TEST REPORT

Applicant:	**Dals Lighting Inc.**
Address of Applicant:	**80 boul. De La Seigneurie Est, Blainville, QC, J7C 4N1, Canada**
Manufacturer/Factory:	**HANGZHOU LIJIACHENG ELECTRIC CO., LTD**
Address of Manufacturer/Factory:	**No.35 Yangshan Road, Gaohong Industrial Zone, Lin'an City, HANGZHOU, Zhejiang, 311300, China**
Equipment Under Test (EUT)	
Product Name:	**LED Bulb**
Model No.:	**SM-BLBPAR20**
Trade Mark:	**DALS, ILLUME,** CONNECT
FCC ID:	**2AQSN-SMBLBPAR20**
IC:	**10733A-SMBLBPAR20**
HVIN:	**SM-BLBPAR20**
Applicable standards:	**FCC CFR Title 47 Part 15 Subpart C Section 15.247** **ANSI C63.10:2013** **RSS-247 Issue 2** **RSS-Gen Issue 5**
Date of sample receipt:	**October 13,2021**
Date of Test:	**October 15,2021- October 20,2021**
Date of report issued:	**October 22,2021**
Test Result :	**PASS ***

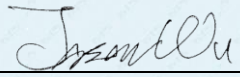
*** In the configuration tested, the EUT complied with the standards specified above.**

Authorized Signature:

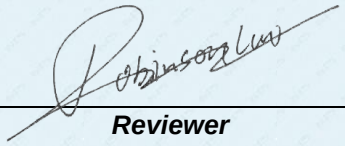
Robinson Luo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*2021-10-22*	*Original*

Prepared By:  ***Date:*** *2021-10-22*

Project Engineer

Check By:  ***Date:*** *2021-10-22*

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	/
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:	LED Bulb
Model No.:	SM-BLBPAR20
Test sample(s) ID:	GTSL202110000195-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware Version:	HT-SPAR206W-DY-V1.2
Software Version:	1.2.7
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Internal Antenna
Antenna Gain:	4.5dBi
Power Supply:	AC 120V/60Hz 6W

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	Beken Wi-Fi Test Tool V1.6.0	Set the EUT to different modulation and channel

Output power setting table:

Test Mode	Set Tx Output Power	Data Rate
BLE	5dBm	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

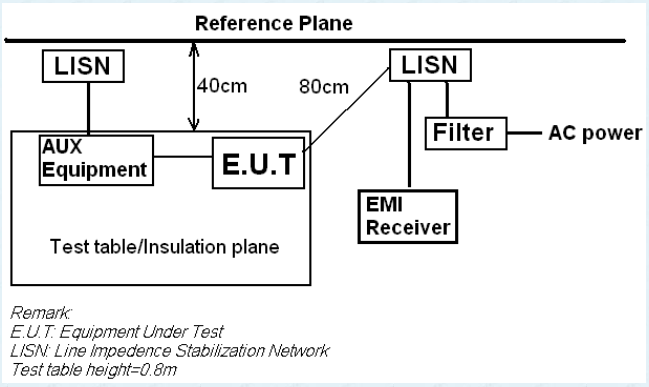
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement

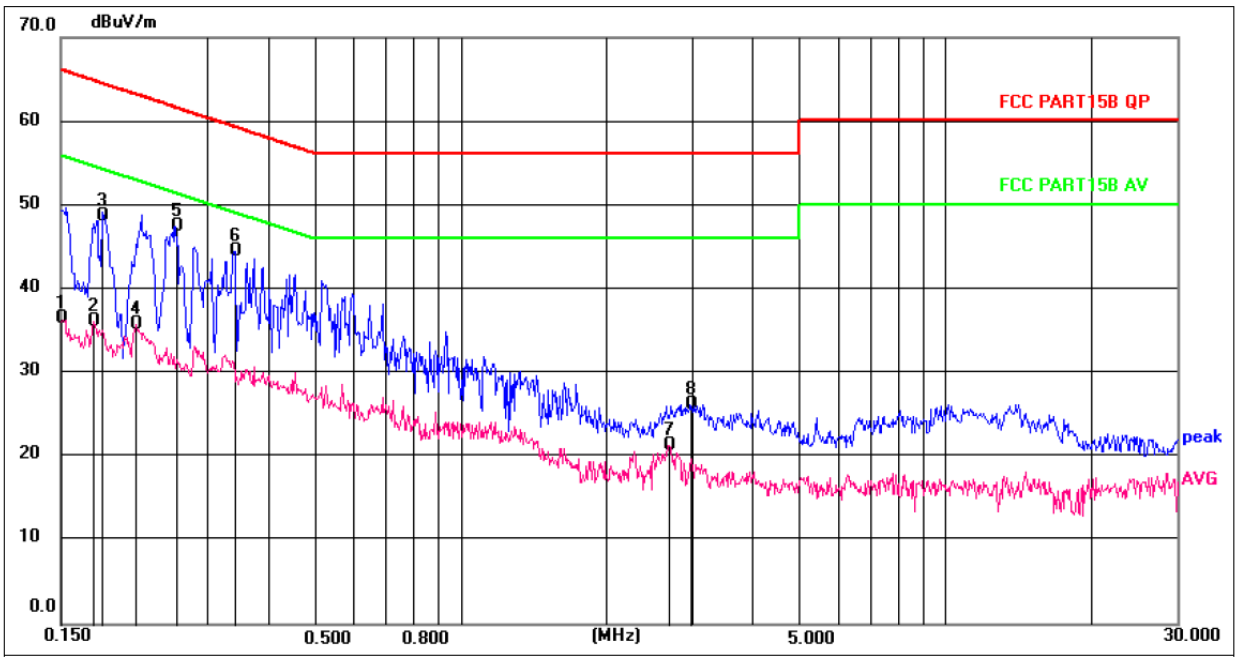
Standard requirement:	FCC Part15 C Section 15.203 /247(b)(4)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a 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 Internal antenna, the best case gain of the is 4.5dBi, 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.: 57% / Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Remark: N/A

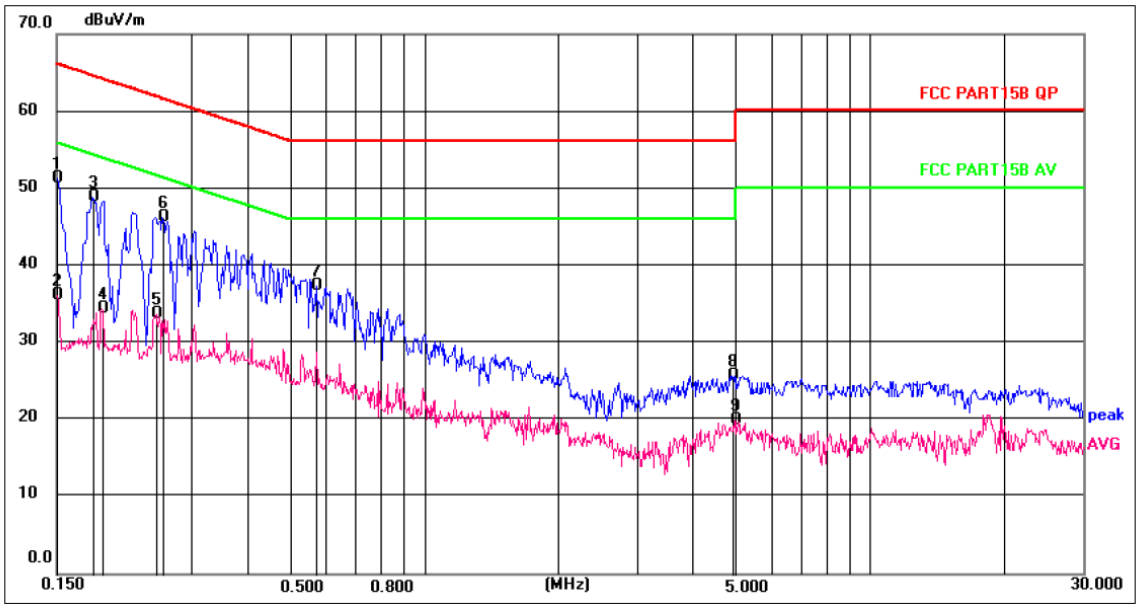
Measurement data
Line:



Site:	**Shielding Room**	**Antenna::L1**	**Temperature(C):25(C)**
Limit:	**FCC PART15B**		**Humidity(%):57%**
EUT:	**LED Bulb**	**Test Time:**	**2021/10/16 18:02:43**
M/N.:	**SM-BLBPAR20**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**ON WITH BT**	**Test Engineer: Jason**	
Note:	**DALS Lighting Inc.**		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1	0.1500	26.41	10.01	36.42	56.00	19.58	AVG	
2	0.1748	26.11	10.02	36.13	54.73	18.60	AVG	
3	0.1824	38.64	10.02	48.66	64.38	15.72	QP	
4	0.2139	25.79	10.02	35.81	53.05	17.24	AVG	
5 *	0.2587	37.39	10.03	47.42	61.47	14.05	QP	
6	0.3409	34.49	10.03	44.52	59.18	14.66	QP	
7	2.6924	11.06	10.29	21.35	46.00	24.65	AVG	
8	2.9776	15.87	10.32	26.19	56.00	29.81	QP	

Neutral:



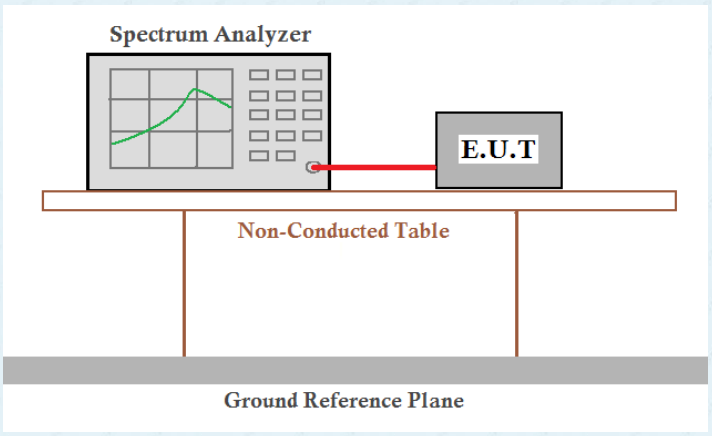
Site:	**Shielding Room**	**Antenna::N**	**Temperature(C):25(C)**
Limit:	**FCC PART15B**		**Humidity(%):57%**
EUT:	**LED Bulb**	**Test Time:**	**2021/10/16 18:09:33**
M/N.:	**SM-BLBPAR20**	**Power Rating:**	**AC 120V/60Hz**
Mode:	**ON WITH BT**	**Test Engineer: Jason**	
Note:	**DALS Lighting Inc.**		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Remark
1 *	0.1507	41.20	10.01	51.21	65.96	14.75	QP	
2	0.1507	26.12	10.01	36.13	55.96	19.83	AVG	
3	0.1805	38.77	10.02	48.79	64.46	15.67	QP	
4	0.1893	24.34	10.02	34.36	54.07	19.71	AVG	
5	0.2507	23.65	10.02	33.67	51.73	18.06	AVG	
6	0.2587	36.24	10.03	46.27	61.47	15.20	QP	
7	0.5731	27.34	10.06	37.40	56.00	18.60	QP	
8	4.8997	15.21	10.52	25.73	56.00	30.27	QP	
9	4.9519	9.49	10.52	20.01	46.00	25.99	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

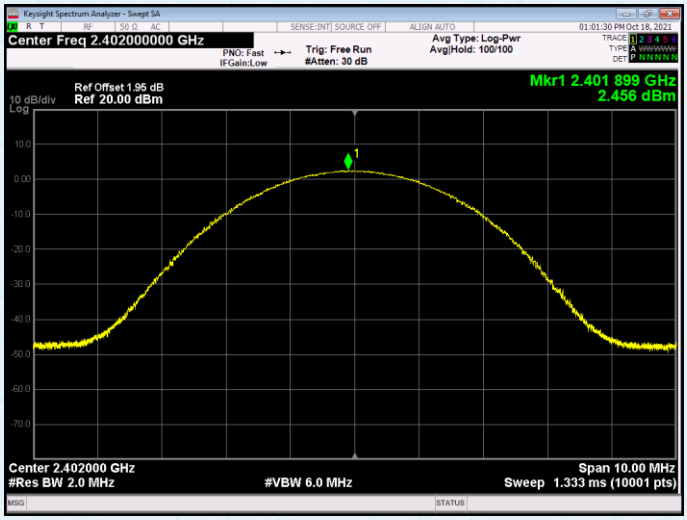
Test Requirement:	FCC Part15 C Section 15.247 (b)(3) RSS-247 Section 5.4(d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 and RSS-Gen
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

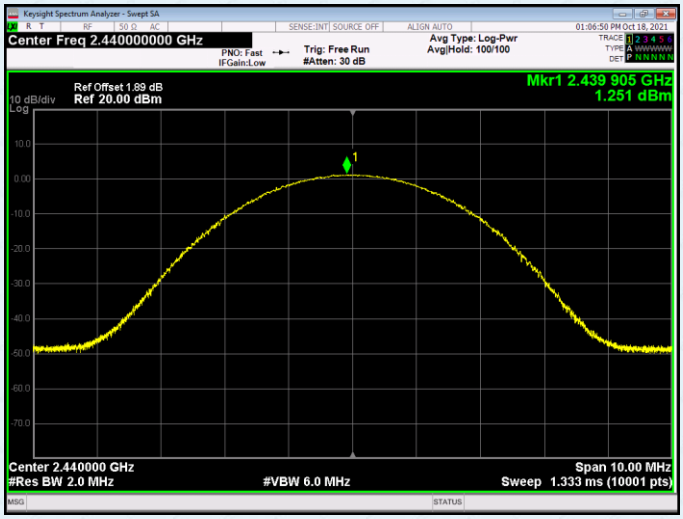
Test channel	Peak Output Power (dBm)	EIRP (dBm)	Output Power Limit(dBm)	EIRP Limit(dBm)	Result
Lowest	2.456	6.956	30.00	36.00	Pass
Middle	1.251	5.751	30.00	36.00	Pass
Highest	0.318	4.818	30.00	36.00	Pass

Test plot as follows:

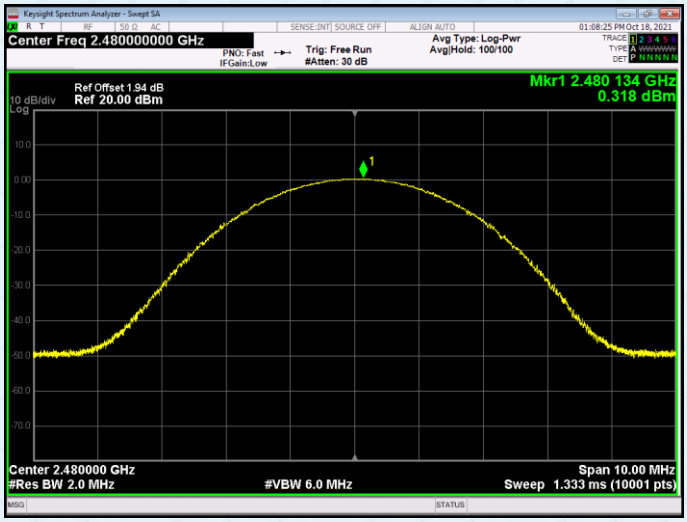
Lowest channel



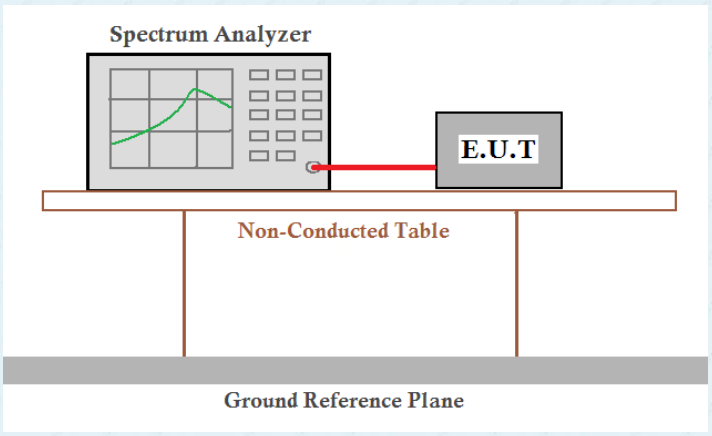
Middle channel



Highest channel



7.4 Channel Bandwidth & 99% Occupy Bandwidth

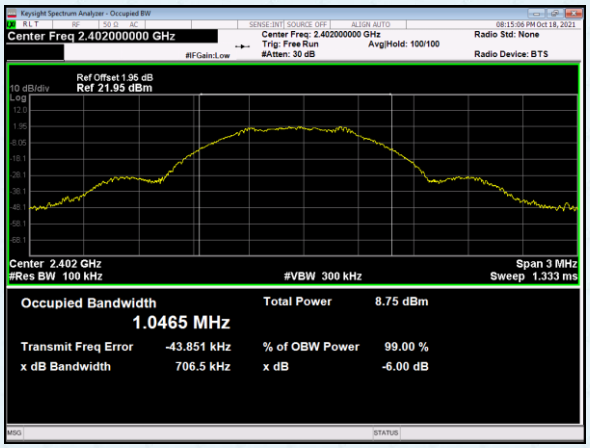
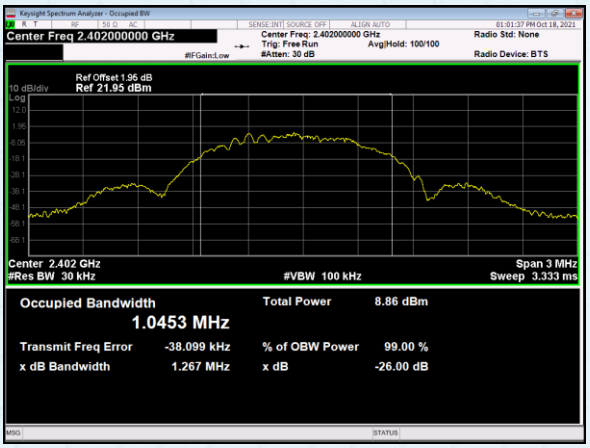
Test Requirement:	FCC Part15 C Section 15.247 (a)(2) RSS-Gen Section 6.7 & RSS-247 Section 5.2(a)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02 and RSS-Gen
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for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

Measurement Data

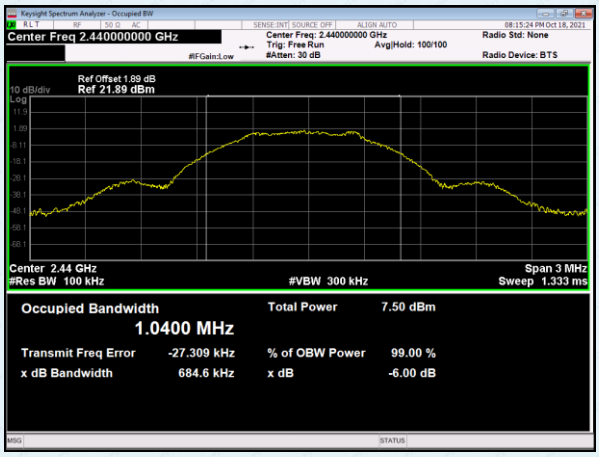
Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
Lowest	0.7065	>500	Pass
Middle	0.6846		
Highest	0.6841		

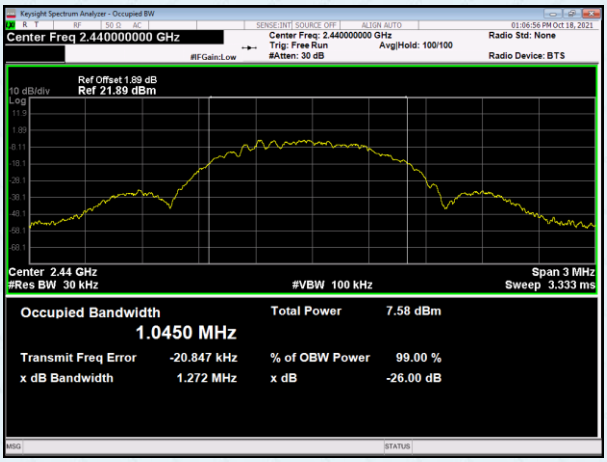
Test channel	99% Bandwidth (MHz)	Result
Lowest	1.0453	Pass
Middle	1.0450	
Highest	1.0413	

Test plot as follows:

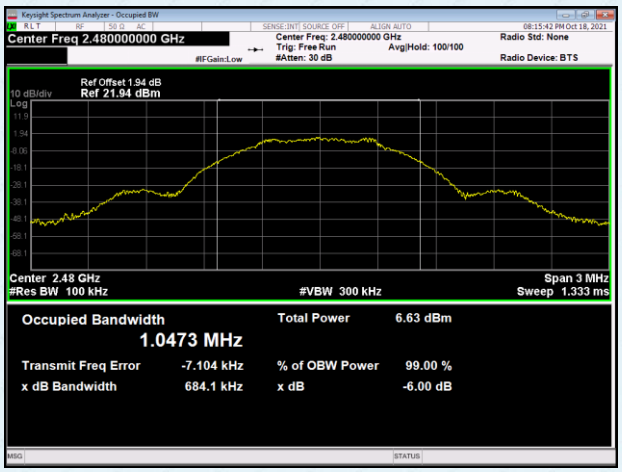
Channel Bandwidth	99% Bandwidth
	

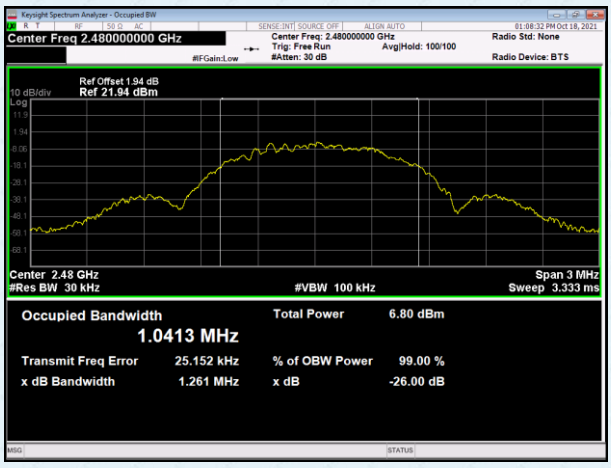
Lowest channel





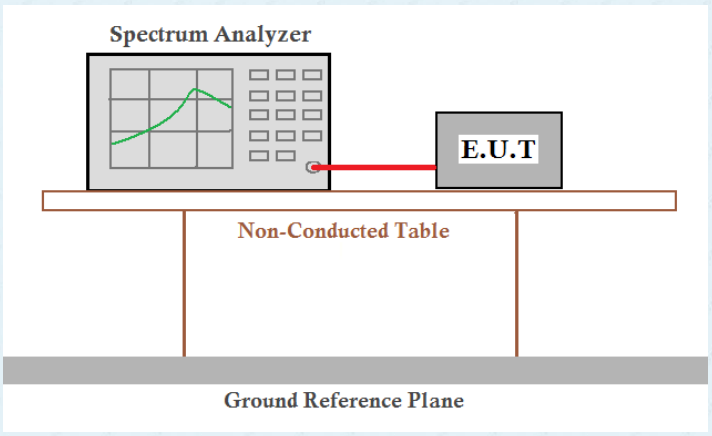
Middle channel





Highest channel

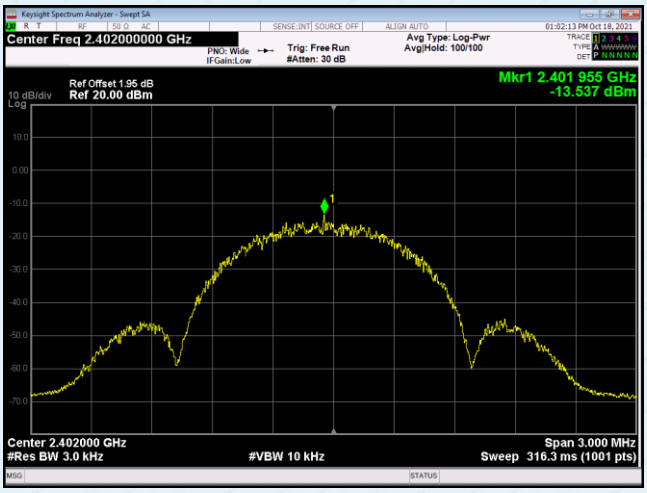
7.5 Power Spectral Density

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

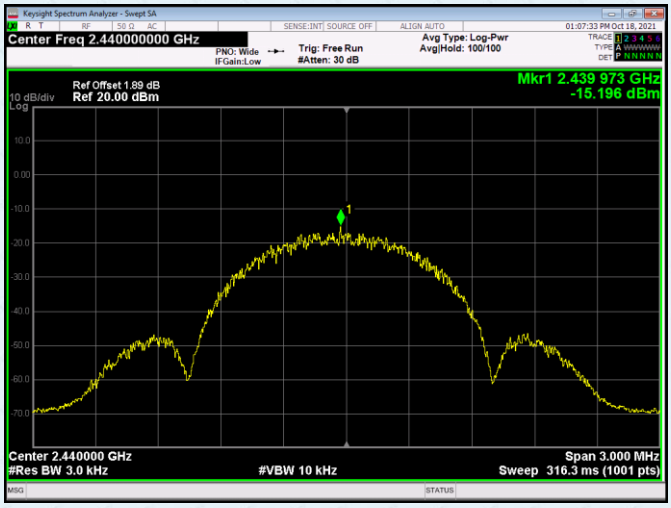
Measurement Data

Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
Lowest	-13.537	8.00	Pass
Middle	-15.196		
Highest	-17.367		

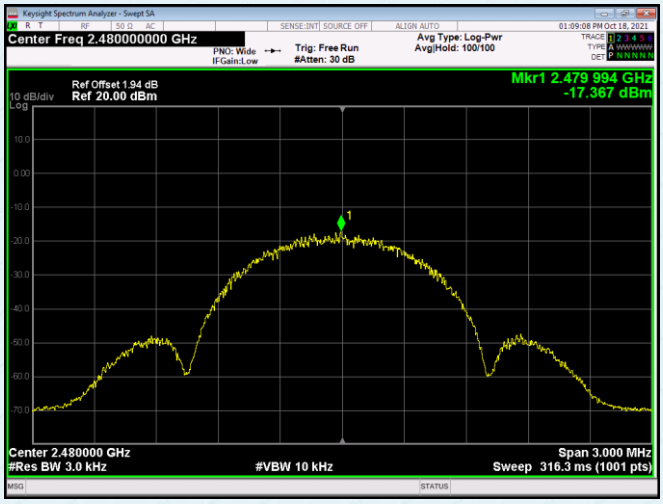
Test plot as follows:



Lowest channel



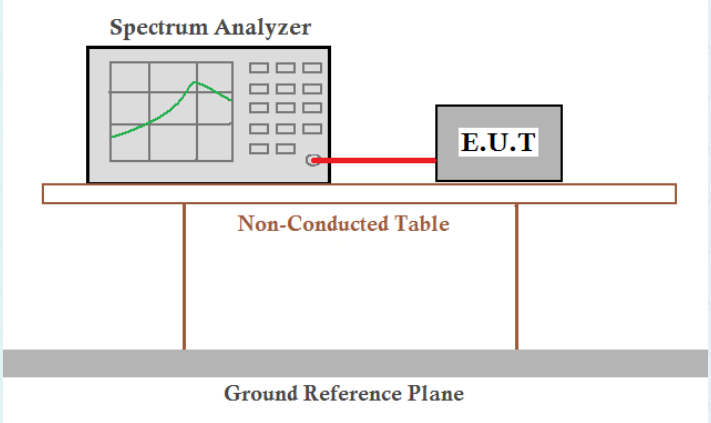
Middle channel



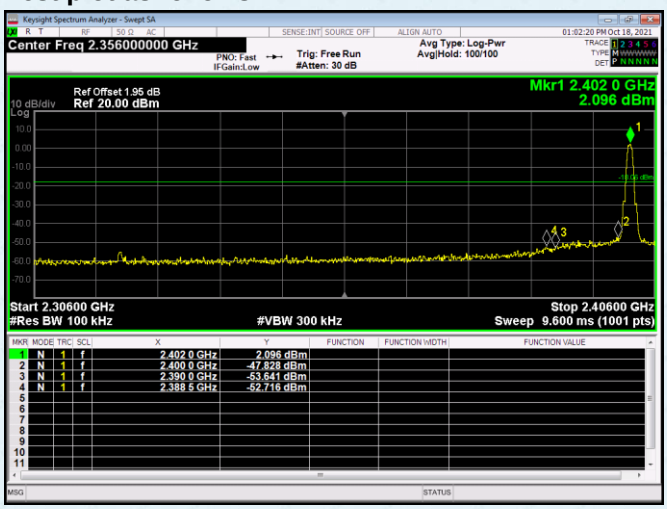
Highest channel

7.6 Band edges

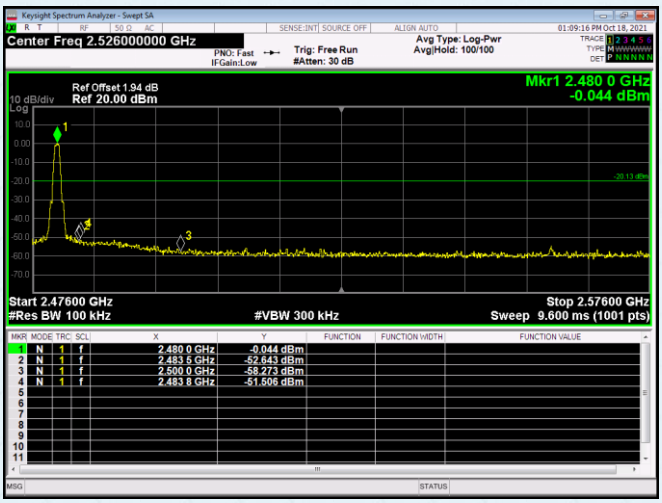
7.6.1 Conducted Emission Method

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



Highest channel

7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205 RSS-247 Section 3.3 & RSS-Gen Section 8.10
Test Method:	ANSI C63.10:2013 & RSS-Gen
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.
Test site:	Measurement Distance: 3m

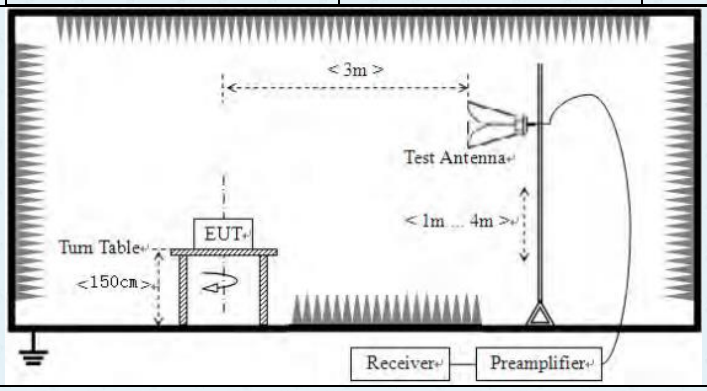
Receiver setup:

Frequency	Detector	RBW	VBW	Value
Above 1GHz	Peak	1MHz	3MHz	Peak
	RMS	1MHz	3MHz	Average

Limit:

Frequency	Limit (dBuV/m @3m)	Value
Above 1GHz	54.00	Average
	74.00	Peak

Test setup:



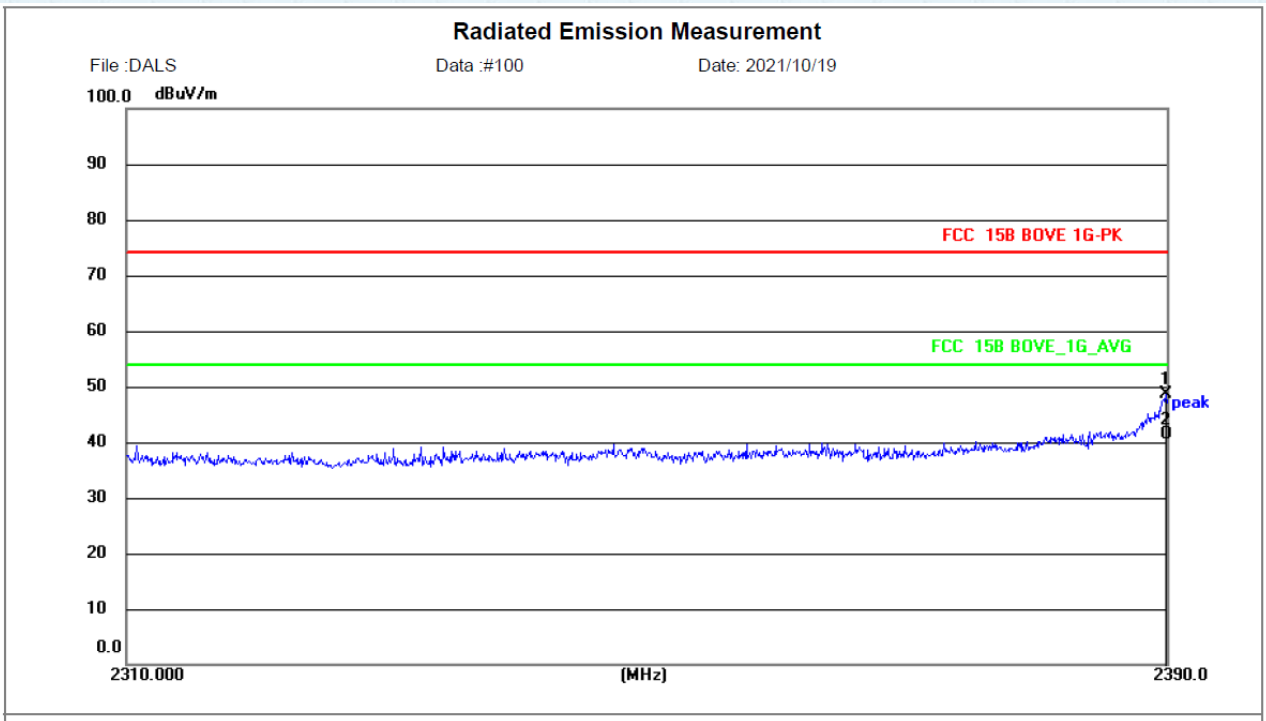
Test Procedure:

1. The EUT was placed on the top of a rotating table 1.5 meters 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.
7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

2402MHz Horizontal



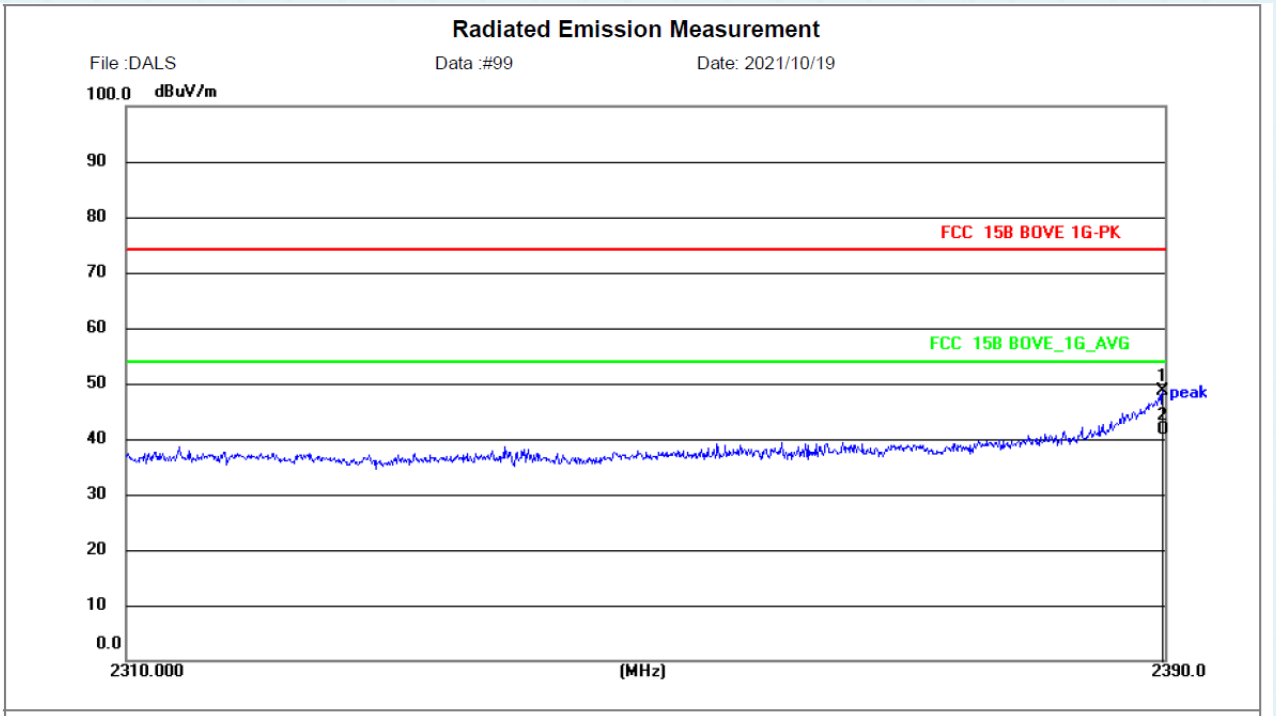
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: ***Horizontal***
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2389.973	44.61	3.90	48.51	74.00	25.49	peak	129	156	P	
2 *	2389.973	37.58	3.90	41.48	54.00	12.52	AVG	118	177	P	

2402MHz Vertical



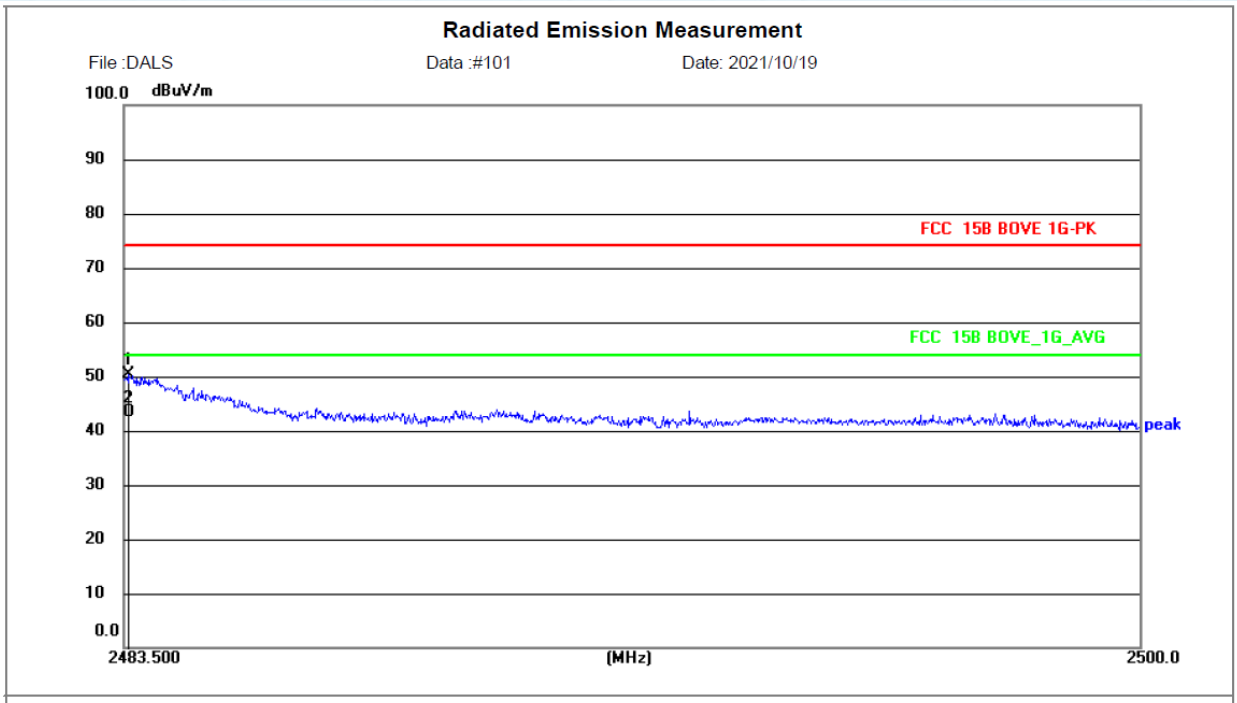
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2389.840	44.74	3.90	48.66	74.00	25.36	peak	137	139	P	
2 *	2389.840	37.85	3.90	41.75	54.00	12.25	AVG	124	221	P	

2480MHz Horizontal



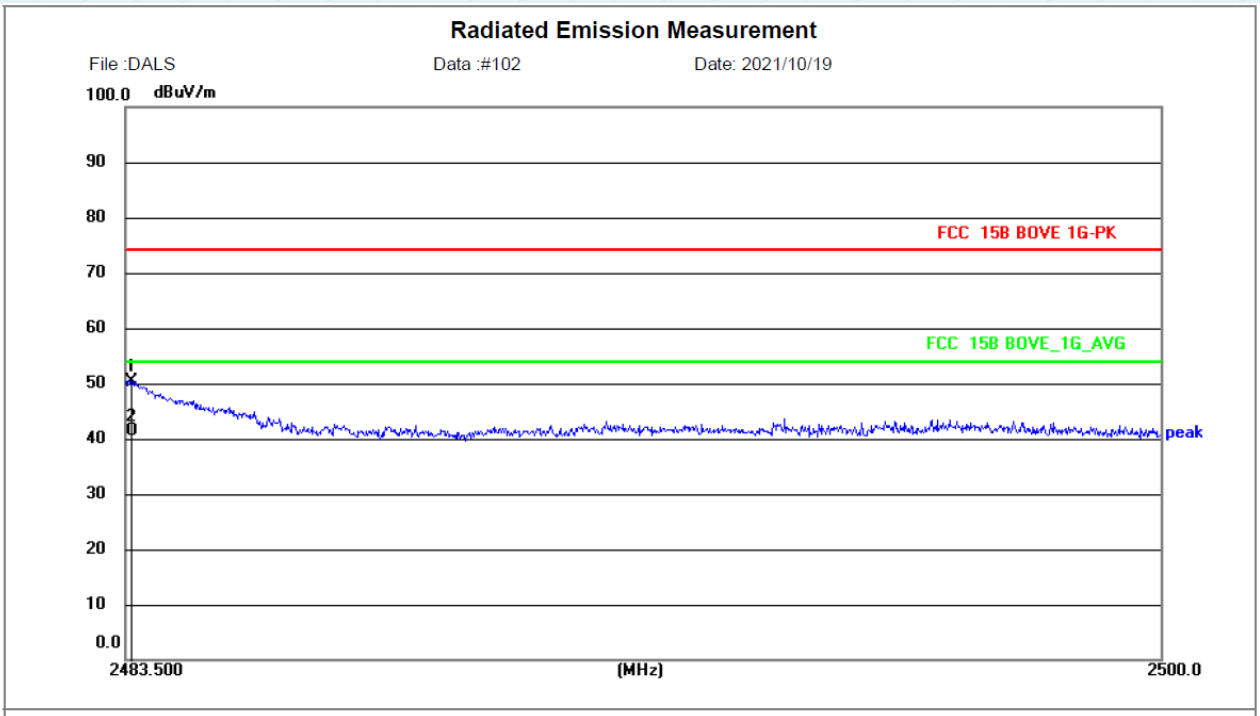
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.593	46.15	4.28	50.43	74.00	23.57	peak	151	218	P	
2 *	2483.593	39.22	4.28	43.50	54.00	10.50	AVG	128	267	P	

2480MHz Vertical



Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

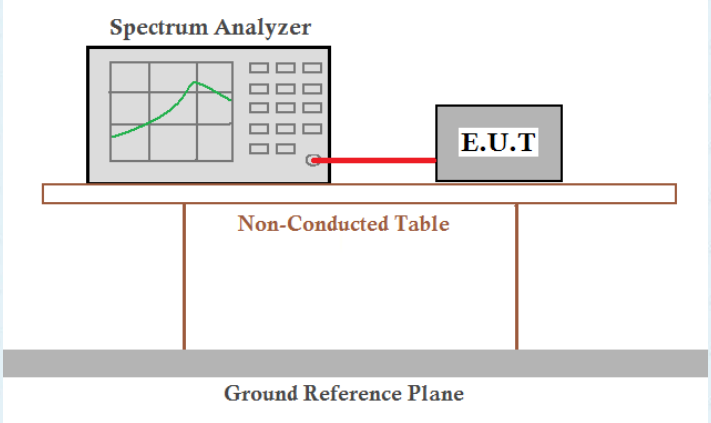
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.604	46.22	4.28	50.50	74.00	23.50	peak	133	264	P	
2 *	2483.604	37.04	4.28	41.32	54.00	12.68	AVG	102	301	P	

Remarks:

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

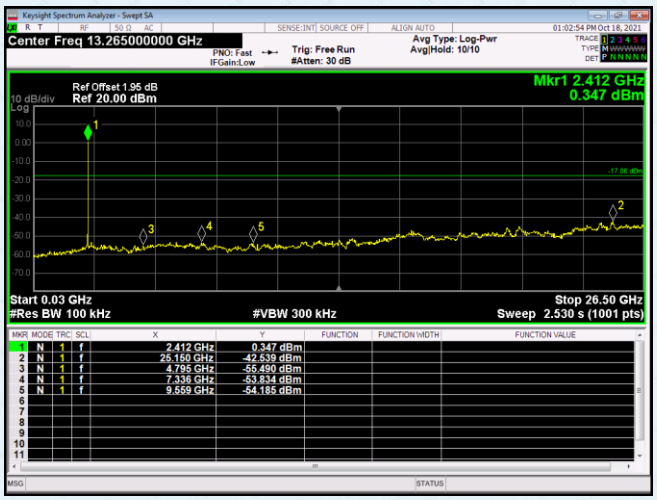
7.7 Spurious Emission

7.7.1 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

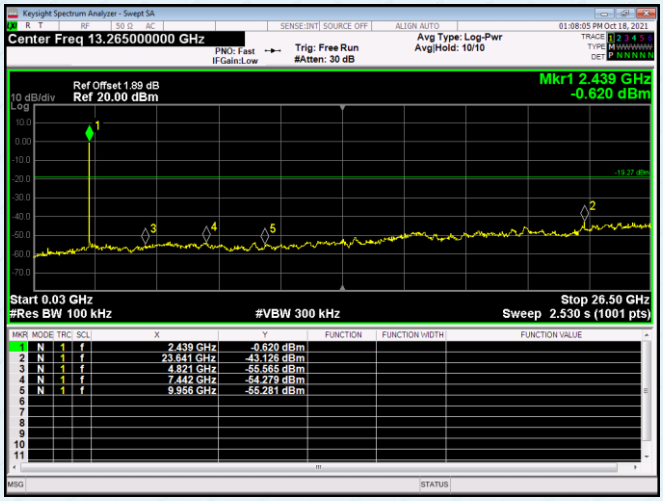
Test plot as follows:

Lowest channel



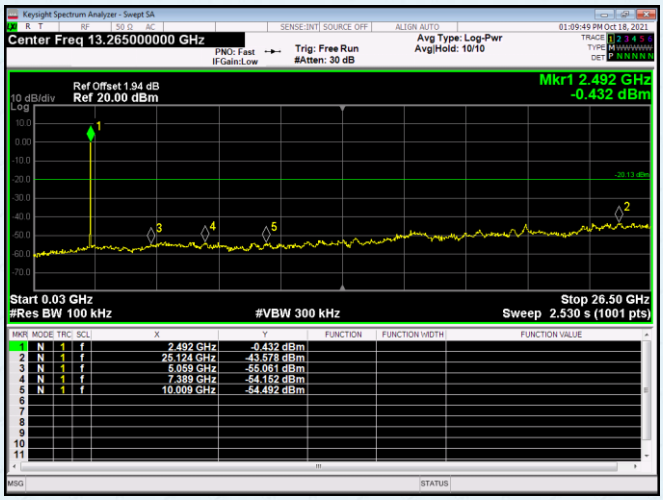
30MHz~26.5GHz

Middle channel



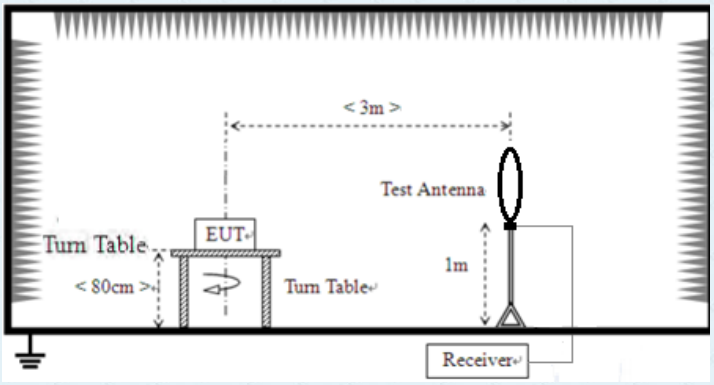
30MHz~26.5GHz

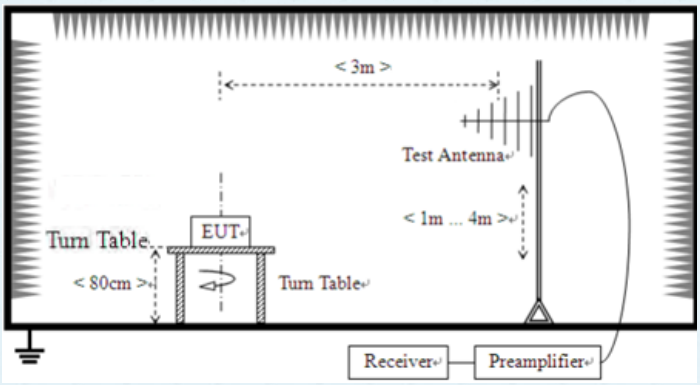
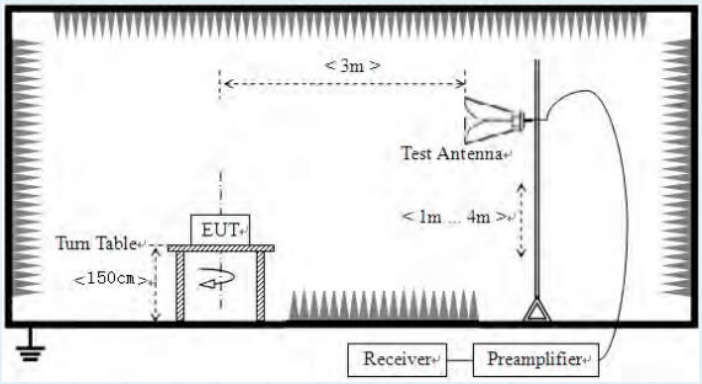
Highest channel



30MHz~26.5GHz

7.7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209
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:
Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

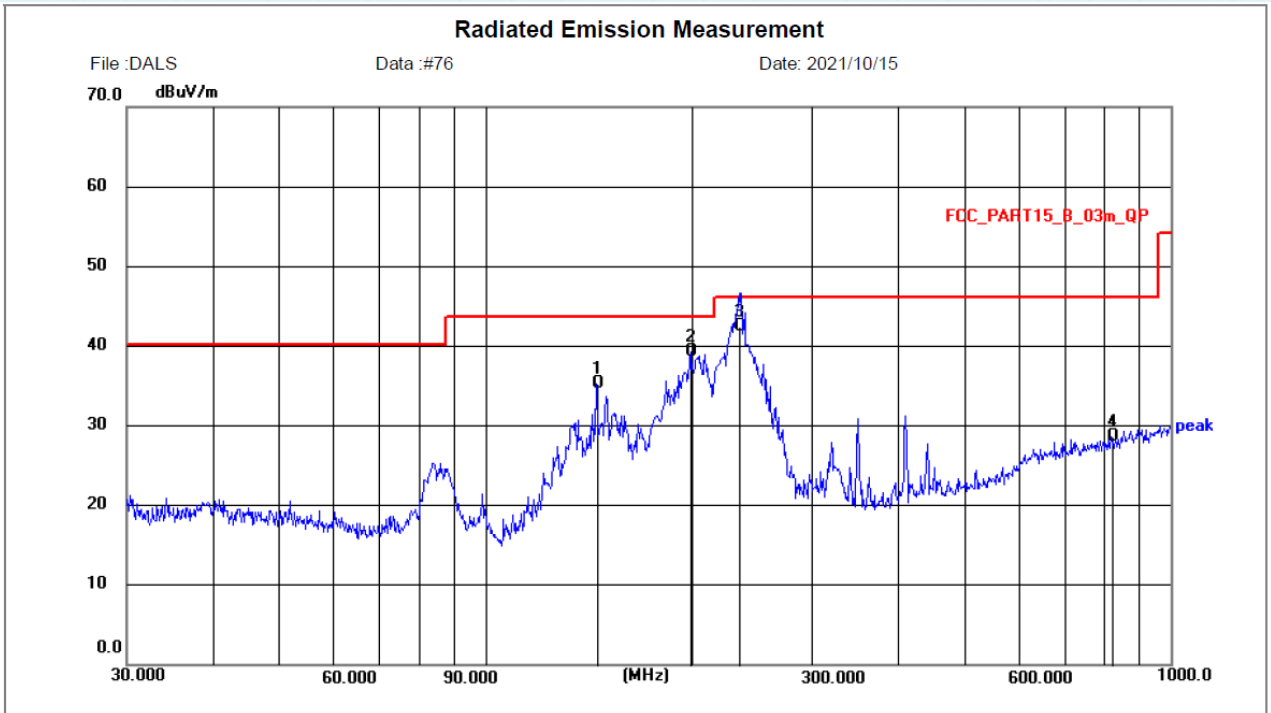
■ **9kHz~30MHz**

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:



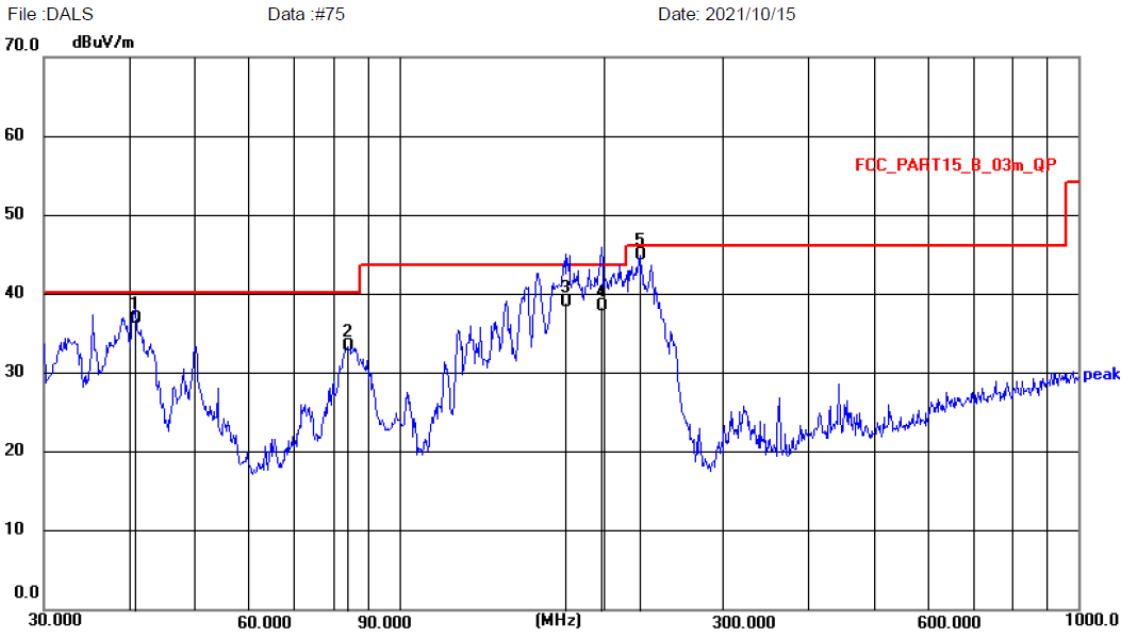
Site 966 Chamber
Limit: FCC_PART15_B_03m_QP
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	145.3506	20.34	15.00	35.34	43.50	8.16	QP	147	258	P	
2	199.2855	27.55	11.82	39.37	43.50	4.13	QP	136	158	P	
3 *	234.9909	29.35	13.15	42.50	46.00	3.50	QP	124	326	P	
4	818.8341	5.48	23.19	28.67	46.00	17.33	QP	142	223	P	

Vertical:



Site 966 Chamber
Limit: FCC_PART15_B_03m_QP
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

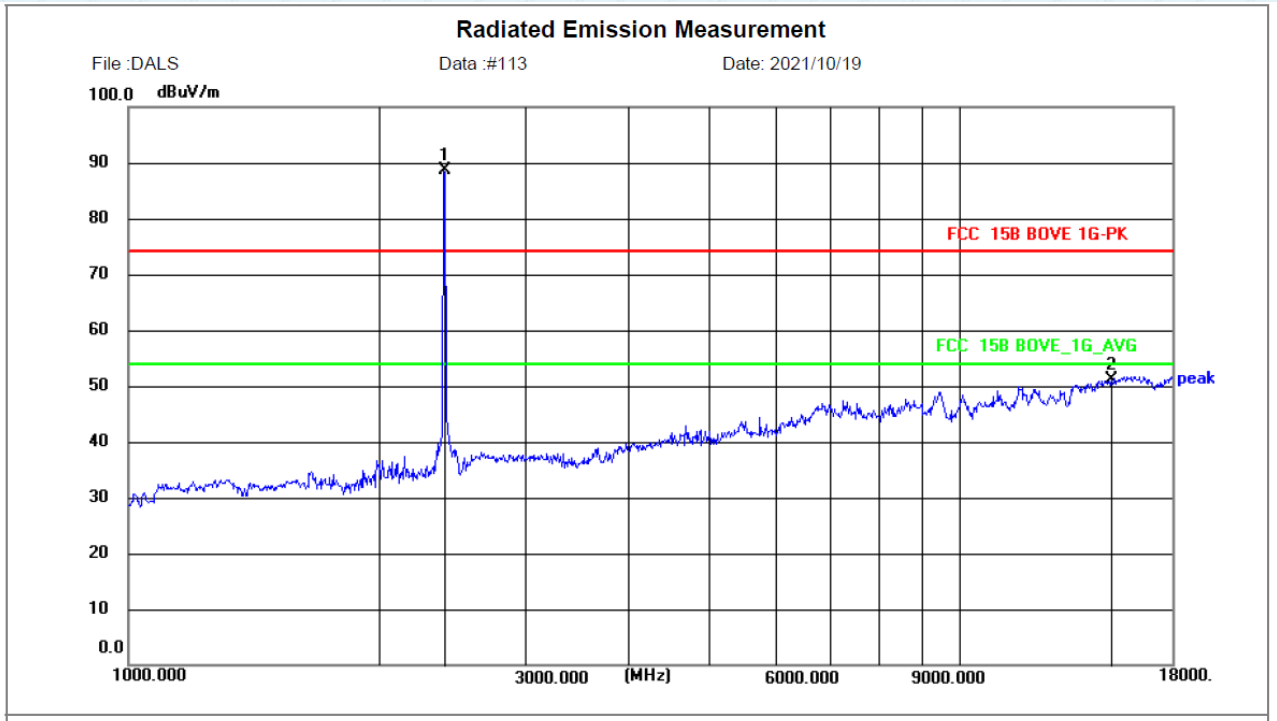
Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	40.9879	21.53	15.27	36.80	40.00	3.20	QP	147	321	P	
2	84.1100	22.39	11.01	33.40	40.00	6.60	QP	142	156	P	
3	176.2684	24.80	14.10	38.90	43.50	4.60	QP	153	254	P	
4	198.5877	26.64	11.86	38.50	43.50	5.00	QP	172	214	P	
5 *	226.0994	32.14	12.79	44.93	46.00	1.07	QP	148	265	P	

■ **Above 1GHz**

Vertical:



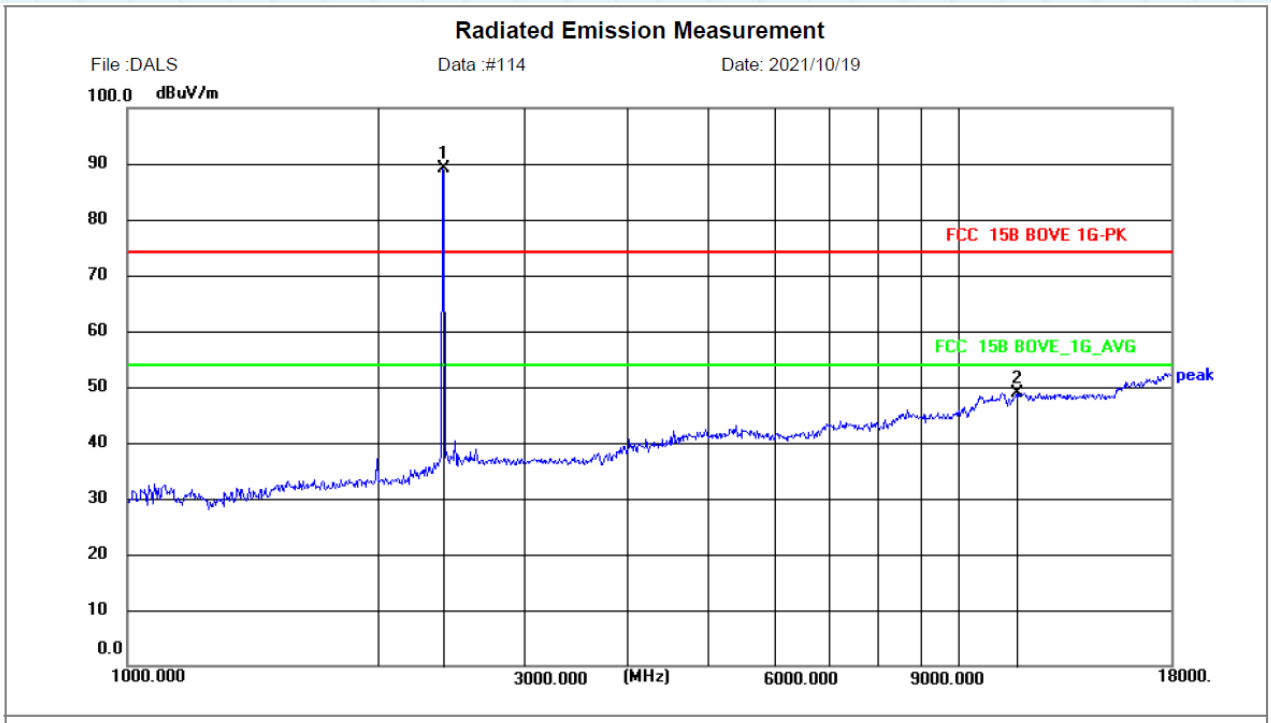
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2402.124	84.66	3.94	88.60	/	/	peak	105	124	/	
2	15240.333	20.70	30.32	51.02	74.00	22.98	peak	117	203	P	

Horizontal:



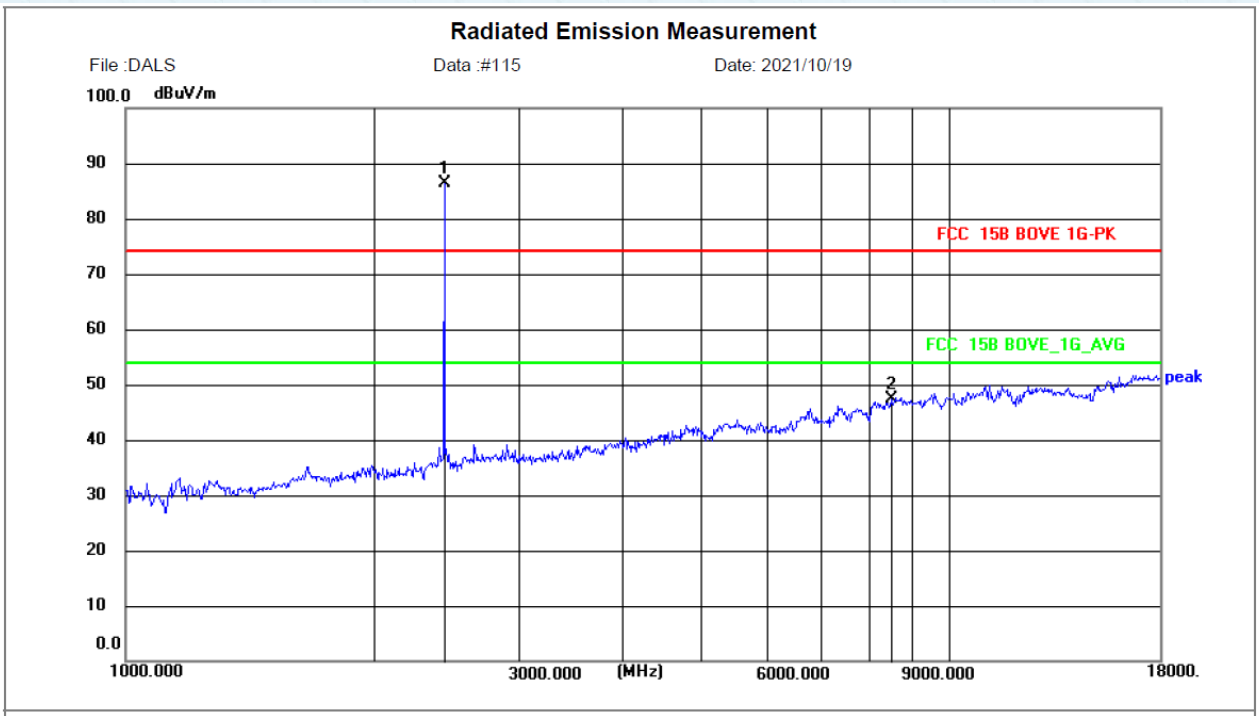
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2402.136	85.18	3.94	89.12	/	/	peak	114	56	/	
2	11738.333	21.91	26.96	48.87	74.00	25.13	peak	108	312	P	

Vertical:



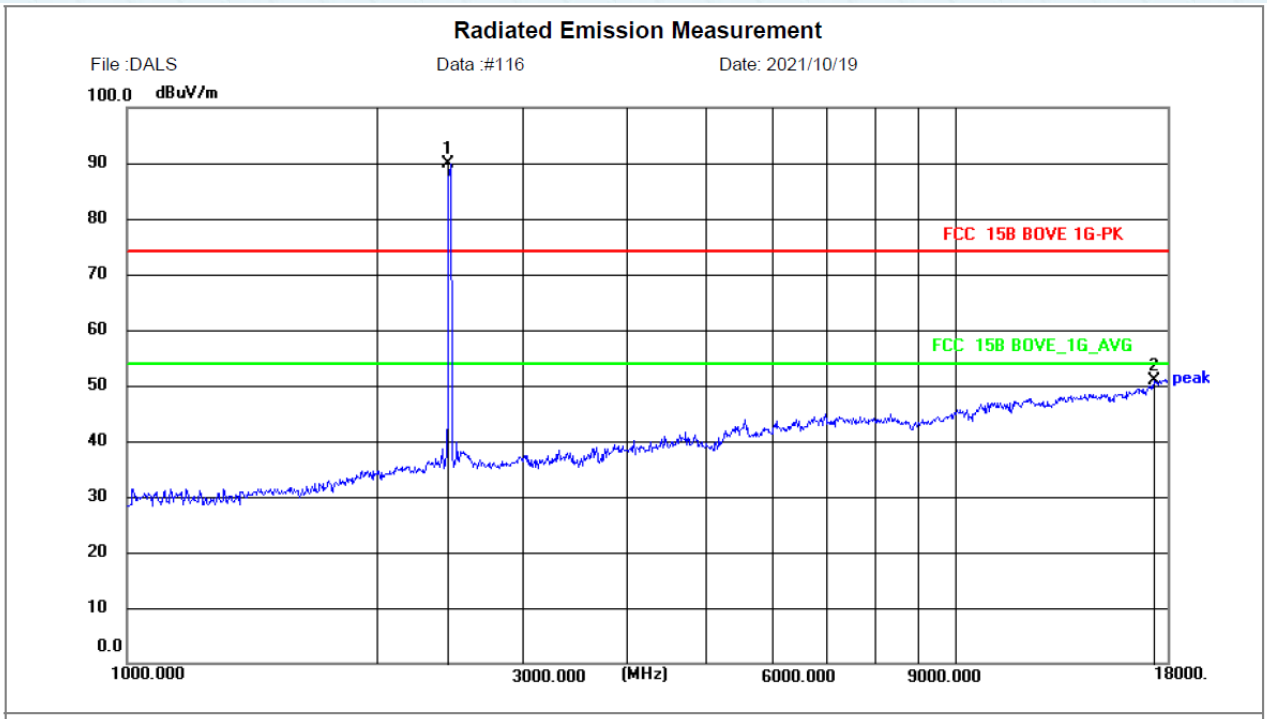
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2440MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2440.025	82.34	4.10	86.44	/	/	peak	115	136	/	
2	8508.333	25.80	21.55	47.35	74.00	26.65	peak	121	178	P	

Horizontal:



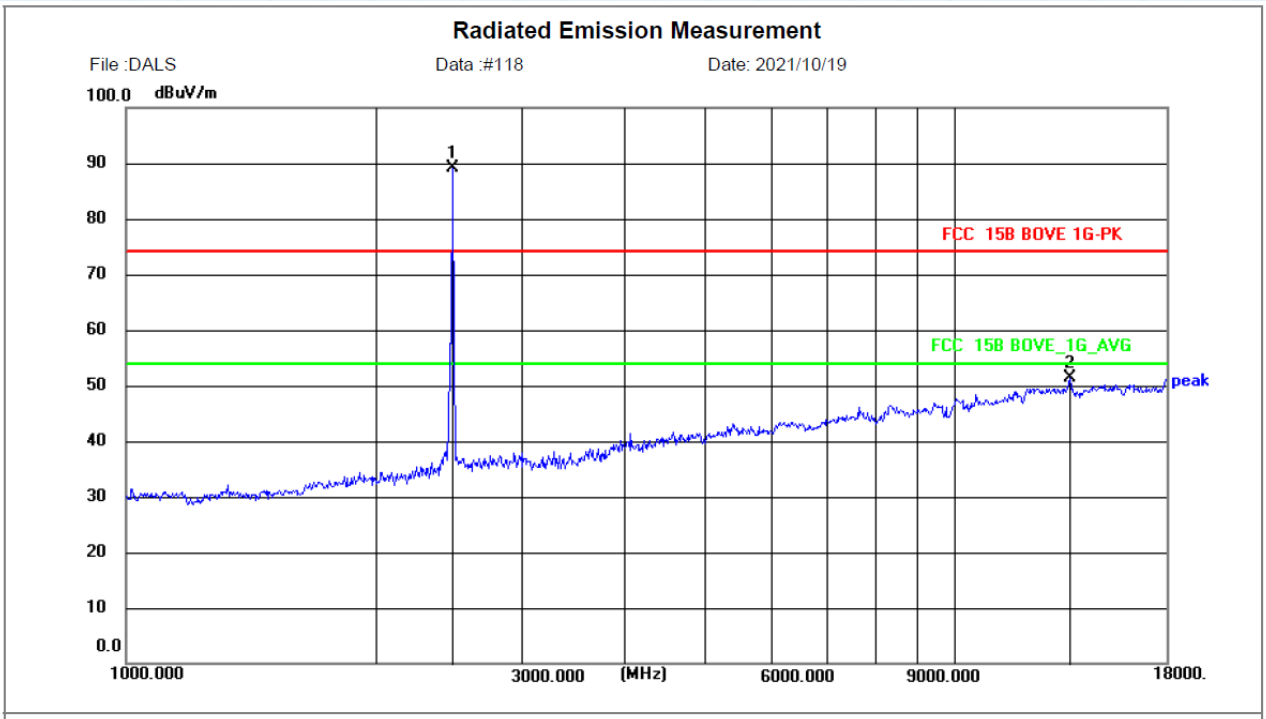
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2440MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2440.561	85.87	4.10	89.97	/	/	peak	122	254	/	
2	17371.000	18.12	32.74	50.86	74.00	23.14	peak	108	169	P	

Vertical:



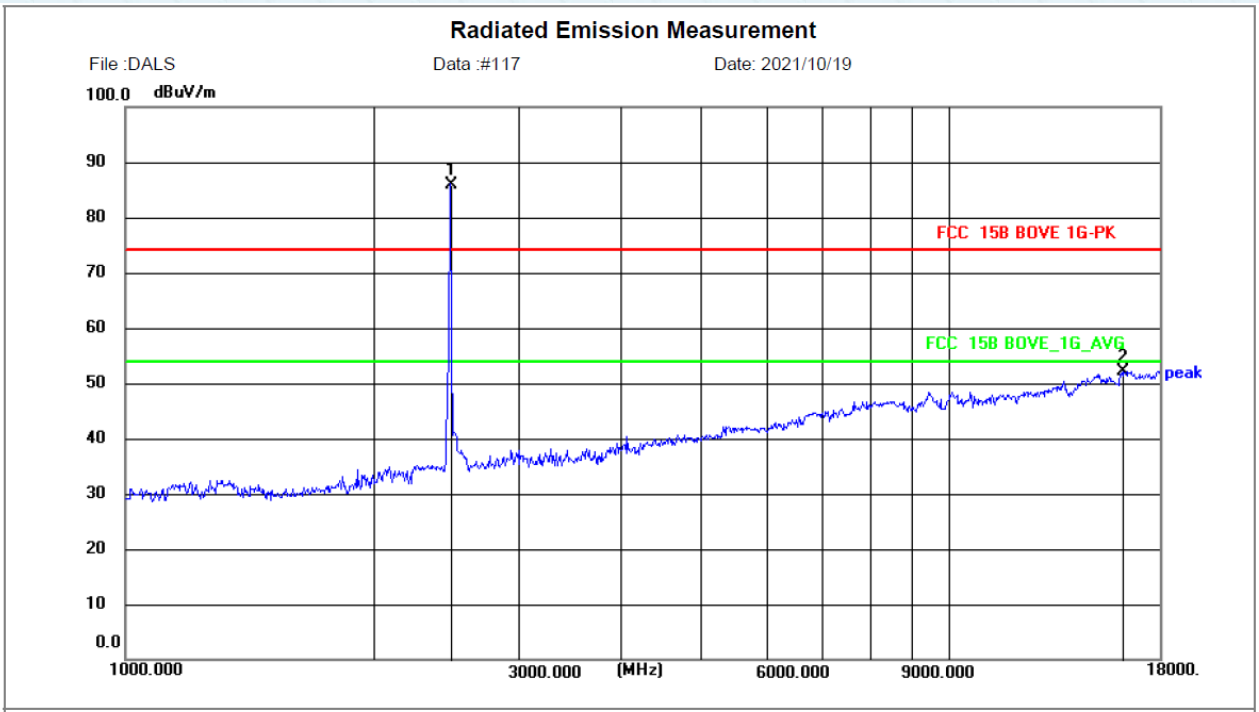
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2479.000	84.81	4.26	89.07	/	/	peak	133	186	/	
2	13778.333	20.61	30.67	51.28	74.00	22.72	peak	124	209	P	

Horizontal:



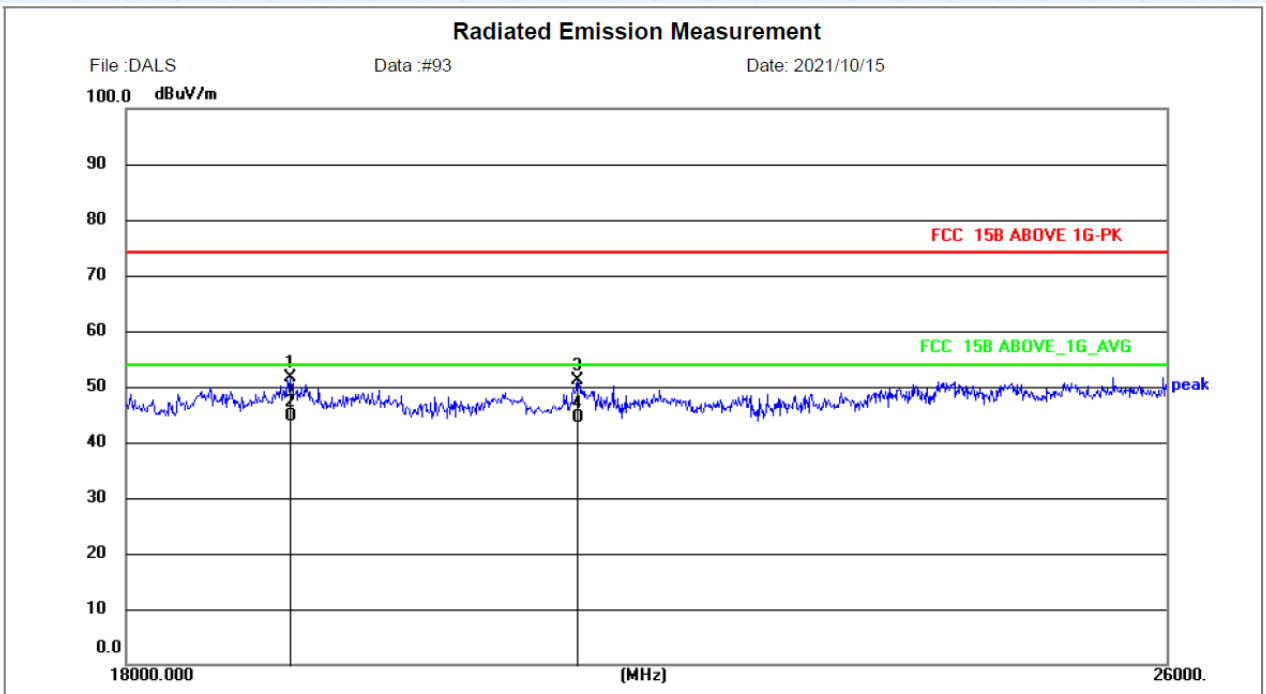
Site 966 Chamber
Limit: FCC 15B BOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	2480.026	81.52	4.27	85.79	/	/	peak	128	216	/	
2	16260.333	23.97	28.28	52.25	74.00	21.75	peak	103	175	P	

Vertical:



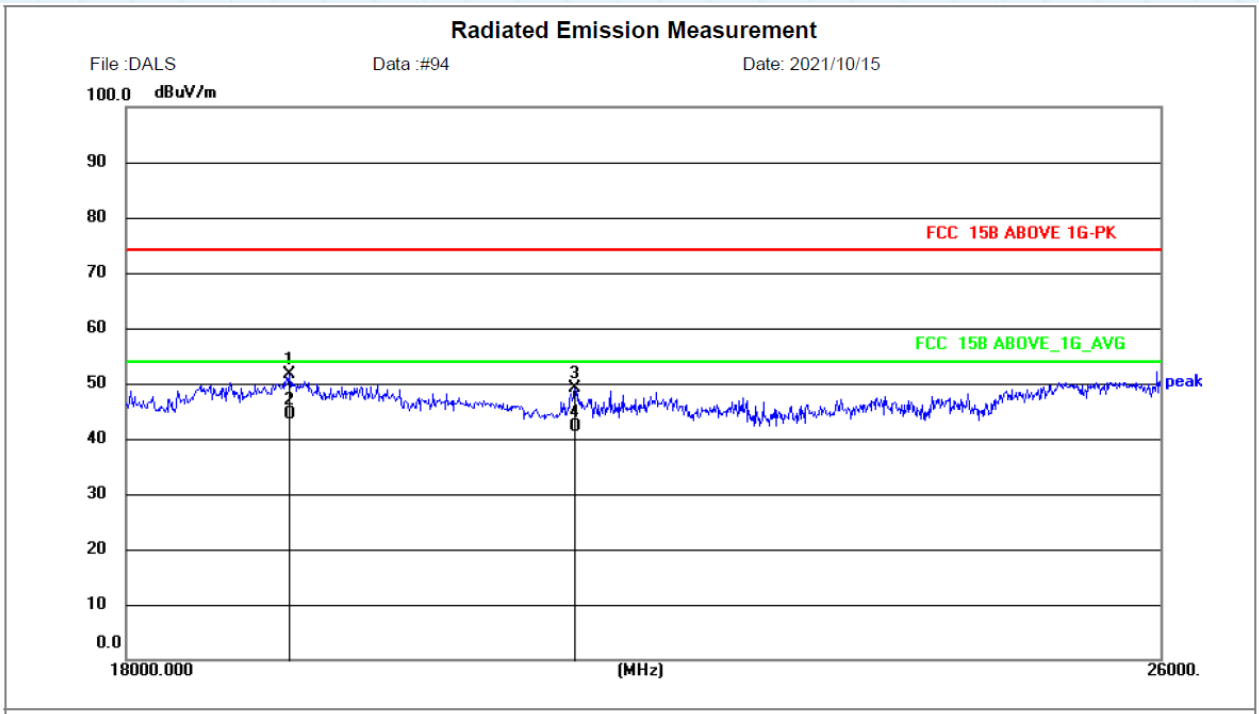
Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	19080.000	28.73	22.79	51.52	74.00	22.48	peak	143	215	P	
2 *	19080.000	21.85	22.79	44.64	54.00	9.36	AVG	175	156	P	
3	21120.000	28.23	22.84	51.07	74.00	22.93	peak	124	212	P	
4	21120.000	21.53	22.84	44.37	54.00	9.63	AVG	156	143	P	

Horizontal:



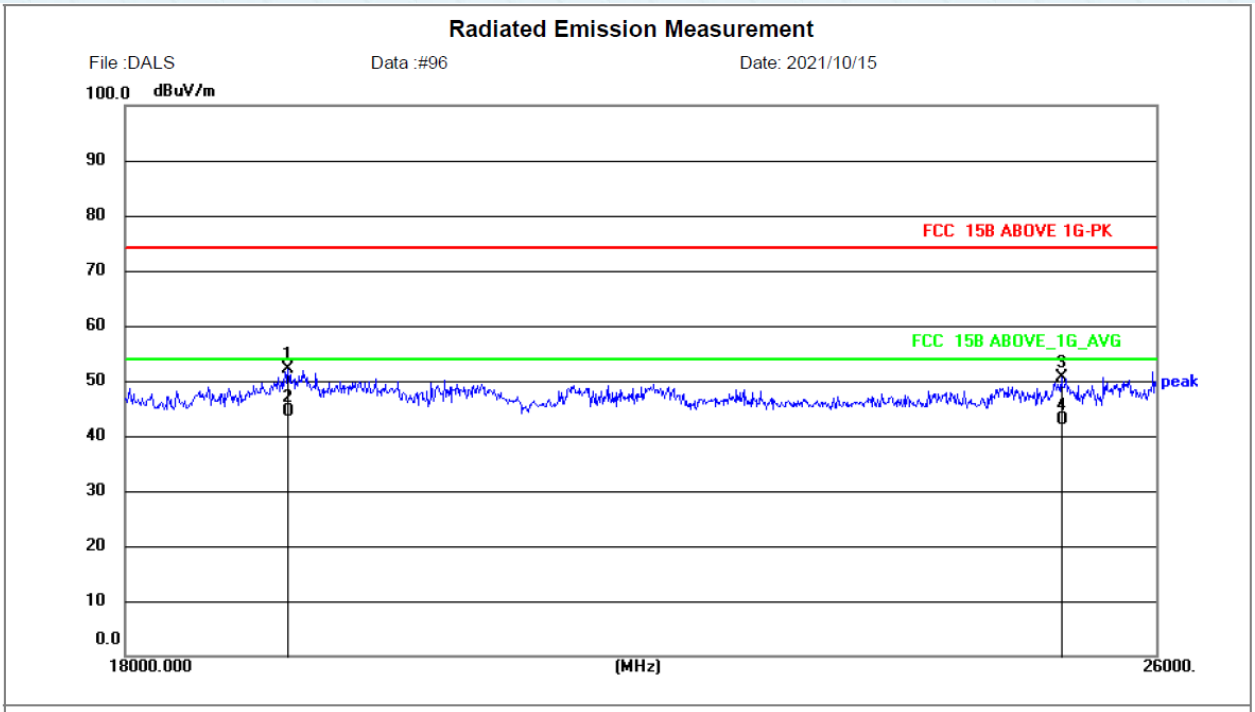
Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2402MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	19080.000	28.73	22.79	51.52	74.00	22.48	peak	137	253	P	
2 *	19080.000	21.63	22.79	44.42	54.00	9.58	AVG	132	213	P	
3	21120.000	26.23	22.84	49.07	74.00	24.93	peak	114	245	P	
4	21120.000	19.35	22.84	42.19	54.00	11.81	AVG	126	56	P	

Vertical:



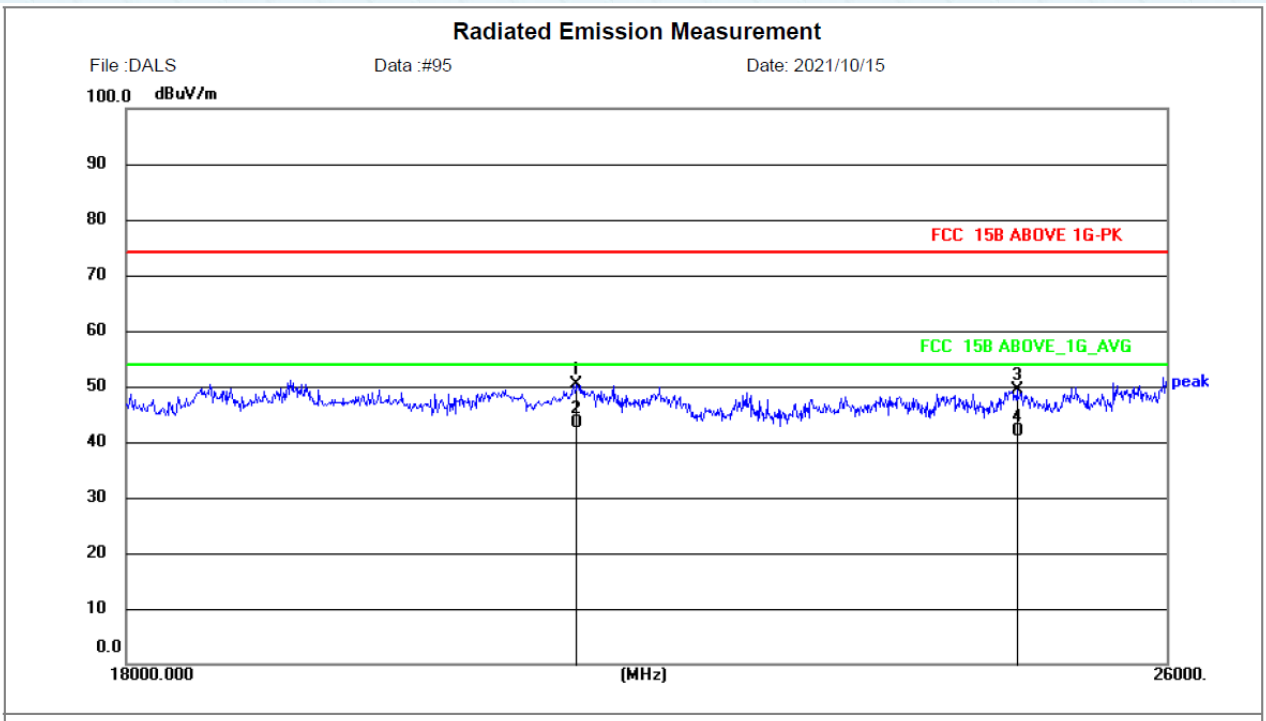
Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2440MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	19080.000	29.23	22.79	52.02	74.00	21.98	peak	121	241	P	
2 *	19080.000	21.56	22.79	44.35	54.00	9.65	AVG	114	142	P	
3	25136.000	30.09	20.43	50.52	74.00	23.48	peak	126	217	P	
4	25136.000	22.41	20.43	42.84	54.00	11.16	AVG	115	319	P	

Horizontal:



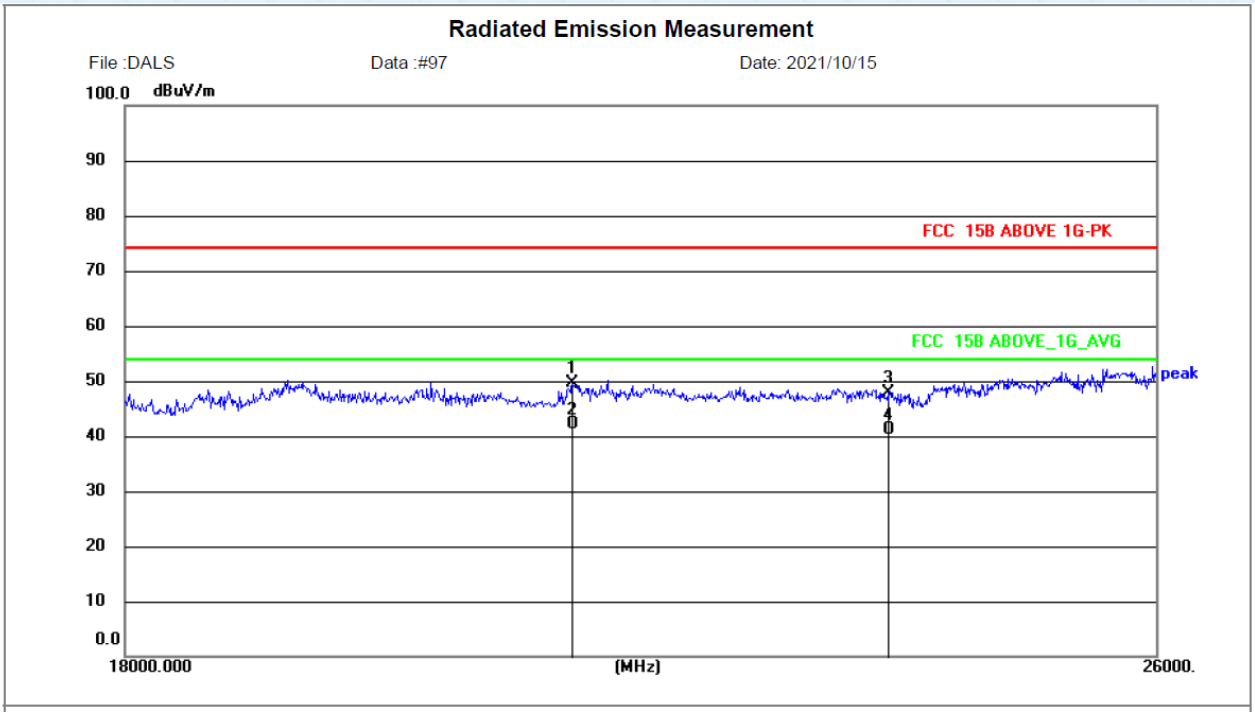
Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2440MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	21112.000	27.60	22.83	50.43	74.00	23.57	peak	118	253	P	
2 *	21112.000	20.66	22.83	43.49	54.00	10.51	AVG	132	182	P	
3	24664.000	28.87	20.58	49.45	74.00	24.55	peak	154	145	P	
4	24664.000	21.35	20.58	41.93	54.00	12.07	AVG	125	332	P	

Vertical:



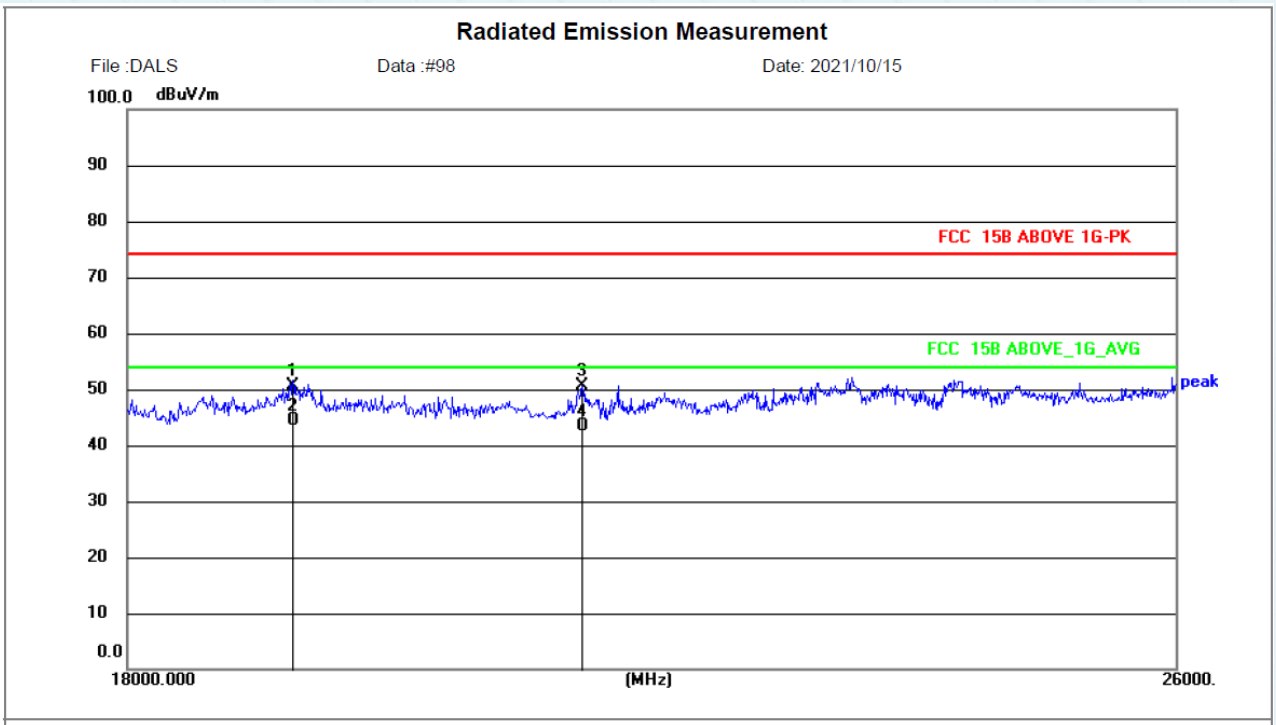
Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Vertical*
Power: AC120V/60Hz
Distance: 3m

Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	21120.000	26.73	22.84	49.57	74.00	24.43	peak	122	213	P	
2 *	21120.000	19.35	22.84	42.19	54.00	11.81	AVG	101	147	P	
3	23640.000	26.15	21.84	47.99	74.00	26.01	peak	147	259	P	
4	23640.000	19.25	21.84	41.09	54.00	12.91	AVG	125	143	P	

Horizontal:



Site 966 Chamber
Limit: FCC 15B ABOVE 1G-PK
EUT: LED Bulb
M/N: SM-BLBPAR20
Mode: BT 2480MHz
Note: DALS Lighting Inc. Operater:Jason

Polarization: *Horizontal*
Power: AC120V/60Hz
Distance: 3m

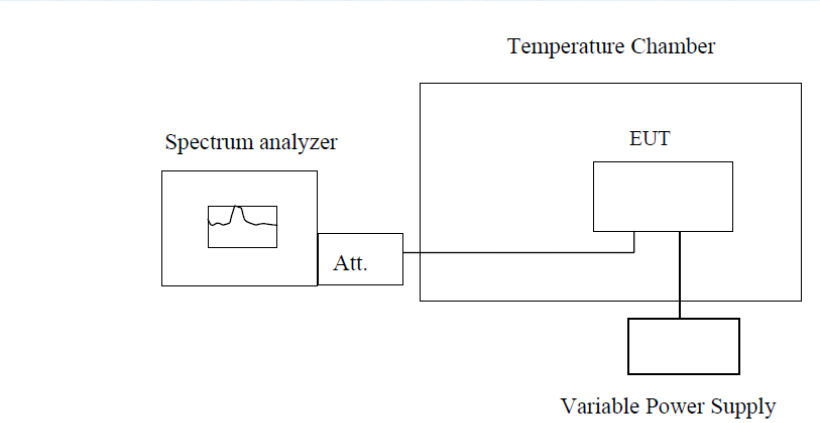
Temperature: 26(C)
Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	19080.000	27.78	22.79	50.57	74.00	23.43	peak	125	352	P	
2 *	19080.000	21.65	22.79	44.44	54.00	9.56	AVG	136	125	P	
3	21120.000	27.73	22.84	50.57	74.00	23.43	peak	141	241	P	
4	21120.000	20.63	22.84	43.47	54.00	10.53	AVG	109	253	P	

Remarks:

4. *Level =Reading + Factor*
5. *Factor= Antenna Gain + Cable Loss – Amplifier Gain*
6. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.8 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 Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)	Pass /Fail
-30	2402	2402.002	2402.001	2402.001	2402.000	Pass
	2440	2440.001	2440.002	2440.000	2440.001	Pass
	2480	2479.999	2479.999	2479.998	2480.001	Pass
-20	2402	2402.001	2402.000	2402.002	2402.000	Pass
	2440	2440.001	2440.000	2440.000	2440.001	Pass
	2480	2479.997	2479.998	2479.999	2480.002	Pass
-10	2402	2401.999	2402.000	2402.003	2402.001	Pass
	2440	2440.001	2439.998	2439.999	2440.002	Pass
	2480	2479.998	2480.001	2479.997	2480.002	Pass
0	2402	2402.002	2402.001	2402.001	2402.000	Pass
	2440	2440.001	2440.001	2439.999	2439.998	Pass
	2480	2479.998	2479.999	2480.002	2479.998	Pass
10	2402	2402.000	2402.002	2401.998	2402.001	Pass
	2440	2440.001	2440.002	2440.000	2439.998	Pass
	2480	2480.001	2479.998	2479.997	2480.000	Pass
20	2402	2402.002	2401.997	2402.001	2402.000	Pass
	2440	2440.001	2440.000	2439.999	2440.001	Pass
	2480	2479.999	2479.998	2479.995	2479.998	Pass
30	2402	2402.003	2402.001	2401.997	2402.001	Pass
	2440	2440.001	2440.004	2439.996	2440.003	Pass
	2480	2480.002	2479.999	2479.999	2480.000	Pass
40	2402	2401.998	2402.000	2402.001	2401.998	Pass
	2440	2440.001	2440.002	2440.001	2439.997	Pass
	2480	2479.998	2480.001	2479.998	2480.002	Pass
50	2402	2402.002	2402.000	2401.997	2402.001	Pass
	2440	2440.002	2440.001	2440.000	2440.002	Pass
	2480	2480.003	2479.999	2480.001	2479.998	Pass
Frequency stability versus Voltage						
Temperature: 25°C						
Power Supply (VAC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)	Pass /Fail
120	2402	2402.000	2419.999	2402.001	2402.003	Pass
	2440	2440.001	2440.000	2440.002	2440.001	Pass
	2480	2480.001	2479.999	2480.001	2479.999	Pass

8 Test Setup Photo

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

9 EUT Constructional Details

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

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