



TEST REPORT

Report Reference No.....	TRE1712001104	R/C.....: 68626
FCC ID	2AEY7-S8A003	
Applicant's name.....	Bak USA Technologies Corp.	
Address.....	425 Michigan Avenue,Buffalo,New York 14203,USA	
Manufacturer.....	Bak USA Technologies Corp.	
Address.....	425 Michigan Avenue,Buffalo,New York 14203,USA	
Test item description	Tablet PC	
Trade Mark	-	
Model/Type reference.....	Seal8Pro	
Listed Model(s)	-	
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247	
Date of receipt of test sample.....	Dec.04, 2017	
Date of testing.....	Dec.05, 2017- Dec.13, 2017	
Date of issue.....	Dec.14, 2017	
Result.....	PASS	

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Approved by (Position+Printed name+Signature):	RF Manager Hans Hu	

Testing Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.
Address.....	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

1.2. Report version

Version No.	Date of issue	Description
00	Dec.14, 2017	Original

2. TEST DESCRIPTION

Test Item	Section in CFR 47	Result	Test Engineer
Antenna Requirement	15.203/15.247 (c)	Pass	William Wang
AC Power Line Conducted Emissions	15.207	Pass	William Wang
Conducted Peak Output Power	15.247 (b)(1)	Pass	Baozhu Hu
20 dB Bandwidth	15.247 (a)(1)	Pass	Baozhu Hu
Carrier Frequencies Separation	15.247 (a)(1)	Pass	Baozhu Hu
Hopping Channel Number	15.247 (a)(1)	Pass	Baozhu Hu
Dwell Time	15.247 (a)(1)	Pass	Baozhu Hu
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	Pass	Baozhu Hu
Restricted band	15.247(d)/15.205	Pass	Baozhu Hu
Radiated Emissions	15.247(d)/15.209	Pass	Baozhu Hu

Note: The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Client Information

Applicant:	Bak USA Technologies Corp.
Address:	425 Michigan Avenue,Buffalo,New York 14203,USA
Manufacturer:	Bak USA Technologies Corp.
Address:	425 Michigan Avenue,Buffalo,New York 14203,USA

3.2. Product Description

Name of EUT:	Tablet PC
Trade Mark:	-
Model No.:	Seal8Pro
Listed Model(s):	-
Power supply:	DC 3.7V From exchange battery
Adapter information:	Input: 100-240Va.c., 50/60Hz, 0.6A Output: 5Vd.c.,5A
Hardware version:	1.1
Software version:	1607
Bluetooth	
Version:	Supported BT4.0+EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Integral antenna
Antenna gain:	2.0dBi

3.3. Operation state

➤ **Test frequency list**

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
00	2402
01	2403
:	:
39	2441
:	:
77	2479
78	2480

➤ **TEST MODE**

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated suprious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data recorded in the report.

3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

/	Manufacturer:	/
	Model No.:	/
/	Manufacturer:	/
	Model No.:	/

3.5. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

4.2. Test Facility

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

IC-Registration No.:5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377B-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

4.4. 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 in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.39 dB	(1)
Radiated Emissions 30~1000MHz	4.24 dB	(1)
Radiated Emissions 1~18GHz	5.16 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipments Used during the Test

Conducted Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
2	Artificial Mains	SCHWARZBECK	NNLK 8121	573	11/11/2017	11/10/2018
3	Pulse Limiter	R&S	ESH3-Z2	101488	11/11/2017	11/10/2018
4	Test Software	R&S	ES-K1	N/A	N/A	N/A
5	RF Connection Cable	HUBER+SUHNER	EF400	N/A	11/21/2017	11/20/2018
6	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	11/11/2017	11/10/2018
7	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	11/11/2017	11/10/2018
8	Four Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T8-02	20375	11/11/2017	11/10/2018
9	V-Network	R&S	ESH3-Z6	100211	11/11/2017	11/10/2018
10	V-Network	R&S	ESH3-Z6	100210	11/11/2017	11/10/2018
11	2-Line V-Network	R&S	ESH3-Z5	100049	11/11/2017	11/10/2018

Radiated Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
2	Loop Antenna	R&S	HFH2-Z2	100020	11/20/2017	11/19/2018
3	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	4/5/2017	4/4/2018
4	Horn Antenna	SCHWARZBECK	9120D	1011	3/27/2017	3/26/2018
5	Horn Antenna	SCHWARZBECK	BBHA9170	25841	3/27/2017	3/26/2018
6	Preamplifier	SCHWARZBECK	BBV 9743	9743-0022	10/18/2017	10/17/2018
7	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-248	10/18/2017	10/17/2018
8	High pass filter	Compliance Direction systems	BSU-6	34202	11/11/2017	11/10/2018
9	Turntable	MATURO	TT2.0	/	N/A	N/A
10	Antenna Mast	MATURO	TAM-4.0-P	/	N/A	N/A
11	EMI Test Software	R&S	ESK1	N/A	N/A	N/A
12	EMI Test Software	Audix	E3	N/A	N/A	N/A

13	RF Connection Cable	HUBER+SUHNE R	3m 3GHz S	N/A	11/21/2017	11/20/2018
14	RF Connection Cable	HUBER+SUHNE R	3m 3GHz RG	N/A	11/21/2017	11/20/2018
15	RF Connection Cable	HUBER+SUHNE R	6m 18GHz S	N/A	11/21/2017	11/20/2018

RF Conducted Method

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Spectrum Analyzer	R&S	FSV40	100048	11/11/2017	11/10/2018
2	OSP	R&S	OSP120	101317	N/A	N/A
3	OSP	R&S	OSP-B157	100890	N/A	N/A
4	Signal generator	R&S	SMB100A	177956	11/11/2017	11/10/2018
5	Vector signal generator	R&S	SMBV100A	260790	7/20/2017	7/19/2018
6	EXA Signal Analyzer	Agilent	N9020A	184247	9/22/2017	9/21/2018
7	Power Meter	Agilent	U2021XA	178231	9/22/2017	9/21/2018
8	DAQ Device	Agilent	U2531A	132812	9/22/2017	9/21/2018

The Cal.Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

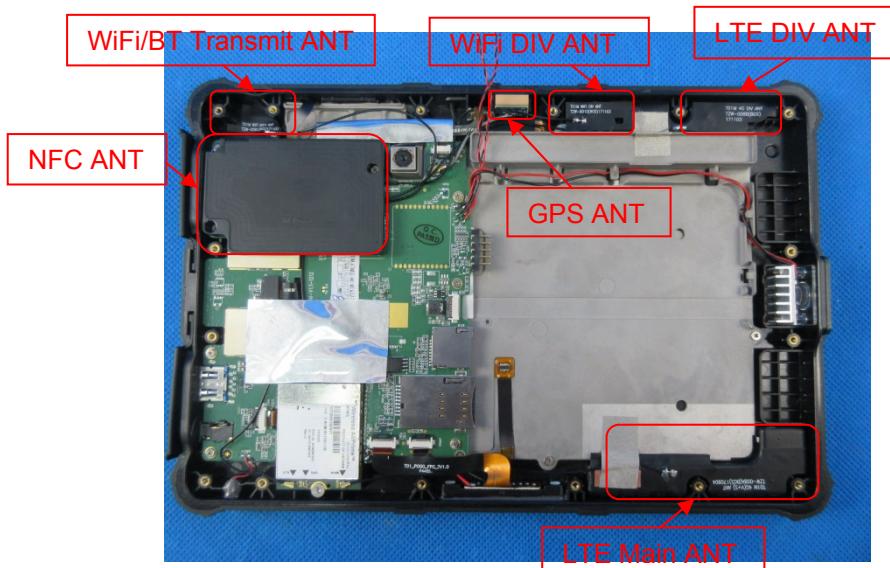
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Test Result:

Passed Not Applicable

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

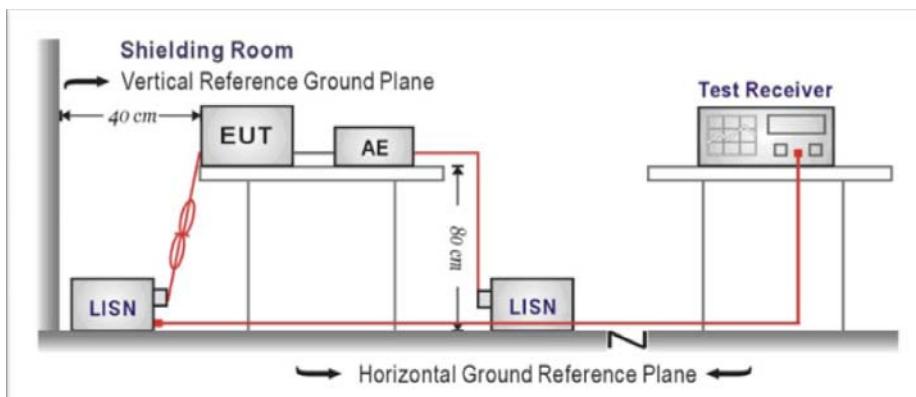
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

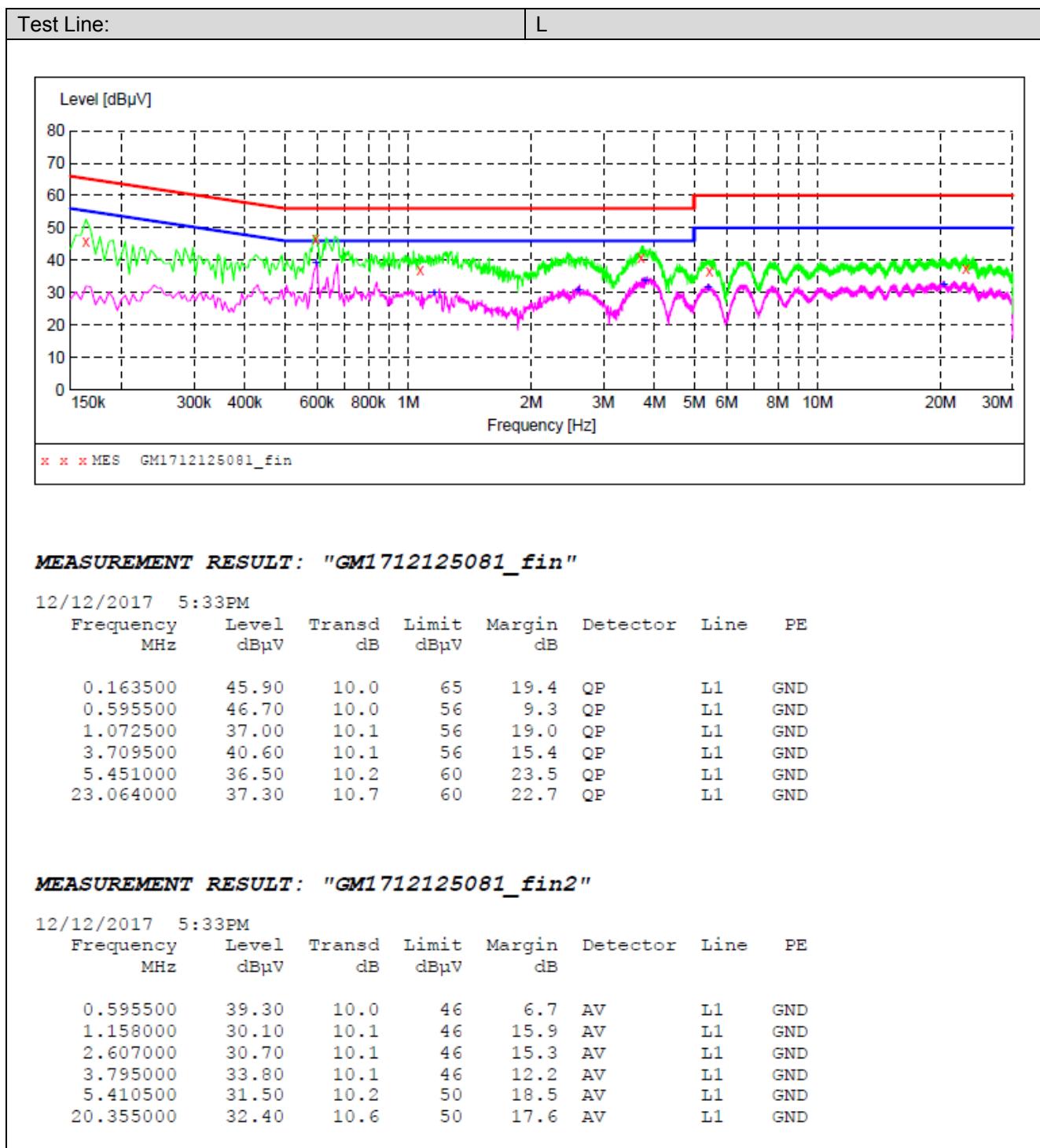
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

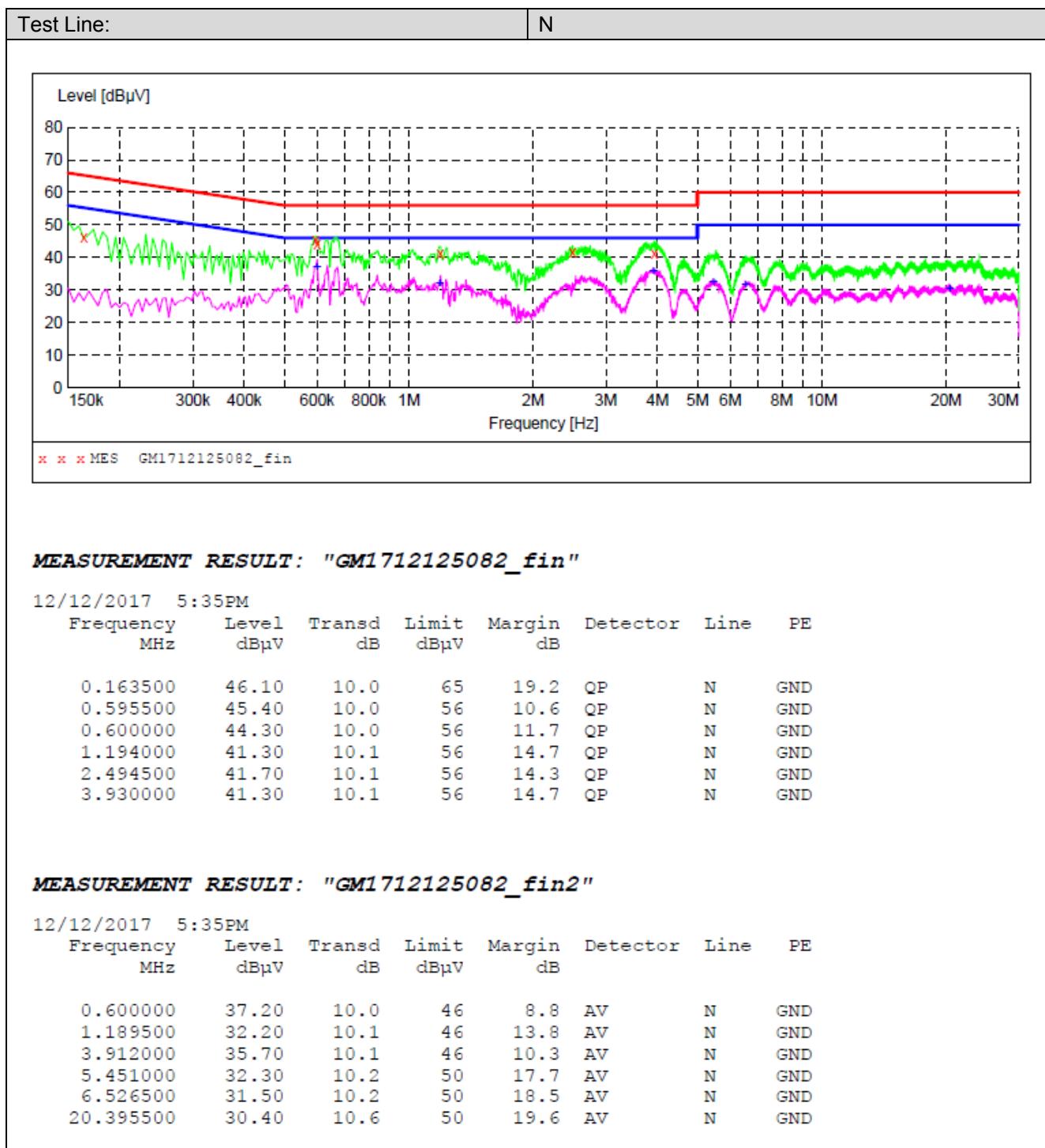
TEST RESULTS

Passed Not Applicable

Note:

- 1) Transd= Cable loss + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit - Level



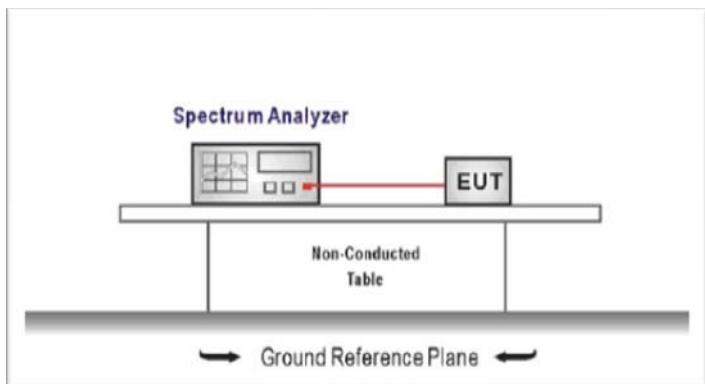


5.3. Conducted Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 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 systems in the 2400-2483.5 MHz band: 0.125 watts.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
 $RBW \geq$ the 20 dB bandwidth of the emission being measured, $VBW \geq RBW$
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

Modulation type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK	00	6.05	≤ 30.00	Pass
	39	6.34		
	78	5.78		
$\pi/4$ DQPSK	00	5.32	≤ 21.00	Pass
	39	5.67		
	78	5.09		
8DPSK	00	5.43	≤ 21.00	Pass
	39	5.86		
	78	5.31		

Modulation Type:		GFSK
CH00		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 2.402 135 GHz 6.046 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.399500000 GHz</p> <p>Stop Freq 2.404500000 GHz</p> <p>CF Step 500.000 kHz Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>
CH39		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 2.441 120 GHz 6.336 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.441000000 GHz</p> <p>Start Freq 2.438500000 GHz</p> <p>Stop Freq 2.443500000 GHz</p> <p>CF Step 500.000 kHz Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>
CH78		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Mkr1 2.480 170 GHz 5.780 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.480000000 GHz</p> <p>Start Freq 2.477500000 GHz</p> <p>Stop Freq 2.482500000 GHz</p> <p>CF Step 500.000 kHz Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>

Modulation Type:		$\pi/4$ DQPSK
CH00		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Span 5.000 MHz</p> <p>#Res BW 2.0 MHz</p> <p>#VBW 6.0 MHz</p> <p>Sweep 1.000 ms (1001 pts)</p> <p>Mkr1 2.402 110 GHz 5.321 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.399500000 GHz</p> <p>Stop Freq 2.404500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>
CH39		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Span 5.000 MHz</p> <p>#Res BW 2.0 MHz</p> <p>#VBW 6.0 MHz</p> <p>Sweep 1.000 ms (1001 pts)</p> <p>Mkr1 2.441 105 GHz 5.670 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.441000000 GHz</p> <p>Start Freq 2.438500000 GHz</p> <p>Stop Freq 2.443500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>
CH78		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Span 5.000 MHz</p> <p>#Res BW 2.0 MHz</p> <p>#VBW 6.0 MHz</p> <p>Sweep 1.000 ms (1001 pts)</p> <p>Mkr1 2.480 175 GHz 5.093 dBm</p> <p>Frequency Auto Tune</p> <p>Center Freq 2.480000000 GHz</p> <p>Start Freq 2.477500000 GHz</p> <p>Stop Freq 2.482500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>

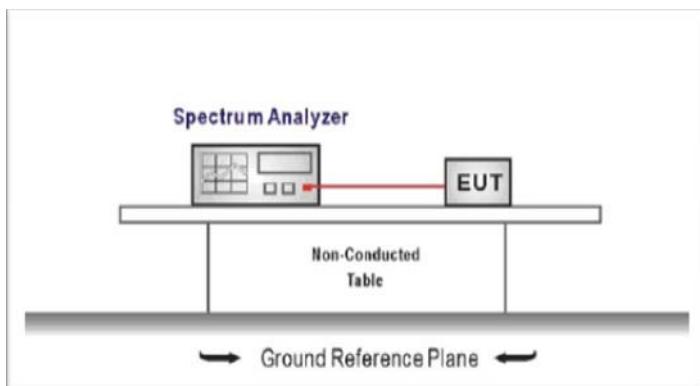
Modulation Type:		8DPSK
CH00		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div</p> <p>Mkr1 2.401930 GHz 5.430 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.399500000 GHz</p> <p>Stop Freq 2.404500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>
CH39		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div</p> <p>Mkr1 2.440910 GHz 5.856 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441000000 GHz</p> <p>Start Freq 2.438500000 GHz</p> <p>Stop Freq 2.443500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>
CH78		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>10 dB/div</p> <p>Mkr1 2.479945 GHz 5.309 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.480000000 GHz</p> <p>Start Freq 2.477500000 GHz</p> <p>Stop Freq 2.482500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p> <p>MSG STATUS</p>

5.4. 20 dB Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

Modulation type	Channel	20 dB Bandwidth (MHz)	Limit (MHz)	Result
GFSK	00	0.93	-	Pass
	39	0.92		
	78	0.92		
$\pi/4$ DQPSK	00	1.29	-	Pass
	39	1.29		
	78	1.29		
8DPSK	00	1.29	-	Pass
	39	1.31		
	78	1.30		

Modulation Type:		GFSK
CH00		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.4020575 GHz 0.42914 dBm</p> <p>Center 2.402 GHz Span 2.5 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 23.93 ms</p> <p>Occupied Bandwidth Total Power 12.6 dBm</p> <p>881.30 kHz</p> <p>Transmit Freq Error -1.022 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 925.8 kHz x dB -20.00 dB</p> <p>MSG STATUS</p>
CH39		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.4410575 GHz 0.78412 dBm</p> <p>Center 2.441 GHz Span 2.5 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 23.93 ms</p> <p>Occupied Bandwidth Total Power 12.9 dBm</p> <p>880.62 kHz</p> <p>Transmit Freq Error -1.228 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 924.5 kHz x dB -20.00 dB</p> <p>MSG STATUS</p>
CH78		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.4800575 GHz 0.18120 dBm</p> <p>Center 2.48 GHz Span 2.5 MHz</p> <p>#Res BW 10 kHz #VBW 30 kHz Sweep 23.93 ms</p> <p>Occupied Bandwidth Total Power 12.3 dBm</p> <p>880.29 kHz</p> <p>Transmit Freq Error -1.971 kHz OBW Power 99.00 %</p> <p>x dB Bandwidth 924.5 kHz x dB -20.00 dB</p> <p>MSG STATUS</p>

Modulation Type:		$\pi/4$ DQPSK
CH00		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.402165 GHz 1.4630 dBm</p> <p>CF Step 250.000 kHz</p> <p>Total Power 11.5 dBm</p> <p>Occupied Bandwidth 1.1729 MHz</p> <p>Transmit Freq Error 95 Hz</p> <p>#VBW 100 kHz</p> <p>OBW Power 99.00 %</p> <p>#Res BW 30 kHz</p> <p>Sweep 2.667 ms</p> <p>x dB Bandwidth 1.289 MHz</p> <p>x dB -20.00 dB</p>
CH39		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.44111625 GHz 2.1805 dBm</p> <p>CF Step 250.000 kHz</p> <p>Total Power 12.0 dBm</p> <p>Occupied Bandwidth 1.1770 MHz</p> <p>Transmit Freq Error -1.115 kHz</p> <p>#VBW 100 kHz</p> <p>OBW Power 99.00 %</p> <p>#Res BW 30 kHz</p> <p>Sweep 2.667 ms</p> <p>x dB Bandwidth 1.291 MHz</p> <p>x dB -20.00 dB</p>
CH78		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.480165 GHz 1.4782 dBm</p> <p>CF Step 250.000 kHz</p> <p>Total Power 11.4 dBm</p> <p>Occupied Bandwidth 1.1741 MHz</p> <p>Transmit Freq Error -1.301 kHz</p> <p>#VBW 100 kHz</p> <p>OBW Power 99.00 %</p> <p>#Res BW 30 kHz</p> <p>Sweep 2.667 ms</p> <p>x dB Bandwidth 1.289 MHz</p> <p>x dB -20.00 dB</p>

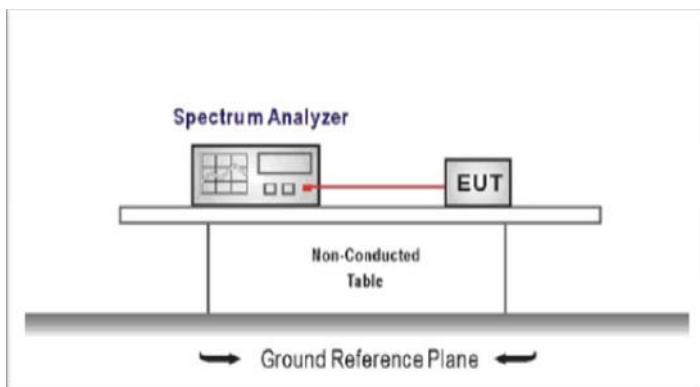
Modulation Type:		8DPSK
CH00		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.4021625 GHz 2.3527 dBm</p> <p>Center 2.402 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 2.5 MHz</p> <p>Sweep 2.667 ms</p> <p>Occupied Bandwidth 1.1850 MHz</p> <p>Total Power 11.3 dBm</p> <p>Transmit Freq Error 3.639 kHz</p> <p>x dB Bandwidth 1.291 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB 11.3 dB</p> <p>-20.00 dB</p>
CH39		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.44111575 GHz 1.2368 dBm</p> <p>Center 2.441 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 2.5 MHz</p> <p>Sweep 2.667 ms</p> <p>Occupied Bandwidth 1.1947 MHz</p> <p>Total Power 11.7 dBm</p> <p>Transmit Freq Error 1.527 kHz</p> <p>x dB Bandwidth 1.312 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB 11.7 dB</p> <p>-20.00 dB</p>
CH78		<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 0.5 dB</p> <p>Ref 20.00 dBm</p> <p>Mkr1 2.4801675 GHz 2.0042 dBm</p> <p>Center 2.48 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 2.5 MHz</p> <p>Sweep 2.667 ms</p> <p>Occupied Bandwidth 1.1927 MHz</p> <p>Total Power 11.2 dBm</p> <p>Transmit Freq Error 176 Hz</p> <p>x dB Bandwidth 1.298 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB 11.2 dB</p> <p>-20.00 dB</p>

5.5. Carrier Frequencies Separation

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the $2/3 \times 20$ dB bandwidth of the hopping channel, whichever is greater.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
RBW $\geq 1\%$ of the span, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

Modulation type	Channel	Carrier Frequencies Separation (MHz)	Limit (MHz) *	Result
GFSK	39	1.00	≥ 0.93	Pass
$\pi/4$ DQPSK	39	1.00	≥ 0.86	Pass
8DPSK	39	1.00	≥ 0.88	Pass

Note:

*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the section 5.4.

$\pi/4$ DQPSK limit = $2/3 \times$ The maximum 20 dB Bandwidth for $\pi/4$ DQPSK modulation on the section 5.4.

8DPSK limit = $2/3 \times$ The maximum 20 dB Bandwidth for 8DPSK modulation on the section 5.4.

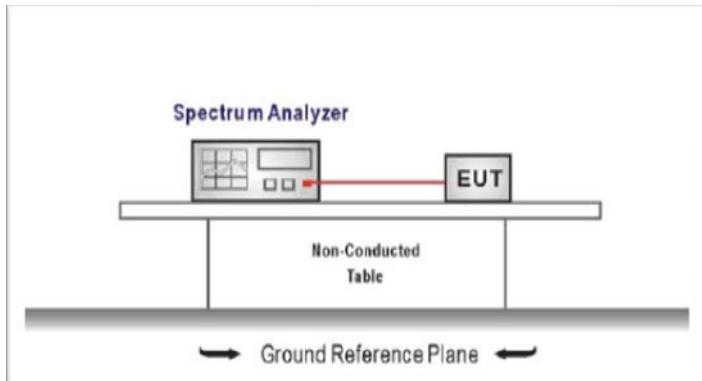


5.6. Hopping Channel Number

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems in the 2400–2483.5 MHz band shall use at least **15** channels.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = the frequency band of operation
RBW \geq 1% of the span, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

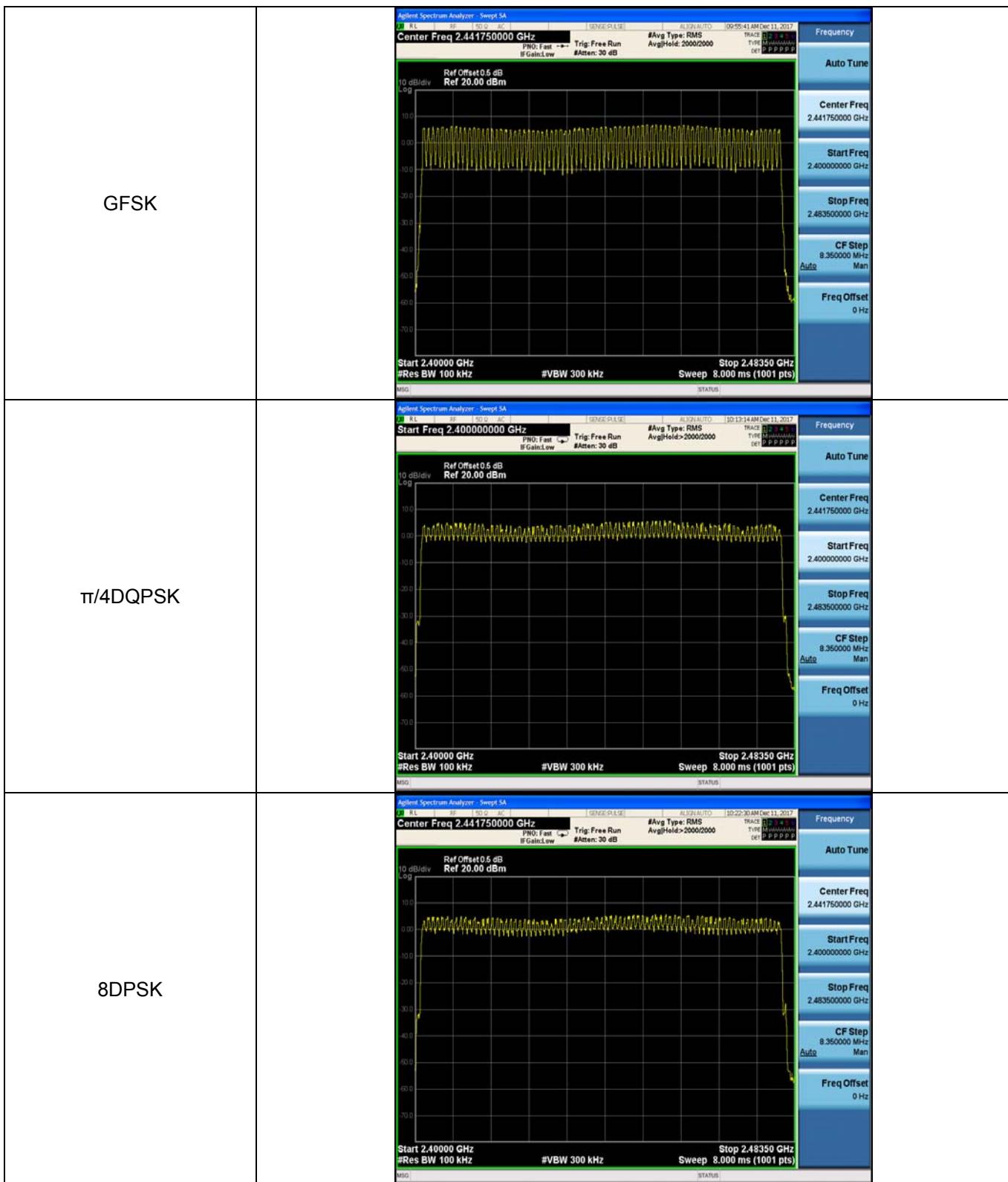
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

Modulation type	Channel number	Limit	Result
GFSK	79	\geq 15.00	Pass
$\pi/4$ DQPSK	79		
8DPSK	79		

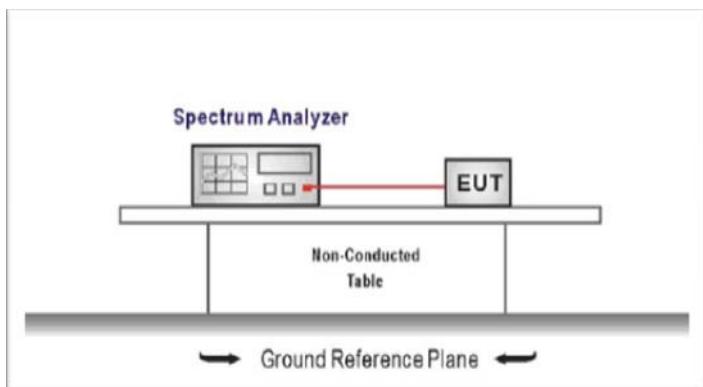


5.7. Dwell Time

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):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.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW \geq RBW
Sweep = as necessary to capture the entire dwell time per hopping channel,
Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

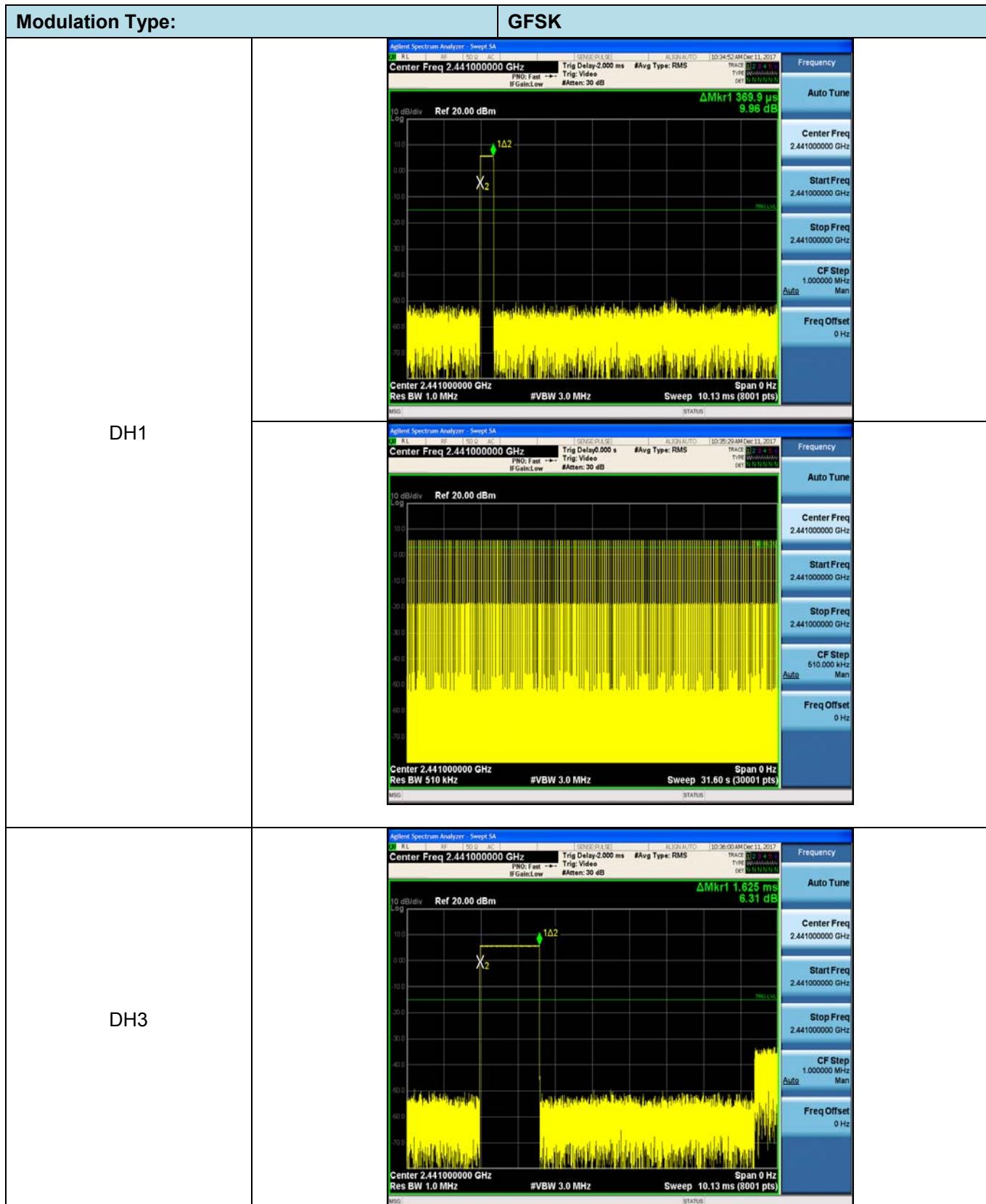
TEST MODE:

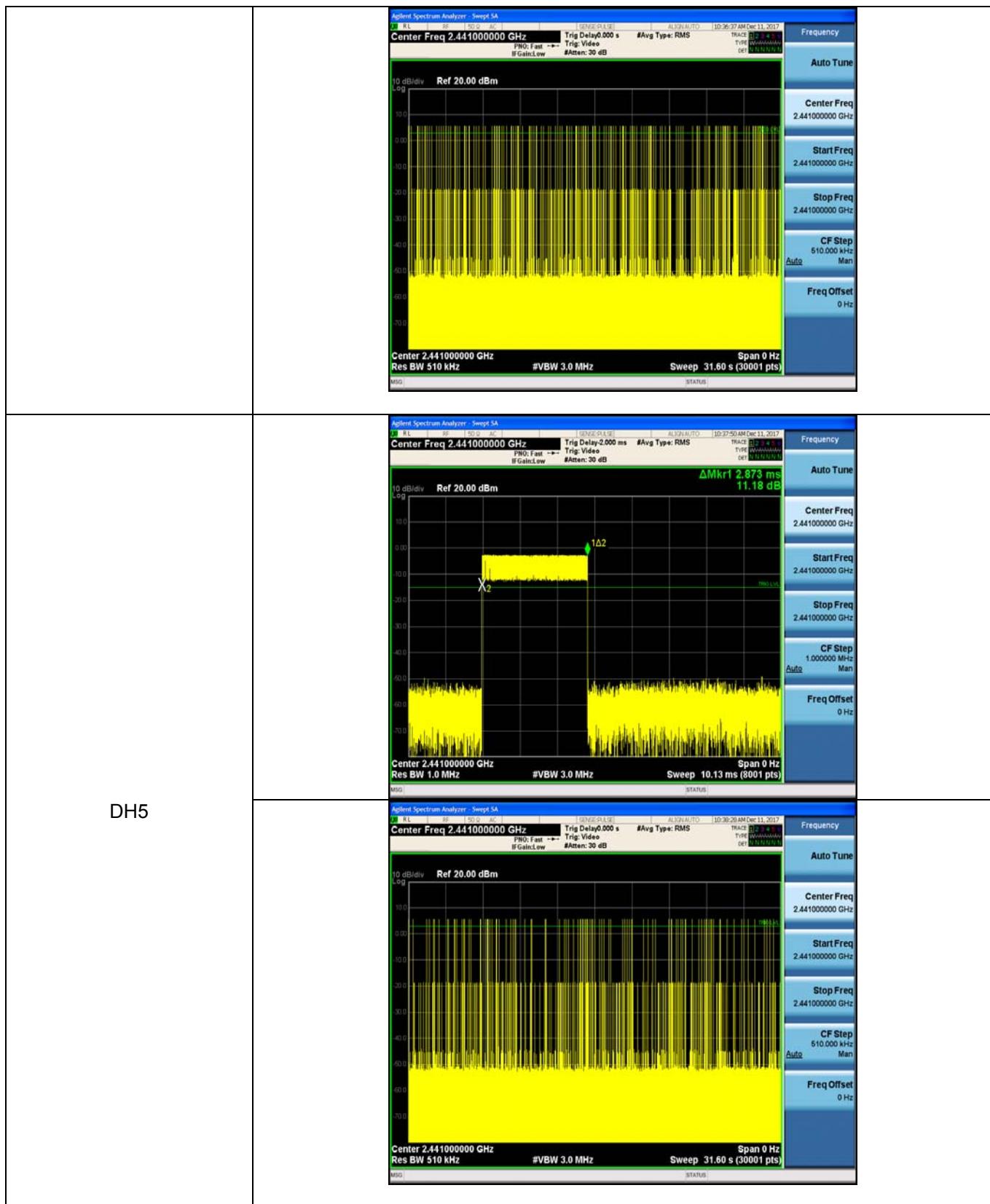
Please refer to the clause 3.3

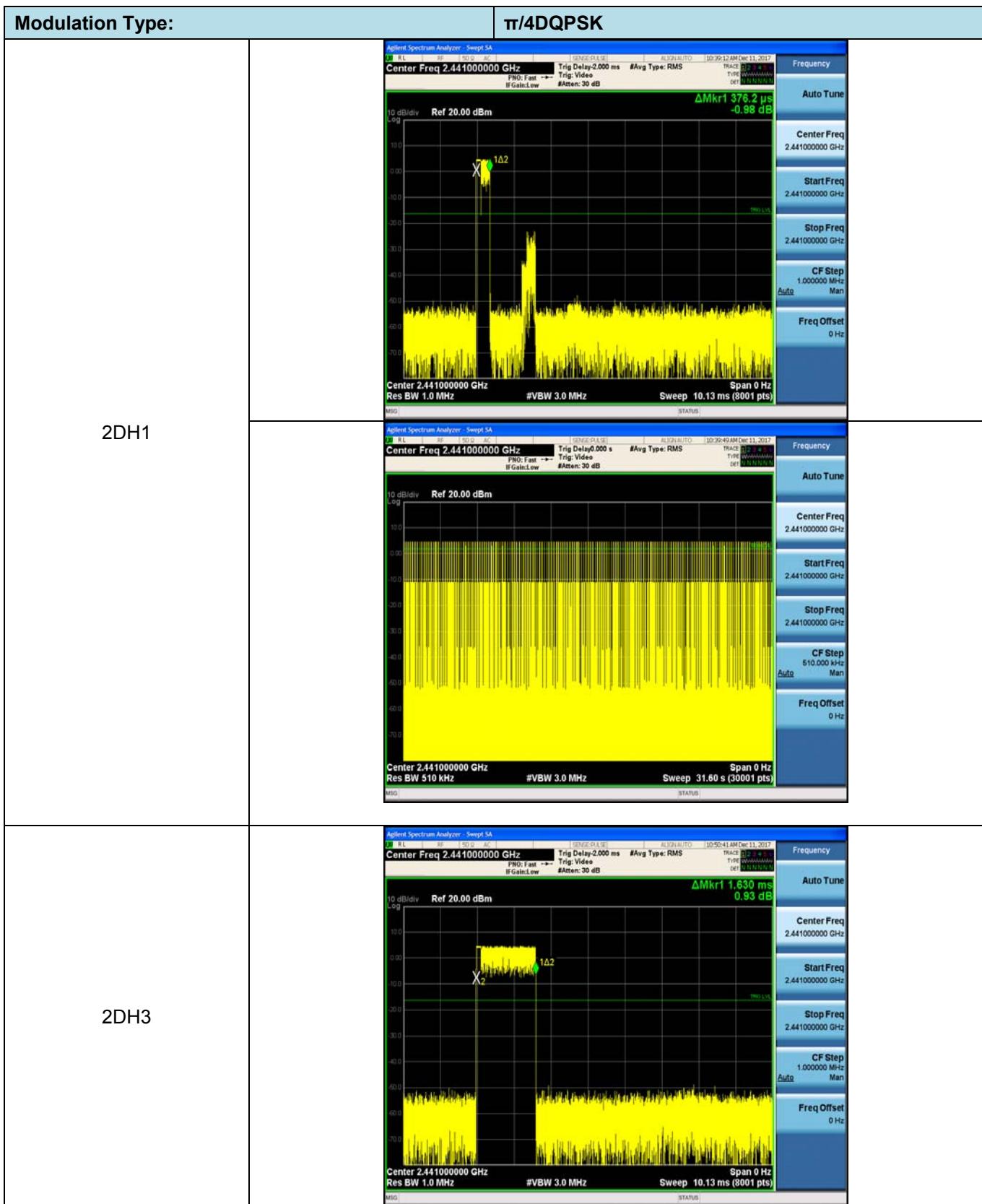
TEST RESULTS

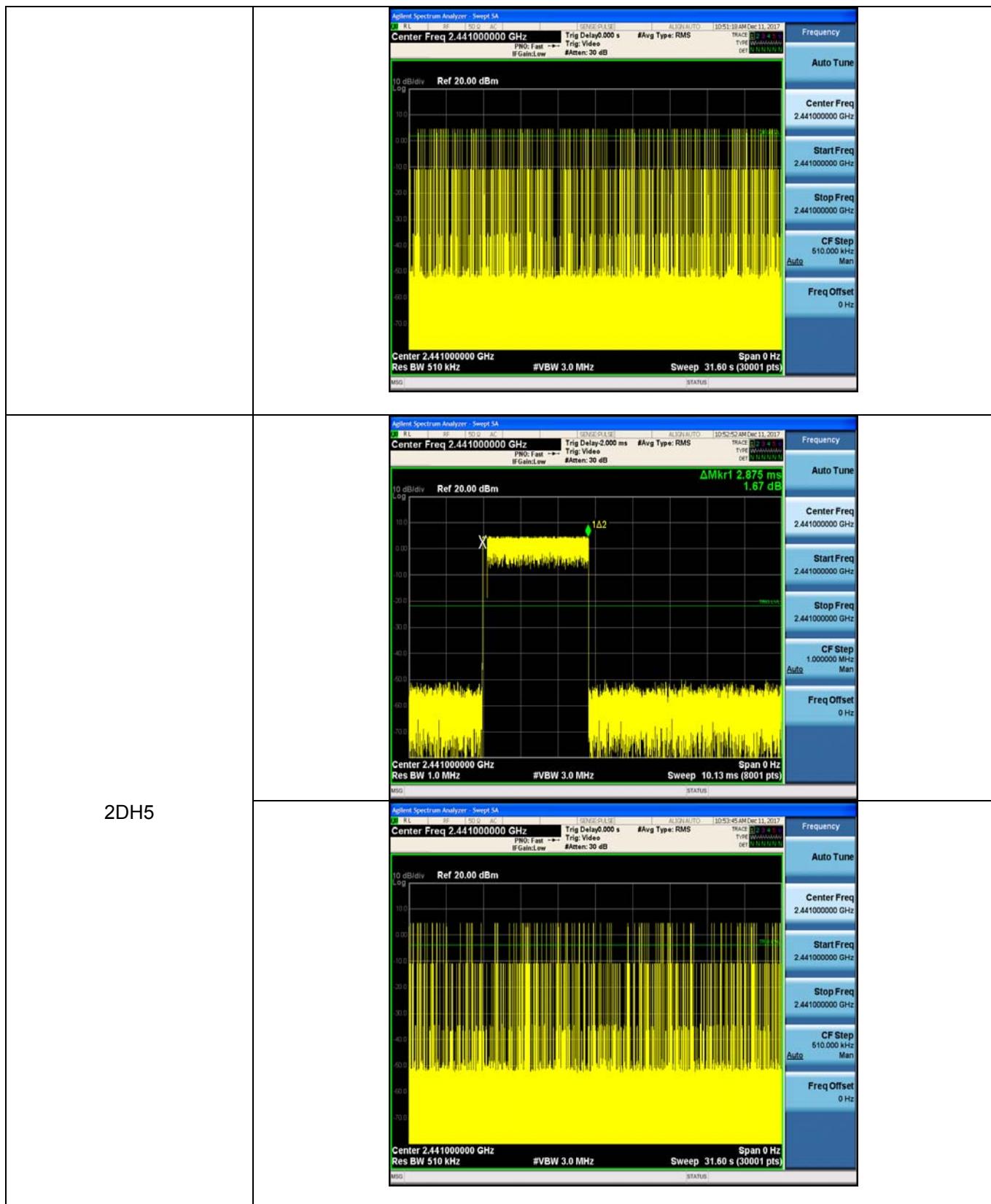
Passed Not Applicable

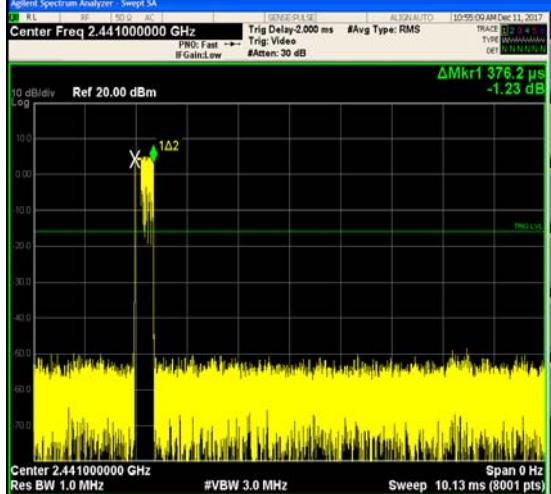
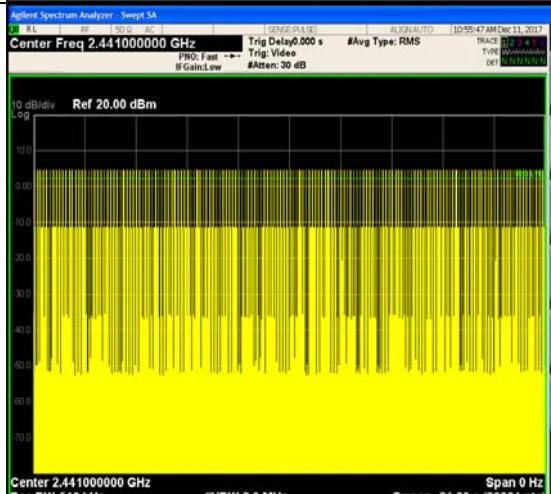
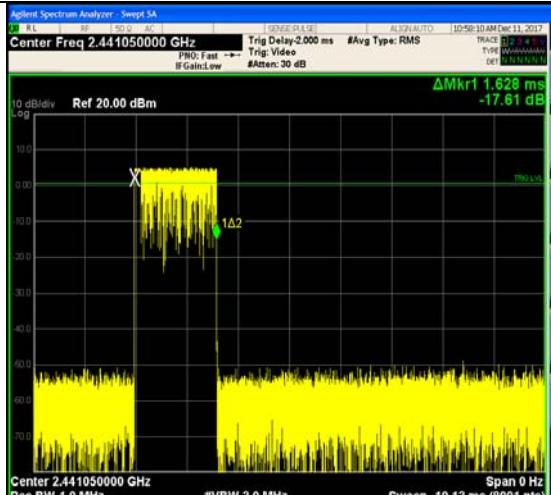
Modulation type	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell time (Second)	Limit (Second)	Result
GFSK	DH1	0.37	312.00	0.12	≤ 0.40	Pass
	DH3	1.63	160.00	0.26		
	DH5	2.87	104.00	0.30		
$\pi/4$ DQPSK	2DH1	0.38	314.00	0.12	≤ 0.40	Pass
	2DH3	1.63	163.00	0.27		
	2DH5	2.88	115.00	0.33		
8DPSK	3DH1	0.38	316.00	0.12	≤ 0.40	Pass
	3DH3	1.63	152.00	0.25		
	3DH5	2.88	99.00	0.29		

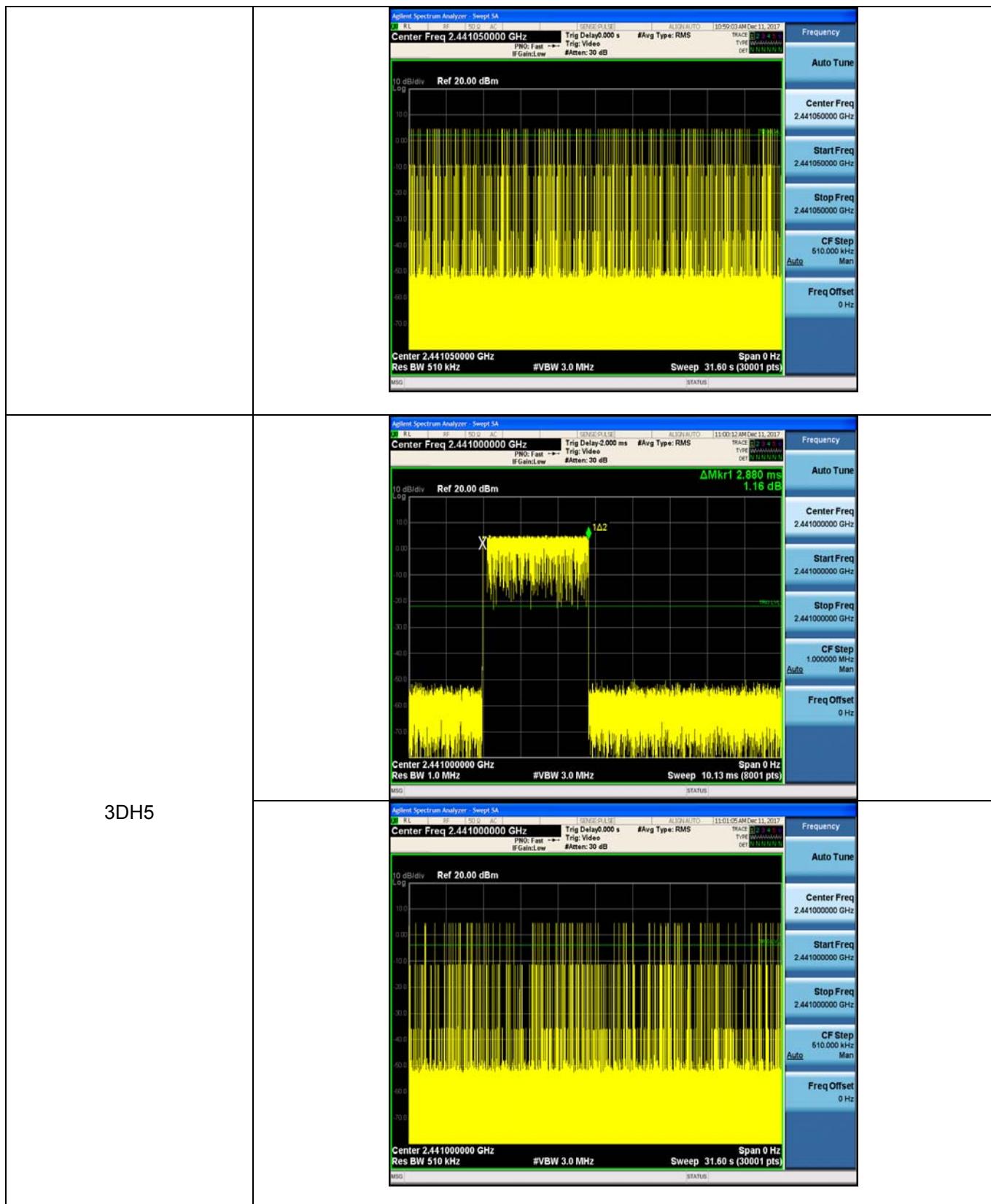








Modulation Type:		8DPSK
3DH1		 <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz Trig Delay:2.000 ms #Avg Type: RMS</p> <p>PPO: Fast Trig: Video IF Gain:Low #Atten: 30 dB</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.441000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)</p> <p>Span 0 Hz</p> <p>MSG STATUS</p>
3DH3		 <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz Trig Delay:0.000 s #Avg Type: RMS</p> <p>PPO: Fast Trig: Video IF Gain:Low #Atten: 30 dB</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.441000000 GHz Res BW 510 KHz #VBW 3.0 MHz Sweep 31.60 s (30001 pts)</p> <p>Span 0 Hz</p> <p>MSG STATUS</p>
		 <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441050000 GHz Trig Delay:2.000 ms #Avg Type: RMS</p> <p>PPO: Fast Trig: Video IF Gain:Low #Atten: 30 dB</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.441050000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)</p> <p>Span 0 Hz</p> <p>MSG STATUS</p>



5.8. Pseudorandom Frequency Hopping Sequence

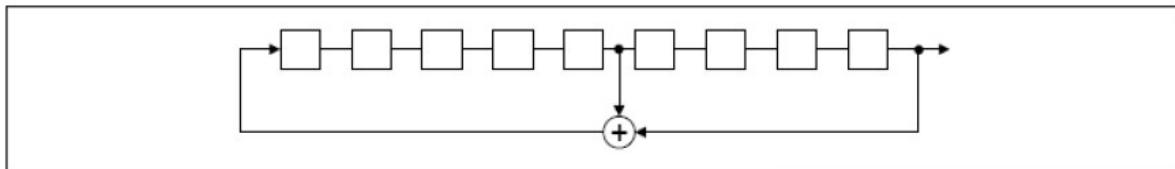
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 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. 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.

TEST RESULTS

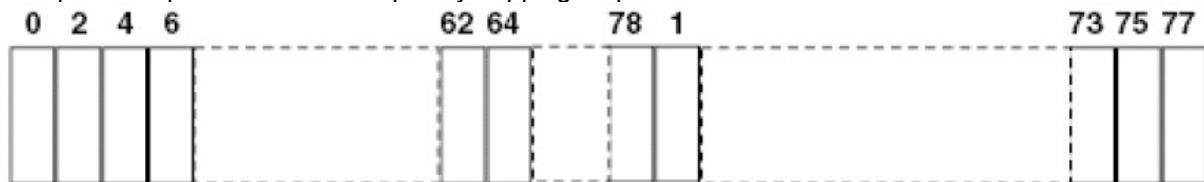
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: $2^9 - 1 = 511$ bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

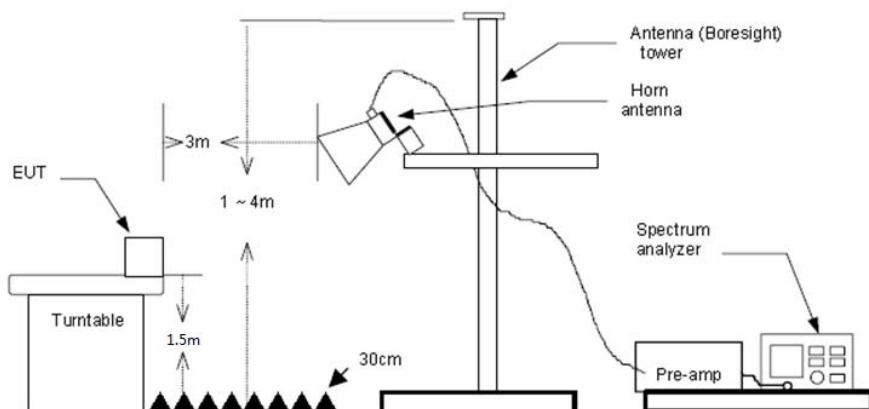
5.9. Restricted band (radiated)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
RBW=1 MHz, VBW=3 MHz Peak detector for Peak value
RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

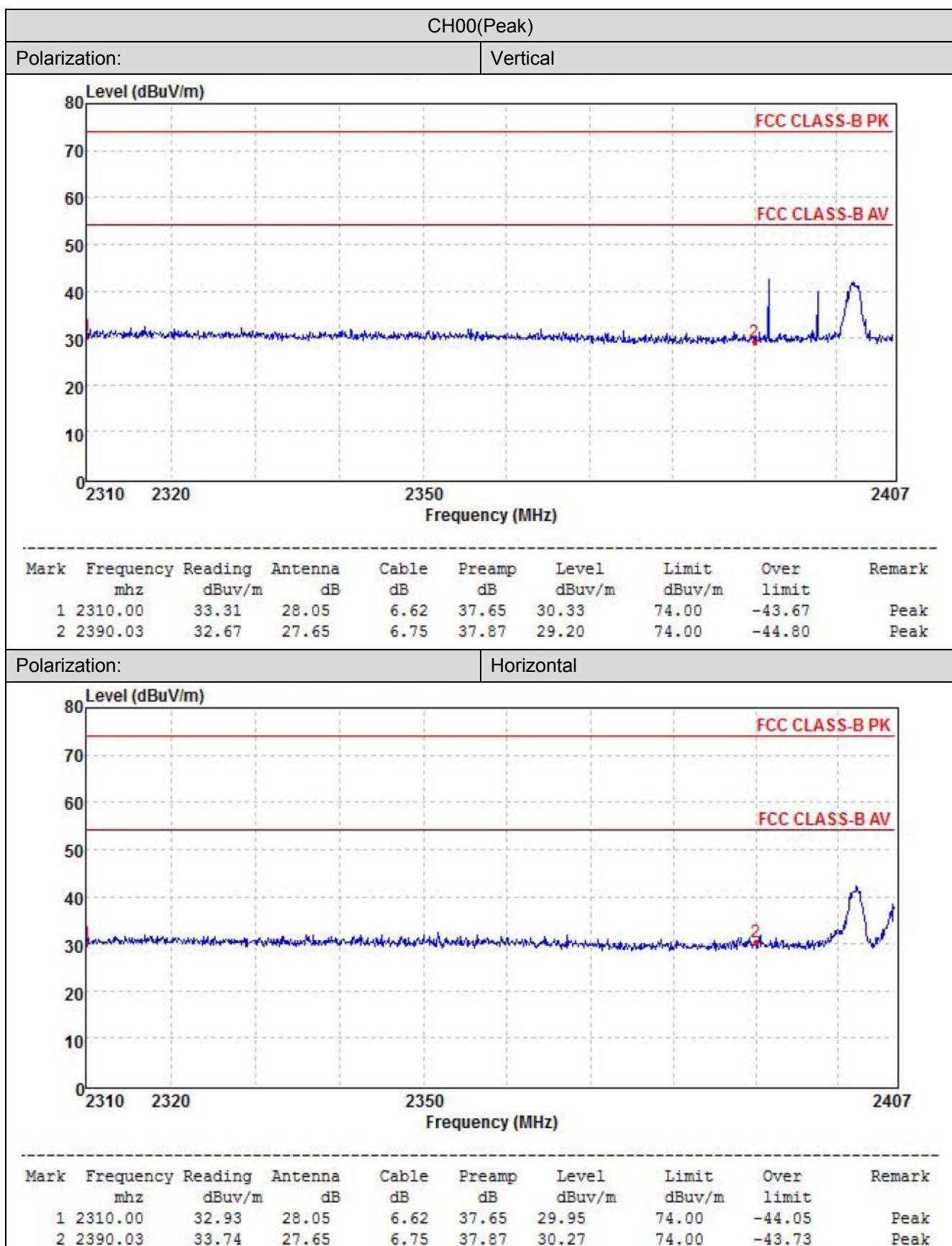
Please refer to the clause 3.3

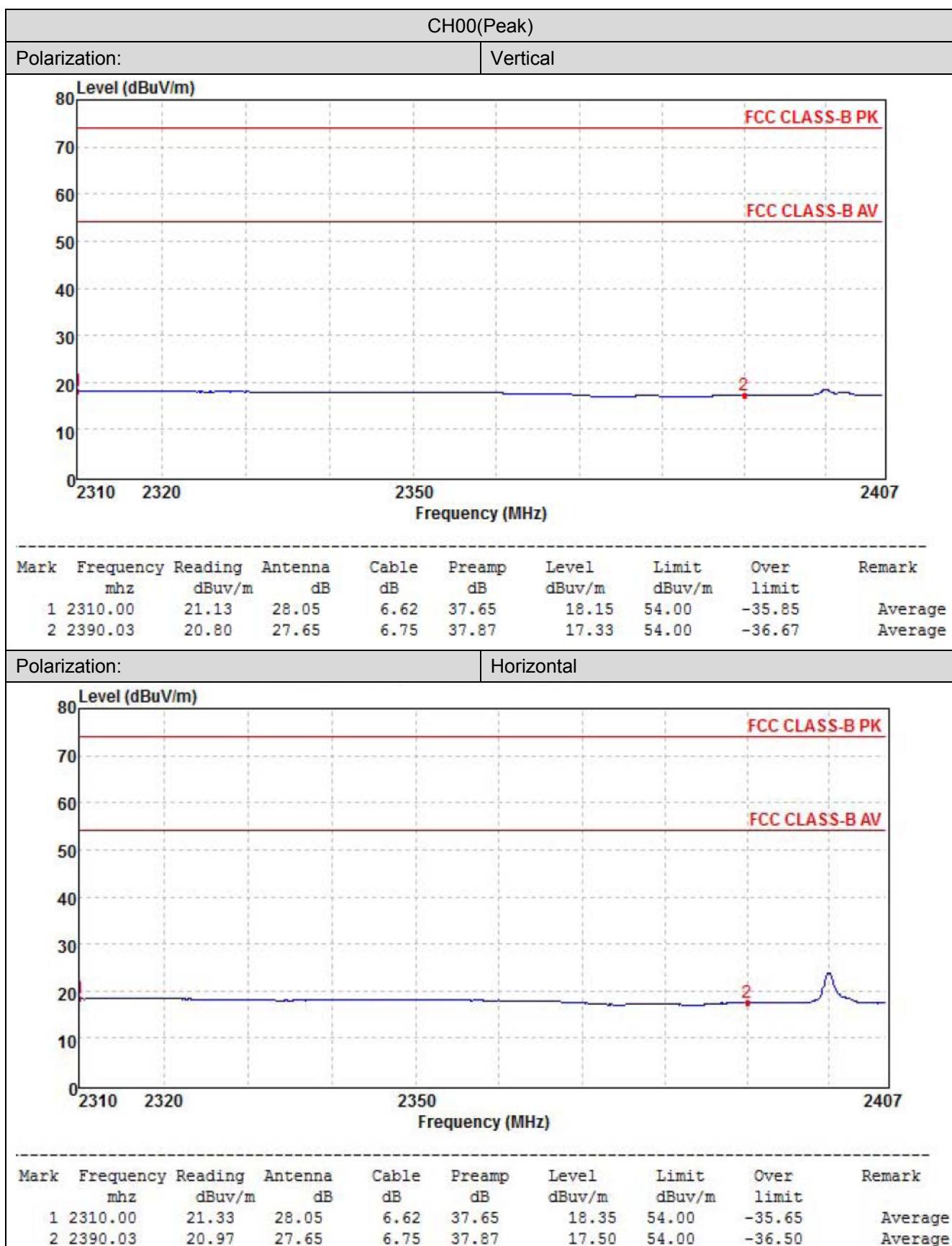
TEST RESULTS

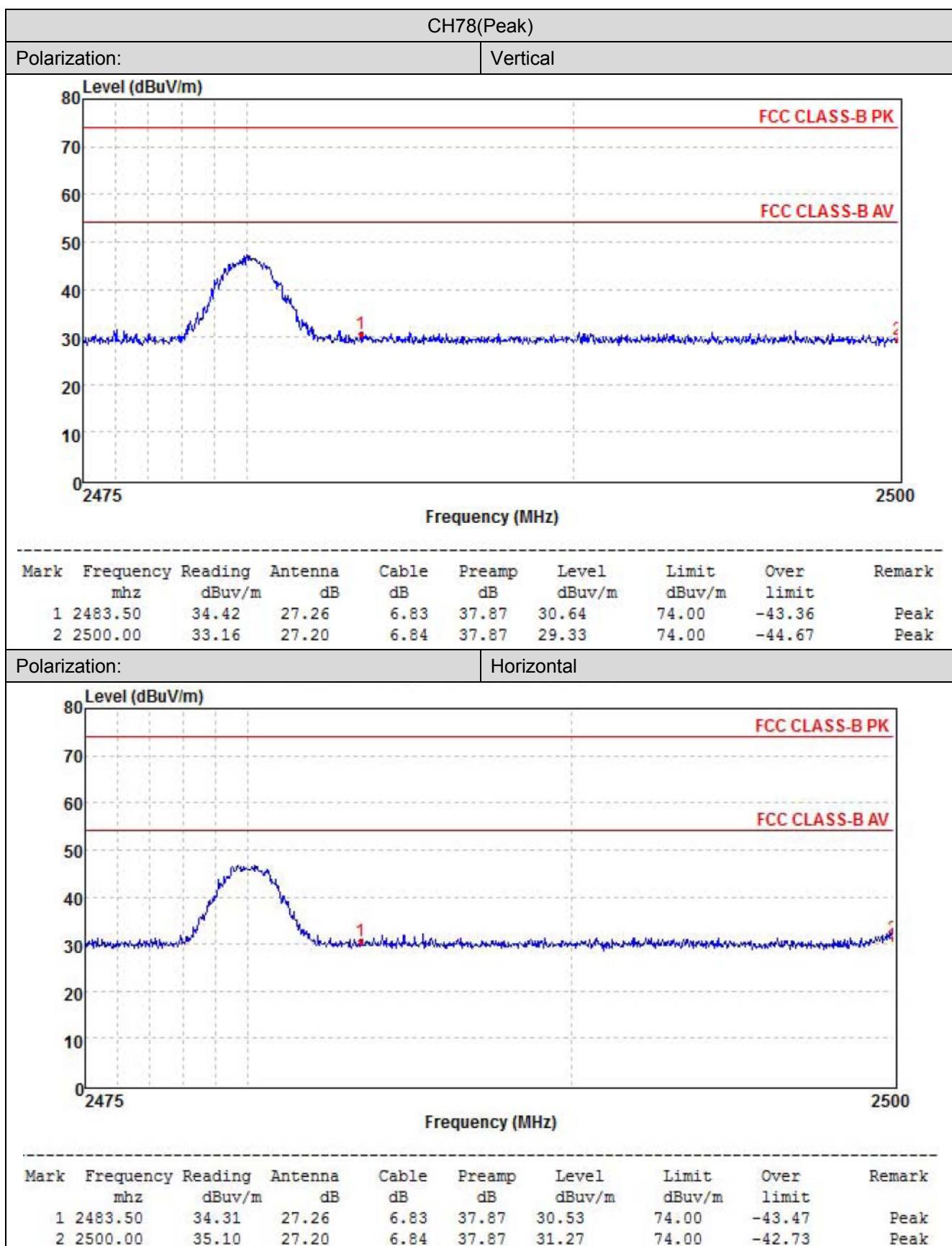
Passed Not Applicable

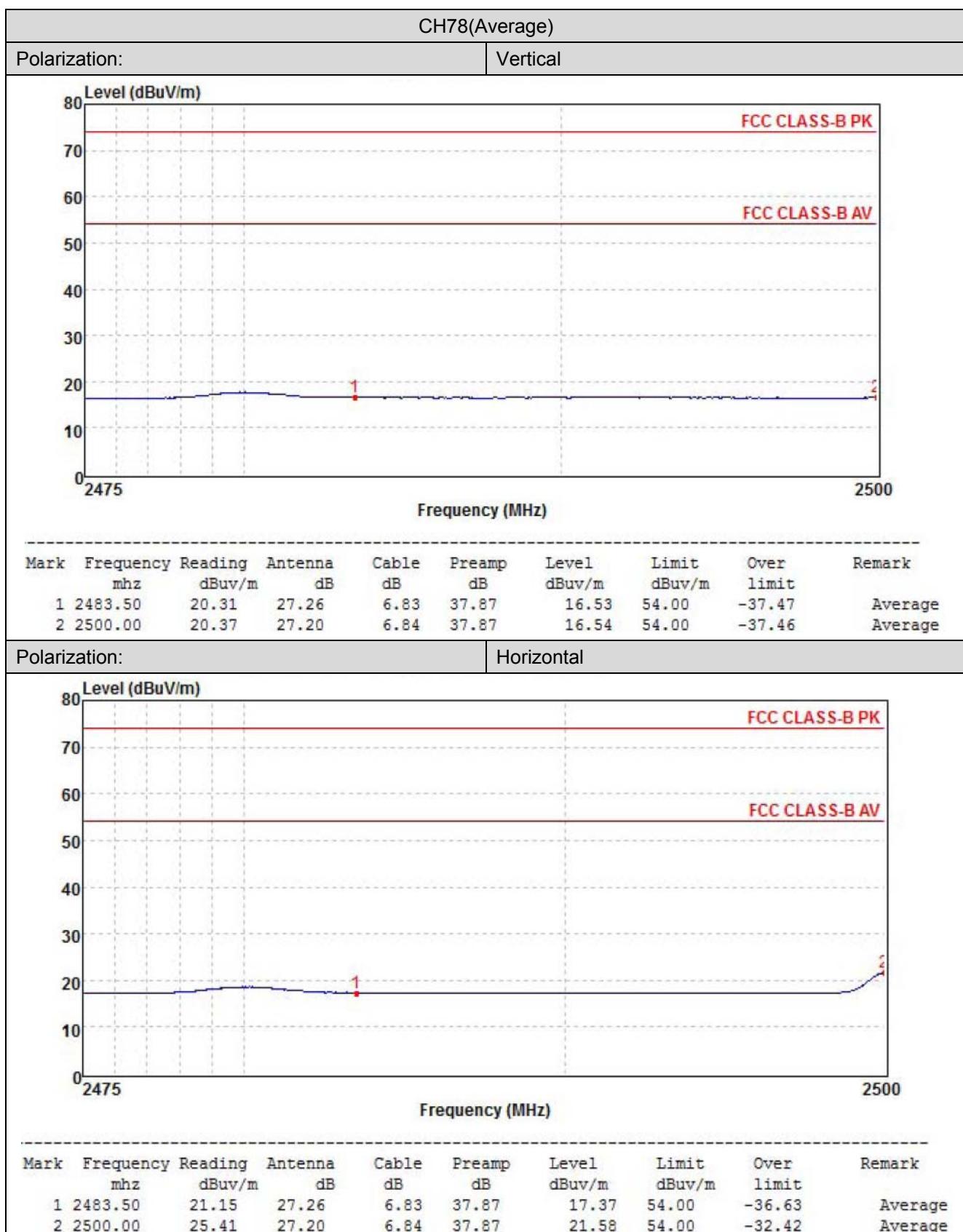
Note:

- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor
- 2) Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report.
- 3) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.







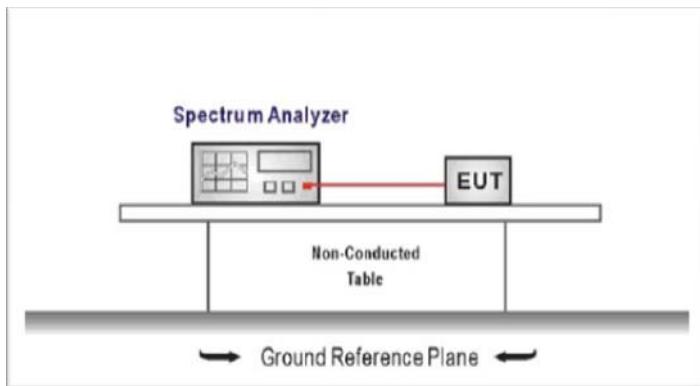


5.10. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

TEST CONFIGURATION



TEST PROCEDURE

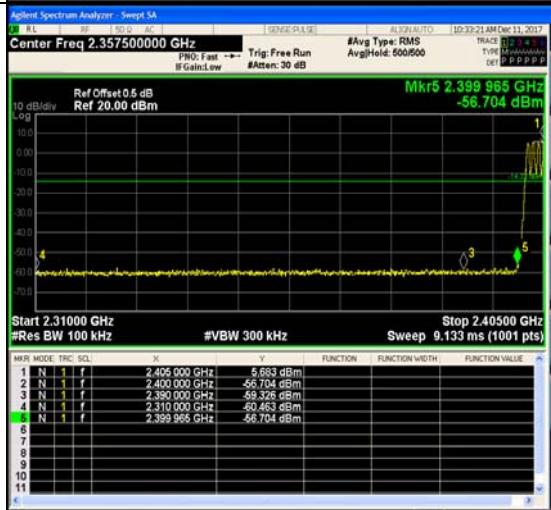
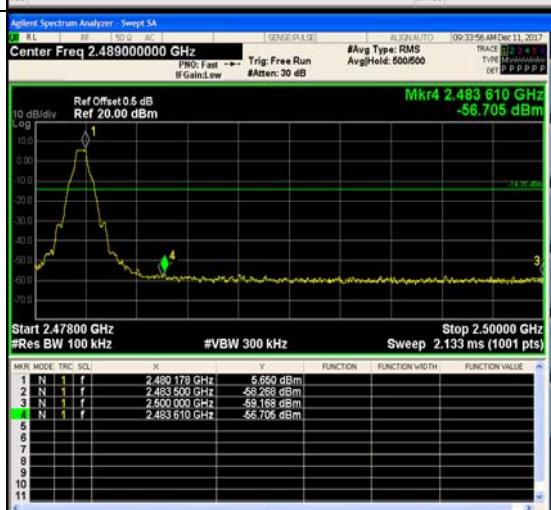
1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
RBW = 100 kHz, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

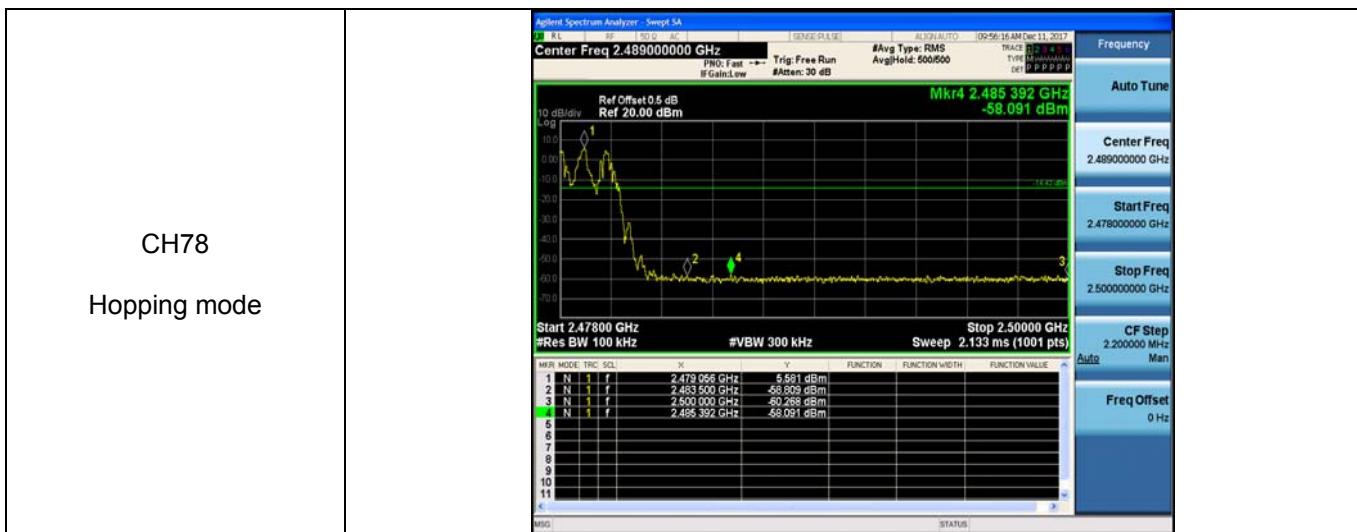
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

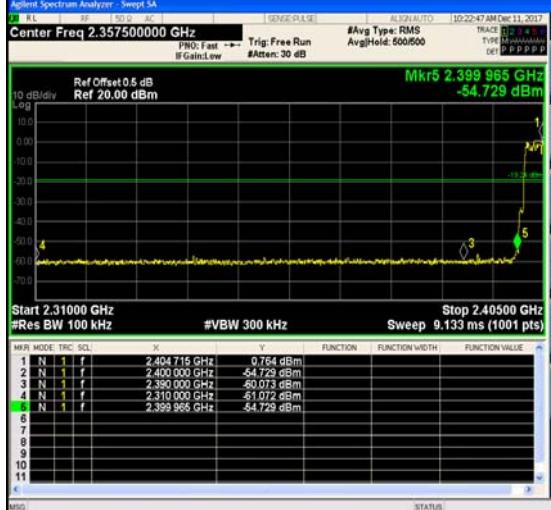
Passed Not Applicable

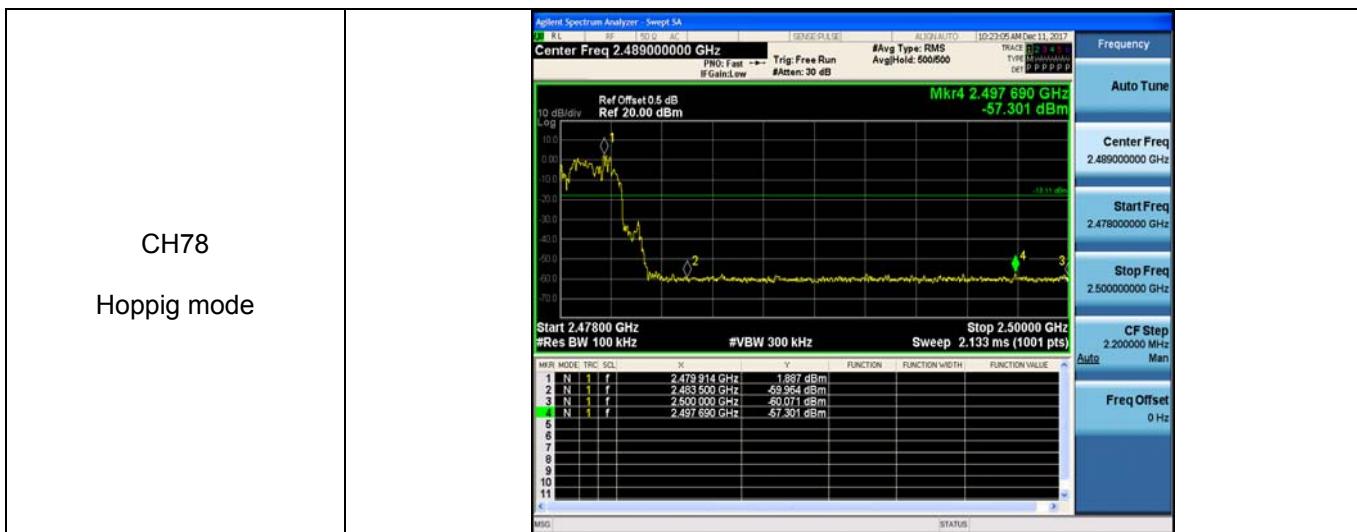
Test Item:	Band edge	Modulation type:	GFSK																																																																																																
	CH00 No hopping mode	 <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.357500000 GHz</p> <p>Start 2.31000 GHz Stop 2.40500 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 9.133 ms (1001 pts)</p> <table border="1"> <thead> <tr> <th>MHR MODE</th> <th>TRC</th> <th>SQL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.401 950 GHz</td><td>5.630 dBm</td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400 000 GHz</td><td>-56.704 dBm</td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.390 000 GHz</td><td>-59.785 dBm</td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.310 000 GHz</td><td>-61.308 dBm</td><td></td><td></td></tr> <tr><td>5</td><td>N</td><td>1</td><td>f</td><td>2.399 955 GHz</td><td>-53.846 dBm</td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	MHR MODE	TRC	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.401 950 GHz	5.630 dBm			2	N	1	f	2.400 000 GHz	-56.704 dBm			3	N	1	f	2.390 000 GHz	-59.785 dBm			4	N	1	f	2.310 000 GHz	-61.308 dBm			5	N	1	f	2.399 955 GHz	-53.846 dBm			6								7								8								9								10								11								Frequency Auto Tune Center Freq 2.357500000 GHz Start Freq 2.310000000 GHz Stop Freq 2.405000000 GHz CF Step 9.50000 MHz Auto Freq Offset 0 Hz
MHR MODE	TRC	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																																																																												
1	N	1	f	2.401 950 GHz	5.630 dBm																																																																																														
2	N	1	f	2.400 000 GHz	-56.704 dBm																																																																																														
3	N	1	f	2.390 000 GHz	-59.785 dBm																																																																																														
4	N	1	f	2.310 000 GHz	-61.308 dBm																																																																																														
5	N	1	f	2.399 955 GHz	-53.846 dBm																																																																																														
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	CH00 Hopping mode	 <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.357500000 GHz</p> <p>Start 2.31000 GHz Stop 2.40500 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 9.133 ms (1001 pts)</p> <table border="1"> <thead> <tr> <th>MHR MODE</th> <th>TRC</th> <th>SQL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.406 000 GHz</td><td>5.693 dBm</td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400 000 GHz</td><td>-56.704 dBm</td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.390 000 GHz</td><td>-59.326 dBm</td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.310 000 GHz</td><td>-60.463 dBm</td><td></td><td></td></tr> <tr><td>5</td><td>N</td><td>1</td><td>f</td><td>2.399 955 GHz</td><td>-56.704 dBm</td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	MHR MODE	TRC	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.406 000 GHz	5.693 dBm			2	N	1	f	2.400 000 GHz	-56.704 dBm			3	N	1	f	2.390 000 GHz	-59.326 dBm			4	N	1	f	2.310 000 GHz	-60.463 dBm			5	N	1	f	2.399 955 GHz	-56.704 dBm			6								7								8								9								10								11								Frequency Auto Tune Center Freq 2.357500000 GHz Start Freq 2.310000000 GHz Stop Freq 2.405000000 GHz CF Step 9.50000 MHz Auto Freq Offset 0 Hz
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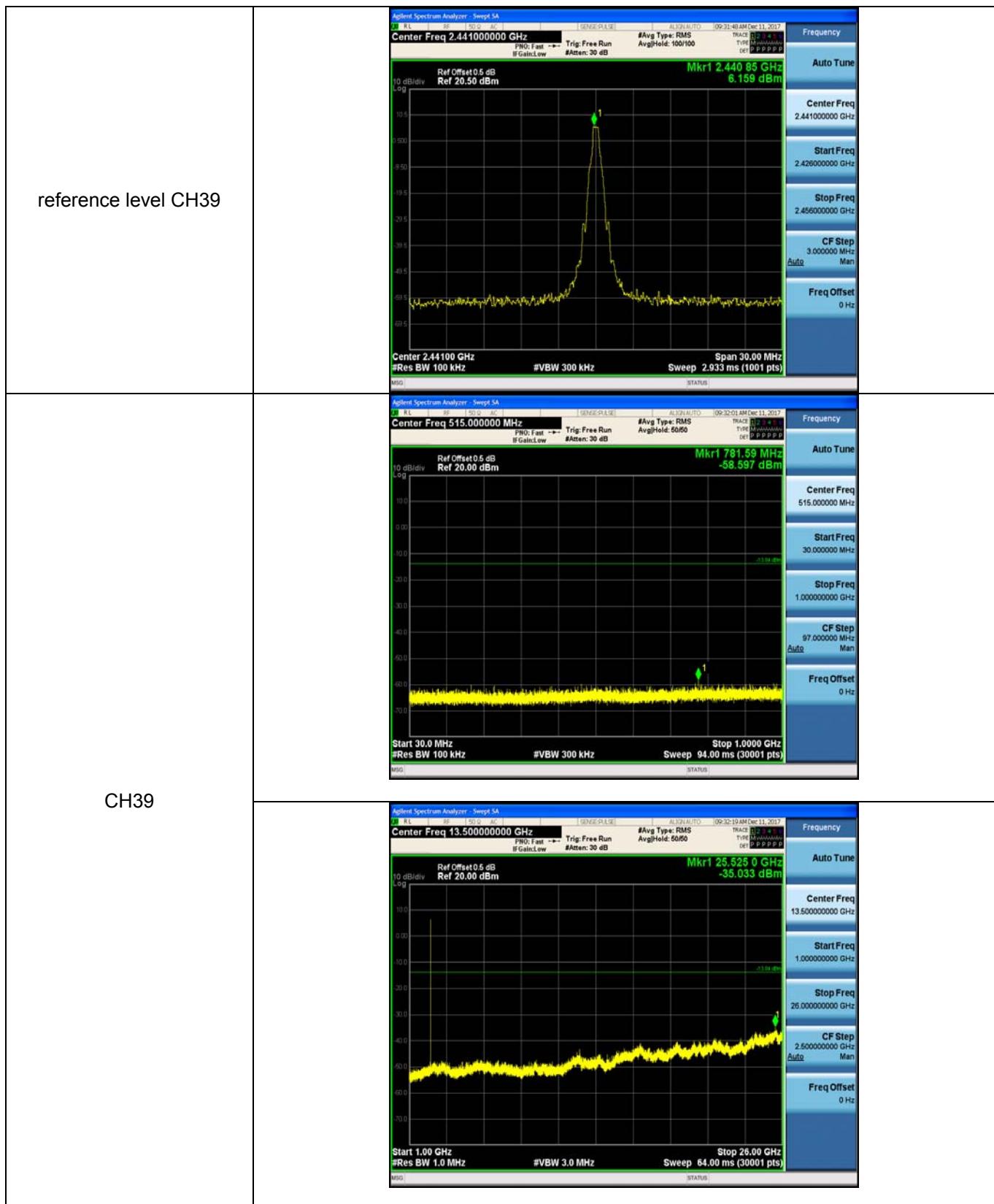
Test Item:	Band edge	Modulation type:	$\pi/4$ DQPSK																														
CH00	No hopping mode	<p>Mkr5 2.399 775 GHz -51.765 dBm</p> <table border="1"> <tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.401 865 GHz</td><td>-4.095 dBm</td></tr> <tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400 000 GHz</td><td>-52.024 dBm</td></tr> <tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.390 000 GHz</td><td>-50.585 dBm</td></tr> <tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.310 000 GHz</td><td>-59.593 dBm</td></tr> <tr><td>5</td><td>N</td><td>1</td><td>f</td><td>2.399 775 GHz</td><td>-51.765 dBm</td></tr> </table>	1	N	1	f	2.401 865 GHz	-4.095 dBm	2	N	1	f	2.400 000 GHz	-52.024 dBm	3	N	1	f	2.390 000 GHz	-50.585 dBm	4	N	1	f	2.310 000 GHz	-59.593 dBm	5	N	1	f	2.399 775 GHz	-51.765 dBm	Frequency Auto Tune Center Freq 2.357500000 GHz Start Freq 2.310000000 GHz Stop Freq 2.405000000 GHz CF Step 9.50000 MHz Auto Freq Offset 0 Hz
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CH78	No hopping mode	<p>Mkr4 2.483 522 GHz -56.510 dBm</p> <table border="1"> <tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.479 849 GHz</td><td>-4.376 dBm</td></tr> <tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483 500 GHz</td><td>-56.629 dBm</td></tr> <tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.500 000 GHz</td><td>-61.229 dBm</td></tr> <tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.483 522 GHz</td><td>-56.510 dBm</td></tr> </table>	1	N	1	f	2.479 849 GHz	-4.376 dBm	2	N	1	f	2.483 500 GHz	-56.629 dBm	3	N	1	f	2.500 000 GHz	-61.229 dBm	4	N	1	f	2.483 522 GHz	-56.510 dBm	Frequency Auto Tune Center Freq 2.489000000 GHz Start Freq 2.478000000 GHz Stop Freq 2.500000000 GHz CF Step 2.20000 MHz Auto Freq Offset 0 Hz						
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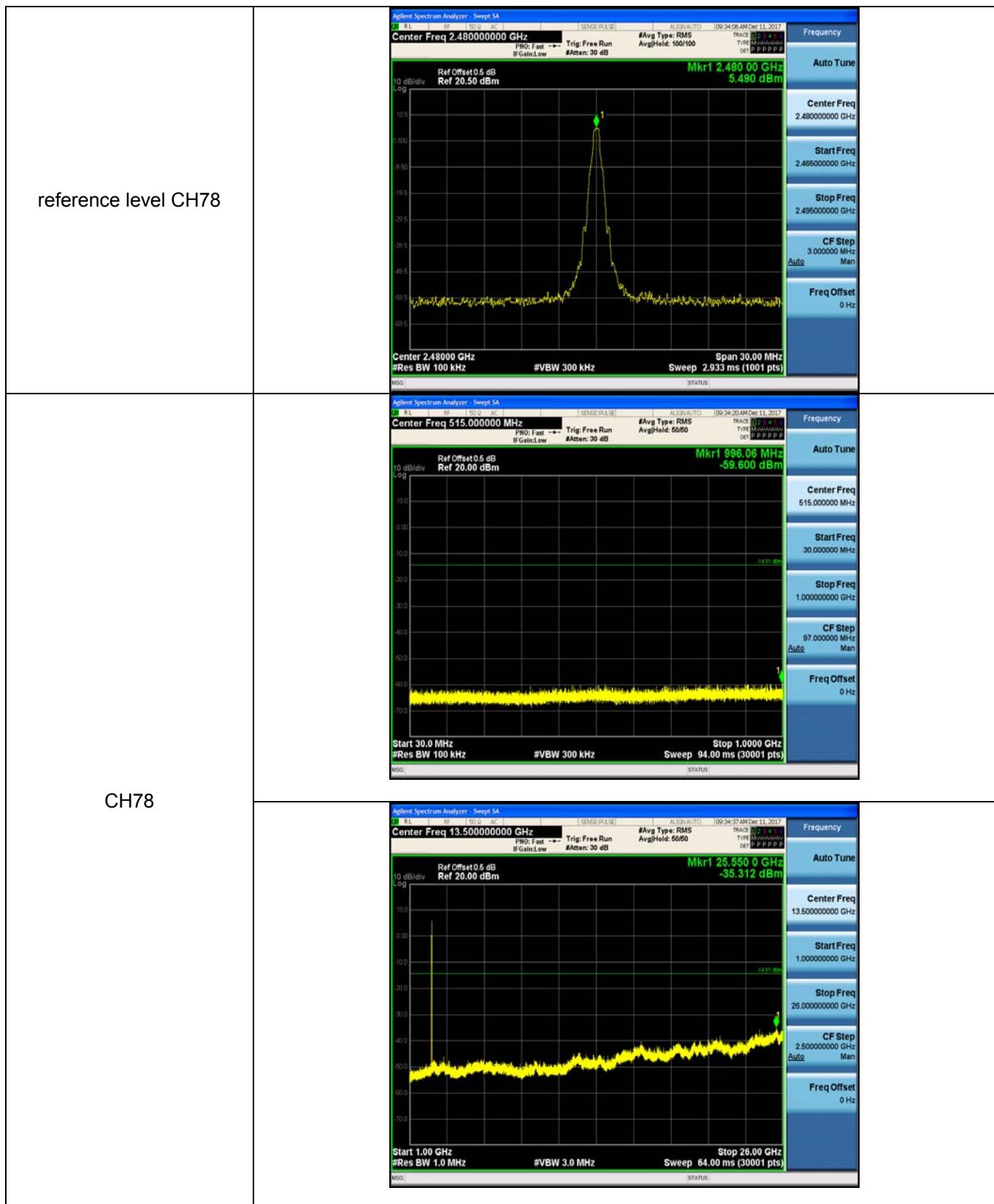


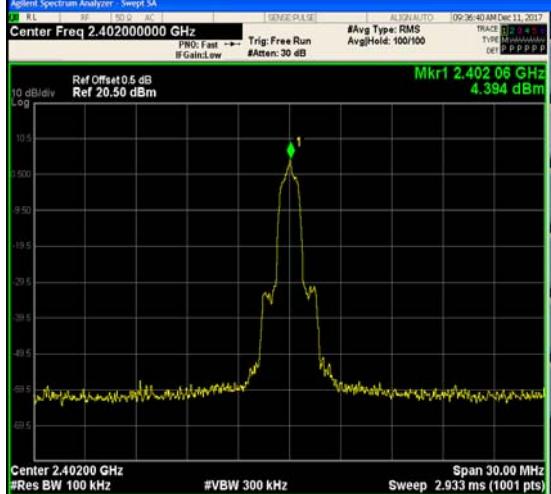
Test Item:	Band edge	Modulation type:	8DPSK																					
	CH00 No hopping mode	 A screenshot of an Agilent Spectrum Analyzer software interface. The plot shows a signal at approximately 2.399 GHz with a power level of -52.685 dBm. The plot includes markers 1, 2, 3, 4, and 5. The status bar at the bottom right shows 'MSO' and 'STATUS'. The right side of the screen displays various measurement parameters: Frequency (Auto Tune), Center Freq (2.357500000 GHz), Start Freq (2.310000000 GHz), Stop Freq (2.405000000 GHz), CF Step (9.50000 MHz Auto), and Freq Offset (0 Hz). A table below the plot lists frequency and power values for markers 1 through 6. <table border="1"><thead><tr><th>Marker</th><th>X (GHz)</th><th>Y (dBm)</th></tr></thead><tbody><tr><td>1</td><td>2.402150</td><td>-4.281</td></tr><tr><td>2</td><td>2.400150</td><td>-54.729</td></tr><tr><td>3</td><td>2.390000</td><td>-60.073</td></tr><tr><td>4</td><td>2.310000</td><td>-61.072</td></tr><tr><td>5</td><td>2.399965</td><td>-52.685</td></tr><tr><td>6</td><td></td><td></td></tr></tbody></table>	Marker	X (GHz)	Y (dBm)	1	2.402150	-4.281	2	2.400150	-54.729	3	2.390000	-60.073	4	2.310000	-61.072	5	2.399965	-52.685	6			
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	CH00 Hopping mode	 A screenshot of an Agilent Spectrum Analyzer software interface, similar to the one above. It shows a signal at approximately 2.399 GHz with a power level of -54.729 dBm. The plot includes markers 1, 2, 3, 4, and 5. The right side of the screen displays various measurement parameters: Frequency (Auto Tune), Center Freq (2.357500000 GHz), Start Freq (2.310000000 GHz), Stop Freq (2.405000000 GHz), CF Step (9.50000 MHz Auto), and Freq Offset (0 Hz). A table below the plot lists frequency and power values for markers 1 through 6. <table border="1"><thead><tr><th>Marker</th><th>X (GHz)</th><th>Y (dBm)</th></tr></thead><tbody><tr><td>1</td><td>2.402150</td><td>-4.764</td></tr><tr><td>2</td><td>2.400150</td><td>-54.729</td></tr><tr><td>3</td><td>2.390000</td><td>-60.073</td></tr><tr><td>4</td><td>2.310000</td><td>-61.072</td></tr><tr><td>5</td><td>2.399965</td><td>-54.729</td></tr><tr><td>6</td><td></td><td></td></tr></tbody></table>	Marker	X (GHz)	Y (dBm)	1	2.402150	-4.764	2	2.400150	-54.729	3	2.390000	-60.073	4	2.310000	-61.072	5	2.399965	-54.729	6			
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	CH78 No hopping mode	 A screenshot of an Agilent Spectrum Analyzer software interface. The plot shows a signal at approximately 2.485 GHz with a power level of -56.145 dBm. The plot includes markers 1, 2, 3, 4, and 5. The right side of the screen displays various measurement parameters: Frequency (Auto Tune), Center Freq (2.489000000 GHz), Start Freq (2.478000000 GHz), Stop Freq (2.500000000 GHz), CF Step (2.20000 MHz Auto), and Freq Offset (0 Hz). A table below the plot lists frequency and power values for markers 1 through 6. <table border="1"><thead><tr><th>Marker</th><th>X (GHz)</th><th>Y (dBm)</th></tr></thead><tbody><tr><td>1</td><td>2.490156</td><td>-3.805</td></tr><tr><td>2</td><td>2.483500</td><td>-57.704</td></tr><tr><td>3</td><td>2.500000</td><td>-59.664</td></tr><tr><td>4</td><td>2.495128</td><td>-56.145</td></tr><tr><td>5</td><td></td><td></td></tr></tbody></table>	Marker	X (GHz)	Y (dBm)	1	2.490156	-3.805	2	2.483500	-57.704	3	2.500000	-59.664	4	2.495128	-56.145	5						
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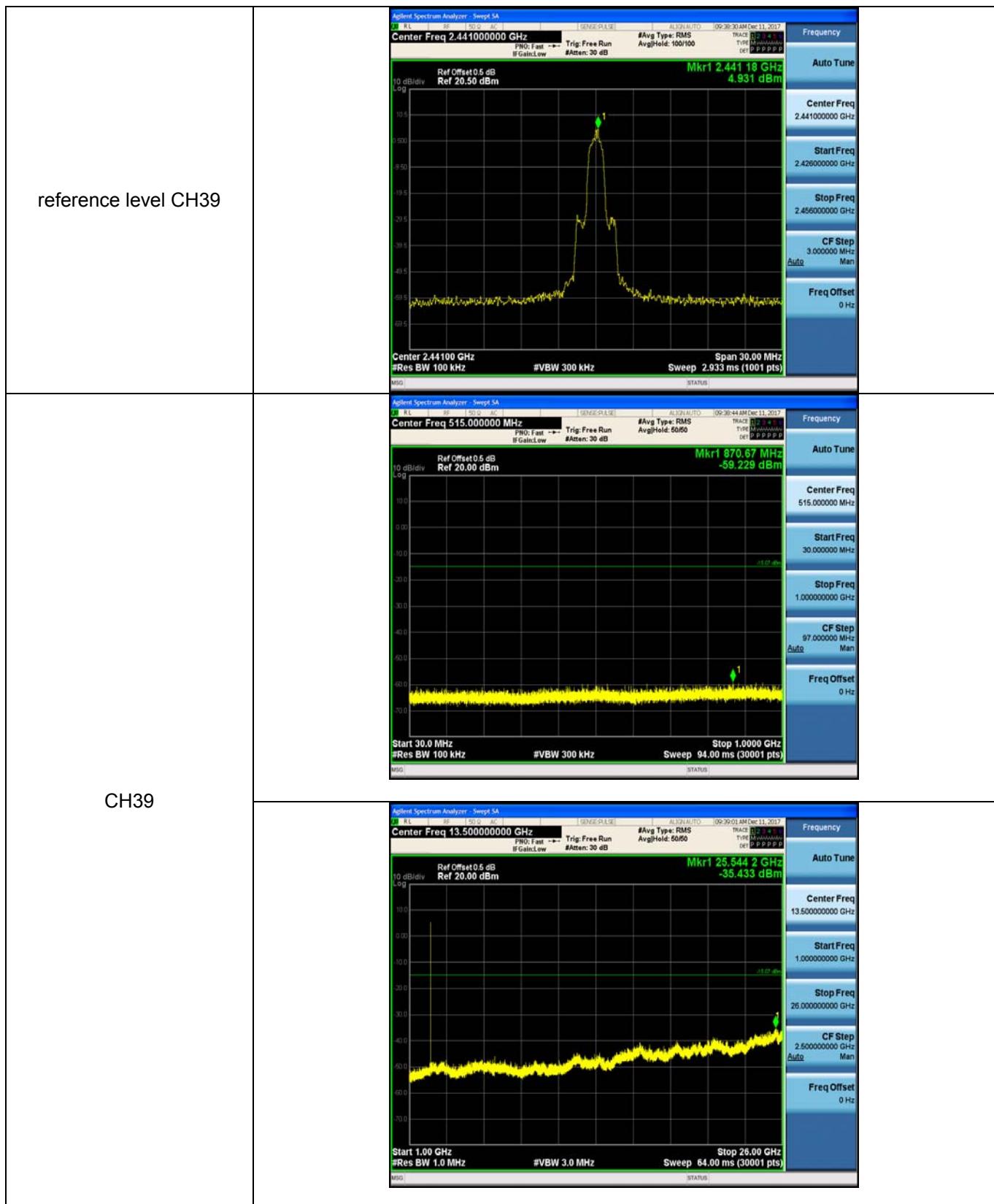


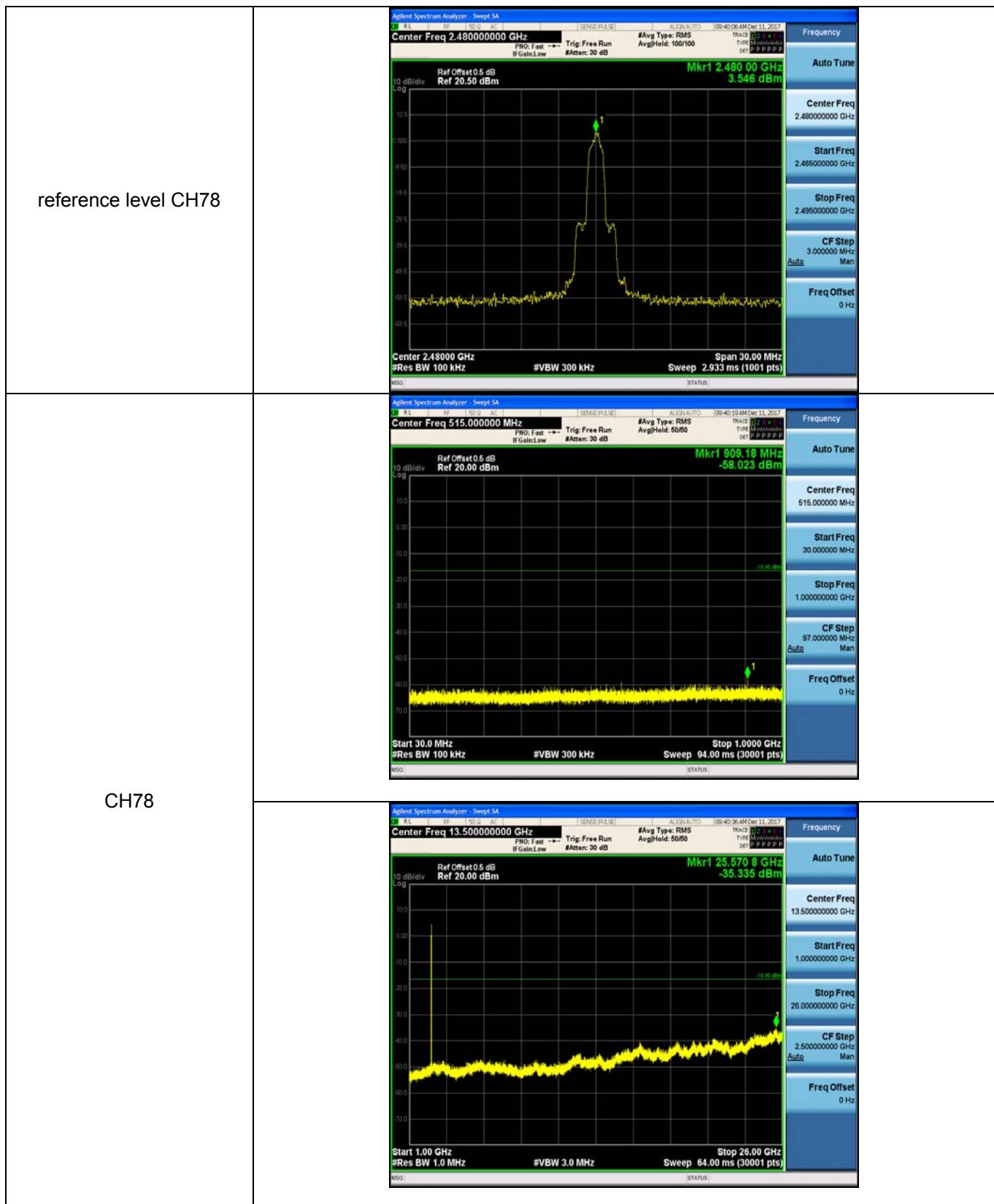
Test Item:	SE	Modulation type:	GFSK
reference level CH00		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 0.5 dB Ref 20.56 dBm</p> <p>10 dB/div Log</p> <p>Span 30.00 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms (1001 pts)</p> <p>Mkr1 2.401 85 GHz 5.944 dBm</p> <p>MSG STATUS</p>	Frequency Auto Tune Center Freq 2.402000000 GHz Start Freq 2.387000000 GHz Stop Freq 2.417000000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
CH00		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 515.0000000 MHz</p> <p>Ref Offset 0.5 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Span 1.0000 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 94.00 ms (30001 pts)</p> <p>Mkr1 729.89 MHz -59.612 dBm</p> <p>MSG STATUS</p>	Frequency Auto Tune Center Freq 515.0000000 MHz Start Freq 30.000000 MHz Stop Freq 1.000000000 GHz CF Step 97.000000 MHz Auto Man Freq Offset 0 Hz
		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 13.500000000 GHz</p> <p>Ref Offset 0.5 dB Ref 20.00 dBm</p> <p>10 dB/div Log</p> <p>Span 26.00 GHz</p> <p>#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 64.00 ms (30001 pts)</p> <p>Mkr1 25.625 0 GHz -35.101 dBm</p> <p>MSG STATUS</p>	Frequency Auto Tune Center Freq 13.500000000 GHz Start Freq 1.000000000 GHz Stop Freq 26.000000000 GHz CF Step 2.500000000 GHz Auto Man Freq Offset 0 Hz



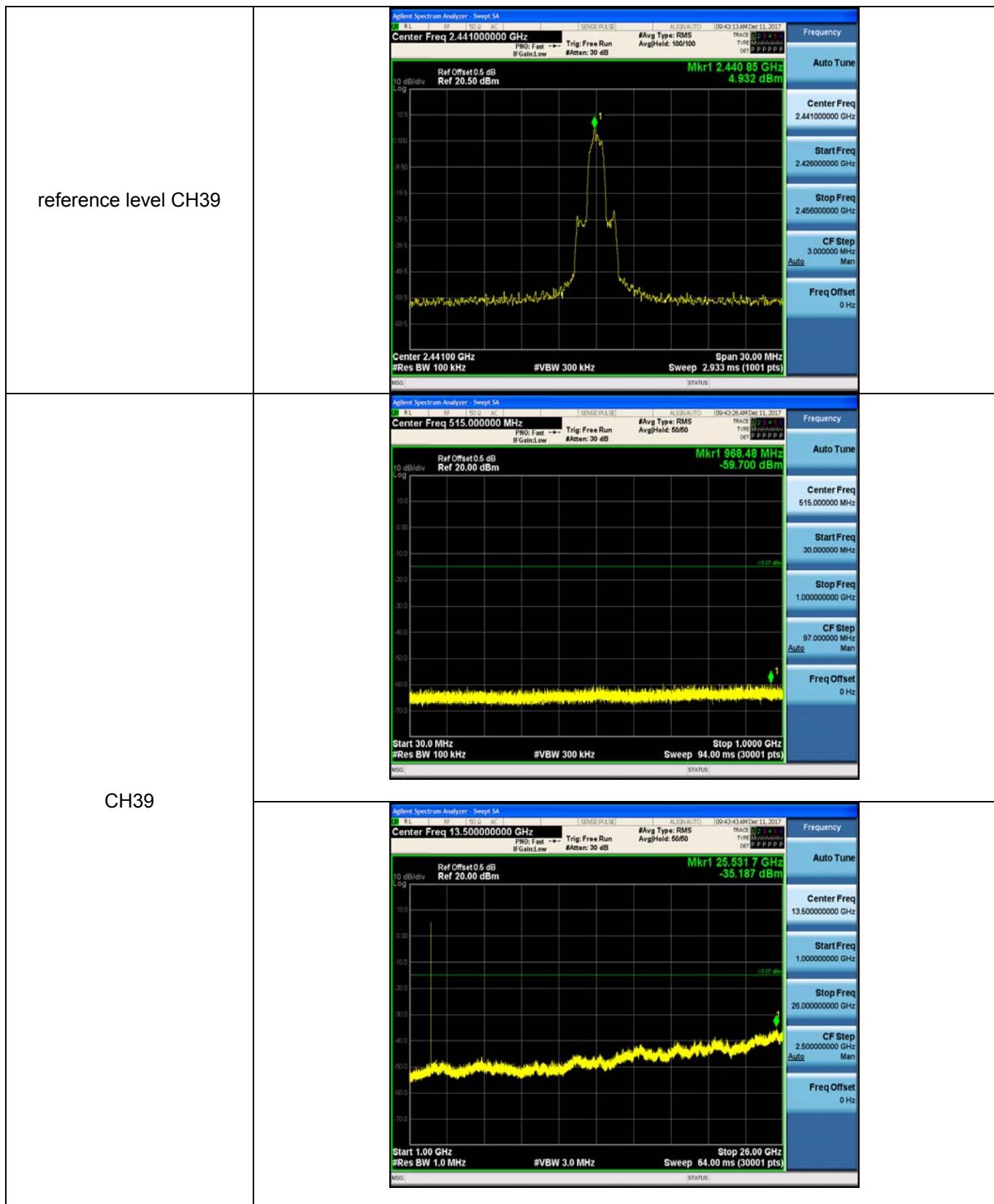


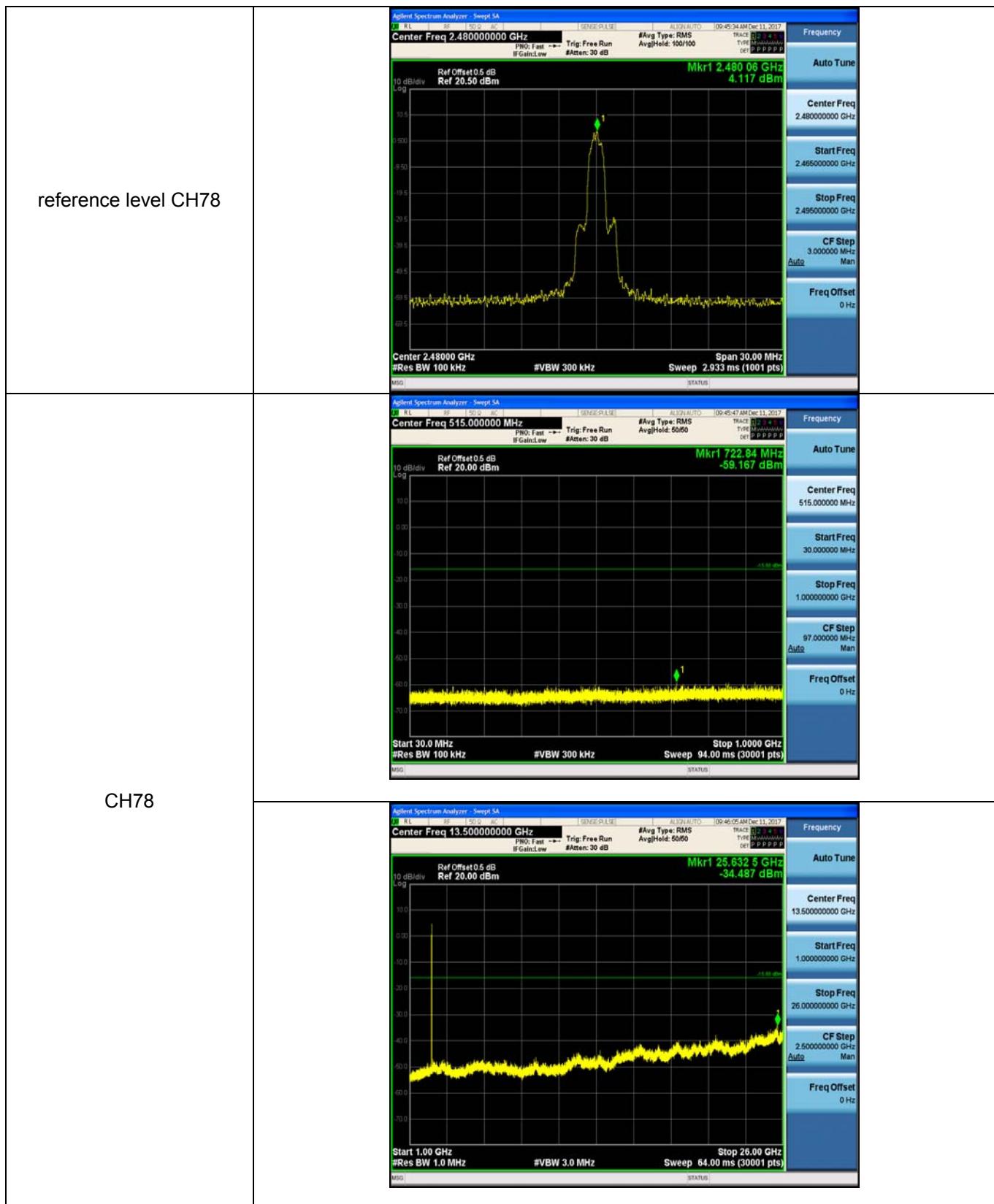
Test Item:	SE	Modulation type:	$\pi/4$ DQPSK
reference level CH00			
CH00			
			





Test Item:	SE	Modulation type:	8DPSK
reference level CH00			<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.387000000 GHz</p> <p>Stop Freq 2.417000000 GHz</p> <p>CF Step 3.000000 MHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>
CH00			<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 515.0000000 MHz</p> <p>Start Freq 30.000000 MHz</p> <p>Stop Freq 1.000000000 GHz</p> <p>CF Step 97.000000 MHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>
			<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 13.500000000 GHz</p> <p>Start Freq 1.000000000 GHz</p> <p>Stop Freq 26.000000000 GHz</p> <p>CF Step 2.500000000 GHz</p> <p>Auto Man</p> <p>Freq Offset 0 Hz</p>





5.11. Spurious Emissions (radiated)

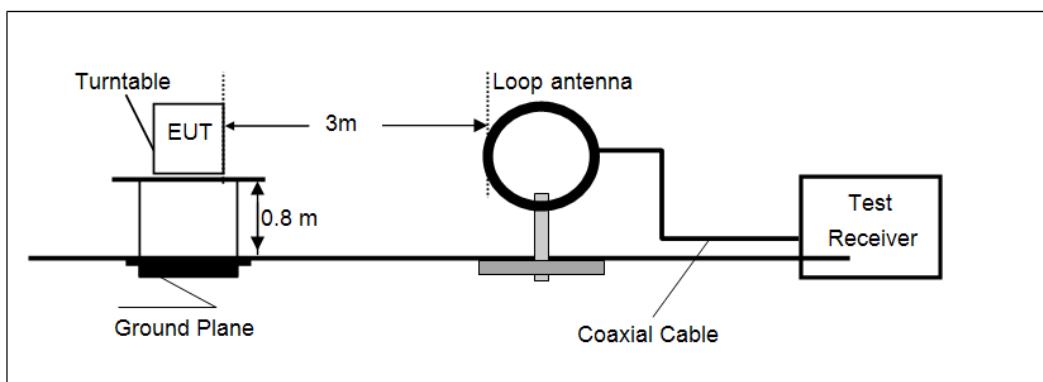
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

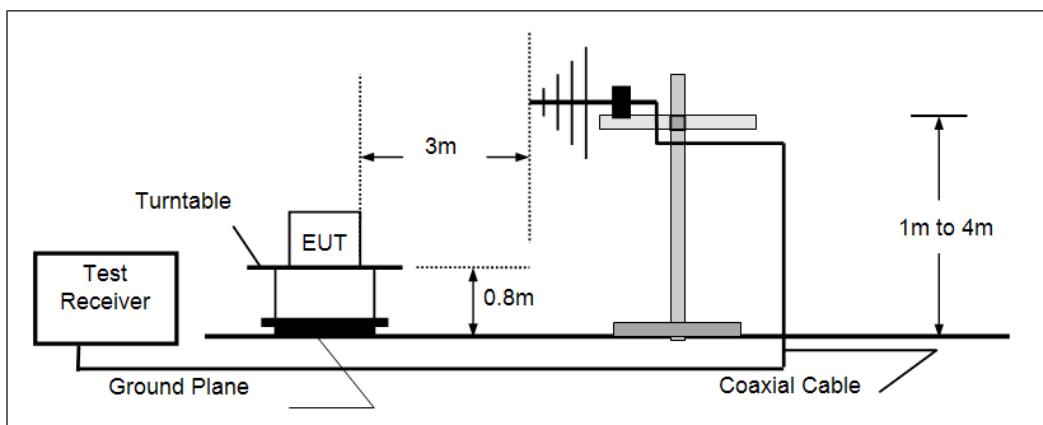
Frequency	Limit (dB _{UV} /m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

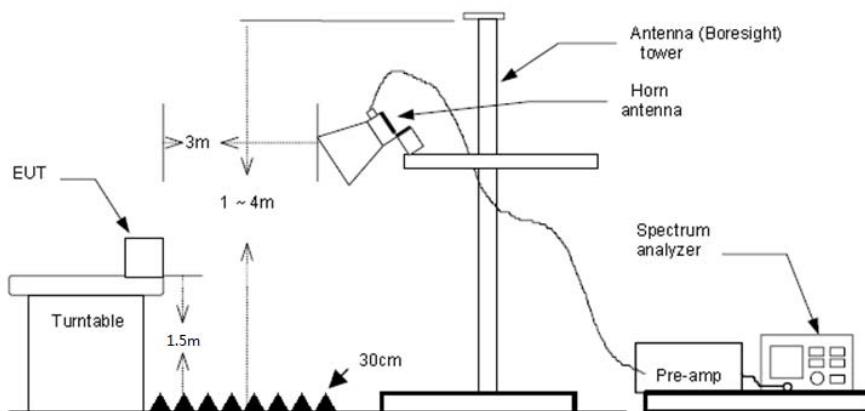
- Below 30 MHz



- 30 MHz ~1000 MHz



- Above 1 GHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
5. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz, RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) Above 1 GHz, RBW=1 MHz, VBW=3 MHz Peak detector for Peak value
RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

Passed Not Applicable

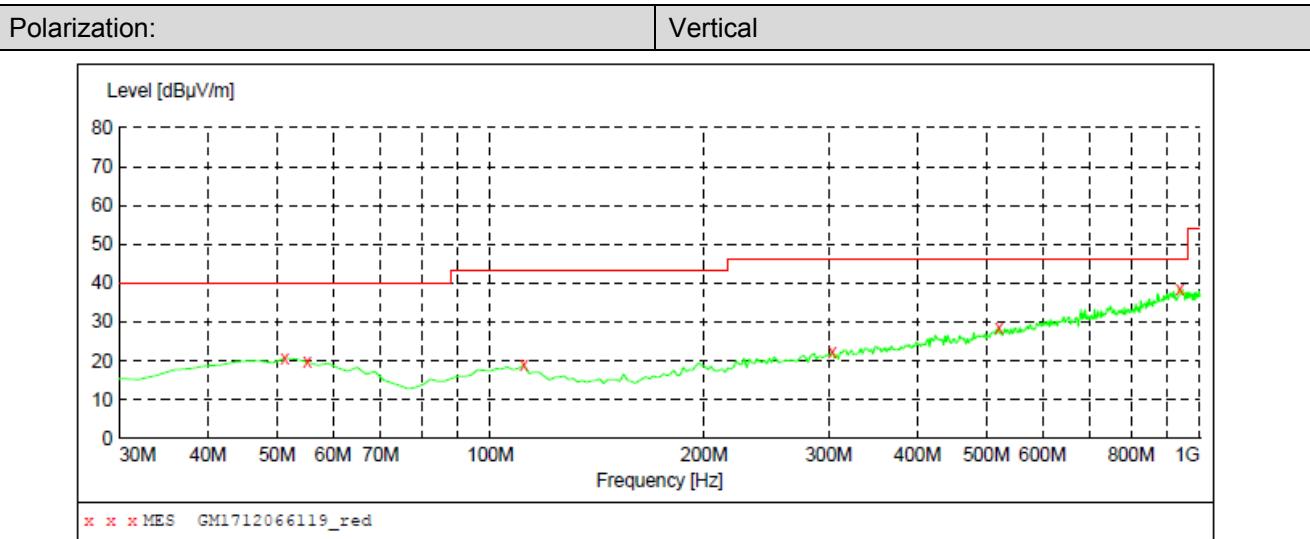
Note:

- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst case, so only the worst case's data on the test report.
- 4) Above 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report
- 5) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

➤ 9 kHz ~ 30 MHz

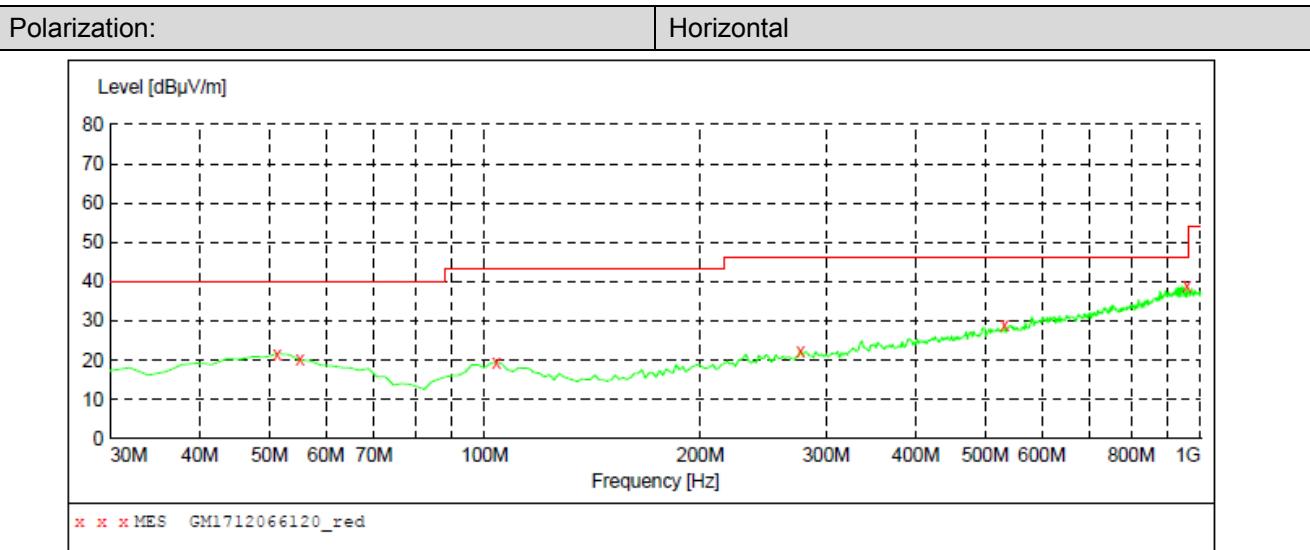
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

> 30 MHz ~ 1 GHz

**MEASUREMENT RESULT: "GM1712066119_red"**

12/6/2017 9:54PM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	20.70	-8.8	40.0	19.3	QP	100.0	269.00	VERTICAL
55.220000	19.70	-9.2	40.0	20.3	QP	100.0	44.00	VERTICAL
111.480000	18.90	-11.0	43.5	24.6	QP	100.0	357.00	VERTICAL
303.540000	22.50	-7.2	46.0	23.5	QP	100.0	150.00	VERTICAL
520.820000	28.50	-1.3	46.0	17.5	QP	100.0	333.00	VERTICAL
935.980000	38.60	7.1	46.0	7.4	QP	100.0	33.00	VERTICAL

**MEASUREMENT RESULT: "GM1712066120_red"**

12/6/2017 9:57PM

Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	21.70	-8.8	40.0	18.3	QP	100.0	197.00	HORIZONTAL
55.220000	20.10	-9.2	40.0	19.9	QP	300.0	275.00	HORIZONTAL
103.720000	19.60	-10.5	43.5	23.9	QP	300.0	36.00	HORIZONTAL
276.380000	22.50	-7.9	46.0	23.5	QP	100.0	288.00	HORIZONTAL
532.460000	28.80	-1.1	46.0	17.2	QP	100.0	186.00	HORIZONTAL
957.320000	38.90	7.3	46.0	7.1	QP	100.0	0.00	HORIZONTAL

> 1 GHz ~ 25 GHz

CH00									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1065.71	41.98	25.40	4.36	36.64	35.10	74.00	-38.90	Vertical	Peak
1399.35	38.83	25.90	5.00	36.46	33.27	74.00	-40.73	Vertical	Peak
4772.91	34.38	31.49	9.53	37.00	38.40	74.00	-35.60	Vertical	Peak
8125.22	33.62	36.92	12.59	34.54	48.59	74.00	-25.41	Vertical	Peak
1138.63	36.58	25.82	4.52	36.60	30.32	74.00	-43.68	Horizontal	Peak
1573.19	36.28	25.14	5.49	36.69	30.22	74.00	-43.78	Horizontal	Peak
3143.98	35.16	28.80	7.65	38.21	33.40	74.00	-40.60	Horizontal	Peak
8063.40	32.33	37.04	12.45	34.54	47.28	74.00	-26.72	Horizontal	Peak

CH39									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1065.71	42.83	25.40	4.36	36.64	35.95	74.00	-38.05	Vertical	Peak
1597.40	36.83	24.92	5.56	36.72	30.59	74.00	-43.41	Vertical	Peak
3634.91	34.90	29.30	8.31	38.26	34.25	74.00	-39.75	Vertical	Peak
8063.40	33.17	37.04	12.45	34.54	48.12	74.00	-25.88	Vertical	Peak
1065.71	43.18	25.40	4.36	36.64	36.30	74.00	-37.70	Horizontal	Peak
2129.79	40.97	26.94	6.38	37.33	36.96	74.00	-37.04	Horizontal	Peak
4570.77	34.79	30.84	9.41	37.28	37.76	74.00	-36.24	Horizontal	Peak
8002.06	33.80	37.10	12.30	34.53	48.67	74.00	-25.33	Horizontal	Peak

CH78									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1065.71	44.36	25.40	4.36	36.64	37.48	74.00	-36.52	Vertical	Peak
2135.22	35.91	26.99	6.38	37.33	31.95	74.00	-42.05	Vertical	Peak
3233.26	35.70	28.60	7.76	38.26	33.80	74.00	-40.20	Vertical	Peak
8166.69	32.72	36.80	12.69	34.55	47.66	74.00	-26.34	Vertical	Peak
1303.09	36.46	26.19	4.84	36.51	30.98	74.00	-43.02	Horizontal	Peak
3634.91	35.30	29.30	8.31	38.26	34.65	74.00	-39.35	Horizontal	Peak
4547.56	33.04	30.80	9.37	37.32	35.89	74.00	-38.11	Horizontal	Peak
7319.96	32.38	36.30	11.99	34.92	45.75	74.00	-28.25	Horizontal	Peak

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

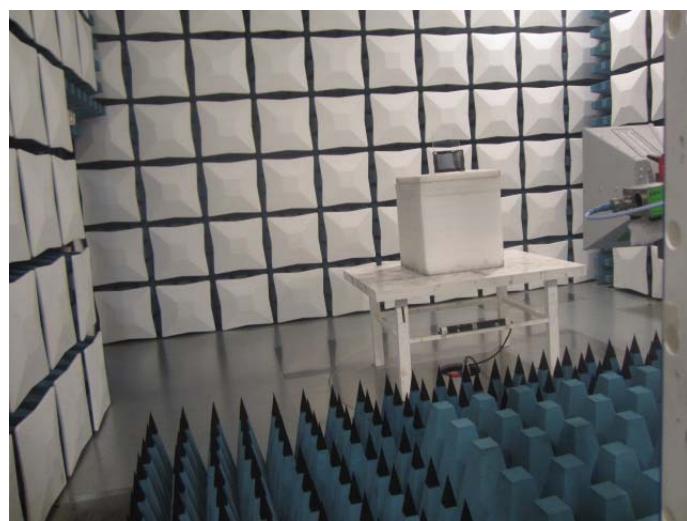
6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions





7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: TRE1712001101.

.....**End of Report**.....