

Report No.: File reference No.:	FCC 2005221 2020-06-09
Applicant:	Shenzhen SKY DRAGON Audio-video Technology Co.,LTD
Product:	Bluetooth Soundbar
Model No.:	SR319B, ITB490B
Trademark:	SAMESAY, CKY
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	
Jack Chung	

Manager

Dated:

June 09, 2020

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



## **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 Content

1.0	General Details	4
1.1	Test Lab Details	4
1.2	Applicant Details	4
1.3	Description of EUT	4
1.4	Submitted Sample	5
1.5	Test Duration	5
1.6	Test Uncertainty	5
1.7	Test By	5
2.0	List of Measurement Equipment	6
3.0	Technical Details	7
3.1	Summary of Test Results	7
3.2	Test Standards	7
4.0	EUT Modification	7
5.0	Power Line Conducted Emission Test	8
5.1	Schematics of the Test	8
5.2	Test Method and Test Procedure	8
5.3	Configuration of the EUT	8
5.4	EUT Operating Condition	9
5.5	Conducted Emission Limit	9
5.6	Test Result	9
6.0	Radiated Emission test	12
6.1	Test Method and Test Procedure	12
6.2	Configuration of the EUT	12
6.3	EUT Operation Condition	12
6.4	Radiated Emission Limit	13
7.0	20dB Bandwidth	25
8.0	Maximum Output Power	37
9.0	Carrier Frequency Separation	50
10.0	Number of Hopping Channel	60
11.0	Time of Occupancy (Dwell Time)	64
12.0	Out of Band Measurement	71
13.0	Antenna Requirement	87
14.0	FCC ID Label	88
15.0	Photo of Test Setup and EUT View	89

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#### 1.0 General Details

#### Test Lab Details 1.1

SHENZHEN TIMEWAY TESTING LABORATORIES. Name : Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Address: Village, Nanshan District, Shenzhen, China Telephone: (755) 83448688 Fax: (755) 83442996 Site Listed with Federal Communications commission (FCC) Registration Number:744189 For 3m Anechoic Chamber Site Listed with Industry Canada of Ottawa, Canada Registration Number: IC: 5205A For 3m Anechoic Chamber

#### 1.2 Applicant Details

Applicant:	Shenzhen SKY DRAGON Audio-video Technology Co.,LTD
Address:	Building 16, Laneway 3, Liuxian 2RD, District 71, Bao'an, Shenzhen, Guangdong, China
Telephone:	18666229862
Fax:	

## 1.3 Description of EUT

Product:	Bluetooth Soundbar		
Manufacturer:	Shenzhen SKY DRAGON Audio-video Technology Co.,LTD		
Address:	Building 16, Laneway 3, Liuxian 2RD, District 71, Bao'an, Shenzhen, Guangdong,		
	China		
Brand Name:	SAMESAY		
Model Number: SR319B			
Additional Model Number: ITB490B			
Additional Brand Name: CKY			

GFSK, J/4DQPSK, 8DPSK for Bluetooth
2402-2480MHz for Bluetooth
1MHz for Bluetooth
By software
79 channels for Bluetooth
PCB antennas used. The gain of the antennas is 1.2dBi
DC18V, 1.5A
Model: JDA0301800150WUS;
Input: 100-240V~, 50/60Hz, 0.8A; Output: DC18.0V, 1.5A

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Bluetooth Version:5.0Hardware Version:V2.0Software Version:14\_SR-319B\_ (ITB490) \_SP7D5F8C4E(VA)

- 1.4 Submitted Sample: 1 Samples
- 1.5 Test Duration 2020-05-11 to 2020-06-08
- 1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB 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	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2019-06-21	2020-06-20
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2019-06-21	2020-06-20
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2019-06-21	2020-06-20
Loop Antenna	EMCO	6507	00078608	2020-06-20	2020-06-20
Spectrum	R&S	FSIQ26	100292	2019-06-21	2020-06-20
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2019-06-21	2020-06-20
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08
Power meter	Anritsu	ML2487A	6K00003613	2019-08-22	2020-08-21
Power sensor	Anritsu	MA2491A	32263	2019-08-22	2020-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03
9*6*6 Anechoic			N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2019-06-21	2020-06-20
EMI Test Receiver	RS	ESH3	860904/006	2019-06-21	2020-06-20
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2019-06-21	2020-06-20
Spectrum	HP/Agilent	E4407B	MY50441392	2019-06-21	2020-06-20
Spectrum	RS	FSP	1164.4391.38	2020-01-16	2021-01-15
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA		2019-06-21	2020-06-20
RF Cable	Zhengdi	7m		2019-06-21	2020-06-20
RF Switch	EM	EMSW18	060391	2019-06-21	2020-06-20
Pre-Amplifier	Schwarebeck	BBV9743	#218	2019-06-21	2020-06-20
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2019-06-21	2020-06-20
LISN	SCHAFFNER	NNB42	00012	2020-01-07	2021-01-06

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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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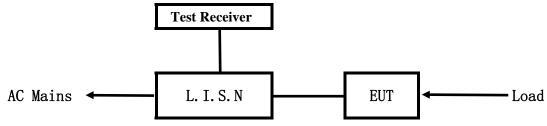
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adopt any other remedies which may be appropriate.



#### 5. Power Line Conducted Emission Test

5.1 Schematics of the test

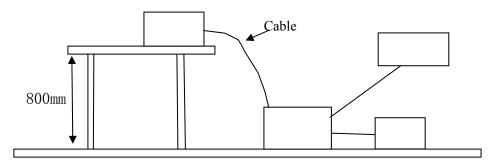


EUT: Equipment Under Test

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
Diveteeth Severaliser	Shenzhen SKY DRAGON Audio-video	SR319B,	
Bluetooth Soundbar	Technology Co.,LTD	ITB490B	ZJP-SR319B

#### B. Internal Device

Device	Manufacturer	Model	Rating

#### C. Peripherals

Device	Manufacturer	Model	Rating

### 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

		0	,,,	
Frequency	Class A Limits (dB µ V)		Class A Limits (dB µ V) Class B Limits (dB µ V)	
(MHz)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
$0.15~\sim~0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*
$0.50~\sim~5.00$	73.0	60.0	56.0	46.0
$5.00 \sim 30.00$	73.0	60.0	60.0	50.0

#### 5.5 Power line conducted Emission Limit according to Paragraph 15.107,15.207

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

2. The tighter limit shall apply at the transition frequencies

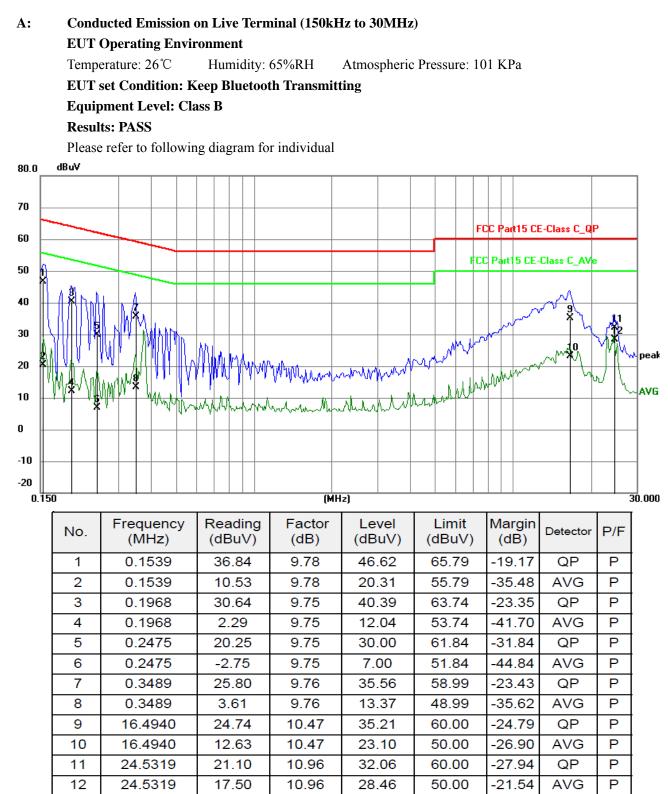
#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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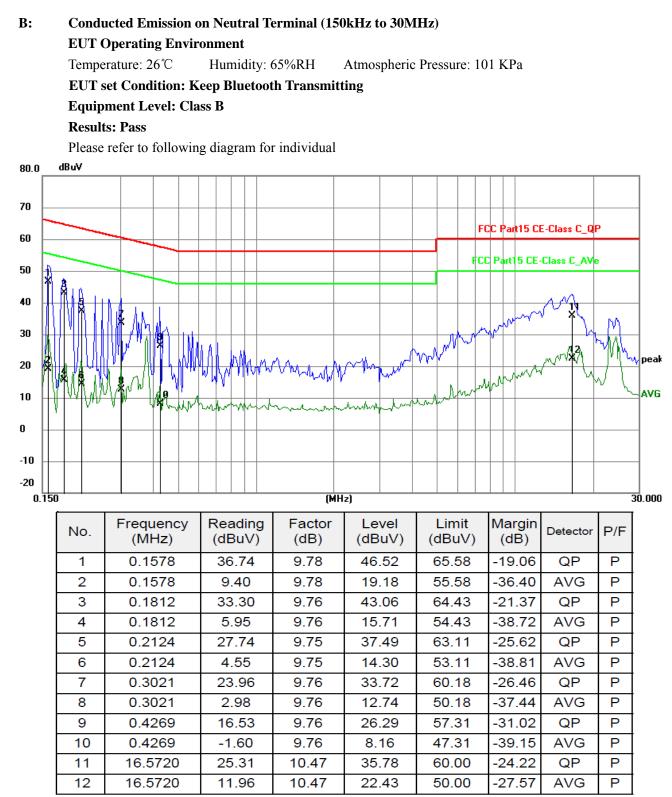




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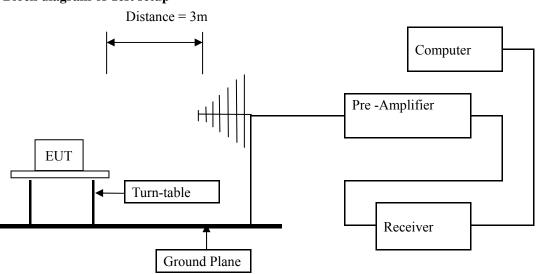
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#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- 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

- 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 $\mu$ 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. GFSK was the worse 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

**Results:** 

Pass

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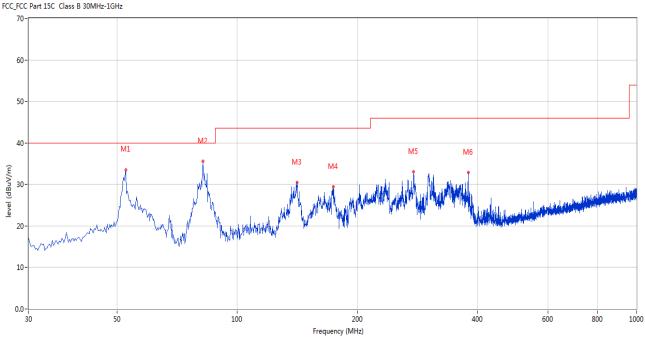
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Test Figure:

Η



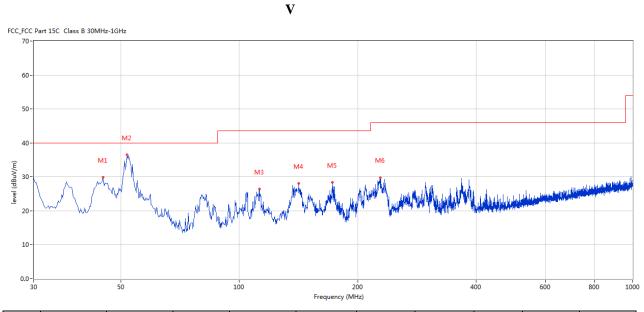
No.	Frequency	Results	Factor (dB)	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(o)	(cm)		
1	52.547	33.55	-11.46	40.0	-6.45	Peak	360.00	200	Н	Pass
2	82.124	35.58	-17.17	40.0	-4.42	Peak	16.00	200	Н	Pass
3	141.037	30.52	-17.26	43.5	-12.98	Peak	337.00	200	Н	Pass
4	173.767	29.45	-15.88	43.5	-14.05	Peak	39.00	200	Н	Pass
5	276.318	33.04	-11.61	46.0	-12.96	Peak	360.00	200	Н	Pass
6	378.628	32.92	-9.29	46.0	-13.08	Peak	125.00	100	Н	Pass

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Test Figure:



No.	Frequency	Results	Factor	Limit	Over	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	Limit (dB)			(cm)		
1	45.031	29.86	-11.41	40.0	-10.14	Peak	360.00	200	V	Pass
2	51.820	36.48	-11.42	40.0	-3.52	Peak	24.00	100	V	Pass
3	112.429	26.46	-13.91	43.5	-17.04	Peak	114.00	100	V	Pass
4	141.522	28.06	-17.28	43.5	-15.44	Peak	180.00	100	V	Pass
5	172.312	28.40	-15.94	43.5	-15.10	Peak	24.00	100	V	Pass
6	228.073	29.79	-12.77	46.0	-16.21	Peak	142.00	100	V	Pass

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Operation Mode: Transmitting under Dow Chamiler (240214112)											
Frequency (MHz)	Level@3m (dBµV/m)	Antenna Polarity	Limit@3m (dB µ V/m)								
4804		Н	74(Peak)/ 54(AV)								
4804		V	74(Peak)/ 54(AV)								
7206		H/V	74(Peak)/ 54(AV)								
9608		H/V	74(Peak)/ 54(AV)								
12010		H/V	74(Peak)/ 54(AV)								
14412		H/V	74(Peak)/ 54(AV)								
16814		H/V	74(Peak)/ 54(AV)								
19216		H/V	74(Peak)/ 54(AV)								
21618		H/V	74(Peak)/ 54(AV)								
24020		H/V	74(Peak)/ 54(AV)								

#### **Operation Mode: Transmitting under Low Channel (2402MHz)**

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

	Transmitting & under Anda		/
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ 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(AV)
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)

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

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:	Operation Mode: Transmitting under High Channel (2480MHZ)											
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ 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)									

#### **Operation Mode: Transmitting under High Channel (2480MHz)**

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

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

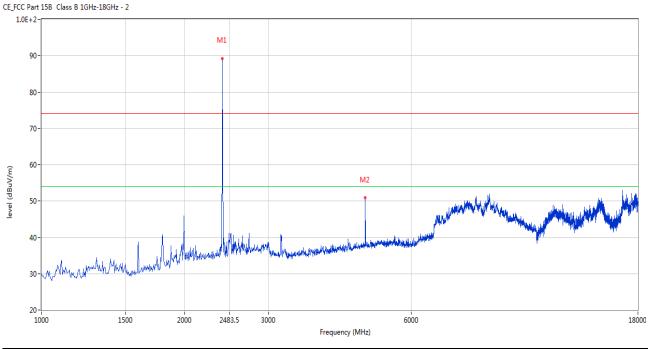
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adopt any other remedies which may be appropriate.



### Please refer to the following test plots for details:

#### Low Channel: Vertical



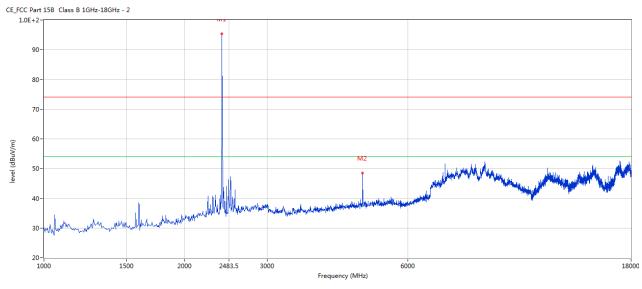
No.	Frequency	Results	Factor (dB)	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(o)	(cm)		
2	4802.799	50.88	3.12	54.0	-3.12	Peak	44.00	100	V	Pass

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#### Low Channel : Horizontal



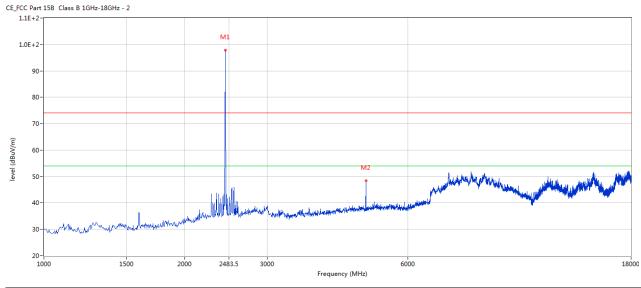
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4802.799	48.49	3.12	54.0	-5.51	Peak	325.00	100	Н	Pass

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#### **Middle Channel : Horizontal**



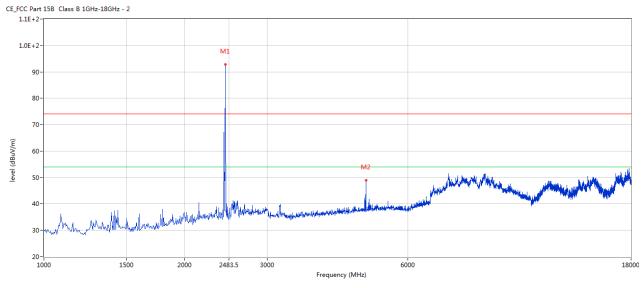
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4879.280	48.35	3.20	54.0	-5.65	Peak	194.00	100	н	Pass

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**Middle Channel : Vertical** 



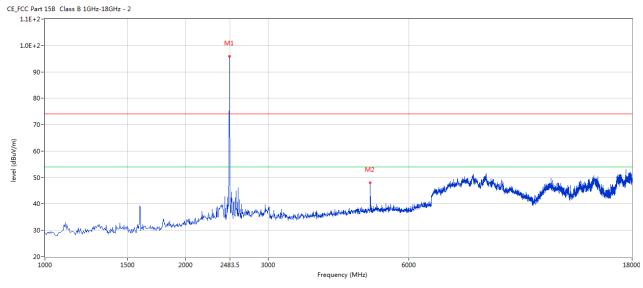
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4879.280	48.89	3.20	54.0	-5.11	Peak	38.00	100	V	Pass

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#### **High Channel : Horizontal**



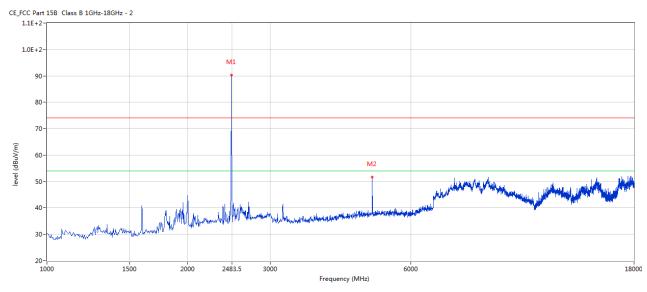
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4960.010	47.95	3.36	54.0	-6.05	Peak	186.00	100	Н	Pass

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No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4960.010	51.61	3.36	74.0	-22.39	Peak	69.00	100	V	Pass

Note: 1. The PK emission level less than the AV limit. No necessary to record the AV emission level. 2. For the radiated emissions above 18G and below 30MHz, it is the floor noise.

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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**

EUT	Blu	etooth Soundbar	Model	SR319B
Mode	Ke	ep Transmitting	Input Voltage	120V~
Temperat	ure	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass/ Fail
Low	2402	1072		Pass
Middle	2441	1043		Pass
High	2480	1048		Pass

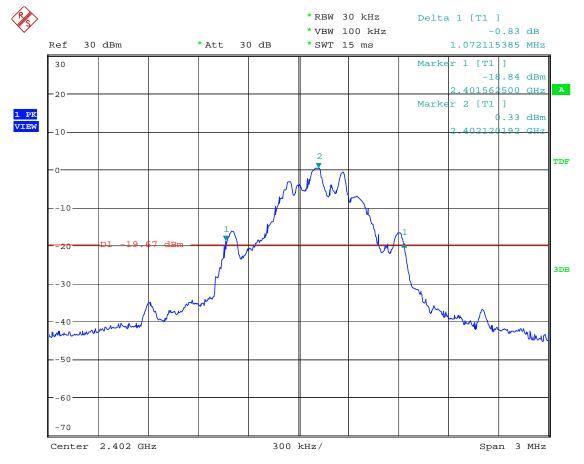
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### Test Figure:





Date: 14.MAY.2020 15:34:51

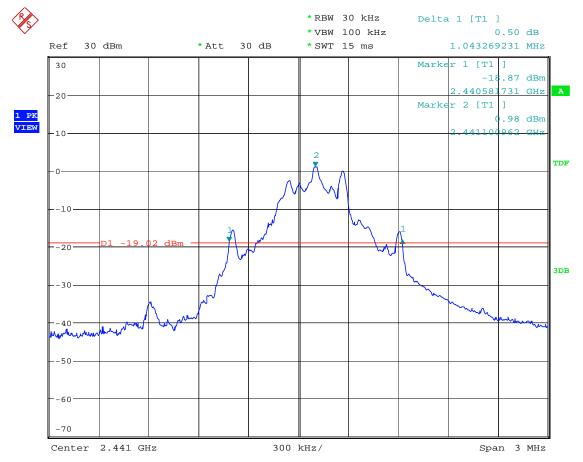
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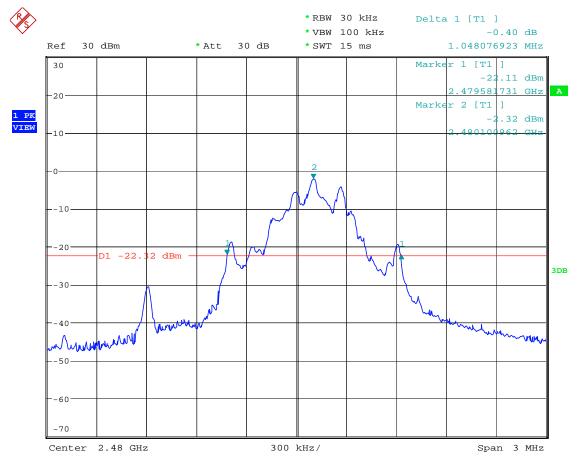
Date: 14.MAY.2020 15:36:57

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3. High Channel



Date: 15.MAY.2020 11:25:04

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# **Test Result**

## **Type of Modulation:** Л/4DQPSK

EUT	Blu	Bluetooth Soundbar		SR319B
Mode	K	Keep Transmitting		120V~
Temperat	ure	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1260		Pass
Middle	2441	1250		Pass
High	2480	1250		Pass

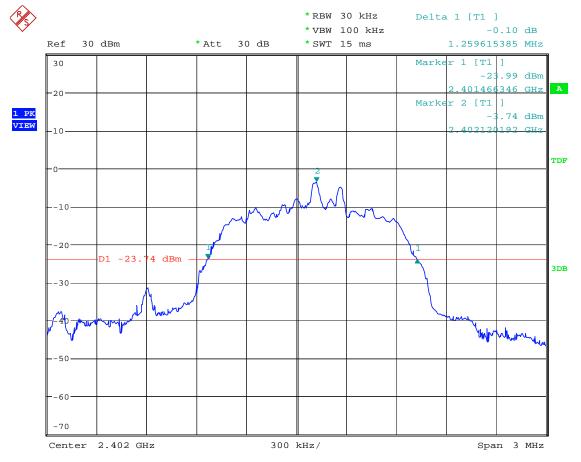
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#### Test Figure:





Date: 14.MAY.2020 15:46:11

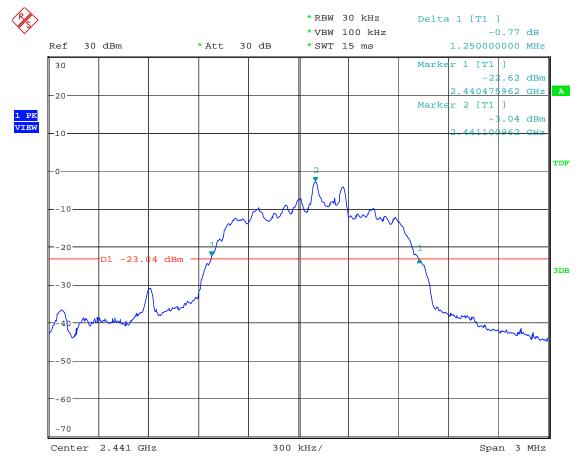
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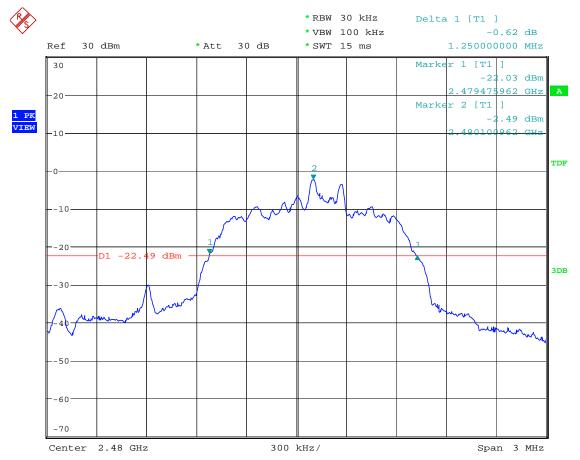
Date: 14.MAY.2020 15:44:24

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3. High Channel



Date: 14.MAY.2020 15:42:06

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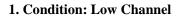
## **Test Result Type of Modulation: 8DPSK**

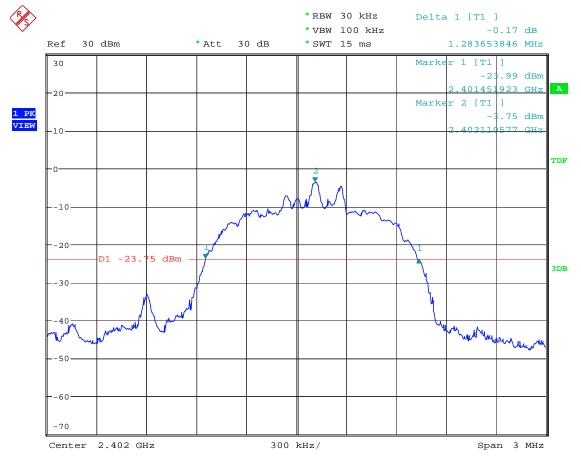
EUT	Bl	Bluetooth Soundbar		SR319B
Mode	K	Keep Transmitting		120V~
Temperat	ure	24 deg. C,		56% RH
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail
Low	2402	1284		Pass
Middle	2441	1269		Pass
High	2480	1269		Pass

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#### Test Figure:





Date: 14.MAY.2020 15:48:06

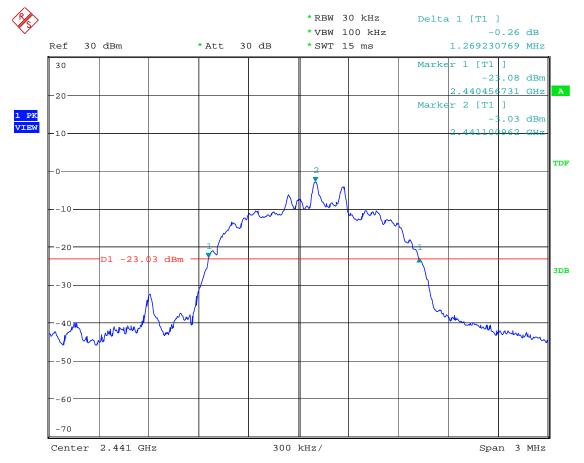
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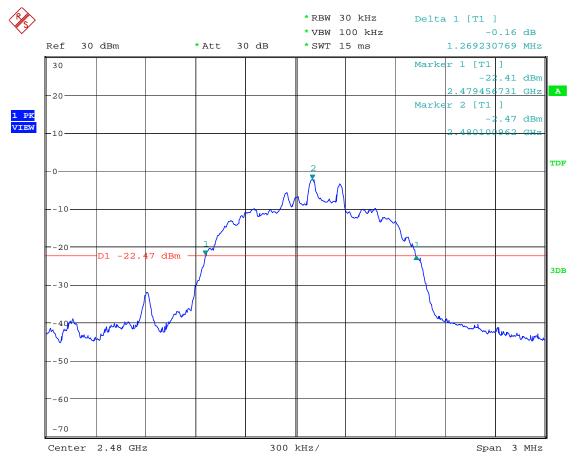
Date: 14.MAY.2020 15:50:03

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3. High Channel



Date: 14.MAY.2020 15:53:01

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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 or 21dBm.

## 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 = 3MHz, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW = 10MHz, RBW=3MHz;

Sweep = auot; 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	Bl	Bluetooth Soundbar			SR319B
Mode	K	Keep Transmitting			120V~
Temperature	e	24 deg. C, Humi		dity	56% RH
Channel	Channel Frequency (MHz)	Max. Power Output (dBm) Peak		Peak Power Limit (dBm)	Pass/ Fail
Low	2402	1.08		30	Pass
Middle	2441	1.68		30	Pass
High	2480	2.12		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

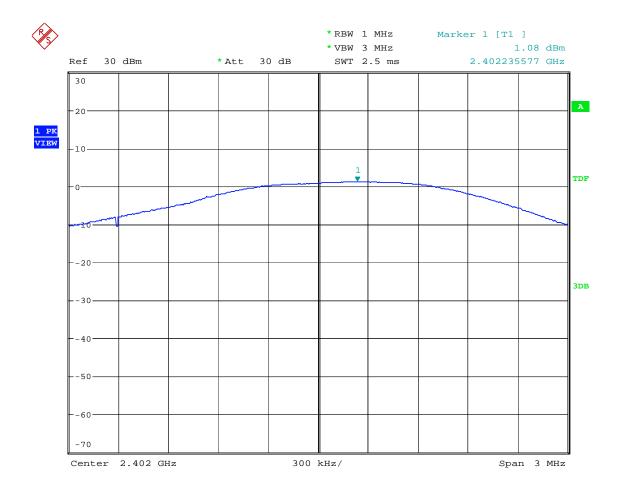
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## Test Figure: 1. Condition: Low Channel



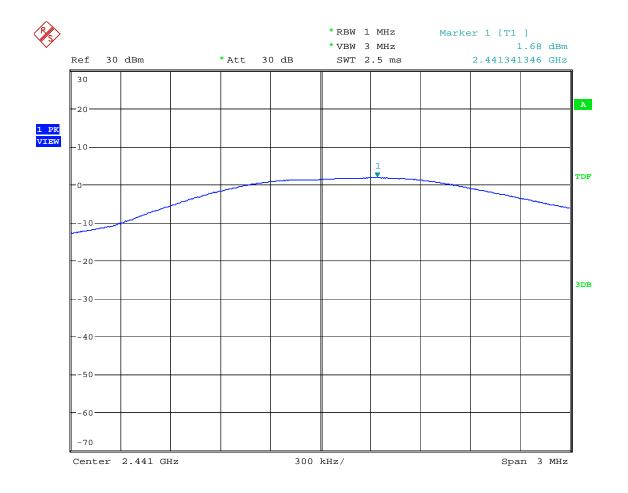
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#### 2. Condition: Middle Channel



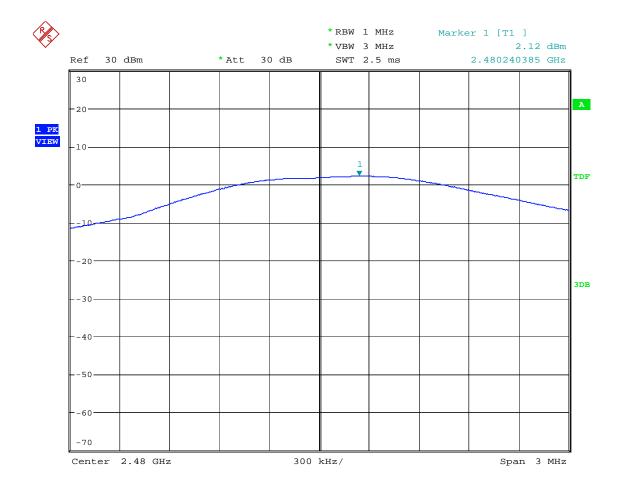
Date: 14.MAY.2020 16:06:31

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### 3. High Channel



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## **Type of Modulation:** Л/4DQPSK

EUT		Bluetooth Soundbar			el	SR319B
Mode		Keep Transmitting		Input Voltage		120V~
Temperature	e		24 deg. C, Humid		idity	56% RH
Channel	Channel Frequency		Max. Power Output (dBm	)	Peak Power	Pass/ Fail
Chaimer		(MHz)	Peak		Limit (dBm)	
Low		2402	-1.44		21	Pass
Middle		2441	-0.79		21	Pass
High		2480	-0.28		21	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

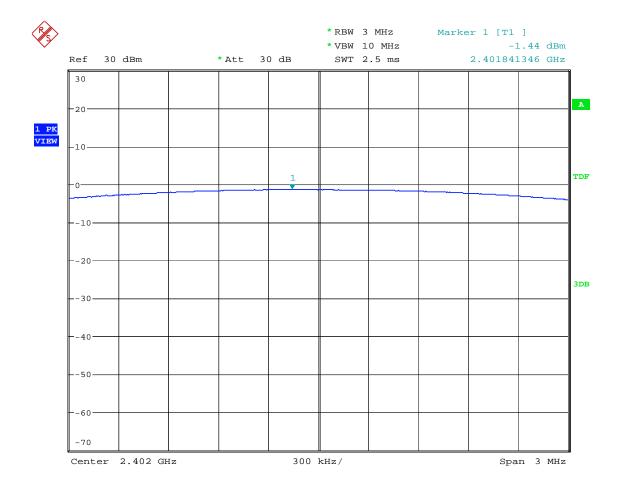
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# Test Figure: 1. Condition: Low Channel



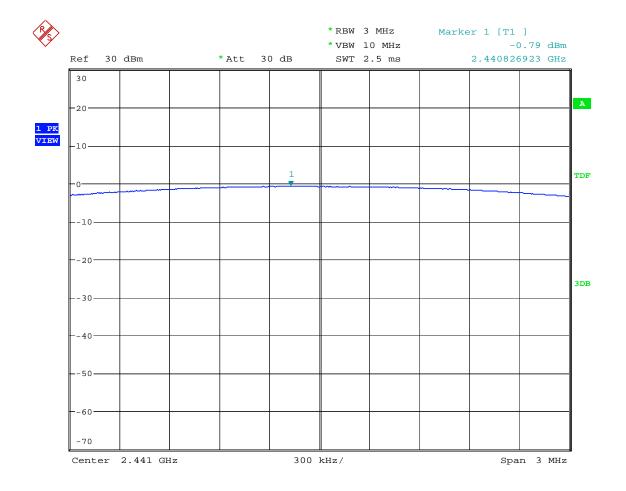
Date: 14.MAY.2020 16:11:23

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#### 2. Condition: Middle Channel



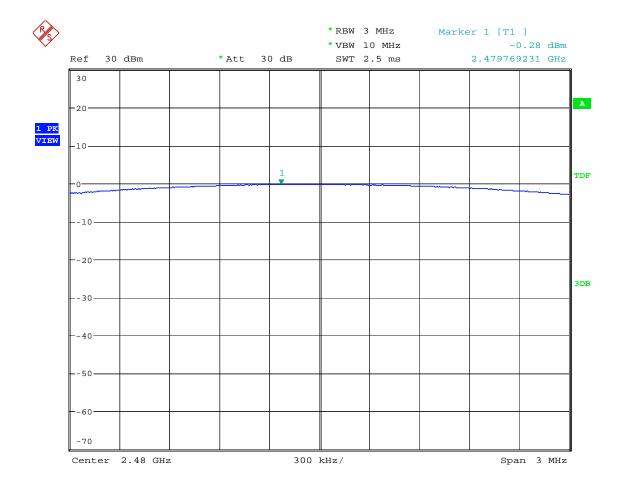
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### 3. High Channel



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**Type of Modulation: 8DPSK** 

EUT	Bh	Bluetooth Soundbar			SR319B
Mode	Ke	Keep Transmitting		it Voltage	120V~
Temperature	re 24 deg. C,		Hu	umidity	56% RH
Channel	Channel Frequency Max. Power Output (dBm		l)	Peak Power	Pass/ Fail
Chamiler	(MHz)	Peak		Limit (dBm)	
-0.80	2402	-0.98		21	Pass
-0.03	2441	-0.31		21	Pass
High	2480	0.20		21	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

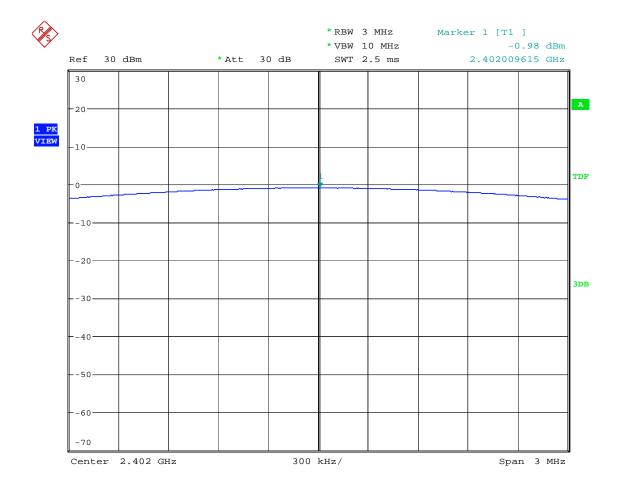
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## Test Figure: 1. Condition: Low Channel



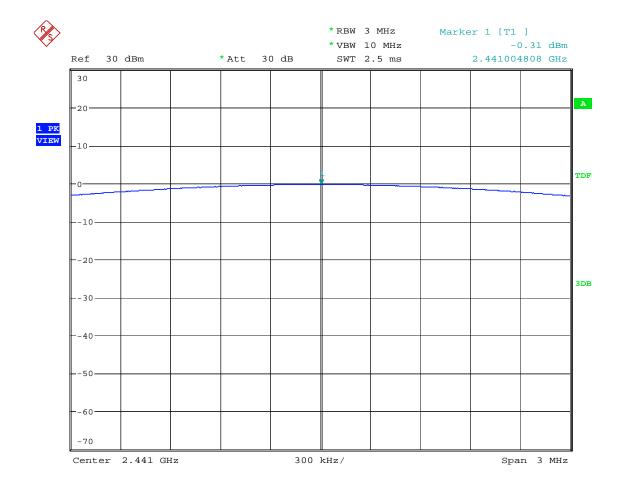
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#### 2. Condition: Middle Channel



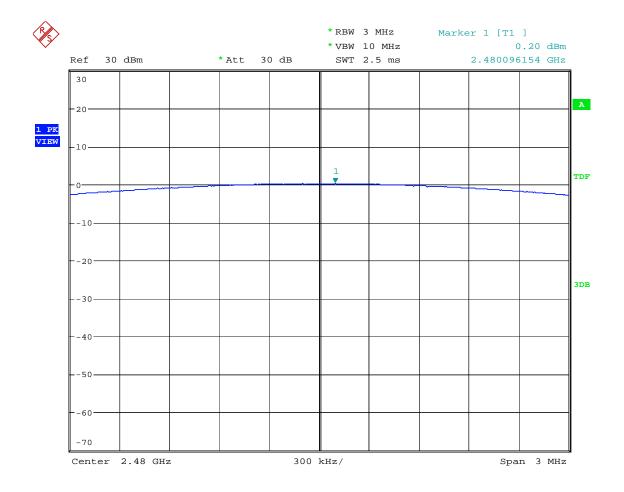
Date: 14.MAY.2020 16:14:47

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### 3. High Channel



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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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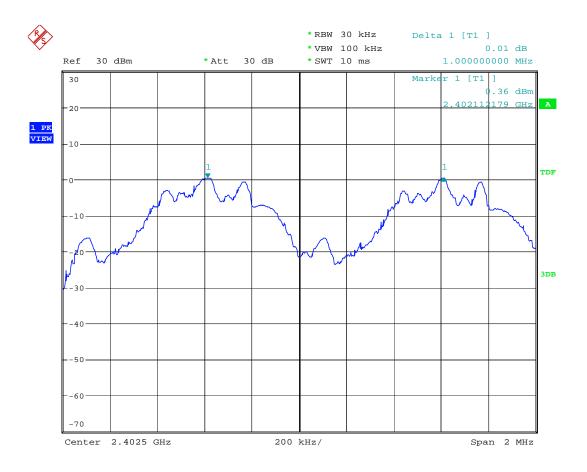
#### 9.4Test Result

#### **Type of Modulation: GFSK**

EUT	Bluetooth Sour	Model		SR319B	
Mode	Hopping O	Input Voltage		120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Carrier I	Frequency Separation		Limit		Pass/ Fail
	1MHz	$\geq$ 25 kHz or 2/3	3 of the 20 dB ban	dwidth	Pass

## **Test Plots**

#### 1. Condition: Low Channel



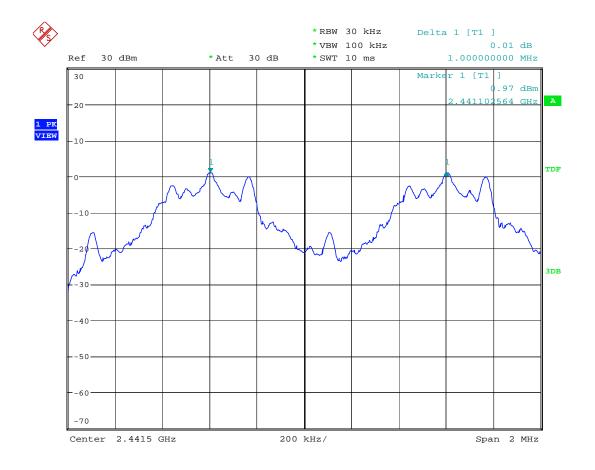
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#### 2. Condition: Middle Channel



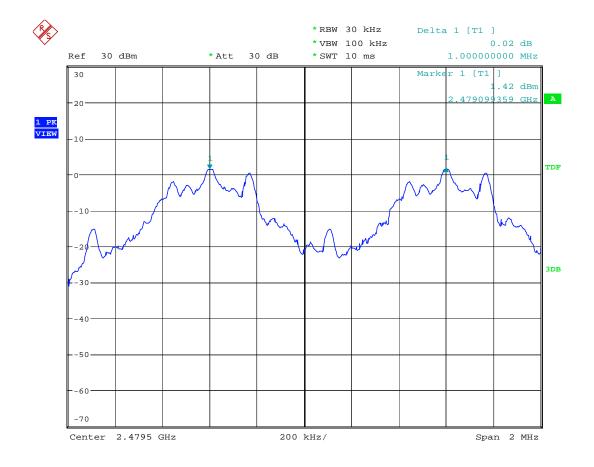
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### 3. High Channel



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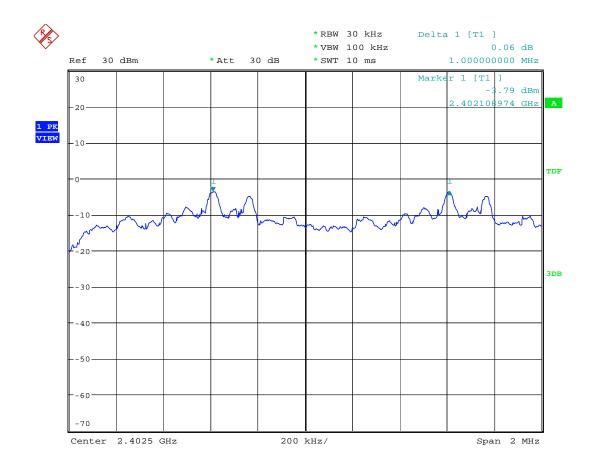


#### **Type of Modulation:** Л/4DQPSK

EUT	Bluetooth Sour	Model		SR319B	
Mode	Hopping O	Input Voltage		120V~	
Temperature	24 deg. C,		Humidity		56% RH
Carrier I	Frequency Separation		Limit		Pass/ Fail
	1MHz	$\geq 25$ kHz or 2	2/3 of 20 dB bandy	width	Pass

## **Test Plots**

#### 1. Condition: Low Channel



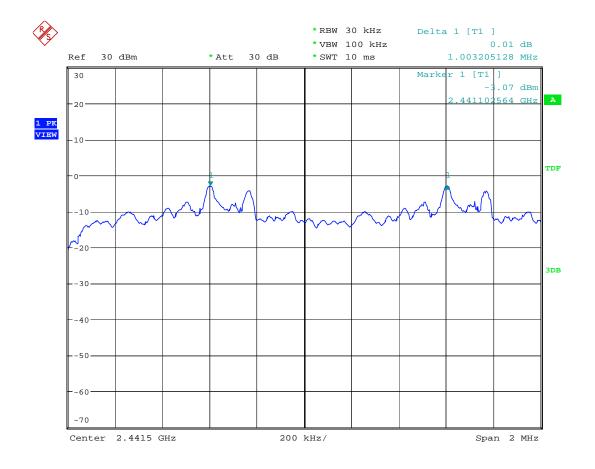
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#### 2. Condition: Middle Channel



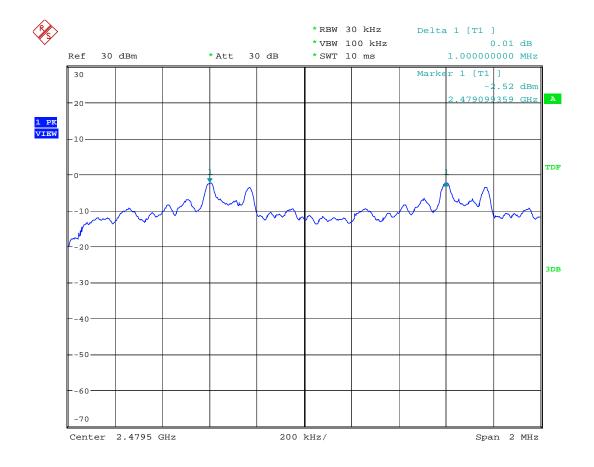
Date: 14.MAY.2020 15:21:28

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### 3. High Channel



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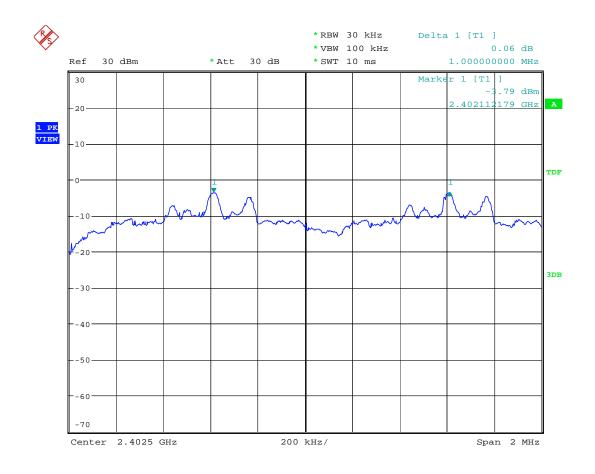


#### **Type of Modulation: 8DPSK**

EUT	Bluetooth Sour	Model		SR319B	
Mode	Hopping O	Input Voltage		120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Carrier I	Frequency Separation		Limit		Pass/ Fail
	1MHz	$\geq 25$ kHz or 2	/3 of 20 dB bandy	width	Pass

### **Test Plots**

#### 1. Condition: Low Channel



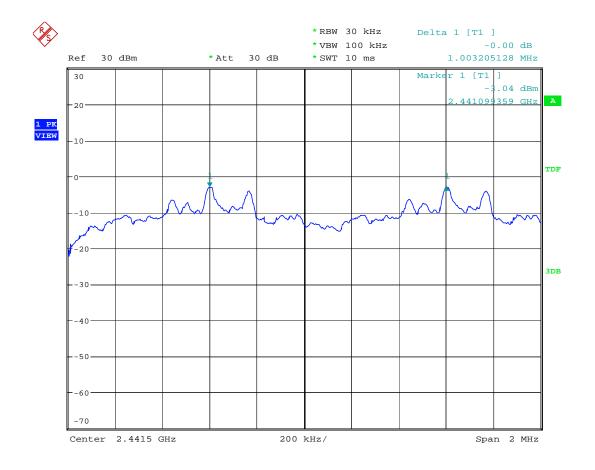
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#### 2. Condition: Middle Channel



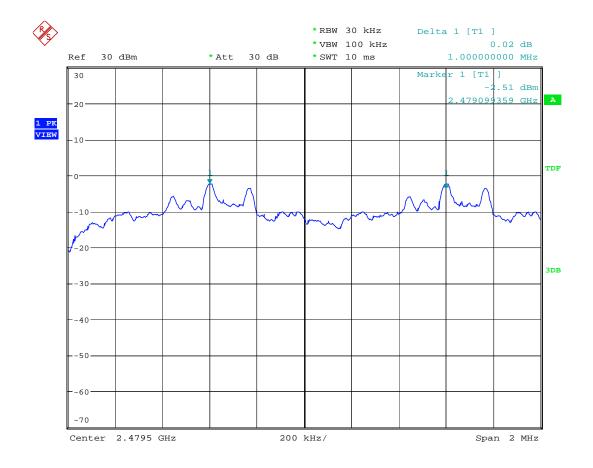
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### 3. High Channel



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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=1MHz, VBW=3MHz;

Sweep = auto; Detector function = peak; Trace = max hold

3. Record the number of hopping channels.

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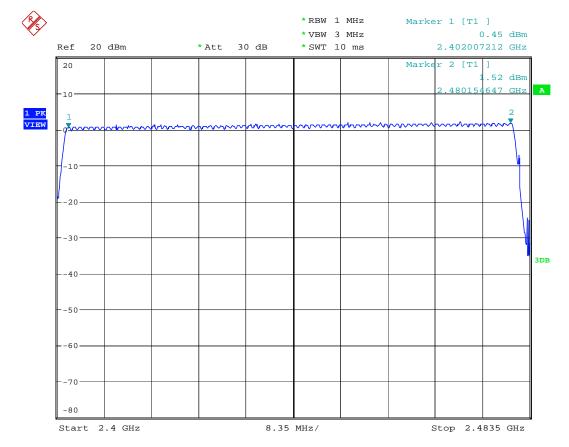


#### **10.4Test Result**

#### **Type of Modulation: GFSK**

EUT	Bluet	ooth Soundbar	Model		SR319B	
Mode	Н	opping On	Input Voltage		120V~	
Temperature	2	24 deg. C,	Humidity	56% RH		
Operating Frequency		Number of hop	ping channels	Limit	Pass/ Fail	
2402-2480MHz		79		≥15	Pass	

#### **Test Plot**



Date: 15.MAY.2020 11:22:09

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

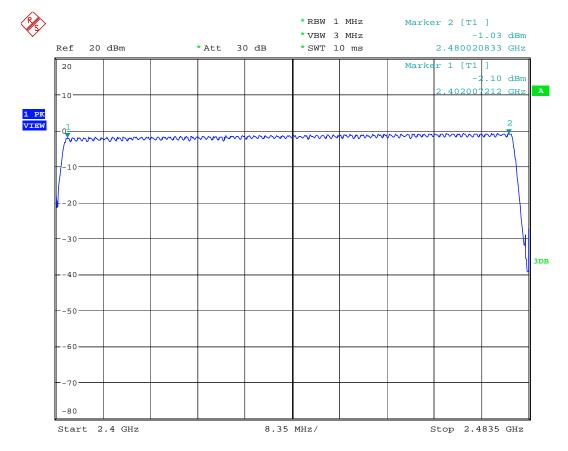
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#### **Type of Modulation:** Л/4DQPSK

EUT	Bluetooth Soundbar		Mode	el	SR319B		
Mode	Hopping On		Input Voltage			120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Operating Frequency		Number of hopping channels		Lir	nit	Pass/ Fail	
2402-2480MHz		79		$\geq 1$	15	Pass	

### **Test Plot**



Date: 15.MAY.2020 11:20:58

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

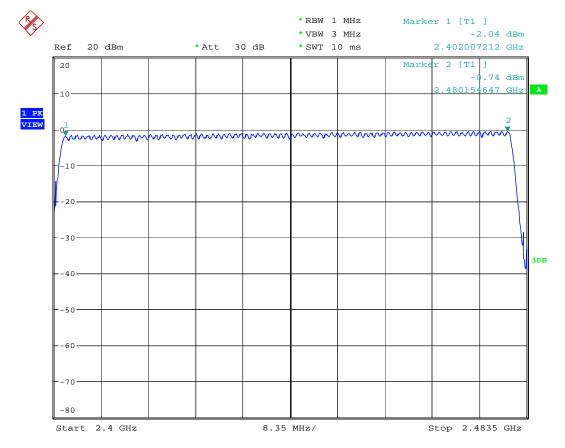
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#### **Type of Modulation: 8DPSK**

EUT	Bluetooth Soundbar		Model			SR319B	
Mode	Hopping On		Input V	oltage		120V~	
Temperature	2	24 deg. C,	Humidi	ity		56% RH	
Operating Frequency		Number of hopp channels	oing	Liı	mit	Pass/ Fail	
2402-2480MHz		79		2	15	Pass	

### **Test Plot**



Date: 15.MAY.2020 11:17:42

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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 = 0.5 MHz; VBW  $\ge$  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	Bluetoot	Bluetooth Soundbar		S	SR319B
Mode	ode Keep Transmitting		Input Voltage	120V~	
Temperatur	e 24 d	leg. C,	Humidity	56% RH	
Channel	Reading	Hoping	g Rate	Actual	Limit
DH5					
Middle	2.998ms	266.66	7 hop/s	0.320s	0.4s

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

#### Note: DH5 was the worst case.

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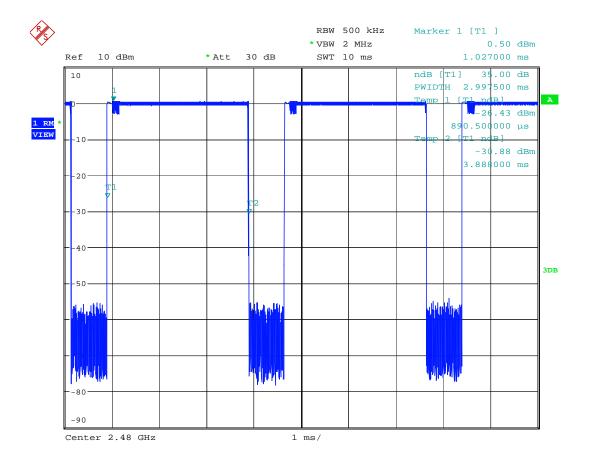
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Page 66 of 98

Test Plots:

DH5



Date: 12.MAY.2020 10:53:20

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### **Test Result**

#### **Type of Modulation:** Л/4DQPSK

EUT	Bluetootl	Bluetooth Soundbar		S	SR319B
Mode	Mode Keep Transmitting		Input Voltage	120V~	
Temperature	e 24 d	eg. C,	Humidity	56% RH	
Channel	Reading	Hoping	g Rate	Actual	Limit
DH5					
Middle	3.006ms	266.667	7 hop/s	0.321s	0.4s

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

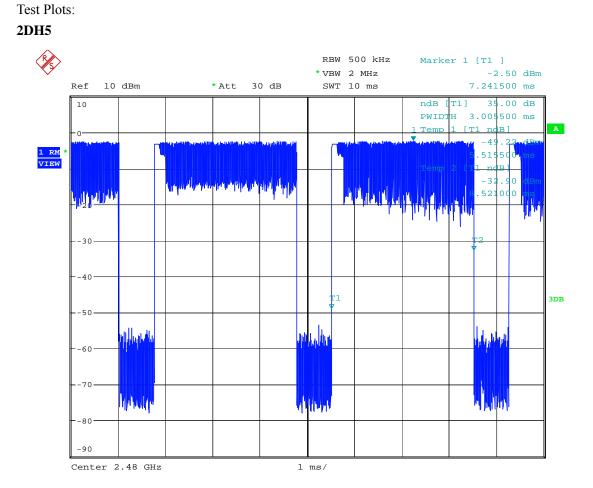
#### Note: 2DH5 was the worst case.

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Page 68 of 98



Date: 12.MAY.2020 10:57:33

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**Type of Modulation: 8DPSK** 

EUT	Bluetootl	Bluetooth Soundbar		S	SR319B
Mode	Keep Transmitting Input Voltage			120V~	
Temperature	e 24 d	eg. C,	Humidity	5	6% RH
Channel	Reading	Hoping	g Rate	Actual	Limit
			DH5		
Middle	3.006ms	266.66	7 hop/s	0.321s	0.4s

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

Note: 3DH5 was the worst case.

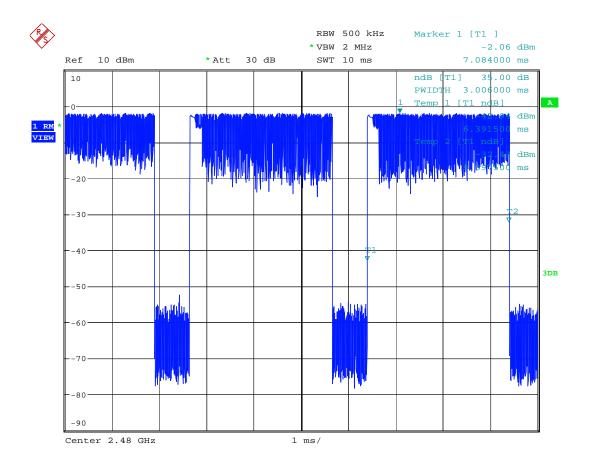
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Page 70 of 98

Test Plots: 3DH5



Date: 14.MAY.2020 15:00:57

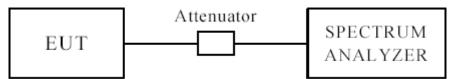
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12 Out of Band Measurement

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.

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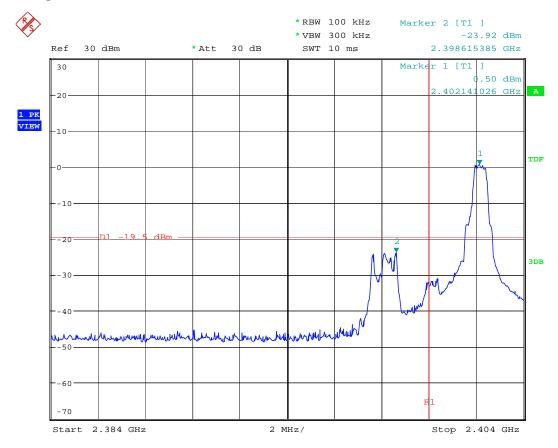


**Type of Modulation: GFSK** 

#### 12.4 Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 16:26:30

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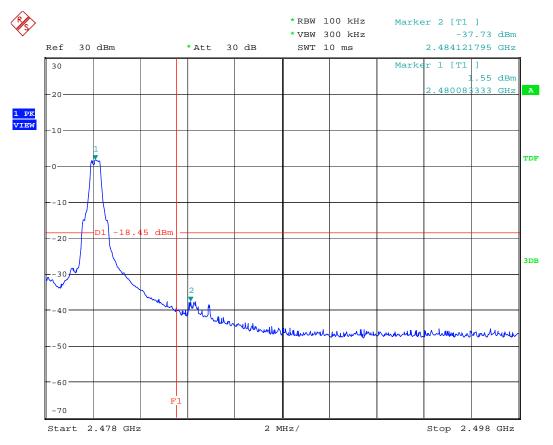


**Type of Modulation: GFSK** 

#### 12.4 Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

### **Test Figure:**



Date: 14.MAY.2020 16:42:09

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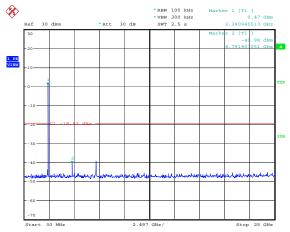


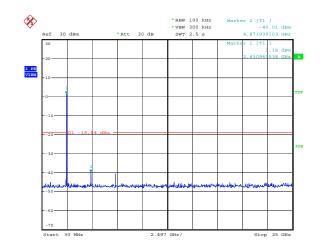
**Type of Modulation: GFSK** 

#### Band Edge Test Result 12.4

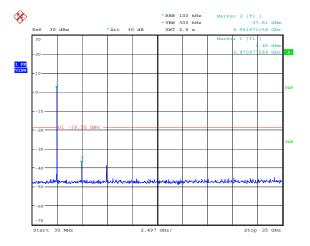
Product:	Bluetooth Soundbar	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

### **Test Figure:**





Date: 14.MAY.2020 17:22:05



Date: 14.MAY.2020 17:26:02

Date: 14.MAY.2020 17:24:18

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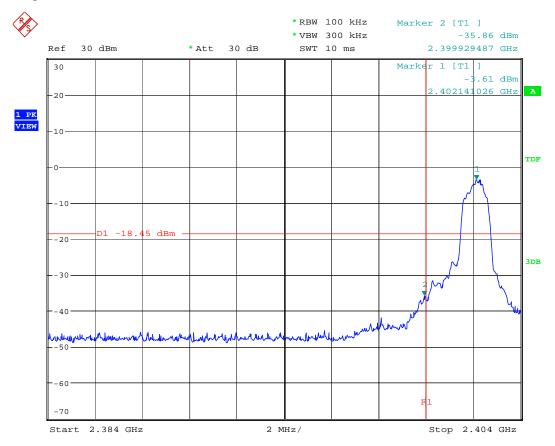


## **Type of Modulation:** Л/4DQPSK

## 12.4 Out of Band Test Result

Product:	Bluetooth Soundbar	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 16:57:22

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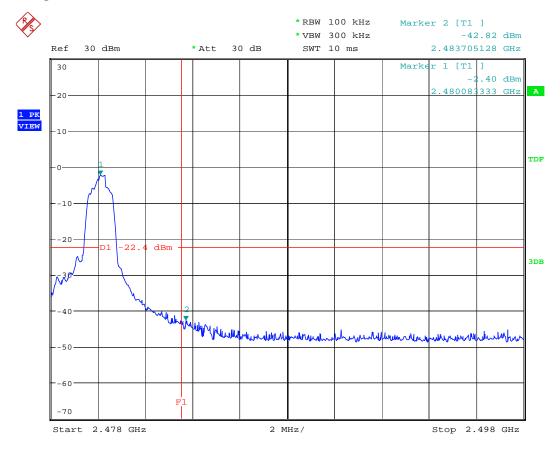


## **Type of Modulation:** Л/4DQPSK

### **12.4** Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 17:00:07

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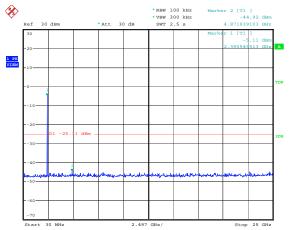


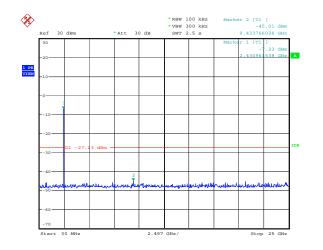
### **Type of Modulation:** Л/4DQPSK

#### Out of Band Test Result 12.4

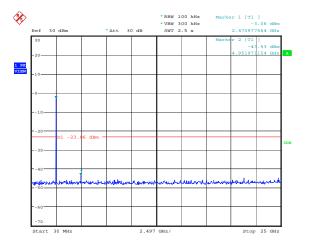
Product:	Bluetooth Soundbar	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	РК

## **Test Figure:**





Date: 14.MAY.2020 17:29:06



Date: 15.MAY.2020 10:50:23

Date: 15.MAY.2020 10:48:25

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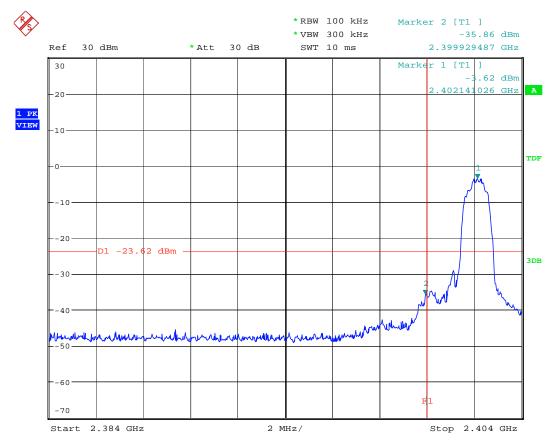


**Type of Modulation: 8DPSK** 

#### Band Edge Test Result 12.4

Product:	Bluetooth Soundbar	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 17:02:51

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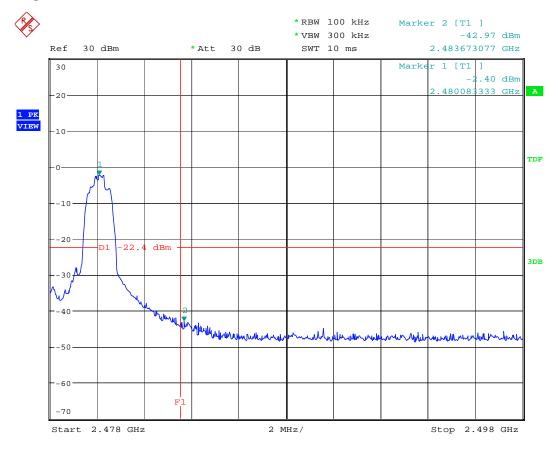


**Type of Modulation: 8DPSK** 

# **12.4** Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	High Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 17:06:12

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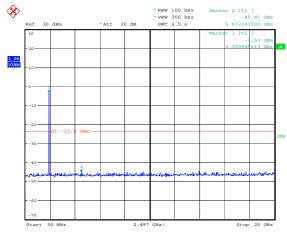


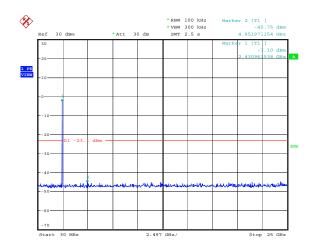
**Type of Modulation: 8DPSK** 

#### Band Edge Test Result 12.4

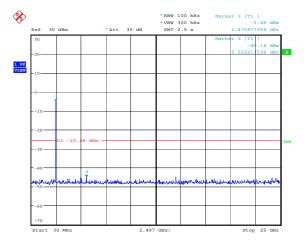
Product:	Bluetooth Soundbar	Test Mode:	Low Channel
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	РК

### **Test Figure:**





Date: 15.MAY.2020 10:55:32



Date: 15.MAY.2020 11:12:12

Date: 15.MAY.2020 10:58:49

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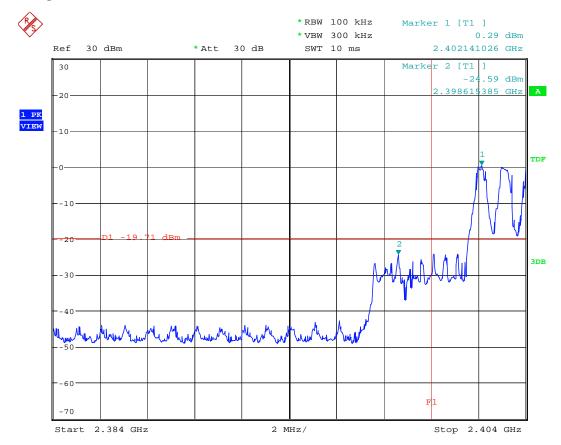


**Type of Modulation: GFSK** 

### 12.4 Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

#### **Test Figure:**



Date: 14.MAY.2020 17:13:28

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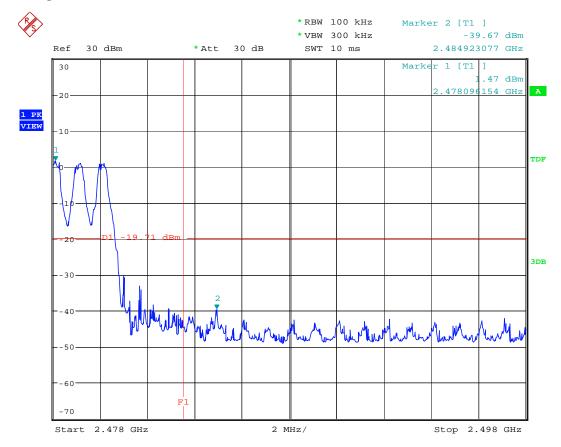


**Type of Modulation: GFSK** 

### 12.4 Band Edge Test Result

Product:	Bluetooth Soundbar	Test Mode:	Hopping mode
Mode	Hopping On	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	РК

**Test Figure:** 



Date: 14.MAY.2020 17:16:06

#### NOTE: Under the Hopping mode, only the worst case recorded in the test report

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#### 12.4 **Restrict Band Measurement**

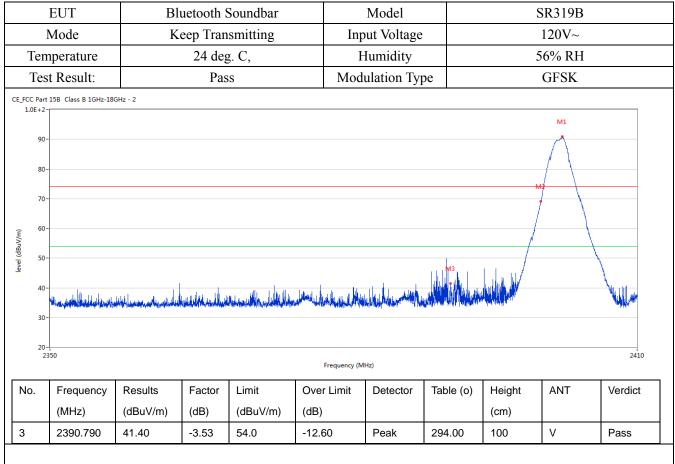
	EUT	BI	uetooth	Soundbar		Model			SR319	В
	Mode	K	eep Tran	smitting	]	Input Volta	ge		120V~	~
Ter	nperature	24 deg. C, Humidity		/	50		6% RH			
Tes	st Result:		Pas	S	М	odulation '	Гуре		GFSK	
	t 15B Class B 1GHz-18	GHz - 2			·					
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1.0E+2	-								~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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30	Muller Westerner State	héhabbirnybl fai beidibbai	aliana na Aldahili.	a(************************************	Frequency (M	Hz)	1999 Manuary Man	******		2410
30 20 2		Results	Factor	Limit	Frequency (M	Hz) Detector	Table (o)	Height	ANT	2410
30	2350	n yang sa ang pang sa ang p	in en er den vin de tekner of Johnson	Limit (dBuV/m)			Table (o)	Height (cm)	ANT	

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#### 12.4 **Restrict Band Measurement**



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#### 12.4 **Restrict Band Measurement**

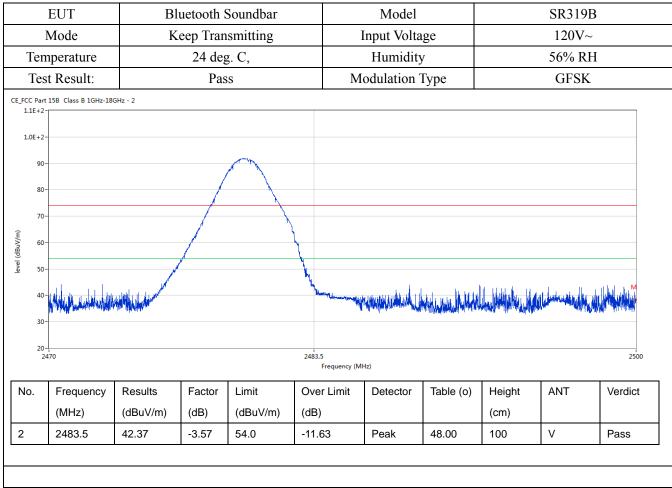
		EUT	BI	uetooth S	Soundbar		Model			SR31	9B
	N	Mode	K	eep Tran	smitting		Input Volt	tage	120V~		
]	ſem	perature	ure 24 deg. C, Humidity		56% RH						
	Test	t Result:		Pas	SS	Ν	Modulation	Туре		GFS	K
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level (dBuV/m)	50- 40-	hulleshand have been been been been been been been be	Hard Lagenda March			2483.5 Frequency (N	лHz)	dablistashistist	an dhi kila dha dha afa		M
level (dBuV/m)	50- 40- 30- 20- 247	Trequency	Results	Factor	Limit		/Hz) Detector	Table (o)	Height	ANT	2500 Verdict
	50- 40- 30- 20- 247		Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Frequency (N	1	Table (o)	Height (cm)	ANT	1

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12.4	<b>Restrict Band Measurement</b>
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Note:1. For Restricted band test, only the worst case was reported.

2. The PK emission level less than the AV limit. No necessary to record the AV emission level.

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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 antennas used. The gain of the antennas is 1.2dBi.

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### 14.0 FCC ID Label

#### FCC ID: ZJP-SR319B

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

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#### 15.0 Photo of testing

Conducted Emission Test Setup:

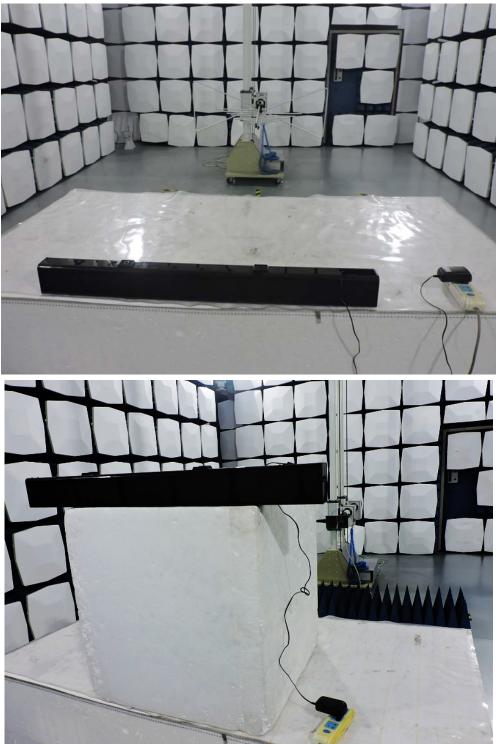


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Page 90 of 98

Radiated Emission Test Setup:



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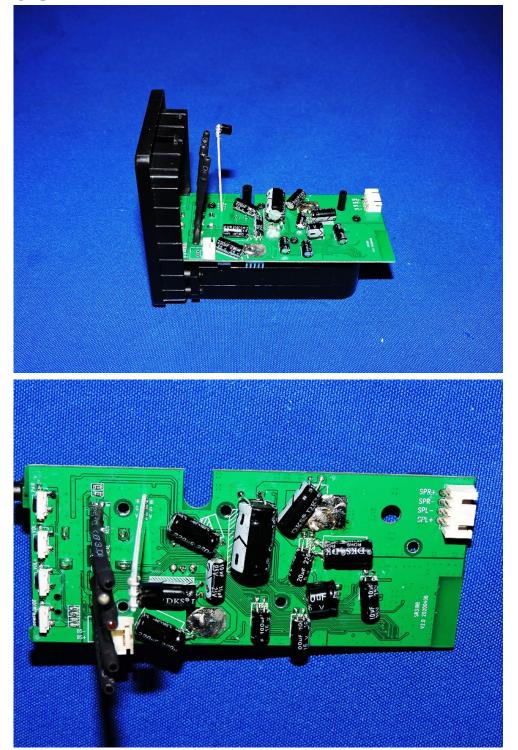
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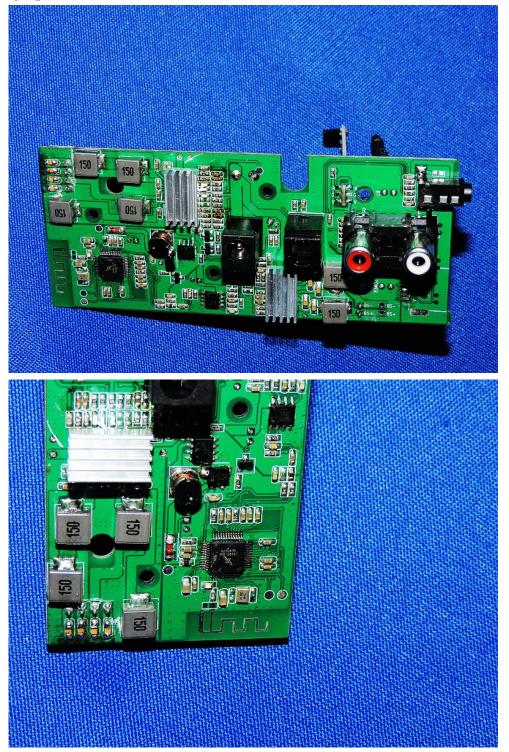
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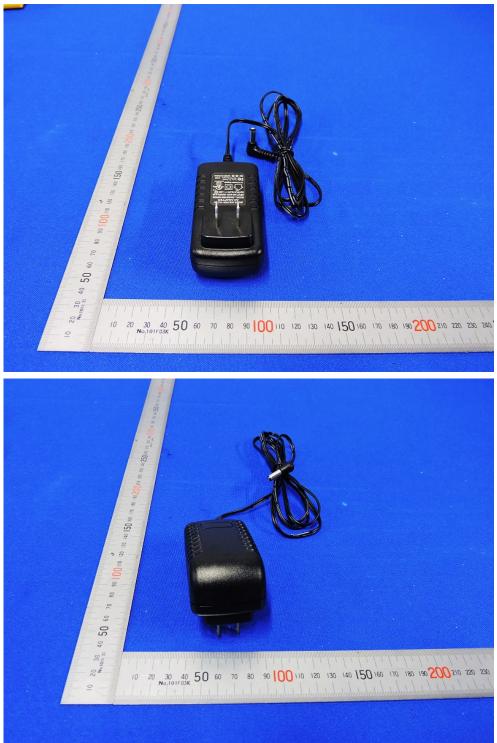


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**Power Supply** 



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**Photographs – EUT** 

**Power Supply** 



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