

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC141133
Page: 1 of 83

FCC Radio Test Report FCC ID: 2ACVA-BT02B150

Original Grant

Report No. : TB-FCC141133

Applicant: HUIZHOU GAOSHENGDA TECHNOLOGY CO., LTD

Equipment Under Test (EUT)

EUT Name : Bluetooth Module

Model No. : BT02B150

Series Model : N/A

No.

Brand Name : N/A

Receipt Date : 2014-07-08

Test Date : 2014-07-09 to 2014-07-24

Issue Date : 2014-07-28

Standards: FCC Part 15, Subpart C(15.247)

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 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



Contents

CON	NTENTS	2
1.	GENERAL INFORMATION ABOUT EUT	4
	1.1 Client Information	4
	1.2 General Description of EUT (Equipment Under Test)	4
	1.3 Block Diagram Showing the Configuration of System Tested	
	1.4 Description of Support Units	
	1.5 Description of Test Mode	
	1.6 Description of Test Software Setting	
	1.7 Test Facility	
2.	TEST SUMMARY	9
3.	CONDUCTED EMISSION TEST	10
	3.1 Test Standard and Limit	10
	3.2 Test Setup	
	3.3 Test Procedure	10
	3.4 Test Equipment Used	11
	3.5 EUT Operating Mode	11
	3.6 Test Data	11
4.	RADIATED EMISSION TEST	14
	4.1 Test Standard and Limit	14
	4.2 Test Setup	15
	4.3 Test Procedure	16
	4.4 EUT Operating Condition	
	4.5 Test Equipment	16
5.	RESTRICTED BANDS REQUIREMENT	32
	5.1 Test Standard and Limit	32
	5.2 Test Setup	32
	5.3 Test Procedure	32
	5.4 EUT Operating Condition	
	5.5 Test Equipment	33
6.	NUMBER OF HOPPING CHANNEL	46
	6.1 Test Standard and Limit	46
	6.2 Test Setup	46
	6.3 Test Procedure	
	6.4 EUT Operating Condition	46
	6.5 Test Equipment	
	6.6 Test Data	46
7 .	AVERAGE TIME OF OCCUPANCY	48
	7.1 Test Standard and Limit	48
	7.2 Test Setup	48
	7.3 Test Procedure	48



Page: 3 of 83

	7.4 EUT Operating Condition	48
	7.5 Test Equipment	48
	7.6 Test Data	49
8.	CHANNEL SEPARATION AND BANDWIDTH TEST	61
	8.1 Test Standard and Limit	61
	8.2 Test Setup	
	8.3 Test Procedure	61
	8.4 EUT Operating Condition	61
	8.5 Test Equipment	62
	8.6 Test Data	62
9.	PEAK OUTPUT POWER TEST	70
	9.1 Test Standard and Limit	70
	9.2 Test Setup	70
	9.3 Test Procedure	70
	9.4 EUT Operating Condition	70
	9.5 Test Equipment	70
	9.6 Test Data	70
10.	ANTENNA CONDUCTED SPURIOUS EMISSION	75
	10.1 Test Standard and Limit	75
	10.2 Test Setup	75
	10.3 Test Procedure	75
	10.4 EUT Operating Condition	76
	10.5 Test Equipment	76
	10.6 Test Data	76
11.	ANTENNA REQUIREMENT	83
	11.1 Standard Requirement	83
	11.2 Antenna Connected Construction	
	11.2 Popult	92



Page: 4 of 83

1. General Information about EUT

1.1 Client Information

Applicant: HUIZHOU GAOSHENGDA TECHNOLOGY CO., LTD

Address: HUA YU RD., NO.75, ZHONGKAI HIGH-TECH DEVELOPMENT

AREA, HUIZHOU, CHINA

Manufacturer : HUIZHOU GAOSHENGDA TECHNOLOGY CO., LTD

Address : HUA YU RD., NO.75, ZHONGKAI HIGH-TECH DEVELOPMENT

AREA, HUIZHOU, CHINA

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Bluetooth Module		
Models No.	:	BT02B150		
Model Difference	:	N/A	N/A	
Operation Frequency: Bluetooth:2402~2480MHz		T		
Description	:	Number of Channel: Bluetooth:79 Channels see note (2) Max Peak Output Power: GFSK: 1.915 dBm (Conducted Powe		
		Antenna Gain:	3 dBi PIFA Antenna	
		Modulation Type: GFSK 1Mbps(1 Mbps) π /4-DQPSK(2 Mbps) 8-DPSK(3 Mbps)		
Power Supply	:	DC Voltage supplied from PC System.		
Power Rating	:	DC 5V by USB adapter from PC System.		
Connecting I/O Port(S)	:	Please refer to the User's Manual		

Note: The equipment with Bluetooth Bluetooth 4.0+EDR have test comply with FCC Part 15C Rules. More detailed features description, please refer to the manufacturer's specifications or the User's Manual.

Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.
- (3) Channel List:

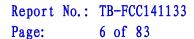
Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)



Page: 5 of 83

00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

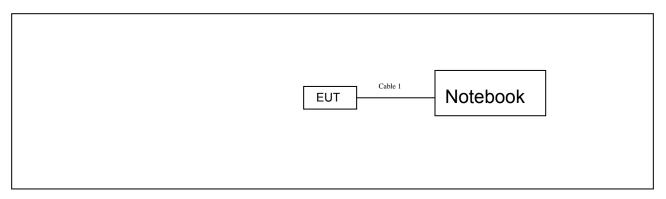
⁽⁴⁾ The Antenna information about the equipment is provided by the applicant.





1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information						
Name Model FCC ID/DOC Manufacturer Used "√"				Used "√"		
Notebook	T60P	42W3244	Lenovo	√		
	Cable Information					
Number Shielded Type Ferrite Core Length Note						
Cable 1	NO	NO	0.35M			

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	PC Charging with TX Mode	

For Radiated Test		
Final Test Mode	Description	
Mode 1	PC Charging with TX Mode	
Mode 2	TX Mode(GFSK) Channel 00/39/78	
Mode 3	TX Mode(IT /4-DQPSK) Channel 00/39/78	
Mode 4	TX Mode(8-DPSK) Channel 00/39/78	



Report No.: TB-FCC141133
Page: 7 of 83

Mode 5	Hopping Mode(GFSK)
Mode 6	Hopping Mode(π /4-DQPSK)
Mode 7	Hopping Mode(8-DPSK)

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. We have pretested all the test mode above.

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:

TX Mode: GFSK (1 Mbps)
TX Mode: 8-DPSK (3 Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. 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 Bluetooth mode.

Test Software Version	Те	st Program: Bluesuite 2.4	l.exe
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	63	63	63
π /4-DQPSK	63	63	63
8-DPSK	63	63	63



Page: 8 of 83

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.



Page: 9 of 83

2. Test Summary

FCC Part 15 Subpart C(15.247)					
Standard Section	Standard Section Test Item		Remark		
15.203	Antenna Requirement	PASS	N/A		
15.207	Conducted Emission	PASS	N/A		
15.205	Restricted Bands	PASS	N/A		
15.247(a)(1)	Hopping Channel Separation	PASS	N/A		
15.247(a)(1)	Dwell Time	PASS	N/A		
15.247(b)(1)	Peak Output Power	PASS	N/A		
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A		
15.247(c)	Radiated Spurious Emission	PASS	N/A		
15.247(c)	Antenna Conducted Spurious Emission		N/A		
15.247(a) 20dB Bandwidth		PASS	N/A		
Note: N/A is an abbreviation for Not Applicable.					



Page: 10 of 83

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

Fraguanay	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.



Report No.: TB-FCC141133 Page: 11 of 83

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&		100221	2013-08-10	2014-08-09
Receiver	SCHWARZ	ESCI	100321	2013-00-10	2014-00-09
50ΩCoaxial	Anritsu	MP59B	X10321	2013-08-10	2014-08-09
Switch	Aillisu	IVIF 39B	X10321	2013-00-10	2014-00-09
L.I.S.N	Rohde & Schwarz	ENV216	101131	2013-08-10	2014-08-09
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	2013-08-10	2014-08-09

3.5 EUT Operating Mode

Please refer to the description of test mode.

3.6 Test Data

Please see the next page.



EUT: Bluetooth Module **Model Name:** BT02B150 25 ℃ Temperature: Relative Humidity: 55% AC 120V/60 Hz **Test Voltage:** Terminal: Line **Test Mode:** AC Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported 90.0 dBuV QP: AVG:

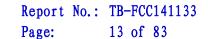
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.4500	40.56	10.02	50.58	56.87	-6.29	QP	
2	0.4500	28.38	10.02	38.40	46.87	-8.47	AVG	
3	0.8260	37.97	10.09	48.06	56.00	-7.94	QP	
4	0.8260	22.87	10.09	32.96	46.00	-13.04	AVG	
5	1.4100	37.81	10.06	47.87	56.00	-8.13	QP	
6	1.4100	23.27	10.06	33.33	46.00	-12.67	AVG	
7	2.1140	37.36	10.06	47.42	56.00	-8.58	QP	
8	2.1140	23.78	10.06	33.84	46.00	-12.16	AVG	
9	3.3380	35.71	10.02	45.73	56.00	-10.27	QP	
10	3.3380	21.93	10.02	31.95	46.00	-14.05	AVG	

(MHz)

Emission Level= Read Level+ Correct Factor

-10 _____ 0.150

30.000





EUT: **Bluetooth Module** Model Name: BT02B150 25 ℃ **Relative Humidity:** Temperature: 55% **Test Voltage:** AC 120V/60 Hz Terminal: Neutral **Test Mode:** AC Charging with TX GFSK Mode 2402 MHz Remark: Only worse case is reported 90.0 dBuV QP: AVG: -10 0.150 30.000 0.5 (MHz) 5 Correct Reading Measure-Limit Over No. Mk. Freq. Factor Level ment MHz dBuV dΒ dBuV dBuV dΒ Detector Comment 56.73 -6.69 QΡ 1 0.4580 40.01 10.03 50.04 2 0.4580 25.68 10.03 35.71 46.73 -11.02 AVG 1.1260 37.81 10.15 47.96 56.00 -8.04 QΡ 3 1.1260 21.43 10.15 31.58 46.00 -14.42 AVG 4 1.4060 36.93 47.05 56.00 -8.95 QΡ 5 10.12 1.4060 10.12 6 21.29 31.41 46.00 -14.59 AVG 7 2.4620 36.80 10.06 46.86 56.00 -9.14 QΡ 8 2.4620 21.90 10.06 31.96 46.00 -14.04 AVG 9 3.1820 34.60 10.06 44.66 56.00 -11.34 QΡ 10 3.1820 19.64 10.06 29.70 46.00 -16.30 AVG

TB-RF-074-1.0



Page: 14 of 83

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 Limit (9 kHz~1000MHz)

Natiated Linission Linit (3 Kitz 1000Mitz)							
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 B (dBuV/m)(at 3m)		
(MHz)	Peak	Average	
Above 1000	74	54	

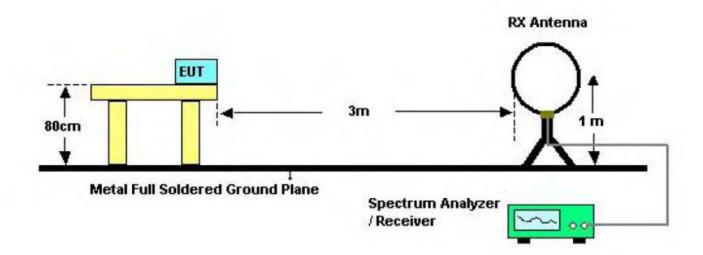
Note:

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

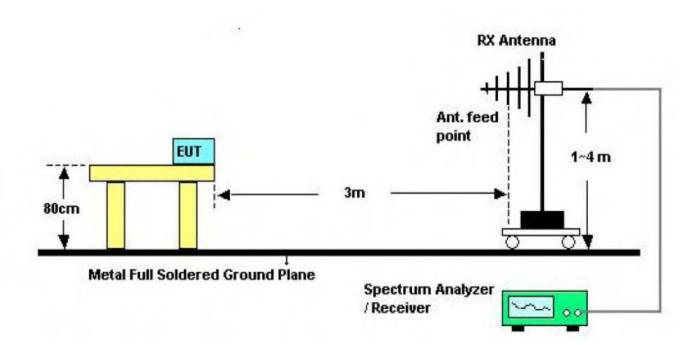


Page: 15 of 83

4.2 Test Setup

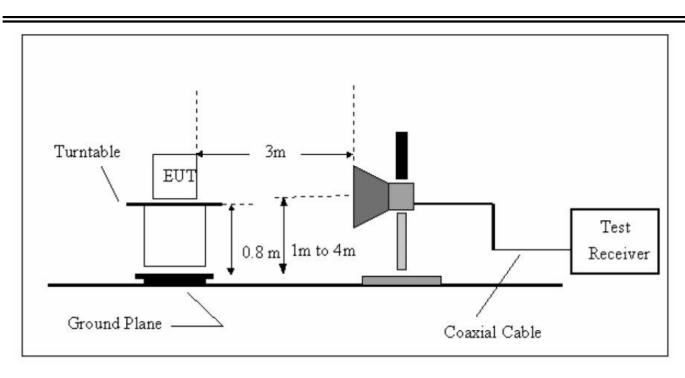


Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup





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 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.
- (6) 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 in TX mode.

4.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
Equipment	Manufacturer	woder No.	Serial No.	Last Cal.	Date



Report No.: TB-FCC141133 Page: 17 of 83

		1	1	T	1	
Spectrum	Agilent		MY45106456	Mar. 20, 2014	Mar. 19, 2015	
Analyzer	Agiletit	E4407B	W143100430	Iviai. 20, 2014	Mai. 19, 2015	
Spectrum	Dalada 8 Oakuuruu		DE05404	A 40, 0040		
Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014	
EMI Test	Rohde & Schwarz		404405	Aug. 10, 2012	Aug 00, 2014	
Receiver	Ronde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014	
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015	
Horn Antenna	ETS-LINDGREN	3117	00143207	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	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015	
Generator	Nonde & Schwarz	GIVILOS	11(1/1002-034	1 CD. 11, 2014	1 CD. 10, 2013	
Positioning	ETS-LINDGREN	2090	N/A	N/A	N/A	
Controller	E I 3-LINDUREN	2090	IN/A	IN/A	IN/A	

4.6 Test Data

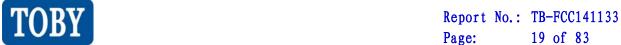
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.



Page: 18 of 83

Test Voltage:	25 ℃		Polat				
<u> </u>	400		Relat	tive Humi	idity:	55%	
Ant. Pol.	AC 120\	//60 Hz					
	Horizont	al					
Test Mode:	TX GFS	K Mode 2402N	ИHz				
Remark:	Only wo	rse case is rep	orted				
80.0 dBuV/m							
20 30.000 40 50	60 70 80		3 4	300	(RE)E	6 X X X X X X X X X X X X X X X X X X X	MIN/North
No. Mk. Fre				easure- ment	Limit	Ov er	
МН	lz	dBuV dB	Um '	dBuV/m	dBu∀/	√m αB	Detector
1 65.34	132	52.90 -24	.04	28.86	40.0	0 -11.14	peak
2 143.8	295 (58.02 -21	.67	36.35	43.5	0 -7.15	peak
3 * 167.8	243 (57.70 -21	.04	36.66	43.5	0 -6.84	peak
4 191.7	450 (56.10 -20	.81	35.29	43.5	0 -8.21	peak
5 377.2	591 -	49.32 -14	.31	35.01	46.0	0 -10.99	peak
6 480.5	276	44.53 -11	.62	32.91	46.0	0 -13.09	peak



EUT: Bluetooth Module Model Name: BT02B150 25 ℃ **Relative Humidity:** Temperature: 55% **Test Voltage:** AC 120V/60 Hz Ant. Pol. Vertical **Test Mode:** TX GFSK Mode 2402MHz Remark: Only worse case is reported 80.0 dBuV/m (RF)FCC 15C 3M Radiati 30 -20 30.000 60 70 (MHz) 600 700 Reading Correct Me asure-Limit Over No. Mk. Freq. Level Factor ment MHz dBu∀ dBuV/m dBuV/m αÐ Detector dB/m 1 65.3432 56.99 -24.04 32.95 40.00 -7.05 peak 2 52.31 99.1797 -21.89 30.42 43.50 -13.08 peak 3 143.8295 53.17 -21.67 31.50 43.50 -12.00 peak 4 185.7882 51.50 -20.76 30.74 43.50 -12.76peak 5 243.3772 51.15 -18.43 32.72 -13.28 46.00

Emission Level= Read Level+ Correct Factor

379.9141

55.74

-14.14

41.60

46.00

-4.40

6

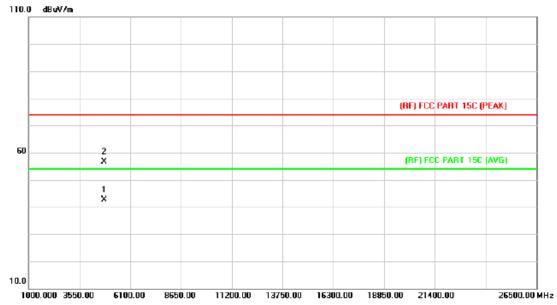
peak

peak



Page: 20 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2402MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

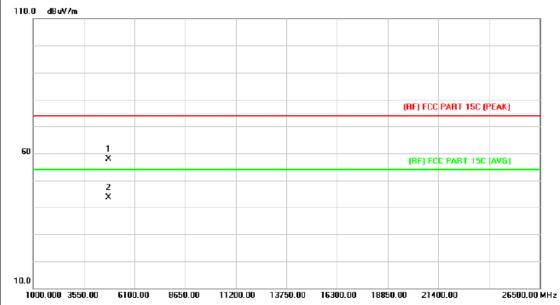


No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1	*	4804.080	29.25	13.44	42.69	54.00	-11.31	AVG
2		4804.290	43.19	13.44	56.63	74.00	-17.37	peak



Page: 21 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2402MH	Z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
700 000						

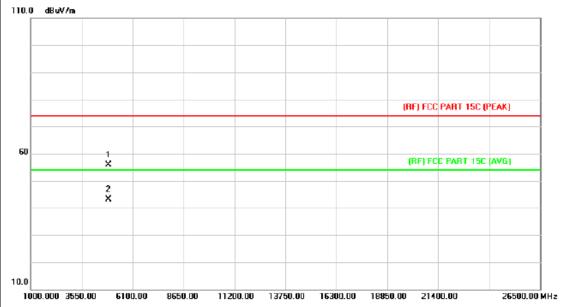


No.	. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		4803.450	44.38	13.44	57.82	74.00	-16.18	peak
2	*	4804.020	30.09	13.44	43.53	54.00	-10.47	AVG



Page: 22 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2441MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
300 000						

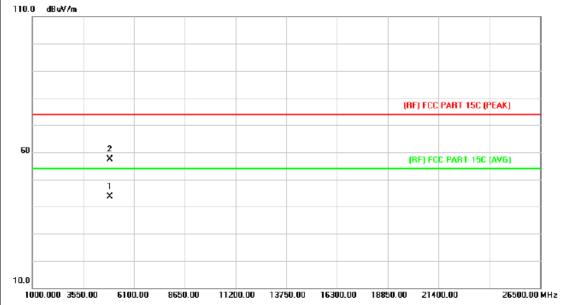


No	. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		4881.940	41.96	13.90	55.86	74.00	-18.14	peak
2	*	4881.940	29.14	13.90	43.04	54.00	-10.96	AVG



Page: 23 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2441MH	Z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
110.0 40.3/2-						

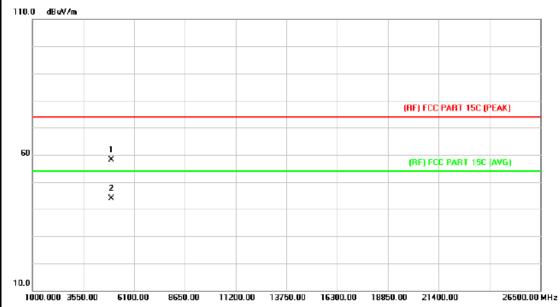


N	lo.	Mk.	Freq.		Correct Factor	Me asure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		*	4881.890	29.80	13.90	43.70	54.00	-10.30	AVG
2			4882.170	43.45	13.90	57.35	74.00	-16.65	peak



Page: 24 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
110.0 dPul/m						

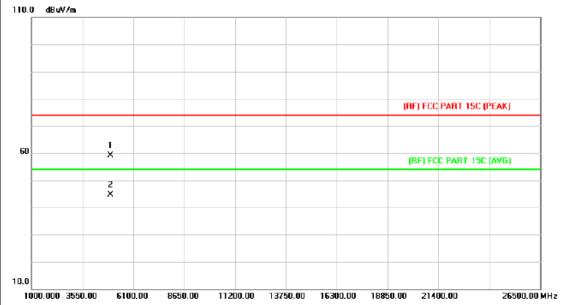


	No.	Mk.	Freq.	Reading Level		Me asure- ment	Limit	Ov er	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1			4959.580	43.86	14.36	58.22	74.00	-15.78	peak
2	!	*	4959.820	29.63	14.36	43.99	54.00	-10.01	AVG



Page: 25 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
	·	·	·			

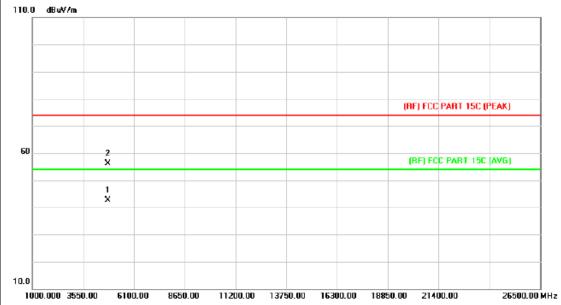


No	. Mk.	Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1		4959.800	44.79	14.36	59.15	74.00	-14.85	peak
2	*	4959.910	30.30	14.36	44.66	54.00	-9.34	AVG



Page: 26 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2402M	1Hz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					



N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1	*	4803.940	29.11	13.44	42.55	54.00	-11.45	AVG
2		4804.200	42.73	13.44	56.17	74.00	-17.83	peak



Page: 27 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX 8-DPSK Mode 2402N	1Hz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					
	prescribed limit.					

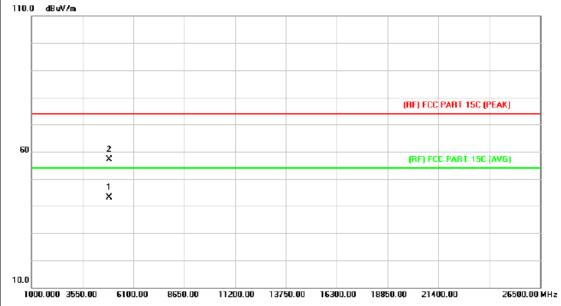


No	Mk.	Freq.	Reading Level		Measure- ment	Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1		4804.010	44.22	13.44	57.66	74.00	-16.34	peak
2	*	4804.120	30.48	13.44	43.92	54.00	-10.08	AVG



Page: 28 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2441M	1Hz					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

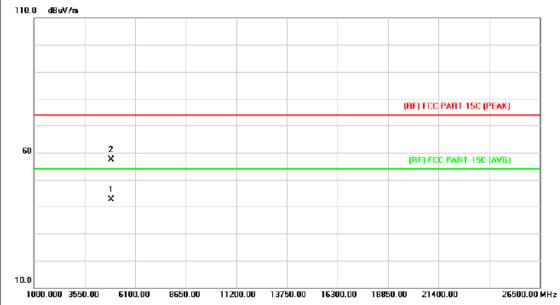


No	o. Mk	. Freq.			Measure- ment	Limit Over		
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αÐ	Detector
1	*	4881.963	29.22	13.90	43.12	54.00	-10.88	AVG
2		4881.985	43.33	13.90	57.23	74.00	-16.77	peak



Page: 29 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150						
Temperature:	25 ℃	Relative Humidity:	55%						
Test Voltage:	AC 120V/60 Hz								
Ant. Pol.	Vertical								
Test Mode:	TX 8-DPSK Mode 2441M	1Hz							
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.							

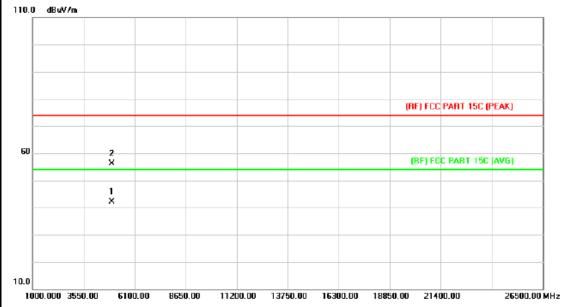


No	. Mk	. Freq.	Reading Correct Level Factor			Limit	Ov er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1	*	4881.967	28.66	13.90	42.56	54.00	-11.44	AVG
2		4881.987	43.42	13.90	57.32	74.00	-16.68	peak



Page: 30 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150						
Temperature:	25 ℃	Relative Humidity:	55%						
Test Voltage:	AC 120V/60 Hz								
Ant. Pol.	Horizontal								
Test Mode:	TX 8-DPSK Mode 2480M	1Hz							
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.							

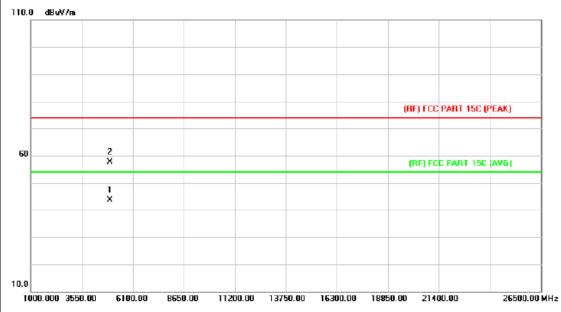


-	No. Mk.		Freq.	Reading Correct Level Factor					
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector
1		*	4959.854	27.83	14.36	42.19	54.00	-11.81	AVG
2			4959.932	41.88	14.36	56.24	74.00	-17.76	peak



Page: 31 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60 Hz							
Ant. Pol.	Vertical							
Test Mode:	TX 8-DPSK Mode 2480M	1Hz						
Remark:	No report for the emissio	n which more than 10 c	B below the					
	prescribed limit.							
110.0 40.40-								



	No.	Mk.	Freq.	_		Measure- ment Limit		Ov er		
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	αB	Detector	
	1	*	4959.963	29.33	14.36	43.69	54.00	-10.31	AVG	
-	2		4959.971	43.30	14.36	57.66	74.00	-16.34	peak	



Report No.: TB-FCC141133 Page: 32 of 83

5. Restricted Bands Requirement

5.1 Test Standard and Limit

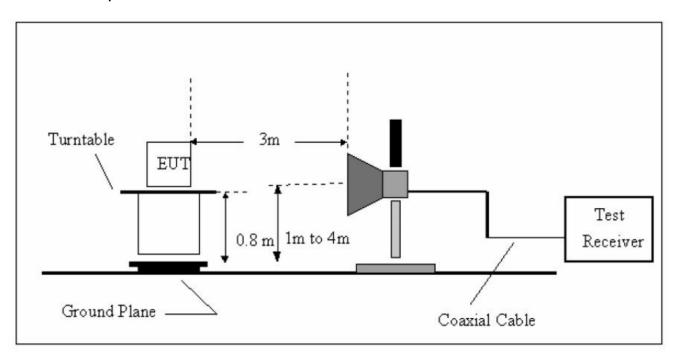
5.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Class B (dBuV/m)(at 3m)					
Peak	Average				
74	54				
74	54				
	Peak 74				

Note: All restriction bands have been tested, only the worst case is reported.

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



Report No.: TB-FCC141133 Page: 33 of 83

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 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.
- (6) 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	
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015	
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014	
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014	
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015	
Horn Antenna	ETS-LINDGREN	3117	00143207	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	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015	
Generator	Tionas a conwarz	0200		. 55. 11, 2011	. 55.15, 2016	
Positioning	ETS-LINDGREN	2090	N/A	N/A	N/A	
Controller			1		IN/A	

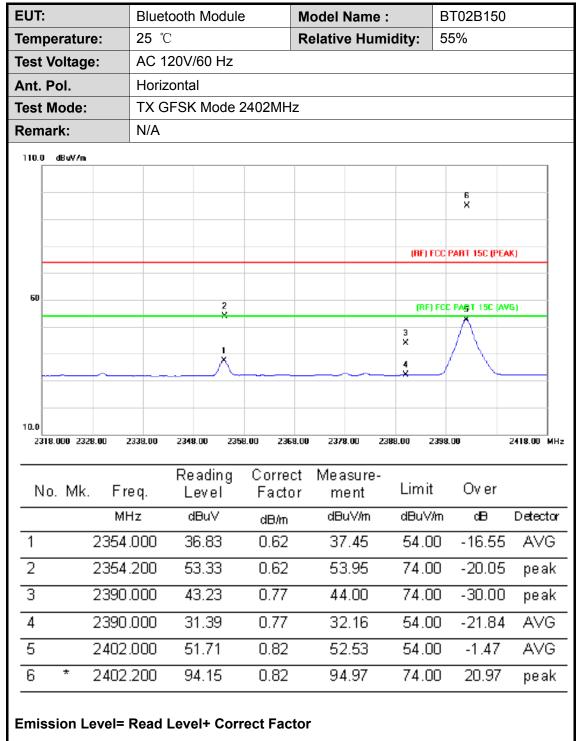
5.6 Test Data

All restriction bands have been tested, only the worst case is reported.



Page: 34 of 83

(1) Radiation Test





Page: 35 of 83

EUT:			Blue	tooth	Module	;	M	odel	Name	:	Е	T02B150)	
Tempe	eratur	e:	25 °C	C			Re	elativ	e Hum	idity:	5	5%		
Test V	oltage) :	AC 1	20V/6	60 Hz									
Ant. P	ol.		Verti	cal										
Test N	lode:		TX G	SFSK	Mode 2	2402MH	Z							
Remai	rk:		N/A											
110.0	dBuV/m													7
												6 X		
										(B	F) FCC	PART 15C (PI	E AK]	
														1
60	60				1 ×			(RF) FC			CC PART 15C (AVG)		1	
										3 X		\wedge		}
					2 X							$/ \setminus$		-
					_/ _		-		<u> </u>	4 X	_/			-
10.0														
2318.0	000 2328	.00 2	338.00	2348.0	10 235	8.00 236	8.00	2378	8.00 23	388.00	2398	3.00	2418.00	MHz
No	. Mk	. Fı	eq.		ading evel	Corre Fact			asure- ent	Lim	nit	Ov er		
		М	Hz	di	∃uV	dB/m		dΒ	uV/m	dBu	ıV/m	αÐ	Detec	tor
1		2354	.000	55	5.34	0.62		55	5.96	74	.00	-18.04	l pea	ak
2		2354	.100	37	7.87	0.62		38	3.49	54	.00	-15.51	AV	G
3		2390	.000	44	1.11	0.77		44	4.88	74	.00	-29.12	2 pea	ak
4		2390	.000	31	1.56	0.77		32	2.33	54	.00	-21.67	7 AV	G
5	Χ	2402	.100	53	3.48	0.82		54	4.30	54	.00	0.30	AV	G
6	*	2402	.200	99	9.07	0.82		99	9.89	74	.00	25.89	pea	ık
Emiss	ion L	evel=	Read	Leve	l+ Corı	ect Fac	tor							



Page: 36 of 83

EUT:	Bluetoo	oth Module	;	Mo	odel l	Name :		BT02B150			
Temperature:	25 ℃			Re	lativ	e Humi	dity:	55%	6		
Test Voltage:	AC 120)V/60 Hz									
Ant. Pol.	Horizor	ntal									
Test Mode:	TX GFS	SK Mode 2	2480 MH	lz							
Remark:	N/A										
110.0 dBuV/m											
	2 X										
							(BF) I	CC PAR	RT 15C (PEA	K)	
60	3 1 X			(RF) FC			FCC PA	CC PART 15C (AVG)			
	Λ					G X					
	/ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					5					
						X					
10.0											
2460.000 2470.00	248 0.00 2	490.00 2500). 0 0 2510).0 0	2520	0.00 253	30.00 2	540.00		2560.00 M	lHz
No. Mk.	Freq.	Reading Level	Corre Facto			asure- ent	Limi	t	Ov er		
	MHz	dBu∀	dB/m		dB	uV/m	dBu∀	/m	αÐ	Detecto	or
1 248	000.08	51.05	1.15		52	2.20	54.0	00	-1.80	AVG	}
2 * 248	30.100	92.90	1.15		94	4.05	74.0	00	20.05	peal	k
3 248	33.500	53.58	1.17		54	4.75	74.0	00	-19.25	peal	k
4 248	33.500	36.98	1.17		38	3.15	54.0	00	-15.85	AVG	-
5 252	28.000	33.10	1.40		34	4.50	54.0	00	-19.50	AVG	}
6 252	28.100	46.64	1.40		48	3.04	74.0	00	-25.96	peal	k
Emission Level	= Read Le	evel+ Corr	ect Fac	tor							



Page: 37 of 83

EUT:	Bluetooth M	odule	Model N	Name :	E	3T02B150		
Temperature:	25 ℃		Relative	e Humic	lity: 5	55%		
Test Voltage:	AC 120V/60	Hz						
Ant. Pol.	Vertical							
Test Mode:	TX GFSK M	ode 2480 MF	łz					
Remark:	N/A							
110.0 dBuV/m								ı
	2							
					(RF) FCC	PART 15C (PEA	iK)	
	3							
60	ı ×			5	(RF) FC	C PART 15C (AV	/G)	
	Λ			x_				
	/ \4 \			6 X				
				^				
10.0								
2450.000 2470.00 3	2480.00 2490.00	2500.00 251	0.00 2520	0.00 2530	1.00 254	0.00	2560.00	MHz
No. Mk. F	Read req. Lev			isure- ent	Limit	Ov er		
M	lHz dBu	V dB/m	dBı	uV/m	dBuV/m	dB	Detect	tor
1 2480	0.000 52.6	66 1.15	53	3.81	54.00	-0.19	AV(3
2 * 2480	0.100 97.4	47 1.15	98	3.62	74.00	24.62	pea	k
3 2483	3.500 58.0	01 1.17	59	9.18	74.00	-14.82	pea	k
4 2483	38.3	33 1.17	39	9.50	54.00	-14.50	AV(3
5 2527	7.700 48.7	⁷⁸ 1.40	50).18	74.00	-23.82	pea	k
6 2528	34.7	⁷ 2 1.40	36	6.12	54.00	-17.88	AV(3
Emission Level=	Read Level+	Correct Fac	tor					



Page: 38 of 83

EUT	:		Blue	tooth I	Module	!	М	del	Nam	e :		BT02B1	50		
Tem	peratur	e:	25 °C	C			Re	lativ	e Hu	mid	ity:	55%			
Test	Voltage) :	AC 1	20V/6	0 Hz						·				
Ant.	Pol.		Horiz	zontal											
Test	Mode:		TX 8	-DPSI	K Mode	2402N	1Hz								
Rem	nark:		N/A												
110.0	0 dBuV/m														
												5 X			
												^			
											(RF) FC	PART 15C (PEAK	l	
60											(RF) F	C PARG 150	[AVG)	
					2 X						3	$+\Lambda$			
					1						×	$/ \setminus$			
					-				~~	-	ž.	/	-		
10.0															
2.	317.000 232	7.00 2	2337.00	2347.0	0 2357	.00 236	7.00	237	7.00	2387.	00 239	7.00	24	417.00	MHZ
	No. Mk.	Fr	eq.		ading vel	Corre Fact			asure nent	e-	Limit	Ον e	er		
		М	Hz	dE	∂uV	dB/m		dE)uV/m	1	dBuV/r	n dB		Detec	tor
1		2354	.100	34	.79	0.62		3:	5.41		54.00	-18.	59	ΑV	'G
2		2354	.200	48	1.32	0.62		48	8.94		74.00	-25.	06	pe:	ak
3		2390	.000	42	.91	0.77		4:	3.68		74.00	-30.	32	pe:	ak
4		2390	.000	31	.29	0.77		3:	2.06		54.00	-21.	94	ΑV	'G
5	*	2402	.000	97	7.41	0.82		9:	8.23		74.00	24.2	23	pe:	ak
6		2402	.000	52	2.02	0.82		5:	2.84		54.00	-1.1	6	ΑV	'G
Emi	ssion L	evel=	Read	Level	+ Corr	ect Fac	tor								



Report No.: TB-FCC141133
Page: 39 of 83

EUT			Bluet	ooth	Module)	M	odel I	Name :		ВТ	02B150)	
Tem	peratur	e:	25 ℃				R	elativ	e Humi	idity:	55	%		
Test	Voltage	e:	AC 1	20V/	60 Hz									
Ant.	Pol.		Vertic	cal										
Test	Mode:		TX 8-	-DPS	K Mode	e 2402N	lHz	:						
Ren	nark:		N/A											
1 10 .0	dBuV/m													7
												6 ×		
										(RF) F	CC PA	ART 15C (PI	EAK)	_
														1
60					2 X					(RF)	FCC I	PART 15C (AVG)	_
										3 X		\wedge		+
					1 X					4	1	\leftarrow		-
		~					-		~~	×	7		~~~~~~	7
														_
10.0														
23	17.000 2323	7.00 2	337.00	2347.1	00 2357	7.00 236	7.00	2377	7.00 23	87.00 2	2397.0	0	2417.00	MHz
	No. Mk	. Fr	eq.		ading evel	Corre Facto			isure- ent	Limit	t	Ov er		
		Mi	Hz	dl	Bu∀	dB/m		dBu	uV/m	dBu∀	/m	αÐ	Dete	ctor
1		2354	.000	37	7.55	0.62		38	3.17	54.0	10	-15.83	3 AV	/G
2		2354	.200	58	3.01	0.62		56	6.63	74.0	10	-17.37	7 ре	ak
3		2390	.000	43	3.72	0.77		44	1.49	74.0	10	-29.51	1 pe	ak
4		2390	.000	31	1.54	0.77		32	2.31	54.0	10	-21.69	9 AV	/G
5	Х	2402	.000	53	3.37	0.82		54	1.19	54.0	10	0.19	A۷	/G
6	*	2402	.200	10	0.92	0.82		10	1.74	74.0	10	27.74	pe pe	ak
Emi	ssion L	evel=	Read	Leve	l+ Corr	ect Fac	tor	,						



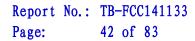
Page: 40 of 83

UT:			Blue	tooth Mo	odule		Mo	odel	Nam	e :	E	3T02B15	50		
em	peratur	e:	25 °	С			Re	lativ	e Hu	mid	ity: 5	55%			
est	Voltage) :	AC 1	120V/60	Hz	•					•				
\nt.	Pol.		Horiz	zontal											
est	Mode:		TX 8	-DPSK	Mode	2480M	Hz								
Rem	ark:		N/A												
110.0	dBuV/m														ı
			2												
			×												
											(BF) FCC	PART 150 (PEAK)		
ŀ															
60			1 X								(RF) FC	C PART 15C	(AVG)	
			Λ							×					
		· /	/ _*							6					
-				<u> </u>			_			Х					
10.0															
248	50.000 2470). 0 0 2	480.00	2490.00	2500	.00 251	0.0 0	2520).00	2530.	.00 254	0.00	2	560.00	MHz
N	lo. Mk.	Fr	eq.	Read Lev		Corre Facti			asure ent	9-	Limit	Ov e	r		
		M	Hz	dBu	٧	dB/m		d⊟	uV/m		dBu∀/m	n dB		Detec	tor
1		2479	.900	51.5	58	1.15		5:	2.73		54.00	-1.2	7	ΑV	G
2	*	2480	.000	96.8	35	1.15		98	3.00		74.00	24.0)0	pea	ak
3		2483	.500	57.2	29	1.17		50	3.46		74.00	-15.6	54	pea	ak
4		2483	.500	37.8	65	1.17		38	3.82		54.00	-15.1	18	ΑV	G
5		2527	.900	48.1	1	1.40		49	9.51		74.00	-24.4	49	pea	ak
6		2528	.000	33.5	6	1.40		3.	4.96		54.00	-19.0)4	ΑV	G
mis	ssion Le	evel=	Read	Level+	Corr	ect Fac	tor								



Page: 41 of 83

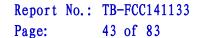
EUT:	Bluetoot	h Module	;	Мс	dell	Name	:	В	T02B150		
Temperature:	25 ℃			Re	lativ	e Hum	idity:	5	5%		
Test Voltage:	AC 120\	//60 Hz									
Ant. Pol.	Vertical										
Test Mode:	TX 8-DF	SK Mode	2480N	1Hz							
Remark:	N/A										
110.0 dBuV/m											
	1 X										
							(BF)	FCC	PART 15C (PEA	iK)	
	3										
60	3 X						(RI	F) FCC	PART 15C (AV	/G)	
	Å						۲				
	/ \ \						5				
	_						\				
10.0											
2450.000 2470.00 2	2480.00 249	90.00 2500	J. 0 0 2 51	0.00	2520).00 2	530.00	2540	.00	2560.00	MHz
	R	eading	Corre	ct	Mea	sure-					
No. Mk. Fr		_evel	Fact			ent	Limi	it	Ov er		
М	Hz	dBu∀	dB/m		dBı	uV/m	dBu∖	//m	αÐ	Detect	or
1 * 2479	.700 !	99.27	1.15		10	0.42	74.0	00	26.42	pea	k
2 2479	.900 :	52.69	1.15		53	3.84	54.0	00	-0.16	AVO	3
3 2483	.500	60.00	1.17		61	.17	74.0	00	-12.83	pea	k
4 2483	.500	38.52	1.17		39	9.69	54.0	00	-14.31	AVO	3
5 2527	.900	49.11	1.40		50).51	74.0	00	-23.49	pea	k
6 2528	.000.	34.46	1.40		35	5.86	54.0	00	-18.14	AVG	3
Emission Level=	Read Lev	el+ Corr	ect Fac	tor							





(2) Conducted Test

EUT:	Bluetooth Module	Model Name :	BT02B150
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Test Mode:	TX GFSK Mode 2402MH	z / 2480 MHz	
Remark:	N/A		
* Agilent 1	10:15:22 Jul 10, 2014		
Ref 15 dBm	#Atten 25 dB	•	Mkr4 2.35375 GHz -43.31 dBm
Peak Log			1 •
10			Y
dB/ offst Displ	lay Line		
² _{dB} -21.0)1 [°] dBm		
DI		~~~~~~~~~~ Q ~~~~	mannament &m
-21.0 dBm			
Center 2.368 G		20111	Span 100 MHz
#Res BW 100 k Marker Tra	ace Type X Axis	Amplitude	0.36 ms (401 pts)
1 (1 2 (1) Freq 2.39000 GHz	-1.014 dBm -53.01 dBm	
3 (1 4 (1	() Freq 2.40000 GHz () Freq 2.35375 GHz	-52.24 dBm -43.31 dBm	
الله الله الله الله الله الله الله الله	10.47.00 1.40 0044		
* Agilent 1	0:17:06 Jul 10, 2014	1	Mkr4 2.49075 GHz
Ref 15 dBm Peak	#Atten 25 dB		-51.79 dBm
Log	1		
10 dB/			
offst Displ	lay Line		
² _{dB} -22.9	00 dBm		
DI	2 4 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		amanaman .
-22.9 dBm			
Center 2.515 G			Span 100 MHz
#Res BW 100 k Marker Tra		S00 kHz Sweep 10 Amplitude	0.36 ms (401 pts)
) Freq 2.48025 GHz	-2.898 dBm -53.73 dBm	
2 (1) Fred 2 48350 CHz		
2 (1 3 (1	Freq 2.48350 GHz 2.50000 GHz	-52.23 dBm	
2 (1	Freq 2.48350 GHz 2.50000 GHz		
2 (1 3 (1	Freq 2.48350 GHz 2.50000 GHz	-52.23 dBm	
2 (1 3 (1	Freq 2.48350 GHz 2.50000 GHz	-52.23 dBm	





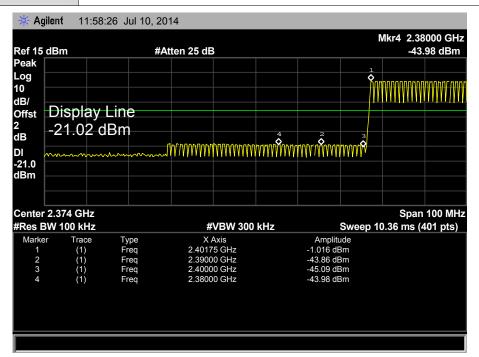
EUT: Bluetooth Module Model Name: BT02B150

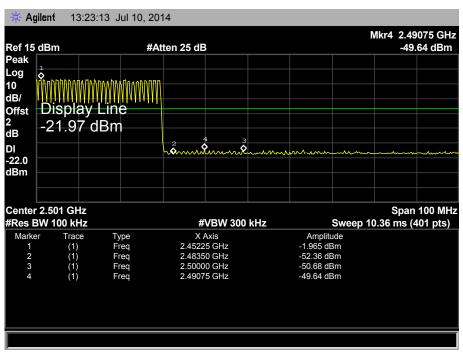
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: AC 120V/60 Hz

Test Mode: GFSK Hopping Mode

Remark: N/A









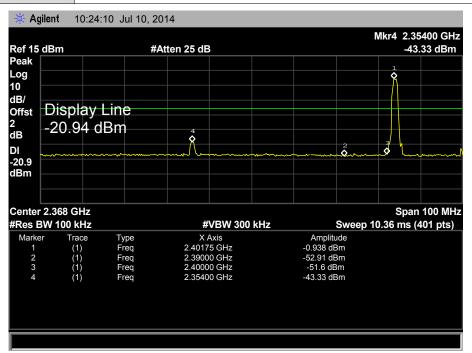
EUT: Bluetooth Module Model Name: BT02B150

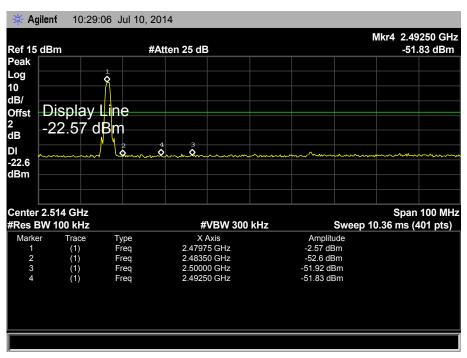
Temperature: 25 °C Relative Humidity: 55%

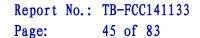
Test Voltage: AC 120V/60 HZ

Test Mode: TX 8-DPSK Mode 2402MHz / 2480 MHz

Remark: N/A









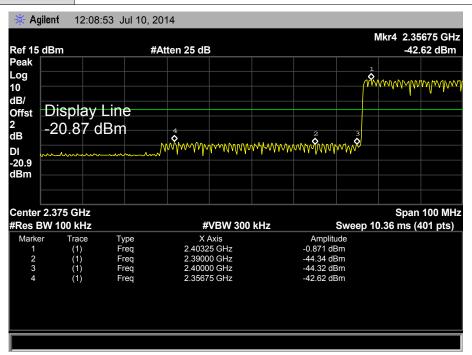
EUT: Bluetooth Module Model Name: BT02B150

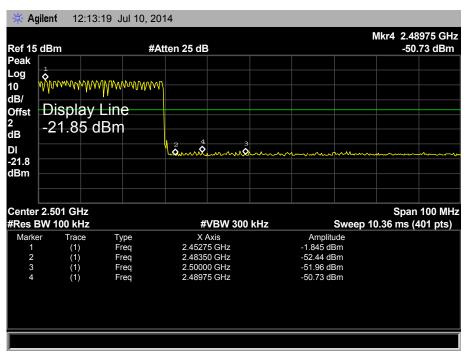
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: AC 120V/60 HZ

Test Mode: 8-DPSK Hopping Mode

Remark: N/A







Page: 46 of 83

6. Number of Hopping Channel

6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

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) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

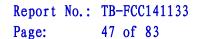
6.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

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

6.6 Test Data





 EUT:
 Bluetooth Module
 Model Name :
 BT02B150

 Temperature:
 25 °C
 Relative Humidity:
 55%

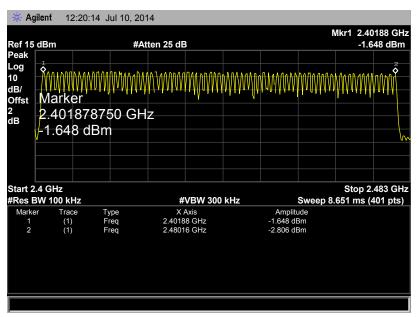
 Test Voltage:
 AC 120V/60 HZ

 Test Mode:
 Hopping Mode (GESK/ 8-DPSK)

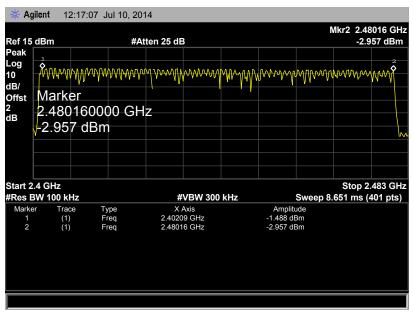
rost mode.	Tiopping Mod	C (OI OIV O DI OIV)	
Frequency	Range	Quantity of Hopping Channel	Limit
2402MHz~24	180MHz	79	>15

GFSK Mode

79









Page: 48 of 83

7. Average Time of Occupancy

7.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210	Average Time of	0.4.000
Annex 8(A8.1d)	Occupancy	0.4 sec

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) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

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

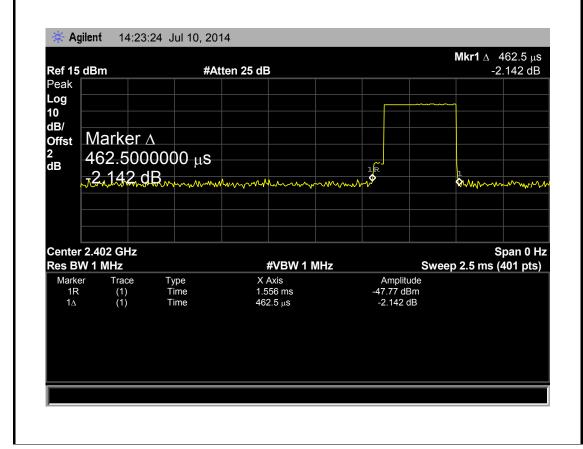


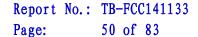


7.6 Test Data

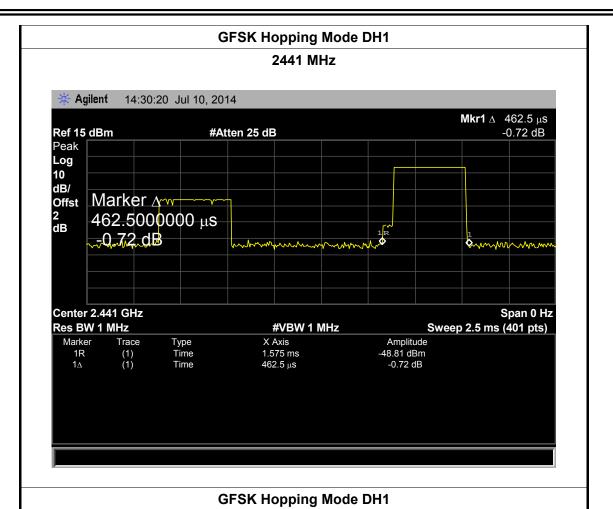
EUT:		Bluetooth	Module	Model Name		BT02E	BT02B150	
Temperature:	1	25 ℃		Relative Hum				
Test Voltage: AC 120V/60 HZ								
Test Mode:	Test Mode: Hopping Mode (GFSK DH1)							
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result	
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result	
2402		0.463	148.16					
2441		0.463	148.16	31.60	40	00	PASS	
2480		0.463	148.16					
GFSK Hopping Mode DH1								

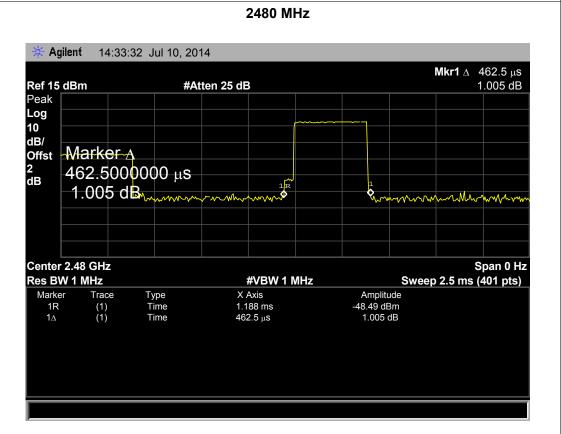
GFSK Hopping Mode DH1







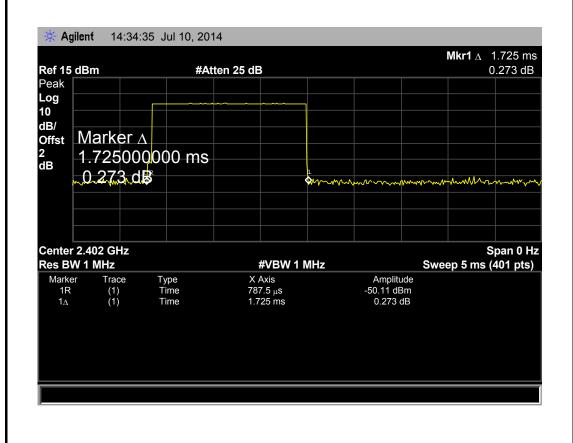


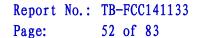




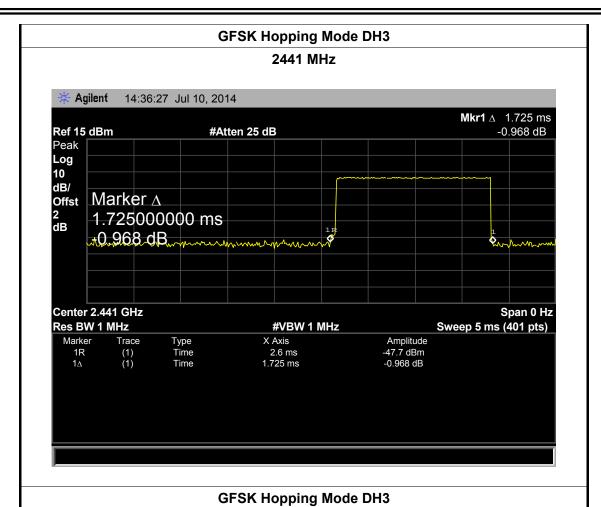
Page: 51 of 83

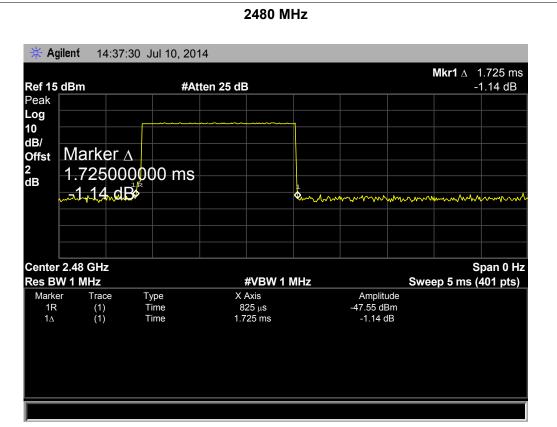
EUT:		Bluetooth Module		Model Name :	lodel Name :		BT02B150	
Temperature:		25 ℃		Relative Humidity: 55		55%	55%	
Test Voltage:	oltage: AC 120V/60 HZ							
Test Mode: Hopping Mode (GFSK DH3)								
Channel	Pu	lse Time	Total of	Period Time	Lir	Limit		
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result	
2402		1.725	276.00					
2441		1.725	276.00	31.60 40		400 PASS	PASS	
2480		1.725	276.00					
GFSK Hopping Mode DH3								









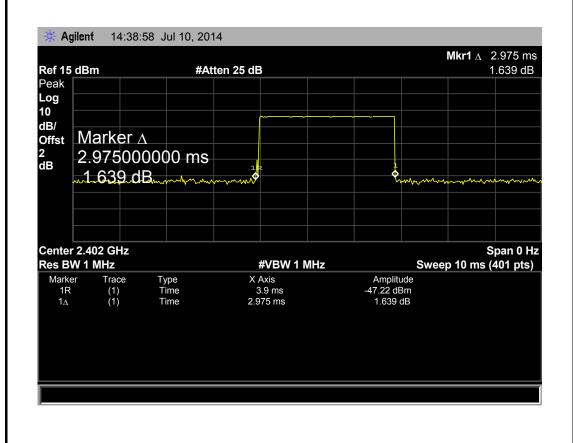


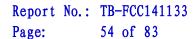


Page: 53 of 83

EUT:		Bluetooth Module		Model Name :	Model Name : BT02		3150
Temperature:		25 ℃		Relative Hum	Relative Humidity: 55%		
Test Voltage:		AC 120V/60 HZ					
Test Mode: Hopping Mode (GFSK DH5)							
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		2.975	317.33				
2441		2.975	317.33	31.60	40	00	PASS
2480		2.975	317.33				
CESV Hanning Mode DUE							

GFSK Hopping Mode DH5







Marker

Trace

(1) (1) Туре

Time Time

GFSK Hopping Mode DH5 2441 MHz 14:41:55 Jul 10, 2014 Agilent Mkr1 \triangle 2.975 ms 2.844 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Marker ∧ Offst 2 dB 2.975000000 ms 2.844 dB Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 10 ms (401 pts) Amplitude -49.91 dBm 2.844 dB Marker X Axis Trace Туре (1) (1) Time Time 5.875 ms 2.975 ms 1R 1Δ

Agilent 14:43:34 Jul 10, 2014 **Mkr1** \triangle 2.975 ms Ref 15 dBm #Atten 25 dB 3.663 dB Peak Log 10 dB/ Offst 2 dB Marker ∧ 2.975000000 ms .3.663.dB Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 10 ms (401 pts)

X Axis

6.325 ms 2.975 ms Amplitude

-49.29 dBm 3.663 dB

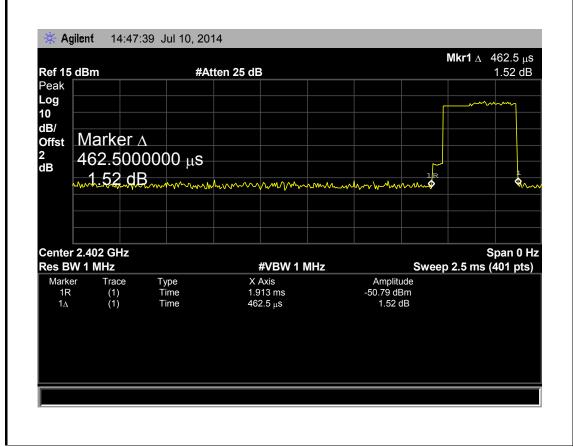
GFSK Hopping Mode DH5
2480 MHz

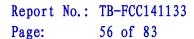


Page: 55 of 83

EUT:		Bluetooth Module		Model Name	Model Name :		BT02B150	
Temperature:		25 ℃		Relative Hum	Relative Humidity: 55%			
Test Voltage:		AC 120V/60 HZ						
Test Mode:	st Mode: Hopping Mode (8-DPSK DH1)							
Channel	Pu	Ise Time	Total of	Period Time	Lir	mit Result		
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result	
2402		0.463	148.16					
2441		0.463	148.16	31.60	40	00	PASS	
2480		0.463	148.16					
8-DPSK Hopping Mode DH1								

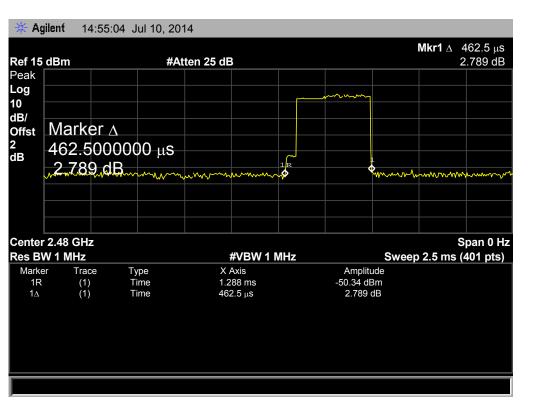
8-DPSK Hopping Mode DH1







8-DPSK Hopping Mode DH1 2441 MHz 14:51:33 Jul 10, 2014 Agilent Mkr1 Δ 462.5 μ s -9.99 dB Ref 15 dBm #Atten 25 dB Peak Log 10 dB/ Marker A Offst 2 dB -9.99 dB Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 2.5 ms (401 pts) X Axis Amplitude Marker Trace Туре (1) (1) Time Time 187.5 μs 462.5 μs -37.92 dBm -9.99 dB 1R 1Δ 8-DPSK Hopping Mode DH1 2480 MHz





Report No.: TB-FCC141133 Page: 57 of 83

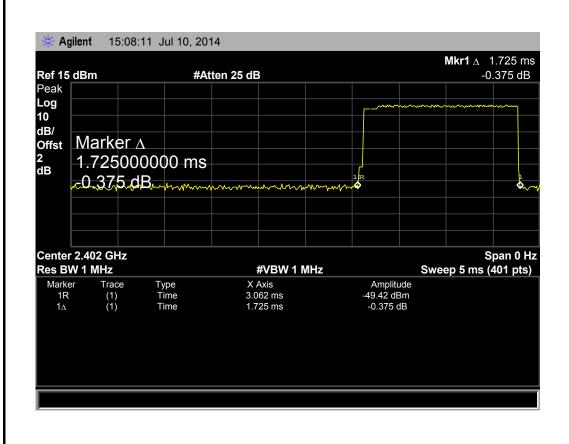
EUT:	Bluetooth Module	Model Name :	BT02B150
Temperature:	25 ℃	Relative Humidity:	55%
- 437.14	4.0.400\//00.117		

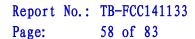
Test Voltage: AC 120V/60 HZ

Test Mode: Hopping Mode (8-DPSK DH3)

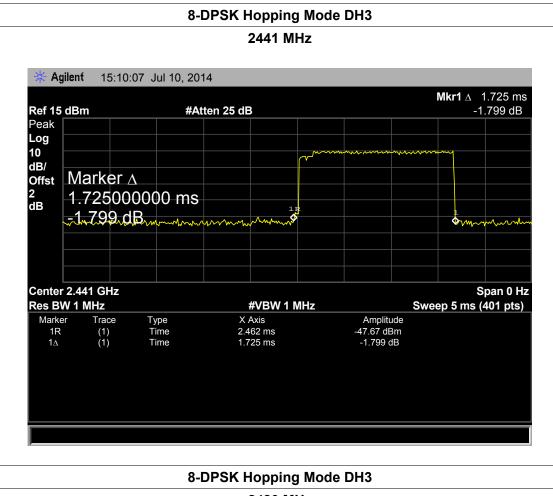
rest meac.		i lopping i	viede (e Bi eit	B110)		
Channel	Pu	lse Time	Total of	Period Time	Limit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(ms)	Result
2402		1.725	276.00			
2441		1.725	276.00	31.60	400	PASS
2480		1.725	276.00			

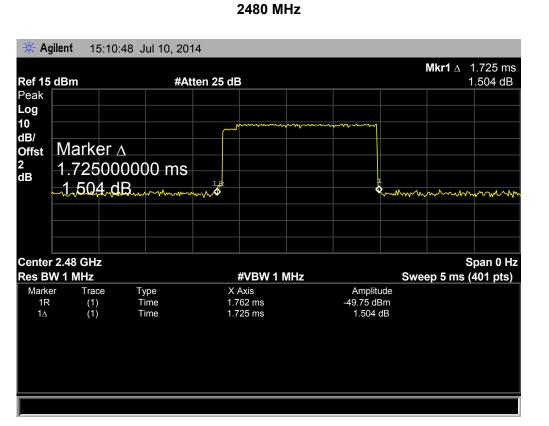
8-DPSK Hopping Mode DH3









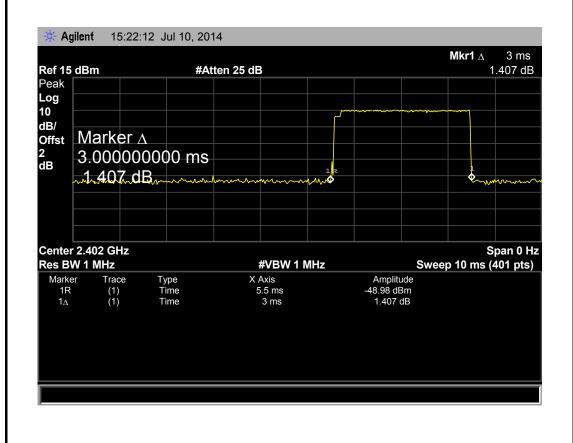


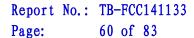


Page: 59 of 83

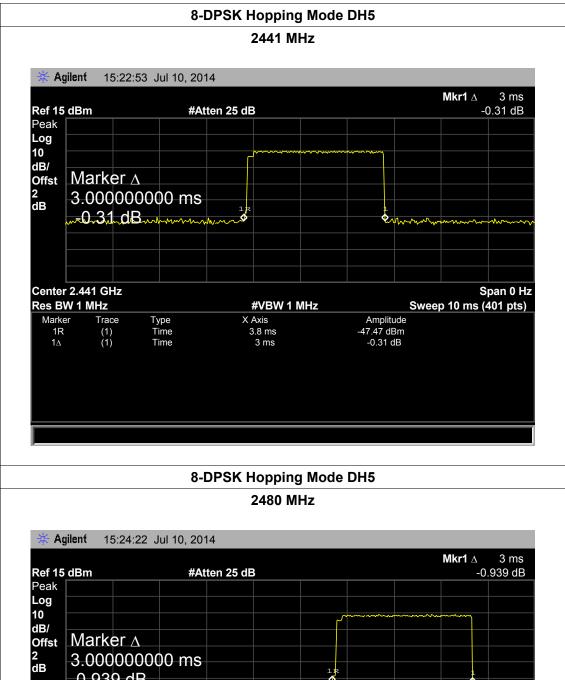
EUT:		Bluetooth Module		Model Name	odel Name :		BT02B150	
Temperature:		25 ℃		Relative Hum	Relative Humidity: 5			
Test Voltage:	Oltage: AC 120V/60 HZ							
Test Mode:	Test Mode: Hopping Mode (8-DPSK DH5)							
Channel	Pu	Ise Time	Total of	Period Time	Lir	mit Result		
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result	
2402		3.000	320.00					
2441		3.000	320.00	31.60	40	00	PASS	
2480		3.000	320.00	1				
8-DPSK Hopping Mode DH5								

8-DPSK Hopping Mode DH5











Report No.: TB-FCC141133 Page: 61 of 83

8. Channel Separation and Bandwidth Test

8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	<=1 MHz	2400~2483.5
	(20dB bandwidth)	
	>25KHz or >two-thirds of	
Channel Separation	the 20 dB bandwidth	2400~2483.5
	Which is greater	

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

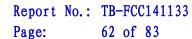
Channel Separation: RBW=30 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB 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.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

8.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.





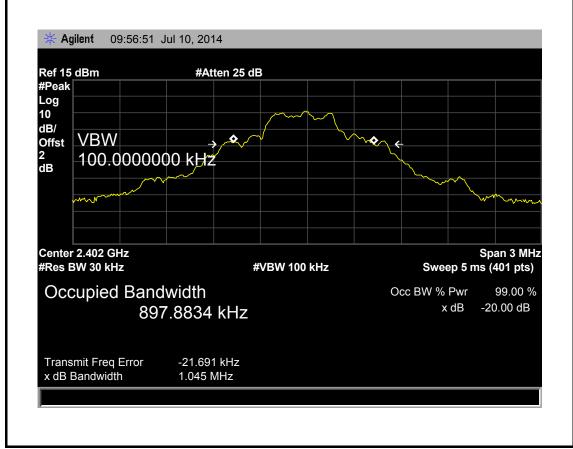
8.5 Test Equipment

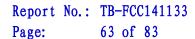
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

8.6 Test Data

EUT:	Bluetooth Module	Model Name :	BT02B150		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 HZ				
Test Mode:	TX Mode (GFSK)				
Channel frequence	cy 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth		
(MHz)		(kHz)	*2/3 (kHz)		
2402	897.89	1045.00	696.67		
2441	906.25	1049.00	699.33		
2480 902.39		1041.00	694.00		
GFSK TX Mode					

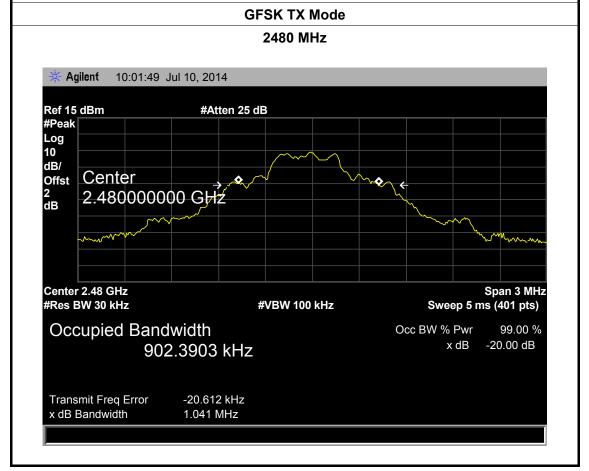
GFSK IX Mode







GFSK TX Mode 2441 MHz Agilent 10:00:23 Jul 10, 2014 Ref 15 dBm #Atten 25 dB #Peak Log 10 dB/ Center Offst 2 dB 2.441000000 GHZ Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB x dB 906.2486 kHz Transmit Freq Error -20.701 kHz x dB Bandwidth 1.049 MHz

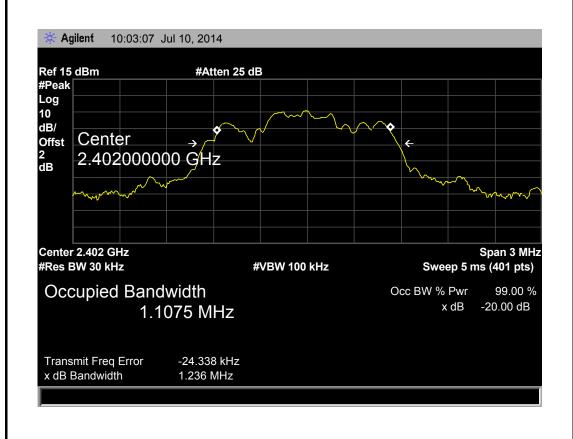


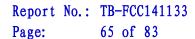


64 of 83 Page:

EUT:	Bluetooth Module	Model Name :	BT02B150
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 HZ		
Test Mode:	TX Mode (8-DPSK)		
Channel frequence	cy 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth
(MHz)		(kHz)	*2/3 (kHz)
2402	1107.50	1236.00	824.00
2441	1106.90	1233.00	822.00
2480	1110.90	1238.00	825.33

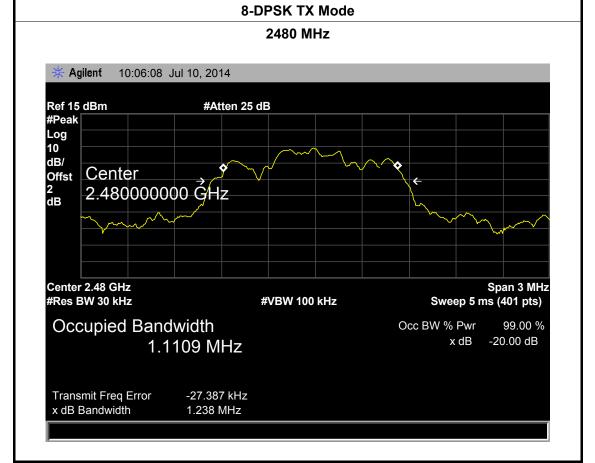
8-DPSK TX Mode 2402 MHz







8-DPSK TX Mode 2441 MHz 10:04:15 Jul 10, 2014 Agilent Ref 15 dBm #Atten 25 dB #Peak Log 10 dB/ Center Offst 2.441000000 GHz 2 dB Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB 1.1069 MHz x dB Transmit Freq Error -25.473 kHz x dB Bandwidth 1.233 MHz





Page: 66 of 83

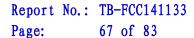
lel Name: BT02B150
ative Humidity: 55%
-

Test Mode: Hopping Mode (GFSK)

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
2402	1005.00	696.67
2441	1005.00	699.33
2480	1005.00	694.00

GFSK Hopping Mode









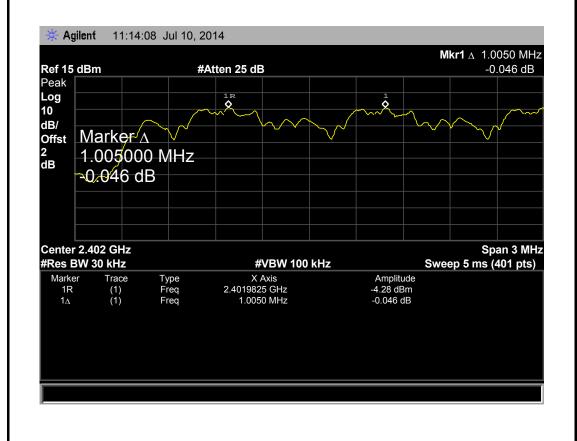


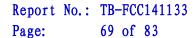
Report No.: TB-FCC141133 Page: 68 of 83

EUT:	Bluetooth Module	Model Name :	BT02B150	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 HZ			
Test Mode:	Hopping Mode (8-DPSK)			

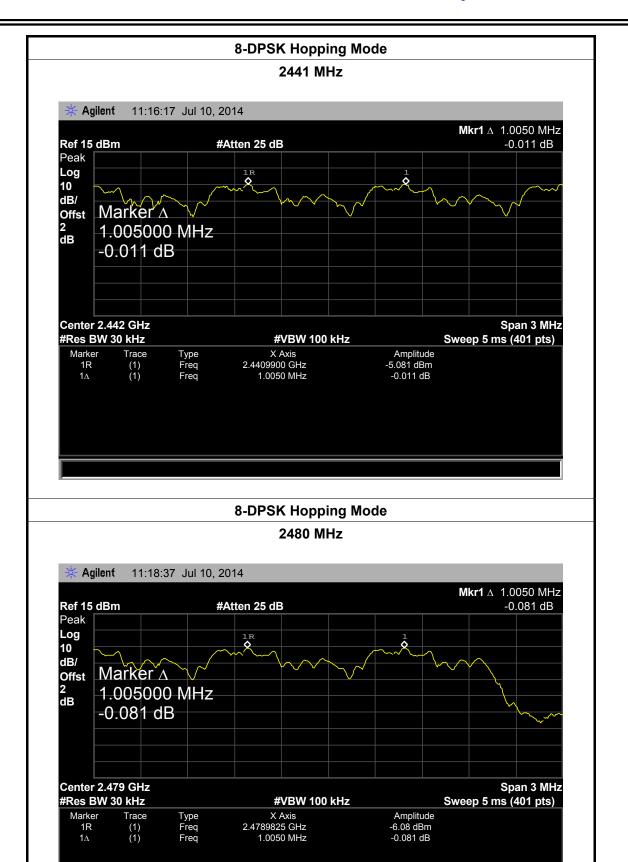
	,		
Channel frequency (MHz)	Separation Read Value	Separation Limit (kHz)	
	(kHz)		
2402	1005.00	824.00	
2441	1005.00	822.00	
2480	1005.00	825.33	

8-DPSK Hopping Mode











Report No.: TB-FCC141133 Page: 70 of 83

9. Peak Output Power Test

9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (b) (1)

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)	
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) 2400~2483.5		
	Other <125 mW(21dBm)		

9.2 Test Setup



9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

9.4 EUT Operating Condition

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

9.5 Test Equipment

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

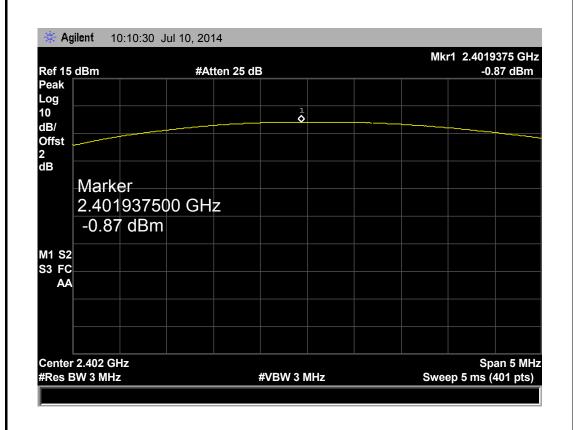
9.6 Test Data

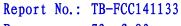


Page: 71 of 83

EUT:	Bluetooth Module		Model Name :		BT02B150	
Temperature:	25 ℃		Relative Humidity:		55%	
Test Voltage:	AC 120V/	AC 120V/60 HZ				
Test Mode:	TX Mode (GFSK)					
Channel frequency (MHz) Test Res			ult (dBm)	Limit (dBm)		
2402		-0.8	-0.870			
2441		-1.6	30		30	
2480		-2 !	587			

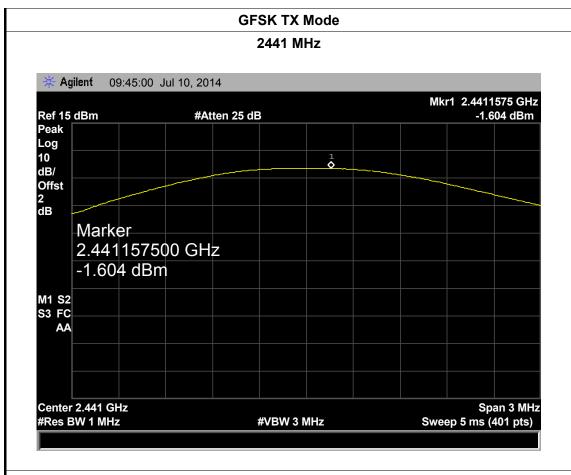
GFSK TX Mode



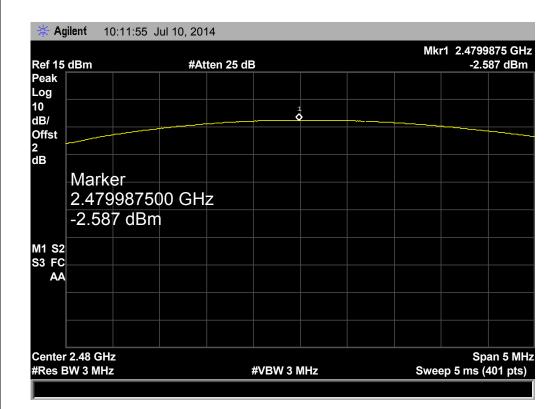




Page: 72 of 83



GFSK TX Mode

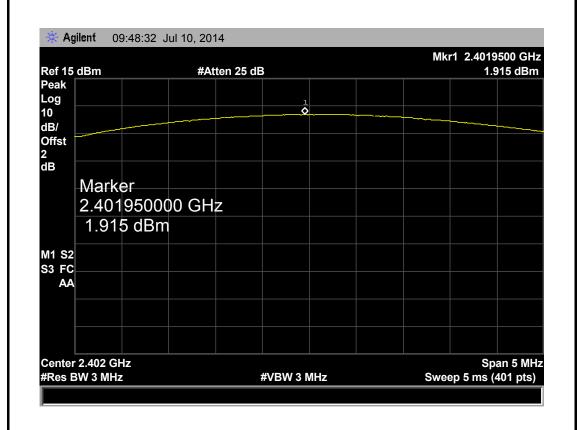


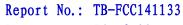


Page: 73 of 83

EUT:	Bluetooth Module		Model Name :		BT02B150	
Temperature:	25 ℃		Relative Humidity:		55%	
Test Voltage:	AC 120V/	AC 120V/60 HZ				
Test Mode:	TX Mode (8-DPSK)					
Channel frequency (MHz) Test Res			ult (dBm)	Limit (dBm)		
2402 1.9		15				
2441 1		16 21		21		
2480		-0.0)44			

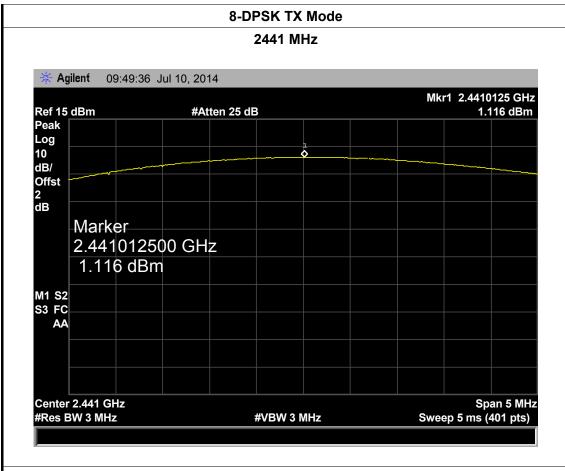
8-DPSK TX Mode



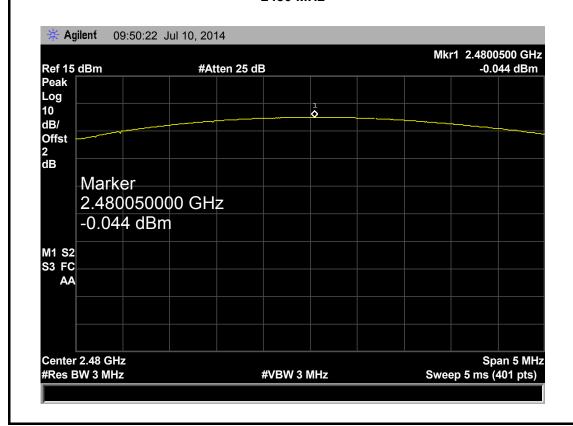




Page: 74 of 83



8-DPSK TX Mode





Report No.: TB-FCC141133 75 of 83

Page:

10. Antenna Conducted Spurious Emission

10.1 Test Standard and Limit

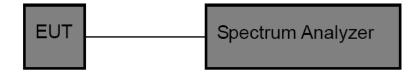
10.1.1 Test Standard FCC Part 15.247 (d)

10.1.2 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (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

10.2 Test Setup



10.3 Test Procedure

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

(2) Spectrum Setting:

RBW=100 KHz, VBW=300 KHz.

Frequency range: from 30MHz to 25 GHz



Page: 76 of 83

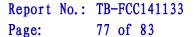
10.4 EUT Operating Condition

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

10.5 Test Equipment

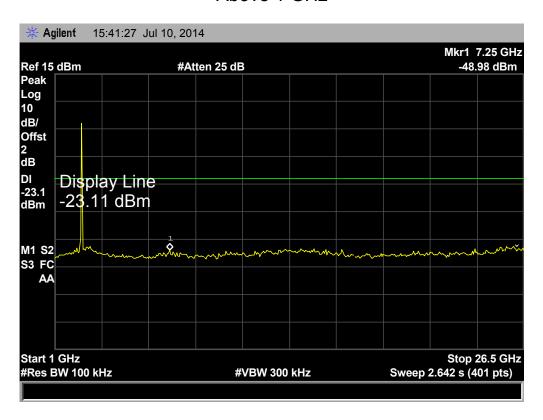
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum	Agilent		MY45106456	Mar. 20. 2014	Mar. 19. 2015
Analyzer	Agilon	E4407B	WH 45 100450	IVIAI. 20, 2014	IVIAI. 19, 2013

10.6 Test Data

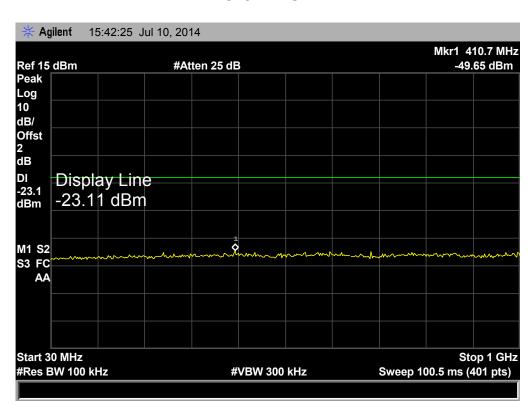


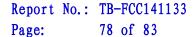


TX CH 00 2402MHz (1 Mbps)



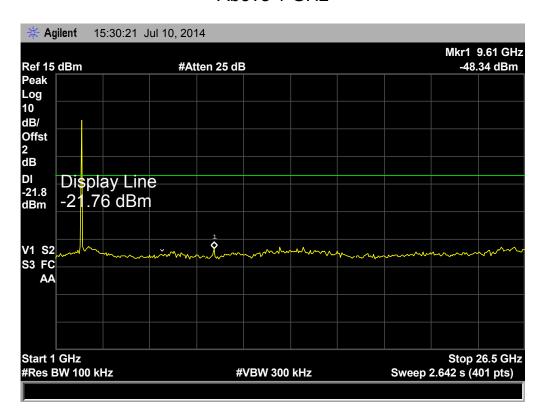
Bellow 1 GHz



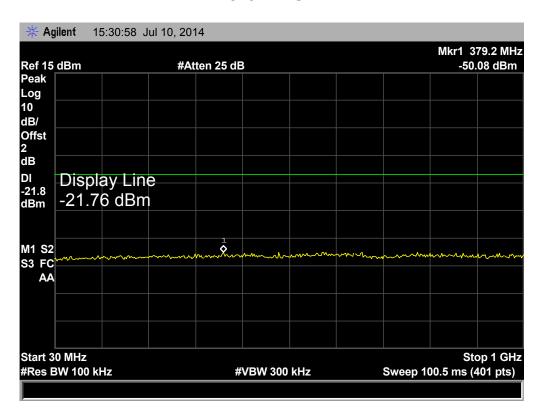


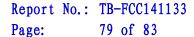


TX CH 39 2441MHz (1 Mbps)



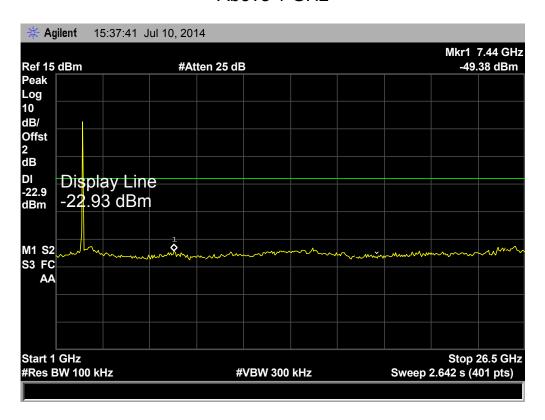
Bellow 1 GHz



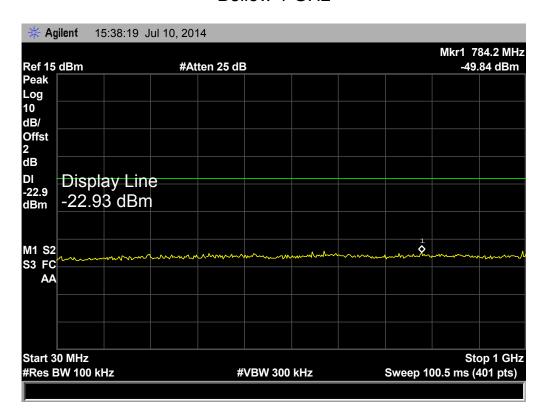


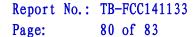


TX CH 78 2480MHz (1 Mbps)



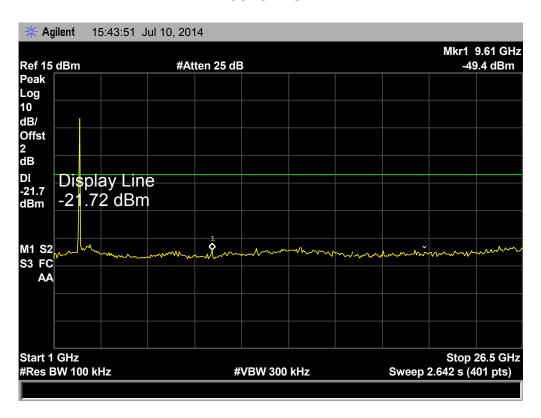
Bellow 1 GHz



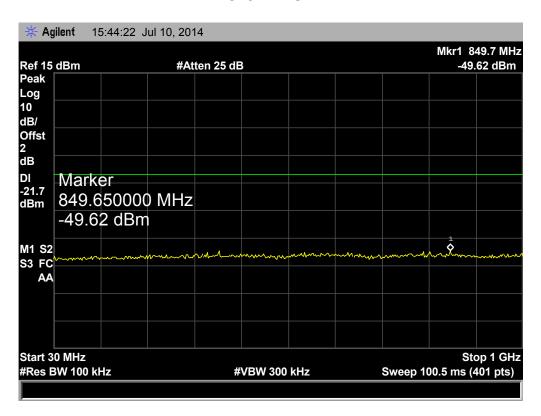


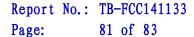


TX CH 00 2402MHz (3 Mbps)



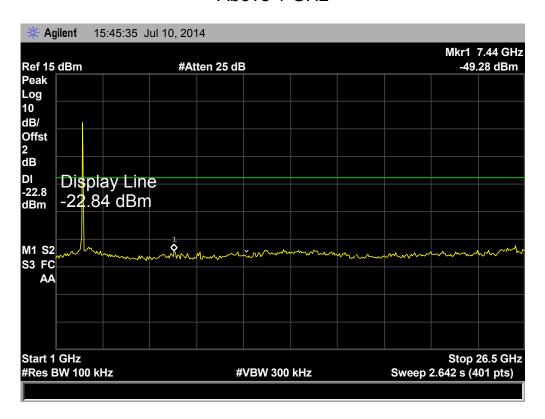
Bellow 1 GHz



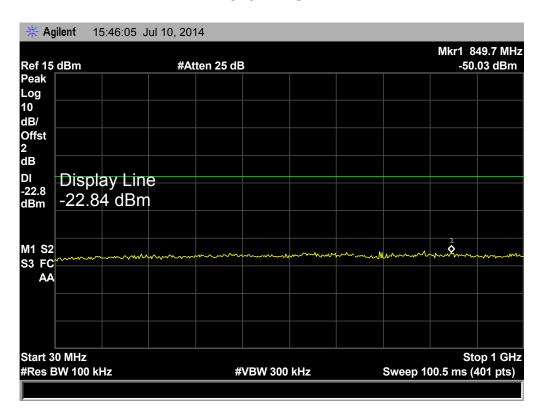


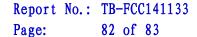


TX CH 39 2441MHz (3 Mbps)



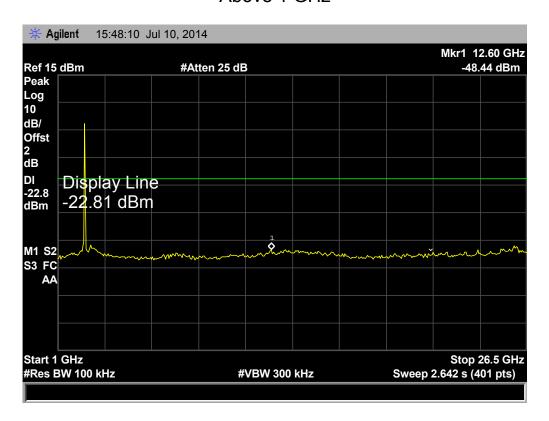
Bellow 1 GHz



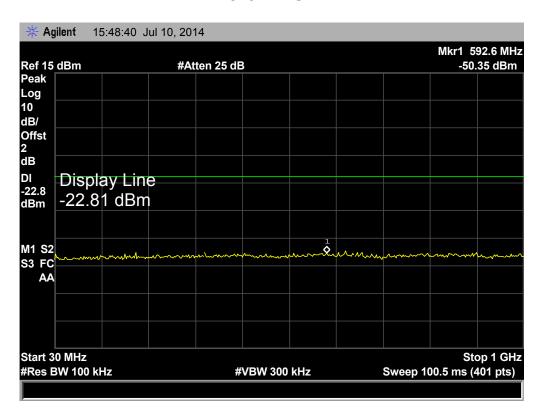




TX CH 78 2480MHz (3 Mbps)



Bellow 1 GHz





Page: 83 of 83

11. Antenna Requirement

11.1 Standard Requirement

11.1.1 Standard FCC Part 15.203

11.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

11.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 3 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

11.2 Result

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