



TEST REPORT nr. R10150501

Federal Communication Commission (FCC)

Test item

Description..... : Receiver Unit
Trademark..... : Teleco Automation
Model/Type..... : RCSP240A04

Test Specification

Standard..... : FCC Rules & Regulations, Title 47 (2009) - Part 15 paragraph(s) : 207, 209, 215 and 249

Client's name..... : Teleco Automation S.r.l.
Address..... : Piazza Ex Convento Cappuccine, 8 - 31100 TREVISO (TV) - ITALY

Manufacturer's name : Same ad client
Address..... :

Report

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

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

Date of issue..... : 12.01.11

Contents..... : 37 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

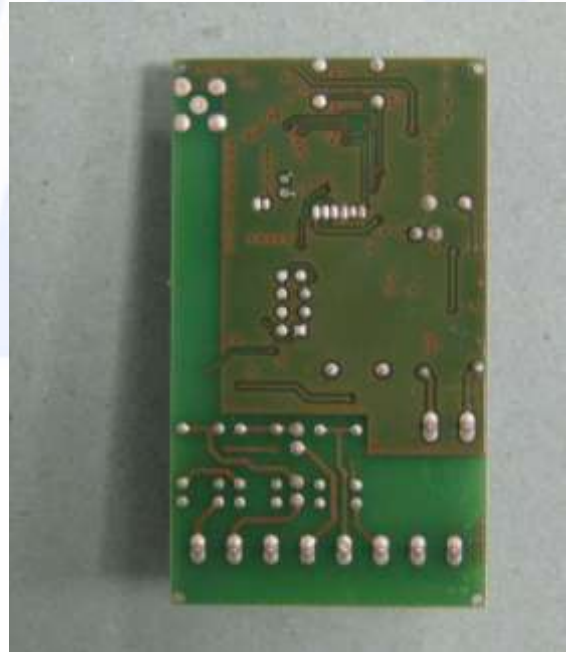
Emission: FCC Rules & Regulations, Title 47

Test specifications	Environmental Phenomena	Tests sequence	Result
Part 15.209 + 15.249	Radiated Emission 30-1000 MHz	1	Complies
Part 15.209	Spurious Emission 1-25 GHz	2	Complies
Part 15.205	Band Edge	3	Complies
Part 15.215	Bandwidth	4	Complied
Part 15.207	Conducted Emission	5	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.



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 S001	Rohde & Schwarz	ESHS30	EMC interference receiver	862024/003	January '10	January '11
CMC S108	Emco	3115	Horn antenna	9811-5622	April '10	April '13
CMC S124	Spin	AMTP42-20	Horn Antenna 18-26GHz	103	May '10	May '13
CMC S127	SCHAFFNER	HLA6120	Loop Antenna	1191	January '10	January '13
CMC S129	Rohde & Schwarz	ESPI7	Receiver	836.914/004	January '10	January '11
CMC S136	Schwarzbeck	VULB 9163	Broadband Antenna	9136-205	May '10	May '13
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '10	January '11



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. Reference documents

<i>Reference no.</i>	<i>Description</i>
FCC Rules and Regulation Title 47 part 15 (2009)	--
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 Radiated Emission 30-1000 MHz

Test configuration and test method

Test site Laboratory
Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 99 kPa Relative humidity 48 %

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.249 and Part 15.209
- Internal Procedure PM001
- See clause 4 of this test report

Test specification

Port: Enclosure.

EUT exercising

See clause 4 of this test report

Result

Frequency (MHz)	Graph(s)	Measured PK level (dB μ V/m)	Limits (dB μ V/m)	Remark
2404,093	G10150514	92,94	93,9	--
2440,084	G10150511	90,13	93,9	--
2476,080	G10150508	93,16	93,9	--

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 S164

Measurement uncertainty: See clause 7 of this test report

Result

The requirements are met



11.2 Spurious Emission 1-25 GHz

Test configuration and test method

Test site Laboratory
 Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 21 °C Atmospheric pressure 99 kPa Relative humidity 48 %

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: Antenna;

EUT exercising

See clause 4 of this test report

Result

Frequency (MHz)	Polarization	Frequency Range (MHz)	Graph(s)	Remarks	Result
2404,093	Vertical	30 – 1000	G10150501	--	Complies
2404,093	Horizontal	30 – 1000	G10150502	--	Complies
2440,084	Horizontal	30 – 1000	G10150503	--	Complies
2440,084	Vertical	30 – 1000	G10150504	--	Complies
2476,080	Vertical	30 – 1000	G10150505	--	Complies
2476,080	Horizontal	30 – 1000	G10150506	--	Complies

Antenna	Frequency Range (MHz)	Graph(s)	Remarks	Result
Loop Antenna	9kHz – 30MHz	G10150507	--	Complies



Nr. Harmonics	AV level (dB μ V/m)						AV Limits (dB μ V/m)	Remark
	2404,093MHz		2440,084MHz		2476,080MHz			
	Frequency	(dB μ V/m)	Frequency	(dB μ V/m)	Frequency	(dB μ V/m)		
II Harmonic	4808,18 MHz	48,7	4880,17	48,4	4952,16	48,3	54,00	--
III Harmonic	7121,27 MHz	46,8	7274,51	47,6	7428,24	49,1	54,00	--
IV Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
V Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
VI Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
VII Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
VIII Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
IX Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
X Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	54,00	--
Measurement Uncertainty: ± 4 dB								

Nr. Harmonics	PK level (dB μ V/m)						PK Limits (dB μ V/m)	Remark
	2404,093MHz		2440,084MHz		2476,080MHz			
	Frequency	(dB μ V/m)	Frequency	(dB μ V/m)	Frequency	(dB μ V/m)		
II Harmonic	4808,18 MHz	54,5	4880,17	54,6	4952,16	54,0	74,00	--
III Harmonic	7121,27 MHz	56,6	7274,51	55,0	7428,24	56,4	74,00	--
IV Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
V Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
VI Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
VII Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
VIII Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
IX Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
X Harmonic	--	More than 10dB below limit	--	More than 10dB below limit	--	More than 10dB below limit	74,00	--
Measurement Uncertainty: ± 4 dB								



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 S108, CMC S124, CMC S127, CMC S136, CMC S164

Measurement uncertainty: See clause 7 of this test report

Result

The requirements are met





11.3 Band edge

Test configuration and test method

Test site Laboratory
 Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 99 kPa Relative humidity 48 %

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.205
- Internal Procedure PM001
- See clause 4 of this test report

Test specification

Port: Antenna;

EUT exercising

See clause 4 of this test report

Acceptance limits

<i>LIMITS</i>
<i>Permitted operating frequency range</i>
2,4000 ÷ 2,4835GHz

Result

<i>Graph(s)</i>	<i>Attenuation Band Edge at 2483,5MHz</i>	<i>Remark</i>
G10150583 and G10150510	48,13 dBµV/m	Peak value
	41,92 dBµV/m	Average value
Measurement Uncertainty: ±4dB		

Graphs for bottom frequency	G10150512 and G10150513
-----------------------------	-------------------------

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

Reference documents

See clause 8 of this test report

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

CMC S164

Result The requirements are met



11.4 Bandwidth

Test configuration and test method

Test site Laboratory
 Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 99 kPa Relative humidity 48 %

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.215
- Internal Procedure PM001
- See clause 4 of this test report

Test specification

Port: Antenna;

EUT exercising

See clause 4 of this test report

Result

<i>Frequency</i>	<i>Graph(s)</i>	<i>Bandwidth</i>	<i>Remark</i>
2404,093	G10150580	75,0 kHz	--
2440,084	G10150581	120,6 kHz	--
2476,080	G10150582	134,4 kHz	--
Measurement uncertainty: ±1 kHz			

Remarks

//////////

Reference documents

See clause 8 of this test report

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

CMC S129

Result

The requirements are met



11.5 Emission of mains terminal disturbance voltage (continuous disturbance)

Test configuration and test method

Test site Laboratory
 Auxiliary equipment See clause 4 of this test report

Environmental conditions

Temperature 20 °C Atmospheric pressure 99 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

<i>Limits</i>		
<i>Frequency range (MHz)</i>	<i>dB(µV) Quasi-peak</i>	<i>dB(µV) Average</i>
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Result

<i>Line</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
Line - (0V)	G10150520	--	Complies
Line + (12V)	G10150521	--	Complies
Line + (24V)	G10150570	--	Complies
Line - (0V)	G10150571	--	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 ////////////////

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

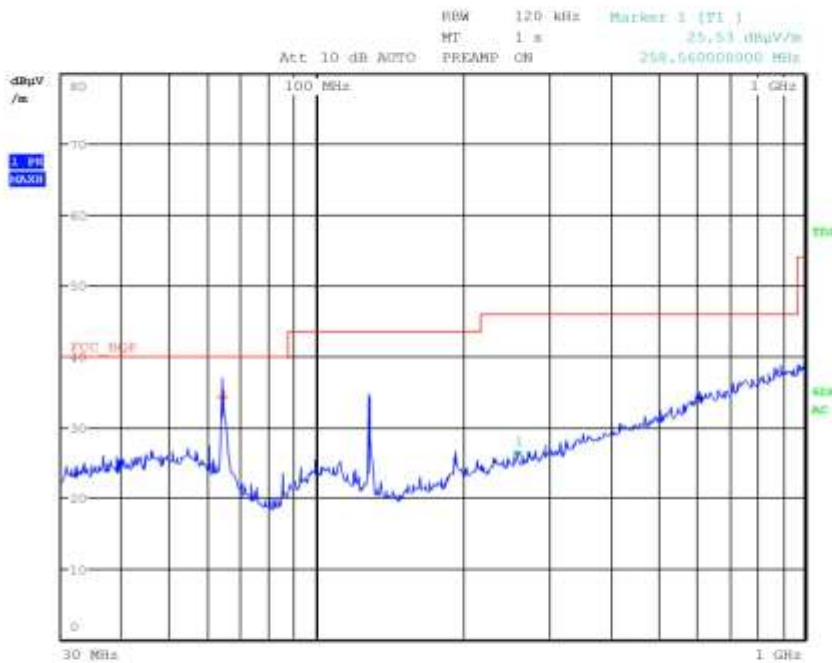
Result The requirements are met



12. Graphs and Tables

G10150501

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MIN
Operator Gandini 10150501
Test Spec
 Vert



Final Measurement

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

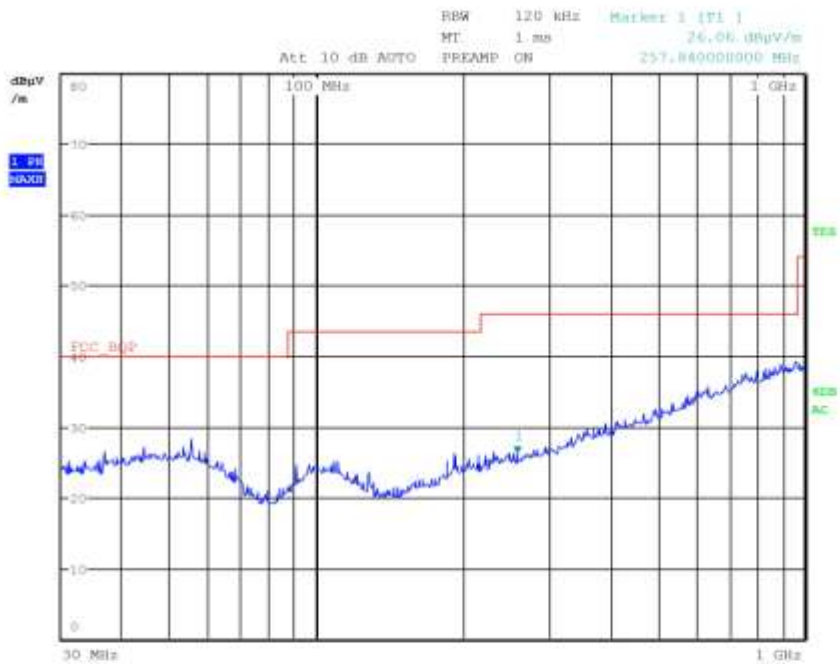
Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	64.120000000 MHz	34.16	Quasi Peak	-5.82

CMC Centro Misure Compatibilità S.r.l.



G10150502

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MIN
Operator Gandini 10150502
Test Spec
Horiz



Final Measurement

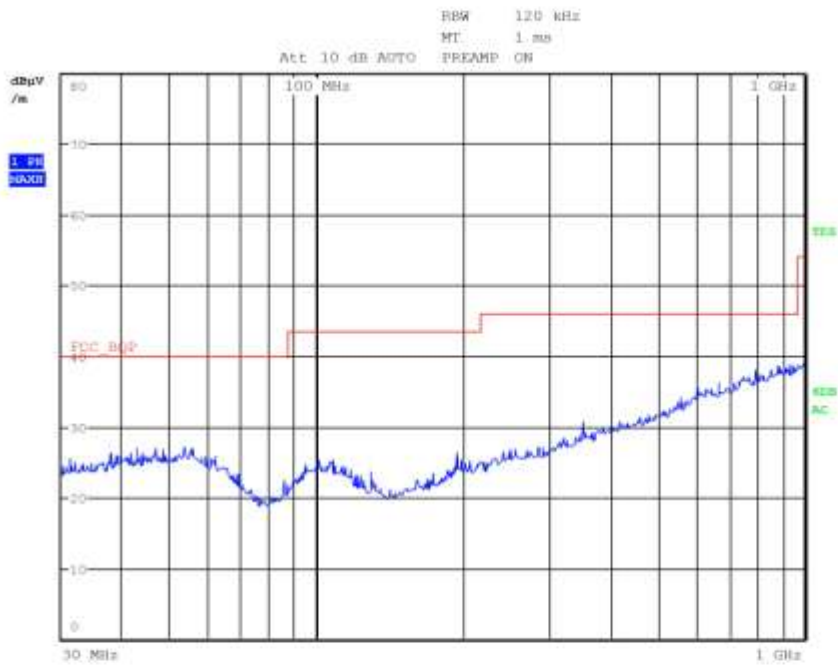
Meas Time: 1 s
Margin: 6 dB
Subranges: 0

CMC Centro Misure Compatibilità S.r.l.



G10150503

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MED
Operator Gandini 10150503
Test Spec
Horiz



Final Measurement

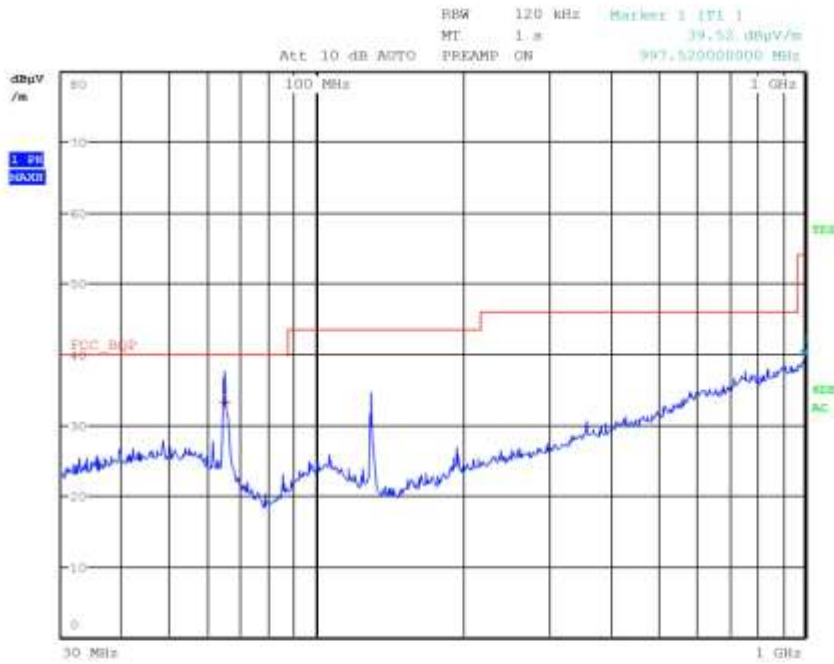
Meas Time: 1 s
Margin: 6 dB
Subranges: 0

CMC Centro Misure Compatibilità S.r.l.



G10150504

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MED
Operator Gandini 10150504
Test Spec
 Vert



Final Measurement

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

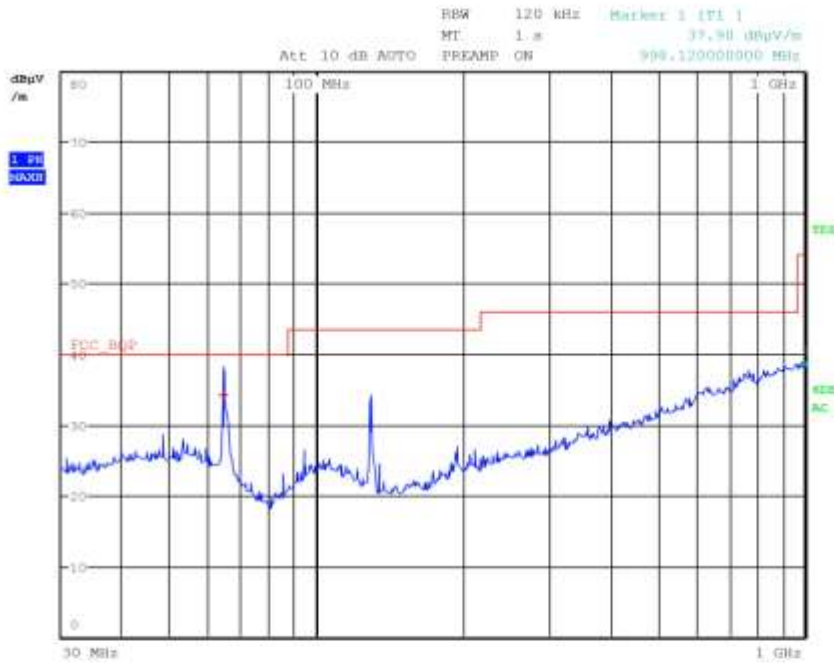
Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	64.64000000 MHz	33.20	Quasi Peak	-6.80

CMC Centro Misure Compatibilità S.r.l.



G10150505

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MAX
Operator Gandini 10150505
Test Spec
 Vert



Final Measurement

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

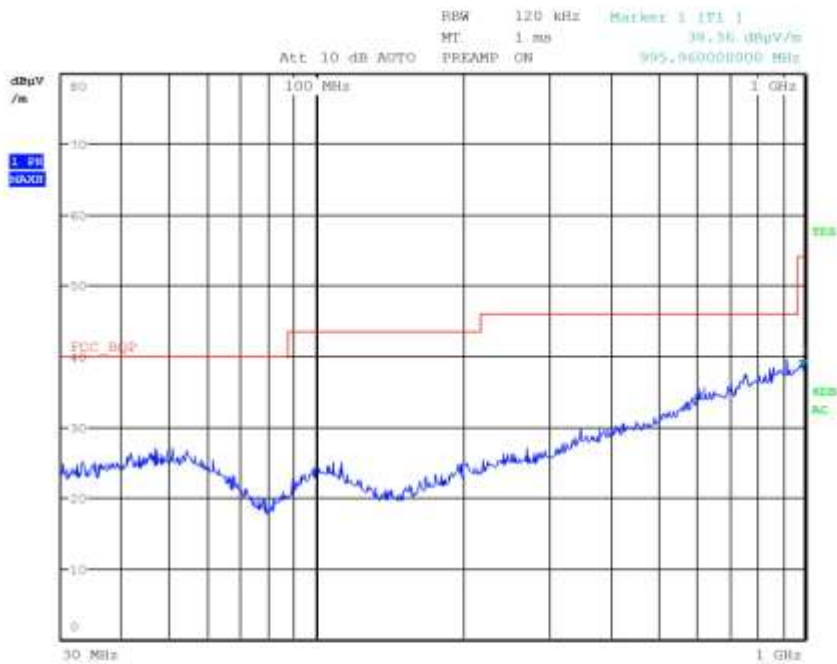
Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	64.560000000 MHz	34.26	Quasi Peak	-5.74

CMC Centro Misure Compatibilità S.r.l.



G10150506

Meas Type Emission 30-1000MHz
Equipment under Test
Manufacturer
OP Condition F MAX
Operator Gandini 10150506
Test Spec
Horiz



Final Measurement

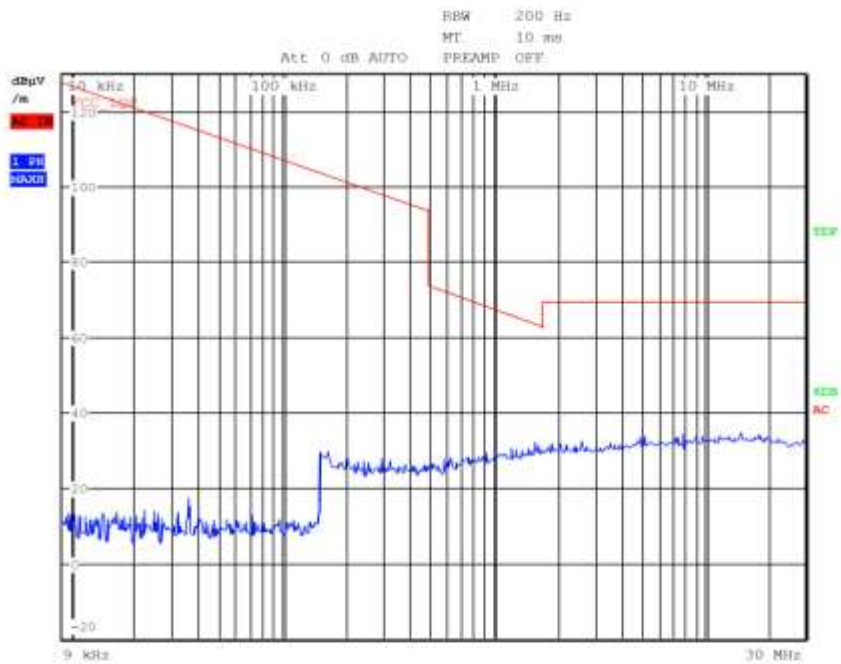
Meas Time: 1 s
Margin: 6 dB
Subranges: 0

CMC Centro Misure Compatibilità S.r.l.



G10150507

Meas Type Emission 0.009-30MHz
Equipment under Test
Manufacturer
OP Condition
Operator Gandini 10150507
Test Spec
Loop



Final Measurement

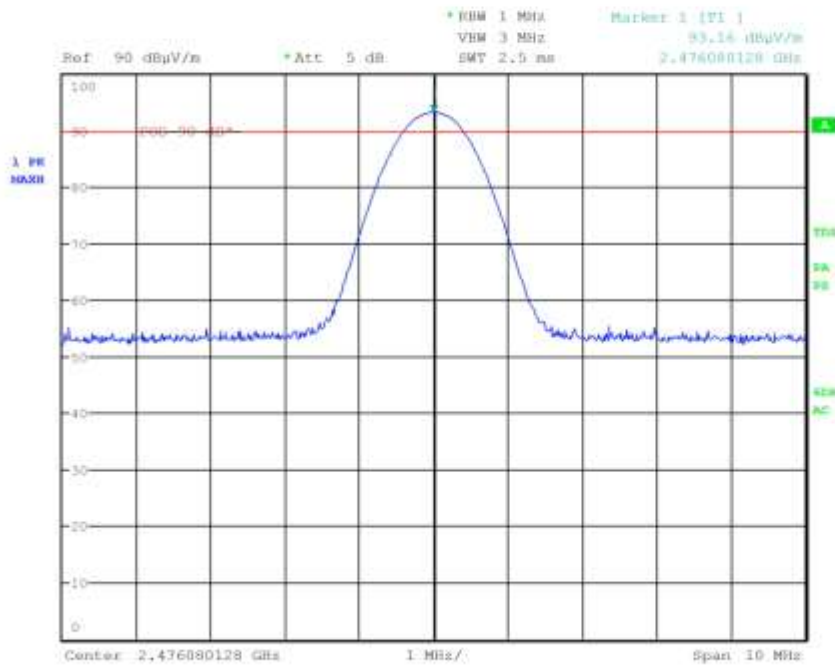
Meas Time: 1 s
Margin: 6 dB
Subranges: 0

CMC Centro Misure Compatibilità S.r.l.



G10150508

Meas Type
Equipment under Test
Manufacturer
OP Condition Fmax
Operator Bertezolo 10150508
Test Spec
Horiz

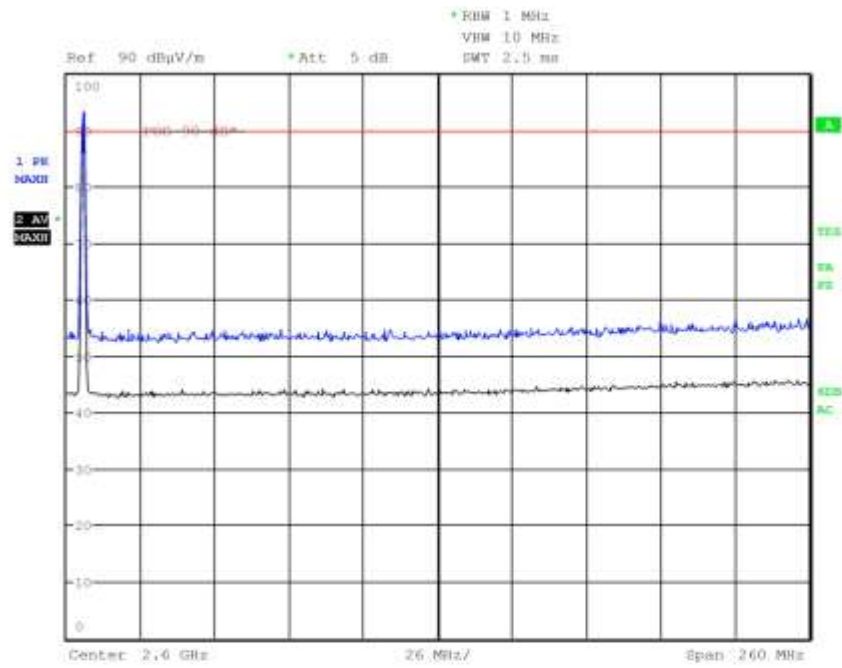


CMC Centro Misure Compatibilità S.r.l.



G10150510

Meas Type
Equipment under Test
Manufacturer
OP Condition Fmax
Operator Bertezzolo 10150510
Test Spec
Horiz

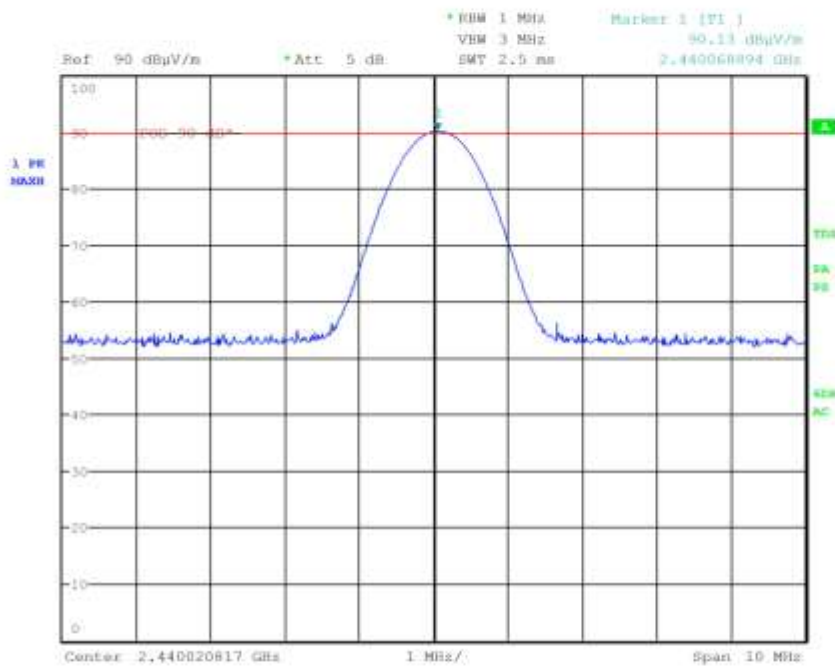


CMC Centro Misure Compatibilità S.r.l.



G10150511

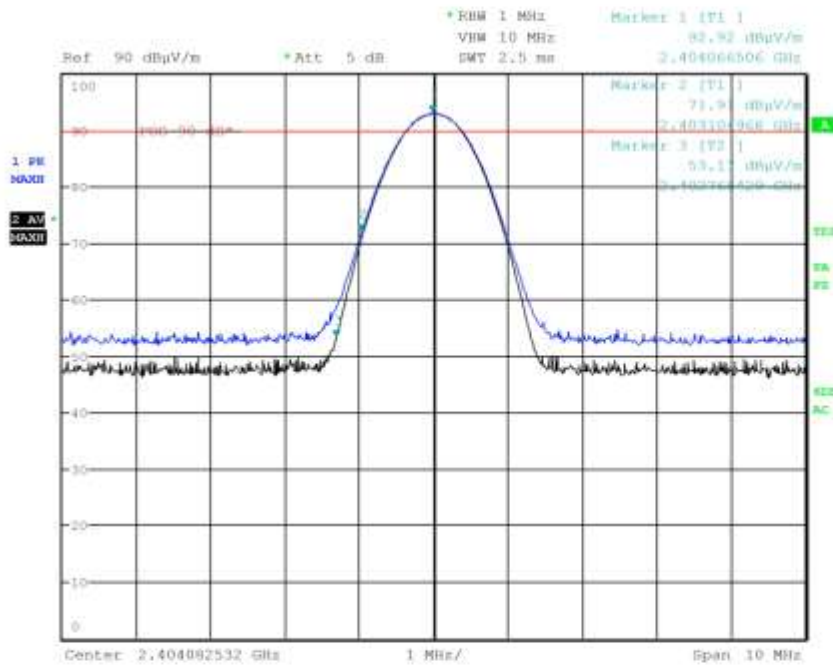
Meas Type
Equipment under Test
Manufacturer
OP Condition Fmin
Operator Bertezolo 10150511
Test Spec
 Horiz





G10150512

Meas Type
Equipment under Test
Manufacturer
OP Condition Fmin
Operator Bertezzolo 10150512
Test Spec
Horiz

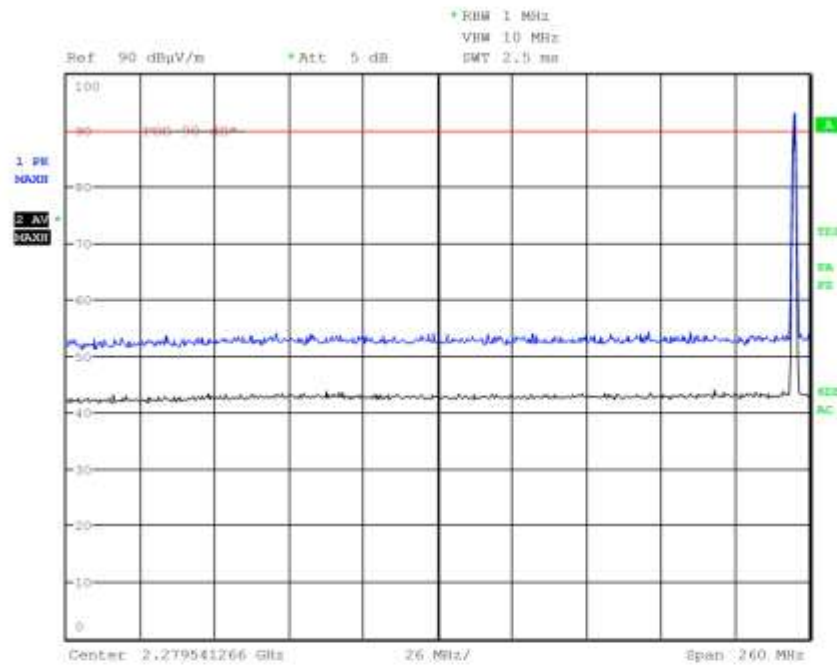


CMC Centro Misure Compatibilità S.r.l.



G10150513

Meas Type
Equipment under Test
Manufacturer
OP Condition Fmin
Operator Bertezolo 10150513
Test Spec
Horiz

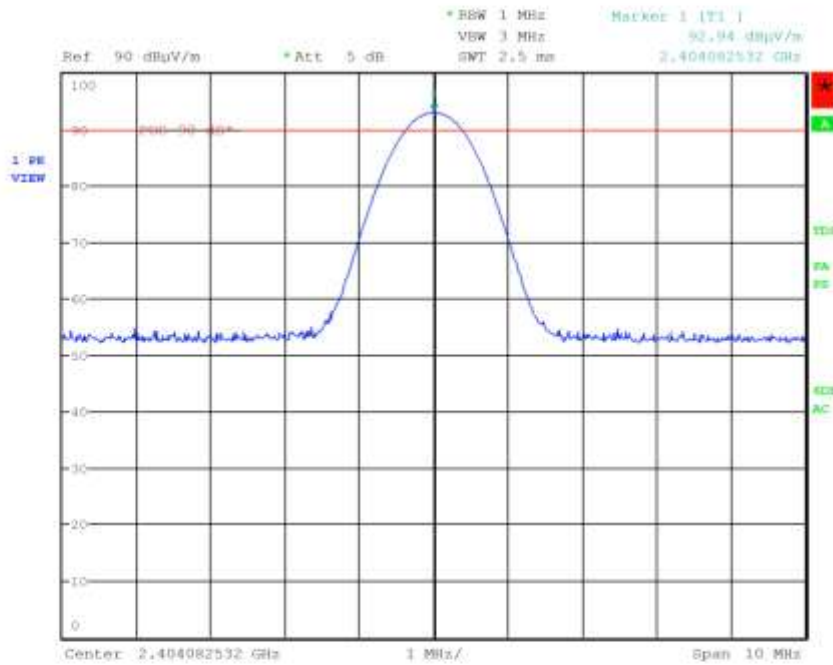


CMC Centro Misure Compatibilità S.r.l.



G10150514

Meas Type
Equipment under Test
Manufacturer
OP Condition Fmin
Operator Bertezolo 10150514
Test Spec
Horiz



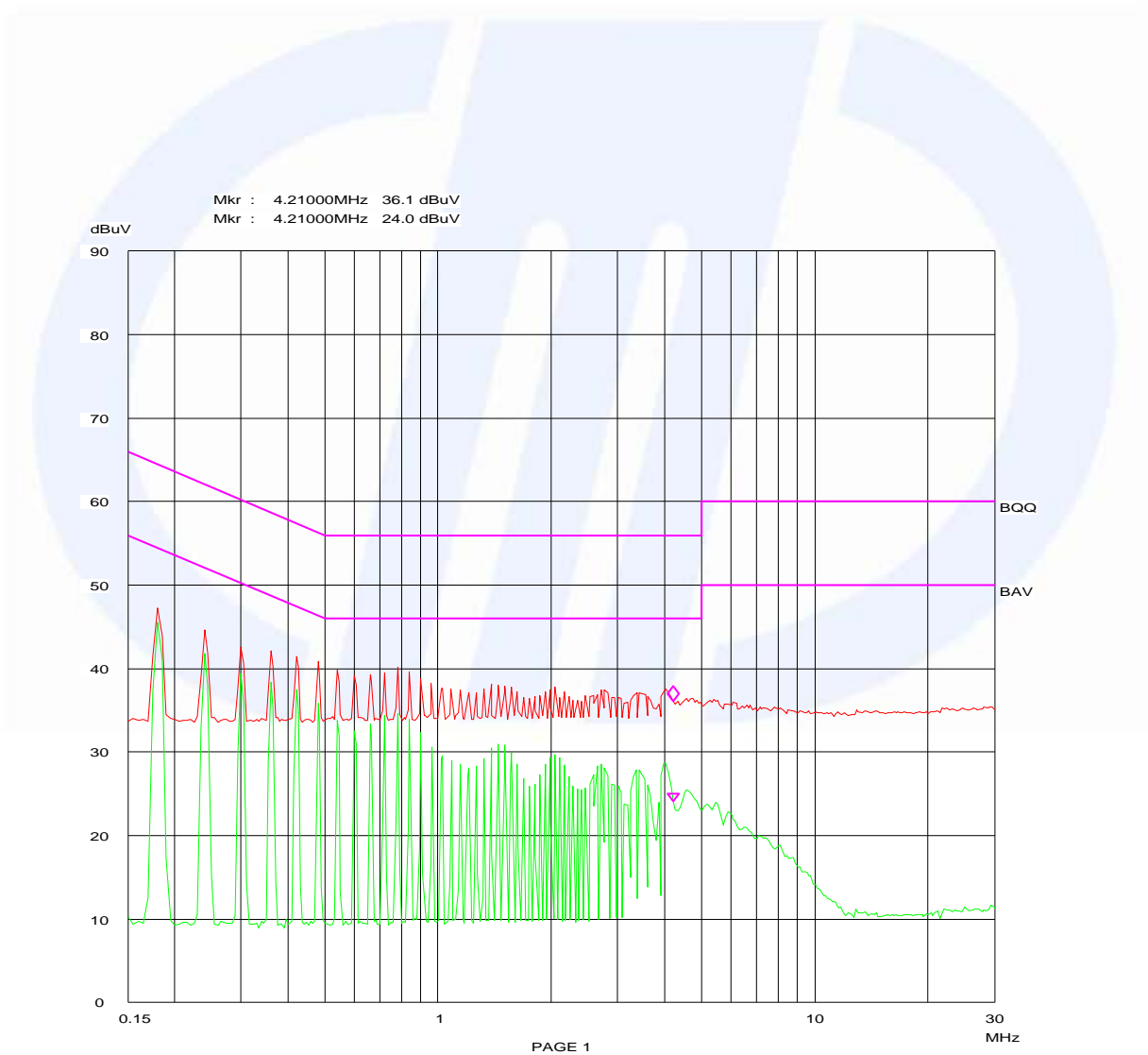


G10150520

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

Operator: Bert. 10150520
Test Spec: Line N



CMC Centro Misure Compatibilità S.r.l.

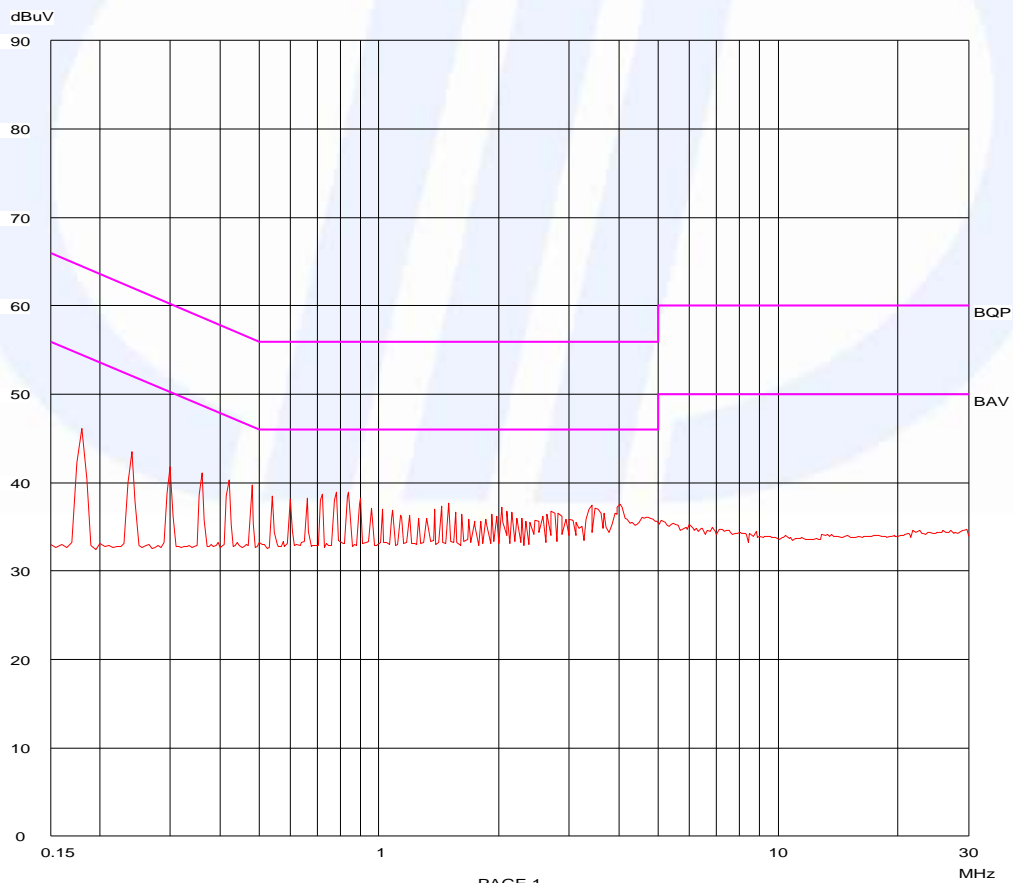


G10150521

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

Op Cond: In funzione
Operator: Bert. 10150521
Test Spec: Line 12V



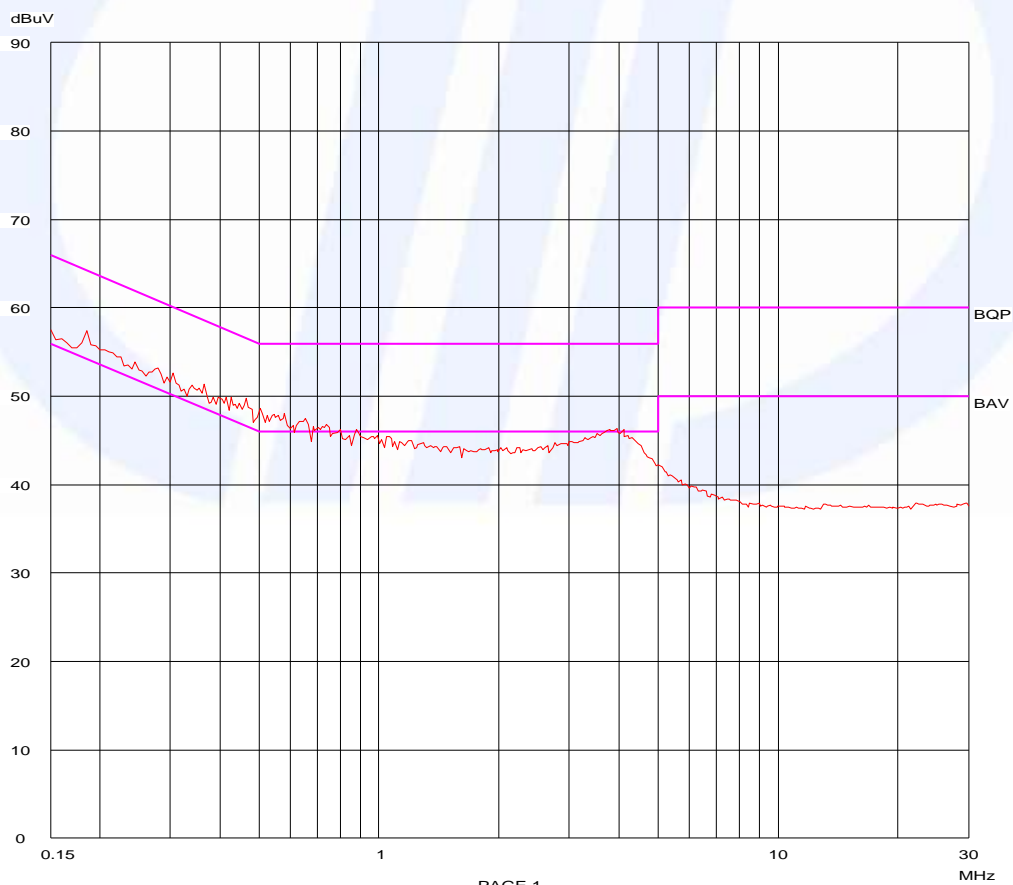
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G10150570

CMC Centro misure compatibilita srl
Emission 0.15-30MHz

Op Cond: In funzione
Operator: Bert. 10150570
Test Spec: Line 24V



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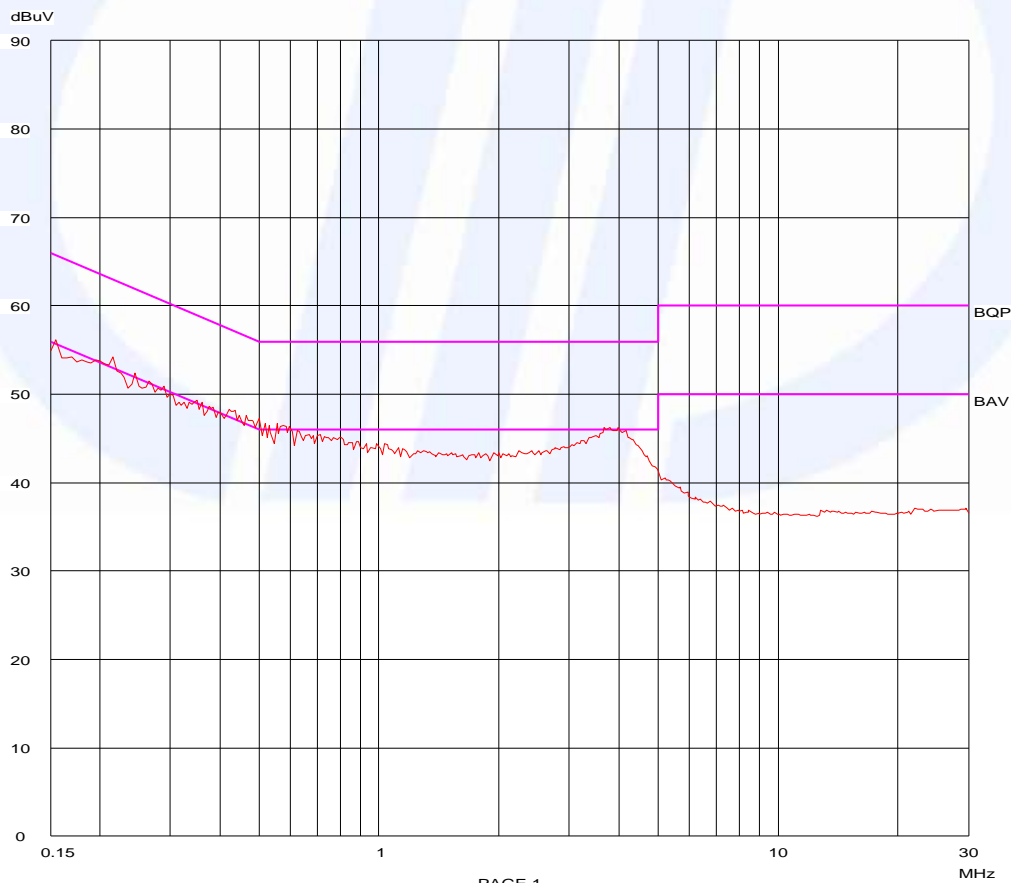


G10150571

CMC Centro misure compatibilita srl

Emission 0.15-30MHz

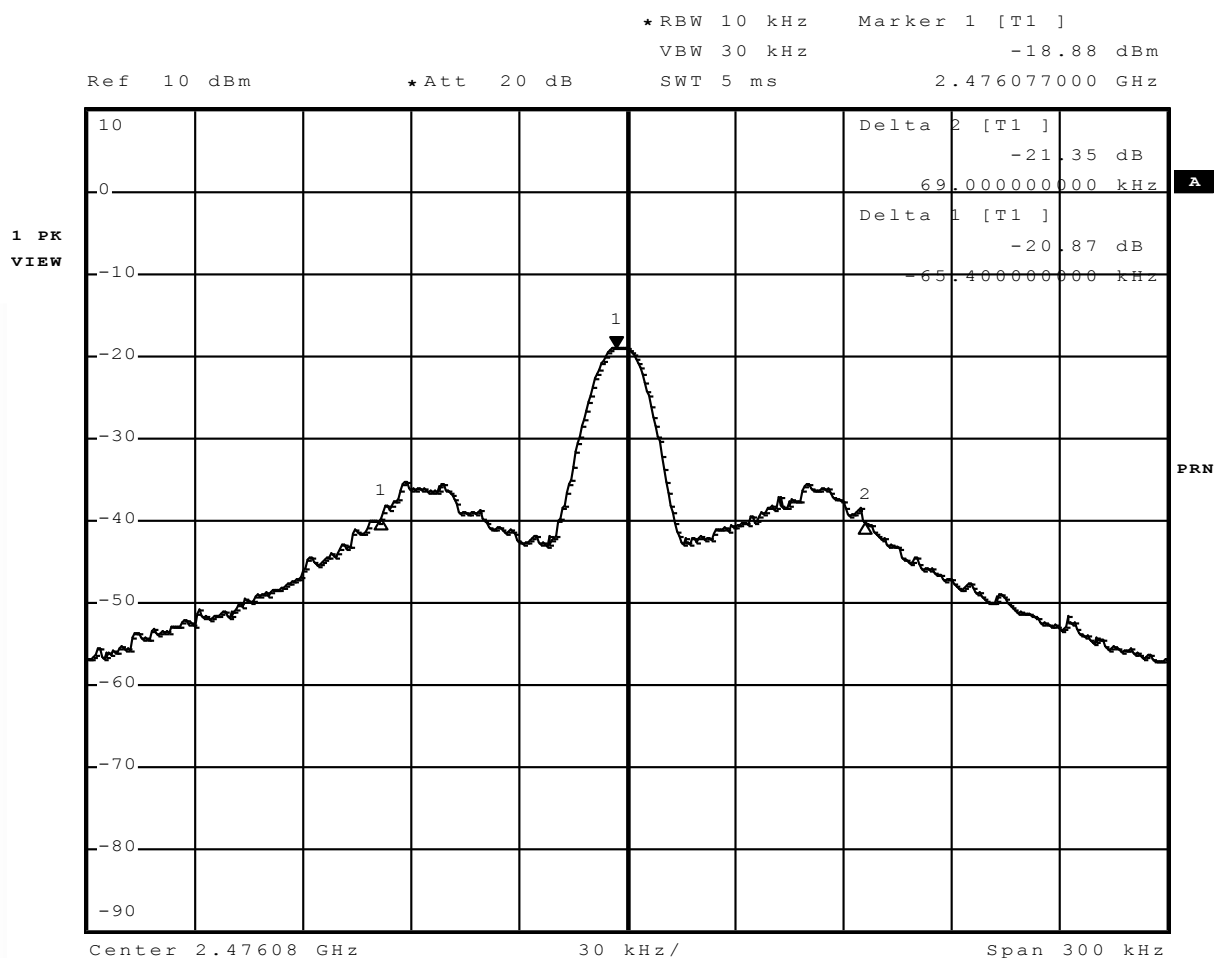
Op Cond: In funzione
Operator: Bert. 10150571
Test Spec: Line 0V



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G10150582

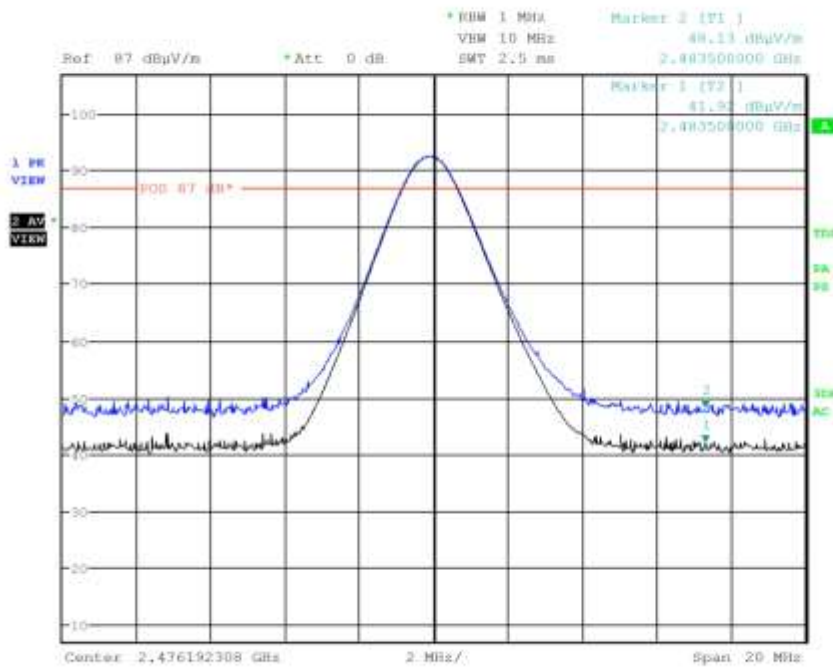


CMC Centro Misure Compatibilit  S.r.l.



G10150583

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition F MAX
Operator Bertezzolo 10150583
Test Spec
Horiz



CMC Centro Misure Compatibilità S.r.l.