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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. R15130901

Federal Communication Commission (FCC)

Test item

Description.....: WITTY TIMER
Trademark.....: MICROGATE
Model/Type .....: WIT001
FCC ID.....: 2ADEOWIT001

Test Specification

Standard .....: FCC Rules & Regulations, Title 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 231

Client's name.....: MICROGATE S.r.l.
Address .....: Via Stradivari, 4 – 39100 Bolzano (BZ) – ITALY

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

Report

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

Approved by.....: R. Beghetto – *Laboratory Manager*

Date of issue .....: 16.02.16
Contents.....: 44 pages

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1. Summary

Standard:

FCC Rules & Regulations, Title 47:2014
Part 15 paragraph(s): 203, 204, 207, 209 and 231

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 15.231(a)	Fundamental and spurious emissions (≤ 1 GHz)	3	Complies
Part 15.209 and 15.231	Spurious emissions (> 1 GHz)	4	Complies
Part 15.231(c)	Occupied channel bandwidth	5	Complies
Part 15.231(a)	Periodic operation characteristics	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	:	434,01 MHz

2.1 Test Site

Company	:	CMC Centro Misure Compatibilità S.r.l.
Address	:	Via dell'Elettronica, 12/C
		36016 Thiene (VI) – ITALY
Test site facility's FCC registration number	:	271947

3. Testing and sampling

Date of receipt of test item	:	12.05.15
Testing start date	:	30.07.15
Testing end date	:	21.10.15
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 P150532

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 '15	January '16
CMC S108	EMCO	3115	Horn Antenna	9811-5622	May '13	May '16
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	January '13	January '16
CMC S129	Rohde & Schwarz	ESPI7	Receiver	836.914/004	January '15	January '16
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '13	May '16
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '15	January '16
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '15	January '16
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121	January '15	January '16

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
DiscontinuousConducted 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

Notes

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 15:2014	--
ANSI C63.4:2009	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. 2.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 8.2 (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

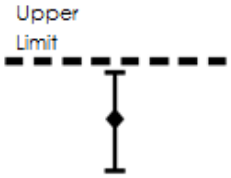
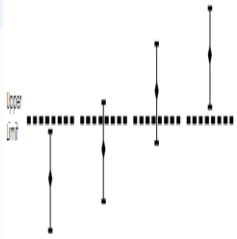
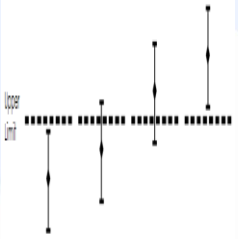
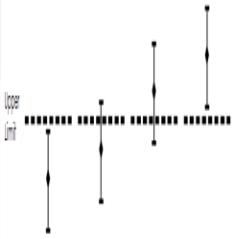
Test case does not apply to the test object ..... : N.A.
Test item does meet the requirement ..... : Complies
Test item does not meet the requirement..... : Does not comply
Test not performed ..... : N.E.

11. Results

In this clause tests results are reported.

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

Judgement of compliance:

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirement. The measurement results is within the specification limit when the measurement uncertainty is taken into account.	The sample complies with the requirement. It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	The sample does not comply with the requirement. 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 sample does not comply with the requirement. 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 (%)*
22	101	45

Result

Antenna Type	*External R.F. power amplifier*	*Remarks*	*Results*
Integral antenna	Not Present	--	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 S136, CMC S164
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

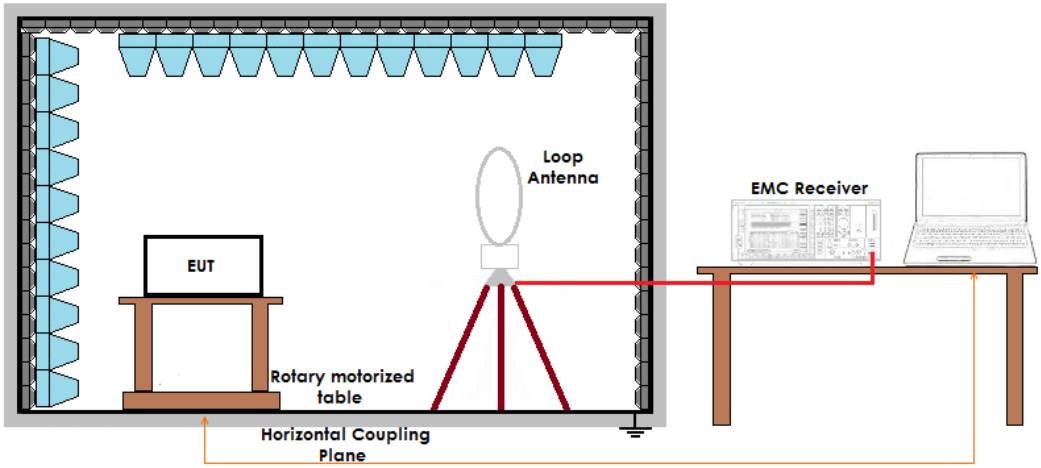
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	45

Acceptance limits

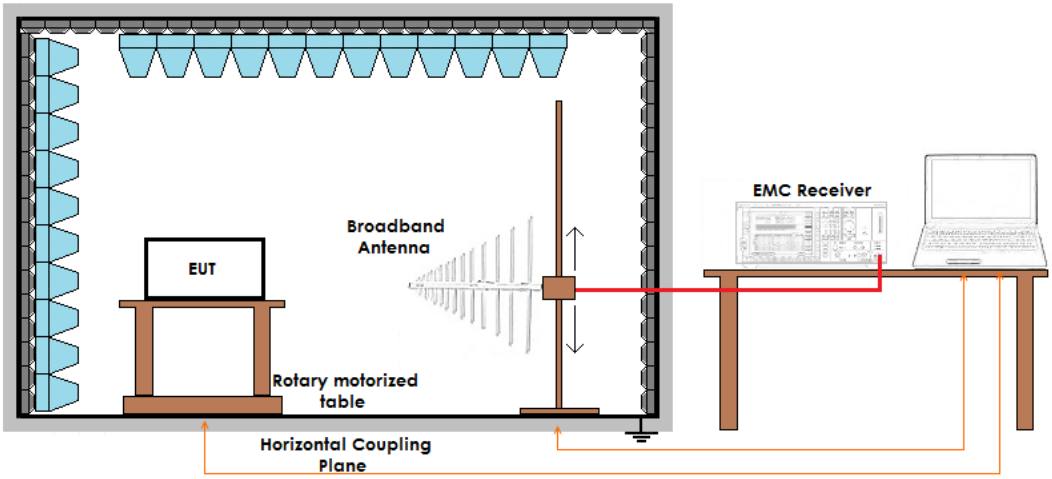
Frequency range (MHz)	*Limits [dB(µV/m)]*
0,009 to 0,490	128,51 to 93,80
0,490 to 1,705	73,80 to 62,97
1,705 to 30	69,54
30 to 88	40
88 to 216	43,52
216 to 960	46,02
Above 960	53,98
Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except 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.	

Setup

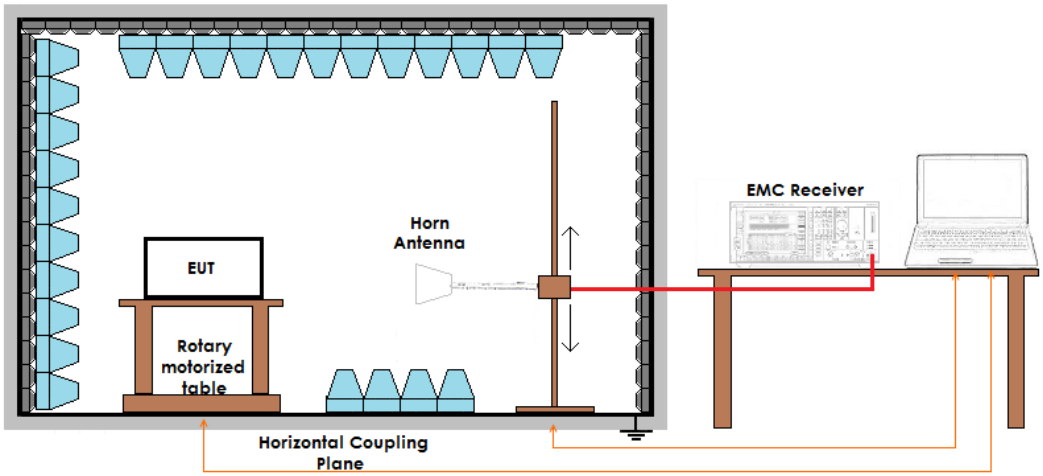
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz



Result

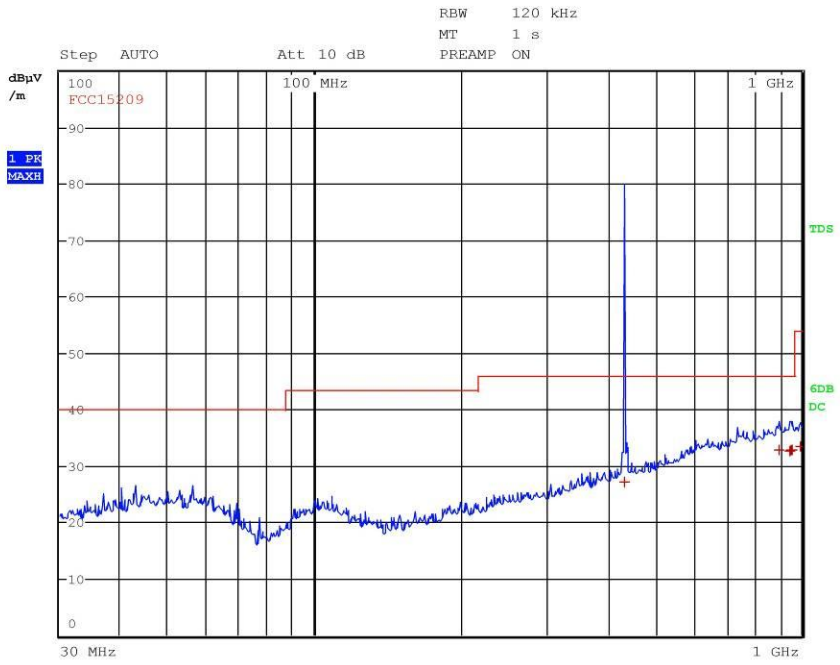
Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
Loop	0,009 – 30	G15130911	CH 1 (lowest channel)	Complies
H	30 – 1000	G15130907	CH 1 (lowest channel)	Complies
V	30 – 1000	G15130908	CH 1 (lowest channel)	Complies
H	1000 – 6000	G15130910	CH 1 (lowest channel)	Complies
V	1000 – 6000	G15130909	CH 1 (lowest channel)	Complies
Loop	0,009 – 30	G15130912	CH 8 (highest channel)	Complies
H	30 – 1000	G15130914	CH 8 (highest channel)	Complies
V	30 – 1000	G15130913	CH 8 (highest channel)	Complies
H	1000 – 6000	G15130916	CH 8 (highest channel)	Complies
V	1000 – 6000	G15130915	CH 8 (highest channel)	Complies
Remarks: --				

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

G15130907

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130907
Test Spec	



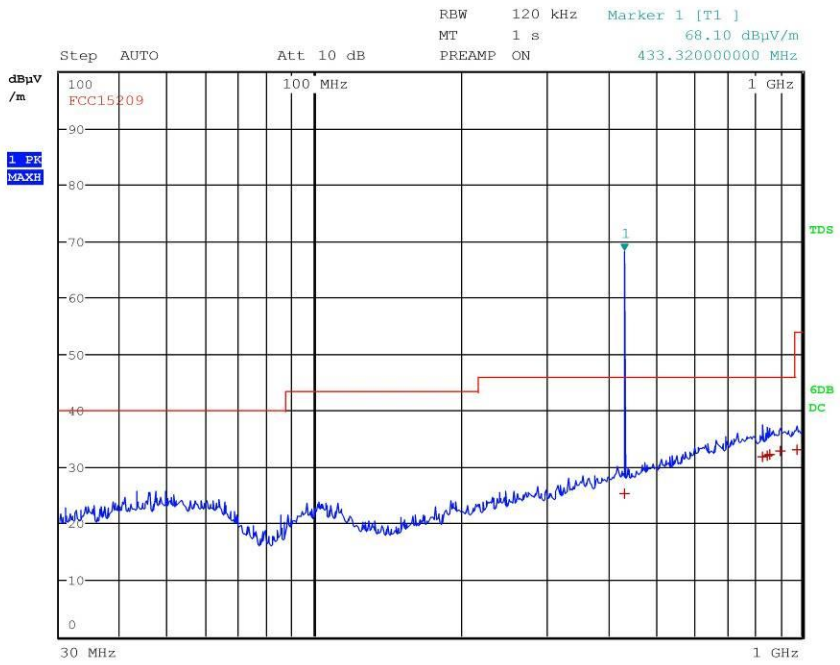
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	433.500000000 MHz	27.24	Quasi Peak	-18.78
1	901.200000000 MHz	32.85	Quasi Peak	-13.17
1	947.160000000 MHz	32.76	Quasi Peak	-13.26
1	952.920000000 MHz	32.91	Quasi Peak	-13.11
1	955.480000000 MHz	32.92	Quasi Peak	-13.10
1	995.800000000 MHz	33.46	Quasi Peak	-20.52

G15130908

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130908
Test Spec	



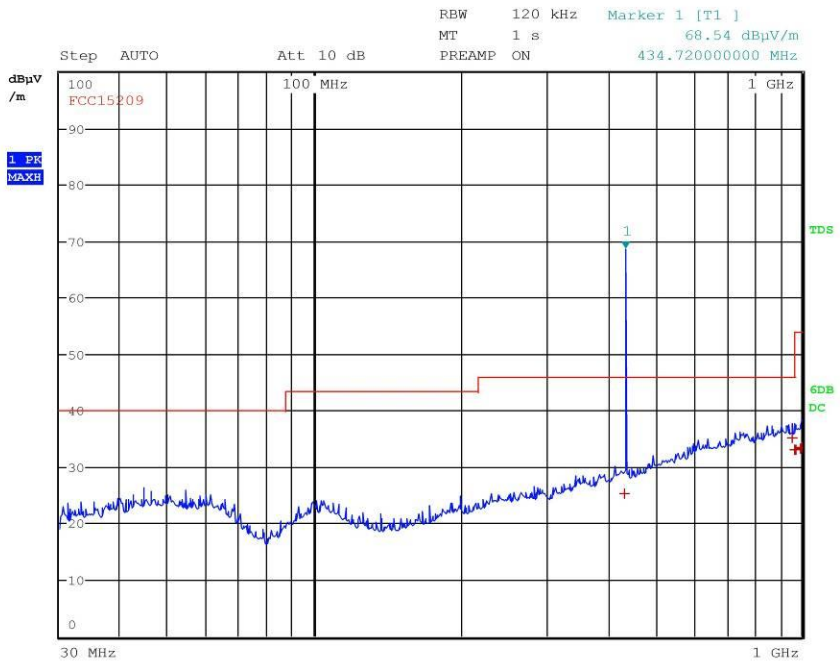
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	433.500000000 MHz	25.41	Quasi Peak	-20.61
1	830.320000000 MHz	31.73	Quasi Peak	-14.29
1	851.320000000 MHz	32.07	Quasi Peak	-13.95
1	860.200000000 MHz	32.20	Quasi Peak	-13.82
1	901.640000000 MHz	32.79	Quasi Peak	-13.23
1	976.720000000 MHz	33.15	Quasi Peak	-20.83

G15130909

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130909
Test Spec	



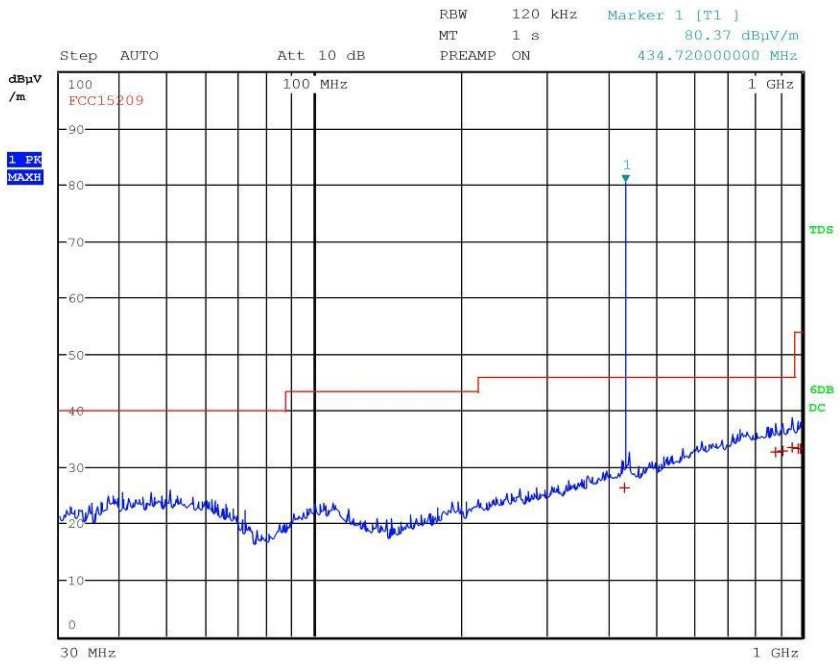
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	433.200000000 MHz	25.33	Quasi Peak	-20.69
1	955.600000000 MHz	35.15	Quasi Peak	-10.87
1	964.520000000 MHz	33.03	Quasi Peak	-20.95
1	971.560000000 MHz	33.12	Quasi Peak	-20.86
1	994.520000000 MHz	33.38	Quasi Peak	-20.60
1	998.120000000 MHz	33.44	Quasi Peak	-20.54

G15130910

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130910
Test Spec	



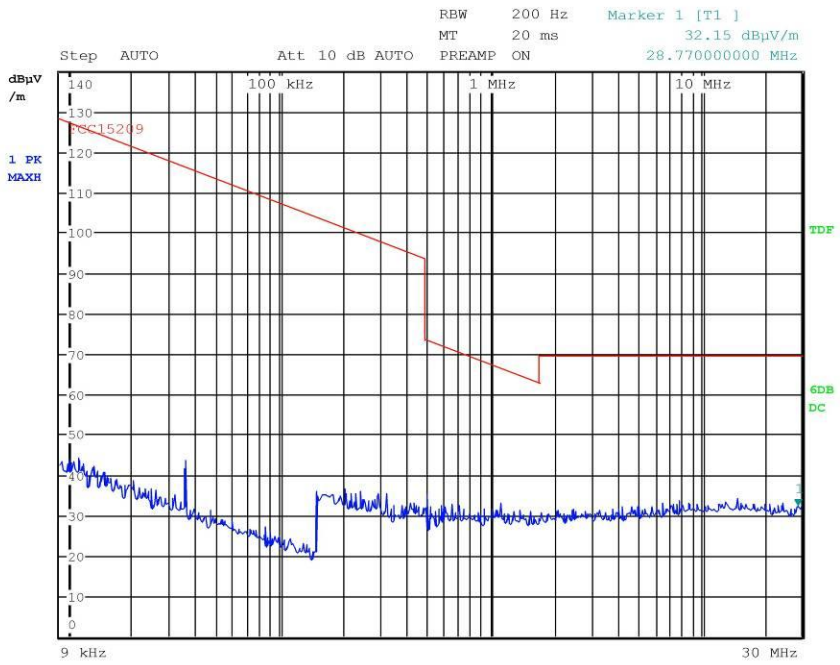
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	433.200000000 MHz	26.39	Quasi Peak	-19.63
1	883.120000000 MHz	32.64	Quasi Peak	-13.38
1	913.160000000 MHz	32.85	Quasi Peak	-13.17
1	955.560000000 MHz	33.60	Quasi Peak	-12.42
1	984.520000000 MHz	33.23	Quasi Peak	-20.75
1	995.520000000 MHz	33.40	Quasi Peak	-20.58

G15130911

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130911
Test Spec	

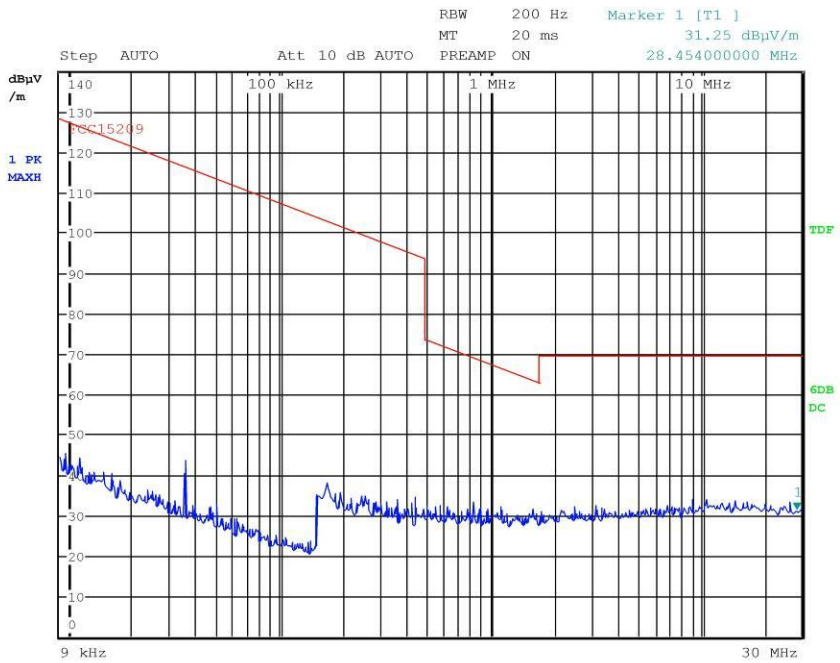


Final Measurement

Meas Time:	1 s
Margin:	6 dB
Subranges:	0

G15130912

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130912
Test Spec	

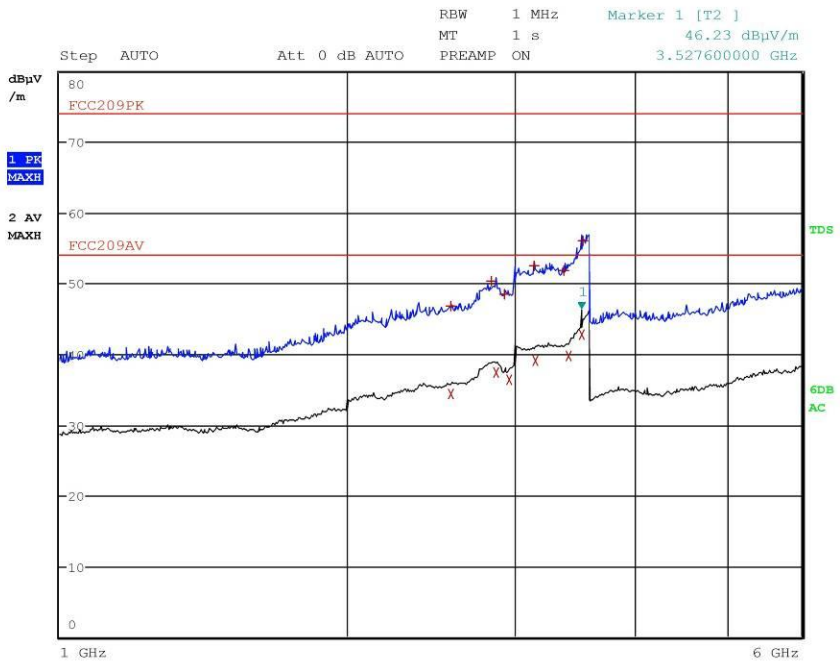


Final Measurement

Meas Time:	1 s
Margin:	6 dB
Subranges:	0

G15130913

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130913
Test Spec	



Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130913
Test Spec	

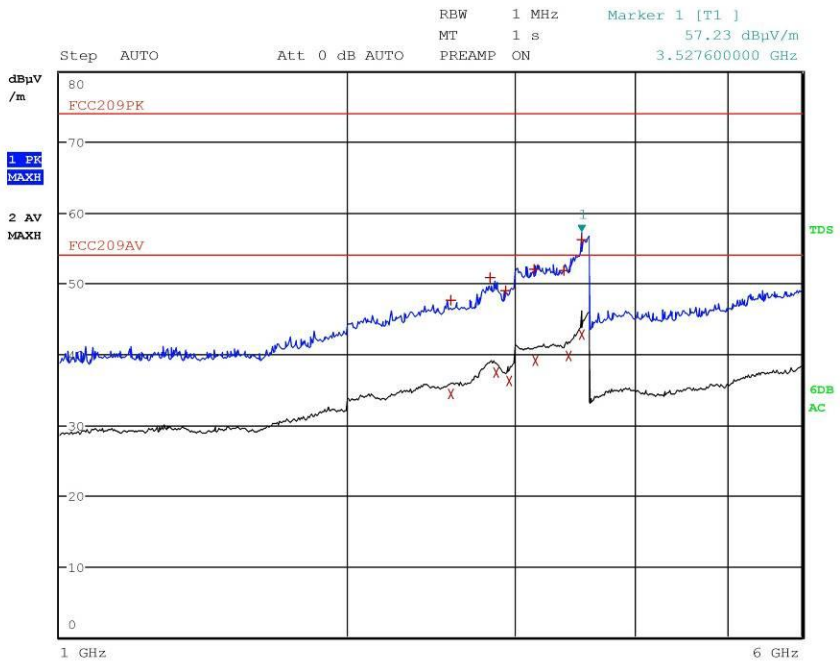
Final Measurement

Meas Time: 1 s
Margin: 6 dB
Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	2.571200000 GHz	46.82	Max Peak	-7.18
2	2.571600000 GHz	34.43	Average	
1	2.830000000 GHz	50.39	Max Peak	-3.61
2	2.866800000 GHz	37.43	Average	
1	2.931200000 GHz	48.43	Max Peak	-5.57
2	2.957200000 GHz	36.31	Average	
1	3.146400000 GHz	52.48	Max Peak	-1.52
2	3.152800000 GHz	39.01	Average	
1	3.380000000 GHz	51.90	Max Peak	-2.10
2	3.416800000 GHz	39.82	Average	
2	3.527600000 GHz	42.75	Average	
1	3.540000000 GHz	56.07	Max Peak	2.07

G15130914

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130914
Test Spec	



Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130914
Test Spec	

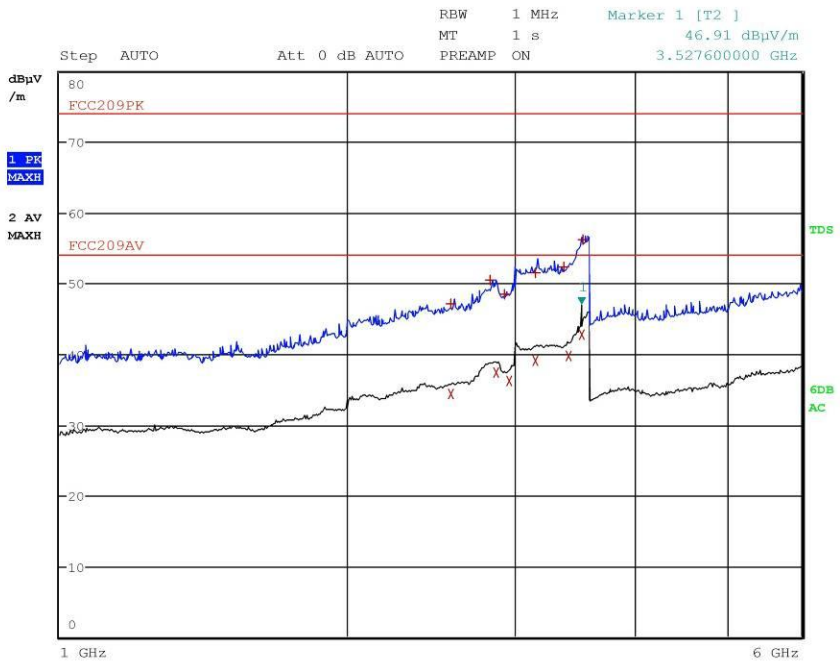
Final Measurement

Meas Time: 1 s
Margin: 6 dB
Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	2.571200000 GHz	47.66	Max Peak	-6.34
2	2.571600000 GHz	34.42	Average	
1	2.830000000 GHz	50.79	Max Peak	-3.21
2	2.866800000 GHz	37.40	Average	
1	2.931200000 GHz	49.07	Max Peak	-4.93
2	2.957200000 GHz	36.28	Average	
1	3.146400000 GHz	51.98	Max Peak	-2.02
2	3.152800000 GHz	39.00	Average	
1	3.380000000 GHz	51.79	Max Peak	-2.21
2	3.416800000 GHz	39.82	Average	
1	3.527600000 GHz	56.22	Max Peak	2.22
2	3.527600000 GHz	42.74	Average	

G15130915

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130915
Test Spec	



Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130915
Test Spec	

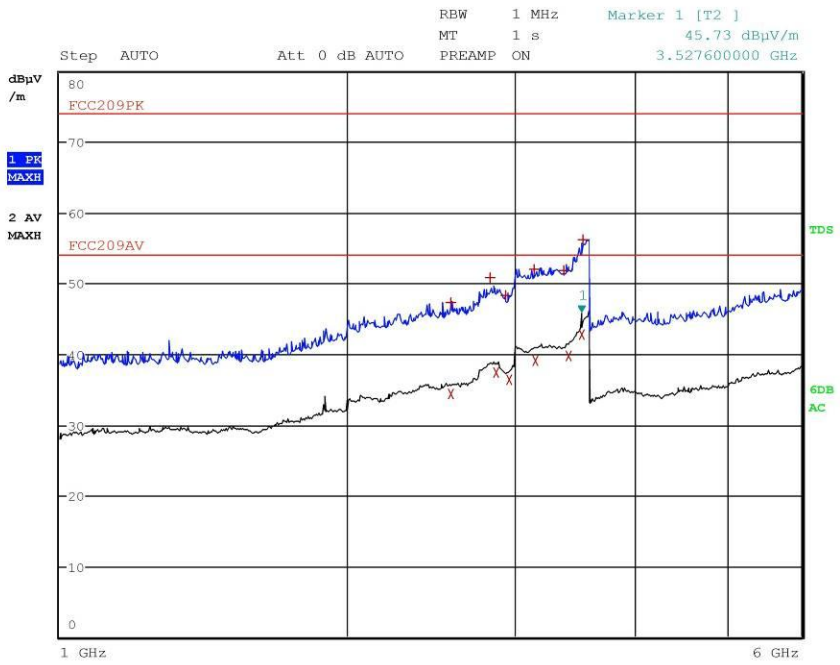
Final Measurement

Meas Time: 1 s
Margin: 6 dB
Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	2.571200000 GHz	47.13	Max Peak	-6.87
2	2.571600000 GHz	34.43	Average	
1	2.830000000 GHz	50.55	Max Peak	-3.45
2	2.866800000 GHz	37.42	Average	
1	2.931200000 GHz	48.56	Max Peak	-5.44
2	2.957200000 GHz	36.30	Average	
1	3.146400000 GHz	51.51	Max Peak	-2.49
2	3.152800000 GHz	39.01	Average	
1	3.380000000 GHz	52.42	Max Peak	-1.58
2	3.416800000 GHz	39.82	Average	
2	3.527600000 GHz	42.75	Average	
1	3.540000000 GHz	56.17	Max Peak	2.17

G15130916

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130916
Test Spec	



Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130916
Test Spec	

Final Measurement

Meas Time: 1 s
Margin: 6 dB
Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	2.571200000 GHz	47.37	Max Peak	-6.63
2	2.571600000 GHz	34.43	Average	
1	2.830000000 GHz	50.86	Max Peak	-3.14
2	2.866800000 GHz	37.41	Average	
1	2.931200000 GHz	48.24	Max Peak	-5.76
2	2.957200000 GHz	36.33	Average	
1	3.146400000 GHz	52.02	Max Peak	-1.98
2	3.152800000 GHz	39.01	Average	
1	3.380000000 GHz	51.88	Max Peak	-2.12
2	3.416800000 GHz	39.82	Average	
2	3.527600000 GHz	42.76	Average	
1	3.540000000 GHz	56.14	Max Peak	2.14

Result: The requirements are met

11.3 Fundamental and Spurious Emission (≤ 1 GHz)

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231(a)
- 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 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
Detector CISPR quasi-peak

Environmental conditions

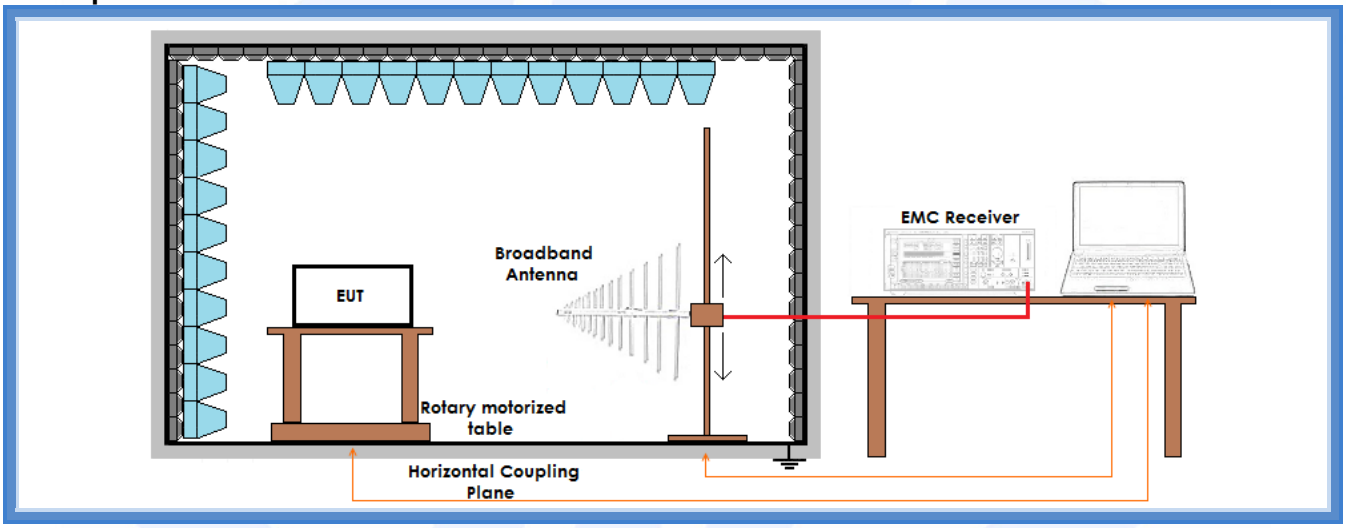
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
20	100	45

Acceptance limits

FCC Part 15.231 (b)		
Fundamental frequency (MHz)	*Field strength of fundamental [dB(µV/m)]*	*Field strength of spurious emissions [dB(µV/m)]*
40,66 to 40,70	67,04	47,04
70 to 130	61,94	41,94
130 to 174	61,94 to 71,48	41,94 to 51,48
174 to 260	71,48	51,48
260 to 470	71,48 to 81,94	51,48 to 61,94
Above 470	81,94	61,94

FCC Part 15.231 (e)		
Fundamental frequency (MHz)	*Field strength of fundamental [dB(µV/m)]*	*Field strength of spurious emissions [dB(µV/m)]*
40,66 to 40,70	60	40
70 to 130	53,98	33,98
130 to 174	53,98 to 63,52	33,98 to 43,52
174 to 260	63,52	43,52
260 to 470	63,52 to 73,98	43,52 to 53,98
Above 470	73,98	53,98

Setup



Graphs:	G15130901 and G15130903

Result – Field strength of fundamental

Channel	*f (MHz)*	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
CH 1	433,31	80,79	80,15	Complies
CH 8	434,71	80,84	80,27	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.				

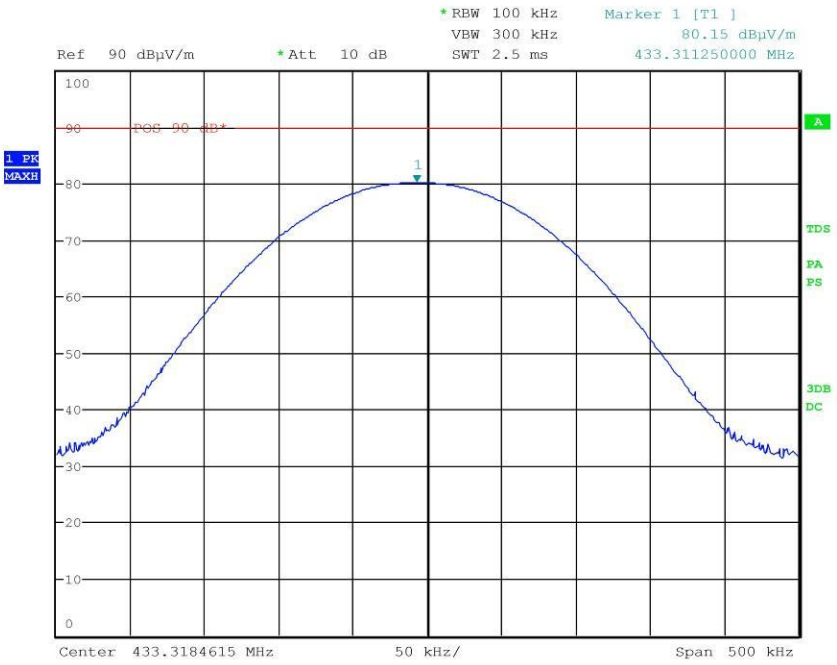
Result – Field strength of spurious emissions

Channel	*f (MHz)*	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
CH 1	866,62	60,79	< 40	Complies
CH 8	869,42	60,84	< 40	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.				

Graphs

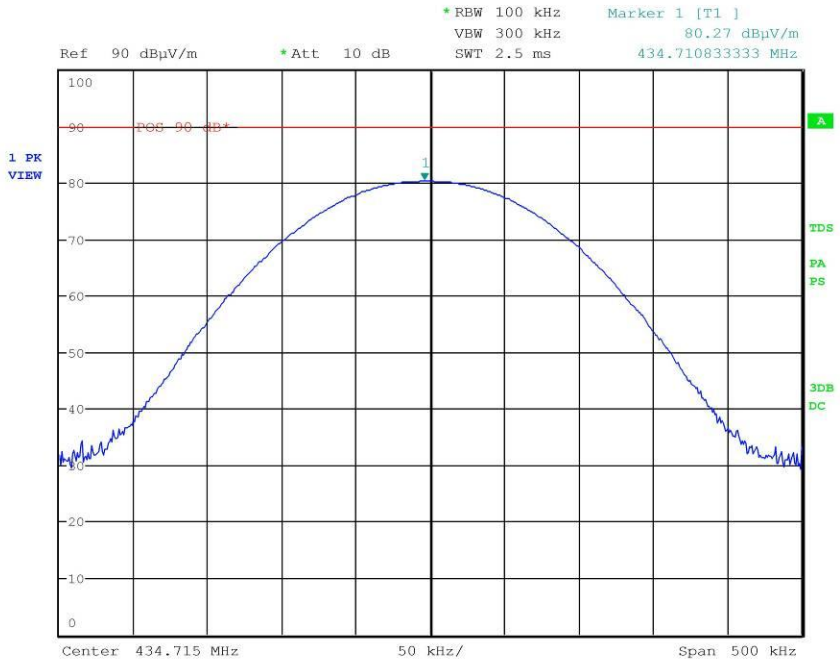
G15130901

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130901
Test Spec	



G15130903

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130903
Test Spec	



Result: The requirements are met

11.4 Spurious Emission (> 1 GHz)

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231
- 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 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
Detector AV + Peak

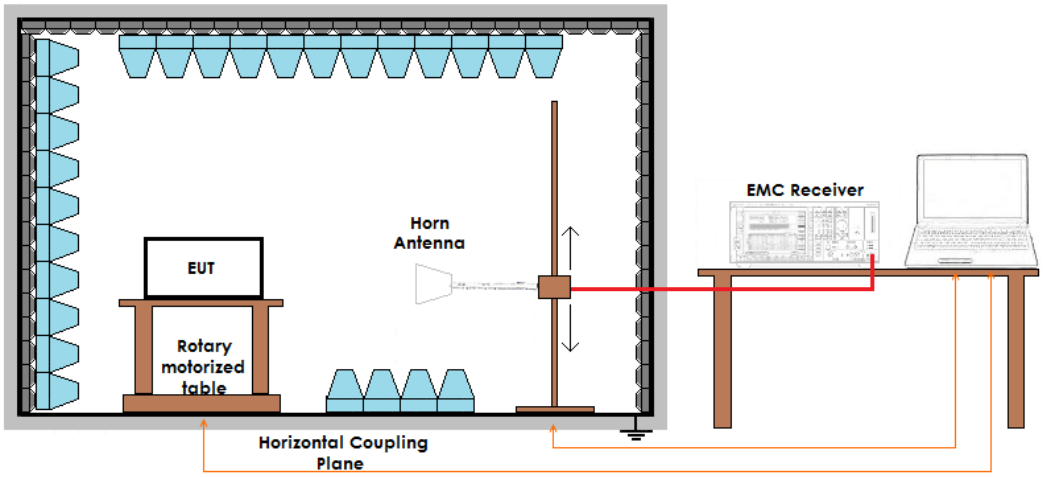
Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
20	100	45

Acceptance limits

Frequency (MHz)	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	54	74

Setup



Result – AV detector

Channel CH 1 (lowest channel)			
Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	54	More than 20 dB below limit	Complies
IV	54	More than 20 dB below limit	Complies
V	54	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values			

Channel CH 8 (highest channel)			
Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	54	More than 20 dB below limit	Complies
IV	54	More than 20 dB below limit	Complies
V	54	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values			

Result – Peak detector

Channel CH 1 (lowest channel)			
Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	74	More than 20 dB below limit	Complies
IV	74	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values			

Channel CH 8 (highest channel)			
Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	74	More than 20 dB below limit	Complies
IV	74	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values			

Result: The requirements are met

11.5 Occupied channel bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (c)
- 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 S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

The bandwidth of the emission shall be no wider than 0,25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0,5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

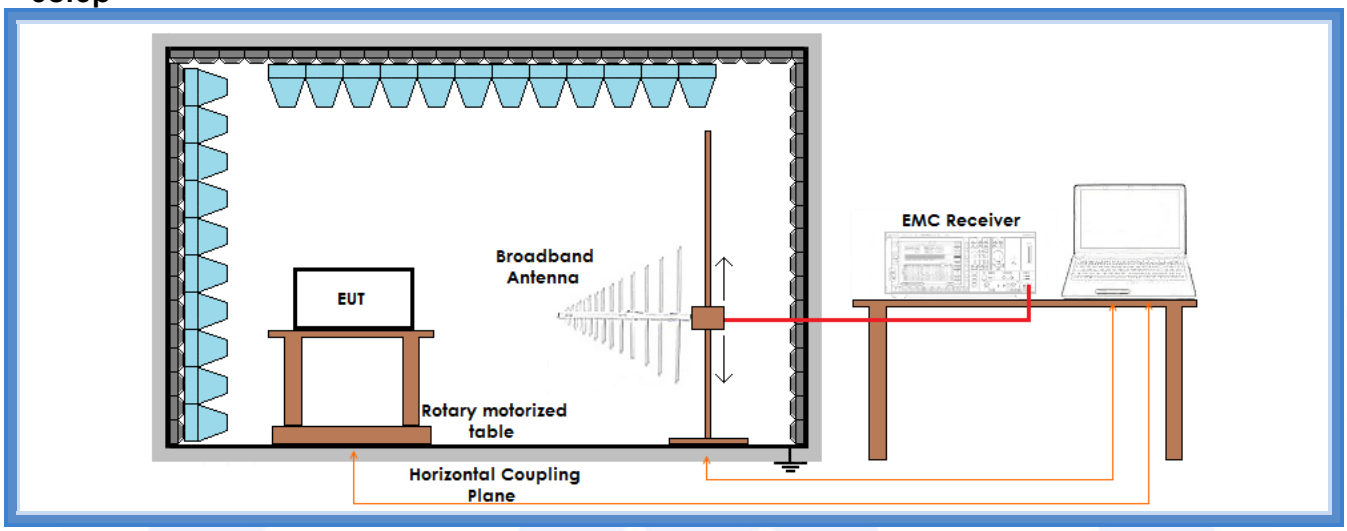
Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	101	55

Acceptance limits

Limits	
Devices operating above 70 MHz and below 900 MHz	***Devices operating above 900 MHz***
0,25% of the center frequency	0,5% of the center frequency

Setup



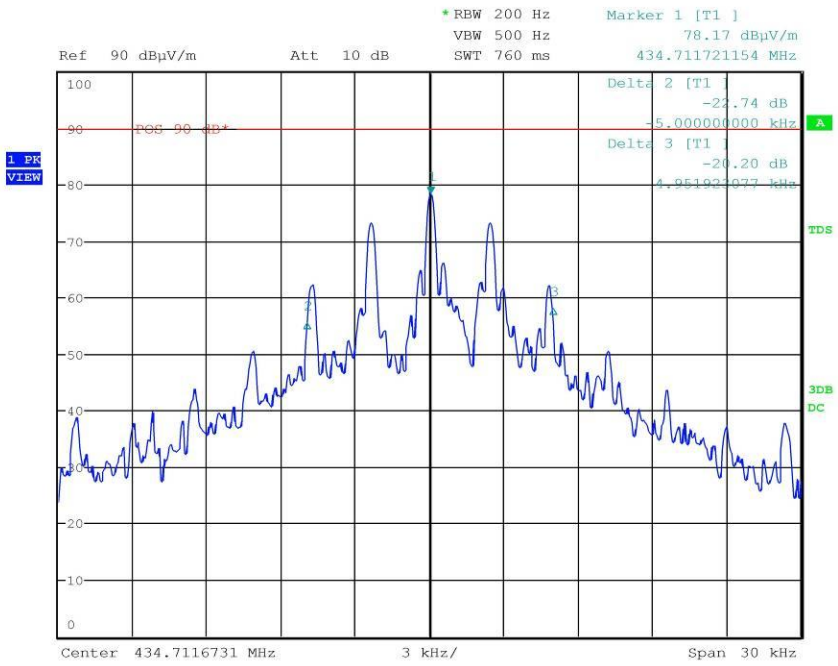
Result

Channel	*f (MHz)*	*Limit (kHz)*	*20 dB bandwidth (kHz)*	*Graphs*	*Results*
CH 1	433,31	1083,275	9,951	G15130906	Complies
CH 8	434,71	1086,775	9,951	G15130905	Complies

Graphs

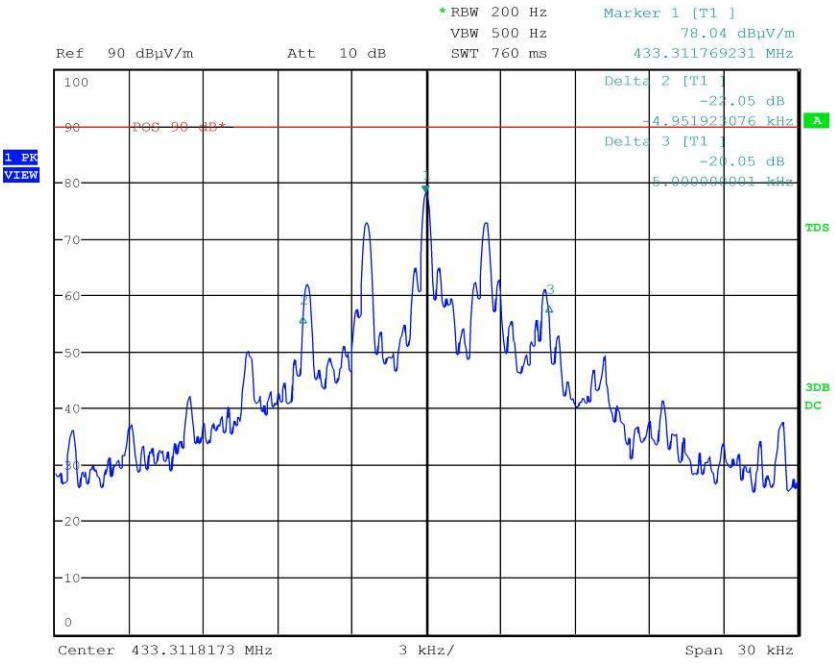
G15130905

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130905
Test Spec	



G15130906

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15130906
Test Spec	



Result: The requirements are met

11.6 Periodic Operation Characteristics

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (a)
- 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 S227
Measurement uncertainty: See clause 7 of this test report

Test specification

☑ Manually operated transmitter
❑ Transmitter activated automatically

The provisions of this section are restricted to periodic operation within the band 40,66–40,70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	100	45

Result

15.231(a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

Channel	*Frequency (MHz)*	*Transmitter deactivation time*	*Graphs*
CH 1	433,31	1,192 s	G15130917
CH 8	434,71	1,195 s	G15130918

15.231(a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation

Result: N.A.

15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Result: The EUT does not employ periodic transmission.

15.231(a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

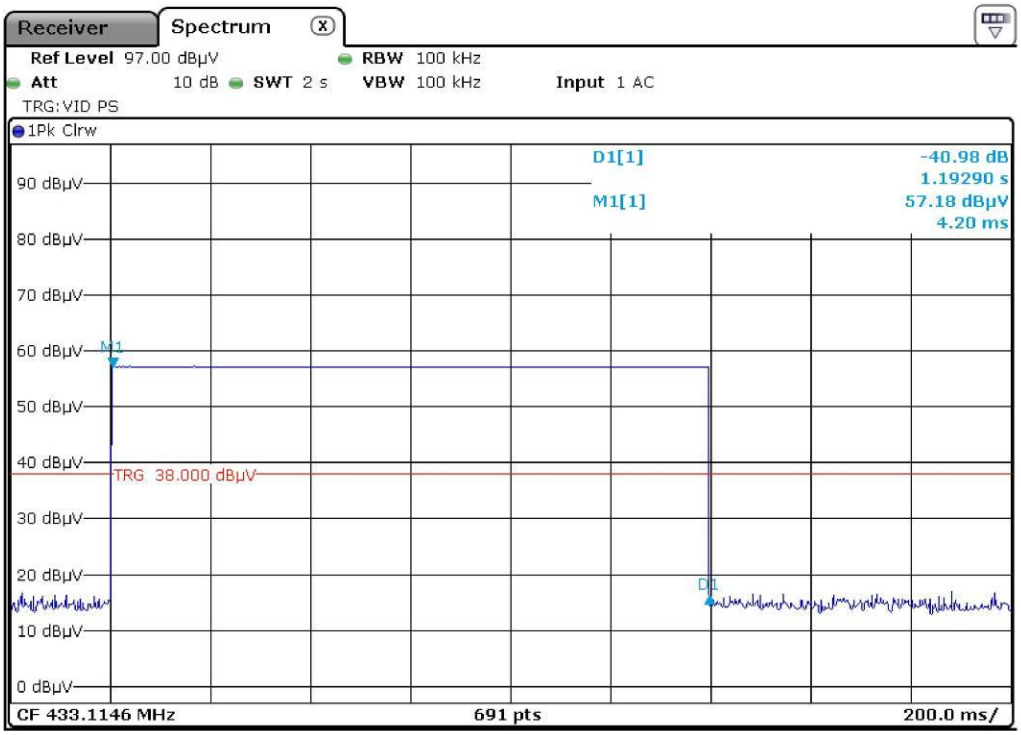
Result: N.A.

15.231(a5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data

Result: N.A.

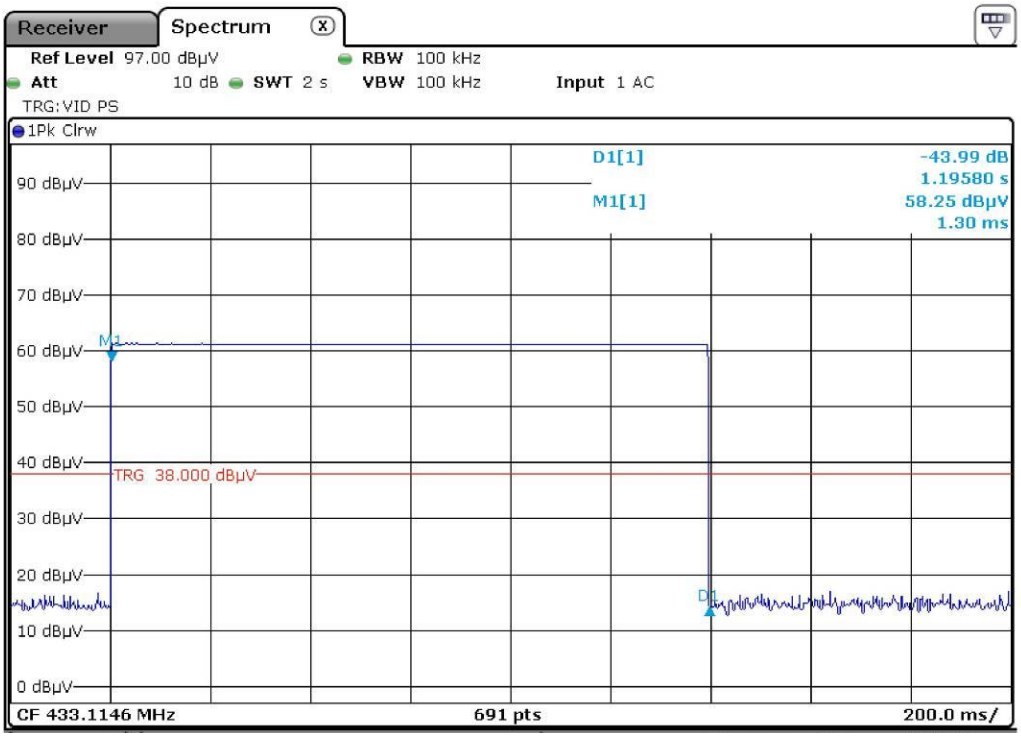
Graphs

G15130917



Bertezzolo 15130917

G15130918



Bertezzolo 15130918

Result: The requirements are met