

# FCC PART 15B, CLASS B

## TEST REPORT

For

### SHENZHEN TENDA TECHNOLOGY CO.,LTD.

Tenda Industrial Park, No. 34-1, Shilong Rd., Shiyan Town, Bao'an District, Shenzhen, P.R.China

**FCC ID: V7TW1800R**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Wireless AC1750 Dual-band Gigabit Router
<b>Test Engineer:</b>	Leon Chen <i>leon chen</i>
<b>Report Number:</b>	R2DG130130005-00A
<b>Report Date:</b>	2013-03-01
<b>Reviewed By:</b>	Ivan Cao <i>Ivan Cao</i> RF Leader
<b>Test Laboratory:</b>	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *SHENZHEN TENDA TECHNOLOGY CO.,LTD.*'s product, model number: W1800R (*FCC ID: V7T W1800R*) or ("EUT") in this report is a Wireless AC1750 Dual-band Gigabit Router, which was measured approximately: 34.5 cm (L) x22.0 cm (W) x3.5 cm (H), rated input voltage: DC 12V from adapter. The highest working frequency is 600MHz.

Adapter information: Honor  
Model: ADS-40FSG-12 12030GPCU  
Input: AC 100-240V, 50/60Hz, Max.1.0A  
Output: DC 12V, 2.5A

*\* All measurement and test data in this report was gathered from production sample serial number: 130130005 (Assigned by BACL, Dongguan). The EUT was received on 2013-01-30.*

### Objective

This report is prepared on behalf of *SHENZHEN TENDA TECHNOLOGY CO.,LTD.* in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15B, Class B.

### Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: *V7TW1800R* for 2412-2462MHz band.  
FCC Part 15C DTS submissions with FCC ID: *V7TW1800R* for 5745-5825MHz band.  
FCC Part 15E NII submissions with FCC ID: *V7TW1800R* for 5180-5240MHz band.

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

### EUT Exercise Software

The software 'Lantest' was used in the testing.

### Equipment Modifications

No modification was made to the EUT.

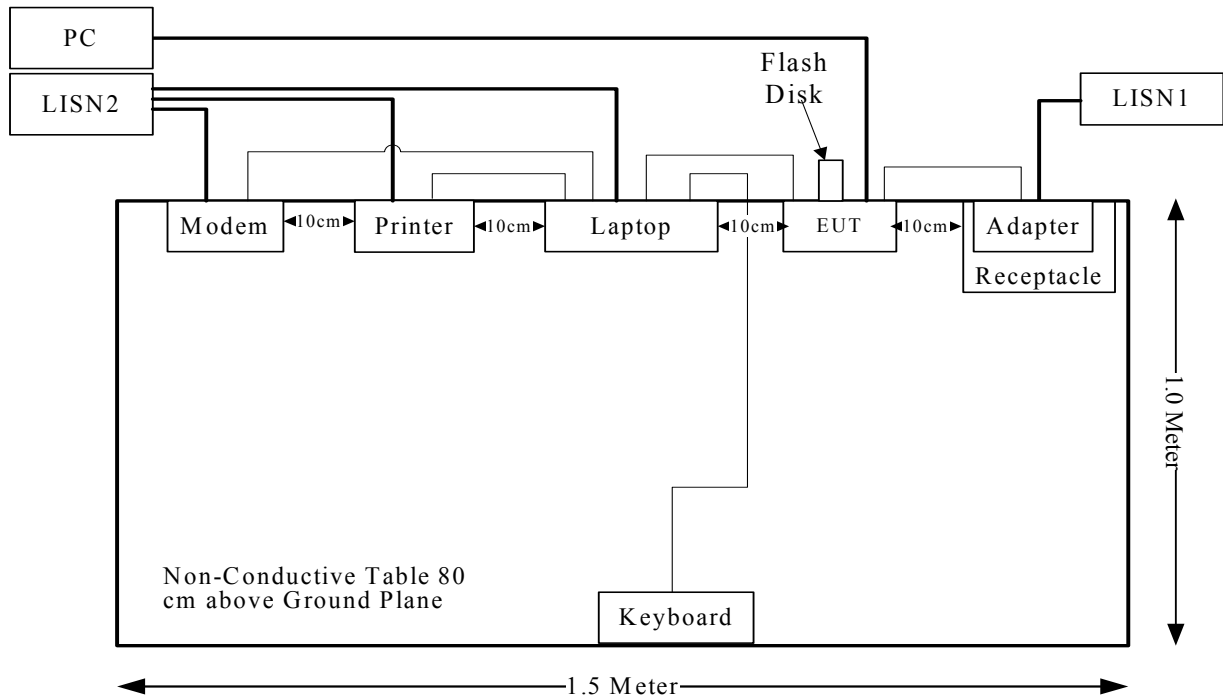
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HP	Printer	C3941A	JPTVOB2337
SAST	Modem	AEM-2100	0293
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Laptop	PP11L	N/A
Kinston	Flash Disk	4G	/
DELL	PC	GX620	/

### External Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable Printer Cable	1.2	Parallel Port of Laptop	Printer
Shielded Detachable Serial Cable	1.2	Serial Port of Laptop	Modem
Shielded Detachable Keyboard Cable	1.5	Keyboard Port of Laptop	Keyboard
RJ 45 Cable	1.0	Laptop	EUT
RJ45 Cable*4	10	EUT	PC

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

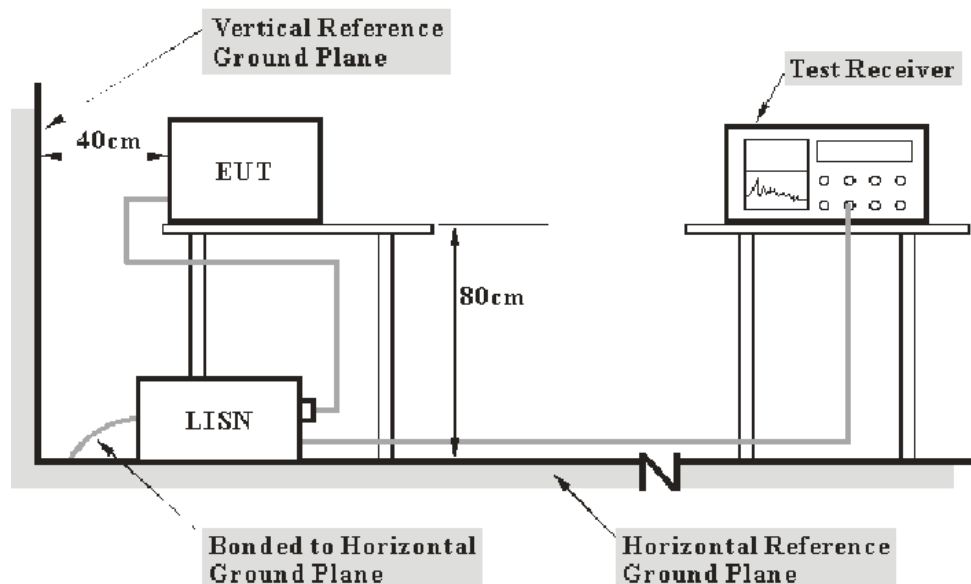
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of  $U_{cisp}$

Measurement	$U_{cisp}$
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 Class B limits.

The adapter was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

### Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	LISN1	ESH3-Z5	843331/015	2012-09-17	2013-09-16
R&S	LISN2	ESH3-Z5	100113	2012-11-29	2013-11-28
BACL	Test Software	BACL-EMC	V1.0-2010	N/A	N/A



**Test Results Summary**

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, with the worst margin reading of:

**12.98 dB at 0.515MHz in the Line** conducted.

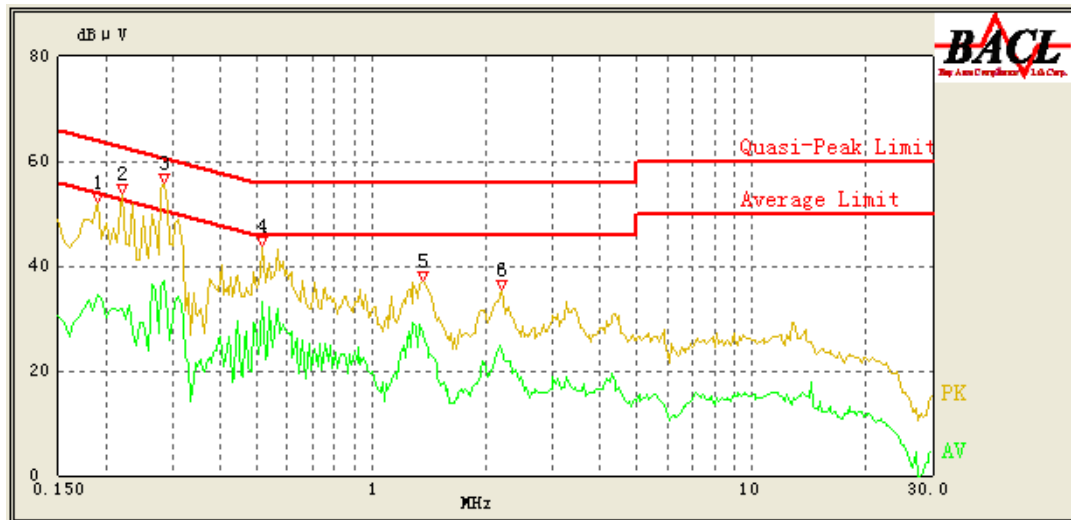
**Test Data****Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	62 %
<b>ATM Pressure:</b>	101.3 kPa

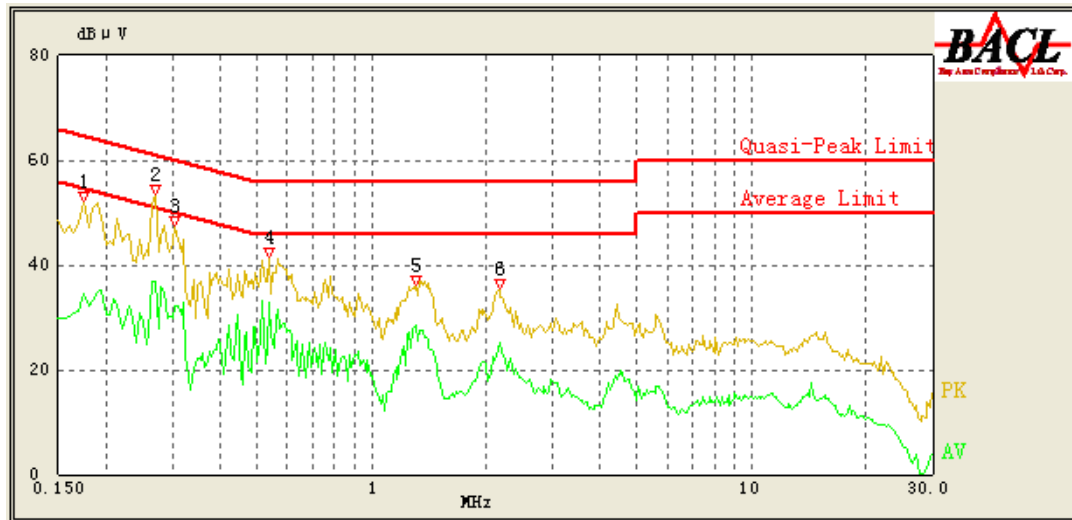
*The testing was performed by Leon Chen on 2013-02-04.*

Test mode: operating

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.190	44.26	0.99	64.86	20.60	QP
0.190	34.46	0.99	54.86	20.40	AV
0.220	41.32	0.94	64.00	22.68	QP
0.220	31.93	0.94	54.00	22.07	AV
0.285	44.11	0.83	62.14	18.03	QP
0.285	37.07	0.83	52.14	15.07	AV
0.515	37.35	0.52	56.00	18.65	QP
0.515	33.02	0.52	46.00	12.98	AV
1.360	32.53	0.33	56.00	23.47	QP
1.360	27.04	0.33	46.00	18.96	AV
2.200	31.29	0.37	56.00	24.71	QP
2.200	24.22	0.37	46.00	21.78	AV

**120 V, 60 Hz, Neutral:**

Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.175	44.99	1.71	65.29	20.30	QP
0.175	34.42	1.71	55.29	20.87	AV
0.270	48.00	1.22	62.57	14.57	QP
0.270	36.69	1.22	52.57	15.88	AV
0.305	42.84	1.06	61.57	18.73	QP
0.305	32.31	1.06	51.57	19.26	AV
0.540	37.06	0.52	56.00	18.94	QP
0.540	32.95	0.52	46.00	13.05	AV
1.310	33.79	0.24	56.00	22.21	QP
1.310	28.36	0.24	46.00	17.64	AV
2.175	31.97	0.28	56.00	24.03	QP
2.175	25.22	0.28	46.00	20.78	AV

## FCC §15.109 - RADIATED EMISSIONS

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cisp}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

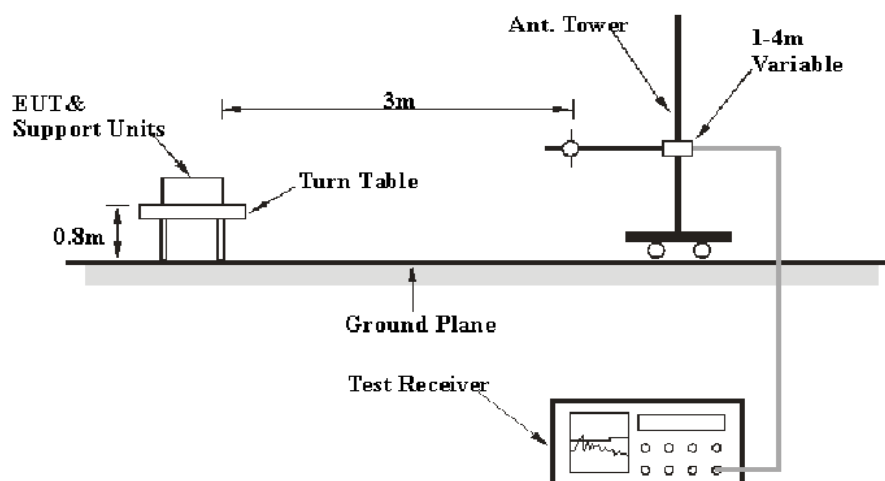
6G~18GHz: 5.23 dB

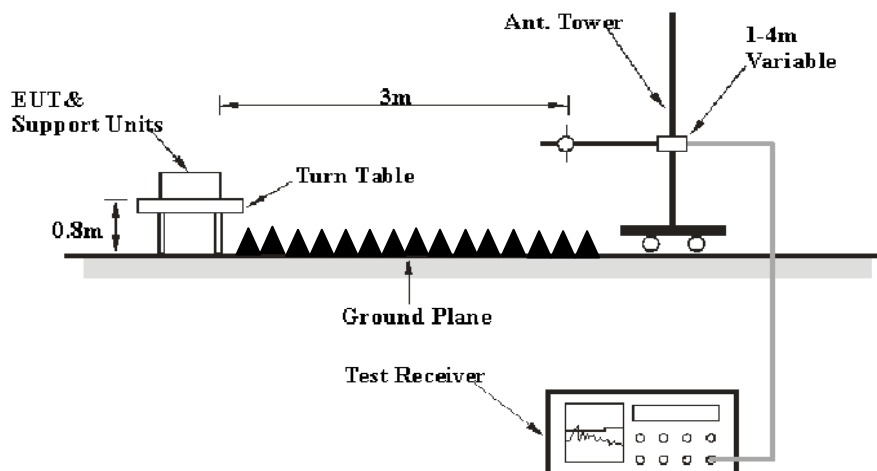
Table 2 – Values of  $U_{cisp}$

Measurement	$U_{cisp}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

### EUT Setup

Below 1 GHz:



**Above 1 G:**

The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.109, Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter connected to a 120 VAC/60 Hz power source.

**EMI Test Receiver Setup**

According to FCC 15.33 requirements, the system was measured from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<i><b>Frequency Range</b></i>	<i><b>RBW</b></i>	<i><b>Video B/W</b></i>	<i><b>Detector</b></i>
30 MHz – 1000 MHz	120 kHz	300 kHz	QP
Above 1 GHz	1MHz	3 MHz	Peak
Above 1 GHz	1MHz	10 Hz	Ave

**Test Procedure**

For the radiated emissions test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in Quasi-peak detection mode for 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-09-06	2013-09-05
HP	Pre-amplifier	8447E	2434A02181	2012-10-08	2013-10-07
R&S	Spectrum Analyzer	FSEM 30	DE31388	2012-03-15	2013-03-14
ETS-LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2014-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-01-30	2014-01-29
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109, Class B, with the worst margin reading of:

**3.10 dB at 250.1900 MHz in the Horizontal polarization**

## Test Data

### Environmental Conditions

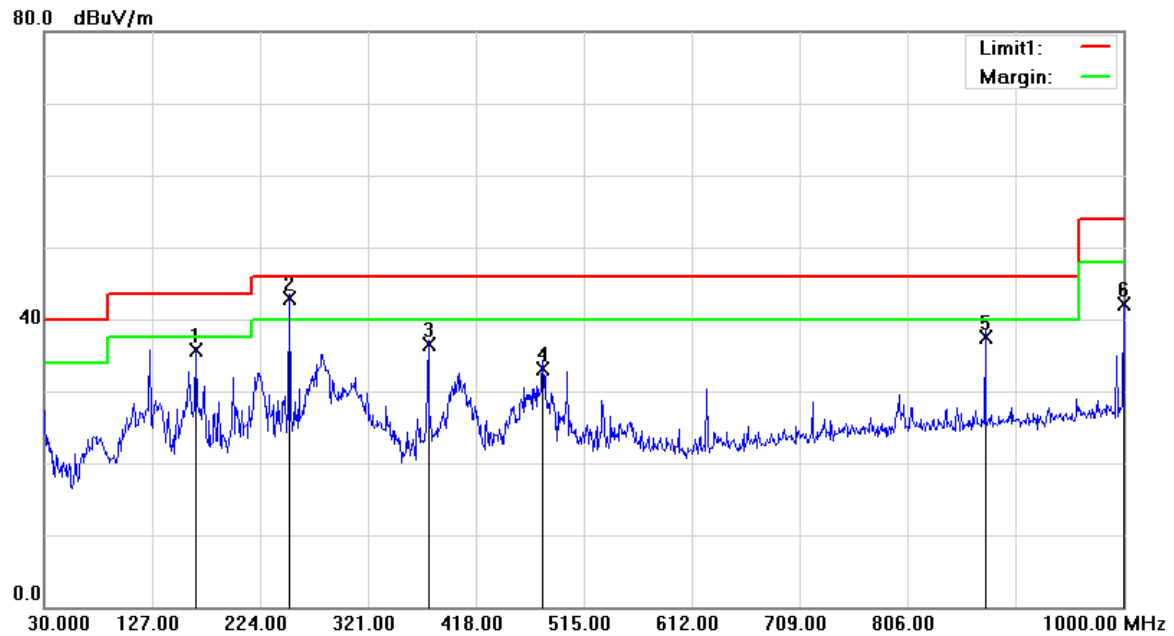
Temperature:	23.5°C
Relative Humidity:	63 %
ATM Pressure:	101.3 kPa

*The testing was performed by Leon Chen on 2013-02-04.*

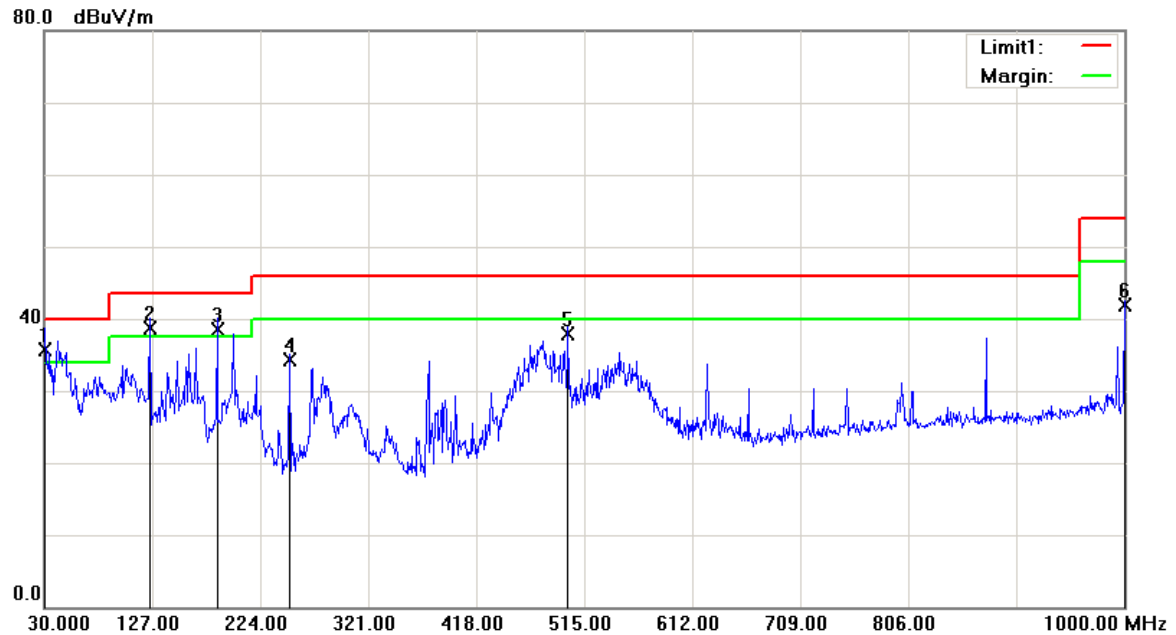
*Test mode: operating*

**Below 1G:**

**Horizontal:**

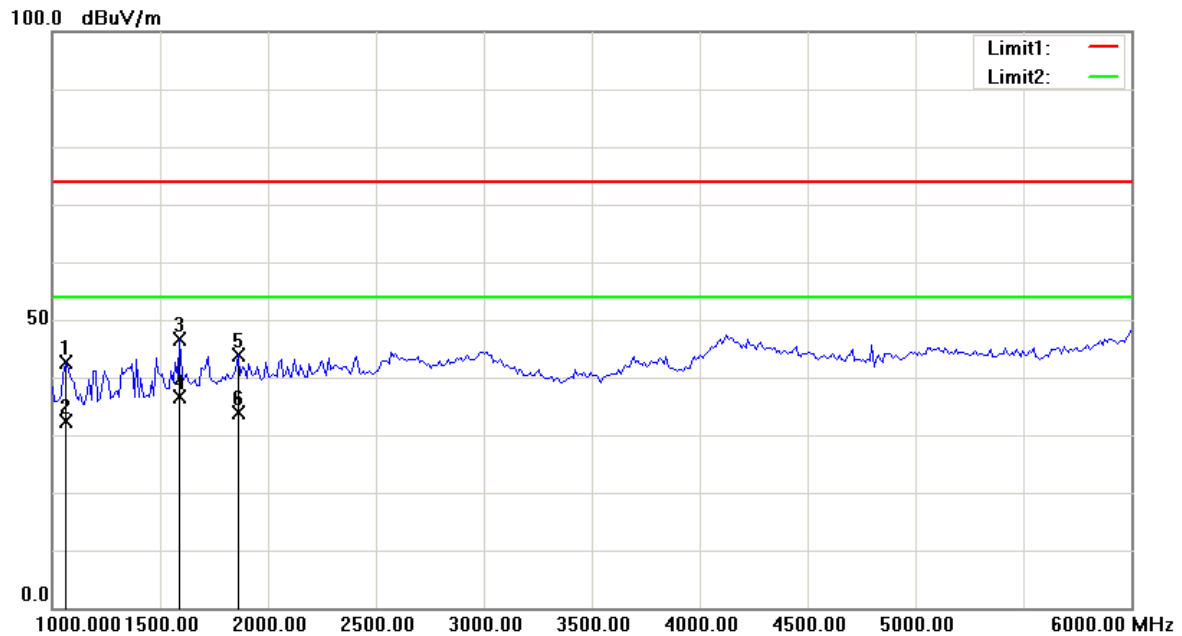


Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
165.8000	43.80	QP	-8.12	35.68	43.50	7.82
250.1900	51.08	QP	-8.18	42.90	46.00	3.10
375.3200	40.99	QP	-4.50	36.49	46.00	9.51
478.1400	35.51	QP	-2.31	33.20	46.00	12.80
875.8400	34.85	QP	2.57	37.42	46.00	8.58
1000.0000	38.15	QP	4.05	42.20	54.00	11.80

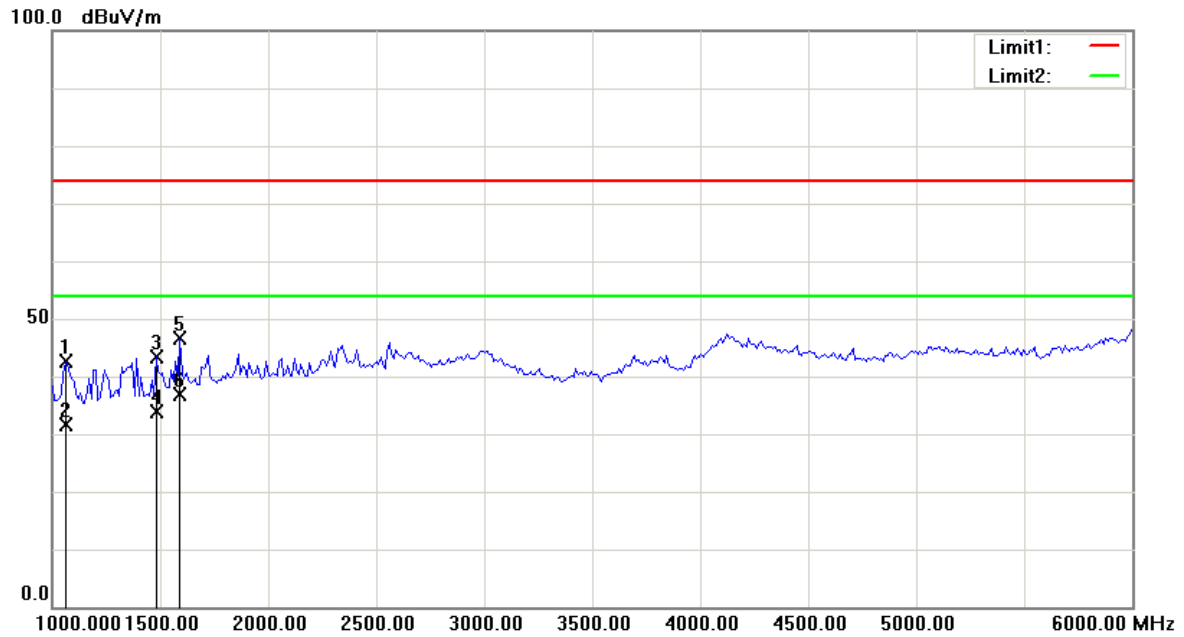
**Vertical:**

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave )	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	34.30	QP	1.41	35.71	40.00	4.29
125.0600	45.06	QP	-6.26	38.80	43.50	4.70
185.2000	47.62	QP	-9.06	38.56	43.50	4.94
250.1900	42.46	QP	-8.18	34.28	46.00	11.72
500.4500	40.09	QP	-2.27	37.82	46.00	8.18
1000.0000	37.90	QP	4.05	41.95	54.00	12.05



**Above 1G:****Horizontal:**

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1060.120	42.08	peak	0.43	42.51	74.00	31.49
1060.120	31.99	AVG	0.43	32.42	54.00	21.58
1591.182	44.82	peak	1.86	46.68	74.00	27.32
1591.182	34.65	AVG	1.86	36.51	54.00	17.49
1861.723	39.96	peak	4.03	43.99	74.00	30.01
1861.723	29.81	AVG	4.03	33.84	54.00	20.16

**Vertical:**

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave )	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1060.120	42.08	peak	0.43	42.51	74.00	31.49
1060.120	31.19	AVG	0.43	31.62	54.00	22.38
1480.962	42.19	peak	1.16	43.35	74.00	30.65
1480.962	32.69	AVG	1.16	33.85	54.00	20.15
1591.182	44.82	peak	1.86	46.68	74.00	27.32
1591.182	34.93	AVG	1.86	36.79	54.00	17.21

\*\*\*\*\* END OF REPORT \*\*\*\*\*