
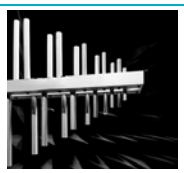
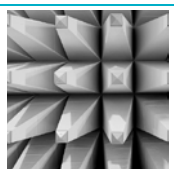

CTC advanced
member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

TEST REPORT

Test report no.: 1-4298/17-02-12

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

Testing laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.ctcadvanced.com
e-mail: mail@ctcadvanced.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-03

Applicant

Sennheiser electronic GmbH & Co. KG
Am Labor 1
30900 Wedemark / GERMANY
Phone: +49 5130 600-0
Fax: +49 5130 600-574
Contact: Volker Bartsch
e-mail: volker.bartsch@sennheiser.com
Phone: +49 5130 600 1465

Manufacturer

Sennheiser electronic GmbH & Co. KG
Am Labor 1
30900 Wedemark / GERMANY

Test standard/s

47 CFR Part 74	Title 47 of the Code of Federal Regulations; Chapter I; Part 74 - Experimental radio, auxiliary, special broadcast and other program distributional services
RSS - 210 Issue 9	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**UHF Wireless In-Ear Monitor Transmitter**
Model name:	**SR IEM G4**
FCC ID:	**DMOG4SR**
IC:	**12099A-G4SR**
Frequency:	470 MHz to 608 MHz
Technology tested:	Proprietary
Antenna:	External antenna connectors
Power supply:	100 V to 240 V AC, 50/60 Hz
Temperature range:	-30°C to +50°C

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

cn=Christoph Schneider, o=CTC advanced GmbH, ou=SND-161128, email=Christoph.Schneider@ctcadvanced.com, c=DE
2018.03.21 13:20:09 +01'00'

Christoph Schneider
Lab Manager
Radio Communications & EMC

Test performed:

cn=Yves Olsommer, o=CTC advanced GmbH, ou=OLS-170522, email=yves.olsommer@ctcadvanced.com, c=DE
2018.03.21 12:08:56 +01'00'

Yves Olsommer
Testing Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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In no case this test report can be considered as a Letter of Approval.

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2017-11-17
Date of receipt of test item:	2017-11-11
Start of test:	2017-12-13
End of test:	2018-02-27
Person(s) present during the test:	-/-

2.3 Test laboratories sub-contracted

None

3 Test standard/s and references

Test standard	Date	Description
47 CFR Part 74		Title 47 of the Code of Federal Regulations; Chapter I; Part 74 - Experimental radio, auxiliary, special broadcast and other program distributional services
RSS - 210 Issue 9	August 2016	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

Guidance	Version	Description
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+23 °C during room temperature tests +50 °C during high temperature tests -30 °C during low temperature tests
Relative humidity content	:		42 %
Barometric pressure	:		1008 hpa
Power supply	:	V_{nom} V_{max} V_{min}	230 V AC, 50/60 Hz by mains adapter NT2-3CW 240 V 100 V

5 Test item

5.1 General description

Kind of test item	:	UHF Wireless In-Ear Monitor Transmitter
Type identification	:	SR IEM G4
HMN	:	-/-
PMN	:	ewG4
HVIN	:	SR IEM G4
FVIN	:	1.1.0
S/N serial number	:	Range A1: 1347000010 Range A: 1347000010 Range G: 1347000011
HW hardware status	:	533940_11
SW software status	:	1.1.0
Frequency band	:	470 MHz to 608 MHz Range A1: 470 MHz to 516 MHz Range A: 516 MHz to 558 MHz Range AS: 520 MHz to 558 MHz Range G: 566 MHz to 608 MHz
Type of radio transmission Use of frequency spectrum	: :	Single carrier, modulated carrier
Type of modulation	:	Analog FM
Number of channels	:	-/-
Antenna	:	External antenna connectors
Power supply	:	100 V to 240 V AC, 50/60 Hz external power supply NT 2-3CW
Temperature range	:	-30°C to +50°C

5.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-4298/17-01-35_AnnexA
1-4298/17-01-35_AnnexB
1-4298/17-01-35_AnnexD

6 Description of the test setup

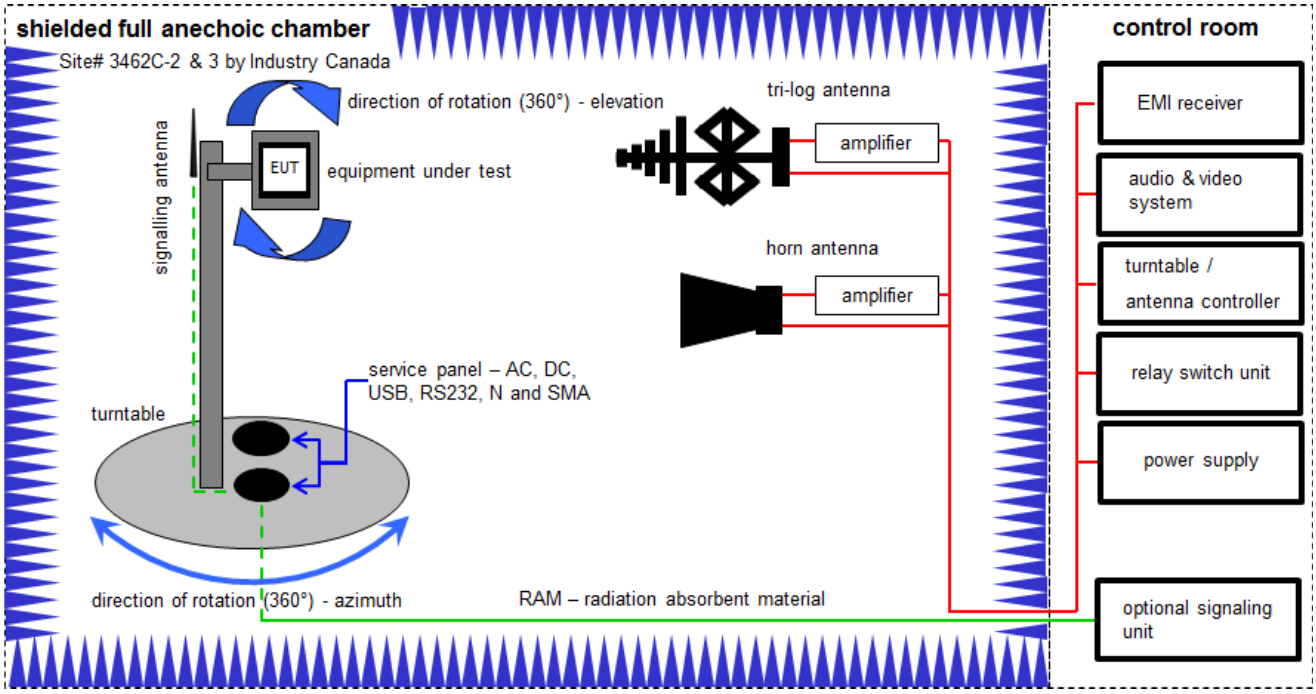
Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

6.1 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter

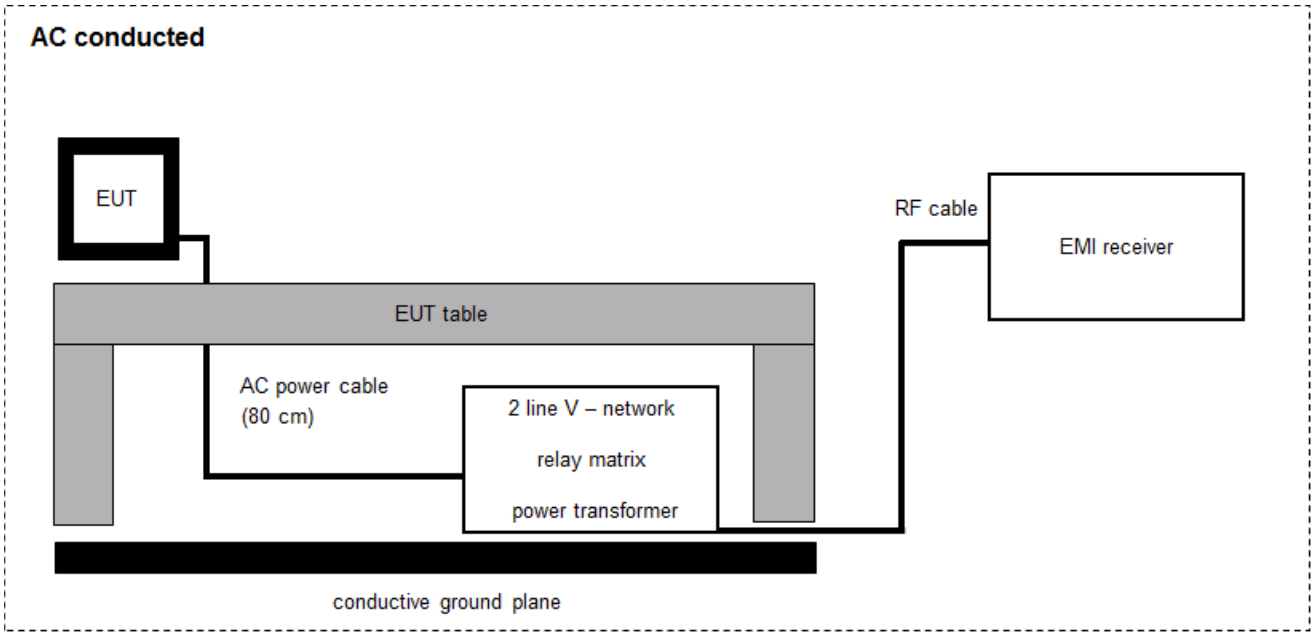
OP = AV + D - G + CA
(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

Example calculation:
OP [dBm] = -65.0 [dBm] + 50 [dB] - 20 [dBi] + 5 [dB] = -30 [dBm] (1 µW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	B	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	07.07.2017	06.07.2019
2	B	Highpass Filter	WHK1.1/15G-10SS	Wainwright	37	400000148	ne	-/-	-/-
3	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	318	300003696	k	23.05.2017	22.05.2020
4	B	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22051	300004483	ev	-/-	-/-
5	A, B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000032	300004510	ne	-/-	-/-
6	A, B	Computer	Intel Core i3 3220/3,3 GHz, Prozessor	-/-	2V2403033A54 21	300004591	ne	-/-	-/-
7	A, B	NEXIO EMV-Software	BAT EMC V3.16.0.49	EMCO	-/-	300004682	ne	-/-	-/-
8	A, B	Anechoic chamber	-/-	TDK	-/-	300003726	ne	-/-	-/-
9	A, B	EMI Test Receiver 9kHz-26,5GHz	ESR26	R&S	101376	300005063	k	14.12.2017	13.12.2018

6.2 AC conducted



FS = UR + CF + VC
(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

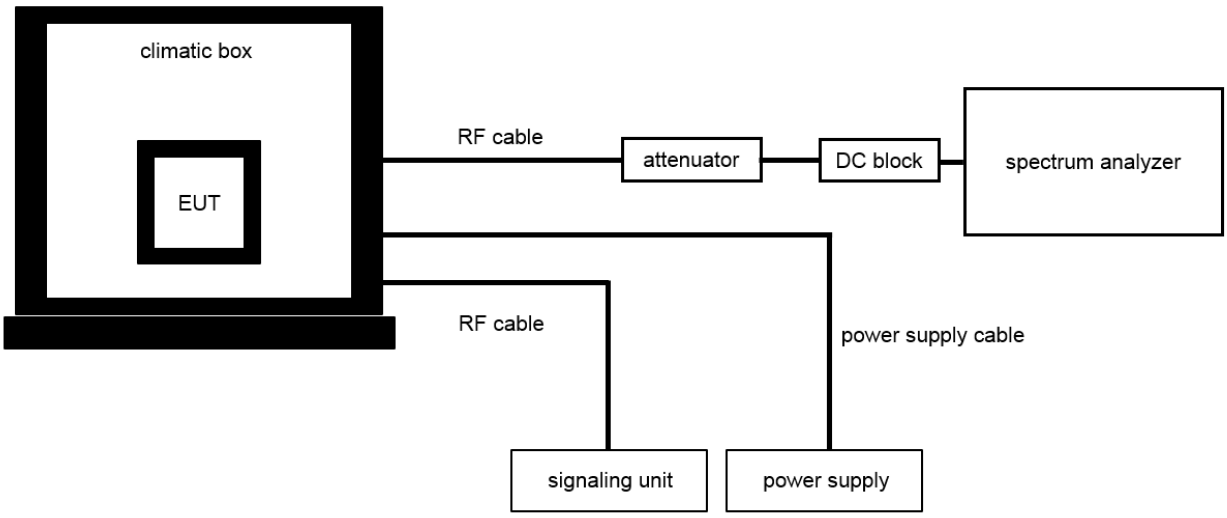
Example calculation:
FS [dBµV/m] = 37.62 [dBµV/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dBµV/m] (244.06 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Two-line V-Network (LISN) 9 kHz to 30 MHz	ESH3-Z5	R&S	892475/017	300002209	k	13.12.2017	12.12.2019
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	k	27.11.2006	-/-
3	A	Hochpass 150 kHz	EZ-25	R&S	100010	300003798	ev	08.04.2008	-/-
4	A	Netzgerät	6038A	HP	2848A06673	300001512	ev	10.11.2005	-/-
5	A	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	18.12.2017	17.12.2018
6	A	Software	EMV E 5000/PAS	SPS	A4638 A10 M5	300004115	ne	-/-	-/-

6.3 Conducted measurements normal and extreme conditions

Conducted measurements normal & extreme conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A, B, C	Isolating Transformer	RT5A	Grundig	12780	300001166	ev	-/-	-/-
2	A, B, C	Signal- and Spectrum Analyzer	FSW26	R&S	101455	300004528	k	20.12.2017	19.12.2018
3	A	Climatic Box	VT 4011	Voetsch Industrietechnik	5856623060001 0	300005363	ev	01.06.2017	31.05.2019
4	B	Multifunction synthesizer DC-600 kHz	8904A	HP	2822A01203	300001367	vlKl!	26.01.2017	25.01.2020
5	B, C	Radiocom. Analyzer	CMTA 84	R&S	894581/013	300001355	k	11.01.2018	10.01.2020
6	C	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	29.01.2018	28.01.2020

7 Sequence of testing

7.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, it is placed on a table with 0.8 m height.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement*

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT. (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT)
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

*)Note: The sequence will be repeated three times with different EUT orientations.

7.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

7.3 Sequence of testing radiated spurious 1 GHz to 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
Transmitter output power	± 3 dB
Occupied bandwidth	± 3 kHz to 10 kHz (depends on the used RBW)
Transmitter frequency stability	± 1 Hz to 1 kHz (depends on the used RBW)
Transmitter unwanted emissions (radiated or conducted)	Radiated: ± 3 dB Conducted: ± 0.5 dB
Modulation characteristics	-/-
Necessary bandwidth (BN) for analogue systems	± 1 kHz (depends on the used RBW)
Frequency modulation	± 3 kHz (depends on the used RBW)
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB

9 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	FCC Part 74 RSS - 210, Issue 9 RSS-Gen Issue 4	See table!	2018-03-21	-/-

Test specification clause	Test case	Temperature conditions	Voltage conditions	C	NC	NA	NP	Remark
FCC Part 74.861 (e)(1)(ii) FCC Part 2.1046) RSS-210 – G.3.1 RSS-Gen – 6.12	Transmitter output power	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 74.861 (e)(5) FCC Part 2.1049 RSS-210 – G.3.2 RSS-Gen – 6.6	Occupied bandwidth	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 74.861 (e)(4) FCC Part 2.1055 RSS-210 – G.3.3 RSS-Gen – 6.11	Transmitter frequency stability	Nominal	Nominal	☒	☐	☐	☐	-/-
		Extreme	Extreme	☒	☐	☐	☐	
FCC Part 74.861 (e)(6) FCC Part 74.861 (e)(7) RSS-210 – G.3.4 ETSI EN 300 422-1 v1.4.2 (2011-08)	Transmitter unwanted emissions (radiated or conducted)	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 2.1047	Modulation characteristics	Nominal	Nominal	-/-				-/-
FCC Part 74.861 (e)(7) ETSI EN 300 422-1 v1.4.2 (2011-08)	Necessary bandwidth (BN) for analogue systems	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 74.861 (e)(3) RSS-210 – G.3.5.2	Frequency modulation	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC Part 74.861 (e)(7) RSS-210 – G.3.4	Receiver spurious emissions	Nominal	Nominal	☐	☐	☒	☐	No receiver integrated!
FCC Part 15.107(a) FCC Part 15.207	Conducted emissions < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-

Note: C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

10 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode:

☒ No test mode available.
Test signal is applied to the transmitter.

☐ Special software is used.
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☒ Operating mode 1 (single antenna)

- *Equipment with 1 antenna,*
- *Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,*
- *Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)*

☐ Operating mode 2 (multiple antennas, no beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.*

☐ Operating mode 3 (multiple antennas, with beamforming)

- *Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.*
  In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

11 Measurement results

11.1 Transmitter output power

Measurement:

Measurement parameter	
Detector:	Peak (worst case) / Average (RMS)
Sweep time:	Auto / 10s
Resolution bandwidth:	> emission bandwidth
Video bandwidth:	> resolution bandwidth
Span:	> 2 times emissions bandwidth
Trace mode:	Max. hold
EUT configuration:	Peak: Unmodulated carrier RMS: Modulate the transmitter with a 2.5 kHz tone at a level 16 dB higher than that required to produce a frequency deviation of ± 75 kHz, or to produce 50% of the manufacturer's rated deviation, whichever is less.
Test setup:	See sub clause 6.3 – A / B
Measurement uncertainty:	See sub clause 8

Limits:

FCC & IC
470 MHz to 608 MHz 250 mW (average) / 24 dBm (average)

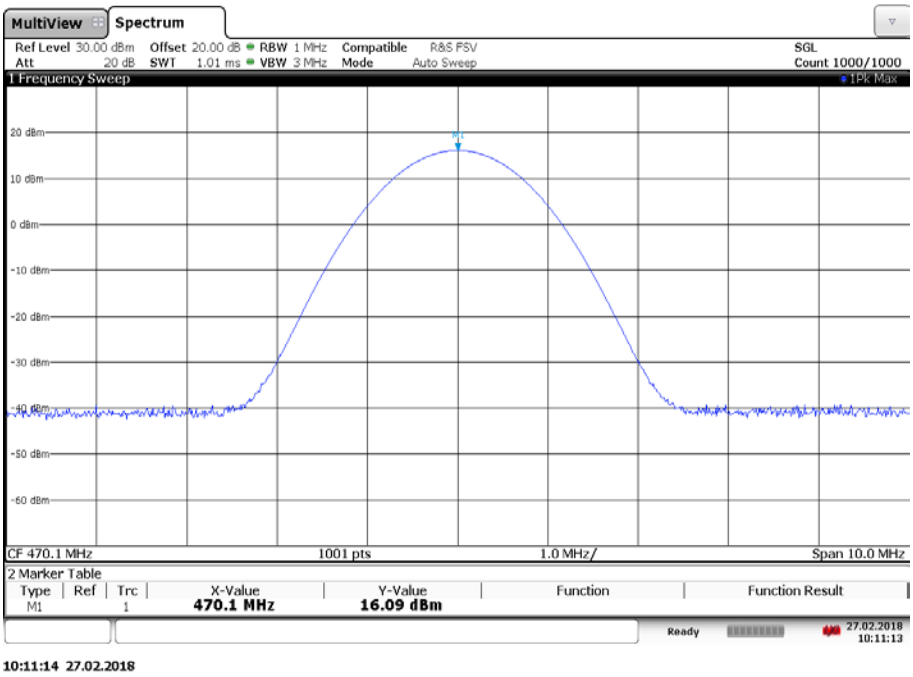
Result:

Channels	Transmitter conducted output power (dBm)					
	Range A1*		Range A*		Range G*	
	Peak	Average	Peak	Average	Peak	Average
Lowest	16.09	-/-	16.48	-/-	16.52	-/-
Middle	16.35	-/-	16.51	-/-	16.55	-/-
Highest	16.53	-/-	16.49	-/-	16.35	-/-

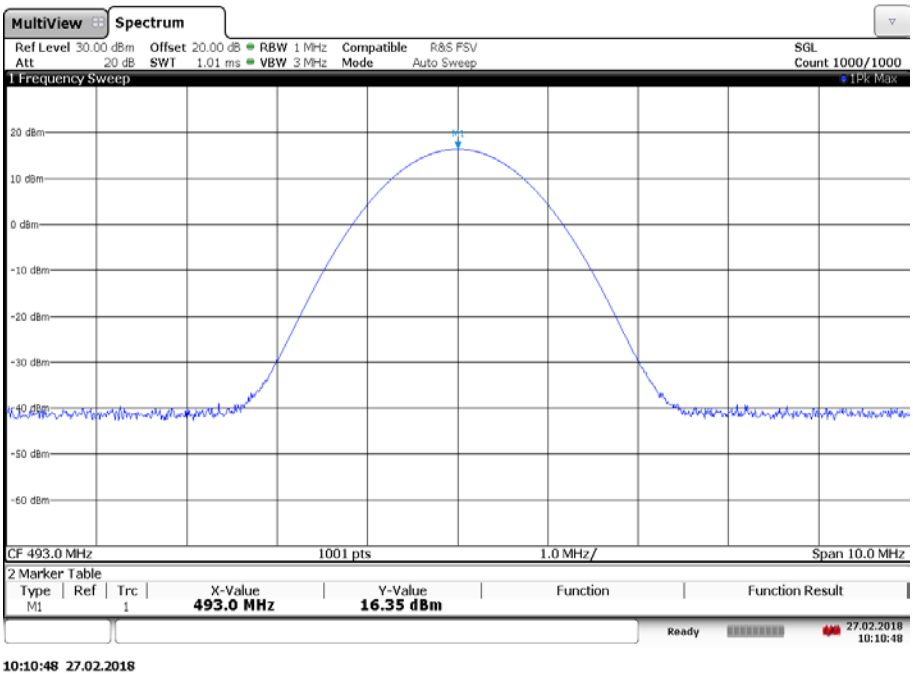
*) Output power set to 50 mW

Plots: Range A1

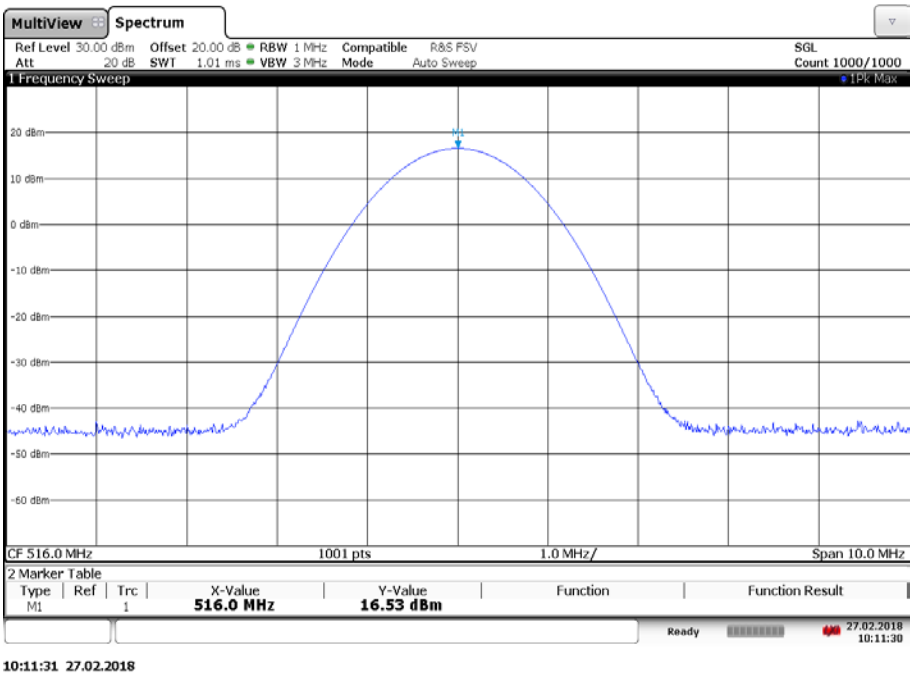
Plot 1: lowest channel, peak (unmodulated carrier)



Plot 2: middle channel, peak (unmodulated carrier)

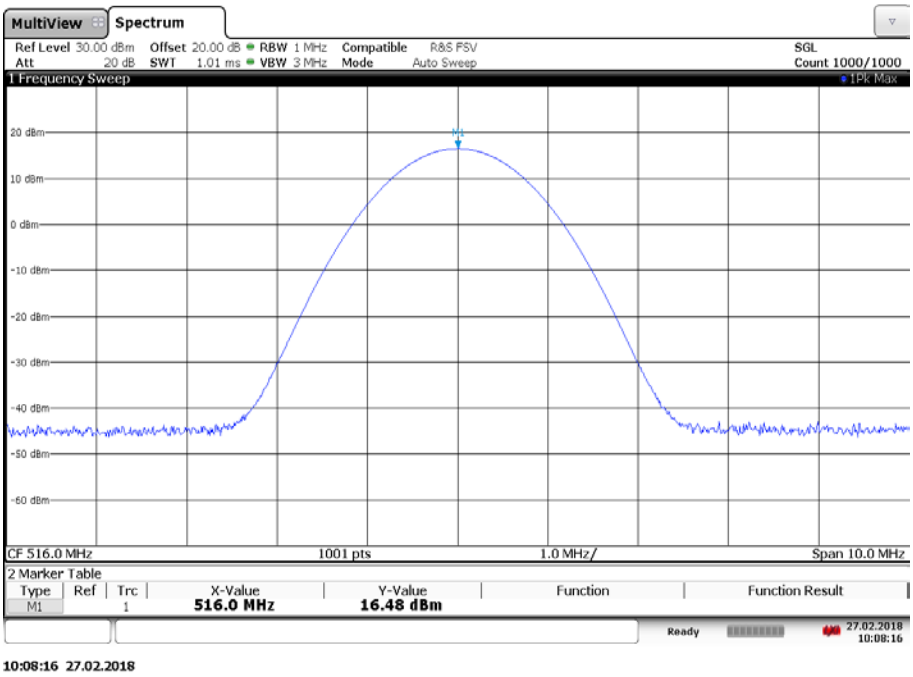


Plot 3: highest channel, peak (unmodulated carrier)

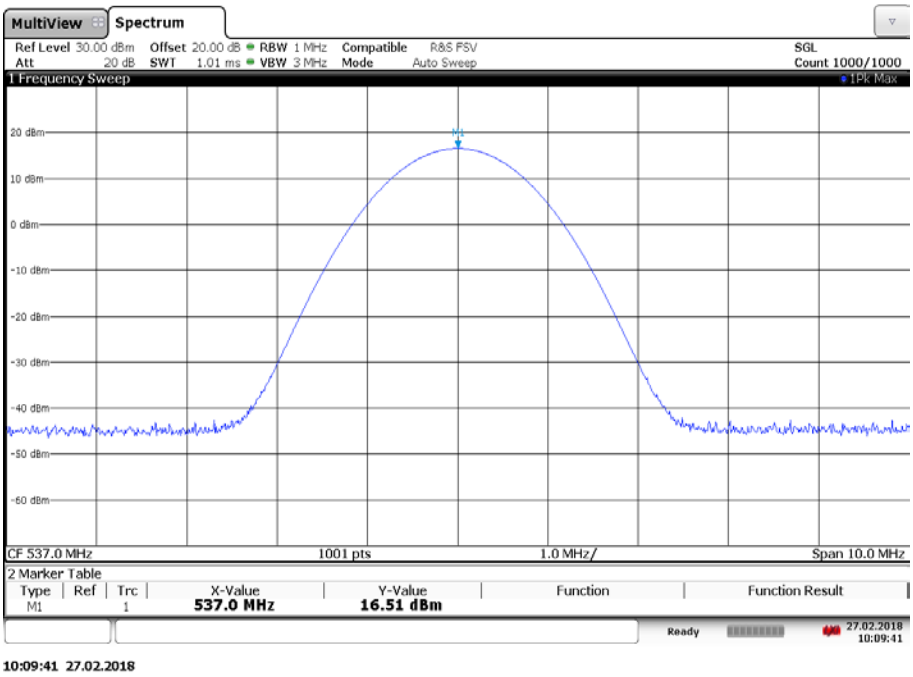


Plots: Range A

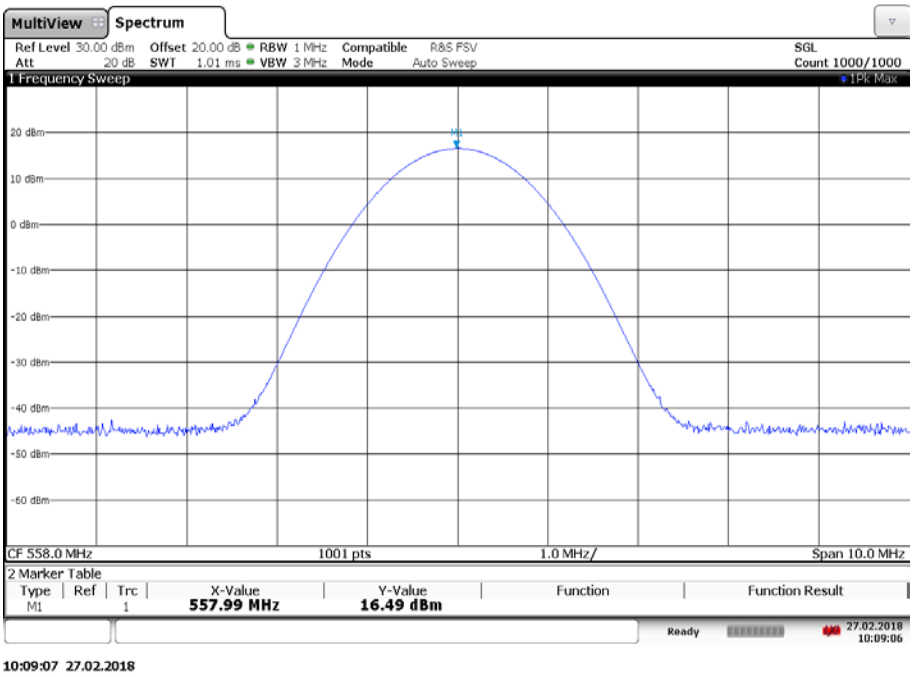
Plot 1: lowest channel, peak (unmodulated carrier)



Plot 2: middle channel, peak (unmodulated carrier)

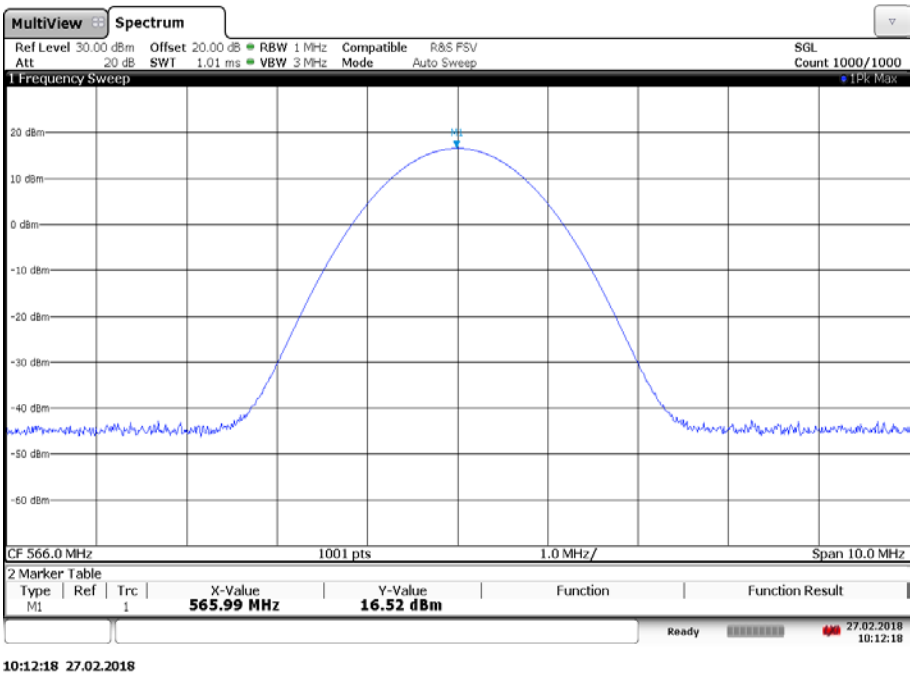


Plot 3: highest channel, peak (unmodulated carrier)

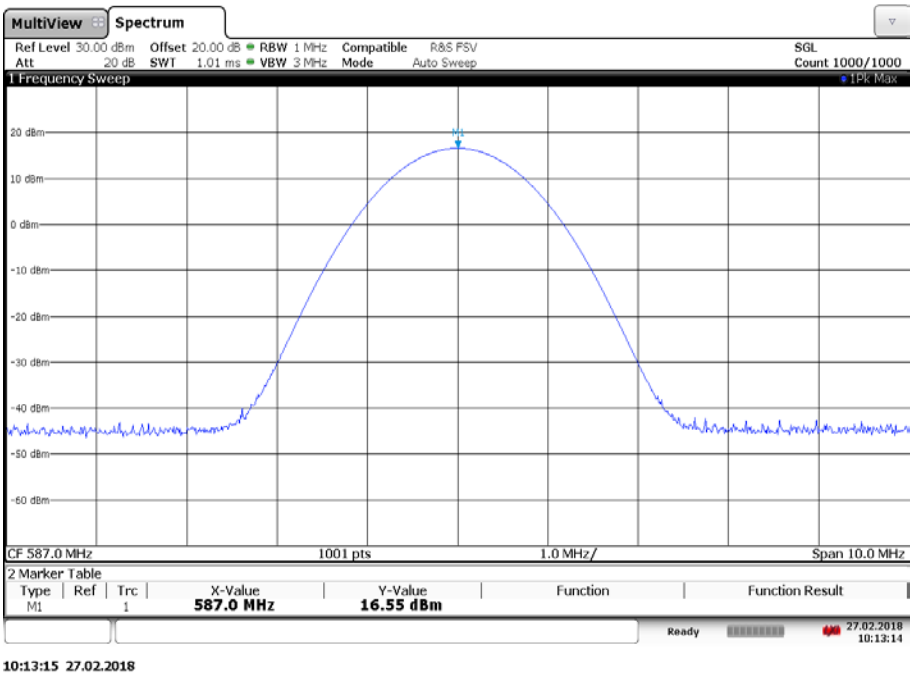


Plots: Range G

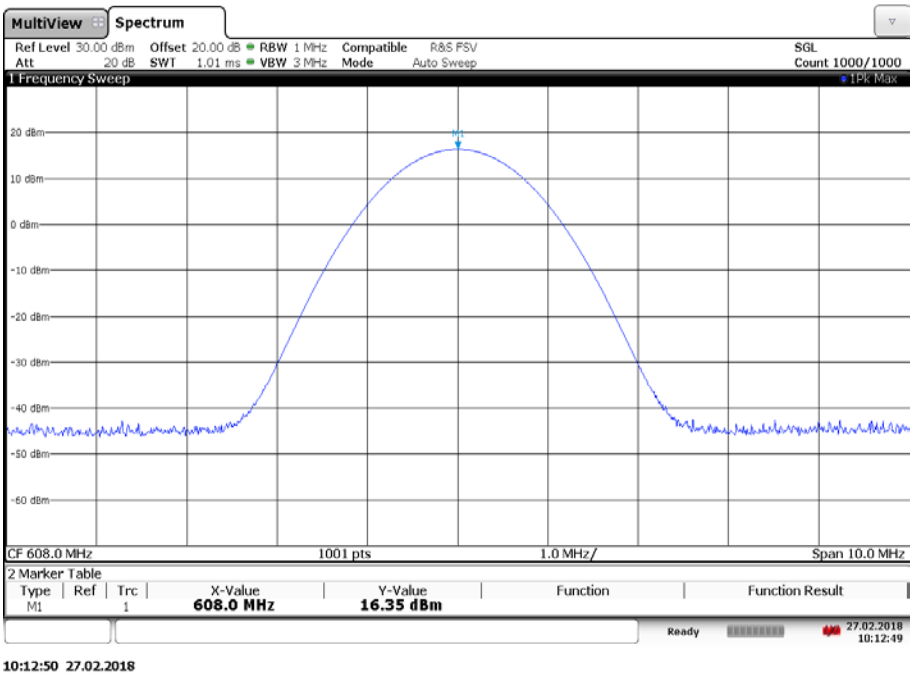
Plot 1: lowest channel, peak (unmodulated carrier)



Plot 2: middle channel, peak (unmodulated carrier)



Plot 3: highest channel, peak (unmodulated carrier)



11.2 Occupied bandwidth

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 % to 5 % of the occupied bandwidth
Video bandwidth:	3 x resolution bandwidth
Span:	2 x emission bandwidth
Trace mode:	Max. hold
Analyzer function:	99% power occupied bandwidth function
EUT:	Modulated signal with max. frequency deviation
Test setup:	See sub clause 6.3 – B
Measurement uncertainty:	See sub clause 8

Limits:

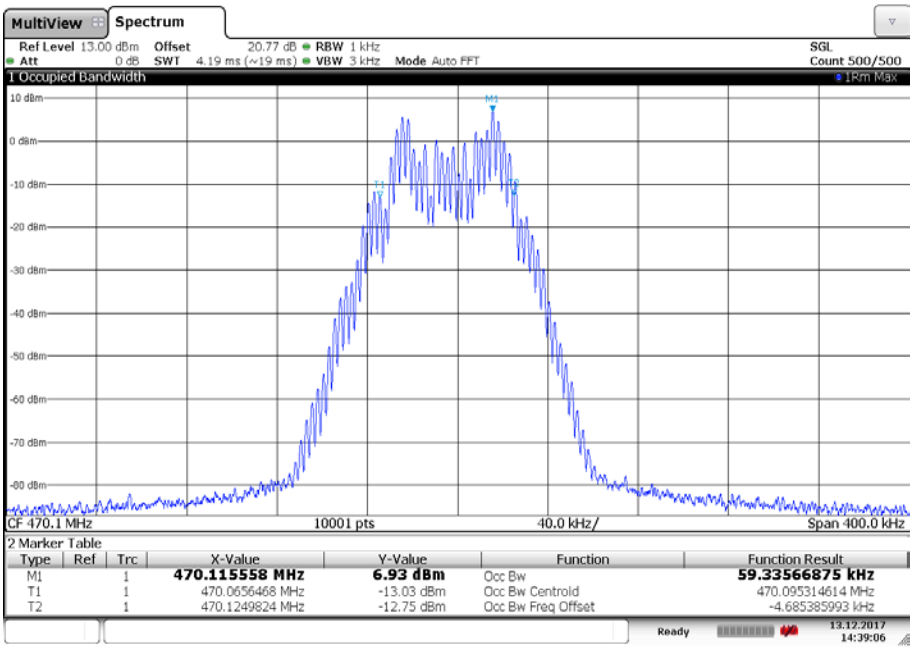
FCC & IC
470 MHz to 608 MHz 200 kHz
Occupied bandwidth 99%. Other than single sideband or independent sideband transmitters - when modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

Result:

Occupied bandwidth (kHz)			
Channels	**Range A1**	**Range A**	**Range G**
Lowest	59.3	51.9	58.3
Middle	58.4	53.7	57.6
Highest	56.9	48.6	57.2

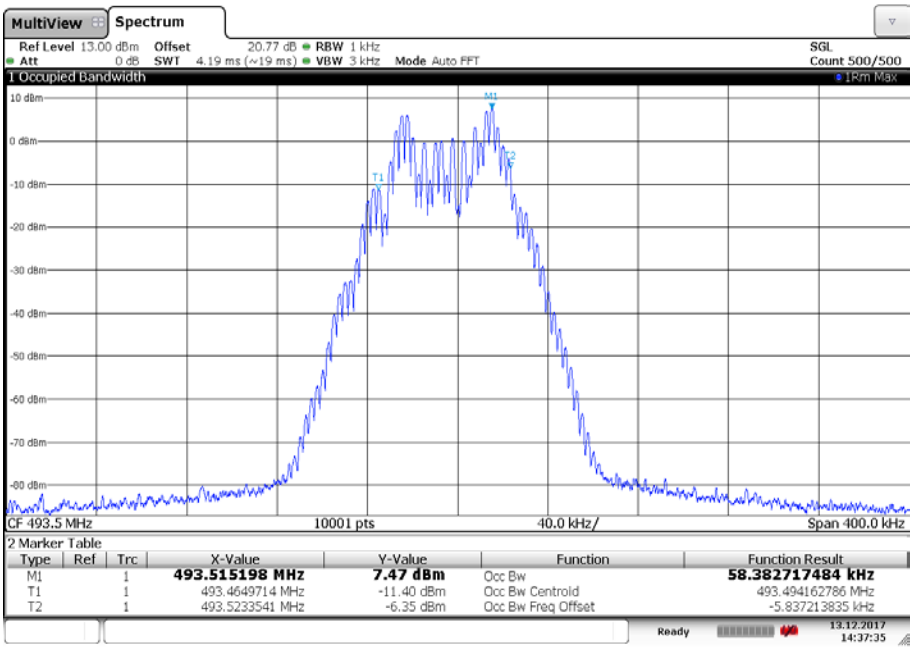
Plots: Range A1

Plot 1: lowest channel



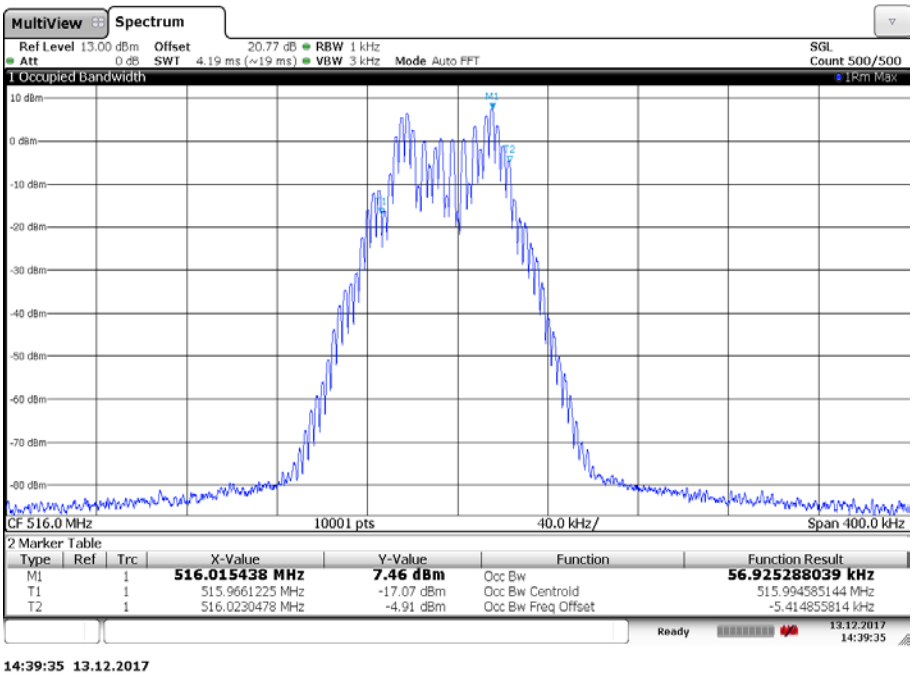
14:39:06 13.12.2017

Plot 2: middle channel



14:37:35 13.12.2017

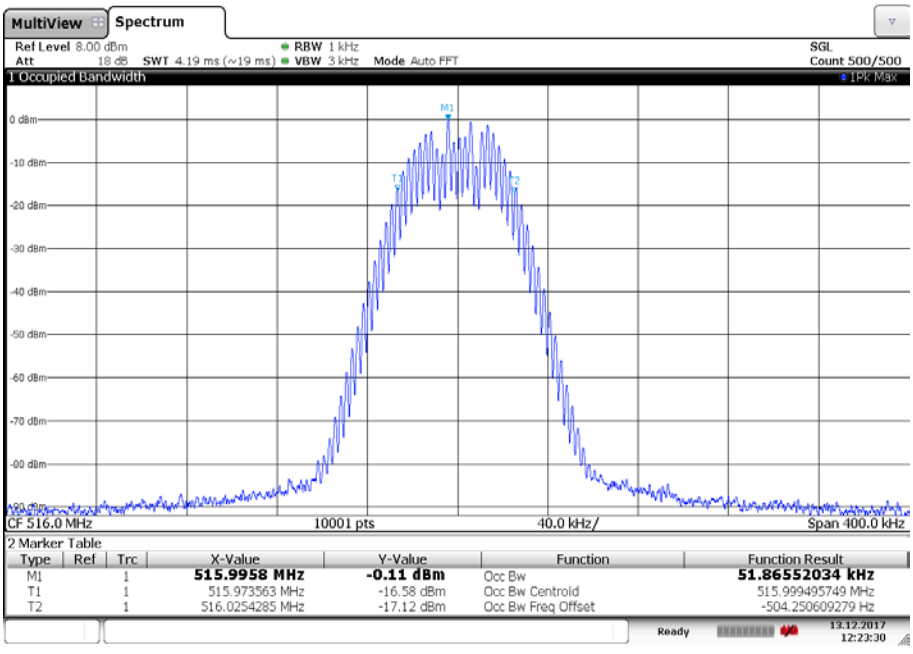
Plot 3: highest channel



14:39:35 13.12.2017

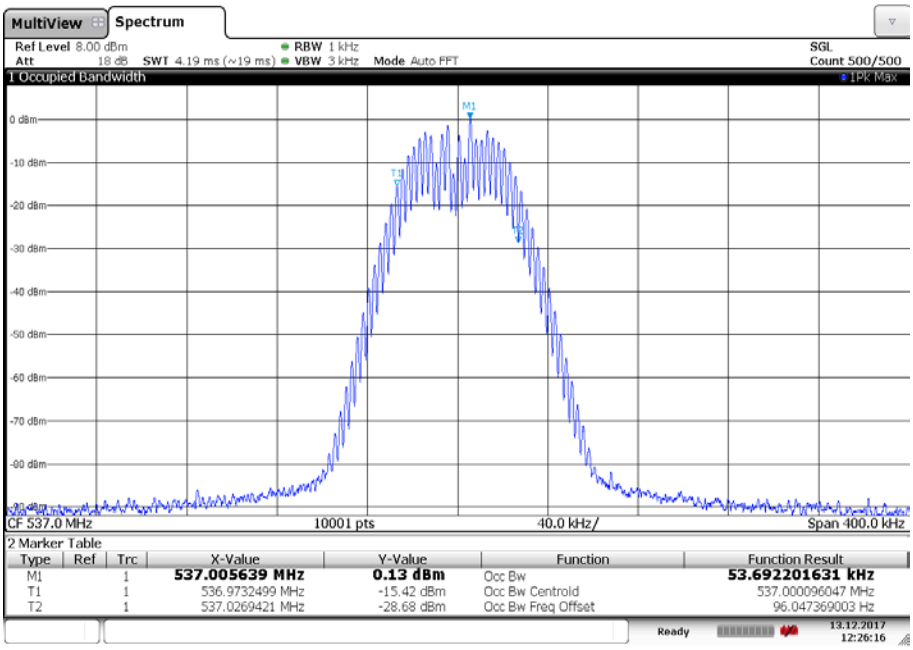
Plots: Range A

Plot 1: lowest channel



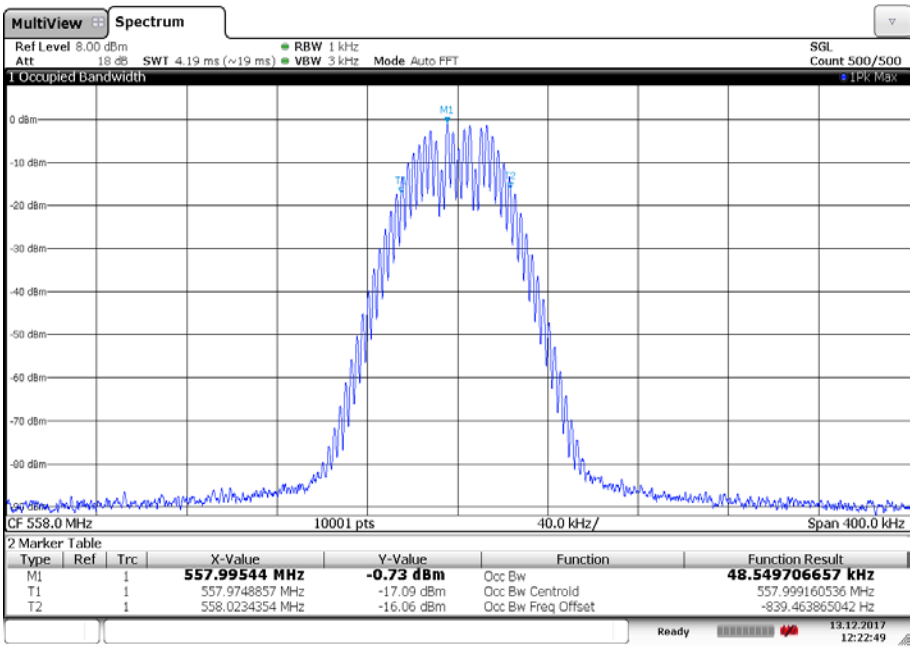
12:23:31 13.12.2017

Plot 2: middle channel



12:26:16 13.12.2017

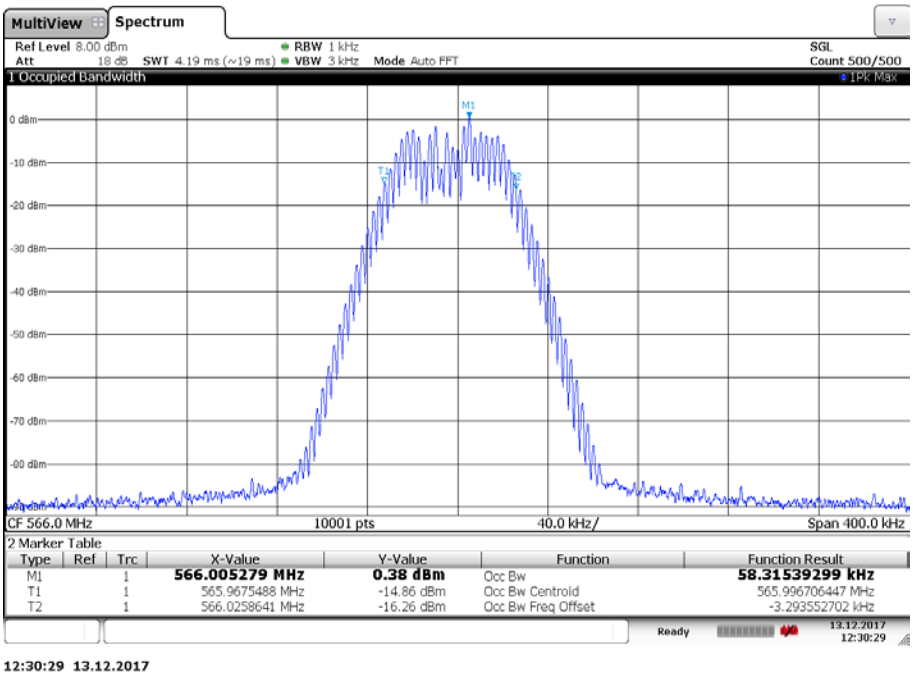
Plot 3: highest channel



12:22:49 13.12.2017

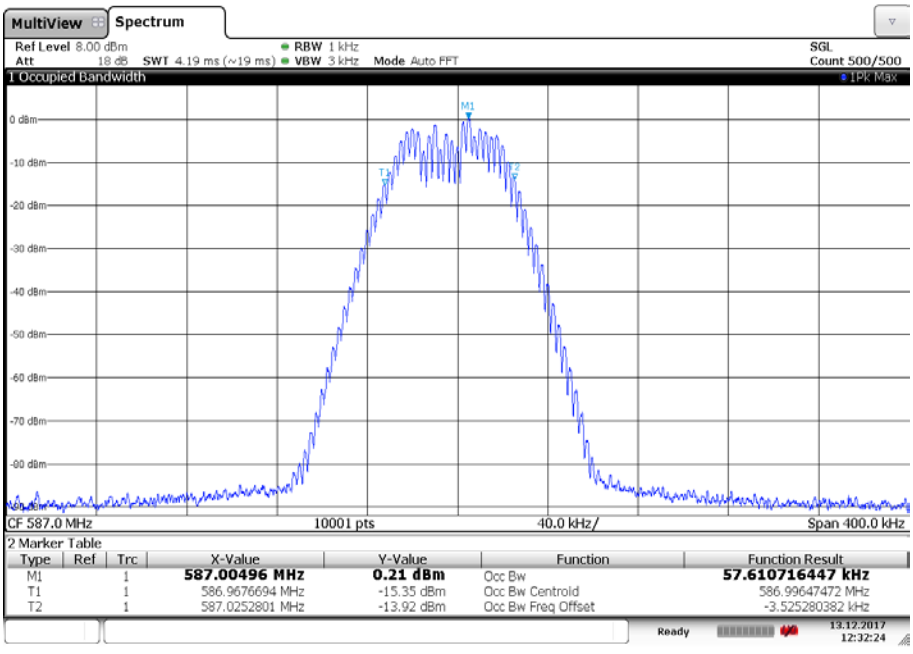
Plots: Range G

Plot 1: lowest channel



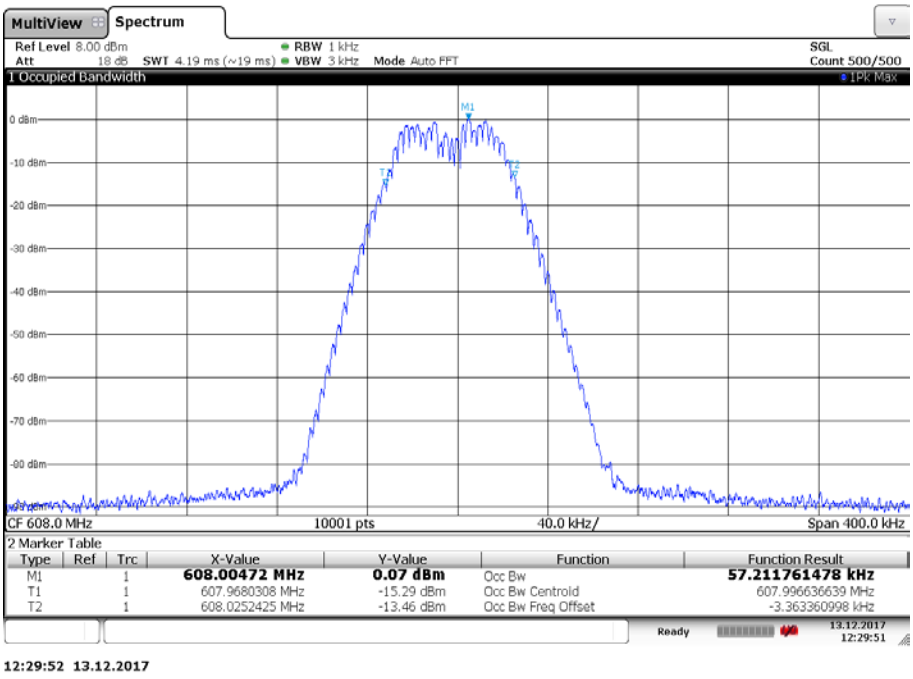
12:30:29 13.12.2017

Plot 2: middle channel



12:32:25 13.12.2017

Plot 6: highest channel



12:29:52 13.12.2017

11.3 Transmitter frequency stability

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 Hz
Video bandwidth:	3 x resolution bandwidth
Span:	wide enough to follow the frequency drift
Trace mode:	clear/write/view
EUT:	CW signal or MC with measurement method description
Test setup:	See sub clause 6.3 - A
Measurement uncertainty:	See sub clause 8

Limits:

FCC & IC
470 MHz to 608 MHz ± 50 ppm

Results: Range A1, lowest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	470.096477	-3.523	-7.496
-20 °C / V_{nom}	470.097126	-2.874	-6.115
-10 °C / V_{nom}	470.098615	-1.385	-2.947
0 °C / V_{nom}	470.099665	-0.335	-0.713
+10 °C / V_{nom}	470.099519	-0.481	-1.024
+20 °C / V_{nom}	470.098908	-1.092	-2.324
+30 °C / V_{nom}	470.098381	-1.619	-3.445
+40 °C / V_{nom}	470.097615	-2.385	-5.075
+50 °C / V_{nom}	470.097538	-2.462	-5.238
+20 °C / V_{nom} - 15%	470.098178	-1.822	-3.877
+20 °C / V_{nom}	470.098908	-1.092	-2.324
+20 °C / V_{nom} + 15%	470.098174	-1.826	-3.885

Results: Range A1, middle channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	493.496041	-3.959	-8.022
-20 °C / V_{nom}	493.496849	-3.152	-6.387
-10 °C / V_{nom}	493.498223	-1.777	-3.601
0 °C / V_{nom}	493.499422	-0.578	-1.171
+10 °C / V_{nom}	493.499222	-0.778	-1.577
+20 °C / V_{nom}	493.498838	-1.162	-2.355
+30 °C / V_{nom}	493.497940	-2.061	-4.176
+40 °C / V_{nom}	493.497169	-2.831	-5.737
+50 °C / V_{nom}	493.497148	-2.852	-5.779
+20 °C / V_{nom} - 15%	493.497841	-2.159	-4.375
+20 °C / V_{nom}	493.498838	-1.162	-2.355
+20 °C / V_{nom} + 15%	493.497859	-2.141	-4.338

Results: Range A1, highest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	515.995702	-4.298	-8.330
-20 °C / V_{nom}	515.996346	-3.655	-7.083
-10 °C / V_{nom}	515.998071	-1.929	-3.738
0 °C / V_{nom}	516.999180	-0.820	-1.589
+10 °C / V_{nom}	515.999031	-0.969	-1.878
+20 °C / V_{nom}	515.998281	-1.719	-3.331
+30 °C / V_{nom}	515.997881	-2.119	-4.107
+40 °C / V_{nom}	515.997179	-2.821	-5.467
+50 °C / V_{nom}	515.996891	-3.109	-6.025
+20 °C / V_{nom} - 15%	515.997536	-2.465	-4.7772
+20 °C / V_{nom}	515.998281	-1.719	-3.3314
+20 °C / V_{nom} + 15%	515.997529	-2.471	-4.7888

Results: Range A, lowest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	515.994014	-5.986	-11.601
-20 °C / V_{nom}	515.994773	-5.227	-10.130
-10 °C / V_{nom}	515.997209	-2.791	-5.409
0 °C / V_{nom}	515.998465	-1.535	-2.975
+10 °C / V_{nom}	515.999427	-0.573	-1.111
+20 °C / V_{nom}	515.999879	-0.122	-0.237
+30 °C / V_{nom}	516.000740	0.740	1.434
+40 °C / V_{nom}	516.001385	1.385	2.684
+50 °C / V_{nom}	516.002200	2.200	4.264
+20 °C / V_{nom} - 15%	516.000228	0.228	0.442
+20 °C / V_{nom}	515.999879	-0.122	-0.237
+20 °C / V_{nom} + 15%	516.000281	0.281	0.545

Results: Range A, middle channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	536.991701	-8.299	-15.454
-20 °C / V_{nom}	536.994435	-5.565	-10.363
-10 °C / V_{nom}	536.996790	-3.210	-5.978
0 °C / V_{nom}	536.998049	-1.951	-3.633
+10 °C / V_{nom}	536.999180	-0.820	-1.527
+20 °C / V_{nom}	536.999829	-0.171	-0.319
+30 °C / V_{nom}	537.000176	0.176	0.328
+40 °C / V_{nom}	537.001478	1.478	2.752
+50 °C / V_{nom}	537.001825	1.825	3.399
+20 °C / V_{nom} - 15%	537.00209	0.210	0.391
+20 °C / V_{nom}	536.999829	-0.171	-0.319
+20 °C / V_{nom} + 15%	537.000220	0.220	0.410

Results: Range A, highest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	557.991495	-8.506	-15.244
-20 °C / V_{nom}	557.993894	-6.106	-10.943
-10 °C / V_{nom}	557.996625	-3.375	-6.048
0 °C / V_{nom}	557.997621	-2.379	-4.264
+10 °C / V_{nom}	557.998805	-1.195	-2.142
+20 °C / V_{nom}	557.999694	-0.306	-0.548
+30 °C / V_{nom}	558.000595	0.595	1.066
+40 °C / V_{nom}	558.001721	1.721	3.084
+50 °C / V_{nom}	558.002521	2.521	4.518
+20 °C / V_{nom} - 15%	557.999761	-0.239	-0.428
+20 °C / V_{nom}	557.999694	-0.306	-0.548
+20 °C / V_{nom} + 15%	558.000002	1.903	3.410

Results: Range G, lowest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	565.993681	-6.319	-11.164
-20 °C / V_{nom}	565.996281	-3.720	-6.573
-10 °C / V_{nom}	565.997626	-2.374	-4.194
0 °C / V_{nom}	565.998142	-1.858	-3.283
+10 °C / V_{nom}	565.998247	-1.753	-3.097
+20 °C / V_{nom}	565.998081	-1.919	-3.391
+30 °C / V_{nom}	565.997206	-2.794	-4.936
+40 °C / V_{nom}	565.997173	-2.827	-4.995
+50 °C / V_{nom}	565.997560	-2.441	-4.319
+20 °C / V_{nom} - 15%	565.997850	-2.150	-3.799
+20 °C / V_{nom}	565.998081	-1.919	-3.391
+20 °C / V_{nom} + 15%	565.997881	-2.119	-3.744

Results: Range G, middle channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	586.993270	-6.730	-11.465
-20 °C / V_{nom}	586.996214	-3.787	-6.452
-10 °C / V_{nom}	585.997244	-2.756	-4.695
0 °C / V_{nom}	586.997956	-2.044	-3.482
+10 °C / V_{nom}	586.998031	-1.969	-3.354
+20 °C / V_{nom}	586.997901	-2.010	-3.424
+30 °C / V_{nom}	586.996926	-3.074	-5.237
+40 °C / V_{nom}	586.996921	-3.079	-5.245
+50 °C / V_{nom}	586.997161	-2.840	-4.838
+20 °C / V_{nom} - 15%	586.997878	-2.122	-3.615
+20 °C / V_{nom}	586.997901	-2.010	-3.424
+20 °C / V_{nom} + 15%	586.997737	-2.263	-3.855

Results: Range G, highest channel

Temperature / Voltage	Frequency (MHz)	Deviation (kHz)	Deviation (ppm)
-30 °C / V_{nom}	607.992969	-7.031	-11.564
-20 °C / V_{nom}	607.995446	-4.554	-7.490
-10 °C / V_{nom}	607.997042	-2.959	-4.867
0 °C / V_{nom}	607.997680	-2.320	-3.816
+10 °C / V_{nom}	607.997777	-2.223	-3.656
+20 °C / V_{nom}	607.997584	-2.416	-3.974
+30 °C / V_{nom}	607.996828	-3.172	-5.217
+40 °C / V_{nom}	607.996801	-3.199	-5.262
+50 °C / V_{nom}	607.9972001	-2.710	-4.457
+20 °C / V_{nom} - 15%	607.997501	-2.500	-4.112
+20 °C / V_{nom}	607.997584	-2.416	-3.974
+20 °C / V_{nom} + 15%	607.997241	-2.759	-4.538

11.4 Transmitter unwanted emissions (radiated)

Measurement:

Measurement parameter	
Detector:	RMS
Sweep time:	Auto
Resolution bandwidth:	See table below!
Video bandwidth:	See table below!
Span:	100 MHz steps!
Trace-Mode:	Max. hold
EUT:	MC with max frequency deviation
Used equipment:	See chapter 6.1- A / B & 6.3 - B
Measurement uncertainty:	See chapter 8

Frequency being measured	Measuring receiver bandwidth
25 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1 000 MHz	100 kHz
> 1 000 MHz	1 MHz

Limits:

FCC & IC (according to ETSI EN 300 422-1 v1.4.2 (2011-08))			
State	Max. spurious level		
	47 MHz to 74 MHz 87.5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1000 MHz	All frequencies > 1000 MHz
Operating	4.0 nW	250 nW	1.00 µW
Standby	2.0 nW	2.0 nW	20.0 nW

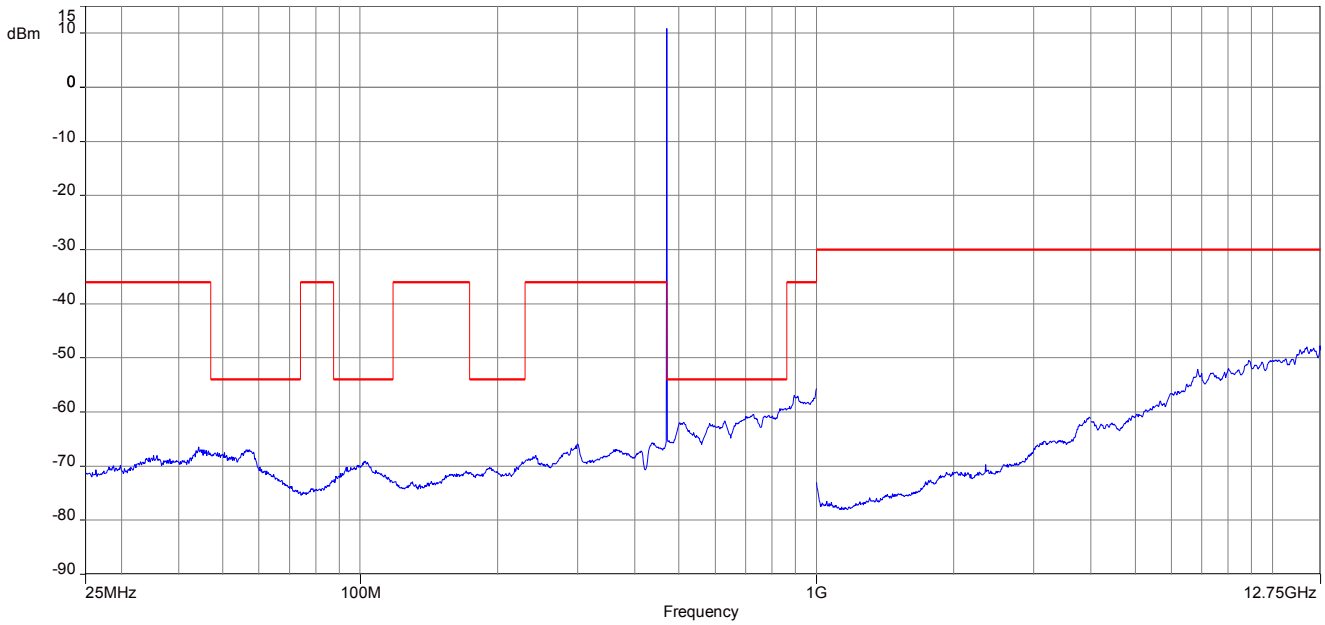
FCC & IC	
The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:	
On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least	25 dB
On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth	35 dB
On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least	43 + 10log10 (mean output power in watts) dB

Results:

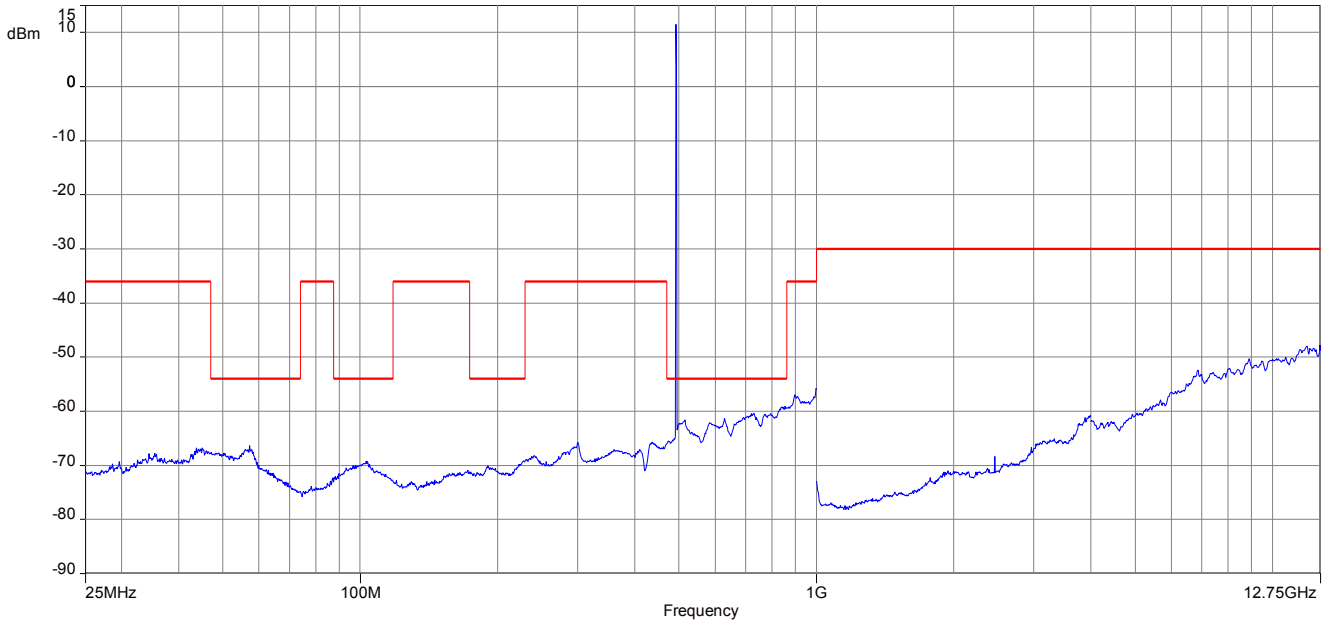
carrier frequency (MHz)	unwanted emission frequency (MHz)	Limit	level (dB) / (dBm) or remark
No emissions were detected.			

Plots: radiated, range A1

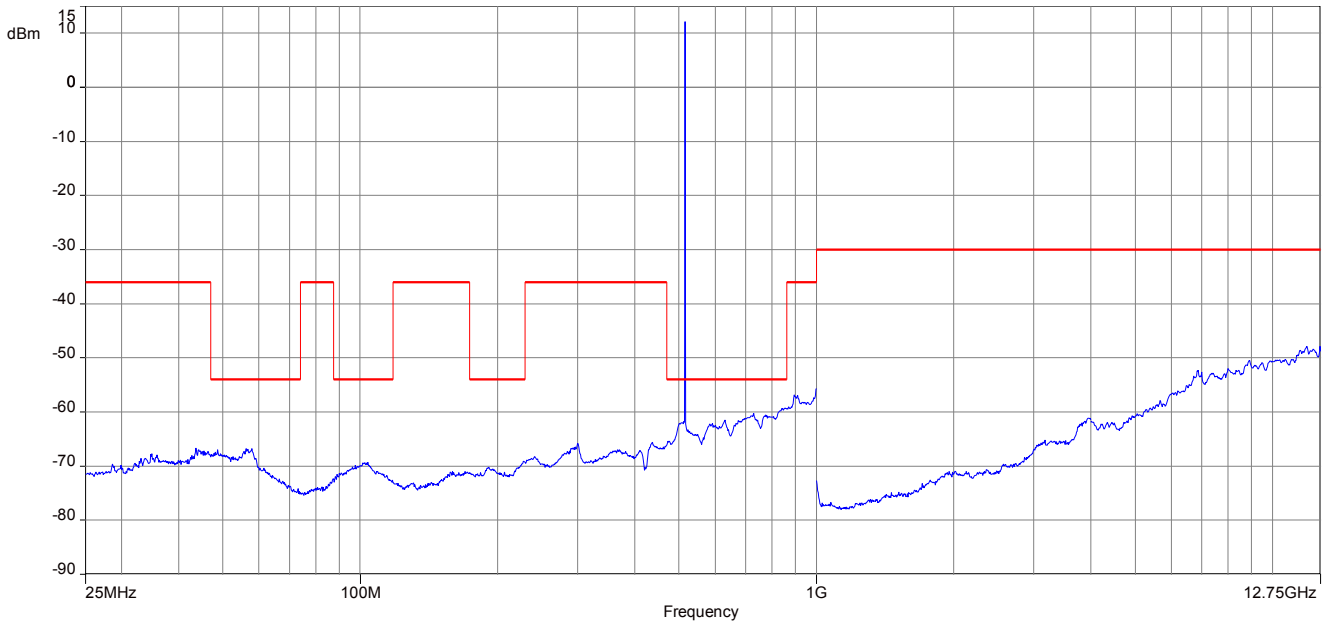
Plot 1: lowest channel, spurious emissions, 25 MHz – 12.75 GHz



Plot 2: middle channel, spurious emissions, 25 MHz – 12.75 GHz

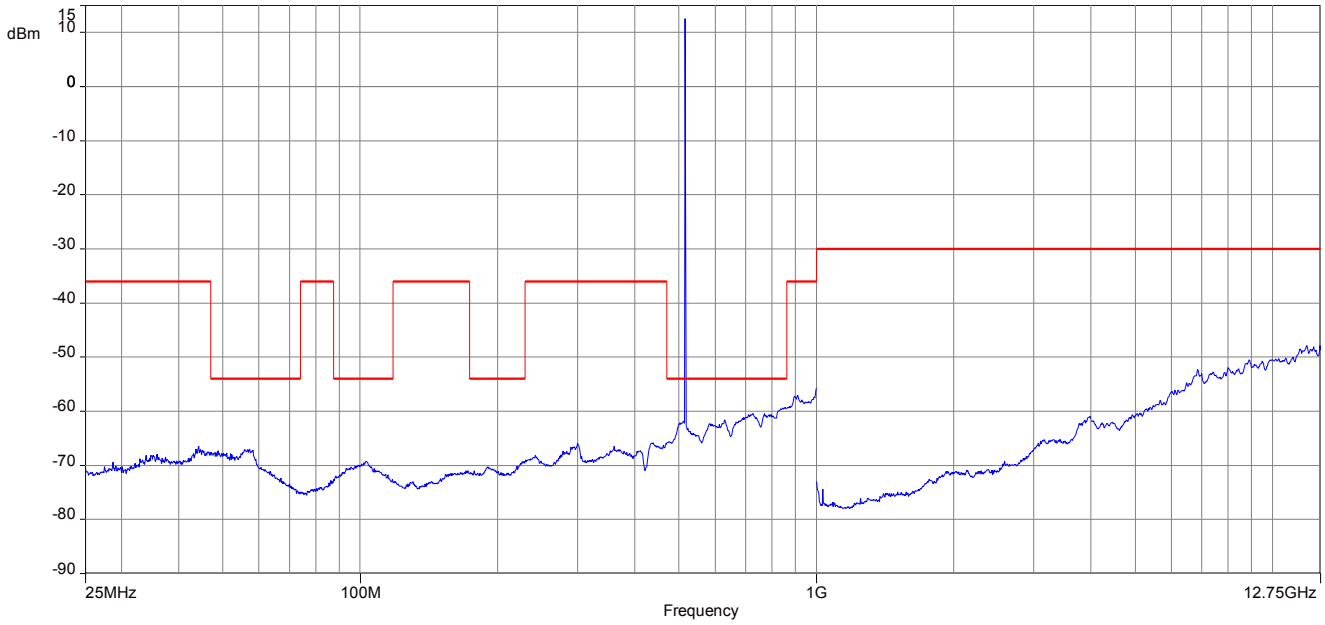


Plot 3: highest channel, spurious emissions, 25 MHz – 12.75 GHz

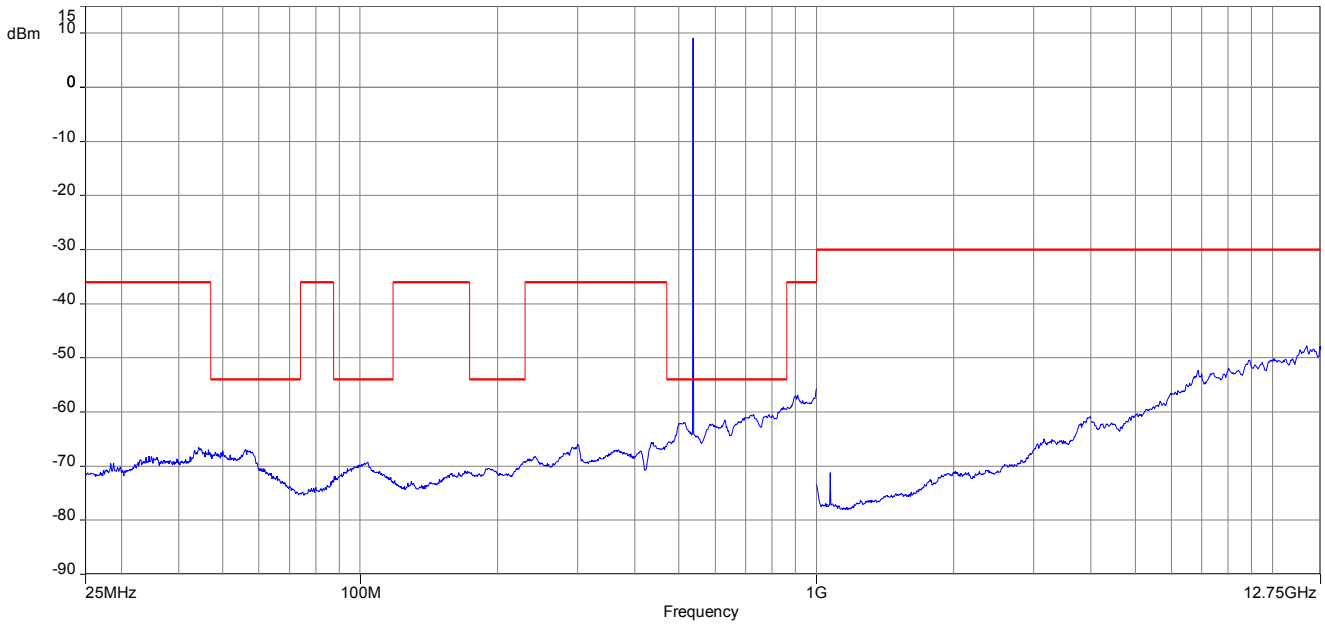


Plots: radiated, range A

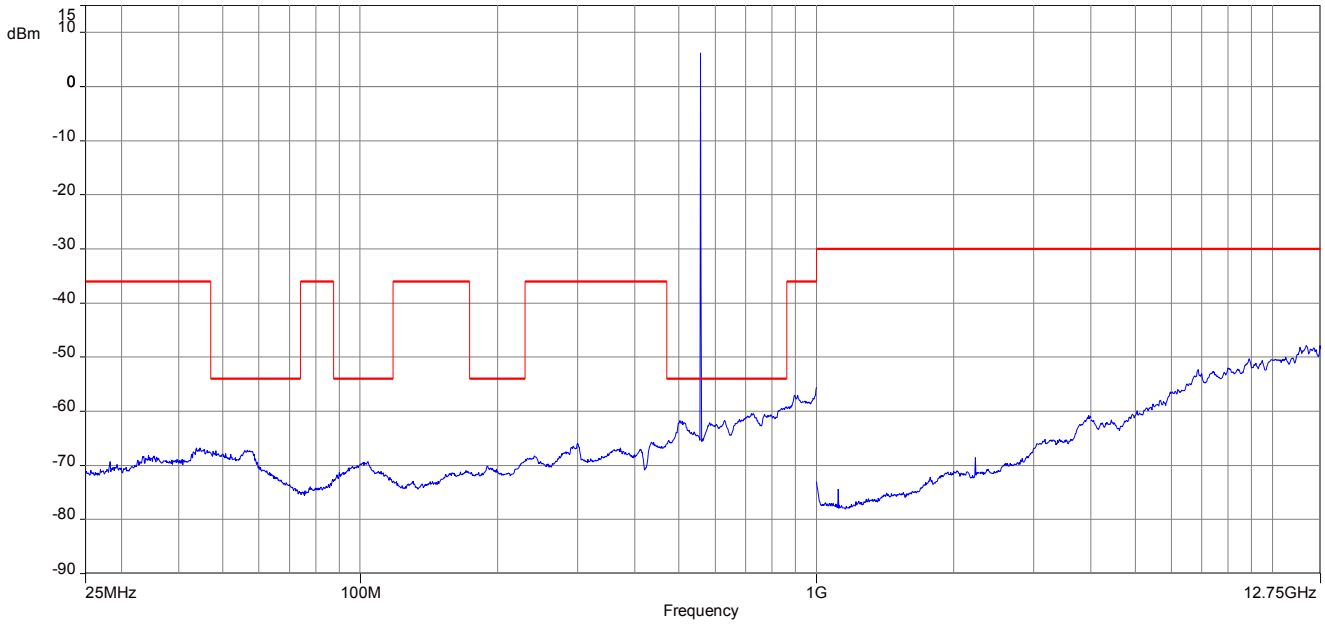
Plot 1: lowest channel, spurious emissions, 25 MHz – 12.75 GHz



Plot 2: middle channel, spurious emissions, 25 MHz – 12.75 GHz

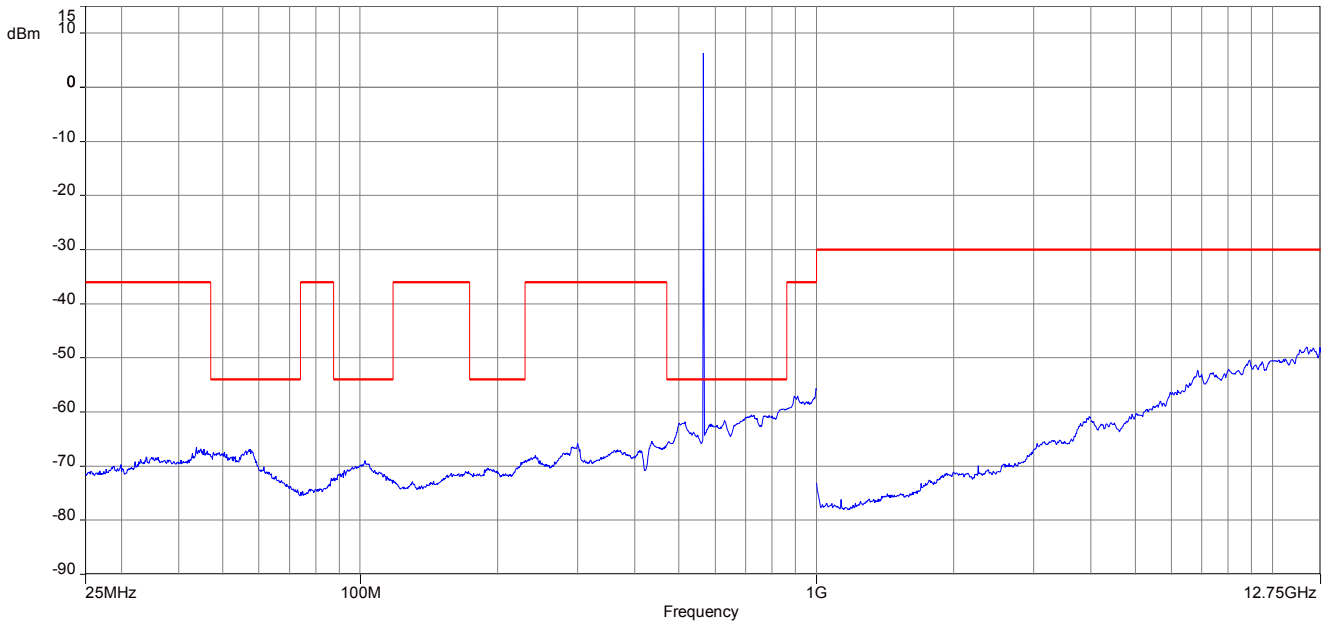


Plot 3: highest channel, spurious emissions, 25 MHz – 12.75 GHz

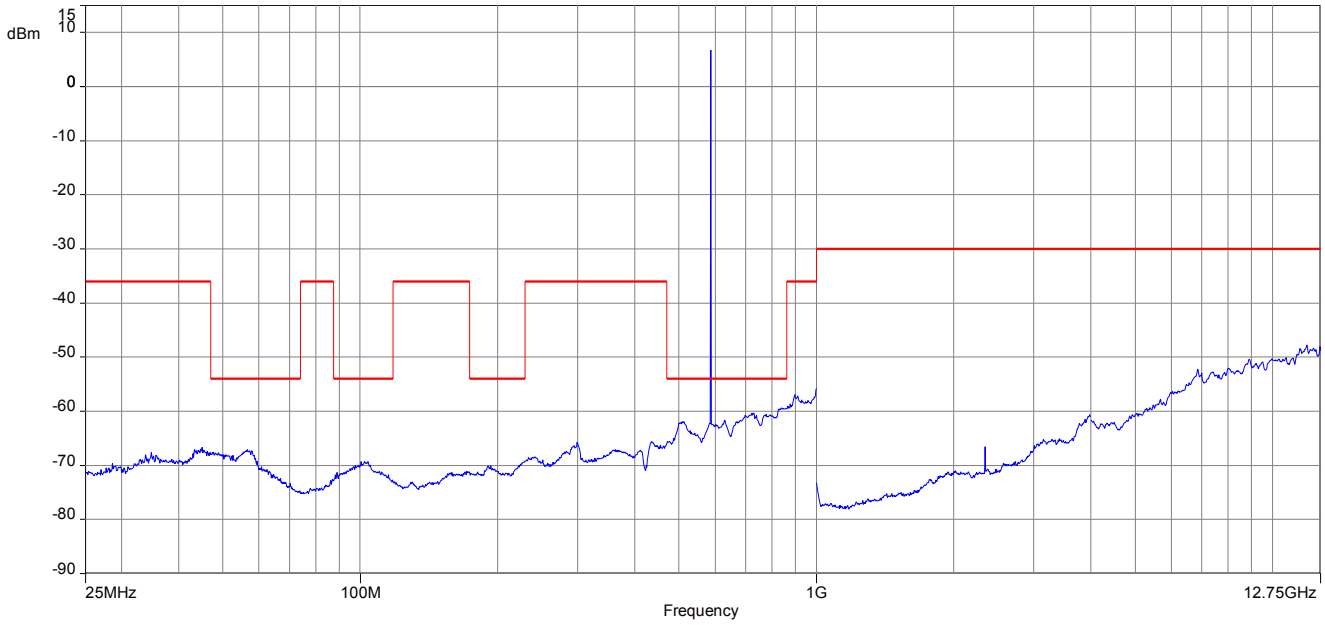


Plots: radiated, range G

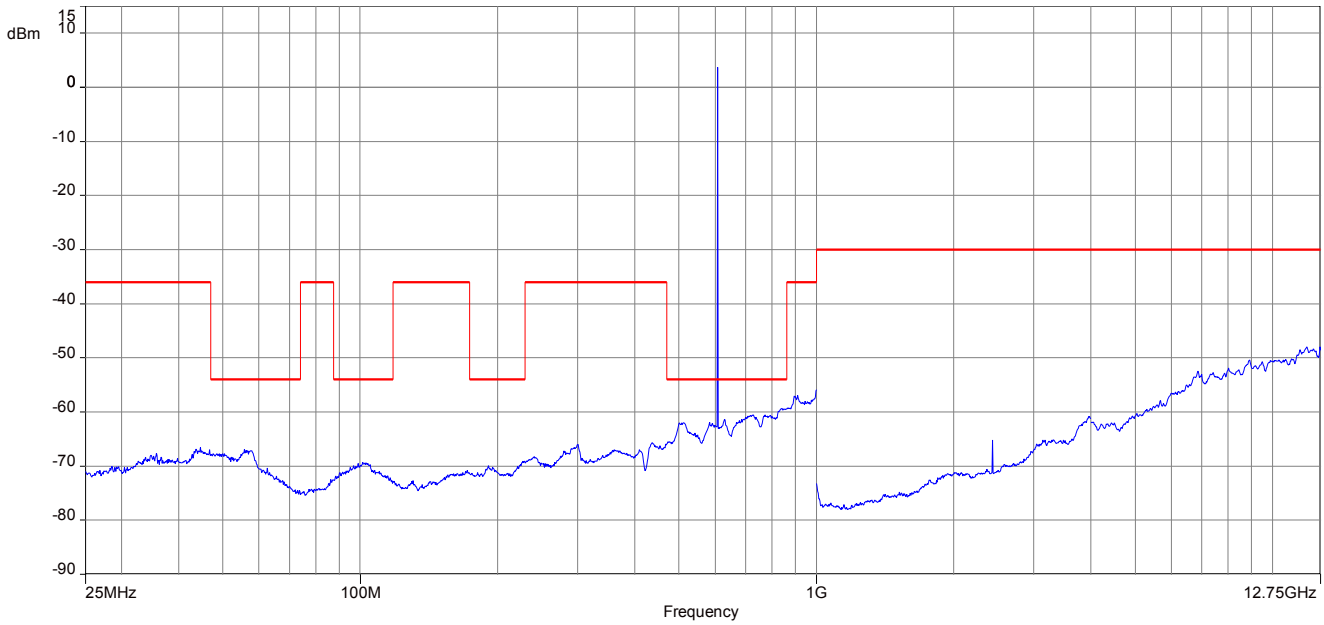
Plot 1: lowest channel, spurious emissions, 25 MHz – 12.75 GHz



Plot 2: middle channel, spurious emissions, 25 MHz – 12.75 GHz



Plot 3: highest channel, spurious emissions, 25 MHz – 12.75 GHz



Plots: conducted, range A1

Plot 1: lowest channel, spectrum mask