



Report No.: TW2109102E File reference No.: 2021-09-23

Applicant: NINGBO SC-STARMAX IMP. & EXP. CO., LTD.

Product: Desk Lamp with BT Speaker

Model No.: 99707

Trademark: N/A

Test Standards: FCC Part 15.247

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for the

evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: September 23, 2021

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The 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 our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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Test Report Conclusion

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1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

1.2 Applicant Details

Applicant: NINGBO SC-STARMAX IMP. & EXP. CO., LTD.

Address: Room 513, Floor 5, Building 3, No.1377, Jiulan Road, High-tech Zone, Ningbo

Telephone: 0574-27651231

Fax: --

1.3 Description of EUT

Product: Desk Lamp with BT Speaker

Manufacturer: NINGBO SC-STARMAX IMP. & EXP. CO., LTD.

Address: Room 513, Floor 5, Building 3, No.1377, Jiulan Road, High-tech Zone,

Ningbo

Trademark: N/A Model Number: 99707

Additional Model Number: N/A

Type of Modulation GFSK, 月/4DQPSK for Bluetooth Frequency range 2402-2480MHz for Bluetooth

Channel Spacing 1MHz for Bluetooth

Frequency Selection By software

Channel Number 79 channels for Bluetooth

Antenna: PCB Antenna. The gain of the antennas is -0.58dBi (Declared by the applicant)

Input Voltage: DC5.0V, 2A

Hardware Version: V1.0 Software Version: V1.0

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2021-09-08 to 2021-09-22

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

The report refers only to the sample tested and does not apply to the bulk.

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Radiated Emissions below 1GHz Uncertainty =4.7dB Radiated Emissions above 1GHz Uncertainty =6.0dB Conducted Power Uncertainty = 6.0dB Occupied Channel Bandwidth Uncertainty = 5%

1.7 Test Engineer Terry Tang

The sample tested by

Print Name: Terry Tang

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2.0 Test Equipment							
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date		
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17		
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17		
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17		
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17		
Loop Antenna	EMCO	6507	00078608	2021-06-18	2022-06-17		
Spectrum	R&S	FSIQ26	100292	2021-06-18	2022-06-17		
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-06-18	2022-06-17		
Horn Antenna	R&S	BBHA 9120D	9120D-631	2021-07-02	2024-07-01		
Power meter	Anritsu	ML2487A	6K00003613	2021-06-18	2022-06-17		
Power sensor	Anritsu	MA2491A	32263	2021-06-18	2022-06-17		
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2021-07-02	2024-07-01		
9*6*6 Anechoic			N/A	2018-02-07	2021-02-06		
EMI Test Receiver	RS	ESVB	826156/011	2021-06-18	2022-06-17		
EMI Test Receiver	RS	ESH3	860904/006	2021-06-18	2022-06-17		
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2021-06-18	2022-06-17		
Spectrum	HP/Agilent	E4407B	MY50441392	2021-06-18	2022-06-17		
Spectrum	RS	FSP	1164.4391.38	2021-01-06	2022-01-05		
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA		2021-06-18	2022-06-17		
RF Cable	Zhengdi	7m		2021-06-18	2022-06-17		
RF Switch	EM	EMSW18	060391	2021-06-18	2022-06-17		
Pre-Amplifier	Schwarebeck	BBV9743	#218	2021-06-18	2022-06-17		
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2021-06-18	2022-06-17		
LISN	SCHAFFNER	NNB42	00012	2021-01-06	2022-01-05		

2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1
For Radiated Emissions	
Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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3.0 **Technical Details**

3.1 **Summary of test results**

The EUT has been tested according to the following specifications:

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	Pass	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	Pass	Complies
Carrier Frequency Separation	15.247(a)(1)	Pass	Complies
20dB Channel Bandwidth	15.247 (a)(1)	Pass	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	Pass	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	Pass	Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	Pass	Complies
Conducted Emissions	15.207(a), 15.107	Pass	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	Pass	Complies

3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 **EUT Modification**

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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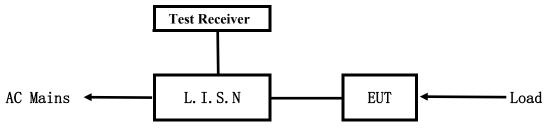
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5. Power Line Conducted Emission Test

5.1 Schematics of the test

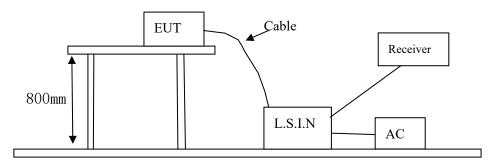


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Test Voltage: 120V~60Hz Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

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A. EUT

Device	Manufacturer	Model	FCC ID	
Desk Lamp with BT Speaker	NINGBO SC-STARMAX IMP. &	99707	2 4 233/31 00707	
	EXP. CO., LTD.		2A2WN-99707	

B. Internal Device

Device	Manufacturer	Model	Rating
N/A			

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	Chenyang	UP0920	Input: 100-240V~, 50-60Hz, 0.5A;
			Output: DC5V or DC9V, 2A

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB µ V)				
(MHz)	Quasi-peak Level	Average Level			
0.15 ~ 0.50	66.0~56.0*	56.0~46.0*			
0.50 ~ 5.00	56.0	46.0			
5.00 ~ 30.00	60.0	50.0			

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

Pass

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Conducted Emission on Live Terminal (150kHz to 30MHz) A:

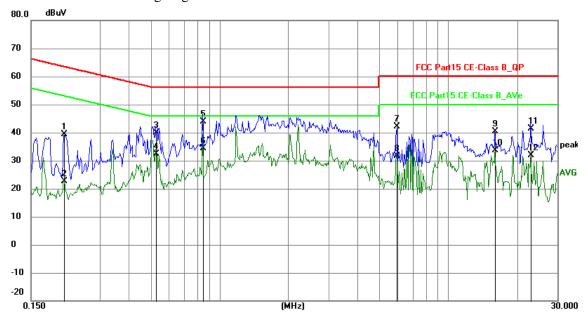
EUT Operating Environment

Temperature: 25°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Communication by BT

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2085	29.68	9.75	39.43	63.26	-23.83	QP	Р
2	0.2085	12.89	9.75	22.64	53.26	-30.62	AVG	Р
3	0.5293	30.16	9.77	39.93	56.00	-16.07	QP	Р
4	0.5293	22.64	9.77	32.41	46.00	-13.59	AVG	Р
5	0.8481	34.12	9.78	43.90	56.00	-12.10	QP	Р
6	0.8481	24.49	9.78	34.27	46.00	-11.73	AVG	Р
7	5.9484	32.16	9.97	42.13	60.00	-17.87	QP	Р
8	5.9484	21.70	9.97	31.67	50.00	-18.33	AVG	Р
9	15.9714	29.98	10.44	40.42	60.00	-19.58	QP	Р
10	15.9714	23.13	10.44	33.57	50.00	-16.43	AVG	Р
11	22.9368	30.54	10.86	41.40	60.00	-18.60	QP	Р
12	22.9368	21.05	10.86	31.91	50.00	-18.09	AVG	Р

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

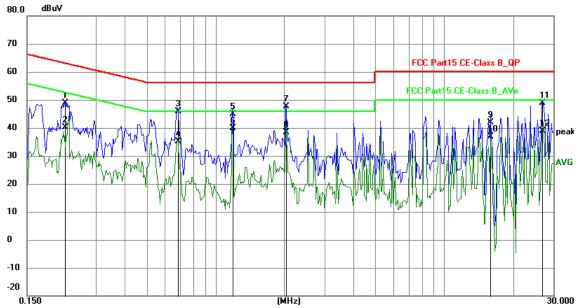
EUT Operating Environment

Temperature: 25°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Communication by BT

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2208	39.17	9.75	48.92	62.79	-13.87	QP	Р
2	0.2208	30.44	9.75	40.19	52.79	-12.60	AVG	Р
3	0.6843	36.15	9.78	45.93	56.00	-10.07	QP	Р
4	0.6843	25.28	9.78	35.06	46.00	-10.94	AVG	Р
5	1.1873	35.16	9.79	44.95	56.00	-11.05	QP	Р
6	1.1873	30.15	9.79	39.94	46.00	-6.06	AVG	Р
7	2.0298	37.84	9.80	47.64	56.00	-8.36	QP	Р
8	2.0298	28.65	9.80	38.45	46.00	-7.55	AVG	Р
9	15.9597	31.54	10.44	41.98	60.00	-18.02	QP	Р
10	15.9597	26.48	10.44	36.92	50.00	-13.08	AVG	Р
11	26.8290	37.68	11.10	48.78	60.00	-11.22	QP	Р
12	26.8290	27.90	11.10	39.00	50.00	-11.00	AVG	Р

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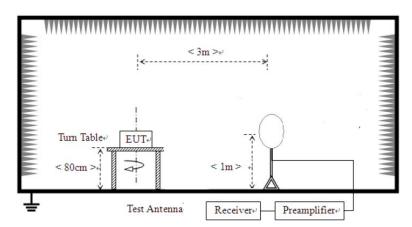


6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



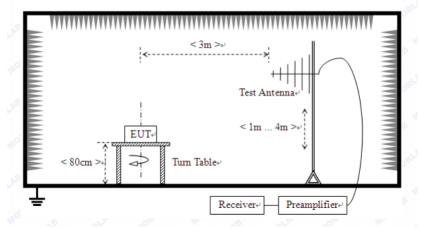
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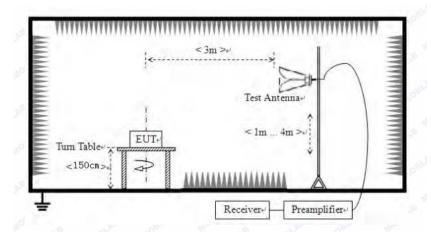
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For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



- 6.2 Configuration of The EUT Same as section 5.3 of this report
- 6.3 **EUT Operating Condition** Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109 and RSS-210

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. Л/4DQPSK was the worst case because it has highest output power

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/Vertical (30MHz----1000MHz)

EUT set Condition: Keep Bluetooth Transmitting

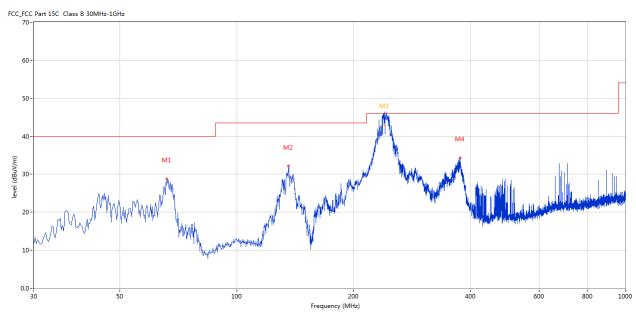
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Test Figure:

H



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	66.123	28.80	-13.97	40.0	-11.20	Peak	324.00	100	Horizontal	Pass
2	135.704	32.11	-17.16	43.5	-11.39	Peak	328.00	100	Horizontal	Pass
3	240.195	43.03	-12.33	46.0	0.03	Peak	150.00	100	Horizontal	N/A
3*	240.195	42.99	-12.33	46.0	-3.01	QP	150.00	100	Horizontal	Pass
4	375.234	34.31	-9.42	46.0	-11.69	Peak	293.00	100	Horizontal	Pass

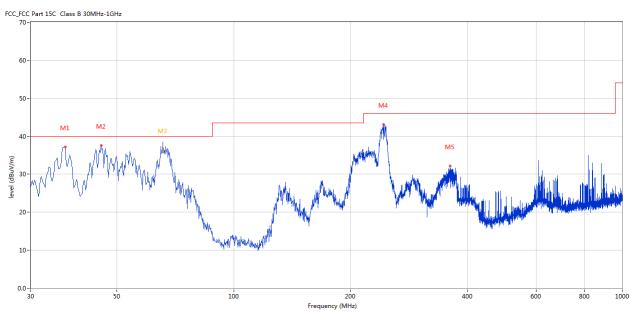
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Test Figure:

V



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	36.788	37.17	-13.31	40.0	-2.83	Peak	77.00	100	Vertical	Pass
2	45.516	37.56	-11.39	40.0	-2.44	Peak	92.00	100	Vertical	Pass
3	65.639	38.50	-13.79	40.0	-1.50	Peak	101.00	100	Vertical	Pass
3*	65.639	36.33	-13.79	40.0	-3.67	QP	101.00	100	Vertical	Pass
4	243.104	43.05	-12.19	46.0	-2.95	Peak	39.00	100	Vertical	Pass
5	360.687	32.19	-9.51	46.0	-13.81	Peak	5.00	100	Vertical	Pass

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Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Antenna Polarity	Limit@3m (dB \(\mu \)V/m)
4804	ı	Н	74(Peak)/ 54(AV)
4804	1	V	74(Peak)/ 54(AV)
7206	1	H/V	74(Peak)/ 54(AV)
9608	1	H/V	74(Peak)/ 54(AV)
12010		H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814	1	H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618	1	H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

Operation Mode: Transmitting g under Middle Channel (2441MHz)

Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4882	-	Н	74(Peak)/ 54(AV)
4882		V	74(Peak)/ 54(AV)
7323		H/V	74(Peak)/ 54(AV)
9764		H/V	74(Peak)/ 54(AV)
12205		H/V	74(Peak)/ 54(AV)
14646		H/V	74(Peak)/ 54(V)
17087		H/V	74(Peak)/ 54(AV)
19528		H/V	74(Peak)/ 54(AV)
21969		H/V	74(Peak)/ 54(AV)
24410		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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Operation Mode: Transmitting under High Channel (2480MHz)

	8 8	, ,	
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB \u03b4 V/m)
4960		Н	74(Peak)/ 54(AV)
4960		V	74(Peak)/ 54(AV)
7440		H/V	74(Peak)/ 54(AV)
9920		H/V	74(Peak)/ 54(AV)
12400		H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840		H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

^{2.} Remark "---" means that the emissions level is too low to be measured

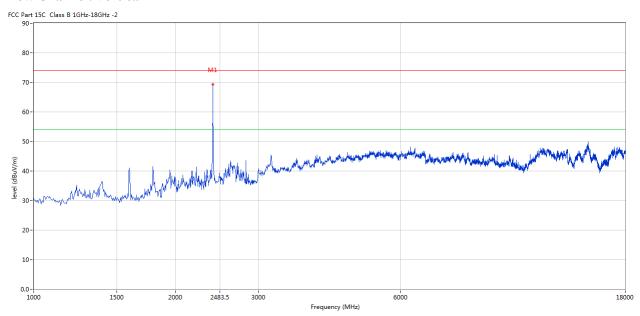
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Please refer to the following test plots for details:

Low Channel: Vertical

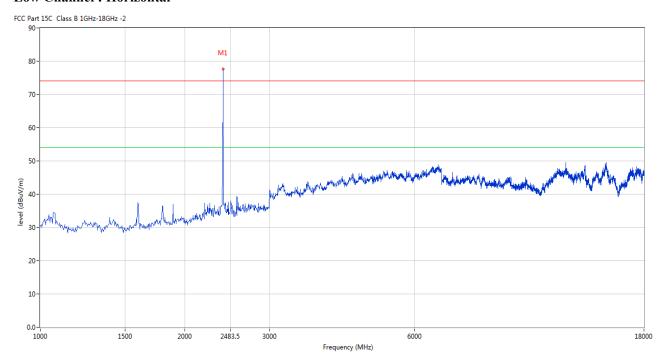


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Low Channel: Horizontal

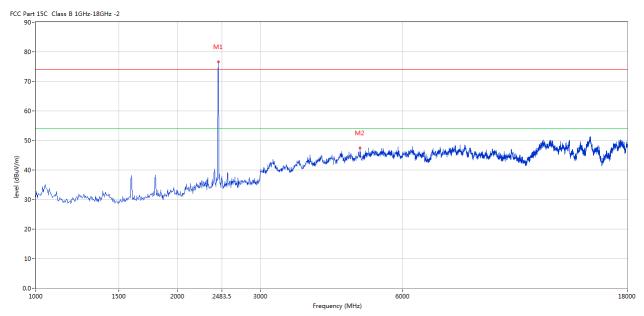


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Middle Channel: Horizontal



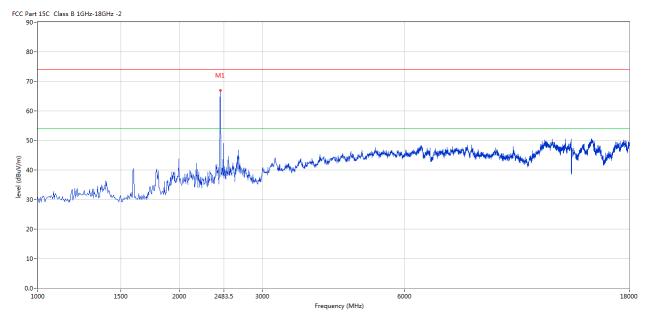
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4880.250	47.50	3.20	74.0	-26.50	Peak	360.00	100	Horizontal	Pass

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Middle Channel: Vertical

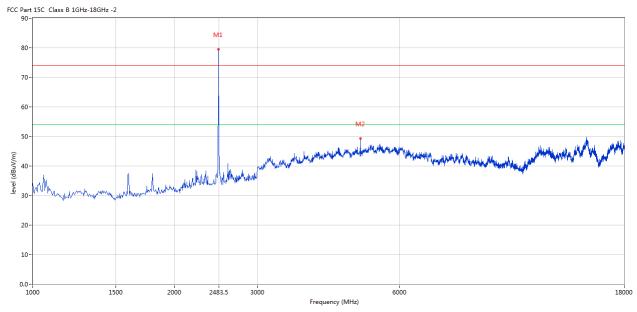


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High Channel: Horizontal



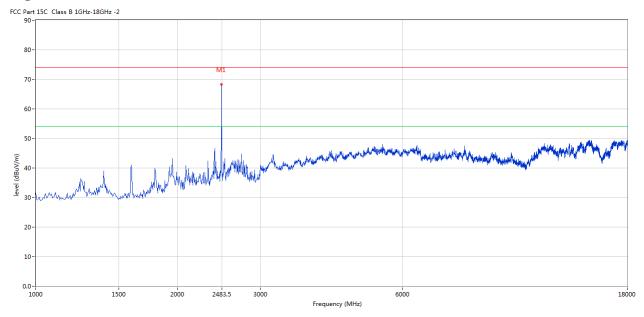
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4961.000	49.25	3.36	74.0	-24.75	Peak	3.00	100	Horizontal	Pass

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High Channel: Vertical



Note: 1. for the radiated emissions above 18G and below 30MHz, it is the floor noise.

2. the measured PK radiated emissions level less than the AV limit, so no necessary to take down the AV result

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7.0 20dB Bandwidth Measurement

7.1 Regulation

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

7.2 Limits of 20dB Bandwidth Measurement

N/A

7.3 Test Procedure.

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span =3MHz, RBW =30 kHz, VBW=100 kHz, Sweep = auto Detector function = peak, Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

7.4 Test Result

Type of Modulation: GFSK

Type of Woulderson ST 511							
EUT Desk Lamp		p with BT Speaker	Model	99707			
Mode	Keep	Keep Transmitting		120V~			
Temperature 24		4 deg. C,	Humidity	56% RH			
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/ Fail			
Low	2402	842		Pass			
Middle	2441	842		Pass			
High	2480	848		Pass			

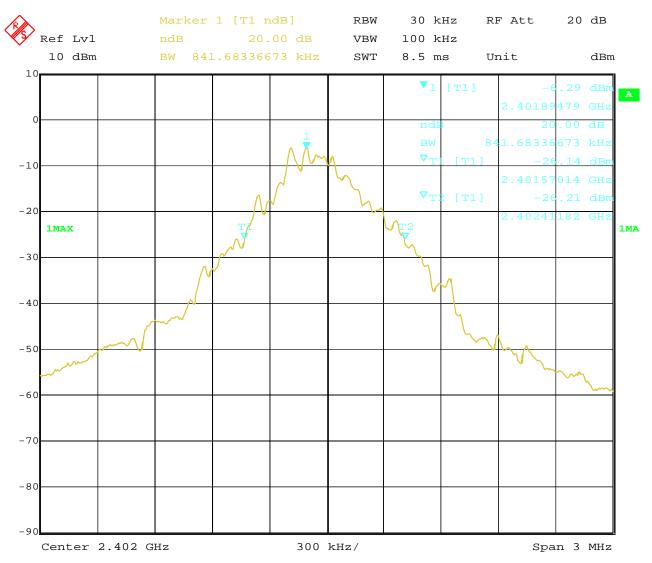
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Test Figure:

1. Condition: Low Channel



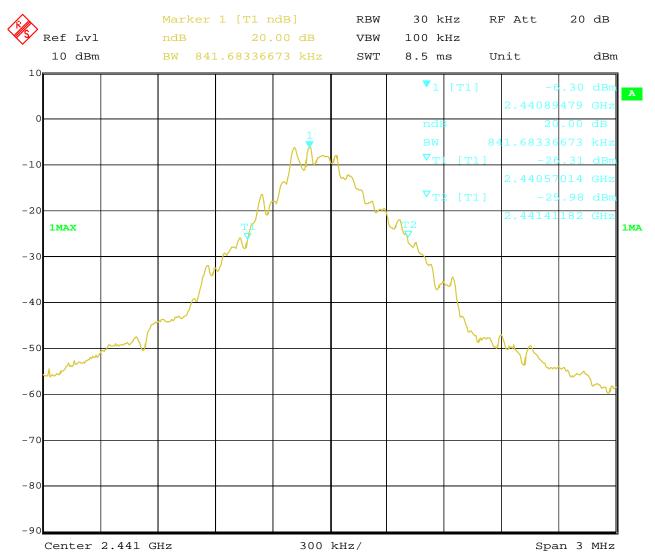
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2. Condition: Middle Channel

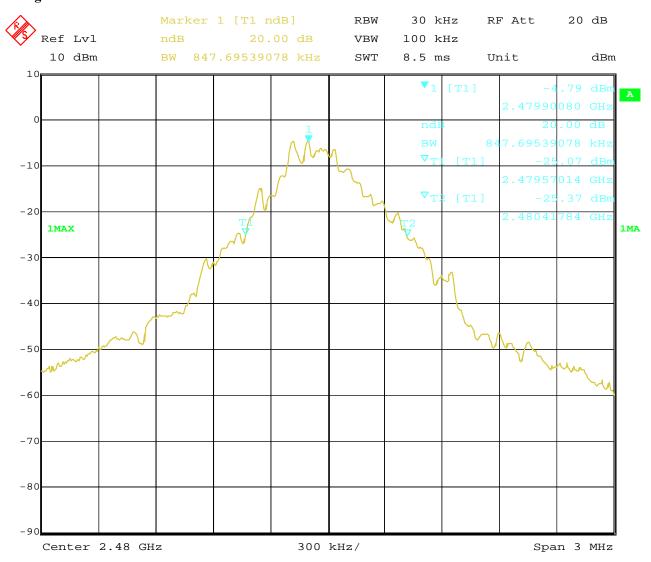


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3. High Channel



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Test Result

Type of Modulation: $\sqrt{1/4}$ DQPSK

EUT	Desk Lam	p with BT Speaker	Model	99707
Mode	Кеер	Transmitting	Input Voltage	120V~
Temperature	2	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz) Channel 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1287		Pass
Middle	2441	1281		Pass
High	2480 1281			Pass

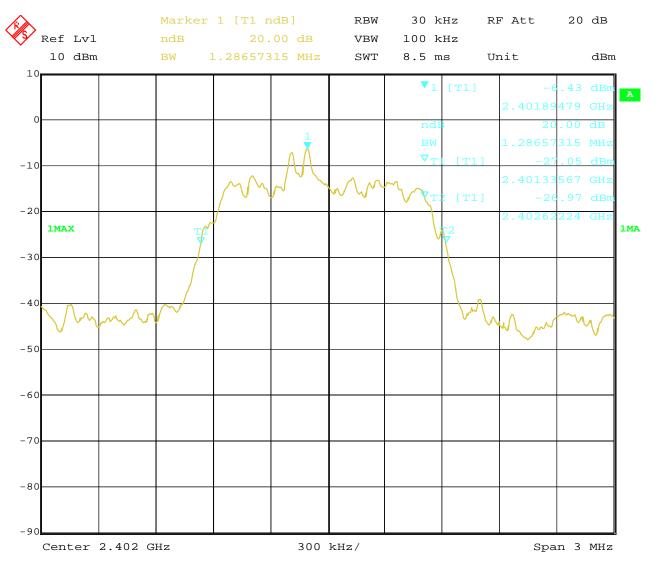
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Test Figure:

1. Condition: Low Channel



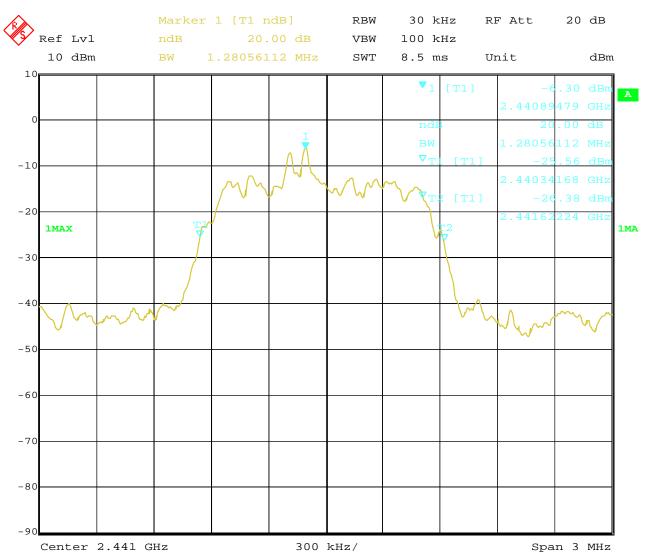
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2. Condition: Middle Channel



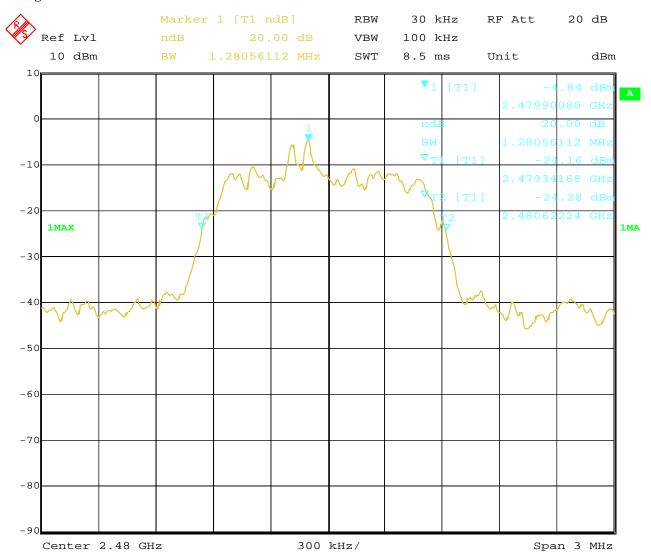
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3. High Channel



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8. Maximum Output Power

8.1 Regulation

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), 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.

8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW = RBW=3MHz; Sweep = 60s; Detector function = PK; Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
- 4. Repeat above procedures until all frequencies measured were complete.

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8.4Test Results

Type of Modulation: GFSK

EUT	Desk Lar	mp with BT Speaker	Model	99707
Mode	Kee	p Transmitting	Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Max. Power Output (dBm) Peak	Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-5.35	30	Pass
Middle	2441	-5.58	30	Pass
High	2480	-3.98	30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The **Peak** power was measured

EUT	Des	k Lamp with BT Speaker	Model	99707	
Mode		Keep Transmitting	Input Voltage	120V~	
Temperature		24 deg. C,	Humidity	56% RH	
Channel	Channel Max. Power Output (dBm) Frequency		Peak Power Limit	Pass/ Fail	
	(MHz)	Peak	(dBm)		
Low	2402	-1.87	30	Pass	
Middle	2441	-1.74	30	Pass	
High	2480	-0.20	30	Pass	

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The **Peak** power was measured

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9. Carrier Frequency Separation

9.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

9.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) \geq 1% of the span; Video (or Average) Bandwidth (VBW) \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.

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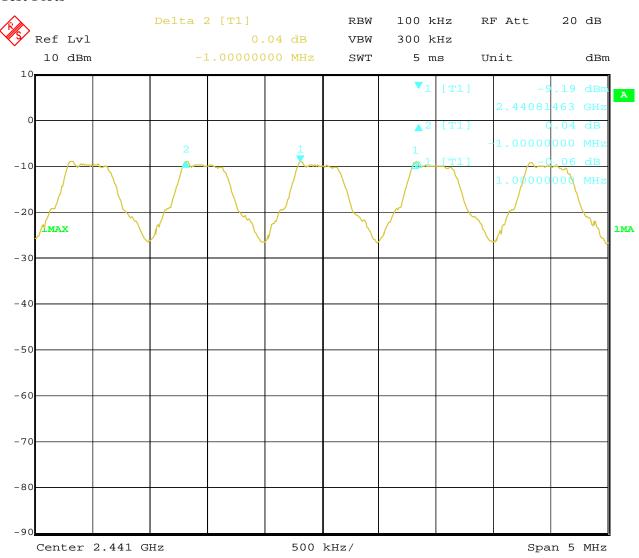


9.4Test Result

Type of Modulation: GFSK

EUT	Desk Lamp with BT Speaker		Model		99707
Mode	Hopping On		Input Voltage		120V~
Temperature	24 deg. C,		Humidity		56% RH
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of the 20 dB bandwidth		dwidth	Pass

Test Plots



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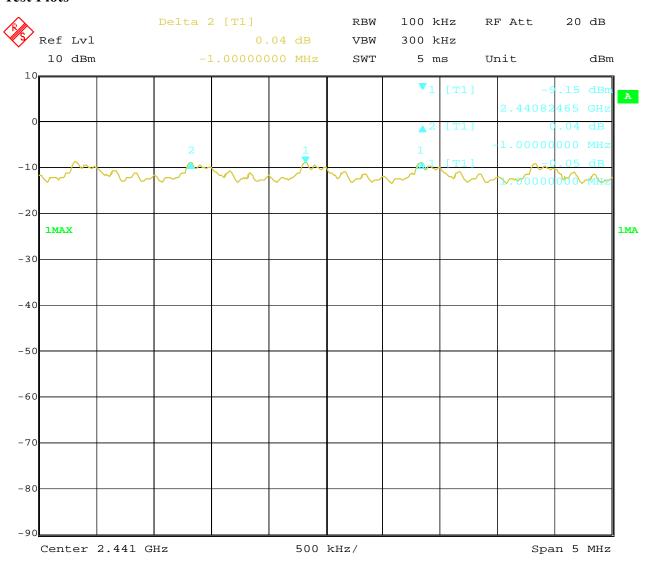
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Type of Modulation: Л/4DQPSK

EUT	Desk Lamp with BT Speaker		Model		99707
Mode	Hopping On		Input Voltage		120V~
Temperature	24 deg. C,		Humidity		56% RH
Carrier Frequency Separation		Limit			Pass/ Fail
1.000MHz		≥ 25 kHz or 2/3 of 20 dB bandwidth		width	Pass

Test Plots



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10. Number of Hopping Channels

10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

10.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=100 kHz, VBW=300 kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

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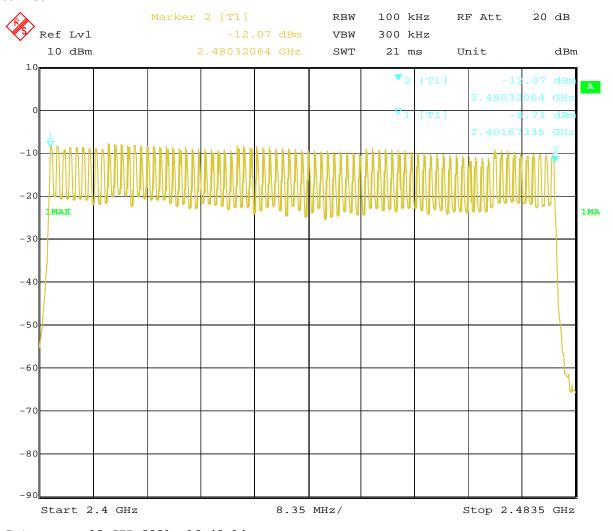


10.4Test Result

Type of Modulation: GFSK

EUT	Desk Lamp with BT Speaker		Model		99707
Mode	Hopping On		Input Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Operating Frequency Number of hopp		ping channels	Limit	Pass/ Fail	
2402-2480MHz 79			≥ 15	Pass	

Test Plot



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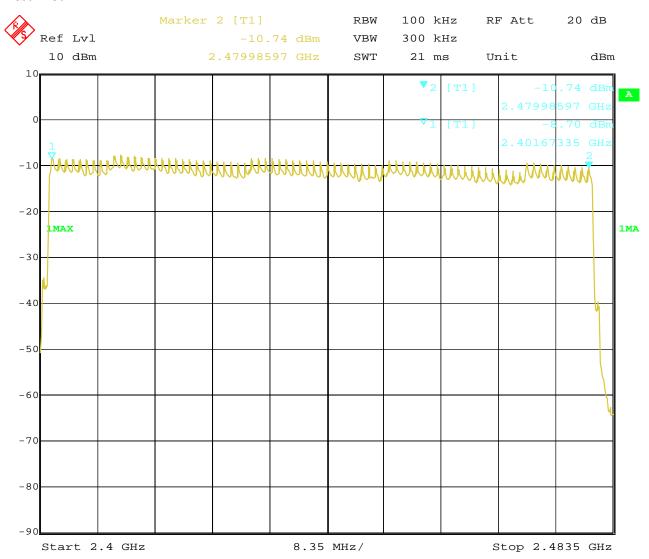
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Type of Modulation: $\sqrt{J/4DQPSK}$

EUT	Desk Lamp with BT Speaker		Mode	el		99707
Mode	Hopping On		Input Volta		120V~	
Temperature	24 deg. C,		Hum	idity	56% RH	
Operating Freque	quency Number of hoppin channels		ıg	Lir	nit	Pass/ Fail
2402-2480MHz		79		≥ ¹	15	Pass

Test Plot



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11. Time of Occupancy (Dwell Time)

11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

11.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW \geq RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
- 3. Measure the dwell time using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.
- 5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

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11.4 Test Result

Type of Modulation: GFSK

EUT	Desk Lamp w	Desk Lamp with BT Speaker			99707
Mode	Keep Tra	ansmitting	Input Voltage		120V~
Temperatur	e 24 d	24 deg. C,		4	56% RH
Channel	Reading	Hoping Rate		Actual	Limit
	DH5				
Middle	2.986ms	266.667 hop/s		0.319s	0.4s
	DH3				
Middle	1.743ms	400 hop/s		0.279s	0.4s
DH1					
Middle	0.461ms	800 h	nop/s	0.148s	0.4s

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

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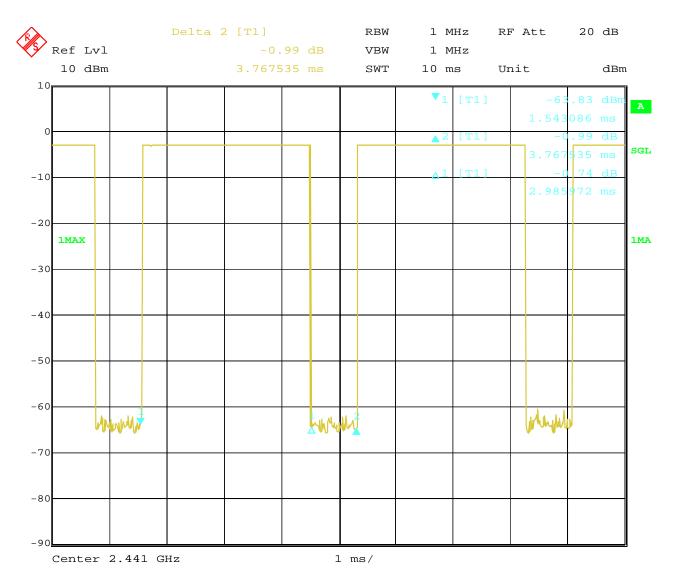
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Test Plots:

DH5



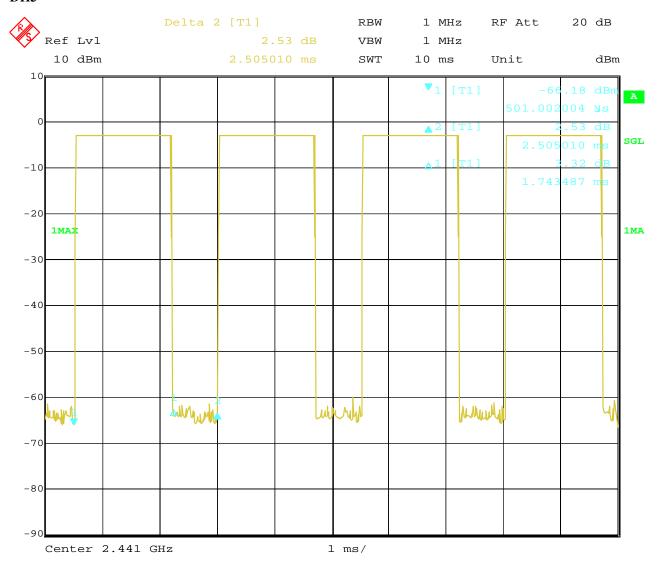
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DH3



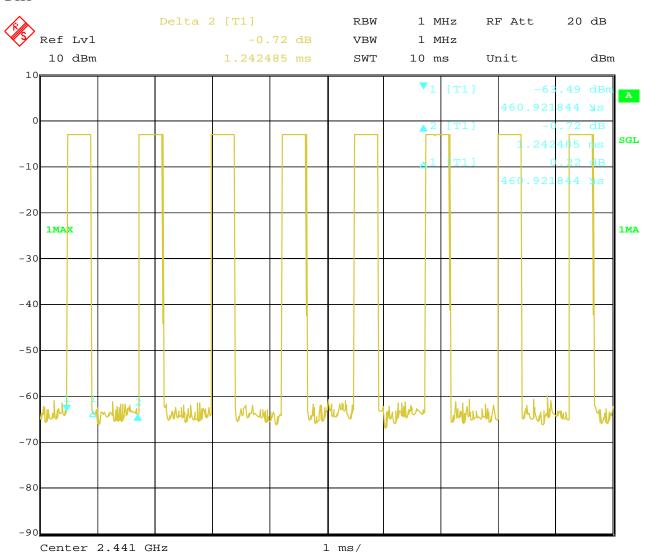
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DH1



13.SEP.2021 11:11:50 Date:

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Test Result

Type of Modulation: $\sqrt{1/4}$ DQPSK

EUT	Desk Lamp w	Desk Lamp with BT Speaker			99707	
Mode	Keep Tr	ansmitting	Input Voltage	1	120V~	
Temperature	24 d	24 deg. C,		5	6% RH	
Channel	Reading	Hoping	g Rate	Actual	Limit	
	2DH5					
Middle	2.986ms	266.667 hop/s		0.319s	0.4s	
	2DH3					
Middle	1.723ms	400 hop/s		0.276s	0.4s	
2DH1						
Middle	0.481ms	800 h	nop/s	0.154s	0.4s	

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

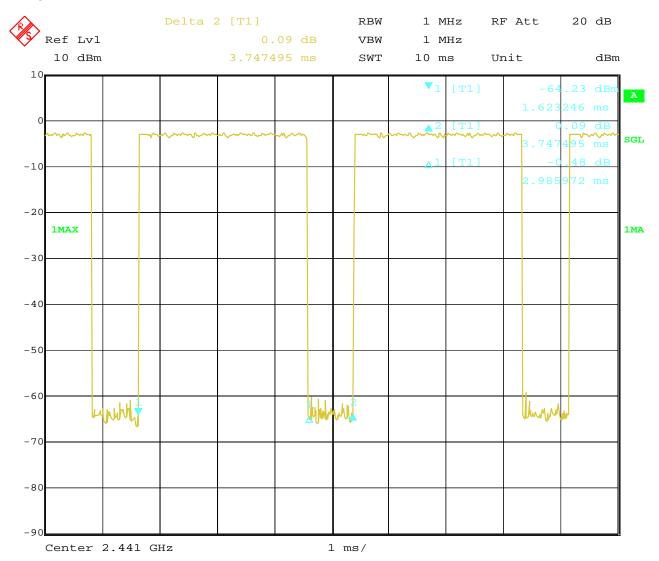
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Test Plots:

2DH5

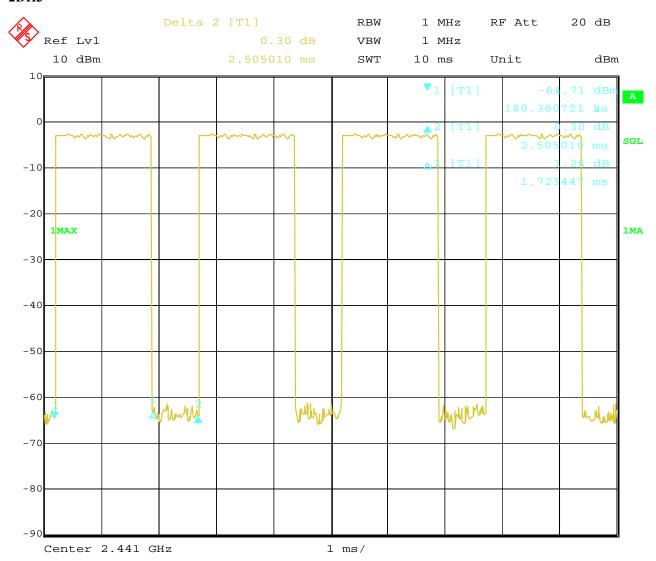


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2DH3



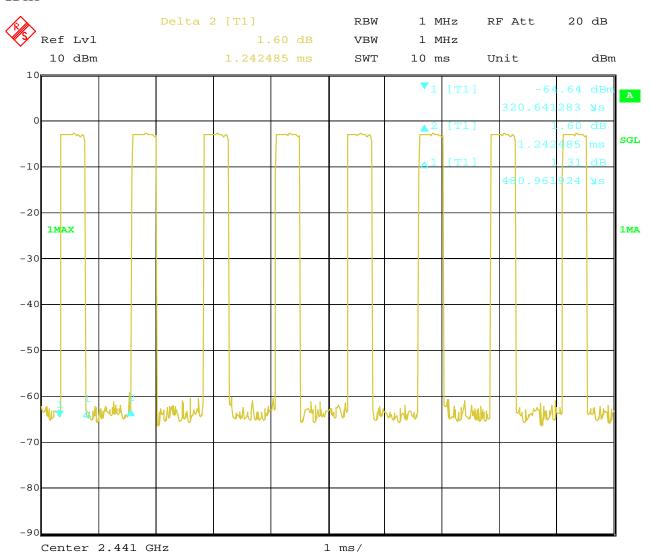
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2DH1



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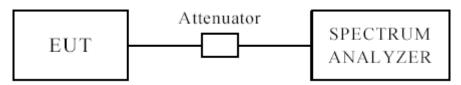
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12 Out of Band Measurement

12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=100kHz, VBW=300 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

2. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

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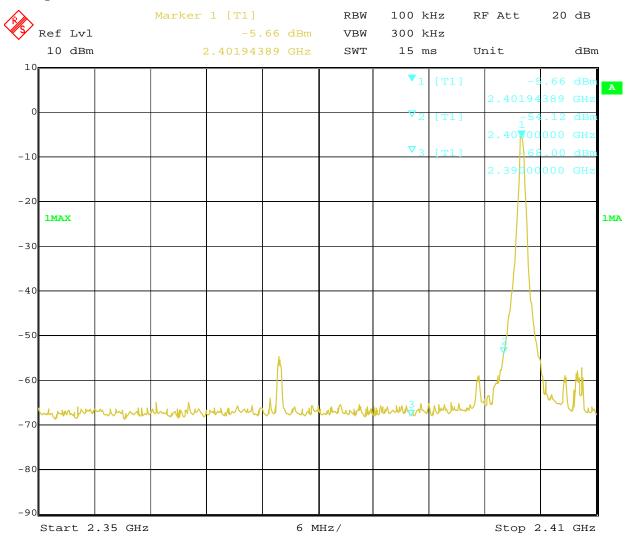


Type of Modulation: GFSK

Band Edge Test Result 12.4

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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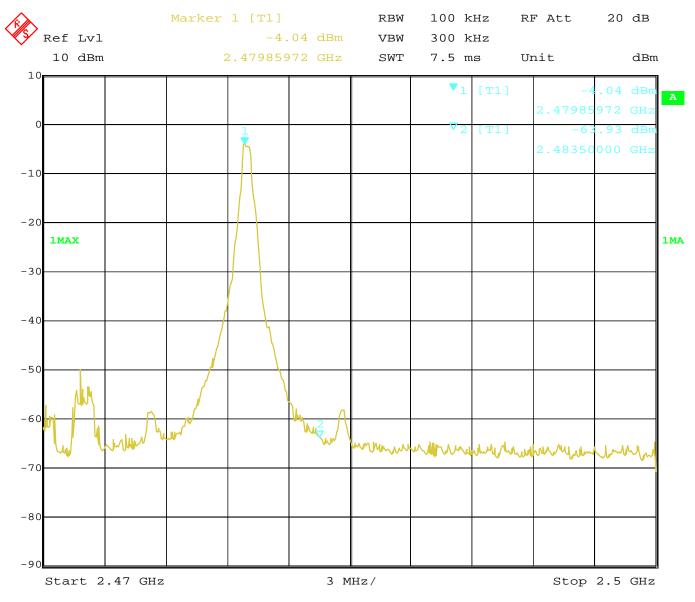


Type of Modulation: GFSK

12.4 Band Edge Test Result

-				
	Product:	Desk Lamp with BT	Test Mode:	99707
		Speaker		
	Mode	Keeping Transmitting	Input Voltage	120V~
	Temperature	24 deg. C,	Humidity	56% RH
	Test Result:	Pass	Detector	PK

Test Figure:



Date: 13.SEP.2021 10:32:40

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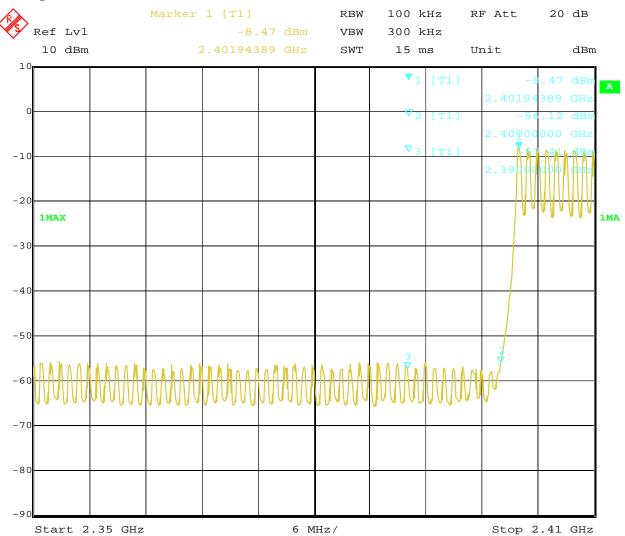


Type of Modulation: GFSK

Band Edge Test Result

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



13.SEP.2021 17:35:57 Date:

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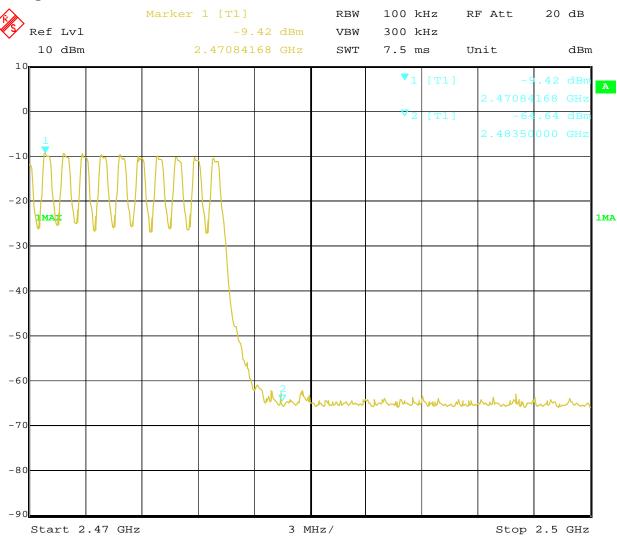
Type of Modulation: GFSK

Band Edge Test Result

Report No.: TW2109102E

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



13.SEP.2021 17:29:05 Date:

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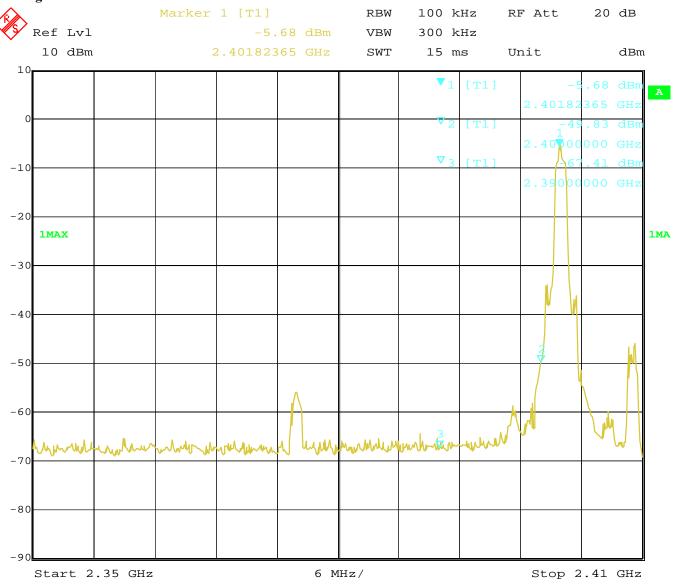


Type of Modulation: Л/4DQPSK

Out of Band Test Result 12.4

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



13.SEP.2021 10:33:46 Date:

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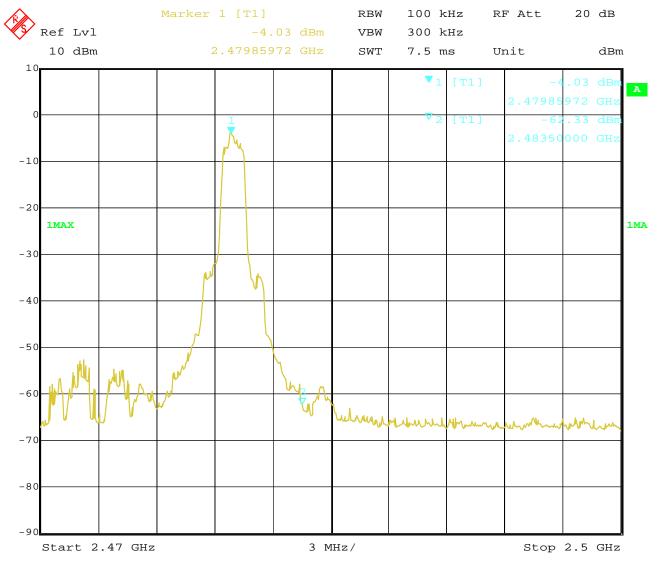


Type of Modulation: Л/4DQPSK

Band Edge Test Result 12.4

Product:	Desk Lamp with BT Speaker	Test Mode:	99707
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 13.SEP.2021 10:31:03

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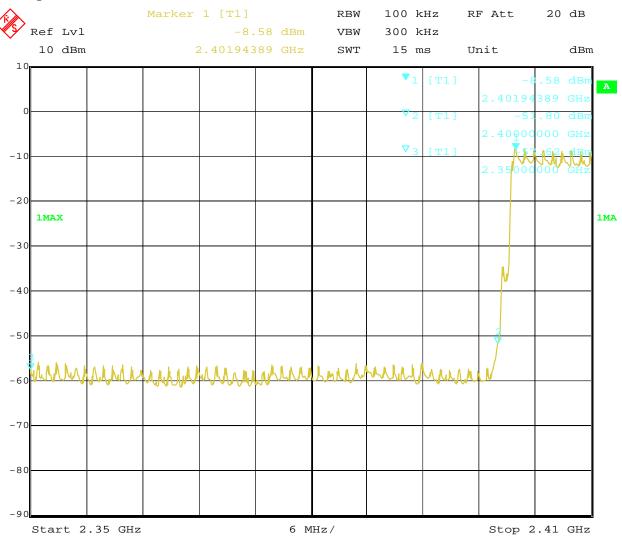


Type of Modulation: Л/4DQPSK

Out of Band Test Result

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



11.SEP.2021 Date: 17:02:18

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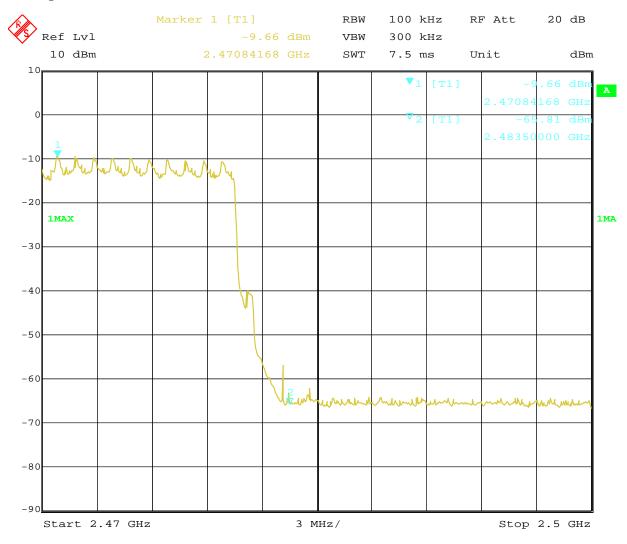


Type of Modulation: Л/4DQPSK

Out of Band Test Result

Product:	Desk Lamp with BT	Test Mode:	99707
	Speaker		
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



13.SEP.2021 17:07:28 Date:

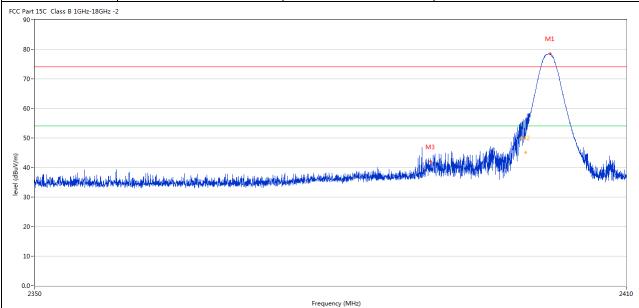
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12.4 Restrict Band Measurement

EUT	Desk Lamp with BT	Model	99707
	Speaker		
Mode	Keep Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Modulation Type	Л/4DQPSK



No.	Frequency	Results	Factor	Limit	Over	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	Limit (dB)			(cm)		
2	2399.680	56.27	-3.57	74.0	-17.73	Peak	156.00	100	Horizontal	Pass
2**	2399.680	45.12	-3.57	54.0	-8.88	AV	156.00	100	Horizontal	Pass
3	2389.975	42.00	-3.53	74.0	-32.00	Peak	147.00	100	Horizontal	Pass

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12.4 Restrict Band Measurement

]	EUT	Desk La	mp with l	BT Speaker		Model			99707	
N	Mode	Kee	ep Transn	nitting	Inp	ut Voltage			120V~	
Tem	perature		24 deg.	C,	I.	Iumidity			56% RH	
Test	t Result:		Pass		Mod	ulation Typ	ne e	Л	/4DQPSK	
C Part 15C	Class B 1GHz-18GHz	-2								
80-									M1	
70-										
60-									$/ \setminus$	
								M2	/	
							140	IVIZ	-	
50-							M3			
	المال ورا المالية المالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والم	والمعادمة المراجعة المعادلة والمعادلة والمعادل				karife ^{il} i karafeli kundlund	M3		Nagli shi	
50- 40- 30-	Marin Ma	Magazanda Waghin, da kanpi tark				indicated the second of the se	M3		Mapliodis	ndhibighnishlici
40-	Marin Ma	officer was the block of the best of the b				naid ^{all} haddhidhadhad	M3		No.	addy hydrolydd Ll
40-	halikat dalah katalan dalah katalah ka	oft, and stay to be a beauty of a conference of		i dalam d		المعالمة الم	M3	Handay Handston	Mayburta	aldyddiddiddiddi
30-	hillion de la companya de la company	nth and analysis blood blood beauth and the single strain		inglesta peterbasik salah s		haid ^{all} haidhidhadhad	M3	Hand the latest	Maybell	ndhjulphinadija s
30-	with the state of	official mediated blood blood blood of mediate from				nacifeli ka aftirina lina il	M3	HARPINA MARIAN	Maydontal	ndhjulghrishijad
30-	halfarin Maria karang manan binga	ath day in and the filter beauth of early the first	Harakiya da kada da ka		Frequency (MHz)	Marifeld Land Africal Design	M3	Manager Property of the Control of t	Napl Mark	2410
30- 20- 10-	Frequency	Results	Factor	Limit	ili a falini a sanininini (a sa	Detector	Table (o)	Height	ANT	2410 Verdict
30- 20- 10- 2350	Frequency (MHz)	Results (dBuV/m)	The Control of the State of the	Afficie de la companya	Frequency (MHz)	her (Mil)	Table (o)		ANT	1
30- 20- 10- 2350			Factor	Limit	Frequency (MHz)	her (Mil)	Table (o) 99.00	Height	ANT Vertical	1

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Dogtmint Dand Mangumamant

2.4	Restrict B									
	EUT	Desk	Lamp w	ith BT	M	odel			99707	
			Speaker	ſ						
	Mode	Keej	Transm	nitting	Input	Voltage			120V~	
Ter	mperature		24 deg. (Ξ,	Hur	nidity			56% RH	
Tes	st Result:		Pass		Modula	tion Type		J	∏/4DQPSK	
C Part 15	5C Class B 1GHz-18GHz	-2					•			
30										
80-			· · · · · · · · · · · · · · · · · · ·							
70-										
			√	\						
			1	\						
60-										
50-	dis	kildirmilli		1	.					
50-				W.		المالم المراجع والمراجع	Miles and Jane I house of		a Markahiti .	
50-					The same of the sa	Marin de puis de plate	Maratasali da melaphap sad		anium, wan dan different filologischen der	manishana dipundak
						Makeuman ji ili Aglid	Maratinaphy de malphys soci	hat his hard popular english	animonomo dinaktiyotik pilikhandarda	man sistem of front his
50-						diametrial high	the analysis of the said	had history of history of his	haineanin diseAlfred Afrikabinda	ne skordyský
30-					Water Mills			had beid on the philips with philips	hadan saka di kadalah pelah pelah kada saka pelah	na iday diyahi
50- 40- 30-							Maranaga da malajanga sad	had history of the resident	interview dan Alfred Afrika biraka	an shored to be
30- 20- 10-					2483.5			had high an fra phyllocethydd y	hadayarin dinaddiyddiyddigadigadigad	
50- 30- 20-					2483.5 Frequency (MHz)		Maranaga da malajangi sud	had hadan for stoler and place	interpretation of the part of the filter being a	2500
30- 20- 10-	Frequency	Results	Factor	Limit		Detector	Table (o)	Height	ANT	
30- 20- 10- 2470		Results (dBuV/m)	Factor (dB)	Г	Frequency (MHz)	Detector				2500

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Restrict Band Measurement 12.4

-	EUT	Desk	Lamp wit	th BT	Mo	odel			99707	
			Speaker							
1	Mode	Keep	Transmi	tting	Input '	Voltage			120V~	
Tem	nperature	2	24 deg. C,	,	Hun	nidity			56% RH	
Test	t Result:		Pass		Modulat	ion Type		Л	/4DQPSK	
C Part 15C	Class B 1GHz-18GHz	-2								
80-										
70-			No	m						
			4/1	T.						
60-			/'							
60-				M.						
50-		اللهن	Martilla radia	Mark Market						
50-	najiriddi ladiisda differd (m	landria de distribuis de la filipida	Howard and the second	A DOME	h Anna Aldre de Lange (1) de	1.11,3.40 1.40 1.40 1.10 (1.10 1.10 1.10 1.10 1.10 1.10 1.			Ashilanh Ludyyddd yr	Mental Address
50-	region destauration extinguistic ex	hardan de dyspensykelle (18 ⁹⁸	Hertisk and the second	The state of the s	kapalalajakanatia		ababah Jarish dhaliadh	ukuntikanagishaph	A philipse in the party of the	Affighangal di jabbi piylin
50-	te girir delik gadisələr ediliylər ediliylər	lyndiau de dyspinosydd ff ff di	divida de la companya	The same of the sa	Kampilal philosophila	dell of the state of the state of	ababah Jarish dhahail	ukhan Nanangalangh	fallkaint yaydullaki	Alphonist arbite
50-	e gjorddyd gwlaed a chiff a chiff a ch	apropries, de de populações per de de la propries d	Hirthorn Co.	The state of the s	tinaple philosoph brown the		ababilit firestrobalisal	adionilistications by	Kahilanind nyanindali pohi	atiphonist deligita
50 - 40 -	region destantes est the policy or	hardina da da parte a principal de la principa	HWH A		Kanadaliphiniph lamatha	dell of the state	abalisto lateratuation	nderfelter bet finderfe	A philipse had been a second and the	All Address of the Ad
30- 20-	te gjirriddigd gwlaith a e diffrie y de d'e e	aproprieta de la descripció de la la descripció de la la descripció de la la descripció de la la descripció de	WWW A	The state of the s	Kangalan kangalangan King		abaligh fireshed aliqui	akinikatikapulaph	Kahileeninkkyssyndyskyphi	atiphonist addysta
50- 50- 30- 20-	kegirin dajalgan international july land de	hardwarde dipetator pet the light	Wirth Control of the	2	483.5 Frequency (MHz)		abaligh lationed a steel	adoministrative productive produc	Kahilanind nyanjihida jahl	2500
30- 20-	Frequency	Results	Factor	Limit	483.5 Frequency (MHz)	Detector	Table (o)	Height	ANT	2500
30- 20- 10- 2470	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	T	Frequency (MHz)	Detector	Table (o)	Height (cm)	ANT	1

Note: 1. For Restricted band test, only the worst case was reported and $\pi/4$ DQPSK was the worst case

2. The measured PK radiated emissions level less than the AV limit, so no necessary to take down the AV result

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13.0 Antenna Requirement

13.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected constructions

PCB antenna used. The gain is -0.58dBi.

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14.0 FCC ID Label

FCC ID: 2A2WN-99707

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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15.0 **Photo of testing**

Conducted Test Setup:



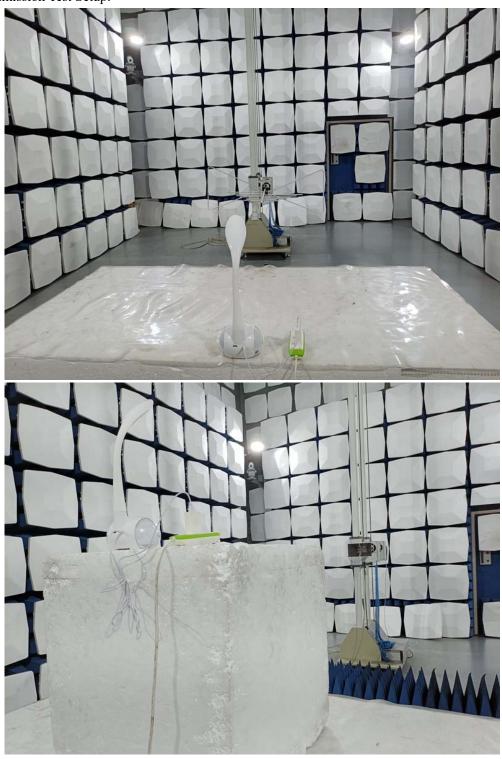
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Radiated Emission Test Setup:



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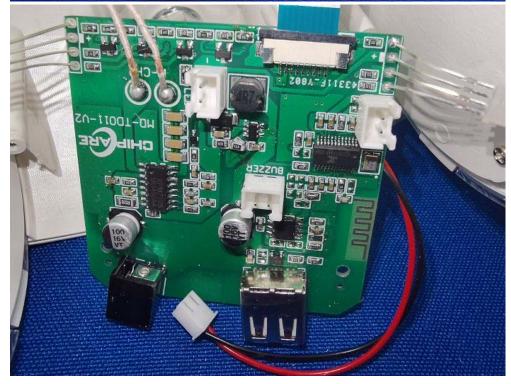
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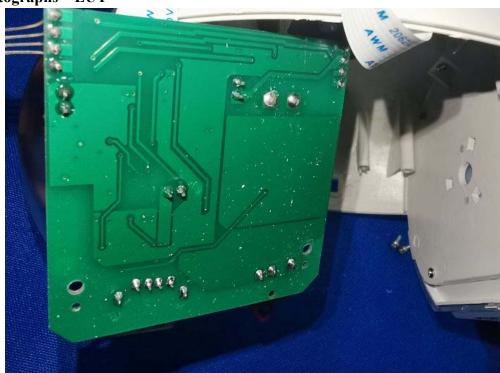
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End of Report