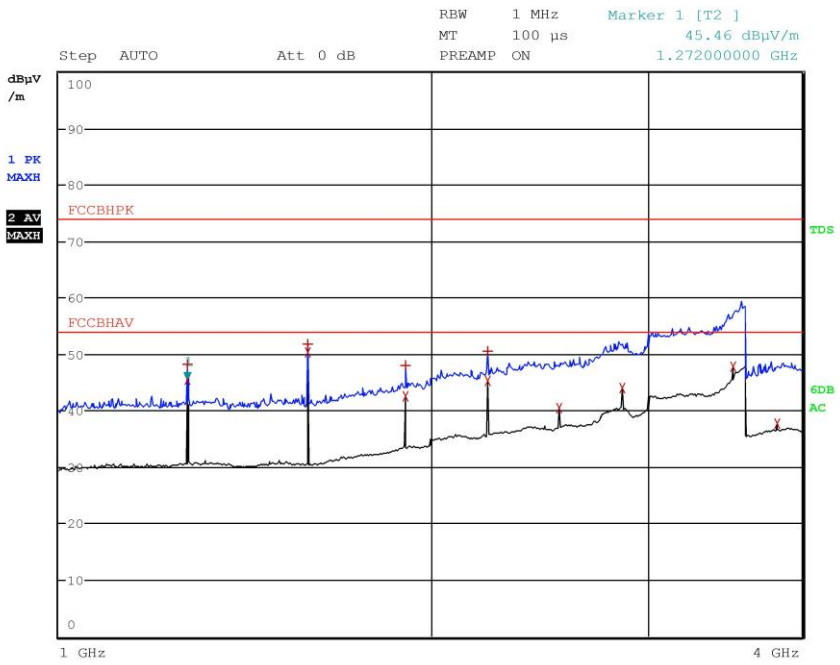
G16086378

Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086378
Test Spec	



Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086378
Test Spec	

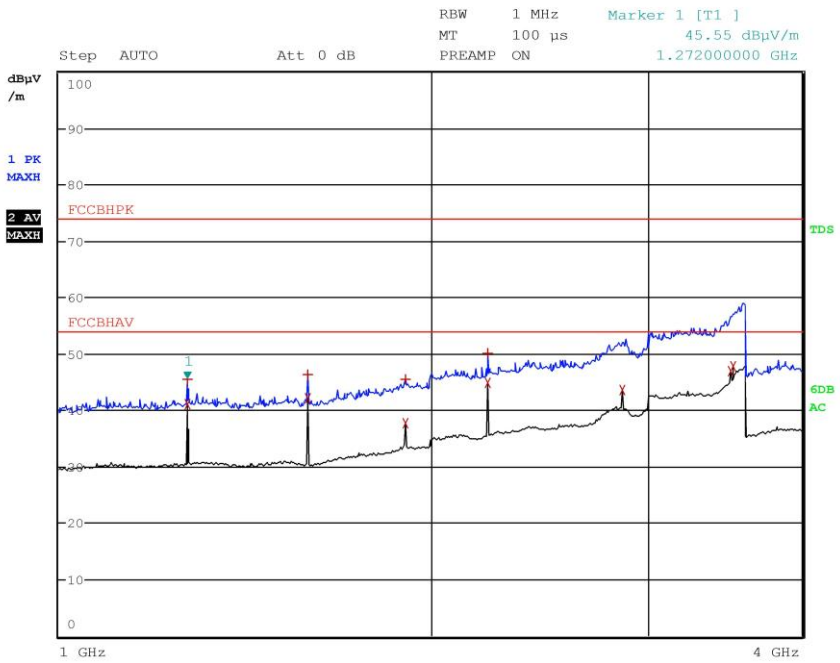
Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	1.272000000 GHz	48.27	Max Peak	-25.73
2	1.272000000 GHz	45.46	Average	-8.54
1	1.590000000 GHz	51.86	Max Peak	-22.14
2	1.590000000 GHz	50.38	Average	-3.62
1	1.908000000 GHz	47.97	Max Peak	-26.03
2	1.908000000 GHz	42.51	Average	-11.49
1	2.226000000 GHz	50.47	Max Peak	-23.53
2	2.226000000 GHz	45.34	Average	-8.66
2	2.544000000 GHz	40.44	Average	-13.56
2	2.862000000 GHz	44.11	Average	-9.89
2	3.519600000 GHz	47.80	Average	-6.20
2	3.816000000 GHz	37.61	Average	-16.39

G16086379

Meas Type	Emission 3m
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086379
Test Spec	



Final Measurement

Meas Time: 1 s
Margin: 6 dB
Peaks: 11

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.272000000 GHz	40.98	Average	-13.02
1	1.272000000 GHz	45.55	Max Peak	-28.45
2	1.590000000 GHz	42.18	Average	-11.82
1	1.590000000 GHz	46.38	Max Peak	-27.62
1	1.907600000 GHz	45.38	Max Peak	-28.62
2	1.908000000 GHz	37.68	Average	-16.32
1	2.226000000 GHz	50.03	Max Peak	-23.97
2	2.226000000 GHz	44.82	Average	-9.18
2	2.862000000 GHz	43.68	Average	-10.32
2	3.498000000 GHz	46.97	Average	-7.03
2	3.519600000 GHz	47.79	Average	-6.21

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

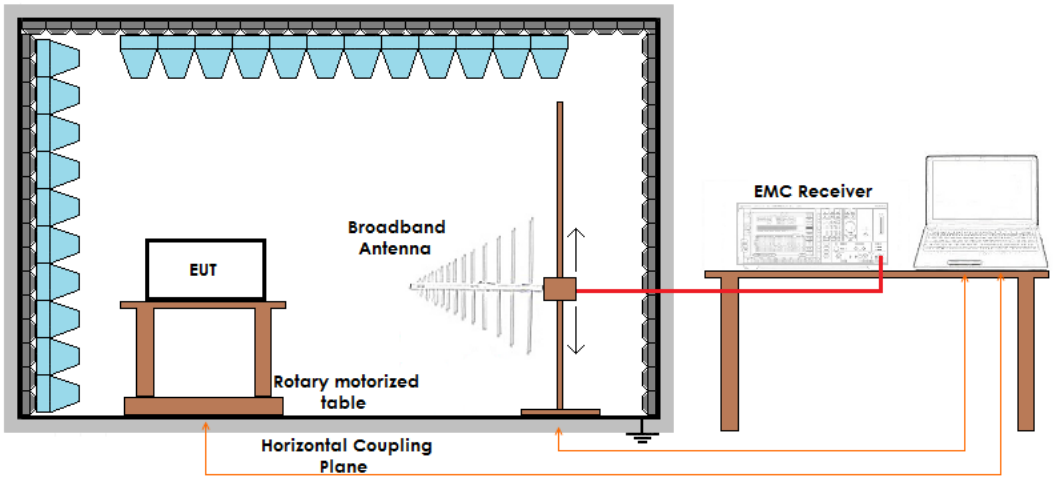
Environmental conditions

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(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

Setup



Graphs:	G16086340, G16086345, G16086350 and G16086354

Result – Field strength of fundamental

Frequency (MHz)	*Limits (dBµV/m)*	*Peak level (dBµV/m)*	*Duty cycle correction (dB)*	*Level (dBµV/m)*	*Results*
309,9892	75,3	76,66	-6,75	69,91	Complies
314,9880	75,6	78,07	-6,75	71,32	Complies
317,9880	75,8	79,63	-6,75	72,88	Complies
389,9842	79,2	78,39	-6,75	71,64	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 = 20log0,46 = -6,75 dB where 0,46 is the highest percentage of declared 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 correction (dB)*	*Level (dBµV/m)*	*Results*
310	620	55,3	41,80	-6,75	35,05	Complies
315	630	55,6	42,00	-6,75	35,25	Complies
318	636	55,8	39,20	-6,75	32,45	Complies
390	780	59,2	39,60	-6,75	32,85	Complies
310	930	55,3	48,60	-6,75	41,85	Complies
315	945	55,6	50,40	-6,75	43,65	Complies
318	954	55,8	44,20	-6,75	37,45	Complies

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

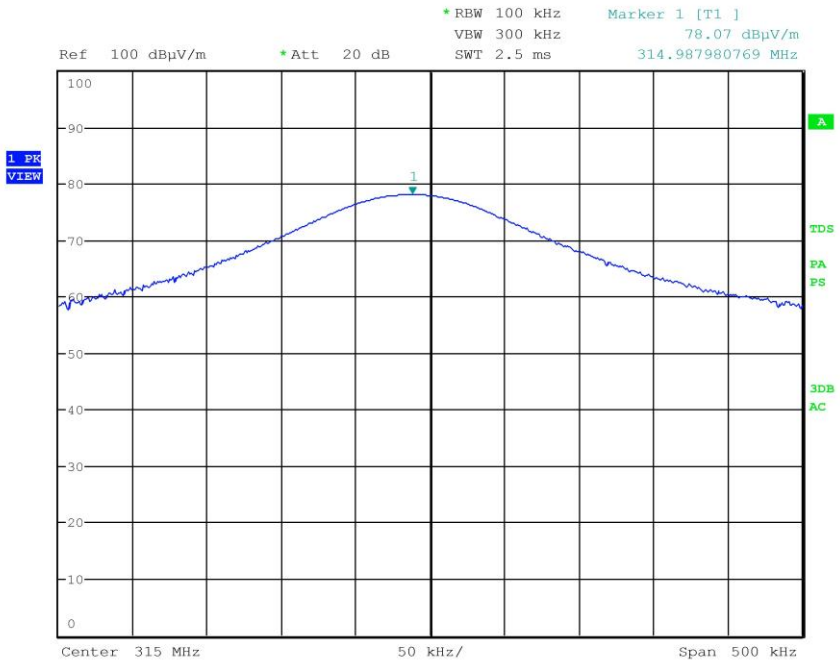
Duty cycle value has been obtained using the following formula:

Duty cycle = 20log0,46 = -6,75 dB where 0,46 is the highest percentage of declared duty cycle between all the modulations

Graphs

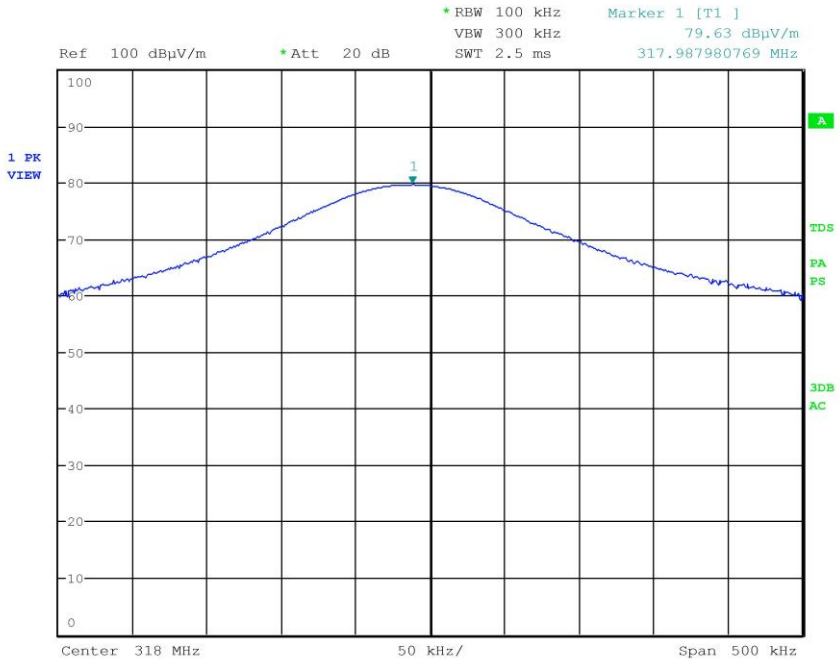
G16086340

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086340
Test Spec	



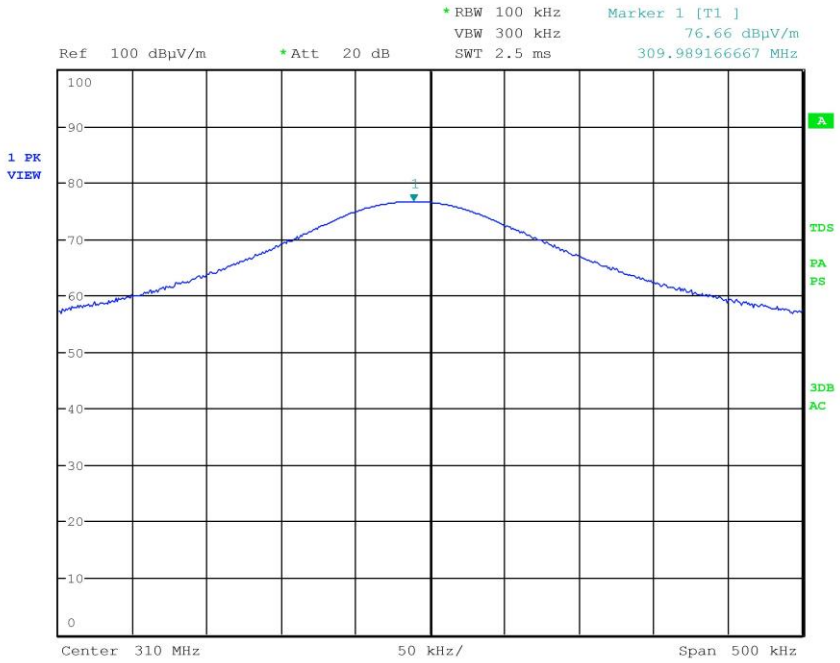
G16086345

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086345
Test Spec	



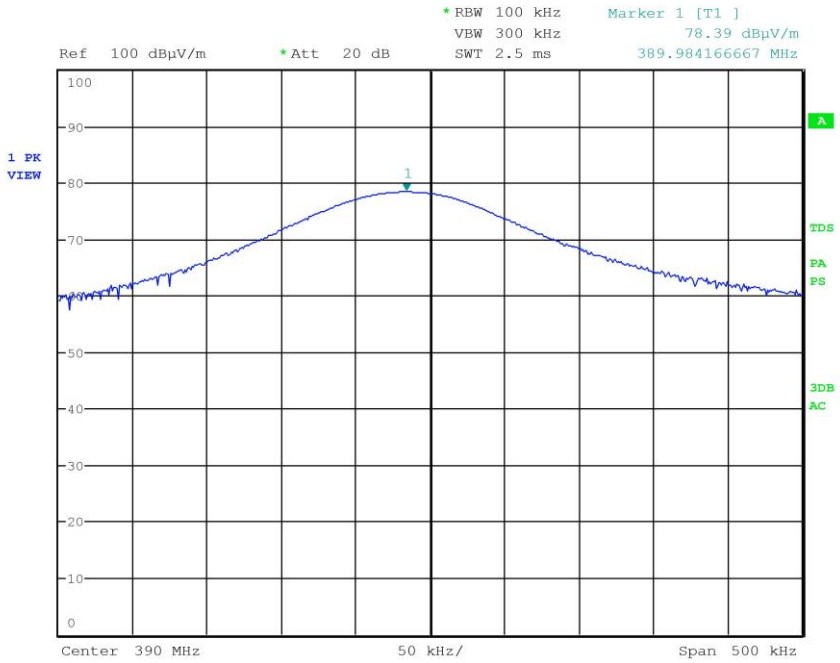
G16086350

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086350
Test Spec	



G16086354

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086354
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

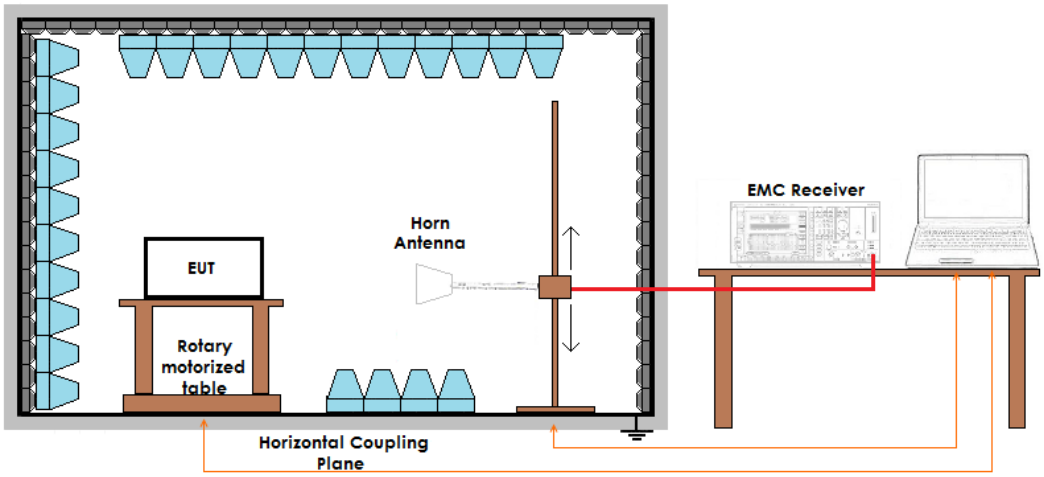
Acceptance limits for emissions in restricted frequency bands		
Frequency (MHz)	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	54	74

The restricted frequency bands are listed in the following table

MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	73 – 74,6	1645,5 – 1646,5	9,3 – 9,5
6,215 – 6,218	74,8 – 75,2	1660 – 1710	10,6 – 12,7
6,26775 – 6,26825	108 – 121,94	1718,8 – 1722,2	13,25 – 13,4
6,31175 – 6,31225	123 – 138	2200 – 2300	14,47 – 14,5
8,291 – 8,294	149,9 – 150,05	2310 – 2390	15,35 – 16,2
8,362 – 8,366	156,52475 – 156,52525	2483,5 – 2500	17,7 – 21,4
8,37625 – 8,38675	156,7 – 156,9	2690 – 2900	22,01 – 23,12
8,41425 – 8,41475	162,0125 – 167,17	3260 – 3267	23,6 – 24,0
12,29 – 12,293	167,72 – 173,2	3332 – 3339	31,2 – 31,8
12,51975 – 12,52025	240 – 285	3345,8 – 3358	36,43 – 36,5
12,57675 – 12,57725	322 – 335,4	3600 – 4400	Above 38,6
13,36 – 13,41			

Acceptance limits for emissions in non-restricted frequency bands
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Setup



Result – AV detector

Nominal frequency (MHz)	*Frequency (MHz)*	*Limits (dBµV/m)*	*Measured Level (dBµV/m)*	*Duty cycle correction (dB)*	*Level (dBµV/m)*	*Results*
310	1240	54,00	41,96	-6,75	35,21	Complies
310	1550	54,00	48,44	-6,75	41,69	Complies
310	1860	55,30	40,66*	-6,75	33,91	Complies
310	2170	55,30	50,50*	-6,75	43,75	Complies
310	2480	55,30	42,51*	-6,75	35,76	Complies
310	2790	54,00	44,37	-6,75	37,62	Complies
310	3410	55,30	46,59*	-6,75	39,84	Complies
310	3519	55,30	47,85*	-6,75	41,10	Complies
310	3720	54,00	39,69	-6,75	32,94	Complies
315	1260	55,60	45,35*	-6,75	38,60	Complies
315	1574	55,60	49,44*	-6,75	42,69	Complies
315	1890	55,60	42,88*	-6,75	36,13	Complies
315	2204	54,00	46,7	-6,75	39,95	Complies
315	2520	55,60	40,99*	-6,75	34,24	Complies
315	2834	54,00	44,30	-6,75	37,55	Complies
315	3464	55,60	47,30*	-6,75	40,55	Complies
315	3519	55,60	48,09*	-6,75	41,34	Complies
315	3780	54,00	37,61	-6,75	30,86	Complies

Nominal frequency (MHz)	Frequency (MHz)	Limits (dBµV/m)	Measured Level (dBµV/m)	Duty cycle correction (dB)	Level (dBµV/m)	Results
318	1272	55,80	45,46*	-6,75	38,71	Complies
318	1590	54,00	50,38	-6,75	43,63	Complies
318	1908	55,80	42,51*	-6,75	35,76	Complies
318	2226	54,00	45,34	-6,75	38,59	Complies
318	2544	55,80	40,44*	-6,75	33,69	Complies
318	2862	54,00	44,11	-6,75	37,36	Complies
318	3498	55,80	46,97*	-6,75	40,22	Complies
318	3519	55,80	47,80*	-6,75	41,05	Complies
318	3816	54,00	37,61	-6,75	30,86	Complies
390	1170	54,00	60,71	-6,75	53,96	Complies
390	1560	54,00	38,71	-6,75	31,96	Complies
390	1950	54,00	59,37	-6,75	52,62	Complies
390	2340	54,00	41,10	-6,75	34,35	Complies
390	2730	54,00	52,74	-6,75	45,99	Complies
390	3120	59,20	43,12*	-6,75	36,37	Complies
390	3510	59,20	52,42*	-6,75	45,67	Complies
390	3900	54,00	40,46	-6,75	33,71	Complies

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

Duty cycle value has been obtained using the following formula:

Duty cycle = 20log0,46 = -6,75 dB where 0,46 is the highest percentage of declared duty cycle between all the modulations

Result – Peak detector

Nominal frequency (MHz)	*Frequency (MHz)*	*Limits (dBµV/m)*	*Measured Level (dBµV/m)*	*Duty cycle correction (dB)*	*Level (dBµV/m)*	*Results*
310	1240	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
310	1550	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
310	1860	75,30	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
310	2170	75,30	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
310	2480	75,30	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
310	2790	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
310	3410	75,30	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
310	3519	75,30	58,36*	-6,75	51,61	Complies
310	3720	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
315	1260	75,60	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
315	1574	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
315	1890	75,60	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
315	2204	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
315	2520	75,60	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
315	2834	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
315	3464	75,60	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
315	3519	75,60	58,66*	-6,75	51,91	Complies
315	3780	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies

Nominal frequency (MHz)	Frequency (MHz)	Limits (dBµV/m)	Measured Level (dBµV/m)	Duty cycle correction (dB)	Level (dBµV/m)	Results
318	1272	75,80	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
318	1590	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
318	1908	75,80	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
318	2226	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
318	2544	75,80	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
318	2862	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
318	3498	75,80	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
318	3519	75,80	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
318	3816	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
390	1170	74,00	62,57	-6,75	55,82	Complies
390	1560	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
390	1950	79,20	61,18*	-6,75	54,43	Complies
390	2340	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies
390	2730	74,00	55,89	-6,75	49,14	Complies
390	3120	79,20	More than 20 dB below limit*	-6,75	More than 20 dB below limit	Complies
390	3510	79,20	58,78*	-6,75	52,03	Complies
390	3900	74,00	More than 20 dB below limit	-6,75	More than 20 dB below limit	Complies

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

Duty cycle value has been obtained using the following formula:

Duty cycle = 20log0,46 = -6,75 dB where 0,46 is the highest percentage of declared 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

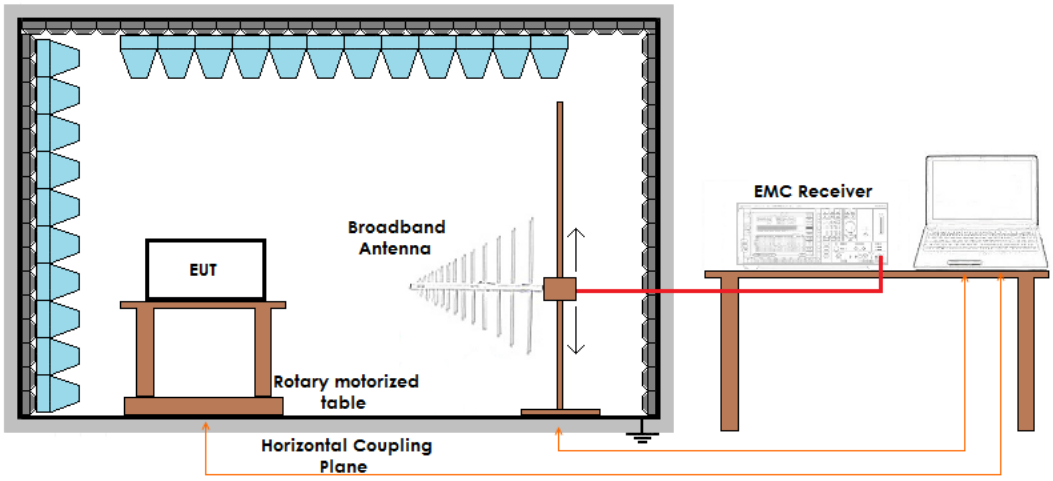
Environmental conditions

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



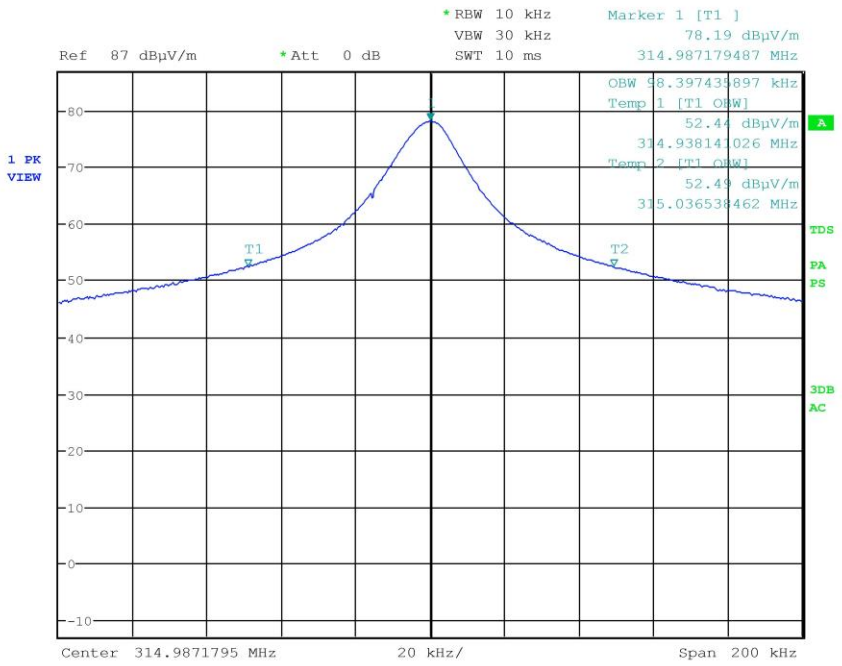
Result

Coding	*Frequency (MHz)*	*Limit (kHz)*	*20 dB bandwidth (kHz)*	*Graphs*	*Results*
Chamberlain yellow	310	775,0	54,333	G16086352	Complies
Chamberlain yellow	315	787,5	54,166	G16086343	Complies
Chamberlain yellow	390	975,0	54,333	G16086356	Complies
Linear Megacode	318	795,0	53,846	G16086349	Complies
NOTE: for nominal frequencies 310, 315 and 318 MHz, test has been performed on Chamberlain yellow coding as worst case					

Graphs

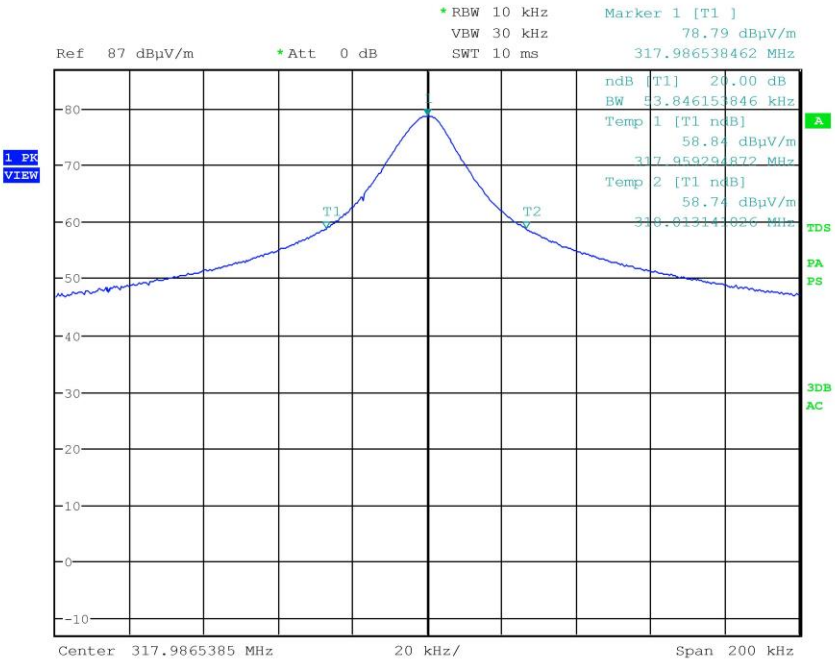
G16086343

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 16086343
Test Spec



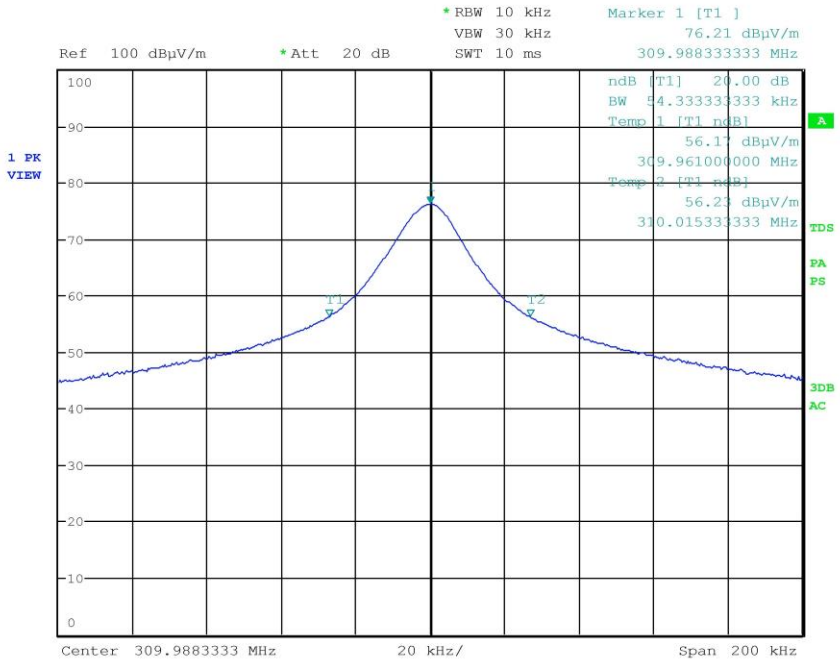
G16086349

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086349
Test Spec	



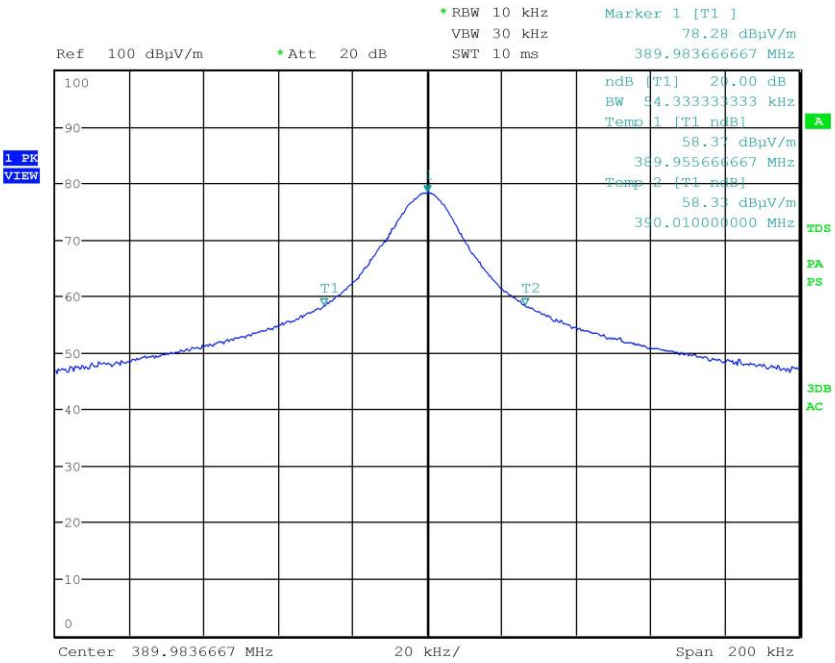
G16086352

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086352
Test Spec	



G16086356

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 16086356
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 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	784,90	G16086387
Genie Intellicode II	315	890,70	G16086386
Genie Intellicode II	390	860,30	G16086385
Chamberlain orange/red	390	784,00	G16086384
Chamberlain green	390	859,60	G16086383
Linear Megacode	318	903,80	G16086388
Chamberlain yellow	310	149,42	G16086380
Chamberlain yellow	315	283,50	G16086381
Chamberlain yellow	390	356,70	G16086382

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.

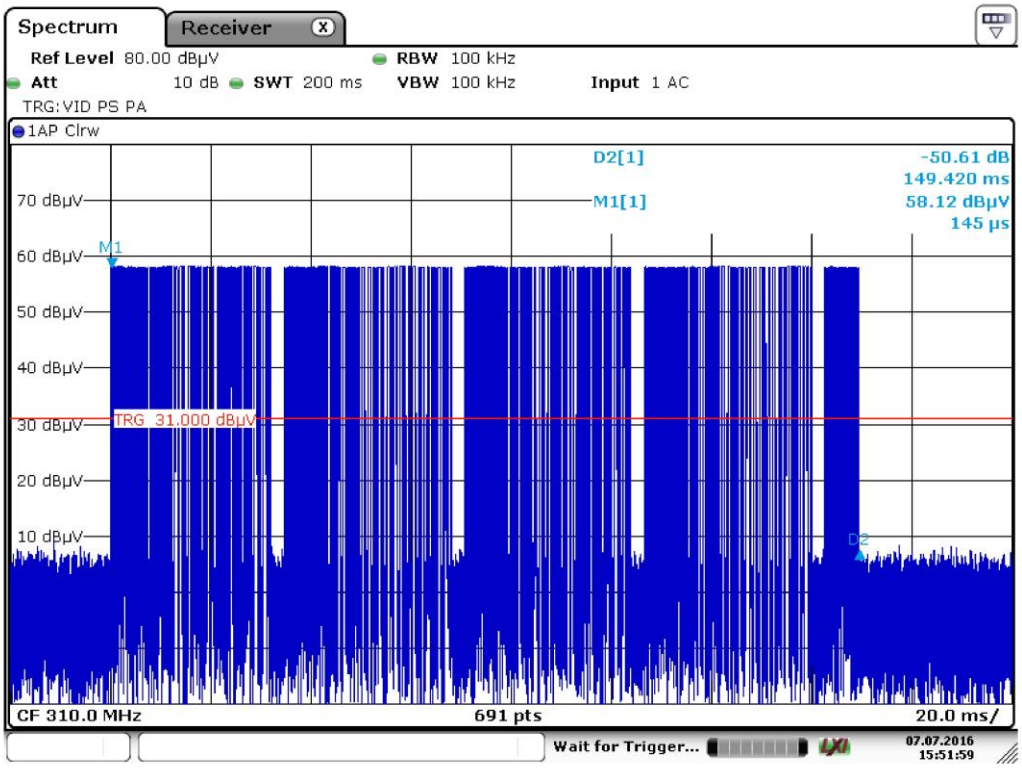
Result: N.A.

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.

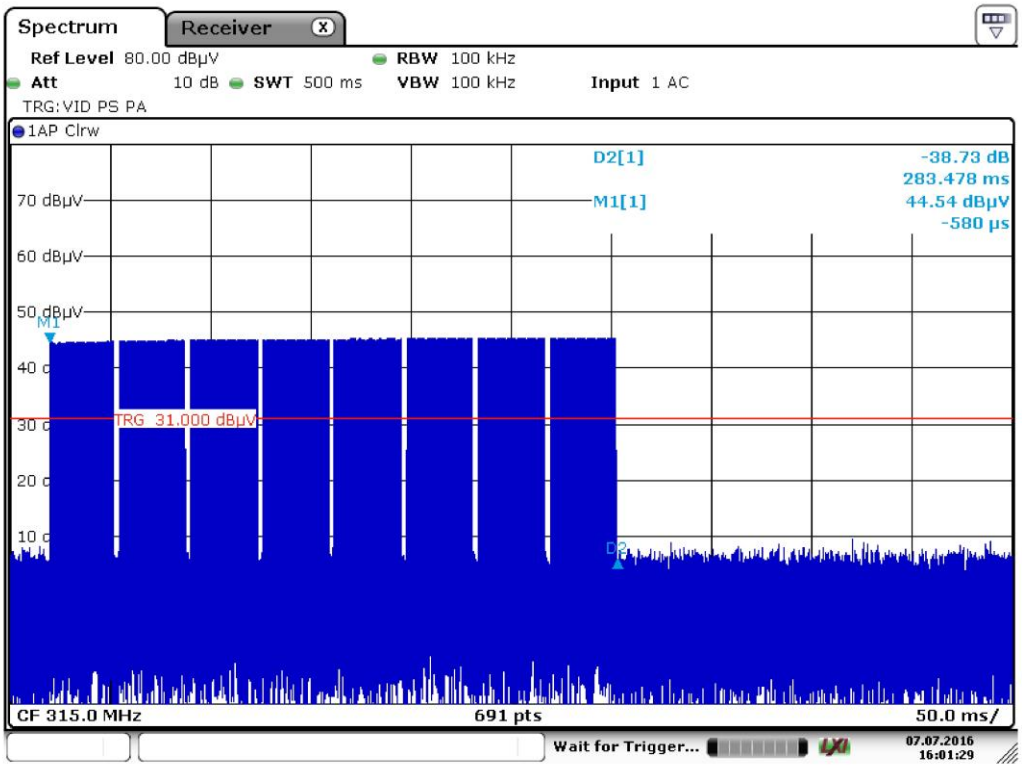
Graphs

G16086380



Bertezzolo 16086380

G16086381



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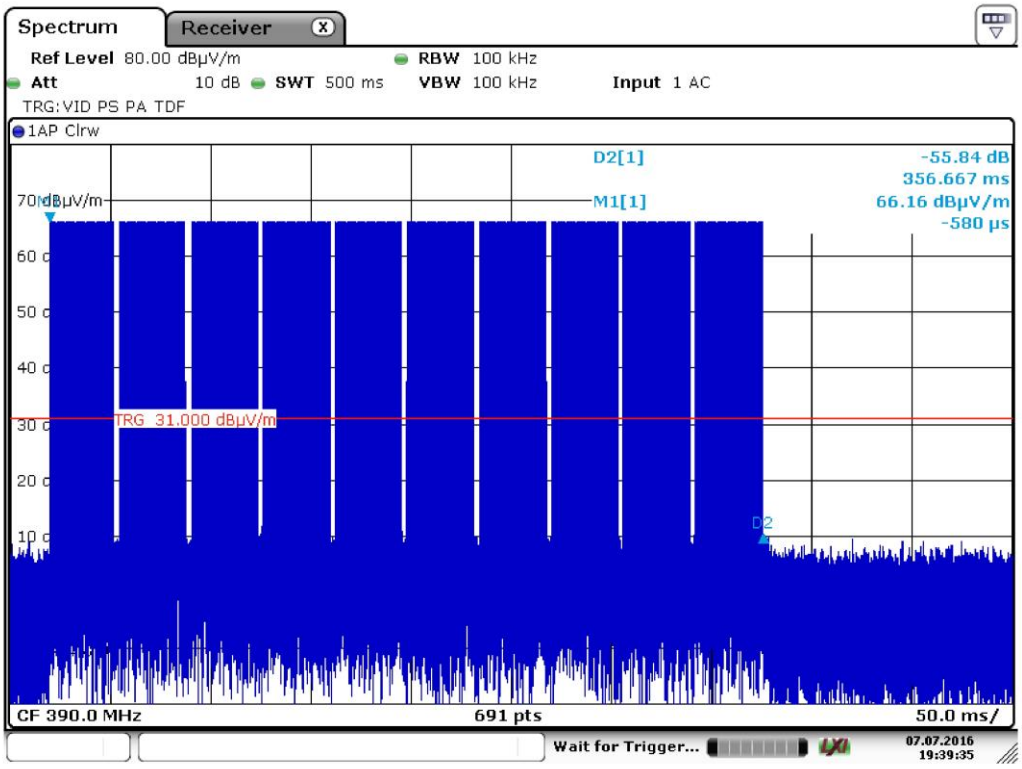

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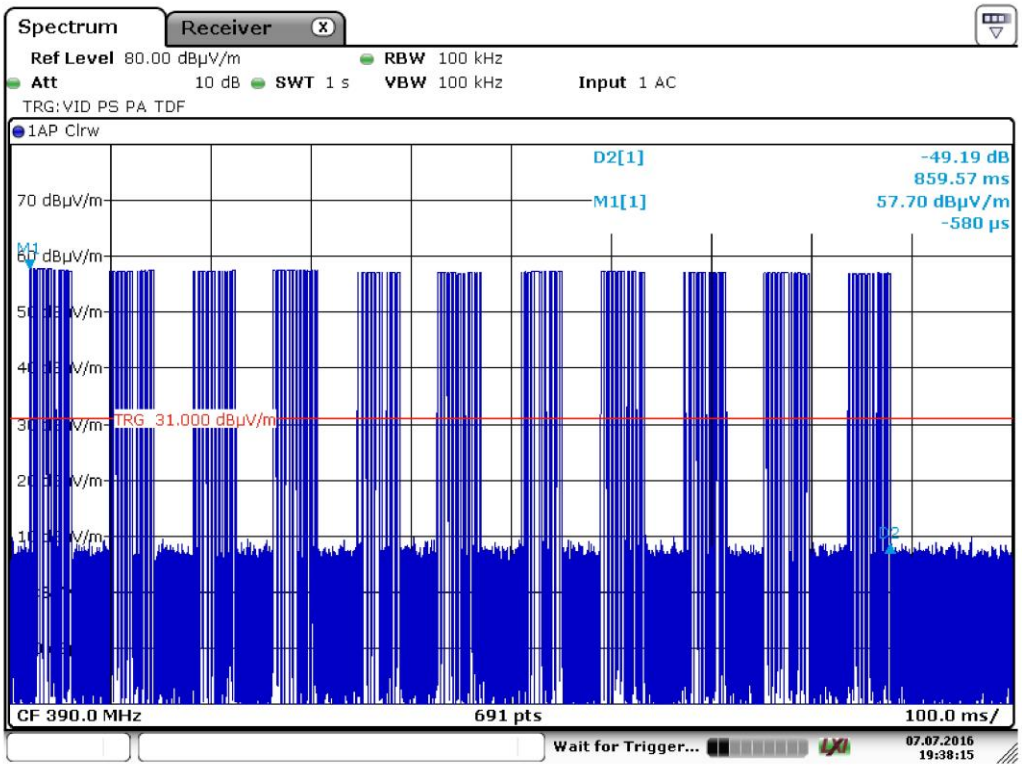

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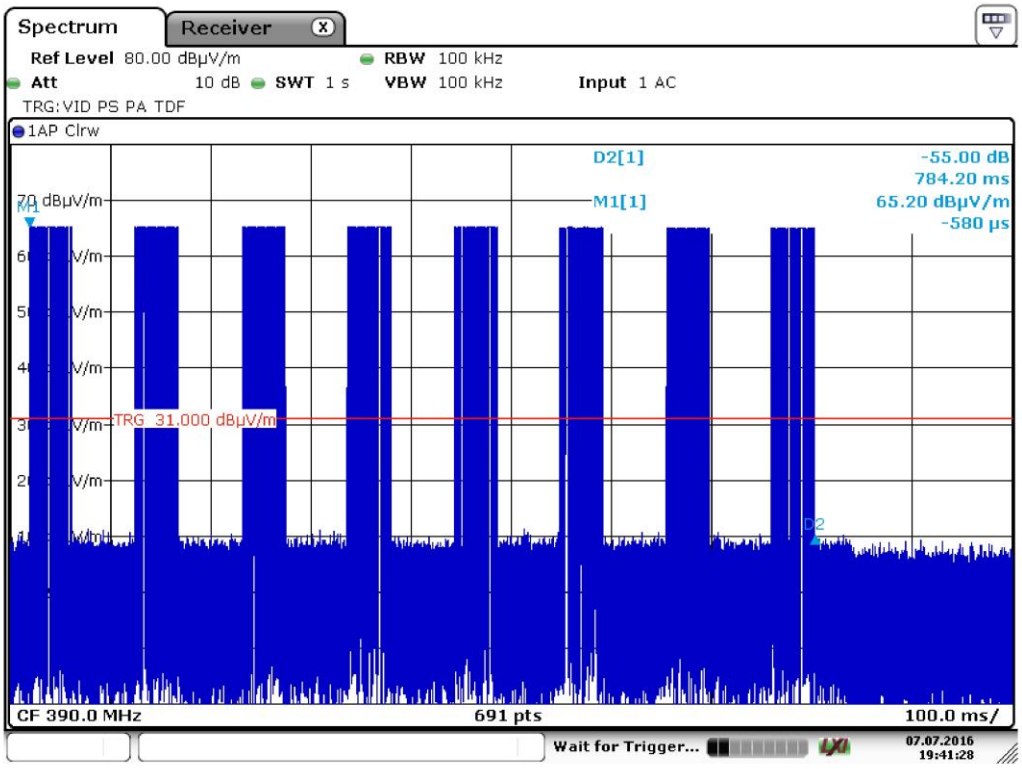

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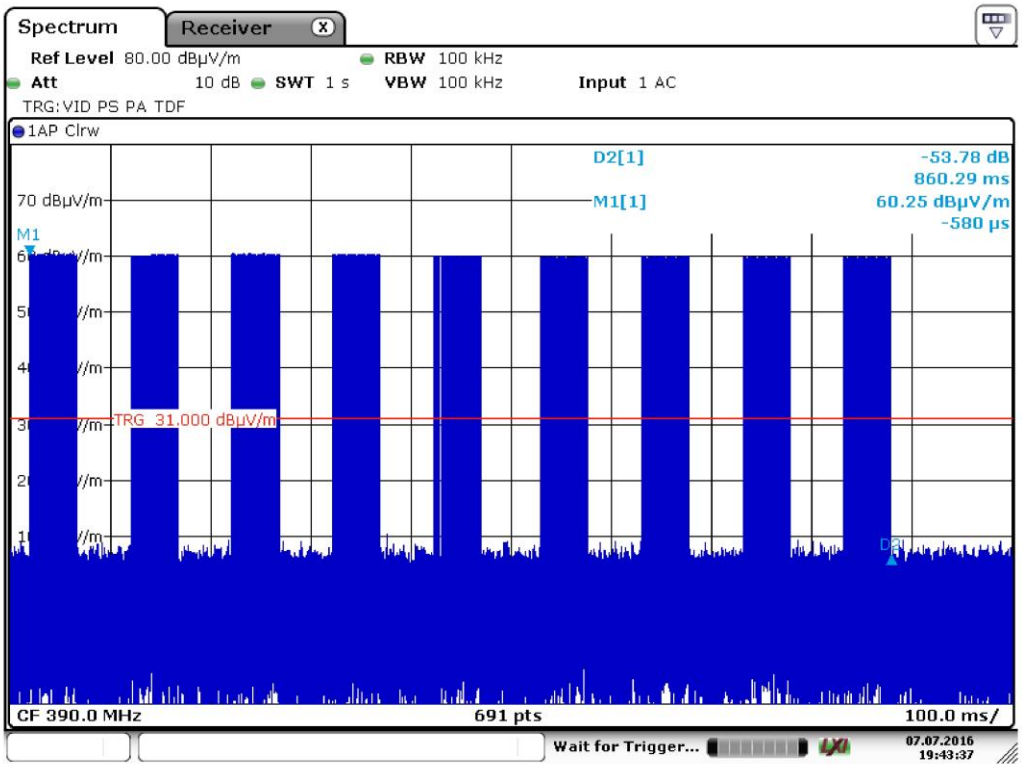

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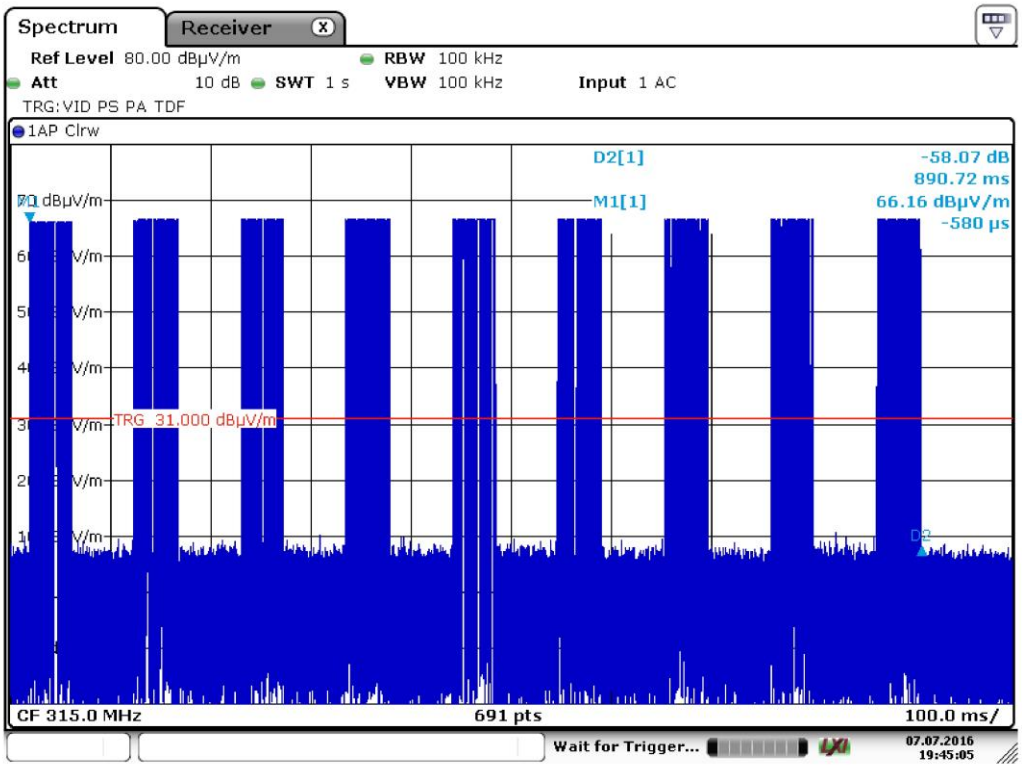
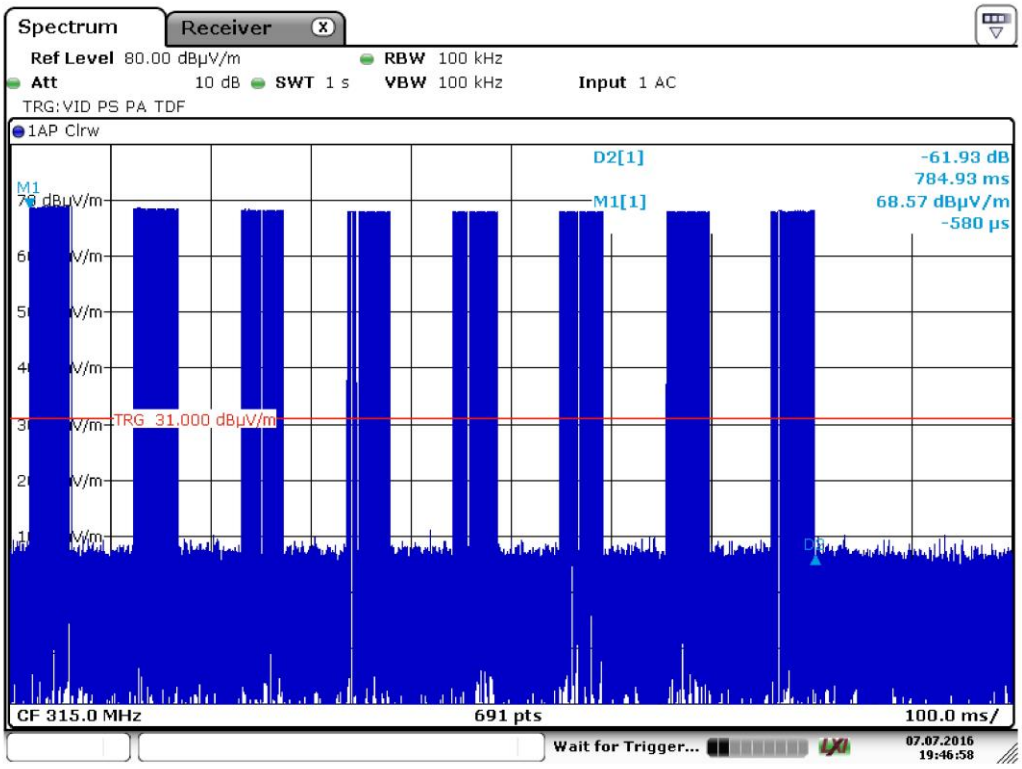
G16086386



G16086387



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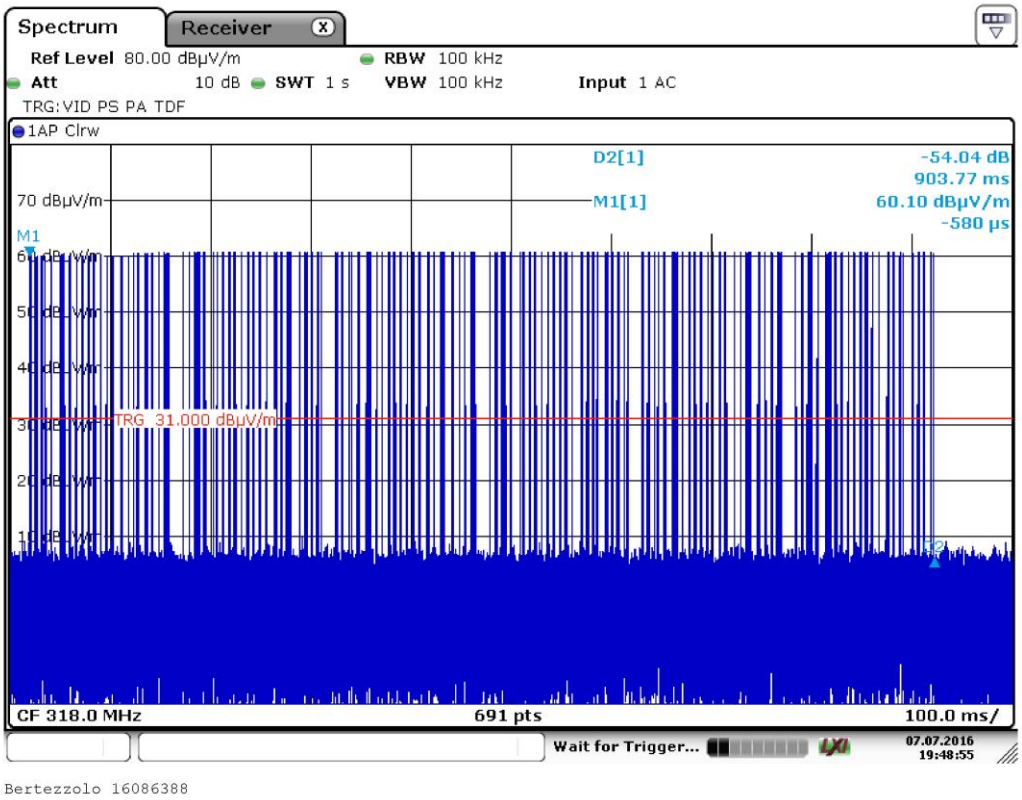

Result: The requirements are met