FCC - TEST REPORT

Report Number	:	**68.950.18.0283.01**	Date of Issue:	August 16, 2018
Model	:	M87FX		
Product Type	:	Tommy Jeans / Hilfiger wireless speaker		
Applicant	:	BRAND ADDITION LTD		
Address	:	Trafford Wharf Road, Manchester, M17 1DD		
Production Facility	:	Shenzhen Jonter Digital Co.,Ltd		
Address	:	Building 4, Jinfo Industrial Park, Hezhou Village, Xixiang		
	:	Town, Bao'an District, Shenzhen 51800, China.		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	56		

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Nanshan District, Shenzhen 518052, P.R. China

2 Details about the Test Laboratory

Details about the Test Laboratory

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.:	514049
IC Registration No:	10320A-1

3 Description of the Equipment Under Test

Product:	Tommy Jeans / Hilfiger wireless speaker
Model no.:	M87FX
FCC ID:	2ALSK-M87FX
Options and accessories:	USB Cable, AUX IN Cable
Rating:	DC3.7V, 610mAh (Supplied by Li-ion rechargeable battery) DC5.0V, 1.0A (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:	0dBi
Description of the EUT:	The EUT is a music box with Bluetooth3.0 function.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2017 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			
Test Condition		Pages	Test Result
§15.207	Conducted emission AC power port	10	Pass
§15.247(b)(1)	Conducted peak output power	13	Pass
§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
§15.247(a)(1)	Min. of Hopping Channel Carrier Frequency Separation	27	Pass
§15.247(a)(1)(iii)	Min number of hopping frequencies	30	Pass
§15.247(a)(1)(iii)	Dwell Time - Average Time of Occupancy	32	Pass
§15.247(d)	Spurious RF conducted emissions	32	Pass
§15.247(d)	Band edge	39	Pass
§15.247(d) & §15.209 &15.205	Spurious radiated emissions for transmitter and receiver	42	Pass
§15.203	Antenna requirement	See note 2	Pass

Note 1: N/A=Not Applicable.
Note 2: The EUT uses an Integrated antenna, which gain is 0dBi. 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: 2ALSK-M87FX, complies with Section 15.207, 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

M87FX is a Bluetooth music box. The TX and RX range is 2402MHz-2480MHz for BDR+EDR.

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: July 28, 2018

Testing Start Date: August 1, 2018

Testing End Date: August 14, 2018

Reviewed by:	Prepared by:	Tested by:
John Zhi	Moon Xiong	Louise Liu
EMC Section Manage.	EMC Project Engineer	EMC Test Engineer

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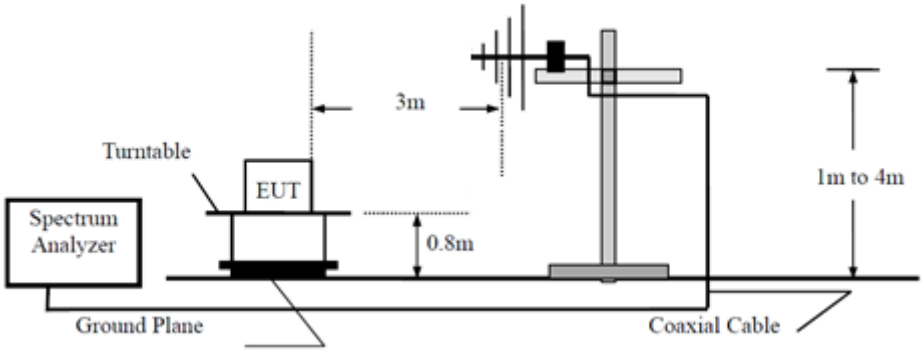
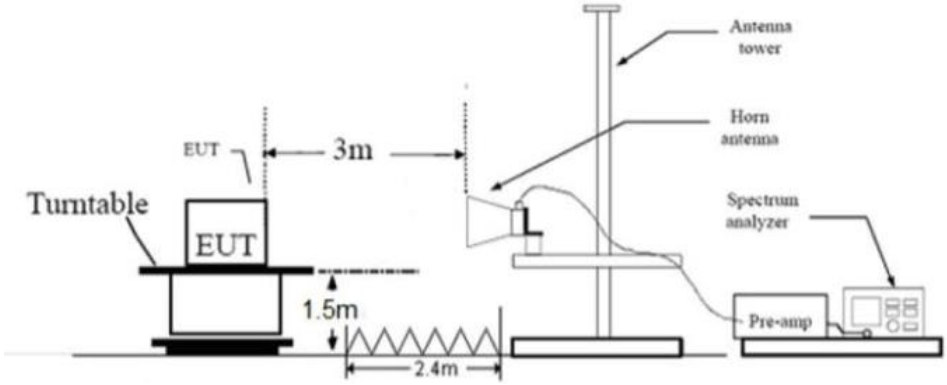
7 Test Setups

7.1 Radiated test setups

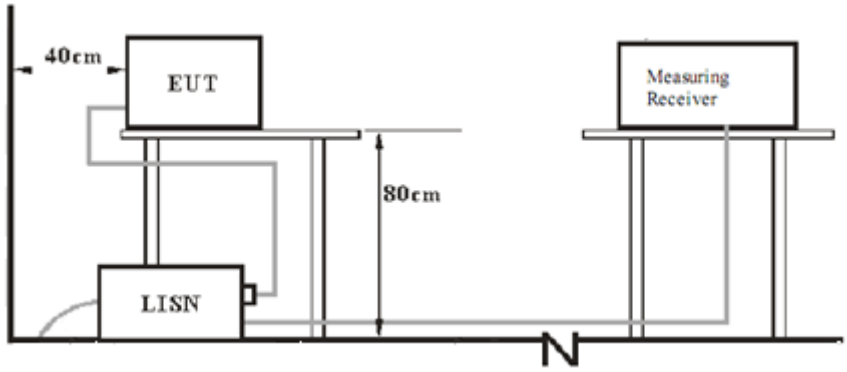
Below 1GHz



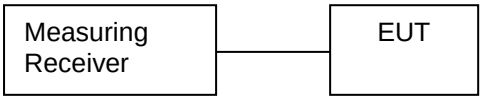
Above 1GHz



7.2 AC Power Line Conducted Emission test setups



7.3 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Lenovo	X220	---

Test software: BK test tool, 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 AC power port

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

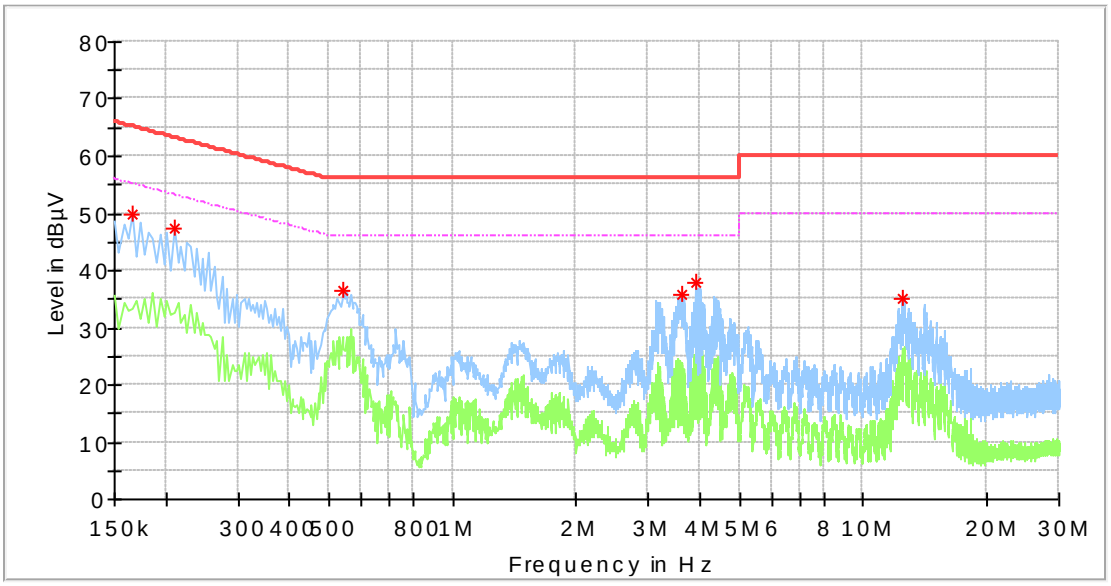
Limit

According to §15.107, conducted emissions limit as below:

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

*Decreasing linearly with logarithm of the frequency

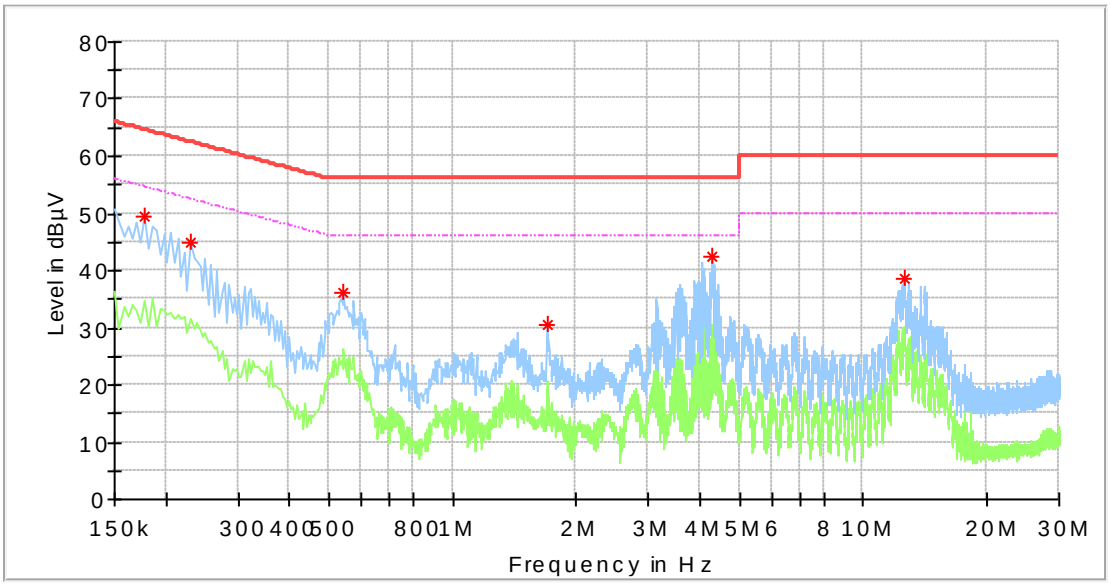
Model:	M87FX
Test mode:	Normal working, BT link
Test Voltage:	120V/60Hz
Test By:	Adam
Remark:	



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	49.94	---	65.16	15.21	L1	OFF	10.2
0.210000	47.39	---	63.21	15.82	L1	OFF	10.2
0.542000	36.59	---	56.00	19.41	L1	OFF	10.2
3.622000	35.84	---	56.00	20.16	L1	OFF	10.3
3.898000	37.82	---	56.00	18.18	L1	OFF	10.3
12.530000	35.03	---	60.00	24.97	L1	OFF	10.6

Model:	M87FX
Test mode:	Normal working, BT link
Test Voltage:	120V/60Hz
Test By:	Adam
Remark:	



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.178000	49.35	---	64.58	15.23	N	OFF	10.3
0.230000	44.85	---	62.45	17.60	N	OFF	10.3
0.542000	36.03	---	56.00	19.97	N	OFF	10.4
1.694000	30.55	---	56.00	25.45	N	OFF	10.4
4.286000	42.58	---	56.00	13.42	N	OFF	10.5
12.574000	38.76	---	60.00	21.24	N	OFF	11.0

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

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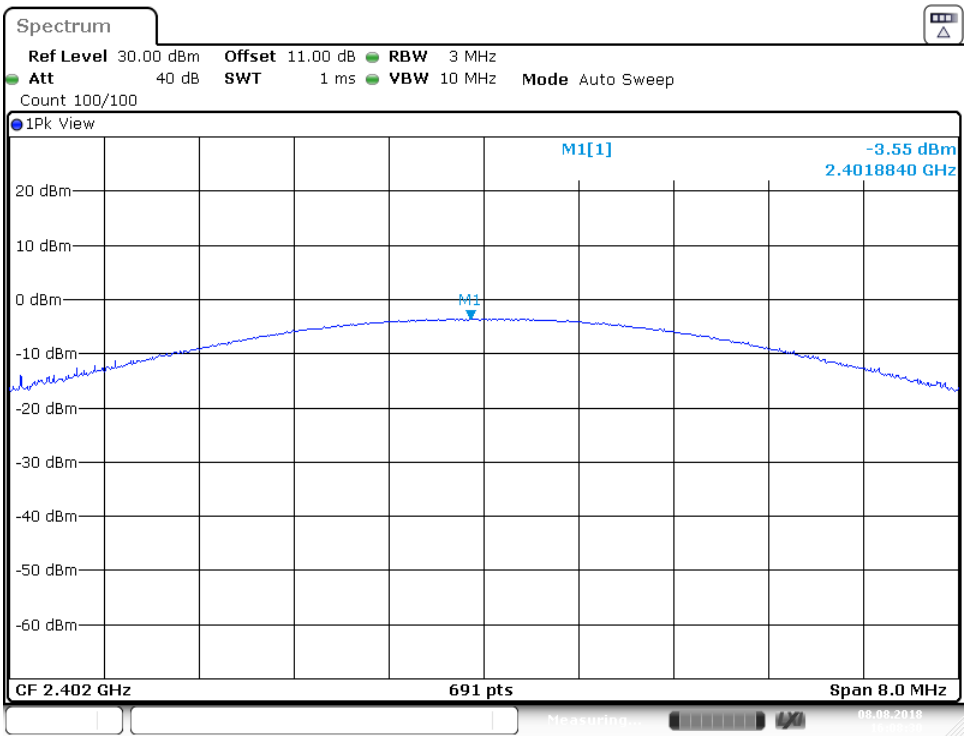
Conducted peak output power

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-3.55	Pass
Middle channel 2441MHz	-4.14	Pass
High channel 2480MHz	-4.65	Pass

Low channel 2402MHz



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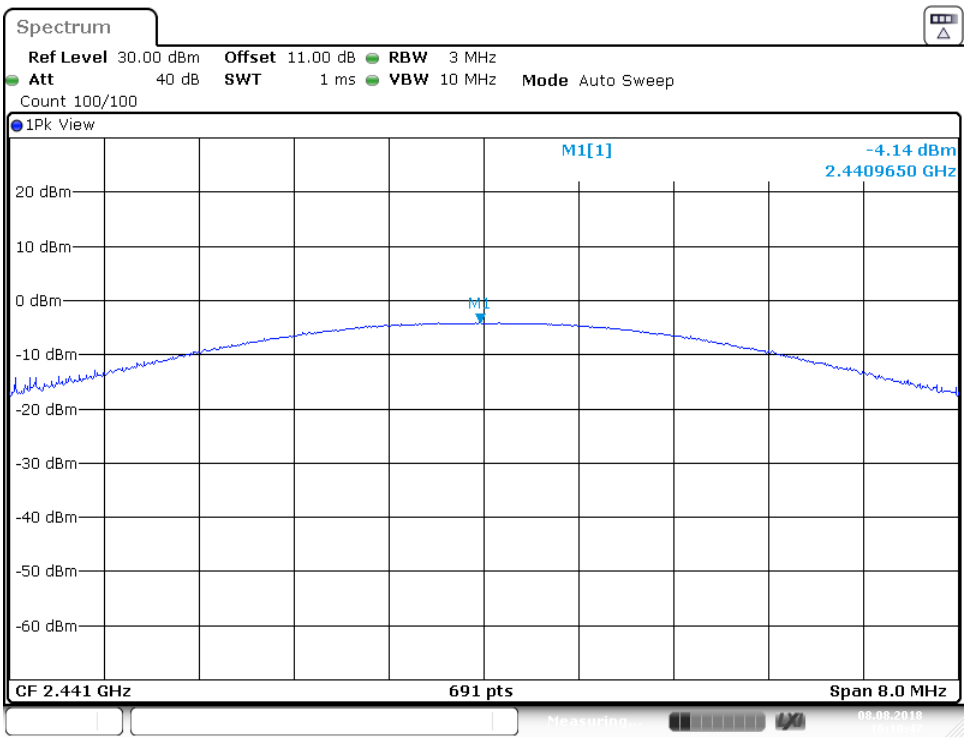
Middle channel 2441MHz



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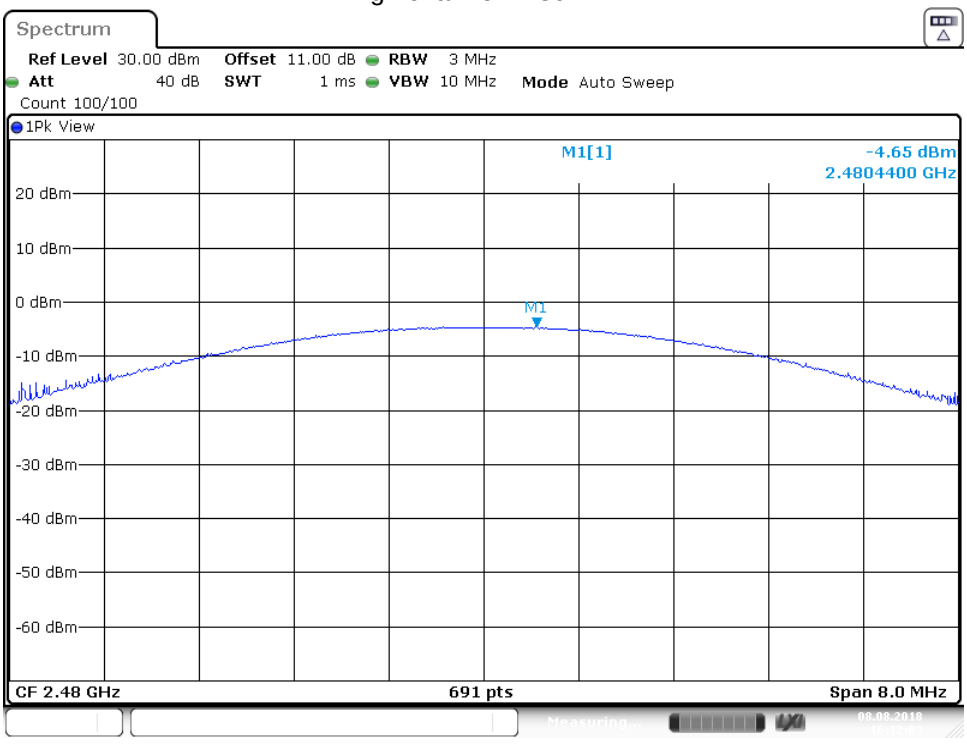
High channel 2480MHz



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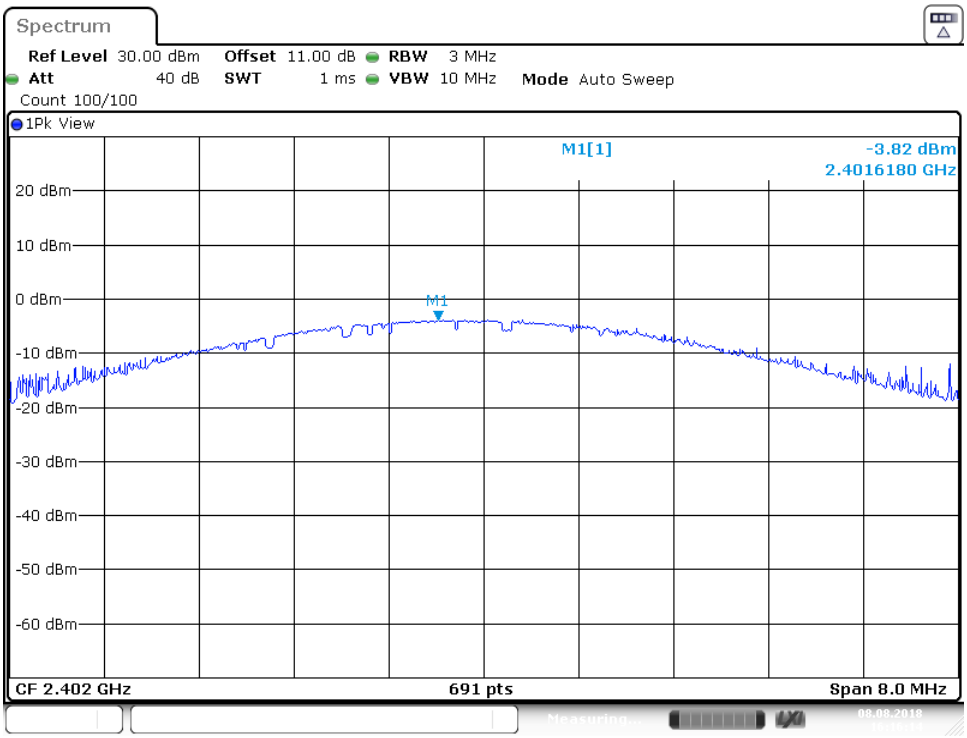
Bluetooth Mode π/4-DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-3.82	Pass
Middle channel 2441MHz	-4.40	Pass
High channel 2480MHz	-4.90	Pass

Low channel 2402MHz



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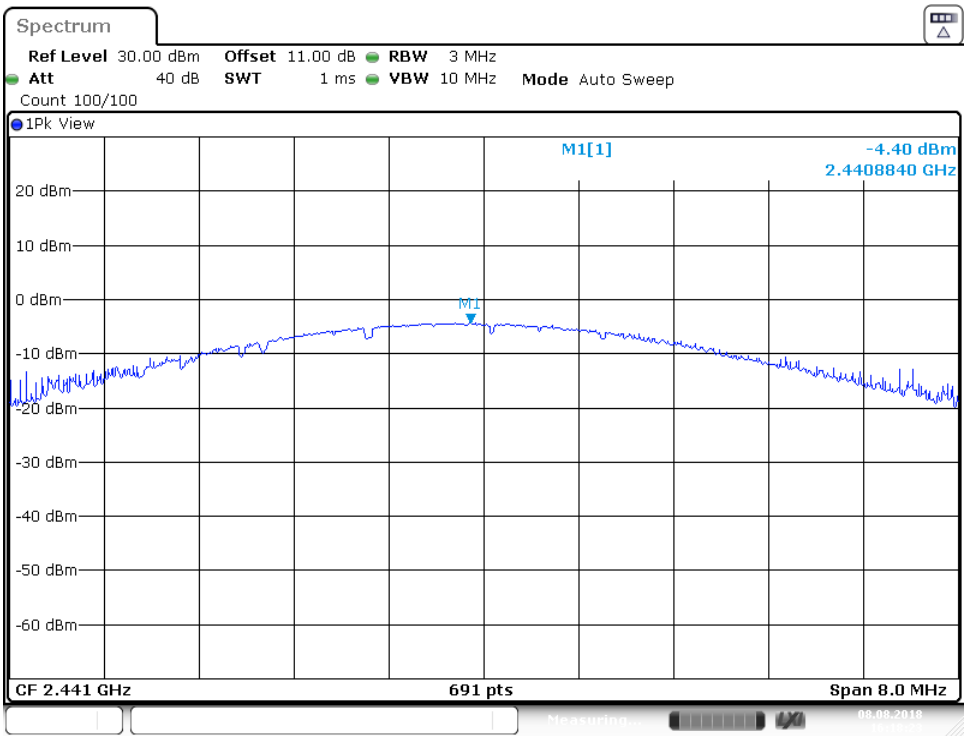
Middle channel 2441MHz



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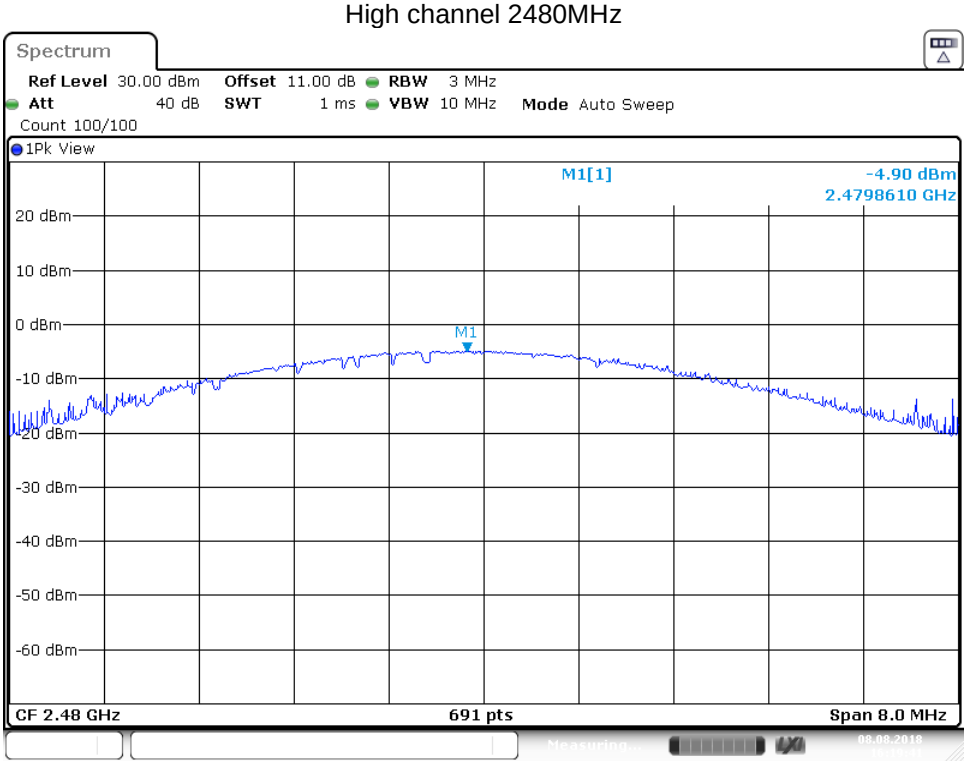
High channel 2480MHz



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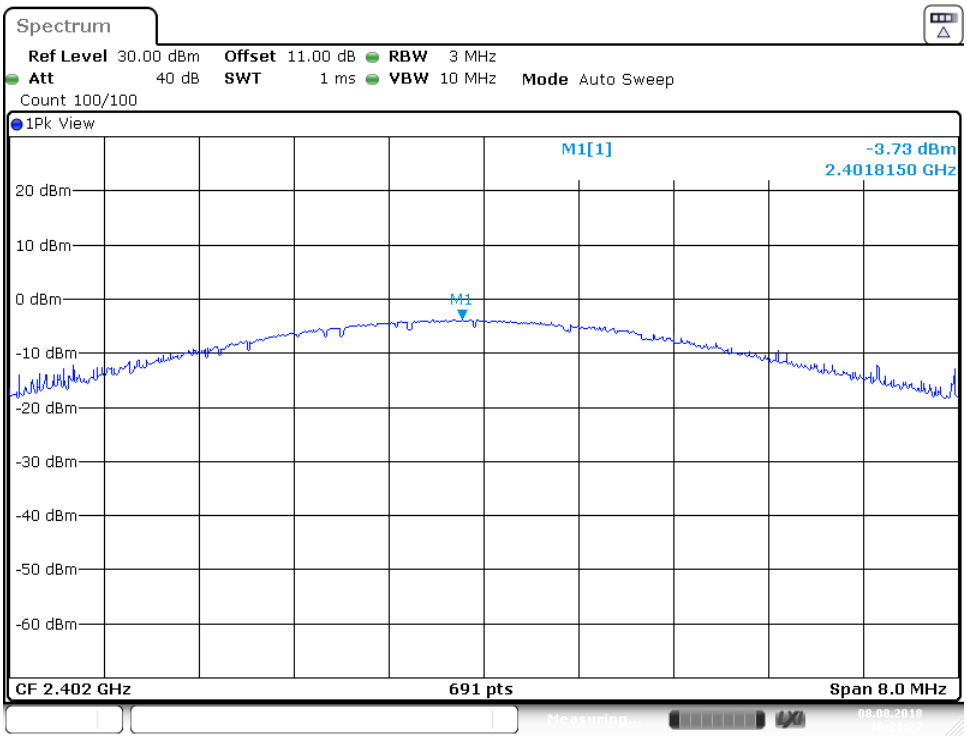
Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-3.73	Pass
Middle channel 2441MHz	-4.41	Pass
High channel 2480MHz	-4.90	Pass

Low channel 2402MHz



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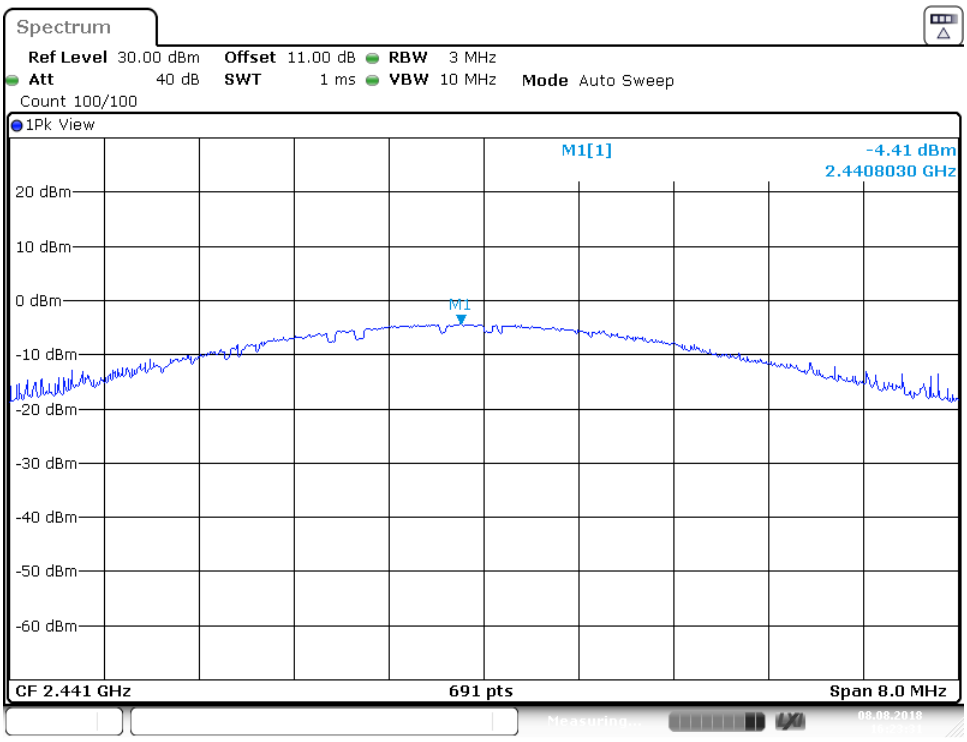
Middle channel 2441MHz



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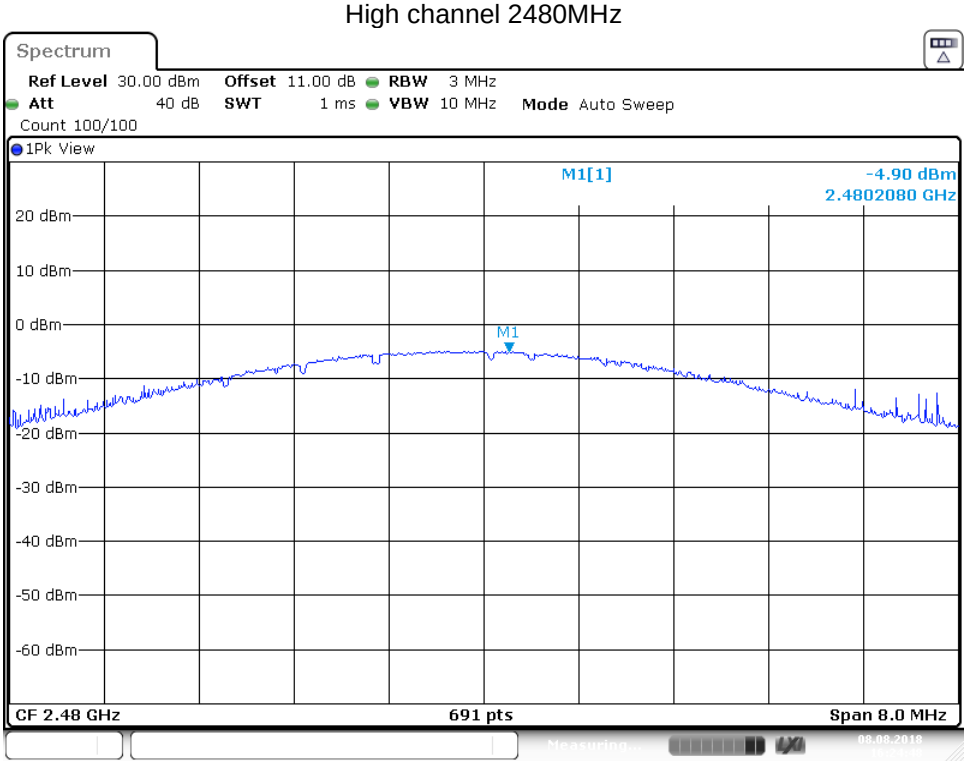
High channel 2480MHz



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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

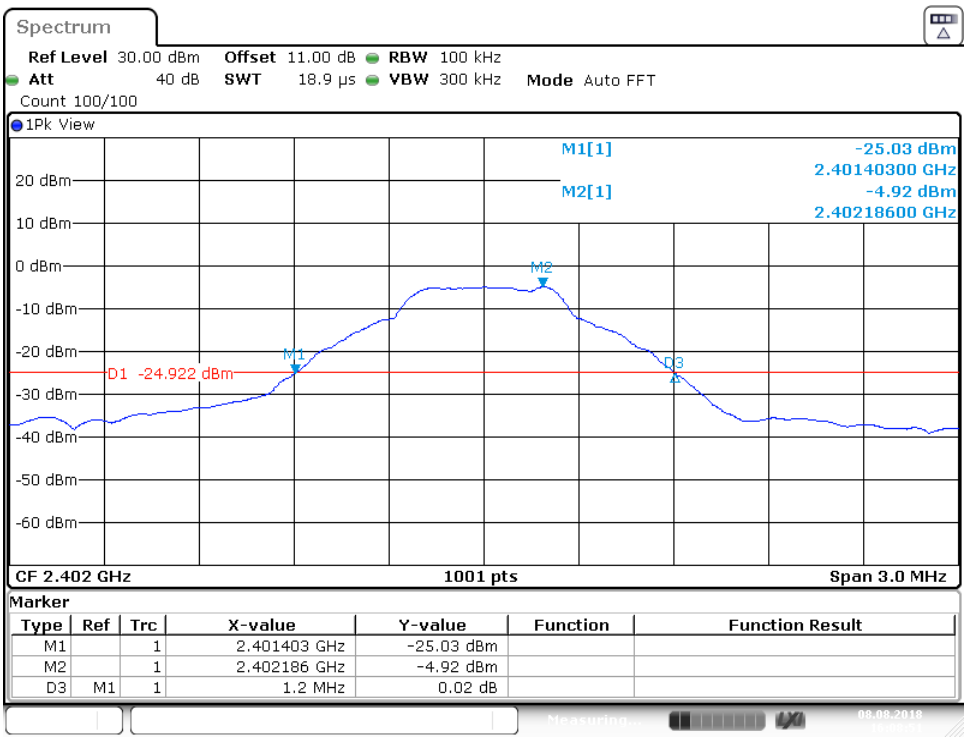
Limit [kHz]
N/A

20 dB bandwidth

Bluetooth Mode GFSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	Limit kHz	Result
2402	1200	--	Pass
2441	1206	--	Pass
2480	1215	--	Pass

Low channel 2402MHz



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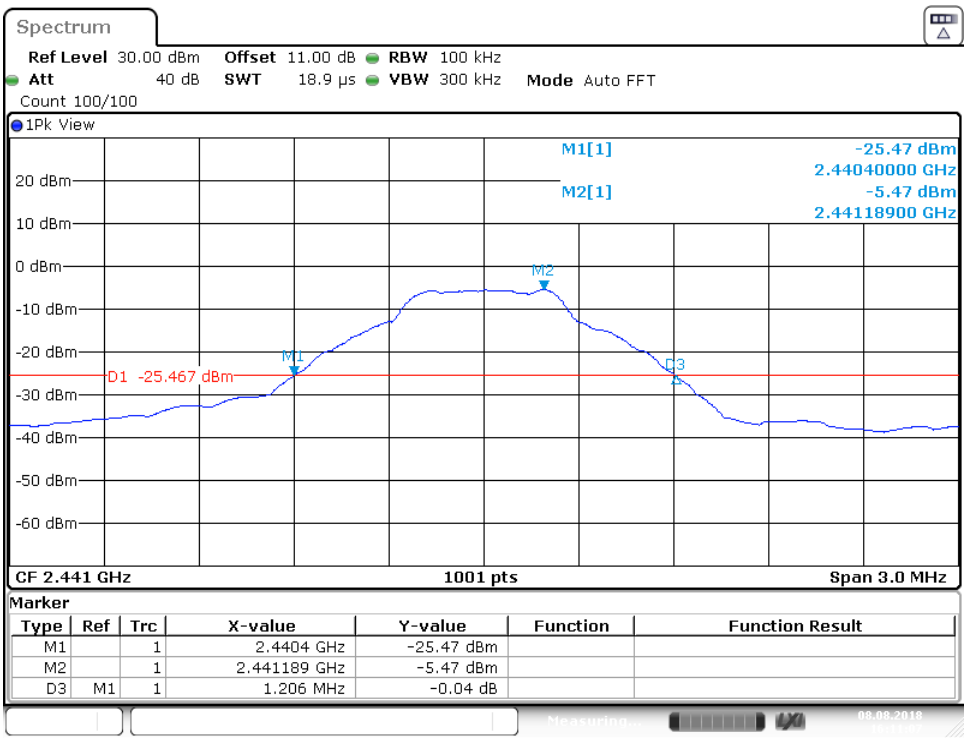
Middle channel 2441MHz



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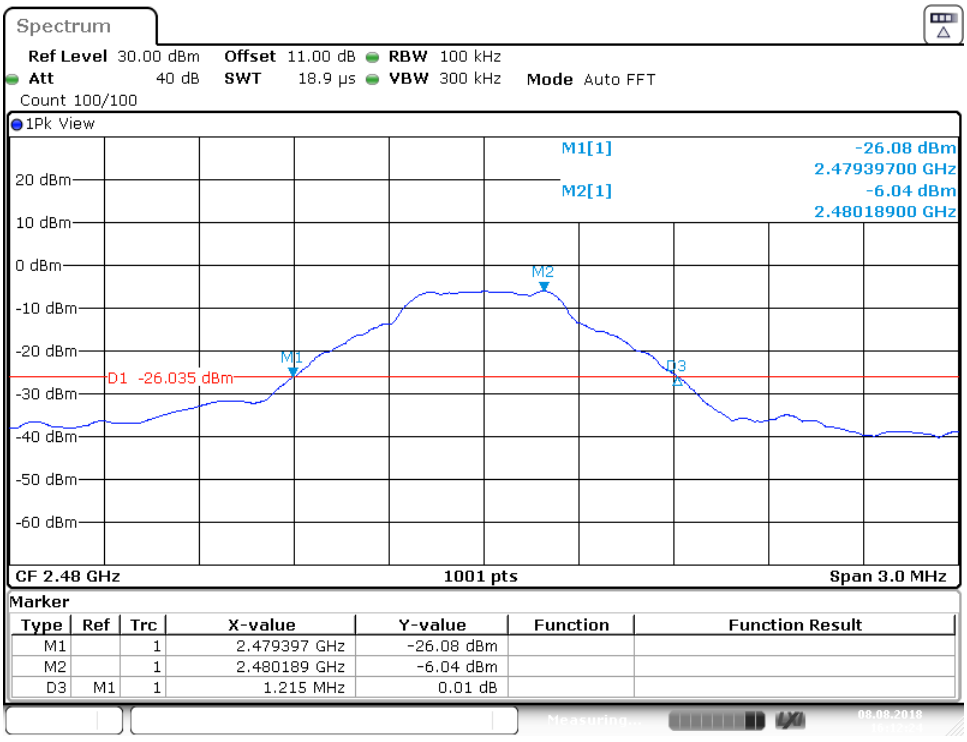
High channel 2480MHz



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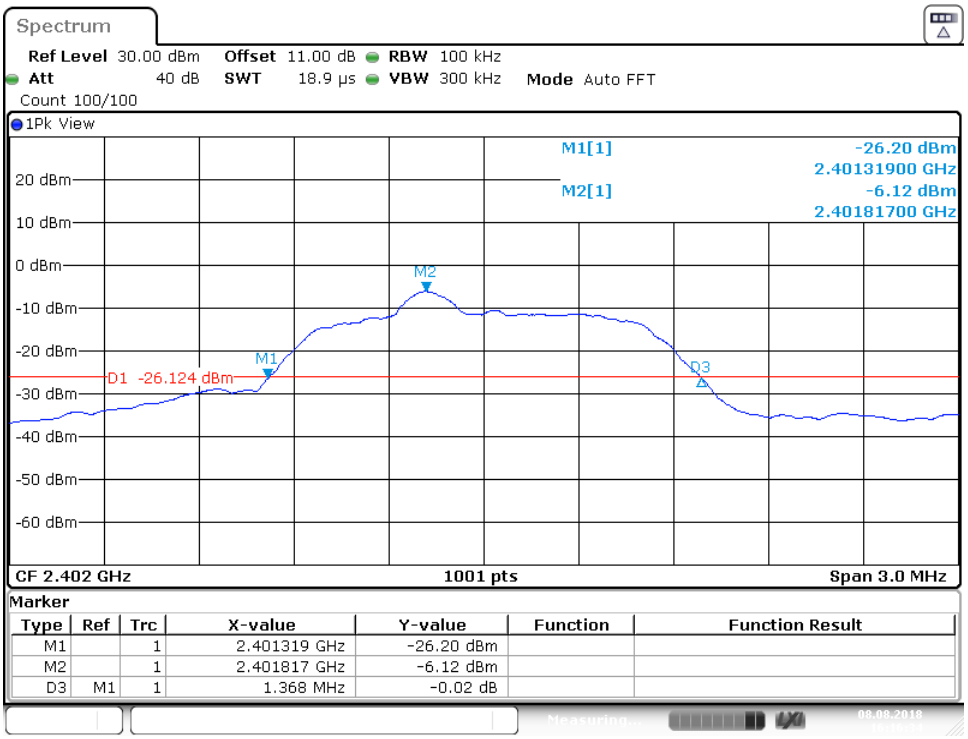
20 dB bandwidth

Bluetooth Mode π/4-DQPSK Modulation test result

Frequency	20 dB Bandwidth	Limit	Result
MHz	kHz	kHz	
2402	1368	--	Pass
2441	1365	--	Pass
2480	1362	--	Pass

Low channel 2402MHz



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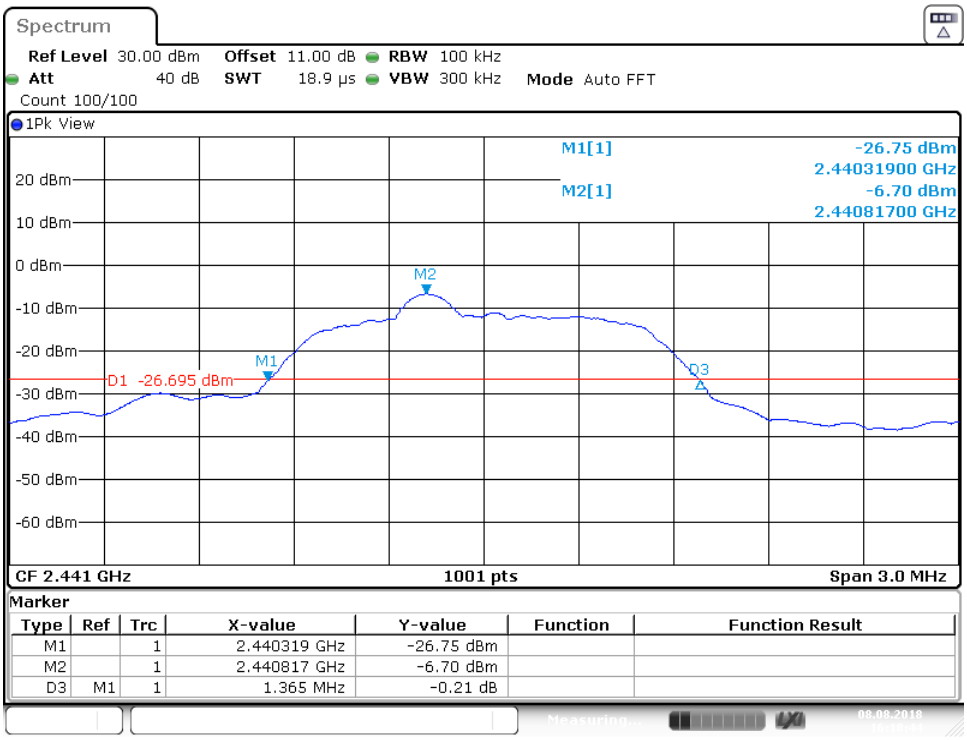
Middle channel 2441MHz



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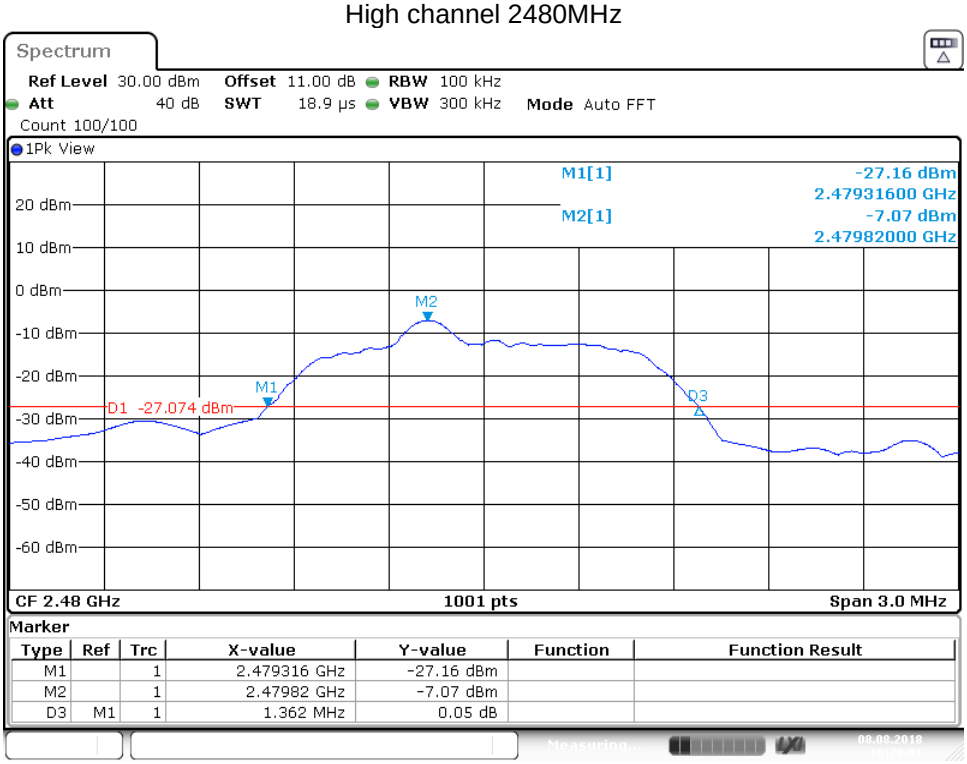
High channel 2480MHz



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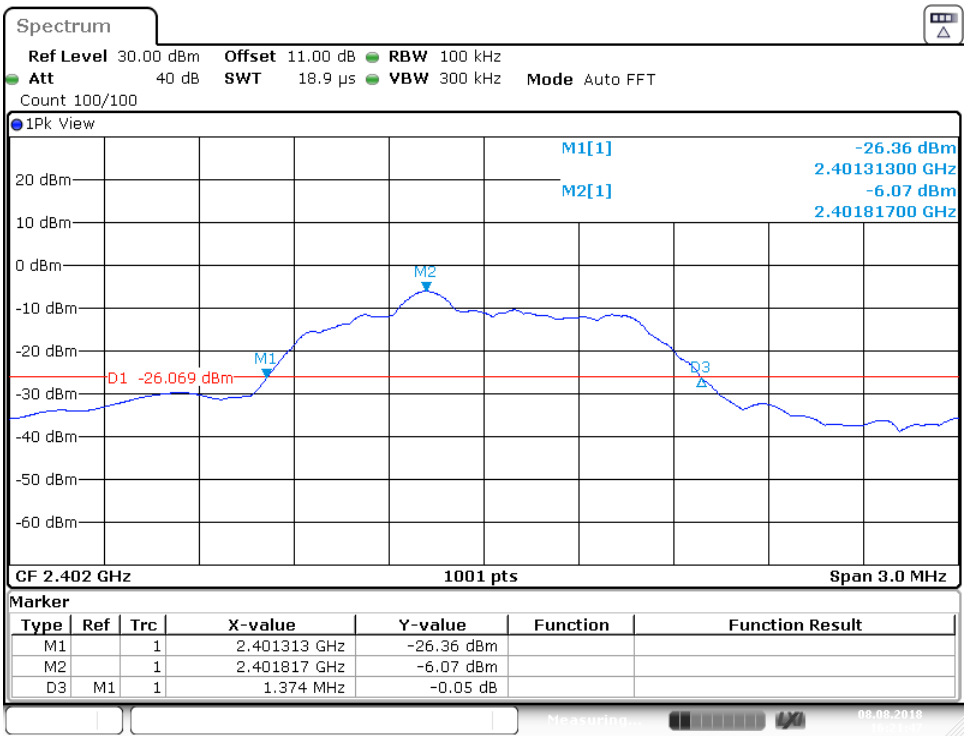
20 dB bandwidth

Bluetooth Mode 8DPSK Modulation test result

Frequency MHz	20 dB Bandwidth kHz	Limit kHz	Result
2402	1374	--	Pass
2441	1410	--	Pass
2480	1359	--	Pass

Low channel 2402MHz



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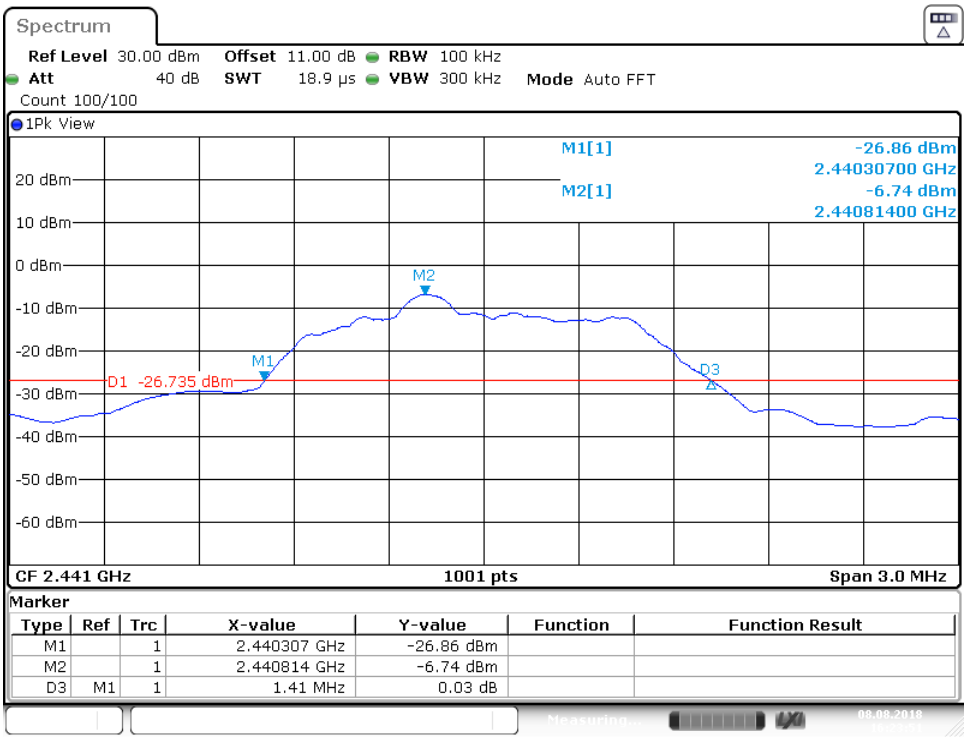
Middle channel 2441MHz



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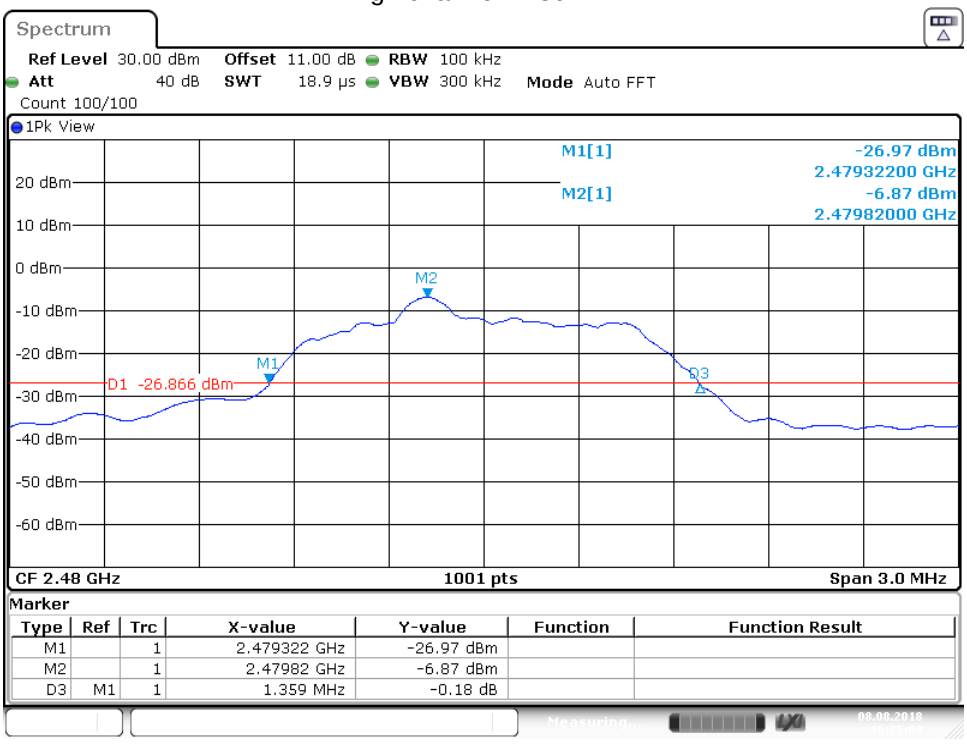
High channel 2480MHz



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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	631
2441	633.9
2480	633.9

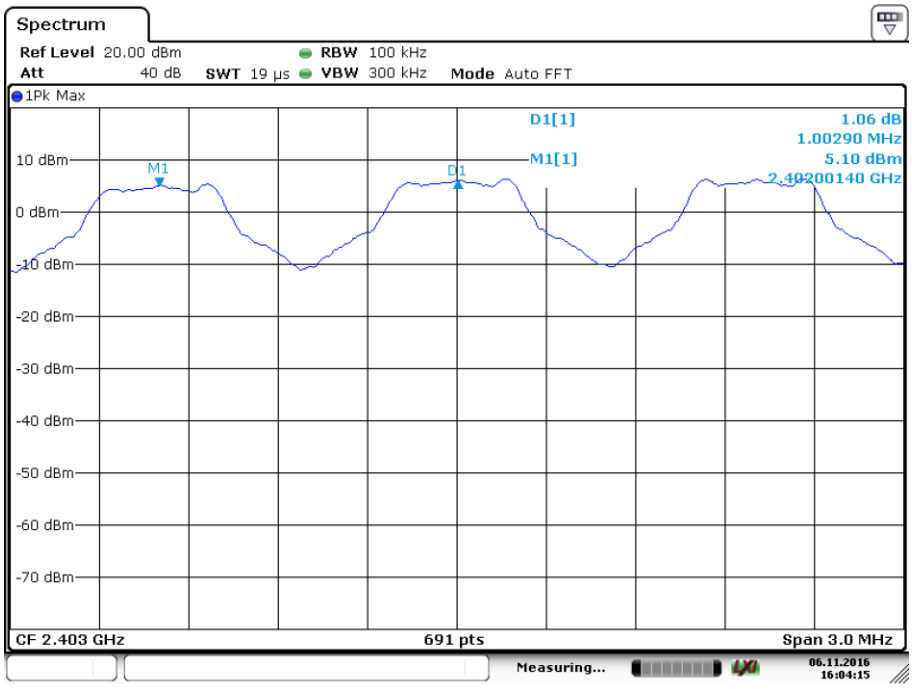
Carrier Frequency Separation

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	1002.9	Pass
2441	1002.9	Pass
2480	1002.9	Pass

Low channel 2402MHz



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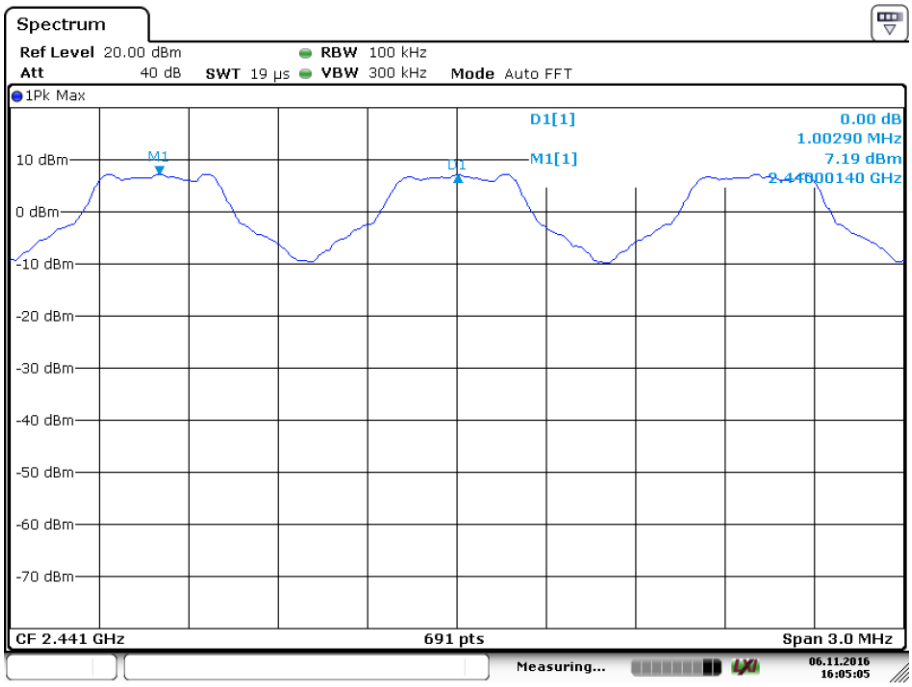
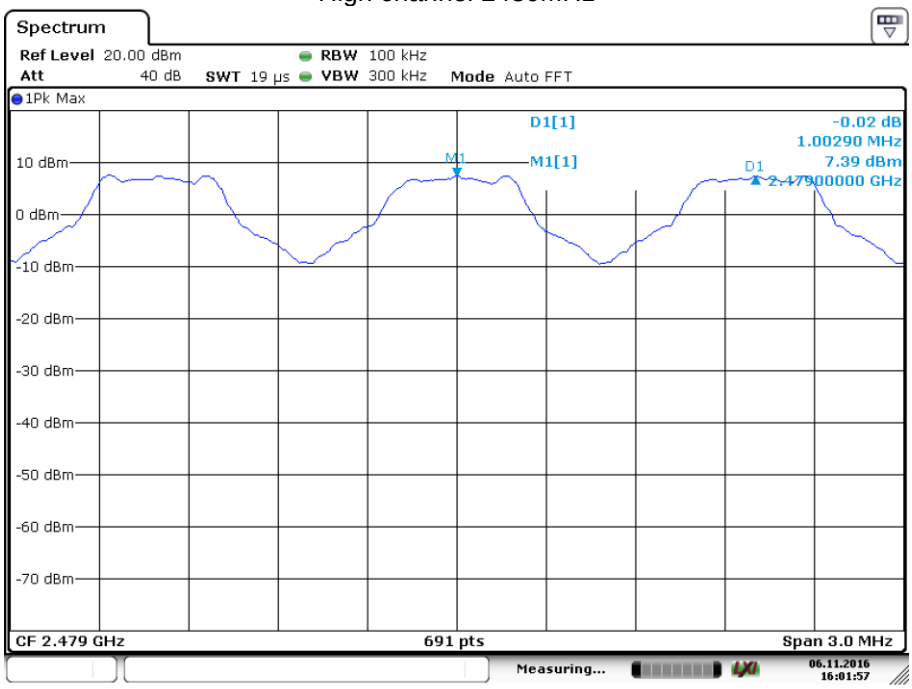
Middle channel 2441MHz



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.

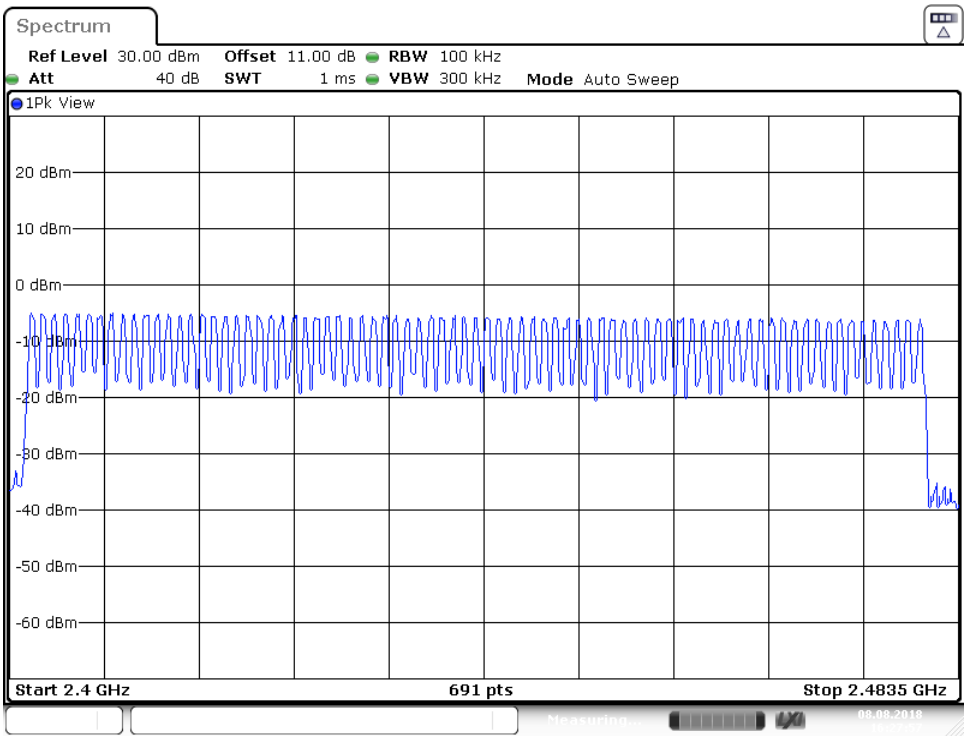
Limit

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];

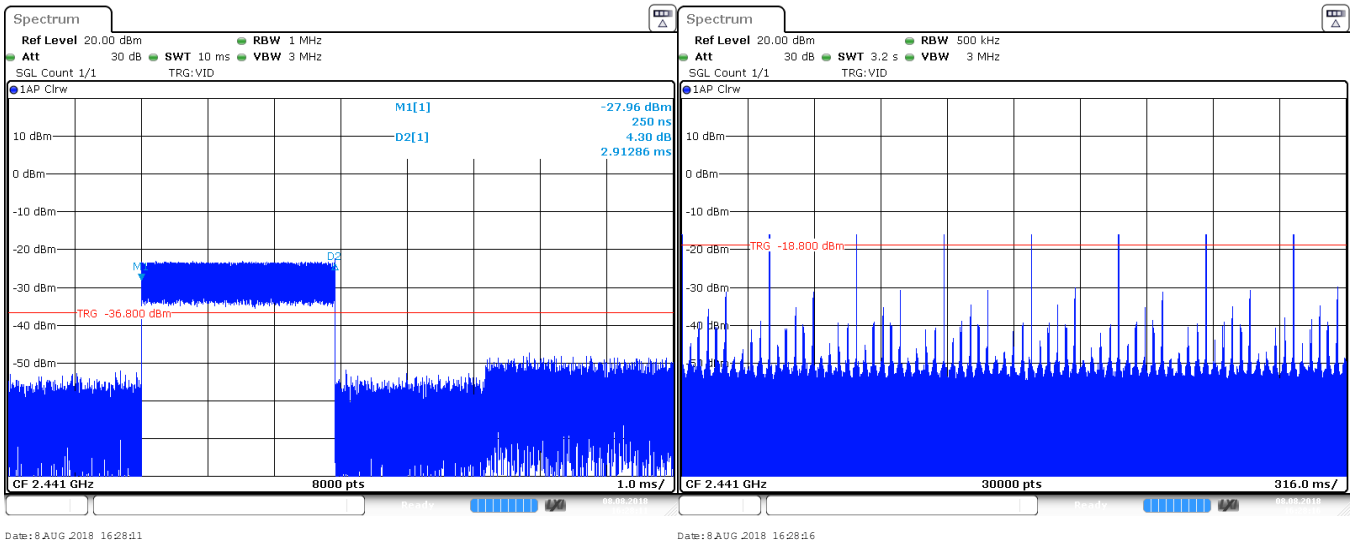
The burst width, which is directly measured, refers to the duration on one channel hop.

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

Test Result

Modulation	Mode	Reading (ms)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	2.91	80	233	< 400	Pass
π/4-DQPSK	2DH5	2.93	80	234	< 400	Pass
8-DPSK	3DH5	2.91	80	233	< 400	Pass

GFSK Modulation



DH5

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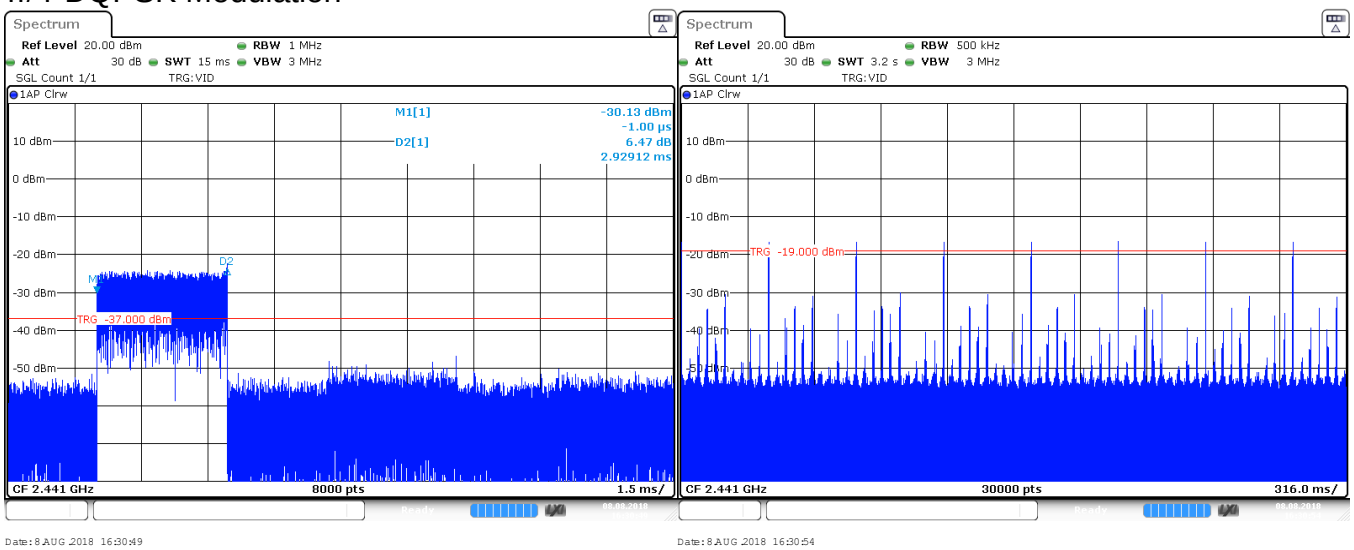
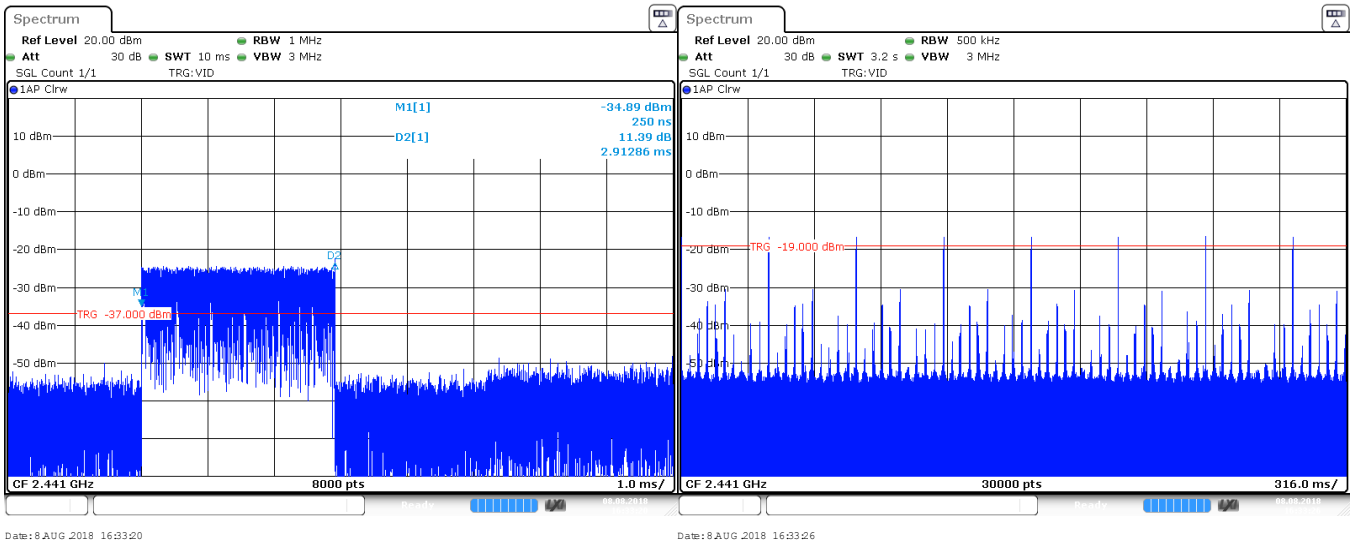
π/4-DQPSK Modulation



2DH5

8-DPSK Modulation



3DH5

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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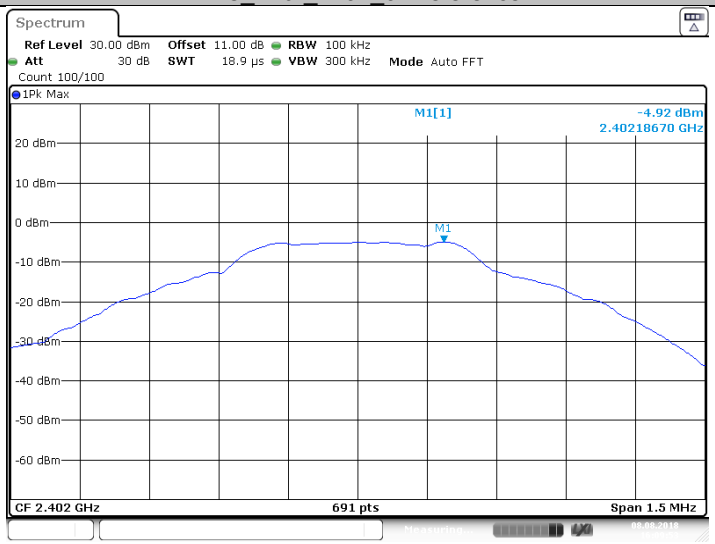
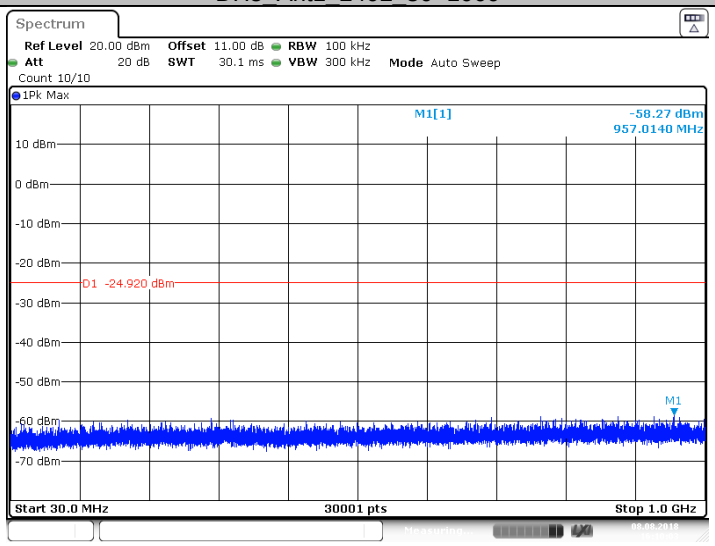
Spurious RF conducted emissions

TestMode	Antenna	Channel	FreqRange	RefLevel	Result	Limit	Verdict
DH5	Ant1	2402	Reference	-4.92	-4.92	---	PASS
		2402	30~1000	-4.92	-58.27	-24.92	PASS
		2402	1000~26500	-4.92	-42.12	-24.92	PASS
		2441	Reference	-5.47	-5.47	---	PASS
		2441	30~1000	-5.47	-58.87	-25.47	PASS
		2441	1000~26500	-5.47	-41.66	-25.47	PASS
		2480	Reference	-6.08	-6.08	---	PASS
		2480	30~1000	-6.08	-59.19	-26.08	PASS
		2480	1000~26500	-6.08	-40.06	-26.08	PASS
2DH5	Ant1	2402	Reference	-6.28	-6.28	---	PASS
		2402	30~1000	-6.28	-58.79	-26.28	PASS
		2402	1000~26500	-6.28	-41.11	-26.28	PASS
		2441	Reference	-6.94	-6.94	---	PASS
		2441	30~1000	-6.94	-59.02	-26.94	PASS
		2441	1000~26500	-6.94	-41.02	-26.94	PASS
		2480	Reference	-7.25	-7.25	---	PASS
		2480	30~1000	-7.25	-58.9	-27.25	PASS
		2480	1000~26500	-7.25	-40.49	-27.25	PASS
3DH5	Ant1	2402	Reference	-5.99	-5.99	---	PASS
		2402	30~1000	-5.99	-59.04	-25.99	PASS
		2402	1000~26500	-5.99	-39.67	-25.99	PASS
		2441	Reference	-6.70	-6.70	---	PASS
		2441	30~1000	-6.70	-59.07	-26.7	PASS
		2441	1000~26500	-6.70	-41.5	-26.7	PASS
		2480	Reference	-7.27	-7.27	---	PASS
		2480	30~1000	-7.27	-58.4	-27.27	PASS
		2480	1000~26500	-7.27	-40.23	-27.27	PASS

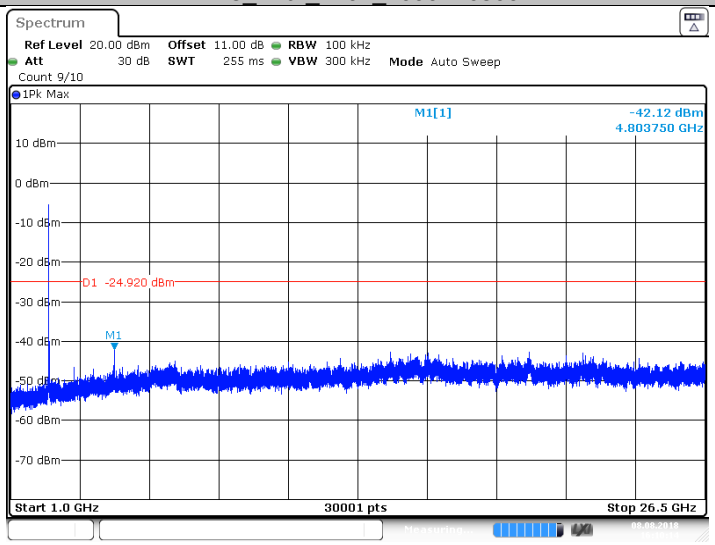
DH5_Ant1_2402_0~Reference



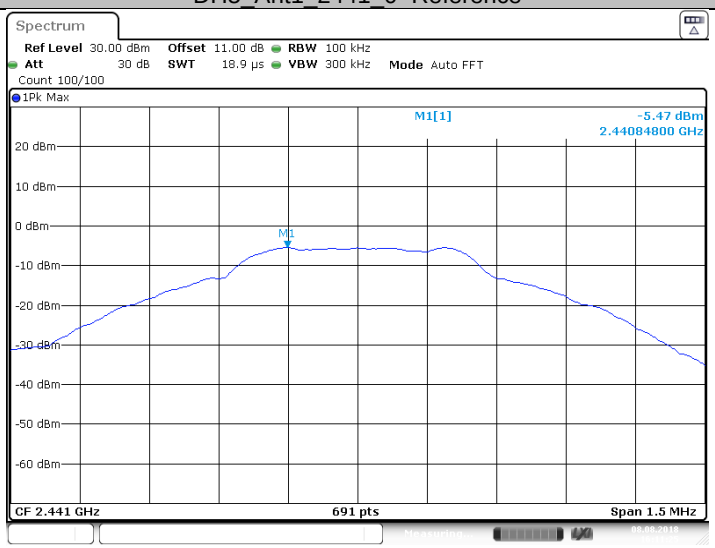
DH5_Ant1_2402_30~1000



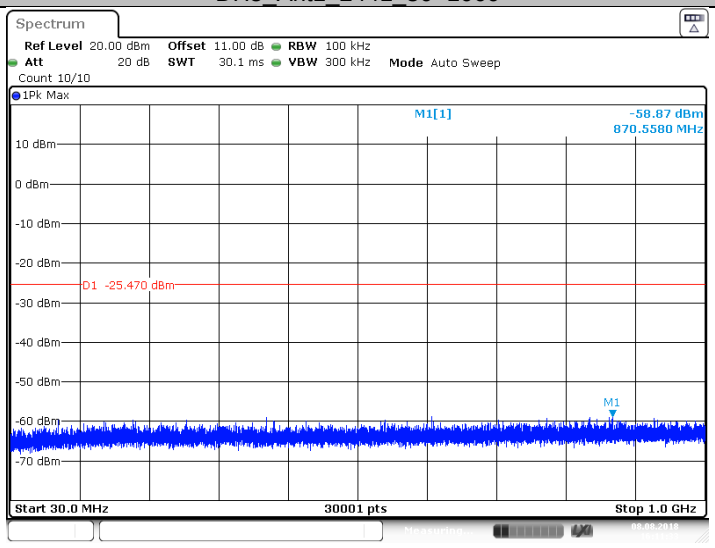
DH5_Ant1_2402_1000~26500



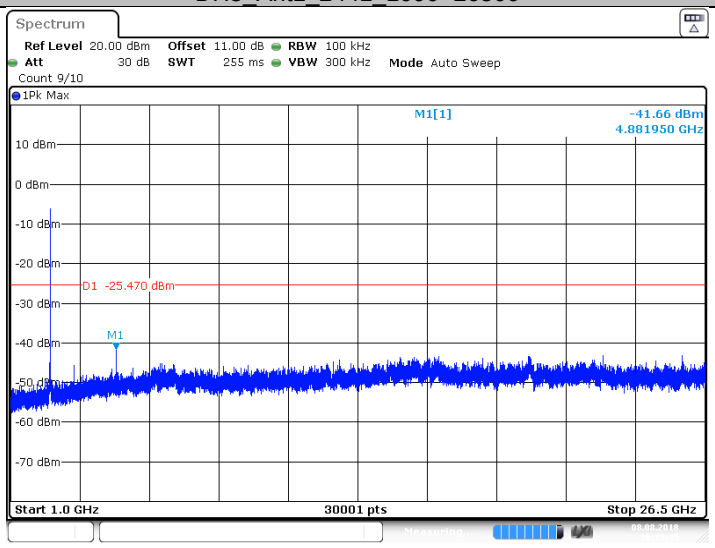
DH5_Ant1_2441_0~Reference



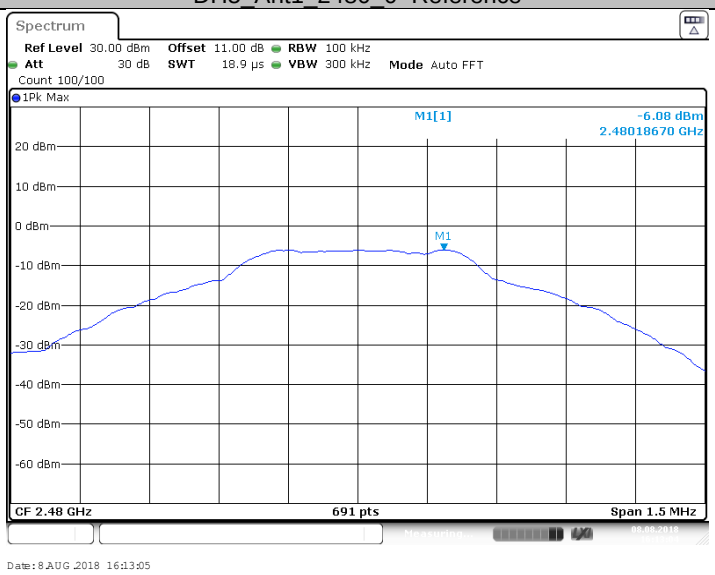
DH5_Ant1_2441_30~1000



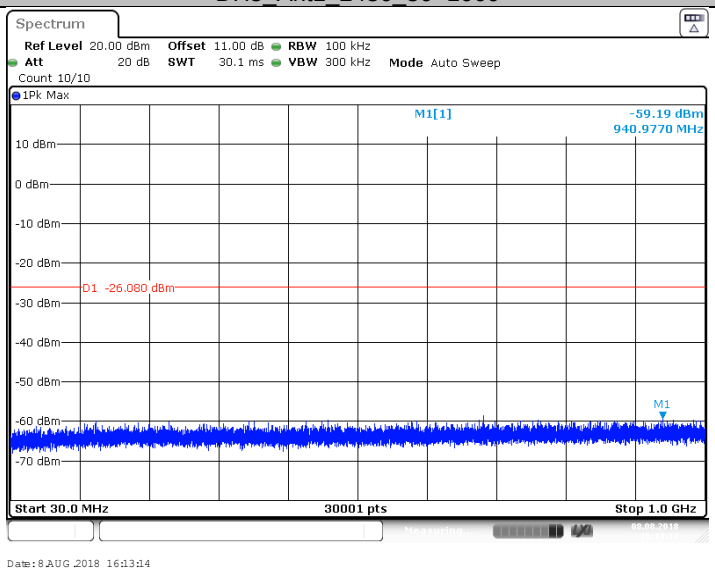
DH5_Ant1_2441_1000~26500



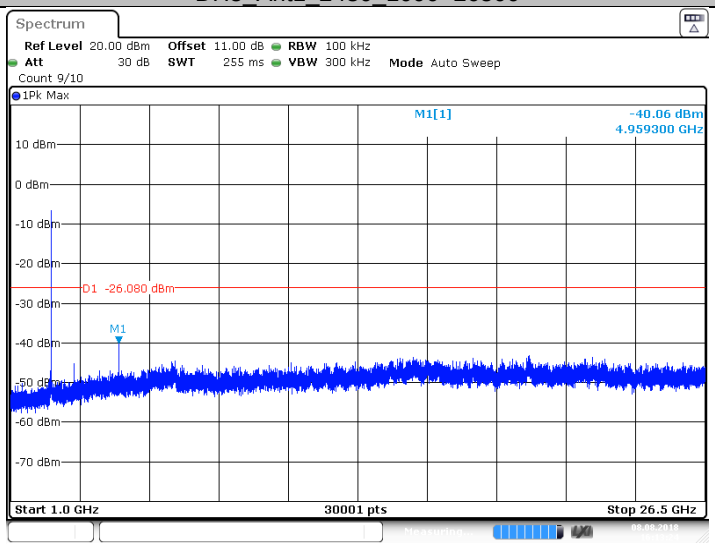
DH5_Ant1_2480_0~Reference



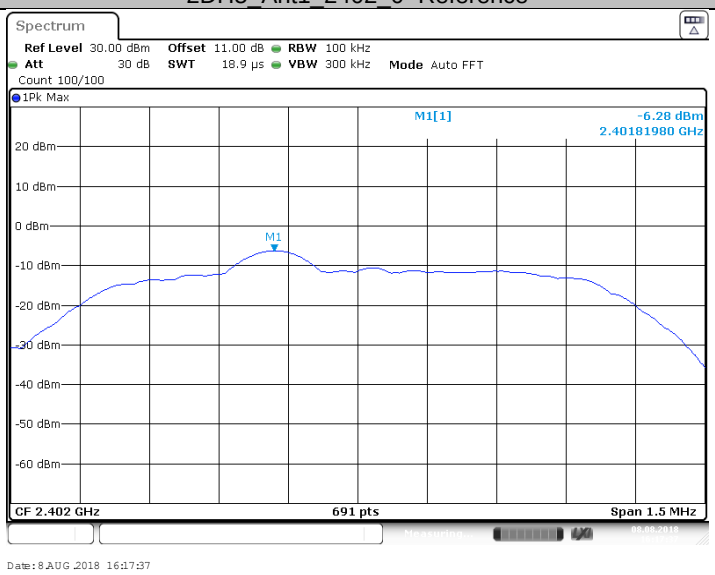
DH5_Ant1_2480_30~1000



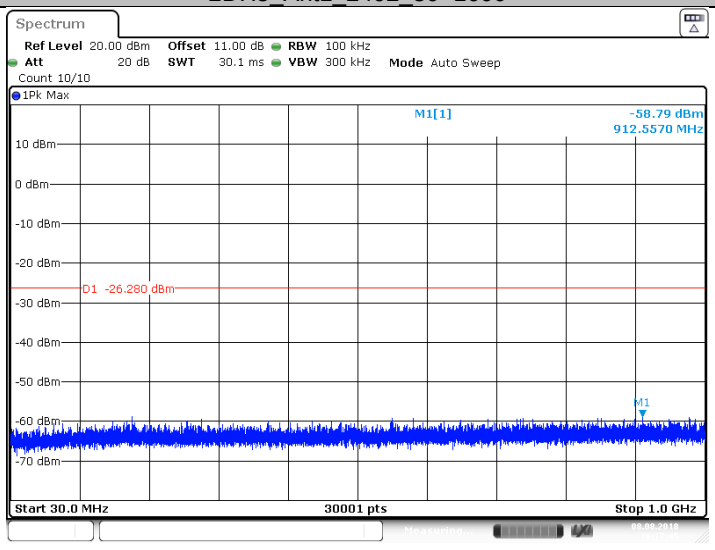
DH5_Ant1_2480_1000~26500



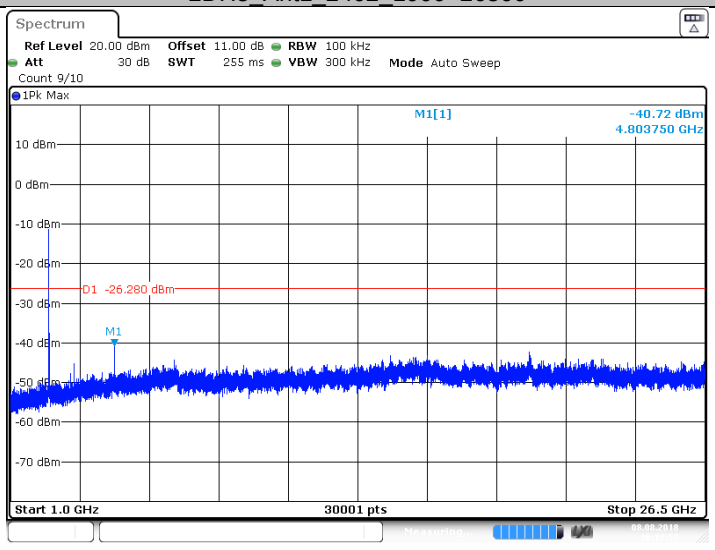
2DH5_Ant1_2402_0~Reference



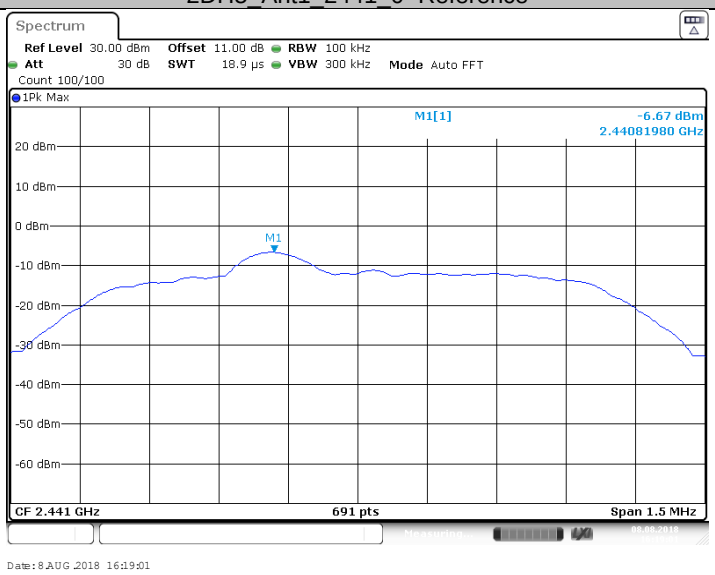
2DH5_Ant1_2402_30~1000



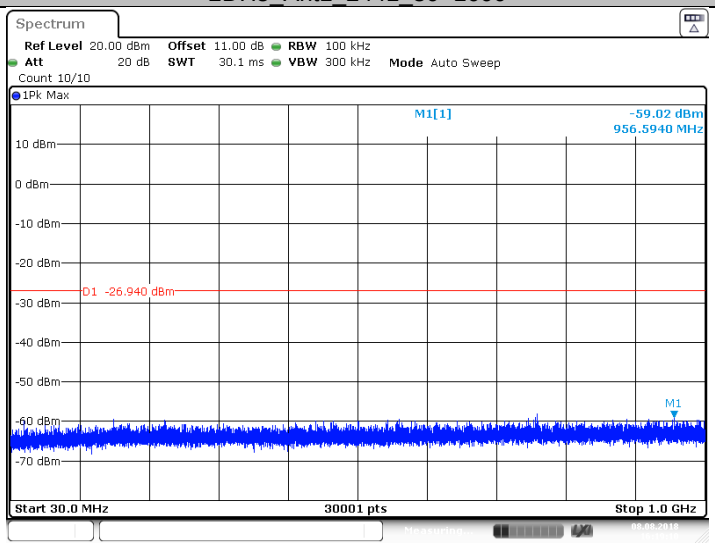
2DH5_Ant1_2402_1000~26500



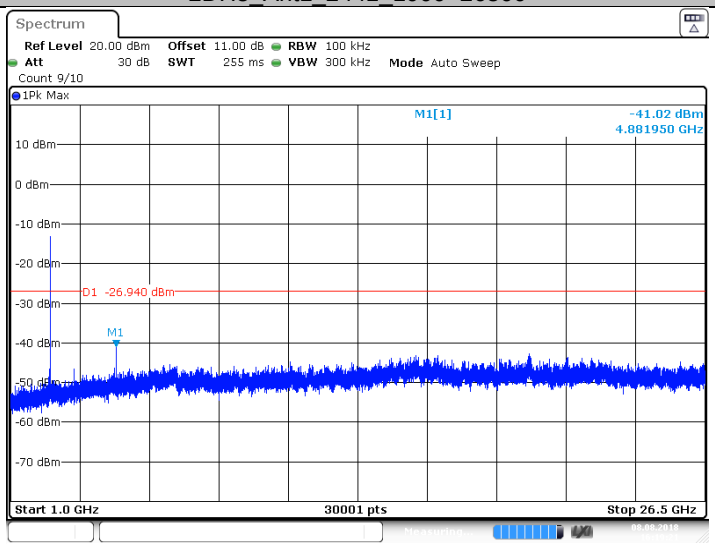
2DH5_Ant1_2441_0~Reference



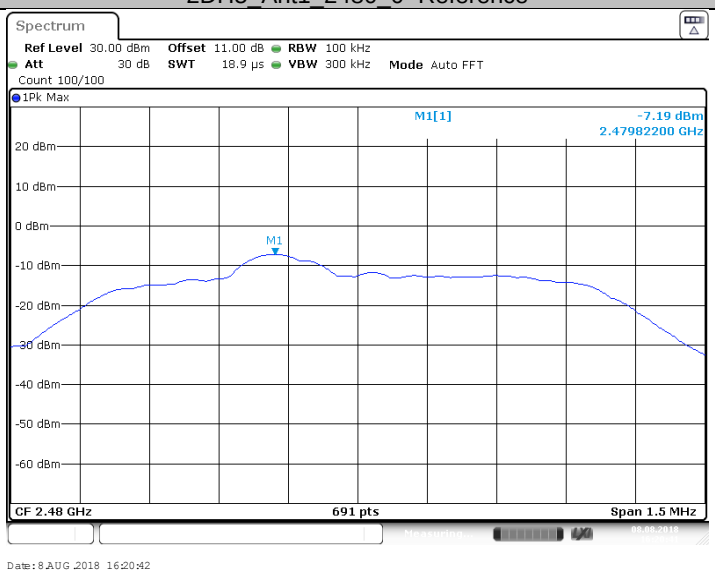
2DH5_Ant1_2441_30~1000



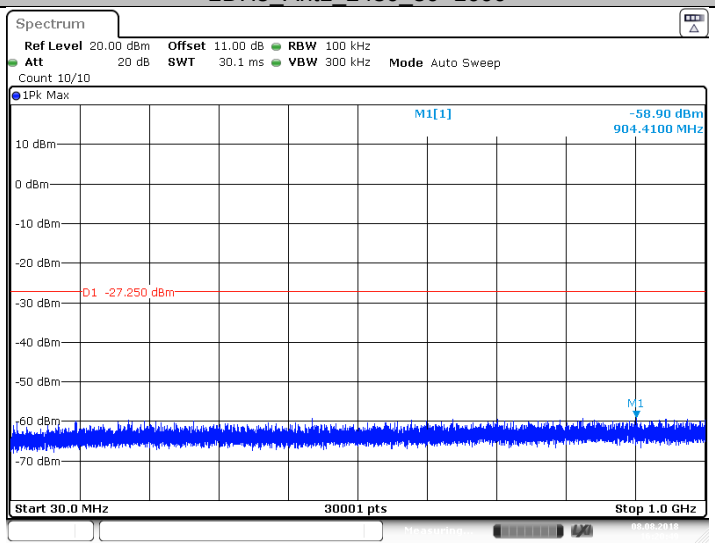
2DH5_Ant1_2441_1000~26500



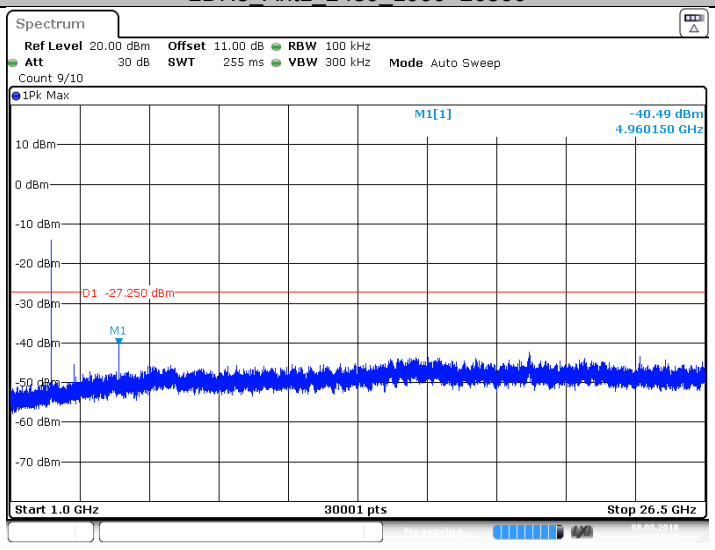
2DH5_Ant1_2480_0~Reference



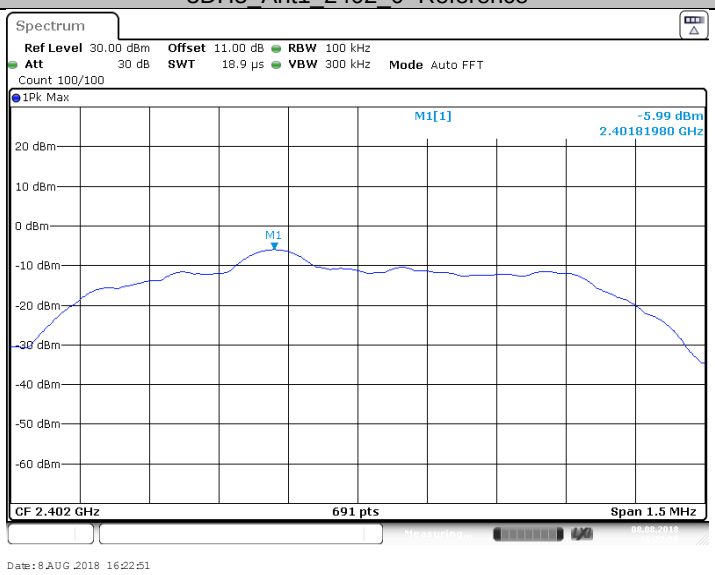
2DH5_Ant1_2480_30~1000



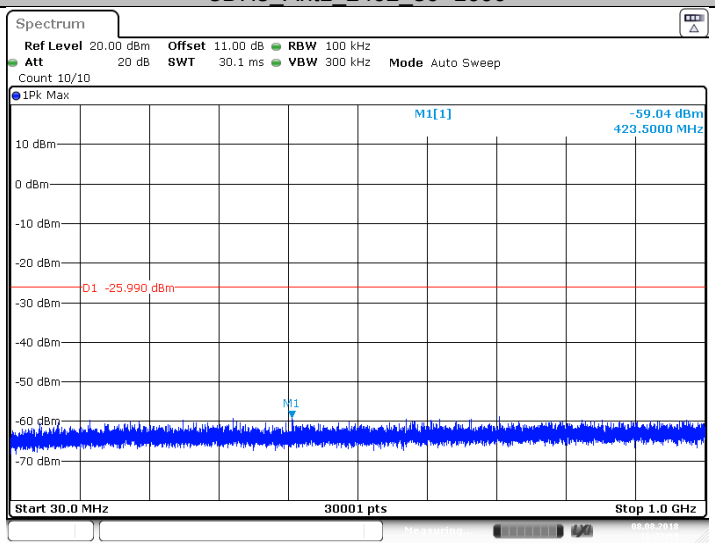
2DH5_Ant1_2480_1000~26500



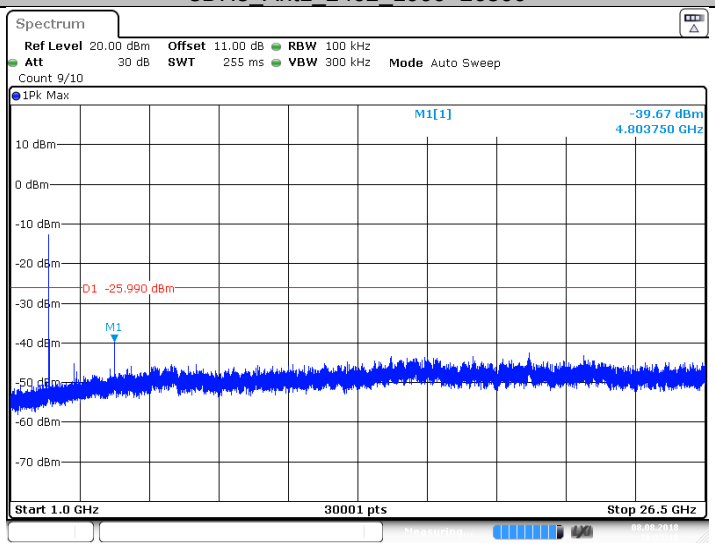
3DH5_Ant1_2402_0~Reference



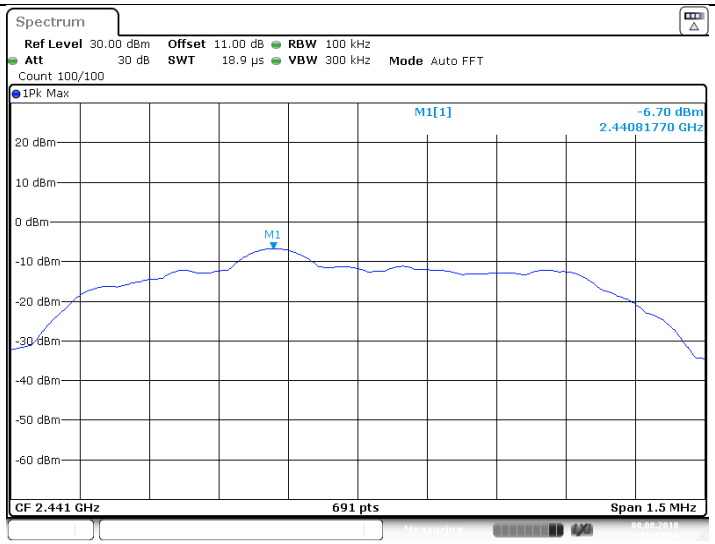
3DH5_Ant1_2402_30~1000



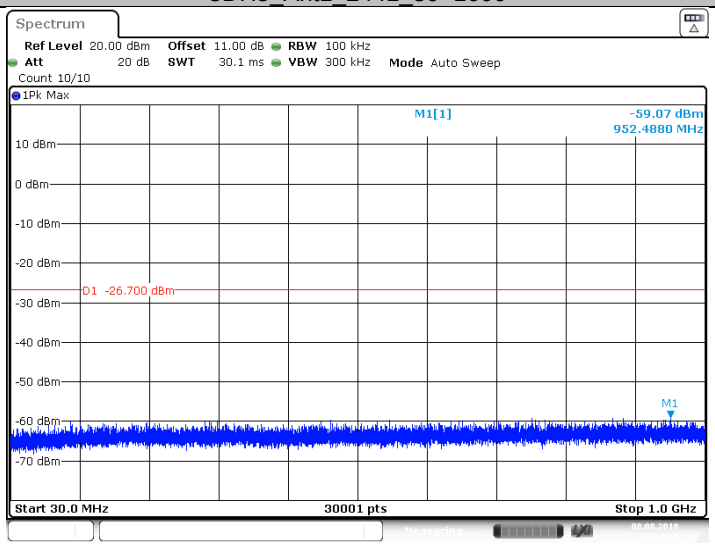
3DH5_Ant1_2402_1000~26500



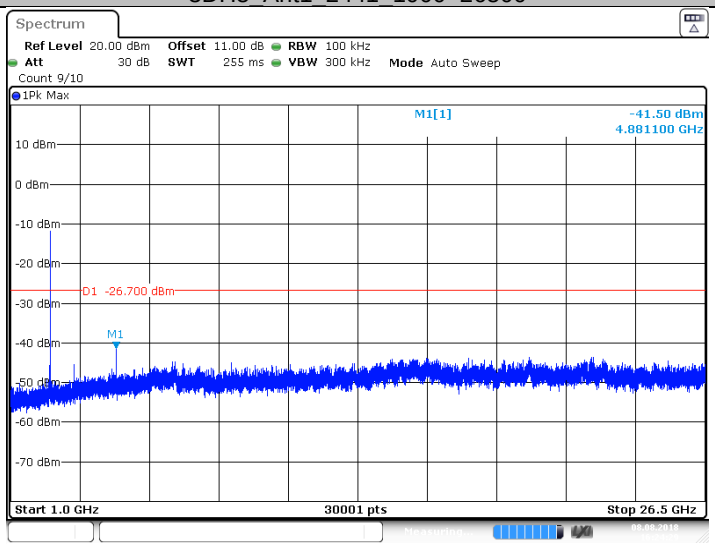
3DH5_Ant1_2441_0~Reference

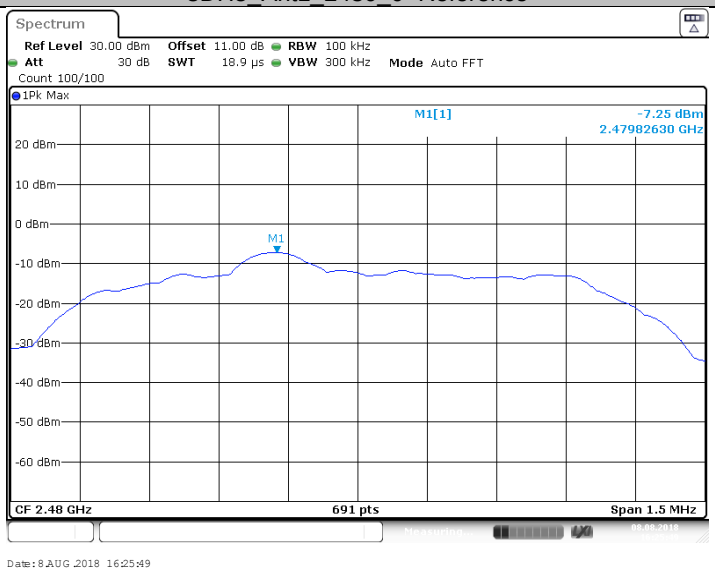


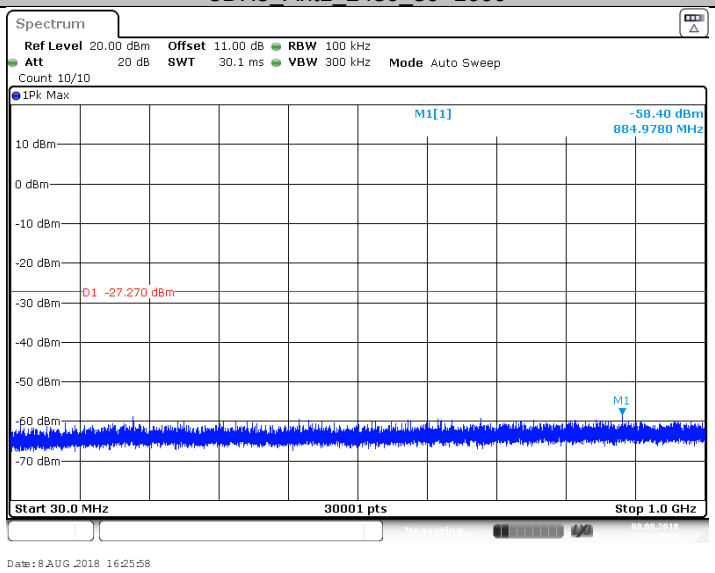
3DH5_Ant1_2441_30~1000

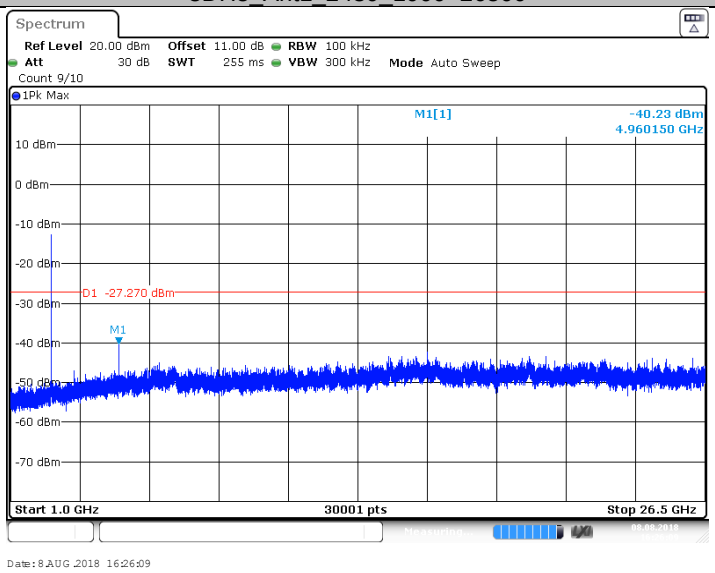


3DH5_Ant1_2441_1000~26500



3DH5_Ant1_2480_0~Reference


3DH5_Ant1_2480_30~1000


3DH5_Ant1_2480_1000~26500


9.8 Band edge testing

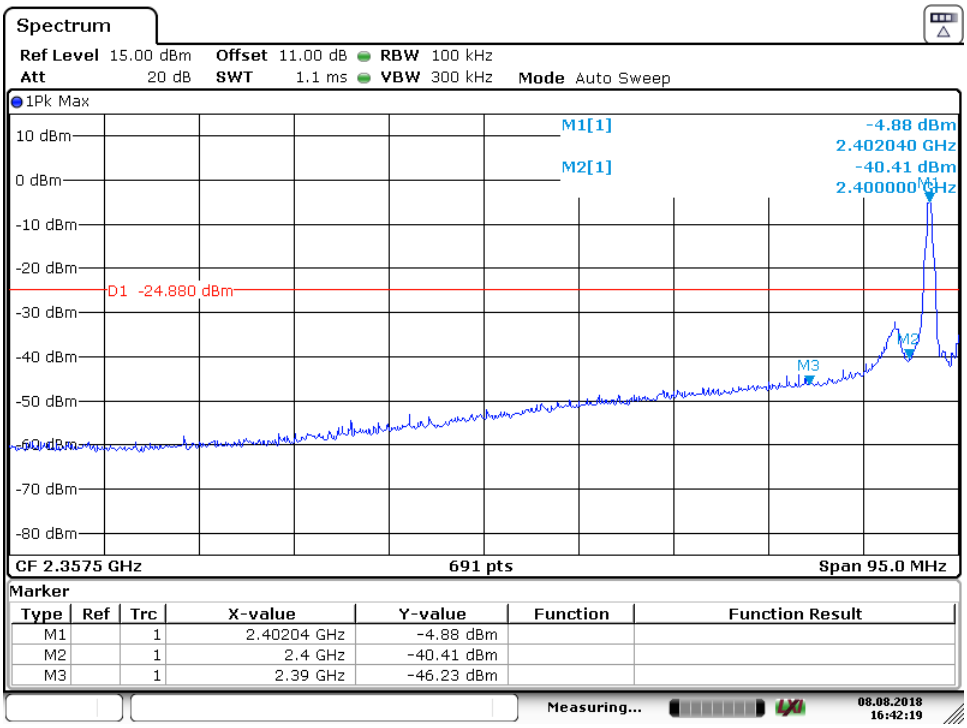
Test Method

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.

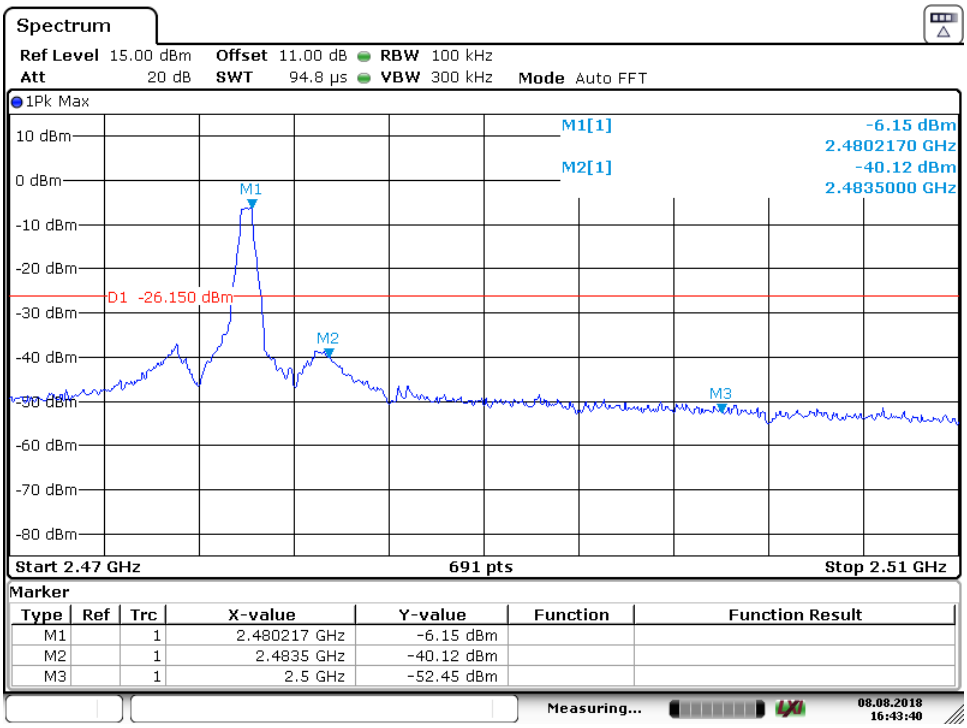
Limit:

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.

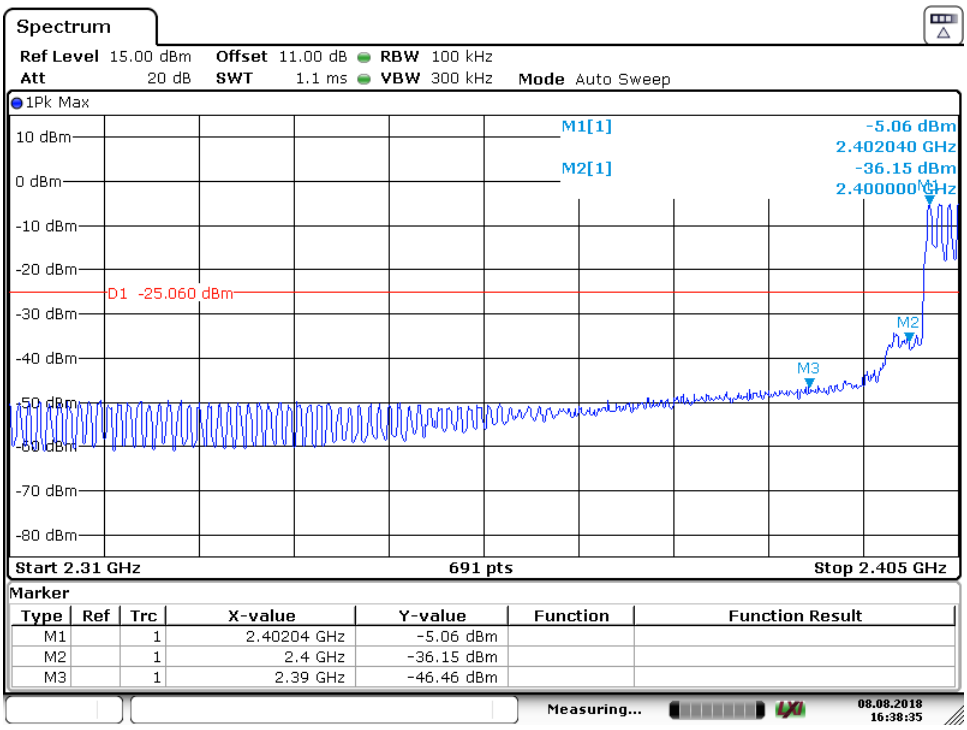
GFSK mode:



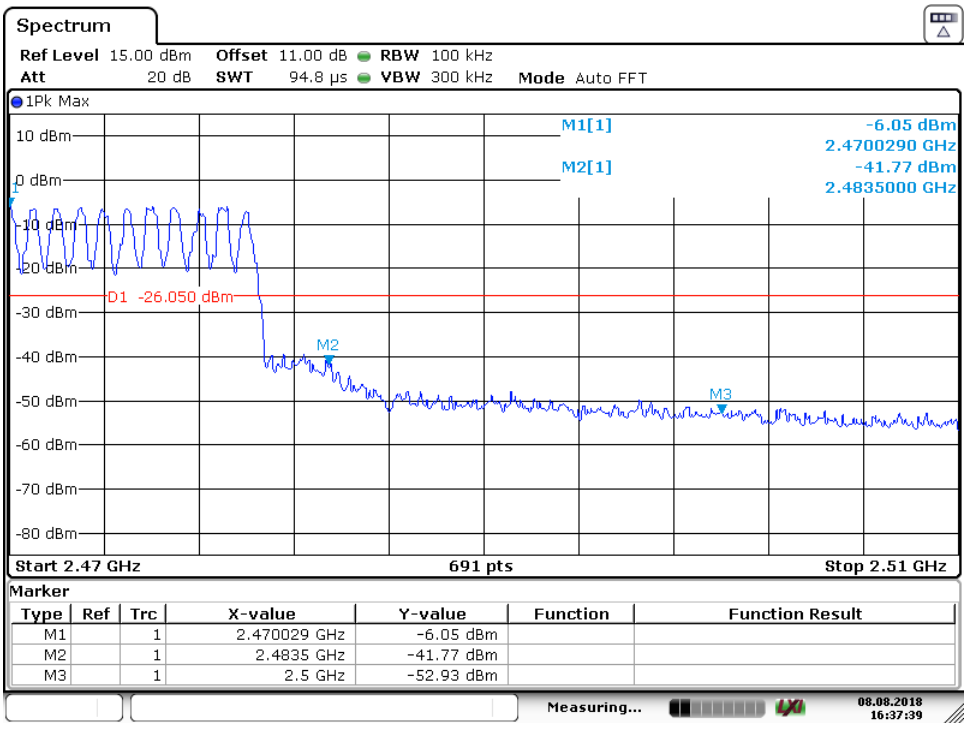
Date: 8.AUG.2018 16:42:20



Date: 8.AUG.2018 16:43:41

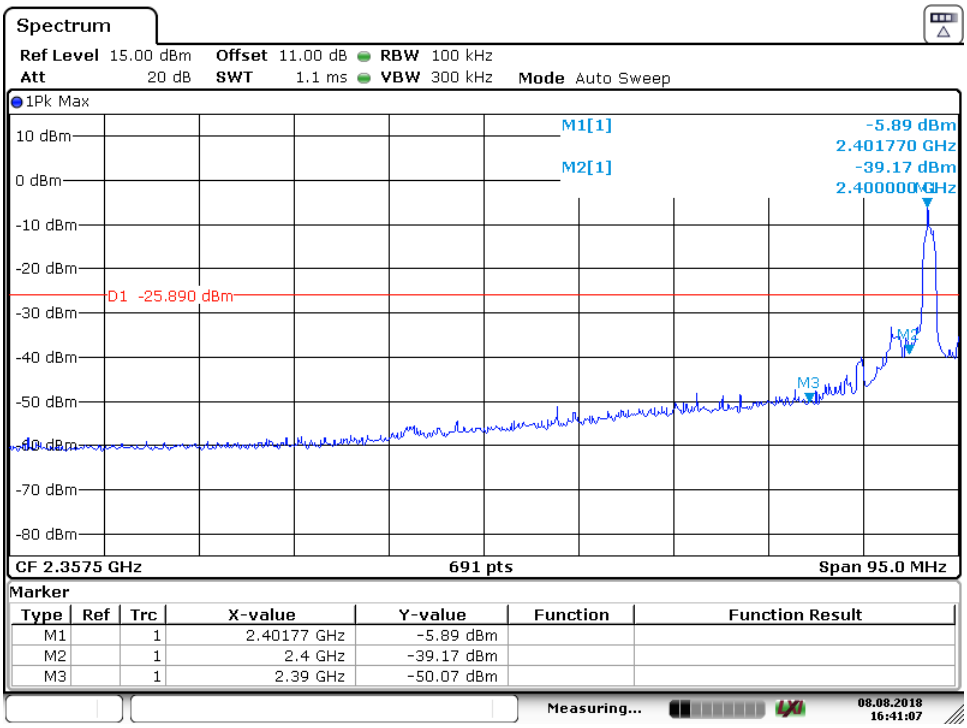


Date: 8.AUG.2018 16:38:35

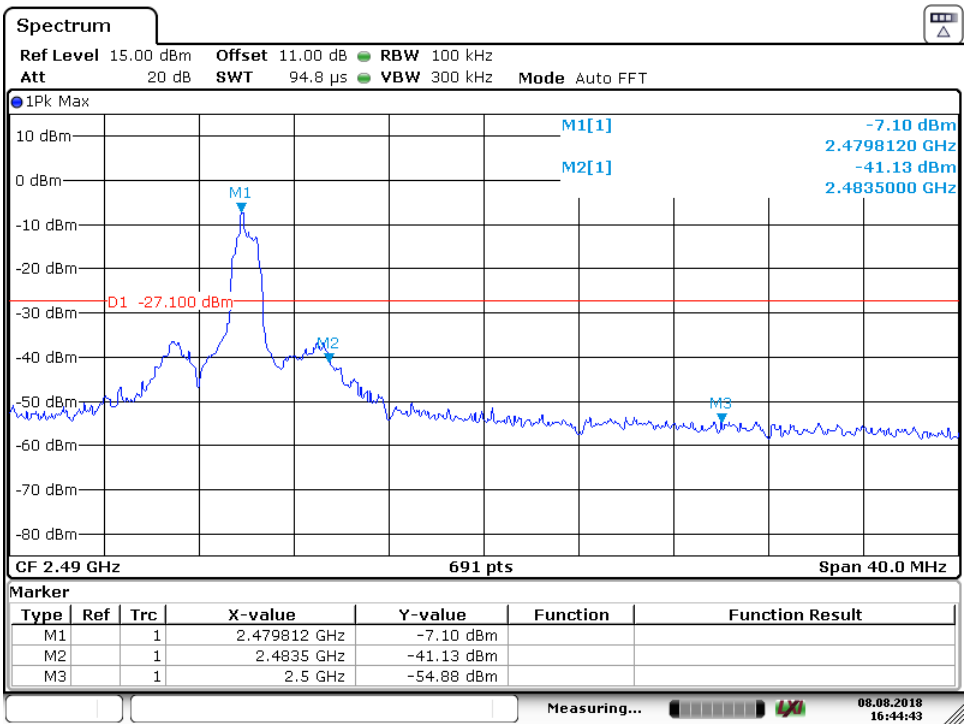


Date: 8.AUG.2018 16:37:40

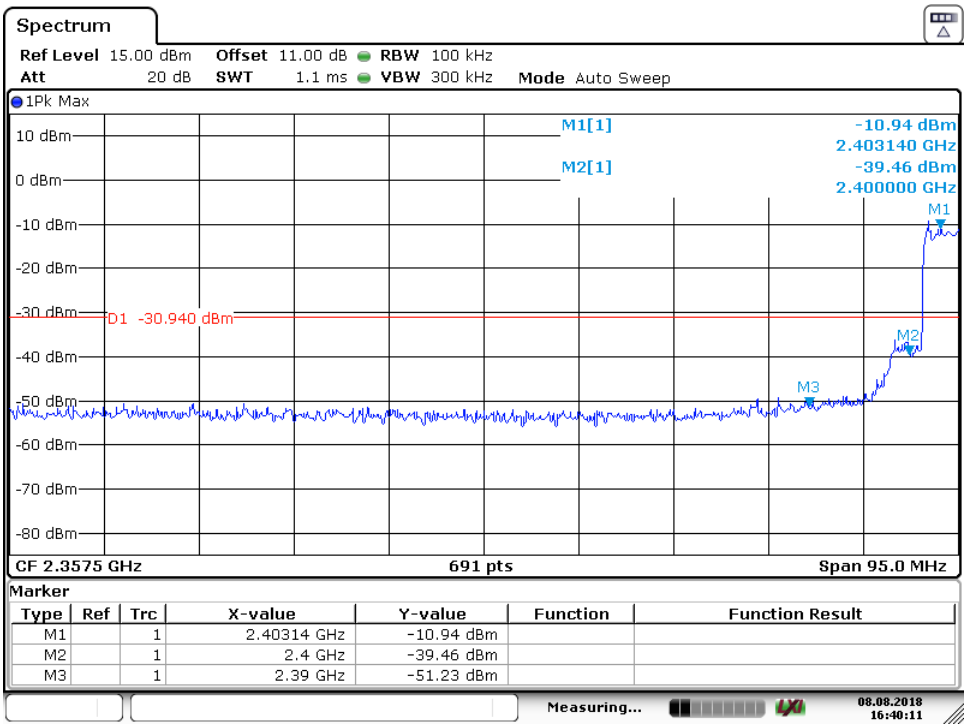
8DPSK mode:



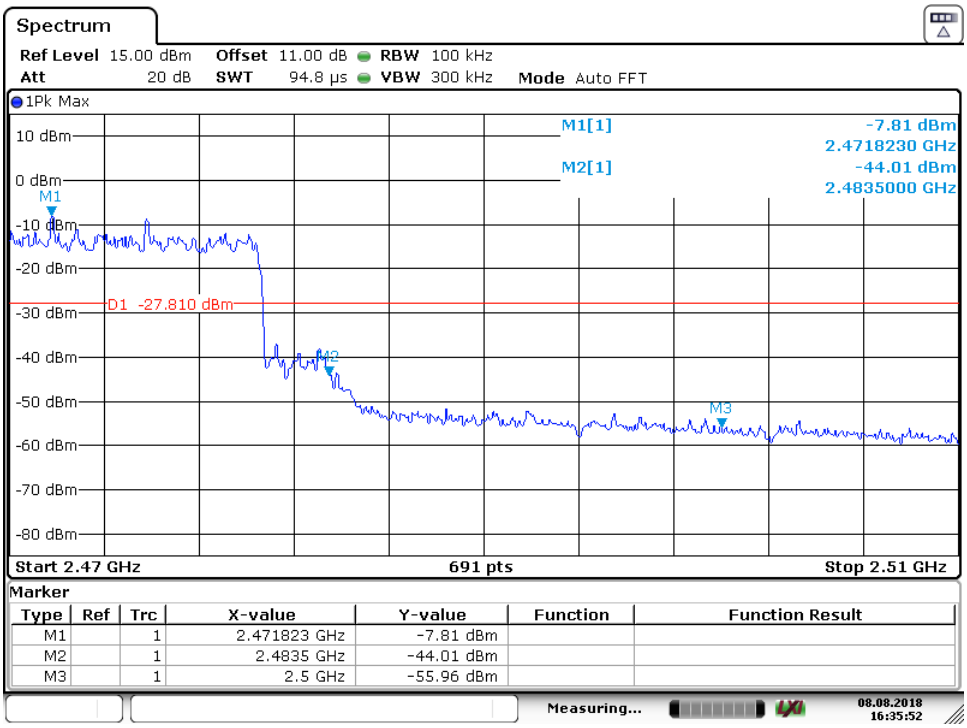
Date: 8.AUG.2018 16:41:08



Date: 8.AUG.2018 16:44:44



Date: 8.AUG.2018 16:40:11



Date: 8.AUG.2018 16:35:52

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

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.

Transmitting spurious emission test result as below:

GFSK Modulation 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	878.372778	31.21	H	46	QP	14.79	-16.2	Pass
	879.127222	27.66	V	40	QP	18.34	-16.1	Pass
1000-25000MHz	4803.750000	51.10	H	74	PK	22.9	2.8	Pass
	--	--	H	54	AV	--	--	Pass
	4803.281250	49.11	V	74	PK	24.89	2.9	Pass
	--	--	V	54	AV	--	--	Pass

GFSK Modulation 2441MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	--	--	H	43.5	QP	--	--	Pass
	--	--	H	46	QP	--	--	Pass
1000-25000MHz	7323.750000	49.00	H	74	PK	5.0	5.6	Pass
	--	--	H	54	AV	--	--	Pass
	4881.562500	46.88	V	74	PK	8.86	5.7	Pass
	--	--	V	54	AV	--	--	Pass

GFSK Modulation 2480MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
	MHz	dBuV/m		dBµV/m		dBuV/m	(dB)	
30-1000MHz	--	--	H	43.5	QP	--	--	Pass
	--	--	H	46	QP	--	--	Pass
1000-25000MHz	4960.312500	50.82	H	74	PK	23.18	3.2	Pass
	--	--	H	54	AV	--	--	Pass
	7440.468750	47.48	V	74	PK	26.52	6.3	Pass
	--	--	V	54	AV	--	--	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.

(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

10 Test Equipment List

List of Test Instruments

Radiated Spurious Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102295	2019-6-28
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2019-7-6
Fully Anechoic Chamber	TDK	8X4X4	--	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	108272	2019-7-6
Vector Signal Generator	Rohde & Schwarz	SMBV100A	262825	2019-7-6
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270	101251	2019-5-31
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2019-7-6
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2019-7-6
Power Splitter	Weinschel	1580	SC319	2019-7-5
10dB Attenuator	Weinschel	4M-10	43152	2019-7-6
10dB Attenuator	R&S	DNF	DNF-001	2019-7-6
10dB Attenuator	R&S	DNF	DNF-002	2019-7-6
10dB Attenuator	R&S	DNF	DNF-003	2019-7-6
10dB Attenuator	R&S	DNF	DNF-004	2019-7-6
Test software	Rohde & Schwarz	EMC32	Version 10.38.00	N/A
Test software	Tonscend	System for BT/WIFI	Version 2.6	N/A

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:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.59dB; Vertical: 4.58dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%