

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC142338 Page: 1 of 41

FCC Radio Test Report FCC ID: 2ADHMTJA

Original Grant

Report No. : TB-FCC142338

Applicant: T.Ware Pte Ltd.

Equipment Under Test (EUT)

EUT Name : T.Jacket

Model No. : TJA

Brand Name : T.Jacket

Receipt Date : 2014-10-23

Test Date : 2014-10-23 to 2014-10-28

Issue Date : 2014-10-31

Standards: FCC Part 15, Subpart C (15.247:2014)

Test Method : ANSI C63.4:2003

Conclusions : PASS

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

The EUT technically complies with the FCC and IC requirements

Test/Witness Engineer

Approved& Authorized

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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1. General Information about EUT

1.1 Client Information

Applicant: T.Ware Pte Ltd.

Address : 71 Ayer Rajah Crescent #06-15, Singapore 139951

Manufacturer: T.Ware Pte Ltd.

Address: 71 Ayer Rajah Crescent #06-15, Singapore 139951

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	T.Jacket			
Models No.	:	TJA			
Brand Name	:	T.Jacket	T.Jacket		
Model Difference	:	N/A			
		Operation Frequency: 2402MHz~2480MHz			
		Number of Channel:	Bluetooth 4.0 (BLE): 40 channels see note(3)		
Product Description		RF Output Power:	-6.312 dBm Conducted Power		
Description		Antenna Gain:	0.5 dBi Chip Antenna		
		Modulation Type:	GFSK		
		Bit Rate of Transmitter:	1Mbps(GFSK)		
Power Supply	:	DC power by USB cable	-		
		DC power by Li-ion battery			
Power Rating	:	: DC 5V by USB Cable from PC system.			
		DC 3.7V by 2200 mAh Li-ion Battery.			
Connecting	:	Please refer to the User's Manual			
I/O Port(S)					

Note:

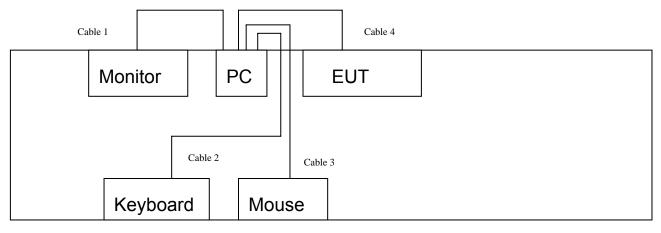
- (1) This Test Report is FCC Part 15.247 for Bluetooth BLE, the test procedure follows the FCC KDB 558074 D01 DTS Meas Guidance v03r02.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (3) Antenna information provided by the applicant.
- (4) Channel List:



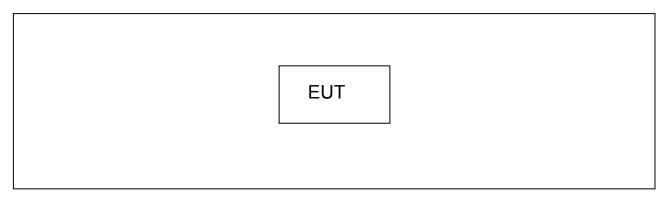
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Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	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 USB Charging with TX Mode



TX Mode





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1.4 Description of Support Units

Equipment Information							
Name	Manufacturer	Used "√"					
LCD Monitor	E170Sc	DOC	DELL	√			
PC	OPTIPLEX380	DOC	DELL	√			
Keyboard	L100	DOC	DELL	√			
Mouse	M-UARDEL7	DOC	DELL	√			
	Cable Information						
Number	Length	Note					
Cable 1	YES	YES	1.5M				
Cable 2	YES	YES	1.5M				
Cable 3	YES	NO	1.5M				
Cable 4	YES	YES	0.5M				

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 with TX Mode		

For Radiated Test			
Final Test Mode	Description		
Mode 2	USB Charging with 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.



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According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

Bluetooth 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 mobile 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.

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 BLE Graphical User Interface Tool			
Channel	CH 00	CH 20	CH 39	
BLE Mode	DEF	DEF	DEF	

1.7 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.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

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

FCC Part 15 Subpart C(15.247)/RSS-210: 2010					
Standaı	rd Section	Test Item	ludamont	Damada	
FCC	IC	rest item	Judgment	Remark	
15.203	1	Antenna Requirement	PASS	N/A	
15.207	RSS-GEN 7.2.4	Conducted Emission	PASS	N/A	
15.205	RSS-GEN 7.2.2	Restricted Bands	PASS	N/A	
15.247(a)(2)	RSS-210 A.8.2(a)	6dB Bandwidth	PASS	N/A	
15.247(b)	RSS-210 A.8.4(4)	Peak Output Power	PASS	N/A	
15.247(e)	RSS-210 A.8.2(b)	Power Spectral Density	PASS	N/A	
15.247(d)	RSS-210 Annex 8 (A8.5)	Transmitter Radiated Spurious Emission	PASS	N/A	

Note: "/" for no requirement for this test item.

N/A is an abbreviation for Not Applicable.



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3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1Test Standard FCC Part 15.207

3.1.2 Test Limit

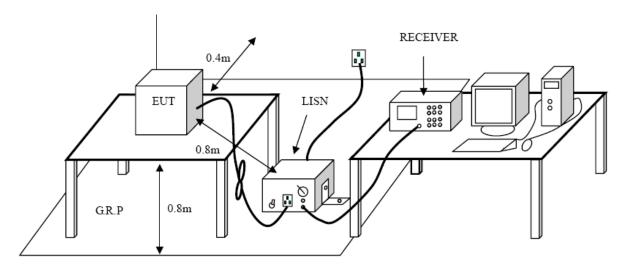
Conducted Emission Test Limit

Fraguency	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.

3.2 Test Setup



3.3 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 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test	ROHDE&		400004	Aug. 08, 2014	Aug. 07, 2015
Receiver	SCHWARZ	ESCI	100321	Aug. 08, 2014	Aug. 07, 2015
50ΩCoaxial	Anritsu	MP59B	X10321	Aug. 08, 2014	Aug. 07, 2015
Switch	Aiiiisu	MESSE	X10321	Aug. 08, 2014	Aug. 07, 2015
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 08, 2014	Aug. 07, 2015
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2014	Aug. 07, 2015

3.5 EUT Operating Mode

Please refer to the description of test mode.

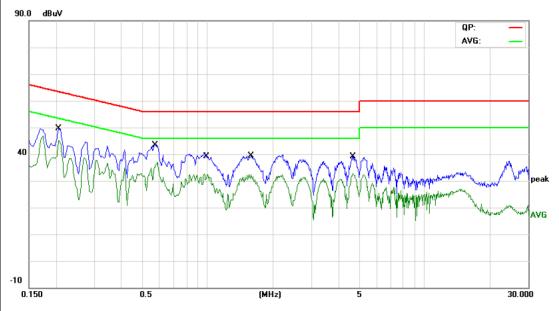
3.6 Test Data

Please see the next page.



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EUT:	T.Jacket	Model:	TJA
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	AC Charging with BLE TX 2402 MHz		
Remark:	Only worse case is reported		



No. I	Иk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2072	38.76	10.02	48.78	63.31	-14.53	QP
2	*	0.2072	35.69	10.02	45.71	53.31	-7.60	AVG
3		0.5700	32.56	10.05	42.61	56.00	-13.39	QP
4		0.5700	25.27	10.05	35.32	46.00	-10.68	AVG
5		0.9860	27.35	10.06	37.41	56.00	-18.59	QP
6		0.9860	20.97	10.06	31.03	46.00	-14.97	AVG
7		1.5940	26.49	10.06	36.55	56.00	-19.45	QP
8		1.5940	21.12	10.06	31.18	46.00	-14.82	AVG
9		4.6940	25.82	9.97	35.79	56.00	-20.21	QP
10		4.6940	22.58	9.97	32.55	46.00	-13.45	AVG

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



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7		1	NV	j
			КY	
3	-		7	

	T.Jack	ket	N	Model:		TJA	
ature:	25 ℃		F	Relative Hum	idity:	55%	
tage:	AC 12	20V/60 Hz					
ıl:	Neutra	al					
de:	AC CI	narging witl	h BLE TX 2	2402 MHz			
:	Only \	worse case	is reporte	d			
/						0.0	
						AVE	
		Washing M.	X or Y			Al and another many of	pea AVI
	0.5		(MHz)	5			30.000
Иk. Fr		Reading Level	Correct Factor	Measure- ment	Limit	Over	
М	Hz	dBuV	dB	dBuV	dBuV	dB	Detector
0.20	060	38.27	10.12	48.39	63.36	-14.97	QP
* 0.20	060	35.32	10.12	45.44	53.36	-7.92	AVG
0.57	780	32.86	10.02	42.88	56.00	-13.12	QP
0.57	780	25.63	10.02	35.65	46.00	-10.35	AVG
2.14	120	27.00	10.06	37.06	56.00	-18.94	QP
2.14	120	22.07	10.06	32.13	46.00	-13.87	AVG
4.75	580	25.22	10.06	35.28	56.00	-20.72	QP
			10.06	32.31	46.00		AVG
	Mk. Fr 0.20 0.55 2.14	I: Neutra de: AC CI : Only v	I: Neutral de: AC Charging with Only worse case Reading Level MHz dBuV 0.2060 38.27 0.2060 35.32 0.5780 32.86 0.5780 25.63 2.1420 27.00	Neutral AC Charging with BLE TX 2 Only worse case is reported	Neutral AC Charging with BLE TX 2402 MHz	Neutral AC Charging with BLE TX 2402 MHz	Neutral AC Charging with BLE TX 2402 MHz Only worse case is reported Only worse case Only worse Only worse case Only worse Only worse Only

Emission Level= Read Level+ Correct Factor



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4. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard FCC Part 15.209

4.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

(0.00-1000)							
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	Class A (dBuV	BuV/m)(at 3 M) Class B (dBu		//m)(at 3 M)
(MHz)	Peak	Average	Peak	Average
Above 1000	80	60	74	54

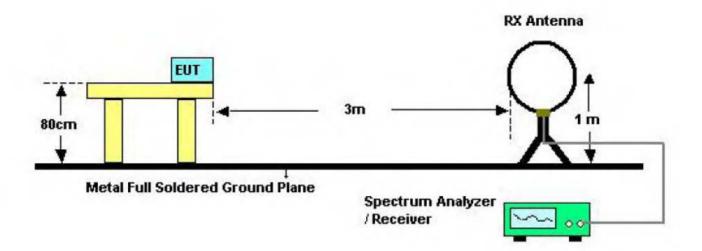
Note:

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

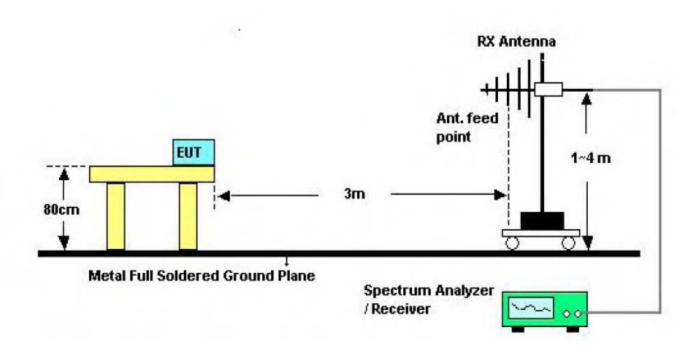


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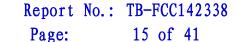
4.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup





Turntable

EUT

0.8 m lm to 4m

Test
Receiver

Coaxial Cable

Above 1GHz Test Setup

4.3 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 the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) 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.
- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) 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.
- (7) For the actual test configuration, please see the test setup photo.

4.4 EUT Operating Condition

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



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4.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNE R	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

4.6 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=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.



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EUT:	T.Jacket	Model:	TJA				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	DC 5V						
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	BLE TX 2402 Mode						
Remark:	Only worse case is re	Only worse case is reported					
80.0 dBuV/m							
-20 30,000 40 50	60 70 80	(RF)	FCC 15C 3M Radiation Margin -6 dB 500 600 700 1000.000				
30.000 40 30	60 70 60	(MITZ) 300 400	500 600 700 1000.000				
	eq. Level Fa	rrect Measure- actor ment Lim					
M	Hz dBuV dE	3/m dBuV/m dBu\	V/m dB Detector				
1 ! 107.	5101 59.95 -2 ²	1.86 38.09 43.	50 -5.41 peak				
2 * 159.2	2251 60.76 -20	0.56 40.20 43.	50 -3.30 QP				
3 ! 216.	7828 59.79 -19	9.67 40.12 46.	00 -5.88 peak				
4 ! 277.0	0935 60.03 -17	7.54 42.49 46.	00 -3.51 QP				
5 346.8	8092 53.21 -14	4.81 38.40 46.	00 -7.60 peak				
*:Maximum data x:O	ver limit !:over margin						



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4		1	1	7
	М		к	Y
, E	•	,		L

UT:	T.Jacket	Mo	odel:	TJA
emperature:	25 ℃	Re	elative Humidity:	55%
est Voltage:	DC 5V			
nt. Pol.	Vertical			
est Mode:	BLE TX 2402 M	ode		
Remark:	Only worse case	e is reported		
80.0 dBuV/m				
20 30.000 40 50	60 70 80	(MHz)	5 5 300 400	FCC 15C 3M Radiation Margin -6 dB 500 600 700 1000.000
No. Mk. F	Reading req. Level	Correct Factor	Measure- ment Limi	t Over
N	/lHz dBuV	dB/m	dBuV/m dBuV	//m dB Detecto
1 * 36.	0007 56.37	-17.67	38.70 40.0	00 -1.30 QP
2 108	.2667 52.17	-21.86	30.31 43.5	50 -13.19 peak
3 ! 160	.3456 58.51	-20.53	37.98 43.5	50 -5.52 peak
4 214	.5143 52.87	-19.76	33.11 43.5	
	.6757 50.58	-17.78	32.80 46.0	·
	Over limit !:over margin			<u> </u>



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EUT:	T.Jacket Model: TJA						
Temperature:	25 ℃ Relative Humidity: 55%						
Test Voltage:	DC 5V	DC 5V					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	BLE Mode TX 2402 MHz	BLE Mode TX 2402 MHz					
Remark:	No report for the emissio	No report for the emission which more than 10 dB below the					
	prescribed limit.						



No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.018	40.68	13.44	54.12	74.00	-19.88	peak
2	*	4804.018	36.12	13.44	49.56	54.00	-4.44	AVG



EUT: T.Jacket Model: TJA Temperature: **25** ℃ **Relative Humidity:** 55% DC 5V **Test Voltage:** Ant. Pol. Vertical **Test Mode:** BLE Mode TX 2402 MHz Remark: No report for the emission which more than 10 dB below the



No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4804.018	39.90	13.44	53.34	74.00	-20.66	peak
2	*	4804.018	36.49	13.44	49.93	54.00	-4.07	AVG

13750.00

16300.00

18850.00

21400.00

Emission Level= Read Level+ Correct Factor

0.0

1000.000 3550.00

6100.00

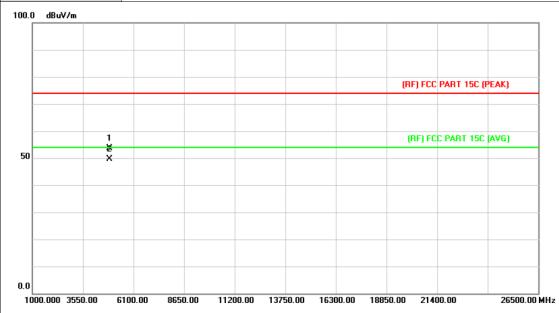
8650.00

11200.00

26500.00 MHz



EUT: Model: TJA T.Jacket Temperature: **25** ℃ **Relative Humidity:** 55% DC 5V Test Voltage: Ant. Pol. Horizontal **Test Mode:** BLE Mode TX 2442 MHz Remark: No report for the emission which more than 10 dB below the prescribed limit.

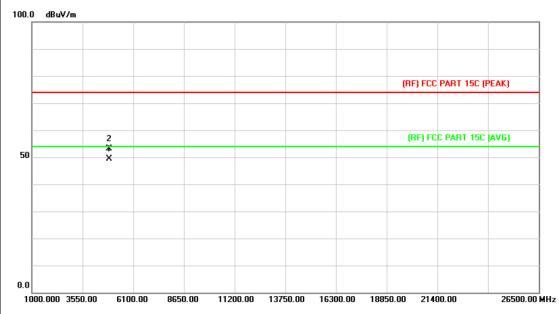


1	No.	Mk.	Freq.	Reading Correct Level Factor		Measure- ment	Limit	Over			
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector		
1			4884.025	39.76	13.92	53.68	74.00	-20.32	peak		
2		*	4884.034	35.75	13.92	49.67	54.00	-4.33	AVG		



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EUT:	T.Jacket	Model:	TJA
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2442 MHz		
Remark:	No report for the emissio prescribed limit.	n which more than 10 o	dB below the

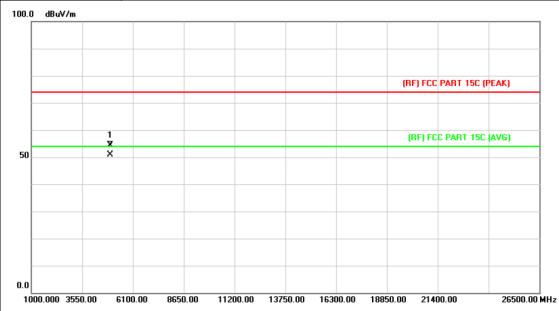


١	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	4884.132	35.39	13.92	49.31	54.00	-4.69	AVG
2			4884.361	39.32	13.92	53.24	74.00	-20.76	peak



23 of 41 Page:

EUT:	T.Jacket	Model:	TJA
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	BLE Mode TX 2480 MHz		
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	dB below the

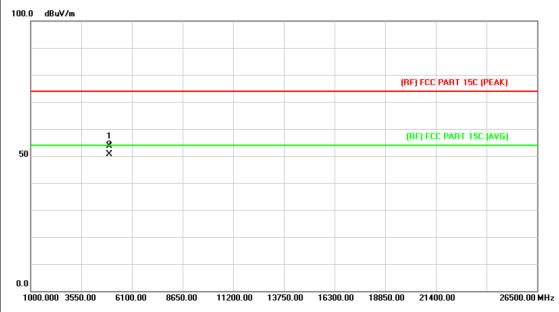


Ν	10.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1			4959.988	39.95	14.36	54.31	74.00	-19.69	peak
2		*	4959.988	36.49	14.36	50.85	54.00	-3.15	AVG



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EUT:	T.Jacket	Model:	TJA
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2480 MHz		
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	IB below the



N	lo. N	Иk.	Freq.	Reading Correct Level Factor		Measure- ment	Limit	Over		
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	
1			4959.994	39.28	14.36	53.64	74.00	-20.36	peak	
2	*	•	4959.994	36.33	14.36	50.69	54.00	-3.31	AVG	



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5. Restricted Bands Requirement

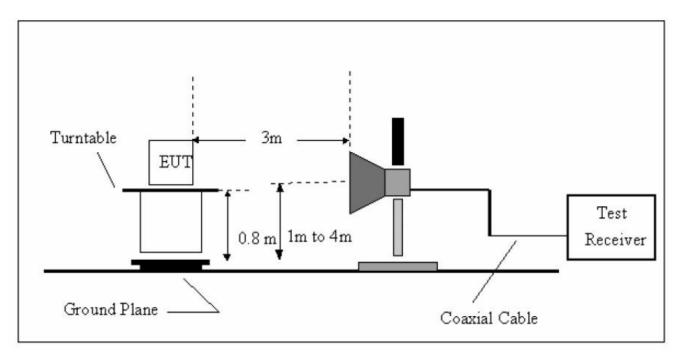
5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Restricted Frequency	Class B (dBu	uV/m)(at 3 M)
Band (MHz)	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

5.2 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) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit



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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.

- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) 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.
- (7) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

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

5.5 Test Equipment

Equipment	Manufacturer Model No. Serial No. Last Cal. Cal. Due Date Agilent E4407B MY45106456 Mar. 20, 2014 Mar. 19, 2015 Rohde & Schwarz FSP30 DE25181 Aug. 08, 2014 Aug. 07, 2015 Rohde & Schwarz ESCI 101165 Aug. 08, 2014 Aug. 07, 2015 ETS-LINDGREN 3142E 00117537 Mar. 07, 2014 Mar.06, 2015 ETS-LINDGREN 3117 00143207 Mar. 07, 2014 Mar.06, 2015 ETS-LINDGREN 3117 00143209 Mar. 07, 2014 Mar.06, 2015 HP 11909A 185903 Mar. 07, 2014 Mar.06, 2015 HP 8447B 3008A00849 Mar. 07, 2014 Mar.06, 2015 HUBER+SUHNER 100 SUCOFLEX Mar. 07, 2014 Mar.06, 2015 Rohde & Schwarz SML03 IKW682-054 Feb. 11, 2014 Feb.10, 2015 ETS-LINDGREN 2090 N/A N/A N/A				
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

5.6 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=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.



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(1) Radiation Test

adiat	ion ie	St									
EU1	T:		T.Ja	cket			Model	:		TJA	
Ten	peratu	re:	25 °	С			Relati	ve Hu	midity:	55%	
Tes	t Voltag	je:	DC 5	5V							
Ant	Pol.		Hori	zontal							
Tes	t Mode:		BLE	Mode T	X 240	2 MHz					
Ren	nark:		N/A								
100.	0 dBuV/m										
										3	
									(RF) I	CC PART 15C (PE	EAK)
									(DE)	FCC PART 15C (A	140
50										PCC PART TOCK	Waj
									1 X		
	dadi anno de consente	-transfer and the same	W. Shakara Mara	marken of the second	Year March and American	ywylnernebischen	fa.ani.i.Etinyttustantan	Lymph Carlotte	2 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	norther to	alanda de la companya
0.0											
23	317.000 232	27.00 2	337.00	2347.00	2357.	00 2367	7.00 23	77.00	2387.00 2	2397.00	2417.00 MHz
				Read		Correc		asure			
١	lo. Mk	. Fre	eq.	Leve	el	Facto	r m	ent	Limit		
		MH	łz	dBu\	V	dB/m	dE	BuV/m	dBuV/	m dB	Detector
1		2390.	000	43.0	9	0.77	4	3.86	74.0	0 -30.14	peak
2		2390.	000	33.0)7	0.77	3	3.84	54.0	0 -20.16	8 AVG
3	Х	2401.	800	84.2	22	0.82	8	5.04	Fundame	ntal Frequency	peak
4	*	2402.	100	82.6	8	0.82	8	3.50	Fundame	ntal Frequency	AVG



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TO	BY

UT	:		T.Jac	cket			Mc	odel:			•	TJA				
em	peratui	e:	25 °C				Re	lativ	e Hu	ımidit	:y:	55%				
est	Voltag	e:	DC 5	δV		'										
nt.	Pol.		Verti	cal												
est	Mode:		BLE	Mode T	X 24	80 MHz										
Test Voltage: Ant. Pol. Test Mode: Remark: 100.0 dBuV/m 50 2317.000 2327.00 No. Mk. F			N/A													
100.0	dBuV/m															
													4			
	nt. Pol. st Mode: mark: 0.0 dBuV/m 2317.000 2327.00 No. Mk. F										(RF) FC	C PAR	r 1 5C (F	PEAK)		
												П				
	50										(DE) E	CC PAR	T 15C	(AVC)		
50												1	1	ATU		
											1 X					
			-	**********		المالوس المحالية في المالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية والمالية و	*******	*****			2 X		7			
- 1	17 000 222	7.00	2337.00	2347.00	2357	00 220	7.00	2377	7.00	2387.0	220	97.00		241	7.00	
23	17.000 232	7.00	2337.00								J 23:	37.00		241	7.00	MI
N	lo Mk	Er	eq.	Read	_	Corre					.imit	(Ovei			
	IO. IVIK		Hz	Leve		Facto)I		ent							-
				dBu\		dB/m			uV/m		IBuV/n		dB)etec	
1		2390	0.000	42.9)4	0.77		43	3.71		74.00) -	30.2	29	pea	ık
2		2390	.000	33.3	38	0.77		34	1.15	;	54.00) -	19.8	35	ΑV	G
3	*	2402	2.100	83.9	7	0.82		84	1.79	Fu	ndamen	ıtal Fr	equen	су	ΑV	G
4	Х	2402	2.200	85.3	30	0.82		86	3.12	Fu	ndamer	ıtal Fr	equen	су	pea	ık
																_



EUT: T.Jacket Model: TJA Temperature: **25** ℃ **Relative Humidity:** 55% **Test Voltage:** DC 5V Ant. Pol. Horizontal **Test Mode:** BLE Mode TX 2480 MHz Remark: N/A 100.0 dBuV/m (RF) FCC PART 15C (PEAK) (RF) FCC PART 15C (AVG) 50 2466.000 2476.00 2486.00 2496.00 2506.00 2516.00 2526.00 2536.00 2546.00 2566.00 MHz Reading Correct Measure-Limit Over No. Mk. Freq. Level Factor ment MHz dBuV dBuV/m dBuV/m dΒ Detector dB/m 2479.800 88.14 89.29 1 Χ 1.15 peak **Fundamental Frequency** 2 87.59 88.74 AVG 2480.000 1.15 **Fundamental Frequency** 3 2483.500 53.68 1.17 54.85 74.00 -19.15 peak 4 2483.500 47.36 1.17 48.53 54.00 -5.47 AVG



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EUT:	T.Jacket	Model:	TJA					
Temperature:	25 ℃	25 ℃ Relative Humidity: 55%						
Test Voltage:	DC 5V	DC 5V						
Ant. Pol.	Vertical	/ertical						
Test Mode:	BLE Mode TX 2480 MHz							
Remark:	N/A							
100.0 dBuV/m								
1								
		(RF) I	FCC PART 15C (PEAK)					
	3	(RF)	FCC PART 15C (AVG)					
	X							
and the state of t	Marina de marina		and the state of t					
0.0 2466.000 2476.00 2	2486.00 2496.00 2506.00 2516	5.00 2526.00 2536.00 2	2546.00 2566.00 MHz					
No. Mk. Fre	•	r ment Limit						
MH	Hz dBuV dB/m	dBuV/m dBuV	/m dB Detector					
1 * 2480.	.100 85.85 1.15	87.00 Fundamer	ntal Frequency AVG					
2 X 2480.	.200 87.63 1.15	88.78 _{Fundamer}	ntal Frequency peak					

Emission Level= Read Level+ Correct Factor

52.53

45.70

1.17

1.17

53.70

46.87

74.00

54.00

2483.500

2483.500

3

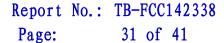
4

peak

AVG

-20.30

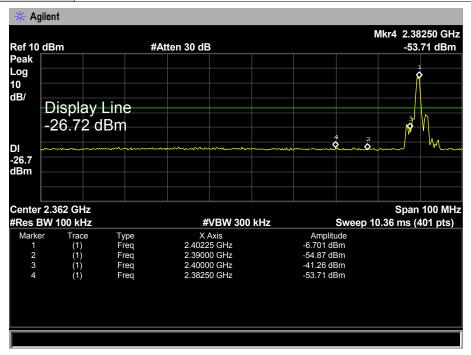
-7.13

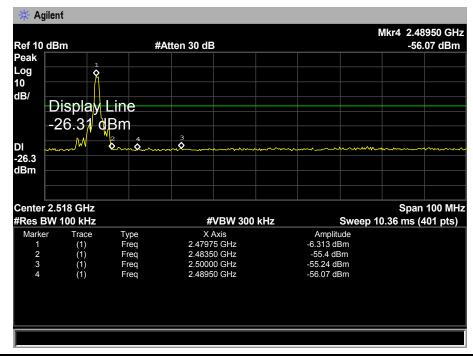




(2) Conducted Test

EUT:	T.Jacket	TJA			
Temperature:	25 ℃	55%			
Test Voltage:	DC 3.7V				
Test Mode:	BLE Mode TX 2402MHz / BLE Mode TX 2480MHz				
Remark:	The EUT is programed in continuously transmitting mode				







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6. Bandwidth Test

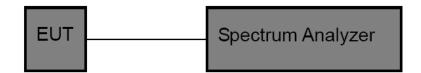
6.1 Test Standard and Limit

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

6.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210						
Test Item Limit Frequency Range(MHz)						
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5				

6.2 Test Setup



6.3 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.

6.4 EUT Operating Condition

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

6.5 Test Equipment

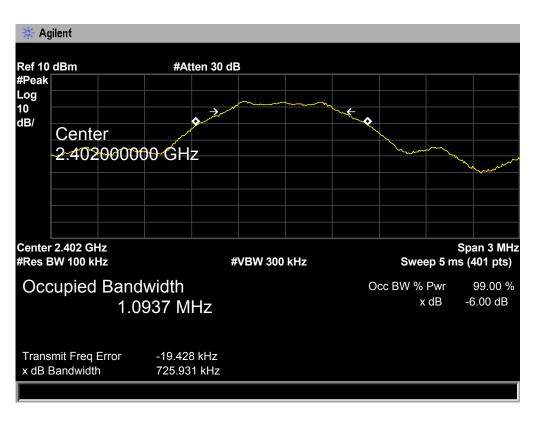
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

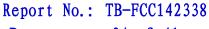


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6.6 Test Data

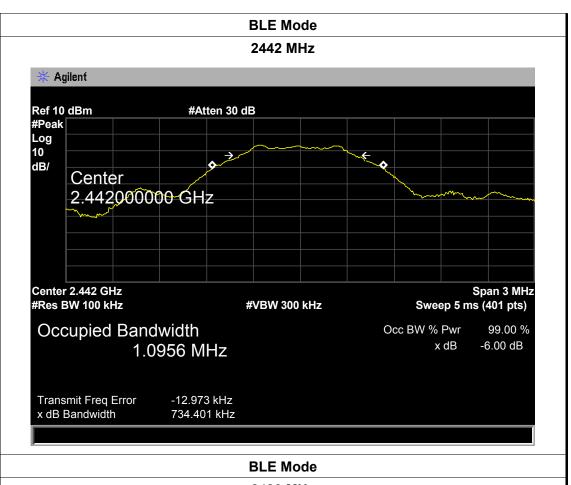
EUT:	T.Jacket	Model:	TJA		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	DC 3.7V				
Test Mode:	BLE TX Mode				
Channel frequence	y 6dB Bandwidth	Limit			
(MHz)	(kHz)	(kHz)	(kHz)		
2402	725.931	1093.70			
2442	734.401	1095.60	>=500		
2480	2480 754.402				
	BLE	Mode			
	2401	2 MHz			

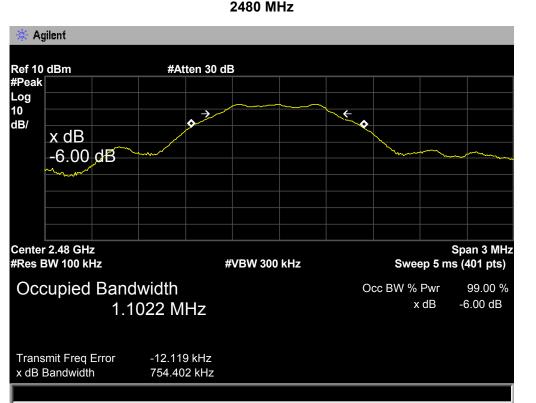






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7. Peak Output Power Test

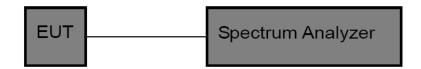
7.1 Test Standard and Limit

7.1.1 Test Standard FCC Part 15.247 (b)

7.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210						
Test Item Limit Frequency Range(MHz)						
Peak Output Power	1 Watt or 30 dBm	2400~2483.5				

7.2 Test Setup



7.3 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 v03r02.

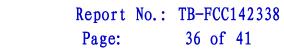
- (1) Set the RBW≥DTS Bandwidth
- (2) Set VBW≥3*RBW
- (3) Set Span≥3*RBW
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

7.4 EUT Operating Condition

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

7.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015





7.6 Test Data

JT:		T.Jacket		Model:		TJA		
mperat	ure:	25 ℃		Relative Humidity:		55%		
st Volta	ige:	DC 3.7\	DC 3.7V					
st Mod	e:	BLE TX	Mode					
hannel	frequen	cy (MHz)	Tes	st Res	ult (dBm)		Limit (dE	3m)
	2402			-6.3	340			
	2442			-6.4	151		30	
	2480			-6.3	312			
				BLE	Mode			
				2402	MHz			
Peak Log 10 dB/					1			
	Markei 2.4022	r 225000	GHz					
	-6.34	dBm						
M1 S2 S3 FC AA								
M1 S2 S3 FC AA								
M1 S2 S3 FC AA	2.402 GHz W 1 MHz				3 MHz		Spa Sweep 5 ms (4	an 3 Mi

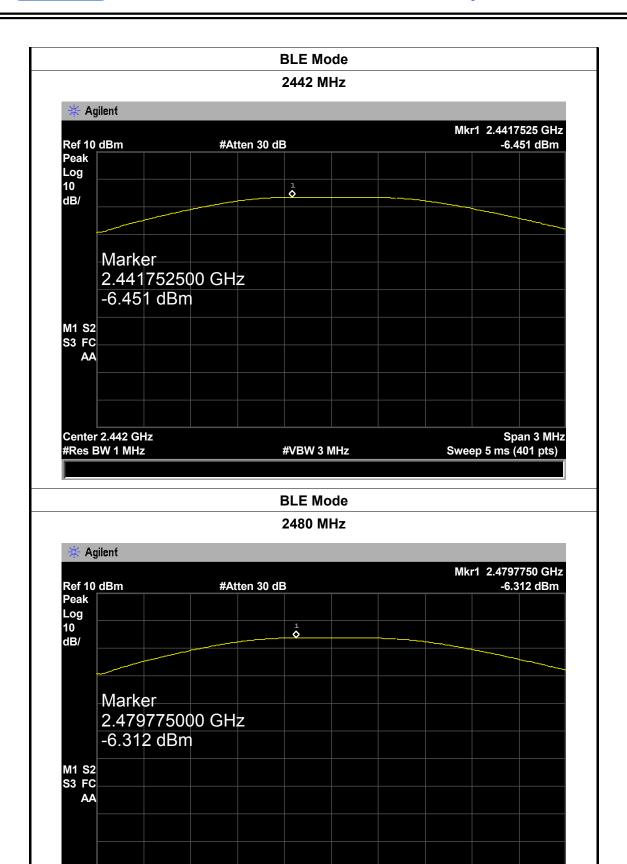




Center 2.48 GHz

#Res BW 1 MHz

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#VBW 3 MHz

Span 3 MHz

Sweep 5 ms (401 pts)



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8. Power Spectral Density Test

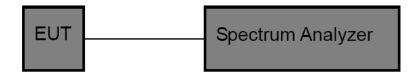
8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247 (e)

8.1.2 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				

8.2 Test Setup



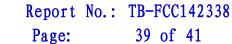
8.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v03r02.

- (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 frequenyc.
- (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.

8.4 EUT Operating Condition

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





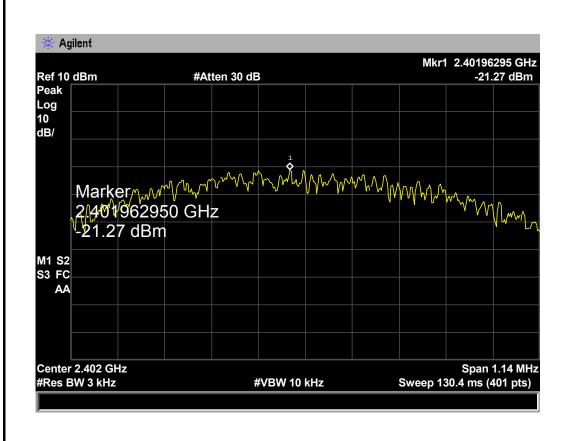
8.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

8.6 Test Data

	i				i e
EUT:	T.Jacket		Model:		TJA
Temperature:	25 ℃		Relative Humidity:		55%
Test Voltage:	DC 3.7V	DC 3.7V			
Test Mode:	BLE TX Mode				
Channel Freque	uency	ey Power Density			Limit (dBm)
(MHz)		(3 kHz/dBm)			
2402		-21.27			
2442 -21		1.83 8		8	
2480		-21.70			
BLE Mode					

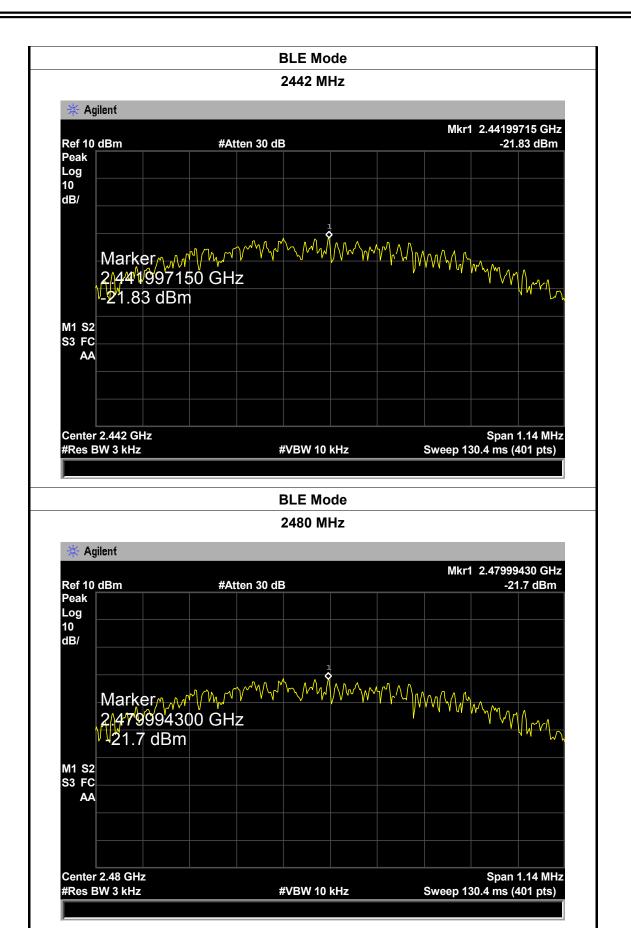
2402 MHz







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9. Antenna Requirement

9.1 Standard Requirement

9.1.1 Standard FCC Part 15.203

9.1.2 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.

9.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0.5 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

9.3 Result

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