



TEST REPORT nr. R09142101

Federal Communication Commission (FCC)

Test item

Description..... : RFID
Trademark..... : DATALOGIC AUTOMATION
Model/Type..... : HF-CNTL IND 02
 HF-CNTL 232 02
 HF-CNTL 485 02

Test Specification

Standard..... : FCC Rules & Regulations, Title 47 (2008)
 Part 15 paragraph(s) : 203, 204, 207, 209 and 225

Client's name..... : Datalogic Automation s.r.l.
Address..... : Via S. Vitalino 13 - 40012 Lippo di Calderara di Reno (BO) - ITALY

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

Report

Tested by..... : A. Bertezzo - *Technician*

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

Date of issue..... : 11.01.10

Contents..... : 28 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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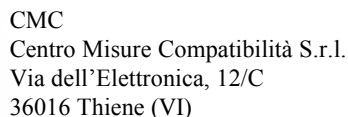
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1. Summary			
Emission: FCC Rules & Regulations, Title 47 (2008)			
Test specifications	Environmental Phenomena	Tests sequence	Result
Part 15.203 and 15.204	Antenna Requirement	--	N.A. (+)
Part 15.207	Conducted Emission	1	Complies
Part 15.209	Radiated Emission	2	Complies
Part 15.225	Field strength within the assigned band	3	Complies
Part 15.225 (e)	Frequency tolerance	4	Complies

(+) EUT is a intentional radiators that must be professionally installed

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	12-30 Vdc
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.....	☐ Integrated ☐ Extern ☒ Other: See user manual
	Test executed with antenna mod. HF-ANT-3030-1 with gain -22,9dBi
Duty cycle.....	--

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

Date of receipt of test item	: 06.11.09
Testing start date	: 06.11.09
Testing end date.....	: 11.11.09
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 P090974

—



5. Photograph(s) of EUT

HF-CNTL IND 02



HF-CNTL 232 02





HF-CNTL 485 02





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 S001	Rohde & Schwarz	ESHS30	EMC interference receiver	862024/003	January '09	January '10
CMC S127	SCHAFFNER	HLA6120	Loop Antenna	1191	January '07	January '10
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '07	May '10
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '09	January '10
CMC B069	Angelantoni	CH 600C	Climatic chamber	41973	June '09	June '10



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. 6.0 (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.

All measurements are done in accordance with the Filling and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA-705

Measurement uncertainty is in accordance with document CMC INC_M rev. 6.0.



11.1 Emission of mains terminal disturbance voltage (continuous disturbance)

Test configuration and test method

Test site

Shielded chamber

Auxiliary equipment

See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 100 kPa Relative humidity 45 %

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)	$dB(\mu V)$ Quasi-peak	$dB(\mu V)$ 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	Graphs	Remarks	Result
0V	G09142116	Antenna mod. 3030-01	Complies
0V	G09142117	50ohm	Complies
24V	G09142118	50ohm	Complies
24V	G09142119	Antenna mod. 3030-01	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 was executed on model HF-CNTL IND 02

Reference documents

See clause 8 of this test report

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

CMC S001

Measurement uncertainty: See clause 7 of this test report

Result The requirements are met



11.2 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

<i>Limits</i>	
<i>Frequency range (MHz)</i>	<i>dB(μV/m) Quasi-peak</i>
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

Model: HF-CNTL IND 02

<i>Polarization</i>	<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
Loop antenna	0,009 to 30	G09142110	Antenna mod. 3030-01	Complies
Horizontal	30 to 1000	G09142103	Antenna mod. 3030-01	Complies
Vertical	30 to 1000	G09142104	Antenna mod. 3030-01	Complies

Model: HF-CNTL 232 02

<i>Polarization</i>	<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
Vertical	30 to 1000	G09142101	Antenna mod. 3030-01	Complies
Horizontal	30 to 1000	G09142102	Antenna mod. 3030-01	Complies

Model: HF-CNTL IND 02

<i>Polarization</i>	<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
Vertical	30 to 1000	G09142105	Antenna mod. 3030-01	Complies
Horizontal	30 to 1000	G09142106	Antenna mod. 3030-01	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



11.3 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 21 °C Atmospheric pressure 100 kPa Relative humidity 48 %

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

<i>Limits (with antenna distance 3m)</i>	
<i>Frequency range (MHz)</i>	<i>dB(μV/m) Quasi-peak</i>
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

<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Transmitter field strength</i>		<i>Result</i>
		<i>Frequency (MHz)</i>	<i>Level (dBμV/m)</i>	
13,553 to 13,567	G09142111	13,56	102,3	Complies

<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
13 to 14,1	G09142112	--	Complies

Remarks

EUT was tested in 3 orthogonal planes. In results table are reported the worst case.
Antenna mod. 3030-01

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



11.4 Frequency tolerance

Test configuration and test method

Test site

Climatic chamber

Auxiliary equipment

See clause 4 of this test report

Environmental conditions

Temperature 21 °C Atmospheric pressure 100 kPa Relative humidity 48 %

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)	Frequency drift (kHz)
Power supply (V)	Temperature		
24 (Un)	20°C	13,559867	--
24 (Un)	-20°C	13,560079	+0,212
24 (Un)	+50°C	13,559882	+0,015
10,2 (12V x 0,85)	20°C	13,559869	+0,002
34,5 (30 x 1,15)	20°C	13,559871	+0,004

Remarks Antenna mod. 3030-01

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

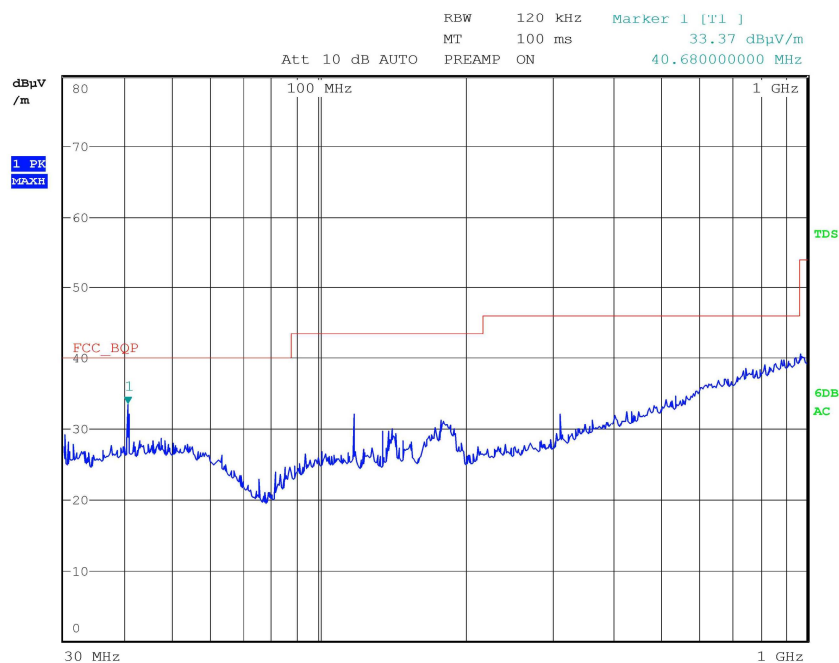
Result The requirements are met



12. Graphs and Tables

G09142101

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-232-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142101
Test Spec
Vert.



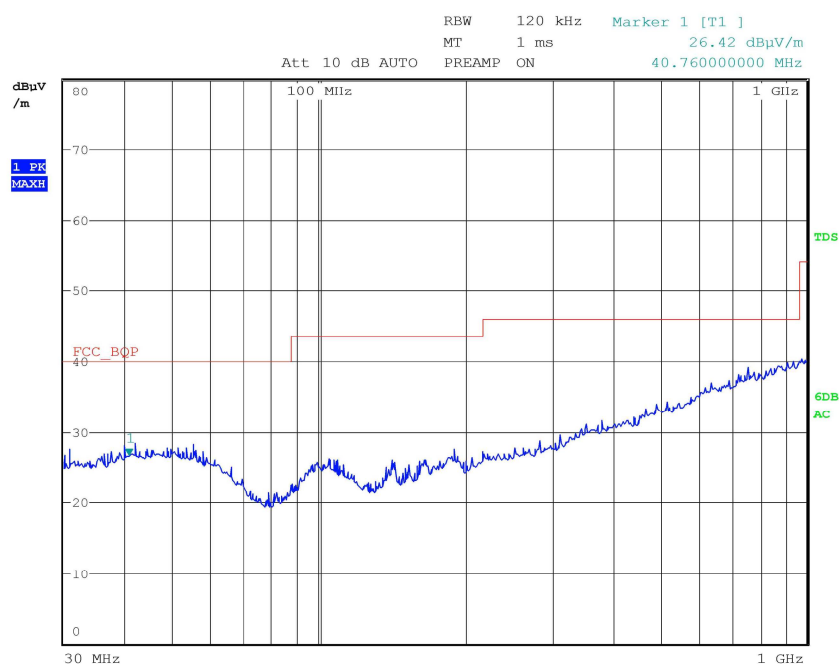
Final Measurement

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



G09142102

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-232-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142102
Test Spec
Horiz



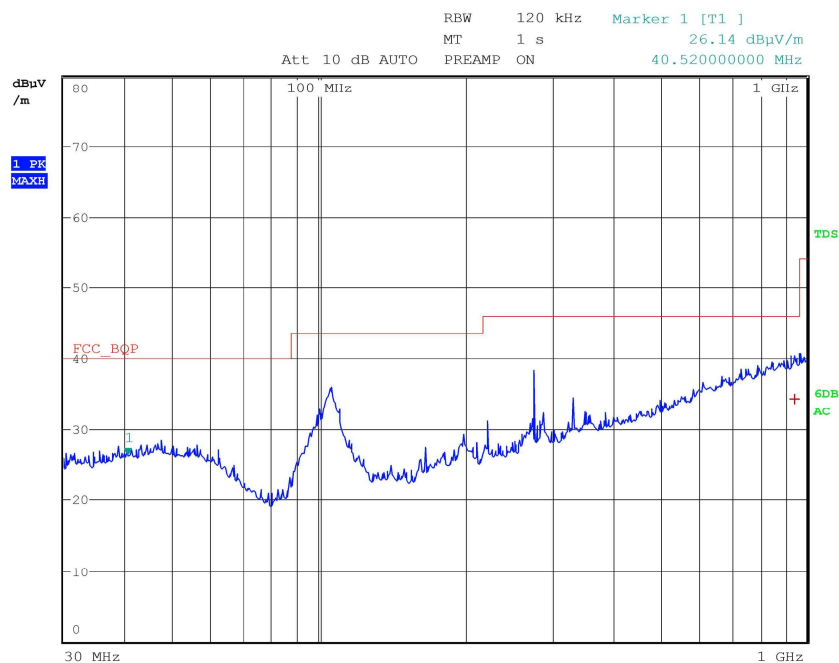
Final Measurement

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



G09142103

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-IND-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142103
Test Spec
Horiz



Final Measurement

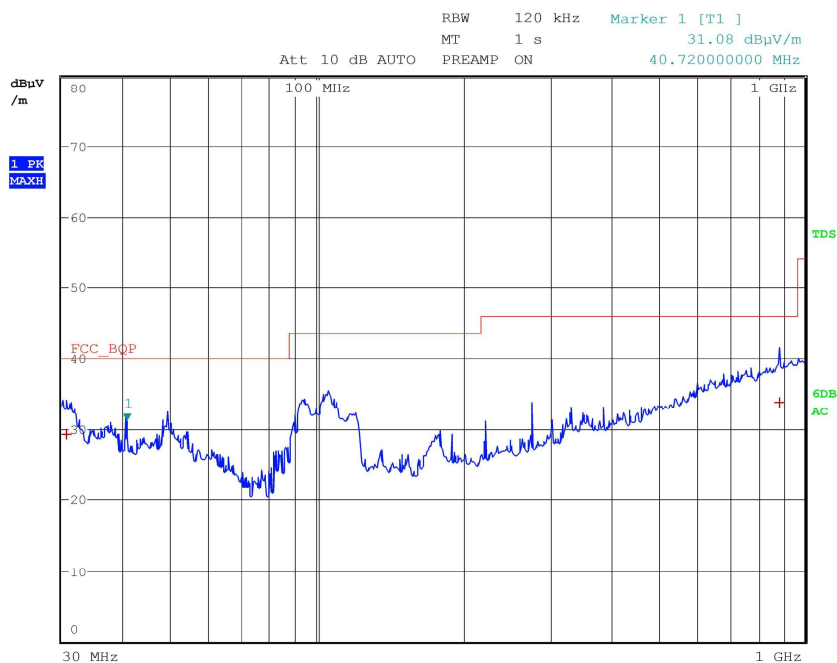
Meas Time: 1 s
Margin: 6 dB
Subranges: 1

Trace	Frequency	Level (dBuV/m)	Detector	Delta Limit/dB
1	945.520000000 MHz	34.16	Quasi Peak	-11.86



G09142104

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-IND-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142104
Test Spec
Vert



Final Measurement

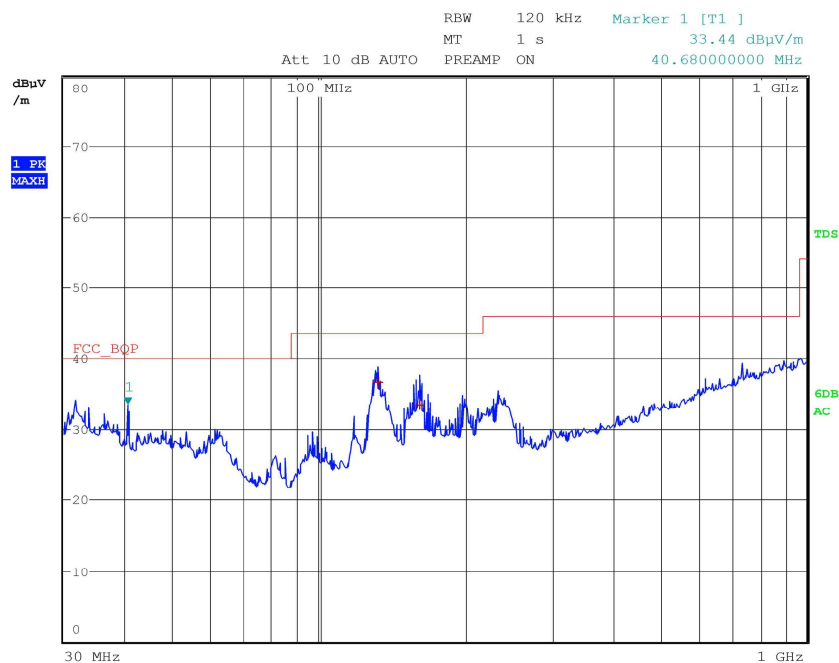
Meas Time: 1 s
Margin: 6 dB
Subranges: 2

Trace	Frequency	Level (dBuV/m)	Detector	Delta Limit/dB
1	30.680000000 MHz	29.23	Quasi Peak	-10.77
1	889.520000000 MHz	33.78	Quasi Peak	-12.24



G09142105

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-485-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142105
Test Spec
Vert



Final Measurement

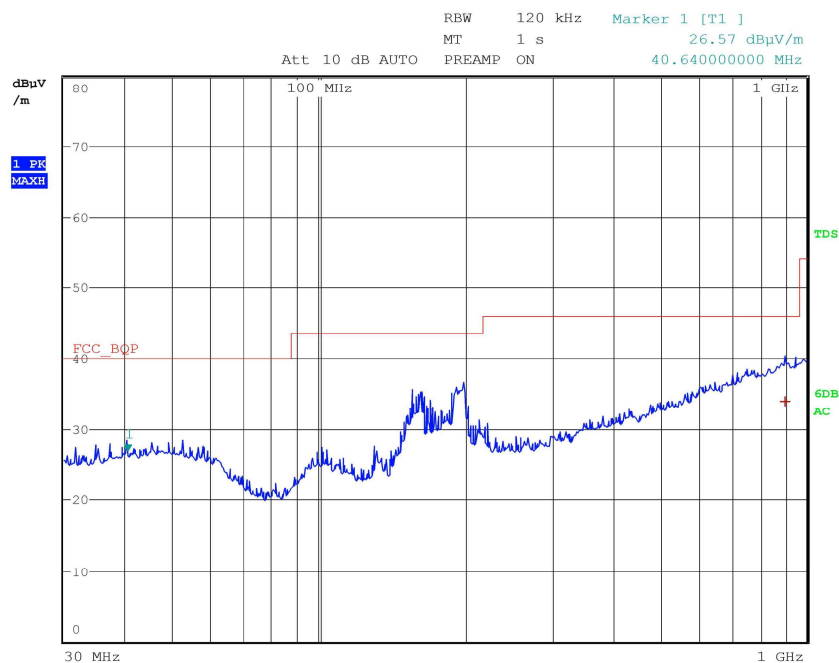
Meas Time: 1 s
Margin: 6 dB
Subranges: 2

Trace	Frequency	Level (dBuV/m)	Detector	Delta Limit/dB
1	132.240000000 MHz	36.51	Quasi Peak	-7.01
1	160.560000000 MHz	33.30	Quasi Peak	-10.22



G09142106

Meas Type Emission 30-1000MHz
Equipment under Test HF-CNTL-485-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142106
Test Spec
Horiz



Final Measurement

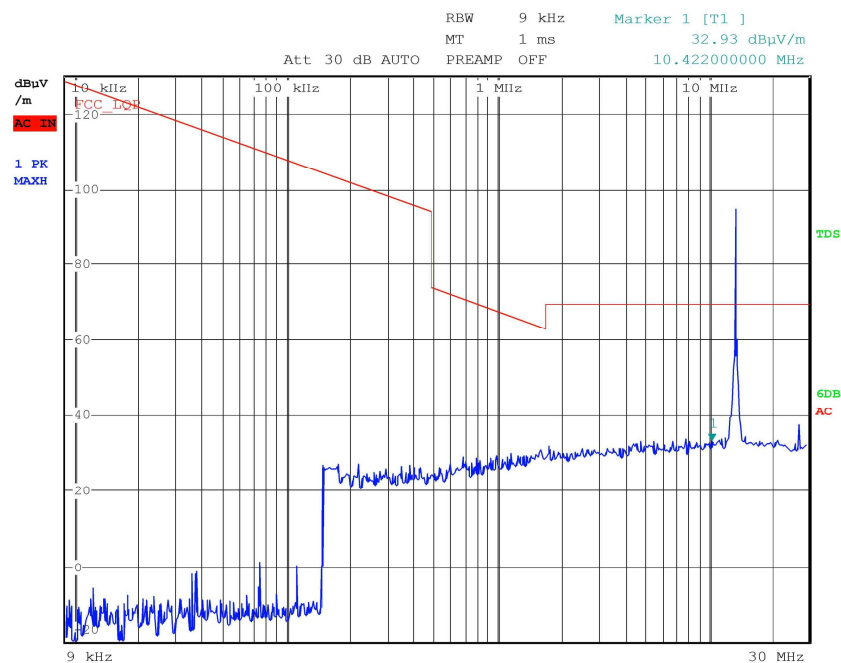
Meas Time: 1 s
Margin: 6 dB
Subranges: 1

Trace	Frequency	Level (dBuV/m)	Detector	Delta Limit/dB
1	901.480000000 MHz	33.91	Quasi Peak	-12.11



G09142110

Meas Type Emission 0.009-30MHz
Equipment under Test HF-CNTL-IND-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142110
Test Spec
Loop



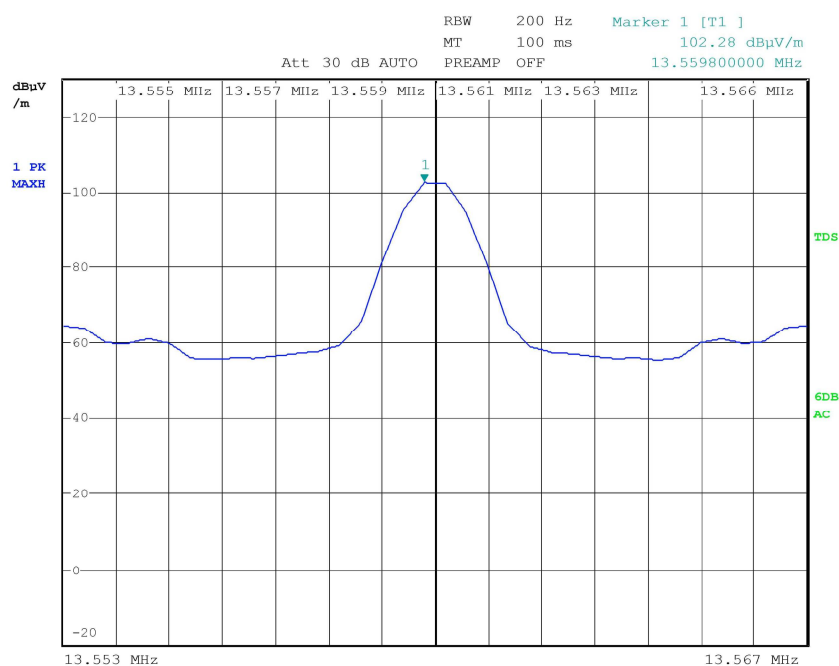
Final Measurement

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



G09142111

Meas Type Emission 13-14.1MHz
Equipment under Test HF-CNTL-PBS-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142111
Test Spec
Loop



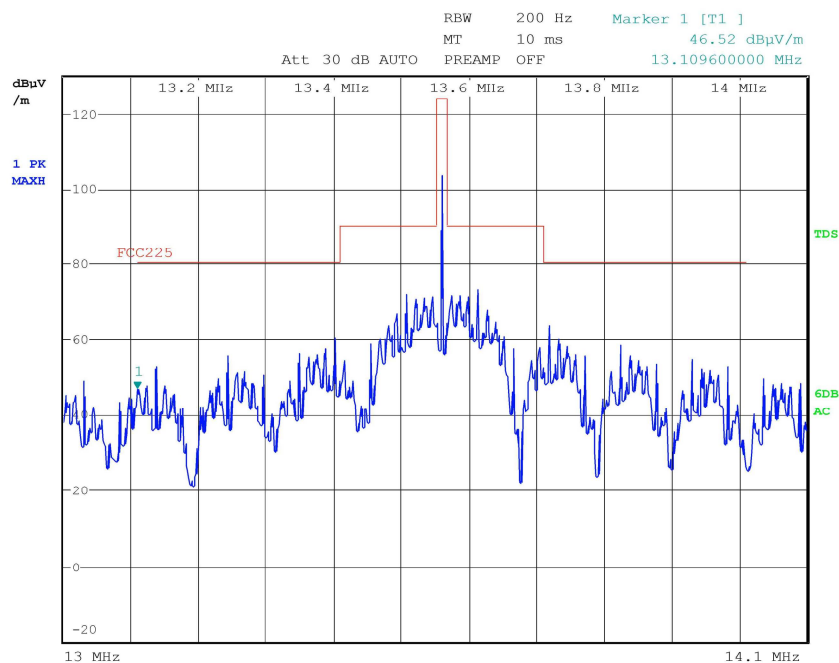
Final Measurement

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



G09142112

Meas Type Emission 13-14.1MHz
Equipment under Test HF-CNTL-PBS-02 antenna HF-ANT-3030-01
Manufacturer
OP Condition In trasmissione
Operator Bertezzo 09142112
Test Spec
Loop



Final Measurement

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

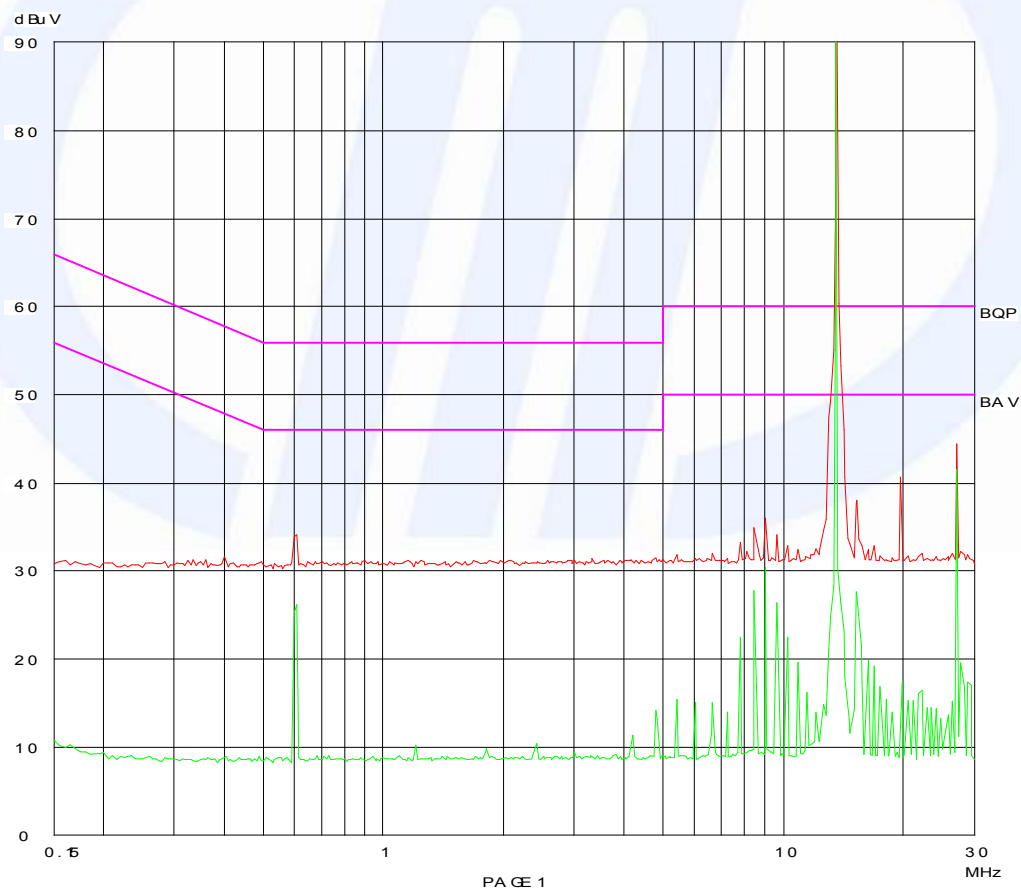


G09142116

CMC Centro misure compatibilit  srl

Emission 0.15-30MHz

EUT: HF-CNTL-IND-02
Op Cond: Art. 303901
Operator: Bert. 0914216
TestSpec: Line 0 V



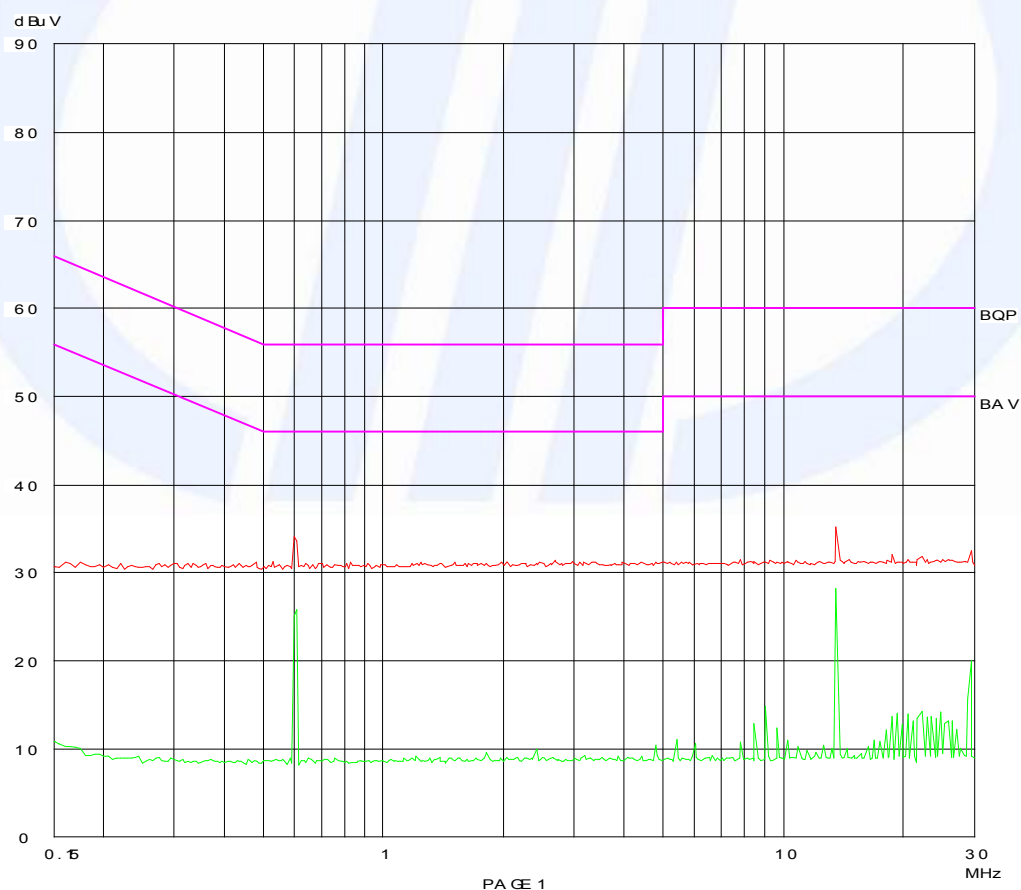


G09142117

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

EUT: HF-CNTL-IND-02
Op Cond 500hmload
Operator: Bert.09142117
TestSpec: Line 0 V



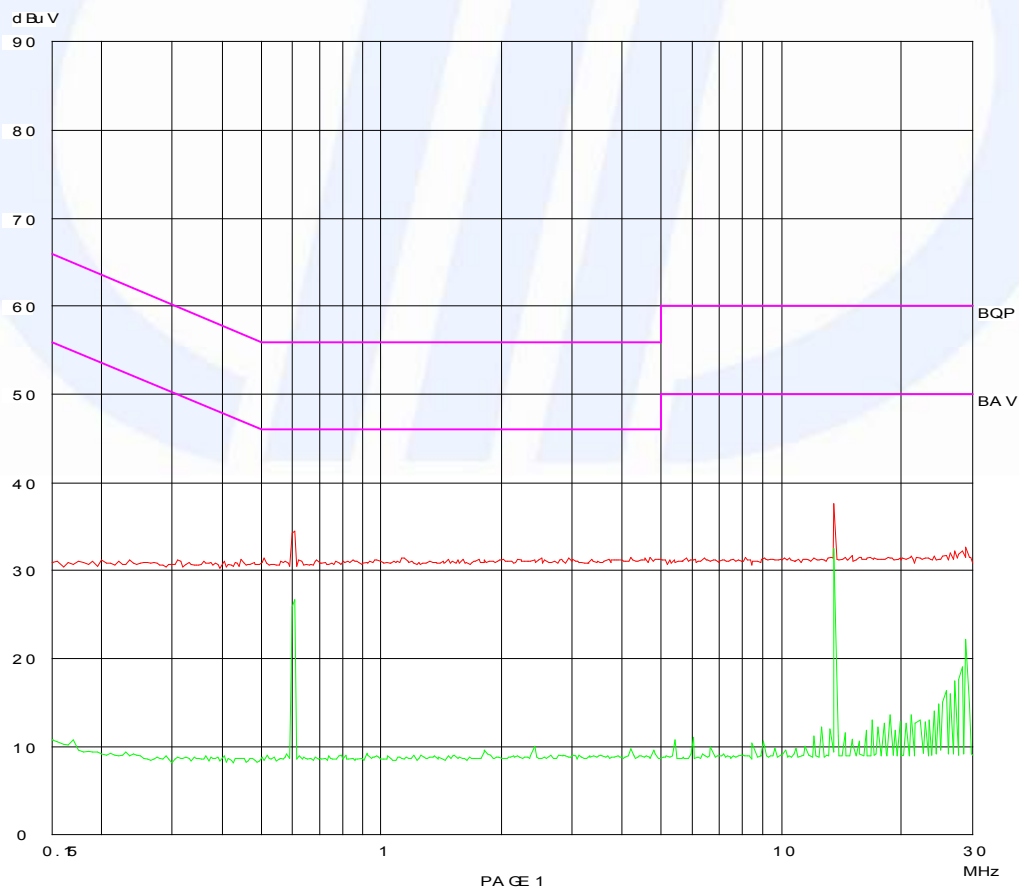


G09142118

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

EUT: HF-CNTL-IND-02
Op Cond: 500mload
Operator: Bert.09142118
TestSpec: Line 24V





G09142119

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

EUT: HF-CNTL-IND-02
Op Cond: Art.303001
Operator: Bert.09142119
TestSpec: Line 24V

