



FCC PART 15B

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,'LTD.

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

FCC ID: V7TW150DV6

Report Type: Original Report	Product Type: ADSL Router
Test Engineer: <u>Ares Liu</u> 	
Report Number: <u>R2DG130813009-00A</u>	
Report Date: <u>2013-10-23</u>	
Reviewed By: <u>Jerry Zhang</u>  <u>EMC Manager</u>	
Test Laboratory: Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn	

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SHENZHEN TENDA TECHNOLOGY CO., LTD.*'s product, model number: *W150D (FCC ID: V7TW150DV6)* (the "EUT") in this report was a *ADSL Router*, which was measured approximately: 17.5 cm (L) x 13.5 cm (W) x 18.0 cm (H), rated input voltage: DC 9V from adapter.

Adapter Information:

MODEL: TEA09U-09100

INPUT: AC100-240VM 50/60Hz,0.3A

OUTPUT: DC 9V, 1.0A

** All measurement and test data in this report was gathered from production sample serial number: 130813009 (Assigned by BACL.Dongguan). The EUT was received on 2013-08-15.*

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 Communications Commission's 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: *V7TW150DV6* for Wifi.

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 Communications 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.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at <http://ts.nist.gov/standards/scopes/5000690.htm>

SYSTEM TEST CONFIGURATION

Justification

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

EUT Exercise Software

No software was used.

Equipment Modifications

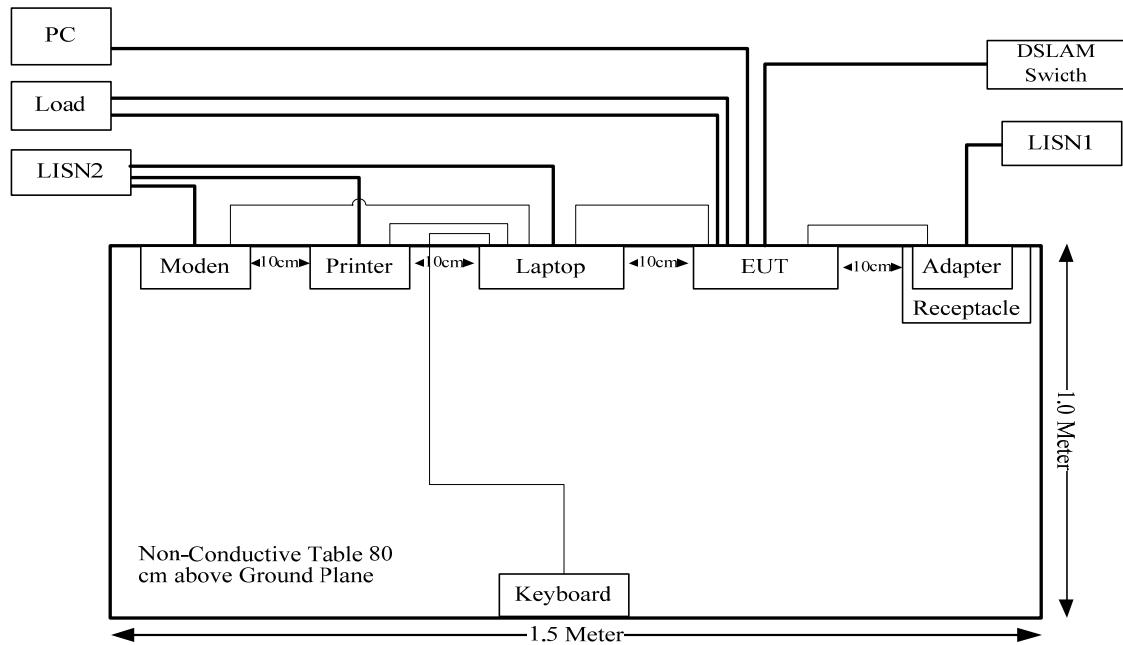
No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
ASTA	Modem	AEM-2100	0293
DELL	PC	GX620	/
Huawei	DSLAM Swicth	MA5615	98MA6444773-001

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.2	Parallel Port of Laptop	Printer
RJ45 Cable*4	yes	yes	2	EUT	PC
RJ11 Cable*1	yes	No	2	EUT	DSLAM Swicth

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 $U_{\text{cisp}}_{\text{r}}$ 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 $U_{\text{cisp}}_{\text{r}}$ of Table 1, then:

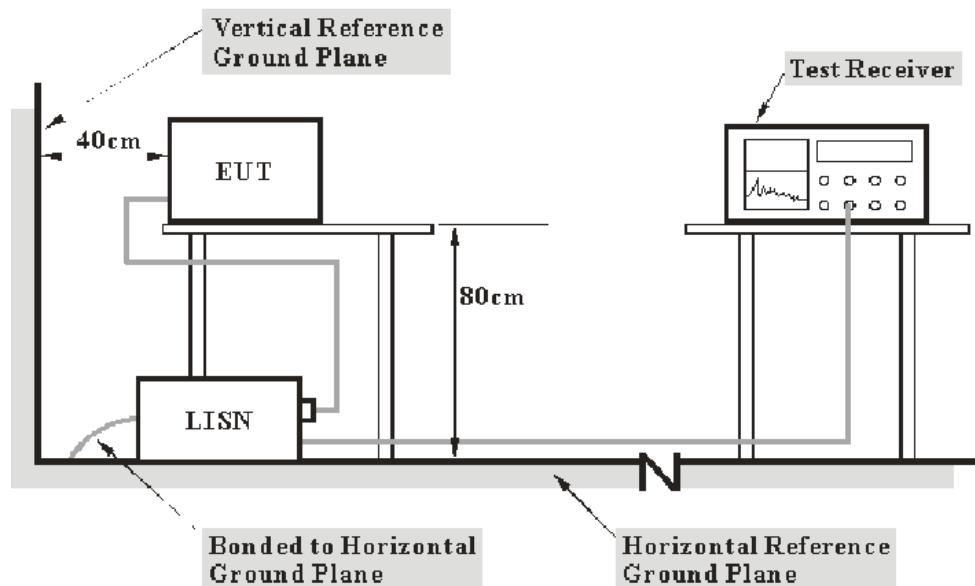
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{\text{lab}} - U_{\text{cisp}}_{\text{r}})$, exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by $(U_{\text{lab}} - U_{\text{cisp}}_{\text{r}})$, exceeds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

Measurement	$U_{\text{cisp}}_{\text{r}}$
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 of EUT 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:

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

Test Procedure

During the conducted emission test, the adapter of EUT 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	Two-line V-network	ENV216	3560.6550.12	2013-2-18	2014-2-17
R&S	L.I.S.N	ESH3-Z5	100113	2012-11-29	2013-11-28

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

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:

9.11 dB at 0.735 MHz in the **Line** conducted mode

Test Data

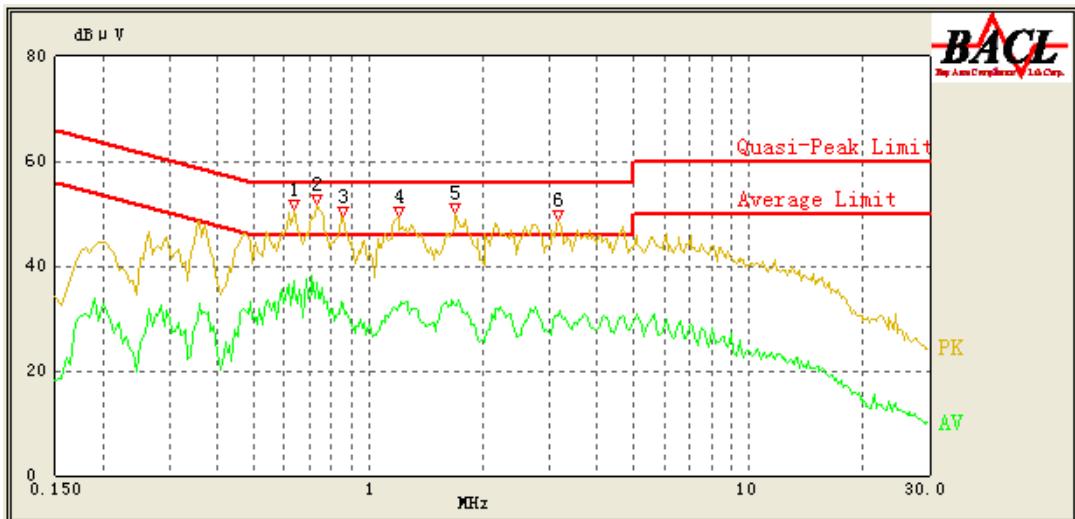
Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	50 %
ATM Pressure:	100.4kPa

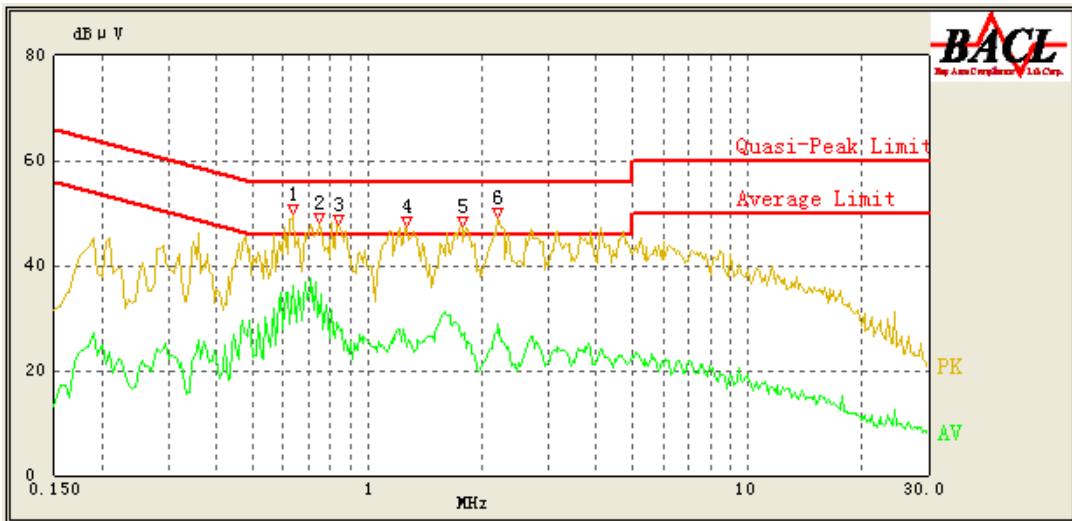
The testing was performed by Ares Liu on 2013-10-14.

Test mode: Normal Link

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/AV/QP)
0.640	43.76	9.67	56.00	12.24	QP
0.640	35.65	9.67	46.00	10.35	AV
0.730	46.13	9.67	56.00	9.87	QP
0.735	36.89	9.67	46.00	9.11	AV
0.860	42.60	9.68	56.00	13.40	QP
0.855	32.81	9.68	46.00	13.19	AV
1.200	42.34	9.68	56.00	13.66	QP
1.190	31.44	9.68	46.00	14.56	AV
1.695	42.19	9.68	56.00	13.81	QP
1.700	32.64	9.68	46.00	13.36	AV
3.165	41.28	9.69	56.00	14.72	QP
3.190	31.65	9.69	46.00	14.35	AV

120 V, 60 Hz, Neutral:

Frequency (MHz)	Cord. Reading (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/AV/QP)
0.640	39.93	9.67	56.00	16.07	QP
0.640	35.05	9.67	46.00	10.95	AV
0.750	40.26	9.67	56.00	15.74	QP
0.750	30.91	9.67	46.00	15.09	AV
0.840	39.35	9.68	56.00	16.65	QP
0.850	27.45	9.68	46.00	18.55	AV
1.270	38.35	9.69	56.00	17.65	QP
1.270	24.40	9.69	46.00	21.60	AV
1.775	37.66	9.68	56.00	18.34	QP
1.770	26.61	9.68	46.00	19.39	AV
2.210	37.61	9.68	56.00	18.39	QP
2.210	28.98	9.68	46.00	17.02	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_{cispr} 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_{cispr} of Table 1, then:

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

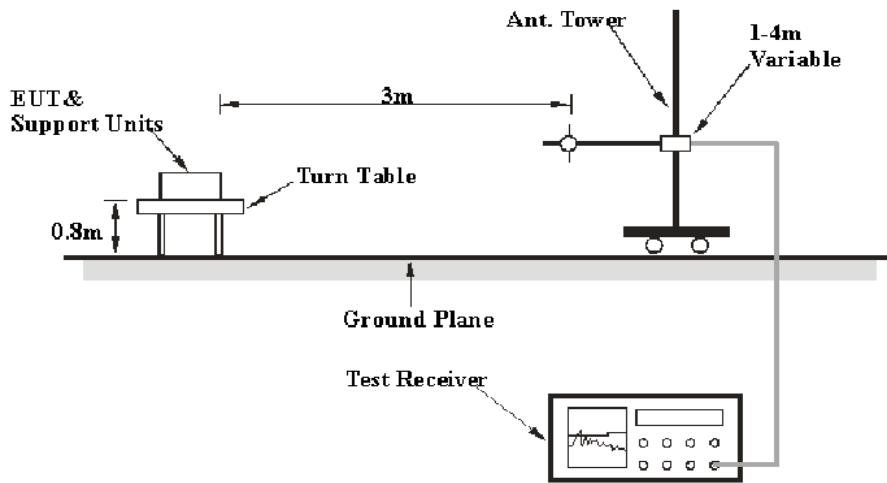
6G~18GHz: 5.23 dB

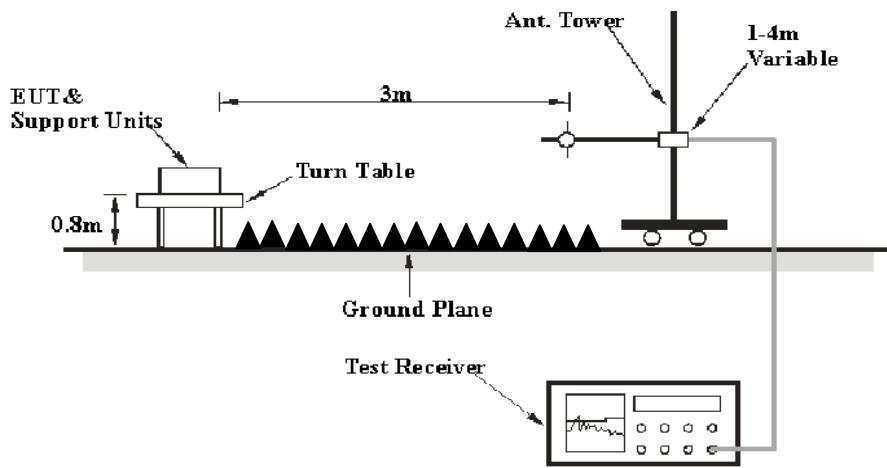
Table 2 – Values of U_{cispr}

Measurement	U_{cispr}
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 1GHz:

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 of EUT 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:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

For the radiated emissions test, the adapter of EUT 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
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2011-9-6	2014-9-5
HP	AMPLIFIER	8447E	2434A02181	N/A	N/A
R&S	Spectrum analyzer	FSEM	DE31388	2013-5-7	2014-5-6
ETS-Lindgren	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

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:

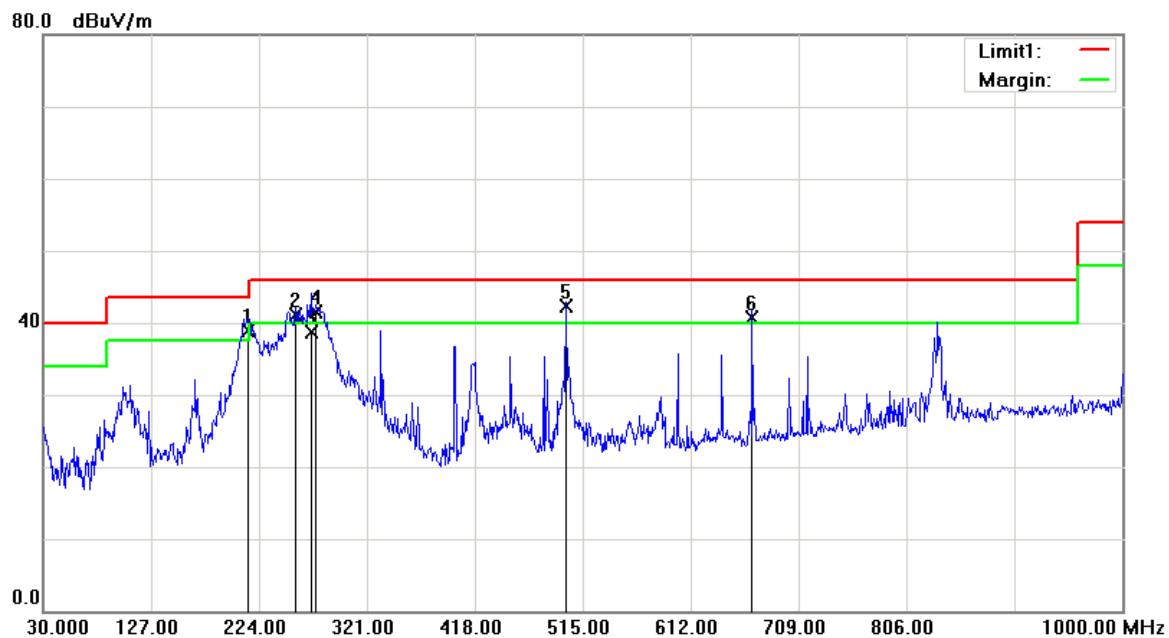
3.60 dB at 499.4800 MHz in the **Horizontal** polarization for below 1G

Test Data

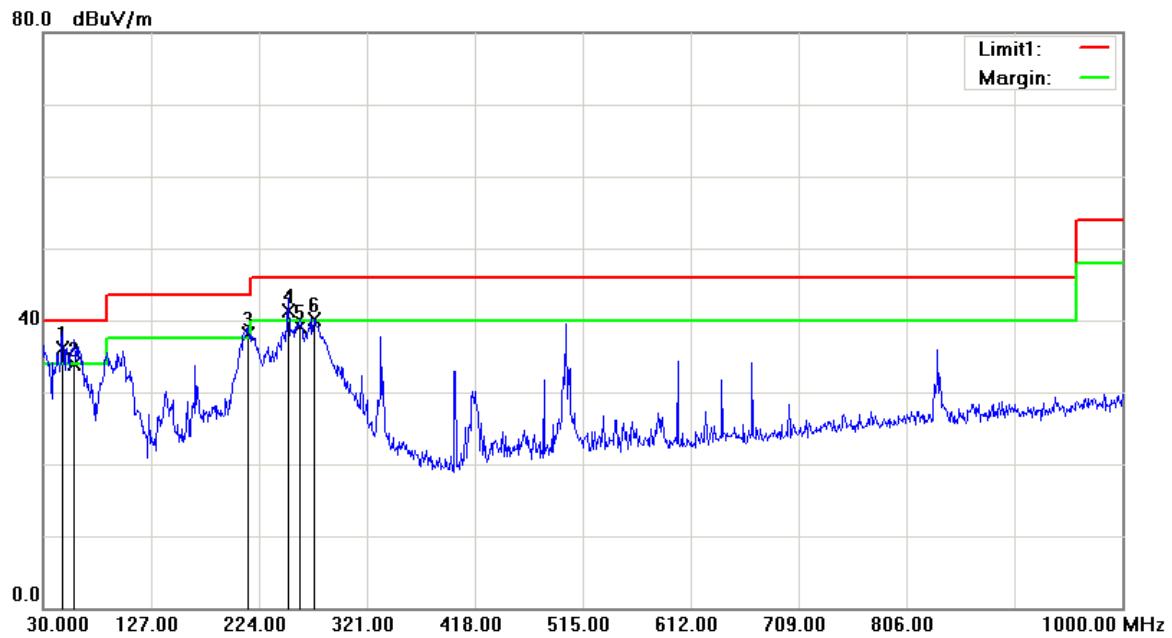
Environmental Conditions

Temperature:	24.5 °C
Relative Humidity:	55 %
ATM Pressure:	100.7 kPa

The testing was performed by Ares Liu on 2013-09-06.

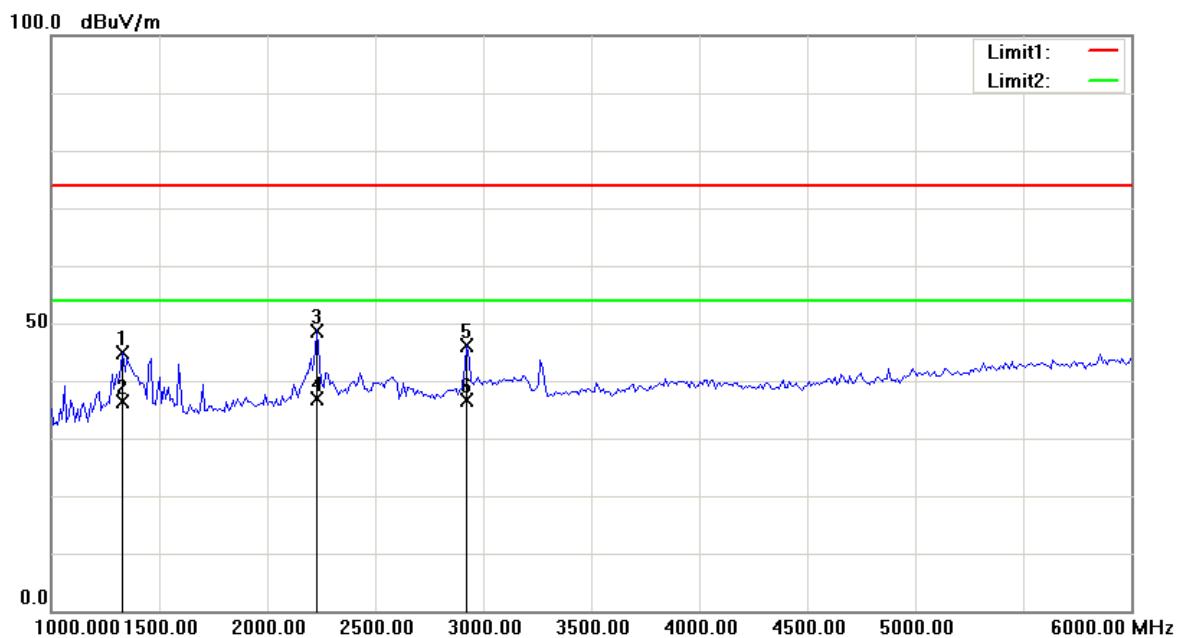
1) Below 1'GJ | :*Test mode: Normal Link***Horizontal:**

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave+)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
214.3000	47.34	QP	-8.44	38.90	43.50	4.60*
256.9800	48.35	QP	-7.25	41.10	46.00	4.90*
270.5600	44.75	QP	-5.95	38.80	46.00	7.20
274.4400	47.50	QP	-5.90	41.60	46.00	4.40*
499.4800	43.77	QP	-1.37	42.40	46.00	3.60*
667.2900	40.15	QP	0.65	40.80	46.00	5.20*

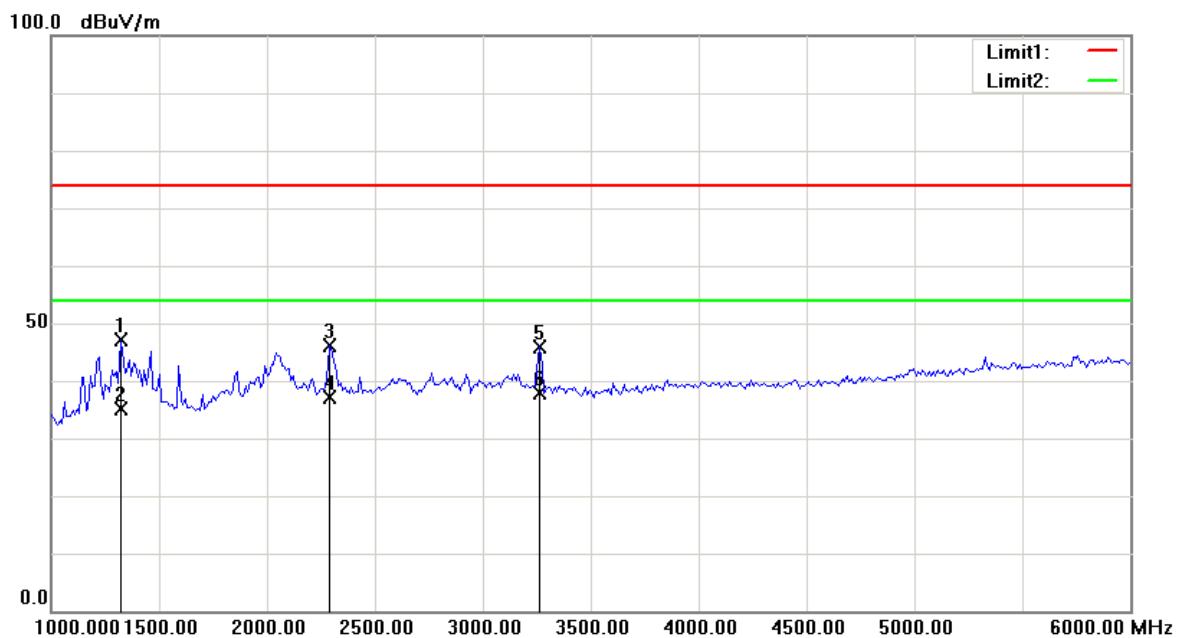
Vertical:

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave+)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
47.4600	46.92	QP	-10.72	36.20	40.00	3.80*
58.1300	47.00	QP	-13.00	34.00	40.00	6.00
214.3000	46.54	QP	-8.44	38.10	43.50	5.40*
250.1900	48.78	QP	-7.48	41.30	46.00	4.70*
260.8600	45.95	QP	-6.75	39.20	46.00	6.80
273.4700	45.97	QP	-5.87	40.10	46.00	5.90*

*Within measurement uncertainty!

2) Above 1'GJ | :*Test mode: Operating***Horizontal:**

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave+)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1330.661	45.92	peak	-1.04	44.88	74.00	29.12
1330.661	37.30	AVG	-1.04	36.26	54.00	17.74
2232.465	46.57	peak	2.15	48.72	74.00	25.28
2232.465	34.70	AVG	2.15	36.85	54.00	17.15
2923.848	39.97	peak	6.26	46.23	74.00	27.77
2923.848	30.40	AVG	6.26	36.66	54.00	17.34

Vertical:

Frequency (MHz)	Receiver Reading (dBuV/m)	Detector (PK/QP/Ave+)	Correction Factor (dB)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1320.641	48.17	peak	-1.10	47.07	74.00	26.93
1320.641	36.30	AVG	-1.10	35.20	54.00	18.80
2292.585	43.63	peak	2.38	46.01	74.00	27.99
2292.585	34.70	AVG	2.38	37.08	54.00	16.92
3264.529	39.21	peak	6.77	45.98	74.00	28.02
3264.529	31.10	AVG	6.77	37.87	54.00	16.13

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