

### CTC Laboratories, Inc.

# **TEST REPORT**

Report No:	CTC2024234906			
FCC ID	2AASG-CS2290			
Applicant:	Shenzhen MinDe Electronics Te	chnology I td		
Address:	5th Floor, Section 1, 25th Block, N Nanshan District, Shenzhen, P.R.	o.5, Kezhi Xi Road, Keji Yuan,		
Manufacturer	Shenzhen MinDe Electronics Technology Ltd.			
Address	Nanshan District, Shenzhen, P.R. China			
Product Name:	Cordless Image Scanner			
Trade Mark:	MINDEO			
Model/Type reference:	CS2290-HD(BT)			
Listed Model(s):	CS2XXX-XX, CS2XXX-XX(BT), CS2XXXS-XX, CS2XXXS-XX(BT) (X Stand for 0-9, A-Z)			
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247			
Test Report Form No:	: CTC-TR-058_A1			
Master TRF:	Dated 2024-09-20			
Date of receipt of test sample:	Aug. 26, 2024			
Date of testing	Aug. 26, 2024 to Oct. 30, 2024			
Date of issue	Dec. 25, 2024			
Result	PASS			
Compiled by:		T. Jima		
(Printed name+signature)	Jim Jiang	)in may		
Supervised by:	barg			
(Printed name+signature)	Jim Jiang Eric Zhang Totti Zhao			
Approved by: 122				
(Printed name+signature)	Totti Zhao	/***		
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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.

<u>RSS-247 Issue 3</u>: 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	CTC2024234906	Dec. 25, 2024	Original

### 1.3. Test Description

FCC Part 15 Subpart C (15.247) / RSS-247 Issue 3					
Test Item	Standard	Section	Decult	Test	
rest nem	FCC ISED		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	
Occupied Bandwidth	/	RSS-GEN 6.7	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:

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

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: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, 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 1" 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 9kHz~30MHz	±4.26 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



### 2. GENERAL INFORMATION

### 2.1. Client Information

Applicant:	Shenzhen MinDe Electronics Technology Ltd.
Address:5th Floor, Section 1, 25th Block, No.5, Kezhi Xi Road, Keji Yuan, Nans District, Shenzhen, P.R. China	
Manufacturer:	Shenzhen MinDe Electronics Technology Ltd.
Address:	5th Floor, Section 1, 25th Block, No.5, Kezhi Xi Road, Keji Yuan, Nanshan District, Shenzhen, P.R. China

### 2.2. General Description of EUT

Product Name:	Cordless Image Scanner			
Trade Mark:	MINDEO			
Model/Type reference:	CS2290-HD(BT)			
Listed Model(s):	CS2XXX-XX, CS2XXX-XX(BT), CS2XXXS-XX, CS2XXXS-XX(BT) (X Stand for 0-9, A-Z)			
Model Difference:	All these models are identical in the same PCB, layout, electrical circuit and enclosure. The difference is the model name.			
Sample ID:	CTC240926-006-S002, CTC240926-006-S003			
Dewer Currhy	5V - 0.5A from Cradle			
Power Supply:	3.7V 2600mAh from lithium battery			
Hardware Version:	/			
Software Version:	/			
Bluetooth 4.2 / BLE				
Modulation:	GFSK			
Operation Frequency:	2402MHz~2480MHz			
Channel Number:	40			
Channel Separation:	2MHz			
Data Rate:	1Mbps			
Antenna Type:	Multilayer Ceramic Antenna			
Antenna Gain:	2.66dBi			



### 2.3. Accessory Equipment Information

Equipment Information						
Name	Model	S/N	Manufacturer			
Notebook	ThinkBook 14 G3 ACL	MP246QDR	Lenovo			
Notebook	X220	4291GM8	Lenovo			
Cradle	CS2X19-BT	1	MINDEO			
Cable Information	Cable Information					
Name	Shielded Type	Ferrite Core	Length			
USB Cable	Unshielded	NO	100cm			
USB Cable Unshielded NO 200cm		200cm				
Test Software Information						
Name	Version	1	/			
RTLBTAPP	5.2.3.54	/	/			



### 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 charges through the Cradle.

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.



### 2.5. Measurement Instruments List

	RF Test System - SRD				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	MXA Signal Analyzer	Keysight	N9020A	MY52091402	Aug. 21, 2025
2	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 12, 2024
3	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 12, 2024
4	USB Wideband Power Sensor	Keysight	U2021XA	MY55130004	Mar. 21, 2025
5	USB Wideband Power Sensor	Keysight	U2021XA	MY55130006	Mar. 21, 2025
6	Wideband Radio Communication Tester	R&S	CMW500	102414	Dec. 12, 2024
7	RF Control Unit	Tonscend	JS0806-2	/	Aug. 21, 2025
8	Test Software	Tonscend	JS1120-3	V3.3.38	/
9	High and low temperature test chamber	ESPEC	MT3035	/	Mar. 21, 2025

	Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until		
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9163	01026	Dec. 18, 2024		
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Sep. 25, 2025		
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 12, 2024		
4	Broadband Amplifier	SCHWARZBECK	BBV9743B	259	Dec. 12, 2024		
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 12, 2024		
6	3m chamber 3	YIHENG	EE106	/	Aug. 28, 2026		
7	Test Software	FARA	EZ-EMC	FA-03A2	/		

		Conducted	d Emission		
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	LISN	R&S	ENV216	101112	Dec. 12, 2024
2	LISN	R&S	ENV216	101113	Dec. 12, 2024
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 12, 2024
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 12, 2024
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 12, 2024
6	Test Software	R&S	EMC32	6.10.10	/

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

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

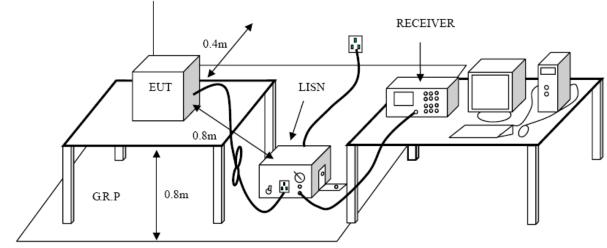
### <u>Limit</u>

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

	Conducted 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



#### 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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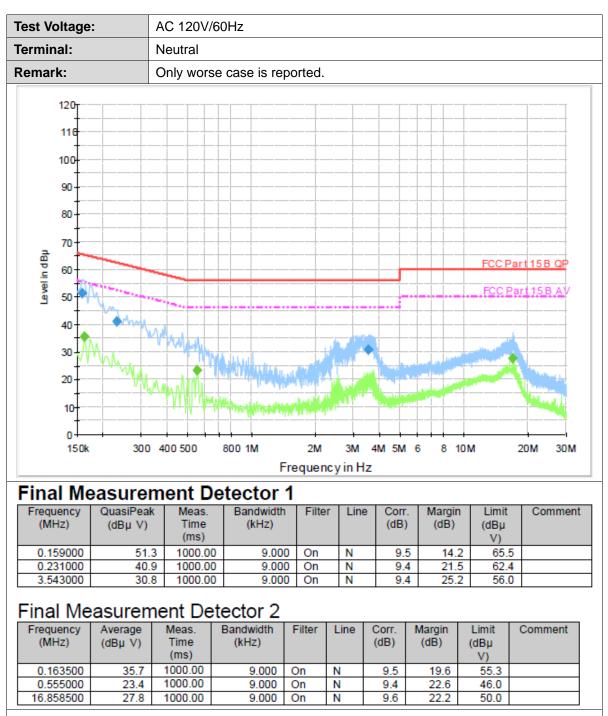


Fest Voltage	: /	AC 120V/6	60Hz						
Ferminal:	l	_ine							
Remark:	(	Only worse case is reported.							
120 116 100 90 80 70 70 18 90 80 70 70 40				ported.					art 15 B QP
30 20 10	MMMM		William William						
20 10	300	400 500	800 1M	2M	3M	4M 5M	6 8 10	DM	20M 30M
20 10	300	400 500		2M requenc			6 8 10	DM	20M 30M
20 10- 0			F	requenc			6 8 10	DM	20M 30M
20 10 150k Final Me Frequency (MHz)	QuasiPeak (dBµ V)	nent De Meas. Time (ms)	Fietector ' Bandwidth (kHz)	requenc 1 Filter	y in Hz	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
20 10 150k Final Me Frequency (MHz) 0.168000	QuasiPeak (dBµ V) 50.4	Meas. Time (ms) 1000.00	Etector Bandwidth (kHz) 9.000	Filter	Line	Corr. (dB) 9.5	Margin (dB) 14.7	Limit (dBµ V) 7 65.1	Comment
20 10 150k Final Me Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms) 1000.00	Fietector ' Bandwidth (kHz)	Filter	y in Hz	Corr. (dB)	Margin (dB)	Limit (dBµ V) 2 65.1 62.4	Comment
20 10 150k Final Me Frequency (MHz) 0.168000 0.231000 3.250500 Final Me Frequency Frequency	QuasiPeak (dBµ V) 50.4 42.0 30.9 easurem Average	Meas. Time (ms) 1000.00 1000.00 1000.00 ent Det Meas.	Bandwidth (kHz) 9.000 9.000 9.000 9.000 9.000 9.000	Filter	Line	Corr. (dB) 9.5 9.5 9.5 Corr.	Margin (dB) 14.7 20.4 25.1 Margin	Limit (dBµ V) 65.1 62.4 56.0	Comment
20 10 150k Final Me Frequency (MHz) 0.168000 0.231000 3.250500 Final Me	QuasiPeak (dBµ V) 50.4 42.0 30.9 easurem	Meas. Time (ms) 1000.00 1000.00 1000.00 ent Det Meas. Time	Find the sector of the sector	Filter	y in Hz Line L1 L1 L1	Corr. (dB) 9.5 9.5 9.5	Margin (dB) 14.7 20.4 25.1	Limit (dBµ V) 65.1 62.4 56.0	Comment
20 10 150k Final Me Frequency (MHz) 0.168000 0.231000 3.250500 Final Me Frequency Frequency	QuasiPeak (dBµ V) 50.4 42.0 30.9 easurem Average	Meas. Time (ms) 1000.00 1000.00 1000.00 ent Det Meas.	Bandwidth (kHz) 9.000 9.000 9.000 9.000 9.000 9.000 9.000	Filter	y in Hz Line L1 L1 L1	Corr. (dB) 9.5 9.5 9.5 Corr.	Margin (dB) 14.7 20.4 25.1 Margin	Limit (dBµ V) 65.1 62.4 56.0	Comment
20 10 10 150k Final Me Frequency (MHz) Frequency (MHz)	QuasiPeak (dBµ V) 50.4 42.0 30.9 easurem Average (dBµ V)	Meas.           Time           (ms)           1000.00           1000.00           1000.00           1000.00           1000.00           1000.00           Time           (ms)	Endwidth (kHz) 9.000 9.000 9.000 9.000 9.000 9.000 9.000 9.000	Filter On On On On	y in Hz Line L1 L1 L1	Corr. (dB) 9.5 9.5 9.5 Corr. (dB)	Margin (dB) 14.7 20.4 25.1 Margin (dB)	Limit (dBµ V) 65.1 62.4 56.0	Comment

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Emission Level = Read Level + Correct Factor



### 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

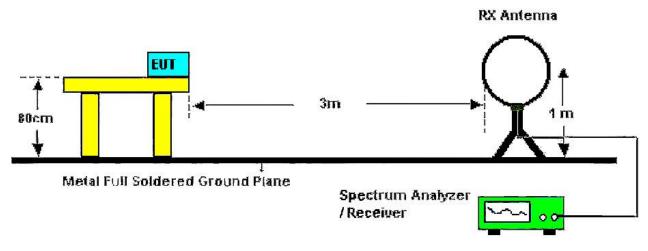
	dBµV/m (at 3 meters)			
Frequency Range (MHz)	Peak	Average		
Above 1000	74	54		

#### Note:

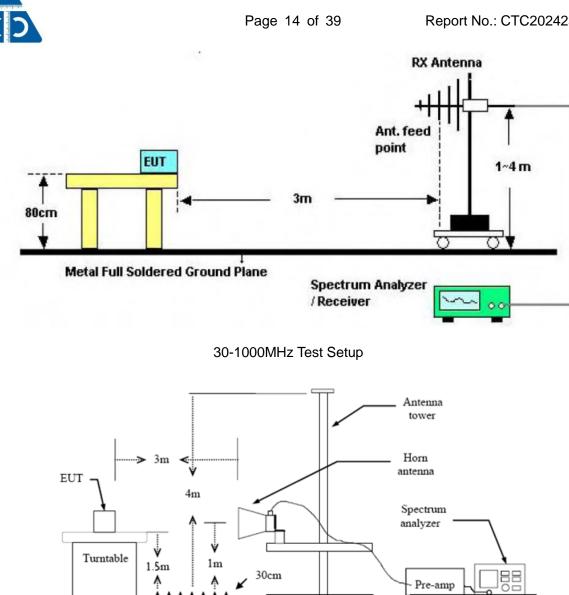
(1) The tighter limit applies at the band edges.

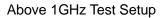
(2) Emission Level ( $dB\mu V/m$ )=20log Emission Level ( $\mu V/m$ ).

#### **Test Configuration**



Below 30MHz Test Setup





#### **Test Procedure**

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

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

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

For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna 4. 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.

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

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(2) 9k – 150kHz:

RBW=300 Hz, VBW=1 kHz, Sweep=auto, Detector function=peak, Trace=max hold (3) 0.15M – 30MHz:

RBW=10 kHz, VBW=30 kHz, Sweep=auto, Detector function=peak, Trace=max hold (4) 30M - 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.

(5) From 1 GHz to 10<sup>th</sup> 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.

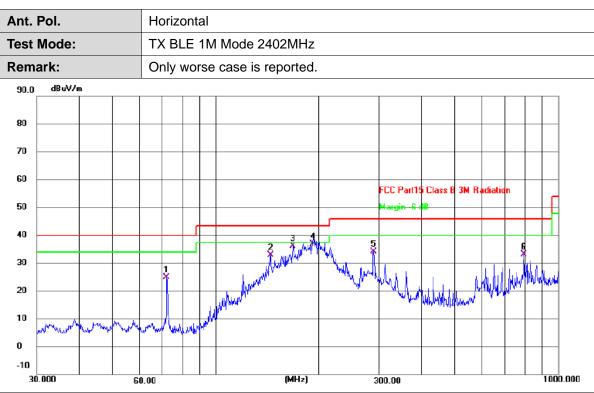
#### <u>Test Result</u>

#### 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.





No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	71.8320	45.63	-20.73	24.90	40.00	-15.10	QP
2	144.3348	51.43	-18.60	32.83	43.50	-10.67	QP
3	167.8243	55.25	-19.14	36.11	43.50	-7.39	QP
4 *	192.4186	57.73	-20.73	37.00	43.50	-6.50	QP
5	289.0021	52.07	-17.90	34.17	46.00	-11.83	QP
6	793.3960	39.30	-6.06	33.24	46.00	-12.76	QP

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





	. Pol.		Vert								
Tes	t Mode:		TX BLE 1M Mode 2402MHz								
Ren	nark:		Onl	y wors	e case	e is reported	•				
90.0	dBuV∕n	n					1 1				
80											
70											
60							F	CC Part15 Class B	3M Radiation	1	
50							largin -6 dB				
40							Ē		4	56	
30			Ť		2	1 1 14		1 1.6.4		25 Muy Martinad	
20 10	under a stars	. Automation	mark	the second and and and and and a second and a			- TANK TON TANK				
0	V	and all									
-10											
3	0.000	6	0.00			(MHz)	30	0.00		1000.0	000
	No.	Frequer (MHz		Rea (dB	_	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ī
	1 *	72.084	13	48	.45	-20.77	27.68	40.00	-12.32	QP	ľ
	2	119.85	56	48	.83	-20.63	28.20	43.50	-15.30	QP	
	3	193.09	45	47	20	-20.77	26.43	43.50	-17.07	QP	
	4	590.97	37	43.	.00	-9.69	33.31	46.00	-12.69	QP	
	5	830.40	00	37.	.35	-5.60	31.75	46.00	-14.25	QP	Î
ľ	6	866.08	79	37	.06	-5.27	31.79	46.00	-14.21	QP	İ

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



Ant	. Pol.		Horizontal							
Tes	t Mode:		TX BLE 1M M	lode 2402Ml	Ηz					
Ren	nark:		No report for t limit.	No report for the emission which more than 20 dB below the prescribed						
				1						
	No.	Frequency (MHz)	y Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
	1	4732.583	40.79	1.93	42.72	74.00	-31.28	peak		
	2	7231.417	37.01	10.19	47.20	74.00	-26.80	peak		
	3	8688.417	39.18	11.13	50.31	74.00	-23.69	peak		
	4	9949.583	39.17	13.20	52.37	74.00	-21.63	peak		
	5	11285.167	7 37.80	14.93	52.73	74.00	-21.27	peak		
	6 *	12362.250	37.30	15.66	52.96	74.00	-21.04	peak		

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

2.Margin value = Level -Limit value

Ant. Pol.	Vertical
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)	Limit (dBuV/m)	Margin (dB)	Detector
1	4807.000	40.43	2.08	42.51	74.00	-31.49	peak
2	6491.167	38.53	7.30	45.83	74.00	-28.17	peak
3	7967.750	38.22	10.80	49.02	74.00	-24.98	peak
4	9620.583	38.27	12.65	50.92	74.00	-23.08	peak
5 *	10717.250	38.37	14.39	52.76	74.00	-21.24	peak
6	12327.000	37.03	15.71	52.74	74.00	-21.26	peak

#### Remarks:

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

2.Margin value = Level -Limit value



Ant. Pol.			Н	Horizontal						
Test Mode:				K BLE 1M M	ode 2440Mł	Ηz				
Ren	nark:			No report for the emission which more than 20 dB below the prescribed limit.						
	No.	Frequenc (MHz)	y	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
	1	4807.000	)	40.44	2.08	42.52	74.00	-31.48	peak	
	2	6436.333	;	38.46	7.13	45.59	74.00	-28.41	peak	

10.59

12.70

14.56

16.31

48.67

50.61

53.10

53.36

74.00

74.00

74.00

74.00

-25.33

-23.39

-20.90

-20.64

peak

peak

peak

peak

Remarks:

3

4

5

6 \*

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

38.08

37.91

38.54

37.05

2.Margin value = Level -Limit value

7862.000

9644.083

10803.417

12667.750

Ant	. Pol.		Vertical					
Test Mode: TX BLE 1M Mode 2440MHz								
Ren	nark:		No report for the limit.	he emission	which more	than 20 dB	below the	e prescribe
	No. Frequence (MHz)		y Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	1199 750	47.34	-7 59	39.75	74 00	-34 25	peak

1			· · ·	· · ·	· ·	· ·	· · ·	
1		1199.750	47.34	-7.59	39.75	74.00	-34.25	peak
2		5151.667	40.14	2.78	42.92	74.00	-31.08	peak
3		7920.750	38.96	10.70	49.66	74.00	-24.34	peak
4		9730.250	37.93	12.87	50.80	74.00	-23.20	peak
5		10889.583	38.01	14.65	52.66	74.00	-21.34	peak
6	*	12017.583	37.42	15.67	53.09	74.00	-20.91	peak

Remarks:

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

2.Margin value = Level -Limit value

peak

peak

peak

-23.70

-21.37

-21.32



Ant	. Pol.		Horizontal					
Tes	t Mode:		TX BLE 1M M	ode 2480MI	Hz			
Ren	nark:		No report for t limit.	he emission	which more	than 20 dB	below the	e prescribe
	No.	Frequency (MHz)	y Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	1438.667	46.20	-6.85	39.35	74.00	-34.65	peak
	2	5183.000	40.39	2.87	43.26	74.00	-30.74	peak
	3	8026.500	39.40	10.79	50.19	74.00	-23.81	peak

12.58

14.60

15.76

50.30

52.63

52.68

74.00

74.00

74.00

Remarks:

4

5

6 \*

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

37.72

38.03

36.92

2.Margin value = Level -Limit value

9507.000

10838.667

12456.250

Ant	. Pol.		Vertical					
Tes	t Mode:		TX BLE 1M M	ode 2480M	Hz			
Rer	nark:		No report for t limit.	he emissior	n which more	than 20 dB	below the	e prescrib
	No.	Frequency (MHz)	(dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	1199.750	48.94	-7.59	41.35	74.00	-32.65	peak
	2	4360.500	40.45	1.08	41.53	74.00	-32.47	peak
	3	6385.417	39.04	6.96	46.00	74.00	-28.00	peak
	4	8324.167	38.99	10.43	49.42	74.00	-24.58	peak
	5	10349.083	38.07	13.91	51.98	74.00	-22.02	peak
	6 *	12436.667	37.26	15.71	52.97	74.00	-21.03	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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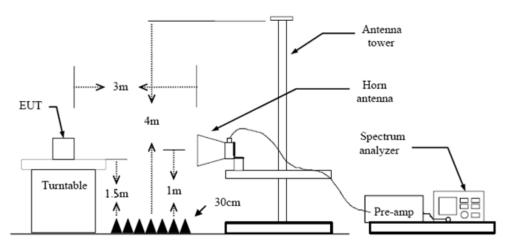
### 3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

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

Restricted Frequency Band	(dBµV/m	ı) (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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For anti-fake verification, please visit the official website of China Inspection And Testing



Ant. Pol	I.		Ho	orizontal					
Test Mo	de:		ТХ	KBLE 1M M	ode 2402MI	Ηz			
120.0 d	dBuV/m	-							
110									
100									
90									
80									A
70							FCC Part 15C 3	1 Above-16 F	eak
60									$\square$
50							FCC Part 15C 3	1 Above-16 A	
40						3) Xe		5	$\square$
30						Â			$\square$
				- A I				6	$\sim$ $\sim$
20									
20									
10 0.0	200 22					2200.02	2020 40 200	4.00 000	
10	000 23	800.00 2312	2.00	2324.00 23	36.00 (MHz)	2360.00	2372.00 238	4.00 239	6.00 2408
10 0.0		Frequence (MHz)	су	2324.00 23 Reading (dBuV)	Factor (dB/m)	Level	2372.00 238 Limit (dBuV/m)	Margin	6.00 2408 Detector
10 0.0 2288.0	0.	Frequen	су	Reading	Factor	Level	Limit	Margin	
10 0.0 2288.0	0.	Frequen (MHz)	су Ю	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
10 0.0 2288.0 No	0.   2	Frequence (MHz) 2321.96	cy 0	Reading (dBuV) 45.52	Factor (dB/m) -9.32	Level (dBuV/m) 36.20	Limit (dBuV/m) 74.00	Margin (dB) -37.80	Detector peak
10 0.0 2288.0 No 1 2 3	0.   2	Frequence (MHz) 2321.96 2321.96	cy 0 0	Reading (dBuV) 45.52 39.79	Factor (dB/m) -9.32 -9.32	Level (dBuV/m) 36.20 30.47	Limit (dBuV/m) 74.00 54.00	Margin (dB) -37.80 -23.53	Detector peak AVG
10 0.0 2288.0 No 1 2 3	0.   <u>2</u> }	Frequence (MHz) 2321.96 2321.96 2361.92	cy 0 0 0	Reading (dBuV) 45.52 39.79 52.31	Factor (dB/m) -9.32 -9.32 -9.17	Level (dBuV/m) 36.20 30.47 43.14	Limit (dBuV/m) 74.00 54.00 74.00	Margin (dB) -37.80 -23.53 -30.86	Detector peak AVG peak

2.Margin value = Level -Limit value

Ant.	Pol.		Vertical					
Test	Mode:		TX BLE 1	M Mode 2402M	lHz			
120.	0 dBuV/m	<b>1</b>						
110								
100								
90								
80						FCC Part 15C 3	4 Above-16 F	
70								
60						FCC Part 15C 3	l Above-16 A	v /
50					3 X 4			
40			1 X 2		Î		X	
30					/			V VI
20								
10 0.0								
2	288.000 2	300.00 2312.	00 2324.00	2336.00 (MHz	2360.00	2372.00 238	4.00 239	<b>16.00 2408.0</b>
	No.	Frequence (MHz)	cy Readii (dBu\		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	2321.96	0 47.26	6 -9.32	37.94	74.00	-36.06	peak
	2	2321.96	0 40.89	9 -9.32	31.57	54.00	-22.43	AVG
ſ	3	2362.04	0 58.77	7 -9.17	49.60	74.00	-24.40	peak
			0 52.05	5 -9.17	42.88	54.00	-11.12	AVG
	4 *	2362.04	0 02.00					
	4 * 5	2362.04 2390.00			38.08	74.00	-35.92	peak

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

2.Margin value = Level -Limit value

nτ.	Pol.		H	orizonta	al								
est	Mode:		T.	K BLE 1	IM M	ode 24	80M	lz					
120.0	) dBuV/m												
110													
100													
90													
80													
70										FCC	: Part 15C 3H	Above-16 F	eak
60													
50	$\Rightarrow$									FCC	Part 15C 3	l Above-16 A	<u>v</u>
40	1				3								
30													
20	~ ^										~~~·		
10													
			1						1				
0.0 24	<b>174.000</b> 24	86.00 24	98.0D	2510.00	252	2.00	(MHz)	254	6.00	255	8.00 257	0.00 258	2.00 2594
	174.000 24 No.	Freque	ncy	Read	ling	Fac	tor	Le	vel		Limit	Margin	1
	No.	Freque (MHz	ncy z)	Read (dBu	ling ıV)	Fac (dB/	ctor /m)	Le (dBu	vel IV/m)	(d	Limit BuV/m)	Margin (dB)	Detector
	No.	Freque (MHz 2483.5	ncy z)	Read (dBu 49.4	ling ıV) 16	Fac (dB/ -8.	ctor /m) 76	Le (dBu 40	vel V/m) .70	(d	Limit BuV/m) 74.00	Margin (dB) -33.30	Detector peak
	No.	Freque (MHz	ncy z) 500	Read (dBu	ling IV) 16	Fac (dB/	ctor /m) 76 76	Le (dBu 40 28	vel IV/m)	(d	Limit BuV/m)	Margin (dB)	Detector

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



۱nt.	Pol.			V	'ertic	al													
<b>Fest</b>	Mode:			Т	X BL	E 1N	1 M	ode 2	24801	ИH	lz								
120.0	) dBuV/m																		
110																			_
100 90															+				
30 80	- A																		
70													FU	C Part 150	3M	ADOVE	-161	Геак	
60	-												FC	C Part 150	311	Above	:-16 /	v	
50	3						3X 4							ьХœ					
40							Ť							Ň	+				$\neg$
30 20		hn	m	~~~~~			Ţ	·			~								
20 10																			
0.0	72.800 24	184.80	249	6.80	250	B. 80	253	20.80	(MH	<b>2</b> ]	254	4.80	255	6.80 2	2568	8.80	259	30, 80	2593
	No.	Free	quei MHz	ncy	Re	eadir IBuV	ng	Fa	actor B/m)		Lev	vel		Limit BuV/m		Mar (dE	gin	Dete	
ľ	1	248	33.5	00	5	6.37	'	-8	8.76		47.	61	1	74.00		-26.	39	pe	ak
Ī	2	248	33.5	00	4	2.62	2	-8	8.76		33.	86	!	54.00		-20.	14	AV	'G
	3	251	19.9	60	5	57.35	;	-8	8.64		48.	71	1	74.00		-25.	29	pea	ak
	4 *	251	19.9	60	5	50.20	)	-8	8.64		41.	56	!	54.00		-12.	44	AV	'G
ľ	5	256	60.0	40	5	53.90	)	-8	3.50		45.	40	1	74.00		-28.	60	pe	ak
	6		60.0			7.88			3.50	-	39.	~ ~	· ·	54.00	$\rightarrow$	-14.	~~	AV	-

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

2.Margin value = Level -Limit value



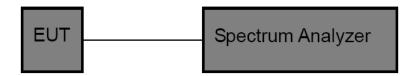
### 3.4. Band Edge and Spurious Emissions (Conducted)

#### <u>Limit</u>

#### 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

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss 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: RBW = 100 kHz, VBW ≥ RBW, scan up through 10<sup>th</sup> harmonic. Sweep = auto, Detector function = peak, Trace = max hold.
- 4. Measure and record the results in the test report.

#### Test Mode

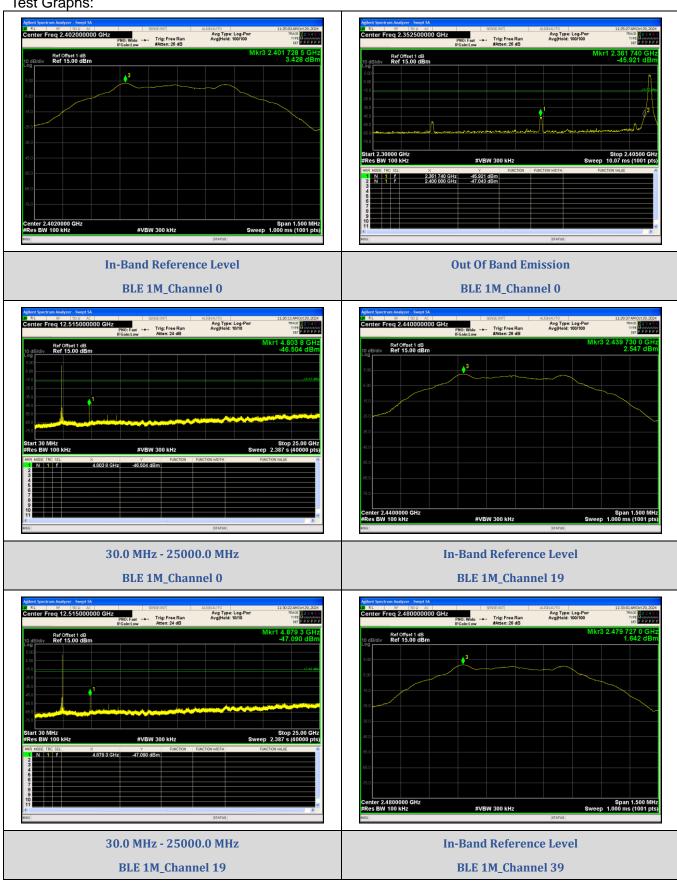
Please refer to the clause 2.4.



#### Test Result

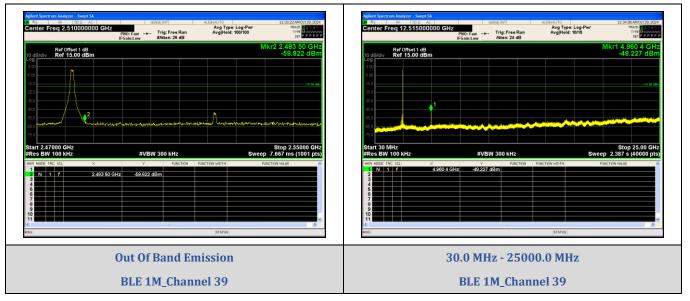
Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
		2361.74	-45.921	-16.57	-29.351	PASS
	0	2400.00	-47.043	-16.57	-30.473	PASS
		4803.80	-46.504	-16.57	-29.934	PASS
BLE 1M	19	4879.30	-47.090	-17.45	-29.640	PASS
	20	2483.50	-59.822	-18.36	-41.462	PASS
	39	4960.45	-48.227	-18.36	-29.867	PASS





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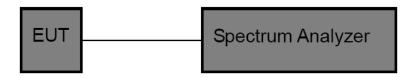
### 3.5. DTS Bandwidth

<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)  $\geq$  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	1.0472	0.7000	≥0.5	Pass
BLE_1M	2440	1.0484	0.7081	≥0.5	Pass
	2480	1.0470	0.7117	≥0.5	Pass

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Room 101 Building B, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of China Inspection And Testing



Bent Spectrum Analyzer Occupied BW RL RF 50.0 AC enter Freq 2.402000000 ( Ref Offset 1 dB	<b>€HZ</b> #IFGain:Low	Center Freq: 2.40200000 Trig: Free Run #Atten: 40 dB	Avg Hold: 2000/2000	11:24:06 AMOct 29, 2024 Radio Std: None Radio Device: BTS Kr2 2.4025216 GHz	Center Freq 2.440000	#IFGain:Low	Center Freq: 2.440000 Trig: Free Run #Atten: 40 dB	ALIGNAUTO 000 GHz Avg[Held: 2000/2000	Radio Device: BTS Mkr2 2.440521 GHz
Ref Offset 1 dB Ref 21.00 dBm 00 00 00 00 00 00 00 00 00 00 00 00 00	<b></b>	·····	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-15.623 dBm	Ref 21.00 10 dible()				-16.657 dBm
enter 2.402 GHz Res BW 20 kHz				Span 2 MHz Sweep 5.333 ms	Center 2.44 GHz #Res BW 20 kHz			<u>-</u>	Span 2 MHz Sweep 5.333 ms
Res BW 20 kHz Occupied Bandwidth		#VBW 62 kHz Total Power	9.54 dBm	Sweep 5.333 ms	#Res BW 20 kHz Occupied Bandv	vidth	#VBW 62 kH Total Power	iz 8.75 dBm	Sweep 5.333 ms
	472 MHz					1.0484 MHz			
Transmit Freq Error x dB Bandwidth	-1.801 kHz 1.307 MHz	OBW Power x dB	99.00 % -26.00 dB		Transmit Freq Erro x dB Bandwidth	r -3.068 kHz 1.307 MHz	OBW Power x dB	99.00 % -26.00 dB	
a			STATUS		MG			STATUS	
		1M_Channo	el O			BLE	1M_Chann	el 19	
den Sector Andyre - Occupied Bit Fra State (2025) enter Freq 2.480000000 C		SENSE DNT 44 Center Freq: 2.48000000	IGNAUTO J GHz Avg Held: 2000/2000	11-22-01 AMOCT 20, 2024 Radio Std: None Radio Device: BTS		BLE	1M_Chann	el 19	
RL RE 50.0 AC	GHz	SENSE:NT A	IGNAUTO J GHz Avg Held: 2000/2000	Radio Std: None		BLE	1M_Chann	el 19	
RL RF 50 Q AC enter Freq 2.480000000 0	GHz	SENSE:NT A	IGNAUTO J GHz Avg Held: 2000/2000	Radio Std: None Radio Device: BTS Kr2 2.4805206 GHz -17.586 dBm		BLE	1M_Chann	el 19	
RL RF 50 Q AC enter Freq 2.480000000 0	SHz #IFGain:Low	SENSE:NT A	IGNAUTO J GHz Avg Held: 2000/2000	Radio Std: None Radio Device: BTS		BLE	1M_Chann	el 19	
RL         100         500         AC           enter Freq 2.480000000         Enter Freq 2.480000000         Enter Freq 2.48000000000000000000000000000000000000	SHz #IFGain:Low	SENSE:NT A	Distanto GHz AvgHeet: 2000/2000 MI	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	
AL 14 153 AC enter Freq 2.480000000 Called Ref 21.00 dBm Called Ref 21.0	GHz #FGaint.ow	20762.011 44 Center Freq: 2.4800000 Frig: Freq 2.4800000 #Acten: 40 dB	Distanto GHz AvgHeet: 2000/2000 MI	Radio Std: None Radio Device: BTS Kr2 2.4805206 GHz -17.586 dBm		BLE	1M_Chann	el 19	
Reformed and whether the set of t	SHz #FGaicLow	Conter Freq: 2.4800000 Trig: Freq: 2.4800000 #Matter: 40 dB	XXXIIO GHz AvgHelt: 2000/2000 MI	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	
AL 14 153 AC enter Freq 2.480000000 Called Ref 21.00 dBm Called Ref 21.0	GHz #FGaint.ow	EXTERNI A Center Freq: 2.4800000 Frig: Freq: 2.4800000 #Atten: 40 dB	Distanto GHz AvgHett: 2000/2000 MI	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	
AL 14 150 AC enter Freq 2.480000000 enter Freq 2.480000000 all all all all all all all all all al	SHz #FGainLow 470 MHz -2.774 kHz	ConterFreq: 2.4800000 Trig:Freq: 2.4800000 #Atten: 40 dB	рикито Эна АудіНені: 2000/2000 Мі Слуді dBm 99.00 %	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	
AL 14 150 AC enter Freq 2.480000000 enter Freq 2.480000000 all all all all all all all all all al	SHz #FGainLow 470 MHz -2.774 kHz	ConterFreq: 2.4800000 Trig:Freq: 2.4800000 #Atten: 40 dB	2000/0 GHz AvgHed: 2000/2000 MI 7.91 dBm 99.00 % -26.00 dB	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	
AL 14 150 AC enter Freq 2.480000000 enter Freq 2.480000000 all all all all all all all all all al	3Hz #FGainctow 470 MHz -2.774 kHz 1.307 MHz	ConterFreq: 2.4800000 Trig:Freq: 2.4800000 #Atten: 40 dB	7.91 dBm 99.00 % -26.00 dB	Radis 5td: None Radis Device: BTS Kr2 2.4905206 GHz -17.596 dBm		BLE	1M_Chann	el 19	

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RL RF 502 AC enter Freq 2.402000000 GH	Z #IFGain:Low	ALCENT L ALCENT  ALCENT ALCENTA ALCE	IGNAUTO O GHz Avg Held: 2000/2000	11:24:33 AMOct 29, 2024 Radio Std: None Radio Device: BTS	Center Freq 2.440000	#IFGain:Low	SENSE:INT Center Freq: 2.440000 Trig: Free Run #Atten: 40 dB	ALIGNAUTO 0000 GHz Avg Hold: 2000/2000	11:29:05 AMOct 29, 2024 Radio Std: None Radio Device: BTS
Ref Offset 1 dB Ref 16.00 dBm 00 00 00 00 00 00 00 00 00 0					10         BR/ Grse 1         Ref 76.00           Log				
4 0 4 0 enter 2.402 GHz Res BW 100 kHz				Span 2 MHz Sweep 1.333 ms	640 740 Center 2.44 GHz #Res BW 100 kHz				Span 2 MHz Sweep 1.333 ms
Res BW 100 kHz Occupied Bandwidth		#VBW 300 kH	2 10.2 dBm	Sweep 1.333 ms	#Res BW 100 kHz Occupied Bandw	ridth	#VBW 300 k Total Power	9.42 dBm	Sweep 1.333 ms
1.07	16 MHz -6.010 kHz	OBW Power x dB	99.00 % -6.00 dB		Transmit Freq Erro x dB Bandwidth	1.0737 MHz	OBW Power x dB	99.00 % -6.00 dB	
٥			STATUS		MSG			STATUS	
en Spectrum Analyzer. Occupied BW	BLE 1	M_Channo	el O			BLE	1M_Chann	el 19	
Red Spectrum Analyser : Occupied NV Alt 1000 ACC enter Freq 2.480000000 GH Ref Offset 1 dB an	SEA	M_Channe Center Free 2.4800000 Trile Free Run SAtten: 40 dB	IGNALITO	11-22-20 AMOC1 20, 2024 Radis Std: None Radis Device: BTS		BLE	1M_Chann	el 19	
RL RE 50.9 AC	2 SBA	REINT A	IGNAUTO	Radio Std: None		BLE	1M_Chann	el 19	
AL 09 930 AC 0 enter Freq 2.48000000 GH Ref0fset 1 dB 06/04 Ref 16.00 dBm 00 00 00 00 00 00 00 00 00 00 00 00 00	2 SBA	REINT A	2000/10 GHz AvgHed: 2000/2000	Radio Std: None Radio Device: BTS		BLE	1M_Chann	el 19	
AL 09 1935 AC enter Freq 2.480000000 GH Pallow Ref 16.00 dBm of the	Z #IFGein1.ov	26.201) 44 Center Free 2.4800000 Frig Free Run Aftan: 40 dB	2000/10 GHz AvgHed: 2000/2000	Radio Std: None		BLE	1M_Chann	el 19	
AL 0/ 1905 AC enter Freq 2.480000000 GH Ref 0.00 dBm of Slow Ref 16.00 dBm enter 2.48 GHz Res BW 100 kHz Occupied Bandwidth 1.07/	z #FGals1.ow 22 MHz -8.147 kHz	ESON 44 Center Free 2.4800000 Frig Free Run Arton: 40 dB	2000/00 GHz AvgHeit: 2000/2000	Radio Std: None Radio Device: BTS		BLE	1M_Chann	el 19	
ALC 49 1935 AC enter Freq Z48000000 GH Ref Offset 1 dB 0 dS/dv Ref 16.00 dBm 0 dS/dv Ref 16.00 dS/dv Ref 1	z #FGals1.ow 22 MHz -8.147 kHz	Center Free 2.4500000 Trail Free Run Akten: 40 dB #VBW 300 kH Total Power OBW Power	2000/10 944 AvgH4el: 2000/2000 2 8.58 dBm 99.00 %	Radio Std: None Radio Device: BTS		BLE	1M_Chann	el 19	



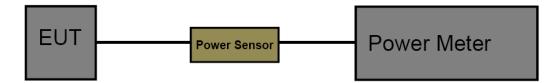
### 3.6. Peak Output Power

<u>Limit</u>

#### 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	Maximum Conducted Output Power	1 Watt or 30dBm	2400~2483.5
	EIRP	4 Watt or 36dBm	2400~2483.5

#### Test Configuration



#### Test Procedure

- 1. The maximum conducted output power may be measured using a broadband Peak RF power meter.
- 2. Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
- 3. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. Record the measurement data.

#### Test Mode

Please refer to the clause 2.4.

#### Test Result

Test Mode	Antenna	Channel	Peak Output Power[dBm]	Limit[dBm]	Verdict
		2402	3.712	≤30	PASS
BLE_1M	Ant1	2440	3.113	≤30	PASS
		2480	2.174	≤30	PASS

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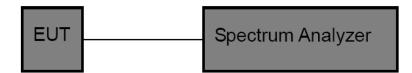
### 3.7. Power Spectral Density

<u>Limit</u>

#### 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

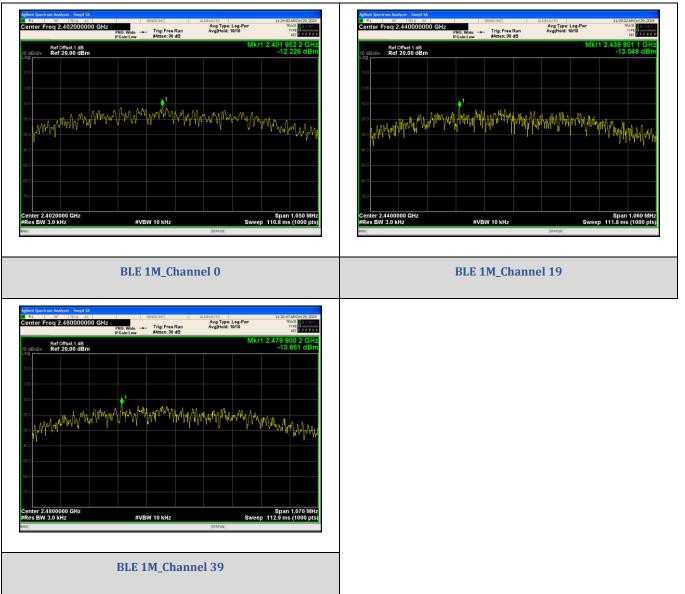
Please refer to the clause 2.4.

#### Test Result

Test Mode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
		2402	-12.226	≤8	PASS
BLE_1M	Ant1	2440	-13.048	≤8	PASS
		2480	-13.661	≤8	PASS

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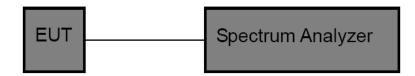


### 3.8. Duty Cycle

#### <u>Limit</u>

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

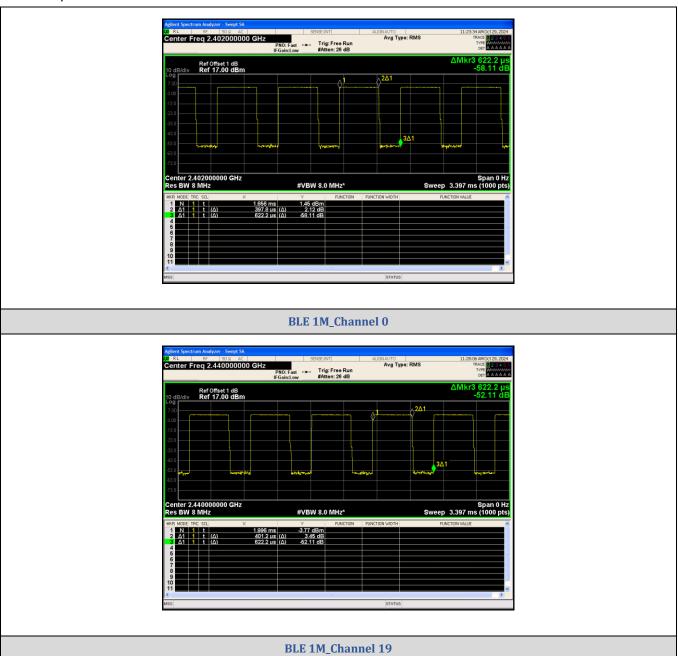
Please refer to the clause 2.4.

#### Test Result

Test Mode	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
	2402	0.398	0.622	63.93	2.51	3
BLE_1M	2440	0.401	0.622	64.48	2.49	3
	2480	0.398	0.622	63.93	2.51	3

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Agilent Spectrum Analyzer - Swept SA W RL RF 50 & AC Center Freq 2.480000000	PNO: Fast	Trig: Free Run	IGNAUTO Avg Type: RMS	11:31:29 AMOct 29, 2024 TRACE 223 4 C S TYPE WWWWWWW DET & A A A A A	
Ref Offset 1 dB 10 dB/div Ref 17.00 dBm	IFGain:Low	Atten: 26 dB		ΔMkr3 622.2 μs -13.19 dB	
		<b>1</b>	2Δ1		
-3.00			3∆1		
-23.0					
-43.0					
-63.0		mangan	Marwarding and	Yemproved D	
Center 2.480000000 GHz Res BW 8 MHz	40 (D)44			Span 0 Hz	
MKR MODE TRC SOL X	Y		TION WIDTH	EEP 3.397 ms (1000 pts)	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.703 ms 1.08 dB 397.8 μs (Δ) 0.08 c 622.2 μs (Δ) -13.19 d	m IB IB			
4					
7					
10				~	
MSG			STATUS		
		M_Channel	00		



### 3.9. Antenna 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.

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

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

#### **RSS-Gen Issue 5 Section 6.8**

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power(e.i.r.p.) limits specified in the applicable standard (RSS) for licence-exempt apparatus.

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

PASS.

The EUT has 1 antenna: a Multilayer Ceramic Antenna for BT.

Note: Antenna use a permanently attached antenna which is not replaceable.

Not using a standard antenna jack or electrical connector for antenna replacement. The antenna has to be professionally installed (please provide method of installation). Which in accordance to RSS-Gen 6.8, please refer to the internal photos.

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For anti-fake verification, please visit the official website of China Inspection And Testing

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