

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC163534

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# **FCC Radio Test Report** FCC ID: 2AQOO-X13C

## **Original Grant**

Report No. TB-FCC163534

**GROUPSFIT Applicant** 

**Equipment Under Test (EUT)** 

**EUT Name** 13.3-INCH NOTEBOOK

Model No. WWNEOX13C-4PK32

WWNEOX13C-4GR32, WWNEOX13C-4BK32 Serial Model No.

**Brand Name** THOMSON

**Receipt Date** 2018-12-19

2018-12-20 to 2019-01-02 **Test Date** 

**Issue Date** 2019-01-03

FCC Part 15: 2018, Subpart C(15.247) **Standards** 

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

**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-FCC163534	Rev.01	Initial issue of report	2019-01-03
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## 1. General Information about EUT

#### 1.1 Client Information

Applicant	:	GROUPSFIT
Address : 80/		80/84 route de la Liberation PONTAULT COMBAULT France 77340
Manufacturer		SEMMAX(HONGKONG)LIMITED
Address	:	Room 01, 21/F, Prosper Commercial Building 9 Yin Chong Street, Kowloon, HongKong

## 1.2 General Description of EUT (Equipment Under Test)

EUT Name		13.3-INCH NOTEBOOK		
Models No.	3	WWNEOX13C-4PK32, WWNEOX13C-4GR32, WWNEOX13C-4BK32		
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only different is colors.		
an B	9	Operation Frequency:	Bluetooth 4.0(BLE): 2402MHz~2480MHz	
	d	Number of Channel:	Bluetooth 4.0(BLE): 40 channels see note(3)	
Product		RF Output Power:	BLE:0.099 dBm	
Description	:	Antenna Gain:	1.87dBi FPC Antenna	
		Modulation Type:	GFSK	
COURS !		Bit Rate of Transmitter:	1Mbps(GFSK)	
Power Supply		AC Adapter(B124-125): Input: AC 100-240V, 50/ Output: DC 12V, 2.0A DC 7.6V by 4000mAh L		
Software Version		WIN10		
Hardware Version	:	N/A		
Connecting I/O Port(S)		Please refer to the User	Please refer to the User's Manual	

#### Note:

This Test Report is FCC Part 15.247 for Bluetooth BLE, 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.

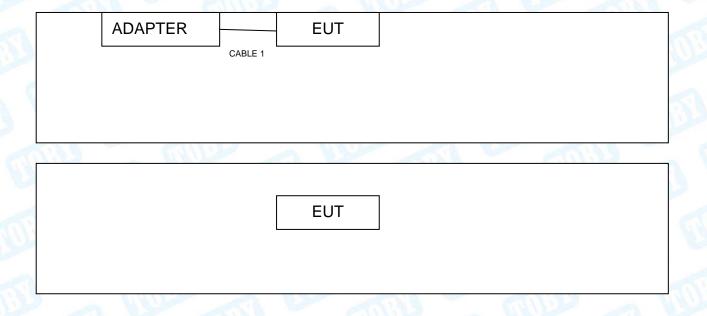


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## (3) Channel List:

	01816				
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
80	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





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## 1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/VOC	Manufacturer	Used "√"
ADAPTER	B124-125		/	V

### 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	Charging+TX Mode		

For Radiated Test		
Final Test Mode Description		
Mode 2	TX Mode	
Mode 3	TX Mode (Channel 00/20/39)	

#### 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	N/A		
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 <sub>Lab</sub> )
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	±4.60 dB
Radiated Effission	9kHz to 30 MHz	±4.00 dB
Radiated Emission	Level Accuracy:	±4.40 dB
Radiated Emission	30MHz to 1000 MHz	±4.40 dB
Radiated Emission	Level Accuracy:	±4.20 dB
Naulaleu Elliissiuli	Above 1000MHz	±4.20 UD



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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-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.



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# 2. Test Summary

Standard Section IC			21/1/7/2	Remark
		Test Item	Judgment	
15.203		Antenna Requirement	PASS	N/A
15.207(a)	RSS-GEN 7.2.4	Conducted Emission	PASS	N/A
15.205&15.247(d)	RSS-GEN 7.2.2	Band-Edge & Unwanted Emissions into Restricted Frequency	PASS	N/A
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth	PASS	N/A
15.247(b)(3)	RSS 247 5.4 (4)	Conducted Max Output Power	PASS	N/A
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	PASS	N/A
15.205, 15.209&15.247(d)	RSS 247 5.5	Transmitter Radiated Spurious &Unwanted Emissions into Restricted Frequency	PASS	N/A

**Note:** N/A is an abbreviation for Not Applicable.



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# 3. Test Equipment

Conducted Emiss	ion Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 18, 2018	Jul. 17, 2019
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 18, 2018	Jul. 17, 2019
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 18, 2018	Jul. 17, 2019
LISN	Rohde & Schwarz	ENV216	101131	Jul. 18, 2018	Jul. 17, 2019
Radiation Emission	on Test			<del>.</del>	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 18, 2018	Jul. 17, 2019
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 18, 2018	Jul. 17, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.16, 2018	Mar. 15, 2019
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.16, 2018	Mar. 15, 2019
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.16, 2018	Mar. 15, 2019
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 14, 2018	Jul. 13, 2019
Pre-amplifier	Sonoma	310N	185903	Mar.16, 2018	Mar. 15, 2019
Pre-amplifier	HP	8449B	3008A00849	Mar.16, 2018	Mar. 15, 2019
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.16, 2018	Mar. 15, 2019
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conduct	ed Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 18, 2018	Jul. 17, 2019
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 18, 2018	Jul. 17, 2019
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Oct. 26, 2017	Oct. 25, 2018
Vector Signal Generator	Agilent	N5182A	MY50141294	Oct. 26, 2017	Oct. 25, 2018
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 15, 2018	Sep. 14, 2019
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 15, 2018	Sep. 14, 2019
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 15, 2018	Sep. 14, 2019



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## 4. Conducted Emission Test

#### 4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

#### 4.1.2 Test Limit

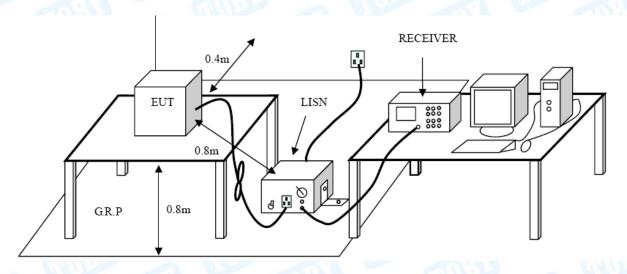
#### **Conducted Emission Test Limit**

	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.

### 4.2 Test Setup



#### 4.3 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.



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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.

## 4.4 EUT Operating Mode

Please refer to the description of test mode.

#### 4.5 Test Da5ta

Please refer to the Attachment A.



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## 5. Radiated Emission Test

### 5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.247(d)

5.1.2 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		

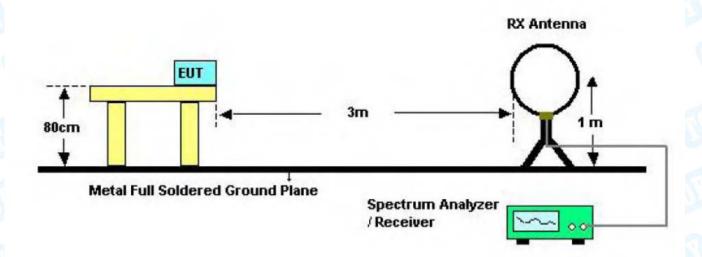
#### Note:

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

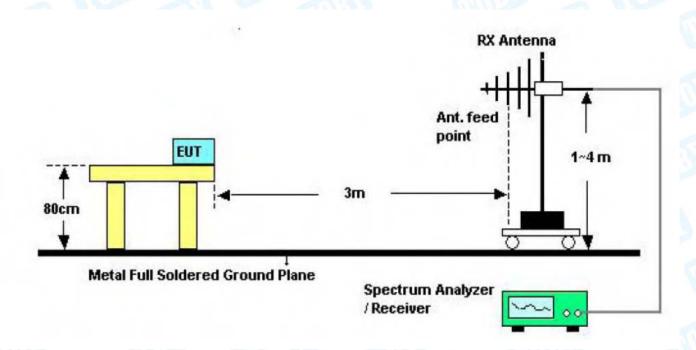


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## 5.2 Test Setup



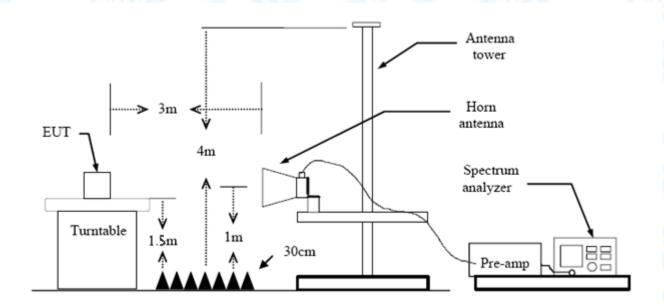
Below 30MHz Test Setup



Below 1000MHz Test Setup



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Above 1GHz Test Setup

#### 5.3 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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## 5.4 EUT Operating Condition

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

#### 5.5 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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## 6. Restricted Bands Requirement

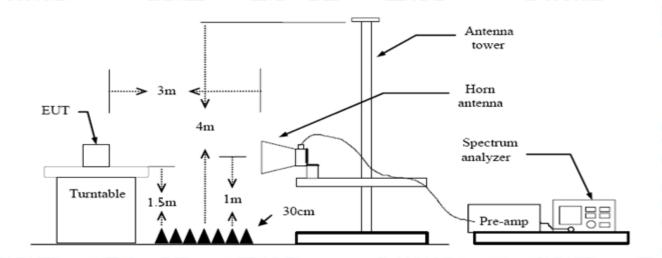
#### 6.1 Test Standard and Limit

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

6.1.2 Test Limit

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

### 6.2 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



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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.

#### 6.4 EUT Operating Condition

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

#### 6.5 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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## 7. Bandwidth Test

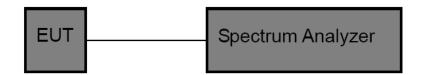
#### 7.1 Test Standard and Limit

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

7.1.2 Test Limit

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

## 7.2 Test Setup



#### 7.3 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.

## 7.4 EUT Operating Condition

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

### 7.5 Test Data

Please refer to the Attachment D.



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## 8. Peak Output Power Test

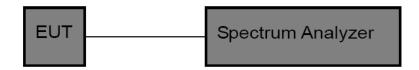
#### 8.1 Test Standard and Limit

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

8.1.2 Test Limit

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

## 8.2 Test Setup



#### 8.3 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.

## 8.4 EUT Operating Condition

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

### 8.5 Test Data

Please refer to the Attachment E.



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## 9. Power Spectral Density Test

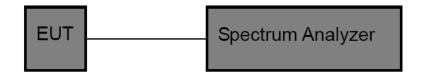
#### 9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (e)

9.1.2 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				

### 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 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 center frequency to DTS channel center 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.

## 9.4 EUT Operating Condition

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

#### 9.5 Test Data

Please refer to the Attachment F.



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## 10. Antenna Requirement

### 10.1 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.

#### 10.2 Antenna Connected Construction

The gains of the antenna used for transmitting is 1.87dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

#### 10.3 Result

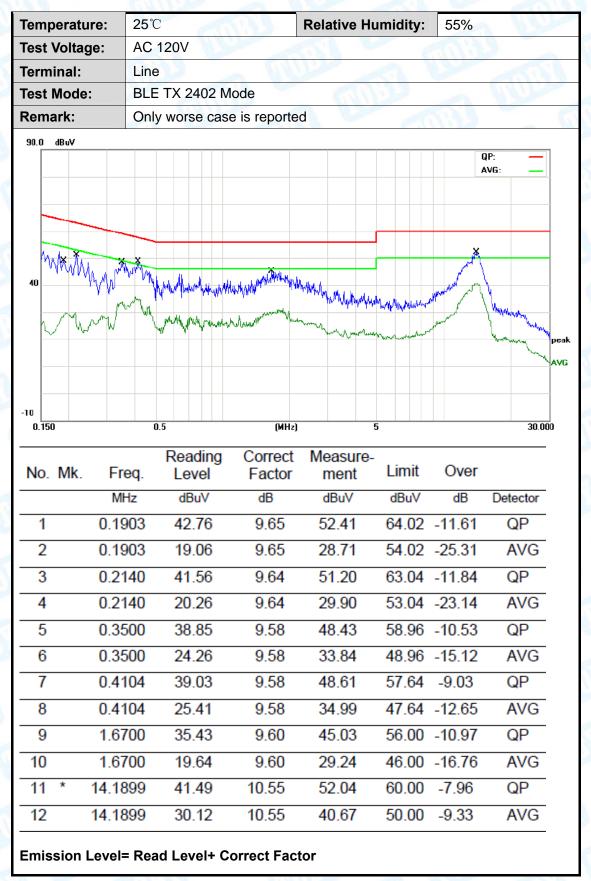
The EUT antenna is a FPC Antenna. It complies with the standard requirement.

Antenna Type					
Permanent attached antenna					
⊠Unique connector antenna	Will state of the				
Professional installation antenna	THE REAL PROPERTY.				



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## **Attachment A-- Conducted Emission Test Data**





25 of 46 Page:

emperature:	<b>25</b> ℃		Relative H	lumidity:	55%		
est Voltage:	AC 120V	130	- OH	11.	-	Alban	
erminal:	Neutral	Tal.	8.0	(A)	THE		
est Mode:	BLE TX 2402 N	BLE TX 2402 Mode					
Remark:	Only worse cas	se is reported			1 n	BULL	
90.0 dBuV					QP:		
					AVG:		
X MM X							
40		¥			ALAN MAN		
\\ \( \)	WANTER STATE OF THE STATE OF TH	halibari kalanda baharan da	rd politica podrava podrava project	Menseman	m,		
W WY	V Wy me Merrymon	Tale Budding Landon Me.		Marie a like the light for a second wife	My My	range pe	
	J., 2544 . " " [V	Andread Anthread	all agent would produce of the	a America	\-	pe	
						- A	
0.150	0.5	(MHz)	5			30.000	
	Reading	Correct	Measure-				
No. Mk. Fr	req. Level	Factor	ment	Limit	Over		
М	Hz dBuV	dB	dBuV	dBuV	dB	Detector	
1 * 0.1	620 46.34	9.64	55.98	65.36	-9.38	QP	
2 0.1	620 19.42	9.64	29.06	55.36	-26.30	AVG	
3 0.2	116 42.21	9.64	51.85	63.14	-11.29	QP	
4 0.2	116 22.29	9.64	31.93	53.14	-21.21	AVG	
5 0.2	459 40.41	9.61	50.02	61.89	-11.87	QP	
6 0.2	459 16.63	9.61	26.24	51.89	-25.65	AVG	
· · · · ·			4C 7E	57.65	-10.90	QP	
	099 37.17	9.58	46.75				
7 0.4	099 37.17 099 23.04	9.58	32.62		-15.03	AVG	
7 0.40 8 0.40				47.65	-15.03 -13.64		
7 0.40 8 0.40 9 0.83	099 23.04	9.58 9.59	32.62	47.65 56.00		QP	
7 0.40 8 0.40 9 0.83 10 0.83	099 23.04 219 32.77	9.58 9.59 9.59	32.62 42.36	47.65 56.00 46.00	-13.64	QP AVG	



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Temperature:	25℃			Relative Hu	midity:	55%	100	
Test Voltage:		AC 240V						
Terminal:	Line							
Test Mode:	BLE TX	BLE TX 2402 Mode						
Remark:	Only w	orse case	is reported			- N	NO.	
-10				A free for the state of the sta	address of the many of the second	QP: AVG:	peak AVG	
0.150	0.5	eading	(MHz)	Measure-			30.000	
No. Mk. F		Level	Factor	ment	Limit	Over		
N	ИHz	dBuV	dB	dBuV	dBuV	dB	Detector	
1 0.2	2986	38.20	9.59	47.79	60.28	-12.49	QP	
2 0.2	2986	8.32	9.59	17.91	50.28	-32.37	AVG	
3 0.4	180	37.38	9.60	46.98	57.49	-10.51	QP	
4 0.4	180	18.17	9.60	27.77	47.49	-19.72	AVG	
5 0.6	660	38.99	9.61	48.60	56.00	-7.40	QP	
6 0.6	6660	21.55	9.61	31.16	46.00	-14.84	AVG	
7 * 0.8	8860	41.09	9.60	50.69	56.00	-5.31	QP	
8.0 8	8860	23.82	9.60	33.42	46.00	-12.58	AVG	
9 1.1	660	39.71	9.60	49.31	56.00	-6.69	QP	
10 1.1	660	24.13	9.60	33.73	46.00	-12.27	AVG	
11 13.4	1939	42.38	10.34	52.72	60.00	-7.28	QP	
12 13.4 Emission Leve		30.32	10.34	40.66	50.00	-9.34	AVG	
Limbolon Leve	Neau L		acit	··				



27 of 46 Page:

Temperature:	25℃		Relative Hu	midity:	55%	013			
Test Voltage:	AC 240V								
Terminal:	Neutral	Neutral							
Test Mode:	BLE TX 2402 M	BLE TX 2402 Mode							
Remark:	Only worse cas	e is reported	CONTRACT OF THE PARTY OF THE PA		1 N	MATERIAL			
40 40 -10 0.150	0.5	(MHz)	Myray Marine Marine	aggerate of the general	QP: AVG:	peak AVG			
	Reading	Correct	Measure-						
No. Mk. Fre		Factor	ment	Limit	Over				
MI	dBuV	dB	dBuV	dBuV	dB	Detector			
1 0.40	061 40.95	9.58	50.53	57.73	-7.20	QP			
2 0.40	061 28.12	9.58	37.70	47.73	-10.03	AVG			
3 * 0.44	67 42.03	9.58	51.61	56.94	-5.33	QP			
4 0.44	67 27.33	9.58	36.91	46.94	-10.03	AVG			
5 0.66	660 39.75	9.59	49.34	56.00	-6.66	QP			
6 0.66	660 26.92	9.59	36.51	46.00	-9.49	AVG			
7 0.85	80 39.77	9.59	49.36	56.00	-6.64	QP			
8 0.85	80 23.42	9.59	33.01	46.00	-12.99	AVG			
9 1.18	38.41	9.59	48.00	56.00	-8.00	QP			
10 1.18	320 21.50	9.59	31.09	46.00	-14.91	AVG			
11 13.78	359 41.84	10.52	52.36	60.00	-7.64	QP			
12 13.78	359 29.51	10.52	40.03	50.00	-9.97	AVG			
Emission Level=	Read Level+ Co	rrect Factor							



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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

	25℃		Chillip	Relative Hun	nidity:	55%	11/1
Test Voltage:	DC 3.7	<b>7</b> V				CHIT.	A STATE OF THE PARTY OF THE PAR
Ant. Pol.	Horizo	ntal		The same	MAI		1
Test Mode:	BLE T	X 2402 Mo	de	1	3	100	
Remark:	Only w	vorse case	is reported	MIN.	_ (	MILL	
80.0 dBuV/m							
					(RF)FCC 1	5C 3M Radiation	
						Margin -6	OB -
30				2 4 5	6		
	1		,X	3 4 X	M Mm	make the mount of the land	mann
month	X	7. ~~~	بالمرس بيلا	~ M /W.	w we		
	70	W	W-				
20 20 30.000 40 5	0 60 70		(MHz)	300	400 5	00 600 700	1000.0
	req.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
No Mk F		Level	i actor	IIIGIIL		0.0.	
		dDu\/		dPu\//m	dBu\//m	dВ	Dotoot
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detect
1 72	MHz .5916	38.57	-23.26	15.31	40.00	-24.69	QP
1 72	MHz						QP QP
1 72 2 183	MHz .5916	38.57	-23.26	15.31	40.00	-24.69	QP QP
1 72 2 183 3 216	MHz .5916 3.2005 5.7828	38.57 40.37	-23.26 -20.05	15.31 20.32	40.00 43.50	-24.69 -23.18	QP QP QP
1 72 2 183 3 216 4 251	MHz .5916 3.2005 3.7828	38.57 40.37 39.66 38.88	-23.26 -20.05 -19.03 -17.16	15.31 20.32 20.63 21.72	40.00 43.50 46.00 46.00	-24.69 -23.18 -25.37 -24.28	QP QP QP
1 72 2 183 3 216 4 251 5 321	MHz .5916 3.2005 5.7828	38.57 40.37 39.66	-23.26 -20.05 -19.03	15.31 20.32 20.63	40.00 43.50 46.00	-24.69 -23.18 -25.37	QP QP QP



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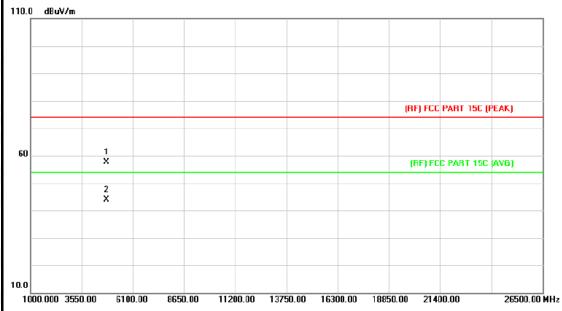
Temperature:	25℃	Re	elative Humid	dity:	55%	TOP
Test Voltage:	DC 3.7V	(A)				1111
Ant. Pol.	Vertical		11	(117)	1133	
Test Mode:	BLE TX 2402 M	lode		100	-	MI.
Remark:	Only worse case	e is reported	WILLIAM STATE			1 less
80.0 dBuV/m						
				(RF)FCC 1	5C 3M Radiation	
					Margin -6	dB
30 1 2 3	4		6			
W March	~	N	mi a	h. word	~~~~	Muly
	many	The state of the s	Two >	my hay.		
	, u					
20						
30.000 40 50	60 70	(MHz)	300	400 5	00 600 700	4000.00
		<b>()</b>	300	400 3	00 000 100	1000.00
			Measure-	400 3	00 000 100	1000.00
No. Mk. F	Reading			Limit	Over	1000.00
	Reading	g Correct	Measure-			
N	Reading req. Level 1Hz dBuV	g Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detecto
N 1 33.0	Reading req. Level 1Hz dBuV 0949 41.15	g Correct Factor dB/m -15.33	Measure- ment dBuV/m 25.82	Limit dBuV/m 40.00	Over dB -14.18	Detecto
M 1 33.0 2 37.8	Reading Level MHz dBuV 0949 41.15 B121 45.26	g Correct Factor dB/m -15.33 -18.08	Measure- ment dBuV/m 25.82 27.18	Limit dBuV/m 40.00 40.00	Over dB -14.18 -12.82	Detecto QP QP
M 1 33.0 2 37.8	Reading req. Level 1Hz dBuV 0949 41.15	g Correct Factor dB/m -15.33	Measure- ment dBuV/m 25.82	Limit dBuV/m 40.00	Over dB -14.18	Detecto QP QP
N 1 33.0 2 37.8 3 * 46.6	Reading Level MHz dBuV 0949 41.15 B121 45.26	g Correct Factor dB/m -15.33 -18.08	Measure- ment dBuV/m 25.82 27.18	Limit dBuV/m 40.00 40.00	Over dB -14.18 -12.82	Detecto QP QP QP
N 1 33.0 2 37.8 3 * 46.6 4 103.	Reading Level dBuV 0949 41.15 8121 45.26 6664 50.92 8054 50.51	g Correct Factor dB/m -15.33 -18.08 -22.13 -22.23	Measure- ment dBuV/m 25.82 27.18 28.79 28.28	Limit dBuV/m 40.00 40.00 40.00	Over  dB  -14.18  -12.82  -11.21  -15.22	Detecto QP QP QP
N 1 33.0 2 37.8 3 * 46.6 4 103. 5 197.	Reading Level MHz dBuV 0949 41.15 8121 45.26 6664 50.92	g Correct Factor dB/m -15.33 -18.08 -22.13 -22.23 -19.93	Measure- ment dBuV/m 25.82 27.18 28.79	Limit  dBuV/m  40.00  40.00  40.00  43.50	Over  dB  -14.18  -12.82  -11.21	Detecto



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### **Above 1GHz**

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



No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.288	43.21	14.42	57.63	74.00	-16.37	peak
2	*	4804.392	29.43	14.43	43.86	54.00	-10.14	AVG



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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V	Million	
Ant. Pol.	Vertical	31 - 6	The state of the s
Test Mode:	BLE Mode TX 2402 MHz		
Remark:	No report for the emission prescribed limit.	which more than 10 dE	3 below the
110.0 40.3//-			

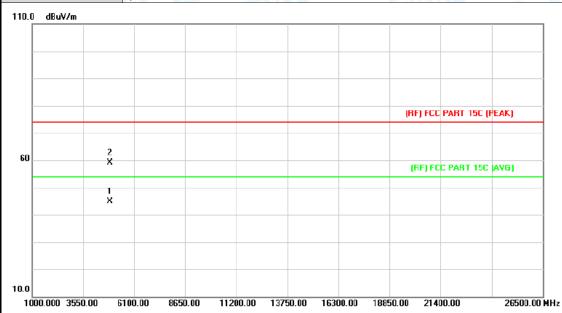


No.	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4804.000	34.27	14.43	48.70	54.00	-5.30	AVG
2		4804.400	45.18	14.43	59.61	74.00	-14.39	peak



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Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	DC 3.7V	THUE	- 1 Marie			
Ant. Pol.	Horizontal					
Test Mode:	BLE Mode TX 2442 MHz	O				
Remark:	No report for the emission was prescribed limit.	hich more than 10 dB	oelow the			



No	. Mk	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4883.972	29.85	14.92	44.77	54.00	-9.23	AVG
2		4884.160	44.32	14.92	59.24	74.00	-14.76	peak



10.0

1000.000 3550.00

Report No.: TB-FCC163534

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Temperature:	25℃	Relative Humidity: 5	5%				
Test Voltage:	DC 3.7V	THE PARTY OF THE P	2 1				
Ant. Pol.	Vertical		19				
Test Mode:	BLE Mode TX 2442 MF	BLE Mode TX 2442 MHz					
Remark:	No report for the emissi prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					
110.0 dBuV/m							
		(RF) FCC PAR	15C (PEAK)				
2 X	!						
60							

No	. Mk	c. Freq.		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4883.952	37.25	14.92	52.17	54.00	-1.83	AVG
2		4884.232	48.89	14.92	63.81	74.00	-10.19	peak

13750.00 16300.00 18850.00

11200.00

8650.00

6100.00

**Emission Level= Read Level+ Correct Factor** 

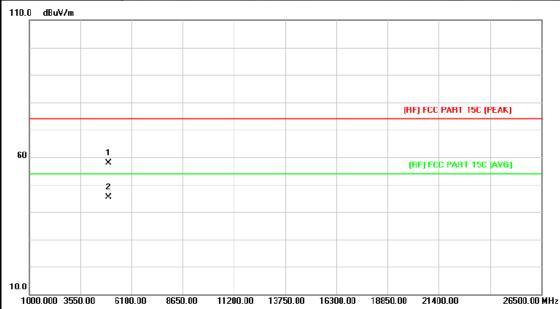
26500.00 MHz

21400.00



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Temperature:	25℃ Relative Humidity: 55%
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	BLE Mode TX 2480 MHz
Remark:	No report for the emission which more than 10 dB below the prescribed limit.
110.0 dBuV/m	

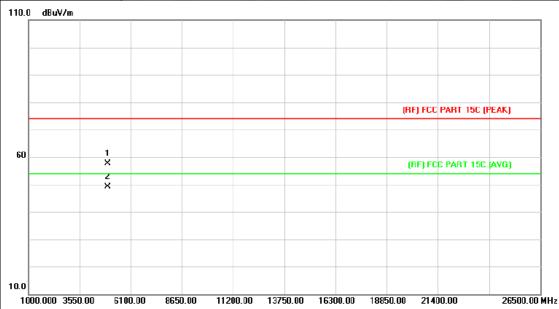


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.468	42.48	15.39	57.87	74.00	-16.13	peak
2	*	4959.468	29.88	15.39	45.27	54.00	-8.73	AVG



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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	DC 3.7V		- W
Ant. Pol.	Vertical		1133
Test Mode:	BLE Mode TX 2480	O MHz	
Remark:	No report for the en	mission which more than 10 dB	below the
110.0 dBuV/m			



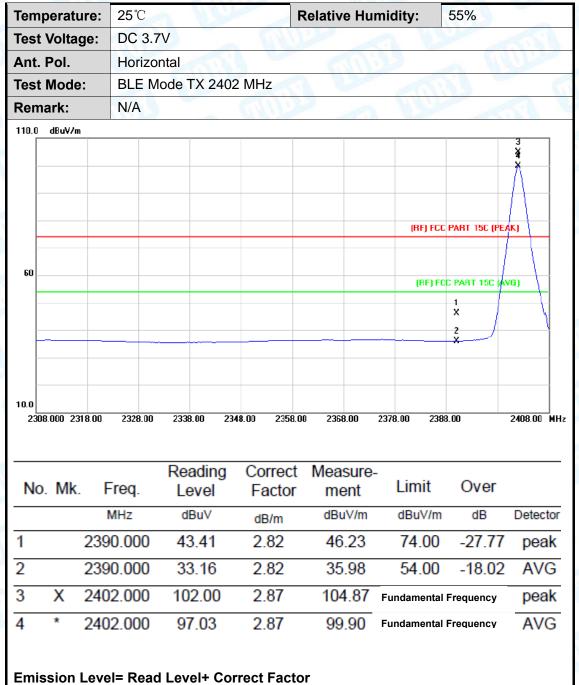
No. Mk.		Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.032	42.33	15.39	57.72	74.00	-16.28	peak
2	*	4960.616	33.85	15.40	49.25	54.00	-4.75	AVG



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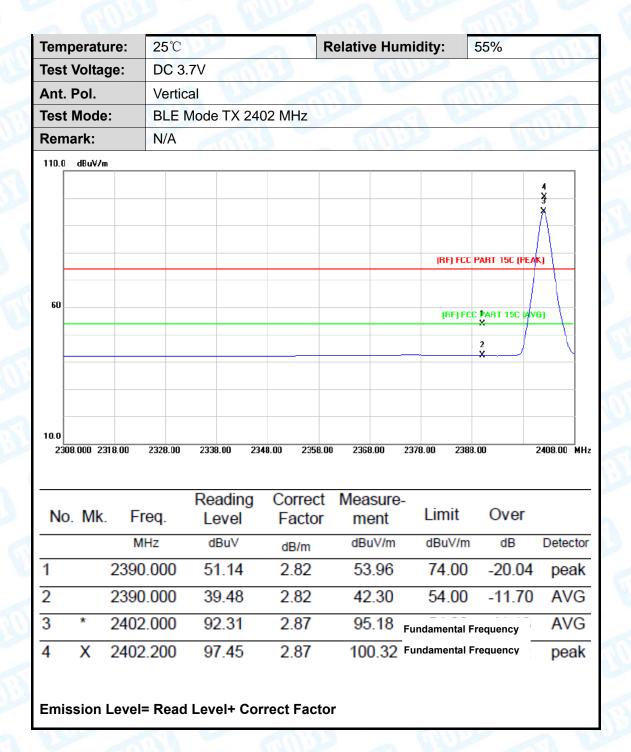
## **Attachment C-- Restricted Bands Requirement Test Data**

#### (1) Radiation Test





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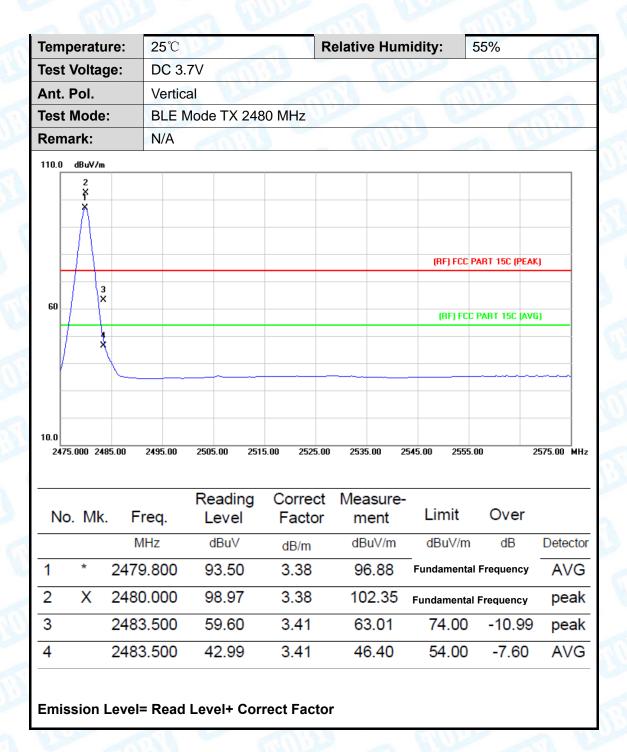


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Temp	peratu	ıre:	25℃	W.		11/1	Rela	tive I	Humidity:	55%	
Test '	Voltaç	ge:	DC 3	3.7V	MAN			OH.	M. P.	-	Mary
Ant. l	Pol.		Horiz	zontal			8.8		CEU	1130	
Test	Mode	:	BLE	Mode T	X 2480 M	ИНz			av		
Rema	ark:		N/A		33		6			a 1	
120.0	dBuV/m										
70	1 2 X X X									: PART 15C (P	
20.0 2475	i.000 248	B5.00 2	495.00	2505.00	2515.00	2525.00	2535	5.00	2545.00 255	5.00	2575.00 MH
				Readir	ng Co	rrect	Mea	sure-		_	
No	. Mk.	Fre	q.	Leve	Fa	actor	me	ent	Limit	Over	
		MH	Z	dBu∀	dE	3/m	dBu	ıV/m	dBuV/m	dB	Detector
1	X	2479.	800	106.3	8 3.	.38	109	9.76	Fundamenta	l Frequency	peak
2	*	2479.	800	100.9	7 3.	.38	104	1.35	Fundamenta	l Frequency	AVG
		2483.	500	66.86	3.	.41	70	.27	74.00	-3.73	peak
3								.27	54.00	-7.73	AVG



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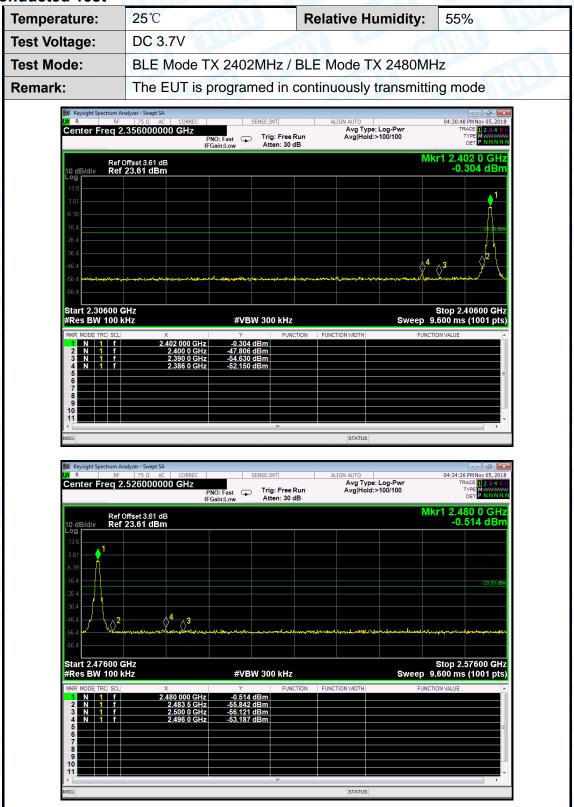




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### (2) Conducted Test





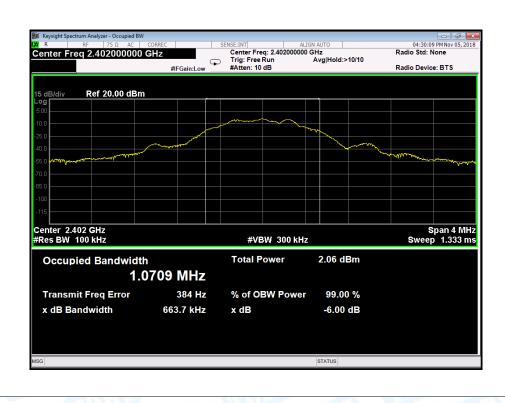
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## **Attachment D-- Bandwidth Test Data**

Temperature:	25℃		Relative Humidity:	55%	
Test Voltage:	DC 3	.7V			
Test Mode:	BLE	TX Mode			
Channel frequency		6dB Bandwidth	99% Bandwidth	Limit	
(MHz)		(kHz)	(kHz)	(kHz)	
2402		663.7	1070.9		
2442		666.2	1071.4	>=500	
2480		660.6	1068.4		

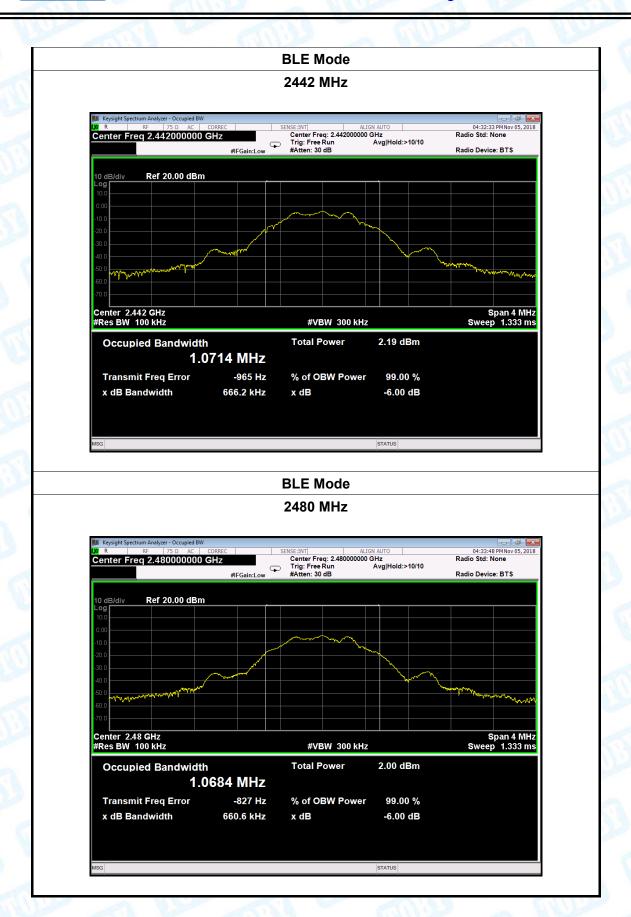
#### **BLE Mode**

#### 2402 MHz





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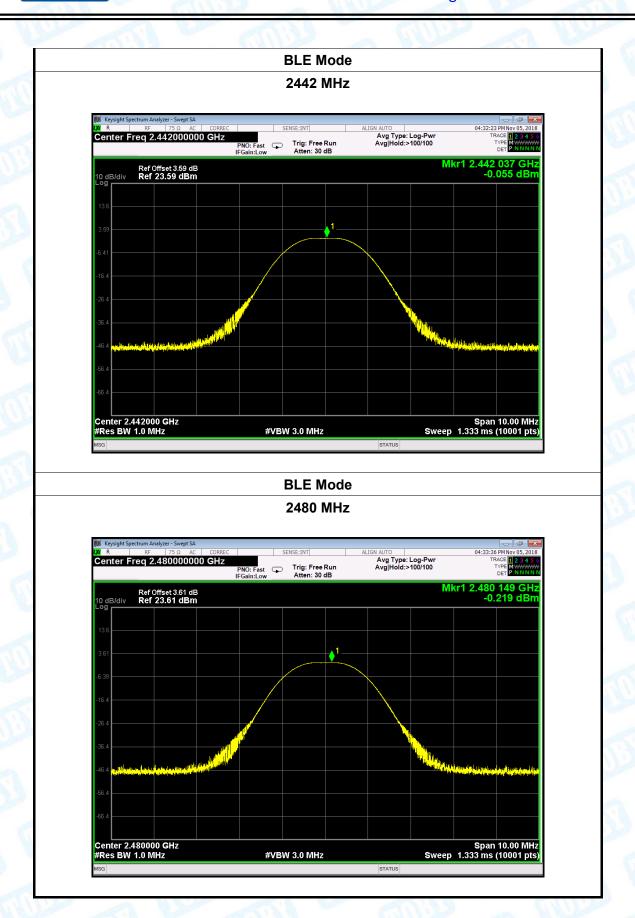
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# **Attachment E-- Peak Output Power Test Data**

st Voltage:	DC 3.7V							
st Mode:	BLE TX M	lode	(m)					
nannel freque			st Resu	ılt (dBm	1)		Limit (c	IBm)
2402	···· <b>·</b>		0.0	-	-,			
2442		-0.055				30		
2480			-0.2				•	
			BLE N					
			2402					
802 II								
Keysight Spectrum Analyz  R  RF	75 Ω AC CORREC		SENSE:INT	A	LIGN AUTO	. I a m Doom		PM Nov 05, 2018
Center Freq 2.40	02000000 GHz	PNO: Fast	Trig: Free	Run dB	Avg Hold:	: Log-Pwr >100/100	1	RACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
Ref Offs 10 dB/div Ref 23	et 3.61 dB . <b>61 dBm</b>					M	kr1 2.402	217 GHz 099 dBm
	.or abiii						•	OOO GEIII
Log Rei 23								
13.6								
Log				<b>→</b> ¹				
13.6				<b>•</b> 1				
13.6 3.61				1				
13.6 3.61				•1				
13.6 3.61 -6.39 -16.4				•1				
13.6 3.61 -6.39 -16.4 -26.4	- Landelprid			•1				
13.6 3.61 -6.39 -16.4 -26.4	Market Market Company			•1			State of the state	eterror fragishis
13.6 3.61 -6.39 -16.4 -26.4				•1			on the state of th	der activit de la
13.6 3.61 -16.4 -26.4 -36.4 -46.4				<b>1</b>			on the state of th	
13.6 3.61 -6.39 -16.4 -26.4 -36.4 -46.4	on in the Affilia			•1				10.00 MHz



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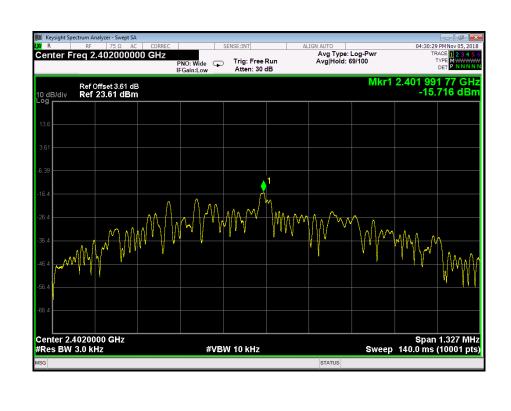
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# **Attachment F-- Power Spectral Density Test Data**

Temperature: 25°C		Relative Humidity:				MAG		
Test Voltage:	DC 3.7V	The second secon						
Test Mode:	BLE TX M	/lode		a W				
Channel Frequency		Power Density			Limit F			
(MHz)		(dBr	(dBn	(dBm)				
2402		-15.7	15.716					
2442 2480		-15.8	8	8				
		-15.956						
		BIFM	ode	1				

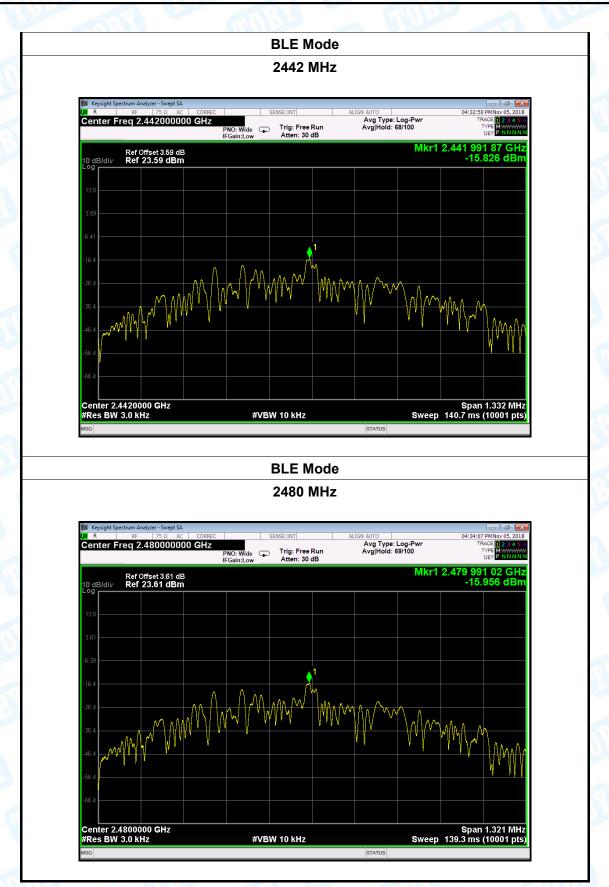
**BLE Mode** 

2402 MHz





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----END OF REPORT-----