CMC Centro Misure Compatibilità S.r.l.
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LAB N° 0168

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

TEST REPORT nr. R17212001

Federal Communication Commission (FCC)

Test item

Description .....: TRANSCEIVER UNIT
Trademark .....: ELCA
Model/Type .....: AT MITO-MINI-915
FCC ID .....: 2ABS7-ATMIMI915

Test Specification

Standard.....: FCC Rules & Regulations, Title 47:2017
Part 15 paragraph(s): 203, 204, 207, 209, 215 and 249

Client's name .....: ELCA S.r.l.
Address .....: Via del Commercio, 7/B – 36065 Mussolente (VI) – ITALY

Manufacturer's name : Same as client
Address .....: --

Report

Tested by .....: G. Gandini – *Technician* .....

Approved by .....: R. Beghetto – *Laboratory Manager* .....
Date of issue .....: 17.04.18
Contents.....: 73 pages

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1. Summary

Standard:

FCC Rules & Regulations, Title 47:2017
Part 15 paragraph(s): 203, 204, 207, 209, 215 and 249

Test specifications	*Environmental Phenomena*	*Tests sequence*	*Result*
Part 15.203	Antenna requirements	1	Complies
Part 15.207	Conducted emissions	--	N.A. (+)
Part 15.209	Radiated emissions	2	Complies
Part 15.209 and 15.249	Peak Output Power	3	Complies
Part 15.215 (c)	20 dB bandwidth	4	Complies
Part 15.249 (d)	Band edge	5	Complies
Part 15.209	Spurious emission	6	Complies

(+) Devices which only employ battery power. See FCC Part 15.207 (c)

The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification

2. Description of Equipment under test (EUT)

Power supply	:	3,7 Vdc from battery
Serial Number	:	--
Type of equipment	:	☑ Transmitter Unit
		☑ Receiver Unit
Type of station	:	❑ Fixed station
		☑ Portable station
		❑ Mobile station
Nominal frequency	:	F_L: 920,00 MHz F_M: 920,60 MHz F_H: 921,15 MHz

2.1 Test Site

Company	:	CMC Centro Misure Compatibilità S.r.l.
Address	:	Via della Fisica, 20
		36016 Thiene (VI) – ITALY
Test site facility's FCC registration number	:	182474

3. Testing and sampling

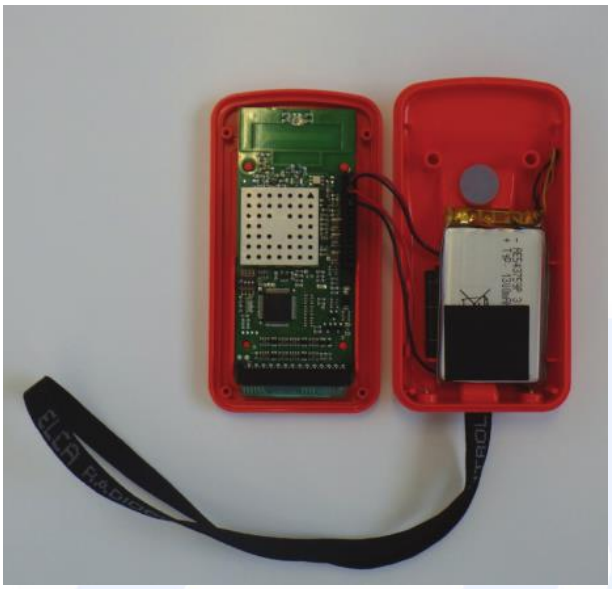
Date of receipt of test item	:	12.10.17
Testing start date	:	12.10.17
Testing end date	:	12.02.18
Samples tested nr.	:	1
Sampling procedure.	:	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion
Internal identification	:	adhesive label with the product number P171185

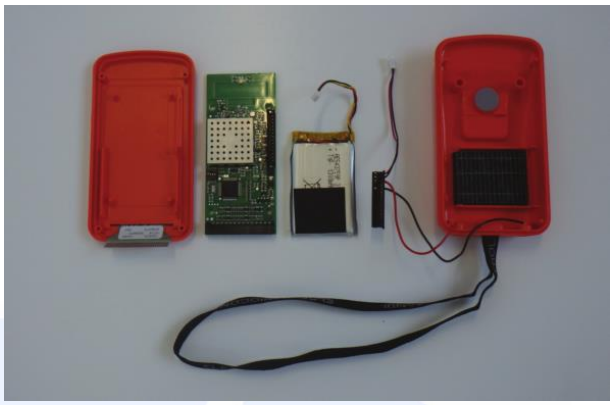
4. Operative conditions

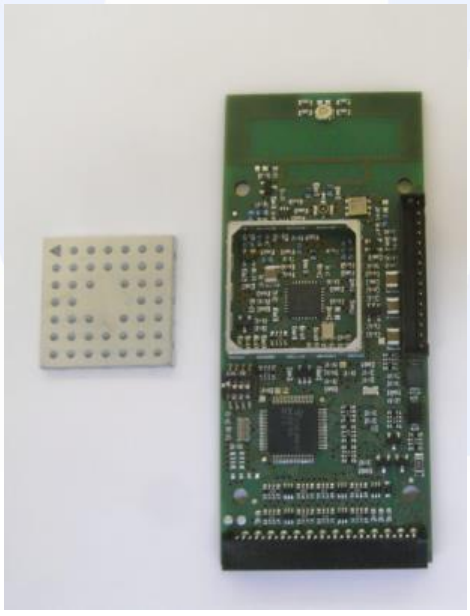
EUT exercising	:	EUT in continuous transmission at maximum power

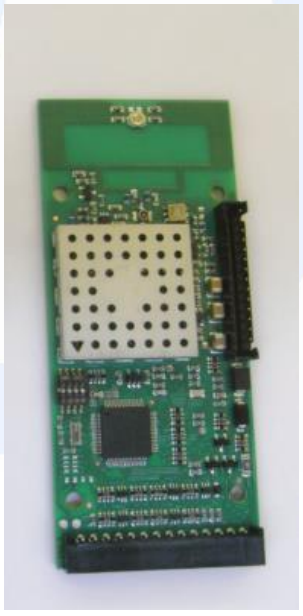
5. Photograph(s) of EUT

5.1 Photograph(s) of EUT









6. Equipment list

Id. number	*Manufacturer*	*Model*	*Description*	*Serial number*	*Last calibration*	*Due date calibration*
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -	January '18	January '19
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '16	June '19
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '13	November '18
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '18	January '19
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '18	January '19
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121	January '18	January '19
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '17	November '18
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '17	November '18
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '17	November '18
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '17	November '18
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '17	November '18
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Biconical Antenna (30-300MHz)	831	June '16	June '19
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3Ghz)	9111B-203	June '16	June '19
CMC S288	CMC	W_sma_white	Joint Shielded Cable	W_001	November '17	November '18

7. Measurement uncertainty

Test	Test Setup	Expanded uncertainty	Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_01	2,8 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30MHz	PE001_02	2,6 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30MHz	PE001_03	2,2 dB	1
Conducted emission CISPR 16 ISN 0,15-30MHz	PE001_04	4,5 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_05	2,8 dB	1
Disturbance Power 30-300 MHz	PE002_01	3,4 dB	1
Radiated Emission LAS 0,15-30MHz	PE003_01	1,5 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30MHz	PE004_01	3,8 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300MHz	PE004_02	3,3 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000MHz	PE004_03	3,2 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18GHz	PE004_04	3,6 dB	1
Human Exposure to electromagnetic fields	PE005_01	10,5 %	1
Harmonic current emissions test	PE006_01	10 mA + 1,6 %	1
Voltage fluctuation and flicker test	PE007_01	3,9 %	1
Radiated Immunity 80MHz-6GHz	PE102_XX	2,1 dB 0,81 V/m a 3V/m	1
Conducted Immunity 0,15-230MHz	PE105_XX	1,2 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,22 % 18,6 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,22 % 1,86 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,12 % 0,21 V a 10V	1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	3,8 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,3 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_04	4,3 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_05	5,5 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,2 dB	1
Adjacent channel power	PR002_01+02	1,2 dB	1
Blocking	PR002_01+02	1,2 dB	1

Test	Test Setup	Expanded uncertainty	Note
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Rev_17_01 date 20/03/2017			

Note 1:
The expanded uncertainty reported according to EN55016-4-2:2011 is based on a standard uncertainty multiplied by a coverage factor of K=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k = 2

8. Reference documents

Reference no.	*Description*
FCC Rules and Regulation Title 47 part 15:2017	--
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 9.0 (Quality Manual)	Measurement uncertainty calculation

9. Deviation from test specification

In agreement with the client, emission tests were performed with peak detector.

At the frequencies where the measures exceed the limit or within 6 dB from it, the test was repeated with quasi-peak detector and/or average detector.

10. Test case verdicts

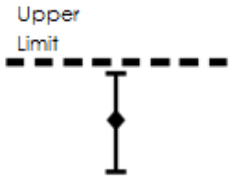
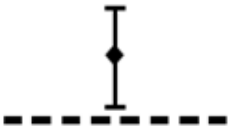
Test case does not apply to the test object	:	N.A.
Test item does meet the requirement	:	Complies
Test item does not meet the requirement	:	Does not comply
Test not performed	:	N.E.

11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 9.0.

Judgement of compliance:

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirement.	The sample complies with the requirement.	The sample does not comply with the requirement.	The sample does not comply with the requirement.
The measurement results is within the specification limit when the measurement uncertainty is taken into account.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification.

11.1 Antenna requirements

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.203 and 15.204
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

--
Measurement uncertainty: See clause 7 of this test report

Test specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
20	101	42

Result

Antenna Type	*External R.F. power amplifier*	*Gain*	*Remarks*	*Results*
Integral antenna	Not Present	0 dBi	--	Complies

Result: The requirements are met

11.2 Radiated emissions

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part. 15.209
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S127, CMC S164, CMC S271, CMC S287
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Frequency range: 0,009 MHz – 10000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
10 m for frequencies ≤ 1000 MHz
3 m for frequencies > 1000 MHz

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	45

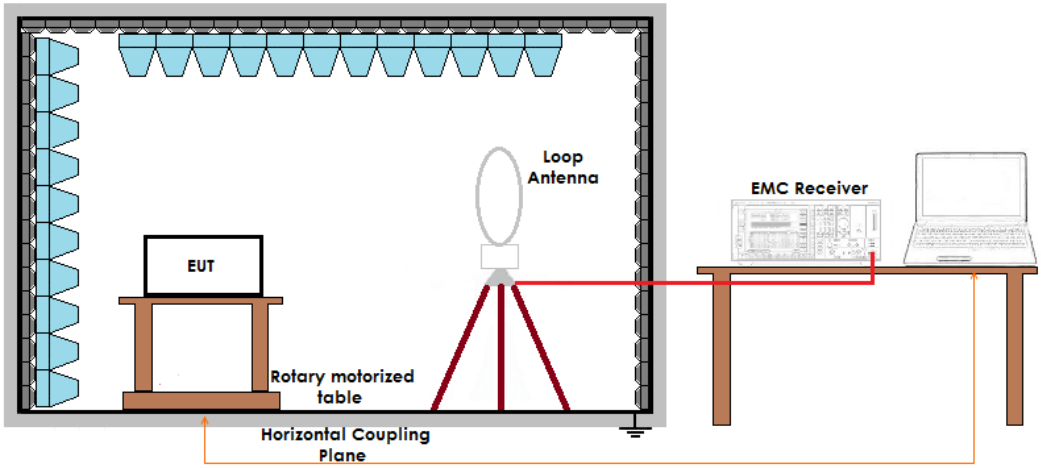
Acceptance limits

Frequency range (MHz)	*Test distance (m)*	*Limits [dB(µV/m)]*	
0,009 to 0,490	300	48,5 to 13,8	
0,490 to 1,705	30	33,8 to 22,9	
1,705 to 30	30	29,5	
30 to 88	3	40	
88 to 216	3	43,5	
216 to 960	3	46,0	
Above 960	3	53,9	
	Test distance (m)	*Linear average detector [dB(µV/m)]*	*Peak detector [dB(µV/m)]*
Above 1000	3	53,9	73,9

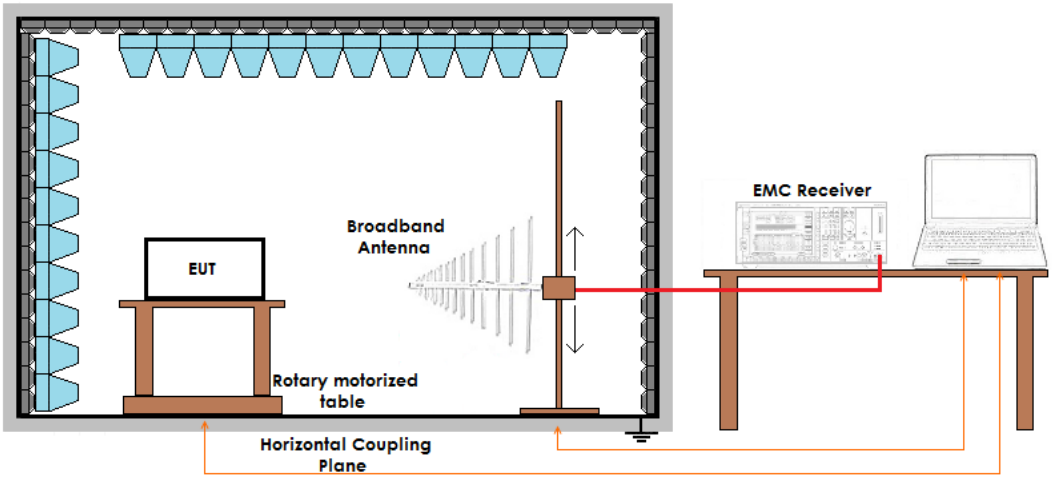
Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. The results have been extrapolated to the specified distance using an extrapolation factor

Setup

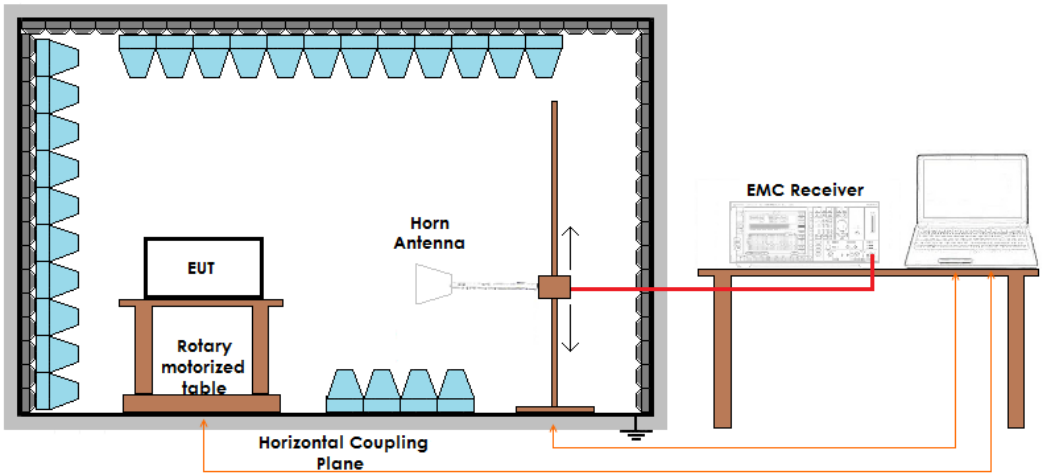
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz



Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
Loop	0,009 – 30	G17212001	Worst case	Complies
V	30 – 300	G17212002	Lowest channel	Complies
H	30 – 300	G17212003	Lowest channel	Complies
H	30 – 300	G17212004	Highest channel	Complies
V	30 – 300	G17212005	Highest channel	Complies
V	30 – 300	G17212006	Medium channel	Complies
H	30 – 300	G17212007	Medium channel	Complies
H	300 – 1000	G17212008	Medium channel	Complies
V	300 – 1000	G17212009	Medium channel	Complies
V	300 – 1000	G17212010	Lowest channel	Complies
H	300 – 1000	G17212011	Lowest channel	Complies
H	300 – 1000	G17212012	Highest channel	Complies
V	300 – 1000	G17212013	Highest channel	Complies
V	1000 – 10000	G17212014	Highest channel	Complies
H	1000 – 10000	G17212015	Highest channel	Complies
H	1000 – 10000	G17212016	Medium channel	Complies
V	1000 – 10000	G17212017	Medium channel	Complies
V	1000 – 10000	G17212018	Lowest channel	Complies
H	1000 – 10000	G17212019	Lowest channel	Complies

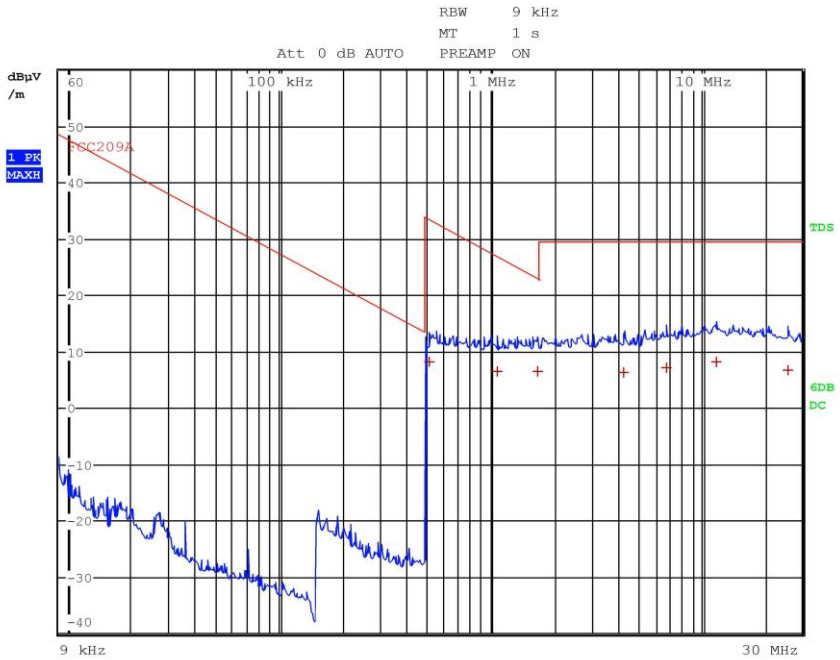
Remarks: Measurements at frequencies lower than 1000 MHz have been performed with an EUT – antenna distance of 10 m. Measured values have been corrected with FCC 3A10 factor.
Peaks above the limits are caused by the nominal transmitting frequencies. Final measurements have been performed only for values with margin lower than 20 dB from limit

Graphs Legend
PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +
AV: Average; AV [1s] (average at 1 second) values are marked with a x

Graphs

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	Tx
Operator	Gandini 17212001
Test Spec	

Loop



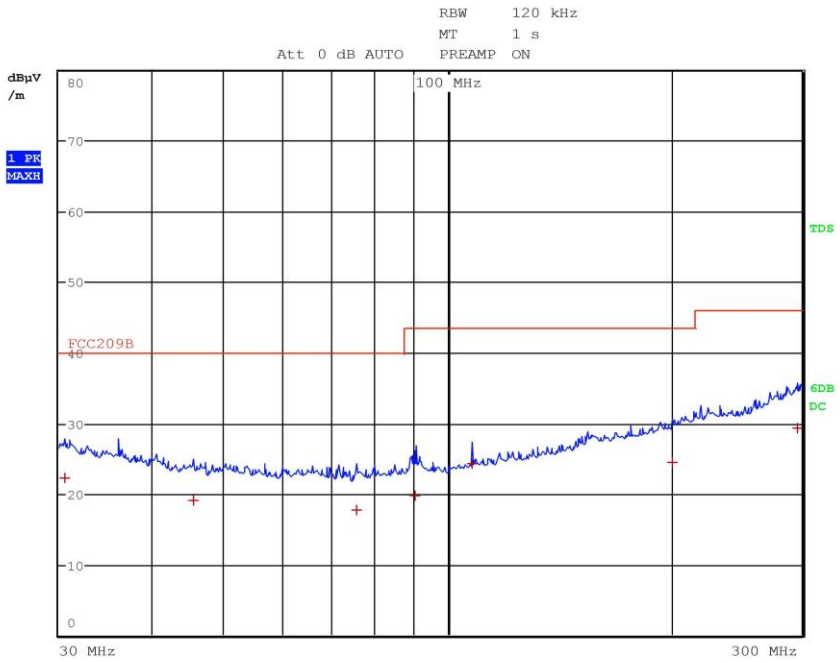
Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	510.000000000 kHz	8.20	Quasi Peak	-25.25
1	1.070000000 MHz	6.55	Quasi Peak	-20.47
1	1.674000000 MHz	6.48	Quasi Peak	-16.65
1	4.266000000 MHz	6.36	Quasi Peak	-23.18
1	6.778000000 MHz	7.22	Quasi Peak	-22.32
1	11.718000000 MHz	8.31	Quasi Peak	-21.23
1	25.618000000 MHz	6.74	Quasi Peak	-22.80

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	Tx - Fmin
Operator	Gandini 17212002
Test Spec	

Vert



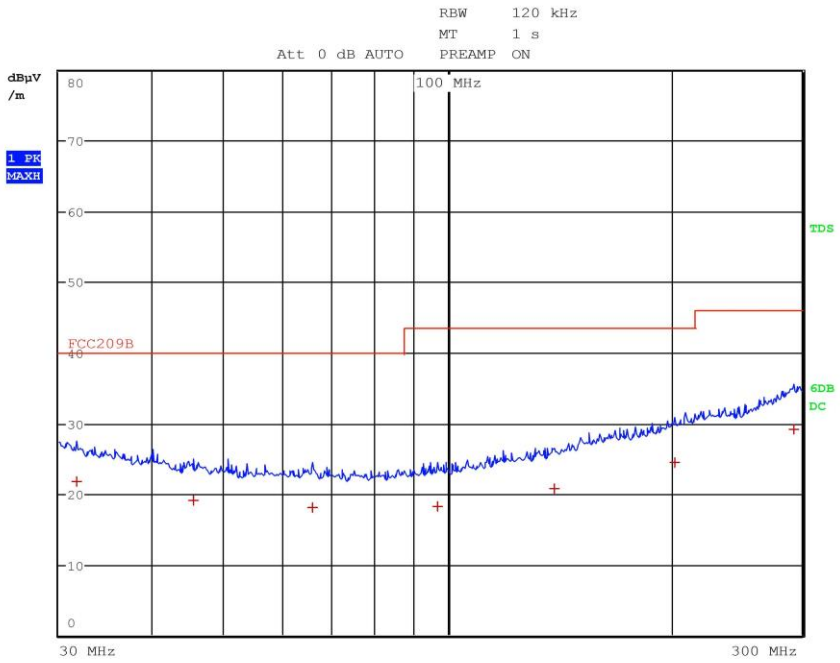
Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	30.520000000 MHz	22.19	Quasi Peak	-17.81
1	45.480000000 MHz	19.13	Quasi Peak	-20.87
1	75.400000000 MHz	17.67	Quasi Peak	-22.33
1	90.440000000 MHz	19.79	Quasi Peak	-23.73
1	108.000000000 MHz	24.35	Quasi Peak	-19.17
1	200.800000000 MHz	24.42	Quasi Peak	-19.10
1	295.560000000 MHz	29.36	Quasi Peak	-16.66

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	Tx - Fmin
Operator	Gandini 17212003
Test Spec	

Horiz



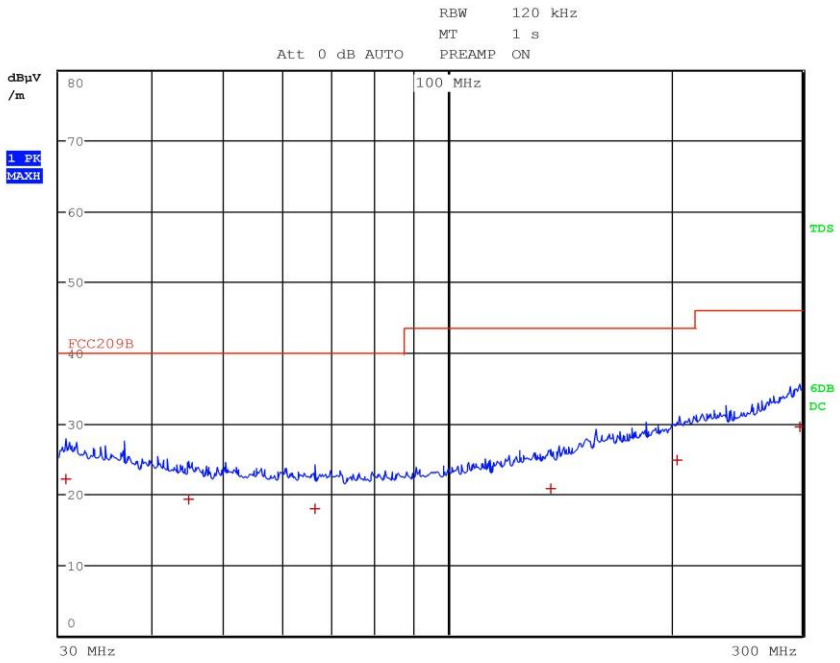
Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	31.720000000 MHz	21.82	Quasi Peak	-18.18
1	45.480000000 MHz	19.11	Quasi Peak	-20.89
1	65.880000000 MHz	18.03	Quasi Peak	-21.97
1	96.880000000 MHz	18.31	Quasi Peak	-25.21
1	139.200000000 MHz	20.75	Quasi Peak	-22.77
1	202.440000000 MHz	24.52	Quasi Peak	-19.00
1	291.960000000 MHz	29.24	Quasi Peak	-16.78

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	Tx - Fmax
Operator	Gandini 17212004
Test Spec	

Horiz



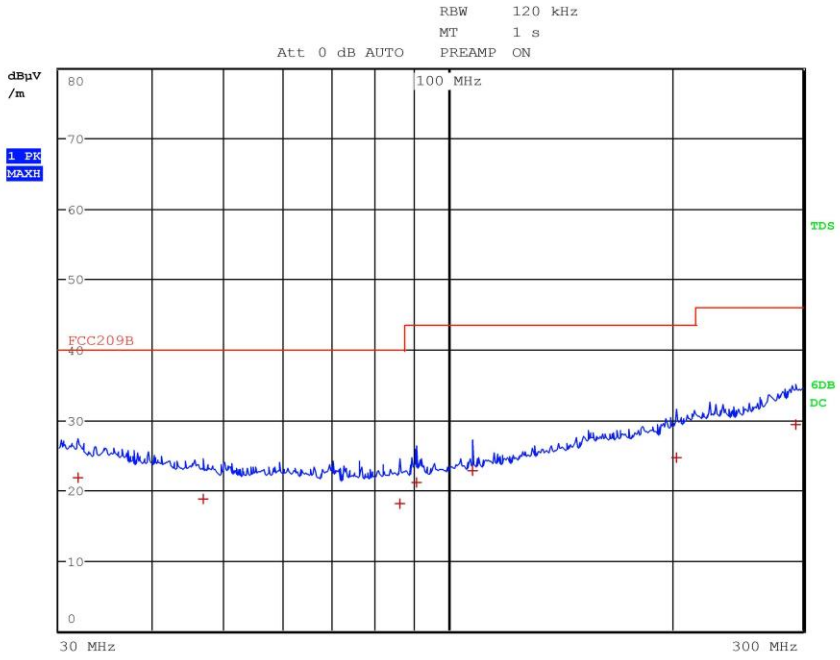
Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	30.640000000 MHz	22.15	Quasi Peak	-17.85
1	44.760000000 MHz	19.22	Quasi Peak	-20.78
1	66.280000000 MHz	17.96	Quasi Peak	-22.04
1	137.480000000 MHz	20.71	Quasi Peak	-22.81
1	203.880000000 MHz	24.79	Quasi Peak	-18.73
1	297.360000000 MHz	29.50	Quasi Peak	-16.52

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	Tx - Fmax
Operator	Gandini 17212005
Test Spec	

Vert

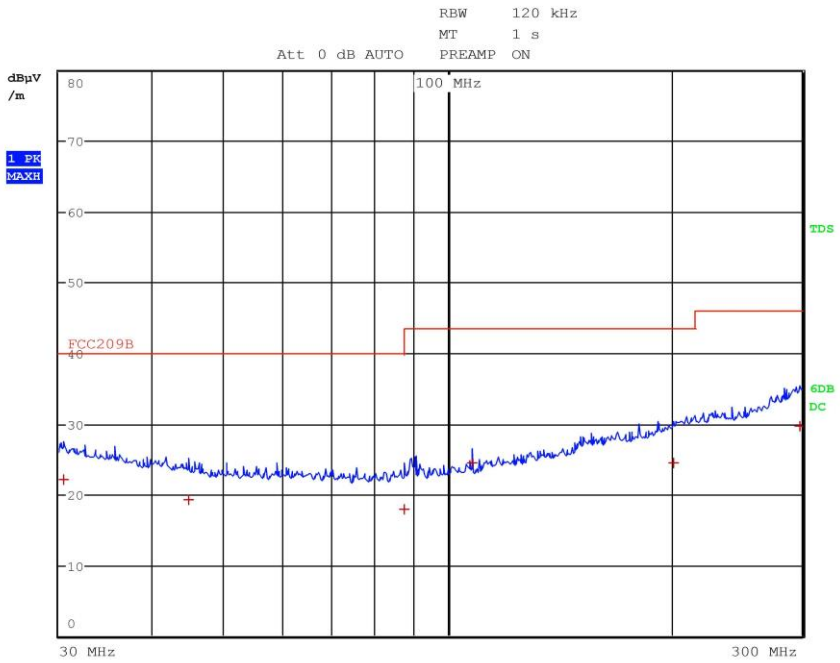


Final Measurement

Meas Time:	1 s
Margin:	20 dB
Subranges:	7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	31.760000000 MHz	21.80	Quasi Peak	-18.20
1	46.840000000 MHz	18.80	Quasi Peak	-21.20
1	86.000000000 MHz	18.02	Quasi Peak	-21.98
1	90.600000000 MHz	21.03	Quasi Peak	-22.49
1	107.960000000 MHz	22.70	Quasi Peak	-20.82
1	202.640000000 MHz	24.62	Quasi Peak	-18.90
1	293.240000000 MHz	29.37	Quasi Peak	-16.65

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmid
Operator Gandini 17212006
Test Spec
Vert

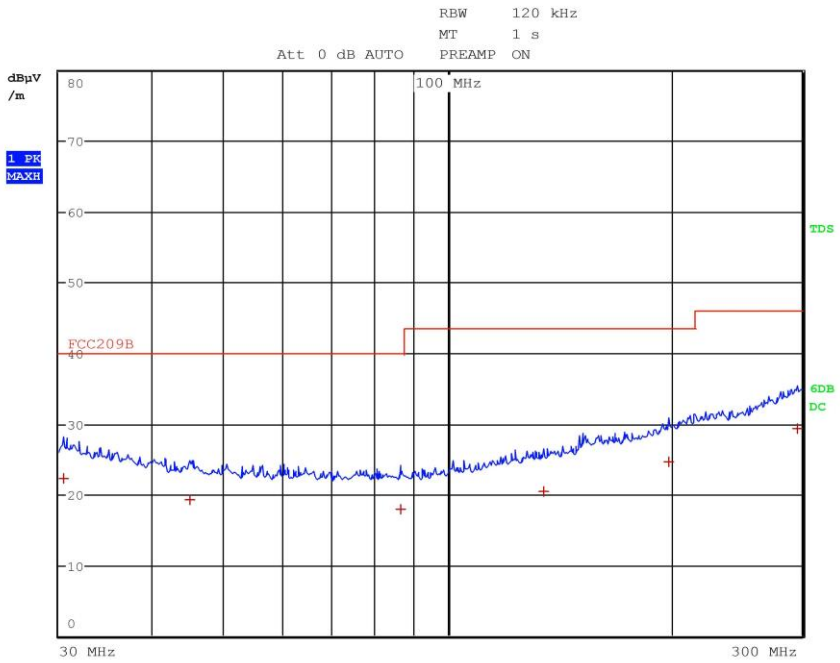


Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	30.400000000 MHz	22.18	Quasi Peak	-17.82
1	44.800000000 MHz	19.18	Quasi Peak	-20.82
1	87.560000000 MHz	17.88	Quasi Peak	-22.12
1	108.000000000 MHz	24.38	Quasi Peak	-19.14
1	201.320000000 MHz	24.47	Quasi Peak	-19.05
1	297.560000000 MHz	29.61	Quasi Peak	-16.41

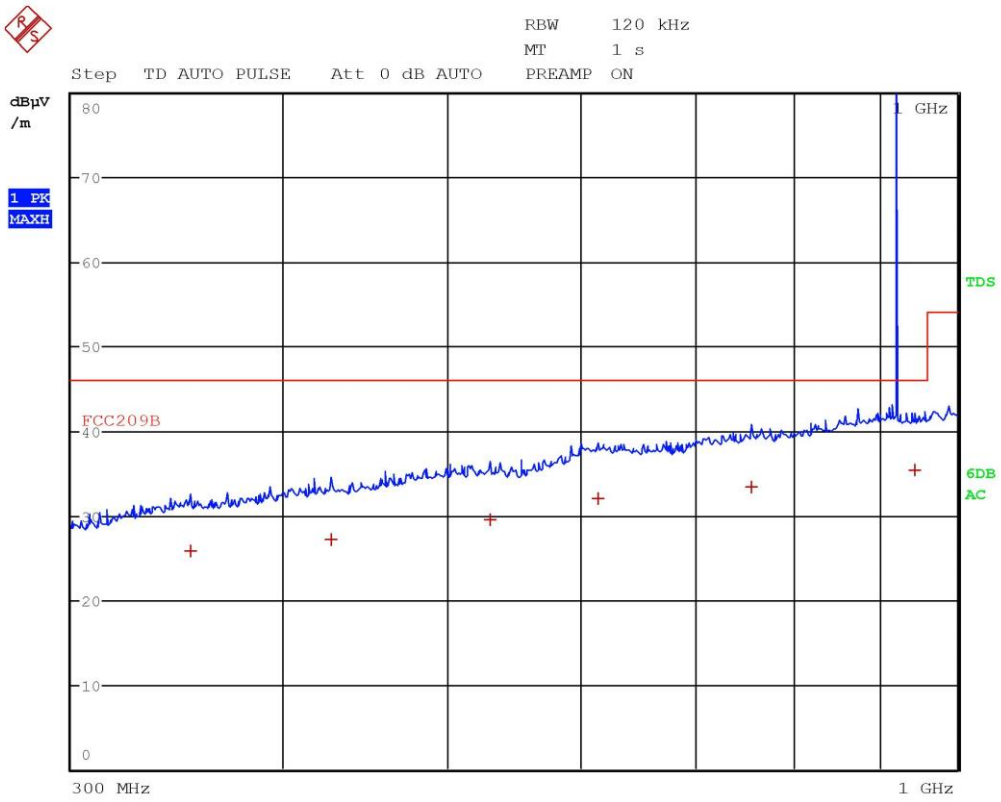
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmid
Operator Gandini 17212007
Test Spec
Horiz



Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	30.440000000 MHz	22.23	Quasi Peak	-17.77
1	44.960000000 MHz	19.19	Quasi Peak	-20.81
1	86.400000000 MHz	17.93	Quasi Peak	-22.07
1	134.440000000 MHz	20.45	Quasi Peak	-23.07
1	198.120000000 MHz	24.57	Quasi Peak	-18.95
1	295.960000000 MHz	29.41	Quasi Peak	-16.61



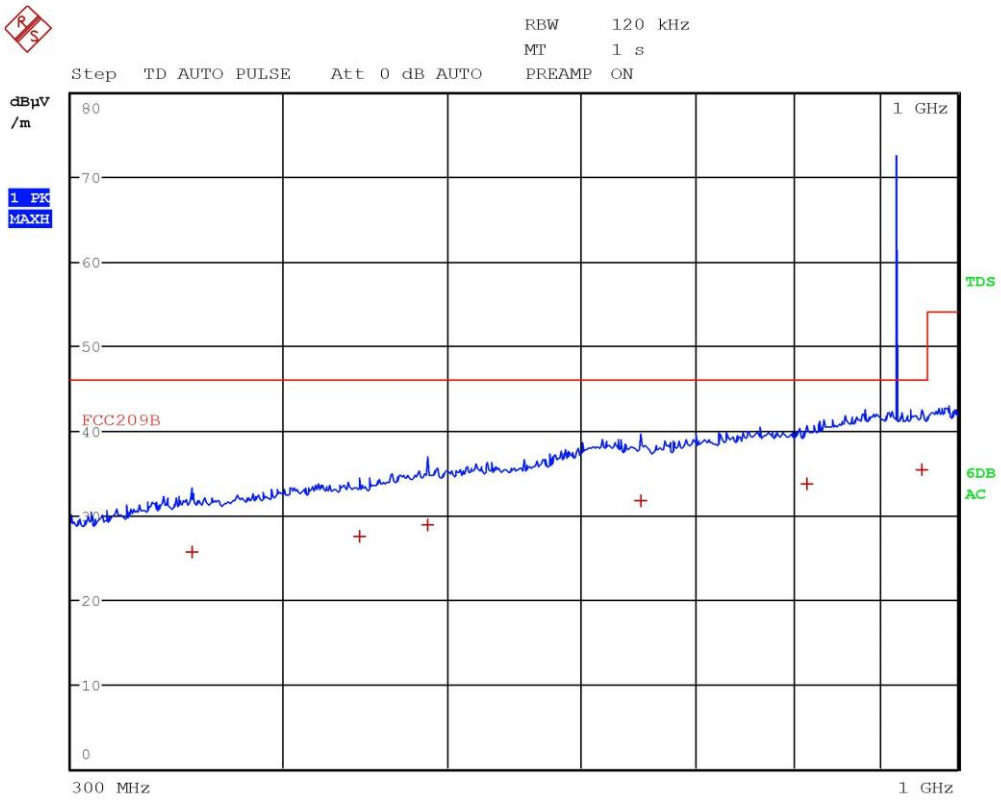
Gandini 17212008-Horiz-Tx Fmid

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	352.8 MHz	25.74	-20.28
1 Quasi Peak	427.35 MHz	27.19	-18.83
1 Quasi Peak	529.65 MHz	29.47	-16.54
1 Quasi Peak	613.23 MHz	31.98	-14.03
1 Quasi Peak	755.73 MHz	33.38	-12.63
1 Quasi Peak	943.83 MHz	35.32	-10.69

Gandini 17212008-Horiz-Tx Fmid



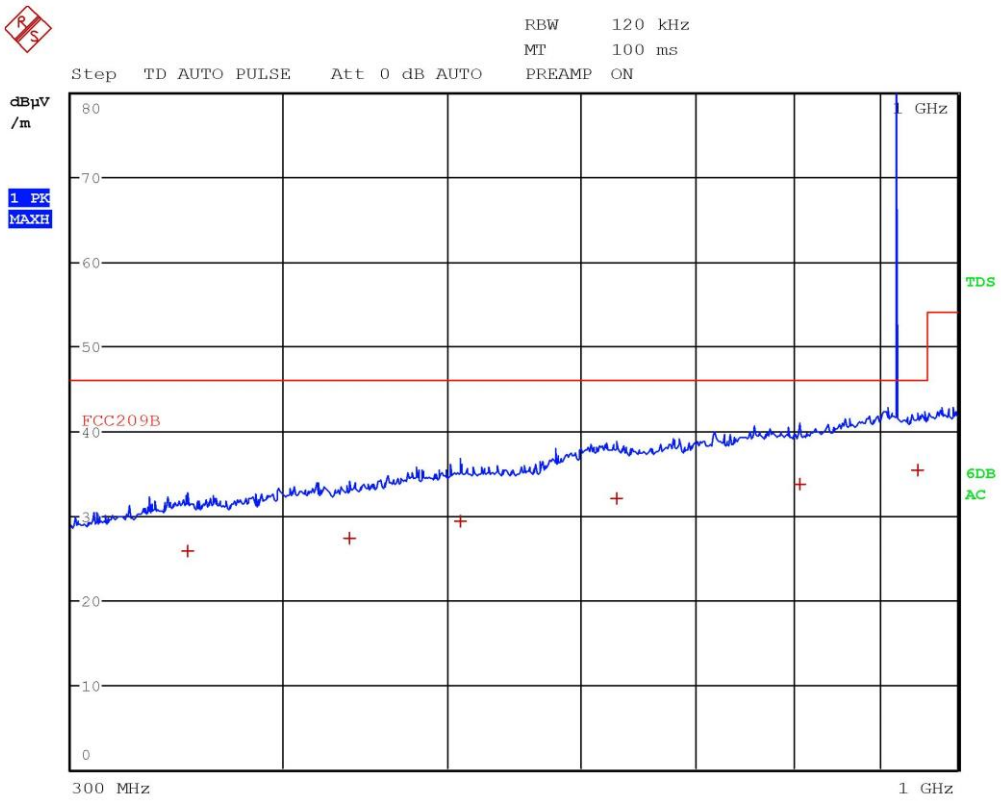
Gandini 17212009-Vert-Tx Fmid

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	353.76 MHz	25.68	-20.33
1 Quasi Peak	443.85 MHz	27.45	-18.56
1 Quasi Peak	486.78 MHz	28.84	-17.17
1 Quasi Peak	650.55 MHz	31.64	-14.37
1 Quasi Peak	815.25 MHz	33.75	-12.26
1 Quasi Peak	953.25 MHz	35.45	-10.56

Gandini 17212009-Vert-Tx Fmid



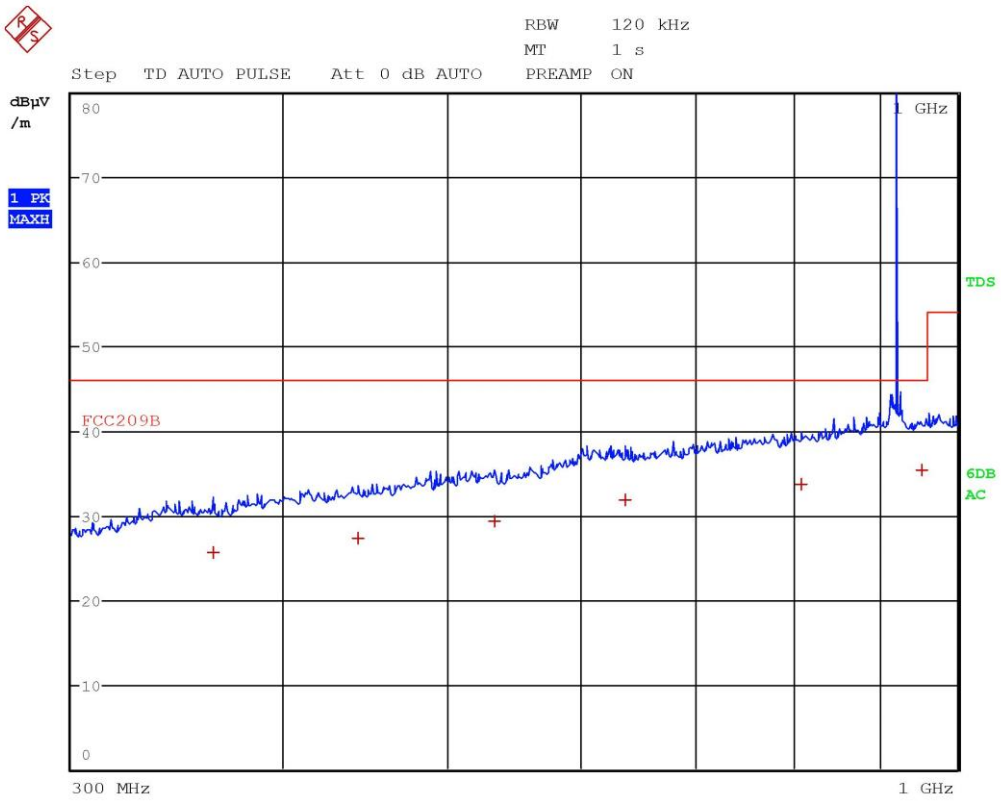
Gandini 17212010-Vert-Tx Fmin

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	351.18 MHz	25.78	-20.23
1 Quasi Peak	437.73 MHz	27.27	-18.74
1 Quasi Peak	509.46 MHz	29.29	-16.72
1 Quasi Peak	629.79 MHz	32.00	-14.01
1 Quasi Peak	806.64 MHz	33.71	-12.30
1 Quasi Peak	947.1 MHz	35.34	-10.67

Gandini 17212010-Vert-Tx Fmin



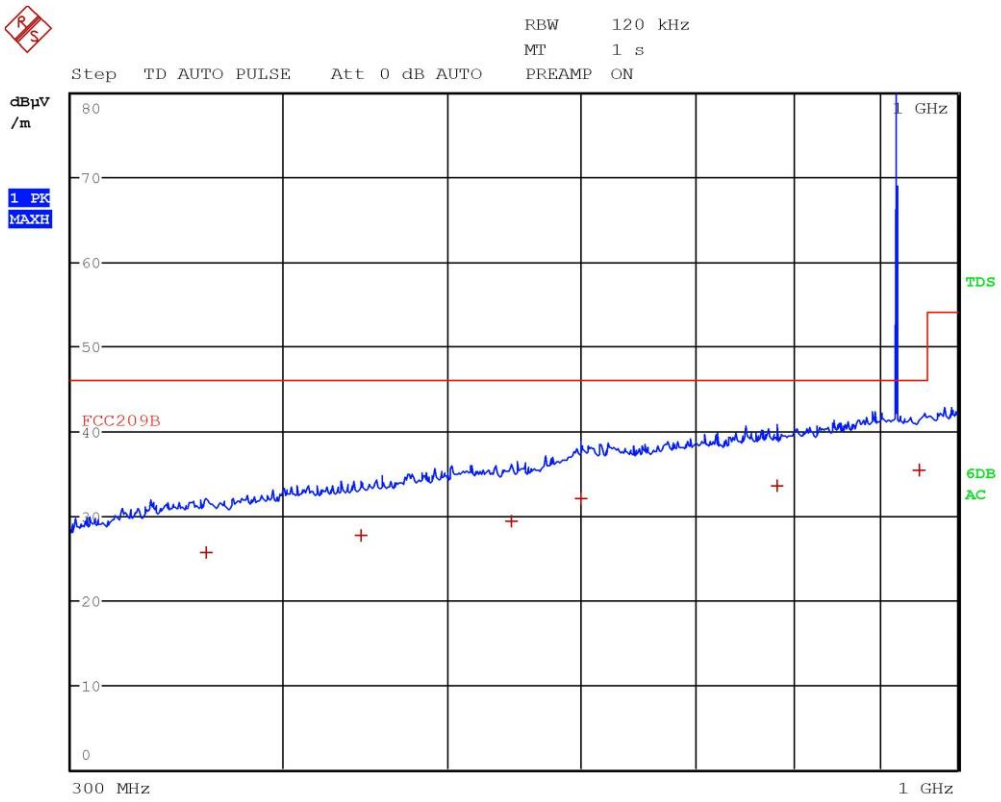
Gandini 17212011-Horiz-Tx Fmin

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	363.78 MHz	25.64	-20.37
1 Quasi Peak	443.16 MHz	27.39	-18.62
1 Quasi Peak	533.19 MHz	29.40	-16.61
1 Quasi Peak	637.02 MHz	31.88	-14.14
1 Quasi Peak	808.95 MHz	33.72	-12.30
1 Quasi Peak	952.23 MHz	35.42	-10.59

Gandini 17212011-Horiz-Tx Fmin



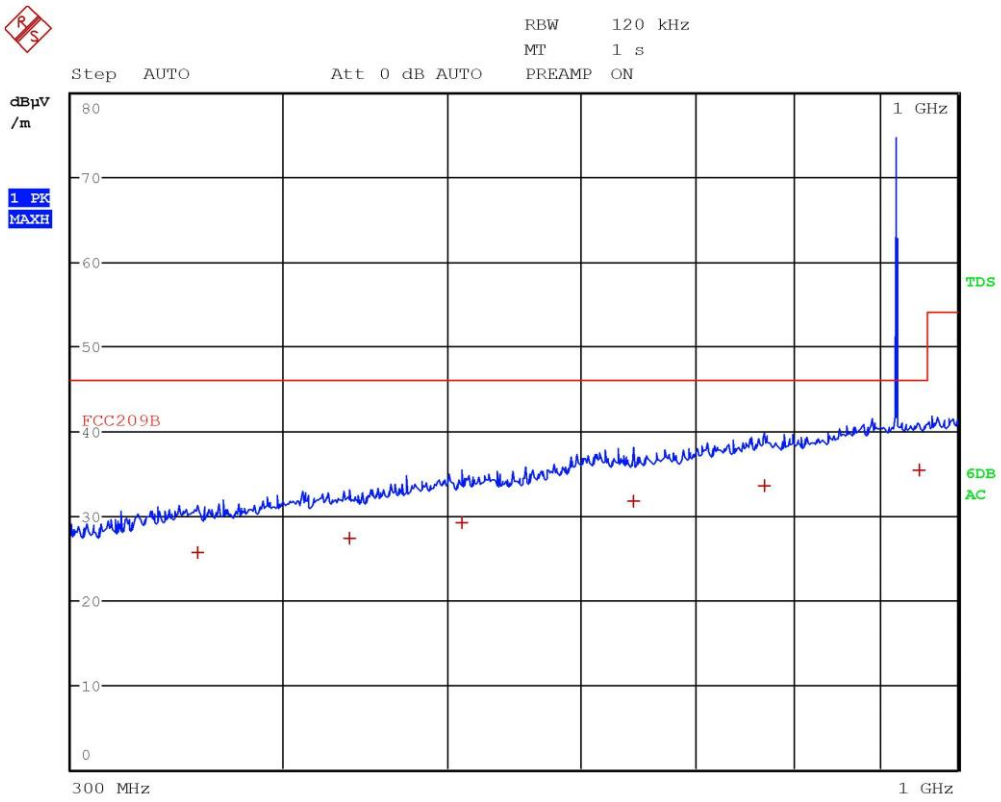
Gandini 17212012-Horiz-Tx Fmax

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	360.57 MHz	25.64	-20.37
1 Quasi Peak	445.02 MHz	27.57	-18.44
1 Quasi Peak	545.07 MHz	29.31	-16.70
1 Quasi Peak	600.24 MHz	31.98	-14.03
1 Quasi Peak	783.15 MHz	33.57	-12.44
1 Quasi Peak	948.99 MHz	35.31	-10.70

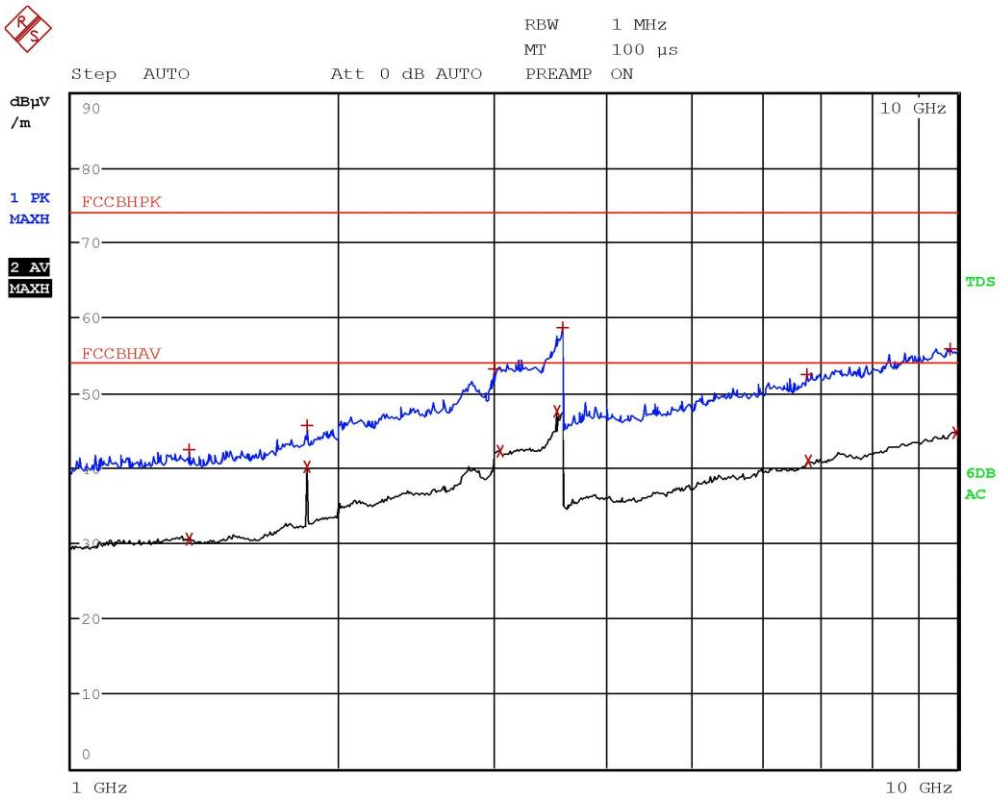
Gandini 17212012-Horiz-Tx Fmax



Gandini 17212013-Vert-Tx Fmax

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	356.44 MHz	25.69	-20.32
1 Quasi Peak	437.48 MHz	27.27	-18.74
1 Quasi Peak	510.16 MHz	29.20	-16.81
1 Quasi Peak	644.6 MHz	31.69	-14.33
1 Quasi Peak	768.6 MHz	33.52	-12.49
1 Quasi Peak	948.96 MHz	35.36	-10.65

Gandini 17212013-Vert-Tx Fmax



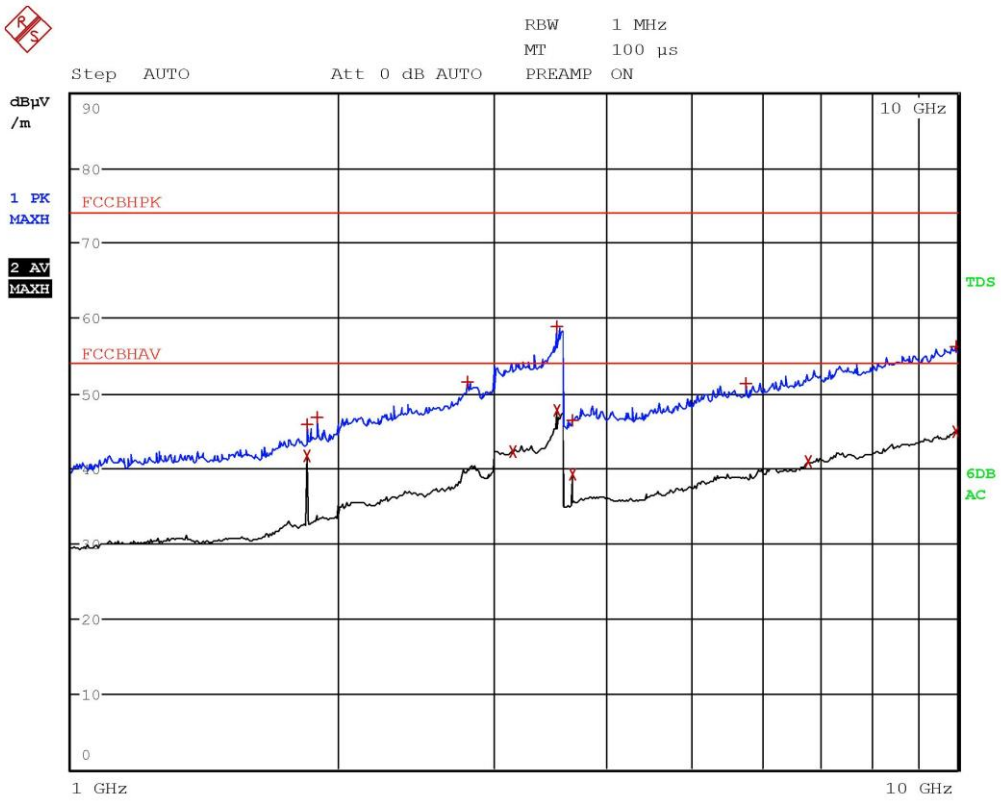
Gandini 17212014-Vert-Tx Fmax

EDIT PEAK LIST (Prescan Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.3564 GHz	30.55	-23.42
1 Max Peak	1.3576 GHz	42.47	-31.50
2 Average	1.8424 GHz	40.19	-13.78
1 Max Peak	1.8424 GHz	45.69	-28.28
1 Max Peak	3.0056 GHz	53.28	-20.69
2 Average	3.0524 GHz	42.30	-11.67
2 Average	3.5256 GHz	47.60	-6.37
1 Max Peak	3.5956 GHz	58.78	-15.19
1 Max Peak	6.7712 GHz	52.49	-21.48
2 Average	6.79 GHz	40.96	-13.01
1 Max Peak	9.8124 GHz	55.82	-18.15
2 Average	9.956 GHz	44.72	-9.25

Gandini 17212014-Vert-Tx Fmax



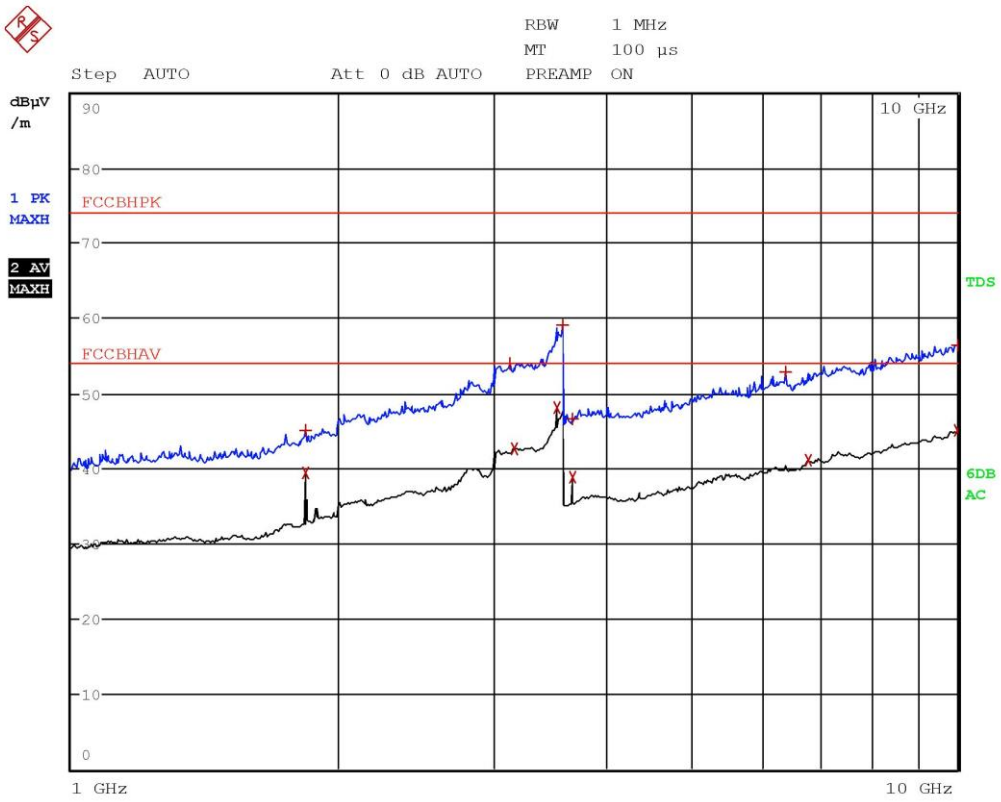
Gandini 17212015-Horiz-Tx Fmax

EDIT PEAK LIST (Prescan Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.8424 GHz	41.75	-12.23
1 Max Peak	1.8424 GHz	45.76	-28.21
1 Max Peak	1.8916 GHz	46.76	-27.21
1 Max Peak	2.7996 GHz	51.46	-22.51
2 Average	3.158 GHz	42.25	-11.72
1 Max Peak	3.5256 GHz	58.85	-15.12
2 Average	3.5256 GHz	47.80	-6.17
1 Max Peak	3.6724 GHz	46.46	-27.51
2 Average	3.6848 GHz	39.27	-14.71
1 Max Peak	5.7704 GHz	51.24	-22.73
2 Average	6.7872 GHz	40.98	-12.99
2 Average	9.9632 GHz	44.90	-9.07
1 Max Peak	9.9696 GHz	56.18	-17.80

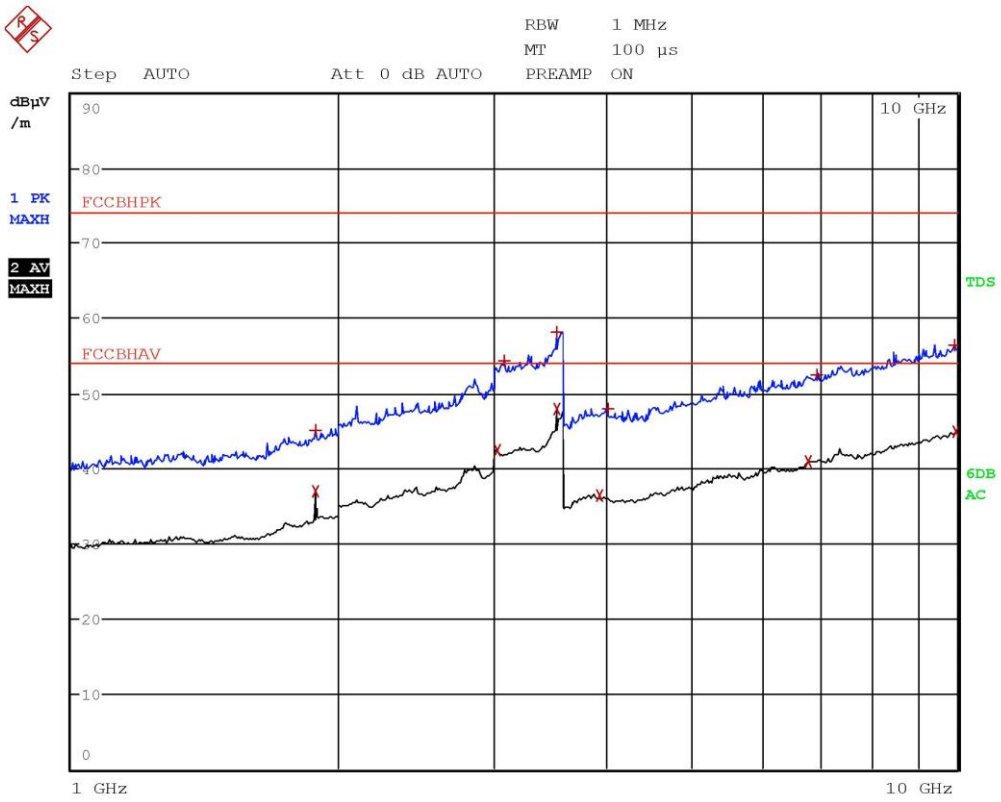
Gandini 17212015-Horiz-Tx Fmax



Gandini 17212016-Horiz-Tx Fmid

EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.8412 GHz	39.33	-14.64
1 Max Peak	1.8412 GHz	45.13	-28.85
1 Max Peak	3.1236 GHz	53.92	-20.05
2 Average	3.1564 GHz	42.69	-11.28
2 Average	3.5256 GHz	48.12	-5.85
1 Max Peak	3.584 GHz	59.01	-14.97
2 Average	3.6812 GHz	38.93	-15.04
1 Max Peak	3.6832 GHz	46.66	-27.31
1 Max Peak	6.3968 GHz	52.93	-21.04
2 Average	6.792 GHz	41.17	-12.80
1 Max Peak	9.9876 GHz	56.40	-17.57
2 Average	9.988 GHz	45.00	-8.97

Gandini 17212016-Horiz-Tx Fmid



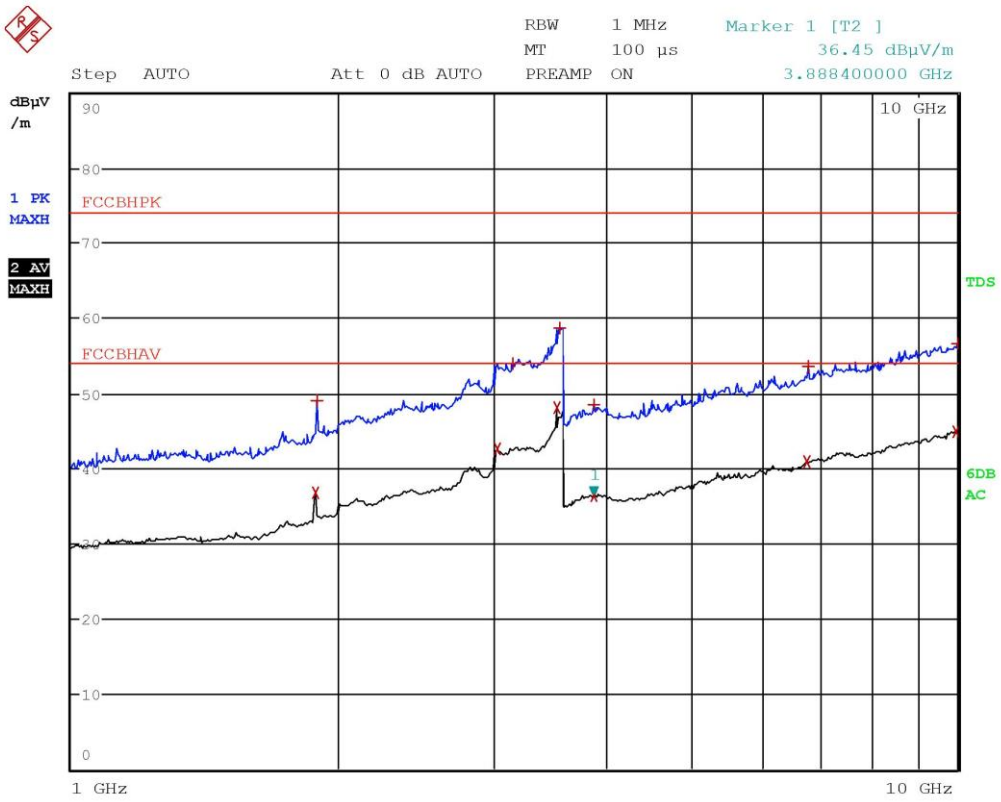
Gandini 17212017-Vert-Tx Fmid

EDIT PEAK LIST (Prescan Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.8832 GHz	36.87	-17.10
1 Max Peak	1.8832 GHz	45.07	-28.90
2 Average	3.0212 GHz	42.50	-11.47
1 Max Peak	3.0808 GHz	54.39	-19.58
1 Max Peak	3.5256 GHz	58.22	-15.75
2 Average	3.5256 GHz	47.88	-6.09
2 Average	3.9404 GHz	36.31	-17.66
1 Max Peak	4.0288 GHz	47.93	-26.04
2 Average	6.7868 GHz	40.88	-13.09
1 Max Peak	6.932 GHz	52.55	-21.42
1 Max Peak	9.9392 GHz	56.47	-17.50
2 Average	9.9672 GHz	44.83	-9.14

Gandini 17212017-Vert-Tx Fmid



Gandini 17212018-Vert-Tx Fmid

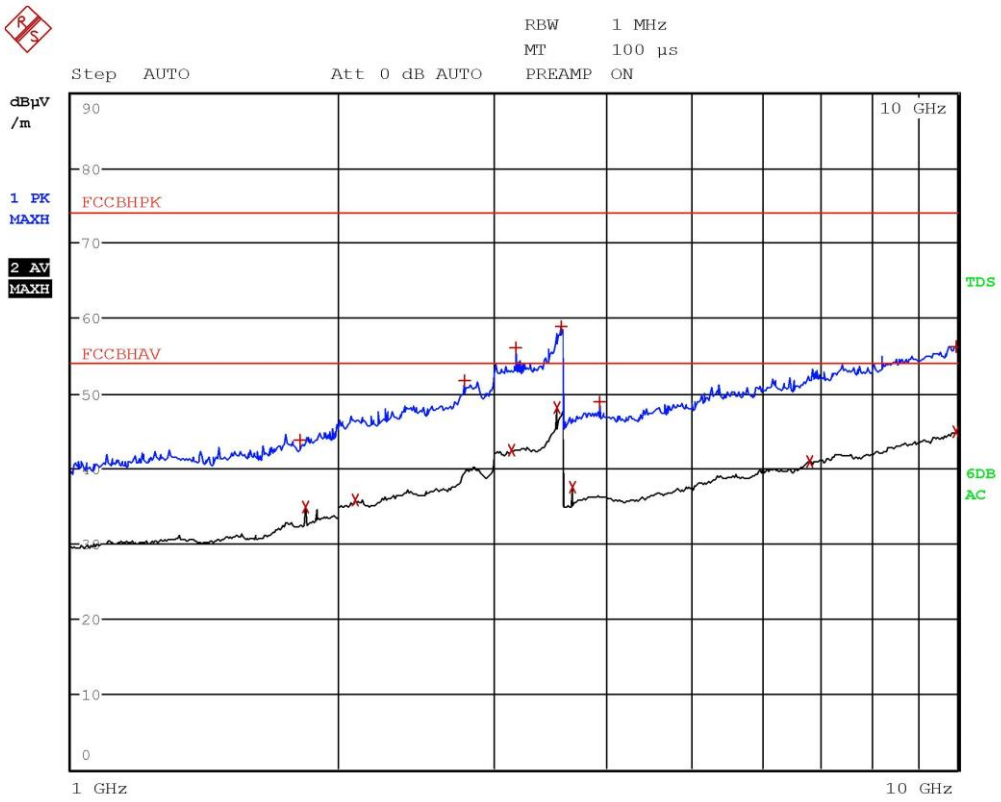
PEAK FREQUENCY
4

EDIT PEAK LIST (Prescan Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.8836 GHz	36.76	-17.21
1 Max Peak	1.8932 GHz	49.13	-24.84
2 Average	3.02 GHz	42.64	-11.33
1 Max Peak	3.1528 GHz	54.00	-19.97
2 Average	3.5256 GHz	48.14	-5.83
1 Max Peak	3.5536 GHz	58.73	-15.24
1 Max Peak	3.8832 GHz	48.43	-25.54
2 Average	3.8884 GHz	36.45	-17.53
2 Average	6.7704 GHz	40.95	-13.02
1 Max Peak	6.794 GHz	53.68	-20.29
2 Average	9.9452 GHz	44.92	-9.05
1 Max Peak	9.986 GHz	56.60	-17.38

Gandini 17212018-Vert-Tx Fmid



Gandini 17212019-Horiz-Tx Fmin

EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Max Peak	1.8088 GHz	43.69	-30.29
2 Average	1.84 GHz	34.80	-19.17
2 Average	2.0924 GHz	35.74	-18.23
1 Max Peak	2.7772 GHz	51.66	-22.31
2 Average	3.1372 GHz	42.38	-11.59
1 Max Peak	3.1684 GHz	55.99	-17.98
2 Average	3.5256 GHz	48.02	-5.95
1 Max Peak	3.5756 GHz	58.88	-15.09
2 Average	3.6788 GHz	37.49	-16.48
1 Max Peak	3.9408 GHz	48.87	-25.10
2 Average	6.8068 GHz	40.97	-13.00
1 Max Peak	9.9756 GHz	56.33	-17.64
2 Average	9.9768 GHz	44.90	-9.07

Gandini 17212019-Horiz-Tx Fmin

Result: The requirements are met

11.3 Peak Output Power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.249
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m

Environmental conditions

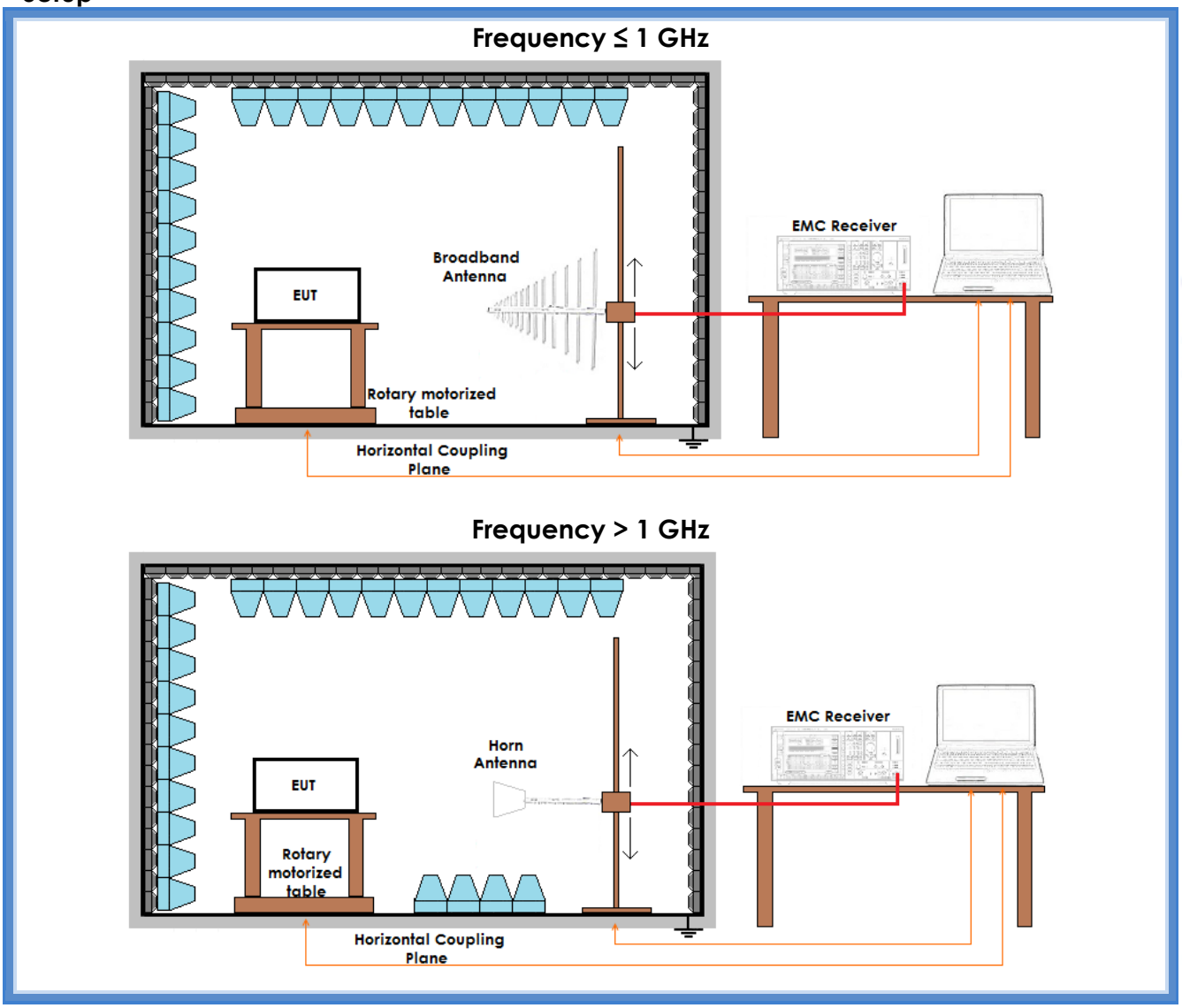
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
21	100	42

Acceptance limits

Frequency range (MHz)	*RF Power Output dB(µV/m)*
902 – 928	94

Frequency range (MHz)	*RF Power Output dB(µV/m)*
2400 – 2483,5	94

Setup



Result

Frequency (MHz)	*Polarization*	*Graphs*	*Measured QP level (dBµV/m)*	*Peak Output Power (mW)*
921,15000	Horizontal	G17212022	91,33	0,407
921,15192	Vertical	G17212023	75,30	0,010
920,60190	Vertical	G17212028	90,65	0,348
920,59615	Horizontal	G17212031	79,07	0,024
919,99879	Horizontal	G17212033	92,82	0,574
920,00288	Vertical	G17212032	81,27	0,040

Remarks

$P = (E \times d)^2 / (30 \times G)$

Where:

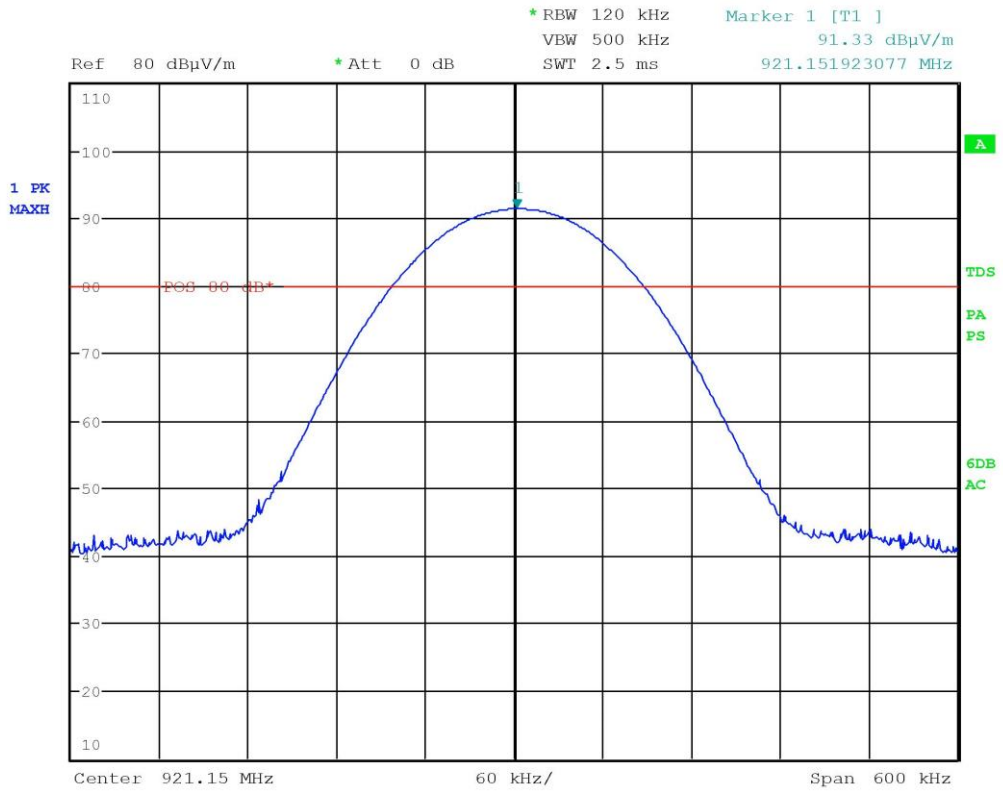
E = the measured maximum fundamental field strength in V/m

G = the numeric gain of the transmitting antenna: 1 (0 dBi)

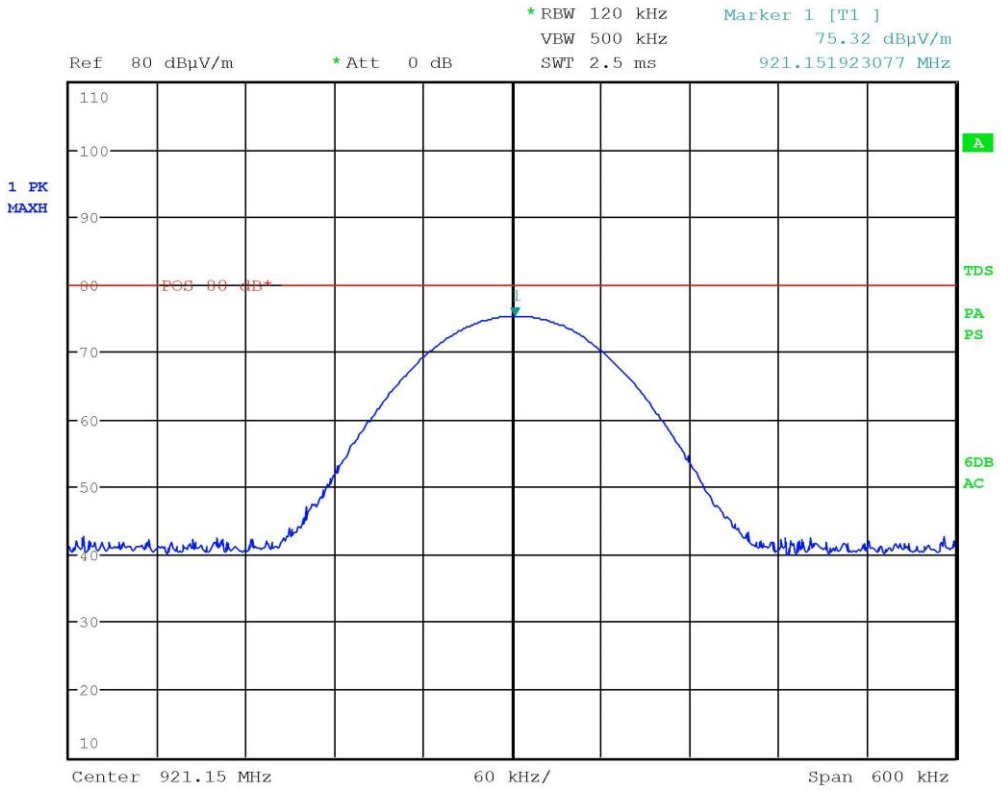
d = the distance in meters from which the field strength was measured (3 m)

P = the power in watts

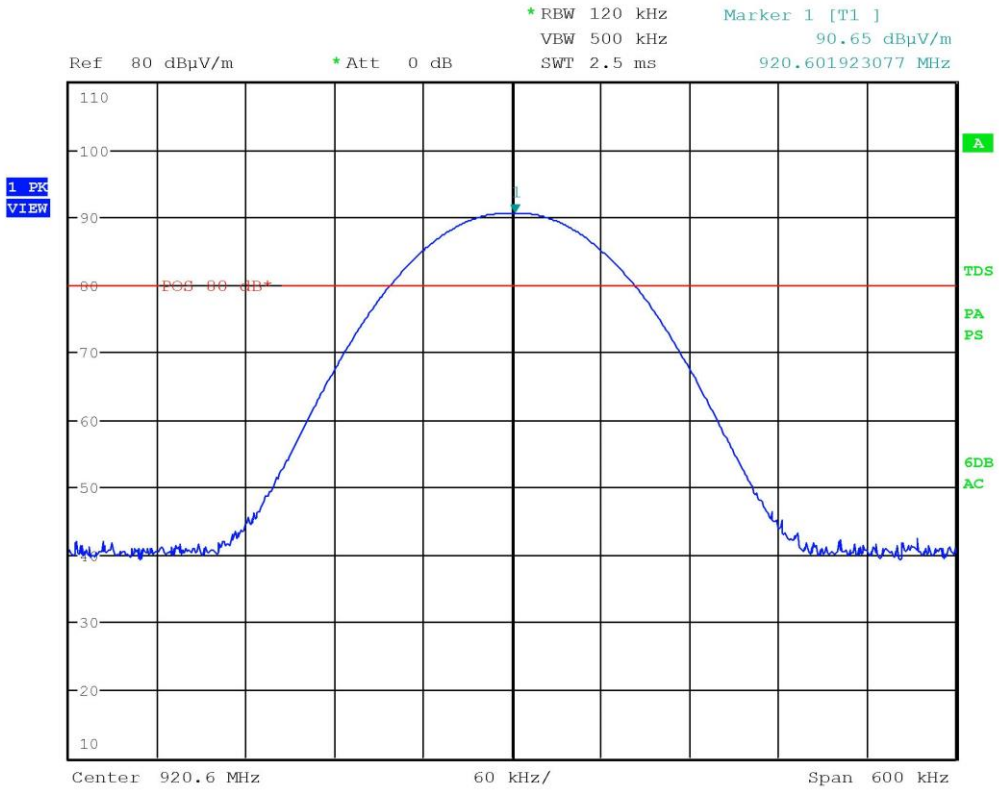
Graphs



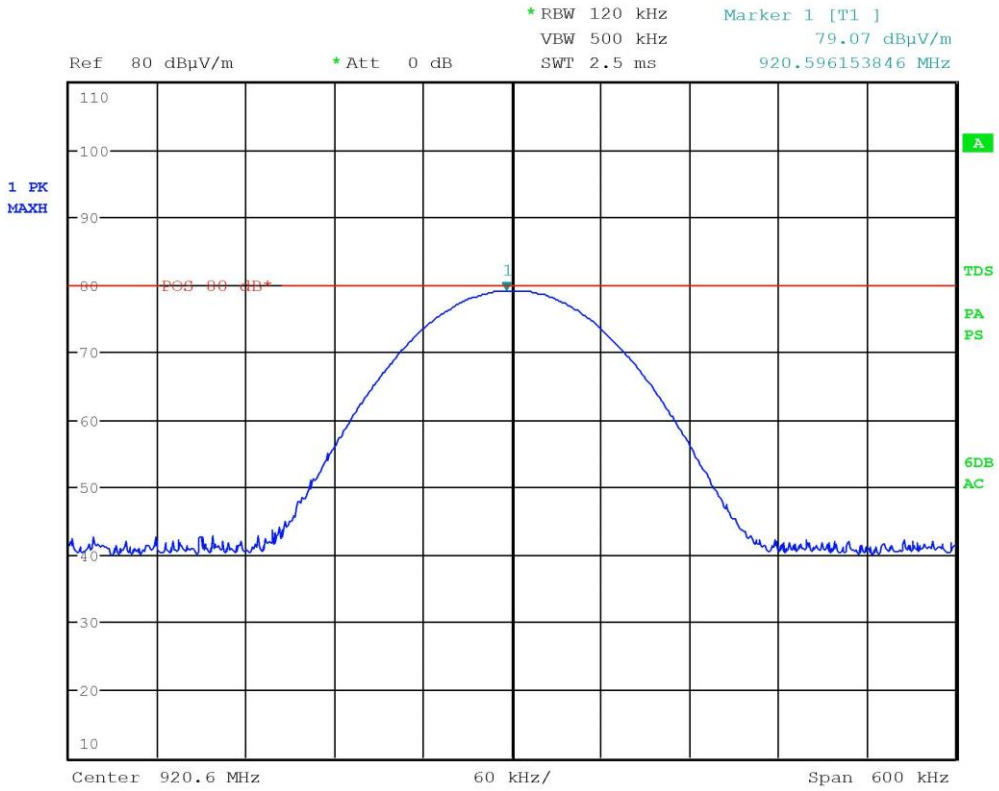
Gandini 17212022-Horiz-Tx Fmax



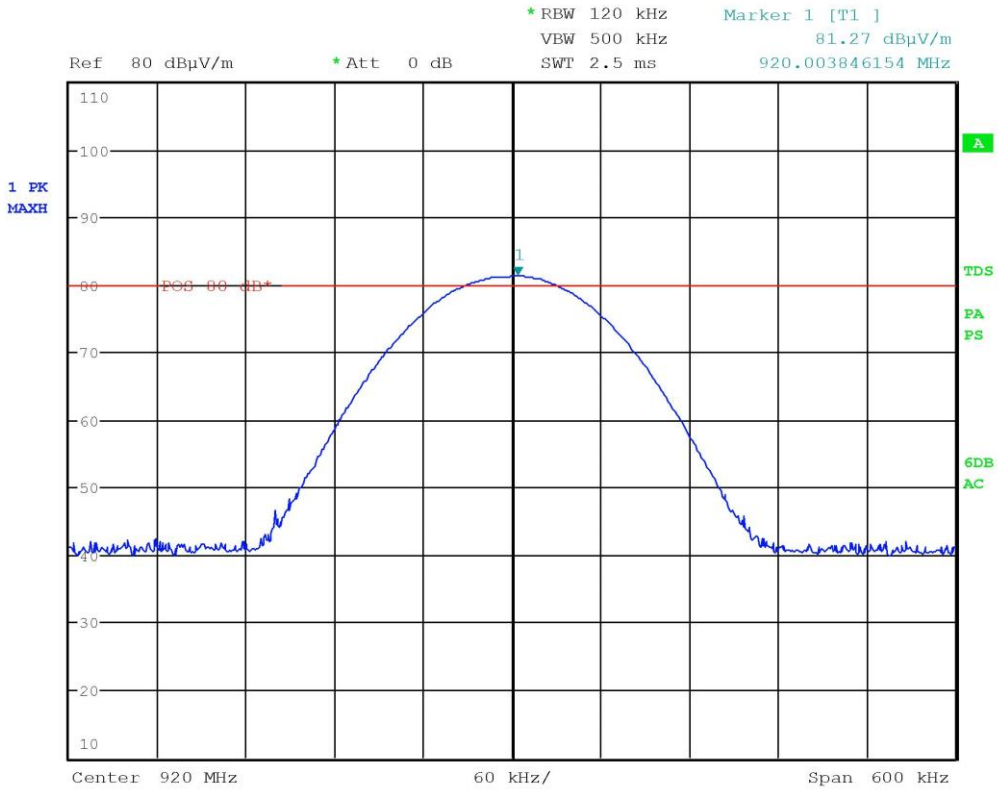
Gandini 17212023-Vert-Tx Fmax



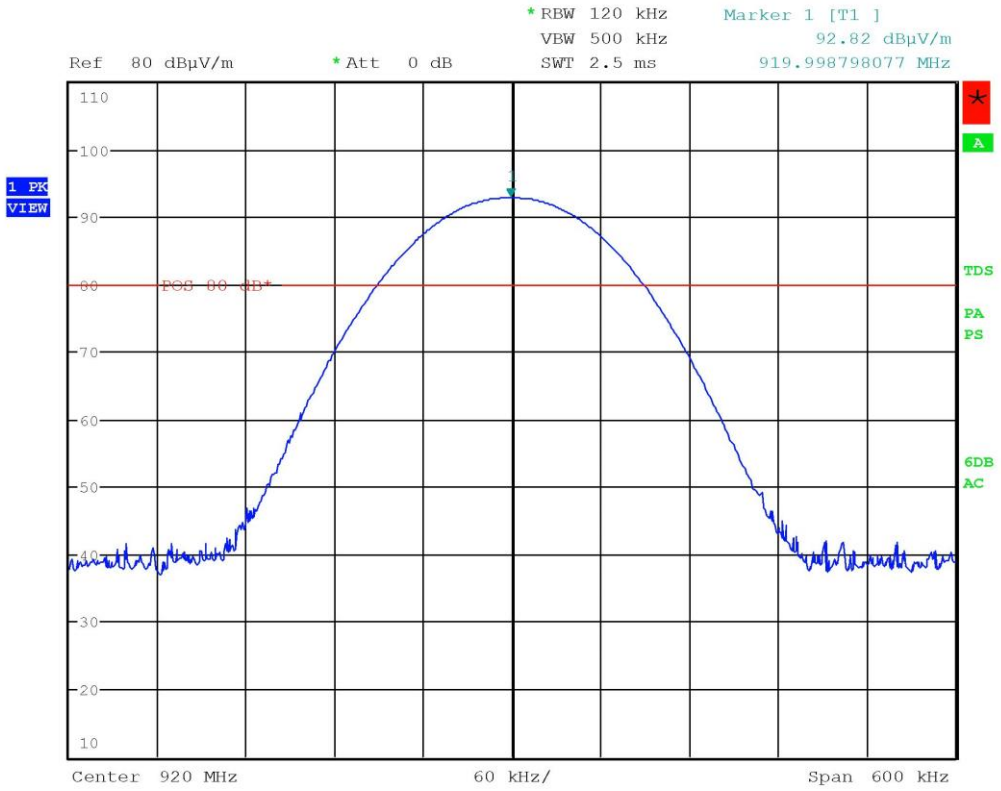
Gandini 17212028-Horiz-Fmid



Gandini 17212031-Vert-Fmid



Gandini 17212032-Vert-Fmin



Gandini 17212033-Horiz-Fmin

Result: The requirements are met

11.4 20 dB bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.215 (c)
- Internal procedure PM001
- See clause 4 of this test report

Test configuration

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

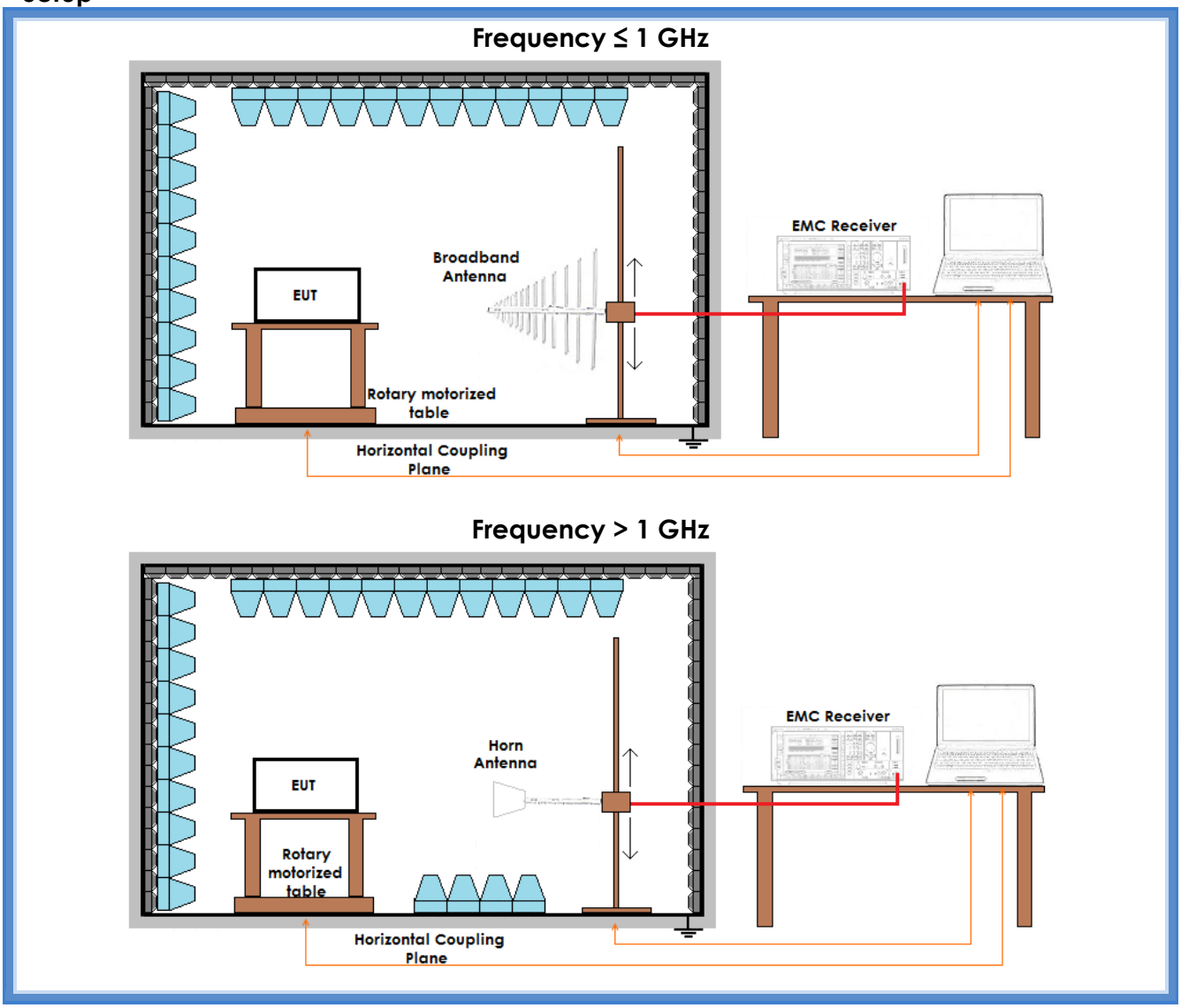
Test specification

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	45

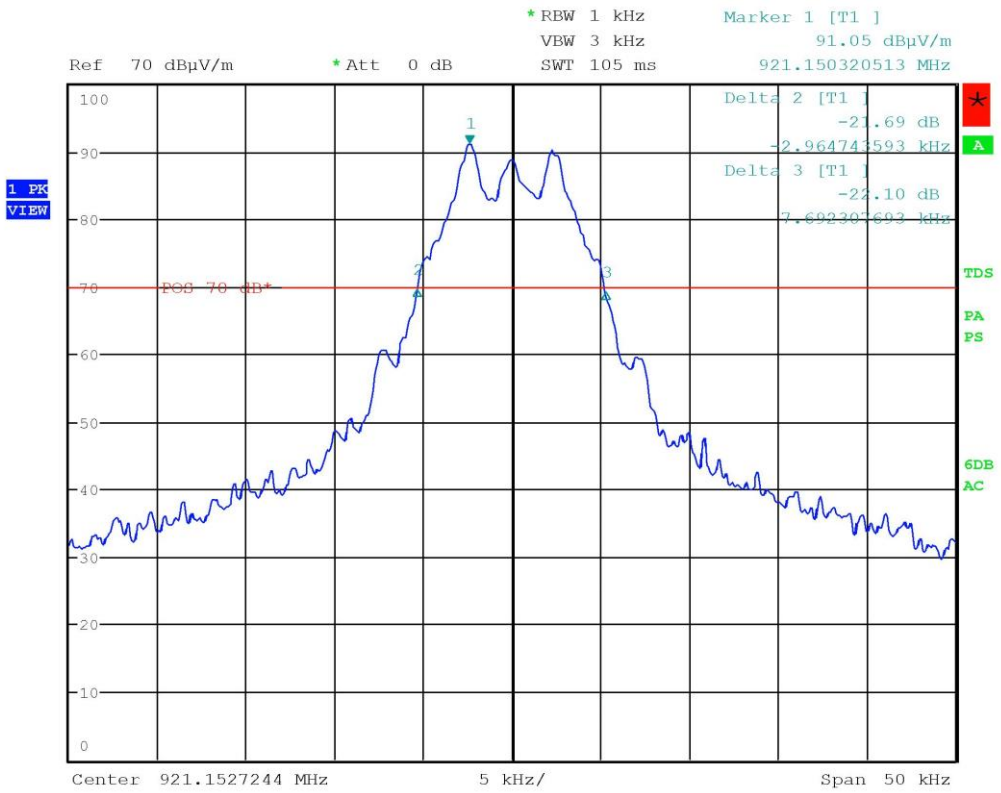
Setup



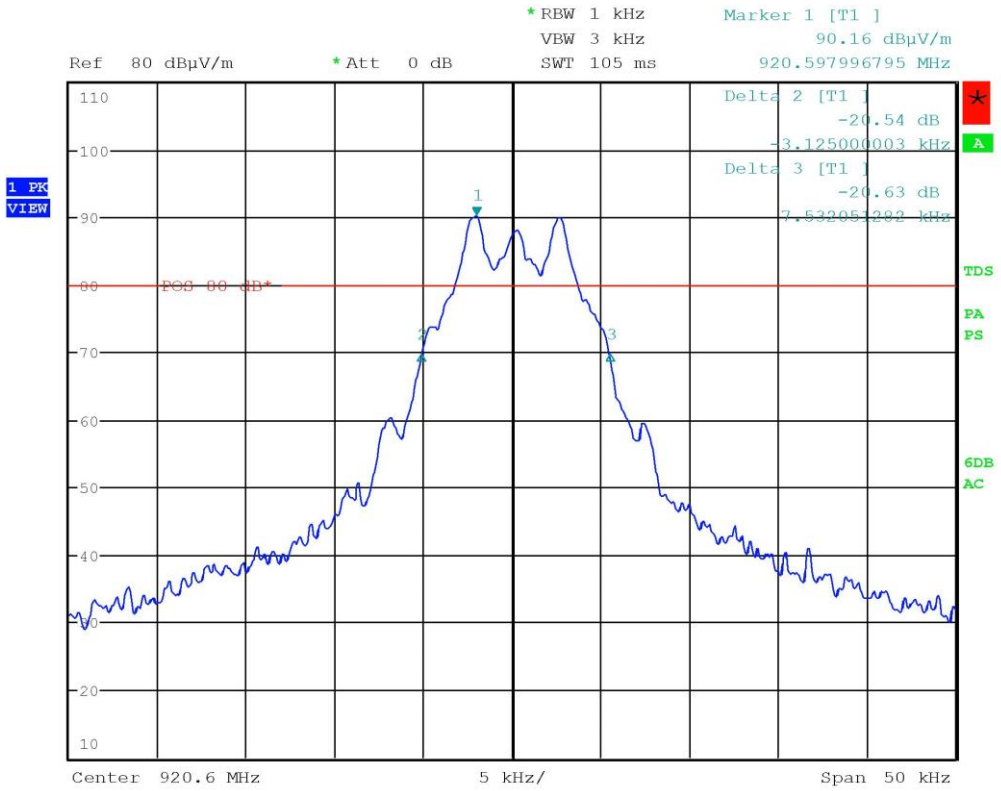
Result

Channel	*Graphs*	*20 dB bandwidth (MHz)*	*Limits (MHz)*	*Results*
Lowest	G17212035	919,994 – 920,004	902 – 928	Complies
Medium	G17212030	920,595 – 920,606	902 – 928	Complies
Highest	G17212025	921,147 – 921,158	902 – 928	Complies

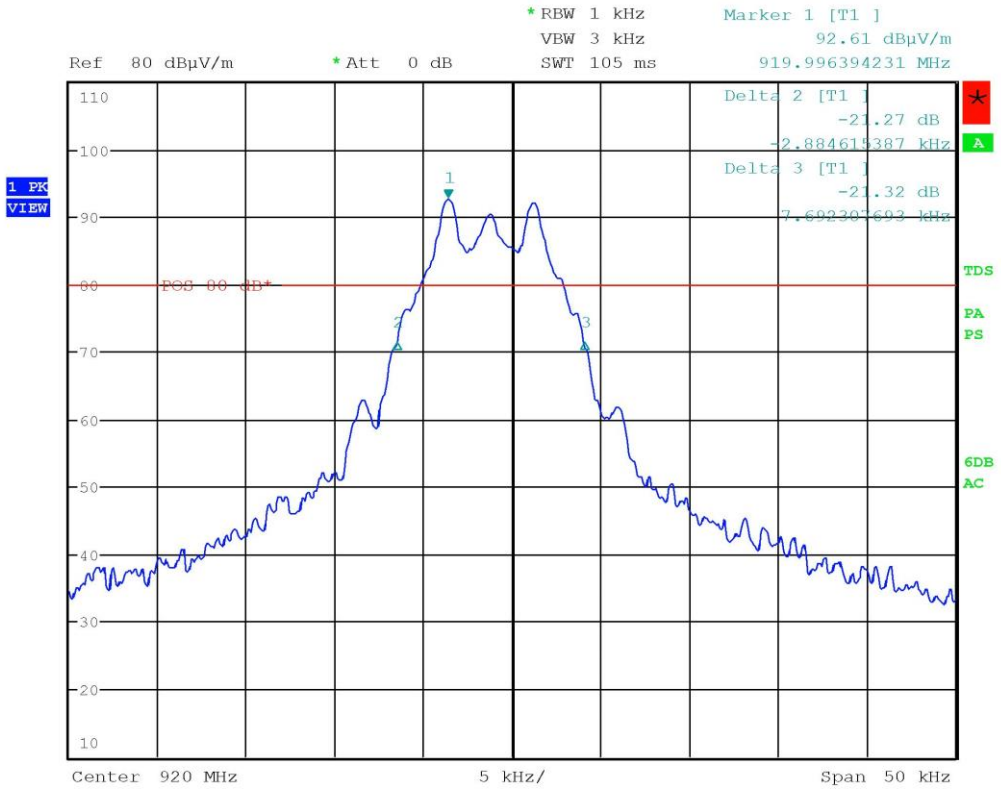
Graphs



Gandini 17212025-Horiz-Fmax



Gandini 17212030-Horiz-Fmid



Gandini 17212035-Horiz-Fmin

Result: The requirements are met

11.5 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.249 (d)
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

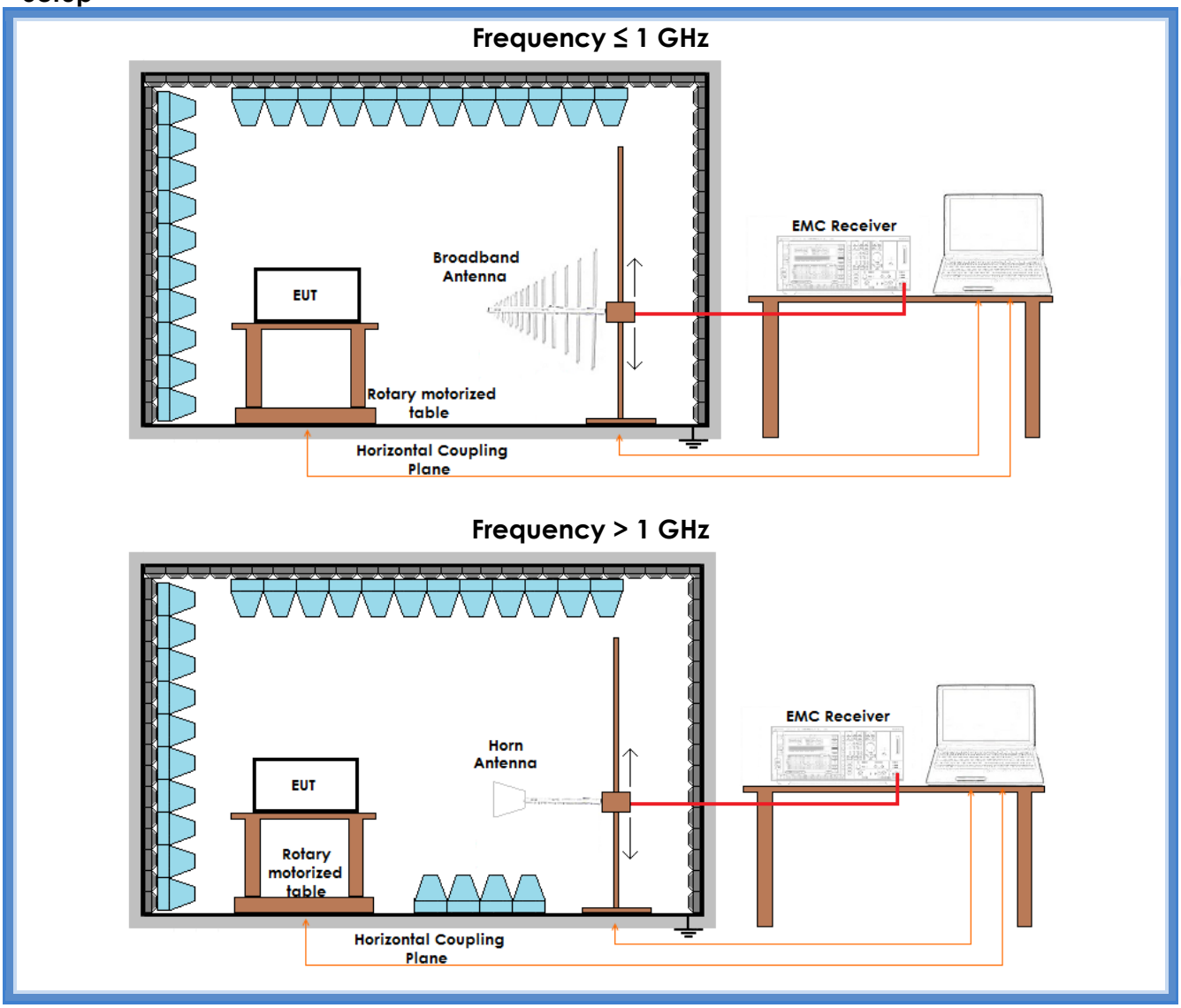
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

Acceptance limits: operation within the band 902 – 928 MHz

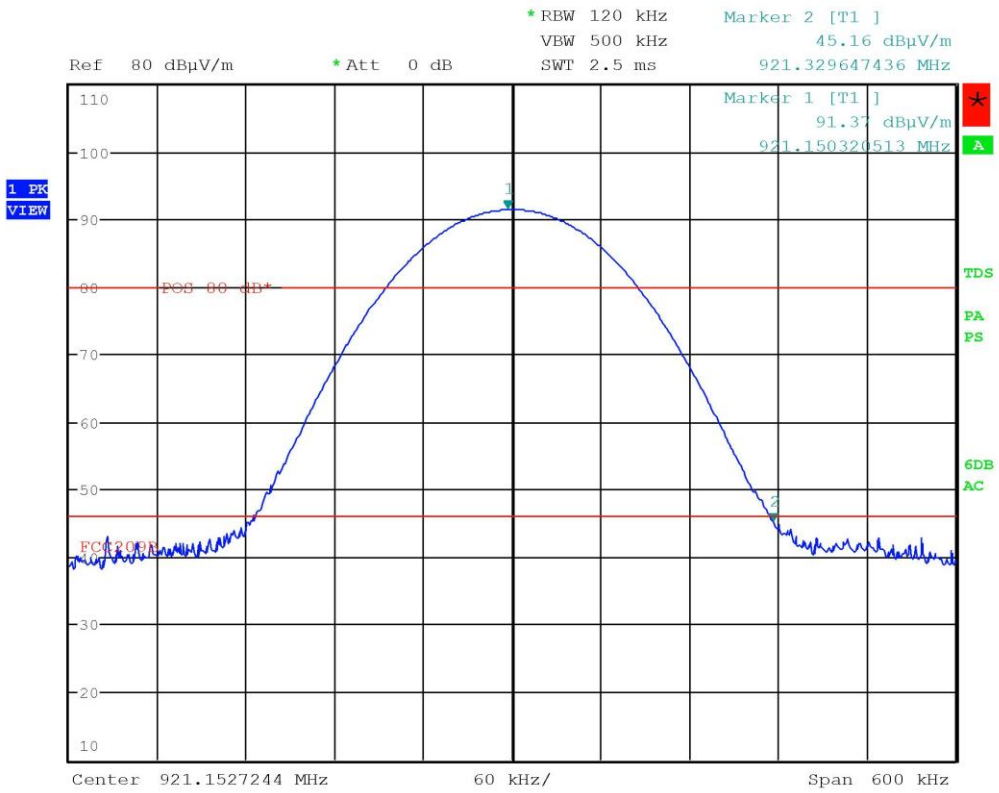
Setup



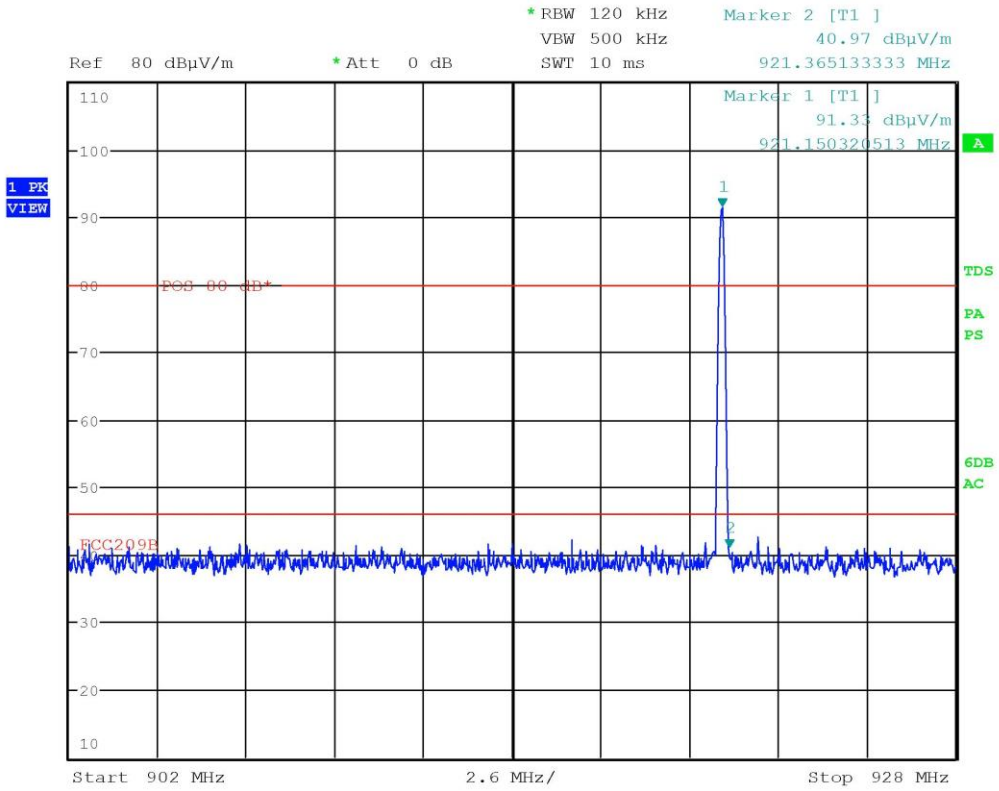
Result

Frequency (MHz)	*Graph(s)*	*Results*	
920,00	G17212036 G17212037	F_L: 919,815385 MHz	Complies
921,15	G17212026 G17212027	F_H: 921,329647 MHz	Complies

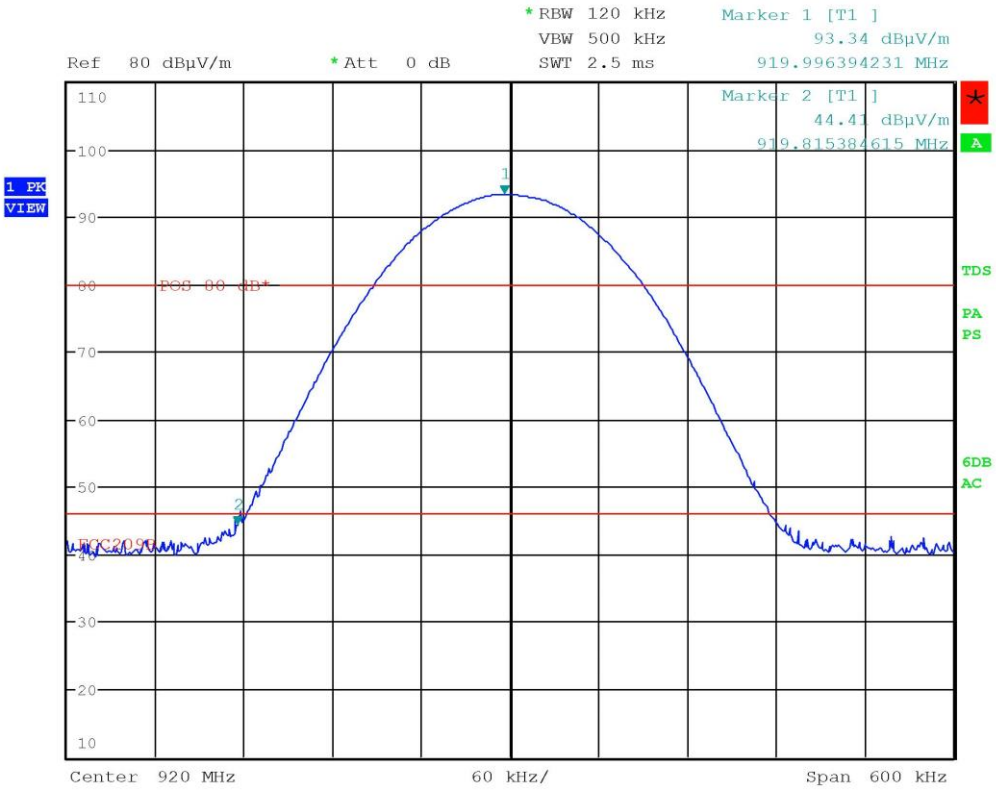
Graphs



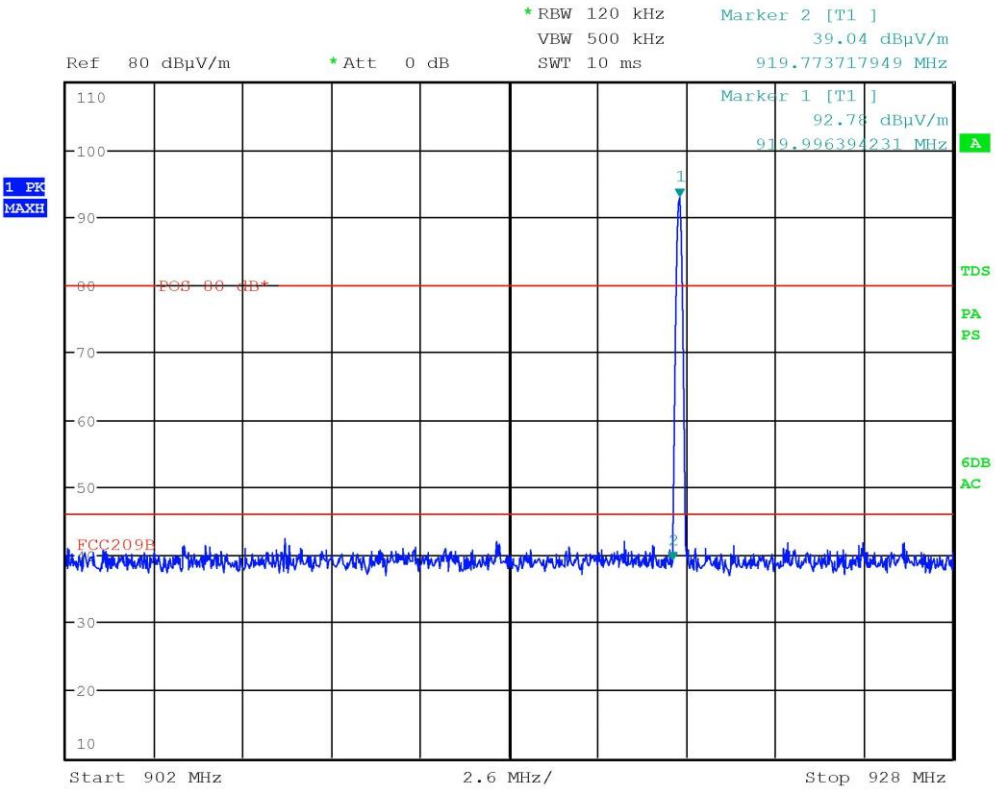
Gandini 17212026-Horiz-Fmax



Gandini 17212027-Horiz-Fmax



Gandini 17212036-Horiz-Fmin



Gandini 17212037-Horiz-Fmin

Result: The requirements are met

11.6 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Frequency range: 0,009 MHz – 10000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
10 m for frequencies ≤ 30 MHz
3 m for frequencies > 30 MHz

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	45

Acceptance limits

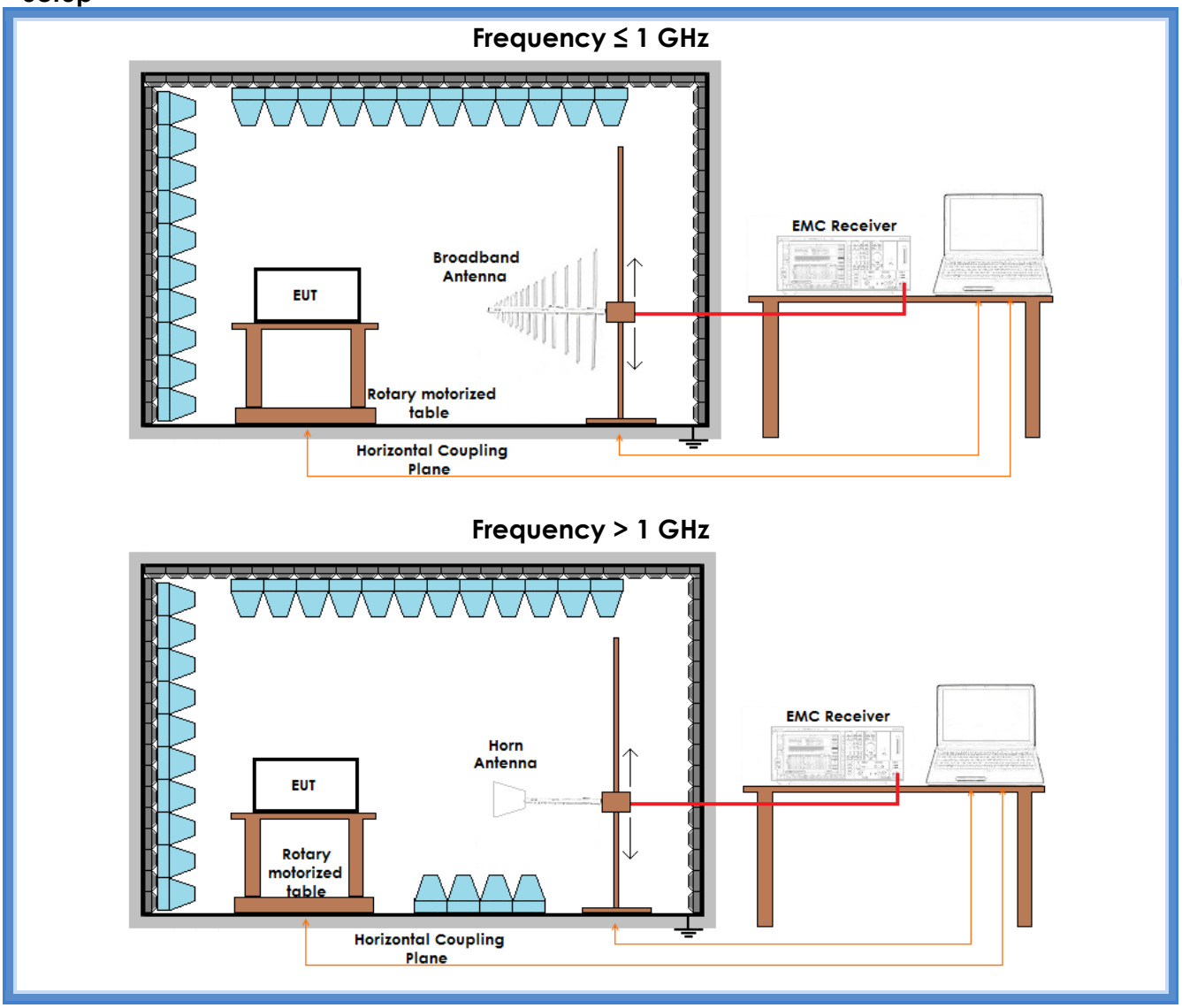
Acceptance limits for emissions in restricted frequency bands		
Frequency (MHz)	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	54	74

The restricted frequency bands are listed in the following table

MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	73 – 74,6	1645,5 – 1646,5	9,3 – 9,5
6,215 – 6,218	74,8 – 75,2	1660 – 1710	10,6 – 12,7
6,26775 – 6,26825	108 – 121,94	1718,8 – 1722,2	13,25 – 13,4
6,31175 – 6,31225	123 – 138	2200 – 2300	14,47 – 14,5
8,291 – 8,294	149,9 – 150,05	2310 – 2390	15,35 – 16,2
8,362 – 8,366	156,52475 – 156,52525	2483,5 – 2500	17,7 – 21,4
8,37625 – 8,38675	156,7 – 156,9	2690 – 2900	22,01 – 23,12
8,41425 – 8,41475	162,0125 – 167,17	3260 – 3267	23,6 – 24,0
12,29 – 12,293	167,72 – 173,2	3332 – 3339	31,2 – 31,8
12,51975 – 12,52025	240 – 285	3345,8 – 3358	36,43 – 36,5
12,57675 – 12,57725	322 – 335,4	3600 – 4400	Above 38,6
13,36 – 13,41			

Acceptance limits for emissions in non-restricted frequency bands
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Setup



Result – AV detector

Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	36,76	54,00	39,33	54,00	41,75	54,00	Complies
III	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
IV	37,49	54,00	38,93	54,00	39,27	54,00	Complies
V	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
VI	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
VII	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
VIII	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
IX	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
X	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other then harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 54 dBµV/m as a worst case.

Result – Peak detector

Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	49,13	74,00	45,13	74,00	45,76	74,00	Complies
III	51,66	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
IV	More than 20 dB below limit	74,00	46,66	74,00	46,46	74,00	Complies
V	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VI	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VII	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VIII	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
IX	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
X	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other then harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 74 dBµV/m as a worst case.

Result: The requirements are met