LABCODE: 500069-0

FCC PART 15B

TEST REPORT

For

Techfaith Wireless Technology Group Limited

No.10A, Tower D2, IT Park, Electronic Town, Jiu Xian Qiao North Road, Chaoyang District, Beijing, China

FCC ID: UJQT700

Report Type:	Product Type:
Original Report	GSM/WCDMA Mobile Pad

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Report Number:	R2DG131217003-00A
Report Date:	2014-01-22
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Techfaith Wireless Technology Group Limited*'s product, model number: *T700 (FCC ID: UJQT700)* (the "EUT") in this report was a *GSM /WCDMA mobile pad,* which was measured approximately: 21.3 cm (L) x 13.5 cm (W) x 2.0 cm (H), rated input voltage: DC 3.7 V from lithium battery or DC 5V from adapter.

Adapter information: ToughShield
Model: STC-A22O50I1500C40
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 5.0V, 1.5A

** All measurement and test data in this report was gathered from production sample serial number: 131217003 (Assigned by BACL.Dongguan). The EUT was received on 2013-11-19.*

Objective

This report is prepared on behalf of *Techfaith Wireless Technology Group Limited* 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: *UJQT700* for Wifi.
FCC Part 15C DTS submissions with FCC ID: *UJQT700* for Bluetooth LE mode.
FCC Part 15C DSS submissions with FCC ID: *UJQT700* for Bluetooth BDR, EDR mode.
FCC Part15C DXX submissions with FCC ID: *UJQT700.*
FCC Part 22H & 24E PCB submissions with FCC ID: *UJQT700.*

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.

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). The highest operating frequency is 1200 MHz.

EUT Exercise Software

The software “Winthrax.exe” was used in test.

Equipment Modifications

No modification was made to the EUT.

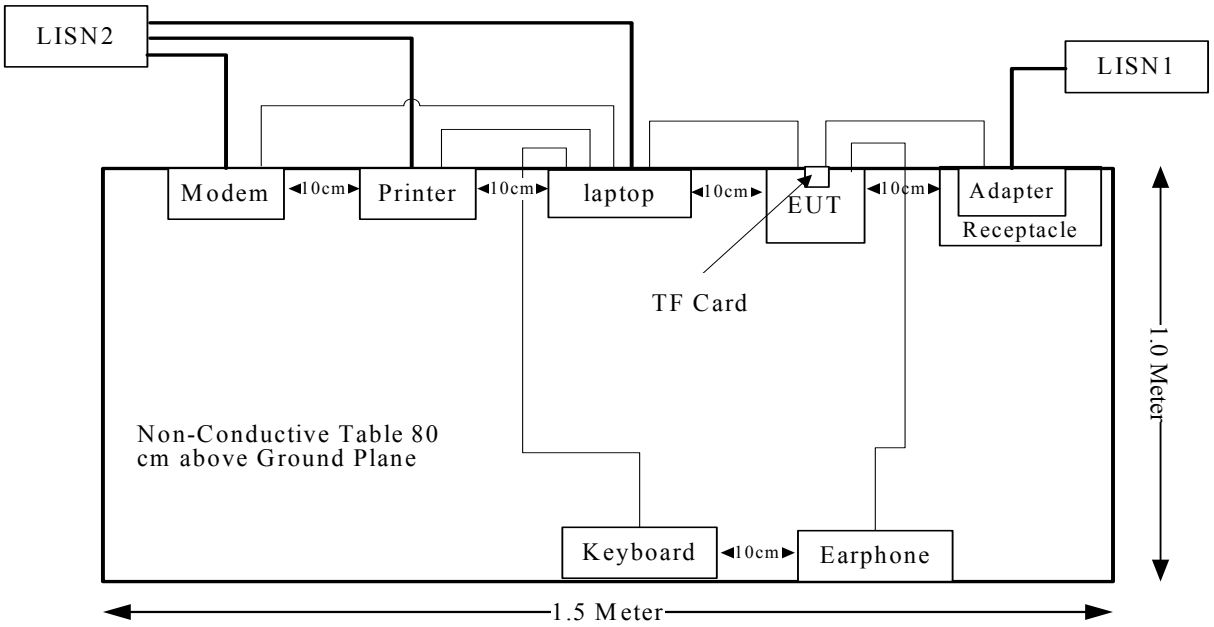
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HP	Printer	C3941A	JPTVOB2337
SAST	Modem	AEM-2100	0293
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Laptop	PP11L	N/A
SAMSUNG	TF Card	4G	N/A
N/A	Earphone	N/A	N/A

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Printer Cable	Yes	No	1.2	Parallel Port of Laptop	Printer
Serial Cable	Yes	No	1.2	Serial Port of Laptop	Modem
Keyboard Cable	Yes	Yes	1.5	USB Port of Laptop	Keyboard
USB Cable	Yes	No	1.2	USB Port of Laptop	EUT
USB Cable	Yes	No	1.2	Adapter	EUT

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_{cispr} 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.

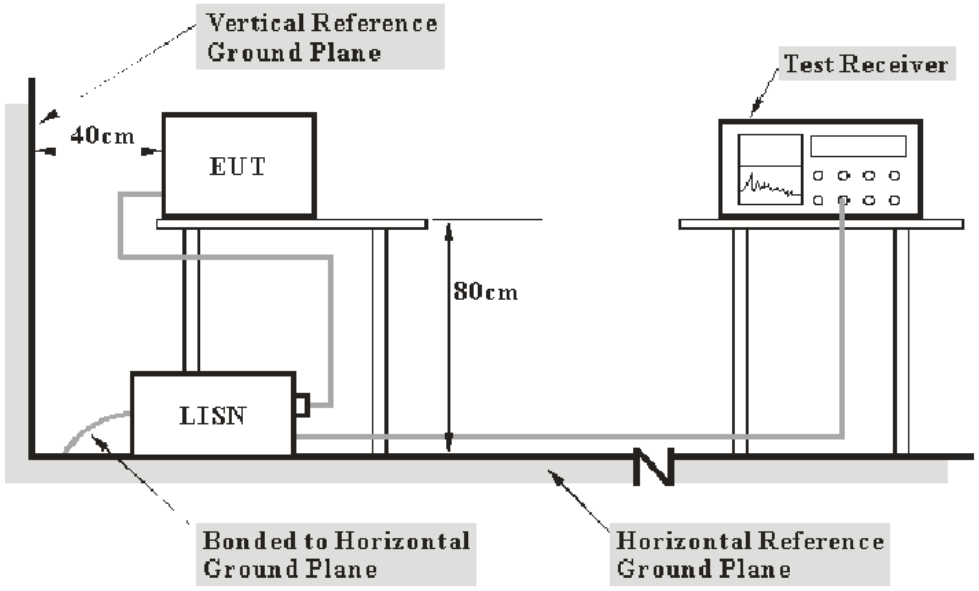
If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), 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_{cispr}

Measurement	U_{cispr}
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 spacing between the peripherals was 10 cm.

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:

Frequency Range	IF B/W
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:

Margin = Limit – 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	2013-11-20	2014-11-19
R&S	Two-line V-network	ENV216	3560.6550.12	2013-02-18	2014-02-17
R&S	L.I.S.N	ESH3-Z5	100113	N/A	N/A
BACL	Test Software	BACL-EMC	V1.0-2010	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 recorded data in following table, the EUT complied with the FCC Part 15.107, with the worst margin reading of:

14.43 dB at **0.830 MHz** in the **Neutral** conducted mode

Test Data

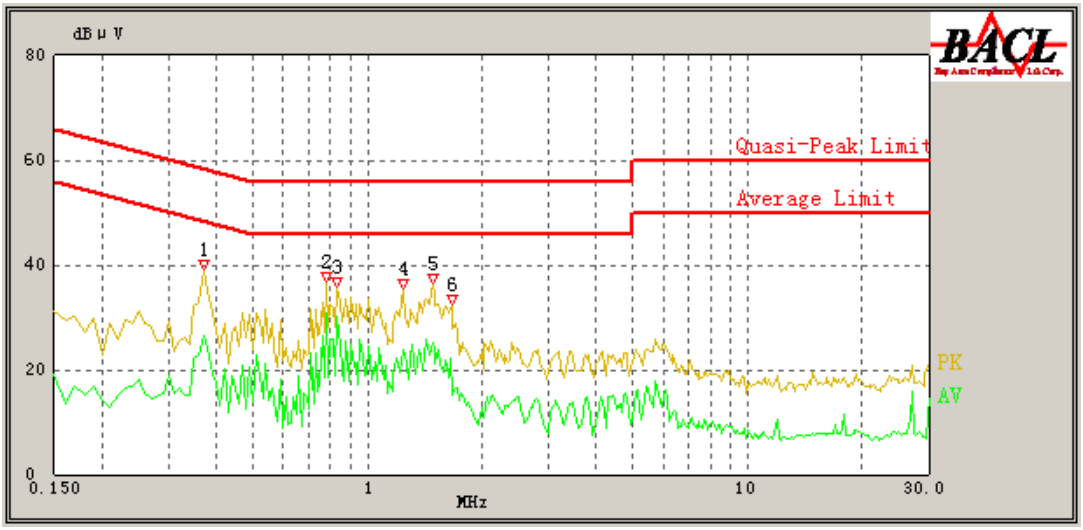
Environmental Conditions

Temperature:	18.3 °C
Relative Humidity:	39 %
ATM Pressure:	101.8 kPa

The testing was performed by Ares Liu on 2013-12-23.

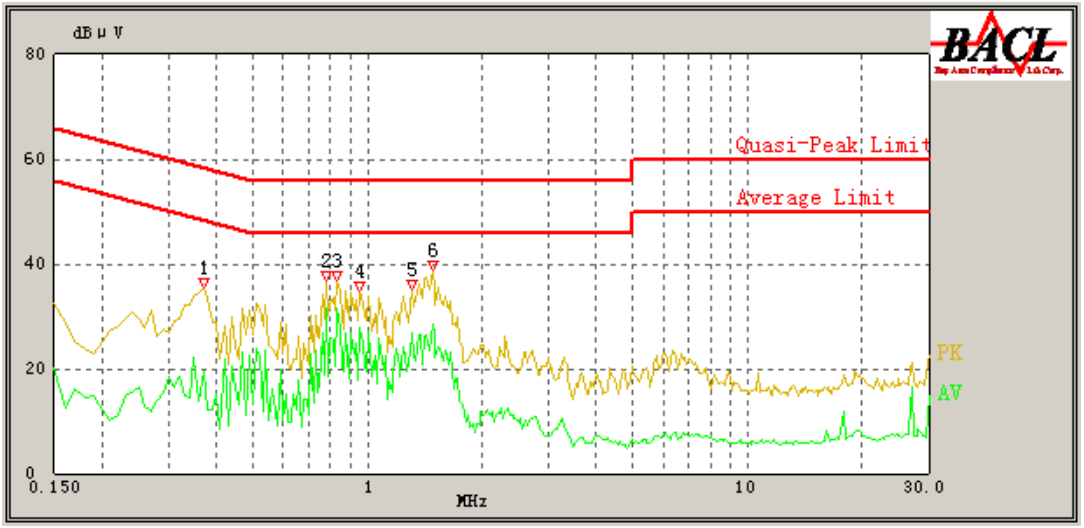
Test mode: USB Downloading

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.370	35.90	9.68	58.50	22.60	QP
0.370	26.43	9.68	48.50	22.07	AV
0.780	33.34	9.67	56.00	22.66	QP
0.780	31.00	9.67	46.00	15.00	AV
0.830	34.14	9.67	56.00	21.86	QP
0.830	30.24	9.67	46.00	15.76	AV
1.240	29.19	9.68	56.00	26.81	QP
1.240	23.81	9.68	46.00	22.19	AV
1.480	32.91	9.68	56.00	23.09	QP
1.480	25.28	9.68	46.00	20.72	AV
1.670	27.72	9.68	56.00	28.28	QP
1.650	22.24	9.68	46.00	23.76	AV

120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
0.370	31.39	9.67	58.50	27.11	QP
0.370	19.50	9.67	48.50	29.00	AV
0.780	35.17	9.68	56.00	20.83	QP
0.780	31.41	9.68	46.00	14.59	AV
0.830	35.72	9.68	56.00	20.28	QP
0.830	31.57	9.68	46.00	14.43	AV
0.950	32.89	9.69	56.00	23.11	QP
0.950	27.72	9.69	46.00	18.28	AV
1.310	32.66	9.69	56.00	23.34	QP
1.310	26.68	9.69	46.00	19.32	AV
1.480	35.39	9.69	56.00	20.61	QP
1.480	28.55	9.69	46.00	17.45	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 ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

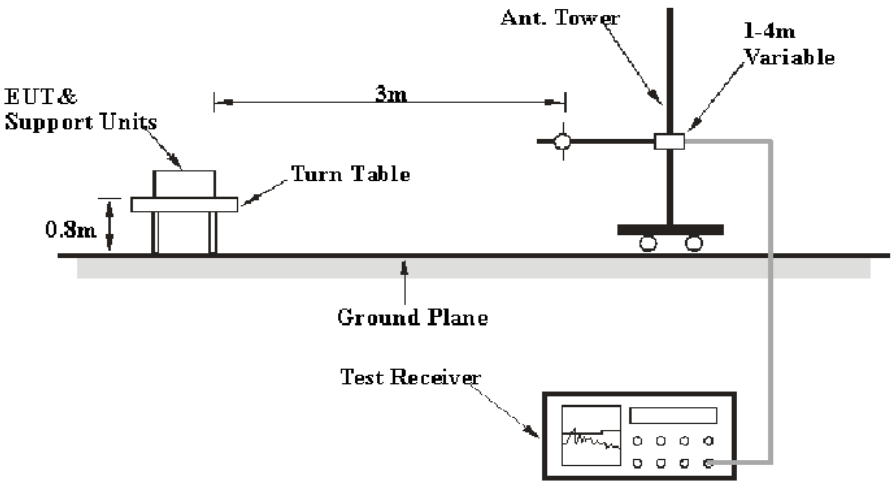
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

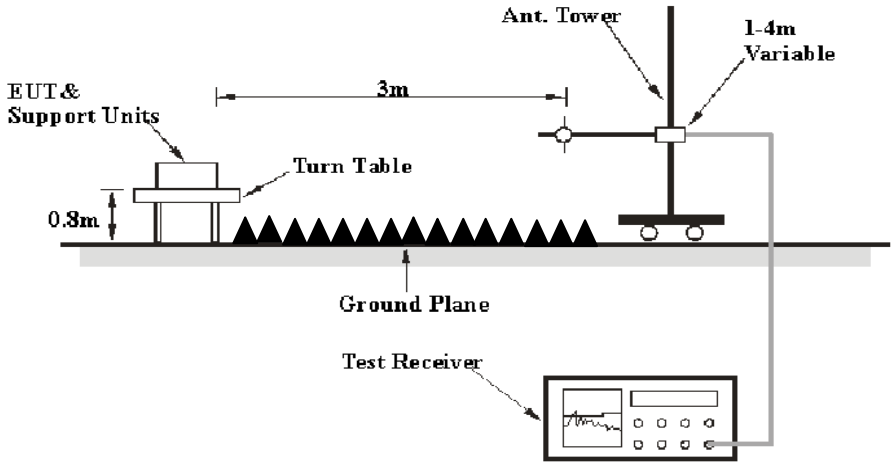
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 spacing between the peripherals was 10 cm.

The adapter was 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/Laptop 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:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2013-05-06	2014-05-05
Sunol Sciences	Antenna	JB3	A060611-1	2011-09-06	2014-09-05
HP	Amplifier	8447E	2434A02181	2013-09-06	2014-09-05
R&S	Spectrum Analyzer	FSEM	DE31388	2013-05-07	2014-05-06
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-2-19	2014-2-18
Farad	Test Software	EZ-EMC	V1.1.4.2	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:

4.80 dB at **30.0000 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

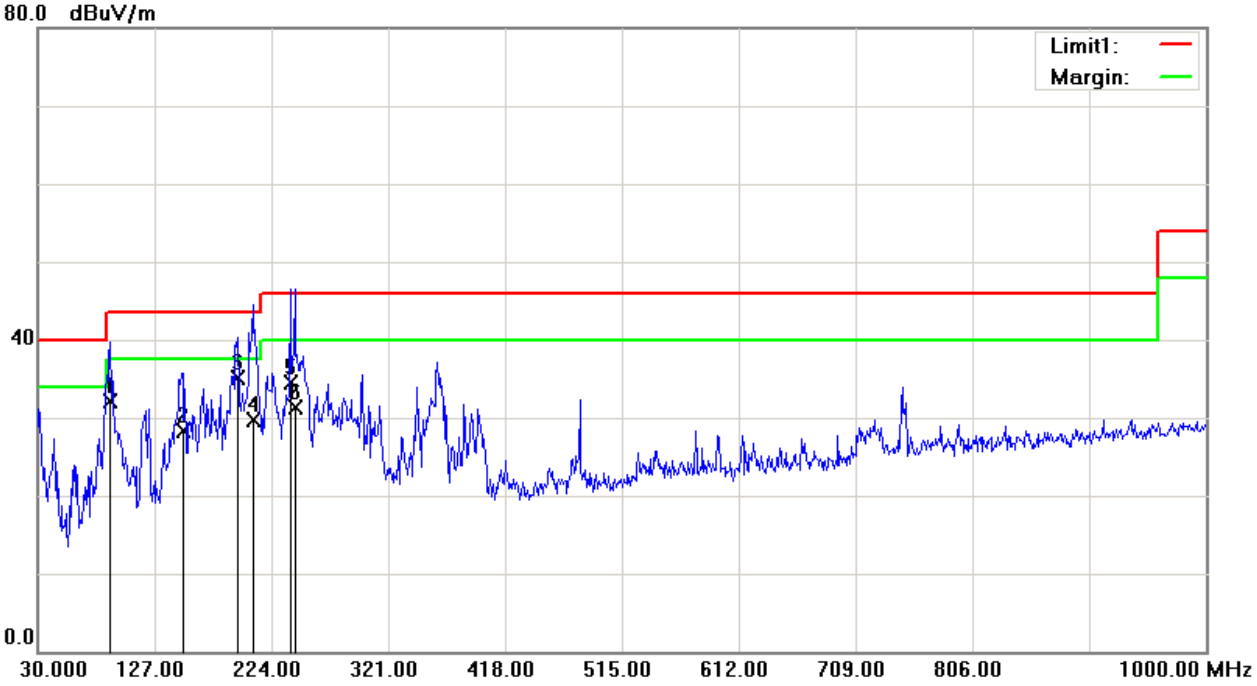
Temperature:	18.3 °C
Relative Humidity:	50 %
ATM Pressure:	102 kPa

The testing was performed by Ares Liu on 2013-12-28.

1) Below 1 GHz:

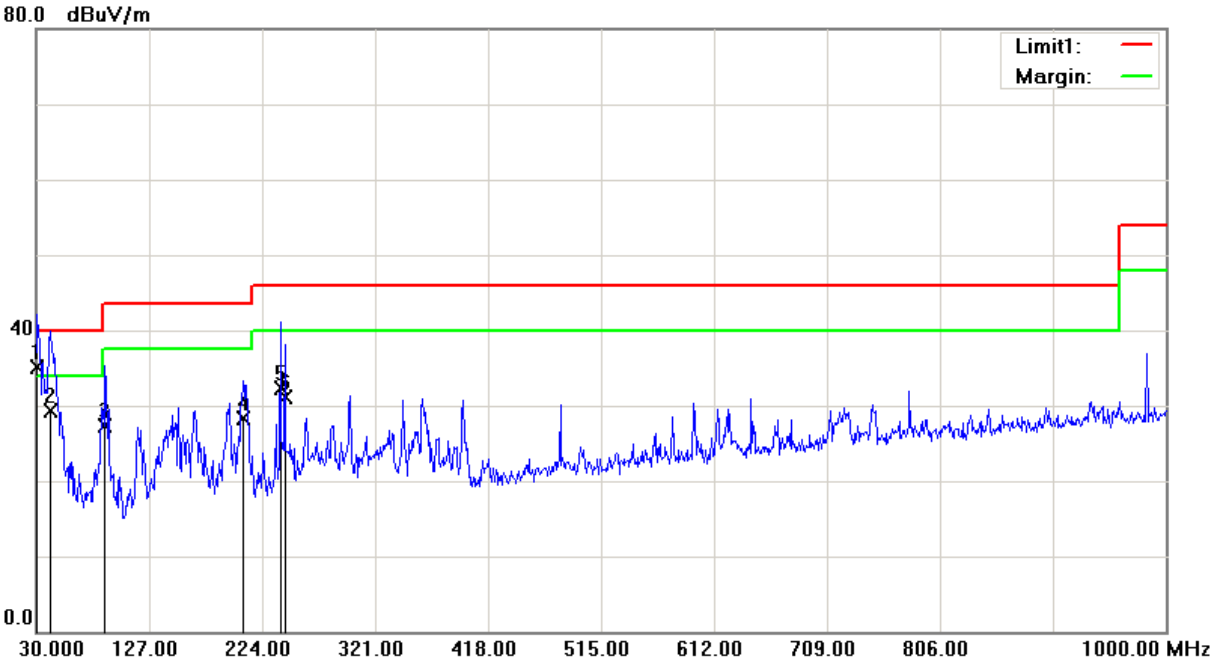
Test mode: USB Downloading

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
90.1400	44.53	QP	-12.43	32.10	43.50	11.40
150.2800	35.69	QP	-7.39	28.30	43.50	15.20
195.8700	43.05	QP	-7.85	35.20	43.50	8.30
208.4800	38.37	QP	-8.67	29.70	43.50	13.80
239.5200	42.14	QP	-7.64	34.50	46.00	11.50
243.4000	38.85	QP	-7.45	31.40	46.00	14.60

Vertical:



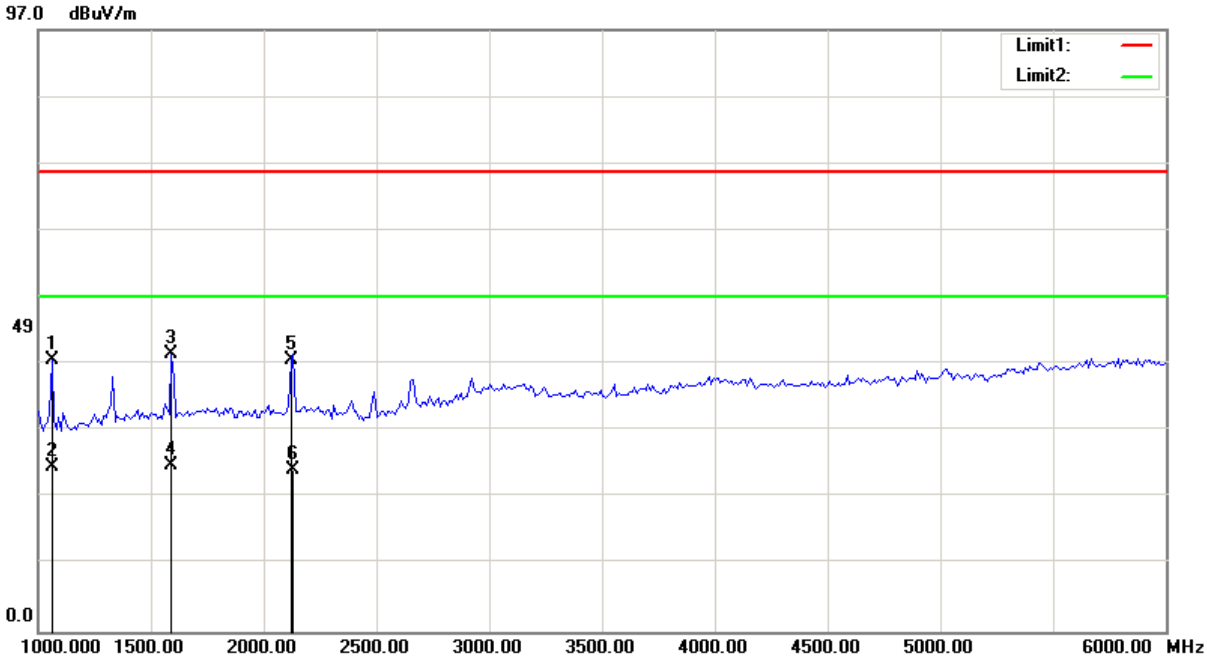
Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	33.75	QP	1.45	35.20	40.00	4.80*
41.6400	36.86	QP	-7.46	29.40	40.00	10.60
89.1700	39.83	QP	-12.53	27.30	43.50	16.20
207.5100	37.05	QP	-8.65	28.40	43.50	15.10
239.5200	39.94	QP	-7.64	32.30	46.00	13.70
243.4000	38.65	QP	-7.45	31.20	46.00	14.80

*Within measurement uncertainty!

2) Above 1 GHz:

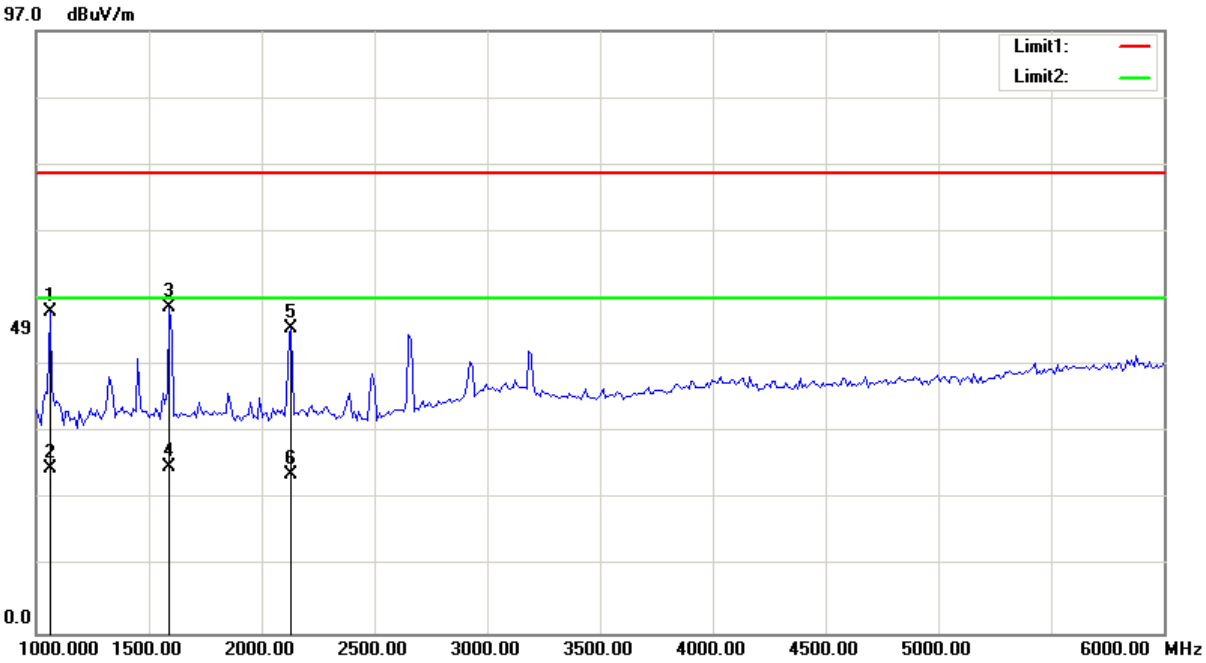
Test mode: USB Downloading

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1060.120	45.85	peak	-2.09	43.76	74.00	30.24
1060.120	28.70	AVG	-2.09	26.61	54.00	27.39
1591.182	44.61	peak	0.10	44.71	74.00	29.29
1591.182	26.64	AVG	0.10	26.74	54.00	27.26
2122.244	41.94	peak	1.72	43.66	74.00	30.34
2132.265	24.21	AVG	1.78	25.99	54.00	28.01

Vertical:



Frequency (MHz)	Receiver Reading (dBuV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1060.120	53.93	peak	-2.09	51.84	74.00	22.16
1060.120	28.53	AVG	-2.09	26.44	54.00	27.56
1591.182	52.41	peak	0.10	52.51	74.00	21.49
1591.182	26.63	AVG	0.10	26.73	54.00	27.27
2132.265	47.38	peak	1.78	49.16	74.00	24.84
2132.265	23.75	AVG	1.78	25.53	54.00	28.47

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