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. R15140001

Federal Communication Commission (FCC)

Test item

Description .....: TRANSMITTER UNIT
Trademark .....: REMDEVICE
Model/Type .....: BR / BPM6
FCC ID .....: RTF-BRBPM6

Test Specification

Standard.....: FCC Rules & Regulations, Title 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 247

Client's name .....: REMDEVICE S.r.l.
Address .....: Via Munari, 72 – 36055 Nove (VI) – ITALY

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

Report

Tested by .....: A. Bertezzolo – *Technician*
Approved by .....: R. Beghetto – *Laboratory Manager*
Date of issue .....: 23.06.16
Contents.....: 51 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 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 247

Test specifications	*Environmental Phenomena*	*Tests sequence*	*Result*
Part 15.203	Antenna requirements	1	Complies
Part 15.207	Conducted emissions	--	N.A. (+)
Part 15.209	Emissions in restricted frequency bands and in unrestricted frequency bands	2	Complies
Part 15.209	DTS bandwidth	3	Complies
Part 15.247 (d)	Band edge	4	Complies
Part 15.209 and 15.247	Fundamental emission output power	5	Complies
Part 15.209 and 15.247	Maximum power spectral density level in the fundamental emission	6	Complies
Part 15.209	Spurious emission	7	Complies
Part 1.1310	Maximum permissible exposure	8	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 ..... : 3,6 Vdc

Serial Number ..... : M003213

Type of equipment ..... : ☑ Transmitter Unit

❑ Receiver Unit

Type of station ..... : ☑ Fixed station

❑ Portable station

❑ Mobile station

Frequency band ..... : F_L: 902,5 MHz F_M: 915,0 MHz F_H: 927,5 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 ..... : 271947

3. Testing and sampling

Date of receipt of test item ..... : 07.07.15

Testing start date ..... : 29.10.15

Testing end date ..... : 11.11.15

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 P150801

4. Operative conditions

EUT exercising ..... : EUT in continuous transmission at maximum power

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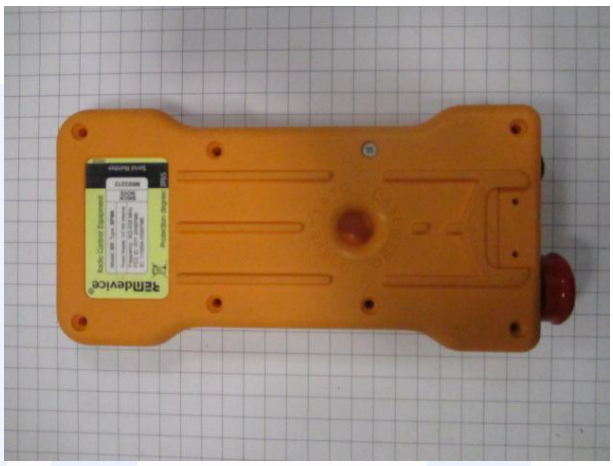
5. Photograph(s) of EUT

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 '16	January '17
CMC S108	EMCO	3115	Horn Antenna	9811-5622	May '13	May '16
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	January '16	January '19
CMC S129	Rohde & Schwarz	ESPI7	Receiver	836.914/004	January '16	January '17
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '13	May '16
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '16	January '17
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '16	January '17
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121	January '16	January '17

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7. Measurement uncertainty

Test	Expanded Uncertainty	note
Conducted Emission		
(50Ω/50µH AMN) - (9 kHz – 150 kHz)	±3.6 dB	1
(50Ω/50µH AMN) - (150 kHz – 30 MHz)	±3.0 dB	1
(Voltage probe) - (150 kHz – 30 MHz)	±2.8 dB	1
(50Ω/5µH AMN) - (150 kHz – 108 MHz)	±2.6 dB	1
Discontinuous Conducted Emission		
Conducted Emission (50Ω/50µH AMN) - (150 kHz – 30 MHz)	±3.0 dB	1
Disturbance Power (30 MHz – 300 MHz)	±3.7 dB	1
Radiated Emission		
(0,150 MHz – 30 MHz)	±4.0 dB	1
(30 MHz – 1000 MHz)	±4.3 dB	1
(1 GHz – 6 GHz)	±4.5 dB	1
Electromagnetic field EMF	±10.5 %	1
Harmonic current emissions test	±1.8 %	1
Voltage fluctuation and flicker test	±2.6 %	1
Insertion loss test	±2.0 dB	1
Radiated electromagnetic disturbance test (loop antenna)	±2.1 dB	1
Radiated electromagnetic field immunity test	0.81 V/m at 3V/m	1
Pulse modulated radiated electromagnetic field immunity test	0.81 V/m at 3V/m	1
Injected currents immunity test	0.45 V at 3V	1
Bulk current	3.7 mA at 60 mA	1
Power frequency magnetic field immunity test	0.1 A/m at 10 A/m	1
Effective radiated power (F < 1GHz)	±4.3 dB	1
Effective radiated power (F > 1GHz)	±3.7 dB	1
Frequency error	< 1x10-7	1
Modulation bandwidth	< 1x10-7	1
Conducted RF power and spurious emission	±0.7 dB	1
Adjacent channel power	±1.2 dB	1
Blocking	±1.2 dB	1
Electrostatic discharge immunity test		2
Electrical fast transients / burst immunity test		2
Surge immunity test		2
Pulse magnetic field immunity test		2
Damped oscillatory magnetic field immunity test		2
Short interruption immunity test		2
Voltage transient emission test	±2.2 %	1
Transient immunity test		2
Rev_15_01 date 04/05/2015		

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 15:2014	--
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
KDB 558074 D01 DTS Meas Guidance v03r03	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
Internal Procedure PM001 rev. 2.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 8.2 (Quality Manual)	Measurement uncertainty calculation

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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.

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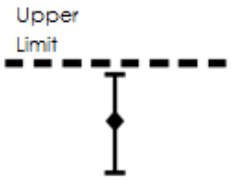
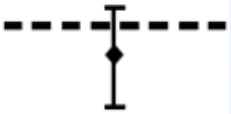
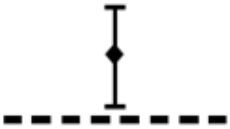
11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 8.2.

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

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 (%)*
23	100	42

Result

Antenna Type	*External R.F. power amplifier*	*Gain*	*Remarks*	*Results*
Integral antenna	Not Present	3,2 dBi	--	Complies

Result: The requirements are met

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11.2 Emissions in restricted frequency bands and in unrestricted frequency bands

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

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 S136, CMC S164, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Frequency range: 0,009 MHz – 1000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m

Environmental conditions

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

Acceptance limits

Frequency range (MHz)	*Limits [dB(µV/m)]*	
0,009 to 0,490	108,51 to 73,80	
0,490 to 1,705	53,80 to 42,97	
1,705 to 30	49,54	
30 to 88	30	
88 to 216	33,52	
216 to 960	36,02	
960 to 1000	43,98	
	Linear average detector [dB(µV/m)]	*Peak detector [dB(µV/m)]*
Above 1000	53,98	73,98
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.		

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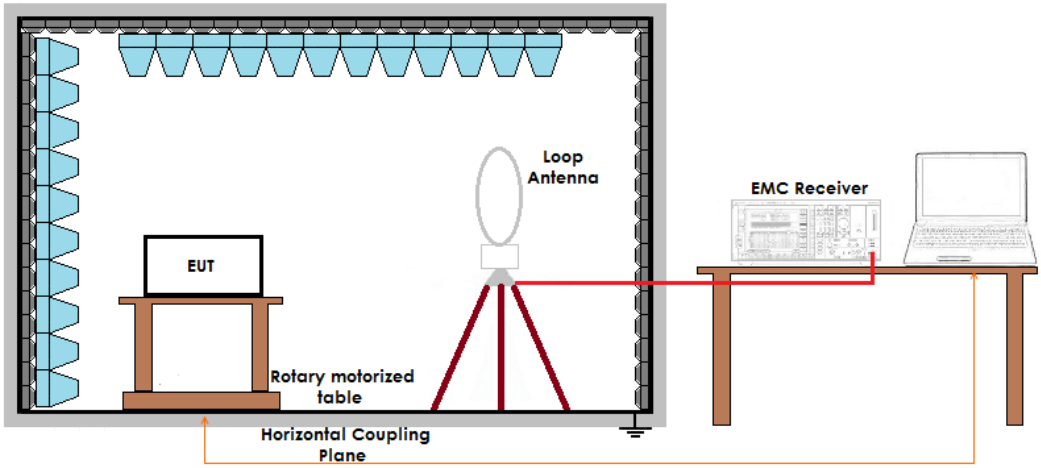
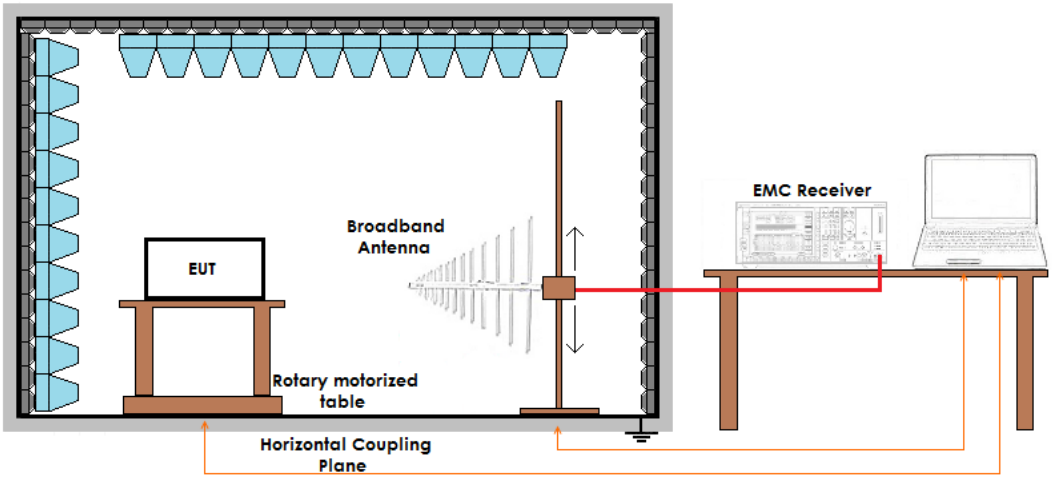
Setup

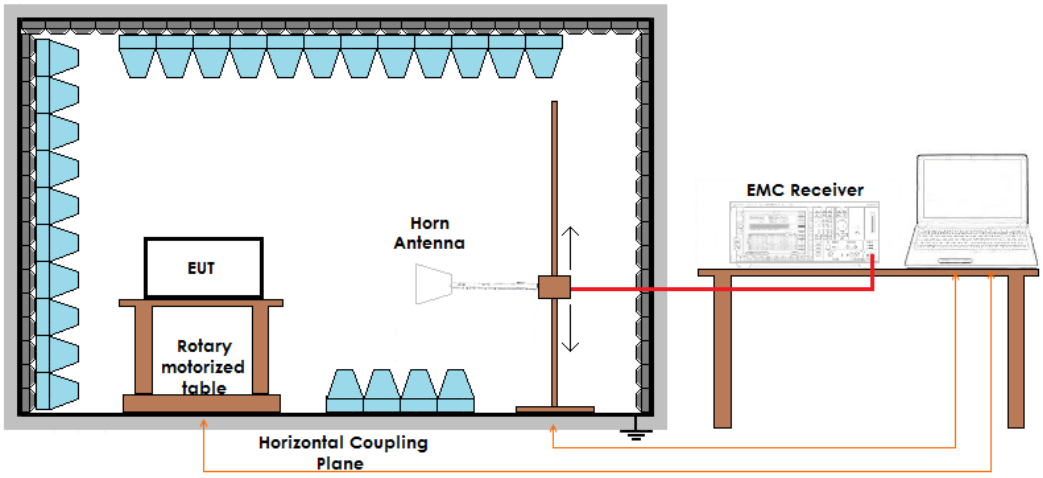
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz



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Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
Loop	0,009 – 30	G15140001	Worst case	Complies
V	30 – 1000	G15140026	Lowest channel	Complies
H	30 – 1000	G15140027	Lowest channel	Complies
V	30 – 1000	G15140025	Medium channel	Complies
H	30 – 1000	G15140024	Medium channel	Complies
V	30 – 1000	G15140023	Highest channel	Complies
H	30 – 1000	G15140022	Highest channel	Complies
V	1000 – 10000	G15140029	Worst case	Complies
H	1000 – 10000	G15140028	Worst case	Complies
Remarks: Peaks above the limits are due to the main transmitting frequencies				

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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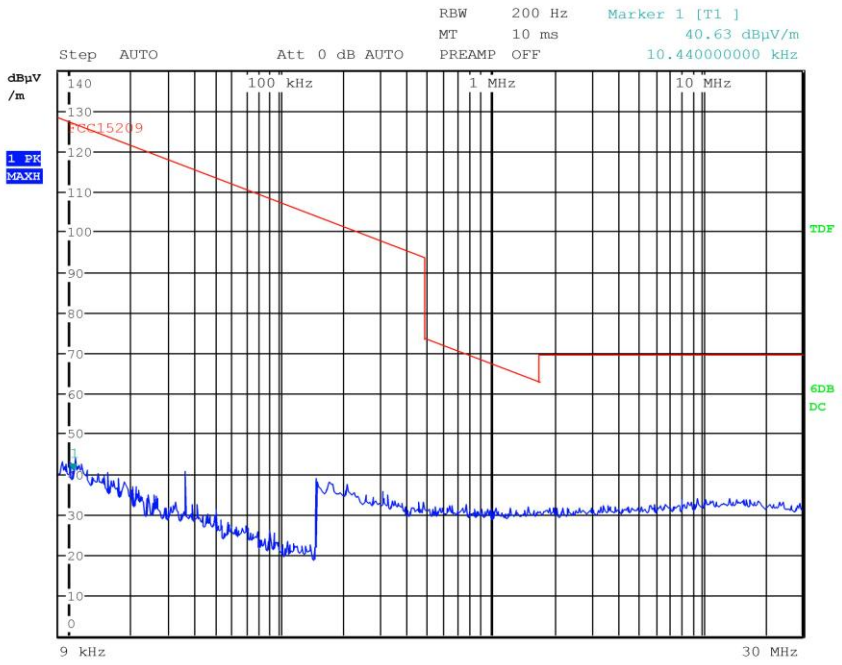
Graphs

G15140001

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 15140001
Test Spec



Final Measurement

Meas Time: 1 s
Margin: 30 dB
Subranges: 0

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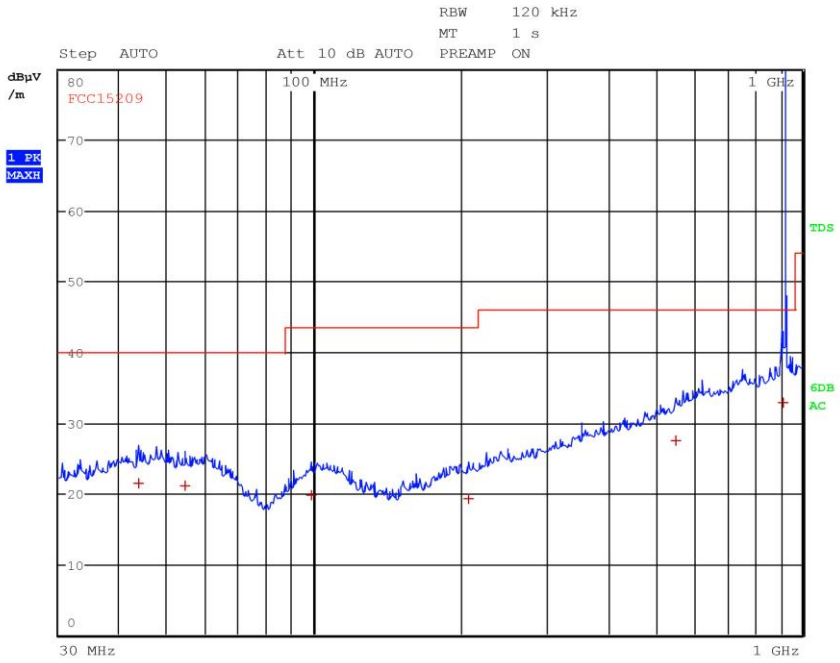
G15140022

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140022
Test Spec	



Final Measurement

Meas Time:	1 s
Margin:	30 dB
Subranges:	6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.47	Quasi Peak	-18.53
1	54.440000000 MHz	21.10	Quasi Peak	-18.90
1	98.800000000 MHz	19.77	Quasi Peak	-23.75
1	207.080000000 MHz	19.33	Quasi Peak	-24.19
1	550.800000000 MHz	27.46	Quasi Peak	-18.56
1	915.000000000 MHz	32.81	Quasi Peak	-13.21

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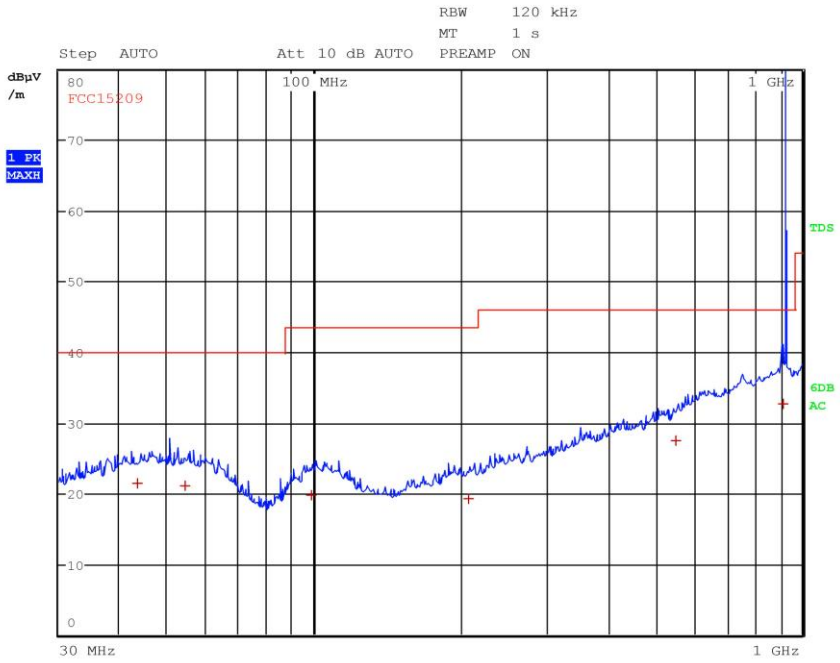
G15140023

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140023
Test Spec	



Final Measurement

Meas Time: 1 s
Margin: 30 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.39	Quasi Peak	-18.61
1	54.440000000 MHz	21.15	Quasi Peak	-18.85
1	98.800000000 MHz	19.76	Quasi Peak	-23.76
1	207.080000000 MHz	19.30	Quasi Peak	-24.22
1	550.800000000 MHz	27.47	Quasi Peak	-18.55
1	915.000000000 MHz	32.74	Quasi Peak	-13.28

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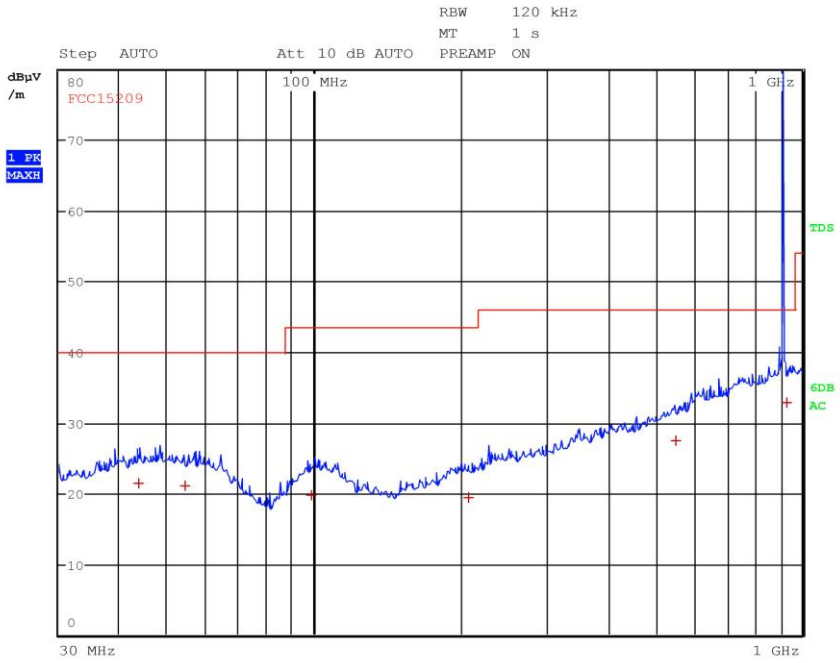
G15140024

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140024
Test Spec	



Final Measurement

Meas Time: 1 s
Margin: 30 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.46	Quasi Peak	-18.54
1	54.440000000 MHz	21.14	Quasi Peak	-18.86
1	98.800000000 MHz	19.71	Quasi Peak	-23.81
1	207.080000000 MHz	19.33	Quasi Peak	-24.19
1	550.800000000 MHz	27.49	Quasi Peak	-18.53
1	928.000000000 MHz	32.80	Quasi Peak	-13.22

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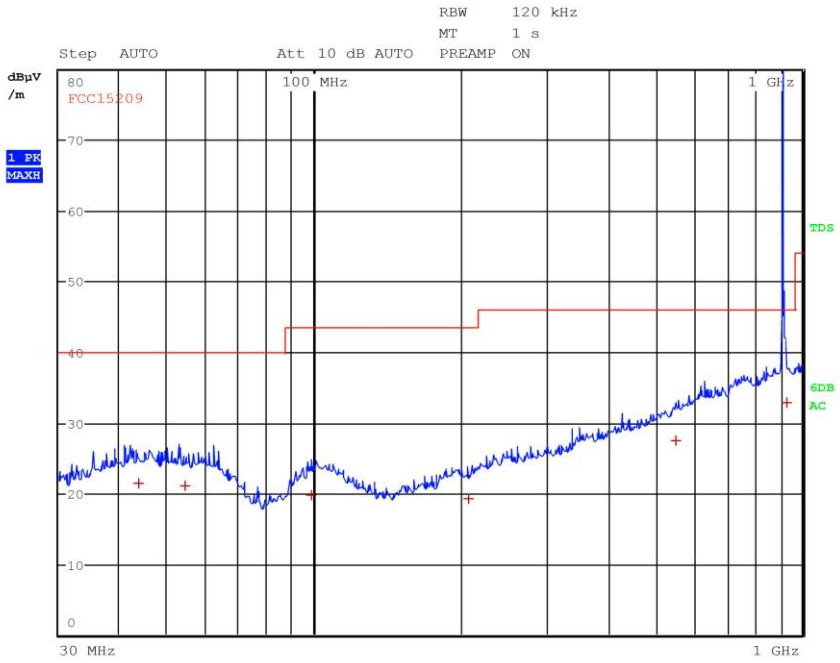
G15140025

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140025
Test Spec	



Final Measurement

Meas Time:	1 s
Margin:	30 dB
Subranges:	6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.47	Quasi Peak	-18.53
1	54.440000000 MHz	21.16	Quasi Peak	-18.84
1	98.800000000 MHz	19.75	Quasi Peak	-23.77
1	207.080000000 MHz	19.31	Quasi Peak	-24.21
1	550.800000000 MHz	27.55	Quasi Peak	-18.47
1	928.000000000 MHz	32.80	Quasi Peak	-13.22

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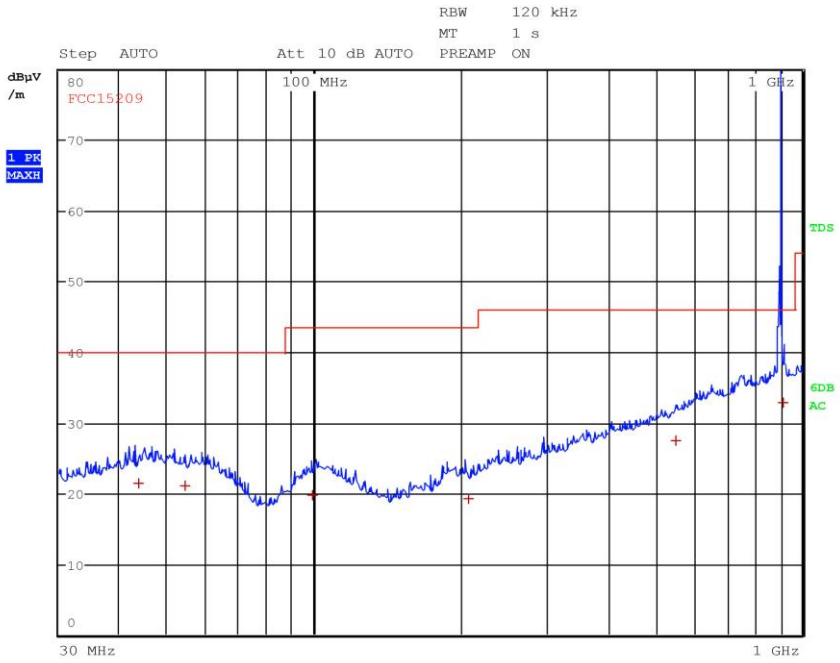
G15140026

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140026
Test Spec	



Final Measurement

Meas Time: 1 s
Margin: 30 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.51	Quasi Peak	-18.49
1	54.440000000 MHz	21.17	Quasi Peak	-18.83
1	98.800000000 MHz	19.74	Quasi Peak	-23.78
1	207.080000000 MHz	19.29	Quasi Peak	-24.23
1	550.800000000 MHz	27.53	Quasi Peak	-18.49
1	915.000000000 MHz	32.87	Quasi Peak	-13.15

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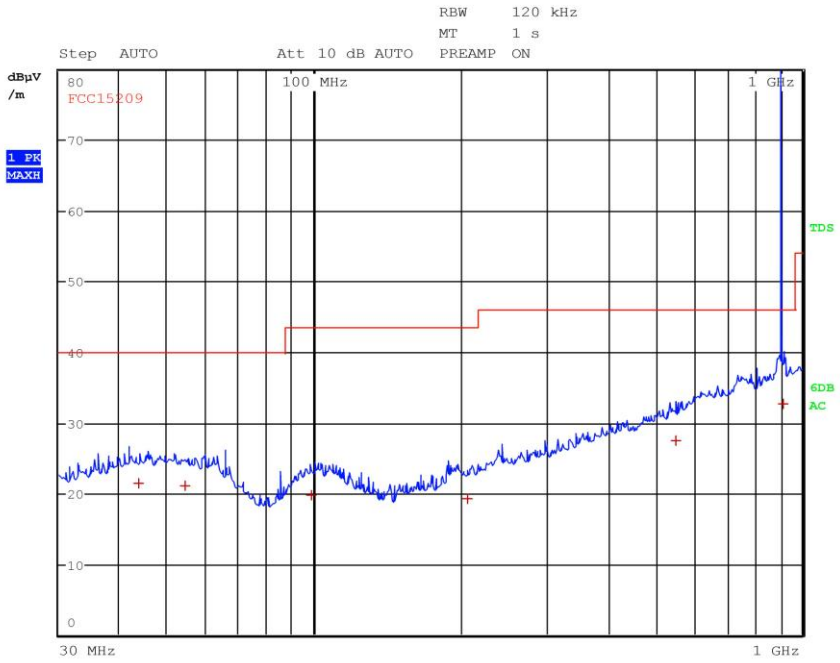
G15140027

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140027
Test Spec	



Final Measurement

Meas Time: 1 s
Margin: 30 dB
Subranges: 6

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	43.560000000 MHz	21.44	Quasi Peak	-18.56
1	54.440000000 MHz	21.14	Quasi Peak	-18.86
1	98.800000000 MHz	19.80	Quasi Peak	-23.72
1	207.080000000 MHz	19.32	Quasi Peak	-24.20
1	550.800000000 MHz	27.51	Quasi Peak	-18.51
1	915.000000000 MHz	32.77	Quasi Peak	-13.25

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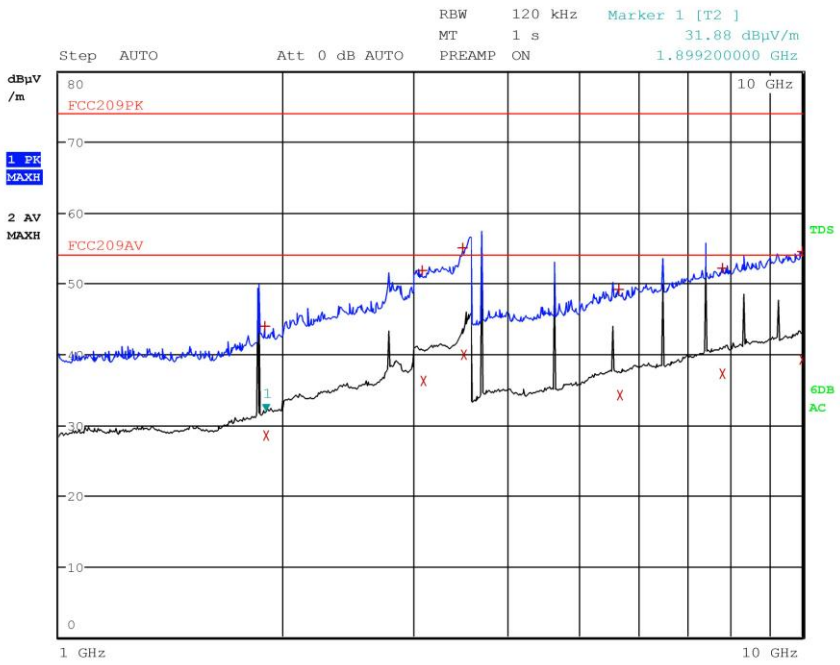
G15140028

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140028
Test Spec	



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Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140028
Test Spec	

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	1.891600000 GHz	44.02	Max Peak	-9.98
2	1.899200000 GHz	28.51	Quasi Peak	
1	3.080800000 GHz	51.82	Max Peak	-2.18
2	3.095600000 GHz	36.28	Quasi Peak	
1	3.499600000 GHz	55.01	Max Peak	-1.01
2	3.508000000 GHz	39.93	Quasi Peak	
1	5.661200000 GHz	49.19	Max Peak	-4.81
2	5.695600000 GHz	34.17	Quasi Peak	
1	7.798400000 GHz	52.15	Max Peak	-1.85
2	7.799600000 GHz	37.26	Quasi Peak	
1	9.990800000 GHz	54.60	Max Peak	-0.60
2	9.994000000 GHz	39.26	Quasi Peak	

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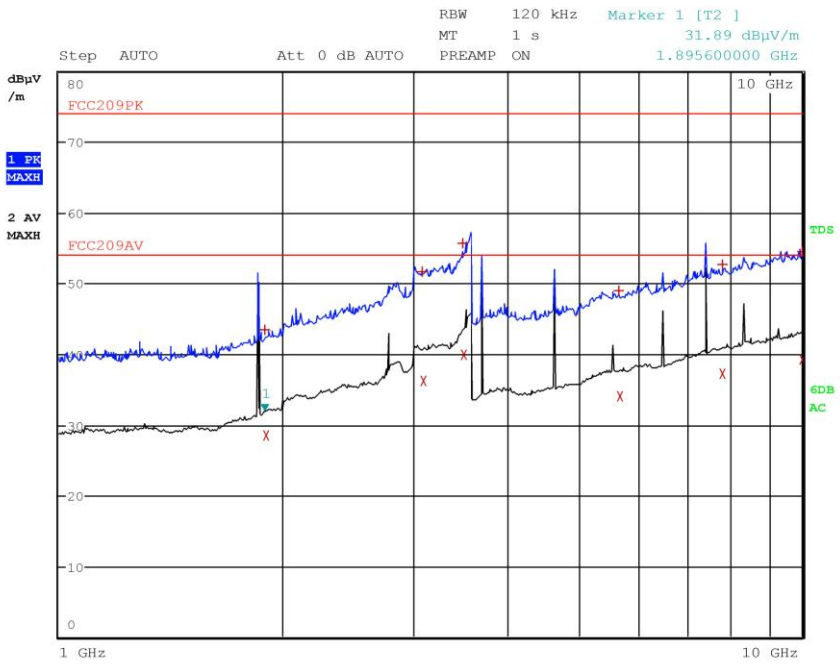
G15140029

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140029
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140029
Test Spec	

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Peaks: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	1.891600000 GHz	43.49	Max Peak	-10.51
2	1.899200000 GHz	28.55	Quasi Peak	
1	3.080800000 GHz	51.76	Max Peak	-2.24
2	3.095600000 GHz	36.26	Quasi Peak	
1	3.499600000 GHz	55.65	Max Peak	-1.65
2	3.508000000 GHz	39.88	Quasi Peak	
1	5.661200000 GHz	49.06	Max Peak	-4.94
2	5.695600000 GHz	34.10	Quasi Peak	
1	7.798400000 GHz	52.63	Max Peak	-1.37
2	7.799600000 GHz	37.16	Quasi Peak	
1	9.990800000 GHz	54.55	Max Peak	-0.55
2	9.994000000 GHz	39.26	Quasi Peak	

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.3 DTS bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 8.1
- 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

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

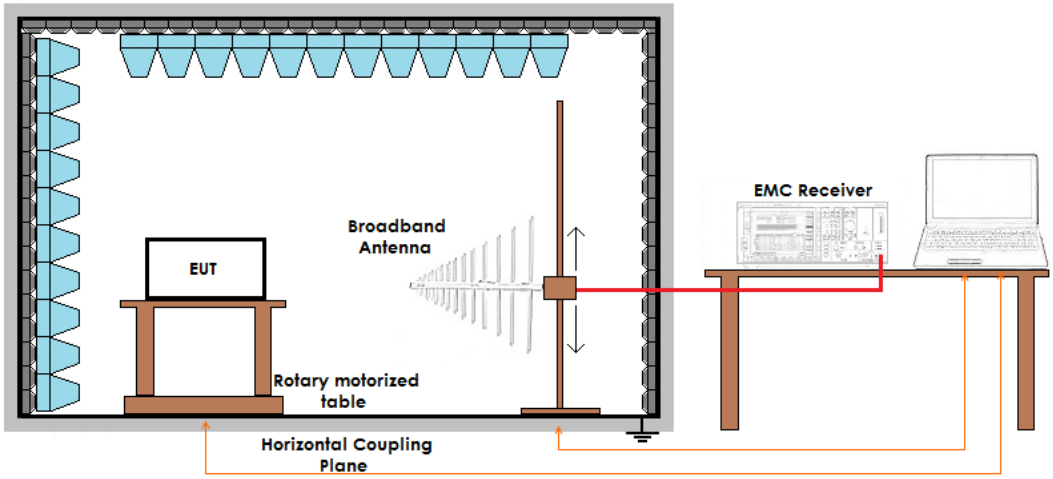
Environmental conditions

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

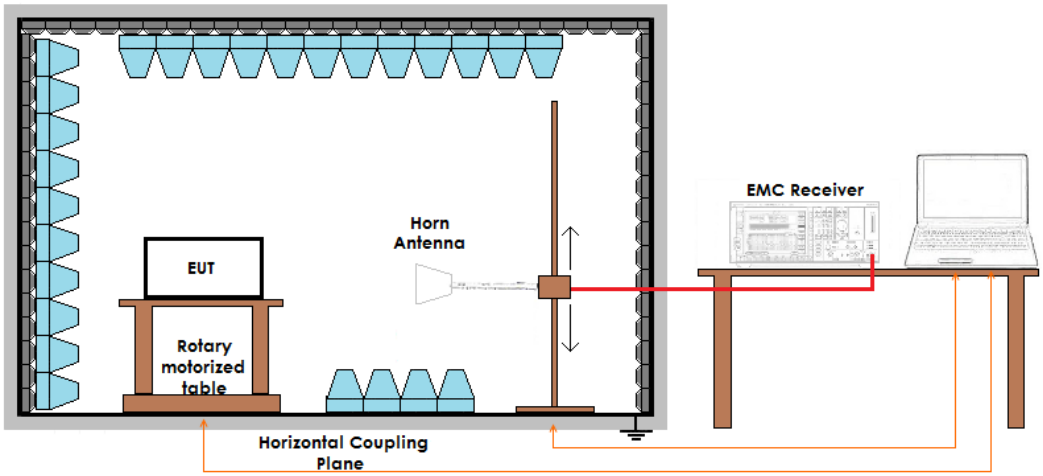
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



Result

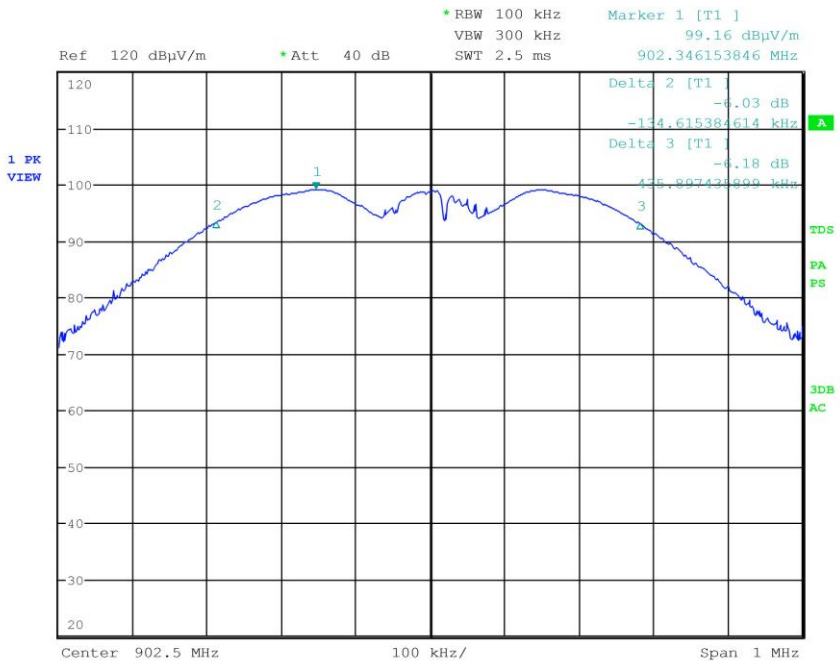
Channel	*Graphs*	*6 dB bandwidth (kHz)*	*Limits (kHz)*	*Results*
Lowest	G15140003	570,512	At least 500	Complies
Medium	G15140010	570,511	At least 500	Complies
Highest	G15140016	568,910	At least 500	Complies

CMC Centro Misure Compatibilità S.r.l.

Graphs

G15140003

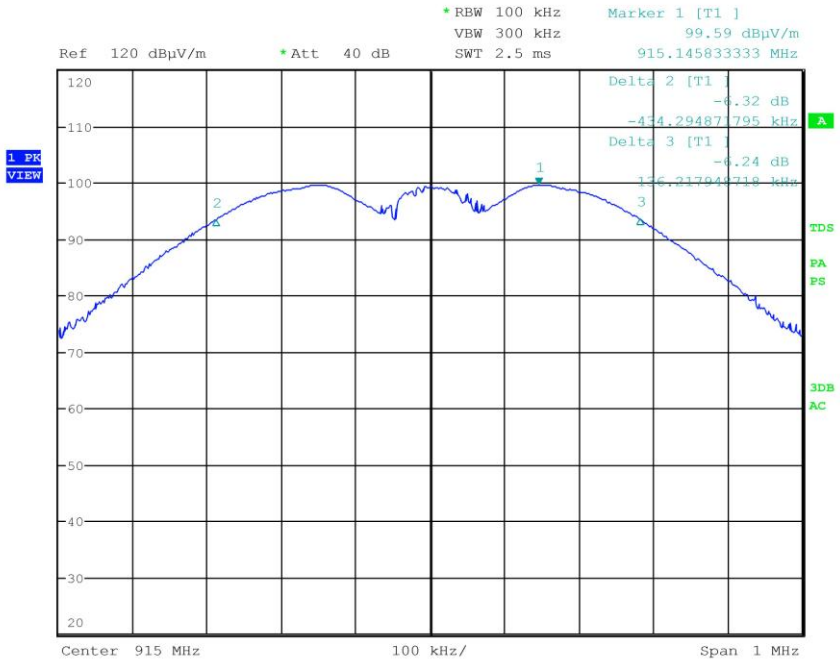
Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140003
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

G15140010

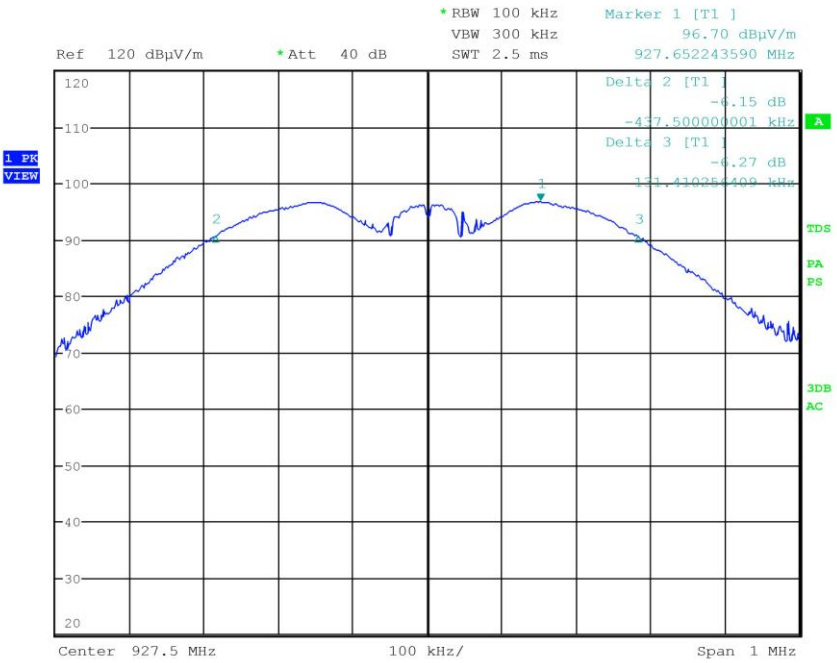
Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140010
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

G15140016

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140016
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 15.247 (d)
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 11.1(a) and 12.1
- 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

See FCC Part 15.247

Environmental conditions

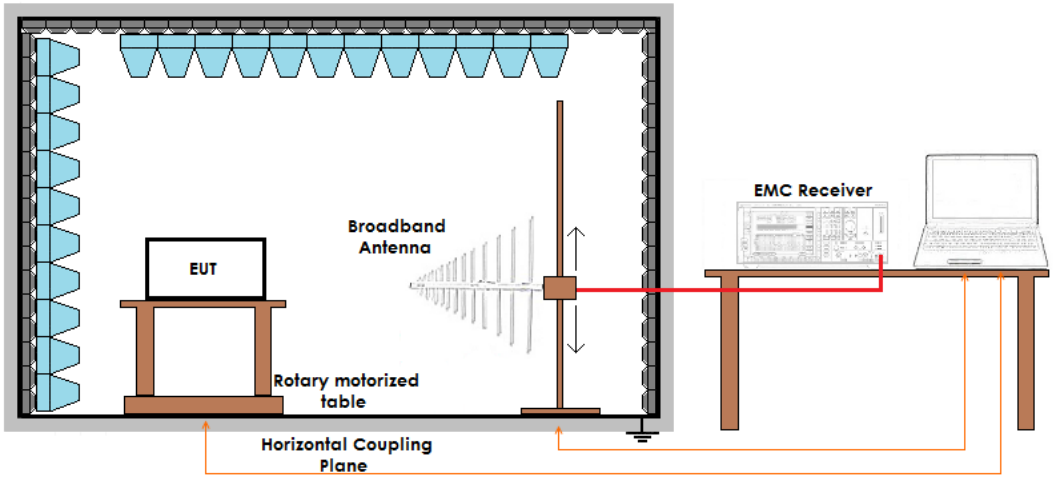
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
21	100	45

Acceptance limits: operation within the band 902 – 928 MHz

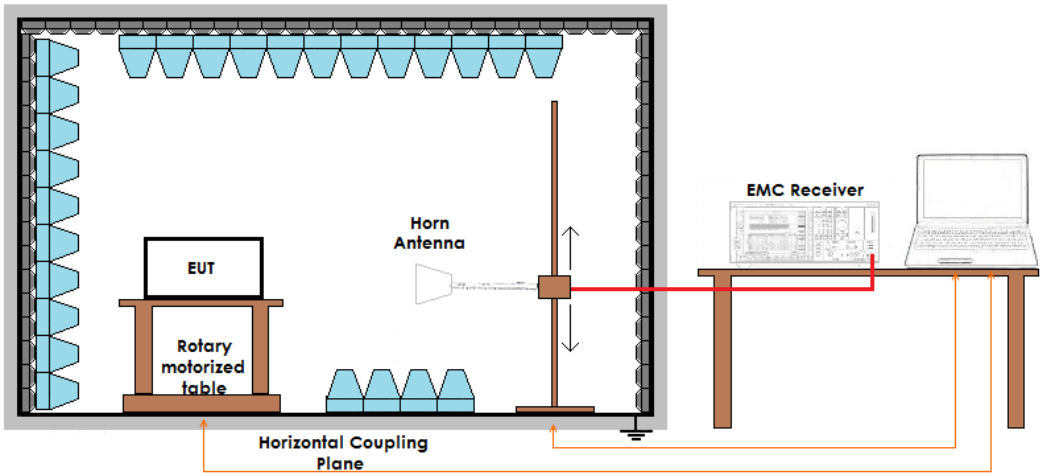
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



Result

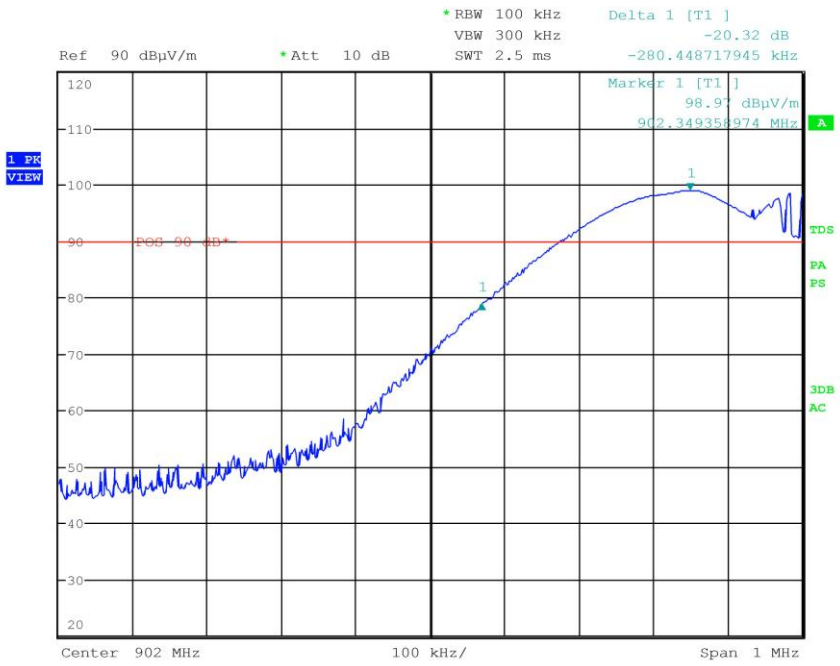
Channel	*Bandwidth*	*Graph(s)*	*Results*	
Lowest	100 kHz	G15140008	902,068910 MHz	Complies
Highest	100 kHz	G15140021	927,935896 MHz	Complies

CMC Centro Misure Compatibilità S.r.l.

Graphs

G15140008

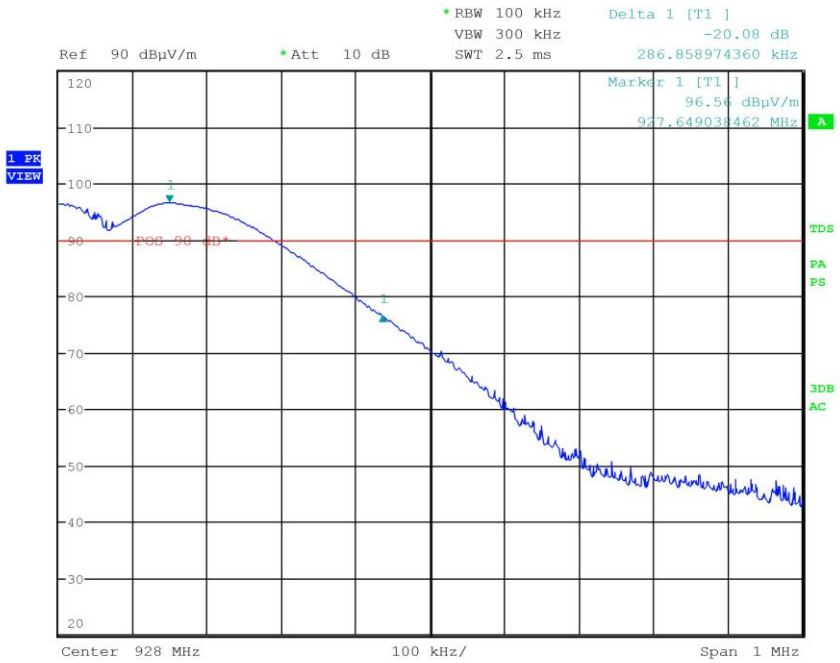
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 15140008
Test Spec



CMC Centro Misure Compatibilità S.r.l.

G15140021

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140021
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.5 Fundamental emission output power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 3.0 and 9
- 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

Port: Enclosure (conducted measurements are not applicable because the antenna connector is not available, see also cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r02)
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
EUT height about the floor: 80 cm

Environmental conditions

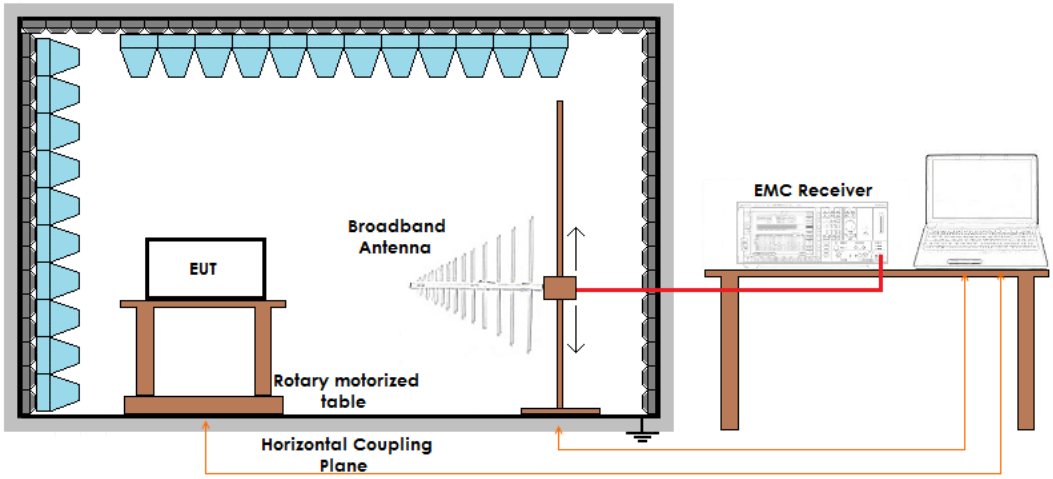
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

Acceptance limits:
For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt

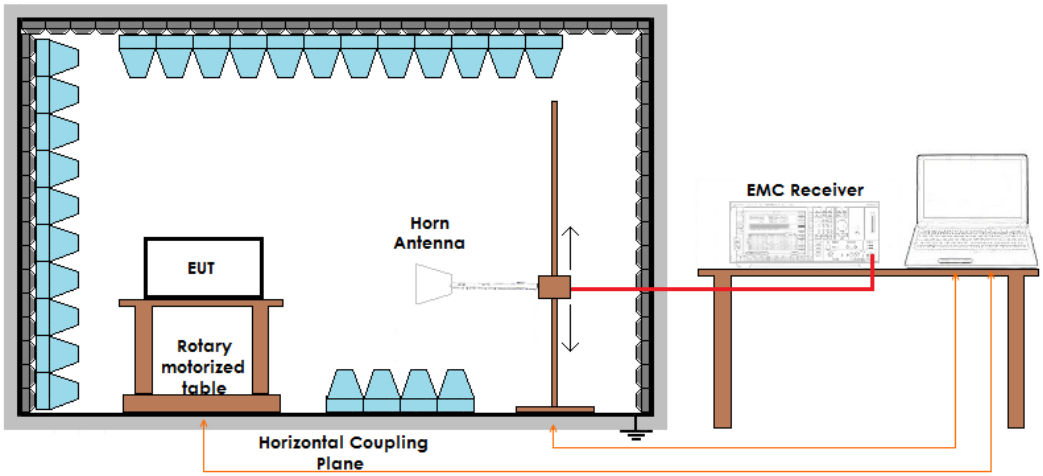
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



CMC Centro Misure Compatibilità S.r.l.

Result

Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Peak Output Conducted Power (mW)*	*Remarks*
Lowest	Worst case	G15140002	99,60	1,31	--
Medium	Worst case	G15140009	100,20	1,50	--
Highest	Worst case	G15140015	97,24	0,76	--

Remarks: the above table shows the results of radiated measurements, in agreement with cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r03.
Conducted measurements are not applicable because the antenna connector is not available.
The following formula, provided in document DA 00-705, has been used for the conversion between radiated to conducted values:

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

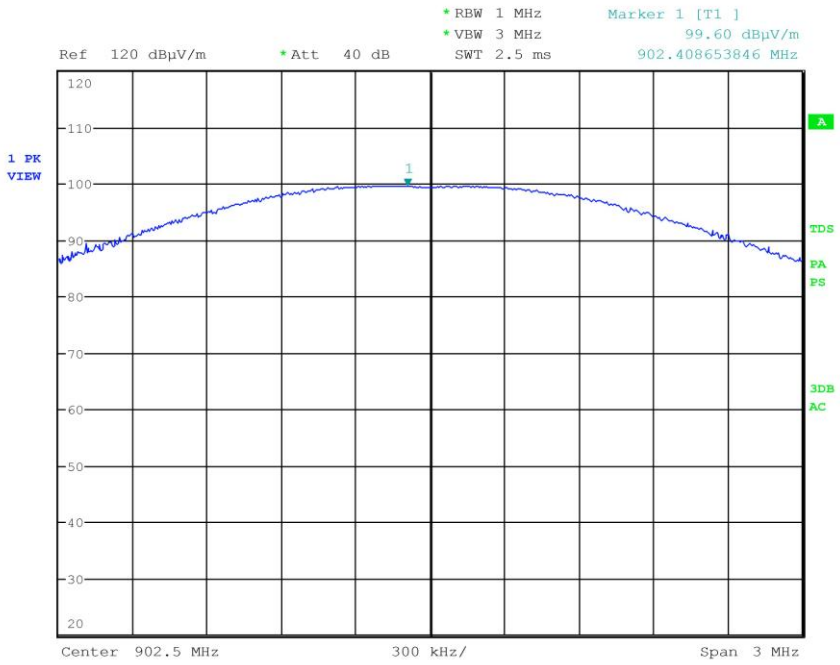
Where:
$E = (10^{(dB\mu V/m)/20})/1000000$, the maximum measured fundamental field strength in V/m
$G = 10^{dBi/10}$, the numeric gain of the transmitting antenna: 2,09 (3,2 dBi)
d = the distance in meters from which the field strength was measured (3 m)
P = the power in watts

CMC Centro Misure Compatibilità S.r.l.

Graphs

G15140002

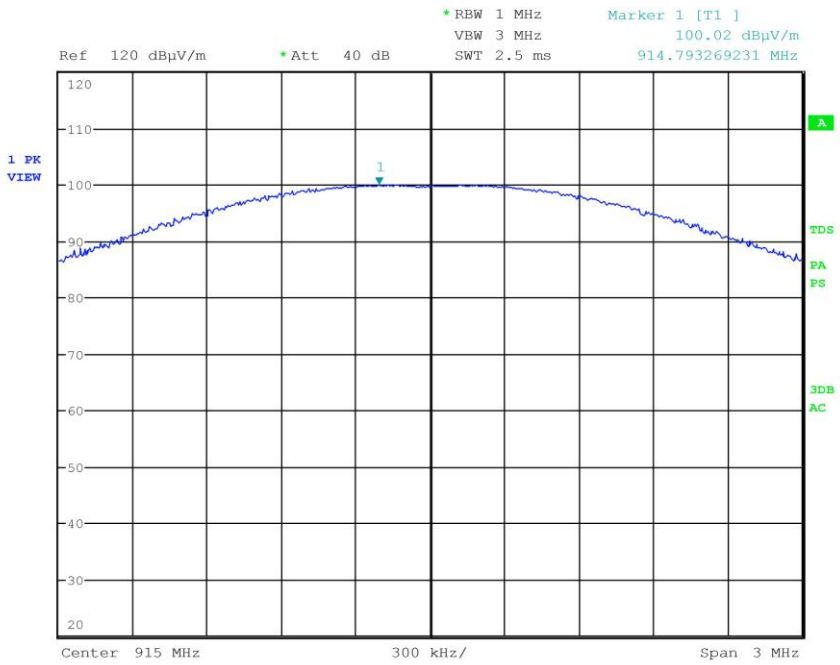
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 15140002
Test Spec



CMC Centro Misure Compatibilità S.r.l.

G15140009

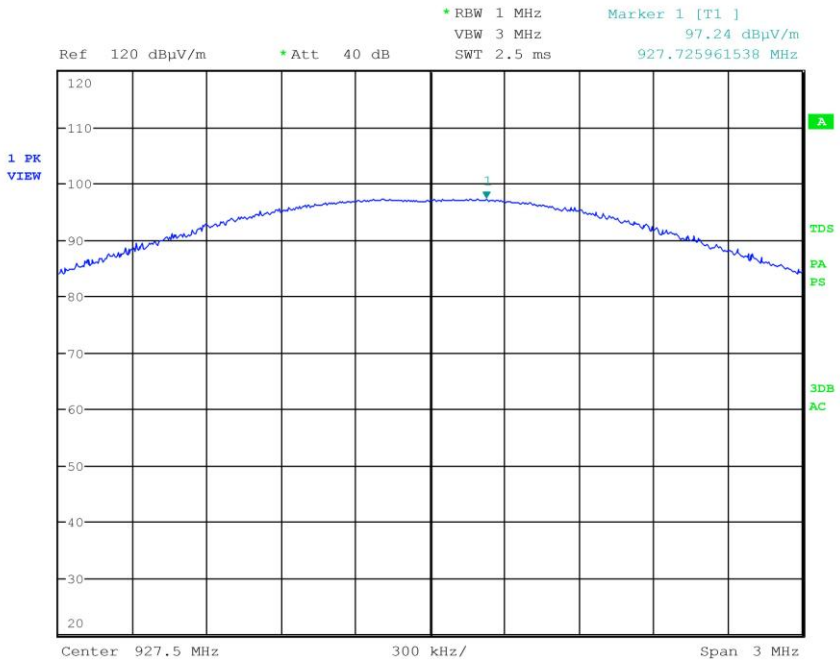
Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140009
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

G15140015

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140015
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.6 Maximum power spectral density level in the fundamental emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 10.2
- 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

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

Environmental conditions

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

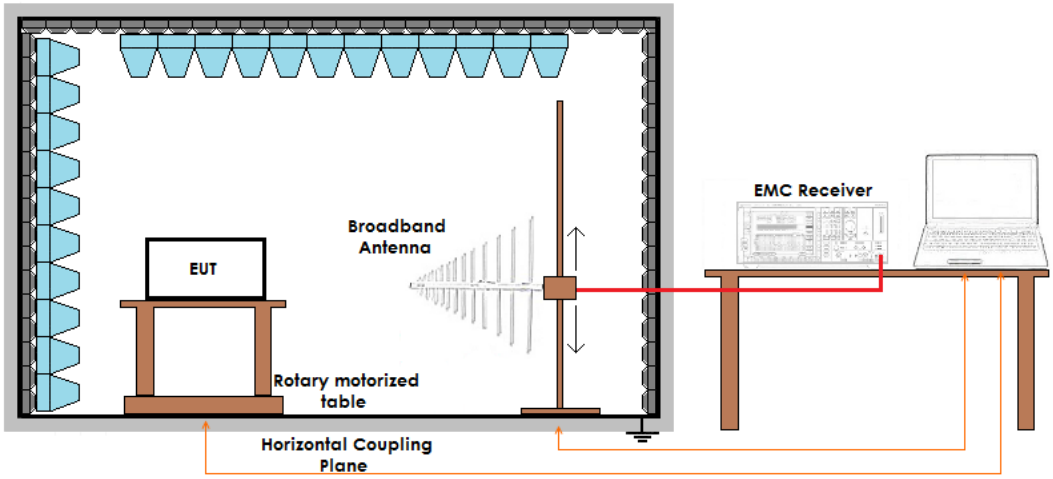
Acceptance limits:

Frequency Range	*Power Spectral Density*
902 – 928 MHz	8 dBm / 6,31 mW

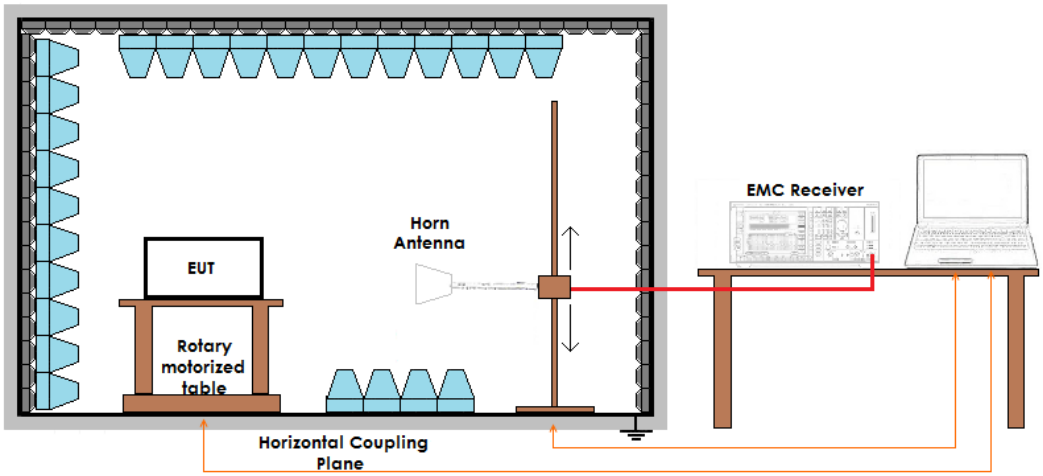
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



CMC Centro Misure Compatibilità S.r.l.

Result

Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Power Spectral Density (mW)*	*Remarks*
Lowest	Worst case	G15140004	99,16	1,18	--
Medium	Worst case	G15140011	99,59	1,31	--
Highest	Worst case	G15140017	96,70	0,67	--

Remarks: the above table shows the results of radiated measurements, in agreement with cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r03.
Conducted measurements are not applicable because the antenna connector is not available.
The following formula, provided in document DA 00-705, has been used for the conversion between radiated to conducted values:

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

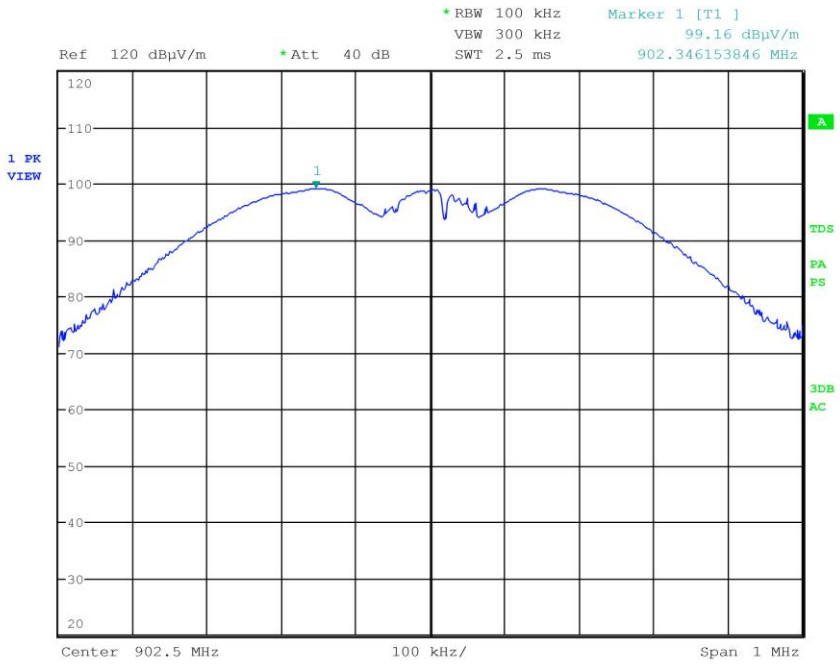
Where:
E = $(10^{(dB\mu V/m)/20})/1000000$, the maximum measured fundamental field strength in V/m
G = $10^{dBi/10}$, the numeric gain of the transmitting antenna: 2,09 (3,2 dBi)
d = the distance in meters from which the field strength was measured (3 m)
P = the power in watts

CMC Centro Misure Compatibilità S.r.l.

Graphs

G15140004

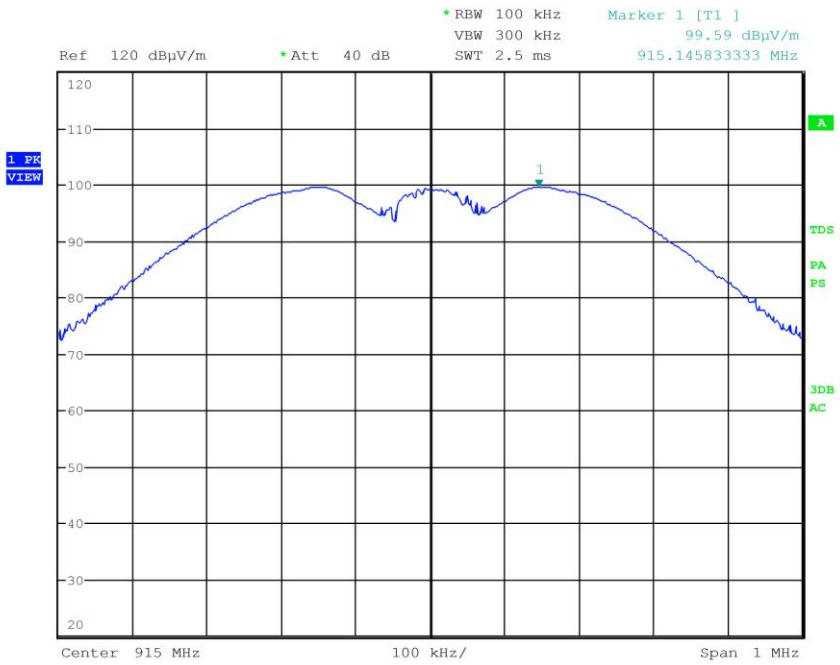
Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140004
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

G15140011

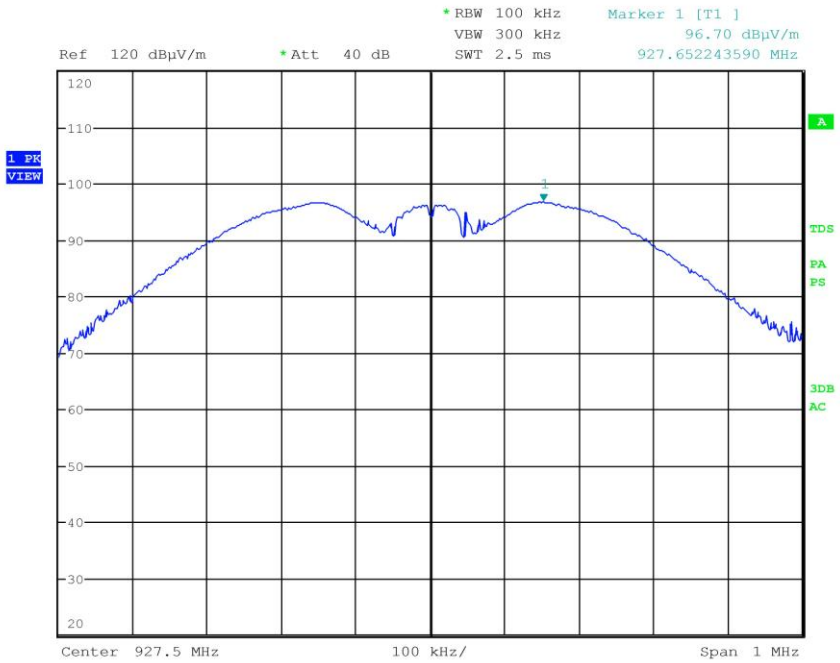
Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140011
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

G15140017

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140017
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.7 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

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
EUT height about the floor: 80 cm
Detector AV + Peak

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

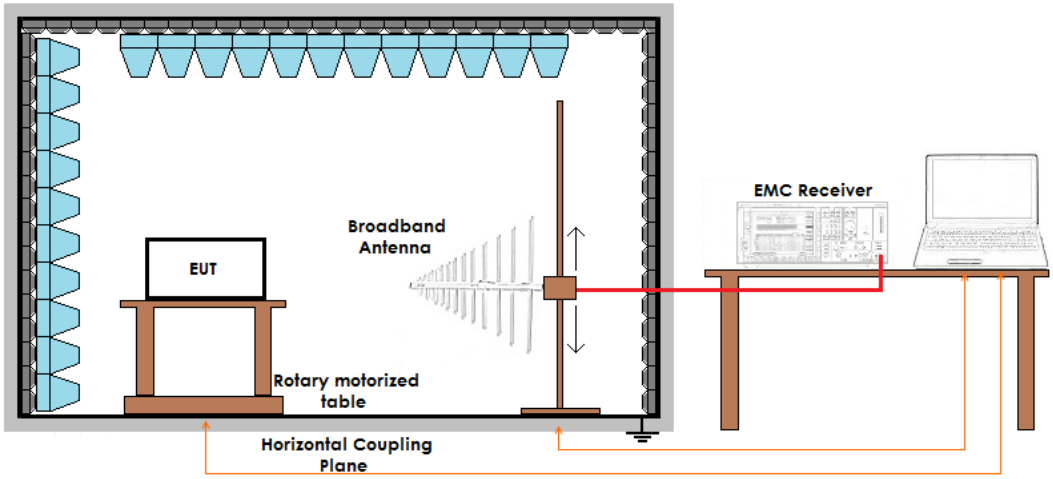
The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

a) If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz
b) If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.
c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required

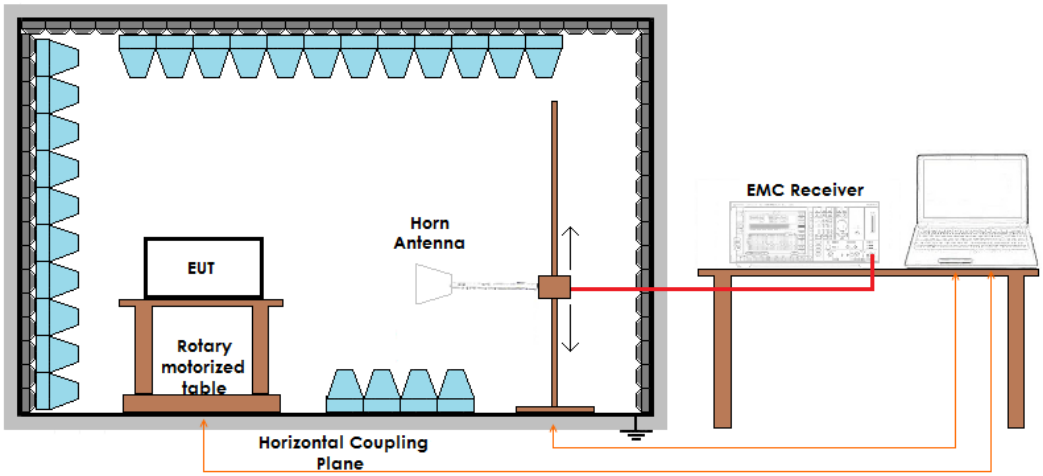
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



CMC Centro Misure Compatibilità S.r.l.

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	57,50*	79,20	52,70*	79,60	47,90*	76,70	Complies
III	48,60*	79,20	46,20*	79,60	46,60*	76,70	Complies
IV	50,30	54,00	49,30	54,00	53,90	54,00	Complies
V	53,50	54,00	52,90	54,00	53,10	54,00	Complies
VI	42,00	54,00	45,00*	79,60	45,60*	76,70	Complies
VII	50,00*	79,20	50,90*	79,60	53,70*	76,70	Complies
VIII	44,00*	79,20	47,40	54,00	51,40	54,00	Complies
IX	49,50	54,00	53,90	54,00	51,60	54,00	Complies
X	50,10	54,00	53,30	54,00	49,00*	76,70	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands

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	58,40*	99,16	55,40*	99,59	50,20*	96,70	Complies
III	52,40*	99,16	51,80*	99,59	52,90*	96,70	Complies
IV	53,40	99,16	51,90	74,00	56,20	74,00	Complies
V	56,10	74,00	54,00	74,00	53,30	74,00	Complies
VI	52,00	74,00	52,00*	99,59	50,50*	96,70	Complies
VII	55,50*	99,16	52,00*	99,59	54,10*	96,70	Complies
VIII	54,00*	99,16	53,50	74,00	55,50	74,00	Complies
IX	57,00	74,00	55,30	74,00	56,00	74,00	Complies
X	57,20	74,00	54,70	74,00	54,00*	96,70	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.8 Maximum permissible exposure

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 1.1310
- Internal procedure PM001
- See clause 4 of this test report

Test configuration

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

Port: Antenna connector

Acceptance limits	(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] ·30[√f(GHz)] ≤ 3.0 for 1-g SAR

Result

Frequency (MHz)	*Output Power (mW)*	*Test separation distance (mm)*	*SAR evaluation*
902,41	1,31	5,00	Not required, see remarks
914,79	1,50	5,00	Not required, see remarks
927,73	0,76	5,00	Not required, see remarks
Remarks: minimum test separation distance is < 5 mm, a distance of 5 mm according to point 5 in section 4.1 of KDB 447498 is applied to determine SAR test exclusion. SAR evaluation is not required because the maximum output power (1,50 mW) is lower than the exclusion threshold for devices operating at 900 MHz (16 mW), see also Appendix A of KDB 447498			

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.