

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC173304

1 of 57 Page:

FCC Radio Test Report FCC ID: 2ASHI-DT96

Original Grant

: TB-FCC173304 Report No.

SHENZHEN XINKEYING DIGITAL CO., LIMITED **Applicant**

Equipment Under Test (EUT)

EUT Name Smart Watch

Model No. **DT96**

: DT95, DT86, DT66, DT56, DT52, DT97, DT92, DT59, DT40, DTX Series Model No.

Brand Name : DT NO.I

Sample ID TBBJ-20200513-08-1#& TBBJ-20200513-08-2#

Receipt Date : 2020-05-25

: 2020-05-26 to 2020-07-02 **Test Date**

Issue Date 2020-07-02

Standards FCC Part 15, Subpart C 15.247

: ANSI C63.10: 2013 **Test Method**

Conclusions **PASS**

In the configuration tested, the EUT complied with the standards specified above,

Test/Witness

Engineer

Engineer

Supervisor

Engineer Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

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Revision History

Report No.	Version	Description	Issued Date
TB-FCC173304	Rev.01	Initial issue of report	2020-07-02
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1. General Information about EUT

1.1 Client Information

Applicant : SHENZHEN XINKEYING DIGITAL		SHENZHEN XINKEYING DIGITAL CO.,LIMITED	
Address		Room 17I, Block A, HuaQiang Square, HuaQiang North Road, Futian District, Shenzhen, China	
Manufacturer		SHENZHEN XINKEYING DIGITAL CO.,LIMITED	
Address		Room 17I, Block A, HuaQiang Square, HuaQiang North Road, Futian District, Shenzhen, China	

1.2 General Description of EUT (Equipment Under Test)

EUT Name		Smart Watch			
Model(s) No.		DT96, DT95, DT86, DT66, DT56, DT52, DT97, DT92, DT59, DT40, DTX			
Model Different		All these models are in the same PCB, layout and electrical circuit, the only difference is apperance size, It's all plastic			
	3	Operation Frequency:	Bluetooth 5.0(BLE): 2402MHz~2480MHz		
The state of the		Number of Channel:	Bluetooth 5.0(BLE): 40 channels see note(3)		
Product	3	RF Output Power:	3.565 dBm (Max)		
Description		Antenna Gain:	2.71dBi PIFA Antenna		
		Modulation Type:	GFSK		
		Bit Rate of Transmitter:	1Mbps&2Mbps		
Power Rating		USB Input:DC 5V DC 3.7V by 230mAh L	i-ion battery		
Software Version		: N/A			
Hardware Version	: Z23V2.0				
Connecting I/O Port(S)		Please refer to the User's Manual			
- CONT.					

Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.

Note:

This Test Report is FCC Part 15.247 for Bluetooth, the test procedure follows the FCC KDB 558074 D01 DTS Means Guidance v05.

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) Antenna information provided by the applicant.



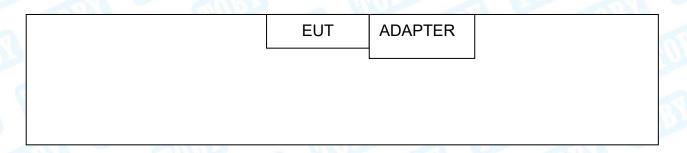
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(3) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Block Diagram Showing the Configuration of System Tested

Conducted Test



Radiated Test





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1.4 Description of Support Units

Equipment Information								
Name	Model	FCC ID/VOC	Manufacturer	Used "√"				
ADAPTER	CHURCH		BAISHIYUAN	√				
	Cable Information							
Number	Number Shielded Type Ferrite Core Length Note							
			(III)					

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test					
Final Test Mode Description					
Mode 1	USB Charging+TX Mode				

For Radiated Test						
Final Test Mode Description						
Mode 2	TX Mode(Channel 00) 1Mbps					
Mode 3	TX 1Mbps Mode (Channel 00/20/39)					
Mode 4	TX 2Mbps Mode (Channel 00/20/39)					
Note : The antenna gain prov	vided by the applicant, the adapter and verified for the RF					

conduction test provided by TOBY test lab.

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

BLE Mode: GFSK Modulation Transmitting mode.

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.



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1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF setting.

Test Software Version	- MILL	nRF_DTM	
Frequency	2402 MHz	2442MHz	2480 MHz
BLE GFSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	$\pm 3.50~\mathrm{dB}$ $\pm 3.10~\mathrm{dB}$
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB



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1.8 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.



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2. Test Summary

Standard Section						
FCC	IC	Test Item	Test Sample(s)	Judgment	Remark	
15.203	3	Antenna Requirement	TBBJ-20200513-08-2#	PASS	N/A	
15.207(a)	RSS-GEN 7.2.4	Conducted Emission	TBBJ-20200513-08-1#	PASS	N/A	
15.205&15.247(d)	RSS-GEN 7.2.2	Band-Edge & Unwanted Emissions into Restricted Frequency	TBBJ-20200513-08-2#	PASS	N/A	
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth	TBBJ-20200513-08-2#	PASS	N/A	
15.247(b)(3)	RSS 247 5.4 (4)	Conducted Max Output Power	TBBJ-20200513-08-2#	PASS	N/A	
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	TBBJ-20200513-08-2#	PASS	N/A	
15.205, 15.209&15.247(d)	RSS 247 5.5	Transmitter Radiated Spurious &Unwanted Emissions into Restricted Frequency	TBBJ-20200513-08-2#	PASS	N/A	

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted Measurement	MTS-8310	MWRFtest	V2.0.0.0



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4. Test Equipment

Conducted Emission	Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 13, 2019	Jul. 12, 2020
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 13, 2019	Jul. 12, 2020
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 13, 2019	Jul. 12, 2020
LISN	Rohde & Schwarz	ENV216	101131	Jul. 13, 2019	Jul. 12, 2020
Radiation Emission 1	est				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 13, 2019	Jul. 12, 2020
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 13, 2019	Jul. 12, 2020
Spectrum Analyzer	Rohde & Schwarz	FSVR	1311.006K40-10 0945-DH	Jul. 13, 2019	Jul. 12, 2020
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Aug.07, 2019	Aug. 06, 2020
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 13, 2019	Jul. 12, 2020
Pre-amplifier	Sonoma	310N	185903	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	EMCI	EMC02325	980217	Jul. 27, 2019	Jul. 26, 2020
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.01, 2020	Feb. 28, 2021
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted	Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 13, 2019	Jul. 12, 2020
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 13, 2019	Jul. 12, 2020
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 16, 2019	Sep. 15, 2020
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 16, 2019	Sep. 15, 2020
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 16, 2019	Sep. 15, 2020
DE Dower Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 16, 2019	Sep. 15, 2020
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 16, 2019	Sep. 15, 2020



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5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1Test Standard FCC Part 15.207

5.1.2 Test Limit

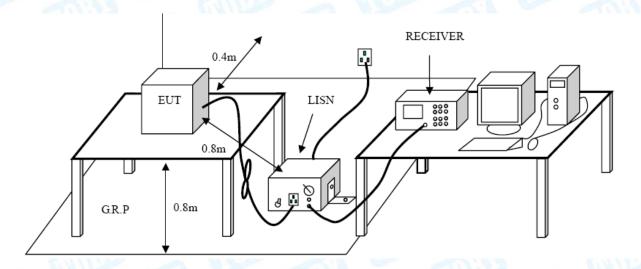
Conducted Emission Test Limit

Eroguanov	Maximum RF Line Voltage (dBμV)			
Frequency	Quasi-peak Level	Average Level		
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup





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5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A.



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6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247(d)

6.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (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
Above 960	500	3

Radiated Emission Limit (Above 1000MHz)

Frequency	Distance Meters(at 3m)			
(MHz)	Peak (dBuV/m)	Average (dBuV/m)		
Above 1000	74	54		

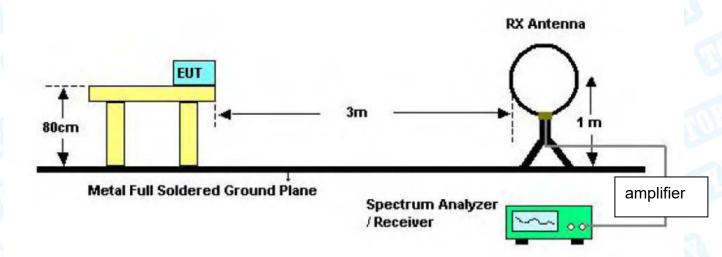
Note:

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

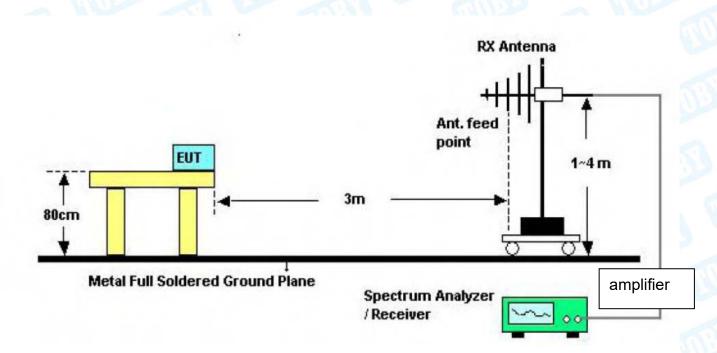


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6.2 Test Setup



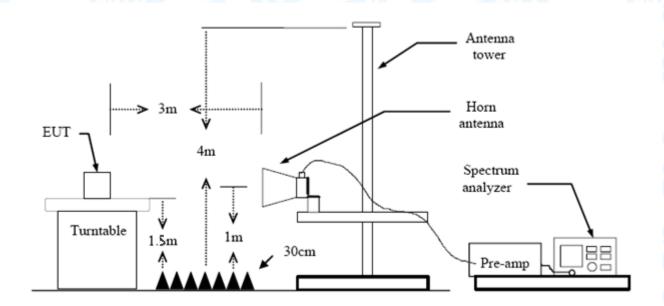
Below 30MHz Test Setup



Below 1000MHz Test Setup



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Above 1GHz Test Setup

6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.



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6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment B.



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7. Restricted Bands Requirement

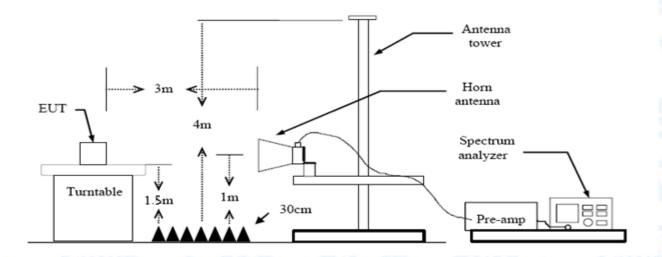
7.1 Test Standard and Limit

7.1.1 Test Standard FCC Part 15.247(d) FCC Part 15.205

7.1.2 Test Limit

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

7.2 Test Setup



7.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.



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(4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

7.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment C.



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8. Bandwidth Test

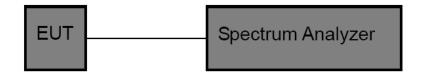
8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247 (a)(2)

8.1.2 Test Limit

FCC	Part 15 Subpart C(15.247)	/RSS-247
Test Item	Limit	Frequency Range(MHz)
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

8.2 Test Setup



8.3 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 bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (3)Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:100 kHz, and Video Bandwidth:300 kHz, Detector: Peak, Sweep Time set auto.

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

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

8.6 Test Data

Please refer to the Attachment D.



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9. Peak Output Power Test

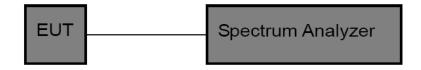
9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (b)(3)

9.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-247				
Test Item	Limit	Frequency Range(MHz)		
Peak Output Power	1 Watt or 30 dBm	2400~2483.5		

9.2 Test Setup



9.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to section 9.1.1 of KDB 558074 D01 DTS Meas Guidance v05.

- (1) Set the RBW≥DTS Bandwidth
- (2) Set VBW≥3*RBW
- (3) Set Span≥3*RBW
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

9.6 Test Data

Please refer to the Attachment E.



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10. Power Spectral Density Test

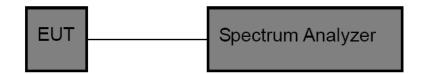
10.1 Test Standard and Limit

10.1.1 Test Standard FCC Part 15.247 (e)

10.1.2 Test Limit

FCC Part 15 Subpart C(15.247)			
Test Item	Limit	Frequency Range(MHz)	
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5	

10.2 Test Setup



10.3 Test Procedure

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 v05.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser centre frequency to DTS channel centre frequency.
- (3) Set the span to 1.5 times the DTS bandwidth.
- (4) Set the RBW to: 3 kHz(5) Set the VBW to: 10 kHz
- (6) Detector: peak(7) Sweep time: auto
- (8) Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

10.4 Deviation From Test Standard

No deviation

10.5 EUT Operating Condition

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

10.6 Test Data

Please refer to the Attachment F.



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11. Antenna Requirement

11.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 Requirement

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 an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

11.2 Deviation From Test Standard

No deviation

11.3 Antenna Connected Construction

The gains of the antenna used for transmitting is 2.71 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

11.4 Result

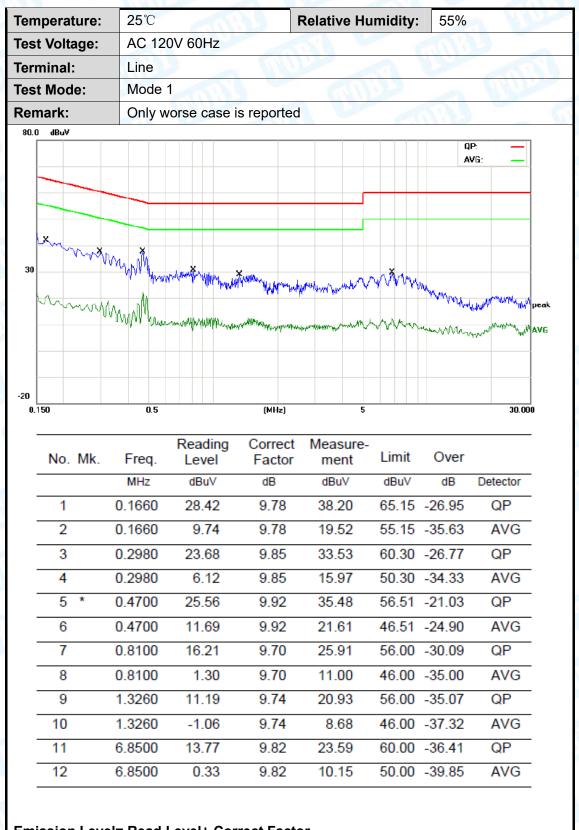
The EUT antenna is a PIFA Antenna. It complies with the standard requirement.

	Antenna Type
	⊠Permanent attached antenna
TUDE OF	Unique connector antenna
THU BE	☐Professional installation antenna



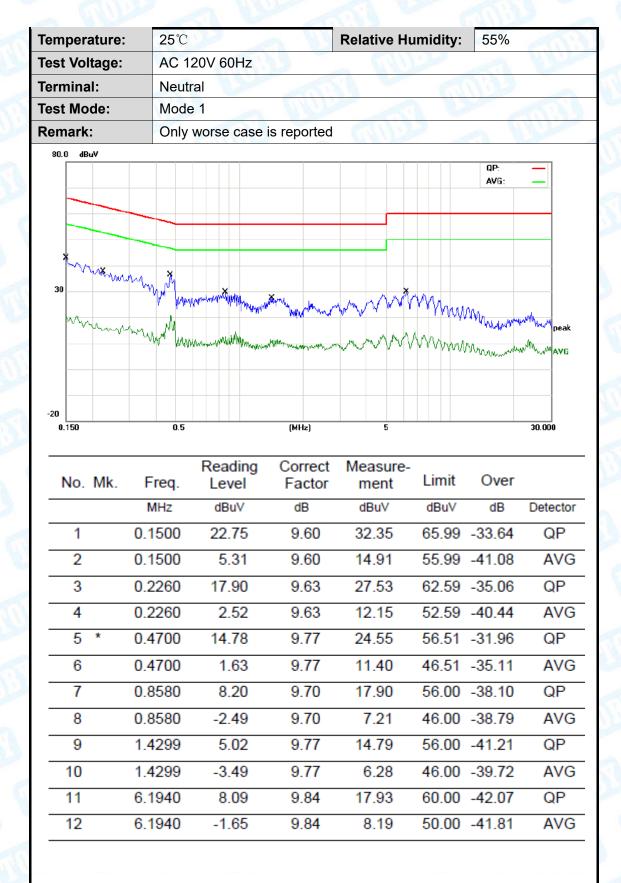
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Attachment A-- Conducted Emission Test Data





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Attachment B-- Radiated Emission Test Data

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.

30MHz~1GHz

empera	ture:	25℃			24/15	Relative Hu	umidity:	55%	
est Vol	tage:	DC 3	.7V	118	No.			10/11/1	
nt. Pol		Horiz	ontal	and the same	-	600		1	100
est Mo	de:	Mode	e 2	160	Moss		W. C.		16
emark:		Only	worse	case i	s reported	T:35		EMINT.	7
80.0 d	BuV/m								
							(RF)FCC	15C 3M Radiation	
								Margin -6 o	B
30				•			5		6 X
laux.	1					***	man X	minimum	
1 Town	mund	has		د لنسرية بار مدوارد	Ehydeman	man man -	MV MV		
		man	Amm	where there					
-20 30.000	40	50 60	70 80		(MHz)	300	D 400 5	500 600 700	1000.000
30.000	40	30 60	70 00		(MIZ)	300	0 400 (000 000 700	1000.000
			Re	ading	Correct	Measure	-		
No. I	Иk.	Freq.		evel	Factor	ment	Limit	Over	
		MHz	d	BuV	dB/m	dBuV/m	dBuV/r	n dB	Detect
1	42	2.8998	38	3.79	-20.40	18.39	40.00	-21.61	QP
2		6.1321	30	9.43	-22.22	17.21	43.50		
3	13	7.4202		0.89	-22.37	18.52	43.50		QP
4	293	3.0842	38	3.20	-16.41	21.79	46.00	-24.21	QP
5	440	0.1963	36	3.91	-12.00	24.91	46.00	-21.09	QP
6 *	84	5.0878	34	1.66	-5.87	28.79	46.00	-17.21	QP

*:Maximum data x:Over limit !:over margin



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est Voltage: [nt. Pol. \ est Mode: N	25℃ DC 3.7V Vertical Mode 2 Only worse	e case is repor		Humidity:	CC 15C 3M Radiation
nt. Pol. \ est Mode: N emark: (80.0 dBuV/m	Vertical Mode 2	e case is repor	ted	(RF)FC	_
est Mode: Nemark: C	Mode 2	e case is repor	ted	(RF)FC	_
emark: (e case is repor	ted	(RF)FC	_
80.0 dBuV/m	Only worse	e case is repor	ted	(RF)FC	_
				(RF)FC	_
30 x 2				(AF)FC	_
M X X	Mulma	5 4 1		make mental and	Margin -6 dB

No	o. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	31.7313	43.83	-14.25	29.58	40.00	-10.42	QP
2		42.8998	47.05	-20.40	26.65	40.00	-13.35	QP
3		49.3594	46.77	-22.83	23.94	40.00	-16.06	QP
4		122.8340	46.97	-22.21	24.76	43.50	-18.74	QP
5		138.3873	52.14	-22.37	29.77	43.50	-13.73	QP
6		562.6624	38.24	-8.77	29.47	46.00	-16.53	QP

^{*:}Maximum data x:Over limit !:over margin



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Above 1GHz

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2402	MHz	
Remark:	No report for the emission w	hich more than 10 dB	below the
	prescribed limit.	CILL OF	

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.780	49.09	12.43	61.52	74.00	-12.48	peak
2	*	4804.780	33.20	12.43	45.63	54.00	-8.37	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 ℃	Relative Humidity:	55%
remperature.	25 C	Relative numbers.	3376
Test Voltage:	DC 3.7V		The same
Ant. Pol.	Vertical		
Test Mode:	BLE(1Mbps) Mode	TX 2402 MHz	
Remark:	No report for the en	nission which more than 10 de	B below the
	prescribed limit.		

No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
2)		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.838	47.94	12.42	60.36	74.00	-13.64	peak
2	*	4803.838	34.18	12.42	46.60	54.00	-7.40	AVG



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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	THE PARTY OF	
Ant. Pol.	Horizontal		133
Test Mode:	BLE(1Mbps) Mode TX 2442	MHz	101313
Remark:	No report for the emission w	hich more than 20 dB	below the
	prescribed limit.		13 6

No	o. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4883.112	48.24	12.90	61.14	74.00	-12.86	peak
2	*	4883.112	33.78	12.90	46.68	54.00	-7.32	AVG

Emission Level= Read Level+ Correct Factor

	55%	Relative Humidity:	25℃	Temperature:
1	13	W.	DC 3.7V	Test Voltage:
AMA		COLUMN TO SERVICE OF THE PERSON OF THE PERSO	Vertical	Ant. Pol.
		MHz	BLE(1Mbps) Mode TX 2442	Test Mode:
	elow the	hich more than 20 dB b	No report for the emission v	Remark:
110 P			prescribed limit.	
	pelow the		BLE(1Mbps) Mode TX 2442 No report for the emission v	Test Mode:

No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4884.510	48.43	12.92	61.35	74.00	-12.65	peak
2	*	4884.510	33.70	12.92	46.62	54.00	-7.38	AVG



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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	TULL	
Ant. Pol.	Horizontal		CE!
Test Mode:	BLE(1Mbps) Mode TX 2480	MHz	C. C. C.
Remark:	No report for the emission w	hich more than 20 dB	below the
	prescribed limit.		

N	o. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.888	48.18	13.38	61.56	74.00	-12.44	peak
2	*	4960.888	33.59	13.38	46.97	54.00	-7.03	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	W.	The same of the sa
Ant. Pol.	Vertical	WILL TO	ATT
Test Mode:	BLE(1Mbps) Mode TX 2480) MHz	
Remark:	No report for the emission v	which more than 20 dB	below the
	prescribed limit.		

No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.922	47.99	13.37	61.36	74.00	-12.64	peak
2	*	4959.922	33.59	13.37	46.96	54.00	-7.04	AVG



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		1.1 1.2			
Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V	THE PARTY OF			
Ant. Pol.	. Pol. Horizontal				
Test Mode:	BLE(2Mbps) Mode TX 2402	MHz			
Remark:	No report for the emission w	hich more than 10 dB	below the		
	prescribed limit.				

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.894	47.82	12.43	60.25	74.00	-13.75	peak
2	*	4804.894	33.12	12.43	45.55	54.00	-8.45	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	THUE	The same of the sa
Ant. Pol.	Vertical	(1111)	A VIII
Test Mode:	BLE(2Mbps) Mode TX 24	102 MHz	The second
Remark:	No report for the emissio prescribed limit.	n which more than 10 dl	3 below the

No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
8		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4805.338	47.83	12.43	60.26	74.00	-13.74	peak
2	*	4805.338	33.15	12.43	45.58	54.00	-8.42	AVG



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Temperature:	25℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V	Million			
Ant. Pol. Horizontal					
Test Mode:	BLE(2Mbps) Mode TX 2442	2 MHz	TOTAL S		
Remark: No report for the emission which more than 20 dB below the					
prescribed limit.					

No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4884.930	48.28	12.92	61.20	74.00	-12.80	peak
2	*	4884.930	33.73	12.92	46.65	54.00	-7.35	AVG

Emission Level= Read Level+ Correct Factor

25℃	Relative Humidity:	55%
DC 3.7V	W.	100
Vertical	WILL STATE	A MARIE
BLE(2Mbps) Mode TX 2442	MHz	
No report for the emission w	hich more than 20 dB	below the
prescribed limit.		- CHILLIA
	DC 3.7V Vertical BLE(2Mbps) Mode TX 2442 No report for the emission w	DC 3.7V Vertical BLE(2Mbps) Mode TX 2442 MHz No report for the emission which more than 20 dB

No	. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4884.348	48.19	12.92	61.11	74.00	-12.89	peak
2	*	4884.348	33.72	12.92	46.64	54.00	-7.36	AVG



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25℃	Relative Humidity:	55%				
DC 3.7V	TULL					
Horizontal						
BLE(2Mbps) Mode TX 2480	MHz	TO THE				
No report for the emission w	No report for the emission which more than 20 dB below the					
prescribed limit.		13				
	DC 3.7V Horizontal BLE(2Mbps) Mode TX 2480 No report for the emission w	DC 3.7V Horizontal BLE(2Mbps) Mode TX 2480 MHz No report for the emission which more than 20 dB				

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.624	48.82	13.38	62.20	74.00	-11.80	peak
2	*	4960.624	33.69	13.38	47.07	54.00	-6.93	AVG

Emission Level= Read Level+ Correct Factor

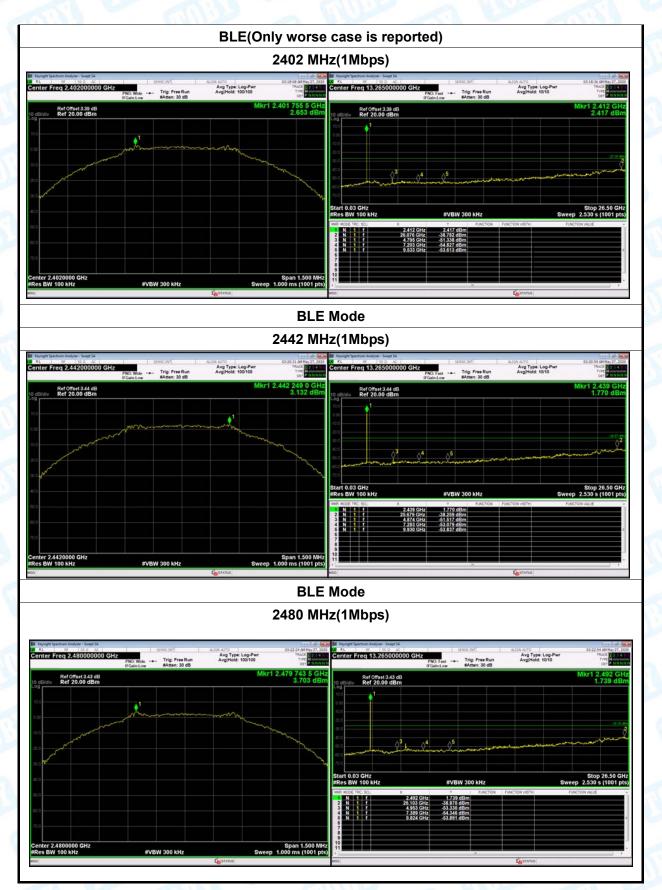
Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	W.	The same of the sa
Ant. Pol.	Vertical	WILL TO	A HILL
Test Mode:	BLE(2Mbps) Mode TX 2480) MHz	
Remark:	No report for the emission v	which more than 20 dB	below the
	prescribed limit.		CHID.

N	o. Mi	c. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.774	33.65	13.38	47.03	54.00	-6.97	AVG
2		4961.254	48.76	13.38	62.14	74.00	-11.86	peak



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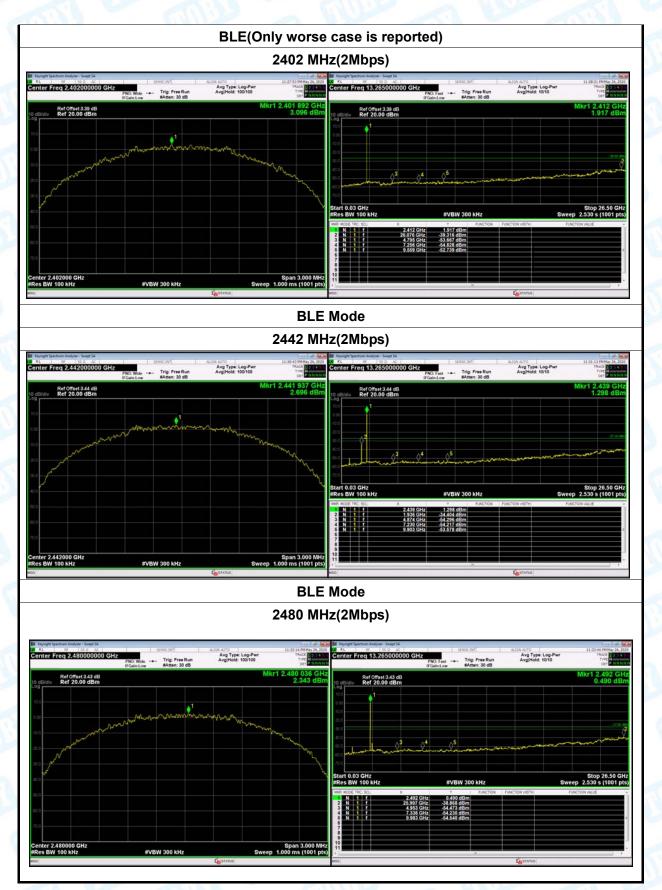
Conducted Emission Test Data





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Conducted Emission Test Data

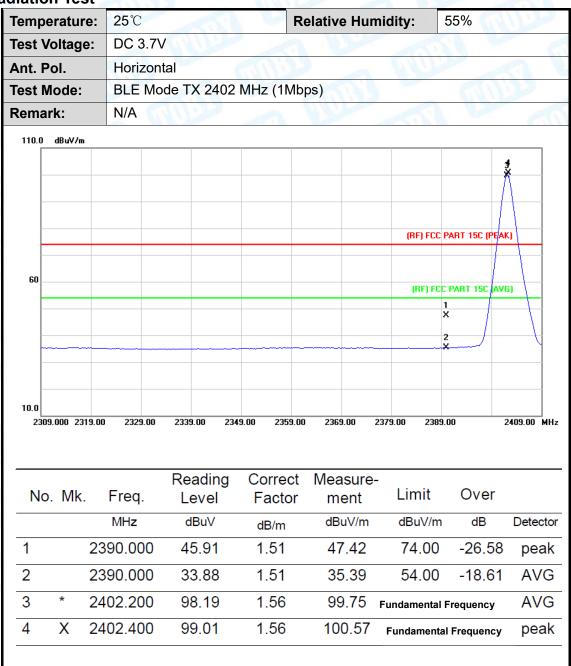




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Attachment C-- Restricted Bands Requirement and Band Edge Test Data

(1) Radiation Test





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empe	ratur	e:	25°	C		9	Relativ	ve Hui	midity:	55%)	
est Vo	oltage	ə :	DC	3.7V	600	130		21	11.15		١ ١	
nt. Po	ol.		Ver	tical	A CALL		180	100			3	
est M	ode:		BLE	Mod	e TX 24	102 MHz(1	Mbps)		a v			
Remar	k:		N/A		600			11/1/2			11/1	
110.0	dBuV/m											
60										C PART 150		
10.0 2309.	000 231	9.00	2329.	00 23	39.00 2	349.00 2359	.00 236	9.00 2	379.00 238	39.00	240	9.00 MHz
No.	Mk.	F	req.		teading Level	Corre Facto		asure	- Limit	t C	ver	
		N	ЛНz		dBuV	dB/m	d	BuV/m	dBuV	/m	dB	Detect
		239	0.00	0	44.44	1.51	4	15.95	74.0	00 -2	28.05	pea
1		220	0.00	0	34.33	1.51	3	35.84	54.0	00 -1	18.16	AV
2		239	U.UU									
	*	240		0	93.51	1.56	ç	5.07	Fundame	ntal Freq	uency	AV(

Emission Level= Read Level+ Correct Factor



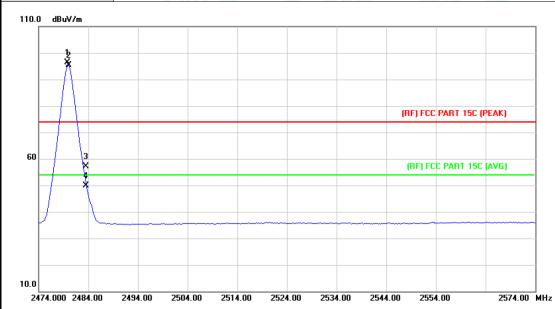
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Temp	eratur	e:	25℃			1	110	Relati	ive F	lumid	ity:	55%	A	11/1
Test V	/oltag	e:	DC	3.7V	TIVE	33		. (11/1	عليال		A. 1	4	
Ant. P	Pol.		Hori	zontal				46			Tien	133		
Test N	/lode:		BLE	Mode	TX 24	480 MI	1z (1ľ	Mbps)	-	10	62		m	dir.
Rema	rk:		N/A		1:7	5		(1)	1/2			2 K	777	
110.0	dBuV/π	1												ı
60	b X	3 X										T 15C (PEAK)		
10.0 247	74.000 24	84.00	2494.00	2504.	JO 251	14.00 2	2524.00	2534.00	25	44.00	2554.00	25	74.00	MHz
No.	Mk.	Fre	eq.		ding vel	Cor Fa	rect ctor	Meas me			mit	Over		
		MH	łz	dE	₿uV	dB/	m	dBu\	V/m	dE	BuV/m	dB	De	etecto
1	Χ	2479.	800	98	.46	2.0)7	100	.53	Funda	mental F	requency	-	peak
2	*	2480.	000	97	.67	2.0)7	99.	74	Funda	mental F	requency		AVG
3		2483.	500	59	.06	2.1	0	61.	16	7	4.00	-12.84	4 p	peak
		2483.	500	17	.56	2.1	0	49.	00	5	4.00	-4.34		AVG



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5	Temperature:	25℃	Relative Humidity:	55%						
	Test Voltage:	DC 3.7V								
	Ant. Pol.	Vertical	Vertical							
	Test Mode:	BLE Mode TX 2480 MHz (1Mbps)								
Remark: N/A										

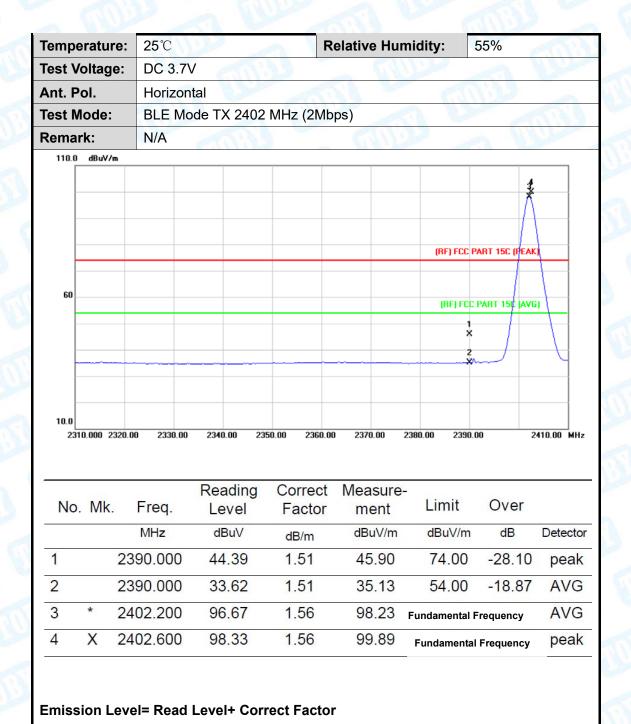


1 X 2 *	[]	MHz 2479.800	dBuV 94.27	dB/m 2.07	dBuV/m 96.34	dBuV/m	dB I Frequency	Detector peak
2 *	(2479.800	94.27	2.07	96.34	Fundamental	Frequency	peak
	1	2480.000	93.26	2.07	95.33	Fundamental	Frequency	AVG
3	1	2483.500	55.06	2.10	57.16	74.00	-16.84	peak
4		2483.500	47.80	2.10	49.90	54.00	-4.10	AVG

Emission Level= Read Level+ Correct Factor



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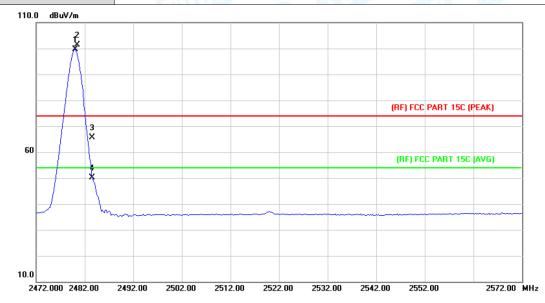
emperature	: 25°C		R	elative Hum	idity:	55%	1
est Voltage:	: DC 3.7	7V	13	ett.			
Ant. Pol.	Vertica			11	Tim	133	
Test Mode:	BLE M	lode TX 240	2 MHz (2M	bps)	10		
Remark:	N/A	10.3		(MID)		a W	A STATE OF
110.0 dBuV/m							
					(RF) FCC PA	RT 15C (PEAK)	
60					(RF) FCC PA	ART 150 (AVG)	
					2		
10.0	.00 2330.00	2340.00 235	0.00 2360.00	2370.00 238	0.00 2390.00	241	0.00 MHz
2310.000 2320	.00 2330.00	2340.00 233	2360.00	2370.00 2300	J.00 2330.00	241	0.00 MH2
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBu∨	dB/m	dBu∀/m	dBuV/m	dB	Detecto
1 2	2390.000	43.91	1.51	45.42	74.00	-28.58	peak
2 2	2390.000	33.36	1.51	34.87	54.00	-19.13	AVG
		92.95	1.56	94.51	_ Fundamenta	I Frequency	AVG
	2402.200	92.90	1.00				

Emission Level= Read Level+ Correct Factor



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Š	Temperature:	25℃	Relative Humidity:	55%					
Ì	Test Voltage:	DC 3.7V							
	Ant. Pol.	Horizontal							
į	Test Mode:	BLE Mode TX 2480 MHz (2Mbps)							
ŕ	Remark: N/A								
	110.0 dRuV/m								

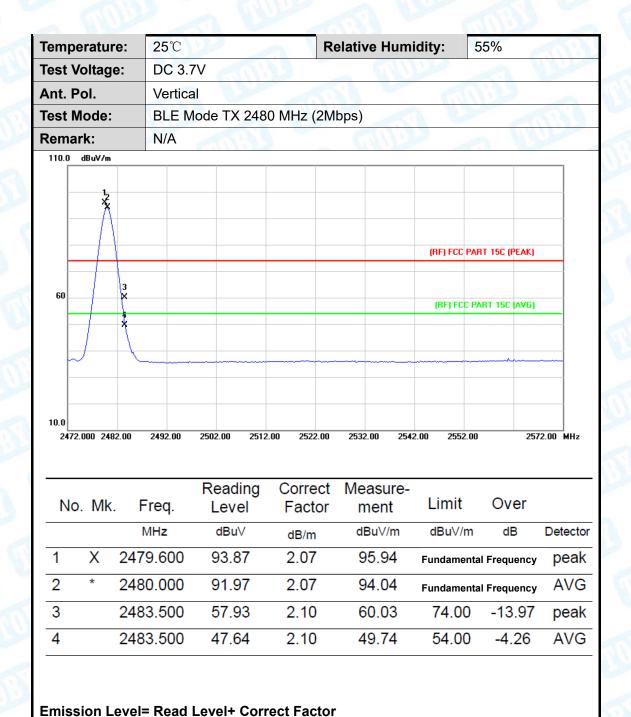


No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	97.56	2.07	99.63	Fundamental F	requency	AVG
2	X	2480.400	99.26	2.07	101.33	Fundamental F	requency	peak
3		2483.500	63.59	2.10	65.69	74.00	-8.31	peak
4		2483.500	48.06	2.10	50.16	54.00	-3.84	AVG

Emission Level= Read Level+ Correct Factor



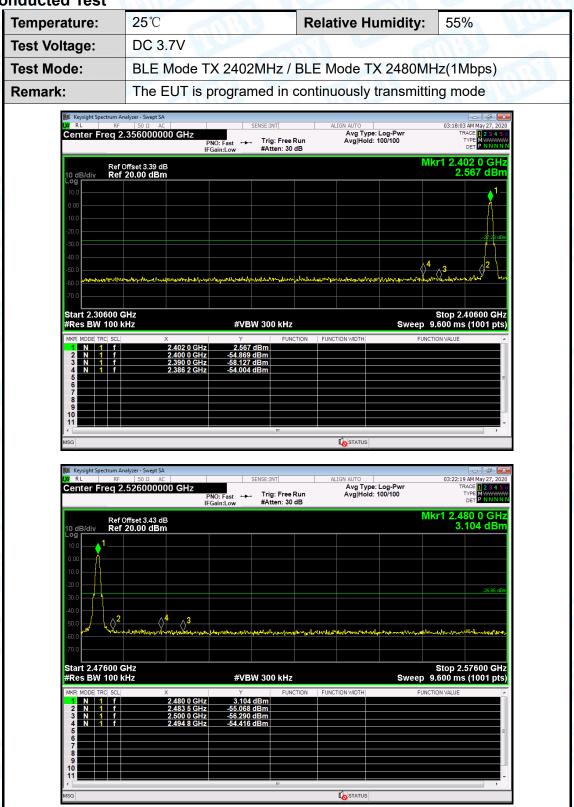
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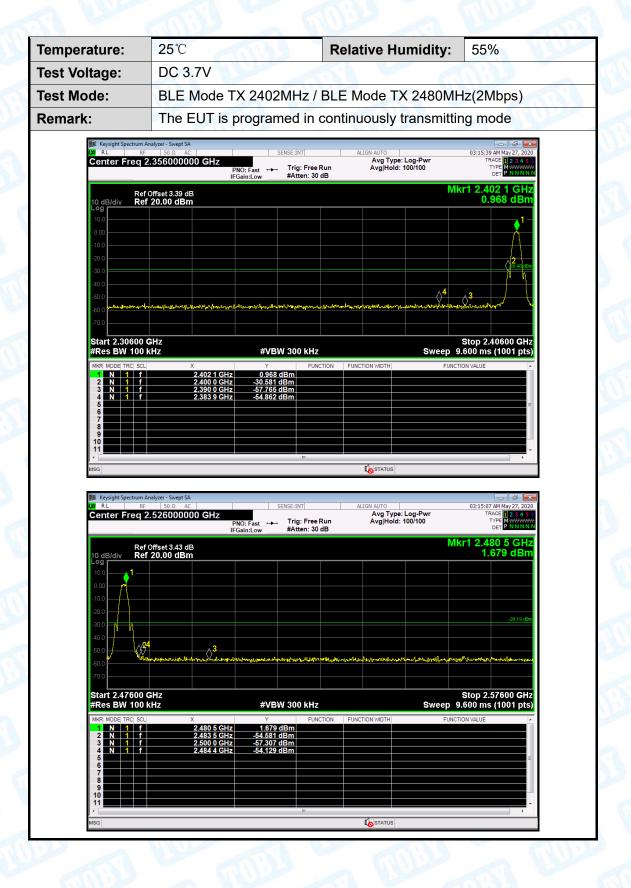
(2) Conducted Test





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Attachment D-- Bandwidth Test Data

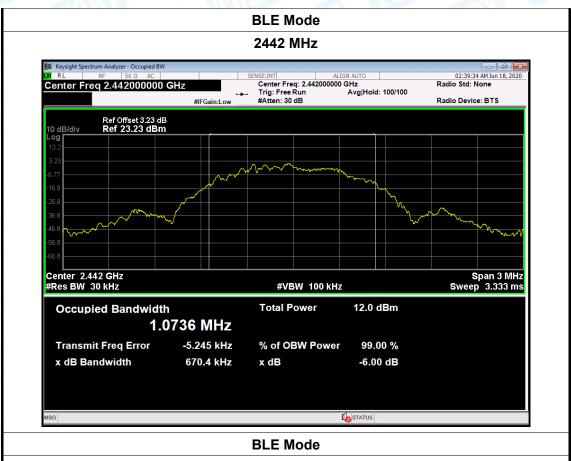
Temperature:	25℃		Relative Humidity:	55%	
Test Voltage:	DC 3	.7V			
Test Mode:	BLE	TX Mode(1 Mbps)			
Channel frequency		6dB Bandwidth	99% Bandwidth	Limit	
(MHz)		(kHz) (kHz)		(kHz)	
2402		666.9	1080.6		
2442		670.4	1073.6	>=500	
2480		667.2	1070.1		

BLE Mode





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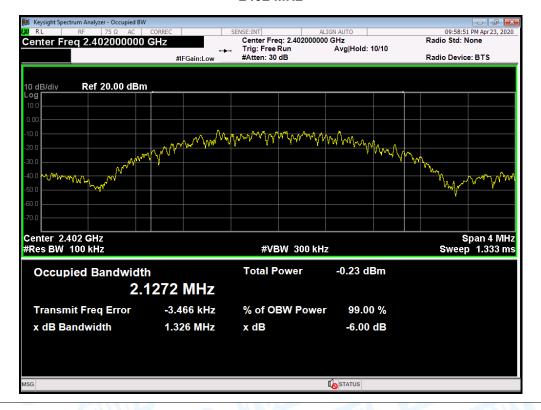






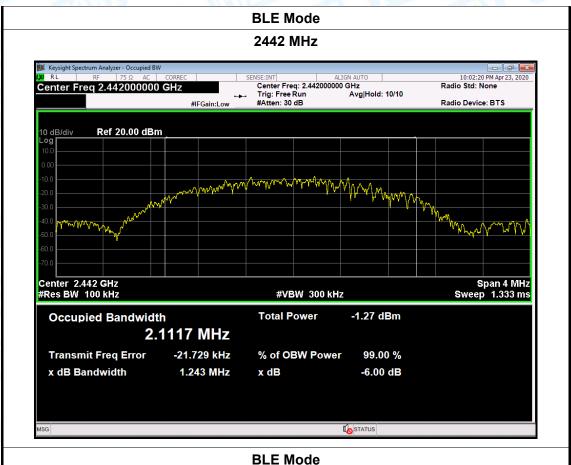
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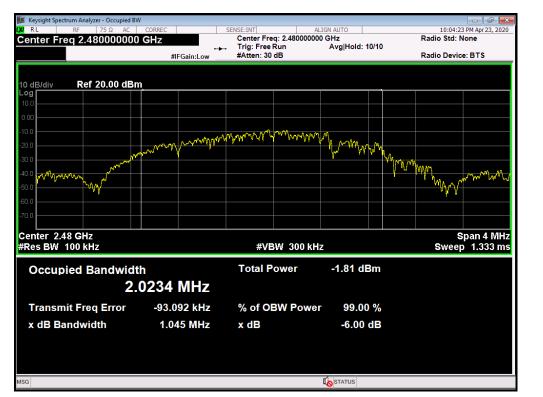
Temperature:	25℃		Relative Humidity:	55%	
Test Voltage:	DC 3	.7V			
Test Mode:	BLE	TX Mode (2Mbps)			
Channel frequency		6dB Bandwidth	99% Bandwidth	Limit	
(MHz)		(kHz)	(kHz)	(kHz)	
2402		1326	2127.2		
2442		1243 2111.7		>=500	
2480		1045	2023.4		
		BLE M	ode		





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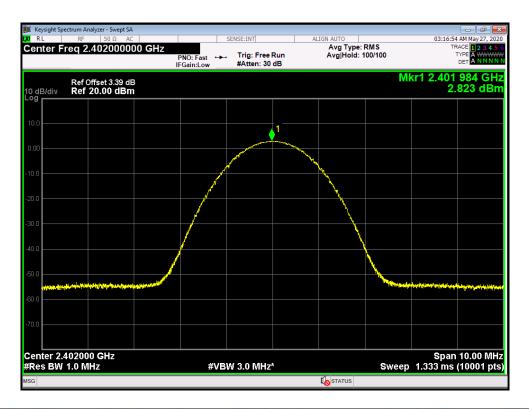




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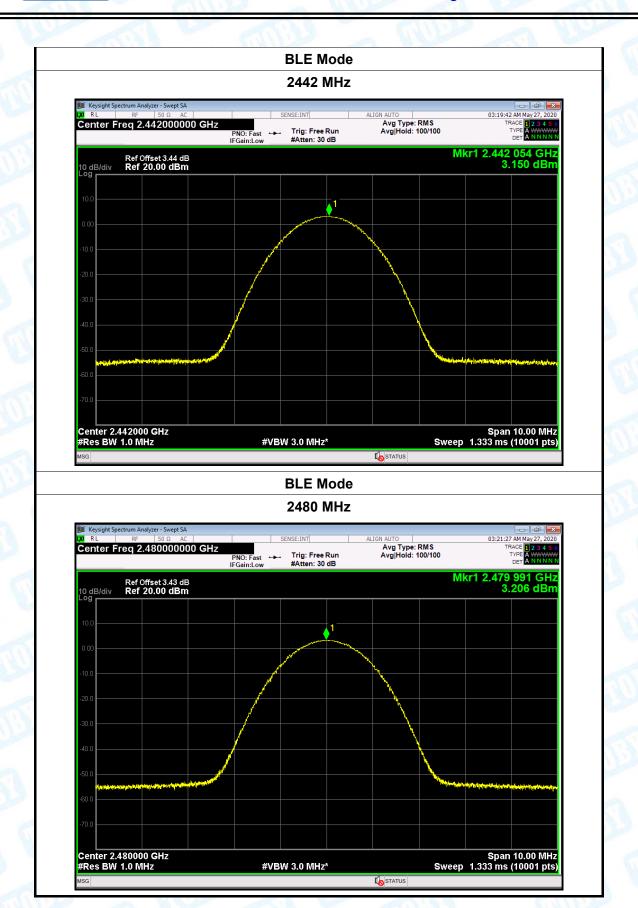
Attachment E-- Peak Output Power Test Data

Temperature:	25℃		Relative Humidity:	55%					
Test Voltage:	DC 3.7V	OC 3.7V							
Test Mode:	BLE TX M								
Channel frequen	cy (MHz)	Test Res	Limit (dBm)						
2402	2402		23						
2442	2442		50	30					
2480		3.2	206						
		BLE	Mode						





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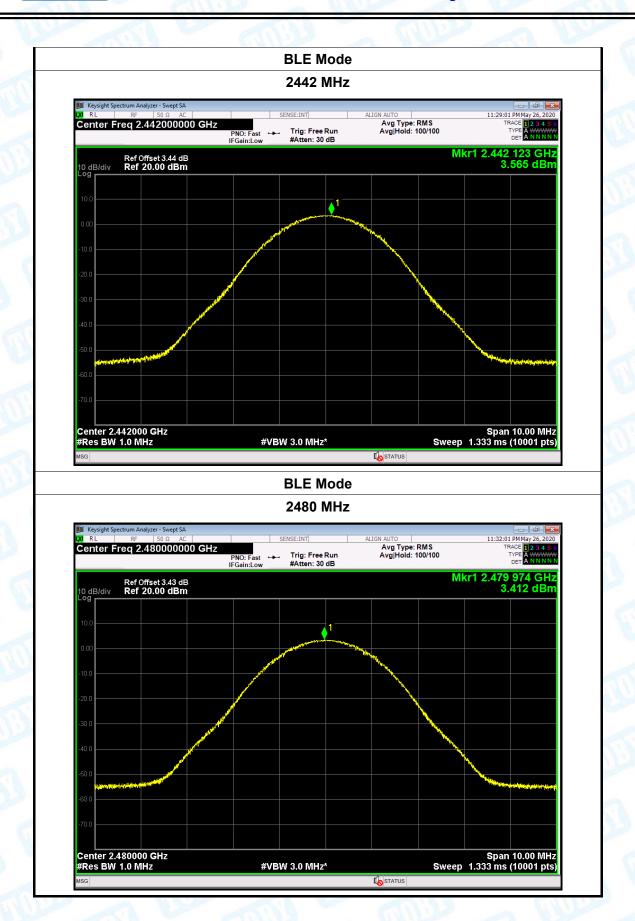


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t Voltage:	DC 3.7V		7147		111111111111111111111111111111111111111	
t Mode:	BLE TX N	lode(2Mbps)	The same of	a V		
annel frequen	icy (MHz)	Test Res		Limit (dBm)		
2402		3.	492			
2442		3.	565		30	
2480		3.	412			
		BLE	Mode			
		240	2 MHz			
	50 Ω AC	SENSE:INT	ALIGN AUTO AVg Typ	e: DMS	11:25:45 PM May 26, 202	
Center Freq 2.40	02000000 GHZ		ree Run Avg Hold : 30 dB	i: 100/100	TRACE 1 2 3 4 5 TYPE A WWWW DET A NNNN	
		IFGain:Low #Atter				
Ref Offs	et 3.39 dB 00 dBm	IFGain:Low #Atter		M	kr1 2.401 975 GH 3.492 dBr	
Ref Offs 10 dB/div Ref 20	et 3.39 dB .00 dBm	IFGain:Low whitei		M	kr1 2.401 975 GH 3.492 dBr	
10 dB/div Ref 20	et 3.39 dB .00 dBm	IFGain:LOW #FALLER	1	M	kr1 2.401 975 GH 3.492 dBr	
10 dB/div Ref 20	et 3.39 dB .00 dBm	TFGBIN:LOW WATER	1	M	kr1 2.401 975 GH 3.492 dBr	
10 dB/div Ref 20	et 3.39 dB .00 dBm	TFGain: EOW WATER		M	kr1 2.401 975 GH 3.492 dBr	
10 dB/div Ref 20	et 3.39 dB .00 dBm	Troamicow writer		M	kr1 2.401 975 GH 3.492 dBr	
10 dB/div Ref 20	et 3.39 dB .00 dBm	TFGainted Watter	1	M	kr1 2.401 975 GH 3.492 dBr	
10.0 Ref 20 10.0 Ref 20 10.0 -10.0 -20.0 -30.0	et 3.39 dB .00 dBm	TFGain-EoW WATER		M	kr1 2.401 975 GH 3.492 dBr	
10.0 dB/div Ref 20 10.0	et 3.39 dB .00 dBm	Troamine water		M	kr1 2.401 975 GH 3.492 dBr	
10.dB/div Ref 20 10.0 10.0 -10.0 -20.0 -30.0	et 3.39 dB .00 dBm	TFGSINEOW WATER		M	kr1 2.401 975 GH 3.492 dBr	
10.0 dB/div Ref 20 10.0	et 3.39 dB .00 dBm	Troatine water		M	3.492 dBr	
10.0 B/div Ref 20	et 3.39 dB .00 dBm	Troamitous written		M	3.492 dBr	



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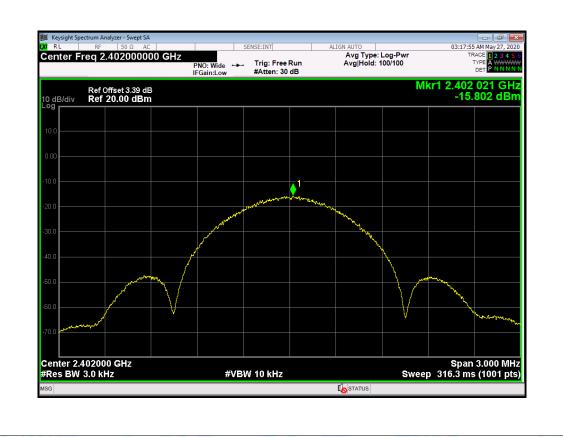


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Attachment F-- Power Spectral Density Test Data

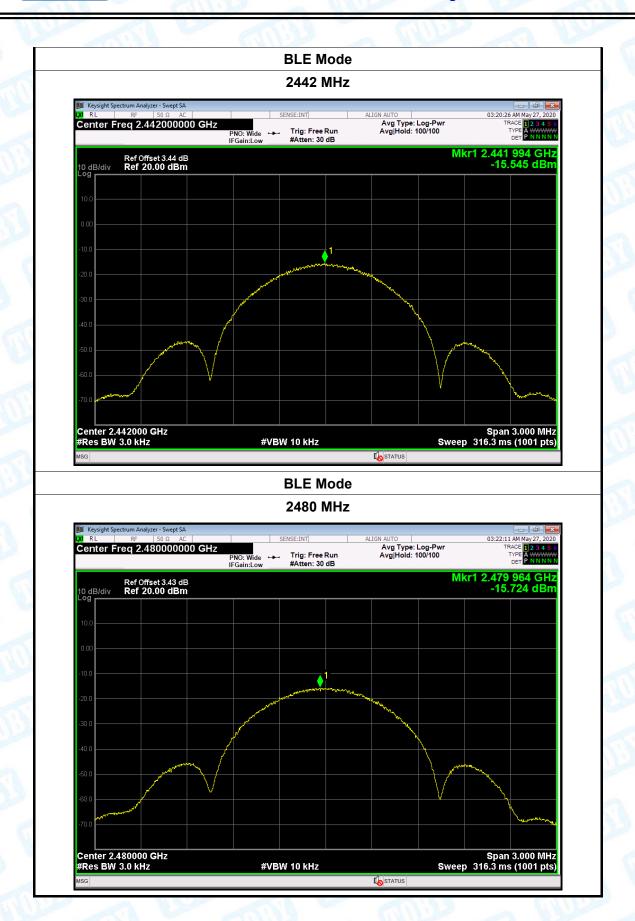
Temperature:	25℃		Relative H	lumidity:	55%	O. L.	
Test Voltage:	DC 3.7V		THE W		THE		
Test Mode:	BLE TX N	Mode(1Mbps)		a v	Laboratoria de la constitución d		
Channel Frequency		Power Density		Lim	it	Result	
(MHz)	(MHz)		(dBm/3kHz)		(dBm/3kHz)		
2402	2402 2442		02				
2442			-15.545		8		
2480		-15.724					
		DIEM	lodo	"			

BLE Mode





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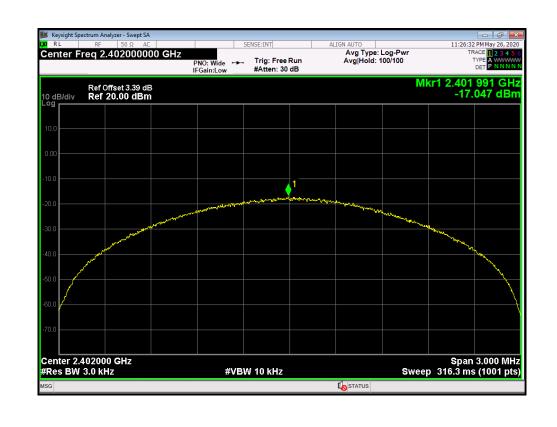




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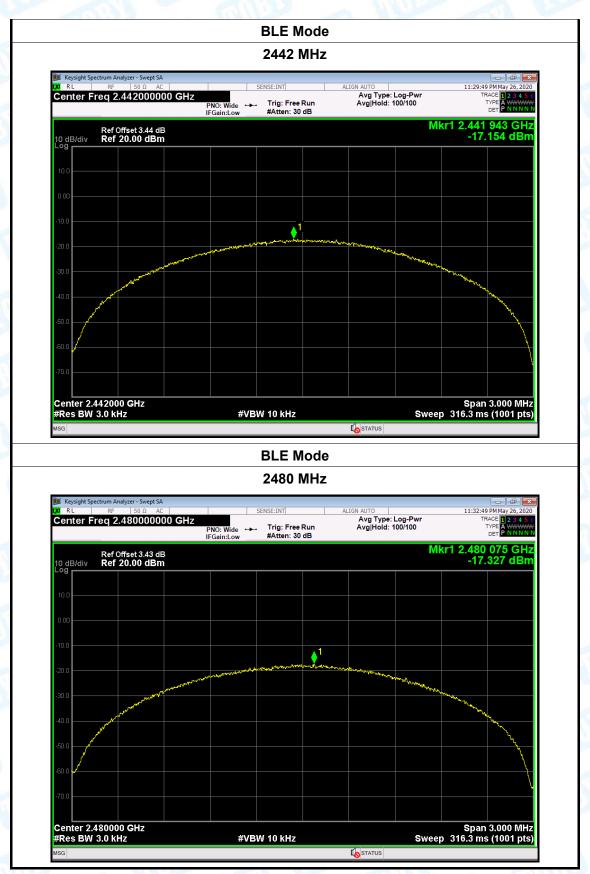
Temperature:	25°C Relative Hu		lumidity:	55%		
Test Voltage:	DC 3.7V					
Test Mode:	BLE TX Mode (2Mbps)					
Channel Frequency		Power Density		Lim	Limit	
(MHz)		(dBm/3kHz)		(dBm/3	(dBm/3kHz)	
2402		-17.0	47			
2442 2480		-17.154 -17.327		8		PASS
		RIEM	ode	- '		

BLE Mode





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