FCC PART 15.247

TEST REPORT

For

Shenzhen Fostar Electronic Co., Ltd

East Wing, 2/F, Block 1 Vision ,Weixin Software Technology Park, No.9 Gaoxin 9th South Road, Nanshan District, Shenzhen

FCC ID: 2AB72FC2501PA

Report Type:	**Product Type:**
Original Report	HD Wireless IP Camera

Test Engineer:	David Lee
Report Number:	RSZ150423008-00A
Report Date:	2015-05-27
Reviewed By:	Jimmy Xiao RF Engineer
Prepared By:	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

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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Fostar Electronic Co.,Ltd's* product, model number: *FC2501PA (FCC ID: 2AB72FC2501PA)* or the "EUT" in this report was a *HD Wireless IP Camera,* which was measured approximately: 9.1cm (L) * 9.1cm (W) * 13.8 cm (H), rated with input voltage: DC 5.0V from adapter.

Adapter Information:
Model: SAW- 0502000
Input: AC 100-240V, 50/60 Hz, 0.5A
Output: DC 5V, 2.0A

Note: *The product, series model FC2501P, FI9825P share the same appearance shape with FC2501PA, they are only different in model names. Model FC2501PA was selected for full test, which is explained in the declaration letter that provided and guaranteed by applicant.*

**All measurement and test data in this report was gathered from production sample serial number: 1503468 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-04-23.*

Objective

This report is prepared on behalf of *Shenzhen Fostar Electronic 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, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: *2AB72FC2501PA.*

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

Measurement uncertainty with RF radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b, 802.11g, and 802.11n-HT20 mode, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT was tested with Channel 1, 6 and 11.

For 802.11n-HT40 mode, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2422	6	2447
2	2427	7	2452
3	2432	/	/
4	2437	/	/
5	2442	/	/

EUT was tested with Channel 1, 4 and 7.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

Test software:MT7601USB.exe

802.11b: Rate 1 MHz, Power level: 13
802.11g: Rate 6 MHz, Power level: 9
802.11n-HT20: Rate MCS0, Power level: 0C
802.11n-HT40: Rate MCS0, Power level: 0A

Support Equipment List and Details

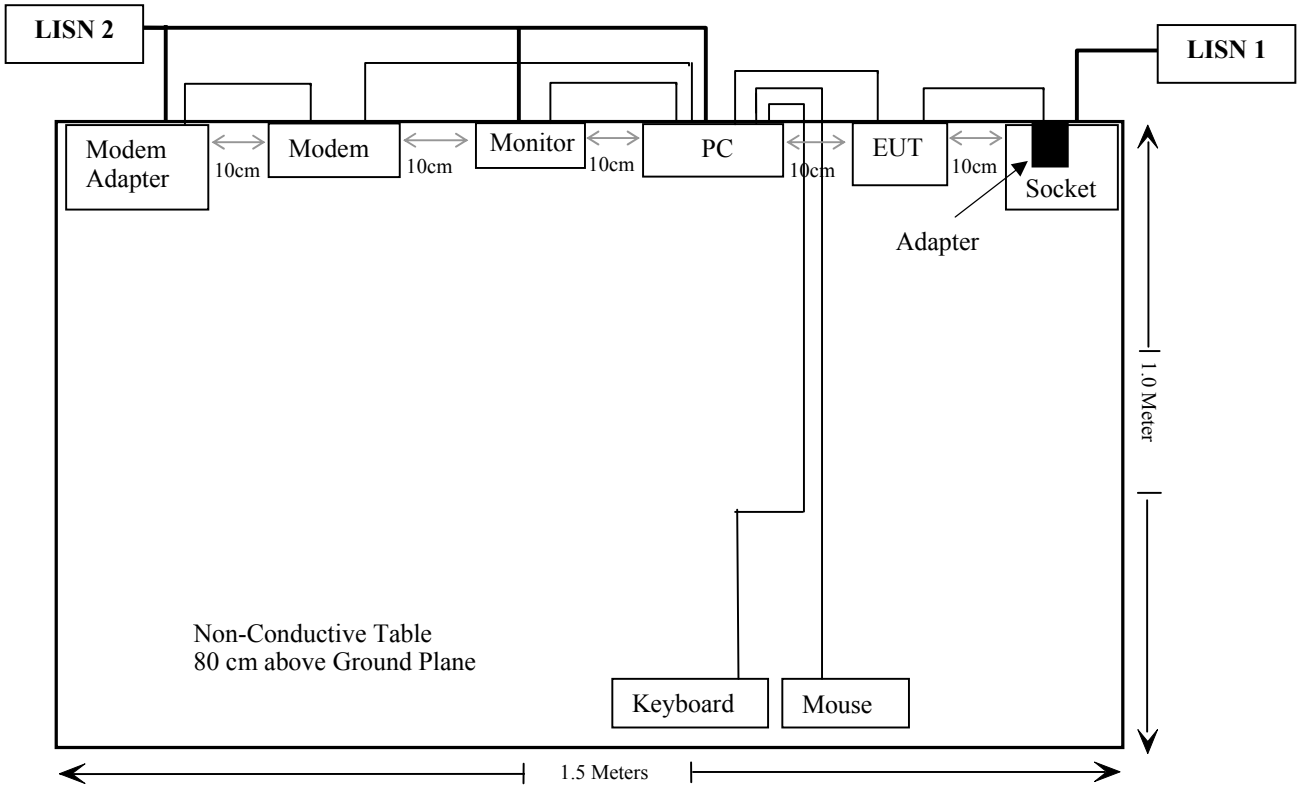
Manufacturer	Description	Model	Serial Number
DELL	PC	DCSCSF	127BPX2
DELL	Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
SAST	Modem	AEM-2100	0293
BULL	Socket	GN-415K	5503290068073

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielding Detachable RS232 cable	1.0	PC	Modem
Shielding Detachable VGA cable	1.0	PC	Monitor
Un-shielding Un-detachable DC cable	0.5	Modem Adapter	Modem
Shielding Un-detachable USB cable	1.2	Keyboard	PC
Shielding Un-detachable USB cable	1.2	Mouse	PC
Un-shielding detachable AC cable	1.2	Monitor	LISN 2
Un-shielding detachable AC cable	1.2	PC	LISN 2
Un-shielding detachable AC cable	1.2	Modem Adapter	LISN 2
Un-shielding Un-detachable AC cable	1.0	Socket	LISN 1
Un-shielding Detachable RJ45 cable	1.5	EUT	PC
Un-shielding Un-detachable DC Power cable	1.5	EUT	Adapter

Block Diagram of Test Setup

For conducted emission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance*
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance**
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

Note: Compliance*: The device uses a module which was tested in Ke Mei Ou Laboratory Co., Ltd. with FCC ID: Q8Y-FR1213C3, and it was granted on 2013-09-02.

Compliance**: We had re-tested the output power, and the result is about the same with the module report.

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (Minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2412	2	1.58	15.33	34.12	20	0.0107	1

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: 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 has a RP-SMA antenna connector arrangement for Wi-Fi which the gain was 2.0dBi, fulfill the requirement of this section. Please refer to the external photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

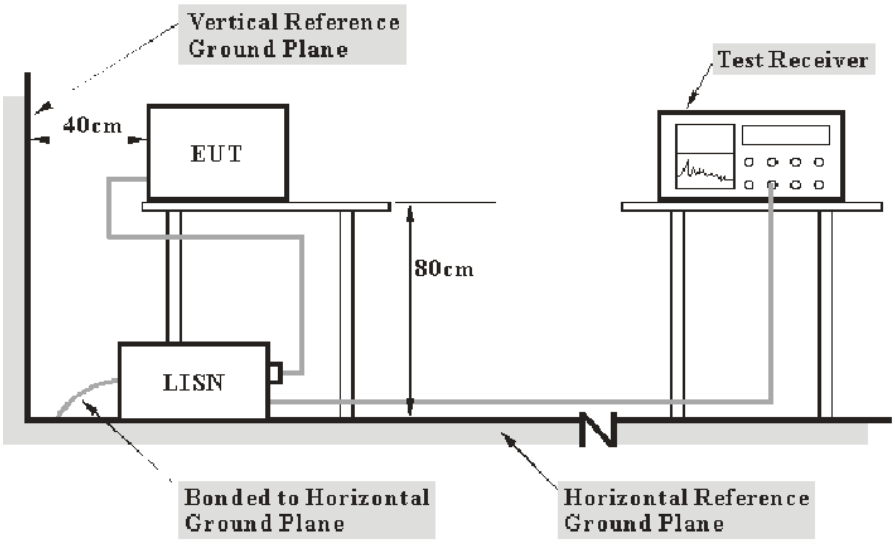
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report.

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 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 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 LISN.

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

All final 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	100176	2014-06-03	2015-06-03
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-12-01	2015-12-01
Rohde & Schwarz	LISN	ESH3-Z5	100113	NCR	NCR
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-10-15	2015-10-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

5.7 dB at **0.481110 MHz** and **0.482770 MHz** in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

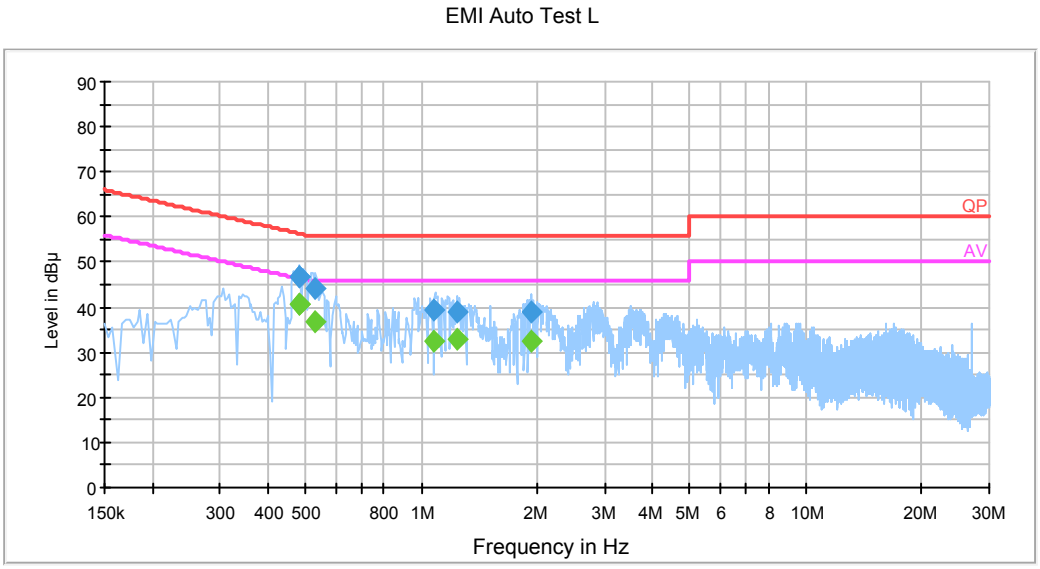
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by David Lee on 2015-05-26.

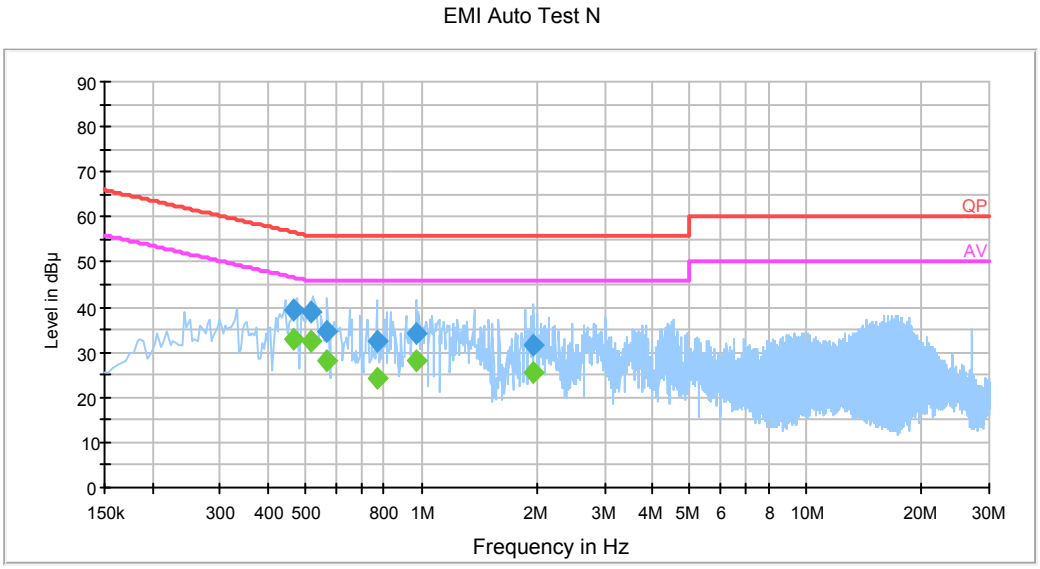
EUT operation mode: Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.481110	46.9	19.9	56.3	9.4	QP
0.481110	40.6	19.9	46.3	5.7	Ave.
0.482770	46.8	19.9	56.3	9.5	QP
0.482770	40.6	19.9	46.3	5.7	Ave.
0.529930	44.0	19.9	56.0	12.0	QP
0.529930	36.9	19.9	46.0	9.1	Ave.
1.077710	39.3	20.0	56.0	16.7	QP
1.077710	32.6	20.0	46.0	13.4	Ave.
1.239430	39.1	20.0	56.0	16.9	QP
1.239430	33.1	20.0	46.0	12.9	Ave.
1.932930	38.8	20.0	56.0	17.2	QP
1.932930	32.3	20.0	46.0	13.7	Ave.

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.466890	39.5	19.9	56.6	17.1	QP
0.466890	33.0	19.9	46.6	13.6	Ave.
0.518170	39.0	19.9	56.0	17.0	QP
0.518170	32.4	19.9	46.0	13.6	Ave.
0.569450	34.4	19.9	56.0	21.6	QP
0.569450	27.9	19.9	46.0	18.1	Ave.
0.770510	32.6	19.9	56.0	23.4	QP
0.770510	24.4	19.9	46.0	21.6	Ave.
0.967450	34.1	20.0	56.0	21.9	QP
0.967450	28.0	20.0	46.0	18.0	Ave.
1.948570	31.8	20.0	56.0	24.2	QP
1.948570	25.7	20.0	46.0	20.3	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

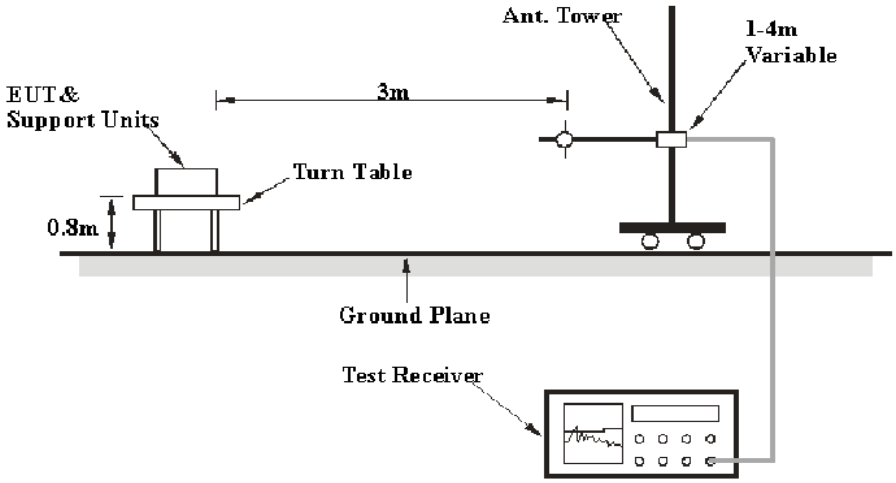
Measurement Uncertainty

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.

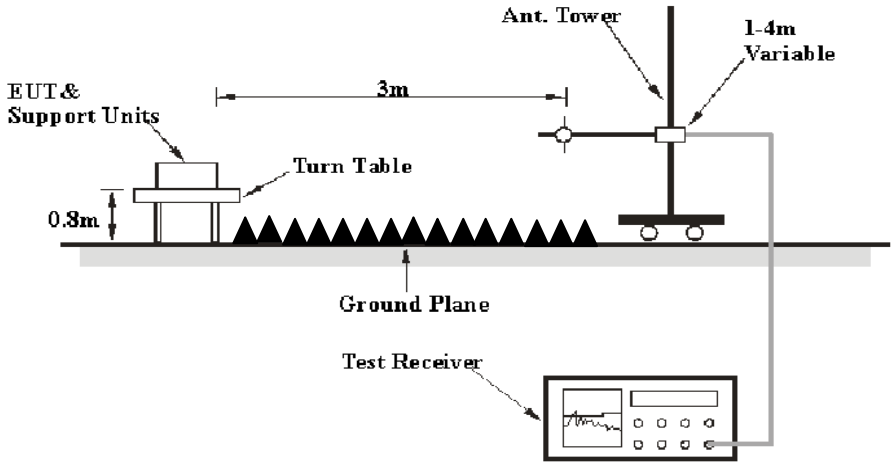
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

EUT Setup

Below 1 GHz:



Above 1GHz:



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 15.247 limits.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
Mini	Amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2014-07-22	2015-07-22
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

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

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:

Corrected Amplitude = Meter Reading + Antenna Factor + 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

0.69 dB at **4944.00 MHz** in the **Vertical** polarization for **802.11g** mode High channel

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by David Lee on 2015-05-26

EUT operation mode: Transmitting

30 MHz-25 GHz:

802.11b Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
650.00	59.35	QP	66	2.5	V	-15.3	44.05	46.0	1.95
2412.00	90.39	PK	61	1.9	H	4.27	94.66	/	/
2412.00	84.82	Ave.	61	1.9	H	4.27	89.09	/	/
2412.00	88.50	PK	106	1.3	V	4.17	92.67	/	/
2412.00	84.15	Ave.	106	1.3	V	4.17	88.32	/	/
2382.27	38.23	PK	125	2.5	H	4.27	42.50	74	31.50
2382.27	24.41	Ave.	125	2.5	H	4.27	28.68	54	25.32
2496.16	41.21	PK	50	1.9	H	7.99	49.20	74	24.80
2496.16	20.52	Ave.	50	1.9	H	7.99	28.51	54	25.49
2731.35	36.76	PK	18	2.1	H	8.31	45.07	74	28.93
2731.35	22.06	Ave.	18	2.1	H	8.31	30.37	54	23.63
4824.00	48.34	PK	114	1.7	H	18.31	66.65	74	7.35
4824.00	33.38	Ave.	114	1.7	H	18.31	51.69	54	2.31
7236.00	40.35	PK	163	1.3	V	22.28	62.63	74	11.37
7236.00	21.91	Ave.	163	1.3	V	22.28	44.19	54	9.81
9648.00	38.53	PK	55	2.1	V	25.22	63.75	74	10.25
9648.00	23.07	Ave.	55	2.1	V	25.22	48.29	54	5.71

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
650.00	58.51	QP	307	2.1	V	-15.3	43.21	46.0	2.79
2437.00	89.98	PK	57	2.2	H	4.27	94.25	/	/
2437.00	84.21	Ave.	57	2.2	H	4.27	88.48	/	/
2437.00	89.32	PK	203	2.0	V	4.17	93.49	/	/
2437.00	84.44	Ave.	203	2.0	V	4.17	88.61	/	/
2386.56	38.01	PK	2	2.3	H	4.27	42.28	74	31.72
2386.56	23.31	Ave.	2	2.3	H	4.27	27.58	54	26.42
2490.41	42.62	PK	122	2.1	H	7.99	50.61	74	23.39
2490.41	20.52	Ave.	122	2.1	H	7.99	28.51	54	25.49
2918.71	36.71	PK	249	1.6	H	8.96	45.67	74	28.33
2918.71	21.94	Ave.	249	1.6	H	8.96	30.90	54	23.10
4874.00	47.70	PK	262	2.1	H	19.21	66.91	74	7.09
4874.00	33.58	Ave.	262	2.1	H	19.21	52.79	54	1.21
7311.00	38.97	PK	294	2.3	V	22.60	61.57	74	12.43
7311.00	21.95	Ave.	294	2.3	V	22.60	44.55	54	9.45
9748.00	37.98	PK	32	1.9	H	25.02	63.00	74	11.00
9748.00	21.92	Ave.	32	1.9	H	25.02	46.94	54	7.06
High Channel (2462 MHz)									
650.00	58.75	QP	174	2.1	V	-15.3	43.45	46.0	2.55
2462.00	89.19	PK	181	1.9	H	7.99	97.18	/	/
2462.00	84.95	Ave.	181	1.9	H	7.99	92.94	/	/
2462.00	88.66	PK	348	1.7	V	7.59	96.25	/	/
2462.00	84.35	Ave.	348	1.7	V	7.59	91.94	/	/
2384.69	38.18	PK	221	1.5	H	4.27	42.45	74	31.55
2384.69	24.29	Ave.	221	1.5	H	4.27	28.56	54	25.44
2496.72	42.30	PK	115	2.4	H	7.99	50.29	74	23.71
2496.72	20.52	Ave.	115	2.4	H	7.99	28.51	54	25.49
2895.95	36.02	PK	319	2.2	H	8.96	44.98	74	29.02
2895.95	21.63	Ave.	319	2.2	H	8.96	30.59	54	23.41
4924.00	47.43	PK	327	1.8	H	19.21	66.64	74	7.36
4924.00	33.48	Ave.	327	1.8	H	19.21	52.69	54	1.31
7386.00	38.58	PK	198	1.4	V	21.54	60.12	74	13.88
7386.00	23.15	Ave.	198	1.4	V	21.54	44.69	54	9.31
9848.00	38.55	PK	79	1.4	V	26.29	64.84	74	9.16
9848.00	23.61	Ave.	79	1.4	V	26.29	49.90	54	4.10

802.11g Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
650.00	59.19	QP	298	1.6	V	-15.3	43.89	46.0	2.11
2412.00	89.21	PK	128	1.1	H	4.27	93.48	/	/
2412.00	84.48	Ave.	128	1.1	H	4.27	88.75	/	/
2412.00	89.08	PK	306	1.2	V	4.17	93.25	/	/
2412.00	83.58	Ave.	306	1.2	V	4.17	87.75	/	/
2383.36	37.34	PK	358	2.1	H	4.27	41.61	74	32.39
2383.36	24.79	Ave.	358	2.1	H	4.27	29.06	54	24.94
2487.05	42.27	PK	359	1.7	H	7.99	50.26	74	23.74
2487.05	20.52	Ave.	359	1.7	H	7.99	28.51	54	25.49
2945.99	36.40	PK	5	1.7	H	8.96	45.36	74	28.64
2945.99	22.09	Ave.	5	1.7	H	8.96	31.05	54	22.95
4824.00	48.31	PK	66	2.1	V	18.51	66.82	74	7.18
4824.00	33.39	Ave.	66	2.1	V	18.51	51.90	54	2.10
7236.00	39.50	PK	216	2.4	H	22.28	61.78	74	12.22
7236.00	22.09	Ave.	216	2.4	H	22.28	44.37	54	9.63
9648.00	37.40	PK	17	1.6	H	25.02	62.42	74	11.58
9648.00	23.53	Ave.	17	1.6	H	25.02	48.55	54	5.45
Middle Channel (2437 MHz)									
650.00	58.71	QP	233	1.0	V	-15.3	43.41	46.0	2.59
2437.00	89.69	PK	30	1.5	H	4.27	93.96	/	/
2437.00	85.84	Ave.	30	1.5	H	4.27	90.11	/	/
2437.00	89.52	PK	124	1.1	V	4.17	93.69	/	/
2437.00	84.20	Ave.	124	1.1	V	4.17	88.37	/	/
2383.69	38.76	PK	33	1.4	H	4.27	43.03	74	30.97
2383.69	23.32	Ave.	33	1.4	H	4.27	27.59	54	26.41
2485.84	41.80	PK	30	1.9	H	7.99	49.79	74	24.21
2485.84	20.52	Ave.	30	1.9	H	7.99	28.51	54	25.49
2745.83	37.60	PK	68	2.0	H	8.31	45.91	74	28.09
2745.83	21.23	Ave.	68	2.0	H	8.31	29.54	54	24.46
4874.00	48.41	PK	233	1.6	H	19.21	67.62	74	6.38
4874.00	33.97	Ave.	233	1.6	H	19.21	53.18	54	0.82
7311.00	39.78	PK	280	1.2	V	22.60	62.38	74	11.62
7311.00	22.08	Ave.	280	1.2	V	22.60	44.68	54	9.32
9748.00	37.10	PK	265	1.7	H	25.02	62.12	74	11.88
9748.00	21.97	Ave.	265	1.7	H	25.02	46.99	54	7.01

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
650.00	59.49	QP	342	2.1	V	-15.3	44.19	46.0	1.81
2462.00	90.80	PK	229	1.9	H	7.99	98.79	/	/
2462.00	85.19	Ave.	229	1.9	H	7.99	93.18	/	/
2462.00	88.27	PK	20	1.1	V	7.59	95.86	/	/
2462.00	84.53	Ave.	20	1.1	V	7.59	92.12	/	/
2388.67	37.69	PK	193	2.1	H	4.27	41.96	74	32.04
2388.67	23.79	Ave.	193	2.1	H	4.27	28.06	54	25.94
2496.91	42.41	PK	200	2.4	H	7.99	50.40	74	23.60
2496.91	20.52	Ave.	200	2.4	H	7.99	28.51	54	25.49
2717.11	37.72	PK	323	1.8	H	8.31	46.03	74	27.97
2717.11	21.30	Ave.	323	1.8	H	8.31	29.61	54	24.39
4924.00	47.17	PK	250	1.8	V	19.41	66.58	74	7.42
4924.00	33.90	Ave.	250	1.8	V	19.41	53.31	54	0.69
7386.00	40.26	PK	153	1.8	V	21.54	61.80	74	12.20
7386.00	22.14	Ave.	153	1.8	V	21.54	43.68	54	10.32
9848.00	37.46	PK	127	1.9	H	26.09	63.55	74	10.45
9848.00	22.30	Ave.	127	1.9	H	26.09	48.39	54	5.61

802.11n-HT20 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
650.00	58.07	QP	144	2.1	V	-15.3	42.77	46.0	3.23
2412.00	89.92	PK	27	2.1	H	4.27	94.19	/	/
2412.00	84.81	Ave.	27	2.1	H	4.27	89.08	/	/
2412.00	89.31	PK	207	1.3	V	4.17	93.48	/	/
2412.00	83.08	Ave.	207	1.3	V	4.17	87.25	/	/
2383.67	38.38	PK	272	1.8	H	4.27	42.65	74	31.35
2383.67	24.28	Ave.	272	1.8	H	4.27	28.55	54	25.45
2493.78	42.63	PK	272	2.3	H	7.99	50.62	74	23.38
2493.78	20.52	Ave.	272	2.3	H	7.99	28.51	54	25.49
2742.46	37.92	PK	304	1.3	V	7.91	45.83	74	28.17
2742.46	22.90	Ave.	304	1.3	V	7.91	30.81	54	23.19
4824.00	48.45	PK	344	1.5	H	18.31	66.76	74	7.24
4824.00	32.43	Ave.	344	1.5	H	18.31	50.74	54	3.26
7236.00	40.09	PK	147	1.4	H	22.28	62.37	74	11.63
7236.00	21.92	Ave.	147	1.4	H	22.28	44.20	54	9.80
9648.00	36.72	PK	76	1.8	H	25.02	61.74	74	12.26
9648.00	23.71	Ave.	76	1.8	H	25.02	48.73	54	5.27
Middle Channel (2437 MHz)									
650.00	59.92	QP	343	1.7	V	-15.3	44.62	46.0	1.38
2437.00	89.95	PK	143	2.3	H	4.27	94.22	/	/
2437.00	85.49	Ave.	143	2.3	H	4.27	89.76	/	/
2437.00	89.45	PK	41	1.5	V	4.17	93.62	/	/
2437.00	83.48	Ave.	41	1.5	V	4.17	87.65	/	/
2386.96	38.85	PK	27	1.6	H	4.27	43.12	74	30.88
2386.96	23.83	Ave.	27	1.6	H	4.27	28.10	54	25.90
2494.31	41.43	PK	3	1.5	H	7.99	49.42	74	24.58
2494.31	20.52	Ave.	3	1.5	H	7.99	28.51	54	25.49
2713.53	36.72	PK	262	1.8	H	8.31	45.03	74	28.97
2713.53	22.36	Ave.	262	1.8	H	8.31	30.67	54	23.33
4874.00	47.61	PK	29	1.8	V	19.41	67.02	74	6.98
4874.00	32.99	Ave.	29	1.8	V	19.41	52.40	54	1.60
7311.00	39.60	PK	48	2.1	H	22.60	62.20	74	11.80
7311.00	22.29	Ave.	48	2.1	H	22.60	44.89	54	9.11
9748.00	37.29	PK	134	1.9	H	25.02	62.31	74	11.69
9748.00	23.06	Ave.	134	1.9	H	25.02	48.08	54	5.92

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
650.00	59.66	QP	304	1.2	V	-15.3	44.36	46.0	1.64
2462.00	89.62	PK	53	2.5	H	7.99	97.61	/	/
2462.00	85.29	Ave.	53	2.5	H	7.99	93.28	/	/
2462.00	88.37	PK	206	1.7	V	7.59	95.96	/	/
2462.00	84.00	Ave.	206	1.7	V	7.59	91.59	/	/
2388.48	37.49	PK	257	2.0	H	4.27	41.76	74	32.24
2388.48	23.20	Ave.	257	2.0	H	4.27	27.47	54	26.53
2484.67	41.58	PK	119	1.2	H	7.99	49.57	74	24.43
2484.67	20.52	Ave.	119	1.2	H	7.99	28.51	54	25.49
2983.09	37.61	PK	109	1.8	H	11.28	48.89	74	25.11
2983.09	22.76	Ave.	109	1.8	H	11.28	34.04	54	19.96
4924.00	47.82	PK	215	2.2	V	19.41	67.23	74	6.77
4924.00	33.03	Ave.	215	2.2	V	19.41	52.44	54	1.56
7386.00	39.18	PK	287	1.0	V	21.54	60.72	74	13.28
7386.00	22.29	Ave.	287	1.0	V	21.54	43.83	54	10.17
9848.00	37.08	PK	328	2.3	H	26.09	63.17	74	10.83
9848.00	22.46	Ave.	328	2.3	H	26.09	48.55	54	5.45

802.11n-HT40 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2422 MHz)									
650.00	58.23	QP	151	2.5	V	-15.3	42.93	46.0	3.07
2422.00	89.99	PK	66	2.2	H	4.27	94.26	/	/
2422.00	84.04	Ave.	66	2.2	H	4.27	88.31	/	/
2422.00	88.42	PK	34	2.2	V	4.17	92.59	/	/
2422.00	83.45	Ave.	34	2.2	V	4.17	87.62	/	/
2381.89	38.93	PK	122	2.1	H	4.27	43.20	74	30.80
2381.89	24.69	Ave.	122	2.1	H	4.27	28.96	54	25.04
2485.40	41.70	PK	136	2.2	H	7.99	49.69	74	24.31
2485.40	20.52	Ave.	136	2.2	H	7.99	28.51	54	25.49
2713.84	36.92	PK	308	1.9	H	8.31	45.23	74	28.77
2713.84	22.77	Ave.	308	1.9	H	8.31	31.08	54	22.92
4844.00	47.54	PK	133	2.3	H	18.31	65.85	74	8.15
4844.00	33.70	Ave.	133	2.3	H	18.31	52.01	54	1.99
7266.00	39.58	PK	199	1.4	H	22.60	62.18	74	11.82
7266.00	23.23	Ave.	199	1.4	H	22.60	45.83	54	8.17
9688.00	37.84	PK	120	2.5	H	25.02	62.86	74	11.14
9688.00	22.27	Ave.	120	2.5	H	25.02	47.29	54	6.71
Middle Channel (2437 MHz)									
650.00	59.20	QP	254	1.8	V	-15.3	43.90	46.0	2.10
2437.00	90.50	PK	84	2.5	H	4.27	94.77	/	/
2437.00	84.68	Ave.	84	2.5	H	4.27	88.95	/	/
2437.00	88.16	PK	307	1.2	V	4.17	92.33	/	/
2437.00	83.70	Ave.	307	1.2	V	4.17	87.87	/	/
2383.11	38.04	PK	172	1.9	H	4.27	42.31	74	31.69
2383.11	24.99	Ave.	172	1.9	H	4.27	29.26	54	24.74
2488.78	41.08	PK	76	2.2	H	7.99	49.07	74	24.93
2488.78	20.52	Ave.	76	2.2	H	7.99	28.51	54	25.49
2790.79	36.17	PK	358	1.3	V	8.01	44.18	74	29.82
2790.79	22.37	Ave.	358	1.3	V	8.01	30.38	54	23.62
4874.00	47.40	PK	286	1.1	V	19.41	66.81	74	7.19
4874.00	32.07	Ave.	286	1.1	V	19.41	51.48	54	2.52
7311.00	39.49	PK	174	2.1	H	22.60	62.09	74	11.91
7311.00	22.59	Ave.	174	2.1	H	22.60	45.19	54	8.81
9748.00	38.44	PK	341	1.7	V	25.22	63.66	74	10.34
9748.00	22.41	Ave.	341	1.7	V	25.22	47.63	54	6.37

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2452 MHz)									
650.00	58.13	QP	38	2.3	V	-15.3	42.83	46.0	3.17
2452.00	90.64	PK	325	2.1	H	7.99	98.63	/	/
2452.00	85.81	Ave.	325	2.1	H	7.99	93.80	/	/
2452.00	89.12	PK	117	2.1	V	7.59	96.71	/	/
2452.00	83.85	Ave.	117	2.1	V	7.59	91.44	/	/
2382.22	38.11	PK	240	1.8	H	4.27	42.38	74	31.62
2382.22	24.66	Ave.	240	1.8	H	4.27	28.93	54	25.07
2486.89	41.71	PK	91	1.7	H	7.99	49.70	74	24.30
2486.89	20.52	Ave.	91	1.7	H	7.99	28.51	54	25.49
2966.02	36.57	PK	219	1.5	V	11.08	47.65	74	26.35
2966.02	22.98	Ave.	219	1.5	V	11.08	34.06	54	19.94
4904.00	47.05	PK	173	1.2	V	19.41	66.46	74	7.54
4904.00	32.76	Ave.	173	1.2	V	19.41	52.17	54	1.83
7356.00	38.64	PK	237	2.4	H	21.54	60.18	74	13.82
7356.00	23.20	Ave.	237	2.4	H	21.54	44.74	54	9.26
9808.00	37.00	PK	141	1.3	H	26.09	63.09	74	10.91
9808.00	23.63	Ave.	141	1.3	H	26.09	49.72	54	4.28

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit - Corrected. Amplitude

FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Data

Test data is referred to FCC ID: Q8Y-FR1213C3 granted on 2013-09-02, report number: KSZ2013053101J01, which was tested by Ke Mei Ou Laboratory Co., Ltd.

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Data

Test data is referred to FCC ID: Q8Y-FR1213C3 granted on 2013-09-02, report number: KSZ2013053101J01, which was tested by Ke Mei Ou Laboratory Co., Ltd.

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Data

Test data is referred to FCC ID: Q8Y-FR1213C3 granted on 2013-09-02, report number: KSZ2013053101J01, which was tested by Ke Mei Ou Laboratory Co., Ltd.

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Data

Test data is referred to FCC ID: Q8Y-FR1213C3 granted on 2013-09-02, report number: KSZ2013053101J01, which was tested by Ke Mei Ou Laboratory Co., Ltd.

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