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LAB N° 0168

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

TEST REPORT nr. R16268201

Federal Communication Commission (FCC)

Test item

Description.....: REMOTE CONTROL

Trademark.....: ELICA

Model/Type .....: ECB0124588

FCC ID.....: TMQECB0124588

Test Specification

Standard .....: FCC Rules & Regulations, Title 47:2015
Part 15 paragraph(s): 203, 204, 207, 209 and 231

Client's name .....: ELICA S.p.A.

Address .....: Via Ermanno Casoli, 2 – 60044 Fabriano (AN) – ITALY

Manufacturer's name : SELCO INDUSTRY S.p.A.

Address .....: Via Azzurra, 16 – 40064 Ozzano dell'Emilia (BO) – ITALY

Report

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

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

Date of issue .....: 10.01.17

Contents.....: 67 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 47:2015
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	2	Complies
Part 15.209	Radiated emissions	3	Complies
Part 15.209 and 15.231(b) (e)	Fundamental and spurious emissions (≤ 1 GHz)	4	Complies
Part 15.209 and 15.231	Spurious emissions (> 1 GHz)	5	Complies
Part 15.231(c)	Occupied channel bandwidth	6	Complies
Part 15.231(a) (e)	Periodic operation characteristics	7	Complies

The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification

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2. Description of Equipment under test (EUT)

Power supply ..... : 3,6 Vdc from battery

Serial Number ..... : --

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

❑ Receiver Unit

Type of station ..... : ❑ Fixed station

❑ Portable station

☑ Mobile station

Nominal frequency ..... : 433,92 MHz

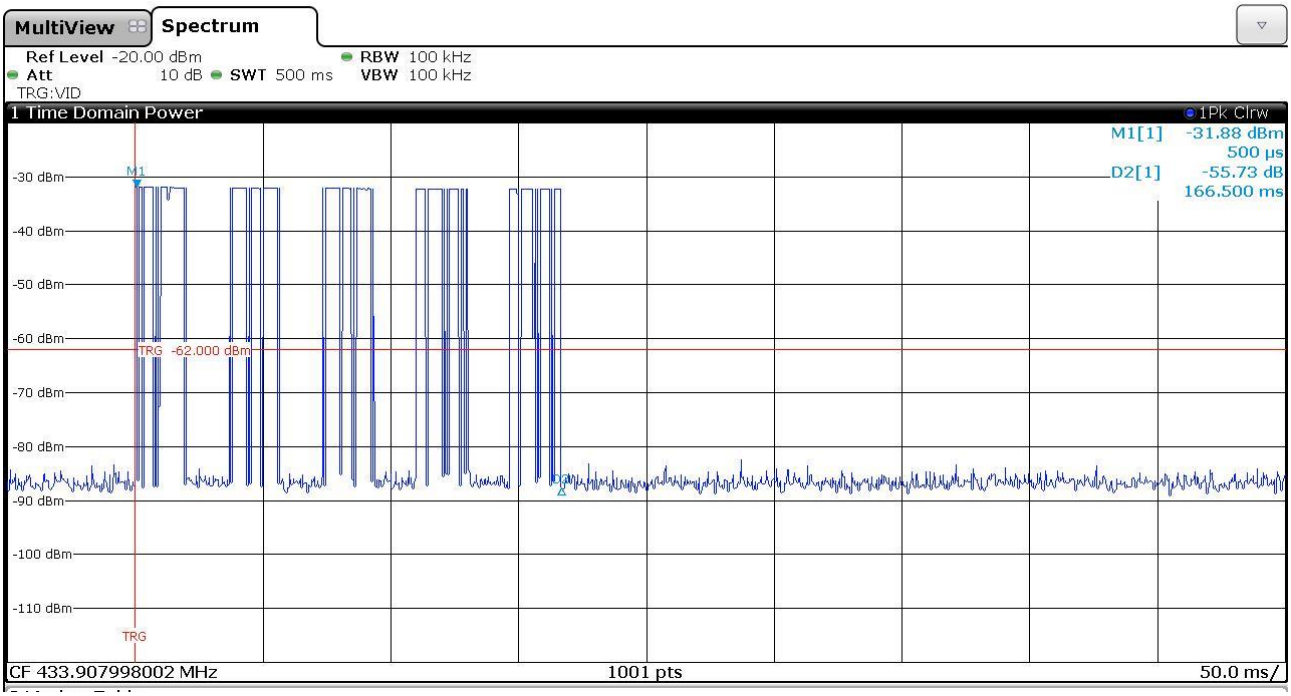
Duty cycle evaluation ..... : 9,095 ms

Evaluation has been performed in agreement with FCC Part 15.35c. The transmission is intended as a train of pulses of 19,92 ms duration with ON time of 9,095 ms. 3 pulses is transmitted during the 100 ms evaluation time, total transmission time is 160,5 ms when button is pushed for less than 2 s. See also graphs G16268238, G16268239, G16268240 and G16268241

Delta (dB) for the performing of tests ..... : 20log (3x9,095 ms /100 ms) = -11,37 dB

G16268238

Bertezzolo 16268238



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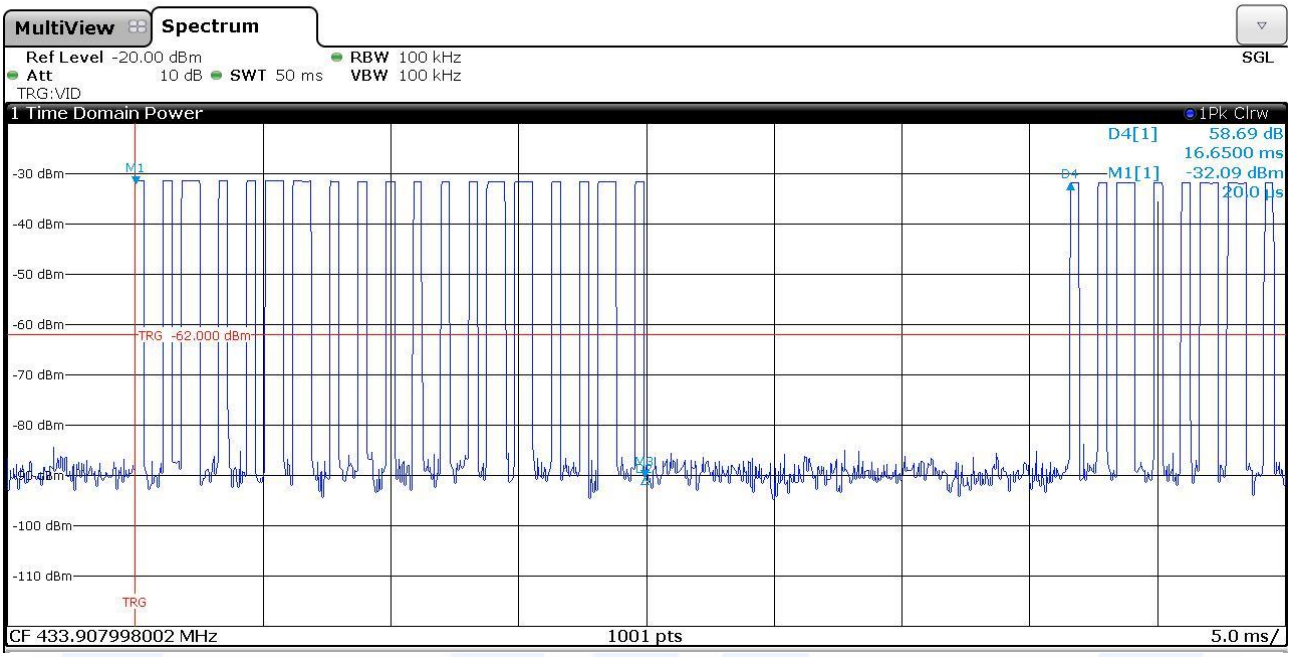
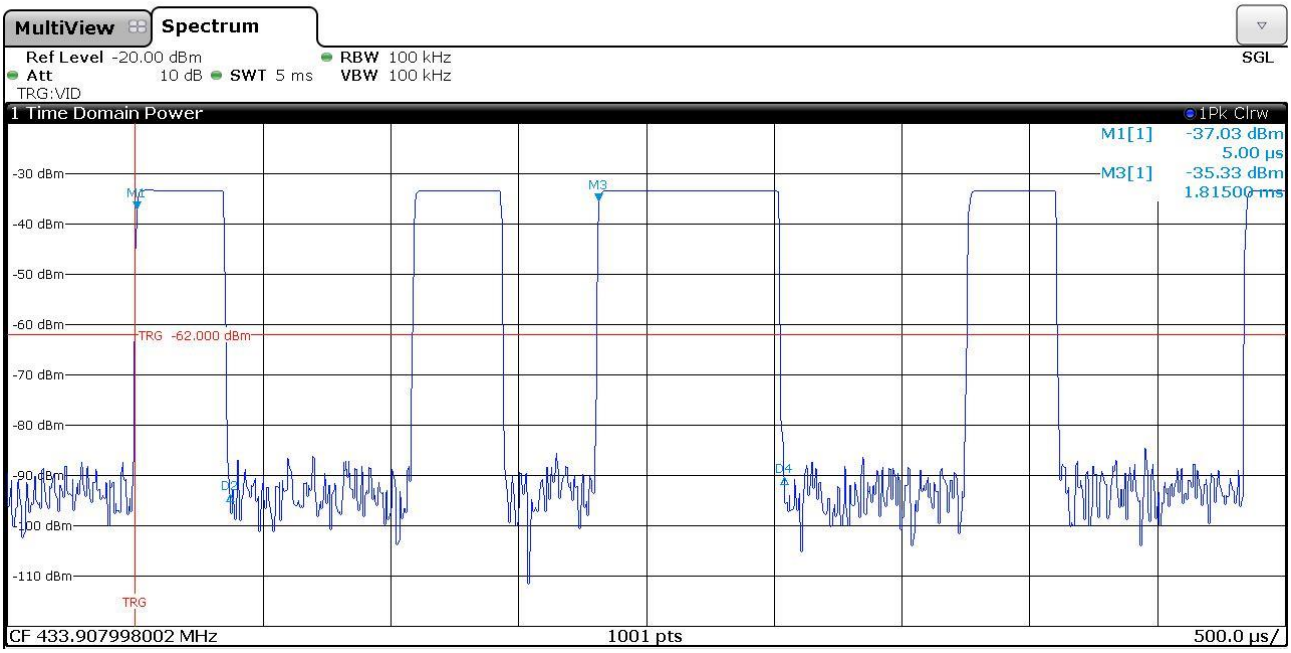
G16268239

Bertezzolo 16268239



G16268240

Bertezzolo 16268240



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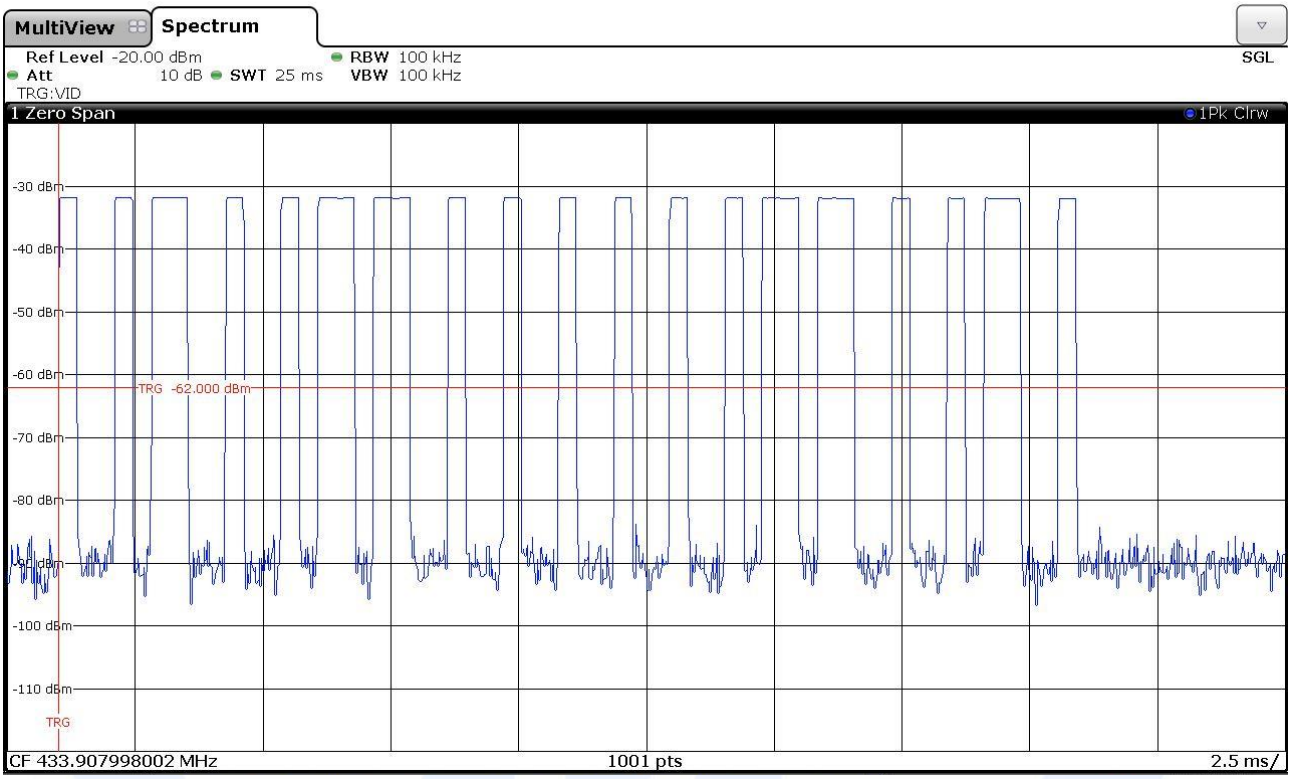
G16268241

Bertezzolo 16268241



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 ..... :	13.12.16
Testing start date ..... :	13.12.16
Testing end date ..... :	21.12.16
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 P161523

4. Operative conditions

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

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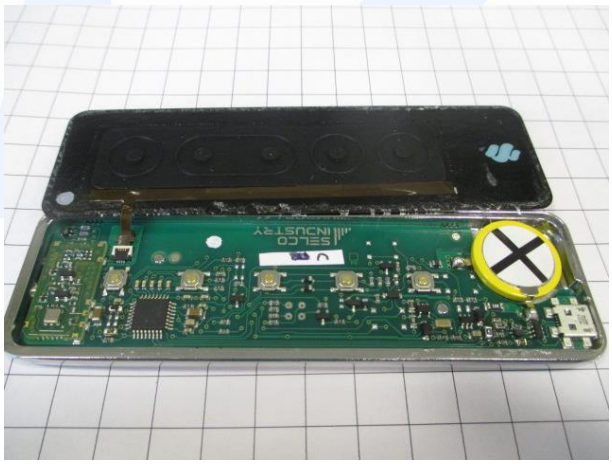
5. Photograph(s) of EUT

5.1 Photograph(s) of EUT



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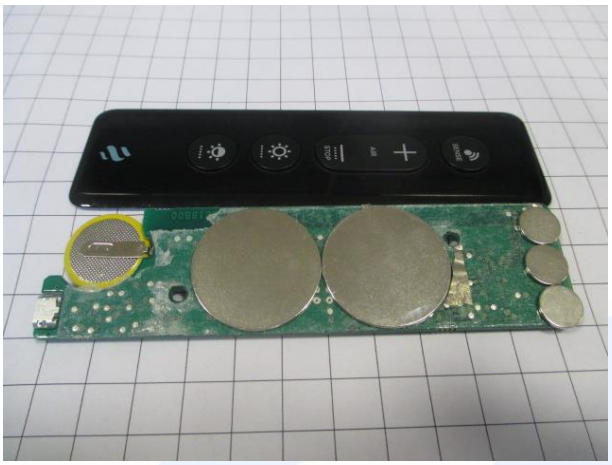

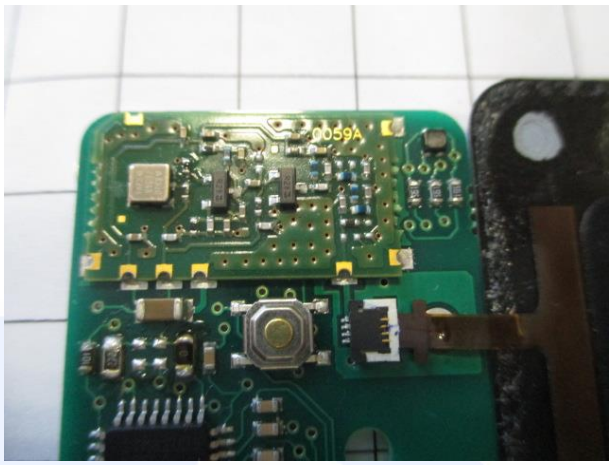

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6. Equipment list

Id. number	Manufacturer	Model	Description	Serial number	Last calibration	Due date calibration
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -	January '16	January '17
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '16	June '19
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '13	November '18
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '16	January '17
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '16	January '17
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121	January '16	January '17
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 '16	June '19
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3Ghz)	9111B-203	June '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	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)	±2,9 dB	1
(50Ω/5μH AMN) - (150 kHz – 108 MHz)	±2,6 dB	1
DiscontinuousConducted Emission		
Conducted Emission (50Ω/50μH AMN) - (150 kHz – 30 MHz)	±3,0 dB	1
Disturbance Power (30 MHz – 300 MHz)	±3,4 dB	1
Radiated Emission		
(0,150 MHz – 30 MHz)	±3,8 dB	1
(30 MHz – 1000 MHz)	±3,8 dB	1
(1 GHz – 6 GHz)	±4,3 dB	1
Electromagnetic field EMF	±10,5 %	1
Harmonic current emissions test	±1,2 %	1
Voltage fluctuation and flicker test	±3,8 %	1
Insertion loss test	±2,0 dB	1
Radiated electromagnetic disturbance test (loop antenna)	±1,5 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	0,23 A/m at 10 A/m	1
Effective radiated power (F < 1GHz)	±3,8 dB	1
Effective radiated power (F > 1GHz)	±5,5 dB	1
Frequency error	< 1x10-7	1
Timing zero span (1001pts.)	0,2% SWT	1
Modulation bandwidth	< 1x10-7	1
Conducted RF power and spurious emission	±0,7 dB	1
Adjacent channel power	±1,2 dB	1
Blocking	±1,2 dB	1
Electrostatic discharge immunity test		2
Electrical fast transients / burst immunity test		2
Surge immunity test		2
Pulse magnetic field immunity test		2
Damped oscillatory magnetic field immunity test		2
Short interruption immunity test		2
Voltage transient emission test	±2,2 %	1
Transient immunity test		2
Rev_16_01 date 09/02/2016		

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 demostrated 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 15:2015	--
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. 3.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 9.0 (Quality Manual)	Measurement uncertainty calculation

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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.

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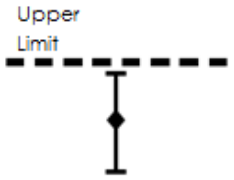
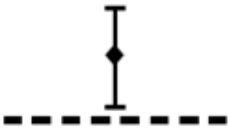
11. Results

In this clause tests results are reported.

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

Judgement of compliance:

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

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

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11.1 Antenna requirements

Test set-up and execution

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

Test configuration 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

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11.2 Conducted emissions

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.207
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Shielded 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 S200, CMC S206
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Main port
Frequency range: 150 kHz – 30 MHz

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
21	98	46

Acceptance limits

Frequency range (MHz)	*dB(µV) Quasi-peak*	*dB(µV) Average*
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

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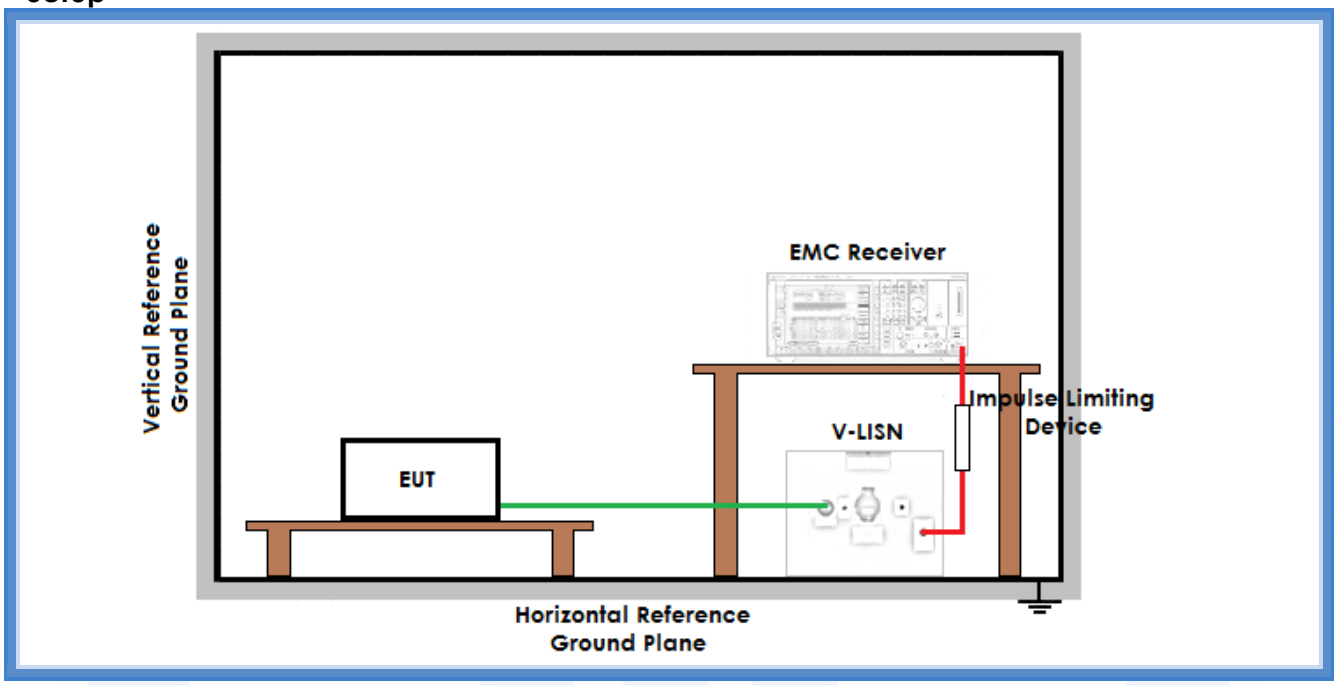
Setup



Result

Line	*Graphs*	*Remarks*	*Result*
N	G16268234	--	Complies
L1	G16268235	--	Complies
Remarks: Recharging mode			

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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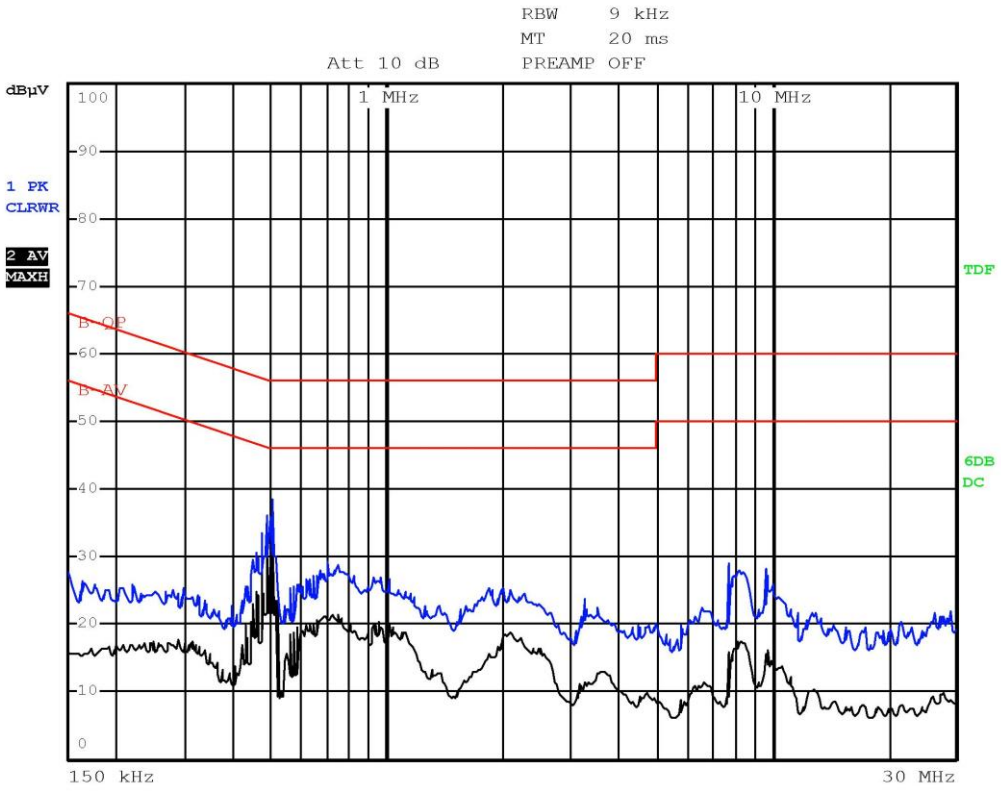
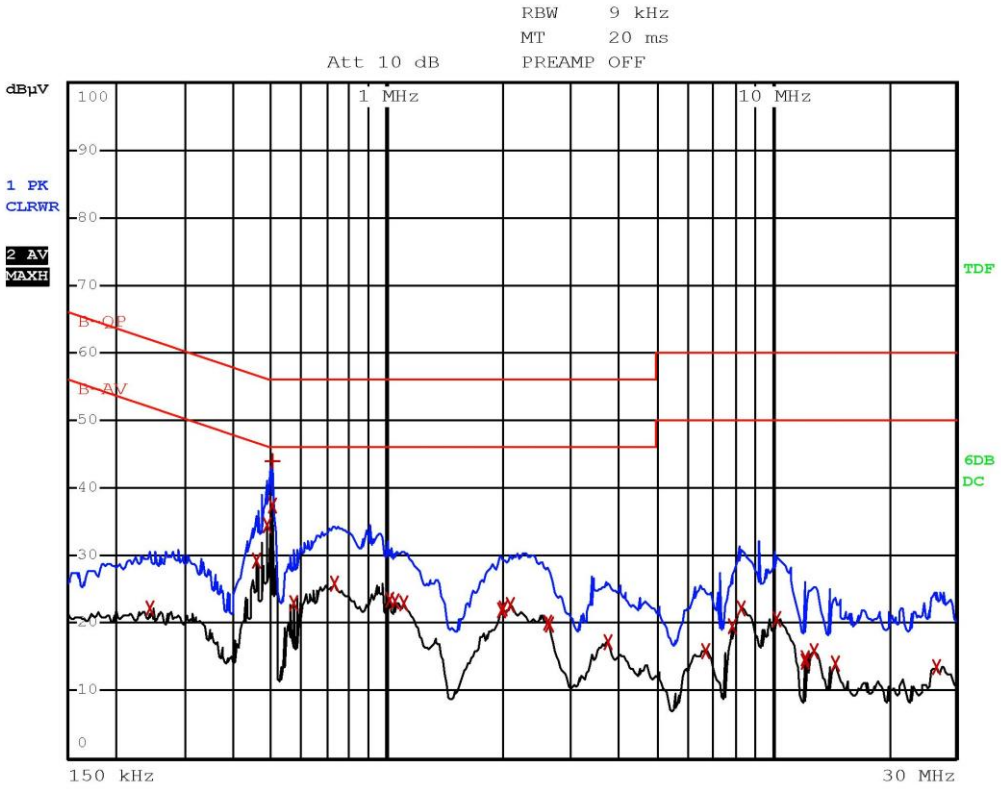
Graphs



Bertezzolo 16268234 Line N

CMC Centro Misure Compatibilità S.r.l.



Bertezzolo 16268235 Line L

Result: The requirements are met

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11.3 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 S164, CMC S271, CMC S287
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Frequency range: 0,009 MHz – 4000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance:
10 m for frequencies ≤ 30 MHz
3 m for frequencies > 30 MHz

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	107,60 to 72,89
0,490 to 1,705	52,89 to 42,05
1,705 to 30	48,63
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.

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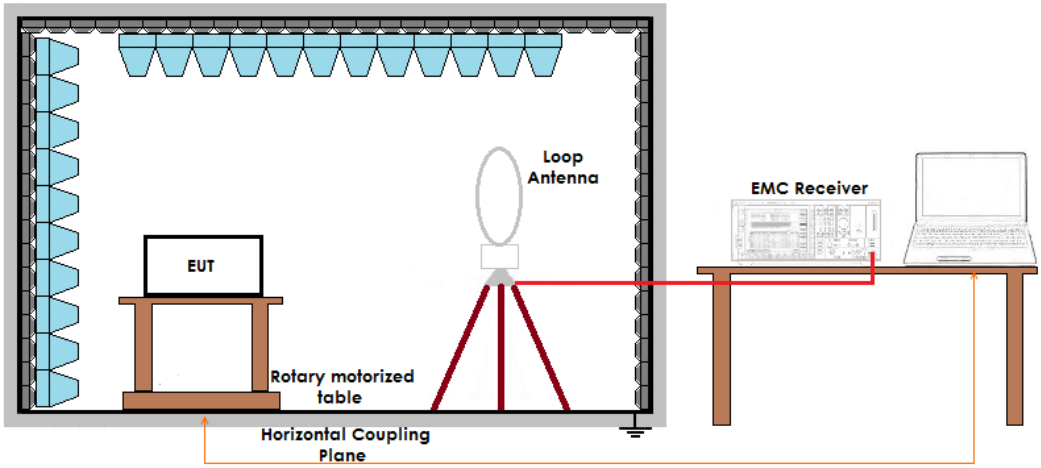
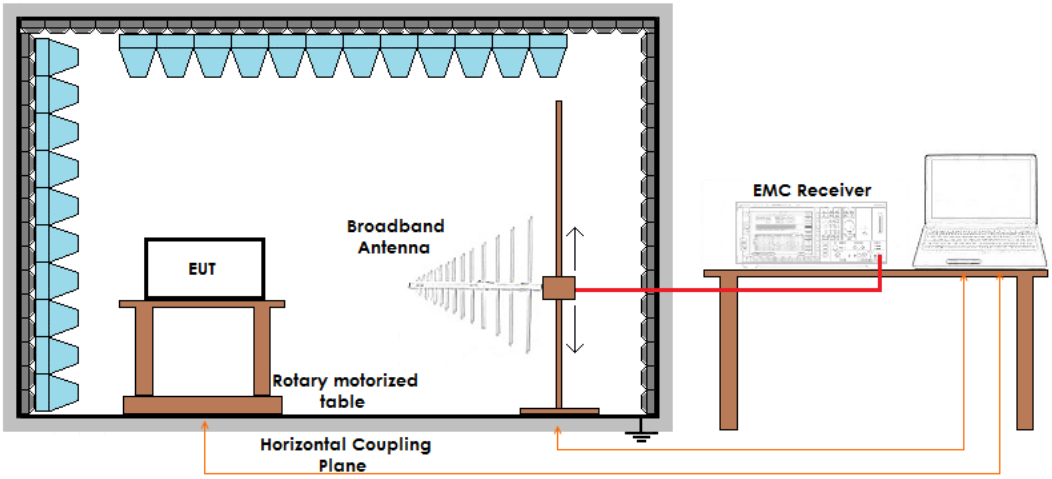
Setup

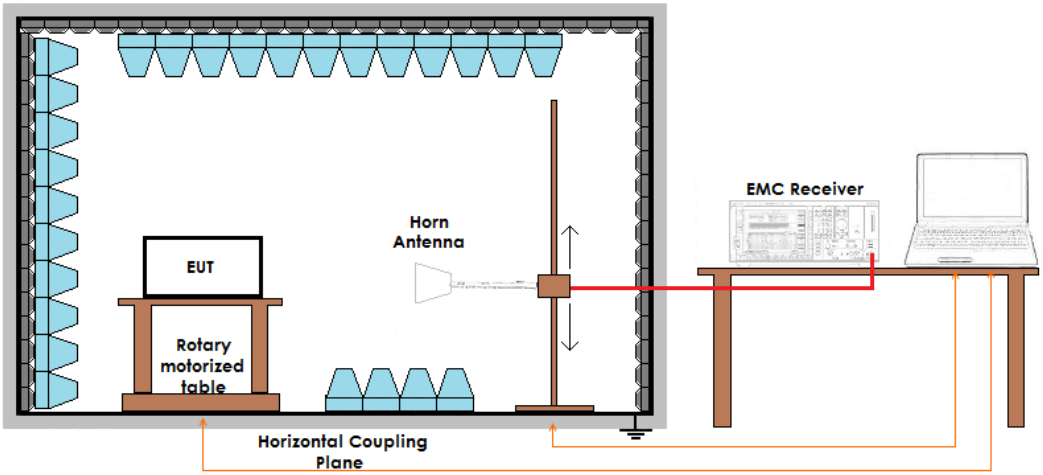
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz



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Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
V	30 – 300	G16268220	Battery mode	Complies
H	30 – 300	G16268221	Battery mode	Complies
H	300 – 1000	G16268222	Battery mode	Complies
V	300 – 1000	G16268223	Battery mode	Complies
V	300 – 1000	G16268224	Recharging mode	Complies
H	300 – 1000	G16268225	Recharging mode	Complies
H	30 – 300	G16268226	Recharging mode	Complies
V	30 – 300	G16268227	Recharging mode	Complies
V	1000 – 5000	G16268228	Recharging mode	Complies
H	1000 – 5000	G16268229	Recharging mode	Complies
H	1000 – 5000	G16268230	Battery mode	Complies
V	1000 – 5000	G16268231	Battery mode	Complies
Loop	0,009 – 30	G16268232	Recharging mode	Complies
Loop	0,009 – 30	G16268233	Battery mode	Complies
Remarks: Peaks above the limits are due to the main transmitting frequency				

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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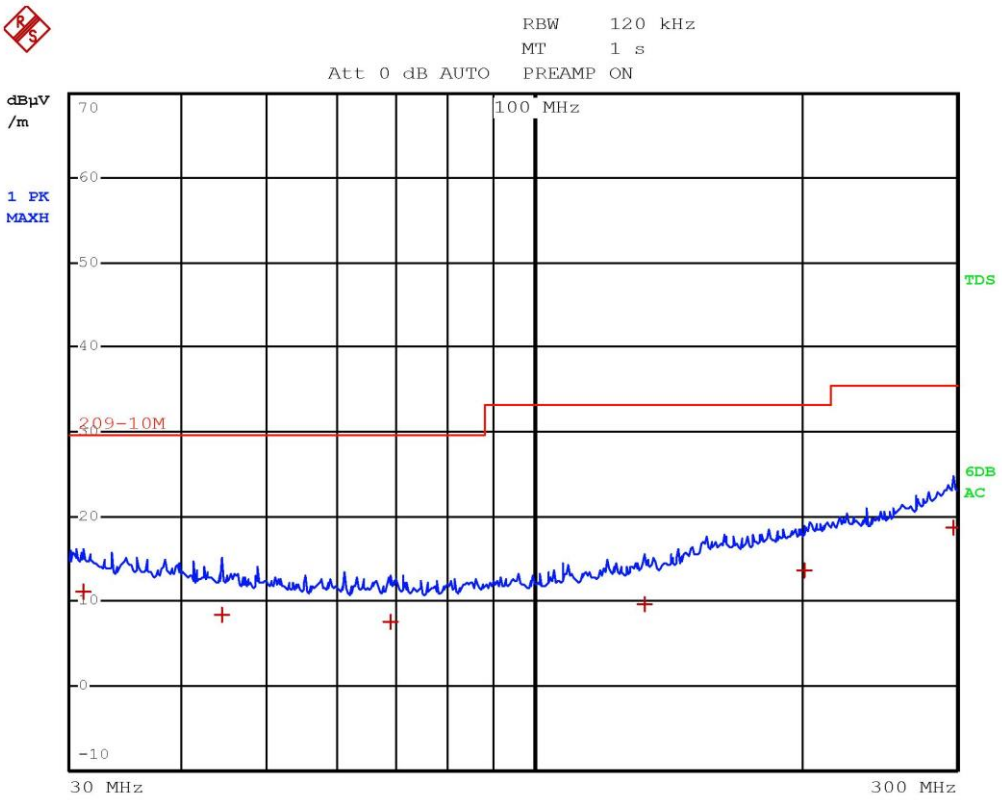
Graphs

G16268220



Bertezzolo 16268220 Vert

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EDIT PEAK LIST (Final Measurement Results)

Trace1:	209-10M
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	31.08 MHz	11.05	-18.48
1 Quasi Peak	44.52 MHz	8.47	-21.06
1 Quasi Peak	69 MHz	7.43	-22.10
1 Quasi Peak	133.16 MHz	9.59	-23.46
1 Quasi Peak	202.16 MHz	13.52	-19.53
1 Quasi Peak	296.6 MHz	18.57	-16.98

Bertezzolo 16268220 Vert

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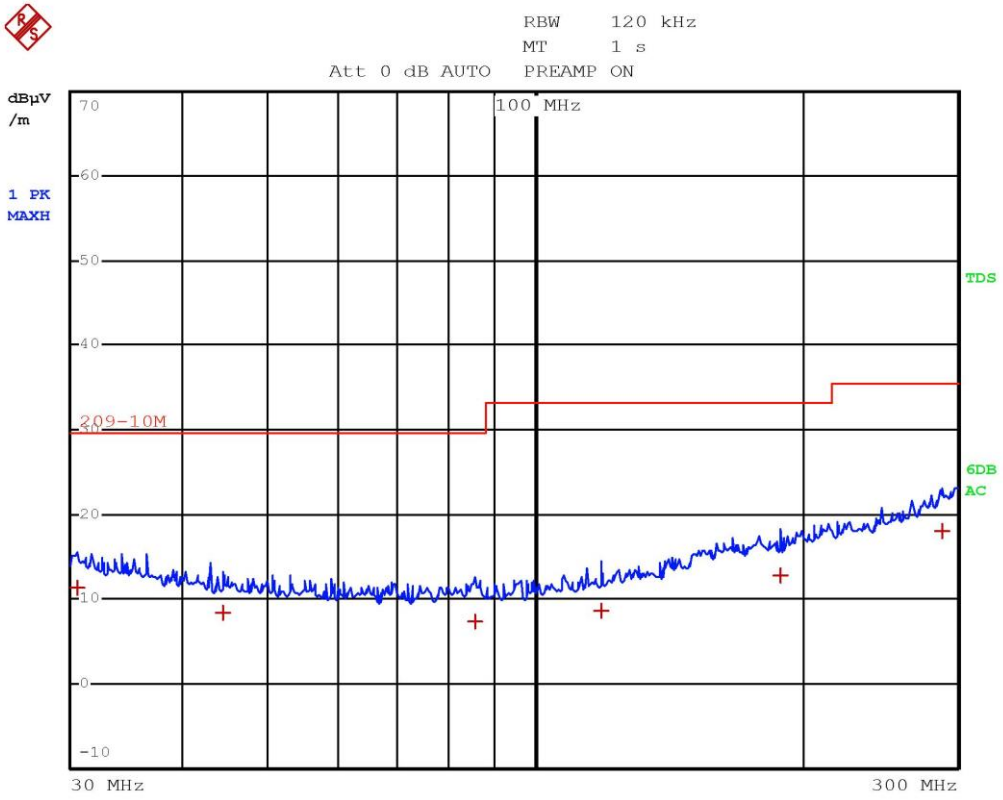
G16268221



Bertezzolo 16268221 Horiz

CMC Centro Misure Compatibilità S.r.l.

EDIT PEAK LIST (Final Measurement Results)

Trace1:	209-10M
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.56 MHz	11.28	-18.25
1 Quasi Peak	44.48 MHz	8.44	-21.09
1 Quasi Peak	85.88 MHz	7.28	-22.25
1 Quasi Peak	118.68 MHz	8.55	-24.50
1 Quasi Peak	189.6 MHz	12.83	-20.23
1 Quasi Peak	288.36 MHz	17.97	-17.59

Bertezzolo 16268221 Horiz

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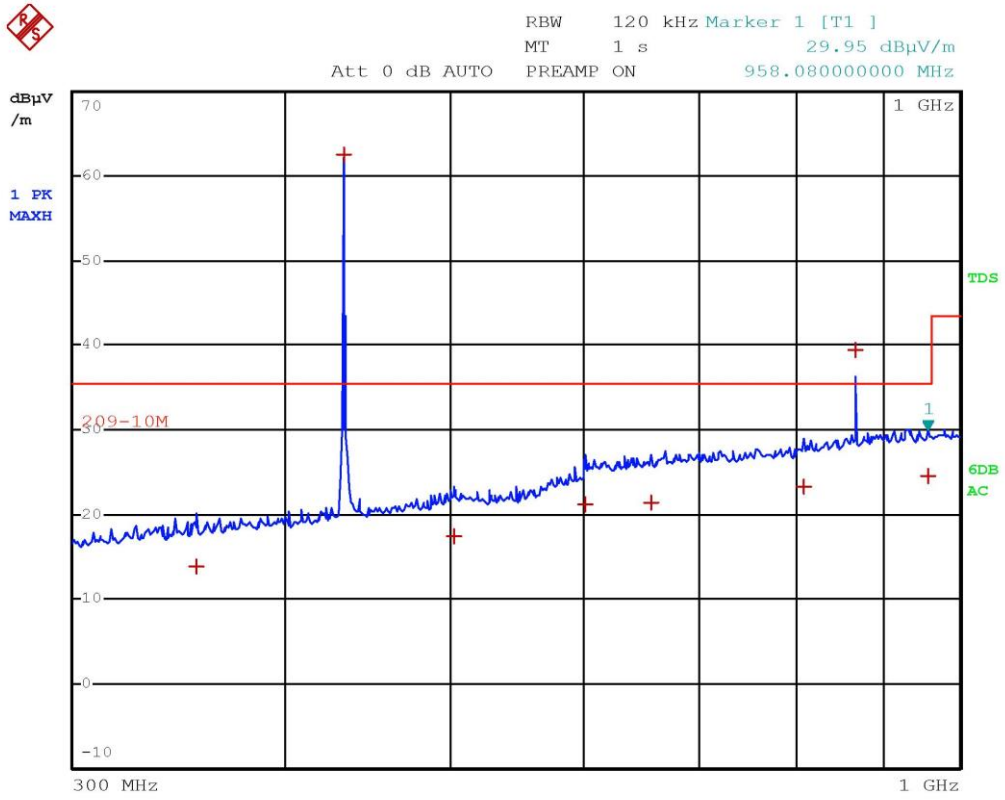
G16268222



Bertezzolo 16268222 Horiz

CMC Centro Misure Compatibilità S.r.l.

EDIT PEAK LIST (Final Measurement Results)

Trace1:	209-10M
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	355.36 MHz	13.81	-21.74
1 Quasi Peak	433.92 MHz	62.54	26.98
1 Quasi Peak	503.96 MHz	17.39	-18.16
1 Quasi Peak	601.24 MHz	21.15	-14.40
1 Quasi Peak	657.68 MHz	21.35	-14.20
1 Quasi Peak	808.8 MHz	23.19	-12.36
1 Quasi Peak	867.84 MHz	39.41	3.85
1 Quasi Peak	958.08 MHz	24.44	-11.11

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CMC Centro Misure Compatibilità S.r.l.

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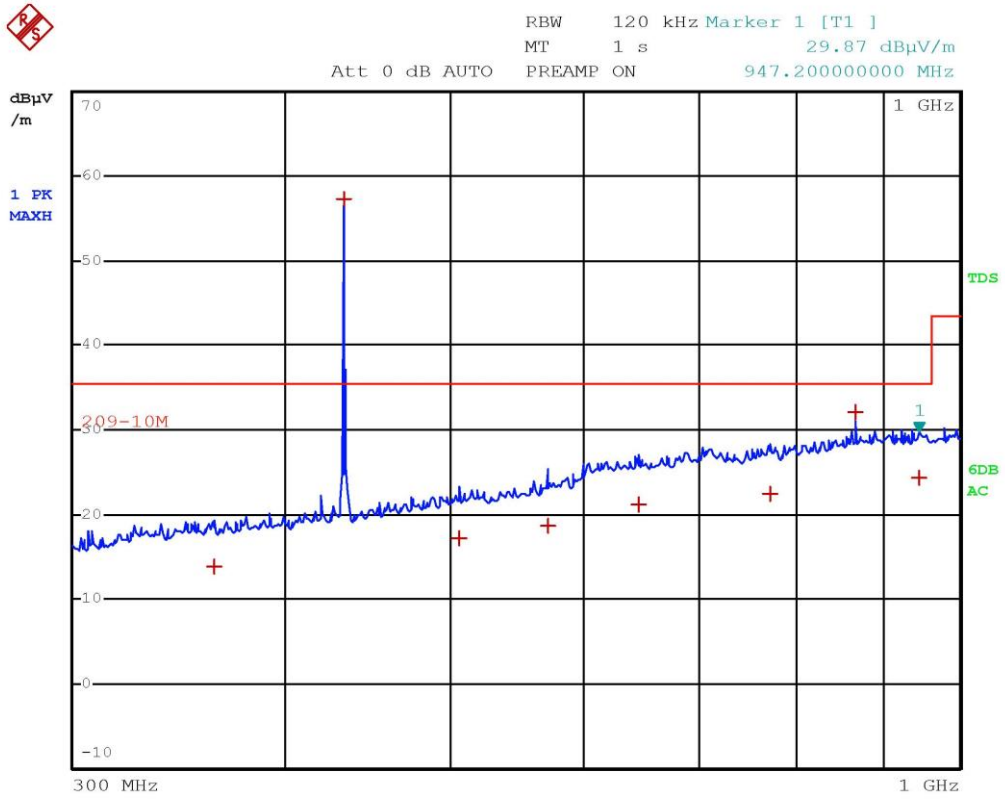

Bertezzolo 16268223 Vert

CMC Centro Misure Compatibilità S.r.l.

EDIT PEAK LIST (Final Measurement Results)

Trace1:	209-10M
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	363.48 MHz	13.85	-21.70
1 Quasi Peak	433.88 MHz	57.23	21.67
1 Quasi Peak	507.12 MHz	17.19	-18.36
1 Quasi Peak	572.12 MHz	18.75	-16.80
1 Quasi Peak	646.04 MHz	21.20	-14.35
1 Quasi Peak	773.64 MHz	22.39	-13.16
1 Quasi Peak	867.84 MHz	31.99	-3.56
1 Quasi Peak	947.2 MHz	24.34	-11.21

Bertezzolo 16268223 Vert

CMC Centro Misure Compatibilità S.r.l.

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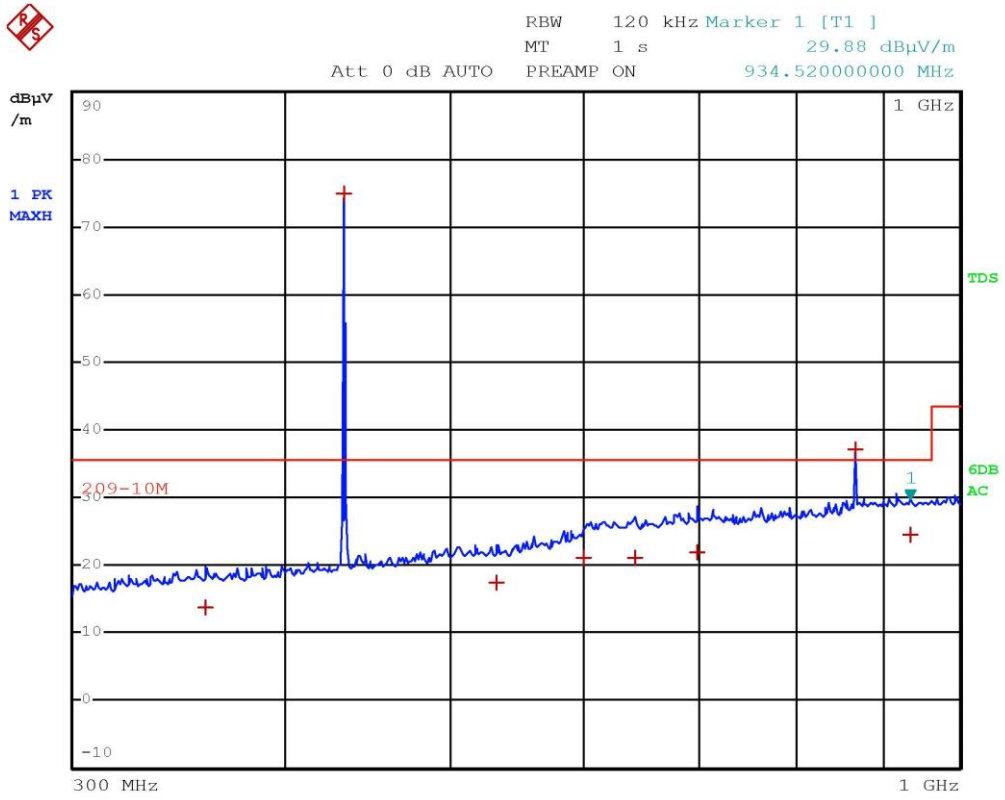

Bertezzolo 16268224 Vert

CMC Centro Misure Compatibilità S.r.l.

EDIT PEAK LIST (Final Measurement Results)

Trace1:	209-10M
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	359.16 MHz	13.81	-21.74
1 Quasi Peak	433.92 MHz	74.99	39.43
1 Quasi Peak	533 MHz	17.46	-18.09
1 Quasi Peak	600.56 MHz	21.18	-14.38
1 Quasi Peak	643.44 MHz	21.17	-14.38
1 Quasi Peak	701 MHz	21.90	-13.65
1 Quasi Peak	867.84 MHz	36.99	1.43
1 Quasi Peak	934.52 MHz	24.43	-11.12

Bertezzolo 16268224 Vert

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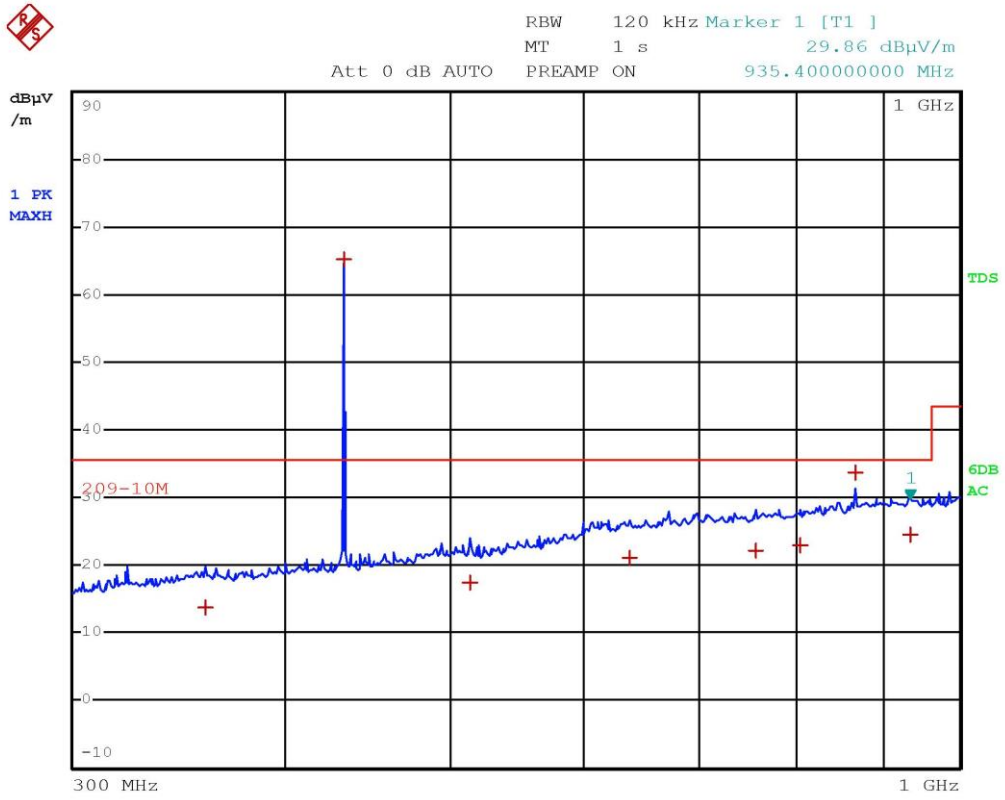
G16268225



Bertezzolo 16268225 Horiz

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