TEST REPORT

Applicant:	**DALS Lighting Inc.**
Address of Applicant:	**80 boul. De La Seigneurie Est, Blainville, QC, J7C 4N1, Canada**
Manufacturer/Factory:	**Hengdian Group Tospo Lighting Co., Ltd.**
Address of Manufacturer/Factory:	**Hengdian Electronics Industrial Zone, Dongyang, Zhejiang, China**
Equipment Under Test (EUT)	
Product Name:	**Self-ballasted LED lamp**
Model No.:	**DCP-BLBA21**
Trade Mark:	**DALS**
FCC ID:	**2AQSN-DCPBLBA21**
IC:	**10733A-DCPBLBA21**
HVIN:	**DCP-BLBA21**
Applicable standards:	**FCC CFR Title 47 Part 15 Subpart C Section 15.247** **ANSI C63.10:2013** **RSS-Gen Issue 5** **RSS-247 Issue 2**
Date of sample receipt:	**May 25, 2022**
Date of Test:	**May 27-June 26, 2022**
Date of report issued:	**June 29, 2022**
Test Result :	**PASS ***

*** In the configuration tested, the EUT complied with the standards specified above.**

Authorized Signature:

Robinson Luo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*2022-6-29*	*Original*

Prepared By: ***Date:*** *2022-6-29*

Project Engineer

Check By: ***Date:*** *2022-6-29*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (b)(4) RSS-Gen Section 6.8	Pass
AC Power Line Conducted Emission	15.207 RSS-Gen Section 8.8	Pass
Conducted Peak Output Power	15.247 (b)(3) RSS-247 Section 5.4(d)	Pass
Channel Bandwidth	15.247 (a)(2) RSS-247 Section 5.2(a)	Pass
99% Occupy Bandwidth	RSS-Gen Section 6.7	Pass
Power Spectral Density	15.247 (e) RSS-247 Section 5.2(b)	Pass
Band Edge	15.247(d) RSS-247 Section 5.5	Pass
Spurious Emission	15.205/15.209 RSS-247 Section 5.5	Pass
Frequency stability	RSS-Gen Section 6.11& Section 8.11	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013 and RSS-Gen.*

Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	1×10^{-7}
2	Duty cycle	0.37%
3	Occupied Bandwidth	2.8dB
4	RF conducted power	0.75dB
5	RF power density	3dB
6	Conducted Spurious emissions	2.58dB
7	AC Power Line Conducted Emission	3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	3.1dB (9kHz-30MHz)
		3.8039dB (30MHz-200MHz)
		3.9679dB (200MHz-1GHz)
		4.29dB (1GHz-18GHz)
		3.30dB (18GHz-40GHz)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.		

5 General Information

5.1 General Description of EUT

	Product Name:	Self-ballasted LED lamp
	Model No.:	DCP-BLBA21
	Test sample(s) ID:	GTSL202206000002-1
	Sample(s) Status:	Engineer sample
	Serial No.:	N/A
	Hardware Version:	V4.8
	Software Version:	V4.0.3
	Operation Frequency:	2402MHz~2480MHz
	Channel Numbers:	40
	Channel Separation:	2MHz
	Modulation Type:	GFSK
	Antenna Type:	PCB Antenna
	Antenna Gain:	2.5dBi
	Power Supply:	AC 120V/60Hz

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

Test Item	Software	Description
Conducted RF Testing and Radiated testing	EMI_Tool	Set the EUT to different modulation and channel

Output power setting table:

Test Mode	Set Tx Output Power	Data Rate
BLE	1.4 dBm	1Mbps

Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

5.2 Description of Support Units

None.

5.3 Deviation from Standards

None.

5.4 Abnormalities from Standard Conditions

None.

5.5 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 24 2021	June. 23 2022
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 24 2021	June. 23 2022
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

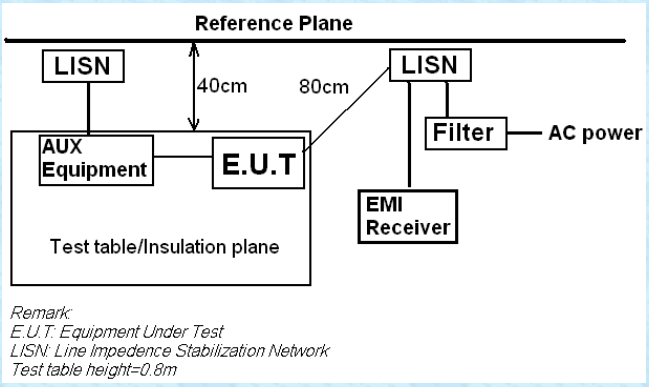
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(b)(4)
15.203 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:** (4) The conducted output power limit specified in paragraph (b) of this sec-tion is based on the use of antennas with directional gains that do not ex-ceed 6 dBi. Except as shown in para-graph (c) of this section, if transmit-ting antennas of directional gain great-er than 6 dBi are used, the conducted output power from the intentional ra-diator shall be reduced below the stat-ed values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appro-priate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
Standard requirement:	RSS-Gen Section 6.8
A transmitter can only be sold or operated with antennas with which it was approved. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power	
E.U.T Antenna:	
The antenna is PCB Antenna, the best case gain of the is 2.5dBi, reference to the appendix II for details	

7.2 Conducted Emissions

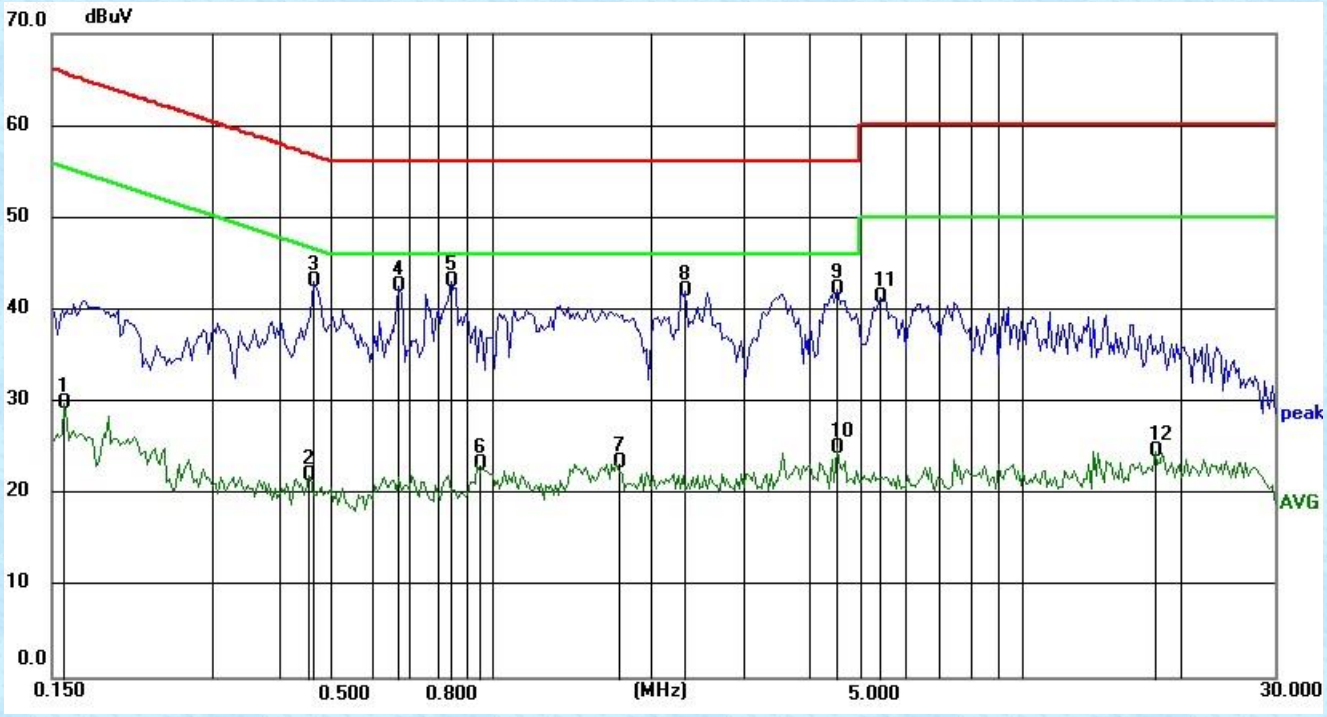
Test Requirement:	FCC Part15 C Section 15.207 RSS-Gen Section 8.8					
Test Method:	ANSI C63.10:2013 and RSS-Gen					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / 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.					
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*					
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data

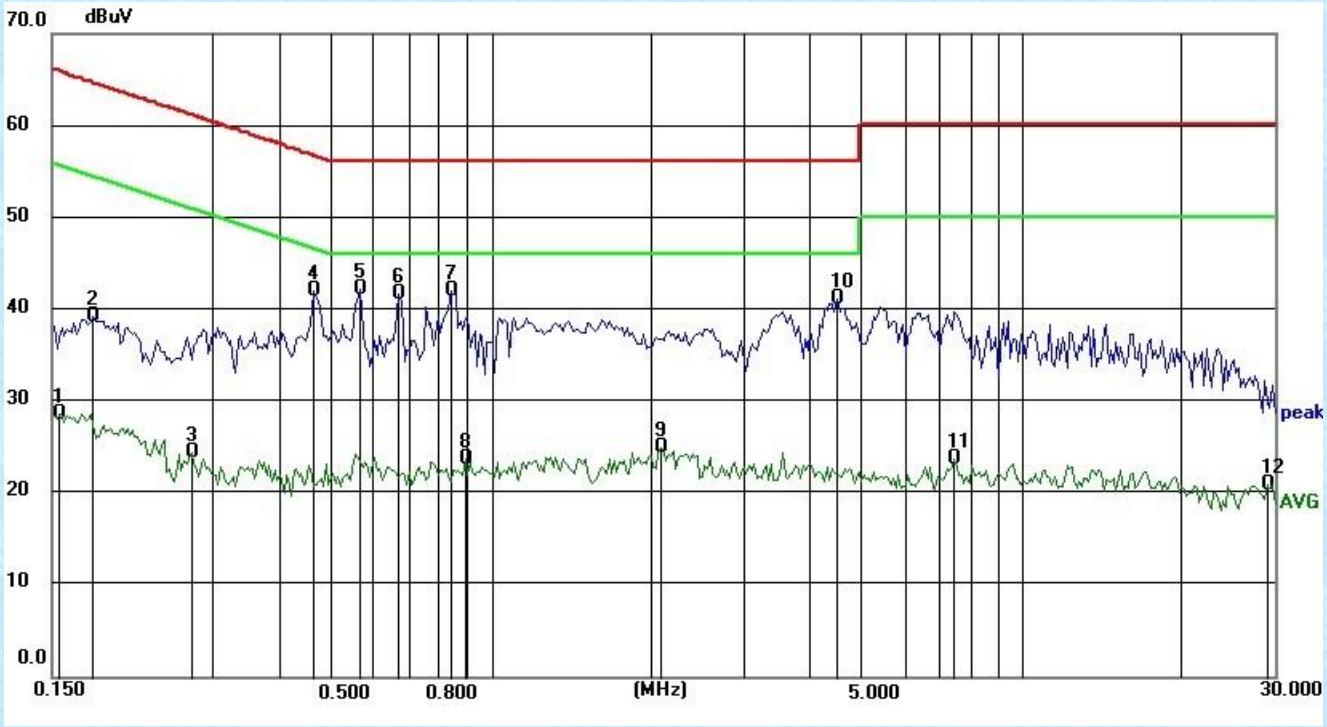
Pre-scan all test modes, found worst case at 2402MHz, and so only show the test result of 2402MHz

Line:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1580	19.78	10.00	29.78	55.57	25.79	AVG
0.4561	12.01	10.00	22.01	46.76	24.75	AVG
0.4661	33.03	10.00	43.03	56.58	13.55	QP
0.6753	32.65	10.00	42.65	56.00	13.35	QP
0.8437	33.11	10.00	43.11	56.00	12.89	QP
0.9477	13.30	10.01	23.31	46.00	22.69	AVG
1.7341	13.41	10.01	23.42	46.00	22.58	AVG
2.3334	32.05	10.01	42.06	56.00	13.94	QP
4.5014	32.13	10.03	42.16	56.00	13.84	QP
4.5014	14.92	10.03	24.95	46.00	21.05	AVG
5.4474	31.28	10.04	41.32	60.00	18.68	QP
17.8490	14.47	10.12	24.59	50.00	25.41	AVG

Neutral:

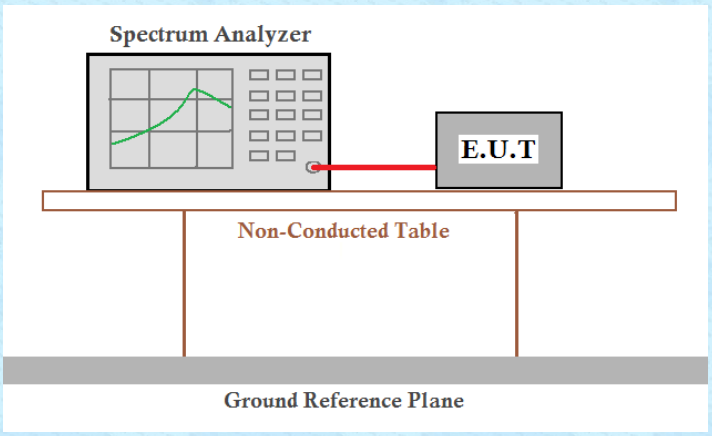


Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1547	18.66	10.00	28.66	55.74	27.08	AVG
0.1796	29.27	10.00	39.27	64.50	25.23	QP
0.2741	14.43	10.00	24.43	50.99	26.56	AVG
0.4661	32.03	10.00	42.03	56.58	14.55	QP
0.5700	32.29	10.00	42.29	56.00	13.71	QP
0.6753	31.65	10.00	41.65	56.00	14.35	QP
0.8437	32.11	10.00	42.11	56.00	13.89	QP
0.8991	13.71	10.01	23.72	46.00	22.28	AVG
2.0988	14.93	10.01	24.94	46.00	21.06	AVG
4.5014	31.13	10.03	41.16	56.00	14.84	QP
7.4858	13.73	10.05	23.78	50.00	26.22	AVG
29.0609	10.84	10.19	21.03	50.00	28.97	AVG

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.3 Conducted Peak Output Power

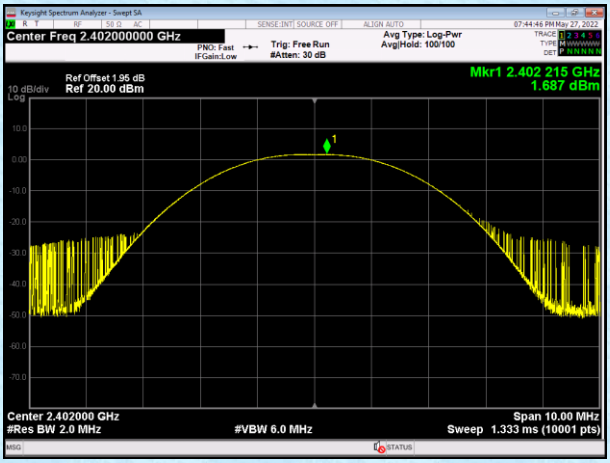
Test Requirement:	FCC Part15 C Section 15.247 (b)(3) RSS-247 Section 5.4(d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 and RSS-Gen
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

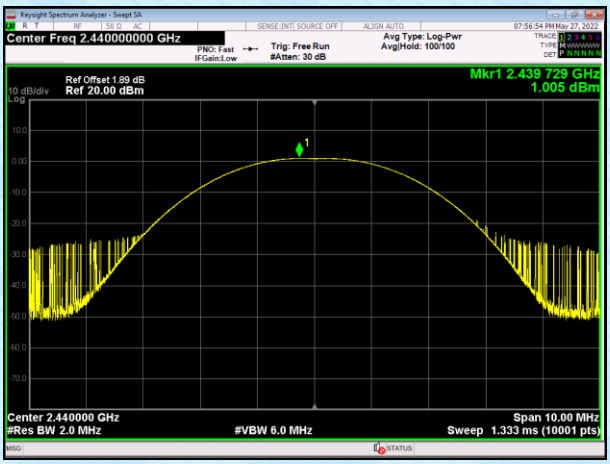
Test channel	Peak Output Power (dBm)	EIRP (dBm)	Output Power Limit(dBm)	EIRP Limit(dBm)	Result
Lowest	1.687	4.187	30.00	36.00	Pass
Middle	1.005	3.505	30.00	36.00	Pass
Highest	0.479	2.979	30.00	36.00	Pass

Test plot as follows:

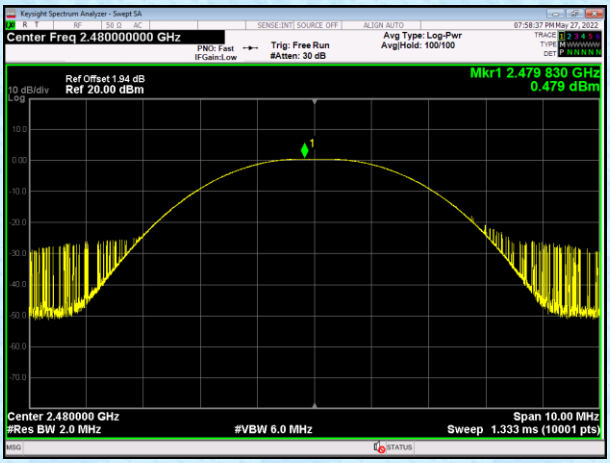
Lowest channel



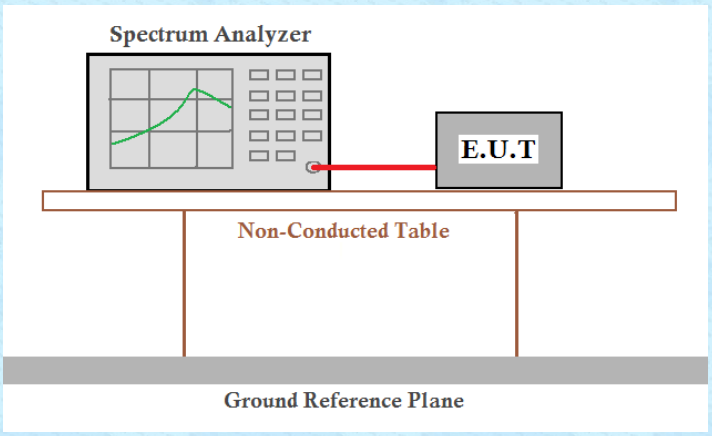
Middle channel



Highest channel



7.4 Channel Bandwidth & 99% Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2) RSS-Gen Section 6.7 & RSS-247 Section 5.2(a)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 and RSS-Gen
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

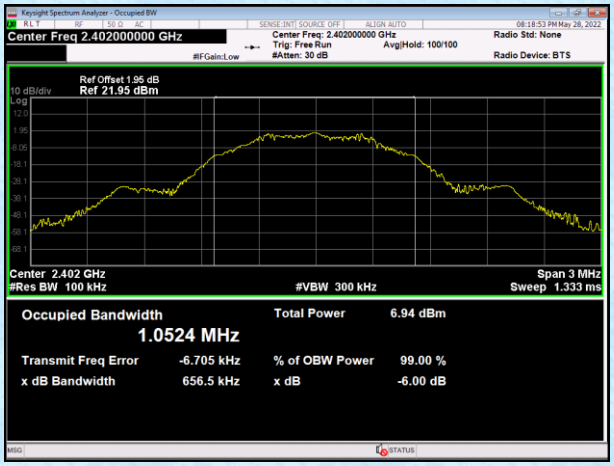
Measurement Data

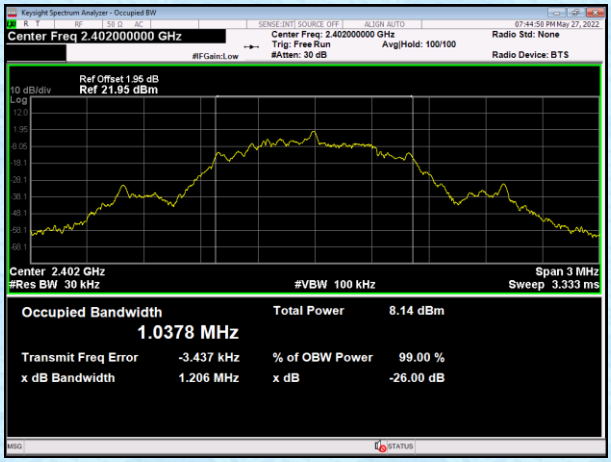
Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
Lowest	0.657	>500	Pass
Middle	0.655		
Highest	0.649		

Test channel	99% Bandwidth (MHz)	Result
Lowest	1.038	Pass
Middle	1.035	
Highest	1.034	

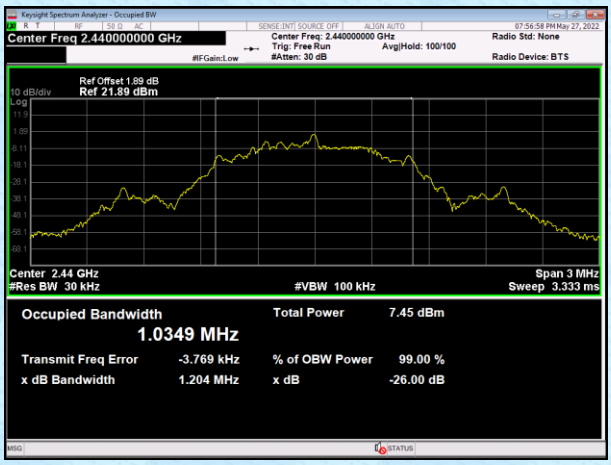
Test plot as follows:

Channel Bandwidth	99% Bandwidth

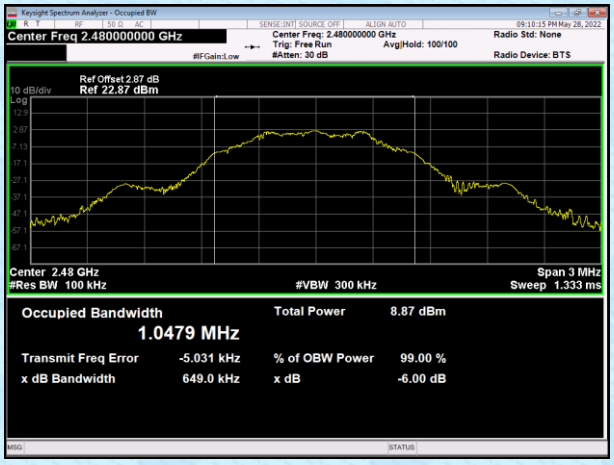


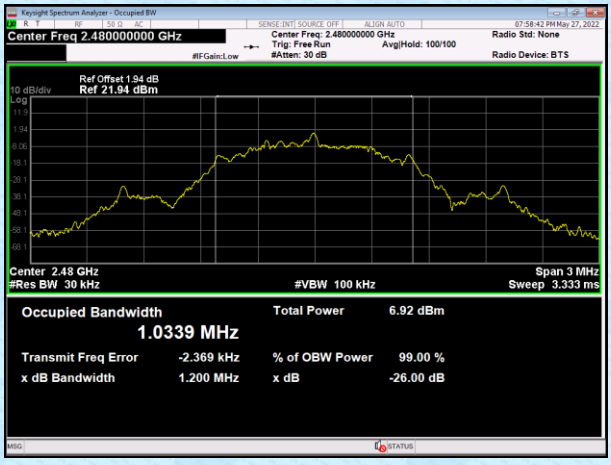


Lowest channel



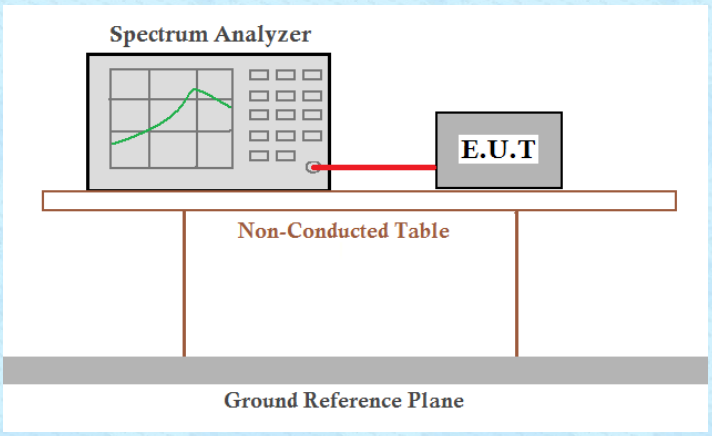
Middle channel





Highest channel

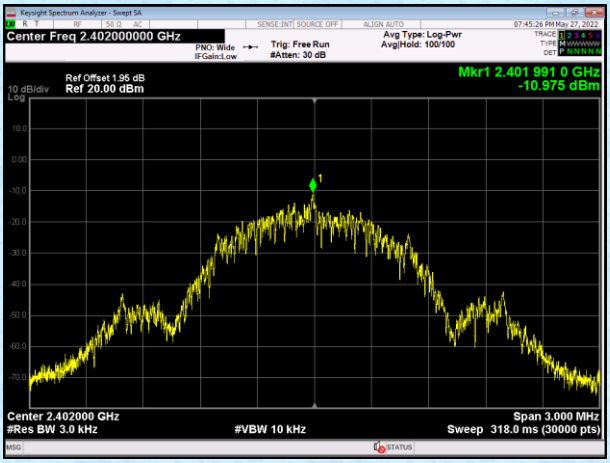
7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e) RSS-247 Section 5.2(b)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 and RSS-Gen
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

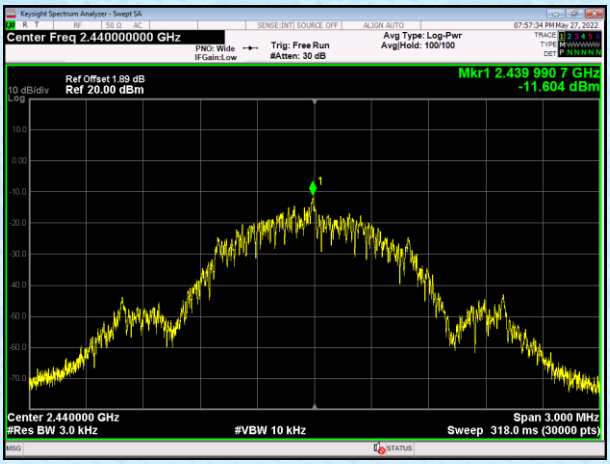
Measurement Data

Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-10.975	8.00	Pass
Middle	-11.604		
Highest	-12.159		

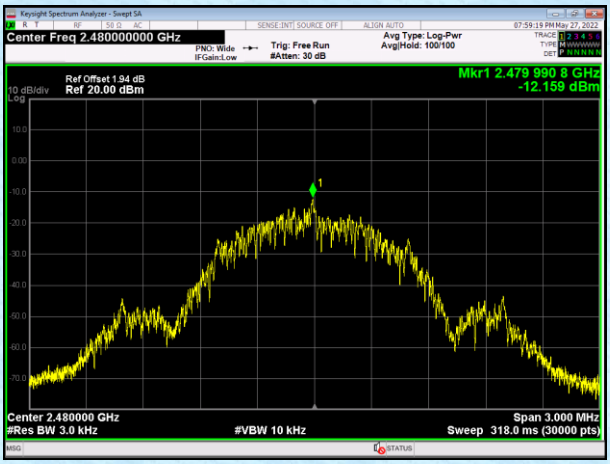
Test plot as follows:



Lowest channel



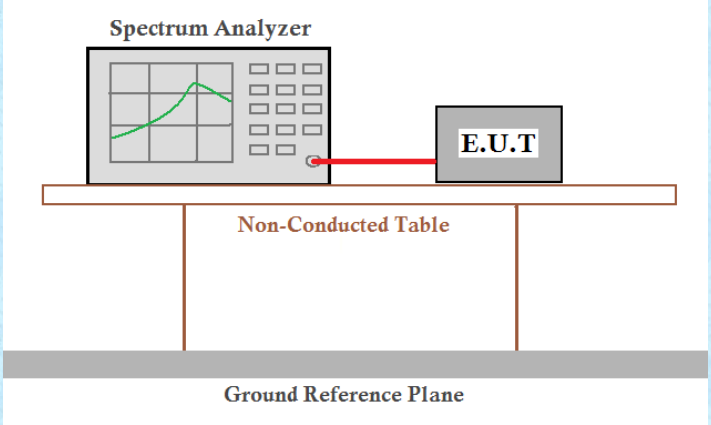
Middle channel



Highest channel

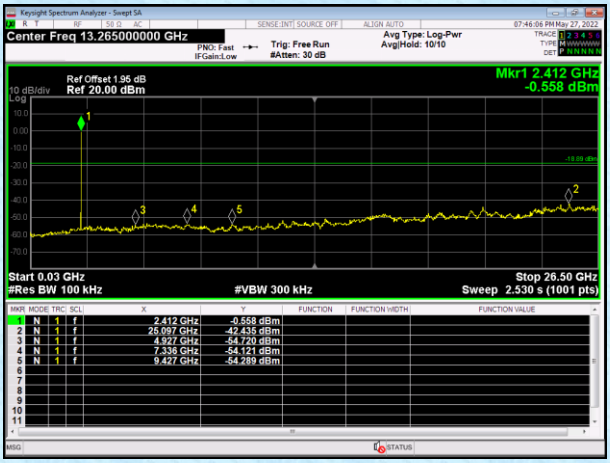
7.6 Spurious Emission in Non-restricted & restricted Bands

7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d) RSS-247 Section 5.5
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 & RSS-Gen
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

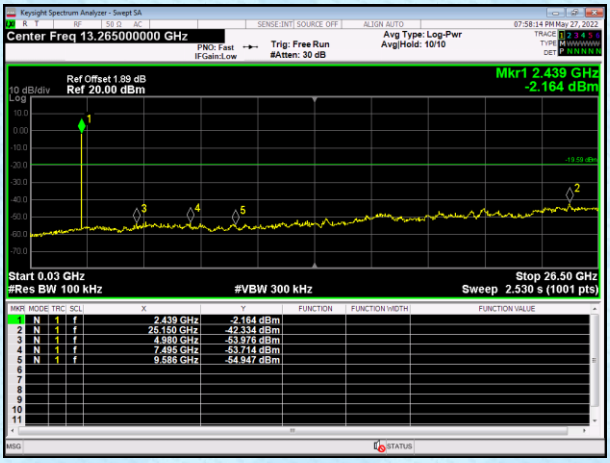
Test plot as follows:

Lowest channel



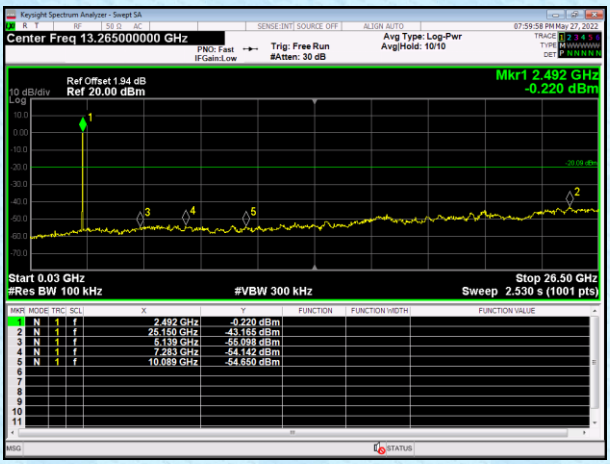
30MHz~26.5GHz

Middle channel



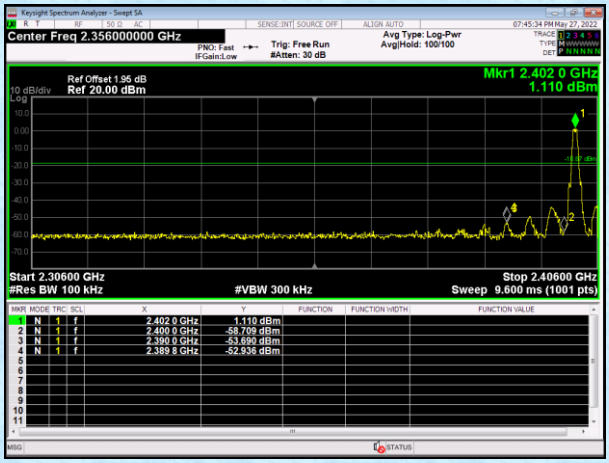
30MHz~26.5GHz

Highest channel

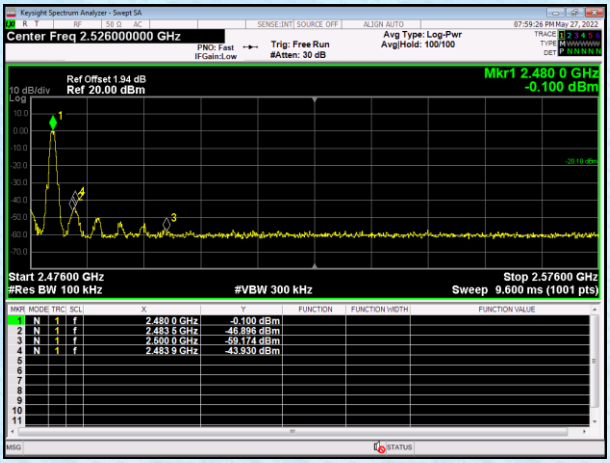


30MHz~26.5GHz

Test plot as follows:

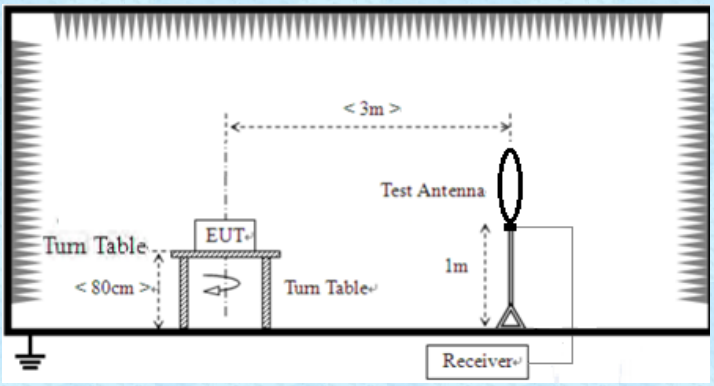


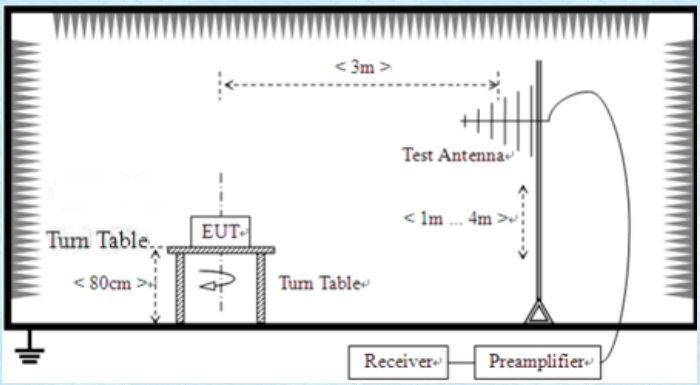
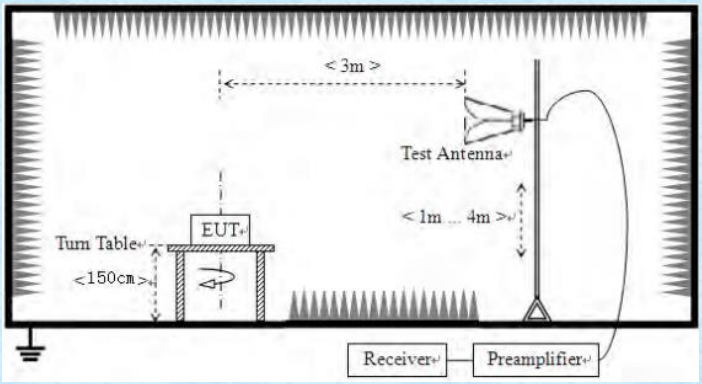
Lowest channel



Highest channel

7.6.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205
RSS-247 Section 3.3 & RSS-Gen Section 8.9</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013 & RSS-Gen</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 26.5GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9KHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>600Hz</td><td>Quasi-peak</td></tr>
<tr><td>150KHz-30MHz</td><td>Quasi-peak</td><td>9KHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>30m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 
</td></tr>
</table>

	For radiated emissions from 30MHz to1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. 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. 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 6.0 for details

Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	26 °C	Humid.:	54%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Measurement data:

Remark:
1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. Both high and low voltages have been tested to show only the worst low voltage test data.

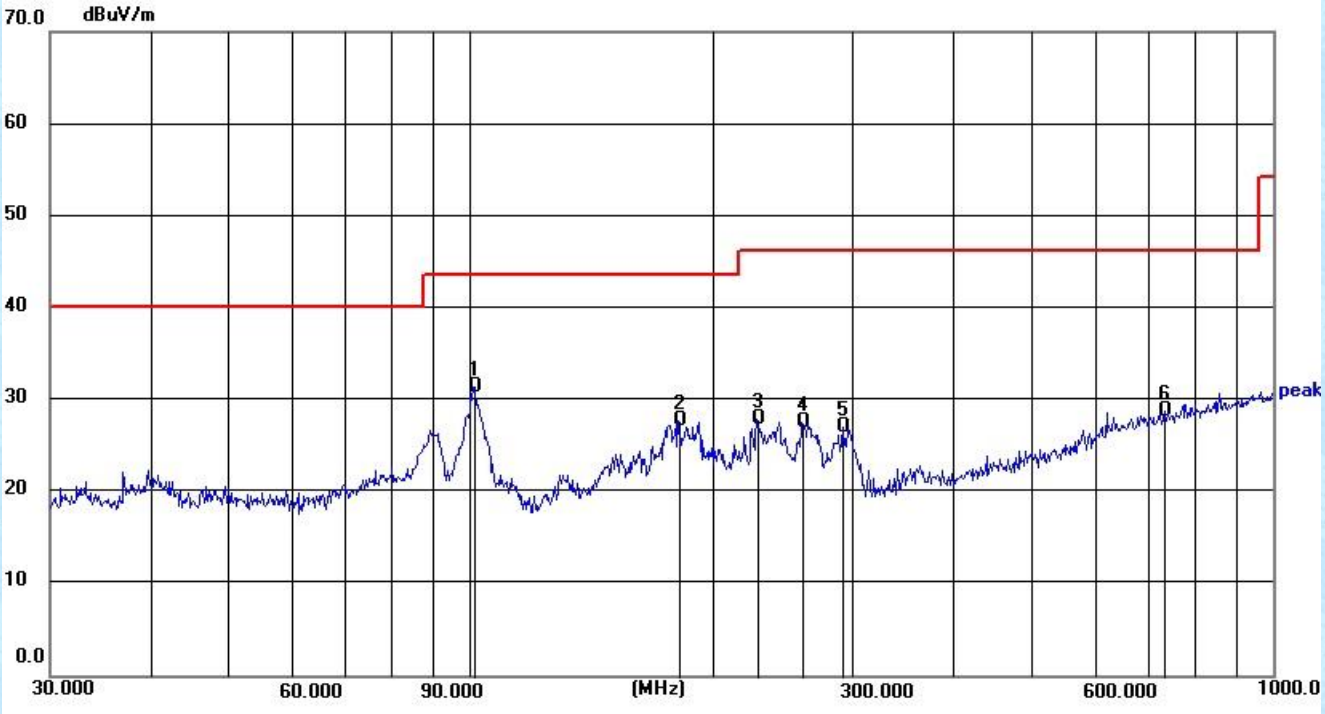
■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Below 1GHz

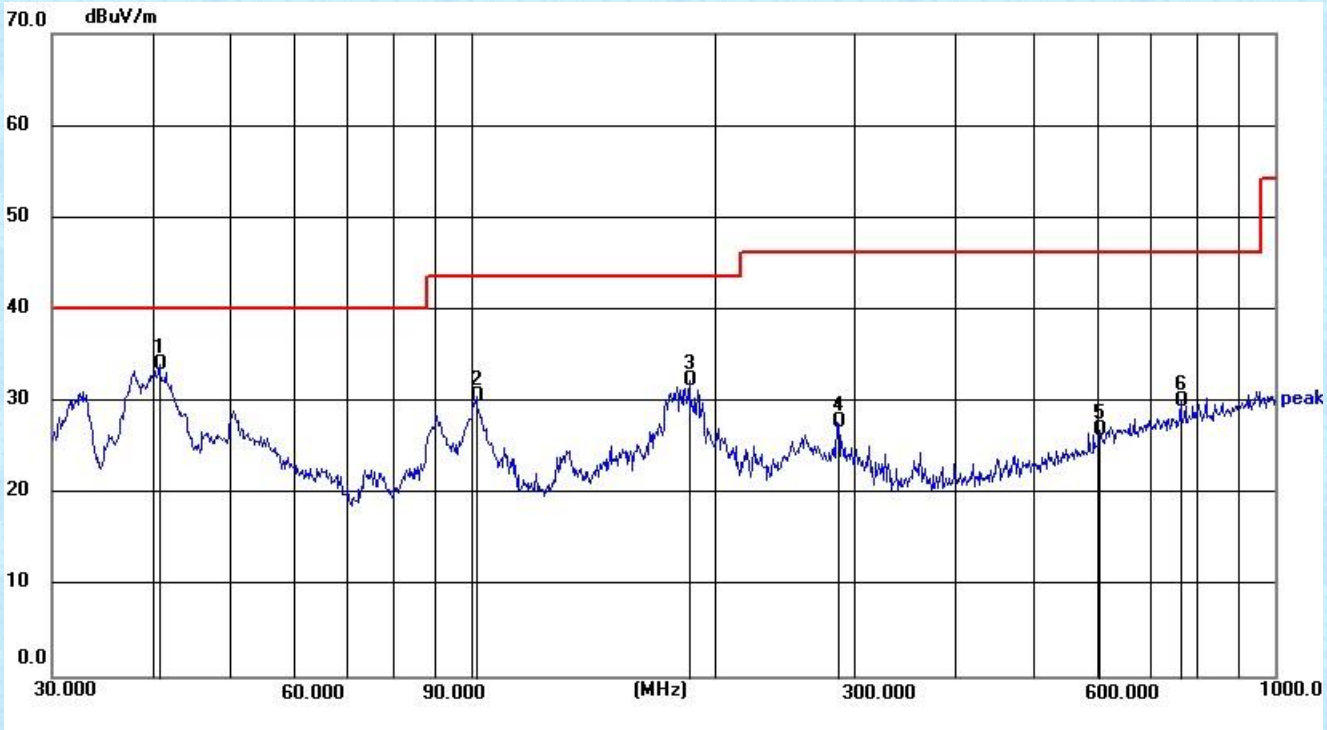
Pre-scan all test modes, found worst case at 2402MHz, and so only show the test result of 2402MHz

Horizontal:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
100.9339	19.44	12.04	31.48	43.50	12.02	QP
181.9202	14.42	13.31	27.73	43.50	15.77	QP
227.6906	15.14	12.85	27.99	46.00	18.01	QP
259.2338	13.84	13.68	27.52	46.00	18.48	QP
291.0358	12.46	14.56	27.02	46.00	18.98	QP
731.9203	6.55	22.33	28.88	46.00	17.12	QP

Vertical:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
40.8446	20.00	14.01	34.01	40.00	5.99	QP
101.2885	18.44	12.08	30.52	43.50	12.98	QP
186.4409	19.60	12.77	32.37	43.50	11.13	QP
284.9767	13.37	14.42	27.79	46.00	18.21	QP
605.6592	6.33	20.63	26.96	46.00	19.04	QP
763.3757	7.29	22.70	29.99	46.00	16.01	QP

Remark:

1. *An initial pre-scan was performed on the Horizontal and Vertical with peak detector.*
2. *Quasi-Peak measurement were performed at the frequencies with maximized peak emission.*
3. *Level =Reading + Factor*
4. *Factor= Antenna Gain + Cable Loss – Amplifier Gain*

■

Unwanted Emissions in non-restricted Frequency Bands

Above 1GHz

Test mode:	BLE	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	38.6	31.62	8.58	32.11	46.69	74	-27.31	Vertical
4804.00	41.95	31.62	8.58	32.11	50.04	74	-23.96	Horizontal

Test mode:	BLE	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	35.25	31.92	8.71	32.11	43.77	74	-30.23	Vertical
4880.00	33.37	31.92	8.71	32.11	41.89	74	-32.11	Horizontal

Test mode:	BLE	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	33.62	31.96	8.75	32.3	42.03	74	-32.87	Vertical
4960.00	33.08	31.96	8.75	32.3	41.49	74	-33.45	Horizontal

Test mode:	BLE	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310.00	44.21	27.14	6.19	42.04	35.5	74	-38.5	Horizontal
2390.00	54.52	27.37	6.31	42.11	46.09	74	-27.91	Horizontal
2310.00	42.32	27.14	6.19	42.04	33.61	74	-40.39	Vertical
2390.00	53.05	27.37	6.31	42.11	44.62	74	-29.38	Vertical

Test mode:	BLE	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.50	67.01	27.66	6.45	42.01	59.11	74	-14.89	Horizontal
2500.00	55.46	27.7	6.47	42	47.63	74	-26.37	Horizontal
2483.50	67.7	27.66	6.45	42.01	59.8	74	-14.2	Vertical
2500.00	55.8	27.7	6.47	42	47.97	74	-26.03	Vertical

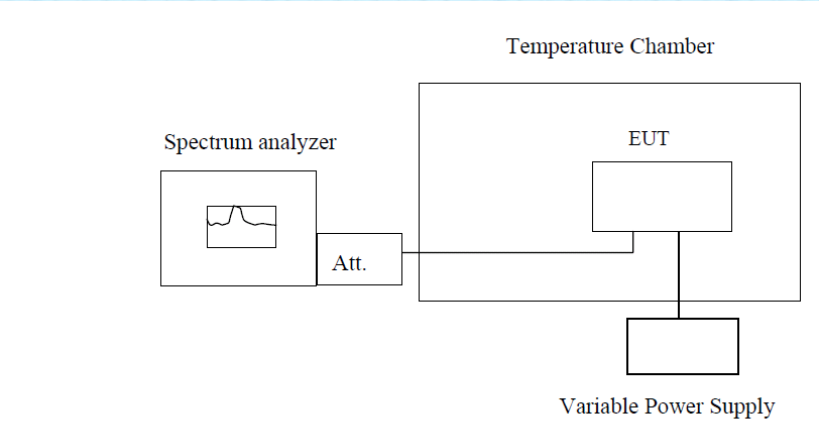
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.50	59.6	27.66	6.45	42.01	51.7	54	-2.3	Horizontal
2500.00	32.37	27.7	6.47	42	24.54	54	-29.46	Horizontal
2483.50	59.53	27.66	6.45	42.01	51.63	54	-2.37	Vertical
2500.00	33.08	27.7	6.47	42	25.25	54	-28.75	Vertical

Remark.

1. *Level =Reading Level+ Antenna factor + Cable Loss – Amplifier factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.7 Frequency Stability

Test Requirement:	RSS-Gen Section 6.11& Section 8.11
Test Method:	ANSI C63.10: 2013 & RSS-Gen
Limit:	Manufactures of devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.10, 2013; tested to 2.1055 for compliance to RSS-Gen requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

Frequency stability versus Temp.										
Power Supply: AC 120V										
Temp. (°C)	Operating Frequency (MHz)	0 minute		2 minute		5 minute		10 minute		Pass /Fail
		Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	
-30	2402	2402.0146	6.08	2402.0144	6	2402.0136	5.66	2402.0161	6.7	Pass
	2440	2439.9949	-2.09	2439.9954	-1.89	2439.994	-2.46	2439.9937	-2.58	Pass
	2480	2479.9887	-4.56	2479.9905	-3.83	2479.9914	-3.47	2479.9921	-3.19	Pass
-20	2402	2402.0118	4.91	2402.0082	3.41	2402.0089	3.71	2402.0112	4.66	Pass
	2440	2439.9825	-7.17	2439.9807	-7.91	2439.9829	-7.01	2439.9792	-8.52	Pass
	2480	2479.9775	-9.07	2479.9762	-9.6	2479.9752	-10	2479.9755	-9.88	Pass
-10	2402	2402.0096	4	2402.0114	4.75	2402.0115	4.79	2402.0101	4.2	Pass
	2440	2440.0037	1.52	2440.0017	0.7	2439.9989	-0.45	2440.0006	0.25	Pass
	2480	2479.9881	-4.8	2479.9902	-3.95	2479.9916	-3.39	2479.9879	-4.88	Pass
0	2402	2402.016	6.66	2402.0139	5.79	2402.0139	5.79	2402.0153	6.37	Pass
	2440	2439.9956	-1.8	2439.9967	-1.35	2439.9974	-1.07	2439.9964	-1.48	Pass
	2480	2479.9912	-3.55	2479.9911	-3.59	2479.9906	-3.79	2479.9876	-5	Pass
10	2402	2402.0109	4.54	2402.009	3.75	2402.0087	3.62	2402.0093	3.87	Pass
	2440	2439.9801	-8.16	2439.9794	-8.44	2439.9819	-7.42	2439.9817	-7.5	Pass
	2480	2479.9755	-9.88	2479.9772	-9.19	2479.9763	-9.56	2479.9775	-9.07	Pass
20	2402	2402.0115	4.79	2402.0116	4.83	2402.0112	4.66	2402.0075	3.12	Pass
	2440	2439.9983	-0.7	2440.0001	0.04	2440.0046	1.89	2439.9985	-0.61	Pass
	2480	2479.9916	-3.39	2479.9892	-4.35	2479.9915	-3.43	2479.9919	-3.27	Pass
30	2402	2402.015	6.24	2402.0125	5.2	2402.0144	6	2402.0145	6.04	Pass
	2440	2439.9933	-2.75	2439.9973	-1.11	2439.9954	-1.89	2439.9969	-1.27	Pass
	2480	2479.9901	-3.99	2479.9881	-4.8	2479.9877	-4.96	2479.9906	-3.79	Pass
40	2402	2402.0073	3.04	2402.0087	3.62	2402.0081	3.37	2402.0096	4	Pass
	2440	2439.9807	-7.91	2439.9795	-8.4	2439.9794	-8.44	2439.9793	-8.48	Pass
	2480	2479.9768	-9.35	2479.9752	-10	2479.9757	-9.8	2479.9773	-9.15	Pass
50	2402	2402.0092	3.83	2402.0094	3.91	2402.0089	3.71	2402.0108	4.5	Pass
	2440	2440.0011	0.45	2439.9999	-0.04	2440.0014	0.57	2440.0047	1.93	Pass
	2480	2479.9907	-3.75	2479.9899	-4.07	2479.9902	-3.95	2479.9903	-3.91	Pass
Frequency stability versus Voltage										
Temperature: 25°C										
Power Supply (VAC)	Operating Frequency (MHz)	0 minute		2 minute		5 minute		10 minute		Pass/Fail
		Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	Measured Frequency (MHz)	Frequency Error (ppm)	
120	2402	2402.0079	3.29	2402	0	2402.0082	3.41	2402.0093	3.87	Pass
	2440	2440.0049	2.01	2440.0033	1.35	2440.0021	0.86	2440.0015	0.61	Pass
	2480	2479.9898	-4.11	2479.9913	-3.51	2479.9909	-3.67	2479.9893	-4.31	Pass

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------