FCC PART 15.247
TEST REPORT

For

Amgoo Telecom Co., Ltd

3/F, Block R2-A(North), Gaoxin S. Ave. 4th, Hi-Tech Industrial Park,
Nanshan District, Shenzhen, China

FCC ID: UOSAM508

Report Type:	Product Type:
Original Report	Smartphone

Test Engineer:	Shawn Xiao
Report Number:	RSZ160525006-00B
Report Date:	2016-06-08
Reviewed By:	Candy Li RF Engineer
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Amgoo Telecom Co.,Ltd*'s product, model number:AM508*(FCC ID: UOSAM508)* or the "EUT" in this report was a *Smartphone ,* which was measured approximately: 14.4 cm (L) × 7.4 cm (W) × 1.0 cm (H), rated with input voltage: DC 3.7V rechargeable Li-ion battery or DC 5.0V from adapter. The highest operating frequency is 2480MHz.

Adapter Information:
Model: CH5
Input: AC 100-240V, 50/60Hz, 0.2A
Output: DC 5V, 1000mA

**All measurement and test data in this report was gathered from production sample serial number: 1602344. (Assigned by Shenzhen BACL).The EUT supplied by the applicant was received on 2016-05-25.*

Objective

This test report is prepared on behalf of *Amgoo Telecom 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, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 22H & 24E PCE, Part 15.247 DTS, and Part 15B JBP submissions with FCC ID: UOSAM508.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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 radiated emission is 5.81 dB for 30MHz-1GHz, and 4.88 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 October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10-2013.

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

The system was configured for testing in engineering mode.

Note: Power level of Bluetooth was 14.

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

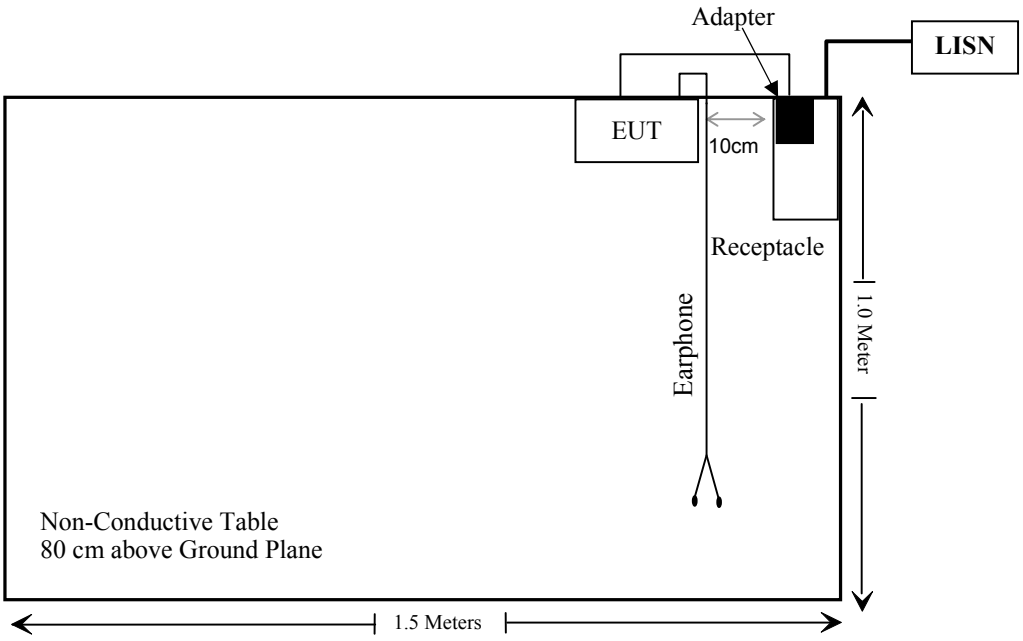
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter
Un-shielding Detachable Earphone Cable	1.2	EUT	Earphone

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

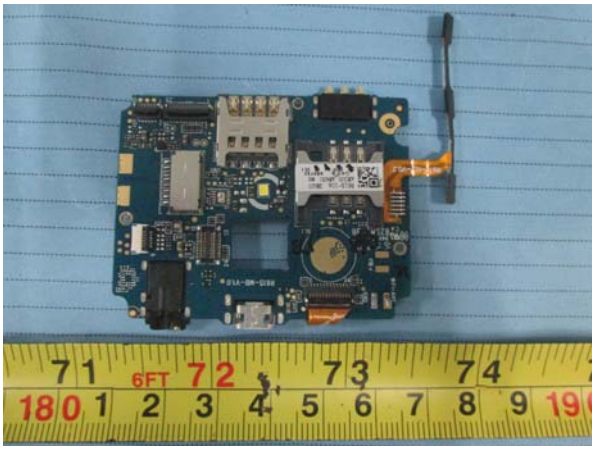
FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance*
§15.247(a)(1)	Channel Separation Test	Compliance*
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance*
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance*
§15.247(b)(1)	Peak Output Power Measurement	Compliance*
§15.247(d)	Band edges	Compliance*

Compliance*: The EUT (Model: AM508, FCC ID: UOSAM508) is the same main board and chip as the EUT (Model: AM402, FCC ID: UOSAM402), the different test data between them is "AC Line Conducted Emissions" & "Radiated Emissions", so all the other test data are referred to the report No.: RSZ160525004-00B, which was tested by Bay Area Compliance Laboratories Corp. (Shenzhen).

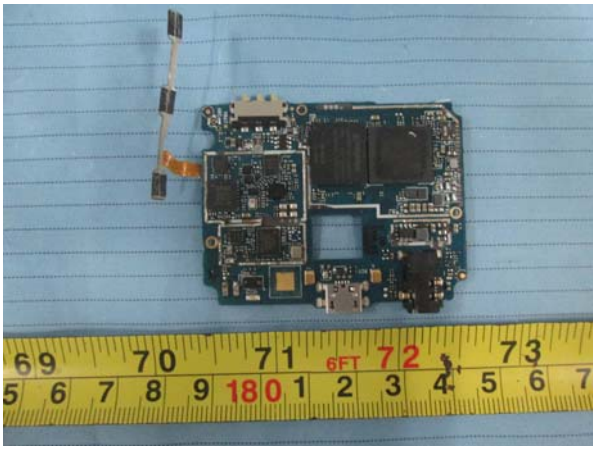
The main board and chip details please refer to the images below.

Model AM508:

Main board top view



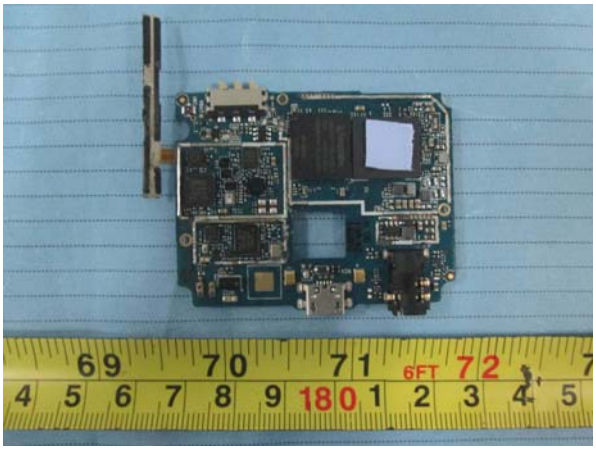
Main board Bottom Shielding Off view



Model AM402:

Main board top view

Main board Bottom Shielding Off view



FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

For worst case:

Frequency (MHz)	Maximum couducted Tune-up power		Calculated Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
	Power (dBm)	Power (mW)				
2480	4.50	2.82	5	0.9	3.0	**Yes**

Result: No SAR test is required

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has one internal antenna arrangement for bluetooth which was permanently attached and the antenna gain is -1.0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

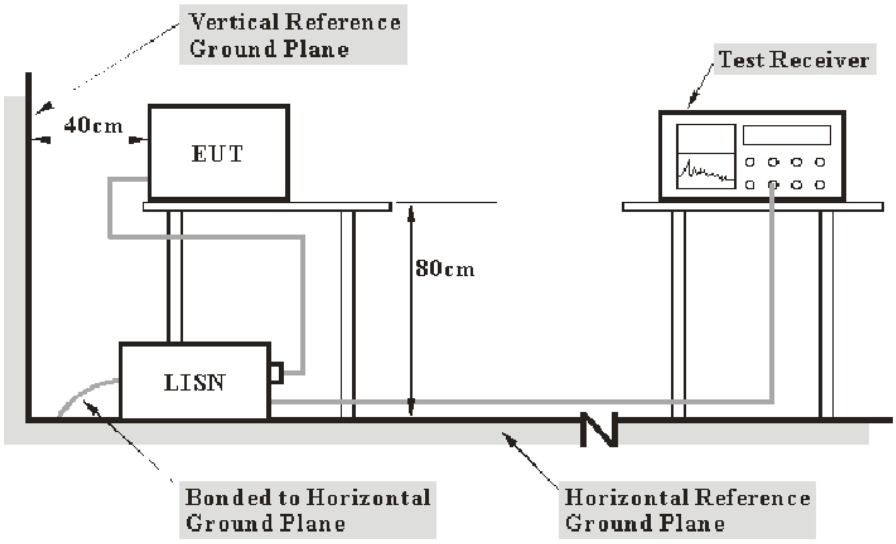
Measurement Uncertainty

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	3.34 dB (k=2, 95% level of confidence)
CAT 3	3.72 dB (k=2, 95% level of confidence)
CAT 5	3.74 dB (k=2, 95% level of confidence)
CAT 6	4.54 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 measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

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

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	2016-06-01	2017-05-31
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2015-12-15	2016-12-14
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2016-05-14	2017-05-14
Ducommun technologies	Conducted Emission Cable	RG-214	CB031	2015-06-15	2016-06-15
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:

11.3 dB at **0.541930 MHz** in the **Neutral** 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

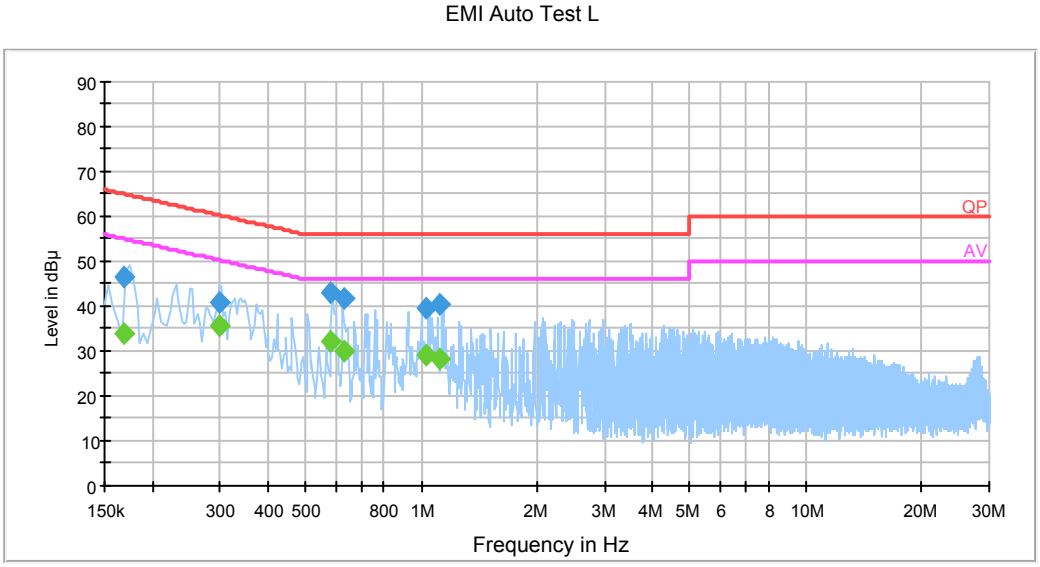
Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	48%
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2016-06-06.

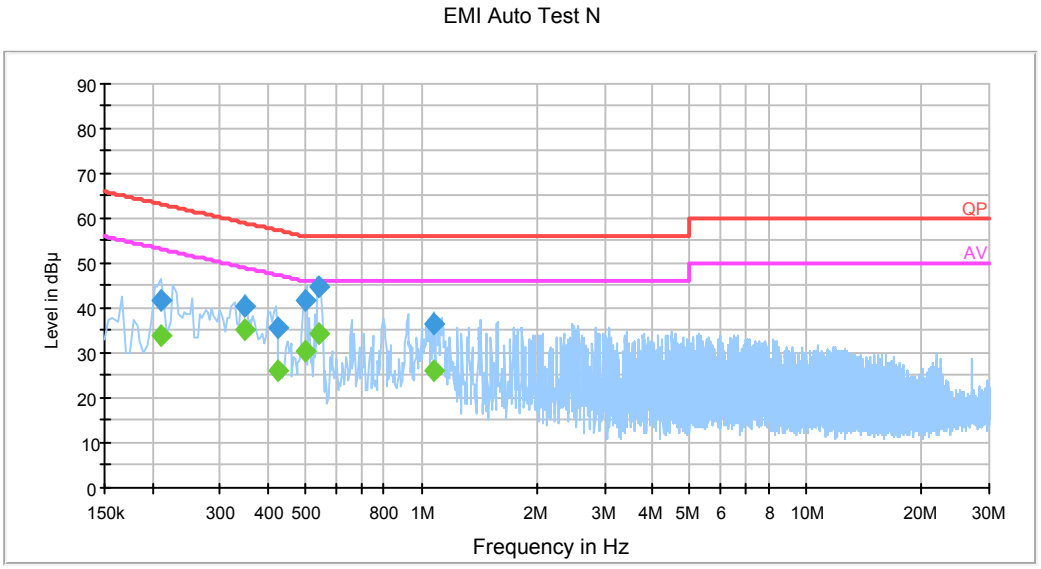
EUT operation mode: Charging & Transmitting

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.169500	46.6	20.0	65.0	18.4	QP
0.297500	40.9	19.9	60.3	19.4	QP
0.581150	42.9	19.9	56.0	13.1	QP
0.628610	41.6	19.9	56.0	14.4	QP
1.034310	39.5	20.0	56.0	16.5	QP
1.116990	40.4	20.0	56.0	15.6	QP
0.169500	34.1	20.0	55.0	20.9	Ave.
0.297500	35.5	19.9	50.3	14.8	Ave.
0.581150	32.4	19.9	46.0	13.6	Ave.
0.628610	30.0	19.9	46.0	16.0	Ave.
1.034310	29.0	20.0	46.0	17.0	Ave.
1.116990	28.1	20.0	46.0	17.9	Ave.

AC 120V/60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.209500	41.6	20.0	63.2	21.6	QP
0.348810	40.3	19.9	59.0	18.7	QP
0.424270	35.9	19.9	57.4	21.5	QP
0.498470	41.7	19.9	56.0	14.3	QP
0.541930	44.7	19.9	56.0	**11.3**	QP
1.073890	36.6	20.0	56.0	19.4	QP
0.209500	33.8	20.0	53.2	19.4	Ave.
0.348810	35.2	19.9	49.0	13.8	Ave.
0.424270	26.1	19.9	47.4	21.3	Ave.
0.498470	30.5	19.9	46.0	15.5	Ave.
0.541930	34.5	19.9	46.0	11.5	Ave.
1.073890	26.2	20.0	46.0	19.8	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 §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

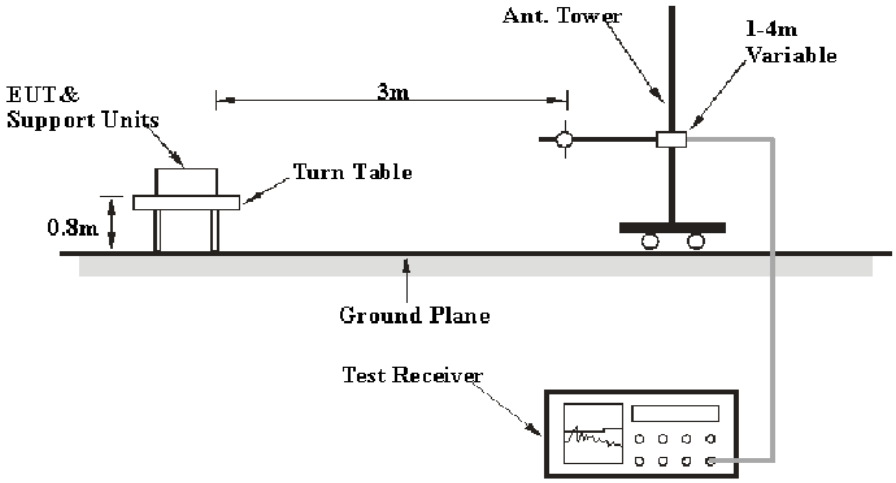
Measurement Uncertainty

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.

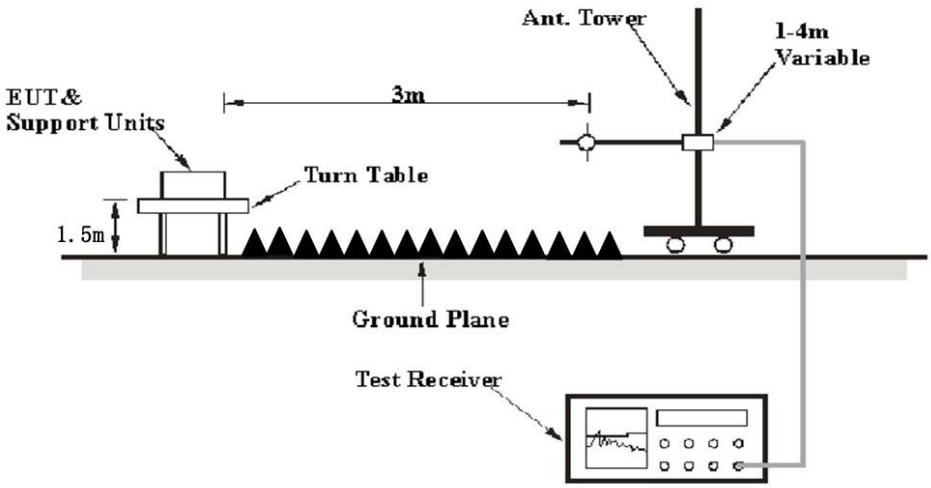
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.81 dB for 30MHz-1GHz, and 4.88 dB for above 1GHz. And this uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI ANSI C63.10-2013. The specification used was the FCC 15.209, 205 and FCC 15.247 limits.

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	1 MHz	3 MHz	/	PK
	1 MHz	10 Hz	/	Ave.

Test Procedure

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

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

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2016-05-06	2017-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Mini	Amplifier	ZVA-183-S+	5969001149	2016-04-23	2017-04-23
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
TDK	Chamber	Chamber A	2#	2013-10-15	2016-10-15
TDK	Chamber	Chamber B	1#	2015-07-23	2016-07-22
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2015-08-03	2016-08-03
R&S	Auto test Software	EMC32	V9.10	NCR	NCR
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	1	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15

*** 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).

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.

6.23 dB at **2483.53 MHz** in the **Horizontal** polarization for **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:	22 ℃
Relative Humidity:	48%
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2016-06-06.

EUT operation mode: Charging & Transmitting

30 MHz -25 GHz: (*Scan with GFSK, π/4-DQPSK, 8-DPSK mode, the worst case as below*)

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 (2402 MHz)									
460.9	34.97	QP	183	1.1	V	-3.2	31.77	46	14.23
2402.00	90.89	PK	211	2.1	H	-6.46	84.43	/	/
2402.00	81.24	Ave.	211	2.1	H	-6.46	74.78	/	/
2402.00	92.98	PK	32	1.6	V	-6.46	86.52	/	/
2402.00	83.14	Ave.	32	1.6	V	-6.46	76.68	/	/
2386.31	51.33	PK	156	2.0	V	-6.46	44.87	74	29.13
2386.31	37.54	Ave.	156	2.0	V	-6.46	31.08	54	22.92
2388.71	53.78	PK	209	2.3	H	-6.46	47.32	74	26.68
2388.71	39.54	Ave.	209	2.3	H	-6.46	33.08	54	20.92
2487.83	42.15	PK	278	1.1	V	-4.74	37.41	74	36.59
2487.83	28.34	Ave.	278	1.1	V	-4.74	23.60	54	30.40
4804.00	49.67	PK	179	2.4	H	3.79	53.46	74	20.54
4804.00	38.58	Ave.	179	2.4	H	3.79	42.37	54	11.63
7206.00	42.28	PK	237	2.4	H	9.79	52.07	74	21.93
7206.00	33.04	Ave.	237	2.4	H	9.79	42.83	54	11.17
9608.00	41.68	PK	153	1.1	H	11.85	53.53	74	20.47
9608.00	32.08	Ave.	153	1.1	H	11.85	43.93	54	10.07

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 (2441 MHz)									
460.9	34.41	QP	40	1.8	V	-3.2	31.21	46	14.79
2441.00	90.99	PK	108	2.4	H	-6.46	84.53	/	/
2441.00	80.82	Ave.	108	2.4	H	-6.46	74.36	/	/
2441.00	93.67	PK	69	2.2	V	-6.46	87.21	/	/
2441.00	83.86	Ave.	69	2.2	V	-6.46	77.40	/	/
2367.55	42.85	PK	197	1.1	H	-6.46	36.39	74	37.61
2367.55	28.34	Ave.	197	1.1	H	-6.46	21.88	54	32.12
2485.55	46.36	PK	229	1.9	V	-4.74	41.62	74	32.38
2485.55	28.34	Ave.	229	1.9	V	-4.74	23.60	54	30.40
2485.81	45.15	PK	47	2.4	H	-4.74	40.41	74	33.59
2485.81	28.34	Ave.	47	2.4	H	-4.74	23.60	54	30.40
4882.00	52.61	PK	189	1.8	V	3.56	56.17	74	17.83
4882.00	41.69	Ave.	189	1.8	V	3.56	45.25	54	8.75
7323.00	42.84	PK	299	1.5	H	10.11	52.95	74	21.05
7323.00	32.82	Ave.	299	1.5	H	10.11	42.93	54	11.07
9764.00	42.89	PK	329	1.1	H	13.21	56.10	74	17.90
9764.00	31.06	Ave.	329	1.1	H	13.21	44.27	54	9.73
High Channel (2480 MHz)									
460.9	34.38	QP	200	1.1	V	-3.2	31.18	46	14.82
2480.00	90.14	PK	281	1.2	H	-4.74	85.40	/	/
2480.00	80.31	Ave.	281	1.2	H	-4.74	75.57	/	/
2480.00	92.86	PK	91	1.6	V	-4.74	88.12	/	/
2480.00	83.14	Ave.	91	1.6	V	-4.74	78.40	/	/
2324.28	41.61	PK	277	1.9	H	-6.65	34.96	74	39.04
2324.28	28.34	Ave.	277	1.9	H	-6.65	21.69	54	32.31
2483.53	72.51	PK	266	2.1	H	-4.74	67.77	74	**6.23**
2483.53	42.25	Ave.	266	2.1	H	-4.74	37.51	54	16.49
2484.19	68.45	PK	204	2.2	V	-4.74	63.71	74	10.29
2484.19	39.42	Ave.	204	2.2	V	-4.74	34.68	54	19.32
4960.00	50.81	PK	31	1.4	H	3.19	54.00	74	20.00
4960.00	39.51	Ave.	31	1.4	H	3.19	42.70	54	11.30
7440.00	43.68	PK	121	2.0	H	8.17	51.85	74	22.15
7440.00	33.50	Ave.	121	2.0	H	8.17	41.67	54	12.33
9920.00	42.93	PK	195	2.5	V	13.21	56.14	74	17.86
9920.00	31.17	Ave.	195	2.5	V	13.21	44.38	54	9.62

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

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