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Report No.: SZEM171201243002
Page: 1 of 30

TEST REPORT

Application No.: SZEM1712012430CR (SHEM1709006514CR)
Applicant: Beijing FengYun Vision Technology Co.Ltd
Address of Applicant: 36 Middle Chuangye Rd, Suite#312, HaiDian District, Beijing, China
Manufacturer: Beijing FengYun Vision Technology Co.Ltd
Address of Manufacturer: 36 Middle Chuangye Rd, Suite#312, HaiDian District, Beijing, China
Factory: Beijing FengYun Vision Technology Co.Ltd
Address of Factory: 36 Middle Chuangye Rd, Suite#312, HaiDian District, Beijing, China
Equipment Under Test (EUT):
EUT Name: JEDEYE
FCC ID 2ANWZ-FY-JDY
Model No.: Jedeye II
Trade mark: JEDEYE
Standard(s) : 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2017-09-27
Date of Test: 2017-12-15 to 2017-12-17
Date of Issue: 2018-01-17

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.




Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-01-17		Original

Authorized for issue by:				
				
		<hr/>		
		Foray Chen /Project Engineer		
				
		<hr/>		
		Eric Fu /Reviewer		



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass



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4 General Information

4.1 Details of E.U.T.

Power supply:	Adapter: Manufacture: Shenzhen LvXiang Technology Co.,Ltd Model: LX050200U001 Input: AC 100-240V, 50/60Hz Output: 5V, 2A
Battery:	DC 3.7V, 2000mAH rechargeable Li-ion battery
Product Type:	Portable product with BT & WiFi
Cable:	AC Cable: 0cm DC Cable: 60cm
Operation Frequency	2402MHz to 2480MHz
BT Version:	4.2 BLE
Modulation Type	GFSK
Number of Channels	40
Channel Spacing	2MHz
Antenna Type	PCB antenna (It is shared by WiFi & BT)
Antenna Gain:	5 dBi

4.2 Description of Support Units

The EUT has been tested with associated equipment below.		
Description	Manufacturer	Model No.
Laptop 1	LENOVO	R400

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
TNVN	22	DC 3.7

Note:

VN:Normal Voltage

VL:Low Extreme Test Voltage

VH:High Extreme Test Voltage

TN:Normal Temperature

TL:Low Extreme Test Temperature

TH:High Extreme Test Temperature

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
3	2406MHz	13	2426MHz	23	2446MHz	33	2466MHz
4	2408MHz	14	2428MHz	24	2448MHz	34	2468MHz
5	2410MHz	15	2430MHz	25	2450MHz	35	2470MHz
6	2412MHz	16	2432MHz	26	2452MHz	36	2472MHz
7	2414MHz	17	2434MHz	27	2454MHz	37	2474MHz
8	2416MHz	18	2436MHz	28	2456MHz	38	2476MHz



9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Using test software was control EUT work in continuous transmitter and receiver mode. And select test channel as below:

Channel	Frequency
The lowest channel (CH1)	2402MHz
The middle channel (CH20)	2440MHz
The highest channel (CH40)	2480MHz

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction emission	3.0dB (150kHz to 30MHz)
2	Radiated emission	4.5dB (30MHz-1GHz)
3	Temperature test	1°C
4	Humidity test	3%



4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Conducted Emission at AC Power Line					
EMI test receiver	R&S	ESR7	SHEM162-1	2017-12-15	2018-12-15
LISN	Schwarzbeck	NSLK8127	SHEM061-1	2017-12-15	2018-12-15
LISN	EMCO	3816/2	SHEM019-1	2017-12-15	2018-12-15
Pulse limiter	R&S	ESH3-Z2	SHEM029-1	2017-12-15	2018-12-15
CE test Cable	/	CE01	/	2017-12-15	2018-12-15
Conducted Test					
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-15	2018-12-15
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2017-09-26	2018-09-25
Power meter	R&S	NRP	SHEM057-1	2017-12-15	2018-12-15
Power Sensor	R&S	NRP-Z22	SHEM136-1	2017-07-22	2018-07-21
Power Sensor	R&S	NRP-Z91	SHEM057-2	2017-12-15	2018-12-15
Signal Generator	R&S	SMR40	SHEM058-1	2017-07-03	2018-07-02
Signal Generator	Agilent	N5182A	SHEM182-1	2017-09-26	2018-09-25
Communication Tester	R&S	CMW270	SHEM183-1	2017-10-22	2018-10-21
Switcher	Tonscend	JS0806	SHEM184-1	2017-09-26	2018-09-25
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2017-09-26	2018-09-25
AC Power Stabilizer	WOCEN	6100	SHEM045-1	2017-12-15	2018-12-15
DC Power Supply	QJE	QJ30003SII	SHEM046-1	2017-12-15	2018-12-15
Conducted test Cable	/	RF01, RF 02	/	2017-12-15	2018-12-15
Radiated Test					
EMI test receiver	R&S	ESU40	SHEM051-1	2017-12-15	2018-12-15
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2017-12-15	2018-12-15
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2017-04-10	2020-04-09
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2017-02-28	2020-02-27
Antenna (25MHz-3GHz)	Schwarzbeck	HL562	SHEM010-1	2017-02-28	2020-02-27
Horn Antenna (1-8GHz)	Schwarzbeck	HF906	SHEM009-1	2017-10-24	2020-10-23
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2017-01-14	2020-01-13
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2017-12-03	2020-12-02
Pre-amplifier (9kHz-2GHz)	CLAVIIO	BDLNA-0001-412010	SHEM164-1	2017-08-22	2018-08-21
Pre-amplifier (1-18GHz)	CLAVIIO	BDLNA-0118-352810	SHEM050-2	2017-08-22	2018-08-21
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2017-12-15	2018-12-15
Band filter	LORCH	9BRX-875/X150-SR	SHEM156-1	/	/
Band filter	LORCH	13BRX-1950/X500-SR	SHEM083-2	/	/
Band filter	LORCH	5BRX-2400/X200-SR	SHEM155-1	/	/
Band filter	LORCH	5BRX-5500/X1000-SR	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G-100SS	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700-3SS	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2017-07-22	2020-07-21
RE test Cable	/	RE01, RE02, RE06	/		

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(c)

6.1.2 Conclusion

Standard Requirement:

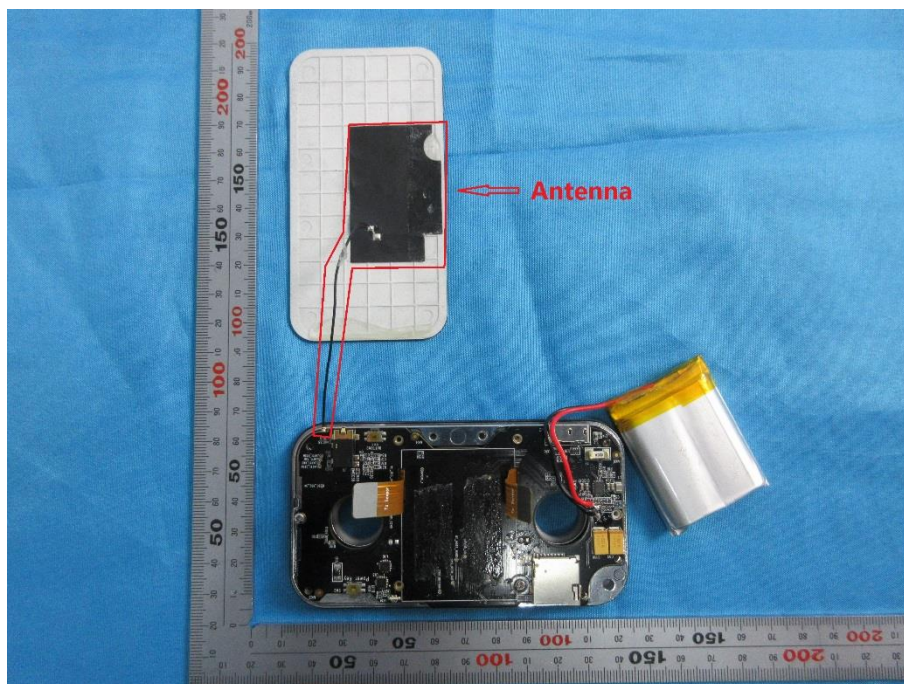
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is 5dBi.



7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

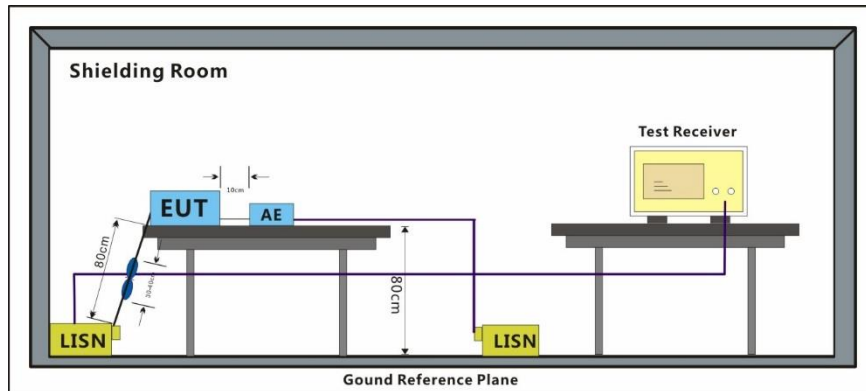
7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

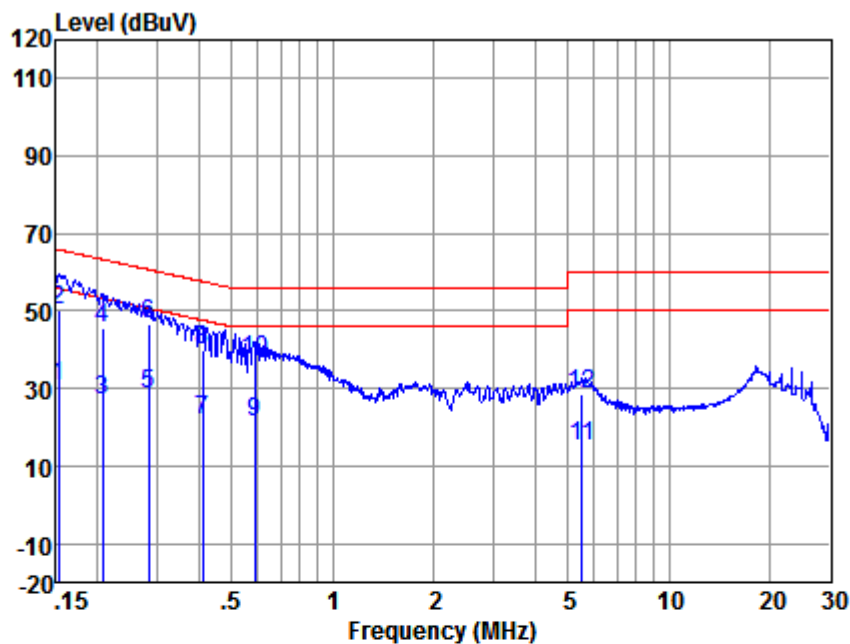
7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

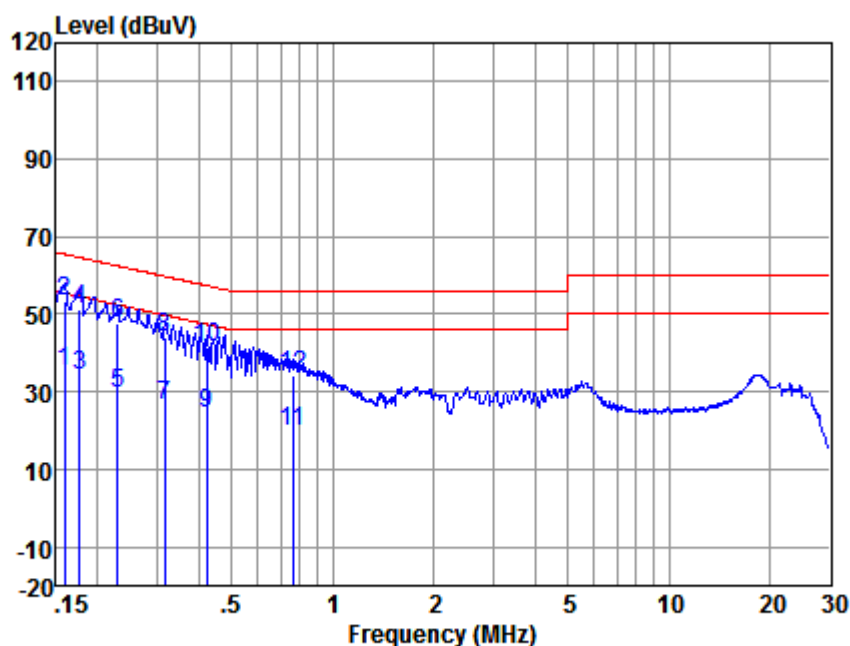
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



Site : chamber
Condition : LISN-L-2017
EUT/Project No: 6514CR
Test mode : d

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	20.90	0.11	9.81	30.82	55.87	-25.05	Average
2	0.152	40.40	0.11	9.81	50.32	65.87	-15.55	QP
3	0.206	16.85	0.11	9.81	26.77	53.36	-26.59	Average
4	0.206	35.67	0.11	9.81	45.59	63.36	-17.77	QP
5	0.283	18.90	0.11	9.81	28.82	50.72	-21.90	Average
6	0.283	36.82	0.11	9.81	46.74	60.72	-13.98	QP
7	0.410	11.73	0.11	9.82	21.66	47.64	-25.98	Average
8	0.410	30.00	0.11	9.82	39.93	57.64	-17.71	QP
9	0.585	11.17	0.11	9.82	21.10	46.00	-24.90	Average
10	0.585	27.24	0.11	9.82	37.17	56.00	-18.83	QP
11	5.505	5.32	0.11	9.86	15.29	50.00	-34.71	Average
12	5.505	18.81	0.11	9.86	28.78	60.00	-31.22	QP



Site : chamber
Condition : LISN-N-2017
EUT/Project No: 6514CR
Test mode : d

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.159	25.55	0.12	9.81	35.48	55.52	-20.04	Average
2	0.159	43.30	0.12	9.81	53.23	65.52	-12.29	QP
3	0.177	24.14	0.12	9.81	34.07	54.64	-20.57	Average
4	0.177	41.61	0.12	9.81	51.54	64.64	-13.10	QP
5	0.229	19.80	0.11	9.81	29.72	52.48	-22.76	Average
6	0.229	37.73	0.11	9.81	47.65	62.48	-14.83	QP
7	0.317	16.52	0.11	9.81	26.44	49.80	-23.36	Average
8	0.317	33.89	0.11	9.81	43.81	59.80	-15.99	QP
9	0.421	14.59	0.11	9.82	24.52	47.42	-22.90	Average
10	0.421	31.30	0.11	9.82	41.23	57.42	-16.19	QP
11	0.759	9.85	0.11	9.83	19.79	46.00	-26.21	Average
12	0.759	24.55	0.11	9.83	34.49	56.00	-21.51	QP

7.2 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
 Test Method: ANSI C63.10 (2013) Section 11.8.1
 Limit: ≥ 500 kHz

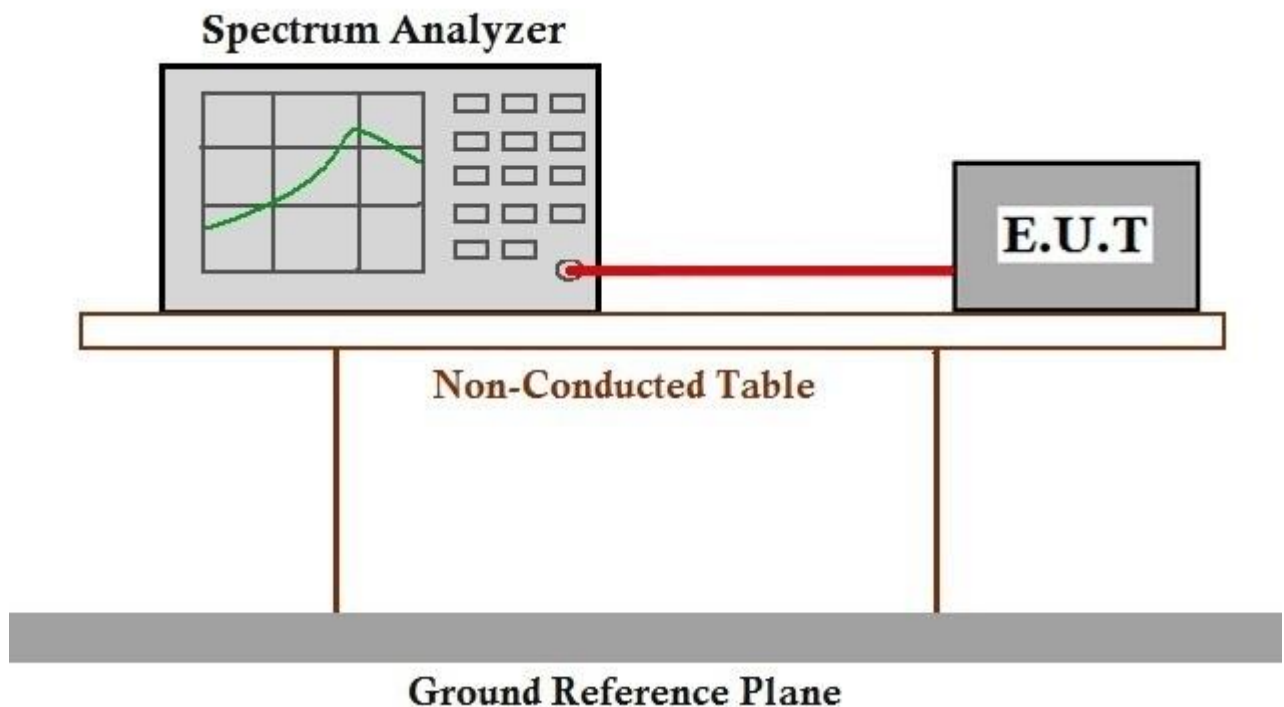
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201243002CR-BLE

7.3 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

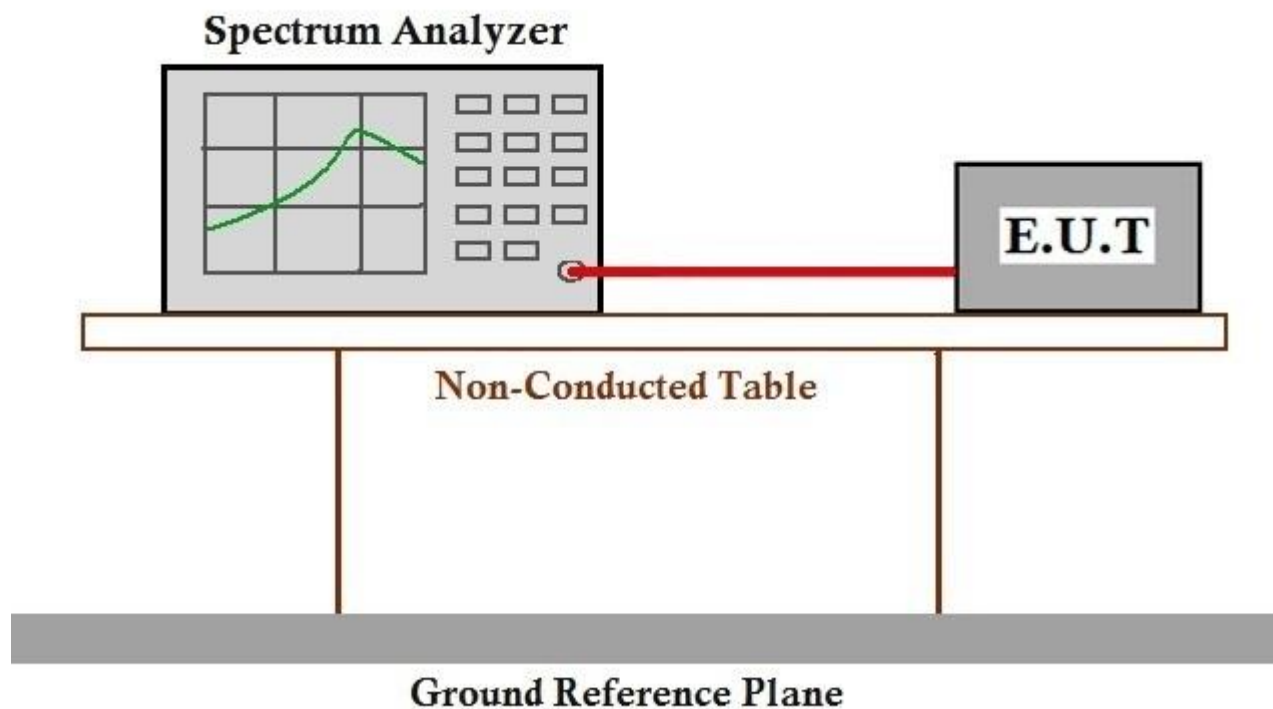
7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201243002CR-BLE

7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
 Test Method: ANSI C63.10 (2013) Section 11.10.2
 Limit: $\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission

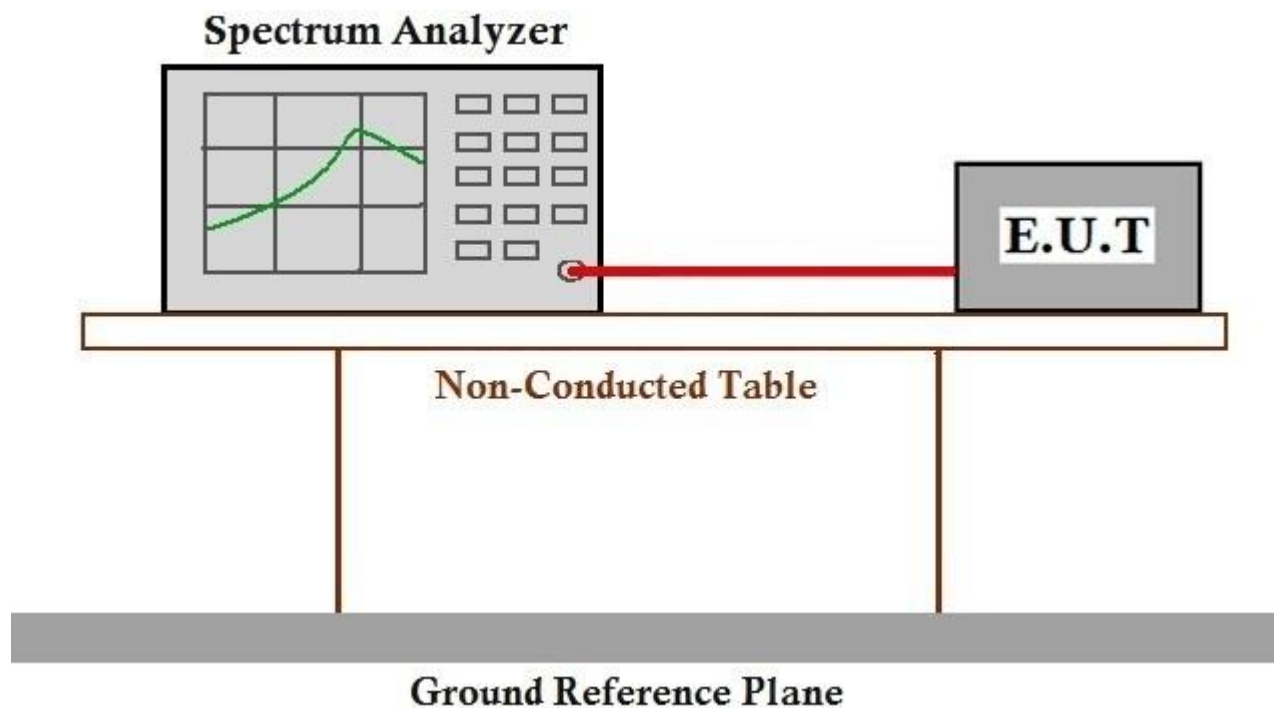
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201243002CR-BLE

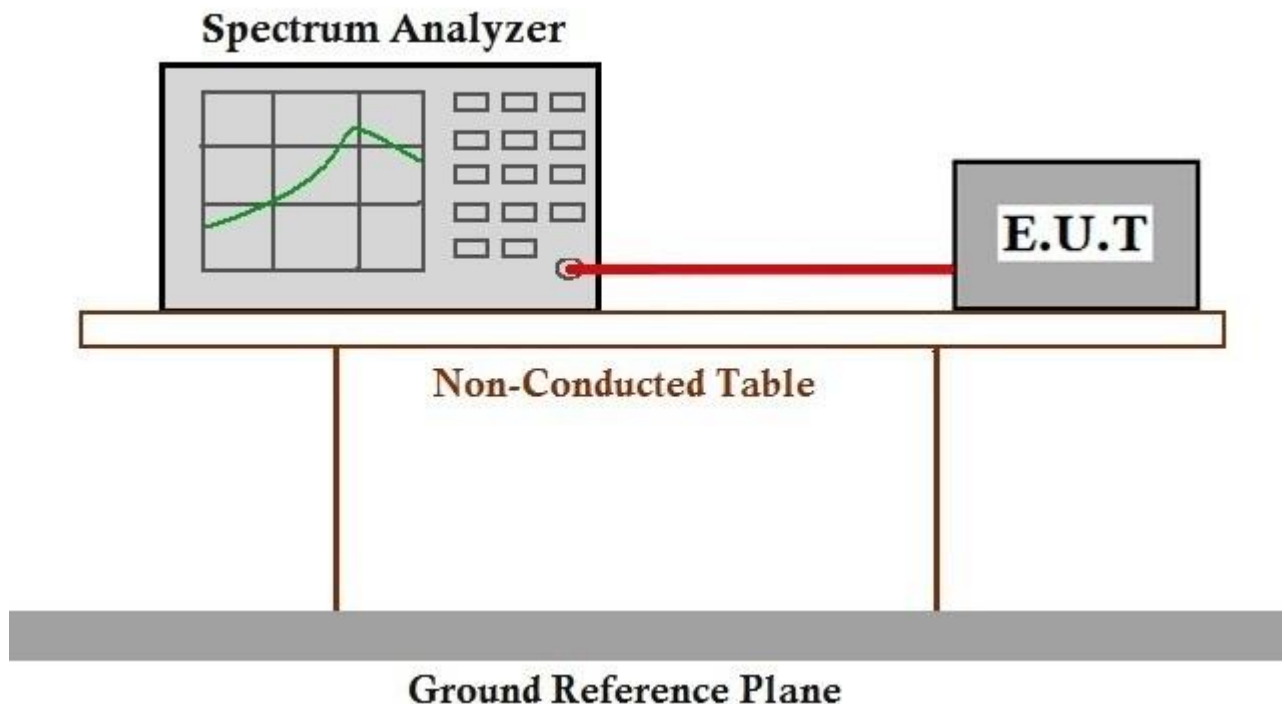
7.5 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2
Limit:	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))

7.5.1 E.U.T. Operation

Operating Environment:					
Temperature:	22 °C	Humidity:	50 % RH	Atmospheric Pressure:	1001 mbar
Test mode	d: Engineering Mode:Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type				

7.5.2 Test Setup Diagram



7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201243002CR-BLE

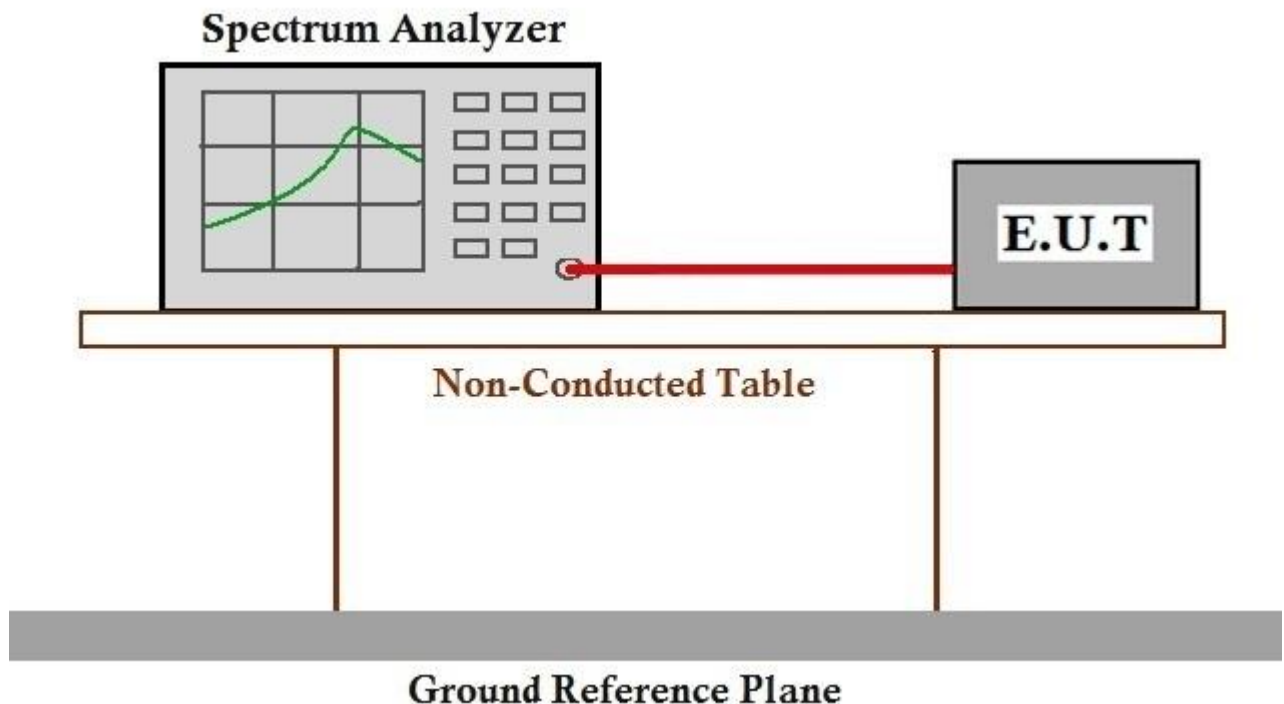
7.6 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
Limit:	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))

7.6.1 E.U.T. Operation

Operating Environment:					
Temperature:	22 °C	Humidity:	50 % RH	Atmospheric Pressure:	1001 mbar
Test mode	d: Engineering Mode:Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type				

7.6.2 Test Setup Diagram



7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix SZEM171201243002CR-BLE



7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

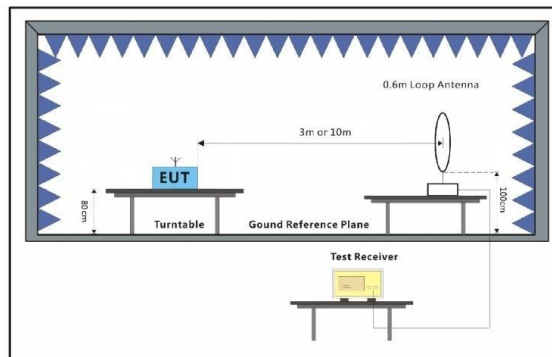
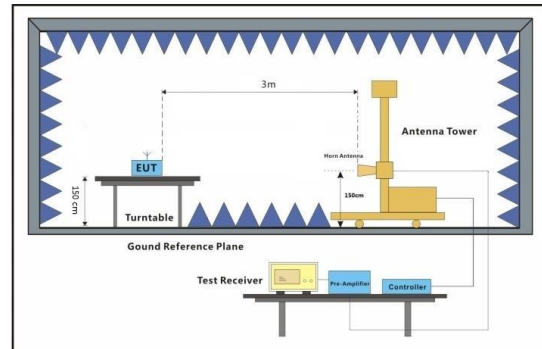
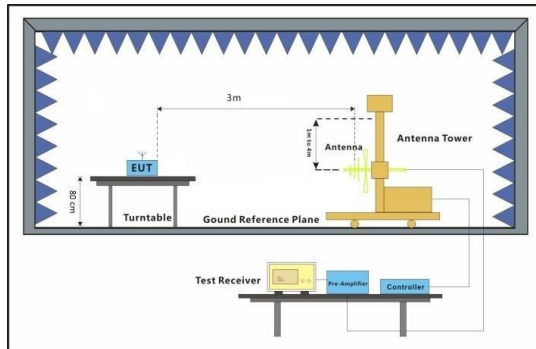
7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

7.7.2 Test Setup Diagram



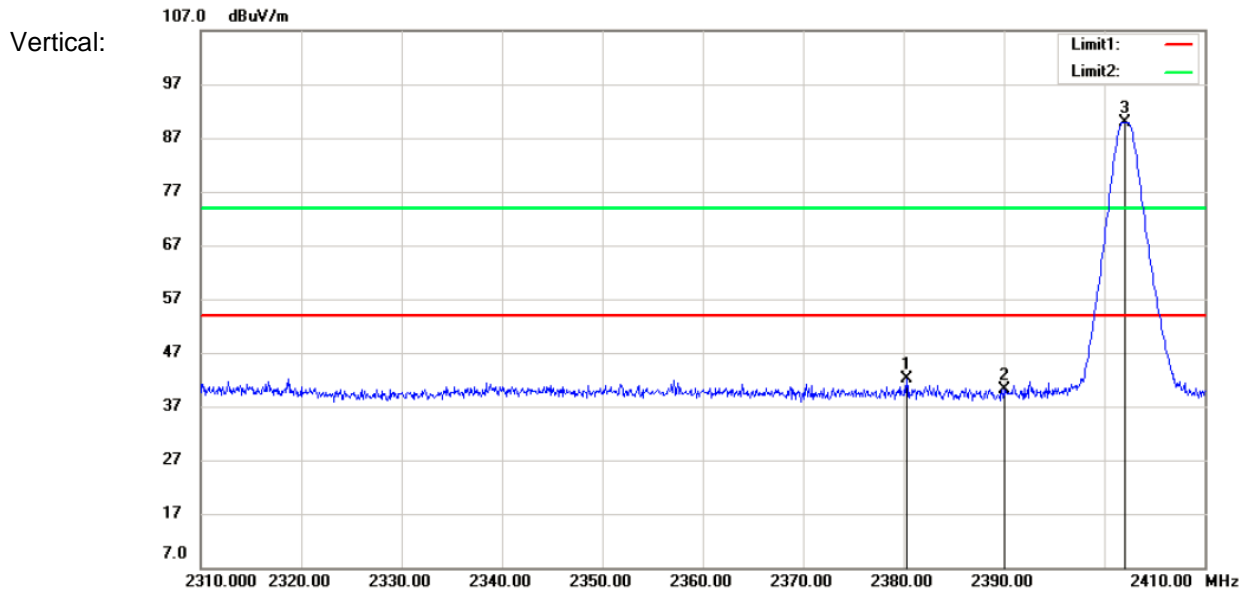
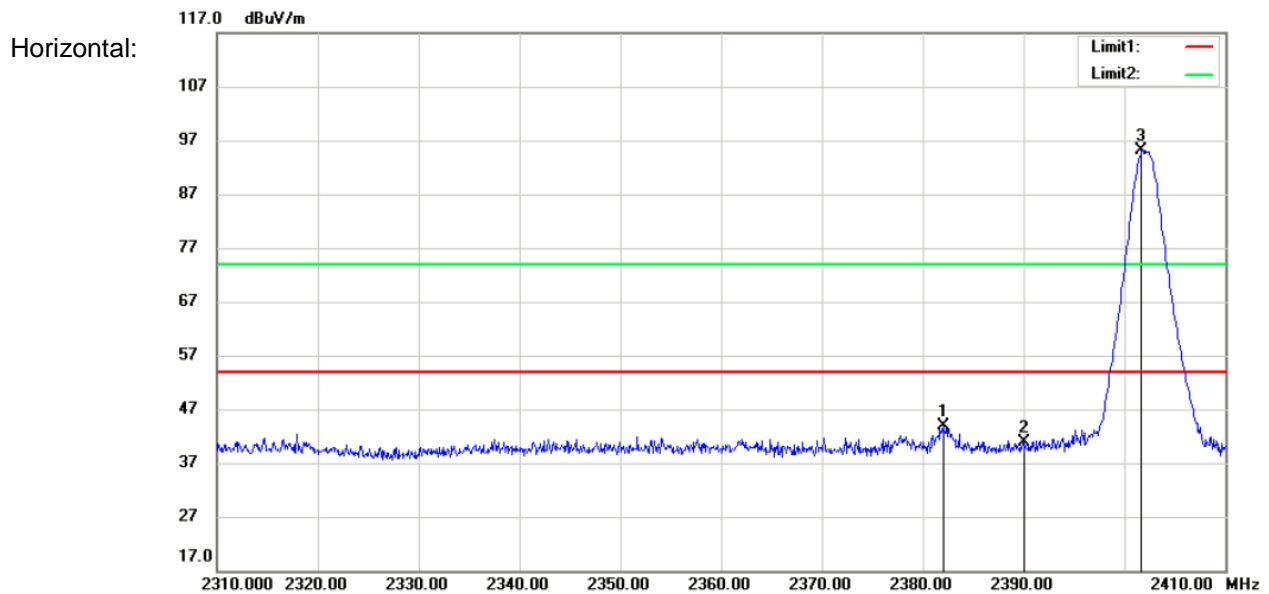
7.7.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Lowest Channel (2402MHz)

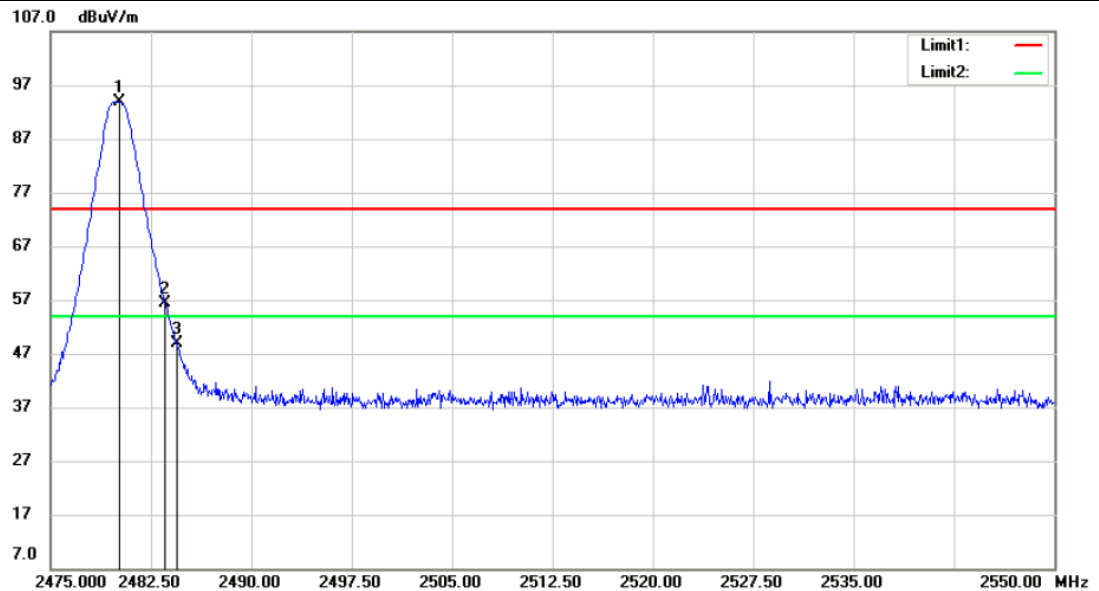
MK.	Frequency (MHz)	Reading (dBUV/m)	Corrected factor(dB)	Result (dBUV/m)	Limit (dBUV/m)	Over Limit (dB)	Detector	Polarization
1	2382	47.68	-3.87	43.81	54	-10.19	Peak	Horizontal
2	2390	44.77	-3.89	40.88	54	-13.12	Peak	Horizontal
3	2401.7	98.97	-3.91	95.06	54	41.06	Peak	Horizontal
1	2380.3	45.99	-3.86	42.13	54	-11.87	Peak	Vertical
2	2390	43.97	-3.89	40.08	54	-13.92	Peak	Vertical
3	2402.1	93.85	-3.92	89.93	54	35.93	Peak	Vertical



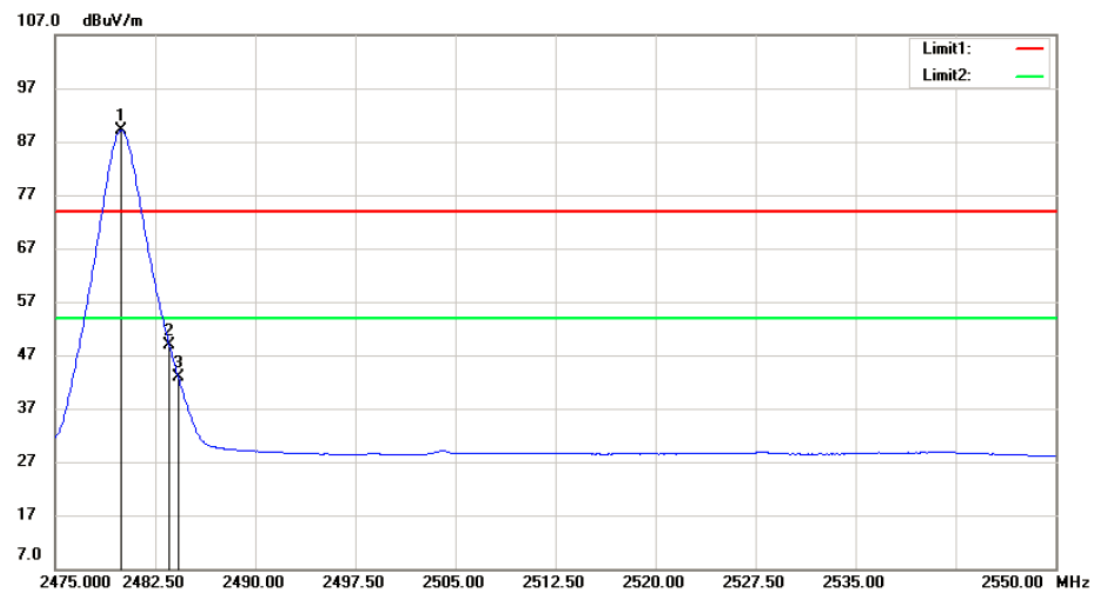
Highest Channel (2480MHz)

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2480.175	97.92	-4	93.92	74	19.92	Peak	Horizontal
2	2483.5	60.33	-4.01	56.32	74	-17.68	Peak	Horizontal
3	2484.45	52.79	-4.02	48.77	74	-25.23	Peak	Horizontal
1	2479.95	93.17	-4	89.17	54	35.17	Average	Horizontal
2	2483.5	52.94	-4.01	48.93	54	-5.07	Average	Horizontal
3	2484.225	46.9	-4.02	42.88	54	-11.12	Average	Horizontal

Peak:



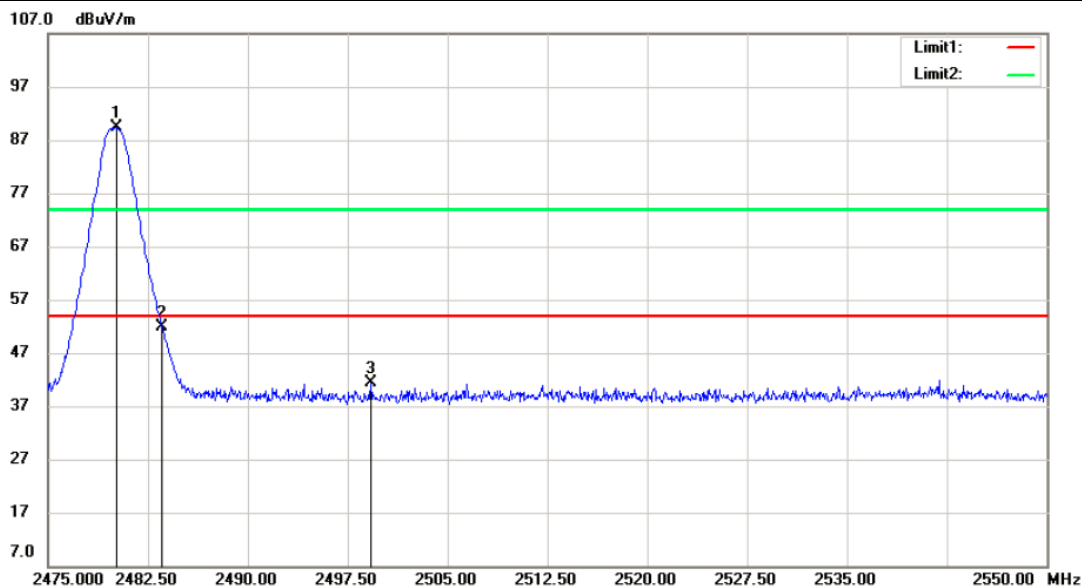
Average:



Highest Channel (2480MHz)

MK.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	2480.1	93.34	-4	89.34	54	35.34	Peak	Vertical
2	2483.5	55.92	-4.01	51.91	54	-2.09	Peak	Vertical
3	2499.225	45.39	-4.02	41.37	54	-12.63	Peak	Vertical

Vertical:





7.8 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

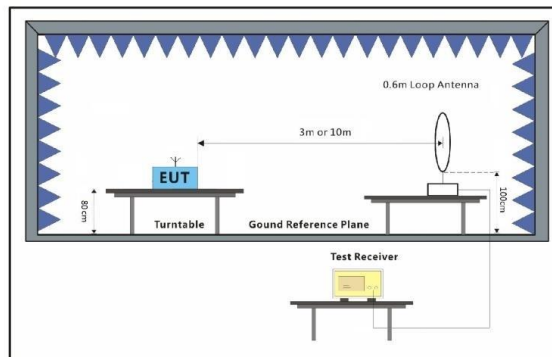
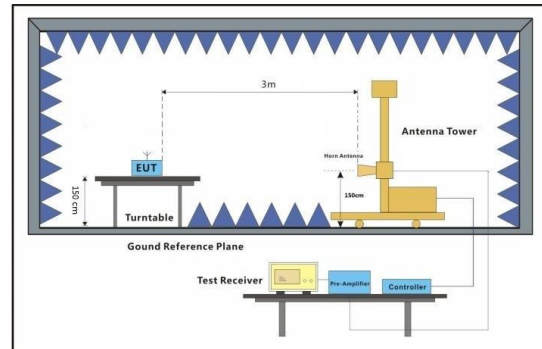
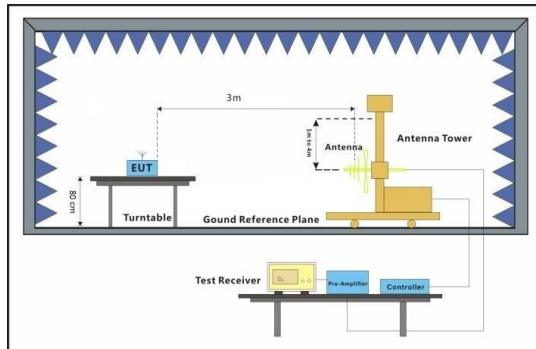
7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1001 mbar

Test mode d: Engineering Mode: Using test software to control EUT working in continuous transmitting and receiving, and select channel and modulation type

7.8.2 Test Setup Diagram



7.8.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4804	36.90	6.18	43.08	54	-10.92	peak
7206	35.04	10.63	45.67	54	-8.33	peak
9608	35.64	14.38	50.02	54	-3.98	peak

Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4804	35.72	6.18	41.90	54	-12.10	peak
7206	33.98	10.63	44.61	54	-9.39	peak
9608	33.62	14.38	48.00	54	-6.00	peak

Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4880	35.05	6.97	42.02	54	-11.98	peak
7320	33.78	11.12	44.90	54	-9.10	peak
9760	35.30	14.35	49.65	54	-4.35	peak

Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4880	36.85	6.97	43.82	54	-10.18	peak
7320	38.02	11.12	49.14	54	-4.86	peak
9760	33.09	14.35	47.44	54	-6.56	peak

Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4960	40.78	7.49	48.27	54	-5.73	peak
7440	35.23	11.65	46.88	54	-7.12	peak
9920	37.64	14.40	52.04	54	-1.96	peak

Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:High

Frequency MHz	RX_R dBuV	Factor dB	Emission dBuV/m	Limit dBuV/m	Margin dB	Detector
4960	36.76	7.49	44.25	54	-9.75	peak
7440	36.42	11.65	48.07	54	-5.93	peak
9920	32.79	14.40	47.19	54	-6.81	peak



8 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -