

Datasheet

ANTENNA BASE FULL FEAT.

ANTENNA BASE_ANT VT FULL FEAT.

Pt no.

23311779/920 447-011

ANTENNA BASE_ANT RT FULL FEAT.

Pt no.

22472983/920 447-012

- Vehicle roof antenna for combined AM/FM/DAB and GNSS reception with integrated LNA
- Transmission operation in the CELLULAR and WLAN services LTE low and high, GSM 850/900/1800/1890/UMTS and WLAN 2,4 GHz plus 5 GHz
- Antenna rod 405 and 200 mm for AM/FM/DAB with M6 thread
- Mounting on metallic vehicle roof from outside

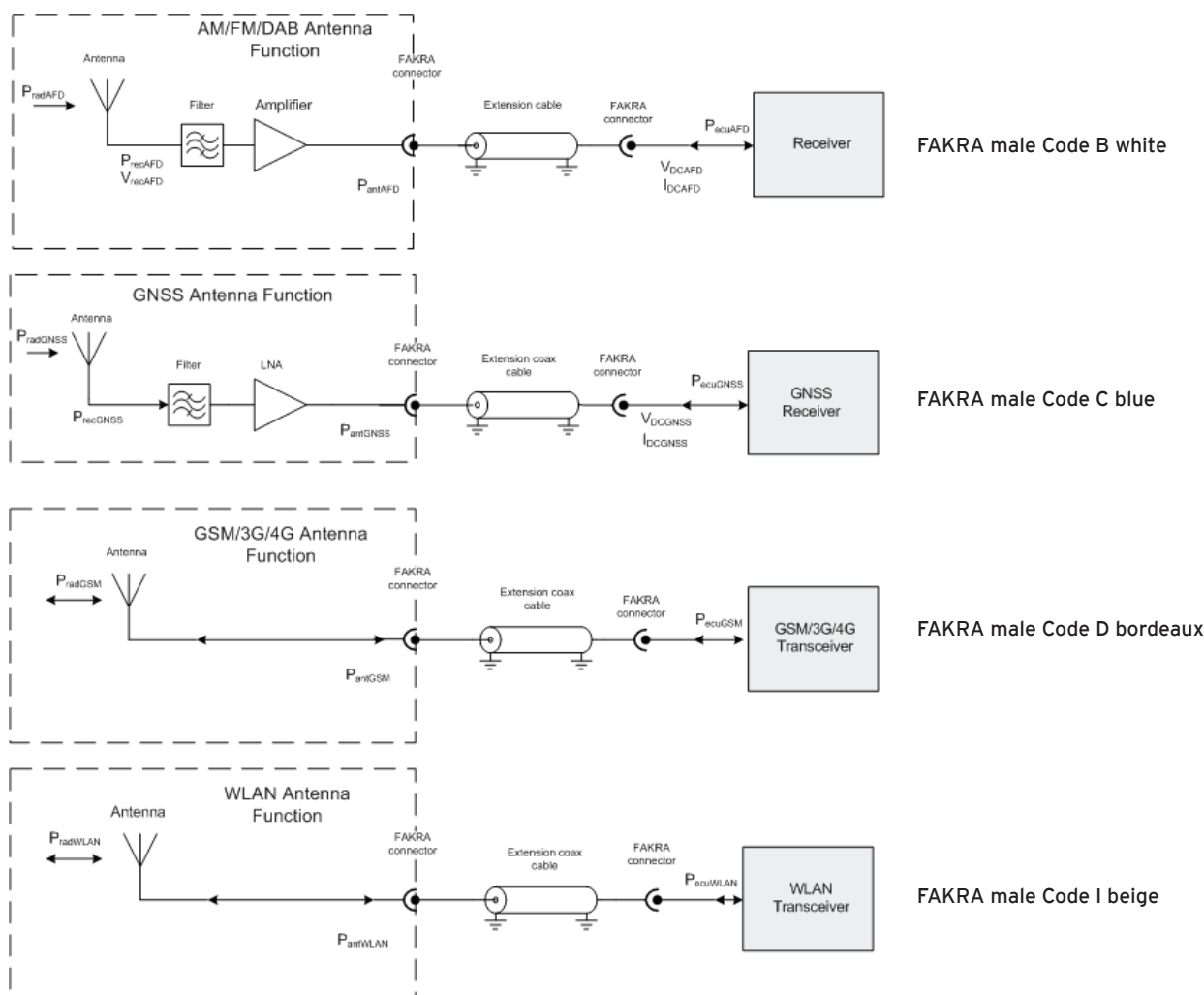
Subject to alterations

ANTENNA AM/FM/DAB-ROD, 400 mm
224 729 86
825 066-001

ANTENNA AM/FM/DAB-ROD, 200 mm
230 371 07
825 180-001



System overview



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Technische Daten / Technical data*

Parameter	TR reference	Remarks	Units	Values
Dimensions / Package				142 mm x 69 mm x 85 mm w/o rod
Housing protection class	REQ 22379848-6 v1 REQ 22379848-7 v1	ISO 20653		IP 6k9k
Housing material	REQ 22379848-23 v1			PA6 Wellamid 6000, UV stabilized, thundergray
Mounting material		metal sheet	mm	0,75 - 1,2mm
Operating temperature	REQ 22379848-9 v1		°C	-40 - +85 °C
Storage temperature			°C	-40 - +85 °C
Antenna Isolation GSM to AM/FM/DAB (wo. Filter at AM/FM/DAB amplifier input)	REQ 22379848-61 v1	87 - 108 MHz 174 - 240 MHz 699 - 960 MHz	dB	> 30 > 22 > 7
Antenna Isolation GSM to WLAN	REQ 22379848-61 v1	699 - 960 MHz 1710 - 2690 MHz	dB	> 26 > 17
Antenna Isolation GSM to GNSS	REQ 22379848-61 v1	699 - 960 MHz 1559 - 1615 MHz 1710 - 2690 MHz	dB	> 32 > 15 > 23
Antenna Isolation WLAN to GNSS (wo. Filter at LNA input)	REQ 22379848-61 v1	1559 - 1615 MHz 2400 - 2500 MHz	dB	> 14 > 8
AM/FM/DAB Amplifier				
Parameter	TR reference	Frequency ranges	Units	Values
Polarization	REQ 22379848-60 v1			vertical
Average antenna gain	REQ 22379848-55 v1	AM-LF 405 mm rod 200 mm rod AM-MF 405 mm rod 200 mm rod FM 405 mm rod 200 mm rod DAB 405 mm rod 200 mm rod	dB ref	2,7 -4,7 3,3 -3,7 9,4 5,5 16,6 15,0
Frequency Bands	REQ 22379848-53 v1	AM $0.1485 \leq f \leq 1.705$ MHz FM $76 \leq f \leq 108$ MHz DAB(BandIII) $174 \leq f \leq 240$ MHz	dB	$\pm 0,5$
Impedance (Output)	REQ 22379848-54 v1		Ω	50
Return loss (Output)	REQ 22379848-54 v1	Band II (FM RoW) Band III	dB	> 10 > 10
$\Delta IM3$ $P_{out} = 110$ dB μ V	REQ 22379848-58 v1	LF $f=(300 \pm 50)$ kHz MF $f=(1000 \pm 50)$ kHz	dB	49 56

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Parameter	TR reference	Frequency ranges	Units	Values
$\Delta IM3$ $P_{out} = 110 \text{ dB}\mu\text{V}$	REQ 22379848-58 v1	Band II $f=(98 \pm 0.5) \text{ MHz}$	dB	60
$\Delta IM3$ $P_{out} = 110 \text{ dB}\mu\text{V}$	REQ 22379848-58 v1	Band III $f=(207 \pm 0.5) \text{ MHz}$	dB	61
AM Voltage gain (S_{21}) 50 Ω resistor connected to ground at the input	REQ 22379848-56 v1	LF MF	dB	5 ± 2 5,7 ± 2
FM Gain (S_{21} Band II / FM RoW)	REQ 22379848-56 v1		dB	10 ± 2
DAB Gain (S_{21} Band III)	REQ 22379848-56 v1		dB	21 -3/+2
Noise Voltage (Output) (Detector average, Bandwidth 9 kHz, open input)	REQ 22379848-63 v1	LF MF	dB μV	-10 -11
Noise figure Band II / FM RoW	REQ 22379848-63 v1		dB	4,8
Noise Figure Band III	REQ 22379848-63 v1		dB	1,9
Supply voltage	REQ 22379848-47 v1		V	12 -4/+2
Supply current	REQ 22379848-48 v1		mA	140 -5/+4
Power Supply Method	REQ 22379848-48 v1			Phantom feed with internal voltage regulator in antenna
GNSS				
Frequency bands	REQ 22379848-53 v1	GNSS (GLONASS, GPS, Galileo, BeiDou) 1559 MHz $\leq f \leq 1606 \text{ MHz}$	dB	$\pm 0,5$
Polarization	REQ 22379848-60 v1			RHCP
Average antenna gain GNSS	REQ 22379848-55 v1	passive, zenith $\theta=0^\circ$	dBic	2,7
Noise figure	REQ 22379848-63 v1		dB	2,1
Gain (Filter+LNA) S_{21}	REQ 22379848-56 v1		dB	28
Out of band $\Delta IM3$	REQ 22379848-58 v1	$f1 = 1712,7 \text{ MHz}$ $f2 = 1850 \text{ MHz}$	dB	> 55
Band Pass Filter Rejection	REQ 22379848-62 v1	$50 \leq \Delta f \leq 70$: 30 dBc $70 < \Delta f \leq 100$: 35 dBc $ \Delta f > 100$: 40 dBc	dB	> 30 > 40 > 50
Impedance Output	REQ 22379848-54 v1		Ω	50
Return loss (Output)	REQ 22379848-54 v1		dB	> 10

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Parameter	TR reference	Frequency ranges	Units	Values
Current consumption	REQ 22379848-48 v1		mA	27 -5/+3
Supply voltage	REQ 22379848-47 v1		V	3,15-5,25
2G/3G/4G (CELLULAR)				
Frequency bands	REQ 22379848-53 v1	698 ≤ f ≤ 803 MHz 824 ≤ f ≤ 960 MHz 1710 ≤ f ≤ 2170 MHz 2300 ≤ f ≤ 2690 MHz	dB	±0,5
Polarization	REQ 22379848-60 v1			vertical
Return loss	REQ 22379848-54 v1	699-803 MHz 824-894 MHz 880-960 MHz 1710-2170 MHz 2300-2690 MHz	typ. dB	7,3 10 9,8 8,0 8,9
Impedance	REQ 22379848-54 v1		Ω	50
Antenna gain (Average)	REQ 22379848-55 v1	699-803 MHz 824-894 MHz 880-960 MHz 1710-2170 MHz 2300-2690 MHz	typ. dBi	3,2 2,0 2,0 3,1 1,6
Diagnosis Resistor	REQ 22379848-67 v1		kΩ	51
Power Handling	REQ 22379848-48 v1	698-803 MHz 824-894 MHz 880-960 MHz 1710-2170 MHz 2300-2690 MHz	dBm	37
WLAN				
Frequency bands	REQ 22379848-53 v1	(2.4GHz) 2400 ≤ f ≤ 2485 MHz (5GHz) 5150 ≤ f ≤ 5925 MHz	dB	±0,5
Polarization	REQ 22379848-60 v1			vertical
Return loss	REQ 22379848-54 v1	2400-2485 MHz	typ. dB	10
Impedance	REQ 22379848-54 v1		Ω	50
Antenna gain (Average)	REQ 22379848-55 v1	2400-2485 MHz	typ. dB	10
Diagnosis resistor	REQ 22379848-67 v1		kΩ	51
Power handling	REQ 22379848-48 v1	2.4GHz/5GHz	dBm	30

* All technical requirements are according to 22379848.06 "Antenna System P2593/P2594 Multifunctional & Single function antennas"

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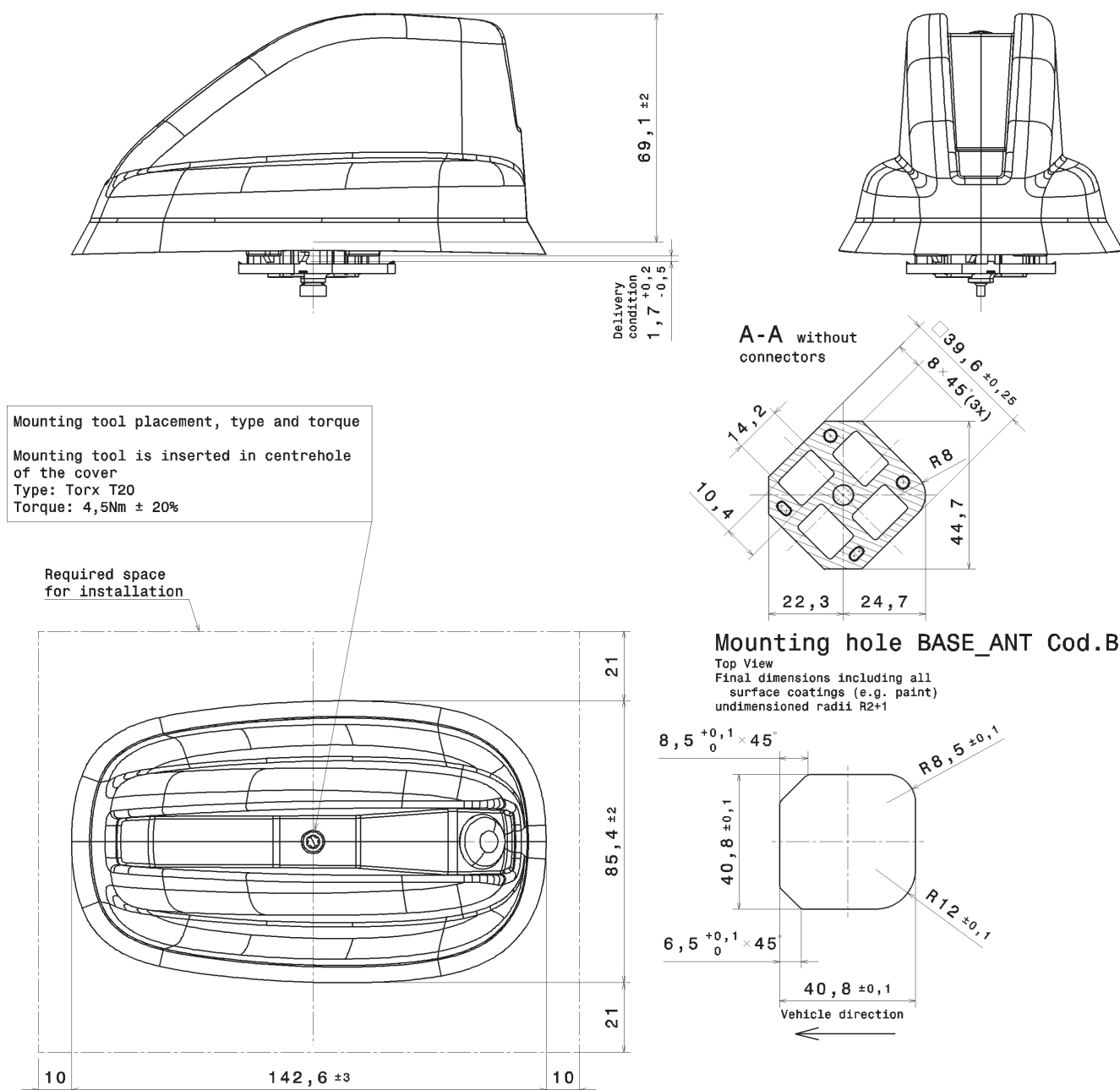
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Technical drawings



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Antenna diagrams

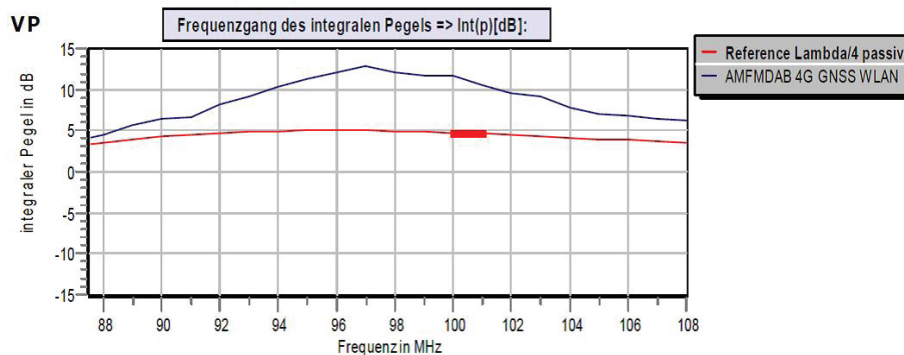
AM/FM

Gain (active w. 405 mm rod)

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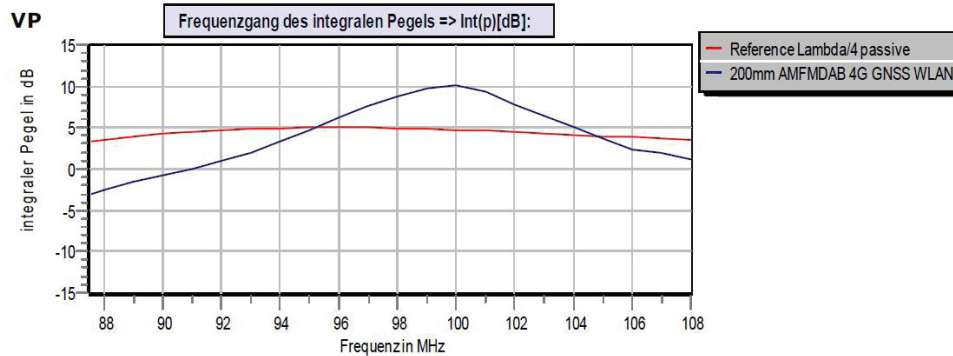


Mittelwert des integralen Pegels als f(f):

Avg(p)[Int(p)] = 4.4dB

Avg(p)[Int(p)] = 9.4dB

Gain (active w. 200 mm rod)



Mittelwert des integralen Pegels als f(f):

Avg(p)[Int(p)] = 4.4dB

Avg(p)[Int(p)] = 5.5dB

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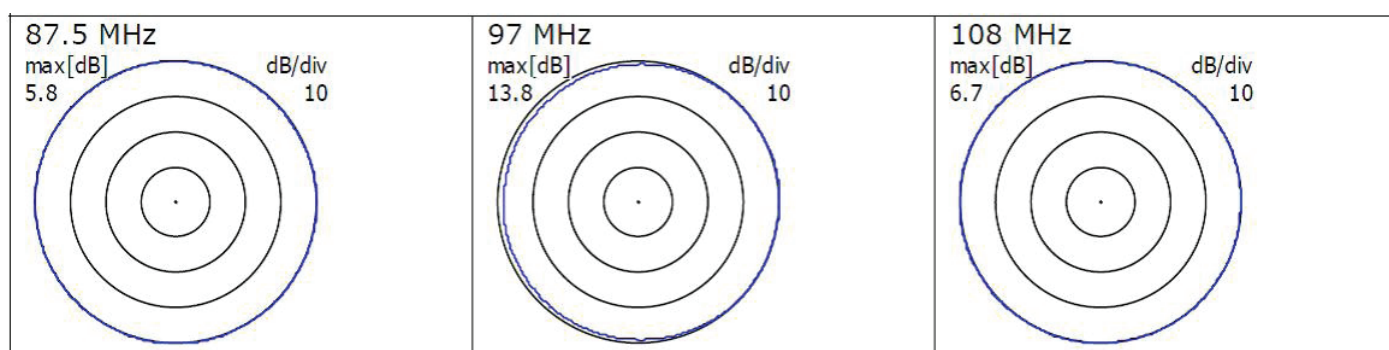
Antenna diagrams AM/FM

ANTENNA BASE_ANT RT FULL FEAT.

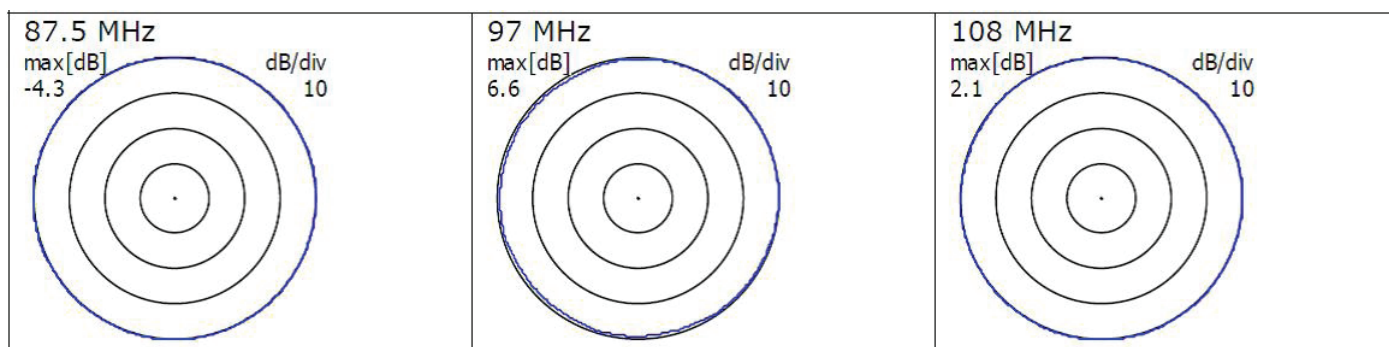
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Radiation pattern, horizontal, 405 mm rod



Radiation pattern, horizontal, 200 mm rod



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Antenna diagrams

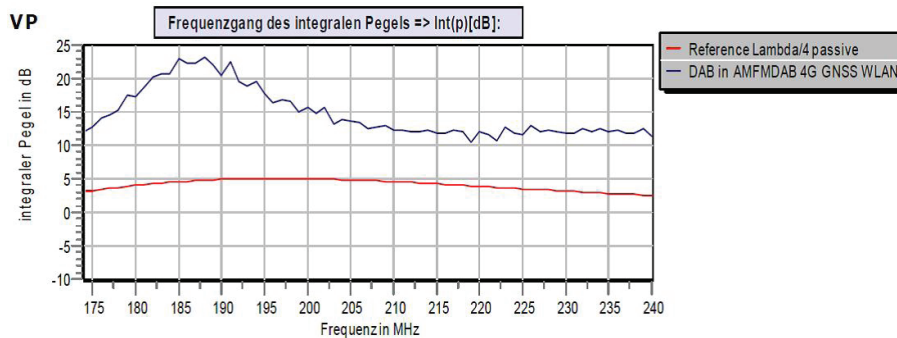
DAB

Gain (active w. 405 mm rod)

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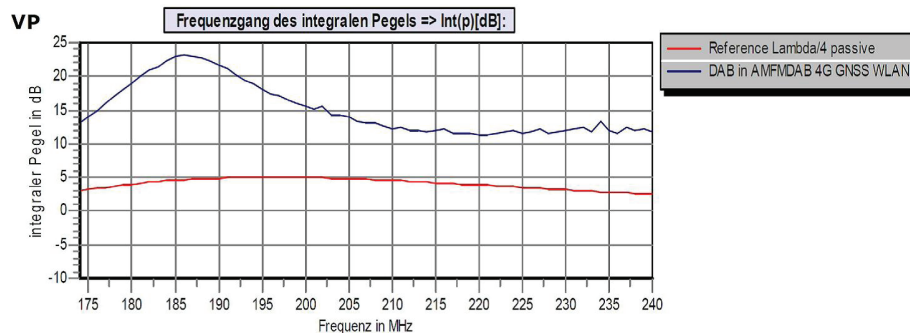


Mittelwert des integralen Pegels als f(f):

Avg(p)[int(p)] = 4.1dB

Avg(p)[Int(p)] = 16.6dB

Gain (active w. 200 mm rod)



Mittelwert des integralen Pegels als f(f):

Avg(p)[int(p)] = 4.1dB

Avg(p)[Int(p)] = 17.0dB

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Antenna diagrams

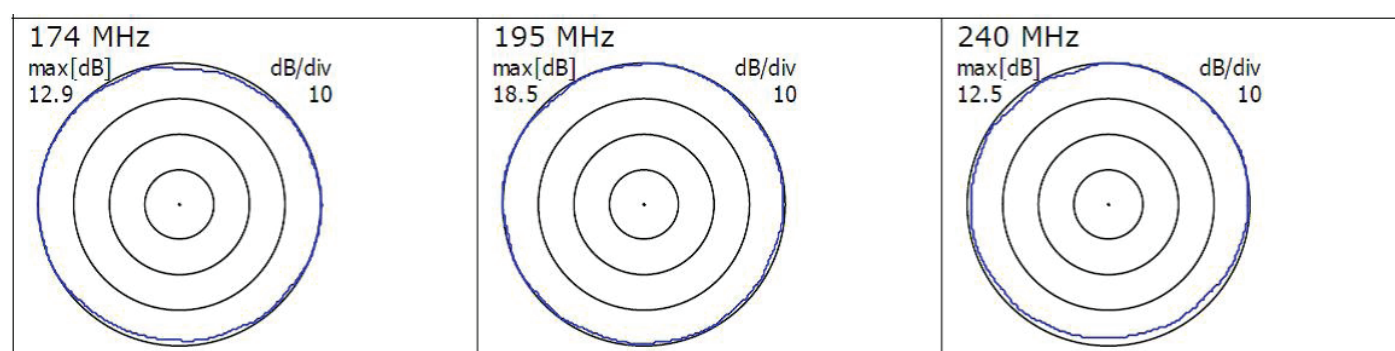
DAB

ANTENNA BASE_ANT RT FULL FEAT.

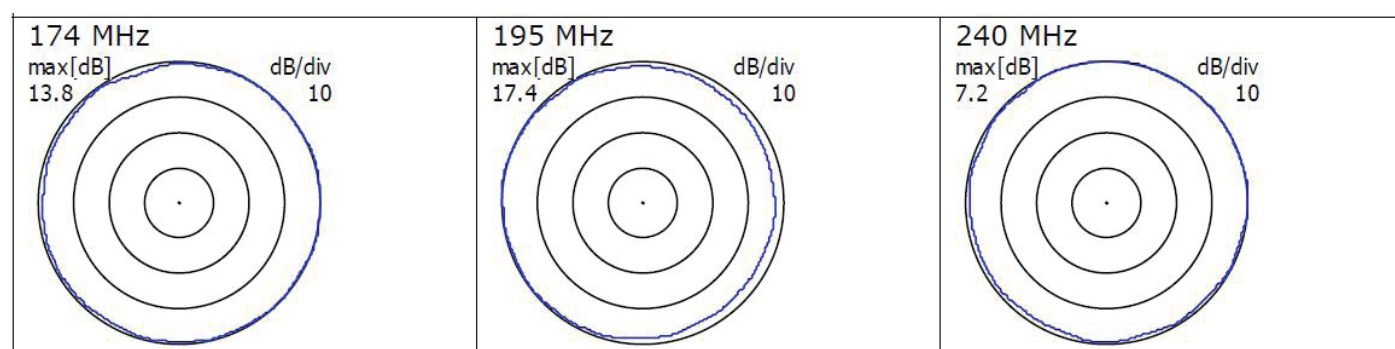
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Radiation pattern, horizontal, 405 mm rod



Radiation pattern, horizontal, 200 mm rod



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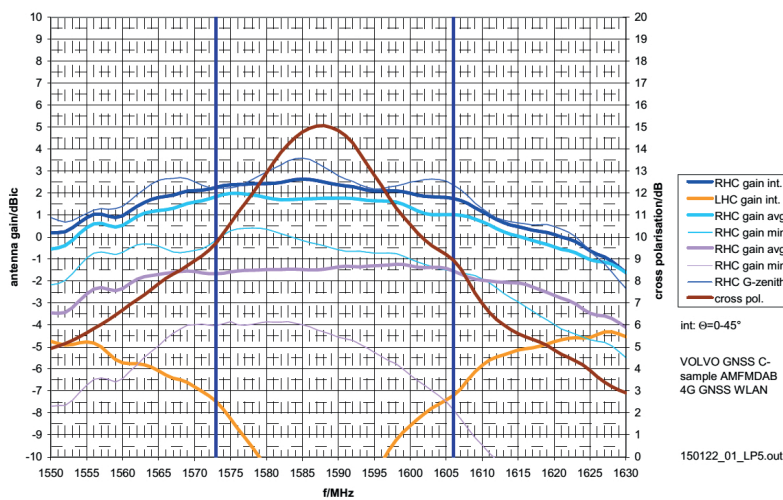
GNSS

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Gain



Summary Antenna Gain RHC over Theta Angle Antenna

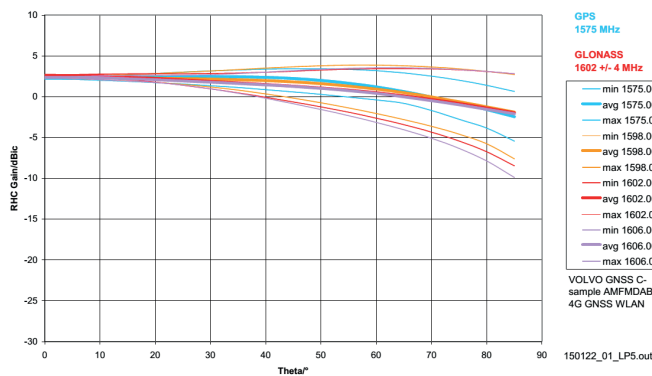
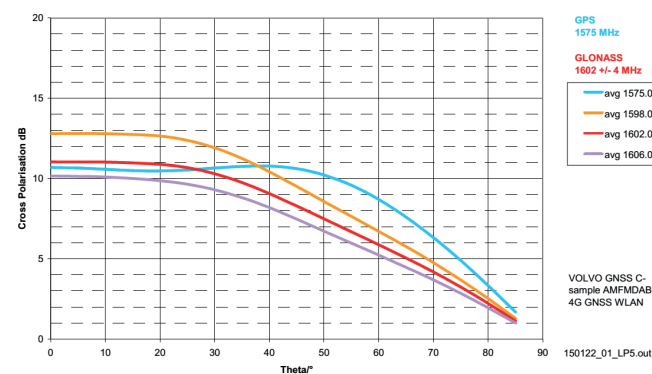


Figure 17 GNSS, Gain over theta, ANTENNA BASE_ANT VT FULL FEAT. (WLAN)

Cross Polarisation: (avg RHC gain - avg LHC gain) per Theta cut



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Antenna diagrams

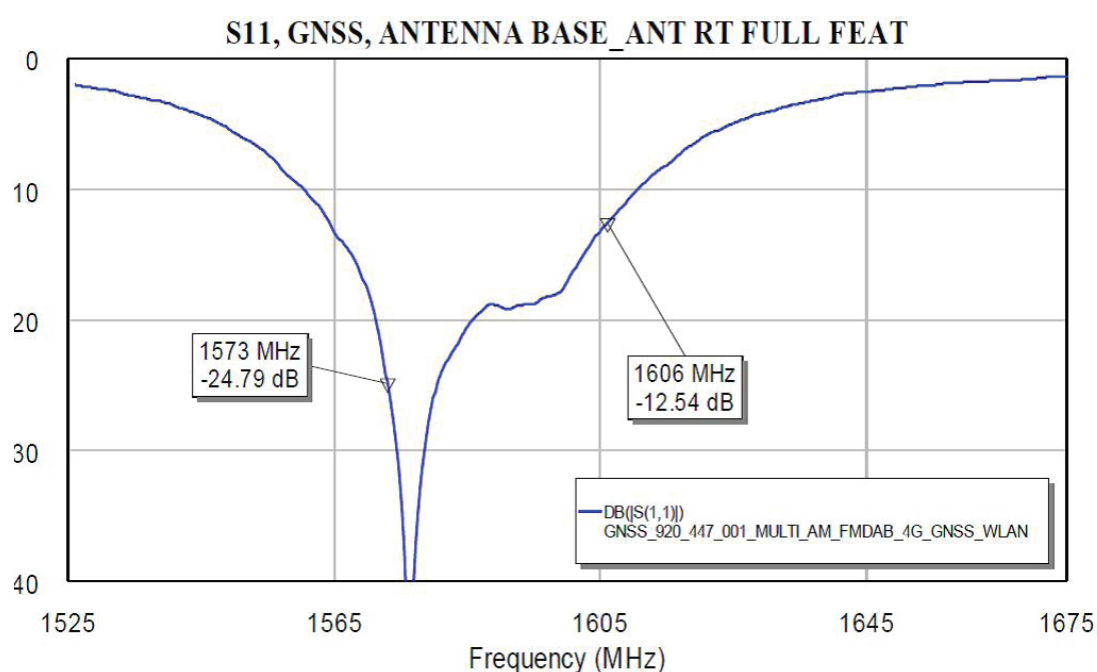
GNSS

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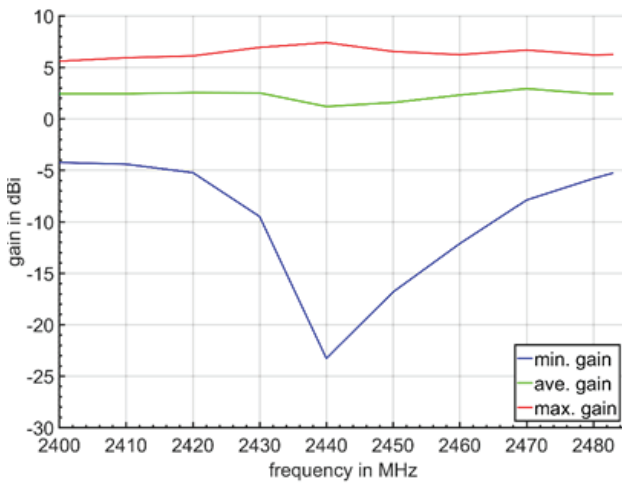
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Antenna diagrams

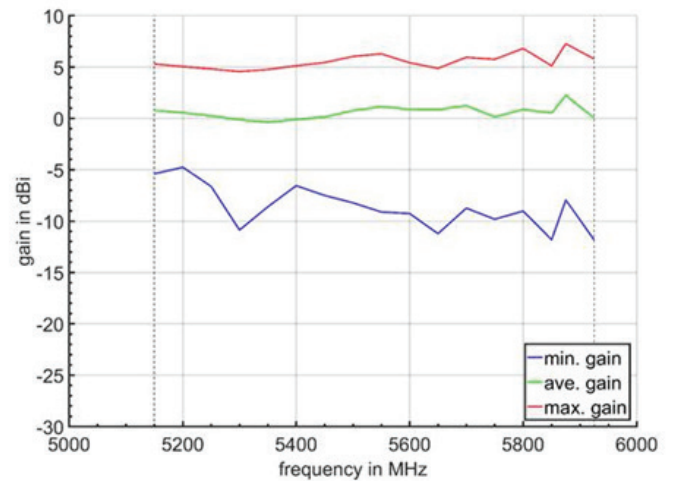
WLAN

Gain

partial average antenna gain (Theta=[60.00 - 90.00]° ; Phi=[0.00 - 360.00]°)
E_Total, Theta - linear w. spherical area consideration, Phi - linear

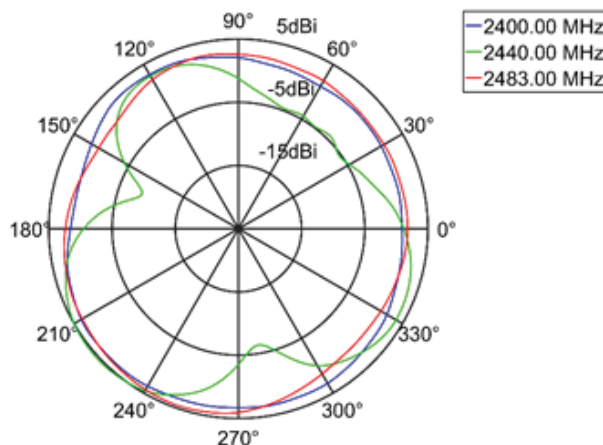


partial average antenna gain (Theta=[60.00 - 90.00]° ; Phi=[0.00 - 360.00]°)
E_Total, Theta - linear w. spherical area consideration, Phi - linear

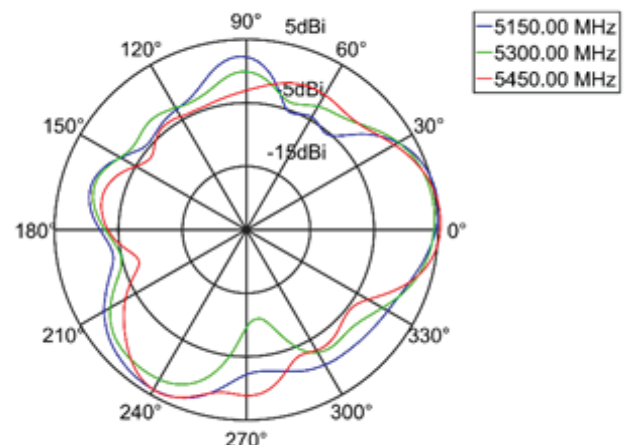


Radiation pattern, horizontal

radiation pattern of the antenna
realized partial average gain (E_Total, Theta = [60.00 - 90.00]°)



radiation pattern of the antenna
realized partial average gain (E_Total, Theta = [60.00 - 90.00]°)



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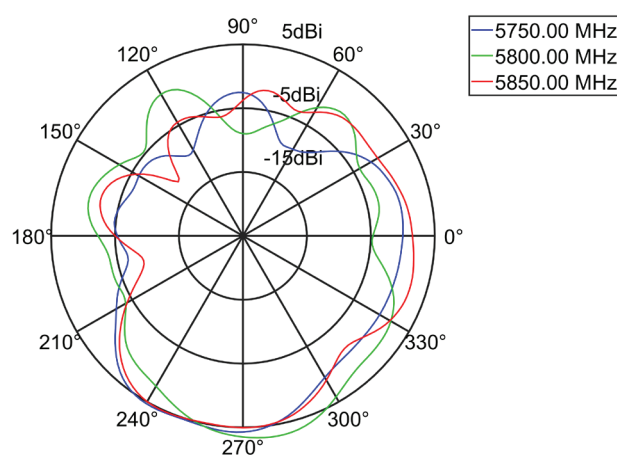
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Antenna diagrams

WLAN

Gain

radiation pattern of the antenna
realized partial average gain (E_Total, Theta = [60.00 - 90.00]°)



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Antenna diagrams

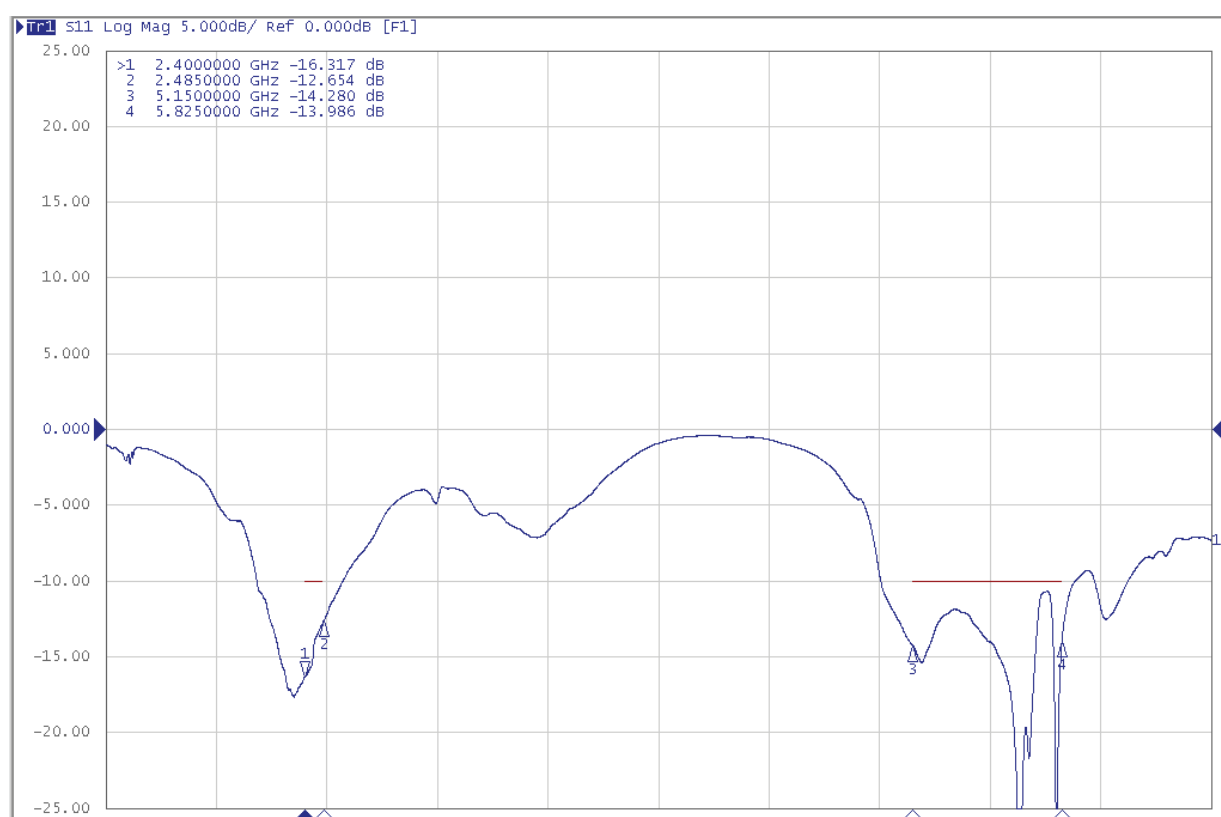
WLAN

Return Loss

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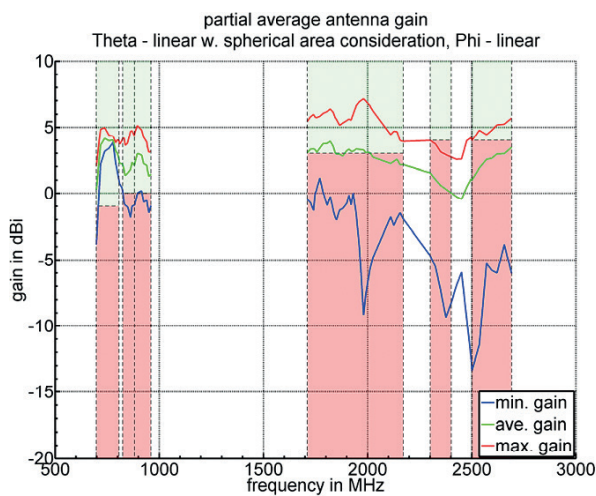
Antenna diagrams CELLULAR

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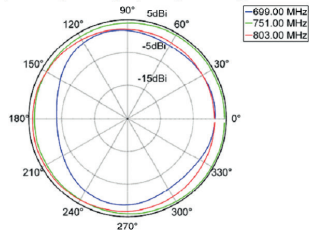
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Gain

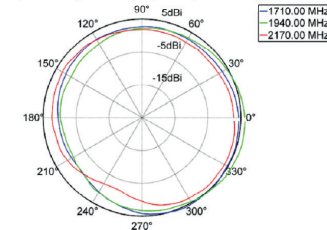


Radiation pattern, horizontal

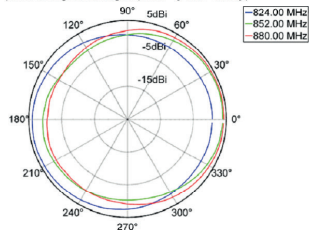
radiation pattern of frequency band [609.0 - 803.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



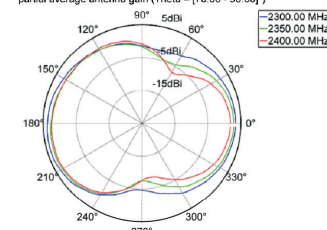
radiation pattern of frequency band [1710.0 - 2170.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



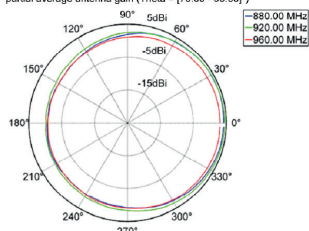
radiation pattern of frequency band [824.0 - 880.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



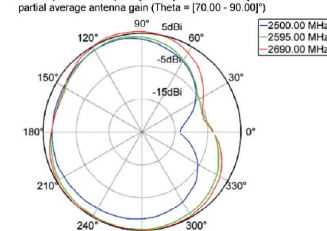
radiation pattern of frequency band [2300.0 - 2400.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



radiation pattern of frequency band [880.0 - 960.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



radiation pattern of frequency band [2500.0 - 2690.0] MHz
partial average antenna gain (Theta = [70.00 - 90.00])



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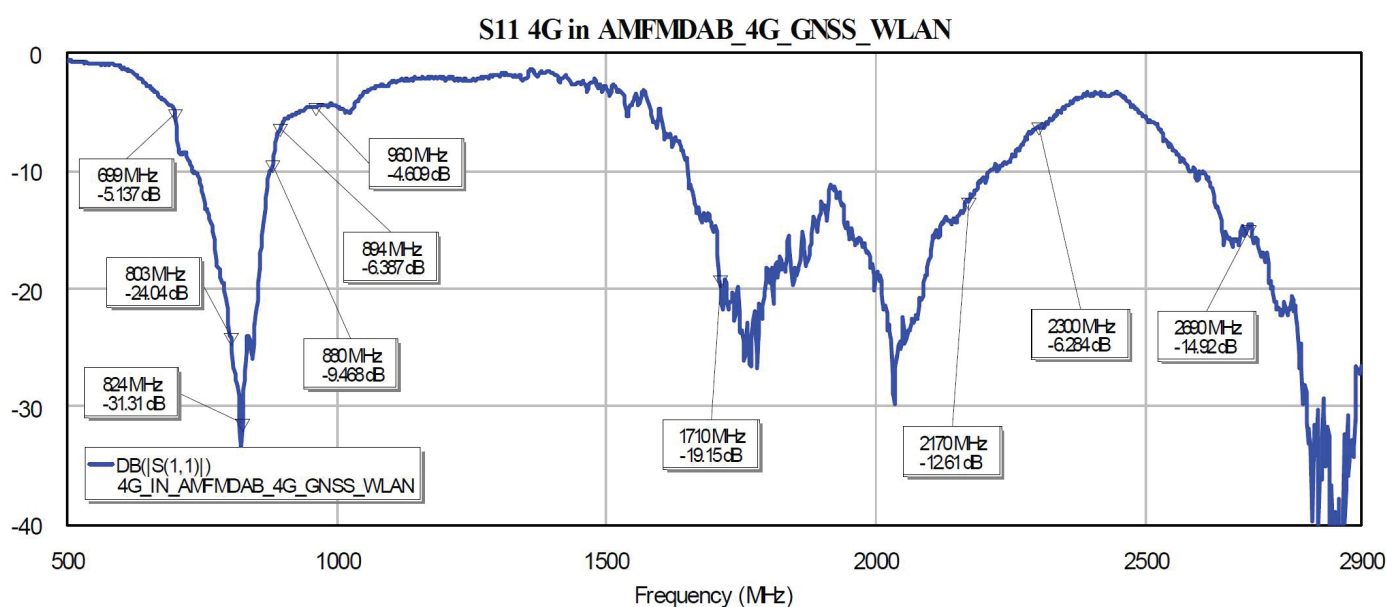
CELLULAR

Return Loss

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Frequency Ranges

Service	Lower Limit	Upper Limit
LF	153 kHz	279 kHz
MF	522 kHz	1710 kHz
Band II / FM	76 MHz	108 MHz
Band III DAB	174 MHz	240 MHz
CELL including LTE	698 MHz 1710 MHz 2300 MHz	960 MHz 2170 MHz 2690 MHz
GNSS	1559 MHz	1605 MHz
WLAN	2400 MHz 5150 MHz	2485 MHz 5925 MHz

Note:

Not mentioned test setups and test conditions according to „VDA-Spezifikation für Fahrzeug-Antennen“ issued 04. February 2003.

Confection

Datasheet is valid also for logisticaly handled package conditions

23311779 / 920 447-111/-112 Multi bin serial assembly
22472983 / 920 447-511/-512 Single package replacement