

CTC Laboratories, Inc.

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Т	EST REPORT			
Report No				
FCC ID:	2AKXB-W3011026			
Applicant:	Woan Technology (Shenzhen) Co	o., Ltd.		
Address:	Room 1101, Qiancheng Commerci Road, Mabu Community, Xixiang S Shenzhen, Guangdong, P.R. China	ub-district, Bao'an District,		
Manufacturer	Woan Technology (Shenzhen) Co.,	Ltd.		
Address	Room 1101, Qiancheng Commercia Road, Mabu Community, Xixiang S Shenzhen, Guangdong, P.R. China	ub-district, Bao'an District,		
Product Name:	SwitchBot Mini Robot Vacuum K	10+ Pro		
Trade Mark:	SwitchBot			
Model/Type reference:	W3011026			
Listed Model(s):	W3011027, W3011028, W3011029			
Standard:	FCC CFR Title 47 Part 15 Subpar	t C Section 15.247		
Date of receipt of test sample:	Jul. 10, 2023			
Date of testing	Jul. 10, 2023 to Aug. 1, 2023			
Date of issue	Mar. 21, 2024			
Result	PASS			
Compiled by:		Jim Jiang		
(Printed name+signature)	Jim Jiang	Jim J		
Supervised by:	7-2, 2/2019			
(Printed name+signature)	Eric Zhang Totti Zhao			
Approved by:		1 Junes		
(Printed name+signature)	Totti Zhao	1000000		

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## 1. TEST SUMMARY

## 1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands 902–928MHz, 2400–2483.5MHz, and 5725-5850MHz.

RSS-247 Issue 3: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

**RSS-Gen Issue 5:** General Requirements for Compliance of Radio Apparatus.

ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

## **1.2. Report Version**

Revised No.	Report No.	Date of issue	Description
01	CTC20231517E06	Aug. 13, 2023	Original
02	CTC20240749E01	Mar. 21, 2024	On the basis of the original report CTC20231517E06, update product name and model number, no testing involved.

## **1.3. Test Description**

FCC Part 15 Subpart C (15.247) / RSS-247 Issue 3					
Test Item	Standard	Section	Result	Test	
iest item	FCC	IC	Result	Engineer	
Antenna Requirement	15.203	RSS-Gen 6.8	Pass	Jim Jiang	
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Jim Jiang	
Conducted Band Edge and Spurious Emissions	15.247(d)	RSS-247 5.5	Pass	Jim Jiang	
Radiated Band Edge and Spurious Emissions	15.205&15.209& 15.247(d)	RSS-247 5.5	Pass	Jim Jiang	
6dB Bandwidth	15.247(a)(2)	RSS-247 5.2 (a)	Pass	Jim Jiang	
Conducted Max Output Power	15.247(b)(3)	RSS-247 5.4 (d)	Pass	Jim Jiang	
Power Spectral Density	15.247(e)	RSS-247 5.2 (b)	Pass	Jim Jiang	
Transmitter Radiated Spurious	15.209&15.247(d)	RSS-247 5.5& RSS-Gen 8.9	Pass	Jim Jiang	

Note:

The measurement uncertainty is not included in the test result. 1.

2. N/A: means this test item is not applicable for this device according to the technology characteristic of device.

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## 1.4. Test Facility

#### Address of the report laboratory

#### CTC Laboratories, Inc.

Add: 2/F., Building 1 and 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Longhua District, Shenzhen, Guangdong, China

#### Laboratory accreditation

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

#### A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

#### FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. 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 951311, Aug 26, 2017.



## **1.5. Measurement Uncertainty**

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties radio equipment characteristics; Part 2" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Items	Measurement Uncertainty	Notes
DTS Bandwidth	±0.0196%	(1)
Maximum Conducted Output Power	±0.686 dB	(1)
Maximum Power Spectral Density Level	±0.743 dB	(1)
Band-edge Compliance	±1.328 dB	(1)
Unwanted Emissions In Non-restricted Freq Bands	9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB	(1)
Conducted Emissions 9kHz~30MHz	±3.08 dB	(1)
Radiated Emissions 30~1000MHz	±4.51 dB	(1)
Radiated Emissions 1~18GHz	±5.84 dB	(1)
Radiated Emissions 18~40GHz	±6.12 dB	(1)

Below is the best measurement capability for CTC Laboratories, Inc.

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## **1.6. Environmental Conditions**

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15 °C to 35 °C
Relative Humidity:	20 % to 75 %
Air Pressure:	101 kPa

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# 2. GENERAL INFORMATION

## 2.1. Client Information

Applicant:	Woan Technology (Shenzhen) Co., Ltd.
Address:	Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R. China, 518100
Manufacturer:	Woan Technology (Shenzhen) Co., Ltd.
Address:	Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R. China, 518100

## 2.2. General Description of EUT

Product Name:	SwitchBot Mini Robot Vacuum K10+ Pro
Trade Mark:	SwitchBot
Model/Type reference:	W3011026
Listed Model(s):	W3011027, W3011028, W3011029
Model Difference:	All these models are identical in the same PCB, layout, electrical circuit and enclosure. The difference is model name.
Power Supply:	Rated Voltage: DC14.4V, Rated Power: 30W, Rated Input: DC24V 1A
Hardware Version:	V1.2
Software Version:	V1.9.0.3080-0.3
Bluetooth 4.2 / BLE	
Modulation:	GFSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	40
Channel Separation:	2MHz
Data Rate:	1Mbps
Antenna Type:	PCB Antenna
Antenna Gain:	3.08dBi

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## 2.3. Accessory Equipment Information

Equipment Information					
Name	Model S/N Manufacturer		Manufacturer		
Notebook	ThinkPad T460s	/	Lenovo		
Cable Information					
Name	Shielded Type	Ferrite Core	Length		
USB Cable	Unshielded	NO	150cm		
Test Software Information					
Name	Version	/	1		
RTL8762x_RFTestTool	v1.0.1.7	/	/		

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## 2.4. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing.

**Operation Frequency List:** 

Channel	Frequency (MHz)
00	2402
01	2404
:	:
18	2438
19	2440
20	2442
:	:
38	2478
39	2480

Note: The display in grey were the channel selected for testing.

#### Test Mode:

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

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## 2.5. Measurement Instruments List

Tonsce	Tonscend RF Test System					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	MXA Signal Analyzer	Keysight	N9020A	MY46471737	Dec. 16, 2023	
2	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023	
3	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024	
4	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 16, 2023	
5	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 16, 2023	
6	Power Sensor	Keysight	U2021XA	MY55130004	Mar. 14, 2024	
7	Power Sensor	Keysight	U2021XA	MY55130006	Mar. 14, 2024	
8	Wideband Radio Communication Tester	R&S	CMW500	102414	Dec. 16, 2023	
9	High and low temperature box	ESPEC	MT3035	/	Mar. 24, 2024	
10	JS1120 RF Test System	TONSCEND	v2.6	/	/	

Radiated Emission (3m chamber 2)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 07, 2024	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-648	Dec. 07, 2024	
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023	
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024	
5	Pre-Amplifier	SONOMA	310	186194	Dec. 16, 2023	
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 16, 2023	
7	Test Receiver	R&S	ESCI7	100967	Dec. 16, 2023	
8	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024	

Conduc	Conducted Emission									
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until					
1			ENV216	101112	Dec. 16, 2023					
2			ENV216	101113	Dec. 16, 2023					
3			ESCS30	100353	Dec. 16, 2023					
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 16, 2023					
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 16, 2023					

Note: 1. The Cal. Interval was one year.

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2. The Cal. Interval was three years of the antenna.

3. The cable loss has been calculated in test result which connection between each test instruments.

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# 3. TEST ITEM AND RESULTS

## 3.1. Conducted Emission

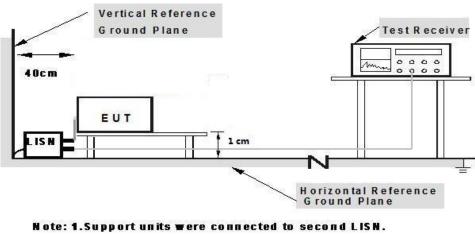
## <u>Limit</u>

## FCC CFR Title 47 Part 15 Subpart C Section 15.207 / RSS-Gen 8.8

	Conducte	ed Limit (dBµV)
Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

\* Decreases with the logarithm of the frequency.

### Test Configuration



2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

#### Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.

2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.

3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm / 50  $\mu$ H coupling impedance for the measuring equipment.

4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

8. During the above scans, the emissions were maximized by cable manipulation.

#### Test Mode

Please refer to the clause 2.4.

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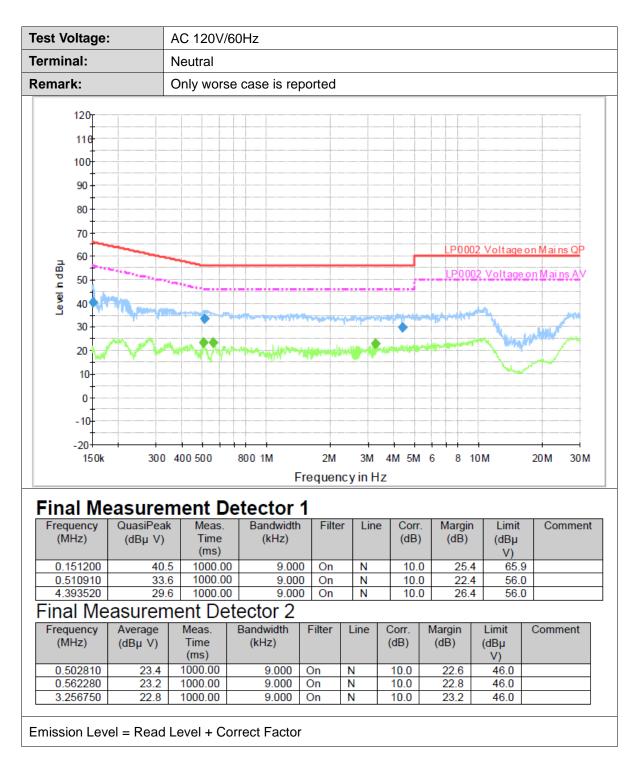
est Voltage:		AC 120V/6	60Hz						
erminal:	L	Line							
emark:	(	Only worse	e case is rep	orted					
120 <del></del>									
110									
100									
90									
80									
+									
70							FCC CI	ace D Voltag	e on Mains QP
≥ <sup>60</sup>									
E 50	()						FCC C	lass B Voltag	e on Mains AV
50 to the second									
30	F FY				and the second second	-	-	A Andrew	
									Anna
20		V VV	a second and the seco	where we		1. Andrew of the second se			
10									
0									
-10-									
+									
-20 + 150k	300	400 500	800 1M	2M	3M	4M 5M	6 8 1	0M	20M 30M
			Fr	requency	in Hz				
Final Me		<u>nent D</u>							
Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time	Bandwidth (kHz)	Filte	r Line	e Corr (dB)		Limit	Comment
(11112)	(ubµ v)	(ms)	(((12)			(00)		(ubµ V)	
0.151200	46.0			_	L1	9.		9 65.9	_
0.169760 0.369750	<u>41.0</u> 37.5				L1	9.			
Final Me									1
Frequency	Average	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit	Comment
(MHz)	(dBµ V)	Time (ms)	(kHz)			(dB)	(dB)	(dBµ	
0.344120	26.7	1000.00	9.000	On	L1	9.7	22.4	V) 49.1	
0.500810	24.7	1000.00	9.000	On	L1	9.7	21.3	46.0	
0.569050	23.8	1000.00	9.000	On	L1	9.7	22.2	46.0	

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## 3.2. Radiated Emission

<u>Limit</u>

#### FCC CFR Title 47 Part 15 Subpart C Section 15.209 / RSS-Gen 8.9

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

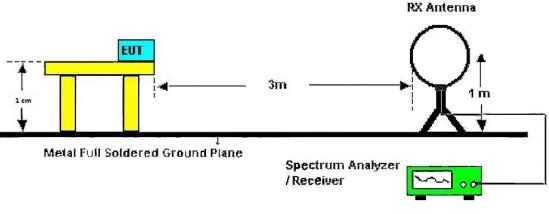
Frequency Range (MHz)	dBµV/m (at 3 meters)				
	Peak	Average			
Above 1000	74	54			

#### Note:

(1) The tighter limit applies at the band edges.

(2) Emission Level (dB $\mu$ V/m)=20log Emission Level ( $\mu$ V/m).

#### **Test Configuration**



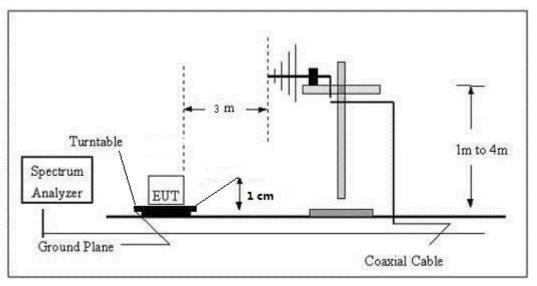
Below 30MHz Test Setup

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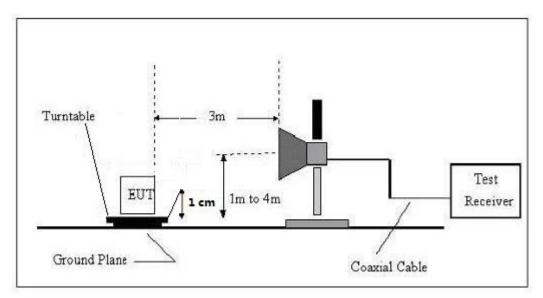
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#### 30-1000MHz Test Setup



#### Above 1GHz Test Setup

#### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013.

2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.

3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
- (1) Span shall wide enough to fully capture the emission being measured;

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#### (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) From 1 GHz to  $10^{th}$  harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.8 Duty Cycle.

#### Test Mode

Please refer to the clause 2.4.

#### <u>Test Result</u>

#### 9 kHz~30 MHz

From 9 kHz to 30 MHz: The conclusion is PASS.

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



QP

QP QP

QP

QP

-8.62

-8.51

-9.01

-6.20

-6.38





Rem	arks:	

2

3

4

5 \*

6

263.0799

382.0516

675.2078

854.6236

942.7912

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

-18.23

-15.25

-9.40

-6.53

-5.36

37.38

37.49

36.99

39.80

39.62

46.00

46.00

46.00

46.00

46.00

55.61

52.74

46.39

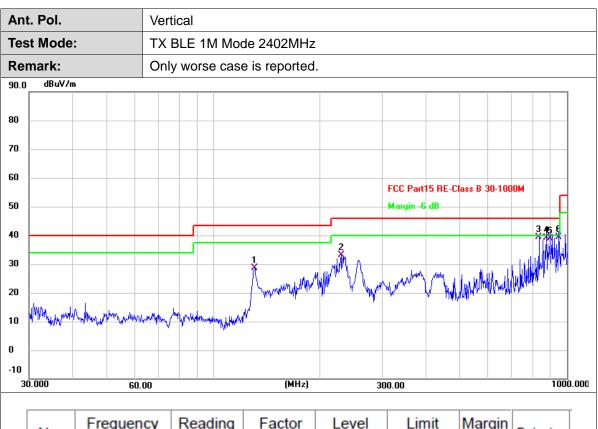
46.33

44.98

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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	130.4704	47.20	-18.46	28.74	43.50	-14.76	QP
2	229.9370	52.47	-19.33	33.14	46.00	-12.86	QP
3	835.6579	46.14	-6.80	39.34	46.00	-6.66	QP
4	876.4754	45.34	-6.22	39.12	46.00	-6.88	QP
5	898.8857	44.83	-5.89	38.94	46.00	-7.06	QP
6 *	950.7590	44.73	-5.26	39.47	46.00	-6.53	QP

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant. Pol.	Horizontal
Test Mode:	TX BLE 1M Mode 2402MHz
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 *	4803.899	30.88	2.16	33.04	54.00	-20.96	AVG
2	4803.915	42.52	2.16	44.68	74.00	-29.32	peak

#### Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Vertical					
TX BLE 1M Mode 2402MHz					
No report for the emission which more than 20 dB below the prescribed limit.					

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	4804.000	41.73	2.16	43.89	74.00	-30.11	peak
2 *	4804.000	29.87	2.16	32.03	54.00	-21.97	AVG

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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-29.86

peak

74.00

Ant. Pol.			Horizontal						
Tes	t Mode:	•	TX BLE 1M M	ode 2440Mł	Ηz				
Remark:			No report for the emission which more than 20 dB below the prescribed limit.						
									Ŧ
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
	1 *	4879.963	30.55	2.31	32.86	54.00	-21.14	AVG	Î

2.31

44.14

Remarks:

2

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

41.83

2.Margin value = Level -Limit value

4880.077

Ant.	Pol.		Vertical									
Test	t Mode:		TX BLE 1M Mode 2440MHz									
Rem	nark:		No report for t limit.	No report for the emission which more than 20 dB below the prescribed limit.								
Г		Frequency	Reading	Factor	l evel	Limit	Margin					
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
	No.		-					Detector peak				

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant	t. Pol.		Horizontal								
Tes	t Mode:		TX BLE 1M M	TX BLE 1M Mode 2480MHz							
Rei	mark:		No report for t limit.	No report for the emission which more than 20 dB below the prescribed mit.							
No. Frequency (MHz)		Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
	1 *	4959.869	29.75	2.48	32.23	54.00	-21.77	AVG	-		
	2	4960.024	41.29	2.48	43.77	74.00	-30.23	peak	ſ		

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant.	Pol.		TX BLE 1M Mode 2480MHz								
Test	Mode:										
Rem	nark:		No report for t limit.	he emissior	which more	than 20 dB	below the	e prescribe			
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
	No.		· · · ·				· ·	Detector peak			

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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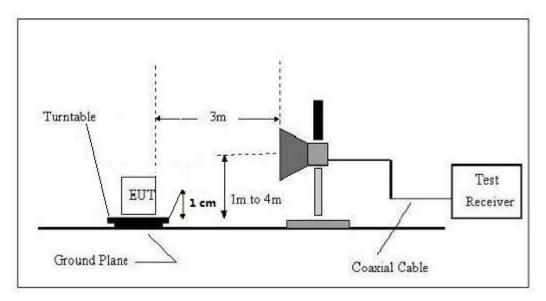
## 3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d) / RSS-247 5.5

Restricted Frequency Band	(dBµV/m) (at 3m)				
(MHz)	Peak	Average			
2310 ~ 2390	74	54			
2483.5 ~ 2500	74	54			

### **Test Configuration**



#### Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.

2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.

3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement. 5. The receiver set as follow:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

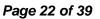
Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.8 Duty Cycle.

#### Test Mode

Please refer to the clause 2.4.

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100										
110	TX BLE 1M Mode 2402MHz									
90										
100										
90										
80										
FCC Part15 Class B 3M Above-1G Peak       50       50       50       60 </td <td></td>										
70	k									
FCC Part15 Class B 3M Above-16 AV       50       40       30       20       10       0.0	ţ									
	$\left  \right $									
	+									
30 20 10 0.0										
0.0										
	2.40 2415									
No.Frequency (MHz)Reading (dBuV)Factor (dB/m)Level (dBuV/m)Limit (dBuV/m)Margin (dB)	Detector									
1 2390.000 50.24 -7.72 42.52 74.00 -31.48	peak									
2 * 2390.000 37.71 -7.72 29.99 54.00 -24.01	AVG									

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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nt. Pol.		Ve	rtical										
est Mode:		ТХ	TX BLE 1M Mode 2402MHz										
20.0 dBuV/m												1	
10													
,													
,													
							FCC P	art15 Cla	ss B 3M .	Above-1	IG Pe	ak	
)												Λ	
)							FCC P	art15 Cla	ss B 3M .	Above-1	IG AV	$  \rangle$	
)					_					1		[ ]	
)										1 X	-	$\left( -\right)$	
)							+			2			
)													
)													
).0 2283.000 22	296.00 2309		2322.00 2	2335.00 (N	(Hz)		1.00	2374.00		87.00		00.00	2413
No.	Frequer (MHz)	-	Reading (dBuV)	·		Lev (dBu'		Lir (dBu	nit V/m)	Mar (dE		Dete	ector
1	2390.00	00	49.62	-7.72	2	41.	90	74	.00	-32.	10	ре	ak
2 *	2390.00	00	37.65	-7.72	2	29.	93	54	.00	-24.	07	A١	/G

2.Margin value = Level -Limit value

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Ant	. Pol.		F	Horiz	ontal										
Tes	t Mode:		Т	TX BL	LE 1M	M	ode 2480	M	Ηz						
120.0	) dBuV/m													Î	1
110															
100															
90															
80		h													
ļ										FCC P	art15	Class B 3M	Above-1G Pe	ak	
70		1													1
60		¥								FCC P	art15	Class B 3M	Above-1G AV		
50		*													-
40															-
30		_ <u></u>										·····			-
20															-
10															-
0.0	67.800 24	80.80 249	3.80	2506	5 80	251	9.80 (MI	17)	254	5.80	255	8.80 25	71.80 25	84.80 259	97.80
	01.000 21		0.00	2000		201	0.00 (	12)	201	0.00	200	0.00 20	20	01.00 L0.	
	No.	Freque (MHz			eading (BuV)		Facto (dB/m		Lev (dBu)			Limit 3uV/m)	Margin (dB)	Detector	Ī
	1	2483.5	00	6	63.37		-7.32		56.	05	1	74.00	-17.95	peak	†
	2 *	2483.5	00	5	53.88		-7.32		46.	56	(	54.00	-7.44	AVG	Ť
l							1						1		1
Ren	narks:														

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1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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Ant. Pol. Test Mode:			Vertical								
	ТХ	TX BLE 1M Mode 2480MHz									
							FCC P	art15	Class B 3M	Above-1G	Peak
}							ECC P		Class P. 2M	About 16	A) (
1							FUU F	artis		ADOVE-TO	
2											
1											
182.00 249	5.00	2508.00	2521.	00 (MI	lz)	254	7.00	256	0.00 25	73.00	2586.00
	-		-							Margi (dB)	
2483.5	00	55.53	3	-7.32		48.	21	7	4.00	-25.79	9 peak
2483.5	00	46.11	1	-7.32		38.	79	5	54.00	-15.2	1 AVG
	1 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x		Image: state	Image: state stat	Image: state stat	Image: state in the state	Image: state of the state	Image: Second	Frequency (MHz)       Reading (dBuV)       Factor (dB/m)       Level (dBuV/m)       I         2483.500       55.53       -7.32       48.21       7	Frequency (MHz)       Reading (dBuV)       Factor (dBuV)       Level (dBuV/m)       Limit (dBuV/m)         2483.500       55.53       -7.32       48.21       74.00	Frequency (MHz)       Reading (dBuV)       Factor (dB/m)       Level (dBuV/m)       Limit (dBuV/m)       Margin (dB)         2483.500       55.53       -7.32       48.21       74.00       -25.75

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2.Margin value = Level -Limit value

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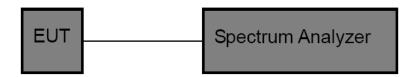
## 3.4. Band Edge and Spurious Emissions (Conducted)

#### Limit

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d) / RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

#### **Test Configuration**



#### **Test Procedure**

- The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss 1. was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- Use the following spectrum analyzer settings: 3 RBW = 100 kHz, VBW  $\geq$  RBW, scan up through 10<sup>th</sup> harmonic. Sweep = auto, Detector function = peak, Trace = max hold.
- Measure and record the results in the test report. 4.

#### Test Mode

Please refer to the clause 2.4.

#### **Test Result**

Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
		2400.00	-56.592	-16.89	-39.702	PASS
	0	2398.18	-56.309	-16.89	-39.419	PASS
BLE 1M		4803.80	-51.033	-16.89	-34.143	PASS
	19	4879.92	-51.844	-16.89	-34.954	PASS
	39	2483.50	-58.228	-16.34	-42	PASS
		4959.83	-51.212	-16.34	-34.872	PASS

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N Specification Million 7 50 2 AC 11 T RF 50 2 AC 11 CF Freq 2.402000000 GHz PND: Wide → Trig: Free Run 27 Called awy #Atten: 26 dB Avg Type: Log-Pwr Avg Hold: 100/100 r Freq 2.352500000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 PNO: Fast ---- Trig: Free Run #Atten: 26 dB Ref Offset 0.5 dB Ref 15.00 dBm 019 5 G 3.114 dl Ref Offset 0.5 dB Ref 15.00 dBm 3 Stop 2.40500 GHz 2.30000 GHz BW 100 kHz #VBW 300 kHz 2.398 180 GHz 2.400 000 GHz -56.309 dE Span 1.500 MH Sweep 1.000 ms (1001 pt ter 2.4020000 GI S BW 100 kHz #VBW 300 kHz **In-Band Reference Level Out Of Band Emission** LE\_Channel 0 LE\_Channel 0 enter Freq 12.515000000 GHz Avg Type: Log-Pwr Avg|Hold: 10/10 nter Freg 2.440000000 GHz Avg Type: Log-Pwr Avg|Hold: 100/100 Trig: Free Run Trig: Free Run #Atten: 26 dB 18 0 ( 107 d Ref Offset 0.5 dB Ref 15.00 dBm Ref Offset 0.5 dB Ref 15.00 dBm **♦**<sup>3</sup> Stop 25.00 GH 2.387 s (40000 pts tart 30 MHz Res BW 100 kHz #VBW 300 kHz Span 1.500 MHz Sweep 1.000 ms (1001 pts er 2.4400000 G BW 100 kHz #VBW 300 kHz **Spurious Emission In-Band Reference Level** LE\_Channel 0 LE\_Channel 19 RF 50 9 AC Avg Type: Log-Pwr Avg Hold: 10/10 er Freg 2.480000000 GH: Avg Type: Log-Pwr AvgHold: 100/100 ---- Trig: Free Run Atten: 26 dB Trig: Free Run #Atten: 26 dB Ref Offset 0.5 dB Ref 15.00 dBm 4.879 9 G 51.844 d Ref Offset 0.5 dB Ref 15.00 dBm ♦<sup>3</sup> Stop 25.00 GHz eep 2.387 s (40000 pts enter 2.4800000 GHz tes BW 100 kHz Span 1.500 MHz Sweep 1.000 ms (1001 pts es BW 100 kH #VBW 300 kHz #VBW 300 kHz **In-Band Reference Level** 

Spurious Emissions LE Channel 19

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LE\_Channel 39



Agend Spectrum Analyzer         Swigt 50         AL         SWIGE 5011         ALS/14/010         D4/34-14 MM/22, 2023           Conter Freq 2.5100000000 GHz         PR0: Frat         →         Trig: Free Run Freinit.ev         Avg Type: Log-Pwr AvgType: Log-Pwr         House 3000000000000000000000000000000000000	Agtion Spectrum Analyzer         Swept SA         SPICE INT         ALXXVAUTO         04:35:15:AM July 2023           Dr. R.T.         NF         90:0         AC         SPICE INT         ALXXVAUTO         04:35:15:AM July 2023           Center Freq 12:5150000000 GHz         Freq Free Run         Avg1*pet: Log-Pvr         Rect 12:023           FRO: Fast         →         Trig: Free Run         Avg1*pet: Log-Pvr         Rect 12:023           IF Galact.ov         Atex: 26 dB         cc         Departure
Bef Offset 0.5 dB         Mkr2 2.483 50 GHz           10 dBldW         Ref 13.00 dBm         -58.228 dBm           500	Ref Offset 0.5 dB         Mkr1 4.559 8 GHz           0 dB/dlv         Ref 15.00 dBm         -51.212 dBm           500         -51.212 dBm         -51.212 dBm
	HRR MODE TRC SCL × V PRICTION PRACTION MULE 455598 GHz 51212 dBm 6 7 7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
LE_Channel 39	LE_Channel 39

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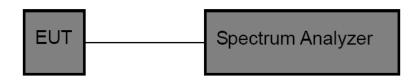
## 3.5. DTS Bandwidth

<u>Limit</u>

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2) / RSS-247 5.2 a

Test Item	Limit	Frequency Range (MHz)
DTS Bandwidth	≥500 kHz (6dB bandwidth)	2400~2483.5

#### **Test Configuration**



#### Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. DTS Spectrum Setting:
  - (1) Set RBW = 100 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq$  3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.
  - OCB Spectrum Setting:
  - (1) Set RBW =  $1\% \sim 5\%$  occupied bandwidth.
  - (2) Set the video bandwidth (VBW)  $\ge$  3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

#### Test Mode

Please refer to the clause 2.4.

#### Test Result

Test Mode	Frequency (MHz)	99% Bandwidth (MHz)	DTS Bandwidth (MHz)	Limit (MHz)	Verdict
	2402	1.0243	0.6529	≥0.5	Pass
BLE_1M	2440	1.0507	0.6477	≥0.5	Pass
	2480	1.0477	0.6911	≥0.5	Pass

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Agilent Spectrum Analyzer - Occupied BW			Agilent Spectrum Analyzer - Occupied BW				
04 R T RF 50 Q AC Center Freq 2.402000000 GHz	Center Freq: 2.40200000 GHz Trig: Free Run Avg Hold: 100/100	01:21:37 AM Jul 19, 2023 Radio Std: None	OF R T RF 58 Q AC Center Freq 2.440000000 G		Center Freq: 2.4400000 Trig: Free Run	00 GHz Avg Hold: 100/100	01:27:08 AM Jul 19, 2023 Radio Std: None
#IFGain:Low	#Atten: 26 dB	Radio Device: BTS Mkr2 2.4025384 GHz		#IFGain:Low	#Atten: 26 dB		Radio Device: BTS Mkr2 2.4405482 GHz
Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm		-17.093 dBm	10 dB/div Ref 20.50 dBm				-16.924 dBm
10.5			10.5				
1500	m		0.500		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
.9.50	and the second s		-9.50	plana h		- market	<u></u>
-29.5			-29.5				Non-
-33.5		have the second se	-39.5				
-59.5			-59.5				
-69.5			-69.5				
Center 2.402 GHz #Res BW 20 kHz	#VBW 62 kHz	Span 2 MHz Sweep  5.333 ms	Center 2.44 GHz #Res BW 20 kHz		#VBW 62 kH;	2	Span 2 MHz Sweep 5.333 ms
Occupied Bandwidth	Total Power 8.79 dBm		Occupied Bandwidth		Total Power	8.77 dBm	
1.0243 MHz			1.0	507 MHz			
Transmit Freq Error 26.489 kHz	OBW Power 99.00 %		Transmit Freq Error		OBW Power	99.00 %	
x dB Bandwidth 1.249 MHz	x dB -26.00 dB		x dB Bandwidth	1.261 MHz	x dB	-26.00 dB	
MSG	STATUS		MSG		<u>.</u>	STATUS	
	E_Channel 0			LE_	Channel '	19	
Agilent Spectrum Analyzer - Occupied BW	SENSE:INT ALIGN AUTO	02:07:39 AM Jul 19, 2023					
Center Freq 2.480000000 GHz	Center Freq: 2.480000000 GHz Trig: Free Run Avg Hold: 100/100 #Atten: 26 dB	Radio Std: None Radio Device: BTS					
#IFGain:Low	WAtten, 20 GB	Mkr2 2.4805486 GHz					
Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm		-16.846 dBm					
10.5							
	mmmm	2					
-19.5		where the second s					
22.5		mmm					
-49.5							
-59.5							
169.5							
Center 2.48 GHz #Res BW 20 kHz	#VBW 62 kHz	Span 2 MHz Sweep   5.333 ms					
Occupied Bandwidth	Total Power 9.63 dBm						
1.0477 MHz							
Transmit Freq Error 24.884 kHz	OBW Power 99.00 %						
x dB Bandwidth 1.285 MHz	x dB -26.00 dB						
MSG	STATUS						
LE	E_Channel 39						

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#### DTS Bandwidth:

Center Freq 2.402000000 GHz	SENSE:INT Center Freq: 2.402000	ALIGNAUTO	01:21:47 AM 3.J 19, 2023 Radio Std: None	Agilent Spectrum Analyzer - Occupied BW On R T RF 502 AC Center Freq 2.440000000 G	Hz	SENSE:INT Center Freq: 2.440000	ALIGN AUTO	01:27:19 AM Jul 19, 202 Radio Std: None
	IFGain:Low #Atten: 26 dB	Avg Hold>100/100	Radio Device: BTS	Center 1164 2.440000000 0	#IFGain:Low		Avg Hold: 100/100	Radio Device: BTS
Ref Offset 0.5 dB				Ref Offset 0.5 dB				
Ref Offset 0.5 dB 0 dB/div Ref 15.50 dBm				10 dB/div Ref 15.50 dBm Log				
5.50				5.50				
14.5				-14.5				~~~~
24.5			- manun	-24.5				and far all and a second
34.5				-34.5				
54.5				-54.5				
64.5				-64.5				
/4.5				-/4.5				
Center 2.402 GHz Res BW 100 kHz	#VBW 300 k	KHZ	Span 2 MHz Sweep 1.333 ms	Center 2.44 GHz #Res BW 100 kHz		#VBW 300 k	Hz	Span 2 MH Sweep 1.333 m
Occupied Bandwidth	Total Power	9.61 dBm		Occupied Bandwidth		Total Power	9.36 dBm	
1.0500	MHz			1.09	982 MHz			
	400 kHz OBW Power	99.00 %		Transmit Freq Error	39.619 kHz	OBW Power	99.00 %	
x dB Bandwidth 65	2.9 kHz x dB	-6.00 dB		x dB Bandwidth	647.7 kHz	x dB	-6.00 dB	
SG		STATUS		MSG			STATUS	
	LE_Channel	0			LE	Channel	19	
gilent Spectrum Analyzer - Occupied BW	SENSE:INT	ALIGNAUTO	02:07:50 AM Jul 19, 2023			_		
Center Freq 2.480000000 GHz	SENSE:INT Center Freq: 2.480000	ALIGNAUTO 0000 GHz AvgjHold: 100/100	02:07:50 AM 3ul 19, 2023 Radio Std: None		-			
RF 50.2 AC Center Freq 2.480000000 GHz	SBNSEIMT Center Freq: 2.480000 →→ Trig: Free Run #Atten: 26 dB	ALIGNAUTO 1000 GHz Avg Hold: 100/100	02:07:50 AM Jul 19, 2023 Radio Std: None Radio Device: BTS					
Center Freq 2.480000000 GHz	Trig: Free Run	ALIGNAUTO 1000 GHz Avg Hold: 100/100	Radio Std: None					
Center Freq 2.480000000 GHz	Trig: Free Run	ALIGNAUTO 0000 GHz Avg Hold: 100/100	Radio Std: None					
RF 50 2 AC Center Freq 2.480000000 GHz	Trig: Free Run	AUGNAUTO DOD GHz Avg Hold: 100/100	Radio Std: None Radio Device: BTS					
Center Freq 2.480000000 GHz	Trig: Free Run	ALI9YAUTO 000 GHz Avg Held: 100/100	Radio Std: None Radio Device: BTS					
Center Freq 2.480000000 GHz	Trig: Free Run	AU2710170	Radio Std: None					
Center Freq 2.480000000 GHz	Trig: Free Run	AUSTICITO 0000 GHz Avg Hold: 100/100	Radio Std: None Radio Device: BTS					
Center Freq 2.480000000 GHz	Trig: Free Run	AU2710170	Radio Std: None Radio Device: BTS					
Center Freq 2.480000000 GHz	Trig: Free Run	ALEWANTO DOOD OH: Avg Held: 100/100	Radio Std: None Radio Device: BTS		·			
Center Freq 2.480000000 GHz	Trig: Free Run	Avgiteld: 100/100	Radio Std: None Radio Device: BTS		·			
Image: Non-Section 2.480000000 GHz           Center Freq 2.4800000000 GHz           Center Freq 2.48000000000 GHz           Center Freq 2.48000000000 GHz           Center 2.48 GHz	IF Gaint ew Frighten: 25 dB	Avgiteld: 100/100	Radio Stef: None Radio Device: BTS		·			
P         202         AC           Center Freq 2.480000000 GHz         Center Freq 2.480000000 GHz         Center Freq 2.48000000000000000000000000000000000000	If Gaint ew Frier 25 dB #VEW 300 k Total Power	Avg Held: 100/100	Radio Stef: None Radio Device: BTS					
Center Freq 2.480000000 GHz Center Freq 2.480000000 GHz Ref 0ffset 0.5 dB Ref 15.50 dBm 400 400 400 400 400 400 400 400 400 40	If Gaint ew Frier 25 dB #VEW 300 k Total Power	Avg Held: 100/100	Radio Stef: None Radio Device: BTS					
Ref offset 0 5 dB Ref offset 0 5 dB Ref offset 0 5 dB Ref 13.50 dBm offset 0 5 db dd dd dd dd dd dd dd dd dd dd dd dd d	Trig: Free Run #Atten: 25 dB #VBW 300 k Total Power MHz	Avg Held: 100100	Radio Stef: None Radio Device: BTS					
enter Freq 2.48000000 GHz enter Freq 2.4800000 GHz enter Freq 2.4800000 GHz enter 2.4800000 GHz enter 2.48 GHz res BW 100 HHz Occupied Bandwidth 1.0817 Transmit Freq Error 33.7	Trig-Free Run #Atten: 25 dB #VBW 300 k Total Power MHz 707 kHz OBW Power	Avg Held: 100100	Radio Stef: None Radio Device: BTS					
enter Freq 2.48000000 GHz enter Freq 2.4800000 GHz enter Freq 2.4800000 GHz enter 2.4800000 GHz enter 2.48 GHz res BW 100 HHz Occupied Bandwidth 1.0817 Transmit Freq Error 33.7	Trig-Free Run #Atten: 25 dB #VBW 300 k Total Power MHz 707 kHz OBW Power	Avg Held: 100100	Radio Stef: None Radio Device: BTS					
enter Freq 2.48000000 GHz enter Freq 2.4800000 GHz enter Freq 2.4800000 GHz enter 2.4800000 GHz enter 2.48 GHz Res BW 100 Hz Cocupied Bandwidth 1.0817 Transmit Freq Error 33.7	Trig-Free Run #Atten: 25 dB #VBW 300 k Total Power MHz 707 kHz OBW Power	Avg Held: 100100	Radio Stef: None Radio Device: BTS					

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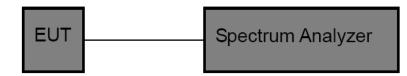
## 3.6. Peak Output Power

Limit

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3) / RSS-247 5.4 d

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(3)	Maximum Conducted Output Power	1 Watt or 30dBm	2400~2483.5
ISED RSS-247 5.4 d	EIRP	4 Watt or 36dBm	2400~2483.5

#### **Test Configuration**



#### **Test Procedure**

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
  - (1) Set RBW ≥ DTS Bandwidth.
  - (2) Set VBW  $\geq$  3\*RBW.
  - (3) Set Span  $\geq$  3\*RBW.
  - (4) Sweep time = Auto couple.
  - (5) Detector = Peak.
  - (6) Trace mode = Max hold.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

#### **Test Mode**

Please refer to the clause 2.4.

#### **Test Result**

Mode	Channel	Peak Output Power (dBm)	Limit (dBm)	Result
	0	3.354	30	PASS
BLE_1M	19	4.436	30	PASS
	39	4.671	30	PASS

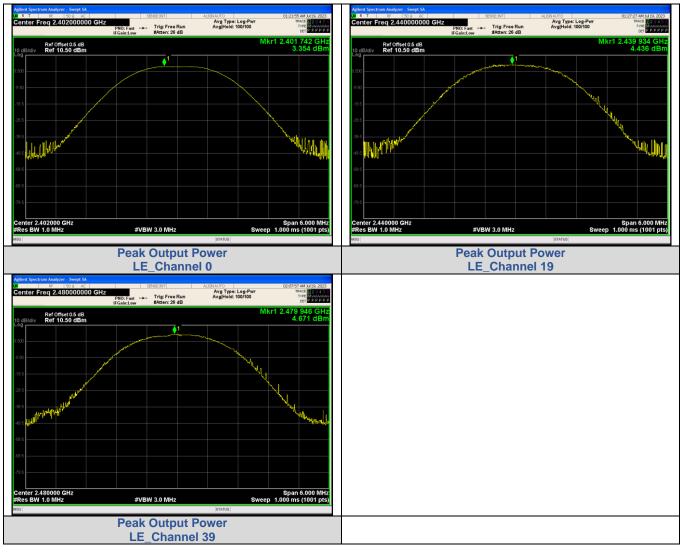
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Test plot as follows:



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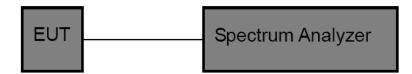
#### **Power Spectral Density** 3.7.

Limit

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e) / RSS-247 5.2 b

Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	8 dBm (in any 3 kHz)	2400~2483.5

#### **Test Configuration**



#### **Test Procedure**

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting:

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz.

Set the VBW to: 10 kHz.

Detector: peak.

Sweep time: auto.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

#### **Test Mode**

Please refer to the clause 2.4.

#### **Test Result**

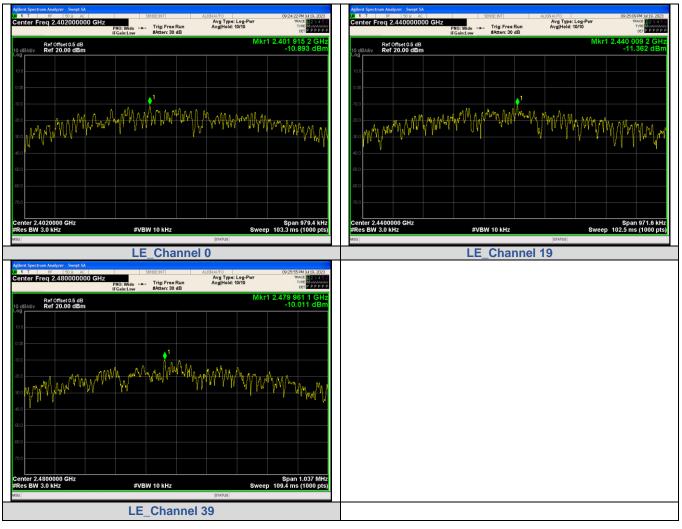
Mode	Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
	0	-10.893	8	PASS
BLE_1M	19	-11.362	8	PASS
	39	-10.011	8	PASS

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Test plot as follows:



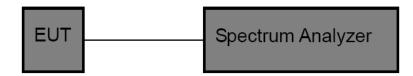


#### **Duty Cycle** 3.8.

#### Limit

None, for report purposes only.

#### **Test Configuration**



#### **Test Procedure**

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

3. Spectrum Setting: Set analyzer center frequency to test channel center frequency. Set the span to 0Hz. Set the RBW to 10MHz. Set the VBW to 10MHz. Detector: Peak. Sweep time: Auto.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

#### **Test Mode**

Please refer to the clause 2.4.

#### **Test Result**

Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
	0	0.274	0.625	43.85	3.65	5
BLE_1M	19	0.274	0.625	43.78	3.65	5
	39	0.275	0.625	43.94	3.64	5

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IXIR T RF 50Ω AC	SENSE:INT		01:21:29 AM Jul 19, 2023
Center Freq 2.402000000 GHz	PNO: Fast ↔→ Trig: Free Ru IFGain:Low #Atten: 26 dB		TRACE 1 2 3 4 5 6 TYPE WWWWWW DET A A A A A A
Ref Offset 0.5 dB 10 dB/div Ref 16.50 dBm			ΔMkr3 624.9 μs -0.29 dB
Log 6.50		2Δ1	3Δ1
-3.50		2∆1	341
-23.5			
-43.5			
-53.5 1 - 51			at the second state of the
-73.5		aladadadha na araara	all the state of the
Center 2.402000000 GHz Res BW 8 MHz	#VBW 8.0 MHz*	Sweep	Span 0 Hz 3.333 ms (40000 pts)
MKR MODE TRC SCL X 1 N 1 t 2.038 2 Al 1 t (A) 2.740	MIN FUNCTION	ON FUNCTION WIDTH FU	NCTION VALUE
<b>3</b> Δ1 <b>1</b> t (Δ) 624.9	μs (Δ) -0.15 dB μs (Δ) -0.29 dB		
5 6 7			
8 9 10			
MSG		STATUS	>
		011100	
	LE 240	2	
Agilent Spectrum Analyzer - Swept SA V/ R T RF 50 Ω AC		ALIGNAUTO	01:27:00 AM Jul 19, 2023
	SENSE:INT PN0: Fast ↔→ Trig: Free Ru	ALIGNAUTO Avg Type: RMS In	01:27:00 AM Jul 19, 2023 TRACE 12 2 4 5 6 TYPE WWWWWW DET & & & & A &
00 R T RF 50 Ω AC Center Freq 2.440000000 GHz Ref Offset 0.5 dB	SENSE:INT PN0: Fast ↔ Trig: Free Ru	ALIGNAUTO Avg Type: RMS In	TRACE 2 3 4 5 6 TYPE WWWWWW DET A A A A A A ΔMkr3 624.9 μs
00 R T RF 50 Q AC Center Freq 2.4400000000 GHz	SENSE:INT PNO: Fast ↔ Trig: Free Ru IFGain:Low #Atten: 26 dB	ALIGNAUTO Avg Type: RMS In 3	TRACE 123456 TYPE WWWWWW DET A A A A A A
R         T         RF         50.9         AC           Center Freq 2.440000000 GHz           IO         B/div         Ref Offset 0.5 dB           10 dB/div         Ref 16.50 dBm           -3.50	SENSE:INT PN0: Fast ↔→ Trig: Free Ru	ALIGNAUTO Avg Type: RMS In	TRACE 2 3 4 5 6 TYPE WWWWWW DET A A A A A A ΔMkr3 624.9 μs
R         T         RF         50.0         AC         AC           Center Freq 2.440000000 GHz         Ref Offset 0.5 dB         AC         AC </td <td>SENSE:INT PNO: Fast ↔ Trig: Free Ru IFGain:Low #Atten: 26 dB</td> <td>ALIGNAUTO Avg Type: RMS In 3</td> <td>TRACE 2 3 4 5 6 TYPE WWWWWW DET A A A A A A ΔMkr3 624.9 μs</td>	SENSE:INT PNO: Fast ↔ Trig: Free Ru IFGain:Low #Atten: 26 dB	ALIGNAUTO Avg Type: RMS In 3	TRACE 2 3 4 5 6 TYPE WWWWWW DET A A A A A A ΔMkr3 624.9 μs
Rt         SO.Q         AC           Center Freq 2.440000000 GHz           Conter Freq 2.440000000 GHz           Ref Offset 0.5 dB           10 dB/div         Ref 16.50 dBm           -0 dB/div         Ref 16.50 dBm           -13 5	PNO: Fast + Trig: Free Ru IFGain:Low #Atten: 26 dB	ALIGNAUTO Avg Type: RMS in 3	ΔMkr3 624.9 μs -0.46 dB
R T         RF         50.2         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB           10 dB/div         Ref 16.50 dBm           6.50	PNO: Fast IFGain:Low An analysis (hpt=10)(31) An an an analysis (hpt=10)(31) An an	ALIGNAUTO Avg Type: RMS in 3	TRACE 123456 TYPE VARMANE CET A A A A A A ΔMkr3 624.9 μs -0.46 dB
R         T         RF         SO Q         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB           10 dB/div         Ref 16.50 dBm           6.50	PNO: Fast IFGain:Low Autor 26 dB	ALIGNAUTO Avg Type: RMS in 3	TRACE 11 23 4 5 G TYPE WARMAND CET & A A A A A A ΔMkr3 624.9 μs -0.46 dB
R         T         RF         SO Q         AC           Center Freq 2.440000000 GHz           Io         Ref Offset 0.5 dB           Io         Ref 16.50 dBm           Io         Ref 16.50 dBm           Io         Ref 16.50 dBm           Io         Io         Io           Io         Ref 16.50 dBm         Io           Io         Io         Io         Io           Io         Io         Io         Io           Io         Io         Io         Io         Io           Io         Io         Io         Io         Io           Io         Io         Io         Io         Io         Io           Io         Io         Io         Io         Io         Io         Io         Io         Io         Io         Io         Io         Io         Io         Io <thio< th="">         Io         <thio< th=""> <thio< th=""> <thio< th=""></thio<></thio<></thio<></thio<>	PNO: Fast IFGain:Low An analysis (hpt=10)(31) An an an analysis (hpt=10)(31) An an	ALIGNAUTO Avg Type: RMS an 3 2 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	TACE    2 3 4 5 6 TYPE    2 3
M         R         T         RF         SO Q         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB         Ref 16,50 dBm           0         B/div         Ref 16,50 dBm           0.5         Image: Context of the second secon	PNO: Fast IFGain:Low	ALIGNAUTO Avg Type: RMS	TRACE 123456 TYPE 123456 TYPE 123484 CET & AA & AA & A ΔMkr3 624.9 μs -0.46 dB
R         T         RF         SO.Q         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB           O dB/div         Ref 16.50 dBm           0 dB/div         Ref 16.50 dB	PNO: Fast IFGain:Low Trig: Free Ru #Atten: 26 dB	ALIGNAUTO Avg Type: RMS	TRACE       2.3.4.5 G         TYPE       Water         CHIKr3       624.9 µs         -0.46 dB       -0.46 dB         -0.46 dB
M         T         RF         S0.2         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB         Ref 16.50 dBm           0 dB/div         Ref 16.50 dBm           0 dB/div         Ref 16.50 dBm           0 dB/div         Ref 16.50 dBm           1 db         Gate         Gate           1 db         Gate         Gate           1 db         Gate         Gate         Gate           1 db         Gate         Gate         Gate         Gate           1 db         Gate         Gate         Gate         Gate           1 db         1 db         1 db         1 db         1 db           1 db         1 db         1 db         1 db         2 db           1 db         1 db         2 db         2 db         2 db           1 db         1 db         1 db         2 db         2 db           1 db         1 db         1 db         2 db         2 db           1 db         1 db         1 db         2 db         2 db           1 db         1 db         1 db         2 db         2 db           1 db         1 db         1 db         2 db <th1< td=""><td>PNO: Fast IFGain:Low</td><td>ALIGNAUTO Avg Type: RMS</td><td>TRACE       2.3.4.5 G         TYPE       Water         CHIKr3       624.9 µs         -0.46 dB       -0.46 dB         -0.46 dB</td></th1<>	PNO: Fast IFGain:Low	ALIGNAUTO Avg Type: RMS	TRACE       2.3.4.5 G         TYPE       Water         CHIKr3       624.9 µs         -0.46 dB       -0.46 dB         -0.46 dB
M         R         T         RF         SO.Q         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB         Ref 16.50 dBm           I         Center Freq 2.440000000 GHz           I         Ref 16.50 dBm           I         G         I           I <thi< th="">         I         I         I</thi<>	PNO: Fast IFGain:Low	ALIGNAUTO Avg Type: RMS	TRACE       2.3.4.5 G         TYPE       Water         CHIKr3       624.9 µs         -0.46 dB       -0.46 dB         -0.46 dB
M         T         RF         SO.Q         AC           Center Freq 2.440000000 GHz           Ref Offset 0.5 dB           10 dB/div         Ref 16.50 dBm           0.50	PNO: Fast IFGain:Low	ALIGNAUTO Avg Type: RMS	TRACE       2.3.4.5 G         TYPE       Water         CHIKr3       624.9 µs         -0.46 dB       -0.46 dB         -0.46 dB

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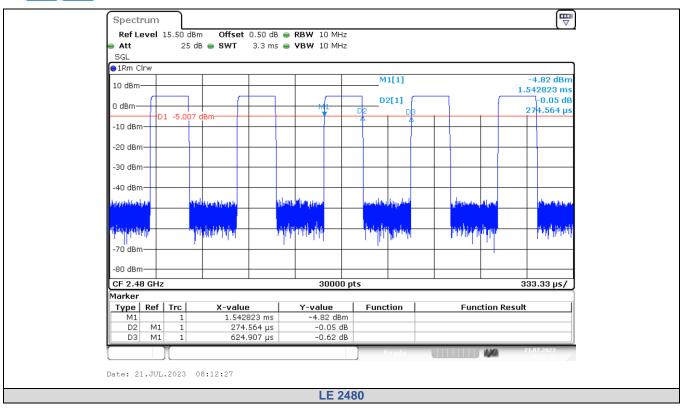
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## 3.9. Antenna Requirement

#### **Requirement**

#### FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

#### Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

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