



# FCC Test Report - EDR

**Product Name: UMTS/GPRS/GSM/EDGE Mobile Phone with  
Bluetooth**

**Model Number: U2801-53**

**Report No: SYBH(Z-RF)010032012-2008  
FCC ID: QISU2801-53**

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<b>REGULATION</b>	FCC CFR47 Part 2:2011, Subpart J;
	FCC CFR47 Part 15:2011, Subpart H;
<b>START OF TEST</b>	Mar.01, 2012
<b>END OF TEST</b>	Mar.07, 2012
<b>Final Judgement:</b>	Pass

Approved By Senior Engineer Jul.25, 2012 Dai Linjun *Dai Linjun*  
 Date Name Signature

Reviewed By Jul.25, 2012 Cousy Xu *Cousy XU*  
 Date Name Signature

Operator Jul.25, 2012 Huang Qiuliang *Huang Qiuliang*  
 Date Name Signature



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# 1 Summary

The table below summarizes the measurements and results for the EUT Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

<b>FCC Measurement Specification</b>	<b>Description</b>	<b>Result</b>
15.247 (a) (1)	Bandwidth measurement	PASS
15.247 (a) (1)	Carrier frequency separation measurement	PASS
15.247 (a) (1) III	Number of hopping channel	PASS
15.247 (a) (1) III	Time of occupancy	PASS
15.247 (b) (1)	Peak output power	PASS
15.247 (d)	Band edge compliance measurement	PASS
15.247 (d)	Conducted RF spurious	PASS
15.247 (d) / 15.205 & 15.209	Radiated spurious emission & Radiated restricted band measurement	PASS
15.207	Conducted emission test for power port	PASS



## 2 Product Description

### 2.1 Product Information

#### 2.1.1 General Description

UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth U2801-53 is subscriber equipment in the WCDMA/GSM system. The UMTS frequency band is Band II, The GSM/GPRS/EDGE frequency band includes GSM850 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, UMTS and GSM/GPRS/EDGE protocol processing, voice, MMS service, GPS etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

The difference between U2801-5 and U2801-53 is showed in the following table.

	U2801-53	U2801-5
Frequency Band	WCDMA1900 GSM/GPRS/EDGE850/1900	WCDMA850/1900 GSM/GPRS/EDGE850/1900
Others	The same	The same

So U2801-53 RF test data refer to U2801-5 RF test report.

#### 2.1.2 Support function and Service

The EUT support the Bluetooth's function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Data and Voice	Modulation: $\pi/4$ -DQPSK	TM1	/
Data and Voice	Modulation: 8DPSK	TM2	/

## 2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable!				



### **3 Test Site Description**

The test site of:

***Huawei Technologies Co. Ltd.  
P.O. Box 518129  
Huawei base, bantian,  
Longgang District, Shenzhen, China***

#### **3.1 Testing Period**

The test have been performed during the period of

Mar.01, 2012 to Mar.07, 2012

#### **3.2 General Set up Description**

The Bluetooth hopping frequency system of Mobile Phone can Support 2.4GHz Band. For compliance with FCC regulation 47CFR part15 subpart C, we set the mobile phone as following test mode to do all compliance tests.

**Bluetooth MODE:**

**TM1:**  $\pi/4$ -DQPSK Modulation

**TM2:** 8DPSK Modulation



## 4 Product Description

### 4.1 Technical Characteristics

#### 4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	2400 to 2483.5 MHz	
Downlink band:	2400 to 2483.5 MHz	
Hop frequency support:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

#### 4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	1 MHz
Channel separation:	1 MHz

#### 4.1.3 Antenna Information

Table 6 Antenna Information

Type:	Integrated / Internal
Maximum Gain(dBi):	-0.83 (from 2400MHz to 2500MHz)



#### 4.1.4 Environmental Requirements

Table 7 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%

#### 4.1.5 Power Source

Table 8 Power Source

AC voltage nominal:	~120V
AC voltage range	~100V-240V
AC current maximal:	650mA

#### 4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

#### 4.1.7 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Table 9 Applied RF module DC Voltages and Currents

Voltage:	 +3.7V
Current:	100mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



## 4.2 EUT Identification List

### 4.2.1 Board Information

Table 10 Board Information

UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth		
U2801-53		
Board and Module		
Hardware Version	Software Version	Serial Number
Ver.A	U2801CCMB904	-

### 4.2.2 Adapter

AC/DC Adapter Model:	HS-050040U6(02130875)
Input Voltage:	~ 100-240V 50/60Hz
Output Voltage:	== 5.0 V
Rated Power:	2W

### 4.2.3 Battery

Name	Manufacture	Description
Rechargeable Li-ion	Huawei Technologies Co., Ltd.	Battery Model: HB5A2(24020752) Rated capacity: 1000mAh Nominal Voltage: == +3.7V Charging Voltage: == +4.2V



## 5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2012
Wireless Communication Test set	Agilent	N4010A	MY49081592	Nov.26.2012
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.20,2012
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2012
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2013
Signal generator	Agilent	E8257D	MY49281095	Jul.9.2012
Test receiver	R&S	ESU26	100150	May.29.2012
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Jan.29.2013
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Jan.29.2013
Horn Antenna	R & S	HF906	100683	May.15, 2012
Horn Antenna	R & S	HF906	100684	Jul.01, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-357	May.15, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-356	May.15, 2012



## 6 Transmitter Measurements

### 6.1 Bandwidth measurement

#### 6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at channel No.0, 40, 78

#### 6.1.2 Test Specifications and Limits

##### 6.1.2.1 Specification

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

##### 6.1.2.2 Supporting Standards

Table 13 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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##### 6.1.2.3 Limits

Not Applicable.

#### 6.1.3 Test Method and Setup

- (a) Connect test port of mobile phone to universal communication tester.
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number and test the 20dB bandwidth with universal communication tester.

## Test setup

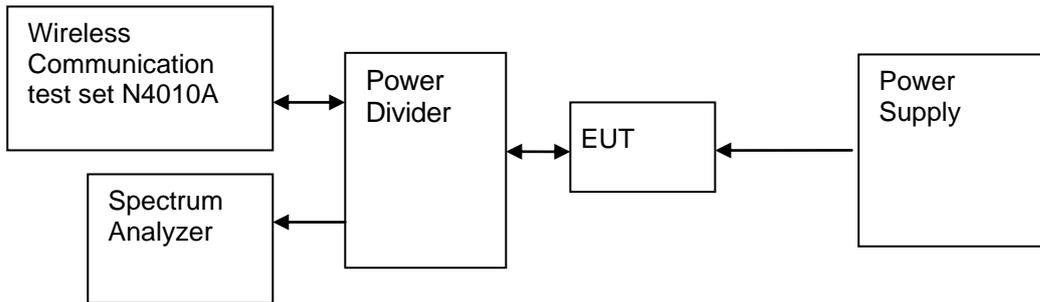


Figure 1. Test Set-up

### 6.1.4 Measurement Results

Table 14 Measurement Results(TM1)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	Bottom	0	2.402	1.28	Pass
99%	Bottom	0	2.402	1.19	Pass
20dB	Middle	40	2.442	1.28	Pass
99%	Middle	40	2.442	1.17	Pass
20dB	Top	78	2.480	1.28	Pass
99%	Top	78	2.480	1.17	Pass

Table 15 Measurement Results(TM2)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	Bottom	0	2.402	1.29	Pass
99%	Bottom	0	2.402	1.17	Pass
20dB	Middle	40	2.442	1.29	Pass
99%	Middle	40	2.442	1.17	Pass
20dB	Top	78	2.480	1.29	Pass
99%	Top	78	2.480	1.17	Pass

### 6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix A.



## 6.2 Carrier frequency separation measurement

### 6.2.1 Test Conditions

Table 16 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at channel No.39, 40, 41

### 6.2.2 Test Specifications and Limits

#### 6.2.2.1 Specification

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

#### 6.2.2.2 Supporting Standards

Table 17 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.2.2.3 Limits

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.

Table 18 Limits(Modulation:  $\pi/4$ -DQPSK)

Regulation:	$\geq 0.025$ or $2/3$ of the 20 dB bandwidth
Limit:	$\geq 2/3 \times \text{OCCUPYEDR240} = 2\text{EDRSeparalIMIT MHz}$

Table 19 Limits(Modulation: 8DPSK)

Regulation:	$\geq 0.025$ or $2/3$ of the 20 dB bandwidth
Limit:	$\geq 2/3 \times \text{OCCUPYEDR340} = 3\text{EDRSeparalIMIT MHz}$

### 6.2.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone 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.

## Test setup

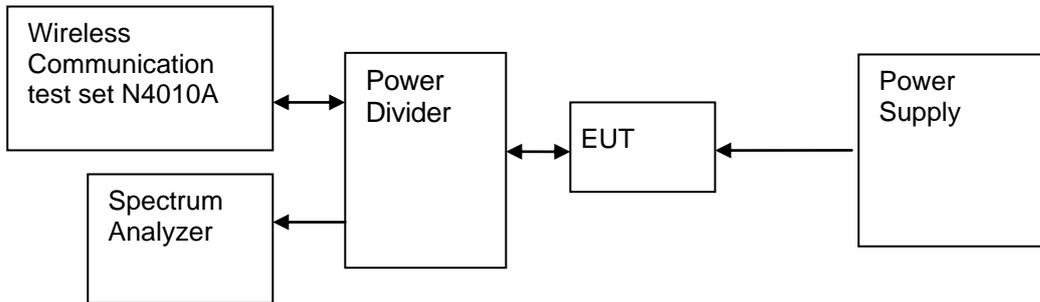


Figure 2. Test Set-up

## 6.2.4 Measurement Results

Table 20 Measurement Results(TM1)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	1.1	≥ 0.853	Pass
40	2.442	41	2.443	1.0	≥ 0.853	Pass

Table 21 Measurement Results(TM2)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	1.0	≥0.860	Pass
40	2.442	41	2.443	0.9	≥0.860	Pass

## 6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix B.

## 6.3 Number of hopping channel

### 6.3.1 Test Conditions

Table 22 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at hopping frequency state

### 6.3.2 Test Specifications and Limits

#### 6.3.2.1 Specification

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

#### 6.3.2.2 Supporting Standards

Table 23 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.3.2.3 Limits

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

Table 24 Limits

Limits	≥ 15 hopping frequency channel
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### 6.3.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone 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.

## Test setup

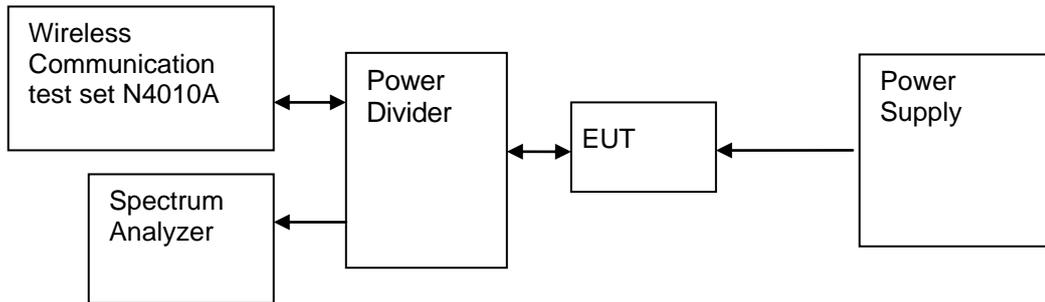


Figure 3. Test Set-up

### 6.3.4 Measurement Results

Table 25 Measurement Results(TM1)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	2EDRnumberchannel40	≥ 15	Pass

Table 26 Measurement Results(TM2)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	3EDRnumberchannel40	≥ 15	Pass

### 6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix C.



## 6.4 Time of occupancy

### 6.4.1 Test Conditions

Table 27 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at hopping frequency state

### 6.4.2 Test Specifications and Limits

#### 6.4.2.1 Specification

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

#### 6.4.2.2 Supporting Standards

Table 28 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.4.2.3 Limits

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.

Table 29 Limits

Limits for time of occupancy	≤ 0.4s
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### 6.4.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- (b) Set the mobile phone 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.

## Test setup

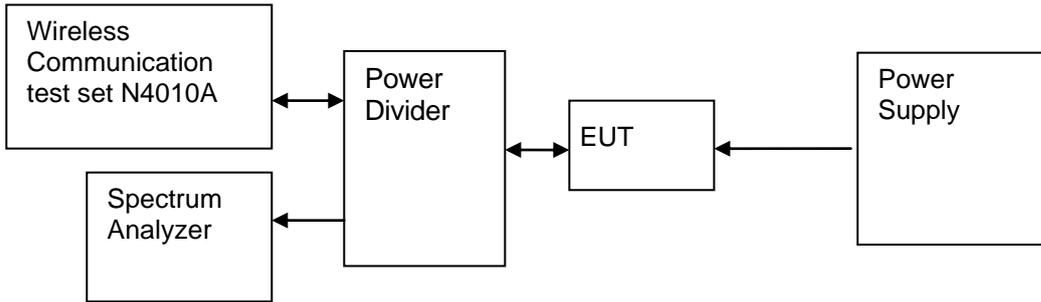


Figure 4. Test Set-up

### 6.4.4 Measurement Results

Table 30 Measurement Results (TM1)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
3.0	106.7	0.32010	≤ 0.4	Pass

Table 31 Measurement Results (TM2)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
2.9	106.7	0.30943	≤ 0.4	Pass

Note: The result is measured at 2-DH5\3-DH5 mode in  $\pi/4$ -DQPSK\8DPSK modulation, which has longest time in one transmission burst.

### 6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix D.



## 6.5 Peak output power

### 6.5.1 Test Conditions

Table 32 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at channel No.0, 40, 78

### 6.5.2 Test Specifications and Limits

#### 6.5.2.1 Specification

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

#### 6.5.2.2 Supporting Standards

Table 33 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.5.2.3 Limits

Compliance with part 15.247 (b) (1), 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.

Table 34 Limits

2.4GHz and 5.8GHz hopping frequency system	1 Watt (=30 dBm)
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### 6.5.3 Test Method and Setup

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

## Test setup

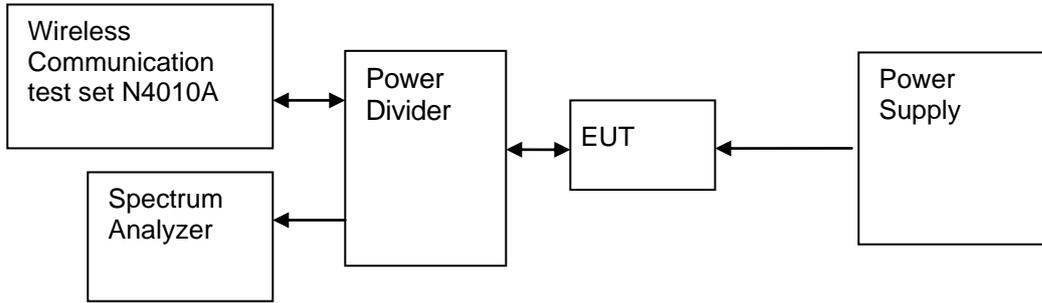


Figure 5. Test Set-up

### 6.5.4 Measurement Results

Table 35 Measurement Results(TM1)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	6.38	< 30	Pass
Middle	40	2442	7.09	< 30	Pass
Top	78	2480	6.36	< 30	Pass

Table 36 Measurement Results(TM2)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	6.38	< 30	Pass
Middle	40	2442	7.10	< 30	Pass
Top	78	2480	6.39	< 30	Pass

### 6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix E.



## 6.6 Band edge spurious emission

### 6.6.1 Test Conditions

Table 37 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at channel No. 0, 78 and frequency hopping state

### 6.6.2 Test Specifications and Limits

#### 6.6.2.1 Specification

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

#### 6.6.2.2 Supporting Standards

Table 38 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.6.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 39 Limits

Band edge spurious:	20 dBc/100kHz
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### 6.6.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the mobile phone to transmit at high, low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

## Test setup

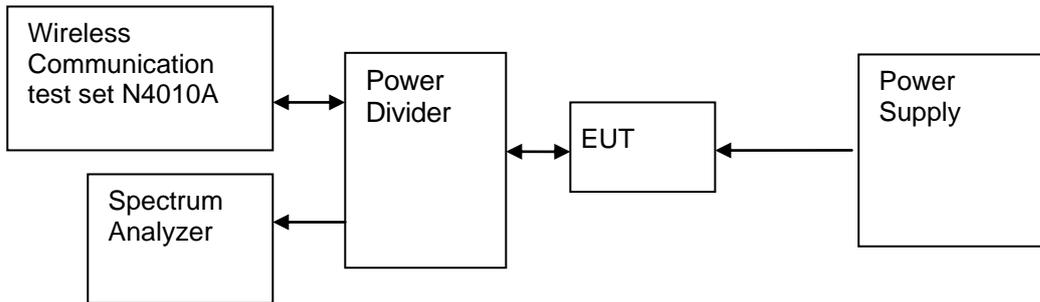


Figure 6. Test Set-up

### 6.6.4 Measurement Results

Table 40 Measurement Results for Band Edge immediately outside the 2.4GHz Band (TM1)

	Chan- nel No.	Carrier Freque- ncy [MHz]	Carrier Power [dBm]	Frequen- cy Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	4.87	Off	-49.20	< -15.1	Pass
	-	-	3.75	On	-52.20	< -16.3	Pass
High Edge	78	2480	4.80	Off	-54.44	< -15.2	Pass
	-	-	4.71	On	-53.51	< -15.3	Pass

Table 41 Measurement Results for Band Edge immediately outside the 2.4GHz Band (TM2)

	Chan- nel No.	Carrier Freque- ncy [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	4.88	Off	-50.98	<-15.1	Pass
	-	-	4.14	On	-52.16	<-15.9	Pass
High Edge	78	2480	4.80	Off	-54.86	<-15.2	Pass
	-	-	4.67	On	-54.19	<-15.3	Pass

### 6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix F.



## 6.7 Conducted RF spurious

### 6.7.1 Test Conditions

Table 42 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55%
Test Configurations:	TM1/TM2 at channel No.0, 40, 78

### 6.7.2 Test Specifications and Limits

#### 6.7.2.1 Specification

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

#### 6.7.2.2 Supporting Standards

Table 43 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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#### 6.7.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 44 Limits

Band edge spurious:	20 dBc/100kHz
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### 6.7.3 Test Method and Setup

- (a) Connect test port of mobile phone to spectrum analyzer and universal communication tester
- (b) Set the mobile phone to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the mobile phone to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

## Test setup

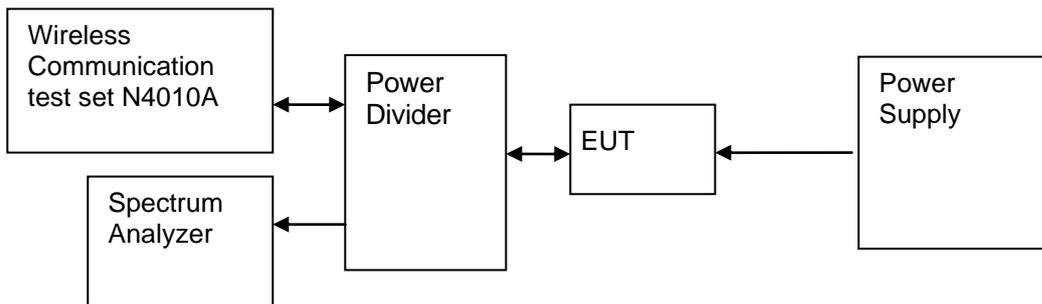


Figure 7. Test Set-up

## 6.7.4 Measurement Results

Table 45 Measurement Results (TM1)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-25GHz	0	2402	2.53	Off	-45.63	< -17.5	Pass
9kHz-25GHz	40	2442	3.17	Off	-44.77	< -16.8	Pass
9kHz-25GHz	78	2480	2.35	Off	-46.11	< -17.7	Pass

Table 46 Measurement Results (TM2)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-25GHz	0	2402	4.08	Off	-45.80	< -15.9	Pass
9kHz-25GHz	40	2442	5.38	Off	-44.88	< -14.6	Pass
9kHz-25GHz	78	2480	3.67	Off	-45.88	< -16.3	Pass

## 6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix G.



## 6.8 Radiated spurious emission & spurious in restricted band

### 6.8.1 Test Conditions

Table 47 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Enclosure
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1/TM2 at channel No.0, 40, 78

### 6.8.2 Test Specifications and Limits

#### 6.8.2.1 Specification

CFR 47 (FCC) part 15.247 (d), 15.205 & 15.209 and DA 00-705

#### 6.8.2.2 Supporting Standards

Table 48 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

#### 6.8.2.3 Limits

According to part 15.247 (d) / 15.205 & 15.209, all spurious emission in the frequency range from 30MHz to 10<sup>th</sup> harmonics of carrier frequency should be meet the requirement of following table.

Table 49 Limits

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)	Detector
30 - 88	100	40	3	QP
88 - 216	150	43.5	3	QP
216 - 960	200	46	3	QP
960 -1000	500	54	3	QP
Above 1000	500	54	3	PK

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a) (see above table).

### 6.8.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using a Quasi-Peak Detector below 1GHz, and AV detector above 1GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0°to 360°, The receive antenna has two polarizations V and H.

Huawei CDMA Mobile Phone with Bluetooth U8651T was communicated with the BTS simulator through Air interface. The Mobile Phone transmits maximum output power at 2.4GHz and switch off frequency hopping function.

Measurement bandwidth: 30 MHz - 1000 MHz: 120 kHz  
 Measurement bandwidth: 1000 MHz - 10<sup>th</sup> Carrier Frequency: 1 MHz

**Test set up**

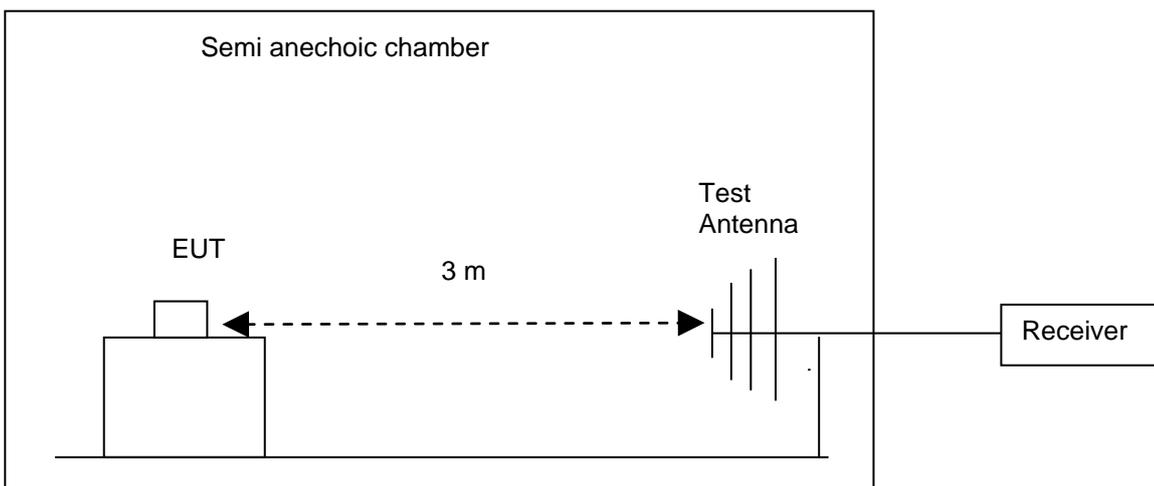


Figure 8. Test Set up

**6.8.4 Measurement Results**

Note: The following measurement results exceed the limit line is the carrier frequency.

Table 50 Measurement Results

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Measured	Result
30MHz-26.5GHz	0	2402	Refer to Appendix H	Pass
30MHz-26.5GHz	40	2442	Refer to Appendix H	Pass
30MHz-26.5GHz	78	2480	Refer to Appendix H	Pass

**6.8.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix H.



## 6.9 Conducted Emission at Power Port

### 6.9.1 Test Conditions

Table 51 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	23.5°C
Relative humidity:	55 %
Test Configurations:	TM1/TM2 at channel No. 40

### 6.9.2 Test Specifications and Limits

#### 6.9.2.1 Specification

CFR 47 (FCC) part 15.207 and DA 00-705

#### 6.9.2.2 Supporting Standards

Table 52 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
------------------	--

#### 6.9.2.3 Limits

Compliance with part15.207, conducted emission must meet the requirement of following table.

Table 53 Limits

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: \* Decreases with the logarithm of the frequency.

### 6.9.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

Huawei CDMA Mobile Phone with Bluetooth U8651T was communicated with the BTS simulator through Air interface, the BTS simulator controls the Mobile Phone to transmitter the maximum power which defined in specification of product. The Mobile Phone operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

### Test Set-up

The Mobile Phone was setup in the screened chamber and operated under nominal conditions.

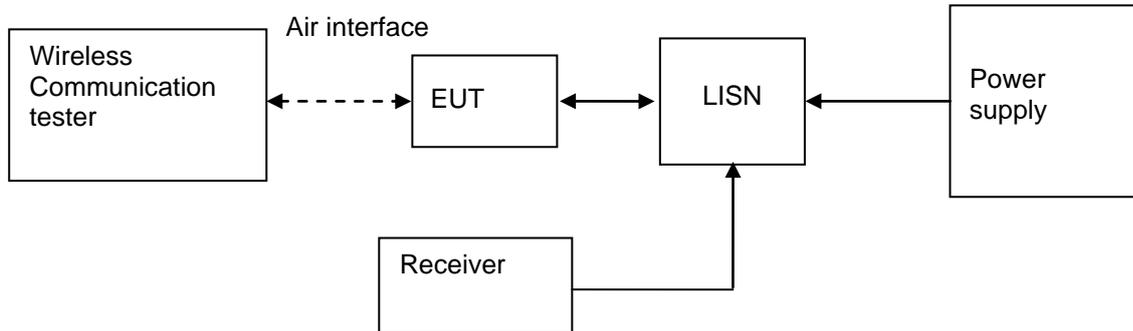


Figure 9. Test Set-up

### 6.9.4 Measurement Result

Table 54 MEASUREMENT RESULT:QP DECTER

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.500000	28.50	10.1	56	27.5	N	FLO
0.716000	28.50	10.1	56	27.5	L1	FLO
1.280000	35.00	10.1	56	21.0	N	FLO
1.836000	32.90	10.1	56	23.1	L1	FLO
3.836000	32.50	10.2	56	23.5	N	FLO
5.426000	35.00	10.2	60	25.0	N	FLO

Table 55 MEASUREMENT RESULT:AV DECTER

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.474000	21.80	10.1	46	24.6	L1	FLO
0.696000	31.90	10.1	46	14.1	L1	FLO
1.286000	20.70	10.1	46	25.3	L1	FLO
1.816000	22.70	10.1	46	23.3	L1	FLO
3.852000	20.00	10.2	46	26.0	L1	FLO
5.498000	19.10	10.2	50	30.9	L1	FLO

### 6.9.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix I.



## 7 System Measurement Uncertainty

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

Table 56 System Measurement Uncertainty

Items		Extended Uncertainty
20dB bandwidth measurement	Magnitude (%)	U=0.2%; k=2
Carrier frequency separation measurement	Magnitude (%)	U=0.2%; k=2
Time of occupancy	Magnitude (%)	U=0.2%; k=2
Peak output power	Power(dBm)	U=0.39dB; k=2
Band edge compliance measurement	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted RF spurious	Disturbance Power(dBm)	U=2.0dB; k=2
Radiated spurious emission & Radiated restricted band measurement	Field strength (dB $\mu$ V/m)	U=2.2dB; k=2 U=5dB; k=2
Conducted emission test for power port	Disturbance Voltage(dB $\mu$ V)	U=4dB; k=2



## 8 Appendices List

Appendix A	Measurement Results 20dB bandwidth measurement
Appendix B	Measurement Results Carrier frequency separation measurement
Appendix C	Measurement Results Number of hopping channel
Appendix D	Measurement Results Time of occupancy
Appendix E	Measurement Results Peak output power
Appendix F	Measurement Results Band edge compliance measurement
Appendix G	Measurement Results Conducted RF spurious
Appendix H	Measurement Results Radiated spurious emission
Appendix I	Measurement Results Conducted emission test for power port
Appendix J	Photos of Test Setup

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



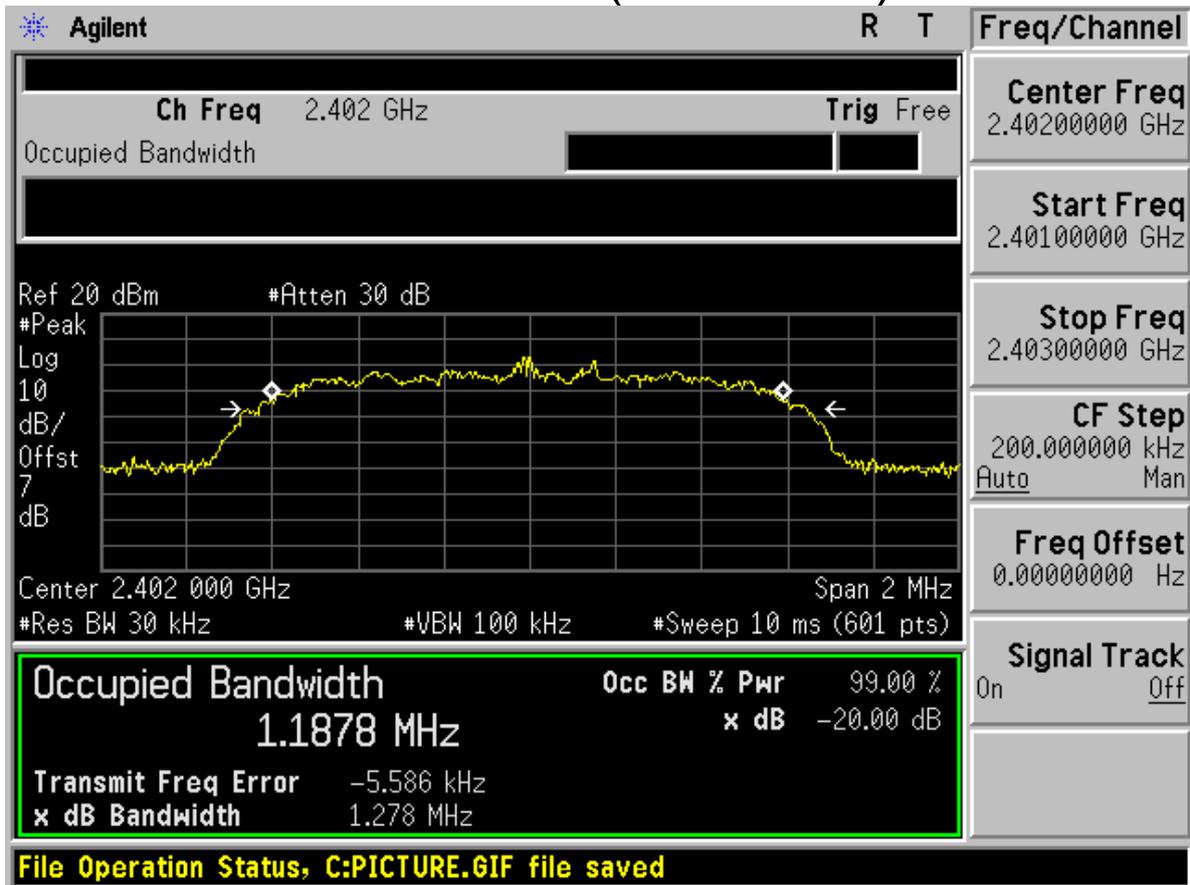
# Appendix A

## Bandwidth measurement

According to FCC Part 15.247 (a) (1)

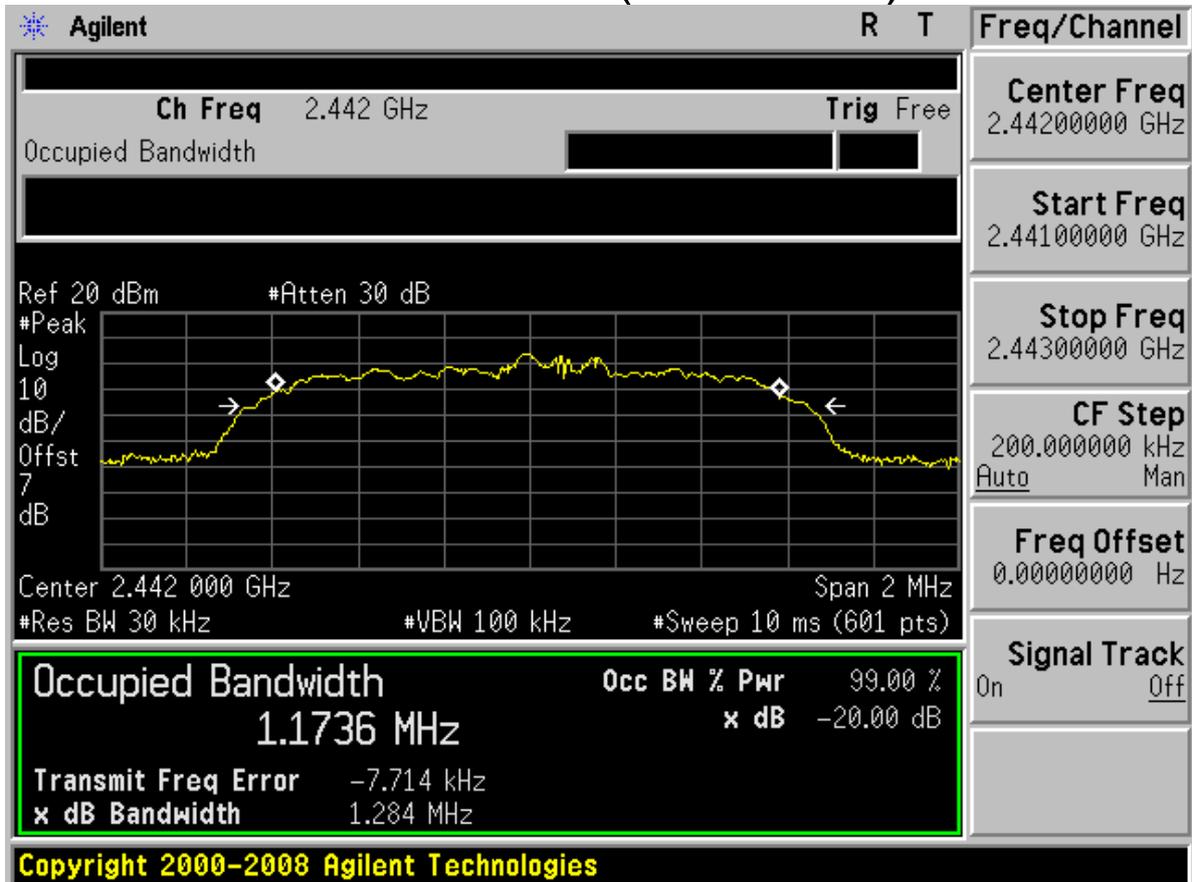


## Modulation: $\pi/4$ -DQPSK Channel 0 (2402MHz)



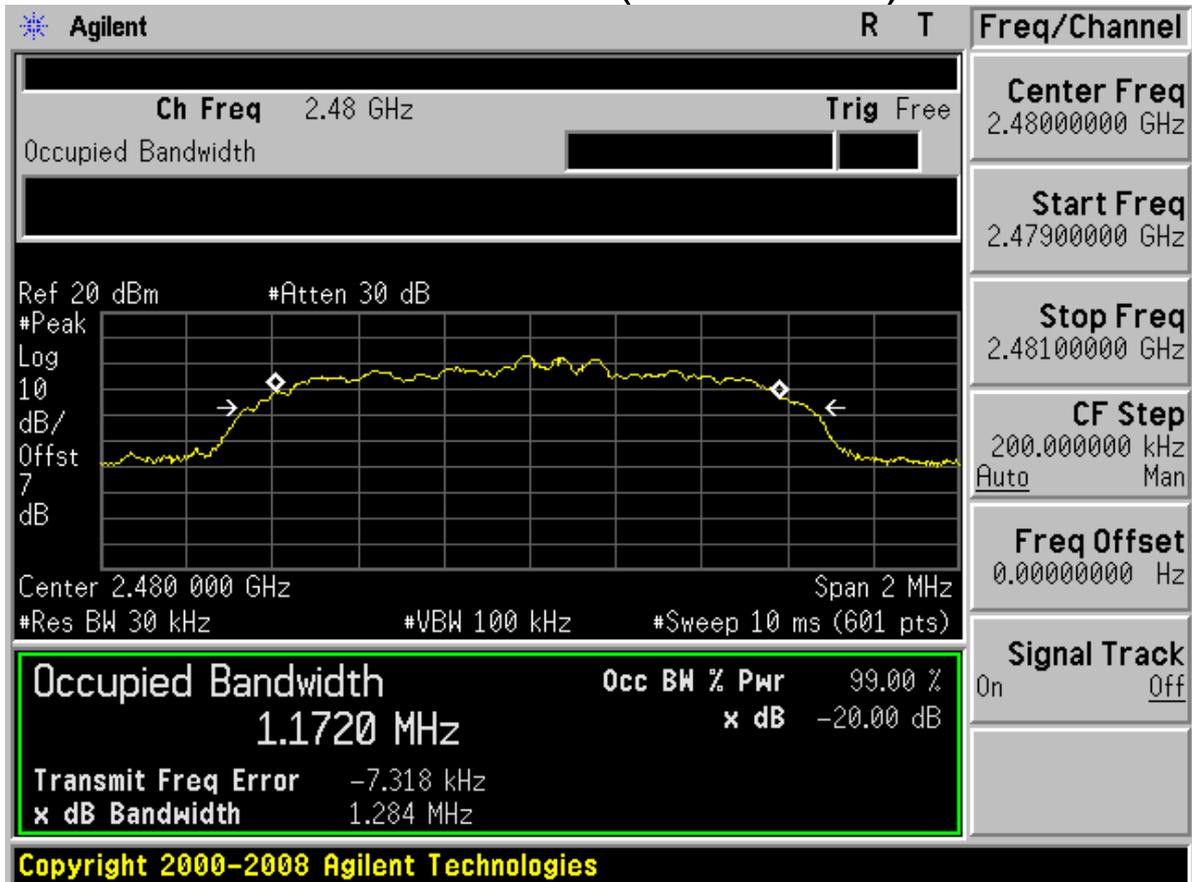


## Channel 40 (2442MHz)



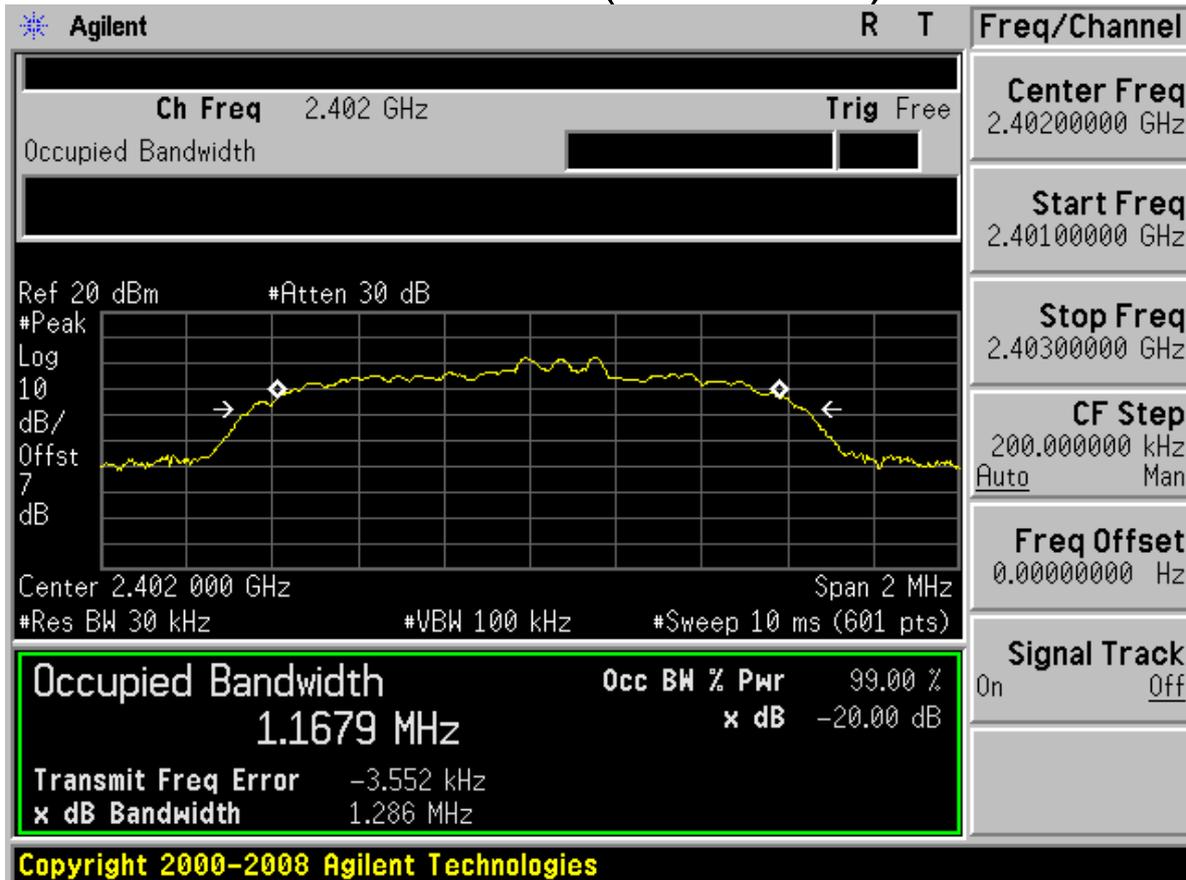


## Channel 78 (2480MHz)



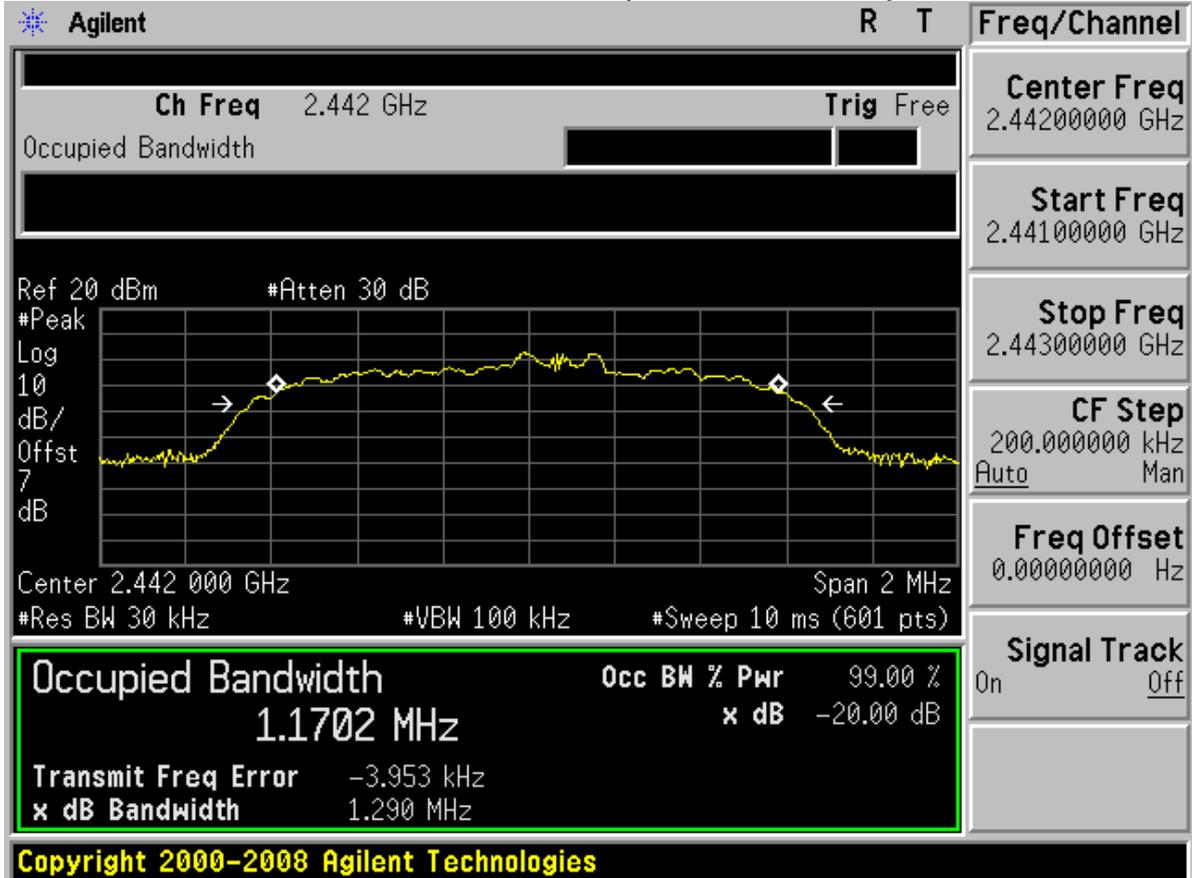


## Modulation:8DPSK Channel 0 (2402MHz)



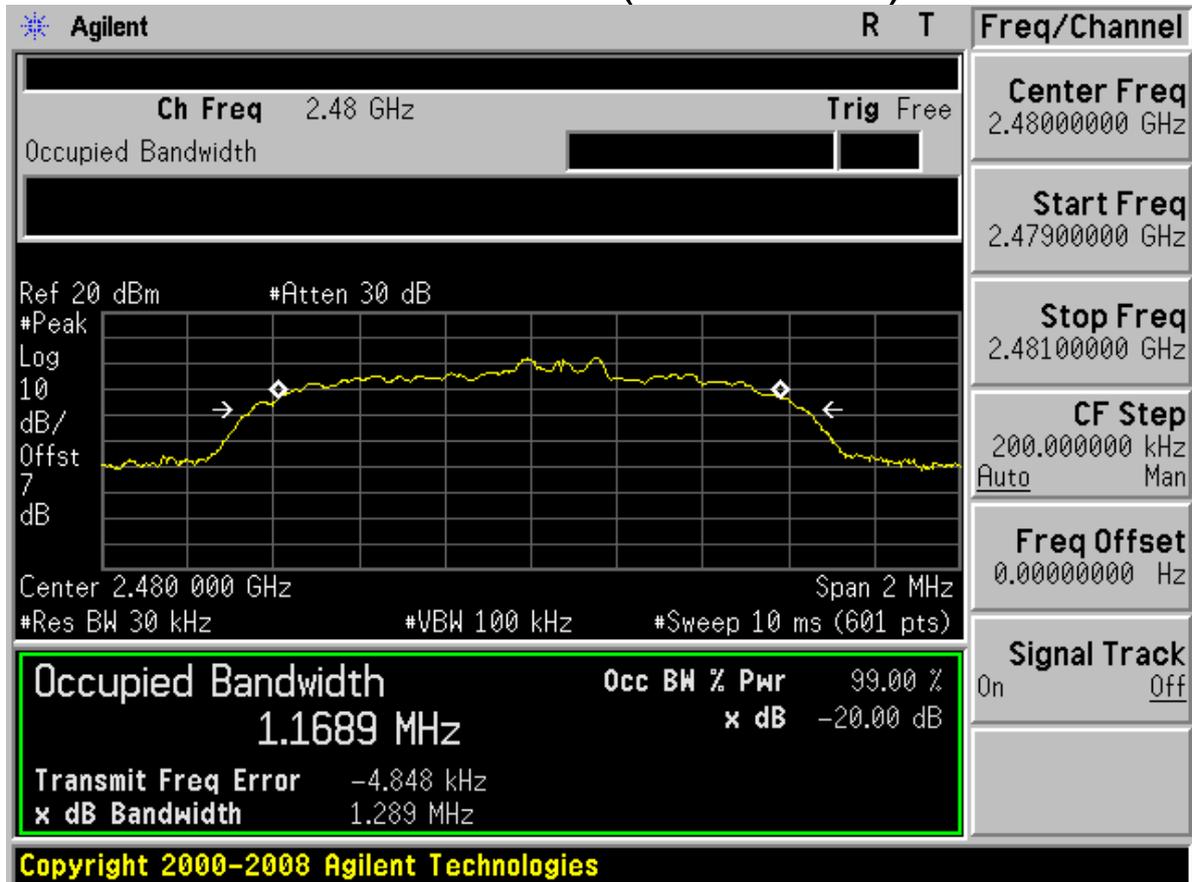


# Channel 40 (2442MHz)





## Channel 78 (2480MHz)



The END



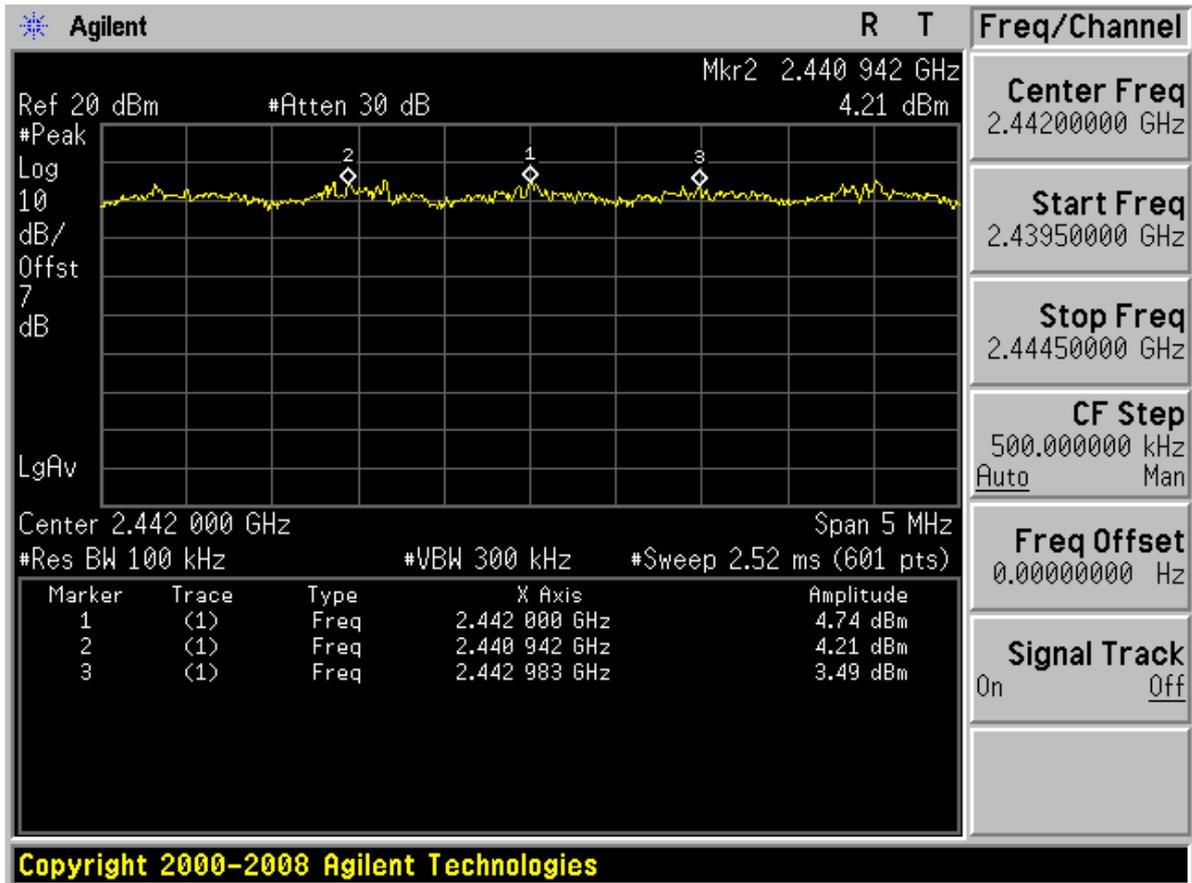
## **Appendix B**

# Carrier frequency separation measurement

According to FCC Part 15.247 (a) (1)

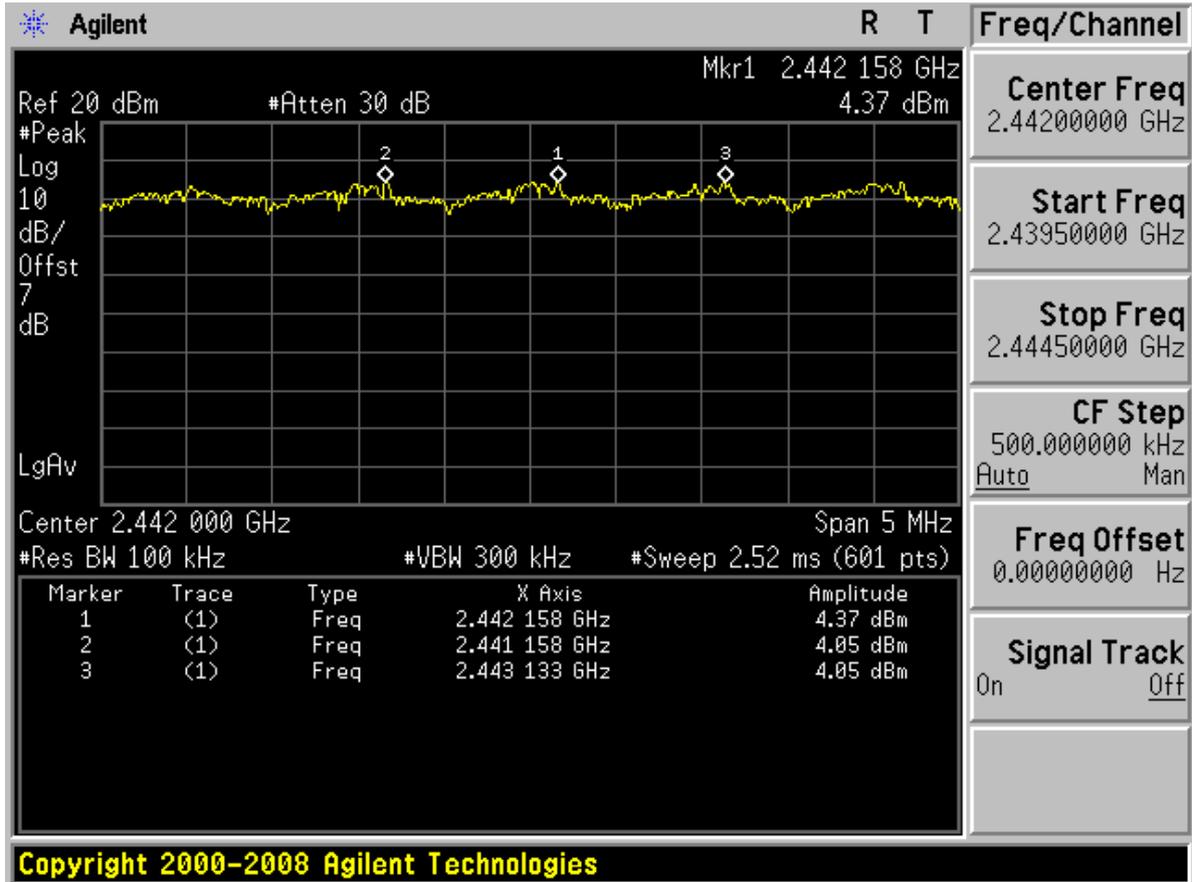


## Modulation: $\pi/4$ -DQPSK Centred at Channel 40





## Modulation:8DPSK Centred at Channel 40



The END



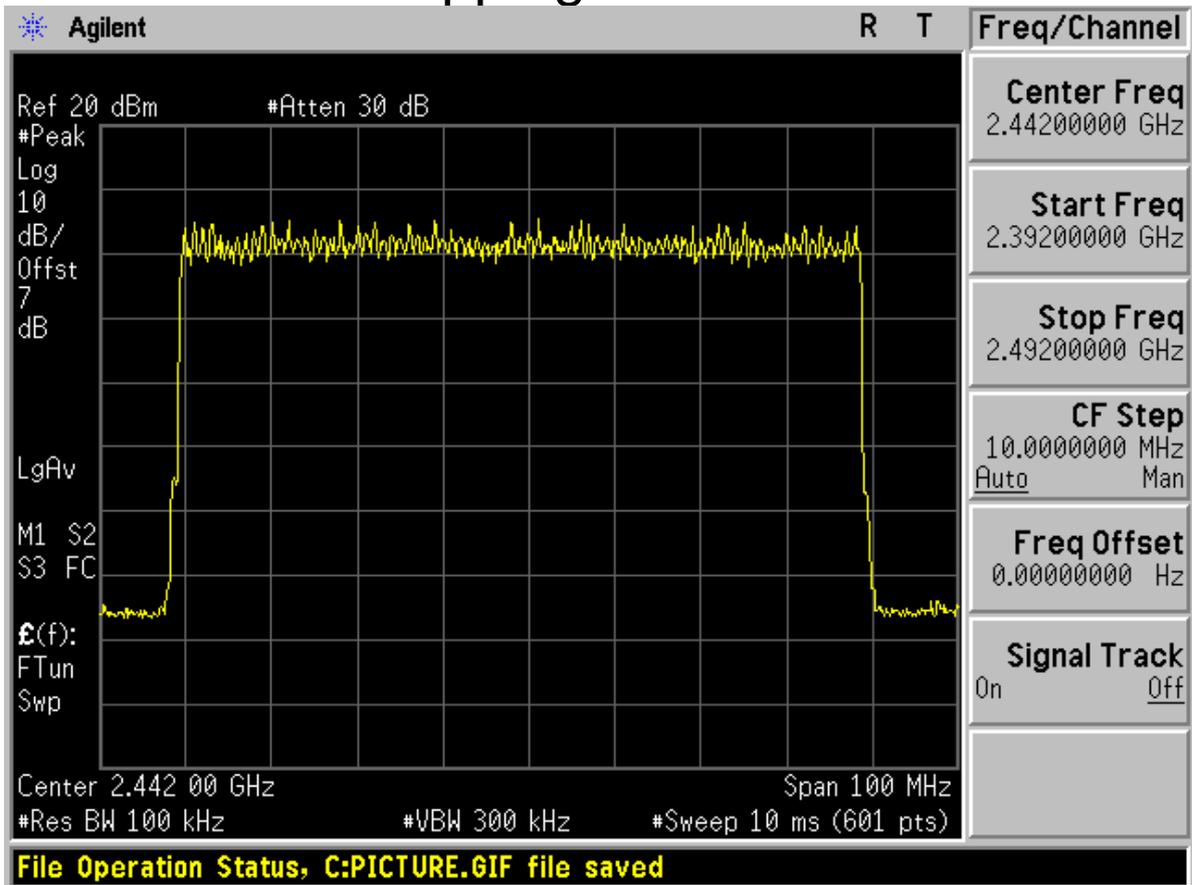
## **Appendix C**

# Number of hopping channel

According to FCC Part 15.247 (a) (1) iii

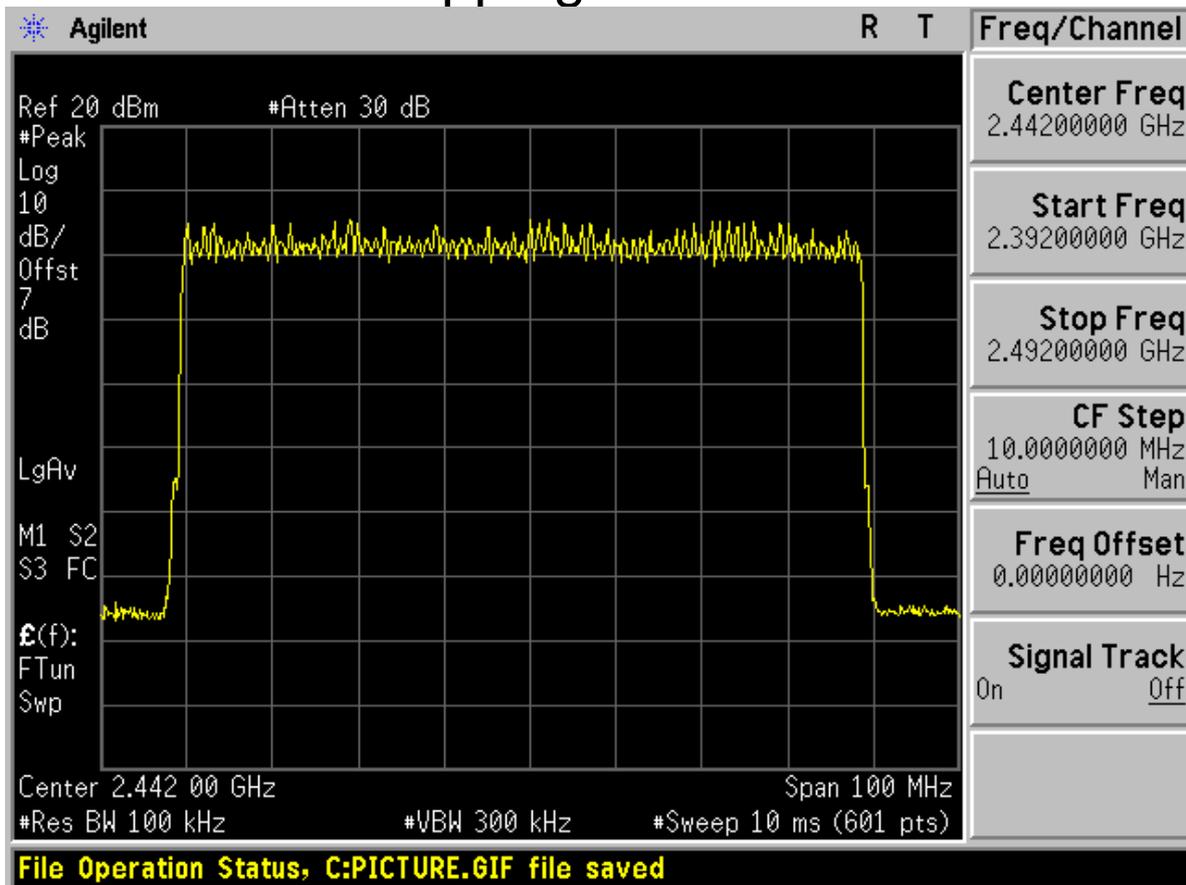


# Modulation: $\pi/4$ -DQPSK Total hopping channels = 79





# Modulation:8DPSK Total hopping channels = 79



The END



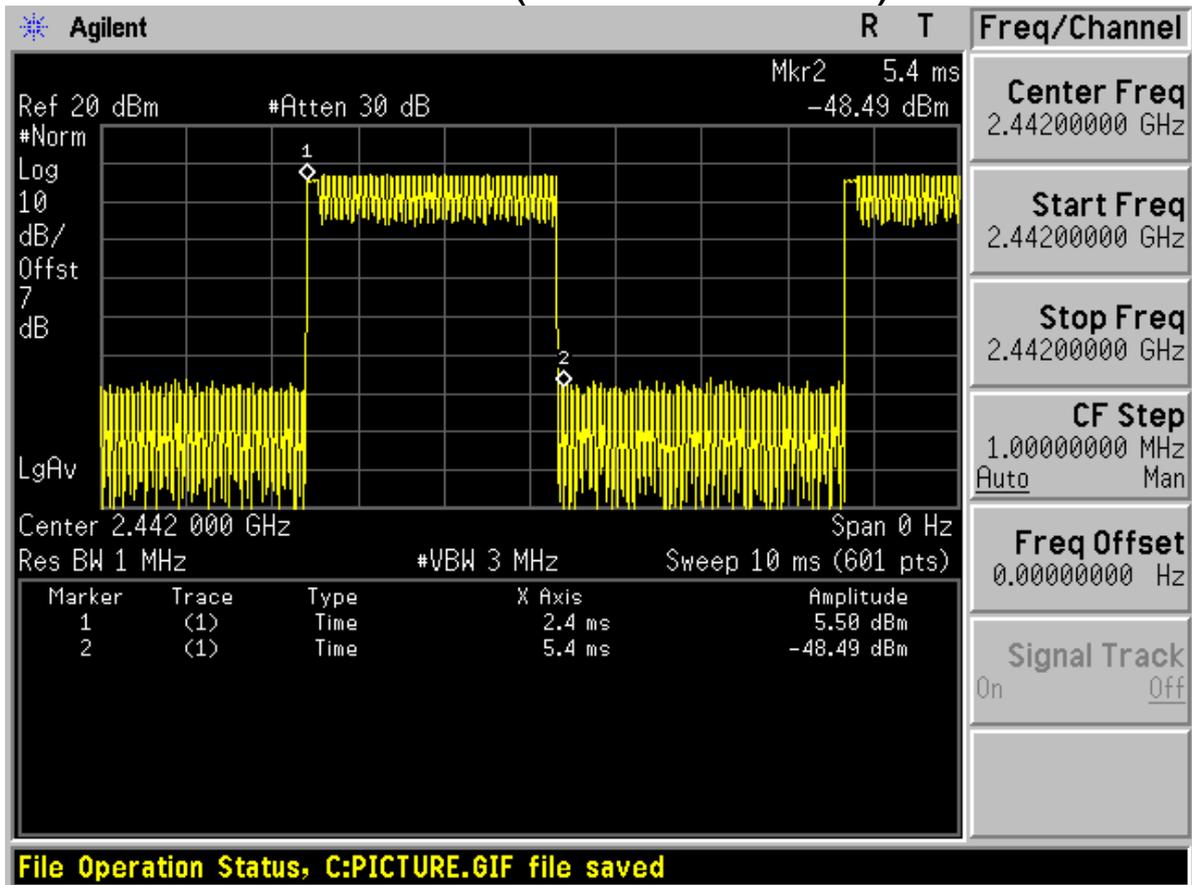
## **Appendix D**

### Time of occupancy

According to FCC Part 15.247 (a) (1) iii



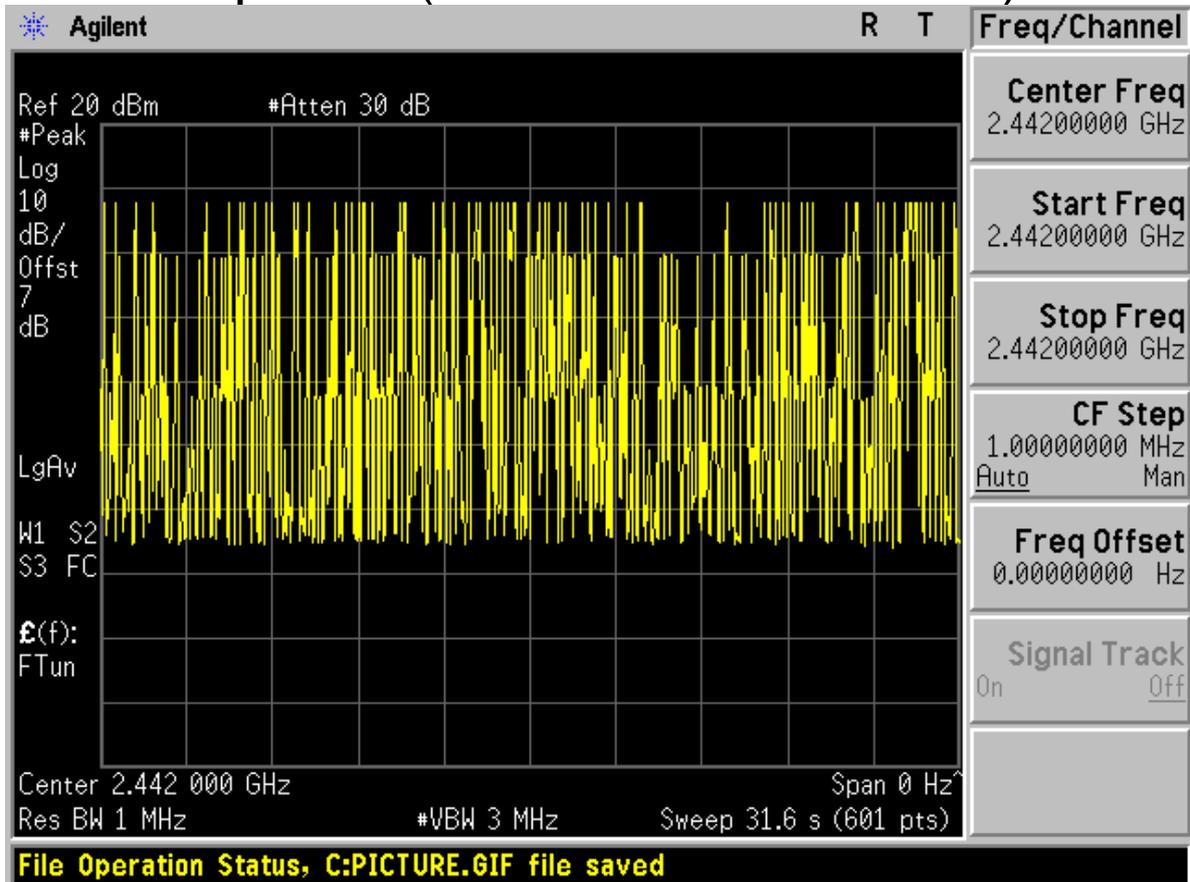
## Modulation: $\pi/4$ -DQPSK A burst (One time slot)



**File Operation Status, C:PICTURE.GIF file saved**

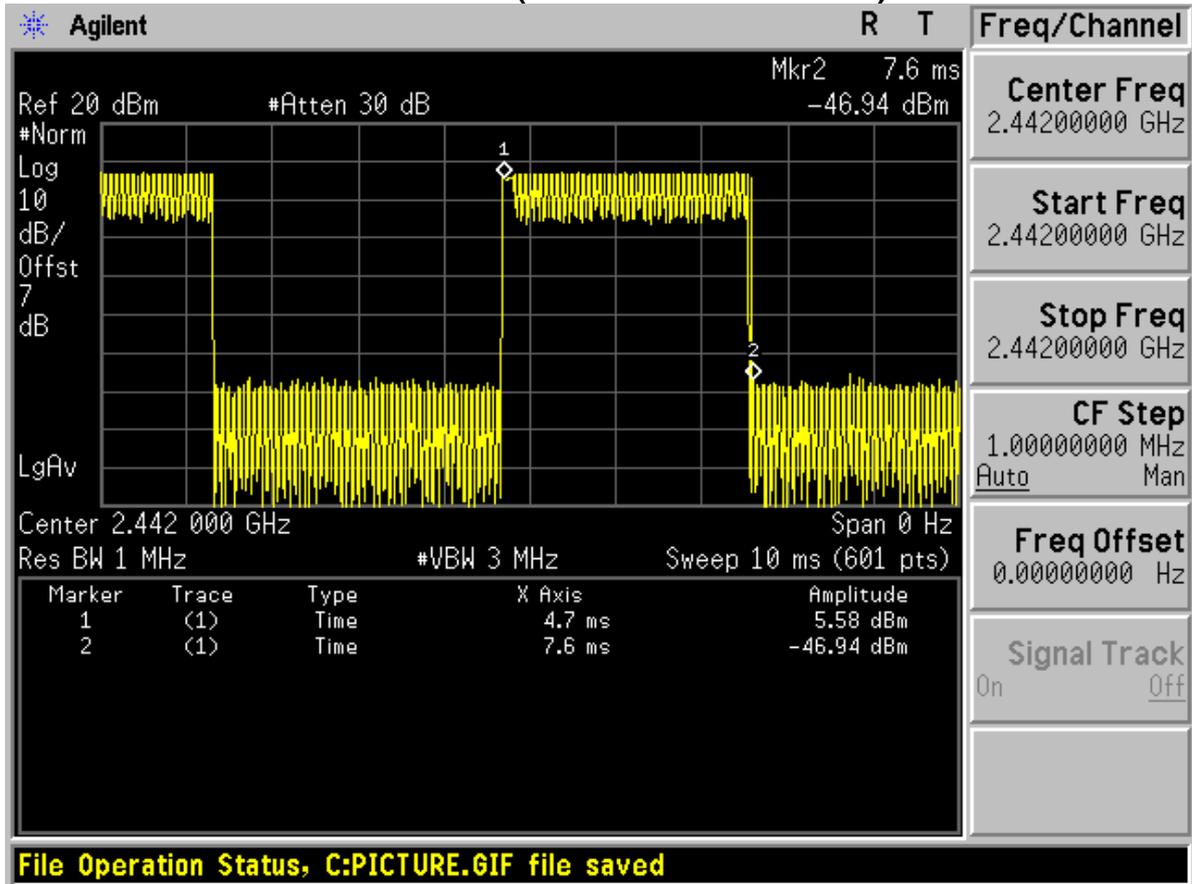


## A period (Less than 106.7 burst)



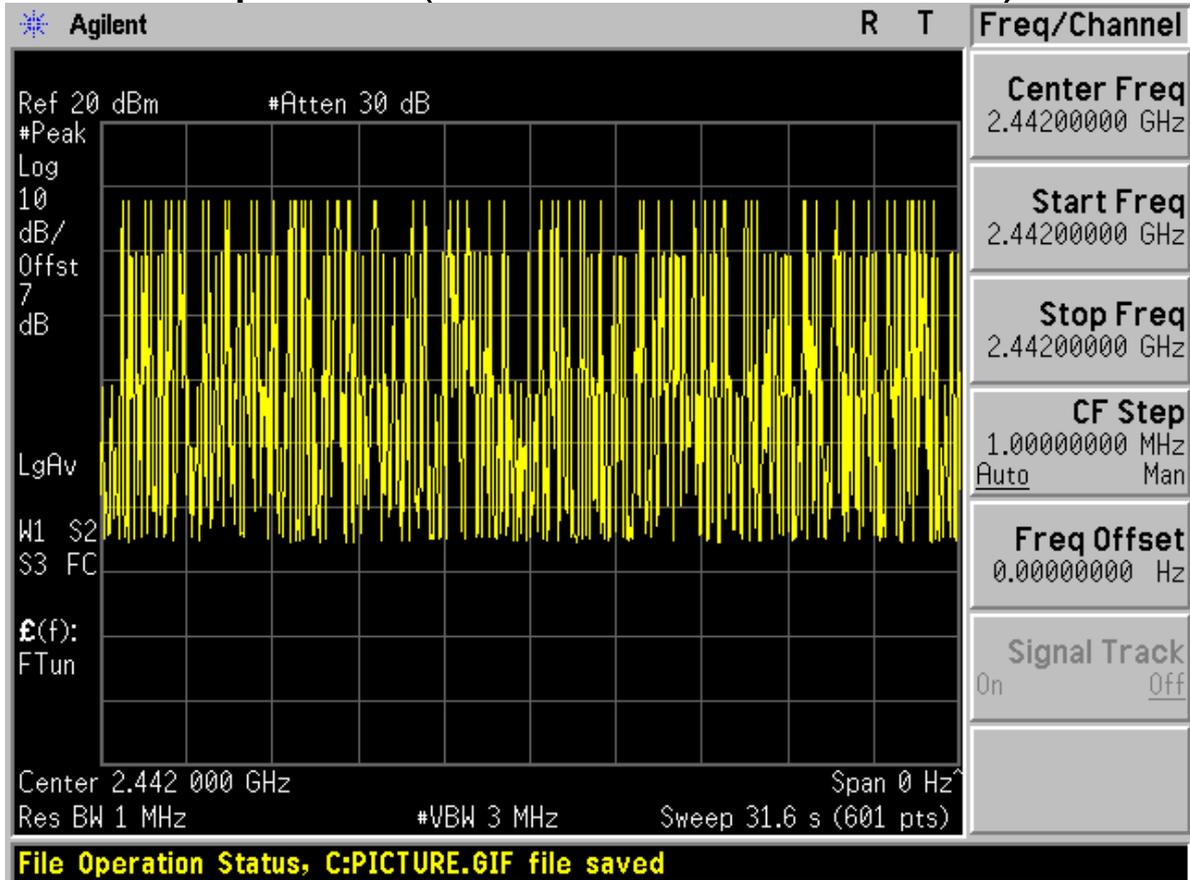


## Modulation:8DPSK A burst (One time slot)





## A period (Less than 106.7 burst)



The END



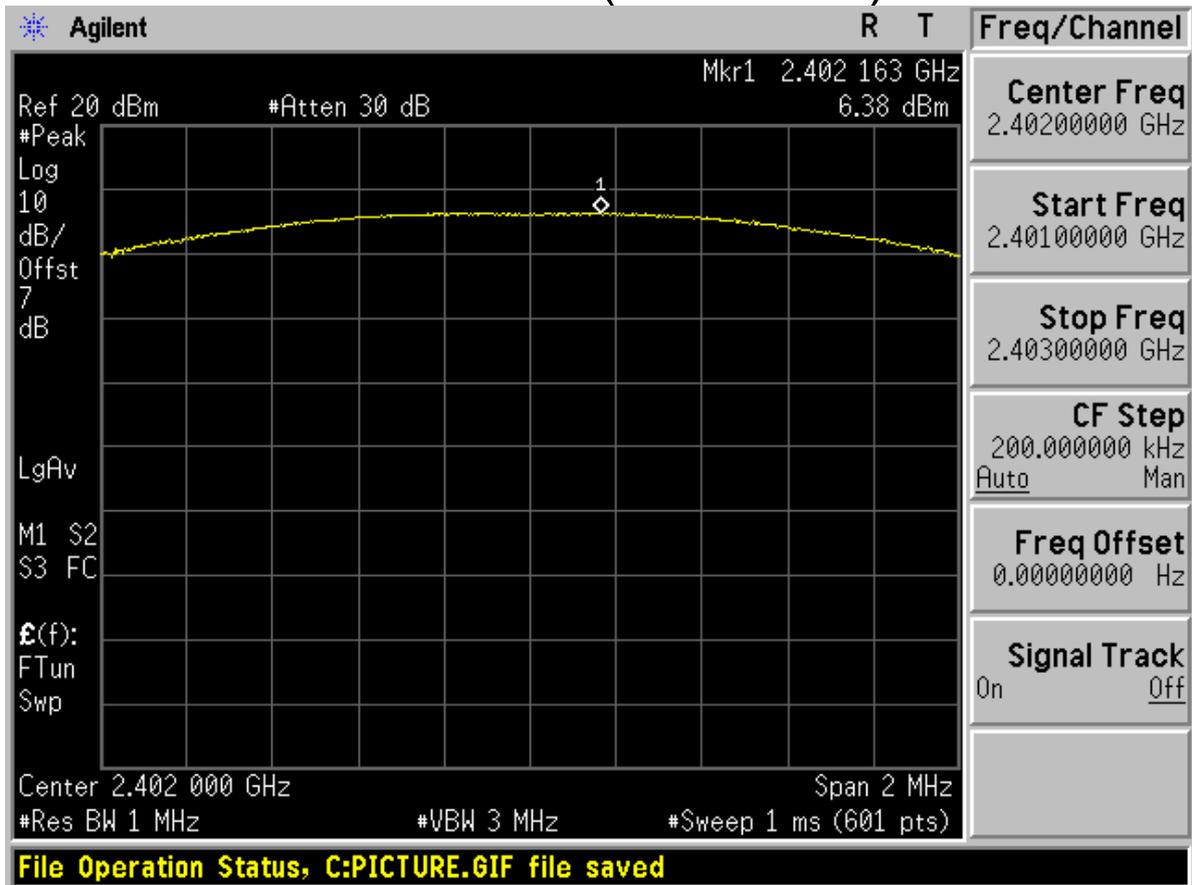
# **Appendix E**

## Peak output power

According to FCC Part 15.247 (b) (1)

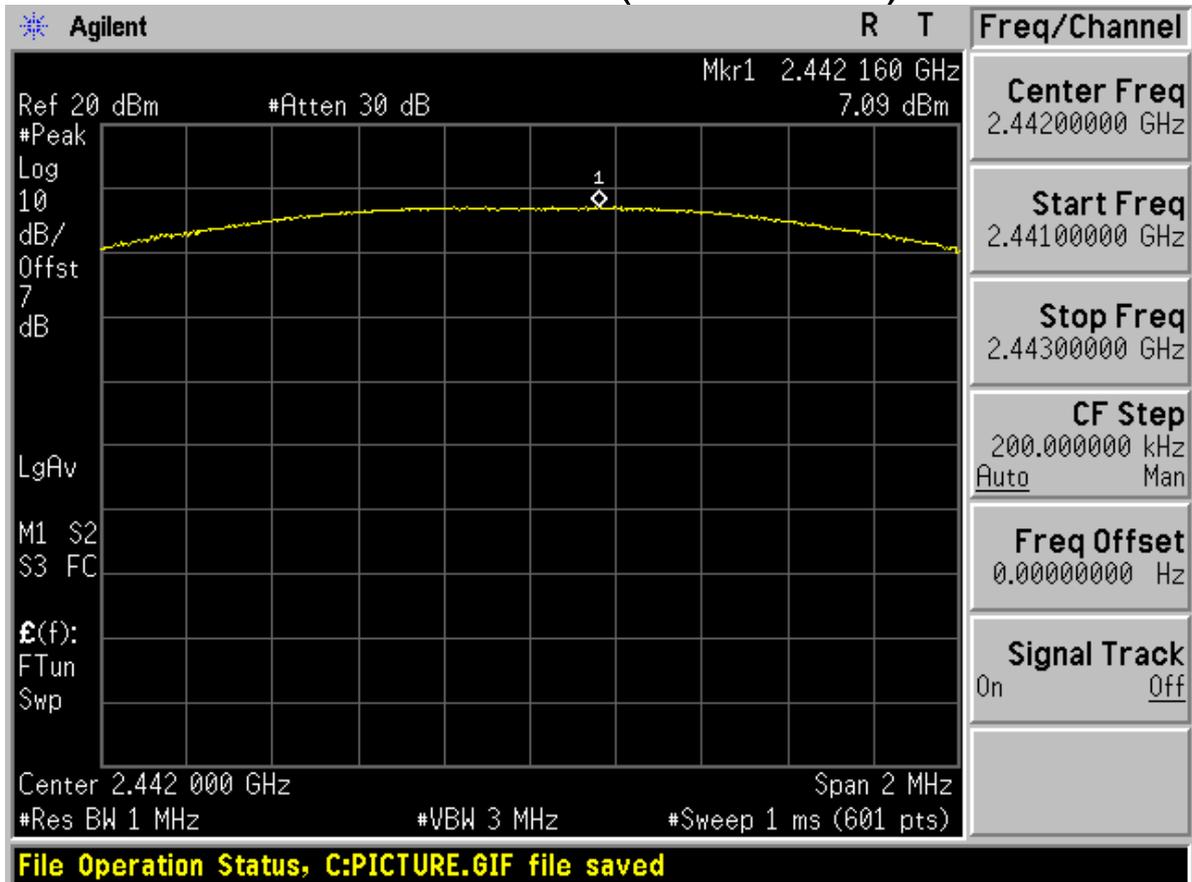


# Modulation: $\pi/4$ -DQPSK Channel 0 (2402MHz)



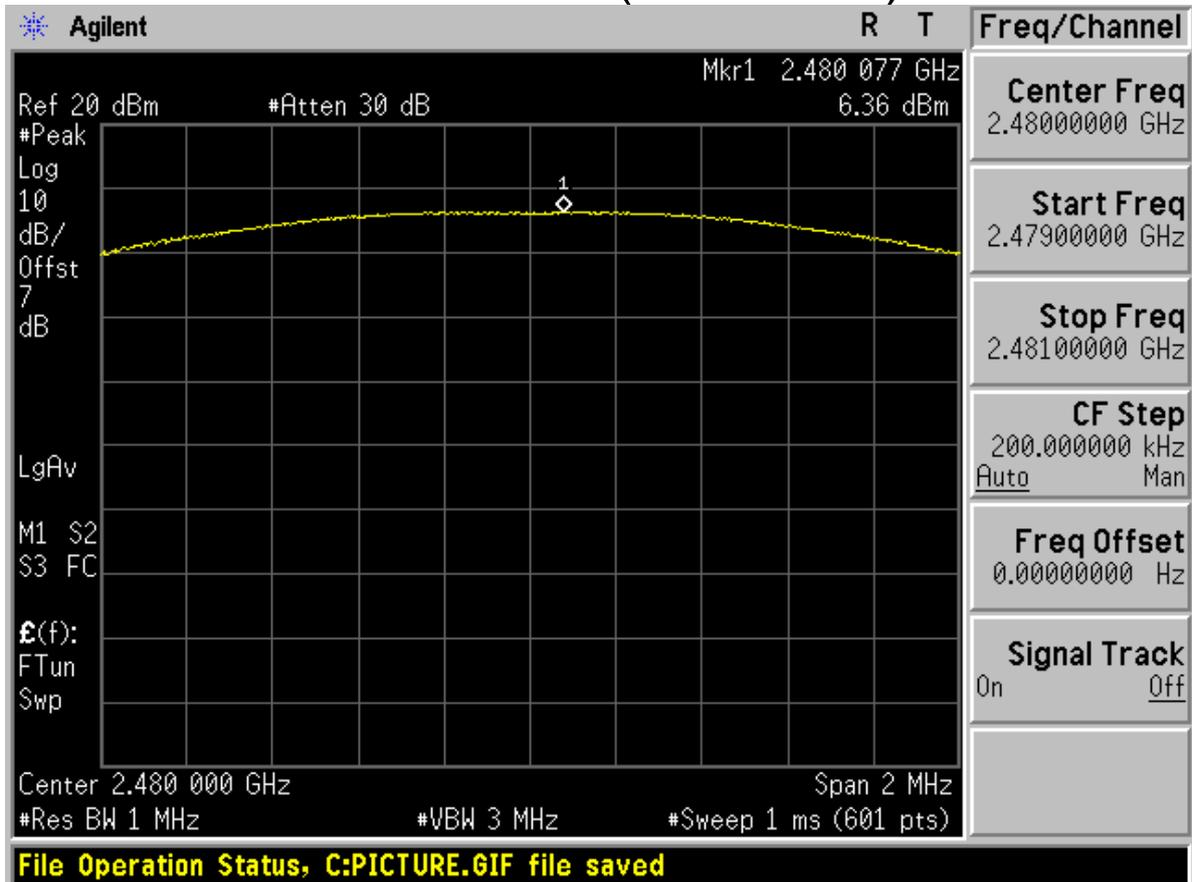


# Channel 40 (2442MHz)



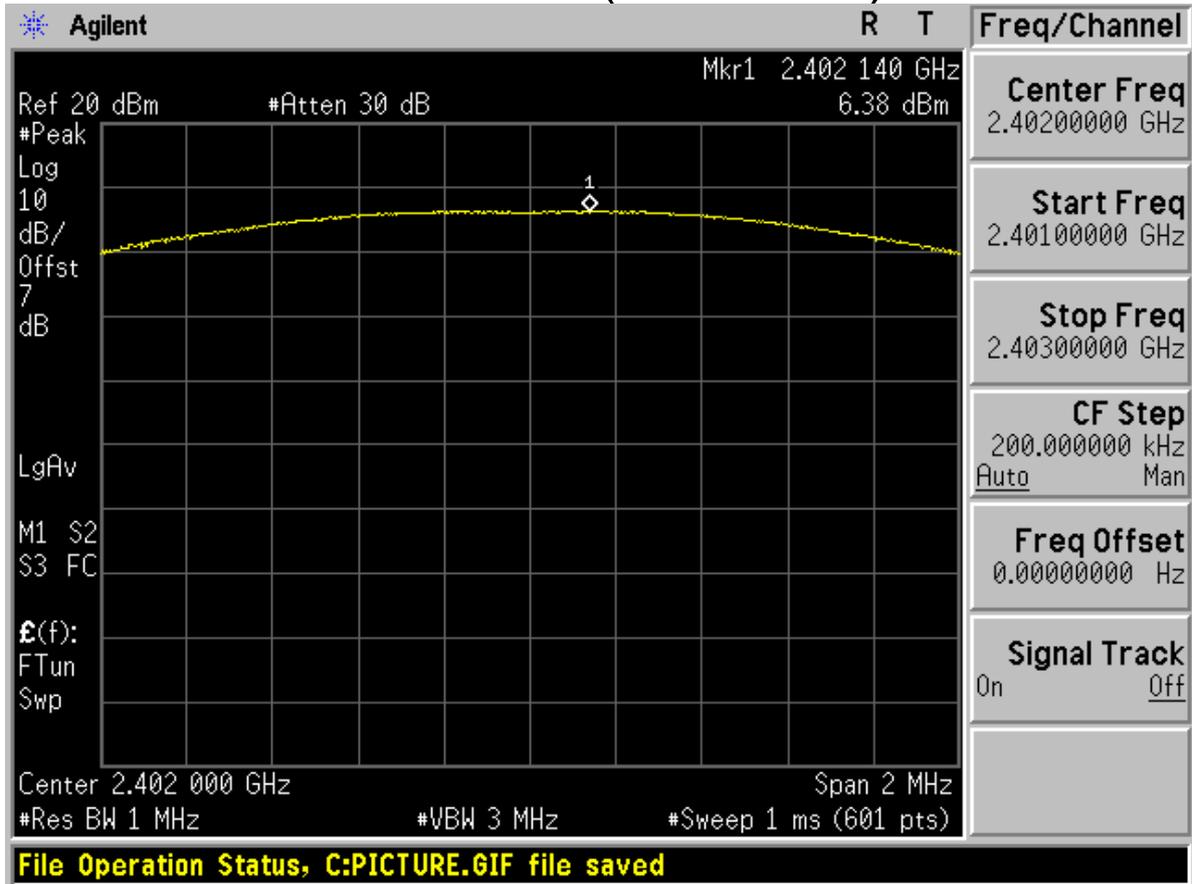


# Channel 78 (2480MHz)



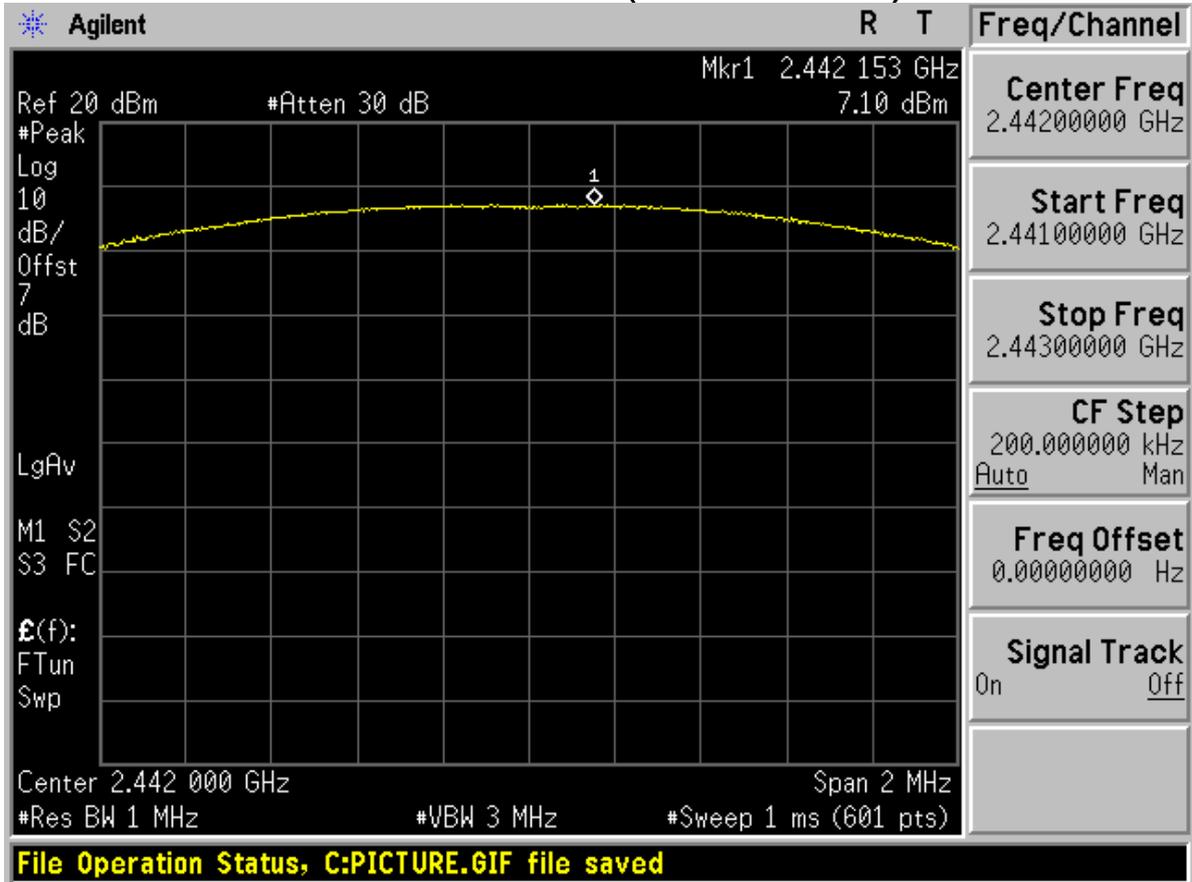


# Modulation:8DPSK Channel 0 (2402MHz)



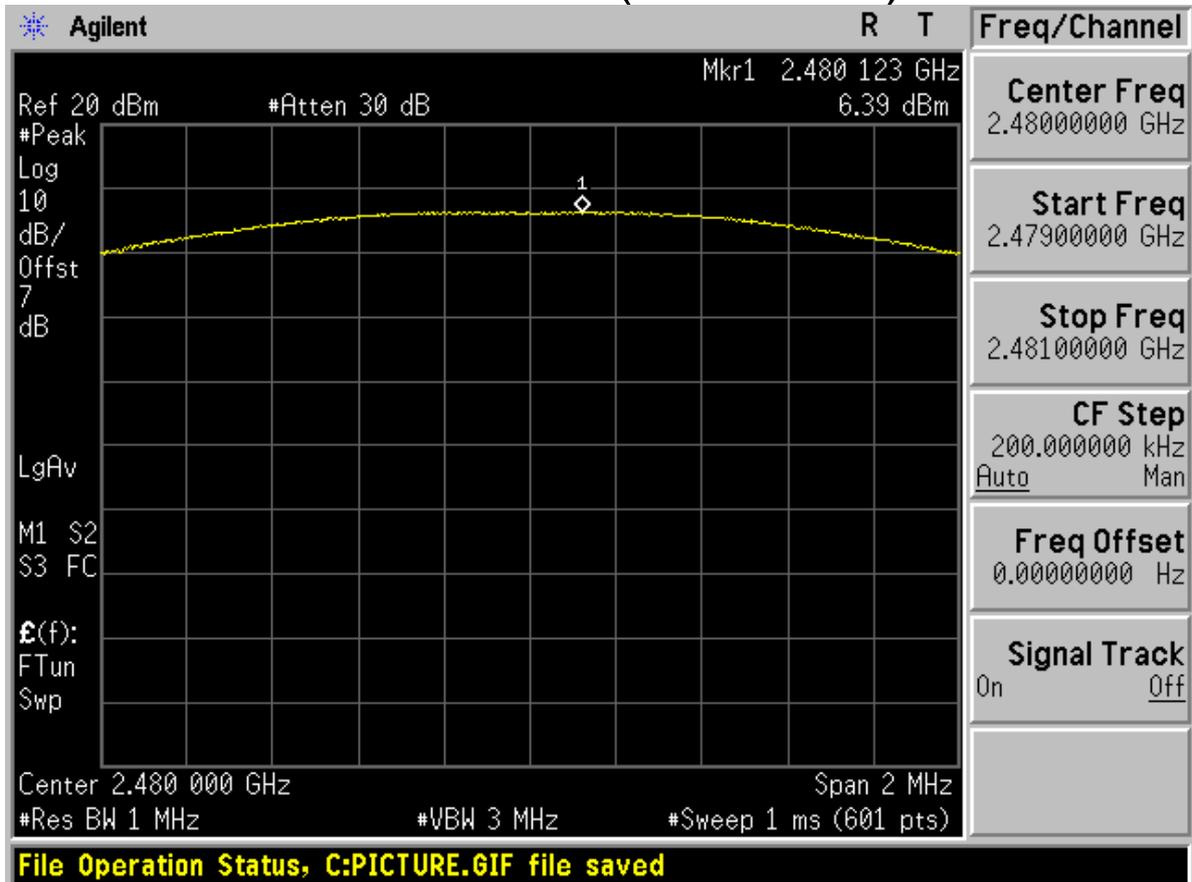


# Channel 40 (2442MHz)





# Channel 78 (2480MHz)



The END



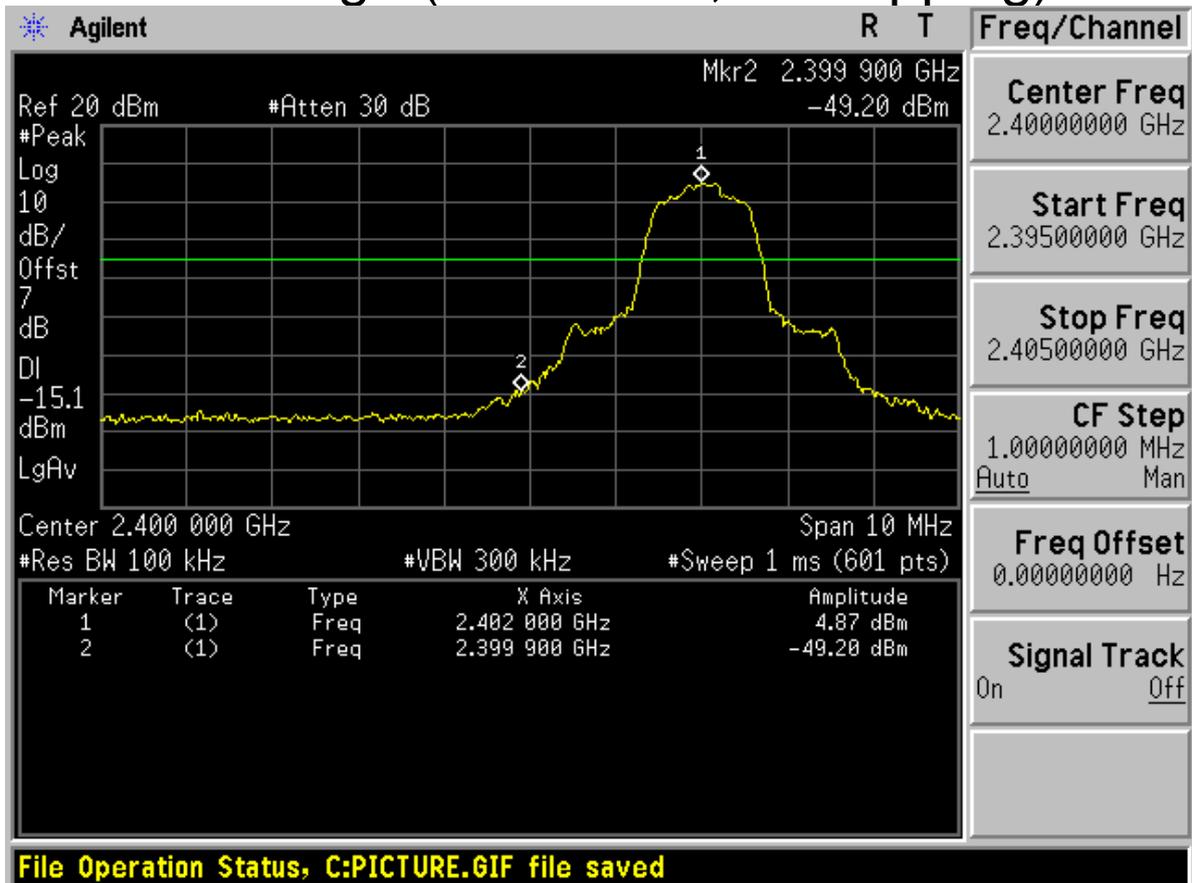
# Appendix F

## Band edge spurious emission

According to FCC Part 15.247 (d)

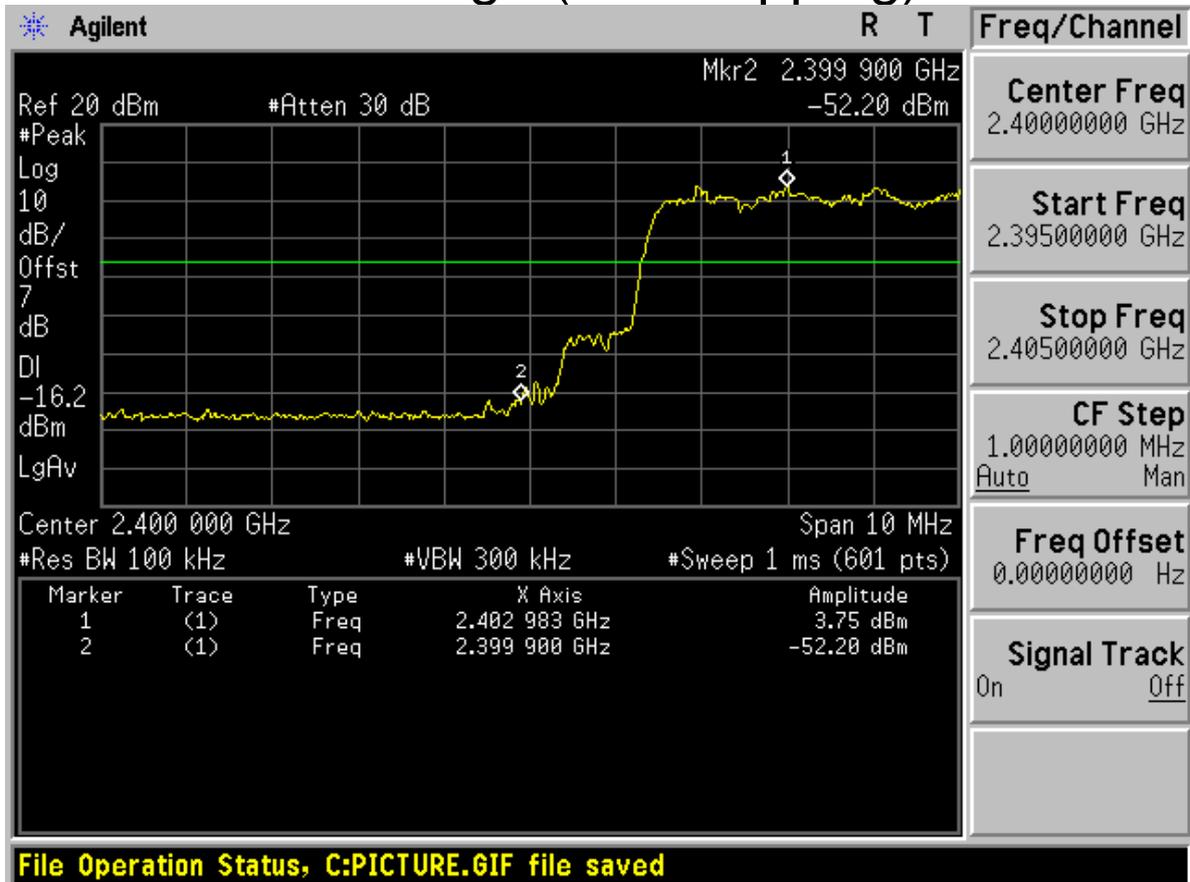


## Modulation: $\pi/4$ -DQPSK Low edge (Channel 0, no hopping)



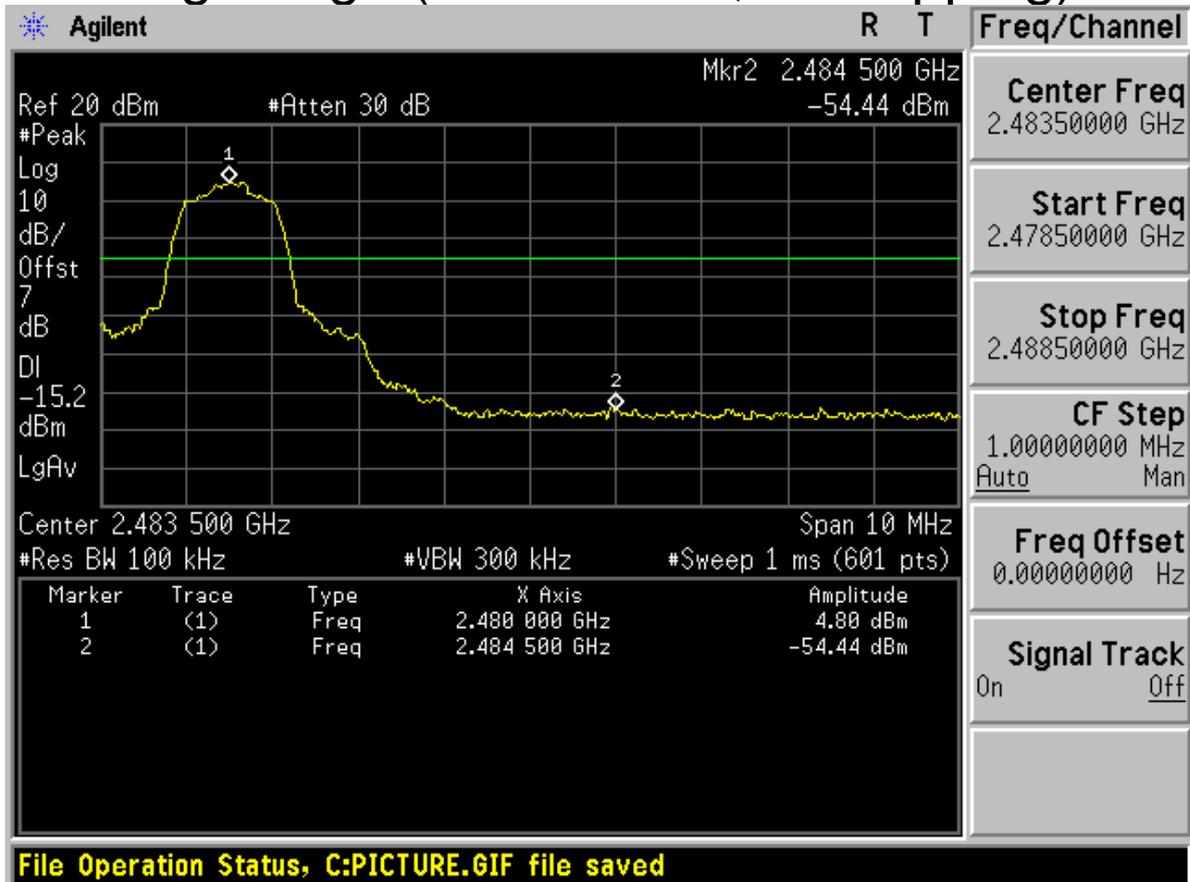


## Low edge (with hopping)



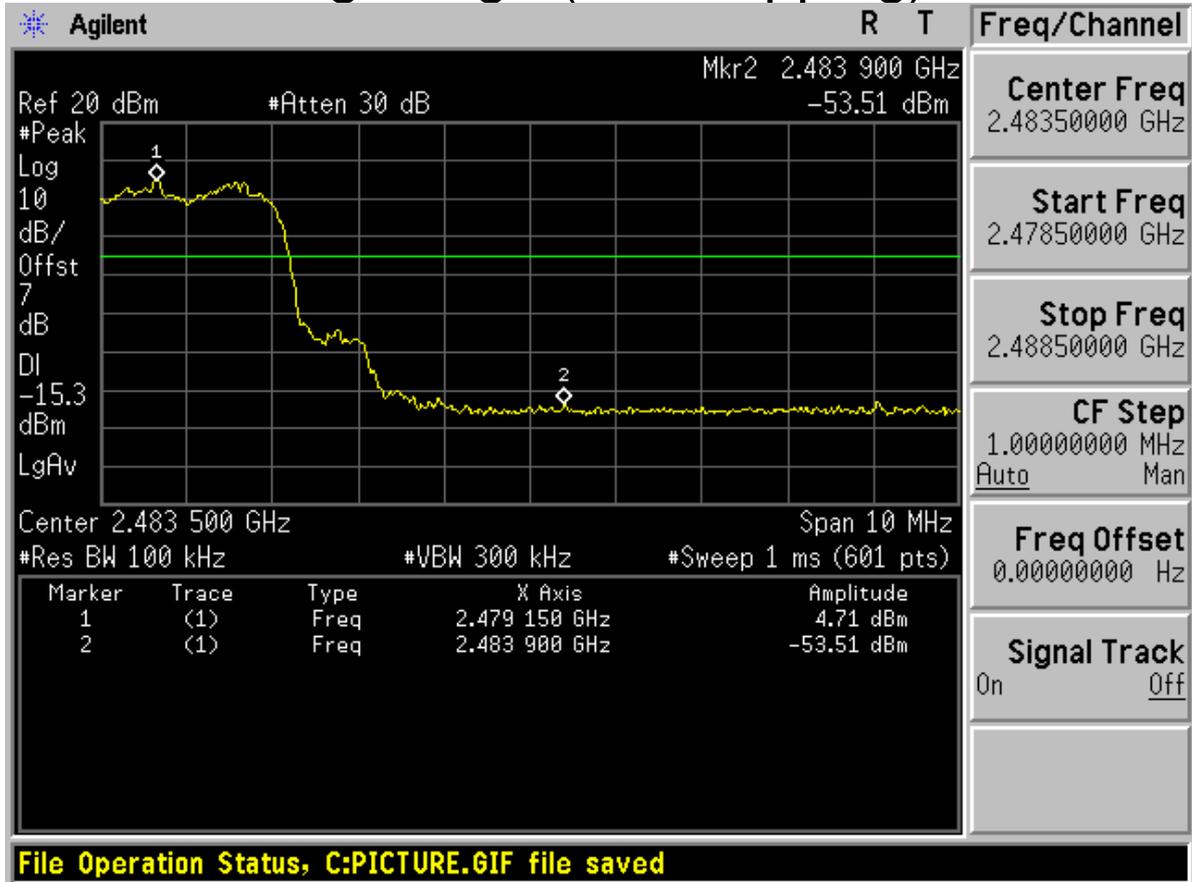


## High edge (Channel 78, no hopping)



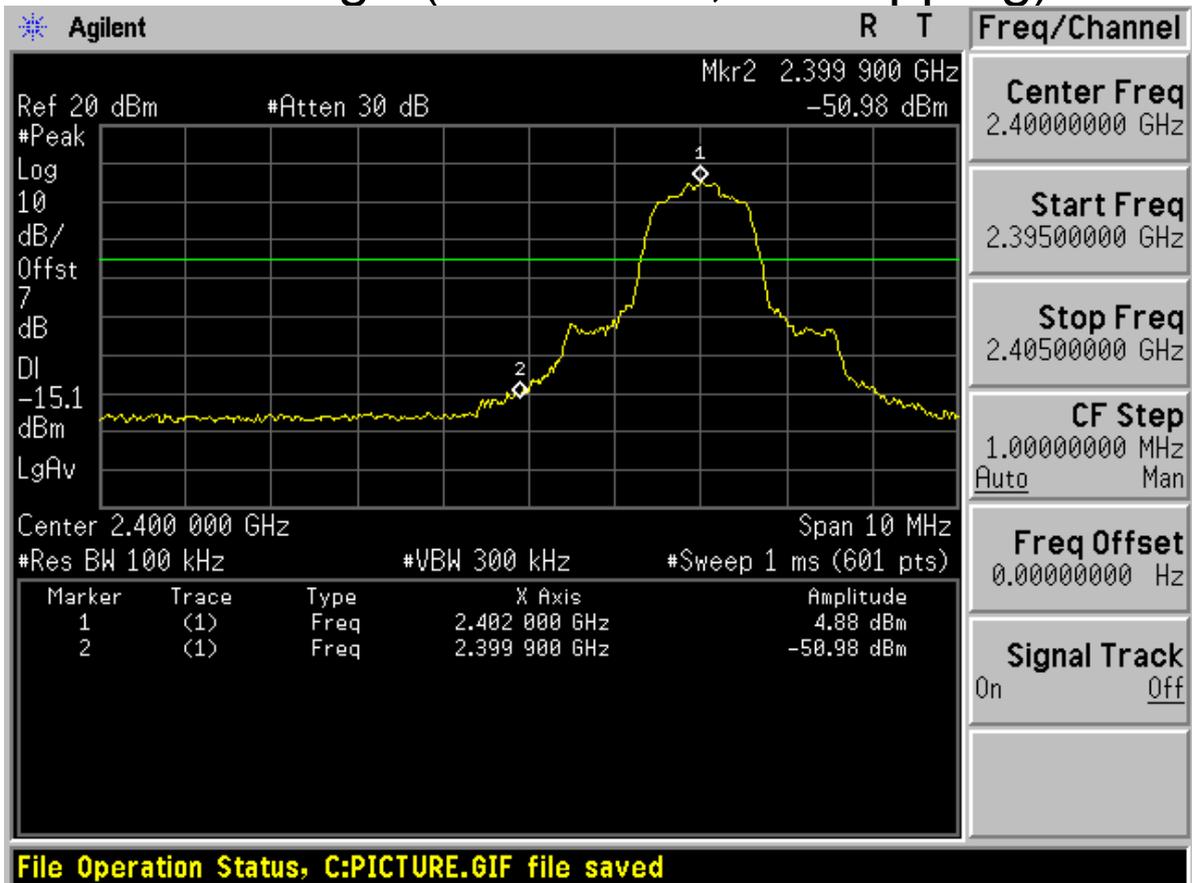


# High edge (with hopping)



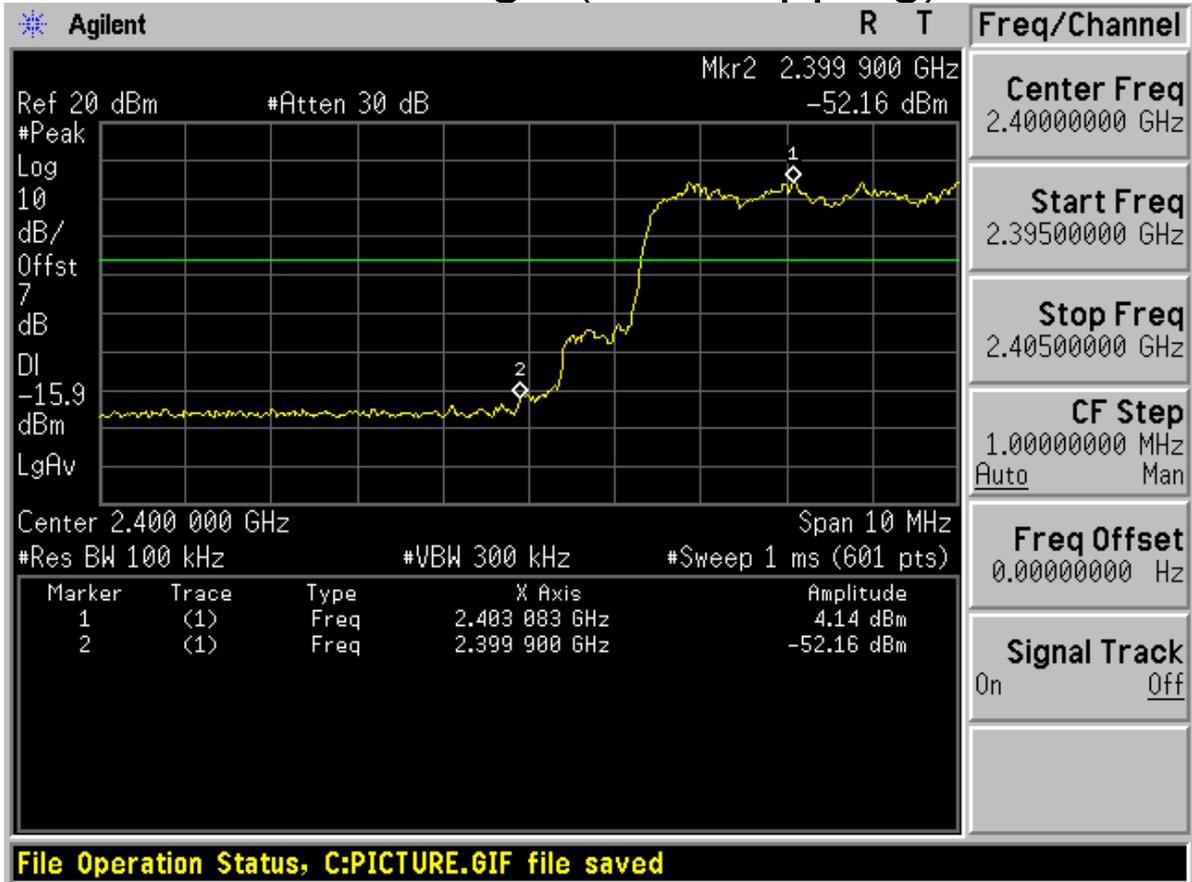


## Modulation:8DPSK Low edge (Channel 0, no hopping)



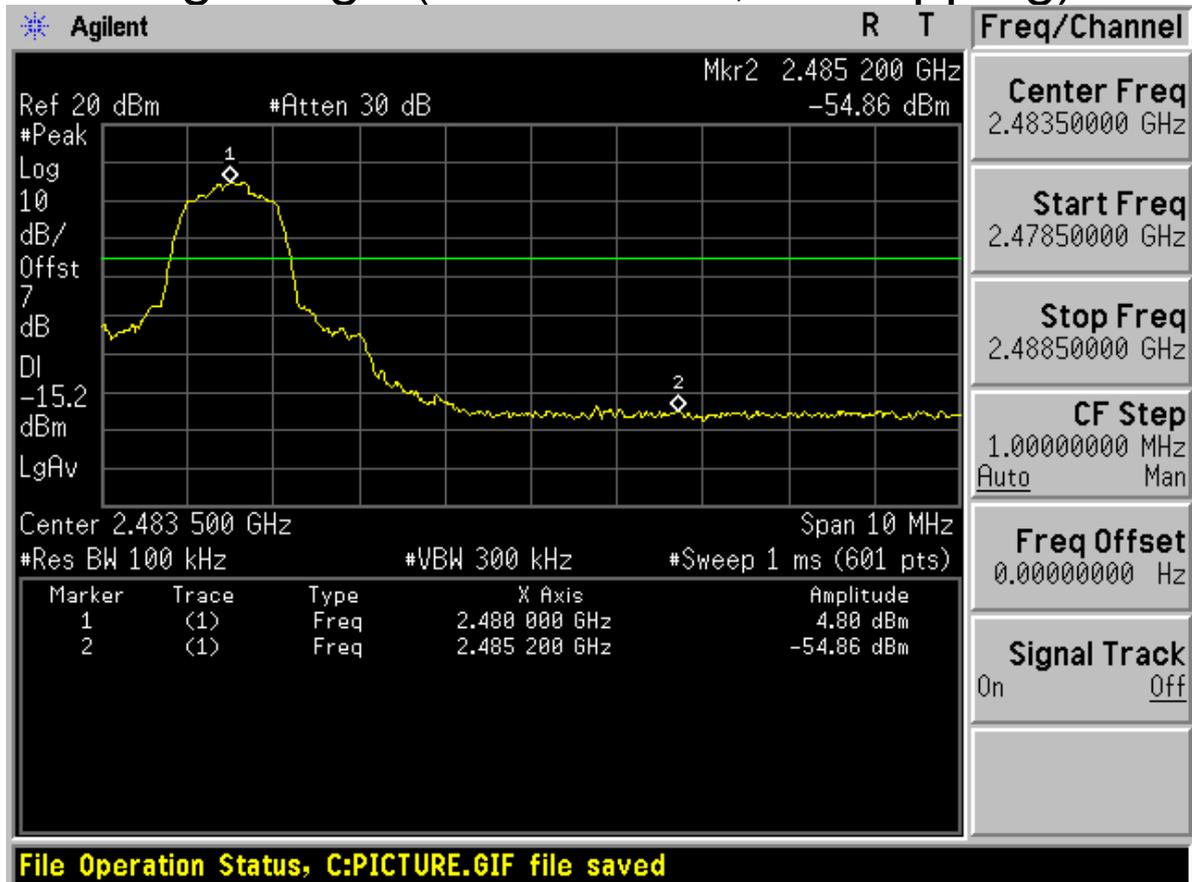


# Low edge (with hopping)



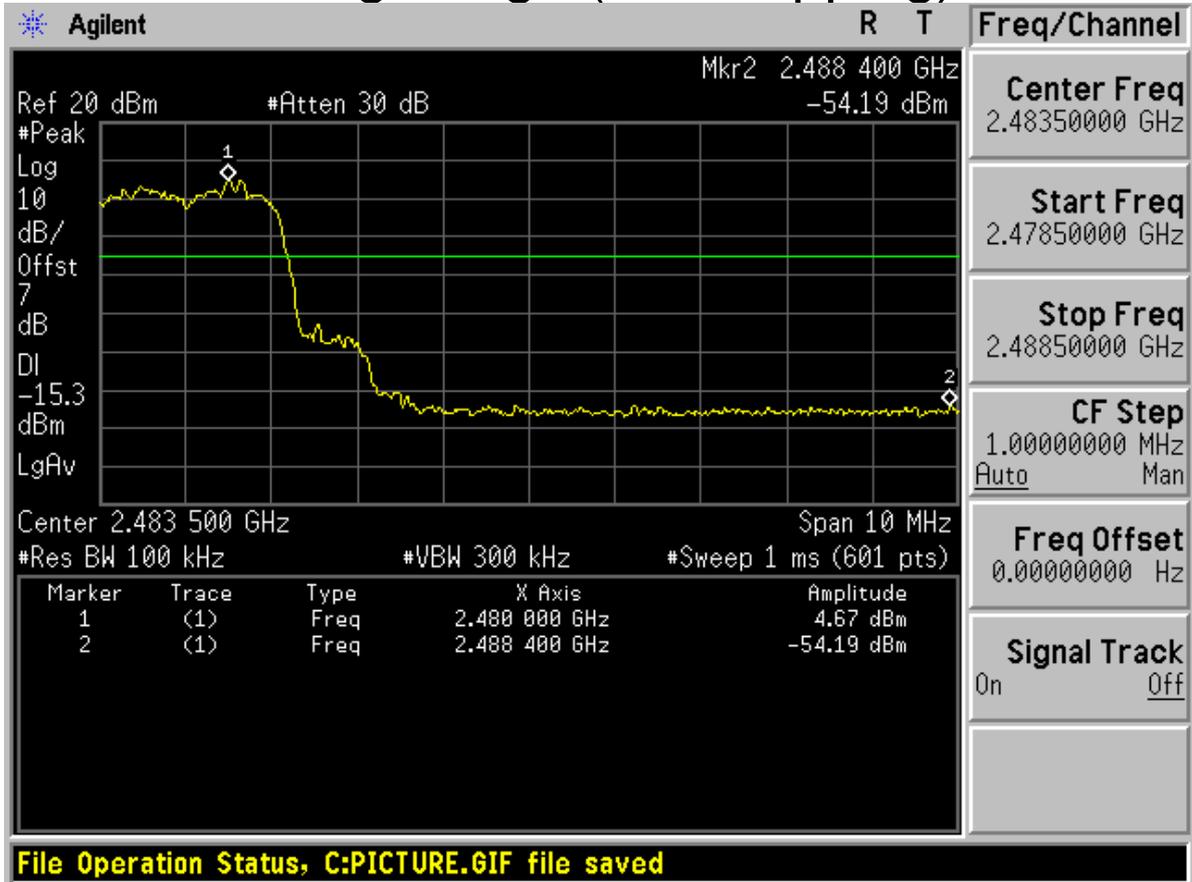


## High edge (Channel 78, no hopping)





# High edge (with hopping)



The END



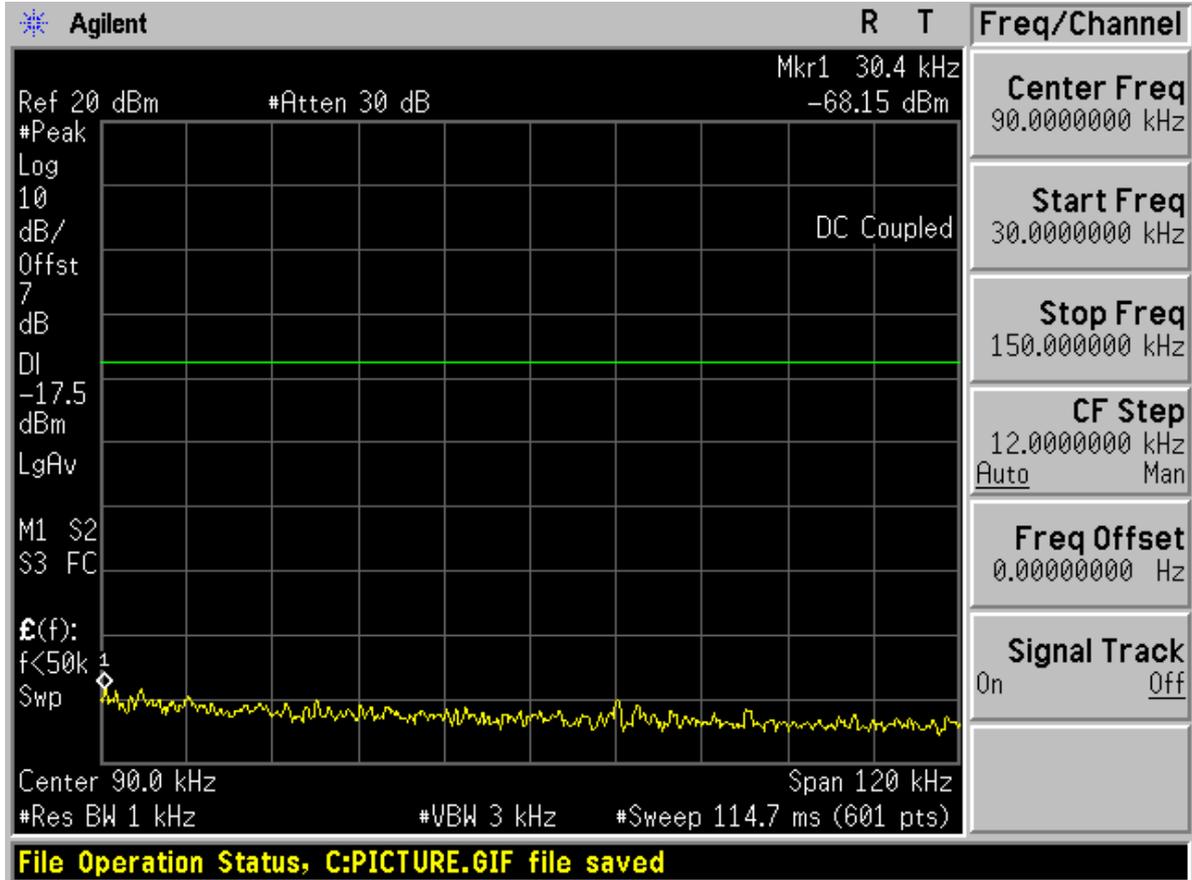
# Appendix G

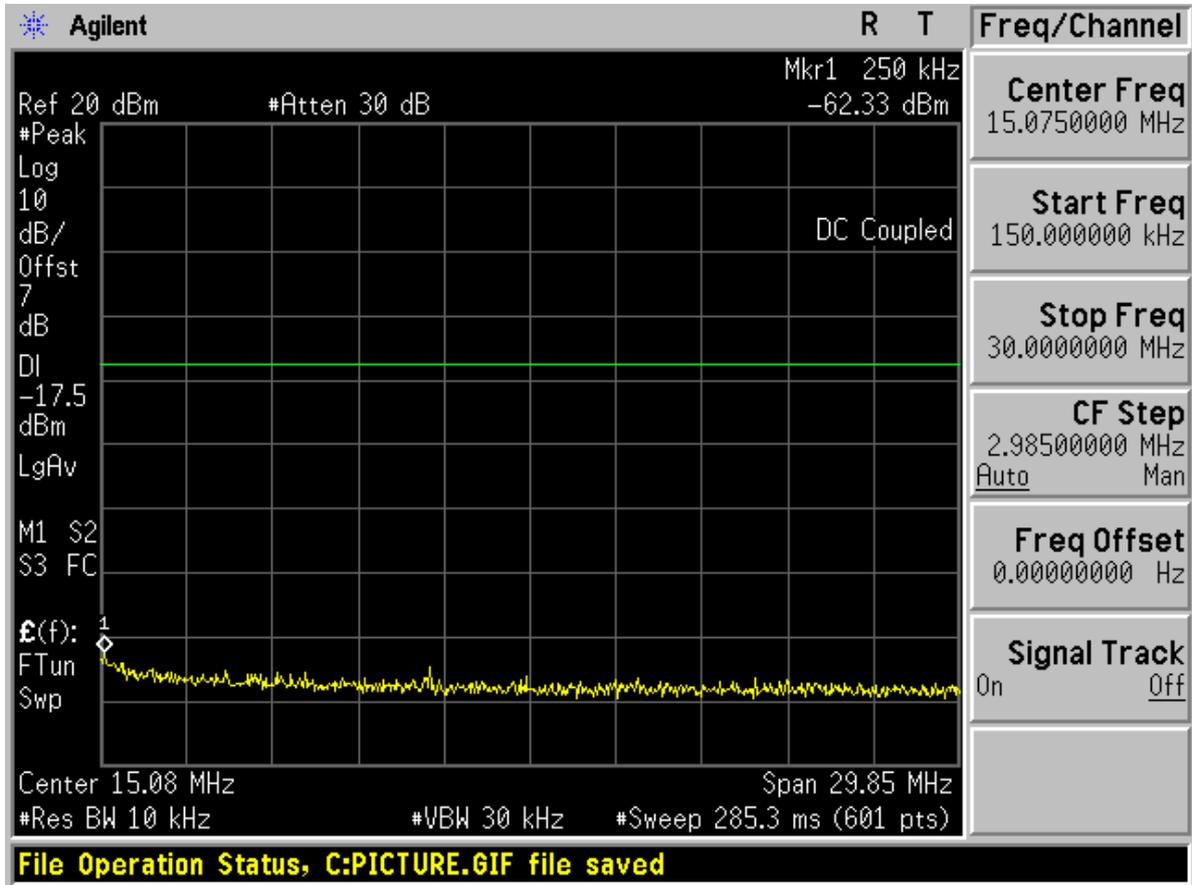
## Conducted RF spurious

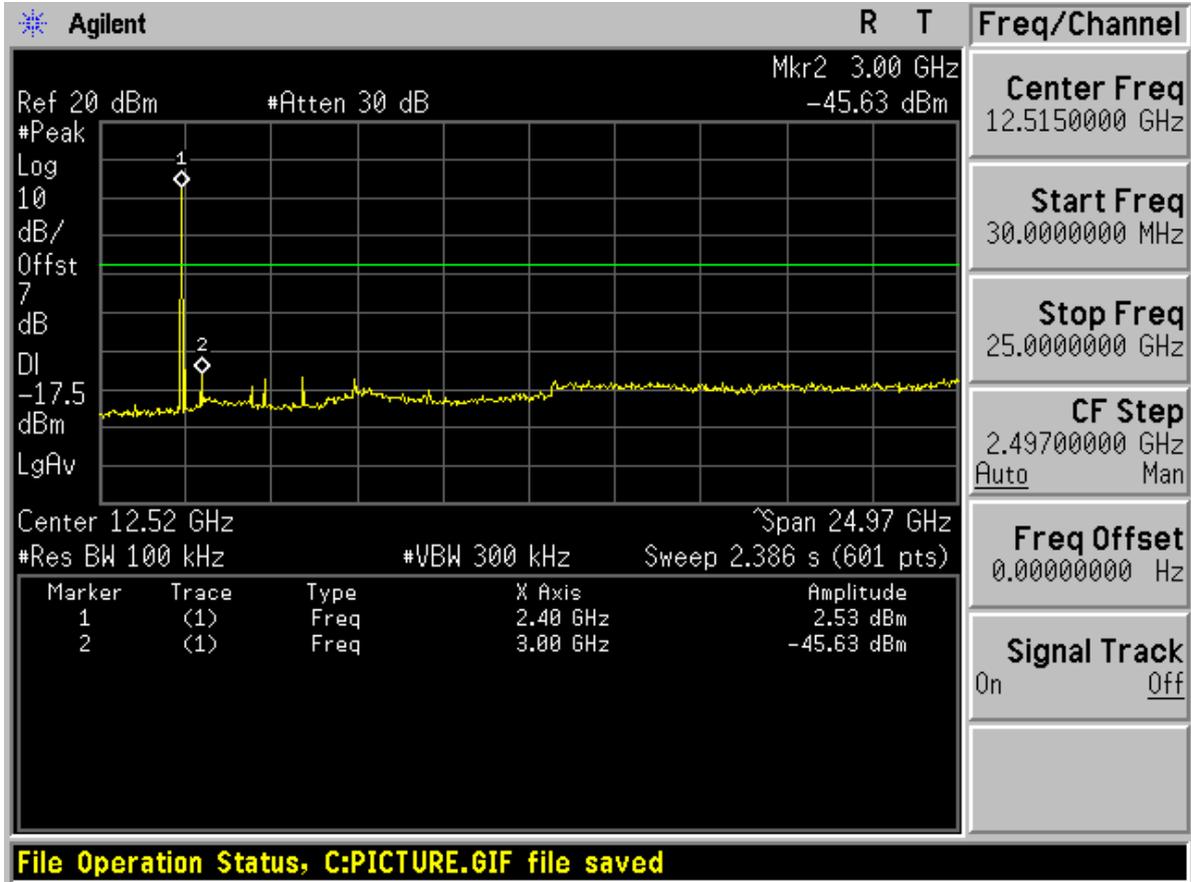
According to FCC Part 15.247 (d)



# Modulation: $\pi/4$ -DQPSK Channel 0

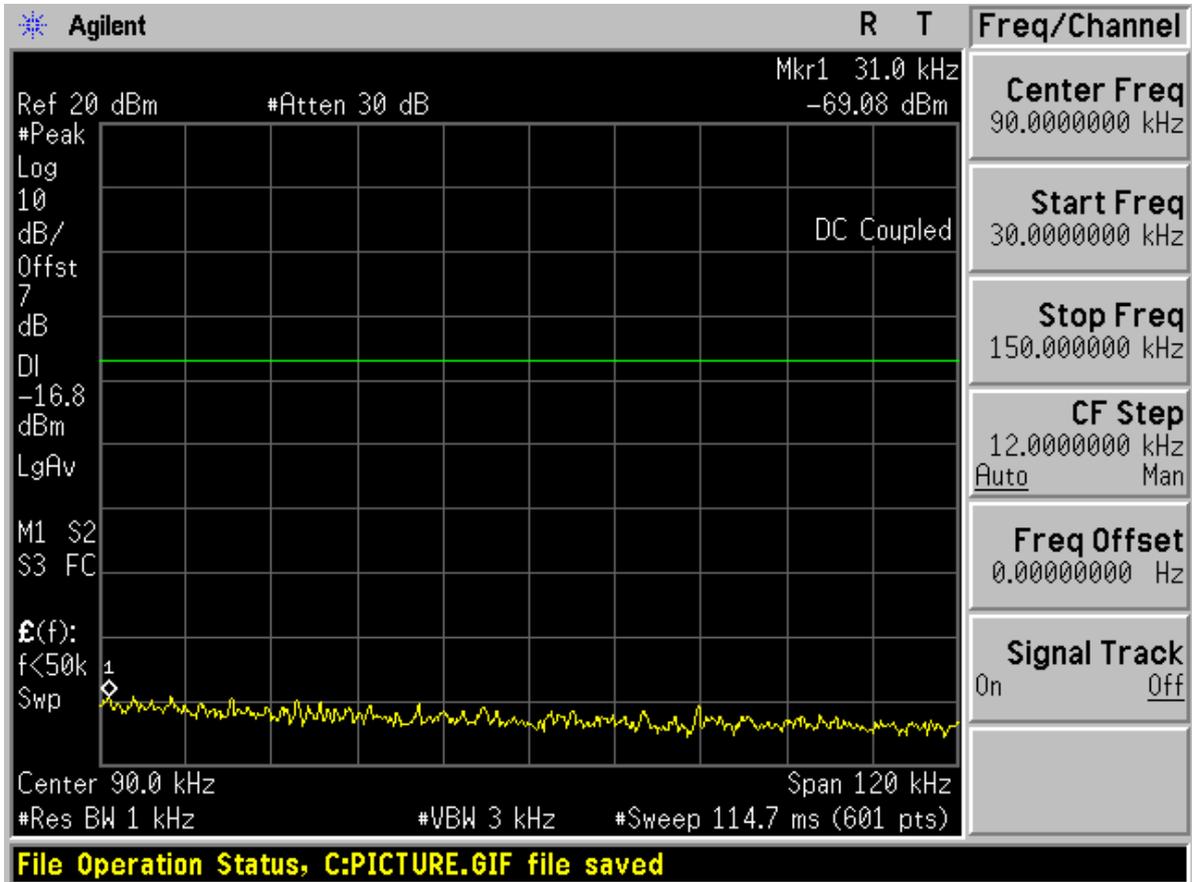


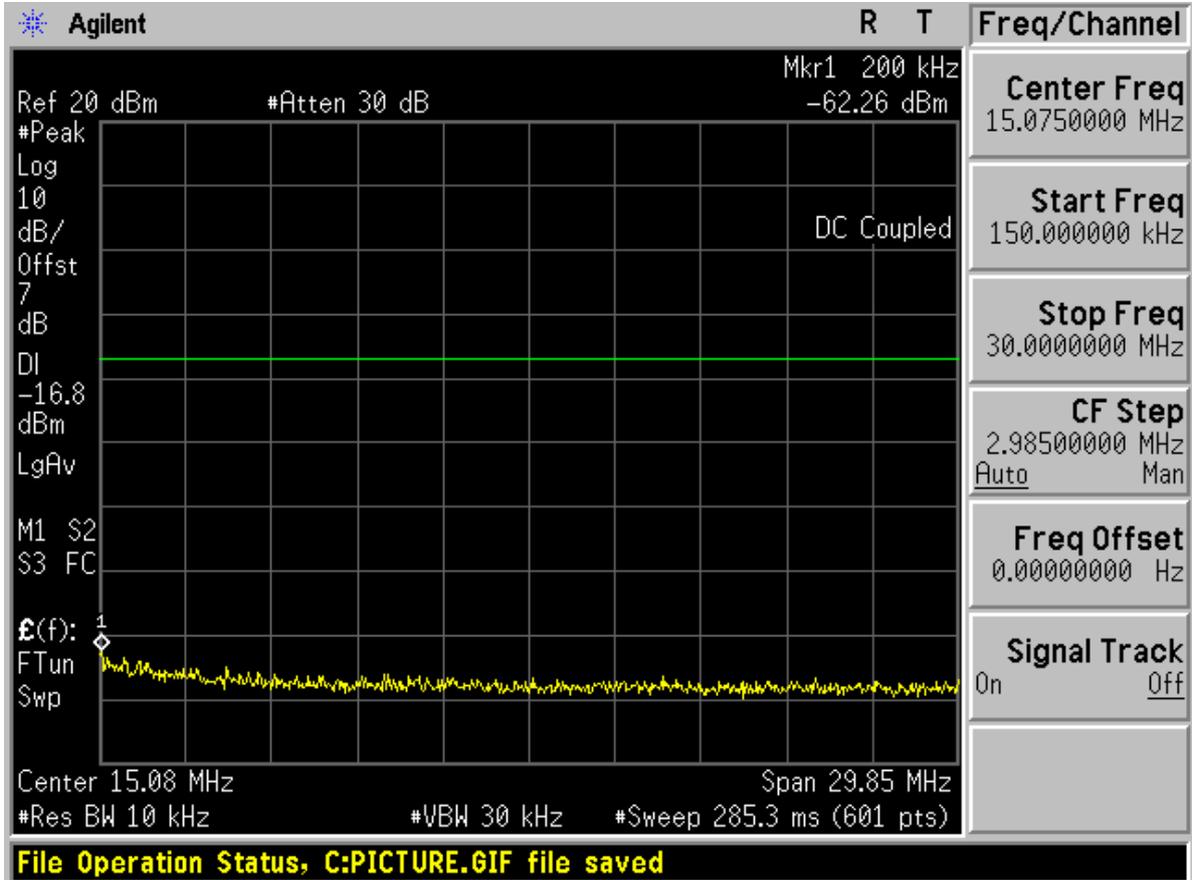


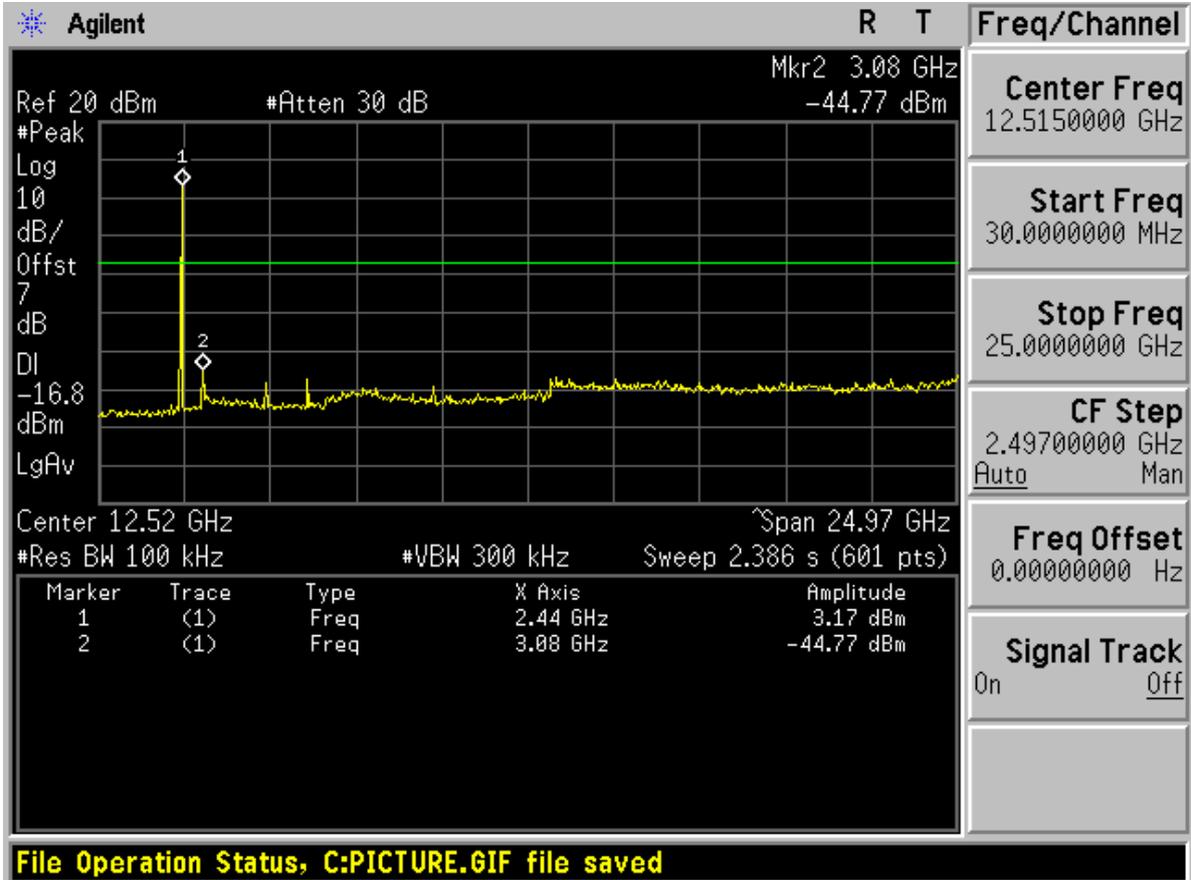




# Channel 40

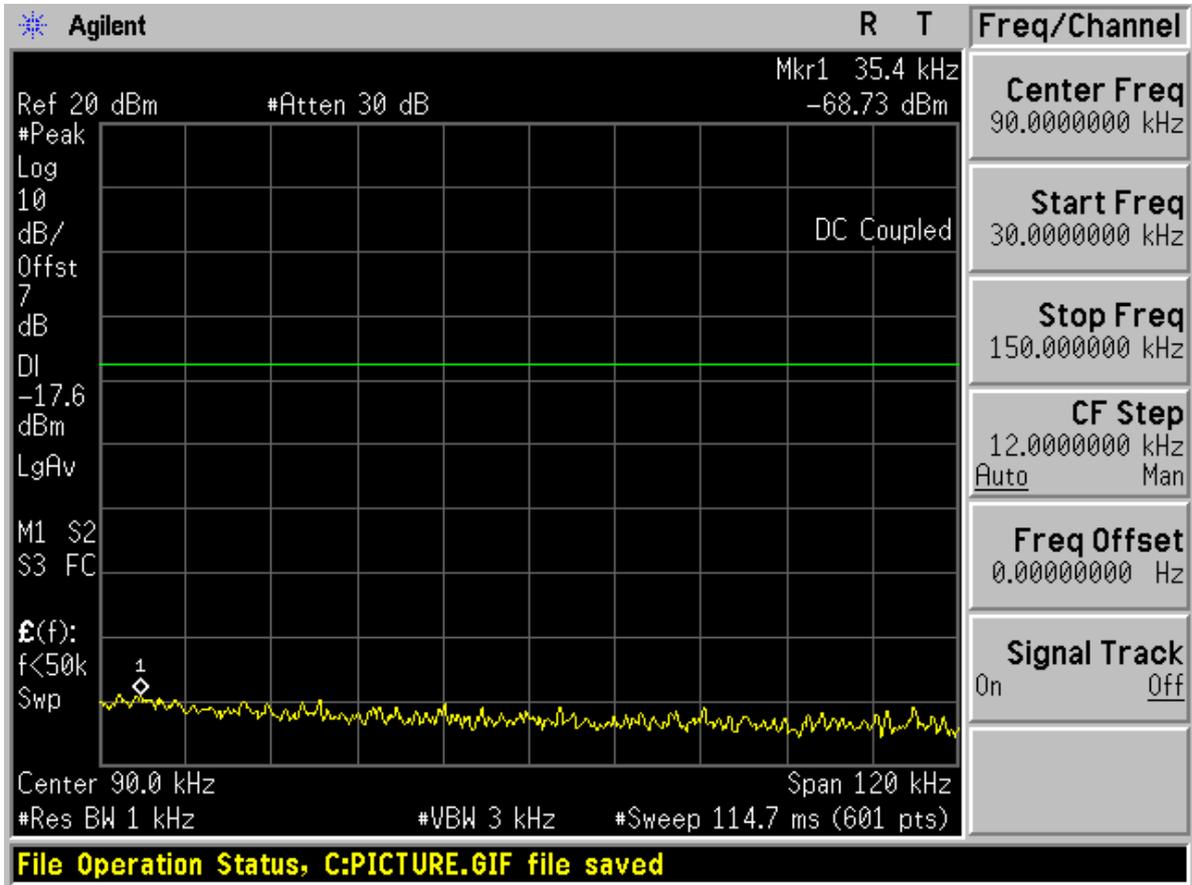


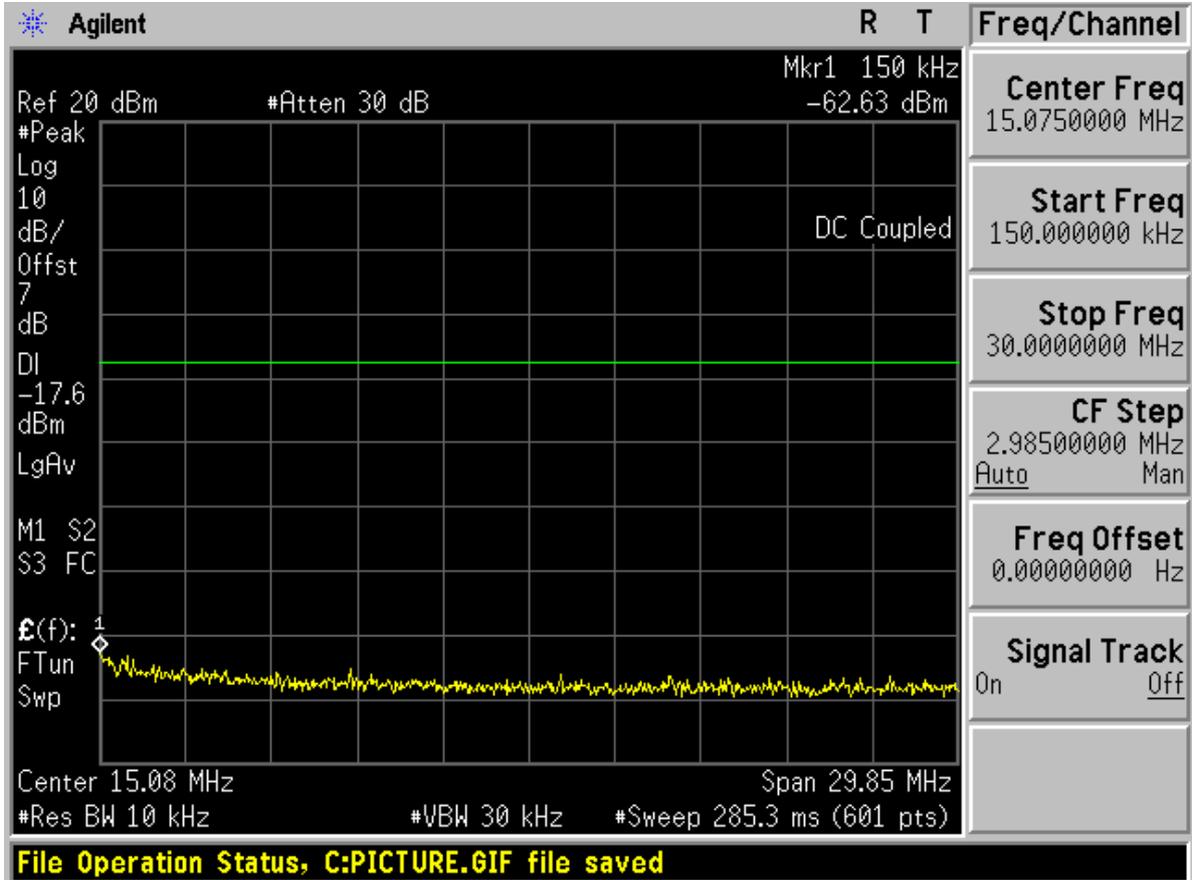


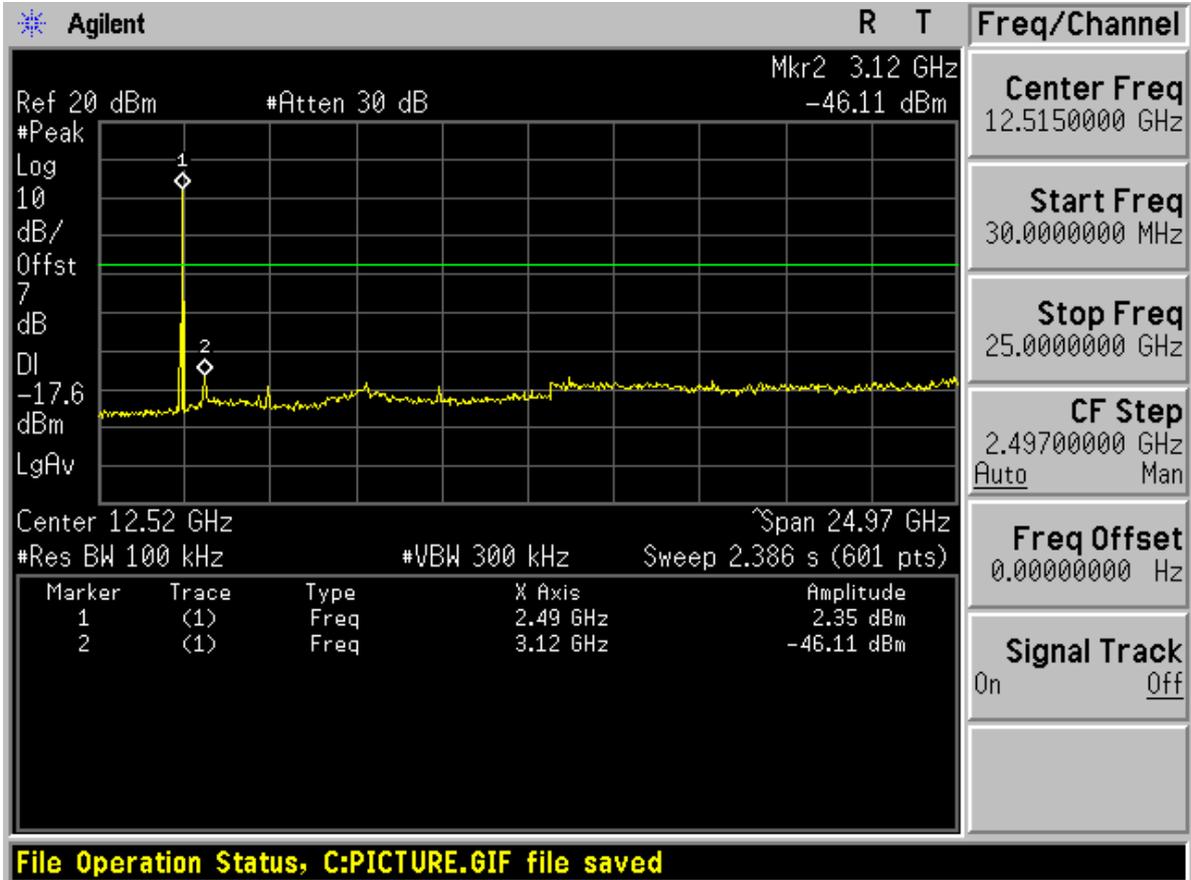




# Channel 78

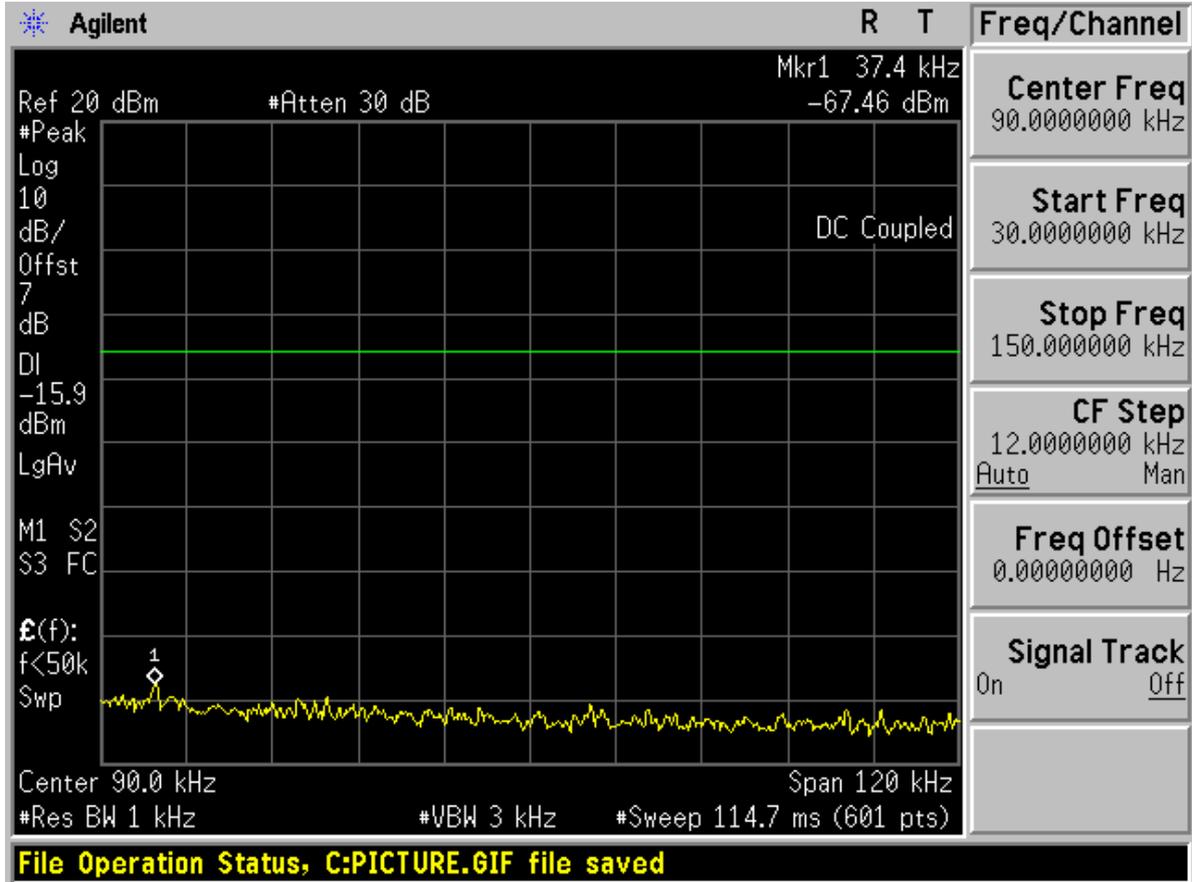


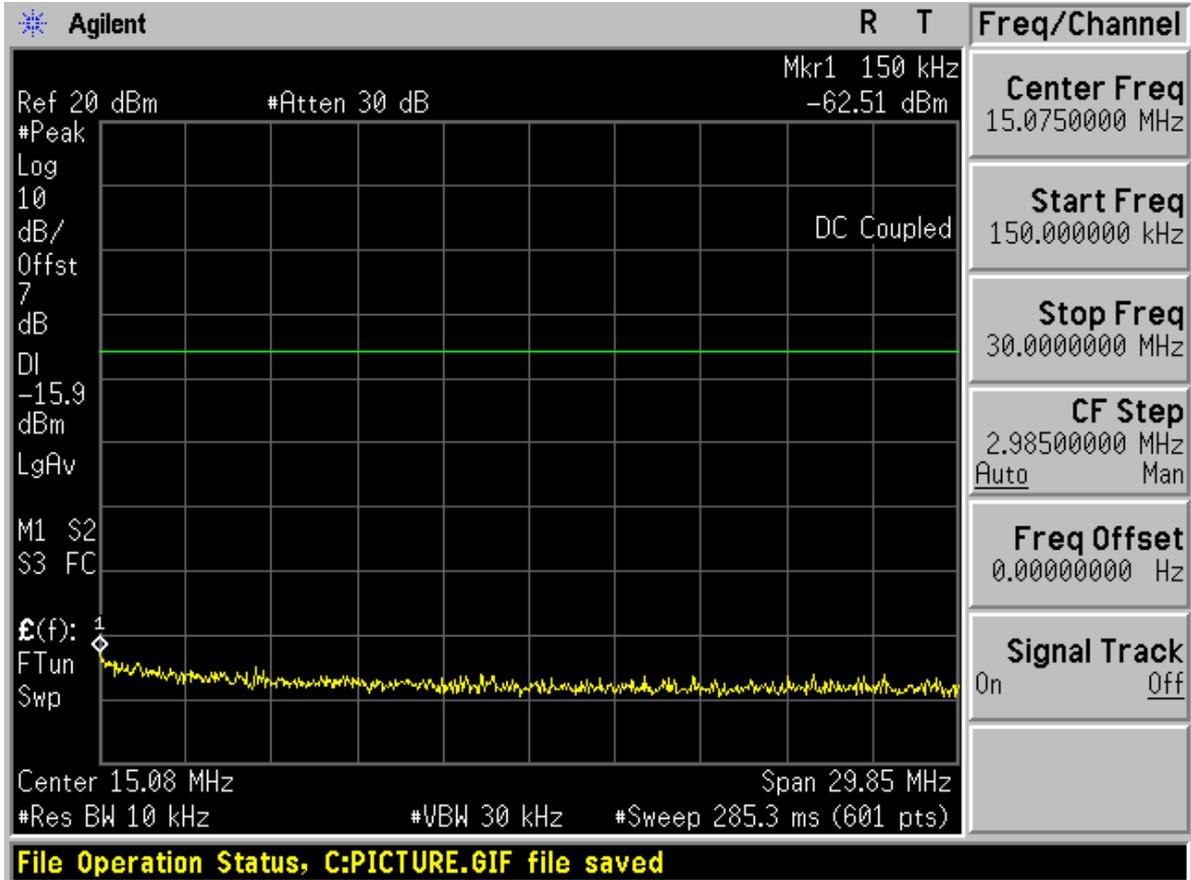


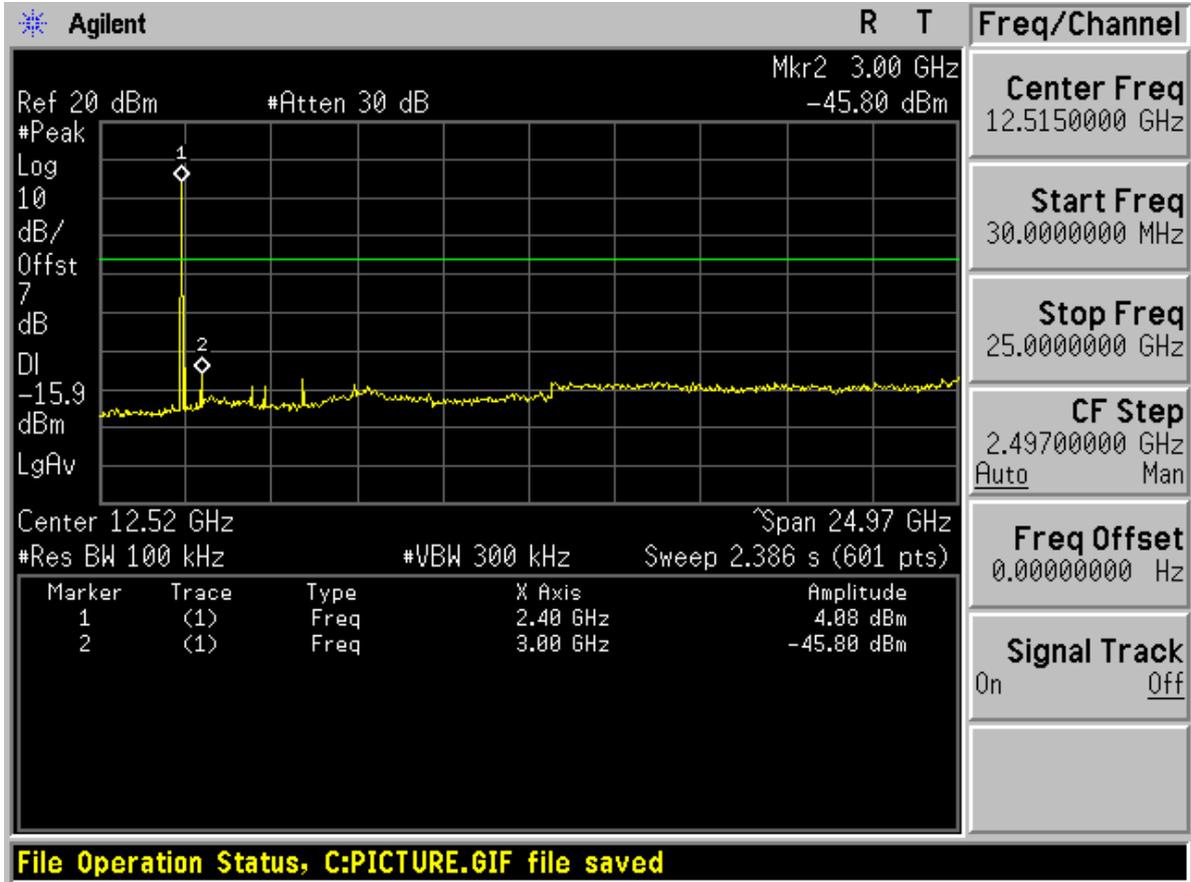




## Modulation:8DPSK Channel 0

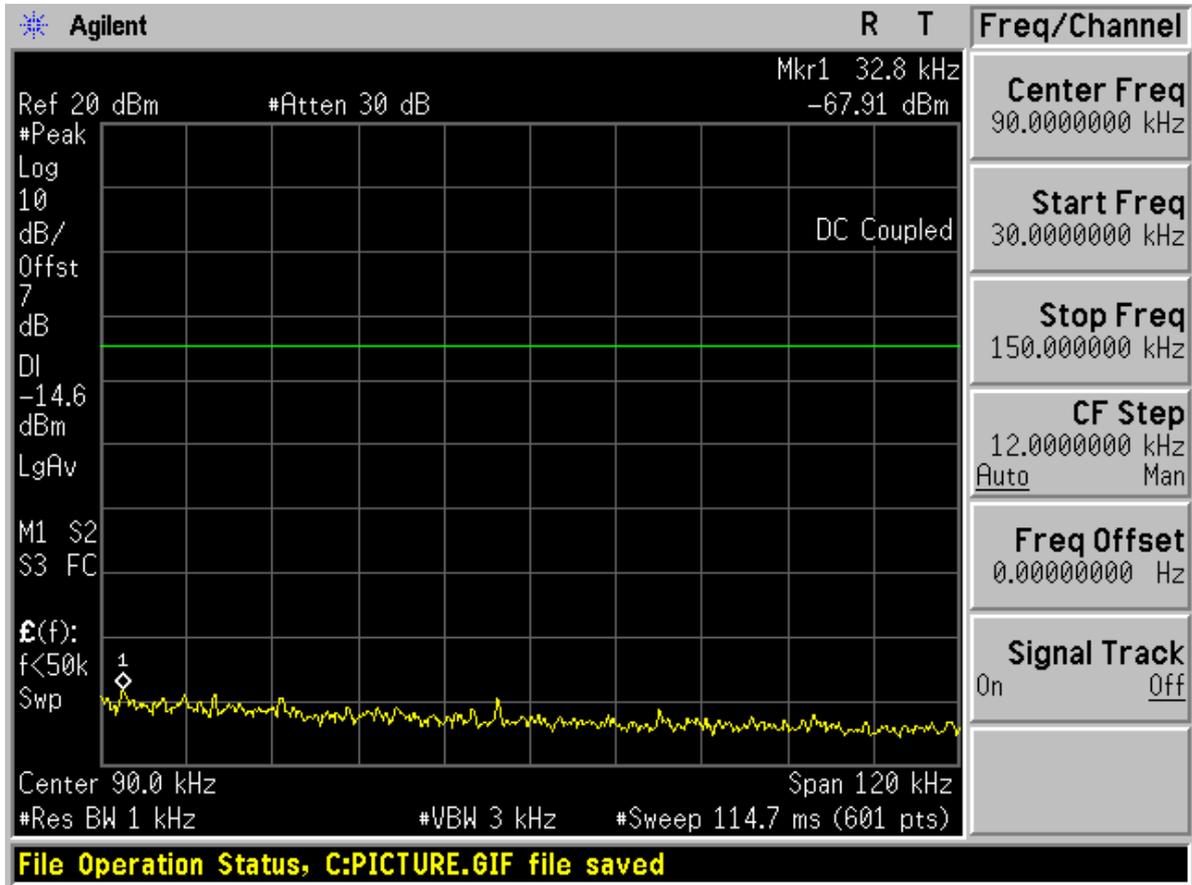


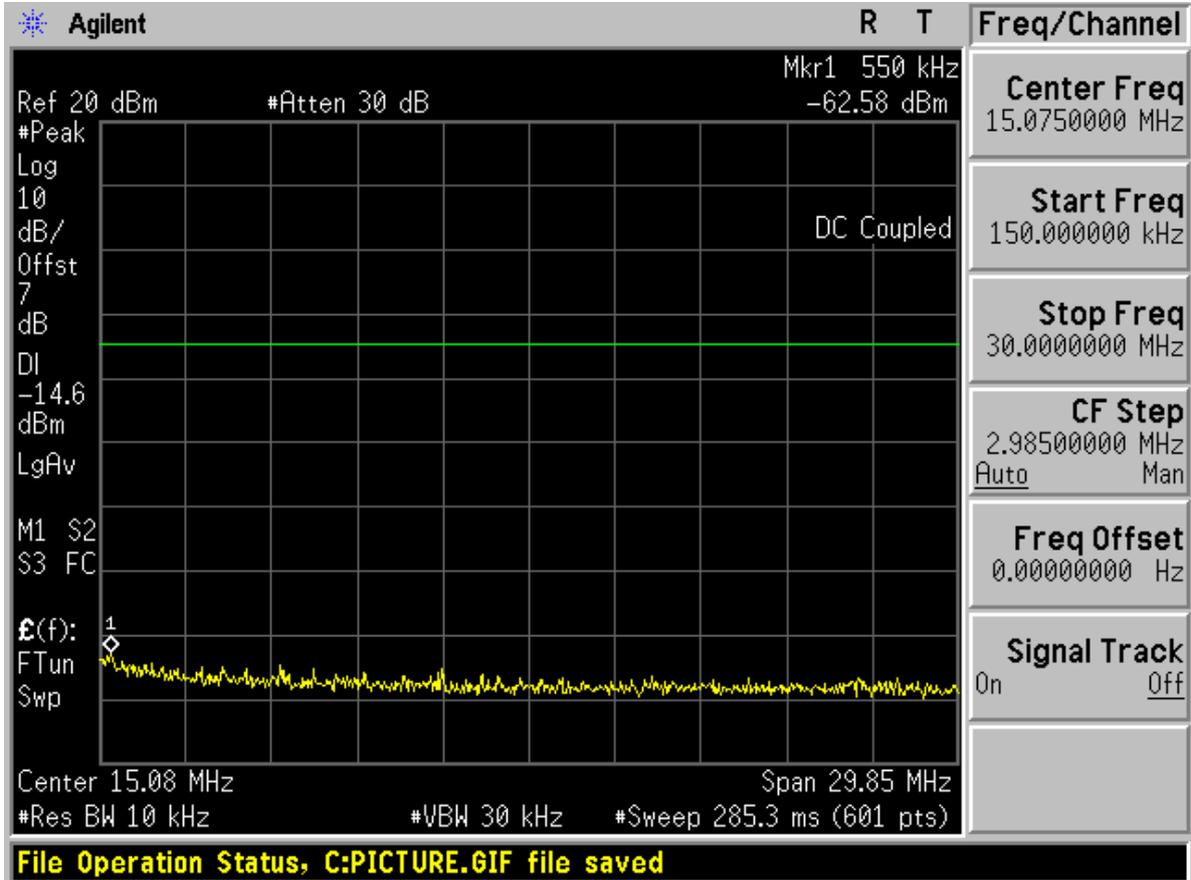


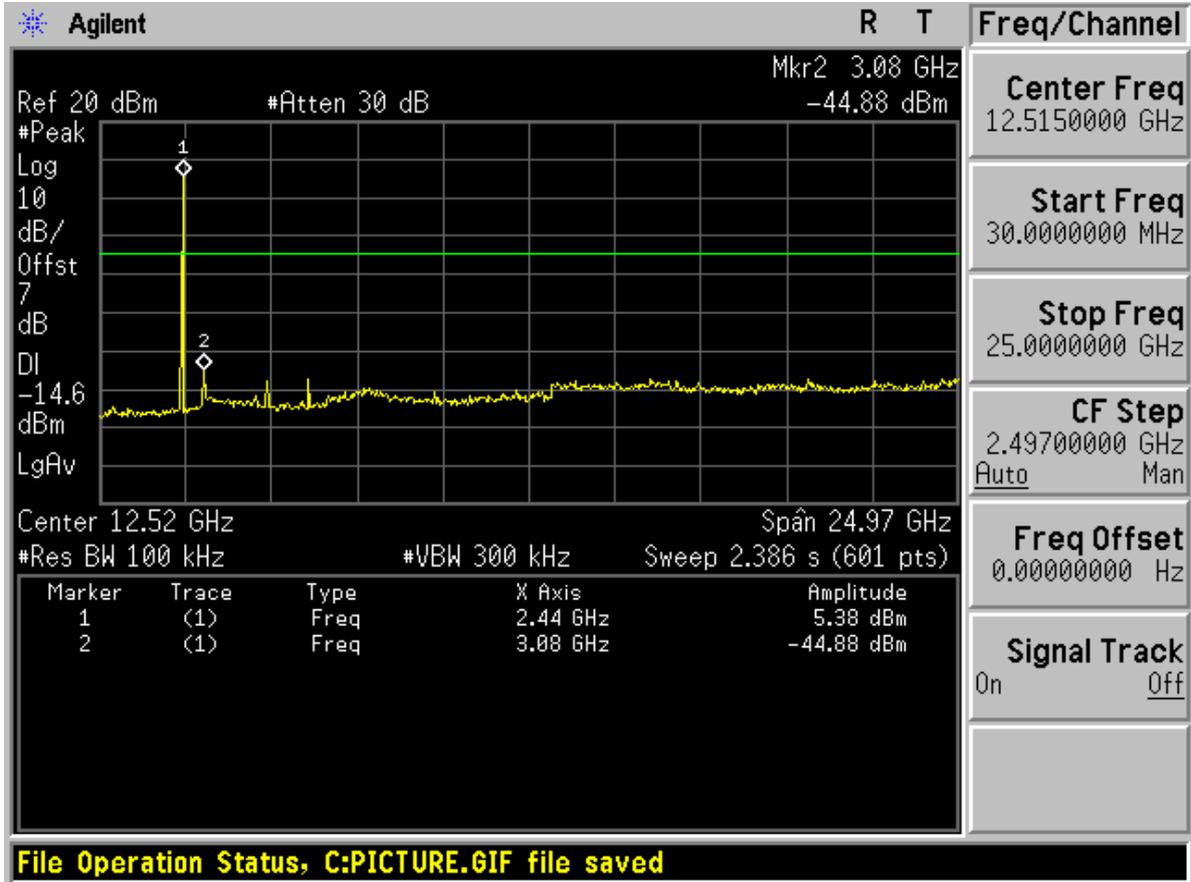




# Channel 40

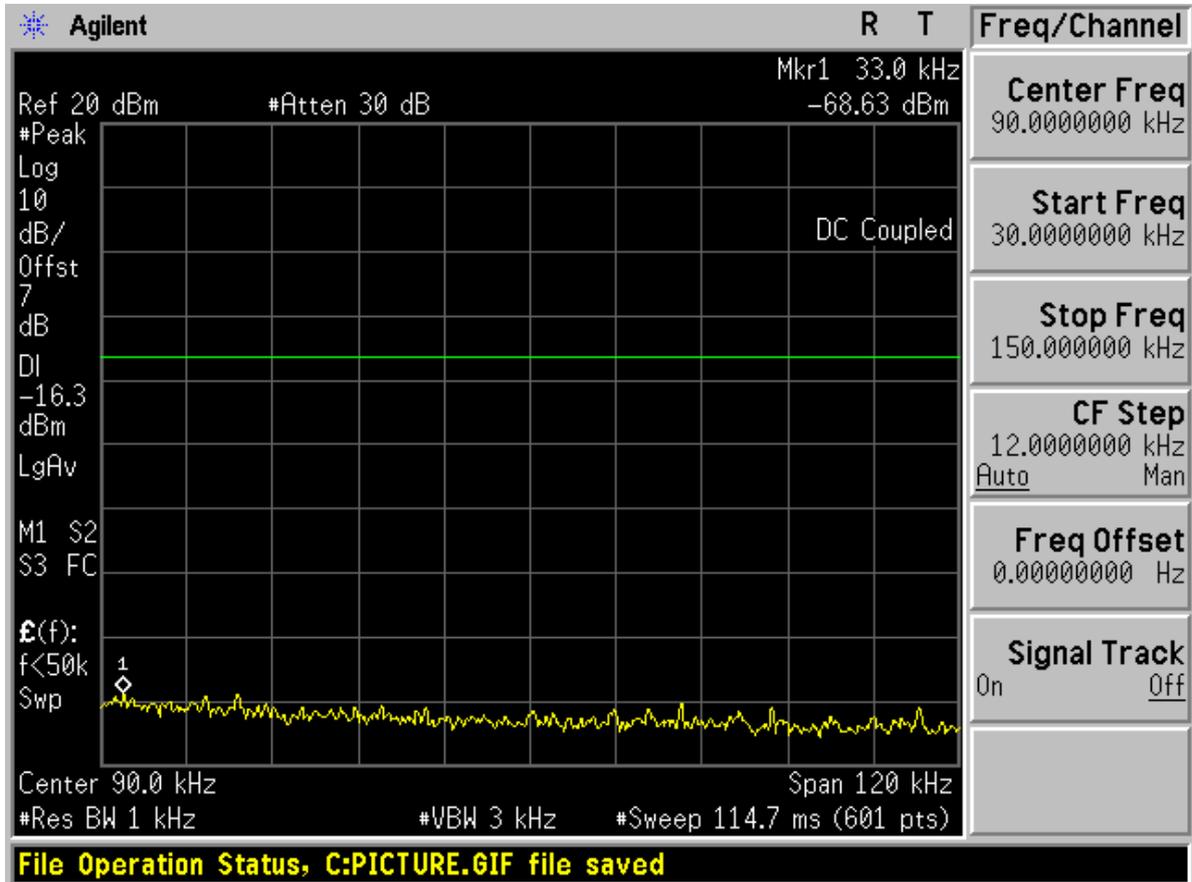


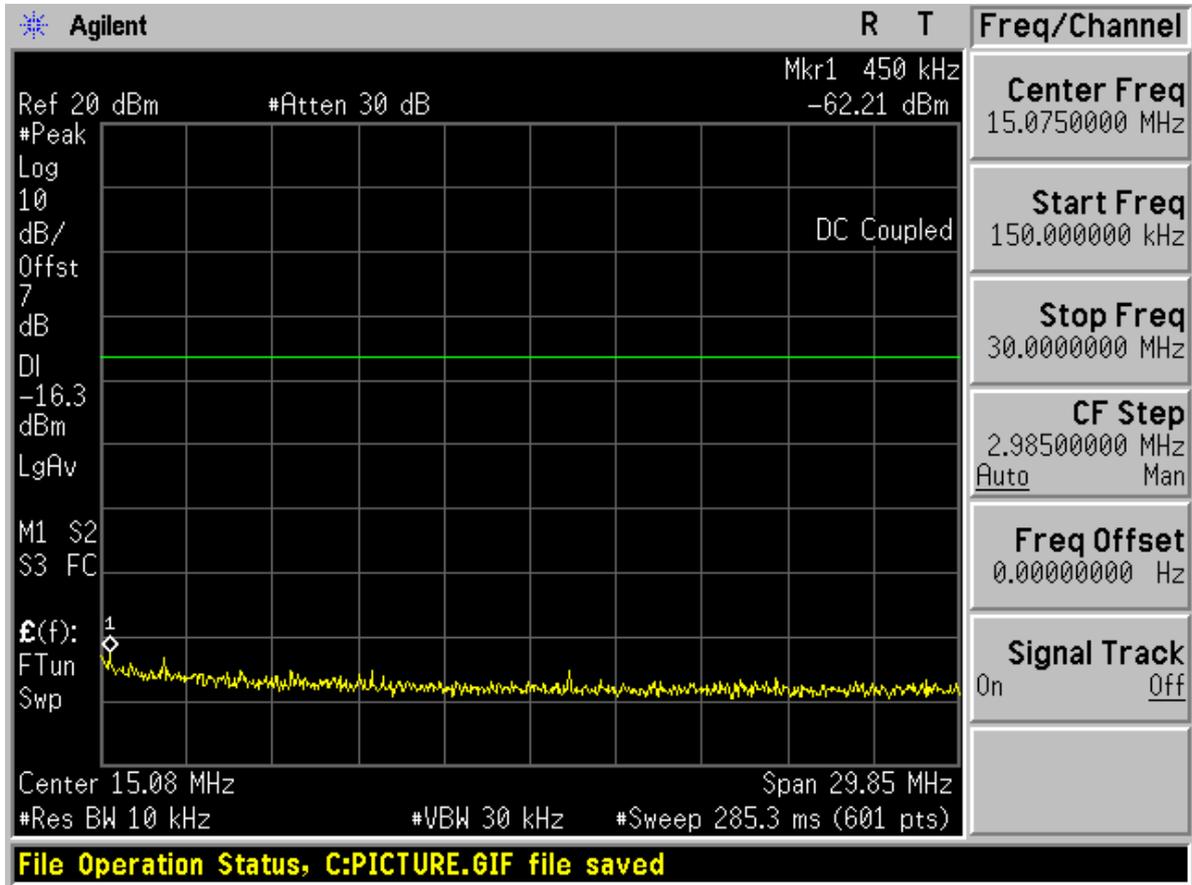


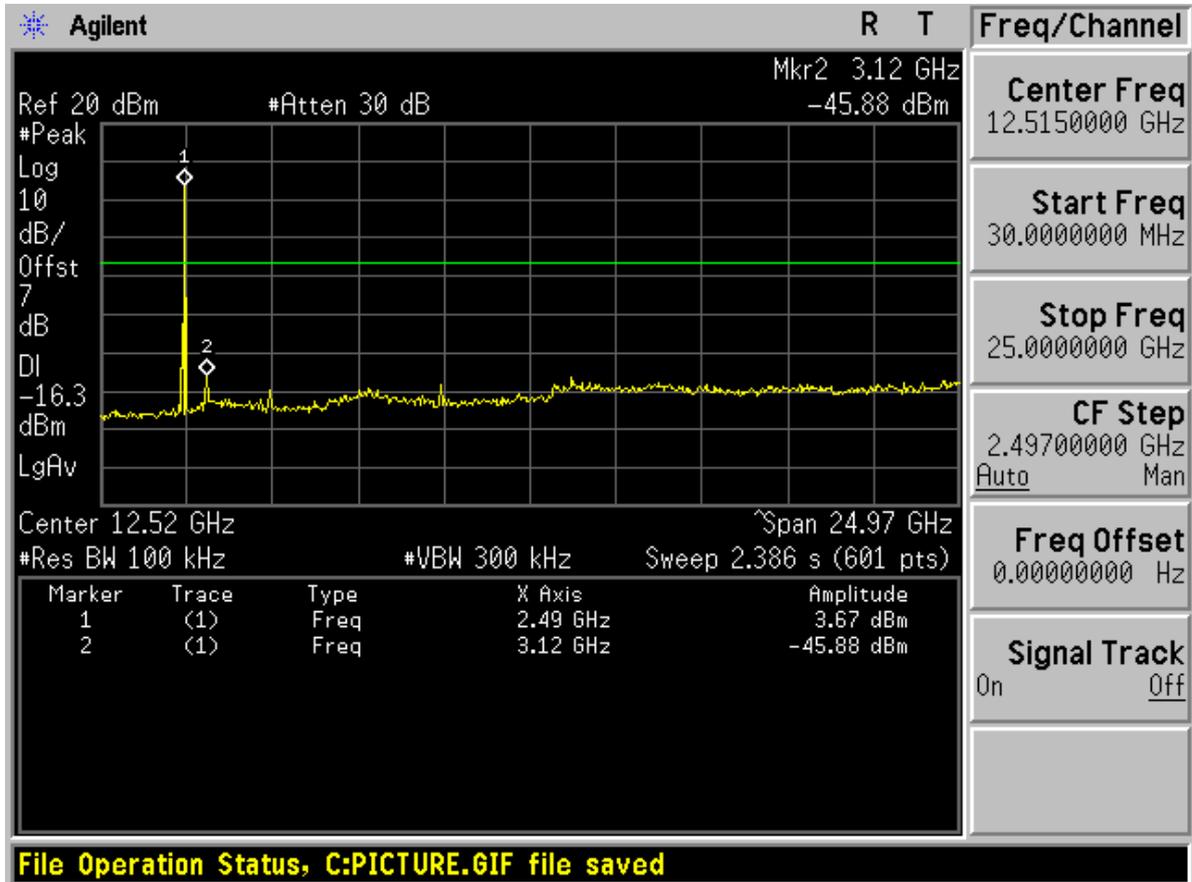




# Channel 78







The END



# Appendix H

## Radiated spurious emission

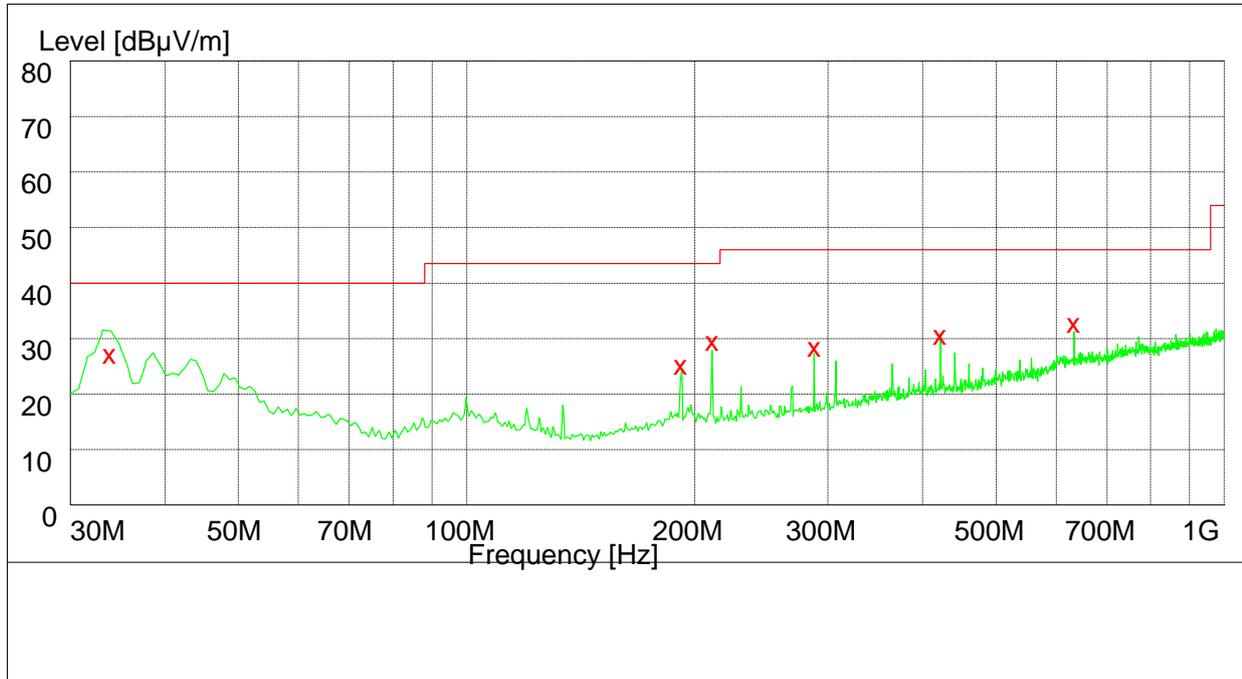
According to FCC Part 15.247 (d) & 15.205 & 15.209



**Part 1: Testing Range of “30 MHz to 1 GHz”**

Note 1: The test results and plot for testing range of “30 MHz to 1 GHz” showed as below is **the WORST case for all Test Modes and Channels**. This range will not be presented for each Test Mode and each Channel.

Note 2: **The emissions in this range are mainly from the Platform Device (Notepad PC and its ancillary components).**



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Plarization
33.840000	28.20	14.8	40.0	11.8	100.0	222.00	VERTICAL
192.000000	26.20	12.1	43.5	17.3	100.0	51.00	VERTICAL
211.200000	30.50	12.5	43.5	13.0	157.0	157.00	HORIZONTAL
288.000000	29.50	14.9	46.0	16.5	112.0	141.00	HORIZONTAL
422.400000	31.60	18.0	46.0	14.4	100.0	281.00	HORIZONTAL
633.600000	33.70	21.6	46.0	12.3	107.0	323.00	VERTICAL



**Part 2: Testing Range of “18 GHz to 26.5 GHz”**

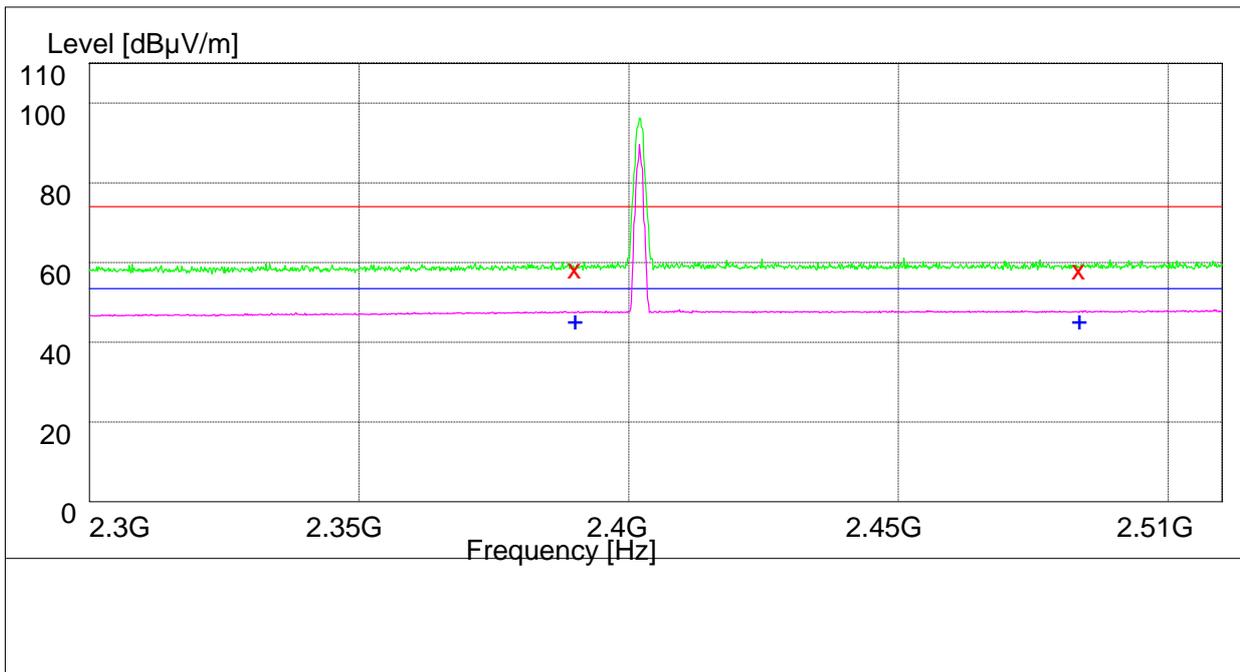
Note: No peak found in pre- test.

**Part 3: Testing Range of “2.3GHz to 2.5GHz”**

- Note 1: The testing range of “2.3 GHz to 2.5 GHz” is for checking radiated emissions located in restricted bands near the EUT operating bands.
- Note 2: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).
- Note 3: The peak spike exceeds the limit line is EUT’s operating frequency.

**1 Test Mode:**

**1.1 Channel 00**



Note: The peak exceeds the limit line is carrier frequency.

MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	59.50	33.5	74.0	14.5	143.0	88.00	HORIZONTAL
2483.500000	59.10	33.8	74.0	14.9	100.0	359.00	VERTICAL

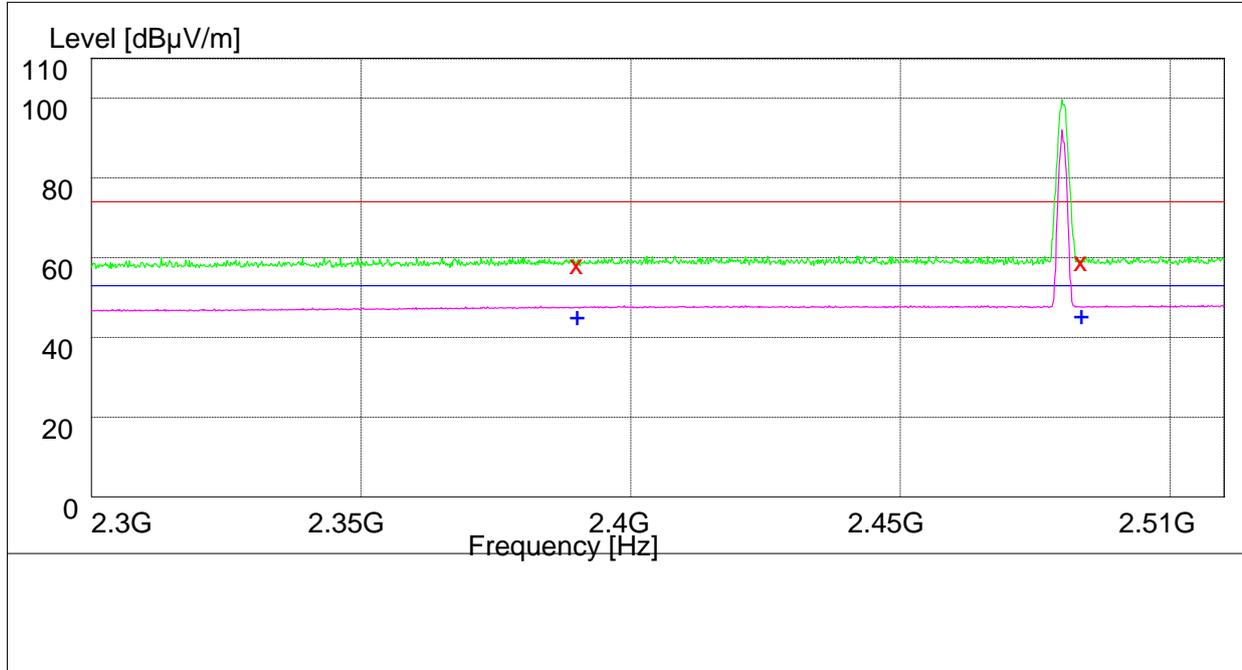
MEASUREMENT RESULT: AVDetector

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	46.40	33.5	54.0	7.6	117.0	82.00	VERTICAL
2483.500000	46.50	33.8	54.0	7.5	133.0	233.00	HORIZONTAL



## 1.2 Channel 78

Note: The peak exceeds the limit line is carrier frequency.



### MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	59.40	33.5	74.0	14.6	114.0	186.00	VERTICAL
2483.500000	59.90	33.8	74.0	14.1	100.0	213.00	VERTICAL

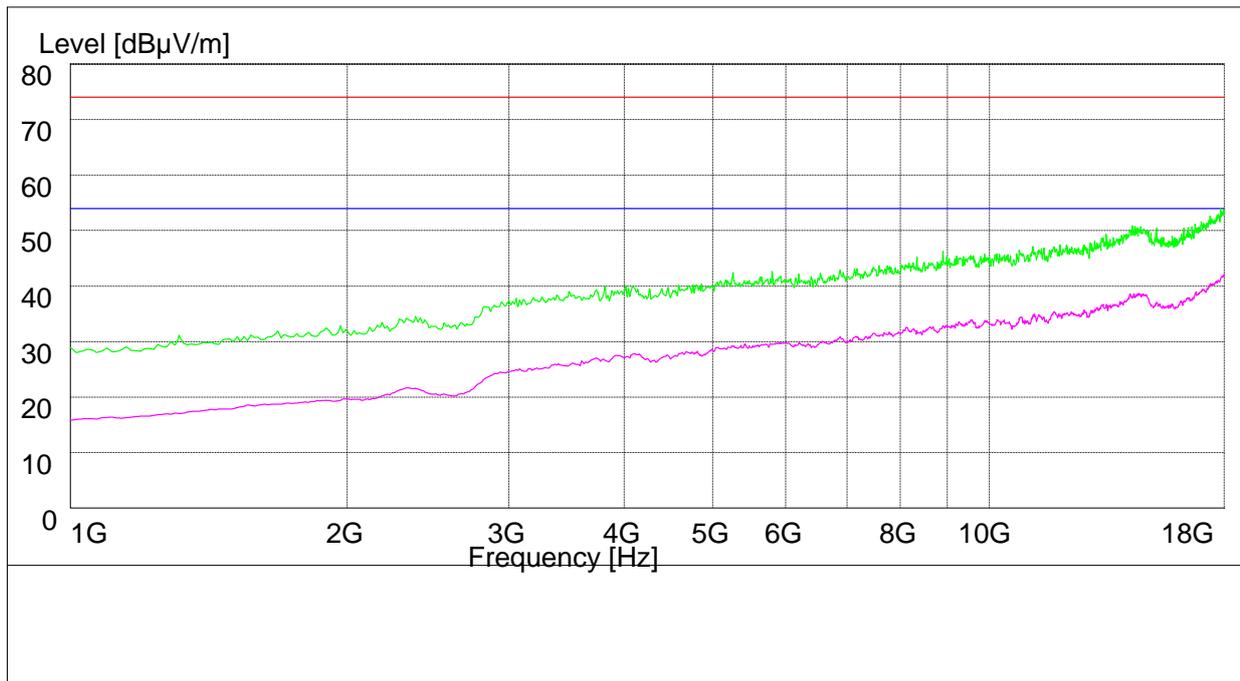
### MEASUREMENT RESULT: AVDetector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2390.000000	46.40	33.5	54.0	7.6	124.0	321.00	VERTICAL
2483.500000	46.50	33.8	54.0	7.5	140.0	10.00	HORIZONTAL

### 1.3

#### Part 4: Testing Range of “1 GHz to 18 GHz”

- Note 1: The test results and plot for testing range of “1 GHz to 18 GHz” showed as below is **the WORST case for all Test Modes and Channels**. This range will not be presented for each Test Mode and each Channel.
- Note 2: The testing range of “1 GHz to 18 GHz” is for checking radiated emissions located in restricted bands faraway from the EUT operating bands.
- Note 3: Two limits are required in the testing range above 1 GHz, that is Peak limit (74 dB $\mu$ V/m) and Average Limit (54 dB $\mu$ V/m).



The END



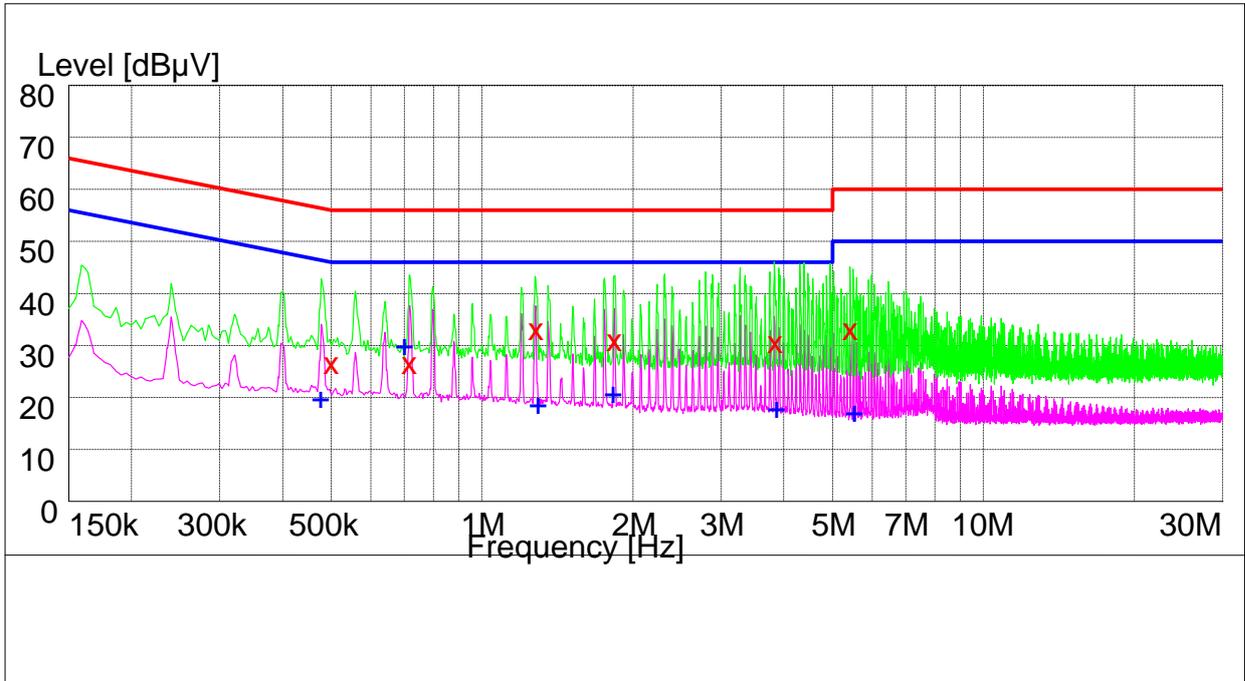
# Appendix I

## Conducted Emission at Power Port

According to FCC Part 15.207



# Channel 40



## MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.500000	28.50	10.1	56	27.5	N	FLO
0.716000	28.50	10.1	56	27.5	L1	FLO
1.280000	35.00	10.1	56	21.0	N	FLO
1.836000	32.90	10.1	56	23.1	L1	FLO
3.836000	32.50	10.2	56	23.5	N	FLO
5.426000	35.00	10.2	60	25.0	N	FLO

## MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.474000	21.80	10.1	46	24.6	L1	FLO
0.696000	31.90	10.1	46	14.1	L1	FLO
1.286000	20.70	10.1	46	25.3	L1	FLO
1.816000	22.70	10.1	46	23.3	L1	FLO
3.852000	20.00	10.2	46	26.0	L1	FLO
5.498000	19.10	10.2	50	30.9	L1	FLO