FCC TEST REPORT

FOR

FN-LINK TECHNOLOGY LIMITED.

2.4G+5G WIFI+BT Module

Model No.: 6221C-PUC

Additional Model No.: N/A

Prepared for	:	FN-LINK TECHNOLOGY LIMITED.
Address	:	No.8 Litong Road, Liuyang Economic Development Zone, Liu yang City, Hunan Province, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
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Web	:	www.LCS-cert.com
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Date of receipt of test sample	:	Mar. 12, 2018
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	Mar. 12, 2018~ Mar. 20, 2018
Date of Report	:	Mar. 20, 2018

FCC TEST REPORT

FCC CFR 47 PART 15 C(15.247)

Report Reference No.	**:**	**LCS180111037AEA**
Date of Issue.....	:	Mar. 20, 2018
Testing Laboratory Name.....	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**:**	**FN-LINK TECHNOLOGY LIMITED.**
Address.....	:	No.8 Litong Road, Liuyang Economic Development Zone, Liu yang City, Hunan Province, China
Test Specification		
Standard	:	FCC CFR 47 PART 15 C(15.247)
Test Report Form No.	:	LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

Test Item Description.	**:**	**2.4G+5G WIFI+BT Module**
Trade Mark.....	:	N/A
Model/ Type reference	:	6221C-PUC
Ratings.....	:	DC 3.3V AC 120V 60Hz(Adapter for DSP)
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Calvin Weng	Dick Su	Gavin Liang
Calvin Weng/ Administrators	Dick Su/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : **LCS180111037AEA**	Mar. 20, 2018 Date of issue

EUT.....	: 2.4G+5G WIFI+BT Module
Type / Model.....	: 6221C-PUC
Applicant.....	**: FN-LINK TECHNOLOGY LIMITED.**
Address.....	: No.8 Litong Road, Liuyang Economic Development Zone, Liu yang City, Hunan Province, China
Telephone.....	:
Fax.....	:
Manufacturer.....	**: FN-LINK TECHNOLOGY LIMITED.**
Address.....	: No.8 Litong Road, Liuyang Economic Development Zone, Liu yang City, Hunan Province, China
Telephone.....	:
Fax.....	:
Factory.....	: **FN-LINK TECHNOLOGY LIMITED.**
Address.....	: No.8 Litong Road, Liuyang Economic Development Zone, Liu yang City, Hunan Province, China
Telephone.....	:
Fax.....	:

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	Mar. 20, 2018	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Name of EUT	2.4G+5G WIFI+BT Module
Model Number	6221C-PUC
Antenna Gain	2dBi (max.) For BT, 2.4G WLAN & 5G WLAN
Hardware version	V1.0
Software version	V1.0
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20:OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40:OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT20:OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac VHT40:OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac VHT80:OFDM (64QAM, 16QAM, QPSK,BPSK)
WLAN FCC Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz,5180-5240MHz,5745-5825MHz IEEE 802.11n HT40:2422-2452MHz,5190-5230MHz,5755-5795MHz IEEE 802.11a:5180-5240MHz, 5745-5825MHz IEEE 802.11ac VHT20:5180-5240MHz, 5745-5825MHz IEEE 802.11ac VHT40:5190-5230MHz, 5755-5795MHz IEEE 802.11ac VHT80:5210MHz,5775MHz
Antenna Type	PIFI Antenna for BT/WIFI
BT Modulation Type	GFSK,8-DPSK,π/4-DQPSK(BT V4.2)
Extreme temp. Tolerance	-30°C to +85°C
Extreme vol. Limits	3.15VDC to 3.45VDC (nominal: 3.30VDC)

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
Lenovo	ADAPTER for EUT's DSP	Sp-888	---	FCC VoC

1.3. External I/O Cable

I/O Port Description	Quantity	Cable
USB Port	1	N/A
PCIe	1	N/A

1.4. Description of Test Facility

FCC Registration Number is 254912.
Industry Canada Registration Number is 9642A-1.
ESMD Registration Number is ARCB0108.
UL Registration Number is 100571-492.
TUV SUD Registration Number is SCN1081.
TUV RH Registration Number is UA 50296516-001

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
		200MHz~1000MHz	±3.10dB	(1)
		1GHz~26GHz	±3.80dB	(1)
		26GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)

(1) The uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7 Description of Test Modes

Bluetooth operates in the unlicensed ISM Band at 2.4GHz. With basic data rate feature, the data rates can be up to 1 Mb/s by modulating the RF carrier using GFSK techniques. The EUT works in the X-axis, Y-axis, Z-axis. The following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Frequency Range (MHz)	Data Rate (Mbps)
BT V 3.0	2402	1/2/3
	2441	1/2/3
	2480	1/2/3
For Conducted Emission		
Test Mode	TX Mode	
For Radiated Emission		
Test Mode	TX Mode	

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power that was determined to be TX (1Mbps).

Worst-case mode and channel used for 9kHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX(1Mbps-High Channel).

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/50Hz modes, recorded worst case;

AC conducted emission pre-test at both at power adapter and power from PC modes, recorded worst case;

Bluetooth V3.0 (DSS) frequency & channel list:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	2402	40	2442
1	2403	41	2443
--	--	--	--
37	2439	77	2479
38	2440	78	2480
39	2441		

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR PART 15C 15.207, 15.209, 15.247 and DA 00-705.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209, 15.247 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is directly placed on the ground. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turntable, which is directly placed on the ground. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmits condition.

3.2 EUT Exercise Software

The sample will be controlled by RFtest tool to enter RF test mode to control sample change channel, modulation and so on;

3.3 Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes
1	PC	DELL	L180AS-03	00021778	/	/	DOC
2	Power adapter	Lenovo	SP-888	/	0.5m	unshielded	DOC

3.4 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)	Application Range
1	Xingka	XK-W5515A-PCB-2.4-5.8-150	PCB	Ipex	2	2400MHz~2483.5MHz
					2	5150MHz~5250MHz
					2	5745MHz~5850MHz

Note: The EUT has only one type antenna.

3.5 Block Diagram/Schematics

Please refer to the related document.

3.6 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.7 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

Applied Standard: FCC Part 15 Subpart C		
FCC Rules	Description of Test	Result
§15.247(b)(1)	Maximum Conducted Output Power	Compliant
§15.247(c)	Frequency Separation And 20 dB Bandwidth	Compliant
§15.247(a)(1)(ii)	Number Of Hopping Frequency	Compliant
§15.247(a)(1)(iii)	Time Of Occupancy (Dwell Time)	Compliant
§15.209, §15.205	Conducted Spurious Emissions and Band Edges Test	Compliant
§15.209, §15.247(d)	Radiated and Conducted Spurious Emissions	Compliant
§15.205	Emissions at Restricted Band	Compliant
§15.207(a)	Conducted Emissions	Compliant
§15.203	Antenna Requirements	Compliant
§15.247(i)§2.1093	RF Exposure	Compliant

Note: This EUT has two antenna ports, but it's SISO, we test both antennas, but only record worst case on Antenna 1.

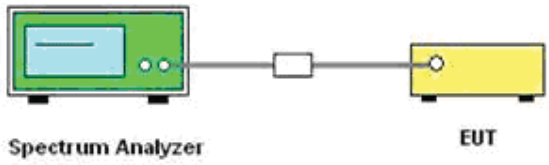
5. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Power Meter	R&S	NRVS	100444	2017-06-17	2018-06-16
2	Power Sensor	R&S	NRV-Z81	100458	2017-06-17	2018-06-16
3	Power Sensor	R&S	NRV-Z32	10057	2017-06-17	2018-06-16
4	ESA-E SERIES SPECTRUM ANALYZER	Agilent	E4407B	MY41440754	2017-11-17	2018-11-16
5	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2017-06-17	2018-06-16
6	SPECTRUM ANALYZER	R&S	FSP	100503	2017-06-17	2018-06-16
7	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2017-06-17	2018-06-16
8	Positioning Controller	MF	MF-7082	/	2017-06-17	2018-06-16
9	EMI Test Software	AUDIX	E3	N/A	2017-06-17	2018-06-16
10	EMI Test Receiver	R&S	ESR 7	101181	2017-06-17	2018-06-16
11	AMPLIFIER	QuieTek	QTK-A2525G	CHM10809065	2017-11-17	2018-11-16
12	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2017-06-23	2018-06-22
13	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2017-05-02	2018-05-01
14	Horn Antenna	EMCO	3115	6741	2017-06-23	2018-06-22
15	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2017-09-21	2018-09-20
16	Broadband Preamplifier	SCHWARZBECK	BBV 9719	9719-025	2017-09-21	2018-09-20
17	RF Cable-R03m	Jye Bao	RG142	CB021	2017-06-17	2018-06-16
18	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2017-06-17	2018-06-16
19	TEST RECEIVER	R&S	ESCI	101142	2017-06-17	2018-06-16
20	RF Cable-CON	UTIFLEX	3102-26886-4	CB049	2017-06-17	2018-06-16
21	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2017-06-17	2018-06-16
22	Artificial Mains	R&S	ENV216	101288	2017-06-17	2018-06-16
23	RF Control Unit	Tonscend	JS0806-2	178060073	2017-10-28	2018-10-27
24	BT/WIFI Test Software	Tonscend	JS1120-3	/	N/A	N/A
Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.						

6. ANTENNA PORT MEASUREMENT

6.1 Peak Power

6.1.1 Block Diagram of Test Setup



6.1.2 Limit

According to §15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping system in the 2400–2483.5 MHz band: 0.125 watts.

6.1.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

VBW ≥ RBW

Sweep = auto

Detector function = peak

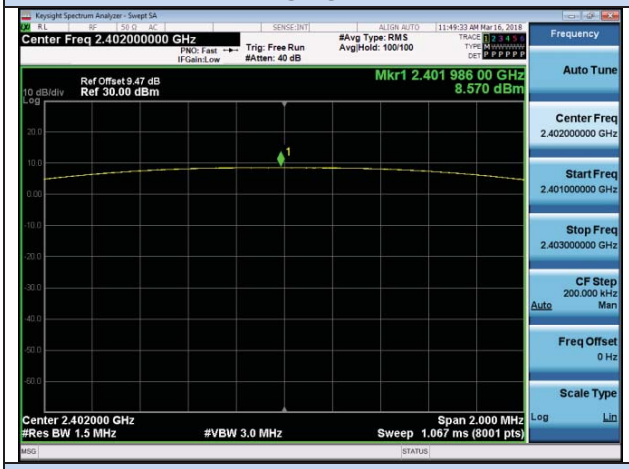
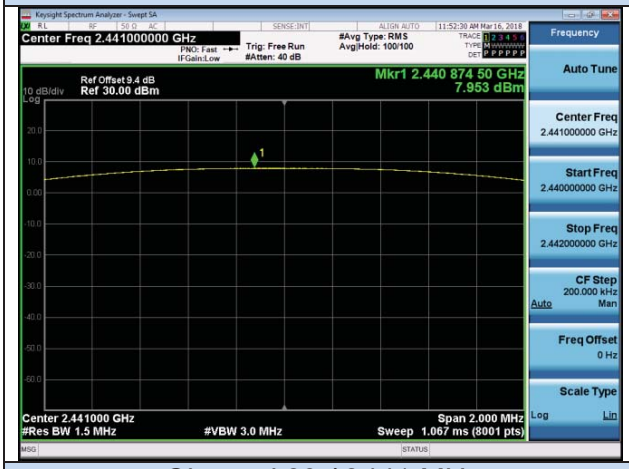
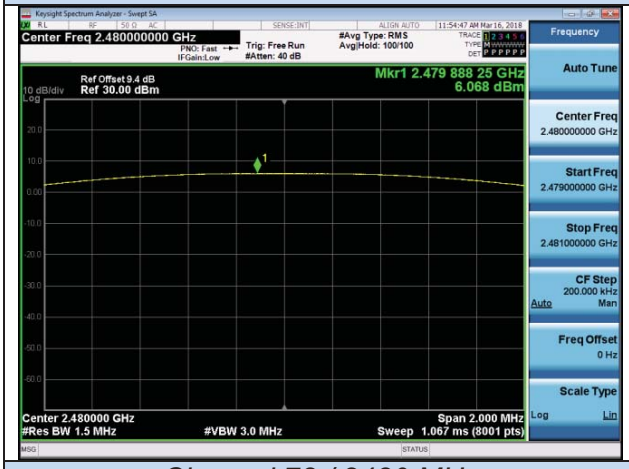
Trace = max hold

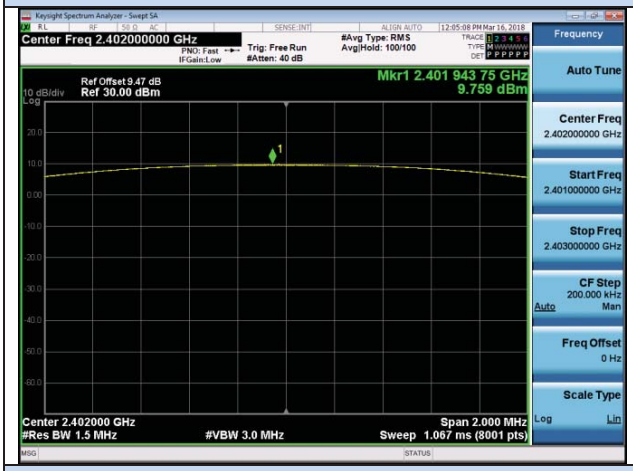
Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

6.1.4 Test Results

Test Mode	Channel	Frequency (MHz)	Measured Maximum Power (dBm)	Limits (dBm)	Verdict
GFSK	0	2402	8.570	21.00	PASS
	39	2441	7.953		
	78	2480	6.068		
π/4DQPSK	0	2402	8.628	21.00	PASS
	39	2441	7.966		
	78	2480	8.060		
8DPSK	0	2402	9.759	21.00	PASS
	39	2441	8.257		
	78	2480	6.415		

Remark:
1. *Test results including cable loss;*
2. *Measured output power at difference Packet Type for each mode and recorded worst case for each mode.*
3. *Worst case data at DH5 for GFSK, 2DH5 for π/4DQPSK, 3DH5 for 8DPSK modulation type;*
4. *Please refer to following test plots.*

Peak Output Power	
GFSK	π/4-DQPSK
	
Channel 0 / 2402 MHz	Channel 0 / 2402 MHz
	
Channel 39 / 2441 MHz	Channel 39 / 2441 MHz
	
Channel 78 / 2480 MHz	Channel 78 / 2480 MHz

Peak Output Power	
8DPSK	
	
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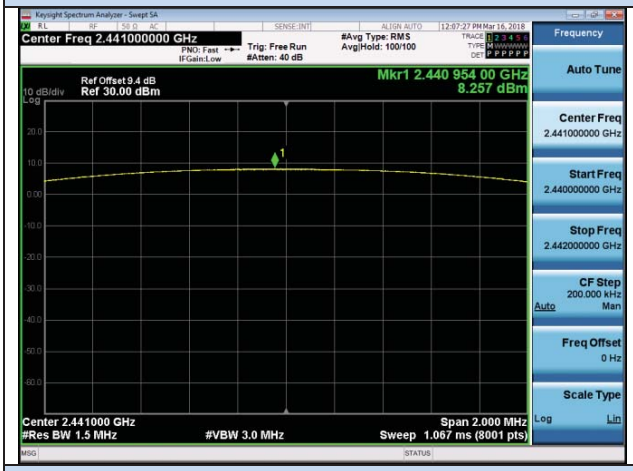
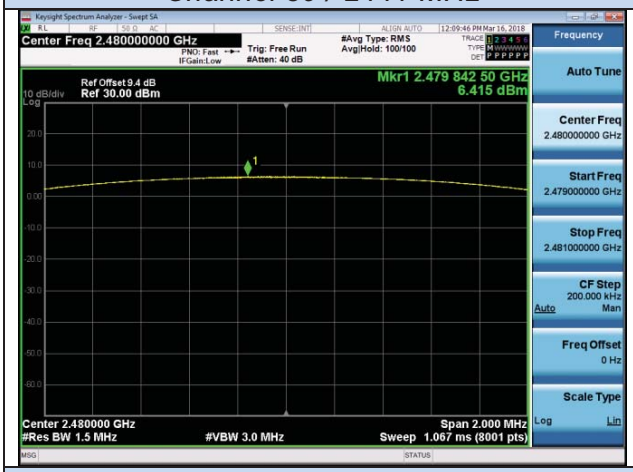
	
Channel 39 / 2441 MHz	
	
Channel 78 / 2480 MHz	

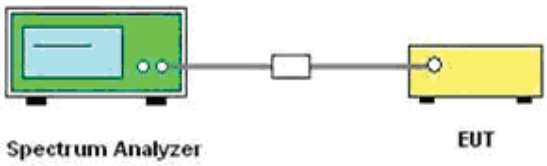
6.2 Frequency Separation and 20 dB Bandwidth

6.2.1 Limit

§ 15.247(a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

According to §15.247(c) or A8.1(a), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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 in15.209(a).

6.2.2 Block Diagram of Test Setup



6.2.3 Test Procedure

Frequency separation test procedure：

1). Place the EUT on the table and set it in transmitting mode.

2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

3). Set center frequency of Spectrum Analyzer = middle of hopping channel.

4). Set the Spectrum Analyzer as RBW = 100 KHz, VBW = 300 KHz, Span = wide enough to capture the peaks of two adjacent channels, Sweep = auto.

5). Max hold, mark 2 peaks of hopping channel and record the 2 peaks frequency.

20dB bandwidth test procedure：

1). Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel.

2). RBW = 30 KHz, VBW = 100 KHz.

3). Detector function = peak.

4). Trace = max hold.

6.2.4 Test Results

6.2.4.1 20dB Bandwidth

Test Mode	Channel	Frequency (MHz)	Measured Bandwidth (KHz)		Limits (KHz)	Verdict
			99%	20dB		
GFSK	0	2402	945.43	1106	No Limits	PASS
	39	2441	942.85	1104		
	78	2480	943.67	1106		
π/4DQPSK	0	2402	1165.4	1313	No Limits	PASS
	39	2441	1169.5	1326		
	78	2480	1165.8	1324		
8DPSK	0	2402	1183.5	1350	No Limits	PASS
	39	2441	1181.7	1348		
	78	2480	1179.3	1345		

Remark:

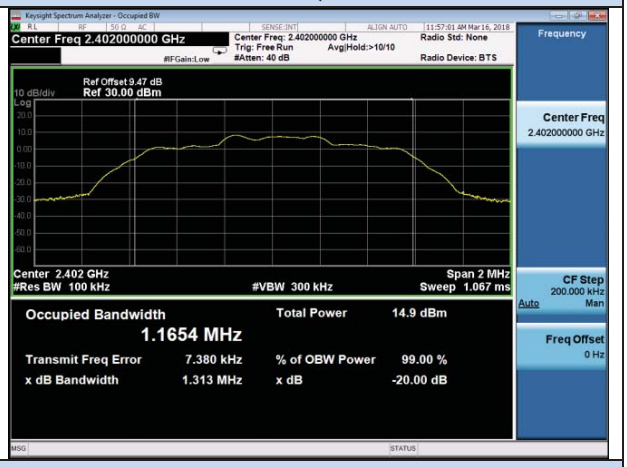
1. *Test results including cable loss;*
2. *Measured 20dB and occupied bandwidth at difference Packet Type for each mode and recorded worst case for each mode.*
3. *Worst case data at DH5 for GFSK, 2DH5 for π/4DQPSK, 3DH5 for 8DPSK modulation type;*
4. *Please refer following test plots;*

20dB Bandwidth and 99% Bandwidth

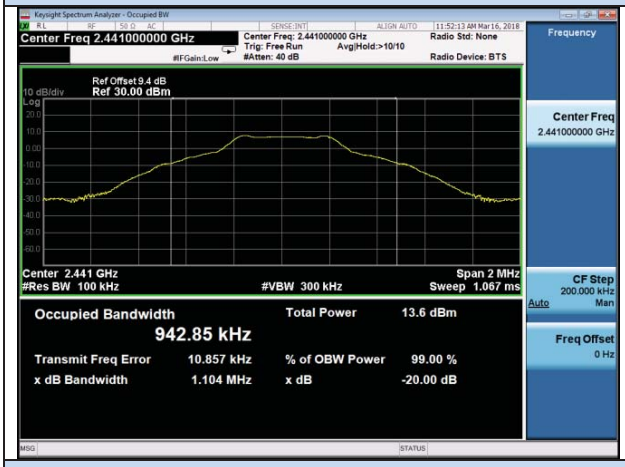
GFSK

Channel 0 / 2402 MHz

π/4DQPSK



Channel 0 / 2402 MHz



Channel 39 / 2441 MHz

Channel 39 / 2441 MHz

Channel 78 / 2480 MHz

Channel 78 / 2480 MHz

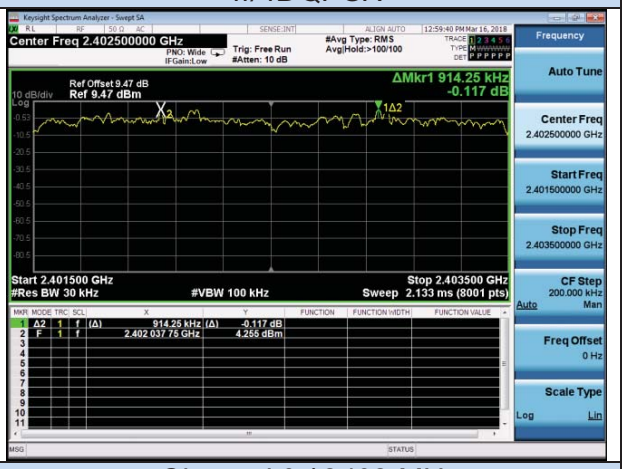
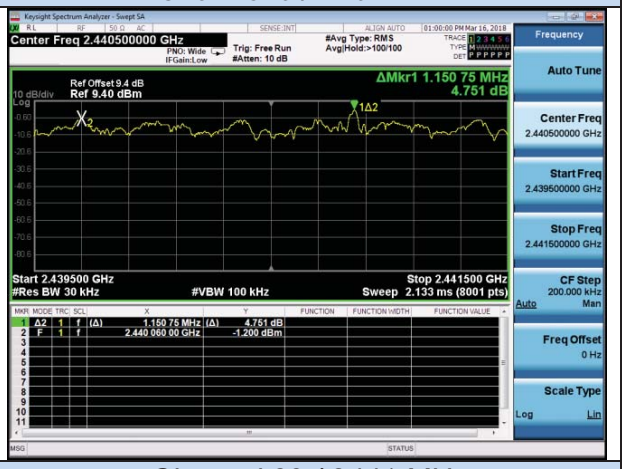
20dB Bandwidth and 99% Bandwidth	
8DPSK	
	
Channel 0 / 2402 MHz	
	
Channel 39 / 2441 MHz	
	
Channel 78 / 2480 MHz	

6.2.4.2 Frequency Separation

The Measurement Result With 1Mbps For GFSK Modulation				
Channel	20dB Bandwidth (KHz)	Channel Separation (MHz)	Limit (KHz)	Result
Low	1106	0.997	≥737.33	PASS
Middle	1104	1.084	≥736	PASS
High	1106	0.913	≥737.33	PASS
The Measurement Result With 2Mbps For π/4-DQPSK Modulation				
Channel	20dB Bandwidth (KHz)	Channel Separation (MHz)	Limit (KHz)	Result
Low	1313	0.914	≥875.33	PASS
Middle	1326	1.151	≥884	PASS
High	1324	0.912	≥ 882.67	PASS
The Measurement Result With 3Mbps For 8-DPSK Modulation				
Channel	20dB Bandwidth (KHz)	Channel Separation (MHz)	Limit (KHz)	Result
Low	1350	1.048	≥ 900	PASS
Middle	1348	0.914	≥ 898.67	PASS
High	1345	1.151	≥ 896.67	PASS

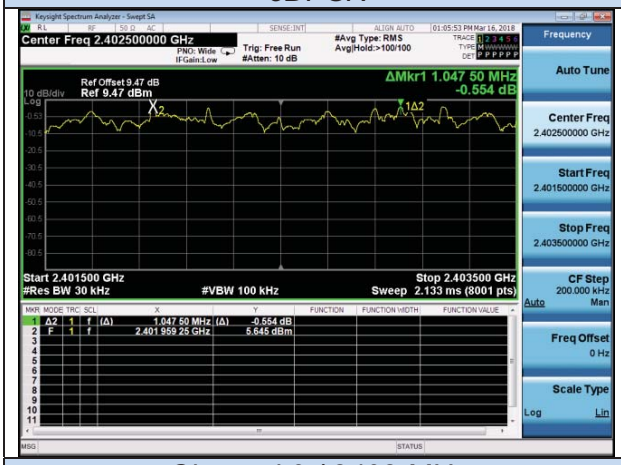
Remark:
1. *Test results including cable loss;*
2. *Please refer to following plots;*
3. *Measured at difference Packet Type for each mode and recorded worst case for each mode.*
4. *Worst case data at DH5 for GFSK, 2DH5 for π/4-DQPSK, 3DH5 for 8DPSK modulation type;*

Frequency Separation

GFSK	π/4DQPSK
	
Channel 0 / 2402 MHz	Channel 0 / 2402 MHz
	
Channel 39 / 2441 MHz	Channel 39 / 2441 MHz
	
Channel 78 / 2480 MHz	Channel 78 / 2480 MHz

Frequency Separation

8DPSK



Channel 0 / 2402 MHz

Channel 39 / 2441 MHz

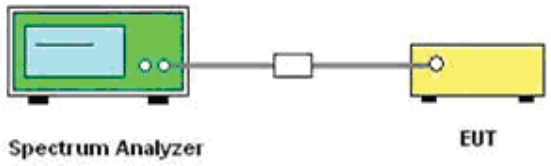
Channel 78 / 2480 MHz

6.3 Number of Hopping Frequency

6.3.1 Limit

According to §15.247(a)(1)(ii) or A8.1 (d), Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

6.3.2 Block Diagram of Test Setup



6.3.3 Test Procedure

1). Place the EUT on the table and set it in transmitting mode.

2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

3). Set Spectrum Analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.

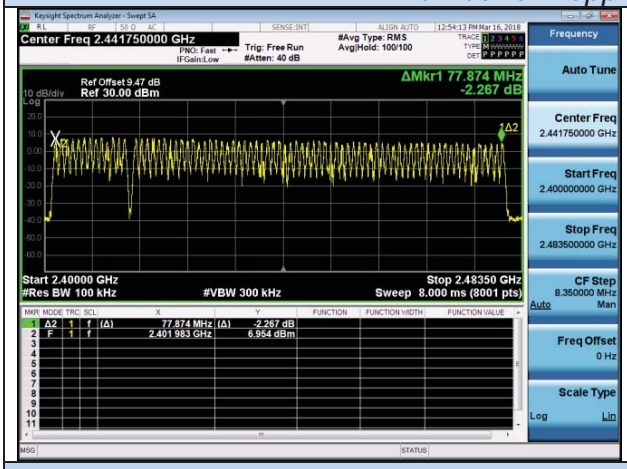
4). Set the Spectrum Analyzer as RBW = 1 MHz, VBW=1MHz.

5). Max hold, view and count how many channel in the band.

6.3.4 Test Results

Test Mode	Measurement Result (No. of Channels)	Limit (No. of Channels)	Result
GFSK	79	≥15	PASS
π/4DQPSK	79	≥15	PASS
8DPSK	79	≥15	PASS

Remark:
1. *Test results including cable loss;*
2. *Measured output power at difference Packet Type for each mode and recorded worst case for each mode.*
3. *Worst case data at DH5 for GFSK, 2DH5 for π/4DQPSK, 3DH5 for 8DPSK modulation type;*
4. *Record test plots only for GFSK;*
5. *Please refer following test plots;*

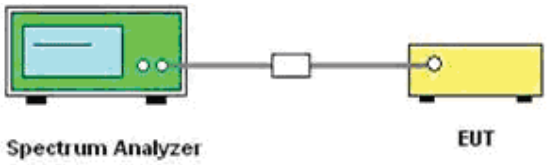
Number of Hopping Frequency	
	
GFSK	

6.4 Time of Occupancy (Dwell Time)

6.4.1 Limit

According to §15.247(a)(1)(iii) or A8.1 (d), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

6.4.2 Block Diagram of Test Setup



6.4.3 Test Procedure

1). Place the EUT on the table and set it in transmitting mode.
2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
3). Set center frequency of Spectrum Analyzer = operating frequency.
4). Set the Spectrum Analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5). Repeat above procedures until all frequency measured was complete.

6.4.4 Test Results

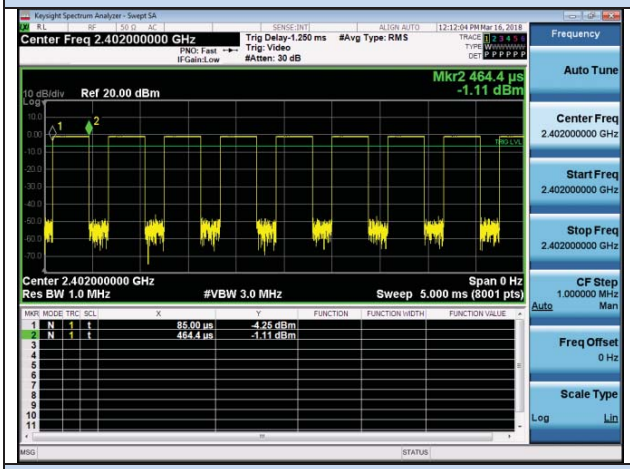
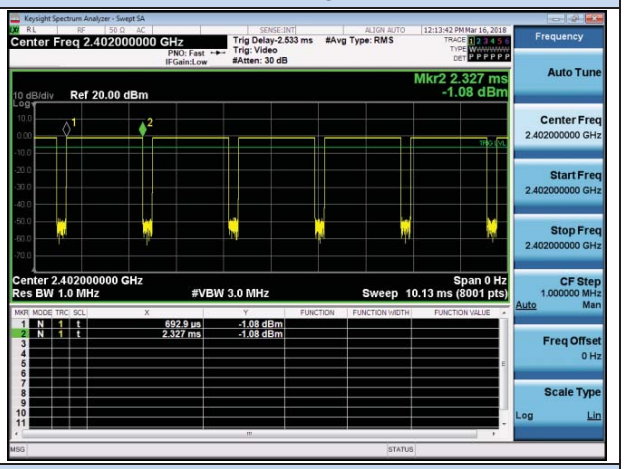
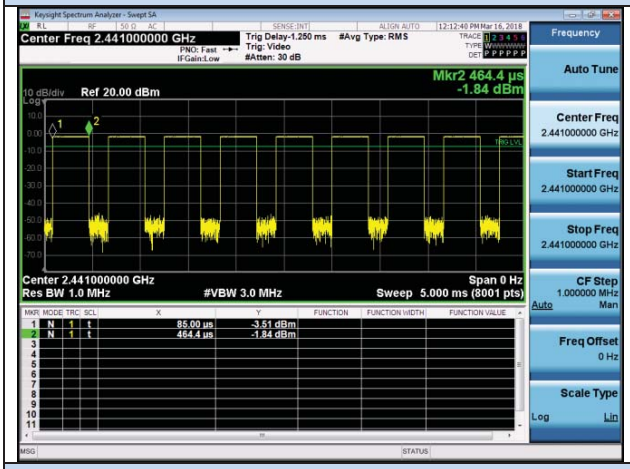
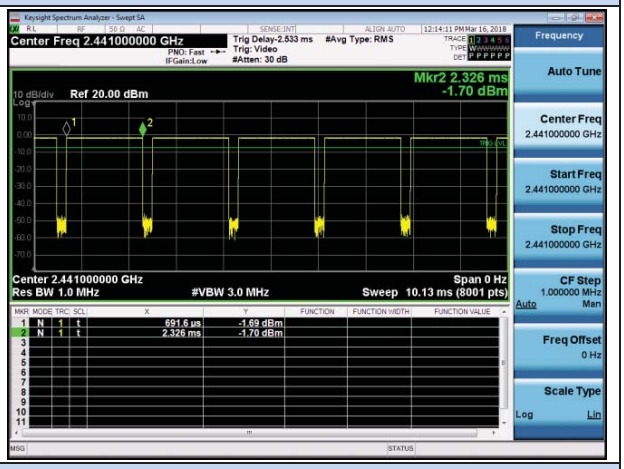
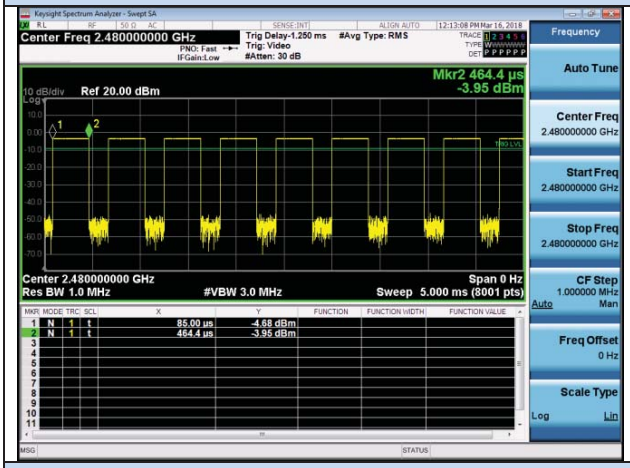
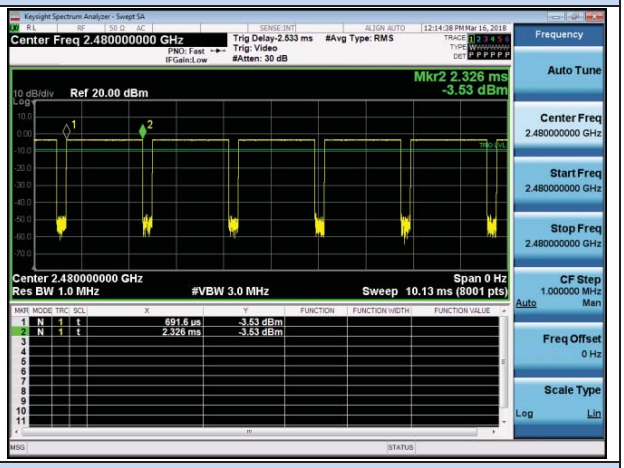
The Dwell Time=Burst Width*Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation: 0.4[s]*hopping number=0.4[s]*79[ch] =31.6[s*ch];
The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop.
The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600 [ch*hop/s] for all channels. So the final hopping rate for all channels is 1600/6=266.67 [ch*hop/s]
The hops per second on one channel: 266.67 [ch*hops/s]/79 [ch] =3.38 [hop/s];
The total hops for all channels within the dwell time calculation duration: 3.38 [hop/s]*31.6[s*ch]=106.67 [hop*ch];
The dwell time for all channels hopping: 106.67 [hop*ch]*Burst Width [ms/hop/ch].

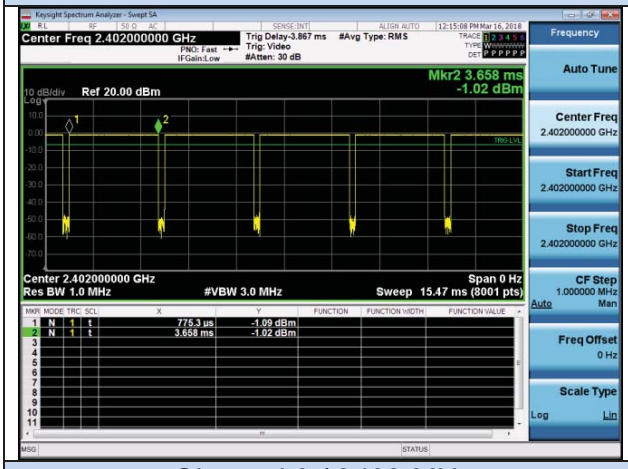
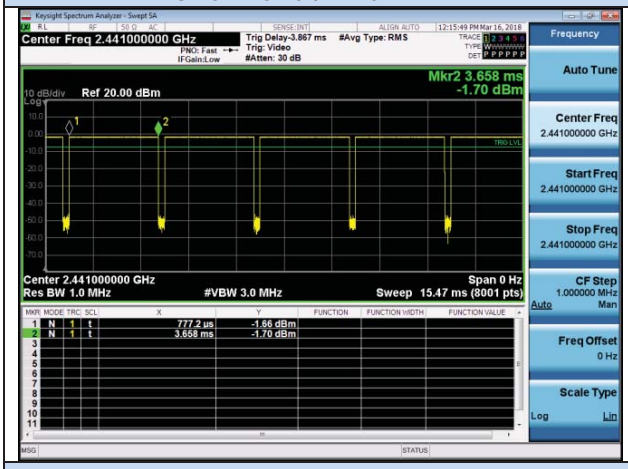
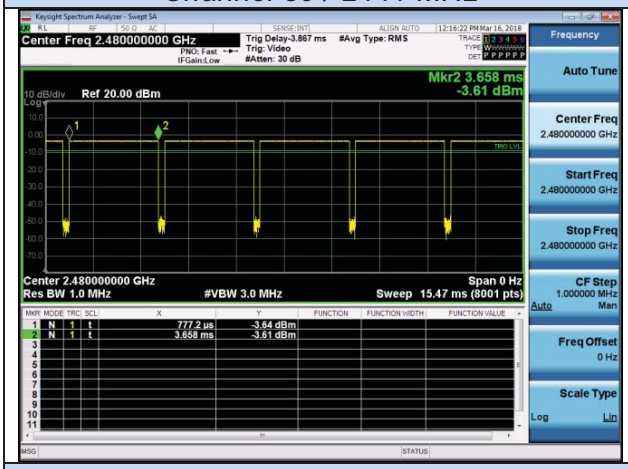
Mode	Burst Type	Frequency (MHz)	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Verdict
GFSK	DH1	2402	0.46	0.15	0.4	PASS
		2441	0.46	0.15	0.4	PASS
		2480	0.46	0.15	0.4	PASS
GFSK	DH3	2402	2.33	0.37	0.4	PASS
		2441	2.33	0.37	0.4	PASS
		2480	2.33	0.37	0.4	PASS
GFSK	DH5	2402	3.66	0.39	0.4	PASS
		2441	3.66	0.39	0.4	PASS
		2480	3.66	0.39	0.4	PASS

Remark:
1. *Test results including cable loss;*
2. *Please refer to following plots;*
3. *Measured at difference Packet Type for each mode and recorded worst case for each mode.*
4. *Dwell Time Calculate formula:*
   DH1: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second
   DH3: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second

DH5: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second

5. *Measured at low, middle and high channel, recorded worst at middle channel;*

Dwell time	
GFSK	GFSK
DH1	DH3
	
Channel 0 / 2402 MHz	Channel 0 / 2402 MHz
	
Channel 39 / 2441 MHz	Channel 39 / 2441 MHz
	
Channel 78 / 2480 MHz	Channel 78 / 2480 MHz

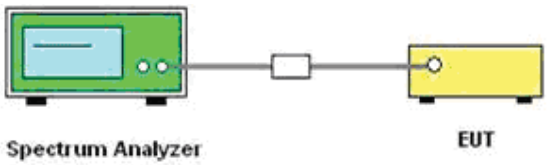
Dwell time	
GFSK	
DH5	
	
Channel 0 / 2402 MHz	
	
Channel 39 / 2441 MHz	
	
Channel 78 / 2480 MHz	

6.5 Conducted Spurious Emissions and Band Edges Test

6.5.1 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, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

6.5.2 Block Diagram of Test Setup



6.5.3 Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz.
Measurements are made over the 9 KHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels

6.5.4 Test Results of Conducted Spurious Emissions

No non-compliance noted. Only record the worst test result (TX-GFSK) in this report. The test data refer to the following page.

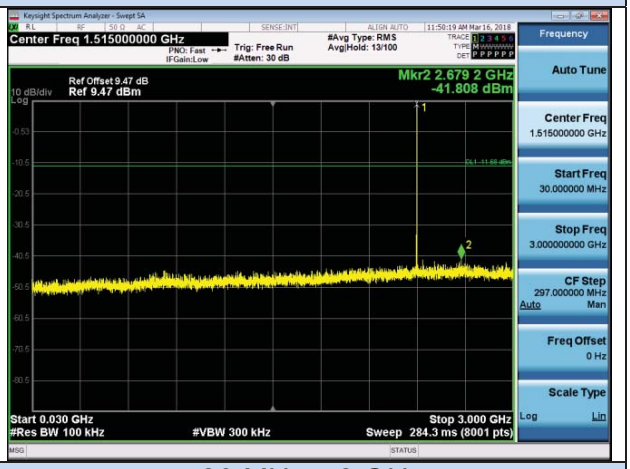
Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBc)	Limits (dBc)	Verdict
GFSK	0	2402	<-20	-20	PASS
	39	2441	<-20		
	78	2480	<-20		
π/4-DQPSK	0	2402	<-20	-20	PASS
	39	2441	<-20		
	78	2480	<-20		
8DPSK	0	2402	<-20	-20	PASS
	39	2441	<-20		
	78	2480	<-20		

Remark:
1. *Test results including cable loss;*
2. *Please refer to following plots;*
3. *Measured at difference Packet Type for each mode and recorded worst case for each mode.*
4. *Worst case data at DH5 for GFSK, 2DH5 for π/4-DQPSK, 3DH5 for 8DPSK modulation type;*
5. *For frequency below 30MHz, no emission was found, therefore, it's not recorded.*

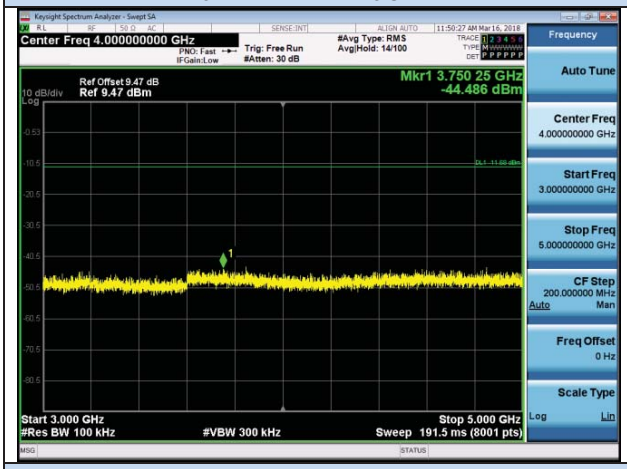
RF Conducted Spurious Emissions

GFSK – Channel 0 / 2402 MHz

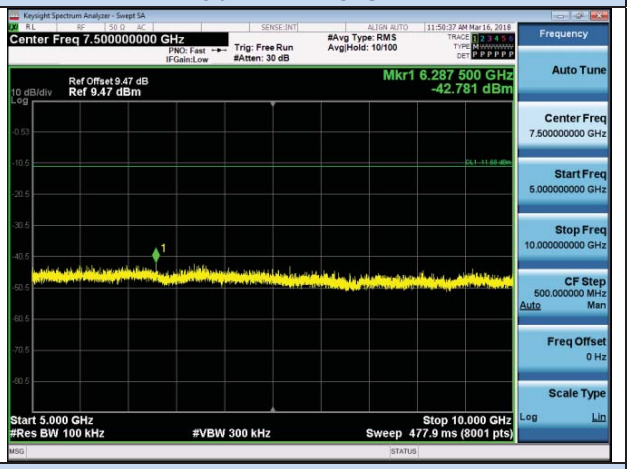
2401 MHz – 2403 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

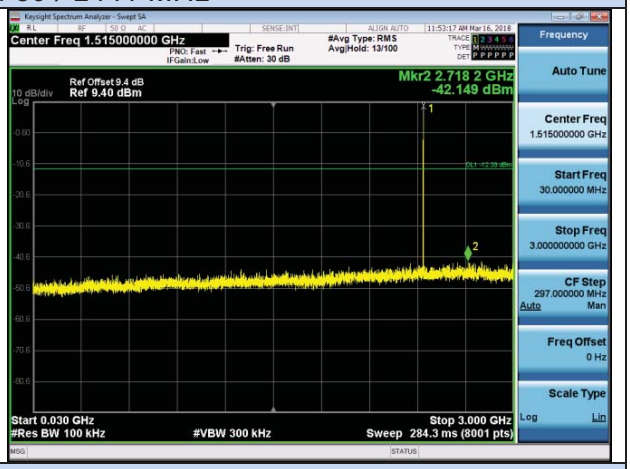
10 GHz – 15 GHz

15 GHz – 25 GHz

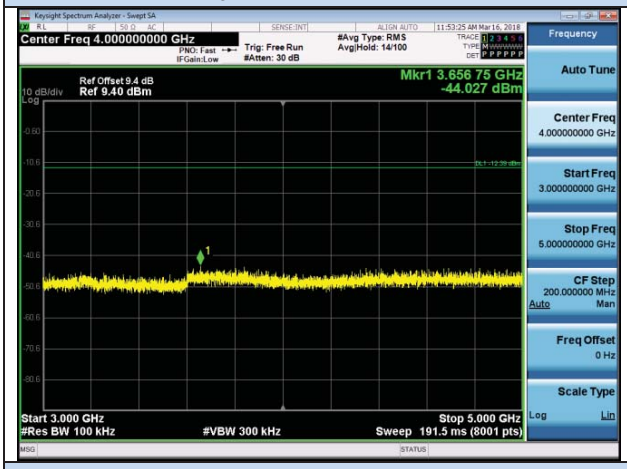
RF Conducted Spurious Emissions

GFSK – Channel 39 / 2441 MHz

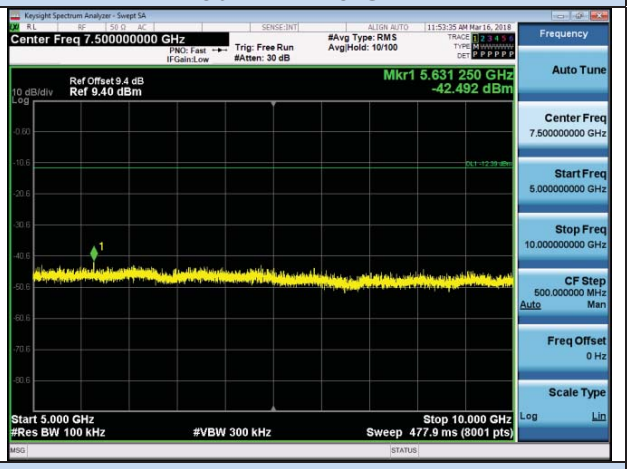
2440 MHz – 2442 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

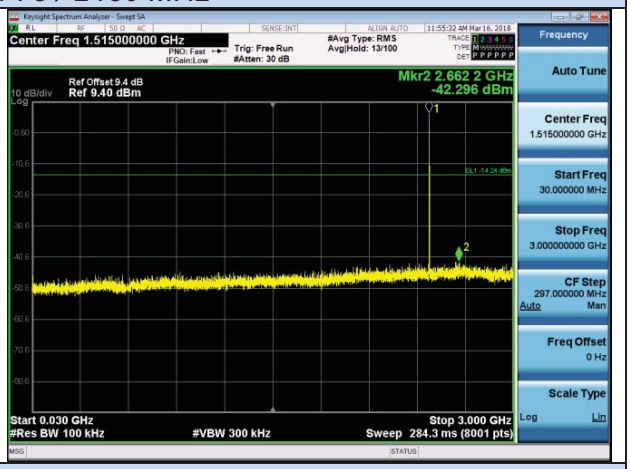
10 GHz – 15 GHz

15 GHz – 25 GHz

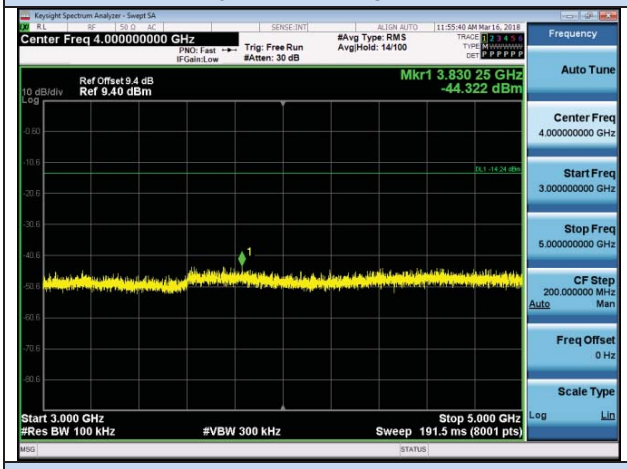
RF Conducted Spurious Emissions

GFSK – Channel 78 / 2480 MHz

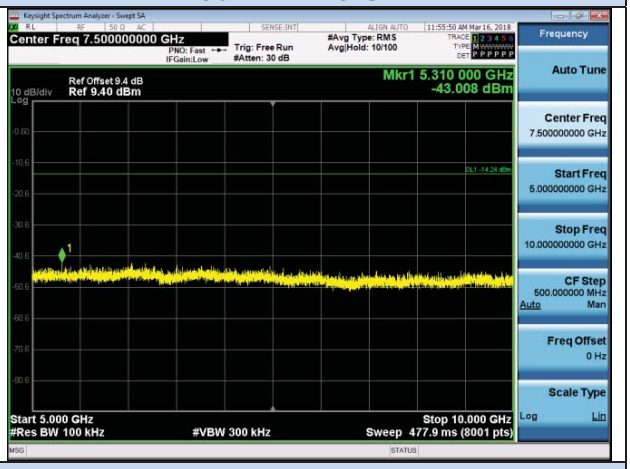
2479 MHz – 2481 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

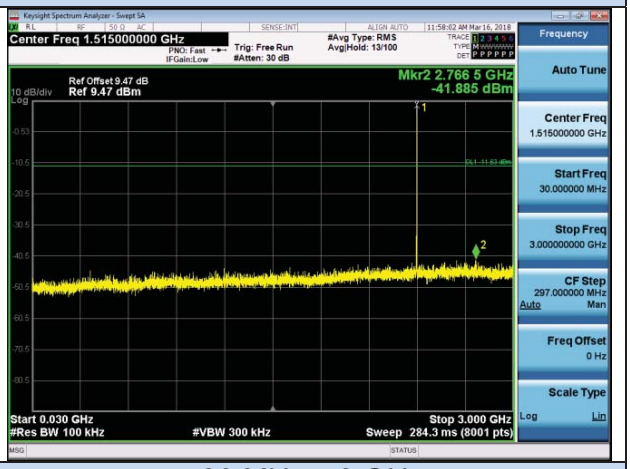
10 GHz – 15 GHz

15 GHz – 25 GHz

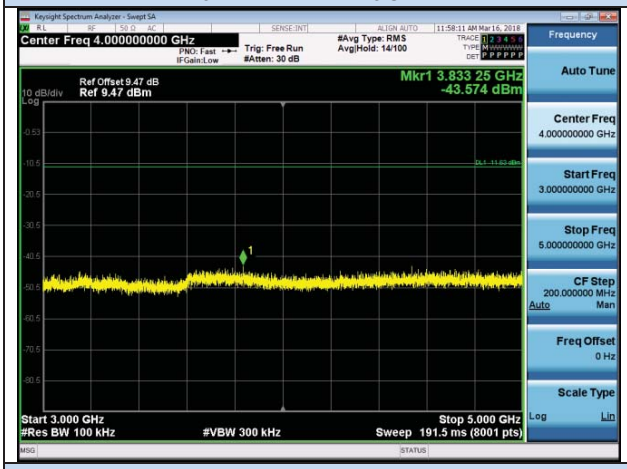
RF Conducted Spurious Emissions

π/4-DQPSK – Channel 0 / 2402 MHz

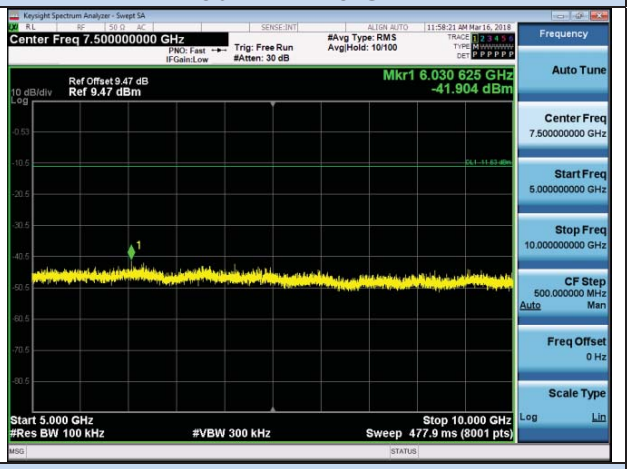
2401 MHz – 2403 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

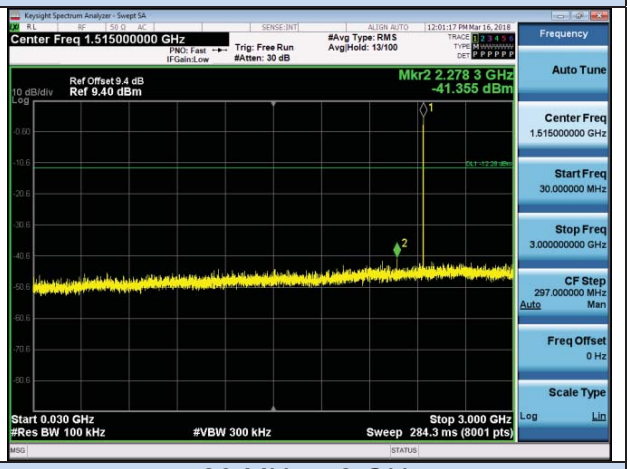
10 GHz – 15 GHz

15 GHz – 25 GHz

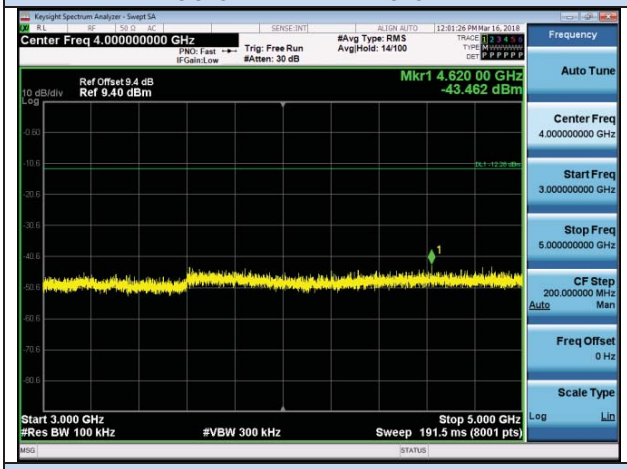
RF Conducted Spurious Emissions

π/4-DQPSK – Channel 39 / 2441 MHz

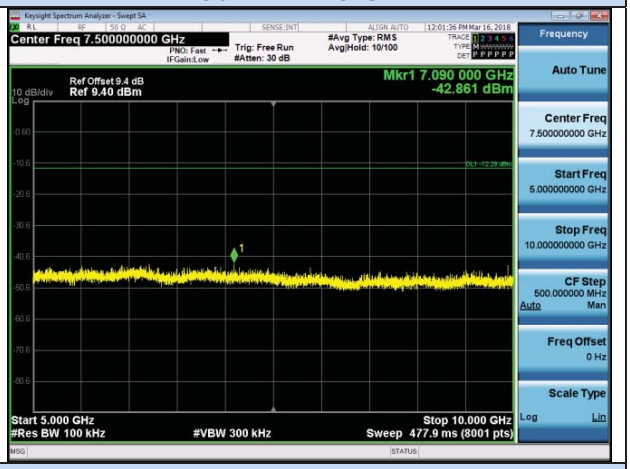
2438.5 MHz – 2443.5 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

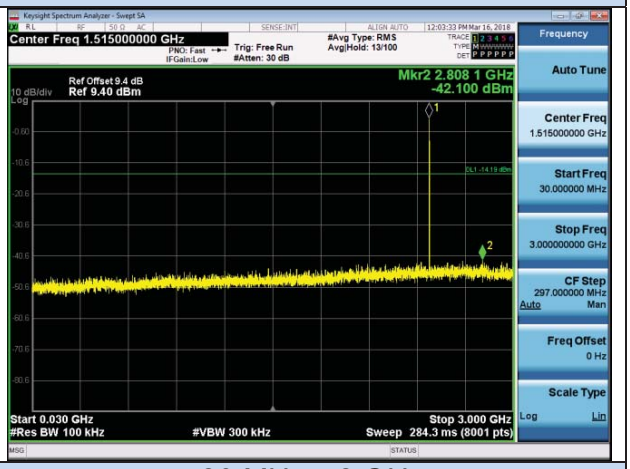
10 GHz – 15 GHz

15 GHz – 25 GHz

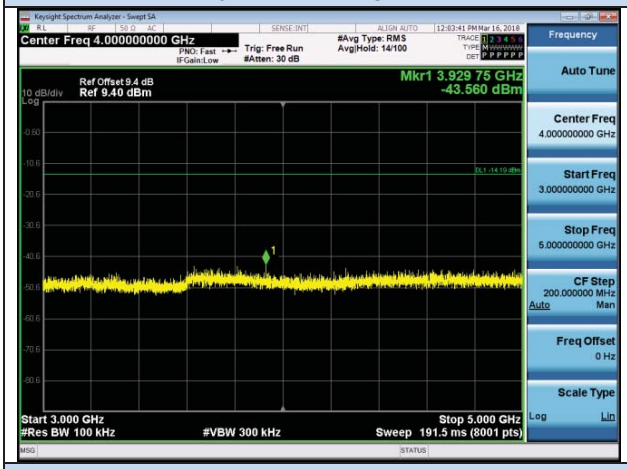
RF Conducted Spurious Emissions

π/4-DQPSK – Channel 78 / 2480 MHz

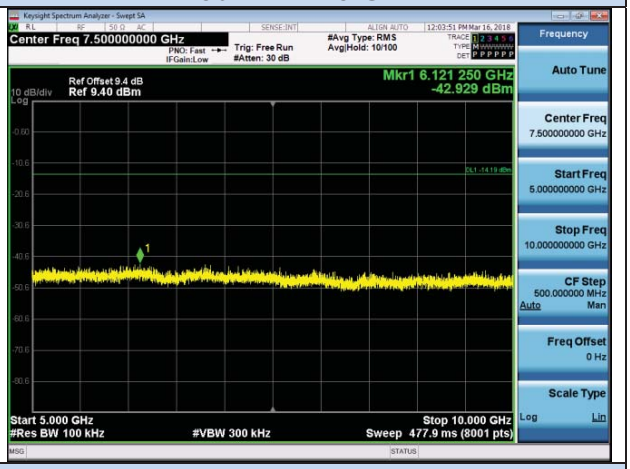
2479 MHz – 2481 MHz



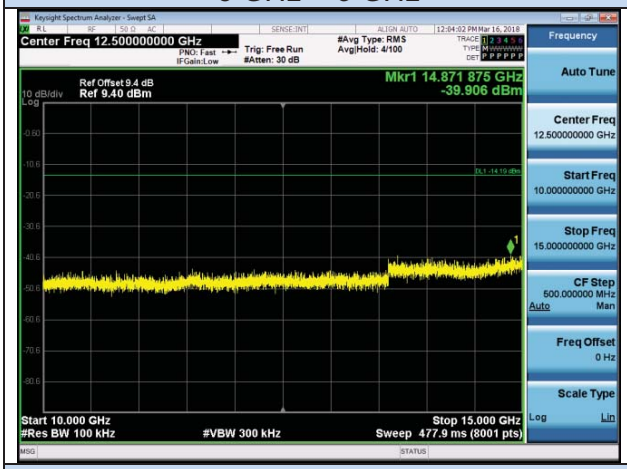
30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz



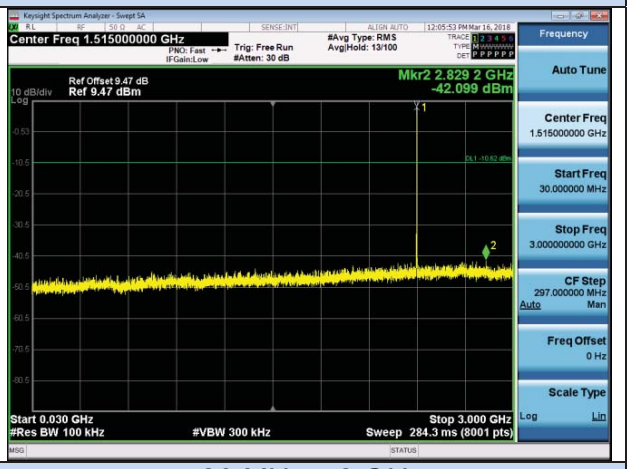
10 GHz – 15 GHz

15 GHz – 25 GHz

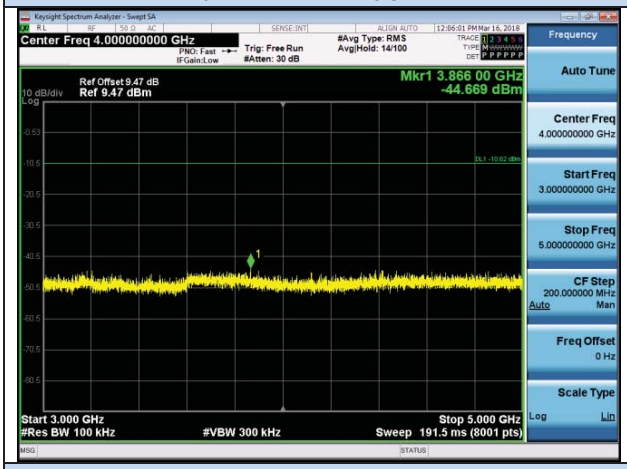
RF Conducted Spurious Emissions

8PSK – Channel 0 / 2402 MHz

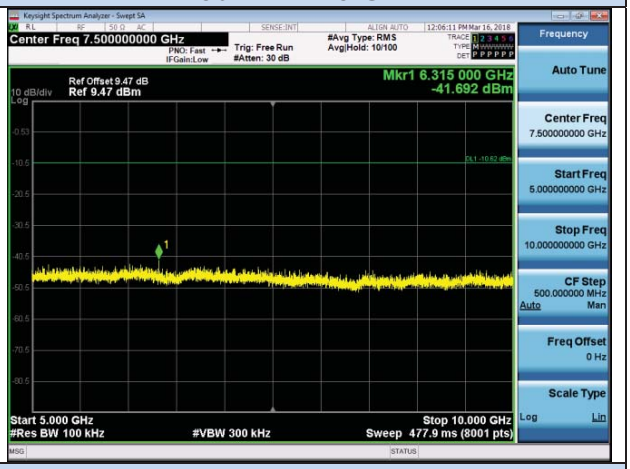
2401 MHz – 2403 MHz



30 MHz – 3 GHz



3 GHz – 5 GHz



5 GHz – 10 GHz

10 GHz – 15 GHz

15 GHz – 25 GHz