

TEST REPORT

APPLICANT	: Xiamen Padmate Technology Co.,LTD
PRODUCT NAME	: Bluetooth Headset
MODEL NAME	: X12
BRAND NAME	: Padmate
FCC ID	: 2AJEO-X12
STANDARD(S)	: 47 CFR Part 15 Subpart C
TEST DATE	: 2018-12-22 to 2018-12-26
ISSUE DATE	: 2018-12-28

Prepared by:

Lion Xiao (Project Engineer)

metin

Lion Nins

Approved by:

Anne Liu(Supervisor)

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DIRECTORY

1. Technical Information 3
1.1. Applicant and Manufacturer Information 3
1.2. Equipment Under Test (EUT) Description 3
1.3. Test Standards and Results 4
1.4. Environmental Conditions 4
2. 47 CFR Part 15C Requirements 5
2.1. Antenna requirement 5
2.2. Number of Hopping Frequency6
2.3. Peak Output Power ······ 9
2.4. 20dB Bandwidth ······16
2.5. Carried Frequency Separation23
2.6. Time of Occupancy (Dwell time)26
2.7. Conducted Spurious Emissions and Band Edge42
2.8. Restricted Frequency Bands55
2.9. Conducted Emission75
2.10. Radiated Emission79
Annex A Test Uncertainty 155
Annex B Testing Laboratory Information

	Change History				
Issue Date Reason for change					
1.0	2018-12-28	First edition			

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Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Xiamen Padmate Technology Co.,LTD			
Applicant Address:	RM 201, Huli Park No.37, Industrial Zone, Tong'an District,			
	Xiamen, China			
Manufacturer:	Xiamen Padmate Technology Co.,LTD			
Manufacturer Address:	RM 201, Huli Park No.37, Industrial Zone, Tong'an District,			
	Xiamen, China			

1.2. Equipment Under Test (EUT) Description

Product Name:	Bluetooth Headset	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	V5.0	
Software Version:	V28	
	Bluetooth: FHSS	
Modulation Type:	GFSK(1Mbps),	
modulation type.	π/4-DQPSK(EDR 2Mbps),	
	8-DPSK(EDR 3Mbps)	
	The frequency range used is 2402MHz – 2480MHz	
Operating Frequency Range:	(79 channels, at intervals of 1MHz);	
	The frequency block is 2400MHz to 2483.5MHz.	
Bluetooth Version:	Bluetooth classic	
Antenna Type:	LDS Antenna	
Antenna Gain:	-7.53dBi	

Note 1: The EUT contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies is F(MHz)=2402+1*n (0<=n<=78). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 39 (2441MHz) and 78 (2480MHz).

Note 2: The right headset and left headset are electrically identical, we selected right headset for fully conducted testing, the differences details was explained in the declaration letter.

Note 3: The right headset and left headset will work simultaneously during normal use, we selected right headset and left headset simultaneous transmission for fully radiated emission

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testing.

Note 4: The EUT connected to the serial port of the computer with a serial communication cable, we use the dedicated software to control the EUT into the test mode.

Note 5: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15 (10-1-15 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.247(a)	Number of Hopping Frequency	Dec 22, 2018	Scott Chen	PASS
3	15.247(b)	Peak Output Power	Dec 22, 2018	Scott Chen	PASS
4	15.247(a)	20dB Bandwidth	Dec 22, 2018	Scott Chen	PASS
5	15.247(a)	Carrier Frequency Separation	Dec 22, 2018	Scott Chen	PASS
6	15.247(a)	Time of Occupancy (Dwell time)	Dec 22, 2018	Scott Chen	PASS
7	15.247(d)	Conducted Spurious Emission and Band Edge	Dec 22, 2018	Scott Chen	PASS
8	15.247(d)	Restricted Frequency Bands	Dec 26, 2018	Jinxin Huang	PASS
9	15.209, 15.247(d)	Radiated Emission	Dec 26, 2018	Jinxin Huang	PASS
10	15.207	Conducted Emission	Dec 26, 2018	Jinxin Huang	PASS
Note	• 1: The tests	were performed according to the r	nethod of measur	ements prescribed	l in ANSI
C63.	10-2013.				

1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106





2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, 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.

2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.



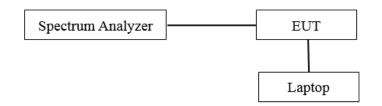
2.2. Number of Hopping Frequency

2.2.1. Requirement

According to FCC §15.247(a)(1)(iii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

2.2.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Please reference ANNEX B(4).

2.2.3. Test Result

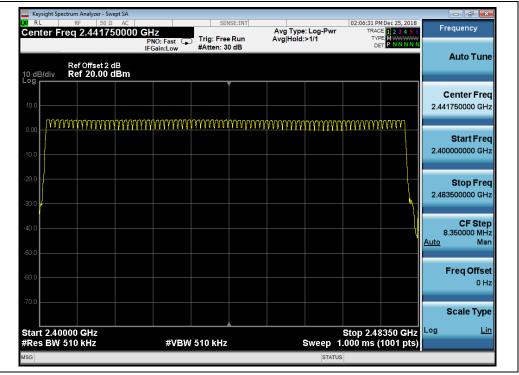
The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

	· • •			
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
π/4-DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

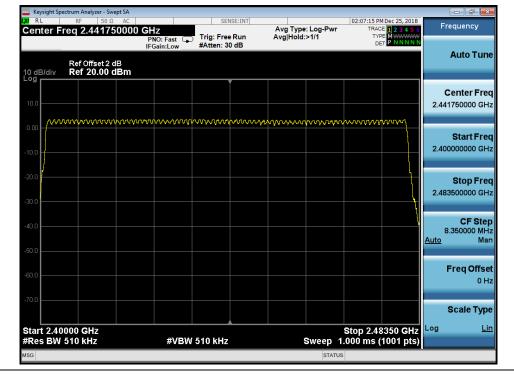
A. Test Verdict:



B. Test Plots:



(GFSK)



(π/4-DQPSK)

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RL RF 50Ω AC Center Freq 2.441750000	PNO: East	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>1/1	02:07:47 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN	Frequency
Ref Offset 2 dB 10 dB/div Ref 20.00 dBm					Auto Tun
		Ĭ			Center Fre
	مبممحممممم	ኁብገለሉቀሌሳልበለለስሌ	ሻሉ-ሞሲ-ብዲፓስቢ ላር ዶታይር አ	ኡብላዲቤልጣበስለስበሳ	2.441750000 GH
0.00				100400000000	Start Fre 2.400000000 GH
-10.0					2.40000000 GP
-20.0					Stop Fre 2.483500000 GH
-30.0					CF Ste
-40.0					8.350000 MH Auto Ma
-30.0					Freq Offs
-60.0					0 +
-70.0					Scale Typ
Start 2.40000 GHz #Res BW 510 kHz	#VBW 5	10 kHz	Sweep 1	Stop 2.48350 GHz .000 ms (1001 pts)	Log <u>Li</u>

(8- DPSK)



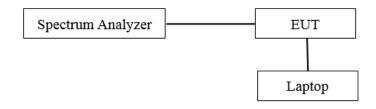
2.3. Peak Output Power

2.3.1. Requirement

According to FCC §15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

2.3.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Please refer ANNEX B(4).

2.3.3. Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the module.

GFSK Mode

A. Test Verdict:

Frequency		Measured Outp	Limit		Vardiat	
Channel	(MHz)	dBm	W	dBm	W	Verdict
0	2402	4.21	0.0026			PASS
39	2441	4.22	0.0026	21	0.125	PASS
78	2480	4.18	0.0026			PASS

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B. Test Plots:

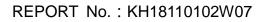
Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω A 01:49:42 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N Center Freq 2.40200000 GHz IFGain:Low Frequency Avg Type: Log-Pwr Trig: Free Run #Atten: 20 dB Auto Tune Mkr1 2.402 279 GHz 4.21 dBm Ref Offset 2 dB Ref 12.00 dBm 10 dB/div Log ▲1 **Center Freq** 2.402000000 GHz Start Freq 2.397500000 GHz Stop Freq 2.406500000 GHz CF Step 900.000 kHz Man Auto Freq Offset 0 Hz Scale Type Span 9.000 MHz Log Sweep 1.000 ms (1001 pts) Center 2.402000 GHz #Res BW 3.0 MHz Lin #VBW 8.0 MHz

(GFSK, Channel 0, 2402MHz)



(GFSK, Channel 39, 2441MHz)

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sysight Spectrum Analyzer - Swept SA					
L RF 50 Ω AC nter Freq 2.480000000	PNO: East	SENSE:INT Trig: Free Run #Atten: 20 dB	Avg Type: Log-Pwr	01:50:52 PM Dec 25, 201 TRACE 1 2 3 4 5 TYPE MWWWW DET P NNNN	Frequency
Ref Offset 2 dB B/div Ref 12.00 dBm			Mkr	1 2.480 261 GH 4.18 dBr	z Auto Tu n
		_ 1			Center F 2.480000000
					Start Fi 2.475500000 0
					Stop F 2.484500000
					CF S 900.000 <u>Auto</u>
					Freq Off
					Scale Ty
ter 2.480000 GHz s BW 3.0 MHz	#VBW 8	0 MHz	Sween	Span 9.000 MH 1.000 ms (1001 pt	z Log

(GFSK, Channel 78, 2480MHz)

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π /4-DQPSK Mode

A. Test Verdict:

Channel	Frequency	Measured Outp	ut Peak Power	Lir	nit	Verdict
Channel	(MHz)	dBm	W	dBm	W	verdici
0	2402	4.14	0.0026			PASS
39	2441	4.13	0.0026	21	0.125	PASS
78	2480	4.07	0.0026			PASS

B. Test Plots:

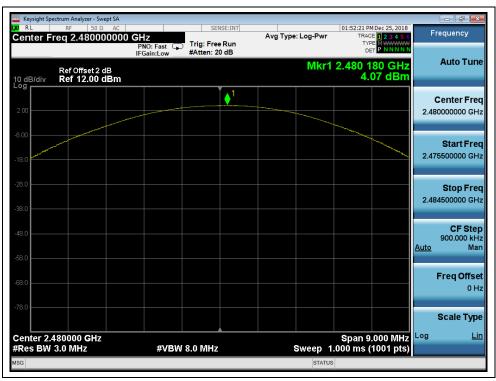
RL Center Fi	RF 50 Ω req 2.40200	Р	Z NO: Fast 😱 Gain:Low			Avg Type: Log	-Pwr T	4 PM Dec 25, 2018 RACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	Frequ	ency
0 dB/div	Ref Offset 2 o Ref 12.00 o	IB IBm				Γ	/kr1 2.402	171 GHz 4.14 dBm	AL	to Tur
					♦ ¹					ter Fre
2.00									2.40200	0000 GH
8.0									St 2.39750	art Fre
8.0									Si 2.40650	op Fre 0000 Gi
8.0										CF Ste).000 kl Ma
8.0									Fre	q Offs 0 I
8.0									Sca	ale Typ
	102000 GHz 3.0 MHz		#VBW	/ 8.0 MHz		Swe	Spar ep 1.000 m	9.000 MHz s (1001 pts)	Log	Ŀ

(π/4-DQPSK, Channel 0, 2402MHz)



eysight Spectrum Analyzer - Swep RL RF 50 Ω	t SA AC	SENSE:INT		01:51:50 PM Dec 25, 2018	
nter Freq 2.441000			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE M	Frequency
Ref Offset 2 dE B/div Ref 12.00 dE			Mkr1	2.441 243 GHz 4.13 dBm	Auto Tu
		↓ ¹			Center Fr
					2.441000000 G
					Start Fr 2.436500000 G
					Stop Fr 2.445500000 G
) 					CF St 900.000 k <u>Auto</u> M
					Freq Offs 0
)					Scale Ty
nter 2.441000 GHz es BW 3.0 MHz	#\/B)	↓	Sween 1	Span 9.000 MHz .000 ms (1001 pts)	Log j

(π/4-DQPSK, Channel 39, 2441MHz)



(π/4-DQPSK, Channel 78, 2480MHz)

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Fax: +86



8-DPSK Mode

A. Test Verdict:

Channel	Frequency	Measured Outp	ut Peak Power	Lir	nit	Verdict
Channel	(MHz)	dBm	W	dBm	W	verdici
0	2402	4.30	0.0027			PASS
39	2441	4.28	0.0027	21	0.125	PASS
78	2480	4.21	0.0026			PASS

B. Test Plots:

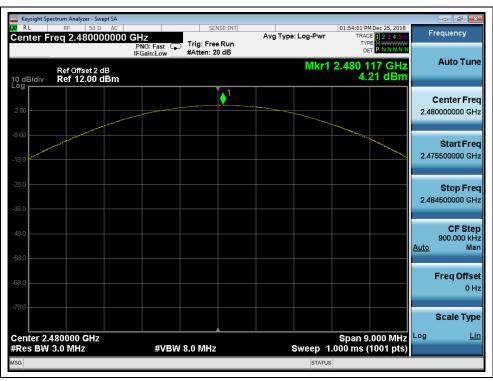
enter Fre	RF 50 Ω 9 q 2.40200	PI	Z NO:Fast 🕞 Gain:Low			Avg Type:	Log-Pwr	TRA	M Dec 25, 2018 CE 1 2 3 4 5 6 PE M WWWWWW ET P N N N N N	F	requency
	Ref Offset 2 d Ref 12.00 d						Mkr1	2.402 (4.	036 GHz 30 dBm		Auto Tur
2.00					1		****				Center Fre 2000000 GH
18.0									and the second s	2.39	Start Fre 7500000 Gi
38.0										2.40	Stop Fre 6500000 GH
18.0										<u>Auto</u>	CF Ste 900.000 kł Ma
8.0											Freq Offs 0 I
enter 2.40	02000 GHz		#\(D)4	8.0 MHz			woon 4	Span 9).000 MHz (1001 pts)	Log	Scale Tyr L

(8-DPSK, Channel 0, 2402MHz)



ight Spectrum Analyzer - Swept SA							6
RF 50 Ω AC ter Freq 2.441000000 I	PNO: East	SENSE:INT Frig: Free Run Atten: 20 dB	Avg Type: Log-Pwr	TRACE	Dec 25, 2018 1 2 3 4 5 6 MWWWWW P N N N N	Freque	
Ref Offset 2 dB /div Ref 12.00 dBm			Mkr1	2.441 0	81 GHz 28 dBm	Aut	0
		↓ 1				Cent	
						2.4410000	00
						Sta 2.4365000	
						Sto	
						2.4455000	00
						C 900. <u>Auto</u>	CF .00
						Freq	10
						Scal	le
er 2.441000 GHz BW 3.0 MHz	#VBW 8.	▲ 0 MHz	Sweep 1	Span 9. 1.000 ms (1		Log	

(8-DPSK, Channel 39, 2441MHz)



(8-DPSK, Channel 78, 2480MHz)

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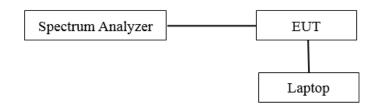


2.4.1. Definition

According to FCC 15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1% = 20dB) taking the total RF output power.

2.4.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Please refer ANNEX B(4).

2.4.3. Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.



GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	0.7996	PASS
39	2441	0.7988	PASS
78	2480	0.7996	PASS

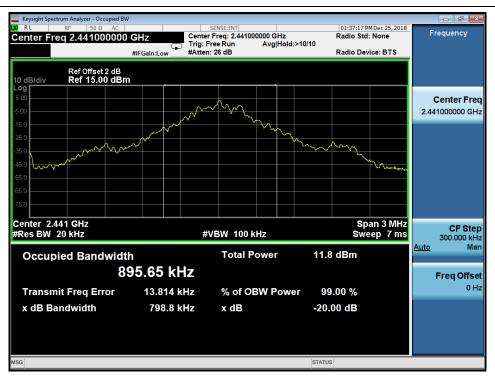
B. Test Plots:



(GFSK, Channel 0, 2402MHz)







(GFSK, Channel 39, 2441MHz)



(GFSK, Channel 78, 2480MHz)

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π/4-DQPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.206	PASS
39	2441	1.206	PASS
78	2480	1.206	PASS

B. Test Plots:

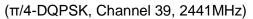
Ref Offset 2 c 10 dB/div Ref 15.00 c -og 5.00						
5.00		M.M.			Center Free 2.402000000 GH:	
15.0 25.0 35.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
45.0						
75.0 Center 2.402 GHz				Span 3 MHz		
#Res BW 20 kHz	#	VBW 100 kHz		Sweep 7 ms	CF Step 300.000 kHz	
Occupied Bandw	^{idth} 1.2615 MHz	Total Power	10.7 c	IBm	Auto Mar Freq Offset	
Transmit Freq Error x dB Bandwidth	18.023 kHz 1.206 MHz	% of OBW Pow x dB	ver 99.0 -20.00		0 H.	

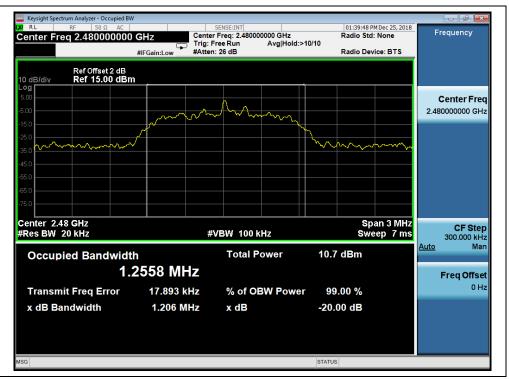
(π/4-DQPSK, Channel 0, 2402MHz)











(π/4-DQPSK, Channel 78, 2480MHz)

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8-DPSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.249	PASS
39	2441	1.250	PASS
78	2480	1.250	PASS

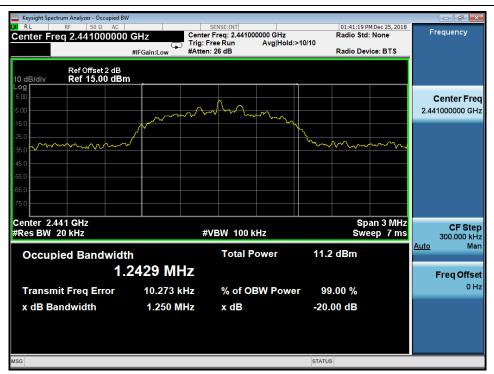
B. Test Plots:

Keysight Spectrum Analyzer - Occupied BW XI RL RF 50 Ω AC		SENSE:INT		01:40:25 PM Dec 25, 2018		
Center Freq 2.402000000	GHz Center	Freq: 2.402000000 GHz ree Run Avg Hold	F 1:>10/10	adio Std: None	Frequency	
Ref Offset 2 dB 0 dB/div Ref 15.00 dBm						
5.00		Andream			Center Fre 2.402000000 GH	
25.0 35.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
45.0						
65.0 75.0						
Center 2.402 GHz #Res BW 20 kHz	#\	/BW 100 kHz		Span 3 MHz Sweep 7 ms		
Occupied Bandwidth	1	Total Power	11.1 c	IBm	<u>Auto</u> Ma	
1.2	2455 MHz				Freq Offse	
Transmit Freq Error	10.333 kHz	% of OBW Pow	er 99.0	0 %	0 H	
x dB Bandwidth	1.249 MHz	x dB	-20.00) dB		
SG			STATUS			

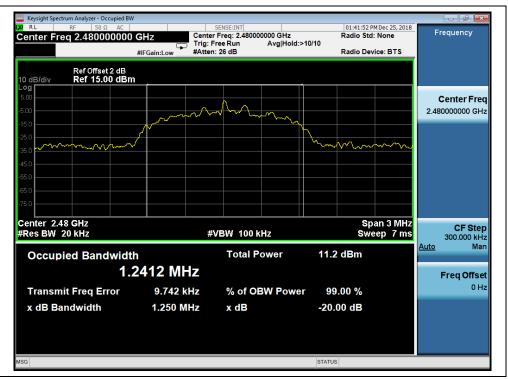
(8-DPSK, Channel 0, 2402MHz)











(8-DPSK, Channel 78, 2480MHz)

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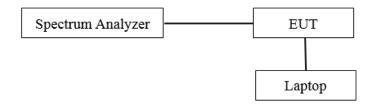
2.5. Carried Frequency Separation

2.5.1. Definition

According to FCC §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

2.5.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Please refer ANNEX B(4).

2.5.3. Test Result

The Bluetooth Module operates at hopping-on test mode. For any adjacent channels (e.g. the channel 39 and 40 as showed below), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (refer to section 2.4.4), whichever is greater. So, the verdict is PASSING.

Test Mode	Measured Channel Numbers	Carried Frequency Separation(MHz)	20dB bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	0.983	0.7988	two thirds of the	PASS
π/4-DQPSK	39 and 40	0.997	1.206	two-thirds of the 20dB bandwidth	PASS
8-DPSK	39 and 40	1.001	1.250		PASS

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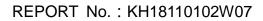
(GFSK)



(π/4-DQPSK)

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(8-DPSK)

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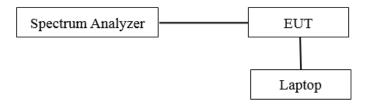
2.6. Time of Occupancy (Dwell time)

2.6.1. Requirement

According to FCC §15.247(a) (1) (iii), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

2.6.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

The EUT was working in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * channel no.(s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell time = time slot length * hop rate / number of hopping channels * 31.6s Hop rate = 1600/s

B. Equipments List:

Please refer ANNEX B(4).



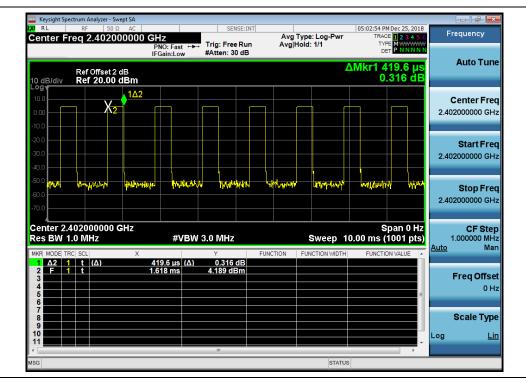
2.6.3. Test Result

GFSK Mode

A. Test Verdict:

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (ms)	Limit (sec)	Verdict
	2402	0.420	134.400		PASS
DH1	2441	0.420	134.400		PASS
	2480	0.420		PASS	
	2402	1.678	268.480		PASS
DH3	2441	1.678	268.480	0.4	PASS
	2480	1.678	268.480		PASS
	2402	2.917	311.147		PASS
DH5	2441	2.917	311.147		PASS
	2480	2.917	311.147		PASS

B. Test Plots:



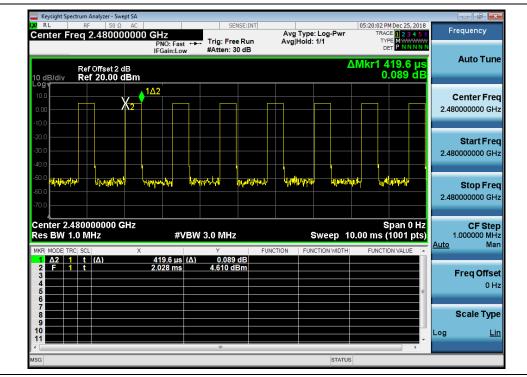
(DH1_2402MHz, GFSK)

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		RF	50 Ω AC			SENS	SE:INT	g Type: Log-P		PM Dec 25, 2018	Fre	quency
Center	r Fred	2.44	10000):Fast ⊷	📕 Trig: Free	Run Av	g Type: Log-P g Hold: 1/1	т	ACE 1 2 3 4 5 6 YPE M WWWWW DET P N N N N N		1
			set 2 dB		in:Low	#Atten: 30	dB			419.6 μs 0.094 dB	1	Auto Tune
10 dB/d ^{Log}	iv .	ter 20	.00 dBn ▲1∆2	<u>n</u>					`	J.034 UB		
10.0	_	Υ.										enter Fred
0.00		<u></u>									2.4410	000000 GH:
-10.0												
-20.0												Start Free
-30.0		+									2.4410	00000 GH:
-40.0												
-50.0	444144	di di	al white all way	v vh	ruffer	WANNAW	with the second	maniper	4,144/444	Tankungatarrit		Stop Eroc
-60.0						In the		11. 1 691				Stop Fred 000000 GH;
-70.0											2.4410	00000 GH
Contor	- 2 44	10000	00 GHz							Span 0 Hz		OF Otor
Res B			00 982		#VB	W 3.0 MHz		Sweep	10.00 ms		1.0	CF Step 000000 MH
MKR MOD				х		Y	FUNCTION	FUNCTION WI			<u>Auto</u>	Mar
1 Δ2	1	t (Δ)		419	.6 µs (Δ) 0.094 d	B					
2 F 3	1	t		1.17	9 ms	4.380 dB	m				F	req Offse
4												0 H:
6												
											S	cale Type
7												
											Log	Lir

(DH1_2441M, GFSK)



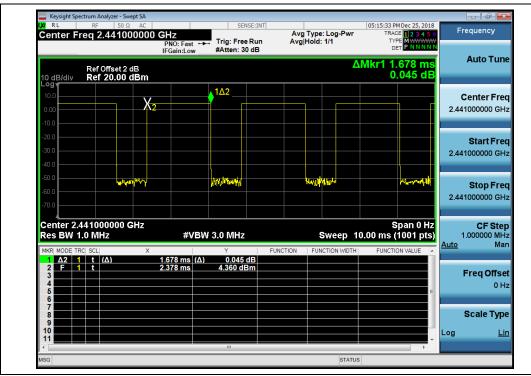
(DH1_2480M, GFSK)

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W RL RF Center Freq 2.4	50 Ω AC 02000000 GHz PNO: Fast	SENSE:INT	Avg Type: Log-Pwr Avg Hold: 1/1	05:06:07 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE M WWWWW	Frequency
	IFGain:Lov set 2 dB 0.00 dBm		Δι	Mkr1 1.678 ms 0.107 dB	Auto T
10.0 -10.0	X_2				Center F 2.402000000
-30.0					Start F 2.402000000
-50.0	evallymetrititaer	νητηρική: Αγ	wihtenik/	hthatin	Stop F 2.402000000
Center 2.4020000 Res BW 1.0 MHz		BW 3.0 MHz	Sweep 10	Span 0 Hz .00 ms (1001 pts)	CF S 1.000000 Auto
MKR MODE TRC SCL 1 Δ2 1 t (Δ) 2 F 1 t	× 1.678 ms 2.827 ms		JNCTION FUNCTION WIDTH	FUNCTION VALUE	_
3 4 5 6				=	Freq Of
7 8 9					Scale T
10					Log

(DH3_2402M, GFSK)



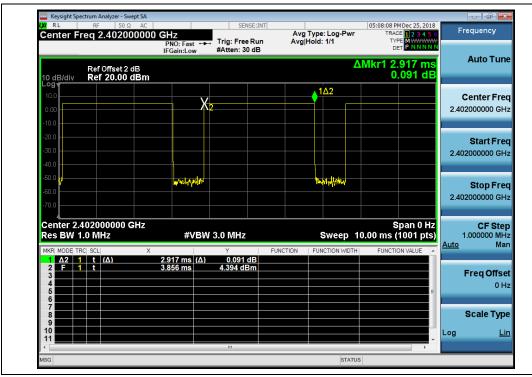
(DH3_2441M, GFSK)

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Center F		50 Ω AC D000000 GH	Z IO:Fast ↔	SENSE:IN	Avg	Type: Log-Pwr Hold: 1/1	05:21:48 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE M WWWWW	Frequency
10 dB/div	Ref Offse Ref 20.0	IFG	ain:Low	#Atten: 30 dB	-	Δι	DET P NNNNN Wkr1 1.678 ms 0.071 dB	Auto Tun
10.0 0.00		X ₂		1Δ2				Center Free 2.480000000 GH
-20.0								Start Free 2.480000000 GH:
-50.0 -60.0 -70.0		-		yenyytyyet		energythere	stanting of the second s	Stop Fre 2.480000000 GH
Center 2. Res BW		0 GHz X	#VBV	V 3.0 MHz Y	FUNCTION	Sweep 10	Span 0 Hz .00 ms (1001 pts)	CF Step 1.000000 MH <u>Auto</u> Mar
1416	1 t (Δ) 1 t		78 ms (Δ) 97 ms	0.071 dB 4.605 dBm			E	Freq Offse 0 H
7								Scale Type

(DH3_2480M, GFSK)



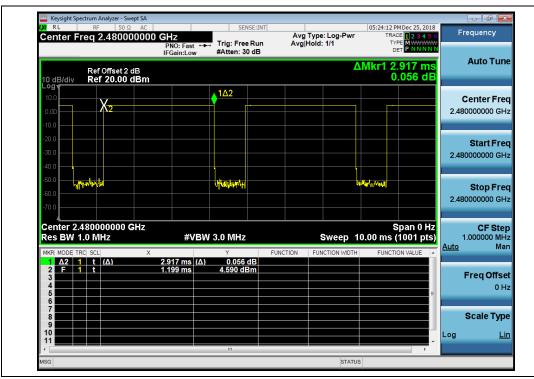
(DH5_2402M, GFSK)

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			eRun Avg	Type: Log-Pwr Hold: 1/1	05:17:37 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWW DET PNNNN	Frequency
10 dB/div Re	ef Offset 2 dB ef 20.00 dBm			Δ	Mkr1 2.917 ms 0.053 dB	Auto T
Log -10.0	X_2					Center F 2.441000000
-20.0 -30.0 -40.0						Start F 2.441000000
-50.0	พาะพุษยุยุย		หมูงมะจุกัญป่า			Stop F 2.441000000
Center 2.4410 Res BW 1.0 M		#VBW 3.0 MHz		Sweep 10	Span 0 Hz .00 ms (1001 pts)	CF S 1.000000 Auto
MKR MODE TRC SC 1 A2 1 t 2 F 1 t 3 4 5 6	(Δ) 2.	917 ms (Δ) 0.053 458 ms 4.372 df		FUNCTION WIDTH	FUNCTION VALUE	Freq Of
7 8 9 10						Scale T

(DH5_2441M, GFSK)



(DH5_2480M, GFSK)

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Fax:

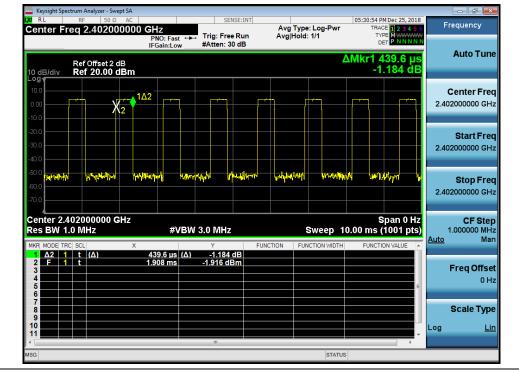


$\pi/4$ -DQPSK Mode

A. Test Verdict:

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (ms)	Limit (sec)	Verdict
	2402	0.440	140.800		PASS
2DH1	2441	0.430	137.600		PASS
	2480	0.430	137.600		PASS
	2402	1.678	268.480		PASS
2DH3	2441	1.678	268.480	0.4	PASS
	2480	1.688	270.080		PASS
	2402	2.927	312.213		PASS
2DH5	2441	2.927	312.213		PASS
	2480	2.927	312.213		PASS

B. Test Plots:



(2DH1_2402M, π/4-DQPSK)

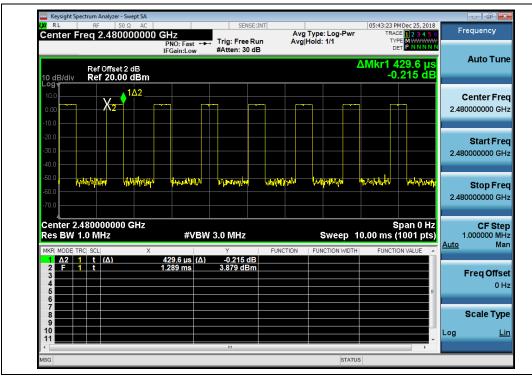
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Fax: +86 592 5612095

Da an 00 06 450



Center F		000000 GH	z	SENSE:IN	Avg	Type: Log-Pwr	05:36:47 PM Dec 25, 20 TRACE 1 2 3 4	56 Frequ	lency
		P	NO: Fast ↔ →→ Gain:Low	Trig: Free Run #Atten: 30 dB	Avg	Hold: 1/1	DET P N N N	N N	
10 dB/div	Ref Offset Ref 20.0					Δ	ب Mkr1 429.6. -0.243 d	IS AI B	uto Tun
10.0		1Δ2						Cer	nter Free
-10.0		2						2.44100	0000 GH
-20.0								s	tart Fre
-30.0								2.44100	0000 GH
-50.0	harmondate	"YU": 11" YU/U/1	uhuhump	Med/yww.ywyt	Alphante	madimin	Just working 184	w s	top Fre
-60.0 -70.0								2.44100	0000 GH
Center 2 Res BW	.441000000	0 GHz	#\/D\\/			0	Span 0 H	iz	CF Ste
Res DW		X	#VBW 3	Y Y	FUNCTION	FUNCTION WIDTH	.00 ms (1001 pt	Auto	0000 MH Ma
MKRI MORELT	1 t (Δ)	42	9.6 µs (Δ)	-0.243 dB	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	ń ———	
1415		1.5	98 ms	3.616 dBm				Ere	eq Offse
1 Δ2 2 F	<u>1 t</u>								
1 Δ2 2 F 3 4	1 t								. он
1 Δ2 2 F 3 4 5 6								E	он
1 Δ2 2 F 3 4 5 6 7								E	
1 Δ2 2 F 3 4 5 6	1 t							E	он ale Typ _{Li}

(2DH1_2441M, π/4-DQPSK)



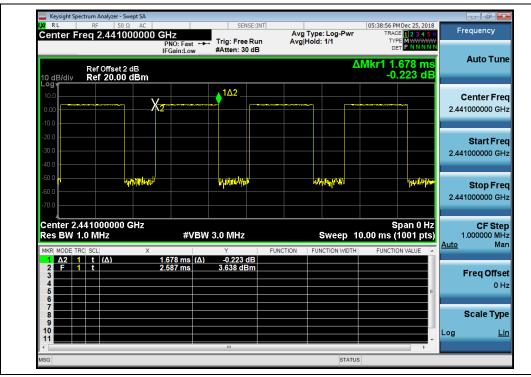
(2DH1_2480M, π/4-DQPSK)

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		RE	50.0	AC			SENS	E:INT	1		05:32:31 P	M Dec 25, 2018		
Cente	r Fre	q 2.4				ast ↔→ .ow	Trig: Free F #Atten: 30	Run		Type: Log-Pwr Hold: 1/1	TRA TY	CE 1 2 3 4 5 PE M ET P NNNN	6 H	requency
10 dB/d			ffset 2 o 20.00 o								∆Mkr1 1 -0	.678 ms .664 dB		Auto Tu
Log - 10.0 - 0.00 - -10.0 -			X ₂		¹	Δ2				· · · · · · · · · · · · · · · · · · ·			2.4	Center Fr 02000000 G
-20.0													2.4	Start Fr 02000000 G
-50.0		n ala	₩ ^I		Para	\{* }*'\\\		U1	NI THE ALEN		windspatra		2.4	Stop Fr 02000000 G
Cente Res B	W 1.0	MH:			;	¢vB₩	3.0 MHz			-	10.00 ms (CF St 1.000000 M M
	2 1	scl t (/	<u>)</u>	X	1.678 m 1.538 m		Y -0.664 dl 3.585 dBr	в	CTION	FUNCTION WIDTH	FUNCT	ON VALUE		Freq Offs 0
2 F 3 4 5 6														Scale Ty
3 4 5													Log	Scale Ty

(2DH3_2402M, π/4-DQPSK)



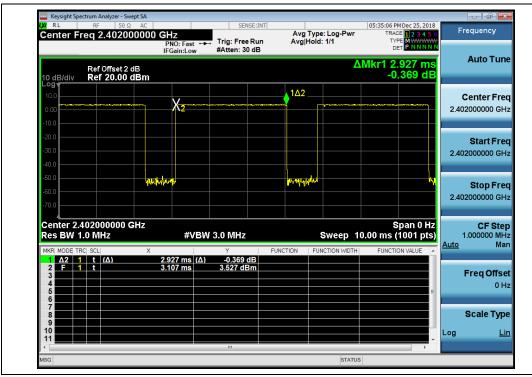
(2DH3_2441M, π/4-DQPSK)

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	50 Ω AC 2.480000000 GHz	SENSE:INT	Avg Type: Log-Pwr	05:45:43 PM Dec 25, 2018 TRACE 1 2 3 4 5 6	Frequency
Center Freq.		ast ↔→→ Trig: Free Run ow #Atten: 30 dB	Avg Hold: 1/1		
10 dB/div Re	f Offset 2 dB f 20.00 dBm	0W #Atten: 30 dB	Δ	Mkr1 1.688 ms -0.570 dB	Auto T
Logv 10.0 0.00	X_2	1Δ2			Center F 2.480000000
-20.0 -30.0 -40.0					Start F 2.480000000
-50.0 -60.0 -70.0	์ เคราะฟล ^า เป็น	ununyundar	Milyoppureline	(แต่งที่จะสำ	Stop F 2.480000000
Center 2.4800 Res BW 1.0 M	IHz	≇VBW 3.0 MHz	Sweep 10	Span 0 Hz 0.00 ms (1001 pts)	CF S 1.000000 <u>Auto</u>
MKR MODE TRC SCI 1 Δ2 1 t 2 F 1 t 3 4 5	X (Δ) 1.688 m 2.597 m	is (Δ) -0.570 dB	JNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Of
6 7 8 9				=	Scale T
10					Log

(2DH3_2480M, π/4-DQPSK)



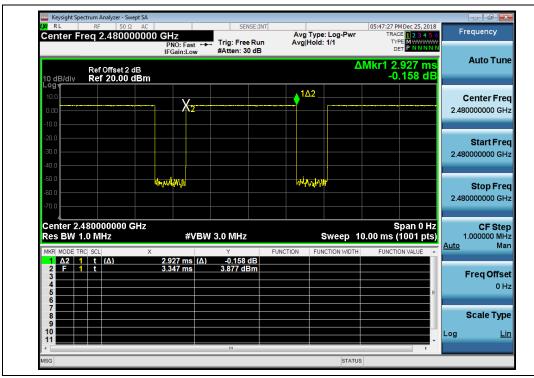
(2DH5_2402M, π/4-DQPSK)

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Center F	RF 50 Ω req 2.44100		st 🛶 Trig: Fre		Avg Type Avg Hold:	: Log-Pwr 1/1	TYPE	2 3 4 5 6 WWWWW P N N N N N	Fre	equenc
10 dB/div	Ref Offset 2 o Ref 20.00 o	IB				ΔN	/kr1 2.92 -0.6	27 ms 68 dB		Auto 1
Log 10.0 0.00 -10.0		2		142						enter 1000000
-20.0 -30.0 -40.0									2.441	Start 1000000
-50.0 -60.0 -70.0	ultrimethikur 		\ 	arthed deliver de			1864)/1444	ini ini	2.441	Stop I 1000000
Res BW 1		#	VBW 3.0 MH;			Sweep 10.	00 ms (10	<u> </u>	1. <u>Auto</u>	CF 9
MKR MODE TH 1 Δ2 1 2 F 1 3 4 5		× 2.927 ms 1.908 ms		dB	CTION FUN	CTION WIDTH	FUNCTION	/ALUE ^		Freq O
6 7 8 9										Scale T
11								-	Log	

(2DH5_2441M, π/4-DQPSK)



(2DH5_2480M, π/4-DQPSK)

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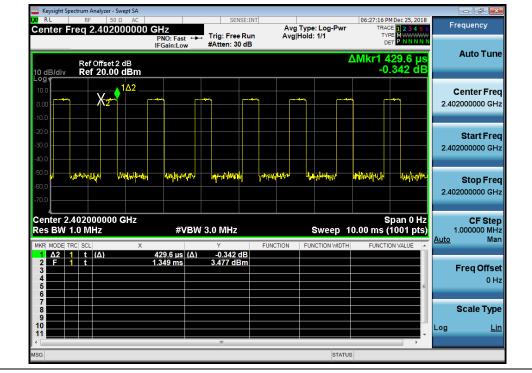


8-DPSK mode

A. Test Verdict:

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (ms)	Limit (sec)	Verdict
	2402	0.430	137.600		PASS
3DH1	2441	0.440	140.800		PASS
	2480	0.430	137.600		PASS
	2402	1.678	268.480		PASS
3DH3	2441	1.678	268.480	0.4	PASS
	2480	1.678	268.480		PASS
	2402	2.927	312.213		PASS
3DH5	2441	2.927	312.213		PASS
	2480	2.927	312.213		PASS

B. Test Plots:



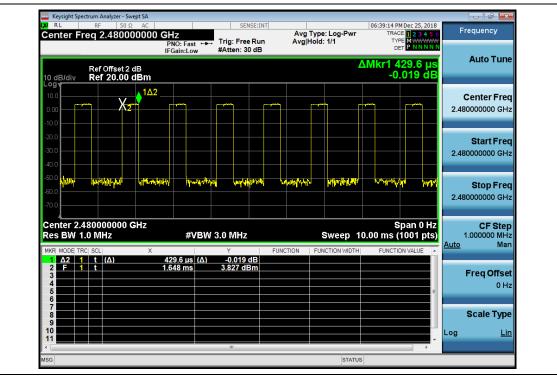
(3DH1_2402M, 8-DQPSK)

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Cen	ter Fr	eq 2	2.44100	0000	PI	Z IO: Fast Gain:Lov			Free R n: 30 d			Type: Hold: ′	Log-Pv 1/1	vr	TR	ACE 1 2 YPE MY DET P N	2 3 4 5 ///////////////////////////////////		requenc	
	B/div		Offset 2 of 20.00 of											Δ	/kr1 -2	439. 9.59	6 μs 4 dB		Auto	Tune
Log 10.0 0.00 -10.0			>	< <mark>2</mark>							***								Center 4100000	
-20.0 -30.0 -40.0					1Δ2													2.4	Start 4100000	
-50.0 -60.0 -70.0	nythyvo		n-fordition And the second		Neryy-Ne	/ *	When	hallow	4 ⁴⁴⁴	w P honey	t-stynt		MU	ululufur		n n n n n n n n n n n n n n n n n n n	N II	2.4	Stop 4100000	
	ter 2.4 BW 1.		00000 G Hz	Hz		#\	/BW	3.0 M	Hz			S	weep	10.0)0 ms	Span (100	1 0 Hz 1 ptsj	Auto	CF 1.000000	Step 0 MHz Mar
1 2 3 4	MODE TRO A2 1 F 1	t	(Δ))	(43 1.9	9.6 µs 48 ms	(Δ)	Y -29.8 3.60	594 de 7 dBn	3	NCTION	FUNC	TION WIE	HTC	FUNC	TION VAL	LUE	Adto	Freq C	
5 6 7 8 9																			Scale	Туре
10																		Log		Lin

(3DH1_2441M, 8-DQPSK)

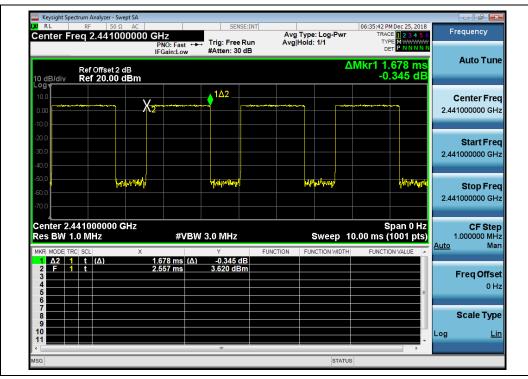


(3DH1_2480M, 8-DQPSK)



Center	RF 50 Ω AC Freq 2.402000000	GHz PNO: Fast ↔ Trig: F	SENSE:INT Avg Type: ree Run Avg Hold: ' : 30 dB	06:28:52 PM D Log-Pwr TRACE 1/1 TYPE DET	123456 Frequency MWWWWW PNNNNN
10 dB/div	Ref Offset 2 dB Ref 20.00 dBm			ΔMkr1 1.6 -0.3	78 ms Auto Tune 72 dB
10.0 0.00	X ₂	1Δ2		~~~~~	Center Freq 2.402000000 GHz
-20.0					Start Freq 2.402000000 GHz
-50.0	apri/J17-454597	anamadika			Stop Freq 2.402000000 GHz
Res BW	2.402000000 GHz 1.0 MHz	#VBW 3.0 MI		weep 10.00 ms (10	Auto Man
MKR MODE 1 A2 2 F 3 4	TRC SCL X 1 t (Δ) 1 t	1.678 ms (Δ) -0.3 1.598 ms 3.457	72 dB	TION WIDTH FUNCTION	Freq Offset
4 5 6 7 8					0 Hz Scale Type
9 10 11					Log <u>Lin</u>

(3DH3_2402M, 8-DQPSK)

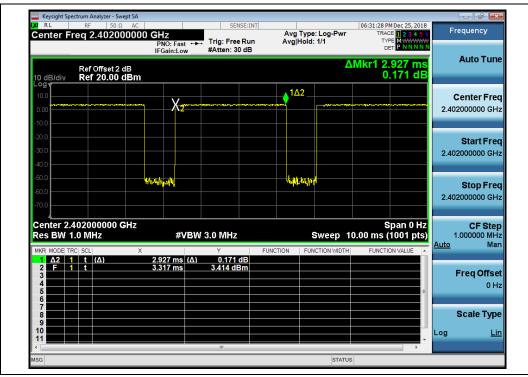


(3DH3_2441M, 8-DQPSK)



Center F	RF 50 Ω req 2.48000	PNO: Fast		Avg Type: Log-Pwr Avg Hold: 1/1	06:40:56 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE M	Frequency
10 dB/div	Ref Offset 2 d Ref 20.00 d		, #Atten: 30 dB	Δ	Mkr1 1.678 ms -0.350 dB	Auto Tun
10.0 0.00		X ₂	1Δ2			Center Fre 2.48000000 GH
-20.0						Start Fre 2.48000000 GH
-50.0 -60.0 -70.0	htti	we you	yanddarda	bray yophysis	wycprocythr	Stop Free 2.480000000 GH:
Center 2. Res BW			BW 3.0 MHz	Sweep 10	Span 0 Hz 0.00 ms (1001 pts)	CF Stej 1.000000 MH <u>Auto</u> Ma
1 Δ2 2 F 3 4 5 6	t (Δ)	<u>1.678 ms</u> 2.418 ms			=	Freq Offse 0 H
7						Scale Type

(3DH3_2480M, 8-DQPSK)

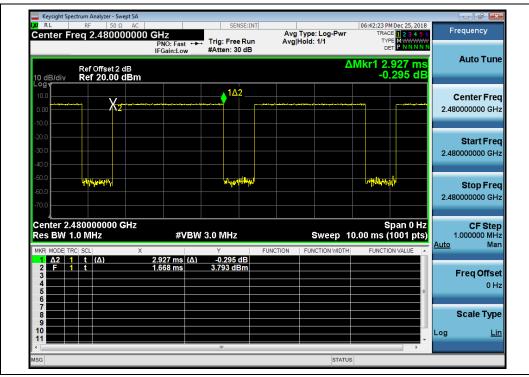


(3DH5_2402M, 8-DQPSK)



Center Freq 2.441	0 Ω AC 0000000 GHz PNO: Fast ↔ IFGain:Low	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 1/1	16:37:20 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
Ref Offset 10 dB/div Ref 20.0	2 dB	with to up	ΔΜ	kr1 2.927 ms 0.183 dB	Auto Tun
10.0 0.00		X ₂	1Δ2	2	Center Fre 2.441000000 GH
-20.0				2	Start Fre 2.441000000 GH
-50.0 -50.0	45yrapidy)	ur		2	Stop Free 2.441000000 GH:
Center 2.44100000 Res BW 1.0 MHz		3.0 MHz	Sweep 10.0	Span 0 Hz 0 ms (1001 pts) Au	CF Step 1.000000 MH to Ma
MKR MODE TRC SCL 1 Δ2 1 t (Δ) 2 F 1 t (Δ) 3 - - - - 4 - - - - 5 - - - - 6 - - - -	× 2.927 ms (Δ) 4.226 ms	Y FU 0.183 dB 3.609 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse
7					Scale Type

(3DH5_2441M, 8-DQPSK)



(3DH5_2480M, 8-DQPSK)



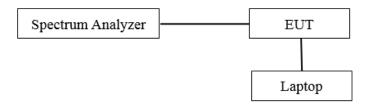
2.7. Conducted Spurious Emissions and Band Edge

2.7.1. Requirement

According to FCC §15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.7.2. Test Description

A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Please refer ANNEX B(4).

2.7.3. Test Result

The Bluetooth Module operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.



GFSK Mode

A. Test Plots:

Note: The power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GHz, GFSK Mode)



(Channel = 0, Band edge,GFSK Mode)

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Test LaboratoryXIAMEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian), P. R. China

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11:02:43 AM Dec 27, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N Peak Search 4.881040843215 GHz Marker 1 Avg Type: Log-Pwr Avg|Hold: 13/100 PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 4.881 0 GHz -37.677 dBm Next Peak Ref Offset 2 dB Ref 20.00 dBm 10 dB/div Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLv More 1 of 2 Stop 25.00 GHz Sweep 2.387 s (8350 pts) Start 30 MHz #Res BW 100 kHz #VBW 300 kHz

(Channel = 0, Band edge with hopping on, GFSK Mode)

(Channel = 39, 30MHz to 25GHz, GFSK Mode)

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Fax: +86Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian), P. R. ChinaTel: +86
Fax: +86
Fax: +86

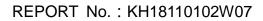




(Channel = 78, 30MHz to 25GHz, GFSK Mode)



(Channel = 78, Band edge, GFSK Mode)







(Channel = 78, Band edge with hopping on, GFSK Mode)



π/4-DQPSK Mode

A. Test Plots:

Note: the power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GHz, $\pi/4$ -DQPSK)



(Channel = 0, Band edge, $\pi/4$ -DQPSK)







(Channel = 0, Band edge with hopping on, $\pi/4$ -DQPSK)



(Channel = 39, 30MHz to 25GHz, $\pi/4$ -DQPSK)





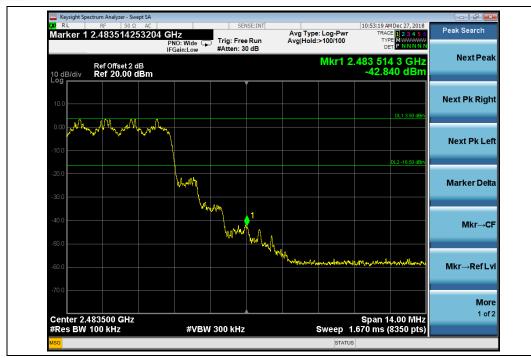
(Channel = 78, 30MHz to 25GHz, $\pi/4$ -DQPSK)



(Channel = 78, Band edge, $\pi/4$ -DQPSK)

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MORL

(Channel = 78, Band edge with hopping on, π /4-DQPSK)



8-DPSK Mode

A. Test Plots:

Note: the power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GH, 8-DPSK)



(Channel = 0, Band edge, 8-DPSK)

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Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian), P. R. China

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M RL RF 50 Ω AC Marker 1 2.399690621631 GHz PNo: Wide IF Gain: Low :07 AM Dec 27, 2018 Peak Search Avg Type: Log-Pwr Avg|Hold:>100/100 Trig: Free Run #Atten: 30 dB Next Peak Mkr1 2.3 99 690 6 GHz -35.748 dBm Ref Offset 2 dB Ref 20.00 dBm 10 dB/di Next Pk Right 1,14 w w Next Pk Left Marker Delta MAA **♦**¹ Mkr→CF howhow Mkr→RefLvl More 1 of 2 Center 2.400000 GHz #Res BW 100 kHz Span 14.00 MHz Sweep 1.670 ms (8350 pts) #VBW 300 kHz



(Channel = 0, Band edge with hopping on, 8-DPSK)

(Channel = 39, 30MHz to 25GHz, 8-DPSK)

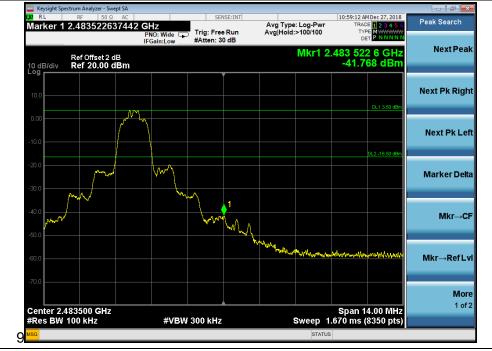
Kehu-Morlab Tel: +86 592 5612050 XIAMEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. **Test Laboratory** Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) , P. R. China







(Channel = 78, 30MHz to 25GH, 8-DPSK)



(Channel = 78, Band edge, 8-DPSK)





(Channel = 78, Band edge with hopping on, 8-DPSK)





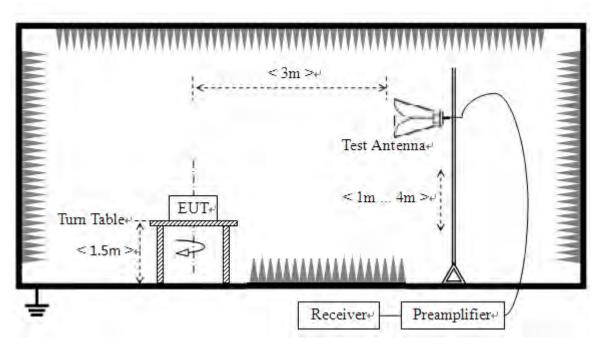
2.8. Restricted Frequency Bands

2.8.1. Requirement

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.8.2. Test Description

A. Test Setup:



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under non hopping-on test mode transmitting 339 bytes DH5, 679 bytes 2DH5 and 1021 bytes 3DH5 packages at maximum power. For the Test Antenna:

Horn Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.



B. Equipments List:

Please refer ANNEX B(4).

2.8.3. Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands. The measurement results are obtained as below: E $[dB\mu V/m] = U_R + A_T + A_{Factor} [dB]; AT = L_{Cable loss} [dB] - G_{preamp} [dB]$ AT: Total correction Factor except Antenna UR: Receiver Reading Gpreamp: Preamplifier Gain AFactor: Antenna Factor at 3m

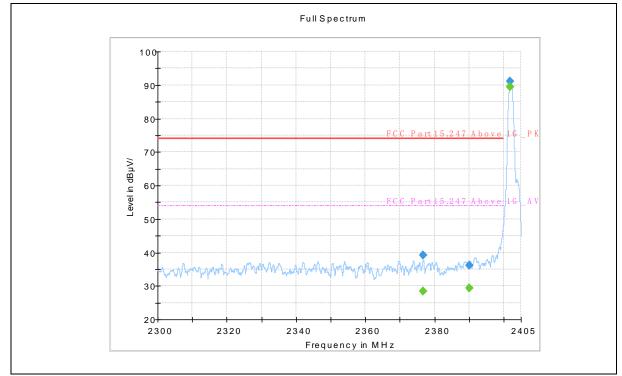
Note: The right headset and left headset will work simultaneously during normal use, we selected right headset and left headset simultaneous transmission for fully radiated emission testing.

Mode	Channel	Limit (dBµV/m)	Antenna	Verdict
	0		Horizontal	Pass
GFSK	0		Vertical	Pass
ULSK	78		Horizontal	Pass
	78		Vertical	Pass
	0		Horizontal	Pass
	0	PK: 74	Vertical	Pass
$\pi/4$ -DQPSK	78	AV: 54	Horizontal	Pass
	78		Vertical	Pass
	0		Horizontal	Pass
0 DDCV	0		Vertical	Pass
8-DPSK	78		Horizontal	Pass
	78		Vertical	Pass

Test Verdict:



GFSK Test mode

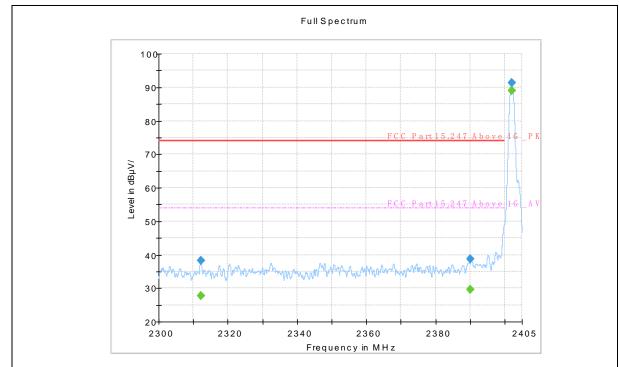


(GFSK _2402MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2376.743333		28.43	54.00	25.57	Н	7.3
2376.743333	39.20		74.00	34.80	Н	7.3
2390.002500	36.05		74.00	37.95	Н	8.0
2390.002500		29.29	54.00	24.71	н	8.0
2401.925833	91.17				Н	8.7
2401.925833		89.41			Н	8.7





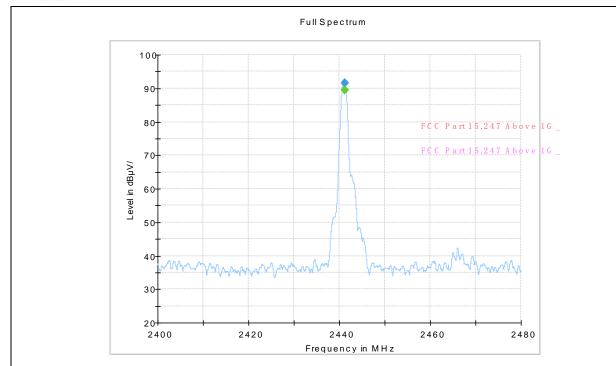


(GFSK _2402MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2312.115833	38.16		74.00	35.84	V	6.8
2312.115833		27.66	54.00	26.34	V	6.8
2390.002500	38.69		74.00	35.31	V	8.0
2390.002500		29.54	54.00	24.46	V	8.0
2402.159167		88.94			V	8.7
2402.159167	91.27				V	8.7





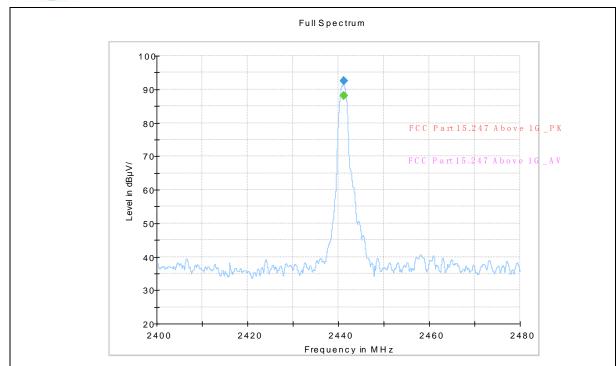


(GFSK _2441MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.133333		89.39			Н	7.8
2441.133333	91.53				Н	7.8





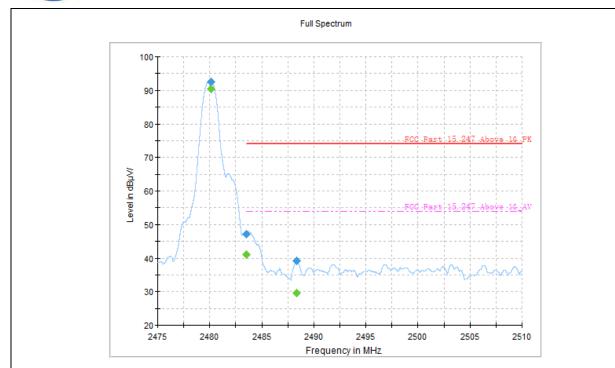


(GFSK _2441MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.191111		88.01			V	7.8
2441.191111	92.56				V	7.8





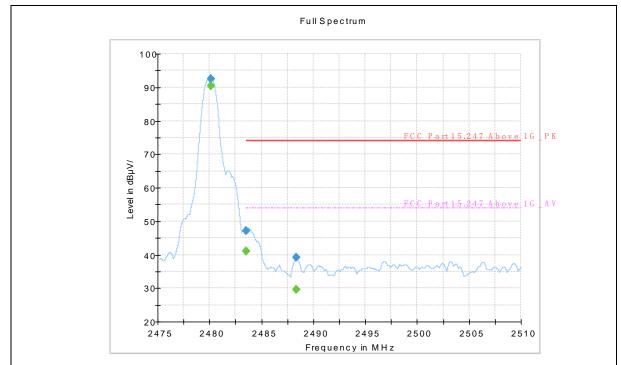


(GFSK _2480MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.137222	92.61				Н	8.2
2480.137222		90.41			н	8.2
2483.501111		41.11	54.00	12.89	н	8.3
2483.501111	47.03		74.00	26.97	Н	8.3
2488.354445	39.17		74.00	34.83	Н	8.4
2488.354445		29.62	54.00	24.38	Н	8.4





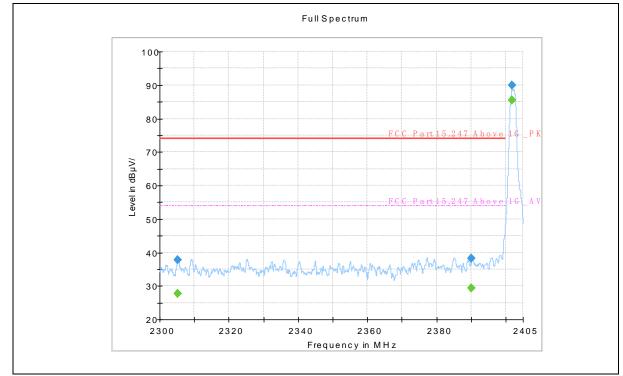


(GFSK _2480MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.437824	92.41				V	8.2
2480.437524		90.32			V	8.2
2483.702179		41.91	54.00	12.89	V	8.3
2483.702179	47.52		74.00	26.97	V	8.3
2488.354665	39.24		74.00	34.83	V	8.4
2488.354665		29.71	54.00	24.38	V	8.4



 $\pi/4$ -DQPSK Test mode

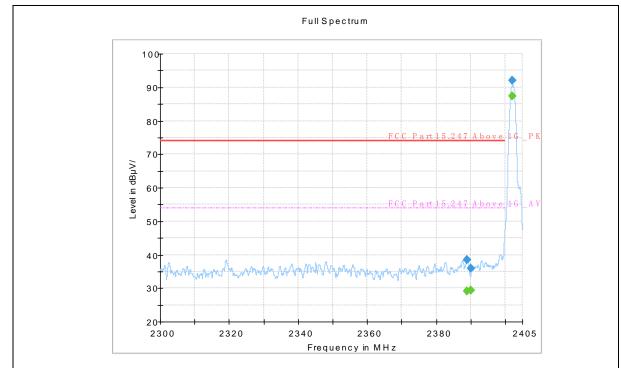


(π/4-DQPSK _2402MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2305.267500		27.83	54.00	26.17	Н	6.6
2305.267500	37.79		74.00	36.21	Н	6.6
2390.002500	38.25		74.00	35.75	Н	8.0
2390.002500		29.46	54.00	24.54	Н	8.0
2401.902500	89.84				Н	8.7
2401.902500		85.60			Н	8.7





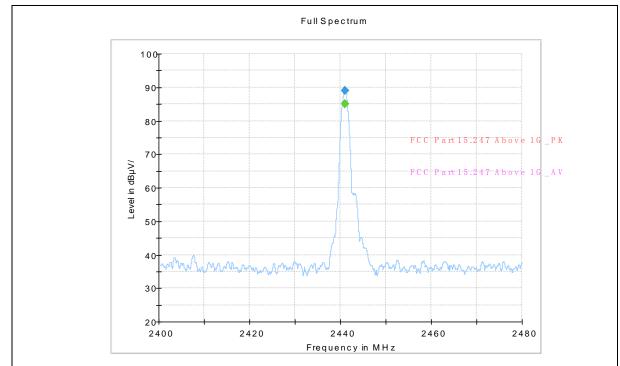


(π/4-DQPSK _2402MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2389.034167	38.40		74.00	35.60	V	7.9
2389.034167		29.05	54.00	24.95	V	7.9
2390.002500		29.30	54.00	24.70	V	8.0
2390.002500	36.01		74.00	38.00	V	8.0
2402.165000	91.94				V	8.7
2402.165000		87.43			V	8.7





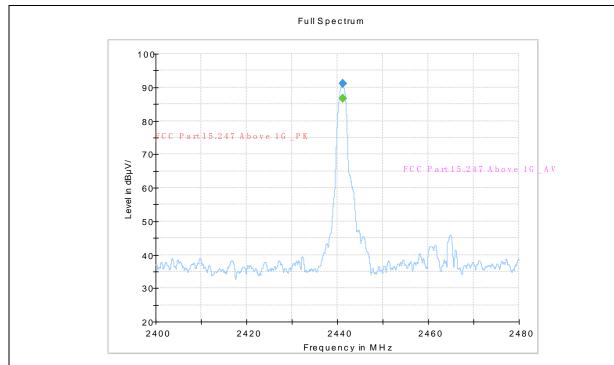


(π/4-DQPSK _2441MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.013333		84.98			Н	7.8
2441.013333	89.03				Н	7.8





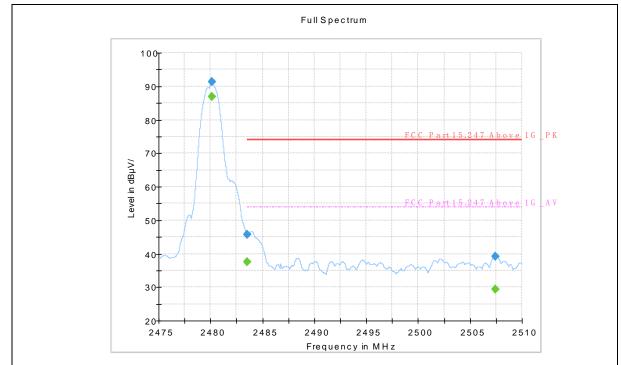


(π/4-DQPSK _2441MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.231111		86.56			V	7.8
2441.231111	91.21				V	7.8





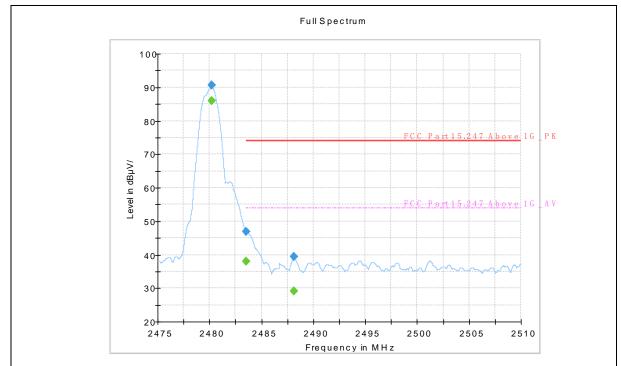


(π/4-DQPSK _2480MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.139167		86.85			Н	8.2
2480.139167	91.31				Н	8.2
2483.501111	45.69		74.00	28.31	Н	8.3
2483.501111		37.44	54.00	16.56	Н	8.3
2507.450833	39.28		74.00	34.72	Н	8.3
2507.450833		29.31	54.00	24.69	Н	8.3





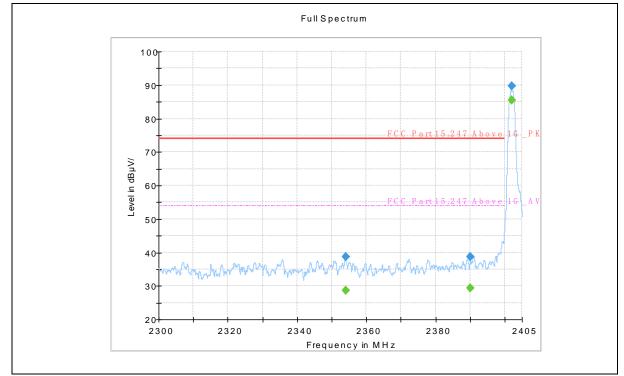


(π/4-DQPSK _2480MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.185833	90.64				V	8.2
2480.185833		86.05			V	8.2
2483.501111	46.82		74.00	27.18	V	8.3
2483.501111		37.99	54.00	16.01	V	8.3
2488.119167		29.05	54.00	24.95	V	8.4
2488.119167	39.46		74.00	34.54	V	8.4



8-DQPSK Test mode

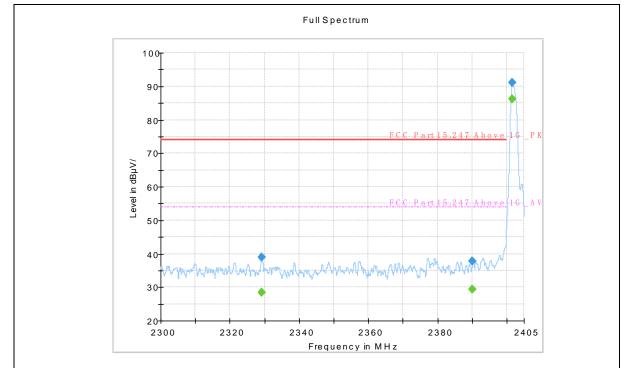


(8-DQPSK _2402MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2353.981667		28.60	54.00	25.40	Н	7.7
2353.981667	38.76		74.00	35.24	Н	7.7
2390.002500	38.77		74.00	35.23	Н	8.0
2390.002500		29.31	54.00	24.69	Н	8.0
2402.112500	89.76				Н	8.7
2402.112500		85.47			Н	8.7





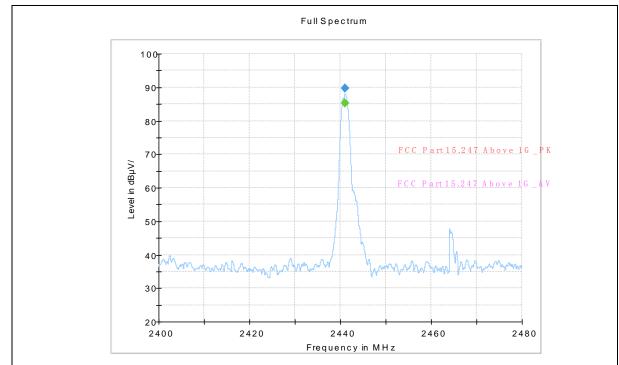


(8-DQPSK _2402MHz _2402MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2329.213333	39.02		74.00	34.98	V	7.4
2329.213333		28.43	54.00	25.57	V	7.4
2390.002500		29.31	54.00	24.69	V	8.0
2390.002500	37.72		74.00	36.28	V	8.0
2401.680833	91.06				V	8.7
2401.680833		86.14			V	8.7





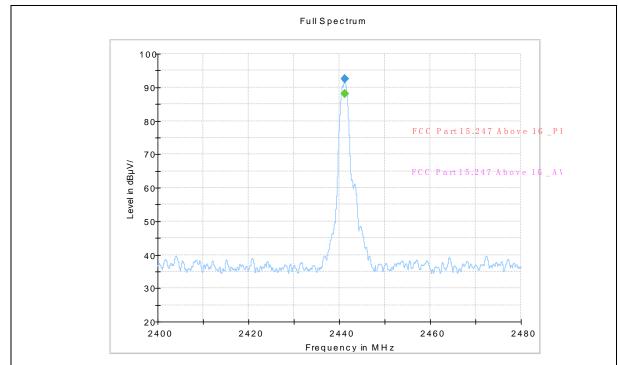


(8-DQPSK _2441MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.026667		85.34			Н	7.8
2441.026667	89.63				Н	7.8





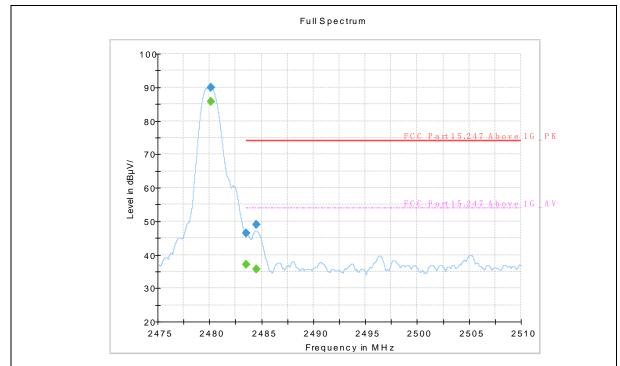


(8-DQPSK _2441MHz _2402MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2441.164445		88.17			V	7.8
2441.164445	92.62				V	7.8







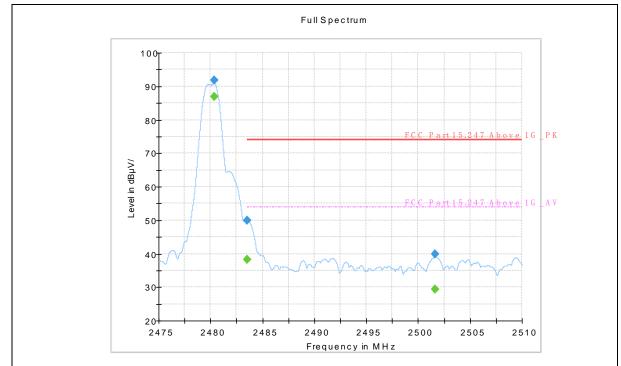
(8-DQPSK _2480MHz, Antenna Horizontal)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.117778	89.97				Н	8.2
2480.117778		85.64			Н	8.2
2483.501111	46.53		74.00	27.47	Н	8.3
2483.501111		37.16	54.00	16.84	Н	8.3
2484.471389		35.64	54.00	18.36	Н	8.3
2484.471389	48.89		74.00	25.11	Н	8.3

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Fax: +80
Fax: +80







(8-DQPSK _2480MHz, Antenna Vertical)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
2480.333611		86.95			V	8.2
2480.333611	91.86				V	8.2
2483.501111	49.96		74.00	24.04	V	8.3
2483.501111		38.26	54.00	15.74	V	8.3
2501.648611	39.88		74.00	34.12	V	8.3
2501.648611		29.45	54.00	24.55	V	8.3



2.9. Conducted Emission

2.9.1. Requirement

According to RSS-GEN section 8.8, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μ H/ 50Ω line impedance stabilization network (LISN).

Frequency range	Conducted Limit (dBµV)		
(MHz)	Quai-peak	Average	
0.15 - 0.50	66 to 56	56 to 46	
0.50 - 5	56	46	
5- 30	60	50	

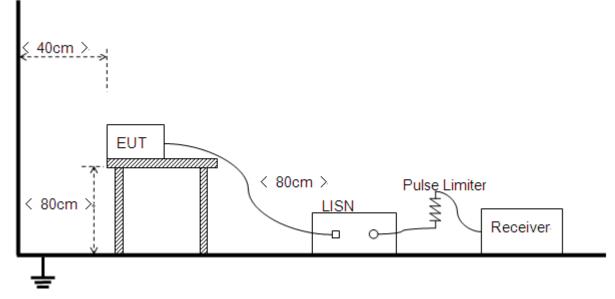
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.9.2. Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.



The factors of the site are calibrated to correct the reading. During the measurement, the Bluetooth EUT is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

B. Equipments List:

Please refer ANNEX B(4).

2.9.3. Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Note: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

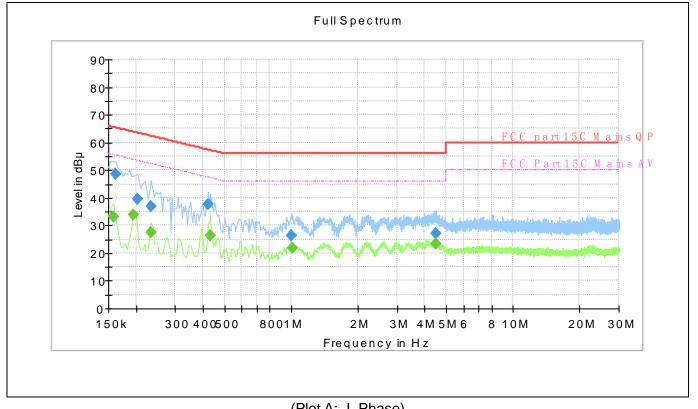
A. Test setup:

The EUT configuration of the emission tests is <u>EUT +Laptop</u>.

Note: The test voltage is AC 120V/60Hz.

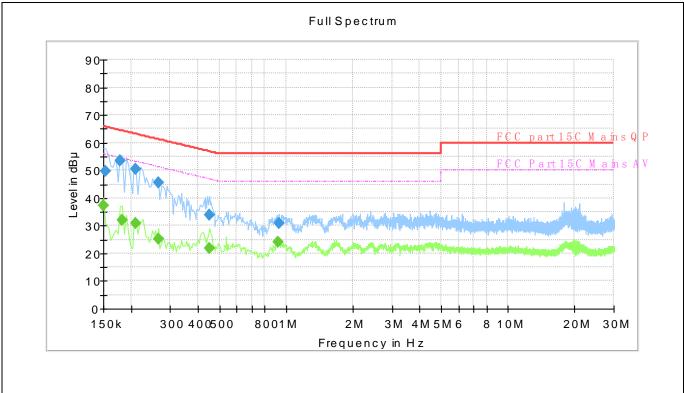


B. Test Plots:



Frequency	MaxPeak	Average	Limit	Margin	Line	Corr.
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)		(dB)
0.158000		33.25	55.57	22.32	L	10.2
0.162000	48.56		65.36	16.80	L	10.2
0.194000		33.83	53.86	20.04	L	10.2
0.202000	39.40		63.53	24.13	L	10.2
0.234000		27.62	52.31	24.69	L	10.2
0.234000	36.81		62.31	25.50	L	10.2
0.422000	37.52		57.41	19.89	L	10.2
0.430000		26.26	47.25	20.99	L	10.2
1.006000	26.47		56.00	29.53	L	10.3
1.014000		22.00	46.00	24.00	L	10.3
4.470000		23.36	46.00	22.64	L	10.4
4.502000	27.11		56.00	28.89	L	10.4





(Plot A: N Phase)								
Frequency	MaxPeak	Average	Limit	Margin	Line	Corr.		
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dB)		(dB)		
0.150000		37.15	56.00	18.85	Ν	10.2		
0.154000	49.70		65.78	16.08	Ν	10.2		
0.178000	53.55		64.58	11.03	Ν	10.2		
0.182000		32.05	54.39	22.34	Ν	10.2		
0.210000		30.80	53.21	22.40	Ν	10.2		
0.210000	50.47		63.21	12.73	Ν	10.2		
0.266000	45.66		61.24	15.58	Ν	10.2		
0.266000		25.17	51.24	26.07	N	10.2		
0.450000	33.98		56.88	22.89	N	10.2		
0.450000		21.79	46.88	25.08	Ν	10.2		
0.918000		24.02	46.00	21.98	Ν	10.3		
0.926000	31.05		56.00	24.95	Ν	10.3		