FCC - TEST REPORT

Report Number	:	68.760.16.750.01	Date of Issue:	October 18, 2016
Model	:	AR102A4BKA, AR102A4AGA, 317857, 320538		
Product Type	:	CAT EAR HEADPHONE V1.2		
Applicant	:	Brookstone Purchasing, Inc.		
Address	:	One Innovation Way, Merrimack, NH 03054, USA		
Production Facility	:	CCA Electronic Factory		
Address	:	Building 120-121th, Pinghuan Industrial City, Pingshan, Town, Pingshan District, 518118 Shenzhen City, PEOPLE,S REPUBLIC OF CHINA		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	48		

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1 Table of Contents

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Shenzhen 518052, P.R. China

2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District Shenzhen 518052 P.R. China
Telephone:	86 755 8828 6998
Fax:	86 755 828 5299
FCC Registration No.:	502708

Test Site 2

Company name:	Waltek Services (Shenzhen) Co., Ltd. 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen 518105, Guangdong, China
Telephone:	86 7558 355 1033
Fax:	86 7558 355 2400
FCC Registration No.:	880581

3 Description of the Equipment Under Test

Product:	CAT EAR HEADPHONE V1.2
Model no.:	AR102A4BKA, AR102A4AGA, 317857, 320538
FCC ID:	2AFVN-317857
Options and accessories:	NIL
Rating:	DC3.7V Supplied by Li-ion Rechargeable Battery DC5.0V Charged by the mini-USB port
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	Integrated antenna
Antenna Gain:	2.55dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Bluetooth headset operated at 2.4GHz

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2015 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and ANSI C63.10-2013.

5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C/RSS-247 Issue 1/RSS-Gen Issue 4				
Test Condition		Pages	Test Result	Test Site
§15.207	Conducted emission AC power port	10	Pass	Site 2
§15.247(b)(1)	Conducted peak output power	13	Pass	Site 2
§15.247(e)	Power spectral density*	--	N/A	--
§15.247(a)(2)	6dB bandwidth	--	N/A	--
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	20	Pass	Site 2
§15.247(a)(1)	Carrier frequency separation	27	Pass	Site 2
§15.247(a)(1)(iii)	Number of hopping frequencies	30	Pass	Site 2
§15.247(a)(1)(iii)	Dwell Time	32	Pass	Site 2
§15.247(d)	Spurious RF conducted emissions	35	Pass	Site 2
§15.247(d)	Band edge	38	Pass	Site 2
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter	43	Pass	Site 2
§15.203	Antenna requirement	See note 1	Pass	--

Note 1: N/A=Not Applicable.
Note 2: The EUT uses an Integrated antenna, which gain is 2.55dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AFVN-317857, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C.

All the models are same except for model name difference for the marketing requirement. So all the tests were applied on AR102A4BKA, other models are deemed to fulfil the test without further testing.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: September 6, 2016

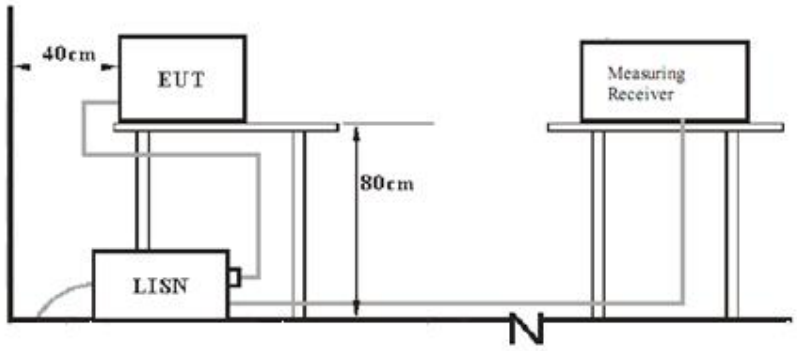
Testing Start Date: September 6, 2016

Testing End Date: September 23, 2016

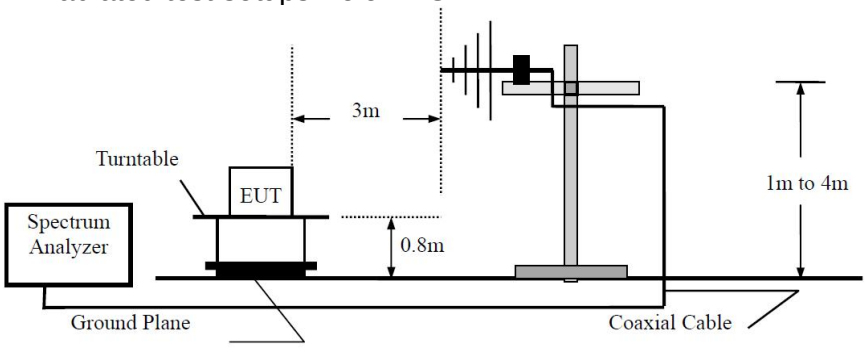
Tested By EMC Test Engineer (Waltek Services (Shenzhen) Co., Ltd.)	2016-10-18 Date	Jack Wen Name	 Signature
Prepared By EMC Project Engineer (TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch)	2016-10-18 Date	Mark Chen Name	 Signature
Approved by EMC Project Manager (TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch)	2016-10-18 Date	Cookies Bu Name	 Signature

7 Test Setups

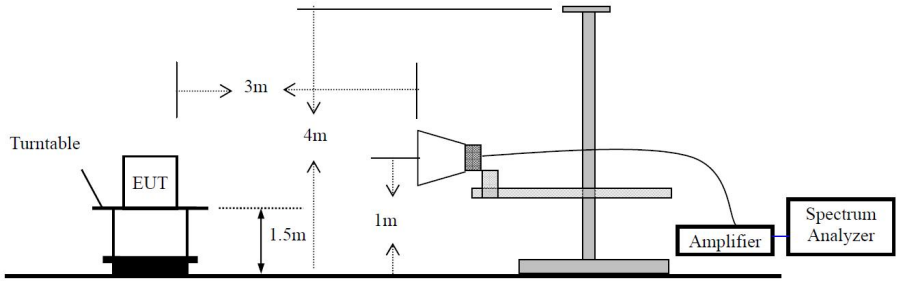
7.1 AC Power Line Conducted Emission test setups



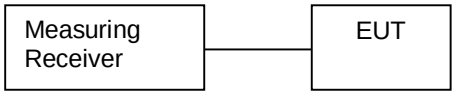
7.2 Radiated test setups Below 1GHz



Above 1GHz



7.3 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
PC	LENOVO	---	---

Test software: CSR Blue Test 3, which used to control the EUT in continues transmitting mode

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

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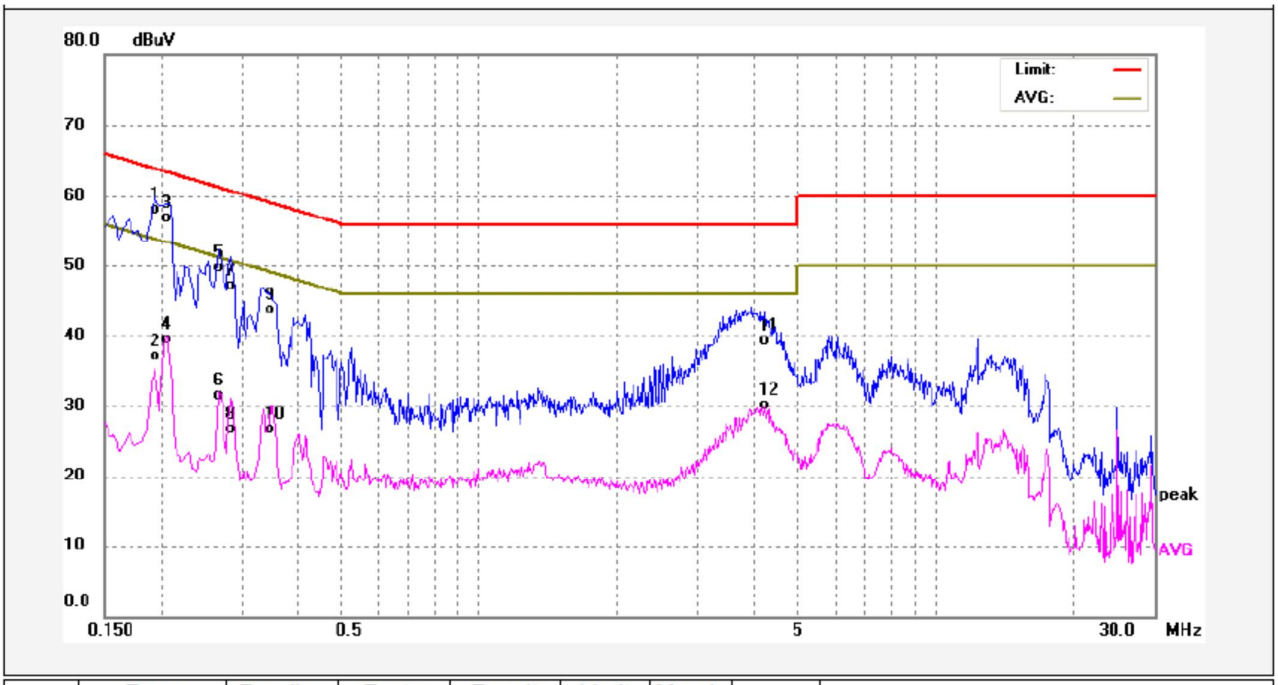
Conducted Emission

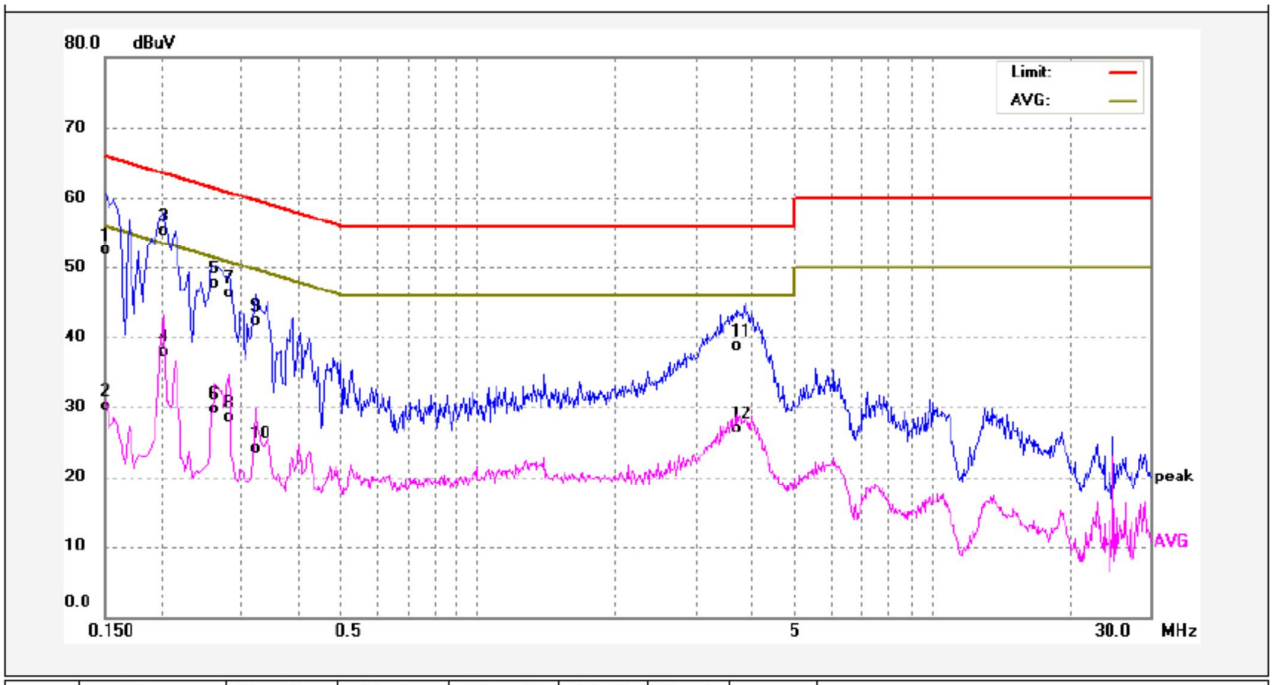
Product Type : CAT EAR HEADPNONE V1.2
M/N : AR102A4BKA
Operating Condition : BT Link
Test Specification : Live
Comment : AC 120V/60Hz



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1940	47.84	10.26	58.10	63.86	-5.76	QP	
2	0.1940	26.85	10.26	37.11	53.86	-16.75	AVG	
3	0.2060	46.70	10.26	56.96	63.36	-6.40	QP	
4	0.2060	29.29	10.26	39.55	53.36	-13.81	AVG	
5	0.2660	39.39	10.27	49.66	61.24	-11.58	QP	
6	0.2660	21.22	10.27	31.49	51.24	-19.75	AVG	
7	0.2860	36.84	10.27	47.11	60.64	-13.53	QP	
8	0.2860	16.52	10.27	26.79	50.64	-23.85	AVG	
9	0.3500	33.39	10.29	43.68	58.96	-15.28	QP	
10	0.3500	16.37	10.29	26.66	48.96	-22.30	AVG	
11	4.2020	28.86	10.51	39.37	56.00	-16.63	QP	
12	4.2020	19.65	10.51	30.16	46.00	-15.84	AVG	

Conducted Emission

Product Type : CAT EAR HEADPNONE V1.2
M/N : AR102A4BKA
Operating Condition : BT Link
Test Specification : Neutral
Comment : AC 120V/60Hz



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	42.28	10.29	52.57	65.99	-13.42	QP	
2	0.1500	19.72	10.29	30.01	55.99	-25.98	AVG	
3	0.2020	45.05	10.26	55.31	63.52	-8.21	QP	
4	0.2020	27.66	10.26	37.92	53.52	-15.60	AVG	
5	0.2620	37.38	10.26	47.64	61.36	-13.72	QP	
6	0.2620	19.48	10.26	29.74	51.36	-21.62	AVG	
7	0.2819	36.03	10.27	46.30	60.76	-14.46	QP	
8	0.2819	18.27	10.27	28.54	50.76	-22.22	AVG	
9	0.3220	31.95	10.28	42.23	59.65	-17.42	QP	
10	0.3220	13.73	10.28	24.01	49.65	-25.64	AVG	
11	3.6860	28.19	10.51	38.70	56.00	-17.30	QP	
12	3.6860	16.43	10.51	26.94	46.00	-19.06	AVG	

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   RBW > the 20 dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

Limits

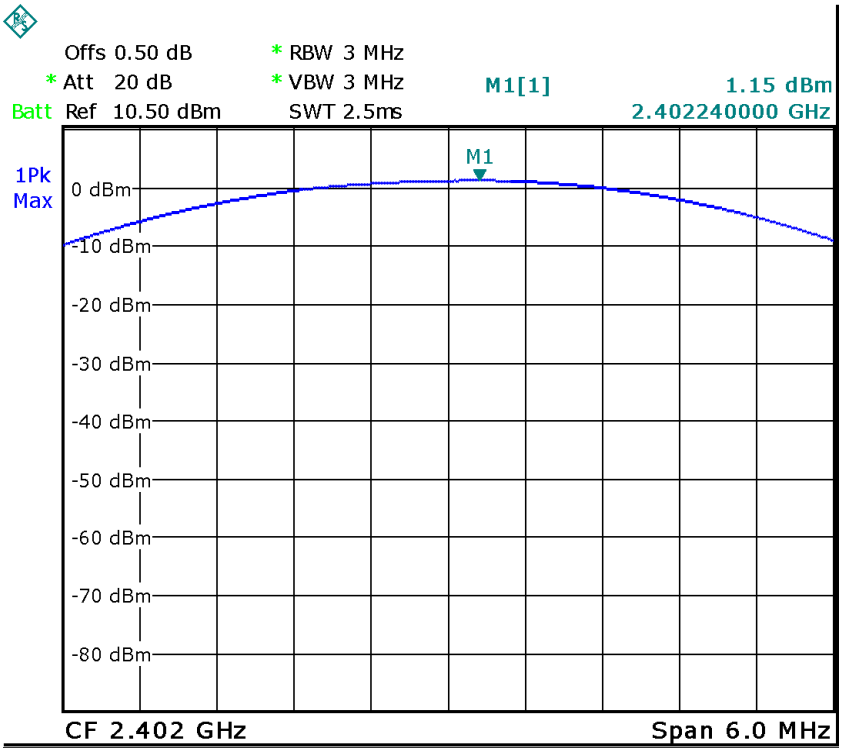
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Conducted peak output power

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	1.15	Pass
Middle channel 2441MHz	2.96	Pass
High channel 2480MHz	2.46	Pass

Low channel 2402MHz



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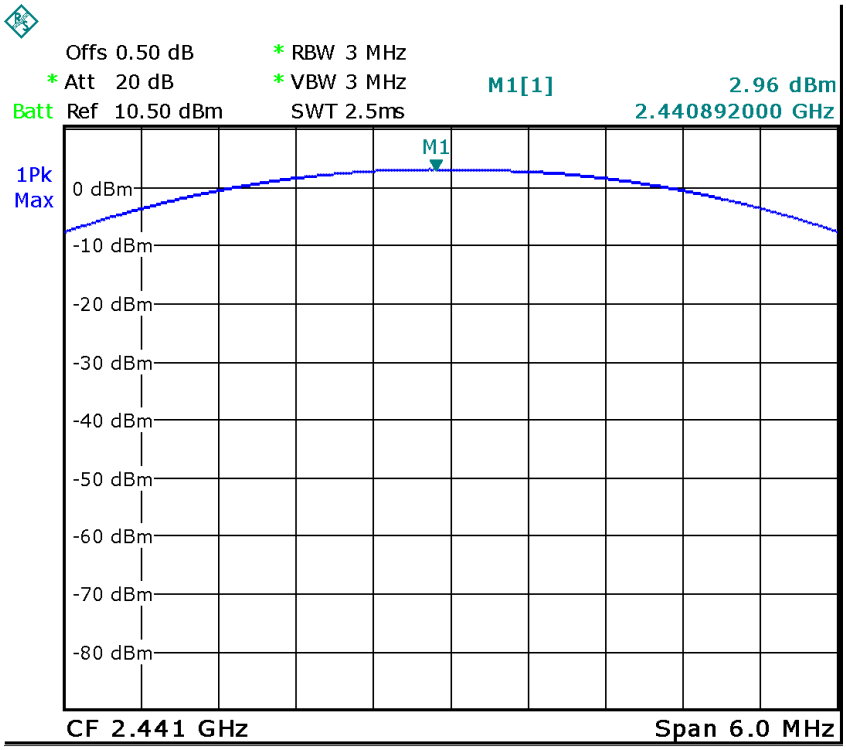
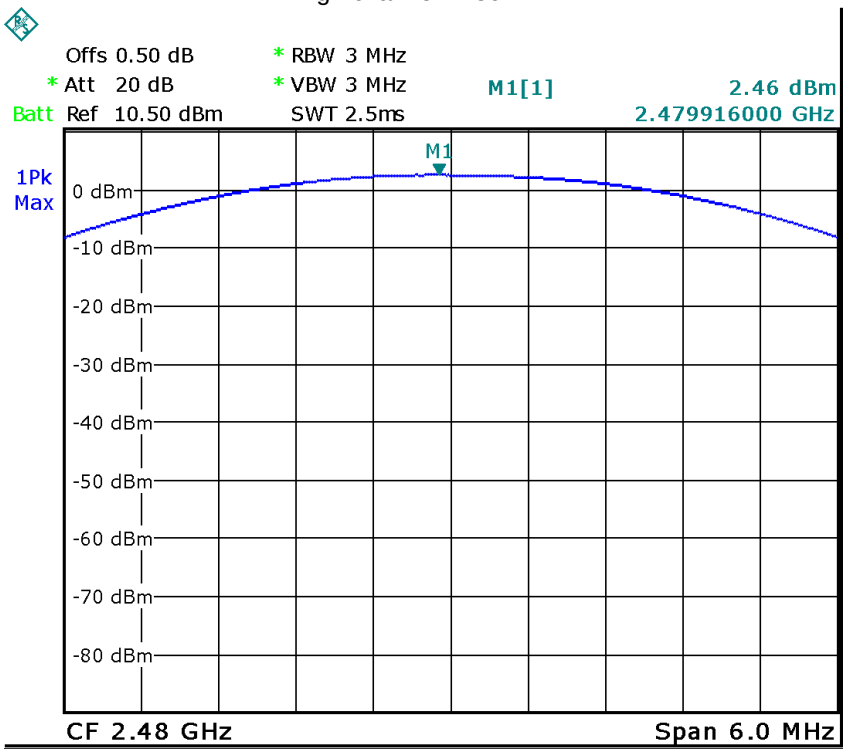
Middle channel 2441MHz



High channel 2480MHz



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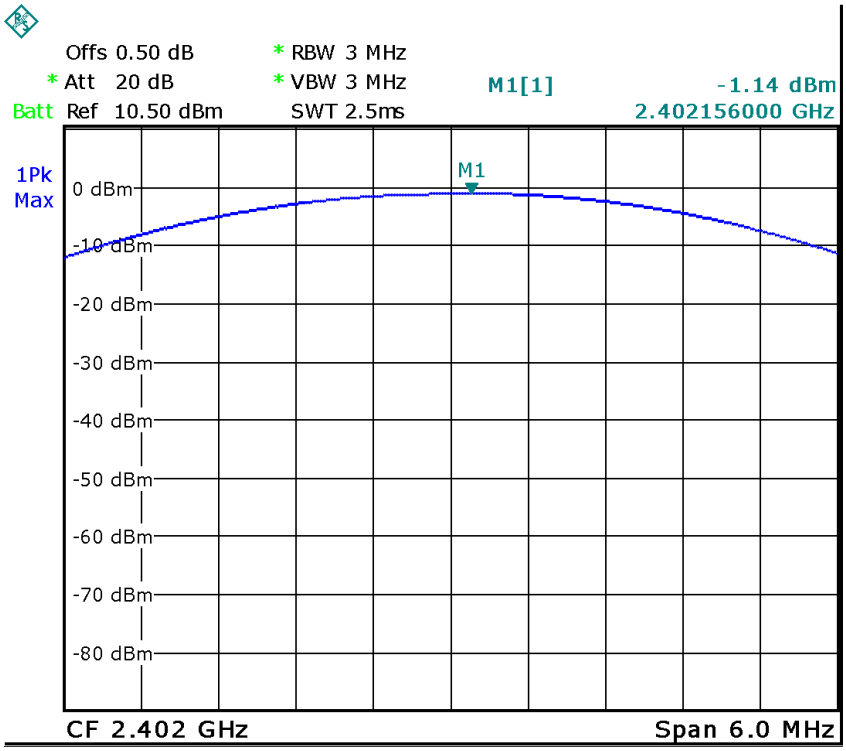
Bluetooth Mode π/4-DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-1.14	Pass
Middle channel 2441MHz	0.95	Pass
High channel 2480MHz	0.43	Pass

Low channel 2402MHz



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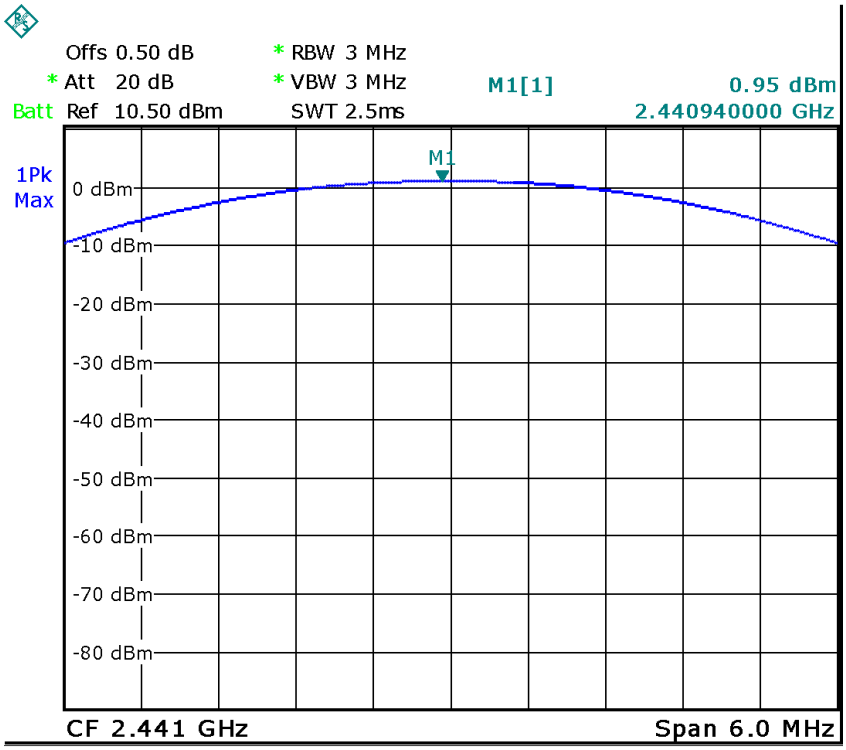
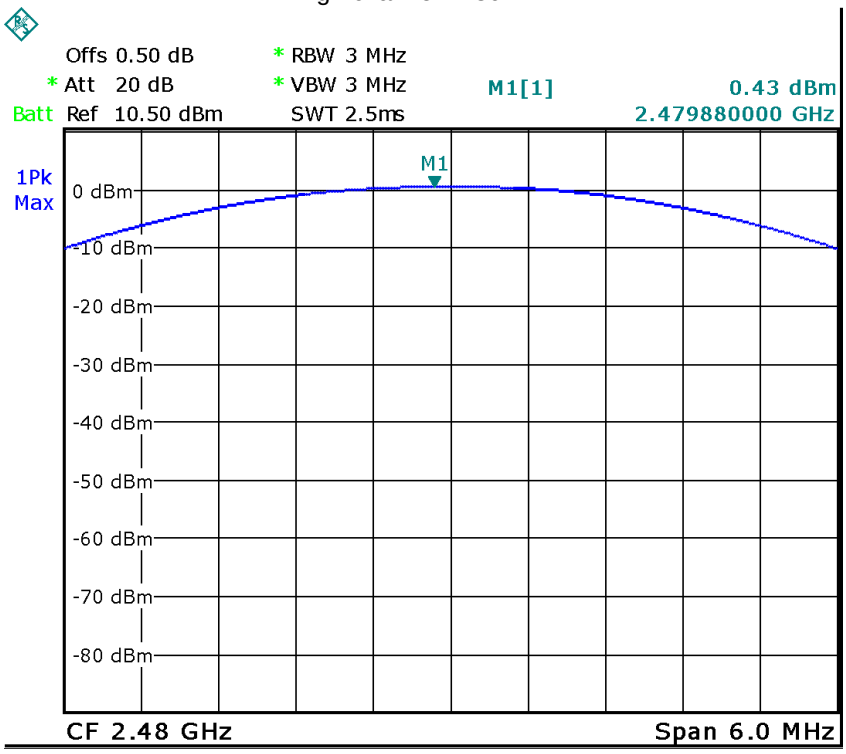
Middle channel 2441MHz



High channel 2480MHz



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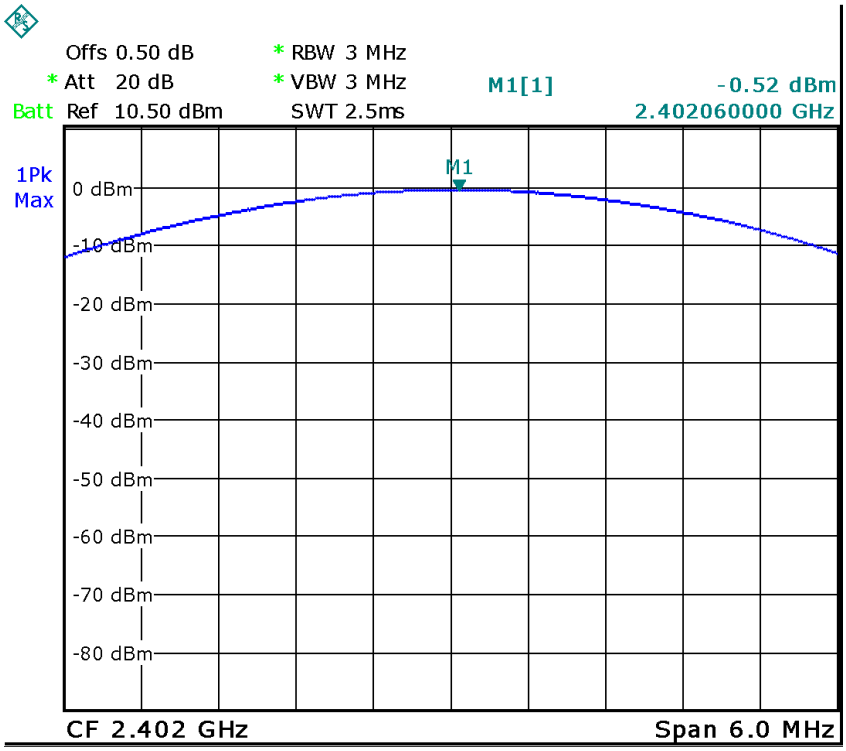
Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-0.52	Pass
Middle channel 2441MHz	1.53	Pass
High channel 2480MHz	1.05	Pass

Low channel 2402MHz



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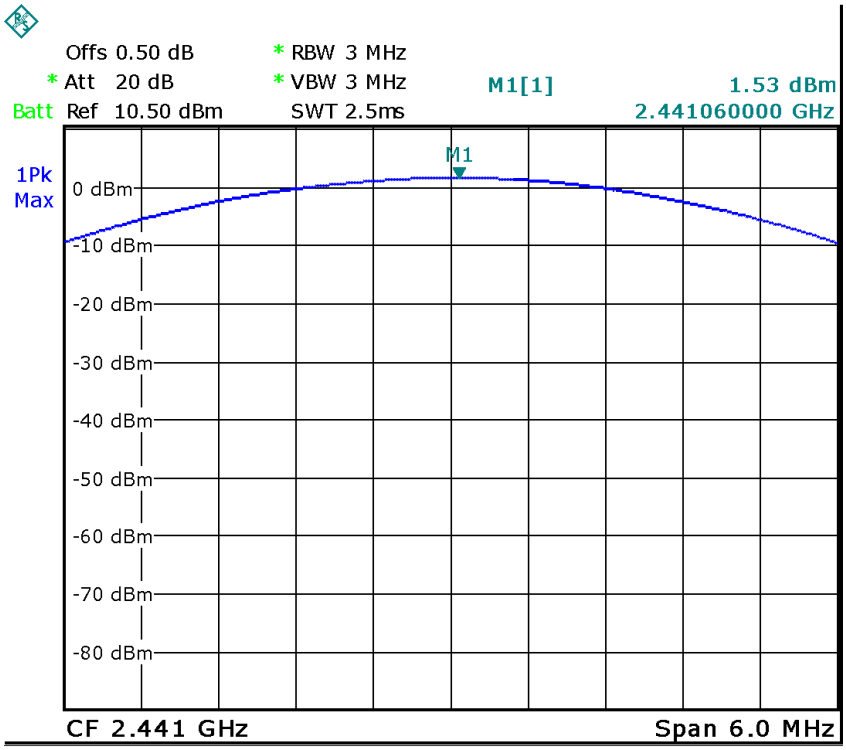
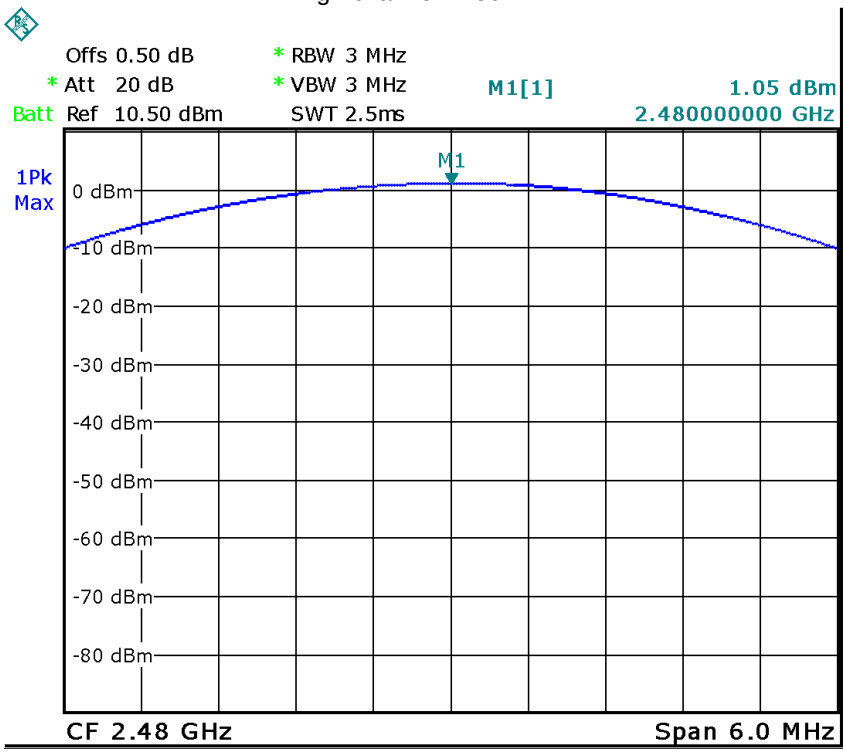
Middle channel 2441MHz



High channel 2480MHz



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9.3 20 dB bandwidth and 99% Occupied Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Limit

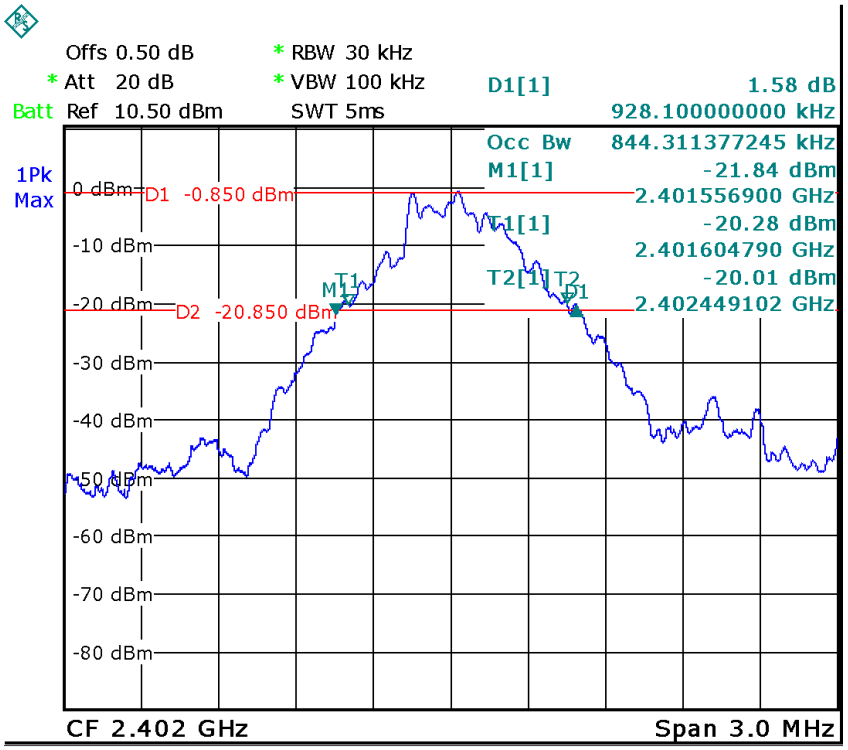
Limit [kHz]
N/A

20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode GFSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	928.1	844.311	--	Pass
2441	922.2	844.311	--	Pass
2480	928.1	844.311	--	Pass

Low channel 2402MHz



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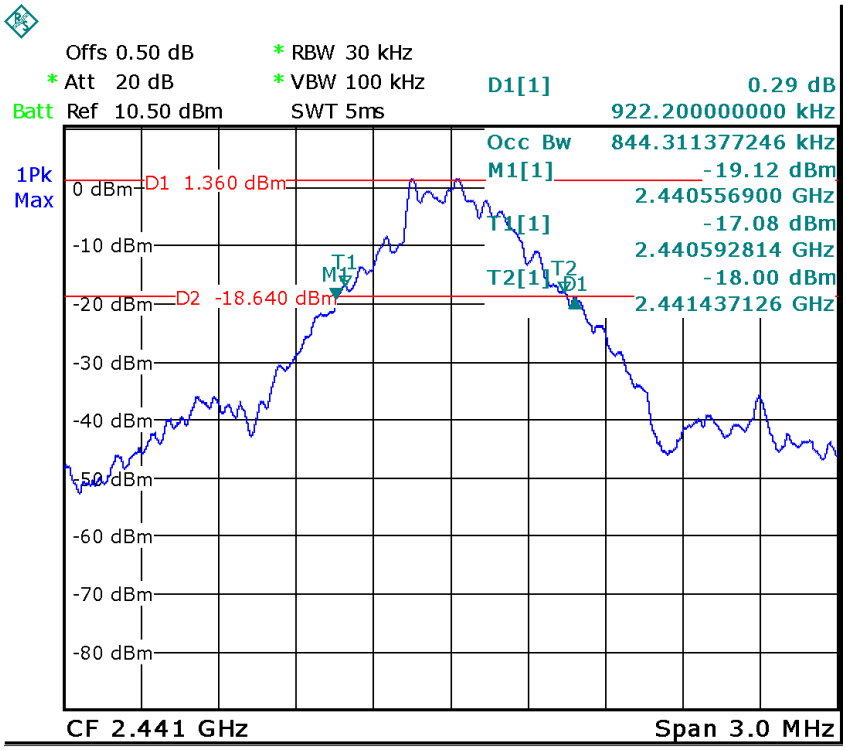
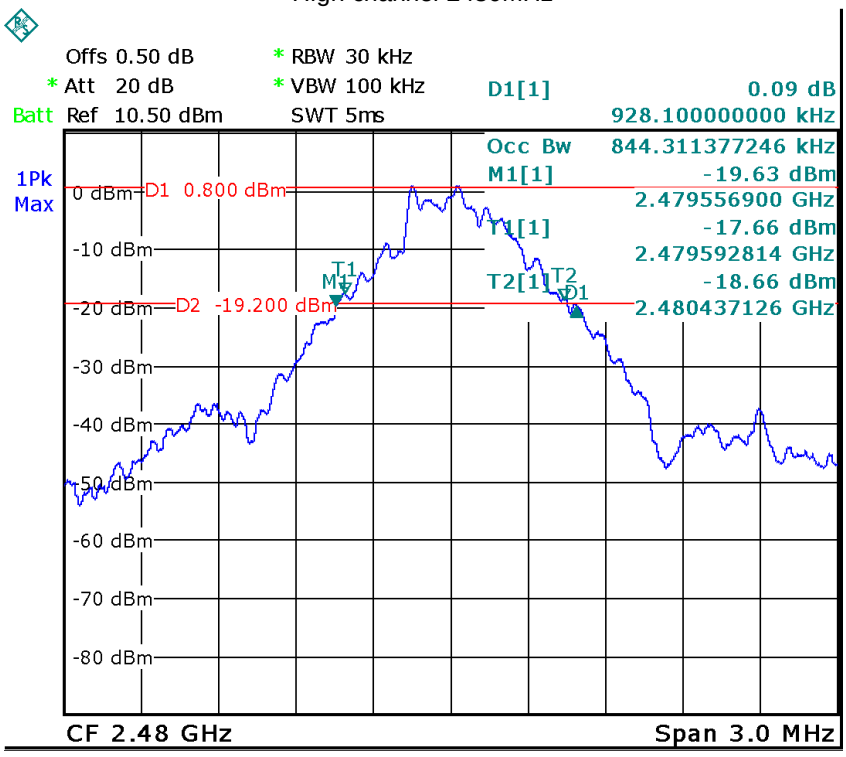
Middle channel 2441MHz



High channel 2480MHz



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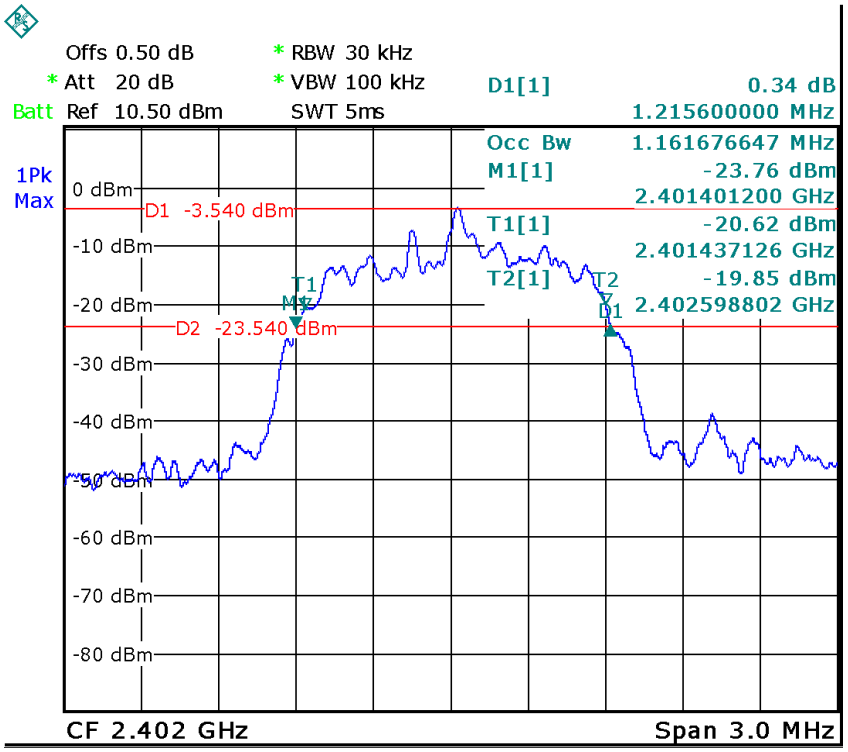
20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode π/4-DQPSK Modulation test result

Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
MHz	kHz	kHz	kHz	
2402	1215.6	1161.68	--	Pass
2441	1221.6	1161.68	--	Pass
2480	1221.6	1161.68	--	Pass

Low channel 2402MHz



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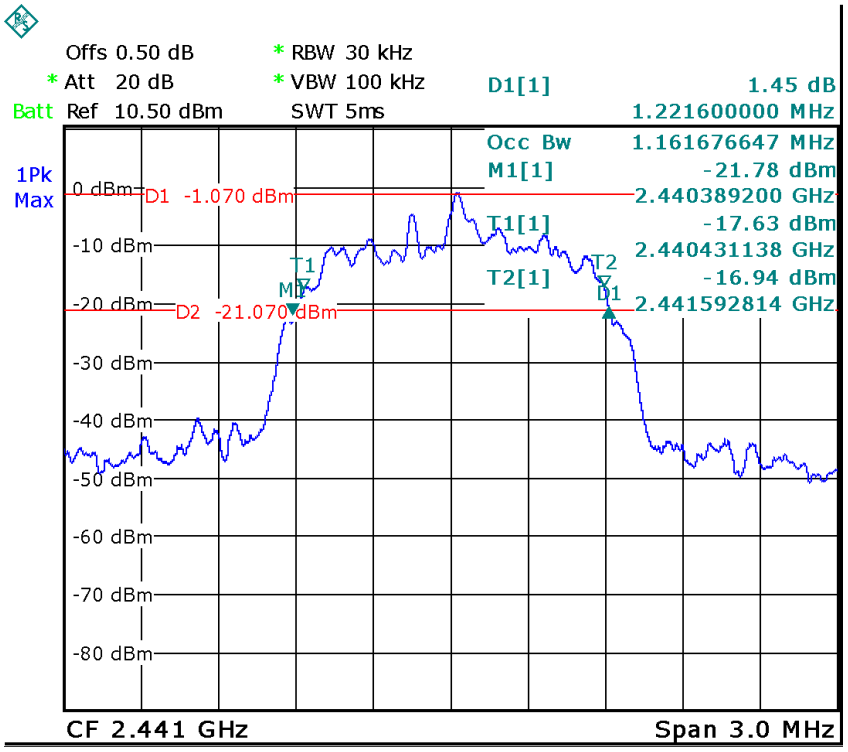
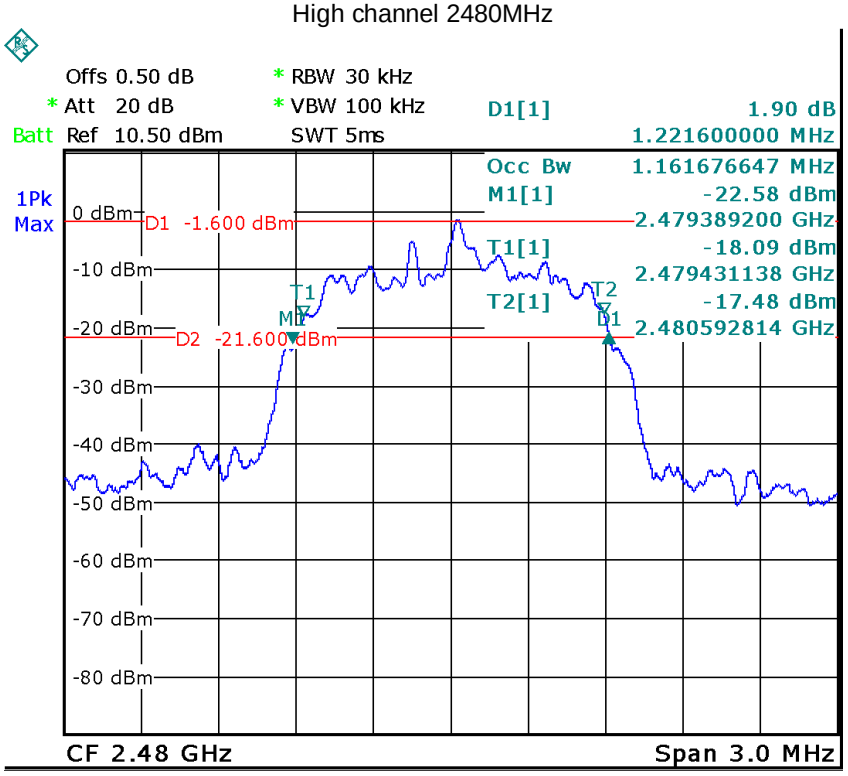
Middle channel 2441MHz



High channel 2480MHz



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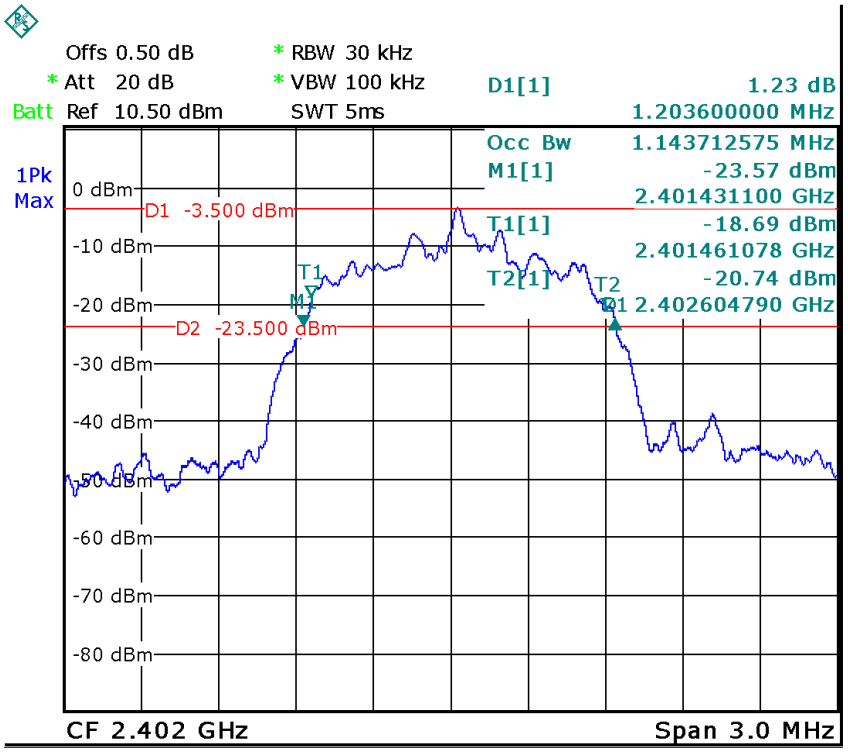
20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode 8DPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz	Result
2402	1203.6	1143.71	--	Pass
2441	1203.6	1143.71	--	Pass
2480	1215.6	1137.72	--	Pass

Low channel 2402MHz



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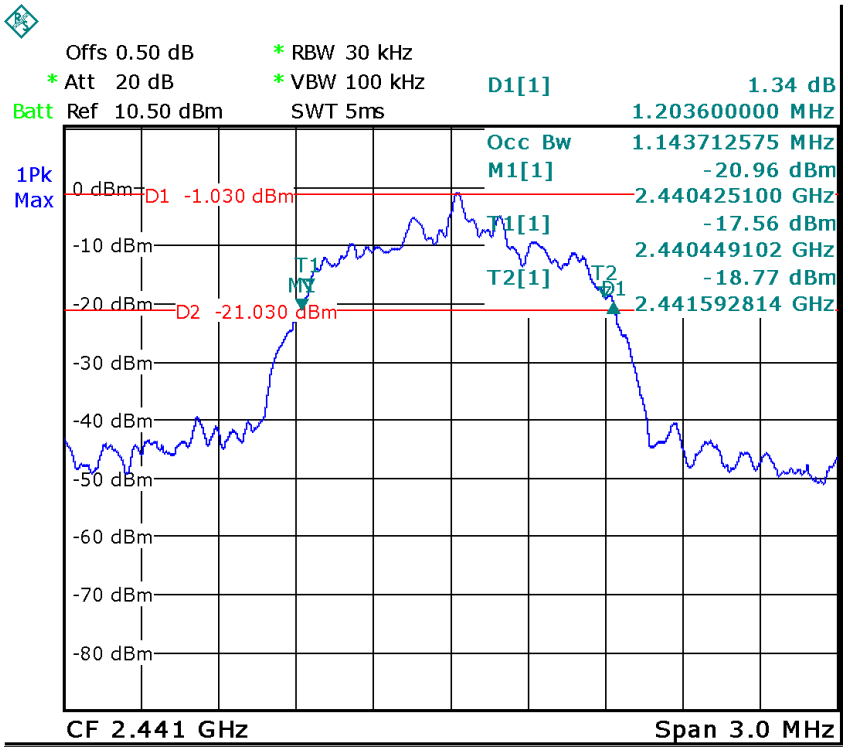
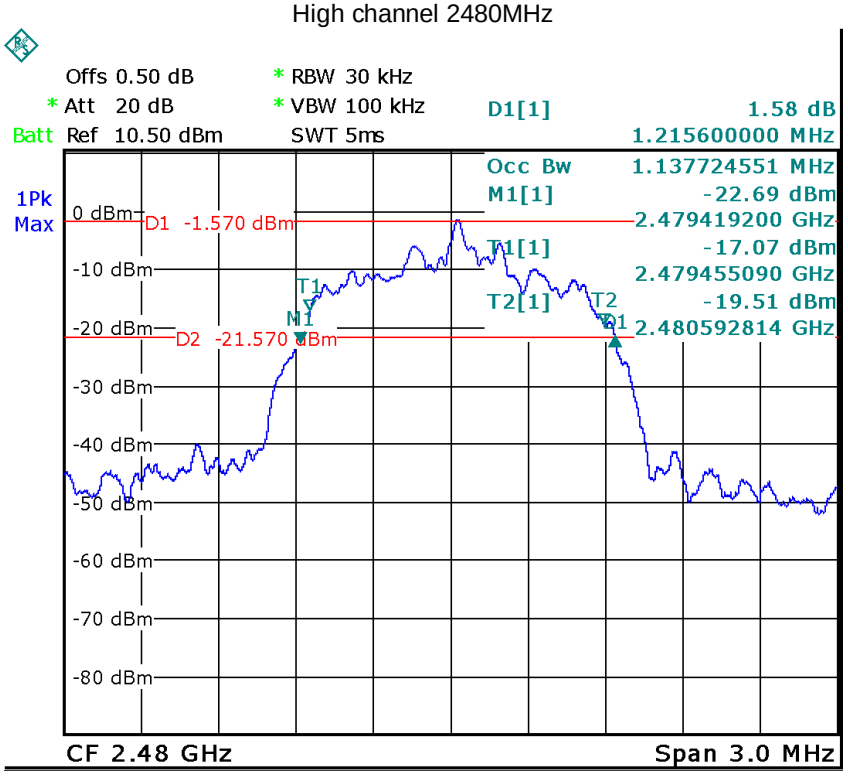
Middle channel 2441MHz



High channel 2480MHz



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9.4 Carrier Frequency Separation

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit kHz
≥25KHz or 2/3 of the 20 dB bandwidth which is greater

GFSK Modulation Limit

Frequency MHz	2/3 of 20 dB Bandwidth kHz
2402	618.73
2441	614.8
2480	618.73

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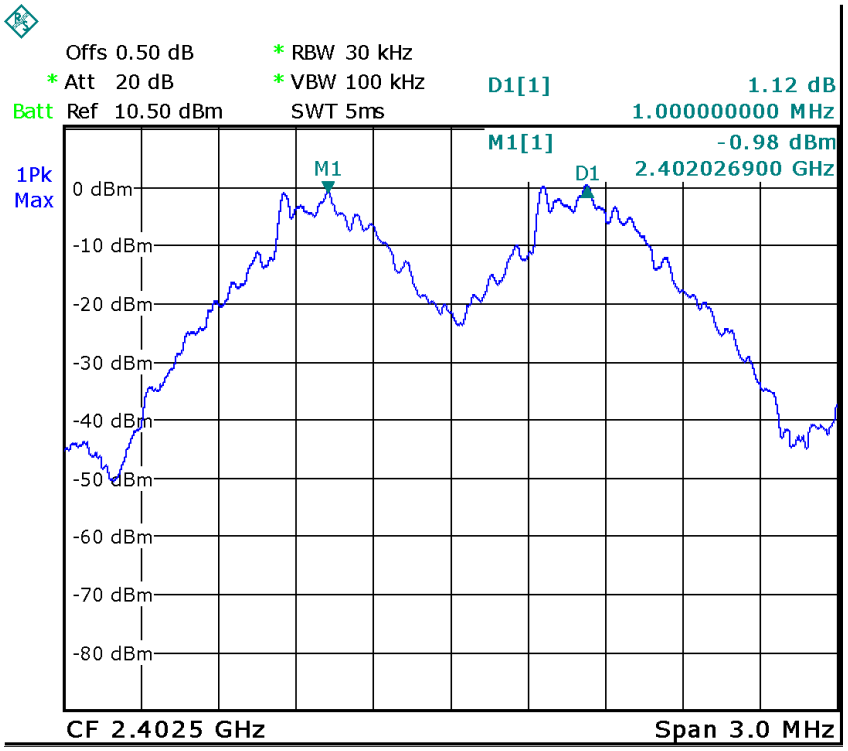
Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

GFSK Modulation test result

Frequency MHz	Carrier Frequency Separation kHz	Result
2402	1000	Pass
2441	1000	Pass
2480	1000	Pass

Low channel 2402MHz



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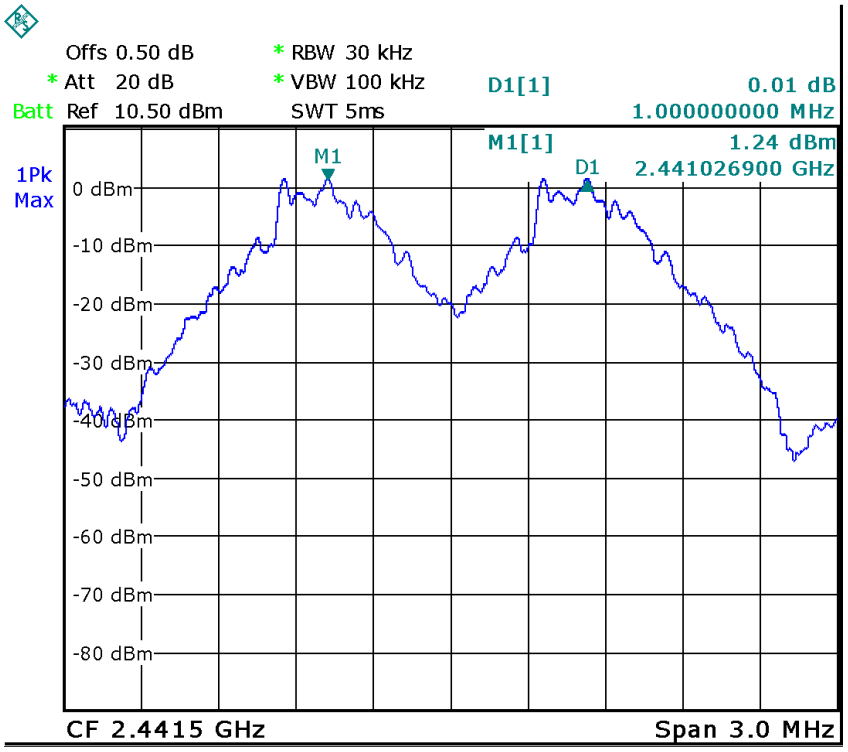
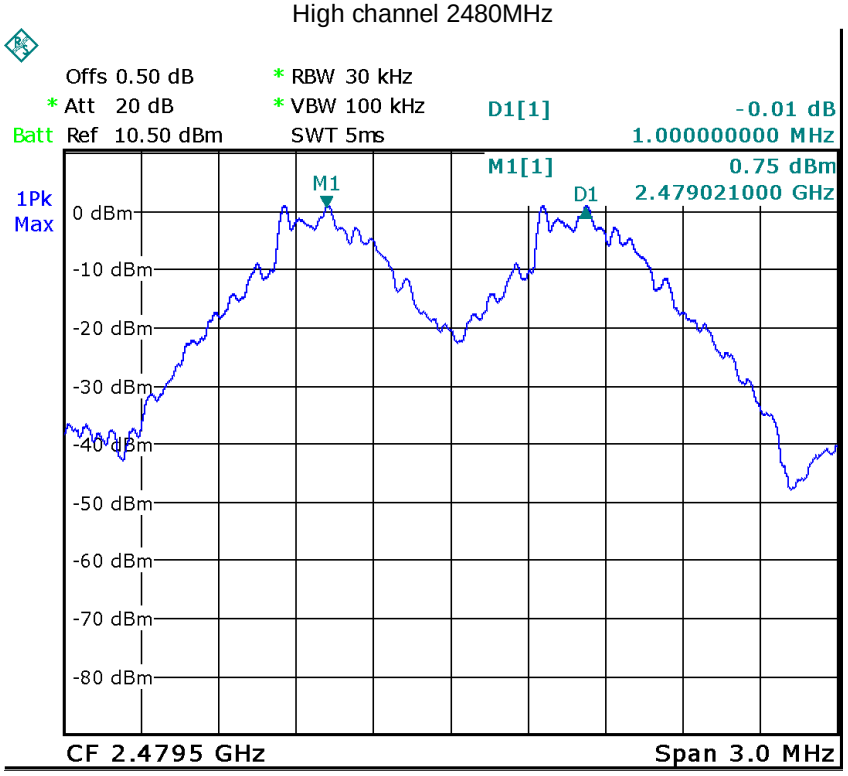
Middle channel 2441MHz



High channel 2480MHz



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9.5 Number of hopping frequencies

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
3. Record all the signals from each channel until each one has been recorded.
4. Repeat above procedures until all frequencies measured were complete.

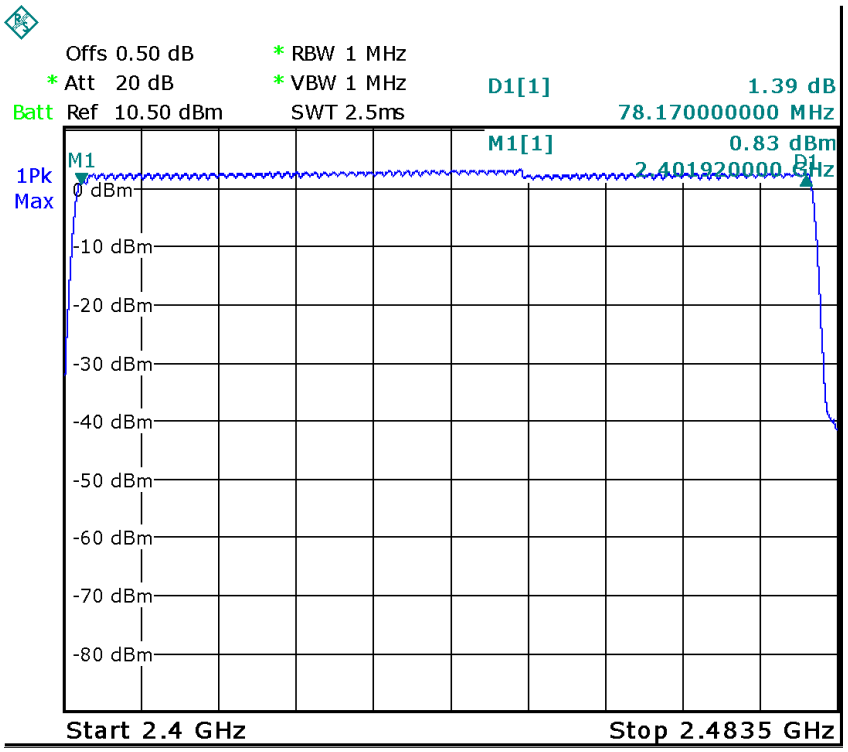
Limit

Limit number
≥ 15

Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

Number of hopping frequencies	Result
79	Pass



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9.6 Dwell Time

Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable. Equipment mode: Spectrum analyzer
2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
4. Measure the Dwell Time by spectrum analyzer Marker function.
5. Repeat above procedures until all frequencies measured were complete.

Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Dwell Time

Dwell time

The maximum dwell time shall be 0.4 s.
According to the Bluetooth Core Specification, the worse result (DH5 mode) was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

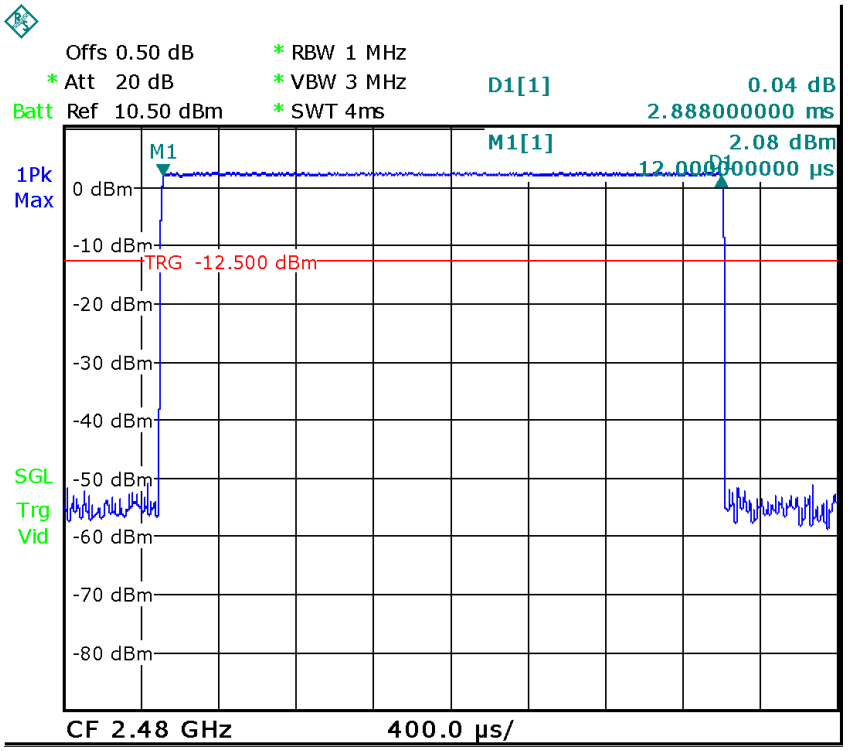
The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result

Modulation	Mode	Reading (us)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	2888	106.67	308.053	< 400	Pass
π/4-DQPSK	2DH5	2888	106.67	308.053	< 400	Pass
8-DPSK	3DH5	2896	106.67	308.907	< 400	Pass

GFSK Modulation



DH5

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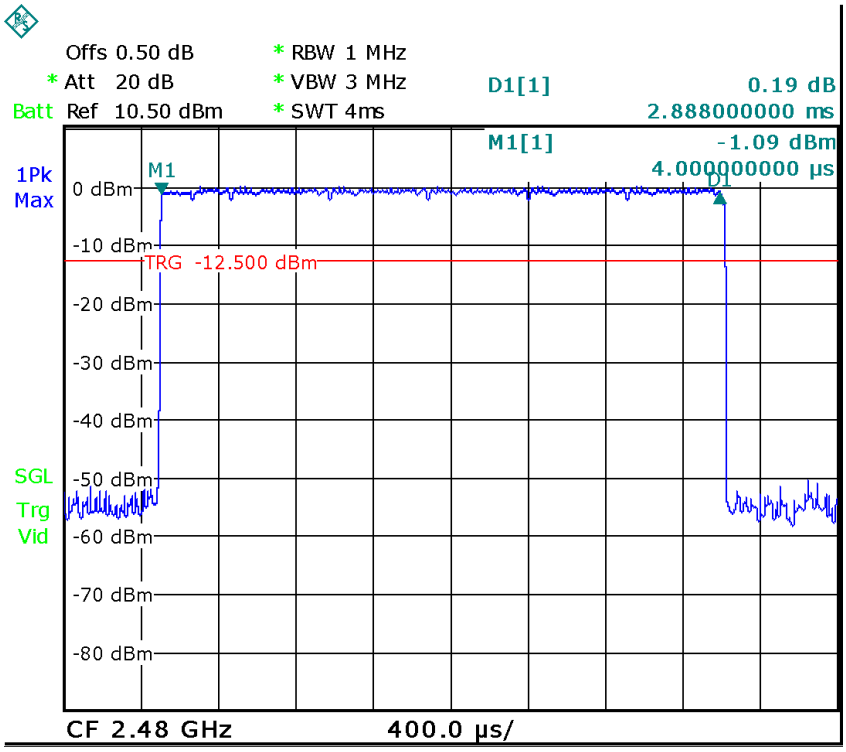
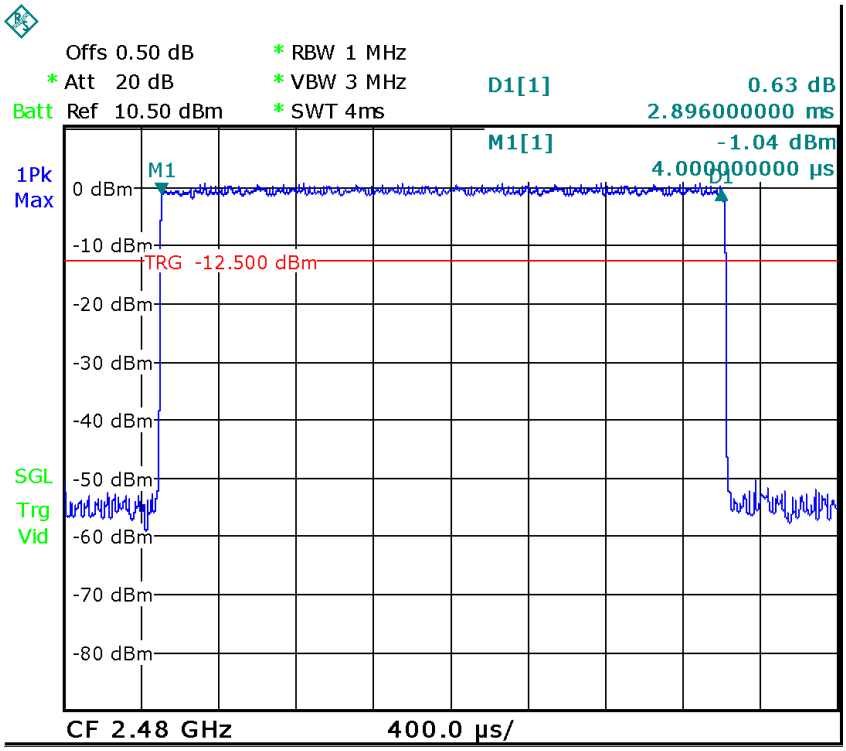
π/4-DQPSK Modulation



2DH5

8-DPSK Modulation



3DH5

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9.7 Spurious RF conducted emissions

Test Method

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
3. The level displayed must comply with the limit specified in this Section. Submit these plots.
4. Repeat above procedures until all frequencies measured were complete.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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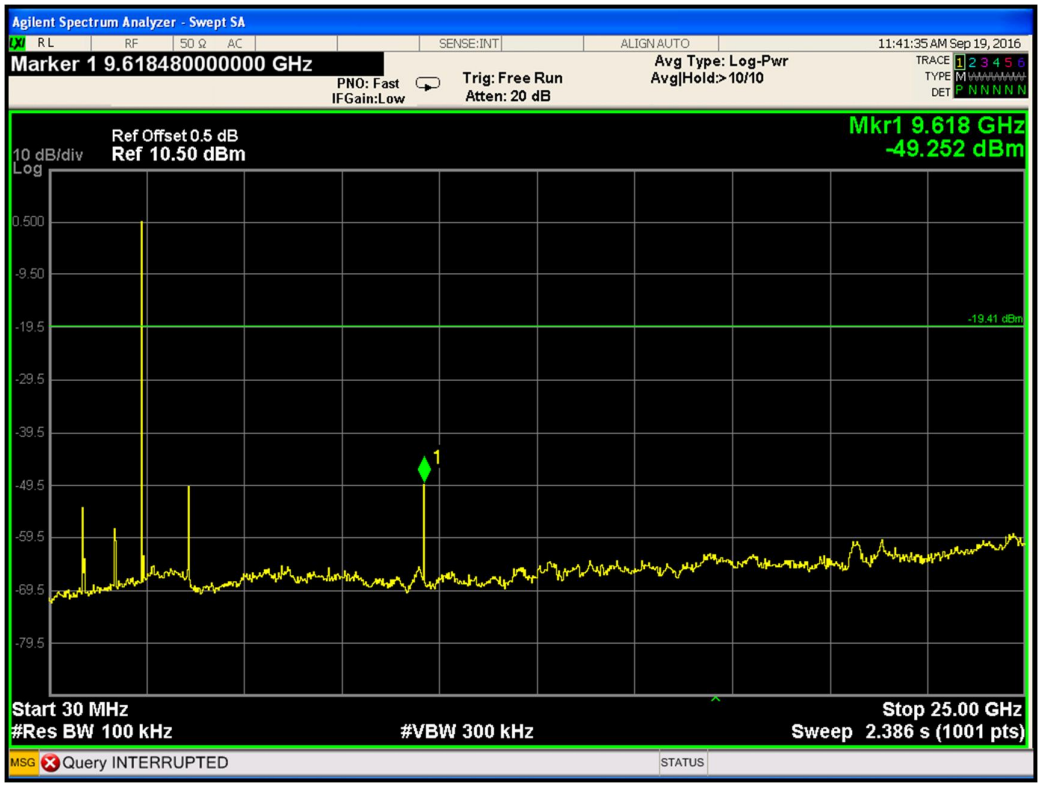
Spurious RF conducted emissions

Only the worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.
BT3.0 GFSK Modulation:

Low channel 2402MHz



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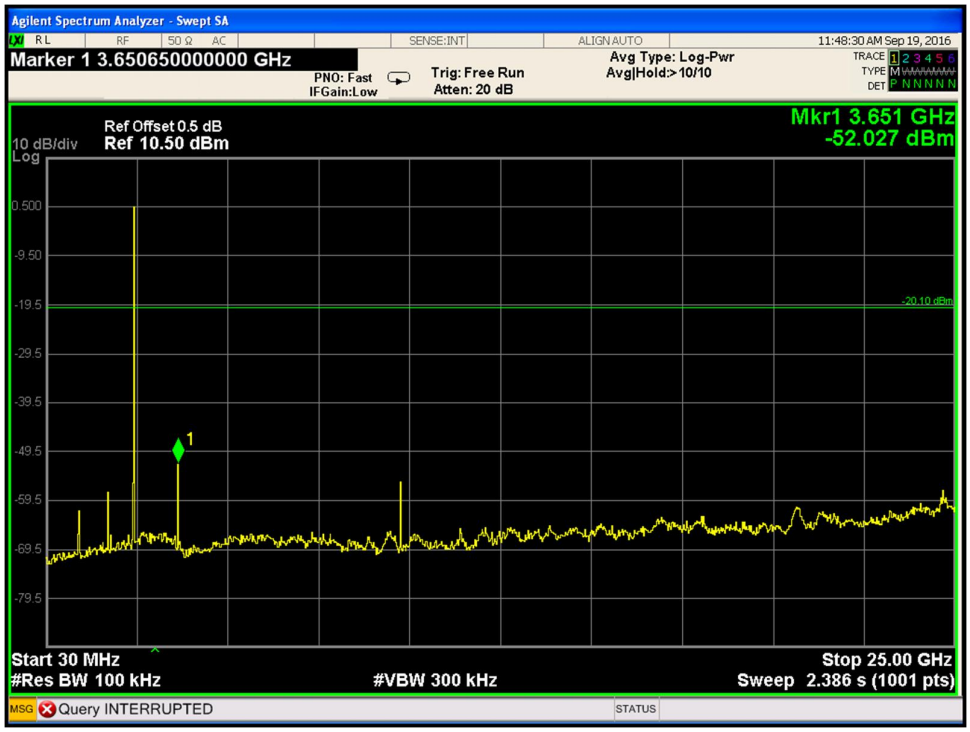
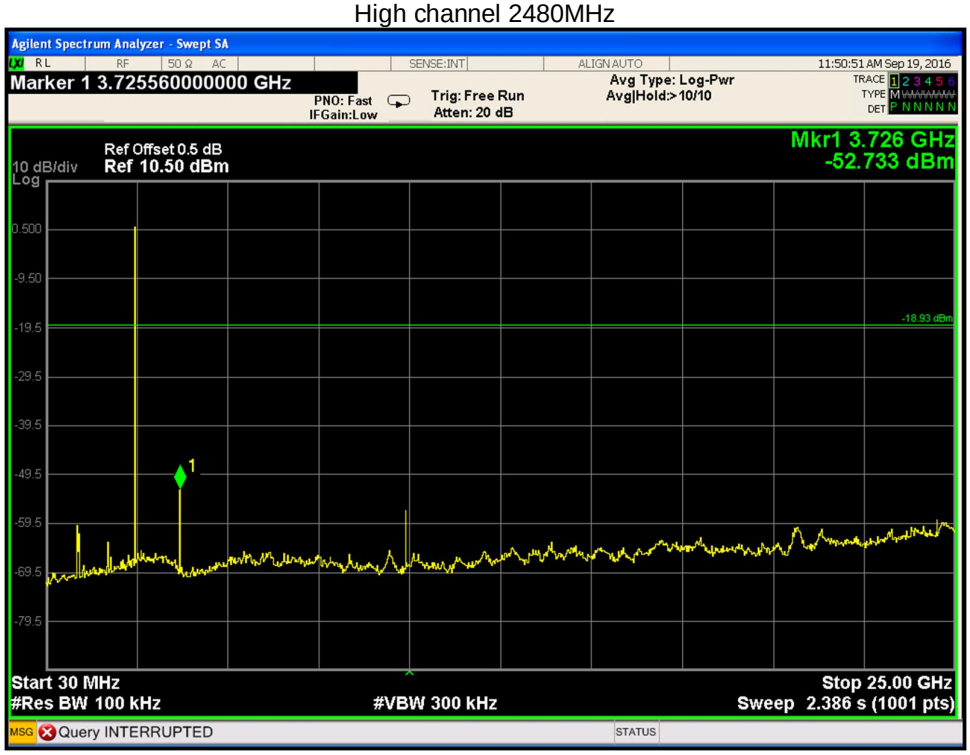
Middle channel 2441MHz



High channel 2480MHz



9.8 Band edge testing

Test Method

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.
4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

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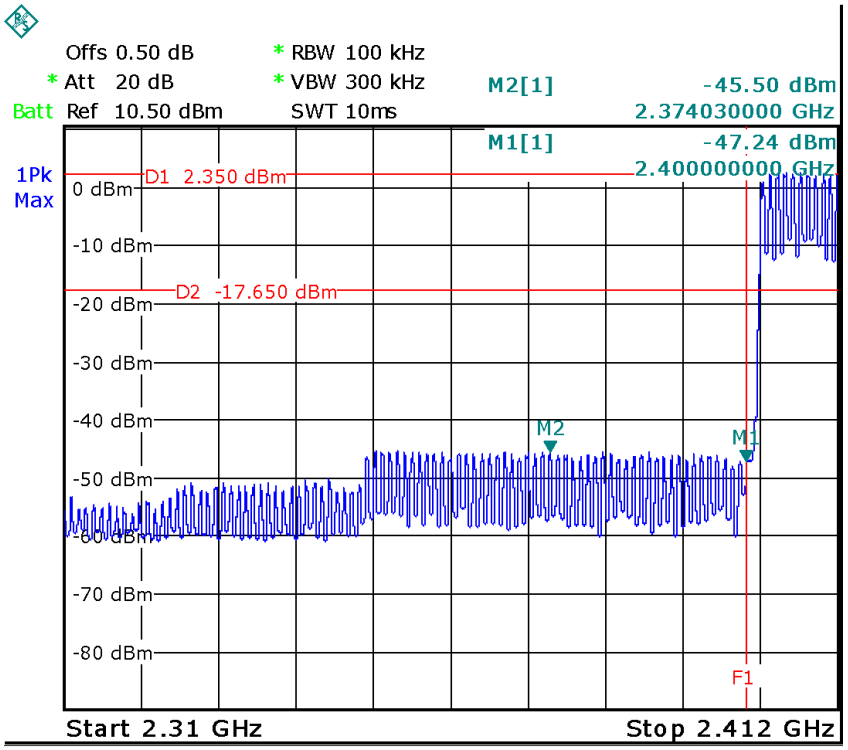
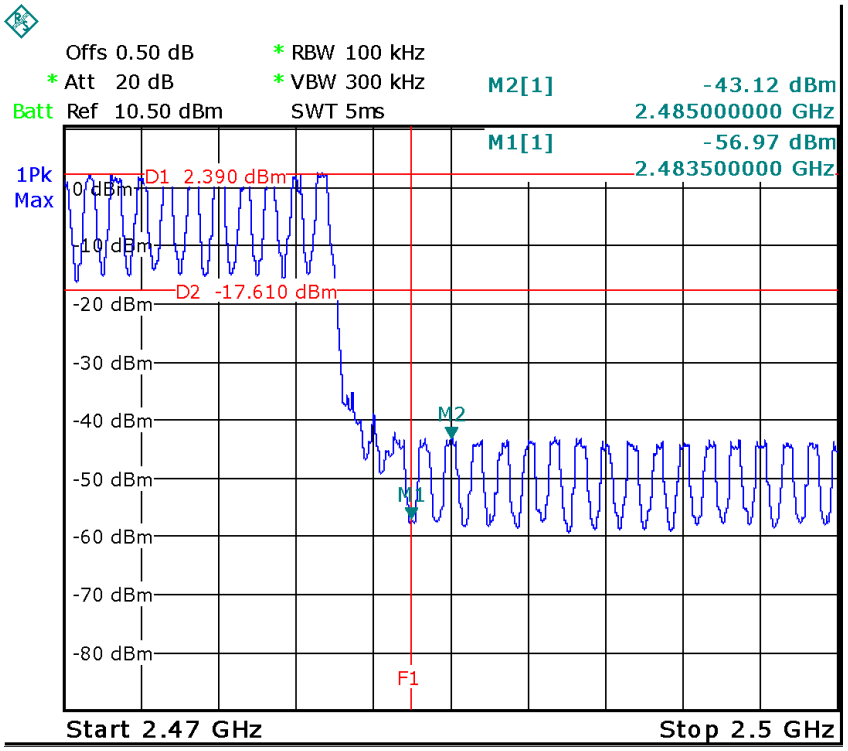
GFSK Hopping on mode:





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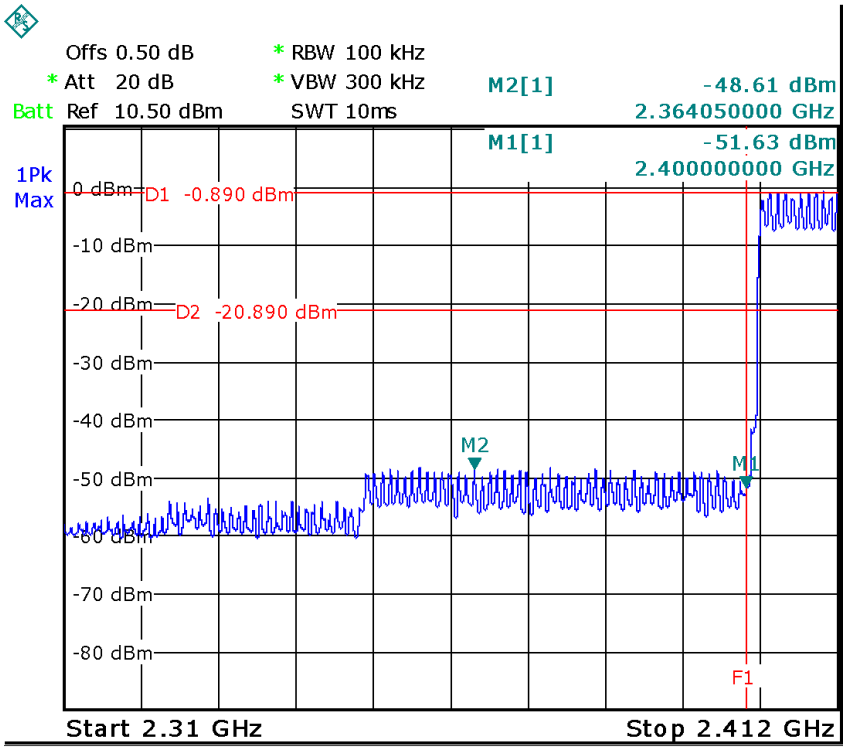
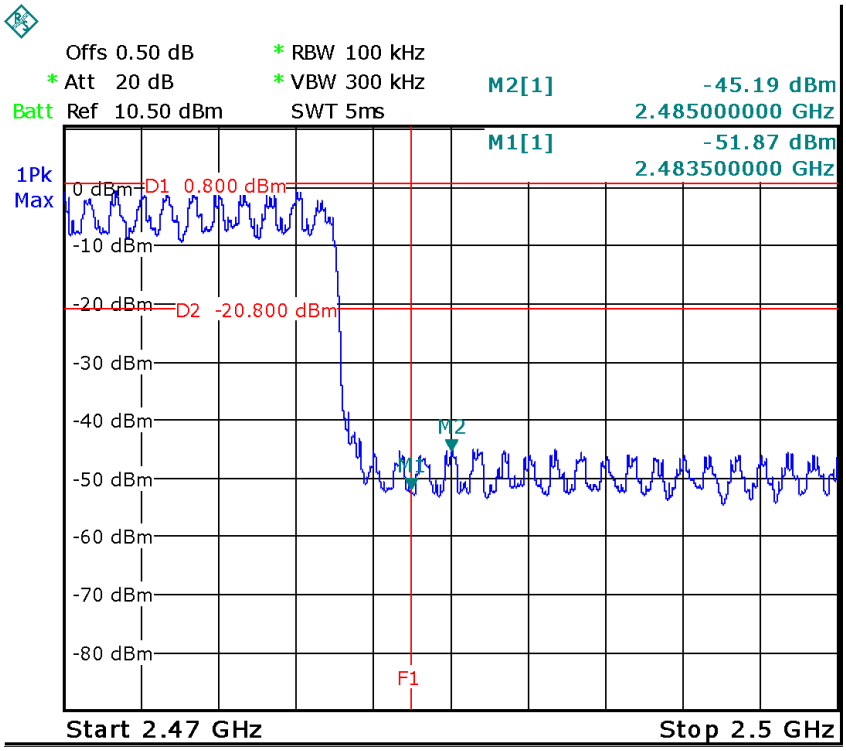
8DPSK Hopping on mode:





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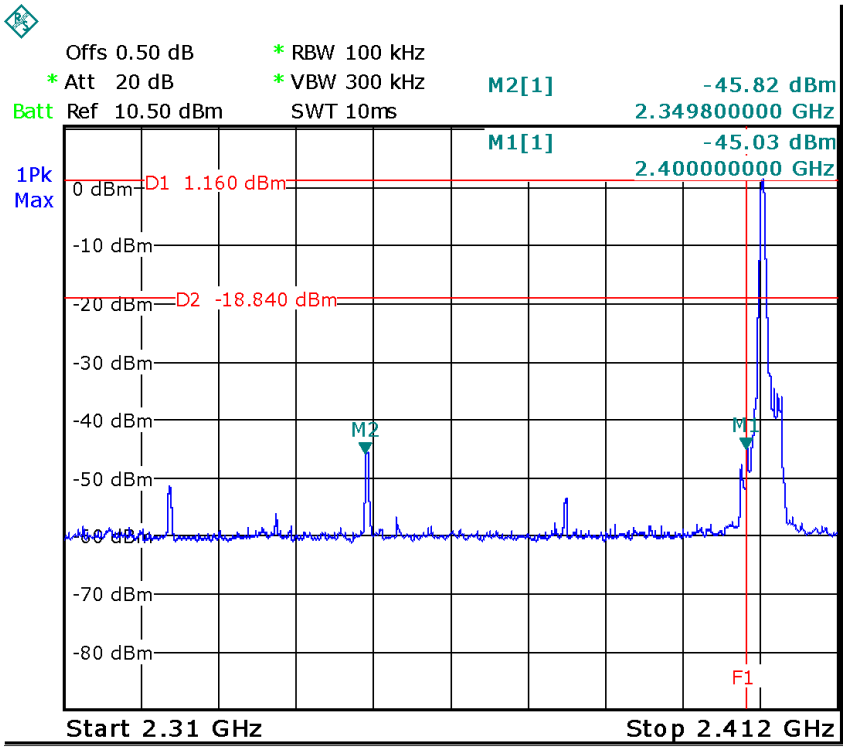
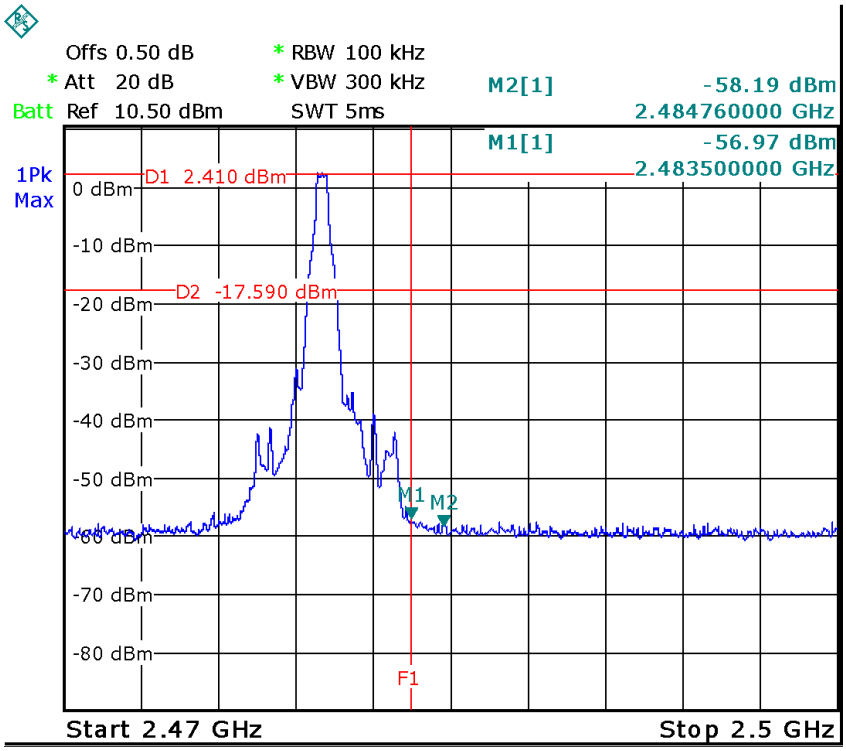
GFSK Hopping off mode:





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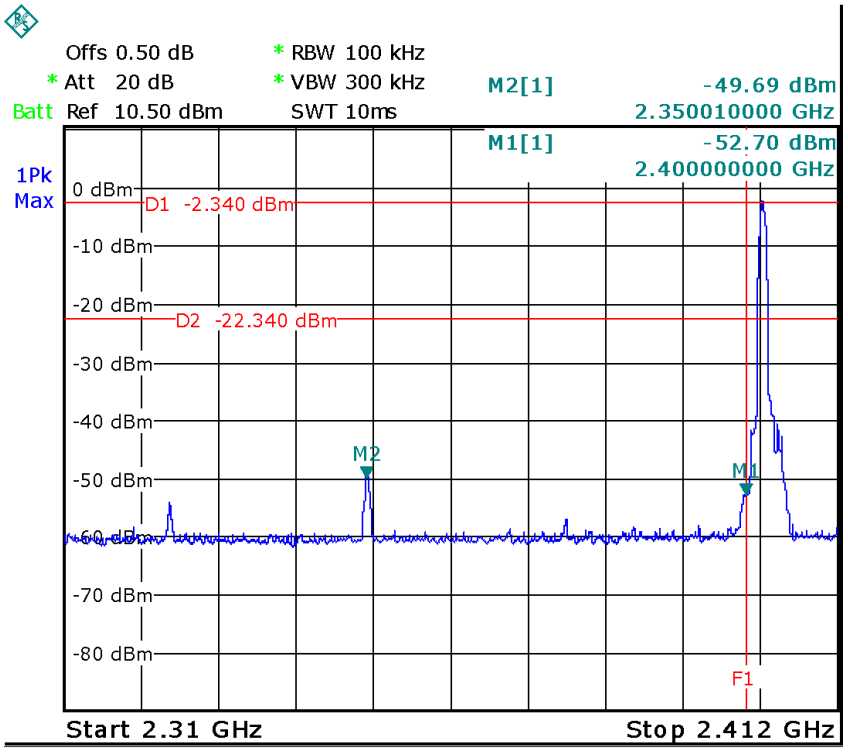
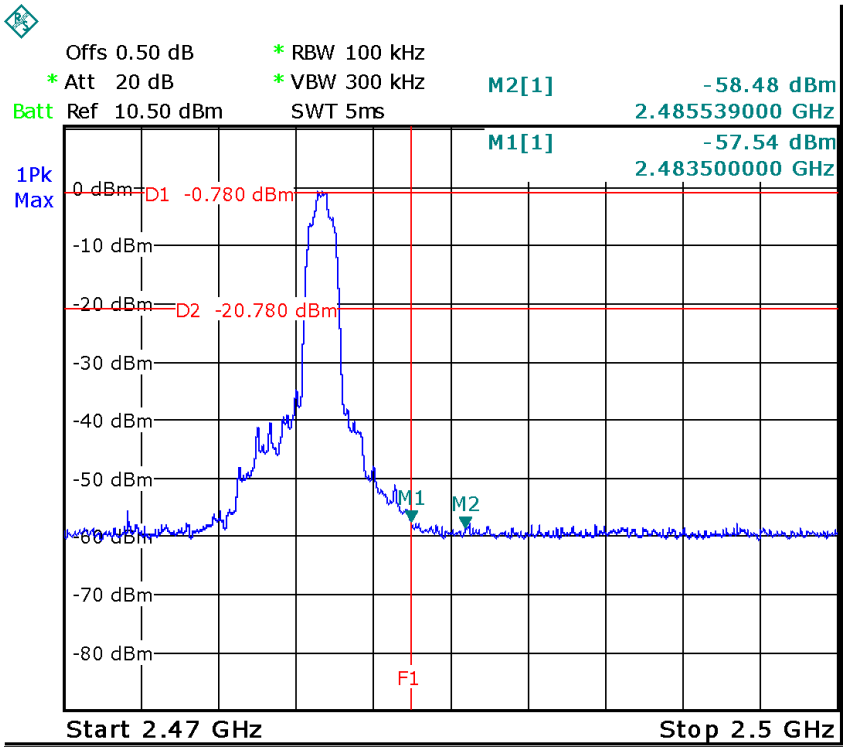
8DPSK Hopping off mode:





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9.9 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.

2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.

3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).

4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.
The only worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.
The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

Transmitting spurious emission test result as below:

BT3.0 GFSK Modulation 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	
26-1000MHz	26.9973	34	H	69.54	QP	35.54	Pass
	116.9493*	18.17	H	43.5	QP	25.33	Pass
	26.896	33.77	V	69.54	QP	35.77	Pass
	116.9492*	22.61	V	43.5	QP	20.89	Pass
1000-24800MHz	4805*	57.55	H	74	PK	16.45	Pass
	4805*	47.89	H	54	AV	6.11	Pass
	4805*	55.89	V	74	PK	18.11	Pass
	4805*	47.66	V	54	AV	6.34	Pass
	--	--	--	--	--	--	Pass

BT3.0 GFSK Modulation 2441MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	
26-1000MHz	27.98	34.78	H	69.54	QP	34.76	Pass
	177.5091	20.39	H	43.5	QP	23.11	Pass
	26.56	34.96	V	69.54	QP	34.58	Pass
	385.2803	22.70	V	46	QP	23.30	Pass
1000-24800MHz	4885*	63.88	H	74	PK	10.62	Pass
	4885*	51.22	H	54	AV	2.78	Pass
	4885*	53.16	V	74	PK	20.84	Pass
	--	--	--	--	--	--	Pass

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BT3.0 GFSK Modulation 2480MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	
26-1000MHz	26.61	34.15	H	69.54	QP	35.39	Pass
	177.5091	20.39	H	43.5	QP	23.11	Pass
	26.35	34.37	V	69.54	QP	35.17	Pass
	93.1131	17.23	V	43.5	QP	26.27	Pass
1000-24800MHz	4960*	67	H	74	PK	7.00	Pass
	4960*	52.22	H	54	AV	1.78	Pass
	4960*	55.79	V	74	PK	18.21	Pass
	4960*	47.66	V	54	AV	6.34	Pass
	--	--	--	--	--	--	Pass

Remark:

(1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.

10 Test Equipment List

Site 2:

Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	101155	Sep.12, 2016	Sep.11, 2017
2	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12, 2016	Sep.11, 2017
3	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12, 2016	Sep.11, 2017
4	Cable	Laplace	RF300	-	Sep.12, 2016	Sep.11, 2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Oct.17,2015	Oct.16,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Oct.17,2015	Oct.16,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2016	Apr.18,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12, 2016	Sep.11, 2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2016	Apr.18,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.19,2016	Apr.18,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2016	Mar.16,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.10,2016	Apr.09,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Apr.10,2016	Apr.09,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.10,2016	Apr.09,2017
3	Amplifier	ANRITSU	MH648A	M43381	Apr.10,2016	Apr.09,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.10,2016	Apr.09,2017
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12, 2016	Sep.11, 2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12, 2016	Sep.11, 2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12, 2016	Sep.11, 2017

RF Conducted Testing:

- Conducted peak output power
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Spurious RF conducted emissions
- Band edge

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Parameter	Uncertainty
Radio Frequency	± 1 x 10-6
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 4.74 dB (Horn antenna 1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

Test setup photos section: Refer to the annex A.

EUT photo section: Refer to the annex B.