



TEST REPORT nr. R17082901
Federal Communication Commission (FCC)

Test item

Description.....: TRANSMITTER FOR AUTOMATIC DOOR SAFETY EDGES
 Trademark.....: JCM TECHNOLOGIES
 Model/Type.....: RB-TX10
 FCC ID.....: U5Z-RB-TX10

Test Specification

Standard.....: FCC Rules & Regulations, Title 47:2016
 Part 15 paragraph(s): 203, 209 and 231

Client's name

.....: JCM TECHNOLOGIES S.A.
 Address.....: Bisbe Morgades, 46 (Baixos) – 08500 Vic – SPAIN

Manufacturer's name

: Same as client
 Address.....: --

Report

Tested by.....: A. Bertezolo – *Technician* 
 Approved by.....: R. Beghetto – *Laboratory Manager* 
 Date of issue.....: 18.05.17
 Contents.....: 58 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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ANNEX 1: photographs of test setup



1. Summary

Standard:

FCC Rules & Regulations, Title 47:2016
 Part 15 paragraph(s): 203, 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 (b)	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 (a3)	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 : 3,6 Vdc from battery

Serial Number : --

Type of equipment : Transmitter Unit
 Receiver Unit

Type of station : Fixed station
 Portable station
 Mobile station

Nominal frequency : 902,30 MHz
 915,65 MHz
 927,70 MHz

Duty cycle evaluation : 2,12 ms

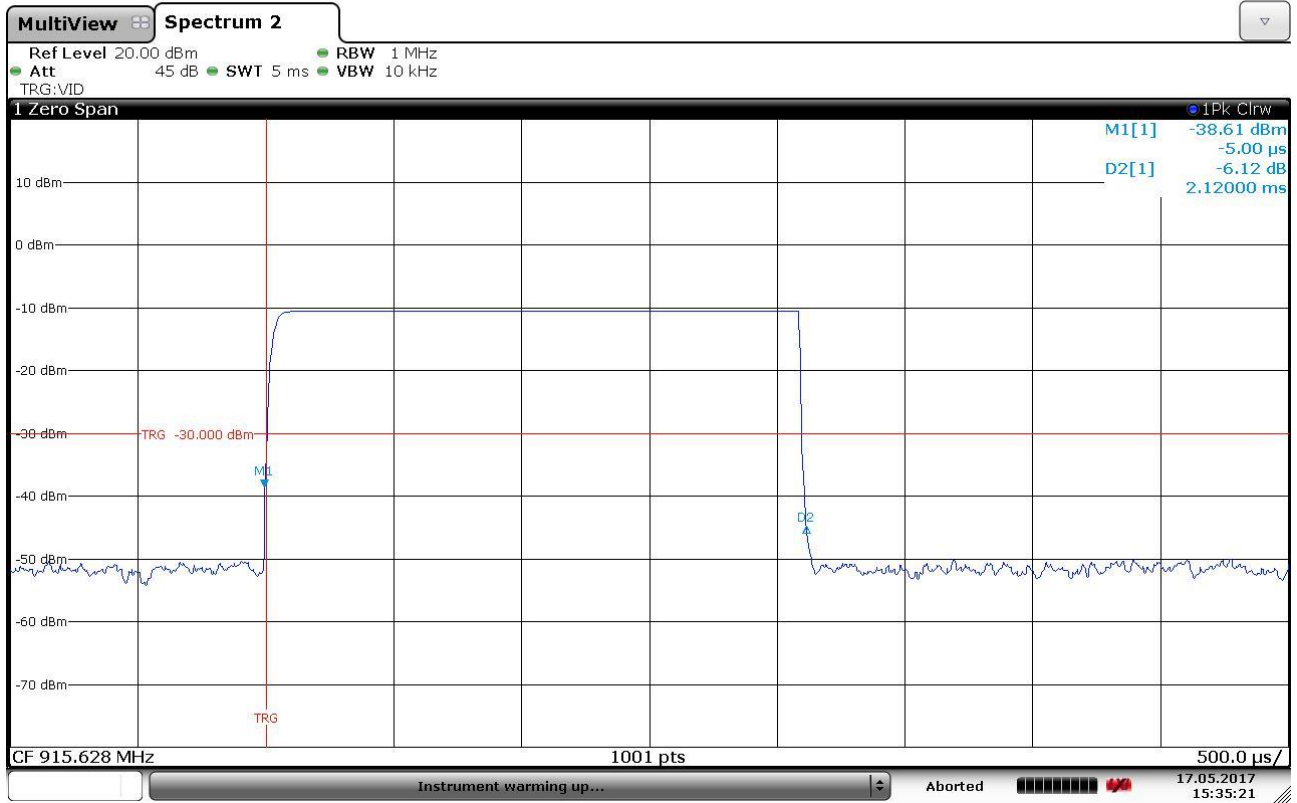
Evaluation has been performed in agreement with FCC Part 15.35c. This transmission is intended as a train of pulses of 2,12 ms ON and 97,88 ms OFF on 100 ms evaluation. See also graph G17082925

Delta (dB) for the performing of tests : $20\log(2,12 \text{ ms} / 100 \text{ ms}) = -33,4 \text{ dB}$

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Bertezzo17082925





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 : 25.11.16
 Testing start date : 15.05.17
 Testing end date : 17.05.17
 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 P161442

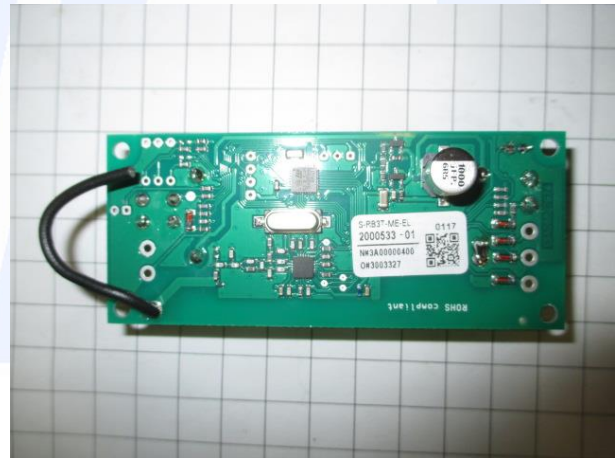
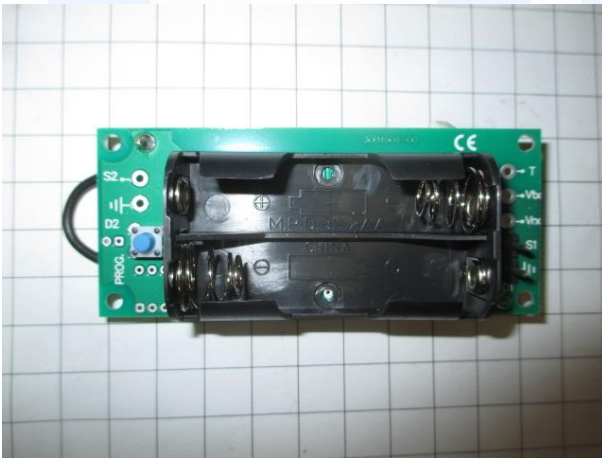
4. Operative conditions

EUT exercising : EUT in continuous transmission at the maximum
 power on each operating frequency



5. Photograph(s) of EUT

5.1 Photograph(s) of EUT





6. Equipment list

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>	<i>Last calibration</i>	<i>Due date calibration</i>
CMC S010	Rohde & Schwarz	ESH3-Z2	Pulse limiter device	--	January 13 th '17	January '18
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June 21 st '16	June '19
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January 10 th '17	January '18
CMC S190	Spin	AMDR-10180	Horn Antenna (1-18 GHz)	01-309-09	N.C.R.	N.C.R.
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January 11 th '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 21 st , '16	June '19
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3GHz)	9111B-203	June 21 st , '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



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 C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 9.0 (Quality Manual)	Measurement uncertainty calculation





9. Deviation from test specification

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.



11. Results

In this clause tests results are reported.

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

Judgement of compliance:

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

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



11.1 Antenna requirements

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.203
- Internal procedure PM001
- See clause 4 of this test report
- Test date: January 10th, 2017
- Technician: A. Bertezolo

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	Gain	Remarks	Results
Integrated 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
- ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6
- Internal procedure PM001
- See clause 4 of this test report
- Test date: May 15th, 2017
- Technician: A. Bertezolo

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 S010, CMC S108, CMC S164, CMC S200,
 CMC S271, CMC S287
 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:
 10 m for frequencies ≤ 1000 MHz
 3 m for frequencies > 1000 MHz
 EUT height about the floor:
 80 cm for frequencies ≤ 1000 MHz
 1,5 m for frequencies > 1000 MHz

Environmental conditions

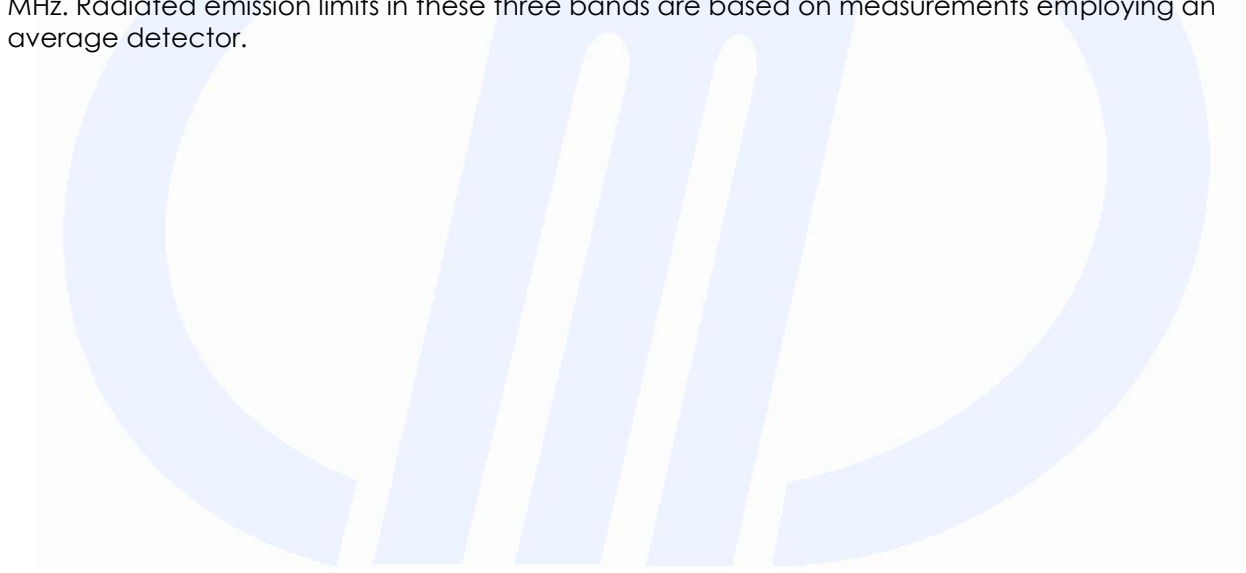
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	45



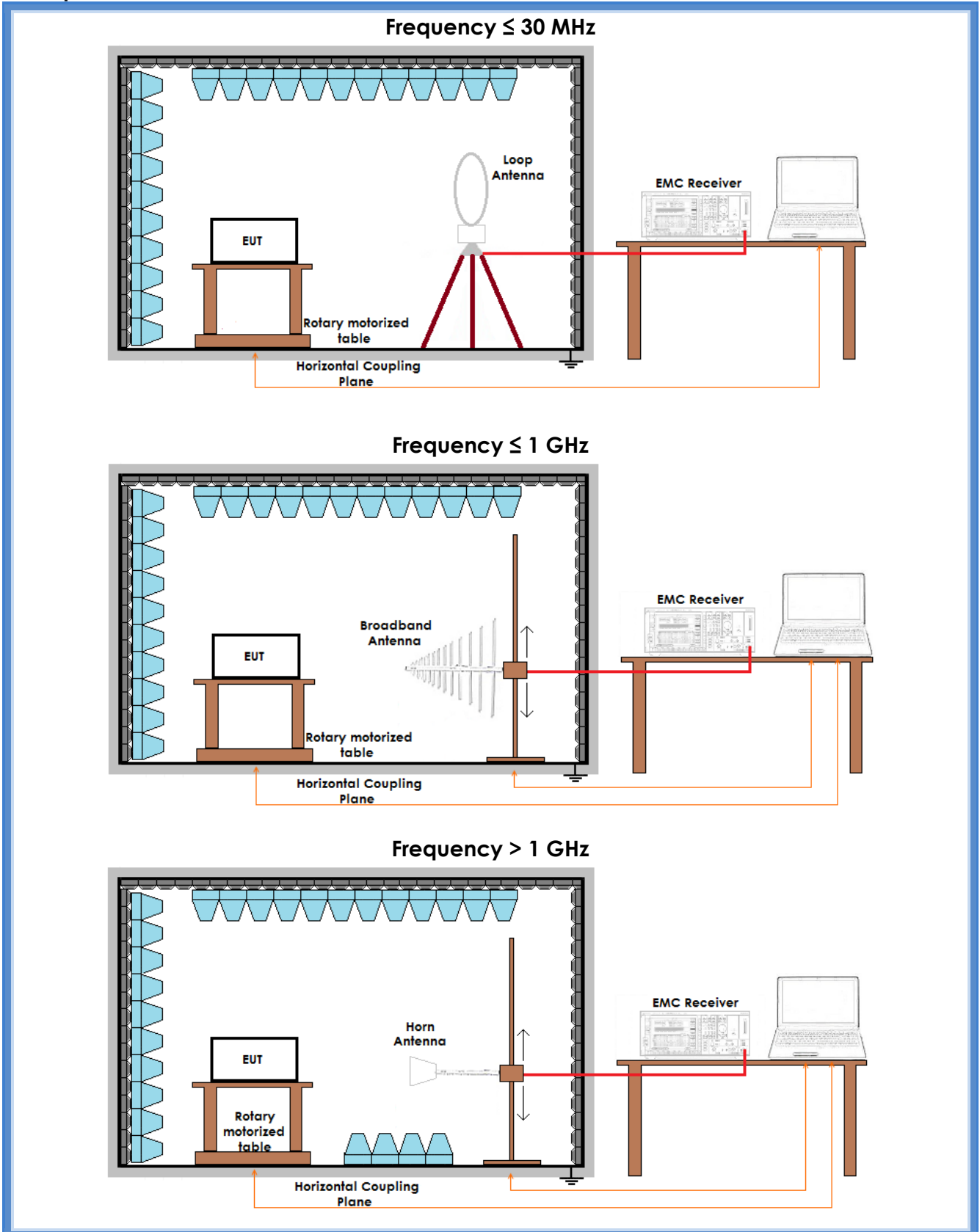
Acceptance limits

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

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



Setup





Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
H	300 – 1000	G17082901	902,30 MHz	Complies
V	300 – 1000	G17082902	902,30 MHz	Complies
V	300 – 1000	G17082903	915,65 MHz	Complies
H	300 – 1000	G17082904	915,65 MHz	Complies
H	300 – 1000	G17082905	927,70 MHz	Complies
V	300 – 1000	G17082906	927,70 MHz	Complies
V	30 – 300	G17082907	Worst case	Complies
H	30 – 300	G17082908	Worst case	Complies
Loop	0,009 – 30	G17082909	Worst case	Complies
H	1000 – 10000	G17082916	927,70 MHz	Complies
H	1000 – 10000	G17082917	902,30 MHz	Complies
H	1000 – 10000	G17082918	915,65 MHz	Complies
V	1000 – 10000	G17082919	915,65 MHz	Complies
V	1000 – 10000	G17082920	927,70 MHz	Complies
V	1000 – 10000	G17082921	902,30 MHz	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 30 dB from limit

Graphs Legend

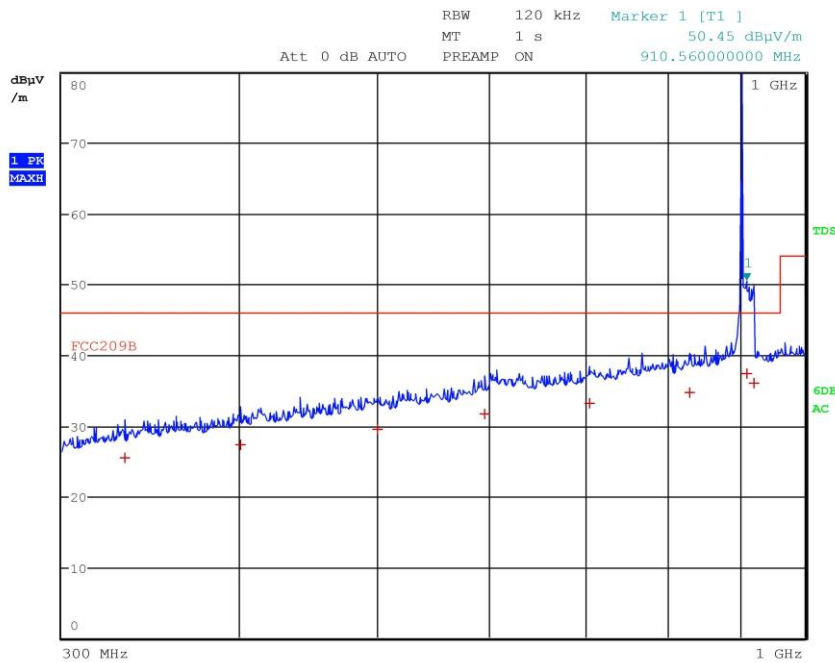
PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +
AV: Average; AV [1s] (average at 1 second) values are marked with a x

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Graphs

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082901
Test Spec



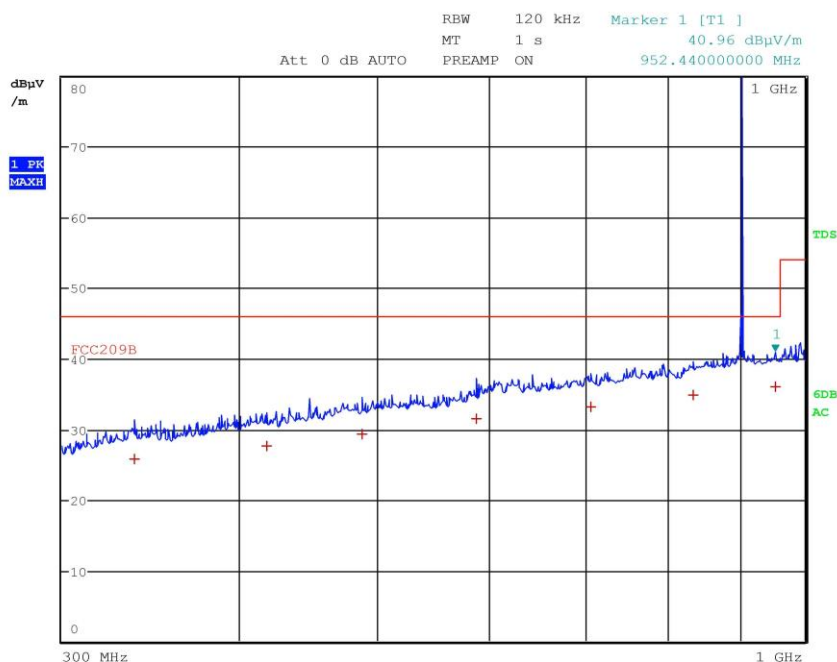
Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 8

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	332.440000000 MHz	25.54	Quasi Peak	-20.48
1	400.320000000 MHz	27.39	Quasi Peak	-18.63
1	500.400000000 MHz	29.54	Quasi Peak	-16.48
1	594.560000000 MHz	31.74	Quasi Peak	-14.28
1	705.200000000 MHz	33.23	Quasi Peak	-12.79
1	829.920000000 MHz	34.79	Quasi Peak	-11.23
1	910.560000000 MHz	37.34	Quasi Peak	-8.68
1	920.560000000 MHz	36.11	Quasi Peak	-9.91



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082902
Test Spec



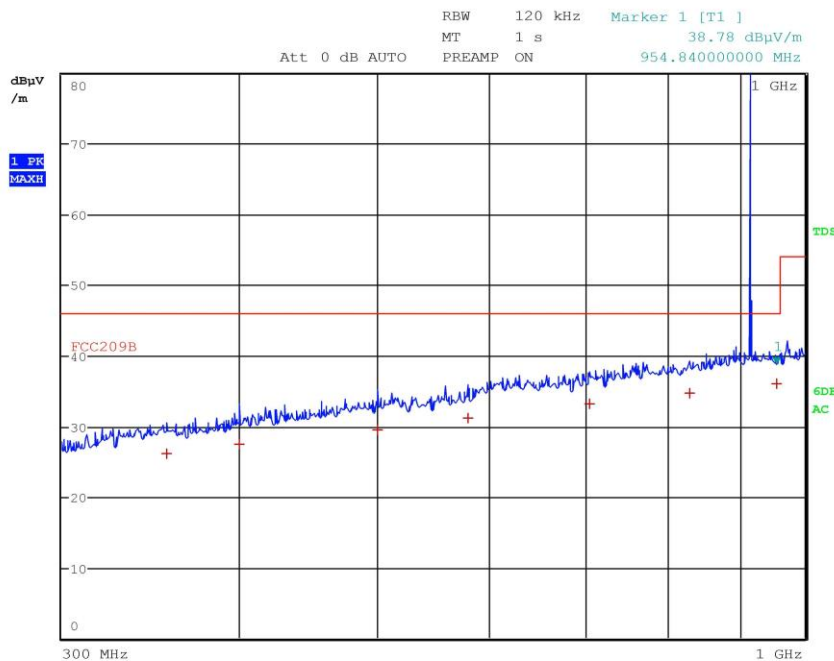
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	337.280000000 MHz	25.76	Quasi Peak	-20.26
1	417.680000000 MHz	27.62	Quasi Peak	-18.40
1	487.520000000 MHz	29.34	Quasi Peak	-16.68
1	587.520000000 MHz	31.48	Quasi Peak	-14.54
1	706.520000000 MHz	33.19	Quasi Peak	-12.83
1	834.640000000 MHz	34.82	Quasi Peak	-11.20
1	952.440000000 MHz	36.08	Quasi Peak	-9.94



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082903
Test Spec



Final Measurement

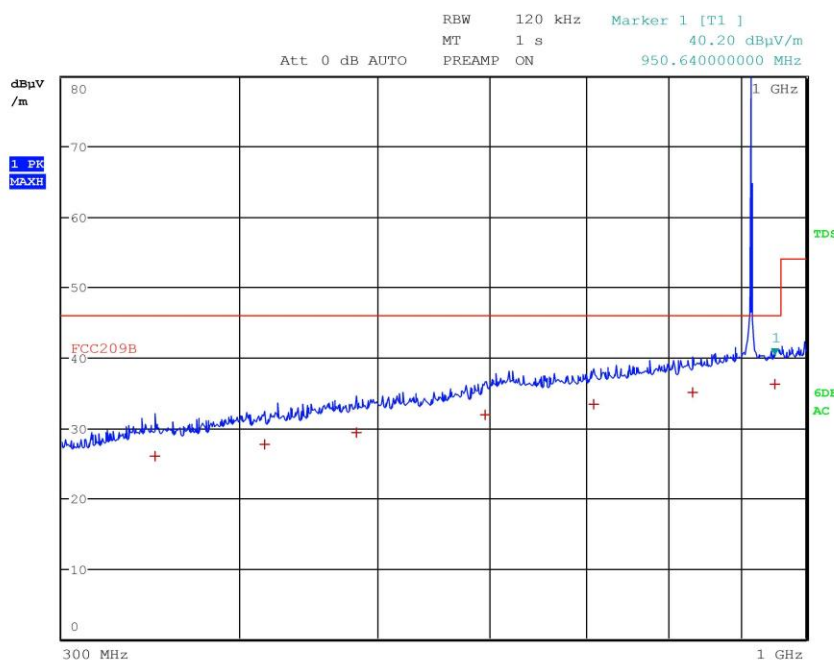
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	355.400000000 MHz	26.09	Quasi Peak	-19.93
1	400.000000000 MHz	27.40	Quasi Peak	-18.62
1	500.280000000 MHz	29.53	Quasi Peak	-16.49
1	579.160000000 MHz	31.16	Quasi Peak	-14.86
1	705.640000000 MHz	33.12	Quasi Peak	-12.90
1	828.640000000 MHz	34.69	Quasi Peak	-11.33
1	954.840000000 MHz	36.03	Quasi Peak	-9.99

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Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082904
Test Spec



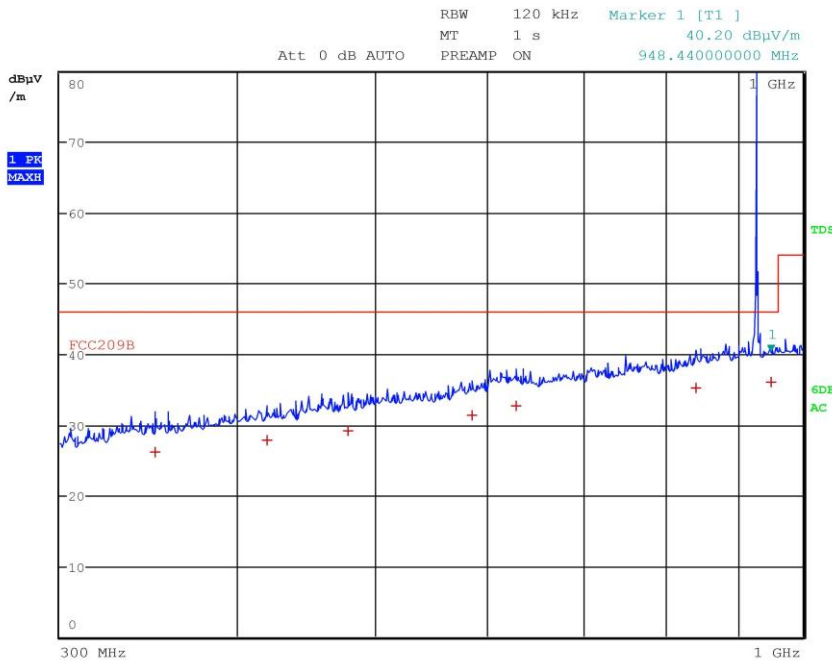
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	349.000000000 MHz	26.03	Quasi Peak	-19.99
1	416.160000000 MHz	27.67	Quasi Peak	-18.35
1	482.680000000 MHz	29.35	Quasi Peak	-16.67
1	594.920000000 MHz	31.77	Quasi Peak	-14.25
1	708.840000000 MHz	33.28	Quasi Peak	-12.74
1	832.080000000 MHz	35.00	Quasi Peak	-11.02
1	950.640000000 MHz	36.17	Quasi Peak	-9.85



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082905
Test Spec



Final Measurement

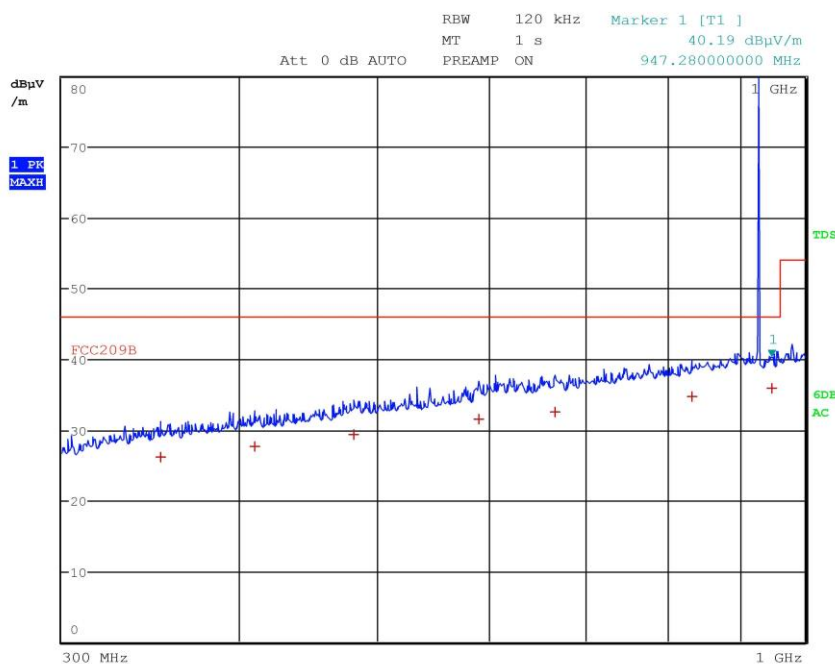
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	349.960000000 MHz	26.12	Quasi Peak	-19.90
1	419.360000000 MHz	27.77	Quasi Peak	-18.25
1	478.840000000 MHz	29.23	Quasi Peak	-16.79
1	584.800000000 MHz	31.39	Quasi Peak	-14.63
1	628.520000000 MHz	32.61	Quasi Peak	-13.41
1	840.720000000 MHz	35.18	Quasi Peak	-10.84
1	948.440000000 MHz	36.01	Quasi Peak	-10.01

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Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082906
Test Spec



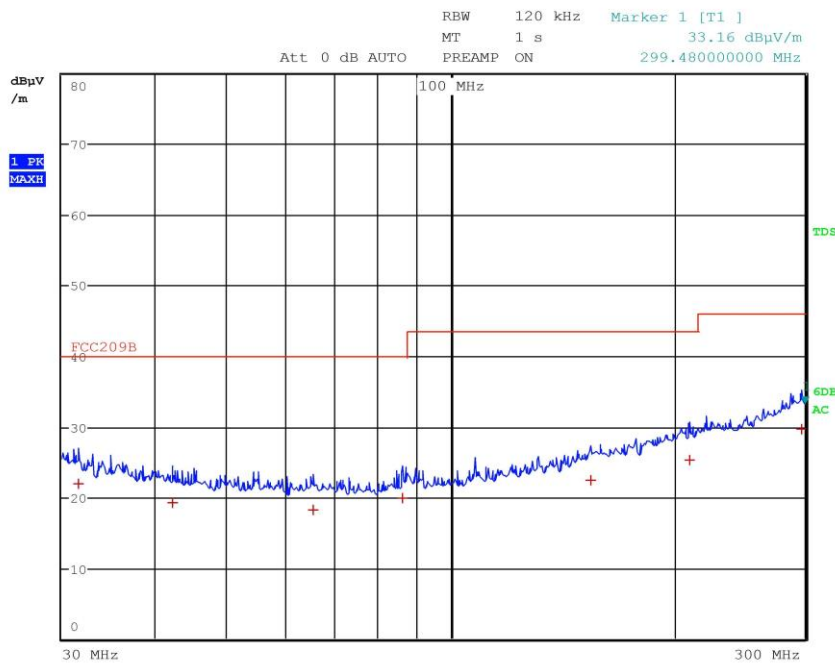
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	352.360000000 MHz	26.13	Quasi Peak	-19.89
1	410.280000000 MHz	27.72	Quasi Peak	-18.30
1	481.000000000 MHz	29.33	Quasi Peak	-16.69
1	589.440000000 MHz	31.50	Quasi Peak	-14.52
1	667.280000000 MHz	32.49	Quasi Peak	-13.53
1	831.840000000 MHz	34.75	Quasi Peak	-11.27
1	947.280000000 MHz	35.87	Quasi Peak	-10.15



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082907
Test Spec



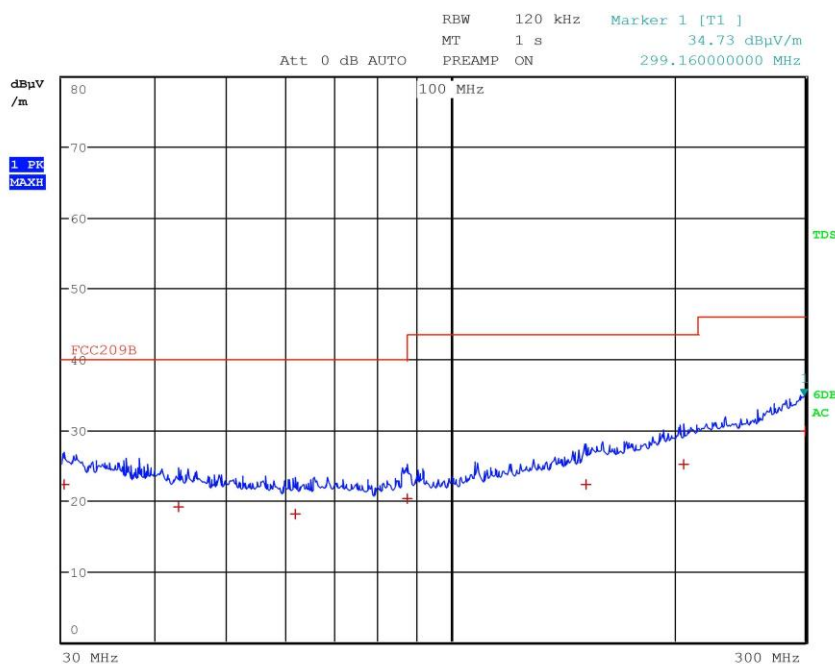
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	31.600000000 MHz	21.91	Quasi Peak	-18.09
1	42.240000000 MHz	19.26	Quasi Peak	-20.74
1	65.240000000 MHz	18.17	Quasi Peak	-21.83
1	86.280000000 MHz	19.99	Quasi Peak	-20.01
1	154.320000000 MHz	22.44	Quasi Peak	-21.08
1	209.880000000 MHz	25.30	Quasi Peak	-18.22
1	296.600000000 MHz	29.58	Quasi Peak	-16.44



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082908
Test Spec



Final Measurement

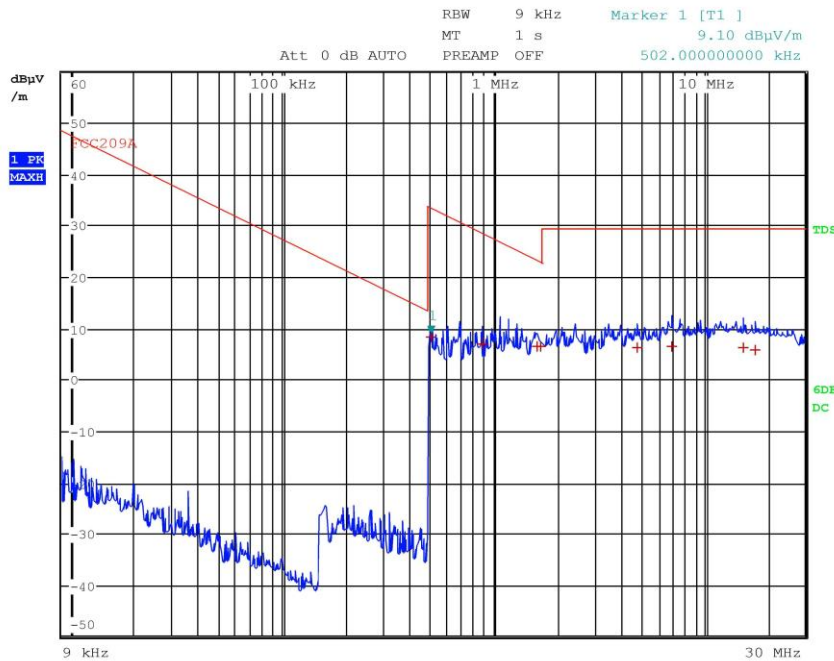
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 7

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	30.200000000 MHz	22.28	Quasi Peak	-17.72
1	42.960000000 MHz	19.09	Quasi Peak	-20.91
1	61.880000000 MHz	18.03	Quasi Peak	-21.97
1	87.440000000 MHz	20.17	Quasi Peak	-19.83
1	152.200000000 MHz	22.30	Quasi Peak	-21.22
1	206.040000000 MHz	25.08	Quasi Peak	-18.44
1	299.560000000 MHz	29.79	Quasi Peak	-16.23

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Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082909
Test Spec



Final Measurement

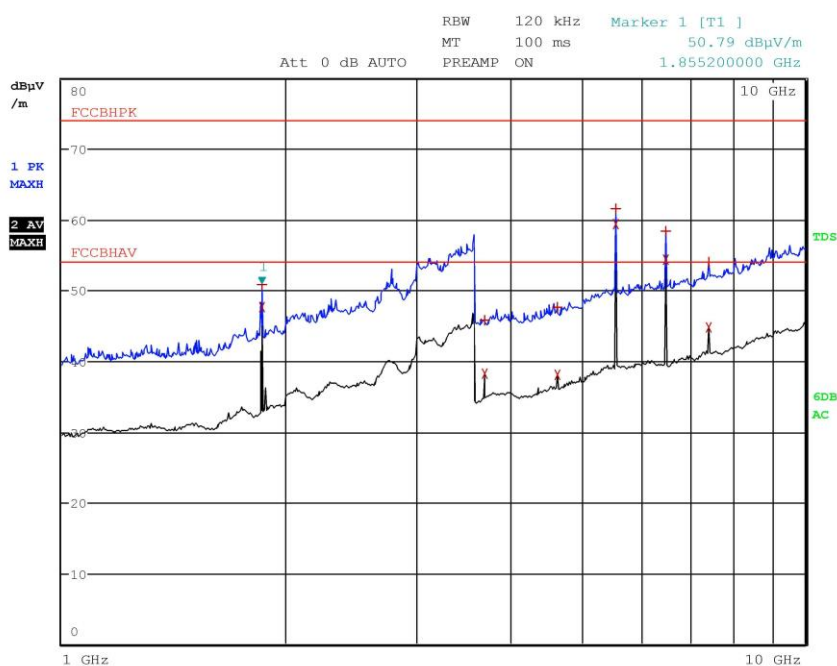
Meas Time: 1 s
Margin: 20 dB
Subranges: 8

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	502.00000000 kHz	8.42	Quasi Peak	-25.17
1	882.00000000 kHz	7.03	Quasi Peak	-21.66
1	1.614000000 MHz	6.54	Quasi Peak	-16.90
1	1.666000000 MHz	6.45	Quasi Peak	-16.72
1	4.794000000 MHz	6.21	Quasi Peak	-23.28
1	6.974000000 MHz	6.56	Quasi Peak	-22.91
1	15.182000000 MHz	6.32	Quasi Peak	-23.12
1	17.338000000 MHz	5.79	Quasi Peak	-23.63

CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082916
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082916
Test Spec

Final Measurement

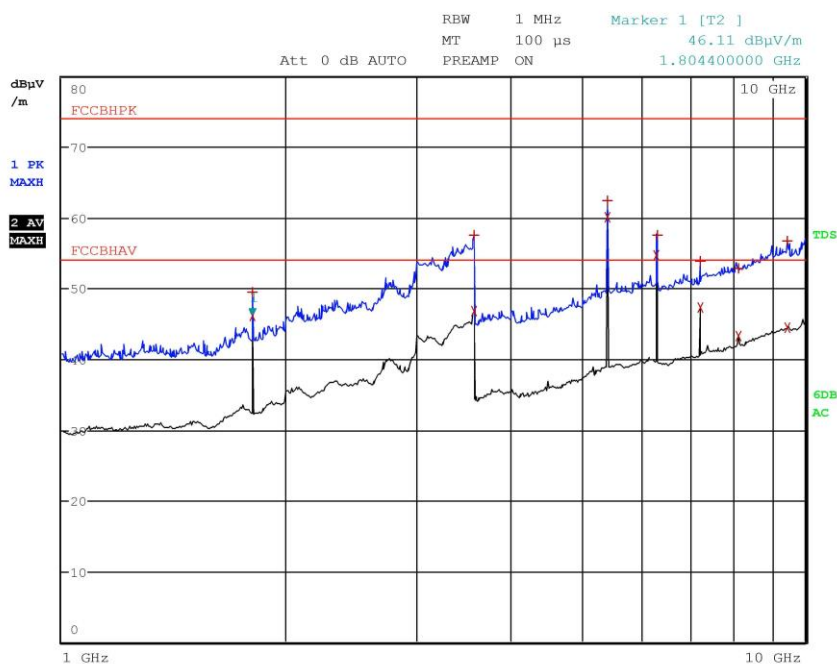
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.855200000 GHz	47.69	Average	-6.29
1	1.855200000 GHz	50.79	Max Peak	-23.19
1	3.708400000 GHz	45.73	Max Peak	-28.25
2	3.710800000 GHz	38.19	Average	-15.79
1	4.635600000 GHz	47.58	Max Peak	-26.40
2	4.638400000 GHz	38.13	Average	-15.85
2	5.566000000 GHz	59.49	Average	5.51
1	5.566400000 GHz	61.66	Max Peak	-12.32
1	6.493600000 GHz	58.36	Max Peak	-15.62
2	6.493600000 GHz	54.44	Average	0.46
1	7.421200000 GHz	54.07	Max Peak	-19.91
2	7.421600000 GHz	44.84	Average	-9.14

CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082917
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082917
Test Spec

Final Measurement

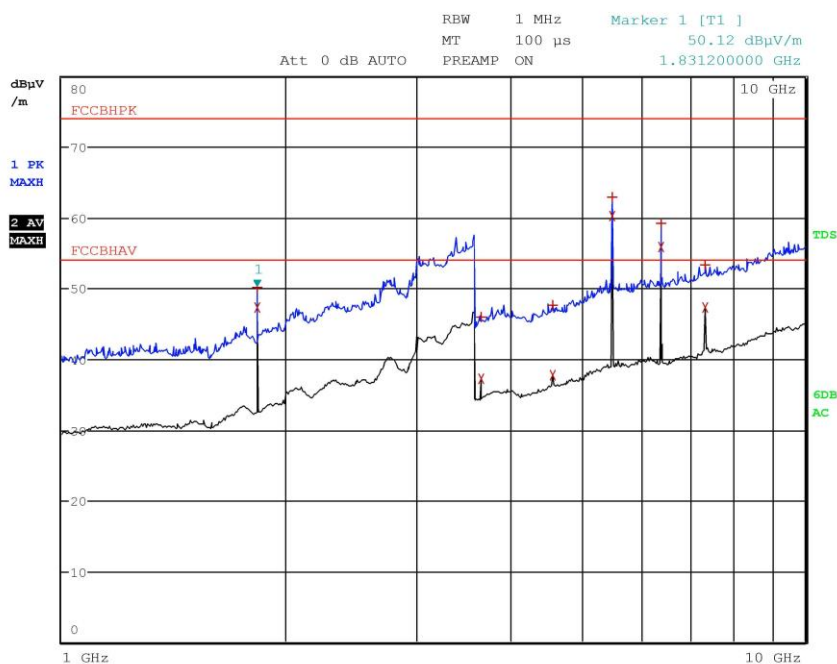
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 14

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.804400000 GHz	46.11	Average	-7.87
1	1.804800000 GHz	49.53	Max Peak	-24.45
1	3.592000000 GHz	57.51	Max Peak	-16.47
2	3.594000000 GHz	46.84	Average	-7.14
1	5.413600000 GHz	62.36	Max Peak	-11.62
2	5.413600000 GHz	60.15	Average	6.17
2	6.316000000 GHz	54.70	Average	0.72
1	6.316400000 GHz	57.54	Max Peak	-16.44
1	7.218000000 GHz	53.86	Max Peak	-20.12
2	7.218400000 GHz	47.27	Average	-6.71
2	8.120400000 GHz	43.31	Average	-10.67
1	8.147200000 GHz	52.80	Max Peak	-21.18
2	9.456800000 GHz	44.41	Average	-9.57
1	9.468000000 GHz	56.76	Max Peak	-17.22

CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082918
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082918
Test Spec

Final Measurement

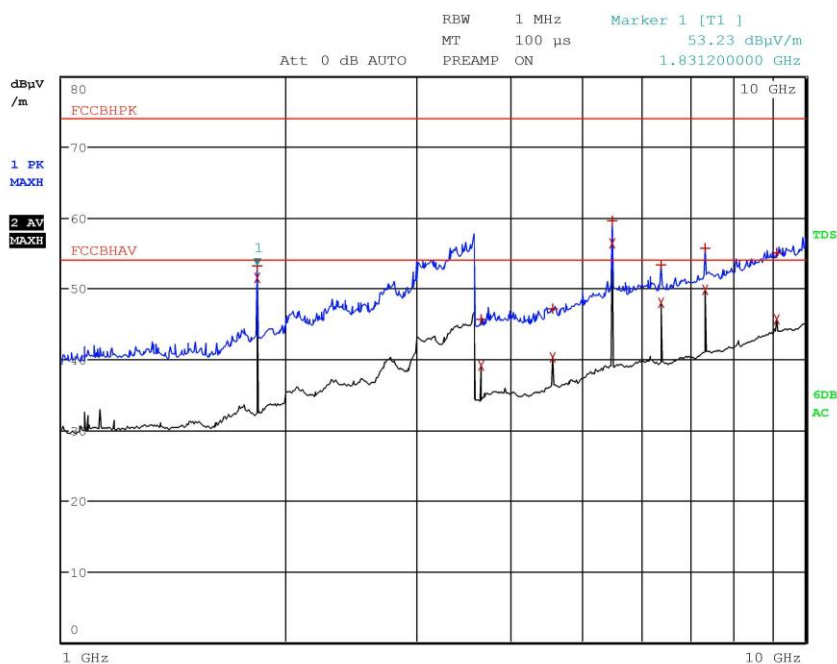
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.831200000 GHz	47.32	Average	-6.66
1	1.831200000 GHz	50.12	Max Peak	-23.86
2	3.662400000 GHz	37.17	Average	-16.81
1	3.662400000 GHz	45.97	Max Peak	-28.01
2	4.578400000 GHz	37.76	Average	-16.22
1	4.578400000 GHz	47.58	Max Peak	-26.40
1	5.494000000 GHz	62.92	Max Peak	-11.06
2	5.494000000 GHz	60.26	Average	6.28
1	6.409200000 GHz	59.19	Max Peak	-14.79
2	6.409600000 GHz	55.92	Average	1.94
1	7.324400000 GHz	53.43	Max Peak	-20.55
2	7.325200000 GHz	47.32	Average	-6.66

CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082919
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082919
Test Spec

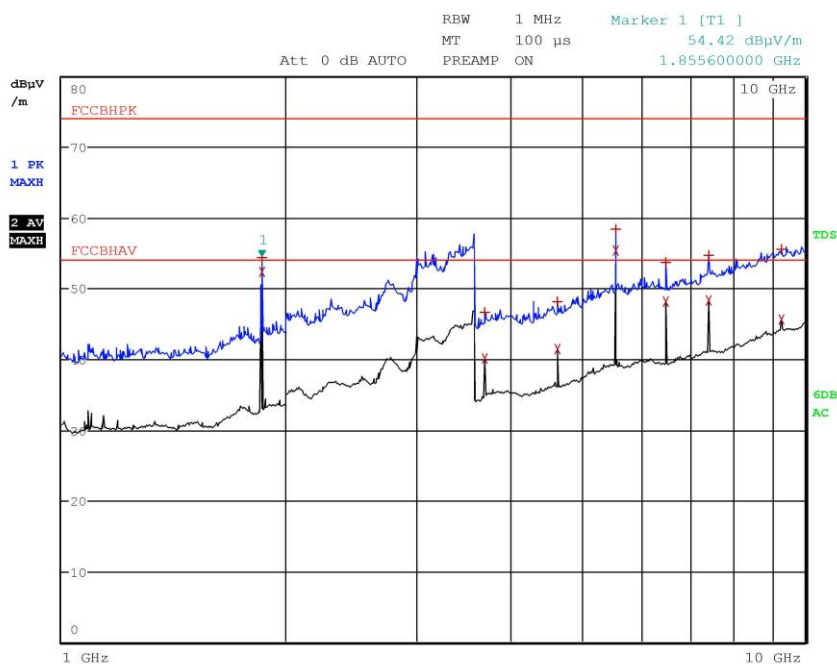
Final Measurement

Meas Time: 1 s
 Margin: 20 dB
 Subranges: 14

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.831200000 GHz	51.57	Average	-2.41
1	1.831200000 GHz	53.23	Max Peak	-20.75
2	3.662400000 GHz	39.16	Average	-14.82
1	3.662400000 GHz	45.69	Max Peak	-28.29
2	4.578000000 GHz	40.30	Average	-13.68
1	4.578000000 GHz	47.09	Max Peak	-26.89
1	5.493600000 GHz	59.51	Max Peak	-14.47
2	5.493600000 GHz	56.38	Average	2.40
1	6.409200000 GHz	53.38	Max Peak	-20.60
2	6.409600000 GHz	47.98	Average	-6.00
1	7.324800000 GHz	55.78	Max Peak	-18.20
2	7.325200000 GHz	49.91	Average	-4.07
1	9.156000000 GHz	55.07	Max Peak	-18.91
2	9.156000000 GHz	45.57	Average	-8.41



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082920
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082920
Test Spec

Final Measurement

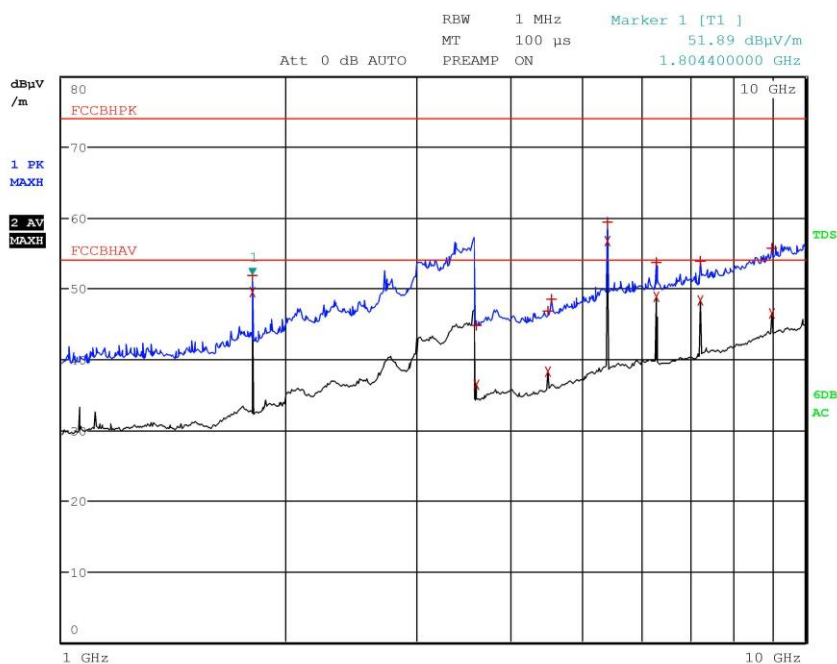
Meas Time: 1 s
 Margin: 20 dB
 Subranges: 14

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.855200000 GHz	52.42	Average	-1.56
1	1.855600000 GHz	54.42	Max Peak	-19.56
1	3.710400000 GHz	46.58	Max Peak	-27.40
2	3.710800000 GHz	40.11	Average	-13.87
1	4.638000000 GHz	48.14	Max Peak	-25.84
2	4.638400000 GHz	41.39	Average	-12.59
1	5.566000000 GHz	58.43	Max Peak	-15.55
2	5.566000000 GHz	55.37	Average	1.39
2	6.493600000 GHz	48.23	Average	-5.75
1	6.494000000 GHz	53.77	Max Peak	-20.21
1	7.421200000 GHz	54.74	Max Peak	-19.24
2	7.421600000 GHz	48.34	Average	-5.64
1	9.277200000 GHz	55.57	Max Peak	-18.41
2	9.277200000 GHz	45.64	Average	-8.34

CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082921
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082921
Test Spec

Final Measurement

Meas Time: 1 s
 Margin: 20 dB
 Subranges: 15

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.804400000 GHz	49.58	Average	-4.40
1	1.804400000 GHz	51.89	Max Peak	-22.09
2	3.609200000 GHz	36.39	Average	-17.59
1	3.609200000 GHz	44.79	Max Peak	-29.19
1	4.505600000 GHz	46.86	Max Peak	-27.12
2	4.511600000 GHz	38.29	Average	-15.69
1	4.555200000 GHz	48.42	Max Peak	-25.56
2	5.413600000 GHz	56.76	Average	2.78
1	5.414000000 GHz	59.41	Max Peak	-14.57
1	6.316000000 GHz	53.67	Max Peak	-20.31
2	6.316000000 GHz	48.78	Average	-5.20
1	7.218000000 GHz	53.88	Max Peak	-20.10
2	7.218400000 GHz	48.25	Average	-5.73
2	9.022800000 GHz	46.52	Average	-7.46
1	9.023200000 GHz	55.79	Max Peak	-18.19

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.



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 (b)
- Internal procedure PM001
- See clause 4 of this test report
- Test date: May 16th, 2017
- Technician: A. Bertezolo

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

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 10 m
EUT height about the floor: 80 cm
Detector CISPR quasi-peak

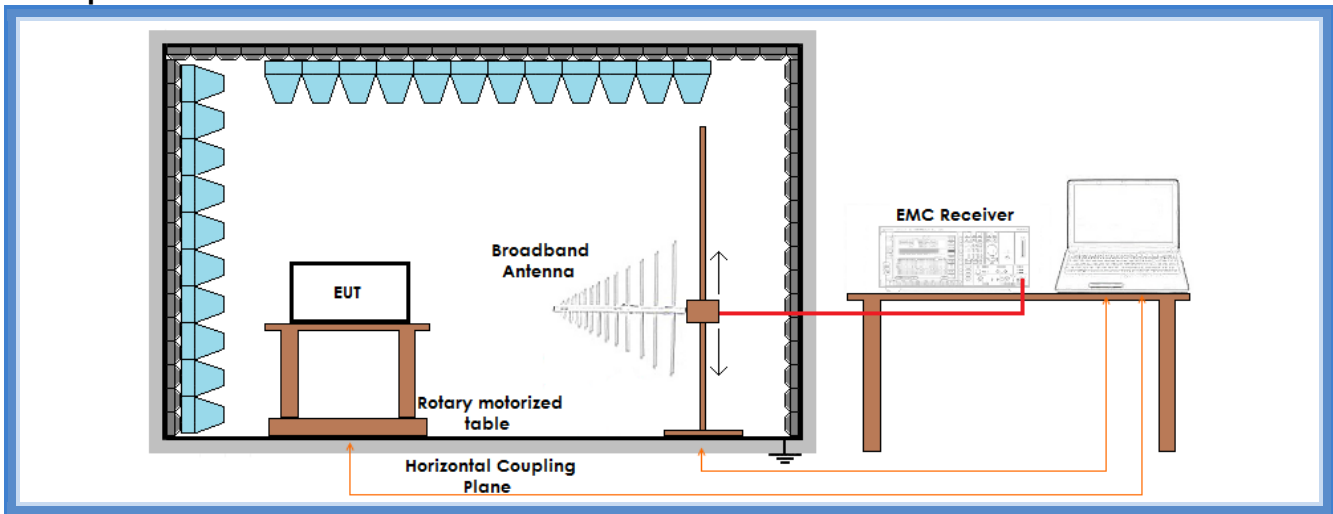
Environmental conditions

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

Acceptance limits

FCC Part 15.231 (b)		
Fundamental frequency (MHz)	Field strength of fundamental [dB(μ V/m)]	Field strength of spurious emissions [dB(μ V/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

Setup



Result – Field strength of fundamental

Frequency (MHz)	Graphs	Limits (dB μ V/m)	3 m referred peak level (dB μ V/m)	Duty cycle (dB)	Level (dB μ V/m)	Results
902,30	G17082911	81,94	102,20	-33,4	68,80	Complies
915,65	G17082912	81,94	102,08	-33,4	68,68	Complies
927,70	G17082910	81,94	101,23	-33,4	67,83	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

Duty cycle value has been obtained using the following formula:

Duty cycle = $20\log(2,12 \text{ ms} / 100 \text{ ms}) = -33,4 \text{ dB}$, see also the duty cycle evaluation of cl. 2 of this Test Report

Result – Field strength of spurious emissions

Frequency band (MHz)	Frequency (MHz)	Limits (dB μ V/m)	Peak level (dB μ V/m)	Duty cycle (dB)	Level (dB μ V/m)	Results
902,30	< 1000	61,94	More than 20 dB below limit	-33,4	More than 20 dB below limit	Complies
915,65	< 1000	61,94	More than 20 dB below limit	-33,4	More than 20 dB below limit	Complies
927,70	< 1000	61,94	More than 20 dB below limit	-33,4	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

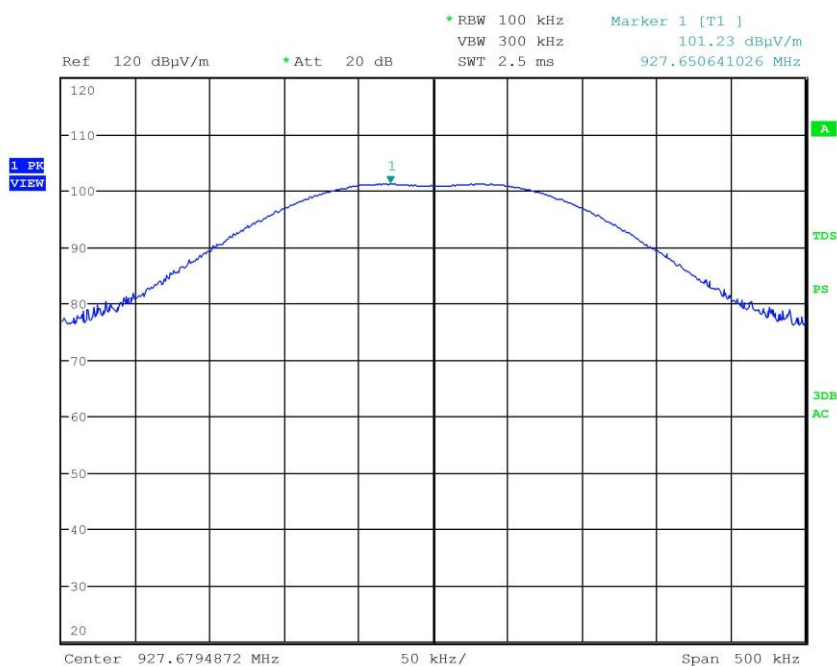
Duty cycle value has been obtained using the following formula:

Duty cycle = $20\log(2,12 \text{ ms} / 100 \text{ ms}) = -33,4 \text{ dB}$, see also the duty cycle evaluation of cl. 2 of this Test Report



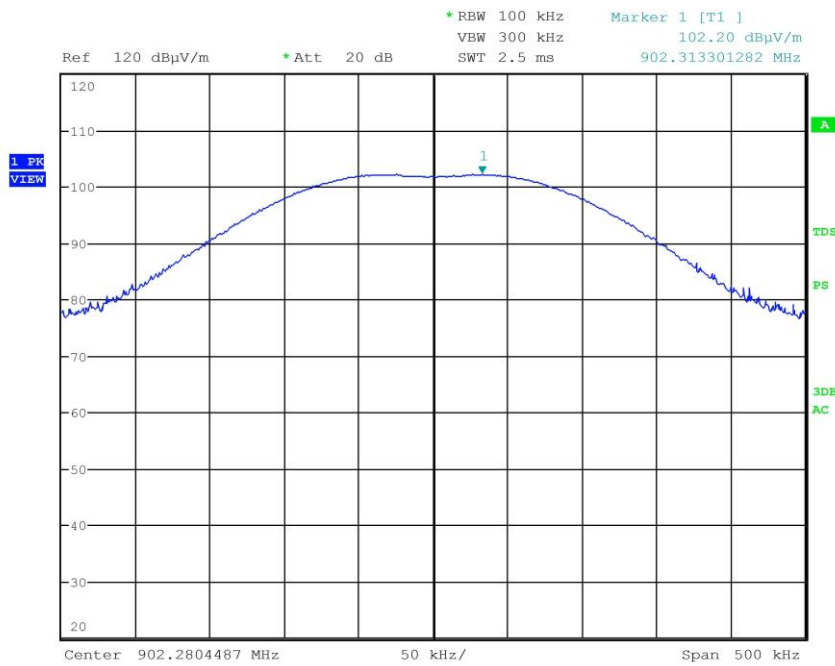
Graphs

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082910
Test Spec



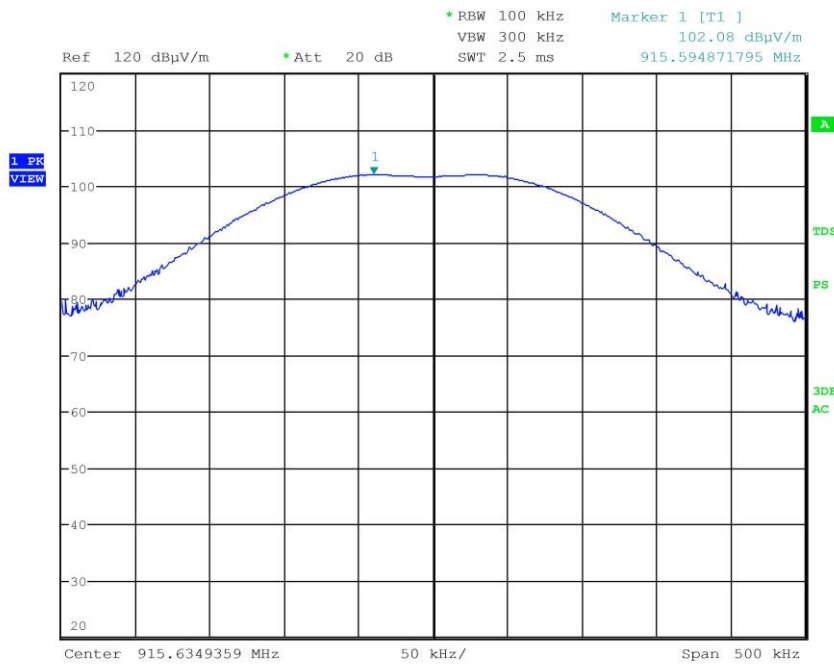


Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082911
Test Spec





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082912
Test Spec



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.



11.4 Spurious Emission (> 1 GHz)

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231
- ANSI C63.10 cl. 6.3.1
- Internal procedure PM001
- See clause 4 of this test report
- Test date: May 16th, 2017
- Technician: A. Bertezolo

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 S164, CMC S190
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: 1,5 m
Detector AV + Peak

Environmental conditions

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

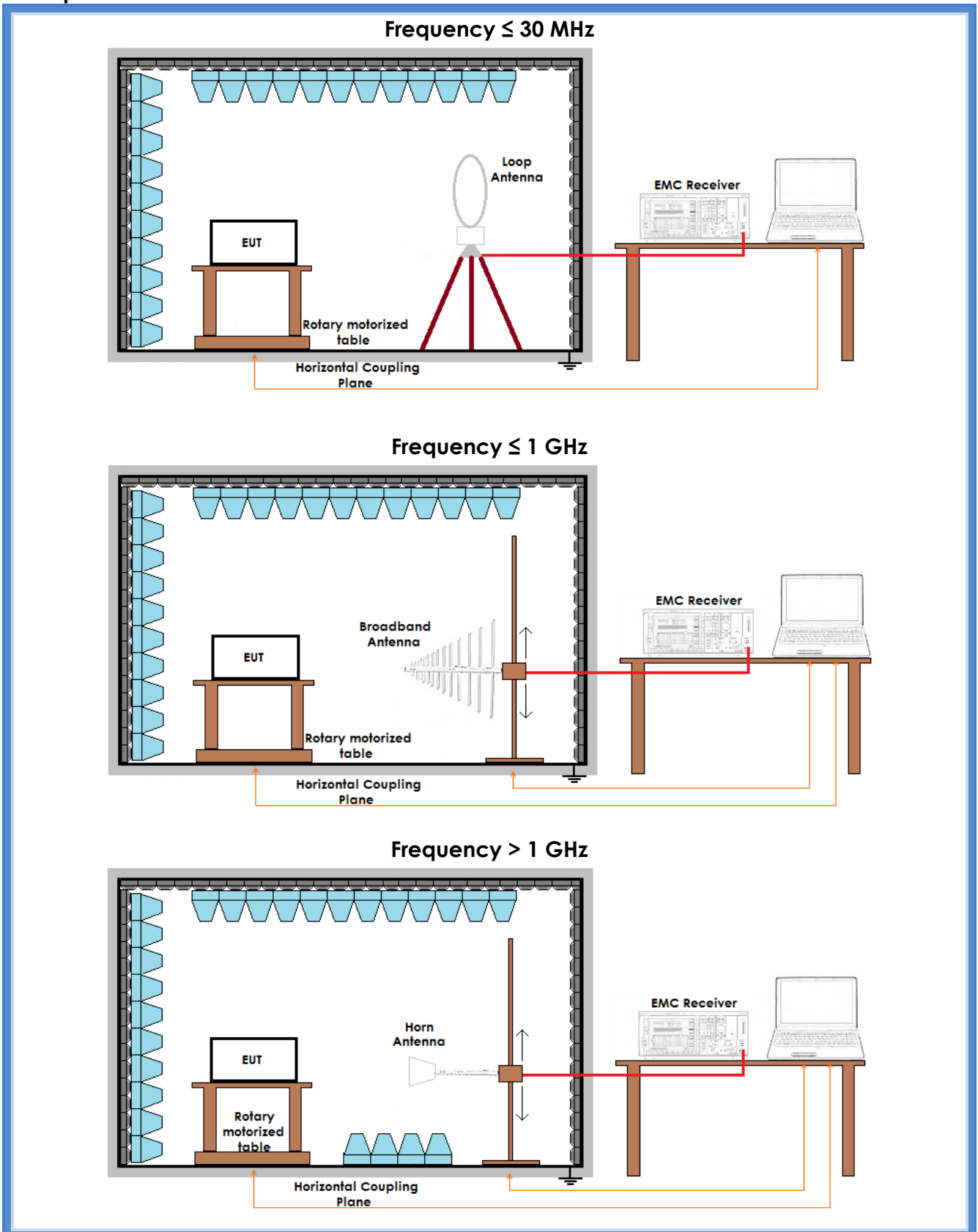
Acceptance limits for emissions in non-restricted frequency bands		
Frequency (MHz)	AV limits [dB(μV/m)]	Peak limits [dB(μV/m)]
> 1000	51,48	71,48



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			

Setup





Result – AV detector

Frequency band (MHz)	Frequency (MHz)	Limits (dBµV/m)	Measured Level (dBµV/m)	Duty cycle (dB)	Level (dBµV/m)	Results
902,30	1804	51,48	49,60	-33,4	16,20	Complies
902,30	3594	54,00	46,50	-33,4	13,10	Complies
902,30	4511	54,00	38,30	-33,4	4,90	Complies
902,30	5413	54,00	60,10	-33,4	26,70	Complies
902,30	6316	51,48	54,70	-33,4	21,30	Complies
902,30	7280	54,00	48,30	-33,4	14,90	Complies
902,30	8120	54,00	43,30	-33,4	9,90	Complies
902,30	9022	54,00	46,50	-33,4	13,10	Complies
915,65	1831	51,48	51,60	-33,4	18,20	Complies
915,65	3662	54,00	39,21	-33,4	5,81	Complies
915,65	4578	54,00	40,30	-33,4	6,90	Complies
915,65	5470	51,48	60,30	-33,4	26,90	Complies
915,65	6409	51,48	55,90	-33,4	22,50	Complies
915,65	7324	54,00	49,90	-33,4	16,50	Complies
915,65	9156	54,00	45,60	-33,4	12,20	Complies
927,70	1855	51,48	52,20	-33,4	18,80	Complies
927,70	3710	54,00	40,10	-33,4	6,70	Complies
927,70	4638	54,00	41,40	-33,4	8,00	Complies
927,70	5566	51,48	59,50	-33,4	26,10	Complies
927,70	6493	51,48	54,40	-33,4	21,00	Complies
927,70	7421	54,00	48,30	-33,4	14,90	Complies
927,70	9277	51,48	45,60	-33,4	12,20	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

Duty cycle value has been obtained using the following formula:

Duty cycle = $20\log(2,12\text{ ms} / 100\text{ ms}) = -33,4\text{ dB}$, see also the duty cycle evaluation of cl. 2 of this Test Report



Result – Peak detector

Frequency band (MHz)	Frequency (MHz)	Limits (dB μ V/m)	Measured Level (dB μ V/m)	Duty cycle (dB)	Level (dB μ V/m)	Results
902,30	1804	71,48	51,90	-33,4	18,50	Complies
902,30	3594	74,00	57,50	-33,4	24,10	Complies
902,30	4511	74,00	48,40	-33,4	15,00	Complies
902,30	5413	74,00	62,40	-33,4	29,00	Complies
902,30	6316	71,48	57,50	-33,4	24,10	Complies
902,30	7280	74,00	53,90	-33,4	20,50	Complies
902,30	8120	74,00	52,80	-33,4	19,40	Complies
902,30	9022	74,00	55,80	-33,4	22,40	Complies
915,65	1831	71,48	53,20	-33,4	19,80	Complies
915,65	3662	74,00	45,70	-33,4	12,30	Complies
915,65	4578	74,00	47,10	-33,4	13,70	Complies
915,65	5470	71,48	63,00	-33,4	29,60	Complies
915,65	6409	71,48	59,20	-33,4	25,80	Complies
915,65	7324	74,00	55,80	-33,4	22,40	Complies
915,65	9156	74,00	55,10	-33,4	21,70	Complies
927,70	1855	71,48	54,40	-33,4	21,00	Complies
927,70	3710	74,00	46,60	-33,4	13,20	Complies
927,70	4638	74,00	48,10	-33,4	14,70	Complies
927,70	5566	71,48	61,70	-33,4	28,30	Complies
927,70	6493	71,48	58,40	-33,4	25,00	Complies
927,70	7421	74,00	54,80	-33,4	21,40	Complies
927,70	9277	71,48	55,60	-33,4	22,20	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

Duty cycle value has been obtained using the following formula:

Duty cycle = $20\log(2,12\text{ ms} / 100\text{ ms}) = -33,4\text{ dB}$, see also the duty cycle evaluation of cl. 2 of this Test Report

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)
- ANSI C63.10 cl. 6.9
- Internal procedure PM001
- See clause 4 of this test report
- Test date: January 12th, 2017
- Technician: A. Bertezolo

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 S164, CMC S287
 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

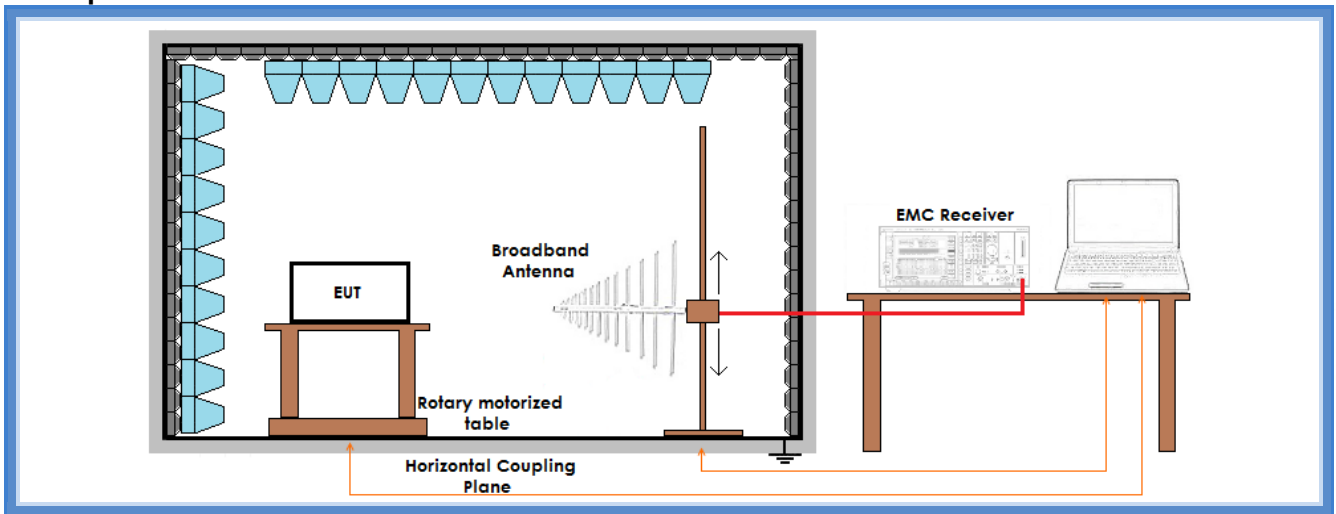
Environmental conditions

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

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



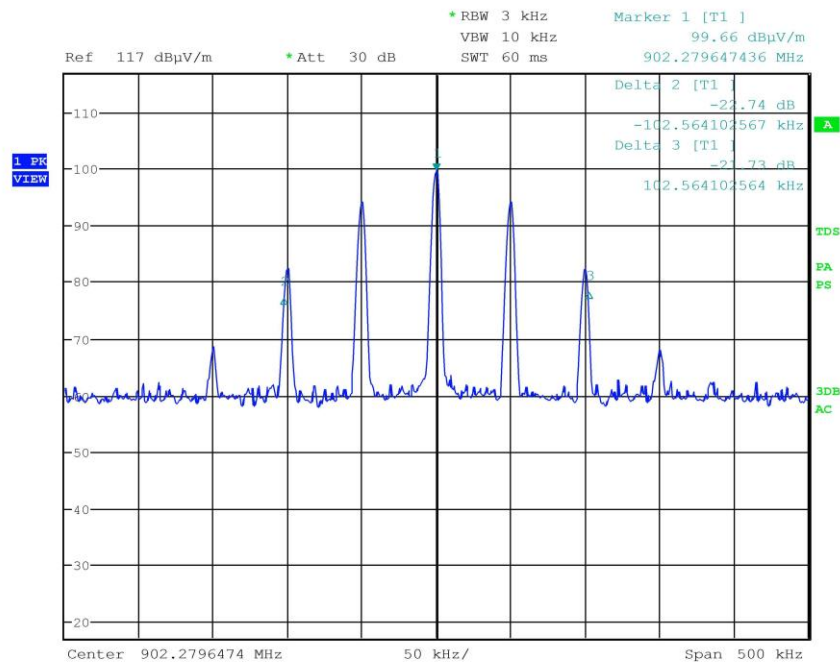
Result

Frequency (MHz)	Limit (kHz)	20 dB bandwidth (kHz)	Graphs	Results
902,30	4511	205,128	G17082913	Complies
915,65	4578	204,326	G17082914	Complies
927,70	4638	205,128	G17082915	Complies



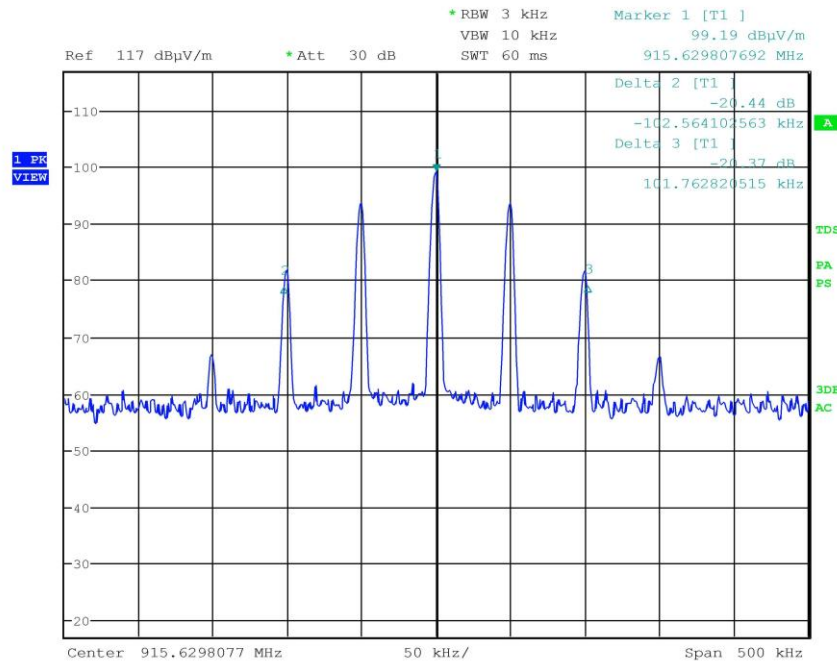
Graphs

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082913
Test Spec





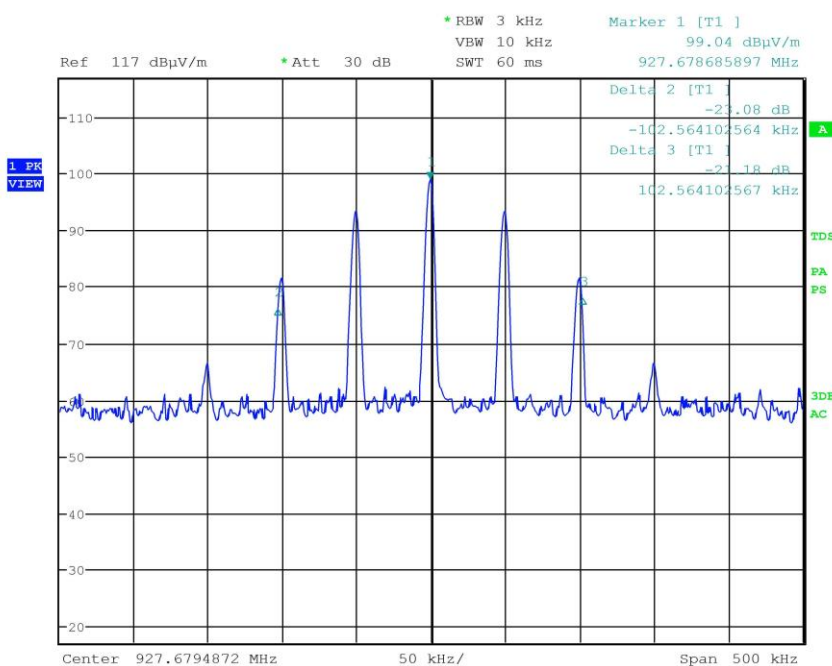
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082914
Test Spec



CMC Centro Misure Compatibilità S.r.l.



Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 17082915
Test Spec



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.



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 date: May 17th, 2017
- Technician: A. Bertezolo

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 S164
 Measurement uncertainty: See clause 7 of this test report

Test specification

- Manually operated transmitter
- Transmitter activated automatically

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.

Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
23	100	45



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

Result: N.A.

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

Parameter	Dwell time (ms)	Silent period between transmissions (s)	Number of transmissions during 1 hour	Total duration of transmissions (max 2 s per h)	Results
Automatic transmission	2,12	20,1	179	179 x 2,12 ms = 379,70 ms	Complies
Graphs	G17082925	G17082926	--	--	--

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.

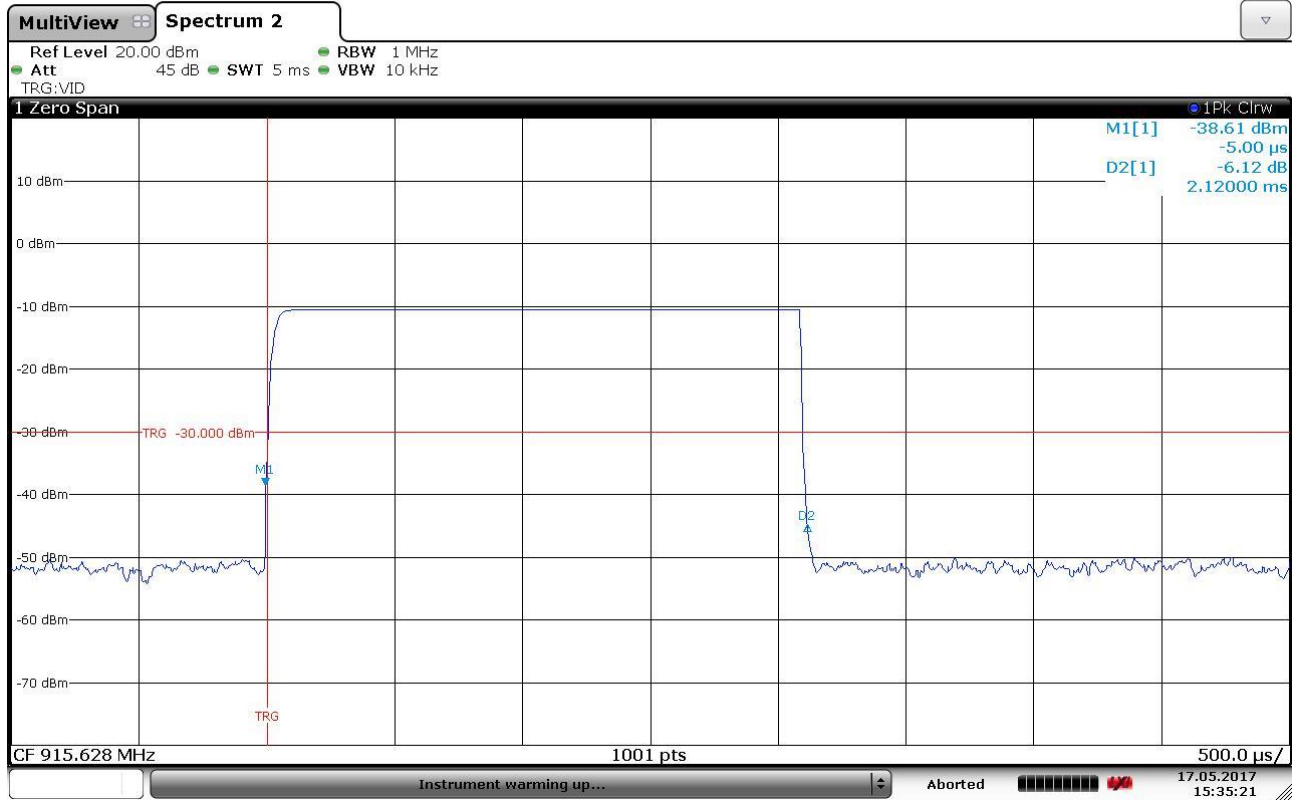
15.231 (a5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch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

Result: N.A.



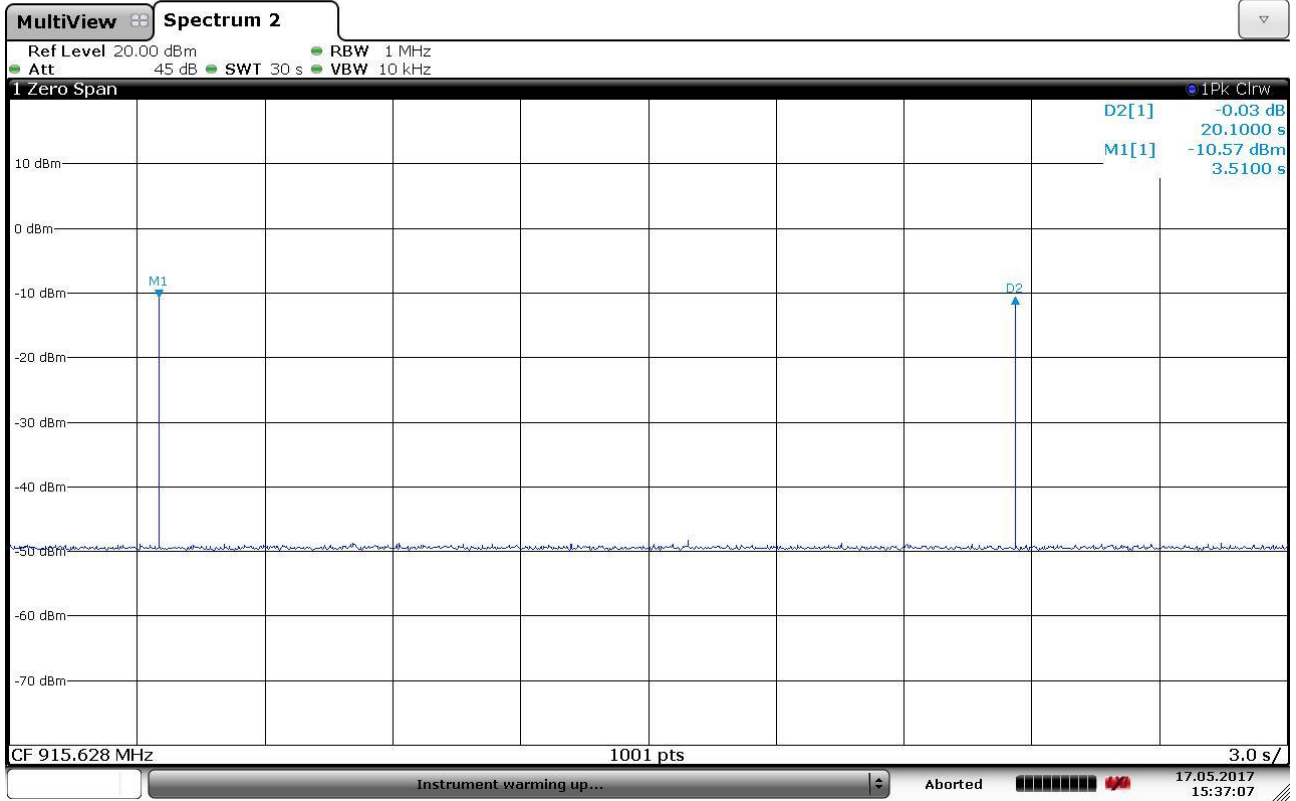
Graphs

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Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.