

FCC PART 15.249

TEST REPORT

For

Chuango Security Technology Corporation

6-17, Overseas Students Pioneer Park, No. 108, Jia, Economic & Technological Development
Zone, Fuzhou 350015, China

FCC ID: RJY-W120

Report Type: Original Report		Product Type: WiFi Alarm System	
Test Engineer:	Bernie Zhang <i>Bernie Zhang</i>		
Report Number:	RSHA170801003-00B		
Report Date:	2017-08-12		
Reviewed By:	Oscar Ye RF Leader <i>Oscar Ye</i>		
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn		

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
MEASUREMENT UNCERTAINTY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EUT EXERCISE SOFTWARE	5
SUPPORT EQUIPMENT LIST AND DETAILS	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	7
TEST EQUIPMENT LIST	8
FCC§15.203 - ANTENNA REQUIREMENT.....	9
APPLICABLE STANDARD	9
ANTENNA CONNECTOR CONSTRUCTION	9
FCC §15.207 (A) – AC LINE CONDUCTED EMISSIONS	10
APPLICABLE STANDARD	10
EUT SETUP	10
EMI TEST RECEIVER SETUP.....	10
TEST PROCEDURE	10
CORRECTED FACTOR & MARGIN CALCULATION	11
TEST RESULTS SUMMARY	11
TEST DATA	11
FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS& OUT OF BAND EMISSION.....	14
APPLICABLE STANDARD	14
EUT SETUP	14
TEST EQUIPMENT SETUP.....	15
TEST PROCEDURE	15
CORRECTED AMPLITUDE & MARGIN CALCULATION	16
TEST RESULTS SUMMARY	16
TEST DATA	16
FCC §15.215(C) – 20 DB BANDWIDTH TESTING.....	18
APPLICABLE STANDARD	18
TEST PROCEDURE	18
TEST DATA	18

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Chuango Security Technology Corporation
Tested Model	W120
Product Type	WiFi Alarm System
Dimension	117.0 mm(L) × 118.5 mm(W) × 40.5 mm(H)
Power Supply	DC 1.5V*4 from AA batteries or DC 12.0V from Adapter

Adapter Information:

Model: SA-US12V

Input: AC100-240 V 60Hz 0.3A

Output: 12.0V, 500mA

**All measurement and test data in this report was gathered from production sample serial number: 20170801010. (Assigned by BACL, Kunshan). The EUT was received on 2017-08-01.*

Objective

This type approval report is prepared on behalf of Chuango Security Technology Corporation in accordance with Part 2-Subpart J, and Part 15-Subparts A 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 15.249 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submission with FCC ID: RJY-W120.

FCC Part 15.249 DXX submissions with FCC ID: RJYRE2300, and FCC ID: RJYDS2300.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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 in testing mode which was provided by manufacturer, channel list is as below:

Channel	Frequency(MHz)
1	915.00

EUT Exercise Software

RF test tool : putty

Support Equipment List and Details

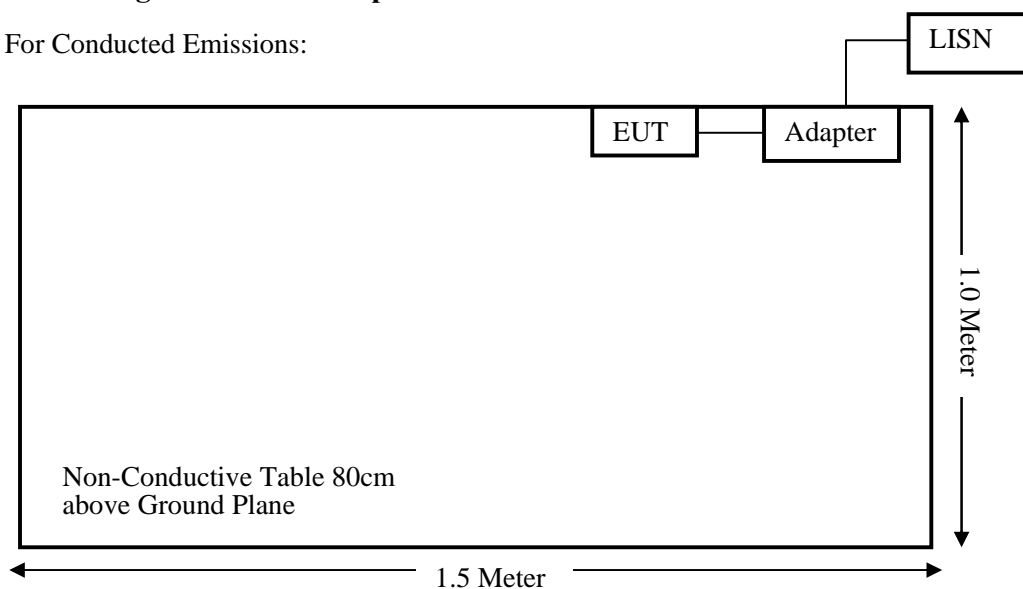
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

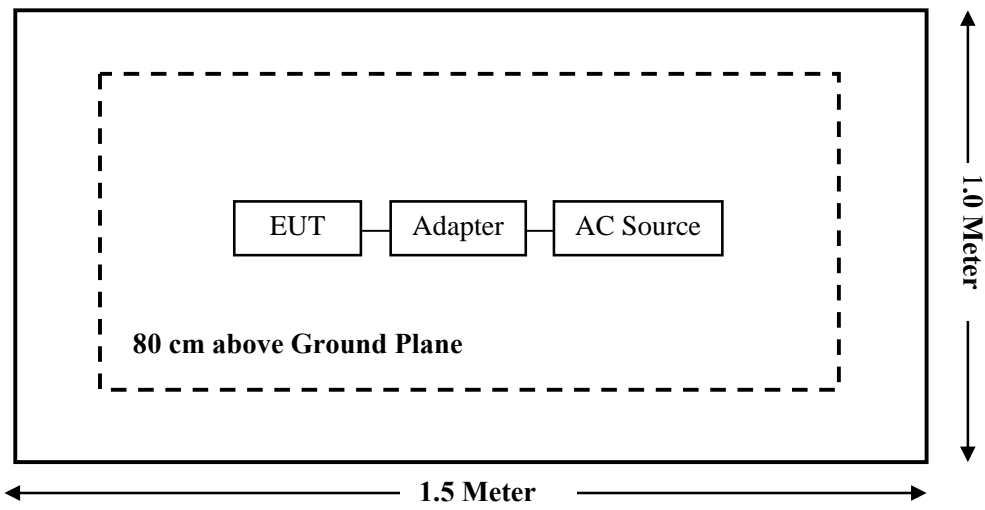
Cable Description	Shielding Type	Length (m)	From Port	To
/	/	/	/	/

Block Diagram of Test Setup

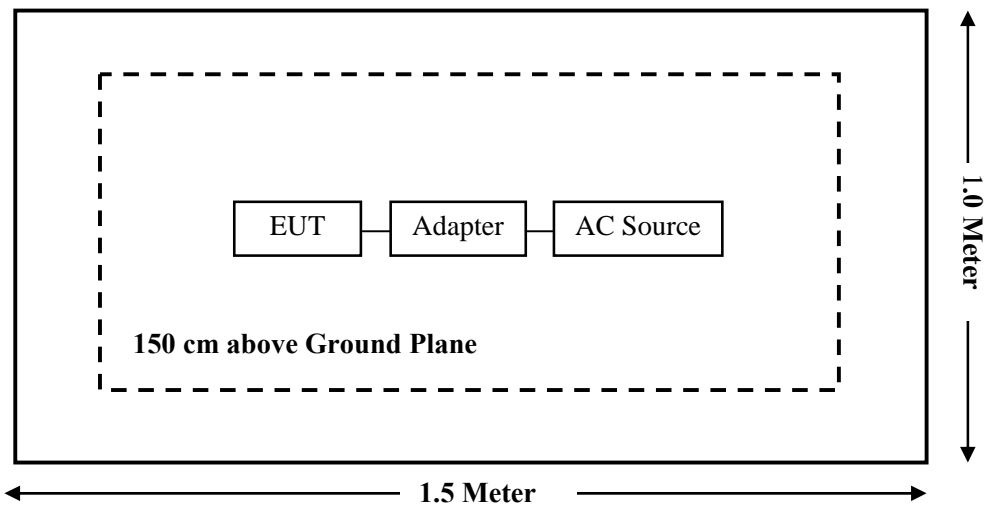
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Compliance
15.205, §15.209, §15.249	Radiated Emissions& Out of Band Emission	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-17
Sonoma Instrument	Pre-amplifier	330	171377	2016-12-12	2017-12-11
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-12-12	2017-12-11
Heatsink Required	Amplifier	QLW-18405536-J0	15964001009	2016-12-12	2017-12-11
R&S	Auto test Software	EMC32	100361	/	/
Haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-11
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-20
Agilent	Power Meter	N1912A	MY5000492	2016-11-18	2017-11-17
Agilent	Power Sensor	N1921A	MY54210024	2016-11-18	2017-11-17
Chuango	RF Cable	/	/	2017-08-04	2018-08-03
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07

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

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, 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.

Antenna Connector Construction

The EUT has an internal integrated antenna arrangement and antenna gain is 2.0 dBi, which was permanently attached ,fulfill the requirement of this section, please refer to the EUT photos.

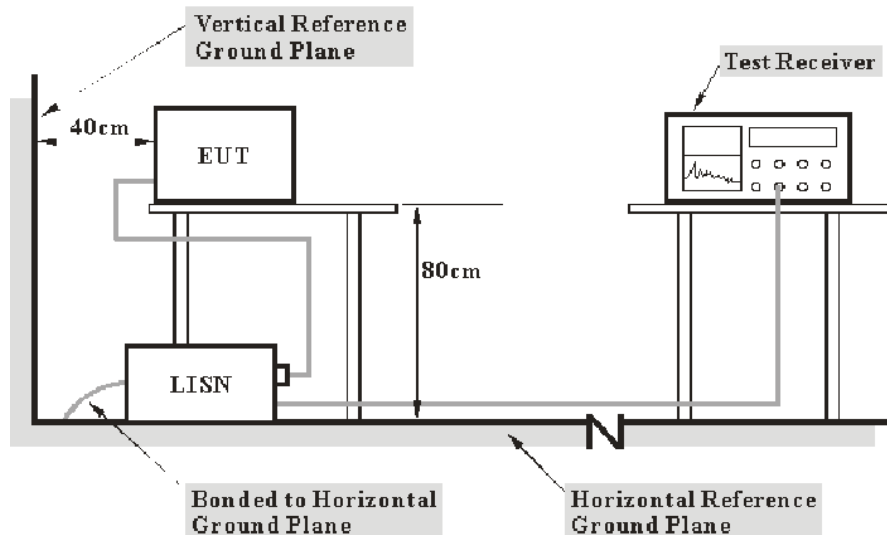
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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 C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

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 data was recorded in the Quasi-peak and average detection mode.

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:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

Environmental Conditions

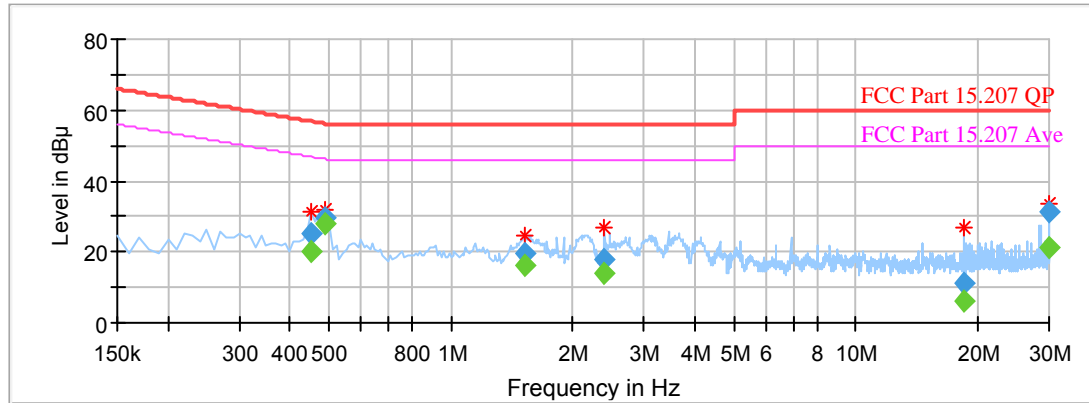
Temperature:	22.7°C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Bernie Zhang on 2017-08-06.

EUT operation mode: Transmitting

AC 120V/60 Hz, Line

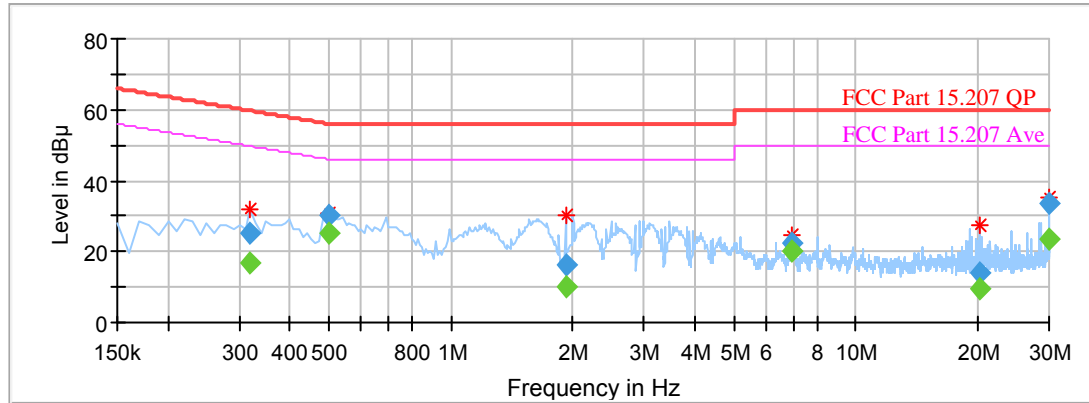
Full Spectrum



Frequency (MHz)	QuasiPeak (dBμV)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.450000	---	20.29	9.000	L1	10.1	26.59	46.88	Compliance
0.450000	25.09	---	9.000	L1	10.1	31.79	56.88	Compliance
0.490000	---	28.03	9.000	L1	10.1	18.14	46.17	Compliance
0.490000	29.68	---	9.000	L1	10.1	26.49	56.17	Compliance
1.520000	---	16.03	9.000	L1	9.9	29.97	46.00	Compliance
1.520000	19.61	---	9.000	L1	9.9	36.39	56.00	Compliance
2.400000	---	14.05	9.000	L1	9.9	31.95	46.00	Compliance
2.400000	18.12	---	9.000	L1	9.9	37.88	56.00	Compliance
18.480000	---	6.21	9.000	L1	10.2	43.79	50.00	Compliance
18.480000	11.15	---	9.000	L1	10.2	48.85	60.00	Compliance
29.980000	---	21.00	9.000	L1	10.3	29.00	50.00	Compliance
29.980000	31.47	---	9.000	L1	10.3	28.53	60.00	Compliance

AC 120V/60 Hz, Neutral

Full Spectrum



Frequency (MHz)	QuasiPeak (dBμV)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.320000	---	16.74	9.000	N	10.1	32.97	49.71	Compliance
0.320000	25.10	---	9.000	N	10.1	34.61	59.71	Compliance
0.500000	---	25.20	9.000	N	10.1	20.80	46.00	Compliance
0.500000	30.06	---	9.000	N	10.1	25.94	56.00	Compliance
1.920000	---	9.93	9.000	N	9.9	36.07	46.00	Compliance
1.920000	15.98	---	9.000	N	9.9	40.02	56.00	Compliance
6.920000	---	20.05	9.000	N	9.9	29.95	50.00	Compliance
6.920000	22.41	---	9.000	N	9.9	37.59	60.00	Compliance
20.320000	---	9.37	9.000	N	10.2	40.63	50.00	Compliance
20.320000	14.03	---	9.000	N	10.2	45.97	60.00	Compliance
29.980000	---	23.67	9.000	N	10.3	26.33	50.00	Compliance
29.980000	33.40	---	9.000	N	10.3	26.60	60.00	Compliance

Note:

- 1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
- 2) Corrected Amplitude = Reading + Corr.
- 3) Margin = Limit -Corrected Amplitude

FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS& OUT OF BAND EMISSION

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

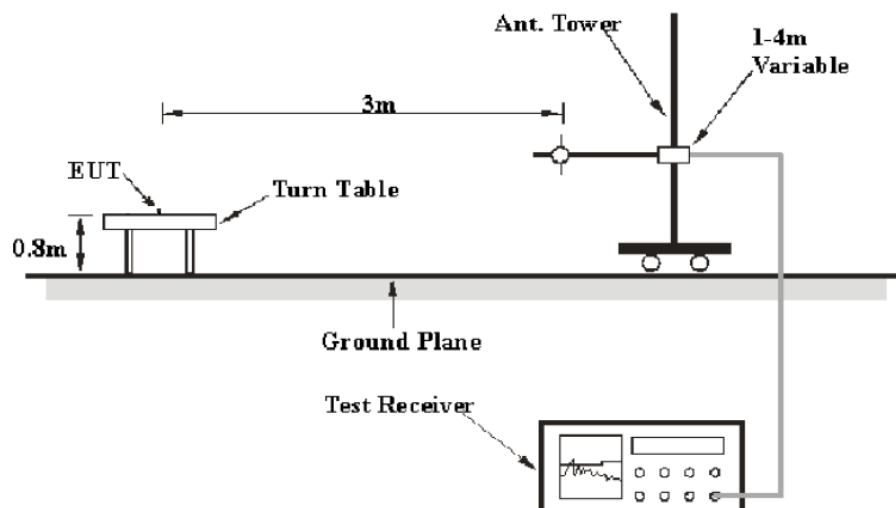
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

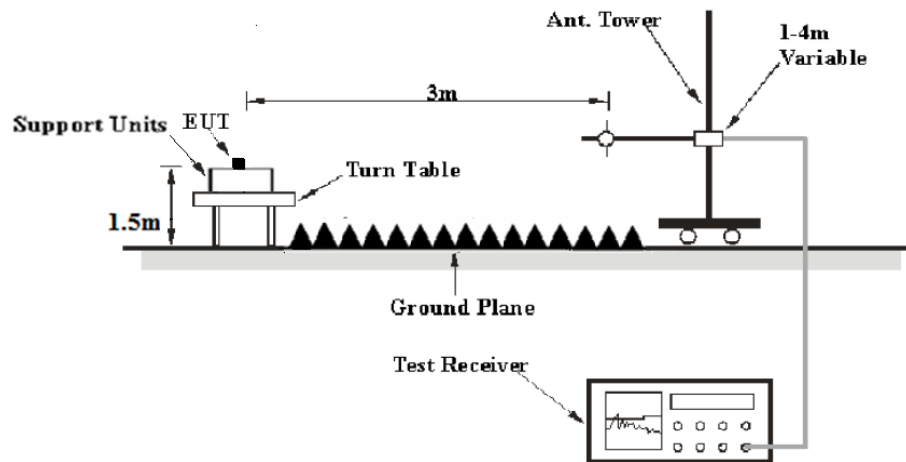
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

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

Test Equipment 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	120 kHz	300 kHz	120 kHz	QP

Frequency Range	RBW	Video B/W	Detector
1GHz – 25GHz	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.

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode 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:

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

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 Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 &15.205 & 15.249.

Test Data

Environmental Conditions

Temperature:	22.6°C
Relative Humidity:	49 %
ATM Pressure:	101.2kPa

The testing was performed by Bernie Zhang on 2017-08-05.

Test Mode: Transmitting (Scan with X-Axis, Y-Axis and Z-Axis position, the worst case X-Axis was recorded)

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209	
	Reading (dBμV)	Detector (PK/QP/ Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
319.87	33.94	QP	67	166	H	1.33	35.27	46.00	10.73
915.00	91.13	PK	280	249	V	12.61	103.74	114.00	10.26
915.00	78.32	Ave	280	249	V	12.61	90.93	94.00	3.07
915.00	85.52	PK	150	233	H	12.61	98.13	114.00	15.87
915.00	73.69	Ave	150	233	H	12.61	86.30	94.00	7.70
902.00	45.62	PK	3	170	V	12.40	58.02	74.00	15.98
902.00	34.52	Ave	3	170	V	12.40	46.92	54.00	7.08
928.00	46.62	PK	21	108	V	12.82	59.44	74.00	14.56
928.00	35.95	Ave	21	108	V	12.82	48.77	54.00	5.23
1315.42	43.11	PK	91	192	V	-9.13	33.98	74.00	40.02
1315.42	32.41	Ave	91	192	V	-9.13	23.28	54.00	30.72
1830.00	45.62	PK	216	162	V	-6.07	39.55	74.00	34.45
1830.00	33.57	Ave	216	162	V	-6.07	27.50	54.00	26.50
2745.00	42.62	PK	192	176	V	-2.51	40.11	74.00	33.89
2745.00	31.58	Ave	192	176	V	-2.51	29.07	54.00	24.93

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (Rx) + cable loss – amplifier factor

Margin = Limit - Corr. Amplitude

Emissions more than 20 dB below the limit do not need to be reported.

FCC §15.215(c) – 20 dB BANDWIDTH TESTING

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	22.3°C
Relative Humidity:	49 %
ATM Pressure:	101.3kPa

The testing was performed by Bernie Zhang on 2017-08-06.

Test Result: Compliant.

Test Mode: Transmitting

Frequency (MHz)	20 dB Bandwidth (kHz)
915.00	32.46

