

TEST REPORT

Secondo i seguenti Standard / According to following Standards

Test specification	FCC Part 15: Subpart B Section 15.107 and 15.109 Test plan: TP-13LA00163/01_140108_REGATE-10-10-03
AC Power Line Conducted Emissions, Section 15.107	Conforme/Compliant
Radiated Emissions, Section 15.109	Conforme/Compliant
Richiedente / Applicant's name : Indirizzo / Address	Eurotech Spa Via F.Ili Solari 3/A – 33020 Amaro (UD) - Italy
Produttore / Manufacturer : Indirizzo / Address	Eurotech Spa Via F.Ili Solari 3/A – 33020 Amaro (UD) - Italy
Dispositivo sottoposto ai test/ Device Under Test : model	M2M compact Gateway (ReliaGATE family) REGATE-10-10-XX where XX= 01, 03
Data di emissione/ Date of issue	17 th Jun 2014
Validità/ Validity	Vedi sezione 1.1 / See section 1.1
Test report redatto da/ Author of Test report	Loris Fruch
Tecnico/i di prova Engineer/s	Loris Fruch
Approvato da (+ firma) Approved by (+ signature)	Giovanni Solari Responsabile di prova/ <i>Test manager</i>
	Silvano Chialina Responsabile del laboratorio/ <i>Head of the Laboratory</i>
Laboratorio / Testing Laboratory . : Indirizzo / Address	Emilab Srl Via F.Ili Solari 5/A – 33020 Amaro (UD) - Italy

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1. Informazioni Generali / General Information

1.0 Laboratorio / Testing Laboratory

Luogo di Prova e partecipanti/ <i>Testing location and participants:</i>	
Testing Laboratory:	
Testing location/ address.....: Emilab Srl	Via F.Ili Solari 5/A – 33020 Amaro (UD) – Italy Tel +39 0433 468625 Fax +39 0433 494739 Email: info@emilab.it
Partecipanti / Participants:	Loris Fruch, Pierluigi Driussi (Eurotech Spa)

1.1 Campionamento e Documentazione / Sampling and Documentation

I campioni sono stati consegnati dal Cliente. I risultati dei test contenuti in questo documento si riferiscono esclusivamente al modello e numero di serie provato. E' responsabilità del costruttore assicurare che la produzione dei modelli in serie rispetti i requisiti del presente documento. Questo documento non può essere riprodotto in parte senza il consenso scritto del responsabile del laboratorio EMILAB.

EMILAB non si assume nessuna responsabilità per danni derivanti da interpretazioni che esulano dal contesto e dall'applicazione del presente documento.

The samples was delivered by customer. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the issuing testing Emilab laboratory.

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1.2 Specifiche del test / Test specifications

Test performed according to:	
Test plan	TP-13LA00163/01_140108_REGATE-10-10-03 Date: 08/01/2014 Author: Pierluigi Pollano - Eurotech S.p.A.
Test specification	ANSI C63.10-2009 - American National Standard for Testing Unlicensed Wireless Devices ANSI C63.4: 2009-09 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Basic Specifications	/

1.3 Svolgimento dei test e condizioni generali / *Test scheduling and general condition*

Svolgimento dei test / Scheduling :

Data ricezione EUT

Date of receipt of EUT : 09/01/2014

Data esecuzione test

Date (s) of performance of tests..... : 16/06/2014 – 17/06/2014

Condizioni ambientali <i>/ Environment Conditions</i>	Se non diversamente specificato / <i>If not otherwise specified:</i> Temperature: 18-28 °C Humidity: 20-90% Pressure: 87-108.56 kPa
Intervallo delle tarature/ <i>Calibration Interval</i>	Minimum 1 year

1.4 Espressione dei risultati finali / *Test case of final verdicts*

I GIUDIZI NON SONO SOGGETTI AD ACCREDITAMENTO

/ VERDICTS ARE NOT SUBJECT TO ACCREDITATION

- test case does not apply to the test object.. : N/A
- test object does meet the requirement : Compliant
- test object does not meet the requirement . : Not Compliant

1.5 Incertezza / *Uncertainty*

L'incertezza estesa riportata è espressa come l'incertezza tipo moltiplicata per il fattore di copertura $k = 2$, che per una distribuzione normale corrisponde ad una probabilità di copertura di circa il 95 %.

The reported expanded uncertainty of measurements is stated as the standard uncertainty of measurement, multiplied by the coverage factor $k=2$, which for a normal distribution corresponding to a coverage probability of approximately 95%.

1.6 Termini, Definizioni e Acronimi/ *Terms, definitions and abbreviations*

With reference to IEC 60050-161

ALSE	absorber-lined shielded enclosure
AV	Average Detector
DTS	Digital Transmission System
DUT	Device Under Test
EMC	electromagnetic compatibility
EMI	electromagnetic interference
EUT	Equipment Under test
OM	Operating Modes
OBW	Occupied Bandwidth
PK	Peak Detector
PSD	Power Spectral Density
QP	Quasi-Peak Detector

2. Apparecchiatura sottoposta a test/ *Device Under Test*

Descrizione / Description.....	The REGATE 10-10-XX is a compact size gateway designed to support M2M (Machine to Machine) communication. All antennas are integrated within the module (models where XX=01,03).
Marchio commercial / <i>Trade Mark</i>	 EUROTECH MODEL: REGATE-10-10-01   E24 10R - XX XXXX S.N.: XXAAMGN0001 FCC ID: UKM MRG101003 MADE IN EU Contain FCC ID: RI7HE910NA POWER: 9-36VDC / 2,5W
	 EUROTECH MODEL: REGATE-10-10-03   FCC ID: UKM MRG101003 S.N.: XXAAMGN0001 Contain FCC ID: RI7HE910NA MADE IN EU POWER: 9-36VDC / 2,5W
Produttore / <i>Manufacturer</i>	Eurotech Spa
Modello / <i>Model/Type reference</i>	REGATE-10-10-03, REGATE-10-10-01
Voltage/Current.....	9÷36Vdc (nominal 24Vdc) / 0.1A
Frequency	/
Power.....	2.5W
Numero EUT / <i>EUT Number</i>	-13LA00163/01 (full option model with integral antennas REGATE 10-10-03), -13LA00163/03 (model REGATE 10-10-01: same model REGATE10-10-03 as above but without GSM module and GSM integral antenna).
Serial Number	/
Numero di campioni testati / <i>Number of samples tested</i>	1+1
Hardware stage/level	S01
Software stage/level	1.1
Operating Mode	Mode 1: the DUT executes the test routine through SSH connection with control PC (placed inside the SAC). WLAN and GSM modules are power supplied, radio links were not activated.
Wiring harness	2mt power supply line, 2mt Ethernet line, 3.5mt Digital I/O, CAN and RS232 lines;
Monitoring	/

Info:

Product family description:

The REGATE 10-10-XX product family is available in 2 different optional versions, here submitted to the verification of compliancy to the FCC regulation, where XX= 01 or 03; more details can be found in the operation manual. Both models are equipped with integral antennas only.

Tested models:

- 1) **REGATE 10-10-03**, which is the full optional model, with integral WLAN and GSM antennas: tested for radiated emissions and conducted emission at power port.
- 2) **REGATE 10-10-01** (obtained from above model **REGATE 10-10-03** removing the GSM radio module and the respective antenna); tested for radiated emissions and conducted emission at power port.

The radiated emission results collected in this report are confirmed in the entire voltage range of EUT power supply (9÷36V dc).

Conducted emissions were evaluated at the 110Vac port of a commercial AC/DC adapter provided by the customer.

The "AC Power Line Conducted Emissions, Section 15.107" and "Radiated Emissions, Section 15.109" tests were executed on EUT n° 13LA00163/01 and 13LA00163/03.

DUT Hardware features

Processor: ARM Cortex A8 Memory SDRAM: 512MB DDR3* Memory FLASH: 512 MB* SD interface: 1 x MicroSD receptacle Real Time Clock: Real-Time Date

Interfaces:

- 2 x Ethernet 10/100, RJ45 connectors
- 2 x CAN BUS, DB9, Supports CAN Version 2 Parts A and B
- 2 x USB 2.0
- 1 x RS 232 (Rx, Tx, Cts, Rts) ; 2 x RS232/RS485 (RX-TX)
- Digital I/O

Communications:

- Modul GPRS, optional 3G HSPA
- Wi-Fi (802.11 b/g/n)

GSM Radio Base Station simulator settings:

During "AC Power Line Conducted Emissions, Section 15.107" and "Radiated Emissions, Section 15.109" the GSM link was not activated;

3.0 Conducted emission - Condizioni di prova / *Test Conditions*

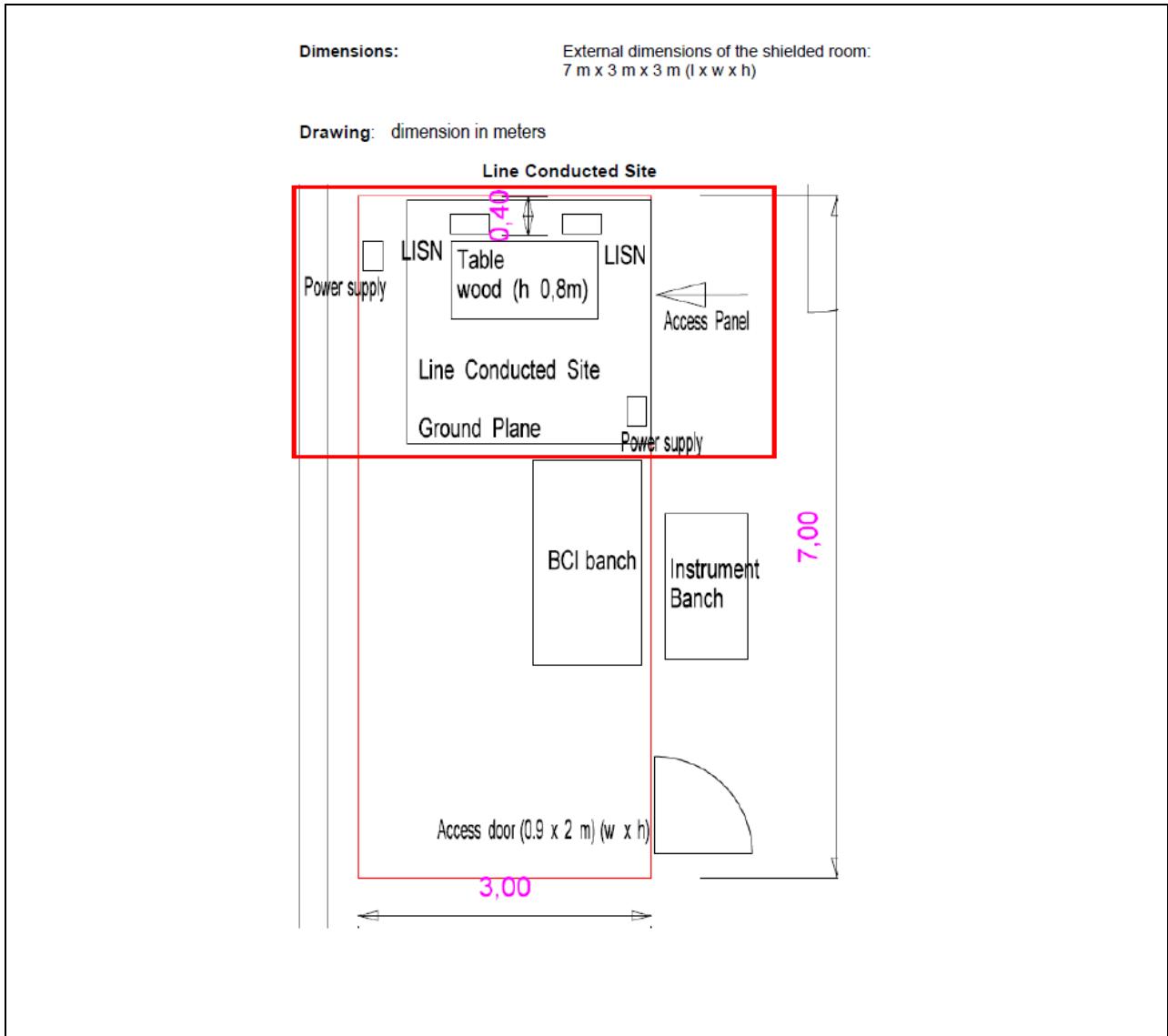
Technician / Tecnico: Loris Fruch		
Table No.	TEST: AC Power Line Conducted Emissions, Section 15.107	\
Method	ANSI C63.4: 2009-09, Par. 7	\
Parameters required prior to the test	Laboratory Ambient Temperature	18 to 28 °C
	Relative Humidity	20 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	26 °C
	Relative Humidity	44 %
Fully configured sample scanned over the following frequency range	150kHz to 30MHz	
Supplementary information:		
<ul style="list-style-type: none"> - EUT operating mode 1 (see the applicable cited test plan); - The EUT was powered by the AC/DC adapter Type FW7520/24 provided by the customer; - Test executed on 110V 60Hz power supply line of above cited AC/DC adapter; 		

3.1 Apparecchiature utilizzate / *Test Equipment Used – Conducted emission*

Apparecchiature usate/ Equipment in use	Modello/Model	Costruttore/ Manufacturer	Numero di serie/ Serial Number
EMI Receiver	ESR	Rohde&Schwarz	101069
LISN	3810/2	Emco	9702-1833
Cable 10m	MIL C-17 OLWG7	CCI/SAXTON	M17/16.4-00001
Cable RF da 6m	PE142LL	Pasternak	EL038210
Shielded Chamber	RFD-100	ETS-Lindgren	2012
Shielded Chamber DC Filter	N5004	ETS-Lindgren (ETSL)	121226
AC Power Supply	KBT-100-C-109-451	BEHLMAN	5896

(*) auxiliary equipment

3.2 Fotografie del setup / Photo of the test setup – Conducted emission



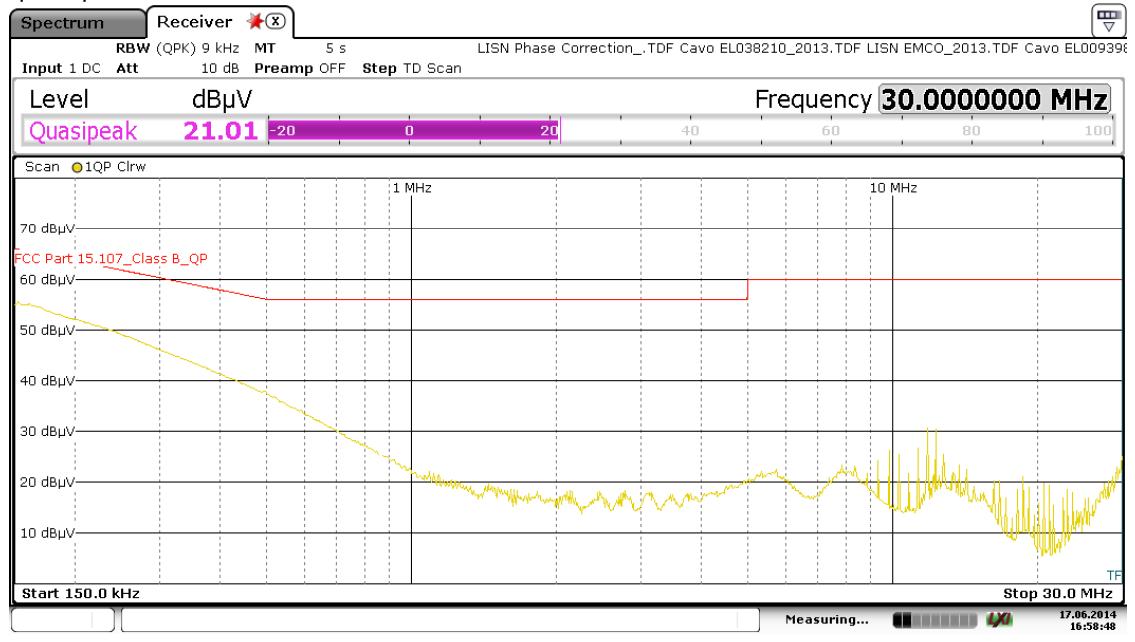
3.3 Risultati / Results - Conducted emission

The result of the test is: **PASS**. See the details in the charts of the following paragraphs.

3.3.1 Grafici dei risultati / Graphical representation data – Conducted emission

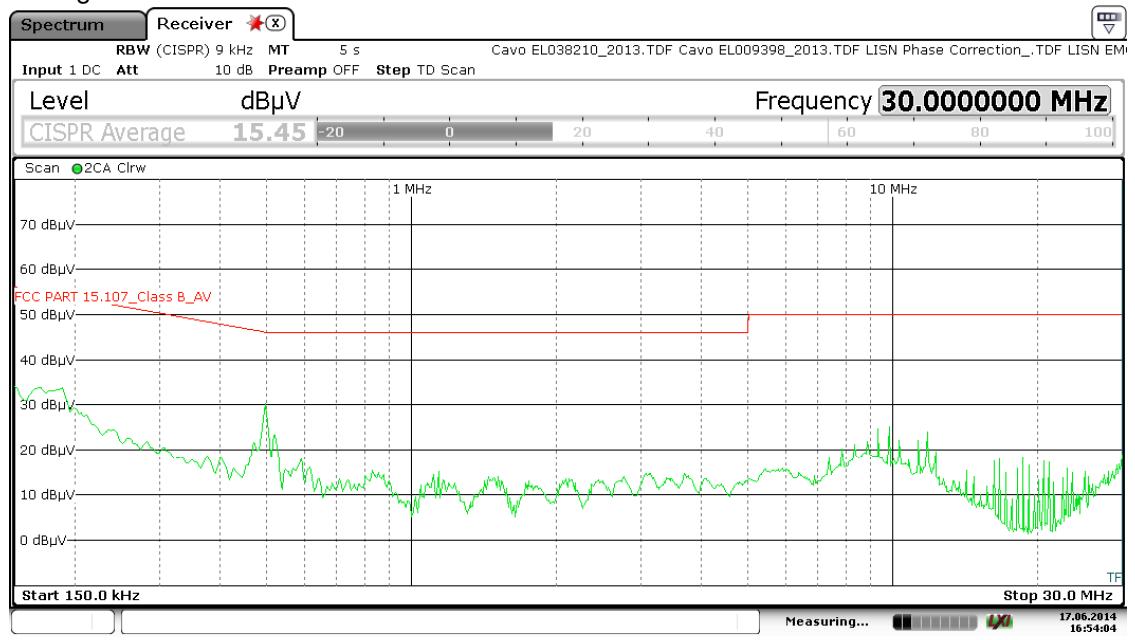
EUT N° 13LA00163/01

Conducted emission measured on 110V 60Hz Line1 (from 0.15MHz to 30MHz): quasi-peak detector with quasi-peak limit



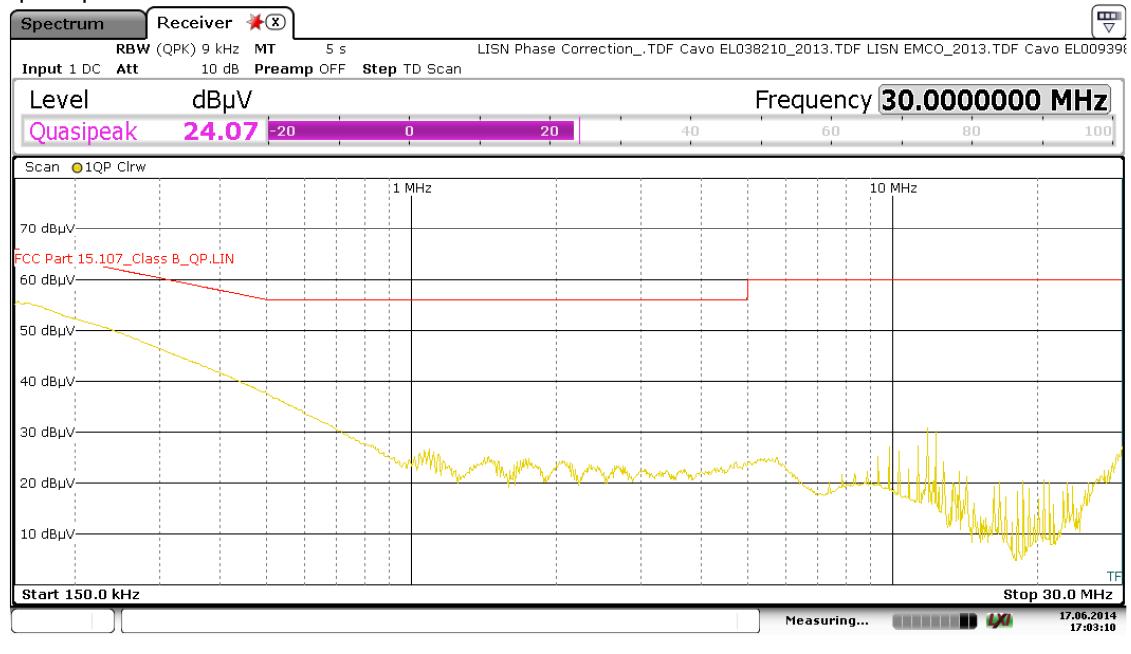
Date: 17.JUN.2014 16:58:48

Conducted emission measured on 110V 60Hz Line1 (from 0.15MHz to 30MHz): average detector with average limit

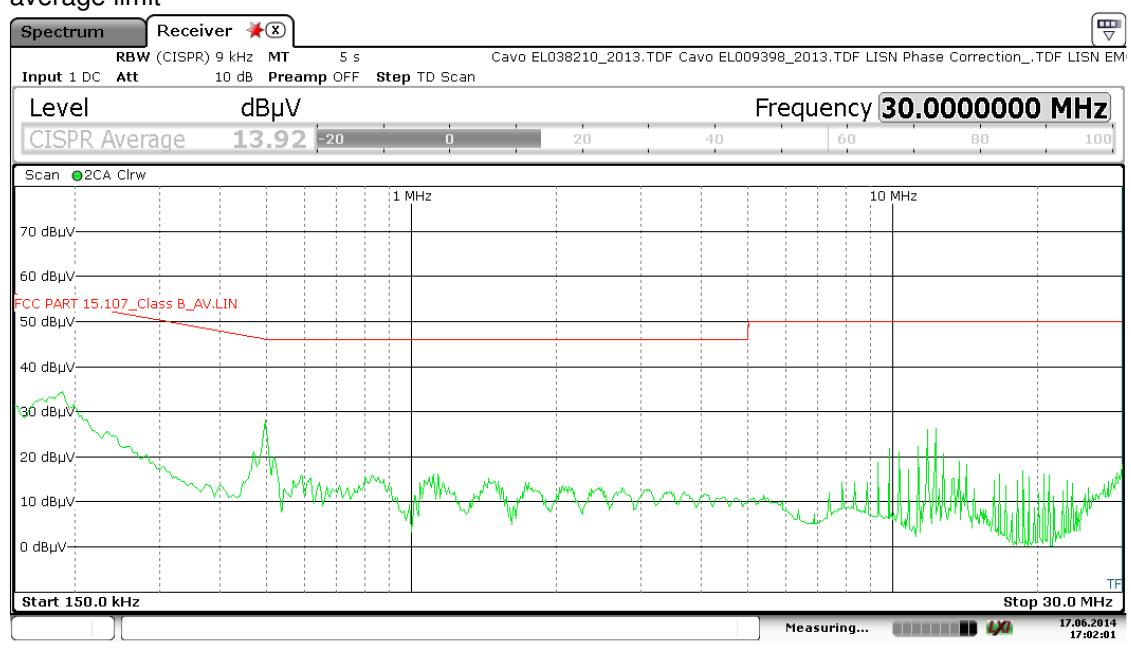


Date: 17.JUN.2014 16:54:03

Conducted emission measured on 110V 60Hz Line2 (from 0.15MHz to 30MHz): quasi-peak detector with quasi-peak limit



Conducted emission measured on 110V 60Hz Line2 (from 0.15MHz to 30MHz): average detector with average limit



Note: the charts of the measurements in same conditions of the DUT N° 13LA00163/03 have not been included in the report: they are similar to the above emission measured on EUT N° 13LA00163/01.

4.0 Radiated Emissions - Condizioni di prova / Test Conditions

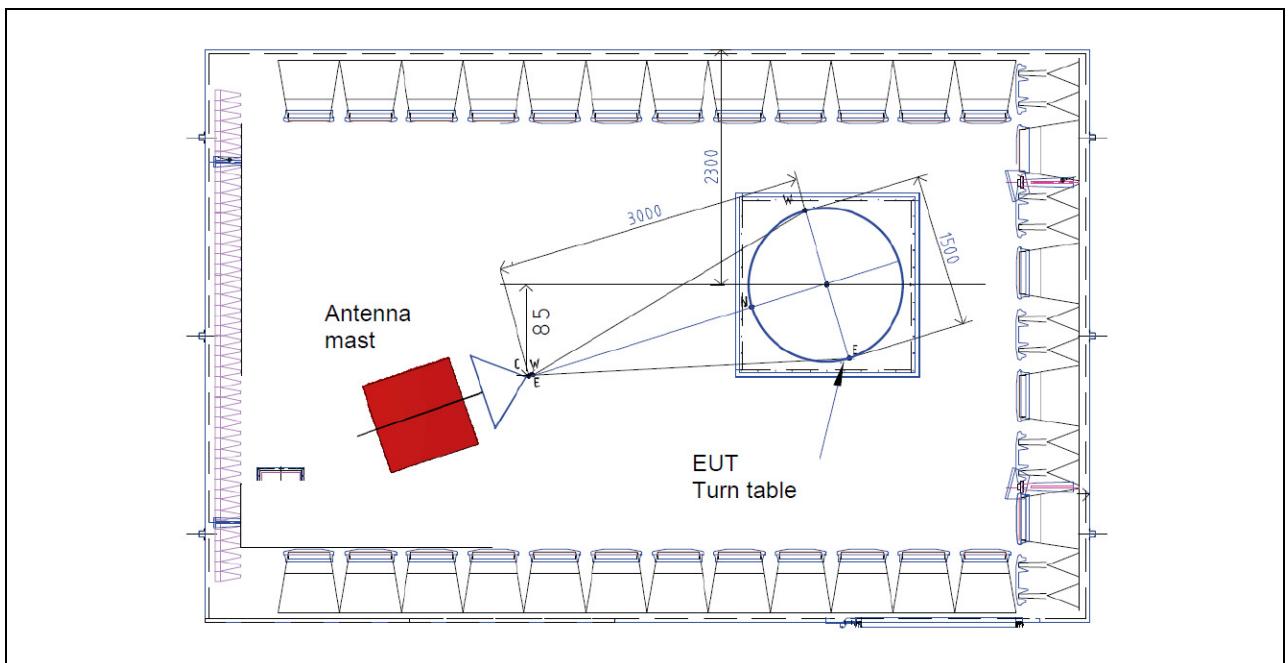
Technician / Tecnico: Loris Fruch		
Table No.	TEST: Radiated Emissions, Section 15.109	\
Method	ANSI C63.4: 2009-09, Par. 8	\
Parameters required prior to the test	Laboratory Ambient Temperature	18 to 28 °C
	Relative Humidity	20 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	25 °C
	Relative Humidity	52 %
Supplementary information:		
<ul style="list-style-type: none"> - EUT operating mode 1 (see the applicable cited test plan). Test site: Semi-anechoic chamber; - The EUT was placed on turn-platform on a dielectric table 0.8m above the ground plane . The EUT was placed 3m apart from the receiving antenna - The turn-platform I rotated from 0° to 360° degrees to determine the position of maximum emission level, in the band 30MHz to 1GHz the antenna height was changed from 1m to 4m to find the highest emission; the receiving antenna was positioned in horizontal and vertical polarization (by means of an automatic procedure computer assisted). - As specified in FCC Part 15: Subpart B Section 15.33 (b) 1, the measures were performed up to 6GHz because the EUT maximum internal frequency is 720MHz; - The measurements were made with the detector set to PEAK within a IF bandwidth of 120KHz from 30MHz to 1GHz and of 1000KHz from 1GHz to 6GHz; - Antennas used during measurements: Bilog antenna from 30MHz to 1GHz, Horn BBHA 9120E from 1GHz to 6GHz; - The measurements with Quasi-Peak/AVE detector were performed only for frequencies for which the Peak values was \geq (limit – 4dB); - The results measured on EUT N° 13LA00163/01 are collected at par. 9.3.3; the same measurements were checked on the sample 13LA00163/03 as well (mod .REGATE 10-10-01) with similar results. 		

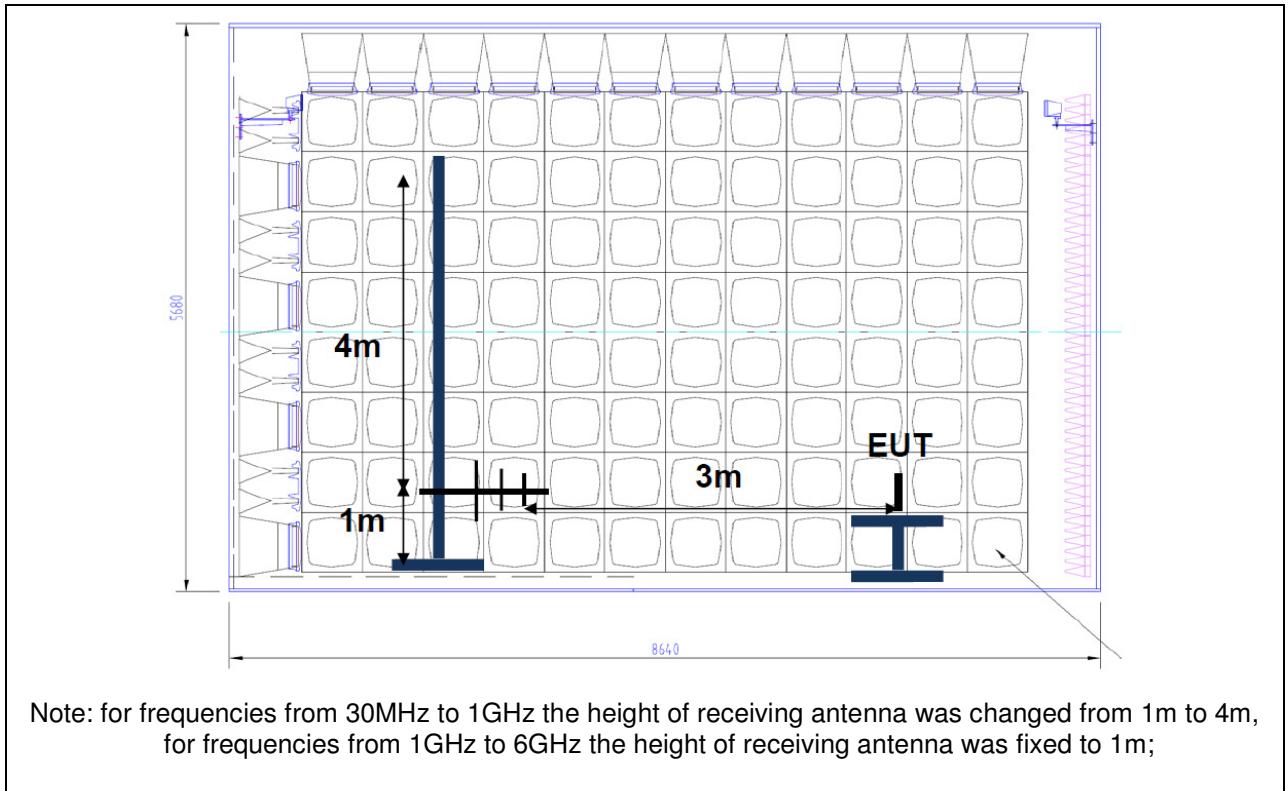
4.1 Apparecchiature utilizzate / *Test Equipment Used – Radiated Emissions*

Apparecchiature usate/ Equipment in use	Modello/Model	Costruttore/ Manufacturer	Numero di serie/ Serial Number
EMI Receiver MXE	N9038A	Agilent Technologies	MY51210230
Antenna Bilog	Bilog CBL6111C	Chase	2415
Antenna Horn	BBHA 9120E	Schwarzbeck	198
PreAmplificatore	SPIN WBPR_01-21-20	SPIN Electronics	01-100-09
RF Cable	S5LL-400	Spin electronics	01-053-12
RF Cable	S5LL-900	Spin electronics	02-053-12
Multi-Device Controller	2090	ETS LINDGREN	81311
Palo d'antenna elettrico	2175	ETS LINDGREN	136028
SAC3 – DC Filter	N6006	ETS-Lindgren (ETSL)	202031
Semi-Anechoic Chamber	-	ETS-Lindgren (ETSL)	5207
DC Power Supply	E3634A	Agilent (AGIL)	MY51070028

(*) auxiliary equipment

4.2 Fotografie del setup / *Photo of the test setup – Radiated Emissions*



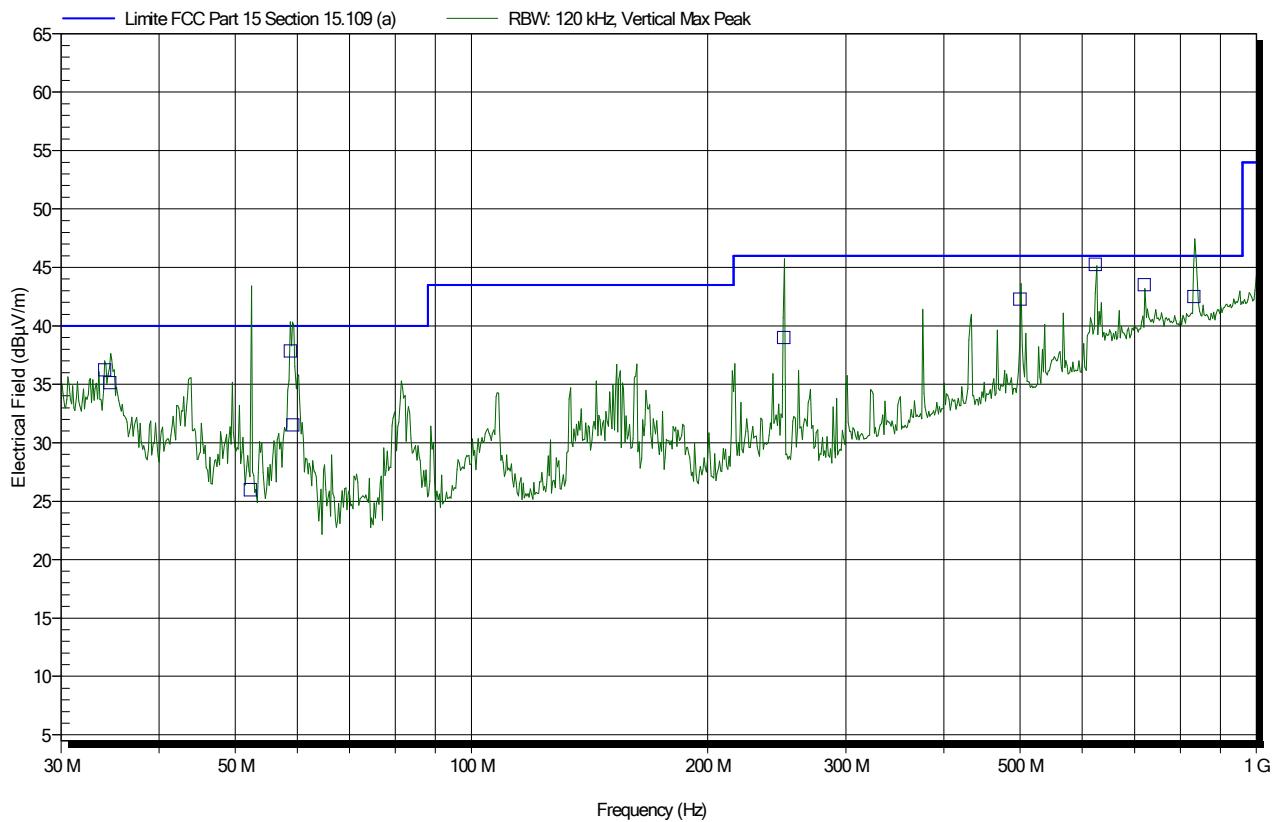


4.3 Risultati / **Results** - Radiated Emissions

The result of the test is: **PASS**. See the details in the charts/tables of the following paragraphs.

4.3.1 Tabelle e grafici dei risultati / Tables and graphical representation data – Radiated Emissions

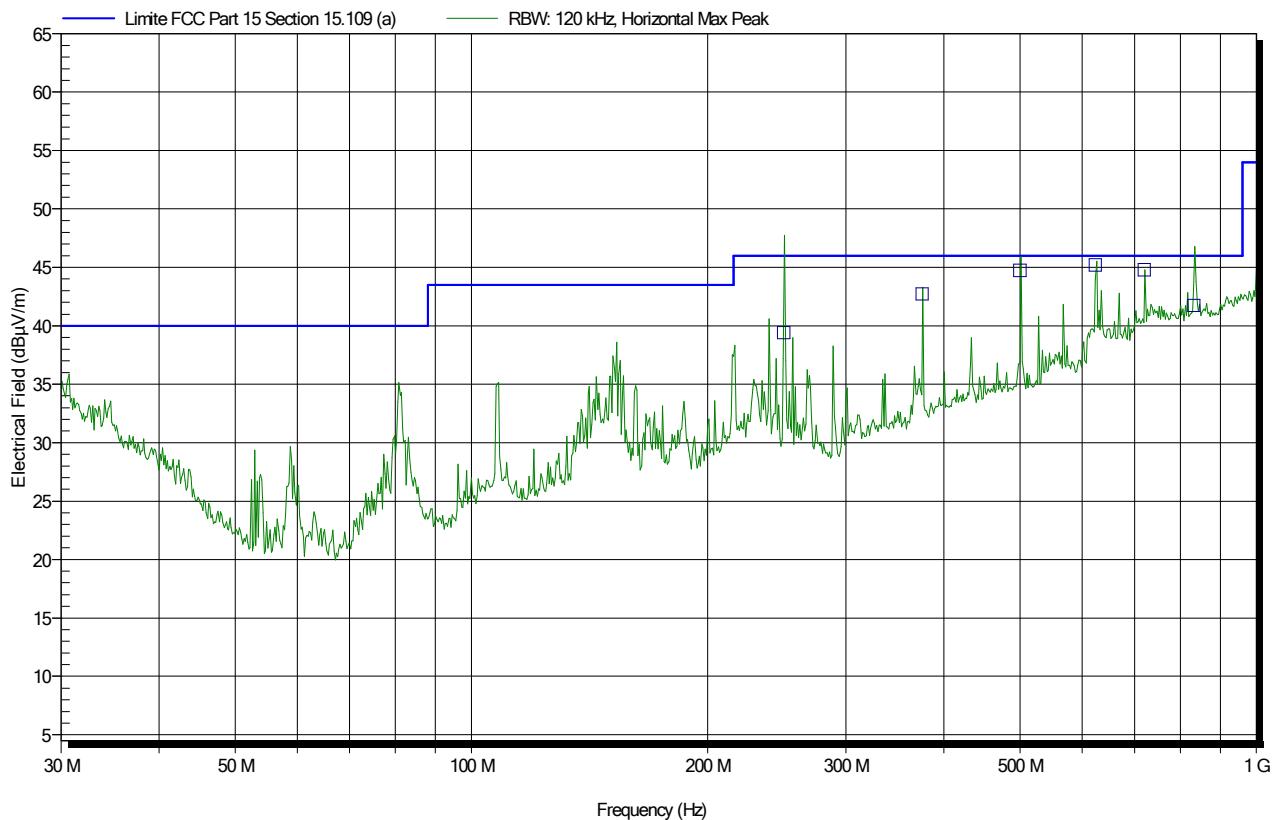
Radiated emissions measured from 30MHz to 1GHz: peak detector (green trace) with Q-Peak limit (blue line). Vertical polarization.



Signals at 4dB from the limit, maximized and re-measured with peak and quasi-peak detector

Frequency	Peak	Quasi-Peak	Q-P Limit	Q-P Difference	Status	Angle	Height
34.104 MHz	41.39 dB μ V/m	36.26 dB μ V/m	40 dB μ V/m	-3.74 dB	Pass	36 Degree	1 m
34.62 MHz	39.93 dB μ V/m	35.13 dB μ V/m	40 dB μ V/m	-4.87 dB	Pass	36 Degree	1 m
52.32 MHz	43.57 dB μ V/m	25.97 dB μ V/m	40 dB μ V/m	-14.03 dB	Pass	252 Degree	1.42 m
58.746 MHz	41.13 dB μ V/m	37.86 dB μ V/m	40 dB μ V/m	-2.14 dB	Pass	288 Degree	1 m
59.226 MHz	35.21 dB μ V/m	31.55 dB μ V/m	40 dB μ V/m	-8.45 dB	Pass	144 Degree	2.27 m
250.016 MHz	41.85 dB μ V/m	39.01 dB μ V/m	46 dB μ V/m	-6.99 dB	Pass	252 Degree	1.37 m
499.984 MHz	45.94 dB μ V/m	42.3 dB μ V/m	46 dB μ V/m	-3.7 dB	Pass	288 Degree	2.06 m
623.99 MHz	48.58 dB μ V/m	45.27 dB μ V/m	46 dB μ V/m	-0.73 dB	Pass	324 Degree	1 m
720.001 MHz	47.62 dB μ V/m	43.53 dB μ V/m	46 dB μ V/m	-2.47 dB	Pass	288 Degree	1 m
833.027 MHz	50.38 dB μ V/m	42.51 dB μ V/m	46 dB μ V/m	-3.49 dB	Pass	144 Degree	3.14 m

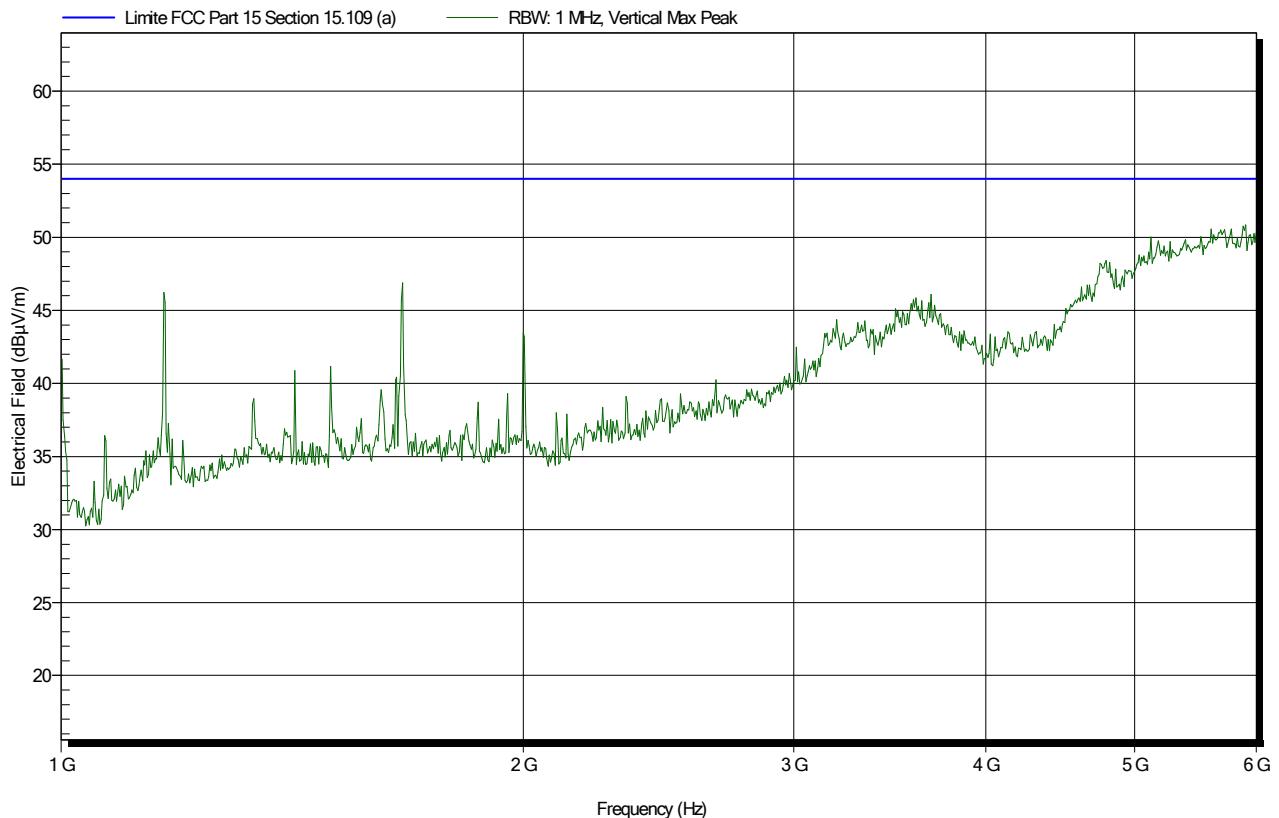
Radiated emissions measured from 30MHz to 1GHz: peak detector (green trace) with Q-Peak limit (blue line). Horizontal polarization.



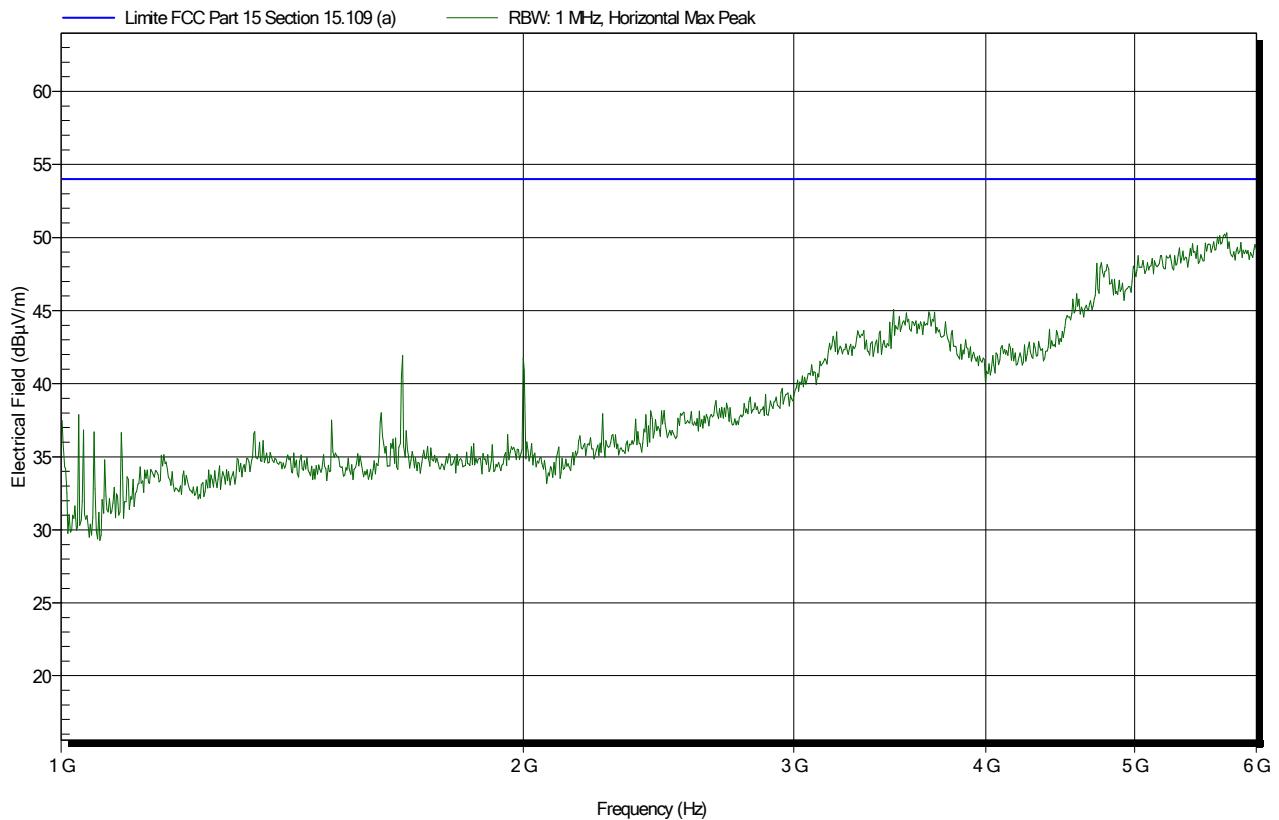
Signals at 4dB from the limit, maximized and re-measured with peak and quasi-peak detector

Frequency	Peak	Quasi-Peak	Q-P Limit	Q-P Difference	Status	Angle	Height
249.992 MHz	47.67 dB μ V/m	39.41 dB μ V/m	46 dB μ V/m	-6.59 dB	Pass	324 Degree	1.41 m
374.994 MHz	44.8 dB μ V/m	42.75 dB μ V/m	46 dB μ V/m	-3.25 dB	Pass	180 Degree	1 m
499.99 MHz	48 dB μ V/m	44.73 dB μ V/m	46 dB μ V/m	-1.27 dB	Pass	324 Degree	1.85 m
623.984 MHz	48.56 dB μ V/m	45.21 dB μ V/m	46 dB μ V/m	-0.79 dB	Pass	216 Degree	1.41 m
719.995 MHz	48.62 dB μ V/m	44.81 dB μ V/m	46 dB μ V/m	-1.19 dB	Pass	108 Degree	1.41 m
832.907 MHz	47.72 dB μ V/m	41.76 dB μ V/m	46 dB μ V/m	-4.24 dB	Pass	180 Degree	1.42 m

Radiated emissions measured from 1GHz to 6GHz: peak detector (green trace) with Average limit (red line). Vertical polarization.



Radiated emissions measured from 1GHz to 6GHz: peak detector (green trace) with Average limit (red line). Horizontal polarization.



Note: the charts of the measurements in same conditions of the DUT N° 13LA00163/03 have not been included in the report: they are similar to the above emission measured on EUT N° 13LA00163/01.

Allegato 2 / Annex 2: Incertezza / Uncertainty

A.2.1 Radiated Emissions: CISPR 16

From 30MHz to 200MHz using Bi-log antenna
Field intensity : +/- 5.5 dB

From 200MHz to 1000MHz using Bi-log antenna
Field intensity : +/- 4.4 dB

Above 1GHz using Horn antenna
Field intensity : +/- 5.4 dB

A.2.2 Conducted Emissions CISPR 16

Voltage Method : +/- 4.2 dB