



Registration
No.788871

TEST REPORT FOR BLUETOOTH TESTING

Report No: SRTC2017-9004(F)-17083001(D)

Product Name: Joy Album

Product Model: K13

Applicant: Joy Home, Inc.

Manufacturer: Joy Home, Inc.

Specification: FCC Part 15, Subpart C (2017)

RSS-247 (February,2017 edition)

FCC ID: 2AMPA-GC125542

IC ID: 23004-GC125542

The State Radio_monitoring_center Testing Center (SRTC)

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1. GENERAL INFORMATION

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
City:	Beijing
Country or Region:	P.R.China
Contacted person:	Liu Jia
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1.3 Applicant's details

Company:	Joy Home, Inc.
Address:	1788 Sutter St. #312, San Francisco,USA
City:	San Francisco
Country or Region:	USA
Grantee Code:	2AMPA
Contacted person:	Alan Chan
Tel:	646.784.1430
Fax:	---
Email:	Alan@joy.co

1.4 Manufacturer's details

Company:	Joy Home, Inc.
Address:	1788 Sutter St. #312, San Francisco,USA
City:	San Francisco
Country or Region:	USA
Contacted person:	Alan Chan
Tel:	646.784.1430
Fax:	---
Email:	Alan@joy.co

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2017-09-05
Testing Start Date:	2017-09-05
Testing End Date:	2017-09-30

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	38
Maximum Extreme	45	---
Minimum Extreme	0	---

Normal Supply Voltage (V d.c.):	3.80
Maximum Extreme Supply Voltage (V d.c.):	4.20
Minimum Extreme Supply Voltage (V d.c.):	3.50

2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Frequency Range	2.402GHz~2.480GHz
Number of Channel	79
Modulation Type	GFSK, $\pi/4$ DQPSK, 8DPSK
Duplex Mode	TDD
Channel Spacing	1MHz
Data Rate	1Mbps, 2 Mbps, 3 Mbps
Power Supply	Battery or Charger
Rated Power Supply Voltage	3.8V
HW Version	5A
SW Version	V1.0
Serial Number:	JT1-E1-061
Antenna type	Refer to Note
Antenna connector	Refer to Note

Note:

The antenna provide to the EUT, please refer to the following table:

Brand	Model	Antenna gain	Frequency range(GHz)	Antenna type	Connecter Type
Walsin Technology Corporation	RFECA321 6060L1T	0.46dBi	2.402GHz~2.480GHz	Multilayer ceramic antenna	fixed

2.2 Description of Test Modes

79 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	16	2418	32	2434	48	2450	64	2466
1	2403	17	2419	33	2435	49	2451	65	2467
2	2404	18	2420	34	2436	50	2452	66	2468
3	2405	19	2421	35	2437	51	2453	67	2469
4	2406	20	2422	36	2438	52	2454	68	2470
5	2407	21	2423	37	2439	53	2455	69	2471
6	2408	22	2424	38	2440	54	2456	70	2472
7	2409	23	2425	39	2441	55	2457	71	2473
8	2410	24	2426	40	2442	56	2458	72	2474
9	2411	25	2427	41	2443	57	2459	73	2475
10	2412	26	2428	42	2444	58	2460	74	2476
11	2413	27	2429	43	2445	59	2461	75	2477
12	2414	28	2430	44	2446	60	2462	76	2478
13	2415	29	2431	45	2447	61	2463	77	2479
14	2416	30	2432	46	2448	62	2464	78	2480
15	2417	31	2433	47	2449	63	2465		

2.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE ≥ 1G	RE < 1G	PLC	APCM	
-	√	√	√	√	-

Where RE 1G: Radiated Emission above 1GHz

RE < 1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 78	0, 39, 78	GFSK, π /4DQPSK, 8DPSK	1Mbps, 2 Mbps, 3 Mbps

Radiated Emission Test (Below 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 78	0, 39, 78	GFSK, $\pi/4$ DQPSK, 8DPSK	1Mbps, 2 Mbps, 3 Mbps

Power Line Conducted Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 78	0, 39, 78	GFSK, $\pi/4$ DQPSK, 8DPSK	1Mbps, 2 Mbps, 3 Mbps

Antenna Port Conducted Measurement:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
0 to 78	0, 39, 78	GFSK, $\pi/4$ DQPSK, 8DPSK	1Mbps, 2 Mbps, 3 Mbps

2.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.

Duty cycle = 0.373 ms/1.247 ms = 0.299 * 100 % = 29.9%

Correction factor = 10* log (1/duty cycle) =10 * log (1/0.299) = 5.24 dB

2.4 EUT Operating conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually. EUT work with a fully -charged battery.

2.5 Support Equipment

The following support equipment was used to exercise the DUT during testing:

Equipment	Charger
Manufacturer	Inventec Appliances (Jiangning) Corporation
Model Number	S13
Serial Number	---

Equipment	Battery
Manufacturer	DONGGUAN YONGWEI TECHNOLOGY CO.,LTD
Model Number	K13
Serial Number	---

3 REFERENCE SPECIFICATION

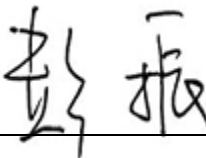
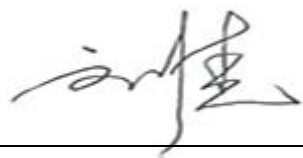
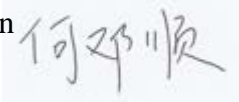
Specification	Version	Title
15.35	2017	Measurement detector functions and bandwidths.
15.209	2017	Radiated emission limits; general requirements.
15.247	2017	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
15.203	2017	Antenna requirement
ANSI C63.10	2013	Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-247	February,2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

4 KEY TO NOTES AND RESULT CODES

Code	Meaning
PASS	Test result shows that the requirements of the relevant specification have been met.
FAIL	Test result shows that the requirements of the relevant specification have not been met.
N/T	Test case is not tested.
NTC	Nominal voltage, Normal Temperature
HV	High voltage, Normal Temperature
LV	Low voltage, Normal Temperature
HTHV	high voltage, High Temperature
LTHV	High voltage, Low Temperature
HTLV	Low voltage, High Temperature
LTLV	Low voltage, Low Temperature

5 RESULT SUMMARY

No.	Test case	Reference	Verdict
1	Occupied Bandwidth	15.247(a)(1) / RSS-247	Pass
2	Channel Separation	15.247(a)(1) / RSS-247	Pass
3	Peak Power Output	15.247(b)(1) / RSS-247	Pass
4	Dwell Time	15.247(a)(1)(iii) / RSS-247	Pass
5	Number of Hopping Frequencies	15.247(a)(1)(iii) / RSS-247	Pass
7	Conducted out of band emission measurement	15.247(d) / RSS-247	Pass
8	Band-edge	15.247(d) / RSS-247	Pass
9	Spurious Radiated Emissions	15.247(d)/15.35(b)/15.209 / RSS-247	Pass
10	AC Power line Conducted Emission	15.207/ RSS-247	Pass
11	Antenna requirement	15.203/ RSS-247	Pass (refer to section 2.1)

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Ms. Liu Jia 
Tested by: Mr. He Dengshun 	Issued date: 20171016

6 TEST RESULT

6.1 Occupied Bandwidth

6.1.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.1.2 Test Description

The bandwidth at 20dB down from the highest in-band spectral density is measured with a spectrum analyzer and Bluetooth test set via a power splitter with a known loss which connected to the transmitter antenna terminal of the EUT while the EUT is operating at maximum power and at the appropriate frequencies. All modes of operation were investigated and the worst case configuration results are reported in this section.

6.1.3 Test limit

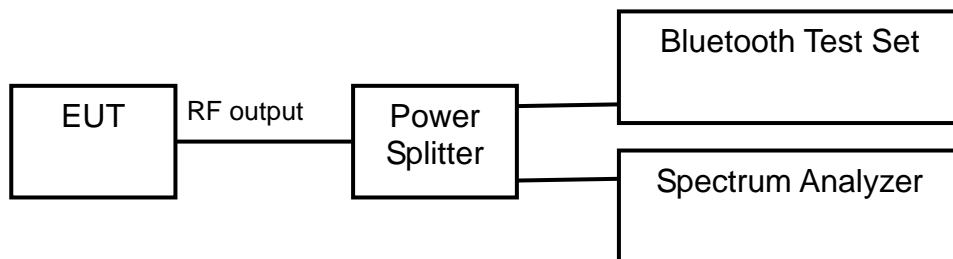
FCC Part15.247 (a)(1), RSS-247

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

6.1.4 Test settings

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 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.
- Measure the frequency difference of two frequencies that were attenuated 30dB from the reference level. Record the frequency difference as the emission bandwidth.
- Repeat above procedures until all frequencies measured were complete.

6.1.5 Test Setup



6.1.6 Test result

The test results are shown in Appendix A .

6.2 Channel Separation

6.2.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.2.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the channel separation measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

6.2.3 Test limit

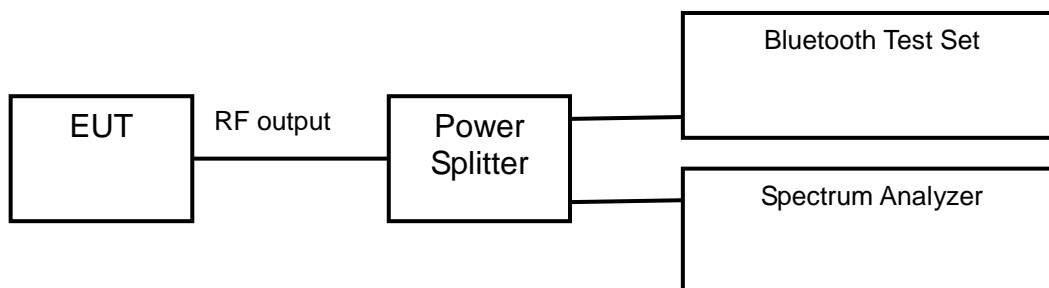
FCC Part15.247 (a)(1) , RSS-247

Measurement is made with EUT operating in hopping mode. The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.

6.2.4 Test Settings

- Detector: Peak-Max hold
- Span: 3 MHz
- Centre Frequency: 2441 MHz
- Resolution Bandwidth (RBW): 30 kHz
- Video Bandwidth (VBW): 1 MHz
- Sweep Time: Coupled

6.2.5 Test Setup



6.2.6 Test result

The test results are shown in Appendix A .

6.3 Peak Power Output

6.3.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.3.2 Test Description

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below were measured using a spectrum analyzer with a Bluetooth signaling test set used only to maintain a Bluetooth link with the EUT.

6.3.3 Test limit

FCC Part15.247(b)(1) , RSS-247:

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.

Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW) →

Modulation type	GFSK	$\pi/4$ DQPSK	8DPSK
Maximum Output Power	30.0dBm	30.0dBm	30.0dBm

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

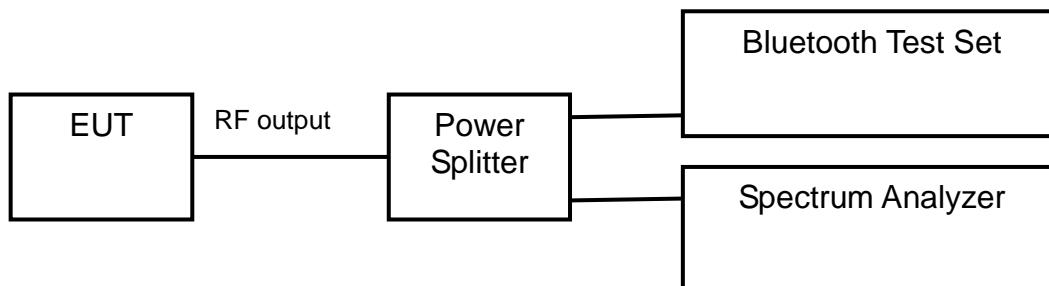
Used conversion factor: Limit (dBm) = 10 log (Limit (W)/1mW) →

Modulation type	GFSK	$\pi/4$ DQPSK	8DPSK
Maximum Output Power	21.0dBm	21.0dBm	21.0dBm

6.3.4 Test Settings

Hopping Mode	Modulation type	RBW	VBW	Span	Sweep time
Hopping OFF	GFSK	2MHz	3MHz	8MHz	1ms
Hopping OFF	$\pi/4$ DQPSK	2MHz	3MHz	8MHz	1ms
Hopping OFF	8DPSK	2MHz	3MHz	8MHz	1ms

6.3.5 Test Setup



6.3.6 Test result

The test results are shown in Appendix A .

6.4 Dwell Time

6.4.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.4.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the dwell time measurements.

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

The time slot length is measured of three different packet types which are available in the Bluetooth technology. Those are DH1, DH3 and DH5 packets. The dwell time is calculated by:

Dwell time = time slot length * hop rate * 31.6/ number of hopping channels with:

- hop rate=1600/2 * 1/s for DH1 packets =800
- hop rate=1600/4 * 1/s for DH3 packets =400
- hop rate=1600/6 * 1/s for DH5 packets =266.67
- number of hopping channels=79
- 31.6 s=0.4 seconds multiplied by the number of hopping channels=0.4s * 79

6.4.3 Test limit

FCC Part15.247(a)(1)(iii) , RSS-247

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

6.4.4 Test Test Settings

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it

to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

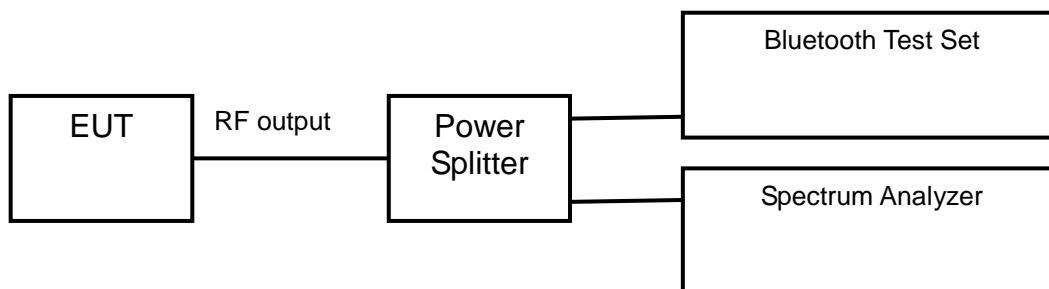
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.

d. Measure the time duration of one transmission on the measured frequency.

And then plot the result with time difference of this time duration.

e. Repeat above procedures until all different time-slot modes have been completed.

6.4.5 Test Setup



6.4.6 Test result

The test results are shown in Appendix A .

6.5 Number of Hopping Frequencies

6.5.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.5.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the number of hopping frequencies measurement. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

6.5.3 Test limit

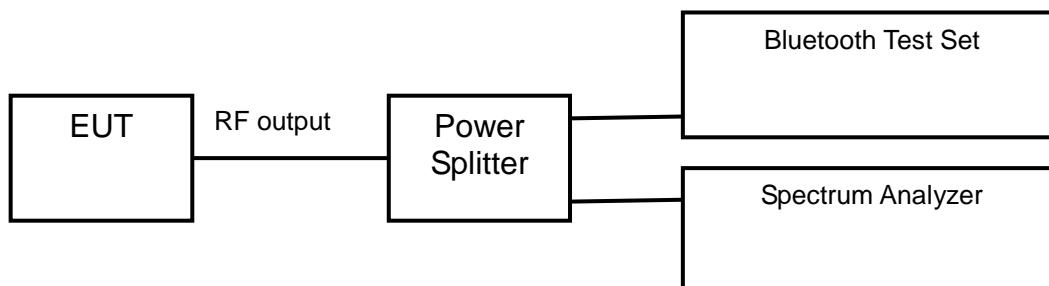
FCC Part15.247(a)(1)(iii) , RSS-247

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

6.5.4 Test Settings

- Detector: Peak-Maxhold
- Start frequency: 2400 MHz
- Stop frequency: 2483.5 MHz
- Resolution Bandwidth (RBW): 30 kHz
- Video Bandwidth (VBW): 1 MHz
- Sweep Time: Coupled

6.5.5 Test Setup



6.5.6 Test result

The test results are shown in Appendix A.

6.6 Conducted out of band emission measurement

6.6.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.6.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

6.6.3 Test limit

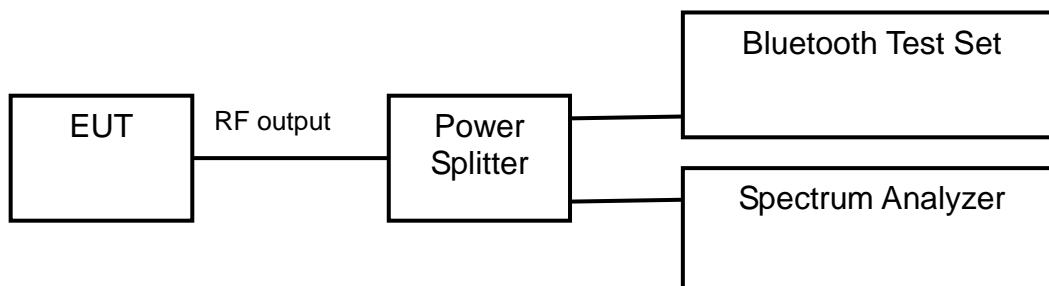
FCC Part15.247(d) , RSS-247:

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.

6.6.4 Test Settings

- Set RBW = 100 kHz.
- Set VBW =300 kHz.
- Set span to encompass the spectrum to be examined
- Detector = peak.
- Trace Mode = max hold.
- Sweep = auto couple. Detector: Peak-Maxhold
- Frequency range: 30 ~25000 MHz

6.6.5 Test Setup



6.6.6 Test result

The test results are shown in Appendix A .

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

6.7 Band-edge measurement

6.7.1 Ambient condition

Temperature	Relative humidity	Pressure
22°C	40%	101.5kPa

6.7.2 Test Description

The Equipment Under Test (EUT) was set up in a shielded room to perform the spurious emissions measurements. The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss.

6.7.3 Test limit

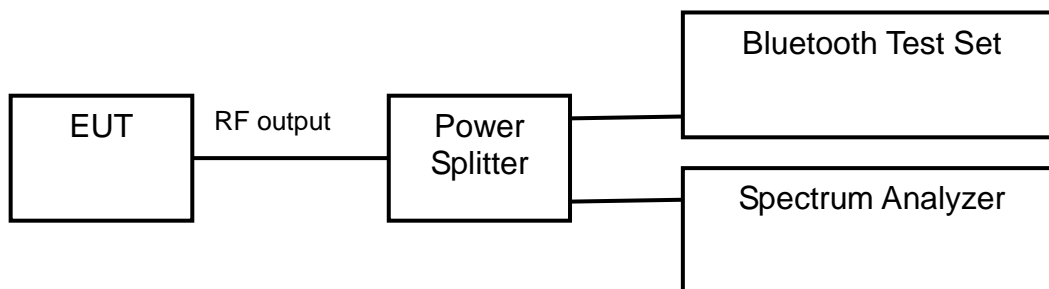
FCC Part15.247(d) , RSS-247:

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.

6.7.4 Test Settings

- h) Set RBW = 100 kHz.
- i) Set VBW =300 kHz.
- j) Set span to encompass the spectrum to be examined
- k) Detector = peak.
- l) Trace Mode = max hold.
- m) Sweep = auto couple. Detector: Peak-Maxhold
- n) Frequency range: 30 ~25000 MHz

6.7.5 Test Setup



6.7.6 Test result

The test results are shown in Appendix A .

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

6.8 Spurious Radiated Emissions

6.8.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.8.2 Test Description

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

6.8.3 Test limit

FCC Part15.247(d) , RSS-247:

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in below Table per Section 15.209.

Frequency [MHz]	Field strength [μ V/m]	Measured Distance [meters]
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Limits

FCC Part15.35(b):

there is also a limit on the radio frequency emissions, as measured using

instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit

Used conversion factor: $\text{Limit (dB}\mu\text{V/m)} = 20 \log (\text{Limit } (\mu\text{V/m})/1\mu\text{V/m})$

Frequency of Emission(MHz)	Limits	
	Detector	Unit (dB μ V/m)
30~88	Quasi-peak	40.0
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46.0
960~1000	Quasi-peak	54.0
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54.0
	Peak	74.0

Conversion Radiated limits

6.7.4 Test Settings

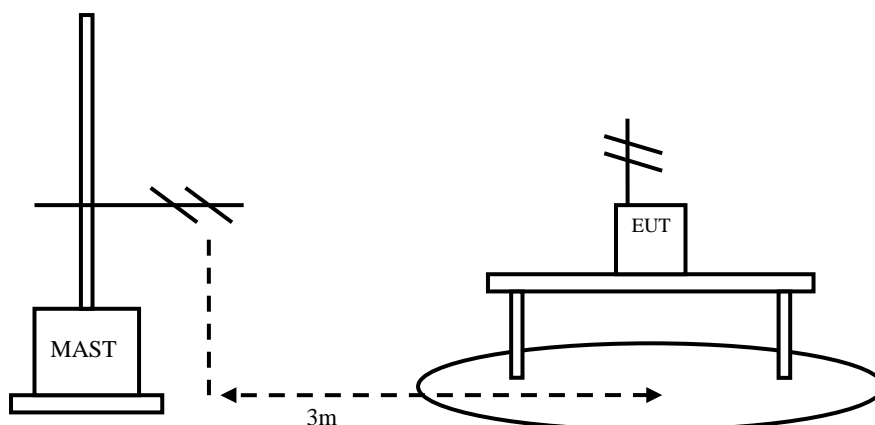
The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration. During the test, the antenna height and EUT azimuth were varied in order to identify the maximum level of emission from the EUT. The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

6.7.5 Test Setup

The EUT and measurement equipment were set up as shown in the diagram below

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic



chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration. Then start the test software ES-K1. Sweep the whole frequency band through the range from 30MHz to 1GHz or above, using receive log period antenna HL562 or Ridge horn antenna HF906.

During the test, the antenna height and EUT azimuth were varied in order to identify the maximum

level of emission from the EUT. The height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees. The measurements shall be repeated with orthogonal polarization of the test antenna. The results shall be showed the worst case of the three orthogonal axes.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

6.7.6 Test result

The test results are shown in Appendix B.

6.8 AC Power line Conducted Emission

6.8.1 Ambient condition

Temperature	Relative humidity	Pressure
20.8°C	36.5%	100.9kPa

6.8.2 Test limit

FCC Part15.207, RSS-247

Frequency of Emission (MHz)	Conducted 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.

The measurement is made according to ANSI C63.4-2014

6.8.3 Test result

The test results are shown in Appendix B .

7 MEASUREMENT UNCERTAINTIES

Items	Uncertainty	
Occupied Bandwidth	3kHz	
Peak power output	0.67dB	
Band edge compliance	1.20dB	
Spurious emissions	30MHz~1GHz	2.83dB
	1GHz~12.75GHz	2.50dB
	12.75GHz~25GHz	2.75dB

8 TEST EQUIPMENTS

No.	Name/ Model	Manufacturer	S/N	Cal date	Cal Due date
1.	Spectrum Analyzer FSV	ROHDE&SCHWARZ	101065	2017.08.20	2018.08.19
2.	Bluetooth Test Set MT8852B	Anritsu	1142010	2017.03.01	2018.02.28
3.	Cable 104EA	SUCOFLEX	9272/4EA	2017.03.01	2018.02.28
4.	Cable 104EA	SUCOFLEX	9266/4EA	2017.03.01	2018.02.28
5.	Power Splitter 11850C	Agilent	026057	2017.08.20	2018.08.19
6.	12.65m×8.03m×7.50m Fully-Anechoic Chamber	FRANKONIA	-----	-----	-----
7.	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	---	-----	-----
8.	Turn table Diameter:1m	HD	-----	-----	-----
9.	Turn table Diameter:5m	HD	-----	-----	-----
10.	Antenna master FAC(MA4.0)	MATURO	-----	-----	-----
11.	Antenna master SAC(MA4.0)	MATURO	-----	-----	-----
12.	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	-----	-----
13.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100030	2017.08.20	2018.08.19
14.	HF 906 Double-Ridged Waveguide Horn Antenna	R&S	100029	2017.08.20	2018.08.19
15.	HL562 Ultra log antenna	R&S	100016	2017.08.20	2018.08.19
16.	3160-09 Receive antenna	SCHWARZ-BECK	002058-002	2017.08.20	2018.08.19
17.	ESI 40 EMI test receiver	R&S	100015	2017.08.20	2018.08.19
18.	Radio tester	CMU 200	114667	2017.08.20	2018.08.19
19.	ESCS30 EMI test receiver	R&S	100029	2017.08.20	2018.08.19
20.	HL562 Receive antenna	R&S	100167	2017.08.20	2018.08.19
21.	ESH3-Z5 LISN	R&S	100020	2017.08.20	2018.08.19

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Please refer to the attachment.

APPENDIX B – TEST DATA OF RADIATED EMISSION

Please refer to the attachment.

APPENDIX C – TEST SETUP

Please refer to the attachment.

APPENDIX A – TEST DATA OF CONDUCTED EMISSION

Occupied Bandwidth

Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

Modulation type: GFSK

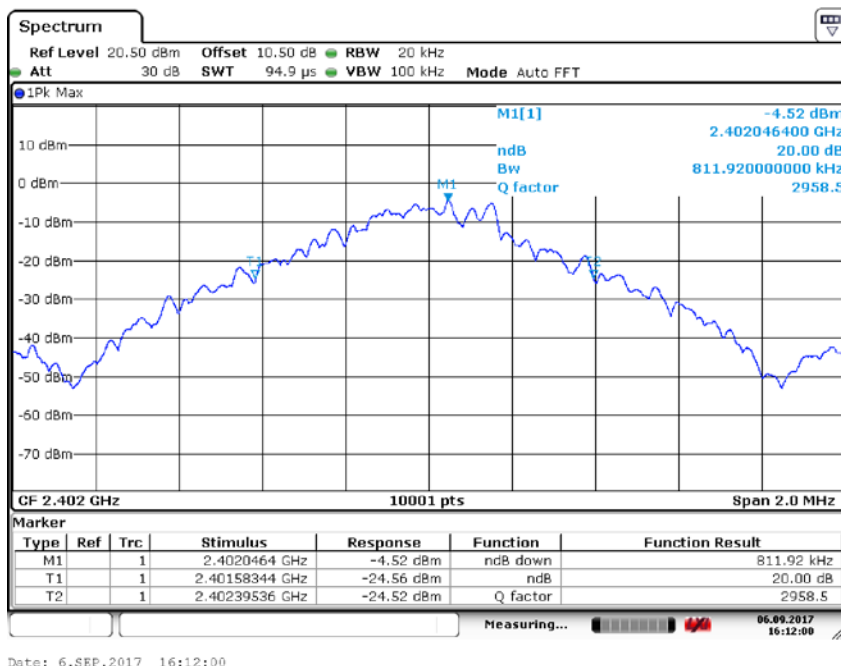
Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	811.92
2441	39	810.52
2480	78	810.52

Modulation type: $\pi/4$ DQPSK

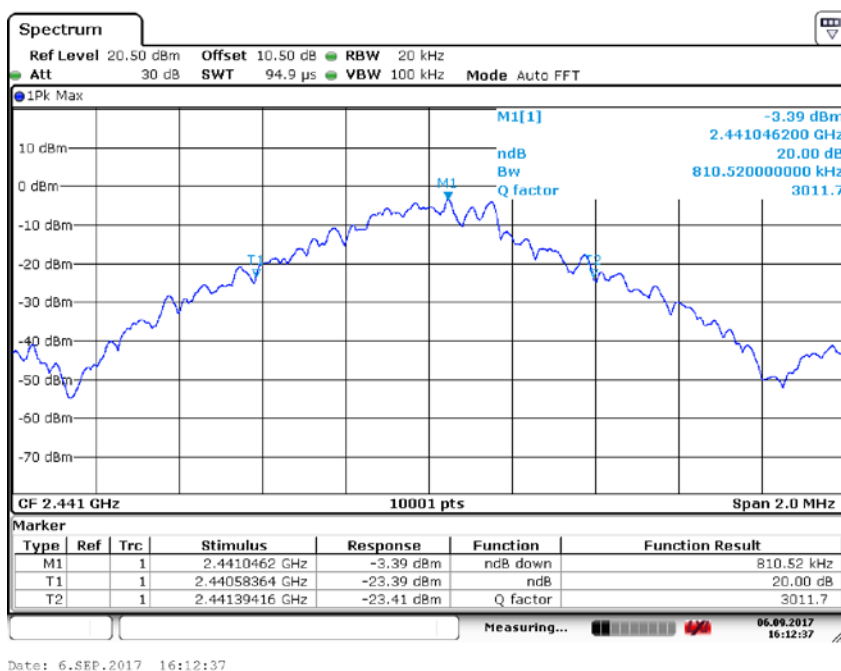
Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	1320.87
2441	39	1320.47
2480	78	1319.67

Modulation type: 8DPSK

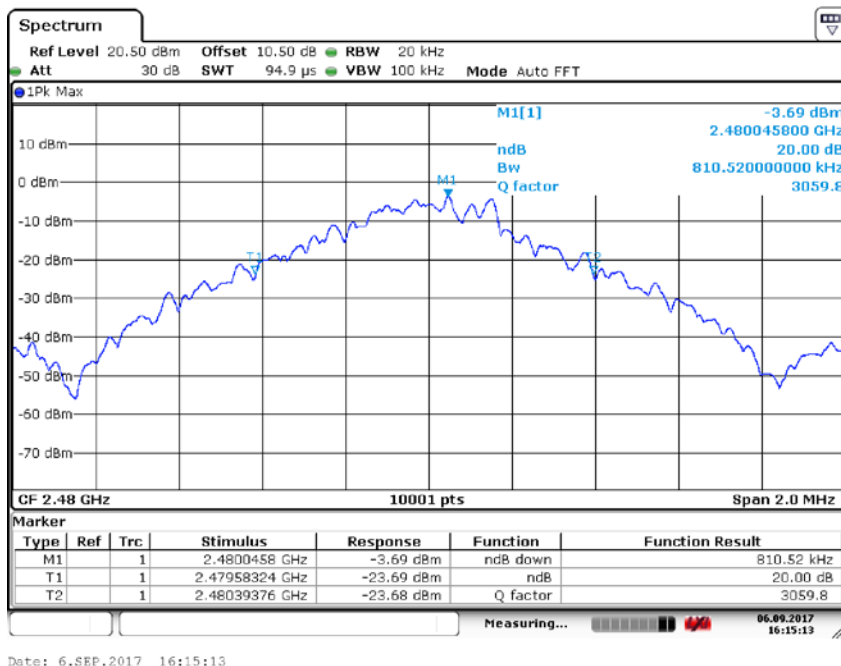
Carrier frequency (MHz)	Channel No.	20 dB bandwidth(kHz)
2402	0	1268.27
2441	39	1268.67
2480	78	1266.67



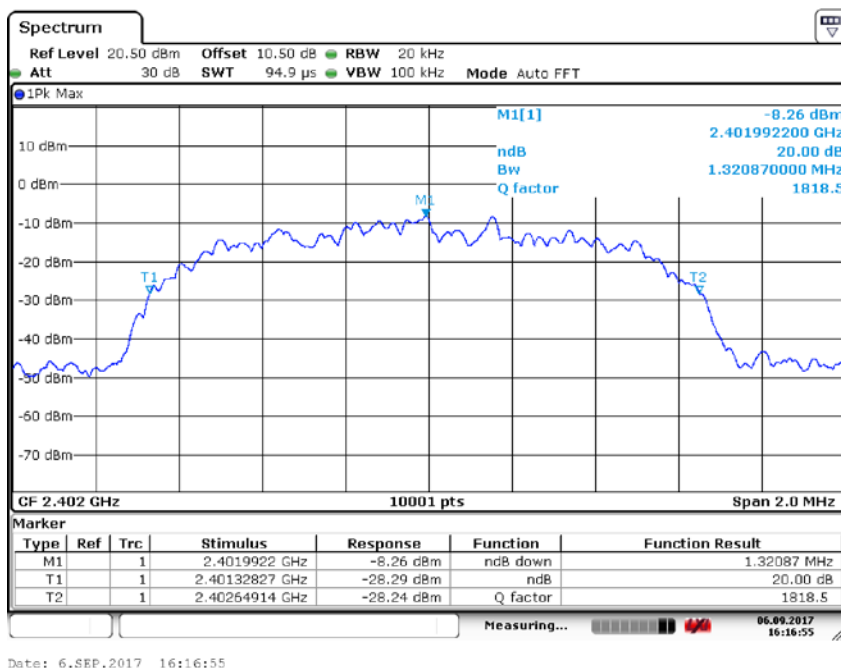
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



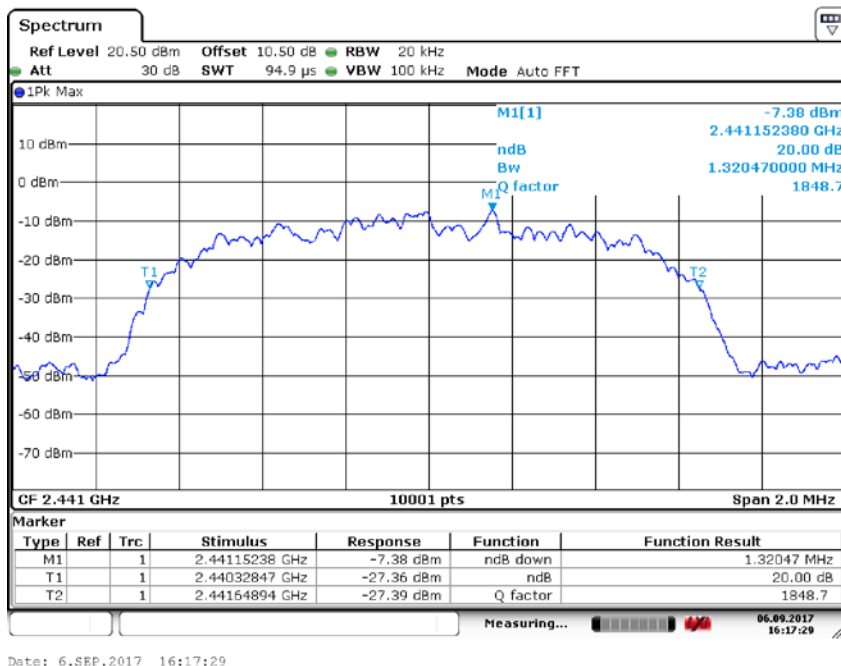
Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



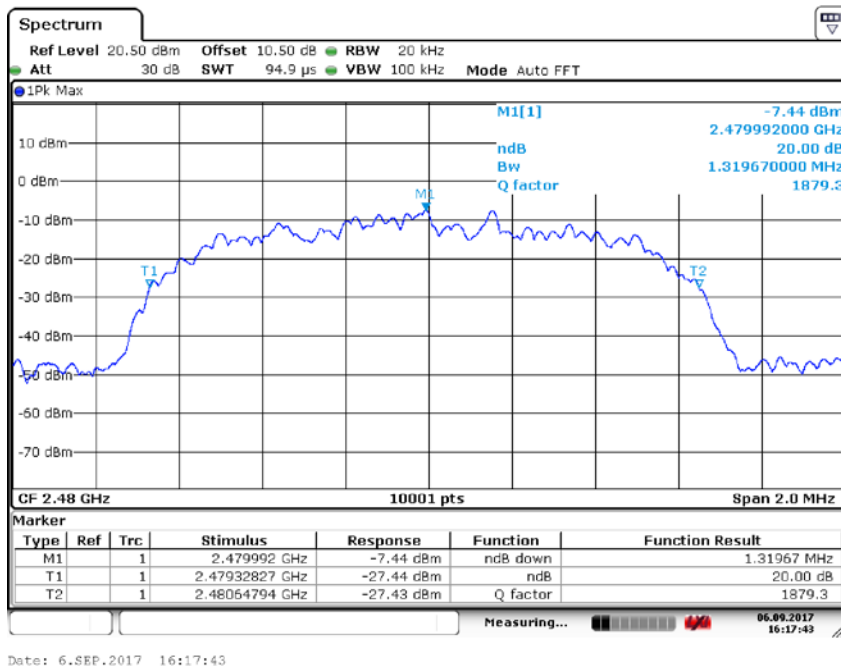
Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



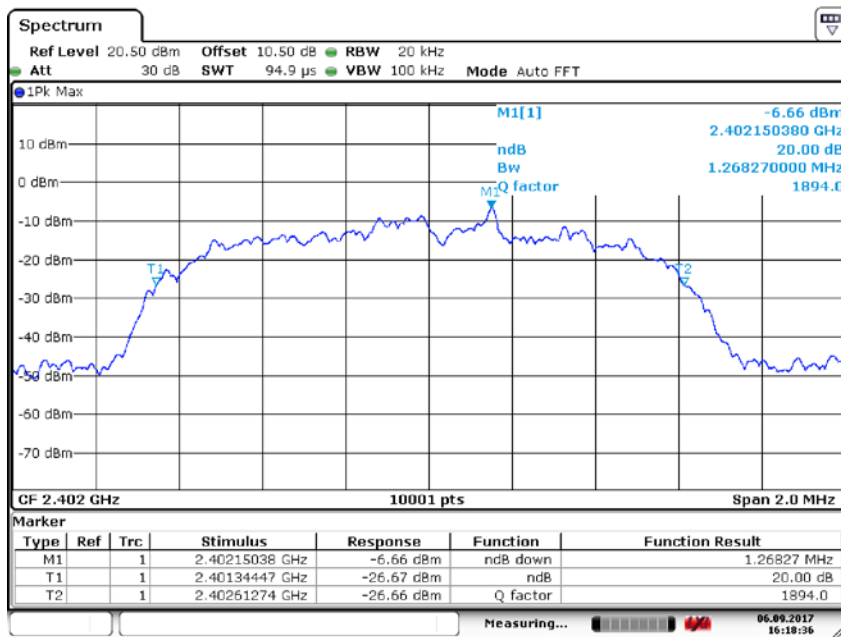
Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK

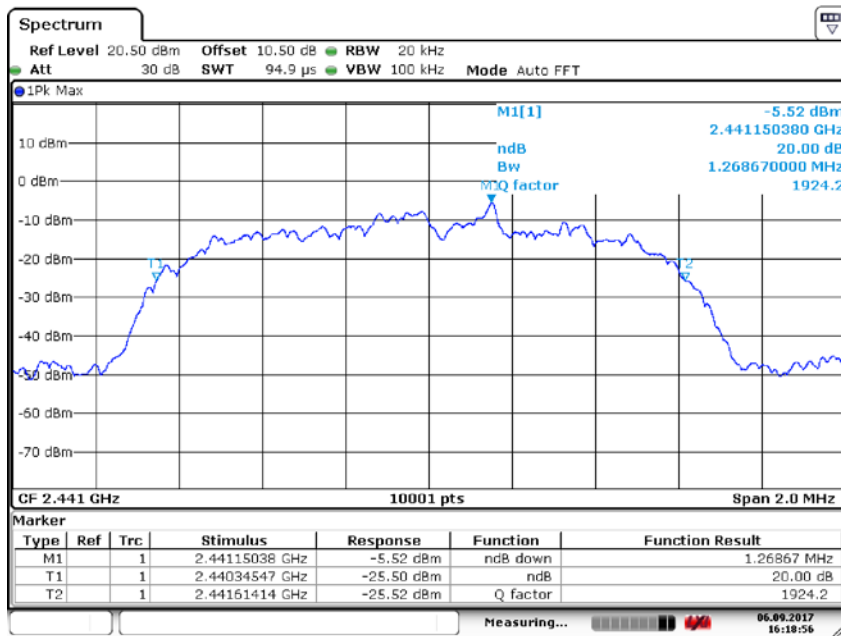


Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



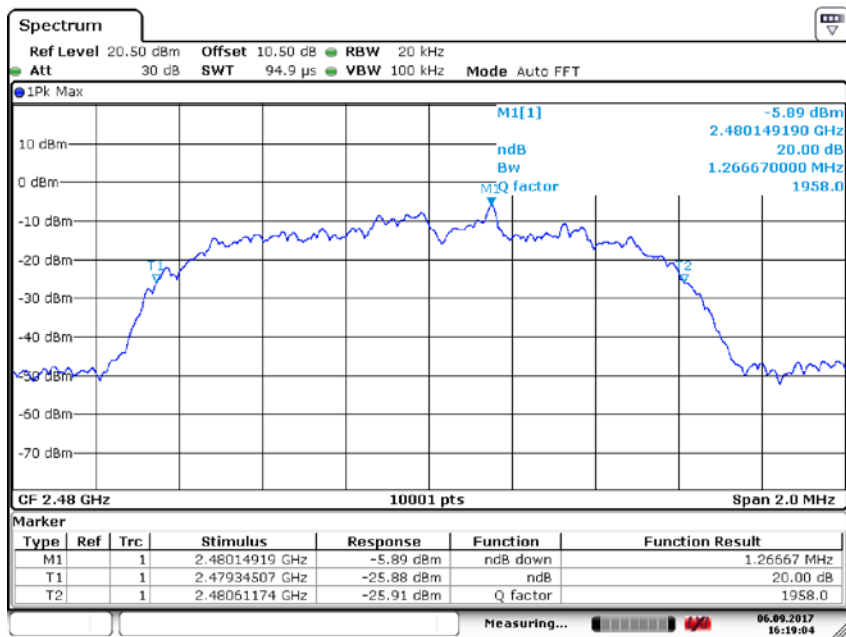
Date: 6.SEP.2017 16:18:36

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Date: 6.SEP.2017 16:18:56

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK



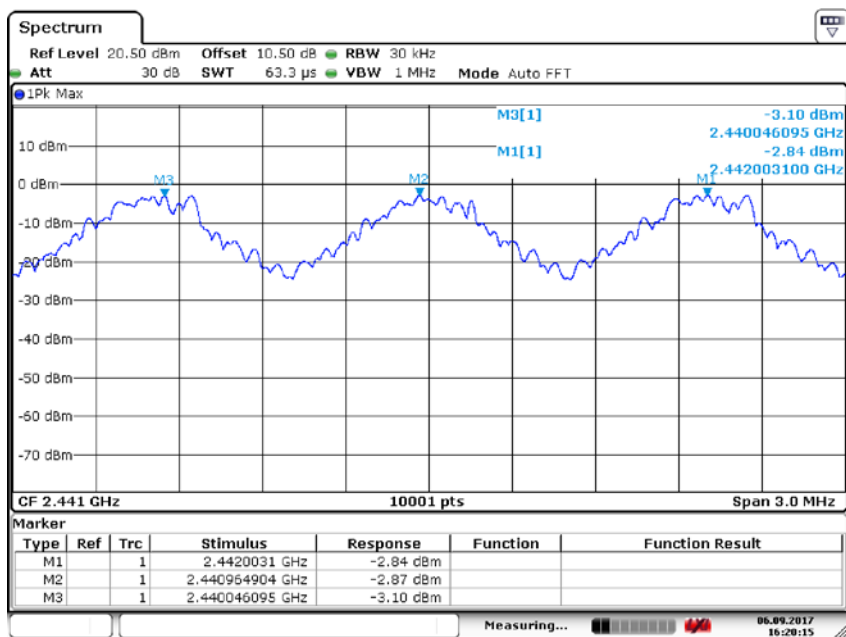
Date: 6.SEP.2017 16:19:04

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

Channel Separation

Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

Op-mode	Channel separation MHz
Hopping mode	1



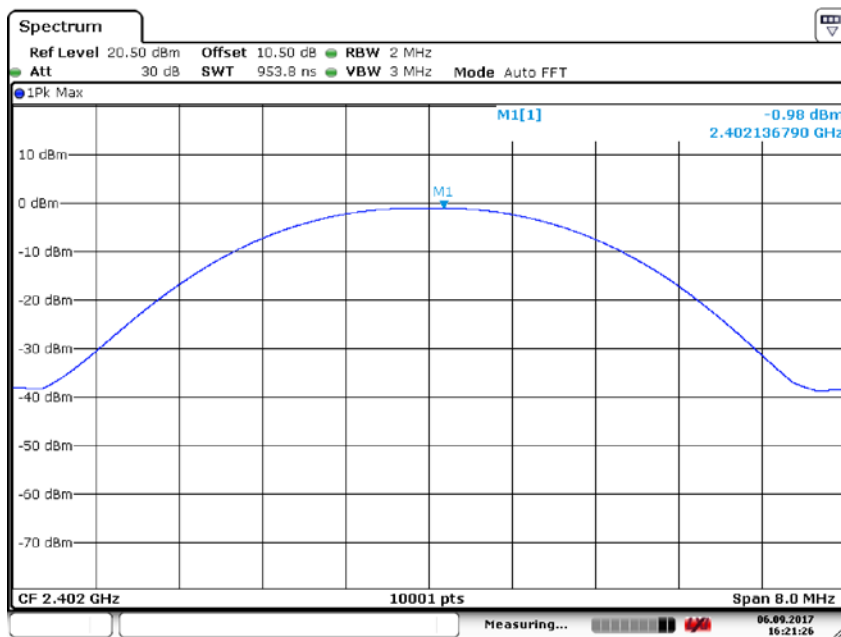
Date: 6.SEP.2017 16:20:15

Op-mode: Hopping mode

Peak Power Output

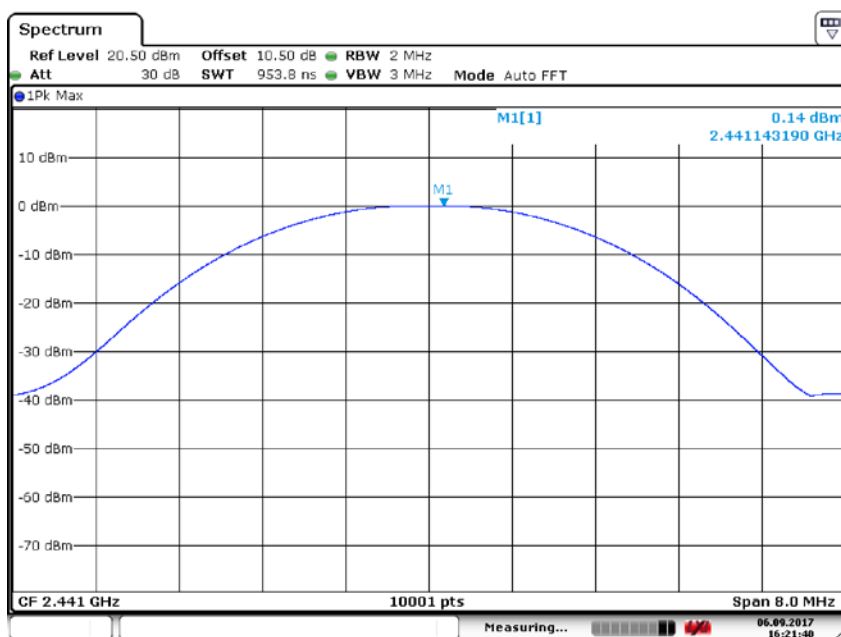
Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

Modulation type	Peak Power Output (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	-0.98	0.14	-0.11
$\pi/4$ DQPSK	-1.17	0.17	-0.48
8DPSK	-0.67	0.14	-0.40



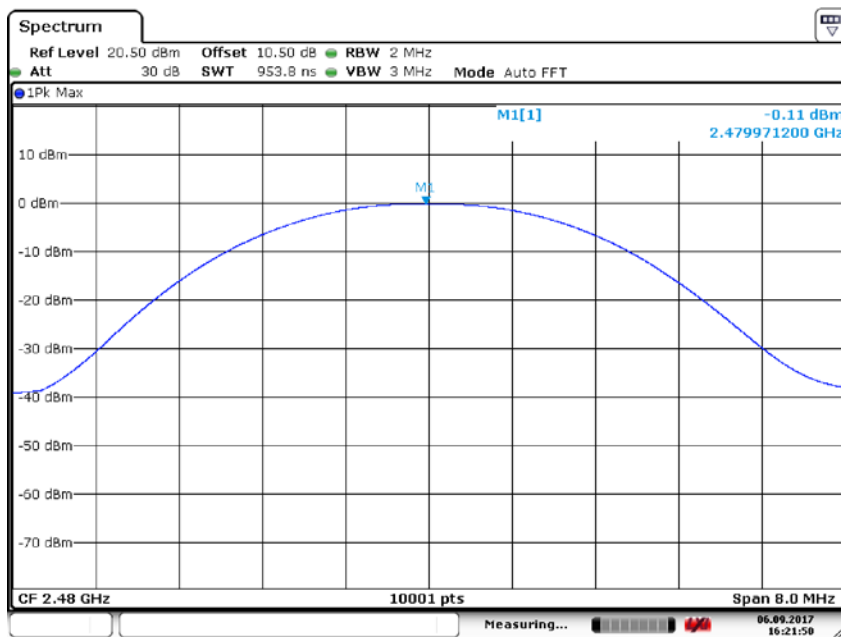
Date: 6.SEP.2017 16:21:26

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: GFSK



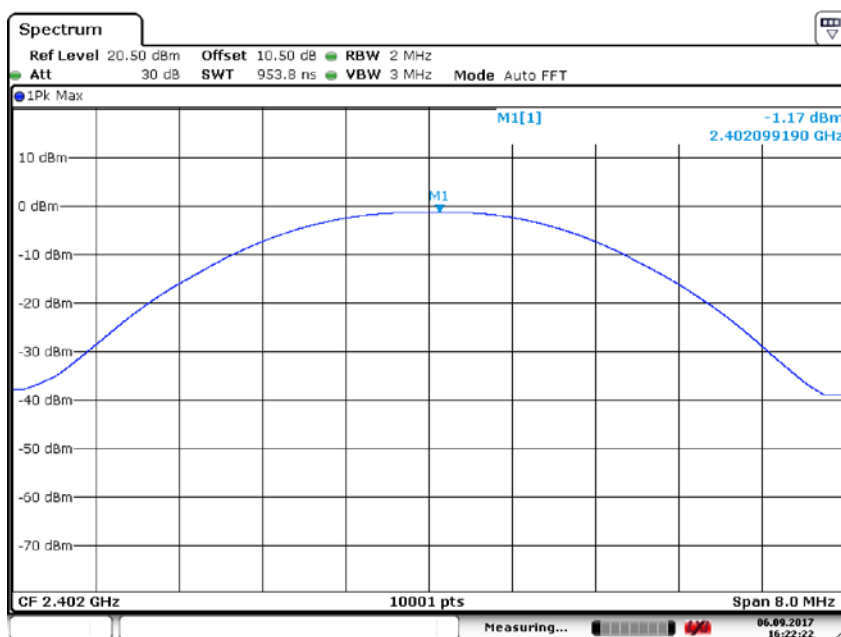
Date: 6.SEP.2017 16:21:40

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: GFSK



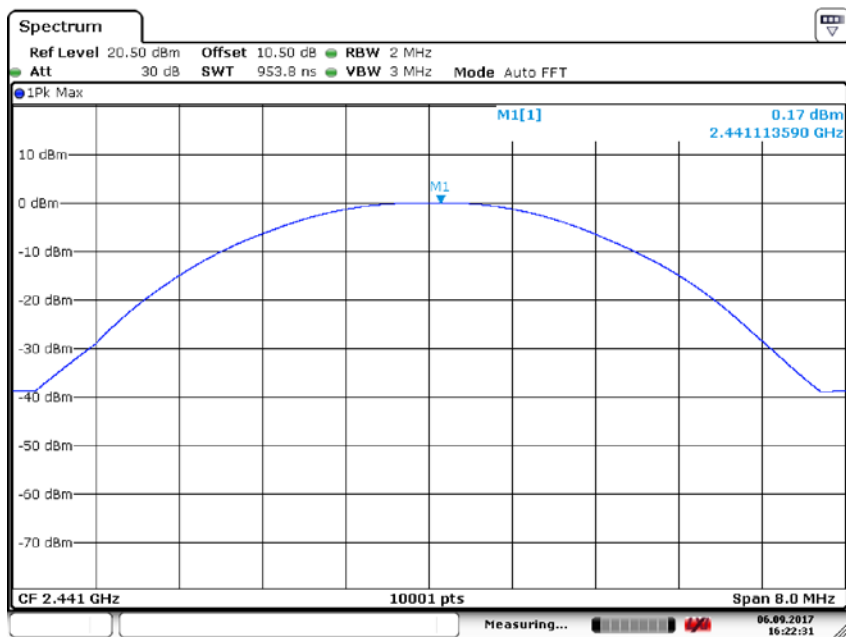
Date: 6.SEP.2017 16:21:49

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: GFSK



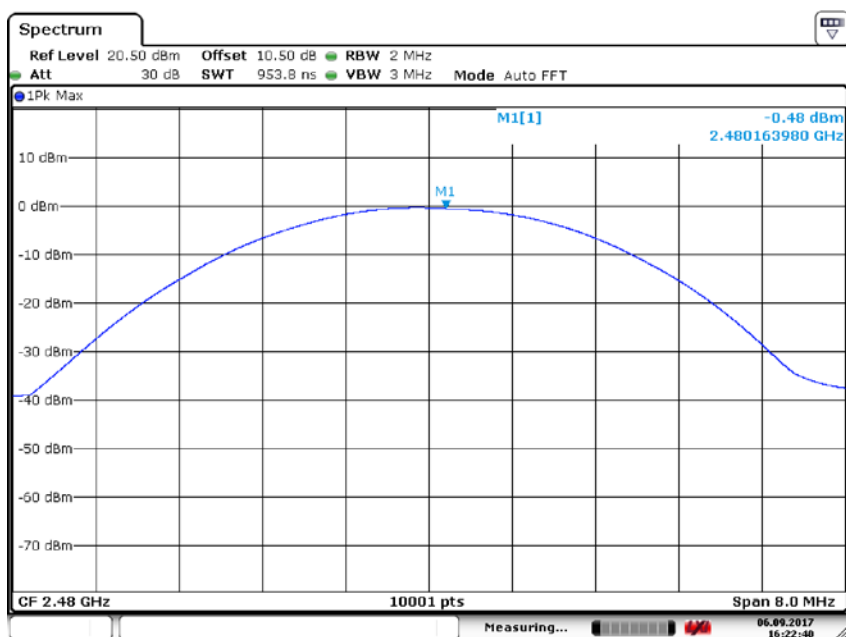
Date: 6.SEP.2017 16:22:22

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: $\pi/4$ DQPSK



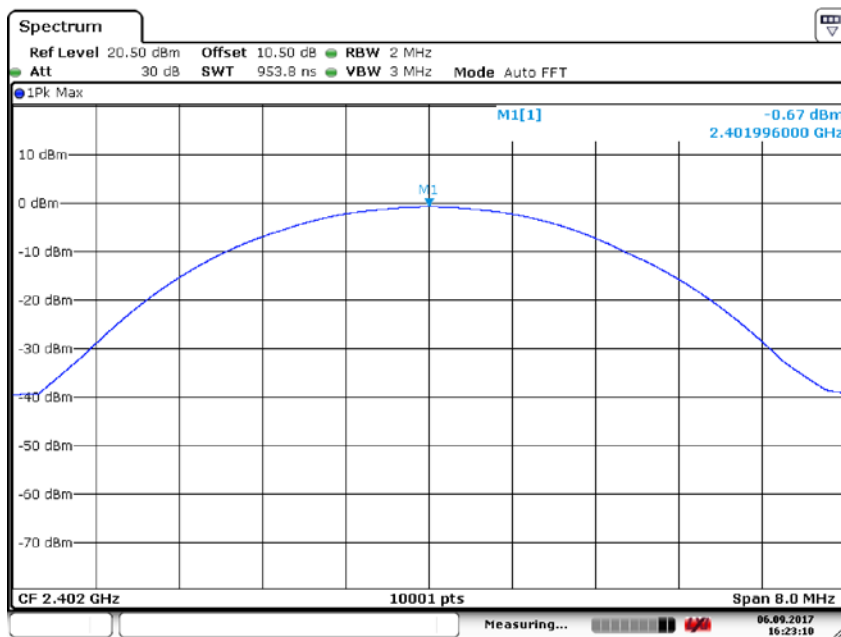
Date: 6.SEP.2017 16:22:31

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: $\pi/4$ DQPSK



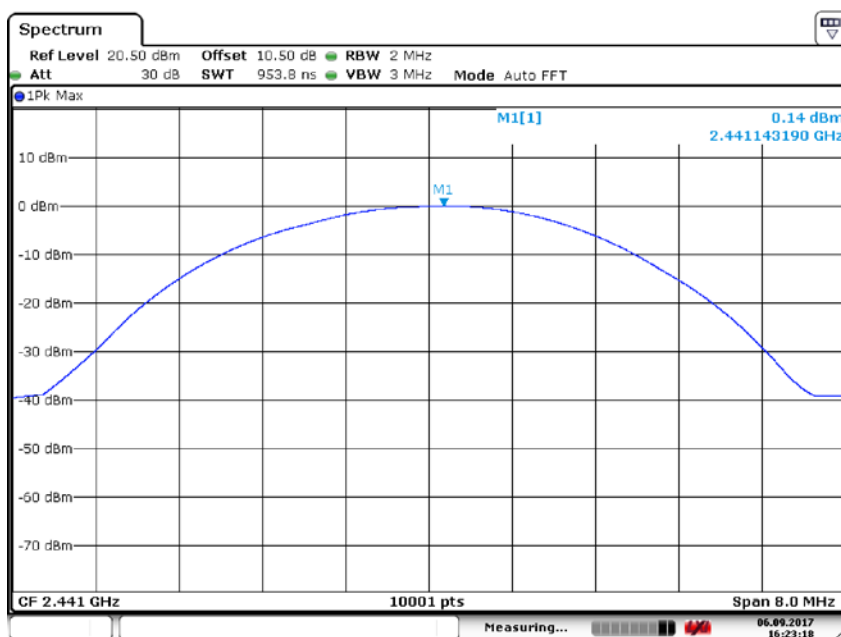
Date: 6.SEP.2017 16:22:40

Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: $\pi/4$ DQPSK



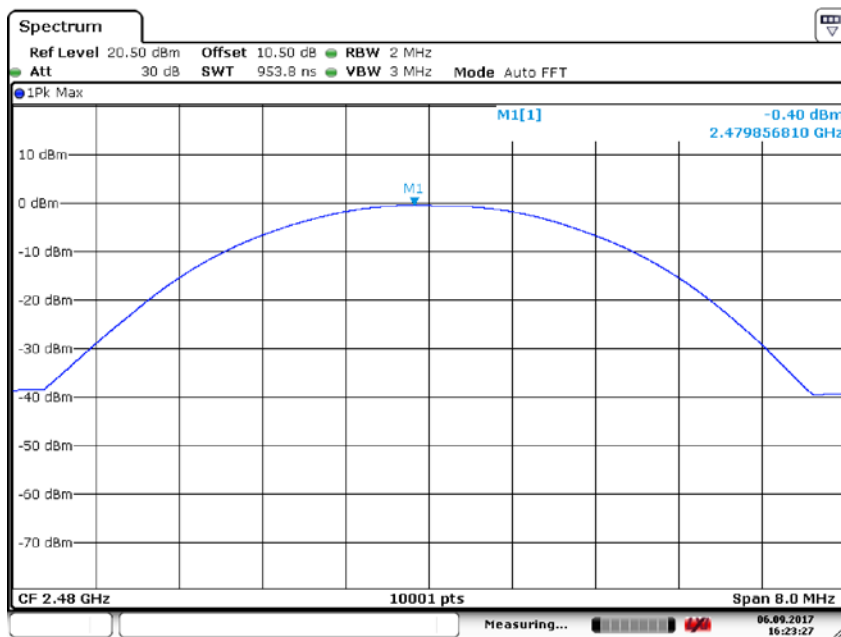
Date: 6.SEP.2017 16:23:10

Carrier frequency (MHz): 2402
Channel No.:0
Modulation type: 8DPSK



Date: 6.SEP.2017 16:23:18

Carrier frequency (MHz): 2441
Channel No.:39
Modulation type: 8DPSK



Date: 6.SEP.2017 16:23:27

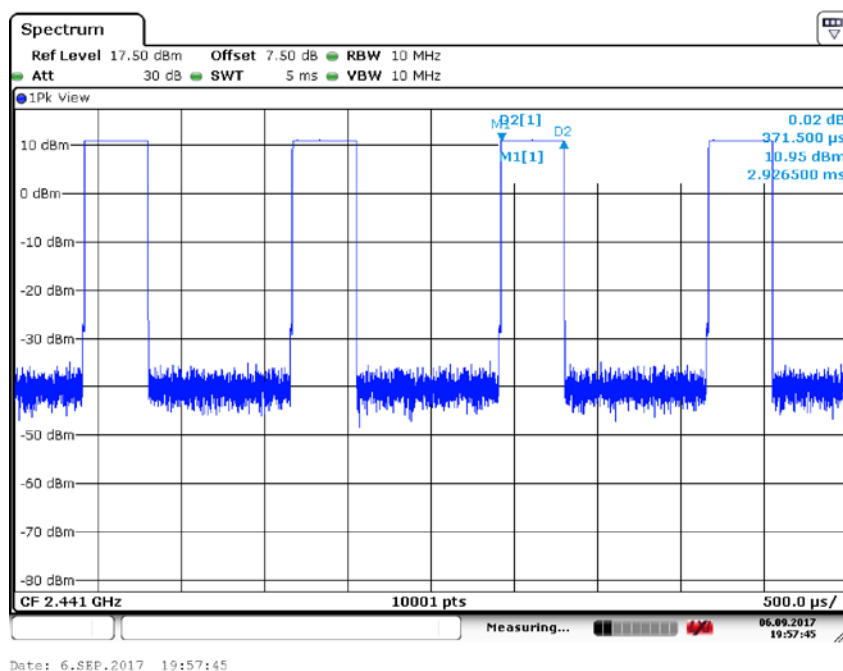
Carrier frequency (MHz): 2480
Channel No.:78
Modulation type: 8DPSK

Dwell Time

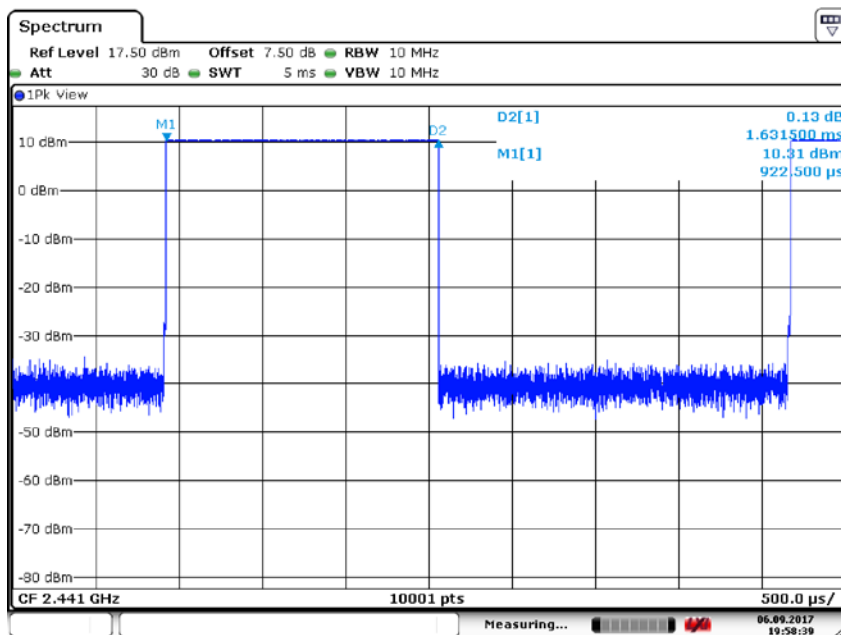
Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

Modulation type: GFSK

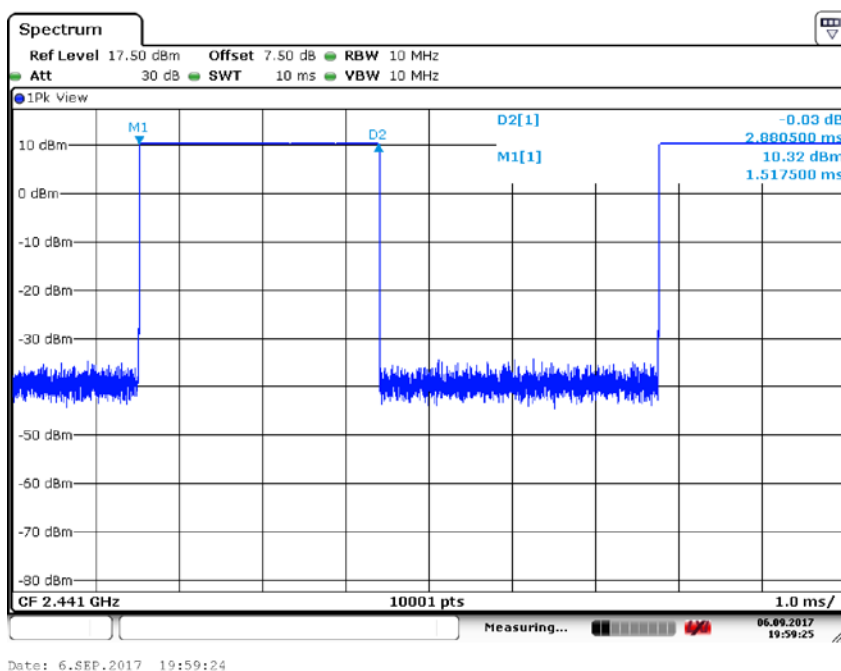
Packet type	Time slot length μs	Dwell time	Dwell time ms
DH1	371	time slot length *31.6 *1600/2 /79	118
DH3	1631	time slot length * 31.6 *1600/4 /79	260
DH5	2880	time slot length * 31.6 *1600/6 /79	307



Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: GFSK



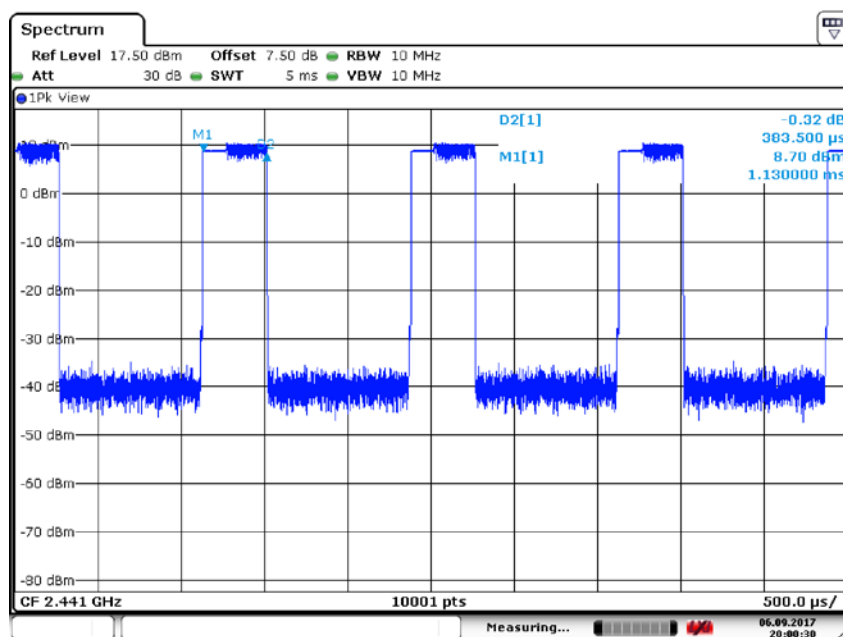
Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: GFSK



Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: GFSK

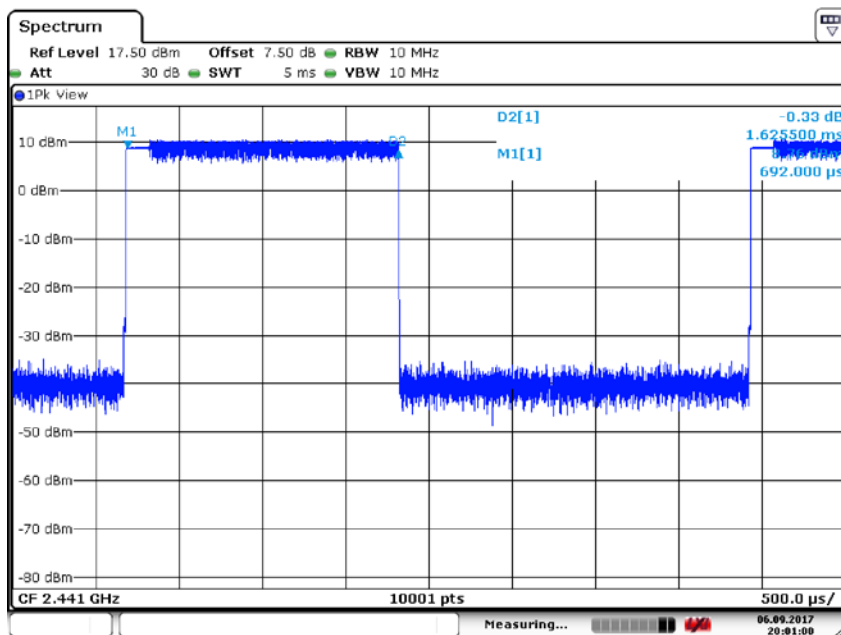
Modulation type: $\pi/4$ DQPSK

Packet type	Time slot length μ s	Dwell time	Dwell time ms
DH1	384	time slot length *31.6 *1600/2 /79	123
DH3	1626	time slot length * 31.6 *1600/4 /79	260
DH5	2867	time slot length * 31.6 *1600/6 /79	306



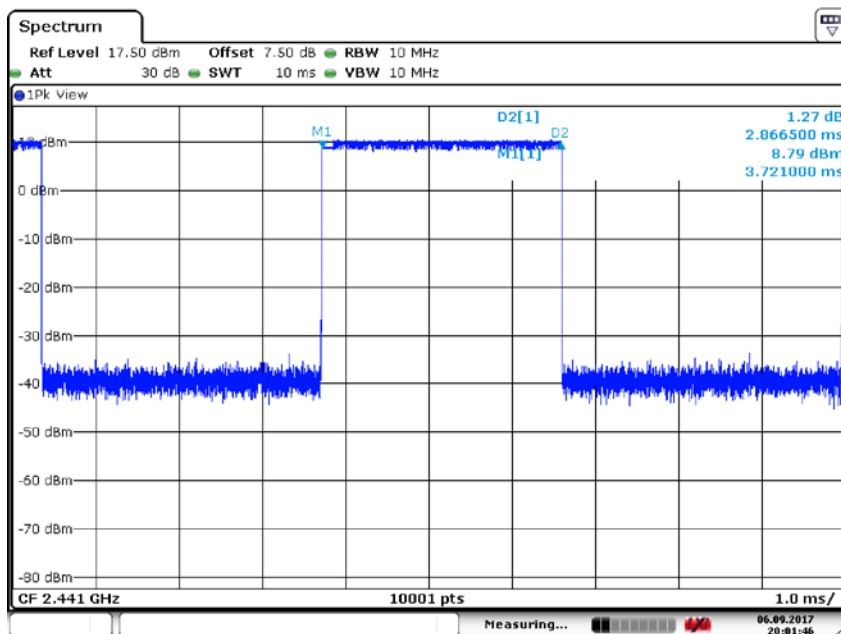
Date: 6.SEP.2017 20:00:30

Carrier frequency (MHz): 2441
Packet type: DH1
Modulation type: $\pi/4$ DQPSK



Date: 6.SEP.2017 20:01:00

Carrier frequency (MHz): 2441
Packet type: DH3
Modulation type: $\pi/4$ DQPSK

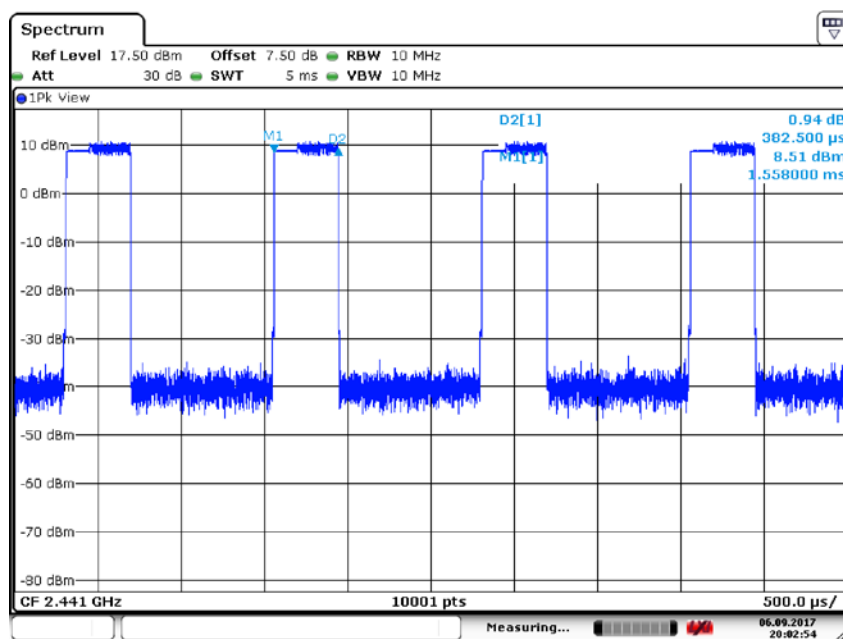


Date: 6.SEP.2017 20:01:45

Carrier frequency (MHz): 2441
Packet type: DH5
Modulation type: $\pi/4$ DQPSK

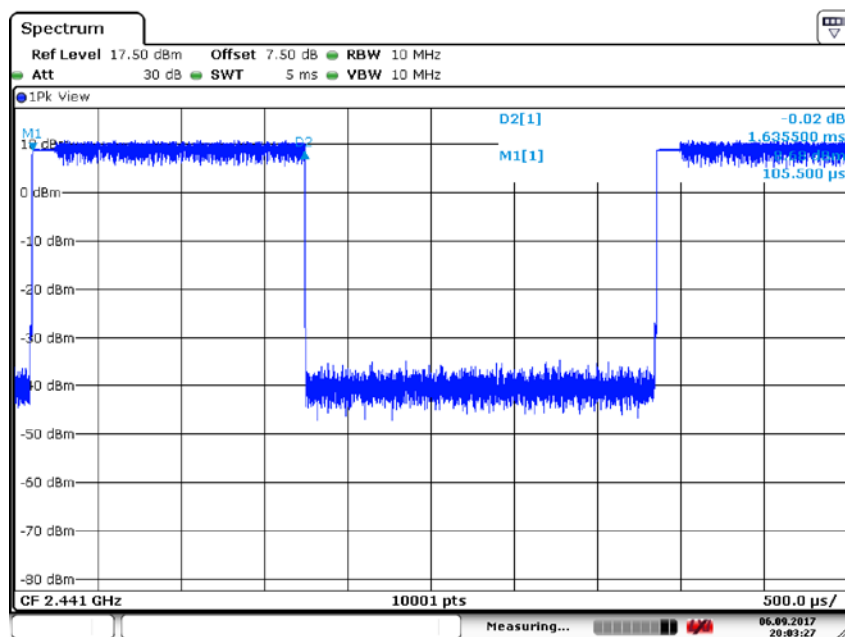
Modulation type: 8DPSK

Packet type	Time slot length μs	Dwell time	Dwell time ms
DH1	383	time slot length *31.6 *1600/2 /79	123
DH3	1636	time slot length * 31.6 *1600/4 /79	262
DH5	2869	time slot length * 31.6 *1600/6 /79	306



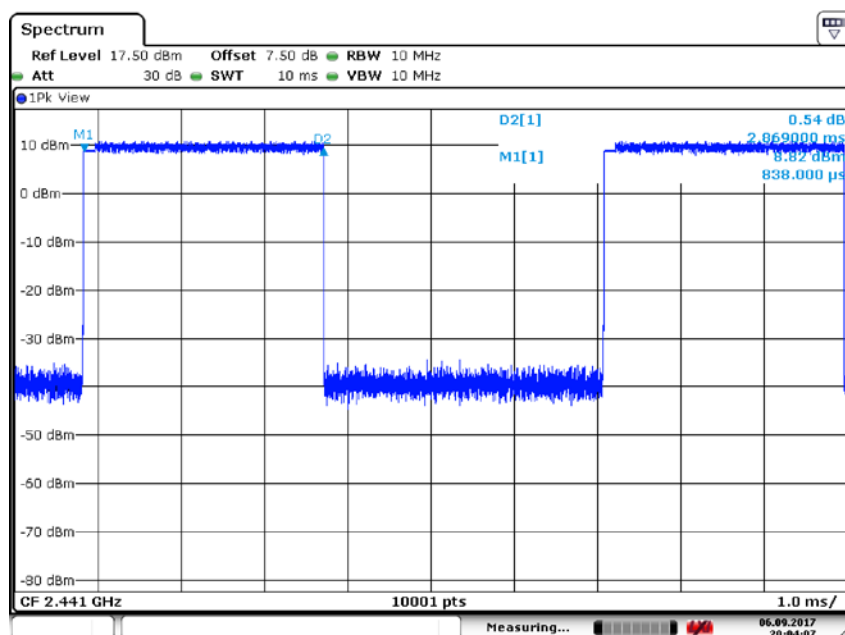
Date: 6.SEP.2017 20:02:54

Carrier frequency (MHz): 2441
Packet type:DH1
Modulation type: 8DPSK



Date: 6.SEP.2017 20:03:27

Carrier frequency (MHz): 2441
 Packet type:DH3
 Modulation type: 8DPSK



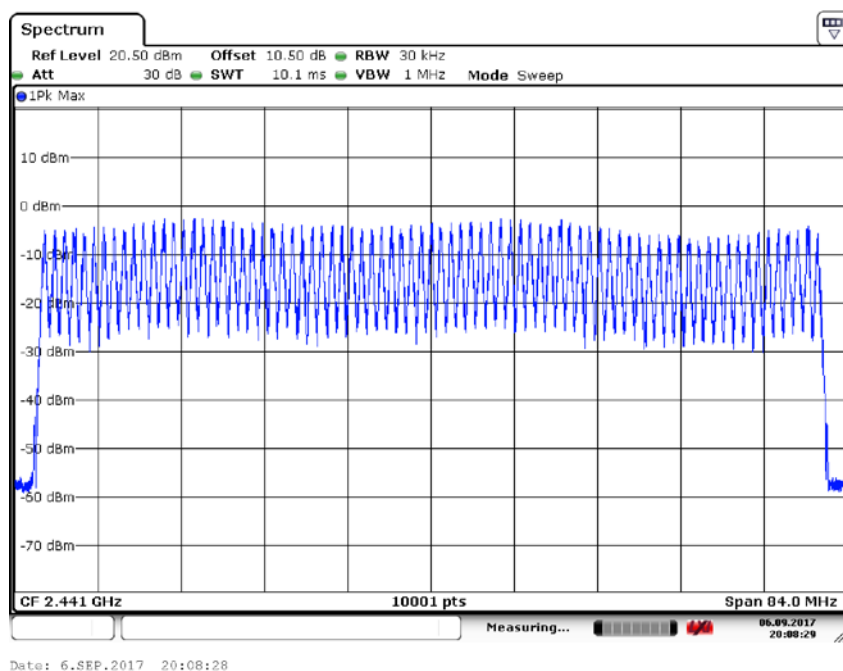
Date: 6.SEP.2017 20:04:06

Carrier frequency (MHz): 2441
 Packet type:DH5
 Modulation type: 8DPSK

Number of Hopping Frequencies

Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

Op-mode	Result
Hopping mode	79

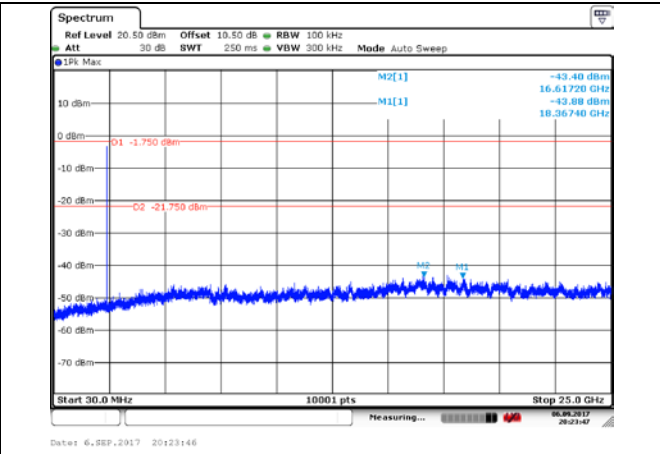
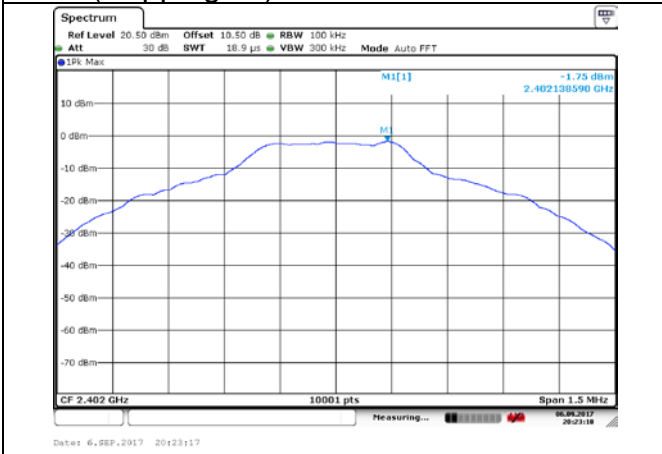


Op-mode: Hopping mode

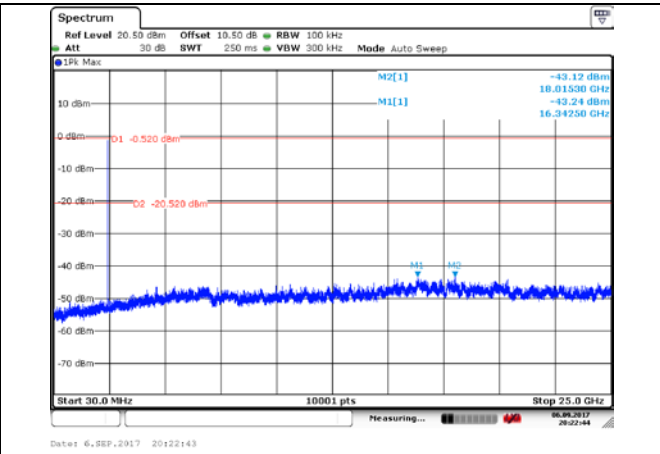
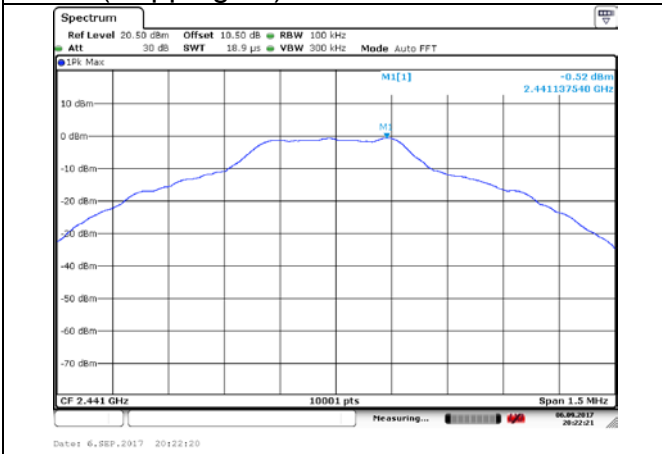
Conducted out of band emission measurement

Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB
GFSK

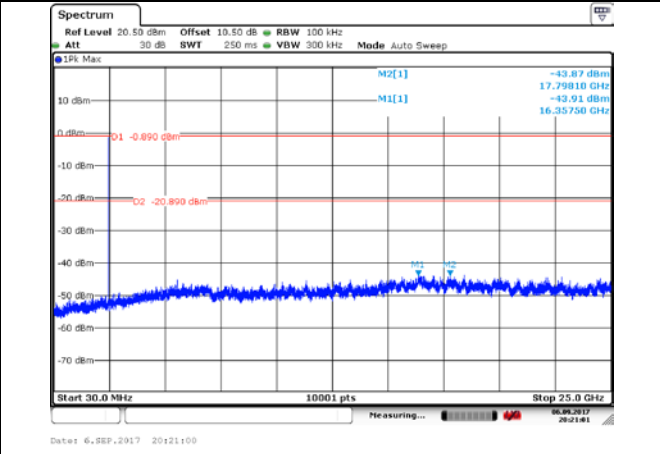
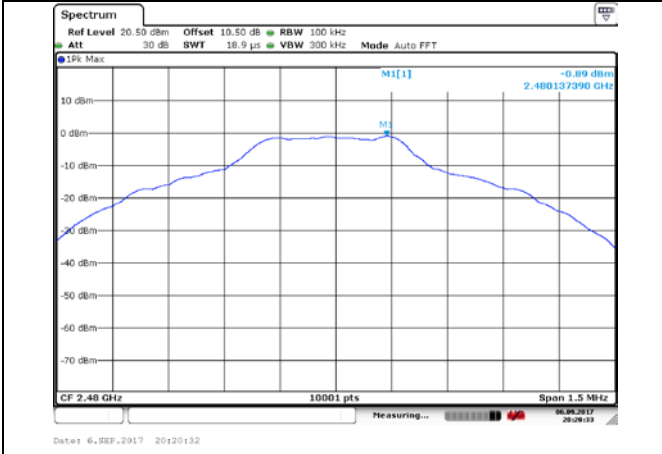
CH0 (Hopping off)



CH39(Hopping off)

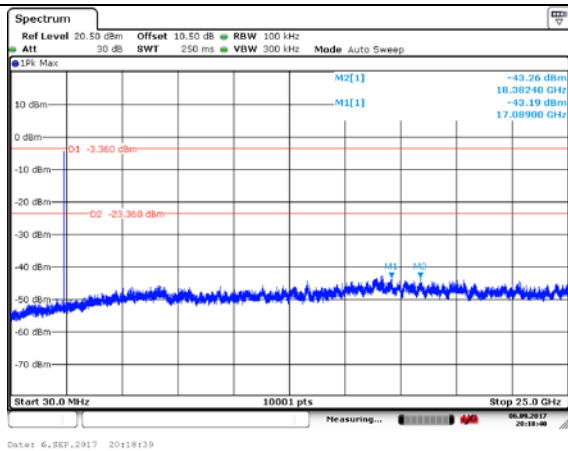
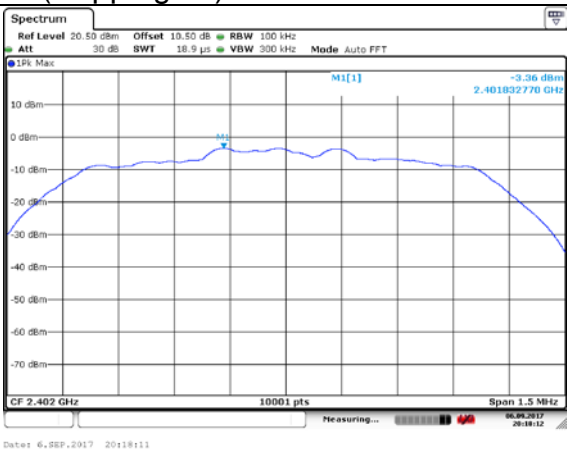


CH78(Hopping off)

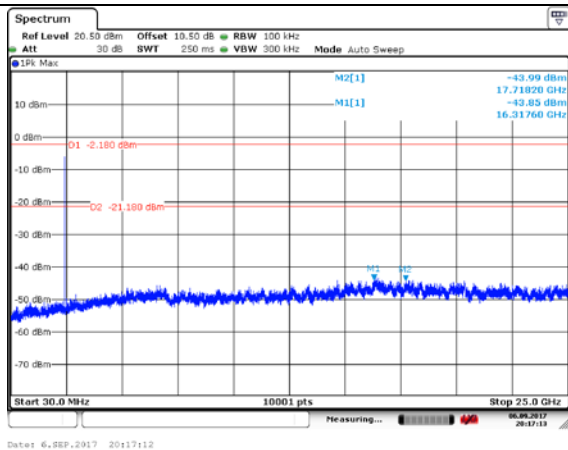
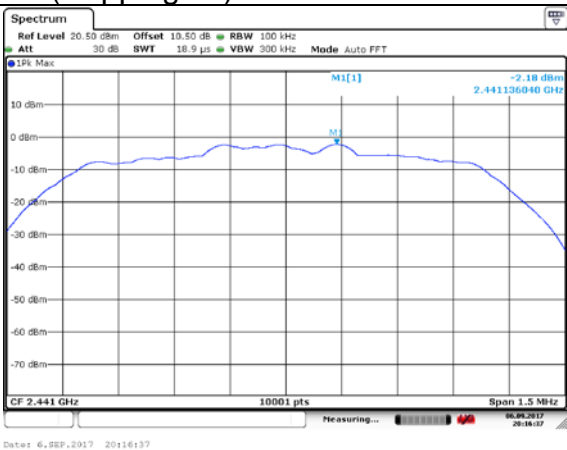


$\pi/4$ DQPSK

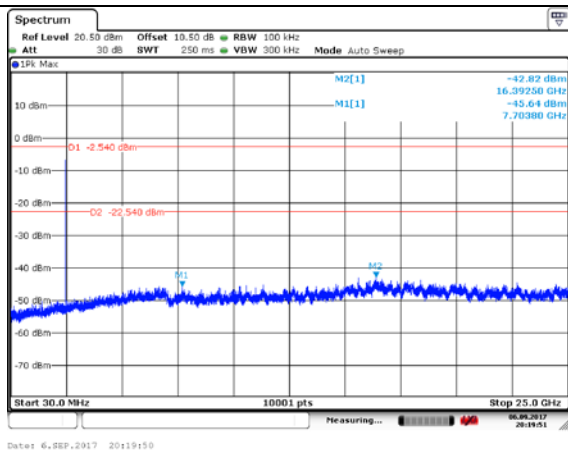
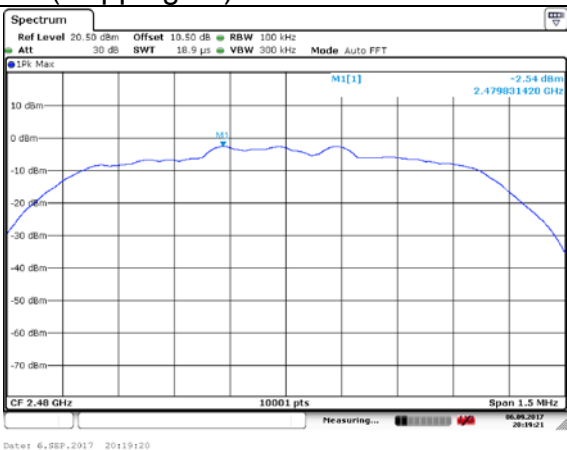
CH0 (Hopping off)



CH39(Hopping off)

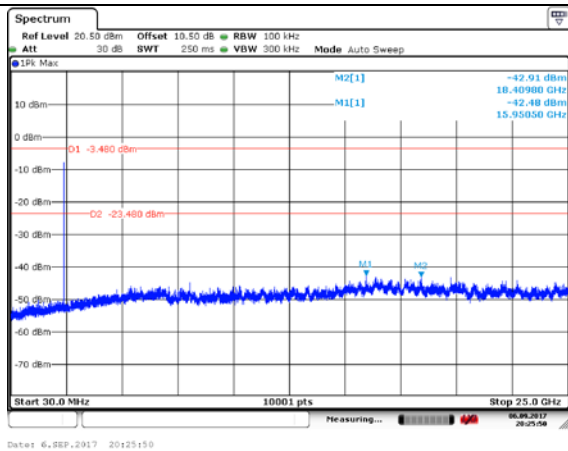
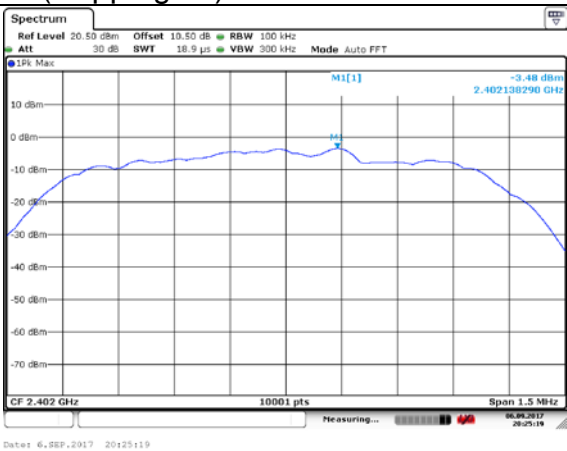


CH78(Hopping off)

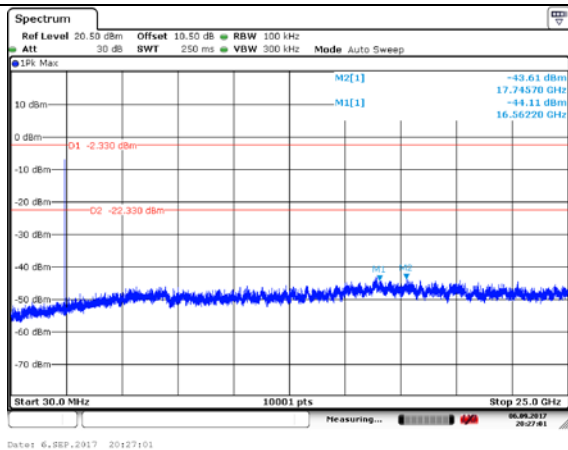
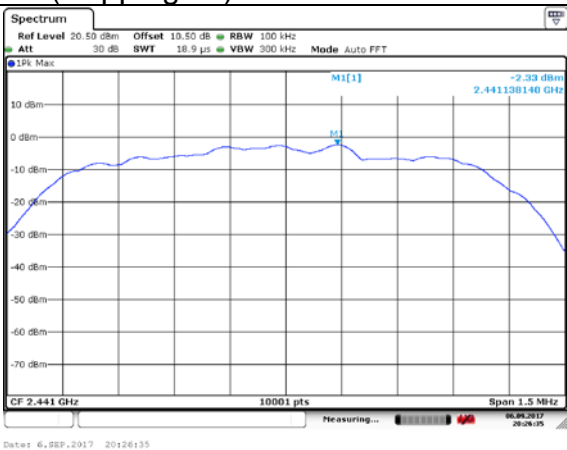


8DPSK

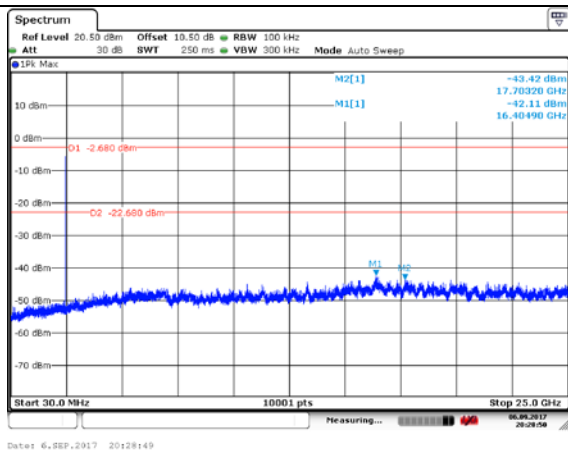
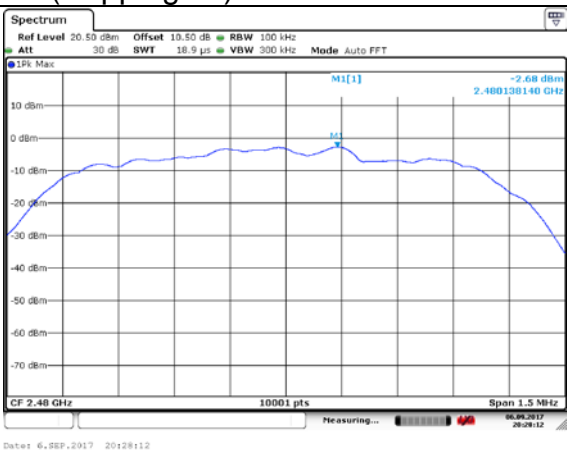
CH0 (Hopping off)



CH39(Hopping off)



CH78(Hopping off)

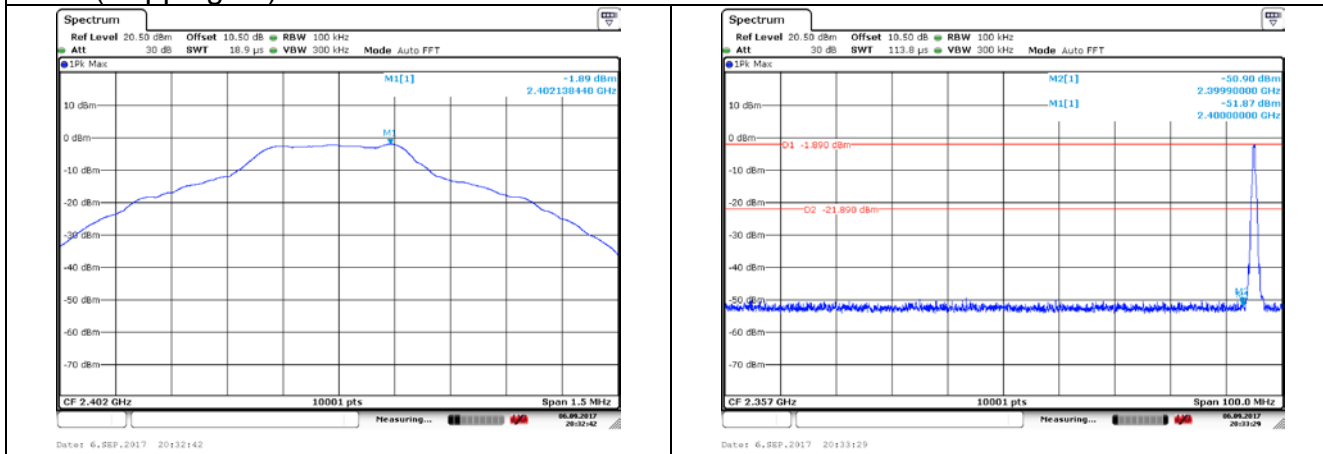


Band Edge measurement

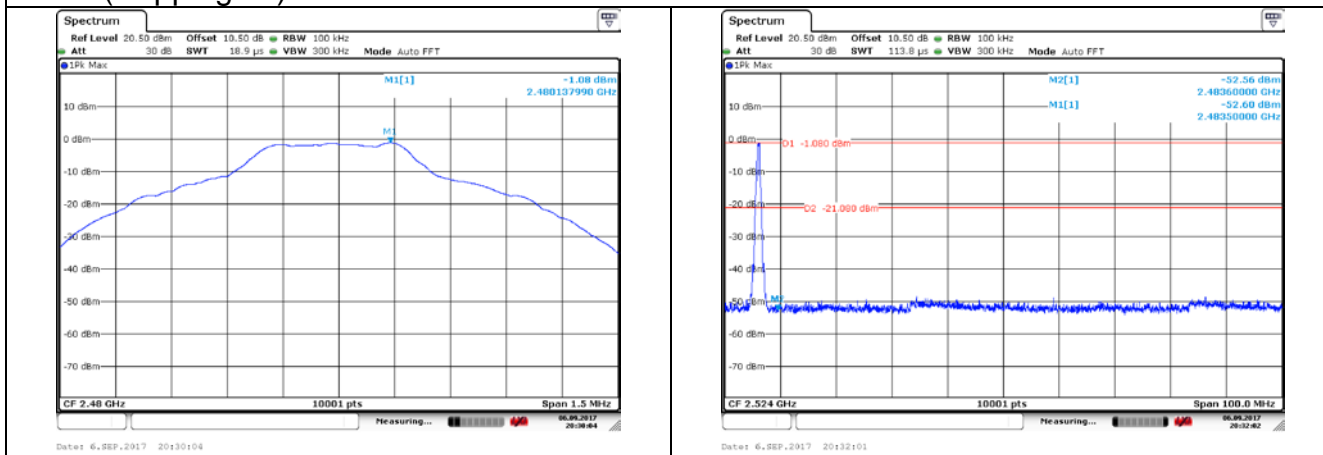
Offset 10.5dB = Attenuator 10dB+ Temporary antenna connector loss 0.2dB+ Cable loss 0.3dB

GFSK

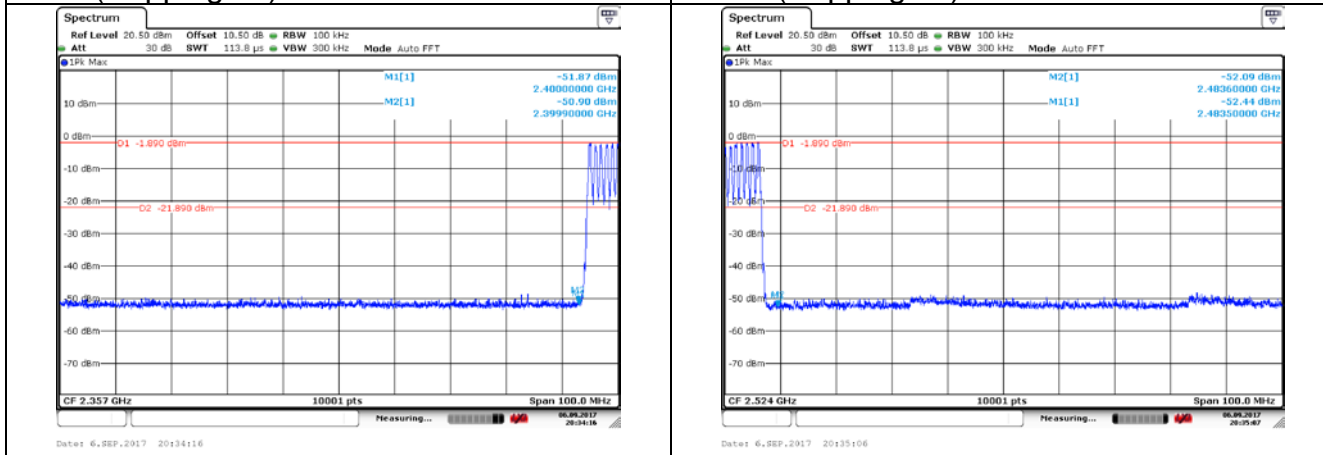
CH0 (Hopping off)



CH78 (Hopping off)

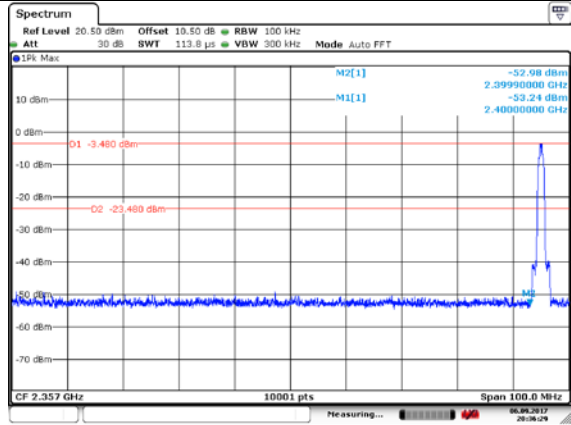
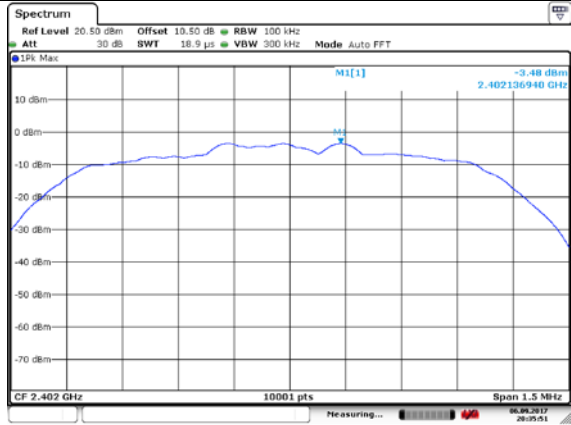


CH0 (Hopping on)

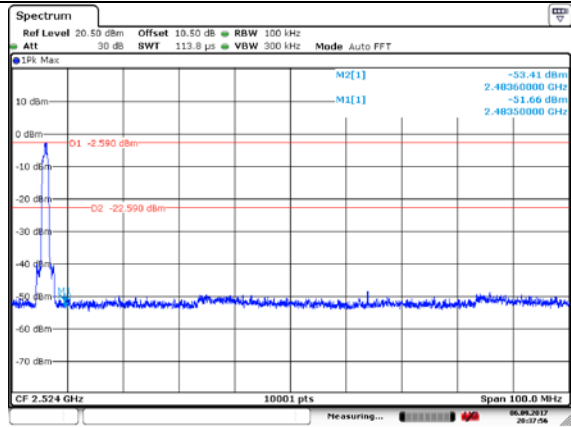
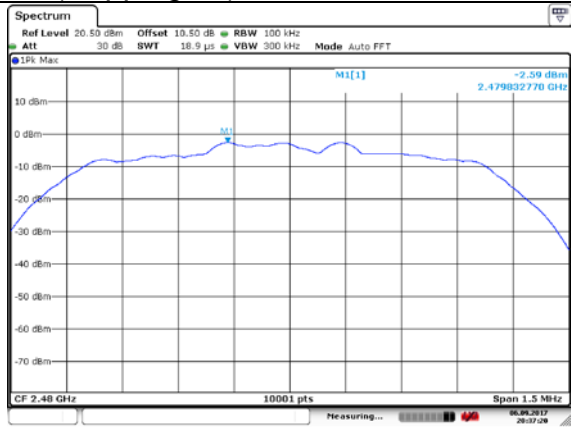


π /4DQPSK

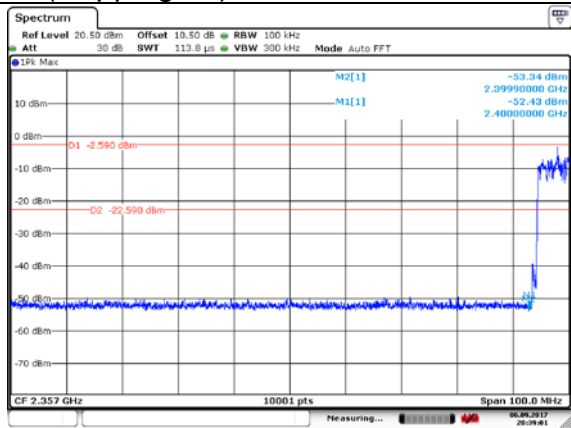
CH0 (Hopping off)



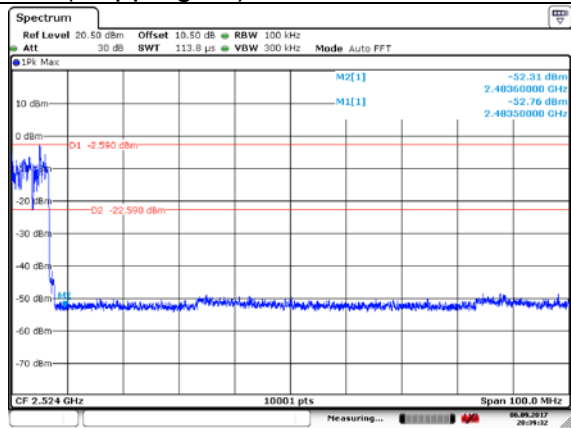
CH78(Hopping off)



CH0 (Hopping on)

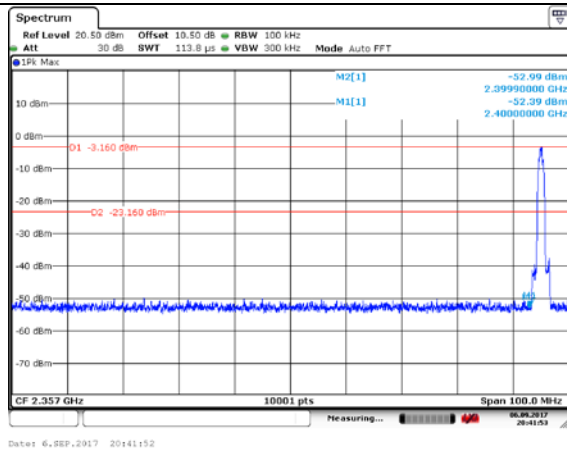
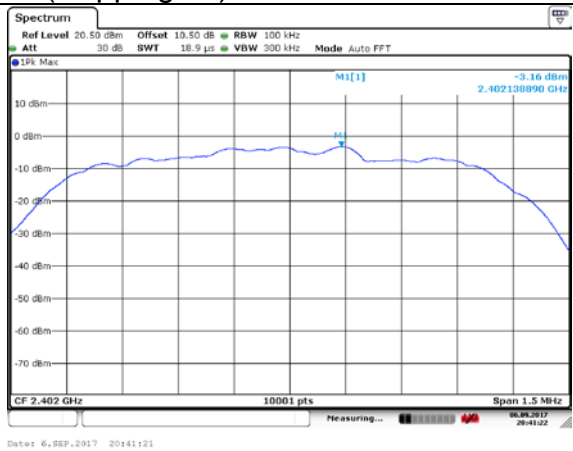


CH78 (Hopping on)

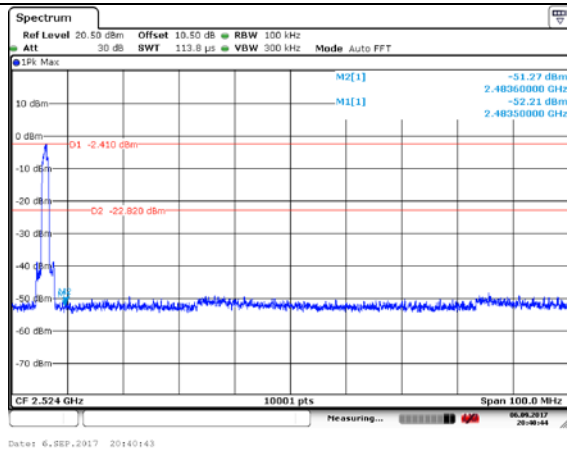
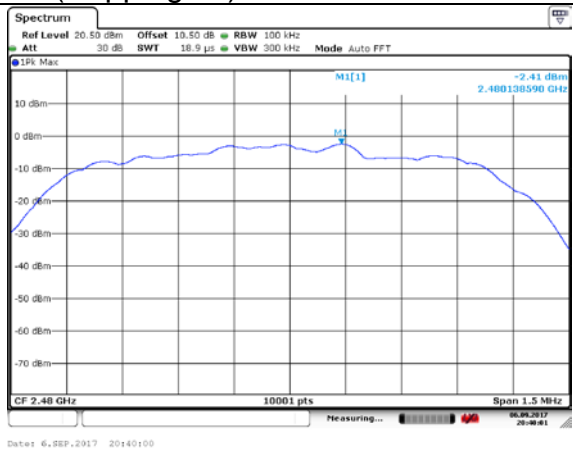


8DPSK

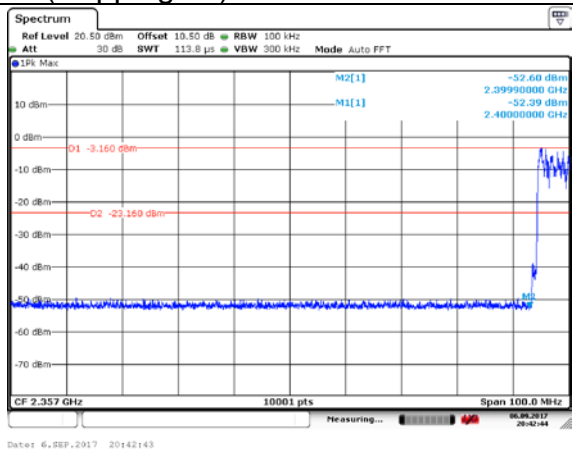
CH0 (Hopping off)



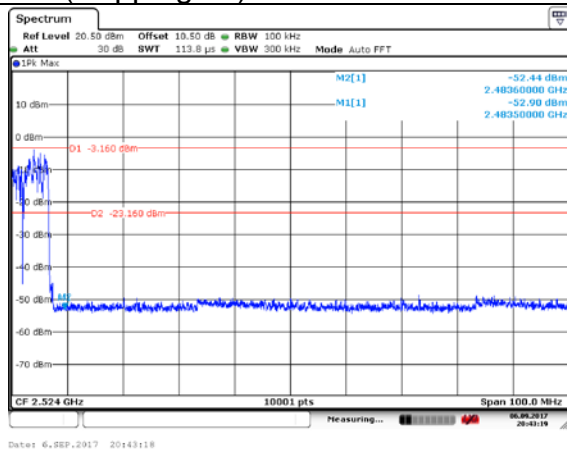
CH78(Hopping off)



CH0 (Hopping on)



CH78 (Hopping on)



APPENDIX B – TEST DATA OF RADIATED EMISSION

Spurious Radiated Emissions

Carrier frequency (MHz): 2402

Channel No.:0

Test Mode: GFSK

Polarity: Vertical

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	100.14	66.14	N/A	N/A	8.90	25.10
2	2390	45.90	11.90	-28.10	74.00	8.90	25.10

Carrier frequency (MHz): 2402

Channel No.:0

Test Mode: GFSK

Polarity: Horizontal

Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	93.99	59.99	N/A	N/A	8.90	25.10
2	2390	40.39	6.39	-33.61	74.00	8.90	25.10

Carrier frequency (MHz): 2402

Channel No.:0

Test Mode: GFSK

Polarity: Vertical

Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	86.54	52.54	N/A	N/A	8.90	25.10
2	2390	34.27	0.27	-19.73	54.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: GFSK
Polarity: Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	81.63	47.63	N/A	N/A	8.90	25.10
2	2390	32.93	-1.07	-21.07	54.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	100.34	66.34	N/A	N/A	8.90	25.10
2	2483.5	46.08	12.08	-27.92	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
Polarity: Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	95.16	61.16	N/A	N/A	8.90	25.10
2	2483.5	44.44	10.44	-29.56	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	93.03	59.03	N/A	N/A	8.90	25.10
2	2483.5	40.65	6.65	-13.35	54.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: GFSK
Polarity: Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	85.90	51.90	N/A	N/A	8.90	25.10
2	2483.5	39.16	5.16	-14.84	54.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: $\pi/4$ DQPSK
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	98.98	64.98	N/A	N/A	8.90	25.10
2	2390	45.84	11.84	-28.16	74.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: $\pi/4$ DQPSK
Polarity: Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	94.68	60.68	N/A	N/A	8.90	25.10
2	2390	42.25	8.25	-31.75	74.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: $\pi/4$ DQPSK
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	85.54	51.54	N/A	N/A	8.90	25.10
2	2390	33.75	-0.25	-20.25	54.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: $\pi/4$ DQPSK
Polarity: Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	84.29	50.29	N/A	N/A	8.90	25.10
2	2390	33.36	-0.64	-20.64	54.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: $\pi/4$ DQPSK
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	99.51	65.51	N/A	N/A	8.90	25.10
2	2483.5	46.56	12.56	-27.44	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: $\pi/4$ DQPSK
Polarity: Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	95.49	61.49	N/A	N/A	8.90	25.10
2	2483.5	44.32	10.32	-29.68	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: $\pi/4$ DQPSK
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	93.08	59.08	N/A	N/A	8.90	25.10
2	2483.5	39.71	5.71	-14.29	54.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: $\pi/4$ DQPSK
Polarity: Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	86.58	52.58	N/A	N/A	8.90	25.10
2	2483.5	39.60	5.60	-14.40	54.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	100.95	66.95	N/A	N/A	8.90	25.10
2	2390	45.63	11.63	-28.37	74.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
Polarity: Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	95.56	61.56	N/A	N/A	8.90	25.10
2	2390	44.81	10.81	-29.19	74.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	93.19	59.19	N/A	N/A	8.90	25.10
2	2390	41.37	7.37	-12.63	54.00	8.90	25.10

Carrier frequency (MHz): 2402
Channel No.:0
Test Mode: 8DPSK
Polarity: Horizontal
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2402	85.79	51.79	N/A	N/A	8.90	25.10
2	2390	40.12	6.12	-13.88	54.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
Polarity: Vertical
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	101.64	67.64	N/A	N/A	8.90	25.10
2	2483.5	47.69	13.69	-26.31	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
Polarity: Horizontal
Detector: Peak

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	95.42	61.42	N/A	N/A	8.90	25.10
2	2483.5	45.10	11.10	-28.90	74.00	8.90	25.10

Carrier frequency (MHz): 2480
Channel No.:78
Test Mode: 8DPSK
Polarity: Vertical
Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	94.99	60.99	N/A	N/A	8.90	25.10
2	2483.5	40.26	6.26	-13.74	54.00	8.90	25.10

Carrier frequency (MHz): 2480

Channel No.:78

Test Mode: 8DPSK

Polarity: Horizontal

Detector: Average

No	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	cable loss (dB)	antenna factor (dB)
1	2480	87.78	53.78	N/A	N/A	8.90	25.10
2	2483.5	39.96	5.96	-14.04	54.00	8.90	25.10

Sample Calculations

Determining Spurious Emissions Levels

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
31.96	21.30	19.7	1.6	Horizontal	40.0
49.51	22.30	9.5	12.8	Vertical	40.0
84.11	27.90	11.6	16.3	Horizontal	43.5
420.64	18.40	19.8	-1.4	Vertical	43.5
540.08	29.10	22.4	6.7	Horizontal	43.5
955.91	28.60	28.9	-0.3	Vertical	43.5

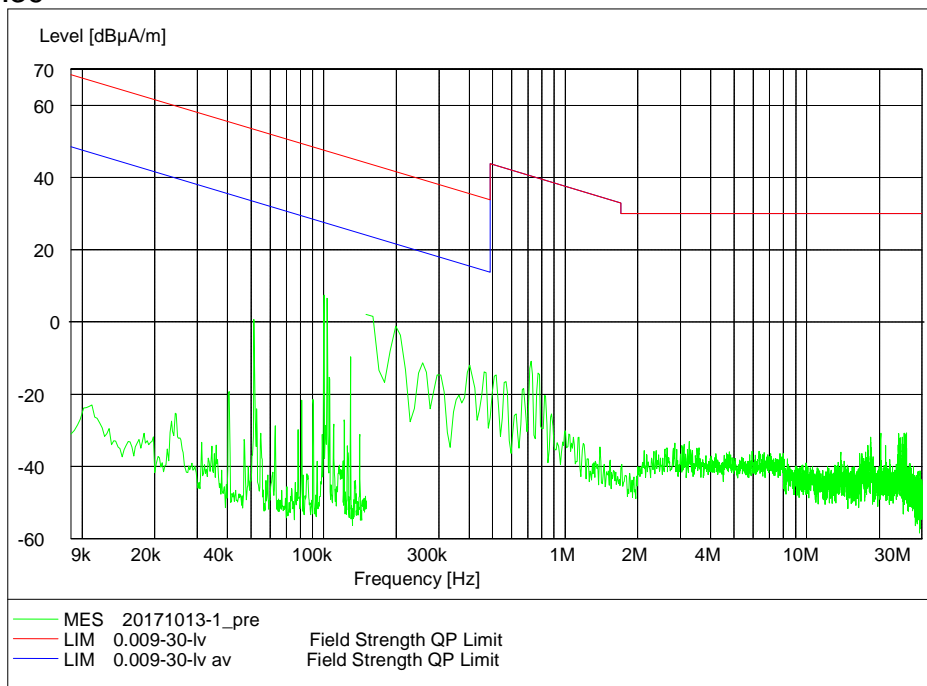
For $\pi/4$ DQPSK
Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
31.12	20.50	20.2	0.3	Vertical	40.0
47.95	22.80	10.2	12.6	Horizontal	40.0
87.09	14.60	11.8	2.8	Vertical	43.5
420.64	18.50	19.8	-1.3	Vertical	43.5
540.08	25.00	22.4	2.6	Horizontal	43.5
947.89	28.50	28.7	-0.2	Vertical	43.5

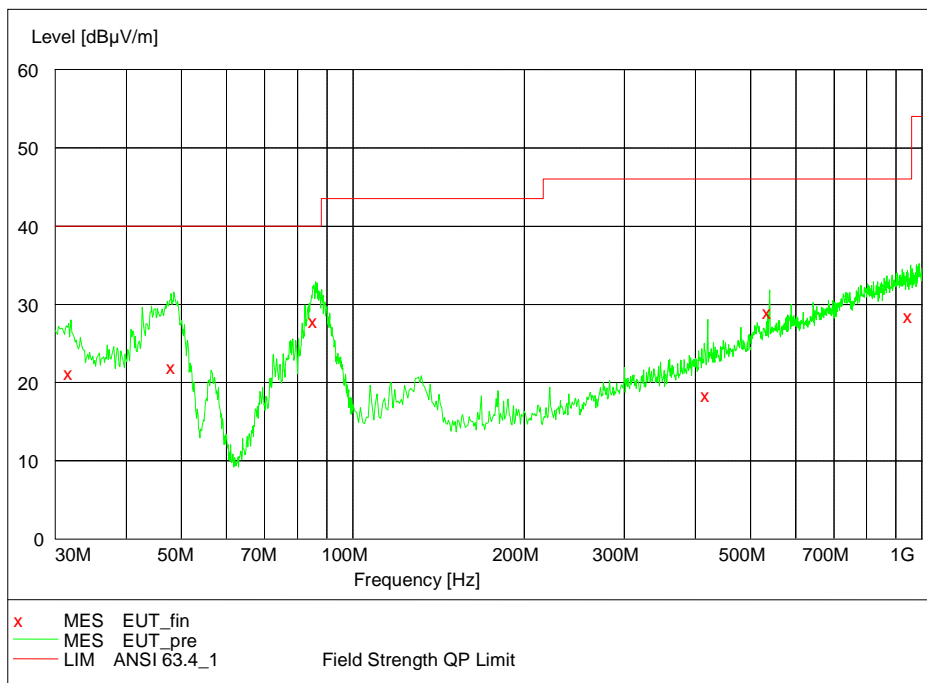
For 8DPSK
Channel No.:39

Frequency (MHz)	Result (dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)
31.96	20.10	19.7	0.4	Vertical	40.0
46.97	23.60	10.8	12.8	Vertical	40.0
86.25	23.80	11.8	12.0	Vertical	43.5
459.91	19.30	20.8	-1.5	Horizontal	43.5
540.08	21.90	22.4	-0.5	Vertical	43.5
940.88	28.40	28.7	-0.3	Vertical	43.5

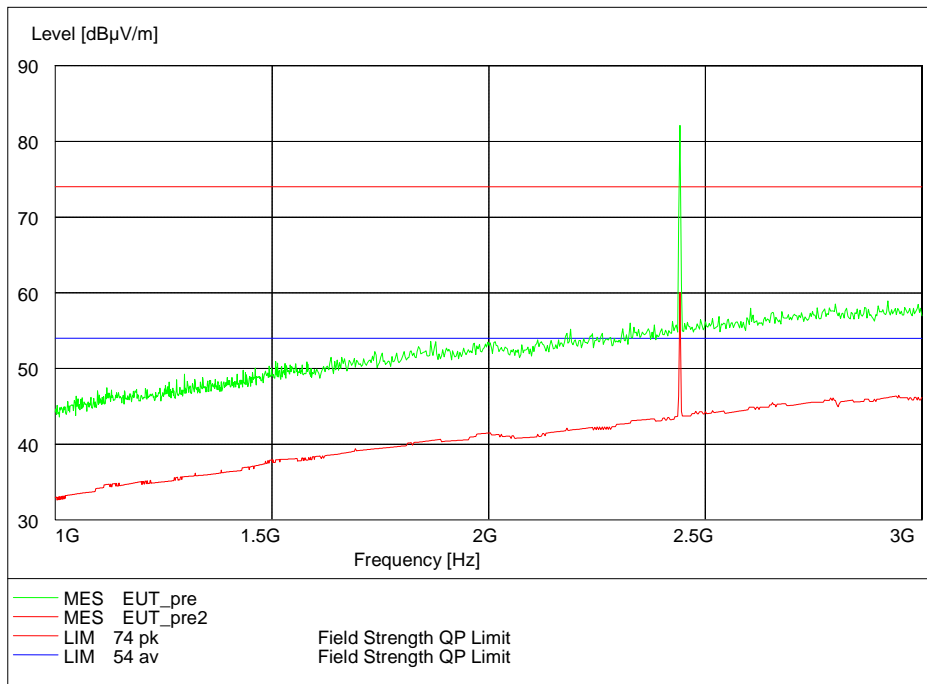
Carrier frequency (MHz): 2441
Channel No.:39



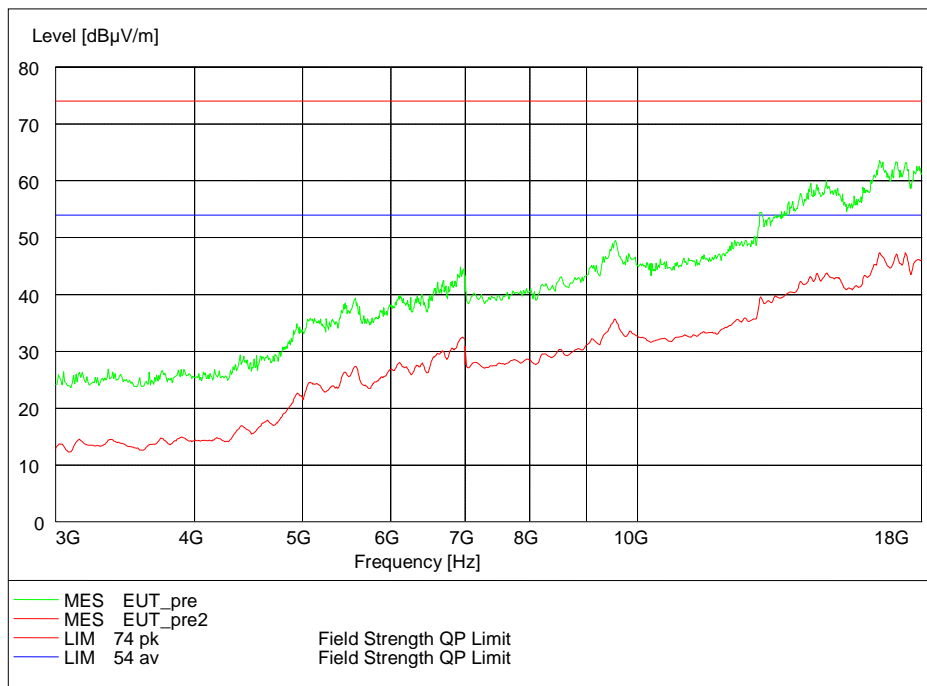
Frequency Range: 9KHz-30MHz
Detector: QP mode
Modulation type: GFSK



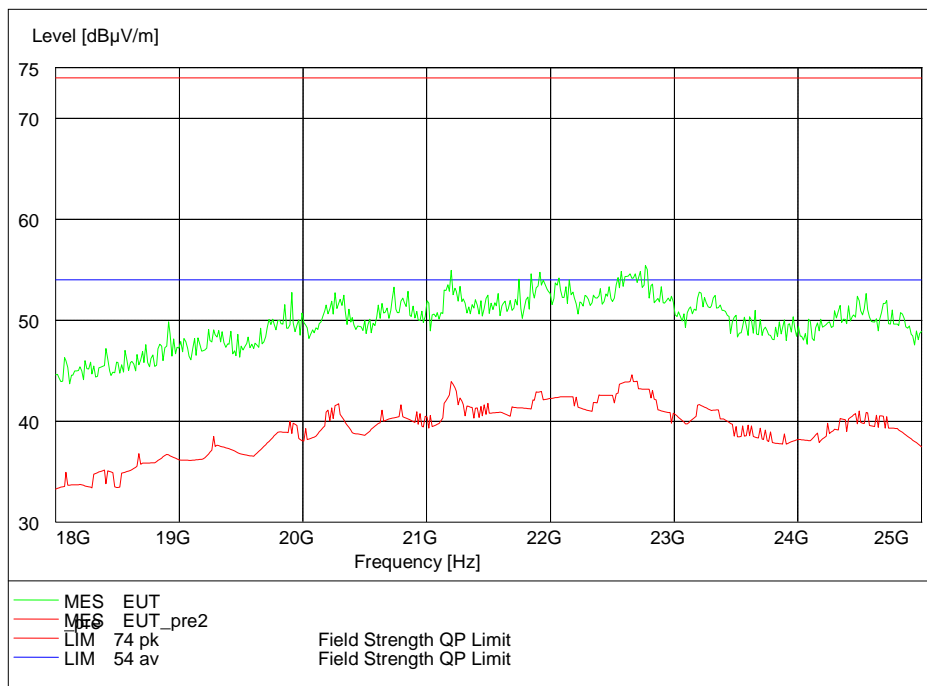
Frequency Range: 30MHz-1000MHz
Detector: QP mode
Modulation type: GFSK



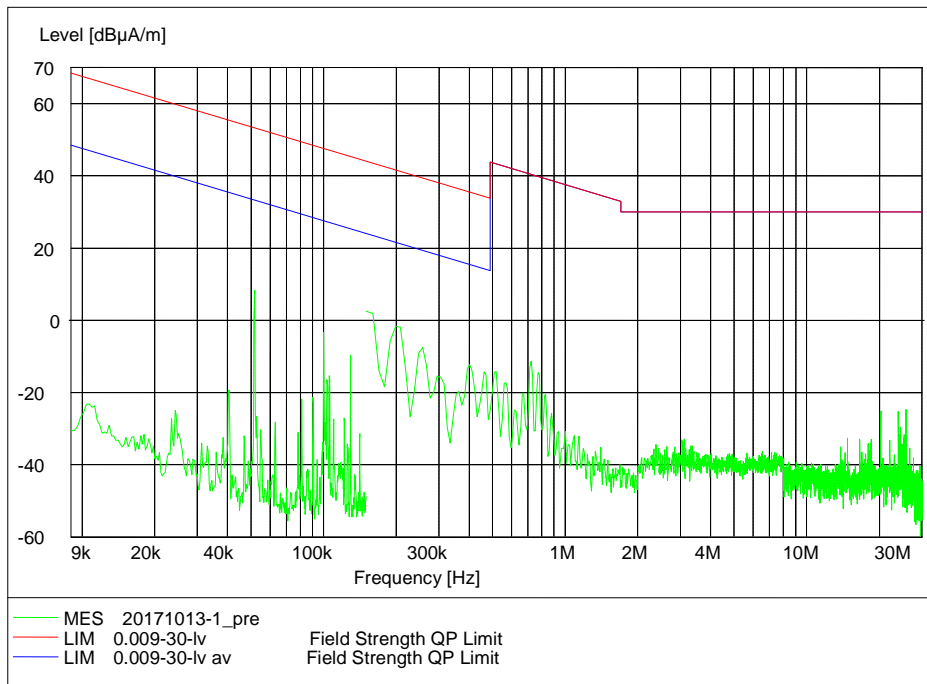
Frequency Range: 1GHz-3GHz
 Detector: Av mode and PK mode
 Modulation type: GFSK



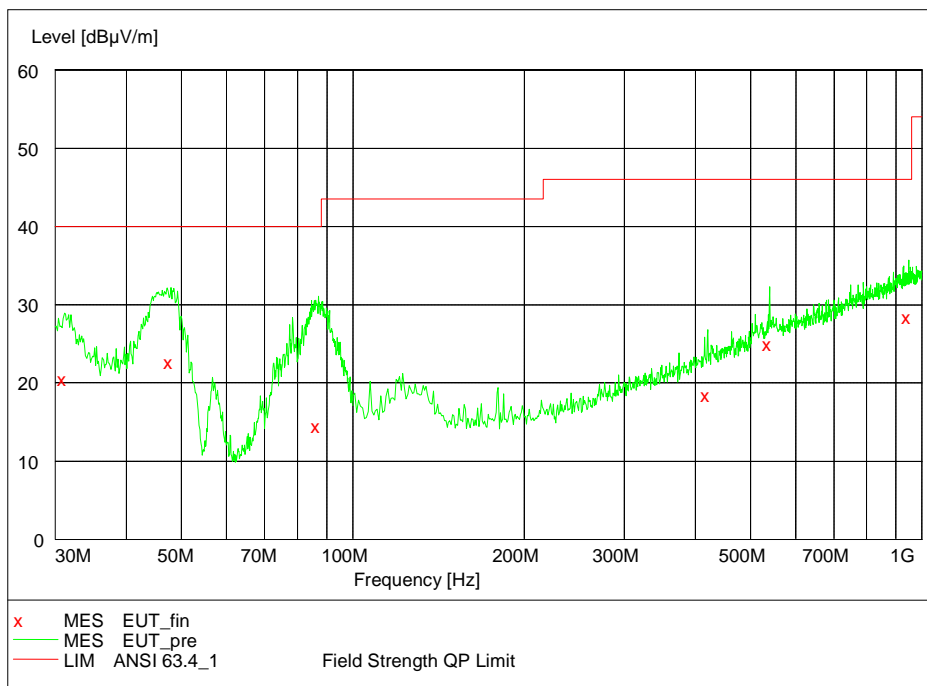
Frequency Range: 3GHz-18GHz
 Detector: Av mode and PK mode
 Modulation type: GFSK



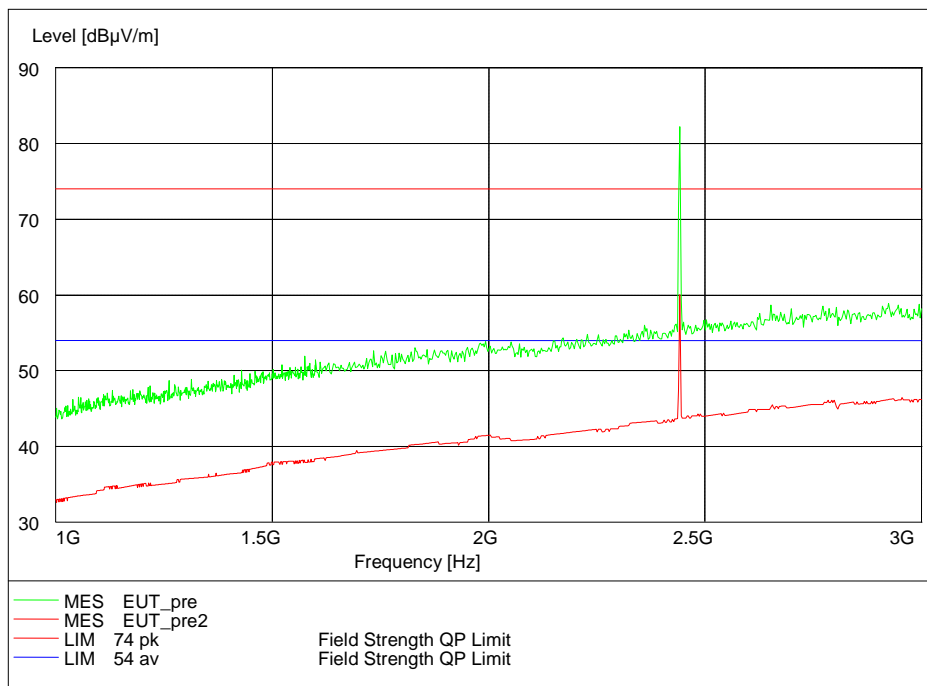
Frequency Range: 18GHz-25GHz
 Detector: Av mode and PK mode
 Modulation type: GFSK



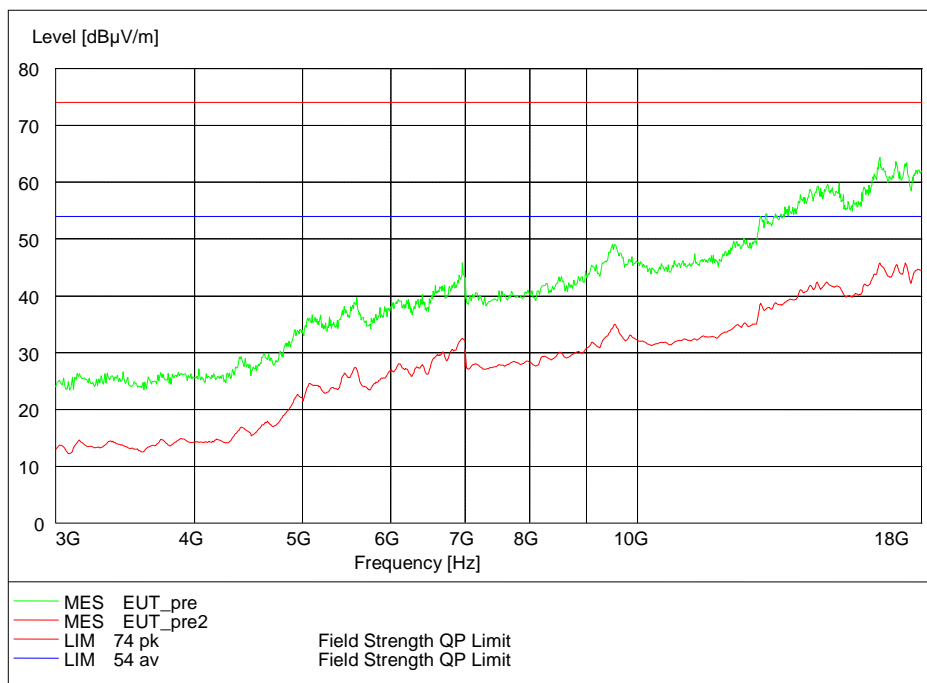
Frequency Range: 9KHz-30MHz
Detector: QP mode
Modulation type: π/4DQPSK



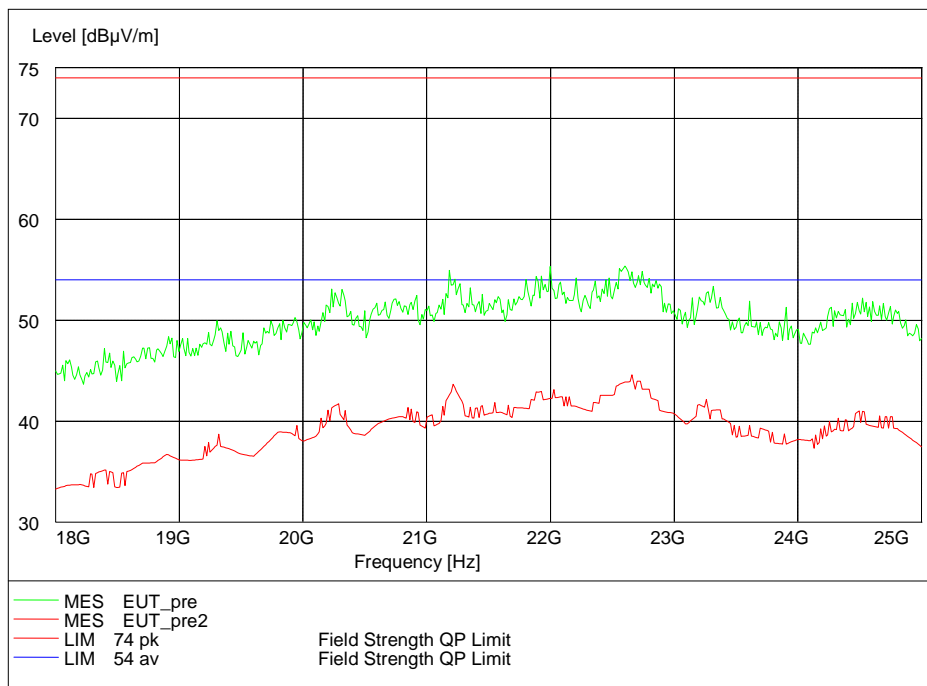
Frequency Range: 30MHz-1000 MHz
Detector: QP mode
Modulation type: π/4DQPSK



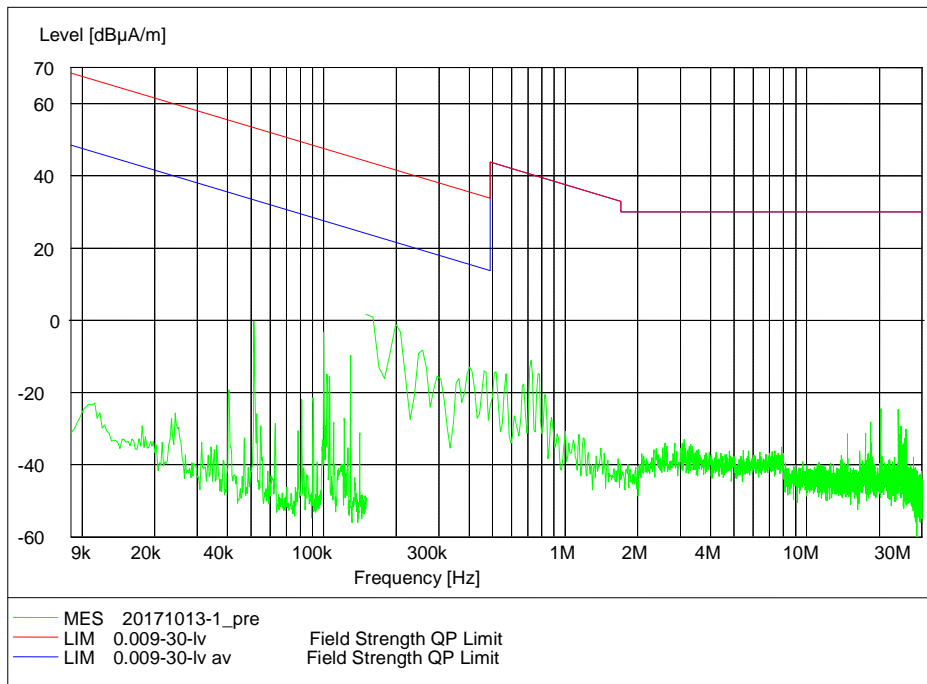
Frequency Range: 1GHz-3GHz
Detector: Av mode and PK mode
Modulation type: $\pi/4$ DQPSK



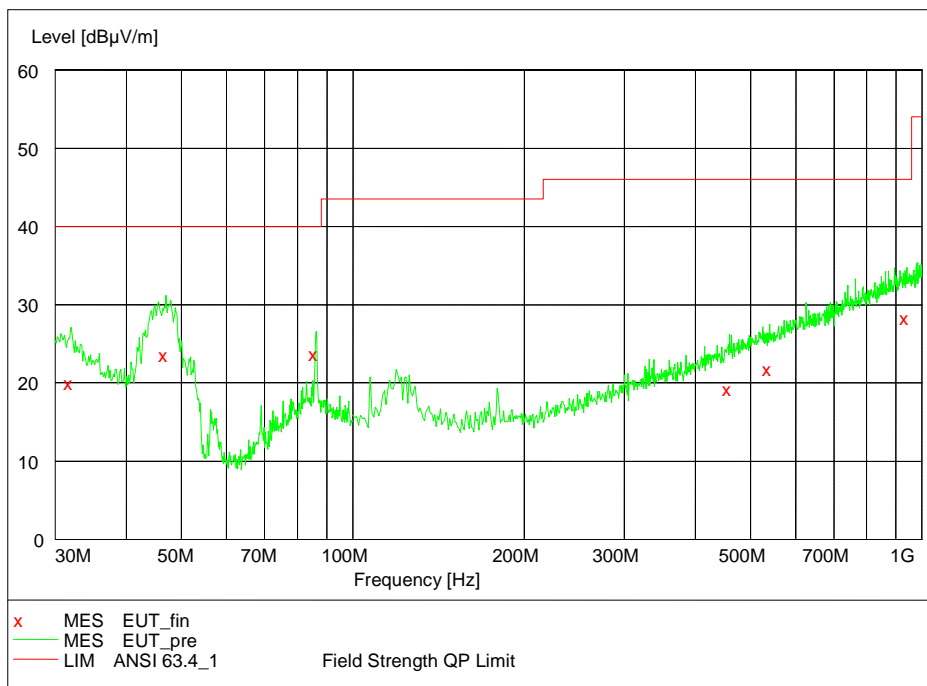
Frequency Range: 3GHz-18GHz
Detector: Av mode and PK mode
Modulation type: $\pi/4$ DQPSK



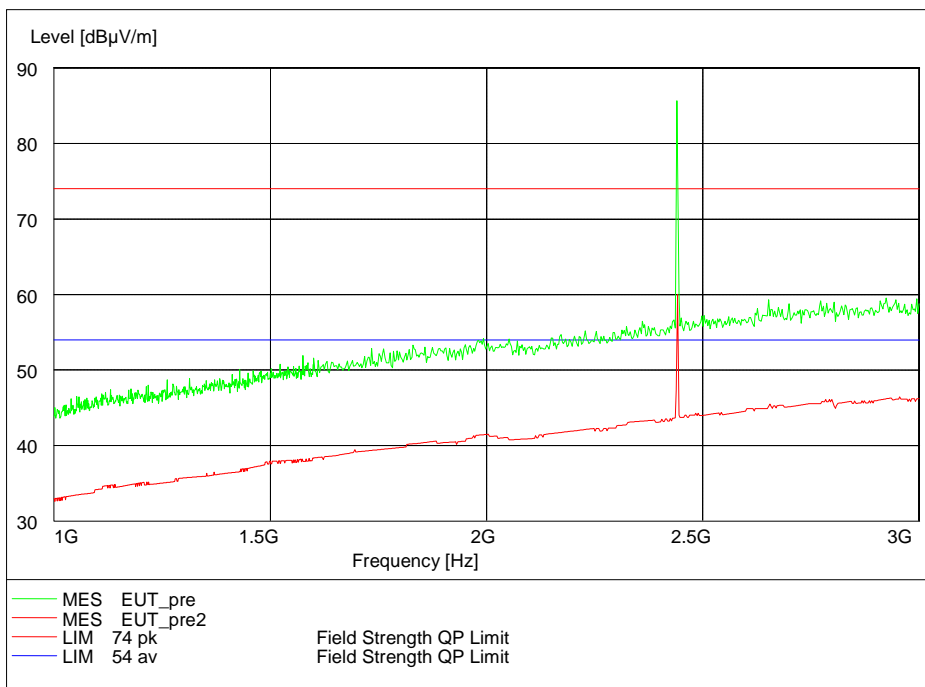
Frequency Range: 18GHz-25GHz
 Detector: Av mode and PK mode
 Modulation type: $\pi/4$ DQPSK



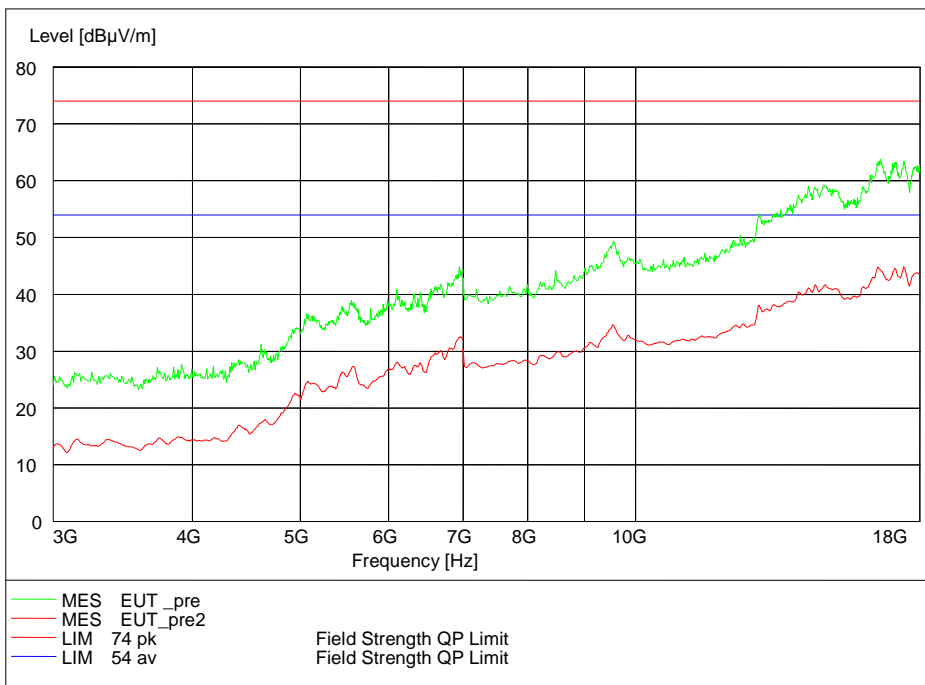
Frequency Range: 9KHz-30MHz
Detector: QP mode
Modulation type: 8DPSK



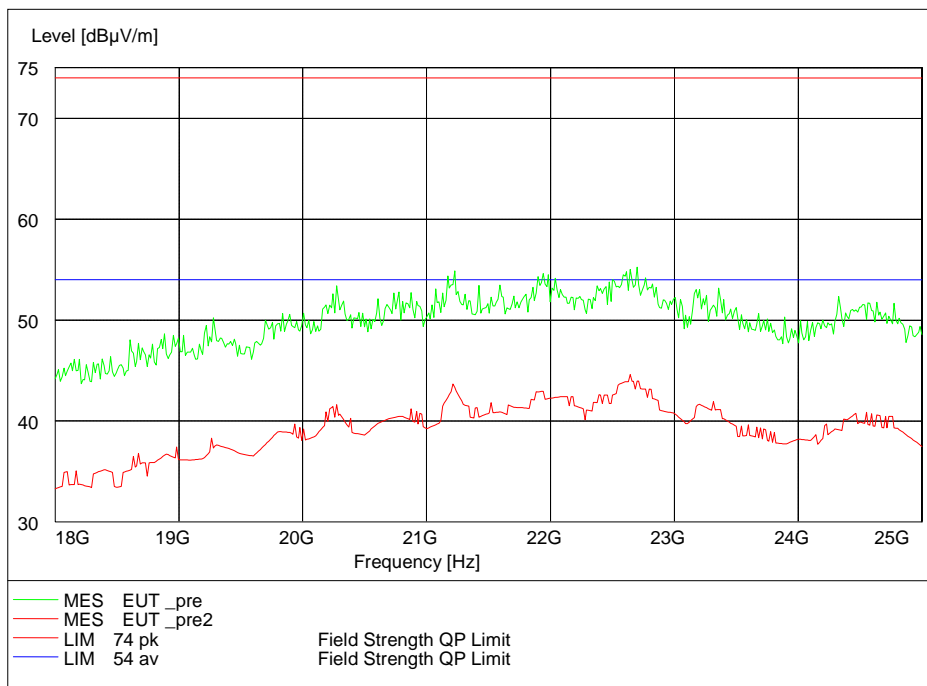
Frequency Range: 30MHz-1000 MHz
Detector: QP mode
Modulation type: 8DPSK



Frequency Range: 1GHz-3GHz
Detector: Av mode and PK mode
Modulation type: 8DPSK



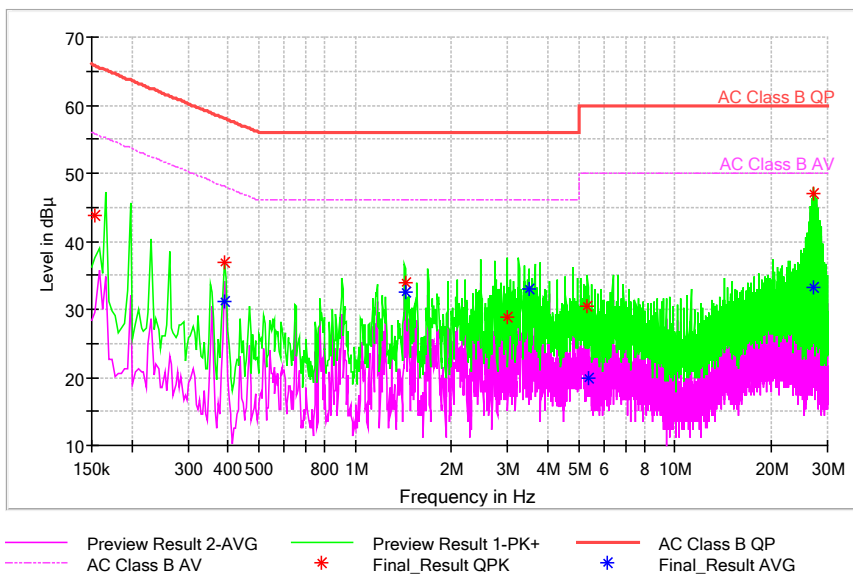
Frequency Range: 3GHz-18GHz
Detector: Av mode and PK mode
Modulation type: 8DPSK



Frequency Range: 18GHz-25GHz
 Detector: Av mode and PK mode
 Modulation type: 8DPSK

AC Power line Conducted Emission

Full Spectrum



Comment

L Line

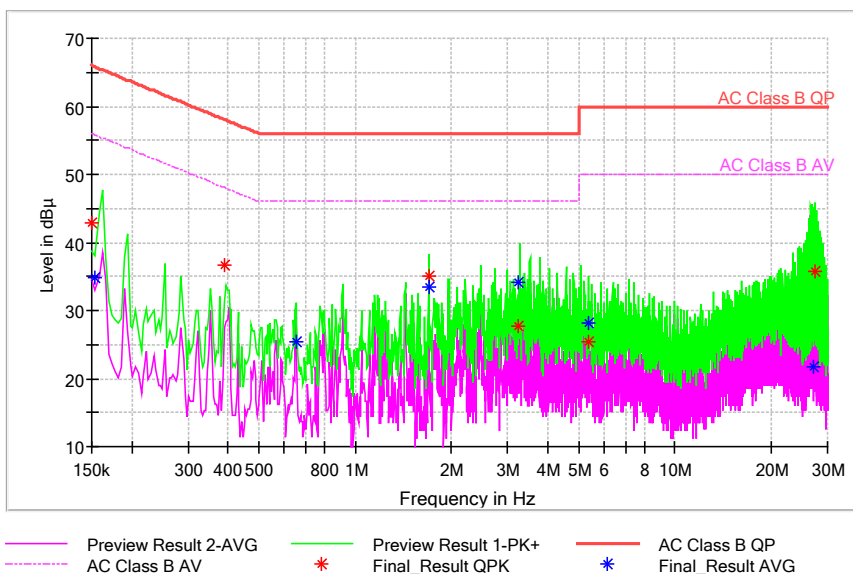
MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency MHz	QuasiPeak dBµV	Limit dBµV	Margin dB
0.154000	43.69	65.78	22.09
0.391000	36.83	58.04	21.21
1.435000	33.99	56.00	22.01
2.991000	28.78	56.00	27.22
5.335000	30.52	60.00	29.48
27.251000	46.98	60.00	13.02

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency MHz	Average dBµV	Limit dBµV	Margin dB
0.391000	31.19	48.04	16.85
1.435000	32.51	46.00	13.49
3.519000	32.94	46.00	13.06
5.351000	19.94	50.00	30.06
27.247000	33.29	50.00	16.71

Full Spectrum



Comment

N Line

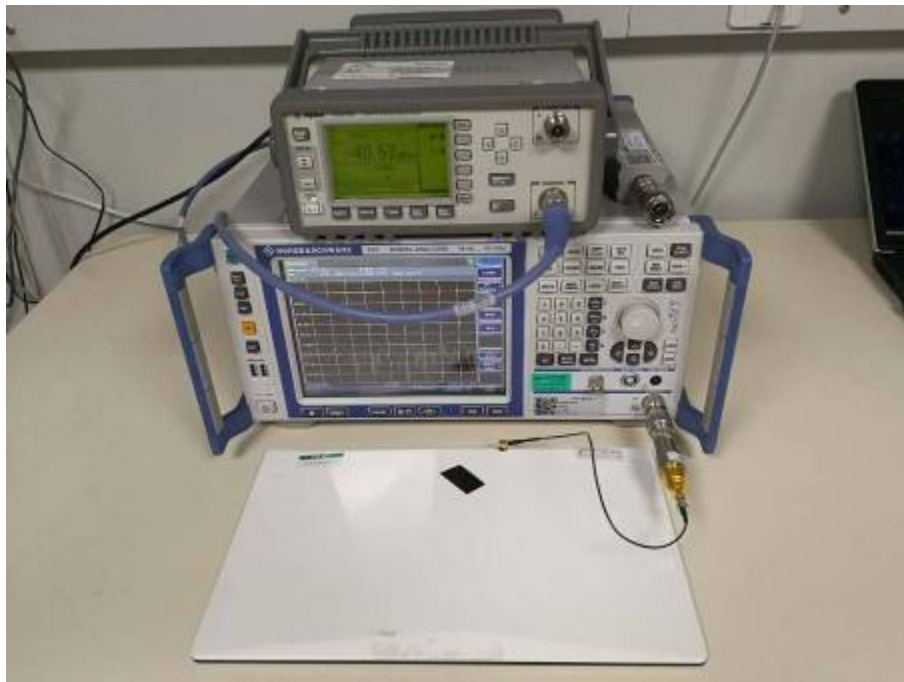
MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency MHz	QuasiPeak dBµV	Limit dBµV	Margin dB
0.150000	42.92	66.00	23.08
0.391000	36.76	58.04	21.28
1.695000	35.00	56.00	21.00
3.251000	27.73	56.00	28.27
5.343000	25.39	60.00	34.61
27.299000	35.70	60.00	24.30

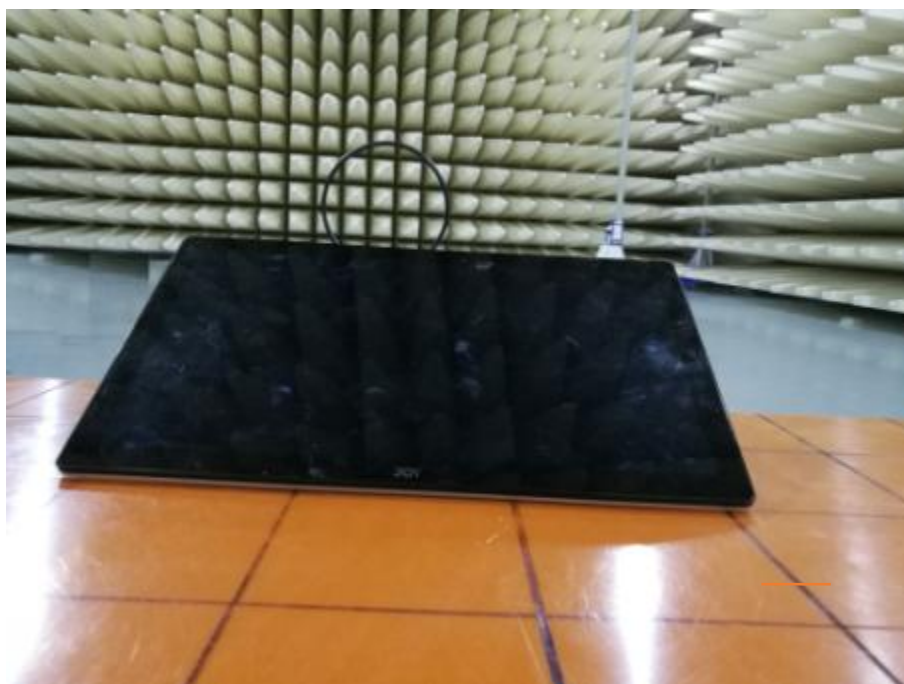
MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency MHz	Average dBµV	Limit dBµV	Margin dB
0.154000	34.86	55.78	20.92
0.655000	25.47	46.00	20.53
1.699000	33.34	46.00	12.66
3.251000	34.19	46.00	11.81
5.355000	28.16	50.00	21.84
27.243000	21.66	50.00	28.34

APPENDIX C – TEST SETUP



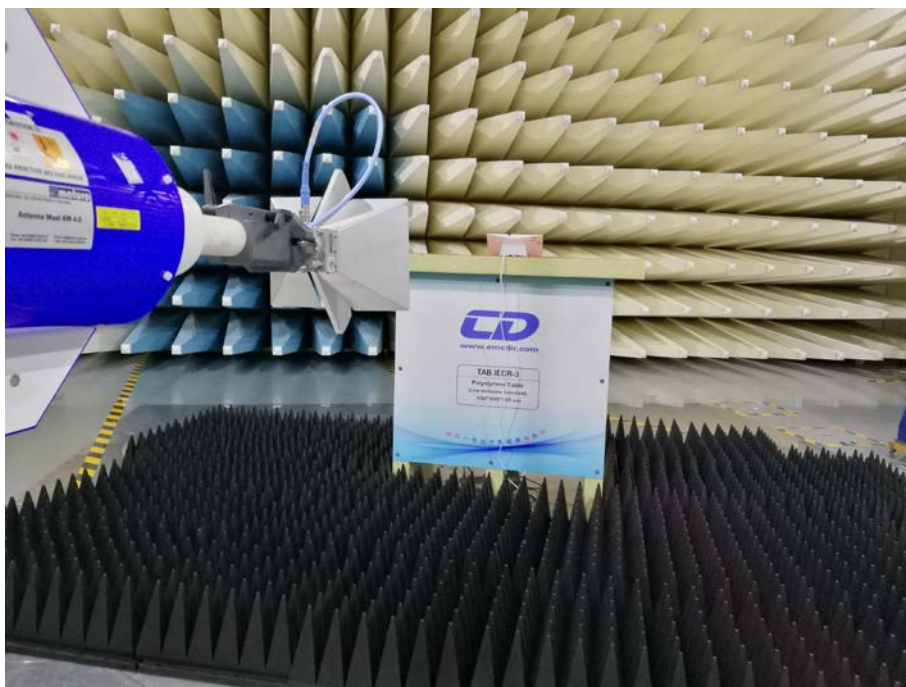
Spurious RF Conducted Emissions Test setup



Spurious Radiated Emissions Test setup (below 30MHz)



Spurious Radiated Emissions Test setup (30MHz~1GHz)



Spurious Radiated Emissions Test setup (1GHz~25GHz)



Conducted Emissions Test Setup (with charger)

---End of Test Report---