



TEST REPORT nr. R12008801

Federal Communication Commission (FCC)

Test item

Description.....: HF RFID CONTROLLER
Trademark.....: DATALOGIC AUTOMATION
Model/Type.....: C0405-232-01

Test Specification

Standard: FCC Rules & Regulations, Title 47 (2011)
Part 15 paragraph(s) : 203, 204,207, 209 and 225

Client's name.....: Datalogic Automation s.r.l.
Address: Via Lavino, 265 - 40050 Monte San Pietro (BO) - Italy

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

Report

Tested by: A. Bertezzo - *Technician*

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

Date of issue.....: 08.02.12

Contents: 22 pages

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The test results presented in this report relate only to the item tested.



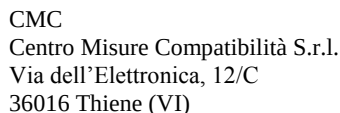
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1. Summary			
Emission: FCC Rules & Regulations, Title 47 (2011)			
Test specifications	Environmental Phenomena	Tests sequence	Result
Part 15.203 and 15.204	Antenna Requirement	5	Complies
Part 15.207	Conducted Emission	4	Complies
Part 15.209	Radiated Emission	1	Complies
Part 15.225	Field strength within the assigned band	2	Complies
Part 15.225 (e)	Frequency tolerance	3	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.



Power supply..... : 10-30 Vdc

Serial number : N12A00001

Type of equipment : ☒ Transmitter Unit ☐ Receiver Unit
 : ☒ Fixed station ☐ Portable station ☐ Mobile station

Receiver class : --

Working Frequency : 13,56 MHz

Number of channels : --

Channel separation..... : --

Modulation : --

Extreme conditions : --

Maximum transmitter output power..... : --

Information on antenna : Antenna model GEL-3251 ANTENNA C0405
Gain = -42,8dBi

Duty cycle..... : --

Filtering and construction devices..... : None

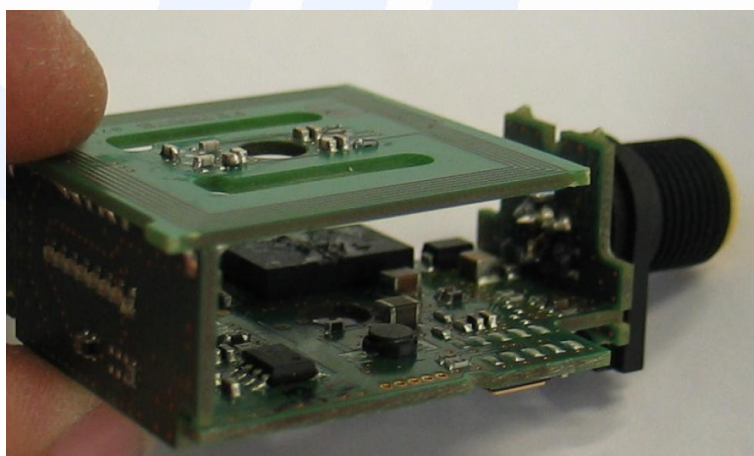
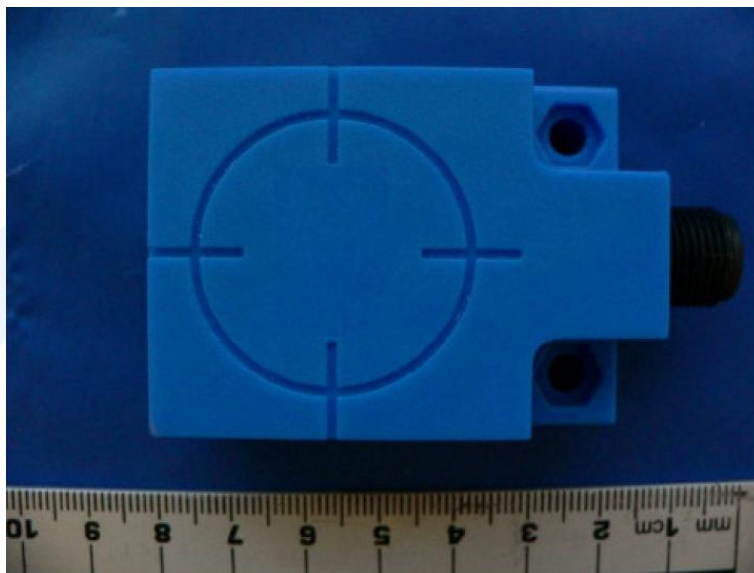
Company: CMC Centro Misure Compatibilità S.r.l.
Address: Via dell'Elettronica, 12/C – 36016 Thiene (VI) – ITALY

Date of receipt of test item	: 01.02.12
Testing start date.....	: 01.02.12
Testing end date.....	: 01.02.12
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 P120082

—



5. 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 S127	SCHAFFNER	HLA6120	Loop Antenna	1191	January '10	January '13
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '10	May '13
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '12	January '13
CMC B069	Angelantoni	CH 600C	Climatic chamber	41973	June '11	June '12
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver	100781	January '12	January '13



7. Measurement uncertainty

Test	Expanded Uncertainty	note
Conducted Emission		
(50Ω/50μH AMN) - (9 kHz – 150 kHz)	±3.8 dB	1
(50Ω/50μH AMN) - (150 kHz – 30 MHz)	±3.4 dB	1
(Voltage probe) - (150 kHz – 30 MHz)	±3.0 dB	1
(50Ω/5μH AMN) - (150 kHz – 108 MHz)	±3.2 dB	1
Discontinuous Conducted Emission		
Conducted Emission (50Ω/50μH AMN) - (9 kHz – 150 kHz)	±3.8 dB	1
Conducted Emission (50Ω/50μH AMN) - (150 kHz – 30 MHz)	±3.4 dB	1
Disturbance Power (30 MHz – 300 MHz)		
	±3.2 dB	1
Radiated Emission		
(0,150 MHz – 30 MHz)	±4.5 dB	1
(30 MHz – 1000 MHz)	±4.8 dB	1
(1 GHz – 6 GHz)	±4.4 dB	1
Electromagnetic field EMF		
	±18.8 dB	1
Harmonic current emissions test		
	±2.4 %	1
Voltage fluctuation and flicker test		
	±6.0 %	1
Insertion loss test		
	±2.6 %	1
Radiated electromagnetic disturbance test (loop antenna)		
	±2.5 %	1
Radiated electromagnetic field immunity test		
	0.9 V/m at 3V/m	1
Pulse modulated radiated electromagnetic field immunity test		
	0.9 V/m at 3V/m	1
Injected currents immunity test		
	0.6 V at 3V	1
Bulk current		
	9 mA at 60 mA	1
Power frequency magnetic field immunity test		
	0.3 A/m at 3 A/m	1
Electrostatic discharge immunity test		
		2
Electrical fast transients / burst immunity test		
		2
Surge immunity test		
		2
Short interruption immunity test		
		2
Voltage transient emission test		
	±5 %	1
Transient immunity test		
		2

Notes

Note 1:

The expanded uncertainty reported according to EN55016-4-2(2004-10) 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. eference documents

Reference no.	Description
FCC Rules and Regulation Title 47 part 15	--
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz – 40GHz
Internal Procedure PM001 rev. 2.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 8.0 (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 6dB 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 / N.A.

Test item does meet the requirement..... : P / Pass / Complies

Test item does not meet the requirement..... : F / Fail / Does not comply

Test not performed : NE / Not Executed

11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 8.0.



11.1 Antenna Requirements

Test configuration and test method

Test site

Laboratory

Auxiliary equipment

See clause 4 of this test report

Environmental conditions

Temperature 22 °C Atmospheric pressure 100 kPa Relative humidity 49 %

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 Requirements

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 unique coupling to the intentional radiator shall be considered sufficient 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 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.

Test specification

Port: Antenna.

EUT exercising

See clause 4 of this test report

Result

Antenna Type	Gain	Remarks	Results
Embedded	-42,8 dBi	--	Complies

Remarks

//////////

Reference documents

See clause 8 of this test report

Result

The requirements are met



11.2 Emission of mains terminal disturbance voltage (continuous disturbance)

Test configuration and test method

Test site
Auxiliary equipment

Shielded chamber
See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 98 kPa Relative humidity 50 %

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 specification

Port: AC mains

EUT exercising

See clause 4 of this test report

Acceptance limits

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

Result

Line	Frequency Range (MHz)	Graphs	Remarks	Result
N	0,15 – 30	G12008810	--	Complies
L	0,15 – 30	G12008811	--	Complies

Graphs Legend

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

Remarks Test executed with typical AC/DC converter (230Vac / 24Vdc)

Reference documents

See clause 8 of this test report

Test equipment used (Id number – see clause 6 of this test report)

CMC S206

Measurement uncertainty: See clause 7 of this test report

Result

The requirements are met



11.3 Radiated Emission

Test configuration and test method

Test site Semi-Anechoic Chamber
Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 98 kPa Relative humidity 50 %

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 specification

Port: Enclosure - Antenna distance: 3m – Frequency range: 30-1000 MHz

EUT exercising

See clause 4 of this test report

Acceptance limits

Limits	
Frequency range (MHz)	$dB(\mu V/m)$ Quasi-peak
0,009 to 0,490	128,51 to 93,79
0,490 to 1,705	73,79 to 62,96
1,705 to 30	69,5
30 to 88	40
88 to 216	43,5
216 to 960	46
Above 960	54

Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
Vertical	30 to 1000	G12008801	--	Complies
Horizontal	30 to 1000	G12008802	--	Complies
Loop	0,009 to 30	G12008803	--	Complies

Graphs Legend

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



Remarks

EUT was tested in 3 orthogonal planes. In results table are reported the worst case.

Reference documents

See clause 8 of this test report

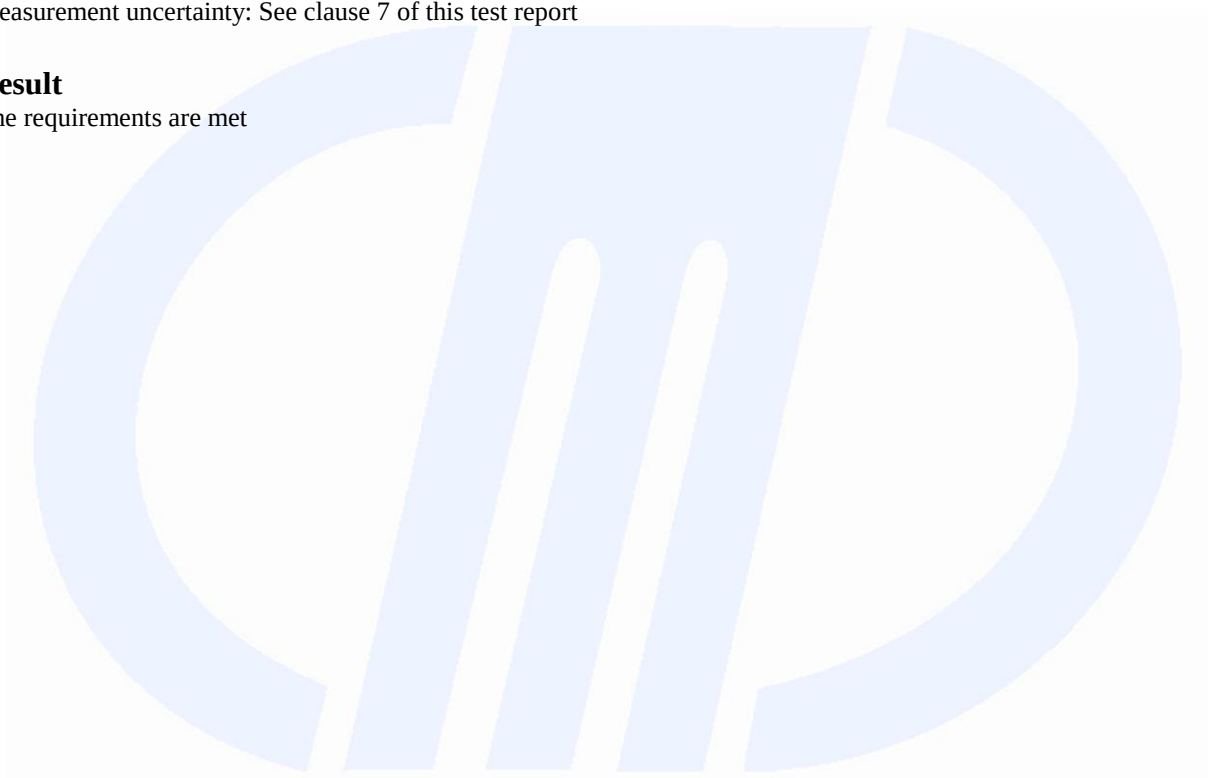
Test equipment used (Id number – see clause 6 of this test report)

CMC S127, CMC S136, CMC S164

Measurement uncertainty: See clause 7 of this test report

Result

The requirements are met





11.4 Field strength within the assigned band

Test configuration and test method

Test site Semi-anechoic chamber
Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 98 kPa Relative humidity 50 %

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.225
- Internal Procedure PM001
- See clause 4 of this test report

Test specification

Test distance: 3m – Frequency Range: 13,553 to 13,567MHz – if bandwidth: 1kHz

EUT exercising

See clause 4 of this test report

Acceptance limits

Limits (with antenna distance 3m)	
Frequency range (MHz)	dB(μV/m) Quasi-peak
13,553 to 13,567	124
13,410 to 13,553 and 13,567 to 13,710	90,5
13,110 to 13,410 and 13,710 to 14,010	80,5

Result

Graphs	Transmitter field strength		Result
	Frequency (MHz)	Level (dBμV/m)	
G12008807	13,5602	55,32	Complies

Frequency Range (MHz)	Graphs	Remarks	Result
13 to 14,1	G12008804	--	Complies

Remarks

EUT was tested in 3 orthogonal planes. In results table are reported the worst case.

Reference documents See clause 8 of this test report

Test equipment used (Id number – see clause 6 of this test report)

CMC S127, CMC S164

Result The requirements are met



11.5 Frequency tolerance

Test configuration and test method

Test site

Climatic chamber

Auxiliary equipment

See clause 4 of this test report

Environmental conditions

Temperature 20 °C

Atmospheric pressure 98 kPa

Relative humidity 50 %

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.225 (e)
- Internal Procedure PM001
- See clause 4 of this test report

Test specification

Frequency range: 13,553 to 13,567MHz

EUT exercising

See clause 4 of this test report

Acceptance limits

Limits for radiated disturbances $\pm 0,01\%$

Result

Test conditions		Measured frequency (MHz)
Power supply (V)	Temperature	
24 (Un)	20°C	13,5604
24 (Un)	-20°C	13,5604
24 (Un)	-10°C	13,5603
24 (Un)	0°C	13,5602
24 (Un)	10°C	13,5602
24 (Un)	30°C	13,5604
24 (Un)	40°C	13,5603
24 (Un)	50°C	13,5602
8,5 (10V x 0,85)	20°C	13,5604
34,5 (30V x 1,15)	20°C	13,5603

Remarks //////////////

Reference documents

See clause 8 of this test report

Test equipment used (Id number – see clause 6 of this test report)

CMC B069, CMC S164

Result

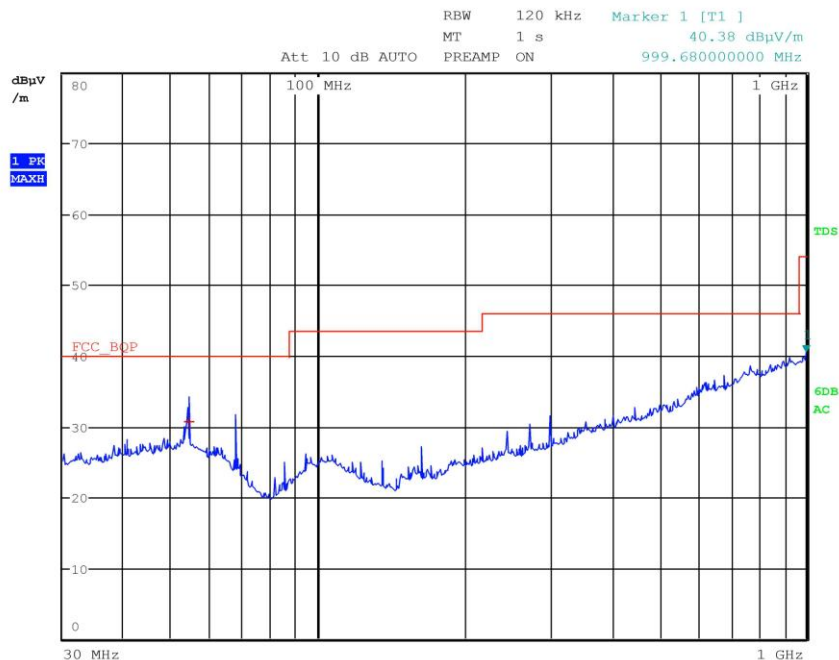
The requirements are met



12. Graphs and Tables

G12008801

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition TX
Operator Bertezzolo 12008801
Test Spec
Vert



Final Measurement

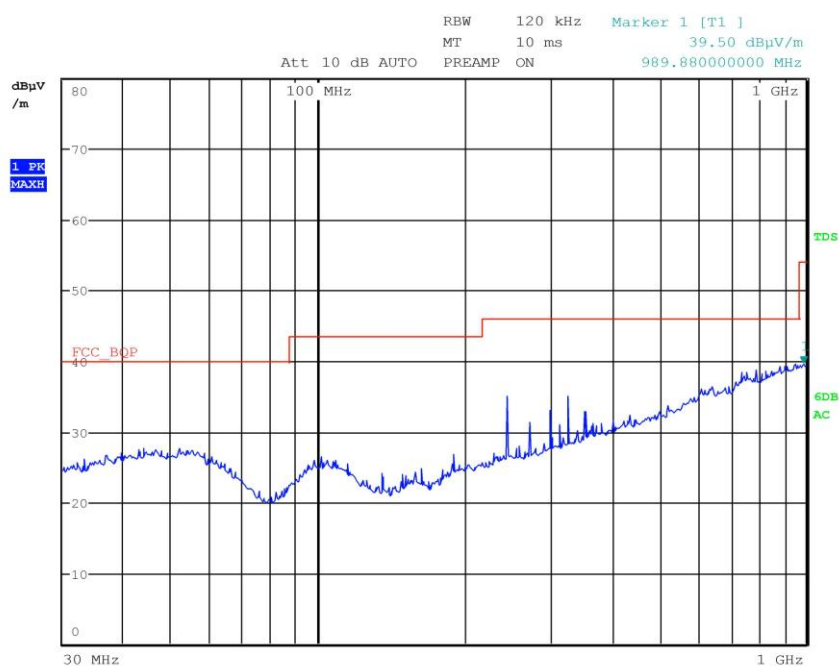
Meas Time: 1 s
Margin: 6 dB
Subranges: 1

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	54.240000000 MHz	30.65	Quasi Peak	-9.35



G12008802

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition TX
Operator Bertezolo 12008802
Test Spec
Horiz



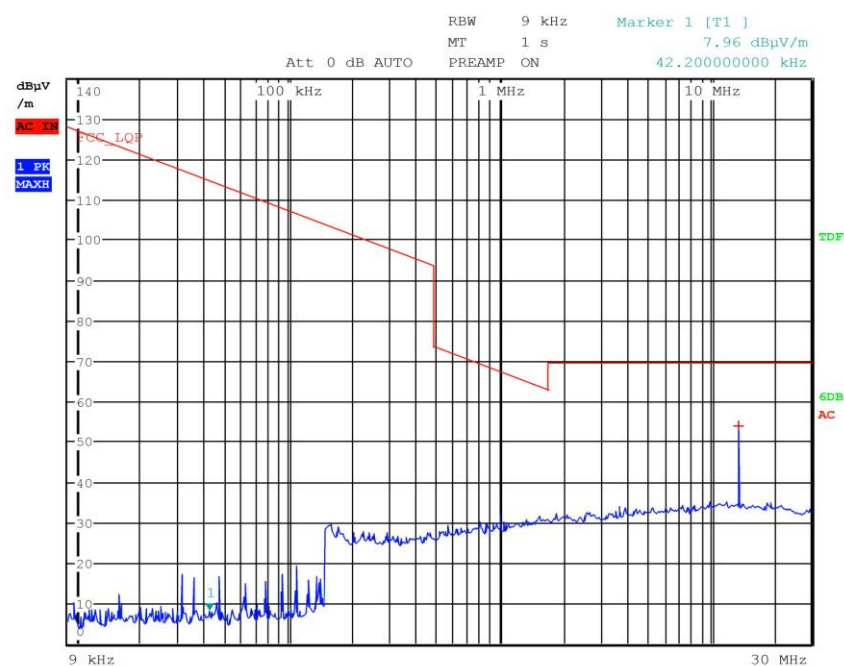
Final Measurement

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



G12008803

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition TX
Operator Bertezolo 12008803
Test Spec
Loop



Final Measurement

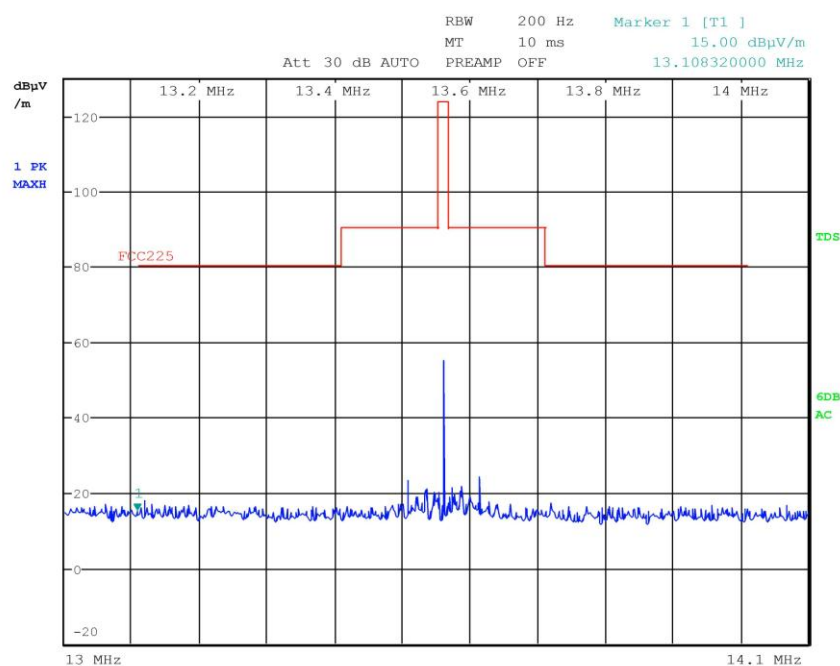
Meas Time: 1 s
Margin: 6 dB
Subranges: 1

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	13.56200000 MHz	54.10	Quasi Peak	-15.40



G12008804

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition TX
Operator Bertezolo 12008804
Test Spec
Loop



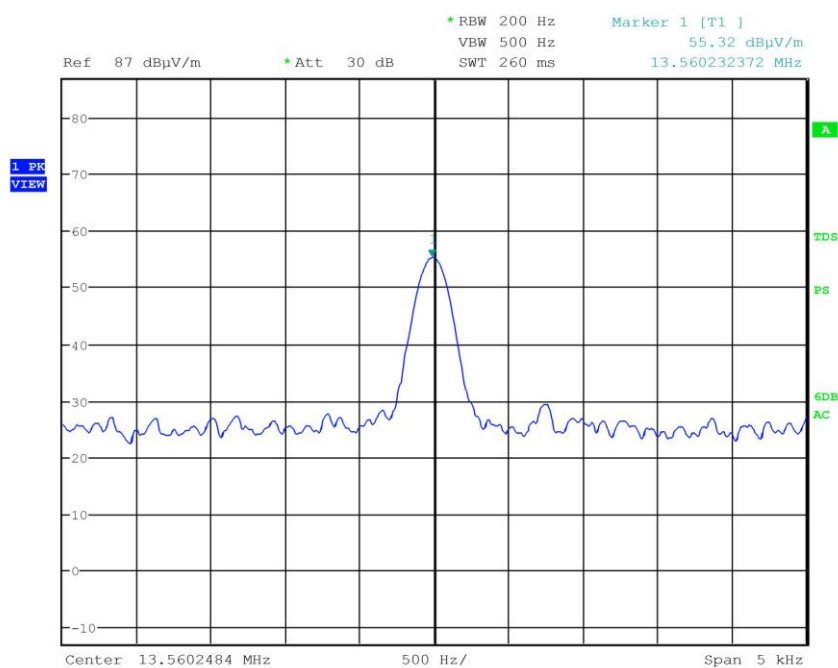
Final Measurement

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



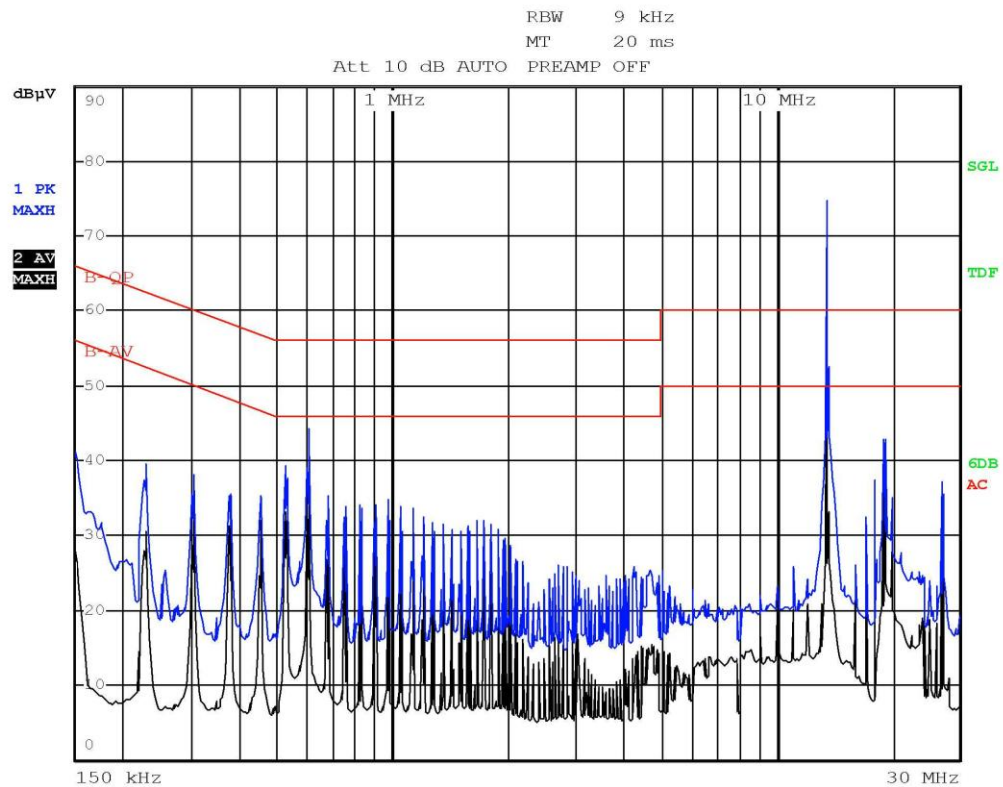
G12008807

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition TX
Operator Bertezolo 12008807
Test Spec
Loop





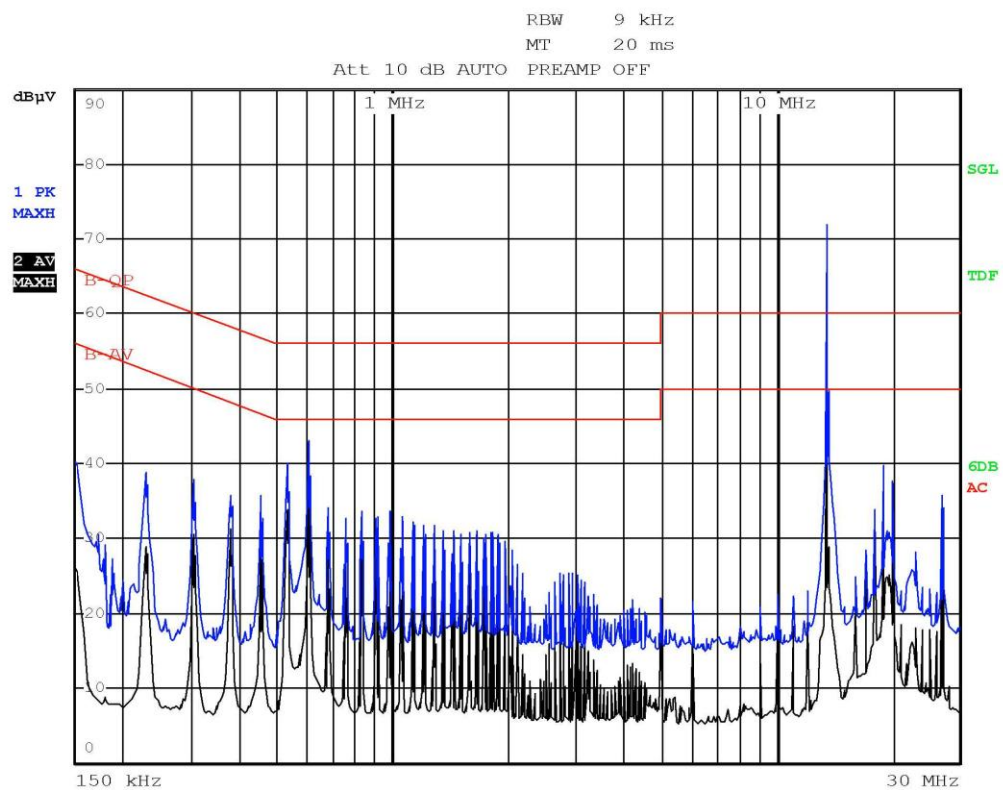
G12008810



Bert 12008810-Line N



G12008811



Bert 12008811-Line L