

# TEST REPORT

For

**Mobile Phone**

**Model Number: RMX3061**

**FCC ID: 2AUYFRMX3061**

**Report Number : WT208002545**

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## TEST REPORT DECLARATION

Applicant : Realme Chongqing Mobile Telecommunications Corp., Ltd.  
Address : No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China.  
Manufacturer : Realme Chongqing Mobile Telecommunications Corp., Ltd.  
Address : No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China.  
EUT Description : Mobile Phone  
Model No. : RMX3061  
Trade mark : realme  
Serial Number : /  
FCC ID : 2AUYFRMX3061

Test Standards:

**FCC Part 15 15.207, 15.209, 15.247 (2019)**

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Project Engineer:	 _____ (Huang Si 黄思)	Date:	<u>Nov.25, 2020</u>
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## 1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
20dB bandwidth measurement	15.247 (a) (1)	Pass
Carrier frequency separation measurement	15.247 (a) (1)	Pass
Number of hopping channel	15.247 (a) (1) III	Pass
Time of occupancy	15.247 (a) (1) III	Pass
Maximum conducted output power	15.247 (b) (1)	Pass
Band edge compliance measurement	15.247 (d)	Pass
Radiated spurious emission & Radiated restricted band measurement	15.247 (d) / 15.205 & 15.209	Pass
Conducted spurious emission	15.247 (d)	Pass
Conducted emission	15.207	Pass
Antenna requirements	15.203	Pass

Remark: "N/A" means "Not applicable."

## 2. GENERAL INFORMATION

### 2.1. Report Information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

The lab will not be liable for any loss or damage resulting for false, inaccurate, inappropriate or incomplete product information provided by the applicant/manufacture.

### 2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

### 2.3.Measurement Uncertainty

Conducted Emission

9 kHz~150 kHz 3.7dB

150 kHz~30MHz 3.3dB

Radiated Emission

30MHz~1000MHz 4.3dB

1GHz~6GHz 4.6 dB

6GHz~18GHz 5.1dB

18GHz~26.5GHz 5.1dB

### 3. PRODUCT DESCRIPTION

NOTE: The extreme test conditions for temperature and antenna gain were declared by the manufacturer.

#### 3.1.EUT Description

Description	: Mobile Phone
Manufacturer	: Realme Chongqing Mobile Telecommunications Corp., Ltd.
Model Number	: RMX3061
Operate Frequency	: 2.402GHz~2.480GHz
Antenna Designation	: BT: PIFA ANTENNA
Modulation	Bluetooth: GFSK, pi/4-DQPSK, 8DPSK
Operating voltage	: 3.60V (Low)/3.87V (Nominal)/ 4.45V (Max)
Software Version	: relame UI V1.0
Hardware Version	: 11

Remark: The model of adaptor, OP52JAUH (3#), OP52JAEH (6#) and OP52JAYH (8#) are identical in circuit design and PCB layout, the only difference is the plug type. The model of adaptor, OP52KAUH (2#), OP52KAEH (5#) and OP52KAYH (7#) are identical in circuit design and PCB layout, the only difference is the plug type. the model of adaptor OP52YAUH (1#), OP52KAUH (2#), OP52JAUH (3#) and OP52CAEH (4#) were chosen as representative to perform all the tests.

#### 3.2.Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2AUYFRMX3061** filing to comply with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C .

#### 3.3.Block Diagram of EUT Configuration



Figure 1 EUT setup

#### 3.4.Operating Condition of EUT

The transmitter has a maximum peak conducted output power of Basic rate GFSK modulation and EDR mode 8DPSK modulation. Tests were performed with Basic rate GFSK modulation and EDR mode 8DPSK modulation.



### 3.5.Support Equipment List

Table 2 Support Equipment List

Name	Model No	S/N	Manufacturer
Adaptor 1#	OP52YAUH	--	Jiangsu Chenyang Electron Co., Ltd.
Adaptor 2#	OP52KAUH	--	ShenZhen KunXing Technology Co., Ltd
Adaptor 3#	OP52JAUH	--	Ten Pao Industrial Co., Ltd.
Adaptor 4#	OP52CAEH	--	Dongguan YOHO Electronic Technology Co., Limited
Adaptor 5#	OP52KAEH	--	ShenZhen KunXing Technology Co., Ltd
Adaptor 6#	OP52JAEH	--	Ten Pao Industrial Co., Ltd.
Adaptor 7#	OP52KAYH	--	ShenZhen KunXing Technology Co., Ltd
Adaptor 8#	OP52JAYH	--	Ten Pao Industrial Co., Ltd.

### 3.6.Test Conditions

Date of test : Oct.20, 2020- Nov.13, 2020

Date of EUT Receive : Oct.19, 2020

Temperature: 22°C-26°C

Relative Humidity: 43%-55%

### 3.7.Special Accessories

Not available for this EUT intended for grant.

### 3.8.Equipment Modifications

Not available for this EUT intended for grant.

#### 4. TEST EQUIPMENT USED

Table 3 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB9058/05	Test Receiver	R&S	ESCI 3	Sep.25,2020	1 Year
SB4357	AMN	R&S	ENN216	Aug.26,2020	1 Year
SB13956	Test Receiver	R&S	ESR26	Feb.14,2020	1 Year
SB3955	Broadband Antenna	Schwarzbeck	VULB 9163	Jan.10,2020	1 Year
SB8501/09	Test Receiver	R&S	ESU40	Feb.14,2020	1 Year
SB3435	Horn Antenna	R&S	HF906	Dec.17,2019	1 Year
SB5472/02	Broadband Antenna	Schwarzbeck	VULB 9163	Jan.10,2020	1 Year
SB9058/03	Pre-Amplifier	R&S	SCU 18	Feb.14,2020	1 Year
SB8501/10	Horn Antenna	R&S	3160-09	Mar.10,2020	3 Years
SB8501/11	Horn Antenna	R&S	3160-09	Mar.09,2020	3 Years
SB8501/12	Horn Antenna	R&S	3160-10	Mar.17,2020	3 Years
SB8501/13	Horn Antenna	R&S	3160-10	Mar.10,2020	3 Years
SB3345	Loop Antenna	Schwarzbeck	FMZB1516-113	Feb.14,2020	1 Year
SB8501/14	Pre-Amplifier	R&S	SCU-03	Feb.14,2020	1 Year
SB8501/15	Pre-Amplifier	R&S	SCU-03	Feb.14,2020	1 Year
SB8501/16	Pre-Amplifier	R&S	SCU 26	Feb.14,2020	1 Year
SB8501/17	Pre-Amplifier	R&S	SCU-18	Feb.14,2020	1 Year
SB9060	Signal Analyzer	R&S	FSQ40	May.18, 2020	1 Year
SB13989	Wireless Wideband Communication Tester	R&S	CMW270	May.18, 2020	1 Year

## 5. CONDUCTED EMISSION TEST

### 5.1. Test Standard and Limit

#### 5.1.1. Test Standard

FCC Part 15 15.207

#### 5.1.2. Test Limit

Table 4 Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

\* Decreasing linearly with logarithm of the frequency

\* The lower limit shall apply at the transition frequency.

### 5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions from both sides of AC line.

Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

The bandwidth of EMI test receiver is set at 9 kHz.

### 5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 5.4. Test Data

The emissions don't show in below are too low against the limits. Refer to the test curves.

Adaptor 1#

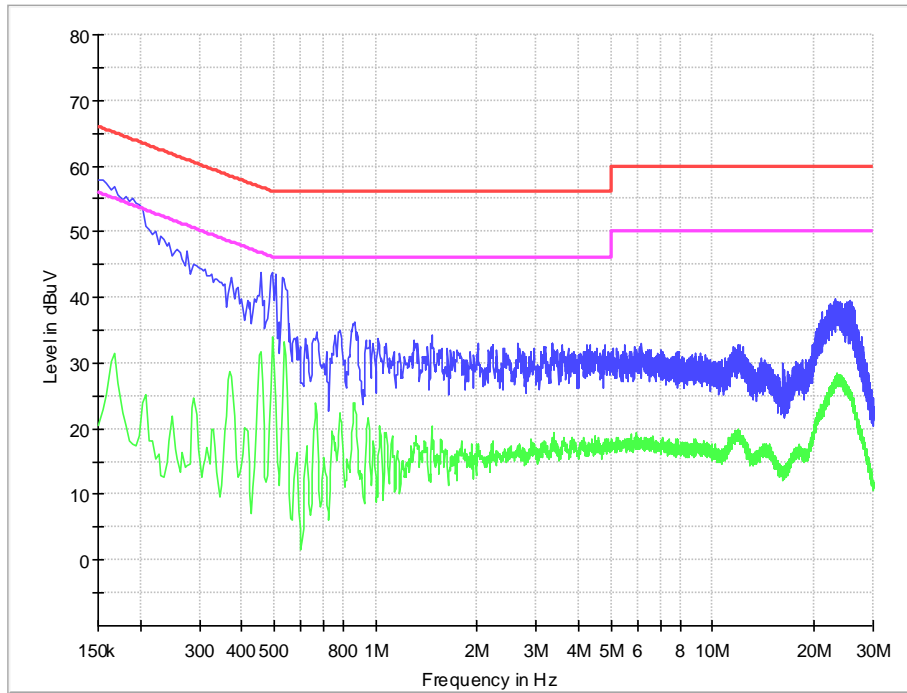
Table 5 Conducted Emission Test Data

Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)
Line	0.150	9.7	44.5	54.2	66	15.5	25.2	56
	0.168	9.7	43.4	53.1	65.1	20.9	30.6	55.1
	0.208	9.7	40.4	50.1	63.3	15.7	25.4	53.3
	0.456	9.7	30.5	40.2	56.8	21.7	31.4	46.8
	0.492	9.7	32.5	42.2	56.1	24.5	34.2	46.1
	0.532	9.8	31.3	41.1	56	22.4	32.2	46
Neutral	0.159	9.7	32.1	41.8	65.5	13.8	23.5	55.5
	0.168	9.7	35.5	45.2	65.1	21.0	30.7	55.1
	0.204	9.7	32.4	42.1	63.4	15.1	24.8	53.4
	0.456	9.7	30.1	39.8	56.8	22.6	32.3	46.8
	0.496	9.7	30.0	39.7	56.1	24.2	33.9	46.1
	0.537	9.8	29.6	39.4	56	23.1	32.9	46

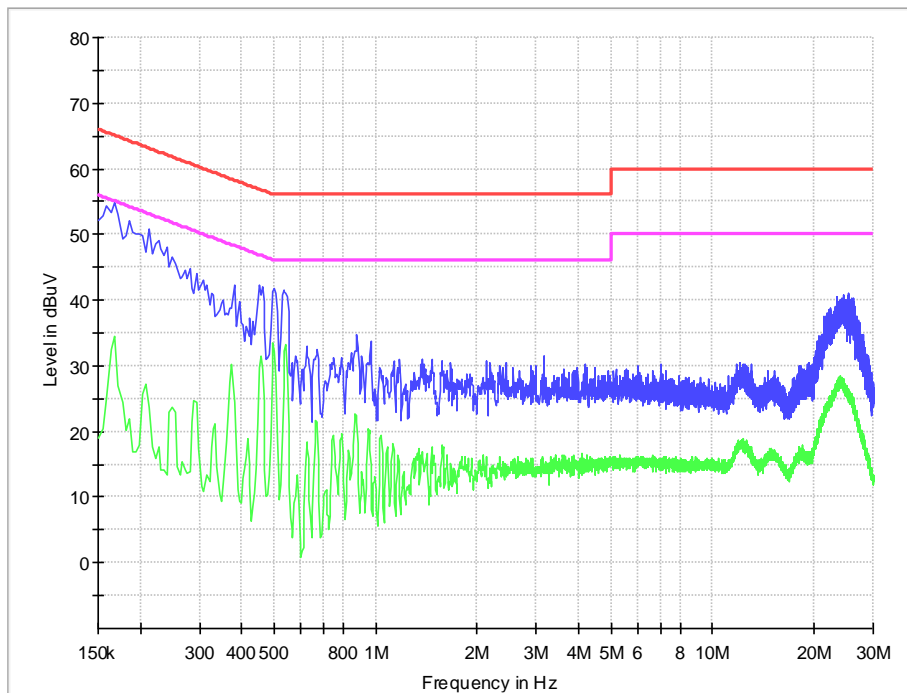
- REMARKS: 1. Emission level (dB $\mu$ V) =Read Value (dB $\mu$ V) + Correction Factor (dB)  
 2. Correction Factor (dB) =LISN Factor (dB) + Cable Factor (dB) +Limiter Factor (dB)  
 3. The other emission levels were very low against the limit.

Adaptor 1#

Line



Neutral



Adaptor 2#

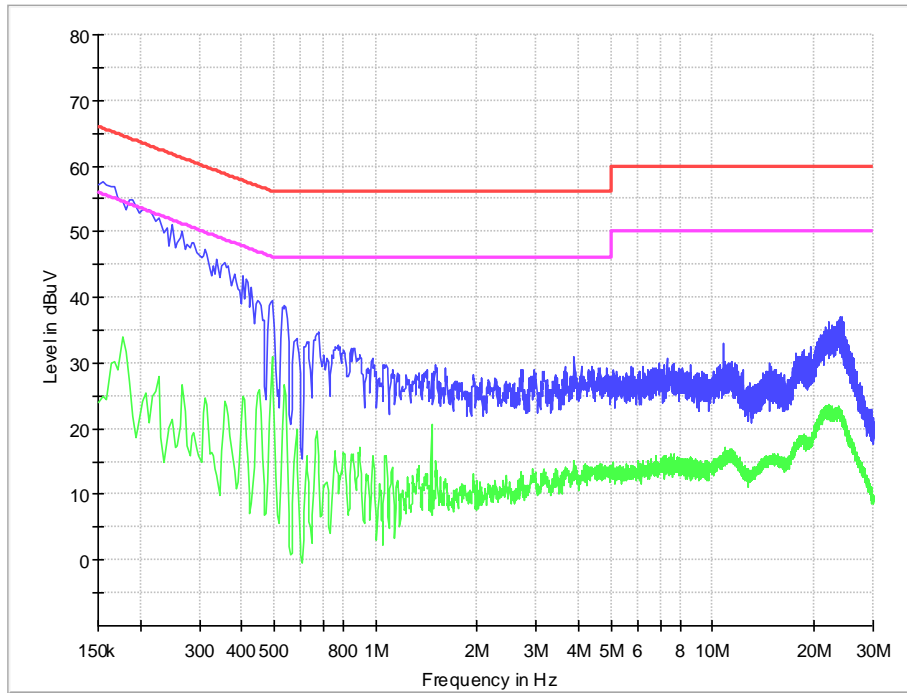
Table 6 Conducted Emission Test Data

Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)
Line	0.150	9.7	41.5	51.2	66	14.1	23.8	56
	0.177	9.7	40.4	50.1	64.6	22.5	32.2	54.6
	0.226	9.7	36.1	45.8	62.6	15.0	24.7	52.6
	0.267	9.7	33.4	43.1	61.2	14.5	24.2	51.2
	0.492	9.7	28.2	37.9	56.1	20.6	30.3	46.1
	0.537	9.8	25.8	35.6	56	16.5	26.3	46
Neutral	0.208	9.7	40.8	50.5	63.3	13.0	22.7	53.3
	0.222	9.7	40.0	49.7	62.7	15.7	25.4	52.7
	0.312	9.7	35.0	44.7	59.9	14.5	24.2	49.9
	0.447	9.7	31.0	40.7	56.9	20.9	30.6	46.9
	0.492	9.7	29.6	39.3	56.1	21.4	31.1	46.1
	0.537	9.8	28.1	37.9	56	18.2	28.0	46

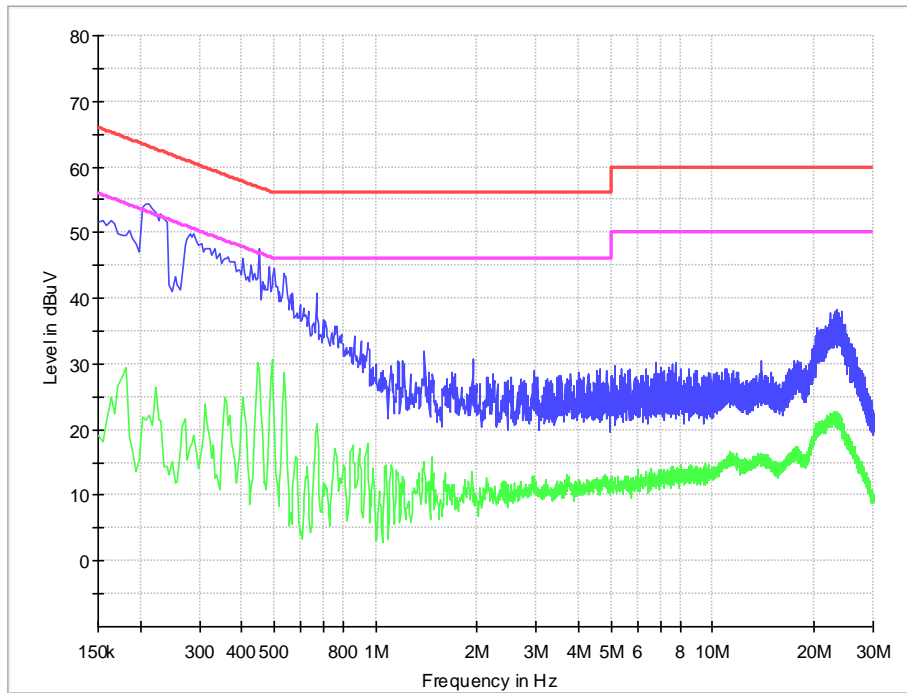
- REMARKS: 1. Emission level (dB $\mu$ V) = Read Value (dB $\mu$ V) + Correction Factor (dB)  
 2. Correction Factor (dB) = LISN Factor (dB) + Cable Factor (dB) + Limiter Factor (dB)  
 3. The other emission levels were very low against the limit.

Adaptor 2#

Line



Neutral



Adaptor 3#

Table 7 Conducted Emission Test Data

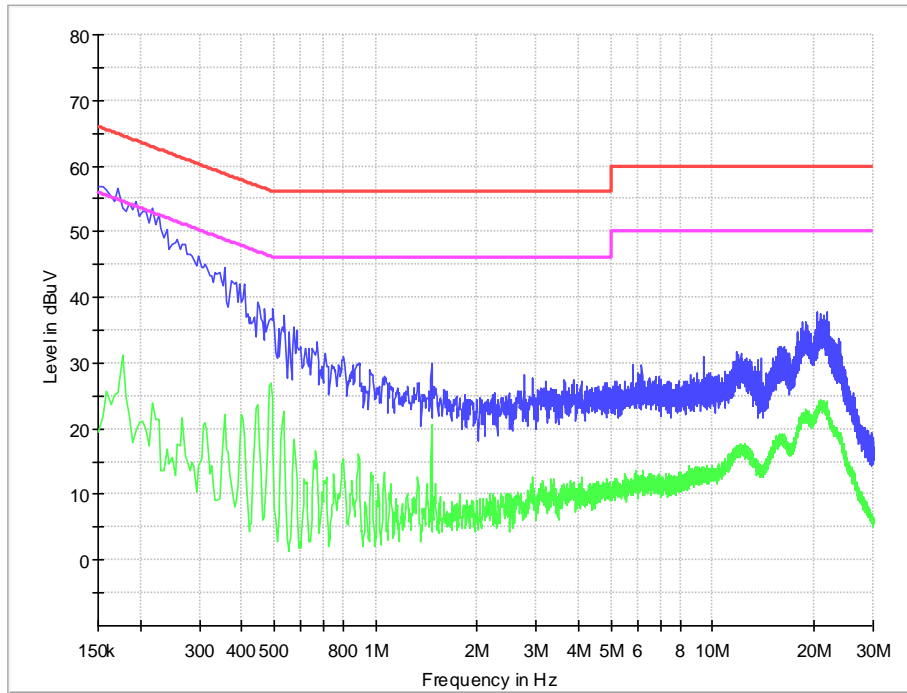
Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)
Line	0.150	9.7	40.4	50.1	66	12.1	21.8	56
	0.177	9.7	38.1	47.8	64.6	19.0	28.7	54.6
	0.217	9.7	35.1	44.8	62.9	11.5	21.2	52.9
	0.267	9.7	30.7	40.4	61.2	10.0	19.7	51.2
	0.447	9.7	24.0	33.7	56.9	13.1	22.8	46.9
	0.487	9.7	25.7	35.4	56.2	17.9	27.6	46.2
Neutral	0.150	9.7	40.4	50.1	66	13.0	22.7	56
	0.177	9.7	38.4	48.1	64.6	21.1	30.8	54.6
	0.226	9.7	34.5	44.2	62.6	13.1	22.8	52.6
	0.447	9.7	27.9	37.6	56.9	17.0	26.7	46.9
	0.492	9.7	25.9	35.6	56.1	17.2	26.9	46.1
	0.537	9.8	24.4	34.2	56	11.8	21.6	46

- REMARKS: 1. Emission level (dB $\mu$ V) =Read Value (dB $\mu$ V) + Correction Factor (dB)  
 2. Correction Factor (dB) =LISN Factor (dB) + Cable Factor (dB) +Limiter Factor (dB)  
 3. The other emission levels were very low against the limit.

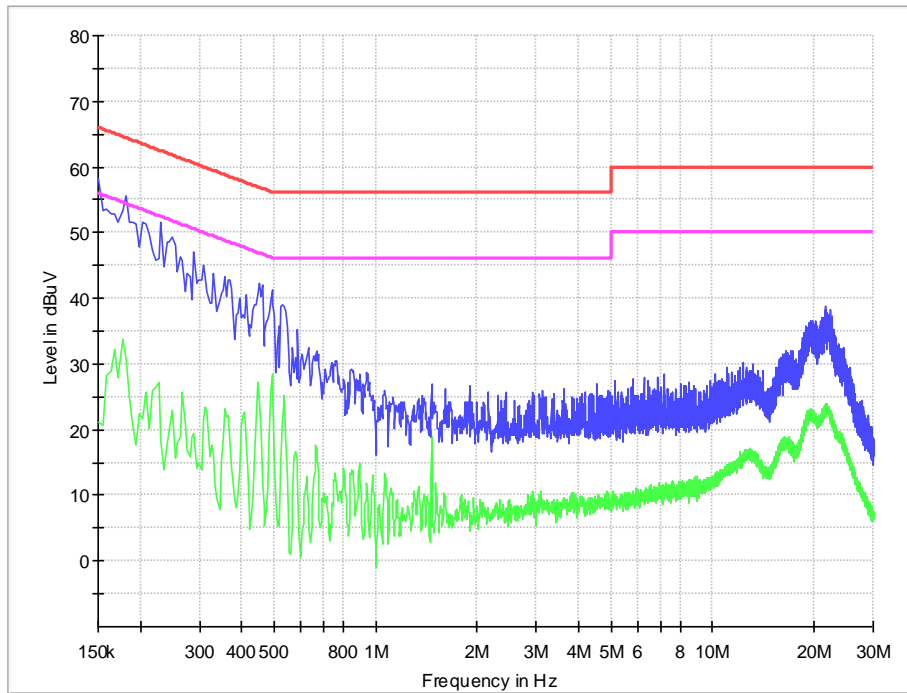


### Adaptor 3#

#### Line



#### Neutral



Adaptor 4#

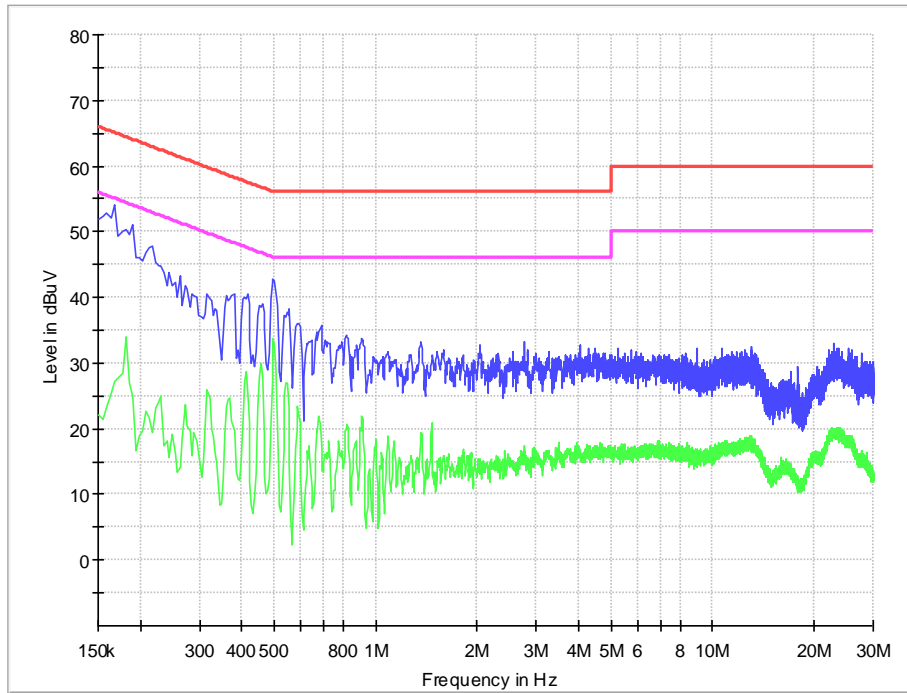
Table 8 Conducted Emission Test Data

Test mode: Charging and Transmitting								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limit (dB $\mu$ V)
Line	0.168	9.7	35.9	45.6	65.1	15.7	25.4	55.1
	0.181	9.7	36.0	45.7	64.4	20.1	29.8	54.4
	0.217	9.7	30.4	40.1	62.9	9.2	18.9	52.9
	0.411	9.7	26.9	36.6	57.6	18.3	28.0	47.6
	0.456	9.7	25.9	35.6	56.8	19.6	29.3	46.8
	0.496	9.7	31.5	41.2	56.1	23.7	33.4	46.1
Neutral	0.168	9.7	34.7	44.4	65.1	13.6	23.3	55.1
	0.181	9.7	33.9	43.6	64.4	17.1	26.8	54.4
	0.411	9.7	24.1	33.8	57.6	16.9	26.6	47.6
	0.451	9.7	29.8	39.5	56.9	21.5	31.2	46.9
	0.501	9.8	25.5	35.3	56	19.5	29.3	46
	0.541	9.8	26.4	36.2	56	17.0	26.8	46

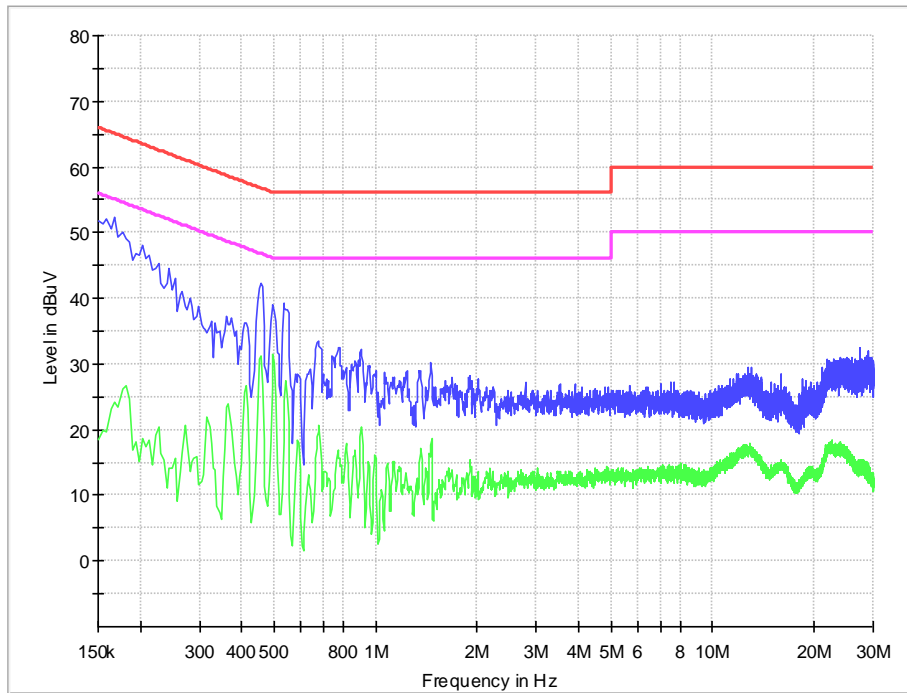
- REMARKS: 1. Emission level (dB $\mu$ V) =Read Value (dB $\mu$ V) + Correction Factor (dB)  
 2. Correction Factor (dB) =LISN Factor (dB) + Cable Factor (dB) +Limiter Factor (dB)  
 3. The other emission levels were very low against the limit.

Adaptor 4#

Line



Neutral



## 6. RADIATED EMISSION TEST

### 6.1. Test Standard and Limit

#### 6.1.1. Test Standard

FCC Part 15 15.209

#### 6.1.2. Test Limit

Table 9 Radiation Emission Test Limit for FCC (Class B) (9 kHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Table 10 Radiation Emission Test Limit for FCC (Class B) (Above 1G)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

### 6.2. Test Procedure

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10-2013. The EUT is set to transmit in a continuous mode. Radiated measurements were performed on the frequency range from 30MHz to 25GHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz,  $VBW \geq RBW$ . All readings above 1 GHz are AV and PK values.  $RBW=1MHz$  and  $1/T$  (10Hz) for AV value,  $RBW=1MHz$  and  $VBW \geq RBW$  for peak value. Measurements were made at 3 meters.

### 6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

## 6.4. Test Data

The emissions don't show in following result tables are more than 20dB below the limits.

Bluetooth basic rate and Bluetooth EDR mode were tested, below only shows worst case result of Bluetooth basic rate.

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

9 kHz-30MHz

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

Table 11 Radiated Emission Test Data 9k Hz-30MHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBµV/m)	Level (dBµV/m)	Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Note
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

30MHz-1GHz

Worst case is shown below for 30MHz-1GHz only.

The emissions don't show in following result tables are more than 20dB below the limits.

Adaptor 1#

Table 12 Radiated Emission Test Data 30MHz-1GHz

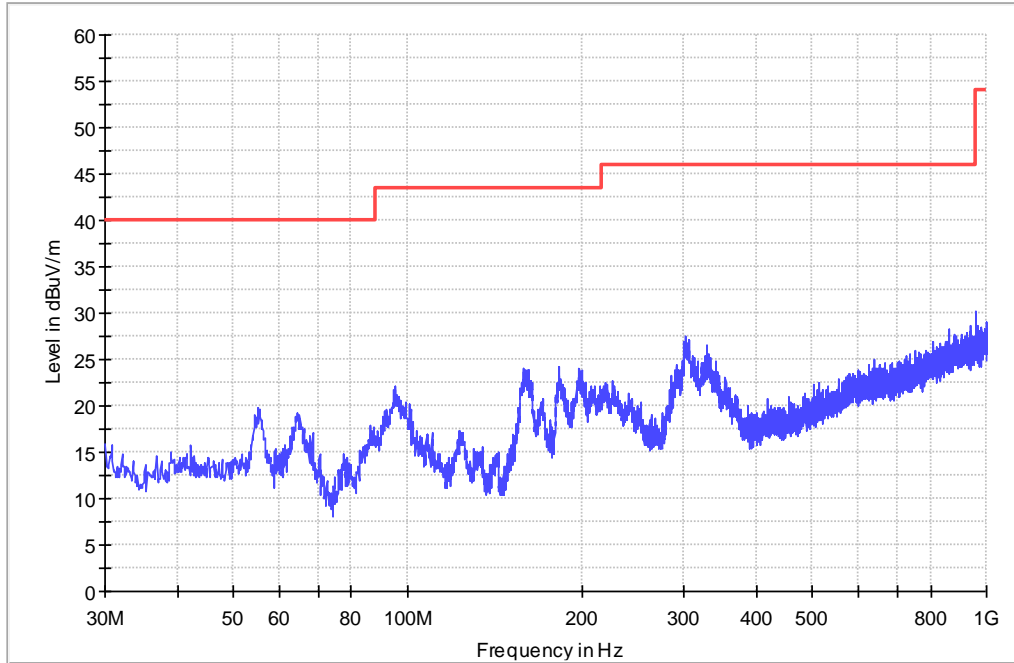
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBµV/m)	Level (dBµV/m)	Polarity (Horizontal/ Vertical)	Limit (dBµV/m)	Margin (dB)	Note
55.220	0.8	13.0	1.7	15.5	Horizontal	40.0	24.5	QP
65.114	0.9	10.7	4.6	16.2	Horizontal	40.0	23.8	QP
95.378	1.1	12.8	5.9	19.8	Horizontal	43.5	23.7	QP
158.719	1.4	8.3	12.6	22.3	Horizontal	43.5	21.2	QP
198.101	1.7	10.6	9.8	22.1	Horizontal	43.5	21.4	QP
302.667	2.0	13.1	10.7	25.8	Horizontal	46.0	20.2	QP
30.000	0.6	12.3	18.2	31.1	Vertical	40	8.9	QP
38.439	0.7	12.3	9.7	22.7	Vertical	40	17.3	QP
53.959	0.8	13.3	11.2	25.3	Vertical	40	14.7	QP
92.759	1.1	11.9	11.2	24.2	Vertical	43.5	19.3	QP
163.181	1.5	8.7	17.7	27.9	Vertical	43.5	15.6	QP
192.475	1.7	10.6	19.5	31.8	Vertical	43.5	11.7	QP

Remark: Emission level (dBµV)=Read Value(dBµV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

Adaptor 1#

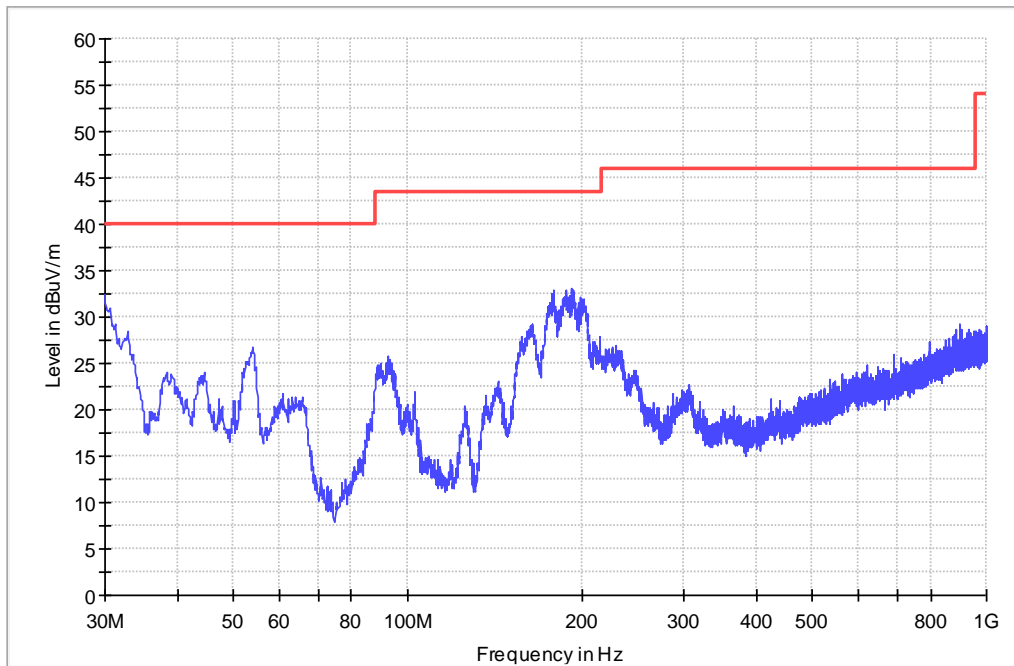
Horizontal

Copy of Field strength 30M-1GHz



Vertical

Copy of Field strength 30M-1GHz



Adaptor 2#

Table 13 Radiated Emission Test Data 30MHz-1GHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dB $\mu$ V/m)	Level (dB $\mu$ V/m)	Polarity (Horizontal/Vertical)	Limit (dB $\mu$ V/m)	Margin (dB)	Note
54.347	0.8	13.3	1.9	16.0	Horizontal	40.0	24.0	QP
94.020	1.1	11.9	6.2	19.2	Horizontal	43.5	24.3	QP
156.973	1.4	8.3	12.4	22.1	Horizontal	43.5	21.4	QP
187.140	1.5	9.7	10.6	21.8	Horizontal	43.5	21.7	QP
199.265	1.6	10.6	8.7	20.9	Horizontal	43.5	22.6	QP
289.863	2.0	12.7	8.0	22.7	Horizontal	46.0	23.3	QP
30.097	0.6	12.3	14.2	27.1	Vertical	40	12.9	QP
37.857	0.7	12.3	11.2	24.2	Vertical	40	15.8	QP
53.765	0.7	13.3	8.1	22.1	Vertical	40	17.9	QP
89.267	1.1	10.3	9.5	20.9	Vertical	43.5	22.6	QP
183.745	1.5	9.7	17.3	28.5	Vertical	43.5	15.0	QP
193.930	1.7	10.6	16.6	28.9	Vertical	43.5	14.6	QP

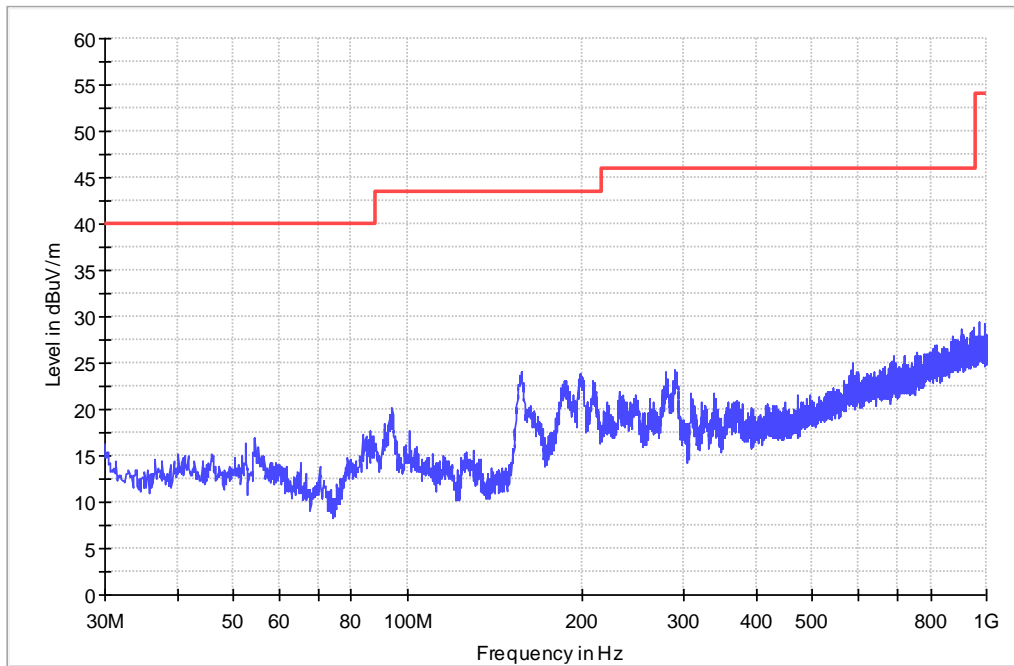
Remark: Emission level (dB $\mu$ V)=Read Value(dB $\mu$ V/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)



## Adaptor 2#

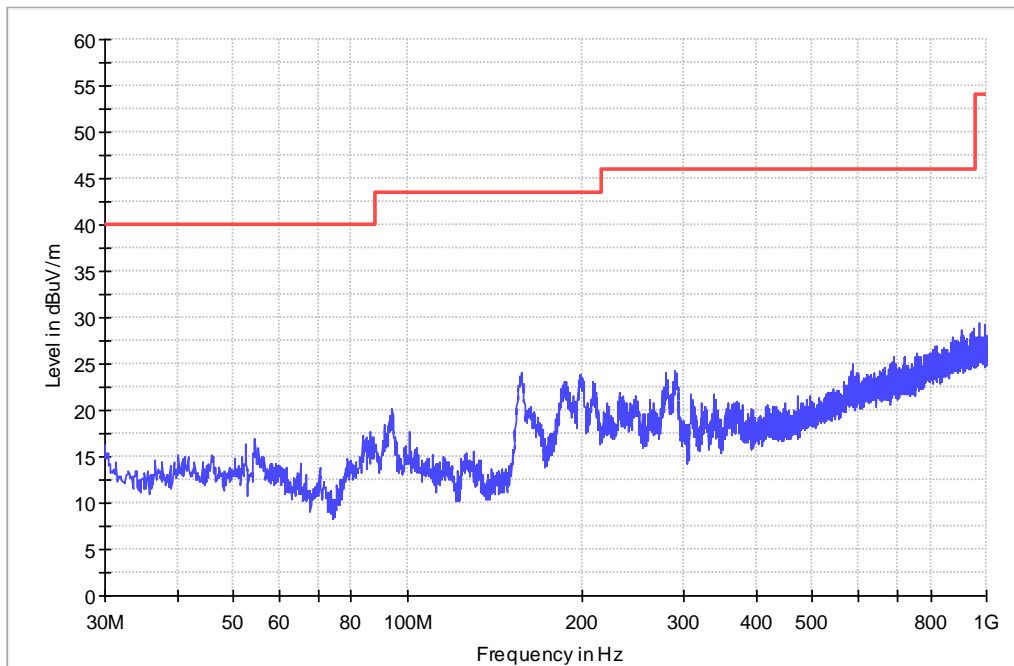
### Horizontal

Copy of Field strength 30M-1GHz



### Vertical

Copy of Field strength 30M-1GHz



Adaptor 3#

Table 14 Radiated Emission Test Data 30MHz-1GHz

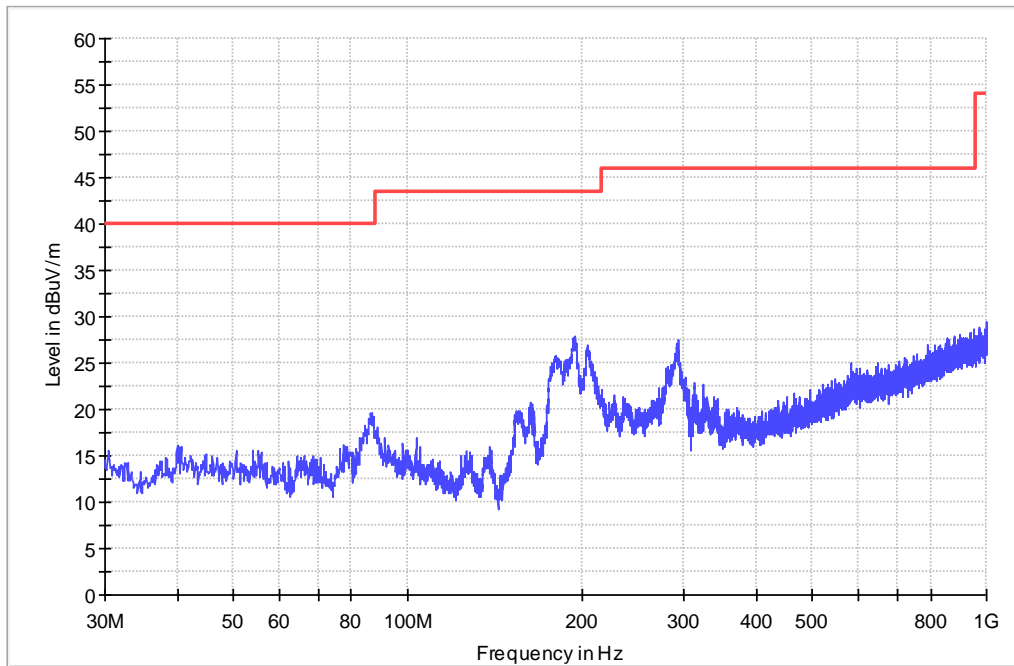
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dB $\mu$ V/m)	Level (dB $\mu$ V/m)	Polarity (Horizontal/Vertical)	Limit (dB $\mu$ V/m)	Margin (dB)	Note
86.357	1.1	10.3	4.1	15.5	Horizontal	40.0	24.5	QP
154.354	1.4	8.3	6.0	15.7	Horizontal	43.5	27.8	QP
162.599	1.5	8.7	8.0	18.2	Horizontal	43.5	25.3	QP
179.768	1.6	9.0	13.5	24.1	Horizontal	43.5	19.4	QP
193.930	1.7	10.6	13.0	25.3	Horizontal	43.5	18.2	QP
293.743	2.0	12.7	11.8	26.5	Horizontal	46.0	19.5	QP
33.395	0.7	12.3	9.7	22.7	Vertical	40	17.3	QP
38.148	0.7	12.3	12.4	25.4	Vertical	40	14.6	QP
53.571	0.7	13.3	7.3	21.3	Vertical	40	18.7	QP
88.879	1.1	10.3	11.1	22.5	Vertical	43.5	21.0	QP
156.585	1.4	8.3	17.1	26.8	Vertical	43.5	16.7	QP
179.865	1.6	9.0	19.5	30.1	Vertical	43.5	13.4	QP

Remark: Emission level (dB $\mu$ V)=Read Value(dB $\mu$ V/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

### Adaptor 3#

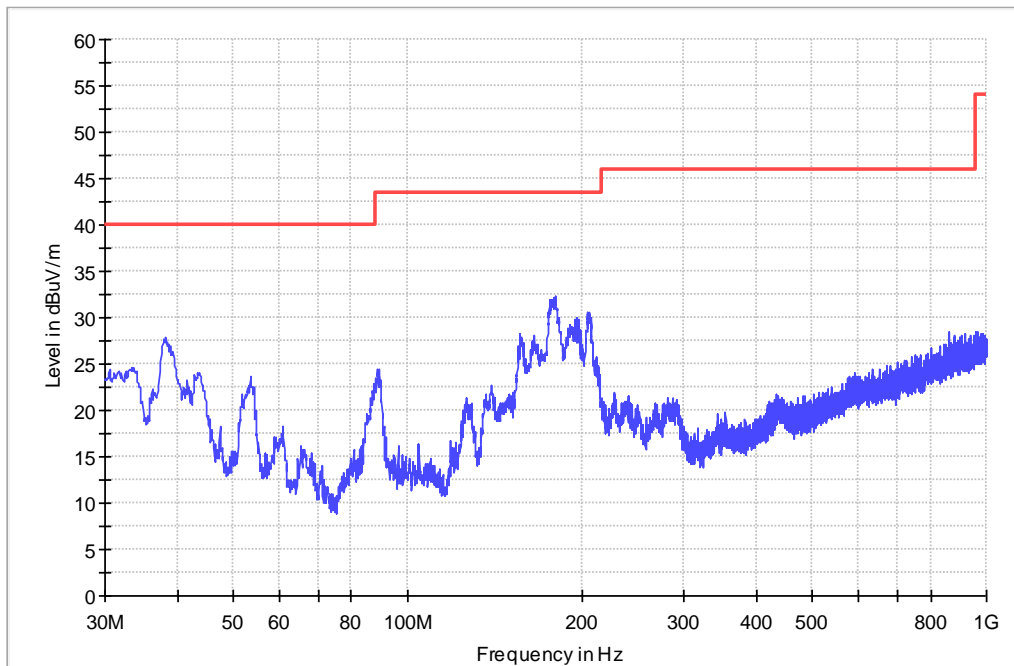
### Horizontal

Copy of Field strength 30M-1GHz



### Vertical

Copy of Field strength 30M-1GHz



Adaptor 4#

Table 15 Radiated Emission Test Data 30MHz-1GHz

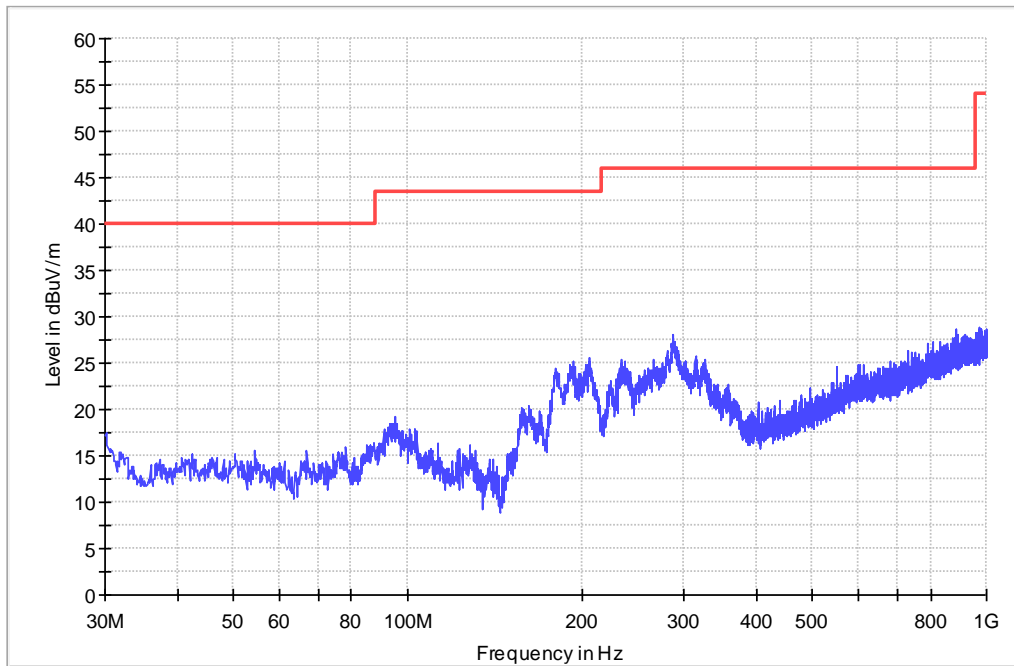
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dB $\mu$ V/m)	Level (dB $\mu$ V/m)	Polarity (Horizontal/ Vertical)	Limit (dB $\mu$ V/m)	Margin (dB)	Note
95.087	1.1	12.8	17.0	30.9	Horizontal	43.5	12.6	QP
157.943	1.4	8.3	20.0	29.7	Horizontal	43.5	13.8	QP
179.768	1.6	9.0	13.8	24.4	Horizontal	43.5	19.1	QP
193.542	1.7	10.6	7.9	20.2	Horizontal	43.5	23.3	QP
206.637	1.7	10.6	17.2	29.5	Horizontal	43.5	14.0	QP
287.147	2.0	12.7	14.1	28.8	Horizontal	46.0	17.2	QP
30.000	0.6	12.3	4.2	17.1	Vertical	40	22.9	QP
32.910	0.7	12.3	5.3	18.3	Vertical	40	21.7	QP
37.857	0.7	12.3	9.3	22.3	Vertical	40	17.7	QP
139.416	1.3	10.5	12.0	23.8	Vertical	43.5	19.7	QP
179.089	1.6	9.0	13.3	23.9	Vertical	43.5	19.6	QP
194.318	1.7	10.6	15.3	27.6	Vertical	43.5	15.9	QP

Remark: Emission level (dB $\mu$ V)=Read Value(dB $\mu$ V/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

## Adaptor 4#

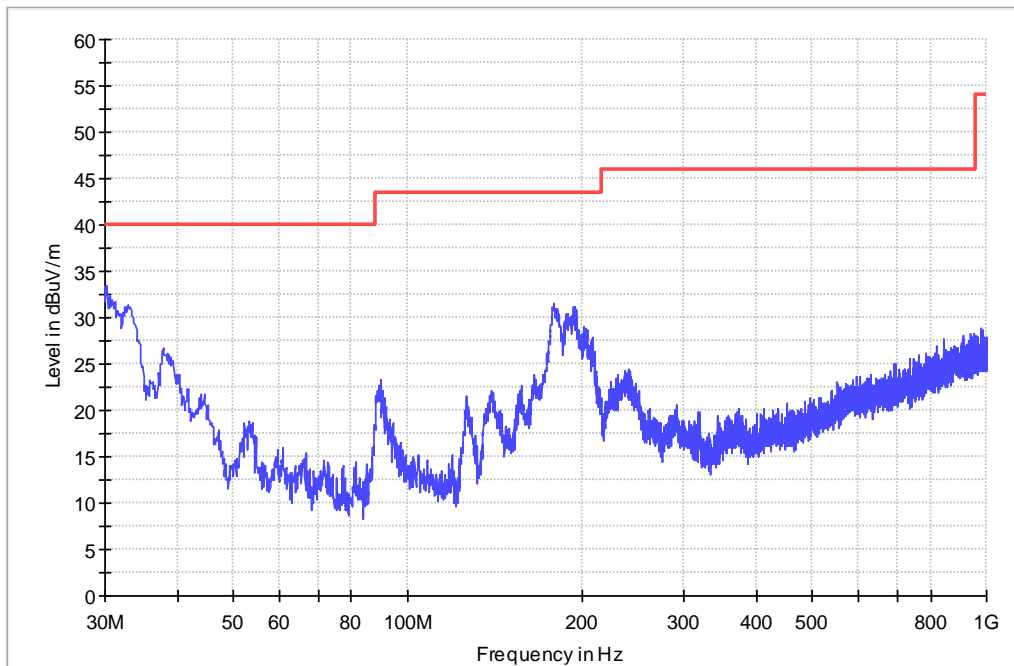
### Horizontal

Copy of Field strength 30M-1GHz



### Vertical

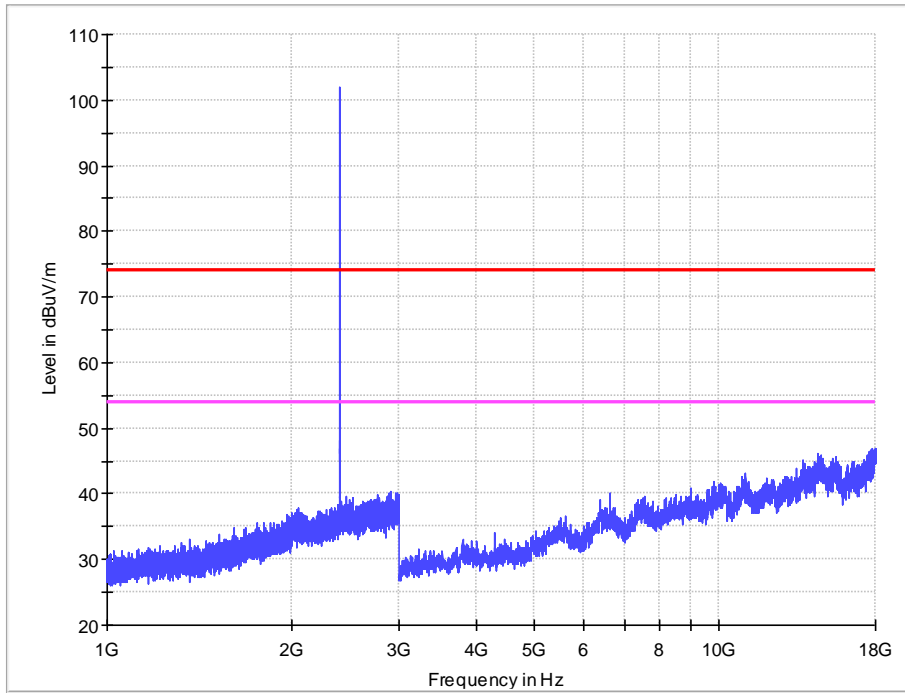
Copy of Field strength 30M-1GHz



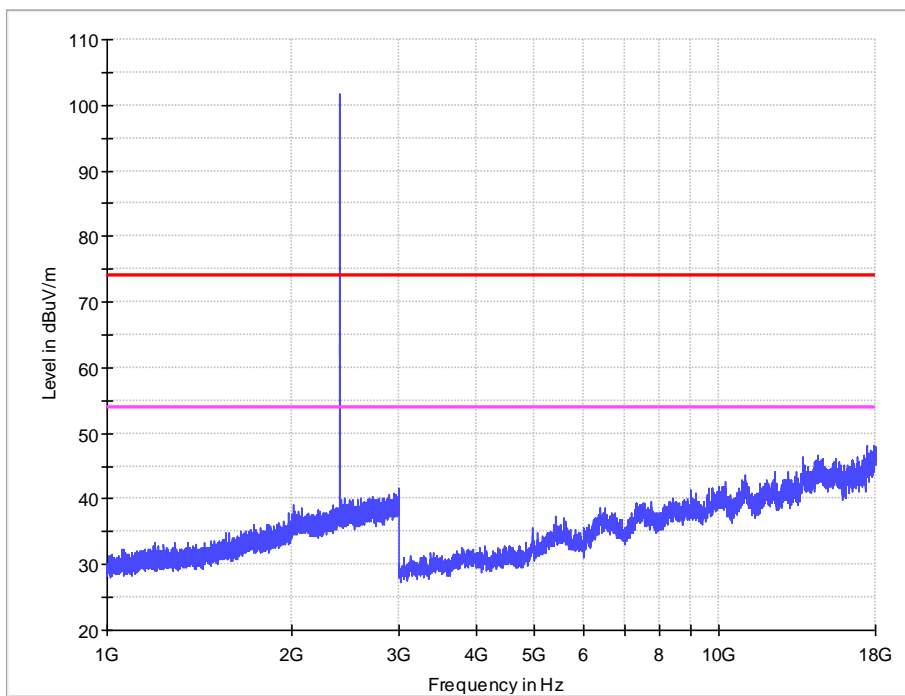
1GHz-18GHz

GFSK CH0

Horizontal



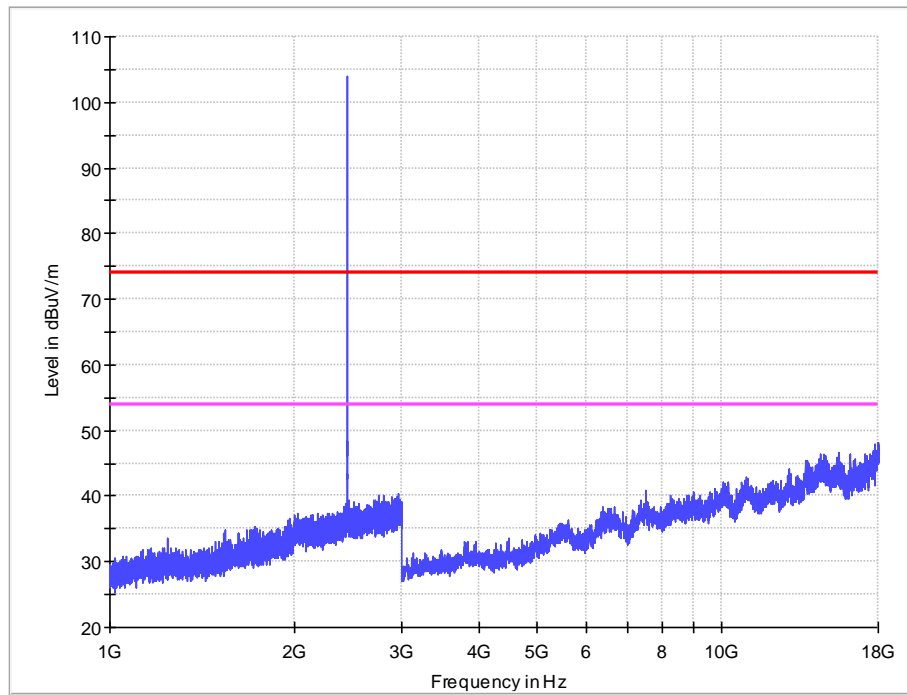
Vertical



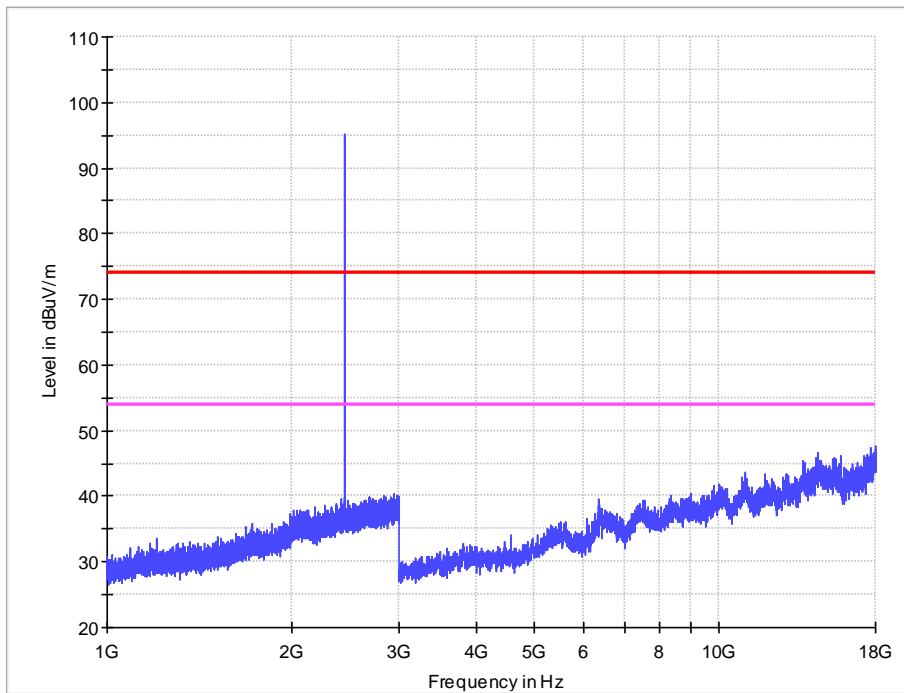
1GHz-18GHz

GFSK CH39

Horizontal



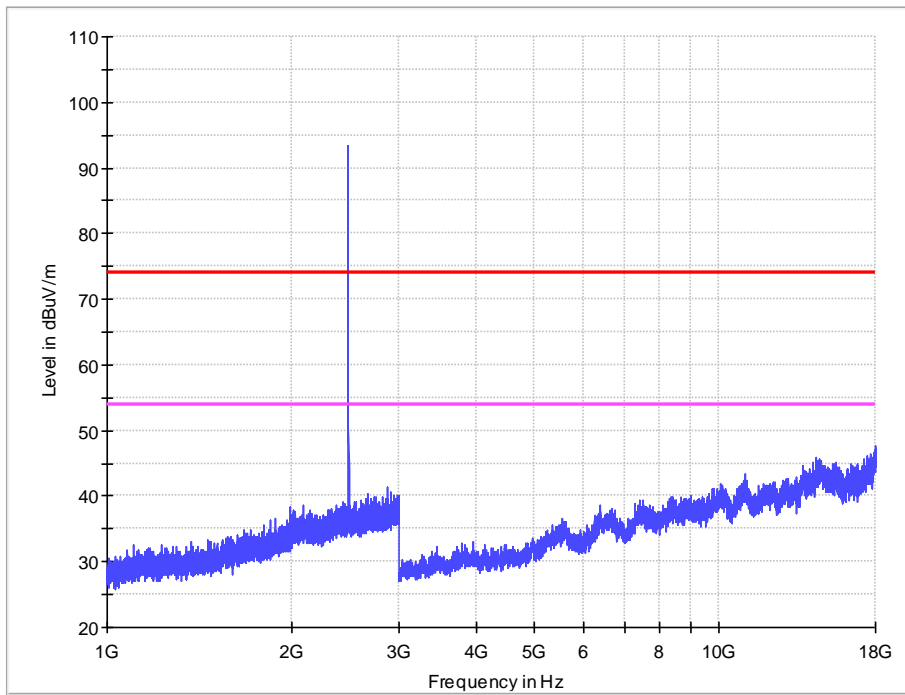
Vertical



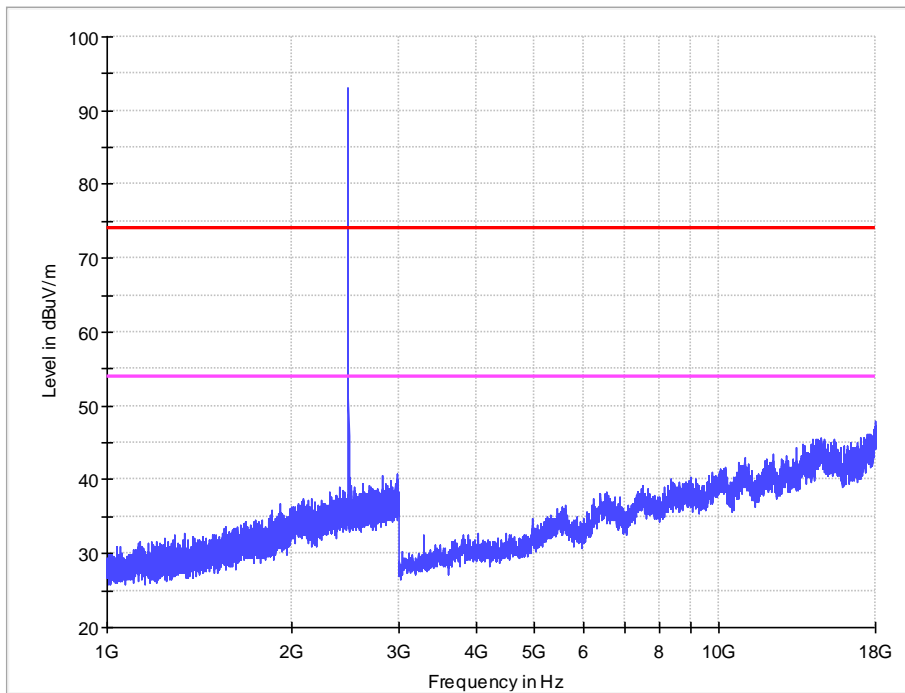
1GHz-18GHz

GFSK CH78

Horizontal



Vertical

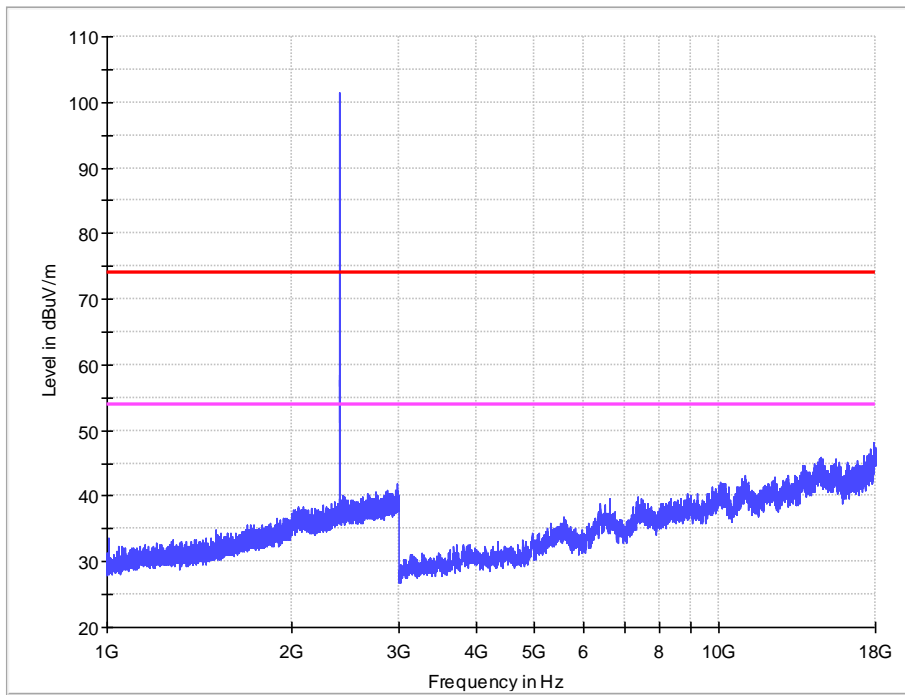




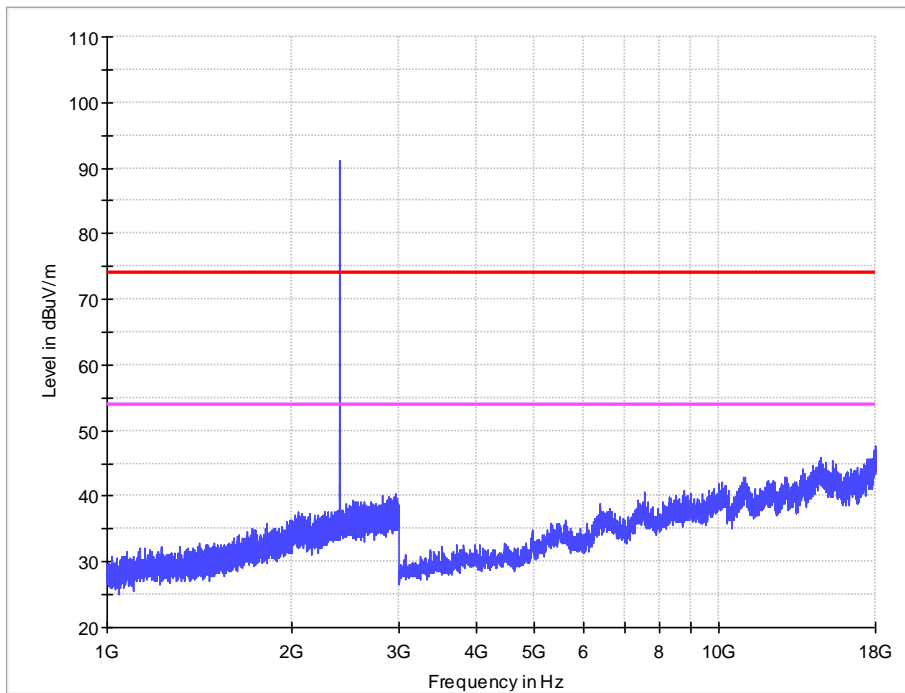
1GHz-18GHz

8PDSK CH0

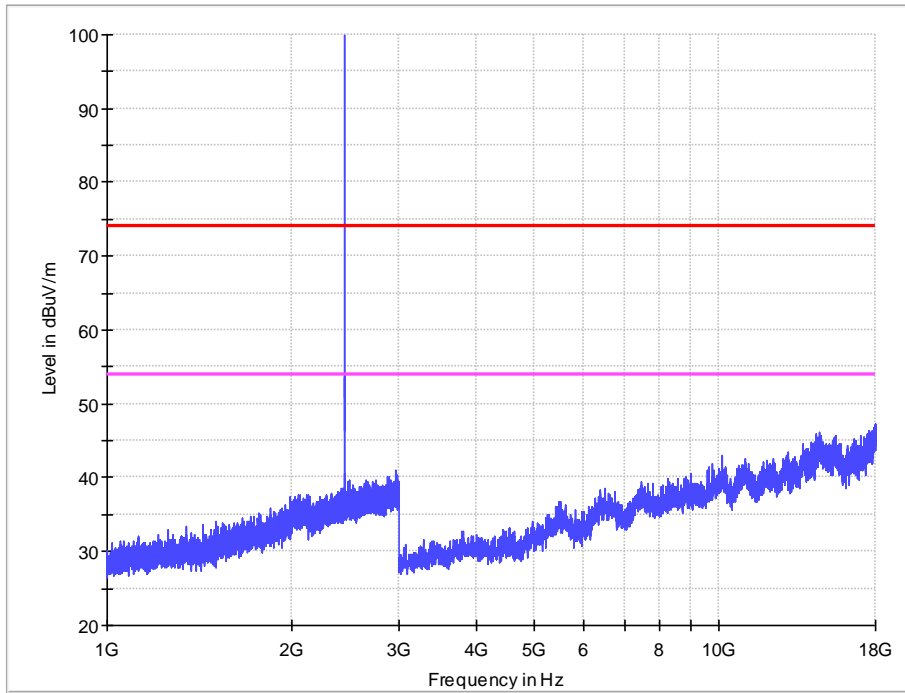
Horizontal



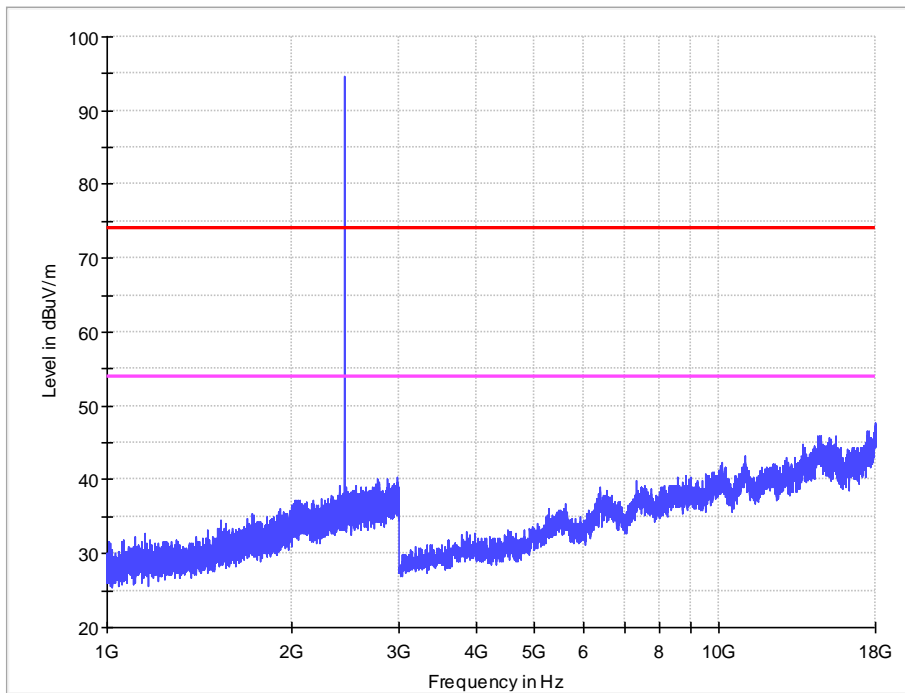
Vertical



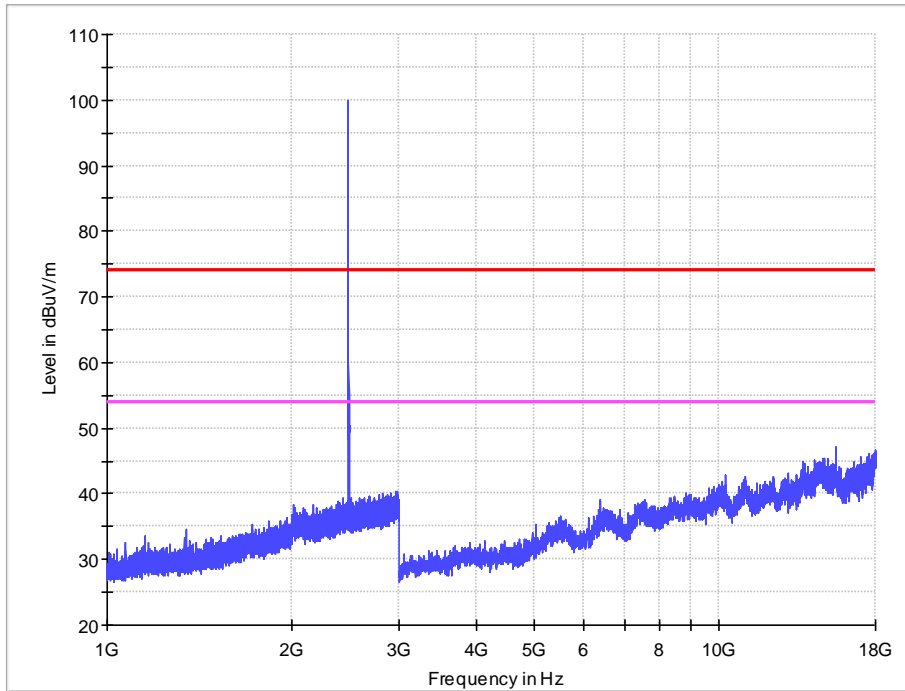
1GHz-18GHz  
8PDSK CH39  
Horizontal



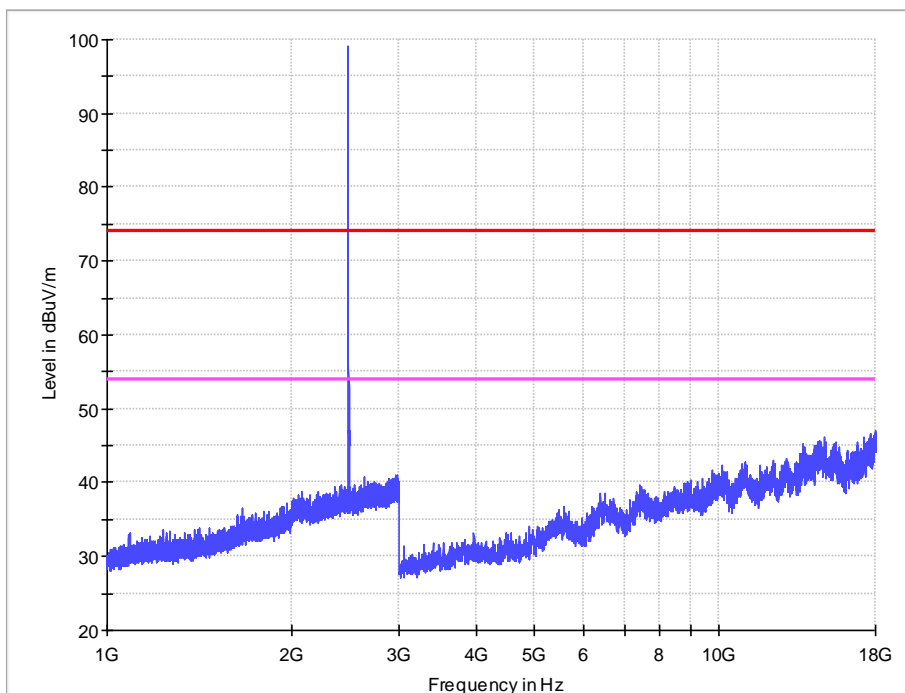
Vertical



1GHz-18GHz  
8PDSK CH78  
Horizontal



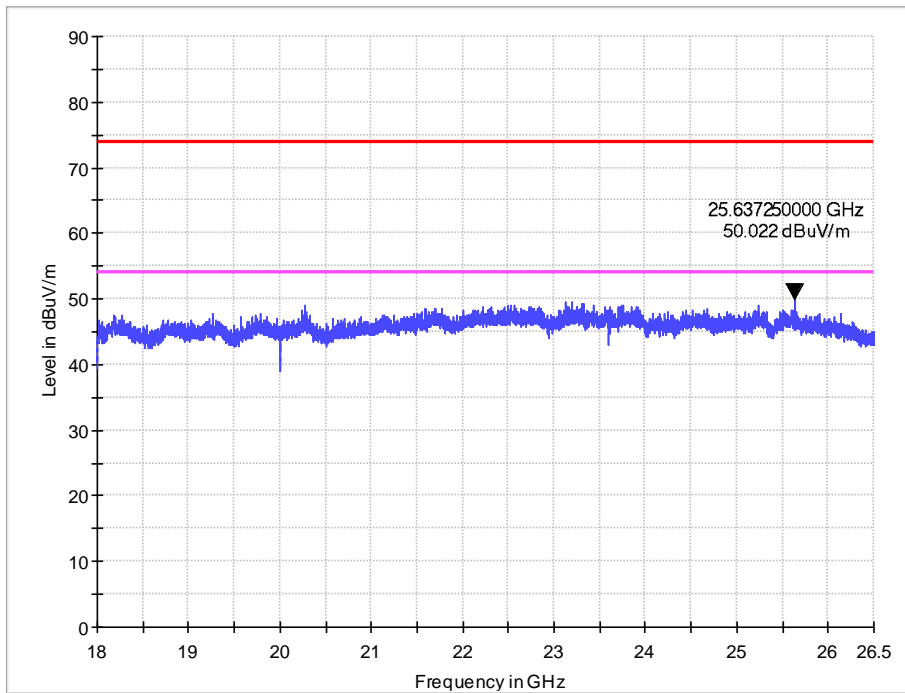
Vertical



18-26.5GHz

No Peak found in pre-scan, only worst case result is listed in this report.

Horizontal



Vertical

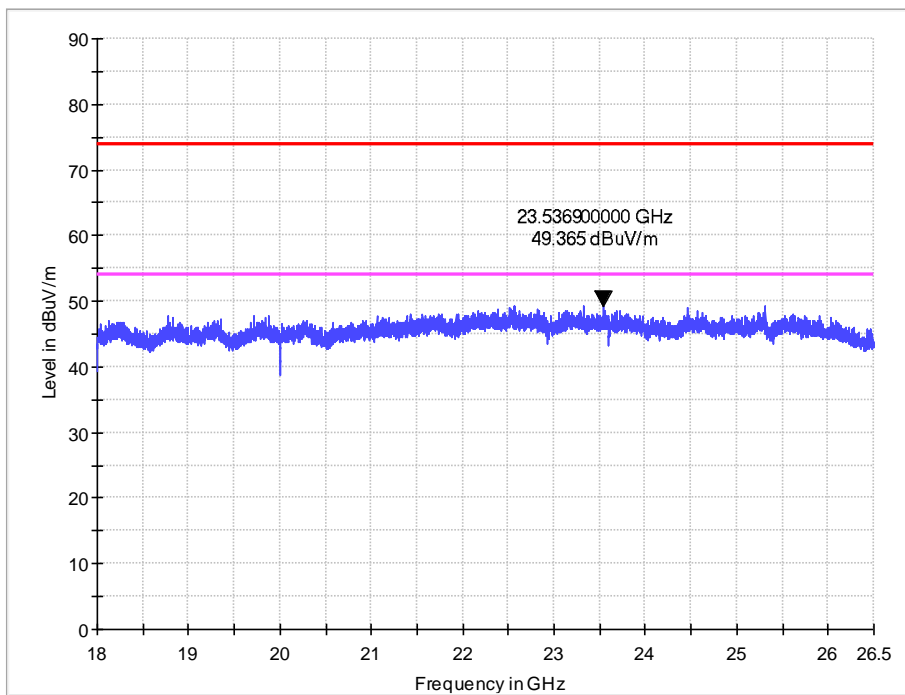


Table 16 Restricted Band Radiated Emission Data

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	
6.31175 - 6.31225	123 - 138	2200 - 2300	
8.291 - 8.294	149.9 - 150.05	2310 - 2390	
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	
12.29 - 12.293	167.72 - 173.2	3332 - 3339	
12.51975 - 12.52025	240 - 285	3345.8 - 3358	
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

Except as shown in table 9 to table 15, all other emission of the above band were less than the limit 20dB.

## 7. 20DB BANDWIDTH MEASUREMENT

### 7.1.Limits of 20dB Bandwidth Measurement

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705

### 7.2.Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and  $VBW \geq RBW$ . The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

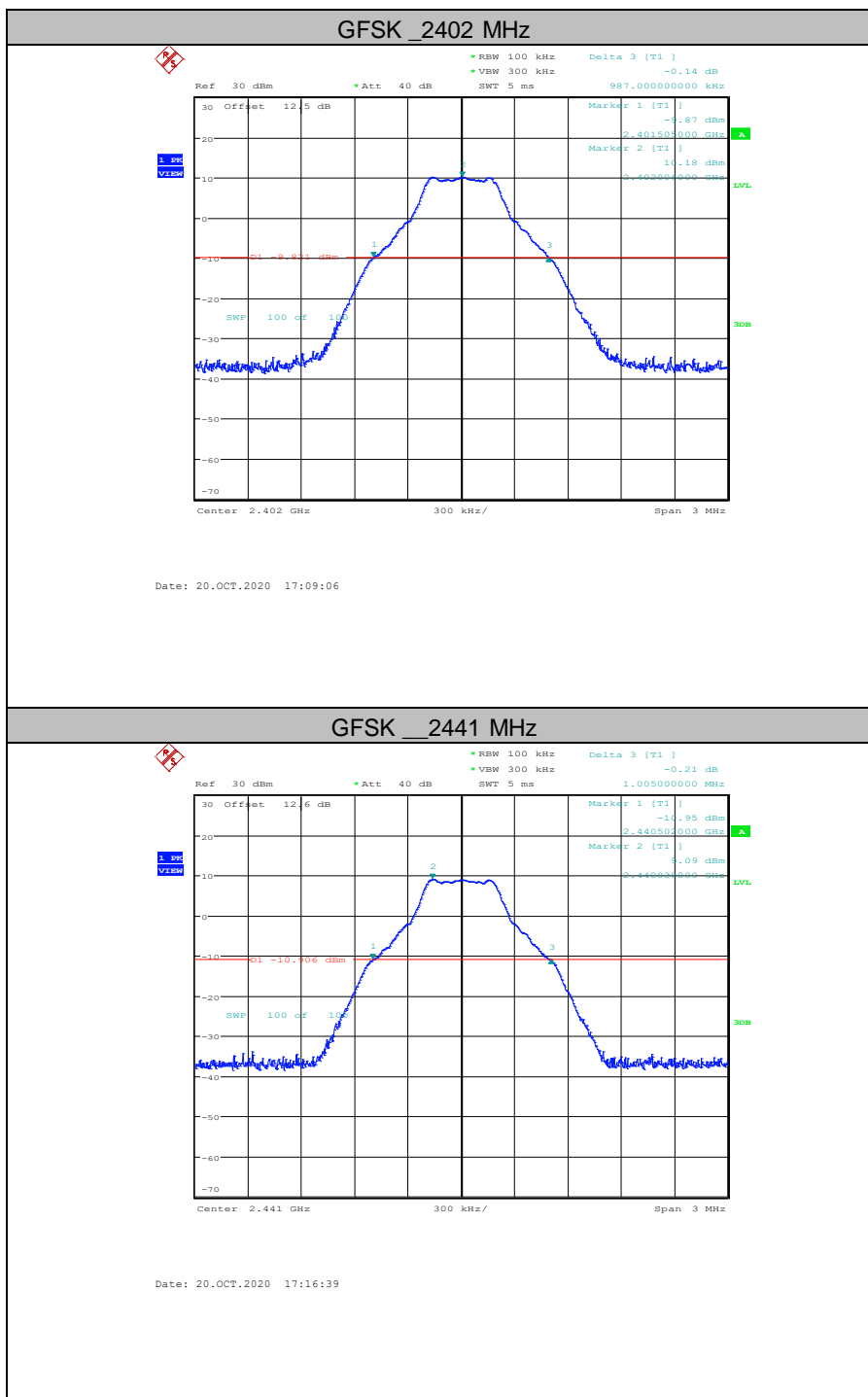
### 7.3.Test Setup



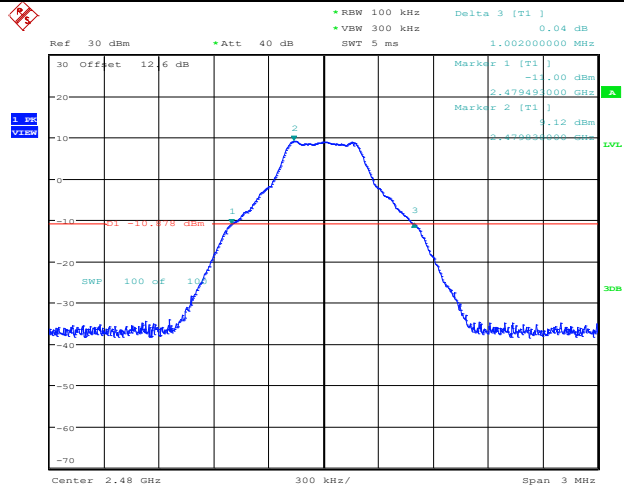
### 7.4.Test Data

Table 17 20dB Bandwidth Test Data Modulation: GFSK

CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	Result
2402	0.987	Pass
2441	1.005	Pass
2480	1.002	Pass



# GFSK \_2480 MHz

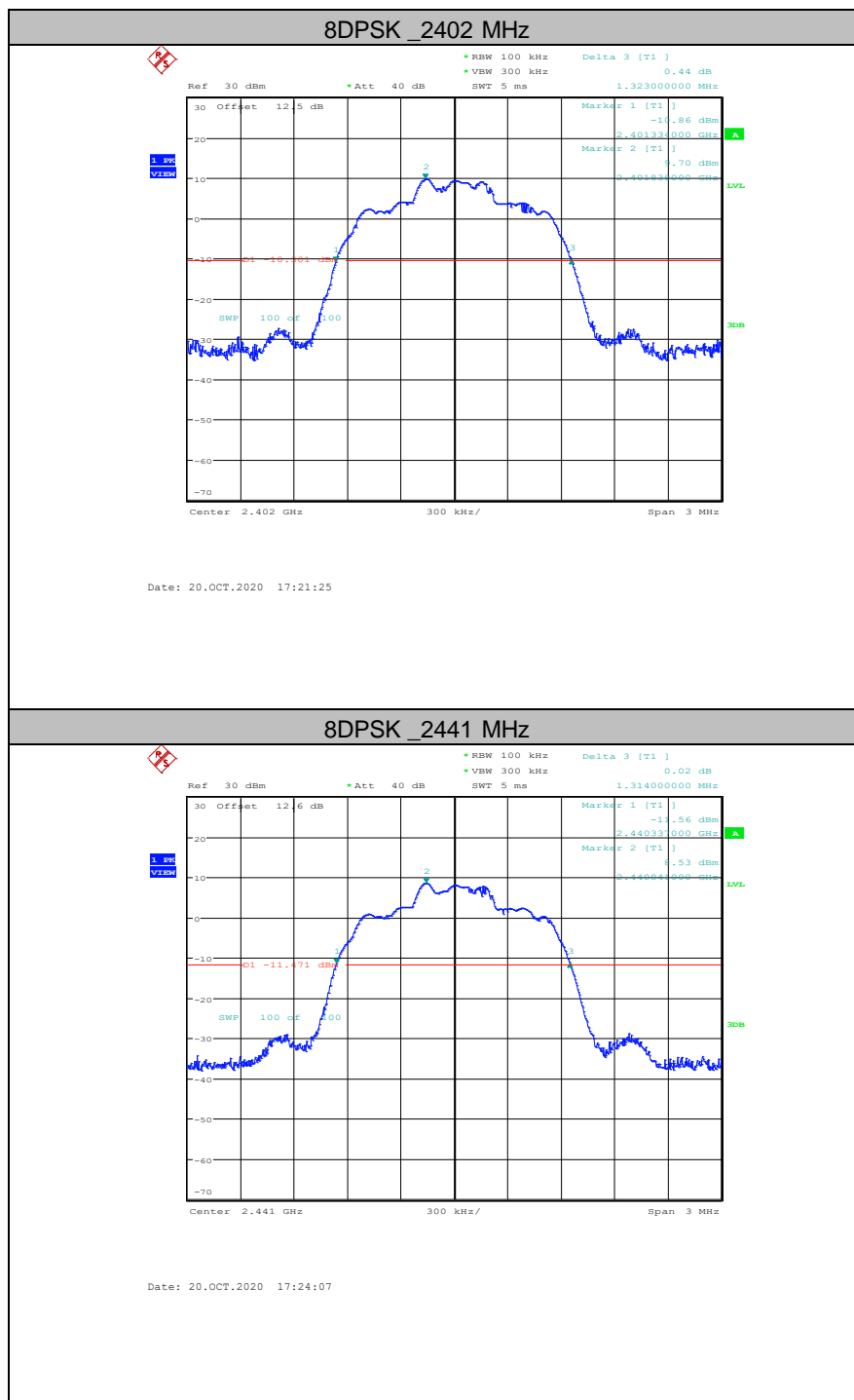


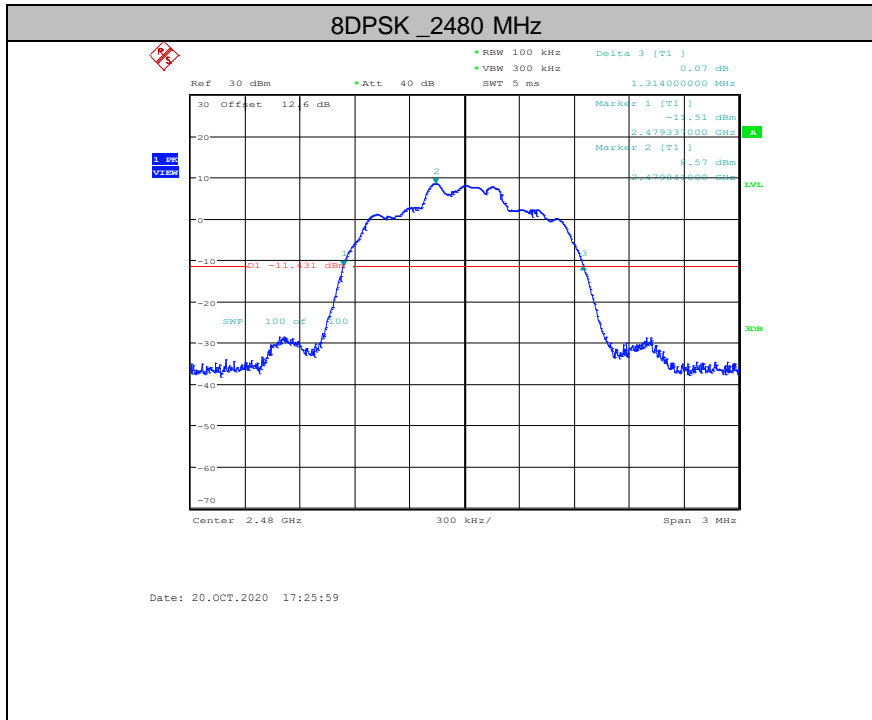
Date: 20.OCT.2020 17:18:30



Table 18 20dB Bandwidth Test Data Modulation: 8DPSK

CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	Result
2402	1.323	Pass
2441	1.314	Pass
2480	1.314	Pass





## 8. CARRIER FREQUENCY SEPARATION MEASUREMENT

### 8.1.Limits of Carrier Frequency Separation Measurement

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

### 8.2.Test Procedure

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number to two adjacent channels separately and test the carrier frequency separation with spectrum analyzer.

### 8.3.Test Setup

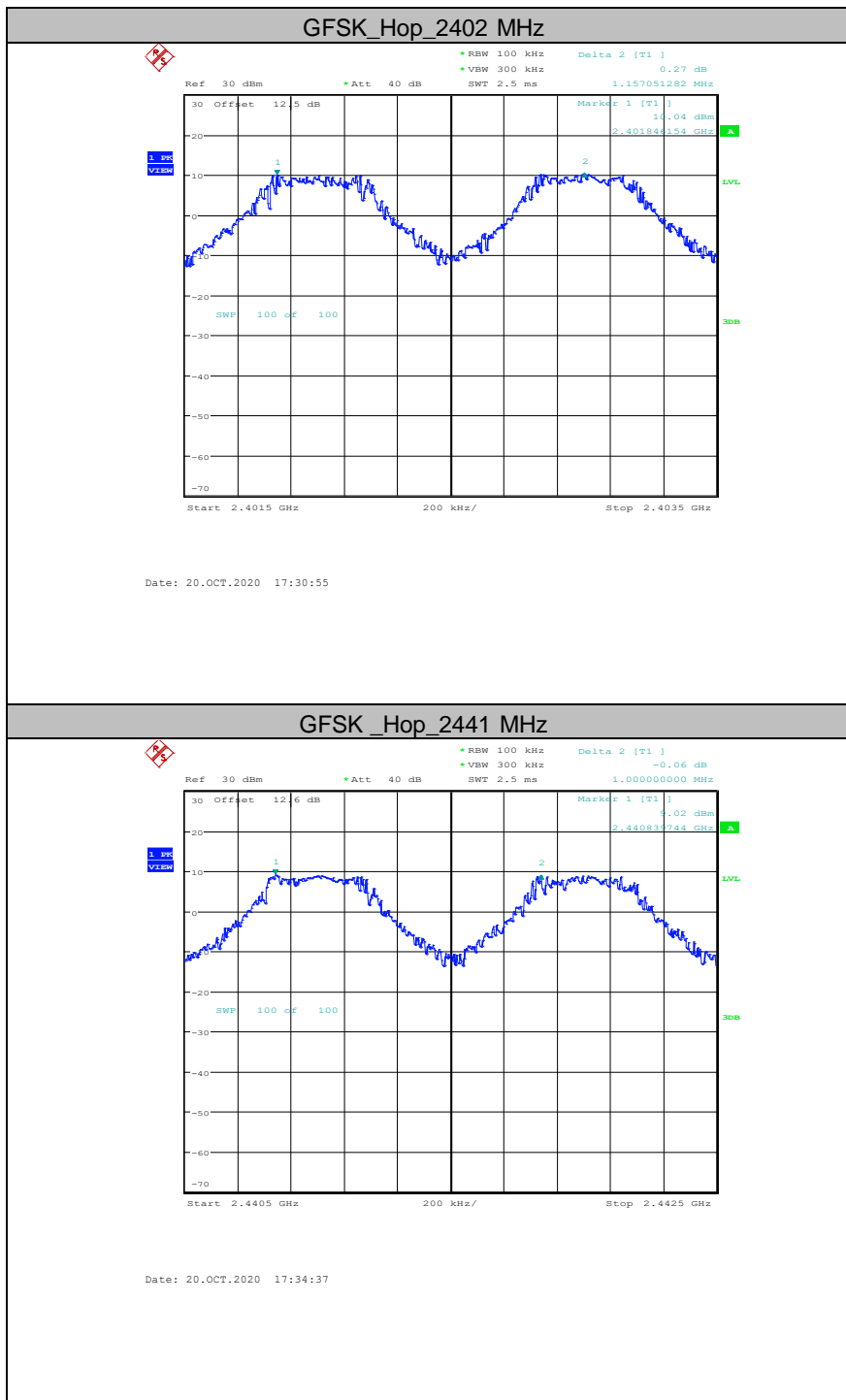


### 8.4.Test Data

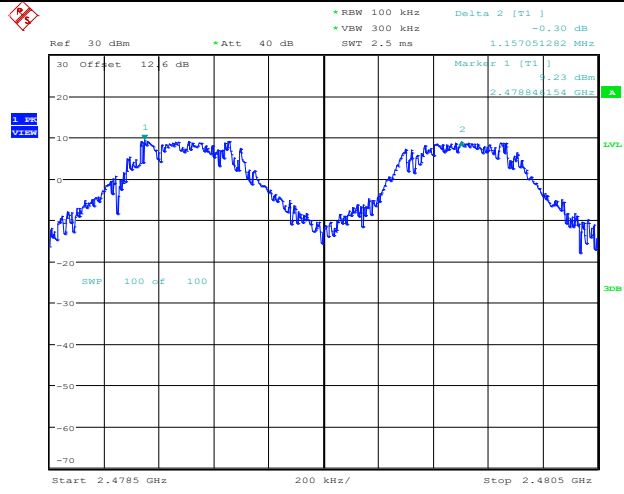
GFSK

Table 19 Carrier Frequencies Separation

Frequency [MHz]	Frequency [MHz]	Frequency separation [MHz]	Limit [MHz]	Result
2402	2403	1.157	$\geq 0.746$	Pass
2441	2442	1	$\geq 0.746$	Pass
2478	2479	1.157	$\geq 0.746$	Pass



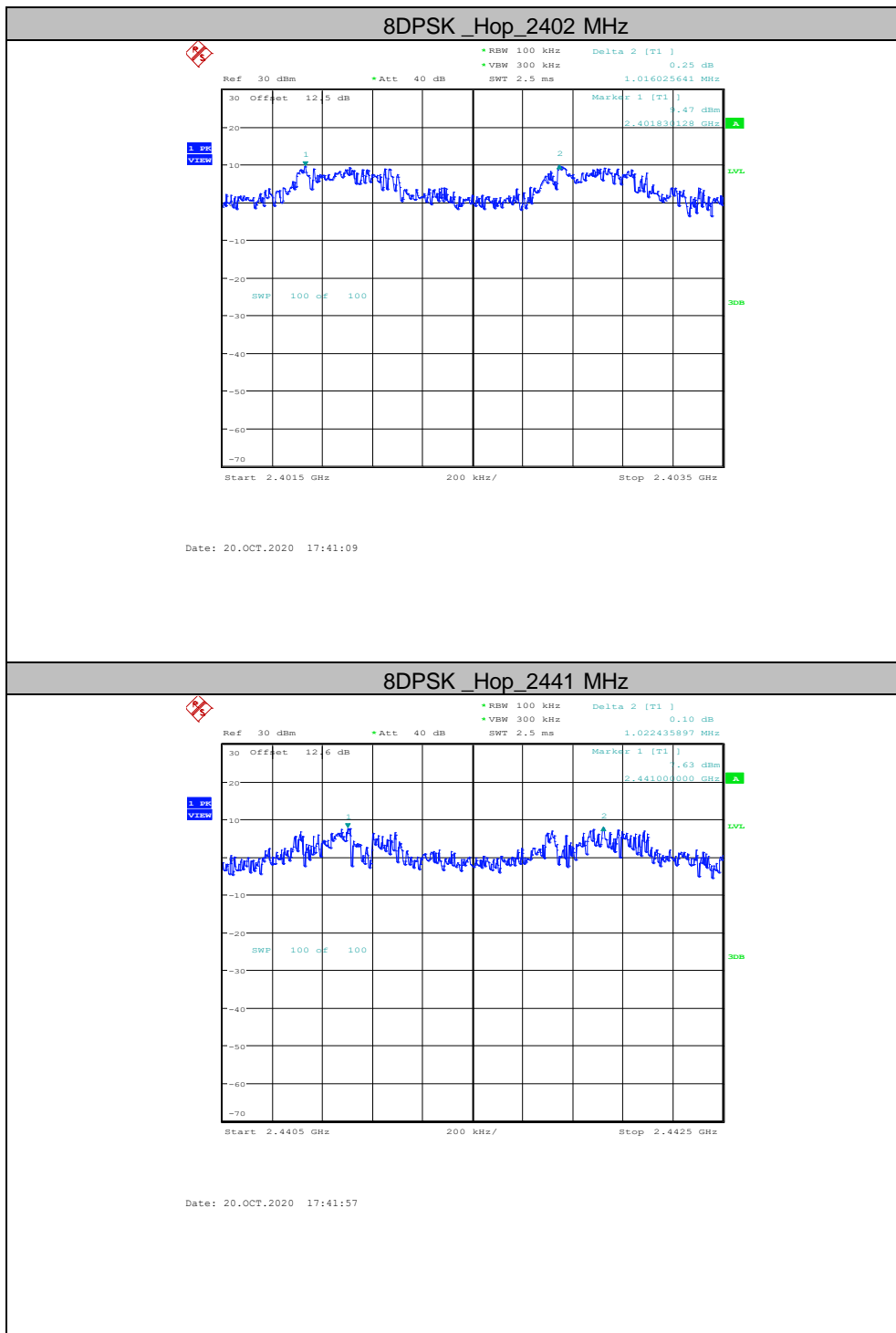
# GFSK\_Hop\_2480 MHz



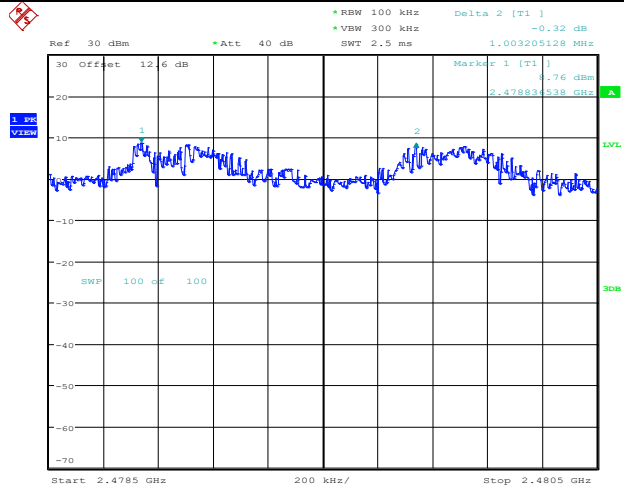
Date: 20.OCT.2020 17:33:16

Table 20 Carrier Frequencies Separation

Frequency [MHz]	Frequency [MHz]	Frequency separation [MHz]	Limit [MHz]	Result
2402	2403	1.016	$\geq 0.922$	Pass
2441	2442	1.022	$\geq 0.922$	Pass
2478	2479	1.003	$\geq 0.922$	Pass



# 8DPSK\_Hop\_2480 MHz



Date: 20.OCT.2020 17:42:56

## 9. NUMBER OF HOPPING CHANNEL

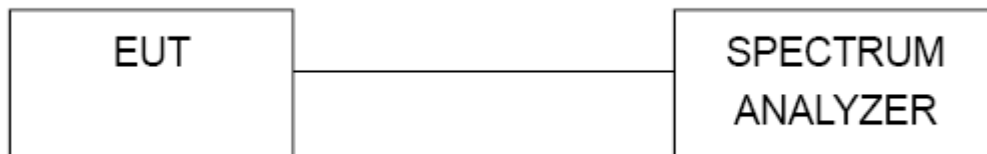
### 9.1.Limits of Number of Hopping Channel

Number of hopping channel should be compliance with the requirements in part15.247 (a) (1) III.

### 9.2.Test Procedure

- (a) Connect test port of EUT to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch on. Frequency hopping function, then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.
- (c) Count the quantity of peaks to get the number of hopping channels.

### 9.3.Test Setup



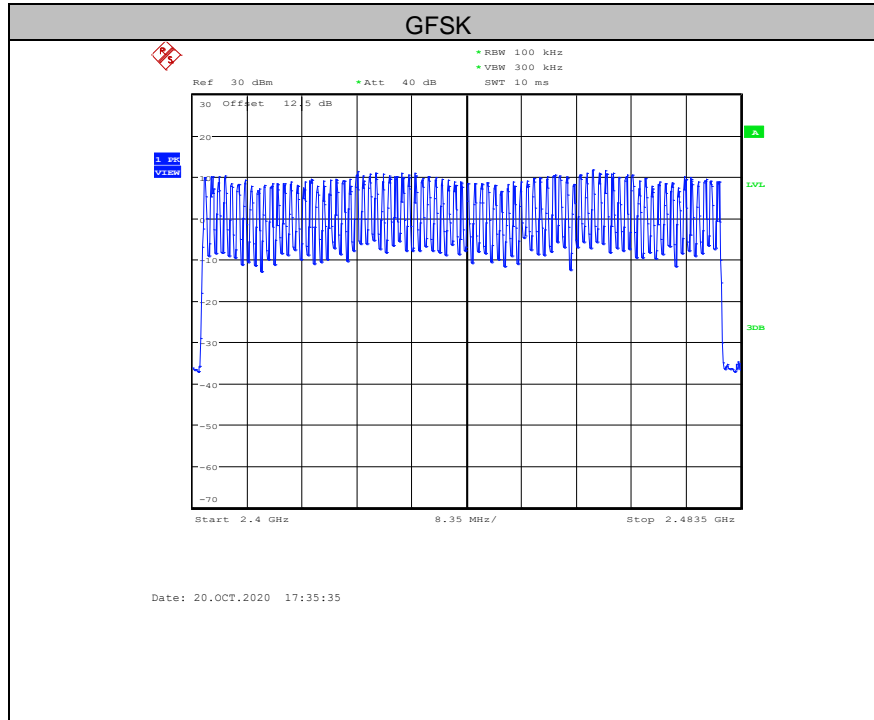
### 9.4.Test Data



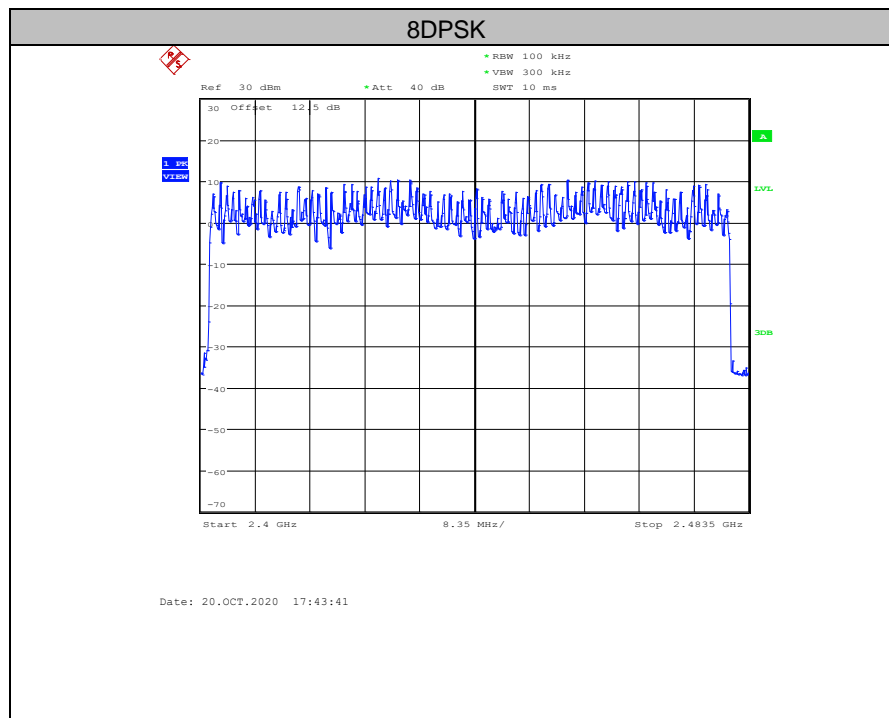
Table 21 Hopping Channel Number Test Data

Hopping Numbers	Limit	Result
79	>15	Pass

GFSK



8DPSK



## 10. TIME OF OCCUPANCY

### 10.1. Limits of Time Occupancy

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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### 10.2. Test Procedure

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- (c) Set the span of spectrum analyzer to 0 Hz, and set the resolution bandwidth to 1 MHz and the video bandwidth to 1 MHz, then get the time domain measured diagram. and set sweep time to 2 times of one burst occupancy time, and measure the time of occupancy of one burst.
- (d) Set the resolution bandwidth to 1 MHz and the video bandwidth to 3 MHz ,and set the sweep time to a period (0.4 seconds multiplied by the number of hopping channels employed), and count the number of the bursts.
- (e) Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

DH1: Dwell time equal to Pluse time (ms)\*(1600/2/79)\*31.6ms

DH3: Dwell time equal to Pluse time (ms)\*(1600/4/79)\*31.6ms

DH5: Dwell time equal to Pluse time (ms)\*(1600/6/79)\*31.6ms

AFH Mode:

DH1: Dwell time equal to Pluse time (ms)\*(800/2/20)\* (0.4\*20) ms

DH3: Dwell time equal to Pluse time (ms)\*(800/4/20)\* (0.4\*20) ms

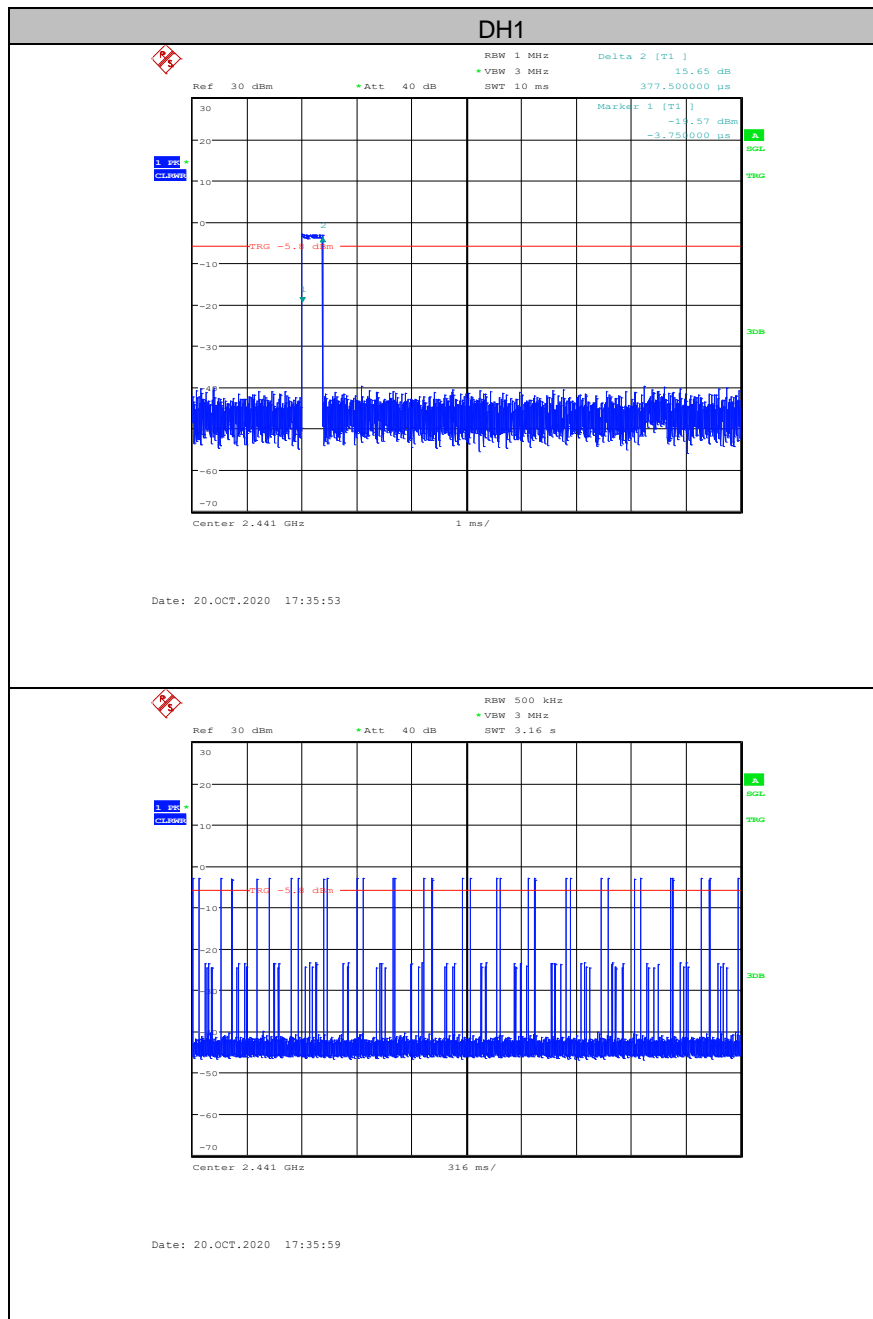
DH5: Dwell time equal to Pluse time (ms)\*(800/6/20)\* (0.4\*20) ms

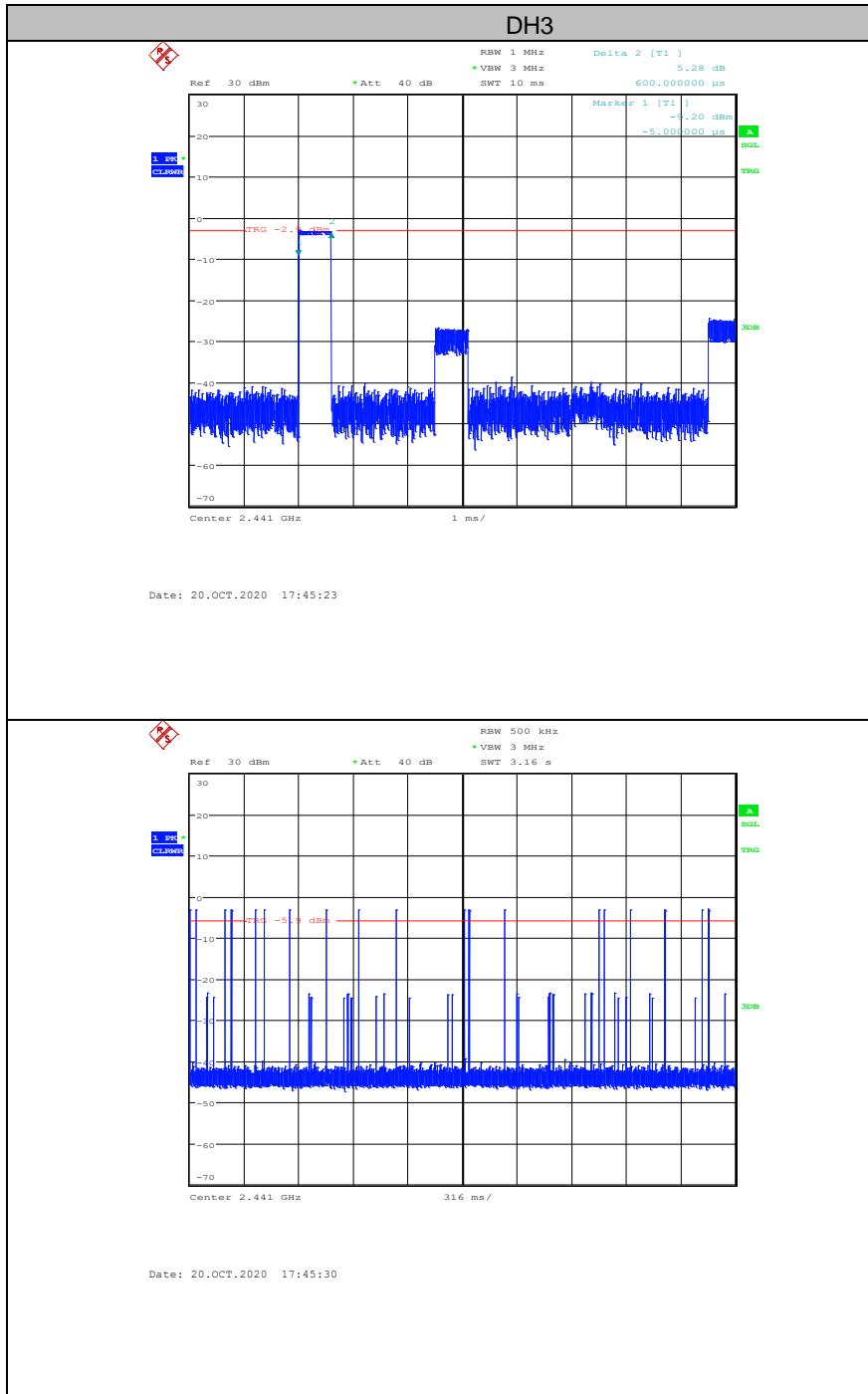
### 10.3. Test Data

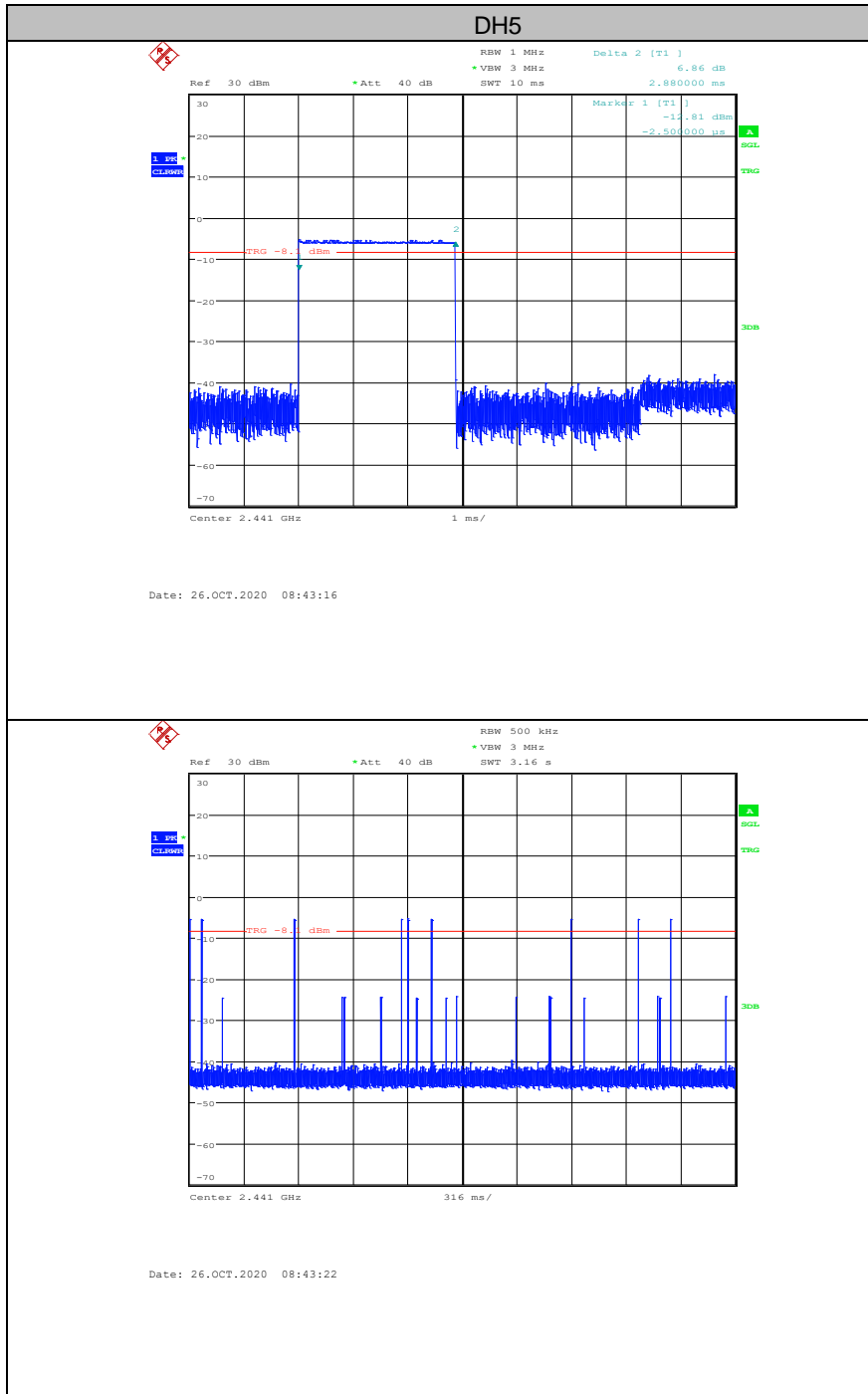
# GFSK

## Table 22 Time of Occupancy

Data Packet	Time of Single Slot [ms]	Numbers of Slots in a period	Time of Occupied in a period [s]	AFH Mode Time of occupied in a period [s]	Limit [s]	Results
DH1	0.38	33	0.12	0.06	$\leq 0.40$	Pass
DH3	0.60	19	0.10	0.05	$\leq 0.40$	Pass
DH5	2.88	9	0.31	0.15	$\leq 0.40$	Pass



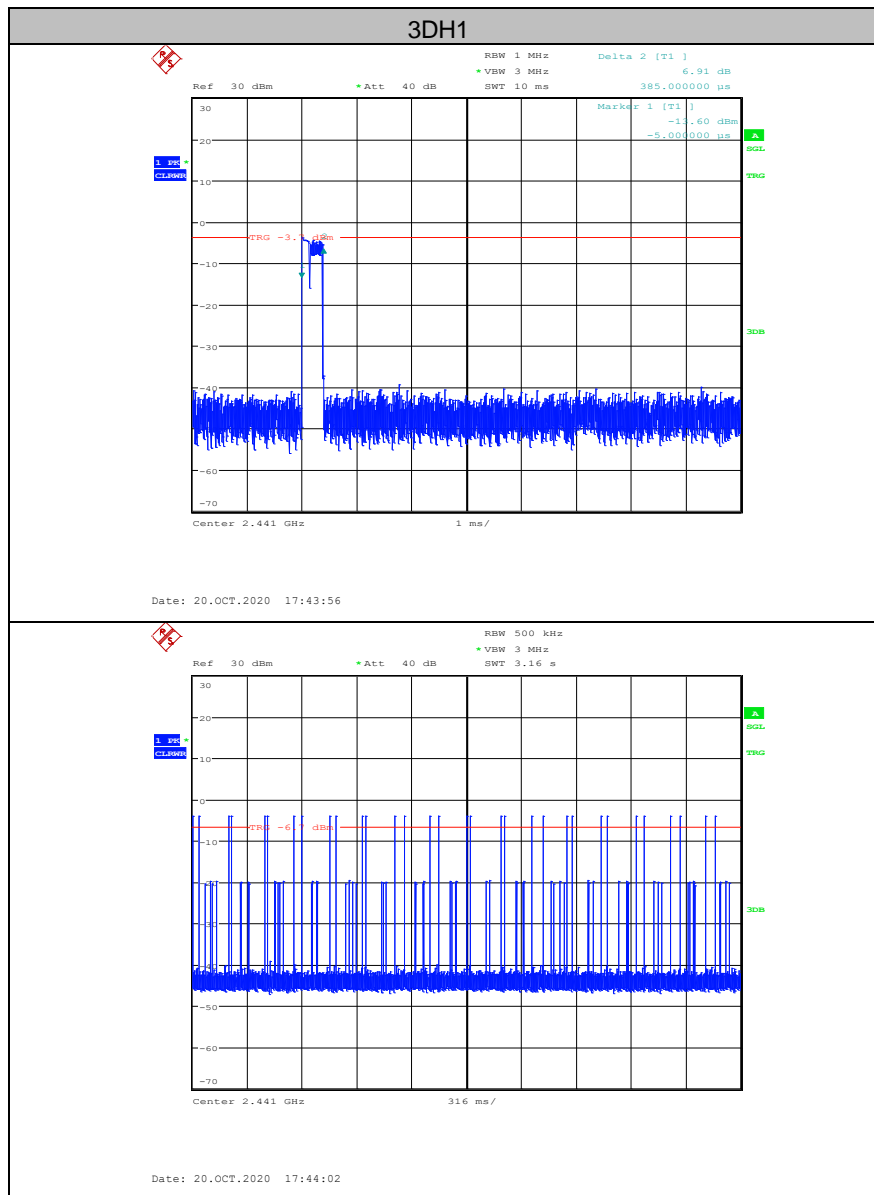


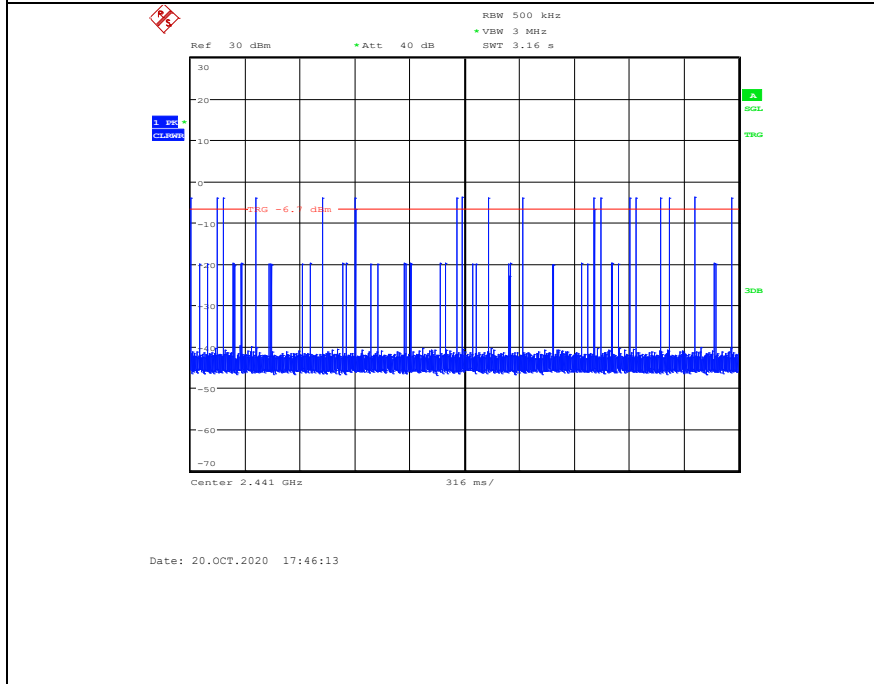
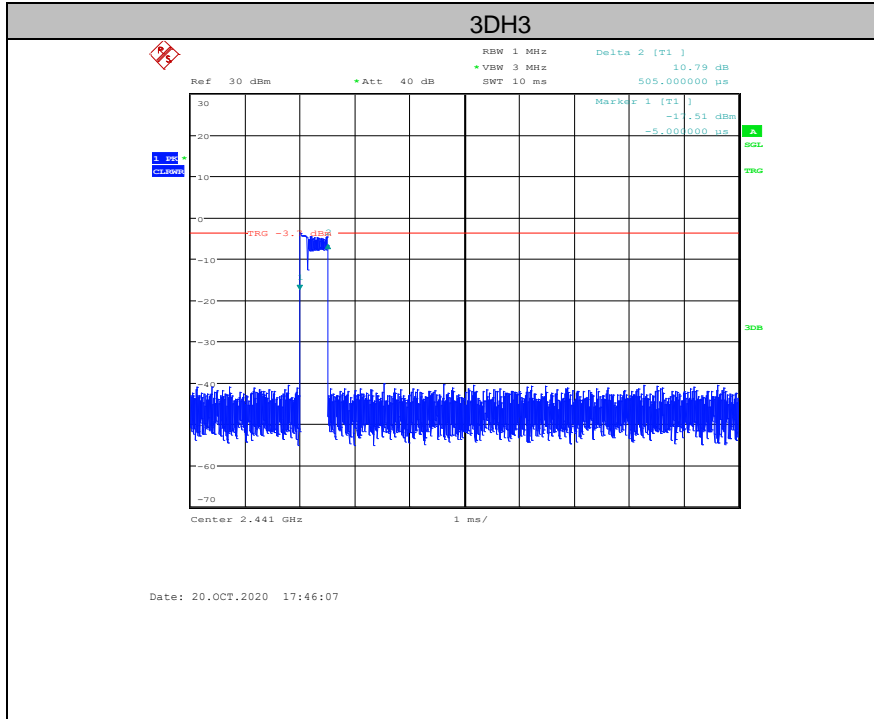


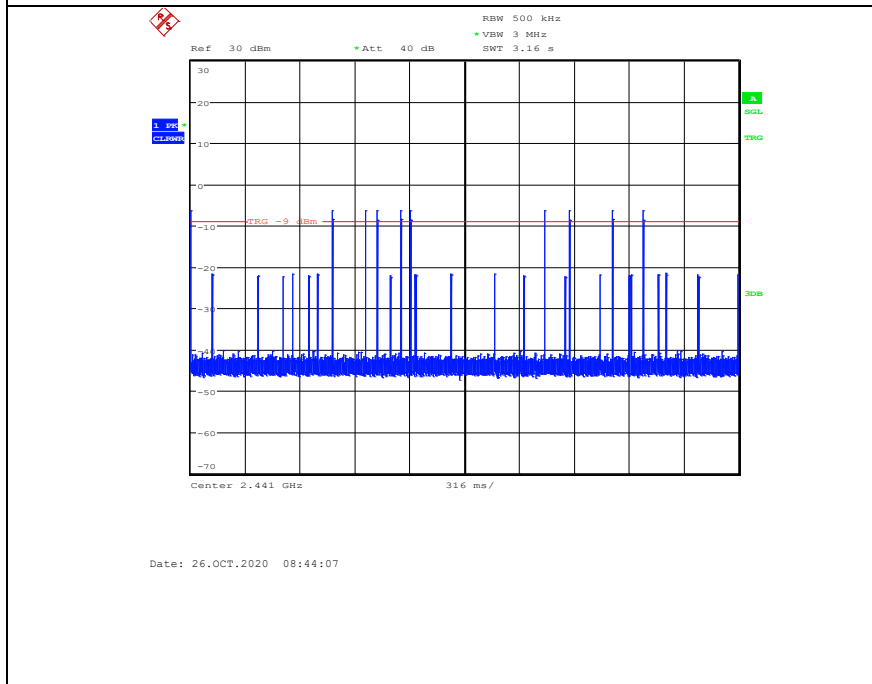
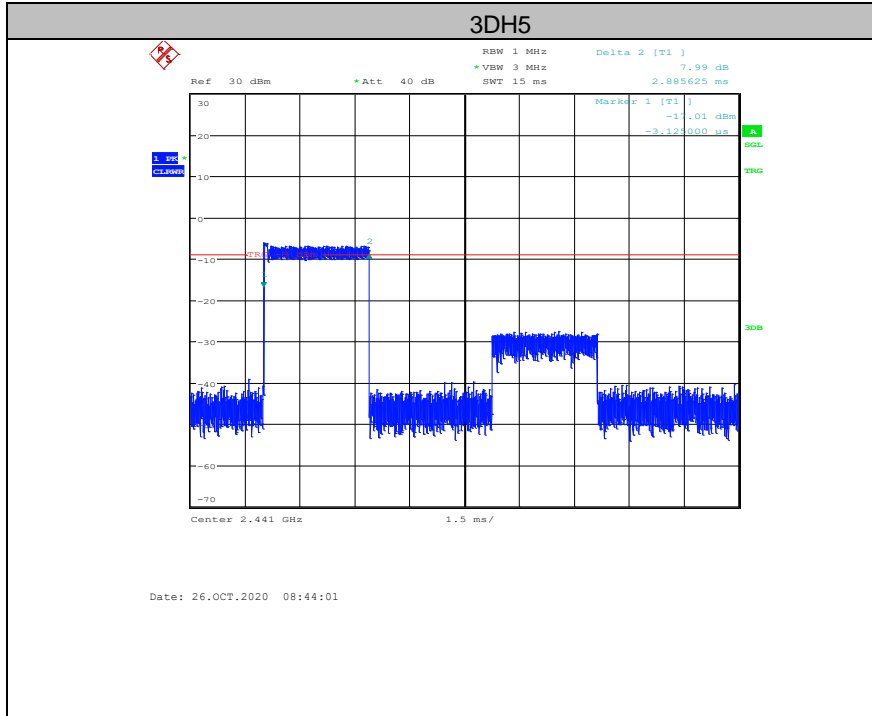
8DPSK

Table 23 Time of Occupancy

Data Packet	Time of Single Slot [ms]	Numbers of Slots in a period	Time of Occupied in a period [s]	AFH Mode Time of occupied in a period [s]	Limit [s]	Result
3DH1	0.39	32	0.06	0.03	<= 0.40	Pass
3DH3	0.51	18	0.04	0.02	<= 0.40	Pass
3DH5	2.89	10	0.15	0.07	<= 0.40	Pass









## **11. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT**

### **11.1. Limits of Maximum Conducted Output Power Measurement**

Compliance with part 15.247 (b) (1) & RSS-247 Clause 5.4(2), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

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

### **11.2. Test Procedure**

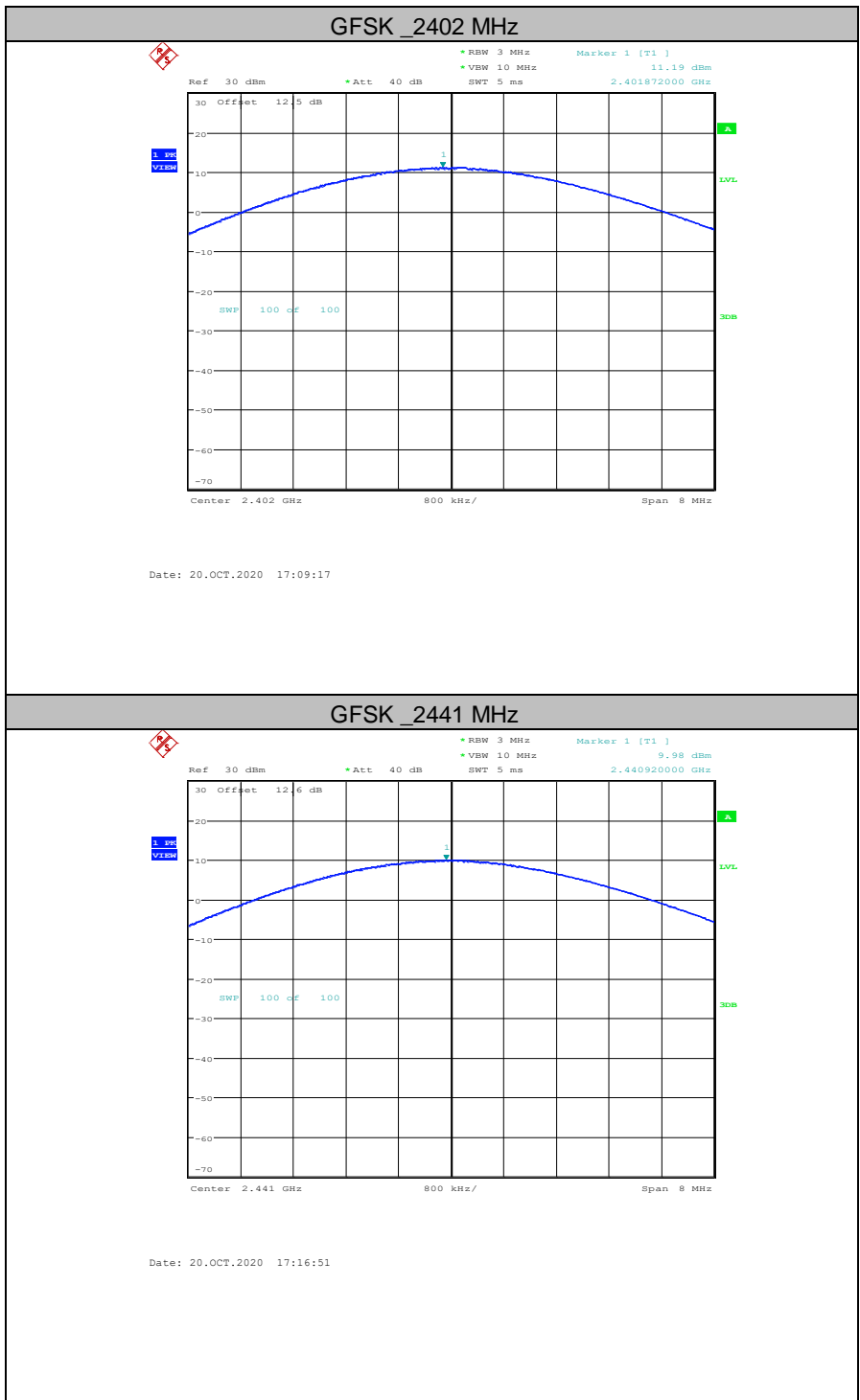
- (a) Connect test port of EUT to universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

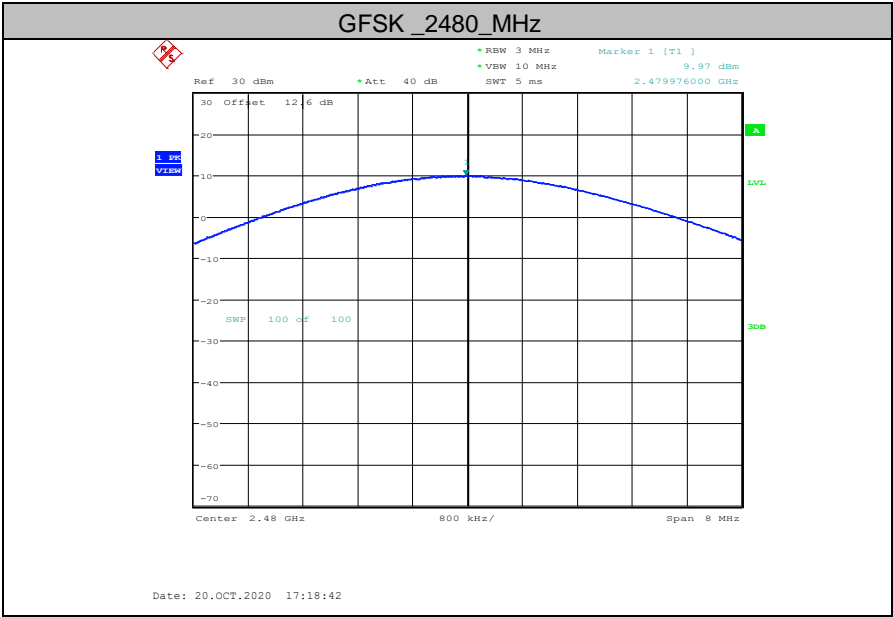
### **11.3. Test Data**

GFSK

Table 24 Maximum Conducted Output Power Test Data

Channel	Channel No.	Center Freq. [MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Low	0	2402	11.19	<=20.97	Pass
Middle	39	2441	9.98	<=20.97	Pass
High	78	2480	9.97	<=20.97	Pass

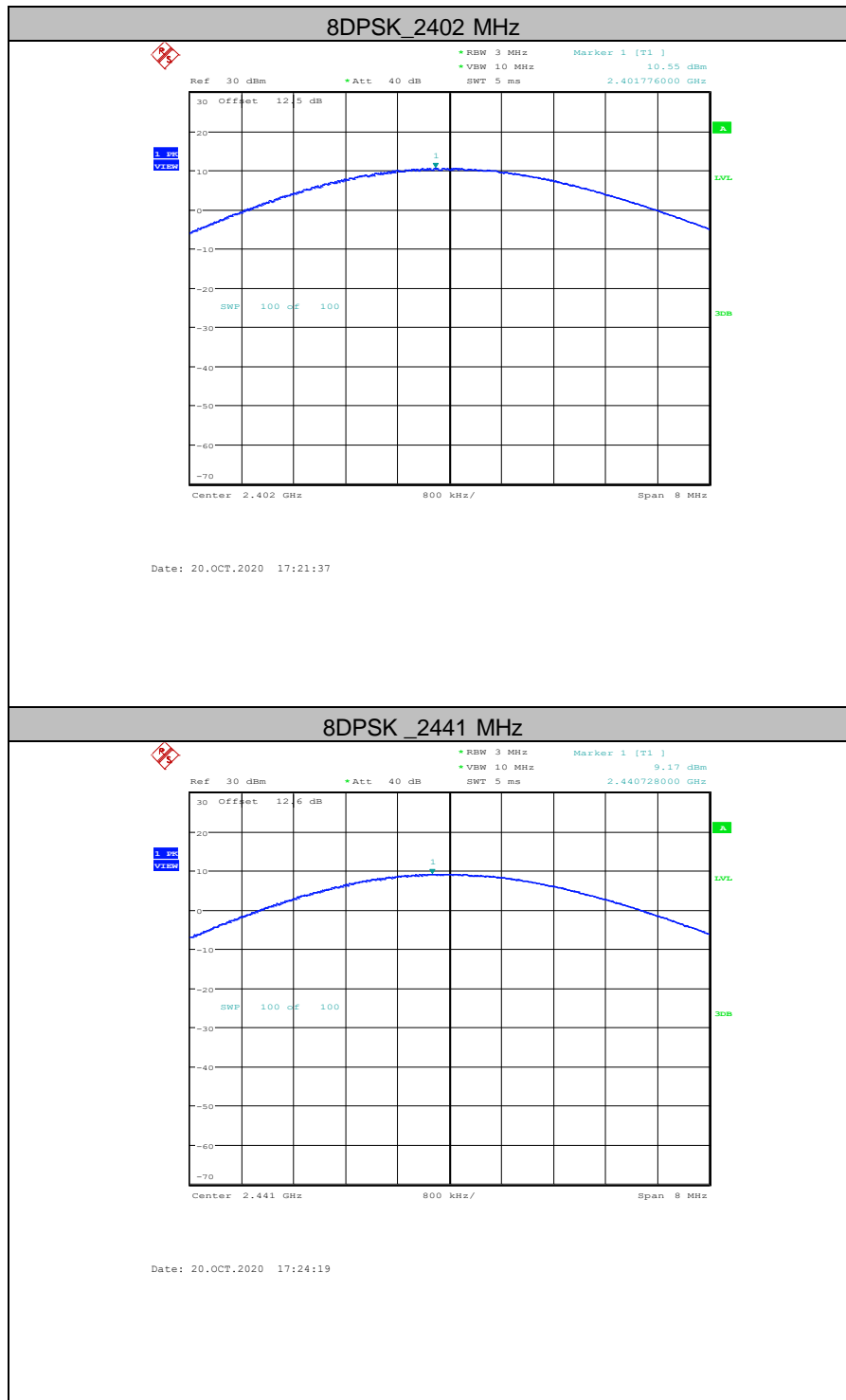




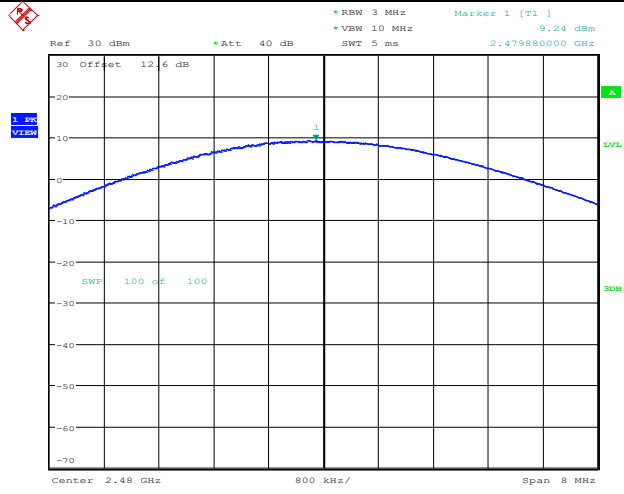
8DPSK

Table 25 Peak Power Test Data

Channel	Channel No.	Center Freq. [MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Low	0	2402	10.55	<=20.97	Pass
Middle	39	2441	9.17	<=20.97	Pass
High	78	2480	9.24	<=20.97	Pass



# 8DPSK\_2480 MHz



Date: 20.OCT.2020 17:26:10

## 12. BAND EDGES MEASUREMENT

### 12.1. Limits of Band Edges Measurement

Below  $-20\text{dB}$  of the highest emission level of operating band (in  $100\text{kHz}$  resolution bandwidth).

### 12.2. Test Procedure

1. The EUT is placed on a turntable, which is  $1.5\text{m}$  above the ground plane.
2. The turntable shall be rotated for  $360$  degrees to determine the position of maximum emission level.
3. EUT is set  $3\text{m}$  away from the receiving antenna, which is varied from  $1\text{m}$  to  $4\text{m}$  to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) AVERAGE:  $\text{RBW}=1\text{MHz}$  /  $\text{VBW}=10\text{Hz}$  / Sweep=AUTO
  - (b) PEAK:  $\text{RBW}=\text{VBW}=1\text{MHz}$  / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

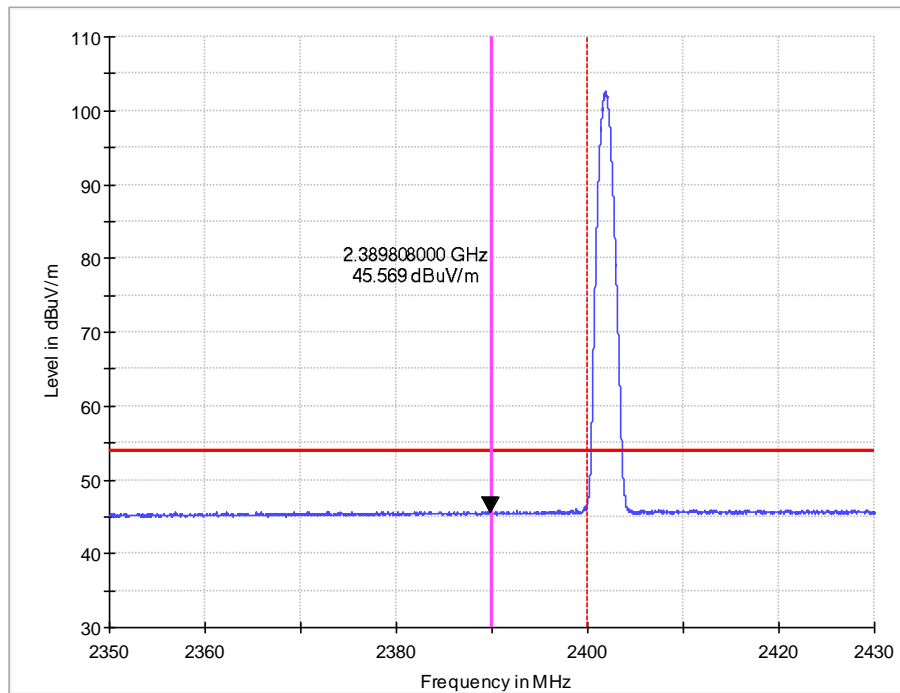
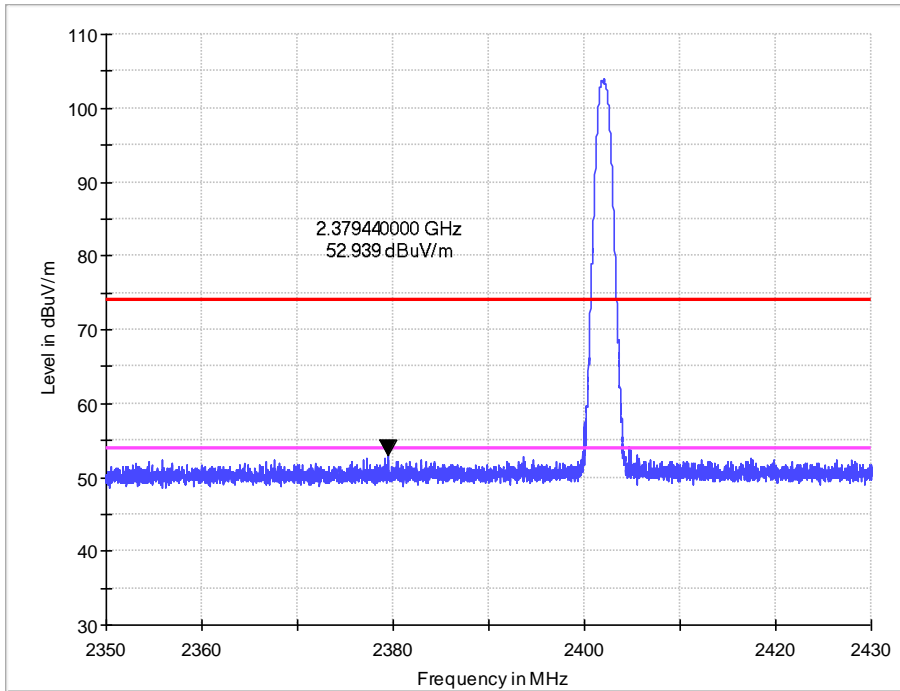
### 12.3. Test Data

The measured plots are attached on the following. Test data shows compliance with the band edge requirement in part 15.247(d).

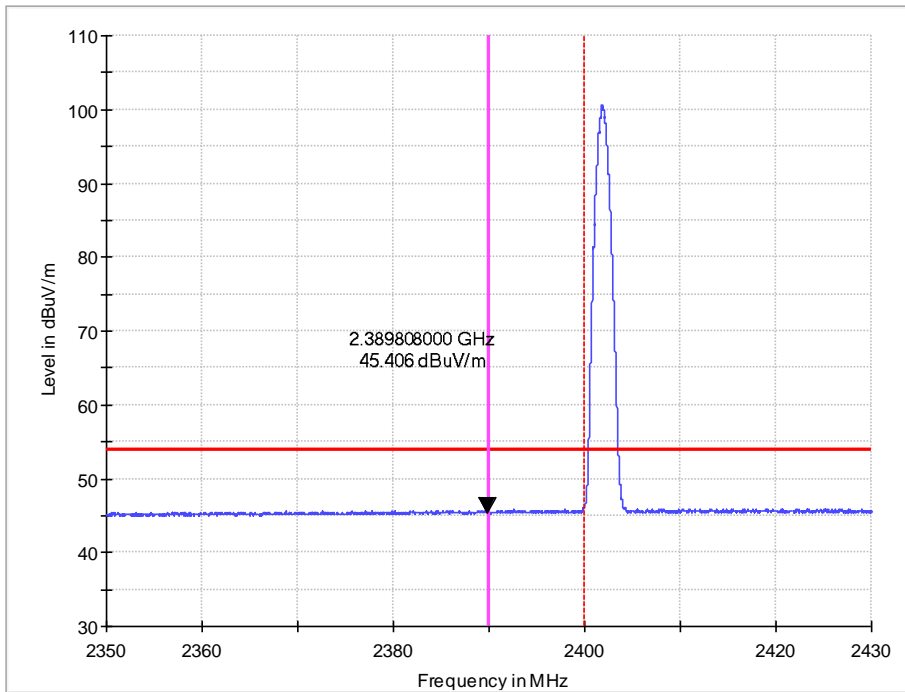
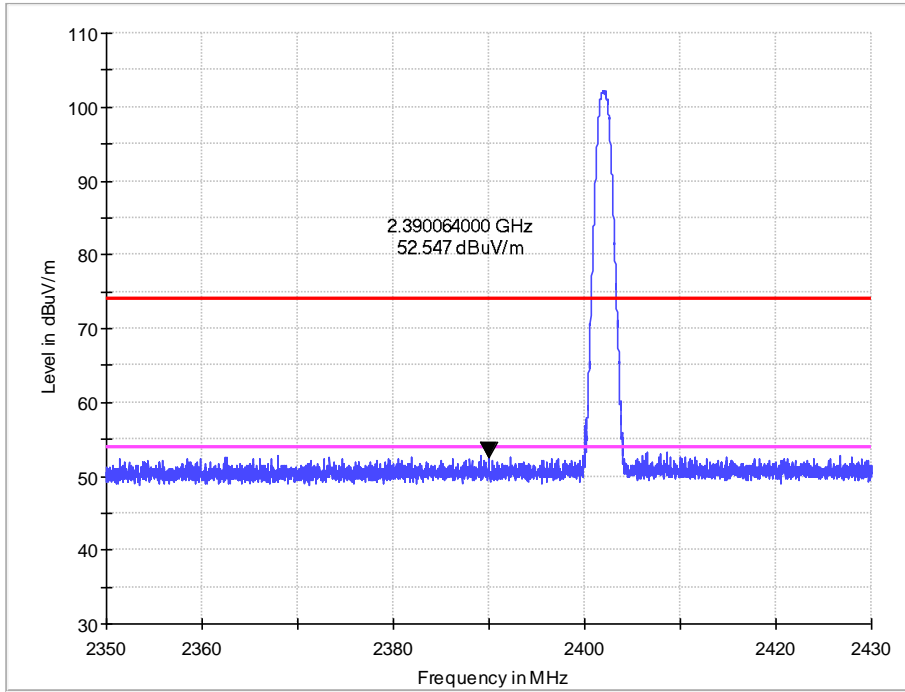
GFSK

Low edge

Horizontal



# Vertical

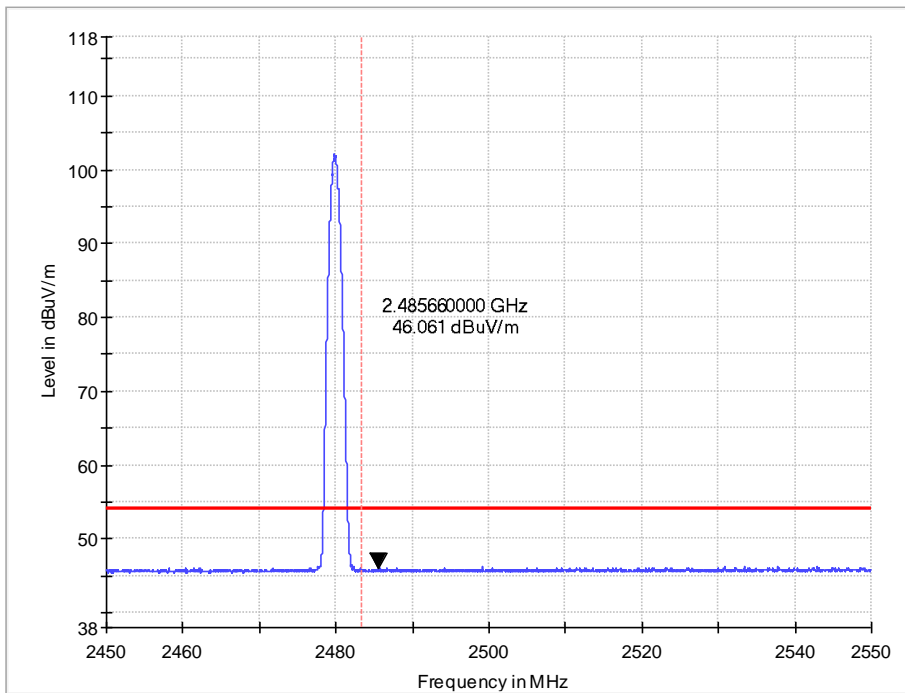
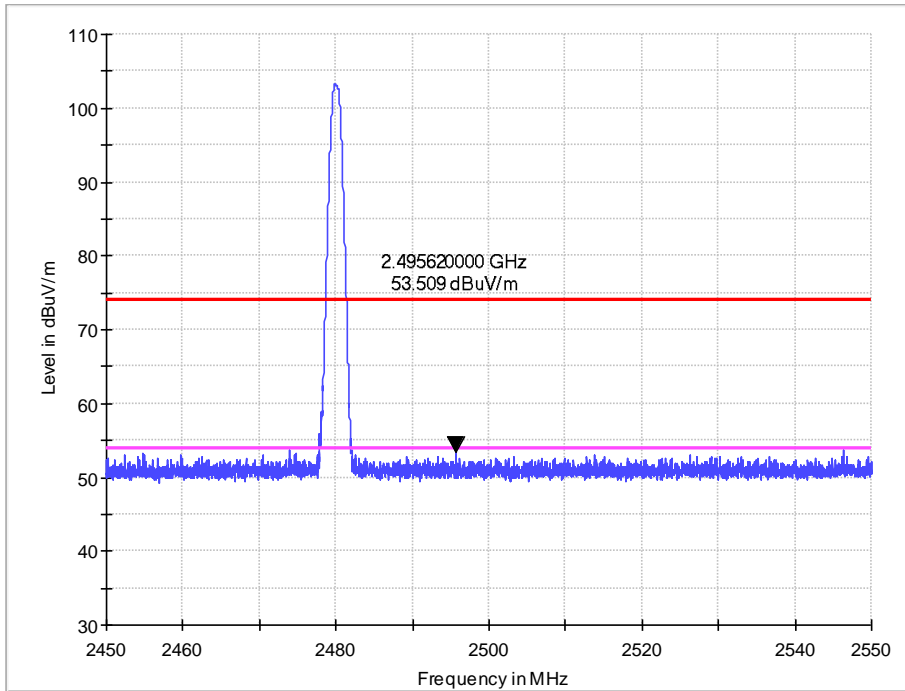




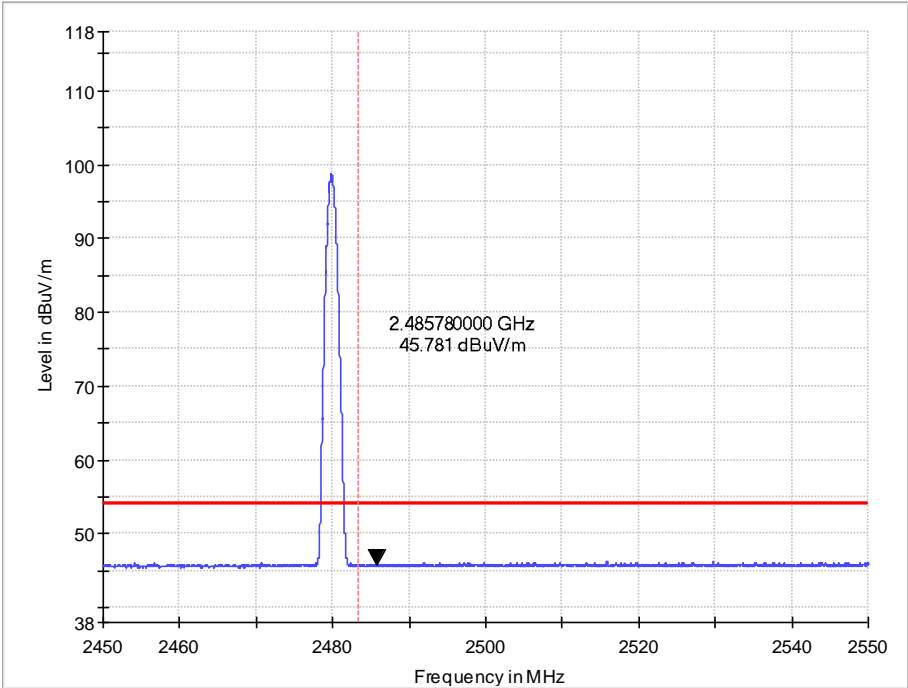
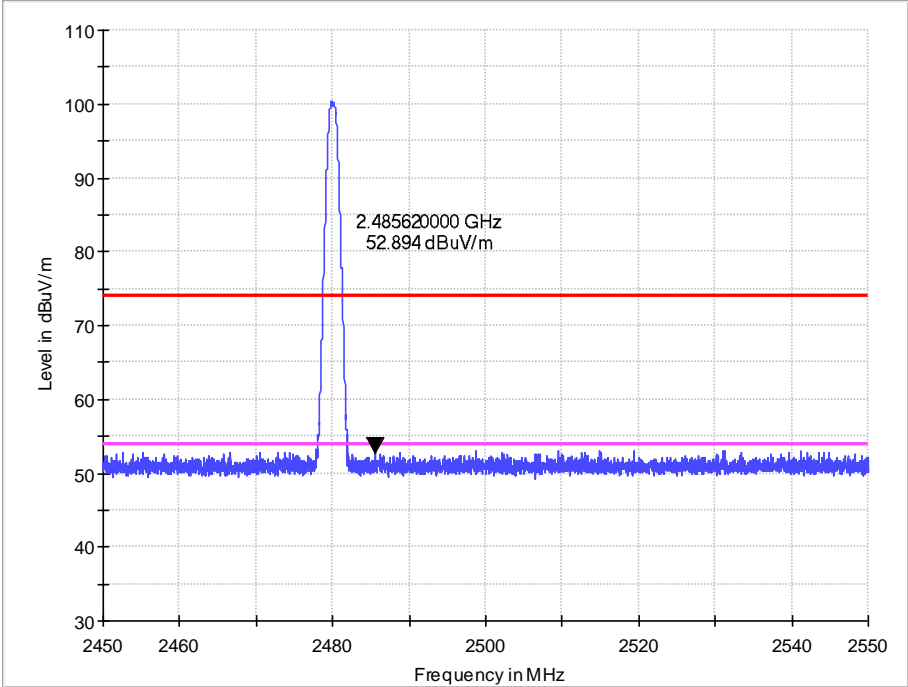
GFSK

Upper Edge

Horizontal



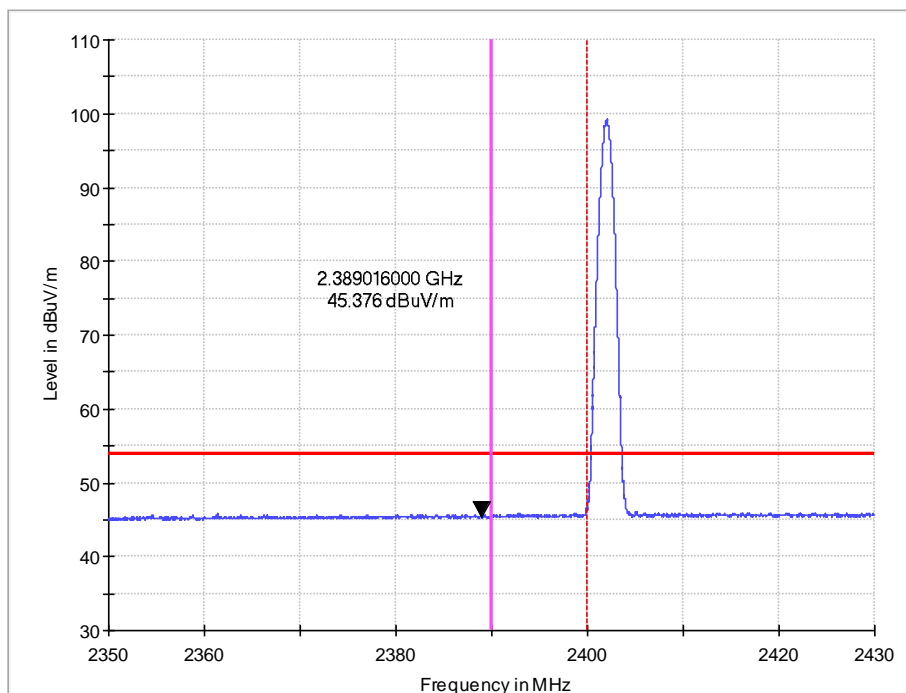
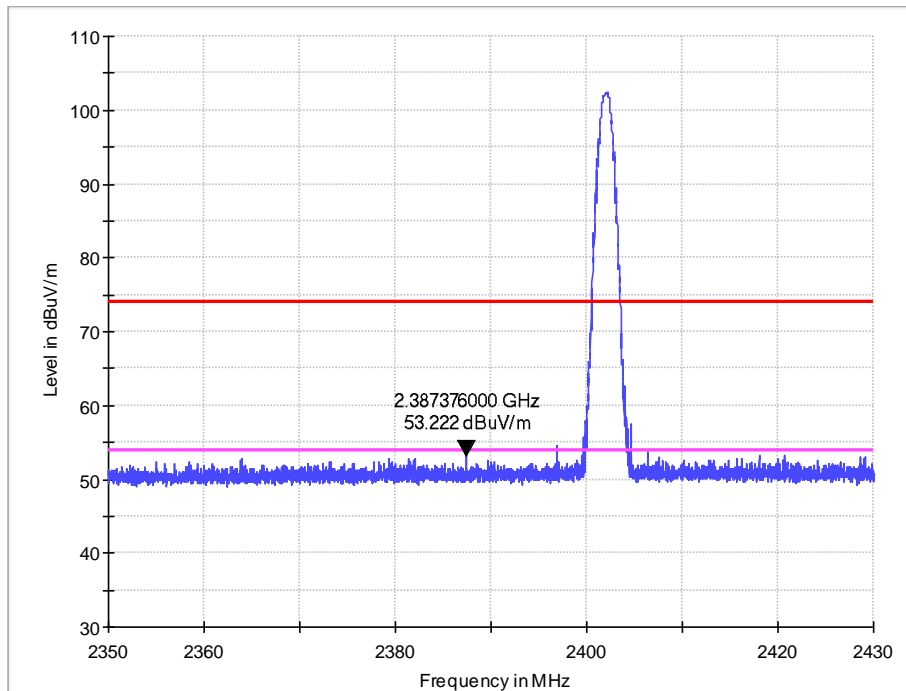
Vertical



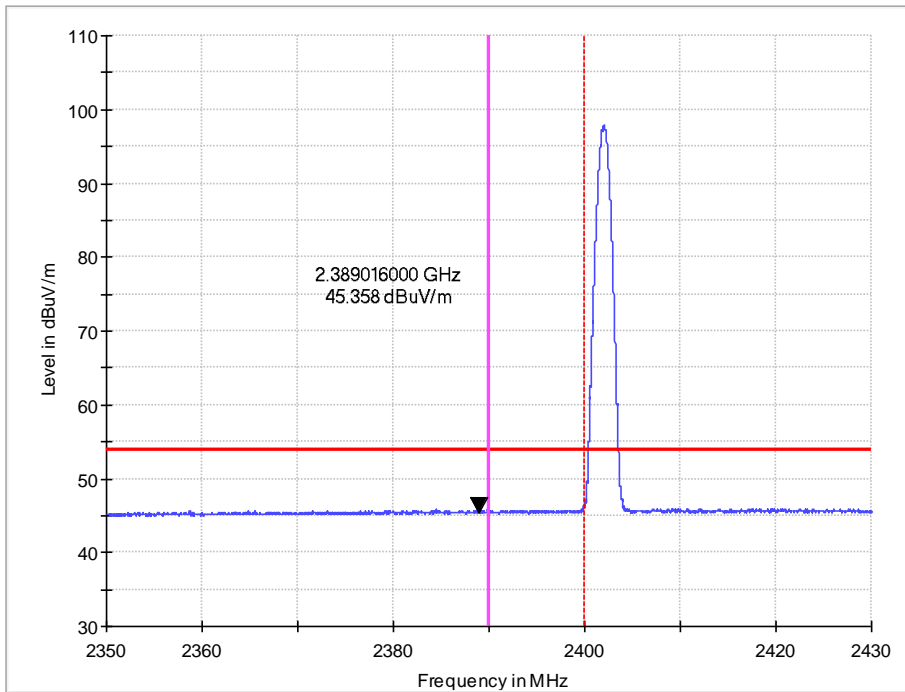
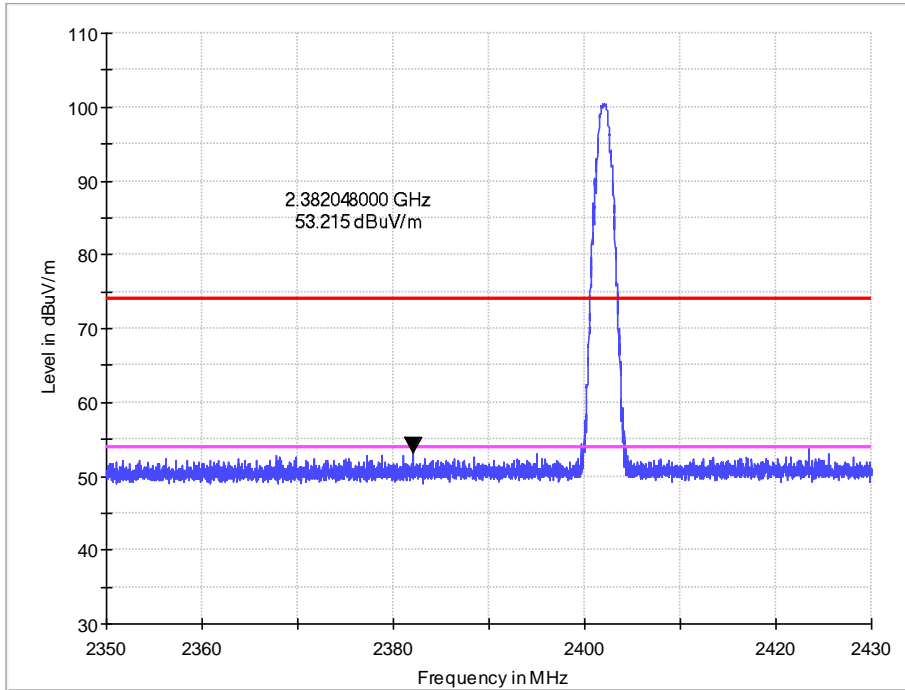
8DPSK

Low edge

Horizontal



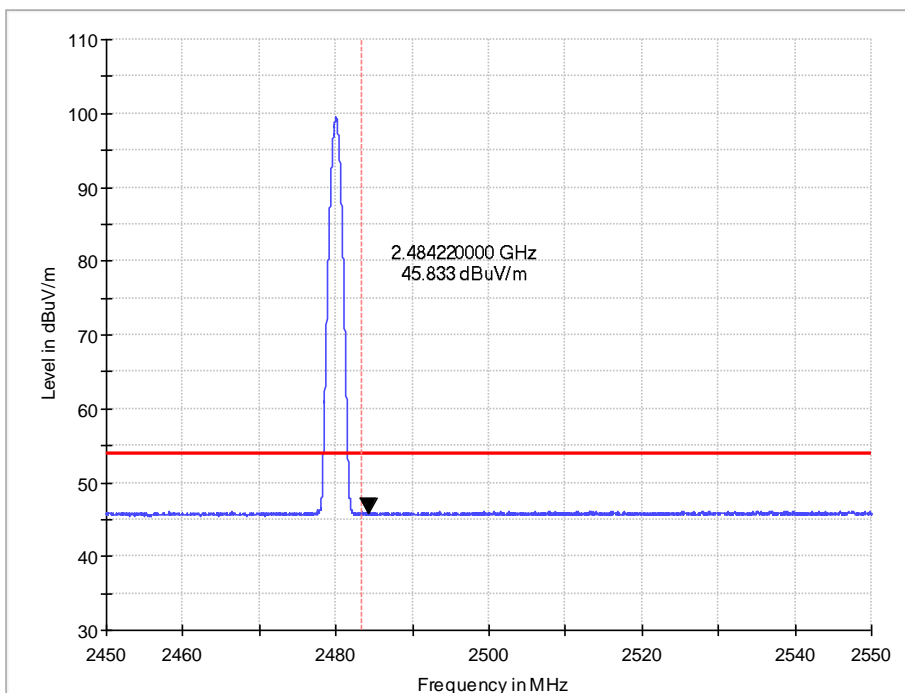
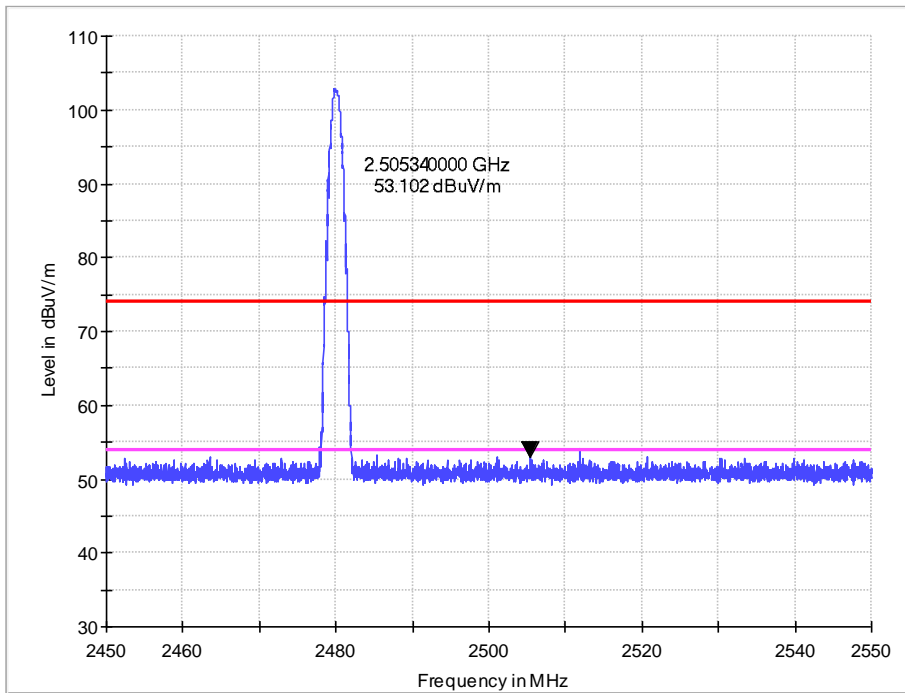
# Vertical



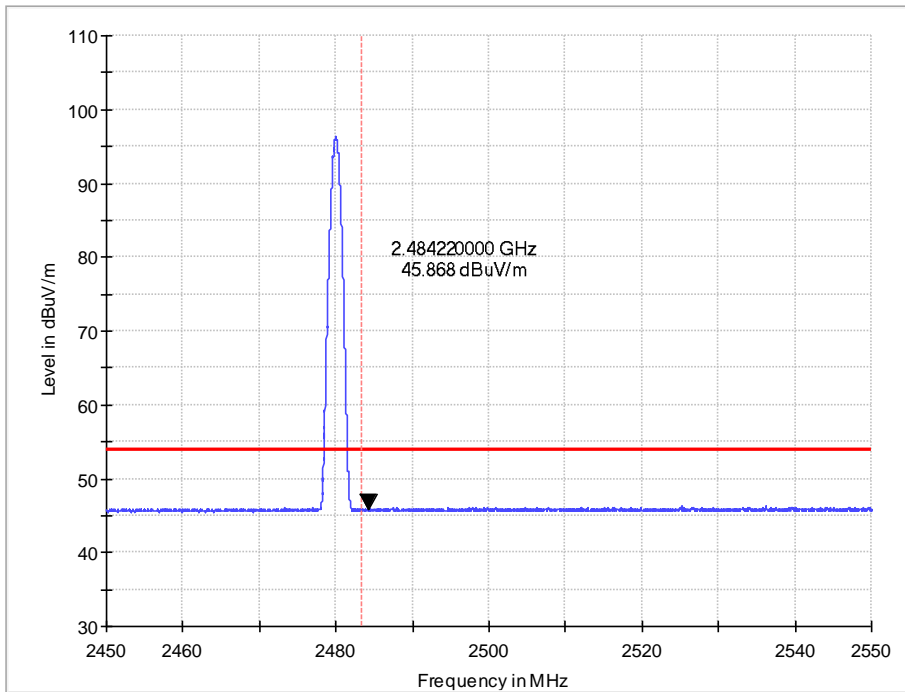
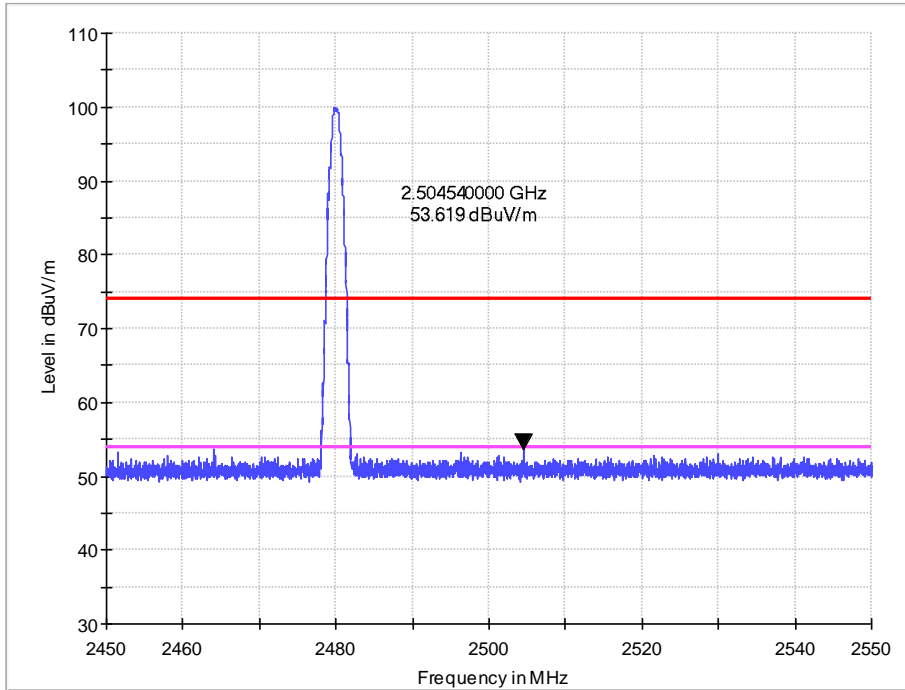
8DPSK

Upper edge

Horizontal



# Vertical



## **13. CONDUCTED SPURIOUS EMISSION**

### **13.1. Limits of Band Edges Measurement**

Below –20dB of the highest emission level of operating band (in 100 kHz resolution bandwidth).

### **13.2. Test Procedure**

The transmitter output was connected to the spectrum analyzer.

The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

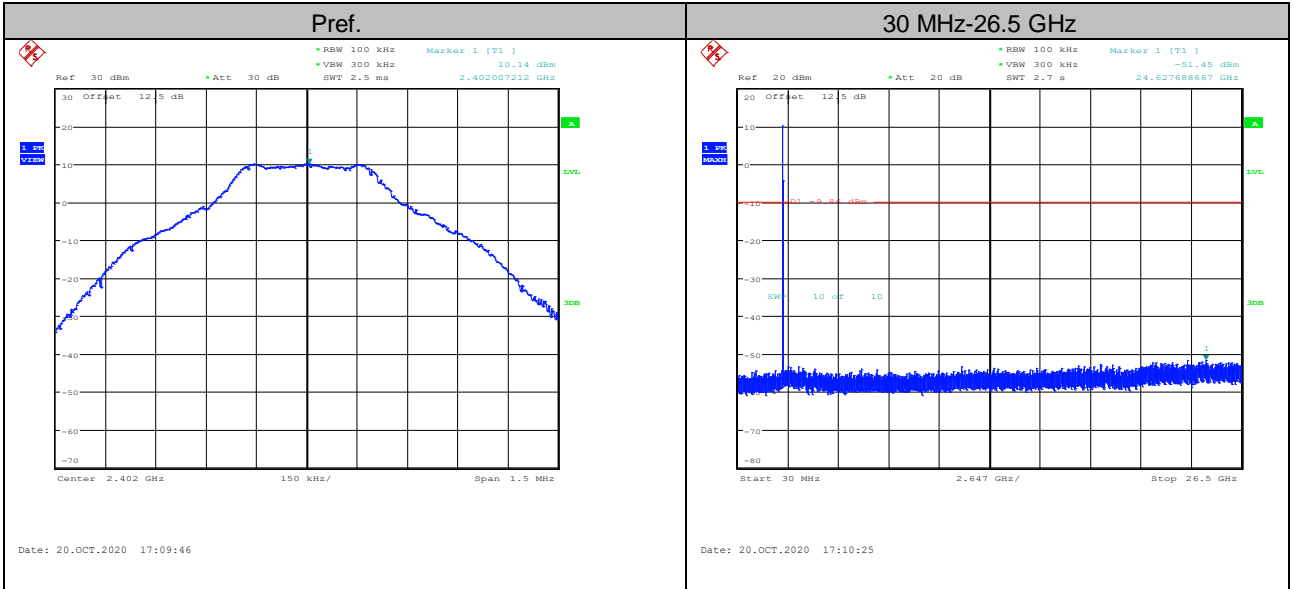
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal

### **13.3. Test Data**

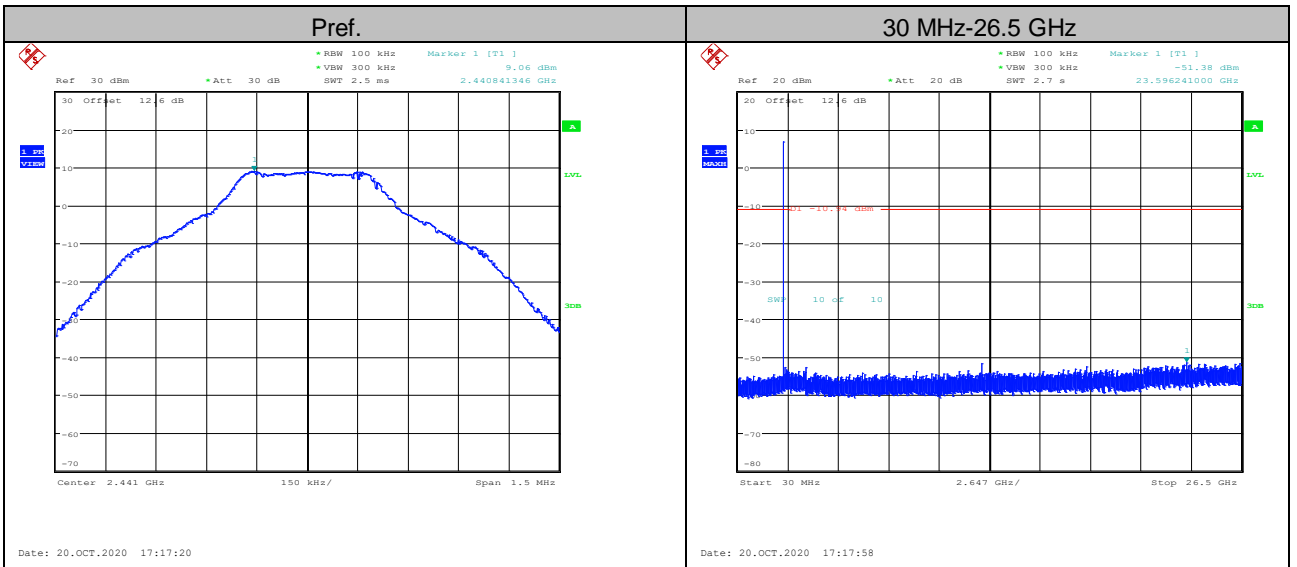
# GFSK

## Low Channel



# GFSK

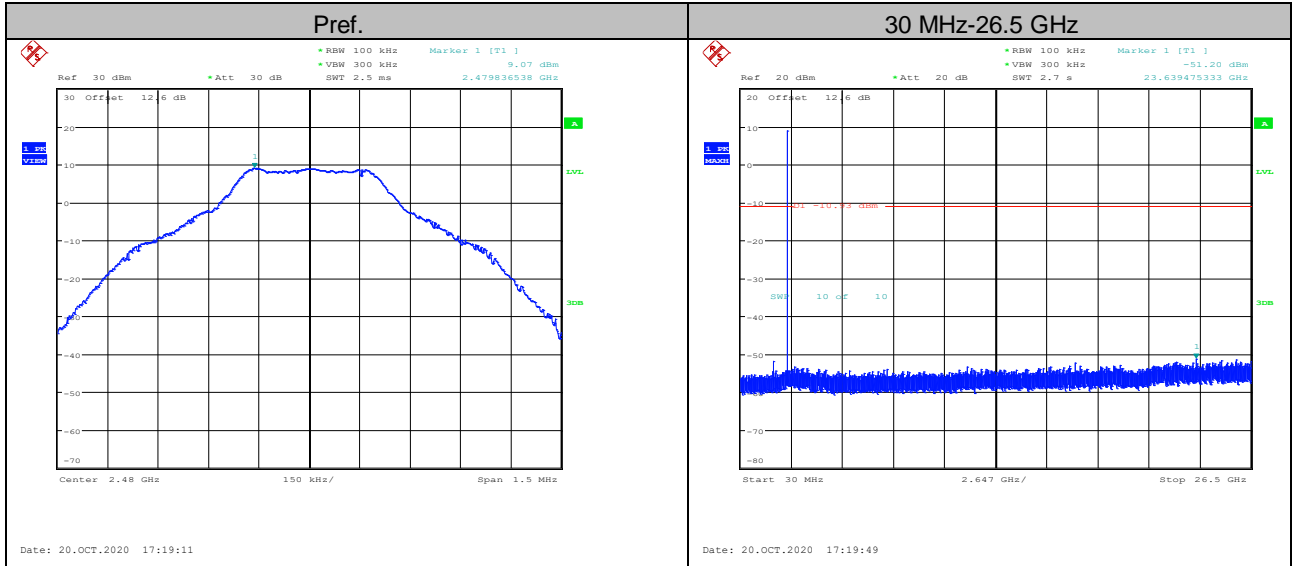
## Mid Channel





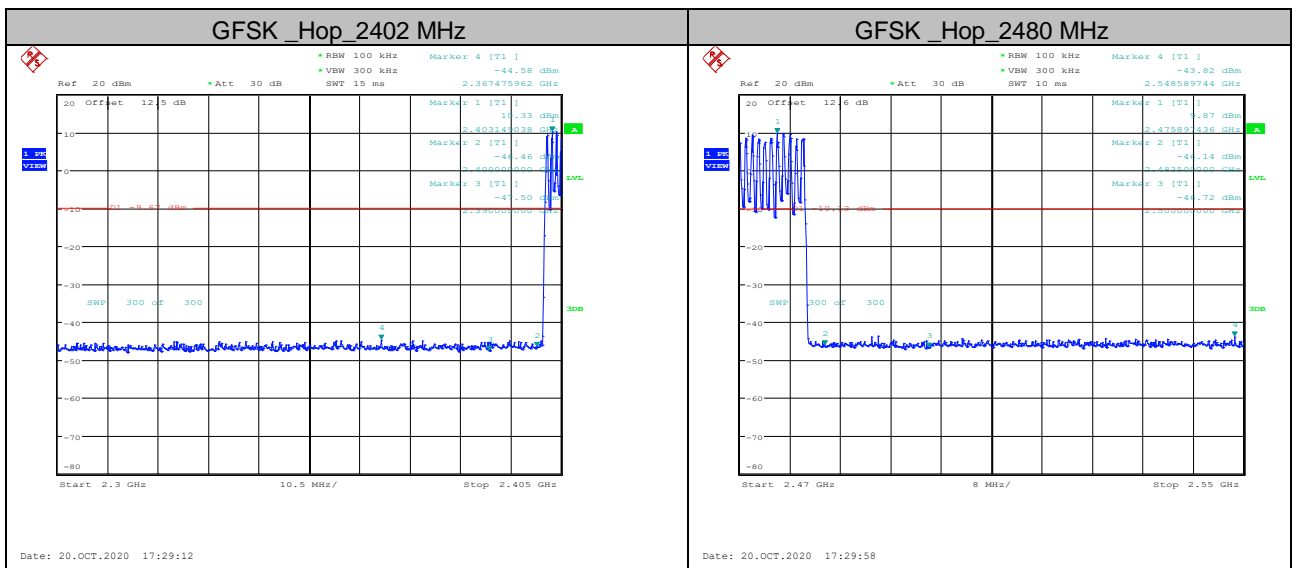
# GFSK

## High Channel



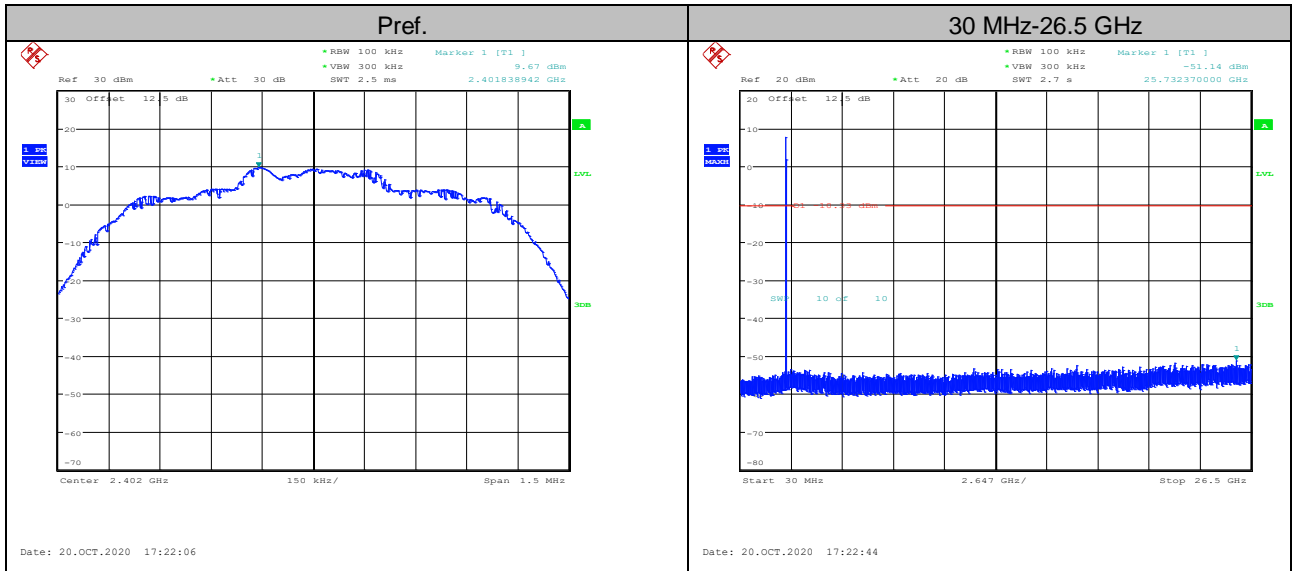
# GFSK

## Band Edge Hopping on



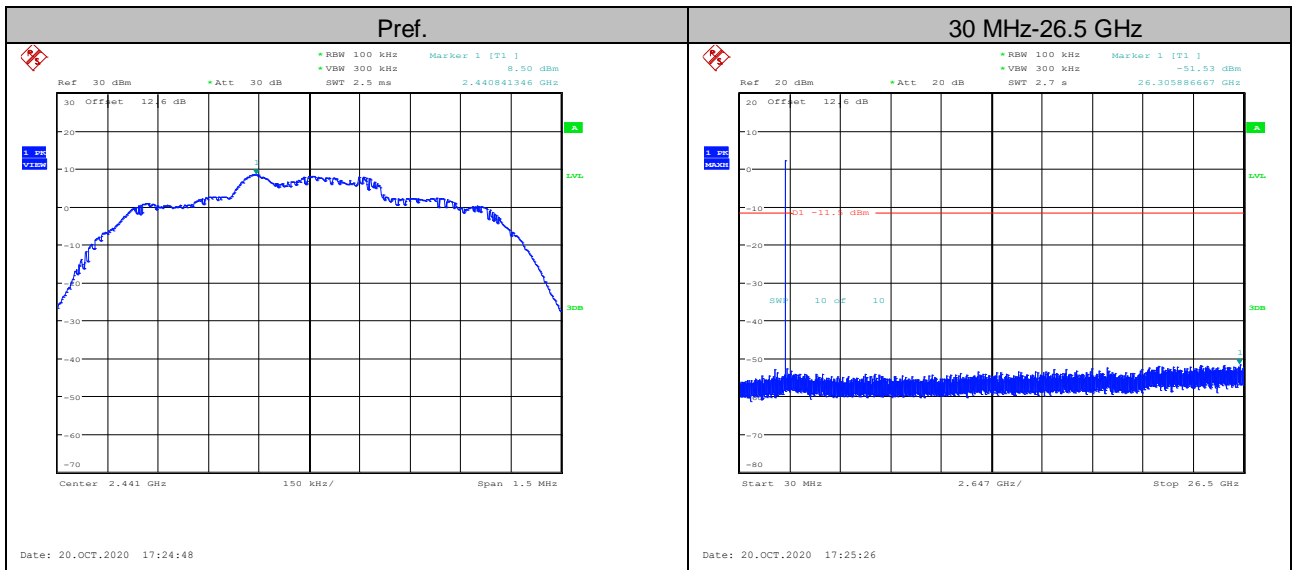
# 8DPSK

## Low Channel



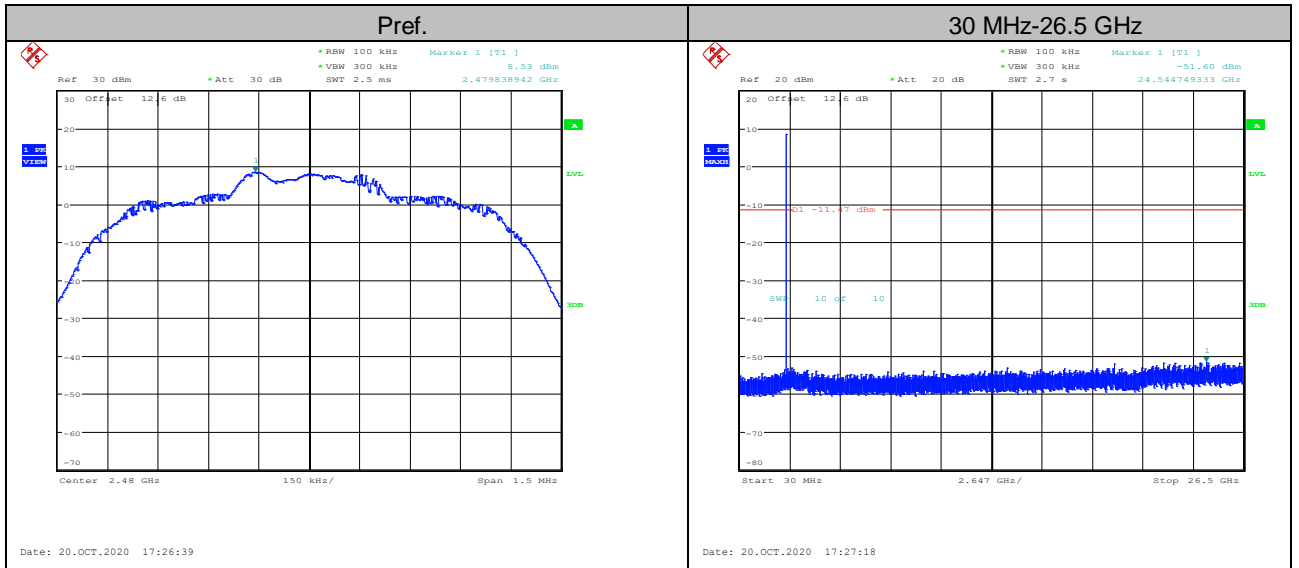
# 8DPSK

## Mid Channel



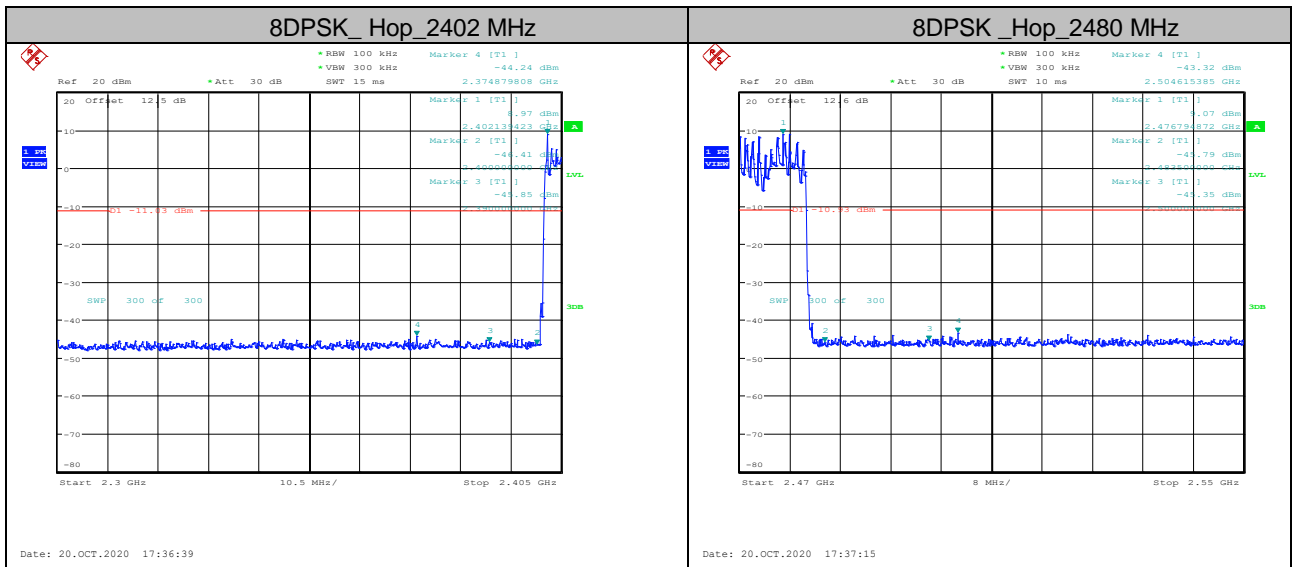
# 8DPSK

## High Channel



# 8DPSK

## Band Edge Hopping on



## 14. ANTENNA REQUIREMENTS

### 14.1. Applicable Requirements

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### 14.2. Antenna Connector

Antenna Connector is on the PCB within enclosure and not accessible to user.

### 14.3. Antenna Gain

The antenna gain of EUT is less than 6 dBi.

-----End of Report-----