



## SGS-CSTC Standards Technical Services Co., Ltd.

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**FEDERAL COMMUNICATIONS COMMISSION**  
Registration number: 282399

Report No.: GZEM100600055601  
Page: 1 of 21  
FCC ID:MG38700

# TEST REPORT

Application No.:	GZEM1006000556RF
Applicant:	Universal Electronics Inc.
Equipment Under Test (EUT):	
EUT Name:	Monster Revolution200(AVL50), Table Top Remote, 09
Item No.:	MG38700
Trade Name:	Monster Revolution 200
FCC ID:	MG38700
Radio Function:	Wireless Remote controller
Standards:	FCC PART 15 Subpart C: 2009
Date of Receipt:	2010-06-07
Date of Test:	2010-06-20 to 2010-06-24
Date of Issue:	2010-09-07
Test Result :	Pass*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



2010. Sep.

Stephen Guo  
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.




The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2010-09-07		Original

Authorized for issue by:				
Tested By		 (Print Name) / Project Engineer		2010-6-20 to 2010-6-24 Date
Prepared By		 (Print Name) / Project Engineer		2010-06-30 Date
Checked By		 (Print Name) / Reviewer		2010-09-07 Date



### 3 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Field Strength of Fundamental	FCC PART 15:2009	Section 15.249 (a)	PASS
Field Strength of Unwanted Emissions	FCC PART 15:2009	Section 15.249 (a) Section 15.249 (d)	PASS
Occupied Bandwidth	FCC PART 15:2009	Section 15.215(c)	PASS
Band Edges	FCC PART 15:2009	Section 15.249 (d)	PASS
Conducted Emission	FCC PART 15:2009	Section 15.107	PASS
Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver. RF: In this whole report RF means Radiated Frequency.			



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## **5 General Information**

### **5.1 Client Information**

Applicant's Name: Universal Electronics Inc.  
Applicant Address: 6101 Gateway Drive, Cypress CA, 90630-4841  
Factory's Name: Jetta (China) Industries CO., LTD  
Factory's Address: 333 CAI XIN LU, LIANG DI BU GONG YE QU, LAN HE ZHEN, PAN YU QU, GUANG ZHOU SHI, CHINA

### **5.2 General Description of E.U.T**

Product Name: Monster Revolution200(AVL50), Table Top Remote, 09  
Model: MG38700  
Trade Name: Monster Revolution 200

### **5.3 Details of E.U.T**

Power Supply: DC 6V (4x 1.5V Size 'AAA' batteries)  
Type of Modulation FSK  
Channel Frequency 908.42MHz  
Antenna Type Integrate Antenna

### **5.4 Description of Support Units**

The EUT was tested as an independent unit.

### **5.5 Standards Applicable for Testing**

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15, SUBPART C (2009) section 15.249.

### **5.6 Other Information Requested by the Customer**

None.



## 5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

## 5.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,  
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,  
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



## 6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2010-01-25	2011-01-25
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2009-07-18	2010-07-18
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	2009-12-09	2010-12-09
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2009-12-20	2010-12-20
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2009-12-20	2010-12-20
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	2009-09-15	2010-09-15
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	2009-12-05	2010-12-05
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2010-01-25	2011-01-25
EMC0049	Amplifier	Agilent	8447D	2944A10862	2010-04-21	2011-04-21
EMC0075	310N Amplifier	Sonama	310N	272683	2009-10-26	2010-10-26
EMC0523	Active Loop Antenna	EMCO	6502	42963	2009-11-17	2010-11-17
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	2010-05-17	2011-05-17

Conducted Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m <sup>3</sup>	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	2009-11-24	2010-11-24
EMC0118	Two-line v-netwok	Rohde & Schwarz	ENV216	3560.6550.02	2009-08-18	2010-08-18
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	2009-11-24	2010-11-24
EMC0107	Coaxial Cable	SGS	2m	N/A	2009-11-25	2010-11-25
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	N/A
EMC0120	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	20550	2010-01-25	2011-01-25
EMC0121	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	20549	2010-01-25	2011-01-25
EMC0122	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	20548	2010-01-25	2011-01-25



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General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2009-12-16	2010-12-16
EMC0007	DMM	Fluke	73	70671122	2009-12-16	2010-12-16





## 7 Test Results

### 7.1 E.U.T. Operation

Input voltage: 120V AC 60Hz

Operating Environment:

Temperature: 26°C

Humidity: 56% RH

Atmospheric Pressure: 1005mbar

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

The program used to control the EUT for staying in continuous transmitting mode supplied by manufacturer.

Channel 908.42MHz is chosen for testing.

Test the EUT in transmitting mode.



## 7.2 Test Procedure & Measurement Data

### 7.2.1 Field Strength of Fundamental & Field Strength of Unwanted Emissions

Test Requirement:	FCC Part15 C Section 15.249(a) & (d)
Test Method:	Based on FCC Part15 C Section 15.249 & ANSI C63.4:2003
Status	Pre-test the EUT in continuous transmitting mode with setup as stand-alone in X, Y, Z three axes, found the worst case is X axes and report the data.
Measurement Distance:	3m (Semi-Anechoic Chamber)
Frequency range	30 MHz – 10GHz for transmitting mode. Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 10GHz)
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal, a turntable rotate through 360° in the horizontal plane and it is used to support the test sample at 0.8m above the ground plane.

Requirements:

FCC Part 15.249(a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics (dBuV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

FCC Part 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

#### Remark:

The fundamental frequency range is in the frequency band of the EUT is 902MHz ~ 928MHz.

The limit for Quasi-Peak field strength dBuV/m for the fundamental frequency = 94.0 dBuV/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dBuV/m for the harmonics = 54.0 dBuV/m.

The limit for peak field strength dBuV/m for the harmonics = 74.0 dBuV/m.

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or 54.0 dBuV/m in 15.209. Here the limit for the other emission is 54.0 dBuV/m.

### Test Procedure:

#### 1) 9K to 30MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.4:2003 section 8.2.1. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT, During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

#### 2) 30MHz to 1GHz emissions:

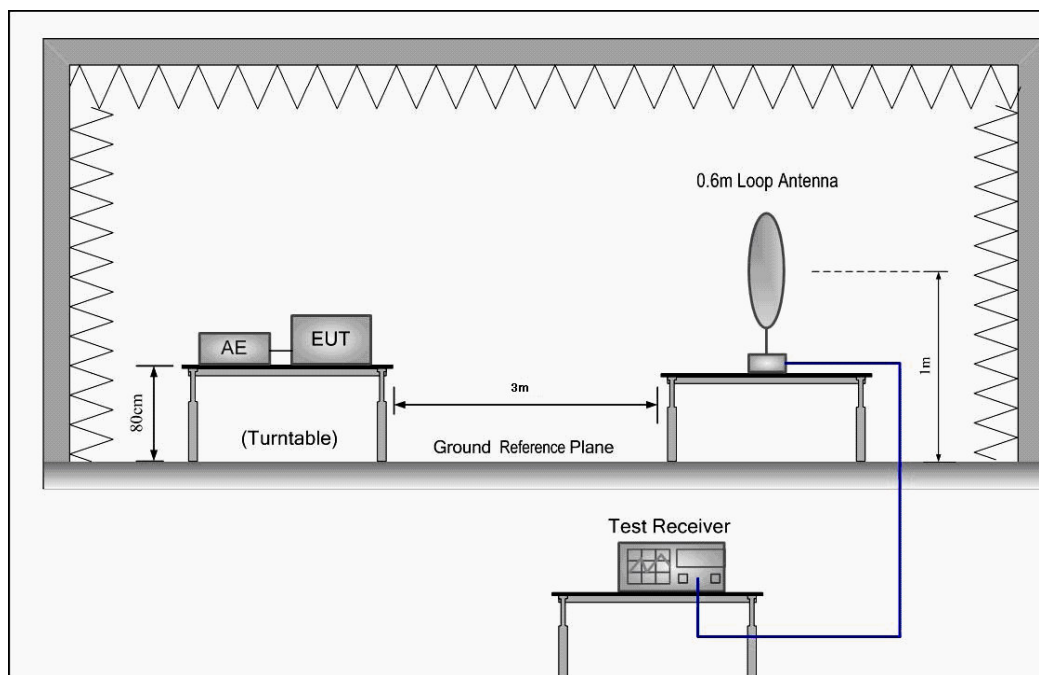
For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

#### 3) 1GHz to 40GHz emissions:

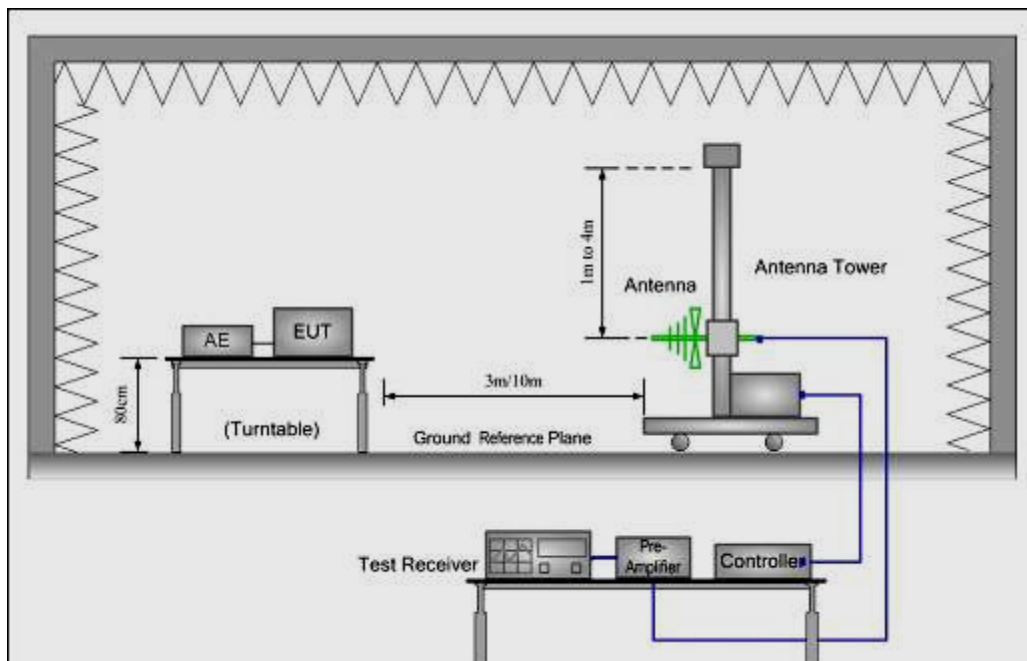
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

### Test Configuration:

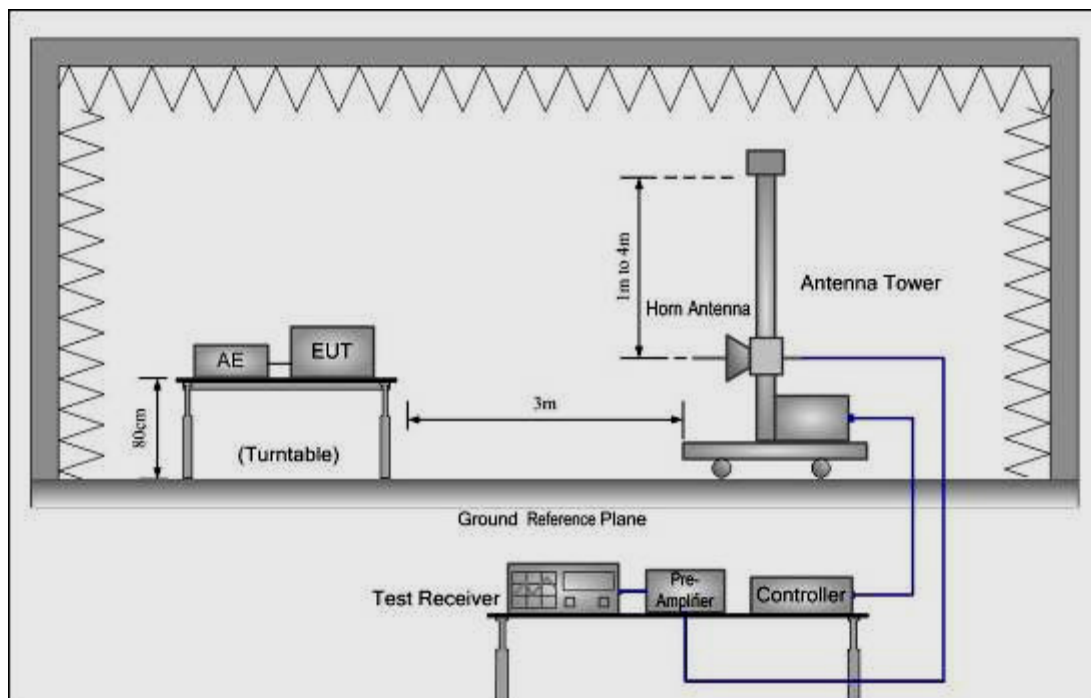
#### 1) 9K to 30MHz emissions:



2) 30MHz to 1GHz emissions:



3) 1GHz to 40GHz emissions:



The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$



**The following test results were performed on the Host:**

1. Test in Channel (908.42MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
908.42	90.32	20.4	2.7	25.10	88.32	94.0	-5.68	QP
47.46	29.62	14.07	0.6	24.50	19.79	40.0	-20.21	QP
1847	33.44	26.91	3.80	37.20	26.95	54.0	-27.05	Average
1847	49.44	16.45	1.90	25.30	42.95	74.0	-51.05	PK

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
908.42	79.47	20.40	2.7	25.10	77.47	94.0	-16.53	QP
112.45	29.04	12.15	0.9	24.50	17.59	43.5	-25.91	QP
2827	28.43	29.7	4.7	37.13	28.19	54.0	-25.81	Average
2827	46.82	29.7	4.7	37.13	44.09	74.0	-29.91	PK

**Remark:**

- 1). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 2) Sweep from 30MHz to 10GHz, find the max radiated emissions and record it, when the emissions are too weak to be detected, it will not be reported.

**Test results: The unit does meet the FCC requirements.**



## 7.2.2 Occupied Bandwidth & Band Edge

Test Requirement: FCC Part 15 C Section 15.249

Test Method: ANSI C63.4:2003 and FCC Part 2.1049

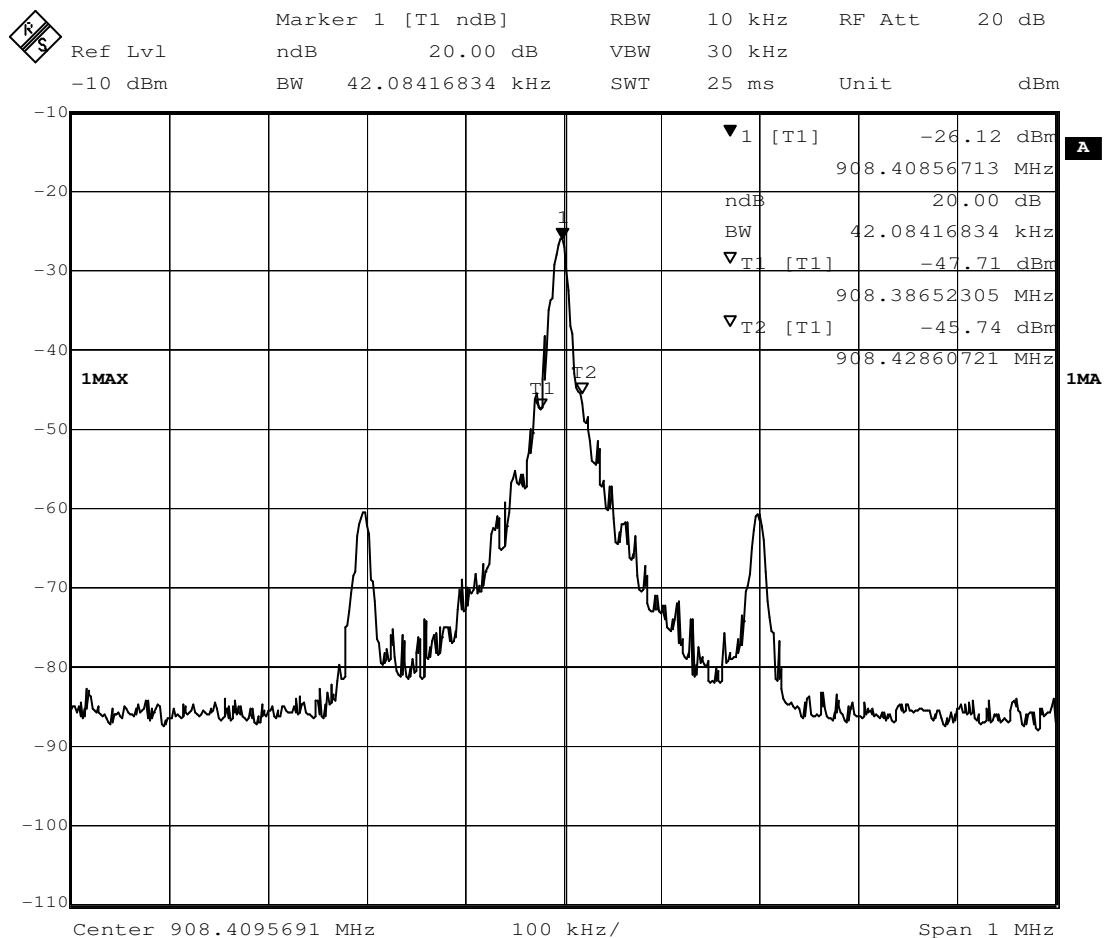
Operation within the band 902-928MHz

Requirements: 15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

For Controller:

The occupied bandwidth as below:



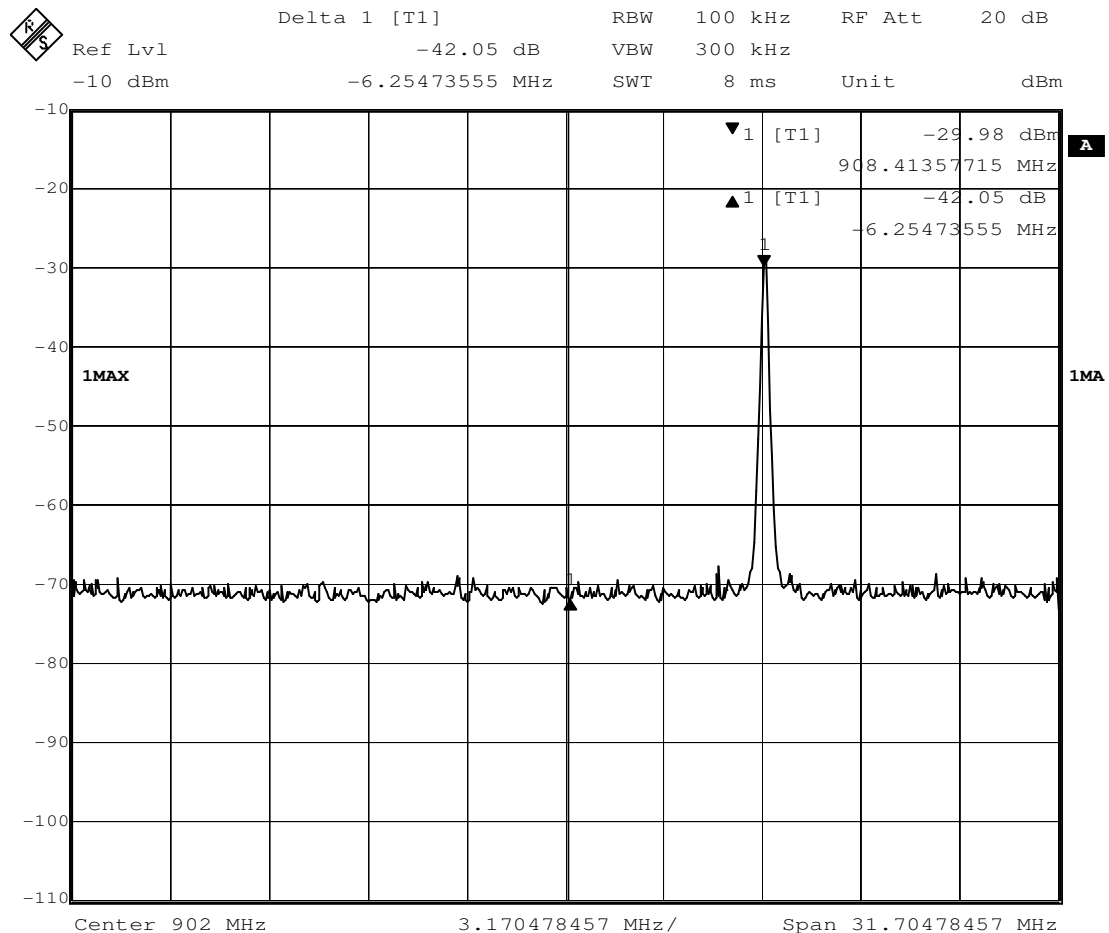
The low frequency is 908.386MHz, The high frequency is 908.428MHz,  
Within the band 902MHz to 928MHz.



The Band Edge Emission as below:

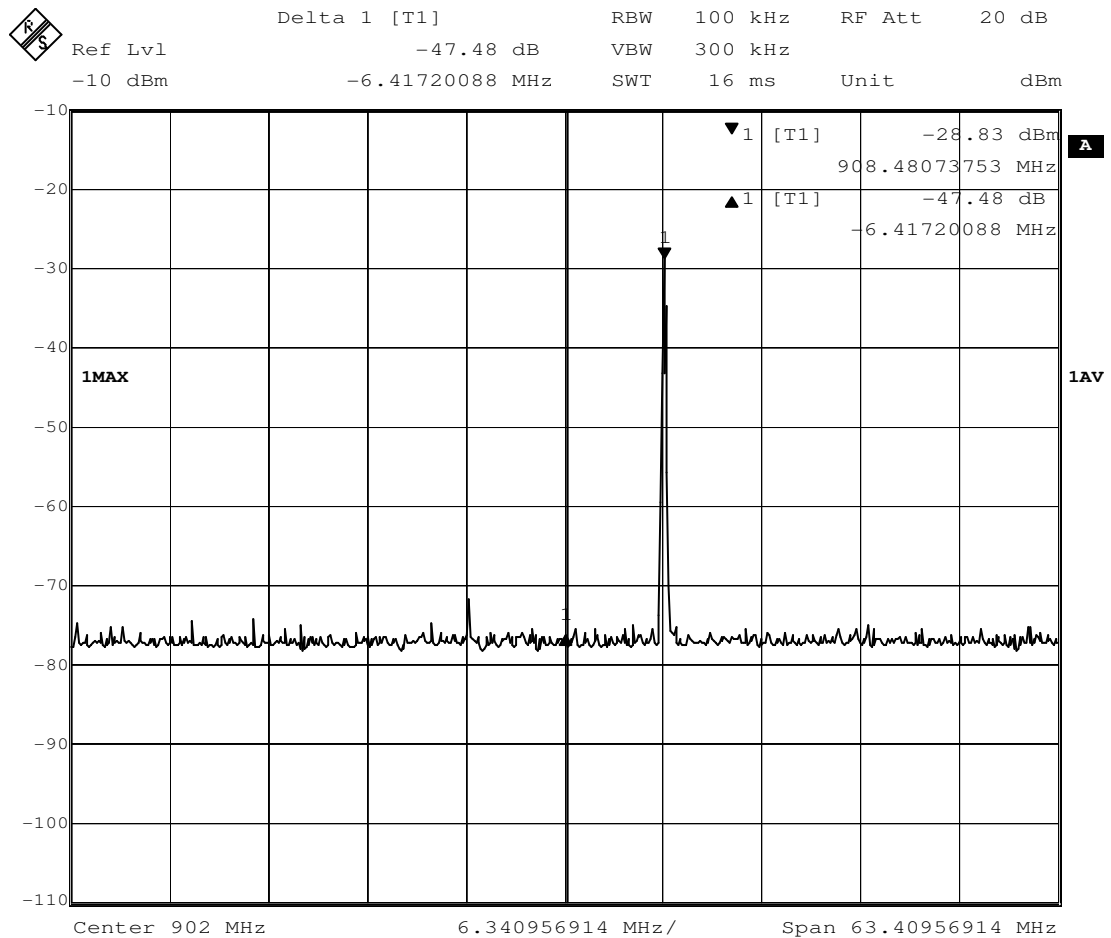
Band Edge 902MHz

Detector mode: Peak





Detector mode: Average



For 902MHz band edge checked with 908.42MHz frequency operated, the delta shown at the plots are -42.05dB for peak detector mode and -47.48dB for Average detector mode.

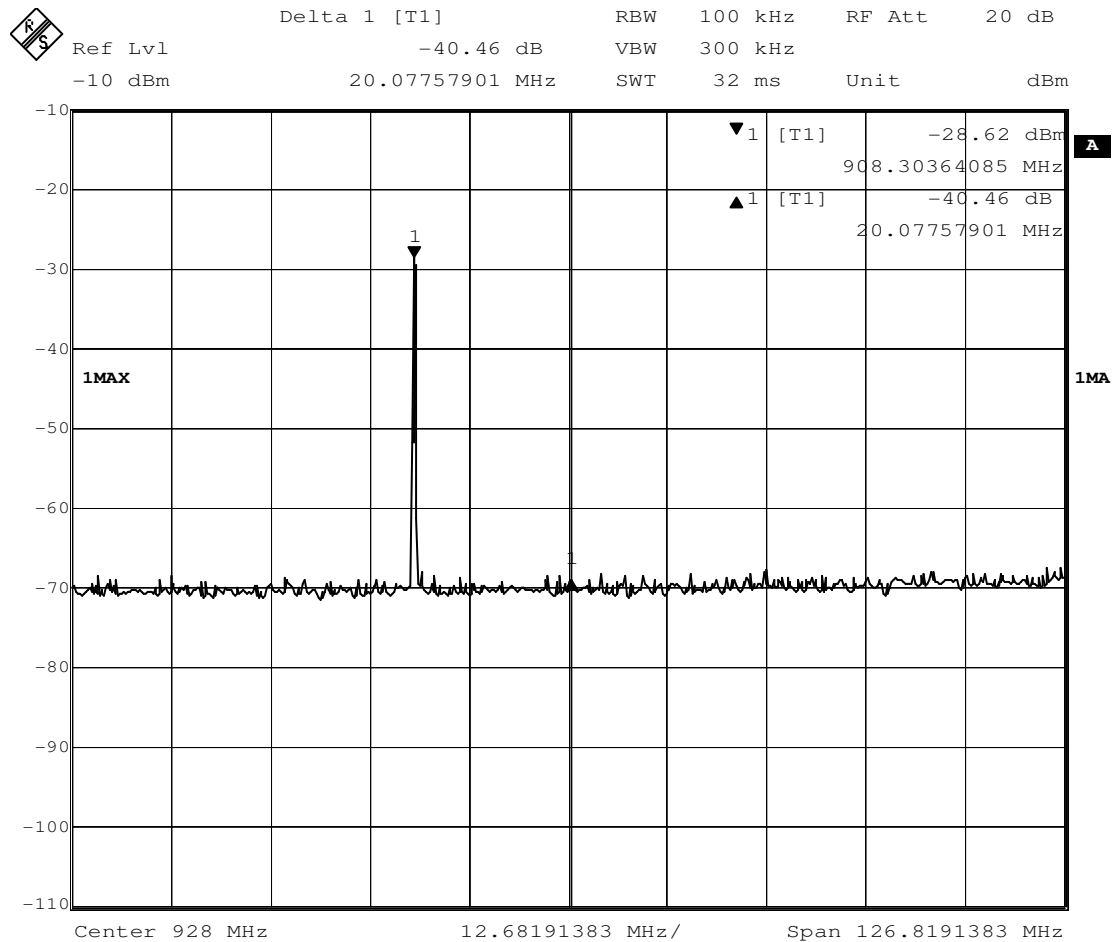
With the peak value 88.81BuV/m and average value at 88.12dBuV/m for the fundamental, the spurious emission level at 902MHz were 46.76dBuV/m for peak and 40.64dBuV/m for average.





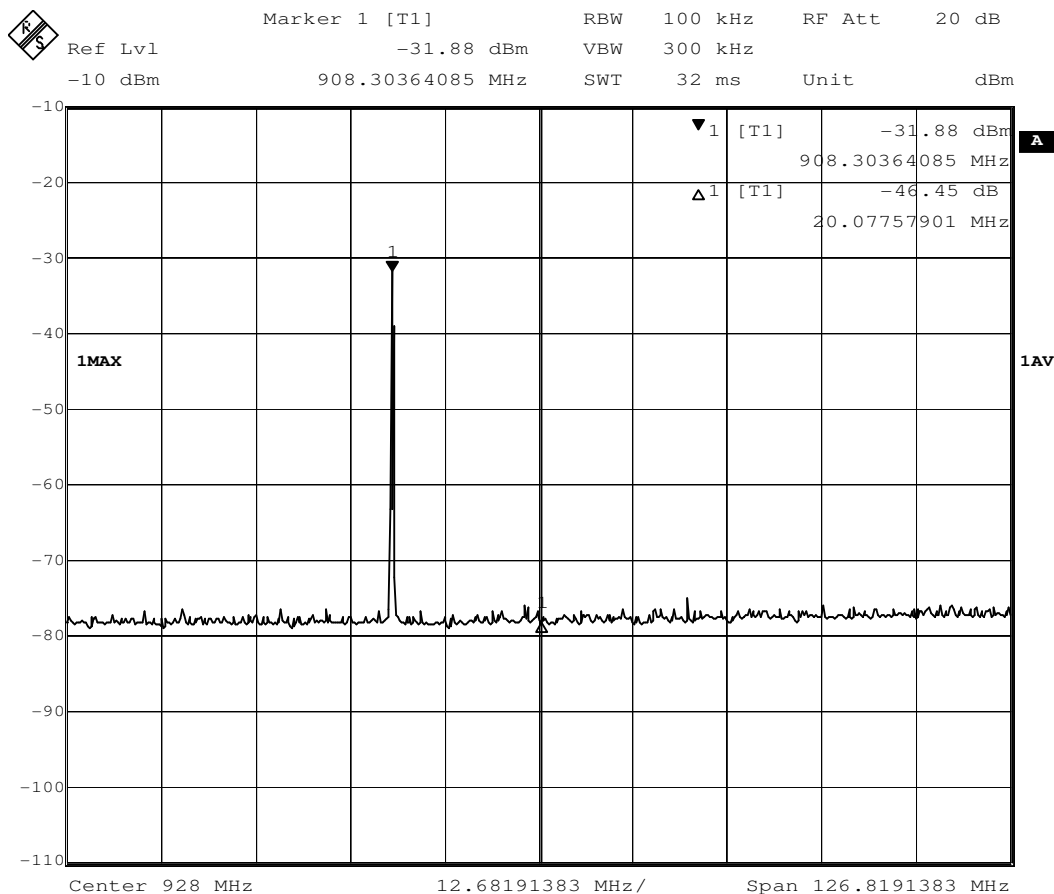
Highest Band Edge 928MHz

Detector mode: Peak





Detector mode: Average



For 928MHz bandage checked with 908.42MHz frequency operated, the delta shown at the plots are -40.46dB for peak detector mode and -46.45dB for Average detector mode.

With the peak value 88.81dBuV/m and average value at 88.12dBuV/m for the fundamental, the spurious emission level at 928MHz were 48.35dBuV/m for peak and 41.67dBuV/m for average.

The test result for the Emissions radiated outside of the specified frequency bands; please refer to the section 7.2.1 of this report.

**The results: The unit does meet the FCC requirements.**

### 7.2.3 Conducted Emissions Mains Terminals, 150kHz to 30MHz

Test Requirement: FCC Part15.207

Test Method: ANSI C63.4:2003

Frequency Range: 150KHz to 30MHz

Detector: Peak for pre-scan (9kHz Resolution Bandwidth)

Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit

Operating Environment:

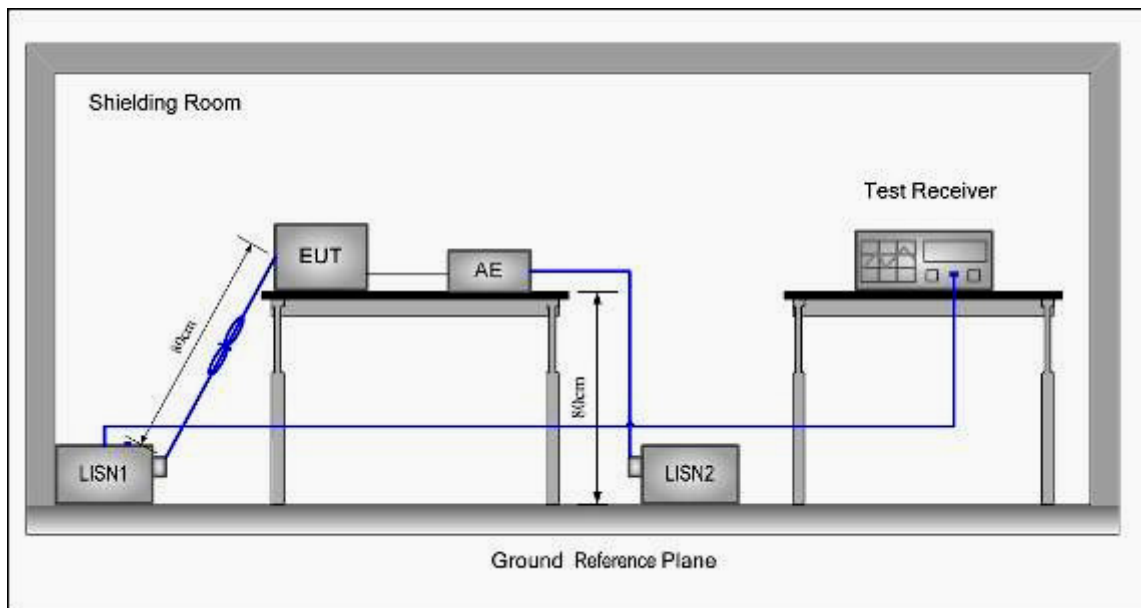
Temperature: 20.0 °C

Humidity: 50 % RH

Atmospheric Pressure: 1005 mbar

EUT Operation: Test the EUT in PC connection mode kept write data.

#### Plan View of Test Setup



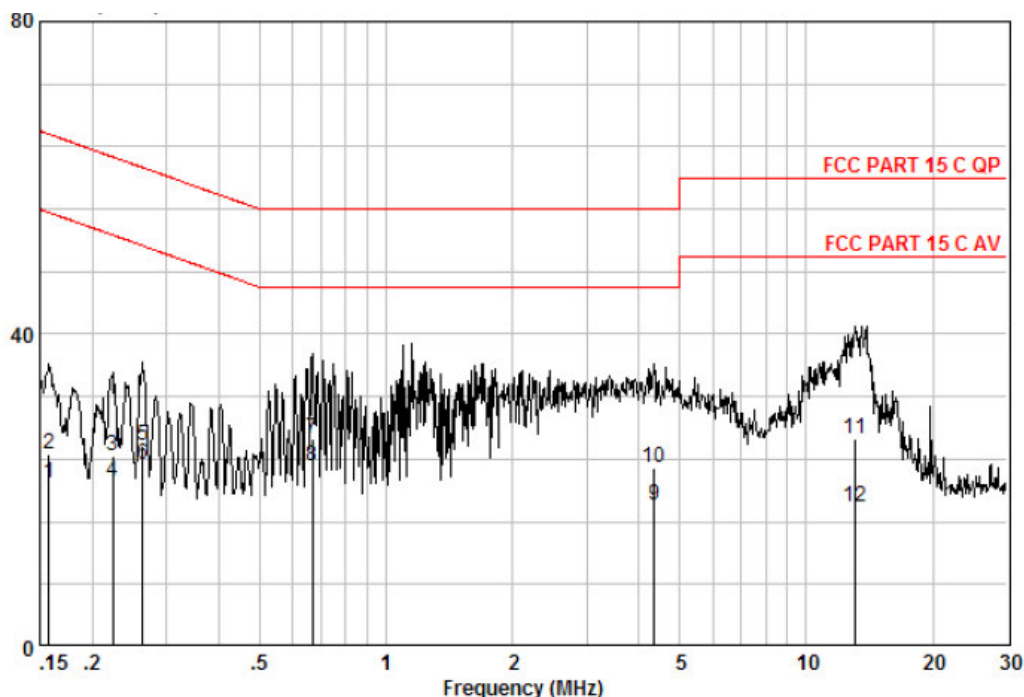


## Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:

Peak Scan:



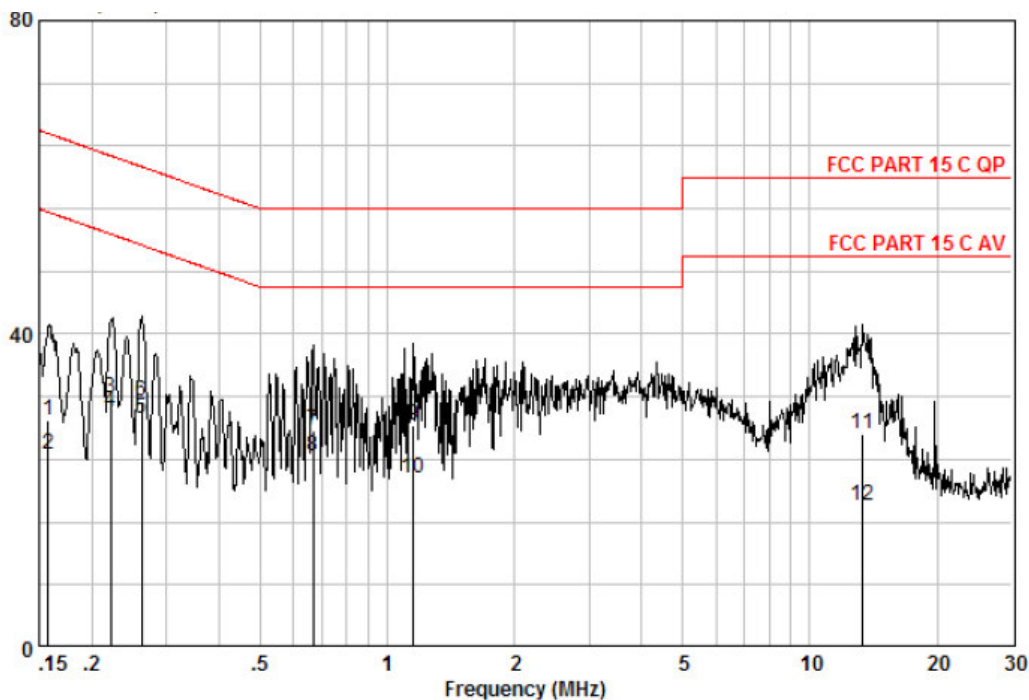
Quasi-peak and Average measurement:

Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.157	20.98	0.00	0.00	20.98	55.60	-34.62	AVERAGE
0.157	24.66	0.00	0.00	24.66	65.60	-40.94	QP
0.223	24.44	0.00	0.00	24.44	62.70	-38.26	QP
0.223	21.18	0.00	0.00	21.18	52.70	-31.52	AVERAGE
0.263	25.66	0.00	0.00	25.66	61.34	-35.68	QP
0.263	23.38	0.00	0.00	23.38	51.34	-27.96	AVERAGE
0.668	26.66	0.00	0.00	26.66	56.00	-29.34	QP
0.668	23.15	0.00	0.00	23.15	46.00	-22.85	AVERAGE
4.338	18.02	0.06	0.00	18.08	46.00	-27.92	AVERAGE
4.338	22.92	0.06	0.00	22.98	56.00	-33.02	QP
13.057	26.46	0.15	0.00	26.61	60.00	-33.39	QP
13.057	17.80	0.15	0.00	17.95	50.00	-32.05	AVERAGE



Neutral Line

Peak Scan:



Quasi-peak and Average measurement:

Freq	Read Level	Cable Loss	LISN Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.157	29.08	0.00	0.00	29.08	65.60	-36.52	QP
0.157	24.59	0.00	0.00	24.59	65.60	-41.01	AVERAGE
0.222	31.72	0.00	0.00	31.72	62.74	-31.02	QP
0.222	30.13	0.00	0.00	30.13	62.74	-32.61	AVERAGE
0.262	29.24	0.00	0.00	29.24	61.38	-32.14	AVERAGE
0.262	31.46	0.00	0.00	31.46	61.38	-29.92	QP
0.668	27.70	0.00	0.00	27.70	56.00	-28.30	QP
0.668	24.38	0.00	0.00	24.38	56.00	-31.62	AVERAGE
1.153	28.34	0.01	0.00	28.35	56.00	-27.65	QP
1.153	21.47	0.01	0.00	21.48	56.00	-34.52	AVERAGE
13.267	27.06	0.15	0.00	27.21	60.00	-32.79	QP
13.267	18.02	0.15	0.00	18.17	60.00	-41.83	AVERAGE

End of the report