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TEST REPORT

Product Name	:	**Bluetooth earphone with Ambient mode with Bluetooth Transmitter**
Model Number	:	**ERHG-BTWITHAMBIENT**
FCC ID	:	**2AU6S-HGBTAMB**
IC	:	**25701-HGBTAMB**

Prepared for	:	LUCID AUDIO
Address	:	14301 Faa Blvd, Ft Worth, Tx 76155, USA
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282
Report Number	:	ES191227035W
Date(s) of Tests	:	December 27, 2019 to January 22, 2020
Date of issue	:	February 25, 2020

Table of Contents

1 TEST RESULT CERTIFICATION

Applicant:	LUCID AUDIO 14301 Faa Blvd, Ft Worth, Tx 76155, USA
Manufacture:	NINGBO HONGSHUO ELECTRONICS & APPLIANCE CO., LTD Zhangqi Industry Zone, Cixi Ningbo, Zhejiang, China
Product Description:	Bluetooth earphone with Ambient mode with Bluetooth Transmitter
Model Number:	ERHG-BTWITHAMBIENT
Trade Mark:	HearGear™
File Number:	ES191227035W
Date of Test:	December 27, 2019 to January 22, 2020

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2 2018, Subpart J FCC 47 CFR Part 15 2018, Subpart C IC RSS-GEN, Issue 5, March 2019 IC RSS-247 Issue 2, February 2017.	PASS

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 2018 & IC RSS-GEN, Issue 5 March 2019 and Part 15.247 2018 & IC RSS-247 Issue 2, February 2017.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : December 27, 2019 to January 22, 2020

Prepared by: Abel Wu /Editor

Reviewer: Joe Xia /Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

2 GENERAL INFORMATION

2.1 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Product Name	earphone with Ambient mode with Bluetooth Transmitter
Model number	ERHG-BTWITHAMBIENT
Device Type	Adaptive Frequency Hopping (non-LBT based) (Bluetooth V4.0 Signal mode)
Data Rate	1Mbps for GFSK modulation 2Mbps for pi/4-DQPSK modulation 3 Mbps for 8DPSK modulation
Modulation	GFSK modulation (1Mbps) pi/4-DQPSK modulation (2Mbps) 8DPSK modulation (3Mbps)
Operating Frequency Range	2402-2480MHz
Number of Channels	79 channels
Max Transmit Power	3.612 dBm
Antenna Type	PCB Antenna
Gain	2dBi
Power supply	DC 3.7V
Temperature Range	-40°C ~ +85°C
Product SW/HW version	V1.0
Radio SW/HW version	V1.0
Test SW Version	V2.5.8

Note: for more details, please refer to the User's manual of the EUT.

3 SUMMARY OF TEST RESULT

FCC PartClause	Test Parameter	Verdict	Remark
FCC Part 15.247(a)(1) RSS-247 Clause 5.1(a)	20dB Bandwidth	PASS	
RSS-Gen 6.7	99% Occupied Bandwidth	PASS	
FCC Part 15.247(a)(1) RSS-247 Clause 5.1(b)	Carrier Frequency Separation	PASS	
FCC part 15.247(a)(1)(iii) RSS-247 Clause 5.1(d)	Number of Hopping Frequencies	PASS	
FCC part 15.247(a)(1)(iii) RSS-247 Clause 5.1(d)	Average Time of Occupancy (Dwell Time)	PASS	
FCC Part 15.247(b)(1) RSS-247 Clause 5.4(b)	Maximum Peak Conducted Output Power	PASS	
FCC Part 15.247(d) RSS-247 Clause 5.5	Conducted Spurious Emissions	PASS	
FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3	Radiated Spurious Emissions	PASS	
FCC Part 15.207(a) RSS-Gen Clause 8.8	Conducted Emission	PASS	
FCC Part 15.247(b)(4) and Part 15.203 RSS-Gen Clause 6.8	Antenna Application	PASS	
NOTE1:N/A (Not Applicable)			

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AU6S-HGBTAMB filing to comply with Section 15.247 of the FCC Part 15, Subpart C.

This submittal(s) (test report) is intended for IC: 25701-HGBTAMB filing to comply with RSS 247 Clause 5 of the IC.

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart C
IC RSS-GEN, Issue 5, March 2019
IC RSS-247 Issue 2, February 2017
FCC KDB 558074 D01 15.247 Meas Guidance V05r02

4.2 MEASUREMENT EQUIPMENT USED

4.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/18/2019	May 17, 2020
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/18/2019	May 17, 2020
50Ω Coaxial Switch	Anritsu	MP59B	M20531	05/18/2019	May 17, 2020

4.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 19, 2019	May 18, 2020
Pre-Amplifier	HP	8447F	2944A07999	May 18, 2019	May 17, 2020
Bilog Antenna	Schwarzbeck	VULB9163	142	May 18, 2019	May 17, 2020
Loop Antenna	ARA	PLA-1030/B	1029	May 18, 2019	May 17, 2020
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 19, 2019	May 18, 2020
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 18, 2019	May 17, 2020
Cable	Schwarzbeck	AK9513	ACRX1	May 19, 2019	May 18, 2020
Cable	Rosenberger	N/A	FP2RX2	May 19, 2019	May 18, 2020
Cable	Schwarzbeck	AK9513	CRPX1	May 19, 2019	May 18, 2020
Cable	Schwarzbeck	AK9513	CRRX2	May 19, 2019	May 18, 2020

4.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LASTCAL.	DUE CAL.
Spectrum Analyzer	Agilent	E4407B	88156318	May 19, 2019	May 18, 2020

Remark: *Each piece of equipment is scheduled for calibration once a year.*

4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (1Mbps for Bluetooth GFSK modulation; 2Mbps for Bluetooth pi/4-DQPSK modulation; 3Mbps for Bluetooth 8DPSK modulation) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for Bluetooth V4.0

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	39	2441	…	…
1	2403	40	2442	76	2478
2	2404	41	2443	77	2479
…	…	…	…	78	2480
Note: fc=2402MHz+(k-1)×1MHz k=1 to 79					

Test Frequency and channel for Bluetooth V4.0

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	39	2441	78	2480

Note: The test software is CSR BlueSuite 2.5.8, gain of external amplifier is set 255 and internal amplifier is set 25.

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by CNAS, 2018.11.30
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2016.5.19
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC, August 06, 2018
The certificate is valid until August 07, 2020
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA, August 08, 2018
The certificate is valid until August 31, 2020
The Certificate Number is 4321.01.

Accredited by Industry Canada, November 09, 2018
The Conformity Assessment Body Identifier is CN0008.

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

5.3 TEST SOFTWARE

Item		Software
Conducted Emission	:	EMTEK(Ver.CON-03A1)-Shenzhen
Radiated Emission	:	EMTEK(Ver.RA-03A1)-Shenzhen

6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

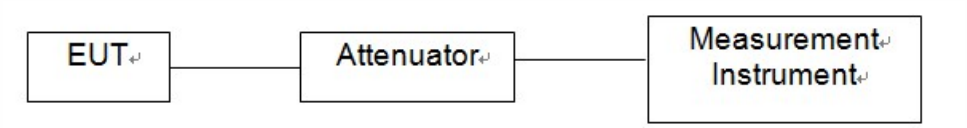
Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0dB
Conducted Emissions Test	±2.0dB
Radiated Emission Test	±2.0dB
Occupied Bandwidth Test	±1.0dB
Band Edge Test	±3dB
All emission, radiated	±3dB
Antenna Port Emission	±3dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%

7 SETUP OF EQUIPMENT UNDER TEST

7.1 RADIO FREQUENCY TEST SETUP 1

The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT androtated about its vertical axis formaximum response at each azimuth about the EUT. The center of the loopshall be 1 m above the ground.For certain applications, the loop antennaplane may also need to be positioned horizontally at the specified distance from the EUT.

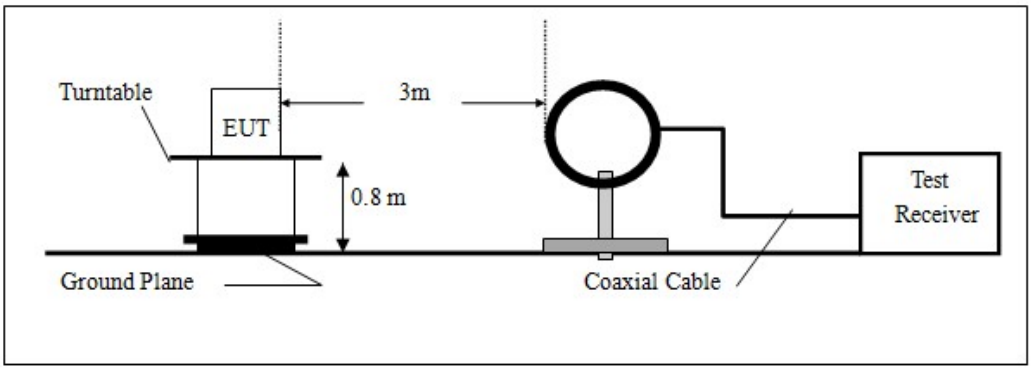
30MHz-1GHz：

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

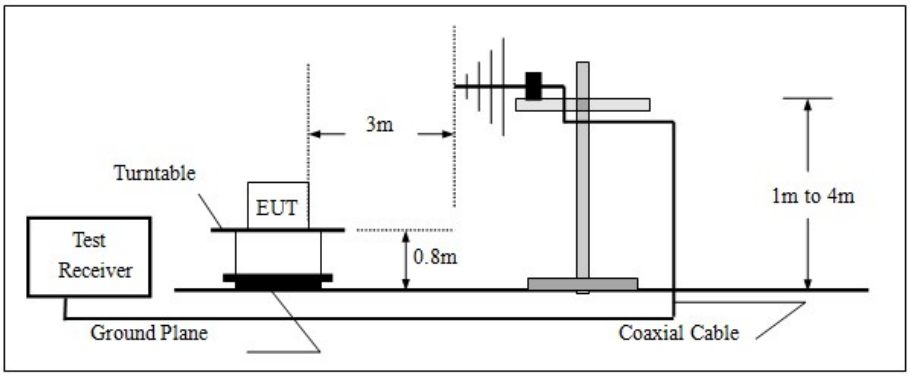
Above 1GHz：

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

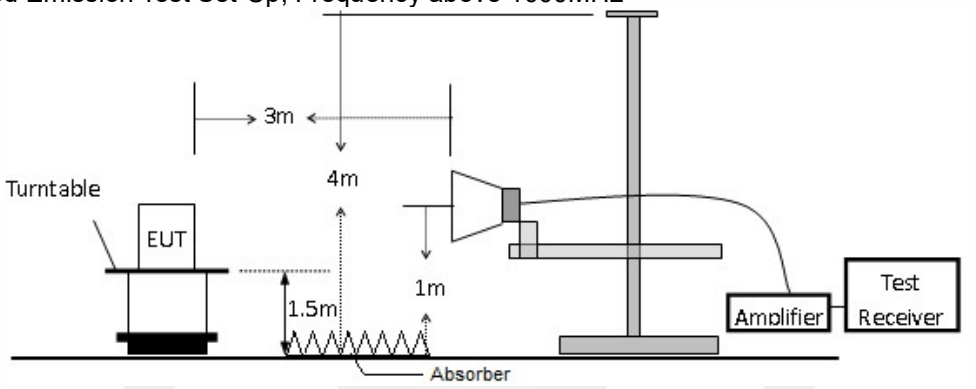
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b)Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

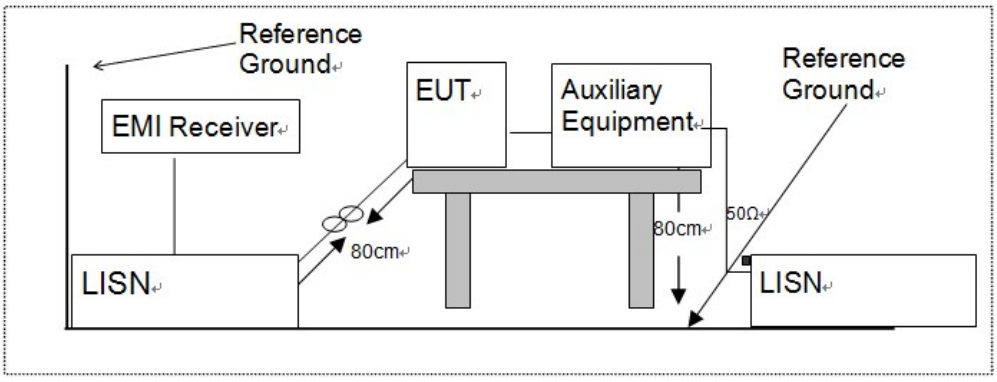


7.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (Game fitness board) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



7.4 SUPPORT EQUIPMENT

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
iPhone	Apple	iPhone 5C/A1526	N/A

Notes:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

8 FREQUENCY HOPPING SYSTEM REQUIREMENTS

8.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

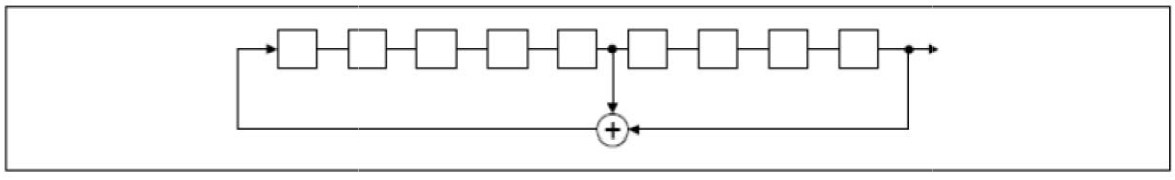
(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

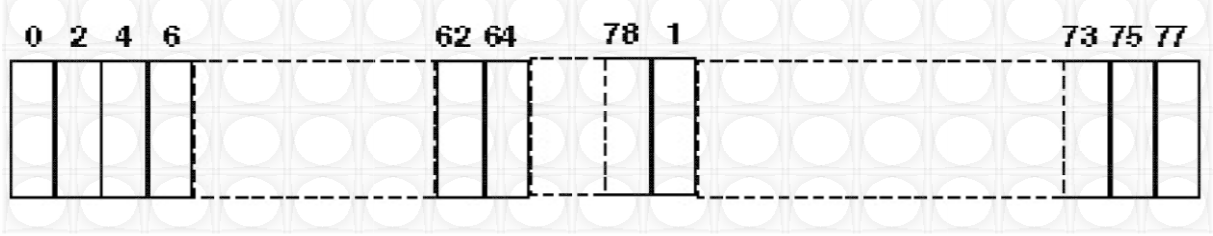
8.2 EUT Pseudorandom Frequency Hopping Sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels.
The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; thephase in the hopping sequence is determined by the Bluetooth clock of the master.The channel is divide into time slots where each slot corresponds to an RF hop frequency. Consecutive hopscorrespond to different RF hop frequencies. The normal hop is 1 600 hops/s.

The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage, and the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones. Number of shift register stages: 9
Length of pseudo-random sequence: 29-1 = 524 bits
Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence



Each frequency used equally on the average by each transmitter.
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

8.3 Equal Hopping Frequency Use

All Bluetooth units participating in the piconet are time and hop-synchronized to the channel.

Example of a 79 hopping sequence in data mode:
35, 27, 6, 44, 14, 61, 74, 32, 1, 11, 23, 2, 55, 65, 29, 3, 9, 52, 78, 58, 40, 25, 0, 7, 18, 26, 76, 60, 47, 50, 2, 5, 16, 37, 70, 63, 66, 54, 20, 13, 4, 8, 15, 21, 26, 10, 73, 77, 67, 69, 43, 24, 57, 39, 46, 72, 48, 33, 17, 31, 75, 19, 41, 62, 68, 28, 51, 66, 30, 56, 34, 59, 71, 22, 49, 64, 38, 45, 36, 42, 53
Each Frequency used equally on the average by each transmitter

8.4 Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH- enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.

9 TEST REQUIREMENTS

9.1 20DB BANDWIDTH

9.1.1 Applicable Standard

According to FCC Part 15.247(a)(1), RSS-247 Clause 5.1(a), 558074 D01 15.247 Meas Guidance V05r02

9.1.2 Conformance Limit

No limit requirement.

9.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.1.4 Test Procedure

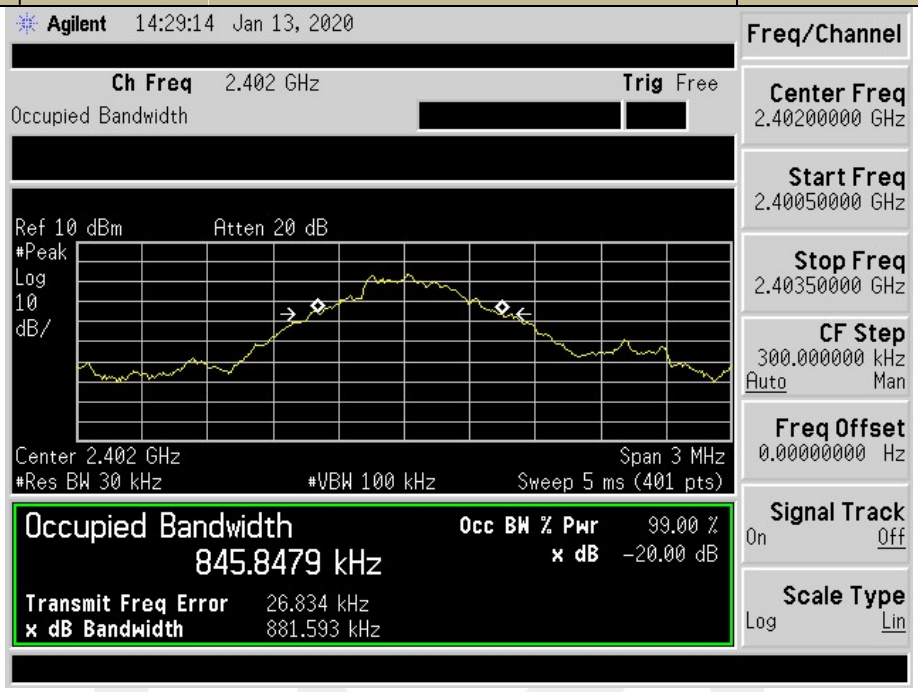
The EUT was operating inBluetooth V4.0 and controlled its channel. Printed out the test result from the spectrum by hard copy function.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously
Set RBW = 30 kHz. OBW for 99% BANDWIDTH
Set the video bandwidth (VBW) =100kHz.
Set Span= approximately 2 to 3 times the 20 dB bandwidth
Set Detector = Peak.
Set Trace mode = max hold.
Set Sweep = auto couple.
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize.Use the marker-to-peak function to set the marker to the peak of the emission. Use themarker-delta function to measure 20 dB down one side of the emission. Reset the markerdeltafunction, and move the marker to the other side of the emission, until it is (asclose as possible to) even with the reference marker level. The marker-delta reading atthis point is the 20 dB bandwidth of the emission.
If this value varies with differentmodes of operation (e.g., data rate, modulation format, etc.), repeat this test for eachvariation.
Measure and record the results in the test report.

Test Results

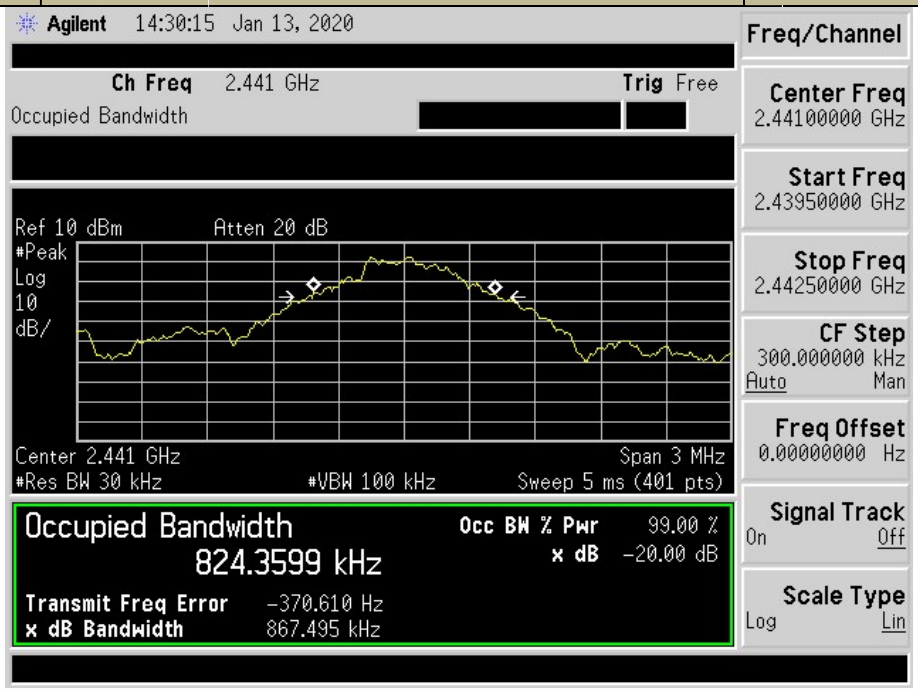
Temperature:	20℃	Test Date:	Jan 13, 2020
Humidity:	45 %	Test By:	XW

Modulation Mode	Channel Number	Channel Frequency (MHz)	20dB Bandwidth (kHz)	2/3 of 20dB Bandwidth (kHz)	99% Bandwidth(KHz)
GFSK	0	2402	881.6	587.7	845.8
	39	2441	867.5	578.3	824.4
	78	2480	875.3	583.5	836.5
pi/4-DQPSK	0	2402	1221	814.0	1175.9
	39	2441	1207	804.7	1177.1
	78	2480	1223	815.3	1183.7
8DPSK	0	2402	1210	806.7	1155.1
	39	2441	1227	818.0	1166.8
	78	2480	1211	807.3	1162.9

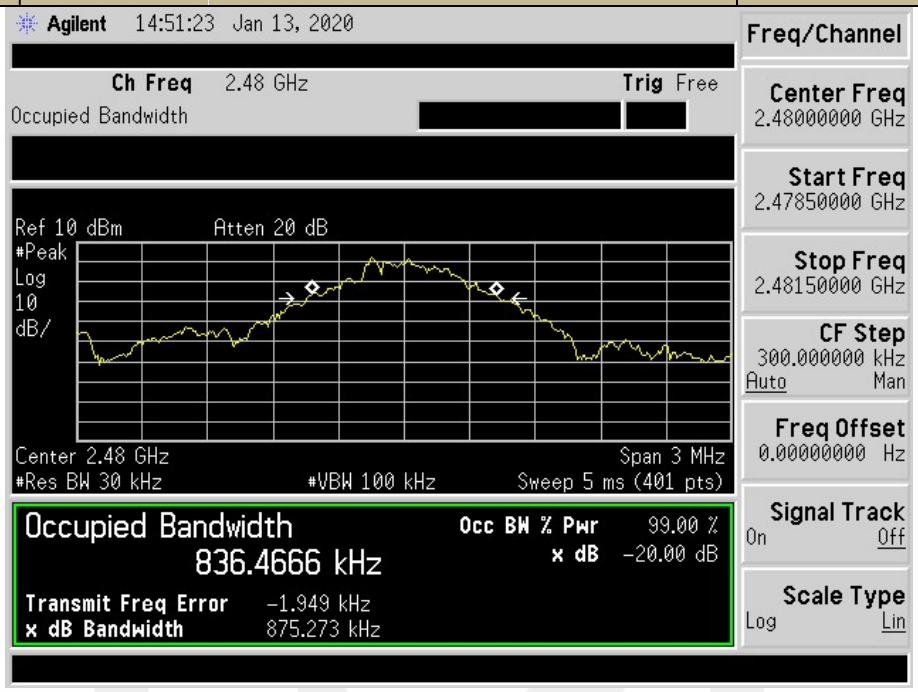
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 0: 2402MHz	GFSKModulation



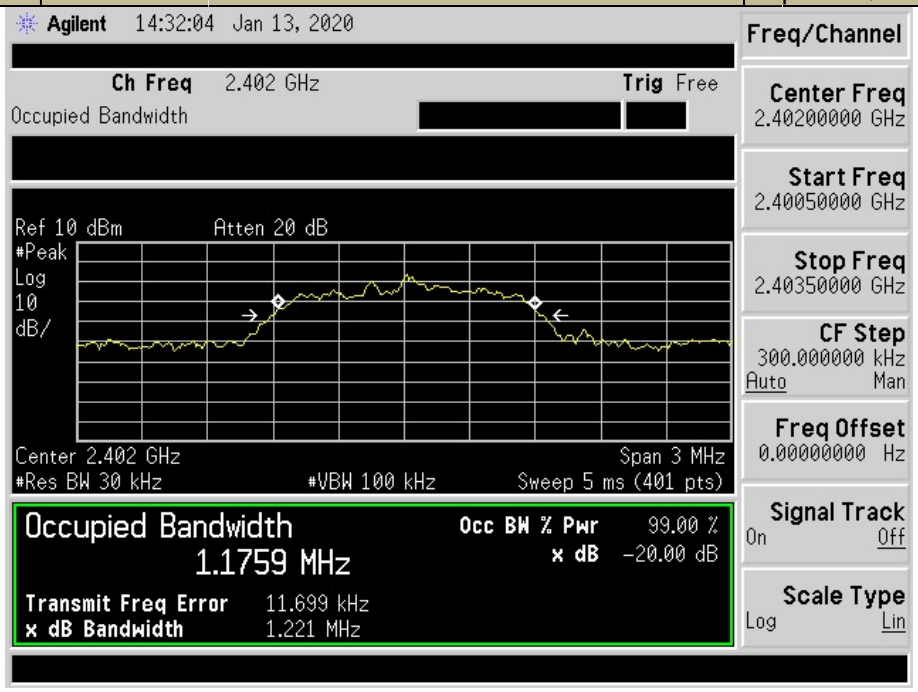
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 39: 2441MHz	GFSKModulation



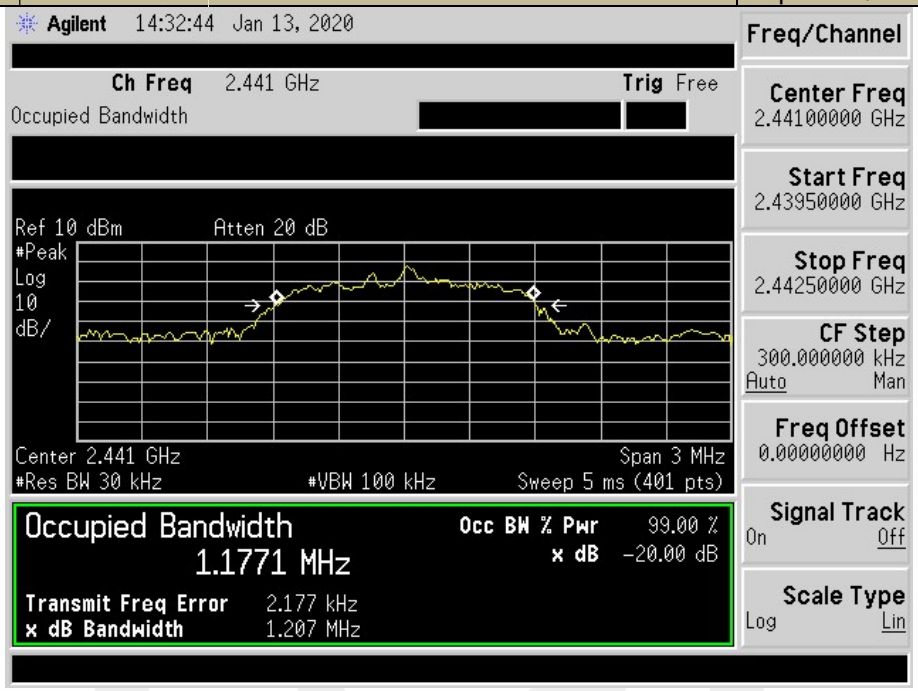
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 78: 2480MHz	GFSKModulation



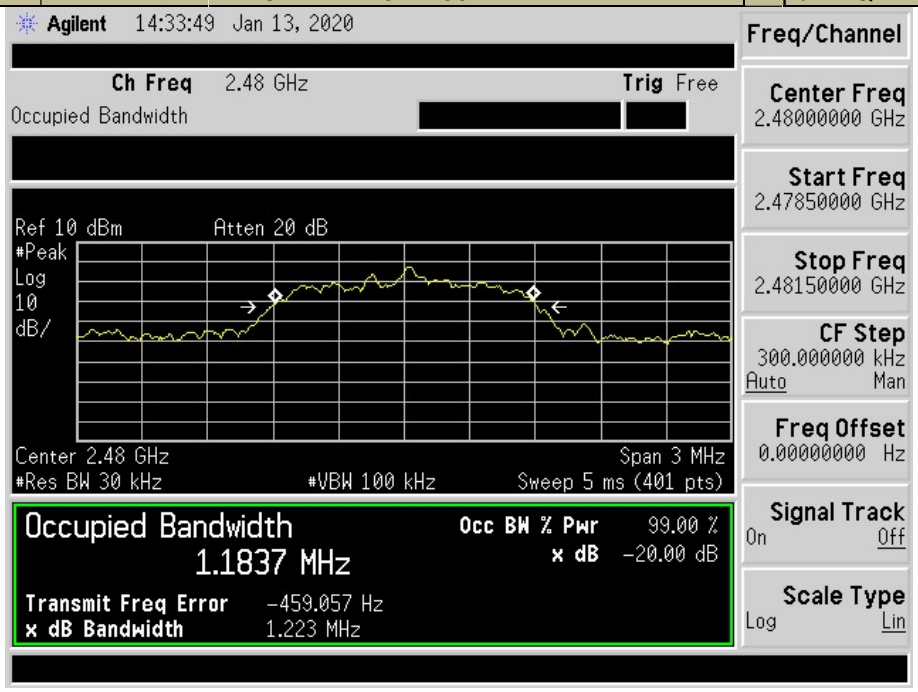
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 0: 2402MHz	pi/4-DQPSKModulation



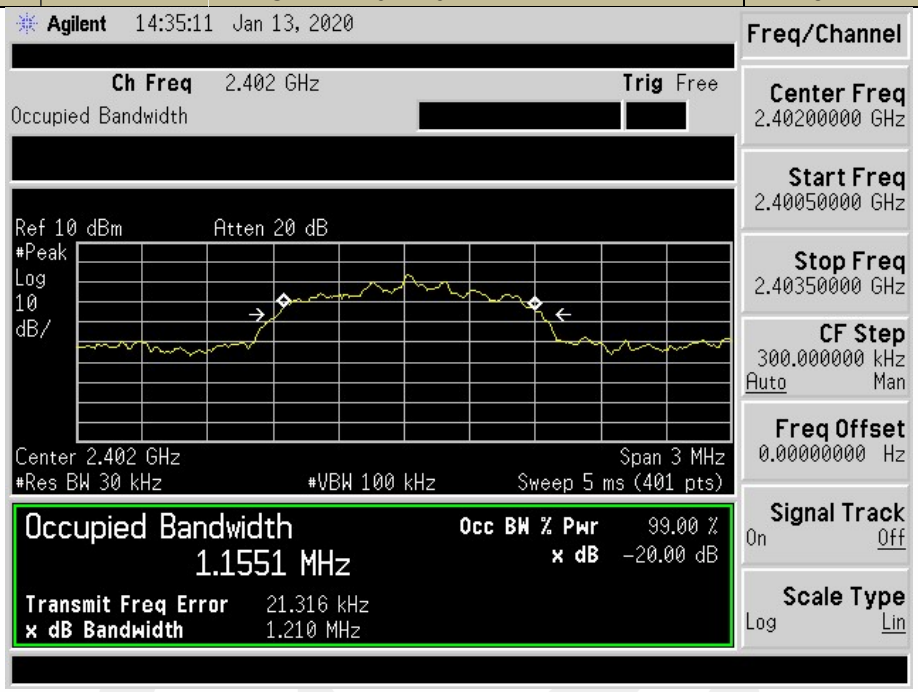
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 39: 2441MHz	pi/4-DQPSKModulation



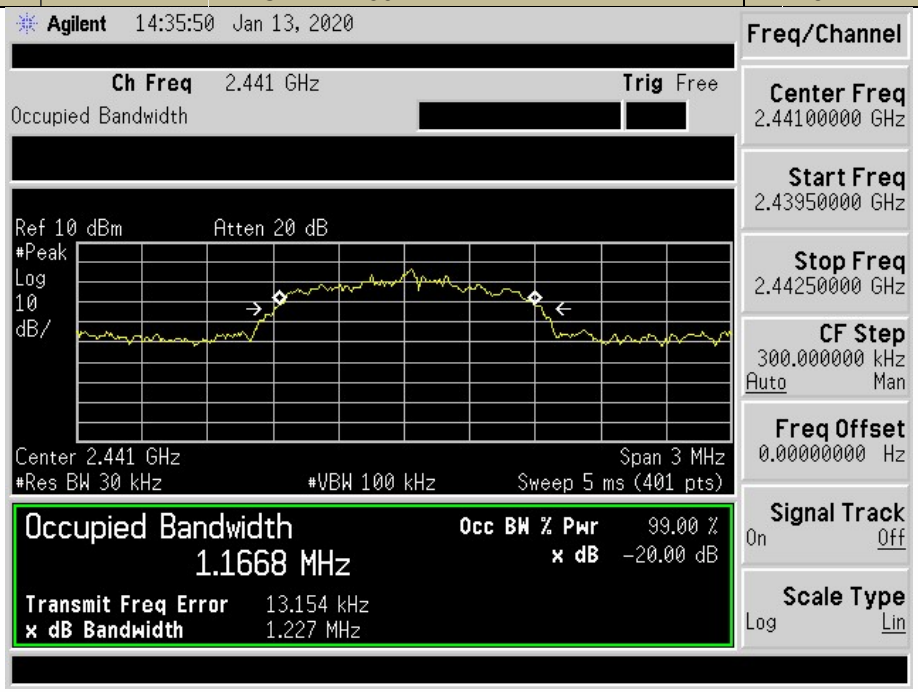
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 78: 2480MHz	pi/4-DQPSKModulation



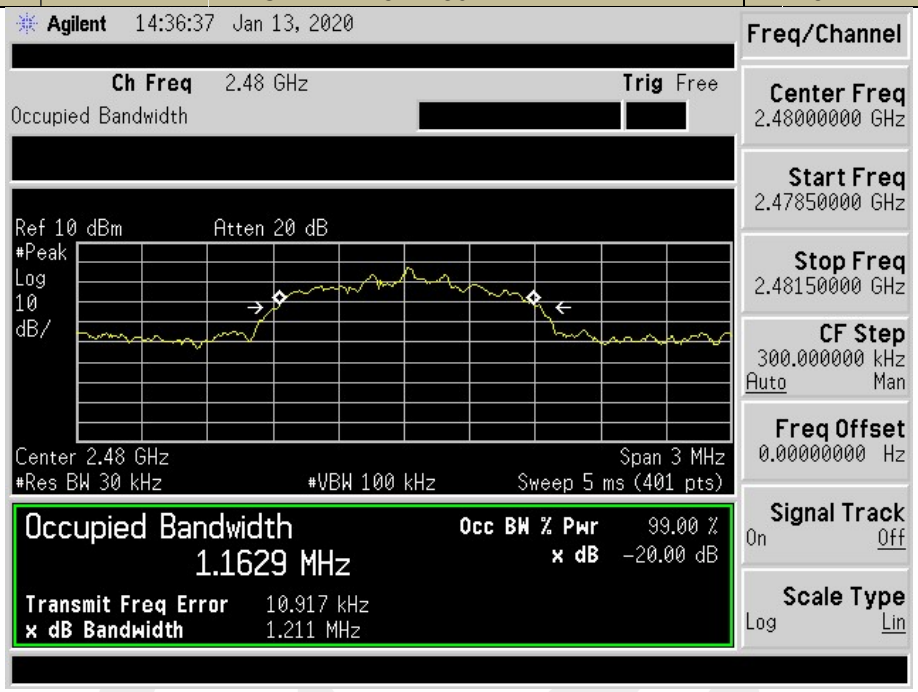
Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 0: 2402MHz	8DPSKModulation



Test Model	20dB Bandwidth and 99% Bandwidth	
	Channel 39: 2441MHz	8DPSKModulation



Test Model		20dB Bandwidth and 99% Bandwidth	
		Channel 78: 2480MHz	8DPSKModulation



9.2 CARRIER FREQUENCY SEPARATION

9.2.1 Applicable Standard

According to FCC Part 15.247(a)(1), RSS-247 Clause 5.1(b), 558074 D01 15.247 Meas Guidance V05r02

9.2.2 Conformance Limit

Frequency hopping systems operating in the 2400-2483.5MHz band shall have hoppingchannel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth ofthe hopping channel, whichever is greater.
In case of an output power less than 125mW,the frequency hopping system may have channels separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

9.2.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.2.4 Test Procedure

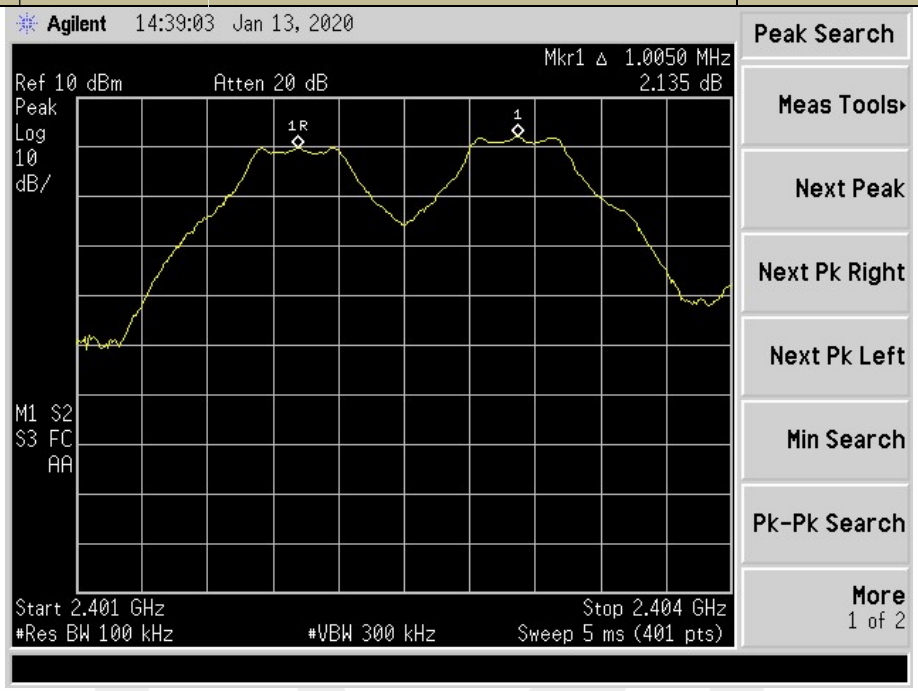
■ According to FCC Part15.247(a)(1) and RSS-247 Clause 5.1(b)
The EUT must have its hopping function enabled. Use the following spectrum analyzersettings:
Set the RBW =100kHz. Set VBW =300kHz.
Set the span = wide enough to capture the peaks of two adjacent channels
Set Sweep time = auto couple.
Set Detector = peak. Set Trace mode = max hold.
Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.

Test Results

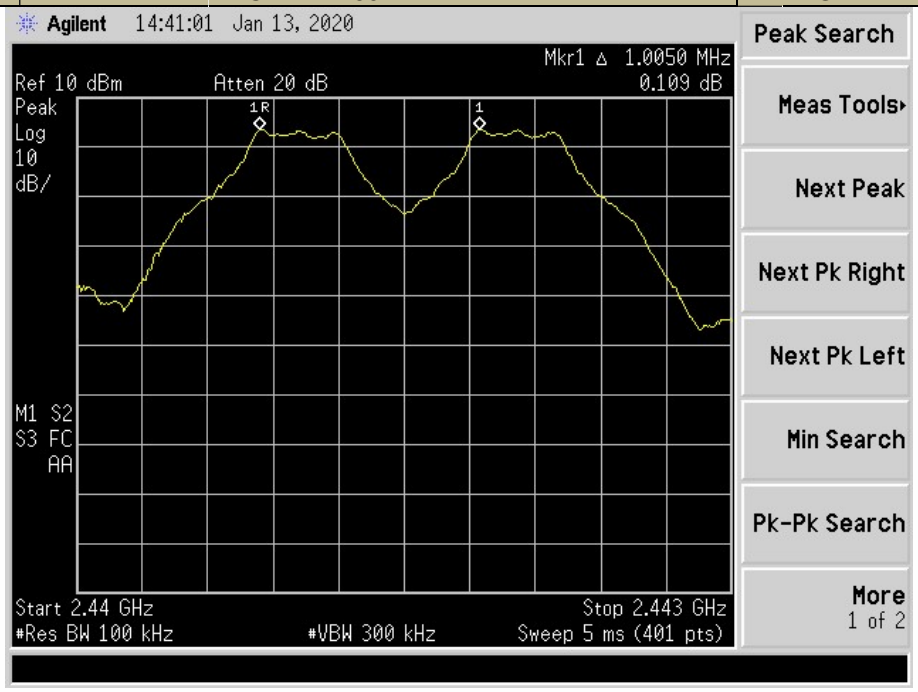
Temperature:	20℃	Test Date:	Jan 13, 2020
Humidity:	45 %	Test By:	XW

Modulation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (kHz)	Limit (kHz)	Verdict
GFSK	0	2402	1005	>587.7	PASS
	39	2441	1005	>578.3	PASS
	78	2480	997.5	>583.5	PASS
pi/4-DQPSK	0	2402	997.5	>814.0	PASS
	39	2441	990.0	>804.7	PASS
	78	2480	1005	>815.3	PASS
8DPSK	0	2402	1005	>806.7	PASS
	39	2441	1005	>818.0	PASS
	78	2480	1012.5	>807.3	PASS
Note: Limit = 20dB bandwidth * 2/3, if it is greater than 25kHz and the output power is less than 125mW (21dBm).					

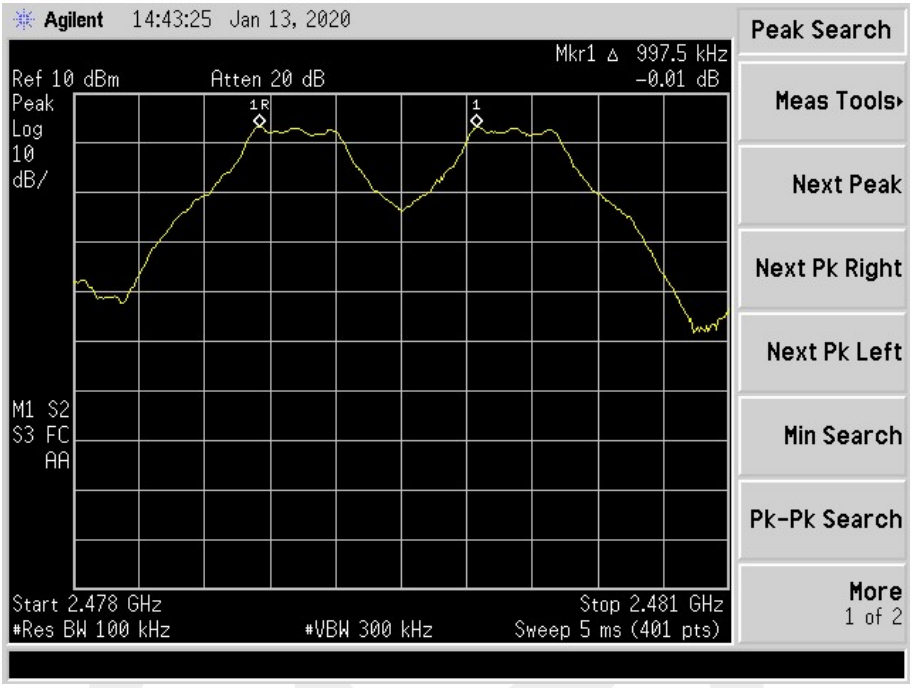
Test Model	Carrier Frequency Separation	
	Channel 0: 2402MHz	GFSKModulation



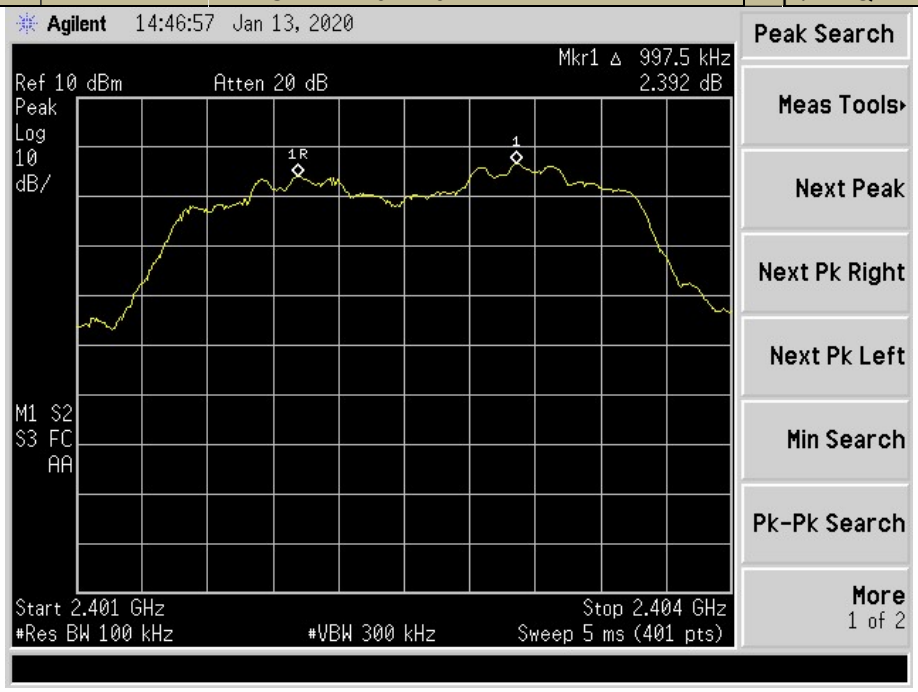
Test Model	Carrier Frequency Separation	
	Channel 39: 2441MHz	GFSKModulation



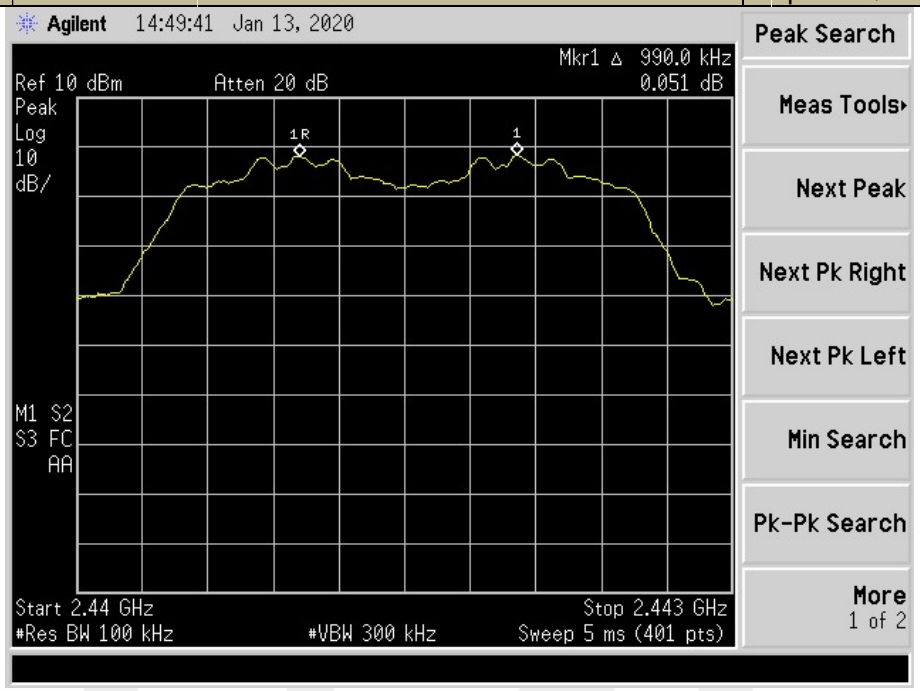
Test Model	Carrier Frequency Separation	
	Channel 78: 2480MHz	GFSKModulation



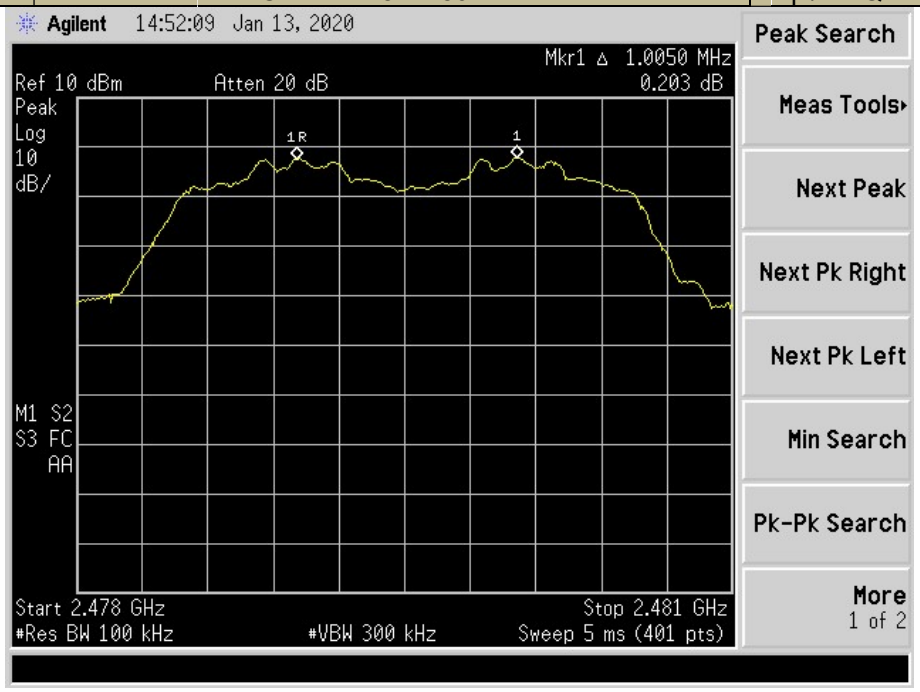
Test Model	Carrier Frequency Separation	
	Channel 0: 2402MHz	pi/4-DQPSKModulation



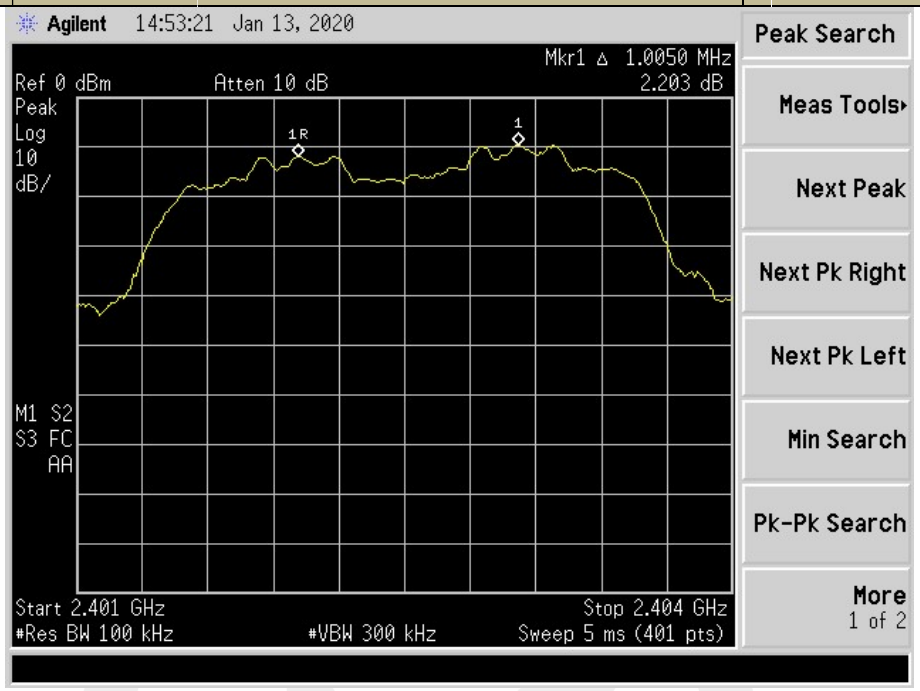
Test Model	Carrier Frequency Separation	
	Channel 39: 2441MHz	pi/4-DQPSKModulation



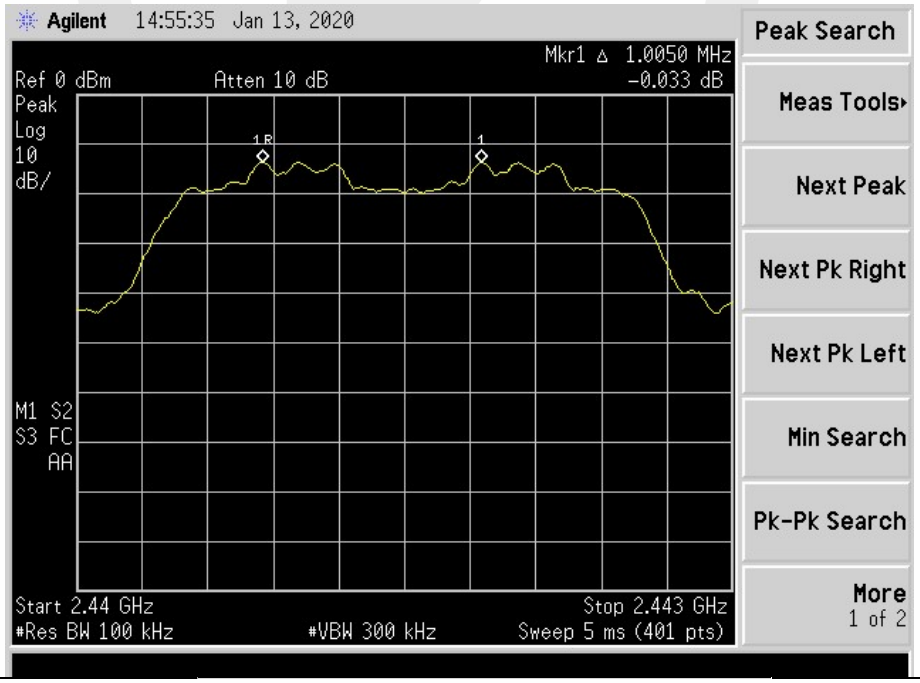
Test Model	Carrier Frequency Separation	
	Channel 78: 2480MHz	pi/4-DQPSKModulation



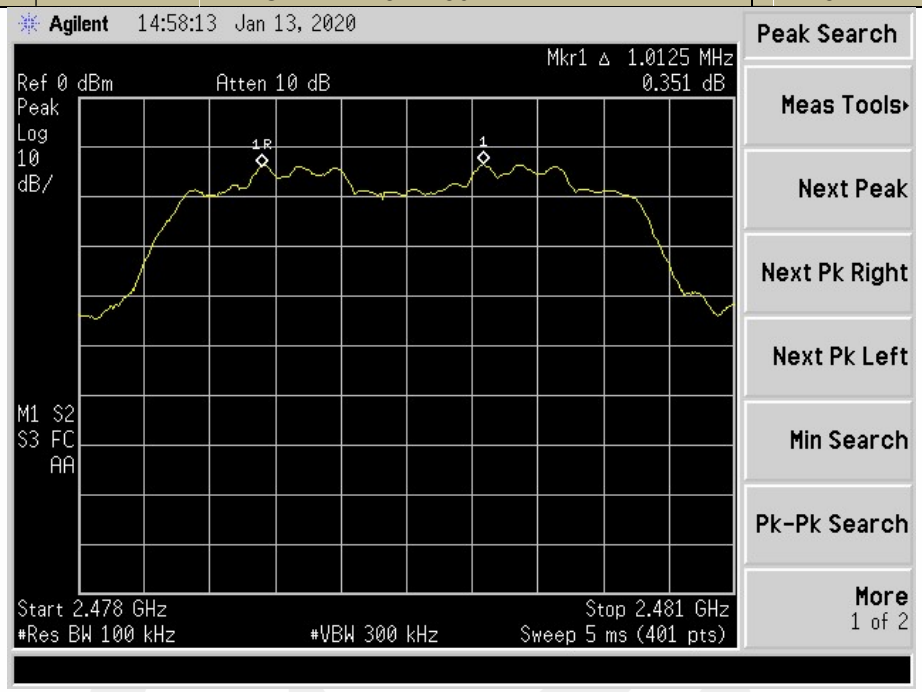
Test Model	Carrier Frequency Separation	
	Channel 0: 2402MHz	8DPSKModulation



Test Model	Carrier Frequency Separation	
	Channel 39: 2441MHz	8DPSKModulation



Test Model	Carrier Frequency Separation	
	Channel 78: 2480MHz	8DPSKModulation



9.3 NUMBER OF HOPPING FREQUENCIES

9.3.1 Applicable Standard

According to FCC Part 15.247(a)(1) (iii), RSS-247 Clause 5.1(d), 558074 D01 15.247 Meas Guidance V05r02

9.3.2 Conformance Limit

Frequency hopping systems operating in the 2400-2483.5MHz band shall use at least 15 channels.

9.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.3.4 Test Procedure

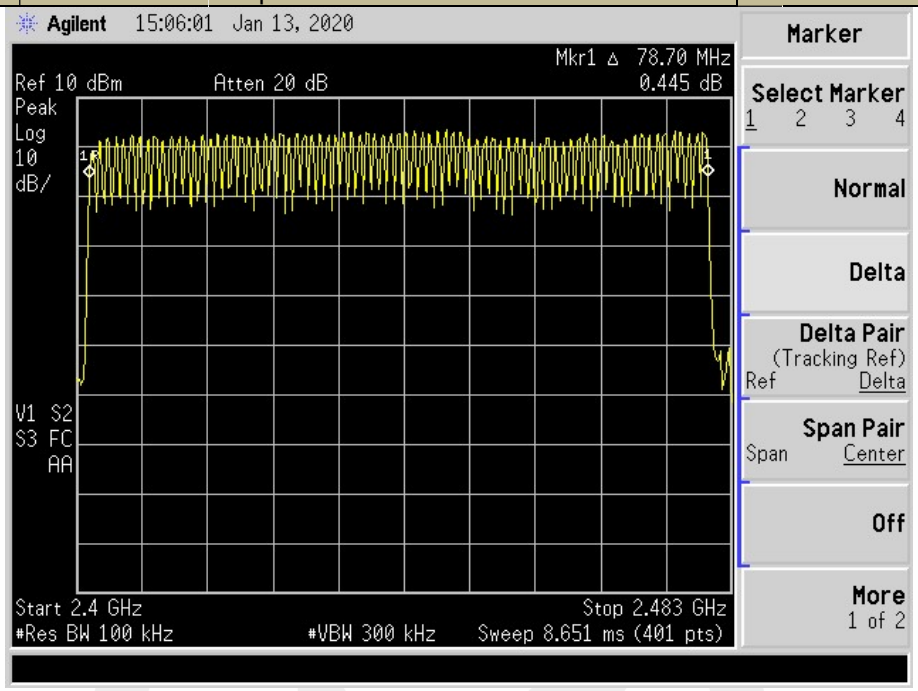
■ According to FCC Part15.247(a)(1)(iii) and RSS-247 Clause 5.1(d)
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW = 100kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize. It may prove necessary to break the span up to sections, inorder to clearly show all of the hopping frequencies.

Test Results

Temperature:	20℃	Test Date:	Jan 13, 2020
Humidity:	45 %	Test By:	XW

Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel limit
2402-2480 (GFSK)	79	＞15
Note: Both BR & EDR mode has same result .		

Test Model	Number Of Hopping Frequencies	
	Span:2400-2483.5MHz	GFSK



9.4 AVERAGE TIME OF OCCUPANCY (DWELL TIME)

9.4.1 Applicable Standard

According to FCC Part 15.247(a)(1)(iii), RSS-247 Clause 5.1(d), 558074 D01 15.247 Meas Guidance V05r02

9.4.2 Conformance Limit

For frequency hopping systems operating in the 2400-2483.5MHz band, the averagetime of occupancy on any channel shall not be greater than 0.4s within a period of 0.4smultiplied by the number of hopping channels employed.

9.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.4.4 Test Procedure

■ According to FCC Part15.247(a)(1)(iii) and RSS-247 Clause 5.1(d)
The EUT must have its hopping function enabled. Use the following spectrum analyzersettings:
Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW ≥ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold
If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphsof this Section.

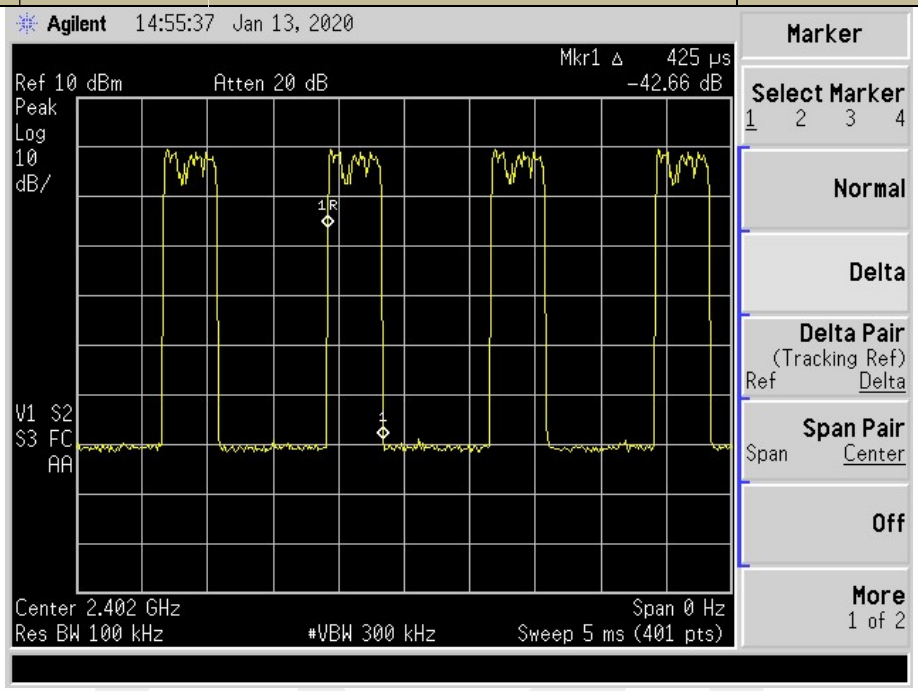
9.4.5 Test Results

Temperature:	20℃	Test Date:	Jan 13, 2020
Humidity:	45 %	Test By:	XW

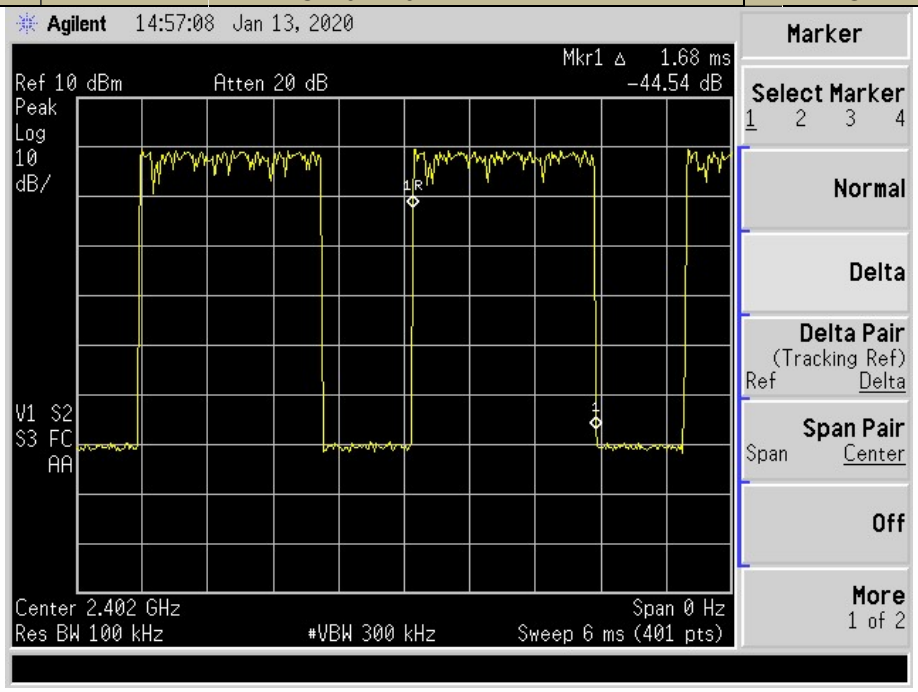
Modulation Mode	Channel Number	Packet type	Pluse width (ms)	DwellTime (ms)	Limit (ms)	Verdict
GFSK	0	DH1	0.425	136.00	<400	PASS
	0	DH3	1.68	268.80	<400	PASS
	0	DH5	2.92	311.47	<400	PASS

Note1: DwellTime(DH1)=PW*(1600/2/79)*31.6
DwellTime(DH3)=PW*(1600/4/79)*31.6
DwellTime(DH5)=PW*(1600/6/79)*31.6
Note2: Bluetooth (GFSK, pi/4-DQPSK, 8DPSK)mode have been tested, and the worst results has been recorded on the follow page.

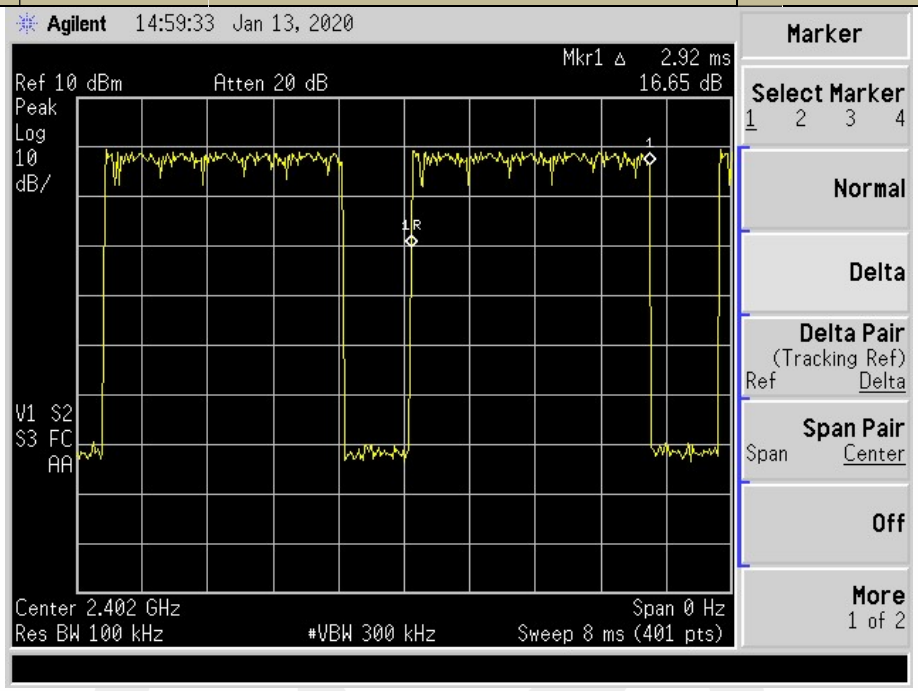
Test Model	Average Time Of Occupancy (Dwell Time)	
	CH 0: 2402MHz	GFSK DH1



Test Model	Average Time Of Occupancy (Dwell Time)	
	CH 0: 2402MHz	GFSK DH3



Test Model	Average Time Of Occupancy (Dwell Time)	
	CH 0: 2402MHz	GFSK DH5



9.5 MAXIMUM PEAK CONDUCTED OUTPUT POWER

9.5.1 Applicable Standard

According to FCC Part 15.247(b)(1), RSS-247 Clause 5.4(b), 558074 D01 15.247 Meas Guidance V05r02

9.5.2 Conformance Limit

The maxFor frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.5.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.5.4 Test Procedure

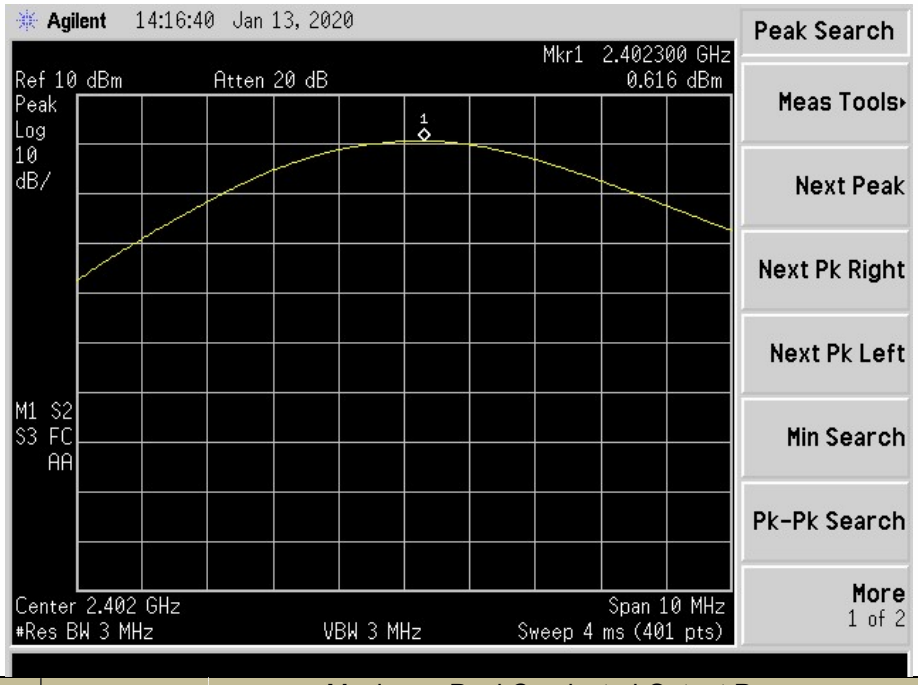
■ According to FCC Part15.247(b)(1) and RSS-247 Clause 5.4(b)
As an alternative to a peak power measurement, compliance with the limit can be based on a measurement of the maximum conducted output power.
Use the following spectrum analyzer settings:
Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel(about 10MHz)
Set RBW > the 20 dB bandwidth of the emission being measured(about 3MHz)
Set VBW ≥ RBW
Set Sweep = auto
Set Detector function = peak
Set Trace = max hold
Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emissionto determine the peak amplitude level.

Test Results

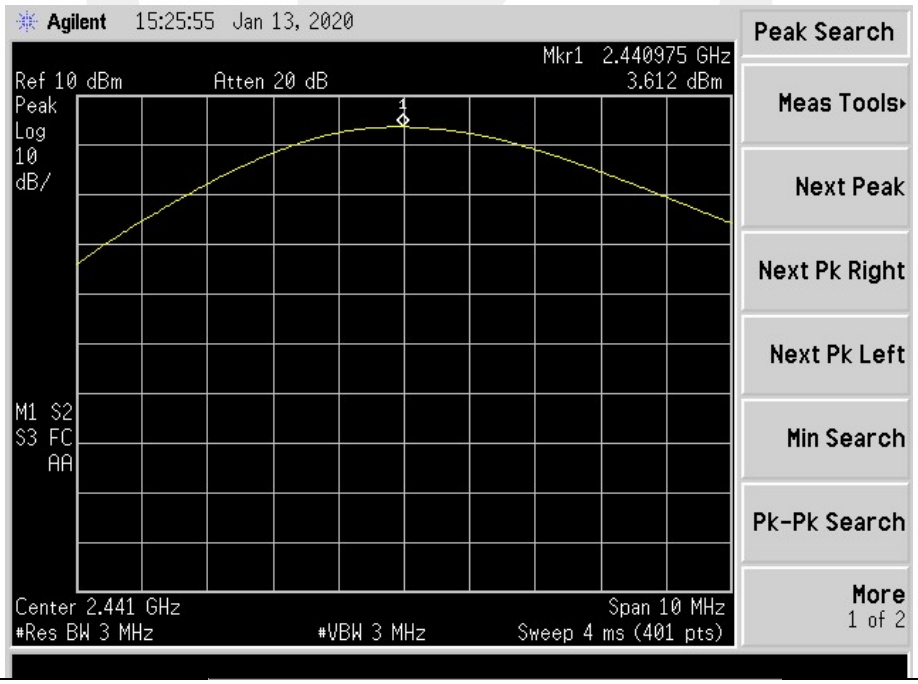
Temperature:	20℃	Test Date:	Jan 13, 2020
Humidity:	45 %	Test By:	XW

Operation Mode	Channel Number	Channel Frequency (MHz)	MeasurementLevel (dBm)	Limit (dBm)	Verdict
GFSK	0	2402	0.616	21	PASS
	39	2441	3.612	21	PASS
	78	2480	3.602	21	PASS
pi/4-DQPSK	0	2402	-3.282	21	PASS
	39	2441	0.453	21	PASS
	78	2480	0.095	21	PASS
8DPSK	0	2402	-2.769	21	PASS
	39	2441	1.075	21	PASS
	78	2480	0.662	21	PASS
Note:N/A					

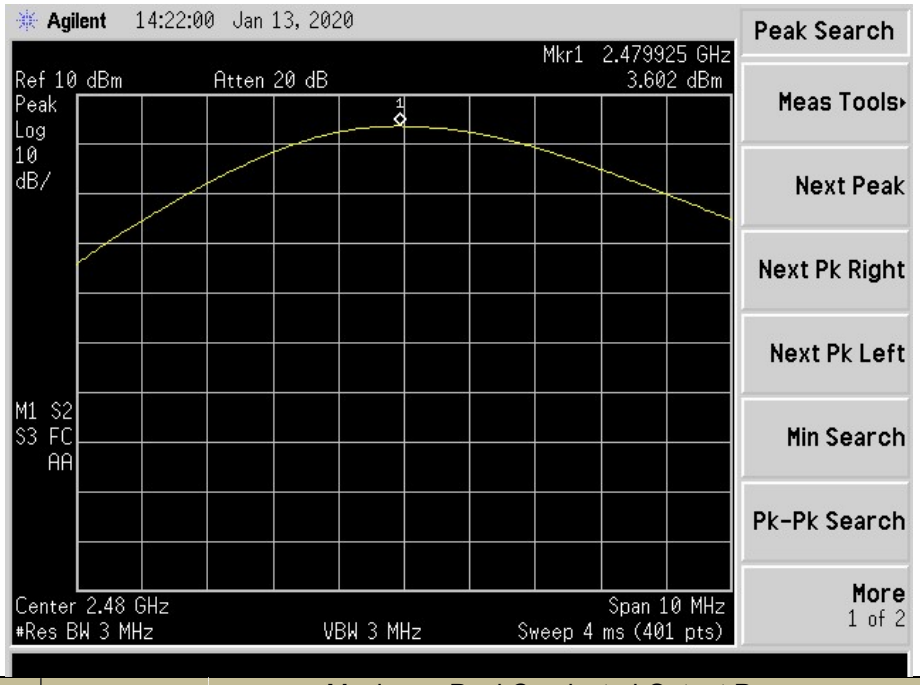
Test Model		Maximum PeakConducted Output Power	
		Channel 0: 2402MHz	GFSK



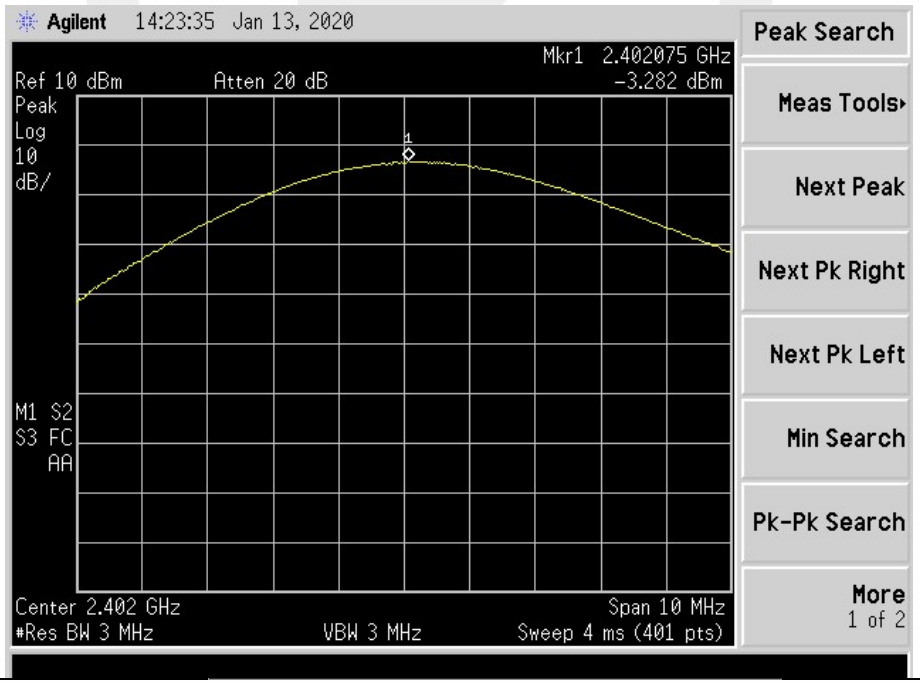
Test Model		Maximum PeakConducted Output Power	
		Channel 39: 2441MHz	GFSK



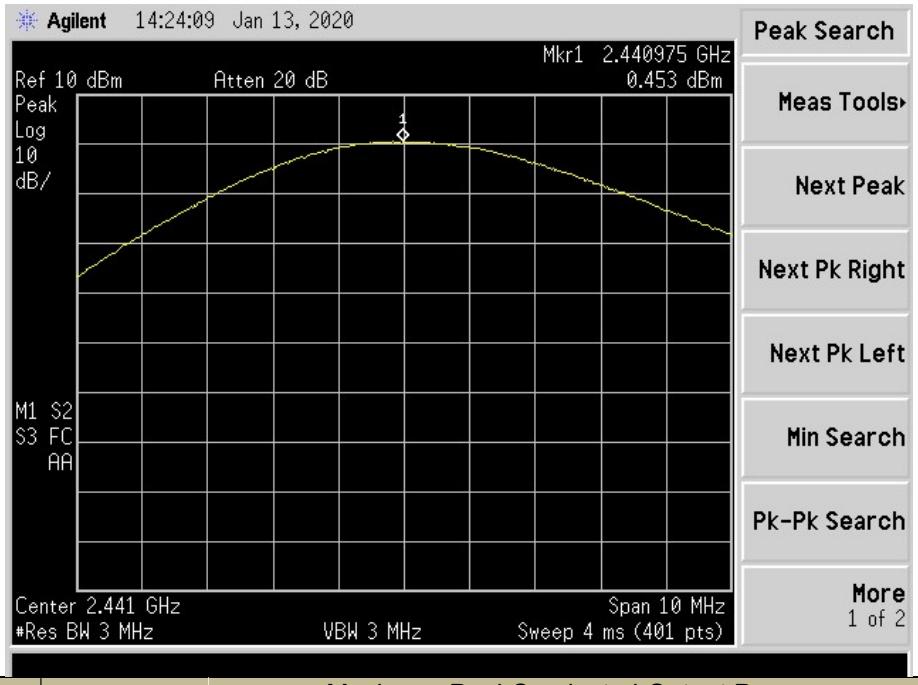
Test Model		Maximum PeakConducted Output Power	
		Channel 78: 2480MHz	GFSK



Test Model		Maximum PeakConducted Output Power	
		Channel 0: 2402MHz	pi/4-DQPSK



Test Model		Maximum PeakConducted Output Power	
		Channel 39: 2441MHz	pi/4-DQPSK



Test Model		Maximum PeakConducted Output Power	
		Channel 78: 2480MHz	pi/4-DQPSK