Filters / Duplexers

Multiband Combiners

Dual-Band Combiners
Triple-Band Combiners
Quad-Band Combiners

Same-Band Combiners
Hybrid Combiners

Same-Band Combiner
Duplex Hybrid Combiner
Active Duplex Hybrid Combiner
Hybrid Combiner
3-dB Couplers
Hybrid Ring Junctions

System Components

Bias Tees
Measuring Directional Couplers
DC-Stops
Attenuators
50-Ω Loads
Power Distribution Unit

DTMAs

Summary of Filter, Combiner and Amplifier Types

The articles are listed by type number in numerical order.

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New Products

Filters / Duplexers

Summary of Filter and Duplexer Types

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Filters:

Description	Type No.	Frequency range	Max. input power	Page
Band-pass Filter	78211149	801 – 862 MHz	100 W	227
Band-pass Filter	78210390	890 – 960 MHz	400 W	228
Band-pass Filter	78210391	890 – 960 MHz	400 W	228
Band-pass Filter	78210392	824 – 888 MHz	400 W	229

Duplexers:

Description	Type No.	Frequency range	Max. input power	Page
Duplexer	78210168	Low band: 824 – 835 MHz High band: 869 – 880 MHz	400 W	230, 231
Duplexer	78210169	Low band: 824 – 835 MHz High band: 869 – 880 MHz	400 W	230, 231
Duplexer	78210170	Low band: 824 – 835 MHz High band: 869 – 880 MHz	400 W	230, 231
Duplexer	78210171	Low band: 835 – 851 MHz High band: 880 – 896 MHz	400 W	230, 231
Duplexer	78210172	Low band: 835 – 851 MHz High band: 880 – 896 MHz	400 W	230, 231
Duplexer	78210215	Low band: 824 – 851 MHz High band: 869 – 896 MHz	400 W	232, 233
Duplexer	78210216	Low band: 824 – 851 MHz High band: 869 – 896 MHz	400 W	232, 233
Duplexer	78210257	Low band: 824 – 846.5 MHz High band: 869 – 891.5 MHz	400 W	232, 233
Duplexer	78210265	Low band: 824 – 846.5 MHz High band: 869 – 891.5 MHz	800 W	232, 233
Duplexer	78210164	Low band: 890 – 915 MHz High band: 935 – 960 MHz	500 W	234
Duplexer	78210165	Low band: 890 – 915 MHz High band: 935 – 960 MHz	500 W	234
Duplexer	78210161	Low band: 890 – 915 MHz High band: 935 – 960 MHz	500 W	234
Duplexer	78210162	Low band: 890 – 915 MHz High band: 935 – 960 MHz	500 W	234
Duplexer	78210167	Low band: 880 – 915 MHz High band: 925 – 960 MHz	250 W	235
Duplexer	792542	Low band: 1710 – 1785 MHz High band: 1805 – 1880 MHz	250 W	236
Duplexer	78210415	Low band: 1710 – 1785 MHz High band: 1805 – 1880 MHz	250 W	236
Duplexer	792544	Low band: 1850 – 1910 MHz High band: 1930 – 1990 MHz	300 W	237
Duplexer	78210192	Low band: 1920 – 1980 MHz High band: 2110 – 2170 MHz	250 W	238
Duplexer	78210193	Low band: 1920 – 1980 MHz High band: 2110 – 2170 MHz	250 W	238

New Products

Band-pass Filter
801 – 862 MHz

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- Band-pass Filter for LTE800 with DVB-T suppression

Typical Attenuation Curves

Diagram I

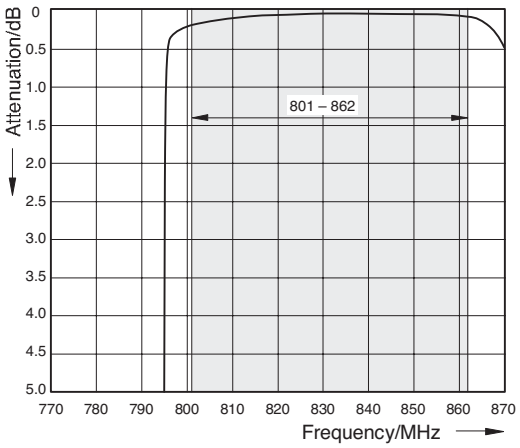
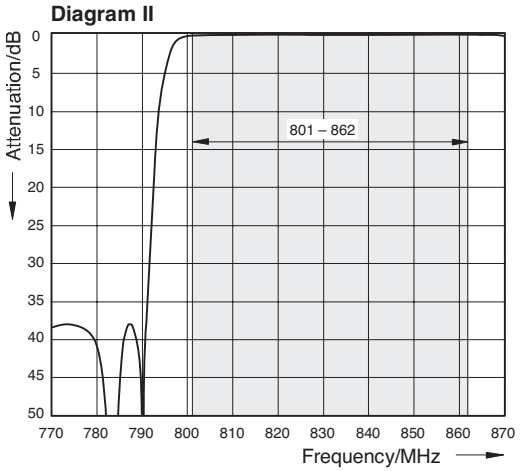


Diagram II



Technical Data

Type No.	78211149
Pass band	801 – 862 MHz
Insertion loss	< 0.3 dB (typ. 0.2 dB)
Stop band attenuation	> 35 dB (470 – 790 MHz)
VSWR	< 1.2
Impedance	50 Ω
Input power	< 100 W
Intermodulation products	< –160 dBc (with 2 x 20 W)
Temperature range	–40 ... +65 °C
DC/AISG	By-pass
Connectors	7–16-female
Application	Outdoor (IP 66)
Weight	Approx. 1.1 kg
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Dimensions (w x h x d)	Approx. 105 x 180 x 60 mm (incl. connectors and mounting feet)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Band-pass Filter
890 – 960 MHz (GSM 900)

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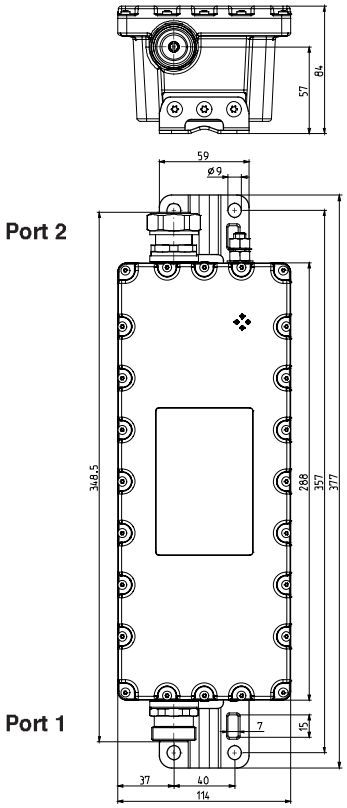
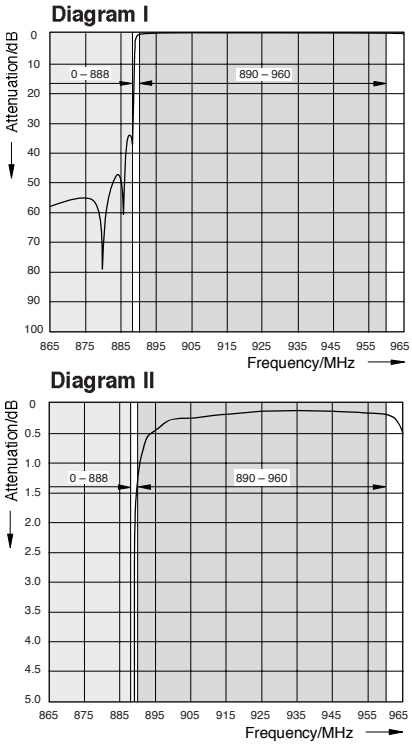
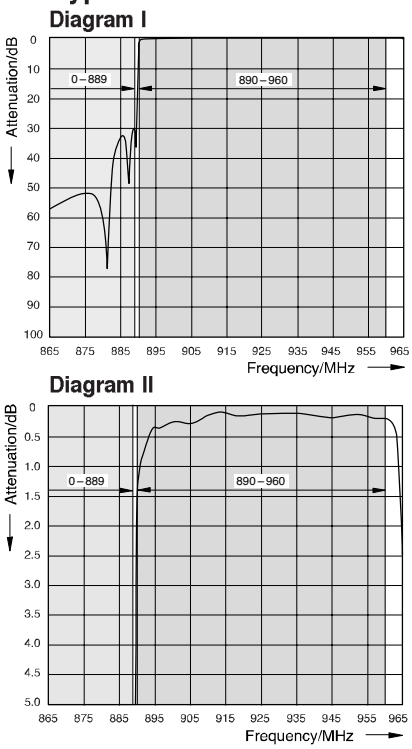
- GSM 900 Tx/Rx preselector filter
- Suppression of interfering Tx signals of an adjacent AMPS or CDMA frequency band
- Suitable for indoor applications
- Built-in DC stop



78210390
Typical Attenuation Curves



78210391
Typical Attenuation Curves



Technical Data

Type No. Stop band Frequency spacing	78210390 0 – 888 MHz 2 MHz	78210391 0 – 889 MHz 1 MHz
Pass band	890 – 960 MHz	890 – 960 MHz
Insertion loss	< 1.5 dB (890 – 892 MHz) < 0.8 dB (892 – 893 MHz) < 0.6 dB (893 – 905 MHz) < 0.3 dB (905 – 960 MHz)	< 4.0 dB (890 – 891 MHz) < 2.5 dB (891 – 892 MHz) < 1.0 dB (892 – 893 MHz) < 0.6 dB (893 – 905 MHz) < 0.3 dB (905 – 960 MHz)
Stop band attenuation	> 50 dB (0 – 880 MHz) > 40 dB (880 – 885 MHz) > 30 dB (885 – 888 MHz)	> 50 dB (0 – 869 MHz) > 30 dB (869 – 889 MHz)
VSWR	< 1.25 (890 – 960 MHz)	< 1.3 (891 – 960 MHz)
Impedance	50 Ω	
Input power	< 400 W (935 – 960 MHz)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	–5 ... +45 °C
Connectors	Port 1: 7-16 female, long neck / Port 2: 7-16 male	
Application	Indoor or outdoor (IP66)	
DC/AISG transparency Port 1 ↔ Port 2	Stop	
Mounting	With 4 screws (max. 4 mm diameter)	
Weight	2 kg	
Packing size	387 x 137 x 130 mm	
Dimensions (w x h x d)	114 x 84 x 377 mm (including connectors and mounting feet)	

Band-pass Filter
824 – 888 MHz (AMPS/CDMA850)

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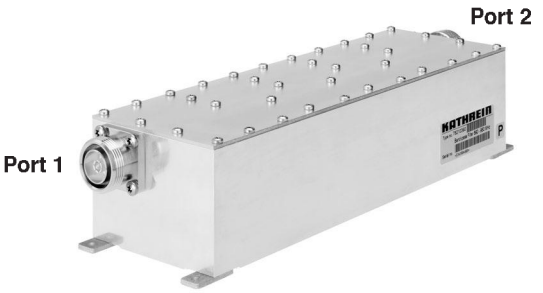
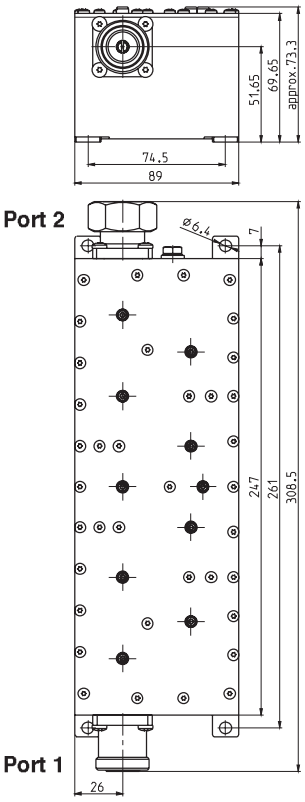
- AMPS/CDMA850 Tx/Rx filter
- Suppression of spurious emissions at adjacent GSM900 Rx frequencys
- Suitable for indoor applications
- Built-in DC stop





Typical Attenuation Curves

Diagram I

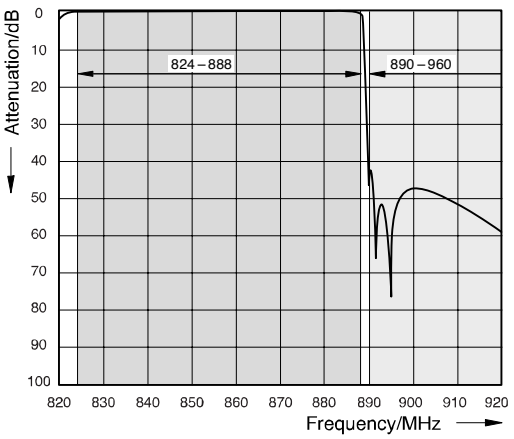
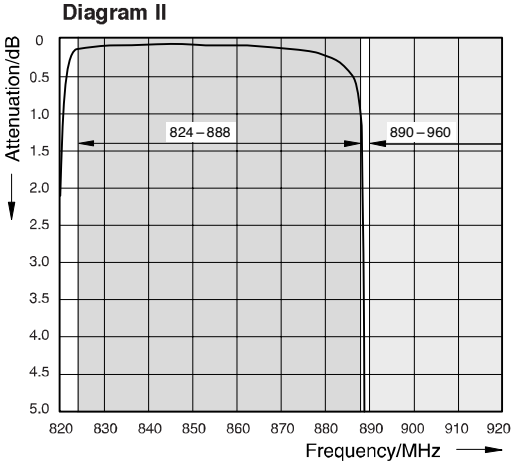


Diagram II



Technical Data

Type No.	78210392
Pass band	824 – 888 MHz
Insertion loss	< 0.5 dB (824 – 885 MHz) < 0.8 dB (885 – 886 MHz) < 1.5 dB (886 – 888 MHz)
Stop band attenuation	> 40 dB (890 – 960 MHz)
VSWR	< 1.25
Impedance	50 Ω
Input power	< 400 W (824 – 888 MHz)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +55 °C
Connectors	Port 1: 7-16 female (long neck) / Port 2: 7-16 male
Application	Indoor
DC/AISG transparency Port 1 ↔ Port 2	Stop
Mounting	With 4 screws (max. 4 mm diameter)
Weight	2 kg
Packing size	387 x 137 x 130 mm
Dimensions (w x h x d)	89 x 73.3 x 308.5 mm (including connectors and mounting feet)

Duplexer
824 – 835 / 869 – 880 MHz (AMPS A-Band)
835 – 851 / 880 – 896 MHz (AMPS B-Band)

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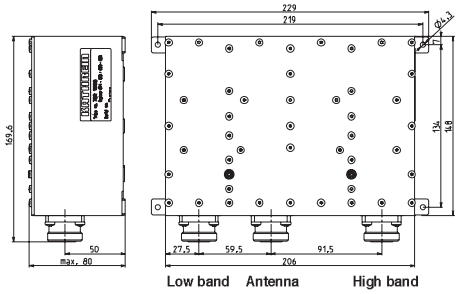
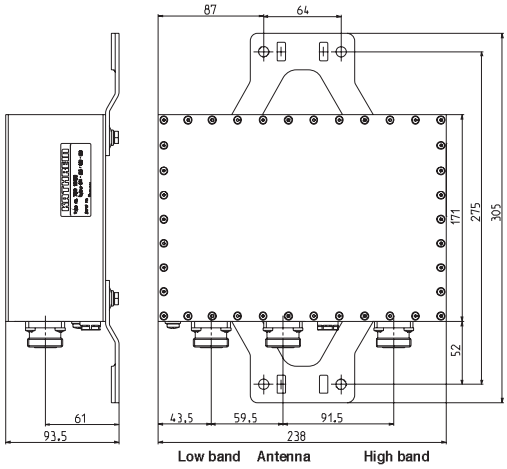
The Duplexer is designed to combine/split GSM Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

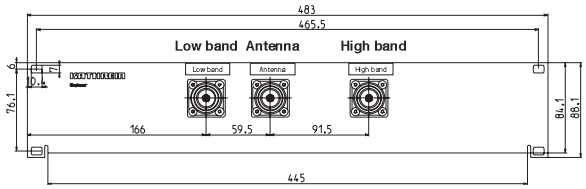
- **78210168:** AMPS A-Band, indoor version
- **78210169:** AMPS A-Band, outdoor version
- **78210170:** AMPS A-Band, indoor version mounted onto a 19˝ drawer
- **78210171:** AMPS B-Band, indoor version
- **78210172:** AMPS B-Band, outdoor version

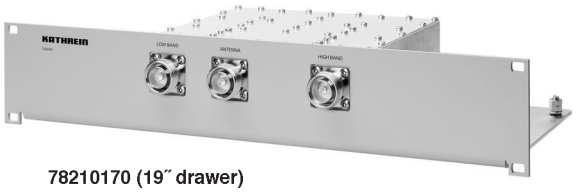


78210168
78210171
(indoor)



78210169
78210172
(outdoor)





78210170 (19˝ drawer)

Technical Data

Type No.	78210168	78210169	78210170	78210171	78210172
	AMPS A-Band			AMPS B-Band	
Pass band Low band High band	824 – 835 MHz 869 – 880 MHz			835 – 851 MHz 880 – 896 MHz	
Insertion loss Antenna → Low band High band → Antenna	< 0.5 dB (824 – 835 MHz) < 0.5 dB (869 – 880 MHz)			< 0.5 dB (835 – 851 MHz) < 0.5 dB (880 – 896 MHz)	
Isolation Low band ↔ High band	> 85 dB (824 – 835 / 869 – 880 MHz)			> 85 dB (835 – 851 / 880 – 896 MHz)	
VSWR	< 1.25 (824 – 835 / 869 – 880 MHz)			< 1.25 (835 – 851 / 880 – 896 MHz)	
Impedance	50 Ω			50 Ω	
Input power	< 400 W (high band; with max. 8 carriers)			< 400 W (high band; with max. 12 carriers)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)			< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–20 ... +55 °C	–40 ... +60 °C	–20 ... +55 °C	–20 ... +55 °C	–40 ... +60 °C
Connectors	7-16 female			7-16 female	
Application	**Indoor**	**Outdoor (IP 66)**	**Indoor, 19˝ drawer**	**Indoor**	**Outdoor (IP 66)**
Special features	Built-in DC stop between all ports			Built-in DC stop between all ports	
Mounting	With 4 screws (max. 4 mm diameter)	Wall mounting with 4 screws (max. 8 mm diameter) Mast mounting with additional clamp set	With 4 screws (max. 6 mm diameter)	With 4 screws (max. 4 mm diameter)	Wall mounting with 4 screws (max. 8 mm diameter) Mast mounting with additional clamp set
Weight	2.8 kg	5.5 kg	3.7 kg	2.8 kg	5.5 kg
Packing size	309 x 162 x 252 mm	347 x 297 x 174 mm	612 x 312 x 224 mm	309 x 162 x 252 mm	347 x 297 x 174 mm
Dimensions (w x h x d)	229 x 80 x 169.6 mm (including connectors and mounting feet)	238 x 305 x 93.5 mm (including mounting feet)	19˝ drawer, 2 height units, plug-in depth 170 mm	229 x 80 x 169.6 mm (including connectors and mounting feet)	238 x 305 x 93.5 mm (including mounting feet)

Duplexer
824 – 835 / 869 – 880 MHz (AMPS A-Band)
835 – 851 / 880 – 896 MHz (AMPS B-Band)

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Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Clamp Set

Typical Attenuation Curves (78210168, 78210169, 78210170)

Diagram I

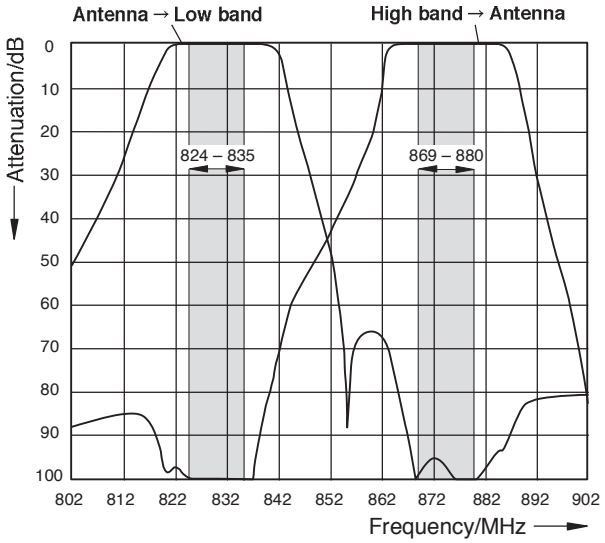
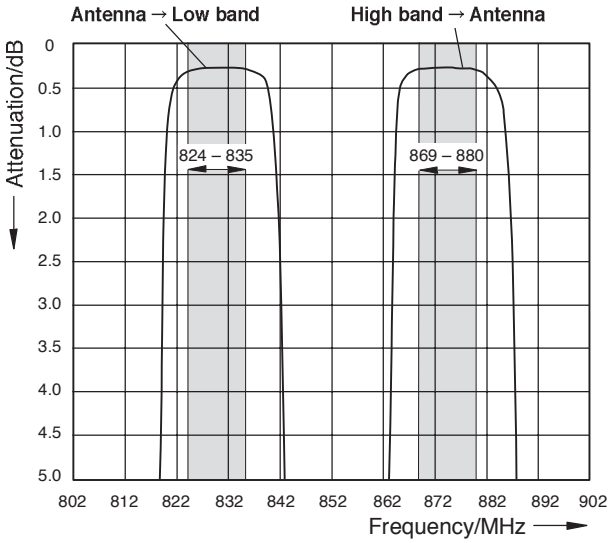


Diagram II



Typical Attenuation Curves (78210171, 78210172)

Diagram I

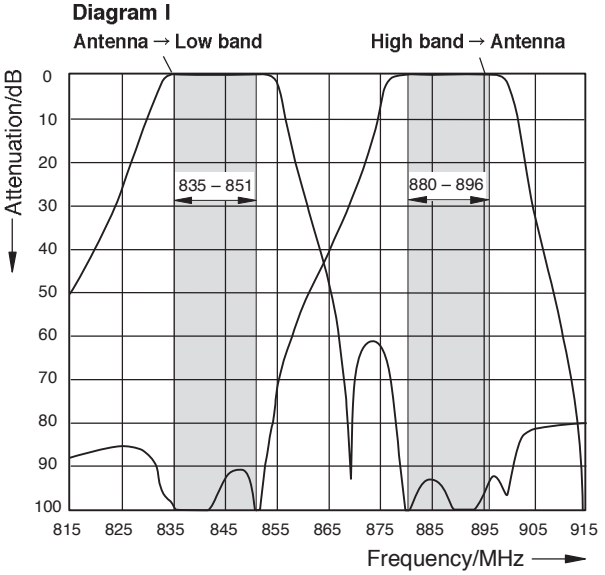
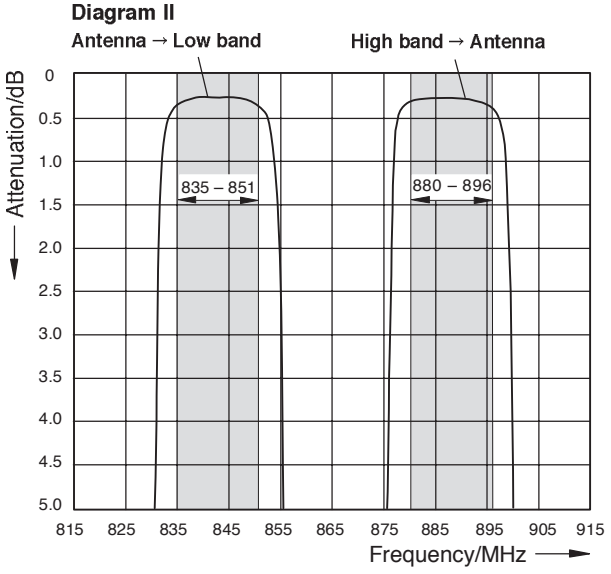


Diagram II



Duplexer
824 – 851 / 869 – 896 MHz (AMPS A/B-Band)
824 – 846.5 / 869 – 891.5 MHz (AMPS A/B-Band)

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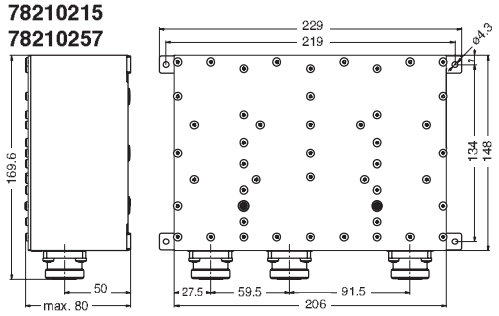
The Duplexer is designed to combine/split AMPS Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

- Suitable for indoor application
- Built-in DC stop

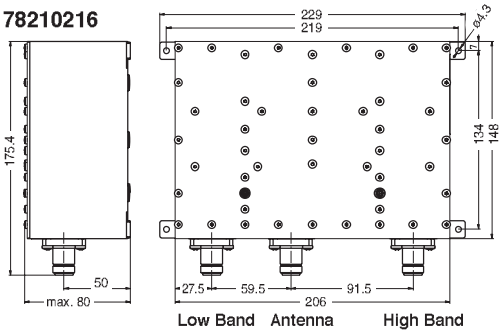
78210215, 78210257

78210216

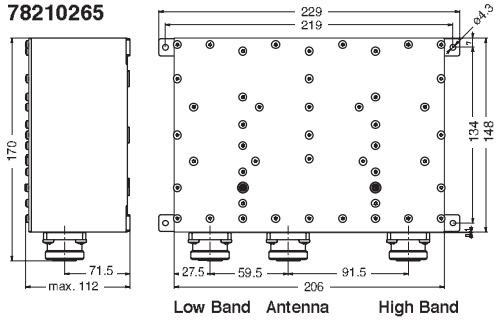
78210215
78210257



78210216



78210265



Technical Data

Type No.	78210215 / 78210216 AMPS A/B-Band		78210257 / 78210265 AMPS A/B-Band (reduced bandwidth)	
Pass band Low band High band	824 – 851 MHz 869 – 896 MHz		824 – 846.5 MHz 869 – 891.5 MHz	
Insertion loss Antenna → Low band High band → Antenna	< 0.5 dB (824 – 851 MHz) < 0.5 dB (869 – 896 MHz)		< 0.5 dB (824 – 846.5 MHz) < 0.5 dB (869 – 891.5 MHz)	
Isolation Low band ↔ High band	> 65 dB (824 – 851 / 869 – 896 MHz)		> 70 dB (824 – 846.5 / 869 – 891.5 MHz)	
VSWR	< 1.25 (824 – 851 / 869 – 896 MHz)		< 1.25 (824 – 846.5 / 869 – 891.5 MHz)	
Impedance	50 Ω		50 Ω	
Input power	< 400 W (high band; with max. 16 carriers)		< 400 W (high band; with max. 16 carriers)	**< 800 W** (high band; with max. 32 carriers)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)		< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–20 ... +55 °C		–20 ... +55 °C	
Connectors	7-16 female	N female	7-16 female	
Application	Indoor		Indoor	
Special features	Built-in DC stop between all ports		Built-in DC stop between all ports	
Mounting	With 4 screws (max. 4 mm diameter)		With 4 screws (max. 4 mm diameter)	
Weight	2.6 kg		2.6 kg	Approx. 3 kg
Packing size	309 x 252 x 162 mm		309 x 252 x 162 mm	309 x 252 x 162 mm
Dimensions (w x h x d)	229 x 80 x 169.6 mm (including connectors and mounting feet)	229 x 80 x 175.4 mm (including connectors and mounting feet)	229 x 80 x 169.6 mm (including connectors and mounting feet)	229 x 112 x 170 mm (including connectors and mounting feet)

Duplexer
824 – 851 / 869 – 896 MHz (AMPS A/B-Band)
824 – 846.5 / 869 – 891.5 MHz (AMPS A/B-Band)

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Typical Attenuation Curves (78210215, 78210216)

Diagram I

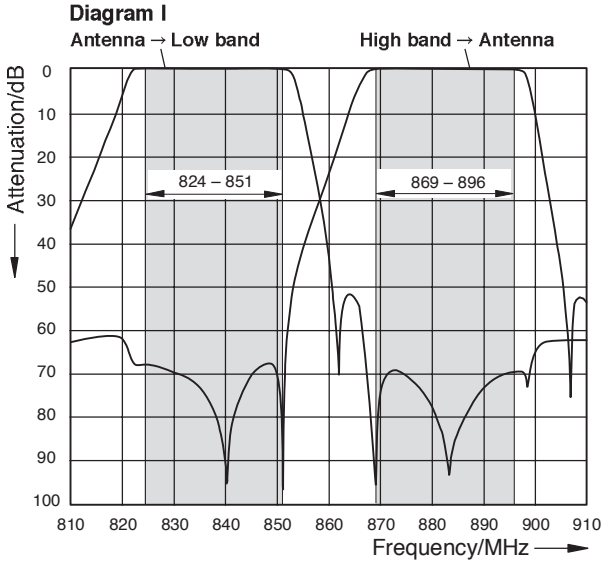
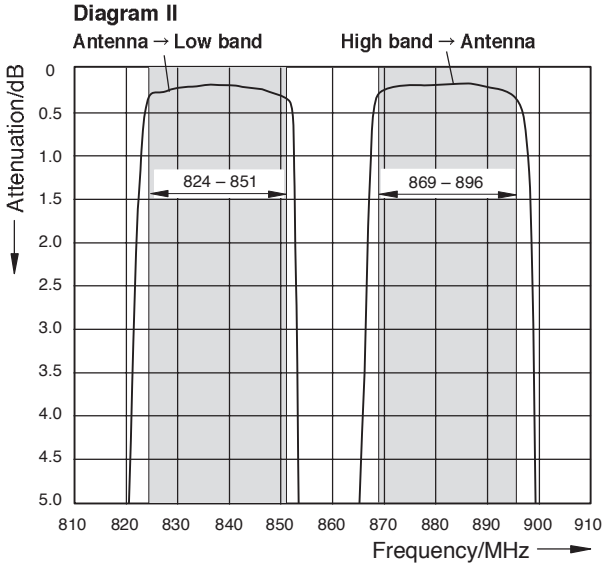


Diagram II



Typical Attenuation Curves (78210257)

Diagram I

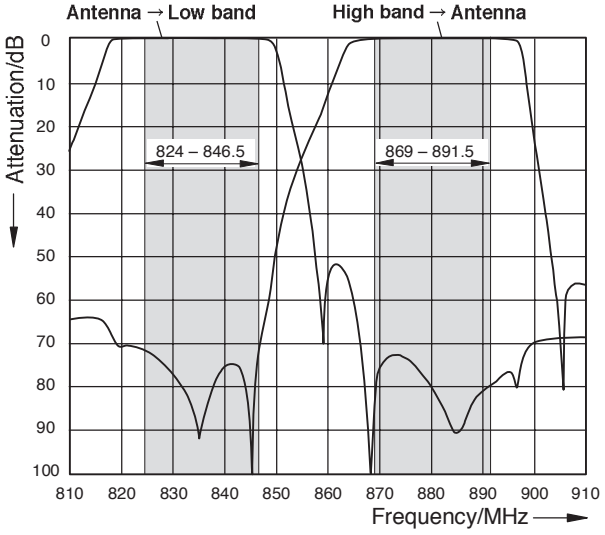
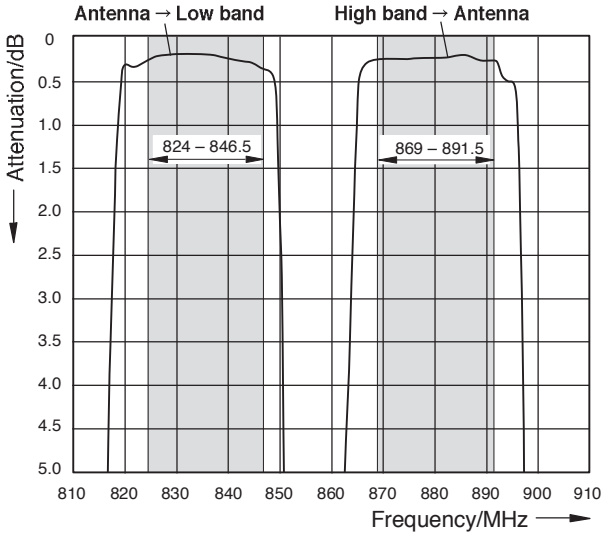


Diagram II



Typical Attenuation Curves (78210265)

Diagram I

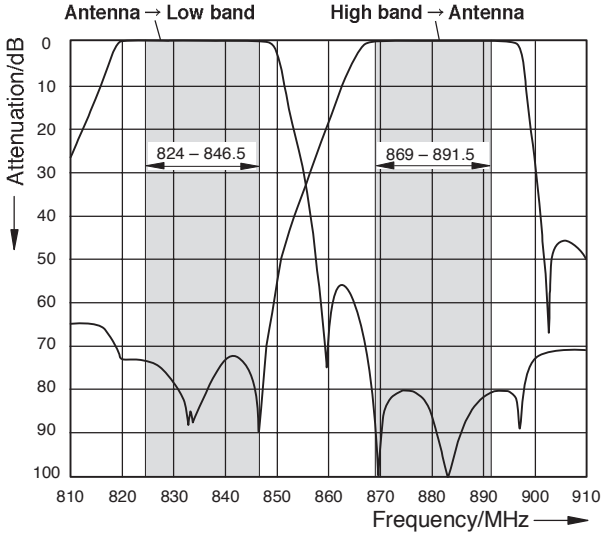
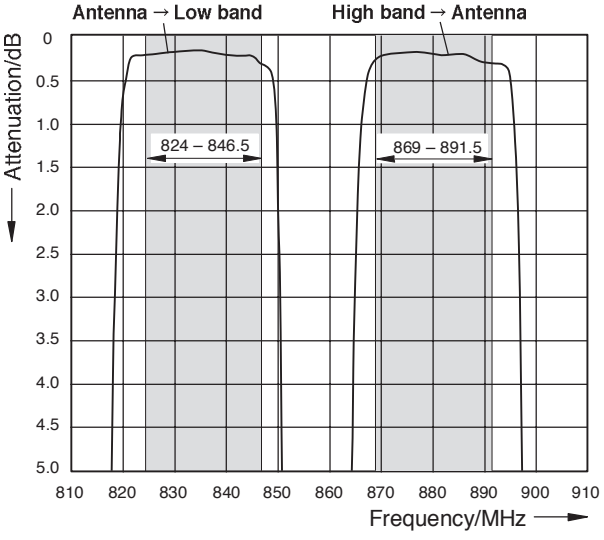


Diagram II



Duplexer
890 – 915 / 935 – 960 MHz (GSM)

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The Duplexer is designed to combine/split GSM Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

- **78210164:** Indoor version with 7-16 female connectors
- **78210165:** Indoor version with 7-16/N female connectors
- **78210161:** Indoor version with 7-16 female connectors mounted onto a 19″ drawer
- **78210162:** Outdoor version with 7-16 female connectors

78210164 (indoor)

78210162 (outdoor)

78210161 (19″ drawer)

78210165 (indoor)

Typical Attenuation Curves

Diagram I

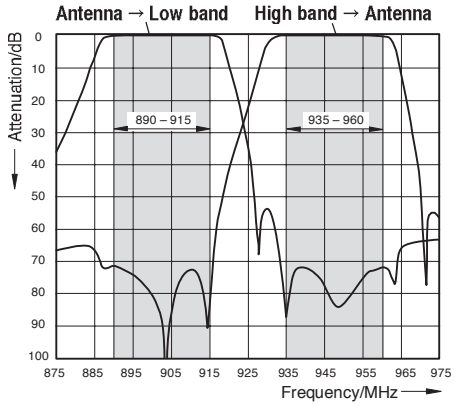
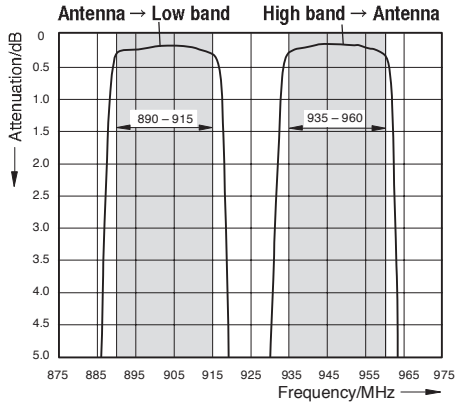


Diagram II



Technical Data

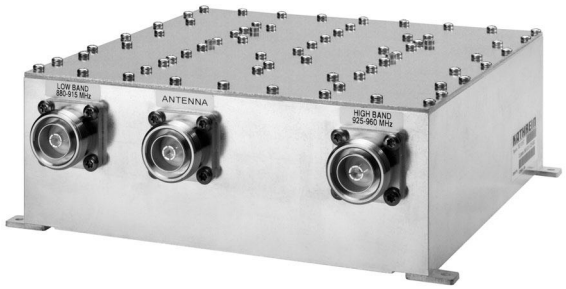
Type No.	78210164	78210165	78210161	78210162
Pass band Low band High band	890 – 915 MHz 935 – 960 MHz			
Insertion loss Antenna → Low band High band → Antenna	< 0.5 dB (890 – 915 MHz) < 0.5 dB (935 – 960 MHz)			
Isolation Low band ↔ High band	> 70 dB (890 – 915 / 935 – 960 MHz)			
VSWR	< 1.25 (890 – 915 / 935 – 960 MHz)			
Impedance	50 Ω			
Input power	< 500 W (high band; with max. 16 carriers)			
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)			
Temperature range	–20 ... +55 °C			–40 ... +60 °C
Connectors Low band High band Antenna	7-16 female 7-16 female 7-16 female	N female 7-16 female 7-16 female	7-16 female 7-16 female 7-16 female	7-16 female 7-16 female 7-16 female
Application	**Indoor**	**Indoor**	**Indoor, 19″ drawer**	**Outdoor (IP 66)**
Special features	Built-in DC stop between all ports			
Mounting	With 4 screws (max. 4 mm diameter)		With 4 screws (max. 6 mm diameter)	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additio- nal clamp set
Weight	2.6 kg		3.5 kg	5.5 kg
Packing size	309 x 162 x 252 mm		612 x 312 x 224 mm	347 x 294 x 174 mm
Dimensions (w x h x d)	229 x 80 x 175.2 mm (including connectors and mounting feet)		19″ drawer, 2 height units, plug-in depth 172 mm	238 x 93.5 x 305 mm (including connectors and mounting brackets)

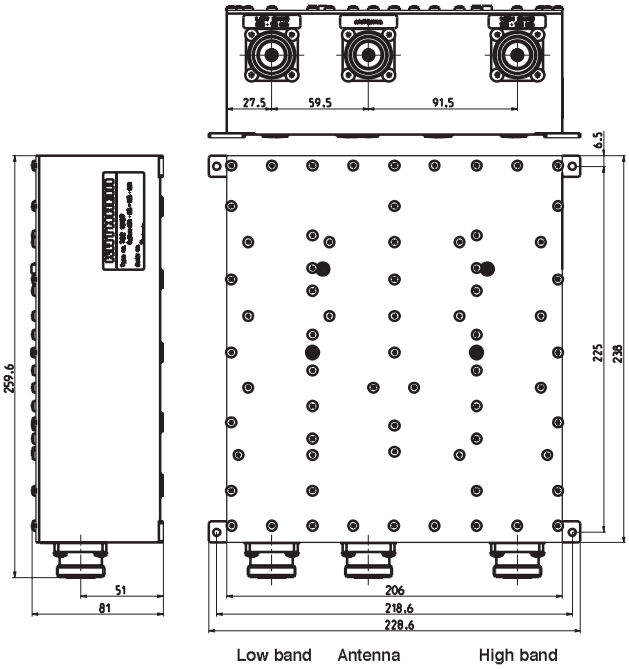
Duplexer
880 – 915 / 925 – 960 MHz (EGSM)

KATHREIN
Antennen · Electronic

The Duplexer is designed to combine/split EGSM Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

- Suitable for indoor applications
- Built-in DC Stop





Typical Attenuation Curves

Diagram I

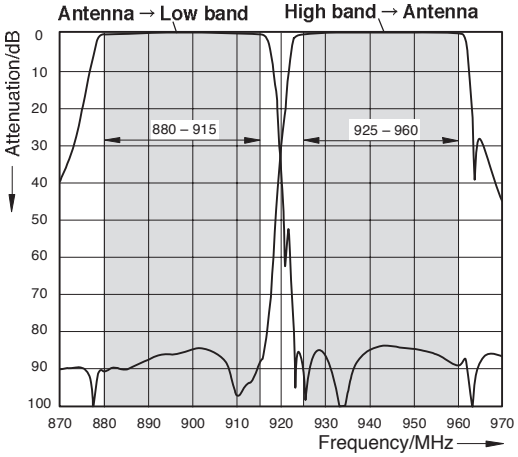
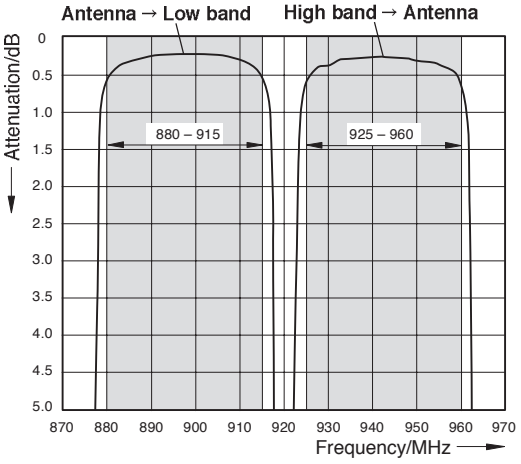


Diagram II



Technical Data

Type No.	78210167
Pass band Low band High band	 880 – 915 MHz 925 – 960 MHz
Insertion loss Antenna → Low band High band → Antenna	 < 0.9 dB (880 – 915 MHz) < 0.9 dB (925 – 960 MHz)
Isolation Low band ↔ High band	 > 75 dB (880 – 915 / 925 – 960 MHz)
VSWR	< 1.25 (880 – 915 / 925 – 960 MHz)
Impedance	50 Ω
Input power	< 250 W (low band *or* high band)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +55 °C
Connectors	7-16 female
Application	Indoor
Special features	Built-in DC stop between all ports
Mounting	With 4 screws (max. 4 mm diameter)
Weight	4.6 kg
Packing size	347 x 297 x 174 mm
Dimensions (w x h x d)	228.6 x 81 x 259.6 mm (including connectors and mounting feet)

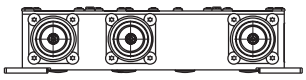
Duplexer
1710 – 1785 / 1805 – 1880 MHz (GSM 1800)

KATHREIN
Antennen · Electronic

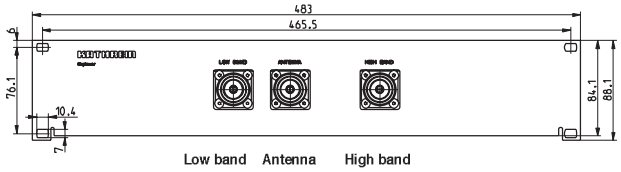
The Duplexer is designed to combine/split GSM 1800 Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

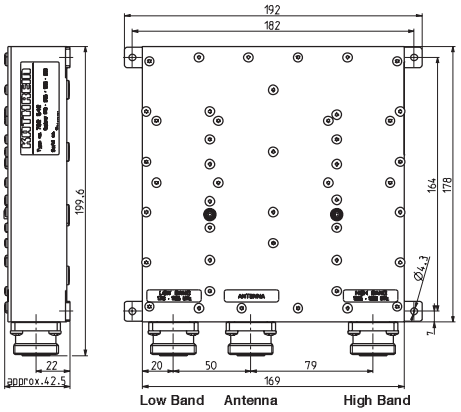
- Suitable for indoor applications
- Built-in DC stop between all ports

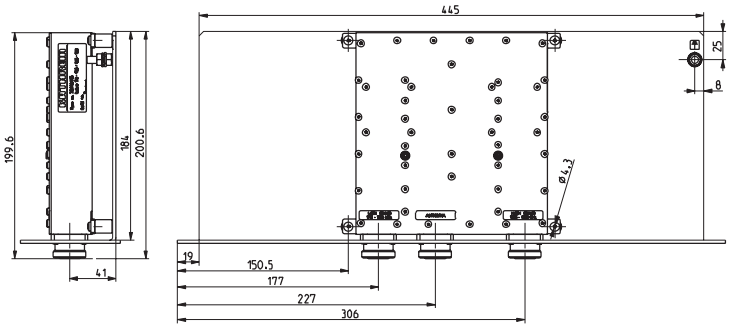
792542



78210415







Typical Attenuation Curves

Diagram I

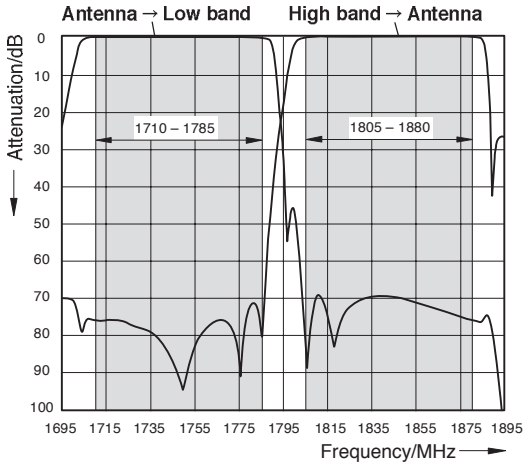
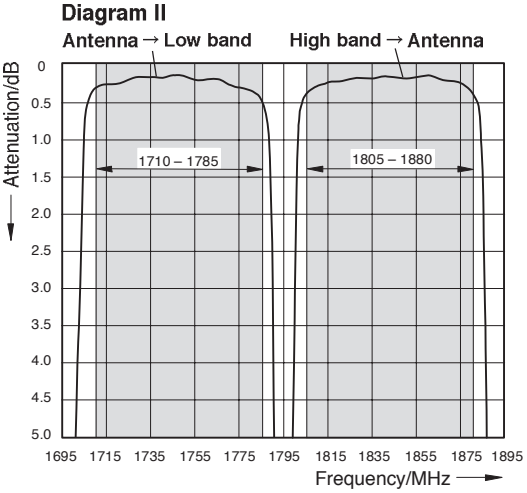


Diagram II



Technical Data

Type No.	792542	78210415
Pass band Low band High band	1710 – 1785 MHz 1805 – 1880 MHz	
Insertion loss Antenna → Low band High band → Antenna	< 0.7 dB (1710 – 1785 MHz) < 0.7 dB (1805 – 1880 MHz)	
Isolation Low band ↔ High band	> 65 dB (1710 – 1785 / 1805 – 1880 MHz)	
VSWR	< 1.25 (1710 – 1785 / 1805 – 1880 MHz)	
Impedance	50 Ω	
Input power	< 250 W (low band *or* high band, with max. 8 carriers)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–20 ... +55 °C	
Connectors	7-16 female	
Application	**Indoor**	**Indoor, 19˝ drawer**
DC/AISG transparency	Built-in DC stop between all ports	
Mounting	With 4 screws (max. 4 mm diameter)	With 4 screws (max. 6 mm diameter)
Weight	1.6 kg	2.6 kg
Packing size	282 x 252 x 114 mm	612 x 312 x 224 mm
Dimensions (w x h x d)	192 x 42.5 x 199.6 mm (including connectors and mounting feet)	19˝ drawer, 2 height units plug-in depth 184 mm

Duplexer
1850 – 1910 / 1930 – 1990 MHz (GSM 1900)

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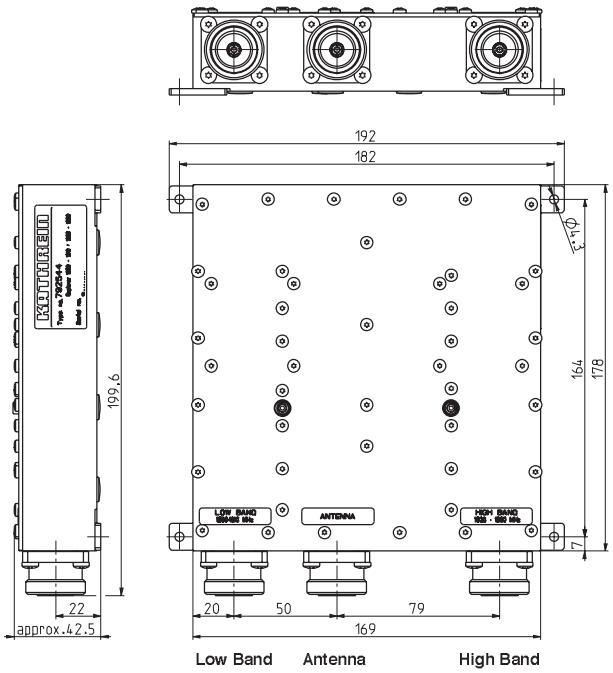
The Duplexer is designed to combine/split GSM 1900 Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

- Suitable for indoor applications
- Built-in DC stop



Technical Data

Type No.	792544
Pass band Low band High band	 1850 – 1910 MHz 1930 – 1990 MHz
Insertion loss Antenna → Low band High band → Antenna	 < 0.7 dB (1850 – 1910 MHz) < 0.7 dB (1930 – 1990 MHz)
Isolation Low band ↔ High band	 > 65 dB (1850 – 1910 / 1930 – 1990 MHz)
VSWR	< 1.25 (1850 – 1910 / 1930 – 1990 MHz)
Impedance	50 Ω
Input power	< 300 W (low band *or* high band)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 ... +55 °C
Connectors	7-16 female
Application	Indoor
Special features	Built-in DC stop between all ports
Mounting	With 4 screws (max. 4 mm diameter)
Weight	1.7 kg
Packing size	282 x 252 x 114 mm
Dimensions (w x h x d)	192 x 42.5 x 199.6 mm (including connectors and mounting feet)

Typical Attenuation Curves

Diagram I

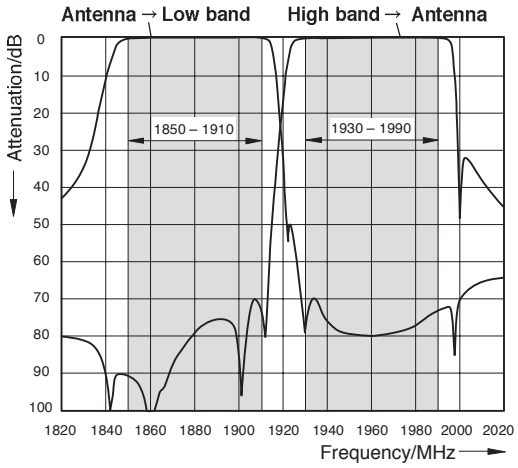
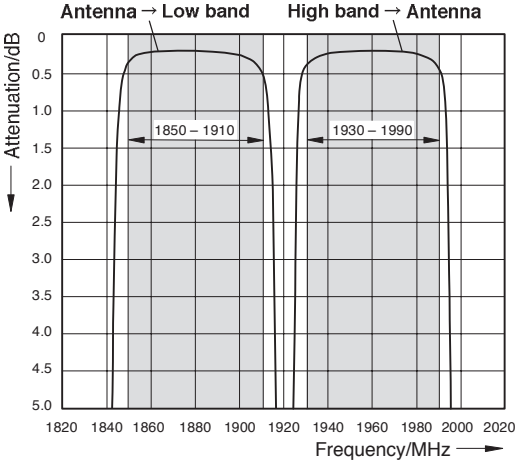


Diagram II



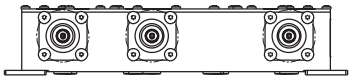
Duplexer
1920 – 1980 / 2110 – 2170 MHz (UMTS)

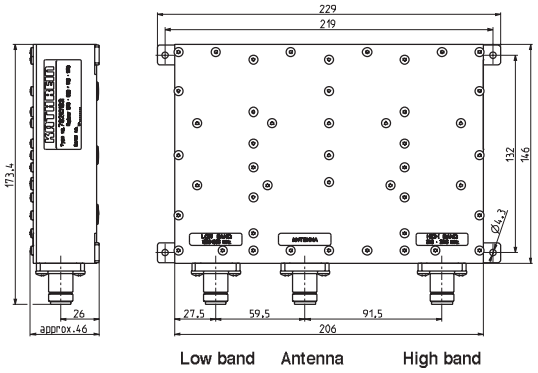
KATHREIN
Antennen · Electronic

The Duplexer is designed to combine/split UMTS Tx and Rx signals onto/from one common Tx/Rx antenna in order to save feeder cable and antenna costs.

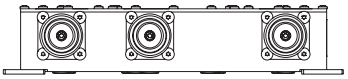
- Suitable for indoor applications
- Built-in DC stop

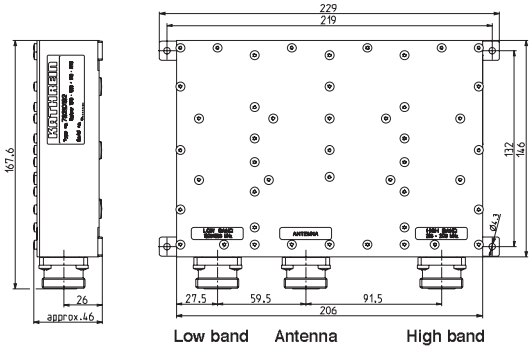
78210193





78210192





Technical Data

Type No.	78210192	78210193
Pass band Low band High band	1920 – 1980 MHz 2110 – 2170 MHz	
Insertion loss Antenna → Low band High band → Antenna	< 0.3 dB (1920 – 1980 MHz) < 0.3 dB (2110 – 2170 MHz)	
Isolation Low band ↔ High band	> 90 dB (1920 – 1980 / 2110 – 2170 MHz)	
VSWR	< 1.25 (1920 – 1980 / 2110 – 2170 MHz)	
Impedance	50 Ω	
Input power	< 250 W (low band *or* high band)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–20 … +55 °C	
Connectors	**7-16 female**	**N female**
Application	Indoor	
Special features	Built-in DC stop between all ports	
Mounting	With 4 screws (max. 4 mm diameter)	
Weight	1.67 kg	
Packing size	272 x 237 x 119 mm	
Dimensions (w x h x d)	229 x 46 x 167.6 mm (including connectors and mounting feet)	229 x 46 x 173.4 mm (including connectors and mounting feet)

Typical Attenuation Curves

Diagram I

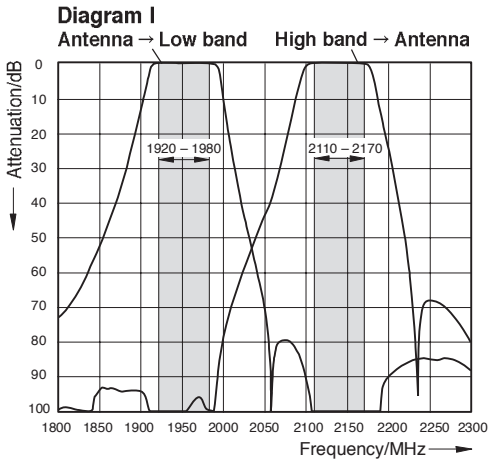
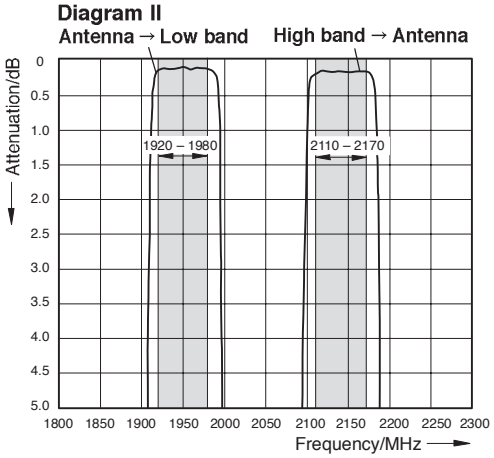


Diagram II



Multiband Combiners

Dual-Band Combiners
Triple-Band Combiners
Quad-Band Combiners

Summary of Multiband Combiner Types

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Multiband Combiners:

Description	Type No.	Frequency range	Max. input power	Page
Dual-Band Combiner	728954	Band 1: 68 – 470 MHz Band 2: 870 – 970 MHz	50 W 50 W	243
Dual-Band Combiner	78210460	Band 1: 50 – 470 MHz Band 2: 806 – 2500 MHz	500 W 500 W	244, 245
Dual-Band Combiner	78210457	Band 1: 87.5 – 470 MHz Band 2: 806 – 2500 MHz	500 W 500 W	244, 245
Dual-Band Combiner	78210458	Band 1: 87.5 – 470 MHz Band 2: 806 – 2500 MHz	500 W 500 W	244, 245
Dual-Band Combiner	791145	Band 1: 50 – 1000 MHz Band 2: 1600 – 2000 MHz	100 W 50 W	246
Dual-Band Combiner	78210341	Band 1: 824 – 880 MHz Band 2: 890 – 960 MHz	400 W 400 W	247
Dual-Band Combiner	78210970	Band 1: 790 – 862 MHz Band 2: 880 – 960 MHz	200 W 200 W	248, 249
Dual-Band Combiner	78210971	Band 1: 790 – 862 MHz Band 2: 880 – 960 MHz	200 W 200 W	248, 249
Dual-Band Combiner	78210972	Band 1: 790 – 862 MHz Band 2: 880 – 960 MHz	200 W 200 W	248, 249
Dual-Band Combiner	78210973	Band 1: 790 – 862 MHz Band 2: 880 – 960 MHz	200 W 200 W	248, 249
Dual-Band Combiner	78210660	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210661	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210662	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210663	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210664	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210665	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	250, 251
Dual-Band Combiner	78210669	Band 1: 470 – 960 MHz Band 2: 1710 – 2700 MHz	650 W 350 W	252, 253
Dual-Band Combiner	78210680	Band 1: 380 – 960 MHz Band 2: 1710 – 2700 MHz	700 W 650 W	254, 255
Dual-Band Combiner	78210681	Band 1: 380 – 960 MHz Band 2: 1710 – 2700 MHz	700 W 650 W	254, 255
Dual-Band Combiner	78210682	Band 1: 380 – 960 MHz Band 2: 1710 – 2700 MHz	700 W 650 W	254, 255
Dual-Band Combiner	78210683	Band 1: 380 – 960 MHz Band 2: 1710 – 2700 MHz	700 W 650 W	254, 255
Dual-Band Combiner	78210278	Band 1: 790 – 1880 MHz Band 2: 1920 – 2170 MHz	500 W 500 W	256, 257
Dual-Band Combiner	78210279	Band 1: 790 – 1880 MHz Band 2: 1920 – 2170 MHz	500 W 500 W	256, 257
Dual-Band Combiner	78210305	Band 1: 790 – 1880 MHz Band 2: 1920 – 2170 MHz	500 W 500 W	256, 257
Dual-Band Combiner	78210306	Band 1: 790 – 1880 MHz Band 2: 1920 – 2170 MHz	500 W 500 W	256, 257
Dual-Band Combiner	78210620	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210621	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210622	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210623	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210624	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210625	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	258, 259
Dual-Band Combiner	78210626	Band 1: 1710 – 1880 MHz Band 2: 1920 – 2170 MHz	300 W 300 W	260, 261
Dual-Band Combiner	78210469	Band 1: 1850 – 1990 MHz Band 2: 1710 – 2155 MHz	250 W 250 W	262
Dual-Band Combiner	78210808	Band 1: 1850 – 1990 MHz Band 2: 1710 – 2155 MHz	250 W 250 W	262
Dual-Band Combiner	78210809	Band 1: 1850 – 1990 MHz Band 2: 1710 – 2155 MHz	250 W 250 W	263
Dual-Band Combiner	78210810	Band 1: 1850 – 1990 MHz Band 2: 1710 – 2155 MHz	250 W 250 W	263
Dual-Band Combiner	78210800	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265
Dual-Band Combiner	78211091	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265

Summary of Multiband Combiner Types

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Multiband Combiners:

Description	Type No.	Frequency range	Max. input power	Page
Dual-Band Combiner	78211092	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265
Dual-Band Combiner	78211093	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265
Dual-Band Combiner	78211094	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265
Dual-Band Combiner	78211095	Band 1: 1710 – 2180 MHz Band 2: 2400 – 2700 MHz	300 W 300 W	264, 265
Dual-Band Combiner	78210264	Band 1: 50 – 2200 MHz Band 2: 2400 – 2500 MHz	200 W 200 W	274
SmartPlex Dual-Band Combiner	78210900	Band 1: 380 – 960 MHz Band 2: 1710 – 2690 MHz	500 W 300 W	272, 273
SmartPlex Dual-Band Combiner	78210901	Band 1: 380 – 960 MHz Band 2: 1710 – 2690 MHz	500 W 300 W	272, 273
Triple-Band Combiner	78210630	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78210631	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78210632	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78210633	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78210634	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78210635	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2170 MHz	700 W 300 W 300 W	266, 267
Triple-Band Combiner	78211130	Band 1: 710 – 960 MHz Band 2: 1710 – 2180 MHz Band 3: 2490 – 2690 MHz	300 W 300 W 300 W	268, 269
Triple-Band Combiner	78211131	Band 1: 710 – 960 MHz Band 2: 1710 – 2180 MHz Band 3: 2490 – 2690 MHz	300 W 300 W 300 W	268, 269
Triple-Band Combiner	78211132	Band 1: 710 – 960 MHz Band 2: 1710 – 2180 MHz Band 3: 2490 – 2690 MHz	300 W 300 W 300 W	268, 269
Triple-Band Combiner	78211133	Band 1: 710 – 960 MHz Band 2: 1710 – 2180 MHz Band 3: 2490 – 2690 MHz	300 W 300 W 300 W	268, 269
Quad-Band Combiner	78210640	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2200 MHz Band 4: 2500 – 2690 MHz	700 W 300 W 300 W 200 W	270, 271
Quad-Band Combiner	78210641	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2200 MHz Band 4: 2500 – 2690 MHz	700 W 300 W 300 W 200 W	270, 271
Quad-Band Combiner	78210642	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2200 MHz Band 4: 2500 – 2690 MHz	700 W 300 W 300 W 200 W	270, 271
Quad-Band Combiner	78210643	Band 1: 380 – 960 MHz Band 2: 1710 – 1880 MHz Band 3: 1920 – 2200 MHz Band 4: 2500 – 2690 MHz	700 W 300 W 300 W 200 W	270, 271

New Products

Type No.	Frequency / MHz
	PMR LTE800 GSM/UMTS900 GSM1800 UMTS2100 WLAN LTE2600/WiMax 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000
Dual-band Combiners	
728954	68 - 470 870 - 970
791145	50 - 1000 1600 - 2000
78210457, ..458 ..460	50 - 470 806 - 2500
78210341	824 - 880 890 - 960
78210970, ..971 ..972 ..973	790 - 862 880 - 960
78210660, ..1 ..2 ..3 ..4 ..5 ..9	470 - 960 1710 - 2700
78210680, ..681 ..682 ..683	380 - 960 1710 - 2700
78210900, 78210901	380 - 960 1710 - 2690
78210278, ..279 ..305 ..306	790 - 1880 1920 - 2170
78210620, ..1 ..2 ..3 ..4 ..5 ..6	1710 - 1880 1920 - 2170
78210264	50 - 2200 2400 - 2500
78210800, 78211091, ..2 ..3 ..4 ..5	1710 - 2180 2400 - 2700
78210469, ..808 ..809 ..810	1710-1755 1850 - 1910 2110-2155
Triple-band Combiners	
78210630, ..1 ..2 ..3 ..4 ..5	380 - 960 1710 - 1880 1920 - 2170
78211130, ..131 ..132 ..133	790 - 960 1710 - 2180 2490 - 2690
Quad-band Combiners	
78210640, ..641 ..642 ..643	380 - 960 1710 - 1880 1920 - 2200 2500 - 2690

Dual-Band Combiner

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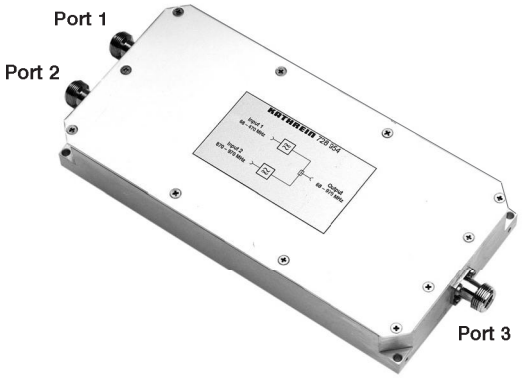
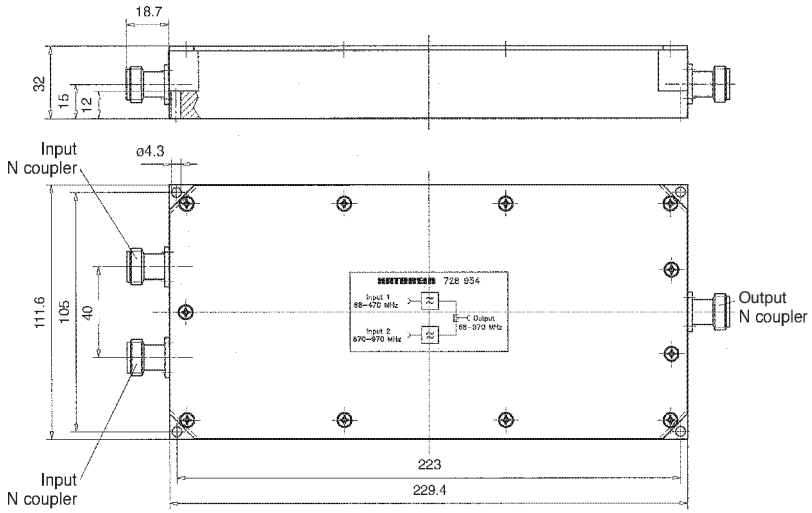
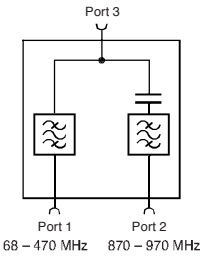
68 – 470 MHz	870 – 970 MHz
80 / 160 / 400 MHz	GSM 900

- Designed for inhouse multiband distribution network
- Enables feeder sharing
- DC by-pass between port 1 and port 3
- Built-in DC stop between port 2 and port 3







Typical Attenuation Curves

Diagram I

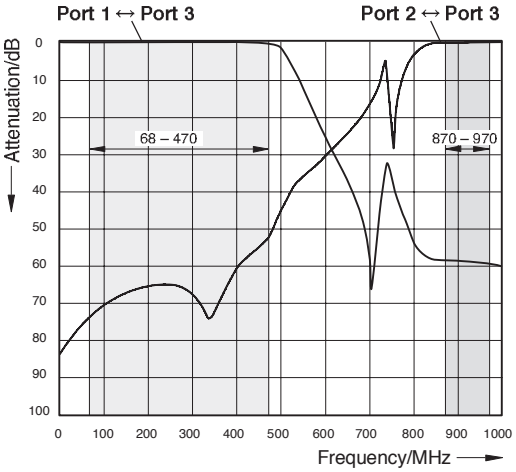
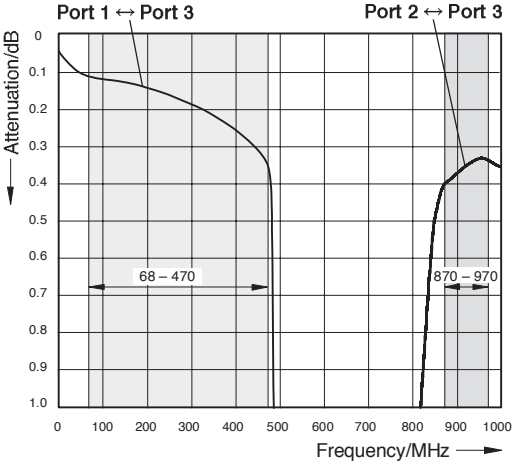


Diagram II



Technical Data

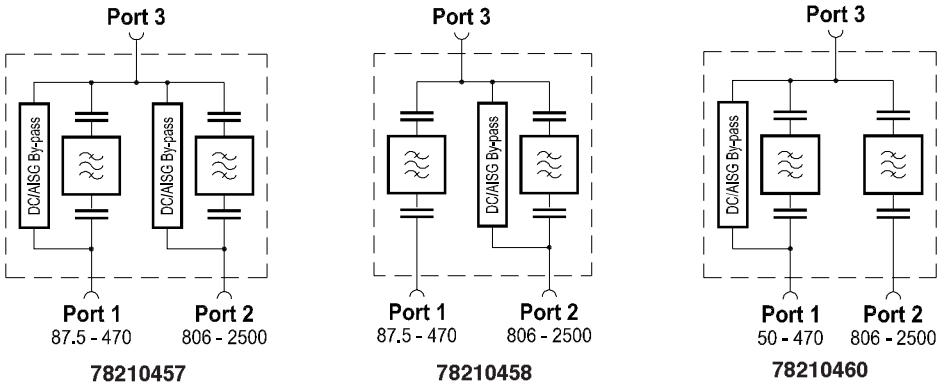
Type No.	728954
Pass band Band 1 Band 2	 68 – 470 MHz 870 – 970 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	 < 0.5 dB (68 – 470 MHz) < 0.5 dB (870 – 970 MHz)
Isolation Port 1 ↔ Port 2	 > 45 dB
VSWR	< 1.2
Impedance	50 Ω
Input power Band 1 Band 2	 < 50 W < 50 W
Intermodulation products	< –160 dBc (2nd/3rd order; with 2 x 20 W)
Temperature range	–20 ... +70 °C
Connectors	N female
Application	Indoor
DC transparency Port 1 ↔ Port 3 Port 2 → Port 3 Port 3 → Port 2	 By-pass (max. 2500mA) short circuited stop
Weight	0.8 kg
Packing size	285 x 55 x 125 mm
Dimensions (w x h x d)	229.4 x 32 x 111.6 mm (without connectors)

Dual-Band Combiner

KATHREIN
Antennen · Electronic

50 – 470 MHz	806 – 2500 MHz
PMR / TETRA / TETRAPOL	CDMA 850 / GSM 900 / GSM 1800 / UMTS 2100 / WLAN

- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- External DC stop available as an accessory
- **Very low insertion loss**
- **High input power**



Technical Data

Type No.	78210457	78210458	78210460
Pass band Band 1 Band 2	87.5 – 470 MHz 806 – 2500 MHz		50 – 470 MHz 806 – 2500 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.15 dB (87.5 – 470 MHz) < 0.15 dB (806 – 2500 MHz)		< 0.15 dB (50 – 470 MHz) < 0.15 dB (806 – 2500 MHz)
Isolation Port 1 ↔ Port 2	> 50 dB (250 – 470 / 806 – 2500 MHz) > 40 dB (87.5 – 250 MHz)		> 50 dB (50 – 470 / 806 – 2500 MHz)
VSWR	< 1.25 (87.5 – 470 / 806 – 960 / 1710 – 2500 MHz)		< 1.25 (50 – 470 / 806 – 960 / 1710 – 2500 MHz)
Impedance	50 Ω		
Input power Band 1 Band 2	< 500 W < 500 W		
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)		
Temperature range	–55 ... +60 °C		
Connectors	7-16 female, long neck		
Application	Indoor or outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop**
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set		
Weight	4 kg		
Dimensions (w x h x d)	122 x 284.7 x 52 mm (without connectors, without mounting brackets)		

50 – 470 MHz
PMR / TETRA / TETRAPOL

806 – 2500 MHz
CDMA 850 / GSM 900 / GSM 1800 / UMTS 2100 / WLAN

Typical Attenuation Curves

78210457

Diagram I

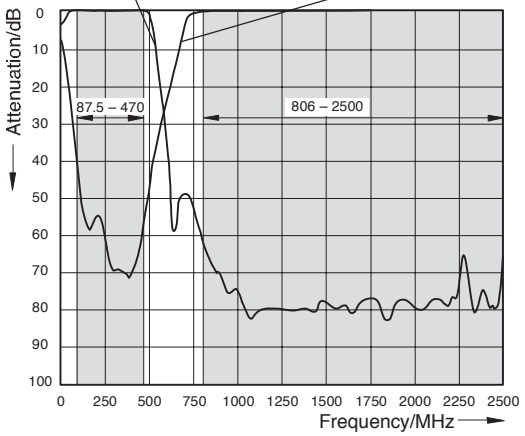
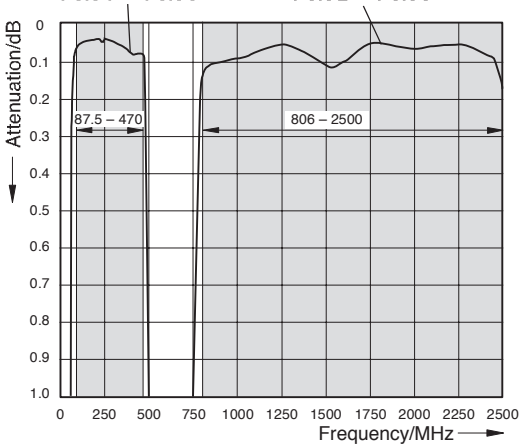


Diagram II



78210458

Diagram I

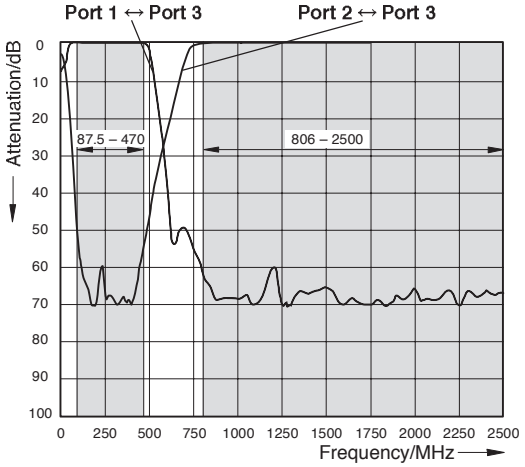
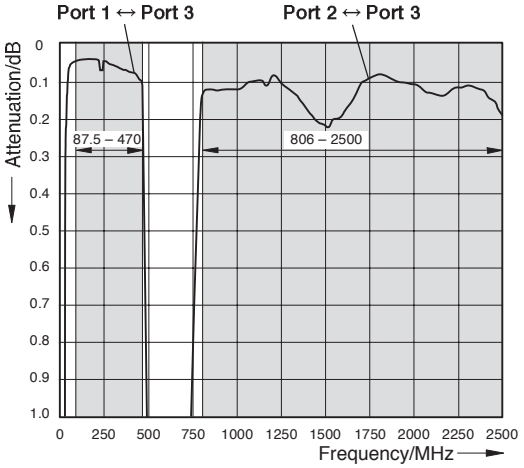


Diagram II



78210460

Diagram I

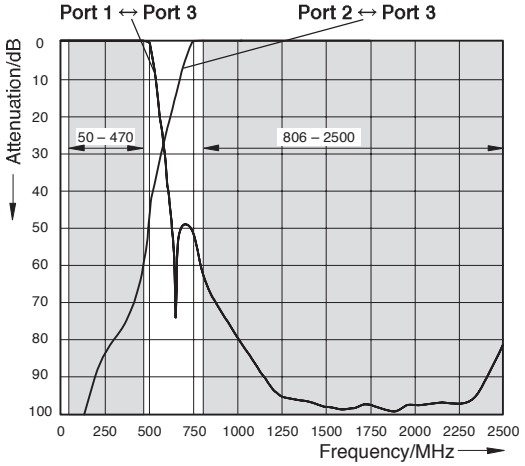
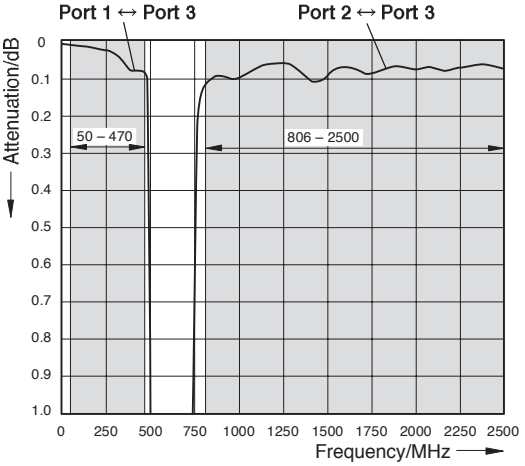


Diagram II

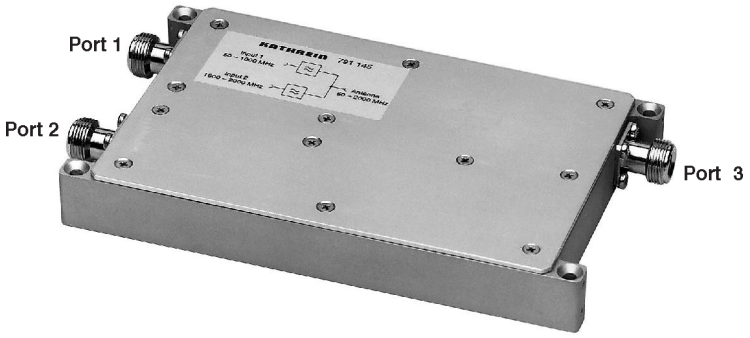


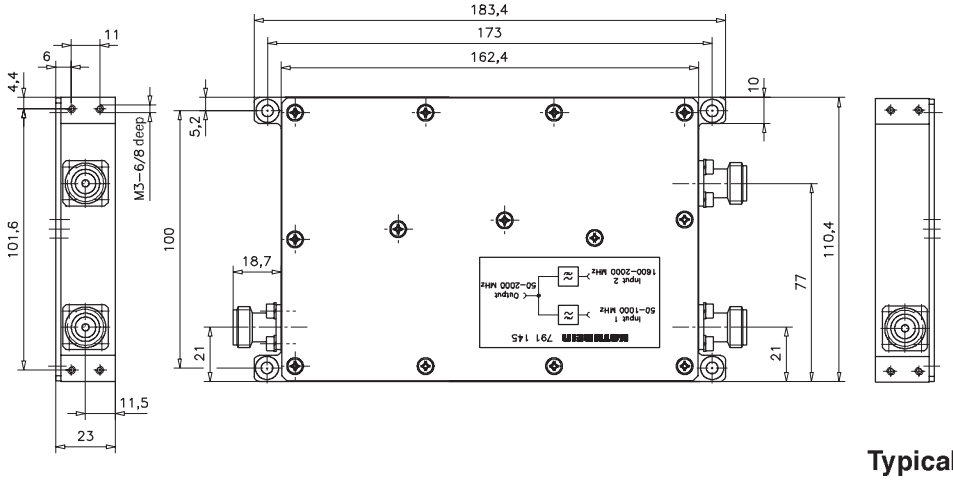
Dual-Band Combiner

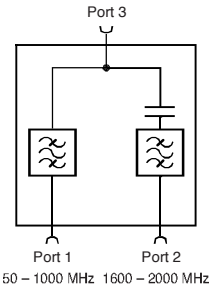
KATHREIN
Antennen · Electronic

50 – 1000 MHz	1600 – 2000 MHz
80 / 160 / 400 / GSM 900	GSM 1800

- Designed for inhouse multiband distribution network
- Enables feeder sharing
- DC by-pass between port 1 and port 3
- Built-in DC stop between port 2 and port 3







Typical Attenuation Curves

Diagram I

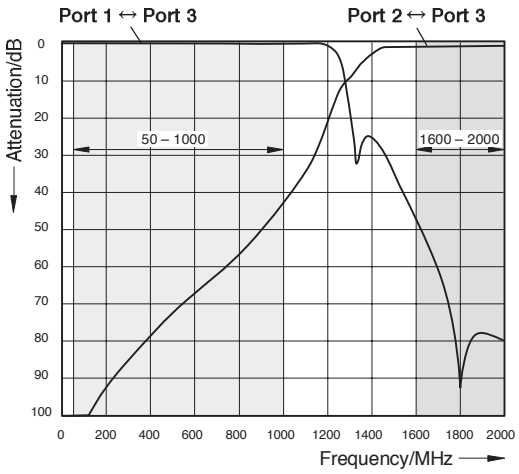
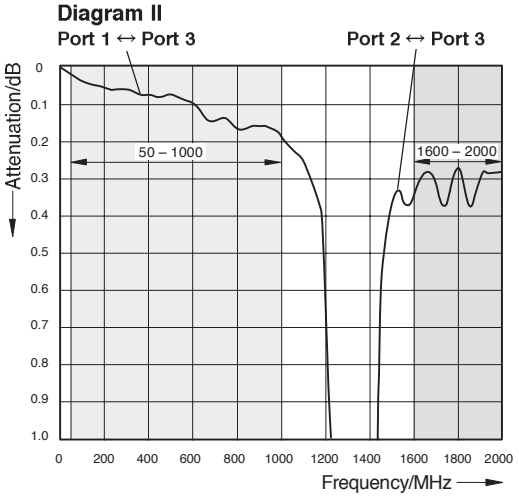


Diagram II



Technical Data

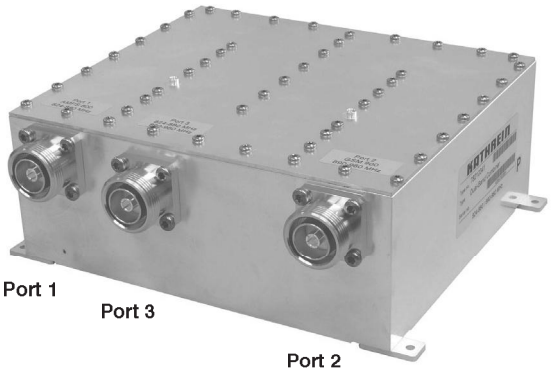
Type No.	791145
Pass band Band 1 Band 2	 50 – 1000 MHz 1600 – 2000 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	 < 0.3 dB (50 – 1000 MHz) < 0.5 dB (1600 – 2000 MHz)
Isolation Port 1 ↔ Port 2	 > 40 dB (50 – 1000 / 1600 – 2000 MHz)
VSWR (all ports)	< 1.2 (50 – 1000 / 1600 – 2000 MHz)
Impedance	50 Ω
Input power Band 1 Band 2	 < 100 W < 50 W
Temperature range	–30 … +60 °C
Connectors	N female
Application	Indoor
DC transparency Port 1 ↔ Port 3 Port 2 → Port 3 Port 3 → Port 2	 By-pass (max. 2500mA) Short circuited Stop
Mounting	With 4 screws (max.4 mm diameter)
Weight	0.7 kg
Packing size	220 x 40 x 140 mm
Dimensions (w x h x d)	199.5 x 23 x 110.4 mm (incl. connectors)

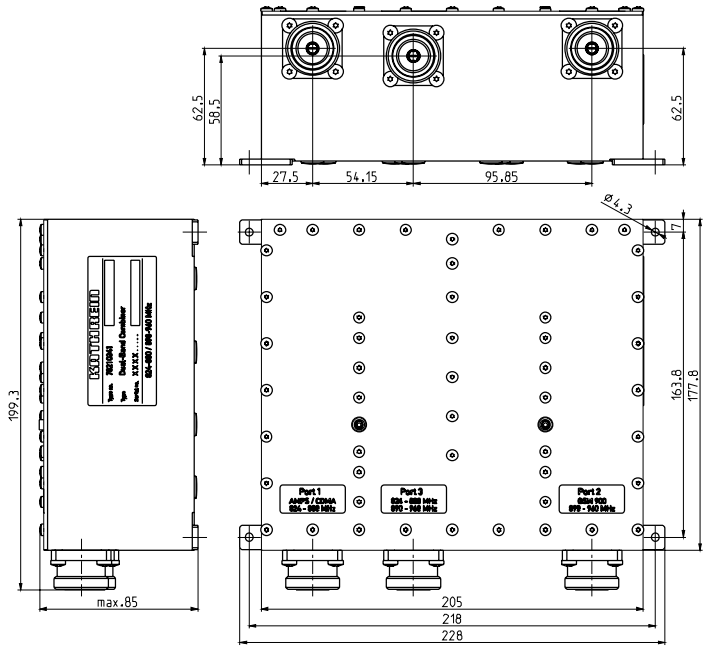
Dual-Band Combiner

KATHREIN
Antennen · Electronic

824 – 880 MHz	890 – 960 MHz
AMPS / CDMA 850	GSM 900

- Designed for co-siting purposes
- Enables feeder sharing
- Suitable for indoor applications
- Built-in DC stop between all ports





Technical Data

Type No.	78210341
Pass band Band 1 (AMPS / CDMA 800) Band 2 (GSM 900)	 824 – 880 MHz 890 – 960 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	 < 0.6 dB (824 – 880 MHz) < 0.6 dB (890 – 960 MHz)
Isolation Port 1 ↔ Port 2	 > 55 dB (824 – 880 / 890 – 960 MHz)
VSWR	< 1.2 (824 – 880 / 890 – 960 MHz)
Impedance	50 Ω
Input power Band 1 Band 2	 < 400 W (with max. 8 carriers) < 400 W (with max. 8 carriers)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 ... +55 °C
Connectors	7-16 female
Application	Indoor
Special features	Built-in DC stop between all ports
Mounting	With 4 screws (max. 4 mm diameter)
Weight	3.2 kg
Dimensions (w x h x d)	228 x 85 x 199.3 mm (including connectors and mounting feet)

Typical Attenuation Curves

Diagram I

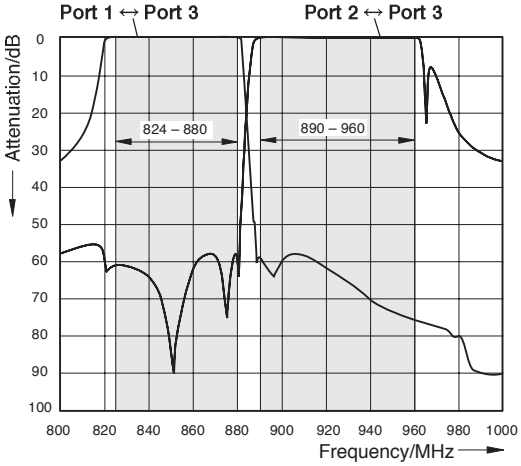
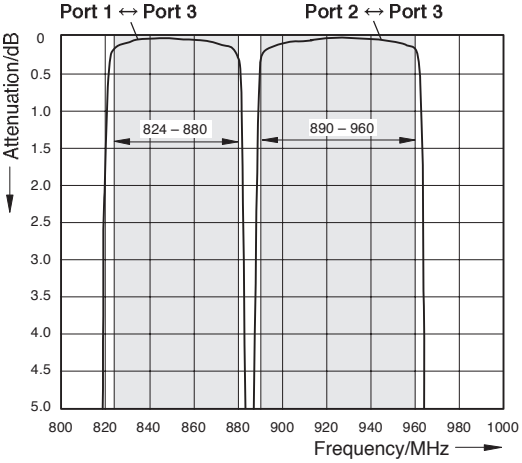


Diagram II



Dual-Band Combiner

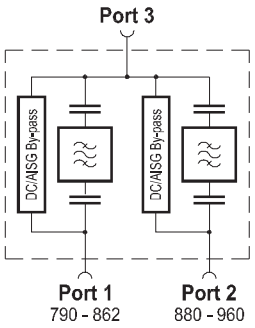
KATHREIN
Antennen · Electronic

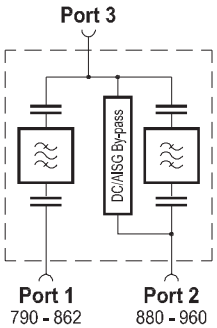
790 – 862 MHz	880 – 960 MHz
LTE 800	GSM 900

- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC stop available as an accessory

78210970, 78210972
Single Unit

78210971, 78210973
Double Unit





Technical Data

Type No.	**78210970** Single Unit	**78210972** Single Unit
	78210971 Double Unit	**78210973** Double Unit
Pass band Band 1 Band 2	790 – 862 MHz 880 – 960 MHz	
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.4 dB, typically 0.2 dB (790 – 862 MHz) < 0.4 dB, typically 0.2 dB (880 – 960 MHz)	
Isolation Port 1 ↔ Port 2	> 50 dB (790 – 862 MHz / 880 – 960 MHz)	
VSWR	< 1.25 (790 – 862 / 880 – 960 MHz)	
Impedance	50 Ω	
Input power Band 1 / Band 2	< 200 W / < 200 W	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	Single Unit: 2.9 kg / Double Unit: 5.8 kg	
Dimensions (w x h x d)	Single Unit: 177.4 x 209.4 x 52.4 mm / Double Unit: 177.4 x 209.4 x 108.4 mm (without connectors, without mounting brackets)	

Dual-Band Combiner

KATHREIN
Antennen · Electronic

790 – 862 MHz	880 – 960 MHz
LTE 800	GSM 900

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
793301	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

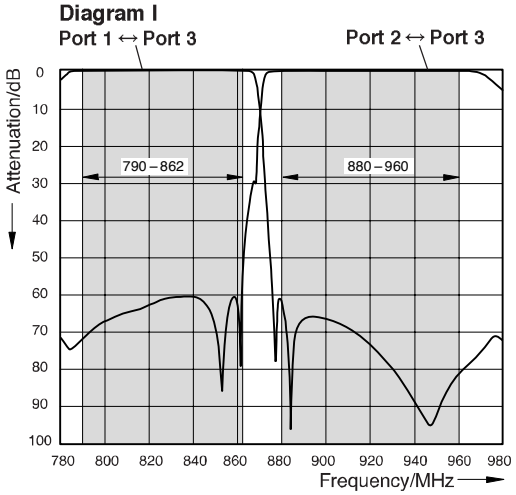
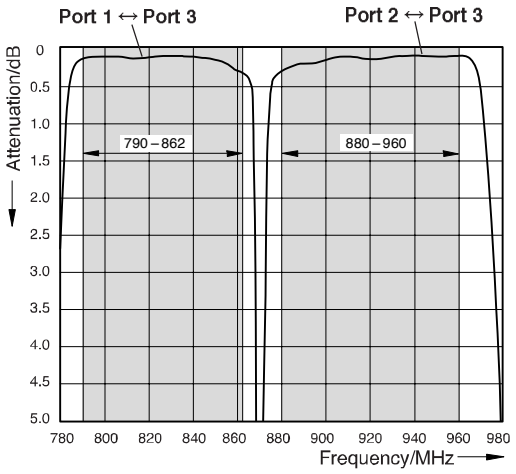
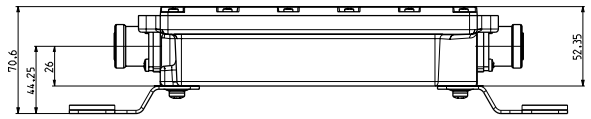
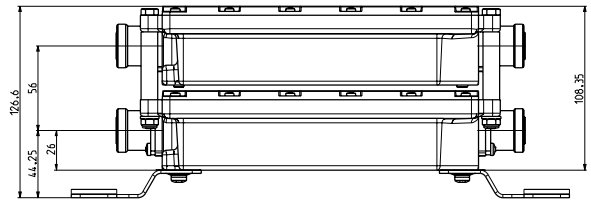


Diagram II

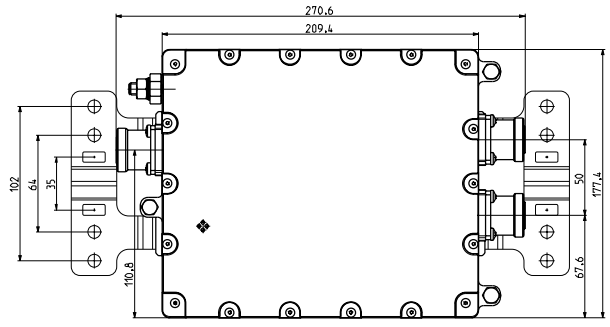




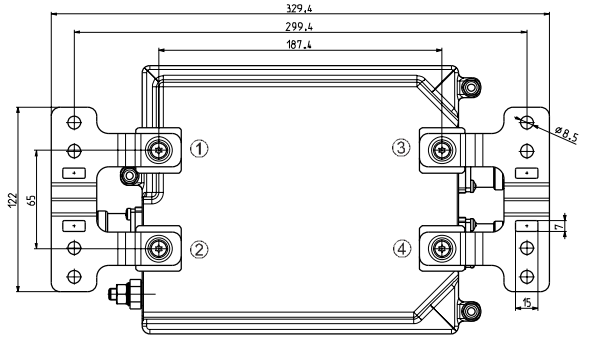
Side view Single Unit



Side view Double Unit



Top view Single Unit, Double Unit



Bottom view Single Unit, Double Unit

Please note:

The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

Dual-Band Combiner

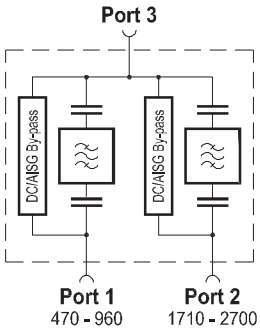
KATHREIN
Antennen · Electronic

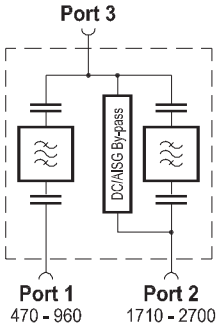
470 – 960 MHz	1710 – 2700 MHz
LTE 800 / CDMA 850 / GSM 900	GSM 1800 / UMTS 2100 / WiMAX / LTE 2600

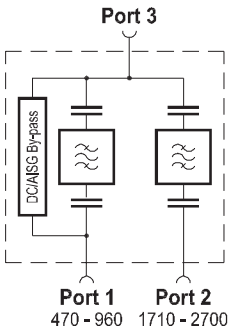
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC stop available as an accessory
- **Extremely small dimensions and low weight**
- **Very low insertion loss**
- **High input power**

78210660, 78210662, 78210664
Single Unit

78210661, 78210663, 78210665
Double Unit







Technical Data

Type No.	**78210660** Single Unit	**78210662** Single Unit	**78210664** Single Unit
	78210661 Double Unit	**78210663** Double Unit	**78210665** Double Unit
Pass band Band 1 Band 2	470 – 960 MHz 1710 – 2700 MHz		
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.15 dB (470 – 960 MHz), typically 0.1 dB (470 – 960 MHz) < 0.2 dB (1710 – 2700 MHz), typically 0.1 dB (1710 – 2700 MHz)		
Isolation Port 1 ↔ Port 2	> 55 dB (470 – 960 MHz) / > 65 dB (1710 – 2700 MHz)		
VSWR	< 1.2 (470 – 960 / 1710 – 2700 MHz)		
Impedance	50 Ohm		
Input power Band 1 / Band 2	< 650 W / < 350 W		
Intermodulation products	< –160 dBc (3rd order with 2 x 20 W)		
Temperature range	–55 ... +60 °C		
Connectors	7-16 female (long neck)		
Application	Indoor *or* outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop**
Lightning protection	3 kA, 10/350 µs pulse		
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set		
Weight	Single Unit: 1.2 kg / Double Unit: 2.4 kg		
Packing size	Single Unit: 285 x 157 x 93 mm / Double Unit: 285 x 157 x 148 mm		
Dimensions (w x h x d)	Single Unit: 126 x 145 x 38 mm / Double Unit: 126 x 145 x 93 mm (without connectors, without mounting brackets)		

Dual-Band Combiner

KATHREIN
Antennen · Electronic

470 – 960 MHz	1710 – 2700 MHz
LTE 800 / CDMA 850 / GSM 900	GSM 1800 / UMTS 2100 / WiMAX / LTE 2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Clamp Set

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

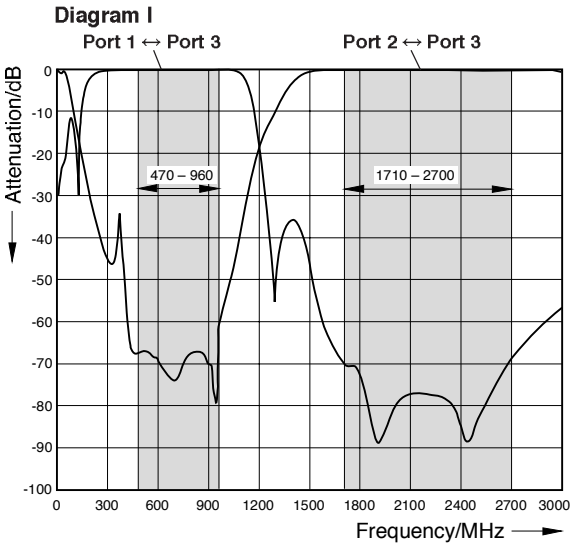
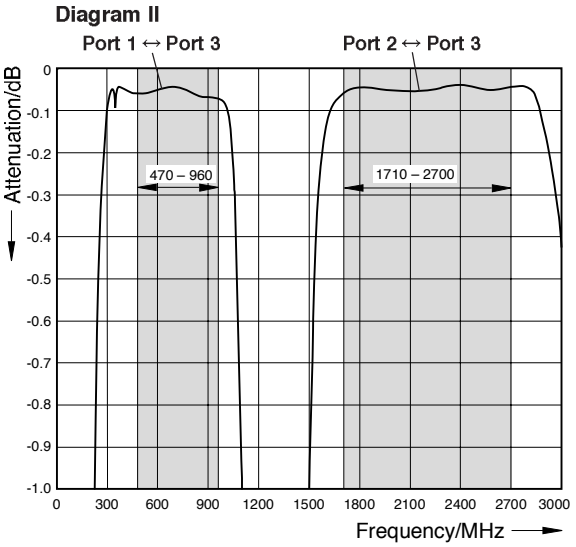
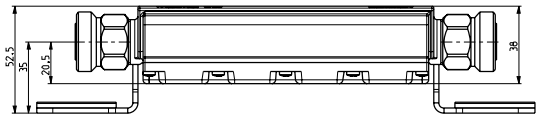
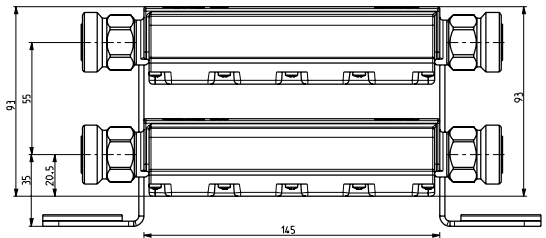


Diagram II

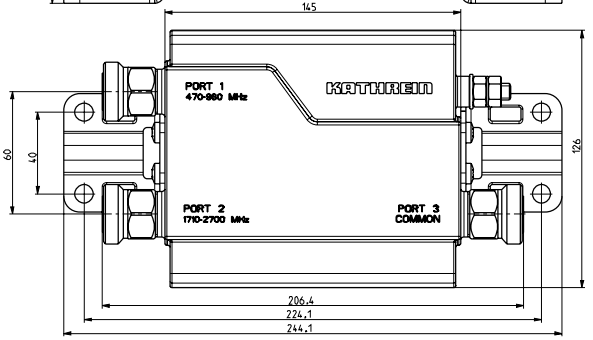




Side view
Single Unit



Side view
Double Unit



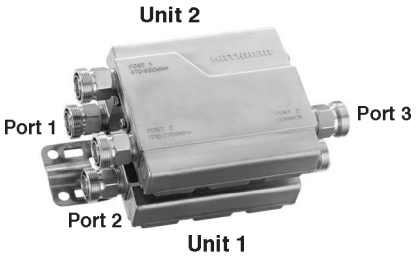
Top view
Single Unit,
Double Unit

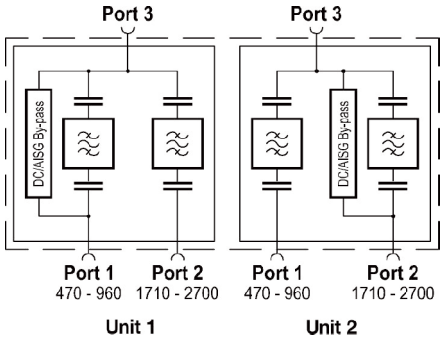
Dual-Band Combiner

KATHREIN
Antennen · Electronic

470 – 960 MHz	1710 – 2700 MHz
DVB-H / CDMA 850 / GSM 900	GSM 1800 / UMTS 2100 / WiMAX / LTE 2600

- Designed to support separate DC/AISG supply for a low-band and high-band DTMA via 2 feeder cables (see application)
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Double unit for XPol antennas
- Built-in lightning protection
- **Extremely small dimensions and low weight**
- **Very low insertion loss**
- **High input power**

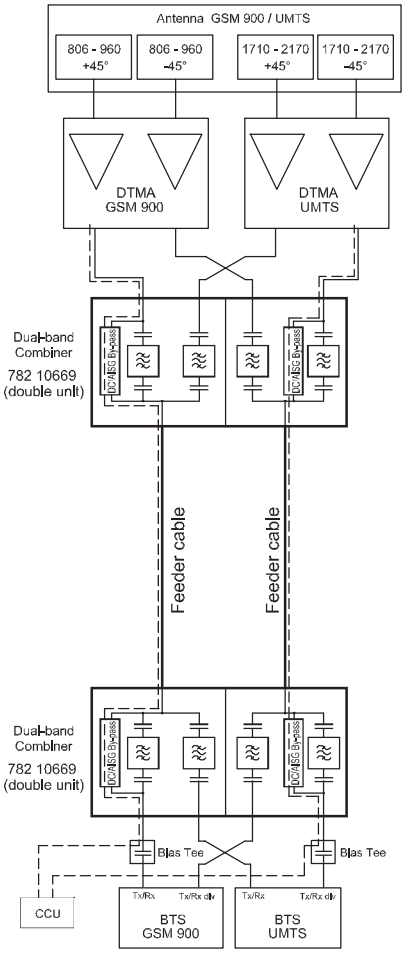




Technical Data

Type No.	78210669 Double Unit	
Pass band Band 1 Band 2	470 – 960 MHz 1710 – 2700 MHz	
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.1 dB (470 – 960 MHz) < 0.1 dB (1710 – 2700 MHz)	
Isolation Port 1 ↔ Port 2	> 55 dB (470 – 960 MHz) / > 65 dB (1710 – 2700 MHz)	
VSWR	< 1.2 (470 – 960 / 1710 – 2700 MHz)	
Impedance	50 Ohm	
Input power Band 1 / Band 2	< 650 W / < 350 W	
Intermodulation products	< –160 dBc (3rd order with 2 x 20 W)	
Temperature range	–55 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**Unit 1** **By-pass** (max. 2500 mA) **Stop**	**Unit 2** **Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	2.4 kg	
Packing size	285 x 157 x 148 mm	
Dimensions (w x h x d)	126 x 145 x 93 mm (without connectors, without mounting brackets)	

Application Example



Dual-Band Combiner

KATHREIN
Antennen · Electronic

470 – 960 MHz	1710 – 2700 MHz
DVB-H / CDMA 850 / GSM 900	GSM 1800 / UMTS 2100 / WiMAX / LTE 2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

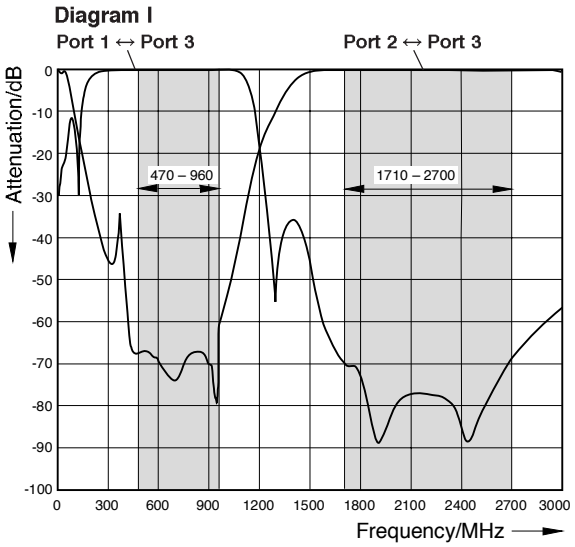
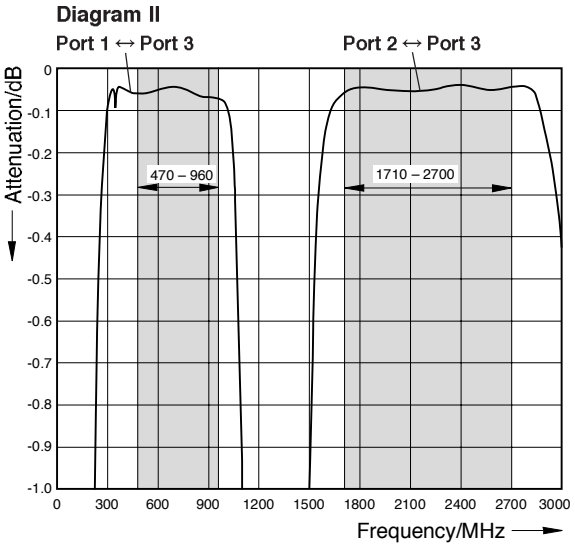
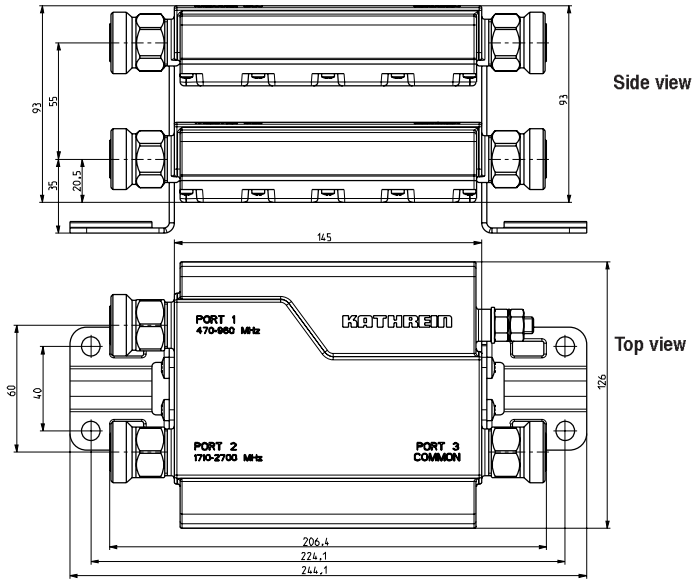


Diagram II





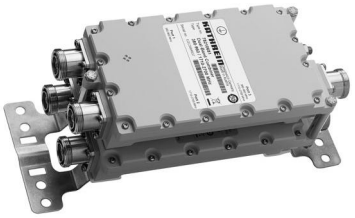
Dual-Band Combiner

KATHREIN
Antennen · Electronic

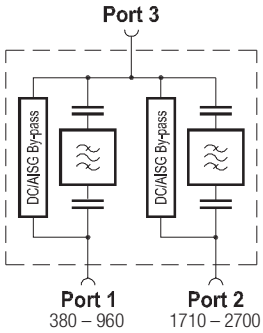
380 – 960 MHz	1710 – 2700 MHz
TETRA / LTE800 / CDMA850 / GSM900	GSM1800 / UMTS2100 / WiMAX / LTE2600

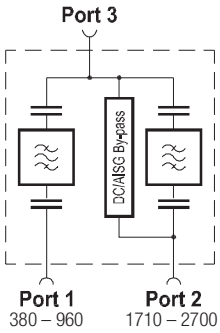
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC stop available as an accessory
- **Extremely low insertion loss**
- **High input power**

78210680, 78210682
Single Unit



78210681, 78210683
Double Unit





Technical Data

Type No.	**78210680** Single Unit **78210681** Double Unit	**78210682** Single Unit **78210683** Double Unit
Pass band Band 1 Band 2	380 – 960 MHz 1710 – 2700 MHz	
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.1 dB (380 – 960 MHz) < 0.1 dB (1710 – 2700 MHz)	
Isolation Port 1 ↔ Port 2	> 55 dB (380 – 550 MHz) / > 65 dB (550 – 960 MHz) / > 65 dB (1710 – 2700 MHz)	
VSWR	< 1.2 (380 – 960 / 1710 – 2700 MHz)	
Impedance	50 Ω	
Input power Band 1 / Band 2	< 700 W / < 700 W	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–55 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	Single Unit: 2.2 kg / Double Unit: 4.3 kg	
Packing size	Single Unit: 365 x 207 x 150 mm / Double Unit: 365 x 207 x 214 mm	
Dimensions (w x h x d)	Single Unit: 117 x 209.5 x 48.8 mm / Double Unit: 117 x 209.5 x 99.5 mm (without connectors, without mounting brackets)	

Dual-Band Combiner

KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 2700 MHz
TETRA / LTE800 / CDMA850 / GSM900	GSM1800 / UMTS2100 / WiMAX / LTE2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

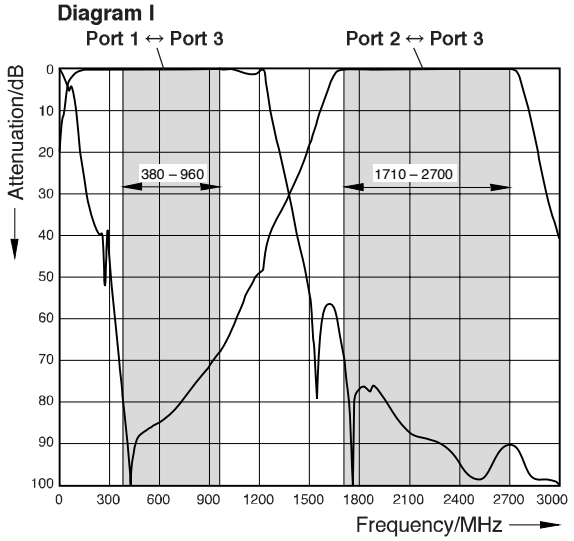
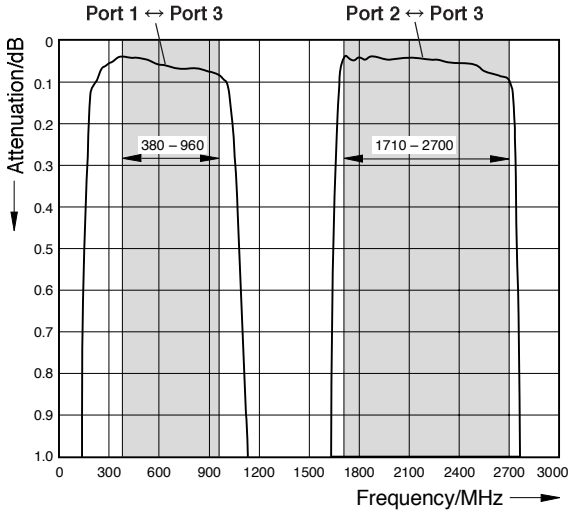
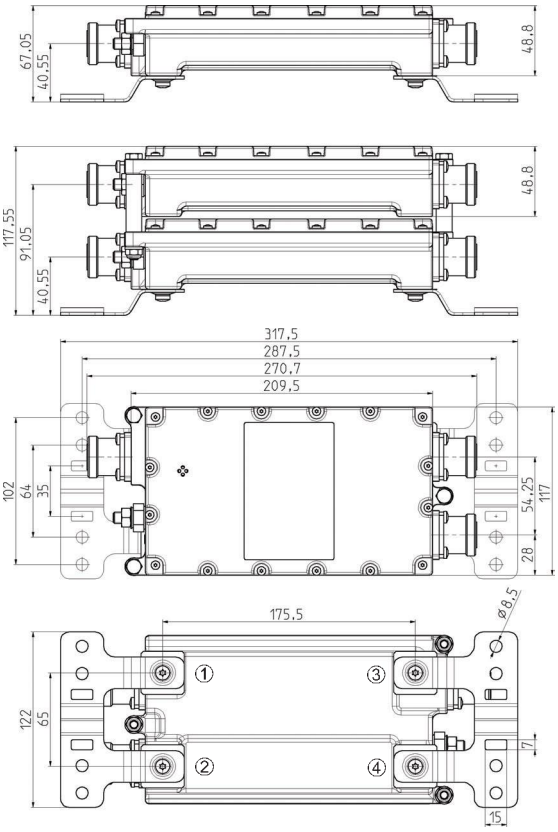


Diagram II





Please note:
The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

Dual-Band Combiner

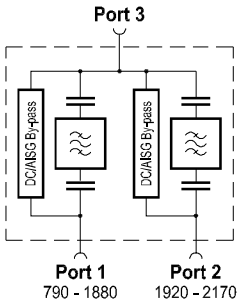
KATHREIN
Antennen · Electronic

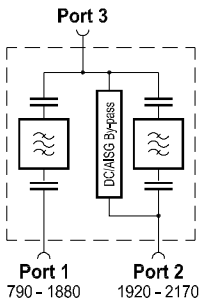
790 – 1880 MHz	1920 – 2170 MHz
LTE 800 / CDMA 850 / GSM 900 / GSM 1800	UMTS 2100

- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC Stop available as an accessory

78210278, 78210305
Single Unit

78210279, 78210306
Double Unit





Technical Data

Type No.	**78210278** Single Unit / **78210279** Double Unit	**78210305** Single Unit / **78210306** Double Unit
Pass band Band 1 Band 2	790 – 1880 MHz 1920 – 2170 MHz	
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.1 dB, typically 0.05 dB (790 – 960 MHz) / < 0.4 dB, typically 0.2 dB (1710 – 1880 MHz) < 0.4 dB, typically 0.2 dB (1920 – 2170 MHz)	
Isolation Port 1 ↔ Port 2	> 55 dB (790 – 960 MHz) / > 50 dB (1710 – 1880 MHz) / > 50 dB (1920 – 2170 MHz)	
VSWR	< 1.2 (790 – 960 MHz) / < 1.25 (1710 – 1880 MHz) / < 1.2 (1920 – 2170 MHz)	
Impedance	50 Ω	
Input power Band 1 / Band 2	< 500 W / < 500 W	
Intermodulation products	< –160 dBc (2^{nd}/3^{rd} order; with 2 x 20 W)	
Temperature range	–55 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	Single Unit: 3.4 kg / Double Unit: 6.6 kg	
Packing size	Single Unit: 207 x 437 x 154 mm / Double Unit: 207 x 437 x 214 mm	
Dimensions (w x h x d)	Single Unit: 122 x 269.9 x 43 mm / Double Unit:122 x 269.9 x 98.5 mm (without connectors, without mounting brackets)	

Dual-Band Combiner

KATHREIN
Antennen · Electronic

790 – 1880 MHz	1920 – 2170 MHz
LTE 800 / CDMA 850 / GSM 900 / GSM 1800	UMTS

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

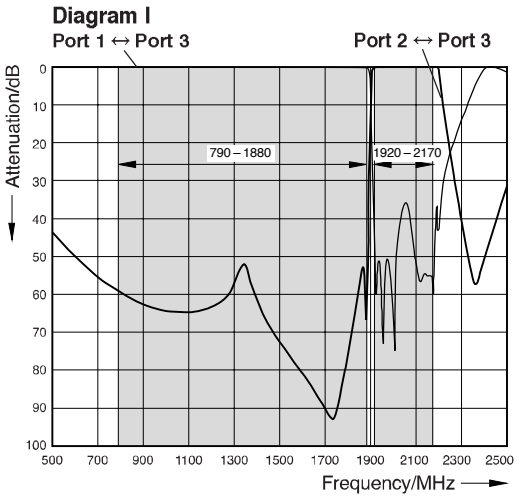
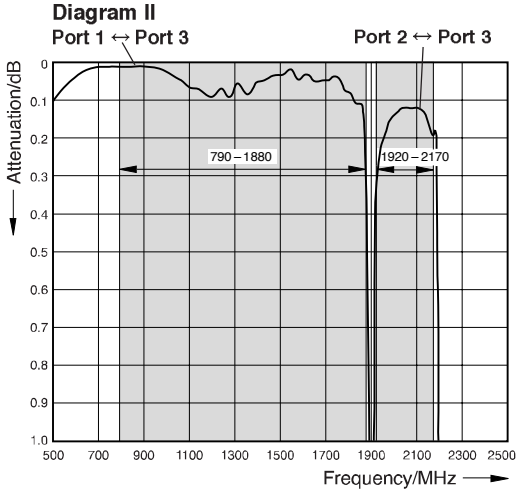
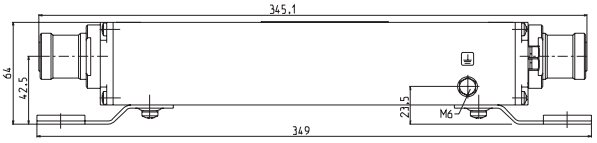
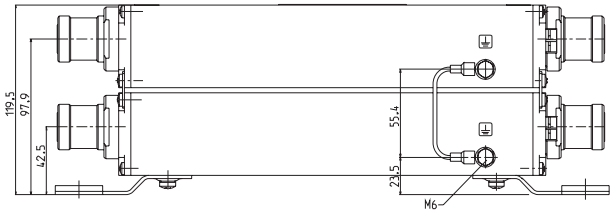


Diagram II

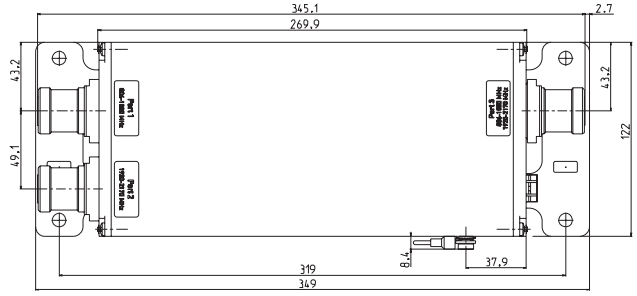




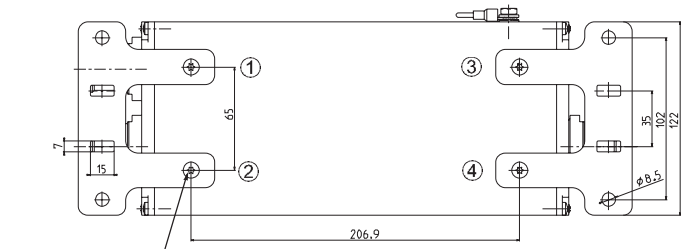
Side view, Single Unit



Side view, Double Unit



Top view, Single Unit, Double Unit



4 screws M5 x 10
4 spring washers
5.5 DIN 6095

Bottom view, Single Unit, Double Unit

Please note:
The mounting plates can be removed by loosening the screws ① to ④ (M5 x 10) and replaced with other means of mounting, always provided that the max. drilled depth of 8.5 mm is respected with the choice of replacement screws.

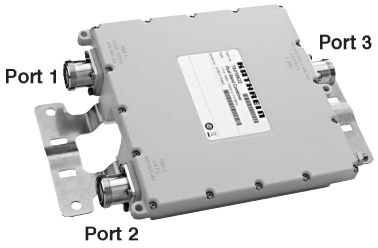
Dual-Band Combiner

KATHREIN
Antennen · Electronic

1710 – 1880 MHz
GSM 1800

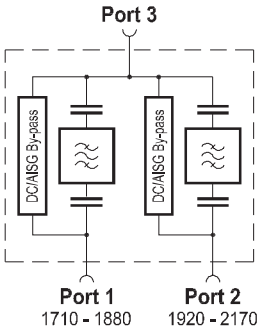
1920 – 2170 MHz
UMTS 2100

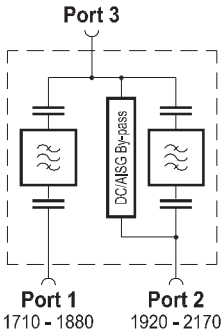
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC Stop available as an accessory

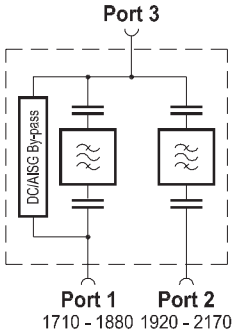


78210620, 78210622, 78210624
Single Unit

78210621, 78210623, 78210625
Double Unit







Technical Data

Type No.	**78210620** Single Unit / **78210621** Double Unit	**78210622** Single Unit / **78210623** Double Unit	**78210624** Single Unit / **78210625** Double Unit
Pass band Band 1 (GSM 1800) Band 2 (UMTS)	1710 – 1880 MHz 1920 – 2170 MHz		
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.3 dB (1710 – 1880 MHz) < 0.3 dB (1920 – 2170 MHz)		
Isolation Port 1 ↔ Port 2	> 50 dB (1710 – 1880 / 1920 – 2170 MHz)		
VSWR	< 1.25 (1710 – 1880 / 1920 – 2170 MHz)		
Impedance	50 Ω		
Input power Band 1 / Band 2	< 300 W / < 300 W		
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)		
Temperature range	–40 ... +60 °C		
Connectors	7-16 female (long neck)		
Application	Indoor *or* outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop**
Lightning protection	3 kA, 10/350 µs pulse		
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set		
Weight	Single Unit: 2.9 kg / Double Unit: 5.7 kg		
Packing size	Single Unit: 392 x 272 x 139 mm / Double Unit: 392 x 272 x 189 mm		
Dimensions (w x h x d)	Single Unit: 199 x 199 x 48 mm / Double Unit: 199 x 199 x 104 mm (without connectors, without mounting brackets)		

Dual-Band Combiner

KATHREIN
Antennen · Electronic

1710 – 1880 MHz	1920 – 2170 MHz
GSM 1800	UMTS 2100

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
793301	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

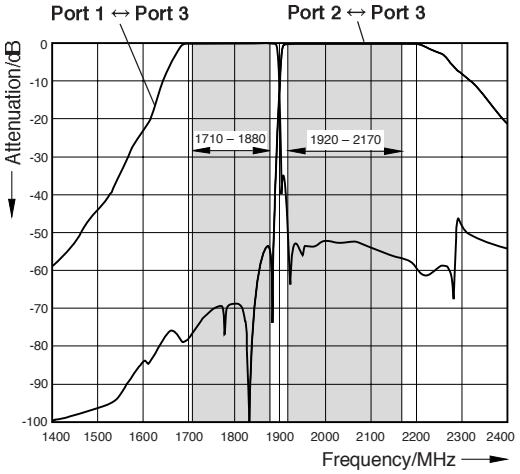
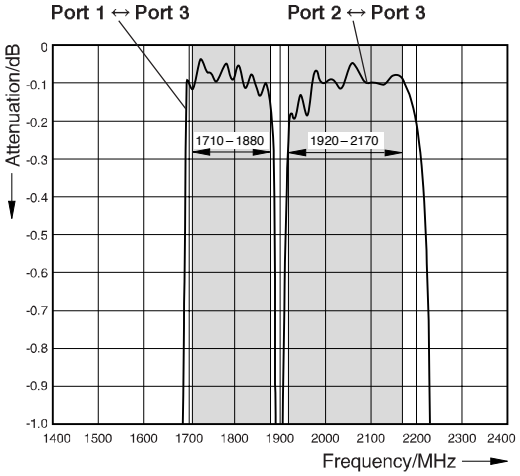
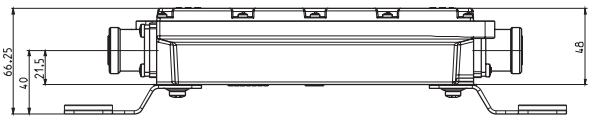
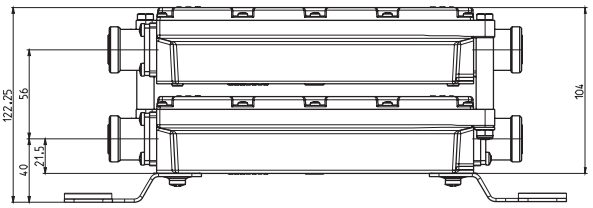


Diagram II

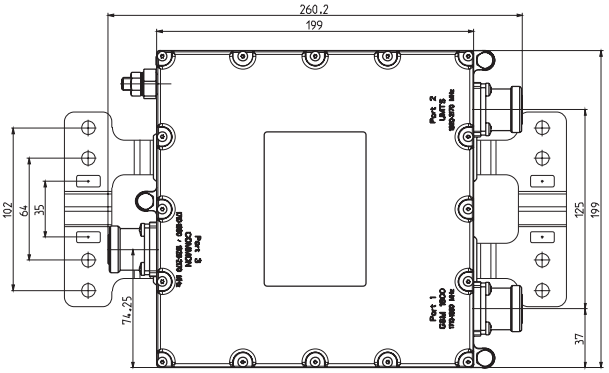




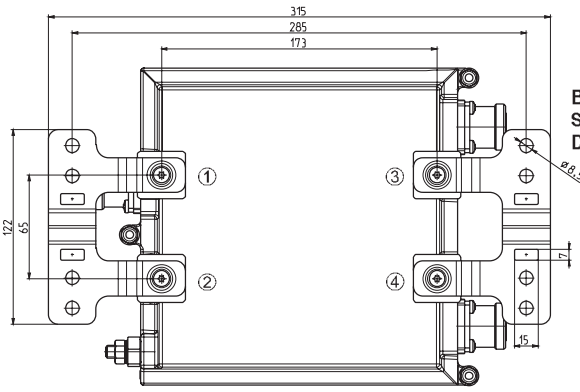
Side view
Single Unit



Side view
Double Unit



Top view
Single Unit,
Double Unit



Bottom view
Single Unit,
Double Unit

Please note:

The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

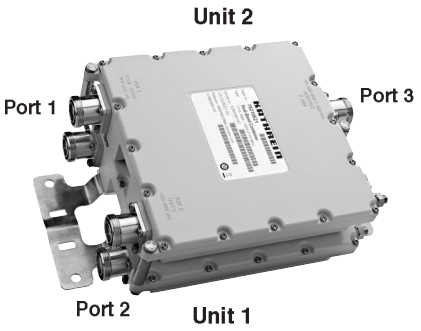
Dual-Band Combiner

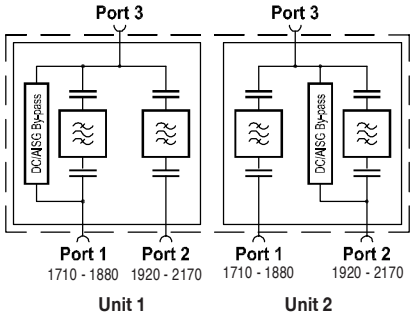
KATHREIN
Antennen · Electronic

1710 – 1880 MHz
GSM 1800

1920 – 2170 MHz
UMTS 2100

- Designed to support separate DC/AISG supply for a low-band and high-band DTMA via 2 feeder cables (see application)
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Double unit for XPol antennas
- Built-in lightning protection

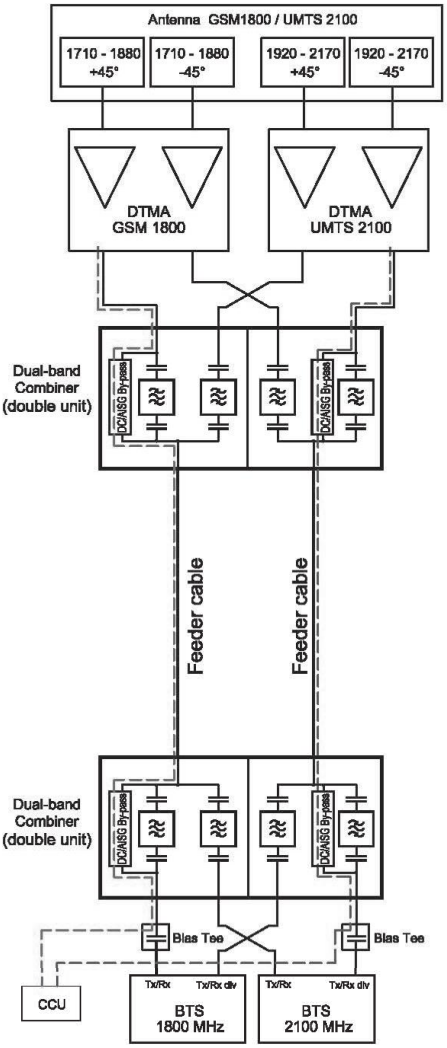




Technical Data

Type No.	78210626 Double Unit	
Pass band Band 1 (GSM 1800) Band 2 (UMTS)	1710 – 1880 MHz 1920 – 2170 MHz	
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.3 dB (1710 – 1880 MHz) < 0.3 dB (1920 – 2170 MHz)	
Isolation Port 1 ↔ Port 2	> 50 dB (1710 – 1880 / 1920 – 2170 MHz)	
VSWR	< 1.25 (1710 – 1880 / 1920 – 2170 MHz)	
Impedance	50 Ohm	
Input power Band 1 / Band 2	< 300 W / < 300 W	
Intermodulation products	< –160 dBc (3rd order with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**Unit 1** **By-pass** (max. 2500 mA) **Stop**	**Unit 2** **Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	5.7 kg	
Packing size	392 x 272 x 189 mm	
Dimensions (w x h x d)	199 x 199 x 104 mm (without connectors, without mounting brackets)	

Application Example



Dual-Band Combiner

KATHREIN
Antennen · Electronic

1710 – 1880 MHz	1920 – 2170 MHz
GSM 1800	UMTS 2100

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
793301	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

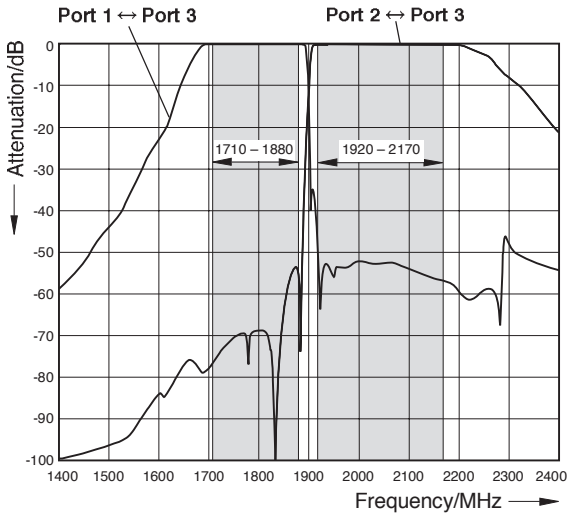
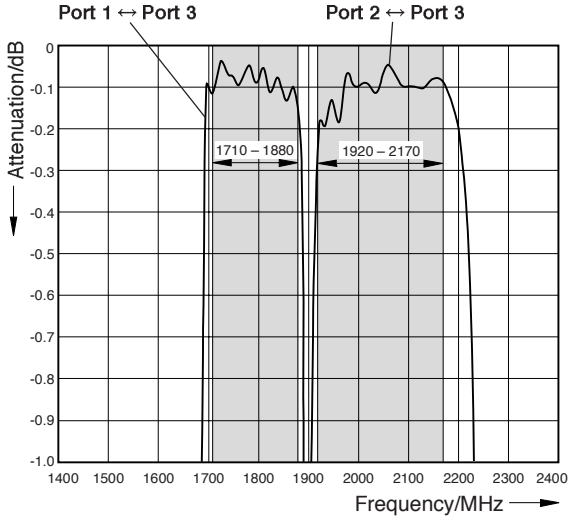
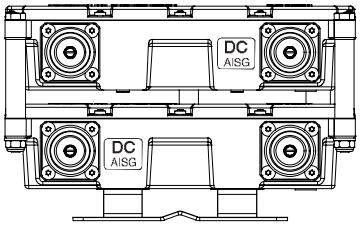


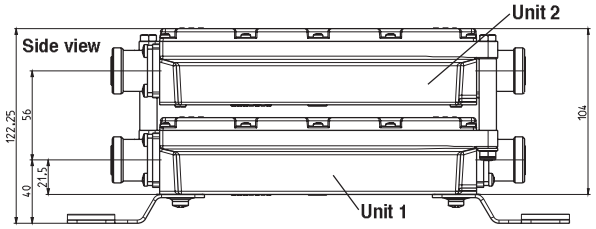
Diagram II



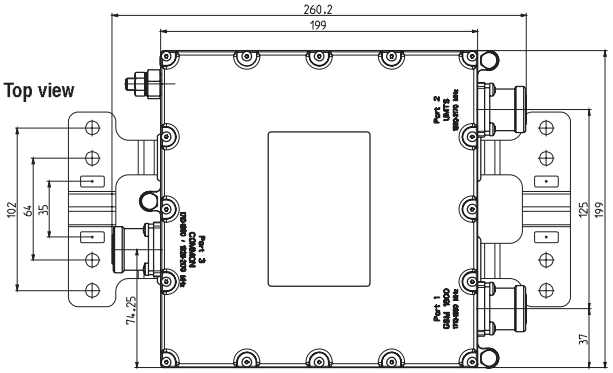
Front view



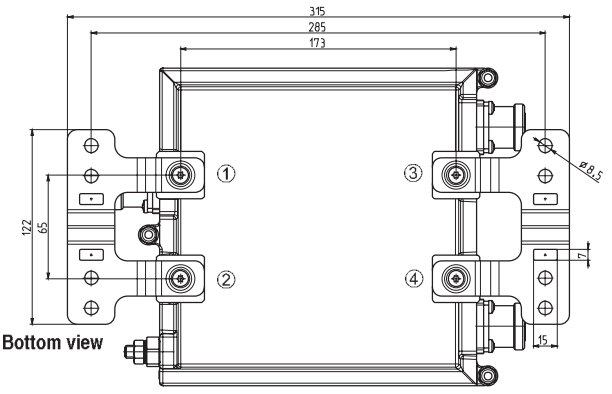
Side view



Top view



Bottom view



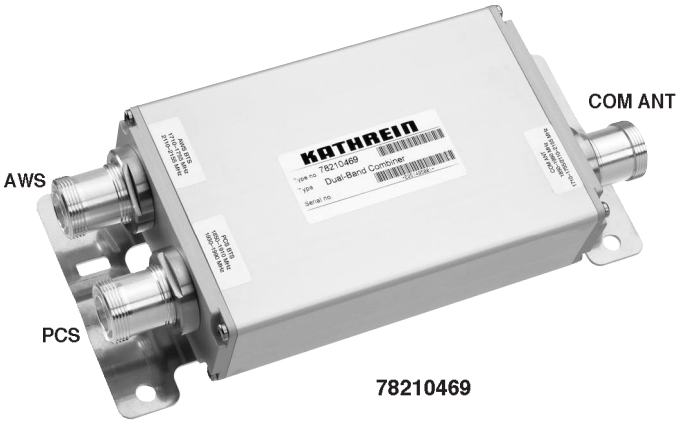
Dual-Band Combiner

KATHREIN
Antennen · Electronic

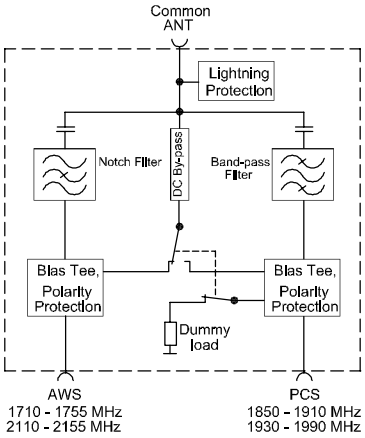
1850 – 1910 / 1930 – 1990 MHz
PCS

1710 – 1755 / 2110 – 2155 MHz
AWS

- Designed for co-siting purposes
- Enables feeder sharing
- Suitable for indoor or outdoor applications
- With fault detection and integrated switch for multiple DC power supply



78210469



Technical Data

Type No.	78210469 Single unit	78210808 Double unit
Pass band Band 1 (PCS) Band 2 (AWS)	1850 – 1910 (Rx) / 1930 – 1990 (Tx) MHz 1710 – 1755 (Rx) / 2110 – 2155 (Tx) MHz	
Insertion loss Port PCS ↔ Port ANT Port AWS ↔ Port ANT	< 0.3 dB (1850 – 1910 / 1930 – 1990 MHz) < 0.2 dB (1710 – 1755 / 2110 – 2155 MHz)	
Isolation Port PCS ↔ Port AWS	> 50 dB (1850 – 1910 / 1930 – 1990 MHz) > 50 dB (1710 – 1755 / 2110 – 2155 MHz)	
VSWR	< 1.25 (1850 – 1910 / 1930 – 1990 MHz) < 1.25 (1710 – 1755 / 2110 – 2155 MHz)	
Impedance	50 Ω	
Input power Port PCS Port AWS	< 250 W (1850 – 1910 / 1930 – 1990 MHz) < 250 W (1710 – 1755 / 2110 – 2155 MHz)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Power supply voltage operational survival	 +10 ... +15 V DC (Port PCS) +10 ... +30 V DC (Port AWS) +10 ... +35 V DC	
Polarity protection	–48 V DC (Port PCS, Port AWS)	
Max. Current	1.5 A (Port ANT)	
Power supply current at PCS port operating with dummy load	100 mA ±20 mA (+10 ... +15 V DC)	
Lightning protection	8/20 µs, 20 kA; 10/350 µs, 3 kA (Port ANT)	
Temperature range	–40 ... +65 °C	
Connectors	7-16 female (long neck)	
Application	Indoor or outdoor (IP 66)	
Weight	2.5 kg	5 kg
Dimensions (w x h x d)	122 x 216.3 x 47 mm (without connectors, without mounting brackets)	122 x 216.3 x 102.6 mm (without connectors, without mounting brackets)

Typical Attenuation Curves

Diagram I

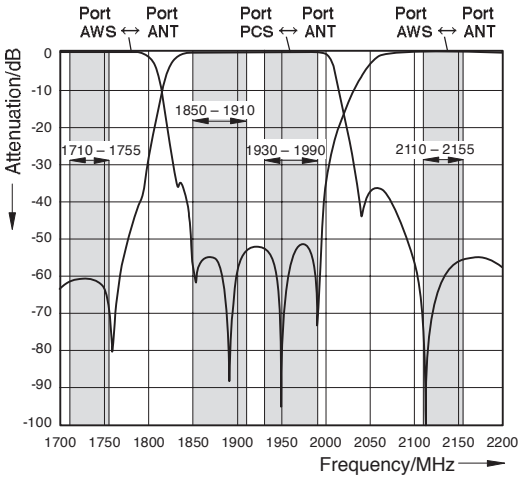
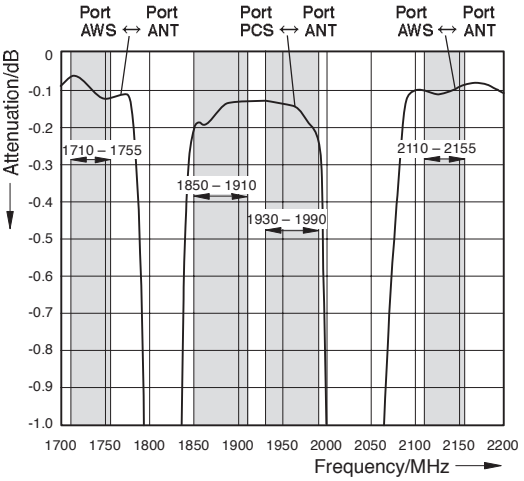


Diagram II



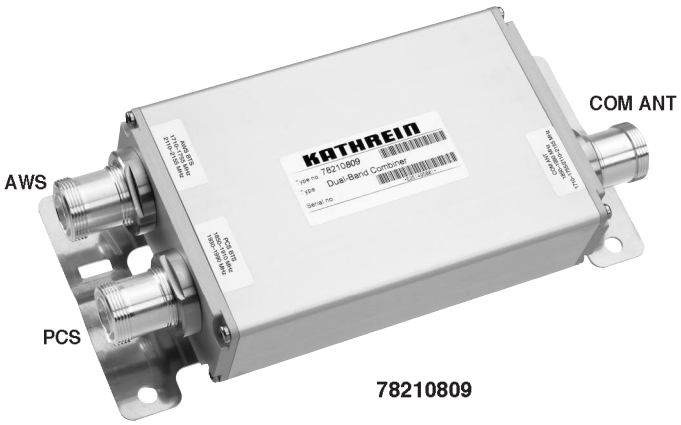
Dual-Band Combiner

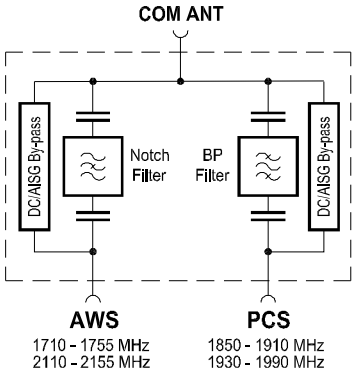
KATHREIN
Antennen · Electronic

1850 – 1910 / 1930 – 1990 MHz
PCS

1710 – 1755 / 2110 – 2155 MHz
AWS

- Designed for co-siting purposes
- Enables feeder sharing
- Suitable for indoor or outdoor applications
- DC by-pass between all ports
- External DC stop available as an accessory





Typical Attenuation Curves

Diagram I

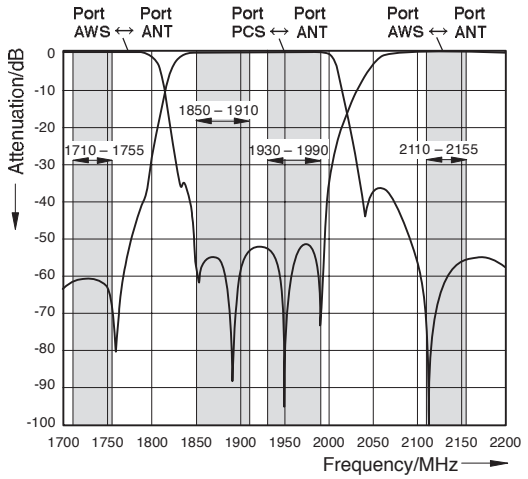
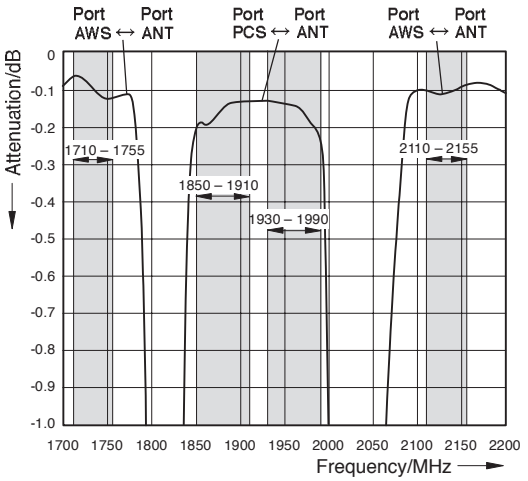


Diagram II



Technical Data

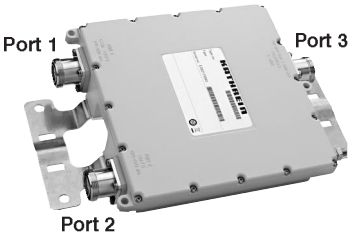
Type No.	78210809 Single unit	78210810 Double unit
Pass band Band 1 (PCS) Band 2 (AWS)	1850 – 1910 (Rx) / 1930 – 1990 (Tx) MHz 1710 – 1755 (Rx) / 2110 – 2155 (Tx) MHz	
Insertion loss Port PCS ↔ Port ANT Port AWS ↔ Port ANT	< 0.3 dB (1850 – 1910 / 1930 – 1990 MHz) < 0.2 dB (1710 – 1755 / 2110 – 2155 MHz)	
Isolation Port PCS ↔ Port AWS	> 50 dB (1850 – 1910 / 1930 – 1990 MHz) > 50 dB (1710 – 1755 / 2110 – 2155 MHz)	
VSWR	< 1.25 (1850 – 1910 / 1930 – 1990 MHz) < 1.25 (1710 – 1755 / 2110 – 2155 MHz)	
Impedance	50 Ω	
Input power Port PCS Port AWS	< 250 W (1850 – 1910 / 1930 – 1990 MHz) < 250 W (1710 – 1755 / 2110 – 2155 MHz)	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Lightning protection	3 kA, 10/350 µs pulse	
Temperature range	–40 ... +65 °C	
Connectors	7-16 female (long neck)	
Application	Indoor or outdoor (IP 66)	
DC/AISG transparency	By-pass between all ports (max. 2500 mA)	
Weight	2.5 kg	5 kg
Dimensions (w x h x d)	122 x 216.3 x 47 mm (without connectors, without mounting brackets)	122 x 216.3 x 102.6 mm (without connectors, without mounting brackets)

Dual-Band Combiner

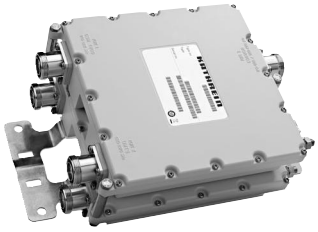
KATHREIN
Antennen · Electronic

1710 – 2180 MHz	2400 – 2700 MHz
GSM1800 / PCS1900 / AWS / UMTS2100	WLAN / WiMAX / BRS/ LTE2600

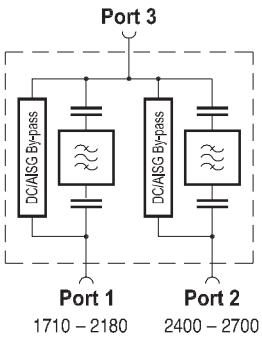
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC stop available as an accessory
- **Very low insertion loss**

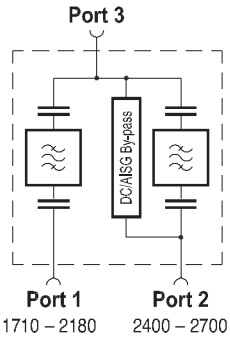


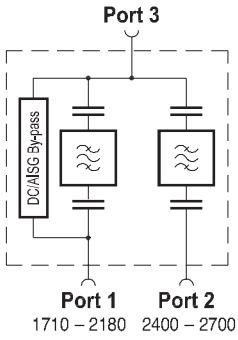
78210800, 78211092, 78211094
Single Unit



78211091, 78211093, 78211095
Double Unit







Technical Data

Type No.	**78210800** Single Unit	**78211092** Single Unit	**78211094** Single Unit
	78211091 Double Unit	**78211093** Double Unit	**78211095** Double Unit
Pass band Band 1 Band 2	1710 – 2180 MHz 2400 – 2700 MHz		
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	< 0.15 dB < 0.15 dB		
Isolation Port 1 ↔ Port 2	> 60 dB		
VSWR	< 1.25 (1710 – 2180 / 2400 – 2700 MHz)		
Impedance	50 Ω		
Input power Band 1 / Band 2	< 300 W / < 300 W		
Intermodulation products	< –160 dBc (3rd order with 2 x 20 W)		
Temperature range	–40 ... +60 °C		
Connectors	7-16 female (long neck)		
Application	Indoor *or* outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop**
Lightning protection	3 kA, 10/350 µs pulse		
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set		
Weight	Single Unit: 2.9 kg / Double Unit: 5.7 kg		
Packing size	Single Unit: 392 x 272 x 139 mm / Double Unit: 392 x 272 x 189 mm		
Dimensions (w x h x d)	Single Unit: 199 x 199 x 44 mm / Double Unit: 199 x 199 x 95 mm (without connectors, without mounting brackets)		

Dual-Band Combiner

KATHREIN
Antennen · Electronic

1710 – 2180 MHz	2400 – 2700 MHz
GSM1800 / PCS1900 / AWS / UMTS2100	WLAN / WiMAX / BRS/ LTE2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

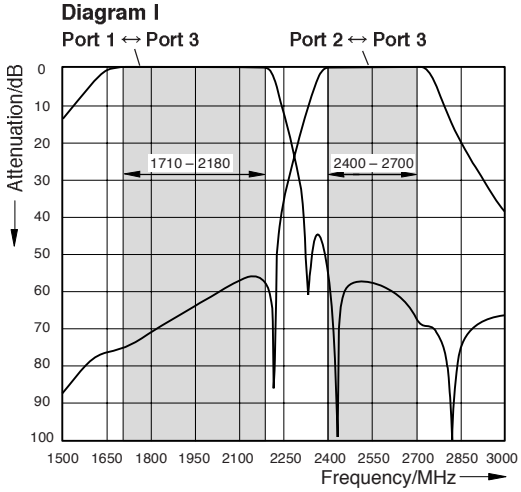
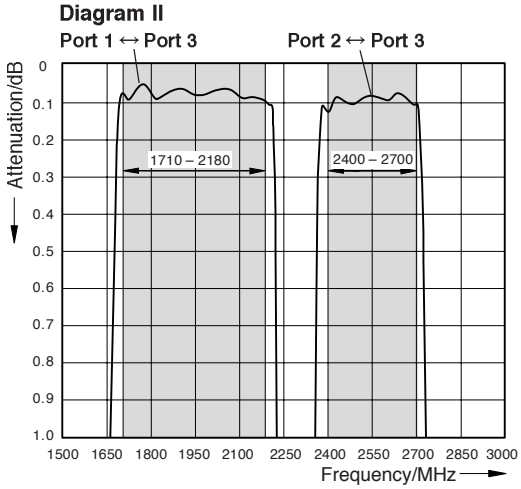
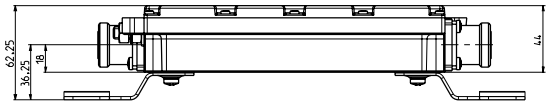
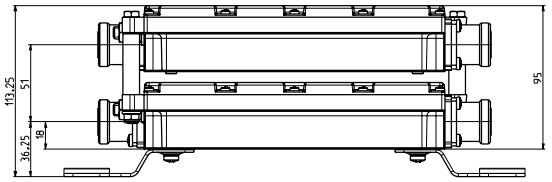


Diagram II

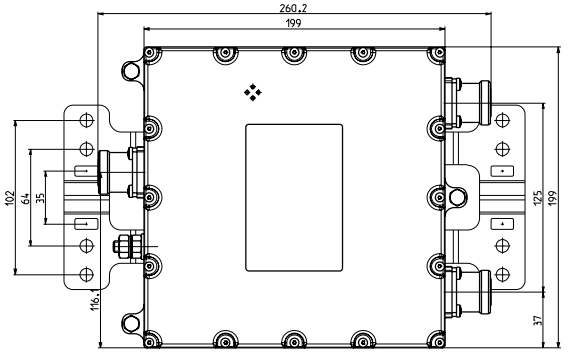




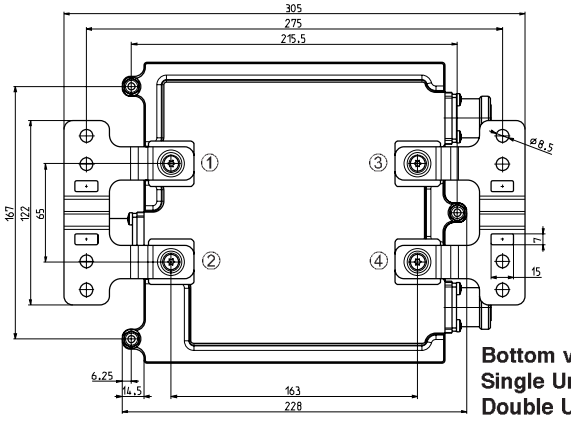
Single Unit
Side view



Double Unit
Side view



Top view
Single Unit
Double Unit



Bottom view
Single Unit
Double Unit

Please note:

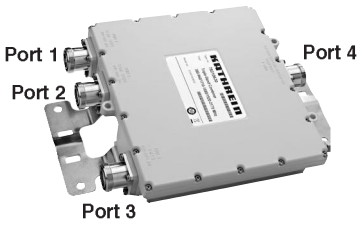
The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

Triple-Band Combiner

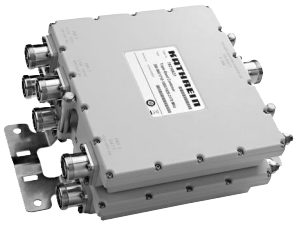
KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 1880 MHz	1920 – 2170 MHz
TETRA, LTE 800, CDMA 850, GSM 900	GSM 1800	UMTS 2100

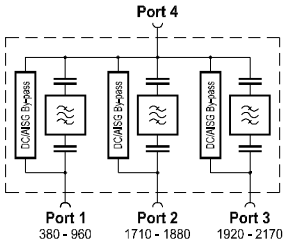
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC Stop available as an accessory

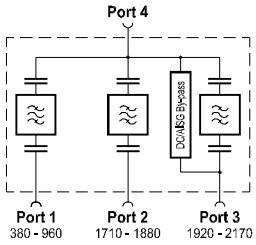


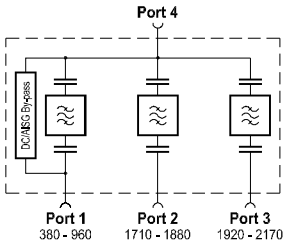
78210630, 78210632, 78210634
Single Unit



78210631, 78210633, 78210635
Double Unit







Technical Data

Type No.	**78210630** Single Unit **78210631** Double Unit	**78210632** Single Unit **78210633** Double Unit	**78210634** Single Unit **78210635** Double Unit
Pass band Band 1 (TETRA ... GSM 900) Band 2 (GSM 1800) Band 3 (UMTS)	380 – 960 MHz 1710 – 1880 MHz 1920 – 2170 MHz		
Insertion loss Port 1 ↔ Port 4 Port 2 ↔ Port 4 Port 3 ↔ Port 4	< 0.2 dB (380 – 960 MHz) < 0.3 dB (1710 – 1880 MHz) < 0.3 dB (1920 – 2170 MHz)		
Isolation Port 1 ↔ Port 2 Port 1 ↔ Port 3 Port 2 ↔ Port 3	> 45 dB (380 – 600 MHz) / > 50 dB (600 – 960 / 1710 – 1880 MHz) > 45 dB (380 – 600 MHz) / > 50 dB (600 – 960 / 1920 – 2170 MHz) > 50 dB (1710 – 1880 / 1920 – 2170 MHz)		
VSWR	< 1.25 (380 – 960 / 1710 – 1880 / 1920 – 2170 MHz)		
Impedance	50 Ω		
Input power Band 1 / Band 2 / Band 3	< 700 W / < 300 W / < 300 W		
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)		
Temperature range	–40 ... +60 °C		
Connectors	7-16 female (long neck)		
Application	Indoor *or* outdoor (IP 66)		
DC/AISG transparency Port 1 ↔ Port 4 Port 2 ↔ Port 4 Port 3 ↔ Port 4	**By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	**Stop** **Stop** **By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA) **Stop** **Stop**
Lightning protection	3 kA, 10/350 µs pulse		
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set		
Weight	Single Unit: 3.2 kg / Double Unit: 6.3 kg		
Packing size	Single Unit: 392 x 292 x 139 mm / Double Unit: 392 x 292 x 189 mm		
Dimensions (w x h x d)	Single Unit: 219 x 199 x 48 mm / Double Unit: 219 x 199 x 104 mm (without connectors, without mounting brackets)		

Triple-Band Combiner

KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 1880 MHz	1920 – 2170 MHz
TETRA, LTE 800, CDMA 850, GSM 900	GSM 1800	UMTS 2100

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Clamp Set

DC stop

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

50-Ohm load

Typical Attenuation Curves

Diagram I

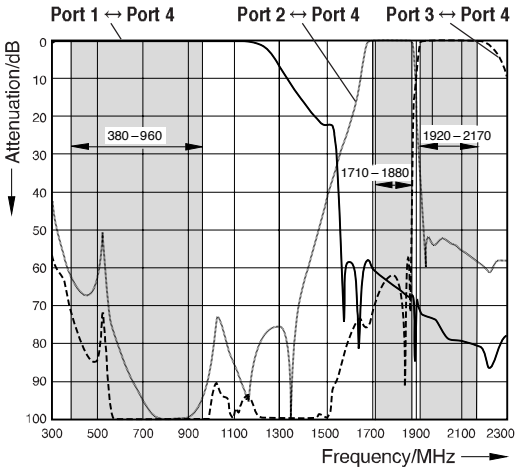
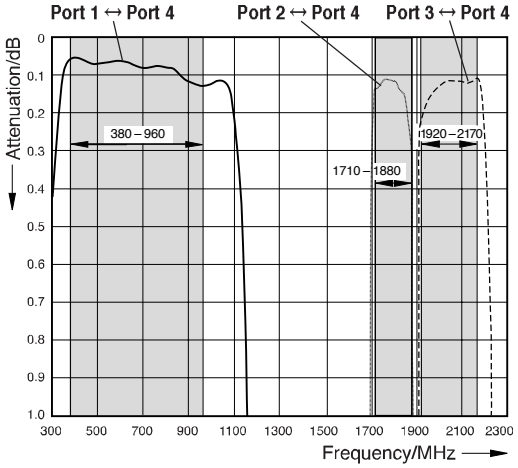
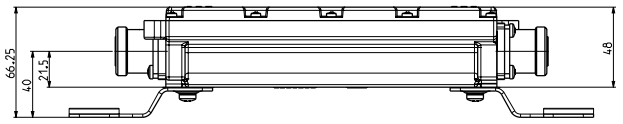
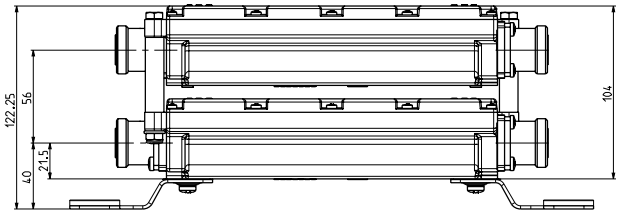


Diagram II

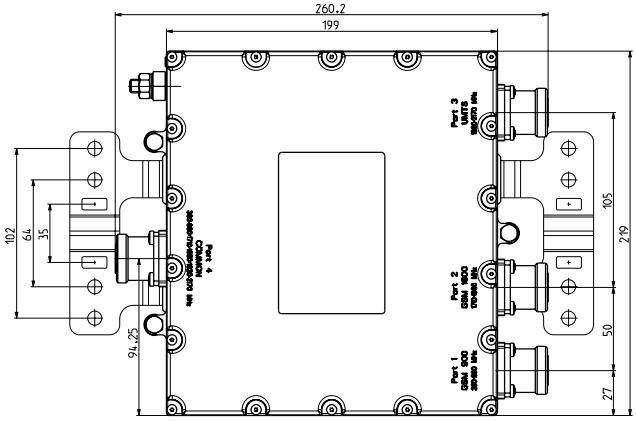




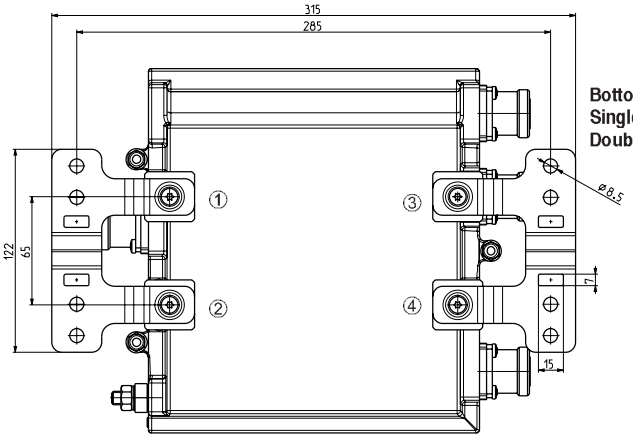
Side view
Single Unit



Side view
Double Unit



Top view
Single Unit,
Double Unit



Bottom view
Single Unit,
Double Unit

Please note:

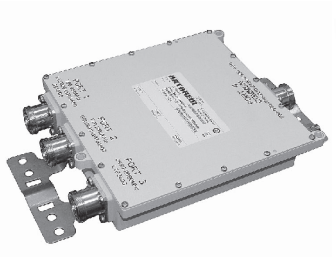
The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

Triple-Band Combiner

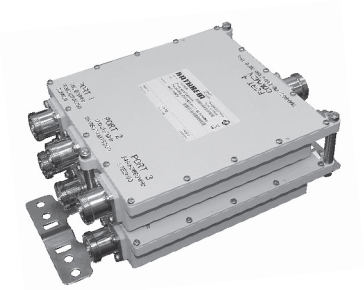
KATHREIN
Antennen · Electronic

790 – 960 MHz	1710 – 2180 MHz	2490 – 2690 MHz
LTE800 / CDMA850 / GSM900	GSM1800 / UMTS2100	LTE2600

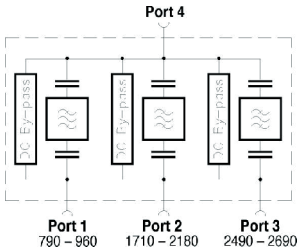
- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection

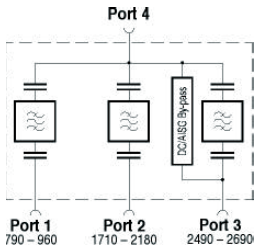


Single Unit



Double Unit





Technical Data

Type No.	78211130 Single Unit	78211132 Single Unit
	78211131 Double Unit	78211133 Double Unit
Pass band		
Band 1 (LTE800, GSM900)	790 – 960 MHz	
Band 2 (GSM1800, UMTS2100)	1710 – 2180 MHz	
Band 3 (LTE2600)	2490 – 2690 MHz	
Insertion loss		
Port 1 ↔ Port 4	< 0.2 dB (790 – 960 MHz)	
Port 2 ↔ Port 4	< 0.2 dB (1710 – 2180 MHz)	
Port 3 ↔ Port 4	< 0.2 dB (2490 – 2690 MHz)	
Isolation		
Port 1 ↔ Port 2	> 50 dB (790 – 960 MHz)	
Port 1 ↔ Port 3	> 50 dB (1710 – 2180 MHz)	
Port 2 ↔ Port 3	> 50 dB (2400 – 2690 MHz)	
VSWR	< 1.25 (790 – 960 / 1710 – 2180 / 2490 – 2690 MHz	
Impedance	50 Ω	
Input power		
Band 1 / Band 2 / Band 3	< 300 W / < 300 W / < 300 W	
Intermodulation products	< – 160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency		
Port 1 ↔ Port 4	**By-pass** (max. 2500 mA)	**Stop**
Port 2 ↔ Port 4	**By-pass** (max. 2500 mA)	**Stop**
Port 3 ↔ Port 4	**By-pass** (max. 2500 mA)	**By-pass** (max. 2500 mA)
Lightining protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	Single Unit: 3 kg / Double Unit: 5.4 kg	
Dimensions (w x h x d)	Single Unit: 199 x 199 x 48 mm / Double Unit: 199 x 199 x 104 mm (without connectors, without mounting brackets)	

Triple-Band Combiner

KATHREIN
Antennen · Electronic

790 – 960 MHz	1710 – 2180 MHz	2490 – 2690 MHz
LTE800 / CDMA850 / GSM900	GSM1800 / UMTS2100	LTE2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Type No.	Description
78210850	DC stop
78410367	50-Ohm load

Clamp Set

DC Stop

50-Ohm load

Typical Attenuation Curves

Diagram I

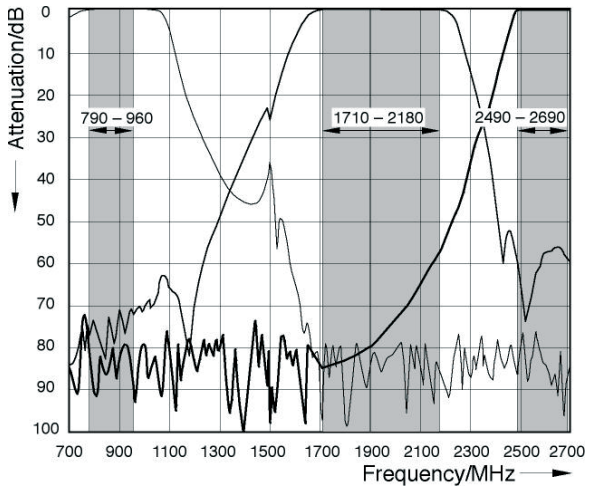
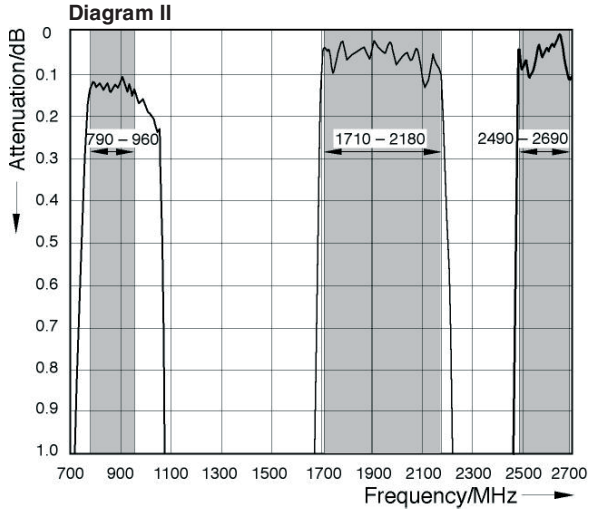
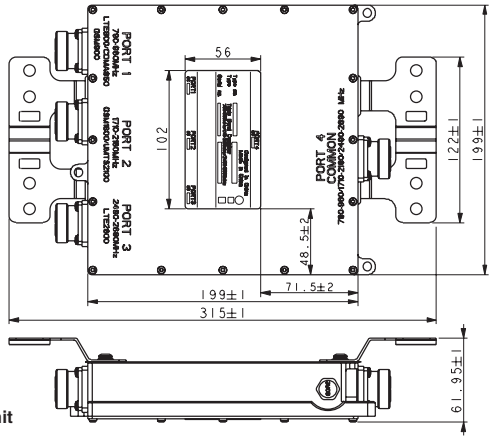
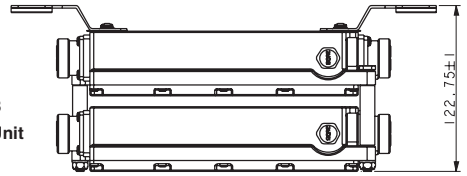


Diagram II

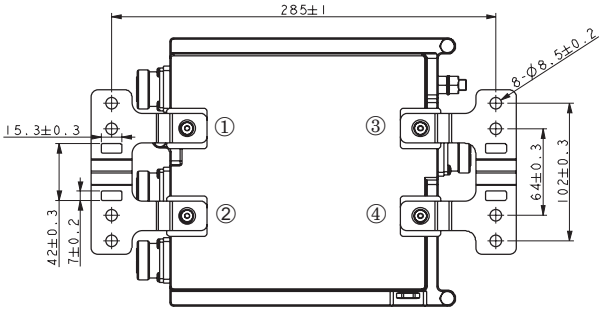




78211130
78211132
Single Unit



78211131
78211133
Duoble Unit



Please Note:

The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

Quad-Band Combiner

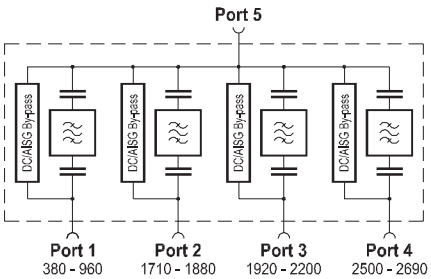
KATHREIN
Antennen · Electronic

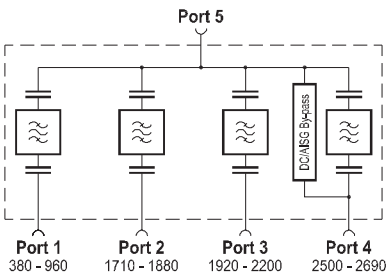
380 – 960 MHz	1710 – 1880 MHz	1920 – 2200 MHz	2500 – 2690 MHz
TETRA / LTE 800 / CDMA 850 / GSM 900	GSM 1800	UMTS 2100	LTE 2600

- Designed for co-siting purposes
- Enables feeder sharing
- Can be used as a combiner near the BTS or in a reciprocal function near the antenna
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Available as a single unit, or for XPol antennas as a double unit
- Built-in lightning protection
- External DC Stop available as an accessory

78210640, 78210642
Single Unit

78210641, 78210643
Double Unit





Technical Data

Type No.	**78210640** Single Unit / **78210641** Double Unit	**78210642** Single Unit / **78210643** Double Unit
Pass band Band 1 (TETRA ... GSM 900) Band 2 (GSM 1800) Band 3 (UMTS) Band 4 (LTE 2600)	380 – 960 MHz 1710 – 1880 MHz 1920 – 2200 MHz 2500 – 2690 MHz	
Insertion loss Port 1 ↔ Port 5 Port 2 ↔ Port 5 Port 3 ↔ Port 5 Port 4 ↔ Port 5	< 0.2 dB (380 – 960 MHz) < 0.3 dB (1710 – 1880 MHz) < 0.3 dB (1920 – 2200 MHz) < 0.2 dB (2500 – 2690 MHz)	
Isolation Port 1 ↔ Port 2 Port 1 ↔ Port 3 Port 1 ↔ Port 4 Port 2 ↔ Port 3 Port 2 ↔ Port 4 Port 3 ↔ Port 4	> 45 dB (380 – 600 MHz) / > 50 dB (600 – 960 / 1710 – 1880 MHz) > 45 dB (380 – 600 MHz) / > 50 dB (600 – 960 / 1920 – 2200 MHz) > 45 dB (380 – 600 MHz) / > 50 dB (600 – 960 / 2500 – 2690 MHz) > 50 dB (1710 – 1880 / 1920 – 2200 MHz) > 50 dB (1710 – 1880 / 2500 – 2690 MHz) > 50 dB (1920 – 2200 / 2500 – 2690 MHz)	
VSWR	< 1.25 (380 – 960 / 1710 – 1880 / 1920 – 2200 / 2500 – 2690 MHz)	
Impedance	50 Ω	
Input power Band 1 / Band 2 / Band 3 / Band 4	< 700 W / < 300 W / < 300 W / < 200 W	
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor *or* outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 5 Port 2 ↔ Port 5 Port 3 ↔ Port 5 Port 4 ↔ Port 5	 **By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA) **By-pass** (max. 2500 mA)	 **Stop** **Stop** **Stop** **By-pass** (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set	
Weight	Single Unit: 3.8 kg / Double Unit: 7.5 kg	
Packing size	Single Unit: 392 x 292 x 139 mm / Double Unit: 392 x 292 x 189 mm	
Dimensions (w x h x d)	Single Unit: 215 x 227.5 x 50.3 mm / Double Unit: 215 x 227.5 x 106.3 mm (without connectors, without mounting brackets)	

Quad-Band Combiner

KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 1880 MHz	1920 – 2200 MHz	2500 – 2690 MHz
TETRA / LTE 800 / CDMA 850 / GSM 900	GSM 1800	UMTS 2100	LTE 2600

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78210850	**DC stop**
78410367	**50-Ohm load**

Clamp Set

DC stop

50-Ohm load

Typical Attenuation Curves

Diagram I

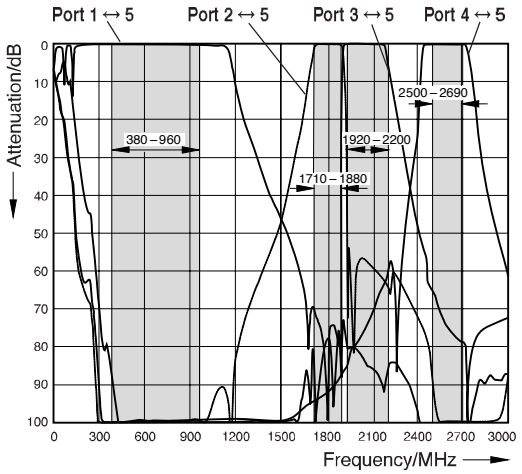
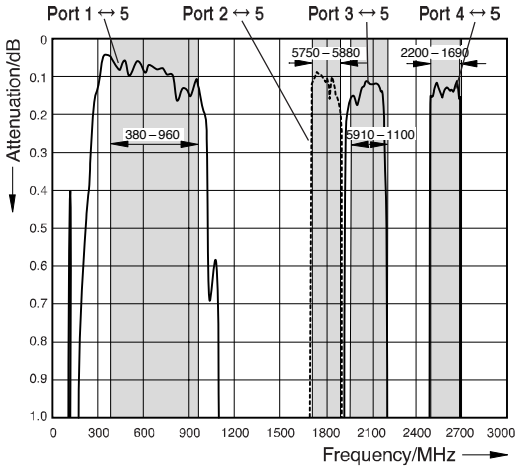
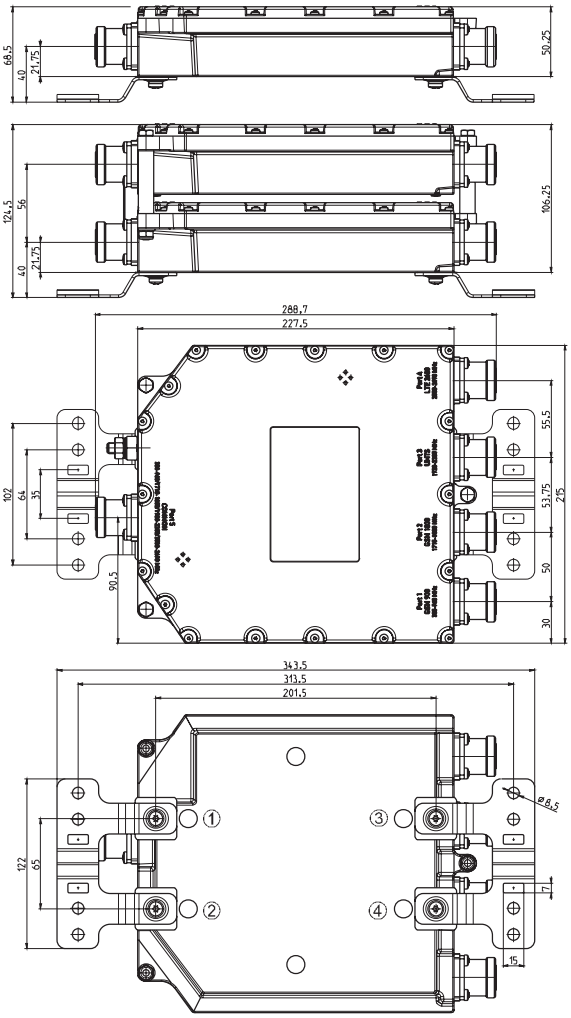


Diagram II





Side view Single Unit

Side view Double Unit

Top view Single Unit, Double Unit

Bottom view Single Unit, Double Unit

Please note:

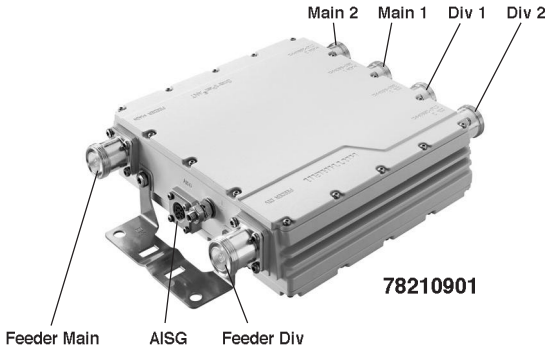
The mounting plates can be removed by loosening the screws ① to ④ (M5 x 12) and replaced with other means of mounting, always provided that the max. drilled depth of 7.5 mm is respected with the choice of replacement screws.

SmartPlex® Dual-Band Combiner

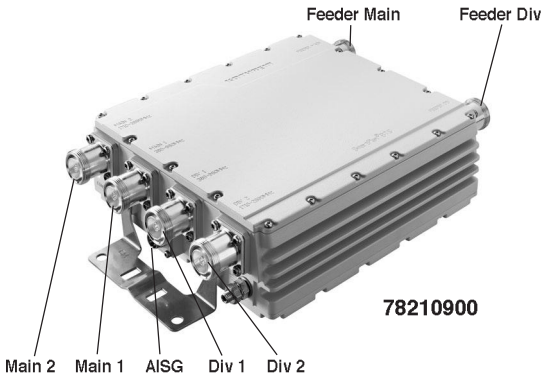
KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 2690 MHz
TETRA / LTE 800 / DD / CDMA / GSM 900	GSM / PCS / AWS / UMTS 2100 / LTE

- Universal multi-protocol dual-band combiner
  - AISG 1.1
  - AISG 2.0
  - 3GPP
  - Current window alarming (CWA)
  - Vendor specific protocols
- Designed for co-siting purposes
- Enables feeder sharing
- **78210900:** For use near the base station **(BTS)**, thereby converting different base station DC voltages into one common feeder DC voltage **(multi-BTS power supply handling)**
  78210901: For use near the antenna **(ANT)**, thereby reproducing the base station DC voltages for the antenna line devices
- **Simultaneous** support of antenna line devices (TMAs, RET units)
- **Dynamic DC/AISG by-pass:** Automatic setting on each RF path according to the BTS and antenna line device requirements
- DC power supply either from BTS via RF path, or from an external source via AISG port (782 10900)
- Provides full **Smart Bias Tee functionality**
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Double unit in one housing for XPol antennas
- Built-in lightning protection
- Very low insertion loss
- High input power



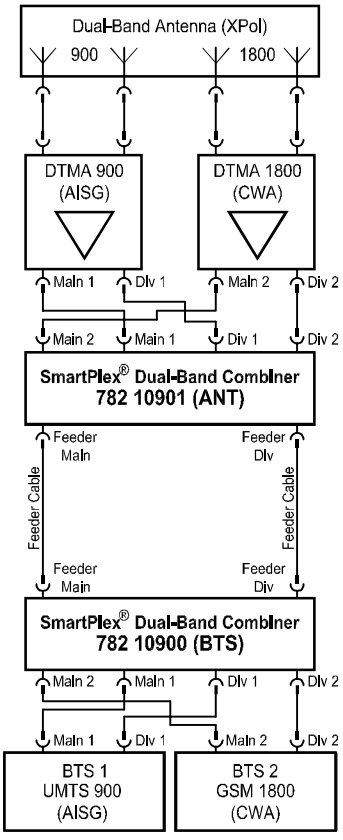
78210901



78210900

Technical Data

Type No.	78210901 (ANT) 78210900 (BTS)
Pass band Band 1 / Band 2	380 – 960 / 1710 – 2690 MHz
Insertion loss	< 0.2 dB, typically 0.15 dB (380 – 960 / 1710 – 2690 MHz)
Isolation Main 1 ↔ Main 2 / Div 1 ↔ Div 2	> 60 dB (380 – 960 / 1710 – 2690 MHz)
VSWR	< 1.22 (380 – 960 / 1710 – 2690 MHz)
Impedance	50 Ohm
Input power Band 1 / Band 2	< 500 W / < 300 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors RF AISG	7-16 female (long neck) 8-pin, IEC 60130-9 (782 10900/901: Male/female) Pin 2: -48V DC (782 10900 only), Pin 3: RS485B, Pin 5: RS485A, Pin 6: Nominal 24 V DC, Pin 7: DC return (78210900/901: Not grounded/grounded), Other pins: Not connected
Power consumption	2 W (idle mode)
DC supply	782 10900: 7 – 30 V DC (via RF connectors)
Application	Indoor *or* outdoor (IP 67)
DC/AISG transparency	For AISG 1.1, AISG 2.0, 3GPP, vendor specific protocols and for current window alarm (CWA) controlled TMAs
Lightning protection	3 kA (10/350 µs pulse), 10 kA (8/20 µs pulse)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	782 10900: 6.5 kg, 782 10901: 4.9 kg
Dimensions (w x h x d)	782 10900: 233 x 258 x 79 mm 782 10901: 233 x 223 x 62 mm (without connectors, without mounting brackets)



Application Example

SmartPlex® Dual-Band Combiner

KATHREIN
Antennen · Electronic

380 – 960 MHz	1710 – 2690 MHz
TETRA / LTE 800 / DD / CDMA / GSM 900	GSM / PCS / AWS / UMTS 2100 / LTE

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78410367	**50-Ohm load** 1.5 W / indoor or outdoor
78211100	DC cable kit –48 VDC
78211101	DC cable kit +24 VDC

Clamp Set

50-Ohm load

Typical Attenuation Curves

Diagram I

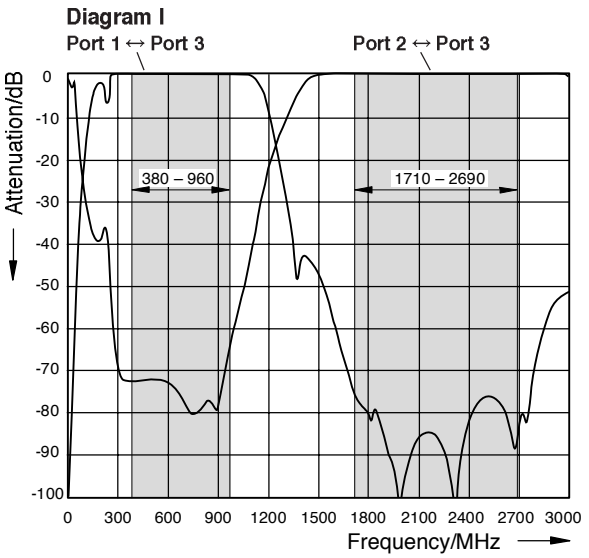
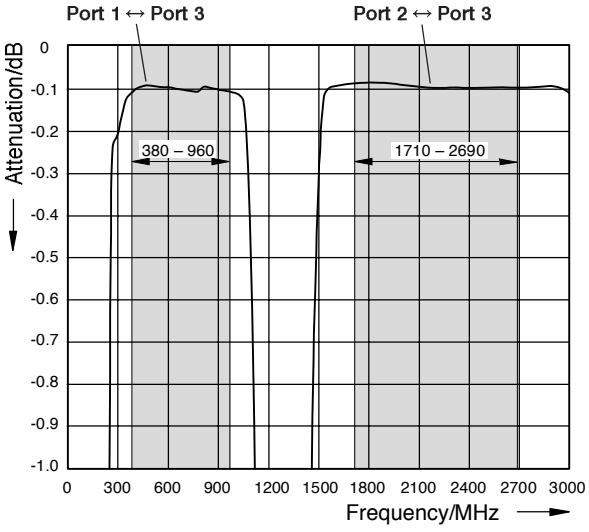
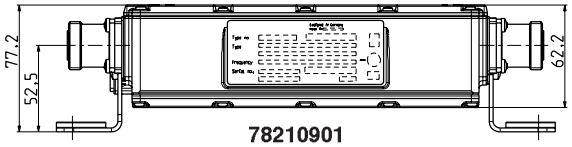
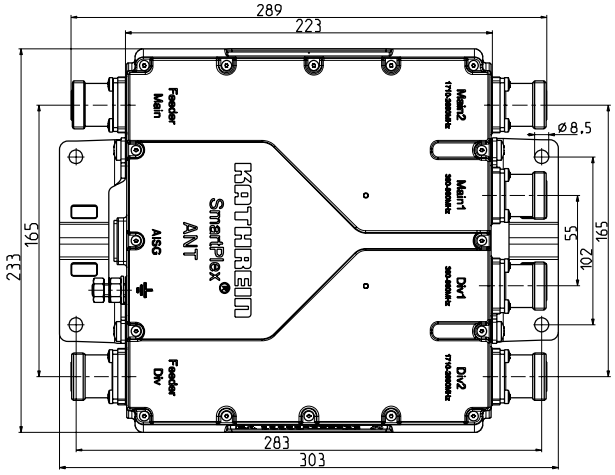


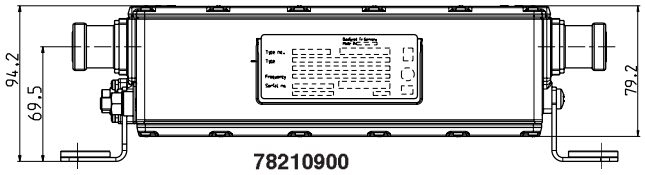
Diagram II



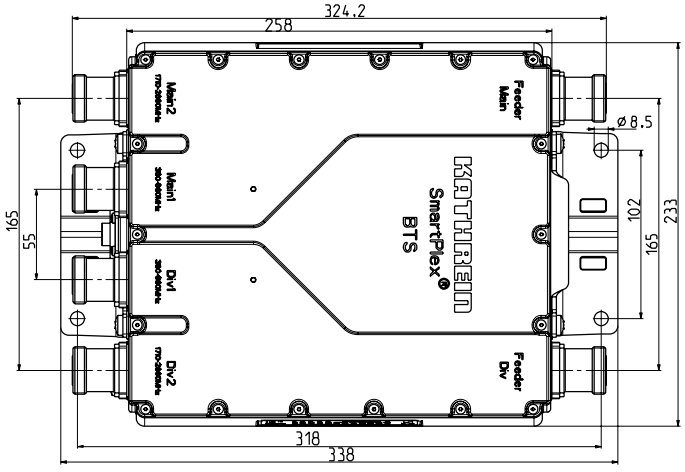


78210901





78210900



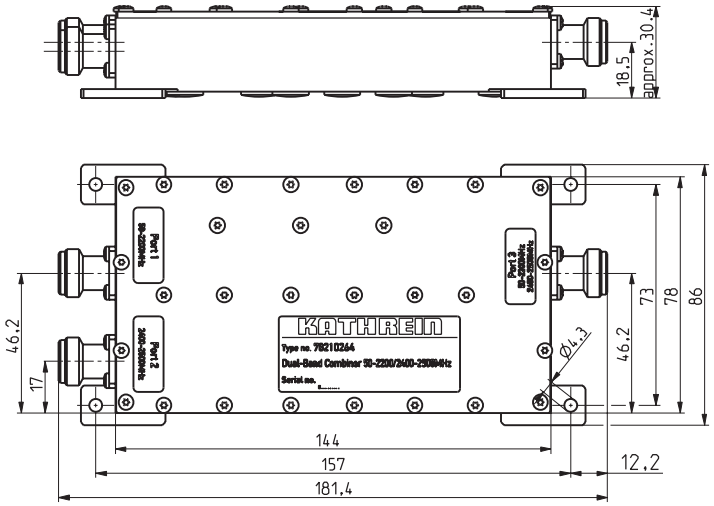
Dual-Band Combiner

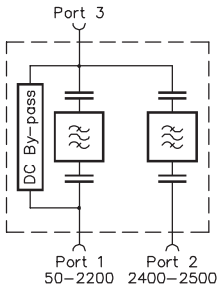
KATHREIN
Antennen · Electronic

50 – 2200 MHz
80 / 160 / 400 / 900 / 1800 / UMTS

2400 – 2500 MHz
WLAN

- Designed for inhouse multiband distribution networks
- Enables feeder sharing
- DC by-pass between ports 1 and 3
- Built-in DC stop between ports 2 and 3





Technical Data

Type No.	78210264
Pass band Band 1 Band 2	 50 – 2200 MHz 2400 – 2500 MHz
Insertion loss Port 1 ↔ Port 3 Port 2 ↔ Port 3	 < 0.1 dB (50 – 2200 MHz) < 0.2 dB (2400 – 2500 MHz)
Isolation Port 1 ↔ Port 2	 > 50 dB (50 – 2200 / 2400 – 2500 MHz)
VSWR	< 1.25 (50 – 2200 / 2400 – 2500 MHz)
Impedance	50 Ω
Input power Band 1 Band 2	 < 200 W < 200 W
Intermodulation products	< –150 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 ... +55 °C
Connectors	N female
Application	Indoor
Special features	Built-in DC stop between ports 2 and 3 DC by-pass between ports 1 and 3 (max. 2500 mA)
Mounting	With 4 screws (max. 4 mm diameter)
Weight	0.47 kg
Packing size	225 x 140 x 75 mm
Dimensions (w x h x d)	86 x 30.4 x 181.4 mm (including connectors and mounting feet)

Typical Attenuation Curves

Diagram I

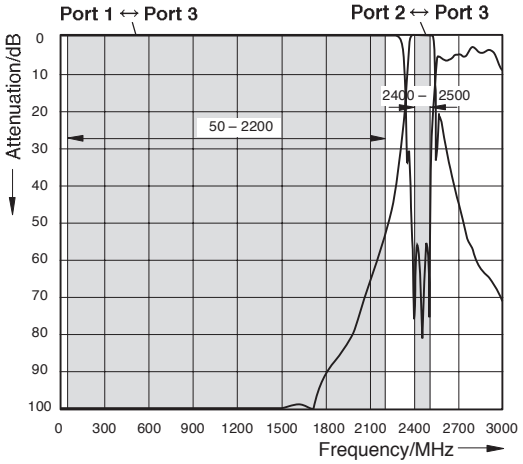
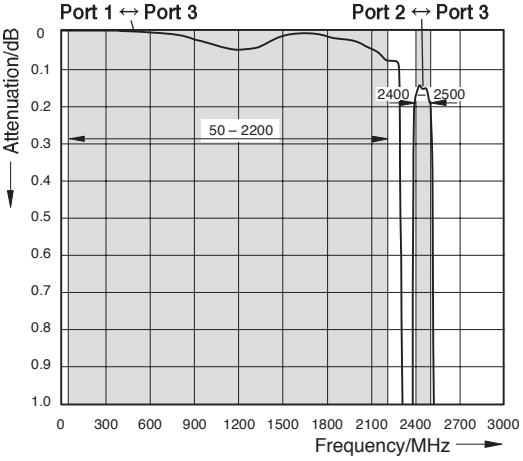


Diagram II



Same-Band Combiners
Hybrid Combiners

Same-Band Combiner
Duplex Hybrid Combiner
Active Duplex Hybrid Combiner
Hybrid Combiner
3-dB Couplers
Hybrid Ring Junctions

Summary of Same-Band Combiner and Hybrid Combiner Types

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Antennen · Electronic

Hybrid Combiners and Couplers:

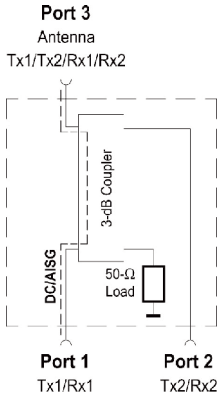
Description	Type No.	Frequency range	Max. input power	Connector	Page
Hybrid Combiner 2:1	792699	806 – 960 MHz	150 W per Tx/Rx port	7-16	278
Hybrid Combiner 2:1	792702	1700 – 2200 MHz	150 W per Tx/Rx port	7-16	279
Hybrid Combiner 2:1	793555	800 – 2200 MHz	150 W per Tx/Rx port	7-16	280
Hybrid Combiner 2:1	78210500	806 – 960 MHz	60 W at each port	7-16	281
Hybrid Combiner 2:1	78210502	1710 – 2170 MHz	60 W at each port	7-16	282
Hybrid Combiner 2:1	78210504	698 – 2690 MHz	60 W at each port	7-16	283
Hybrid Combiner 4:4	78210532	1710 – 2170 MHz	60 W at each port	7-16	284
Hybrid Combiner 4:4	78210534	698 – 2600 MHz	150 W at each port	7-16	285
Hybrid Combiner 8:4	78211141	790 – 960 MHz 1710 – 2690 MHz	75 W	7-16	286 –289
Hybrid Combiner 8:4	78211142	1710 – 1880 MHz 1920 – 2170 MHz	75 W	7-16	286 –289
Hybrid Combiner 12:4	78211143	790 – 960 MHz 1710 – 1880 MHz 1920 – 2170 MHz	50 W	7-16	286 –289
Hybrid Combiner 16:4	78211144	790 – 960 MHz 1710 – 1880 MHz 1920 – 2200 MHz 2500 – 2690 MHz	50 W	7-16	286 –289
Active Duplex Hybrid Combiner	78211110	Rx: 880 – 915 MHz Tx: 925 – 960 MHz	250 W	7-16	292 – 293
Duplex Hybrid Combiner	78210805	Rx: 880 – 915 MHz Tx: 925 – 960 MHz	250 W	7-16	290, 291
Same-Band Combiner	78210925	1920 – 2170 MHz	100 W at each port	7-16	294, 295
Same-Band Combiner	78210926	1920 – 2170 MHz	100 W at each port	7-16	296, 297
Same-Band Combiner	78210930	880 – 960 MHz	100 W at each port	7-16	298, 299
Same-Band Combiner	78210936	880 – 960 MHz	100 W at each port	7-16	300, 301
Hybrid Ring Junction	K6373621	806 – 960 MHz	100 W at each port	N	302, 303
Hybrid Ring Junction	790881	890 – 960 MHz	100 W at each port	N	302, 303
Hybrid Ring Junction	791498	1710 – 1880 MHz	50 W at each port	N	302, 303
3-dB Coupler	78210524	698 – 2690 MHz	150 W at each port	7-16	304, 305
3-dB Coupler	793506	806 – 960 MHz	500 W	7-16	306
3-dB Coupler	793006	1700 – 2200 MHz	300 W	7-16	307
3-dB Coupler	793554	800 – 2200 MHz	300 W	7-16	308

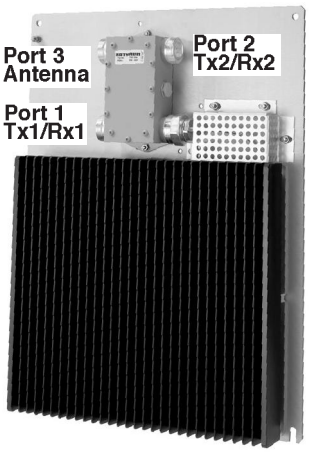
New Products

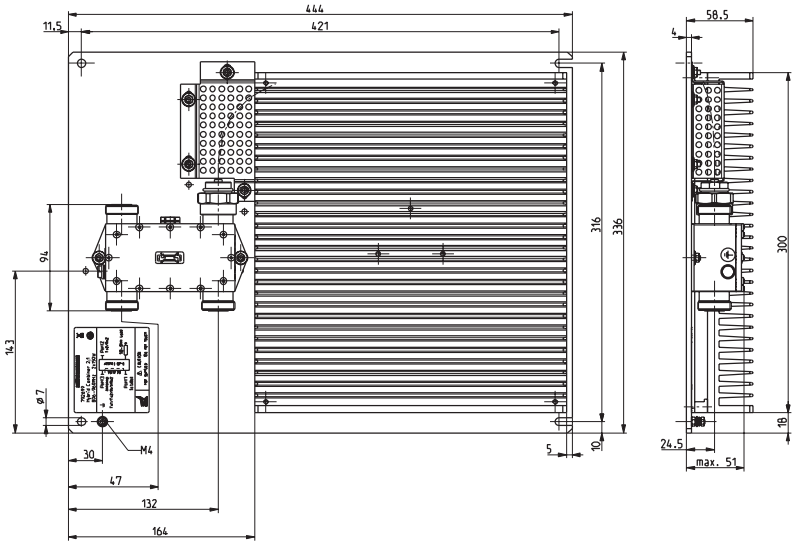
Hybrid Combiner 2:1
806 – 960 MHz
2 x 150 W

KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor applications
- Wall or 19˝ rack mounting
- DC bypass between port 1 and port 3
- External DC stop available as an accessory





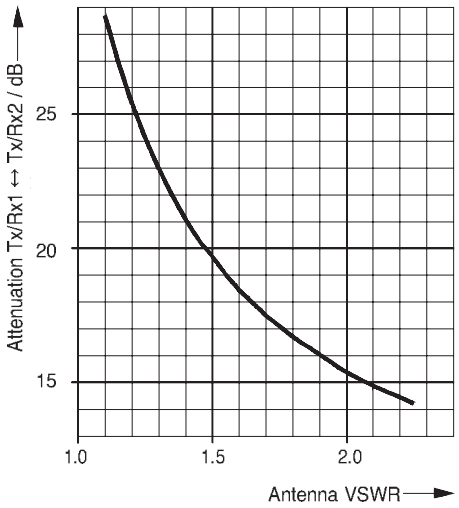


Technical Data

Type No.	792699
Frequency range	806 – 960 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±0.4 dB 3.1 ±0.4 dB > 27 dB *
VSWR (all ports)	< 1.11
Impedance	50 Ω
Input power Port 1 Port 2	 < 150 W (with max. 16 signals) < 150 W (with max. 16 signals)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +50 °C
Connectors	7-16 female
Application	Indoor
DC/AISG transparency Port 1 ↔ Port 3 Port 2	 Bypass (max. 2500 mA) Short circuit (External DC stop available as an accessory)
Mounting	Wall mounting: With 4 screws (max. 7 mm diameter) 19˝ rack mounting: To be inserted on pre-installed 19˝ sliding bars (2 height units required)
Weight	10.3 kg
Packing size	510 x 410 x 100 mm
Dimensions (w x h x d)	336 x 444 x 64 mm

* Valid if all ports are terminated with 50-Ω loads (see diagram).

Typical attenuation Tx/Rx1 ↔ Tx/Rx2 vs. Antenna VSWR



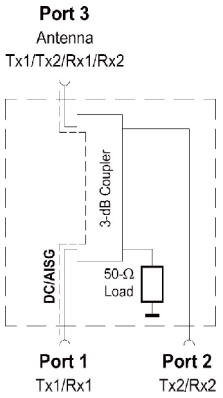
Note:
The input power rating of 150 W per port is specified at an ambient temperature of +55 °C with the combiner mounted vertically (see photo), without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).

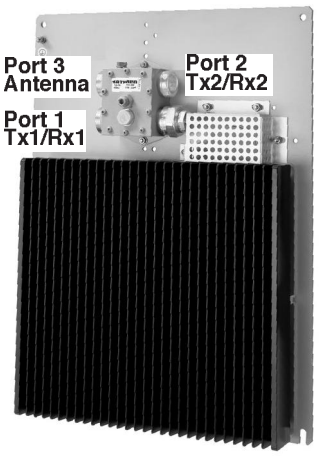
When installed in a 19˝ rack, it must be ensured that the max. power of 150 W is sufficiently dissipated, so that the ambient temperature does not rise above +50 °C. This can be achieved for example by the additional installation of a correspondingly dimensioned ventilator in the 19˝ rack or by reducing the maximum input power.

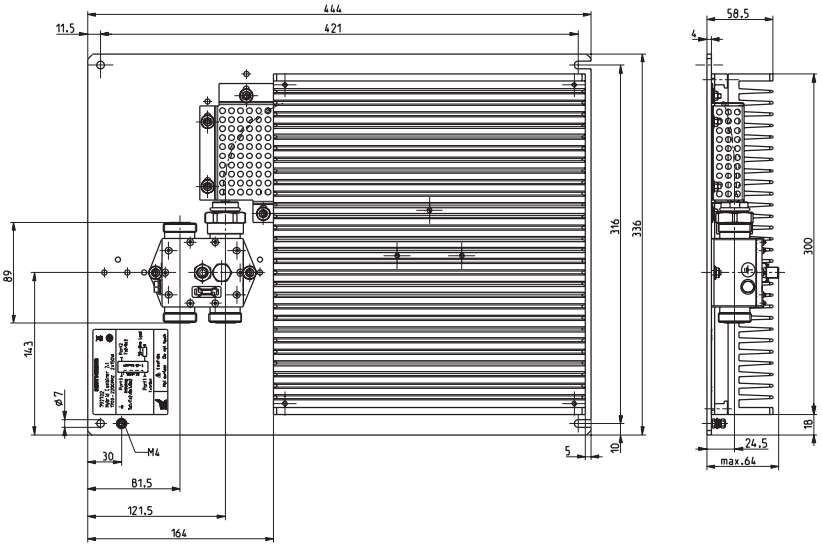
Hybrid Combiner 2:1
1700 – 2200 MHz
2 x 150 W

KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor applications
- Wall or 19´´ rack mounting
- DC bypass between port 1 and port 3
- External DC stop available as an accessory





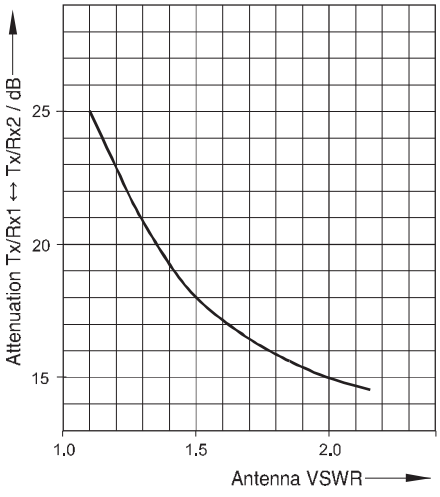


Technical Data

Type No.	792702
Frequency range	1700 – 2200 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±0.4 dB 3.1 ±0.4 dB > 24 dB*
VSWR (all ports)	< 1.15
Impedance	50 Ω
Input power Port 1 Port 2	 < 150 W (with max. 16 signals) < 150 W (with max. 16 signals)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +50 °C
Connectors	7-16 female
Application	Indoor
DC/AISG transparency Port 1 ↔ Port 3 Port 2	 Bypass (max. 2500 mA) Short circuit (External DC stop available as an accessory)
Mounting	Wall mounting: With 4 screws (max. 7 mm diameter) 19´´ rack mounting: To be inserted on pre-installed 19´´ sliding bars (2 height units required)
Weight	9.8 kg
Packing size	510 x 410 x 100 mm
Dimensions (w x h x d)	336 x 444 x 64 mm

* Valid if all ports are terminated with 50-Ω loads (see diagram).

Typical attenuation Tx/Rx1 ↔ Tx/Rx2 vs. Antenna VSWR



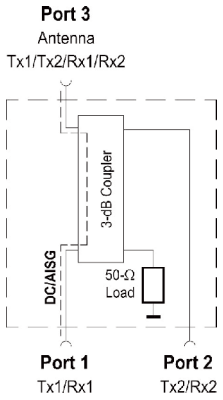
Note:
The input power rating of 150 W per port is specified at an ambient temperature of +55 °C with the combiner mounted vertically (see photo), without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).

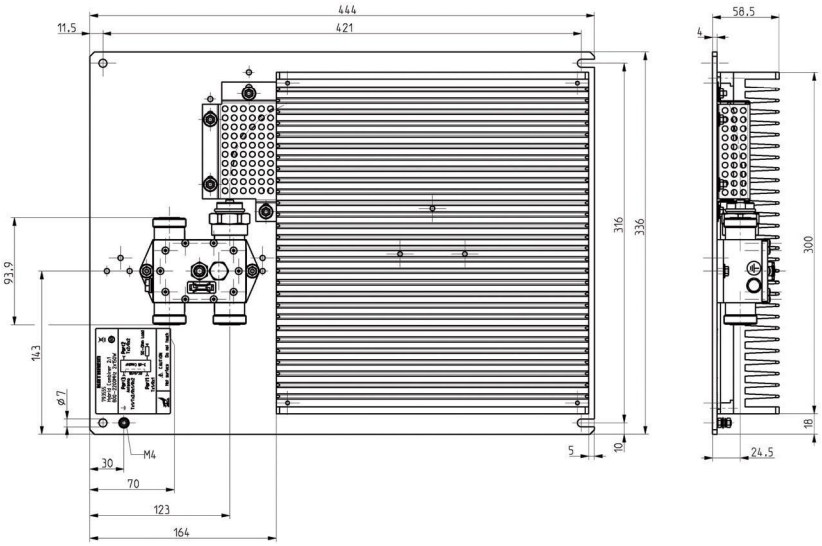
When installed in a 19´´ rack, it must be ensured that the max. power of 150 W is sufficiently dissipated, so that the ambient temperature does not rise above +50 °C. This can be achieved for example by the additional installation of a correspondingly dimensioned ventilator in the 19´´ rack or by reducing the maximum input power.

Hybrid Combiner 2:1
800 – 2200 MHz
2 x 150 W

KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor applications
- Wall or 19˝ rack mounting
- DC bypass between port 1 and port 3
- External DC stop available as an accessory



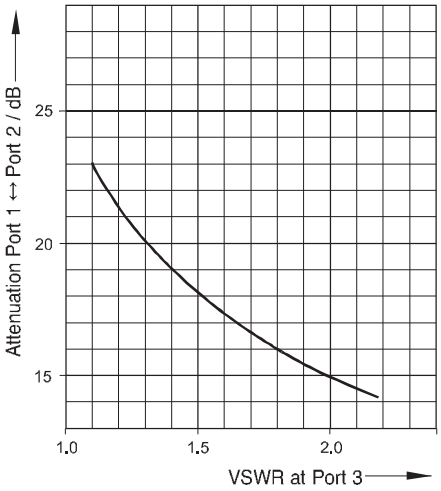


Technical Data

Type No.	793555
Frequency range	800 – 2200 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±1.2 dB 3.1 ±1.2 dB > 22 dB*
VSWR (all ports)	< 1.2
Impedance	50 Ω
Input power Port 1 Port 2	 < 150 W (with max. 16 signals) < 150 W (with max. 16 signals)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +50 °C
Connectors	7-16 female
Application	Indoor
DC/AISG transparency Port 1 ↔ Port 3 Port 2	 Bypass (max. 2500 mA) Short circuit (External DC stop available as an accessory)
Mounting	Wall mounting: With 4 screws (max. 7 mm diameter) 19˝ rack mounting: To be inserted on pre-installed 19˝ sliding bars (2 height units required)
Weight	10 kg
Packing size	510 x 410 x 100 mm
Dimensions (w x h x d)	336 x 444 x 58.5 mm

* Valid if all ports are terminated with 50-Ω loads (see diagram)

Typical attenuation Port 1 ↔ Port 2 vs. VSWR at Port 3



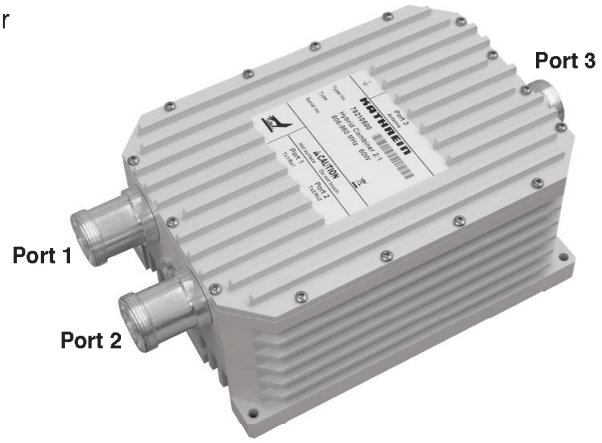
Note:
The input power rating of 150 W per port is specified at an ambient temperature of +55 °C with the combiner mounted vertically (see photo), without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).

When installed in a 19˝ rack, it must be ensured that the max. power of 150 W is sufficiently dissipated, so that the ambient temperature does not rise above +50 °C. This can be achieved for example by the additional installation of a correspondingly dimensioned ventilator in the 19˝ rack or by reducing the maximum input power.

Hybrid Combiner 2:1
806 – 960 MHz
2 x 60 W

KATHREIN
Antennen · Electronic

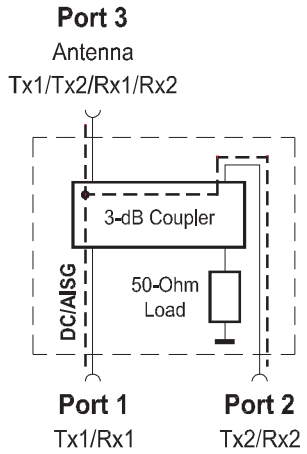
- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- DC bypass between all ports
- External DC stop available as an accessory



Technical Data

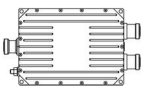
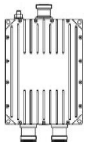
Type No.	78210500
Frequency range	806 – 960 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±0.5 dB 3.1 ±0.5 dB > 23 dB *
VSWR (all ports)	< 1.15
Impedance	50 Ω
Input power Port 1 Port 2	 < 60 W < 60 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +55 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency	Bypass between all ports (max. 2500 mA) AISG: Attenuation 3 dB with / 6 dB without external DC stop at either Port 1 or Port 2
Mounting	Wall mounting: With 4 screws (max. 6.5 mm diameter) Mast mounting: With additional clamp set (see data sheet)
Weight	3.7 kg
Packing size	377 x 232 x 189 mm
Dimensions (w x h x d)	143.6 x 258 x 97.5 mm (including connectors)

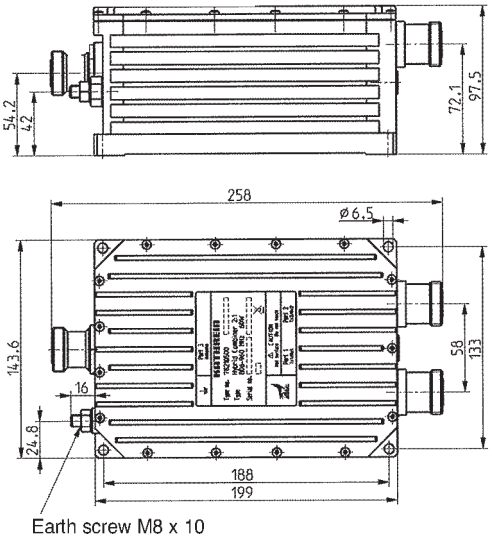
* Valid if all ports are terminated with 50-Ω loads.



Note:
The input power rating of 60 W per port is specified at an ambient temperature of +55 °C with the combiner mounted horizontally, without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).
If mounted vertically and/or used at a lower ambient temperature, then a higher input power in accordance with the following table is possible:

Max. input power per port

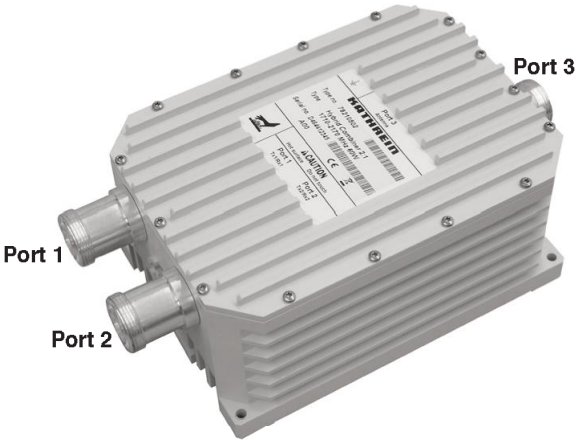
Max. ambient temperature	Mounted horizontally 	Mounted vertically 
+55 °C	**60 W**	70 W
+40 °C	70 W	80 W
+25 °C	75 W	85 W



Hybrid Combiner 2:1
1710 – 2170 MHz
2 x 60 W

KATHREIN
Antennen · Electronic

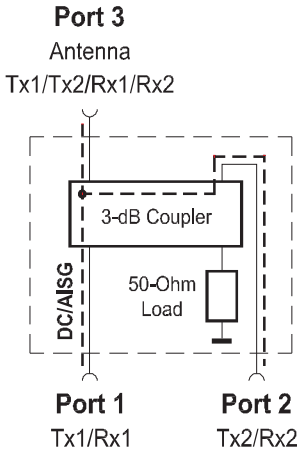
- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- DC bypass between all ports
- External DC stop available as an accessory



Technical Data

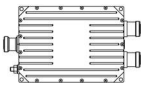
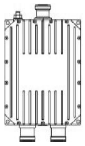
Type No.	78210502
Frequency range	1710 – 2170 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±0.5 dB 3.1 ±0.5 dB > 22 dB*
VSWR (all ports)	< 1.25
Impedance	50 Ω
Input power Port 1 Port 2	 < 60 W < 60 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +55 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency	Bypass between all ports (max. 2500 mA) AISG: Attenuation 3 dB with / 6 dB without external DC stop at either Port 1 or Port 2
Mounting	Wall mounting: With 4 screws (max. 6.5 mm diameter) Mast mounting: With additional clamp set
Weight	3.7 kg
Packing size	377 x 232 x 189 mm
Dimensions (w x h x d)	143.6 x 256 x 97.5 mm (including connectors)

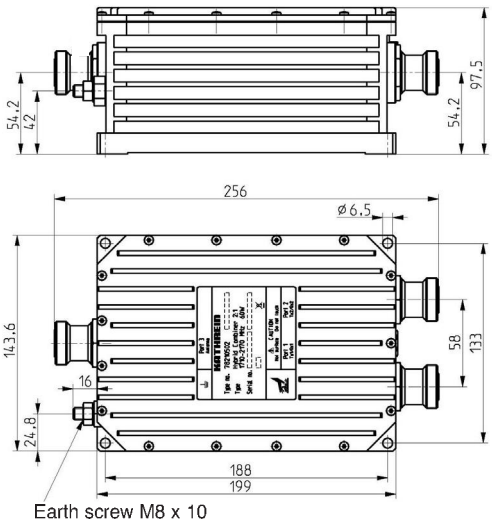
* Valid if all ports are terminated with 50-Ω loads.



Note:
The input power rating of 60 W per port is specified at an ambient temperature of +55 °C with the combiner mounted horizontally, without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).
If mounted vertically and/or used at a lower ambient temperature, then a higher input power in accordance with the following table is possible:

Max. input power per port

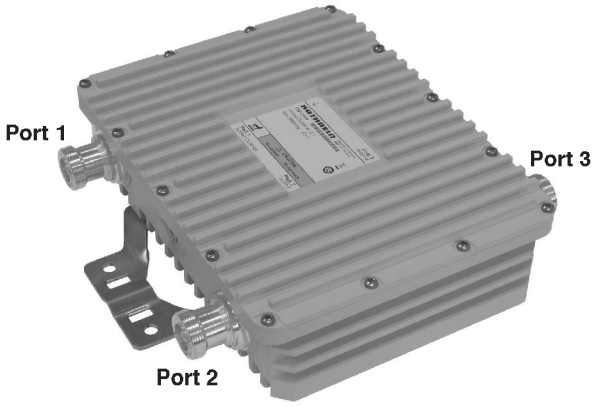
Max. ambient temperature	Mounted horizontally 	Mounted vertically 
+55 °C	**60 W**	70 W
+40 °C	70 W	80 W
+25 °C	75 W	85 W



Hybrid Combiner 2:1
698 – 2690 MHz
2 x 60 W

KATHREIN
Antennen · Electronic

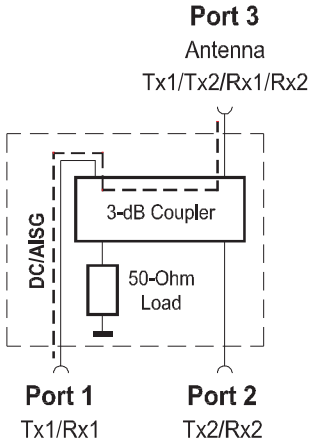
- Designed for the decoupled combining of 2 transmitter or receiver signals onto one common antenna
- The frequency spacing between transmitter signals can be as small as required
- **Excellent intermodulation performance**
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- DC bypass between port 1 and port 3



Technical Data

Type No.	78210504
Frequency range	698 – 2690 MHz
Attenuation Port 1 ↔ Port 3 Port 2 ↔ Port 3 Port 1 ↔ Port 2	 3.1 ±0.5 dB 3.1 ±0.5 dB > 23 dB*
VSWR (all ports)	< 1.2 (698 – 2170 MHz) / < 1.25 (2170 – 2690 MHz)
Impedance	50 Ω
Input power Port 1 Port 2	 < 60 W < 60 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +55 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency Port 1 ↔ Port 3 Port 2 ↔ Port 3	 Bypass (max. 2500 mA) Stop
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	4.3 kg
Packing size	385 x 345 x 168 mm
Dimensions (w x h x d)	264 x 203 x 72.5 mm (without connectors, without mounting brackets)

* Valid if all ports are terminated with 50-Ohm loads.



Note:
The input power rating of 60 W per port is specified at an ambient temperature of +55 °C with the combiner mounted vertically, without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).
If used at a lower ambient temperature, then a higher input power in accordance with the following table is possible:

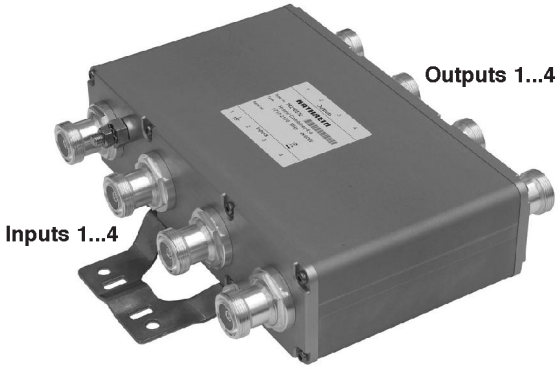
Max. input power per port

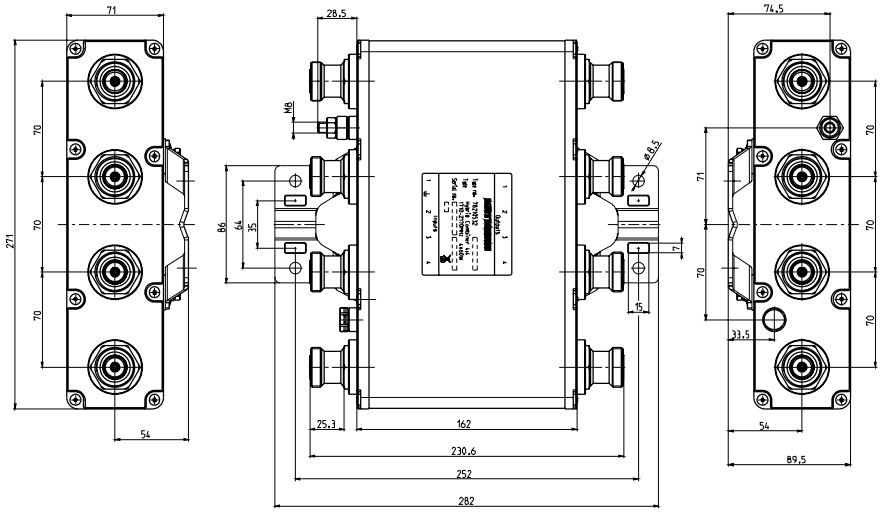
Max. ambient temperature	Mounted horizontally 	Mounted vertically 
+55 °C	55 W	**60 W**
+40 °C	70 W	75 W
+25 °C	80 W	85 W

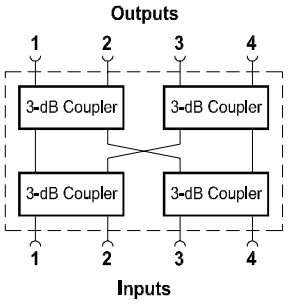
Hybrid Combiner 4:4
1710 – 2170 MHz
4 x 60 W

KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 4 transmitter or receiver signals and distributing these signals equally onto 4 antenna outputs
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- DC bypass between all ports
- External DC stop available as an accessory







Technical Data

Type No.	78210532
Frequency range	1710 – 2170 MHz
Insertion Loss Input 1...4 ↔ Output 1...4	0.5 dB ±0.2 dB
Power distribution loss (excluding insertion loss) Input 1...4 ↔ Output 1...4	6 ±0.75 dB
Isolation Input 1...4 ↔ Input 1...4 Output 1...4 ↔ Output 1...4	> 22 dB* > 22 dB*
VSWR (all ports)	< 1.25
Impedance	50 Ω
Input power	< 60 W at each port
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency	Bypass between all ports (max. 2500 mA) External DC stop available as an accessory
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	4.4 kg
Packing size	357 x 312 x 189 mm
Dimensions (w x h x d)	271 x 282 x 89.5 mm (including connectors and mounting brackets)

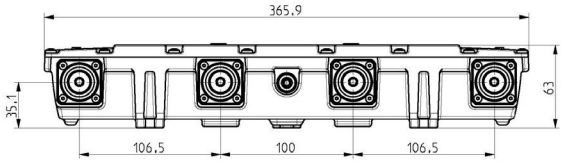
* Valid if all ports are terminated with 50-Ω loads

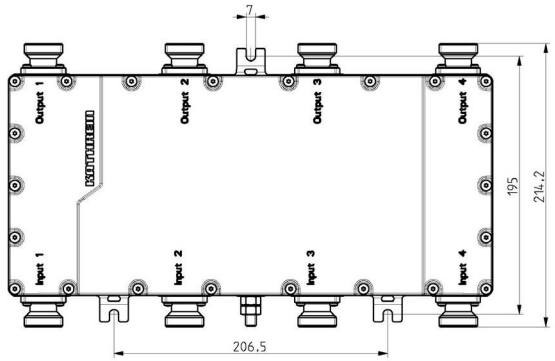
Note:
The use of fewer than 4 inputs or outputs is possible. Any unused input ports have to be terminated with low-power 50-Ohm loads (e.g. Kathrein type 784 10367), unused output ports have to be terminated with high-power 50-Ohm loads (e.g. Kathrein low-intermodulation type 782 10474).

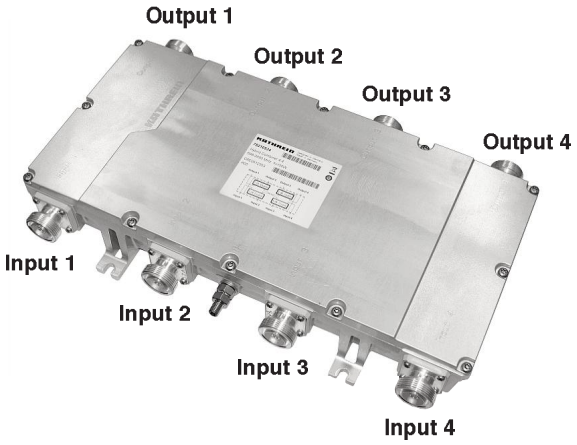
Hybrid Combiner 4:4
698 – 2690 MHz
4 x 150 W

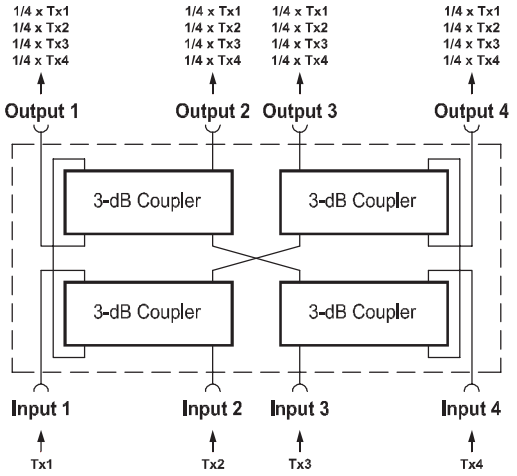
KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 4 transmitter or receiver signals and distributing these signals equally onto 4 antenna outputs
- Suitable for indoor or outdoor applications
- DC/AISG bypass
- External DC stop available as an accessory









Technical Data

Type No.	78210534
Frequency range	698 – 2690 MHz
Insertion loss Input 1...4 ↔ Output 1...4	0.35 ±0.15 dB } (typically 6.3 dB)
Power distribution loss (excluding insertion loss) Input 1...4 ↔ Output 1...4	6 ±0.75 dB } (typically 6.3 dB)
Isolation Input 1...4 ↔ Input 1...4 Output 1...4 ↔ Output 1...4	> 20 dB* (698 – 2690 MHz) > 20 dB* (698 – 2690 MHz)
VSWR (all ports)	< 1.22 (698 – 2170 MHz) < 1.4 (2170 – 2690 MHz)
Impedance	50 Ω
Input power	< 150 W at each input port
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency	Bypass (max. 2500 mA) between Input 1 ↔ Output 4 / Input 2 ↔ Output 2 / Input 3 ↔ Output 3 / Input 4 ↔ Output 1 External DC stop available as an accessory
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional mounting kit
Weight	4.5 kg
Packing size	453 x 125 x 273 mm
Dimensions (w x h x d)	365.9 x 214.2 x 63 mm (with connectors and mounting feet)

* Valid if all ports are terminated with 50-Ohm loads

Note:
The use of fewer than 4 inputs or outputs is possible. Any unused input ports have to be terminated with low-power 50-Ohm loads (e.g. Kathrein type 78410367), unused output ports have to be terminated with high-power 50-Ohm loads (e.g. Kathrein low-intermodulation type 78210474).

Accessories (order separately)

Type No.	Description
78210850	DC stop
78210474	50-Ohm load (80 W)
78410367	50-Ohm load (1.5 W)
78210535	Mast mounting kit

DC stop

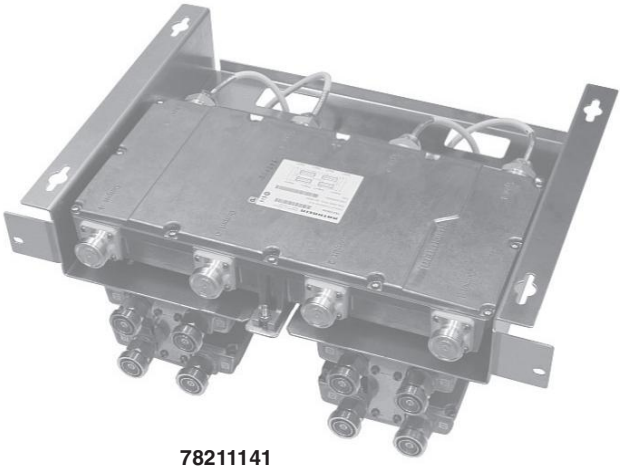
50-Ohm load

50-Ohm load

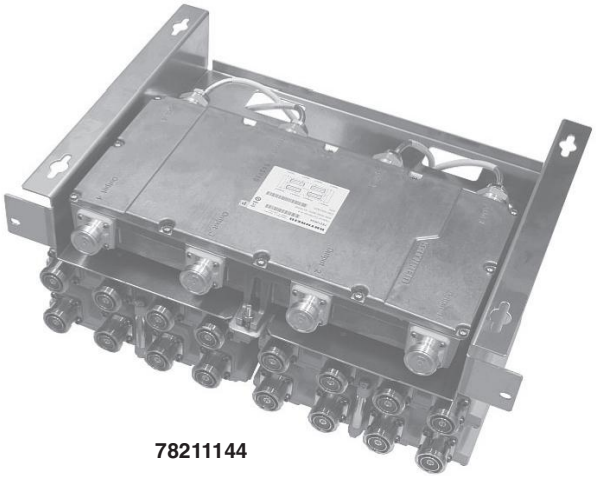
Hybrid Combiner
8:4 / 8:4 / 12:4 / 16:4

KATHREIN
Antennen · Electronic

- Designed for the decoupled combining of 8/12/16 transmitter or receiver signals and distributing these signals evenly onto 4 antenna outputs.



78211141

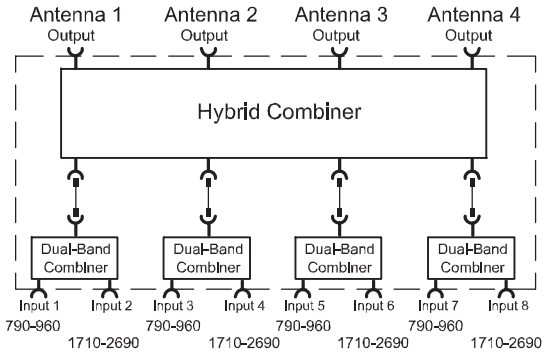


78211144

Technical Data

Type No.	78211141 8 : 4	78211142 8 : 4	78211143 12 : 4	78211144 16 : 4
Frequency range Band 1 Band 2 Band 3 Band 4	698 – 960 MHz 1710 – 2690 MHz	1710 – 1880 MHz 1920 – 2170 MHz	698 – 960 MHz 1710 – 1880 MHz 1920 – 2170 MHz	698 – 960 MHz 1710 – 1880 MHz 1920 – 2170 MHz 2500 – 2690 MHz
Power distribution loss (excluding insertion loss) Input 1 ... 8/12/16 ↔ Output 1 ... 4	6 ±0.75 dB } (typically 6.5 dB)			
Insertion loss Input 1 ... 8/12/16 ↔ Output 1 ... 4	< 0.8 dB }			
Isolation between input ports Same bands Different bands	> 22 dB > 50 dB			
Impedance	50 Ω			
Input power at each input port	< 75 W	< 75 W	< 50 W	< 50 W
Intermodulation products	< – 160 dBc (3rd order; with 2 x 20 W)			
Temperature range	–40 ... +60 °C			
Connectors	7-16 female			
Application	Indoor			
Mounting	Wall mounting: With 4 screws (max. 6 mm diameter) / 19“-drawer			
Weight	Approx. 13 kg	Approx. 19 kg	Approx. 21 kg	Approx. 22 kg

Note:
The use of fewer than 8/12/16 inputs or 4 outputs is possible. Any unused input ports have to be terminated with low-power 50-Ohm loads (e.g. Kathrein type 78410367), unused output ports have to be terminated with high-power 50-Ohm loads (e.g. Kathrein low-intermodulation type 78210474).



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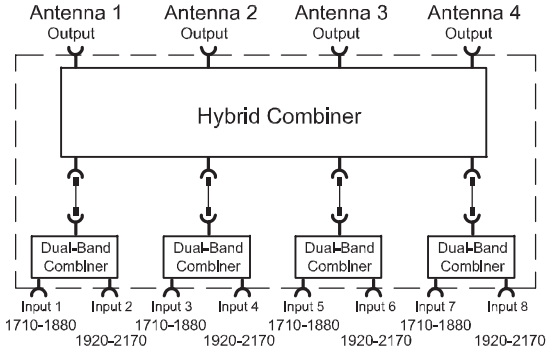
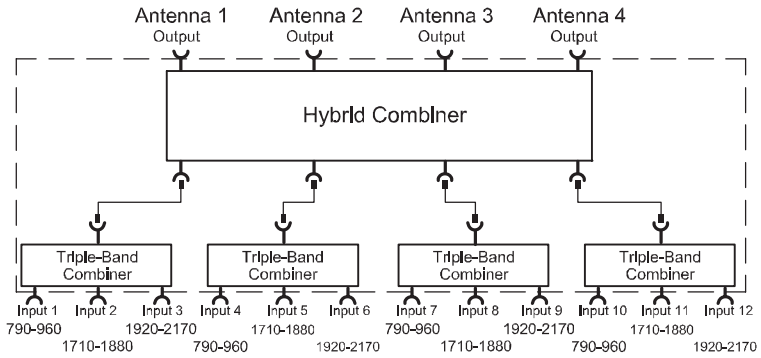
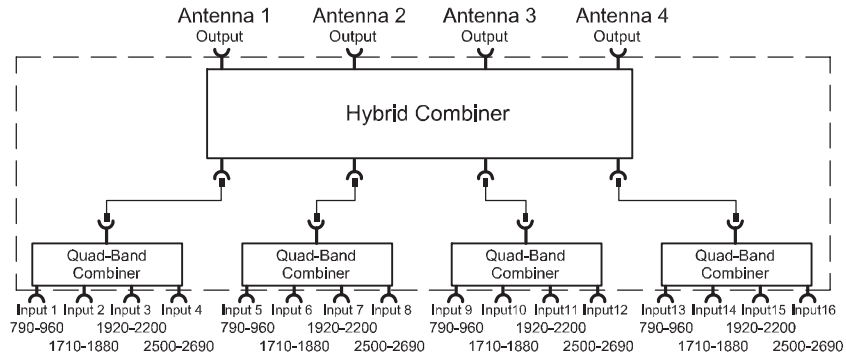


78211142



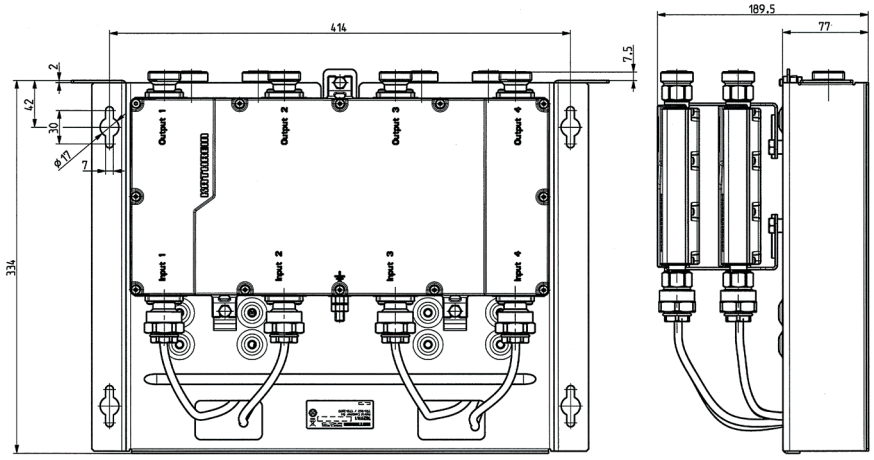
78211143

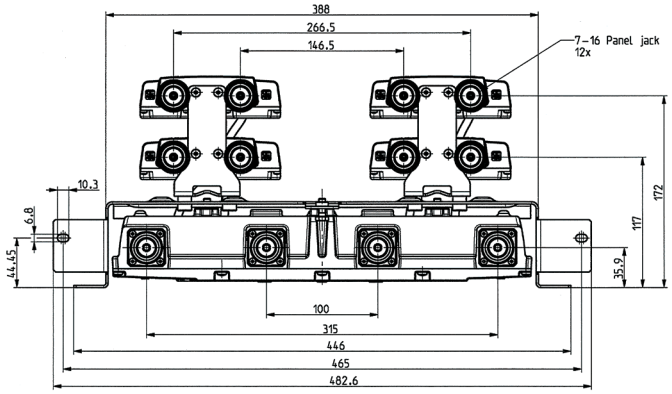


78211144

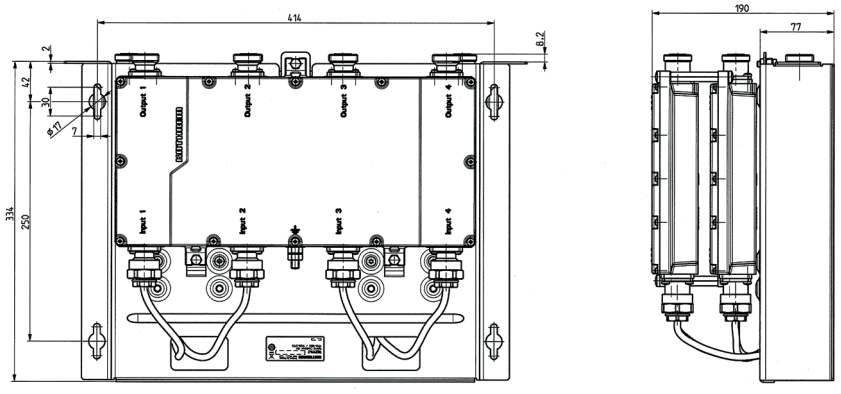
Hybrid Combiner
8:4 / 8:4 / 12:4 / 16:4

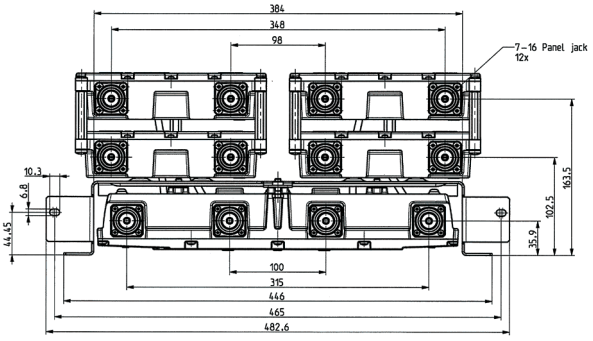
KATHREIN
Antennen · Electronic





78211141





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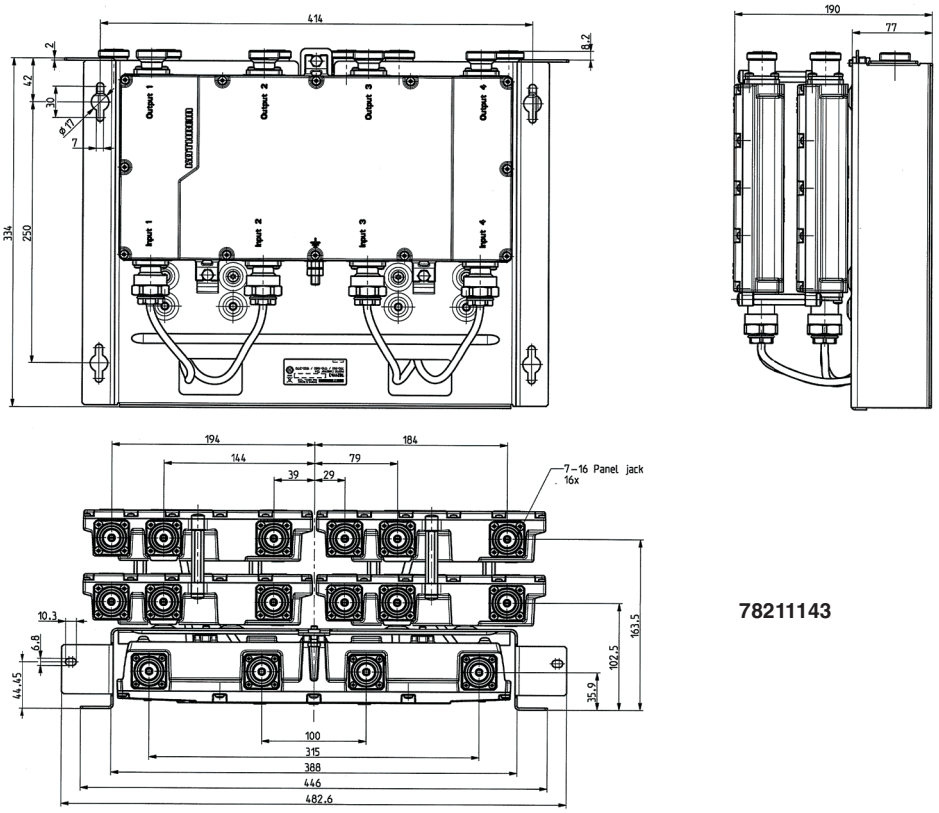

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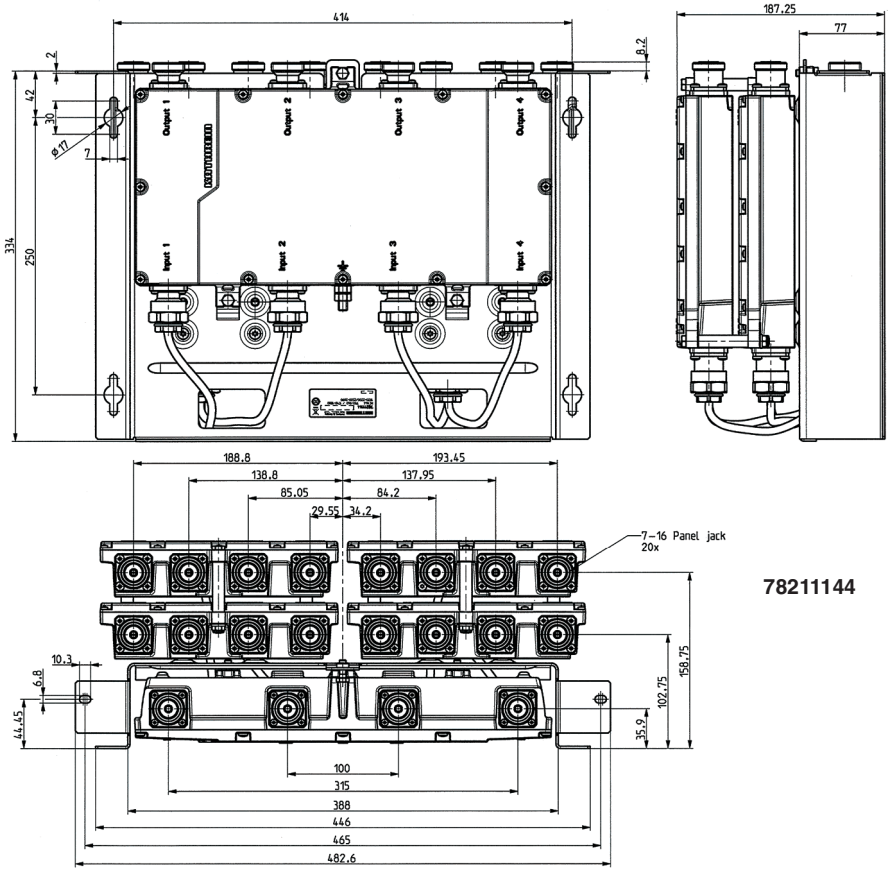


78211144

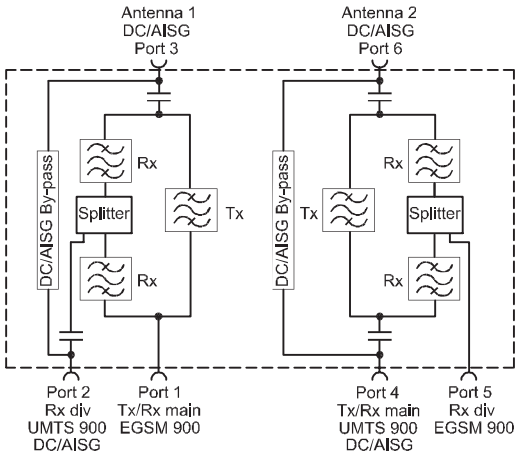
Duplex Hybrid Combiner (Same-Band Combiner)

KATHREIN
Antennen · Electronic

880 – 960 MHz
EGSM 900

880 – 960 MHz
UMTS 900

- Enables antenna and feeder sharing for two base stations in the 900 MHz frequency band
- Very low insertion loss over full EGSM/UMTS 900 Tx bandwith compared to standard hybrid combiners
- Double unit in one housing for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG bypass for DTMA supply (for UMTS paths only)
- Rx diversity ports protected against incorrectly connected Tx power



Typical Attenuation Curves

Diagram I — Port 1 ↔ Port 3, Port 4 ↔ Port 6

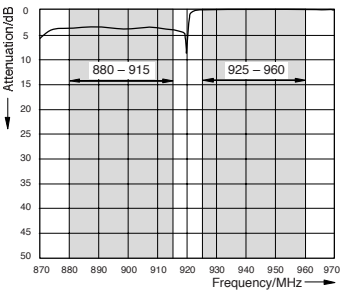


Diagram II — Port 1 ↔ Port 3, Port 4 ↔ Port 6

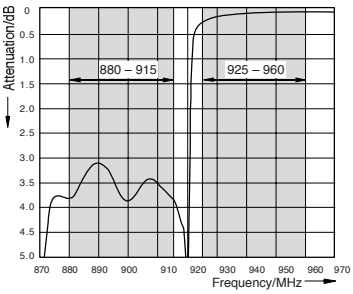


Diagram III — Port 2 ↔ Port 3, Port 5 ↔ Port 6

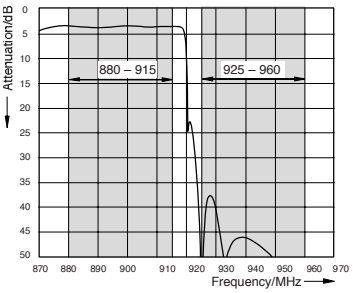
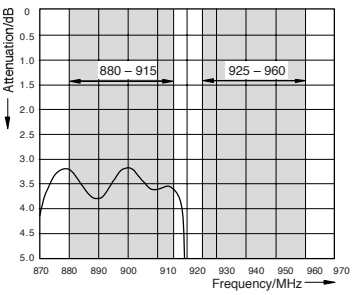


Diagram IV — Port 2 ↔ Port 3, Port 5 ↔ Port 6



Technical Data

Type No.	78210805	
Pass band Rx Tx	 880 – 915 MHz 925 – 960 MHz	
Insertion loss Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 < 0.4 dB, typically 0.2 dB (925 – 960 MHz) – see Diagram I and II < 4.3 dB, typically 3.6 dB (880 – 915 MHz) – see Diagram I and II < 4.0 dB, typically 3.5 dB (880 – 915 MHz) – see Diagram III and IV	
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	 > 25 dB (880 – 915 MHz) > 35 dB (925 – 960 MHz)	
VSWR	< 1.2 (880 – 915 / 925 – 960 MHz)	
Impedance	50 Ω	
Input power	Port 1: < 250 W Port 4: < 250 W	Port 2: < 50 W Port 5: < 50 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Connectors	7-16 female (long neck)	
Application	Indoor or outdoor (IP 66)	
DC/AISG transparency Port 1 ↔ Port 3 / Port 5 ↔ Port 6 Port 2 ↔ Port 3 / Port 4 ↔ Port 6	 Stop Bypass (max. 2500 mA)	
Lightning protection	3 kA, 10/350 µs pulse	
Mounting	With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	6.5 kg	
Packing size	390 x 470 x 160 mm	
Dimensions (w x h x d)	287.1 x 278.6 x 71 mm (without connectors, without mounting brackets)	

Duplex Hybrid Combiner (Same-Band Combiner)

KATHREIN
Antennen · Electronic

880 – 960 MHz
EGSM 900

880 – 960 MHz
UMTS 900

Accessories (order separately)

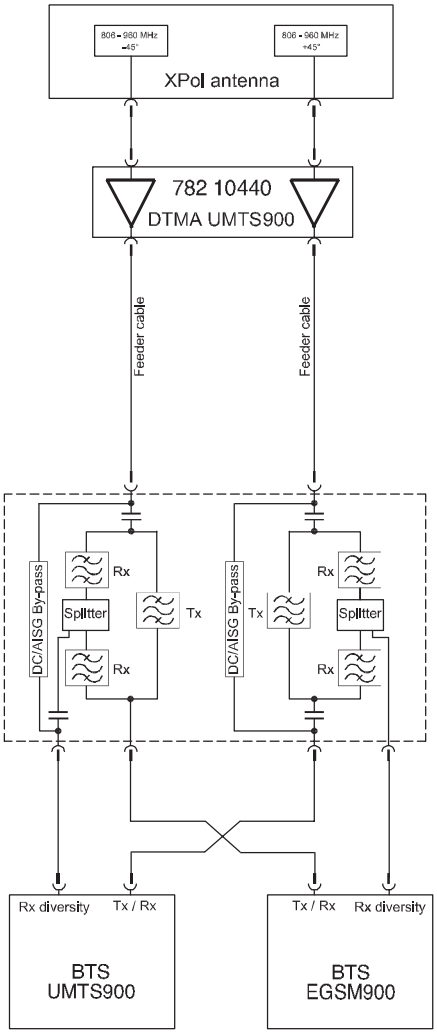
Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
793301	DC stop
78410367	50-Ω load 1.5 W indoor or outdoor

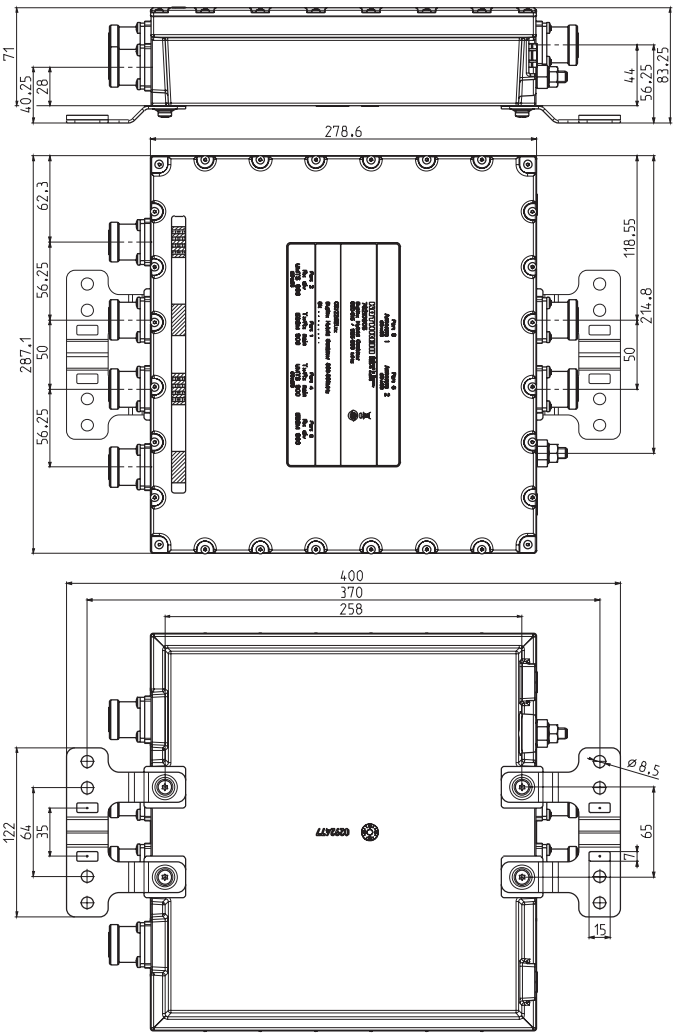
Clamp Set

DC stop

50-Ω load



Application example



Active Duplex Hybrid Combiner (Same-Band Combiner)

KATHREIN
Antennen · Electronic

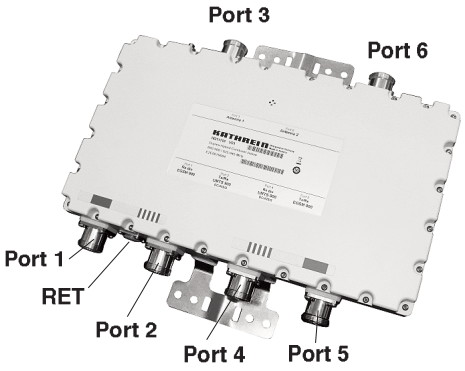
880 ... 960 MHz
EGSM 900

880 ... 960 MHz
UMTS 900

- Enables antenna and feeder sharing for two base stations in the 900 MHz frequency band
- 12 dB gain over 20 MHz Rx bandwidth (factory tunable)
- Very low insertion loss over 20 MHz Tx bandwidth (factory tunable) compared to standard hybrid combiners
- Double unit in one housing for XPol antennas
- Suitable for indoor or outdoor applications
- Supports AISG 1.1 and AISG 2.0 (default)
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode (LNA) to ensure cell operation in case of DC power down
- Built-in lightning protection

Frequency ordering information:
When ordering please specify the required Tx-and Rx-frequencies
Examples of tuning versions:
78211110V01: Rx 880 – 900 MHz, Tx 925 – 945 MHz
78211110V02: Rx 895 – 915 MHz, Tx 940 – 960 MHz
Other frequencies on request.

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm



Technical Data

Type No.	78211110	
Pass band Rx Tx	20 MHz within 880 ... 915 MHz (factory tunable) 20 MHz within 925 ... 960 MHz (factory tunable)	
Tx Insertion loss Port 2 ↔ Port 3 / Port 5 ↔ Port 6	< 0.2 dB (925 – 945 MHz)* – see Diagram I and II	
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	> 25 dB (880 – 900 MHz)* > 65 dB (925 – 945 MHz)*	
Gain	12 dB nominal	
Gain ripple	±1 dB	
Loss in bypass mode	< 5.5 dB (DC OFF)	
Return loss	> 18 dB (DC ON) / > 12 dB (DC OFF)	
Noise figure	< 1.6 dB (+22 ... +28 °C)	
Output 1-dB compression point	> 11 dBm	
3rd order intercept point (OIP3)	> 25 dBm (typically 30 dBm)	
VSWR	< 1.25 (880 – 900 / 925 – 945 MHz)*	
Impedance	50 Ω	
Input power	Port 2 < 200 W Port 5 < 200 W	
Intermodulation products	< 160 dBc (5th order, with 2 x 20 W)	
Environmental Characteristics		
Operating temperature range	–40 … +65 °C	
IP rating	IP67 (see note on page 2)	
MTBF	> 1 000 000 hours (per TMA)	
EMC	According to ETS 300 342-3	
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V	9 – 30 V
Operating current per TMA (without RET)	80 – 120 mA	Nom. 20 mA at 9 V Nom. 30 mA at 30 V
Alarm management	170 – 200 mA	AISG (see note on page 2)
Mechanical Characteristics		
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)	
Mounting	Wall mounting: with 4 screws (max. 8 mm diameter) Mast mounting: with additional clamp set	
Weight	6.8 kg	
Packing size	460 x 375 x 135 mm	
Dimensions (w x h x d)	369 x 209 x 68 mm (without connectors, without mounting brackets)	

* Tuning version 78211110V01: Rx 880 – 900 MHz, Tx 925 – 945 MHz

Active Duplex Hybrid Combiner (Same-Band Combiner)

KATHREIN
Antennen · Electronic

880 ... 960 MHz EGSM 900	880 ... 960 MHz UMTS 900

Accessories (order separately)

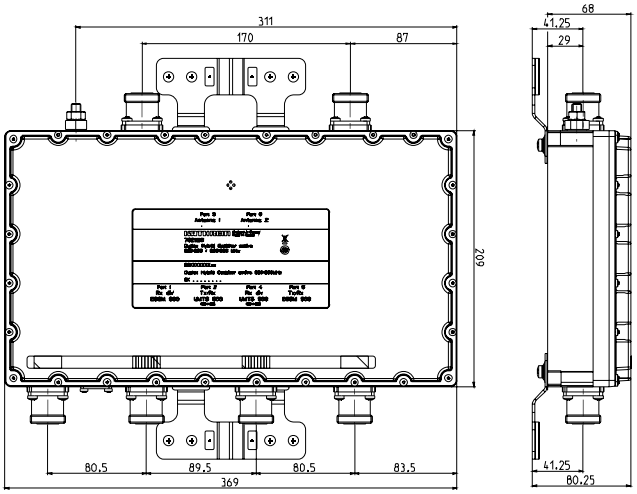
Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

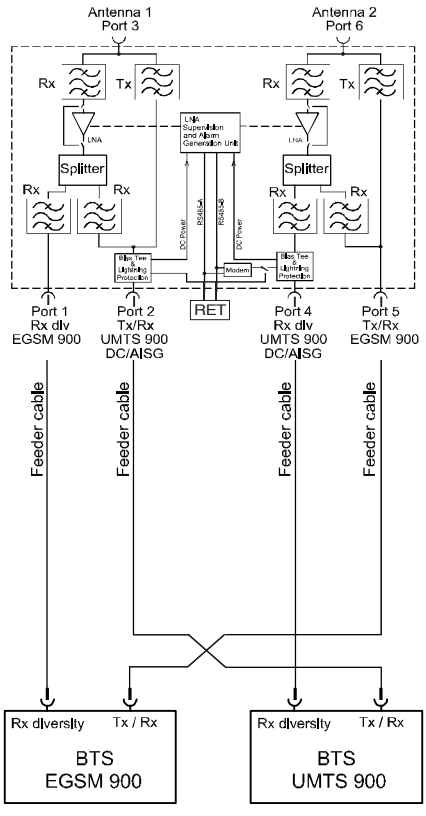
Type No.	Description
793301	**DC stop**
78410367	**50-Ω load** 1.5 W / indoor or outdoor

Clamp Set

DC stop

50-Ω load





Application example

AISG
Antenna Interface Standards Group

Typical Attenuation Curves

Tuning example 78211110V01
Rx: 880 – 900 MHz, Tx: 925 – 945 MHz

Diagram I

Port 2 ↔ Port 3
Port 5 ↔ Port 6

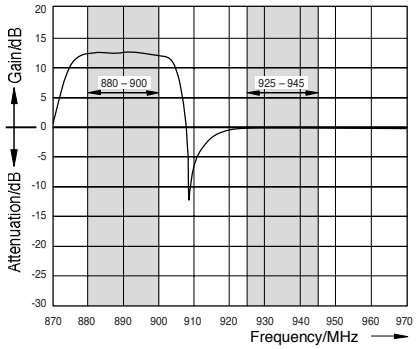


Diagram II

Port 2 ↔ Port 3
Port 5 ↔ Port 6

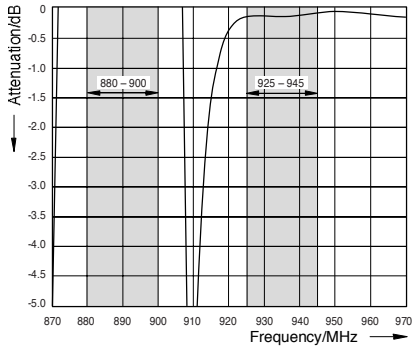


Diagram III

Port 1 ↔ Port 3
Port 4 ↔ Port 6

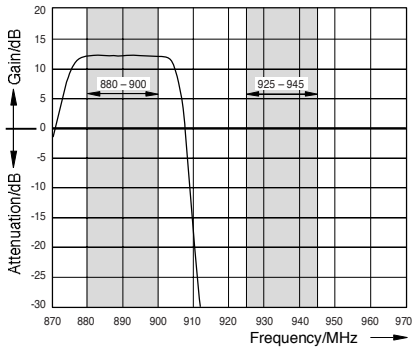
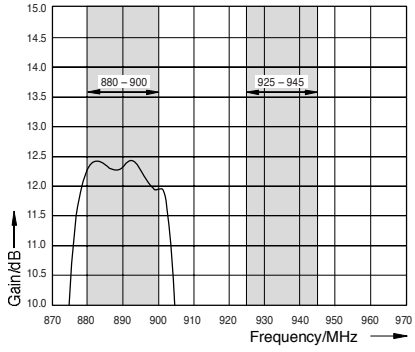


Diagram IV

Port 1 ↔ Port 3
Port 4 ↔ Port 6



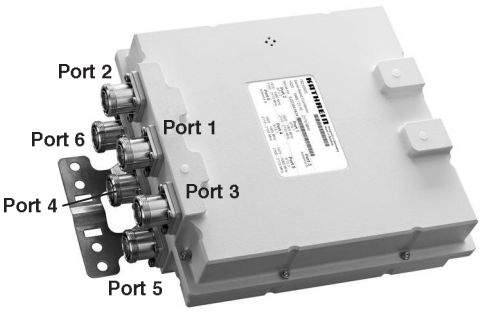
Same-Band Combiner

KATHREIN
Antennen · Electronic

1920 – 1980 / 2110 – 2170 MHz
UMTS 2100

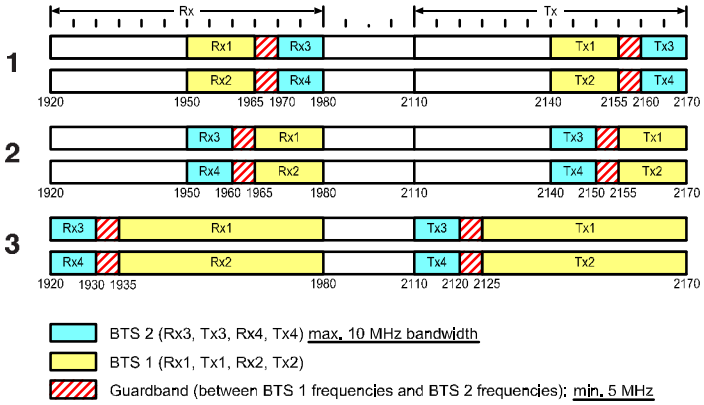
1920 ... 1980 / 2110 ... 2170 MHz
UMTS 2100 (10 MHz Bandwidth)

- Enables antenna and feeder sharing for two base stations in the same frequency band
- Customized 10 MHz Tx/Rx bandpass filters (factory tunable) available for inserting a second UMTS 2100 base station
- Full pass-band (without the second UMTS 2100 10 MHz Tx/Rx frequency blocks) available for the first UMTS 2100 base station
- Low insertion loss over complete UMTS 2100 Tx/Rx bandwidth compared to standard hybrid combiners
- Double unit for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG by-pass for DTMA supply

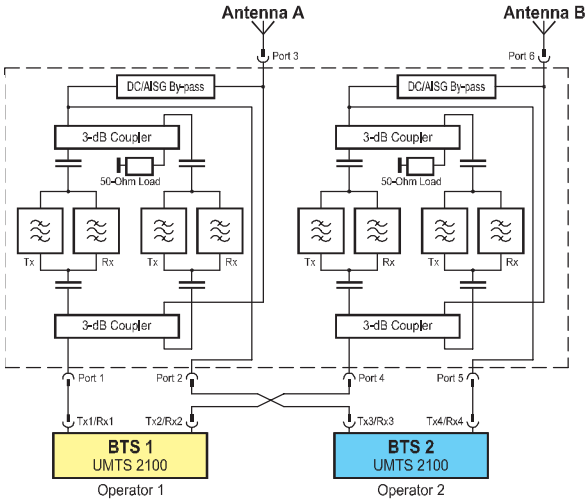


Frequency ordering information:
When ordering please specify the required Tx- and Rx-frequencies
e.g. (tuning example 1)
Rx1/Rx2 1950 – 1965 MHz, Rx3/Rx4 1970 – 1980 MHz
TX1/Tx2 2140 – 2155 MHz, TX3/Tx4 2160 – 2170 MHz

Tuning Examples



Block Diagram



Technical Data

Type No.	78210925
Pass band BTS 1 (UMTS 2100) BTS 2 (UMTS 2100)	Rx = 1920 – 1980 / Tx = 2110 – 2170 MHz (without assigned BTS 2 10 MHz Tx/Rx frequency blocks and ±5 MHz guard bands) Rx = 1920 ... 1980 / Tx = 2110 ... 2170 MHz (factory tunable 10 MHz frequency blocks)
Guard band	5 MHz (between Tx1/Rx1 and Tx3/Rx3, between Tx2/Rx2 and Tx4/Rx4 e.g. tuning example 1: Rx1 (Rx2) = 1950 – 1965 and Tx1 (Tx2) = 2140 – 2155 MHz Rx3 (Rx4) = 1970 – 1980 and Tx3 (Tx4) = 2160 – 2170 MHz
Insertion loss Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	< 1.2 dB – see diagram I and II for tuning example 1 < 1.2 dB – see diagram III and IV for tuning example 1
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	> 30 dB (1920 – 1980 / 2110 – 2170 MHz)
VSWR	< 1.25 (pass bands)
Impedance	50 Ω
Input power Tx1 / Tx2 / Tx3 / Tx4	< 100 W / < 100 W / < 100 W / < 100 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP66)
DC/AISG transparency Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 Stop By-pass (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set
Weight	7 kg
Packing size	425 x 315 x 180 mm
Dimensions (w x h x d)	243 x 240 x 100 mm (without connectors, without mounting brackets)

Same-Band Combiner

KATHREIN
Antennen · Electronic

1920 – 1980 / 2110 – 2170 MHz
UMTS 2100

1920 ... 1980 / 2110 ... 2170 MHz
UMTS 2100 (10 MHz Bandwidth)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Type No.	Description
78410367	**50-Ohm load**

Clamp Set

50-Ohm load

Typical Attenuation Curves (Tuning Example 1)

BTS 1 (UMTS 2100)

Diagram I (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)

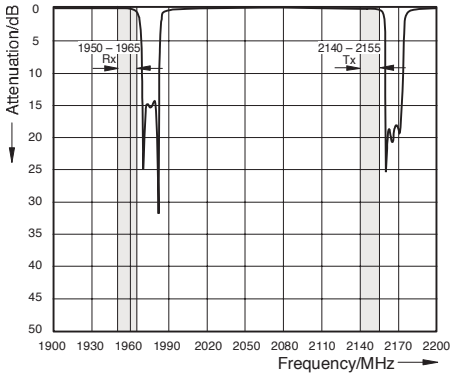
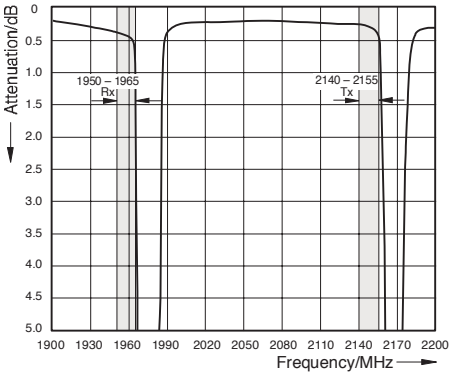


Diagram II (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)



BTS 2 (UMTS 2100)

Diagram III (Port 2 ↔ Port 3 / Port 5 ↔ 6)

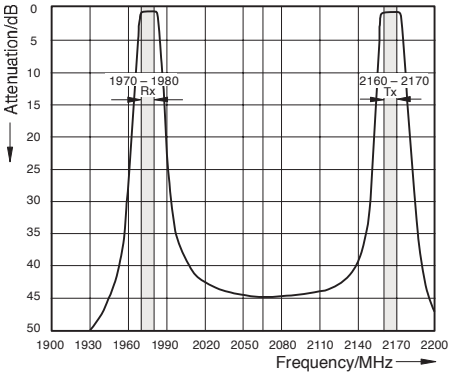
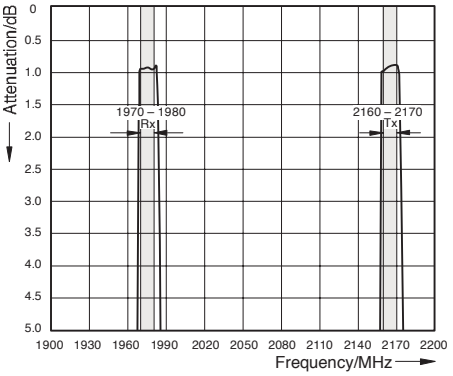
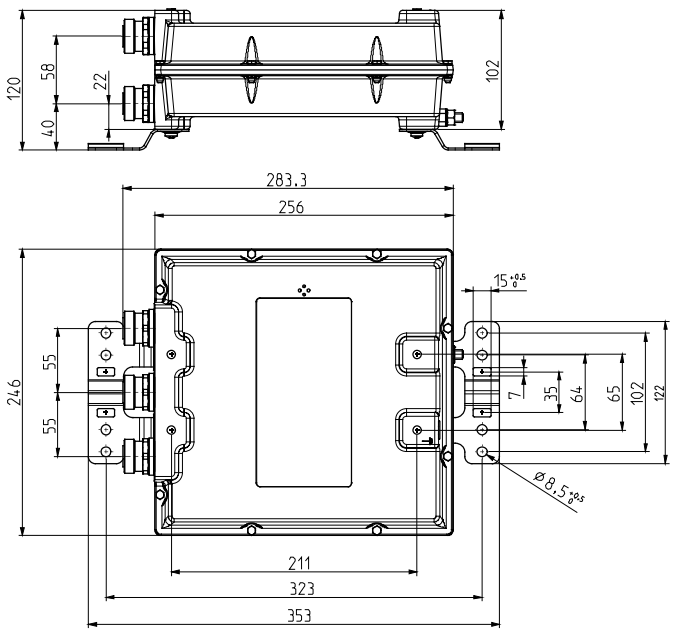


Diagram IV (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)





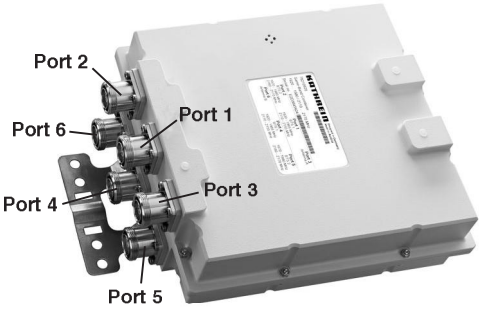
Same-Band Combiner

KATHREIN
Antennen · Electronic

1920 – 1980 / 2110 – 2170 MHz
UMTS 2100

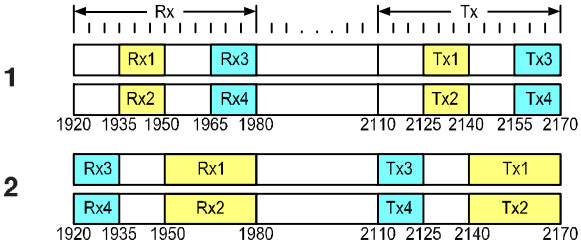
1920 ... 1980 / 2110 ... 2170 MHz
UMTS 2100 (15 MHz Bandwidth)

- Enables antenna and feeder sharing for two base stations in the same frequency band
- Customized 15 MHz Tx/Rx bandpass filters (factory tunable) available for inserting a second UMTS 2100 base station
- Full pass-band (without the second UMTS 2100 15 MHz Tx/Rx frequency blocks) available for the first UMTS 2100 base station
- Low insertion loss over complete UMTS 2100 Tx/Rx band-width compared to standard hybrid combiners
- Double unit for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG by-pass for DTMA supply

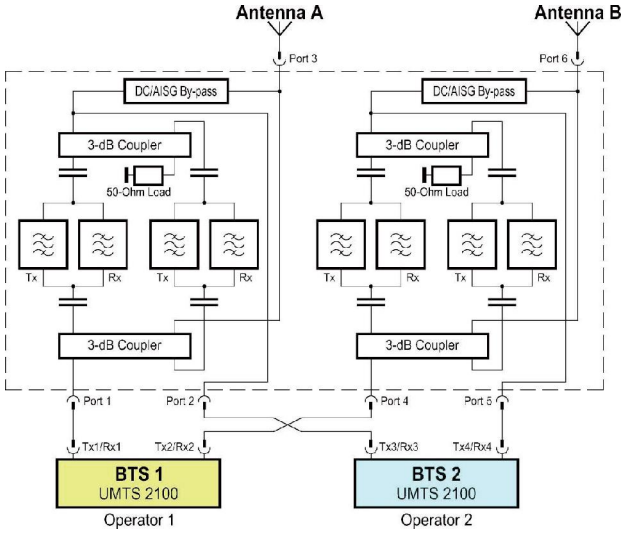


Frequency ordering information:
When ordering please specify the required Tx- and Rx-frequencies e.g. (tuning example 1)
Rx1/Rx2 1935 – 1950 MHz, Rx3/Rx4 1965 – 1980 MHz,
Tx1/Tx2 2125 – 2140 MHz, Tx3/Tx4 2155 – 2170 MHz

Tuning Examples



Block Diagram



Technical Data

Type No.	78210926
Pass band BTS 1 (UMTS 2100) BTS 2 (UMTS 2100)	 Rx = 1920 – 1980 / Tx = 2110 – 2170 MHz (without assigned BTS 2 15 MHz Tx/Rx frequency blocks and ±15 MHz guard bands) Rx = 1920 ... 1980 / Tx = 2110 ... 2170 MHz (factory tunable 15 MHz frequency blocks)
Guard band	15 MHz (between Tx1/Rx1 and Tx3/Rx3, between Tx2/Rx2 and Tx4/Rx4 e.g. tuning example 1: Rx1 (Rx2) = 1935 – 1950 and Tx1 (Tx2) = 2125 – 2140 MHz Rx3 (Rx4) = 1965 – 1980 and Tx3 (Tx4) = 2155 – 2170 MHz
Insertion loss Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 < 1.2 dB < 1.2 dB
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	 > 28 dB (1920 – 1980 / 2110 – 2170 MHz)
VSWR	< 1.25 (pass bands)
Impedance	50 Ω
Input power Tx1 / Tx2 / Tx3 / Tx4	 < 100 W / < 100 W / < 100 W / < 100 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP66)
DC/AISG transparency Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 Stop By-pass (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse
Packing size	425 x 315 x 180 mm
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set
Weight	7 kg
Dimensions (w x h x d)	246 x 256 x 102 mm (without connectors, without mounting brackets)

Same-Band Combiner

KATHREIN
Antennen · Electronic

1920 – 1980 / 2110 – 2170 MHz
UMTS 2100

1920 ... 1980 / 2110 ... 2170 MHz
UMTS 2100 (15 MHz Bandwidth)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Type No.	Description
78410367	**50-Ohm load**

Clamp Set

50-Ohm load

Typical Attenuation Curves (Tuning Example 1)

BTS 1 (UMTS 2100)

Diagram I (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)

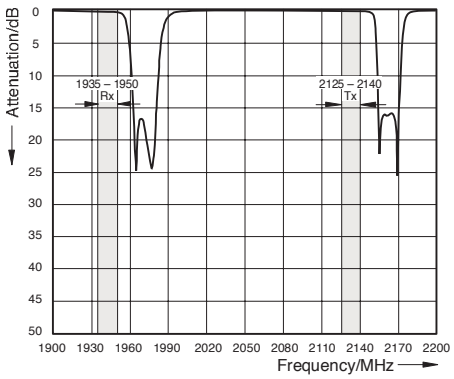
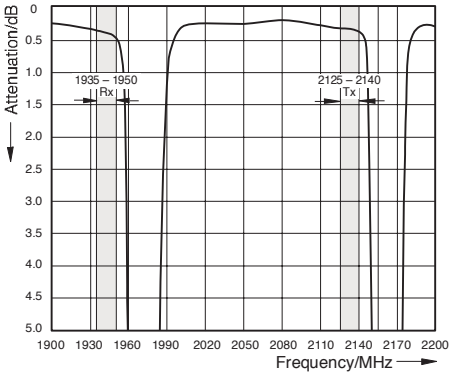


Diagram II (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)



BTS 2 (UMTS 2100)

Diagram III (Port 2 ↔ Port 3 / Port 5 ↔ 6)

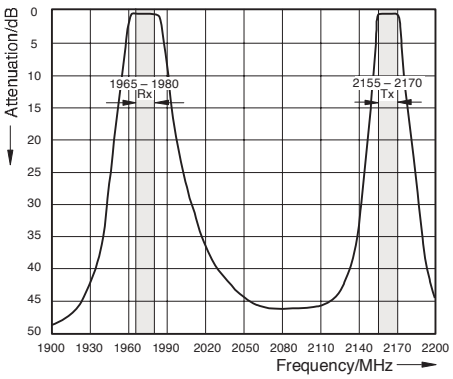
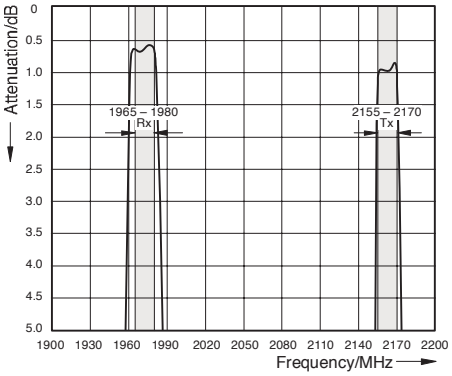
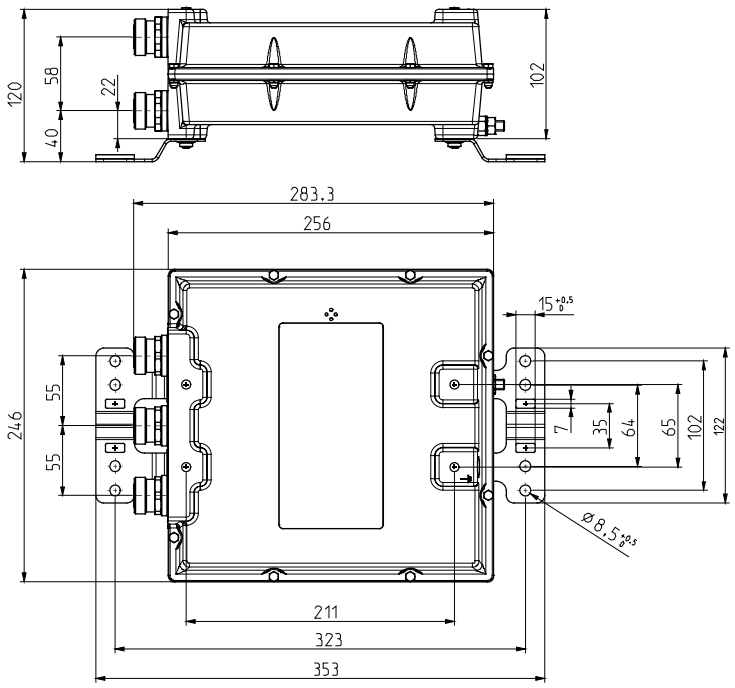


Diagram IV (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)





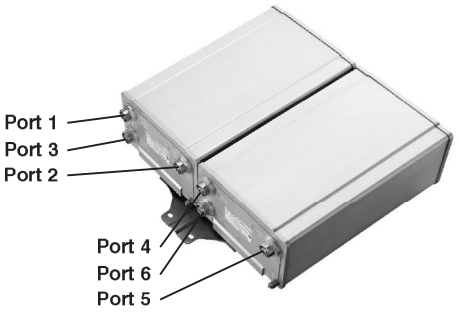
Same-Band Combiner

KATHREIN
Antennen · Electronic

880 – 915 / 925 – 960 MHz
GSM 900

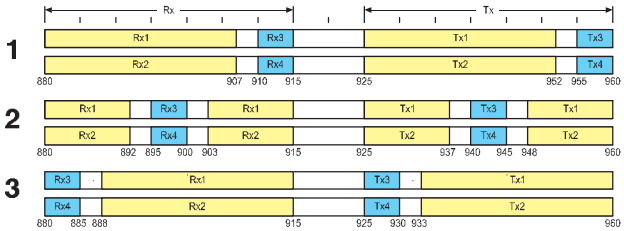
880 ... 915 / 925 ... 960 MHz
LTE / UMTS 900 (5 MHz Bandwidth)

- Enables antenna and feeder sharing for two base stations in the same frequency band
- Suitable for two operators with frequency allocations within the same frequency band
- Customized 5 MHz Tx/Rx pass-band filters (factory tunable) available for inserting LTE/UMTS 900 base station
- Full pass-band (without LTE/UMTS 900 5 MHz Tx/Rx frequency blocks) available for GSM 900 base station
- Very low insertion loss over complete EGSM Tx/Rx bandwidth compared to standard hybrid combiners
- Double unit for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG by-pass for DTMA supply

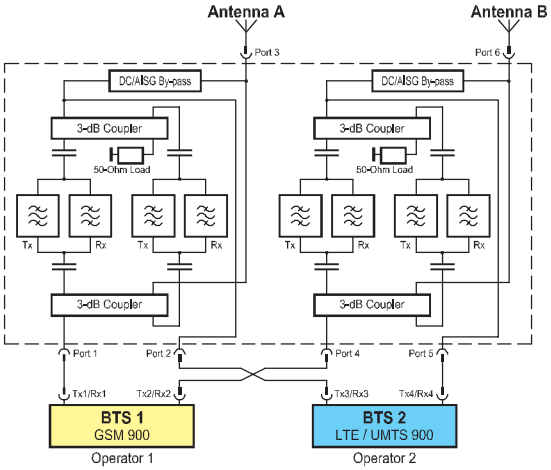


Frequency ordering information:
When ordering please specify the required Tx- and Rx- frequencies e.g. (tuning example 2)
Rx1/Rx2 880 – 892 / 903 – 915 MHz, Rx3/Rx4 895 – 900 MHz
Tx1/Tx2 925 – 937 / 948 – 960 MHz, Tx3/Tx4 940 – 945 MHz

Tuning Examples



Block Diagram



Technical Data

Type No.	78210930
Pass band GSM 900 LTE/UMTS 900	 Rx = 880 – 915 / Tx = 925 – 960 MHz (without assigned LTE/UMTS 900 5 MHz TX/Rx frequency blocks and ± 3 MHz guard bands) Rx = 880 ... 915 / Tx = 925 ... 960 MHz (factory tunable 5 MHz frequency blocks)
Guard band	3 MHz (between Tx/Rx1 and Tx/Rx3, between Tx/Rx2 and Tx/Rx4) – e.g. tuning example 2: Rx1 (Rx2) = 880 – 892 / 903 – 915 and Tx1 (Tx2) = 925 – 937 / 948 – 960 MHz Rx3 (Rx4) = 895 – 900 and Tx3 (Tx4) = 940 – 945 MHz
Insertion loss Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 < 0.6 dB (typically 0.2 dB) – see diagram I and II for tuning example 2 < 0.6 dB (typically 0.4 dB) – see diagram III and IV for tuning example 2
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	 > 30 dB (880 – 915 / 925 – 960 MHz)
VSWR	< 1.25 (pass bands)
Group delay variation GSM 900 LTE/UMTS 900	 < 20 ns (200 kHz) < 50 ns (5 MHz)
Impedance	50 Ω
Input power Tx1 / Tx2 / Tx3 / Tx4	 < 100 W / < 100 W / < 100 W / < 100 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP66)
DC/AISG transparency (switchable) Port 1 ↔ Port 3 / Port 4 ↔ Port 6 (default) Port 2 ↔ Port 3 / Port 5 ↔ Port 6 (default)	 Stop By-pass (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set
Packing size	685 x 645 x 252 mm
Dimensions (w x h x d)	504 x 409 x 158.3 mm (without connectors, without mounting brackets)

Same-Band Combiner

KATHREIN
Antennen · Electronic

880 – 915 / 925 – 960 MHz
GSM 900

880 ... 915 / 925 ... 960 MHz
LTE / UMTS 900 (5 MHz Bandwidth)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

Type No.	Description
784 10367	**50-Ohm load**

Clamp Set

50-Ohm load

Typical Attenuation Curves (Tuning Example 2)

BTS 1 (GSM 900)

Diagram I (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)

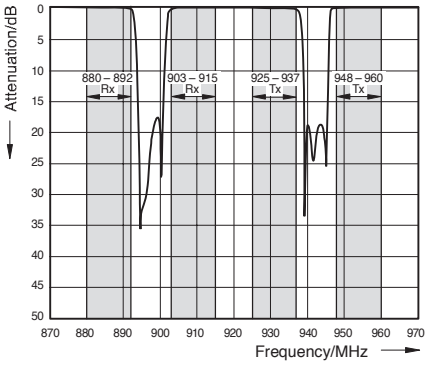
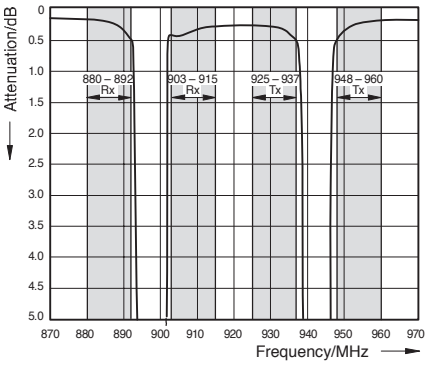


Diagram II (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)



BTS 2 (LTE/UMTS 900)

Diagram III (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)

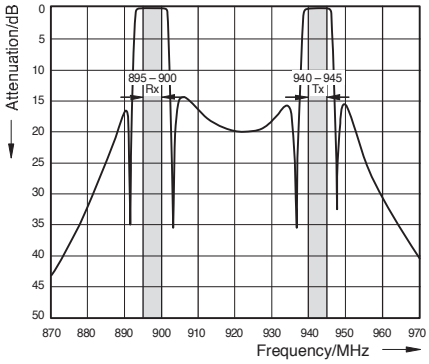
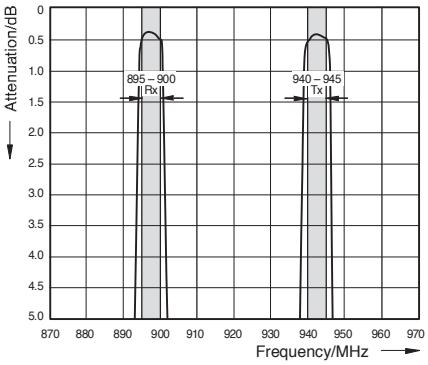
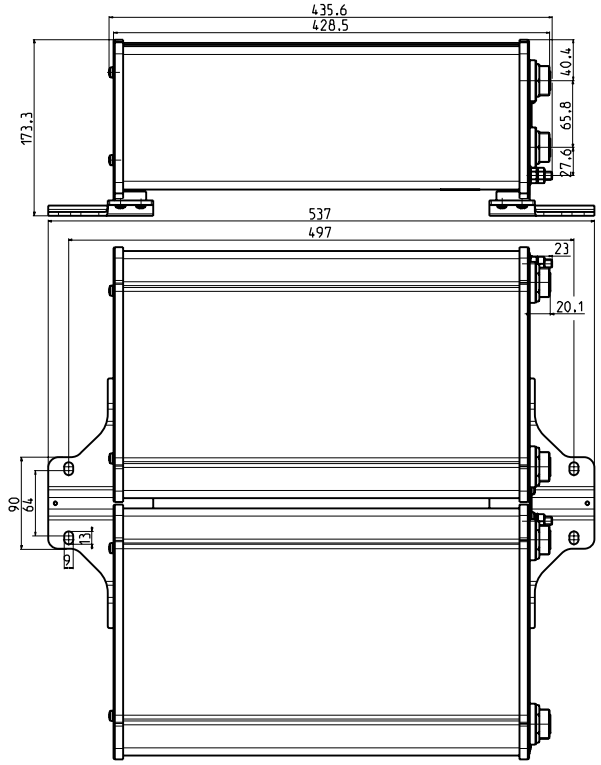


Diagram IV (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)





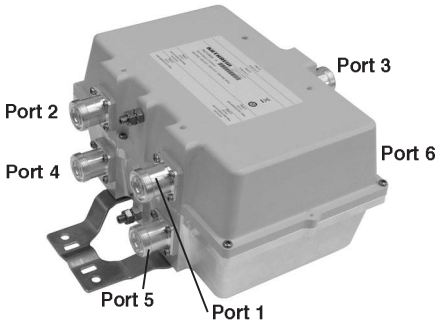
Same-Band Combiner

KATHREIN
Antennen · Electronic

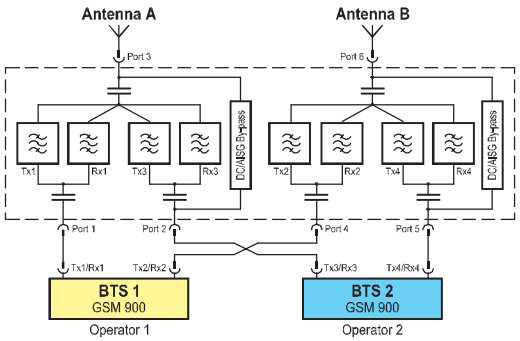
880 – 890 / 925 – 935 MHz
GSM900 (10 MHz Bandwidth)

902.5 – 915 / 947.5 – 960 MHz
GSM900 (12.5 MHz Bandwidth)

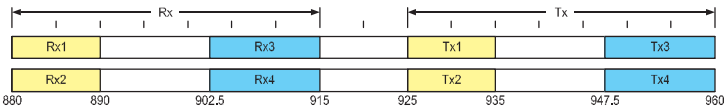
- Enables antenna and feeder sharing for two base stations in the same frequency band
- Suitable for two operators with frequency allocations within the same frequency band
- Very low Tx/Rx insertion loss compared to standard hybrid combiners
- Double unit for XPol antennas
- Suitable for indoor or outdoor applications
- DC/AISG bypass for DTMA supply



Block Diagram



Tuning Diagram



Technical Data

Type No.	78210936
Pass band BTS 1 (GSM900 / Operator 1) BTS 2 (GSM900 / Operator 2)	 Rx1/Rx2 = 880 – 890 MHz, Tx1/Tx2 = 925 – 935 MHz Rx3/Rx4 = 902.5 – 915 MHz, Tx3/Tx4 = 947.5 – 960 MHz
Insertion loss Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 < 0.5 dB, typically 0.3 dB (880 – 890 MHz) / < 0.7 dB, typically 0.4 dB (925 – 935 MHz) < 0.7 dB, typically 0.5 dB (902.5 – 915 MHz) / < 0.5 dB, typically 0.3 dB (947.5 – 960 MHz)
Isolation Port 1 ↔ Port 2 / Port 4 ↔ Port 5	 > 30 dB (880 – 890 / 902.5 – 915 / 925 – 935 / 947.5 – 960 MHz)
VSWR	< 1.2 (pass bands)
Impedance	50 Ω
Input power Tx1 / Tx2 / Tx3 / Tx4	 < 100 W / < 100 W / < 100 W / < 100 W
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +60 °C
Connectors	7-16 female (long neck)
Application	Indoor *or* outdoor (IP66)
DC/AISG transparency Port 1 ↔ Port 3 / Port 4 ↔ Port 6 Port 2 ↔ Port 3 / Port 5 ↔ Port 6	 Stop Bypass (max. 2500 mA)
Lightning protection	3 kA, 10/350 µs pulse
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) / Mast mounting: With additional clamp set
Weight	6.9 kg
Dimensions (w x h x d)	275 x 176 x 140 mm (without connectors, without mounting brackets)

Same-Band Combiner

KATHREIN
Antennen · Electronic

880 – 890 / 925 – 935 MHz
GSM900 (10 MHz Bandwidth)

902.5 – 915 / 947.5 – 960 MHz
GSM900 (12.5 MHz Bandwidth)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Type No.	Description
78410367	**50-Ohm load**

Clamp Set

50-Ohm load

Typical Attenuation Curves

BTS 1 (GSM900)

Diagram I (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)

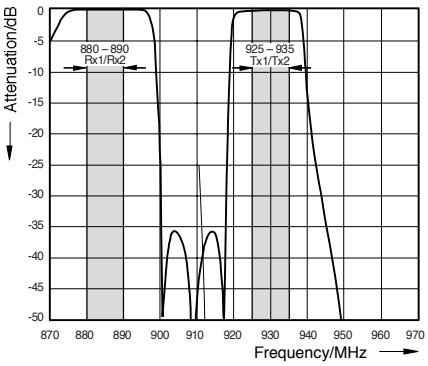
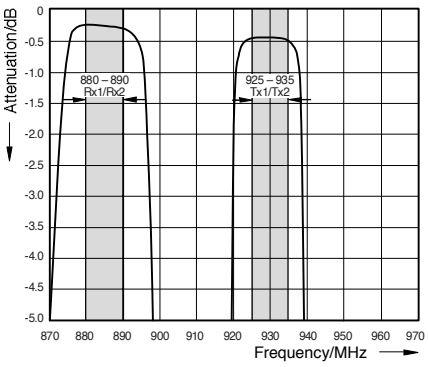


Diagram II (Port 1 ↔ Port 3 / Port 4 ↔ Port 6)



BTS 2 (GSM900)

Diagram III (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)

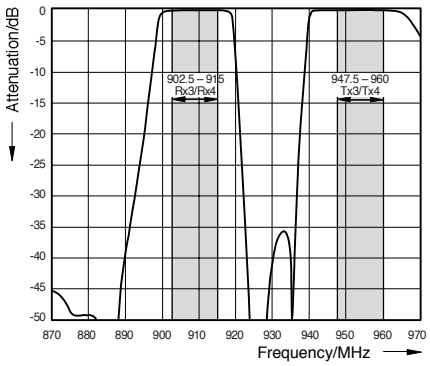
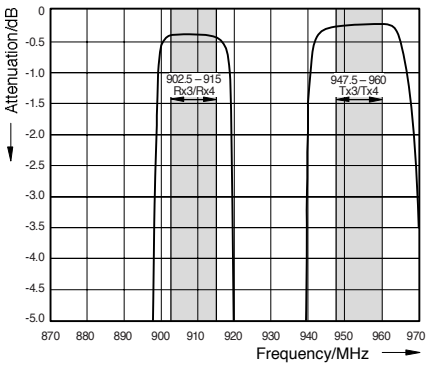
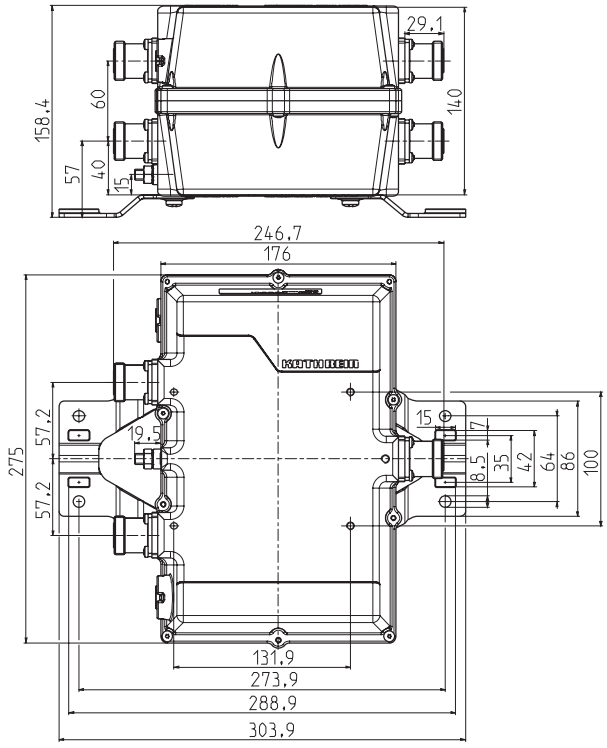


Diagram IV (Port 2 ↔ Port 3 / Port 5 ↔ Port 6)





Hybrid Ring Junction (180° Hybrid)
806 – 960 MHz / 1710 – 1880 MHz

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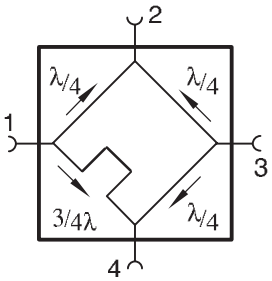
The hybrid ring junction can be used:

- as a power splitter with a ratio of 1:1,
- for the decoupled combining of two transmitters with arbitrarily low frequency spacing (at 3 dB loss),
- for the decoupled combining of two receivers with arbitrarily low frequency spacing,
- for the decoupled combining of two transmitter/receiver units, whose integrated duplexers are within the same frequency range,
- as component to form combiners.

Description:
The hybrid ring junction has four ports, two of which are decoupled from each other. For example effective power entering into port 1 is distributed into ports 2 and 4, port 3 is decoupled and without power if ports 2 and 4 are ideally matched. In practice an absorber of suitable power at port 3 is to be planned for according to the mismatch of ports 2 and 4.
Decoupled combining can be made via ports 1 and 3 or 2 and 4.

K6373621
790881

791 498



Technical Data

Type No.	K6373621	790881	791498
Frequency range	806 – 960 MHz	890 – 960 MHz	1710 – 1880 MHz
Attenuation 1 ↔ 2 or 1 ↔ 4	3 ±0.4 dB (see diagram I)	3 ±0.3 dB (see diagram I)	3 ±0.4 dB (see diagram I)
Attenuation 1 ↔ 3 or 2 ↔ 4	See diagram II		See diagram II
VSWR	< 1.2		< 1.3
Impedance	50 Ω		50 Ω
Input power	< 100 W per input		< 50 W per input
Connectors	N female		N female
Application	Indoor		Indoor
Mounting	With 2 screws (max. 4.5 mm diameter)		With 4 screws (max. 4.5 mm diameter)
Weight	0.32 kg		0.25 kg
Packing size	Approx. 160 x 40 x 105 mm		90 x 40 x 110 mm
Dimensions (w x h x d)	150 x 30 x 87 mm (including connectors)		80 x 26 x 106 mm (including connectors)

Note: VSWR and attenuation values are measured when the remaining ports are terminated with 50-Ω loads.

Hybrid Ring Junction (180° Hybrid)
806 – 960 MHz / 1710 – 1880 MHz

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Typical Attenuation Curves

K 63 73 621

Diagram I

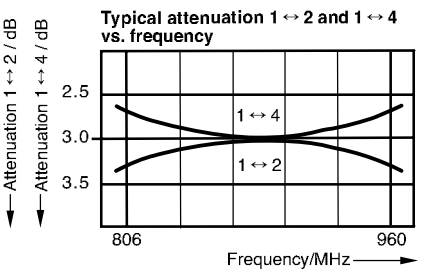
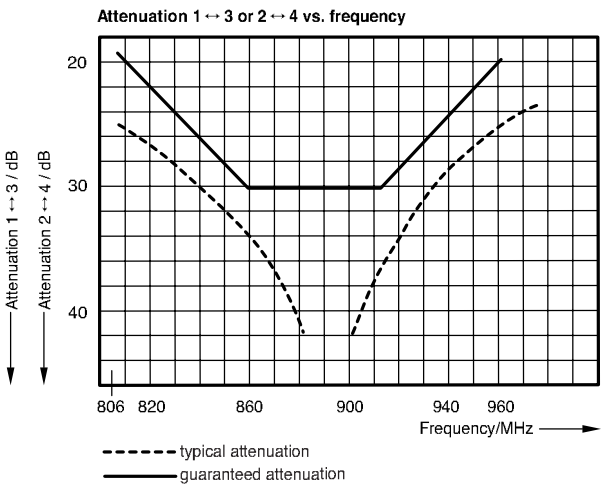


Diagram II



790881

Diagram I

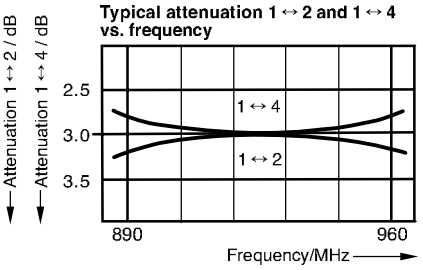
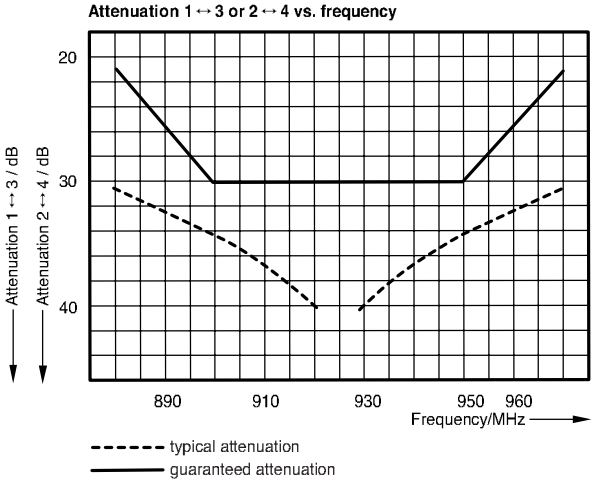


Diagram II



791498

Diagram I

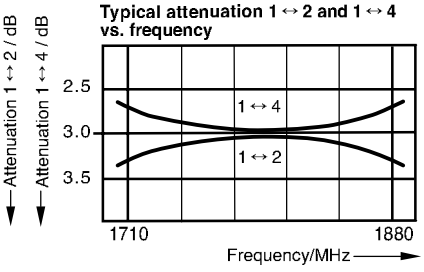
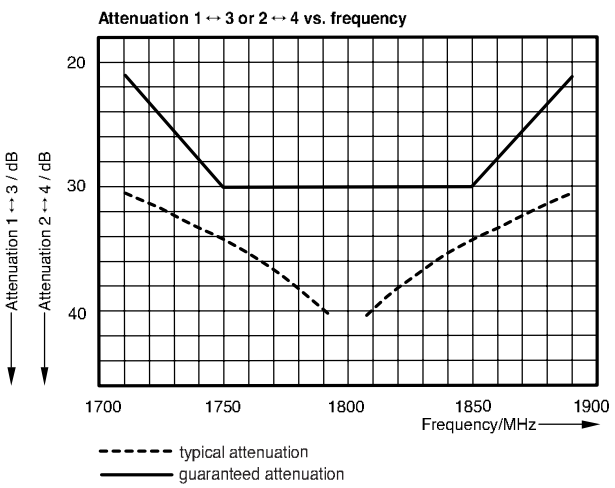


Diagram II



3-dB Coupler
Hybrid Combiner 2:2
698 – 2690 MHz

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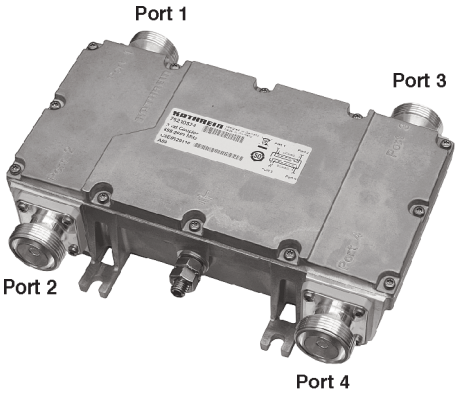
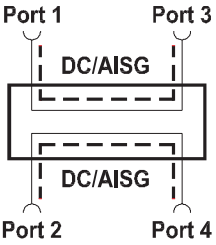
- Can be used for the decoupled combining of 2 transmitters onto a common antenna with frequency spacing as narrow as desired (3 dB loss) – see application example 1
- Can be used for the decoupled combining of 2 transmitters onto two antennas with frequency spacing as narrow as desired – see application example 2
- Can be used as a decoupled 2-way splitter – see application example 3
- Can be used as a frequency-independant 90° phase shifter (90° Hybrid)
- Suitable for indoor or outdoor applications
- DC/AISG bypass
- External DC stop available as an accessory



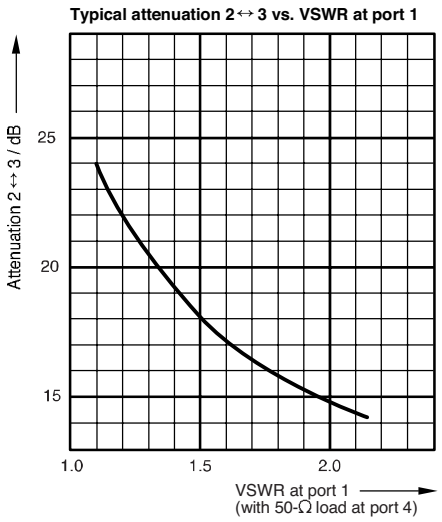


Technical Data

Type No.	782 10524
Frequency range	698 – 2690 MHz
Attenuation Port 1 ↔ Port 2 Port 1 ↔ Port 3 Port 2 ↔ Port 3	 3.1 ±0.5 dB 3.1 ±0.5 dB See diagram
Directivity	> 20 dB
VSWR	< 1.25
Impedance	50 Ω
Input power	< 150 W at each input port
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 ... +70 °C
Connectors	7-16 female
Application	Indoor *or* outdoor (IP66)
DC/AISG transparency	Bypass between Port 1 ↔ Port 3 / Port 2 ↔ Port 4 (max. 2500 mA) External DC stop available as an accessory
Mounting	With 4 screws (max. 6.5 mm diameter)
Weight	1.5 kg
Packing size	268 x 115 x 203 mm
Dimensions (w x h x d)	205.4 x 60 x 104 mm (without connectors and mounting feet)

Note:
VSWR and attenuation values only valid if all ports are terminated with 50-Ohm loads.

Diagram



Accessories (order separately)

Type No.	Description
78210850	DC stop
78210474	50-Ohm load (80 W)
78410367	50-Ohm load (1.5 W)

DC stop

50-Ohm load

50-Ohm load

3-dB Coupler
Hybrid Combiner 2:2
698 – 2690 MHz

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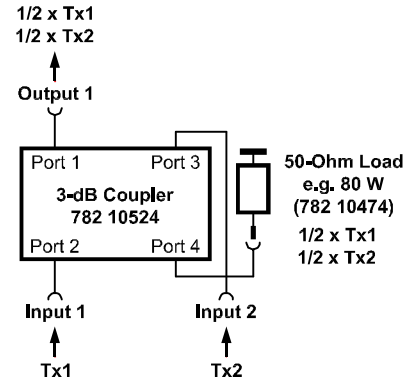
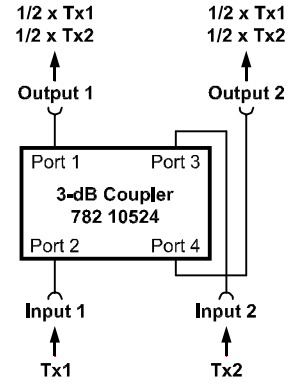
Application Example 1: Hybrid Combiner 2:1

Tx1 and Tx2 signals combined onto **one** output (antenna)
Half the power dissipated in absorber
(suitably dimensioned 50-Ohm load required - to be ordered separately)



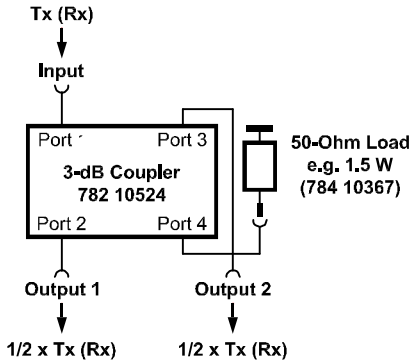
Application Example 2: Hybrid Combiner 2:2

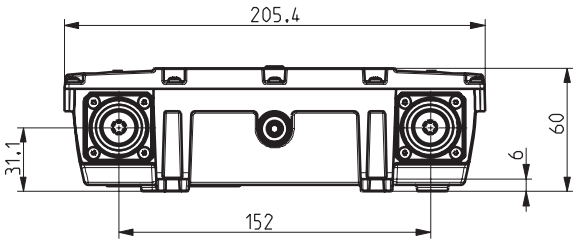
Tx1 and Tx2 signals combined and distributed equally
onto **two** outputs (antennas)

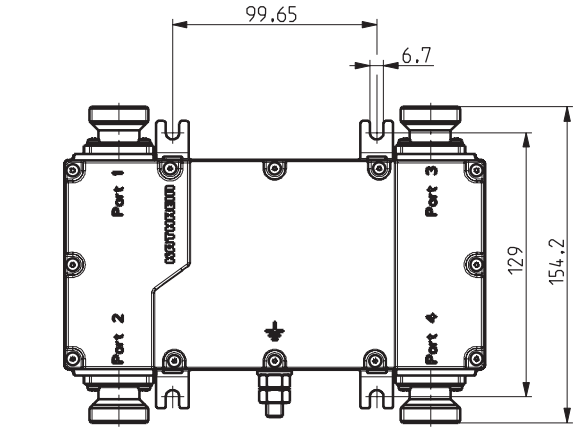


Appl. Example 3: Decoupled 2-way Splitter

Tx (or Rx) signal distributed equally onto two outputs
(suitably dimensioned 50-Ohm load required - to be ordered separately)







3-dB Coupler
Hybrid Combiner 2:2
806 – 960 MHz

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The 3-dB coupler can be used:

- as a decoupled power splitter with a ratio of 1:1,
- for the decoupled combining of two transmitters with frequency spacing as narrow as desired (at 3 dB loss),
- for the decoupled combining of two receivers with frequency spacing as narrow as desired,
- for the decoupled combining of two transmitter/receiver units, whose integrated duplexers are within the same frequency range,
- as a frequency-independent 90° phase shifter,
- as a component to form combiners.

Function:
The 3-dB coupler has four ports, two of which are decoupled from each other. For example effective power entering into port 1 is distributed into ports 2 and 3. Port 4 is decoupled and without power if ports 2 and 3 are ideally matched. In practice an absorber of suitable power at port 4 is to be planned in accordance with the mismatch of ports 2 and 3.
Decoupled combining can be achieved via the diagonally opposite ports 2 and 3 or 1 and 4.

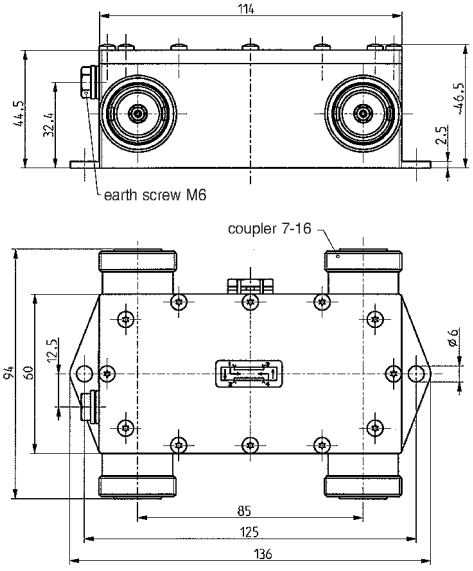
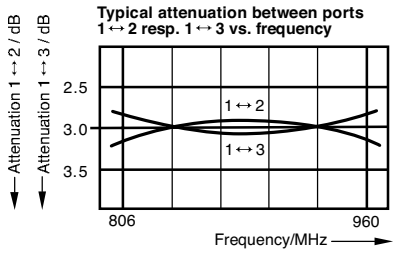
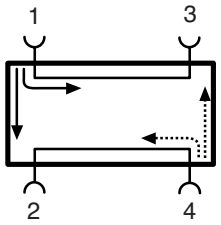


Diagram I



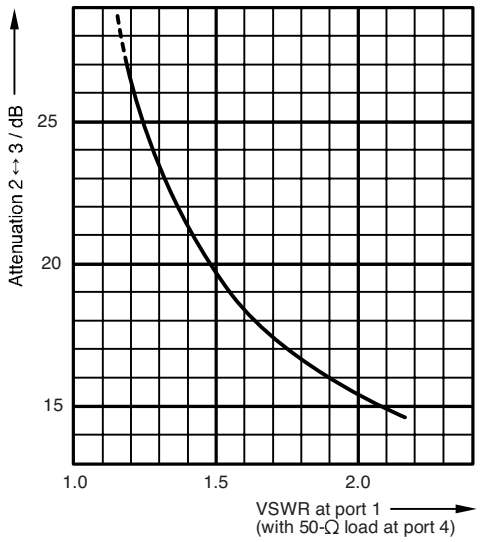


Technical Data

Type No.	793506
Frequency range	806 – 960 MHz
Attenuation 1 ↔ 2 / 1 ↔ 3	3 ±0.4 dB (see diagram I)
Attenuation 2 ↔ 3	See diagram II
Directivity	> 30 dB
VSWR	< 1.1
Impedance	50 Ω
Input power	< 500 W total power at *two* inputs, with max. 350 W at *one* input
Intermodulation products	**< –160 dBc** (3rd order; with 2 x 20 W)
Temperature range	–30 ... +70 °C
Connectors	7-16 female
Application	Indoor or **outdoor** (IP66)
Mounting	With 2 screws (max. 6 mm diameter)
Weight	1.8 kg
Packing size	160 x 95 x 65 mm
Dimensions (w x h x d)	136 x 46.5 x 94 mm (including connectors)

Note: VSWR and attenuation values are measured when the remaining ports are terminated with 50-Ω loads.

Diagram II



3-dB Coupler
Hybrid Combiner 2:2
1700 – 2200 MHz

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The 3-dB coupler can be used:

- as a decoupled power splitter with a ratio of 1:1,
- for the decoupled combining of two transmitters with frequency spacing as narrow as desired (at 3 dB loss),
- for the decoupled combining of two receivers with frequency spacing as narrow as desired,
- for the decoupled combining of two transmitter/receiver units, whose integrated duplexers are within the same frequency range,
- as a frequency-independent 90° phase shifter,
- as a component to form combiners.

Function:
The 3-dB coupler has four ports, two of which are decoupled from each other. For example effective power entering into port 1 is distributed into ports 2 and 3. Port 4 is decoupled and without power if ports 2 and 3 are ideally matched. In practice an absorber of suitable power at port 4 is to be planned in accordance with the mismatch of ports 2 and 3.
Decoupled combining can be achieved via the diagonally opposite ports 2 and 3 or 1 and 4.

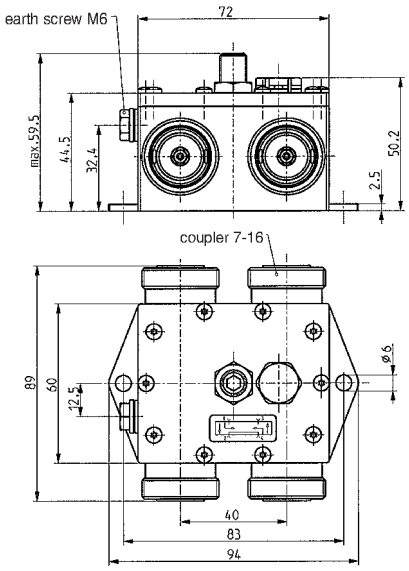
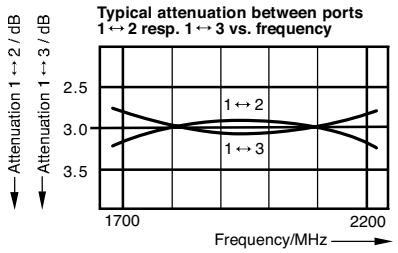
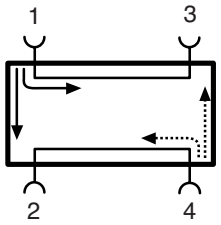


Diagram I



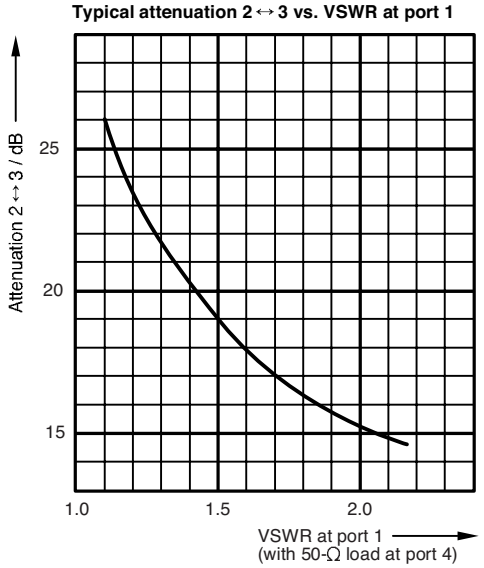


Technical Data

Type No.	793006
Frequency range	1700 – 2200 MHz
Attenuation 1 ↔ 2 / 1 ↔ 3	3 ±0.4 dB (see diagram I)
Attenuation 2 ↔ 3	See diagram II
Directivity	> 25 dB
VSWR	< 1.15
Impedance	50 Ω
Input power	< 300 W total power at *two* inputs, with max. 200 W at *one* input
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–30 ... +70 °C
Connectors	7-16 female
Application	Indoor or outdoor (IP66)
Mounting	With 2 screws (max. 5.5 mm diameter)
Weight	1.3 kg
Packing size	160 x 95 x 65 mm
Dimensions (w x h x d)	94 x 59.5 x 89 mm (including connectors)

Note: VSWR and attenuation values are measured when the remaining ports are terminated with 50-Ω loads.

Diagram II



3-dB Coupler
Hybrid Combiner 2:2
800 – 2200 MHz

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The 3-dB coupler can be used:

– as a decoupled power splitter with a ratio of 1 : 1,
– for the decoupled combining of two transmitters with frequency spacing as narrow as desired (at 3 dB loss),
– for the decoupled combining of two receivers with frequency spacing as narrow as desired,
– for the decoupled combining of two transmitter/receiver units whose integrated duplexers are within the same frequency range,
– as a frequency-independent 90° phase shifter,
– as a combiner component.

Function:
The 3-dB coupler has four ports, two of which are decoupled from each other. For example effective power entering into port 1 is distributed into the ports 2 and 3. Port 4 is decoupled and without power if ports 2 and 3 are ideally matched. In practice an absorber of suitable power at port 4 is to be planned for according to the mismatch of ports 2 and 3.
Decoupled combining can be achived via the diagonally opposite ports 2 and 3 respectively 1 and 4.

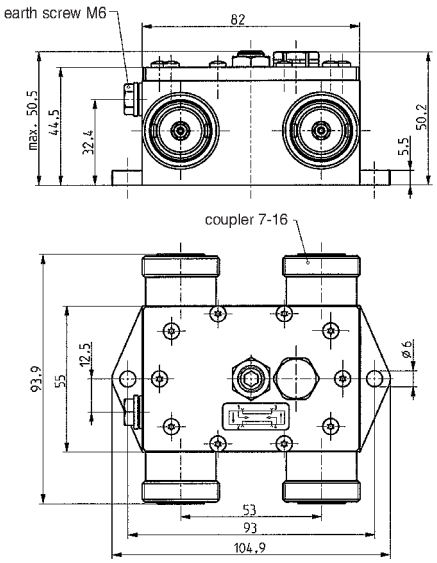
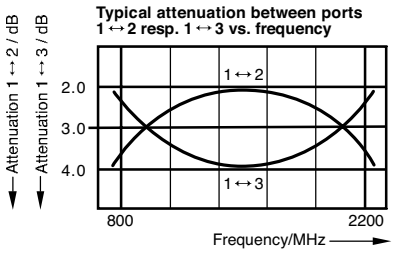
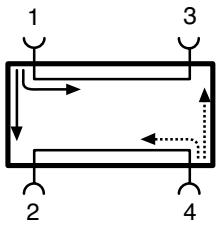


Diagram I



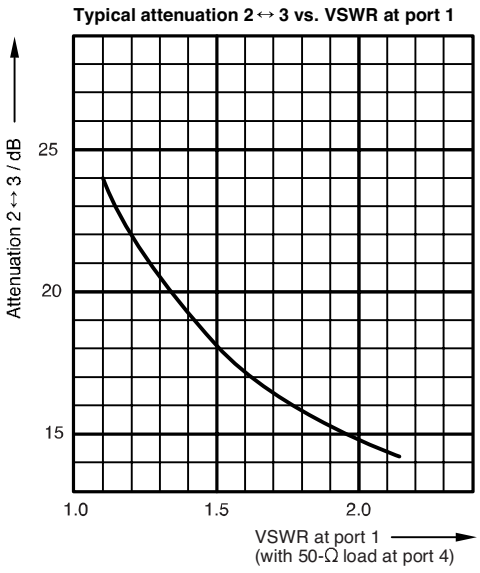


Technical Data

Type No.	793554
Frequency range	800 – 2200 MHz
Attenuation 1 ↔ 2 / ↔ 3	3 ±1.2 dB (see diagram I)
Attenuation 2 ↔ 3	See diagram II
Directivity	> 20 dB
VSWR	< 1.2
Impedance	50 Ω
Input power	< 300 W total power at *two* inputs, with max. 200 W at *one* input
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperatur range	–30 … +70 °C
Connectors	7-16 female
Application	Indoor or outdoor (IP66)
Mounting	With 2 screws (max. 5.5 mm diameter)
Weight	1.3 kg
Packing size	160 x 95 x 65 mm
Dimensions (w x h x d)	104.9 x 50.2 x 93.9 mm (including connectors)

Note: VSWR and attenuation values are measured when the remaining ports are terminated with 50-Ω loads.

Diagram II



System Components

Bias Tees
Measuring Directional Couplers
DC-Stops
Attenuators
50-Ω Loads
Power Distribution Unit

Summary of System Component Types

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System Components:

Description	Type No.	Frequency range	Max. input power	Page
DC Stop	793301	800 – 2170 MHz	750 W	312
DC Stop	78210850	250 – 2700 MHz	750 W	313
Bias Tee	793304	800 – 2170 MHz	250 W	314
Bias Tee AISG	78210429	800 – 2170 MHz	250 W	315
Bias Tee, outdoor	78210577	690 – 2700 MHZ	250 W	316
Bias Tee, outdoor (AISG)	78210578	690 – 2700 MHZ	250 W	317
Smart Bias Tee	78211053	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211054	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211055	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211056	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211063	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211064	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211065	690 – 2700 MHz	750 W	318, 319
Smart Bias Tee	78211066	690 – 2700 MHz	750 W	318, 319
50-Ω Load (N male)	K6226611	0 – 2700 MHz	0.5 W	322
50-Ω Load (7-16 male)	78410367	0 – 4000 MHz	1.5 W	322
50-Ω Load (7-16 female)	78410470	0 – 4000 MHz	1.5 W	322
50-Ω Load (N male)	K6226111	0 – 2700 MHz	2 W	322
50-Ω Load (N female)	K6226401	0 – 2700 MHz	10 W	322
50-Ω Load (N male)	K6226411	0 – 2700 MHz	10 W	322
50-Ω Load (N female)	K6226201	0 – 2700 MHz	25 W	323
50-Ω Load (N male)	K6226211	0 – 2700 MHz	25 W	323
50-Ω Load (7-16 female)	K6226207	0 – 2700 MHz	25 W	323
50-Ω Load (7-16 male)	K6226217	0 – 2700 MHz	25 W	323
50-Ω Load (N female)	K6226301	0 – 2700 MHz	50 W	323
50-Ω Load (N male)	K6226311	0 – 2700 MHz	50 W	323
50-Ω Load (7-16 female)	K6226307	0 – 2700 MHz	50 W	323
50-Ω Load (7-16 male)	K6226317	0 – 2700 MHz	50 W	323
50-Ω Load (N female)	K6226501	0 – 1000 MHz	100 W	323
50-Ω Load (N male)	K6226511	0 – 1000 MHz	100 W	323
50-Ω Load (7-16 female)	K6226507	0 – 1000 MHz	100 W	323
50-Ω Load (7-16 female) Low IM	78210474	800 – 2700 MHz	80 W	324
Attenuator 3 dB	78410235	0 – 4000 MHz	2 W	325
Attenuator 6 dB	78410236	0 – 4000 MHz	2 W	325
Attenuator 10 dB	78410237	0 – 4000 MHz	2 W	325
Attenuator 20 dB	78410238	0 – 4000 MHz	2 W	325
Attenuator 3 dB	791918	0 – 4000 MHz	15 W	325
Attenuator 6 dB	791919	0 – 4000 MHz	12 W	325
Attenuator 10 dB	791920	0 – 4000 MHz	10 W	325
Attenuator 20 dB	791921	0 – 4000 MHz	10 W	325
Measuring Directional Coupler	792972	824 – 960 MHz 960 – 2500 MHz	800 W 200 W	326

Description	Type No.	Power supply (DC input)	Page
Power Distribution Unit (PDU)	78210344	38 ... 72 V DC	320, 321

New Products

DC Stop
800 – 2170 MHz

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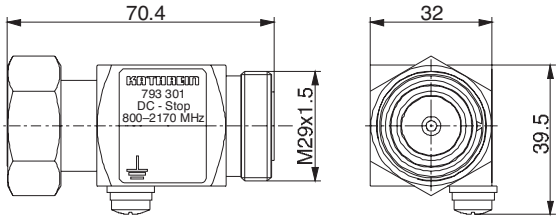
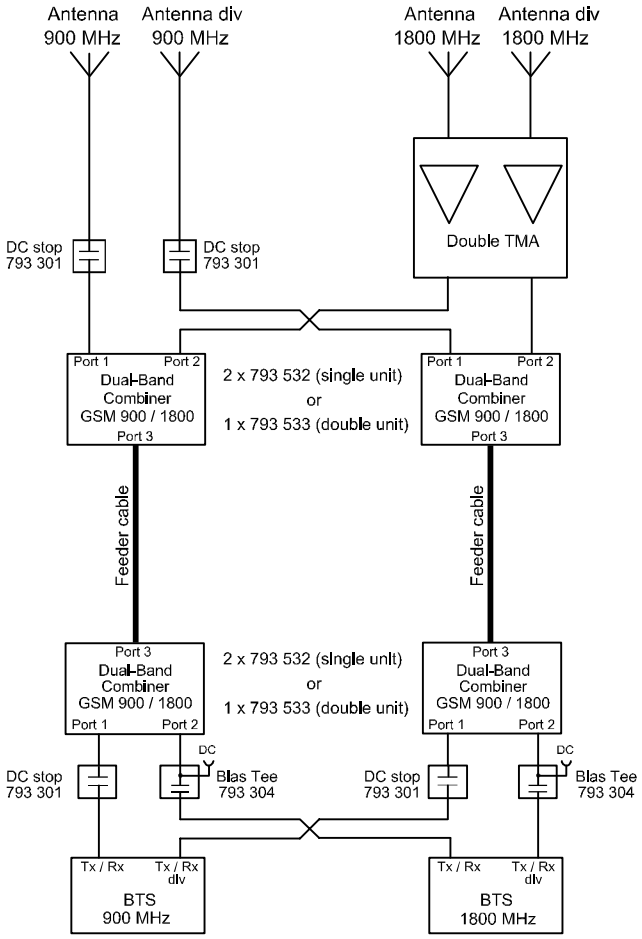
DC Stop is used in dual- or multi-band antenna systems where one or more antenna systems require a DC supply for an installed mast head amplifier. The DC Stop prevents DC voltage from being shorted within the non-biased antenna system(s) and isolates the corresponding base station output(s) from DC voltage.

- Low RF signal insertion loss
- High DC signal isolation from port 1 to port 2 and vice versa
- Suitable for indoor or outdoor applications

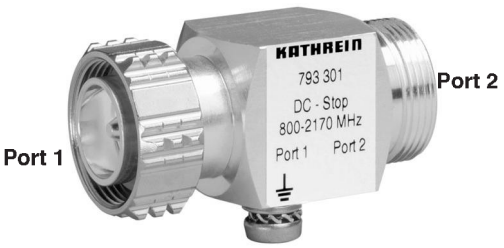




Application Example

Technical Data

Type No.	793 301
Frequency range	800 – 2170 MHz
Insertion loss Port 1 ↔ Port 2	< 0.1 dB (800 – 2170 MHz)
Isolation Port 1 ↔ Port 2	> 70 dB (DC)
VSWR	< 1.1 (800 – 2000 MHz) < 1.2 (2000 – 2170 MHz
Impedance	50 Ω
Input power	< 750 W (800 – 2170 MHz)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 ... +70 °C
Connectors Port 1 Port 2	 7-16 male 7-16 female
Application	Indoor or outdoor (IP 67)
Weight	0.32 kg
Dimensions (w x h x d)	70.4 mm x 39.5 mm x 32 mm (including connectors and earthing screw of 6 mm diameter)



DC Stop
250 – 2700 MHz

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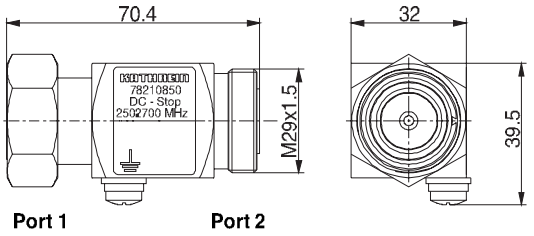
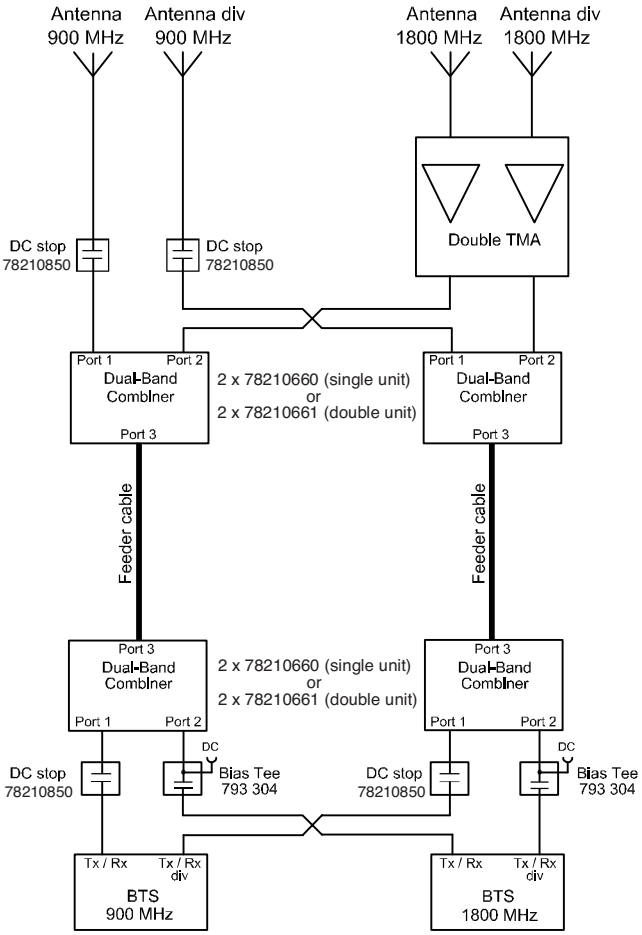
DC Stop is used in dual- or multi-band antenna systems where one or more antenna systems require a DC supply for an installed mast head amplifier. The DC Stop prevents DC voltage from being shorted within the non-biased antenna system(s) and isolates the corresponding base station output(s) from DC voltage.

- Low RF signal insertion loss
- High DC signal isolation from port 1 to port 2 and vice versa
- Suitable for indoor or outdoor applications





Application Example

Technical Data

Type No.	78210850
Frequency range	250 – 2700 MHz
Insertion loss Port 1 ↔ Port 2	< 0.1 dB (250 – 2700 MHz)
Isolation Port 1 ↔ Port 2	> 70 dB (DC)
VSWR	< 1.1 (380 – 2700 MHz) < 1.2 (250 – 380 MHz)
Impedance	50 Ω
Input power	< 750 W (250 – 2700 MHz)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 ... +70 °C
Connectors Port 1 Port 2	 7-16 male 7-16 female
Application	Indoor or outdoor (IP 67)
Weight	0.32 kg
Dimensions (w x h x d)	70.4 mm x 39.5 mm x 32 mm (including connectors and earthing screw of 6 mm diameter)

Bias Tee
800 – 2170 MHz

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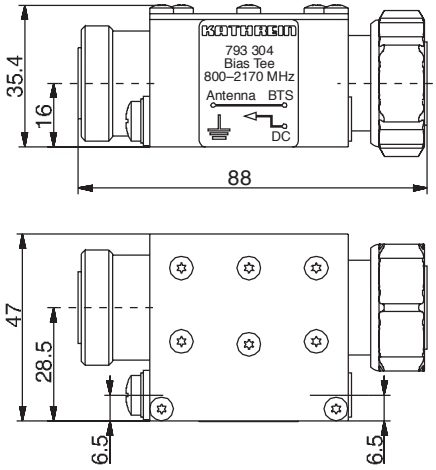
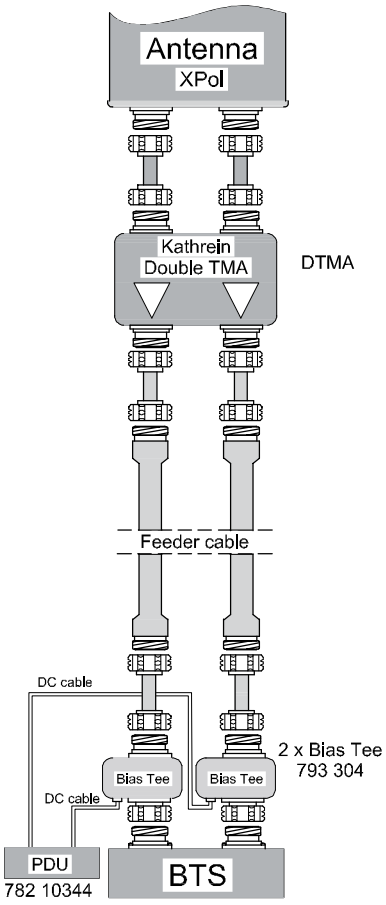
The Bias Tee is suitable to feed DC voltage into the feeder cable of a receiving and/or transmitting antenna system in order to provide the operating voltage for a mast head amplifier.

- The Bias Tee provides low RF signal insertion loss from the BTS to the antenna port and vice versa.
- The DC voltage is fed from the DC port to the antenna port while providing a high level of DC isolation from the DC to the BTS port and from the antenna to the BTS port.
- The measures taken to protect against static discharge and lightning ensure a high level of reliability and operational safety.



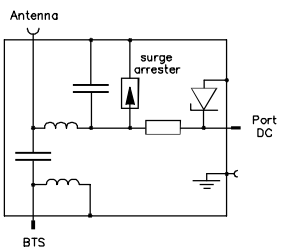


Application Example

Technical Data

Type No.	793304
Frequency range	800 – 2170 MHz
Insertion loss BTS ↔ Antenna	< 0.1 dB (800 – 2170 MHz)
Isolation BTS ↔ Antenna BTS ↔ DC	> 70 dB (DC) > 70 dB (DC)
VSWR	< 1.1 (800 – 2170 MHz)
Impedance	50 Ω
Input power BTS DC	< 250 W (800 – 2170 MHz) < 1000 mA / 0 ... +30 VDC
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Lightning protection	5 kA, 8/20 µs pulse
Temperature range	–40 ... +70 °C
Connectors BTS Antenna Port DC	 7-16 male 7-16 female SMB male
Application	Indoor
Weight	0.6 kg
Packing size	145 x 145 x 50 mm
Dimensions (w x h x d)	88 x 47 x 35.4 mm (including connectors and earthing screw of 6 mm diameter)

Port DC

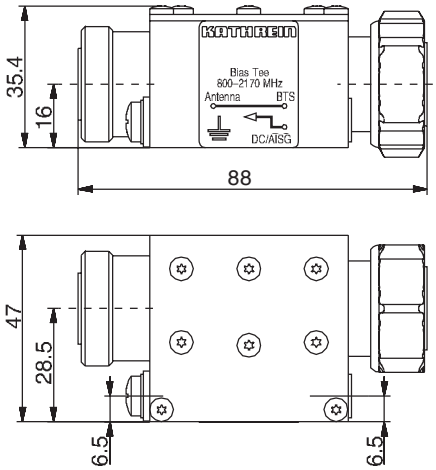


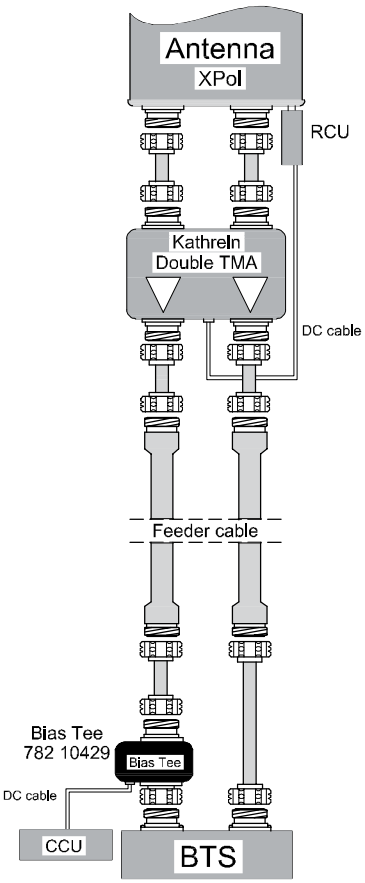
Bias Tee
800 – 2170 MHz

KATHREIN
Antennen · Electronic

The Bias Tee is suitable to feed DC voltage and AISG control signals into the feeder cable in order to provide operating voltage and control signals via the RF feeder cable to the TMA or RCU.

- The Bias Tee provides low RF signal insertion loss from the BTS to the antenna port and vice versa.
- The DC voltage and AISG control signal (2.176 MHz) is fed from the DC port to the antenna port while providing a high level of DC isolation from the DC to the BTS port and from the antenna to the BTS port.
- The measures taken in conjunction with the CCU-LOC to protect against static discharge and lightning ensure a high level of reliability and operational safety.



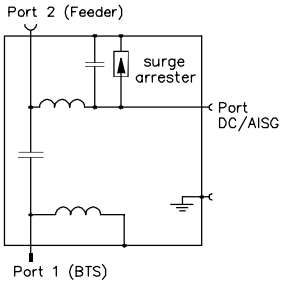


Application Example

Technical Data

Type No.	78210429
Frequency range	800 – 2170 MHz
Insertion loss BTS ↔ Antenna	< 0.1 dB (800 – 2170 MHz)
Isolation BTS ↔ Antenna BTS ↔ DC/AISG	> 70 dB (DC) > 70 dB (DC)
VSWR	< 1.1 (800 – 2170 MHz)
Impedance	50 Ω
Input power BTS DC/AISG	< 250 W (800 – 2170 MHz) < 1.8 A / 13 VDC < 0.8 A / 29 VDC
Lightning protection	3 kA, 10/350 µs pulse
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 ... +70 °C
Connectors Port 1 BTS Port 2 Antenna Port DC/AISG	 7-16 male 7-16 female SMB male
Application	Indoor
Weight	0.6 kg
Packing size	145 x 145 x 50 mm
Dimensions (w x h x d)	88 x 47 x 35.4 mm (including connectors and earthing screw of 6 mm diameter)

Port DC/AISG



Bias Tee
690 – 2700 MHz

KATHREIN
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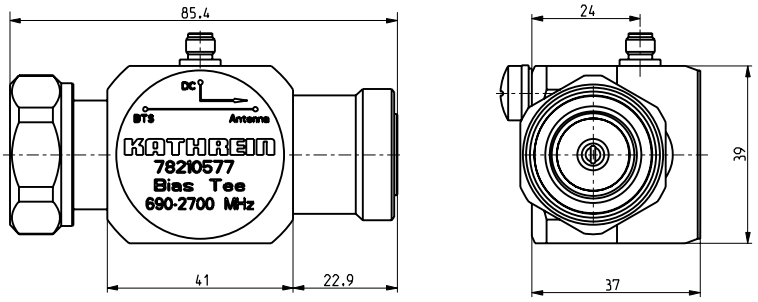
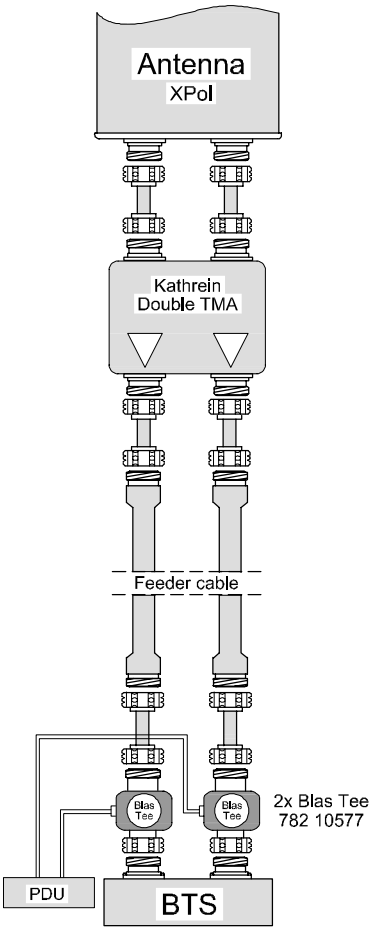
The Bias Tee is suitable to feed DC voltage into the feeder ca-ble of a receiving and/or transmitting antenna system in order to provide the operating voltage for a mast head amplifier.

- The Bias Tee provides low RF signal insertion loss from the BTS to the antenna port and vice versa.
- The DC voltage is fed from the DC port to the antenna port while providing a high level of DC isolation from the DC to the BTS port and from the antenna to the BTS port.
- The measures taken to protect against static discharge and lightning ensure a high level of reliability and operational safety.

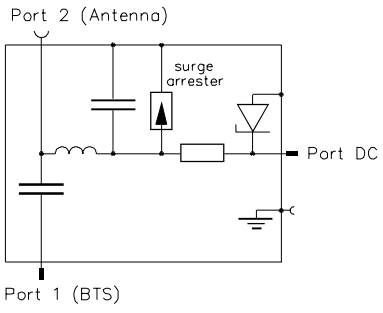




Application Example

Technical Data

Type No.	78210577
Frequency range	690 – 2700 MHz
Insertion loss Port 1 ↔ Port 2	< 0.1 dB (690 – 2700 MHz)
Isolation Port 1 ↔ Port 2 Port 1 ↔ DC	> 70 dB (DC) > 70 dB (DC)
VSWR	< 1.1 (690 – 2700 MHz)
Impedance	50 Ω
Input power Port 1 DC	< 250 W (690 – 2700 MHz) < 1 A / 0 ... +30 VDC
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Lightning protection	3 kA, 10/350 µs pulse
Temperature range	–40 ... +70 °C
Connectors Port 1 (BTS) Port 2 (Antenna) Port DC	 7-16 male 7-16 female SMA female
Application	Indoor *or* outdoor (IP 66)
Weight	0.47 kg
Packing size	128 x 75 x 88 mm
Dimensions (w x h x d)	85.4 x 45 x 46.2 mm (including connectors and earthing screw of 6 mm diameter)

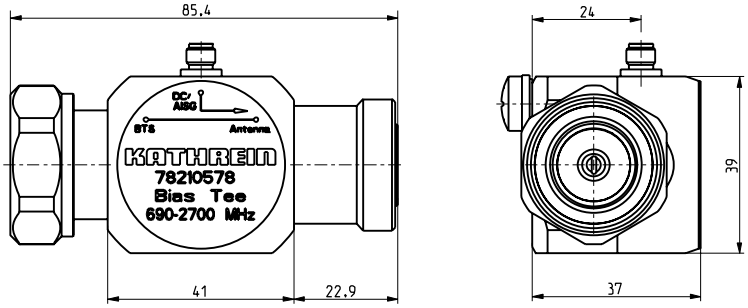


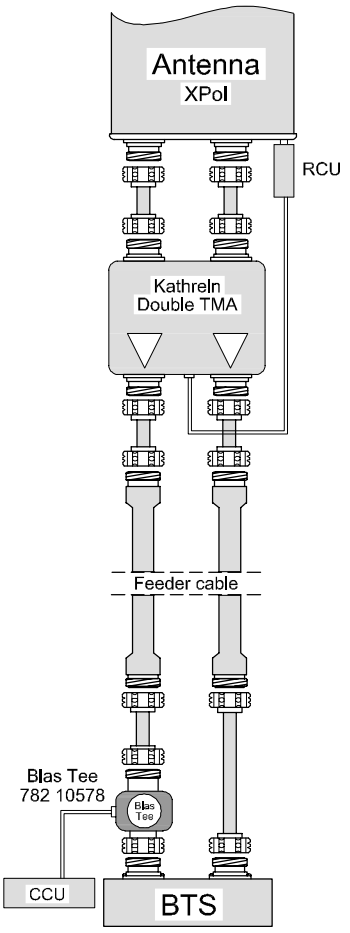
Bias Tee (AISG)
690 – 2700 MHz

KATHREIN
Antennen · Electronic

The Bias Tee is suitable to feed DC voltage and AISG control signals into the feeder cable in order to provide operating voltage and control signals via the RF feeder cable to the TMA or RCU.

- The Bias Tee provides low RF signal insertion loss from the BTS to the antenna port and vice versa.
- The DC voltage and AISG control signal (2.176 MHz) is fed from the DC port to the antenna port while providing a high level of DC isolation from the DC to the BTS port and from the antenna to the BTS port.
- The measures taken in conjunction with the CCU-LOC to protect against static discharge and lightning ensure a high level of reliability and operational safety.





Application Example

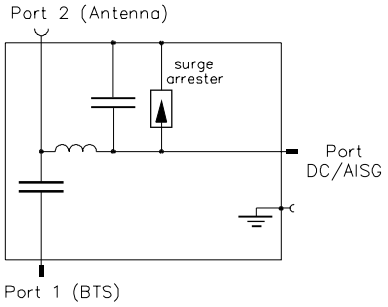
Technical Data

Type No.	78210578
Frequency range	690 – 2700 MHz
Insertion loss Port 1 ↔ Port 2	< 0.1 dB (690 – 2700 MHz)
Isolation Port 1 ↔ Port 2 Port 1 ↔ Port DC/AISG	> 70 dB (DC) > 70 dB (DC)
VSWR	< 1.1 (690 – 2700 MHz)
Impedance	50 Ω
Input power Port 1 Port DC/AISG	< 250 W (690 – 2700 MHz) < 1 A / 0 ... +30 VDC
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Lightning protection	3 kA, 10/350 µs pulse
Temperature range	–40 ... +70 °C
Connectors Port 1 (BTS) Port 2 (Antenna) Port DC/AISG	 7-16 male 7-16 female SMA female
Application	Indoor *or* outdoor (IP 66)
Weight	0.47 kg
Packing size	128 x 75 x 88 mm
Dimensions (w x h x d)	85.4 x 45 x 46.2 mm (including connectors and earthing screw of 6 mm diameter)

Port DC/AISG

Port 2 Antenna

Port 1 BTS



System Components

Smart Bias Tee
690 – 2700 MHz

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The **Smart Bias Tee** combines the performance of a standard Bias Tee (e.g. type 78210577) with the function of an additional modem (AISG standard) in order to provide either DC voltage as well as remote control signals via an RF feeder cable to a TMA or RCU.

The **Smart Bias Tee** provides low RF signal insertion loss from port 1 to port 2 and vice versa.The measures taken to protect against static discharge and lightning ensure a high level of reliability and operational safety.

- **78211053, 78211063:** +8 ... 14 VDC (DC on pin1) version for use near the BTS, in order to feed-in DC voltage and RCU control signals into a feeder cable
- **78211054, 78211064:** +8 ... 14 VDC (DC on pin1) version for use near the antenna, in order to control an RCU (only required if **no TMA** is in use)
- **78211055, 78211065:** +8 ... 30 VDC (DC on pin6) version for use near the BTS, in order to feed-in DC voltage and RCU control signals into a feeder cable
- **78211056, 78211066:** +8 ... 30 VDC (DC on pin6) version for use near the antenna, in order to control an RCU (only required if **no TMA** is in use)

Abbreviations:
RCU = **R**emote **C**ontrol **U**nit for remote electrical control of antenna tilt
BTS = **B**ase **T**ransceiver **S**tation
TMA = **T**ower **M**ounted **A**mplifier
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
Port 1 = Port for BTS or for Antenna
Port 2 = Port for Feeder Cable
Port DC/RCU = **Port** for **DC** voltage and **R**emote **C**ontrol **U**nit signals

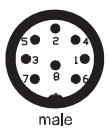
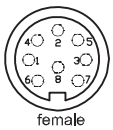
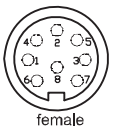
78211054
78211056

78211064
78211066

78211053
78211055

78211063
78211065

Pin connections

8-pin connector (IEC 60130-9)	782 11053 782 11063	782 11054 782 11064	782 11055 782 11065	782 11056 782 11066
	 male	 female	 male	 female
Pin 1	+8...+14 VDC in	+8...+14 VDC out	Not connected	Not connected
Pin 2	Not connected	Not connected	Not connected	Not connected
Pin 3	RS485-B	RS485-B	RS485-B	RS485-B
Pin 4	Not connected	Not connected	Not connected	Not connected
Pin 5	RS485-A	RS485-A	RS485-A	RS485-A
Pin 6	Not connected	Not connected	+8...+30 VDC in	+8...+30 VDC out
Pin 7	DC return (grounded)	DC return (grounded)	DC return (grounded)	DC return (grounded)
Pin 8	Not connected	Not connected	Not connected	Not connected

Technical Data

Type No.	**78211053** **+8 ... +14 VDC / BTS**	**78211054** **+8 ... +14 VDC / Antenna**	**78211055** **+8 ... +30 VDC / BTS**	**78211056** **+8 ... +30 VDC / Antenna**
Port 1: 7-16 male	BTS	Antenna	BTS	Antenna
Port 2: 7-16 female	Feeder	Feeder	Feeder	Feeder

Type No.	**78211063** **+8 ... +14 VDC / BTS**	**78211064** **+8 ... +14 VDC / Antenna**	**78211065** **+8 ... +30 VDC / BTS**	**78211066** **+8 ... +30 VDC / Antenna**
Port 1: 7-16 female	BTS	Antenna	BTS	Antenna
Port 2: 7-16 male	Feeder	Feeder	Feeder	Feeder

Frequency range	690 – 2700 MHz	
Insertion loss Port 1 ↔ Port 2	< 0.1 dB (690 – 2700 MHz)	
Isolation for DC and RCU signals Port 1 ↔ Port 2 Port 1 ↔ Port DC/RCU Port 2 ↔ Port DC/RCU	 > 70 dB > 70 dB > 0 dB	
VSWR	< 1.1 (690 – 2700 MHz)	
Impedance	50 Ω	
Input power Port 1 *or* port 2 Port DC/RCU	 < 750 W (690 – 2700 MHz) < 2.5 A / +8 ... +14 VDC	 < 750 W (690 – 2700 MHz) < 2.5 A / +8 ... +30 VDC
Power consumption	Typically 0.6 W	
Lightning protection	3 kA, 10/350 µs pulse	
Intermodulation products	< – 160 dBc (3rd order; with 2 x 20 W)	
Temperature range	–40 ... +60 °C	
Modem carrier frequency	2.176 MHz	
Application	Indoor *or* outdoor (IP 66)	
Weight	0.8 kg	
Packing size (w x h x d)	167 x 102 x 86 mm	
Dimensions (w x h x d)	81 x 81 x 46 mm (without connectors)	

Smart Bias Tee
690 – 2700 MHz

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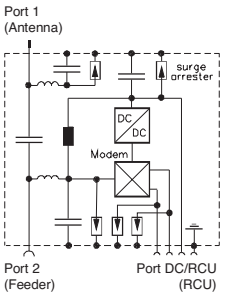
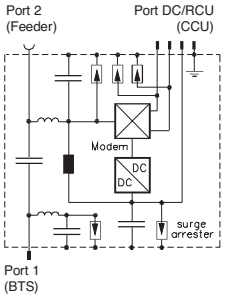
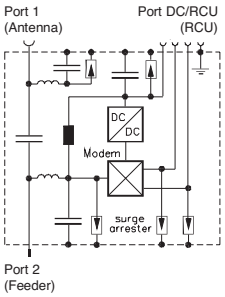
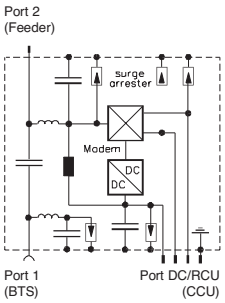
Block diagrams

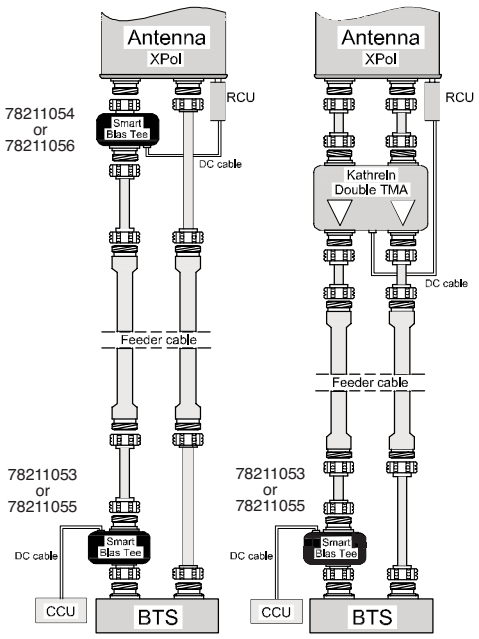


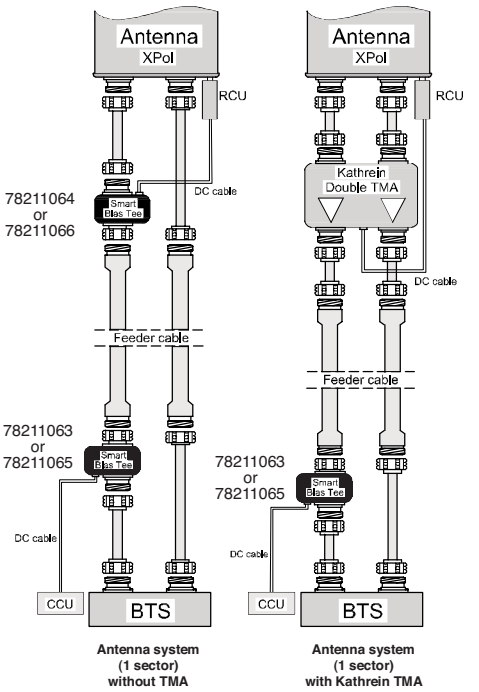






Application Examples





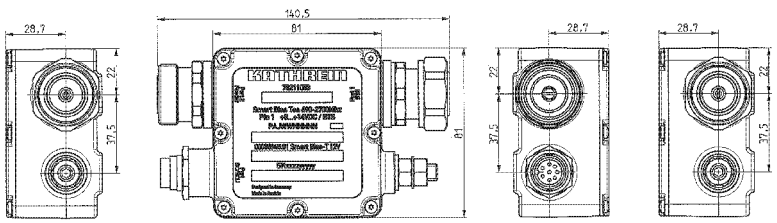
Please note:

The Smart Bias Tees are designed to operate under the environmental conditions as described in ETS 300 019-1-4 class 4.1 E and have passed environmental tests as recommended in ETS 300 019-2-4.

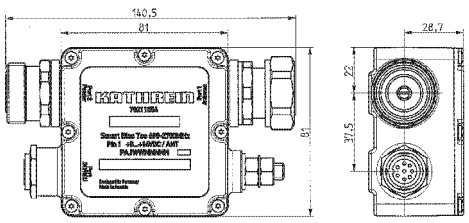
The installation team must be properly qualified and also be familiar with the relevant national safety regulations.

The coupling torque at 7-16 connectors is 25 – 30 Nm! Hold the smart bias tee housing securely while tightening the 7-16 locking nut.
The tightning torque for fixing the AISG connector must be 0.5 – 1.0 Nm ('hand-tightened').

Dimensional Drawings



78211053, 78211055
78211063, 78211065



78211054, 78211056
78211064, 78211066

Power Distribution Unit (PDU)

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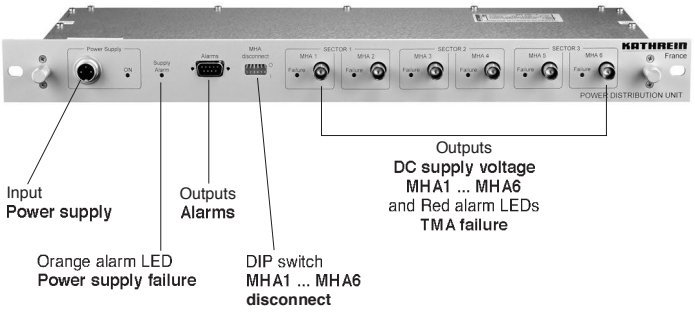
The PDU provides DC supply voltage and alarm interfacing for up to 6 TMAs/MHAs (Tower Mounted Amplifiers/Mast Head Amplifiers) with current window alarming.

- Suitable for low DC power requirements, e.g. Kathrein DTMA 78210612 (UMTS) or 78210580 (GSM1800)
- Not suitable for DTMA 78210440/78210442
- Alarm signals available on SubD 9-pin connector and LEDs
- Bias Tees and cable sets for connection of up to 6 Bias Tees for servicing 6 TMAs (or 3 DTMAs = double TMAs) are available as accessories



Alarm interface function: Under normal operating conditions each TMA pulls the nominal current from the PDU. In case of failure when a TMA consumes a current outside the specified alarm window, then an internal TMA circuit pulls an increased alarm current. Once the respective TMA failure detection threshold is registered by the PDU, then the following alarms are activated:

1. The DC supply voltage for the defective TMA is switched off.
2. The corresponding red alarm LED lights up.
3. The contacts 4 and 5 on the SubD 9-pin connector are closed. In addition, the respective pins 1 (TMA1), 2 (TMA2), 3 (TMA3), 6 (TMA4), 7 (TMA5), or 8 (TMA6) are grounded. This contact status can be used for monitoring purposes.

If required, the additional DIP switch can be used to override the individual alarm and turn off the respective TMA supply voltage (1 = supply voltage and red LED alarm OFF, 0 = supply voltage and red LED alarm ON).

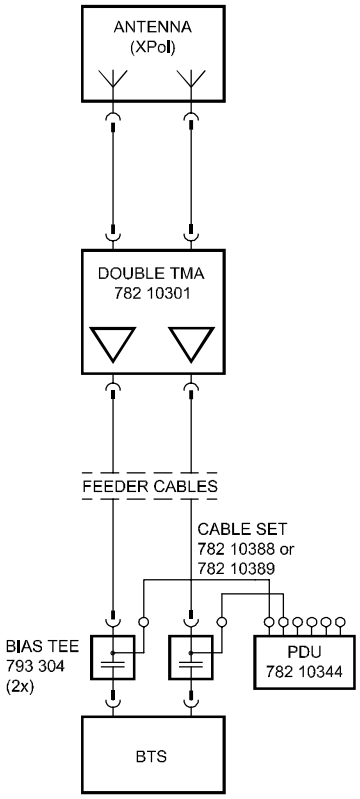
Technical Data

Type No.	78210344
Power supply (DC input)	38 ... 72 V DC
DC supply voltage (DC outputs to MHA1 ... MHA6)	6x +12 ±0.3 V / nominal current: **110 mA** ±20%
Failure detection threshold	**> 230 mA** ±10%
Alarms LED indicators	 Red LED ON = TMA failure at indicated DC output Orange LED ON = power supply failure (back-up power supply in use) Green LED ON = power supply ON
SubD 9-pin connector	Contact pins 4 + 5 closed when failure detection threshold is exceeded = MHA or power supply failure Contact pins 1 ... 3, 6 ... 8 grounded when failure detection threshold is exceeded = MHA failure
Electrical protection against	Reverse voltage on DC outputs Reverse polarity voltage, over-current and over-voltage on DC input (power supply)
Temperature range	–40 ... +60 °C
Connectors	Power supply: DIN 3-pin male DC supply voltage: BNC female (6 x) Alarms: SubD 9-pin
Scope of delivery	PDU, 3 m power supply cable with DIN 3-pin female connector (brown (+), blue (–), green-yellow (grd))
MTBF	> 450 000 hours
Mounting	With 2 screws (M6)
Application	Indoor (IP20)
Weight	2.2 kg
Dimensions (w x h x d)	19˝ drawer, 2 height units, plug-in depth 171 mm

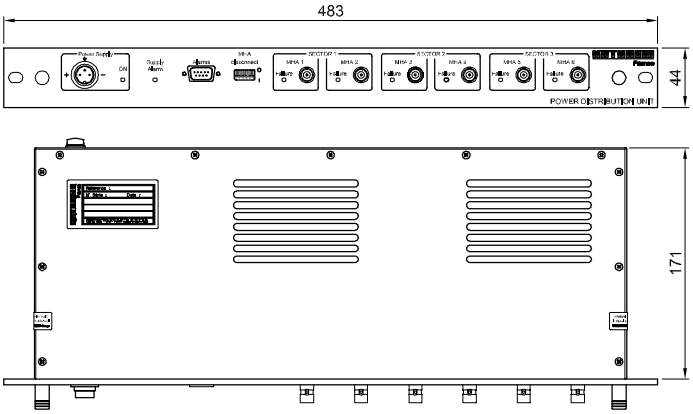
Accessories (order separately)

Type No.	Description	Technical data
78210388	**Cable set 2 m (6 cables)**	Lenth: 2.0 m Cable type: RG 316 Connectors: BNC male / SMB female Voltage drop at 110 mA nominal current: < 0.2 V
78210389	**Cable set 5 m (6 cables)**	Lenth: 5.0 m Cable type: RG 316 Connectors: BNC male / SMB female Voltage drop at 110 mA nominal current: < 0.2 V
793304	**Bias Tee**	Please see separate data sheet

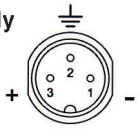
Bias Tee 793 304



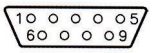
Application example
Antenna system (1 sector) with Kathrein PDU 78210344, Bias Tees 793304 and UMTS Douple TMA 78210301



Detail Power supply connector



Detail SupD 9-pin connector



Compatibility List

Type No.	
900 MHz DTMA	
782 10440	Not compatible
782 10442	Not compatible
1800 MHz DTMA	
782 10555	Compatible
782 10556	Compatible
782 10557	Compatible
782 10558	Compatible
782 10580	Compatible
2100 MHz DTMA	
782 10151	Compatible
782 10152	Compatible
782 10153	Compatible
782 10154	Compatible
782 10561	Compatible
782 10562	Compatible
782 10563	Compatible
782 10564	Compatible
782 10565	Compatible
782 10566	Compatible
782 10567	Compatible
782 10568	Compatible
782 10569	Compatible
782 10570	Compatible
782 10571	Compatible
782 10579	Compatible
782 10610	Compatible
782 10612	Compatible
782 10613	Compatible
782 10652	Compatible
782 10653	Compatible

SubD 9-pin connector and LED alarms

		SubD 9-pin connector pin #									Red alarm LED #						Orange alarm LED	Green alarm LED
		1	2	3	4	5	6	7	8	9	1	2	3	4	5	6		
MHA1	failure	grd	–	–			–	–	–	grd	ON	–	–	–	–	–	–	ON
	no failure	open	–	–			–	–	–	grd	OFF	–	–	–	–	–	–	ON
MHA2	failure	–	grd	–			–	–	–	grd	–	ON	–	–	–	–	–	ON
	no failure	–	open	–			–	–	–	grd	–	OFF	–	–	–	–	–	ON
MHA3	failure	–	–	grd			–	–	–	grd	–	–	ON	–	–	–	–	ON
	no failure	–	–	open			–	–	–	grd	–	–	OFF	–	–	–	–	ON
MHA4	failure	–	–	–			grd	–	–	grd	–	–	–	ON	–	–	–	ON
	no failure	–	–	–			open	–	–	grd	–	–	–	OFF	–	–	–	ON
MHA5	failure	–	–	–			–	grd	–	grd	–	–	–	–	ON	–	–	ON
	no failure	–	–	–			–	open	–	grd	–	–	–	–	OFF	–	–	ON
MHA6	failure	–	–	–			–	–	grd	grd	–	–	–	–	–	ON	–	ON
	no failure	–	–	–			–	–	open	grd	–	–	–	–	–	OFF	–	ON
Power supply	failure	–	–	–			–	–	–	grd	–	–	–	–	–	–	ON	ON
	no failure	–	–	–			–	–	–	grd	–	–	–	–	–	–	OFF	ON

contacts closed if at least 1 failure

contacts open if no failure

– contact status not defined
grd contact grounded

50-Ohm Load
0 ... 4000 MHz
0.5 ... 100 W

KATHREIN
Antennen · Electronic

- Standard 50-Ohm terminations for small and medium power
- Suitable for terminating open ports on RF equipment for indoor and/or outdoor applications

0.5 Watt *

Type No.	K6226611
Connector	N male
Frequency range	0 – 2700 MHz
VSWR 0 – 1000 MHz 1000 – 2000 MHz 2000 – 2700 MHz	< 1.08 < 1.15 < 1.20
Application	Indoor
Weight	40 g
Packing size	90 x 60 x 25 mm
Dimensions	33 / 21 mm diameter

K 62 26 61 1

1.5 Watt *

Type No.	78410367	78410470
Connector	7-16 male	7-16 female
Frequency range	0 – 4000 MHz	
VSWR 0 – 2000 MHz 2000 – 4000 MHz	< 1.10 < 1.30	
Application	Indoor *or* outdoor (IP65)	
Weight	120 g	
Packing size	Approx. 50 x 90 x 100 mm	
Dimensions	40 / 32 mm diameter	42 / 29 mm diameter

784 10367

2 Watt *

Type No.	K6226111
Connector	N male
Frequency range	0 – 2700 MHz
VSWR 0 – 1000 MHz 1000 – 2000 MHz 2000 – 2700 MHz	< 1.08 < 1.15 < 1.20
Application	Indoor
Weight	40 g
Packing size	90 x 60 x 25 mm
Dimensions	30 / 21 mm diameter

K 62 26 11 1

10 Watt *

Type No.	K6226401	K6226411
Connector	N female	N male
Frequency range	0 – 2700 MHz	
VSWR 0 – 1000 MHz 1000 – 2000 MHz 2000 – 2700 MHz	< 1.08 < 1.15 < 1.20	
Application	Indoor	
Weight	Approx. 250 g	
Packing size	50 x 90 x 100 mm	
Dimensions (w x h x d)	40 x 82 x 77 mm (including connector)	40 x 82 x 85 mm (including connector)

K 62 26 40 1

50-Ohm Load
0 ... 4000 MHz
0.5 ... 100 W

KATHREIN
Antennen · Electronic

25 Watt *

Type No.	K6226201	K6226211	K6226207	K6226217
Connector	N female	N male	7-16 female	7-16 male
Frequency range	0 – 2700 MHz			
VSWR 0 – 1000 MHz 1000 – 2000 MHz 2000 – 2700 MHz	< 1.08 < 1.15 < 1.20			
Application	Indoor			
Weight	Approx. 0.5 kg			
Packing size	50 x 100 x 135 mm			
Dimensions (w x h x d)	35 x 94 x 113 mm (incl. connector)	35 x 94 x 121 mm (incl. connector)	35 x 94 x 125 mm (incl. connector)	35 x 94 x 124 mm (incl. connector)

K 62 26 20 1

50 Watt *

Type No.	K6226301	K6226311	K6226307	K6226317
Connector	N female	N male	7-16 female	7-16 male
Frequency range	0 – 2700 MHz			
VSWR 0 – 1000 MHz 1000 – 2000 MHz 2000 – 2700 MHz	< 1.08 < 1.15 < 1.20			
Application	Indoor			
Weight	Approx. 0.8 kg			
Packing size	80 x 95 x 145 mm			
Dimensions (w x h x d)	67 x 90 x 130 mm (incl. connector)	67 x 90 x 138 mm (incl. connector)	67 x 90 x 134 mm (incl. connector)	67 x 90 x 133 mm (incl. connector)

K 62 26 30 1

100 Watt *

Type No.	K6226501	K6226511	K6226507
Connector	N female	N male	7-16 female
Frequency range	0 – 1000 MHz		
VSWR 0 – 1000 MHz	< 1.08		
Application	Indoor		
Weight	Approx. 2.4 kg		
Packing size	130 x 195 x 180 mm		
Dimensions (w x h x d)	114 x 153 x 156 mm (including connector)	114 x 161 x 156 mm (including connector)	114 x 170 x 156 mm (including connector)

K 62 26 50 1

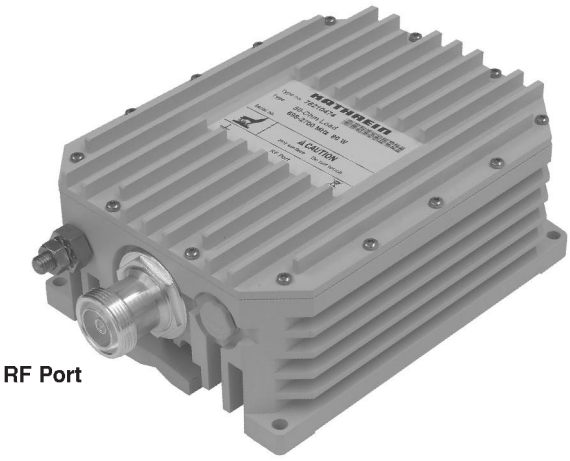
* Rated power at 40 °C ambient temperature. The max. power rating increases or decreases with falling or rising ambient temperature.

Note: The 50-Ohm load, type 782 010474, should be used if intermodulation requirements are of high priority.

50-Ohm Load
698 – 2700 MHz
80 W

KATHREIN
Antennen · Electronic

- Designed as 50-Ohm termination wherever improved intermodulation performance compared to standard loads is required
- **Excellent intermodulation performance**
- Suitable for indoor or outdoor applications
- Wall or mast mounting
- Built-in DC stop



RF Port

Technical Data

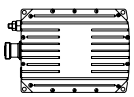
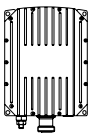
Type No.	78210474
Frequency range	698 – 2700 MHz
VSWR	< 1.12
Impedance	50 Ω
Input power	< 80 W (see table)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–40 … +55 °C
Connector	7-16 female (long neck)
Application	Indoor *or* outdoor (IP 66)
DC/AISG transparency	Built-in DC stop AISG: Attenuation up to 3 dB when used in a network
Mounting	Wall mounting: With 4 screws (max. 6.5 mm diameter) Mast mounting: With additional clamp set (see data sheet)
Weight	3.1 kg
Packing size	377 x 232 x 189 mm
Dimensions (w x h x d)	143.6 x 216 x 79.2 mm (including connector)

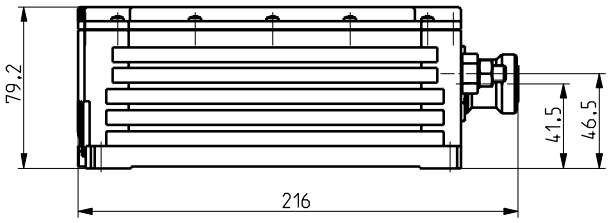
Note:
The RF port connector should always point downwards if mounted outdoors.

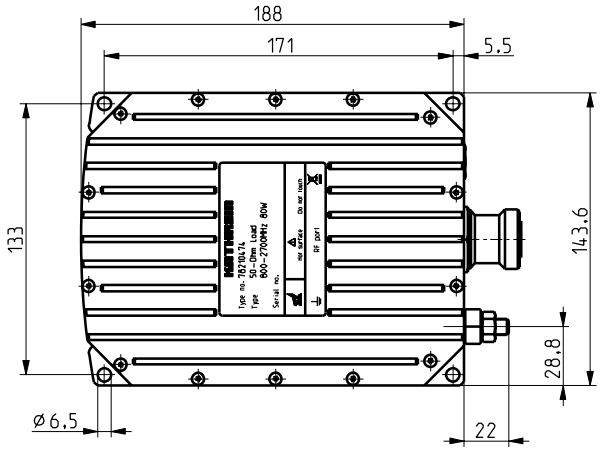
The input power rating of 80 W is specified at an ambient temperature of +40 °C with the combiner mounted vertically, without additional cooling, and while respecting the safety standard EN IEC 60950 (max. surface temperature +90 °C).

The max. power rating increases or decreases with falling or rising ambient temperature and depending on horizontal or vertical mounting in accordance with the following table:

Max. input power

Max. ambient temperature	Mounted horizontally	Mounted vertically
		
+55 °C	50 W	60 W
+40 °C	70 W	**80 W**
+25 °C	90 W	100 W





Attenuator
2 – 15 W
0 – 4000 MHz

KATHREIN
Antennen · Electronic

Air-cooled attenuator for low power rating

- Signal attenuation for test, measuring or tuning purposes
- Good matching over large frequency range
- Closed metal housing, very stable and RF proof
- Free choice of mounting position due to convection-cooling

Technical Data

Type No.	78410235	78410236	78410237	78410238
Attenuation	3 ±0.3 dB	6 ±0.3 dB	10 ±0.3 dB	20 ±0.5 dB
Frequency range	0 – 4000 MHz			
VSWR	< 1.12			
Impedance	50 Ω			
Max. power	2 W			
Connectors	N			
IP rating	**IP65**			
Application	**Outdoor**			
Weight	60 g			
Dimensions (L x diameter)	49 x 21 mm			

Air-cooled attenuator for medium power rating

- Signal attenuation for test, measuring or tuning purposes
- Good matching over large frequency range
- Closed metal housing, very stable and RF proof
- Free choice of mounting position due to convection-cooling

Technical Data

Type No.	791918	791919	791920	791921
Attenuation	3 ±0.3 dB	6 ±0.3 dB	10 ±0.3 dB	20 ±0.5 dB
Max. power	15 W	12 W	10 W	10 W
Frequency range	0 – 4000 MHz			
VSWR	< 1.15			
Impedance	50 Ω			
Connectors	N			
IP rating	**IP65**			
Application	**Outdoor**			
Weight	70 g			
Dimensions (L x diameter)	50 x 26 mm			

Measuring Directional Coupler
824 – 2500 MHz

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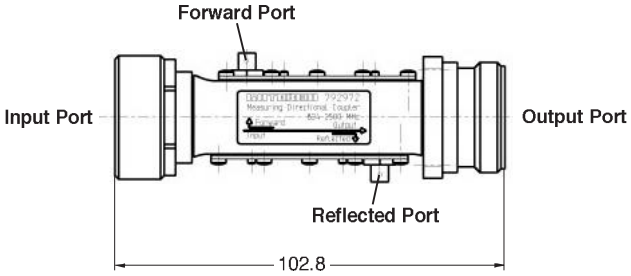
The Measuring Directional Coupler provides measurement ports for monitoring the forward and reflected power of a RF signal.

- Easy implementation into existing RF systems due to male/female connectors
- Input and output ports are reciprocal in nature
- Front panel mounting possible via flange
- Suitable for indoor applications



Technical Data

Type No.	792972
Frequency range	824 – 2500 MHz
Insertion loss Input port → Output port	< 0.05 dB (824 – 2500 MHz)
Coupling attenuation Input port → Forward port Output port → Reflected port	32.0 ±0.75 dB (824 – 960 MHz) 28.5 ±1.50 dB (1710 – 2500 MHz) 32.0 ±0.75 dB (824 – 960 MHz) 28.5 ±1.50 dB (1710 – 2500 MHz)
Directivity	> 28 dB (824 – 2200 MHz) > 25 dB (2200 – 2500 MHz)
VSWR Input port, Output port Forward port, Reflected port	< 1.04 (824 – 960 MHz) < 1.08 (960 – 2500 MHz) < 1.2 (824 – 2500 MHz)
Impedance	50 Ω
Input power	< 800 W (824 – 960 MHz) < 200 W (960 – 2500 MHz)
Intermodulation products	< –160 dBc (3rd order; with 2 x 20 W)
Temperature range	–20 … +55 °C
Connectors Input port Output port Forward port, Reflected port	 7-16 male 7-16 female MCX female
Application	Indoor
Mounting	Front panel mounting possible with 4 screws (max. 2.5 mm diameter)
Weight	0.26 kg
Dimensions (w x h x d)	32 x 32 x 102.3 mm

DTMAs

Summary of DTMA Types

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DTMAs:

Description	Type No.	Frequency range	Gain	Page
Single Mode AISG or CWA				
DTMA-800-12-AISG	78210430	UL: 832 – 862 / DL: 791 – 821 MHz	12 dB	329
DTMA-1800-12-CWA	78210580	UL: 1710 – 1785 / DL: 1805 – 1880 MHz	12 dB	330
DTMA-1800-12-AISG	78210581	UL: 1710 – 1785 / DL: 1805 – 1880 MHz	12 dB	331
DTMA-1900-850-BYP-12-AISG	78210406	UL: 1850 – 1910 / DL: 1930 – 1990 MHz Bypass: 806 – 896 MHz	12 dB	332
DTMA-UMTS-12-AISG	78211145	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	333
Dual Mode AISG and CWA				
DTMA-850-12-AISG-CWA	78210874	UL: 824 – 849 / DL: 869 – 894 MHz	12 dB	334
DTMA-900-12-32-AISG-CWA	78210440	UL: 880 – 915 / DL: 925 – 960 MHz	12/32 dB	335
DTMA-900-12-32-AISG-CWA	78210442	UL: 880 – 915 / DL: 925 – 960 MHz	12/32 dB	335
DTMA-1800-UMTS-12-AISG-CWA	78211103	UL: 1710 – 1785 / DL: 1805 – 1880 MHz	12 dB	336
DTMA-1800-UMTS-12-AISG-CWA	78211105	UL: 1710 – 1785 / DL: 1805 – 1880 MHz	12 dB	336
DTMA-1900-12-AISG-CWA	78210876	UL: 1850 – 1910 / DL: 1930 – 1990 MHz	12 dB	337
DTMA-AWS-12-AISG-CWA	78210877	UL: 1710 – 1770 / DL: 2110 – 2170 MHz	12 dB	338
DTMA-UMTS-BYP1800-12-AISG-CWA	78211102	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	339
DTMA-UMTS-BYP1800-12-AISG-CWA	78211104	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	339
DTMA-UMTS-BYP900/1800-12-AISG-CWA	78210652	UL: 1920 – 1980 / DL: 2110 – 2170 MHz Bypass: 870 – 960 MHz 1710 – 1880 MHz	12 dB	340, 341
DTMA-UMTS-BYP900/1800-12-AISG-CWA	78210653	UL: 1920 – 1980 / DL: 2110 – 2170 MHz Bypass: 870 – 970 MHz 1710 – 1880 MHz	12 dB	340, 341
DTMA-UMTS-12-AISG-CWA	78210610	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	342
DTMA-UMTS-12-AISG-CWA	78210612	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	342
DTMA-UMTS-12-AISG-CWA	78211120	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	342
DTMA-UMTS-24-AISG-CWA	78210613	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	24 dB	343
DTMA-1800-UMTS-12-AISG-D	78210990	UL: 1920 – 1980 / DL: 2110 – 2170 MHz	12 dB	344, 345
DTMA-2600-12-AISG	78210860	UL: 2500 – 2570 / DL: 2620 – 2690 MHz	12 dB	346

New Products

UL = Up Link / DL = Down Link

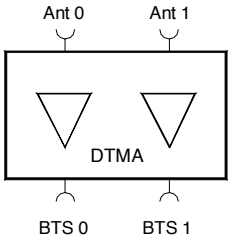
DTMA-800-12-AISG

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- **Compact line**
- Double unit for easy use with XPol antennas
- Supports AISG 1.1 and AISG 2.0 (default)
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

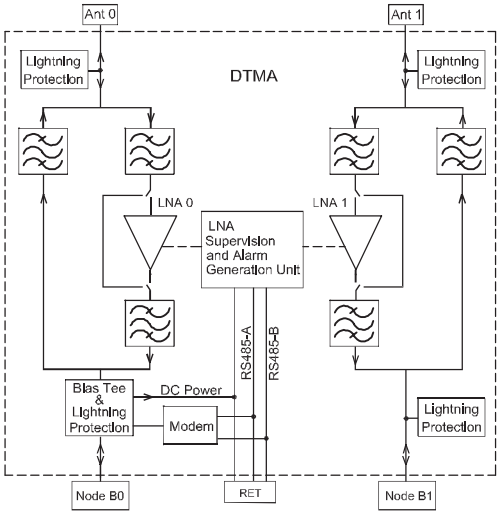
RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup



Technical Data

Type No.	78210430 DTMA-800-12-AISG (12 dB gain)
Tx Characteristics	
Frequency range	791 – 821 MHz
Insertion loss	Typically 0.25 dB
Ripple	< 0.3 dB
Input power (per input)	< 100 W (+50 dBm) CW
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	832 – 862 MHz
Loss in bypass mode	Typically 2 dB
Return loss	> 16 dB (DC ON)
Gain	12 dB nominal
Noise figure	Typically 1.2 dB
3rd order intercept point (OIP3)	Typically 30 dBm
Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67*
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3
DC and Alarm Characteristics	
DC supply	10 – 30 V
Operating current per DTMA (without RET)	Nom. 155 mA at 10 V / Nom. 60 mA at 30 V
Alarm management	AISG
Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 10 – 30 V DC, pin 7: DC return, other pins: Not connected)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	6.2 kg
Packing size	250 x 450 x 210 mm
Dimensions (w x h x d)	176 x 246.6 x 103.6 mm (without connectors, without mounting brackets)

* (see note on data sheet)



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

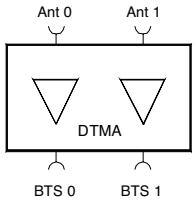
DTMA-1800-12-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- **Compact line**
- Double units for easy use with XPol antennas
- Alarm management: CWA
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

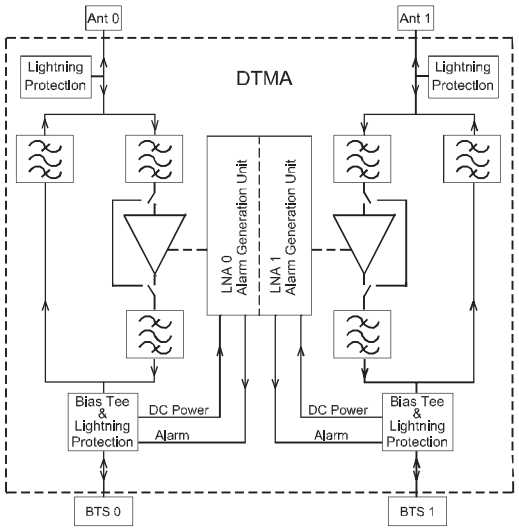
CWA = **C**urrent **W**indow **A**larm



Technical Data

Type No.	78210580 DTMA-1800-12-CWA (12 dB gain)
Tx Characteristics	
Frequency range	1805 – 1880 MHz
Insertion loss	Typically 0.25 dB
Input power (per input)	< 200 W (+53 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	1710 – 1785 MHz
Loss in bypass mode	Typically 1.7 dB (DC OFF)
Return loss	> 16 dB (DC ON)
Gain	12 dB nominal
Noise figure	Typically 1.0 dB
Output 1-dB compression point	> 10 dBm
3rd order intercept point (OIP3)	Typically 30 dBm
Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67*
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3
DC and Alarm Characteristics	**CWA Mode**
DC supply	7 – 15 V
Operating current per DTMA (without RET)	Typically 80 mA
Alarm management	230 – 290 mA
Mechanical Characteristics	
Material	Aluminium housing
Connectors	7-16 female (long neck)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	4 kg
Packing size	405 x 235 x 175 mm
Dimensions (w x h x d)	218 x 169 x 74.3 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

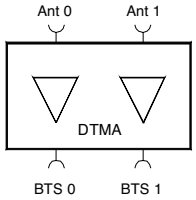
DTMA-1800-12-AISG

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- **Compact line**
- Double units for easy use with XPol antennas
- Supports AISG 1.1 and AISG 2.0 (default)
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

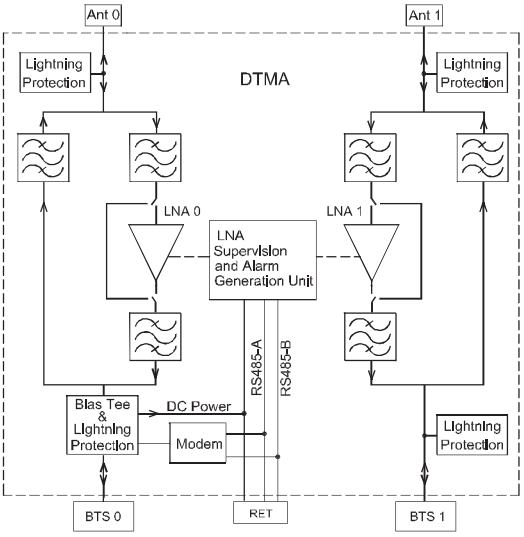
RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup



Technical Data

Type No.	78210581 DTMA-1800-12-AISG (12 dB gain)
Tx Characteristics	
Frequency range	1805 – 1880 MHz
Insertion loss	Typically 0.25 dB
Input power (per input) Intermodulation products in Rx band	< 200 W (+53 dBm) CW / < 1.6 kW (+62 dBm) peak < –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	1710 – 1785 MHz
Loss in bypass mode	Typically 1.7 dB (DC OFF)
Return loss	> 16 dB (DC ON)
Gain	12 dB nominal
Noise figure	Typically 1.0 dB
Output 1-dB compression point	> 10 dBm
3rd order intercept point (OIP3)	Typically 30 dBm
Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67*
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3
DC and Alarm Characteristics	**AISG Mode**
DC supply	10 – 30 V
Operating current per DTMA (without RET)	Nom. 130 mA at 10 V Nom. 50 mA at 30 V
Alarm management	AISG
Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	4 kg
Packing size	235 x 405 x 175 mm
Dimensions (w x h x d)	169 x 218 x 74.3 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

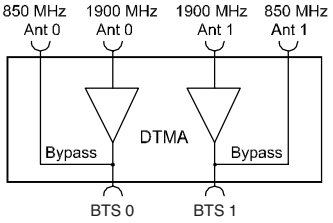
DTMA-1900-850 BYP-12-AISG

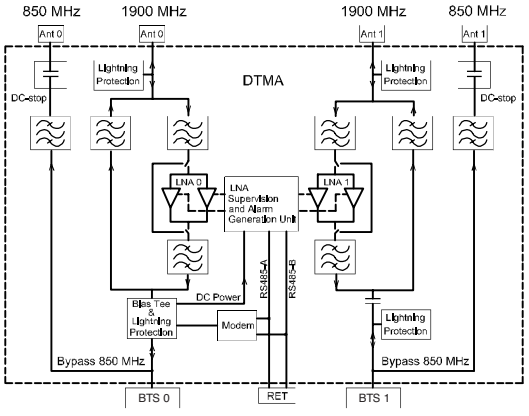
Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double units for easy use with XPol antennas
- RF-Bypass feature for 850 MHz
- DC-stop integrated to 850 MHz ports
- Kathrein redundancy amplifier design for improved system reliability
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection
- Compact size
- Suitable for antenna RET control according to AISG standard
- **DTMA DC supply and AISG feed via BTS 0 port for both TMAs**

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
BYP = RF-**BYP**ass





Technical Data

Type No.	78210406 DTMA-1900-850 BYP-12-AISG (12 dB gain)
850 MHz Bypass	
Frequency range	806 – 896 MHz
Insertion loss	< 0.15 dB
Isolation to 1900 MHz	> 80 dB
Input power	500 W CW per input
Return loss	> 18 dB
1900 MHz DTMA	
Tx Characteristics	
Frequency range	1930 – 1990 MHz
Bandwidth	60 MHz
Insertion loss	< 0.5 dB at 80% of BW, a further 0.25 dB at 100% BW.
Input power	< 160 W (+52 dBm) CW per input < 1.6 kW (+62 dBm) Peak
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	1850 – 1910 MHz
Bandwidth	60 MHz
Loss in bypass mode	Typically 2.8 dB
Return loss	> 18 dB (DC ON) > 15 dB (DC OFF)
Gain **+22 ... +28 °C** –40 ... +65 °C	12 ±0.7 dB 12 ±1.3 dB
Noise figure **+22 ... +28 °C**	< 1.7 dB at 80% of BW, a further 0.3 dB at 100% BW.
Noise figure –40 ... +65 °C	< 2.2 dB at 80% of BW, a further 0.3 dB at 100% BW.
Output 1-dB compression point	> 15 dBm
3rd order intercept point (OIP3)	> 25 dBm
Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67*
MTBF	> 1 000 000 hours (per TMA)
EMC Lightning protection	ETS 300 342-3 5 kA, 8/20 µs RF connections and AISG port
DC and Alarm Characteristics	**Through BTS 0 Port only**
DC supply without RET	+12 V nominal (9 – 15 V, minus grounded) Typically 150 mA per TMA
Operating current per DTMA (without RET)	Nom. 130 mA at 10 V Nom. 50 mA at 30 V
Alarm management	According to AISG standard 1.1
Modem Characteristics	According to AISG standard 1.1 (Data rate: 9.6 kB)
Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG (Compliance AISG 1.1)	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 1: +12 V nominal, pin 3: RS485B, pin 5: RS485A, pin 7: DC return, other pins: Not connected)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	Approx. 8.7 kg
Packing size	352 x 514 x 212 mm
Dimensions (w x h x d)	271 x 278 x 77.5 mm (without connectors, without mounting brackets)

* see note on data sheet

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

DTMA-UMTS-12-AISG

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

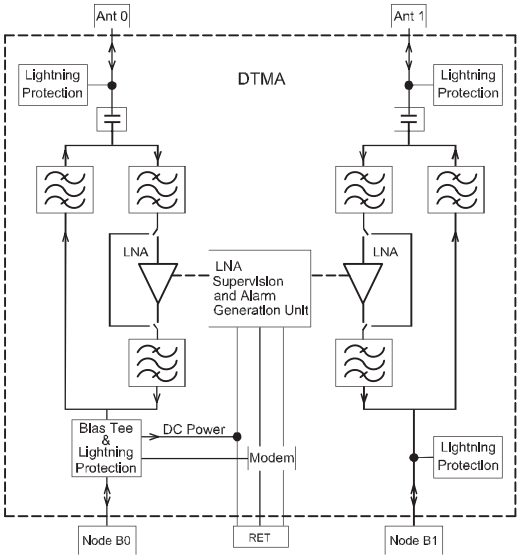
- **Slimeline design**
- Double units for easy use with XPol antennas
- Supports AISG 1.1 and 2.0 (default)
- AISG setting switchable
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection
- Low weight

AISG = **A**ntenna **I**nterface **S**tandards **G**roup
RET = **R**emote **E**lectrical **T**ilt

Technical Data

Type No.	78211145 DTMA-UMTS-12-AISG (12 dB gain)
Tx Characteristics	
Frequency range	2110 – 2170 MHz
Insertion loss	Typically 0.2 dB
Ripple	< 0.1 dB
Input power (per input)	< 100 W (+50 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in RX band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	1920 – 1980 MHz
Loss in bypass mode	Typically 2.0 dB (DC OFF)
Return loss	> 18 dB (DC ON)
Gain	Typically 12 dB
Noise figure	Typically 1.4 dB
3rd order intercept point (OIP3)	Typically 30 dBm
Environmental Characteristics	
Operating temperature range	–40 ... +65 °C
IP rating	IP67*
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3
DC and Alarm Characteristics	**AISG Mode**
DC supply	10 – 30 V
Operating current (without RET)	Nom. 130 mA at 10 V Nom. 50 mA at 30 V
Alarm management	AISG*
Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 30130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 - 30 V DC, pin 7: DC return, other pins: Not connected)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	3 kg
Packing size	217 x 397 x 170 mm
Dimensions (w x h x d)	138 x 191 x 71.6 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

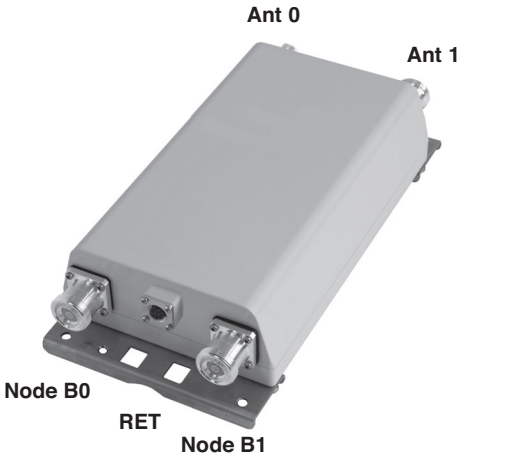
DTMA-850-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double unit for easy use with XPol antennas
- Supports CWA, AISG 1.1 and AISG 2.0 (default)
- AISG setting switchable
- CWA and AISG configurations
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

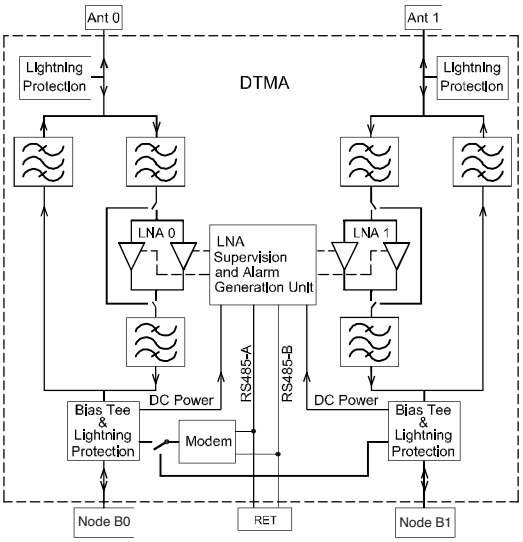
RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandard **G**roup
CWA = **C**urrent **W**indow **A**larm



Technical Data

Type No.	78210874 DTMA-850-12-AISG-CWA (12 dB gain)	
Tx Characteristics		
Frequency range	869 – 894 MHz	
Insertion loss	< 0.35 dB	
Input power (per input)	< 100 W (+50 dBm)	
Intermodulation products in Rx band	< –116 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	824 – 849 MHz	
Loss in bypass mode	Typically 1.5 dB (DC OFF)	
Return loss	> 18 dB (DC ON) / > 15 dB (DC OFF)	
Gain	12 dB nominal	
Noise figure	< 1.3 dB	
Output 1-dB compression point	> 10 dBm	
3rd order intercept point (OIP3)	Typically 25 dBm	
Environmental Characteristics		
Operating temperature range	–40 ... +65 °C	
IP rating	IP67	
MTBF	> 1 200 000 hours (per TMA)	
EMC	FCC Part 15	
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V	9 – 30 V
Operating current per TMA	80 – 130 mA	Nom. 50 mA at 12 V
Alarm management	170 – 180 mA	AISG*
Mechanical Characteristics		
Material	Aluminium housing	
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: Not connected)	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	4.9 kg	
Packing size	400 x 250 x 150 mm	
Dimensions (w x h x d)	168 x 275 x 73 mm (without connectors, without mounting brackets)	

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

DTMA-900-12-32-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double units for easy use with XPol antennas
- Gain setting switchable from 12 dB (default) to 32 dB
- Both versions support CWA, AISG 1.1 and AISG 2.0 (default)
  782 10440: CWA alarm 170 – 200 mA / 800 – 900 mA
  782 10442: CWA alarm 230 – 295 mA / 800 – 900 mA
- AISG and gain setting switchable as described on page 2
- CWA and AISG configurations as described on page 2
- Suitable for antenna RET control according to AISG/3GPP standard
- By-pass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm

Technical Data

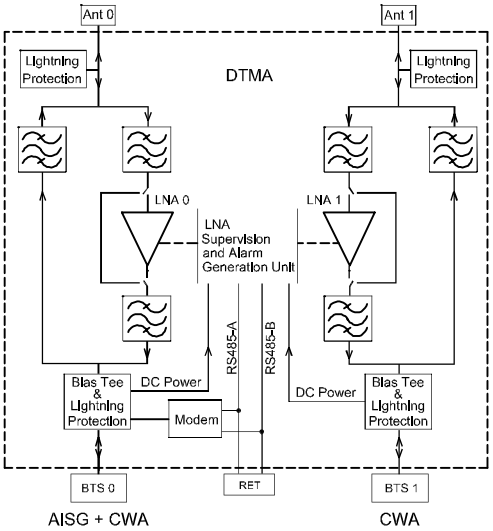
Type No.	CWA alarm 170 – 200 mA / 800 – 900 mA	**78210440** DTMA-900-12-32-AISG-CWA (12/32 dB gain)
	CWA alarm 230 – 295 mA / 800 – 900 mA	**78210442** DTMA-900-12-32-AISG-CWA (12/32 dB gain)

Tx Characteristics	
Frequency range	925 – 960 MHz
Insertion loss*	Typically 0.5 dB
Input power (per input)	< 180 W (+52.5 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	880 – 915 MHz
Loss in by-pass mode	Typically 4 dB (DC OFF)
Return loss	> 16 dB (DC ON)
Gain	12/32 dB nominal
Noise figure	Typically 1.3 dB
Input 3rd order intercept point (IIP3)	Typically 5 dBm
Environmental Characteristics	
Operating temperature range	–40 … +55 °C
IP rating	IP 67
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3

DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	8.5 – 19 V (12 dB gain) 8.5 – 15 V (32 dB gain)	10 – 30 V
Operating current per TMA (without RET)	80 – 130 mA (12 dB gain) 360 – 400 mA (32 dB gain)	< 110 mA (12 dB gain) < 350 mA (32 dB gain)
Alarm management 12 dB gain 32 dB gain	**782 10440:** 170 – 200 mA **782 10442:** 230 – 295 mA 800 – 900 mA	AISG*

Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)
Weight	8.7 kg
Packing size	342 x 579 x 212 mm
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Dimensions (w x h x d)	250 x 353 x 94 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

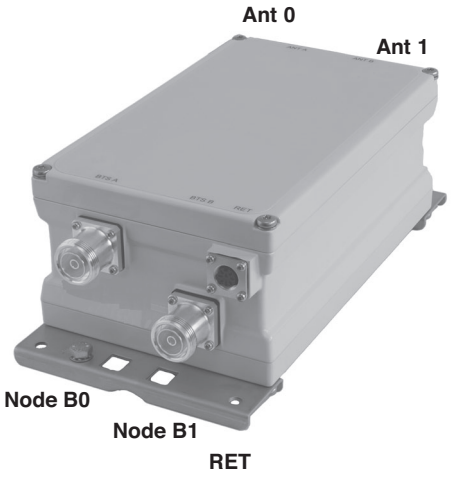
DTMA-1800-UMTS-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double unit for easy use with XPol antennas
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Supports CWA, AISG 1.1 and AISG 2.0 (default)
- Built-in lightning protection
- AISG setting switchable
- CWA and AISG configurations

RET = Remote **E**lectrical **T**ilt
AISG = Antenna **I**nterface **S**tandard **G**roup
CWA = Current **W**indow **A**larm



Technical Data

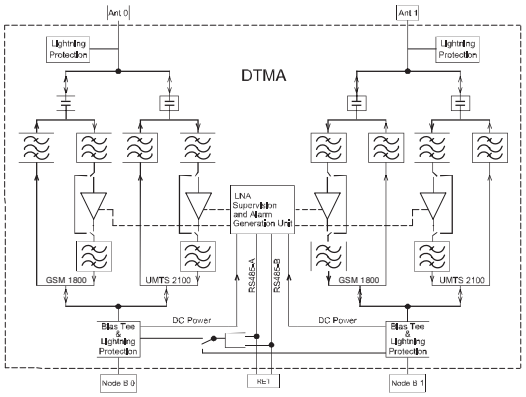
Type No.	CWA alarm 170 – 200 mA	78211103 DTMA-1800-UMTS-12-AISG-CWA
Type No.	CWA alarm 230 – 295 mA	78211105 DTMA-1800-UMTS-12-AISG-CWA

1800 MHz Tx Characteristics		
Frequency range		1805 – 1880 MHz
Insertion loss		Typically 0.5 dB
Input power (per input)		< 100 W (+50 dBm) / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band		< –116 dBm (2 Tx carriers at +43 dBm)
Return loss		> 18 dB
1800 MHz Rx Characteristics		
Frequency range		1710 – 1785 MHz
Loss in bypass mode		Typically 2.0 dB
Return loss		> 18 dB (DC ON) / > 14 dB (DC OFF)
Gain		12 dB nominal
Noise figure		Typically 1.5 dB
3rd order intercept point (OIP3)		Typically 25 dBm
UMTS Tx Characteristics		
Frequency range		2110 – 2170 MHz
Insertion loss		Typically 0.3 dB
Input power (per input)		< 100 W (+50 dBm) / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band		< –116 dBm (2 Tx carriers at +43 dBm)
Return loss		> 18 dB
UMTS Tx Characteristics		
Frequency range		1920 – 1980 MHz
Loss in bypass mode		Typically 2.0 dB
Return loss		> 18 dB (DC ON) / > 14 dB (DC OFF)
Gain		12 dB nominal
Noise figure		Typically 1.4 dB
3rd order intercept point (OIP3)		Typically 25 dBm
Environmental Characteristics		
Operating temperature range		–40 … +65 °C
IP rating		IP67*
MTBF		> 1 000 000 hours per TMA
EMC		According to ETS 300 342-3
Lightning protection		3 kA, 10/350 µs pulse

DC and Alarm Characteristics	CWA Mode	AISG Mode
DC supply	9 – 19 V DC	9 – 31 V DC
Operating current per DTMA (without RET)	80 – 120 mA	Nom. 300 mA at 10 V Nom. 100 mA at 30 V
Alarm management	**78211103:** 170 – 200 mA **78211105:** 230 – 295 mA	AISG*

Mechanical Characteristics		
Material		Aluminium housing
Connectors	RF	7-16 female (long neck)
	AISG	8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 31 V DC, pin 7: DC return, other pins: Not connected)
Mounting		Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight		8 kg
Dimensions (w x h x d)		Approx. 168 x 274 x 120 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

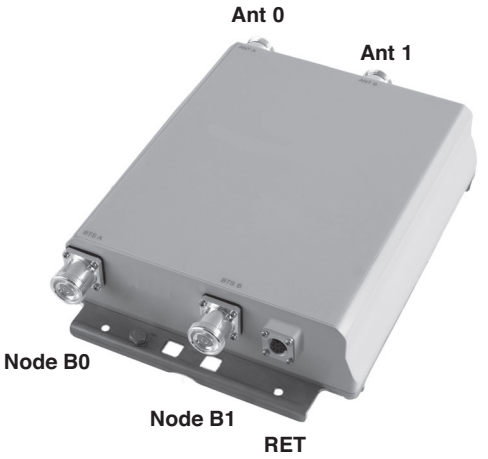
DTMA-1900-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double unit for easy use with XPol antennas
- Supports CWA, AISG 1.1 and AISG 2.0 (default)
- AISG setting switchable
- CWA and AISG configurations
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

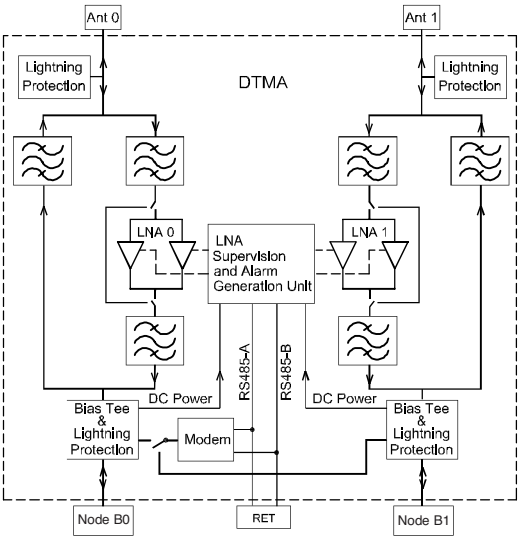
RET = Remote **E**lectrical **T**ilt
AISG = Antenna **I**nterface **S**tandard **G**roup
CWA = Current **W**indow **A**larm



Technical Data

Type No.	78210876 DTMA-1900-12-AISG-CWA (12 dB gain)	
Tx Characteristics		
Frequency range	1930 – 1990 MHz	
Insertion loss	< 0.3 dB	
Input power (per input)	< 100 W (+50 dBm)	
Intermodulation products in Rx band	< –116 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	1850 – 1910 MHz	
Loss in bypass mode	Typically 2.0 dB (DC OFF)	
Return loss	> 18 dB (DC ON) / > 15 dB (DC OFF)	
Gain	12 dB nominal	
Noise figure	< 1.4 dB	
Output 1-dB compression point	> 10 dBm	
3rd order intercept point (OIP3)	> 25 dBm	
Environmental Characteristics		
Operating temperature range	–40 ... +65 °C	
IP rating	IP67	
MTBF	> 1 200 000 hours (per TMA)	
EMC	FCC Part 15	
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V	9 – 30 V
Operating current per TMA	80 – 130 mA	Nom. 50 mA at 12 V
Alarm management	170 – 180 mA	AISG*
Mechanical Characteristics		
Material	Aluminium housing	
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: Not connected)	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	4.6 kg	
Packing size	395 x 290 x 180 mm	
Dimensions (w x h x d)	168 x 275 x 61 mm (without connectors, without mounting brackets)	

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

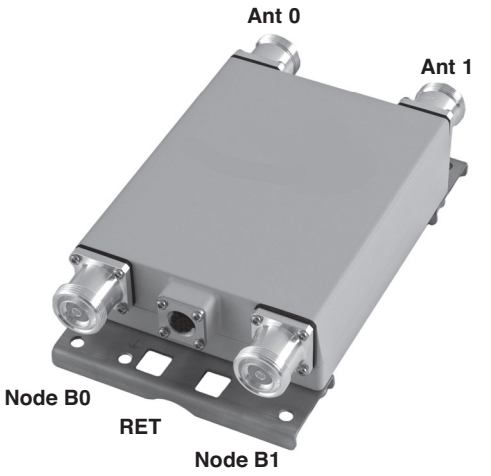
DTMA-AWS-12-AISG-CWA

Fullband Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double unit for easy use with XPol antennas
- Built-in lightning protection
- Compact size
- Suitable for antenna RET control according to AISG/3GPP standard
- AISG setting switchable
- CWA and AISG configuration
- Support CWA and AISG 1.1 and AISG 2.0 (default)

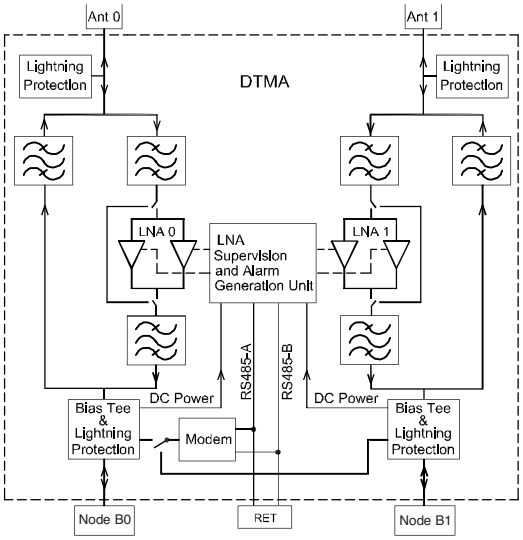
AISG = Antenna **I**nterface **S**tandard **G**roup
RET = Remote **E**lectrical **T**ilt
CWA = Current **W**indow **A**larm



Technical Data

Type No.	78210877 DTMA-AWS-12-AISG-CWA (12 dB gain)	
Tx Characteristics		
Frequency range	2110 – 2170 MHz	
Insertion loss	Typically 0.3 dB	
Ripple	< 0.1 dB	
Input power	< 100 W (+50 dBm)	
Intermodulation products in Rx band	< –125 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	1710 – 1770 MHz	
Loss in bypass mode	Typically 2.0 dB (DC OFF)	
Gain	12 dB nominal	
Return loss	> 18 dB (DC ON) / > 12 dB (DC OFF)	
Noise figure	< 1.3 dB	
Output 1-dB compression point	> 10 dBm	
3rd order intercept point (OIP3)	> 25 dBm	
Environmental Characteristics		
Operating temperature range	–40 ... +65 °C	
IP rating	IP67	
MTBF	> 1 200 000 hours (per TMA)	
EMC	According to EN 301 489-8	
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V	9 – 30 V
Operating current	80 – 130 mA	Nom. 50 mA at 12 V
Alarm management	170 – 180 mA	AISG*
Mechanical Characteristics		
Material	Aluminium housing	
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 6: 9 – 30 V DC, pin 3: RS485B, pin 5: RS485A, pin 7: DC return, other pins: Not connected)	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	2.5 kg	
Packing size	325 x 240 x 130 mm	
Dimensions (w x h x d)	152 x 174 x 50 mm (without connectors, without mounting brackets)	

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

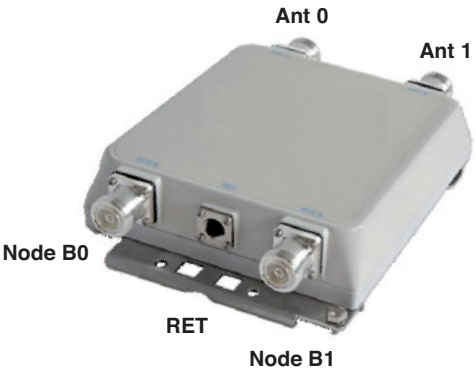
DTMA-UMTS-BYP1800-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- Double units for easy use with XPol antennas
- RF-Bypass for 1800 MHz
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection
- AISG setting switchable
- CWA and AISG configuration
- Support CWA, AISG 1.1 and AISG 2.0 (default)

RET = **R**emote **E**lectrical **T**ilt
BYP = RF-**BYP**ass
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm



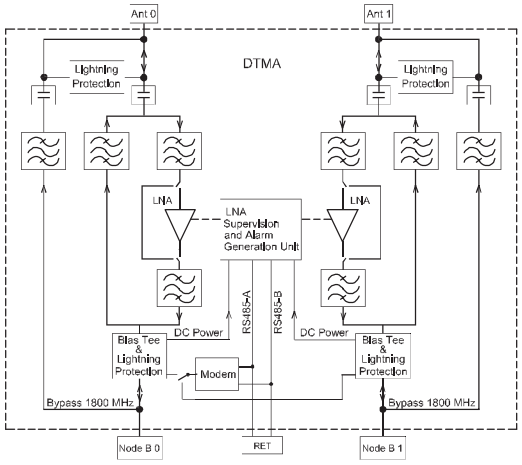
Technical Data

Type No.	CWA alarm 170 – 200 mA	**78211102** DTMA-UMTS-BYP1800-12-AISG-CWA (12 dB gain)
Type No.	CWA alarm 230 – 295 mA	**78211104** DTMA-UMTS-BYP1800-12-AISG-CWA (12 dB gain)
UMTS 2100 Tx Characteristics		
Frequency range		2110 – 2170 MHz
Insertion loss		< 0.4 dB (typically 0.3 dB)
Input power (per input)		< 100 W (+50 dBm)
Intermodulation products in Rx band		< –117 dBm (2 Tx carriers at +43 dBm)
Return loss		> 18 dB
UMTS 2100 Rx Characteristics		
Frequency range		1920 – 1980 MHz
Loss in bypass mode		Typically 2.9 dB (DC OFF)
Return loss		> 18 dB (DC ON) / > 14 dB (DC OFF)
Gain		12 dB nominal
Gain ripple		±0.35 dB (typically ±0.3 dB)
Noise figure		< 1.4 dB (+20 ... +30 °C)
3rd order intercept point (OIP3)		Typically 25 dBm
1800 MHz Bypass Characteristics		
Frequency range 1800		1710 – 1880 MHz
Insertion loss 1710–1880 MHz		< 0.4 dB (typically 0.2 dB)
Input power (per input)		< 100 W (+50 dBm)
Intermodulation products in Rx band		< –116 dBm (2 Tx carriers at +43 dBm)
Return loss		> 18 dB
Environmental Characteristics		
Operating temperature range		–40 … +65 °C
IP rating		IP67*
MTBF		> 1 000 000 hours per TMA
EMC		According to ETS 301 489-8
Lightning protection		3 kA, 10/350 µs pulse

DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V DC	9 – 30 V DC
Operating current	80 – 130 mA	Nom. 100 mA at 12 V
Alarm management	**78211102:** 170 – 200 mA **78211104:** 230 – 295 mA	AISG*

Mechanical Characteristics		
Material		Aluminium housing
Connectors	RF	7-16 female (long neck)
	AISG	8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: Not connected)
Packing size		300 x 370 x 145 mm
Mounting		Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight		4 kg
Dimensions (w x h x d)		208 x 224 x 55 mm (without connectors, without mounting brackets)

* see note on data sheet



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

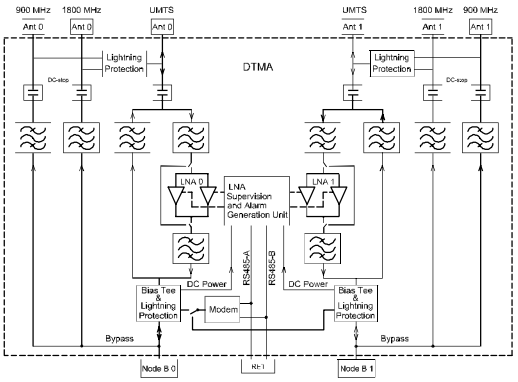
DTMA-UMTS-BYP900/1800-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier with 900 MHz and 1800 MHz Bypass

KATHREIN
Antennen · Electronic

- Double units for easy use with XPol antennas
- Both versions support CWA, AISG 1.1 and AISG 2.0 (default)
  78210652: CWA alarm 170 – 200 mA
  78210653: CWA alarm 230 – 295 mA
- RF-Bypass for 900 MHz and 1800 MHz
- Integrated DC stops
- AISG setting switchable as described on data sheet
- CWA and AISG configurations as described on data sheet
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm
BYP = RF-**BYP**ass



Technical Data

Type No.	CWA alarm 170 – 200 mA	**78210652** DTMA-UMTS-BYP900/1800-12-AISG-CWA (12 dB gain)
	CWA alarm 230 – 295 mA	**78210653** DTMA-UMTS-BYP900/1800-12-AISG-CWA (12 dB gain)
UMTS Tx Characteristics		
Frequency range		2110 – 2170 MHz
Insertion loss		< 0.4 dB
Return loss		> 18 dB
Input power (per input)		< 100 W (+50 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band		< –117 dBm (2 Tx carriers at +43 dBm)
UMTS Rx Characteristics		
Frequency range		1920 – 1980 MHz
Loss in bypass mode		< 3.0 dB (DC OFF)
Return loss		> 16 dB (DC ON) / > 14 dB (DC OFF)
Gain		12 ±0.7 dB (+22 ... +28 °C) / 12 ±1.3 dB (– 40 ... +60 °C)
Gain ripple in 5 MHz bandwidth		< ±0.2 dB
Noise figure*		< 1.3 dB (+22 ... +28 °C)
Output 1-dB compression point		> 10 dBm
3rd order intercept point (OIP3)		> 23 dBm
Intermodulation products in Rx band		< –117 dBm (2 Tx carriers at +43 dBm)
1800 MHz Bypass Characteristics		
Frequency range		1710 – 1880 MHz
Insertion loss		< 0.3 dB
Return loss		> 18 dB
Isolation		> 80 dB (2400 – 2900 MHz) / > 60 dB (2110 – 2170 MHz) / > 50 dB (2010 – 2025 MHz) / > 50 dB (1920 – 1980 MHz) / > 80 dB (880 – 960 MHz)
Input power (per input)		100 W CW / 300 W peak
Intermodulation products in Rx band		< –117 dBm (2 Tx carriers at +43 dBm)
900 MHz Bypass Characteristics		
Frequency range		870 – 970 MHz
Insertion loss		< 0.3 dB
Return loss		> 18 dB
Isolation		> 30 dB (1710 – 1880 MHz) > 40 dB (1920 – 2900 MHz)
Input power (per input)		100 W CW / 300 W peak
Environmental Characteristics		
Operating temperature range		–40 ... +60 °C
IP rating		IP67 (see note on data sheet)
MTBF		> 1 000 000 hours per TMA
EMC		According to ETS 300 342-3
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 19 V	9 – 30 V
Operating current per TMA (without RET)	80 – 140 mA	Nom. 95 mA at 9 V Nom. 35 mA at 30 V
Alarm management	**78210652:** 170 – 200 mA **78210653:** 230 – 295 mA	AISG
Mechanical Characteristics		
Material		Aluminium housing
Connectors RF AISG		7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)
Mounting		Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Dimensions (w x h x d)		222 x 316.9 x 108.5 mm (without connectors, without mounting brackets)

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Clamp Set

Type No.	Description
78410367	**50-Ω load** 1.5 W / indoor or outdoor

50-Ω load

* Noise figure $\overline{NF} = \frac{NF_{1920\ MHz} + 2 \times NF_{1950\ MHz} + NF_{1980\ MHz}}{4}$

(Additional variation at –40 ... +60 °C: $\Delta\ \overline{NF} < 0.3$ dB)

DTMA-UMTS-BYP900/1800-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier with 900 MHz and 1800 MHz Bypass

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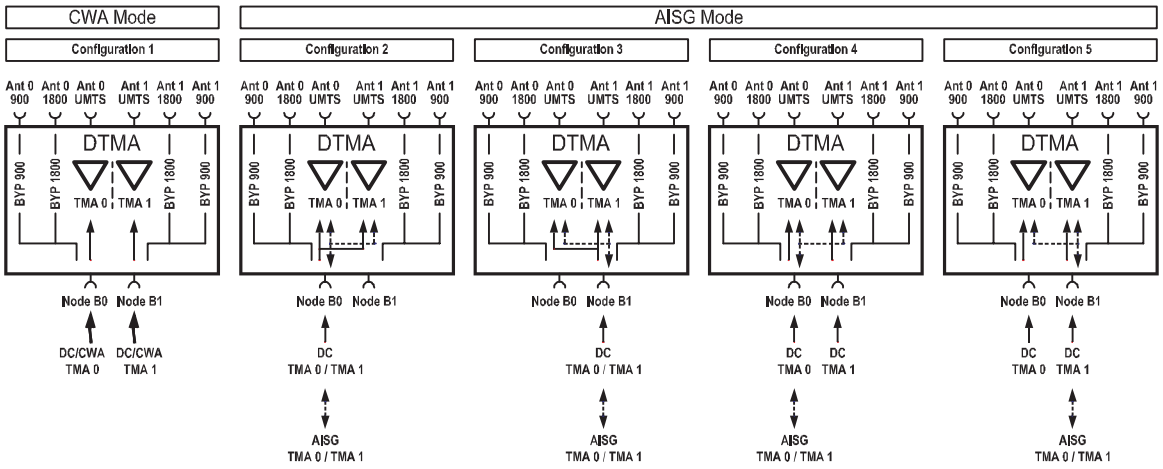
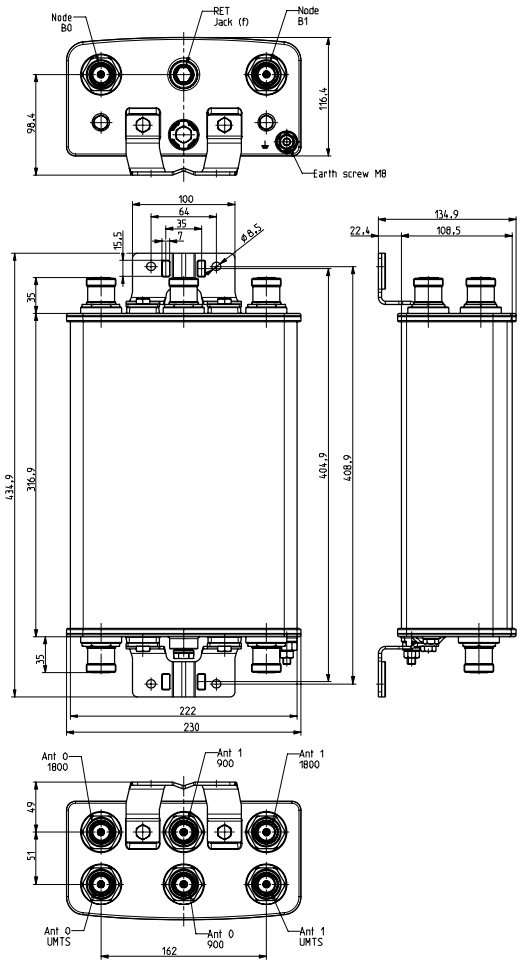
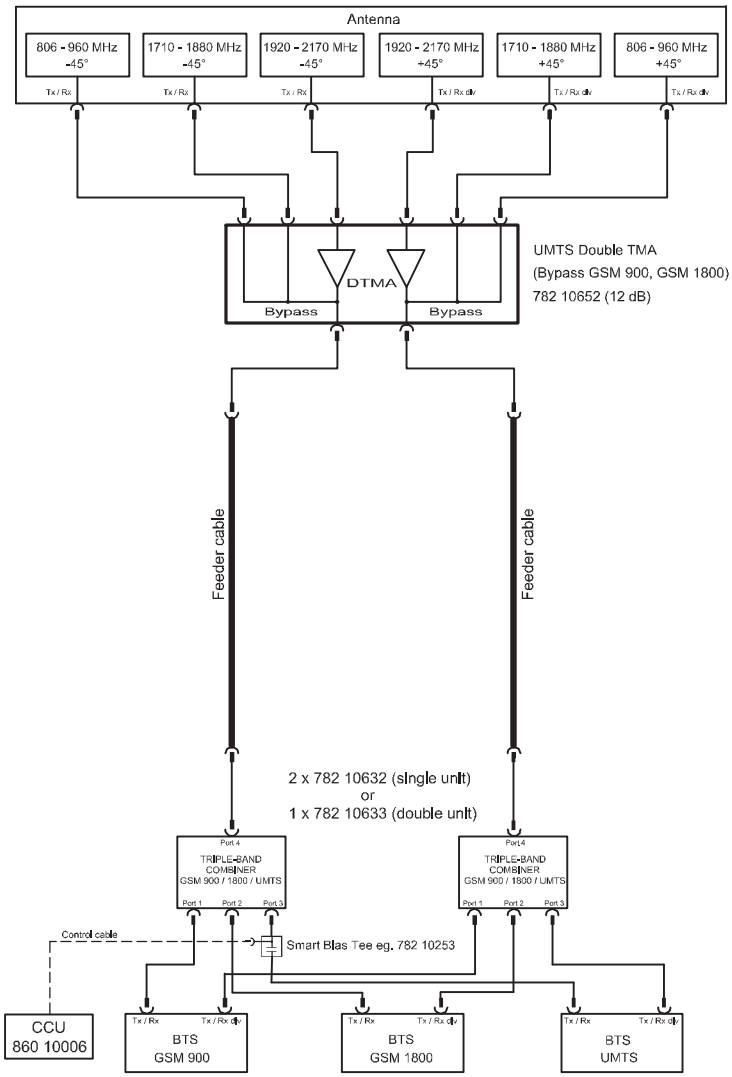
DC Supply, Current Window Alarm and AISG Configuration
(automatically chosen by the DTMA depending on incoming signals)





78210652, 78210653

Application Example



AISG Setting

The protocol of the software interface can be switched between AISG 2.0 / 3GPP and AISG 1.1 and vice versa with a vendor specific command (depending on default setting). If the primary station does not support the default setting, it has to be switched over before system start-up. Please contact Kathrein for further information.

DTMA-UMTS-12-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- **Slimline design**
- Double units for easy use with XPol antennas
- Both versions support CWA, AISG 1.1 and AISG 2.0
  782 10610 default setting: AISG 1.1
  782 10612 default setting: AISG 2.0
- AISG setting switchable as described on data sheet
- CWA and AISG configurations as described on data sheet
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm

Technical Data

Type No.	Default setting AISG 1.1 170 – 200 mA	**78210610** DTMA-UMTS-12-AISG-CWA (12 dB gain)
	Default setting AISG 2.0 170 – 200 mA	**78210612** DTMA-UMTS-12-AISG-CWA (12 dB gain)
	Default setting AISG 2.0 230 – 295 mA	**78211120** DTMA-UMTS-12-AISG-CWA (12 dB gain)

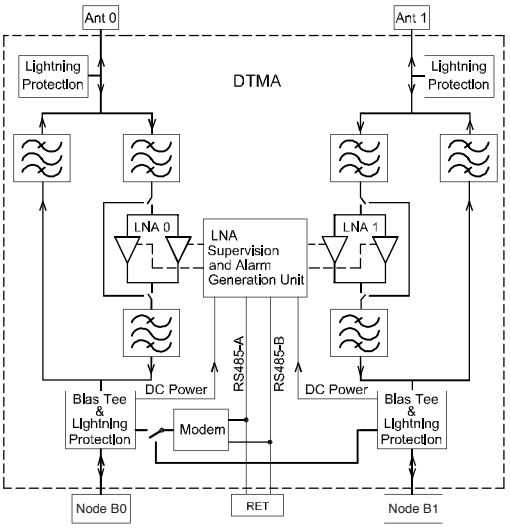
Tx Characteristics	
Frequency range	2110 – 2170 MHz
Insertion loss	< 0.3 dB (typically 0.15 dB)
Ripple	< 0.1 dB
Input power (per input)	< 100 W (+50 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB

Rx Characteristics	
Frequency range	1920 – 1980 MHz
Loss in bypass mode	< 2.5 dB (DC OFF)
Return loss	> 18 dB (DC ON) / > 12 dB (DC OFF)
Gain	12 ±1.0 dB (+22 ... +28 °C) / 12 ±1.2 dB (– 40 ... +65 °C)
Gain ripple	< ±0.3 dB
Noise figure*	< 1.3 dB (+22 ... +28 °C)
Output 1-dB compression point	> 11 dBm
3rd order intercept point (OIP3)	> 25 dBm (typically 30 dBm)

Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3

DC and Alarm Characteristics	CWA Mode	AISG Mode
DC supply	9 – 15 V	9 – 30 V
Operating current per TMA (without RET)	80 – 140 mA	Nom. 95 mA at 9 V Nom. 35 mA at 30 V
Alarm management		
78210610	170 – 200 mA	AISG
78210612	170 – 200 mA	
78211120	230 – 295 mA	

Mechanical Characteristics		
Material		Aluminium housing
Connectors	RF	7-16 female (long neck)
	AISG	8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)
Mounting		Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight		3.8 kg
Packing size		262 x 502 x 214 mm
Dimensions (w x h x d)		160 x 205 x 63 mm (without connectors, without mounting brackets)



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

* Noise figure $\overline{NF} = \frac{NF_{1920\ MHz} + 2 \times NF_{1950\ MHz} + NF_{1980\ MHz}}{4}$

(Additional variation at –40 ... +65 °C: $\Delta\overline{NF} < 0.3$ dB)

DTMA-UMTS-24-AISG-CWA

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

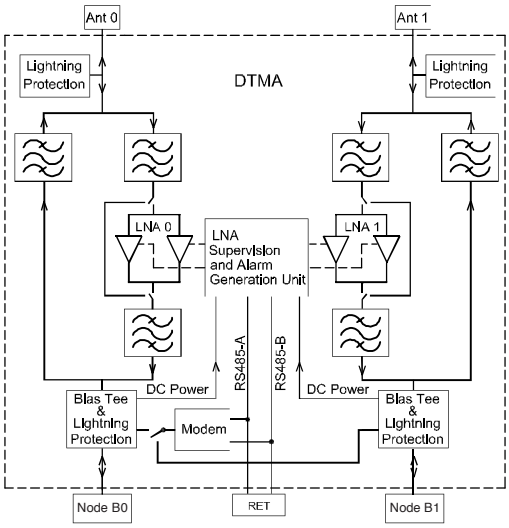
KATHREIN
Antennen · Electronic

- **Slimline design**
- Double unit for easy use with XPol antennas
- Supports CWA, AISG 1.1 and AISG 2.0 (default)
- AISG setting switchable as described on data sheet
- CWA and AISG configurations as described on data sheet
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup
CWA = **C**urrent **W**indow **A**larm

Technical Data

Type No.	78210613 DTMA-UMTS-24-AISG-CWA (24 dB gain)	
Tx Characteristics		
Frequency range	2110 – 2170 MHz	
Insertion loss	< 0.3 dB (typically 0.15 dB)	
Ripple	< 0.1 dB	
Input power (per input)	< 100 W (+50 dBm) CW / < 1.6 kW (+62 dBm) peak	
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	1920 – 1980 MHz	
Loss in bypass mode	< 2.5 dB (DC OFF)	
Return loss	> 18 dB (DC ON) / > 12 dB (DC OFF)	
Gain	24 ±1.0 dB (+22 ... +28 °C) / 24 ±1.2 dB (– 40 ... +65 °C)	
Gain ripple	< ±0.3 dB	
Noise figure*	< 1.4 dB (+22 ... +28 °C)	
Output 1-dB compression point	> 18 dBm	
3rd order intercept point (OIP3)	> 25 dBm (typically 30 dBm)	
Environmental Characteristics		
Operating temperature range	–40 ... +65 °C	
IP rating	IP67	
MTBF	> 1 000 000 hours (per TMA)	
EMC	According to ETS 300 342-3	
DC and Alarm Characteristics	**CWA Mode**	**AISG Mode**
DC supply	9 – 15 V	9 – 30 V
Operating current per TMA (without RET)	130 – 340 mA	Nom. 210 mA at 9 V Nom. 70 mA at 30 V
Alarm management	380 – 420 mA	AISG
Mechanical Characteristics		
Material	Aluminium housing	
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 9 – 30 V DC, pin 7: DC return, other pins: not connected)	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Weight	3.8 kg	
Packing size	262 x 502 x 214 mm	
Dimensions (w x h x d)	160 x 205 x 63 mm (without connectors, without mounting brackets)	



Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

* Noise figure $\overline{NF} = \frac{NF_{1920\ MHz} + 2 \times NF_{1950\ MHz} + NF_{1980\ MHz}}{4}$

(Additional variation at –40 ... +60 °C: $\Delta\ \overline{NF} < 0.4$ dB)

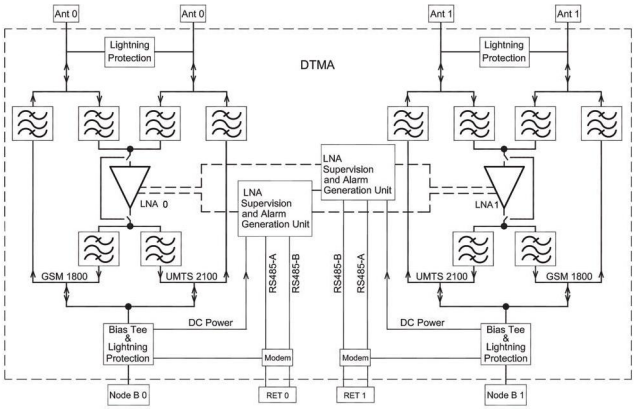
DTMA-1800-UMTS-12-AISG-D

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

KATHREIN
Antennen · Electronic

- **Compact line**
- Double unit for easy use with XXPol antennas
- Supports AISG 1.1 and AISG 2.0 (default)
- Suitable for antenna RET control according to AISG/3GPP standard
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection
- DC Supply via Node B0, Node B1 or both
- Signaling
  Node B0: AISG communication with 1800 MHz BTS
  Node B1: AISG communication with 2100 MHz BTS

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup



Technical Data

Type No.	78210990 DTMA-1800-UMTS-12-AISG-D (12 dB gain)	
Tx Characteristics		
Frequency range	1805 – 1880 MHz	2110 – 2170 MHz
Insertion loss	Typ. 0.5 dB	Typ. 0.3 dB
Input power (per input)	< 100 W (+50 dBm)	
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)	
Return loss	> 18 dB	
Rx Characteristics		
Frequency range	1710 – 1785 MHz	1920 – 1980 MHz
Loss in bypass mode	Typically 2.3 dB (DC OFF)	
Return loss	> 16 dB (DC ON)	> 12 dB (DC OFF)
Gain	12 dB nominal	
Noise figure	Typ. 1.4 dB	Typ. 1.4 dB
3rd order intercept point (OIP3)	Typically 30 dBm	
Environmental Characteristics		
Operating temperature range	–40 … +65 °C	
IP rating	IP67*	
MTBF	> 1 000 000 hours (per TMA)	
EMC	According to ETS 300 342-3	
DC and Alarm Characteristics		
DC supply	10 – 30 V	
Operating current per DTMA (without RET)	Nom. 175 mA at 10 V Nom. 65 mA at 30 V	
Alarm management	AISG*	
Mechanical Characteristics		
Material	Aluminium housing	
Connectors RF	7-16 female (long neck)	
Connectors AISG	8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 10 – 30 V DC, pin 7: DC return, other pins: Not connected)	
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set	
Dimensions (w x h x d)	220 x 220 x 80 mm (without connectors, without mounting brackets)	

* see note on data sheet

Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734 360	34 – 60 mm
734 361	60 – 80 mm
734 362	80 – 100 mm
734 363	100 – 120 mm
734 364	120 – 140 mm
734 365	45 – 125 mm

DTMA-1800-UMTS-12-AISG-D

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

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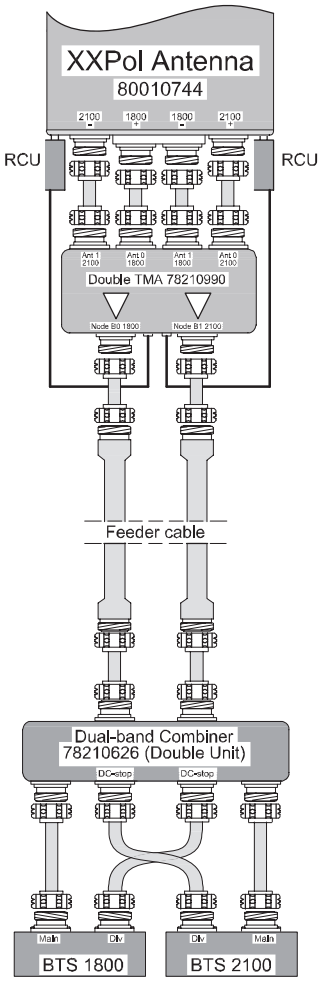
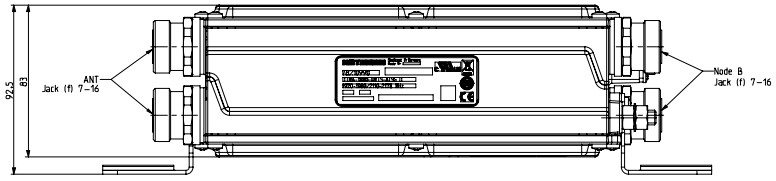
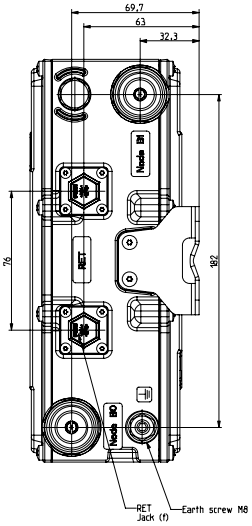
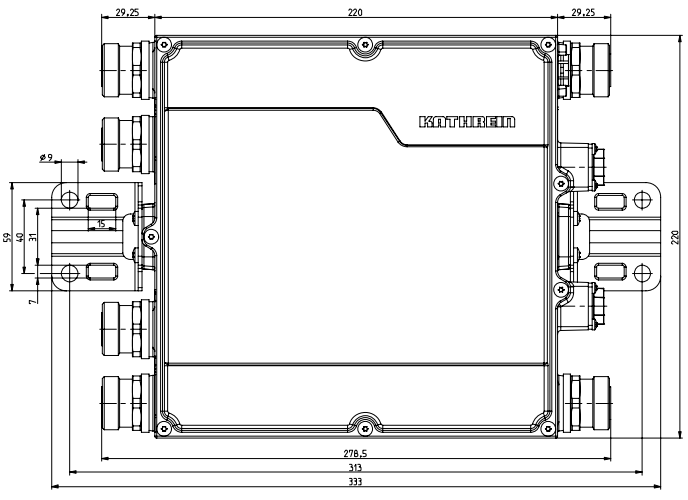
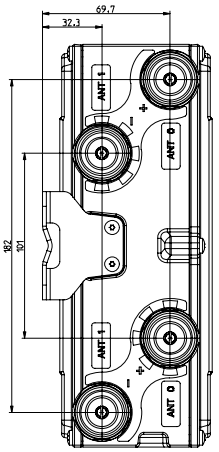


Application Example









DTMAs

DTMA-2600-12-AISG

Fullband Double Dual Duplex Tower Mounted Amplifier (Masthead Amplifier)

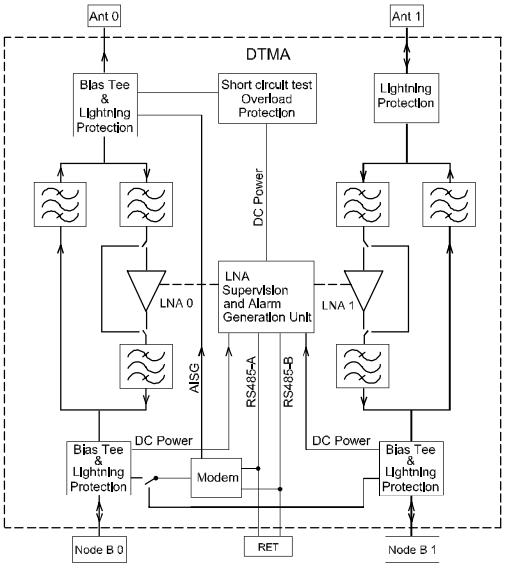
KATHREIN
Antennen · Electronic

- Double unit for easy use with XPol antennas
- Supports AISG 1.1 and AISG 2.0 (default)
- Suitable for antenna RET control according to AISG/3GPP standard
- DC/AISG bypass between ports “Node B0 or Node B1” and “Ant 0” for the support of RET integrated antennas (incl. short circuit protection)
- Bypass mode to ensure cell operation in case of DC power down
- Built-in lightning protection

RET = **R**emote **E**lectrical **T**ilt
AISG = **A**ntenna **I**nterface **S**tandards **G**roup

Technical Data

Type No.	78210860 DTMA-2600-12-AISG (12 dB gain)
Tx Characteristics	
Frequency range	2620 – 2690 MHz
Insertion loss	Typically 0.3 dB
Ripple	< 0.35 dB
Input power (per input)	< 100 W (+50 dBm) CW / < 1.6 kW (+62 dBm) peak
Intermodulation products in Rx band	< –117 dBm (2 Tx carriers at +43 dBm)
Return loss	> 18 dB
Rx Characteristics	
Frequency range	2500 – 2570 MHz
Loss in bypass mode	Typically 2 dB
Return loss	> 18 dB (DC ON)
Gain	12 dB nominal
Noise figure	Typically 1.2 dB
Output 1-dB compression point	> 13 dBm
3rd order intercept point (OIP3)	Typically 30 dBm
Environmental Characteristics	
Operating temperature range	–40 … +65 °C
IP rating	IP67 (see note on data sheet)
MTBF	> 1 000 000 hours (per TMA)
EMC	According to ETS 300 342-3
DC and Alarm Characteristics	
DC supply	10 – 30 V
Operating current per DTMA (without RET)	Nom. 175 mA at 10 V DC Nom. 70 mA at 30 V DC
Alarm management	AISG
Mechanical Characteristics	
Material	Aluminium housing
Connectors RF AISG	7-16 female (long neck) 8-pin female, IEC 60130-9 (Pin 3: RS485B, pin 5: RS485A, pin 6: 10 – 30 V DC, pin 7: DC return, other pins: not connected)
Mounting	Wall mounting: With 4 screws (max. 8 mm diameter) Mast mounting: With additional clamp set
Weight	3.5 kg
Packing size	217 x 407 x 144 mm
Dimensions (w x h x d)	165.3 x 236.4 x 65.1 mm (without connectors, without mounting brackets)



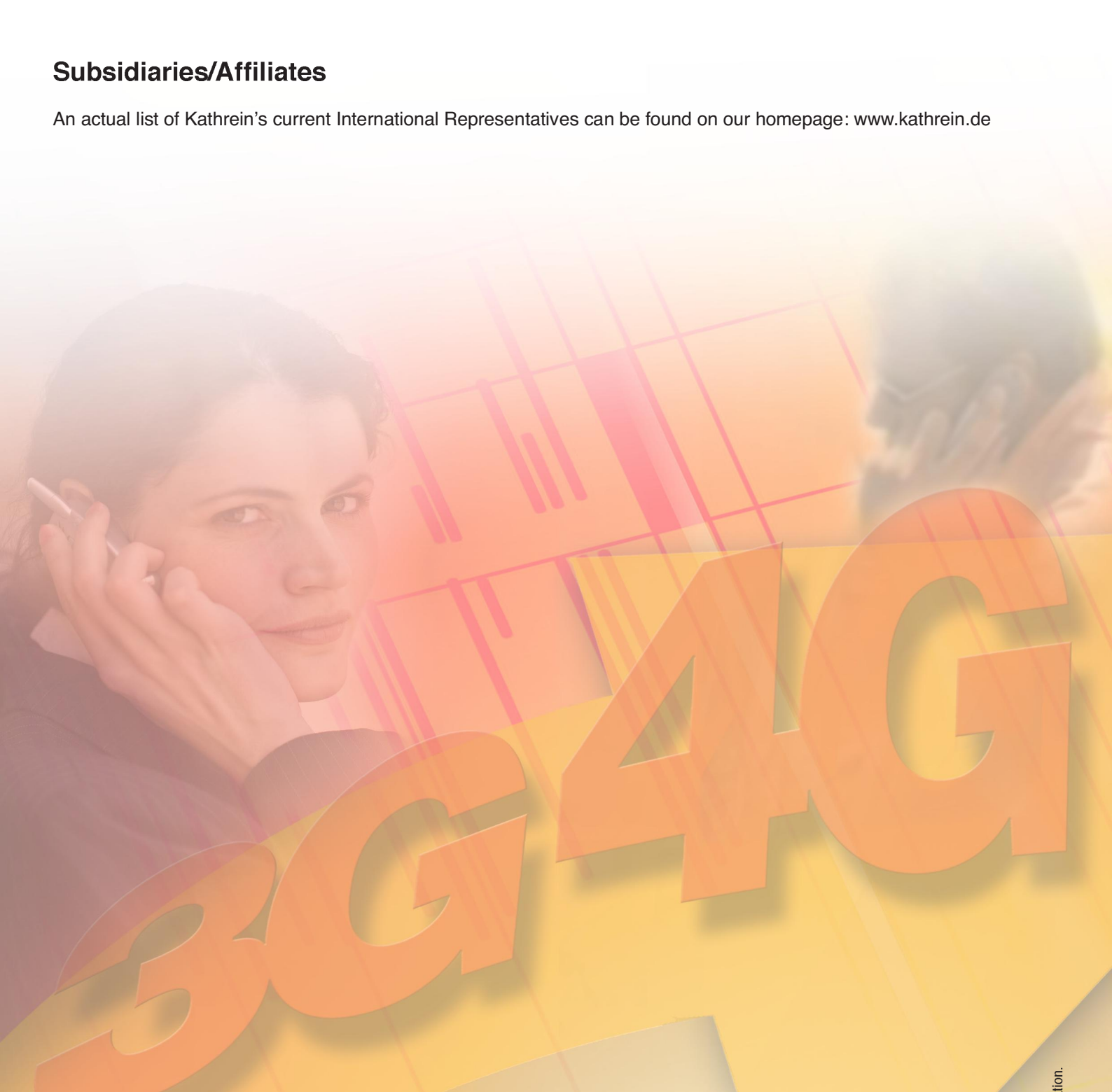
Accessories (order separately)

Type No.	Clamp set suitable for mast diameter of
734360	34 – 60 mm
734361	60 – 80 mm
734362	80 – 100 mm
734363	100 – 120 mm
734364	120 – 140 mm
734365	45 – 125 mm

Clamp Set

Subsidiaries/Affiliates

An actual list of Kathrein's current International Representatives can be found on our homepage: www.kathrein.de



Please contact for

Sales queries, orders, catalogues or CD-ROM:

Fax: +49 80 31 184-820
E-Mail: central.sales@kathrein.de

Technical Information:

Fax: +49 80 31 184-973
E-Mail: mobilcom@kathrein.de

9981.1767/1211/6/ZWT/MM Subject to alteration.

Internet: www.kathrein.de

KATHREIN-Werke KG · Phone +49 80 31 184-0 · Fax +49 80 31 184-973
Anton-Kathrein-Straße 1 – 3 · P.O. Box 10 04 44 · D-83004 Rosenheim · Germany

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