

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC158581

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FCC Radio Test Report FCC ID: XHW-EWT147

Original Grant

Report No. TB-FCC158581

Applicant E-matic

Equipment Under Test (EUT)

EUT Name Tablet PC

: EWT147 Model No.

: EWT147BL, EWT147BU, EWT147PR, EWT147PN, EWT147R Serial Model No.

: EMATIC **Brand Name**

: 2018-03-12 **Receipt Date**

2018-03-13 to 2018-03-23 **Test Date**

Issue Date 2018-03-24

Standards : FCC Part 15: 2017, Subpart C(15.247)

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-RF158581	Rev.01	Initial issue of report	2018-03-24
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1. General Information about EUT

1.1 Client Information

Applicant : E-matic		E-matic
Address : 3435 Ocean Park Blvd #107 PMB # 444, Santa Monica CA 90405, Angeles, California, United States		3435 Ocean Park Blvd #107 PMB # 444, Santa Monica CA 90405, Los Angeles, California, United States
Manufacturer		Shaghal Ltd
Address		2231 Colby Ave. L.A., C.A., 90064 U.S.A

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Tablet PC			
Models No.	1	EWT147, EWT147BL, EWT147BU, EWT147PR, EWT147PN, EWT147R			
Model Difference		All these models are identical in the same PCB layout and electrical circuit, the only difference is appearance and color.			
		Operation Frequency:	Bluetooth 4.0(BLE): 2402MHz~2480MHz		
		Number of Channel:	Bluetooth 4.0(BLE): 40 channels see note(3)		
Product		RF Output Power:	-0.752 dBm Conducted Power		
Description		Antenna Gain:	2dBi FPC Antenna		
		Modulation Type:	GFSK		
	3	Bit Rate of Transmitter:	1Mbps(GFSK)		
Power Supply	5	Adapter(TEKA018-050200UK): Input: AC:100V~240V,50/60Hz , 0.5A Output: DC 5V, 2.5A DC 3.8V by 10000mAh 38Wh Rechargeable Li-ion Battery.			
Software Version		windows 10.1	windows 10.1		
Hardware Version	:	N/A			
Connecting I/O Port(S)	3	Please refer to the User's Manual			

Note:

This Test Report is FCC Part 15.247 for BLE, the test procedure follows the FCC KDB 558074 D01 DTS Means Guidance v04.

- (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:

	W 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		f		
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

Charging + TX Mode

Adapter	EUT	

1.4 Description of Support Units

The EUT has been test as an independent unit.



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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	Bluetooth MP Tool		
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})
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	±4.60 dB
Radiated Effilssion	9kHz to 30 MHz	±4.60 db
Radiated Emission	Level Accuracy:	±4.40 dB
Radiated Effilssion	30MHz to 1000 MHz	±4.40 db
Radiated Emission	Level Accuracy:	±4,20 dB
Radiated Emission	Above 1000MHz	±4.20 UD



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1.8 Test Facility

The testing report were 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.

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		Took Itam	ludana ant	Domostr
FCC IC		Test Item	Judgment Remar	
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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 20, 2017	Jul. 19, 2018
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 20, 2017	Jul. 19, 2018
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 20, 2017	Jul. 19, 2018
LISN	Rohde & Schwarz	ENV216	101131	Jul. 21, 2017	Jul. 20, 2018
Radiation Emission	n Test				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 20, 2017	Jul. 19, 2018
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 20, 2017	Jul. 19, 2018
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. 03, 2017	Jul. 02, 2018
Pre-amplifier	Sonoma	310N	185903	Mar.17, 2018	Mar. 16, 2019
Pre-amplifier	HP	8449B	3008A00849	Mar.17, 2018	Mar. 16, 2019
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.17, 2018	Mar. 16, 2019
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducte	d Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 20, 2017	Jul. 19, 2018
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 20, 2017	Jul. 19, 2018
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	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Oct. 26, 2017	Oct. 25, 2018
DE Dawas Cas	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Oct. 26, 2017	Oct. 25, 2018
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Oct. 26, 2017	Oct. 25, 2018
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Oct. 26, 2017	Oct. 25, 2018



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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

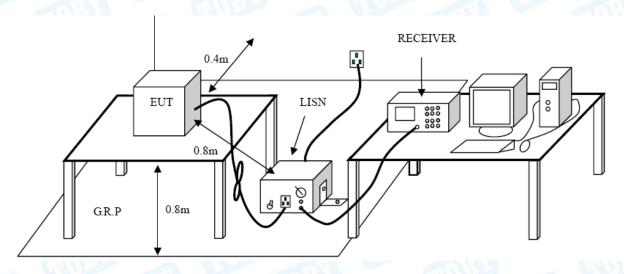
Conducted Emission Test Limit

THE FRANCE OF THE PARTY OF THE	Maximum RF Line	e 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 Met	ers(at 3m)
(MHz)	Peak (dBuV/m)	Average (dBuV/m)
Above 1000	74	54

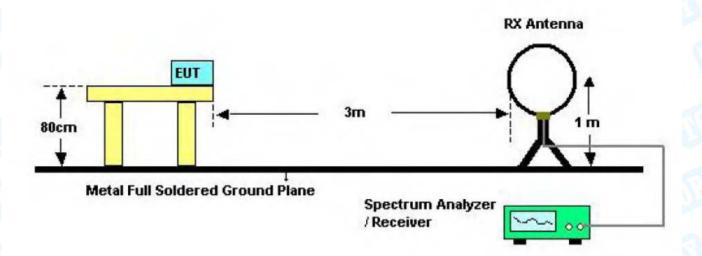
Note:

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

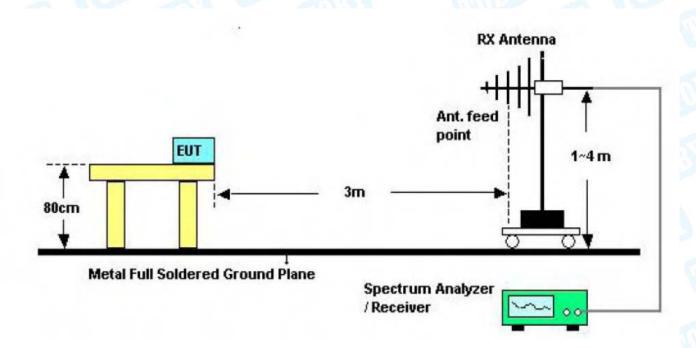


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5.2 Test Setup



Below 30MHz Test Setup

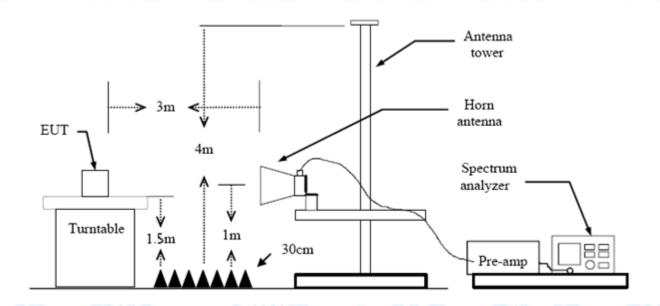


Below 1000MHz Test Setup



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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

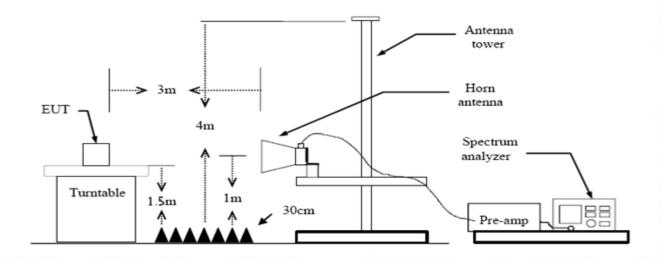
6.1 Test Standard and Limit

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

6.1.2 Test Limit

Restricted Frequency	Distance Meters(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

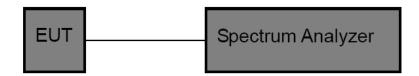
7.1 Test Standard and Limit

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

7.1.2 Test Limit

FCC P	art 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

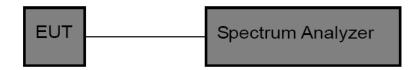
8.1 Test Standard and Limit

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

8.1.2 Test Limit

FCC Par	t 15 Subpart C(15.247)/RS	S-247
Test Item	Limit	Frequency Range(MHz)
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 v04.

- (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

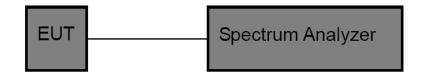
9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (e)

9.1.2 Test Limit

FC	CC Part 15 Subpart C(15.2	47)
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 v04.

- (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 directional gains of the antenna used for transmitting is 2dBi, 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.

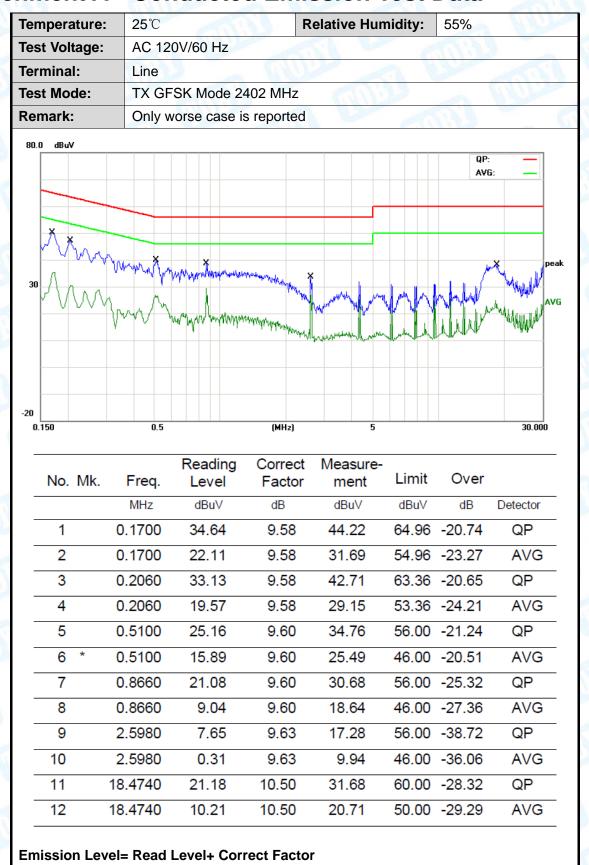
Antenna Type	
Permanent attached antenna	
⊠Unique connector antenna	Miles Control
Professional installation antenna	THE PERSON NAMED IN



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Attachment A-- Conducted Emission Test Data







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	25 ℃			Relative	e Humidity	: 55	%
est Voltage:	AC 1	20V/60 Hz	BU .		(III)		J 100
erminal:	Neut	ral		21 1	6		9
est Mode:	TX	SFSK Mode	e 2402 MHz				
emark:	Only	worse cas	e is reporte	d (000	-	HARRY
0.0 dBuV							QP: —
		Ly many that I madelered	to a de s'illigra de cardo a finante para de la financia del la financia de la fi				AVG:
D.150	0.5	Danding	(MHz)	Magazira	5		30.000
No Mk E		Reading		Measure-		Over	
	req.	Level	Factor	ment	Limit	Over dB	Detector
N	req. //Hz	Level dBuV	Factor dB	ment dBuV	Limit dBu∀	dB	Detector
1 * 0.1	req.	Level	Factor	ment	Limit	dB 17.89	Detector QP AVG
1 * 0.1 2 0.1	req. //Hz /740	dBuV 37.23	Factor dB 9.64	ment dBuV 46.87	dBuV 64.76 -1	dB 17.89 23.04	QP
1 * 0.1 2 0.1 3 0.2	req. //Hz /740 /740	dBuV 37.23 22.08	9.64 9.64	ment dBuV 46.87 31.72	dBuV 64.76 -2	dB 17.89 23.04 23.57	QP AVG
1 * 0.1 2 0.1 3 0.2 4 0.2	740 1740 1740	dBuV 37.23 22.08 27.61	9.64 9.58	ment dBuV 46.87 31.72 37.19	Limit dBuV 64.76 -2 54.76 -2 60.76 -2	dB 17.89 23.04 23.57 24.29	QP AVG QP
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5	740 2819 2819	dBuV 37.23 22.08 27.61 16.89	9.64 9.58 9.58	ment dBuV 46.87 31.72 37.19 26.47	Limit dBuV 64.76 -2 54.76 -2 60.76 -2 50.76 -2	dB 17.89 23.04 23.57 24.29 20.09	QP AVG QP AVG
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5 6 0.5	740 2819 2819 5500	Level dBuV 37.23 22.08 27.61 16.89 26.33	9.64 9.58 9.58 9.58	ment dBuV 46.87 31.72 37.19 26.47 35.91	Limit dBuV 64.76 -1 54.76 -2 60.76 -2 50.76 -2 56.00 -2	dB 17.89 23.04 23.57 24.29 20.09	QP AVG QP AVG QP
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5 6 0.5 7 0.8	740 2819 2500	Level dBuV 37.23 22.08 27.61 16.89 26.33 16.63	9.64 9.58 9.58 9.58 9.58	ment dBuV 46.87 31.72 37.19 26.47 35.91 26.21	Limit dBuV 64.76 -1 54.76 -2 60.76 -2 50.76 -2 46.00 -1	dB 17.89 23.04 23.57 24.29 20.09 19.79 21.33	QP AVG QP AVG QP AVG
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5 6 0.5 7 0.8 8 0.8	740 740 2819 2819 5500 3820	Level dBuV 37.23 22.08 27.61 16.89 26.33 16.63 25.08	9.64 9.64 9.58 9.58 9.58 9.58 9.59	ment dBuV 46.87 31.72 37.19 26.47 35.91 26.21 34.67 27.47	Limit dBuV 64.76 -1 54.76 -2 60.76 -2 50.76 -2 46.00 -1 56.00 -2	dB 17.89 23.04 23.57 24.29 20.09 19.79 21.33	QP AVG QP AVG QP AVG QP
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5 6 0.5 7 0.8 8 0.8	740 740 819 8819 8500 8820 8820	Level dBuV 37.23 22.08 27.61 16.89 26.33 16.63 25.08 17.88 12.46	9.64 9.58 9.58 9.58 9.58 9.59 9.65	ment dBuV 46.87 31.72 37.19 26.47 35.91 26.21 34.67 27.47 22.11	Limit dBuV 64.76 -2 54.76 -2 50.76 -2 56.00 -2 46.00 -2 46.00 -3	dB 17.89 23.04 23.57 24.29 20.09 19.79 21.33 18.53 33.89	QP AVG QP AVG QP AVG QP AVG QP
1 * 0.1 2 0.1 3 0.2 4 0.2 5 0.5 6 0.5 7 0.8 8 0.8 9 2.6	740 740 8819 8500 8820	Level dBuV 37.23 22.08 27.61 16.89 26.33 16.63 25.08 17.88	9.64 9.64 9.58 9.58 9.58 9.58 9.59	ment dBuV 46.87 31.72 37.19 26.47 35.91 26.21 34.67 27.47	Limit dBuV 64.76 -2 54.76 -2 50.76 -2 56.00 -2 46.00 -2 46.00 -2	dB 17.89 23.04 23.57 24.29 20.09 19.79 21.33 18.53 33.89	QP AVG QP AVG QP AVG QP AVG





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Temperature:	25℃		R	Relative Hu	midity:	55%	- TO
Гest Voltage:	AC 240	V/60 Hz	3		10		Alter
Terminal:	Line	Richard	100	10	6	MILE	
Test Mode:	TX GFS	K Mode 240	02 MHz		A K		
Remark:	Only wo	rse case is	reported	CHILD:		A 1	ARD -
30 dBuV		hand the second the se		who		QP: AVE	i:
0.150	0.5		(MHz)	5			30.000
		Reading	Correct	Measure-			
No. Mk.	Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBu∨	dB	Detector
1 *	0.1740	40.47	9.64	50.11	64.76	-14.65	QP
2	0.1740	27.45	9.64	37.09	54.76	-17.67	AVG
3	0.2100	36.15	9.64	45.79	63.20	-17.41	QP
4	0.2100	24.88	9.64	34.52	53.20	-18.68	AVG
5	0.5180	28.14	9.58	37.72	56.00	-18.28	QP
6	0.5180	20.21	9.58	29.79	46.00	-16.21	AVG
7	1.0380	22.14	9.59	31.73	56.00	-24.27	QP
8	1.0380	9.38	9.59	18.97	46.00	-27.03	AVG
9	2.6780	12.01	9.65	21.66	56.00	-34.34	QP
10	2.6780	3.79	9.65	13.44	46.00	-32.56	AVG
		17.88	10.62	28.50		-31.50	QP
11	16.6380			_			-





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Temperature:	25℃		2 ///	Relative H	lumidity:	55%	
Test Voltage:	AC 24	10V/60 Hz	13		100		Alto
Terminal:	Neutra	al			6.1	MIS	
Test Mode:	TX GI	FSK Mode 2	402 MHz		1 6		
Remark:	Only	worse case i	s reported			1	HIII.
80.0 dBuV							
						QP:	
X							
1./\ 🗴							
[N \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	MMWWW	X MARINE STATE OF THE STATE OF	O. alton			× "M	ži u
30 / / / /	Mywjm	Set-William Mariner	Consideration of Marie	L. Marie Lawre	don by s	المسالمة	* MANUALINA PE
30		Secretary Management	worth showing the of the	war war	MAN		ALMINA MARINE
30	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Jos de general de la companya de la	When when we have to be a fact of the control of th	marth with			
30	V/////////////////////////////////////	Martingal Harpen	Whitematherman of the control of the	man man de la company de la co			ANN AND AV
30		AMANANA MANANANA	whale mothermound	and have seen to the seen to t			MANAGE PER STATE OF THE
30		Yor way and for many and the same of the s	Whitematherman of	marine live			AMMAN AV
<i>/\\\\</i>		AMANANAN AMANANANANANANANANANANANANANANA	Whitemathermand	Market Comment			A A A A A A A A A A A A A A A A A A A
<i>/\\\\</i>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Martin Ma	(MHS)				30.000
-20	0.5	Northern Warnesser	(MHS)	Market Comments			VUMMAN AV
-20	0.5	Reading					VUMMAN AV
-20	0.5	Reading Level	(MHz) Correct Factor	Measure- ment	Limit	Over	VUMMAN AV
-20 0.150			Correct	Measure-		Over	VUMMAN AV

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBu∀	dB	Detector
1	*	0.1740	38.34	9.58	47.92	64.76	-16.84	QP
2		0.1740	25.68	9.58	35.26	54.76	-19.50	AVG
3		0.2060	32.41	9.58	41.99	63.36	-21.37	QP
4		0.2060	22.76	9.58	32.34	53.36	-21.02	AVG
5		0.5220	25.99	9.60	35.59	56.00	-20.41	QP
6		0.5220	16.39	9.60	25.99	46.00	-20.01	AVG
7		0.8900	24.72	9.60	34.32	56.00	-21.68	QP
8		0.8900	19.33	9.60	28.93	46.00	-17.07	AVG
9		11.6540	10.99	10.19	21.18	60.00	-38.82	QP
10		11.6540	1.42	10.19	11.61	50.00	-38.39	AVG
11		17.7500	18.76	10.50	29.26	60.00	-30.74	QP
12		17.7500	7.83	10.50	18.33	50.00	-31.67	AVG





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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

Temperature:	25℃		CHAIR	Relative Hun	nidity:	55%	81
Test Voltage:	AC 12	0/60Hz				CHI	
Ant. Pol.	Horizo	ntal		Carried Street			67
Test Mode: BLE TX 2402 Mode							
Remark:	Only w	orse case i	s reported	ATTA S	_ 6	Allin	
80.0 dBuV/m							
					(RF)FCC 15C	3M Radiation	
						Margin -6	dB
	2			3 Y4 		5 Y	5
30 ×	×					Mariale	UVU/N
M	1	۱ I	adlinariba dista	" The work	المسلمان المالية	, a subtitu	Yw
My man		V MAN	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	"W	ANIMACADA LA CARAMA		
V	W.	The state of the s					
20							
30.000 40	50 60 70	80	(MHz)	300	400 500	600 700	1000.000
		Reading	Correct	Measure-			
No. Mk.	Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detecto
1 3	2.0667	44.87	-14.73	30.14	40.00	-9.86	peak
	2.0841	58.16	-22.99	35.17	40.00	-4.83	peak
3 ! 22	28.4901	58.39	-18.15	40.24	46.00	-5.76	peak
4 24	40.8301	54.48	-17.53	36.95	46.00	-9.05	peak
5 ! 60	01.4265	48.67	-8.43	40.24	46.00	-5.76	peak
6 ! 82	21.7103	45.21	-5.04	40.17	46.00	-5.83	peak
			_				
*:Maximum data	x:Over limit	!:over margin					





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Temperature:	25℃	25 [°] C Relative Humidity: 5				55%	TO !
Test Voltage:	AC 120/6	60Hz					
Ant. Pol.	Vertical	A Tree			CU	1,30	
Test Mode:	BLE TX	BLE TX 2402 Mode					
Remark:	Only wor	se case is	reported	0.00	2	a W	Michigan
80.0 dBuV/m							
30		Marwall	ntullulululur (Ma)		(RF)FCC	15C 3M Radiation	
-20							
30.000 40 50	60 70 8	0	(MHz)	300	400	500 600 700	1000.0
30.000 40 50	R	Reading Level	(MHz) Correct Factor	Measure- ment	400 Limit	500 600 700 Over	1000.0
30.000 40 50 No. Mk. F	R	Reading	Correct	Measure-			1000.0
30.000 40 50 No. Mk. F	R Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	
No. Mk. F	req. MHz 6202	Reading Level dBuV	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over	Detecto
No. Mk. F 1 * 31. 2 ! 47.	Freq. MHz 6202 9938	Reading Level dBuV 49.88	Correct Factor dB/m -14.47	Measure- ment dBuV/m 35.41	Limit dBuV/m 40.00	Over dB -4.59	Detecto
No. Mk. F 1 * 31. 2 ! 47. 3 ! 71.	Freq. WHz 6202 9938 5806	dBuV 49.88 57.20	Correct Factor dB/m -14.47 -22.95 -23.01	Measure- ment dBuV/m 35.41 34.25 34.72	Limit dBuV/m 40.00 40.00 40.00	Over dB -4.59 -5.75 -5.28	Detector peal peal peal
No. Mk. F 1 * 31. 2 ! 47. 3 ! 71. 4 159	Freq. MHz 6202 9938 5806 .7844	dBuV 49.88 57.20 57.73	Correct Factor dB/m -14.47 -22.95 -23.01 -19.81	Measure- ment dBuV/m 35.41 34.25 34.72 34.41	Limit dBuV/m 40.00 40.00 40.00 43.50	Over dB -4.59 -5.75 -5.28 -9.09	peal peal peal peal
No. Mk. F 1 * 31. 2 ! 47. 3 ! 71. 4 159 5 560	Freq. MHz 6202 9938 5806 .7844 .6928	dBuV 49.88 57.20	Correct Factor dB/m -14.47 -22.95 -23.01	Measure- ment dBuV/m 35.41 34.25 34.72	Limit dBuV/m 40.00 40.00 40.00	Over dB -4.59 -5.75 -5.28	Detector peal peal peal

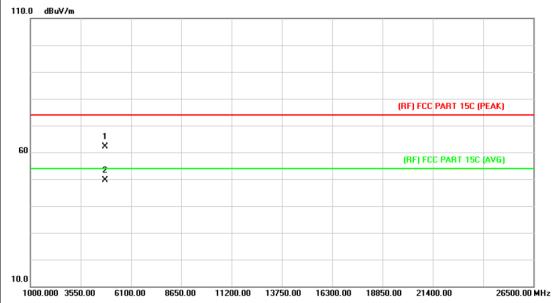




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Above 1GHz

25℃	Relative Humidity:	55%
AC 120/60Hz		
Horizontal		The same of the sa
BLE Mode TX 2402 MHz		
No report for the emission was prescribed limit.	hich more than 10 dB	below the
	AC 120/60Hz Horizontal BLE Mode TX 2402 MHz No report for the emission w	AC 120/60Hz Horizontal BLE Mode TX 2402 MHz No report for the emission which more than 10 dB



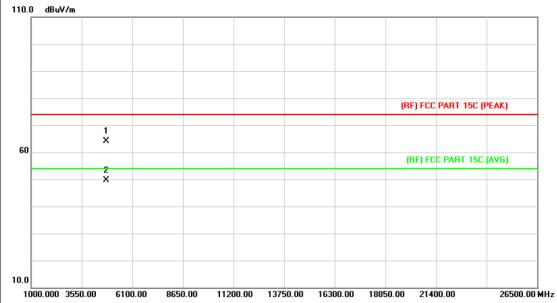
No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4805.000	46.30	15.87	62.17	74.00	-11.83	peak
2	*	4803.748	33.81	15.87	49.68	54.00	-4.32	AVG



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Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	AC 120/60Hz	AC 120/60Hz					
Ant. Pol.	Vertical	Vertical					
Test Mode:	BLE Mode TX 240	BLE Mode TX 2402 MHz					
Remark:	No report for the en	mission which more than 10 d	B below the				
110.0 dBuV/m							



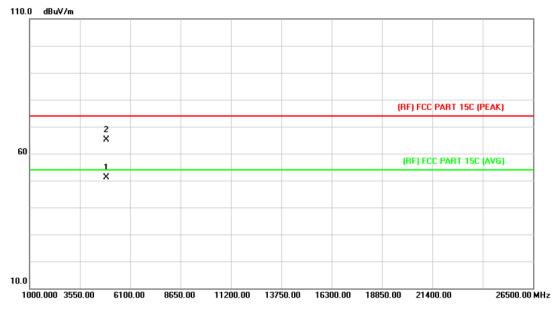
No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.572	48.34	15.87	64.21	74.00	-9.79	peak
2	*	4803.384	33.76	15.86	49.62	54.00	-4.38	AVG



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Temperature:	25℃	Relative Humidity:	55%				
Test Voltage:	AC 120/60Hz		13				
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	BLE Mode TX 2442 MHz	O					
Remark:	No report for the emission of prescribed limit.	which more than 10 dB	below the				
110.0 dBuV/m							



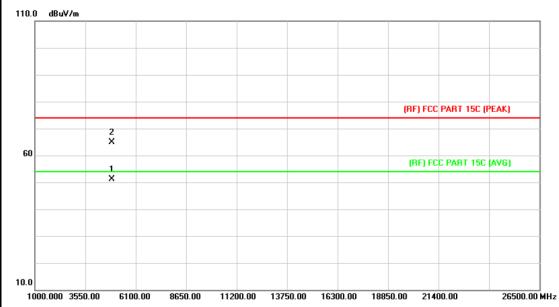
No.	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4884.900	34.54	16.55	51.09	54.00	-2.91	AVG
2		4884.988	48.55	16.55	65.10	74.00	-8.90	peak







Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	AC 120/60Hz	Million	1			
Ant. Pol.	Vertical					
Test Mode:	BLE Mode TX 2442 MHz					
Remark:	No report for the emission was prescribed limit.	hich more than 10 dB	below the			
110.0 dBuV/m						



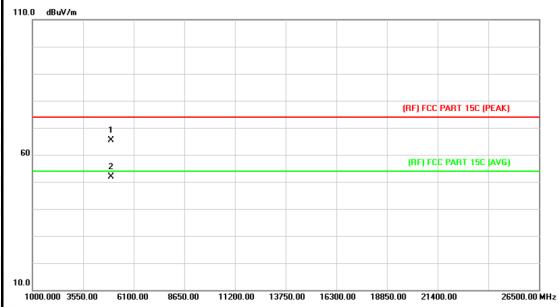
No.	Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4884.456	34.53	16.55	51.08	54.00	-2.92	AVG
2		4883.822	48.40	16.54	64.94	74.00	-9.06	peak





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Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120/60Hz	WILLIAM STATE	
Ant. Pol.	Horizontal		1133
Test Mode:	BLE Mode TX 2480 MHz		
Remark:	No report for the emission v prescribed limit.	which more than 10 dB	below the
110.0 JD.V/	·		

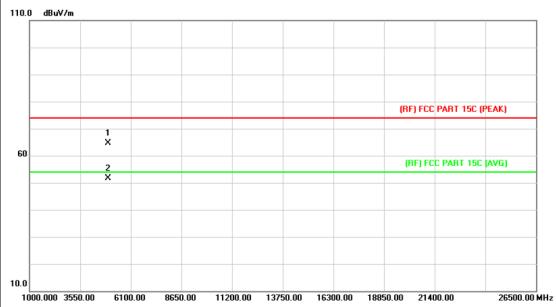


No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.864	48.20	17.19	65.39	74.00	-8.61	peak
2	*	4960.758	34.58	17.19	51.77	54.00	-2.23	AVG



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Temperature:	25℃	Relative Humidity:	55%			
Test Voltage:	AC 120/60Hz					
Ant. Pol.	Vertical					
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		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.304	47.50	17.19	64.69	74.00	-9.31	peak
2	*	4960.660	34.56	17.19	51.75	54.00	-2.25	AVG

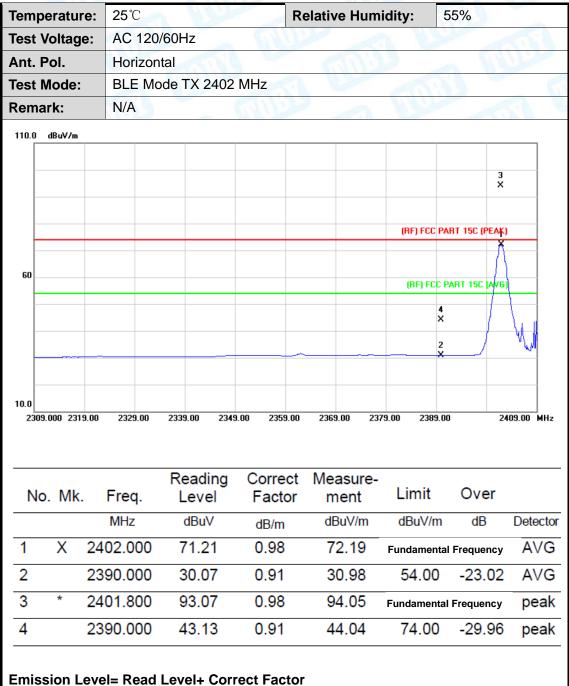




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Attachment C-- Restricted Bands Requirement Test Data

(1) Radiation Test





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Tem	emperature: 25°C						Re	Relative Humidity: 55%					N		
Test	Voltag	e:	AC	120/60	Hz				011			-	N		
Ant.	Pol.		Vert	ical	The same		1	113			GW	1178			h.
Test	Mode:		BLE	Mode	TX 24	02 MHz	1)			1	63		4		
Rem	nark:		N/A			3		6	11/10			a 1			
110.0	dBuV/m														1
												3			
										(R	F) FCC I	PART 15C			
												1			
60											BE) FCC	PART 150	IAVE		
										'	111)11 CC	17.111 140	, ara,		
											4 X				
								_			2 X				
10.0 23	13.000 232	3.00	2333.00	234	3.00 23	53.00 23	63.00	2373	3.00 2	2383.00	2393.	.00	24	13.00	∐ MHa
N	o. Mk.	. F	req.		eading .evel	Corre Fact			asure ent		mit	Ove	er		
		N	ИHz		dBuV	dB/n	1	dE	BuV/m	dE	BuV/m	dE	3	Dete	ecto
1	*	240	2.000) 6	32.54	0.98	3	6	3.52	Fund	lament	al Freque	ncy	A۱	/G
2		239	0.000) 3	32.19	0.91		3	3.10	5	4.00	-20	90	A۱	/G
3	X	240	1.700) 7	78.50	0.98	}	7	9.48	Fund	lament	al Freque	ency	ре	ak
4		239	0.000) 4	10.64	0.91		4	1.55	7	4.00	-32	45	pe	ak
Ξmis	ssion L	.evel:	= Rea	d Lev	el+ Co	rrect Fa	ctor								







. •	peratu	re:	25℃	25℃ Relative Humidity: 55%								
Tes	t Voltag	je:	AC 1	20/60Hz			_ (الماليا		1	
4nt	. Pol.		Horiz	zontal					67			
Tes	t Mode:		BLE	Mode T	X 2480 MH	Ηz		1			A	
Ren	nark:		N/A		77			110		0	HIN!	
110.0) dBuV/m											
		3										
		×										
		1				_			(RF) FCC	PART 15C	(PEAK)	-
		Ň										
60		114										
		×				+			(RF) FC	C PART 150	: (AVG)	\dashv
	}											
		× ×										
												-
												_
10.0	69.000 247		489.00	2499.00	2509.00 2	519.00	2529.00		39.00 254	9.00		
N	o. Mk.	Fre	 -	Readir Leve			Meas mei		Limit	Ov	er	
N	o. Mk.	Fre		Readir Leve	l Fac	ctor	Meas mei	nt	Limit dBuV/r			Detecto
N 1	o. Mk.		· Iz	Leve	l Fac	ctor m	mei	nt //m		n dE	В [Detecto
		MH	lz 900	Leve dBuV	dB/6 1.3	m 2	mei dBu\	nt V/m 57	dBuV/r	n dE	B [
1		MH 2479.	900 500	dBuV 72.25	dB/d 5 1.3	m i2	dBu\	nt //m 57 72	dBuV/r	n dE ntal Freque	ency 5.28	AVG





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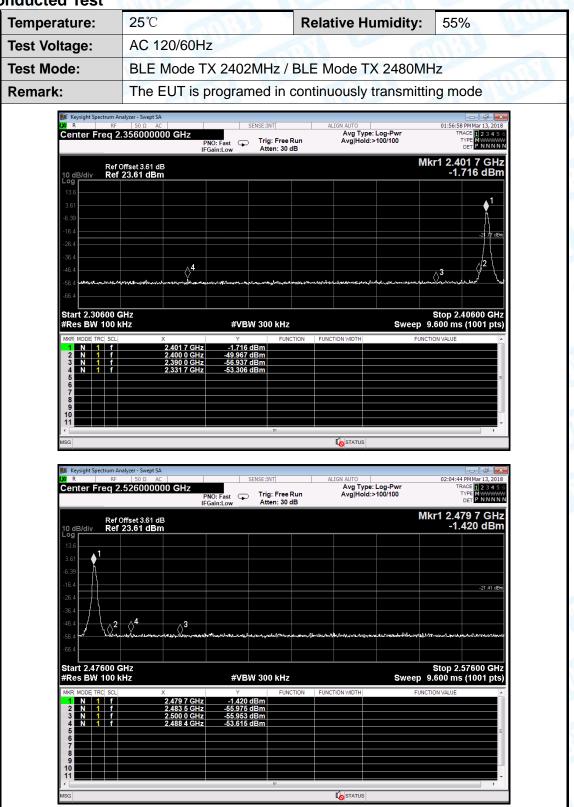
emperature: 25			25℃	Relative Humidity: 55%										
est	Voltag	je:	AC 12	20/60Hz		13			OH.		9		A. B.	
nt.	Pol.		Vertic	al		-	1				GUI	1133		
est	Mode	•	BLE N	Mode T	X 248	0 MHz	_			1	62	1	M	
Rem	ark:		N/A					1	11/10	1		3 M		
10.0	dBuV/m													1
		3 X					_							
		1								(F	IF) FCC P	ART 15C (PEA	ıK)	
		Ň]
60		4									(RF) FCC	PART 15C (AV	/G)	1
		×												1
	}	2					_							
-	/									-				1
0.0														
	9.000 247	9.00	2489.00	2499.00	2509	.00 2	2519.00	2529	0.00	2539.00	2549.0	00	2569.00	MI
N.I.	o. Mk	. F	req.	Read Lev		Corr			sure ent		nit	Over		
NC												dB	Dete	cto
NO		N	ИHz	dBu	V	dB/	m	dB	uV/m	dB	uV/m	uD.		
	*		ИНZ 9.900	dBu 70.1		dB/ 1.3			uV/m 1.50			Frequency	A۷	<u>′</u> G
1 2	*	247			18		2	71		Funda				
1	* X	247	9.900	70.′	18	1.3	2	71 36	1.50	Funda 54	mental	Frequency		⁄G





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(2) Conducted Test







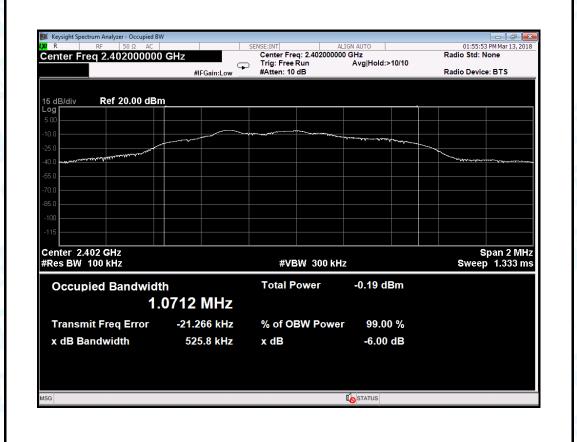
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Attachment D-- Bandwidth Test Data

Temperature:	25℃		Relative Humidity:	55%	
Test Voltage:	AC 1	20/60Hz			
Test Mode:	BLE	TX Mode			
Channel frequency		6dB Bandwidth	99% Bandwidth	Limit	
(MHz)		(kHz)	(kHz)	(kHz)	
2402		525.80	1071.2		
2442		524.50 1067.9		>=500	
2480		522.90	1067.1	-	
		l .	1	1	

BLE Mode

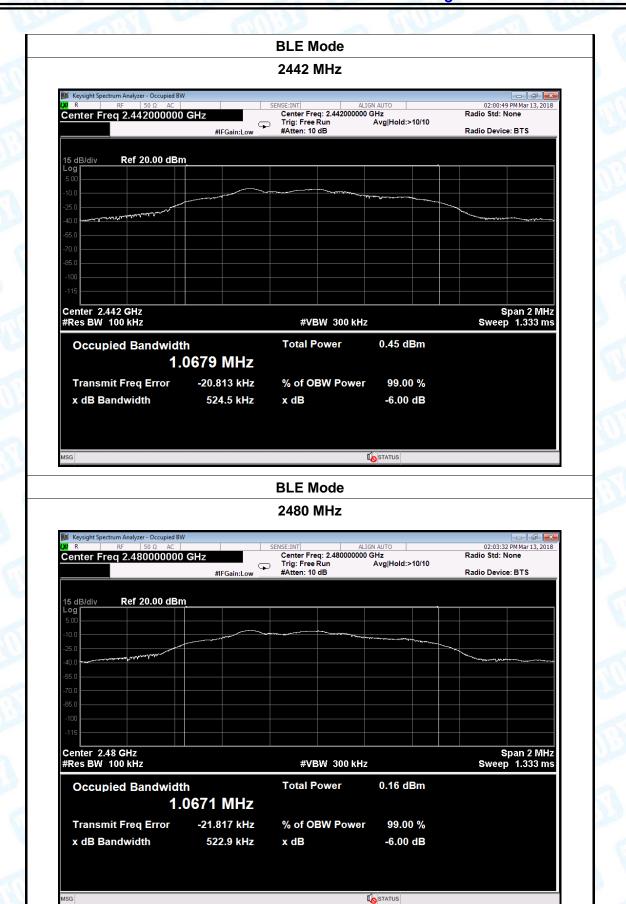
2402 MHz







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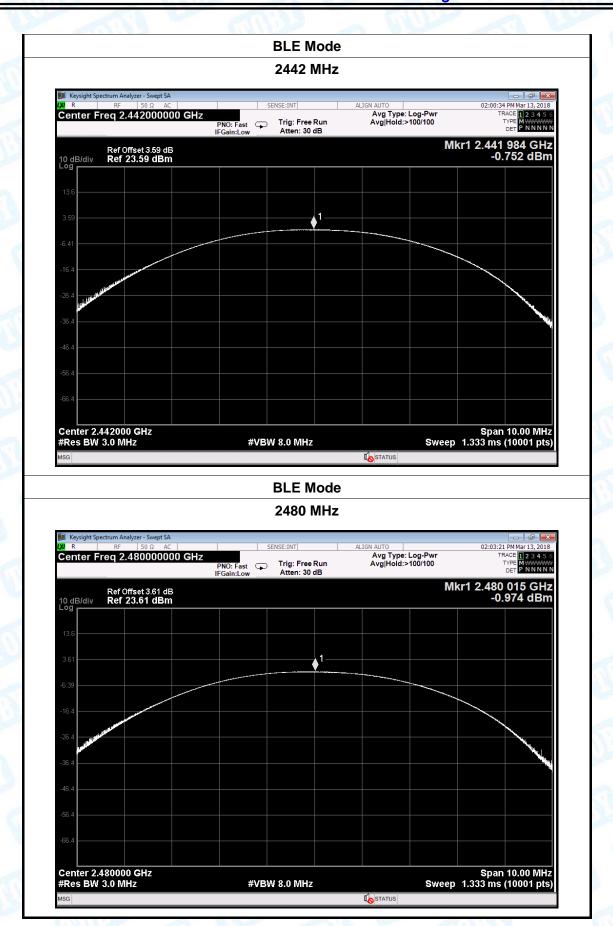
Attachment E-- Peak Output Power Test Data

mperature:	25℃		Relat	ive Humi	dity:	55%	
st Voltage:	AC 120/6	0Hz	-557		rest	11:15	
st Mode:	BLE TX M	1ode	Million		1 6		1
hannel freque	ency (MHz)	Test F	Result (dB	m)		Limit (dBı	m)
2402	2		-1.389				
2442	2		-0.752			30	
2480)		-0.974				
		В	LE Mode				
		24	402 MHz				
Keysight Spectrum Ana	lyzer - Swept SA	SENSE	·INT	ALIGN AUTO		01:55:41 PM M	ar 13 2018
	402000000 GHz		rig: Free Run	Aug Type: Avg Hold:>	Log-Pwr	TRACE TYPE	2 3 4 5 6 MWWWW P NNNNN
			tten: 30 dB	7.18 10 tal.			
Ref Of	fset 3.61 dB 2 3.61 dBm				M	r1 2.401 78 1.389-	6 GHz 9 dBm
10 dB/div Ref 2							
13.6							
3.61			1				
-6.39							
40.4							
-16.4							
-16.4 -26.4							egthinspace = 1
-26.4							
-26.4 -36.4							
-26.4 -36.4 -46.4 -56.4							
-26.4 -36.4 -46.4							
-26.4 -36.4 -46.4 -56.4		#VBW 8.				Span 10./ 1.333 ms (100	00 MHz



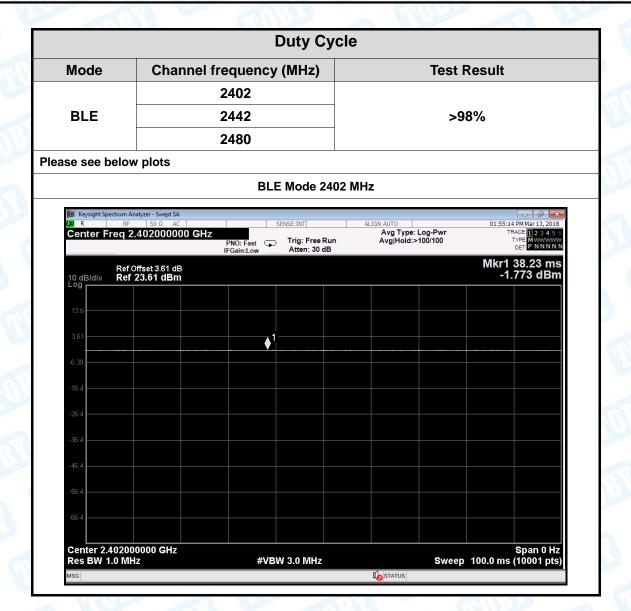


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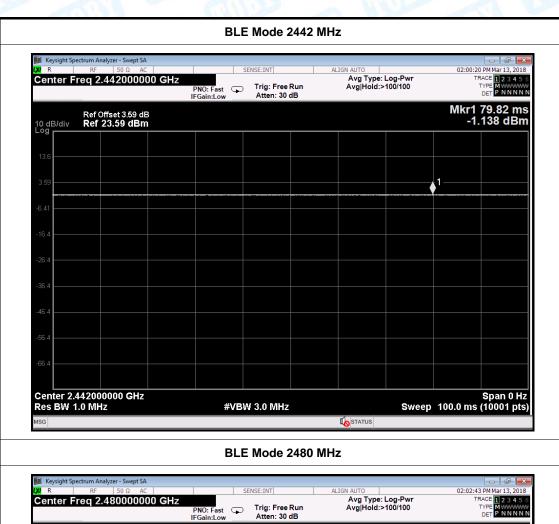
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Temperature:

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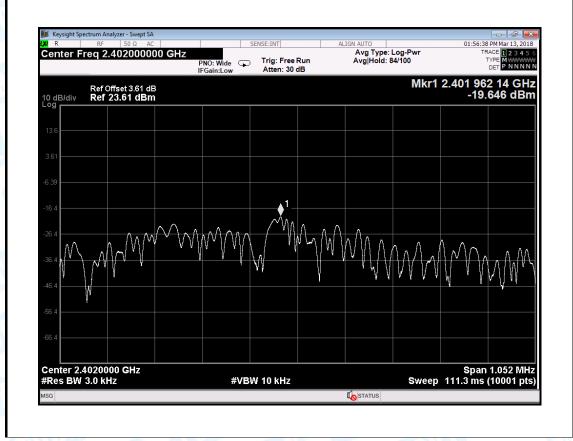
Attachment F-- Power Spectral Density Test Data

25℃

Test Voltage:	AC 120/6	0Hz		
Test Mode:	BLE TX N	/lode		Time.
Channel Freq	uency	Power Density	Limit	Result
(MHz)		(dBm/3KHz)	(dBm/3KHz)	Result
2402		-19.646		
2442		-19.210	8	PASS
2480		-19.447		
		BLE Mode		

Relative Humidity:

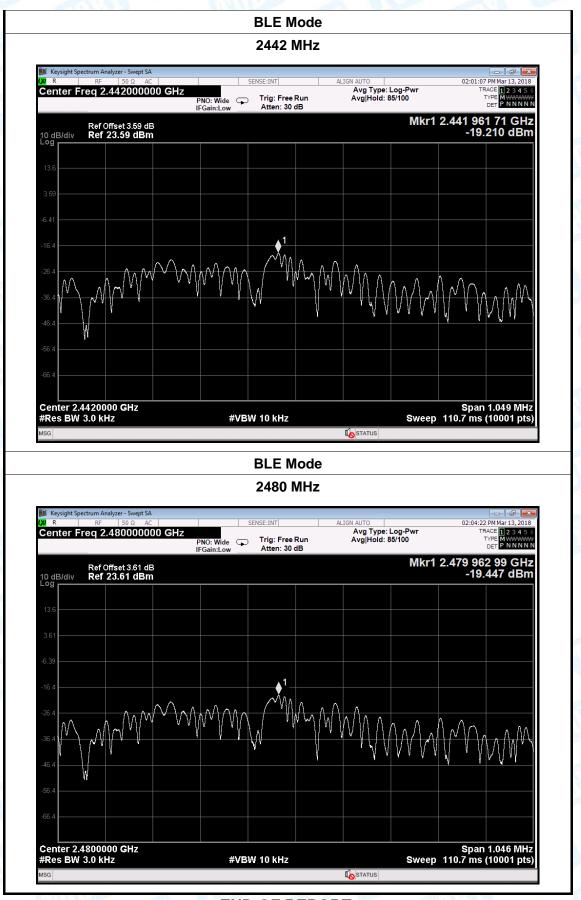
2402 MHz





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