



FCC PART 15B TEST REPORT

For

i.safe MOBILE GmbH

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FCC ID:2AACZ-INNOVATION2X

Report Type: Original Report	Product Type: Mobile phone
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Report Number:	<u>RDG140805004-00D</u>
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *i.safe MOBILE GmbH*'s product, model number: *INNOVATION2.0 (FCC ID: 2AACZ-INNOVATION2X)* (or the "EUT") in this report was a *Mobile phone*, which was measured approximately: 12.3 cm (L) x 7.0 cm (W) x 3.0 cm (H), rated input voltage: DC3.7 V rechargeable Li-ion or DC5V charging from adapter.

The highest operating frequency is 1.2 GHz.

Adapter information: RugGear
Model: ICP12-050-2000B
Input: 100-240V~50/60Hz, 0.3A
Output: DC5.0V, 2000mA

** All measurement and test data in this report was gathered from production sample serial number: 1020.1201.0540 (Assigned by BACL, Dongguan). The EUT was received on 2014-08-08.*

Objective

This report is prepared on behalf of *i.safe MOBILE GmbH* 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 DSS submissions with FCC ID: 2AACZ-INNOVATION2X.
FCC Part 22H, 24E PCE submissions with FCC ID: 2AACZ-INNOVATION2X.
FCC Part 15C DTS submissions with FCC ID: 2AACZ-INNOVATION2X.

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.

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 exercise software “Withrax” was used during test.

Equipment Modifications

No modification was made to the EUT.

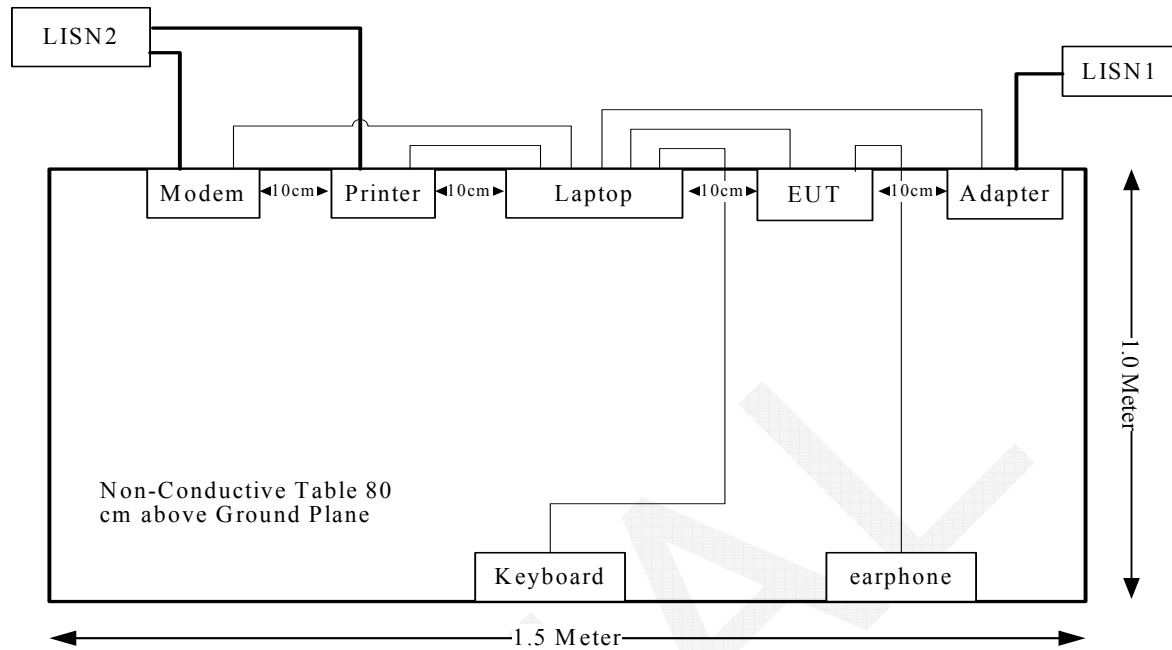
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017
HP	Printer	C3941A	JPTVOB2337
DELL	Keyboard	L100	CNORH656658907BL05DC
SAST	Modem	AEM-2100	0293
Kingston	Micro SD Card	4GB	/

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Serial Cable	yes	No	1.2	Serial Port of Laptop	Modem
Parallel Cable	yes	No	1.2	Parallel Port of Laptop	Printer
Keyboard Cable	yes	No	1.8	USB Port of Laptop	Keyboard
USB Cable	yes	No	1.5	USB Port of Laptop	EUT
Earphone Cable	No	No	1.2	Earphone	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:

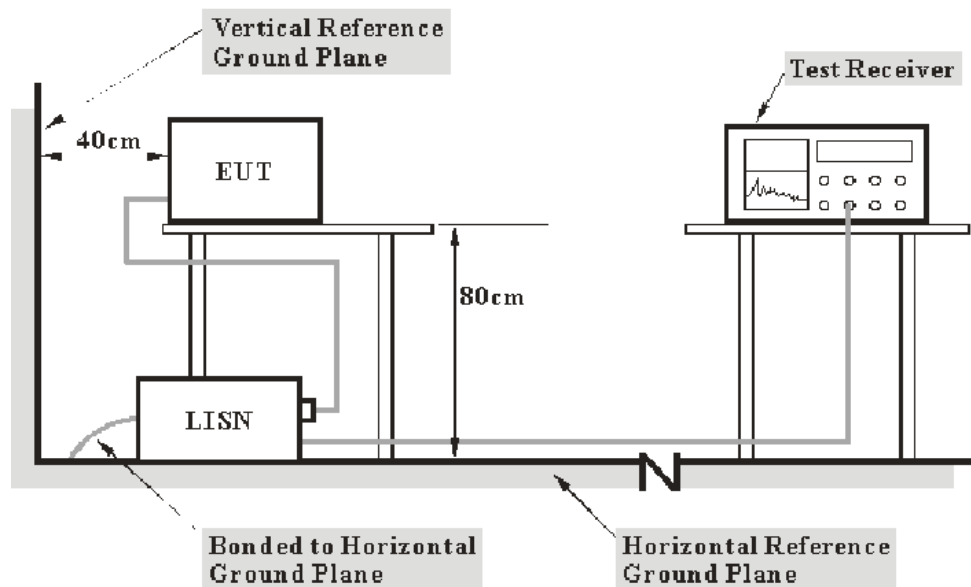
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

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 adapter of laptop 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 30MHz.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-10-16	2015-10-16
R&S	L.I.S.N	ESH3-Z5	843331/015	N/A	N/A
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-01-22	2015-01-22
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

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

Test Procedure

During the conducted emission test, the adapter of laptop 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

9.7 dB at 0.309742MHz in the Neutral conducted mode

Test Data

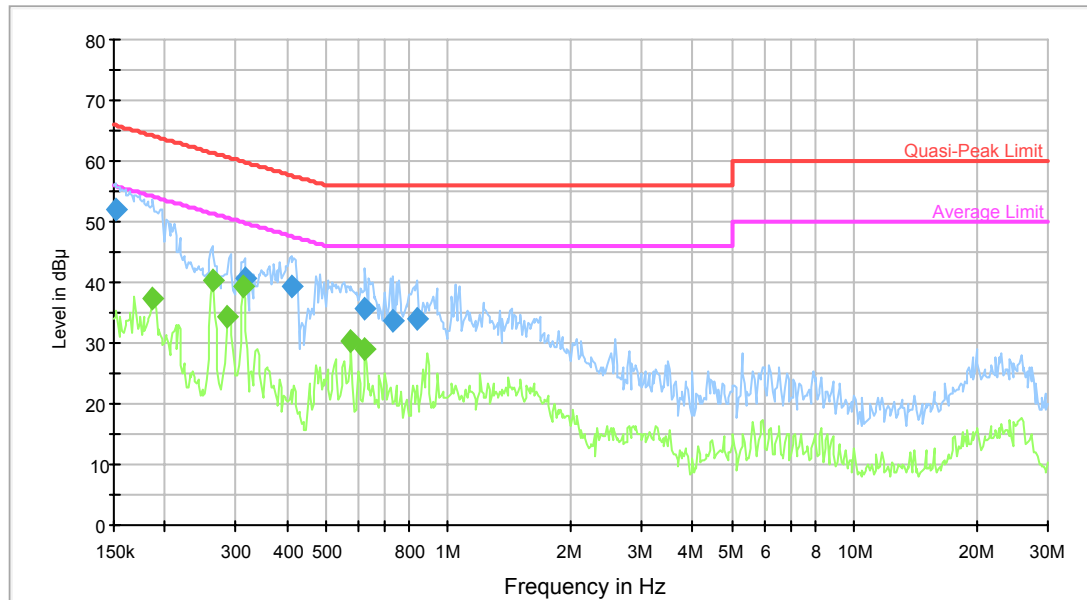
Environmental Conditions

Temperature:	27.6°C
Relative Humidity:	51%
ATM Pressure:	100.3 kPa

The testing was performed by Dean Liu on 2014-09-11

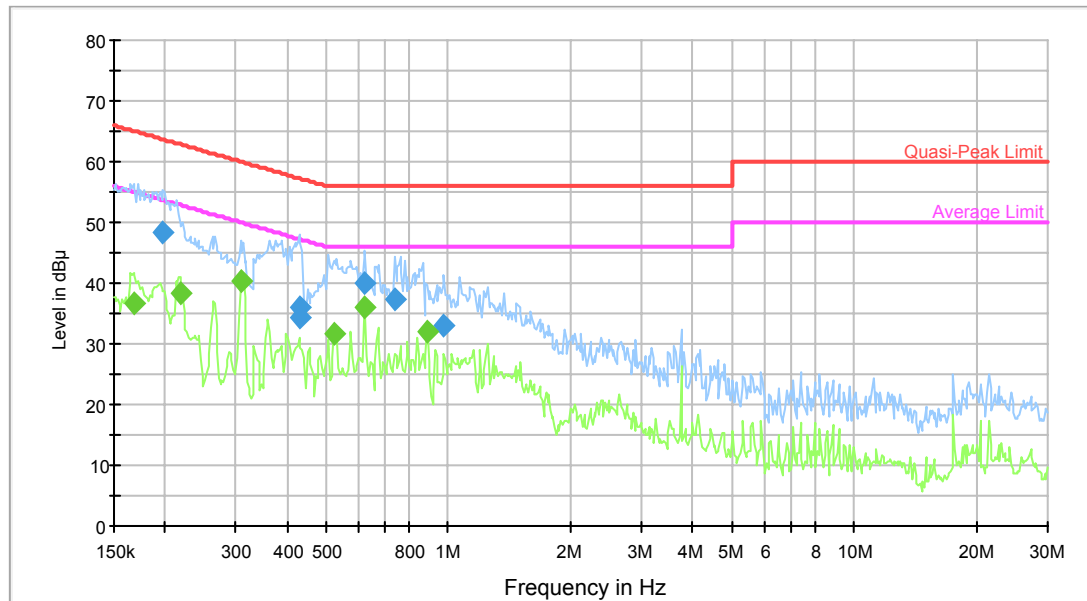
Test mode: USB Downloading

AC 120V/60Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.151200	52.1	9.000	L1	10.1	13.8	65.9	Compliance
0.314718	40.6	9.000	L1	10.7	19.2	59.8	Compliance
0.409372	39.4	9.000	L1	10.5	18.2	57.7	Compliance
0.624492	35.7	9.000	L1	10.5	20.3	56.0	Compliance
0.732382	33.7	9.000	L1	10.6	22.3	56.0	Compliance
0.838622	34.0	9.000	L1	10.5	22.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.187494	37.3	9.000	L1	10.6	16.8	54.1	Compliance
0.264113	40.2	9.000	L1	10.7	11.1	51.3	Compliance
0.286019	34.2	9.000	L1	10.7	16.4	50.6	Compliance
0.312220	39.2	9.000	L1	10.7	10.7	49.9	Compliance
0.576662	30.4	9.000	L1	10.4	15.6	46.0	Compliance
0.624492	28.9	9.000	L1	10.5	17.1	46.0	Compliance

AC 120V/60Hz, Neutral:

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.198249	48.2	9.000	N	11.3	15.5	63.7	Compliance
0.429420	35.9	9.000	N	10.6	21.3	57.3	Compliance
0.432855	34.3	9.000	N	10.6	22.9	57.2	Compliance
0.624492	39.8	9.000	N	10.5	16.2	56.0	Compliance
0.738241	37.3	9.000	N	10.6	18.7	56.0	Compliance
0.975701	33.1	9.000	N	10.5	22.9	56.0	Compliance

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.167702	36.5	9.000	N	10.6	18.6	55.1	Compliance
0.218141	38.3	9.000	N	11.3	14.6	52.9	Compliance
0.309742	40.3	9.000	N	11.1	9.7	50.0	Compliance
0.524077	31.6	9.000	N	10.3	14.4	46.0	Compliance
0.624492	36.1	9.000	N	10.5	9.9	46.0	Compliance
0.886728	32.0	9.000	N	10.6	14.0	46.0	Compliance

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

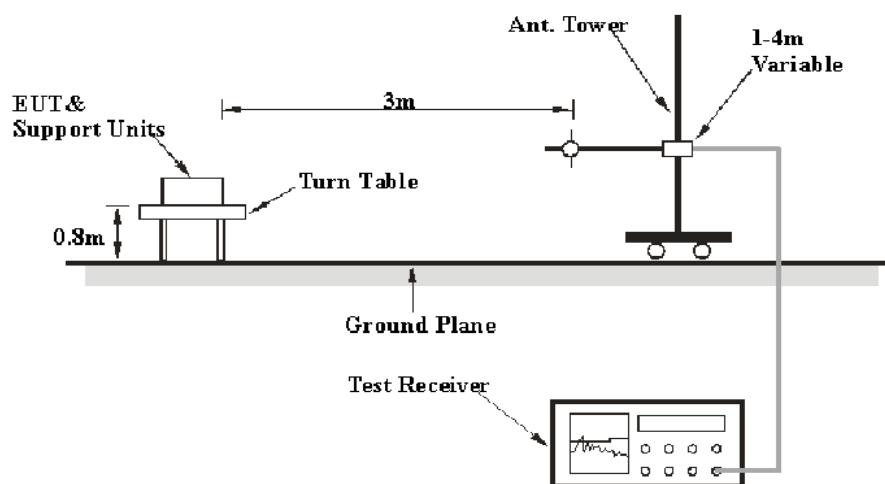
6G~18GHz: 5.23 dB

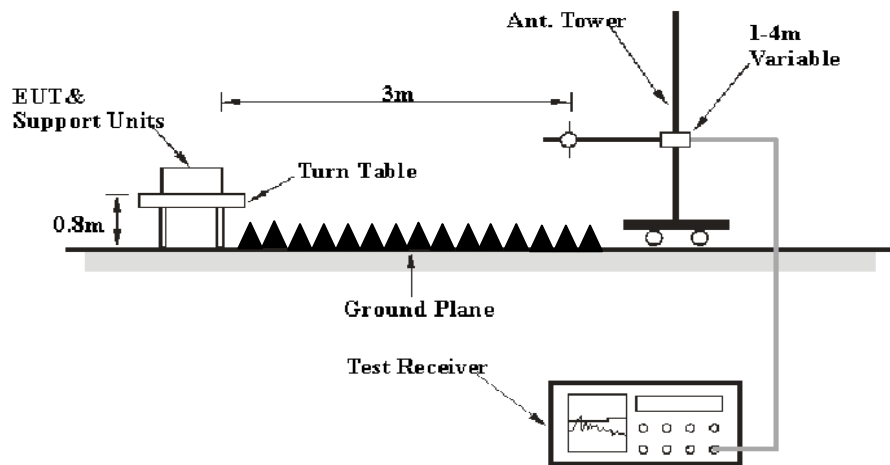
Table 2 – Values of U_{cisp}

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 1GHz:

The radiated emission test was 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 laptop 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 6GHz.

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
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

For the radiated emissions test, the adapter of 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
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, traceable to National Primary Standards and International System of Units (SI).

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 Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

0.70 dB at 720.6400 MHz in the Horizontal polarization

Test Data

Environmental Conditions

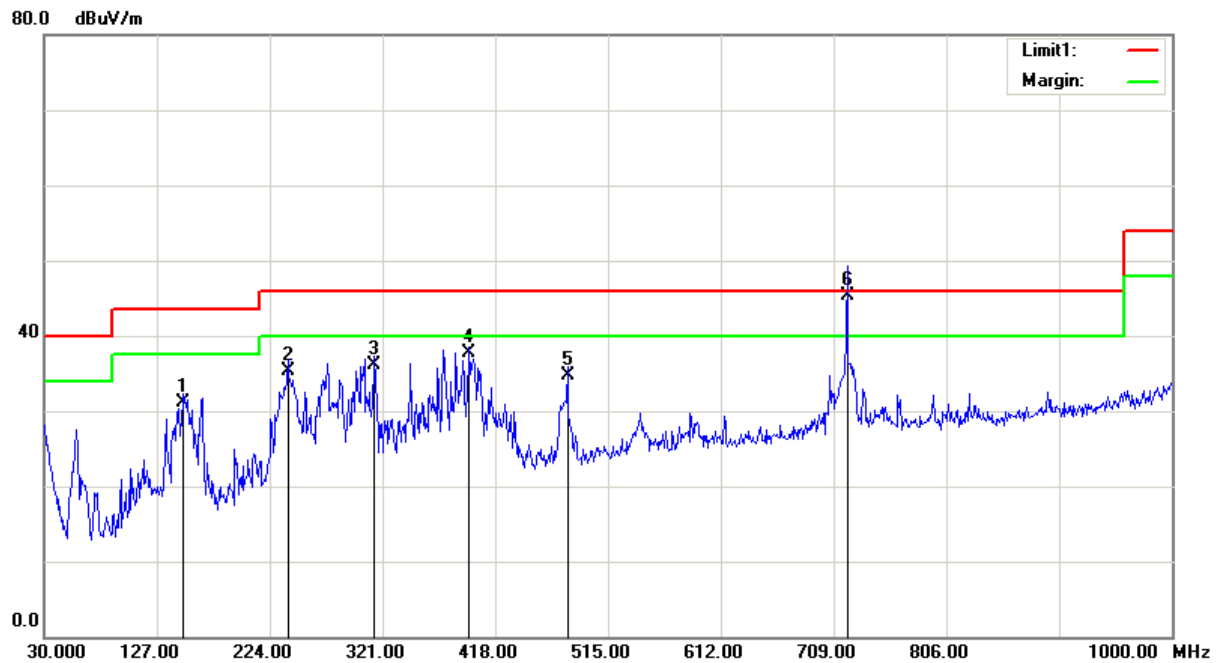
Temperature:	25.5 °C
Relative Humidity:	55 %
ATM Pressure:	101 kPa

The testing was performed by Dean Liu on 2014-11-03

Test mode: USB Downloading

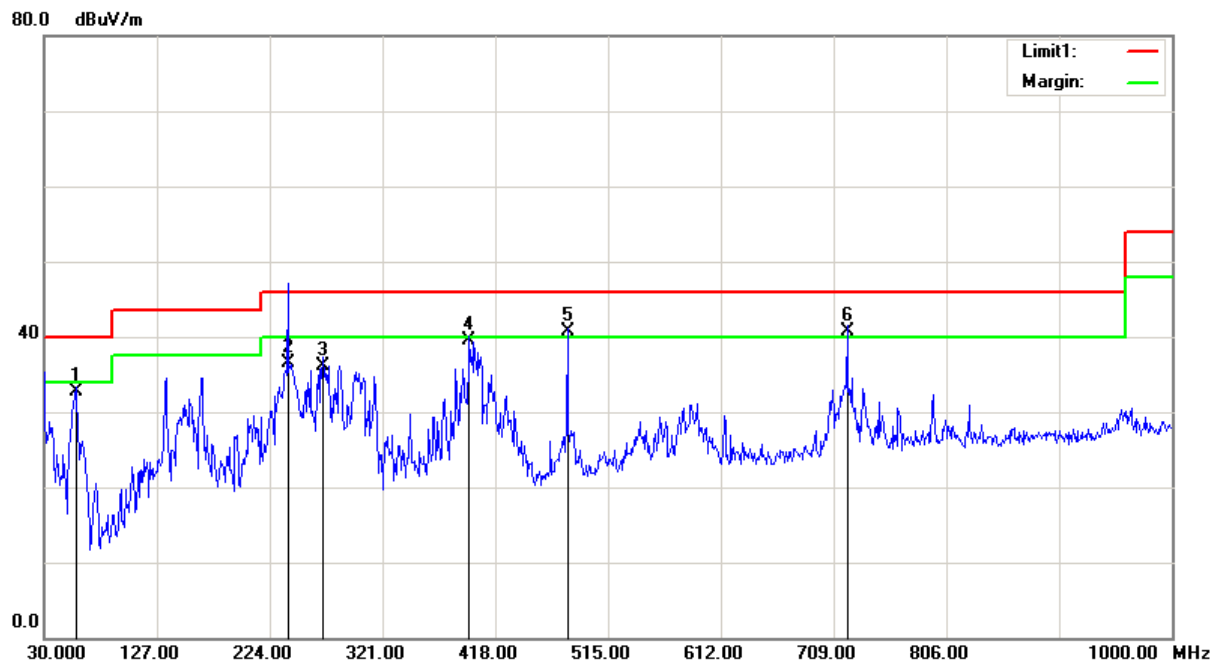
1) Below 1GHz

Horizontal:



Frequency (MHz)	Receiver Reading (dBμV)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
149.3100	38.33	QP	-7.23	31.10	43.50	12.40
239.5200	43.37	QP	-7.97	35.40	46.00	10.60
314.2100	41.79	QP	-5.59	36.20	46.00	9.80
395.6900	41.70	QP	-3.90	37.80	46.00	8.20
480.0800	36.13	QP	-1.43	34.70	46.00	11.30
720.6400	43.78	QP	1.52	45.30	46.00	0.70*

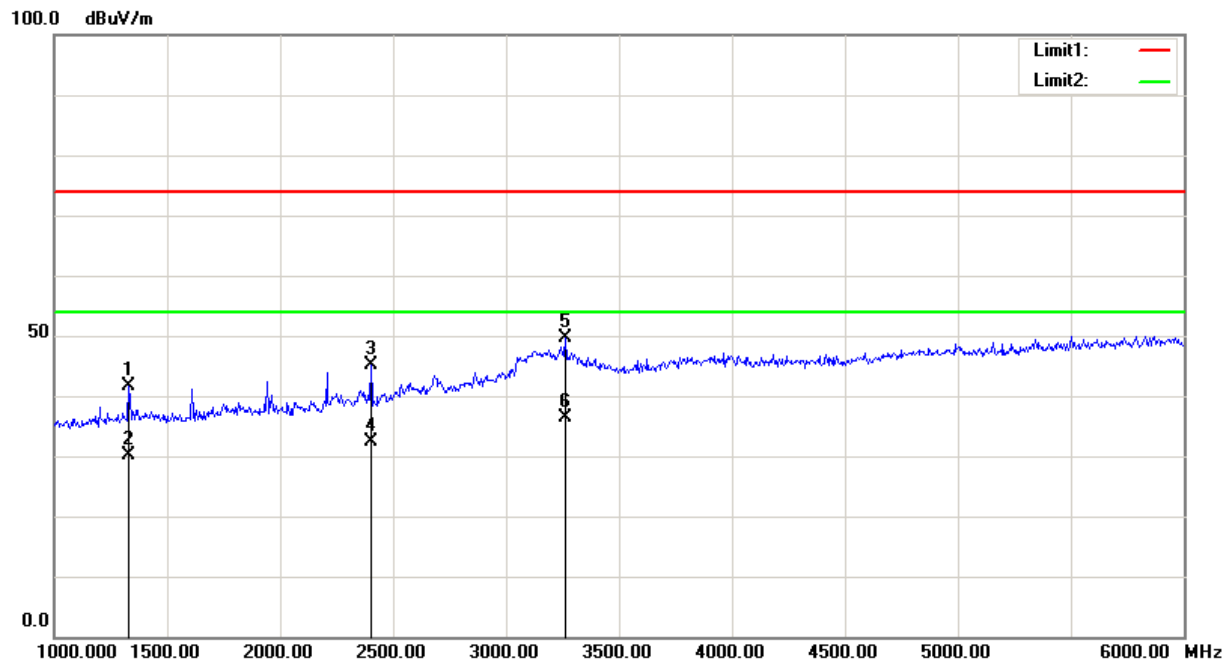
*Within measurement uncertainty!

Vertical:

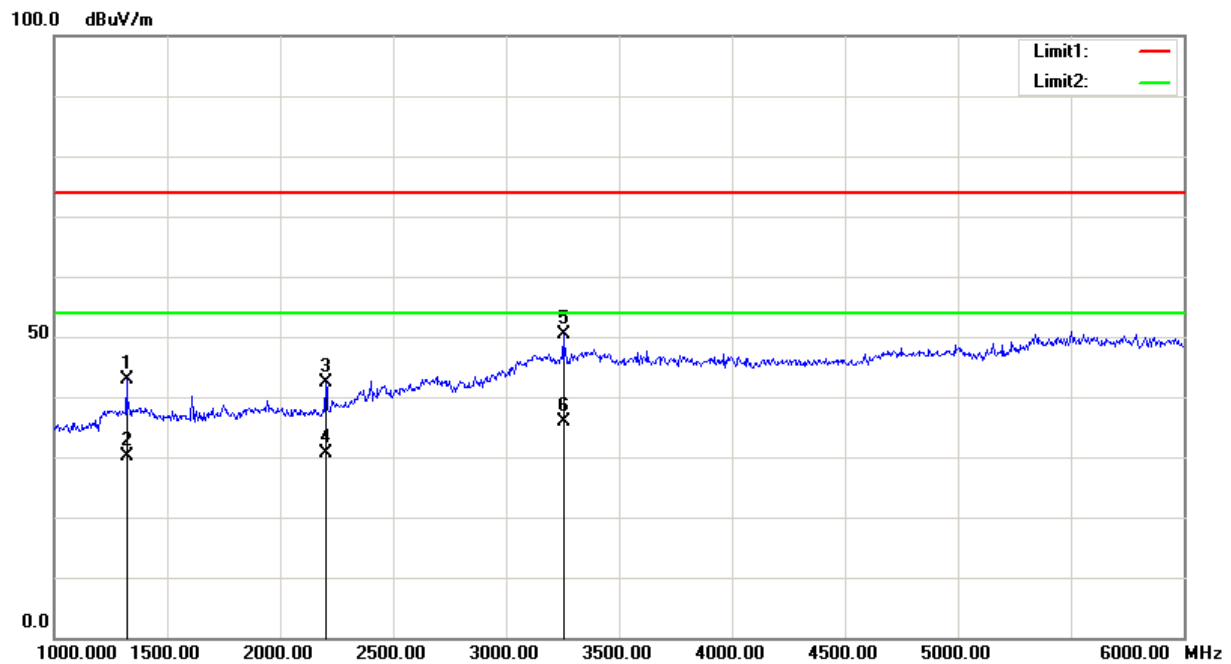
Frequency (MHz)	Receiver Reading (dB μ V)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
57.1600	45.90	QP	-13.10	32.80	40.00	7.20
239.5200	44.47	QP	-7.97	36.50	46.00	9.50
269.5900	42.46	QP	-6.26	36.20	46.00	9.80
395.6900	43.50	QP	-3.90	39.60	46.00	6.40
480.0800	42.13	QP	-1.43	40.70	46.00	5.30
720.6400	39.28	QP	1.52	40.80	46.00	5.20

2) Above 1GHz

Horizontal:



Frequency (MHz)	Receiver Reading (dB μ V)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1330.661	42.47	peak	-0.79	41.68	74.00	32.32
1330.661	31.00	AVG	-0.79	30.21	54.00	23.79
2402.806	42.36	peak	2.75	45.11	74.00	28.89
2402.806	29.69	AVG	2.75	32.44	54.00	21.56
3264.529	42.65	peak	6.88	49.53	74.00	24.47
3264.529	29.39	AVG	6.88	36.27	54.00	17.73

Vertical:

Frequency (MHz)	Receiver Reading (dB μ V)	Detector (PK/QP/Ave)	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1320.641	43.59	peak	-0.83	42.76	74.00	31.24
1320.641	30.95	AVG	-0.83	30.12	54.00	23.88
2202.405	40.46	peak	2.00	42.46	74.00	31.54
2202.405	28.65	AVG	2.00	30.65	54.00	23.35
3254.509	43.54	peak	6.96	50.50	74.00	23.50
3254.509	28.88	AVG	6.96	35.84	54.00	18.16

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