



FCC PART 15C

TEST REPORT

For

Zhuhai Unitech Power Technology Co., Ltd.

No.102, Yinhua Road, Xiangzhou, Zhuhai, Guangdong, China

FCC ID: Z5FIKEYMU-1

Report Type: Original Report	Product Type: Smart Key (Zigbee)
Test Engineer: <u>Eric Lee</u>	
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Reviewed By: <u>EMC Engineer</u>	
Test Laboratory: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	

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* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk “★” (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Zhuhai Unitech Power Technology Co., Ltd.*'s product, model number: *iKeyMU-1_F (FCC ID: Z5FIKEYMU-1)* (the "EUT") in this report is a *Smart Key*, which was measured approximately: 13.2 cm (L) x 7.2 cm (W) x 3.1 cm (H), rated input voltage: DC 4.2V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1110042 (Assigned by BACL, Shenzhen). The EUT was received on 2011-10-13.*

Objective

This report is prepared on behalf of *Zhuhai Unitech Power Technology Co., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207 and 15.209 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: Z5FIADAPTERL
FCC Part 15.247 DTS submissions with FCC ID: Z5FIKEYMU-1

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. 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. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode which was selected by manufacturer.

EUT Exercise Software

Software was provided by client.

Equipment Modifications

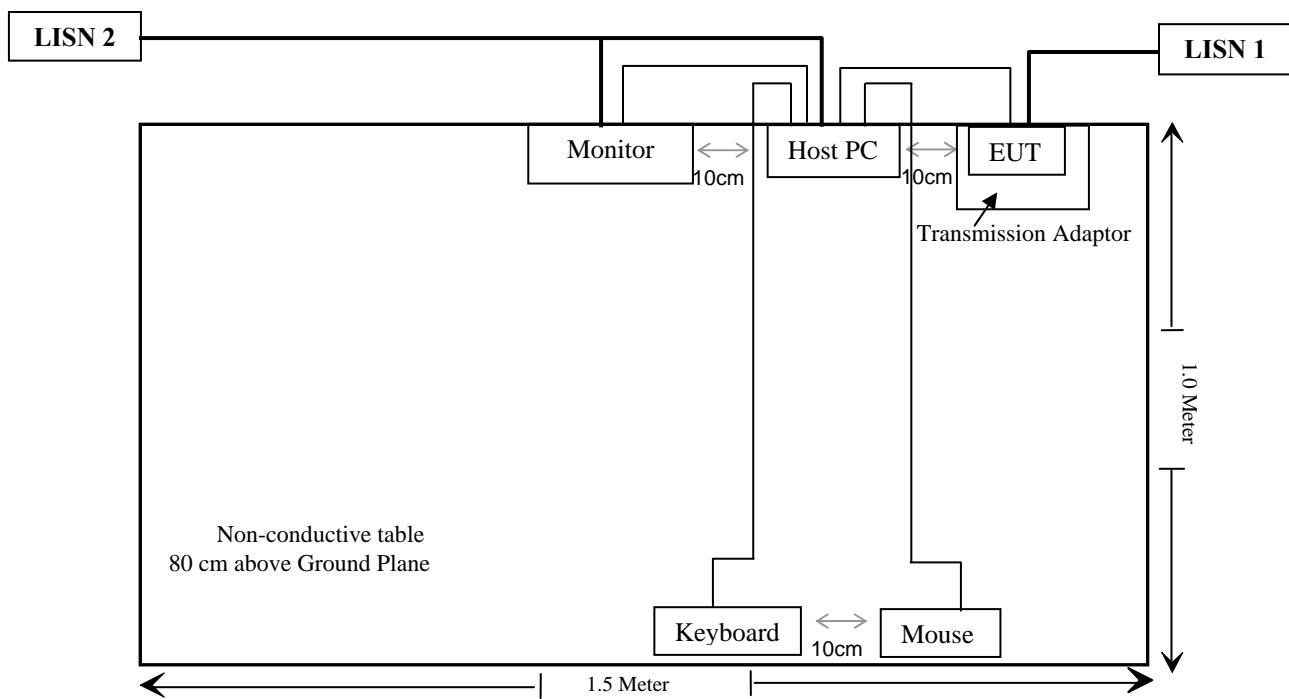
No modifications were made to the unit tested.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Host PC	1#	N/A
DELL	Keyboard 1#	L100	CNORH656658907BL04TY
DELL	Mouse 1#	MOC5UO	G1B0096D
SAMSUNG	Monitor	225MS	CR22HV2P401073M
Zhuhai Unitech Power Technology Co., Ltd	Transmission Adaptor	iAdapterL-2_FU	N/A

External I/O Cabling List and Details

Cable Description	Length (m)	From	To
Shielded Detachable Keyboard Cable	1.5	Keyboard Port/Host	Host PC
Shielded Detachable Mouse Cable	1.2	Mouse Port/Host	Host PC
Unshielded Detachable VGA Cable	1.5	VGA Port/Host	Monitor
Unshielded Detachable RS-232 Cable	1.0	EUT	Host PC

Block Diagram of Test Setup

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.209	Radiated Emissions	Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT owns one integral antenna, which in accordance to section 15.203; please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

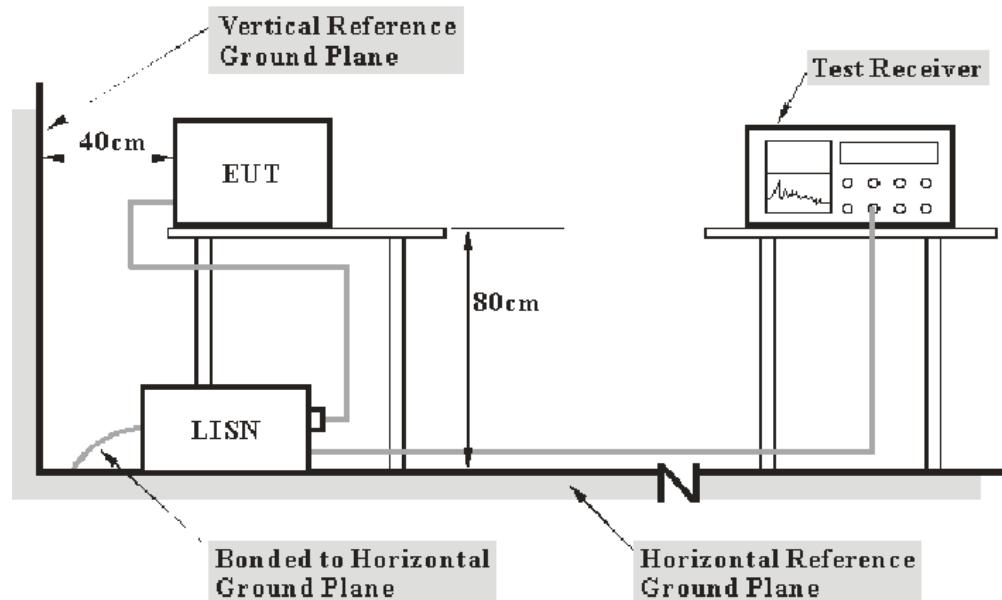
FCC §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence).

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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The 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:

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

Test Procedure

During the conducted emission test, the EUT was connected to the 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2011-07-08	2012-07-07

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Results Summary

According to the recorded data in following table, the EUT complied with the [FCC Part 15.207](#), with the worst margin reading of:

10.89 dB at 27.120 MHz in the Line conducted mode

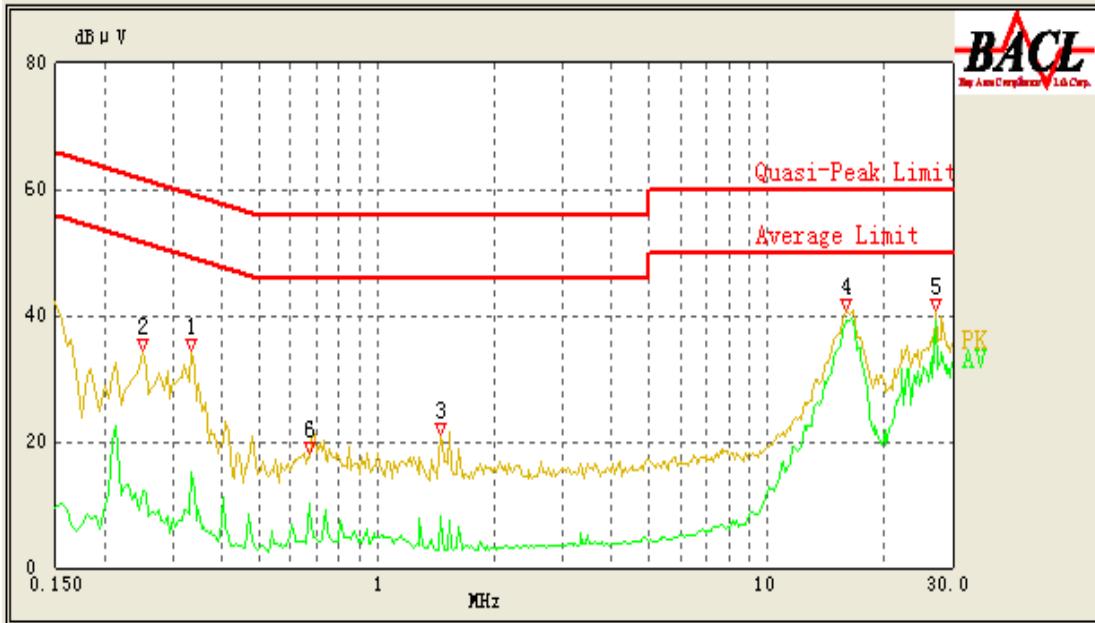
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

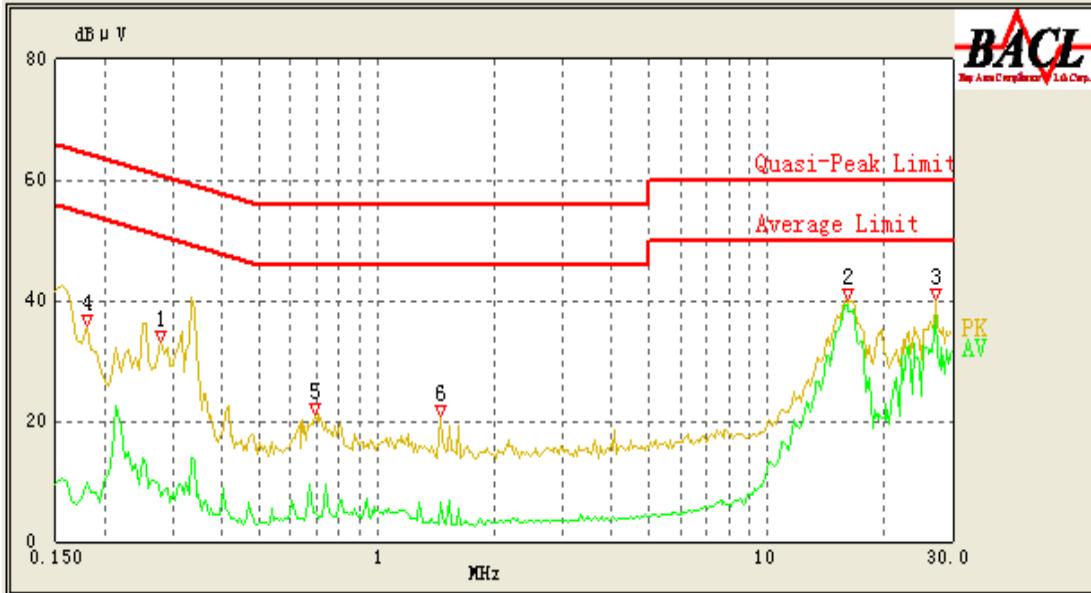
The testing was performed by Eric Lee on 2011-11-16.

AC 120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
27.120	39.11	12.66	50.00	10.89	Ave.
16.045	39.02	11.46	50.00	10.98	Ave.
27.120	38.98	12.66	60.00	21.02	QP
0.250	29.14	10.23	63.14	34.00	QP
0.335	15.13	10.23	50.71	35.58	Ave.
0.335	25.01	10.23	60.71	35.70	QP
0.670	10.21	10.24	46.00	35.79	Ave.
1.460	8.05	10.28	46.00	37.95	Ave.
1.460	17.02	10.28	56.00	38.98	QP
0.250	12.30	10.23	53.14	40.84	Ave.
16.045	18.51	11.46	60.00	41.49	QP
0.670	14.23	10.24	56.00	41.77	QP

AC 120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
16.090	39.08	11.46	50.00	10.92	Ave.
27.120	37.59	12.66	50.00	12.41	Ave.
27.120	39.02	12.66	60.00	20.98	QP
16.090	31.39	11.46	60.00	28.61	QP
1.460	6.57	10.28	46.00	39.43	Ave.
1.460	16.46	10.28	56.00	39.54	QP
0.690	14.94	10.24	56.00	41.06	QP
0.690	4.87	10.24	46.00	41.13	Ave.
0.280	20.15	10.23	62.29	42.14	QP
0.280	7.63	10.23	52.29	44.66	Ave.
0.180	9.83	10.23	55.14	45.31	Ave.
0.180	19.15	10.23	65.14	45.99	QP

FCC §15.209 - RADIATED EMISSIONS

Applicable Standard

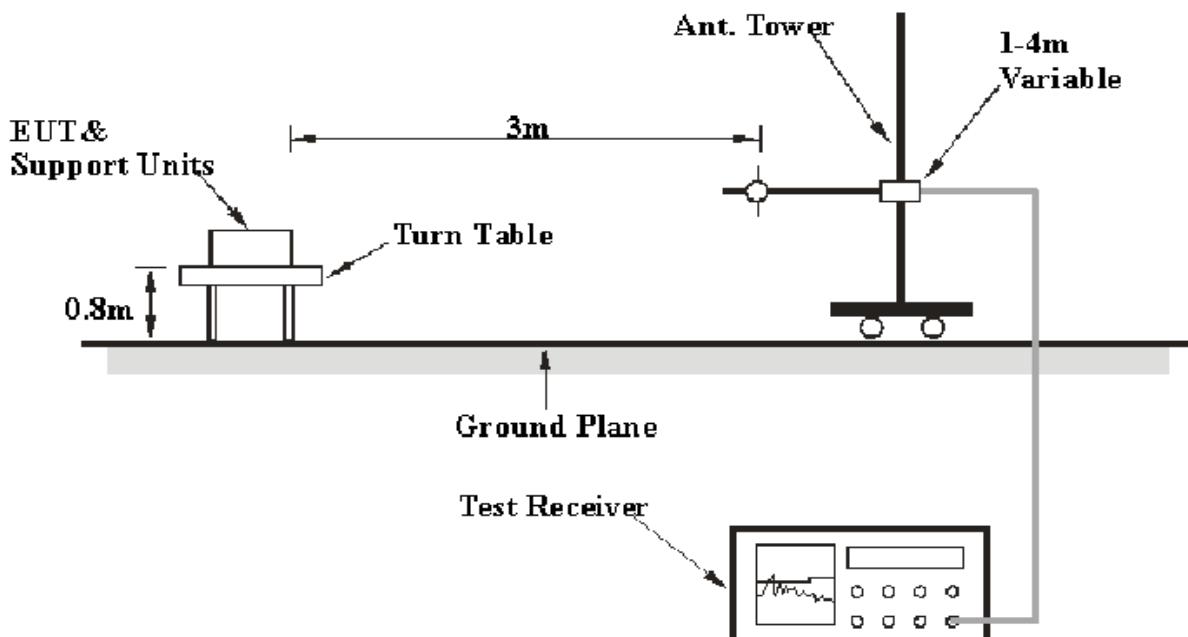
FCC §15.209

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence) .

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.209 limits.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 1 GHz.

Test Procedure

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

Corrected Amplitude & Margin Calculation

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

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

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
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10
ETS	Passive Loop Antenna	6512	00029604	2011-04-27	2012-04-26

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15, Subpart C, section 15.209, with the worst margin reading of:

0.3 dB at 175.973500 MHz in the Horizontal polarization

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

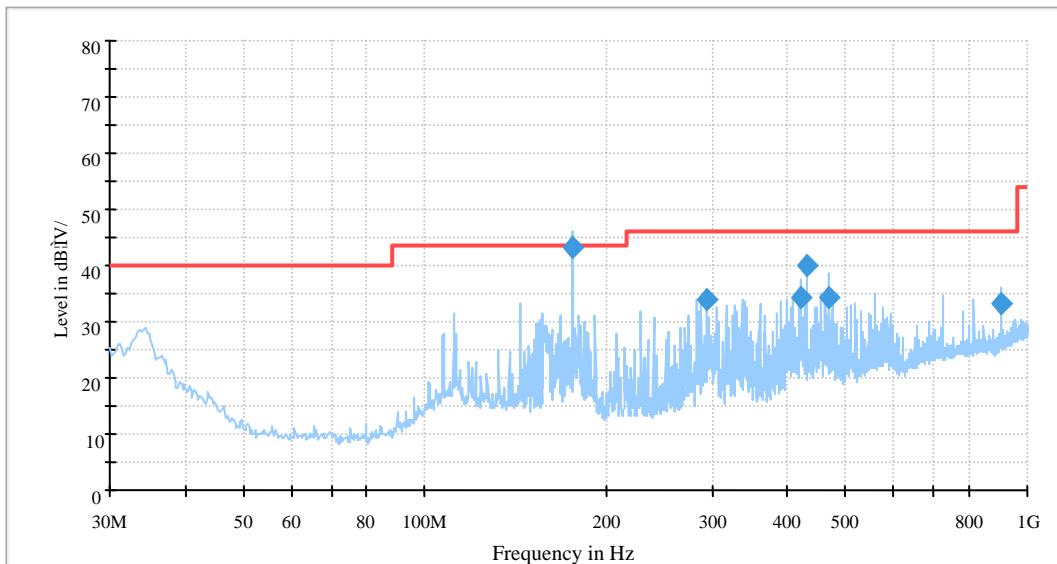
The testing was performed by Eric Lee on 2011-11-21 and 2012-02-08.

Test Mode: Transmitting

1): 9 kHz ~ 30 MHz

Indicated		Table Angle Degree	Antenna Height (m)	Detector PK/QP/AV	Correction Factor			Cord Amp. (dB μ V/m) @3m	FCC Part 15.209	
Frequency (MHz)	Max. Reading (dB μ V) @3m				Factor (dB)	Cable Loss (dB)	Pre-Amp. (dB)		Limit (dB μ V/m) @3m	Comments
0.11258	18.52	175	1.5	PK	76.3	0.06	0.0	94.88	106.57	Fund.
0.11665	9.97	105	1.5	PK	75.2	0.06	0.0	85.23	106.27	Spurious
0.150	31.37	0	1.5	PK	60.7	0.08	0.0	92.15	104.08	Spurious

2): 30 ~ 1000 MHz



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
175.973500	43.2	157.0	H	299.0	-15.1	43.5	0.3*
431.993750	40.0	155.0	V	0.0	-9.4	46.0	6.0
468.725250	34.5	103.0	V	182.0	-8.8	46.0	11.5
420.752500	34.3	103.0	H	40.0	-9.6	46.0	11.7
293.647000	33.8	103.0	H	0.0	-12.5	46.0	12.2
907.300500	33.3	238.0	H	304.0	-0.6	46.0	12.7

*Within measurement uncertainty.

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