



# TEST REPORT

No.25T04N000942-005-BT

for

**Sonim Technologies, Inc.**

**5G feature phone**

**Model Name: X530(S1501),X530(S1601),X530(S1504),  
X530(S1604),X530(S1502),X530(S1602),X530(S1503),X530(S1603),X5  
30(S1510),X530(S1610)**

with

**Hardware Version: V1.0**

**Software Version: X53.0-01-15.0-10.07.00**

**FCC ID: WYPS1501**

**Issued Date: 2025-08-26**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen,  
Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. [www.caict.ac.cn](http://www.caict.ac.cn)



No.25T04N000942-005-BT

## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
25T04N000942-005-BT	Rev.0	1st edition	2025-08-26

Note: the latest revision of the test report supersedes all previous versions.

## CONTENTS

<b>1. SUMMARY OF TEST REPORT .....</b>	<b>4</b>
1.1. TEST ITEMS .....	4
1.2. TEST STANDARDS .....	4
1.3. TEST RESULT .....	4
1.4. TESTING LOCATION .....	4
1.5. PROJECT DATA .....	4
1.6. SIGNATURE .....	4
<b>2. CLIENT INFORMATION .....</b>	<b>5</b>
2.1. APPLICANT INFORMATION .....	5
2.2. MANUFACTURER INFORMATION .....	5
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....</b>	<b>6</b>
3.1. ABOUT EUT .....	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST .....	6
3.4. GENERAL DESCRIPTION .....	6
<b>4. REFERENCE DOCUMENTS .....</b>	<b>7</b>
4.1. DOCUMENTS SUPPLIED BY APPLICANT .....	7
4.2. REFERENCE DOCUMENTS FOR TESTING .....	7
<b>5. TEST RESULTS .....</b>	<b>8</b>
5.1. TESTING ENVIRONMENT .....	8
5.2. TEST RESULTS .....	8
5.3. STATEMENTS .....	8
<b>6. TEST EQUIPMENTS UTILIZED .....</b>	<b>9</b>
<b>7. LABORATORY ENVIRONMENT .....</b>	<b>10</b>
<b>8. MEASUREMENT UNCERTAINTY .....</b>	<b>11</b>
<b>ANNEX A: DETAILED TEST RESULTS .....</b>	<b>12</b>
TEST CONFIGURATION .....	12
A.0 ANTENNA REQUIREMENT .....	15
A.1 MAXIMUM PEAK OUTPUT POWER .....	16
A.2 BAND EDGES COMPLIANCE .....	17
A.3 CONDUCTED EMISSION .....	24
A.4 RADIATED EMISSION .....	30
A.5 20dB BANDWIDTH .....	42
A.6 TIME OF OCCUPANCY (DWELL TIME) .....	48
A.7 NUMBER OF HOPPING CHANNELS .....	51
A.8 CARRIER FREQUENCY SEPARATION .....	54
A.9 AC POWER LINE CONDUCTED EMISSION .....	57

## 1. Summary of Test Report

### 1.1. Test Items

Description 5G feature phone  
Model Name X530 (Type: S1501, S1601, S1504, S1604, S1502, S1602, S1503, S1603, S1510, S1610)  
Applicant's name Sonim Technologies, Inc.  
Manufacturer's Name Sonim Technologies, Inc.

### 1.2. Test Standards

FCC Part 15, Subpart C-2025; ANSI C63.10-2020/Cor 1-2023.

### 1.3. Test Result

**Pass**

Please refer to "5.2 Test Results"

### 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 51800

### 1.5. Project data

Testing Start Date: 2025-05-07  
Testing End Date: 2025-07-14

### 1.6. Signature



Lin Zechuang

(Prepared this test report)



An Ran

(Reviewed this test report)



Feng Zhifang

(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Sonim Technologies, Inc.  
Address: 4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA  
Contact Person: Avena.Xu /TA manager  
E-Mail: Avena.xu@sonimtech.com  
Telephone: 001-650-378-8100  
Fax: 001-650-378-8100

### **2.2. Manufacturer Information**

Company Name: Sonim Technologies, Inc.  
Address: 4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA  
Contact Person: Avena.Xu /TA manager  
E-Mail: Avena.xu@sonimtech.com  
Telephone: 001-650-378-8100  
Fax: 001-650-378-8100



### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	5G feature phone
Model Name	X530(S1501),X530(S1601),X530(S1504), X530(S1604),X530(S1502),X530(S1602),X530(S1503),X53 0(S1603),X530(S1510),X530(S1610)
Frequency Band	ISM 2400MHz~2483.5MHz
Equipment type	Bluetooth® BR/EDR
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Antenna Type	Integrated antenna
Antenna Gain	-1dBi
Power Supply	3.8V DC by Battery
FCC ID	WYPS1501
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### **3.2. Internal Identification of EUT used during the test**

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
UT01aa	016724000001963	V1.0	X53.0-01-15.0-10.0 7.00	2025-05-07
UT12aa	016724000008182	V1.0	X53.0-01-15.0-10.0 7.00	2025-06-11

\*EUT ID: is used to identify the test sample in the lab internally.

UT01aa is used for conduction test, UT12aa is used for radiation test and AC Power line Conducted Emission test.

#### **3.3. Internal Identification of AE used during the test**

AE No.	Description	AE ID*
AE1	/	/

\*AE ID and AE Label: is used to identify the test sample in the lab internally.

#### **3.4. General Description**

The Equipment under Test (EUT) is a model of 5G feature phone with integrated antenna and battery.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



## 4. Reference Documents

### 4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### 4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.107 Conducted limits; 15.203 Antenna requirement; 15.205 Restricted bands of operation; 15.207 Conducted limits; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz	2025
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2020/ Cor 1-2023

## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Verdict
0	Antenna Requirement	15.203	P
1	Maximum Peak Output Power	15.247 (b)	P
2	Band Edges Compliance	15.247 (d)	P
3	Conducted Spurious Emission	15.247 (d)	P
4	Radiated Spurious Emission	15.247,15.205,15.209	P
5	Occupied 20dB bandwidth	15.247(a)	I
6	Time of Occupancy(Dwell Time)	15.247(a)	P
7	Number of Hopping Channel	15.247(a)	P
8	Carrier Frequency Separation	15.247(a)	P
9	AC Power line Conducted Emission	15.107,15.207	P

See **ANNEX A** for details.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

## 6. Test Equipments Utilized

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSW43	102683	Rohde & Schwarz	2026-01-20	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2025-12-26	1 year
3	RF Control Unit	T-RFSW T01	23331101	Smart Testing	2025-09-11	1 year
4	Wireless Connective Tester	CMW270	100540	Rohde & Schwarz	2026-03-10	1 year
5	Shielding Room	S81	CT000986-1344	ETS-Lindgren	2026-09-12	5 years

### Radiated test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Test Receiver	ESR7	101676	Rohde & Schwarz	2025-11-21	1 year
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2027-10-23	3 years
3	Horn Antenna	3117	00227733	ETS-Lindgren	2026-08-01	3 years
4	Anechoic Chamber	FACT3-2.0	1285	ETS-Lindgren	2027-05-27	2 years
5	Spectrum Analyzer	FSV40	101192	Rohde & Schwarz	2026-01-09	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2028-05-19	3 years
7	Horn Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2026-02-01	3 years
8	Test Receiver	ESCI	100702	Rohde & Schwarz	2026-01-09	1 year
9	LISN	ENV216	102067	Rohde & Schwarz	2025-10-07	1 year

### Test software

No.	Equipment	Manufacturer	Version
1	T-RFSIOT	Smart Testing	V1.0
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal.

The EUT was programmed to be in continuously transmitting mode.

## 7. Laboratory Environment

### Shielded room

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz > 60 dB; 1MHz-18000MHz > 90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

### Anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz > 60 dB; 1MHz-18000MHz > 90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

## 8. Measurement Uncertainty

Test Name	Uncertainty ( $k=2$ )	
1. Maximum Peak Output Power	1.32dB	
2. Band Edges Compliance	1.92dB	
3. Transmitter Spurious Emission - Conducted	$30\text{MHz} \leq f < 1\text{GHz}$	1.41dB
	$1\text{GHz} \leq f < 7\text{GHz}$	1.92dB
	$7\text{GHz} \leq f < 13\text{GHz}$	2.31dB
	$13\text{GHz} \leq f \leq 26\text{GHz}$	2.61dB
4.. Transmitter Spurious Emission - Radiated	$9\text{kHz} \leq f < 30\text{MHz}$	1.79dB
	$30\text{MHz} \leq f < 1\text{GHz}$	4.86dB
	$1\text{GHz} \leq f < 18\text{GHz}$	4.82dB
	$18\text{GHz} \leq f \leq 40\text{GHz}$	2.90dB
5. 20dB Bandwidth	4.56kHz	
6. Time of Occupancy (Dwell Time) & Number of Hopping Channels	0.58ms	
7. Carrier Frequency Separation	4.56kHz	
8. AC Power line Conducted Emission	$150\text{kHz} \leq f \leq 30\text{MHz}$	2.68dB

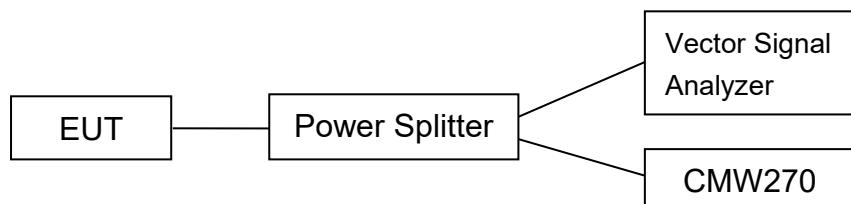
## **ANNEX A: Detailed Test Results**

### **Test Configuration**

The measurement is made according to ANSI C63.10.

#### **1) Conducted Measurements**

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the EUT hopping mode (hopping on or hopping off).
5. Set the spectrum analyzer to start measurement.
6. Record the values.



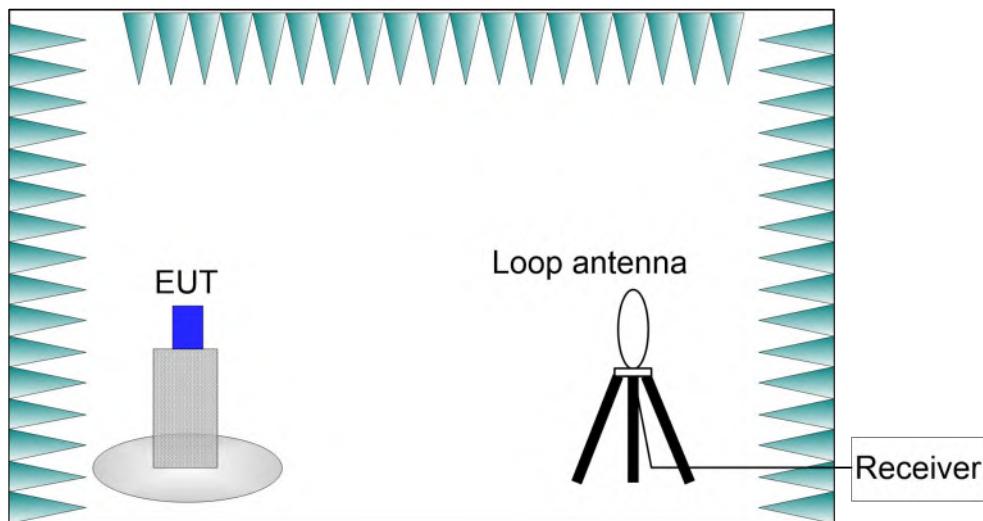
#### **2) Radiated Measurements**

##### **Test setup:**

##### **9kHz-30MHz:**

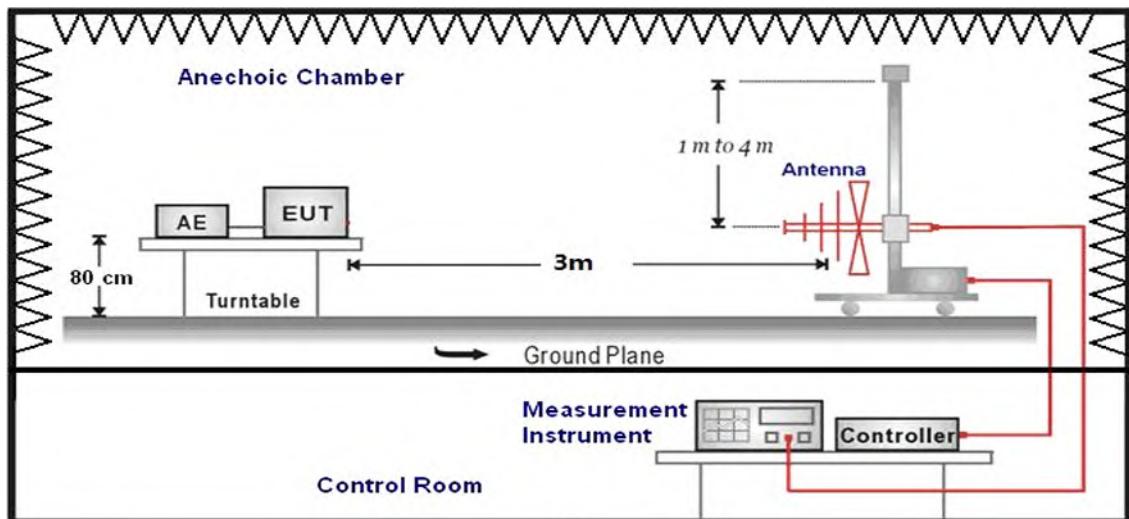
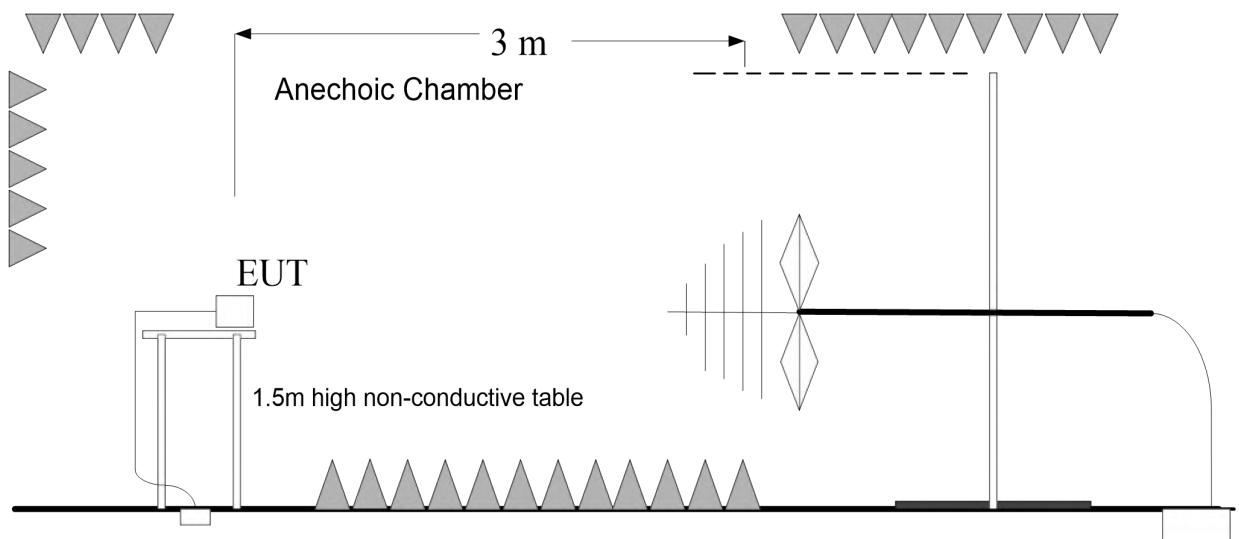
The EUT are measured in an anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below.

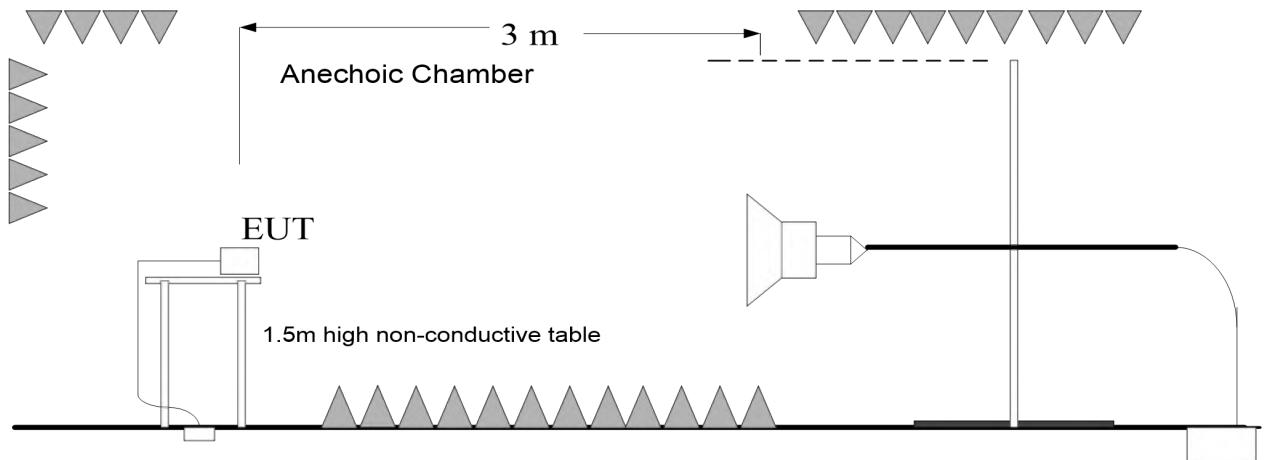
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



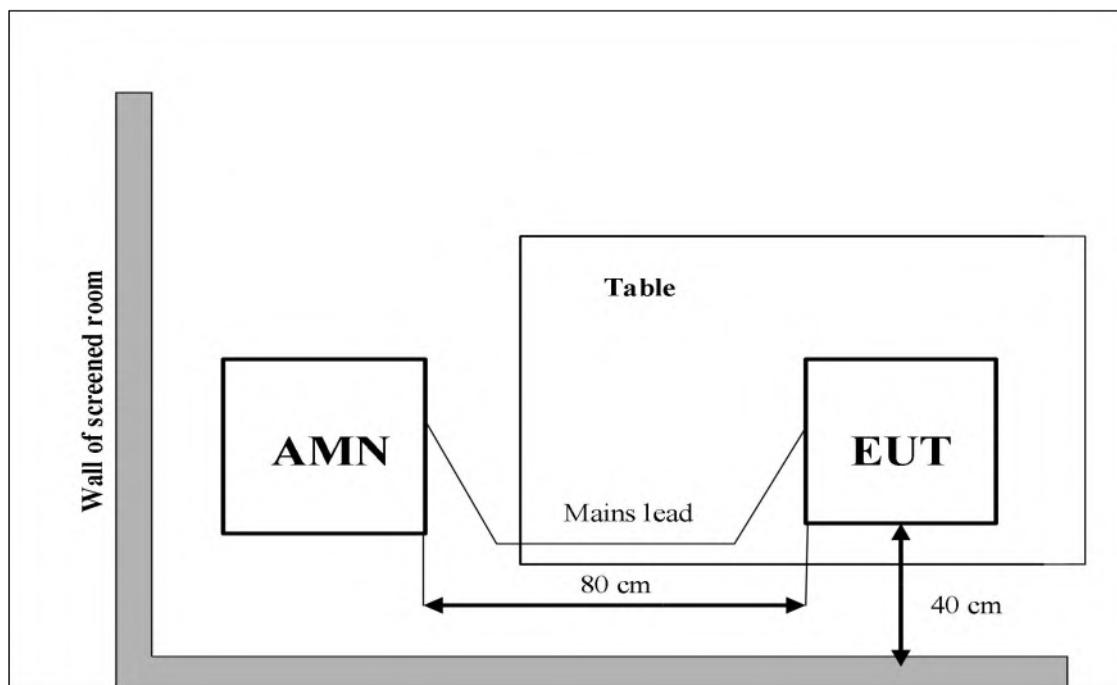
**30MHz-26.5GHz:**

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

**30MHz-1GHz:**

**1GHz-3GHz:**


**3GHz-26.5GHz:**

**3) AC Power line Conducted Emission Measurement**

The EUT is working as Bluetooth terminal. A communication link of Bluetooth is set up with a System Simulator (SS). The EUT is commanded to operate at maximum transmitting power.





## A.0 Antenna requirement

### Measurement Limit:

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

**Conclusion: The Directional gains of antenna used for transmitting is -1dBi.**

**The RF transmitter uses an integrate antenna without connector.**



### A.1 Maximum Peak Output Power

**Method of Measurement: See ANSI C63.10-clause 7.8.5.**

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

**Measurement Limit:**

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

**Measurement Results:**

Mode	Peak Conducted Output Power (dBm)		
	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)
GFSK	10.80	11.09	10.34
$\pi/4$ DQPSK	10.24	10.70	9.80
8DPSK	10.44	10.71	10.12

**Conclusion: Pass**

## A.2 Band Edges Compliance

Method of Measurement: See ANSI C63.10-clause 7.8.6.

### Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

### Measurement Result:

Mode	Frequency (MHz)	Hopping	Test Results (dBc)	Conclusion
GFSK	2402(CH0)	OFF	Fig.1 56.34	P
	2480(CH78)	OFF	Fig.2 63.66	P
	2402(CH0)	ON	Fig.3 42.64	P
	2480(CH78)	ON	Fig.4 57.20	P
$\pi/4$ DQPSK	2402(CH0)	OFF	Fig.5 56.66	P
	2480(CH78)	OFF	Fig.6 59.27	P
	2402(CH0)	ON	Fig.7 48.83	P
	2480(CH78)	ON	Fig.8 49.05	P
8DPSK	2402(CH0)	OFF	Fig.9 55.21	P
	2480(CH78)	OFF	Fig.10 61.14	P
	2402(CH0)	ON	Fig.11 46.62	P
	2480(CH78)	ON	Fig.12 55.17	P

See below for test graphs.

Conclusion: Pass

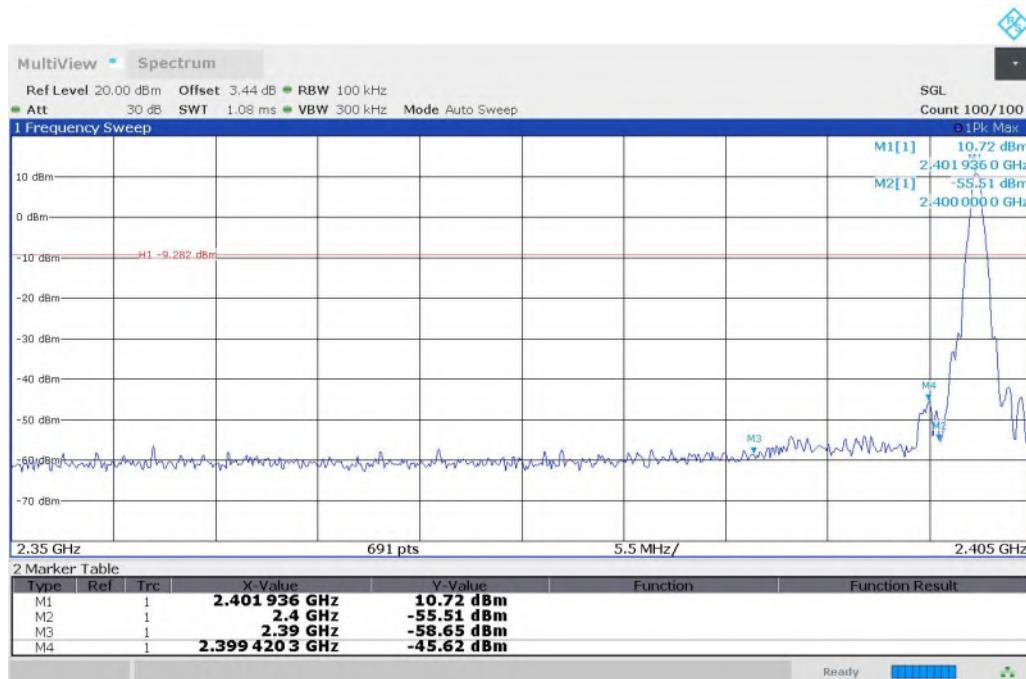


Fig. 1 Band Edges (GFSK, CH0, Hopping OFF)

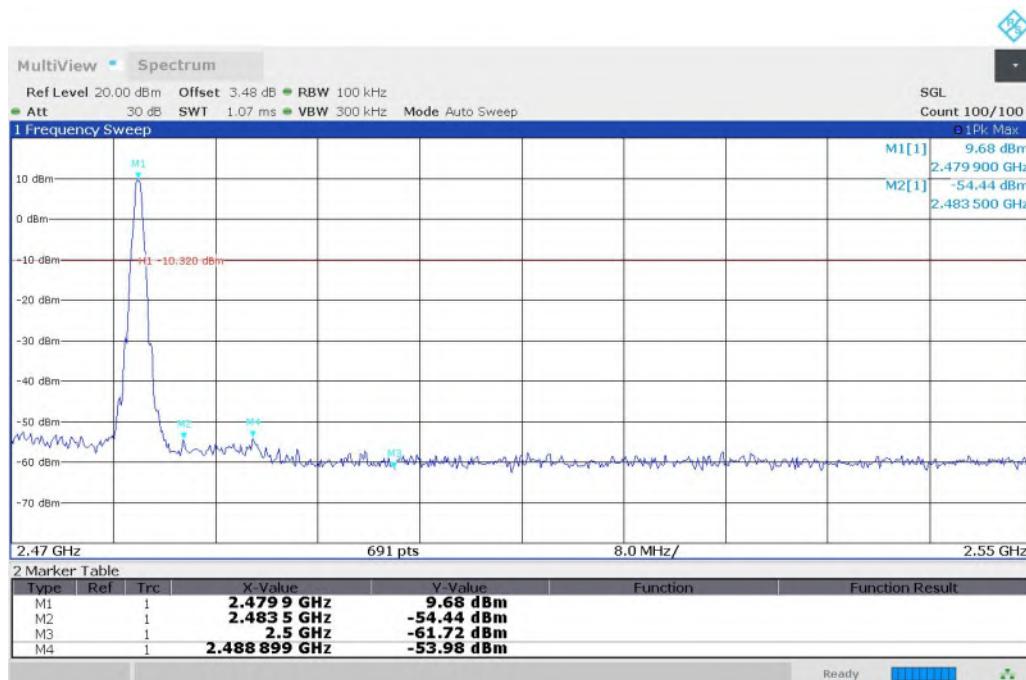


Fig. 2 Band Edges (GFSK, CH78, Hopping OFF)

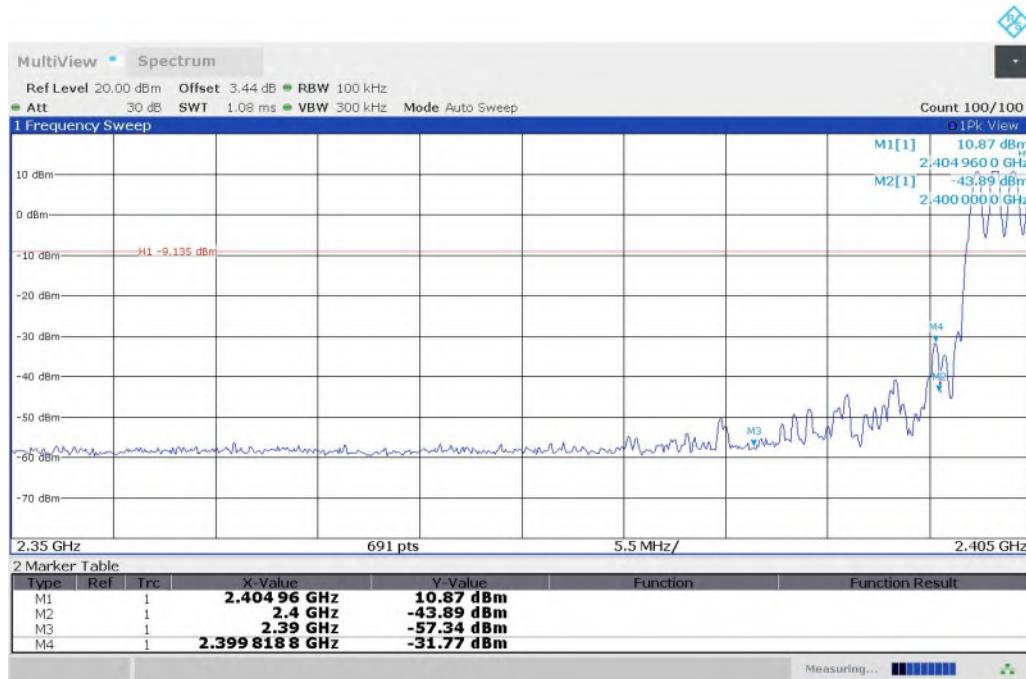


Fig. 3 Band Edges (GFSK, CH0, Hopping ON)

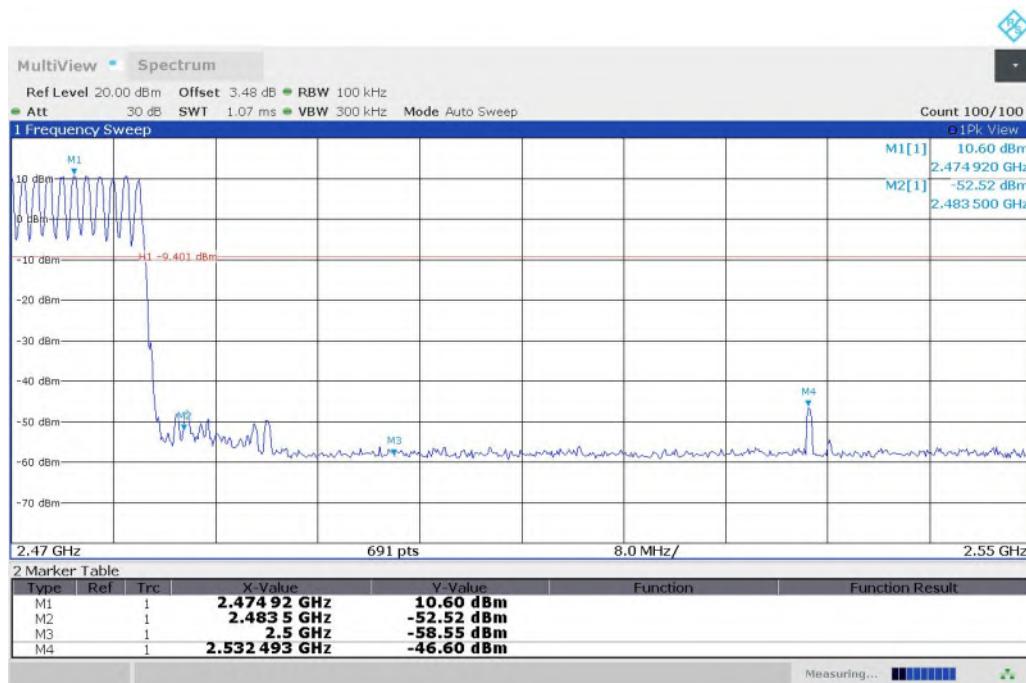
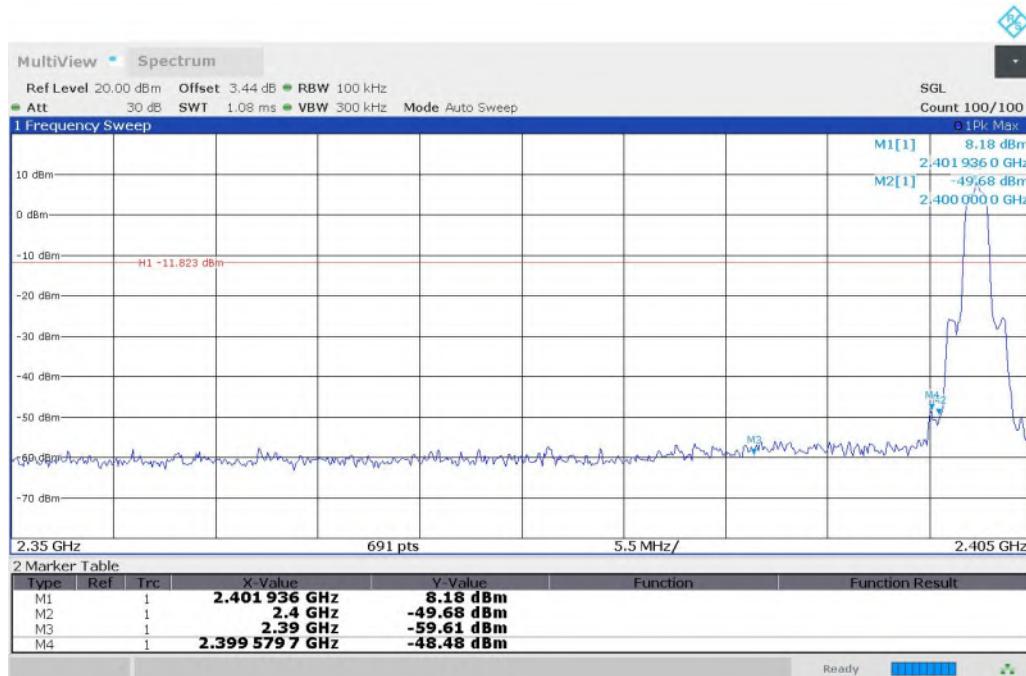
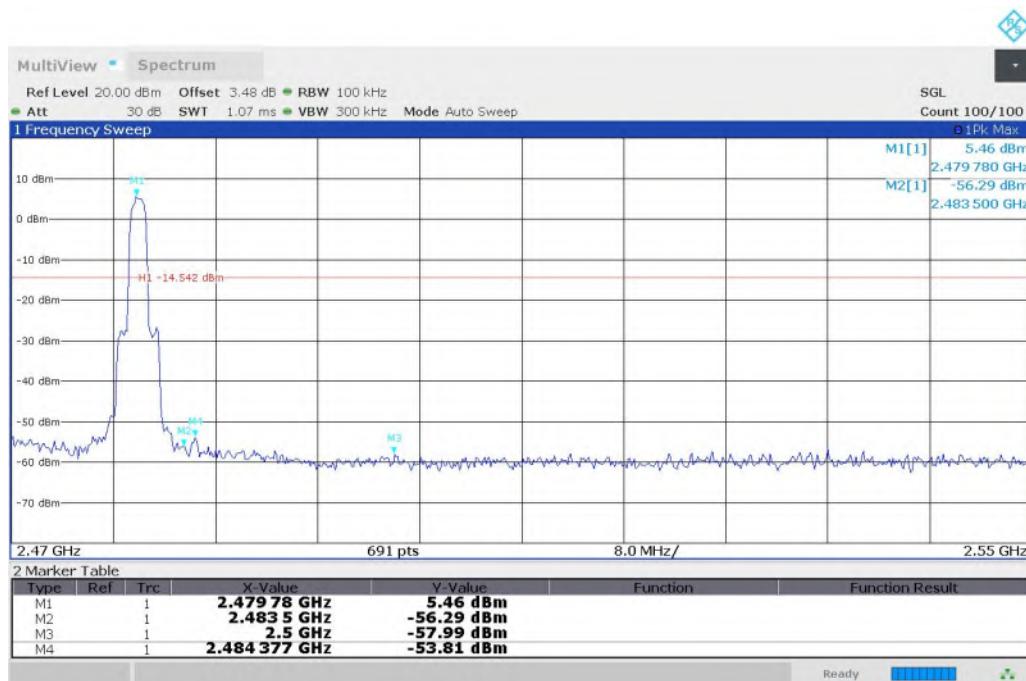
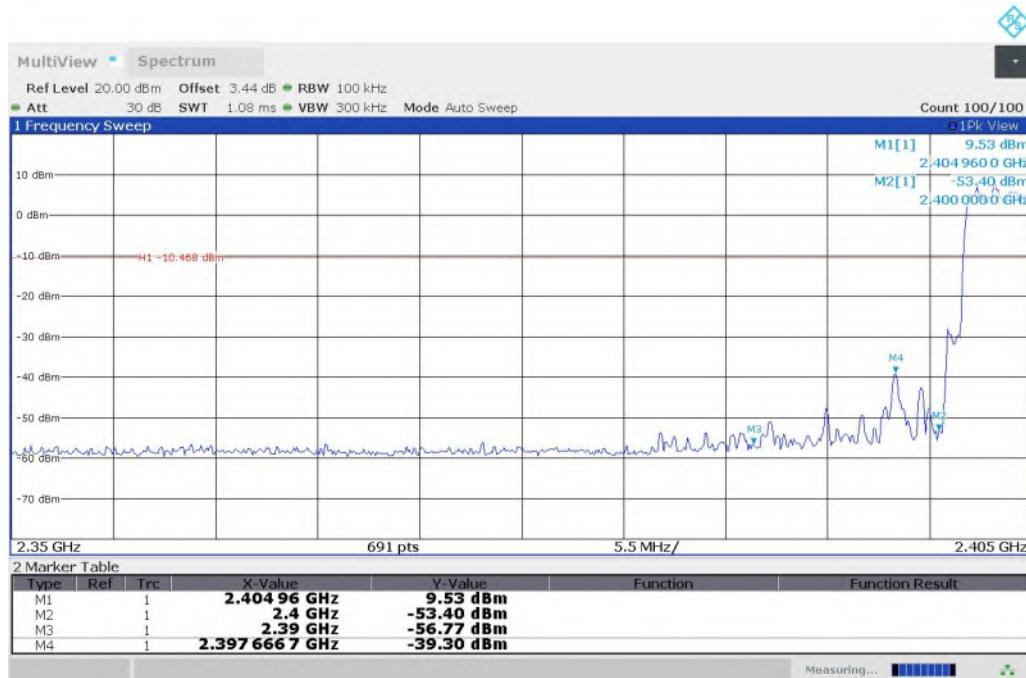
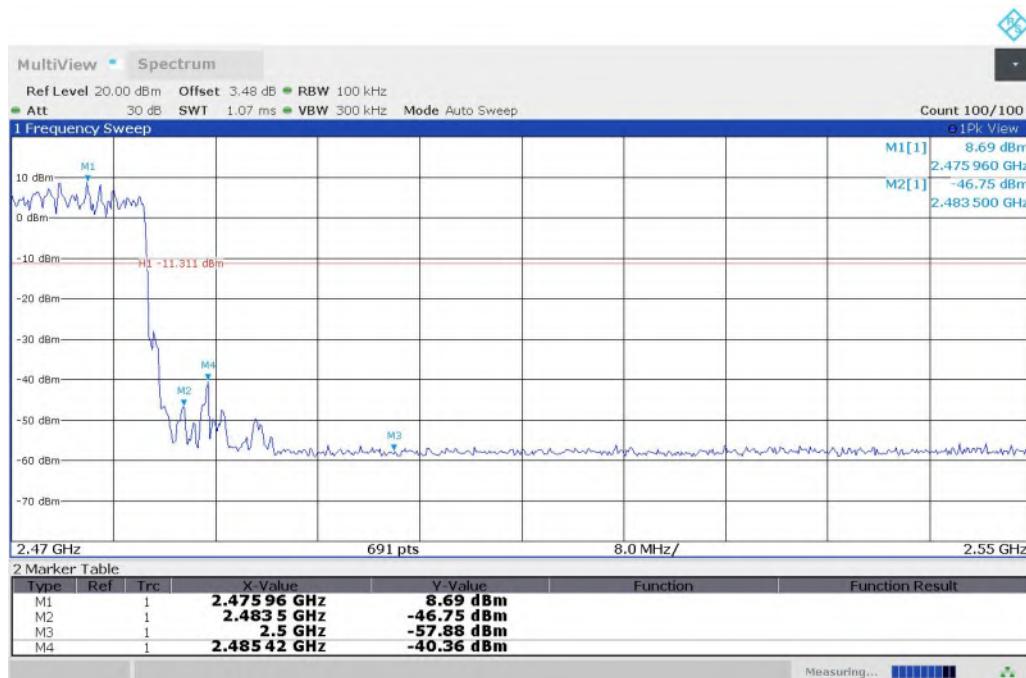


Fig. 4 Band Edges (GFSK, CH78, Hopping ON)


 Fig. 5 Band Edges ( $\pi/4$  DQPSK, CH0, Hopping OFF)

 Fig. 6 Band Edges ( $\pi/4$  DQPSK, CH78, Hopping OFF)


 Fig. 7 Band Edges ( $\pi/4$  DQPSK, CH0, Hopping ON)

 Fig. 8 Band Edges ( $\pi/4$  DQPSK, CH78, Hopping ON)

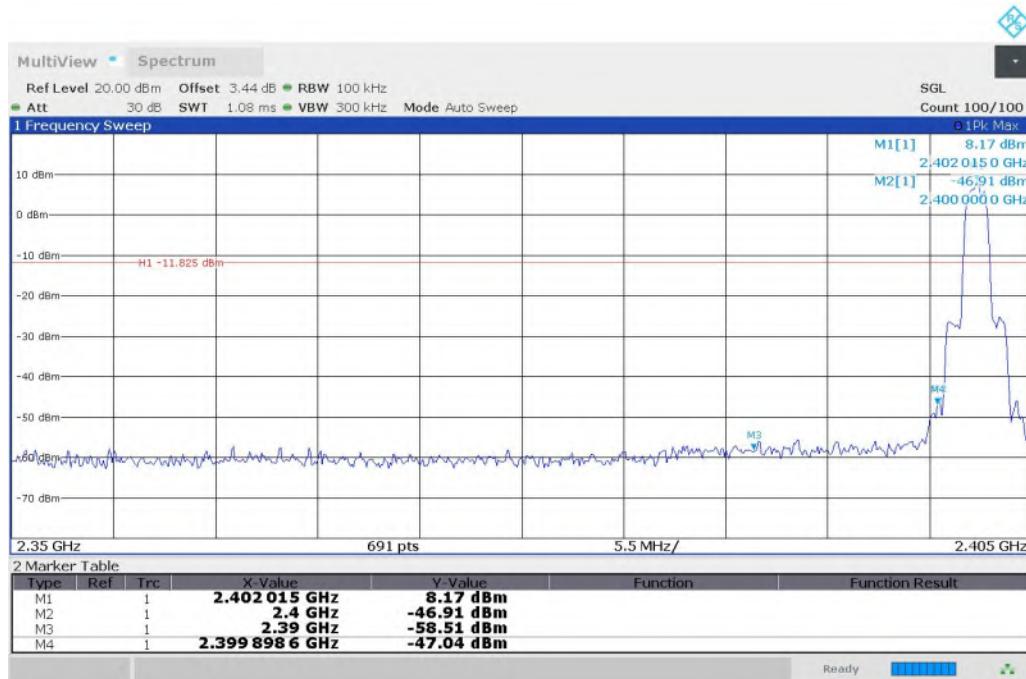


Fig. 9 Band Edges (8DPSK, CH0, Hopping OFF)

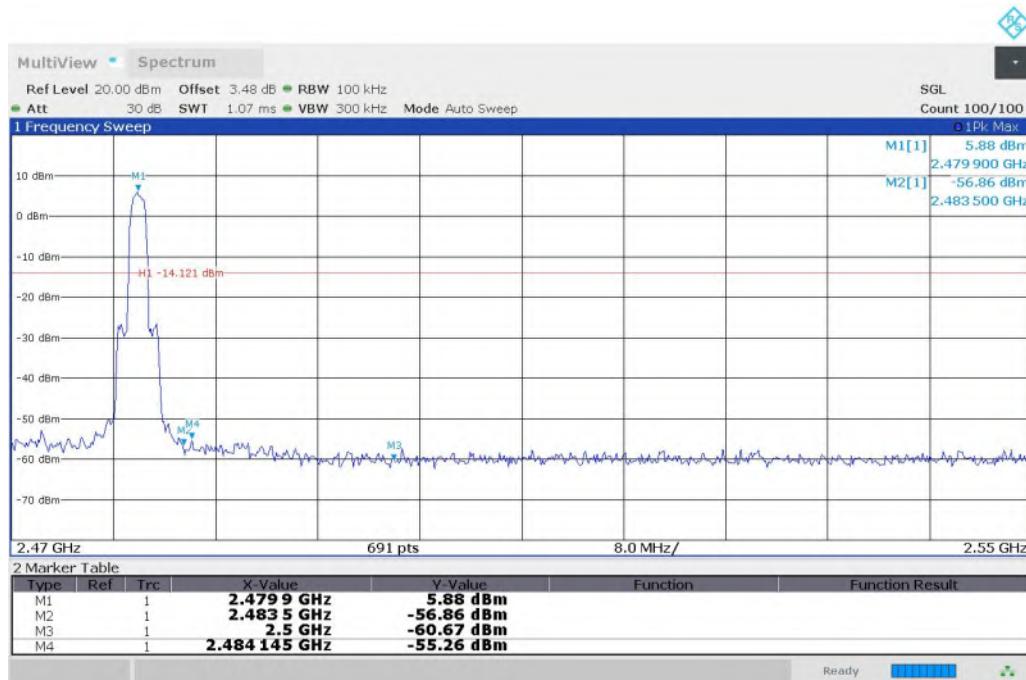


Fig. 10 Band Edges (8DPSK, CH78, Hopping OFF)

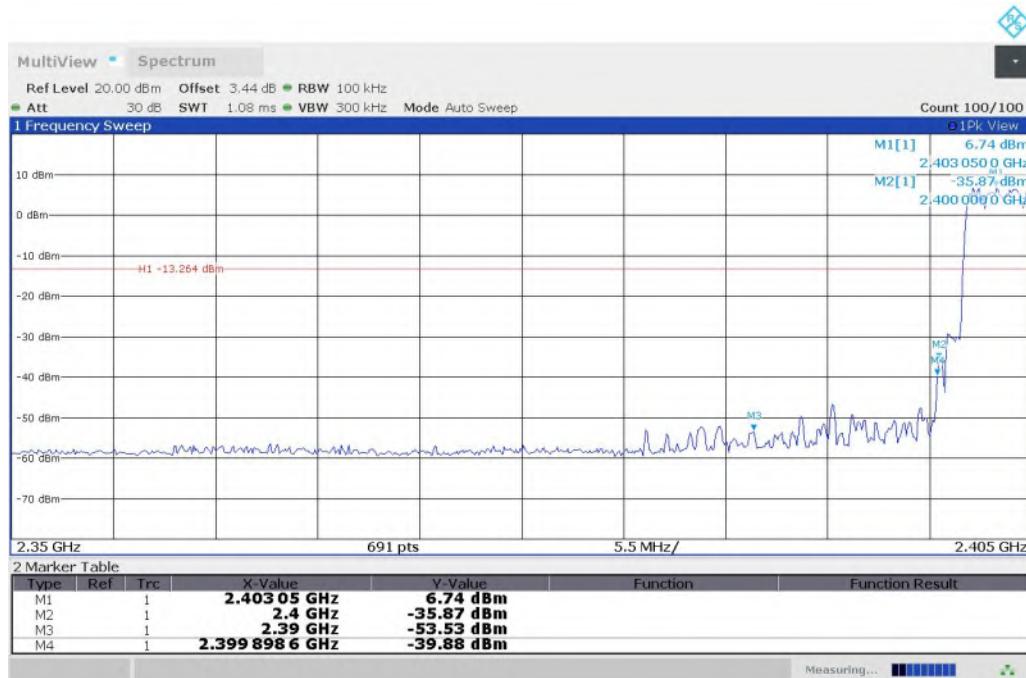


Fig. 11 Band Edges (8DPSK, CH0, Hopping ON)

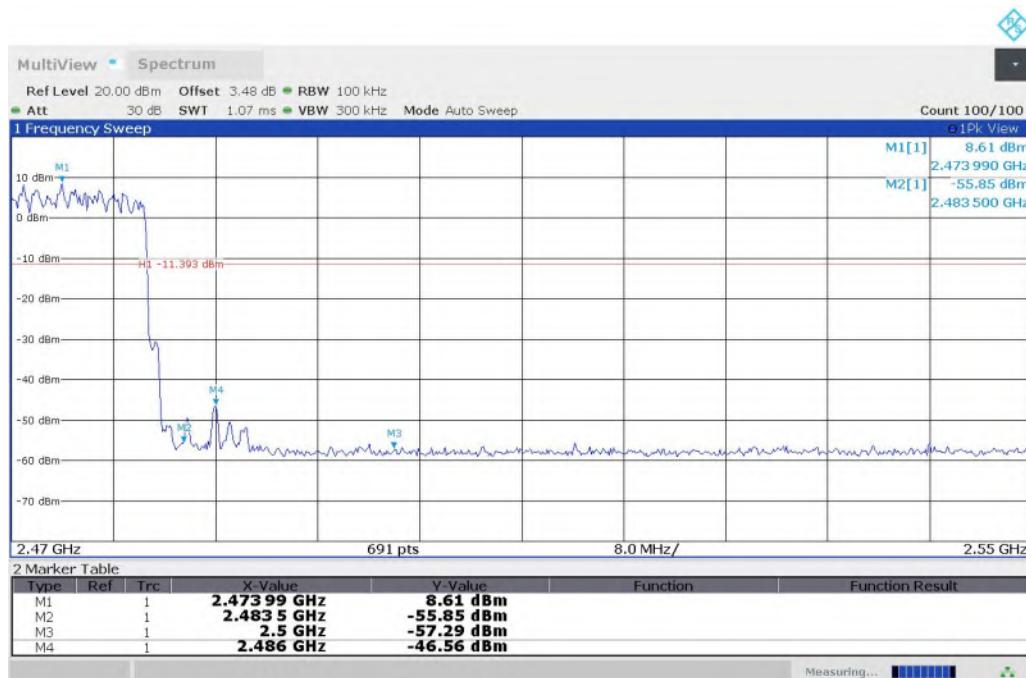


Fig. 12 Band Edges (8DPSK, CH78, Hopping ON)

### A.3 Conducted Emission

**Method of Measurement: See ANSI C63.10-clause 7.8.8.**

**Measurement Limit:**

Standard	Limit (dBm)
FCC 47 CFR Part 15.247 (d)	20dBm below peak output power in 100kHz bandwidth

**Measurement Results:**

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
GFSK	2402(CH0)	1GHz-26.5GHz	Fig.13	P
	2441(CH39)	1GHz-26.5GHz	Fig.14	P
	2480(CH78)	1GHz-26.5GHz	Fig.15	P
$\pi/4$ DQPSK	2402(CH0)	1GHz-26.5GHz	Fig.16	P
	2441(CH39)	1GHz-26.5GHz	Fig.17	P
	2480(CH78)	1GHz-26.5GHz	Fig.18	P
8DPSK	2402(CH0)	1GHz-26.5GHz	Fig.19	P
	2441(CH39)	1GHz-26.5GHz	Fig.20	P
	2480(CH78)	1GHz-26.5GHz	Fig.21	P
/	All channels	30MHz -1GHz	Fig.22	P

See below for test graphs.

**Conclusion: Pass**

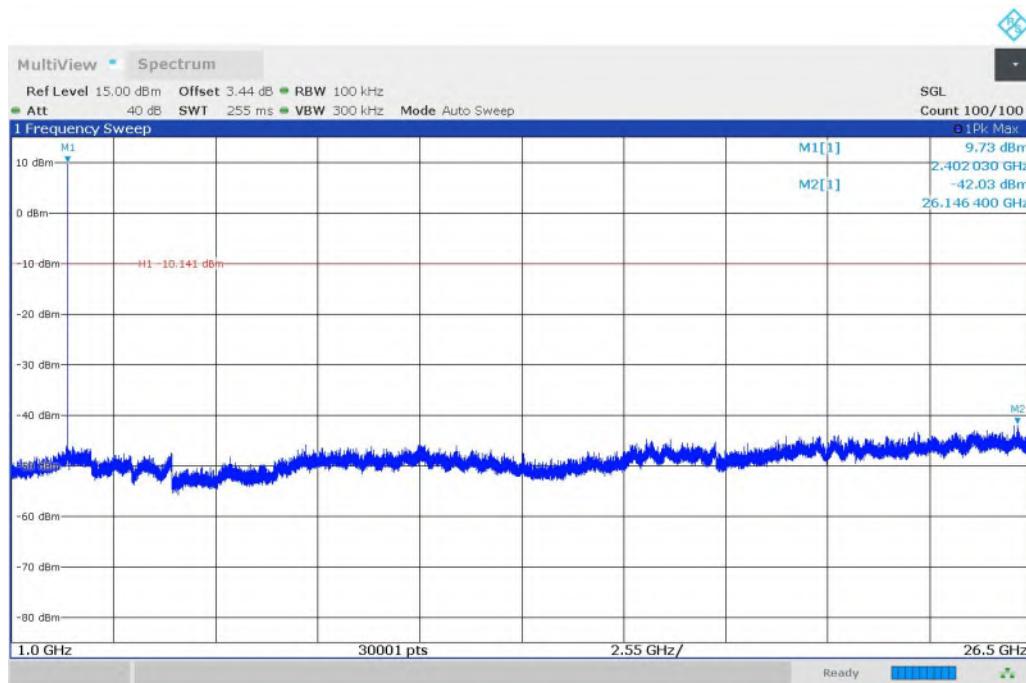


Fig. 13 Conducted Spurious Emission (GFSK, CH0, 1GHz-26.5GHz)

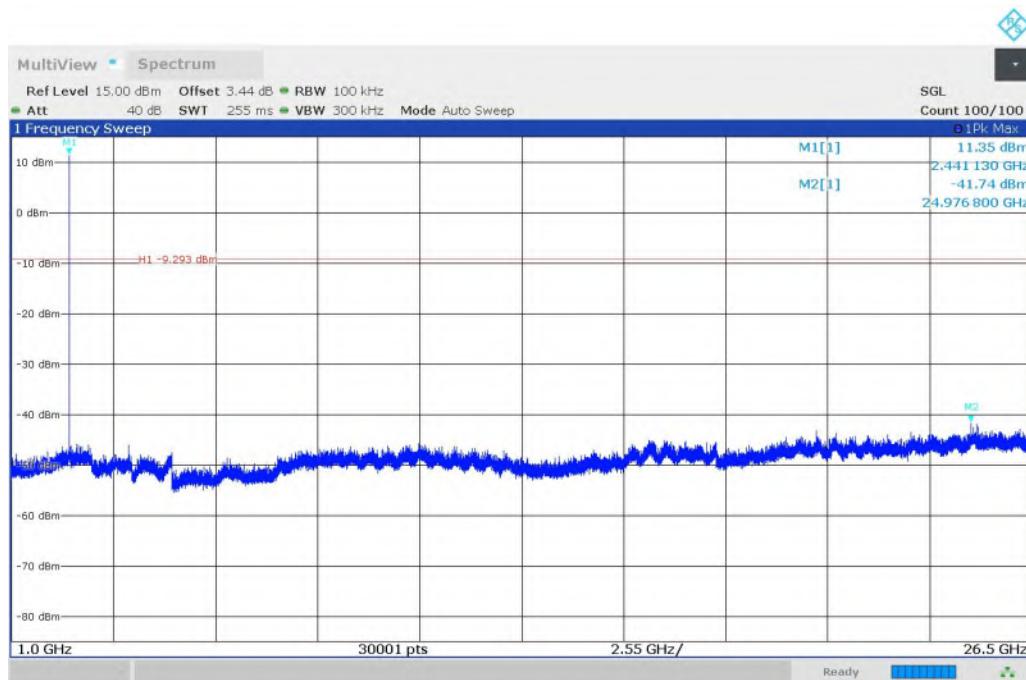


Fig. 14 Conducted Spurious Emission (GFSK, CH39, 1GHz-26.5GHz)

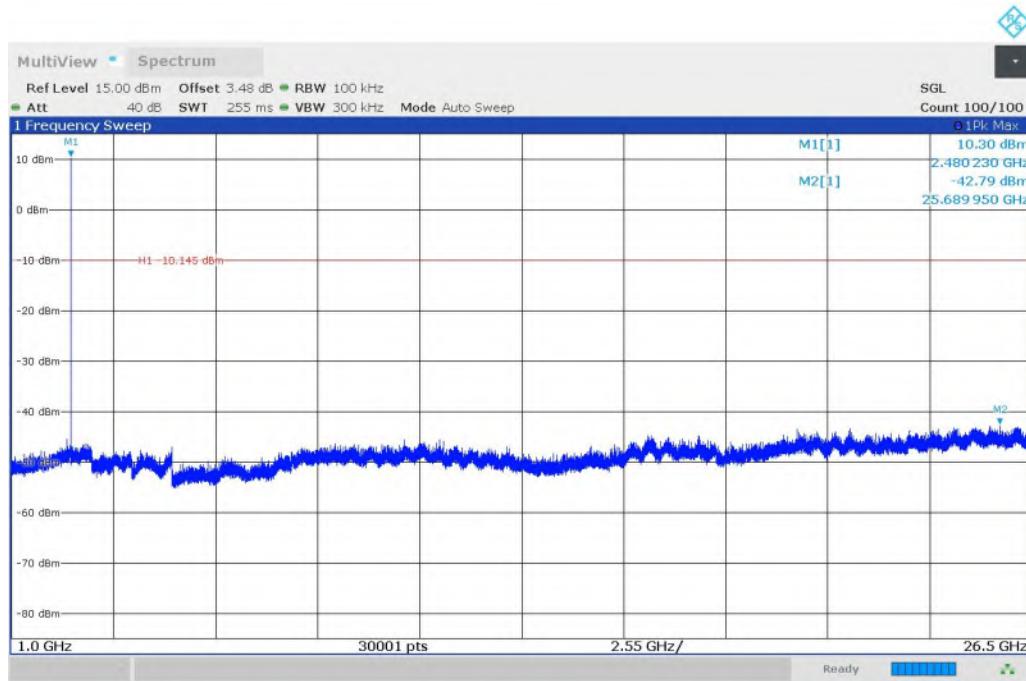


Fig. 15 Conducted Spurious Emission (GFSK, CH78, 1GHz-26.5GHz)

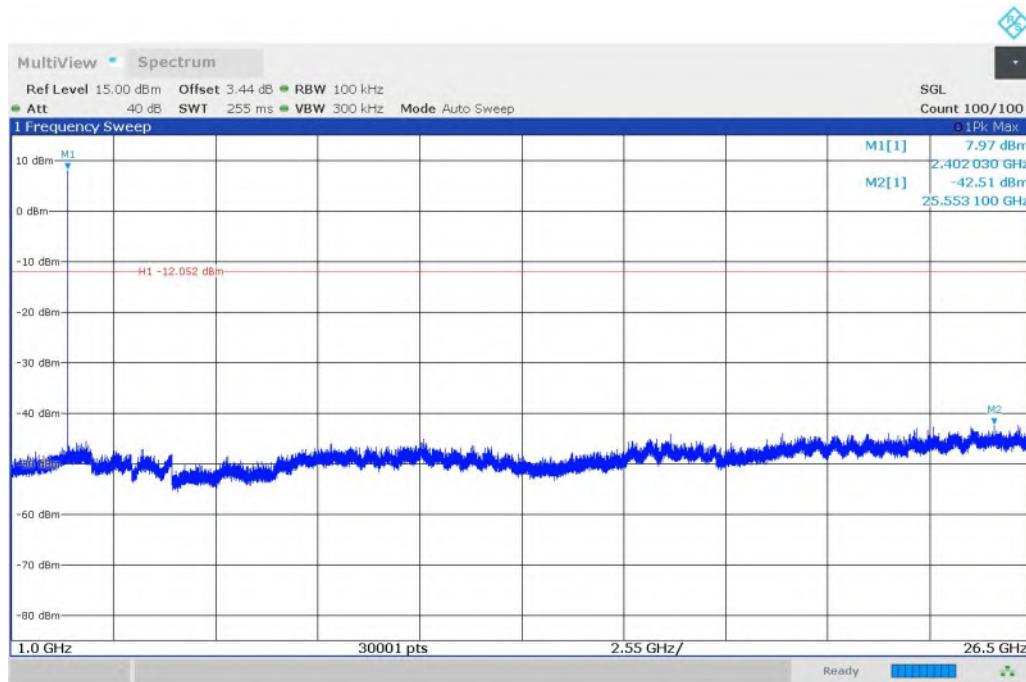


Fig. 16 Conducted Spurious Emission ( $\pi/4$  DQPSK, CH0, 1GHz-26.5GHz)

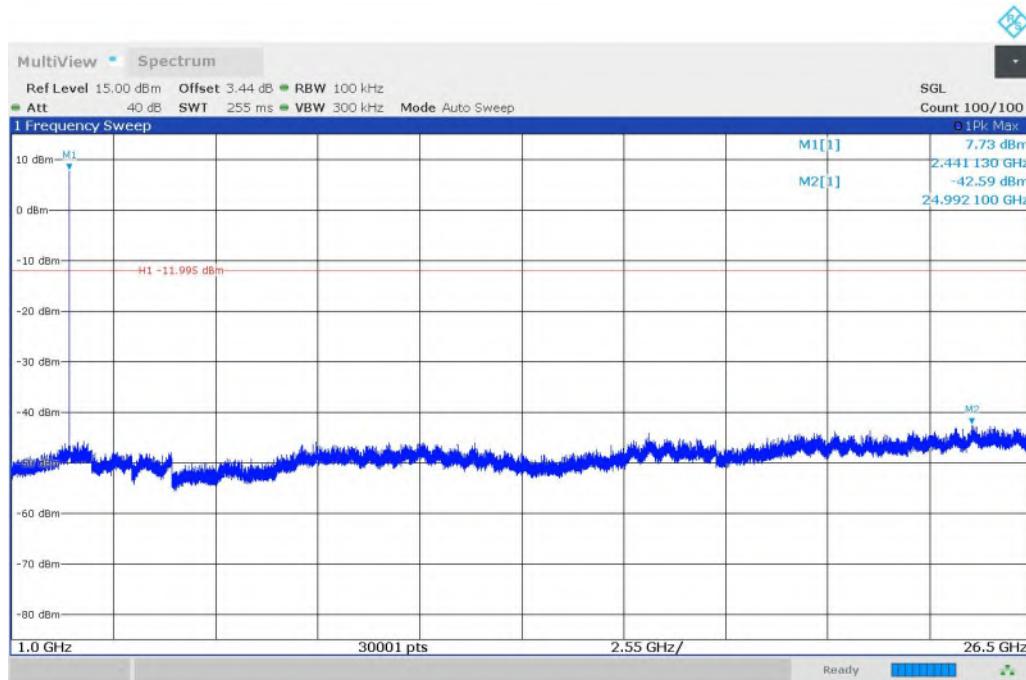


Fig. 17 Conducted Spurious Emission ( $\pi/4$  DQPSK, CH39, 1GHz-26.5GHz)

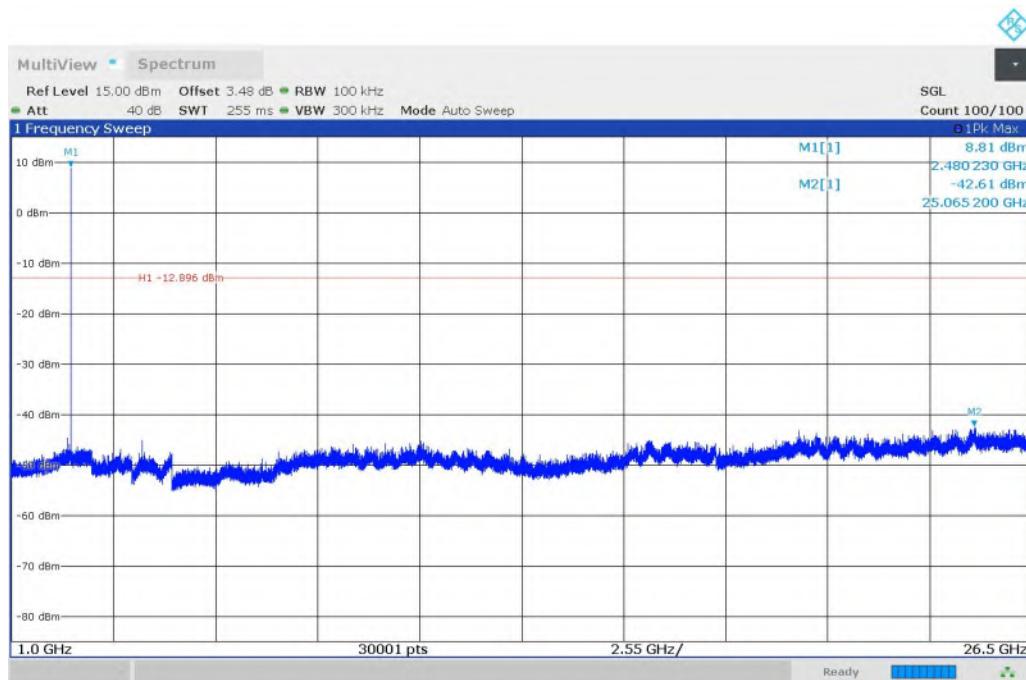


Fig. 18 Conducted Spurious Emission ( $\pi/4$  DQPSK, CH78, 1GHz-26.5GHz)

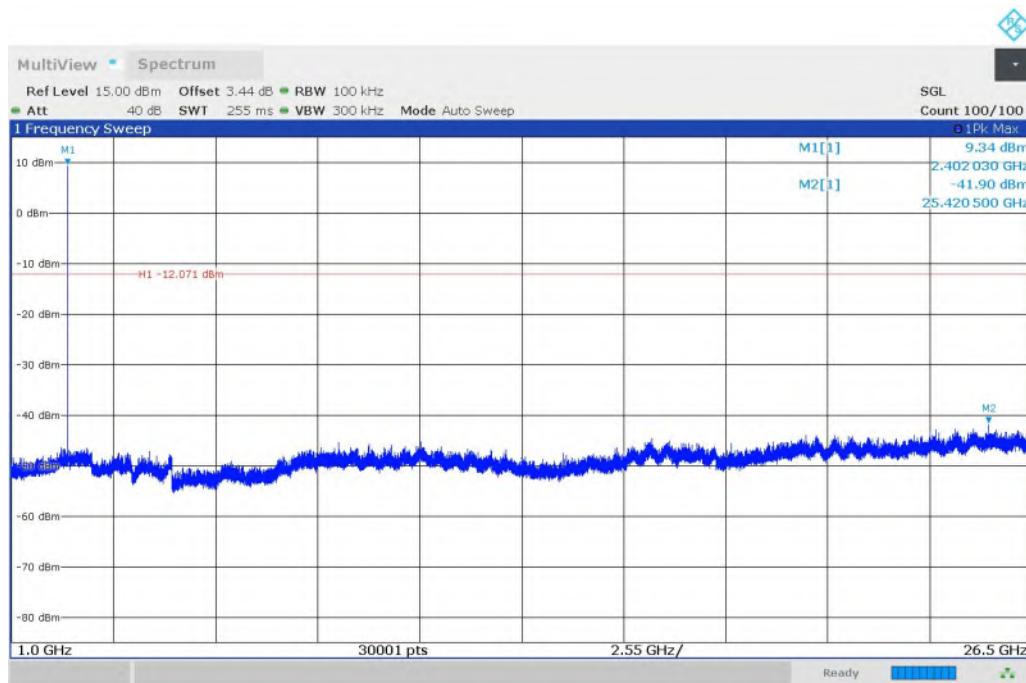


Fig. 19 Conducted Spurious Emission (8DPSK, CH0, 1GHz-26.5GHz)

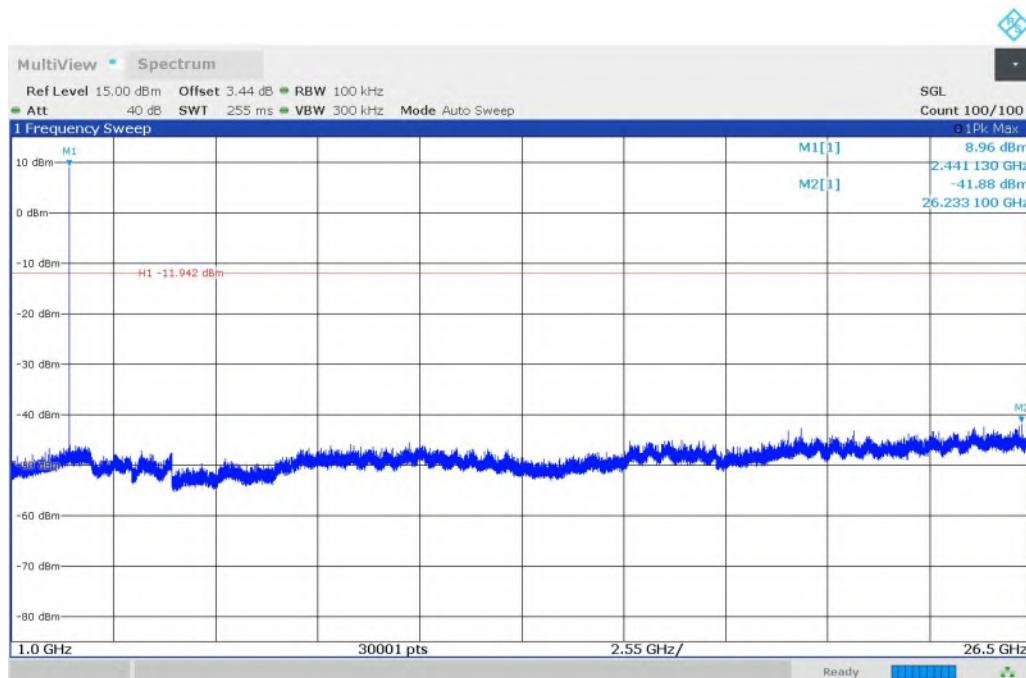


Fig. 20 Conducted Spurious Emission (8DPSK, CH39, 1GHz-26.5GHz)

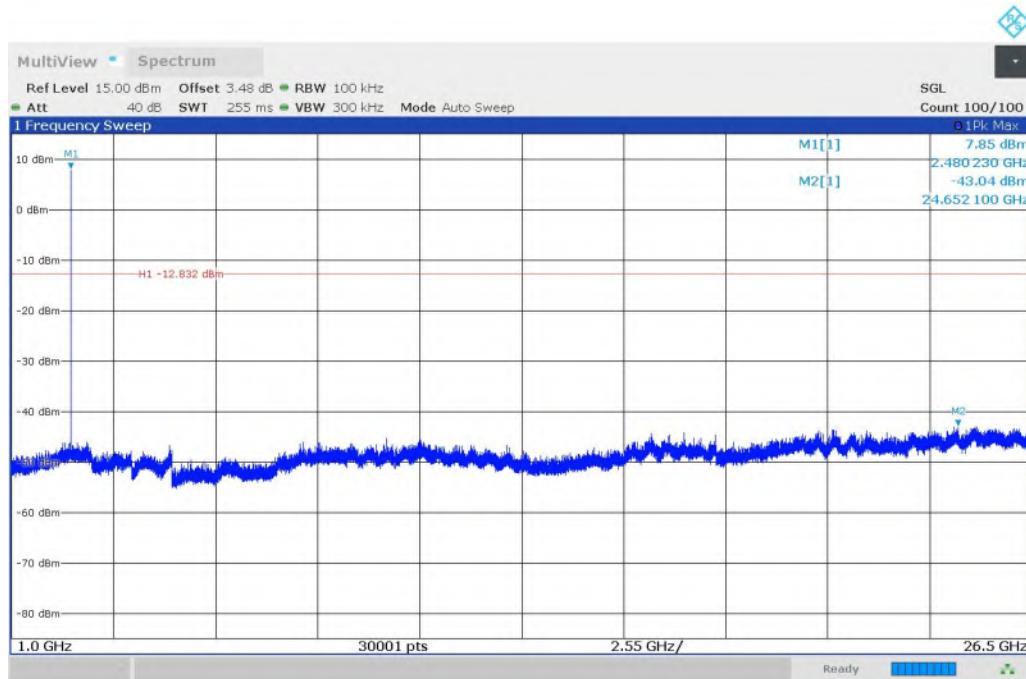


Fig. 21 Conducted Spurious Emission (8DPSK, CH78, 1GHz-26.5GHz)

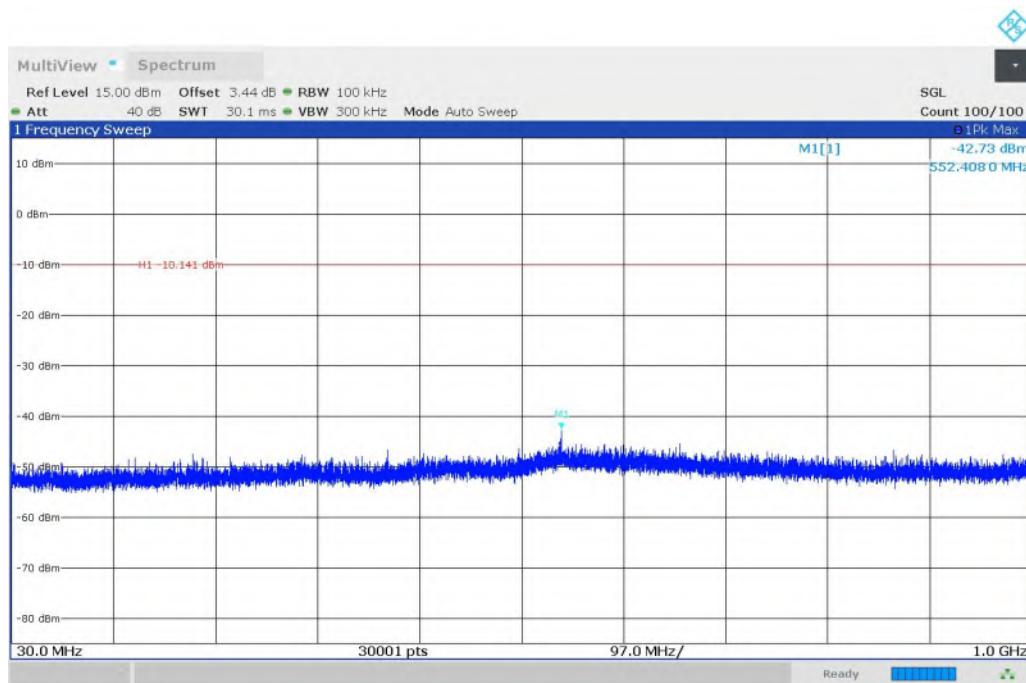


Fig. 22 Conducted Spurious Emission (All Channels, 30MHz -1GHz)

#### A.4 Radiated Emission

**Method of Measurement: See ANSI C63.10-clause 6.3&6.4&6.5&6.6.**

**Measurement Limit:**

Standard	Limit (dBm)
FCC 47 CFR Part 15.247, 15.205, 15.209	20dBm below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

**Limit in restricted band:**

Frequency of emission (MHz)	Field strength(µV/m)	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
Above 960	500	3

**Test Condition:**

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

**Note:** According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

**Measurement Results:**

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
GFSK	2402(CH0)	1 GHz ~18 GHz	Fig.23	P
	2441(CH39)	1 GHz ~18 GHz	Fig.24	P
	2480(CH78)	1 GHz ~18 GHz	Fig.25	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.26	P
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.27	P
$\pi/4$ DQPSK	2402(CH0)	1 GHz ~18 GHz	Fig.28	P
	2441(CH39)	1 GHz ~18 GHz	Fig.29	P
	2480(CH78)	1 GHz ~18 GHz	Fig.30	P
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.31	P
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.32	P
8DPSK	2402(CH0)	1 GHz ~18 GHz	Fig.33	P
	2441(CH39)	1 GHz ~18 GHz	Fig.34	P
	2480(CH78)	1 GHz ~18 GHz	Fig.35	P
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.36	P
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.37	P
/	All channels	9 kHz ~30 MHz	Fig.38	P
		30 MHz ~1 GHz	Fig.39	P
		18 GHz ~26.5 GHz	Fig.40	P

**Worst Case Result**
**GFSK CH39 (1-18GHz)**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
4357.800000	45.59	74.00	28.41	V	3.3
5590.200000	48.98	74.00	25.02	H	5.3
7031.142857	45.57	74.00	28.43	V	6.3
9696.000000	45.56	74.00	28.44	H	8.2
12420.857143	49.49	74.00	24.51	H	12.7
16624.714286	55.64	74.00	18.36	H	19.0

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
4357.800000	33.50	54.00	20.50	V	3.3
5590.200000	36.24	54.00	17.76	H	5.3
7031.142857	33.78	54.00	20.22	V	6.3
9696.000000	33.81	54.00	20.19	H	8.2
12420.857143	37.04	54.00	16.96	H	12.7
16624.714286	43.36	54.00	10.64	H	19.0

**$\pi/4$  DQPSK CH39 (1-18GHz)**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
4085.400000	46.27	74.00	27.73	V	3.2
5584.500000	48.50	74.00	25.50	H	5.3
7008.000000	46.26	74.00	27.74	V	6.3
11842.714286	49.85	74.00	24.15	V	12.4
16561.285714	55.13	74.00	18.87	H	18.6
17914.714286	58.04	74.00	15.96	H	21.8

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
4085.400000	34.11	54.00	19.89	V	3.2
5584.500000	36.42	54.00	17.58	H	5.3
7008.000000	33.99	54.00	20.01	V	6.3
11842.714286	36.72	54.00	17.28	V	12.4
16561.285714	43.13	54.00	10.87	H	18.6
17914.714286	45.41	54.00	8.59	H	21.8

**8DPSK CH39 (1-18GHz)**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
10287.857143	48.92	74.00	25.08	V	10.0
11177.142857	48.33	74.00	25.67	H	10.7
12869.571429	50.24	74.00	23.76	V	13.3
14893.714286	53.01	74.00	20.99	V	15.3
16501.714286	54.28	74.00	19.72	H	18.2
17990.142857	57.73	74.00	16.27	H	21.5

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB/m)
10287.857143	35.92	54.00	18.08	V	10.0
11177.142857	35.72	54.00	18.28	H	10.7
12869.571429	38.31	54.00	15.69	V	13.3
14893.714286	40.42	54.00	13.58	V	15.3
16501.714286	42.27	54.00	11.73	H	18.2
17990.142857	45.06	54.00	8.94	H	21.5

**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss.  $P_{Mea}$  is the field strength recorded from the instrument. The measurement results are obtained as described below:

Result=  $P_{Mea}$  +Cable Loss +Antenna Factor-Gain of the preamplifier.

**See below for test graphs.**

**Conclusion: Pass**

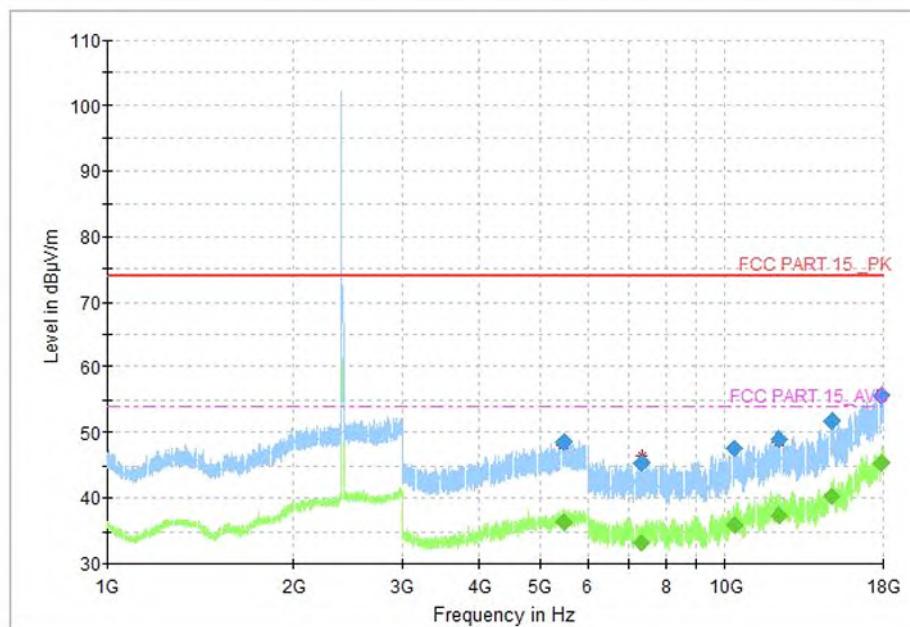


Fig. 23 Radiated Spurious Emission (GFSK, CH0, 1GHz ~18GHz)

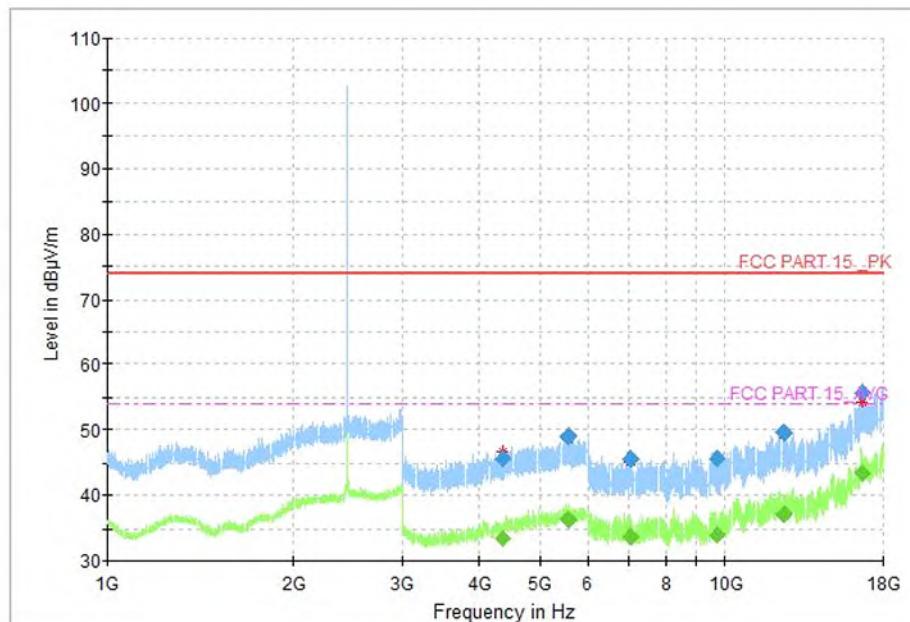


Fig. 24 Radiated Spurious Emission (GFSK, CH39, 1GHz ~18GHz)

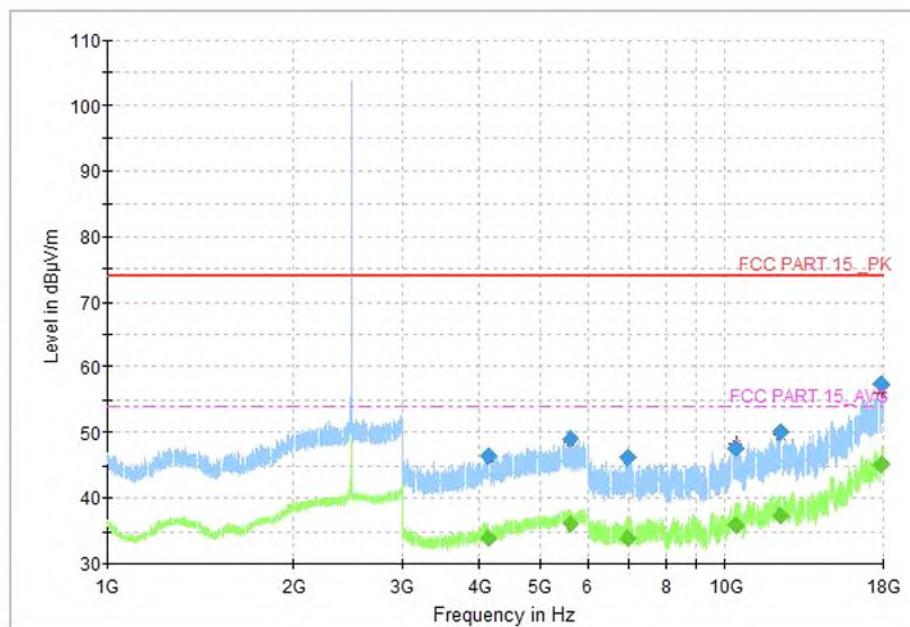


Fig. 25 Radiated Spurious Emission (GFSK, CH78, 1GHz ~18GHz)

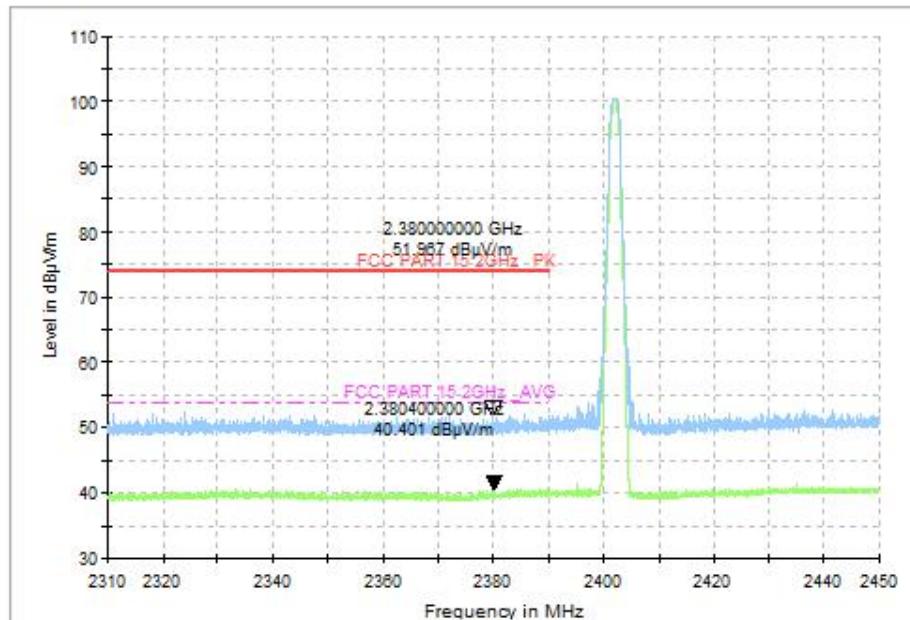


Fig. 26 Radiated Band Edges (GFSK, CH0, 2.38GHz~2.45GHz)

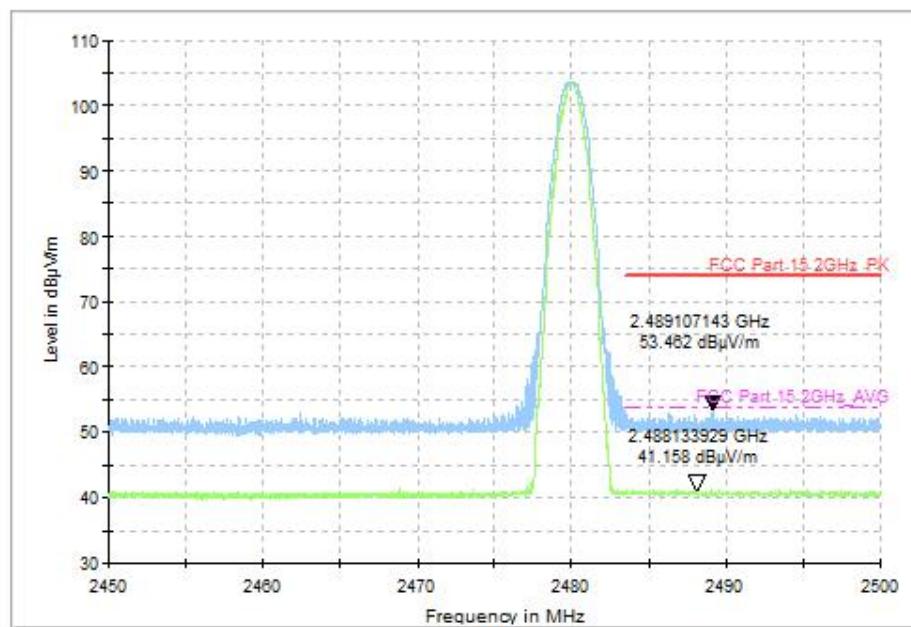


Fig. 27 Radiated Band Edges (GFSK, CH78, 2.45GHz~2.50GHz)

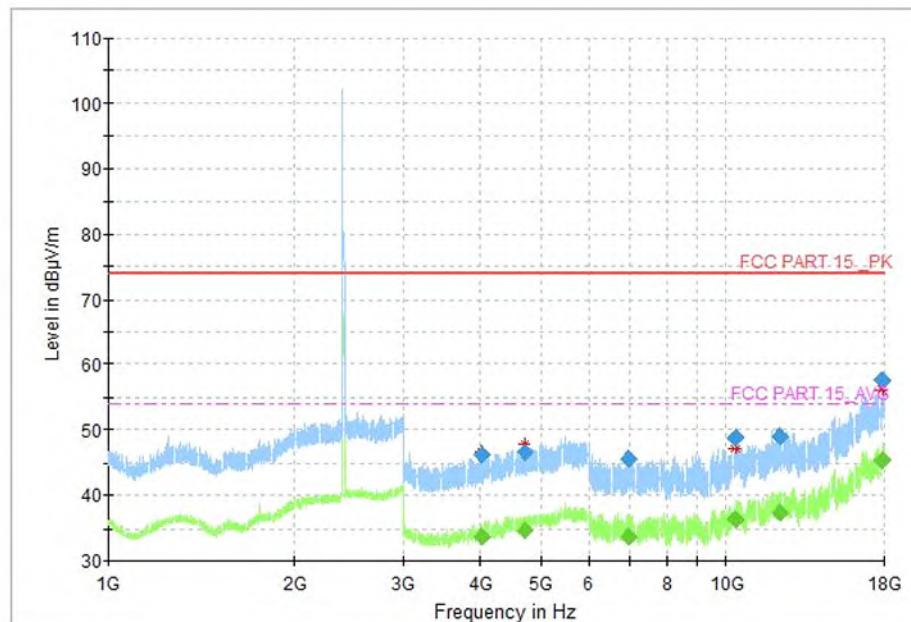
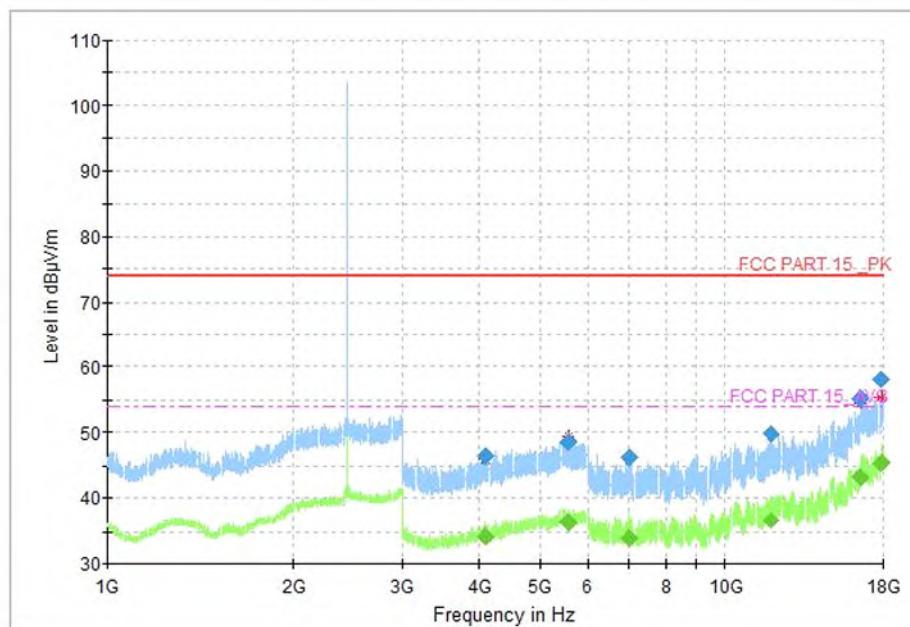
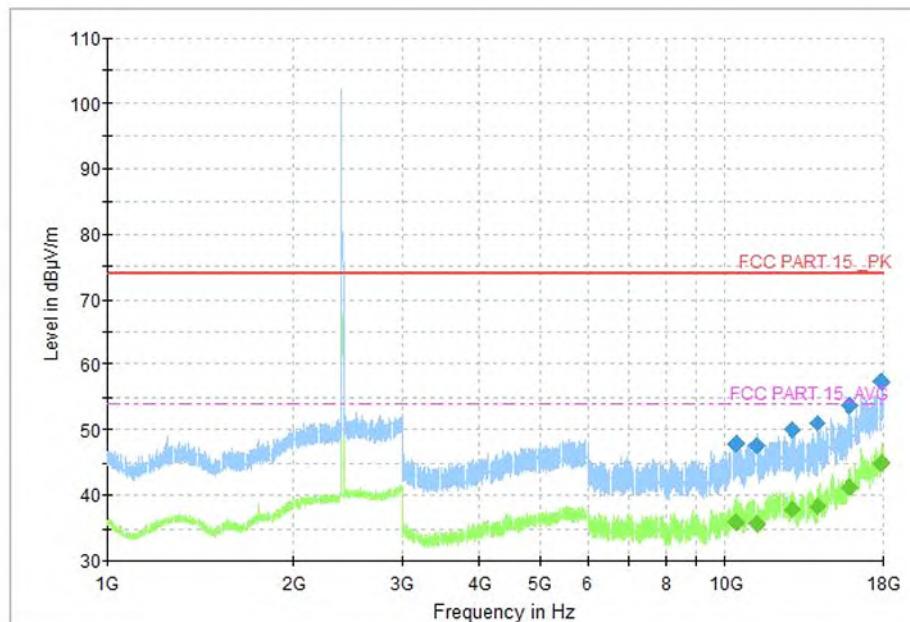


Fig. 28 Radiated Spurious Emission ( $\pi/4$  DQPSK, CH0, 1GHz ~18GHz)



**Fig. 29 Radiated Spurious Emission ( $\pi/4$  DQPSK, CH39, 1GHz ~18GHz)**



**Fig. 30 Radiated Spurious Emission ( $\pi/4$  DQPSK, CH78, 1GHz ~18GHz)**

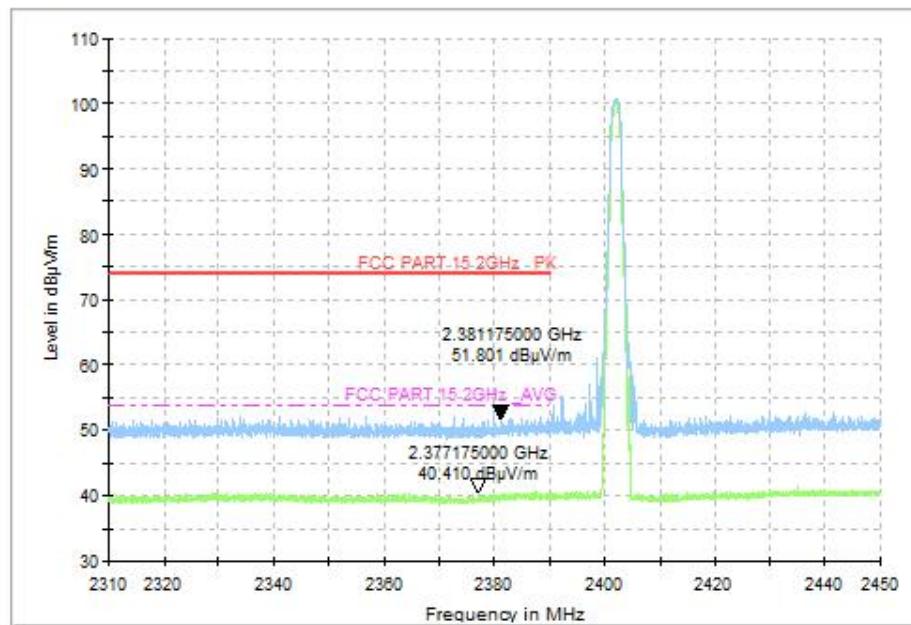


Fig. 31 Radiated Band Edges ( $\pi/4$  DQPSK, CH0, 2.38GHz~2.45GHz)

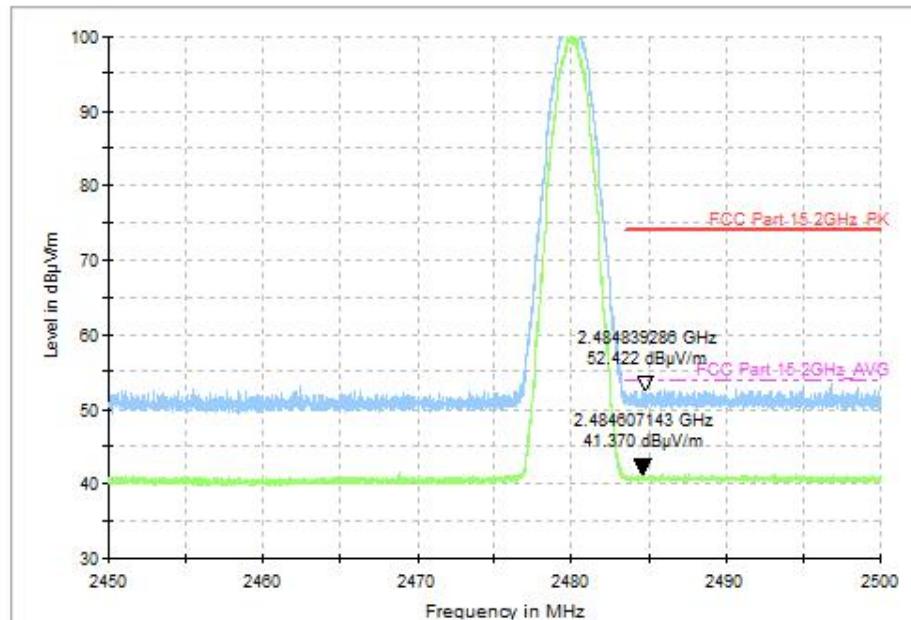


Fig. 32 Radiated Band Edges ( $\pi/4$  DQPSK, CH78, 2.45GHz~2.50GHz)

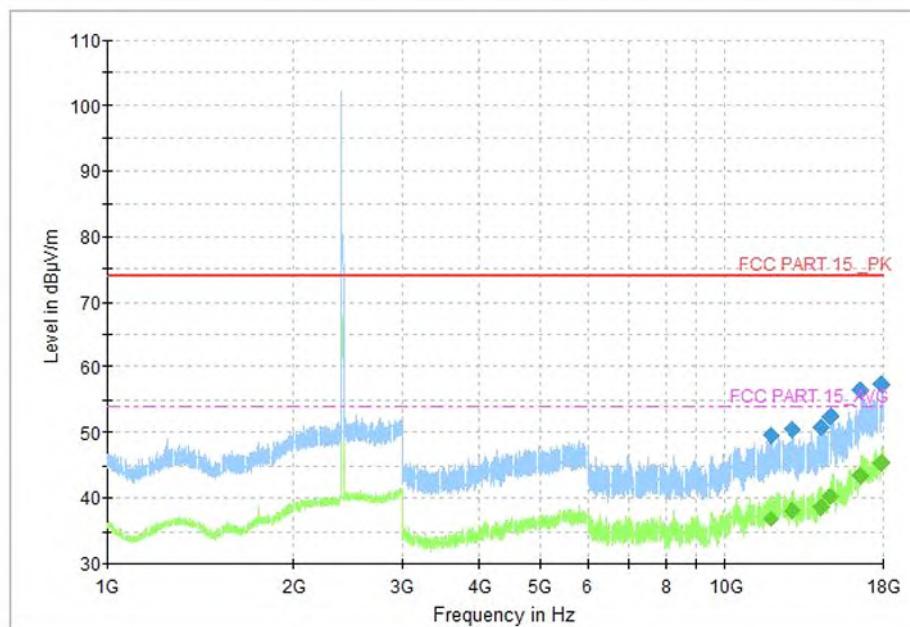


Fig. 33 Radiated Spurious Emission (8DPSK, CH0, 1GHz ~18GHz)

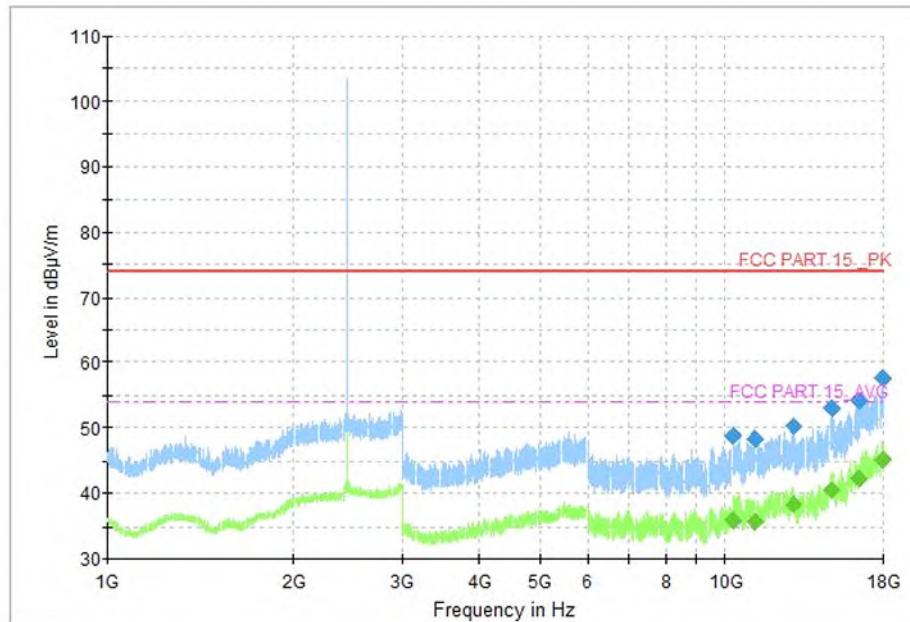


Fig. 34 Radiated Spurious Emission (8DPSK, CH39, 1GHz ~18GHz)

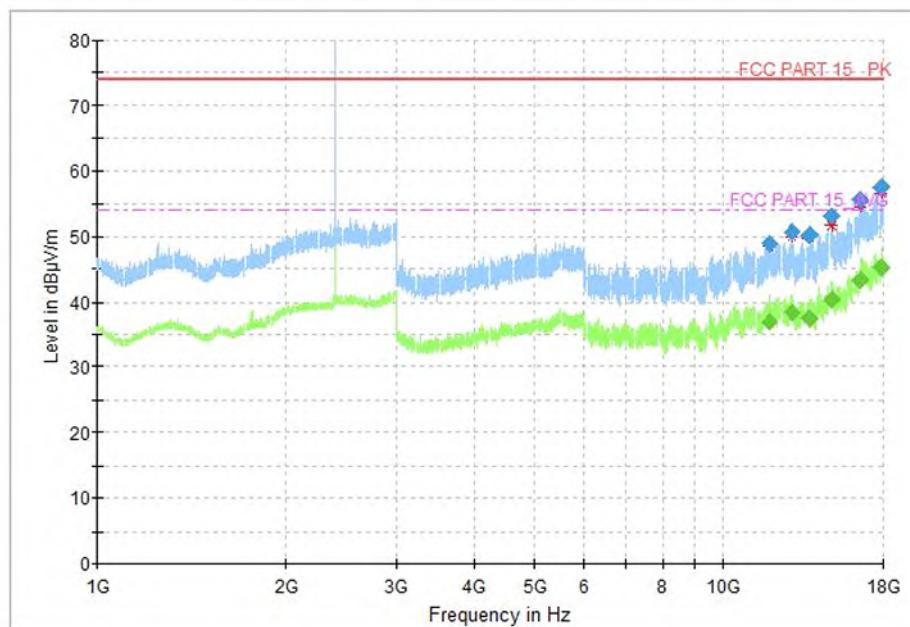


Fig. 35 Radiated Spurious Emission (8DPSK, CH78, 1GHz ~18GHz)

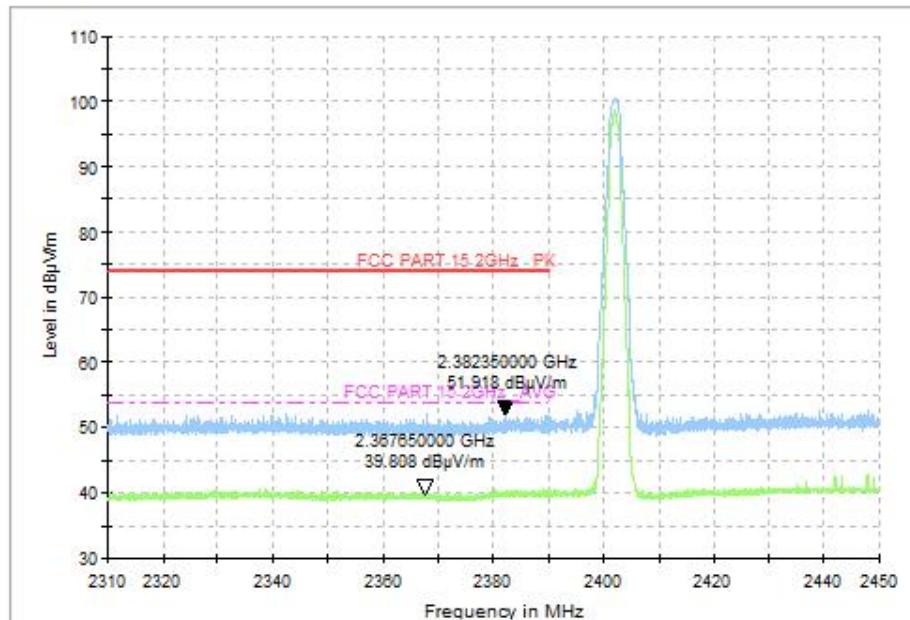


Fig. 36 Radiated Band Edges (8DPSK, CH0, 2.38GHz~2.45GHz)

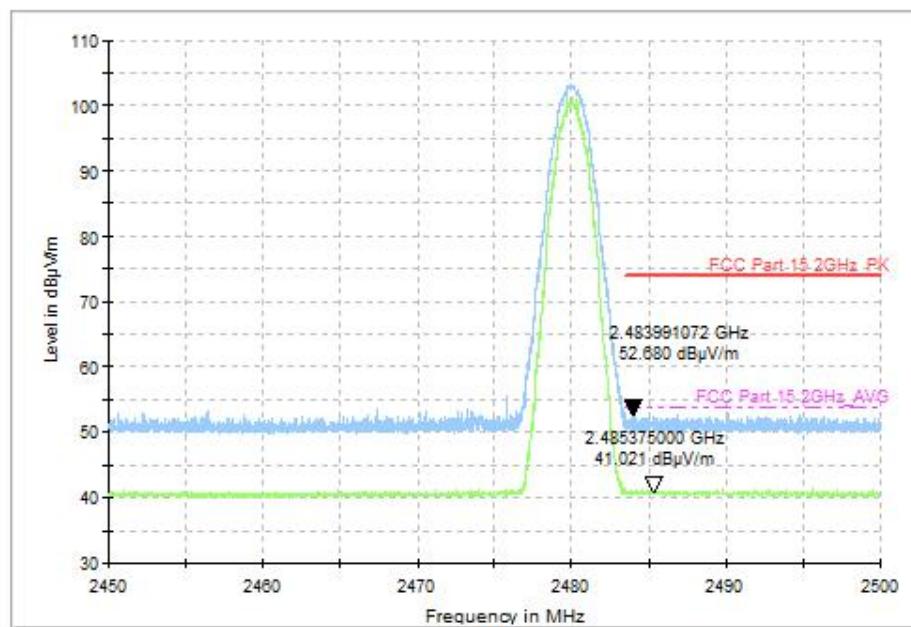


Fig. 37 Radiated Band Edges (8DPSK, CH78, 2.45GHz~2.50GHz)

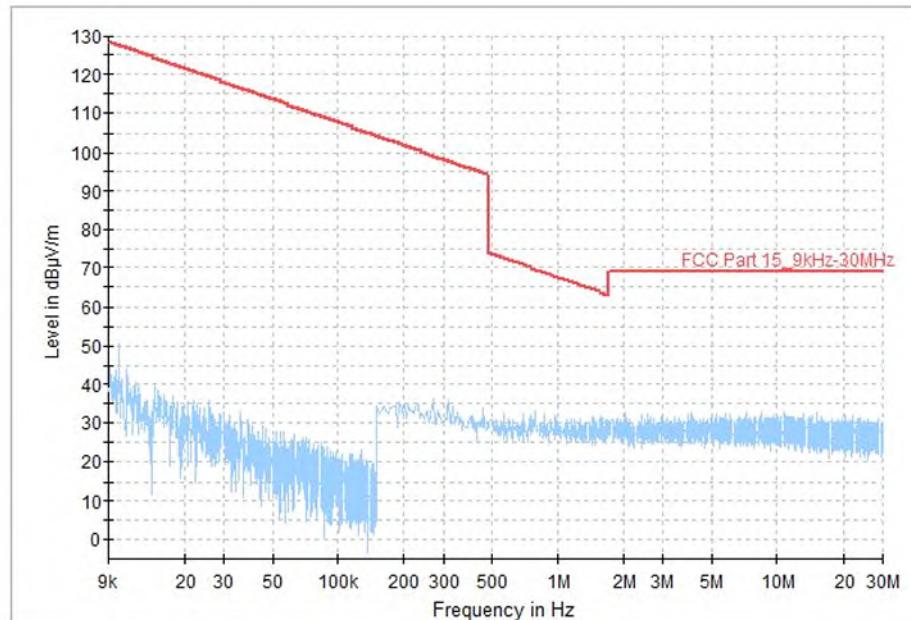


Fig. 38 Radiated Spurious Emission (All Channels, 9kHz ~30MHz)

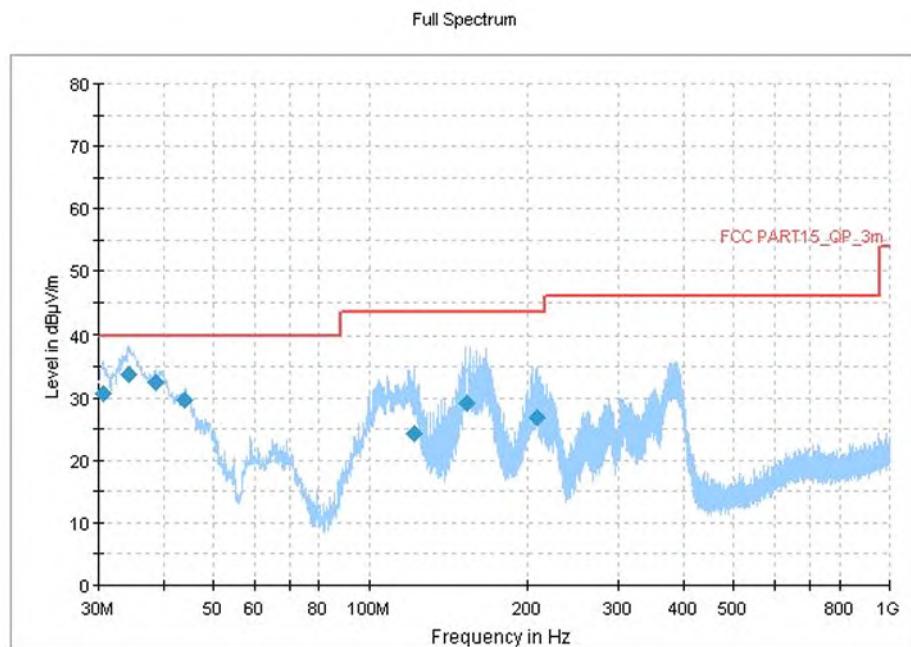


Fig. 39 Radiated Spurious Emission (All Channels, 30MHz ~1GHz)

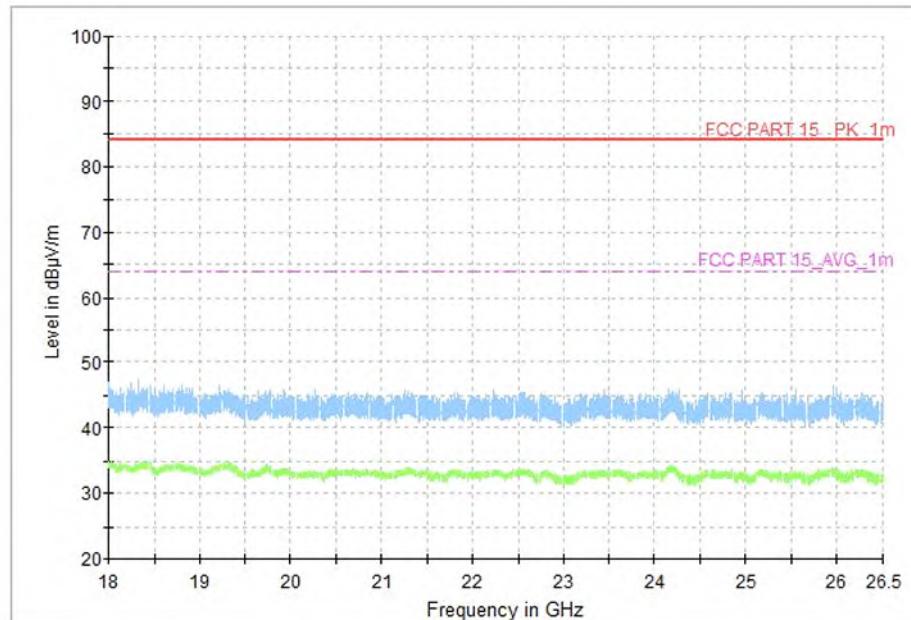


Fig. 40 Radiated Spurious Emission (All Channels, 18GHz ~26.5GHz)



### A.5 20dB Bandwidth

**Method of Measurement: See ANSI C63.10-clause 7.8.7.**

**Measurement Limit:**

Standard	Limit (MHz)
FCC 47 CFR Part 15.247 (a)	/

**Measurement Result:**

Mode	Frequency (MHz)	20dB Bandwidth (MHz)		Conclusion
GFSK	2402(CH0)	Fig.41	0.95	/
	2441(CH39)	Fig.42	0.95	
	2480(CH78)	Fig.43	0.95	
$\pi/4$ DQPSK	2402(CH0)	Fig.44	1.32	/
	2441(CH39)	Fig.45	1.32	
	2480(CH78)	Fig.46	1.32	
8DPSK	2402(CH0)	Fig.47	1.30	/
	2441(CH39)	Fig.48	1.30	
	2480(CH78)	Fig.49	1.30	

**See below for test graphs.**

**Conclusion: PASS**



Fig. 41 20dB Bandwidth (GFSK, CH0)



Fig. 42 20dB Bandwidth (GFSK, CH39)



Fig. 43 20dB Bandwidth (GFSK, CH78)


 Fig. 44 20dB Bandwidth ( $\pi/4$  DQPSK, CH0)


 Fig. 45 20dB Bandwidth ( $\pi/4$  DQPSK, CH39)

 Fig. 46 20dB Bandwidth ( $\pi/4$  DQPSK, CH78)



Fig. 47 20dB Bandwidth (8DPSK, CH0)



Fig. 48 20dB Bandwidth (8DPSK, CH39)



Fig. 49 20dB Bandwidth (8DPSK, CH78)

### A.6 Time of Occupancy (Dwell Time)

**Method of Measurement: See ANSI C63.10-clause 7.8.4.**

**Measurement Limit:**

Standard	Limit (s)
FCC 47 CFR Part 15.247(a)	< 0.4

**Measurement Results:**

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.50	307.20	<b>P</b>
$\pi/4$ DQPSK	39	2-DH5	Fig.51	307.20	<b>P</b>
8DPSK	39	3-DH5	Fig.52	307.20	<b>P</b>

See below for test graphs.

**Conclusion: Pass**

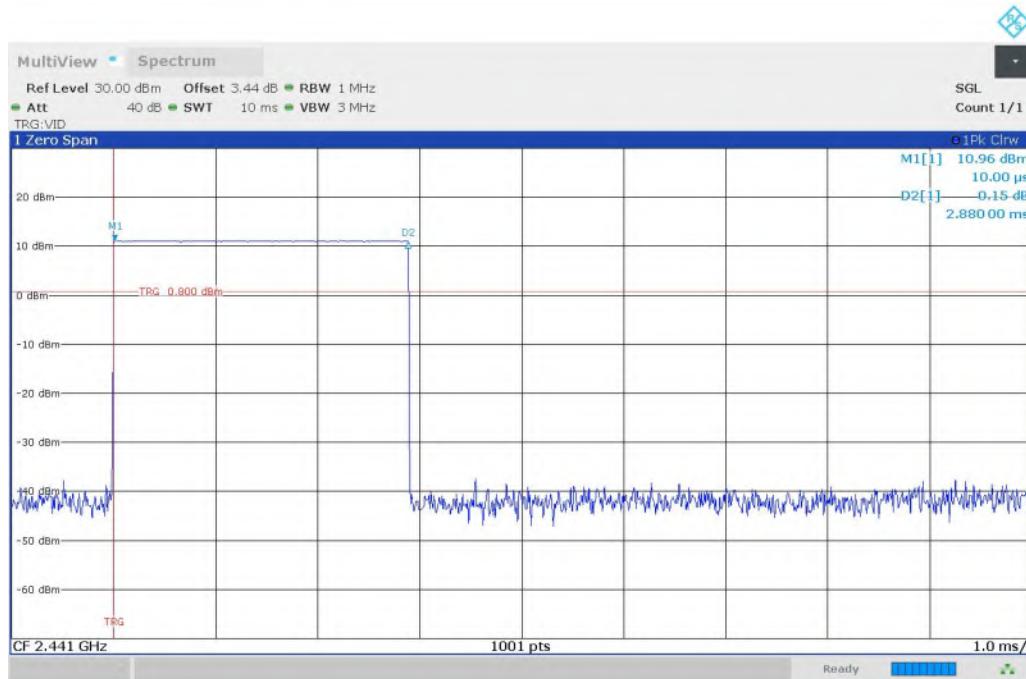


Fig. 50 BurstWidth (Dwell Time) (GFSK, CH39)

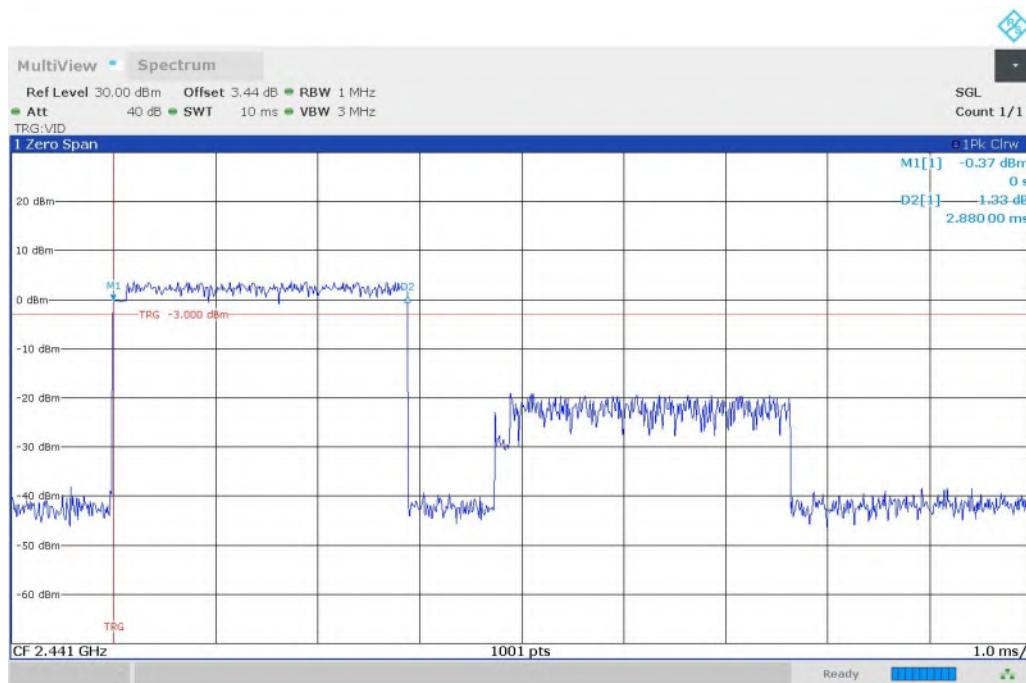


Fig. 51 BurstWidth (Dwell Time) ( $\pi/4$  DQPSK, CH39)

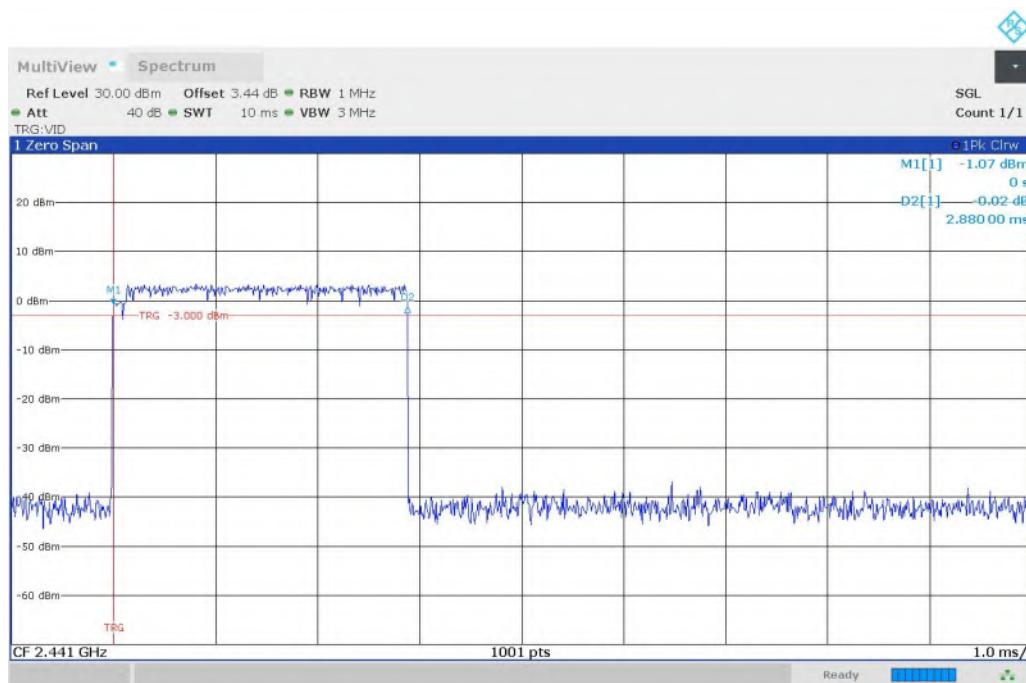


Fig. 52 BurstWidth (Dwell Time) (8DPSK, CH39)

### A.7 Number of Hopping Channels

**Method of Measurement: See ANSI C63.10-clause 7.8.3.**

**Measurement Limit:**

Standard	Limit (Num)
FCC 47 CFR Part 15.247(a)	At least 15 non-overlapping channels

**Measurement Results:**

Mode	Packet	Number of Hopping Channels	Test results (Num)	Conclusion
GFSK	DH5	Fig.53	79	P
$\pi/4$ DQPSK	2-DH5	Fig.54	79	P
8DPSK	3-DH5	Fig.55	79	P

See below for test graphs.

**Conclusion: Pass**

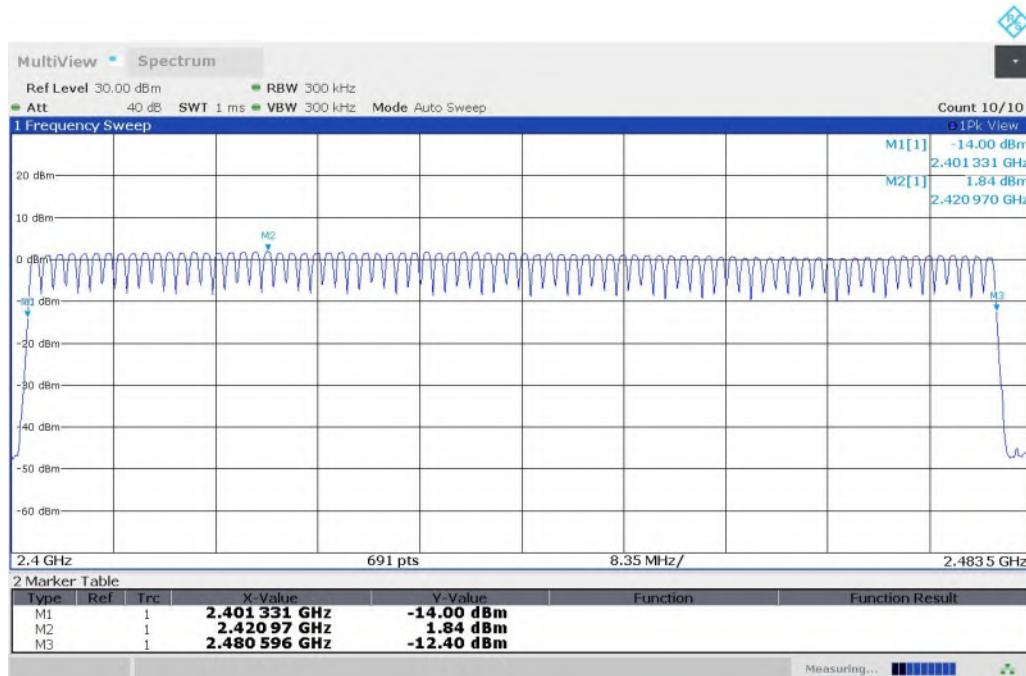


Fig. 53 Number of Hopping Channels (GFSK, Hopping)

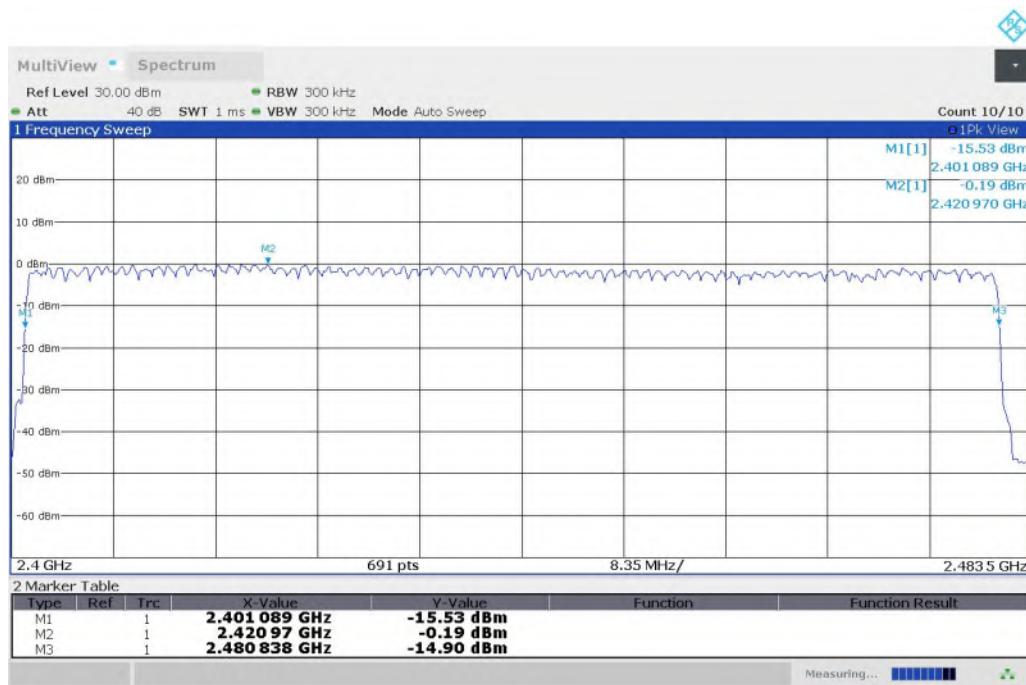


Fig. 54 Number of Hopping Channels ( $\pi/4$  DQPSK, Hopping)

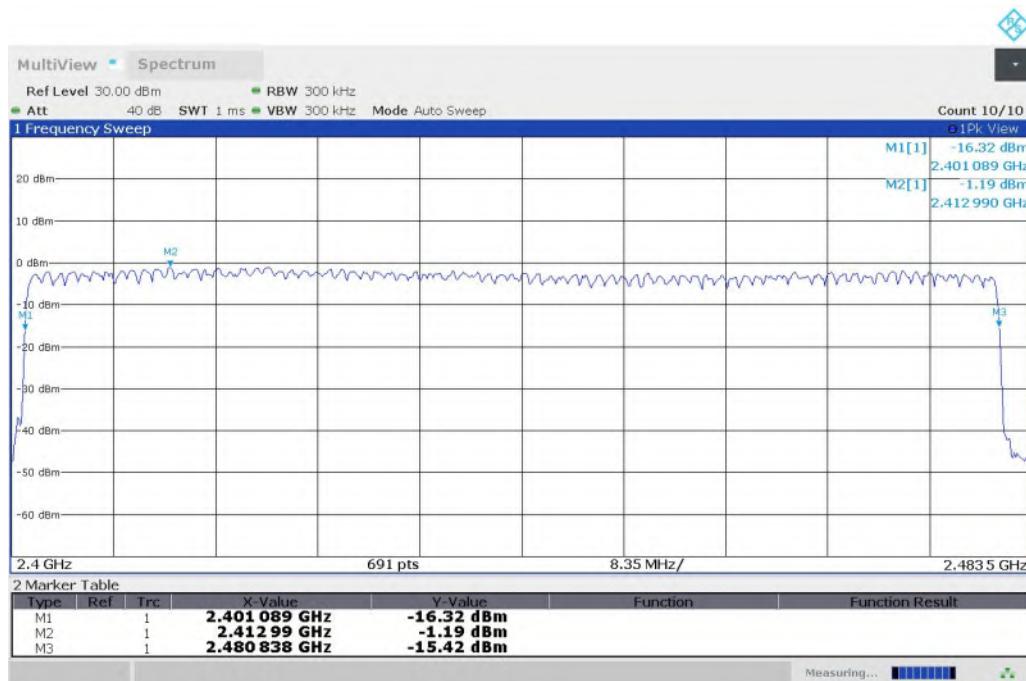


Fig. 55 Number of Hopping Channels (8DPSK, Hopping)

### A.8 Carrier Frequency Separation

**Method of Measurement: See ANSI C63.10-clause 7.8.2.**

**Measurement Limit:**

Standard	Limit (kHz)
FCC 47 CFR Part 15.247(a)	By a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater

**Measurement Results:**

Mode	Frequency (MHz)	Packet	Separation of hopping channels	Test result (kHz)	Conclusion
GFSK	2441(CH39)	DH5	Fig.56	1010.00	P
$\pi/4$ DQPSK	2441(CH39)	2-DH5	Fig.57	940.00	P
8DPSK	2441(CH39)	3-DH5	Fig.58	990.00	P

See below for test graphs.

**Conclusion: Pass**

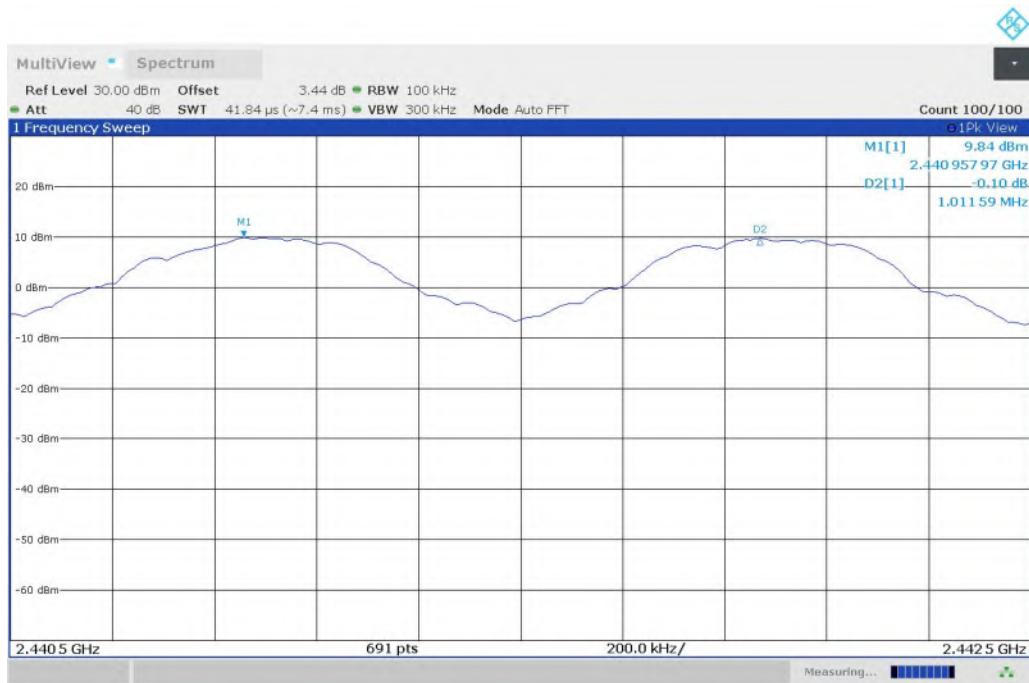


Fig. 56 Carrier Frequency Separation (GFSK, CH39)

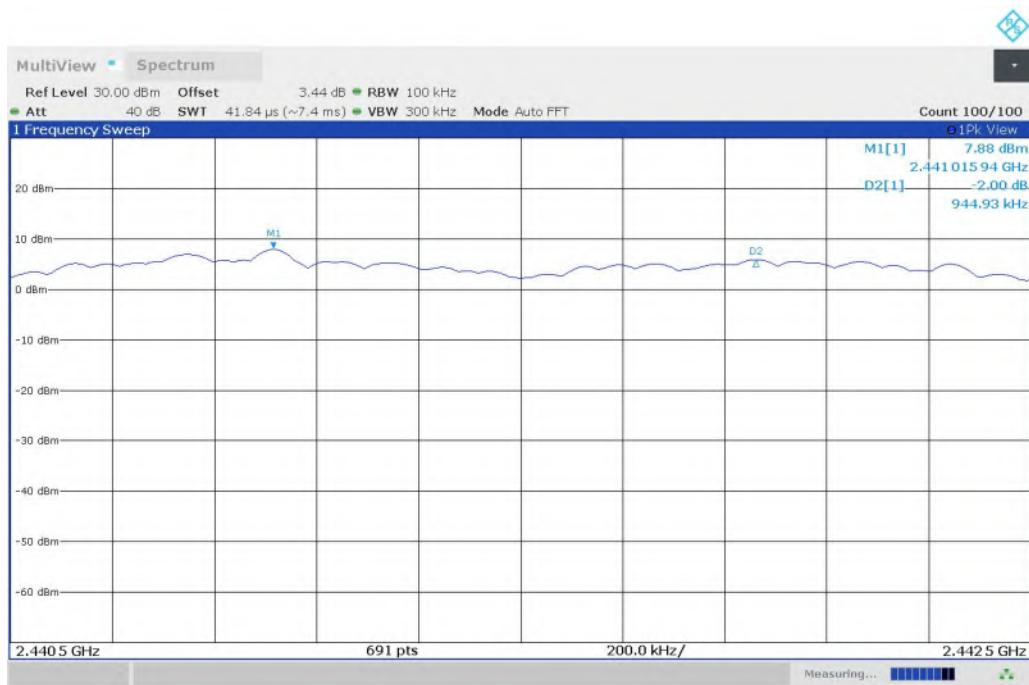
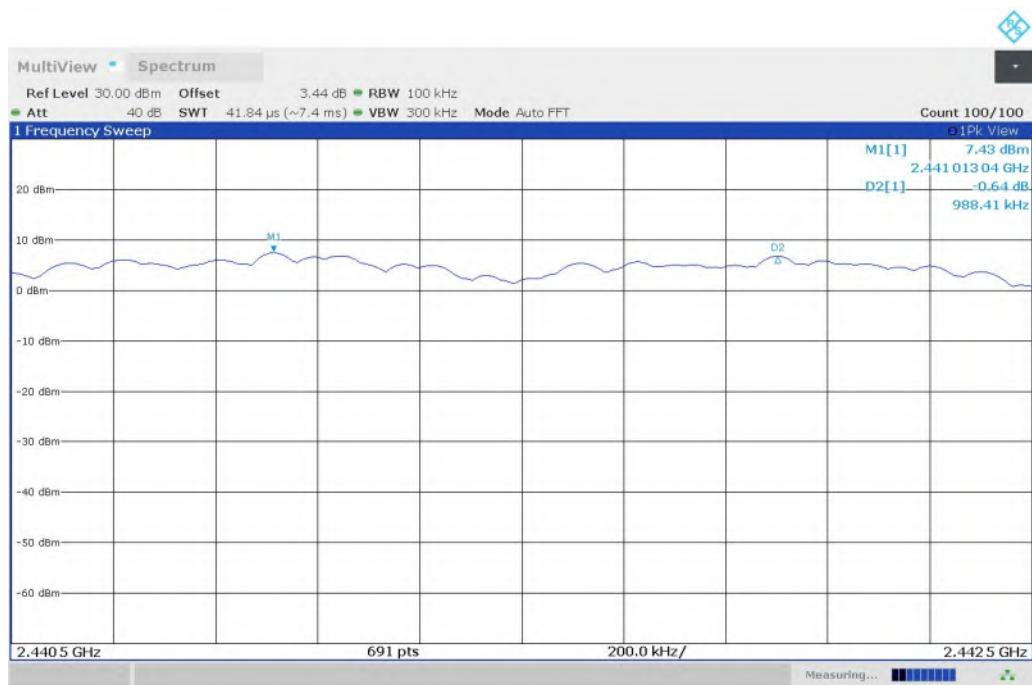


Fig. 57 Carrier Frequency Separation ( $\pi/4$  DQPSK, CH39)



**Fig. 58 Carrier Frequency Separation (8DPSK, CH39)**

### A.9 AC Power line Conducted Emission

**Method of Measurement: See ANSI C63.10-clause 6.2.**

**Test Condition:**

Voltage (V)	Frequency (Hz)
120	60

**Measurement Result and limit:**

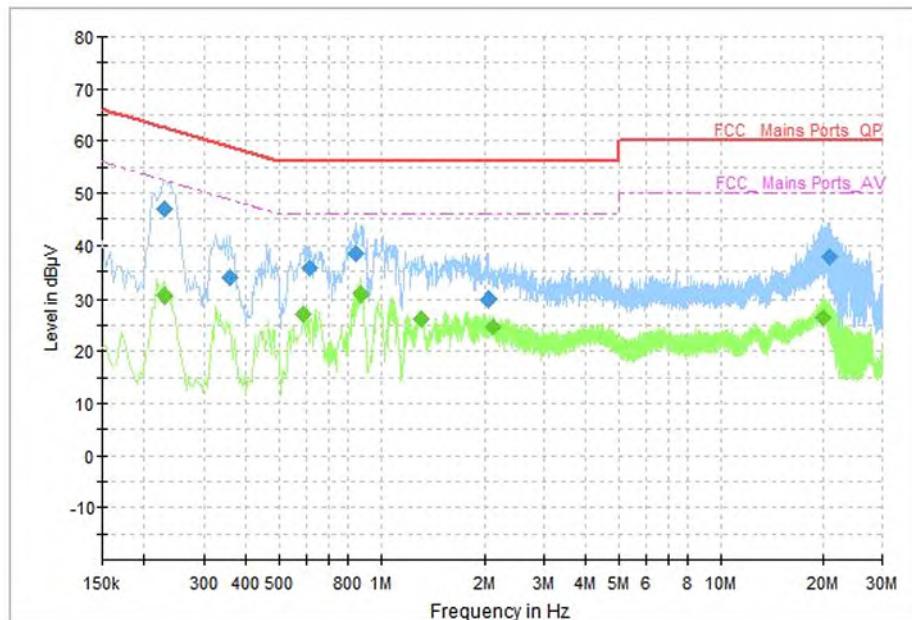
Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Average-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
			Traffic	Idle	
0.15 to 0.5	66 to 56	56 to 46	Fig.59	Fig.60	P
0.5 to 5	56	46			
5 to 30	60	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

**Note:** The measurement results include the L1 and N measurements.

**See below for test graphs.**

**Conclusion: Pass**



**Fig. 59 AC Power line Conducted Emission (Traffic)**

**Measurement Results: Quasi Peak**

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.230000	47.03	62.45	15.42	N	ON	10
0.358000	33.88	58.78	24.89	N	ON	10
0.618000	35.73	56.00	20.27	N	ON	10
0.842000	38.29	56.00	17.71	N	ON	10
2.046000	29.73	56.00	26.27	L1	ON	10
20.994000	37.73	60.00	22.27	L1	ON	10

**Measurement Results: Average**

Frequency (MHz)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.230000	30.32	52.45	22.13	N	ON	10
0.590000	27.24	46.00	18.76	N	ON	10
0.874000	30.74	46.00	15.26	N	ON	10
1.322000	26.31	46.00	19.69	N	ON	10
2.126000	24.80	46.00	21.20	N	ON	10
20.158000	26.36	50.00	23.64	L1	ON	10

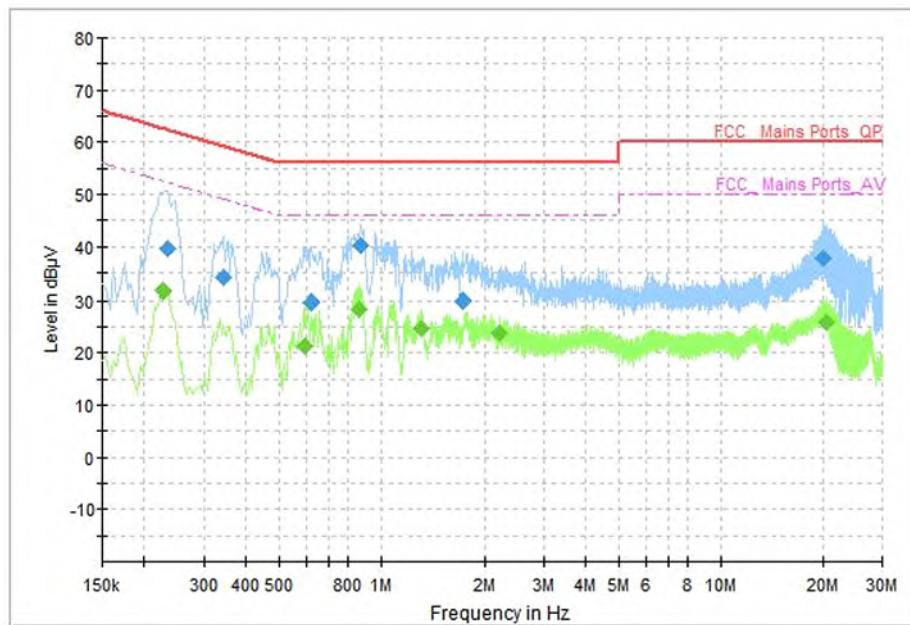


Fig. 60 AC Power line Conducted Emission (Idle)

**Measurement Results: Quasi Peak**

Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.234000	39.70	62.31	22.61	N	ON	10
0.342000	34.18	59.16	24.98	N	ON	10
0.622000	29.63	56.00	26.37	N	ON	10
0.874000	40.22	56.00	15.78	N	ON	10
1.726000	29.73	56.00	26.27	L1	ON	10
20.030000	37.87	60.00	22.13	L1	ON	10

**Measurement Results: Average**

Frequency (MHz)	Average (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.226000	31.54	52.60	21.05	N	ON	10
0.594000	21.18	46.00	24.82	N	ON	10
0.858000	28.18	46.00	17.82	N	ON	10
1.322000	24.55	46.00	21.45	N	ON	10
2.226000	23.59	46.00	22.41	N	ON	10
20.606000	25.77	50.00	24.23	L1	ON	10

\*\*\*END OF REPORT\*\*\*