



TEST REPORT nr. R15177001

Federal Communication Commission (FCC)

Test item

Description.....: REMOTE CONTROL OPERATING AT 310, 315, 318, 390 MHz
Trademark.....: ILCO
Model/Type: EZ-4U
FCC ID.....: 2AFV3EZ4U

Test Specification

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

Client's name: SICE TECH S.r.l.

Address: Via Berardo Maggi, 4 – 25124 Brescia (BS) – ITALY

Manufacturer's name : EUTECH ELECTRONICS S.r.l.

Address: Via dei Gelsi, 19 – 31010 Godega di Sant'Urbano (TV) – ITALY

Report

Tested by: A. Bertezolo – Technician

Approved by: R. Beghetto – Laboratory Manager

Date of issue: 16.11.15

Contents.....: 64 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 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) (e)	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) (e)	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 Vdc from battery

Serial Number : --

Type of equipment : ☒ Transmitter Unit

☒ Receiver Unit

Type of station : ☐ Fixed station

☐ Portable station

☒ Mobile station

Coding	Nominal frequency (MHz)	Modulation	Declared duty cycle (worst case)	Delta (dB)
Chamberlain purple	315	21 PWM symbols 1/4-2/4-3/4	31%	-10,17
Chamberlain orange/red	390	21 PWM symbols 1/4-2/4-3/4	31%	-10,17
Chamberlain green	390	11 PWM symbols 1/4-2/4-3/4	42%	-7,75
Chamberlain yellow	310 – 315 – 390	24 Manchester symbols preamble + 8 Manchester symbols radix + 30 Manchester symbols data	46%	-6,74
Genie Intellicode I	315 – 390	1 short pulse on + 11x(1 short pulse off + 1 short pulse on) + short pause + 66 PWM symbol 1/3-2/3+long pause	53%	-5,51
Genie Intellicode II	315 – 390	1 short pulse on + 11x(1 short pulse off + 1 short pulse on) + short pause + 66 PWM symbol 1/3-2/3+long pause	53%	-5,51
Linear Megacode	318	1 short pulse on + 22 Pulse Position Modulation symbols 1/6 + 2 short pulses off + 1 short pulse on	16%	-15,91

Remarks: for the execution of tests it was used the worst value of duty cycle, 53%



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 : 03.08.15
Testing start date : 17.09.15
Testing end date : 12.10.15
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
P150915

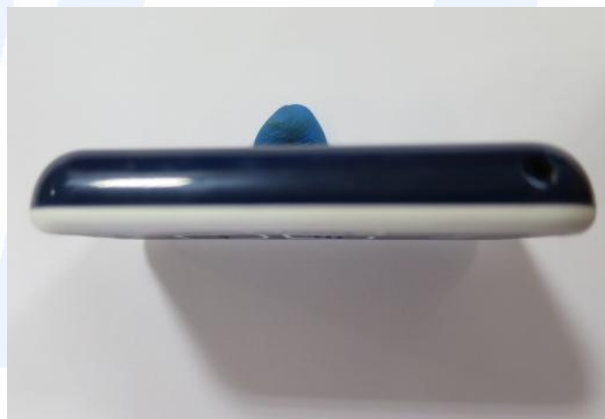
4. Operative conditions

EUT exercising : EUT in continuous transmission at maximum power



5. Photograph(s) of EUT

5.1 Photograph(s) of EUT





6. Equipment list

<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	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
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

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
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.

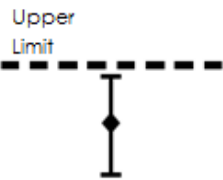
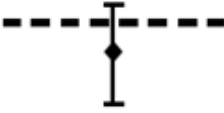
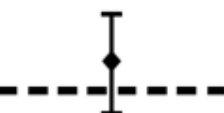


11. Results

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

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



11.1 Antenna requirements

Test set-up and execution

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

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

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

Test specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded

Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	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 (%)
23	100	45

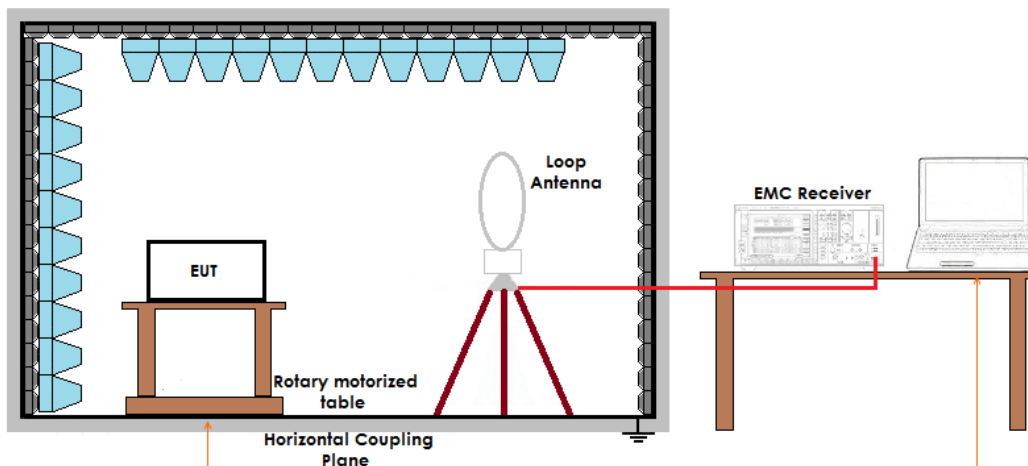
Acceptance limits

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

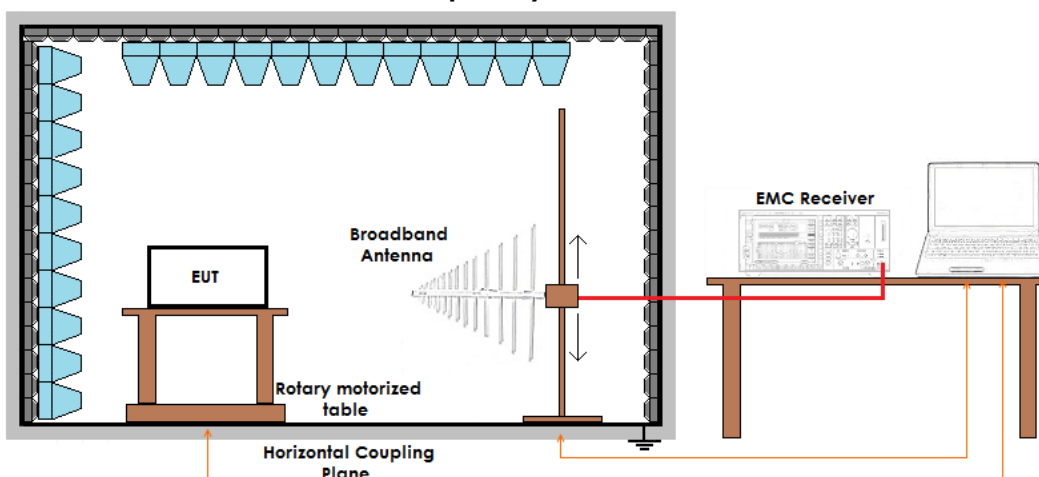
Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Setup

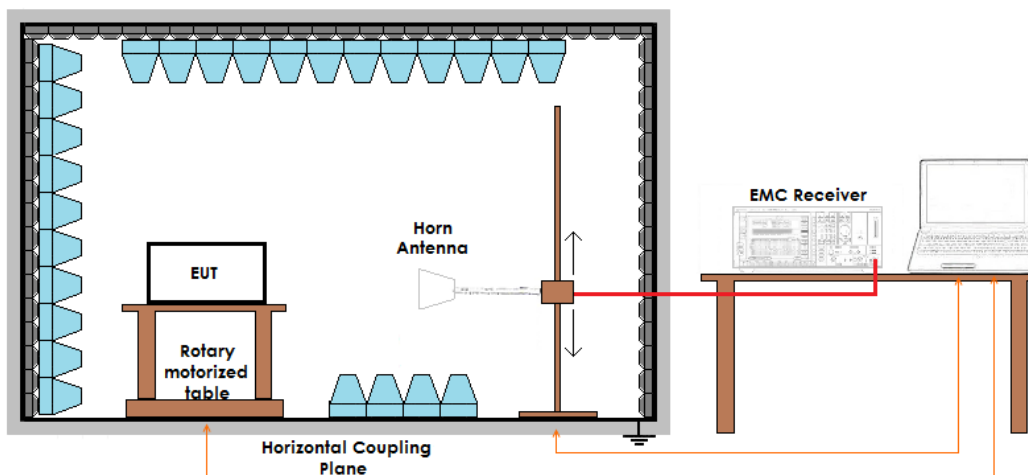
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz





Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
Loop	0,009 – 30	G151770220	Worst case	Complies
H	30 – 1000	G151770212	310 MHz frequency	Complies
V	30 – 1000	G151770213	310 MHz frequency	Complies
H	1000 – 10000	G151770211	310 MHz frequency	Complies
V	1000 – 10000	G151770210	310 MHz frequency	Complies
H	30 – 1000	G151770215	315 MHz frequency	Complies
V	30 – 1000	G151770214	315 MHz frequency	Complies
H	1000 – 10000	G151770208	315 MHz frequency	Complies
V	1000 – 10000	G151770209	315 MHz frequency	Complies
H	30 – 1000	G151770216	318 MHz frequency	Complies
V	30 – 1000	G151770217	318 MHz frequency	Complies
H	1000 – 10000	G151770207	318 MHz frequency	Complies
V	1000 – 10000	G151770206	318 MHz frequency	Complies
H	30 – 1000	G151770219	390 MHz frequency	Complies
V	30 – 1000	G151770218	390 MHz frequency	Complies
H	1000 – 10000	G151770204	390 MHz frequency	Complies
V	1000 – 10000	G151770205	390 MHz frequency	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 +

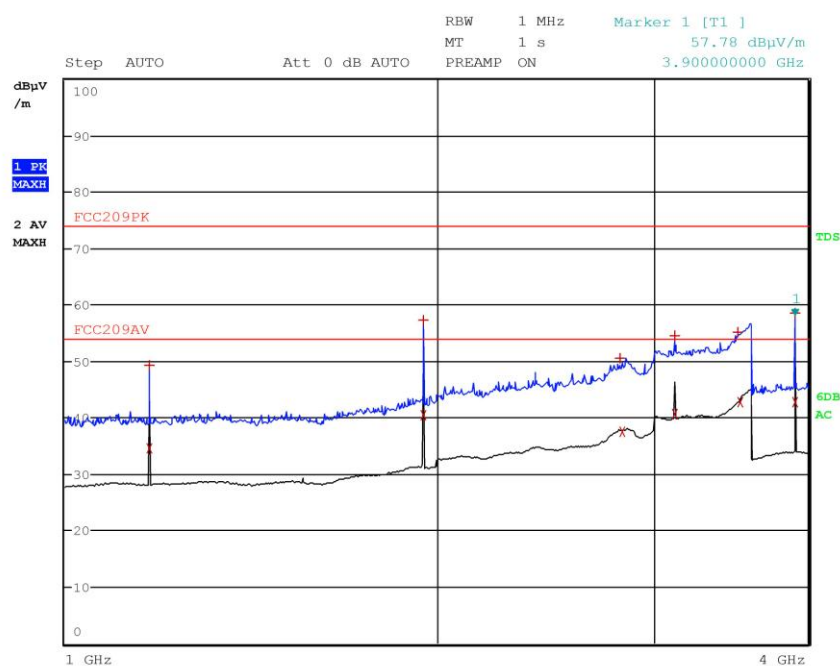
AV: Average; AV [1s] (average at 1 second) values are marked with a x



Graphs

G151770204

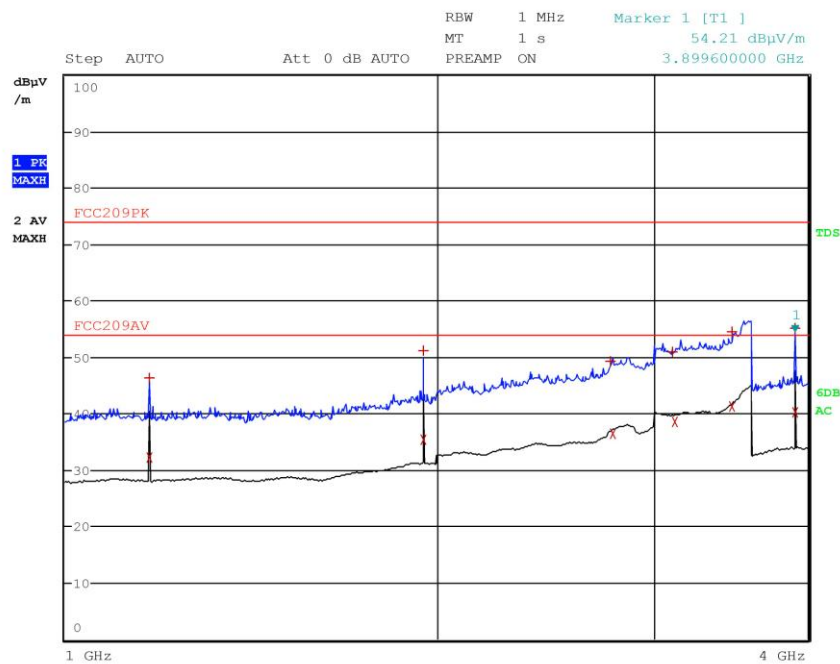
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770204
Test Spec





G151770205

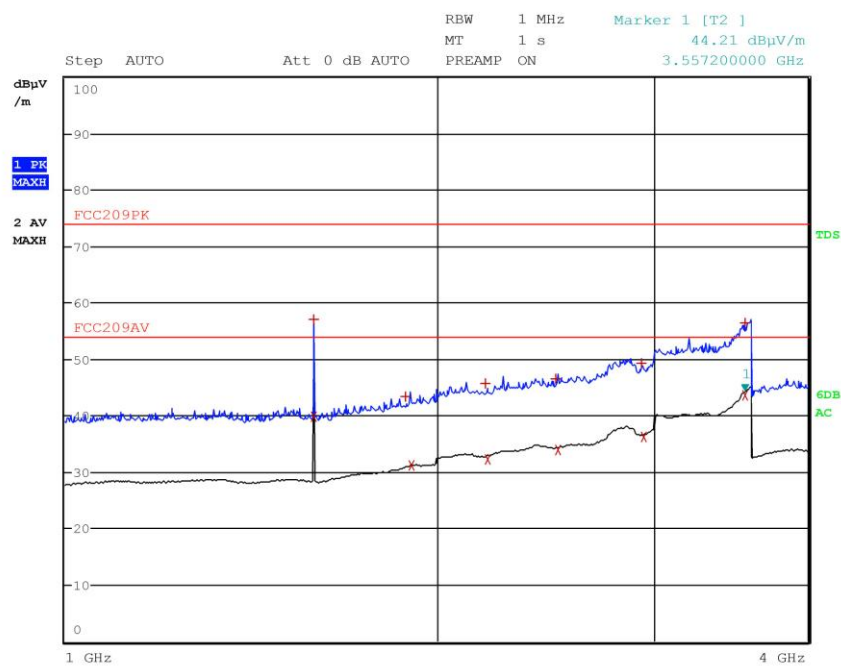
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Manufacturer
OP Condition
Operator Bertezolo 151770205
Test Spec





G151770206

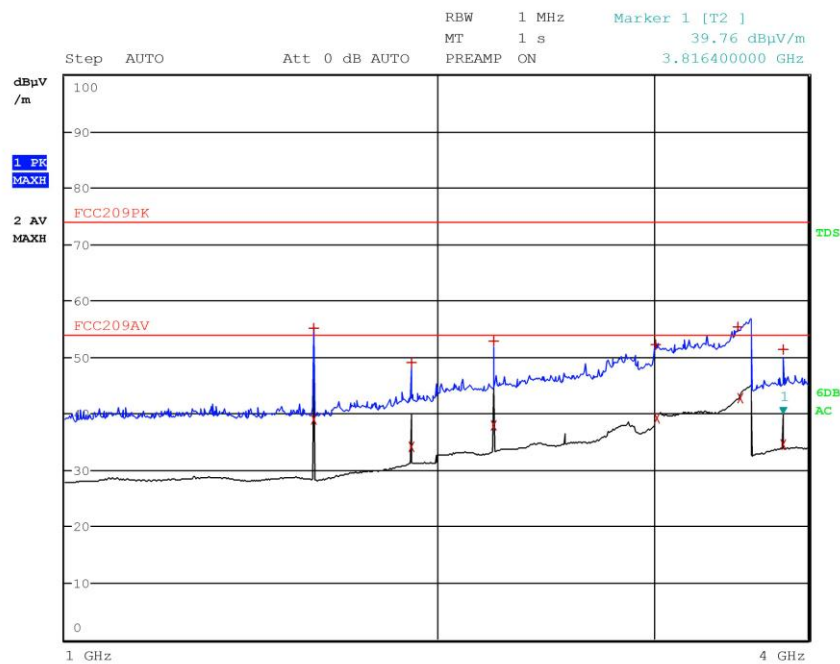
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770206
Test Spec





G151770207

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770207
Test Spec





G151770208

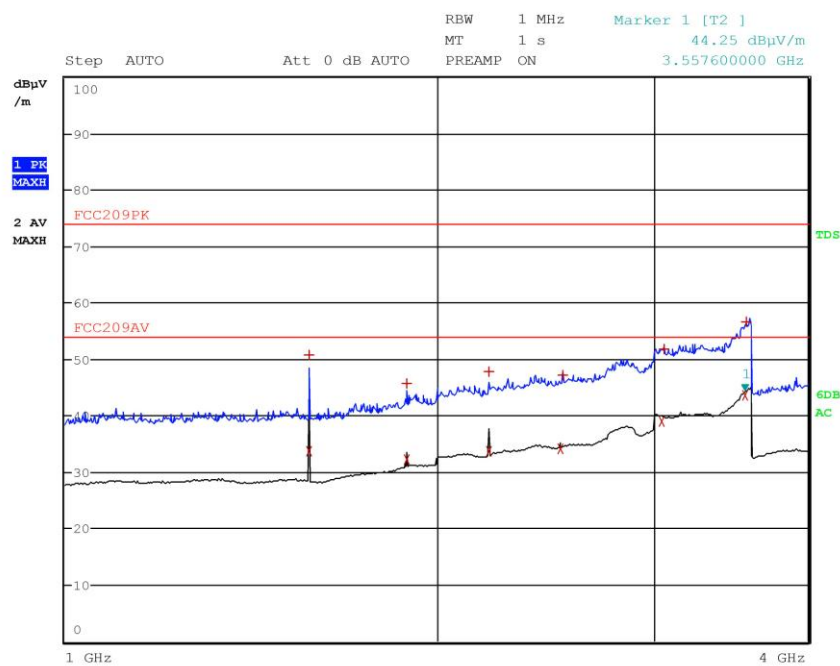
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Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770208
Test Spec





G151770209

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770209
Test Spec





G151770210

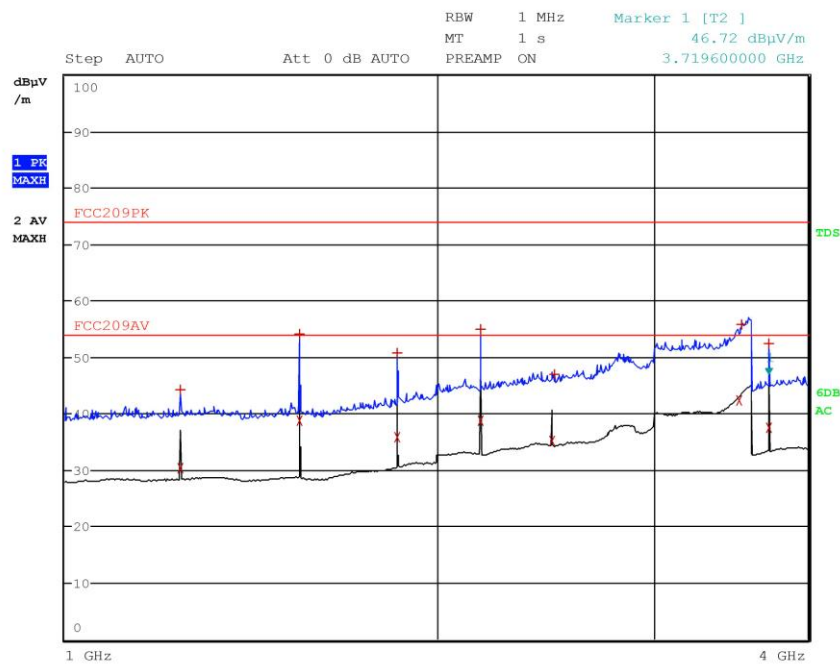
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Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770210
Test Spec





G151770211

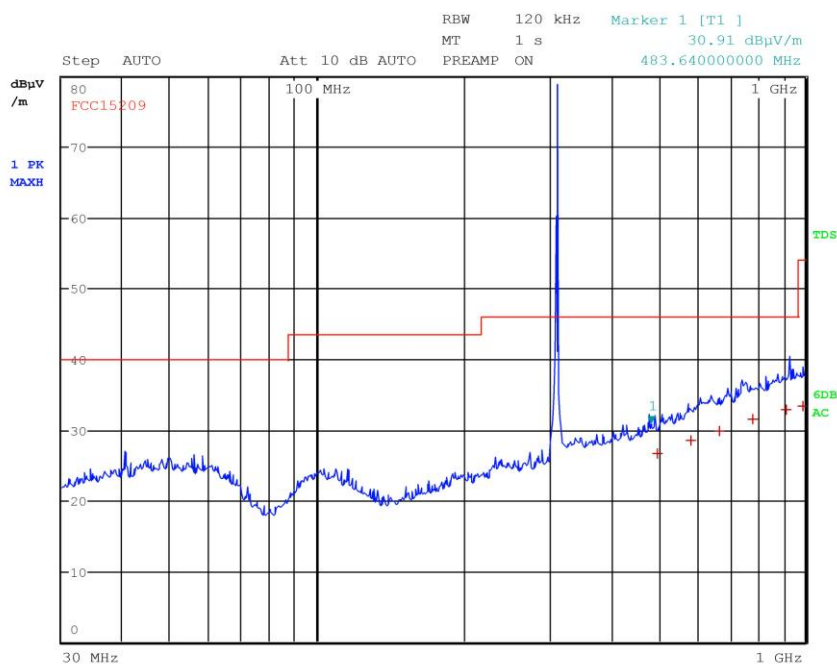
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770211
Test Spec





G151770212

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770212
Test Spec



Final Measurement

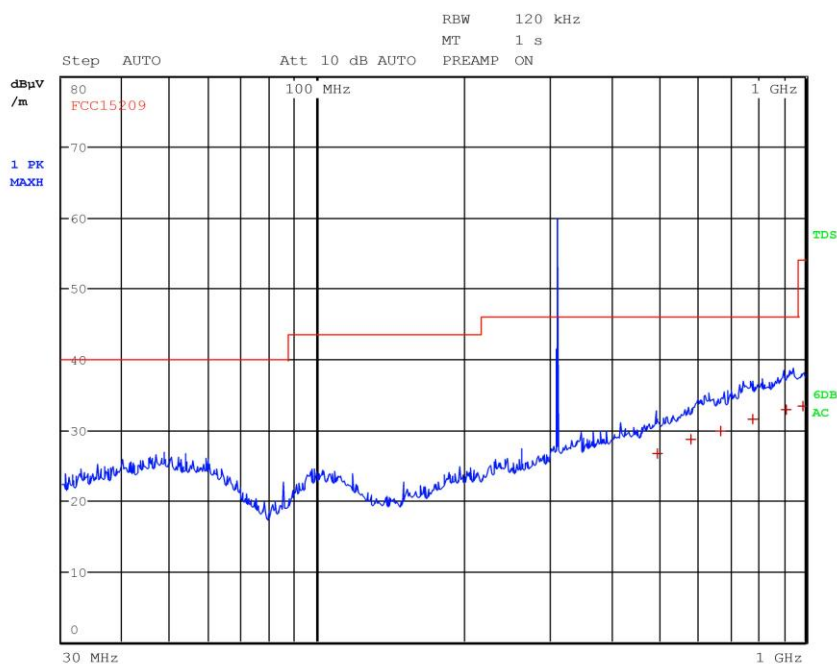
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.69	Quasi Peak	-19.33
1	584.400000000 MHz	28.53	Quasi Peak	-17.49
1	668.560000000 MHz	29.79	Quasi Peak	-16.23
1	780.800000000 MHz	31.48	Quasi Peak	-14.54
1	916.120000000 MHz	32.82	Quasi Peak	-13.20
1	987.400000000 MHz	33.32	Quasi Peak	-20.66



G151770213

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770213
Test Spec



Final Measurement

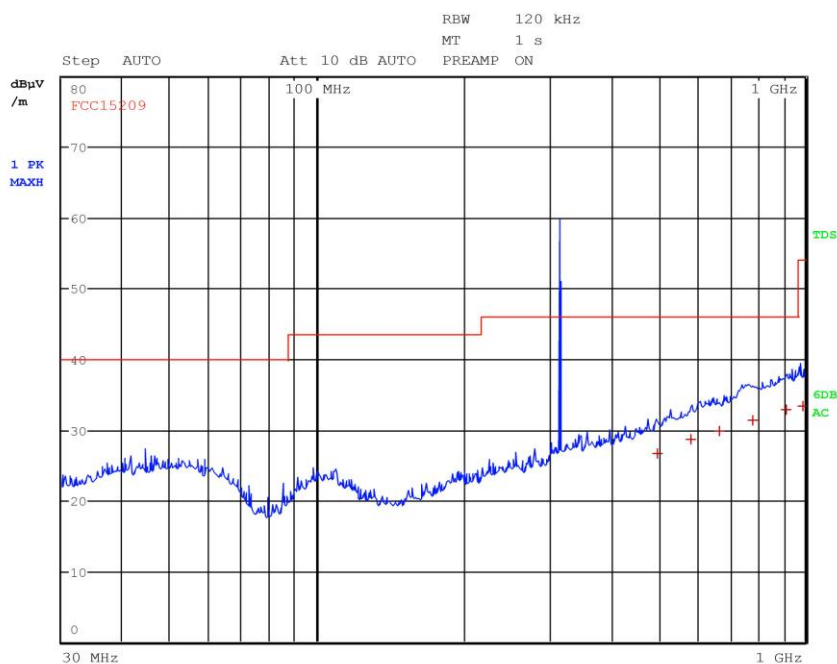
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.66	Quasi Peak	-19.36
1	584.400000000 MHz	28.58	Quasi Peak	-17.44
1	668.560000000 MHz	29.78	Quasi Peak	-16.24
1	780.800000000 MHz	31.45	Quasi Peak	-14.57
1	916.120000000 MHz	32.83	Quasi Peak	-13.19
1	987.400000000 MHz	33.34	Quasi Peak	-20.64



G151770214

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770214
Test Spec



Final Measurement

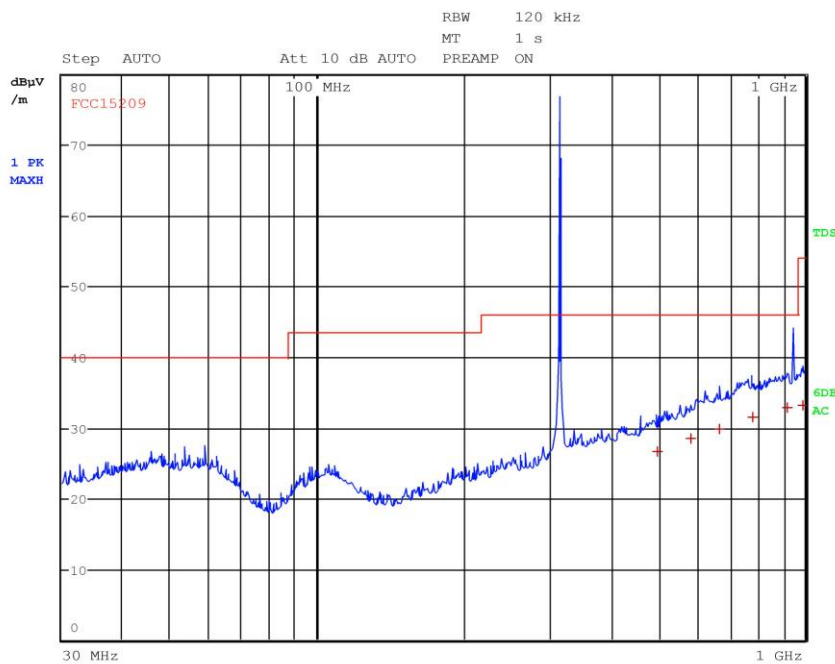
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.71	Quasi Peak	-19.31
1	584.400000000 MHz	28.63	Quasi Peak	-17.39
1	668.560000000 MHz	29.83	Quasi Peak	-16.19
1	780.800000000 MHz	31.38	Quasi Peak	-14.64
1	916.120000000 MHz	32.88	Quasi Peak	-13.14
1	987.400000000 MHz	33.32	Quasi Peak	-20.66



G151770215

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770215
Test Spec



Final Measurement

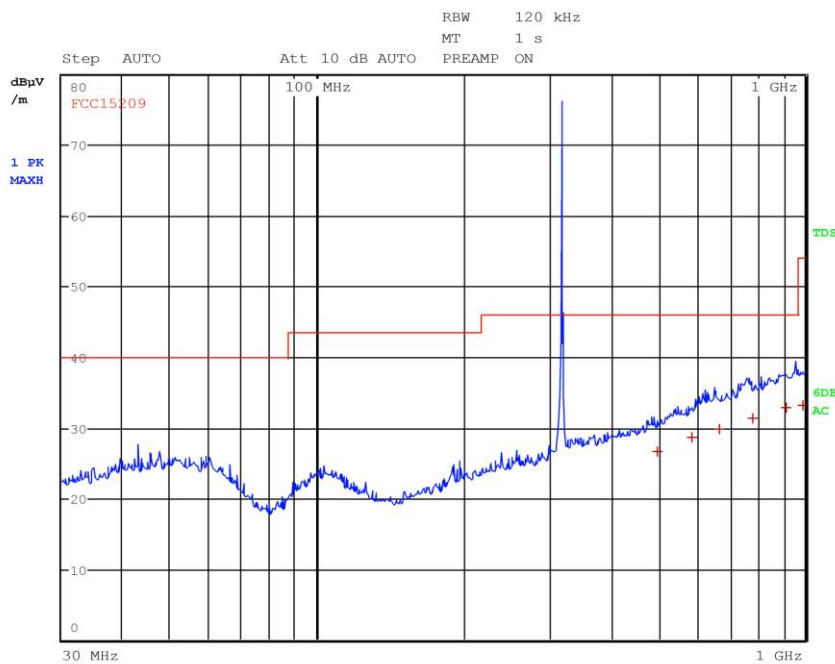
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.62	Quasi Peak	-19.40
1	584.400000000 MHz	28.53	Quasi Peak	-17.49
1	668.560000000 MHz	29.81	Quasi Peak	-16.21
1	780.800000000 MHz	31.45	Quasi Peak	-14.57
1	916.120000000 MHz	32.84	Quasi Peak	-13.18
1	987.400000000 MHz	33.28	Quasi Peak	-20.70



G151770216

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770216
Test Spec



Final Measurement

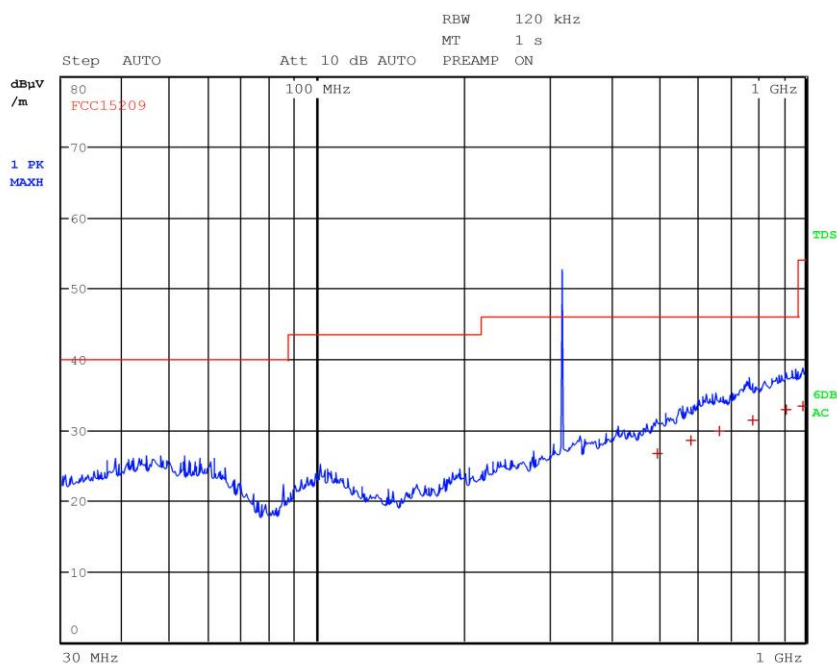
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.68	Quasi Peak	-19.34
1	584.400000000 MHz	28.58	Quasi Peak	-17.44
1	668.560000000 MHz	29.79	Quasi Peak	-16.23
1	780.800000000 MHz	31.42	Quasi Peak	-14.60
1	916.120000000 MHz	32.78	Quasi Peak	-13.24
1	987.400000000 MHz	33.22	Quasi Peak	-20.76



G151770217

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770217
Test Spec



Final Measurement

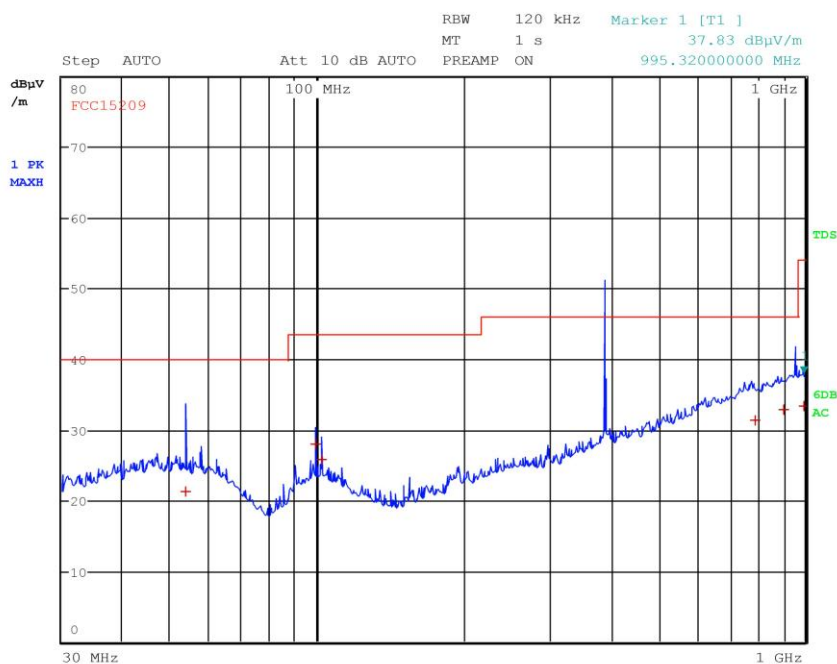
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dB μ V/m)	Detector	Delta Limit/dB
1	497.640000000 MHz	26.68	Quasi Peak	-19.34
1	584.400000000 MHz	28.57	Quasi Peak	-17.45
1	668.560000000 MHz	29.82	Quasi Peak	-16.20
1	780.800000000 MHz	31.39	Quasi Peak	-14.63
1	916.120000000 MHz	32.87	Quasi Peak	-13.15
1	987.400000000 MHz	33.29	Quasi Peak	-20.69



G151770218

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770218
Test Spec



Final Measurement

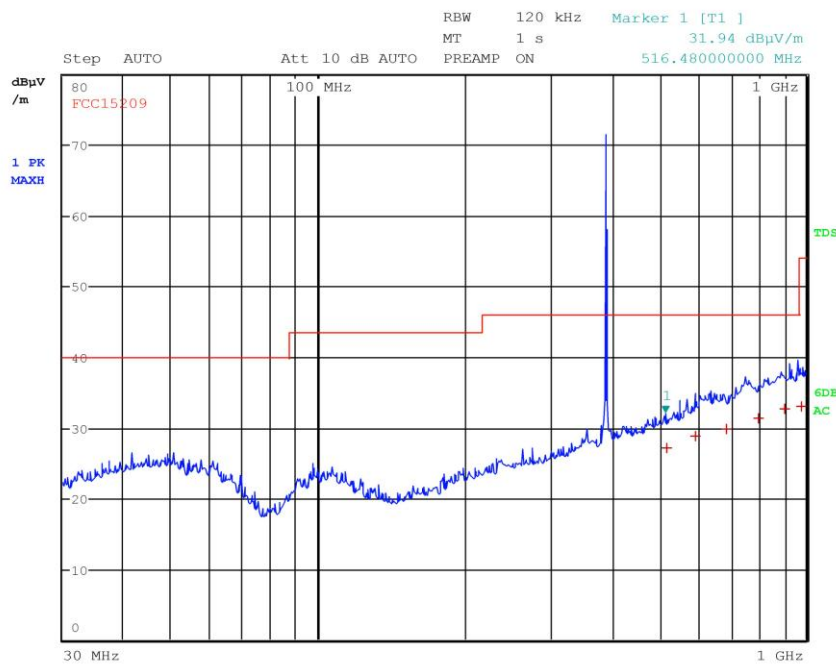
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	53.800000000 MHz	21.23	Quasi Peak	-18.77
1	99.360000000 MHz	27.97	Quasi Peak	-15.55
1	102.240000000 MHz	25.83	Quasi Peak	-17.69
1	788.560000000 MHz	31.37	Quasi Peak	-14.65
1	905.480000000 MHz	32.80	Quasi Peak	-13.22
1	995.320000000 MHz	33.37	Quasi Peak	-20.61



G151770219

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770219
Test Spec



Final Measurement

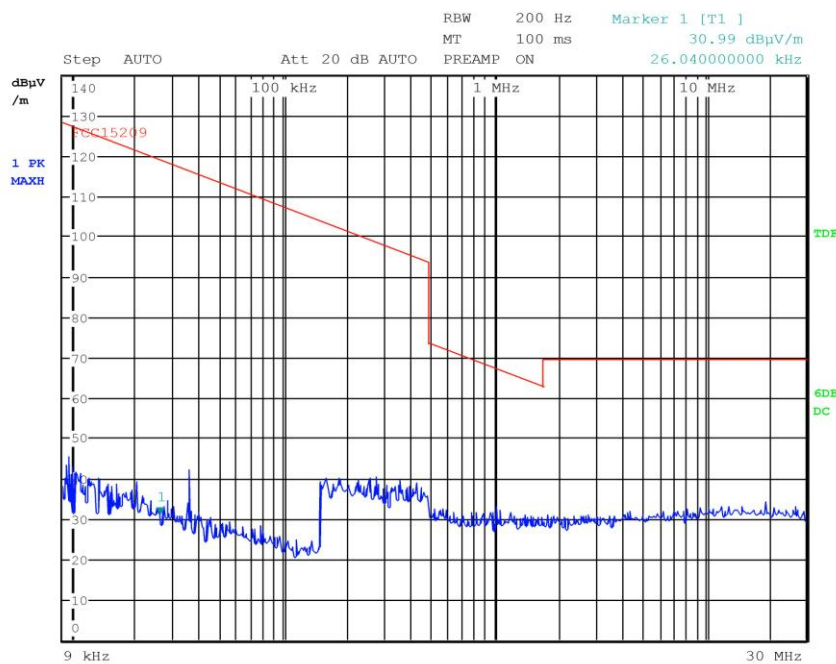
Meas Time: 1 s
Margin: 6 dB
Subranges: 6

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	517.600000000 MHz	27.07	Quasi Peak	-18.95
1	591.640000000 MHz	28.79	Quasi Peak	-17.23
1	688.000000000 MHz	29.80	Quasi Peak	-16.22
1	797.840000000 MHz	31.35	Quasi Peak	-14.67
1	902.640000000 MHz	32.77	Quasi Peak	-13.25
1	977.040000000 MHz	33.07	Quasi Peak	-20.91



G151770220

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770220
Test Spec



Final Measurement

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

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 (b)
- 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

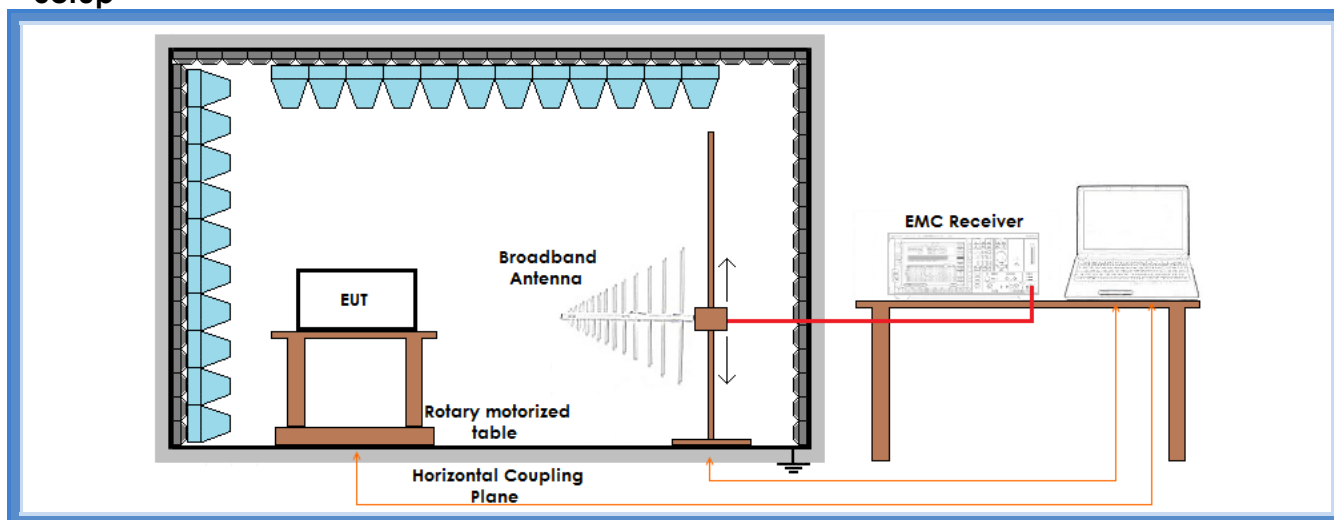
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
23	100	45

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



Graphs:

G151770200, G151770201, G151770202 and
G151770203

Result – Field strength of fundamental

Frequency (MHz)	Limits (dB μ V/m)	Peak level (dB μ V/m)	Duty cycle (dB)	Level (dB μ V/m)	Results
309,989	75,32	78,73	-5,51	73,22	Complies
314,989	75,62	77,41	-5,51	71,90	Complies
317,987	75,80	76,63	-5,51	71,12	Complies
389,986	79,24	73,17	-5,51	67,66	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 = $20\log 0,53 = -5,51$ dB where 0,53 is the highest percentage of duty cycle between all the modulations



Result – Field strength of spurious emissions

Nominal frequency (MHz)	Frequency (MHz)	Limits (dBμV/m)	Peak level (dBμV/m)	Duty cycle (dB)	Level (dBμV/m)	Results
310	930	55,31	52,5	-5,51	46,99	Complies
315	945	55,62	53,0	-5,51	47,49	Complies
318	954	55,80	53,1	-5,51	47,59	Complies
390	780	59,24	< 40	-5,51	< 35	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:

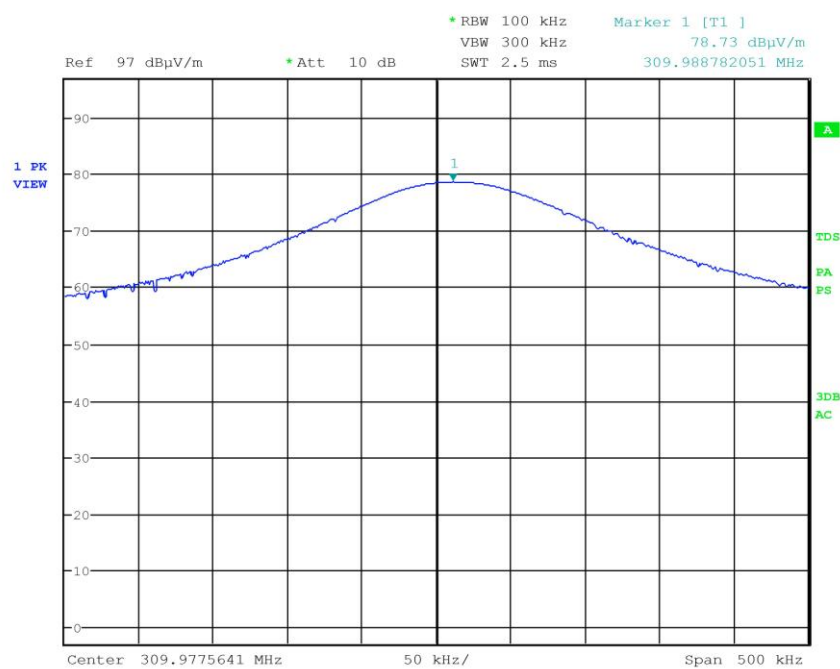
Duty cycle = $20\log 0,53$ = -5,51 dB where 0,53 is the highest percentage of duty cycle between all the modulations



Graphs

G151770200

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770200
Test Spec





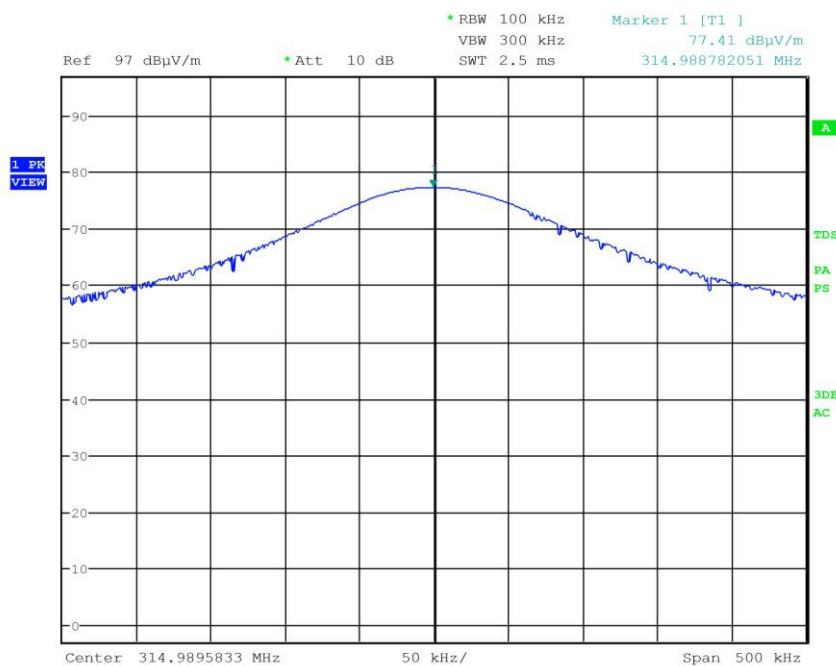
CMC
Centro Misure Compatibilità S.r.l.
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36016 Thiene (VI)



LAB N° 0168

G151770201

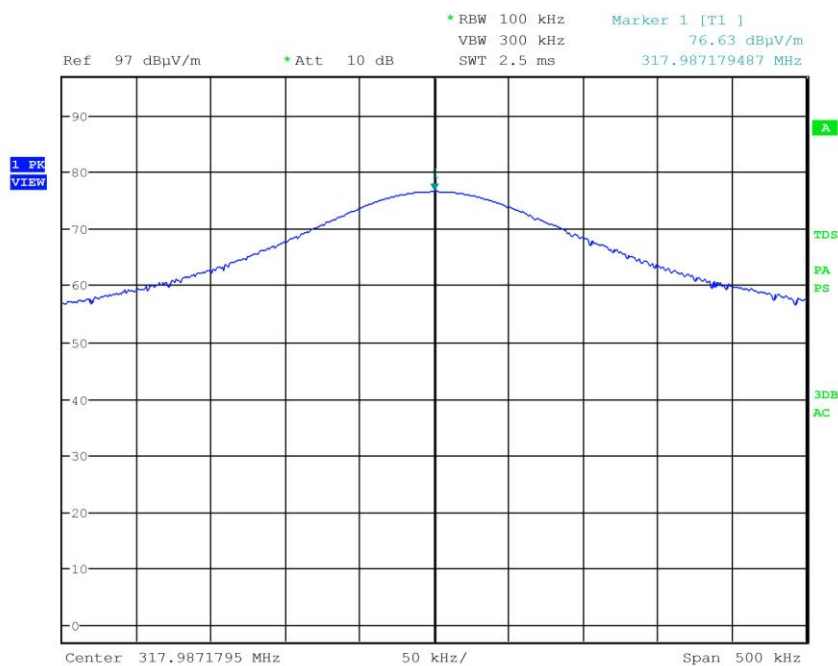
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770201
Test Spec





G151770202

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770202
Test Spec





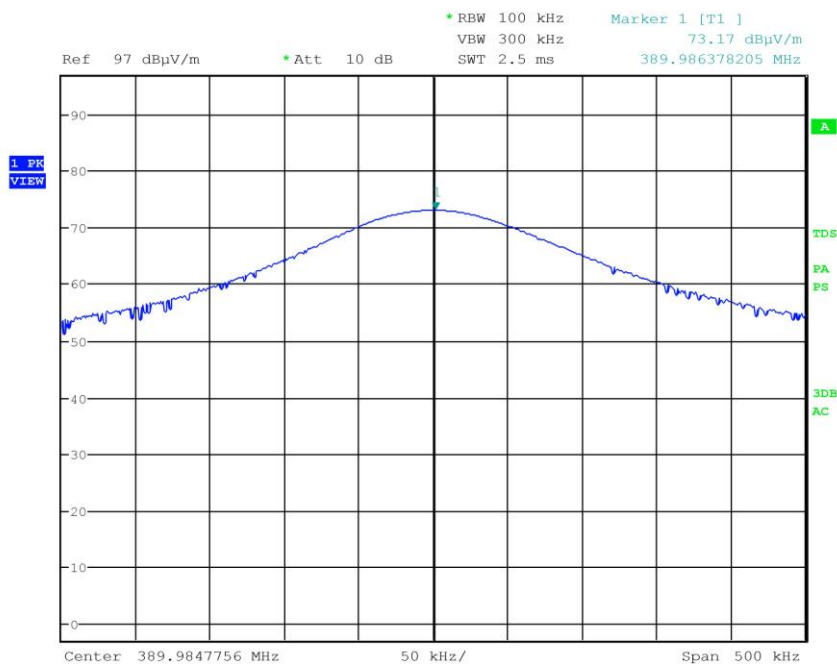
CMC
Centro Misure Compatibilità S.r.l.
Via dell'Elettronica, 12/C
36016 Thiene (VI)



LAB N° 0168

G151770203

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770203
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

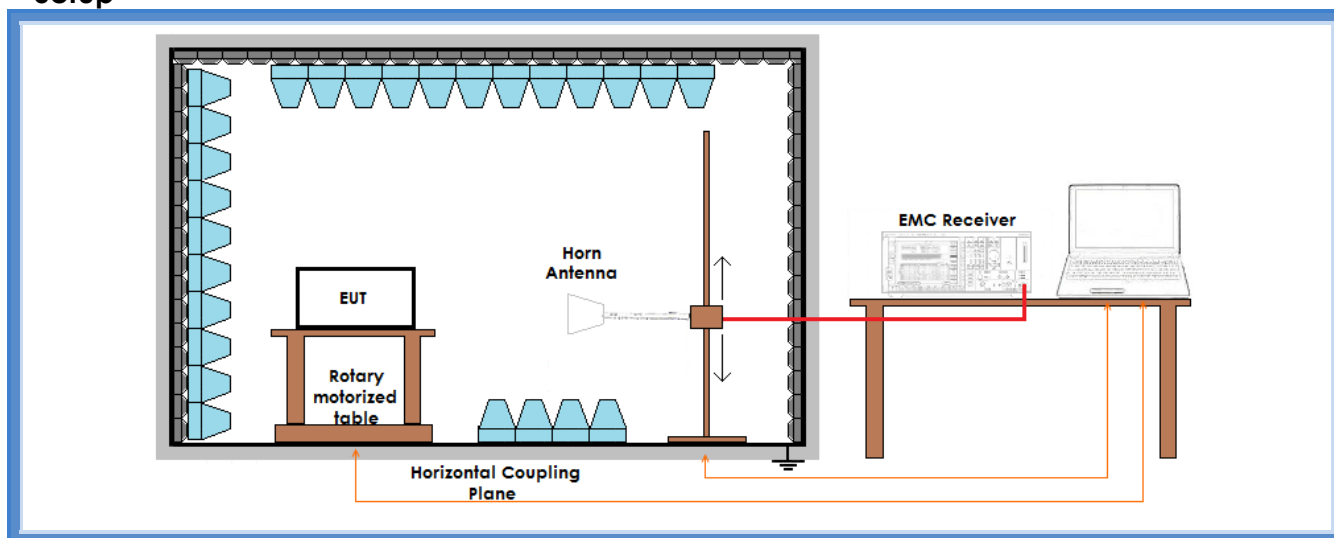
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
23	100	45

Acceptance limits

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



Setup



Result – AV detector

Nominal frequency (MHz)	Frequency (MHz)	Limits (dBμV/m)	Measured Level (dBμV/m)	Duty cycle (dB)	Level (dBμV/m)	Results
310	1550	54	54,1	5,51	48,59	Complies
310	2170	54	55,0	5,51	49,49	Complies
315	1575	54	56,8	5,51	51,29	Complies
315	2205	54	53,5	5,51	47,99	Complies
318	1590	54	58,9	5,51	53,39	Complies
390	1950	54	59,8	5,51	54,29	Complies
390	3900	54	58,9	5,51	53,39	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 = $20\log 0,53 = -5,51$ dB where 0,53 is the highest percentage of duty cycle between all the modulations



Result – Peak detector

Nominal frequency (MHz)	Frequency (MHz)	Limits (dBµV/m)	Measured Level (dBµV/m)	Duty cycle (dB)	Level (dBµV/m)	Results
310	1550	74	38,8	5,51	33,29	Complies
310	2170	74	40,2	5,51	34,69	Complies
315	1575	74	41,0	5,51	35,49	Complies
315	2205	74	38,5	5,51	32,99	Complies
318	1590	74	44,3	5,51	38,79	Complies
390	1950	74	44,3	5,51	38,79	Complies
390	3900	74	43,7	5,51	38,19	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 = $20\log 0,53 = -5,51$ dB where 0,53 is the highest percentage of duty cycle between all the modulations

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

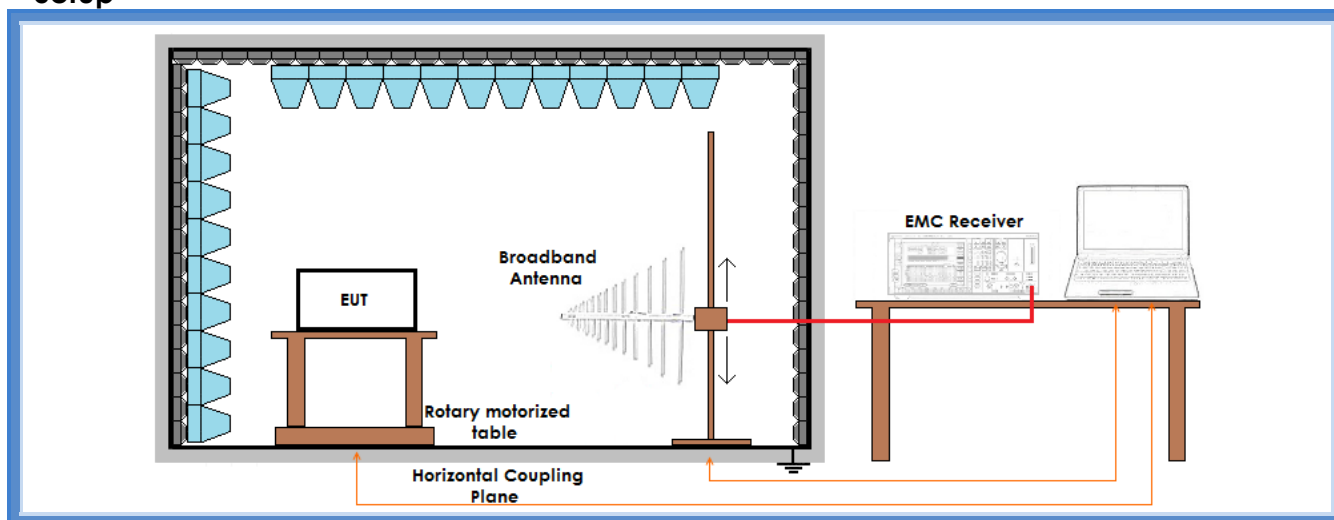
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
23	100	45

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



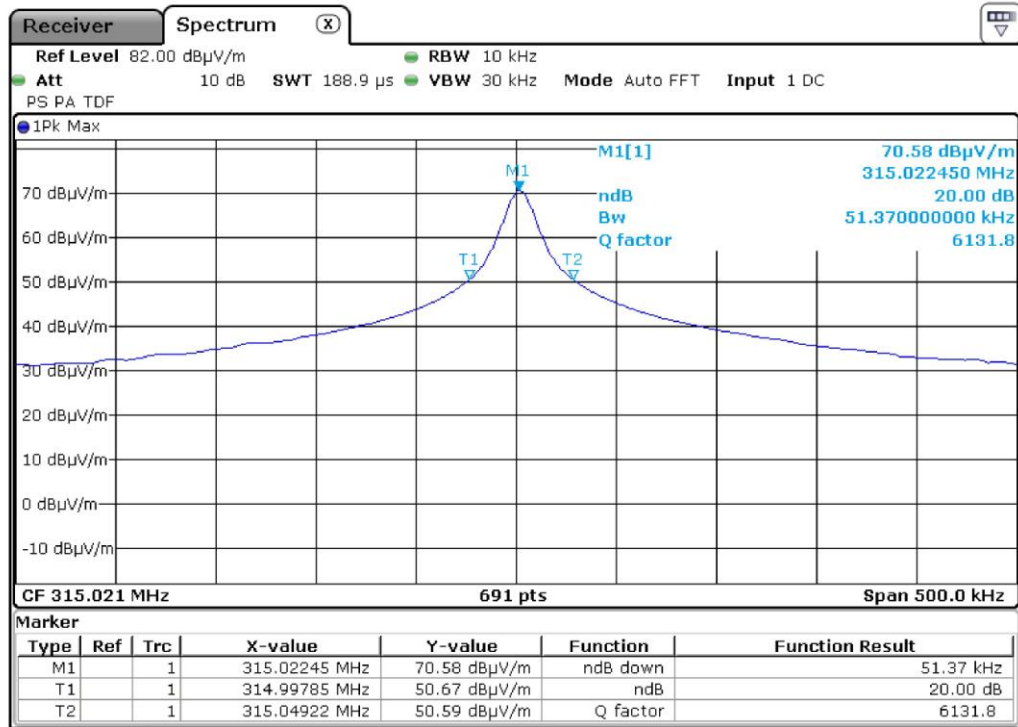
Result

Coding	Frequency (MHz)	Limit (kHz)	20 dB bandwidth (kHz)	Graphs	Results
Chamberlain purple	315	787,5	51,37	G151770227	Complies
Chamberlain yellow	310	775,0	51,37	G151770243	Complies
Chamberlain yellow	315	787,5	51,37	G151770242	Complies
Chamberlain yellow	390	975,0	50,65	G151770239	Complies
Chamberlain orange/red	390	975,0	49,93	G151770234	Complies
Chamberlain green	390	975,0	52,10	G151770235	Complies
Linear Megacode	318	795,0	49,21	G151770246	Complies
Genie Intellicode (worst case between I and II)	315	787,5	52,83	G151770230	Complies
Genie Intellicode (worst case between I and II)	390	975,0	49,92	G151770238	Complies



Graphs

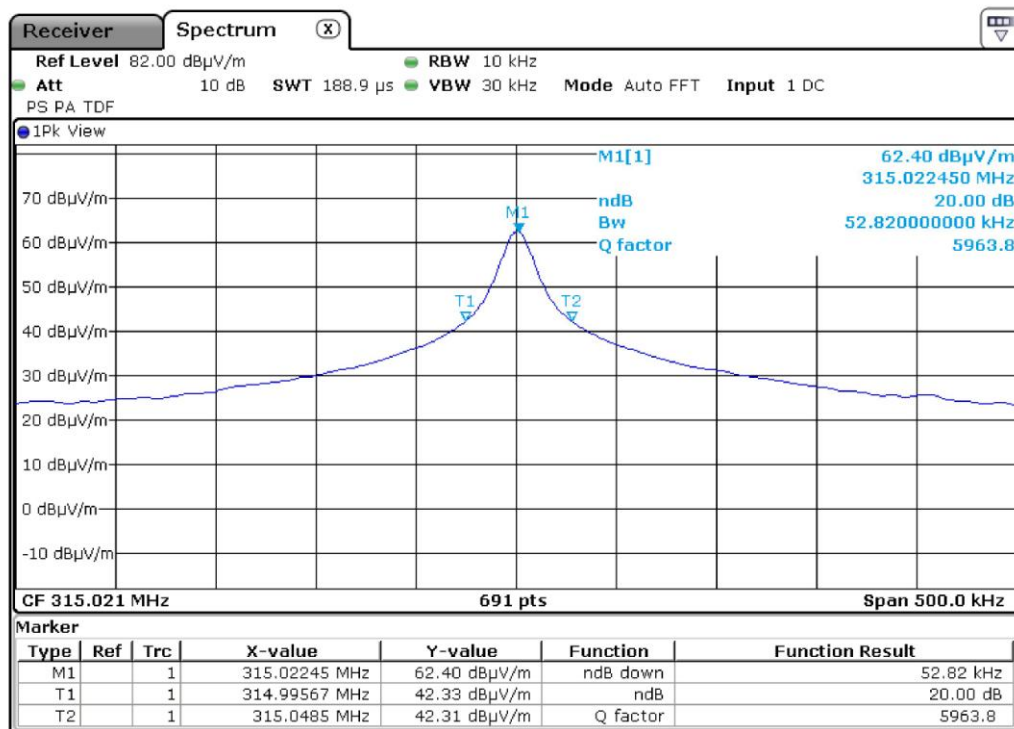
G151770227



151770227



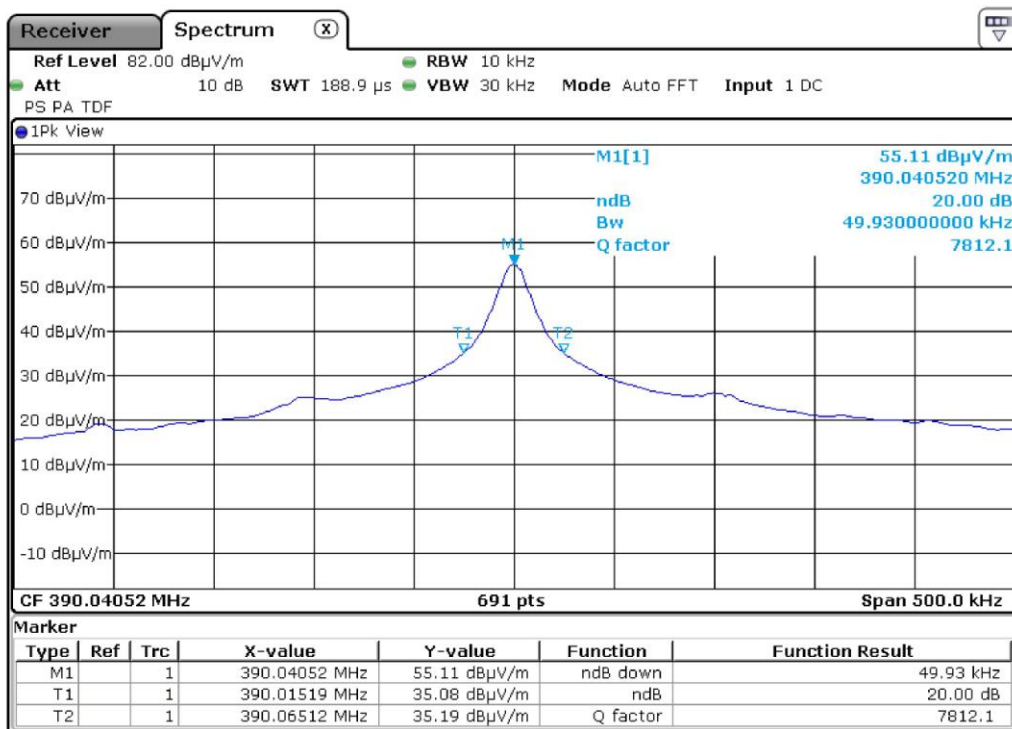
G151770230



151770230



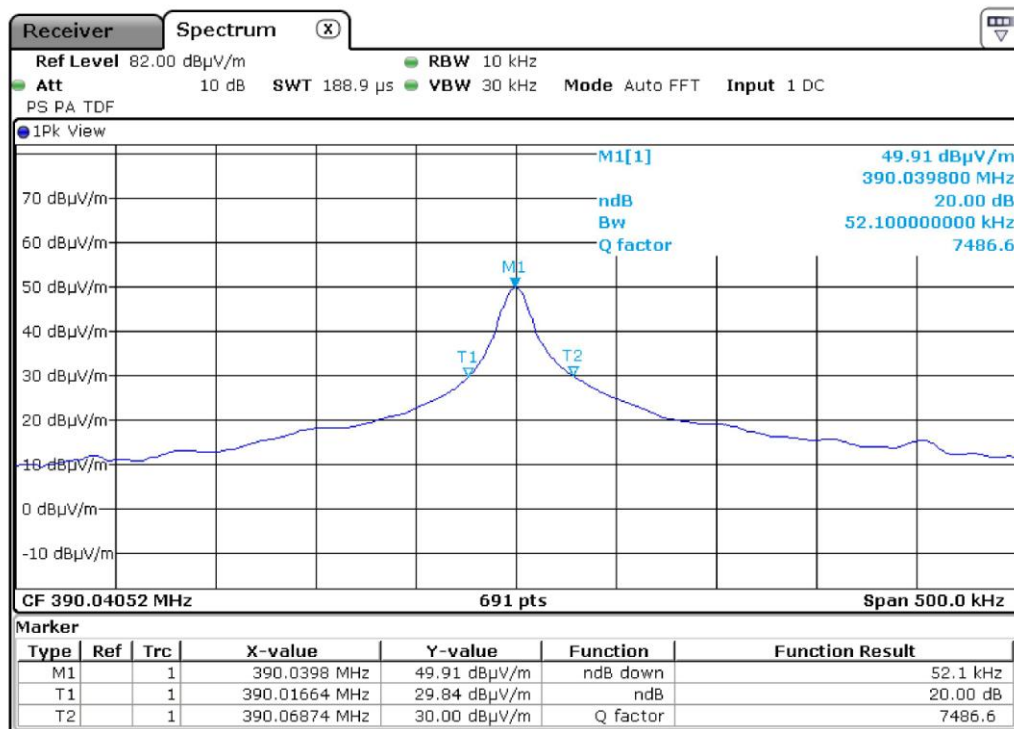
G151770234



151770234



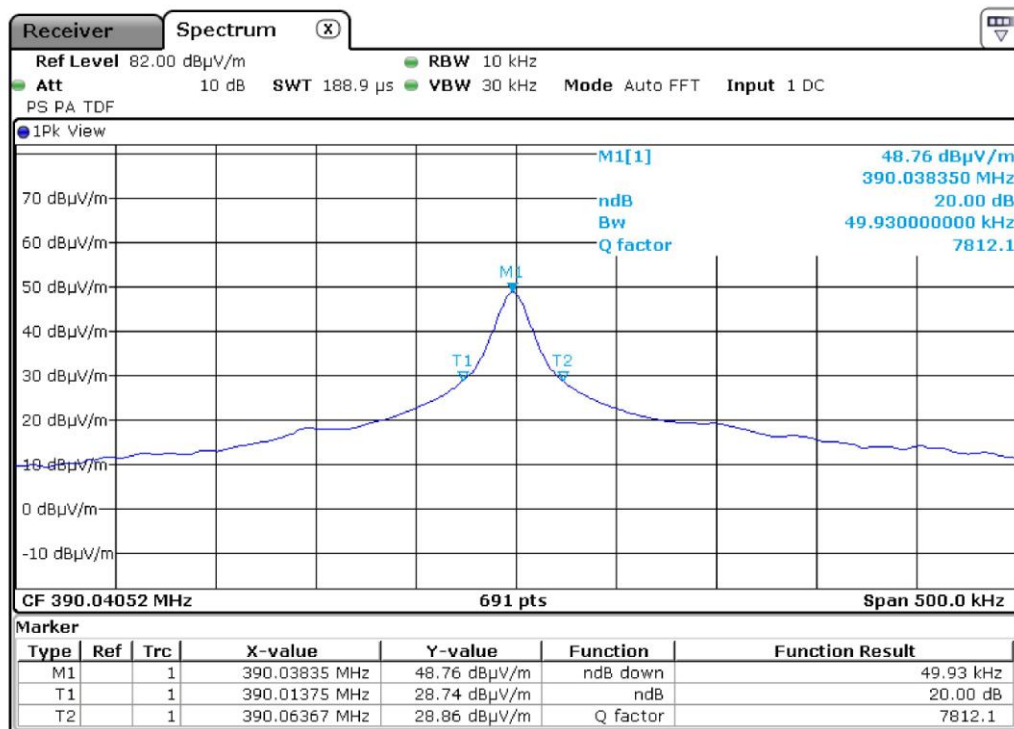
G151770235



151770235



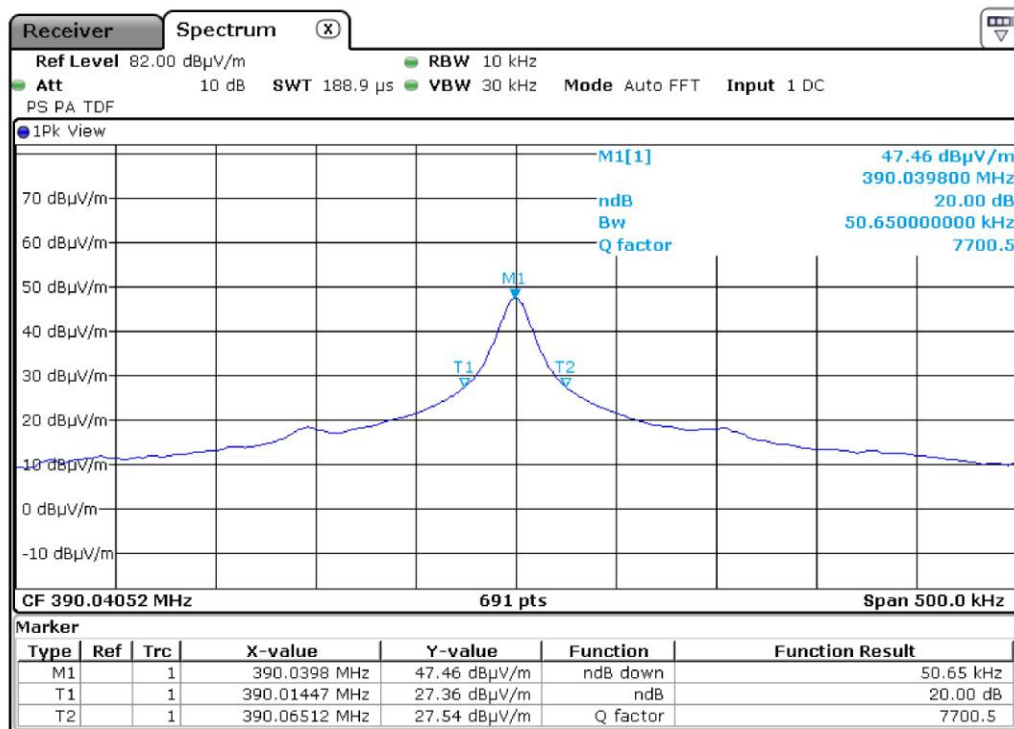
G151770238



151770238



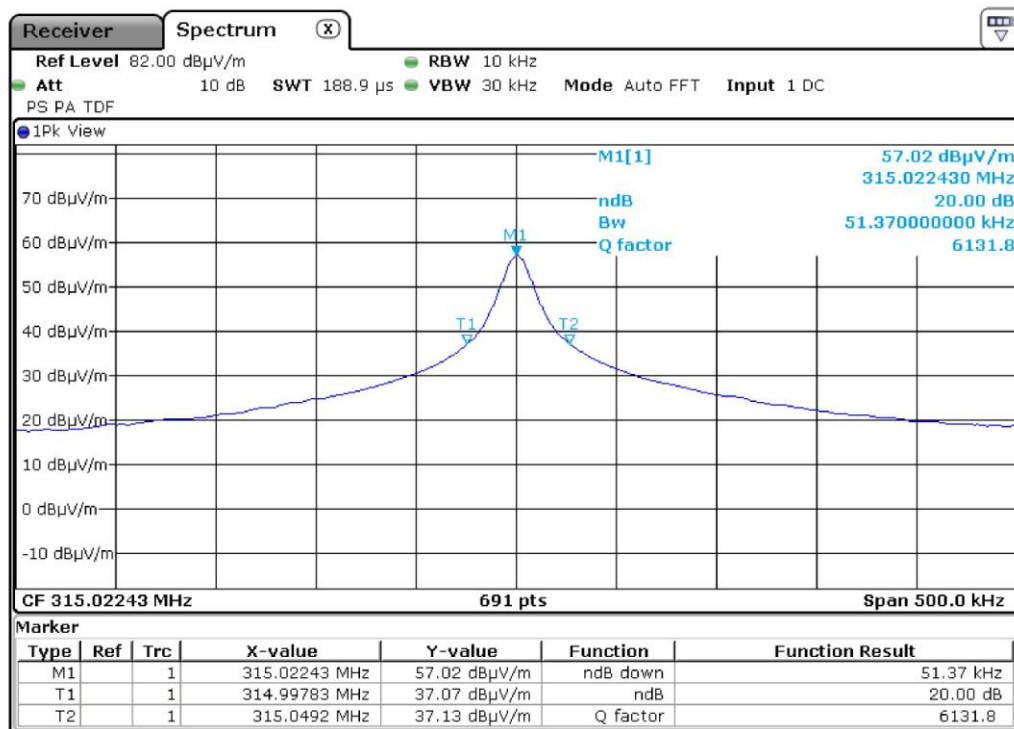
G151770239



151770239



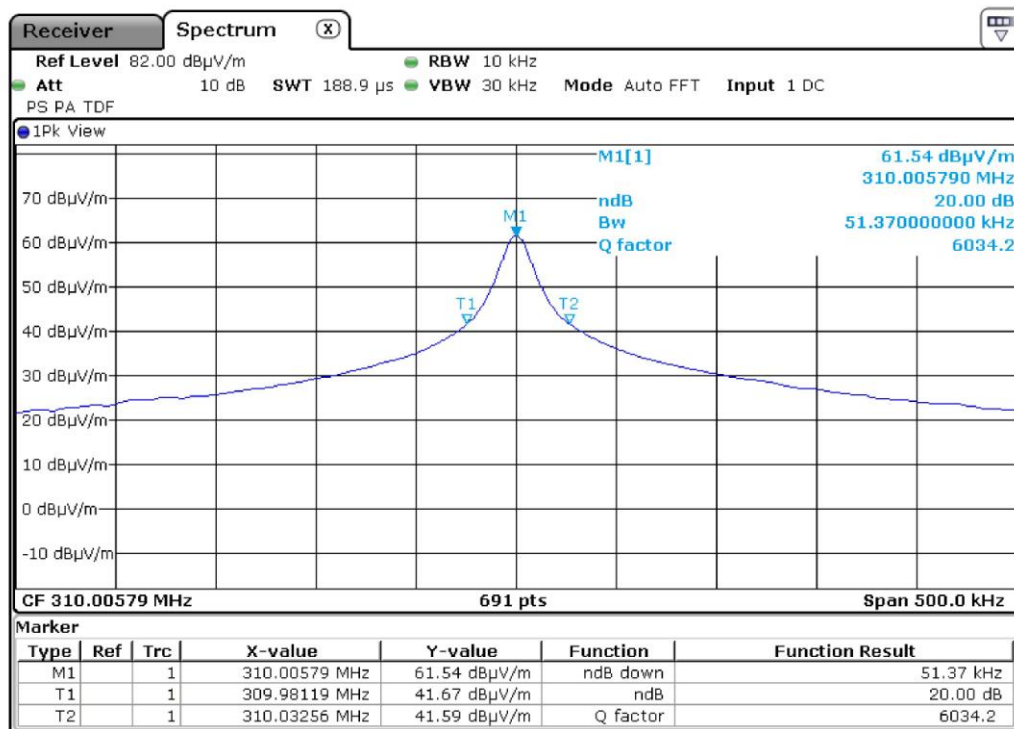
G151770242



151770242



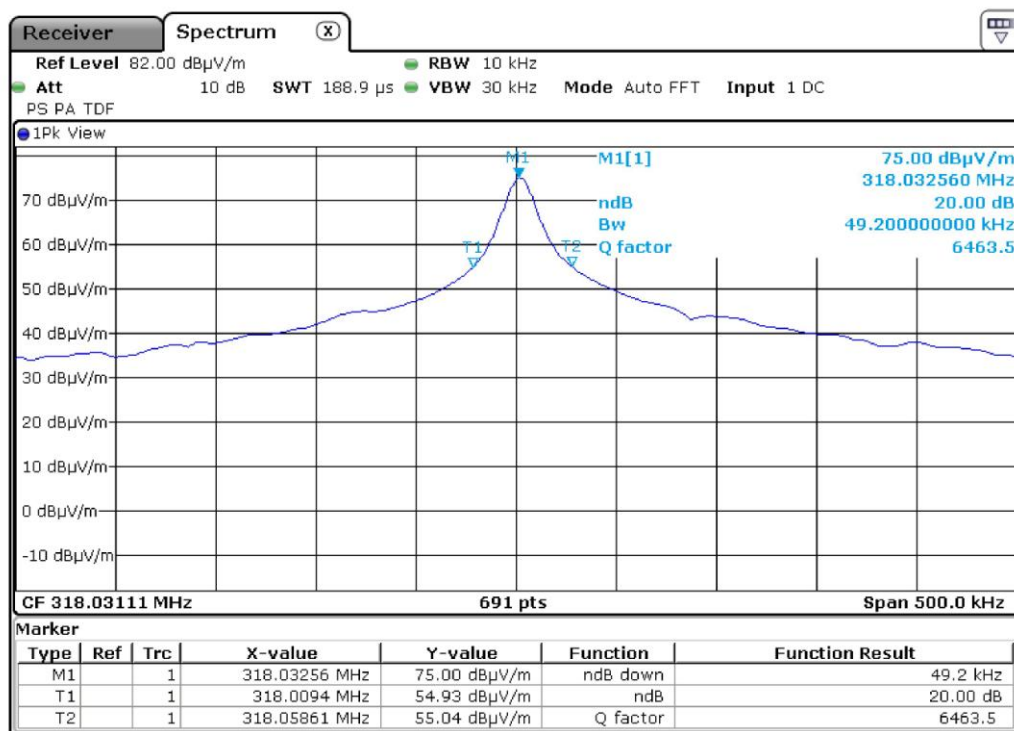
G151770243



151770243



G151770246



151770246

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 S164
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



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

Coding	Frequency (MHz)	Transmitter deactivation time	Graphs
Chamberlain purple	315	< 1,84 s	G151770221
Genie Intellicode II	315	< 0,55 s	G151770222
Genie Intellicode II	390	< 1,31 s	G151770223
Chamberlain orange/red	390	< 1,80 s	G151770224
Chamberlain green	390	< 1,84 s	G151770225
Linear Megacode	318	< 1,61 s	G151770226
Chamberlain yellow	310	< 1,85 s	G151770247
Chamberlain yellow	315	< 1,73 s	G151770248
Chamberlain yellow	390	< 1,72 s	G151770249

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

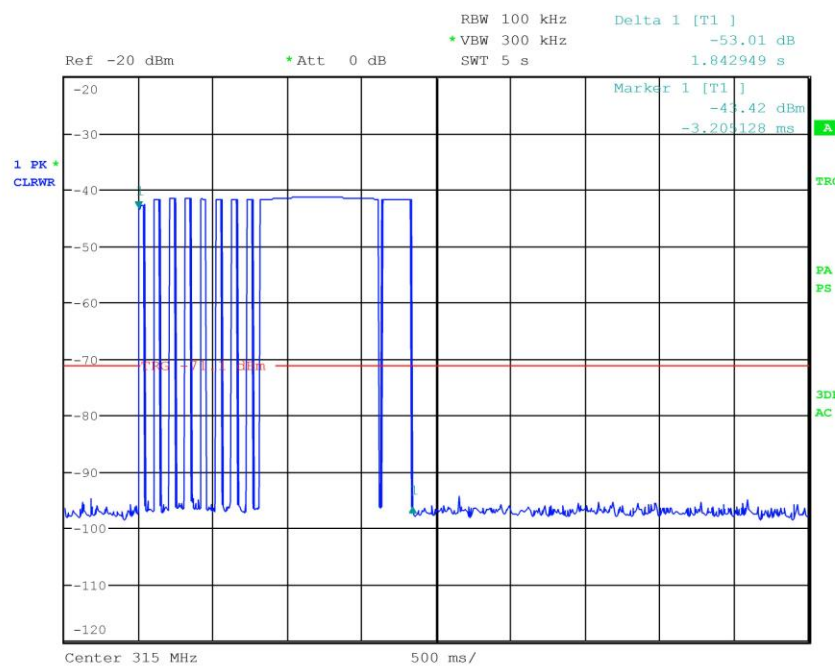
Result: N.A.



Graphs

G151770221

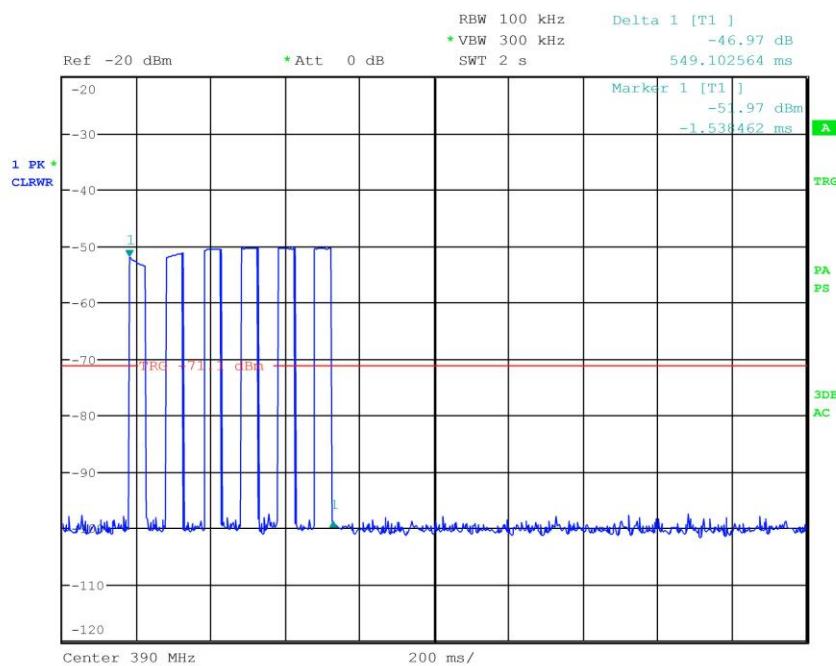
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770221
Test Spec





G151770222

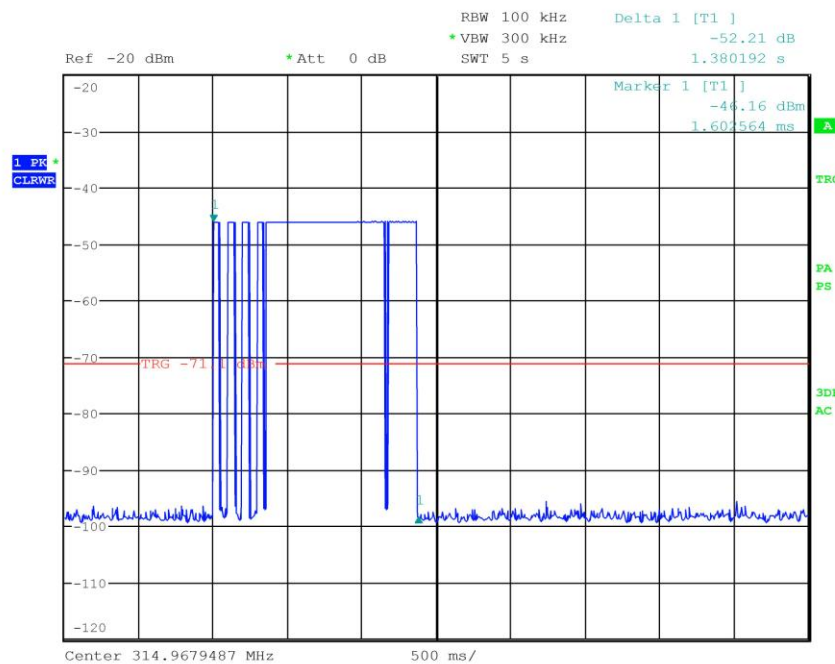
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770222
Test Spec





G151770223

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770223
Test Spec





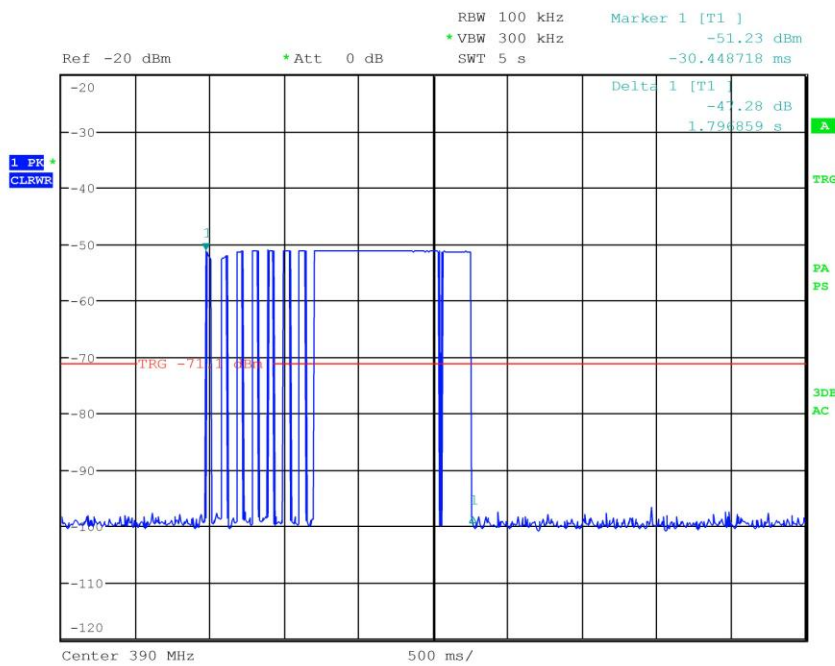
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LAB N° 0168

G151770224

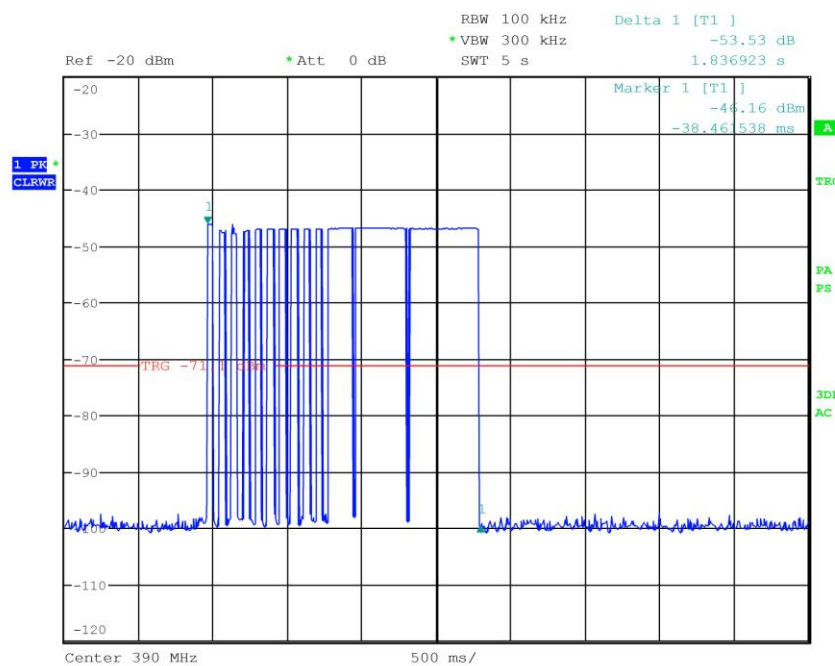
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 151770224
Test Spec





G151770225

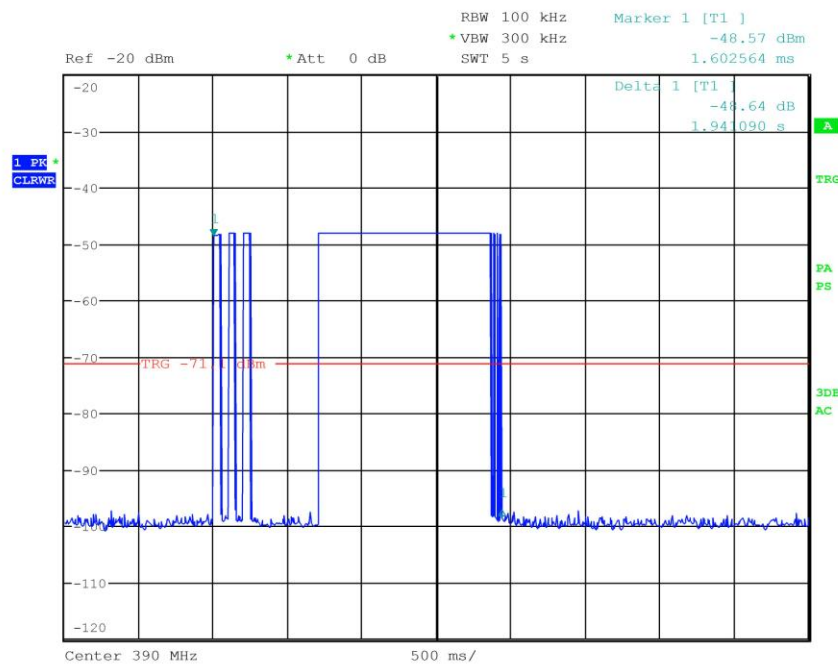
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770225
Test Spec





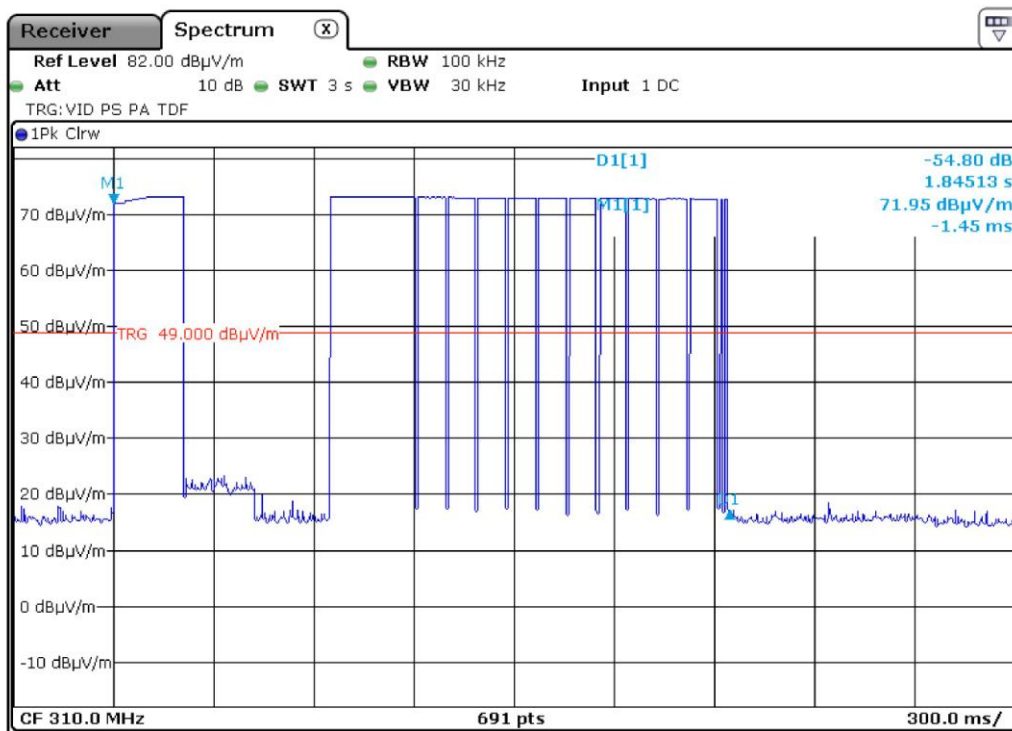
G151770226

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 151770226
Test Spec





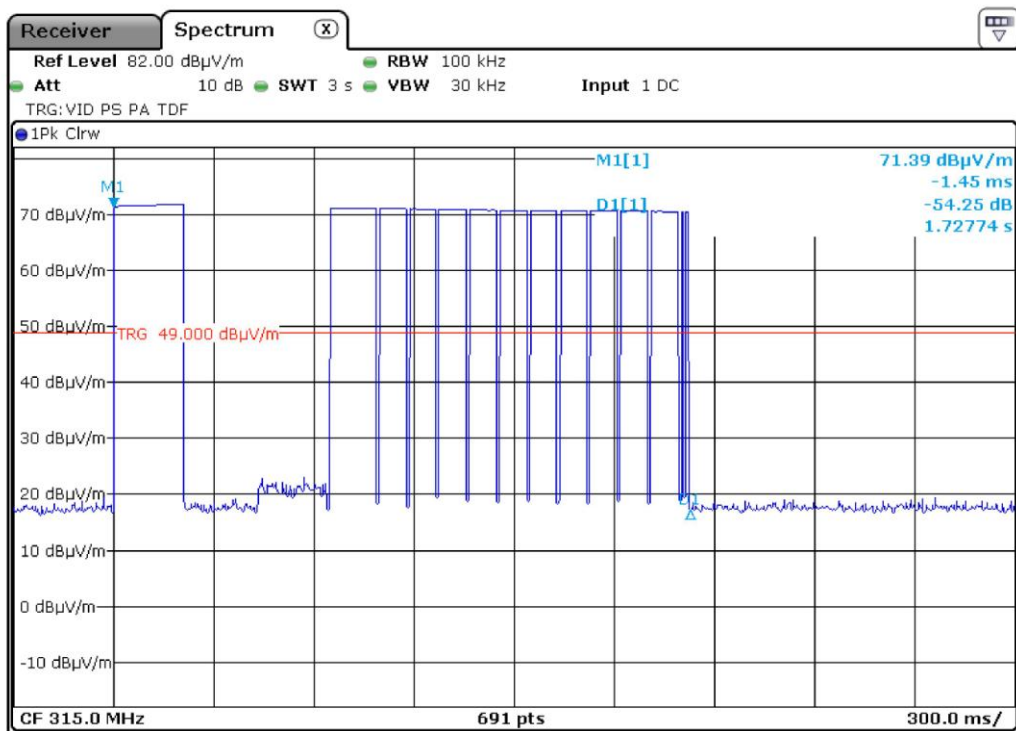
G151770247



1517700247



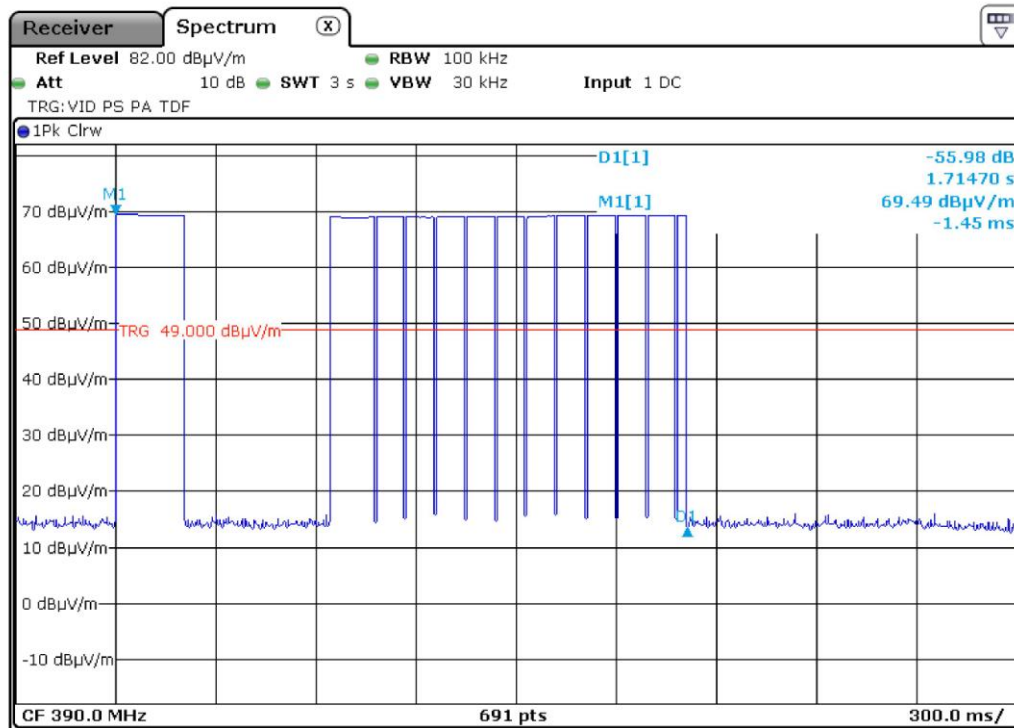
G151770248



1517700248



G151770249



1517700249

Result: The requirements are met