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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. R16191801

Federal Communication Commission (FCC)

Test item

Description .....: UJB WIRELESS PORTABLE UNIT
Trademark .....: HEXAGON
Model/Type .....: G59626601
FCC ID .....: OYWG596266

Test Specification

Standard .....: FCC Rules & Regulations, Title 47:2016
Part 15 paragraph(s): 203, 204, 207, 209 and 249

Client's name .....: HEXAGON METROLOGY S.p.A.
Address .....: Strada del Portone, 113 – 10095 Grugliasco (TO) – ITALY

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

Report

Tested by .....: A. Bertezzolo – *Technician* .....

Approved by .....: R. Beghetto – *Laboratory Manager* .....
Date of issue .....: 26.06.17
Contents .....: 44 pages

This test report shall not be reproduced except in full without the written approval of CMC.
The test results presented in this report relate only to the item tested.

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1. Summary

Standard:

FCC Rules & Regulations, Title 47:2016
Part 15 paragraph(s): 203, 204, 207, 209 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 15.249 (d)	Band edge	4	Complies
Part 15.209	Spurious emission	5	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

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2. Description of Equipment under test (EUT)

Power supply	:	7,2 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: 902,75 MHz F_M: 912,25 MHz F_H: 923,65 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	:	20.05.16
Testing start date	:	14.09.16
Testing end date	:	06.06.17
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 P160624

4. Operative conditions

EUT exercising	:	EUT in continuous transmission at maximum power

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5. Photograph(s) of EUT

5.1 Photograph(s) of EUT

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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 '17	January '18
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 '17	January '18
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '17	January '18
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121	January '17	January '18
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '16	November '17
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '16	November '17
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '16	November '17
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '16	November '17
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '16	November '17
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 '16	November '17

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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

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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

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8. Reference documents

Reference no.	*Description*
FCC Rules and Regulation Title 47 part 15:2016	--
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

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9. Deviation from test specification

None

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.

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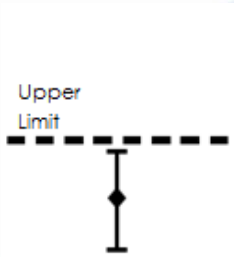
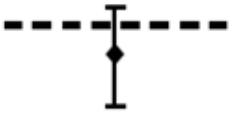
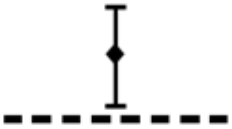
11. Results

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.

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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*
Integrated antenna	Not Present	0 dBi	--	Complies

Result: The requirements are met

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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 ≤ 30 MHz
3 m for frequencies > 30 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

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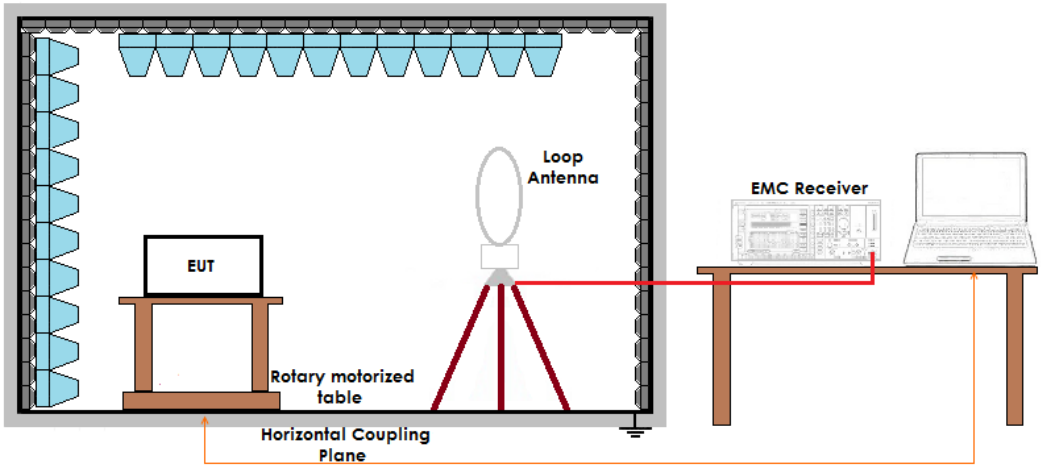
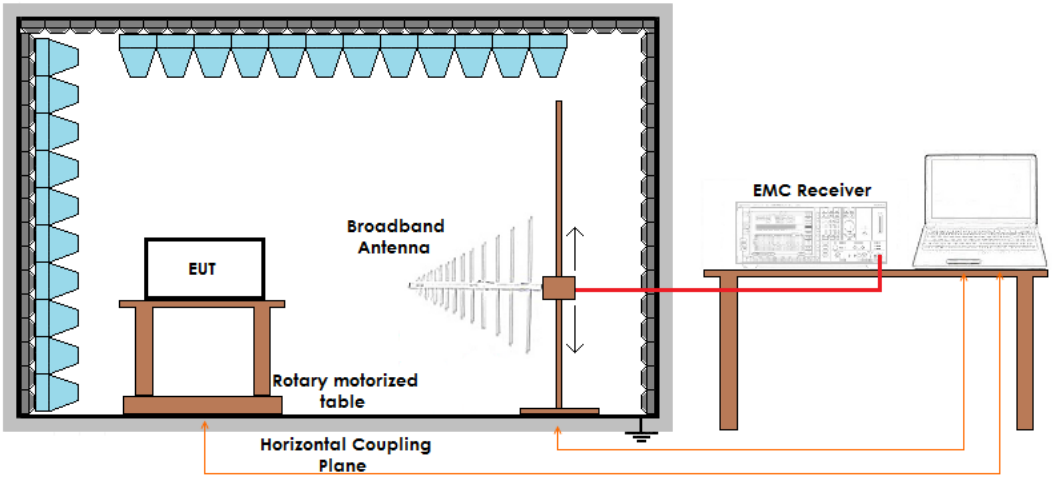
Setup

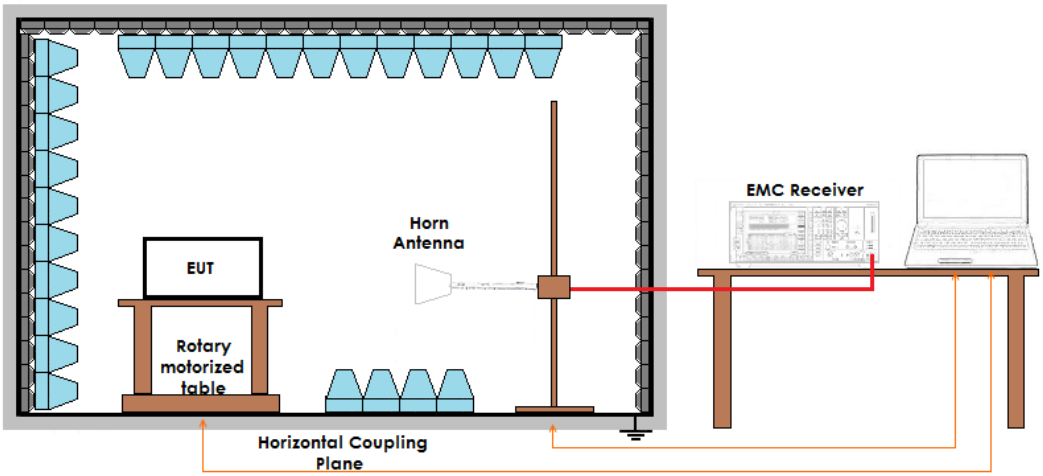
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz



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Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
V	300 – 1000	G16191873	Lowest channel	Complies
H	300 – 1000	G16191874	Lowest channel	Complies
H	300 – 1000	G16191875	Medium channel	Complies
V	300 – 1000	G16191876	Medium channel	Complies
V	300 – 1000	G16191877	Highest channel	Complies
H	300 – 1000	G16191878	Highest channel	Complies
H	30 – 300	G16191879	Worst case	Complies
V	30 – 300	G16191880	Worst case	Complies
Loop	0,009 – 30	G16191881	Worst case	Complies
V	1000 – 10000	G16191850	Lowest channel	Complies
H	1000 – 10000	G16191851	Lowest channel	Complies
V	1000 – 10000	G16191854	Medium channel	Complies
H	1000 – 10000	G16191855	Medium channel	Complies
H	1000 – 10000	G16191856	Highest channel	Complies
V	1000 – 10000	G16191857	Highest 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

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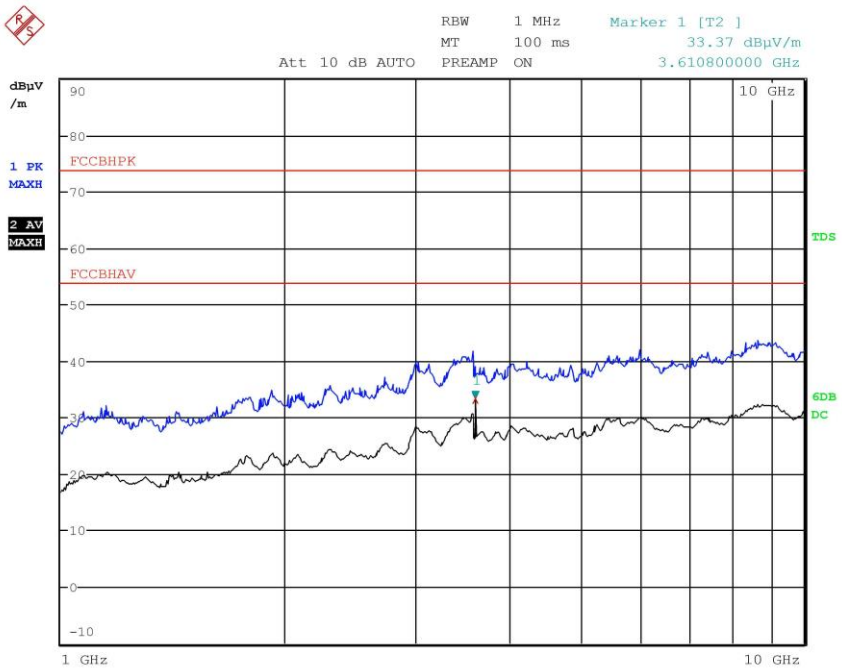
Graphs

Meas Type Emission 3m
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 16191850
Test Spec



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	3.610800000 GHz	33.37	Average	-20.61

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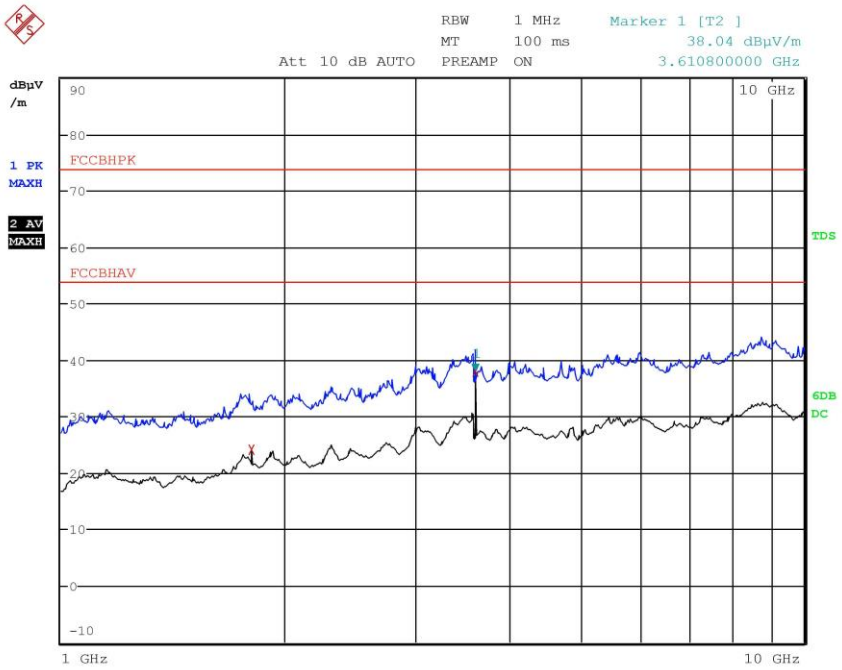
Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191851
Test Spec	



Final Measurement

Meas Time:	1 s
Margin:	20 dB
Subranges:	2

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.805600000 GHz	24.07	Average	-29.91
2	3.610800000 GHz	38.04	Average	-15.94

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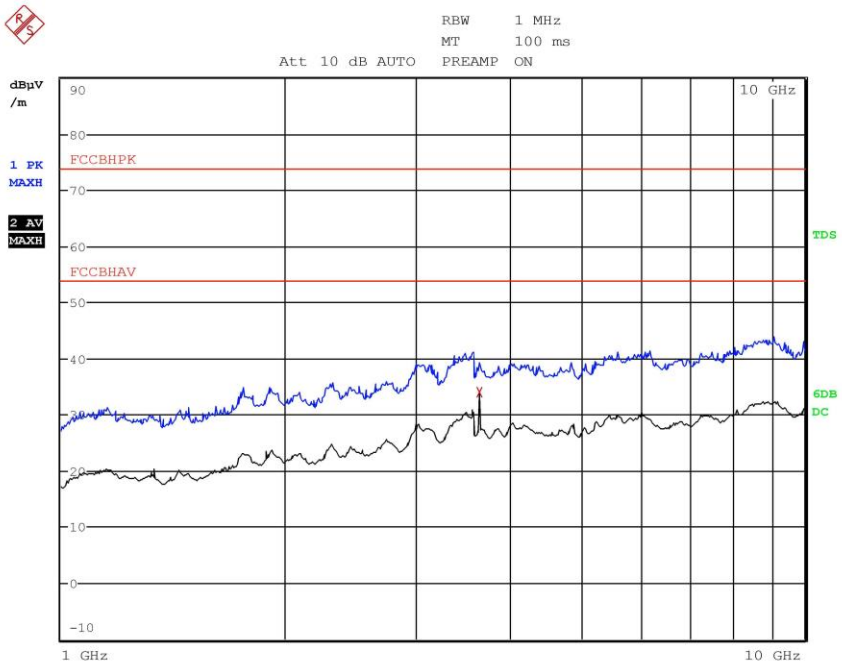
Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191854
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	3.648800000 GHz	34.08	Average	-19.90

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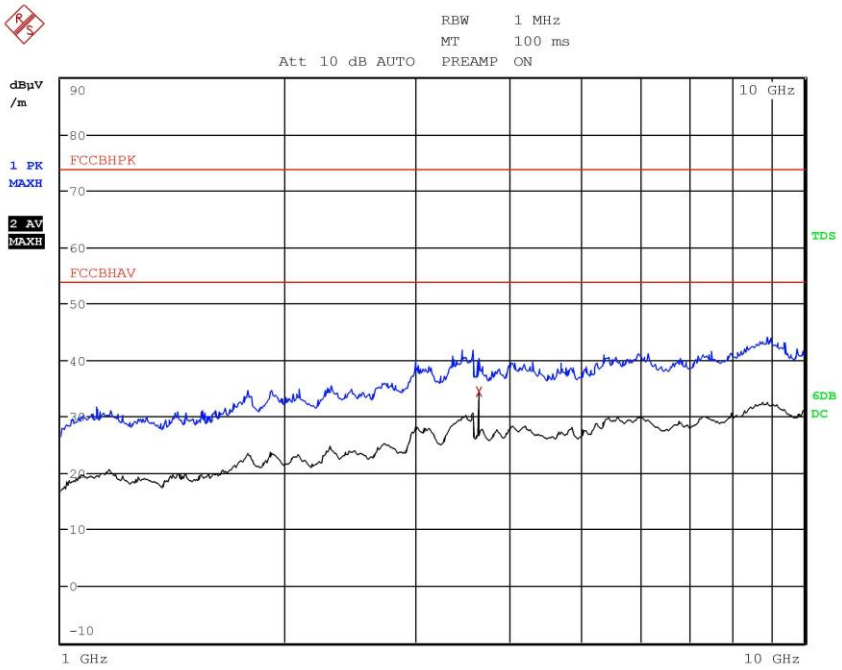
Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191855
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	3.649200000 GHz	34.50	Average	-19.48

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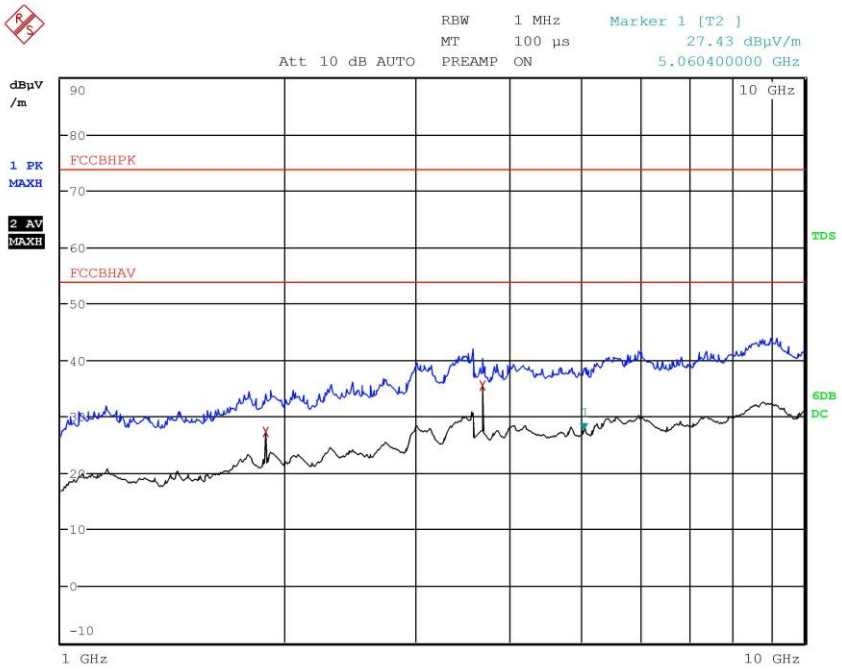
Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191856
Test Spec	



Final Measurement

Meas Time:	1 s
Margin:	20 dB
Subranges:	2

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.888400000 GHz	27.37	Average	-26.61
2	3.694400000 GHz	35.43	Average	-18.55

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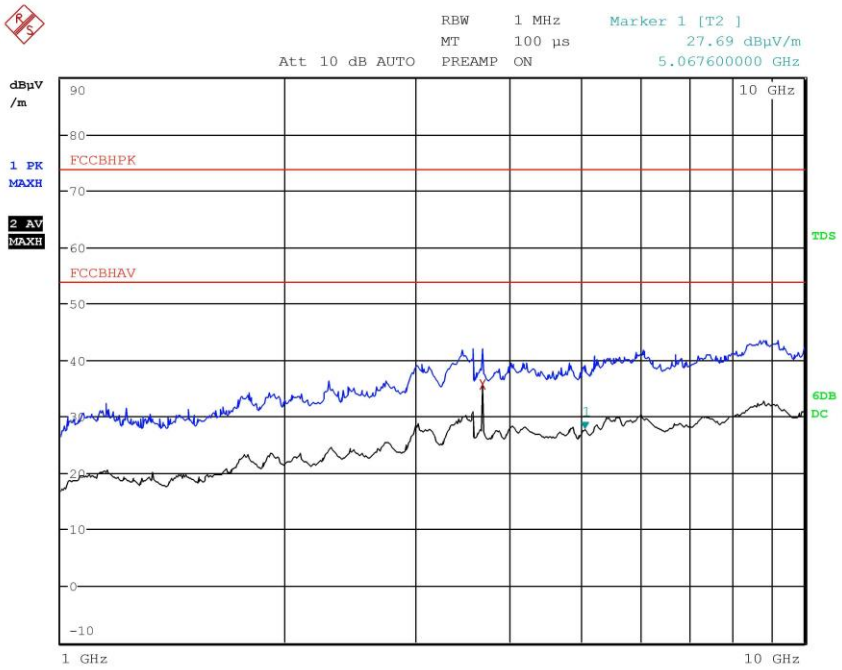
Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191857
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	3.694800000 GHz	35.70	Average	-18.28

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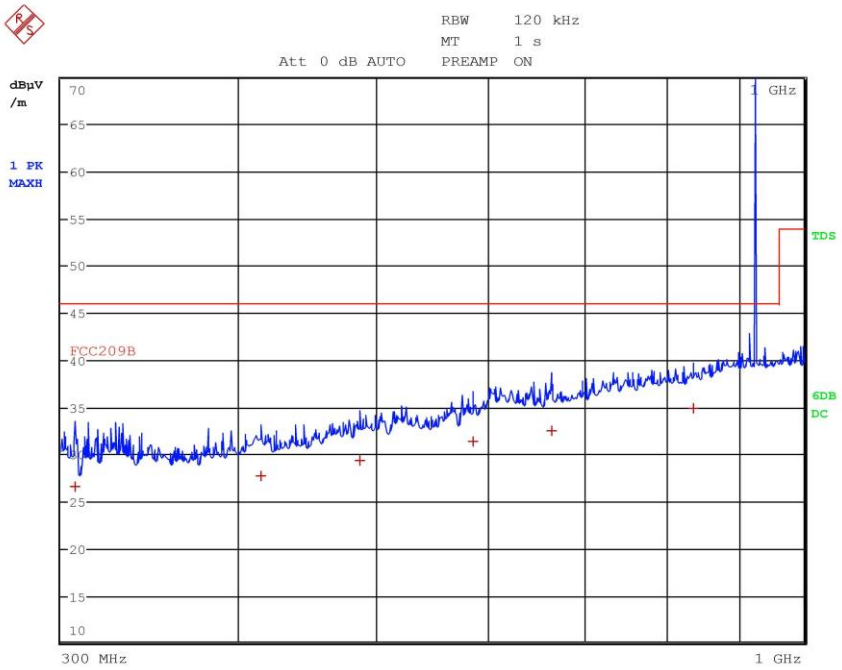
Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191873
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	306.720000000 MHz	26.59	Quasi Peak	-19.43
1	414.520000000 MHz	27.71	Quasi Peak	-18.31
1	487.120000000 MHz	29.39	Quasi Peak	-16.63
1	584.520000000 MHz	31.37	Quasi Peak	-14.65
1	664.680000000 MHz	32.45	Quasi Peak	-13.57
1	835.440000000 MHz	34.92	Quasi Peak	-11.10

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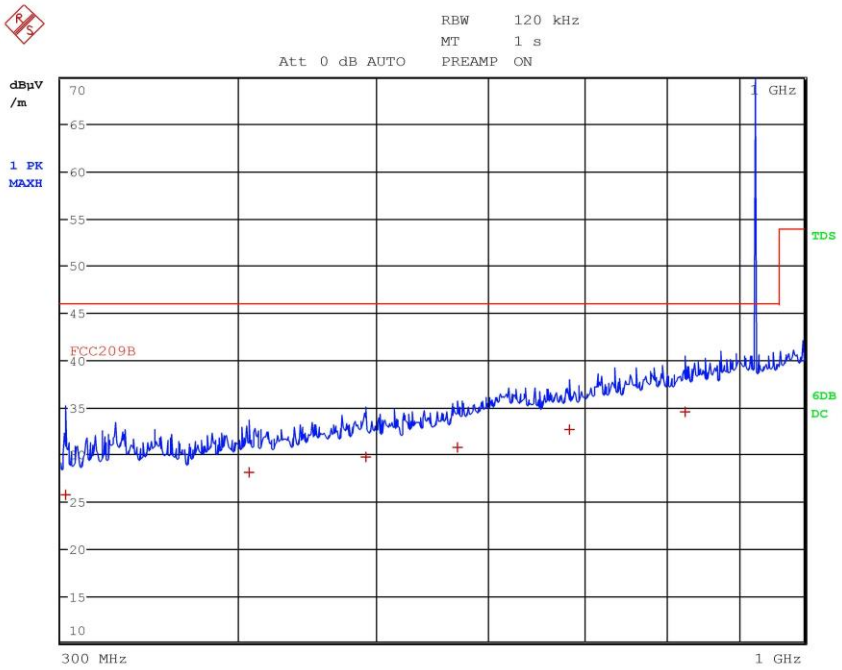
Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191874
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	302.440000000 MHz	25.76	Quasi Peak	-20.26
1	407.280000000 MHz	28.08	Quasi Peak	-17.94
1	491.720000000 MHz	29.76	Quasi Peak	-16.26
1	570.440000000 MHz	30.78	Quasi Peak	-15.24
1	684.080000000 MHz	32.62	Quasi Peak	-13.40
1	825.240000000 MHz	34.57	Quasi Peak	-11.45

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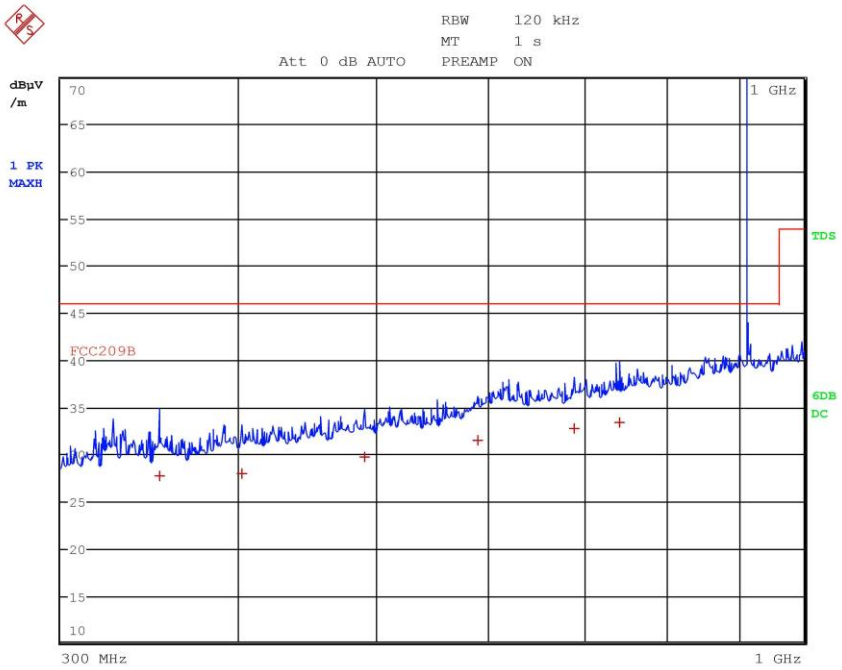
Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191875
Test Spec	



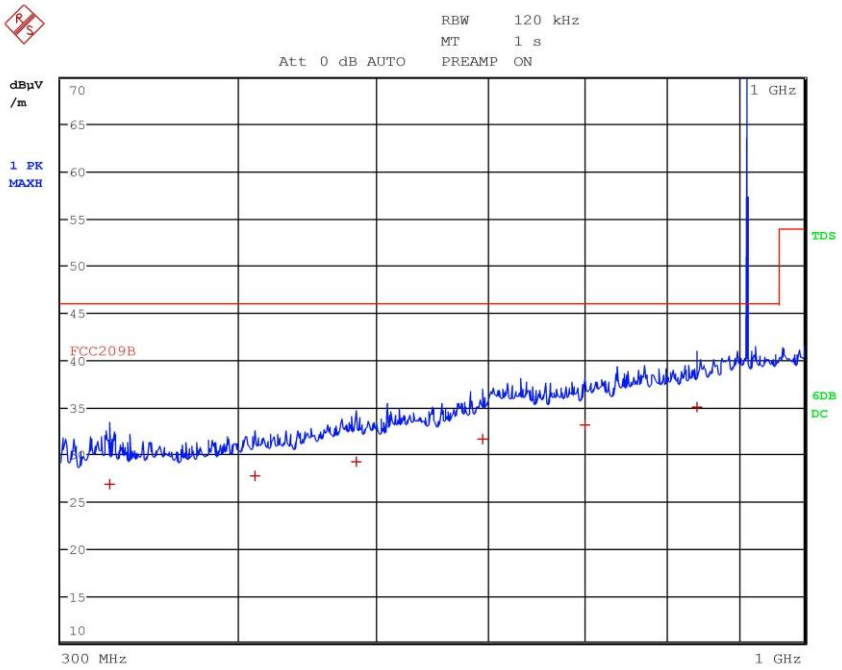
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	351.760000000 MHz	27.71	Quasi Peak	-18.31
1	402.240000000 MHz	28.01	Quasi Peak	-18.01
1	490.360000000 MHz	29.79	Quasi Peak	-16.23
1	589.120000000 MHz	31.49	Quasi Peak	-14.53
1	689.000000000 MHz	32.70	Quasi Peak	-13.32
1	741.360000000 MHz	33.44	Quasi Peak	-12.58

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191876
Test Spec	



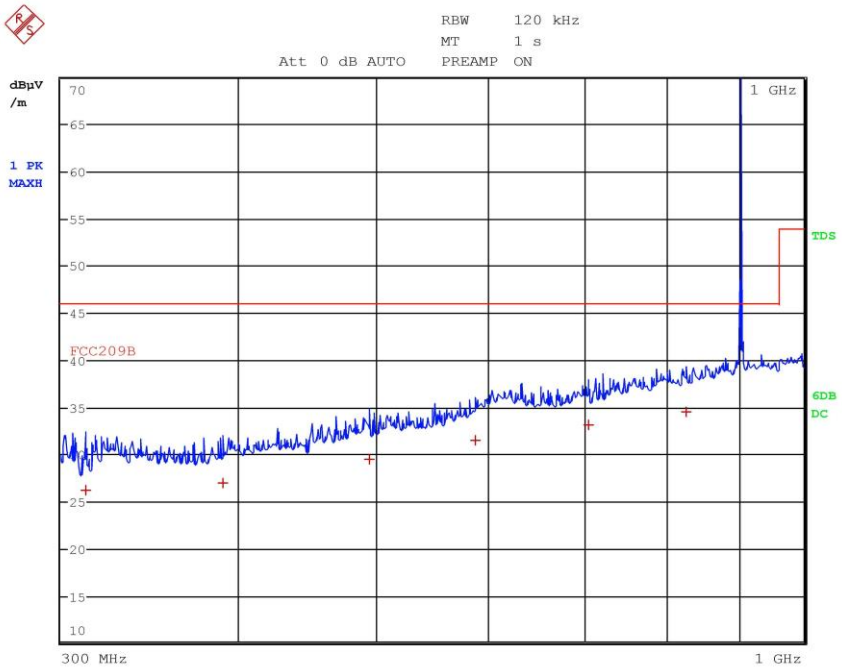
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	324.520000000 MHz	26.77	Quasi Peak	-19.25
1	410.680000000 MHz	27.66	Quasi Peak	-18.36
1	483.800000000 MHz	29.27	Quasi Peak	-16.75
1	593.880000000 MHz	31.66	Quasi Peak	-14.36
1	700.560000000 MHz	33.13	Quasi Peak	-12.89
1	841.320000000 MHz	35.00	Quasi Peak	-11.02

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191877
Test Spec	



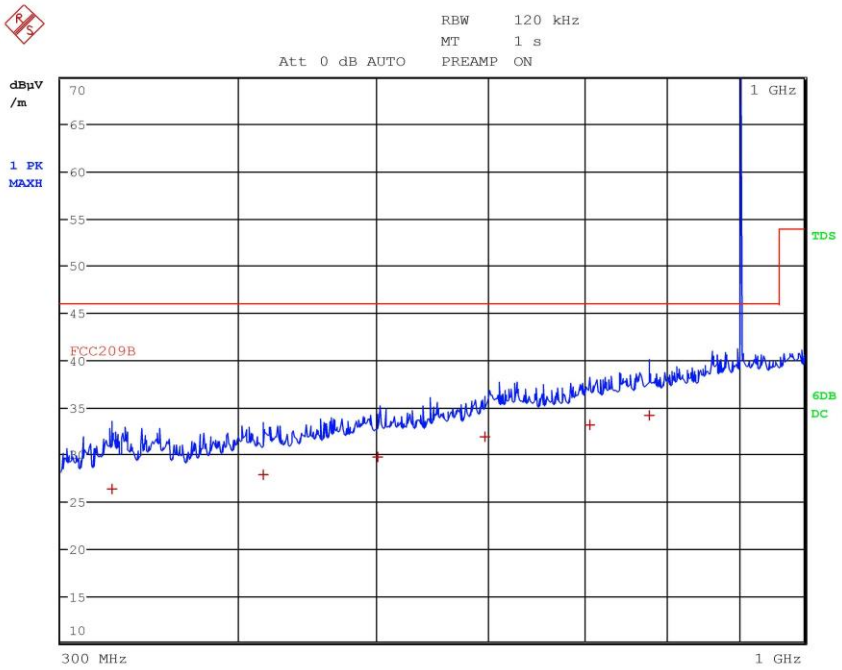
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	312.160000000 MHz	26.24	Quasi Peak	-19.78
1	389.920000000 MHz	26.96	Quasi Peak	-19.06
1	494.360000000 MHz	29.43	Quasi Peak	-16.59
1	586.560000000 MHz	31.48	Quasi Peak	-14.54
1	705.480000000 MHz	33.10	Quasi Peak	-12.92
1	825.360000000 MHz	34.58	Quasi Peak	-11.44

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191878
Test Spec	



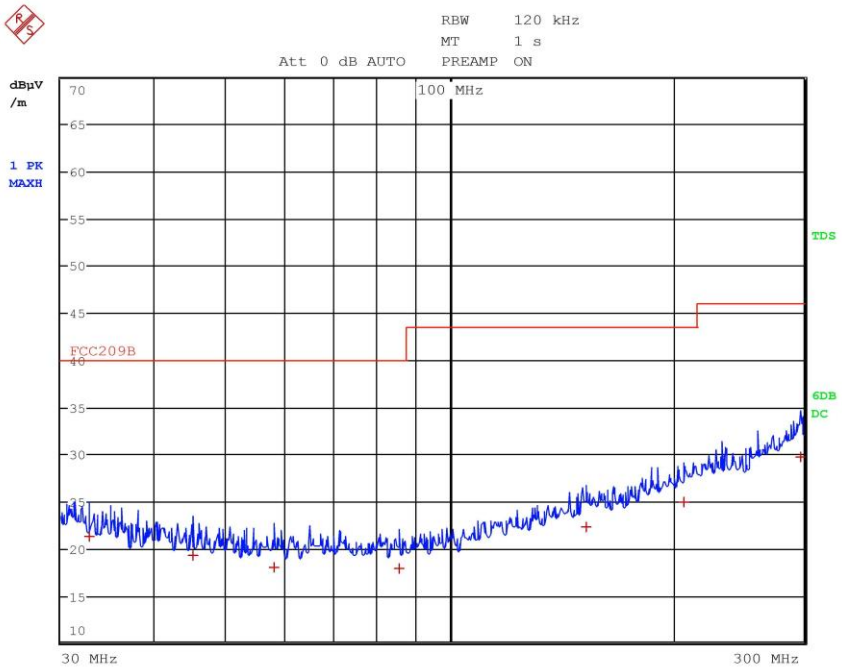
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	325.880000000 MHz	26.32	Quasi Peak	-19.70
1	416.240000000 MHz	27.84	Quasi Peak	-18.18
1	501.560000000 MHz	29.67	Quasi Peak	-16.35
1	596.520000000 MHz	31.90	Quasi Peak	-14.12
1	706.920000000 MHz	33.12	Quasi Peak	-12.90
1	778.000000000 MHz	34.09	Quasi Peak	-11.93

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191879
Test Spec	



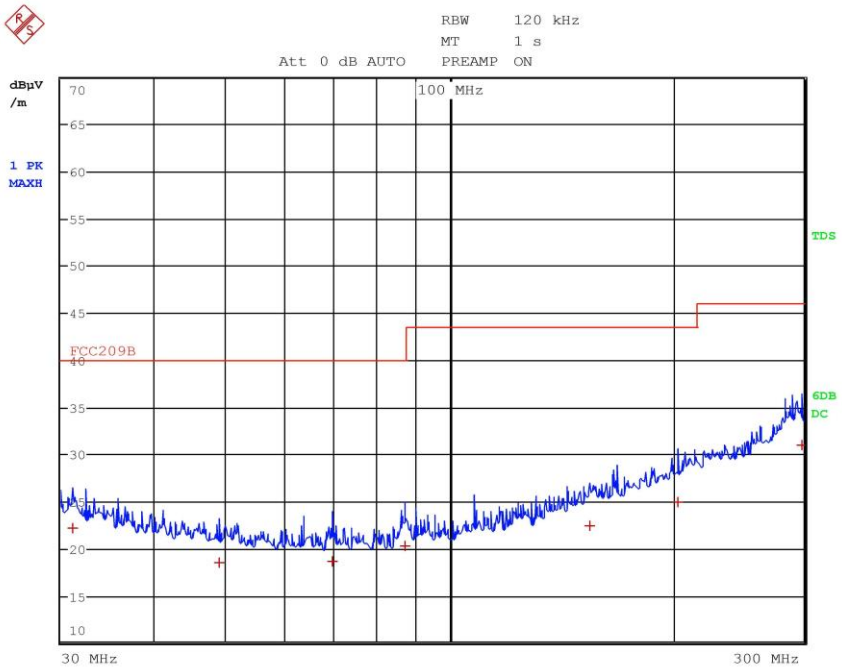
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	32.720000000 MHz	21.27	Quasi Peak	-18.73
1	45.120000000 MHz	19.27	Quasi Peak	-20.73
1	58.040000000 MHz	17.94	Quasi Peak	-22.06
1	85.360000000 MHz	17.92	Quasi Peak	-22.08
1	152.640000000 MHz	22.34	Quasi Peak	-21.18
1	206.320000000 MHz	24.94	Quasi Peak	-18.58
1	296.520000000 MHz	29.68	Quasi Peak	-16.34

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191880
Test Spec	



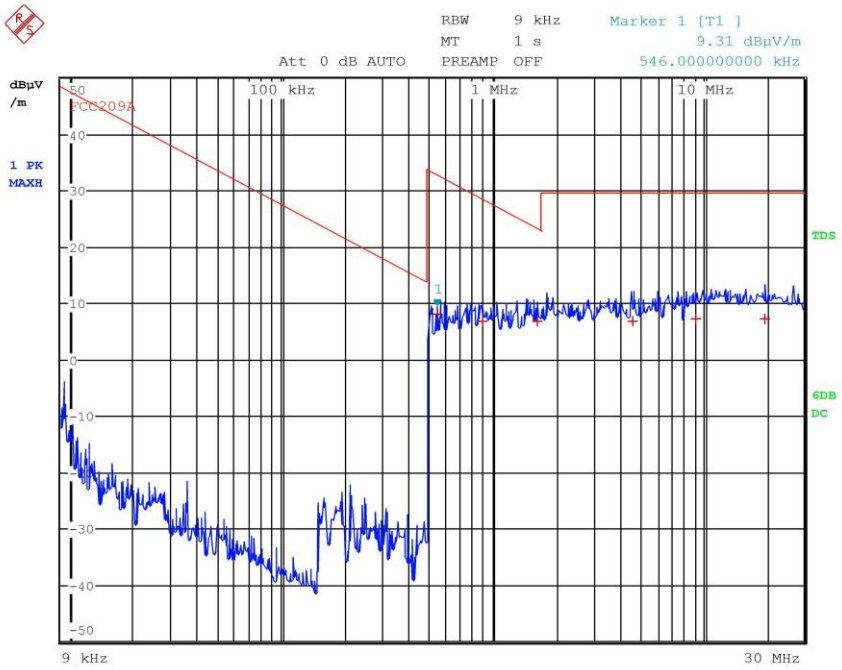
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	31.120000000 MHz	22.17	Quasi Peak	-17.83
1	49.040000000 MHz	18.53	Quasi Peak	-21.47
1	69.520000000 MHz	18.64	Quasi Peak	-21.36
1	87.240000000 MHz	20.22	Quasi Peak	-19.78
1	154.600000000 MHz	22.41	Quasi Peak	-21.11
1	202.600000000 MHz	24.99	Quasi Peak	-18.53
1	297.800000000 MHz	31.01	Quasi Peak	-15.01

CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191881
Test Spec	



Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	546.000000000 kHz	8.10	Quasi Peak	-24.76
1	894.000000000 kHz	6.90	Quasi Peak	-21.68
1	1.634000000 MHz	6.86	Quasi Peak	-16.48
1	4.606000000 MHz	6.73	Quasi Peak	-22.81
1	9.226000000 MHz	7.33	Quasi Peak	-22.21
1	19.562000000 MHz	7.31	Quasi Peak	-22.23

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

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: 10 m

Environmental conditions

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

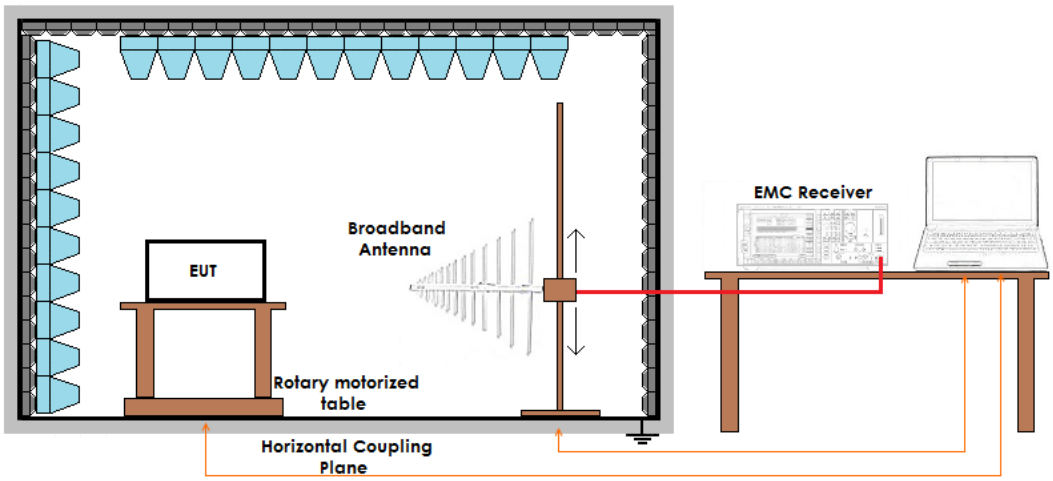
Acceptance limits

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

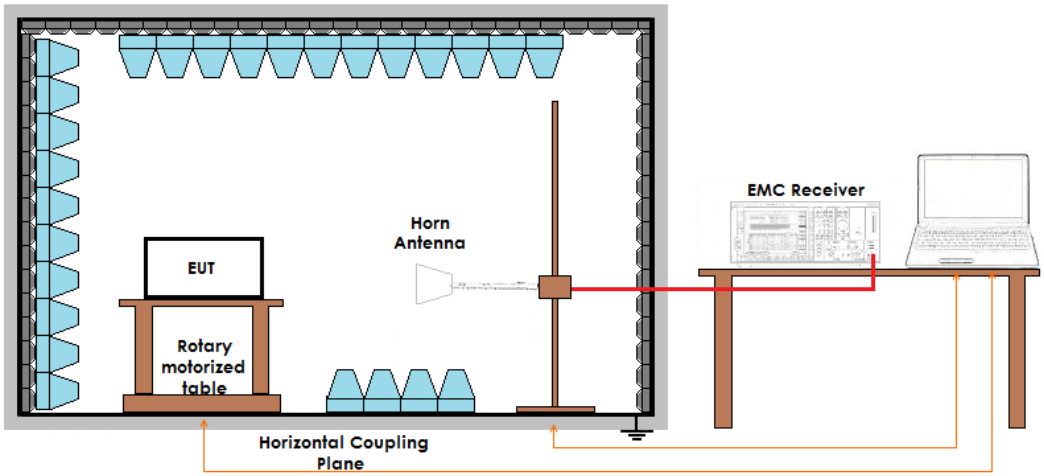
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



Result

Frequency (MHz)	*Polarization*	*Graphs*	*3 m referred peak level (dBµV/m)*	*Peak Output Power (mW)*	*Remarks*
902,75	Worst case	G16191862	87,17	0,156	--
912,25	Worst case	G16191863	85,01	0,095	--
923,65	Worst case	G16191864	85,28	0,101	--

Remarks: the results have been extrapolated to the specified distance using an extrapolation factor.

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

Where:

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

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

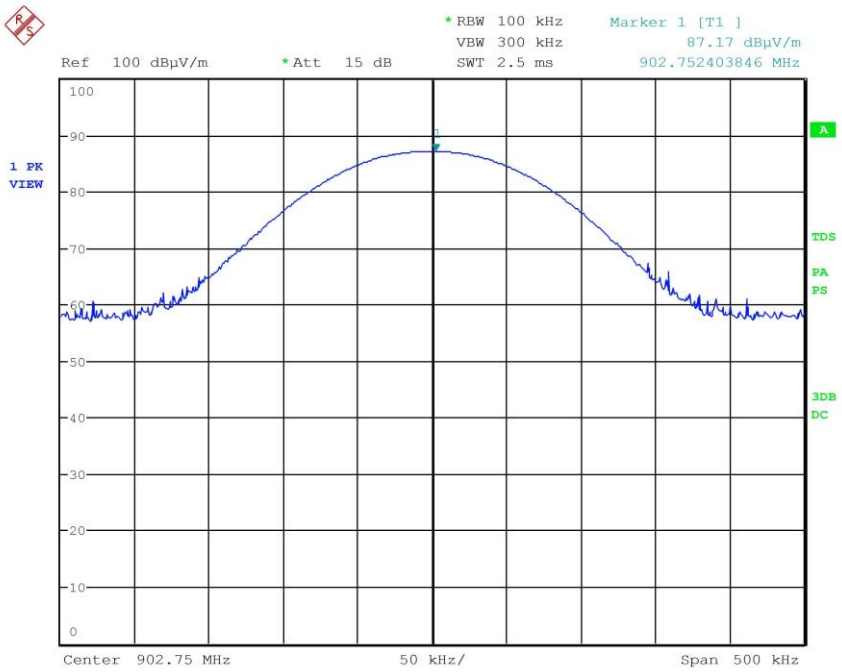
d = the distance in meters from which the field strength was measured (3 m)

P = the power in watts

CMC Centro Misure Compatibilità S.r.l.

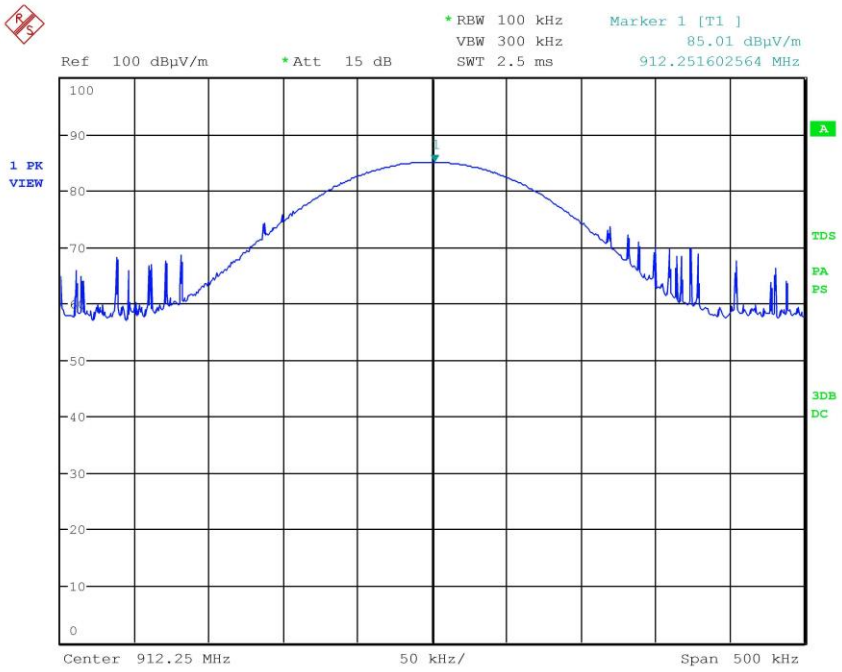
Graphs

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191862
Test Spec	



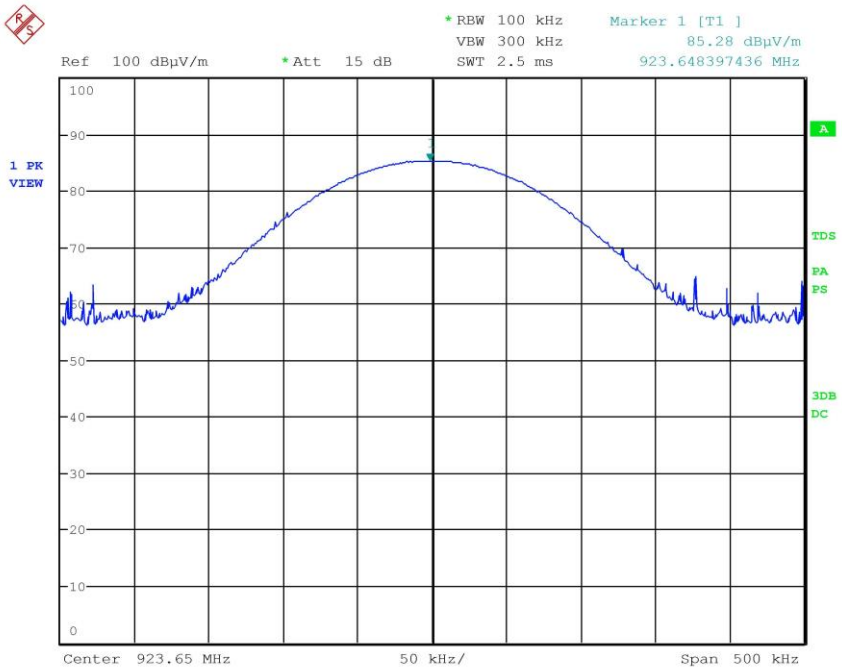
CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191863
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191864
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.4 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

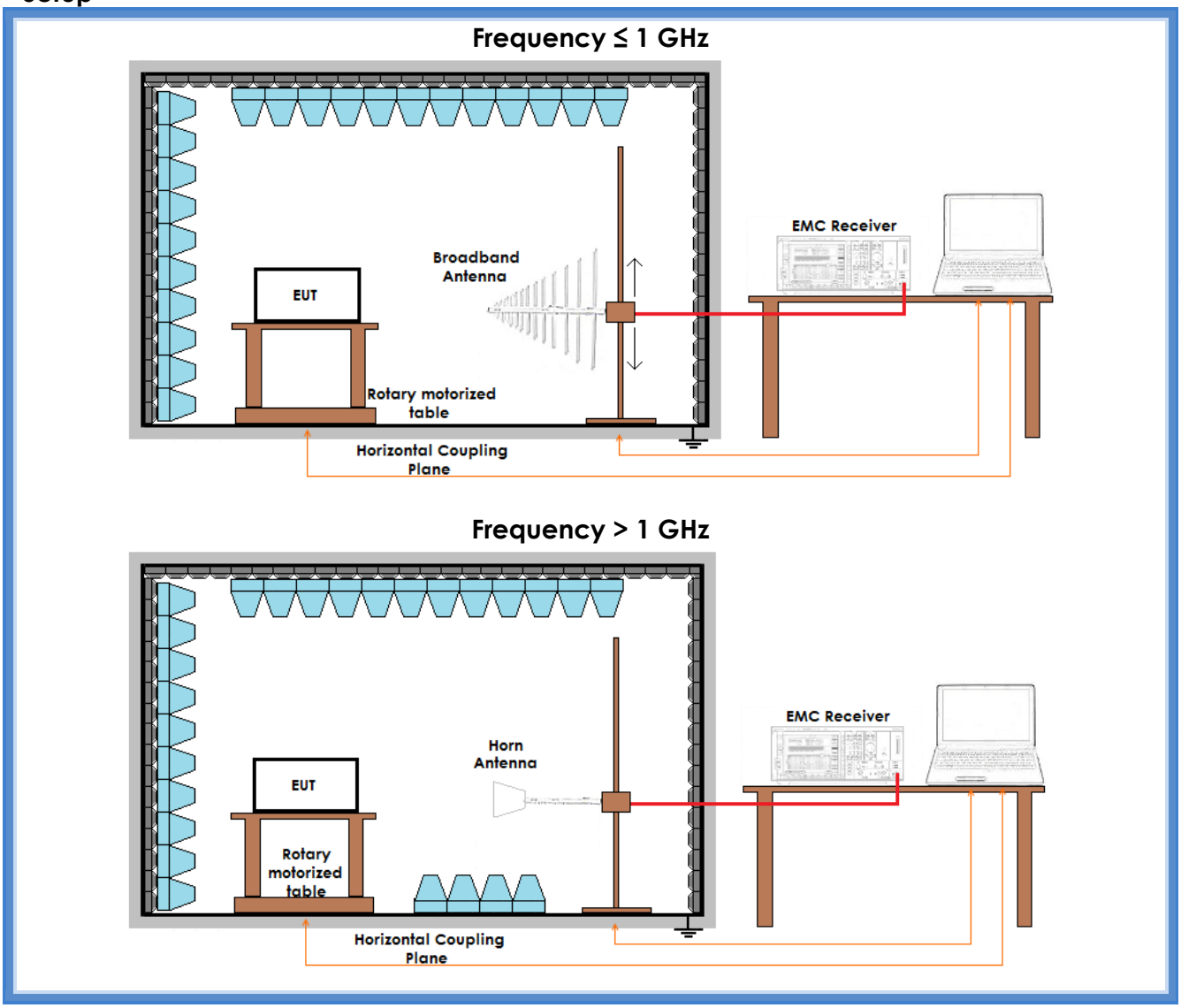
Environmental conditions

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

Acceptance limits: operation within the band 902 – 928 MHz

CMC Centro Misure Compatibilità S.r.l.

Setup



Result

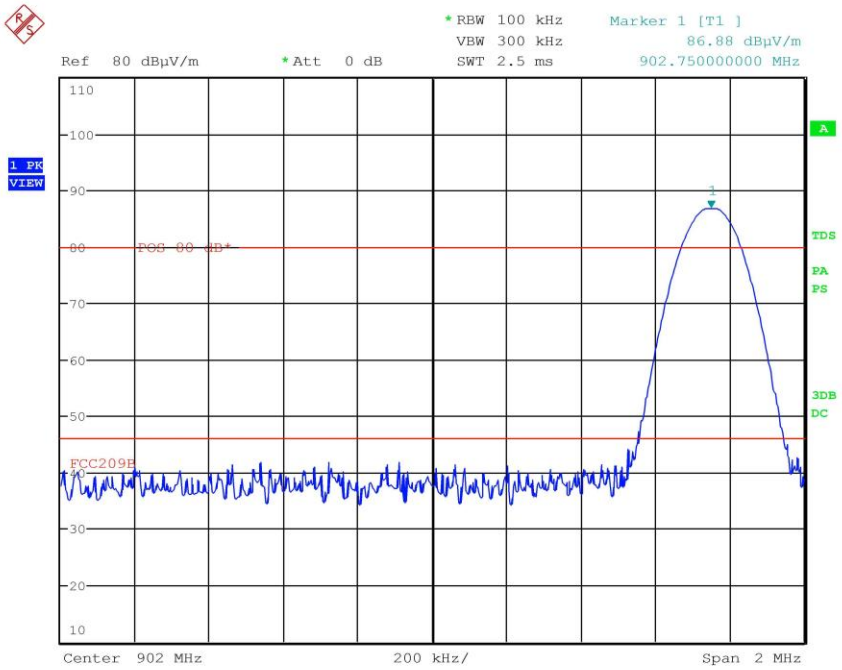
Frequency (MHz)	*Graph(s)*	*Results*	
902,75	G16191865	F_L: 902,5700 MHz	Complies
923,65	G16191872	F_H: 923,6800 MHz	Complies

Remarks: the results have been extrapolated to the specified distance using an extrapolation factor.

CMC Centro Misure Compatibilità S.r.l.

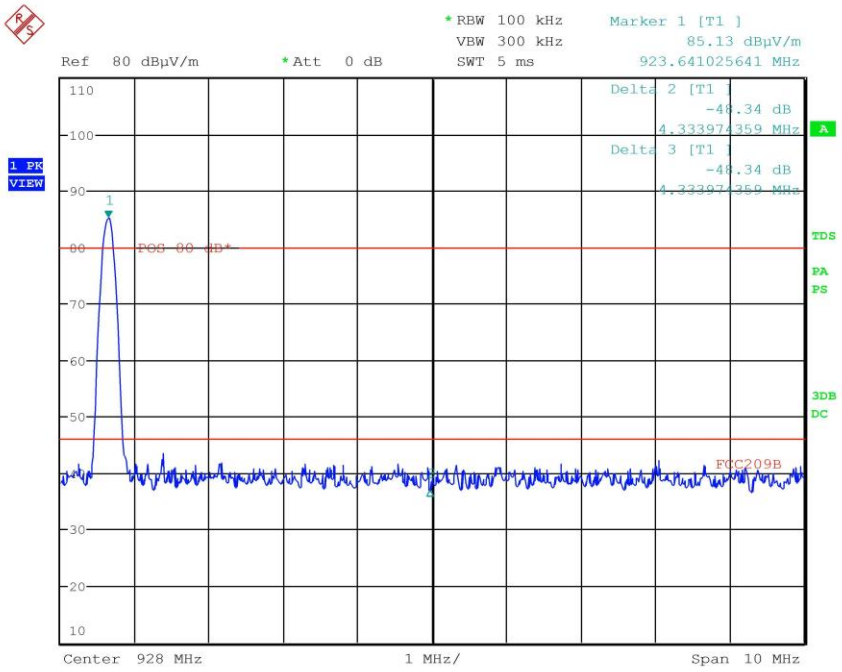
Graphs

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191865
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission 10m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16191872
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.5 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and 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
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

CMC Centro Misure Compatibilità S.r.l.

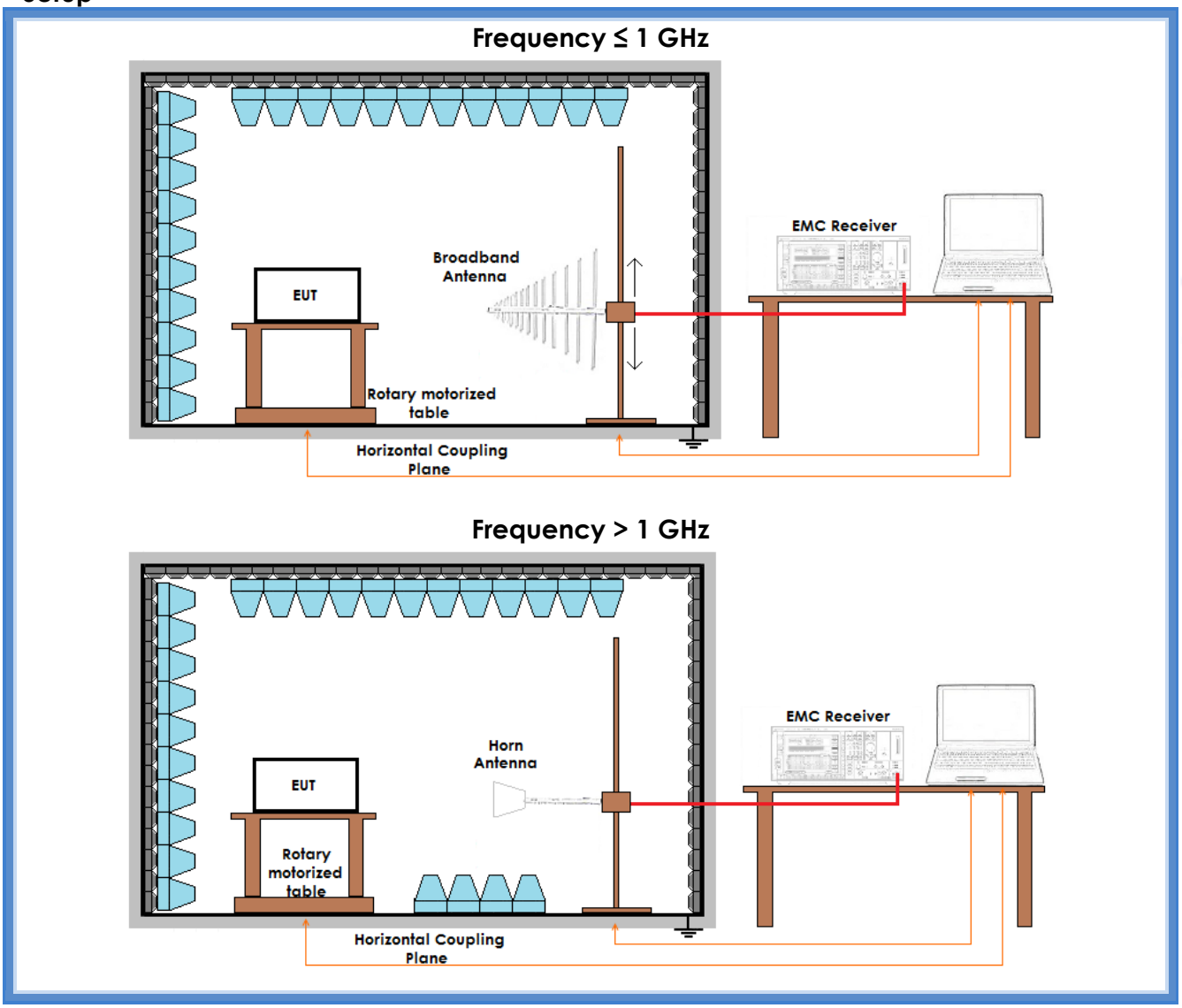
The restricted frequency bands are listed in the following table

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.

CMC Centro Misure Compatibilità S.r.l.

Setup



CMC Centro Misure Compatibilità S.r.l.

Result – AV detector

Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*			*Results*
		902,750 MHz	*912,250 MHz*	*923,65 MHz*	
II	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
III	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IV	54	38,03	34,49	35,70	Complies
V	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	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 worse case.

CMC Centro Misure Compatibilità S.r.l.

Result – Peak detector

Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*			*Results*
		902,750 MHz	*912,250 MHz*	*923,65 MHz*	
II	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
III	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IV	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	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 worse case.

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.