

CTC Laboratories, Inc.

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1	EST REPORT				
Report No. ······:	CTC20211260E02				
FCC ID:	2AYD5-I21M02				
Applicant:	Imin Technology Pte Ltd				
Address······	11 Bishan Street 21, #03-05 Bosch Bui	lding, Singapore 573943			
Manufacturer:	Imin Technology Pte Ltd				
Address:	11 Bishan Street 21, #03-05 Bosch Bui	lding, Singapore 573943			
Product Name······:	Mobile POS				
Trade Mark······	iMin				
Model/Type reference······:	I21M02				
Listed Model(s) ······	N/A				
Standard:	FCC CFR Title 47 Part 15 Subpart C	Section 15.247			
Date of receipt of test sample:	Jul. 20, 2021				
Date of testing	Jul. 21, 2021 ~ Aug. 11, 2021				
Date of issue	Aug. 26, 2021				
Result:	PASS				
Compiled by:		- C			
(Printed name+signature)	Terry Su	Tenny Su Miller Ma Mitten chus			
Supervised by:		noiller Na			
(Printed name+signature)	Miller Ma	//////////////////////////////////////			
Approved by:		-t al			
(Printed name+signature)	Walter Chen	Mallen Chis			
Testing Laboratory Name:	CTC Laboratories, Inc.				
Address	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China				
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report is received. It will not be taken into consideration beyond this limit. The test report merely

correspond to the test sample.



Table of Contents

Page

1.	7TES	T SUMMARY	3
-	1.1.	Test Standards	3
2	1.2.	REPORT VERSION	3
2	1.3.	TEST DESCRIPTION	4
-	1.4.	TEST FACILITY	
-	1.5.	Measurement Uncertainty	5
-	1.6.	ENVIRONMENTAL CONDITIONS	6
2.	GEN	ERAL INFORMATION	7
2	2.1.	CLIENT INFORMATION	7
2	2.2.	GENERAL DESCRIPTION OF EUT	7
2	2.3.	ACCESSORY EQUIPMENT INFORMATION	
2	2.4.	OPERATION STATE	9
2	2.5.	Measurement Instruments List	. 10
3.	TEST	ITEM AND RESULTS	12
	3.1.	CONDUCTED EMISSION	. 12
3	3.2.	RADIATED EMISSION	. 15
3	3.3.	BAND EDGE EMISSIONS (RADIATED)	. 31
3	3.4.	BAND EDGE AND SPURIOUS EMISSIONS (CONDUCTED)	
3	3.5.	DTS BANDWIDTH	. 50
3	3.6.	PEAK OUTPUT POWER	
3	3.7.	Power Spectral Density	. 56
3	3.8.	DUTY CYCLE	
3	3.9.	ANTENNA REQUIREMENT	62



1.1. Test Standards

The tests were performed according to following standards:

<u>FCC Rules Part 15.247</u>: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz. <u>RSS 247 Issue 2</u>: Standard Specifications for Frequency Hopping Systems (FHSs) and Digital Transmission Systems (DTSs) Operating in the Bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz. <u>ANSI C63.10-2013</u>: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Date of issue	Description
01	Aug. 12, 2021	Original
02	Aug. 23, 2021	Update application, manufacturer address
03	Aug. 26, 2021	Increase the trademark



1.3. Test Description

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

Note: The measurement uncertainty is not included in the test result.





CTC Laboratories, Inc.

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

Laboratory accreditation

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

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

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 r 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 inour 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 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.

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



Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(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)
Occupied Bandwidth		(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.6. Environmental conditions

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

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa



EN

2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Imin Technology Pte Ltd
Address:	11 Bishan Street 21, #03-05 Bosch Building, Singapore 573943
Manufacturer:	Imin Technology Pte Ltd
Address:	11 Bishan Street 21, #03-05 Bosch Building, Singapore 573943

2.2. General Description of EUT

Product Name:	Mobile POS
Trade Mark:	iMin
Model/Type reference:	I21M02
Listed Model(s):	N/A
Power supply:	5Vdc/2A from AC/DC Adapter 7.4Vdc from 2600mAh Li-ion Battery
Adapter model: TPA-46050200UU Input:100-240V~ 50/60Hz 0.3A Output: 5Vdc/2A	
Hardware version:	N/A
Software version:	N/A
BT 5.0/ BLE Support 1M PHY, 2M	PHY, Code PHY(S=2, S=8)
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	FPC Antenna
Antenna gain:	1.67dBi



FN

2.3. Accessory Equipment information

Equipment Information						
Name	Model	S/N	Manufacturer			
1	1	1	1			
1	1	1	1			
Cable Information	Cable Information					
Name	Shielded Type	Ferrite Core	Length			
1	1	1	1			
Test Software Information						
Name Versions / /						
Engineering mode	1	1	1			



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.



2.5. Measurement Instruments List

Tonsc	Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	
1	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 25, 2021	
2	Spectrum Analyzer	Rohde & Schwarz	FUV40-N	101331	Mar. 15, 2022	
3	Spectrum Analyzer	KEYSIGHT	N9020A	100231	Dec. 25, 2021	
4	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 25, 2021	
5	Signal Generator	Agilent	E8257D	MY46521908	Dec. 25, 2021	
6	Power Sensor	Agilent	U2021XA	MY5365004	Dec. 25, 2021	
7	Power Sensor	Agilent	U2021XA	MY5365006	Dec. 25, 2021	
8	Simultaneous Sampling DAQ	Agilent	U2531A	TW54493510	Dec. 25, 2021	
9	Climate Chamber	TABAI	PR-4G	A8708055	Dec. 25, 2021	
10	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	116410	Dec. 25, 2021	
11	Climate Chamber	ESPEC	MT3065	/	Dec. 25, 2021	
12	300328 v2.2.2 test system	TONSCEND	v2.6	/	/	

Radiated emission(3m chamber 2)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Jan.12, 2022	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 24, 2021	
3	Spectrum Analyzer	R&S	FSU26	100105	Dec. 25, 2021	
4	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 15, 2022	
5	Pre-Amplifier	SONOMA	310	186194	Dec. 25, 2021	
6	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 25, 2021	
7	Test Receiver	R&S	ESCI7	100967	Dec. 25, 2021	

Radiated	Radiated emission(3m chamber 3)										
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until						
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-759	Nov.09, 2021						
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 24, 2021						
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 25, 2021						
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 25, 2021						
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 25, 2021						



Conduct	Conducted Emission											
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until							
1	LISN	R&S	ENV216	101112	Dec. 25, 2021							
2	LISN	R&S	ENV216	101113	Dec. 25, 2021							
3	EMI Test Receiver	R&S	ESCI	100658	Dec. 25, 2021							

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

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



3. TEST ITEM AND RESULTS

3.1. Conducted Emission

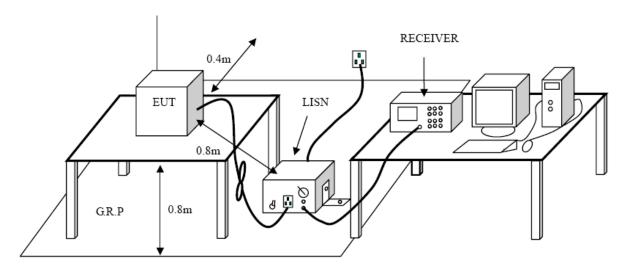
<u>Limit</u>

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

	Limit (d	BuV)
Frequency range (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.

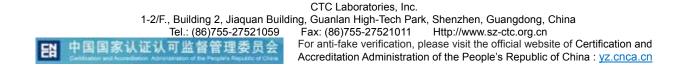
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

4. 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.

5. 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.

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

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

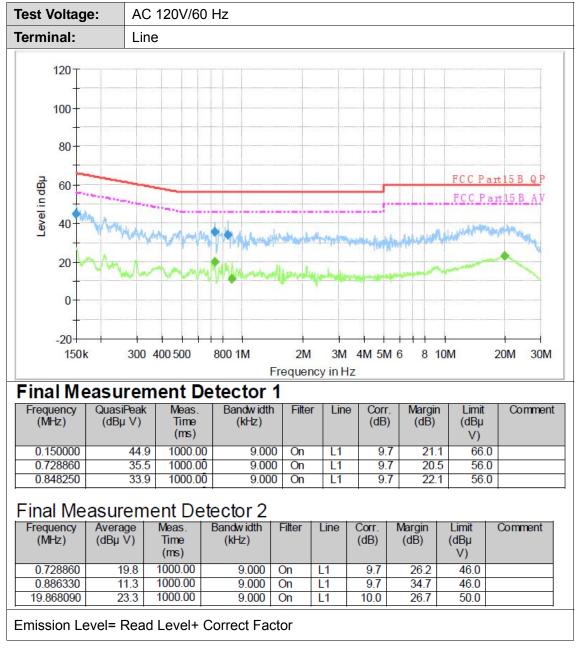




Test Mode:

Please refer to the clause 2.4.

Test Results





EN

	je:	AC	20V/60	Hz								
erminal:		Neut	tral									
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80-												
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-20 150	k	300 4	00 500	800 1M		M	3M	4M 5		10	M	20M 30M
-20 150	k	300 4	00 500	800 1M		M enc		4M 5M		10	M	 20M 30M
150					Frequ		3M sy in H			10	M	20M 30M
150		em Peak			Frequ 1			z	. Març	gin	M Limit (dB µ V)	20M 30M
150 Frequency (MHz)	QuasiF (dB μ	°eak V) 45.5	ent De Meas. Time (ms) 1000.00	etector Bandwidth (kHz) 9.000	Frequerer Fi	enc ter	Line	z Corr	. Març) (dE	gin	Limit (dB µ V) 66.0	Comment
150 Frequency (MHz) 0.150000 0.770750	QuasiF (dB μ	Peak V) 45.5 33.7	ent De Meas. Time (ms) 1000.00 1000.00	etector Bandwidth (kHz) 9.000 9.000	Frequ 1 Fi O Or O Or	ter	Line	Z Corr (dB)	. Marg (dE	gin 3) 0.5 2.3	Limit (dB µ V) 66.0 56.0	Comment
150 Frequency (MHz)	QuasiF (dB μ	°eak V) 45.5	ent De Meas. Time (ms) 1000.00	etector Bandwidth (kHz) 9.000 9.000	Frequ 1 Fi O Or O Or	ter	Line	Z Corr (dB) 10.	. Marg (dE	gin 3) 0.5	Limit (dB µ V) 66.0	Comment
150 Frequency (MHz) 0.150000 0.770750 20.107460	QuasiF (dB μ	rem('eak V) 45.5 33.7 41.3	ent De Meas. Time (ms) 1000.00 1000.00	etector Bandwidth (kHz) 9.000 9.000 9.000	Frequ 1 Fi O Or O Or	ter	Line	Z Corr (dB)	. Marg (dE	gin 3) 0.5 2.3	Limit (dB µ V) 66.0 56.0	Comment
150 Frequency (MHz) 0.150000 0.770750 20.107460 inal Me	QuasiF (dB μ	Peak ∨) 45.5 33.7 41.3 eme eme	ent De Meas. Time (ms) 1000.00 1000.00	etector Bandwidth (kHz) 9.000 9.000 9.000	Frequ 1 Fi O Or O Or		Line	Z Corr (dB)	. Marg (dE	gin 3) 0.5 2.3 8.7	Limit (dB µ V) 66.0 56.0	Comment
150 Frequency (MHz) 0.150000 0.770750 20.107460 Frequency (MHz) 0.728860	QuasiF (dB μ easure (dB μ \ Averag (dB μ \ 22	Peak V 45.5 33.7 41.3	Meas. Time (ms) 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00	etector Bandwidth (kHz) 9.000 9.000 9.000 tector 2 Bandwidth (kHz) 9.000	Frequ Filte	tter	Line N N Line N N N	Z Corr. (dB) 10. 10. (dB) Corr. (dB)	. Marçi) (dE 0 22 0 22 0 11 Margin (dB) 24.0	gin 3) 0.5 2.3 8.7	Limit (dB µ V) 66.0 60.0 Limit (dB µ V) 46.0	Comment
150 Frequency (MHz) 0.150000 0.770750 20.107460 Frequency (MHz)	QuasiF (dB µ easure Averag (dB µ \	Peak V 45.5 33.7 41.3 41.3 eme 1 .0 1 .2 1	Meas. Time (ms) 1000.00 1000.00 1000.00 1000.00 1000.00 1000.00 Meas. Time (ms)	etector Bandwidth (kHz) 9.000 9.000 9.000 9.000 tector 2 Bandwidth (kHz)	Frequeration Filter	tter	Line	Z Corr (dB) 10. 10. 10. (dB)	. Marçi) (dE 0 22 0 22 0 11 Margin (dB)	gin 3) 0.5 2.3 8.7	Limit (dB µ V) 66.0 60.0 Limit (dB µ V)	Comment

Emission Level= Read Level+ Correct Factor



3.2. Radiated Emission

<u>Limit</u>

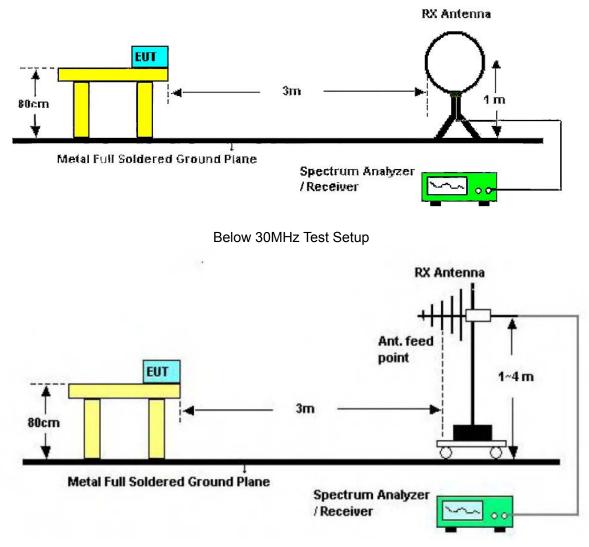
FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9

Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
	54.00	Average
Above 1 GHz	74.00	Peak

Note:

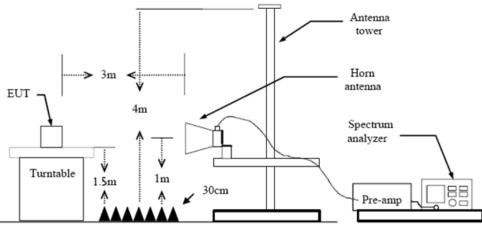
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

Test Configuration



Below 1000MHz Test Setup





Above 1GHz Test Setup

Test Procedure

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

2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for

above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable 3. height antenna tower.

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

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;

(2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

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

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

RBW=1MHz, VBW≥1/T Peak detector for Average value.

Note 1: For the 1/T& 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: Conclusion: PASS

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



	Pol.	Hor	izontal								
est I	Node:	TX	TX 1MHz Mode 2402MHz								
Rema	ırk:	Onl	y worse c	ase is reporte	d						
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10	Freque	ncy	Readin (dBuV	(мн ₂) g Factor		Limit	Margin (dB)	1000.0 Detector			
10 30.00	Freque	ncy z)		(мн ₂) g Factor) (dB/m)	300 Level	Limit	-				
10 <u>30.00</u> No.	Freque (MHz	ncy z) 385	(dBuV	(мн ₂) g Factor (dB/m) -20.10	Level (dBuV/m)	Limit (dBuV/m)	(dB)	Detector			
10 30.00 No.	Freque (MHz 189.73	ncy z) 385 767	(dBuV 34.67	(мн ₂) g Factor (dB/m) -20.10 -18.22	Level (dBuV/m) 14.57	Limit (dBuV/m) 43.50	(dB) -28.93	Detector QP			
No.	Freque (MHz 189.73 * 284.97	ncy z) 385 767	(dBu∨ 34.67 55.06	(мн ₂) g Factor (dB/m) -20.10 -18.22 -16.18	Level (dBuV/m) 14.57 36.84	Limit (dBuV/m) 43.50 46.00	(dB) -28.93 -9.16	Detector QP QP			
No.	Freque (MHz 189.73 * 284.97 379.91	ncy z) 385 767 41 325	(dBu∨ 34.67 55.06 45.79	(мн ₂) g Factor (dB/m) -20.10 -18.22 -16.18 -15.49	300 Level (dBuV/m) 14.57 36.84 29.61	Limit (dBuV/m) 43.50 46.00 46.00	(dB) -28.93 -9.16 -16.39	Detector QP QP QP			

Remarks:



Δnt	. Pol		Vert	ical						
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N	lo.	Freque (MH		Readi (dBu\	-	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1	66.49		33.36	·	-19.74	13.62	40.00	-26.38	QP

66.4989	33.36	-19.74	13.62	40.00	-26.38	QP
189.7385	40.79	-20.10	20.69	43.50	-22.81	QP
284.9767	41.67	-18.22	23.45	46.00	-22.55	QP
379.9141	39.72	-16.18	23.54	46.00	-22.46	QP
543.2742	33.89	-13.15	20.74	46.00	-25.26	QP
857.0247	32.12	-8.81	23.31	46.00	-22.69	QP
	189.7385 284.9767 379.9141 543.2742	189.7385 40.79 284.9767 41.67 379.9141 39.72 543.2742 33.89	189.7385 40.79 -20.10 284.9767 41.67 -18.22 379.9141 39.72 -16.18 543.2742 33.89 -13.15	189.7385 40.79 -20.10 20.69 284.9767 41.67 -18.22 23.45 379.9141 39.72 -16.18 23.54 543.2742 33.89 -13.15 20.74	189.7385 40.79 -20.10 20.69 43.50 284.9767 41.67 -18.22 23.45 46.00 379.9141 39.72 -16.18 23.54 46.00 543.2742 33.89 -13.15 20.74 46.00	189.7385 40.79 -20.10 20.69 43.50 -22.81 284.9767 41.67 -18.22 23.45 46.00 -22.55 379.9141 39.72 -16.18 23.54 46.00 -22.46 543.2742 33.89 -13.15 20.74 46.00 -25.26

Remarks:



FN

Fest Mo	de:	TX E	BLE 1MHz	Mode 2402	MHz			
Remark	:		eport for t cribed lim	he emission v it.	which more	than 10 dB t	pelow the	;
00.0 dBu\	//m							
0								
0						FCC Part15 C -	Above 1G PK	
0								
0								
						FCC Part15 C -	Above 1G AV	
0	1 X							
0								
	2 X							
:0								
0								
0.0	3500.00 60	000.00	8500.00	11000.00 (MHz)	16000.00	18500.00 21000	.00 23500.0	0 26000.0
	Frequer		Reading (dBuV)		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.)	(ubuv)					
No.	(MHz 4803.6	<i>'</i>	42.16	3.11	45.27	74.00	-28.73	peak



EN

	l.	Vert	ical							
est Mo	ode:	TX I	3LE ^	1MHz N	/lode 240	2MHz				
Remark	(:			t for the ed limit.	e emissio	n which	more t	han 10 dE	below th	е
100.0 dB	uV/m									
30										
70								FCC Part15	C - Above 1G I	РК
50								FCC Part15	C - Above 1G /	AV
50	1 X									
10	2									
30	×									
20		_								
10										
0.0	0 3500.00 (5000.00	850	0.00 11	000.00 (MI		000.00	8500.00 210	00.00 2350	0.00 26000
No.	Freque (MHz		1	ading BuV)	Facto (dB/m		evel uV/m)	Limit (dBuV/m	Margir) (dB)	Detector
No. 1)	(dE	-) (dB				Delecto



e:	TX E						
		BLE 1MHZ I	Mode 2440	ИHz			
				which more t	han 10 dB t	pelow the	ļ
m							
					FCC Part15 C	Above 1G PK	
	_				ECC Part15 C	Above 16 AV	
						ADOTE TO AT	
×							
Ĵ							
	_						
3500.00 6	000 00	8500.00 1	1000 00 (MHz)	16000.00 1	19500 00 21000	00 23500	00 26000
		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
4880.8	24	27.58	3.33	30.91	54.00	-23.09	AVG
4880.8	85	41.40	3.33	44.73	74.00	-29.27	peak
	Frequer (MHz 4880.8		m 2 2 2 2 3 3 500.00 6000.00 8500.00 1 5 5 5 5 5 5 5 5 5 5 5 5 5	Image: state in the state	теquency Reading Factor Level (dBuV/m) 4880.824 27.58 3.33 30.91	m FCC Part15 C 3 FCC Part15 C 1 FCC Part15 C 3 FCC Part15 C 1 FCC Part16 C </th <th>m FCC Part15 C - Above 1G PK Image: Second conduction FCC Part15 C - Above 1G PK Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second cond Conduction FCC</th>	m FCC Part15 C - Above 1G PK Image: Second conduction FCC Part15 C - Above 1G PK Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second conduction FCC Part15 C - Above 1G AV Image: Second cond Conduction FCC

Page 21 of 62



Ant	. Pol	•	Vert	ical									
Test	t Mo	de:	TX E	BLE	1MHz N	/lode 244	0	1Hz					
Ren	nark	:			t for the	e emissio	n v	vhich	more t	han 10 dl	3 below t	he	
100.0	dBu∖	//m											_
90													_
80										FCC Part1	i C - Above 1G	PK	_
70													
60										FCC Part1	i C - Above 1G	AV	_
50		2 X											
40		1											-
30		×											-
20													-
10 0.0													
10	00.000	3500.00 6	000.00	850	0.00 11	000.00 (MI	lz)	160	00.00 1	8500.00 21	000.00 235	00.00	26000.00
N	о.	Frequer (MHz			ading BuV)	Facto (dB/m			vel V/m)	Limit (dBuV/n	n) (dB)		ector
1	*	4879.0		2	7.82	3.33		31	.15	54.00	-22.8	5 A'	/G
2	2	4879.7	19	4	1.48	3.33		44	.81	74.00	-29.1	9 pe	eak
Ren	narks												

Page 22 of 62



	l.	Horiz	zontal										
est Mo	ode:	TX E	BLE 1M	Hz N	lode 24	80N	1Hz						
Remark	(:		eport fo cribed l		emissi	on v	vhich	more t	han 1	0 dB l	pelow t	he	
00.0 dBu	i¥7m												_
0													
0													
									FUUF	art15 C ·	Above 1G	РК	-
0													
0													_
0									FLUF		Above 1G	AV	
	1 X												
0													
o	2 X					_							
0													
o													_
0.0)))))))) ()))) ()) ()) ()	MHz)		00.00 1	8500.00	21000		00.00	26000.
1000.000	3500.00 6	000.00	8500.00										
1000.000	Freque	псу	Readi	ng	Fact	or		evel	Lir		Margi		ecto
	1	псу		ng	Fact (dB/r			evel uV/m)			(dB)	Dei	ecto
1000.000	Freque	ncy)	Readi	ing V)		n)	(dBi			V/m)		Dei	ector



FN

Ant. Po	d.	Vert	ical										
est Mo	ode:	TX E	BLE 1	MHz M	/lode 24	80N	1Hz						
Remark	K :			for the d limit.	e emissi	on v	vhich	more t	han 10) dB k	pelow t	he	
00.0 dBu	iV/m												
)		_											
ı						_							
						_			FCC F	art15 C	Above 1G	РК	
·													
									FLU F	artist	Above 16	AV	
	1 X												
·													
·	2 X												
)													
).0 1000.000	3500.00 6	000.00	8500.	00 11	000.00 (N	IHz)	100	00.00 1	8500.00	21000	00 225	500.00	26000.
No.	Freque (MHz			iding suV)	Facto (dB/n			vel iV/m)	Lin (dBu'		Marg (dB)		Detector
1	4959.3	54	41	.13	3.57	,	44	.70	74.	00	-29.3	0	peak
2 *	4960.5	04	27	.05	3.57	'	30	.62	54.	00	-23.3	8	AVG
			<u> </u>		<u> </u>		1		1		1		



	l.	Horiz	zontal					
Test Mo	de:	TX B	LE 2MHz N	/lode 2402N	/Hz			
Remark	:		eport for the cribed limit.	emission v	vhich more t	han 10 dB b	pelow the	
100.0 dBu\	√/m							
90								
0						FCC Part15 C -	Above 1G PK	
0								
o								
0						FCC Part15 C -	Above 1G AV	
	2 X							
0	1							
0	1 X							
0								
o								
0.0	3500.00 6	000.00	8500.00 110	000.00 (MHz)	16000.00 1	8500.00 21000	.00 23500.0	0 26000.1
No.	Frequer (MHz	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	4803.5	67	26.99	3.11	30.10	54.00	-23.90	AVG
2	4804.4	25	41.30	3.11	44.41	74.00	-29.59	peak

2.Margin value = Level -Limit value

EN



	-	Vert	ical					
est Mo	de:	TX E	BLE 2MHz I	Mode 2402N	/IHz			
emark	:		eport for the		which more f	han 10 dB b	pelow the	!
0.0 dBuV	//m							
						FCC Part15 C -	Above 1G PK	
						FCC Part15 C -	Above 1G AV	
·	2 X							
·								
	X							
0.0								
1000.000	3500.00 6	000.00	8500.00 1	1000.00 (MHz)	16000.00	18500.00 21000	.00 23500.	00 26000.
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	4804.4	19	28.11	3.11	31.22	54.00	-22.78	AVG
	4804.7	40	41.53	3.11	44.64	74.00	-29.36	peak

Remarks:

EN



EN

Ant. Po	l	Hori	zontal			Horizontal										
lest Mo	de:	TX E	BLE 2MI	Hz Mod	e 2440l	∕IHz										
Remark			eport fo		nission	which	more t	han 10) dB b	elow the						
100.0 dBu	V/m	1 p. 00														
90																
30								FCC P	art15 C - <i>i</i>	Above 1G PK						
70																
50																
50								FCC P	art15 C - <i>i</i>	Above 1G AV						
	2 X															
40	1															
30	X															
20																
10																
0.0																
1000.000	3500.00	6000.00	8500.00	11000.0	0 (MHz)	160	0.00 1	8500.00	21000.0	0 23500.0	0 26000.					
20		6000.00	8500.00	11000.0	0 (MHz)	160	DO. OO 18	8500.00	21000.0	0 23500.0	0					
					_											
No.	Freque (MH2		Readi (dBu\	-	Factor dB/m)		evel ıV/m)		nit V/m)	Margin (dB)	Detecto					
No.		z)		V) (0		(dBu		(dBu			Detecto					



est Mod	e:		Vertical										
emark:		TX BLE 2MHz Mode 2440MHz No report for the emission which more than 10 dB below the											
			eport for the cribed limit.	emission v	vhich more t	han 10 dB t	pelow the						
00.0 dBuV/	'n												
0													
						FCC Part15 C	- Above 1G PK						
)						FCC Part15 C	Above 16 AV						
	2 X						Above To Av						
)	1 X												
	×												
)													
D D. O													
	3500.00 6	000.00	8500.00 11	000.00 (MHz)	16000.00	18500.00 21000	.00 23500.	00 26000.					
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
1 *	4879.7	49	27.30	3.33	30.63	54.00	-23.37	AVG					
2	4880.2	03	40.97	3.33	44.30	74.00	-29.70	peak					

Remarks:



Ant. Po) .	Hori	Horizontal										
est Mo	ode:	TX E	BLE 2MHz	Mode 2480N	ЛНz								
Remarl	K :		eport for th	e emission v	which more f	han 10 dB l	below the	;					
00.0 dB	uV/m												
0													
80						FCC Part15 C	- Above 1G PK						
70													
50 <u> </u>						FCC Part15 C	- Above 1G AV	,					
50	1×												
ю													
80	2 X												
20													
0													
0.0													
No.	Frequer (MHz		Reading	Factor (dB/m)	Level	Limit (dBuV/m)	Margin						
1000.000	Frequer	ncy)		1	I	Limit	Margin	Detector					



1	No repo		emission	MHz which more t	han 10 dB b FCC Part15 C -	Above 16 PK	
2×			e emission	which more t	FCC Part15 C -	Above 16 PK	
					FCC Part15 C -	Above 1G AV	
					FCC Part15 C -	Above 16 AV	
						ABOTE TO AT	
1 ×							
×							
00 6000	0 00 850	0 00 110	100.00 (MHz)	16000.00 1	8500.00 21000	00 23500.0	0 26000.
equenc (MHz)			Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
59.303	3 2	27.44	3.57	31.01	54.00	-22.99	AVG
59.939	9 4	1.32	3.57	44.89	74.00	-29.11	peak
	equeno MHz) 59.30	equency Re MHz) (c 59.303 2	equency MHz) Reading (dBuV) 59.303 27.44	equency Reading Factor MHz) (dBuV) (dB/m) 59.303 27.44 3.57	equency Reading Factor Level (dBuV) (dBuV) (dB/m) 59.303 27.44 3.57 31.01	equency Reading Factor Level Limit (dBuV) (dB/m) (dBuV/m) (dBuV/m) 59.303 27.44 3.57 31.01 54.00	equency Reading Factor Level Limit (dBuV) (dBuV) (dBuV/m) (dBuV/m) (dBuV/m) (dB) 59.303 27.44 3.57 31.01 54.00 -22.99



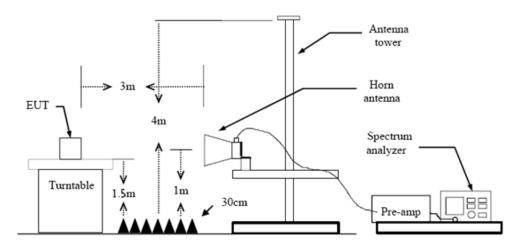
3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

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

Restricted Frequency Band	(dBuV/m	n)(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 3.7 Duty Cycle.

Test Mode

Please refer to the clause 2.4.



Test Results

nt. Po	Ι.	Hori	zontal					
est Mo		BLE	1MHz Mod	e 2402MHz				
10.0 dBu	V/m							
00								
0								
:0						FCC Part15 C	- Above 1G P	ĸ
0								
								\square
o ⊨						FCC Part15 C	- Abave 1G A	×
0	and the second second	mount	man and the second second	range and a second and a second	when the second s	and the second second	-	month
0								
0.0 2304.783	2314.78	2324.78	2334.78 23	44.78 (MHz)	2364.78	2374.78 2384.	.78 2394.3	78 2404.7
	Freque	PRCV	Reading	Factor	Level	Limit	Margin	
	Treque					(dBuV/m)		Detector
No.	(MH	z)	(dBuV)	(dB/m)	(ubuv/iii)	(aba v/m)	()	
No. 1	(MH 2390.		(dBuV) 22.82	(dB/m) 30.84	53.66	74.00	-20.34	peak

Remarks:



Ant. Po		Vert	cal					
lest Mo		BLE	1MHz Mode	e 2402MHz				
110.0 dBu	√/m							
100								
								Λ
90								
80						FCC Part15 C	- Above 1G Pl	
70								
60								
50						FCC Part15 C	- Abbve 1G A	
40	warden warden of the	hann	www.www.www.	nonwhere	philippine and the second s	and the feasily of the second s	and marked	and C
30								
20								
10.0 2305.000	2315.00	2325.00	2335.00 23	45.00 (MHz)	2365.00	2375.00 2385.	00 2395.0	0 2405.0
No.	Freque (MH	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.	000	22.64	30.84	53.48	74.00	-20.52	peak
2 *	2390.	000	6.65	30.84	37.49	54.00	-16.51	AVG
	(dB/m) =		na Factor (c Limit value	IB/m)+Cable	e Factor (dB)-Pre-ampli	fier Facto	or



nt.	Pol.		Hori	zontal					
est	Mod		BLE	1MHz Mod	e 2480 MHz	Z			
10.0	dBuV	'm	_						
00									
0 -									
• -	A						FCC Part15 C	- Above 1G P	'K
ן ו	11								
	1						FCC Part15 C	- Above 1G A	v
ם									
)	2	an a	other where	an ana ang ang ang ang ang ang ang ang a	and the second of the second o	al and a second second and a second	undensen meterseken m	an and a start of the second second	anarthereauther
) -									
0.0 247	7.500	2487.50	2497.50	2507.50 25	17.50 (MHz)	2537.50 2	2547.50 2557.	50 2567.	50 2577.5
		Frequ	encv	Reading	Factor	Level	Limit	Margin	
N	0.	(MF		(dBuV)	(dB/m)		(dBuV/m)		Detector
1		2483	.500	22.31	31.24	53.55	74.00	-20.45	peak
2	*	2483	.500	7.42	31.24	38.66	54.00	-15.34	AVG

Remarks:

EN



Ant. Pol.		Vert	Vertical								
Test Mo	ode:	BLE	BLE 1MHz Mode 2480 MHz								
110.0 dBu	i¥/m										
100											
90											
30											
70						FCC Part15 C	- Above 1G PK				
50											
50	1×					FCC Part15 C	- Above 1G AV	,			
40	2				Advantation	the second second second					
80		outre est united a cont	and a second second second second		of a definition of the second s		a start of sectors				
20											
10.0	2486.50	2496.50	2506.50 25	16.50 (MHz)	2536.50 2	2546.50 2556.	50 2566.5	0 2576.50			
	1						1				
No.	Freque (MH	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
1	2483.	500	20.21	31.24	51.45	74.00	-22.55	peak			
2 *	2483.	500	7.68	31.24	38.92	54.00	-15.08	AVG			
Remark		• •	na Factor (d								



Ant.	Pol.		Hori	zontal							
Test Mode:			BLE 2MHz Mode 2402MHz								
10.0	dBuV/	m									
00 -											
0 -									A		
0 -							FCC Part15 C	- Above 1G P	K /		
0											
							FCC Part15 C	- Altove 16 A	v		
0 - 0 -								2			
	- Argenta-re	manantherran	eren Astronom	when the work where	-udhenen mender ser adh	nan sen sen sen sen sen sen sen sen sen se	hallen og fra han skrivet for en skrivet for	yoray Pary Alafaha dad	· ·		
0.0 230	5.500 2	2315.50 2	325.50	2335.50 23	45.50 (MHz)	2365.50	2375.50 2385.	50 2395.	50 2405.5		
						1					
N	o.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
		2390.0	00	22.34	30.84	53.18	74.00	-20.82	peak		
1								-15.21			

Remarks:



Ant. Pol. Vertical														
Test N	lode:		BLE	2MHz M	Nod	e 2402N	1Hz							
10.0 d	BuV∕m													_
100														
90 -														
30										FCC Pa	rt15 C	- Above 1G I	чк ↓	Ì.
70														
io —										FCC Pa	rt15 C	- Above 16 /	w	+
i0												×		
0	mann	Andreas and	mm	nushinana	en an	m Month	m		-	an and the second second	n	2	und	
														-
20														-
10.0 2305.0	00 2315.	00 23	25.00	2335.00	23	845.00 (N	(Hz)	2365.	00 2	2375.00	2385.	00 2395	.00	2405.0
No.		equen (MHz)		Readi (dBu)		Facto (dB/m		Lev (dBu∖		Limi (dBuV		Margin (dB)	Det	ector
1	23	90.00	00	20.7	6	30.84	4	51.6	60	74.0	0	-22.40	pe	ak
2 *	23	90.00	00	7.78	3	30.84	4	38.6	62	54.0	0	-15.38	A	/G
Remai		m) – (nton	na Fact			abl	-						



(MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dB) 1 2483.500 21.38 31.24 52.62 74.00 -21.38 p									zontal	Hori		I.	. Po	\nt
No. Frequency (MHz) Reading (dBuV) Factor (dBm) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Data Data No. Frequency (MHz) Reading (dBuV) Factor (dBm) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Data 1 2483.500 21.38 31.24 52.62 74.00 -21.38 p					2) MHz	2480	Mode	2MHz I	BLE		de:	t Mo	es
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dBuV/m) Definition 1 2483.500 21.38 31.24 52.62 74.00 -21.38 production												ıV/m) dBu	10.0
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dBuV/m) Detection 1 2483.500 21.38 31.24 52.62 74.00 -21.38 p														00
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Remarks:

EN

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



Ant	t. Po	Ι.		Vert	ical											
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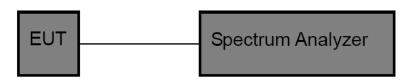


3.4. Band edge and Spurious Emissions (Conducted)

<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.

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 Results

(1) Band edge Conducted Test

Test Mode	Frequency[MHz]	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE 1MHz	2402	4.85	-55.98	<=-15.15	PASS
	2480	5.25	-57.77	<=-14.75	PASS
	2402	4.34	-40.29	<=-15.66	PASS
BLE 2MHz	2480	4.35	-57.77	<=-15.65	PASS





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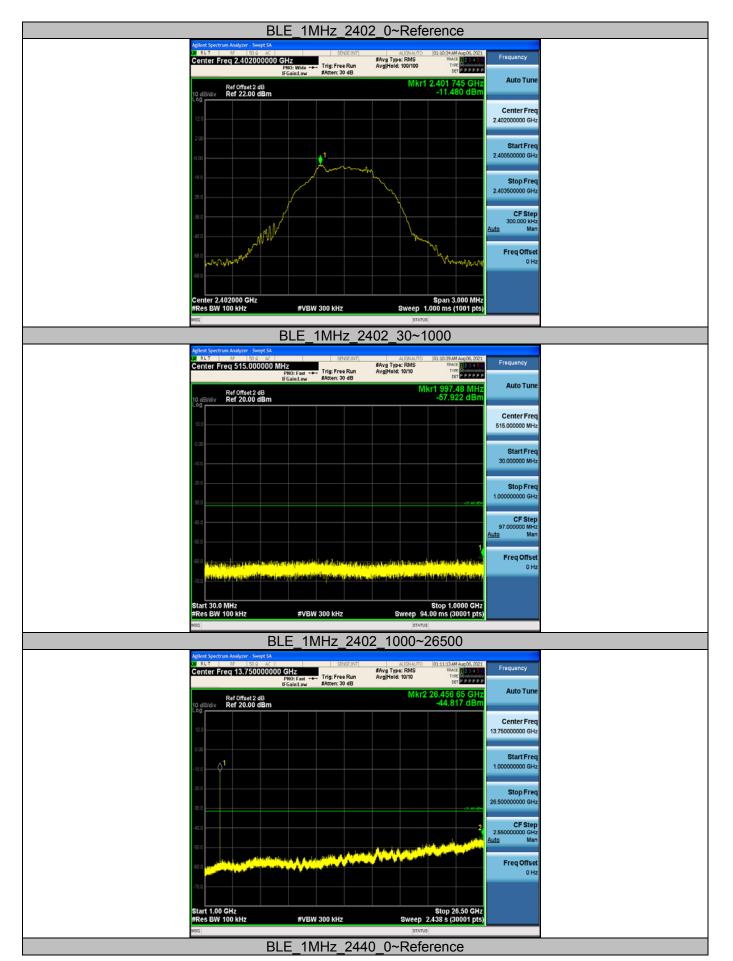
Agilent Spectrum Analyzer - Swept SA				
2 RF 50 R AC Center Freq 2.510000000		#Avg Type ree Run Avg Hold:	LIGNAUTO 01:18:43 AM Aug 04, 20 : RMS TRACE 2 3 4 300/300 TYPE M DET P P P P	Frequency
Ref Offset 0.5 dB 10 dB/div Ref 20.00 dBm			Mkr4 2.483 92 GH -57.767 dBi	Z Auto Tune n
100 000 -100			-15.65 d	Center Freq 2.510000000 GHz
-20.0			-15.05 0	Start Freq 2.470000000 GHz
-50.0 -50.0 -70.0	adjanting provident and provid	an a	una lunin menangan penangan p	Stop Freq 2.550000000 GHz
Start 2.47000 GHz #Res BW 100 kHz	#VBW 300 kH		Stop 2.55000 GF Sweep 7.667 ms (1001 pt FUNCTION VALUE	CF Step 8) 8.000000 MHz Auto Man
2 N 1 f 2.4 3 N 1 f 2.5	79 52 GHz 4.348 83 50 GHz 58.891 00 00 GHz 59.809 83 92 GHz 57.767	dBm		Freq Offset 0 Hz
7 8 9 10 11				8
MSG			STATUS	



(2) Conducted Spurious Emissions Test

Test Mode	Frequency [MHz]	Freq Range [MHz]	Ref Level [dBm]	Result[dBm]	Limit[dBm]	Verdict	
		Reference	-11.48	-11.48		PASS	
	2402	30~1000	-11.48	-57.92	<=-31.48	PASS	
		1000~26500	-11.48	-44.82	<=-31.48	PASS	
		Reference	5.05	5.05		48 PASS 48 PASS 95 PASS 95 PASS 95 PASS 91 PASS 91 PASS 91 PASS 06 PASS	
BLE 1MHz	2440	30~1000	5.05	-59.47	<=-14.95	PASS	
		1000~26500	5.05	-46.33	<=-14.95	PASS	
	2480	Reference	5.09	5.09		PASS	
		30~1000	5.09	-56.95	<=-14.91	PASS	
		1000~26500	5.09	-46.16	<=-14.91	PASS	
		Reference	3.94	3.94		PASS	
	2402	30~1000	3.94	-59.78	<=-16.06	PASS	
		1000~26500	3.94	-45.51	<=-16.06	PASS	
		Reference	4.70	4.70		PASS	
BLE 2MHz	BLE 2MHz 2440	30~1000	4.70	-59.71	<=-15.3	PASS	
		1000~26500	4.70	-46.38	<=-15.3	PASS	
		Reference	3.16	3.16		PASS	
	2480	30~1000	3.16	-59.48	<=-16.84	PASS	
		1000~26500	3.16	-46.5	<=-16.84	PASS	

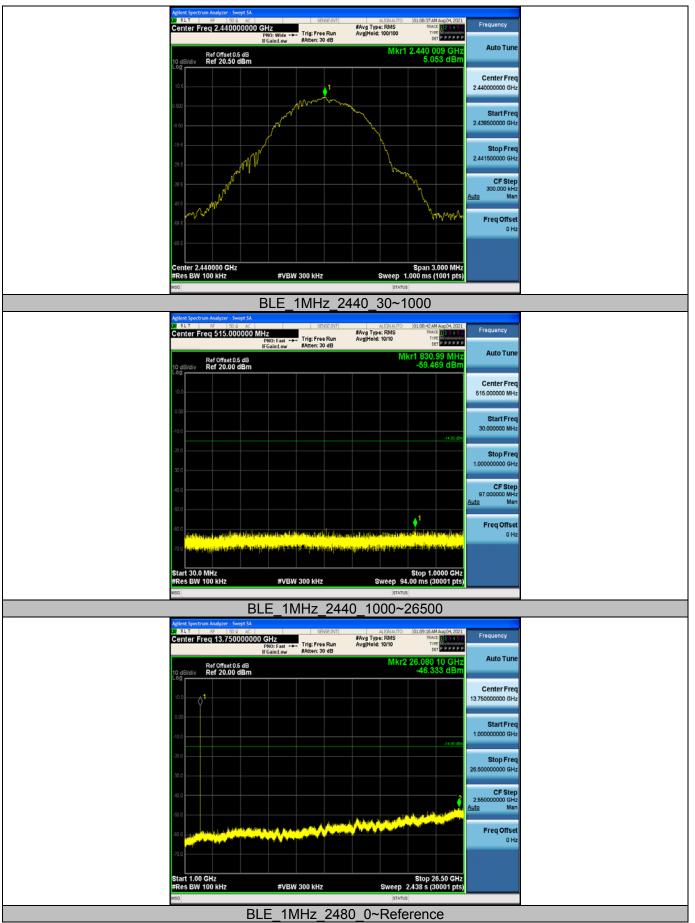




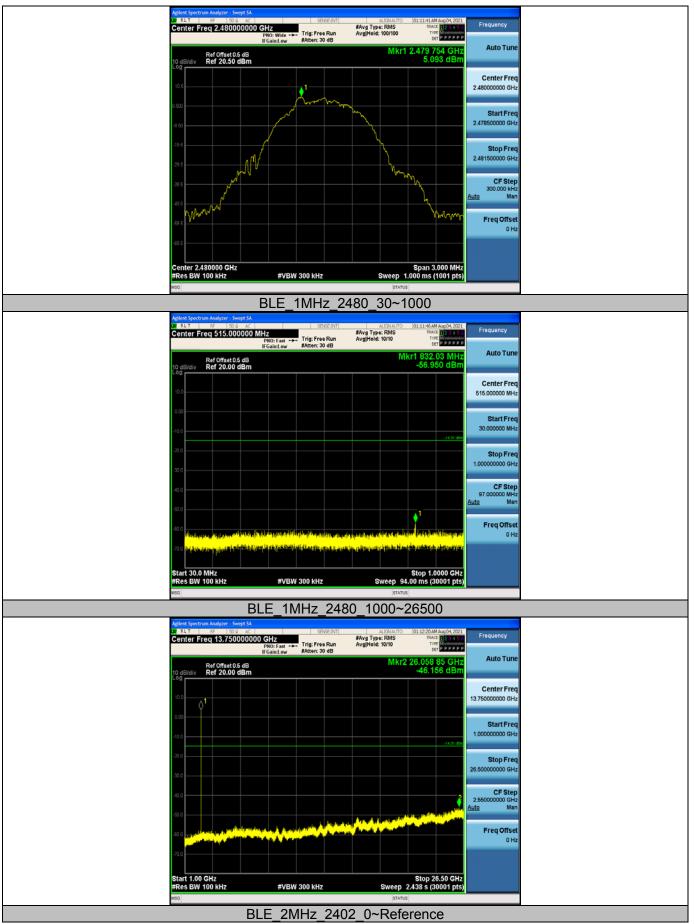
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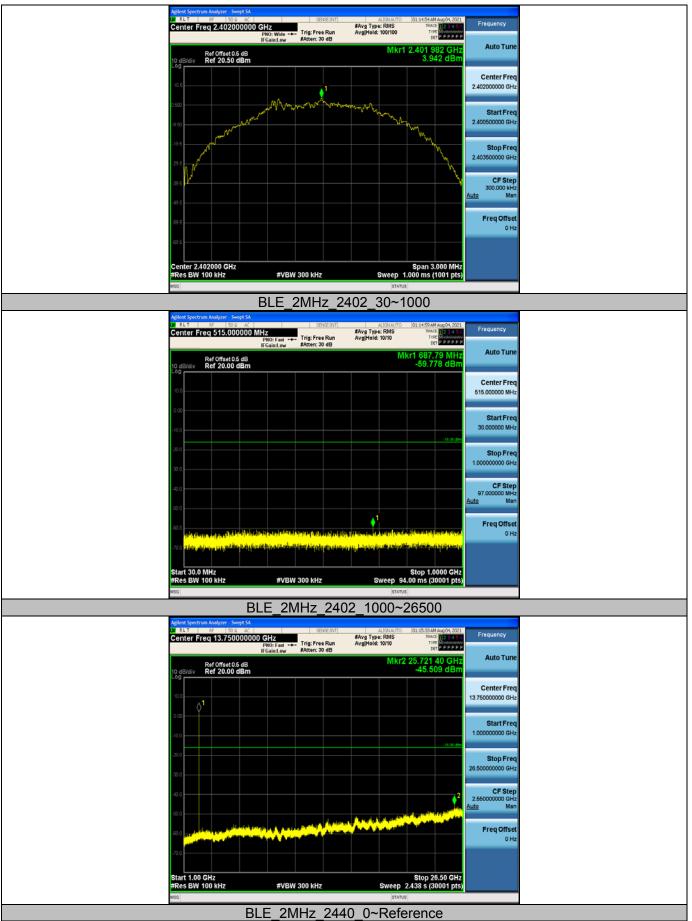






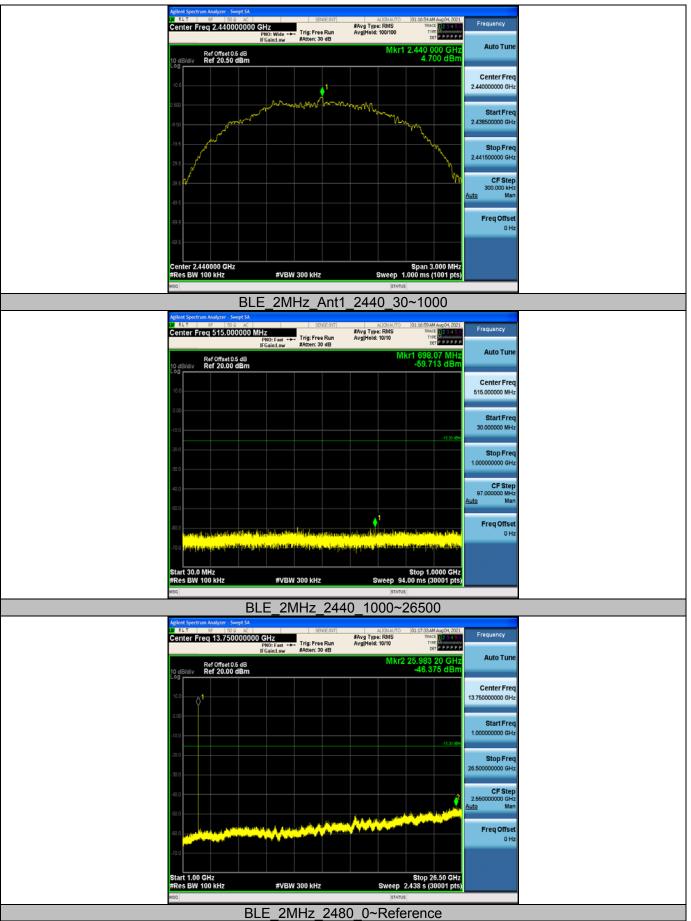




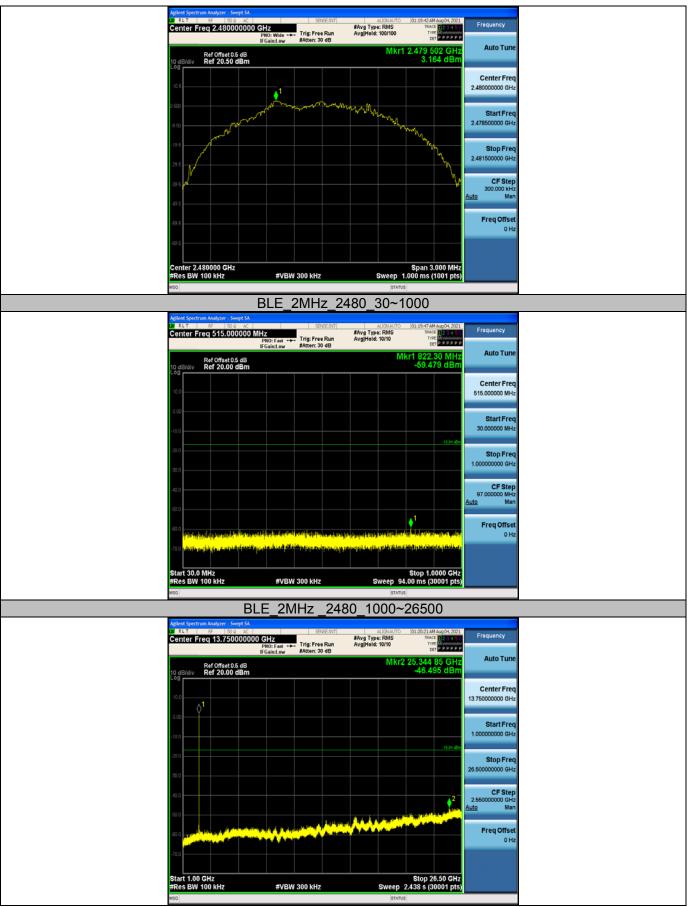




FN









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

EUT	Spectrum Analyzer

Test Procedure

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

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

Test Mode

Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	DTS BW[MHz]	Limit[MHz]	Verdict
	2402	0.692	>=0.5	PASS
BLE 1MHz	2440	0.624	>=0.5	PASS
	2480	0.656	>=0.5	PASS
	2402	1.128	>=0.5	PASS
BLE 2MHz	2440	1.224	>=0.5	PASS
	2480	1.176	>=0.5	PASS





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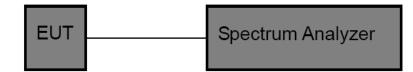
3.6. Peak Output Power

<u>Limit</u>

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

Section	Test Item	Limit	Frequency Range(MHz)
CFR 47 FCC 15.247(b)(3)	Maximum conducted output power	1 Watt or 30dBm	2400~2483.5
ISED RSS-247 5.4 d	EIRP	4 Watt or 36dBm	2400~2483.5

Test Configuration



Test Procedure

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

2. Spectrum Setting:

Peak Detector: RBW≥DTS Bandwidth, VBW≥3*RBW.

Sweep time=Auto.

Detector= Peak.

Trace mode= Maxhold.

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

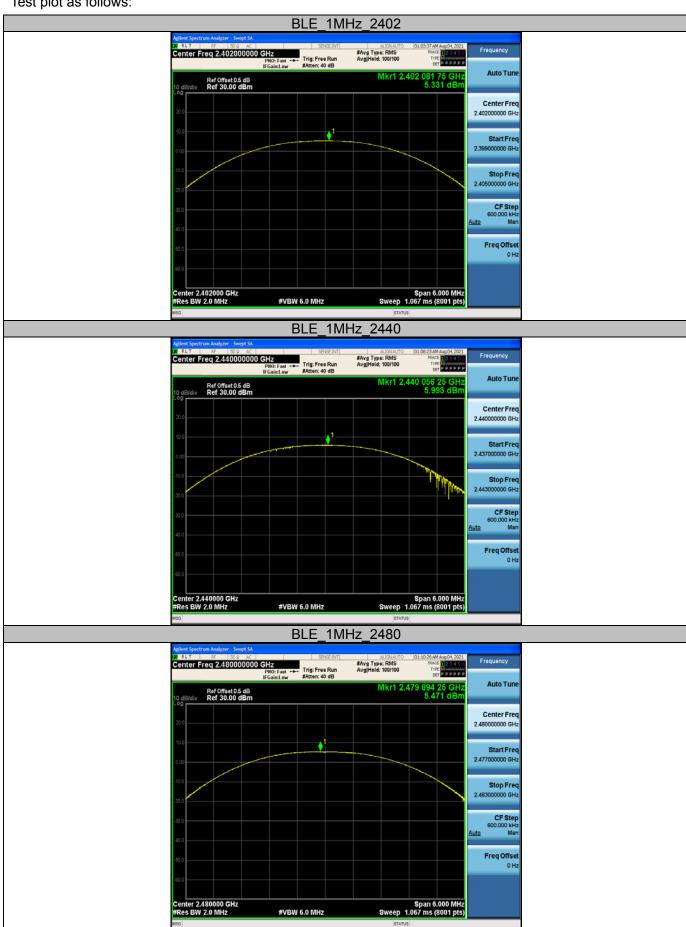
Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm]	Limit[dBm]	Verdict
	2402	5.33	<=30	PASS
BLE 1MHz	2440	5.99	<=30	PASS
	2480	5.47	<=30	PASS
BLE 2MHz	2402	5.18	<=30	PASS
	2440	5.73	<=30	PASS
	2480	5.31	<=30	PASS



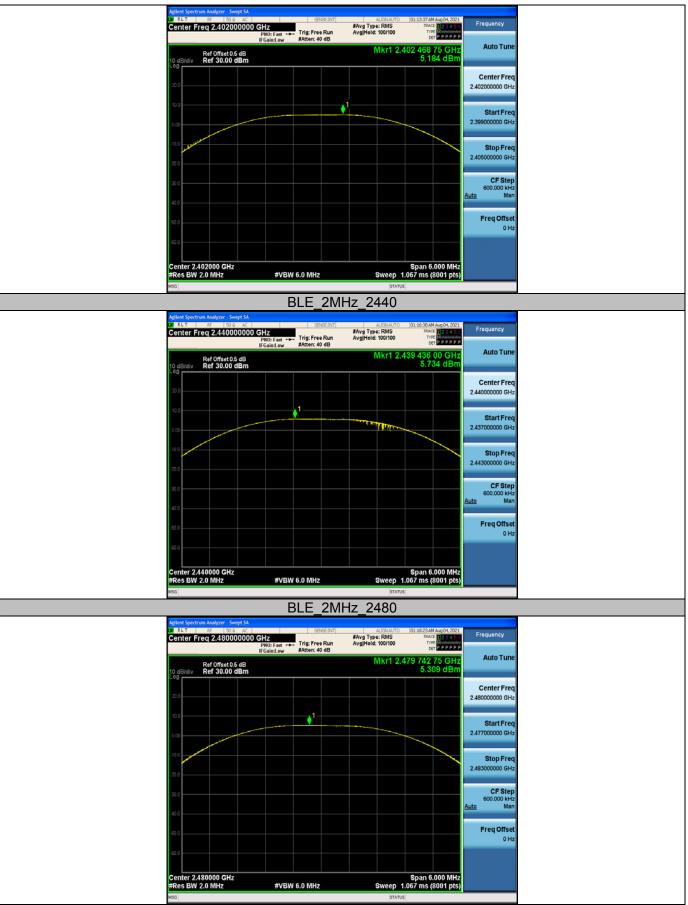


BLE 2MHz 2402

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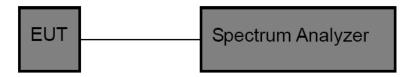
3.7. Power Spectral Density

<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	8dBm(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.

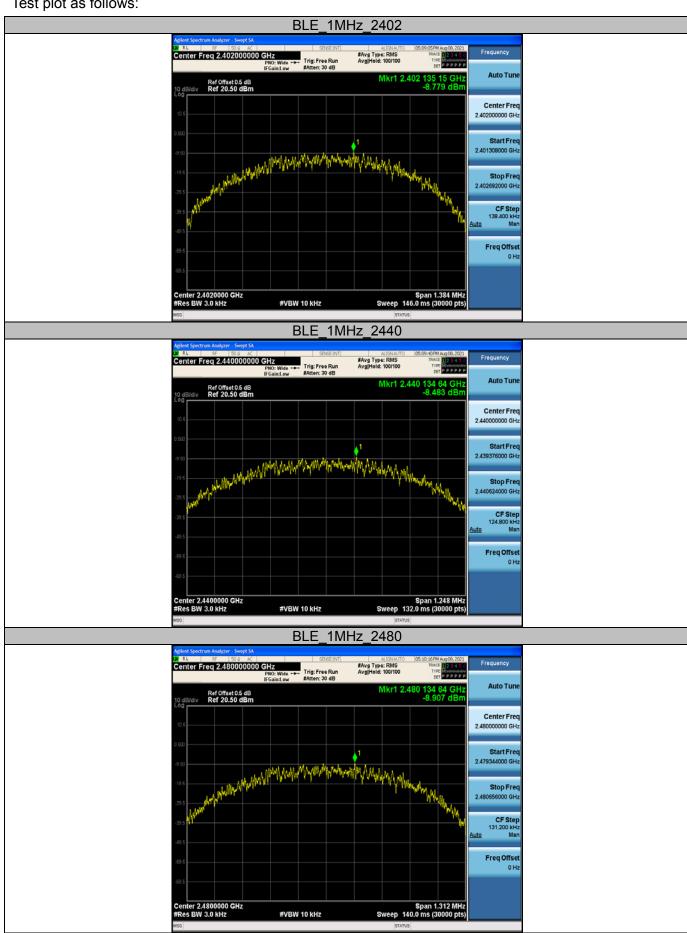
Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE 1MHz	2402	-8.78	<=8	PASS
	2440	-8.48	<=8	PASS
	2480	-8.91	<=8	PASS
BLE 2MHz	2402	-11.36	<=8	PASS
	2440	-11.19	<=8	PASS
	2480	-11.63	<=8	PASS



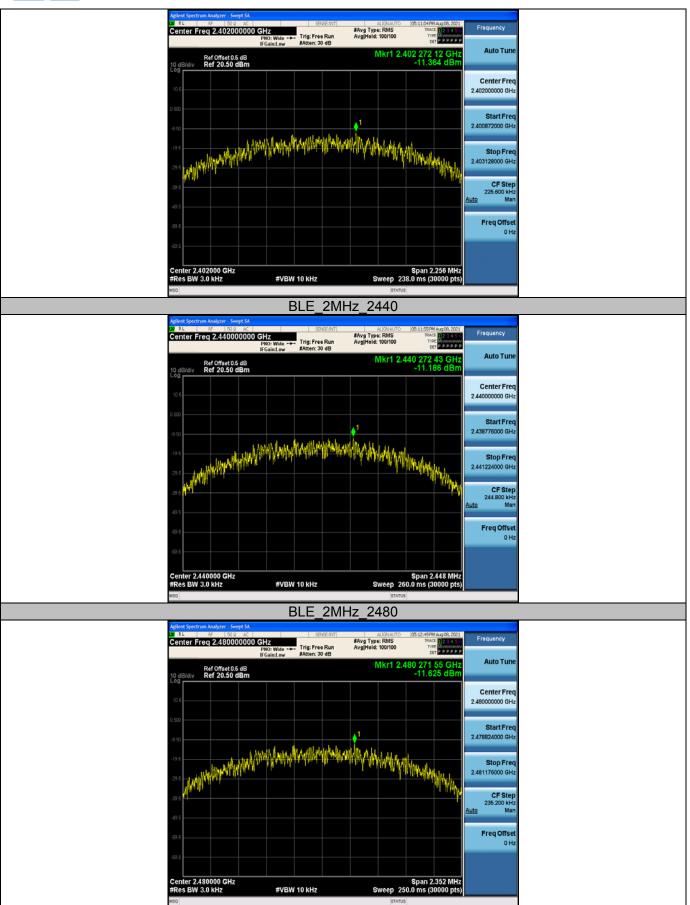


BLE 2MHz 2402

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Page 58 of 62

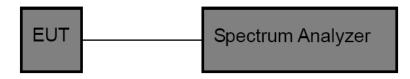


3.8. Duty Cycle

<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 8MHz Set the VBW to 8MHz 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.

<u>Test Result</u>

Test Mode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
BLE 1MHz	2402	1.64	1.88	87.23	0.53	1
	2440	1.64	1.88	87.23	0.53	1
	2480	1.64	1.88	87.23	0.53	1
BLE 2MHz	2402	0.82	1.25	65.60	0.80	1
	2440	0.82	1.25	65.60	0.80	1
	2480	0.82	1.25	65.60	0.80	1





BLE_2MHz_2402

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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 less than 6dBi, please refer to the EUT internal photographs antenna photo.