

CTC Laboratories, Inc.

TEST REPORT

Report No:	CTC2025018104			
FCC ID:	2BNWDCVR-CRL6			
Applicant:	Avantis Education Limited			
Address:	Unit 2 & 3 Jessop Court, Waterwells Business Park, Quedgeley, Gloucester, GL2 2AP UK			
Manufacturer	SHENZHEN SKYWORTH NEW W CO.,LTD.			
Address	508, Block A,SKYWORTH Buildi Nanshan District, ShenZhen, Ch	0		
Product Name:	Hand Controller			
Trade Mark:	CLASSVR			
Model/Type reference:	CVR-ASC-CRL6-PR			
Listed Model(s):	CVR-ASC-CRL6-L, CVR-ASC-CRL6-R			
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:	Feb. 10, 2025			
Date of testing	Feb. 10, 2025 ~ Mar. 02, 2025			
Date of issue	Mar. 25, 2025			
Result:	PASS			
Compiled by:		I work (mon		
(Printed name+signature)	Lucy Lan	Lucy lan		
Supervised by:	Zic zhang			
(Printed name+signature)	Eric Zhang			
Approved by: (Printed name+signature)	Totti Zhao			
	10111 21100	/		

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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>ANSI C63.10-2013</u>: 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	CTC2025018104	Mar. 25, 2025	Original

1.3. Test Description

FCC Part 15 Subpart C (15.247)					
Test Item	Standard Section	Result	Test Engineer		
Antenna Requirement	15.203	Pass	Marrow		
Conducted Emission	15.207	N/A	N/A		
Conducted Band Edge and Spurious Emissions	15.247(d)	Pass	Marrow		
Radiated Band Edge and Spurious Emissions	15.205&15.209& 15.247(d)	Pass	Marrow		
6dB Bandwidth	15.247(a)(2)	Pass	Marrow		
Conducted Max Output Power	15.247(b)(3)	Pass	Marrow		
Power Spectral Density	15.247(e)	Pass	Marrow		
Transmitter Radiated Spurious	15.209&15.247(d)	Pass	Marrow		

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.

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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:	Avantis Education Limited	
Address:	Unit 2 & 3 Jessop Court, Waterwells Business Park, Quedgeley, Gloucester, GL2 2AP UK	
Manufacturer:	SHENZHEN SKYWORTH NEW WORLD TECHNOLOGY CO., LTD.	
Address:	508, Block A,SKYWORTH Building, Gaoxin AVE. 1.S Nanshan District, ShenZhen, China.	
Factory:	Shenzhen Skyworth Digital Technology Co., LTD. Baoan Factory	
Address:	2-5F,Integration Multi-Storied Building, Skyworth Science and Technology Industrial Park, Tangtou Industrial Zone, Shiyan Street, Baoan District, Shenzhen city, China.	

2.2. General Description of EUT

Product Name:	Hand Controller
Trade Mark:	CLASSVR
Model/Type reference:	CVR-ASC-CRL6-PR
Listed Model(s):	CVR-ASC-CRL6-L, CVR-ASC-CRL6-R
Model Difference:	CVR-ASC-CRL6-PR, Pair of controllers for CVR-655-128 CVR-ASC-CRL6-L, Left controller for CVR-655-128 CVR-ASC-CRL6-R, Right controller for CVR-655-128
Sample ID:	CTC250114-016-S003
Power Supply:	DC 1.5V/1A
Hardware Version:	/
Software Version:	/
Bluetooth 4.0 / BLE	
Modulation:	GFSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	40
Channel Separation:	2MHz
Data Rate:	1Mbps, 2Mbps
Antenna Type:	FPC
Antenna Gain:	2.75dBi

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2.3. Accessory Equipment Information

Equipment Information						
Name	Model	S/N	Manufacturer			
Notebook	ThinkPad T460s	/	Lenovo			
Cable Information	Cable Information					
Name	Shielded Type	Ferrite Core	Length			
USB Cable	Unshielded	NO	150cm			
Test Software Informat	Test Software Information					
Name	Version	/	1			
nRF	V2.4.0	/	/			

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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

	Radiated emission							
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Calibrated Until		
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 18, 2024	Dec. 17, 2025		
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-648	Dec. 12, 2024	Dec. 11, 2025		
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 13, 2024	Dec. 12, 2025		
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 22, 2024	Mar. 21, 2025		
5	Pre-Amplifier	SONOMA	310	186194	Dec. 13, 2024	Dec. 12, 2025		
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 13, 2024	Dec. 12, 2025		
7	Test Receiver	R&S	ESCI7	100967	Dec. 13, 2024	Dec. 12, 2025		
8	RE32L-001	HUBENR	/	009 (9k-1GHz)	Feb. 09, 2024	Feb. 08, 2025		
9	RE32L-002	HUBENR	/	010 (9k-1GHz)	Feb. 09, 2024	Feb. 08, 2025		
10	RE32L-003	HUBENR	/	011 (9k-1GHz)	Feb. 09, 2024	Feb. 08, 2025		
11	RE32H-001	HUBENR	/	012 (1G-18GHz)	Feb. 09, 2024	Feb. 08, 2025		
12	RE32H-002	HUBENR	/	013 (1G-18GHz)	Feb. 09, 2024	Feb. 08, 2025		
13	3m chamber 2	Frankonia	EE025	/	Oct. 19, 2024	Oct. 18, 2027		
14	Test Software	FARA	EZ-EMC	FA-03A2	/	/		

	RF Test System - SRD						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Calibrated Until	
1	Spectrum Analyzer	R&S	FSV40-N	101654	Aug. 07, 2024	Aug. 06, 2025	
2	TIMES Microwave Systems	Tonscend	HF160-KMKMR-1.50M	/	Aug. 09, 2024	Aug. 08, 2025	
3	RF Control Unit	Tonscend	JS0806-2	/	Aug. 22, 2024	Aug. 21, 2025	
4	Test Software	Tonscend	JS1120-3	V3.3.38		/	

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

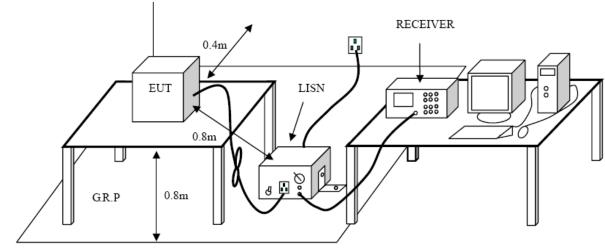
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207

	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



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 μ 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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N/A

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3.2. Radiated Emission

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

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

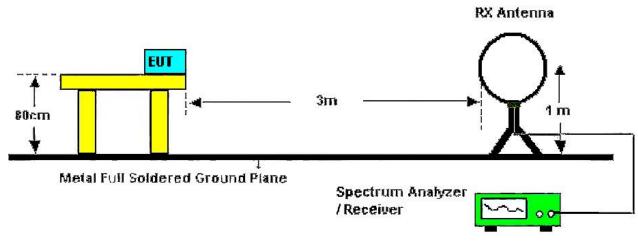
	dBµV/m (at 3 meters)				
Frequency Range (MHz)	Peak	Average			
Above 1000	74	54			

Note:

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

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

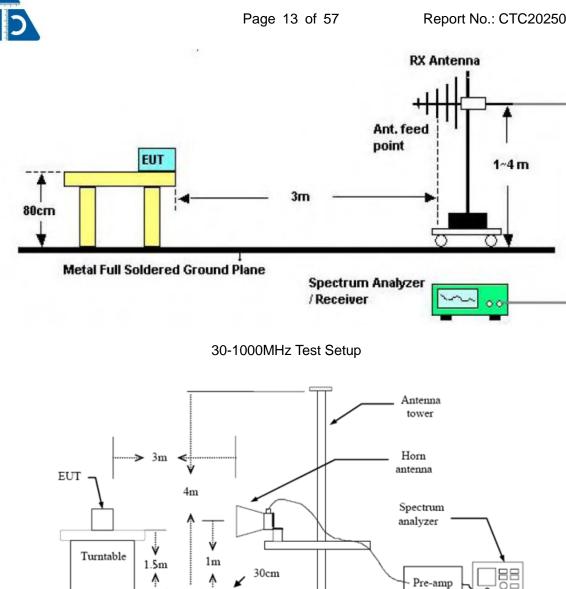
Test Configuration



Below 30MHz Test Setup

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Above 1GHz 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.

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

Span shall wide enough to fully capture the emission being measured; (1)

(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

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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 guasi-peak detector and reported.

(5) From 1 GHz to 10th 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.

Test Result

9 kHz~30 MHz

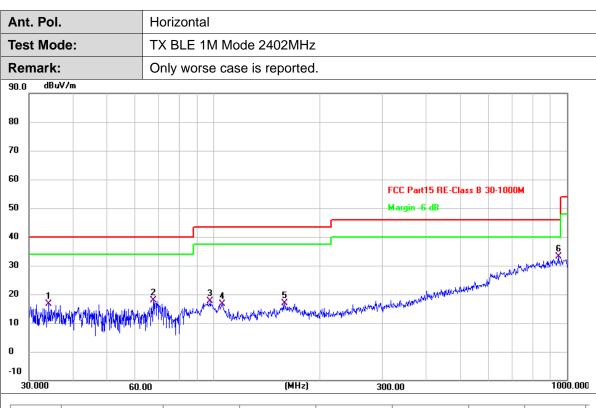
From 9 kHz to 30 MHz: The conclusion is PASS.

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

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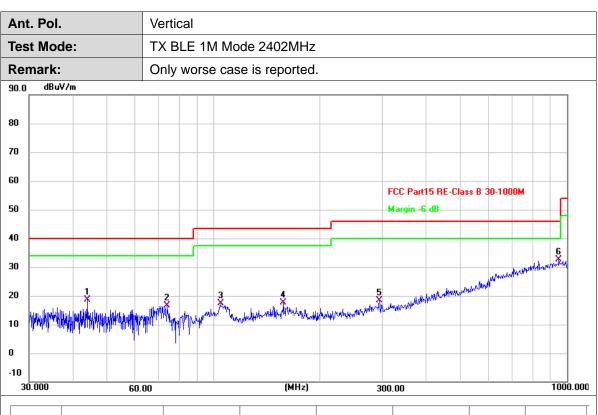
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	34.1560	32.41	-15.90	16.51	40.00	-23.49	QP
2	67.4382	36.64	-18.72	17.92	40.00	-22.08	QP
3	97.7983	37.94	-20.27	17.67	43.50	-25.83	QP
4	105.6415	36.32	-19.67	16.65	43.50	-26.85	QP
5	158.6677	32.86	-16.06	16.80	43.50	-26.70	QP
6 *	945.4400	34.61	-1.42	33.19	46.00	-12.81	QP

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

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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	43.8119	34.76	-16.06	18.70	40.00	-21.30	QP
2	73.8756	36.23	-19.63	16.60	40.00	-23.40	QP
3	104.5361	37.14	-19.78	17.36	43.50	-26.14	QP
4	157.5588	33.64	-16.03	17.61	43.50	-25.89	QP
5	294.1137	34.15	-15.72	18.43	46.00	-27.57	QP
6 *	948.7610	33.99	-1.40	32.59	46.00	-13.41	QP

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	4803.454	42.63	1.84	44.47	74.00	-29.53	peak
2 *	4803.986	32.30	1.84	34.14	54.00	-19.86	AVG

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 limit.					elow the p	rescribed	
No	Frequency	Reading	Factor	Level	Limit	Margin	Detector

No.	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector	
1	4803.941	38.42	1.84	40.26	74.00	-33.74	peak	-
2 *	4804.013	27.92	1.84	29.76	54.00	-24.24	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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Ant. Pol.		Horizontal					
Test Mod	de:	TX BLE 1M Mode 2440MHz					
Remark: No report for the emission which more than 20 dB below the pres- limit.			rescribed				
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4879.867	38.82	1.96	40.78	74.00	-33.22	peak
2 *	4879.867	30.17	1.96	32.13	54.00	-21.87	AVG

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

2.Margin value = Level -Limit value

nt. Pol		Vertical					
est Mode: TX BLE 1M Mode 2440MHz							
Remark: No report for the emission which more than 20 dB bel limit.					low the p	rescribed	
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	4880.021	29.65	1.96	31.61	54.00	-22.39	AVG
2	4880.030	39.85	1.96	41.81	74.00	-32.19	peak

2.Margin value = Level -Limit value

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Ant. Pol.		Horizontal	Horizontal					
Test Mod	de:	TX BLE 1M N	TX BLE 1M Mode 2480MHz					
Remark:		No report for the emission which more than 20 dB below the prescrib limit.				rescribed		
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1 *	4959.906	27.31	2.08	29.39	54.00	-24.61	AVG	
2	4959.919	38.78	2.08	40.86	74.00	-33.14	peak	
-								

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

2.Margin value = Level -Limit value

Ant. Pol	-	Vertical							
Fest Mo	de:	TX BLE 1M M	/lode 2480MH	Ηz					
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	4959.997	41.20	2.08	43.28	74.00	-30.72	peak		
2 *	4960.011	28.39	2.08	30.47	54.00	-23.53	AVG		

2.Margin value = Level -Limit value

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Ant. Pol.	Horizontal
Test Mode:	TX BLE 2M 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	4803.983	42.09	1.84	43.93	74.00	-30.07	peak
2 *	4803.983	30.32	1.84	32.16	54.00	-21.84	AVG

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 2M 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	4803.849	40.63	1.84	42.47	74.00	-31.53	peak
2 *	4803.973	26.59	1.84	28.43	54.00	-25.57	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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					Horizontal		Ant. Pol.
			Ηz	lode 2440MI	TX BLE 2M N	de:	Test Mod
cribed	elow the pro	No report for limit.		Remark:			
etector	Margin (dB)	Limit (dBuV/m)	Level (dBuV/m)	Factor (dB/m)	Reading (dBuV)	Frequency (MHz)	No.
eak	-33.42	74.00	40.58	1.96	38.62	4880.063	1
VG	-24.41	54.00	29.59	1.96	27.63	4880.063	2 *
)((dB) -33.42	74.00	40.58	1.96	38.62	4880.063	1

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

2.Margin value = Level -Limit value

U			han 20 dB be Limit (dBuV/m)	Margin	
Reading	Factor	Level	Limit	Margin	
U				-	Detector
U				-	Detector
U				-	Detector
		(aba v/m)	(ubuv/iii)	(ub)	
38.70	1.96	40.66	74.00	-33.34	peak
27.08	1.96	29.04	54.00	-24.96	AVG
I					
actor (dB/m)+	Cable Fact	tor (dB)-Pre-a	amplifier Fact	or	
	uctor (dB/m)+	uctor (dB/m)+Cable Fac	uctor (dB/m)+Cable Factor (dB)-Pre-a	uctor (dB/m)+Cable Factor (dB)-Pre-amplifier Fact	ictor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor value

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Ant. Pol.		Horizontal					
Test Mod	de:	TX BLE 2M M	lode 2480MI	Ηz			
Remark:		No report for limit.	the emission	which more t	han 20 dB be	elow the p	rescribed
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4959.821	36.06	2.08	38.14	74.00	-35.86	peak
2 *	4959.821	26.42	2.08	28.50	54.00	-25.50	AVG

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

2.Margin value = Level -Limit value

nt. Pol.		Vertical								
est Mod	le:	TX BLE 2M N	/lode 2480M	Hz						
emark:		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 *	4959.903	27.36	2.08	29.44	54.00	-24.56	AVG			
2	4959.969	39.91	2.08	41.99	74.00	-32.01	peak			

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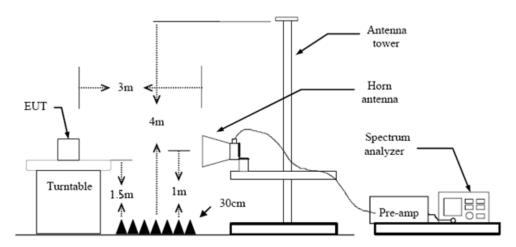
3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)

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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est Mode		-		Horizontal									
0.0 dBuV				ΜM	ode 2402	2MH	lz						
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0													
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									FCC Pa	rt15 C	- Alqove 1G X	AV	
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1.0 2305.500	2315.50 2	2325.50	2335.50	234	45.50 (MI	Hz)	236	5.50 2	2375.50	2385.	50 239	5.50	2405.
No.	Freque (MHz		Readir (dBu\		Facto (dB/m			vel V/m)	Lim (dBuV		Margi (dB)	n _D	etector
1	2390.0	00	20.58	3	31.31		51	.89	74.0	0	-22.1	1	peak
2 *	2390.0	000	4.98		31.31		36	.29	54.0	0	-17.7	1	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.	Ant. Pol.			Vertical									
est Mod	le:		TX BLE 1M Mode 2402MHz										
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2305.000	2315.00	2325.00	2335.00	2345.00	(MHz)	236	5.00	2375.00 238	35.00 2395.	.00 240	5.L		
No.		uency Hz)	Readin (dBuV)	• I	ctor /m)	Le ^v (dBu		Limit (dBuV/m	Margin) (dB)	Detect	or		
1	2390	0.000	16.50	31.	31	47.	.81	74.00	-26.19	peal	K		
2 *	2390	0.000	4.65	31.	31	35.	96	54.00	-18.04	AVG	3		

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.		Horizontal					
est Mod	e:	TX BLE 1M	Mode 2480MH	Ηz			
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\square					FCC Part15 C	- Above 16 P	ĸ
	1 X				FCC Part15 C	- Above 1G A	V
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.0 2475.500	2485.50 2495	5.50 2505.50 2	515.50 (MHz)	2535.50	2545.50 2555.	.50 2565.!	50 2575.
No.	Frequenc (MHz)	y Reading (dBuV)	Factor (dB/m)		Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500		31.50	48.23	74.00	-25.77	peak
-							
2 *	2483.500) 4.40	31.50	35.90	54.00	-18.10	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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est	Mod	le:			ТХ В	LE 1M N	lode 24	480MI	Ηz						
20.0	dBu\	//m													
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י -	Λ														
י -	\mathbb{H}										FCC Part	15 C - Abo	ve 1G P	ĸ	
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) -).0															
_ L	77.000	2487.0) 24	97.00	250	7.00 25	i17.00	(MHz)	253	7.00	2547.00	2557.00	2567.	00 2577.	
		Fre	quen	cv	Re	ading	Fac	ctor	Le	vel	Limit	Ma	argin		
N	0.		MHz)			BuV)	(dB				(dBuV/		dB)	Detector	
1		248	33.50	0	1	6.22	31.	50	47	.72	74.00) -26	6.28	peak	
2	*	248	33.50	0	4	.41	31.	50	35	.91	54.00) -18	8.09	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		l	Horizontal					
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2305.500	2315.50	2325.50	2335.50 2	345.50 (MHz)	2365.50	2375.50 2385.	50 2395.9	50 2405.5
No.	Freque (MH		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.	000	18.07	31.31	49.38	74.00	-24.62	peak
2 *	2390.	000	5.10	31.31	36.41	54.00	-17.59	AVG
2	2000	000	5.10	51.51	50.41	54.00	-17.08	Ave

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

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lz	e 2402M⊦	TX BLE 2M M	e:	est Mod
			//m	20.0 dBuV
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FCC Part15 C - Above 16 AV				
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2366.00 2376.00 2386.00 2396.00 2406.0		2336.00 234	2316.00 2326.00	.0
2300.00 2310.00 2300.00 2300.00 2400.0) (MHz)	2330.00 234	2310.00 2320.00	2300.000
Level Limit Margin (dBuV/m) (dBuV/m) (dB) Detector	Factor dB/m)	Reading (dBuV)	Frequency (MHz)	No.
47.77 74.00 -26.23 peak	31.31	16.46	2390.000	1
36.59 54.00 -17.41 AVG	31.31	5.28	2390.000	2 *
47.77 74.00 -26.23	31.31	16.46	2390.000	-

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		Horizonta					
est Mo	de:	TX BLE 2	M Mode 2480M	Hz			
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2476.500	2486.50 249	6.50 2506.50	2516.50 (MHz)	2536.50	2546.50 2556.	.50 2566.	50 2576.9
No.	Frequence (MHz)	cy Readir (dBu∀		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.50	0 15.20	31.50	46.70	74.00	-27.30	peak
2 *	2483.50	0 5.29	31.50	36.79	54.00	-17.21	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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).0	76.500	2486.5		496.50	2506		2516		(MH:			6.50	2546.50		6.50	2566.	50 2576.
N	о.		quer MHz			ading BuV)			ctor /m)			vel V/m)		imit uV/m		argin dB)	Detector
1	1	24	33.50	00	18	.32		31	.50		49	.82	74	1.00	-2	4.18	peak
2	*	24	33.50	00	5	.16		31	.50		36	.66	54	1.00	-1	7.34	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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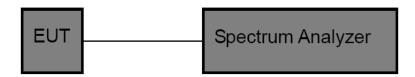
3.4. Band Edge and Spurious Emissions (Conducted)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)

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 10th 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

Band Edge Conducted Test

TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
	A pt1	Low	2402	1.71	-47.26	≤-18.29	PASS
BLE_1M	Ant1	High	2480	1.70	-45.83	≤-18.3	PASS
	Ant1	Low	2402	1.69	-30.88	≤-18.31	PASS
BLE_2M	AIIU	High	2480	1.69	-46.83	≤-18.31	PASS

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Conducted Spurious Emissions Test

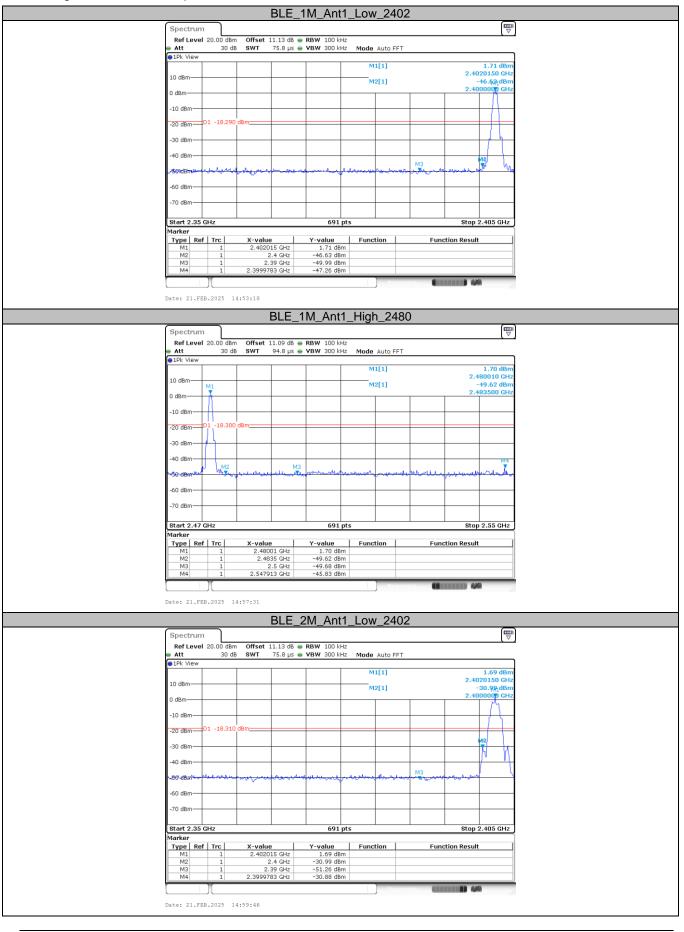
TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
			Reference	1.60	1.60		PASS
		2402	30~1000	1.60	-48	≤-18.4	PASS
			1000~26500	1.60	-41.11	≤-18.4	PASS
			Reference	1.62	1.62		PASS
BLE_1M	Ant1	2440	30~1000	1.62	-48.64	≤-18.38	PASS
			1000~26500	1.62	-40.24	≤-18.38	PASS
			Reference	1.65	1.65		PASS
		2480	30~1000	1.65	-48.19	≤-18.35	PASS
			1000~26500	1.65	-40.06	≤-18.35	PASS
			Reference	1.60	1.60		PASS
		2402	30~1000	1.60	-48.43	≤-18.4	PASS
			1000~26500	1.60	-40.92	≤-18.4	PASS
			Reference	1.62	1.62		PASS
BLE_2M	Ant1	2440	30~1000	1.62	-48.36	≤-18.38	PASS
			1000~26500	1.62	-40.95	≤-18.38	PASS
			Reference	1.66	1.66		PASS
		2480	30~1000	1.66	-48.2	≤-18.34	PASS
			1000~26500	1.66	-41.01	≤-18.34	PASS

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Band Edge Conducted Test plot as follows:



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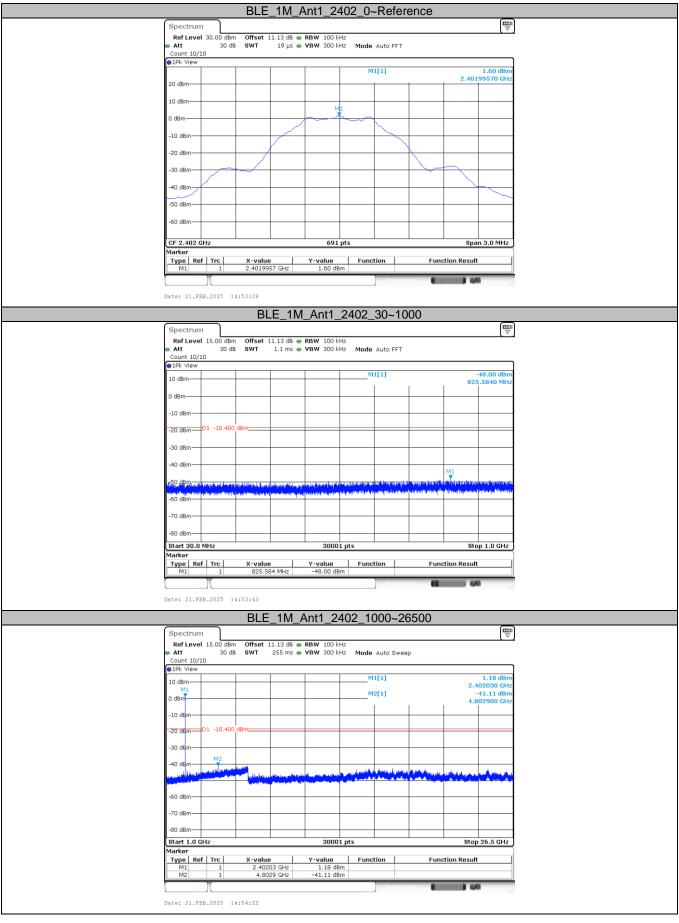


		В	BLE_2	M_Ant1_	_High_24	180				
Spectru	n									
Ref Lev	al 20.00 dBm	Offset 11	.09 dB 👄	RBW 100 kHz						
👄 Att	30 dB	SWT 9	94.8 µs 😑	VBW 300 kHz	Mode Auto I	FT				
IPk View										
					M1[1]			1.69 dBm		
10 dBm					M2[1]			480010 GHz -49.94 dBm		
	M1				MZ[1]			483500 GHz		
0 dBm	1									
-10 dBm-										
-20 dBm	D1 -18.310	dBm								
20.10										
-30 dBm—										
-40 dBm										
	M2	tumpele A	M3	The New York	. And the second second					
∿56∕d8th ^{#∆}	·	- ali anno an	ينعكن روكتها للمات	Mar Change an	and the second	an and a second	en al alle contraine	and mandalan		
-60 dBm										
-50 dbiii										
-70 dBm						-	_			
Start 2.4	, GHz			691 pts	5		Sto	p 2.55 GHz		
Marker										
Type R		X-value		Y-value	Function	F	unction Resu	t 🔤		
M1 M2	1	2.48001		1.69 dBm -49.94 dBm						
M3	1		5 GHz	-49.79 dBm						
M4	1	2.50258		-46.83 dBm						
) Me	asuring		M		
Date: 21.F	'EB.2025 15	5:03:47								

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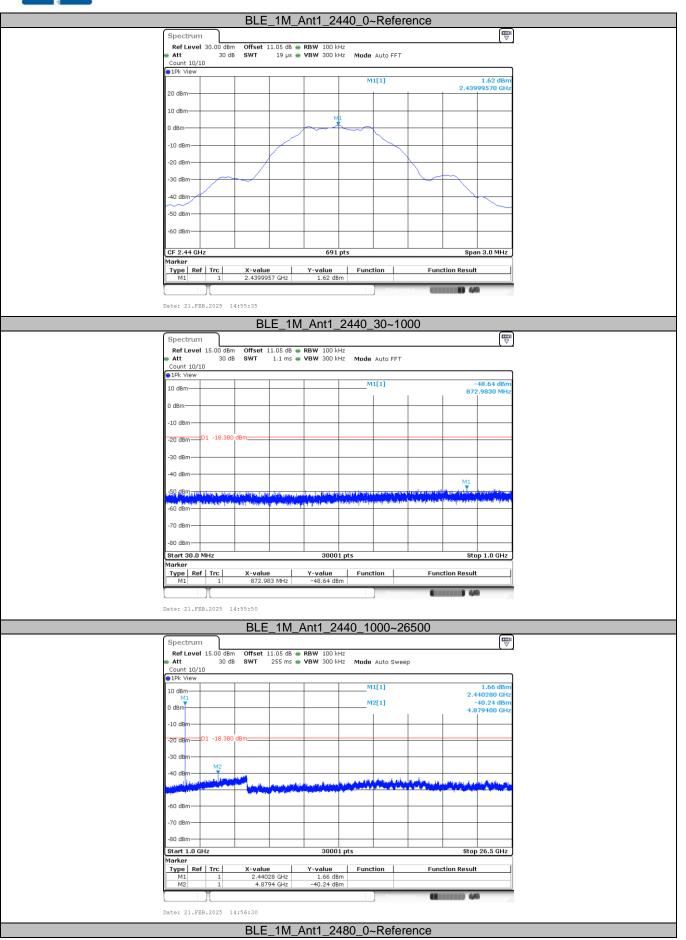
Conducted Spurious Emissions Test plot as follows:



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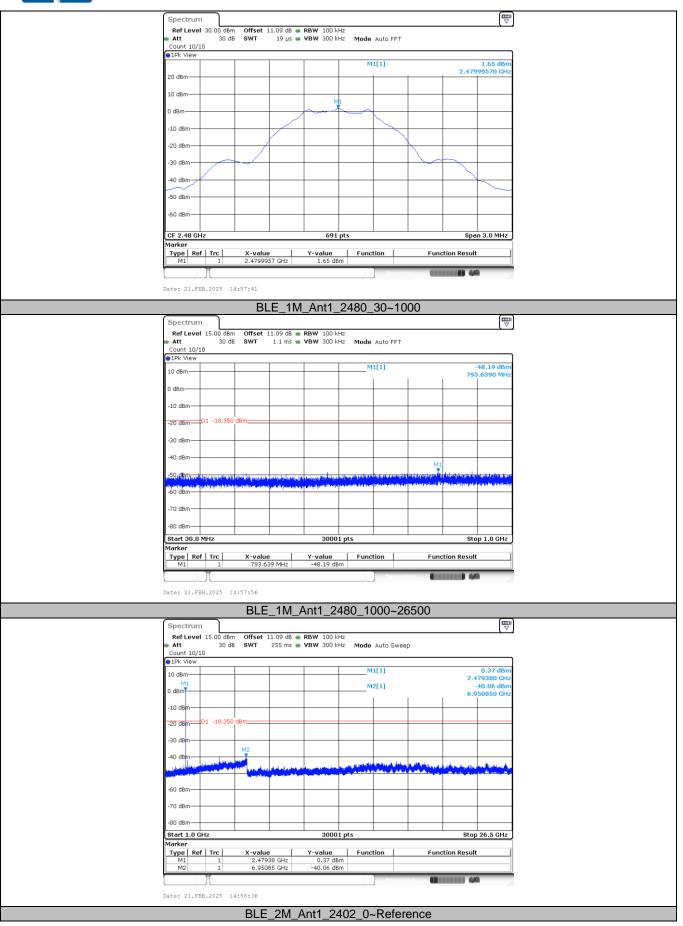
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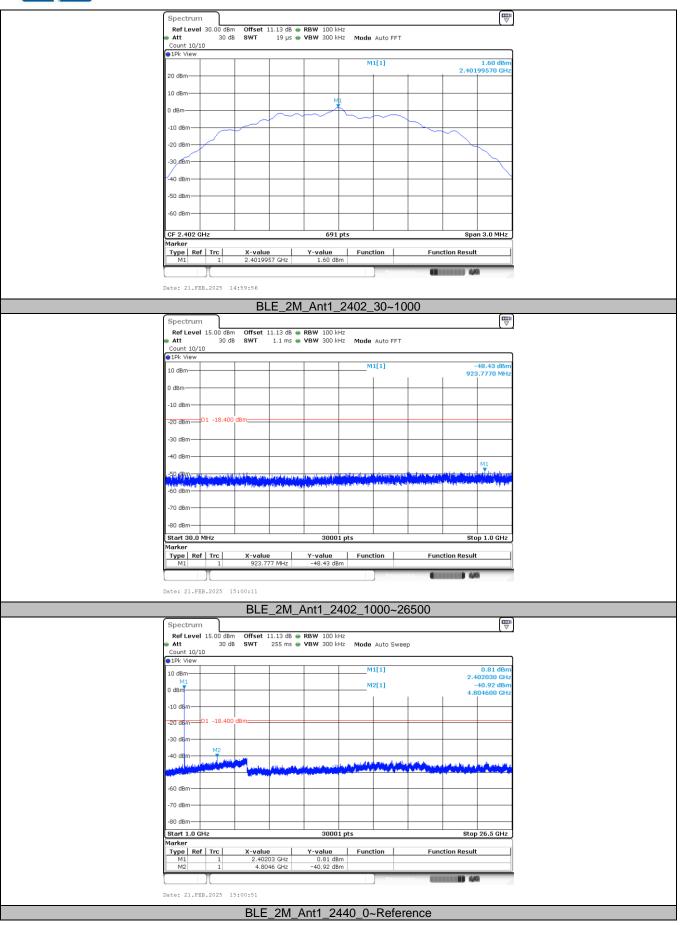
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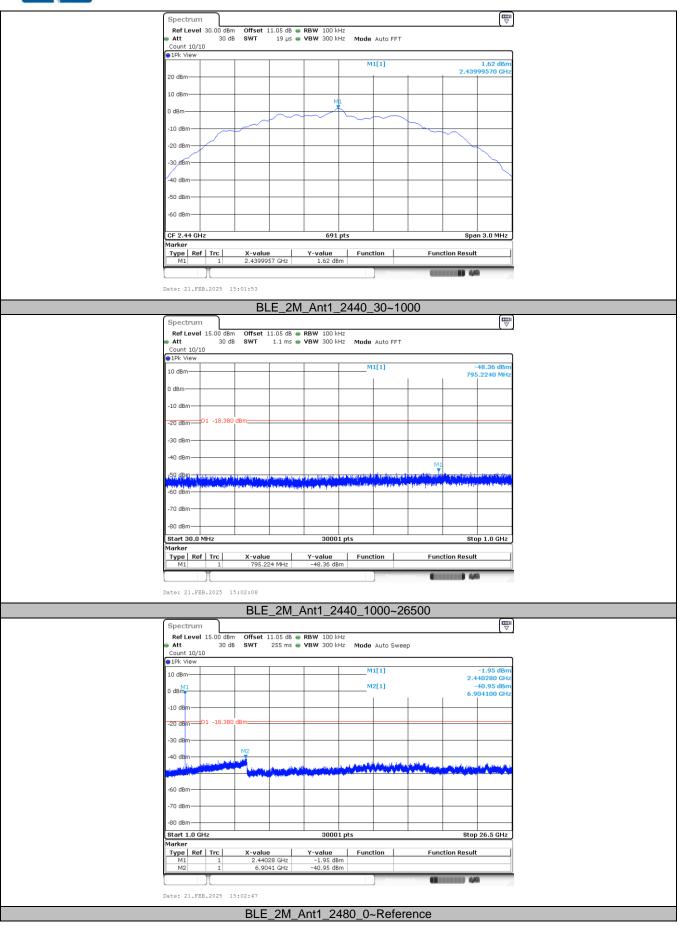
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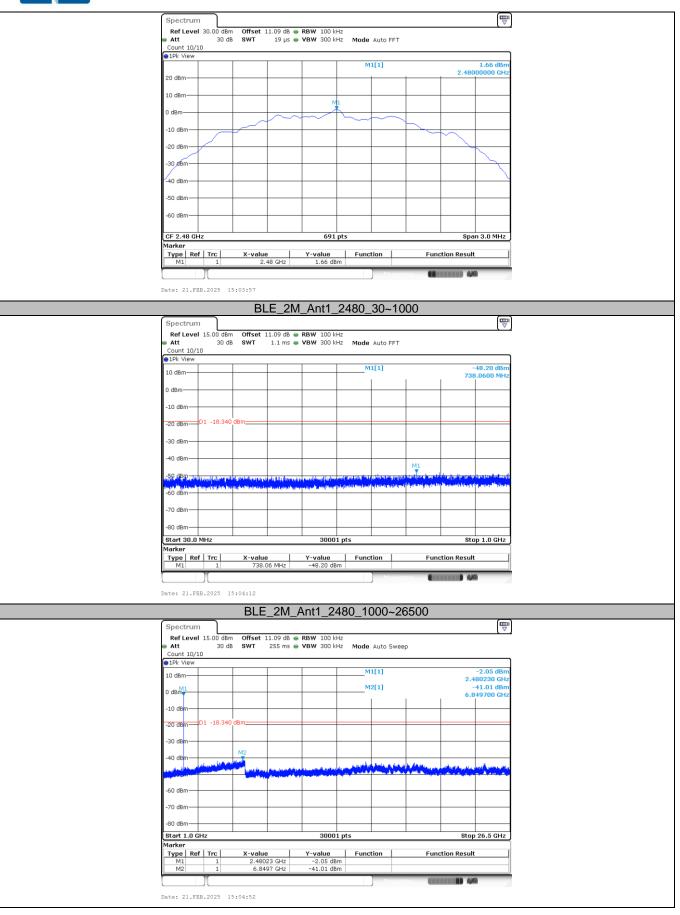
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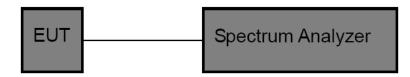
3.5. DTS Bandwidth

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2)

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.

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TestMode	Antenna	Freq(MHz)	OCB [MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M Ant1	2402	1.051	0.70	2401.64	2402.35	0.5	PASS	
	2440	1.055	0.70	2439.64	2440.34	0.5	PASS	
	2480	1.055	0.69	2479.65	2480.34	0.5	PASS	
BLE_2M Ant1	2402	2.058	1.13	2401.44	2402.57	0.5	PASS	
	Ant1	Ant1 2440	2.058	1.13	2439.44	2440.57	0.5	PASS
		2480	2.062	1.13	2479.44	2480.57	0.5	PASS

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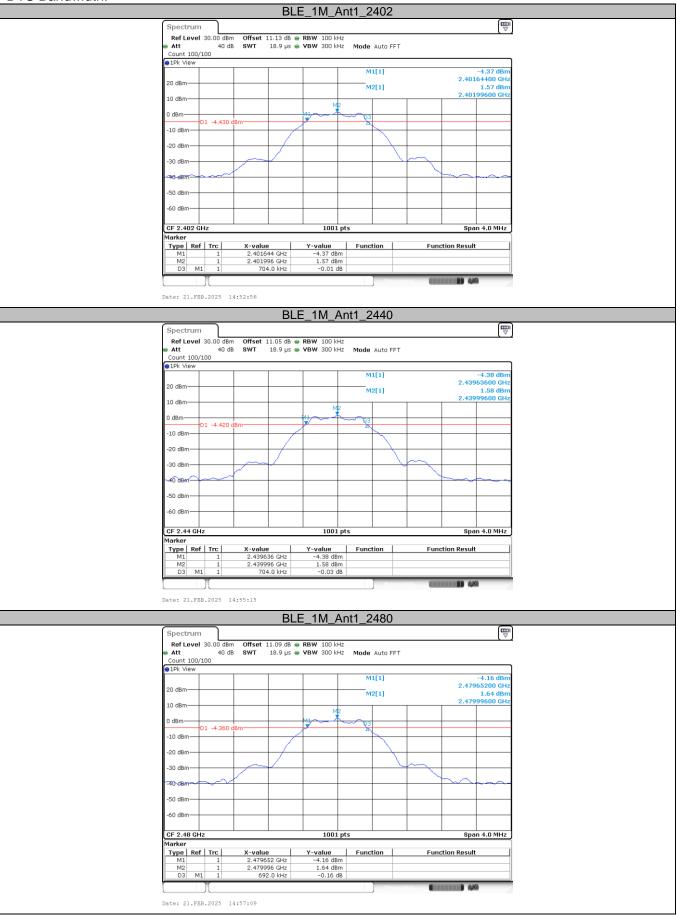




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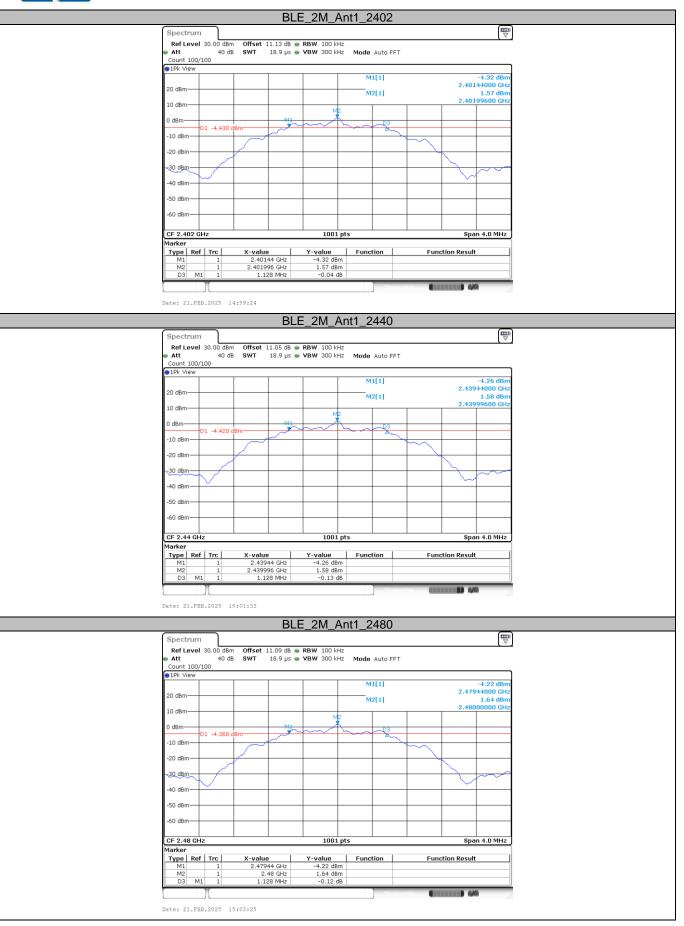
DTS Bandwidth:



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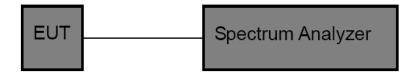
3.6. Peak Output Power

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3)

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

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 \geq 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.

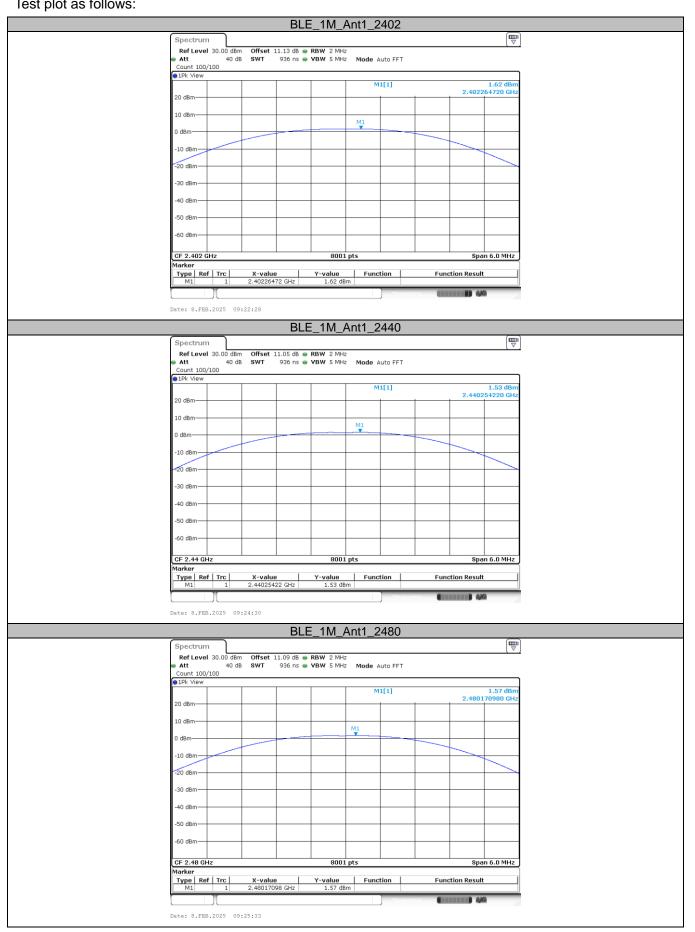
Test Result

Test Mode	Frequency (MHz)	Conducted Output Power (dBm)	FCC Limit (dBm)	Verdict
	2402	1.62	≤30	Pass
BLE_1M	2440	1.53	≤30	Pass
	2480	1.57	≤30	Pass
BLE_2M	2402	1.60	≤30	Pass
	2440	1.44	≤30	Pass
	2480	1.57	≤30	Pass

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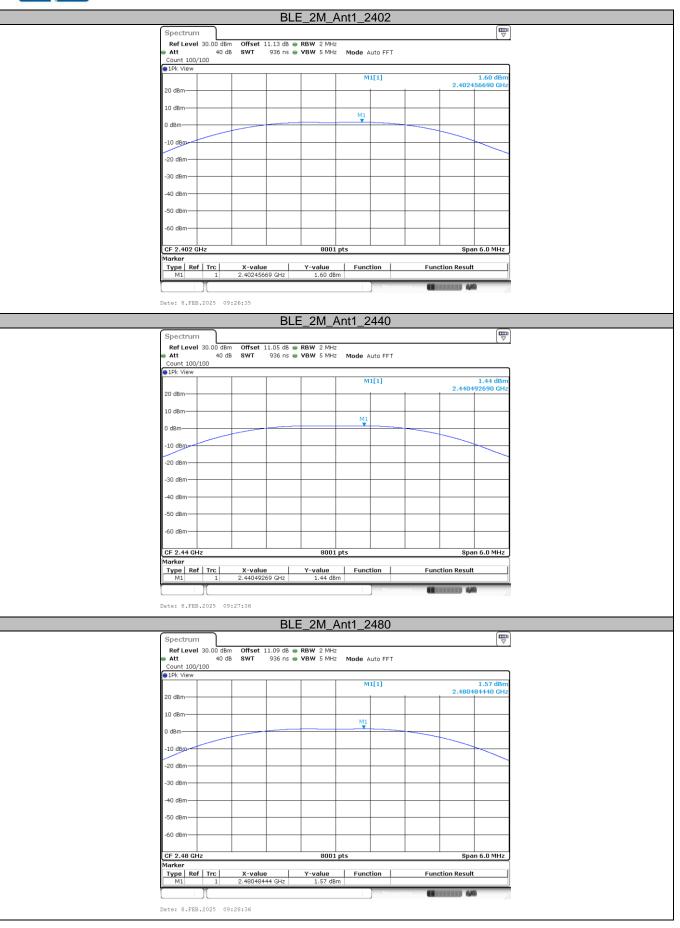
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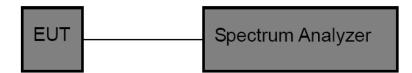
3.7. Power Spectral Density

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e)

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.

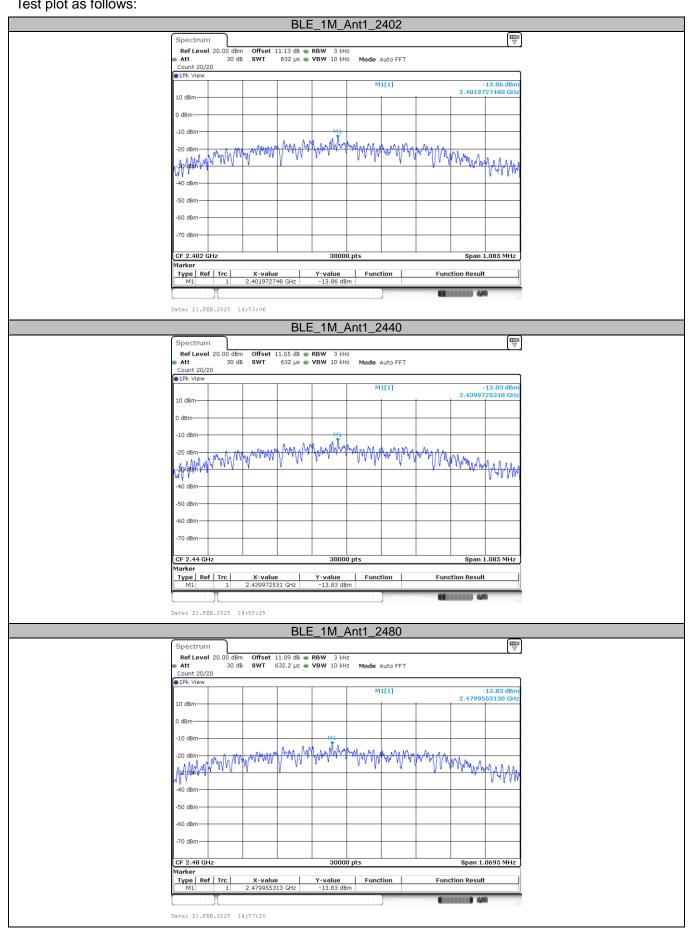
Test Result

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M		2402	-13.86	≤8.00	PASS
	Ant1	2440	-13.83	≤8.00	PASS
		2480	-13.83	≤8.00	PASS
BLE_2M	Ant1	2402	-16.14	≤8.00	PASS
		2440	-16.20	≤8.00	PASS
		2480	-16.31	≤8.00	PASS

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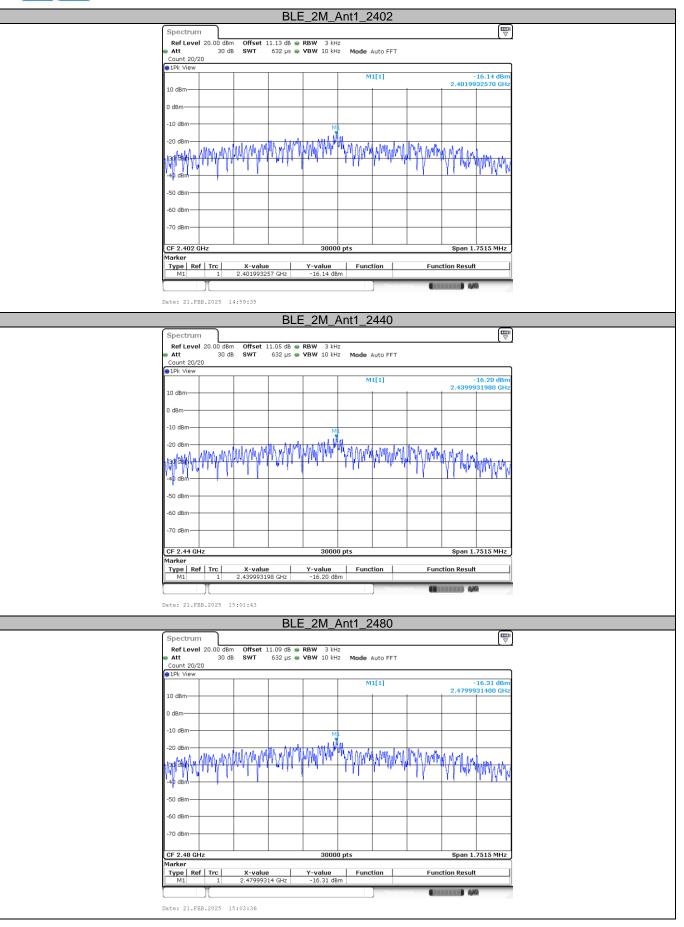
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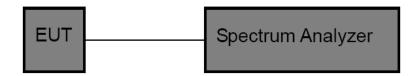


3.8. Duty Cycle

<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.

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.

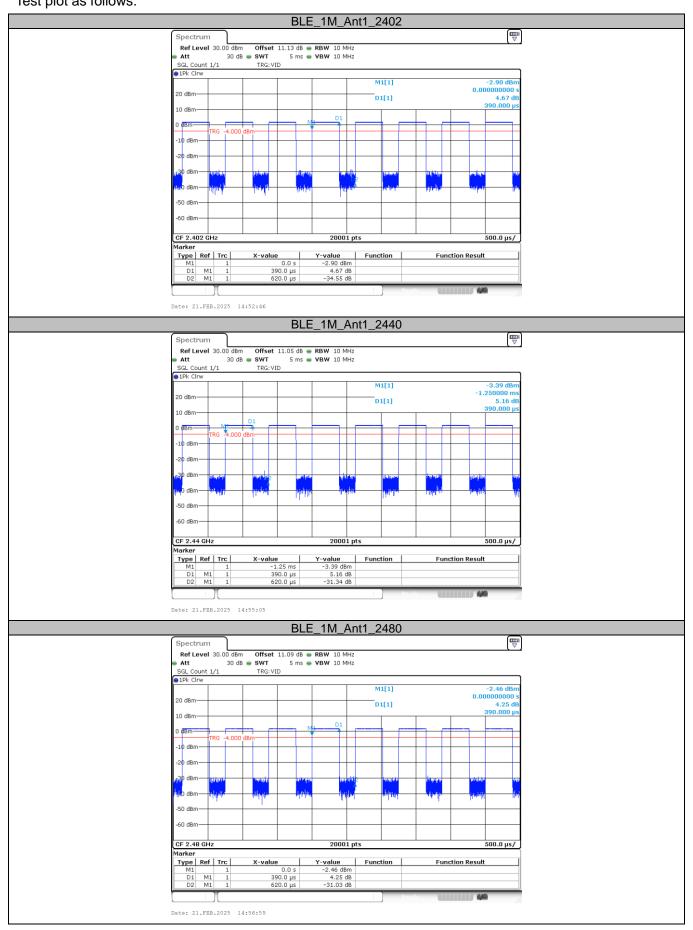
Test Result

Test Mode	Frequency (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
	2402	0.39	0.62	62.90	2.56	3
BLE_1M	2440	0.39	0.62	62.90	2.56	3
	2480	0.39	0.62	62.90	2.56	3
	2402	0.21	0.62	33.87	4.76	5
BLE_2M	2440	0.21	0.62	33.87	4.76	5
	2480	0.21	0.63	33.33	4.76	5

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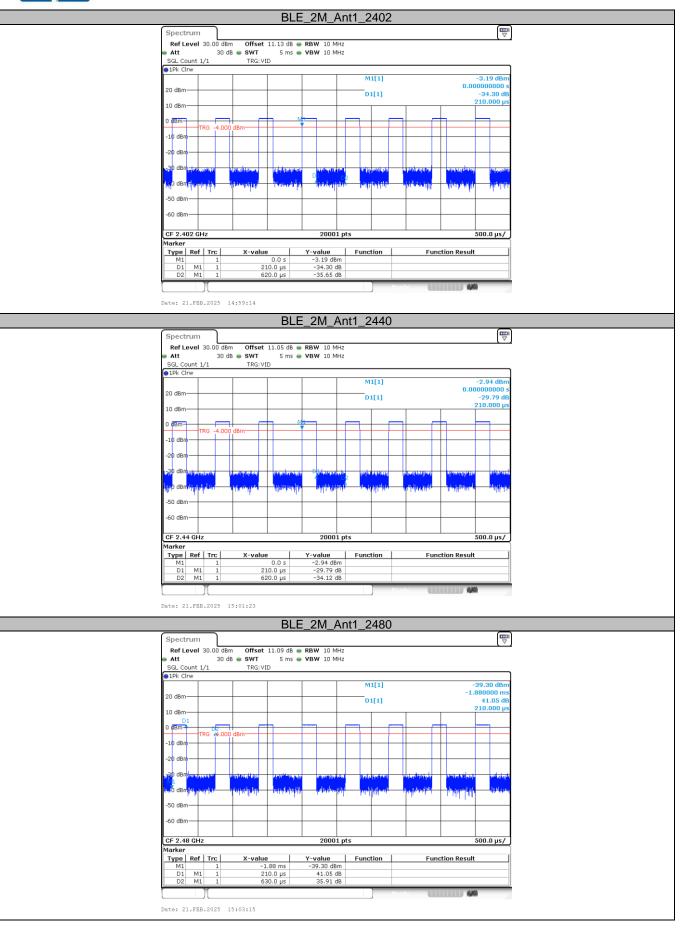
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3.9. Antenna Requirement

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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