



FCC Test Report - EDR

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

Model Number: HUAWEI U8651S, U8651S, Summit

**Report No: SYBH(Z-RF)002022012-2011
FCC ID:QISU8651S**

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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

| FCC Measurement Specification | Description | Result |
|--------------------------------------|---|---------------|
| 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 Production Information

2.1.1 General Description

HUAWEI U8651S, U8651S, U8651, Astro subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band IV and Band II and Band V. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, AGPS and WIFI 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 U8651S and U8651T is showed in the following table.

| | U8651S | U8651T |
|--------------------|--|--|
| GSM four bands | the same | the same |
| WCDMA bands | WCDMA1900/AWS/850 | WCDMA1900/AWS/850 |
| FLASH | the same | the same |
| PCB | the same | the same |
| Appearance | the difference | the difference |
| Bluetooth mode | the same | the same |
| WLAN mode | the same | the same |
| BT/ WLAN antenna | the same | the same |
| GSM/ WCDMA antenna | the same | the same |
| External camera | the same | the same |
| internal camera | the same | the same |
| Adapter | the same | the same |
| Battery | the same | the same |
| Chipset | the same | the same |
| Memory | the same | the same |
| Form factor | Bar type, Internal antenna | Bar type, Internal antenna |
| RF Parameter | The same RF Parameter in the same band | The same RF Parameter in the same band |
| BT RF Parameter | the same | the same |
| Dimension | the same | the same |
| Weight | the same | the same |
| Bluetooth | the same | the same |
| External camera | the same | the same |



| | | |
|----------------------|------------------------------|------------------------------|
| Main Frequency NV | The same NV in the same band | The same NV in the same band |
| BT conducted power | the same | the same |
| WIFI conducted power | the same | the same |

So U8651S RF test data refer to U8651T RF 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! | | | | |
| Not applicable! | | | | |
| 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

Jan.10, 2012 to Jan.17, 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): | -1 (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

| | | |
|--|------------------------|------------------|
| HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth | | |
| HUAWEI U8651S, U8651S, Summit | | |
| Board and Module | | |
| Hardware Version | Software Version | Serial Number |
| HD4U865M | U8651S100R001USAC85B29 | L7M7ND1270400132 |

4.2.2 Adapter

| | |
|---------------------|--|
| AC/DC Adapter Model | HW-050100U1W |
| Manufacturer | Huawei Technologies Co., Ltd. |
| Input Voltage | ~100-240V 50/60Hz 0.2A |
| Output Voltage | 5V  1A |
| Rated Power | 5W |

4.2.3 Battery

| Name | Manufacture | Description |
|---------------------|-------------------------------|---|
| Rechargeable Li-ion | Huawei Technologies Co., Ltd. | Battery Model: HB5K1H Rated capacity: 1400mAh 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.29.2012 |
| Tunable Dipole | Schwarzbeck | D69250-UHAP/D69250-VHAP | 979/917 | Jan.29.2012 |
| 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 |
|---------------------|--|

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

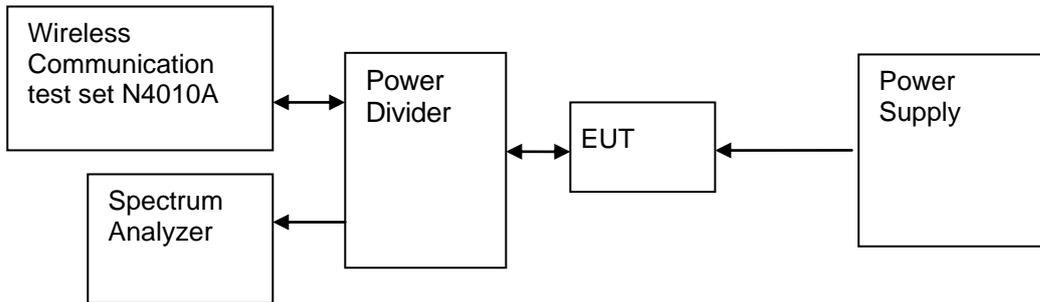


Figure 1. Test Set-up

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 | 1.31 | Pass |
| 99% | Bottom | 0 | 2.402 | 1.20 | Pass |
| 20dB | Middle | 40 | 2.442 | 1.34 | Pass |
| 99% | Middle | 40 | 2.442 | 1.20 | Pass |
| 20dB | Top | 78 | 2.480 | 1.33 | Pass |
| 99% | Top | 78 | 2.480 | 1.20 | 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 | 1.18 | Pass |
| 20dB | Middle | 40 | 2.442 | 1.30 | Pass |
| 99% | Middle | 40 | 2.442 | 1.18 | Pass |
| 20dB | Top | 78 | 2.480 | 1.30 | Pass |
| 99% | Top | 78 | 2.480 | 1.18 | 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 |
|---------------------|---|

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: | ≥ 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: | ≥ 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

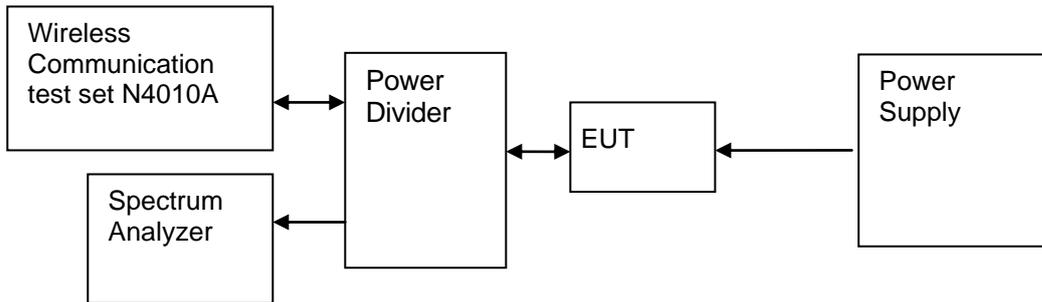


Figure 2. Test Set-up

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 | ≥ 0.893 | Pass |
| 40 | 2.442 | 41 | 2.443 | 1.1 | ≥ 0.893 | 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 | 1.1 | ≥0.867 | Pass |
| 40 | 2.442 | 41 | 2.443 | 1.1 | ≥0.867 | 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 |
|----------------------|---|

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 |
|--------|--------------------------------|

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

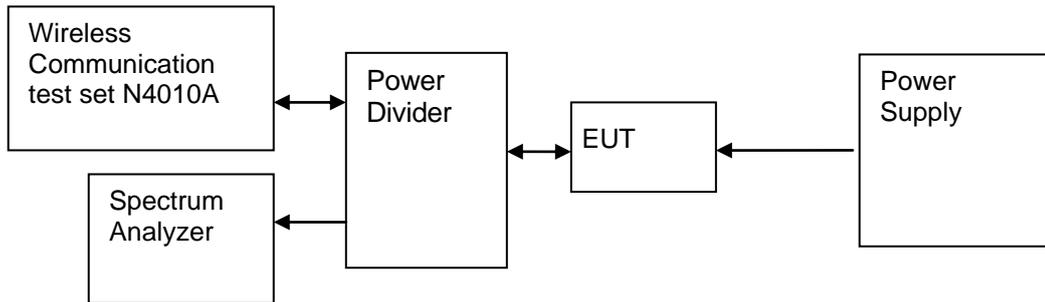


Figure 3. Test Set-up

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 |
|----------------------|---|

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 |
|------------------------------|--------|

6.4.3 Test Method and Setup

- Connect test port of mobile phone to spectrum analyzer and universal communication tester.
- Set the mobile phone to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- 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.
- 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.
- Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

Test setup

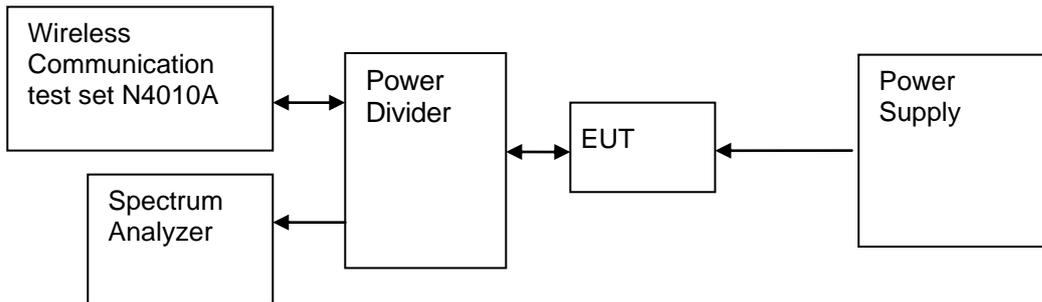


Figure 4. Test Set-up

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 |
|--------------------------|------------------------------|----------------------------------|-----------|--------|
| 2.9 | 106.7 | 0.30943 | ≤ 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 |
|----------------------|---|

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) |
|--|------------------|

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

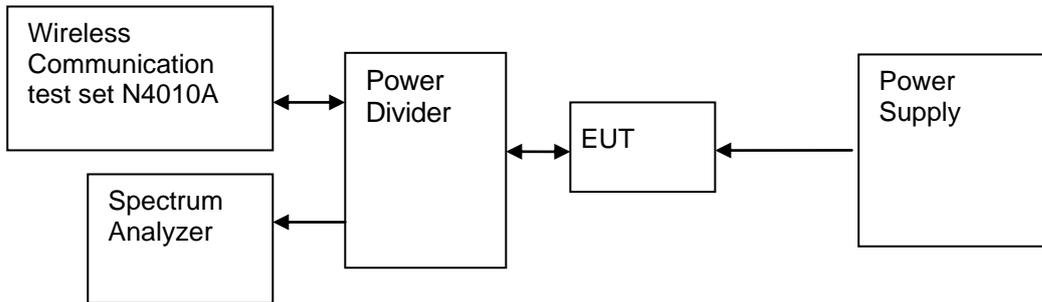


Figure 5. Test Set-up

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 | 7.58 | < 30 | Pass |
| Middle | 40 | 2442 | 7.69 | < 30 | Pass |
| Top | 78 | 2480 | 6.99 | < 30 | Pass |

Table 36 Measurement Results(TM2)

| Channel | Channel No. | Center Freq.[MHz] | Meas. Level (Cond.) [dBm] | Limit [dBm] | Result |
|---------|-------------|-------------------|---------------------------|-------------|--------|
| Bottom | 0 | 2402 | 7.66 | < 30 | Pass |
| Middle | 40 | 2442 | 7.66 | < 30 | Pass |
| Top | 78 | 2480 | 6.97 | < 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 |
|----------------------|---|

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 |
|---------------------|---------------|

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

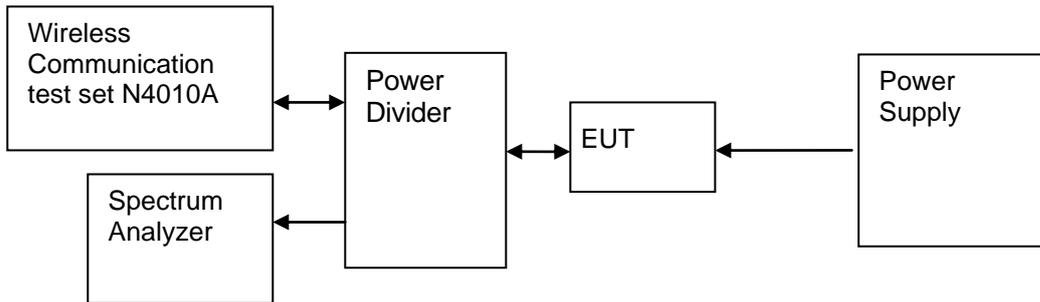


Figure 6. Test Set-up

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 | 7.54 | Off | -46.73 | < -12.5 | Pass |
| | - | - | 7.29 | On | -48.51 | < -12.7 | Pass |
| High Edge | 78 | 2480 | 8.34 | Off | -50.73 | < -11.7 | Pass |
| | - | - | 7.76 | On | -52.62 | < -12.2 | 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 | 7.50 | Off | -46.21 | <-12.5 | Pass |
| | - | - | 6.41 | On | -46.93 | <-13.6 | Pass |
| High Edge | 78 | 2480 | 8.33 | Off | -51.47 | <-11.7 | Pass |
| | - | - | 8.33 | On | -51.53 | <-11.7 | 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 |
|----------------------|---|

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 |
|---------------------|---------------|

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

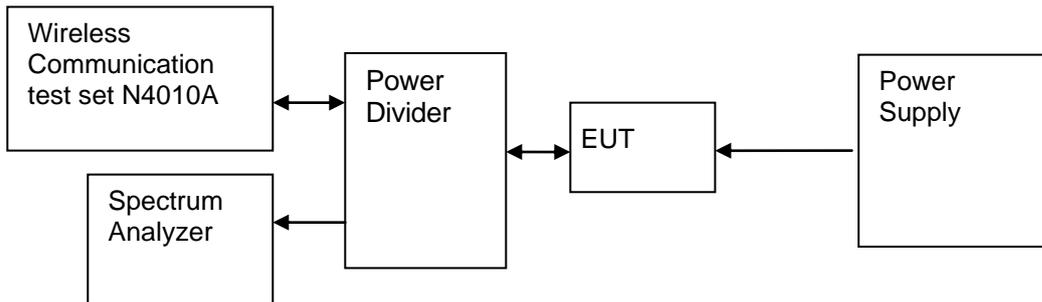


Figure 7. Test Set-up

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 | 7.22 | Off | -40.02 | < -12.8 | Pass |
| 9kHz-25GHz | 40 | 2442 | 6.74 | Off | -42.98 | < -13.3 | Pass |
| 9kHz-25GHz | 78 | 2480 | 5.56 | Off | -46.78 | < -14.4 | 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 | 5.17 | Off | -39.92 | < -14.8 | Pass |
| 9kHz-25GHz | 40 | 2442 | 7.21 | Off | -43.41 | < -12.8 | Pass |
| 9kHz-25GHz | 78 | 2480 | 5.51 | Off | -46.74 | < -14.5 | 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 10th 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 - 10th Carrier Frequency: 1 MHz

Test set up

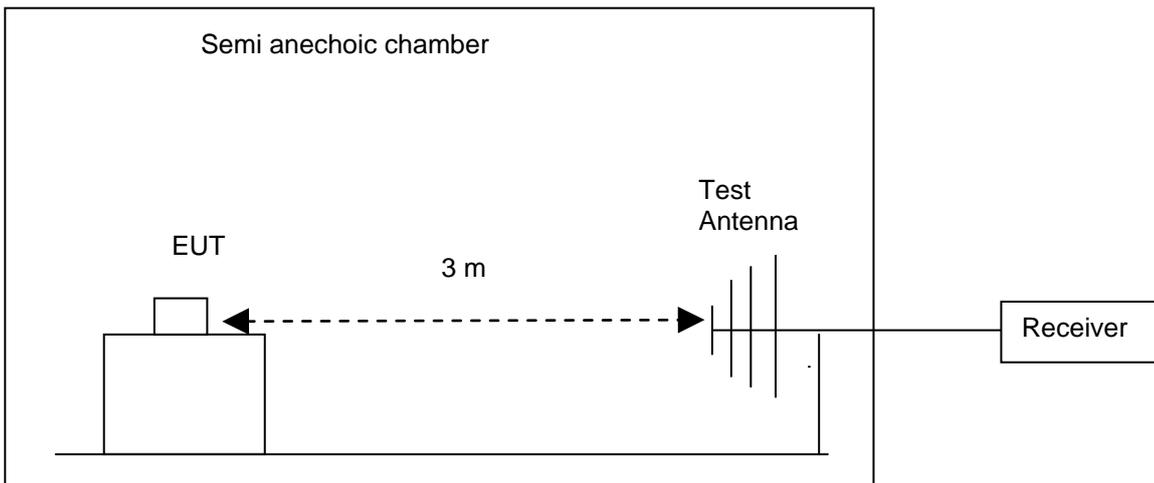


Figure 8. Test Set up

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 μ 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.

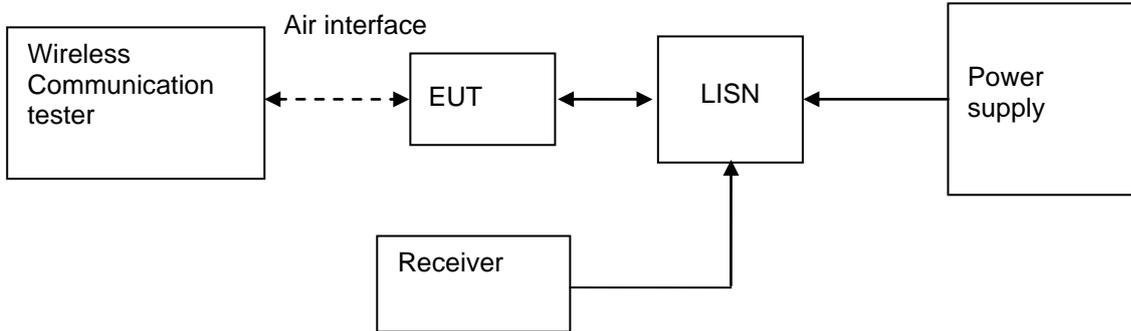


Figure 9. Test Set-up

6.9.4 Measurement Result

Table 54 MEASUREMENT RESULT:QP DECTER

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.152000 | 41.00 | 10.1 | 66 | 25.0 | N | FLO |
| 0.202000 | 45.20 | 10.1 | 64 | 18.8 | N | FLO |
| 0.770000 | 33.90 | 10.1 | 56 | 22.1 | N | FLO |
| 0.966000 | 35.20 | 10.1 | 56 | 20.8 | N | FLO |
| 3.390000 | 30.10 | 10.2 | 56 | 25.9 | N | FLO |
| 6.302000 | 29.20 | 10.2 | 60 | 30.8 | N | FLO |

Table 55 MEASUREMENT RESULT:AV DECTER

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.204000 | 30.50 | 10.1 | 53 | 22.5 | N | FLO |
| 0.336000 | 29.10 | 10.0 | 49 | 19.9 | N | FLO |
| 0.706000 | 27.40 | 10.1 | 46 | 18.6 | N | FLO |
| 1.186000 | 25.90 | 10.1 | 46 | 20.1 | N | FLO |
| 3.110000 | 24.00 | 10.2 | 46 | 22.0 | N | FLO |
| 5.368000 | 22.60 | 10.2 | 50 | 27.4 | N | 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 μ V/m) | U=2.2dB; k=2 U=5dB; k=2 |
| Conducted emission test for power port | Disturbance Voltage(dB μ 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)

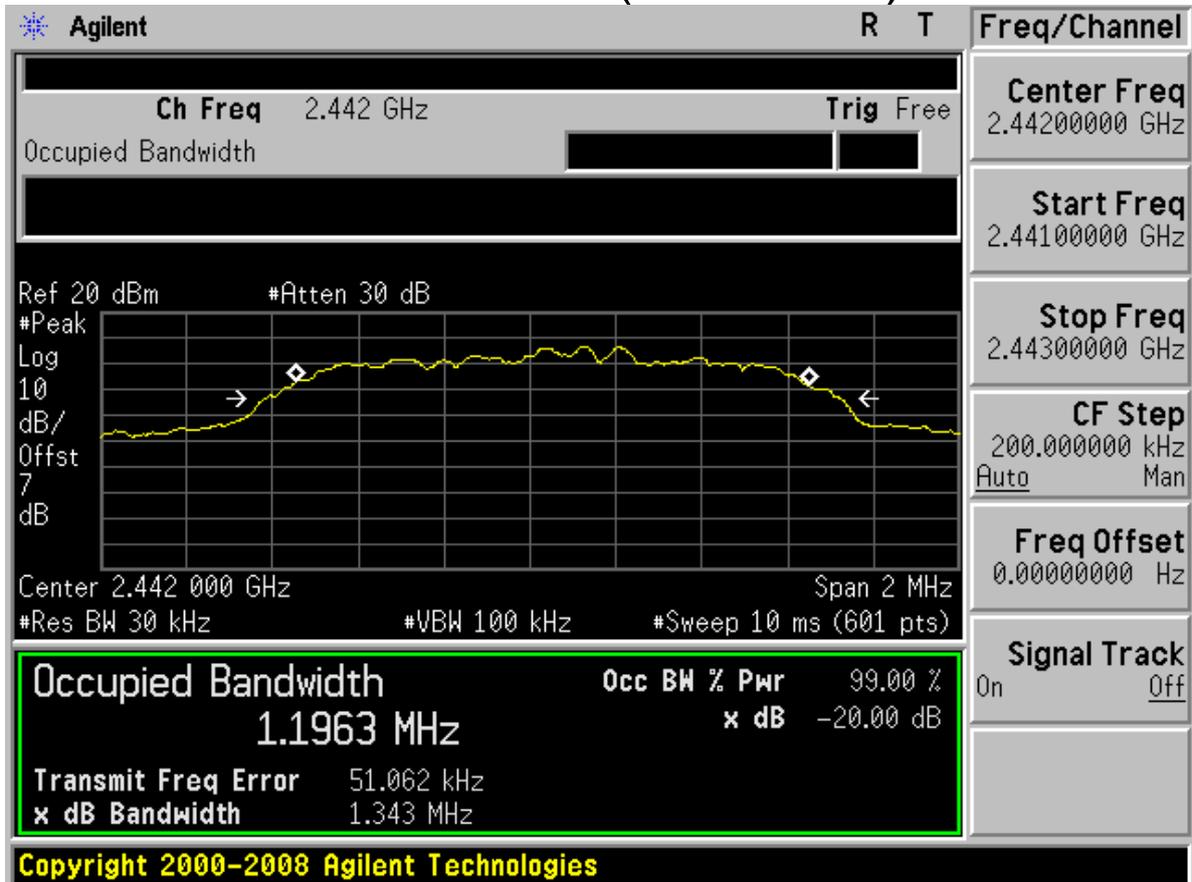


Modulation: $\pi/4$ -DQPSK Channel 0 (2402MHz)



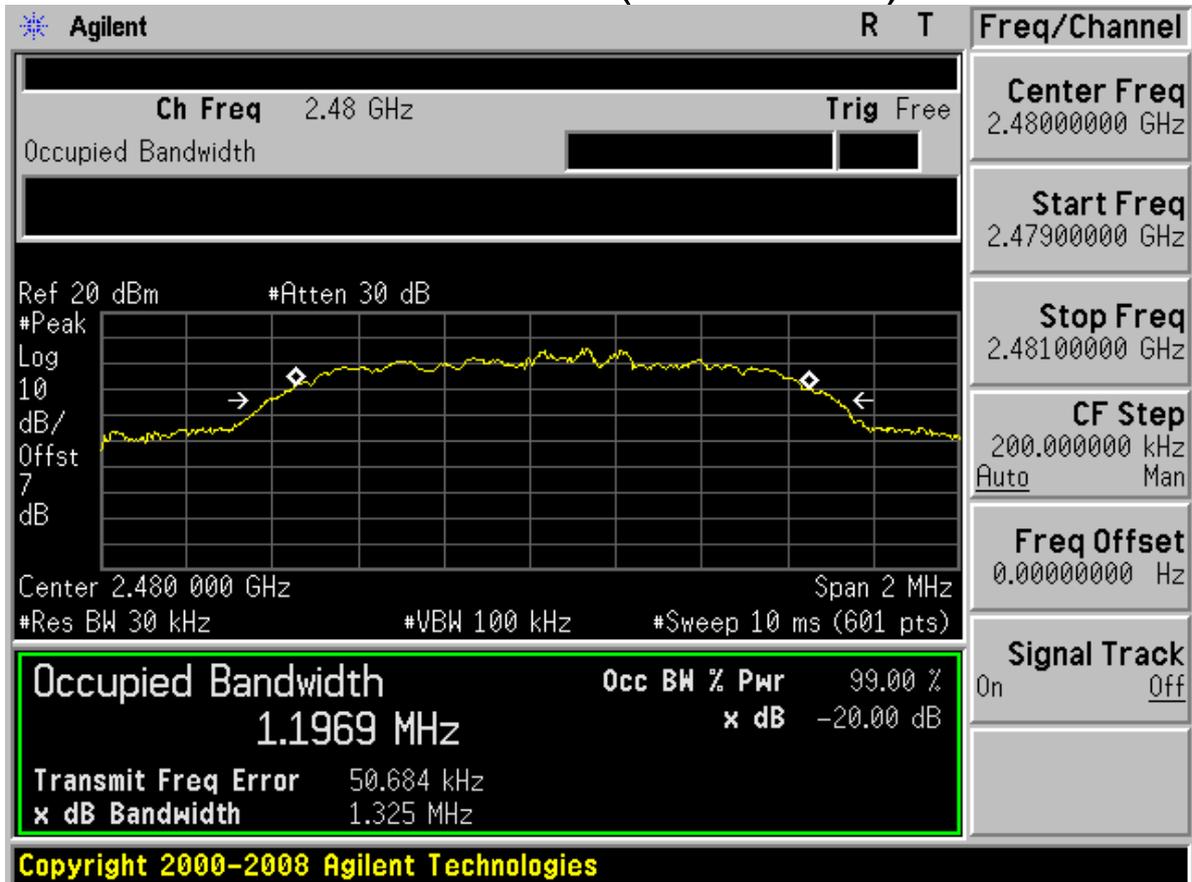


Channel 40 (2442MHz)



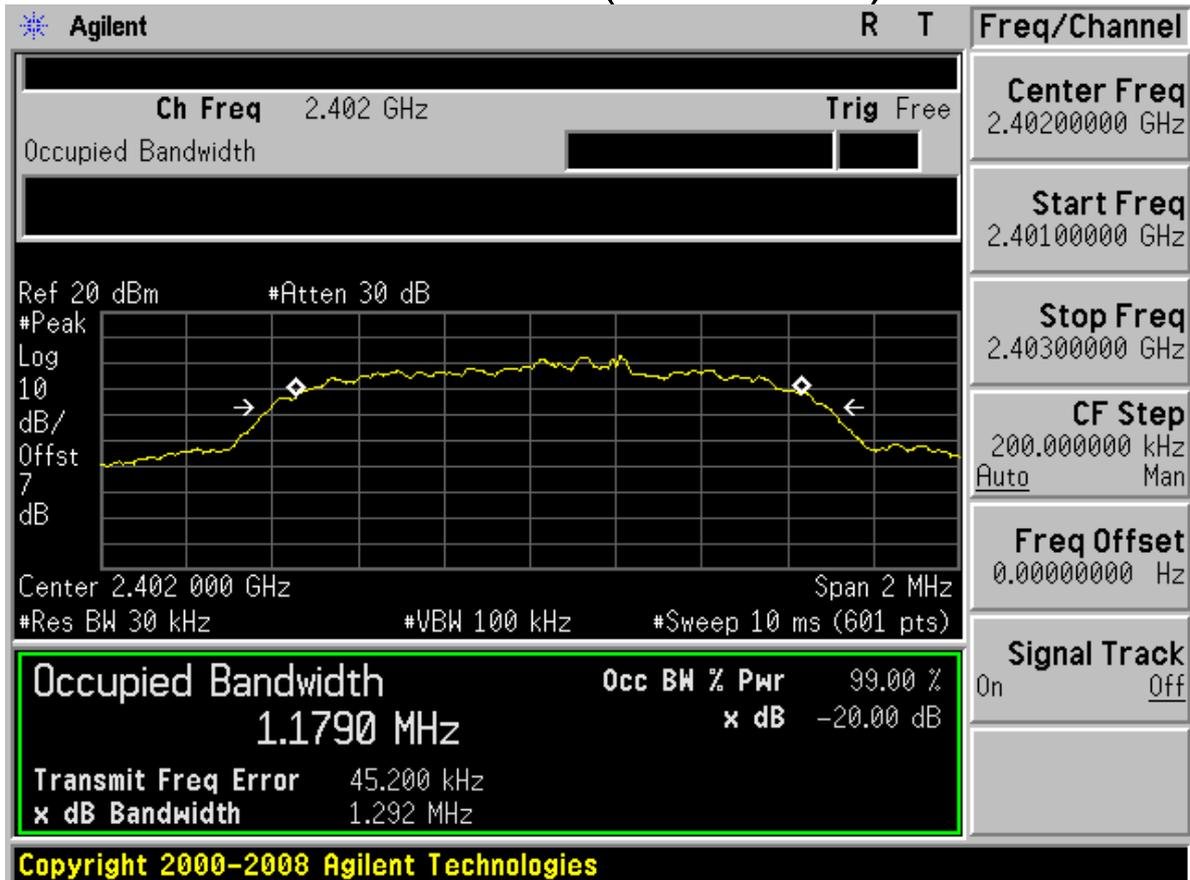


Channel 78 (2480MHz)



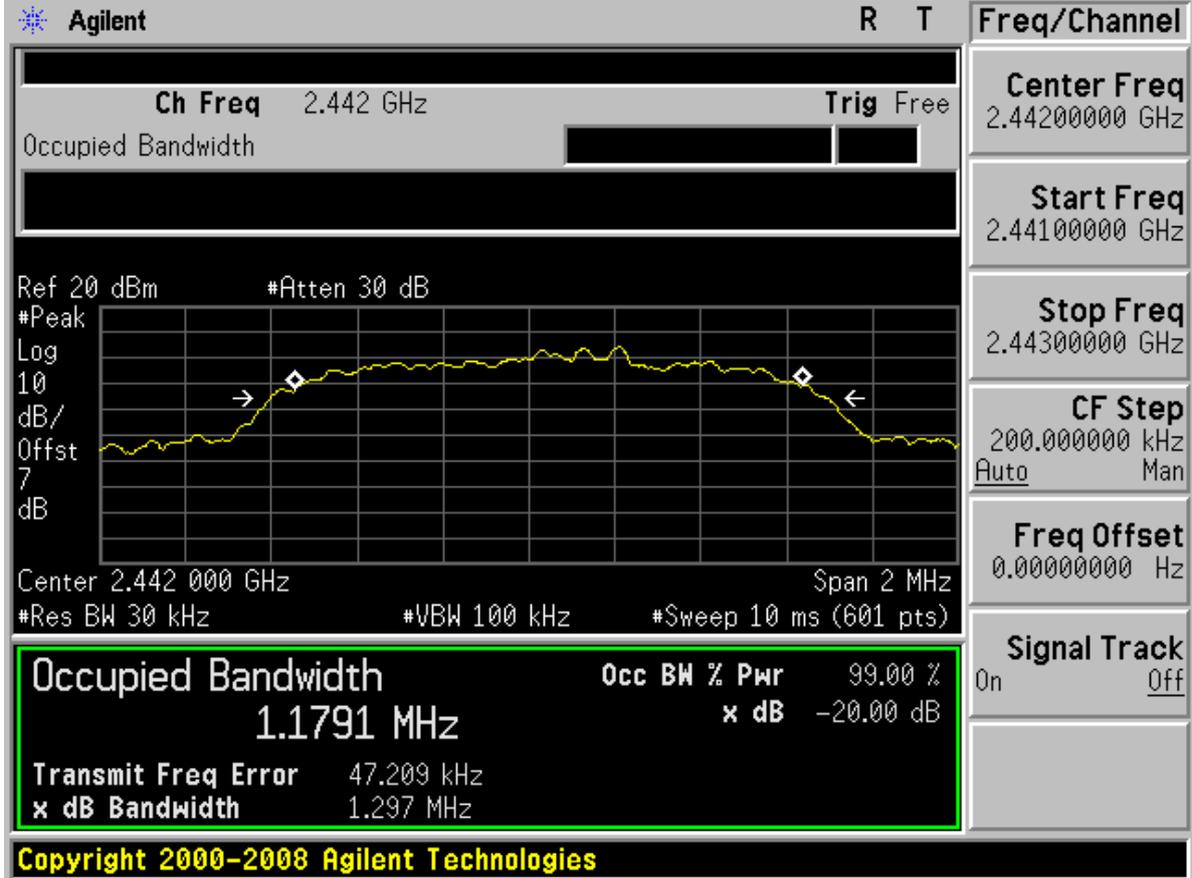


Modulation:8DPSK Channel 0 (2402MHz)



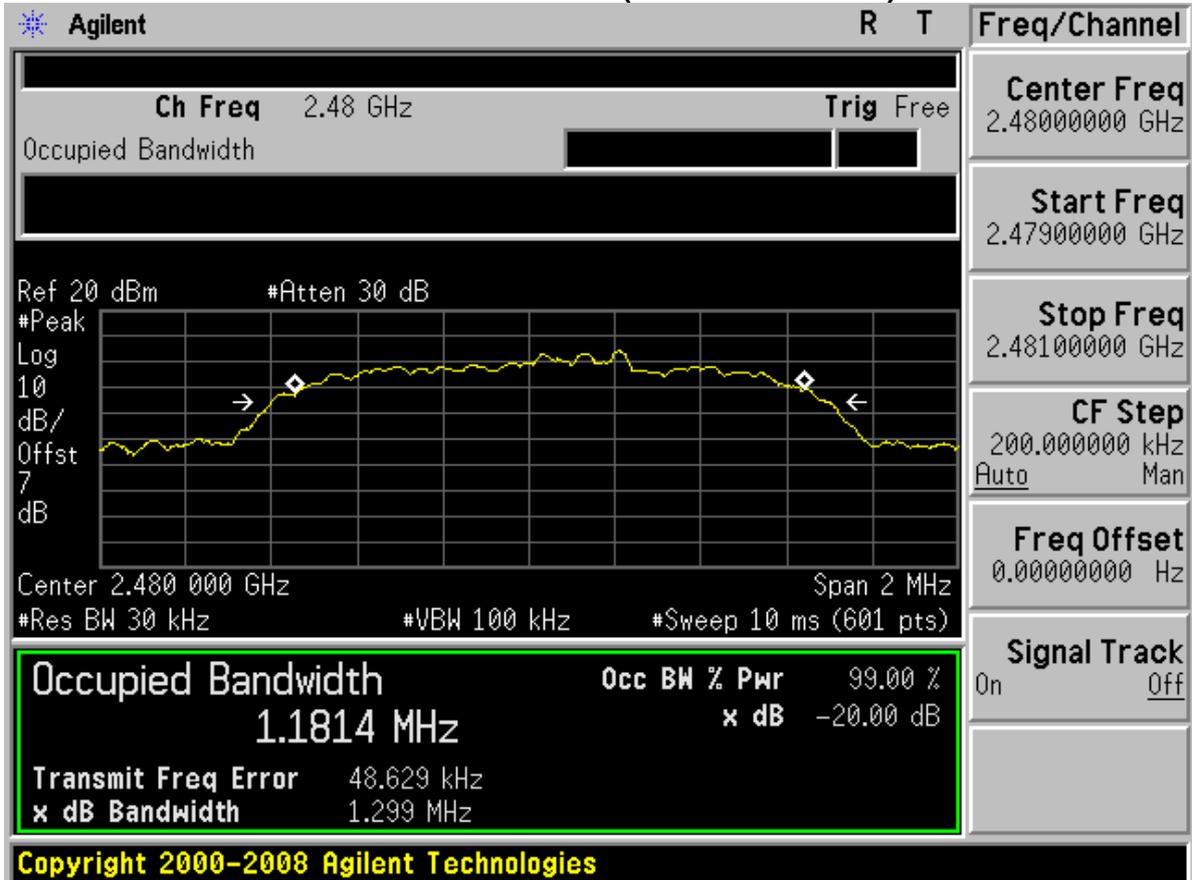


Channel 40 (2442MHz)





Channel 78 (2480MHz)



The END



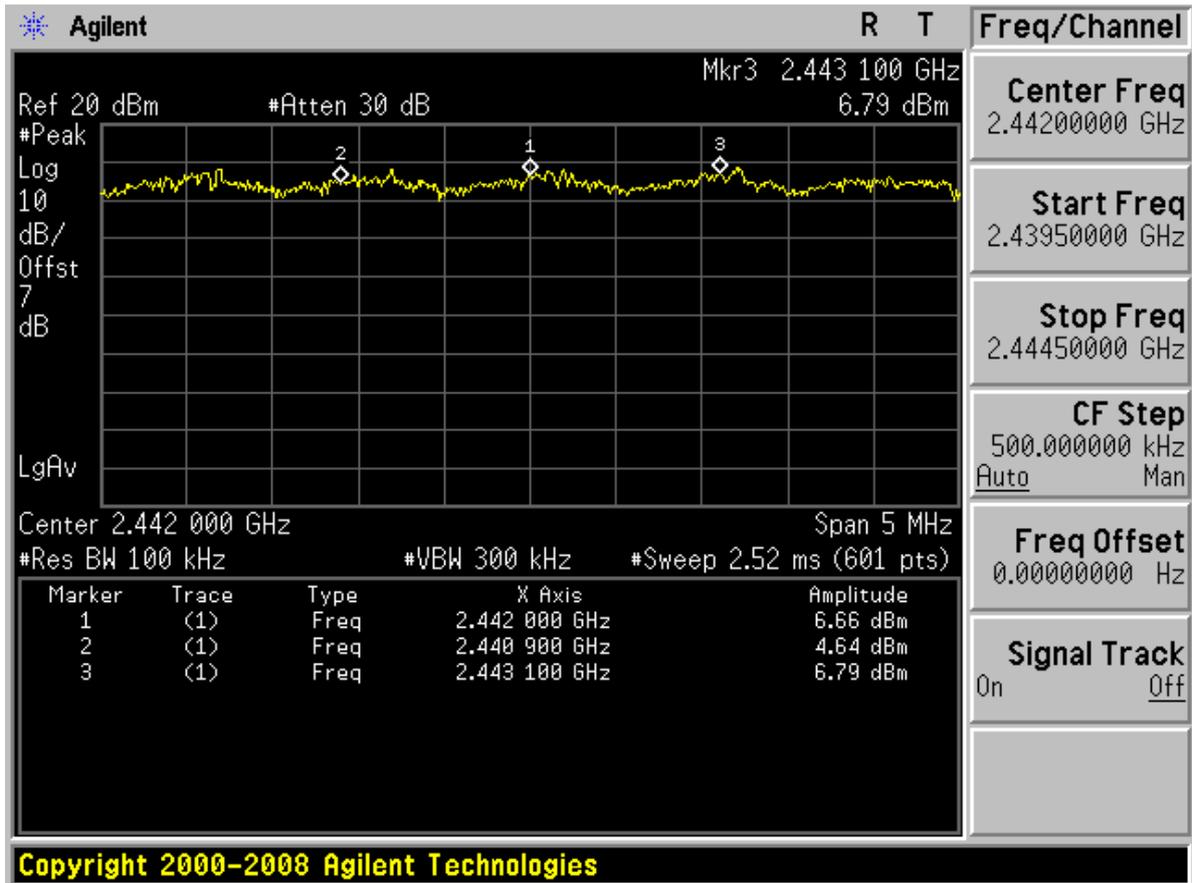
Appendix B

Carrier frequency separation measurement

According to FCC Part 15.247 (a) (1)

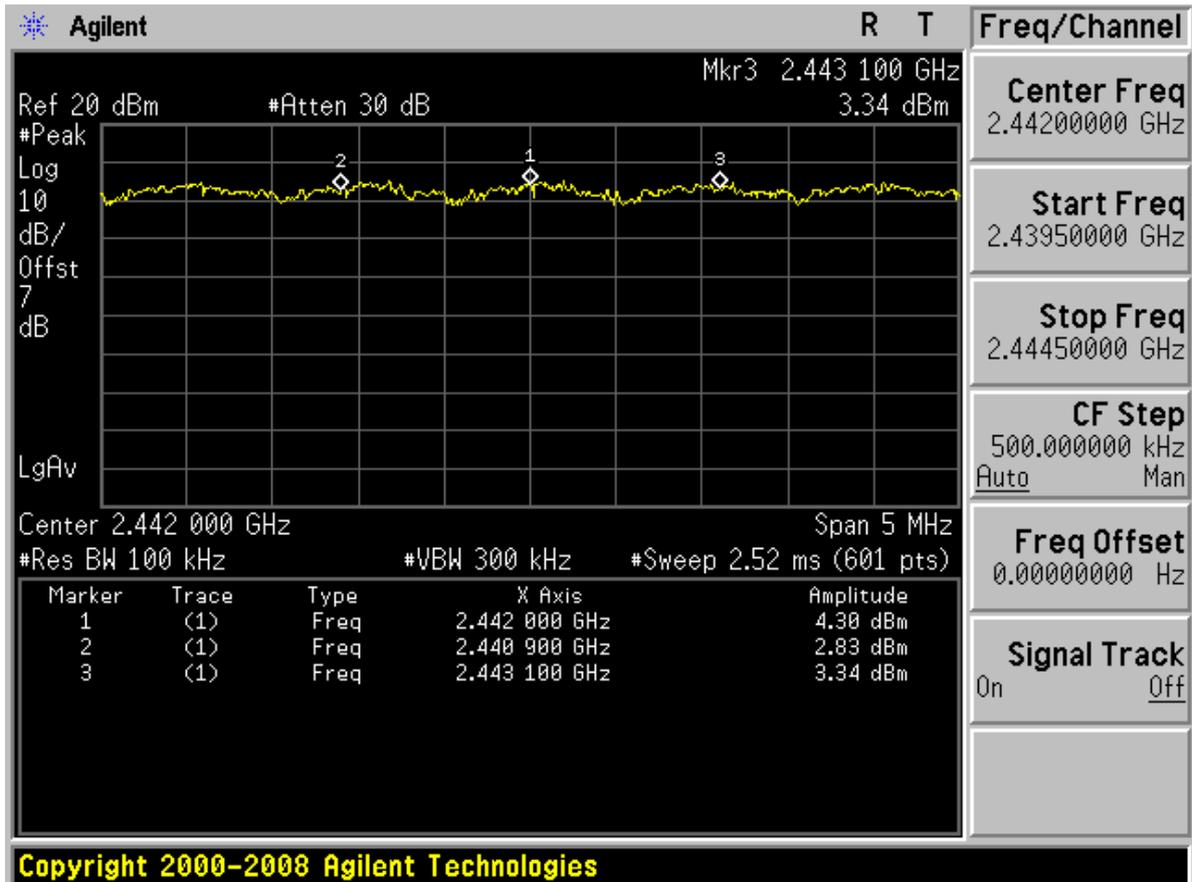


Modulation: $\pi/4$ -DQPSK Centred at Channel 40





Modulation:8DPSK Centred at Channel 40



The END



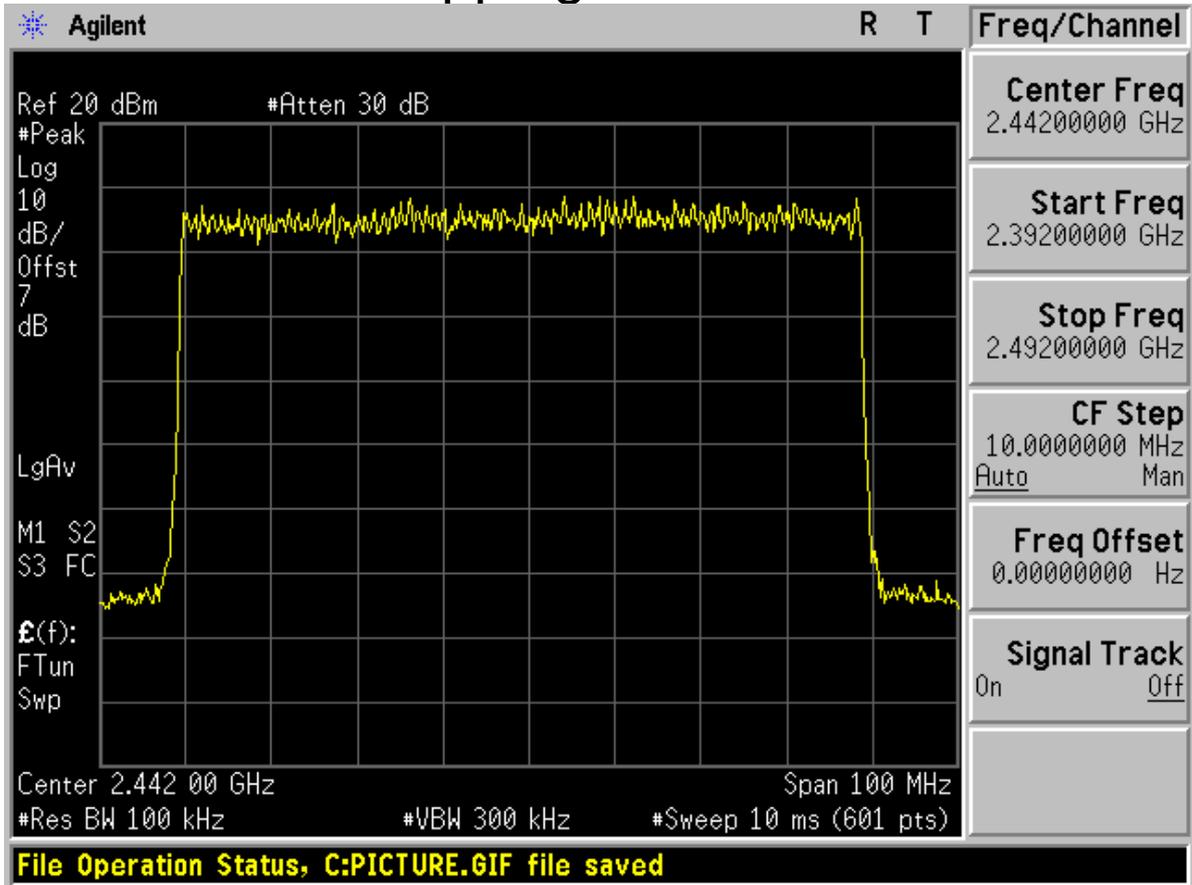
Appendix C

Number of hopping channel

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

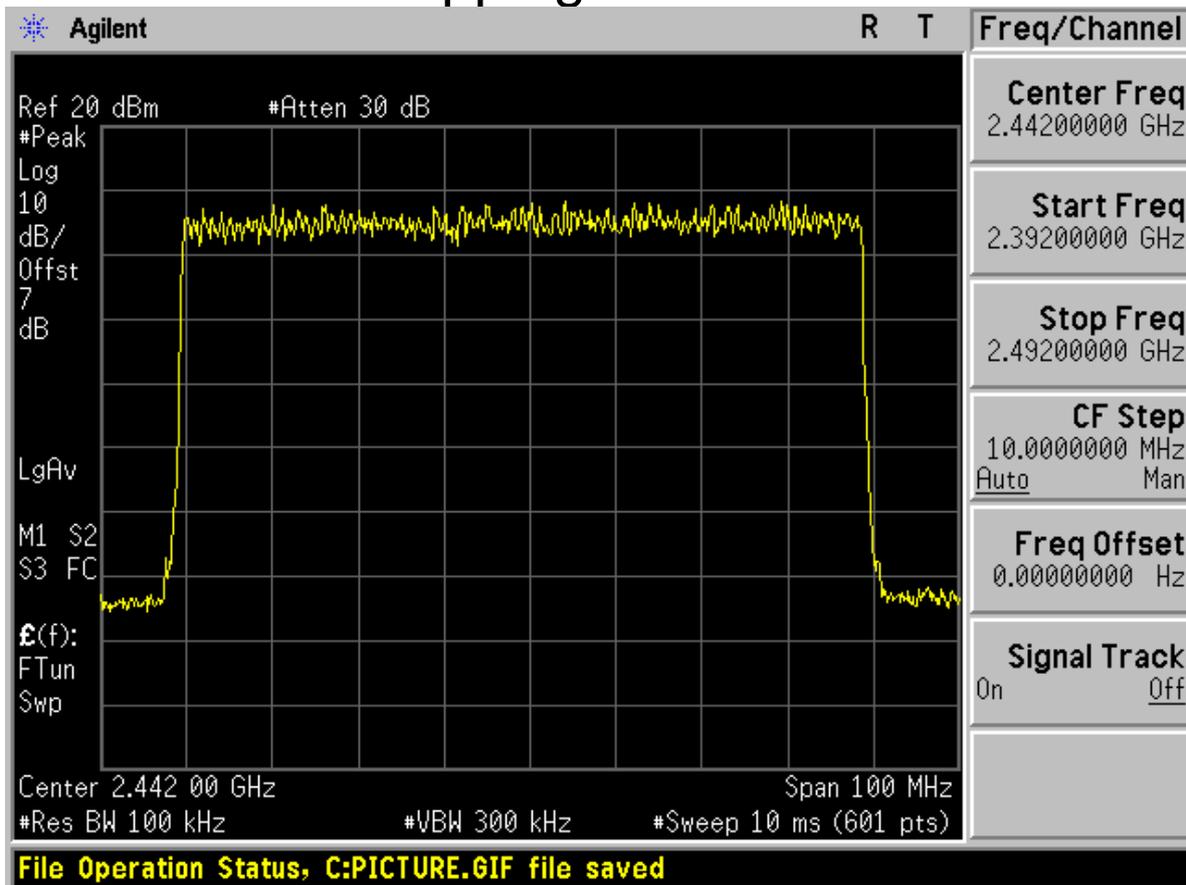


Modulation: $\pi/4$ -DQPSK Total hopping channels = 79





Modulation:8DPSK Total hopping channels = 79



The END



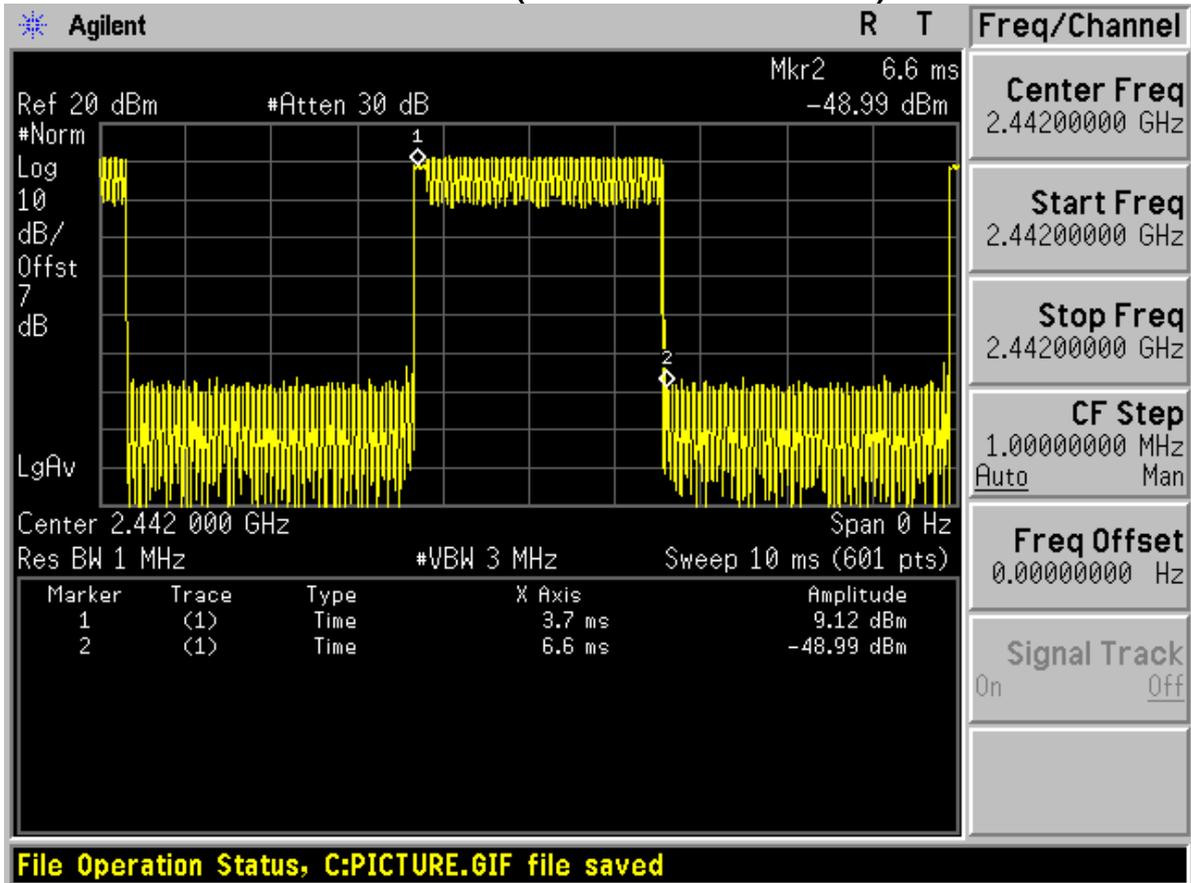
Appendix D

Time of occupancy

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

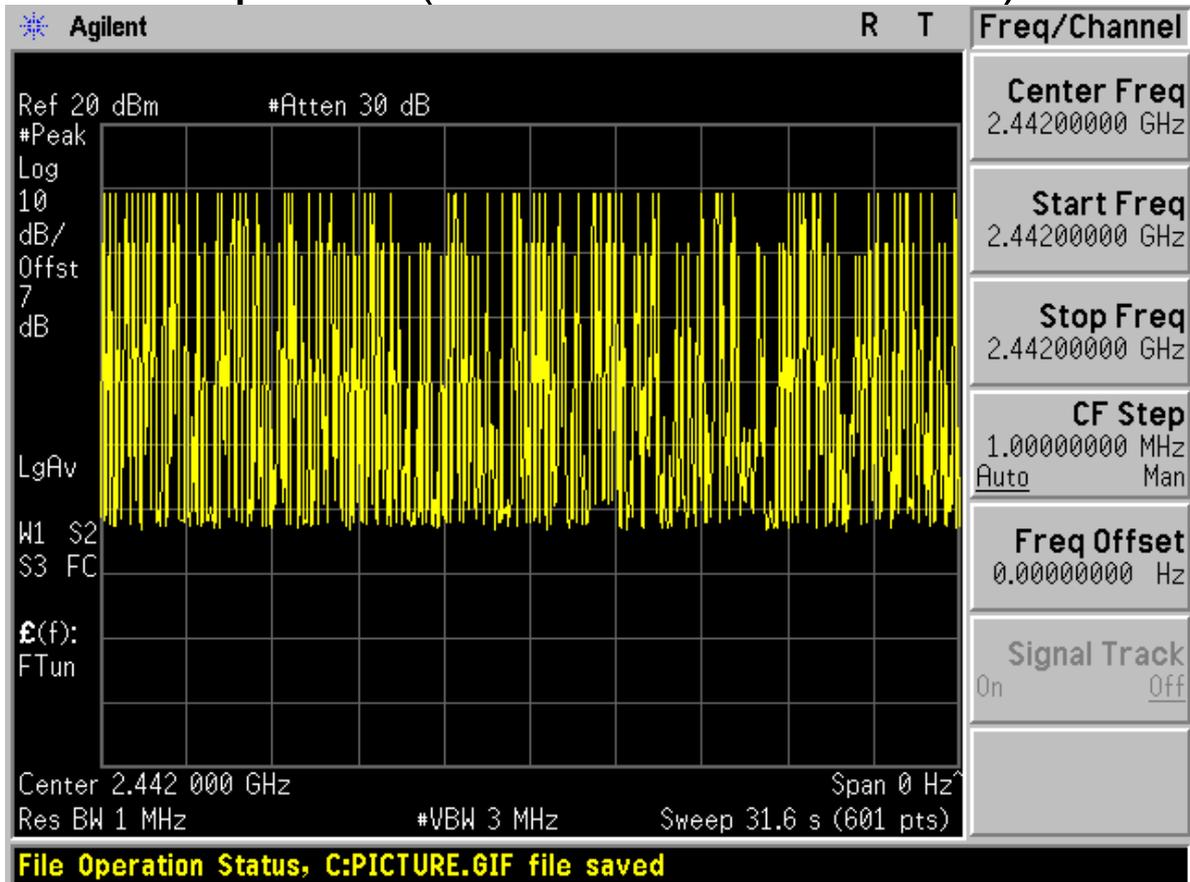


Modulation: $\pi/4$ -DQPSK A burst (One time slot)



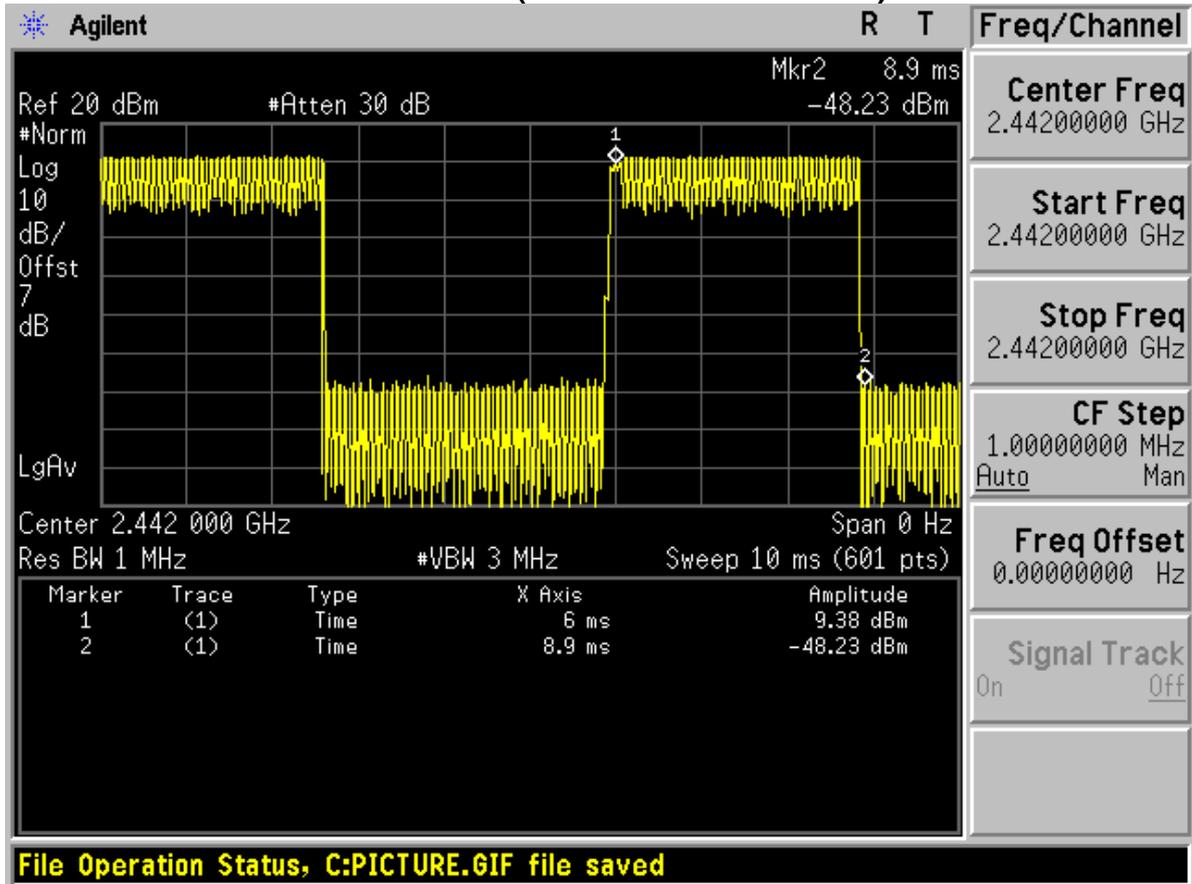


A period (Less than 106.7 burst)



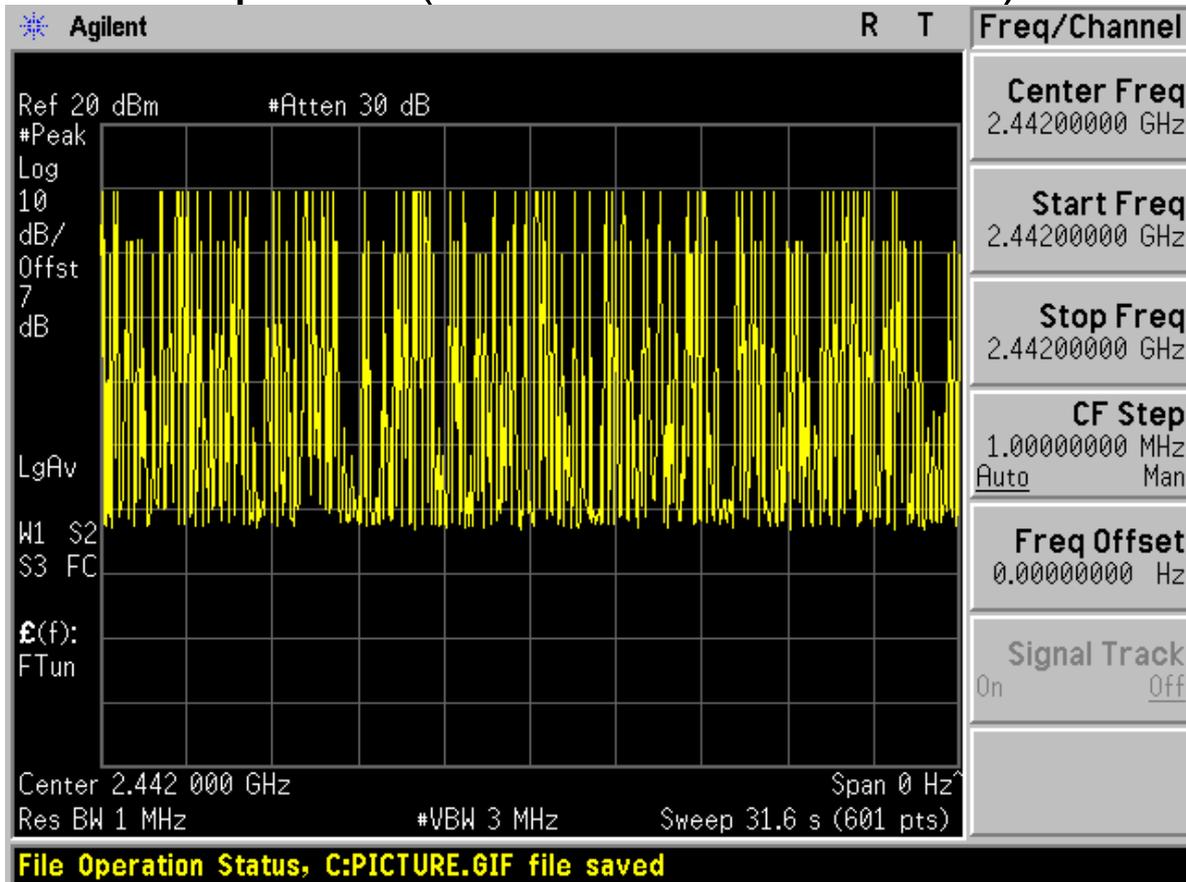


Modulation:8DPSK A burst (One time slot)





A period (Less than 106.7 burst)



The END



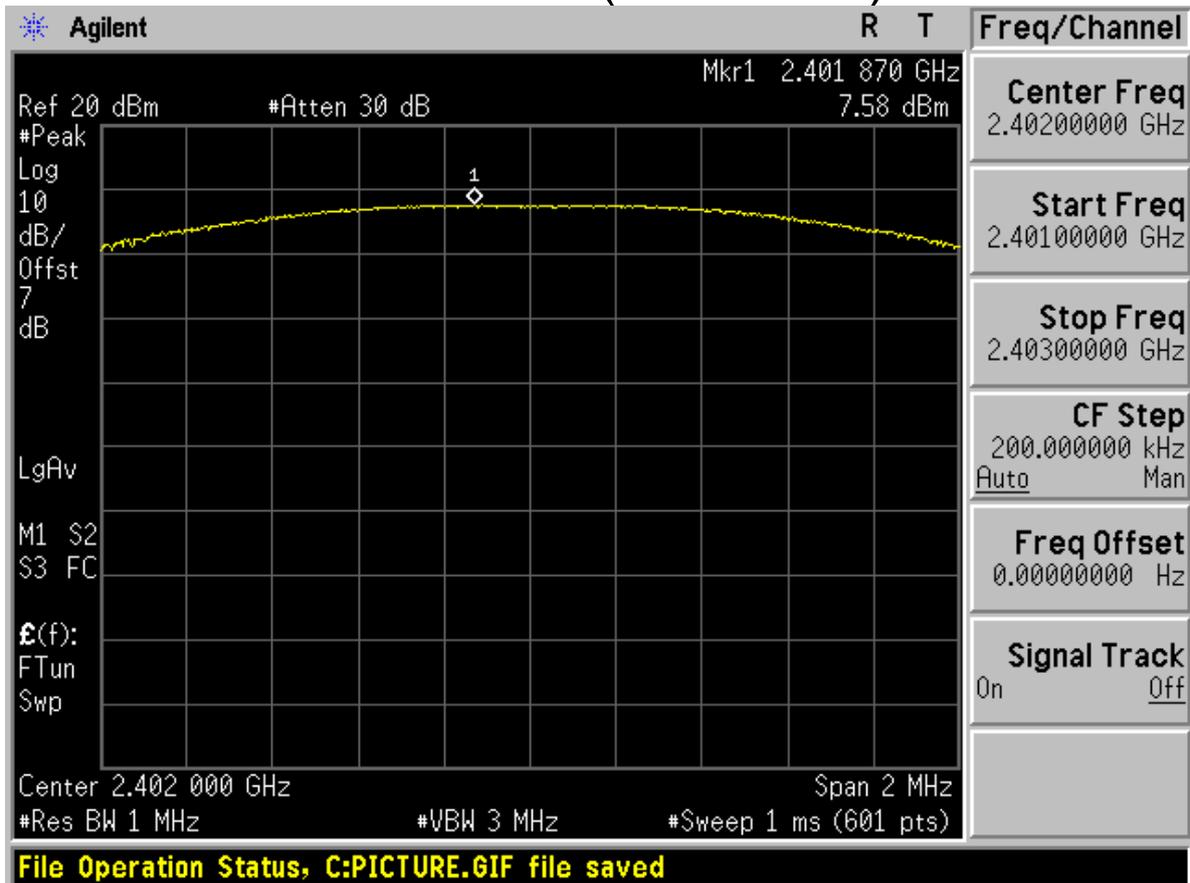
Appendix E

Peak output power

According to FCC Part 15.247 (b) (1)

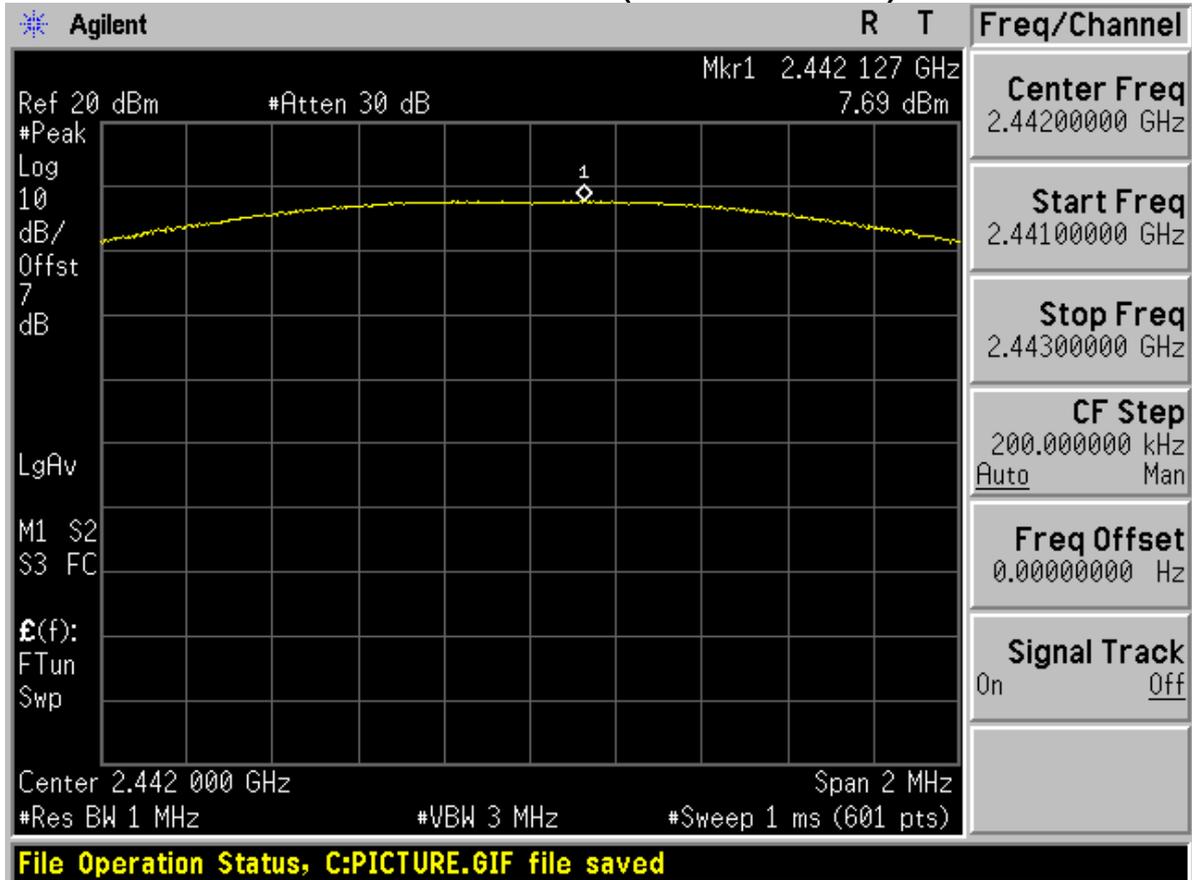


Modulation: $\pi/4$ -DQPSK Channel 0 (2402MHz)



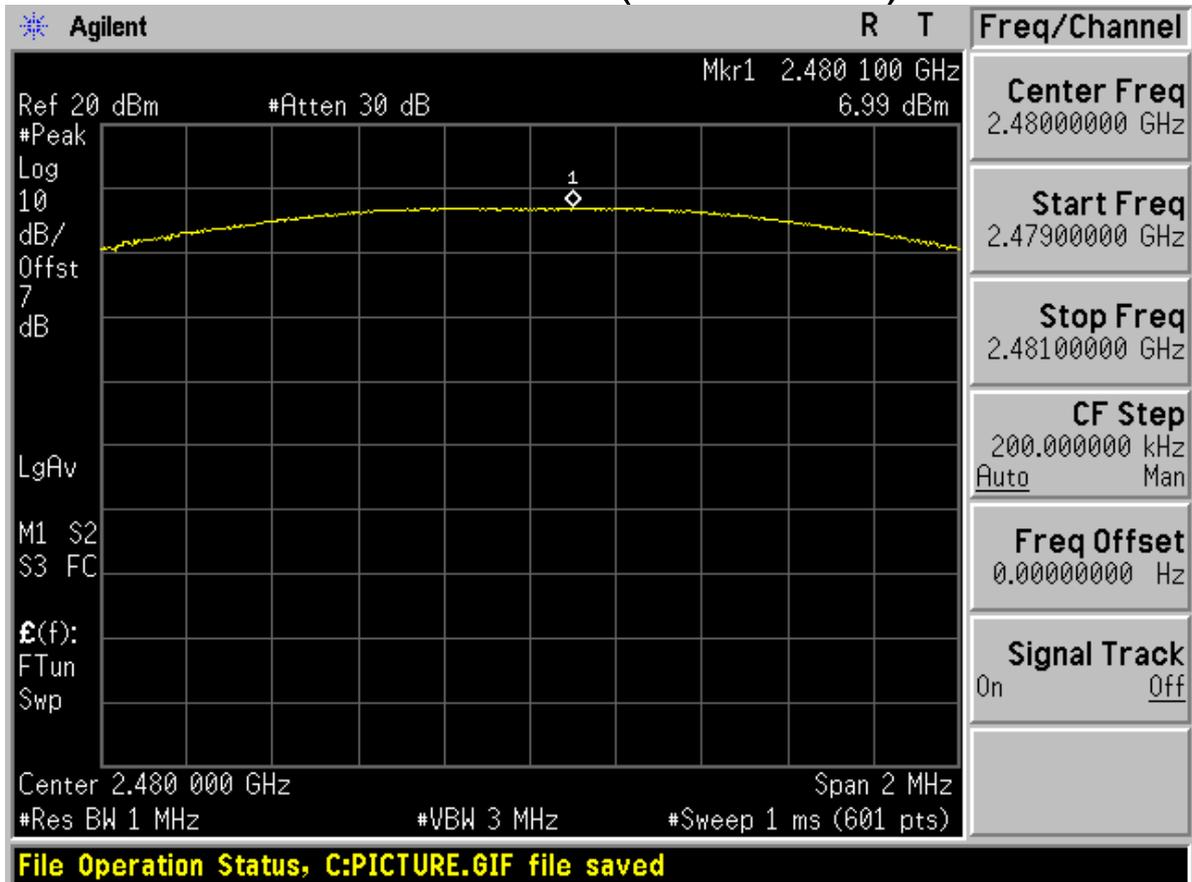


Channel 40 (2442MHz)



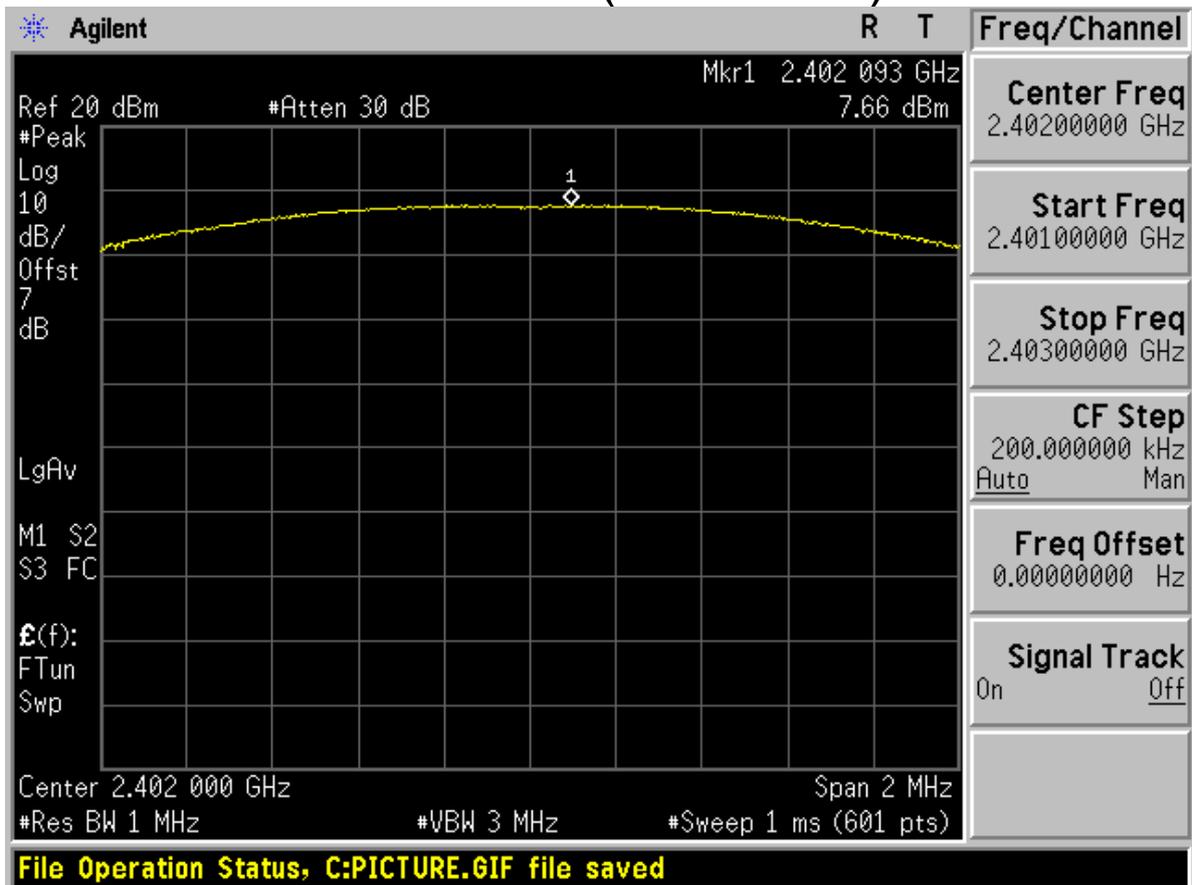


Channel 78 (2480MHz)



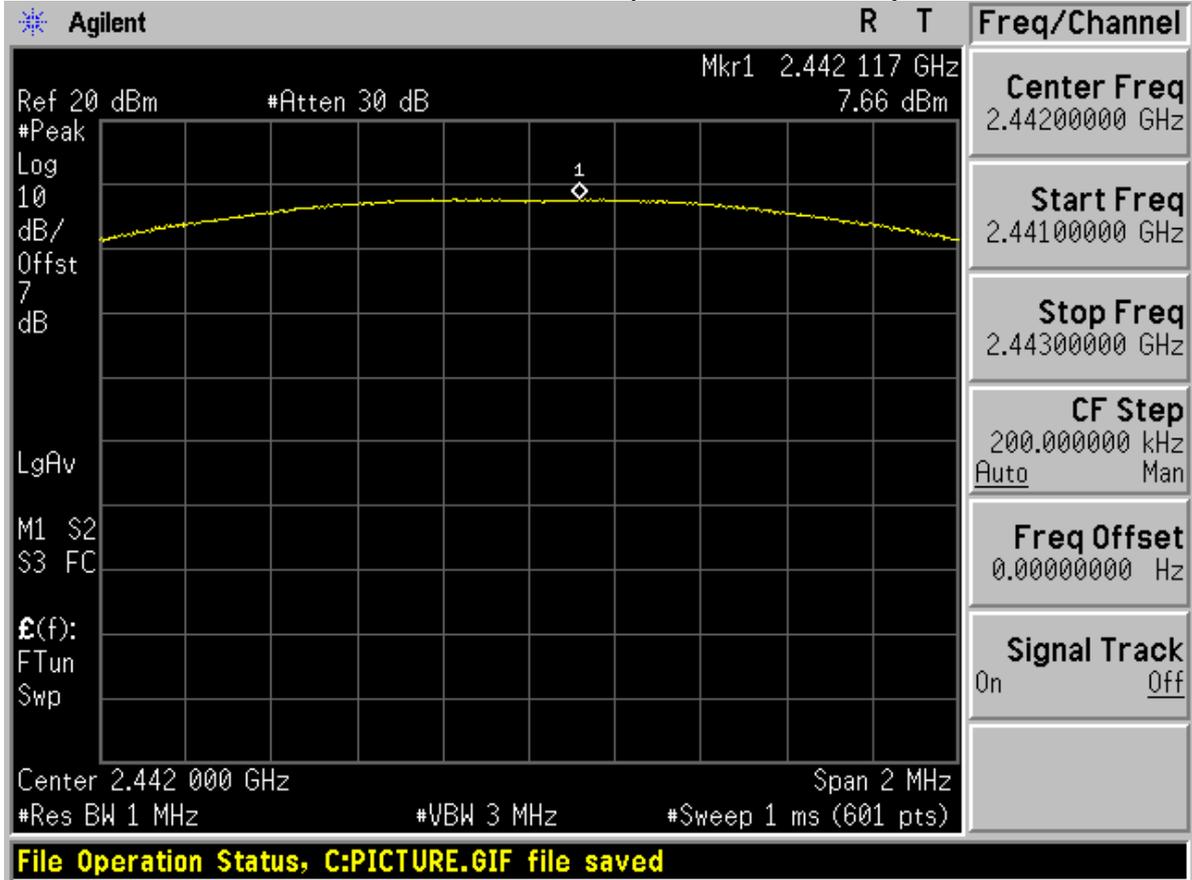


Modulation:8DPSK Channel 0 (2402MHz)



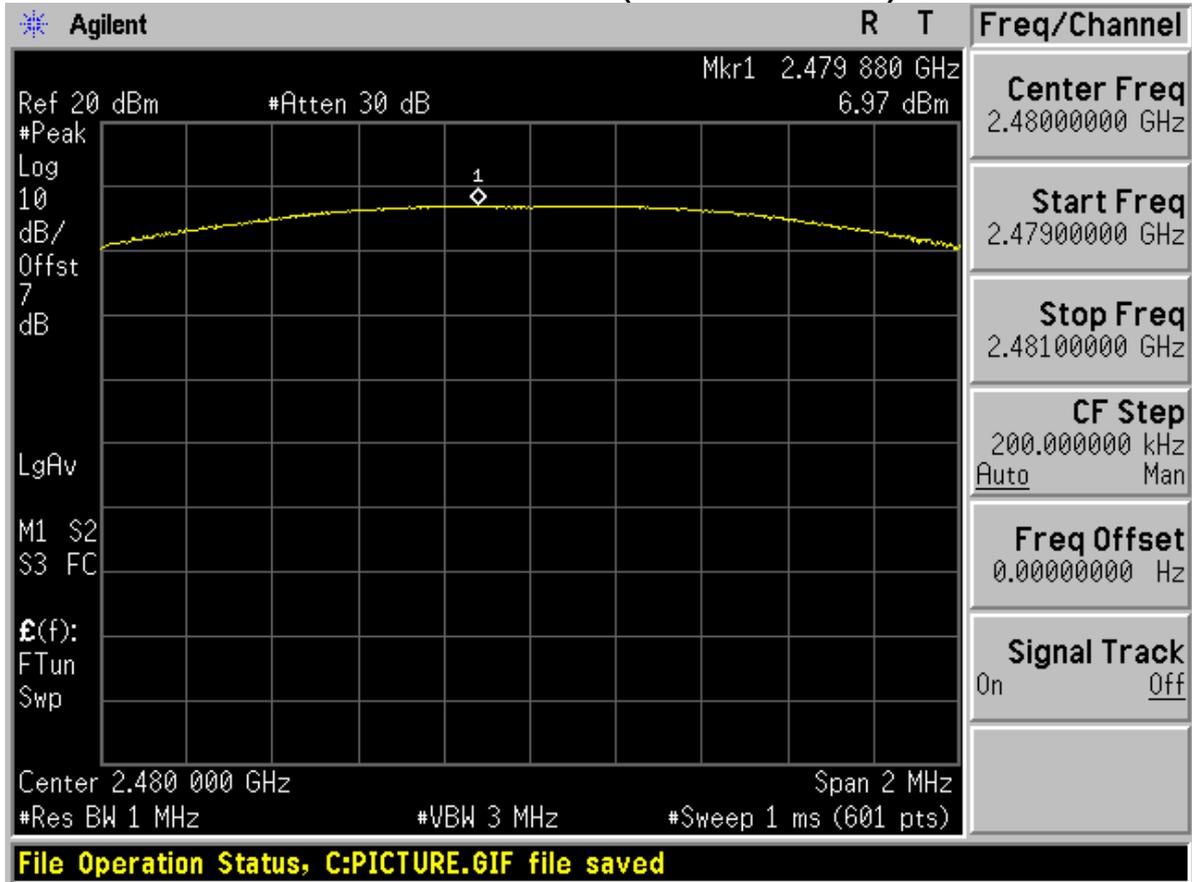


Channel 40 (2442MHz)





Channel 78 (2480MHz)



The END



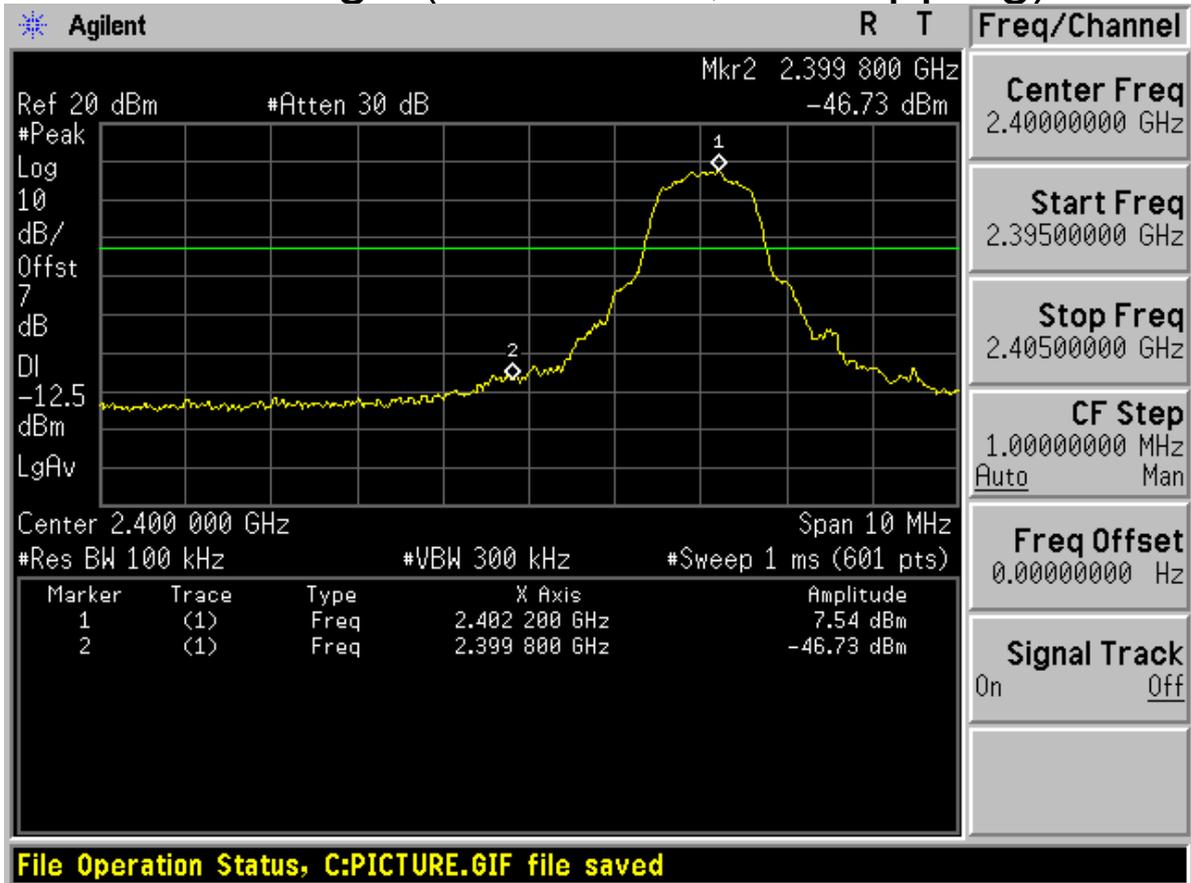
Appendix F

Band edge spurious emission

According to FCC Part 15.247 (d)

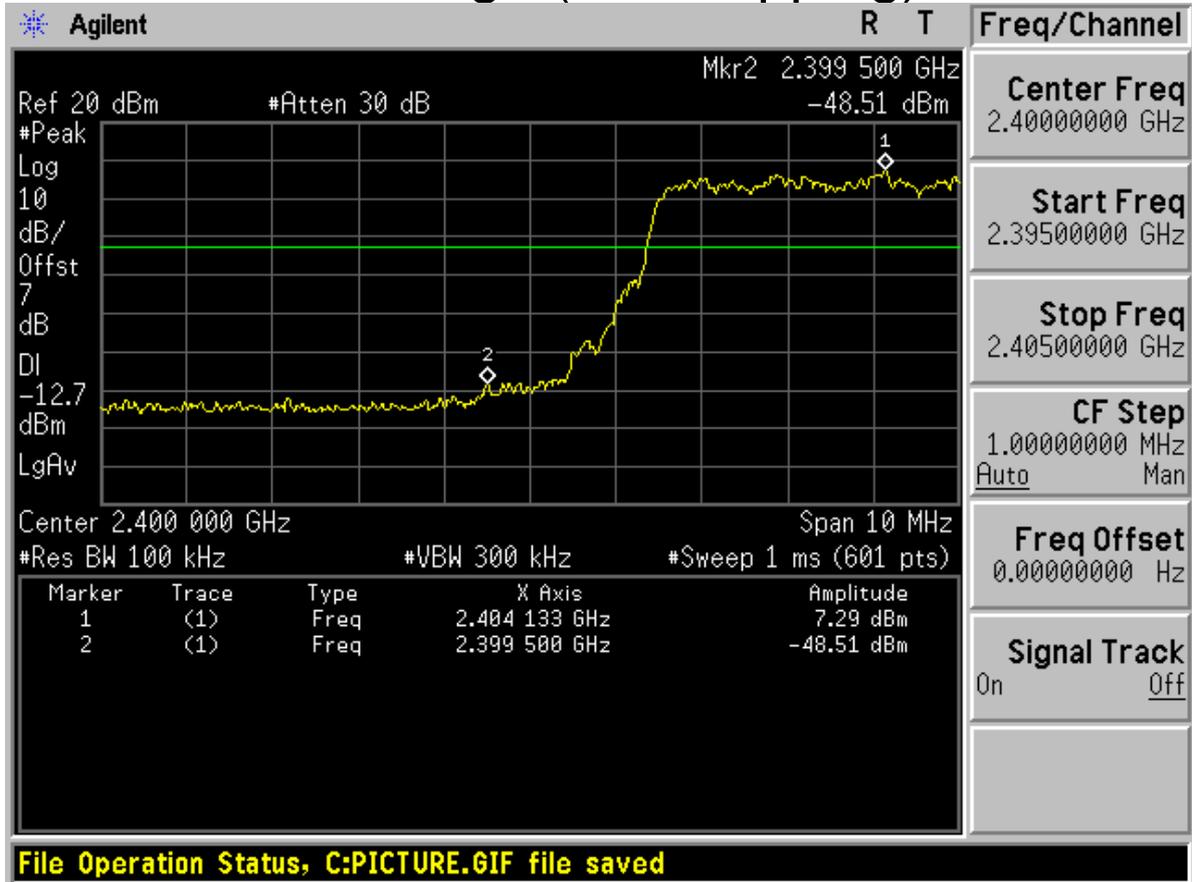


Modulation: $\pi/4$ -DQPSK Low edge (Channel 0, no hopping)



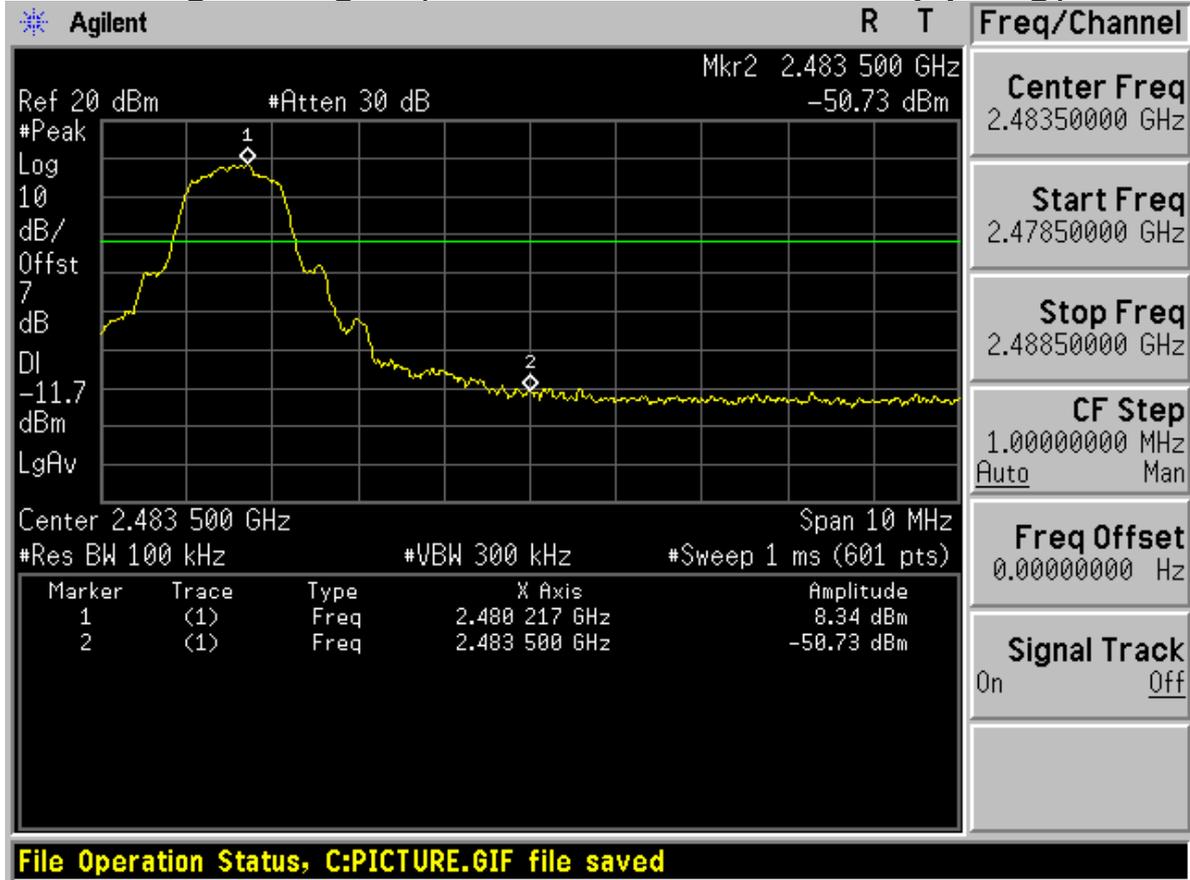


Low edge (with hopping)



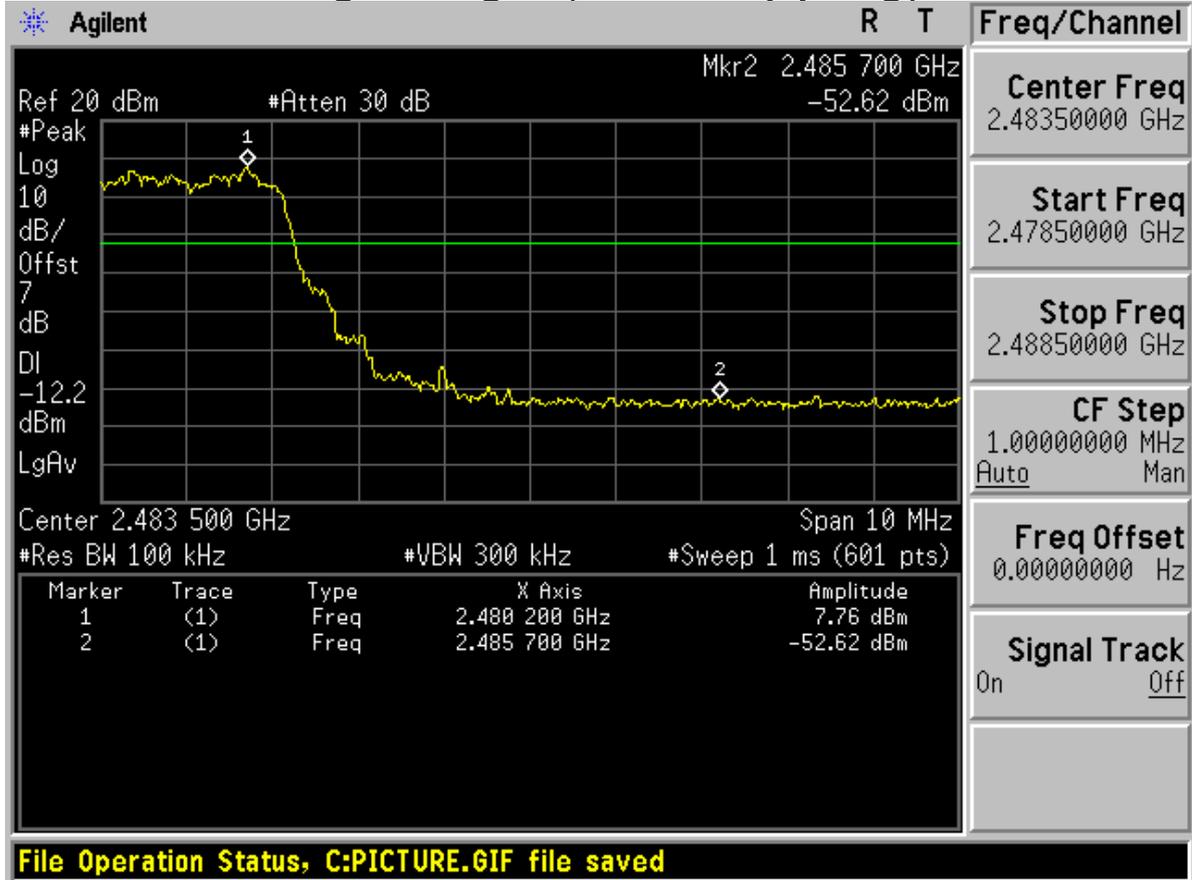


High edge (Channel 78, no hopping)



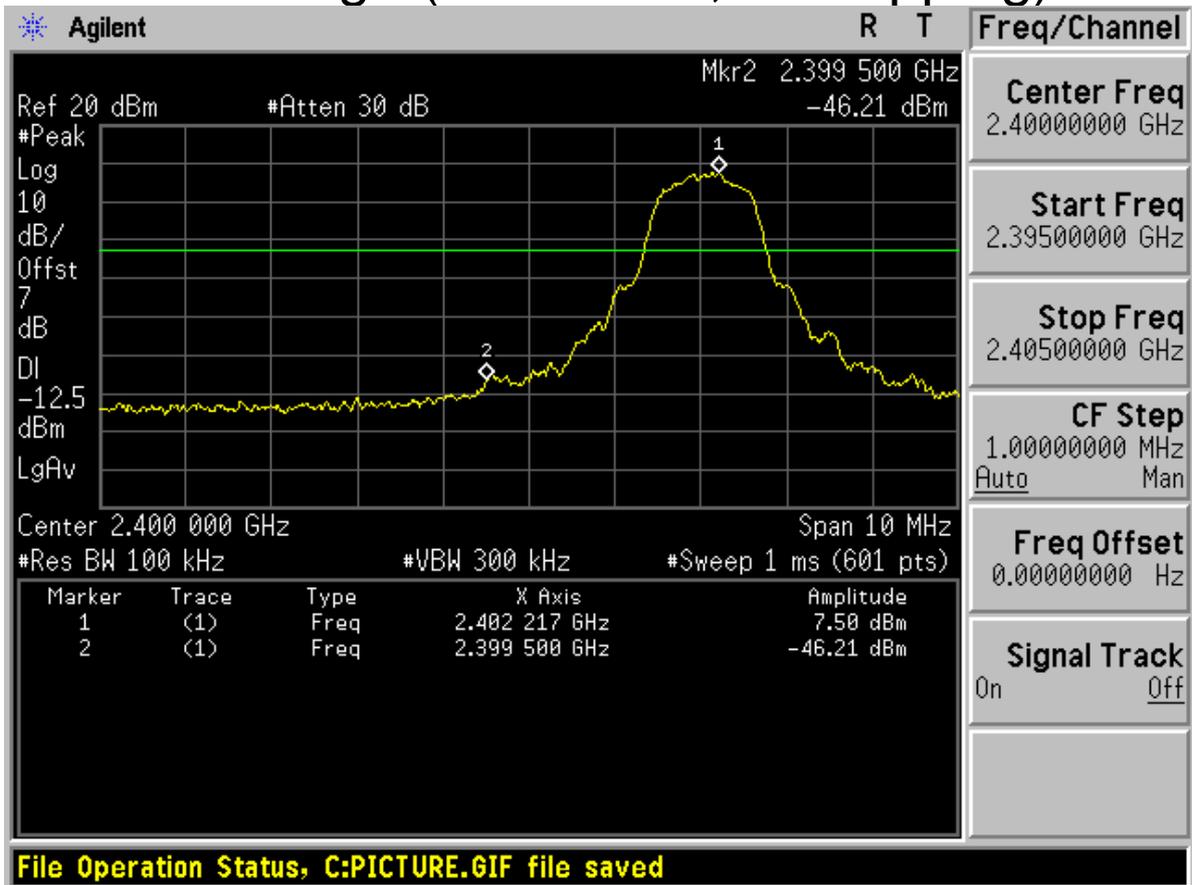


High edge (with hopping)



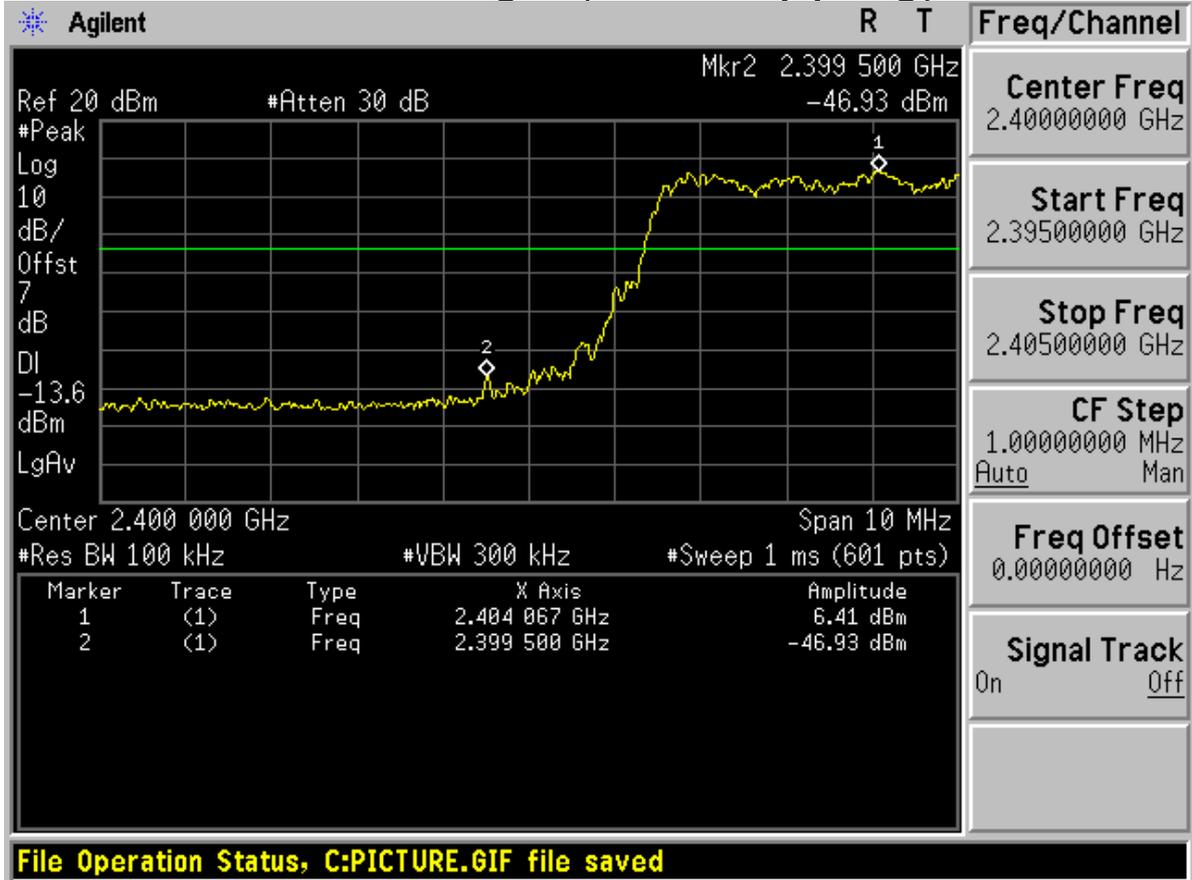


Modulation:8DPSK Low edge (Channel 0, no hopping)



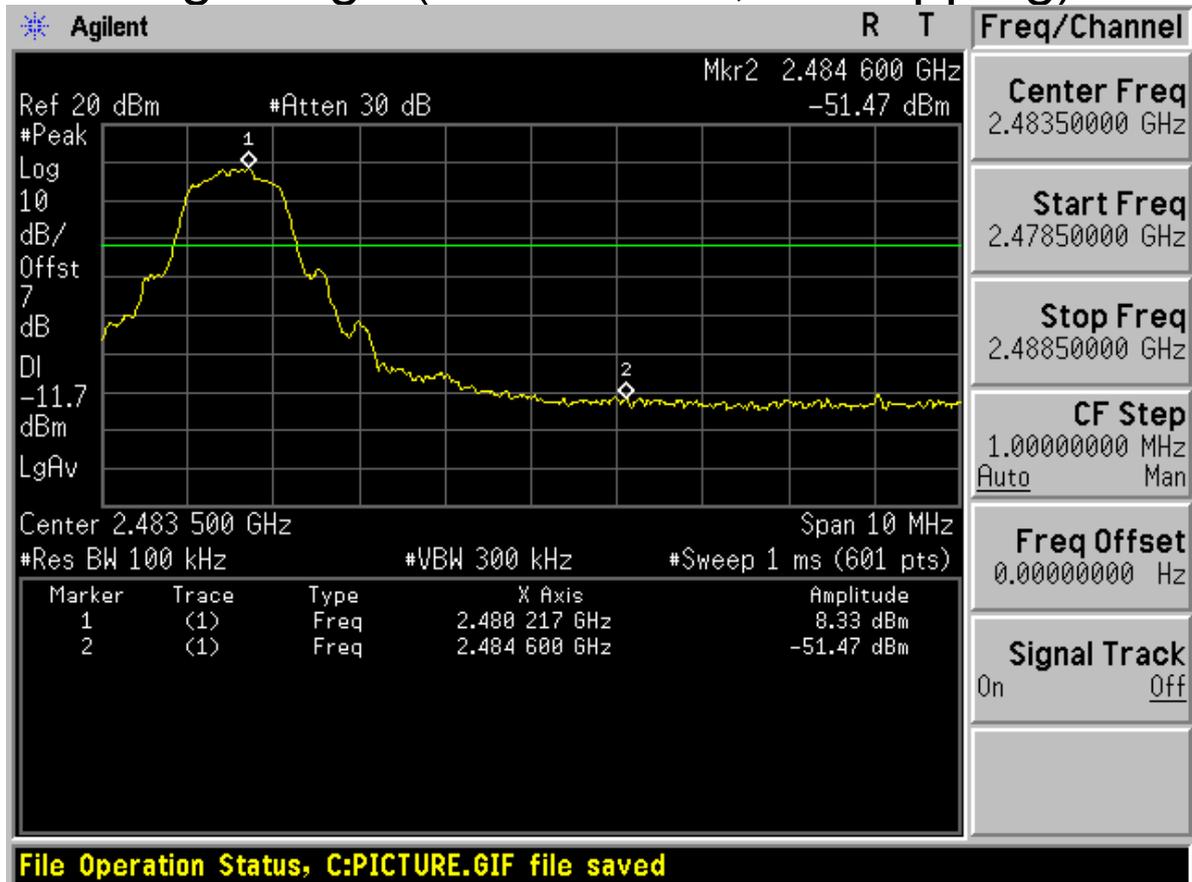


Low edge (with hopping)



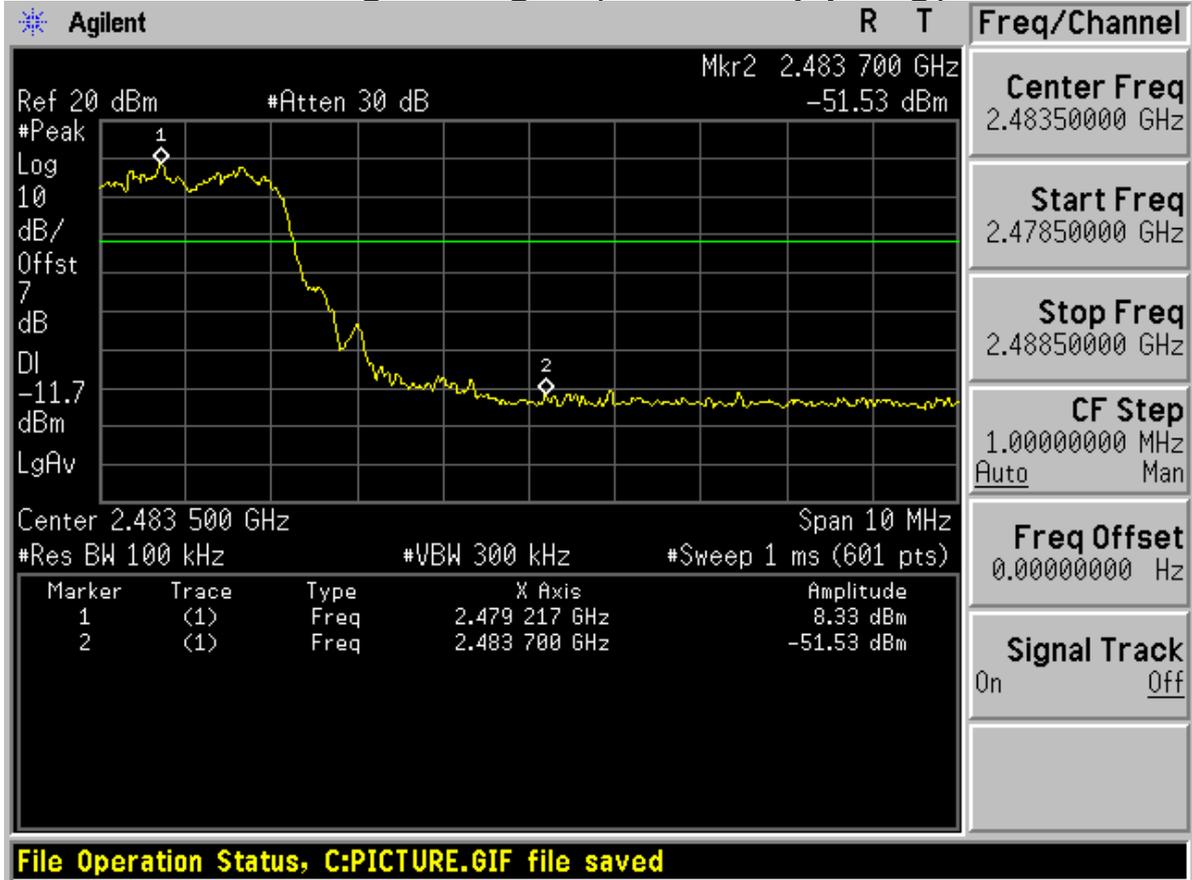


High edge (Channel 78, no hopping)





High edge (with hopping)



The END



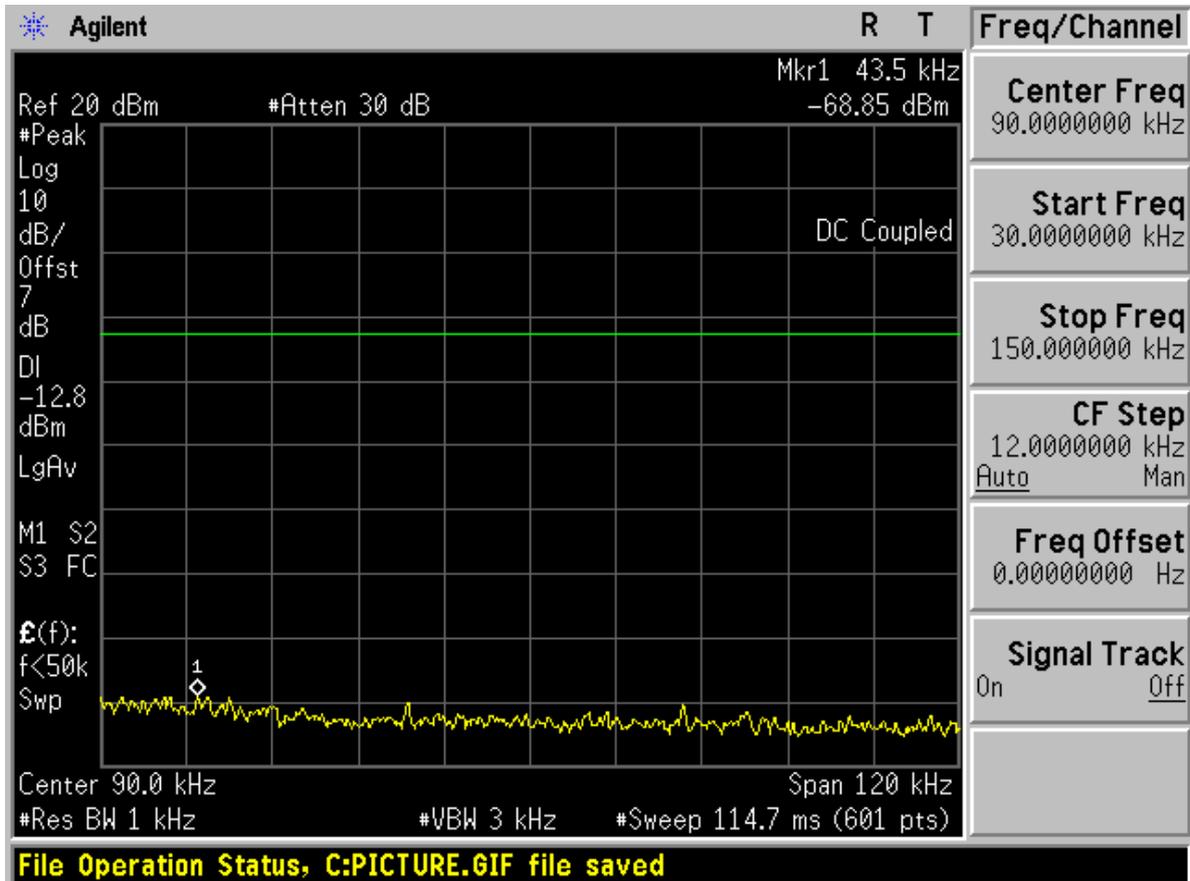
Appendix G

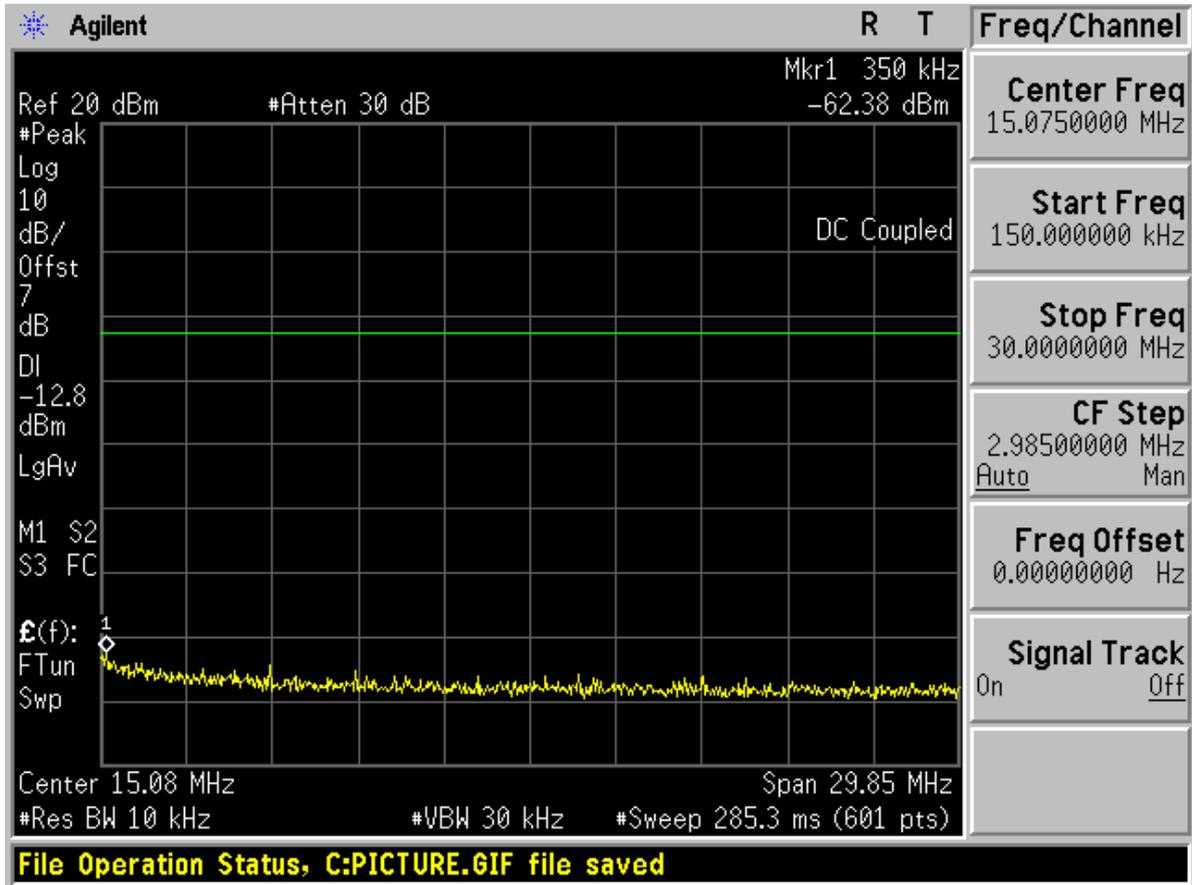
Conducted RF spurious

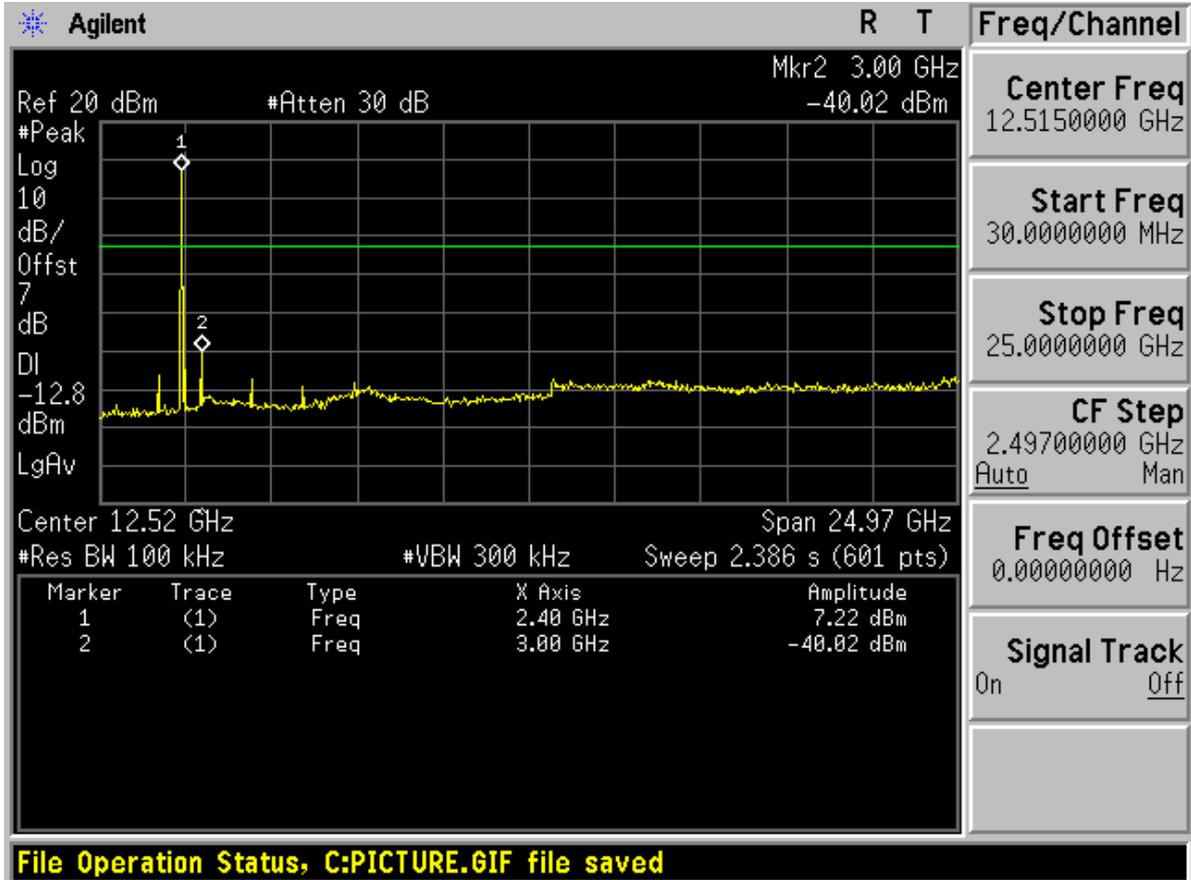
According to FCC Part 15.247 (d)



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

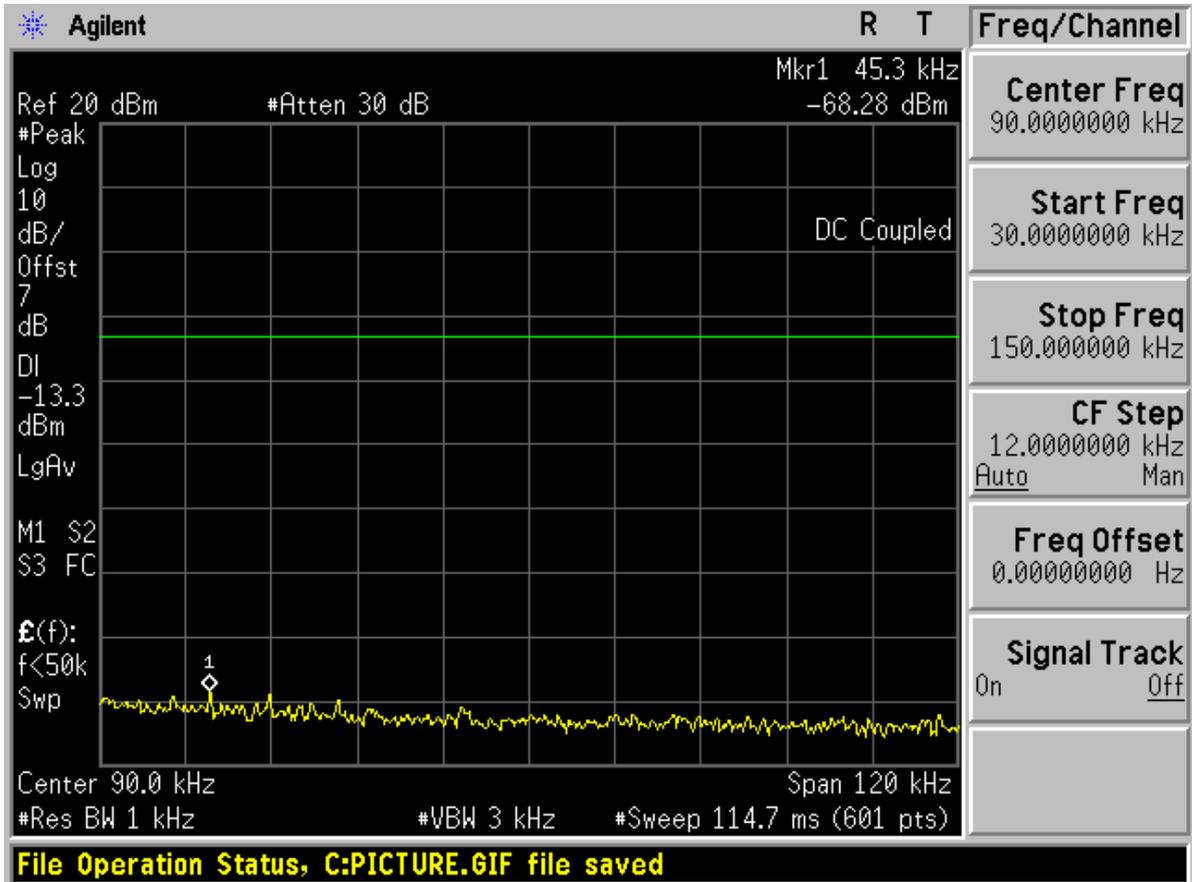


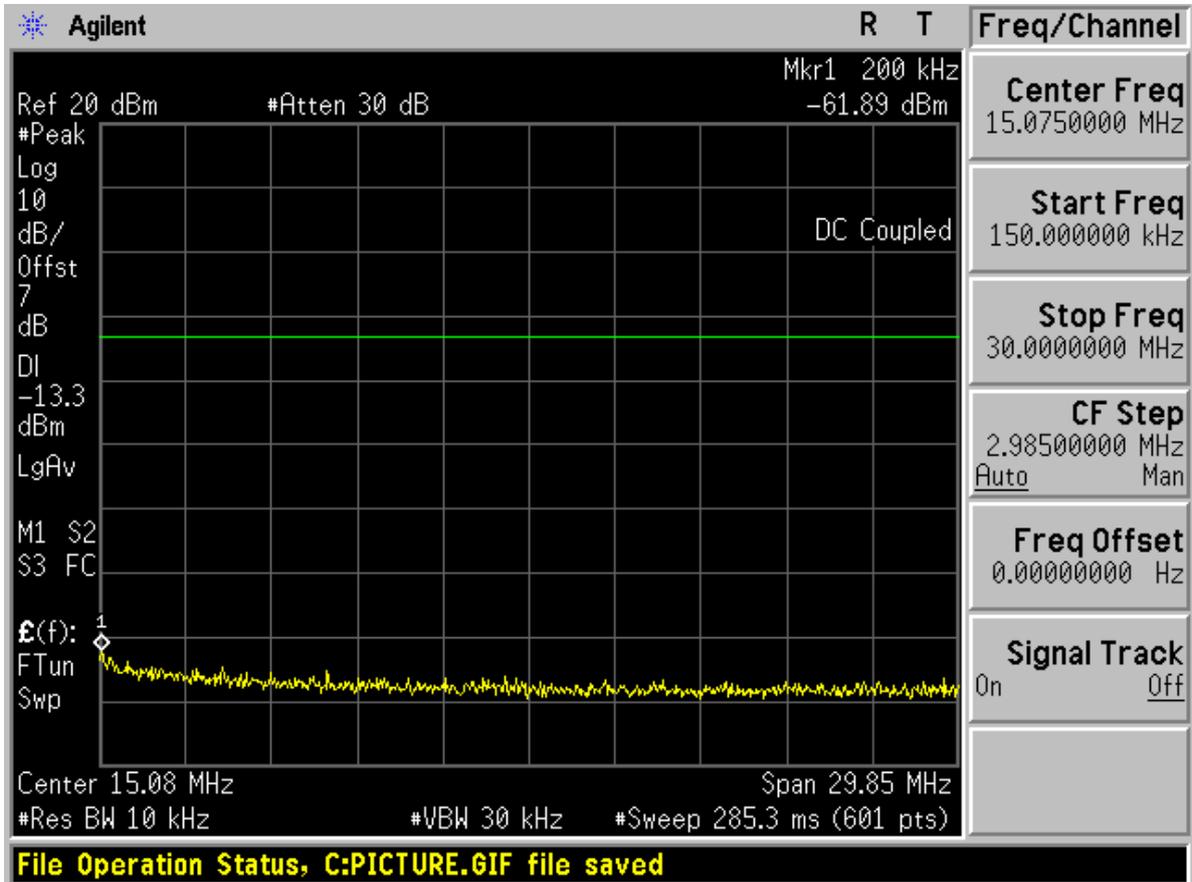


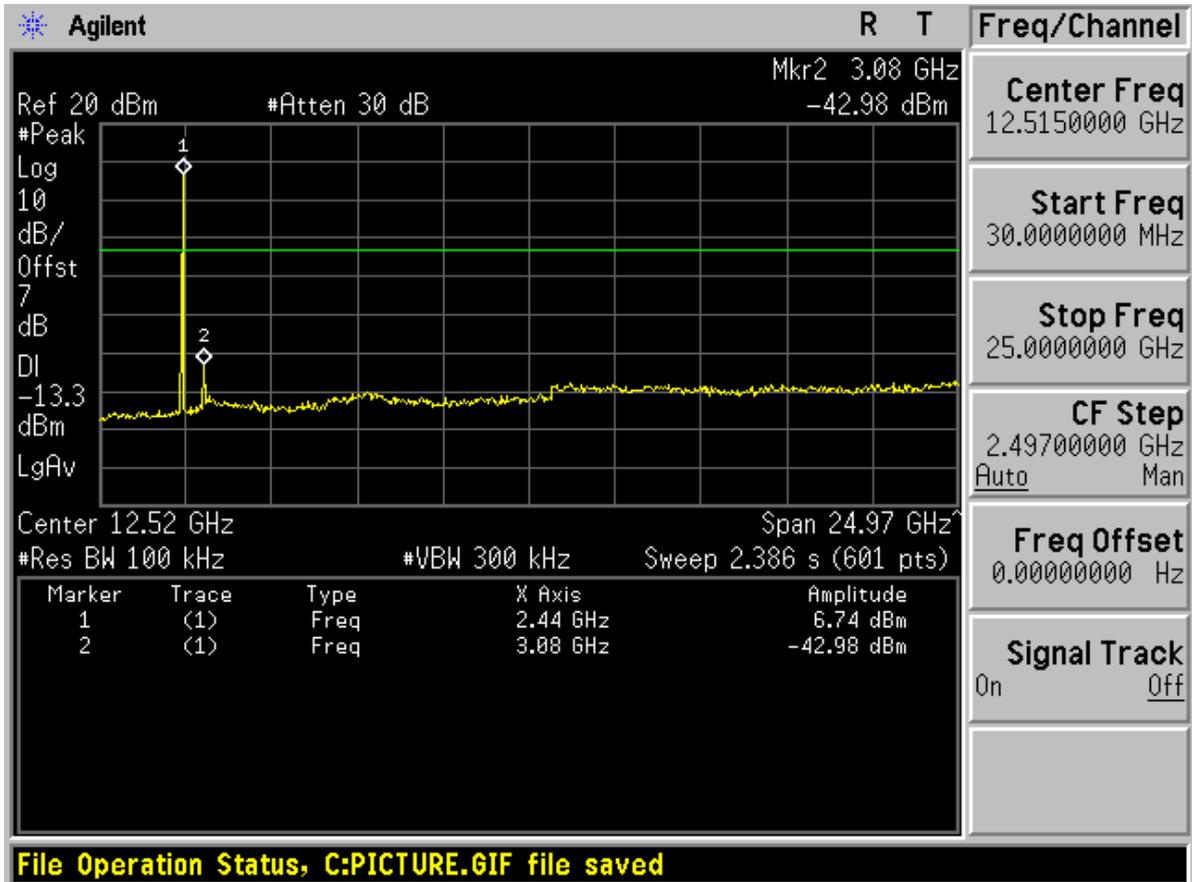




Channel 40

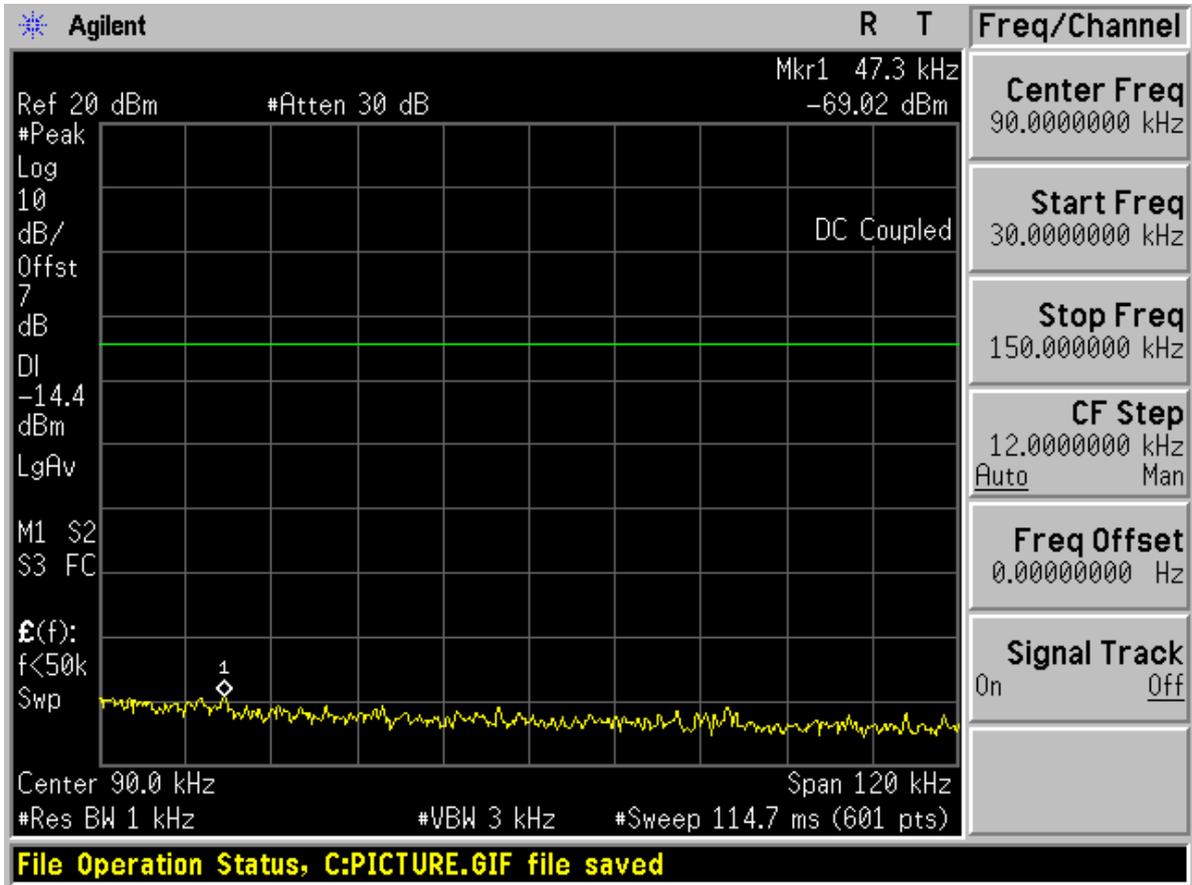


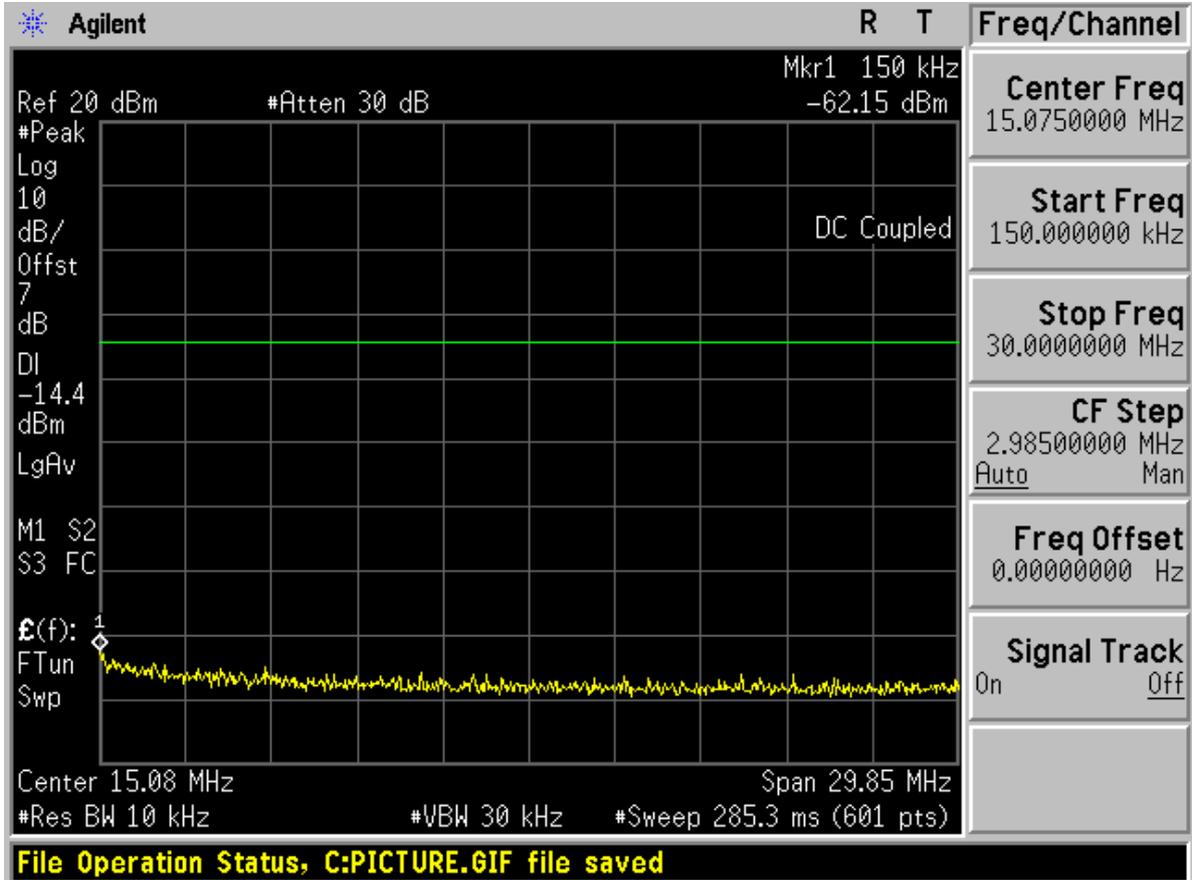


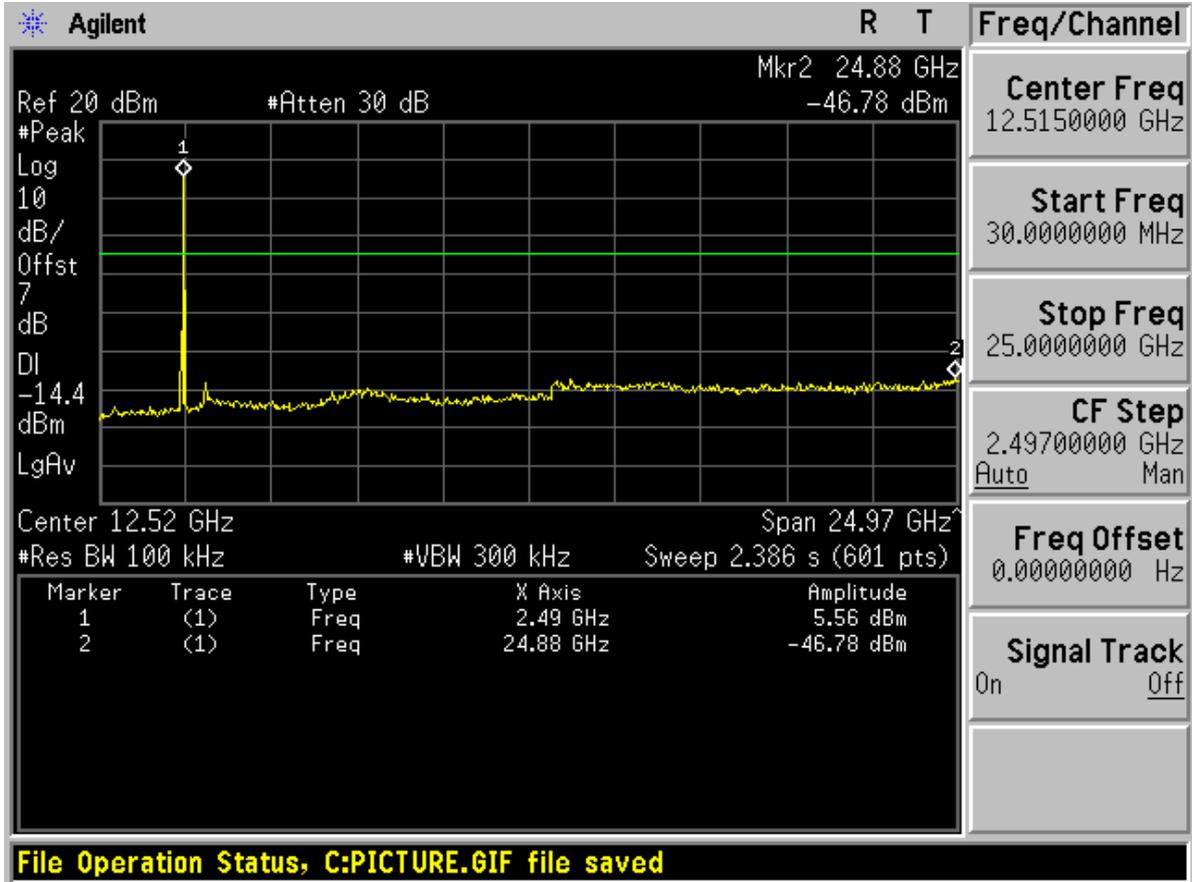




Channel 78

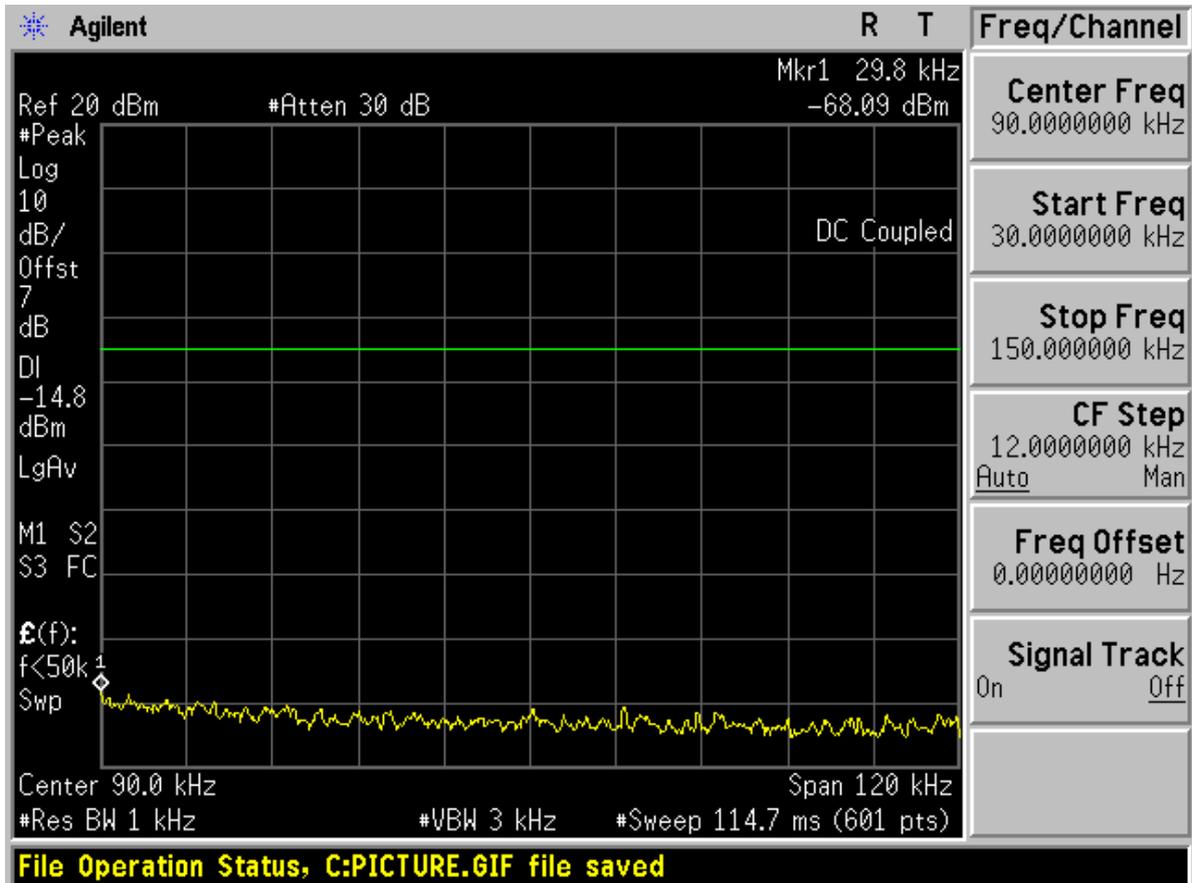


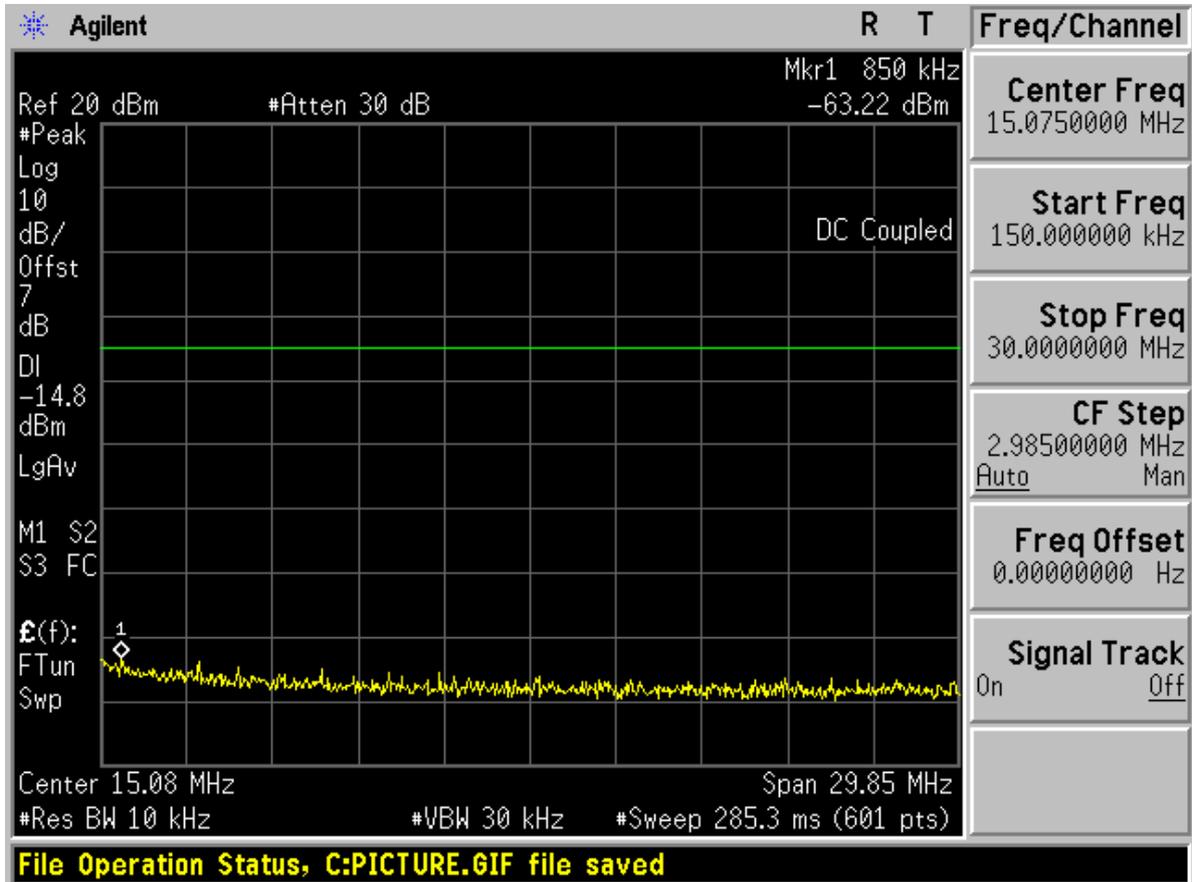


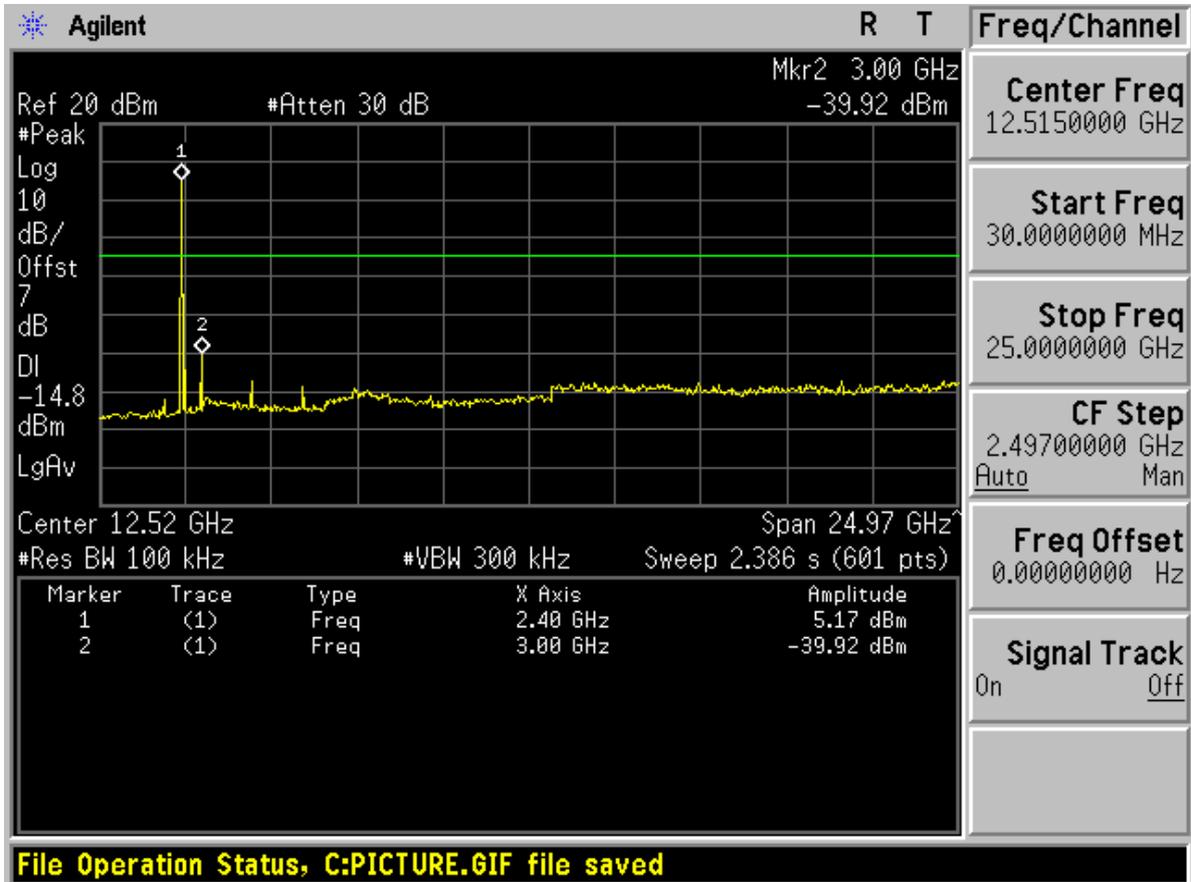




Modulation:8DPSK Channel 0

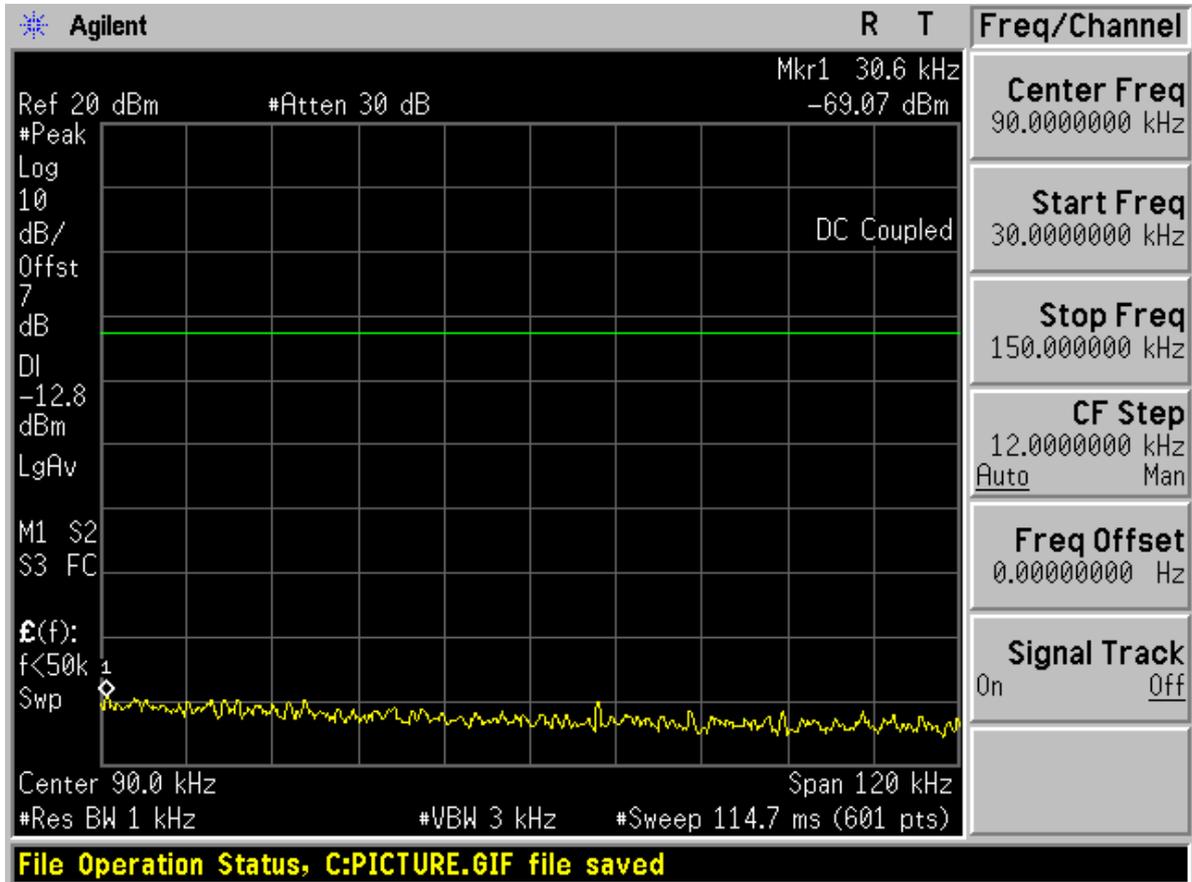


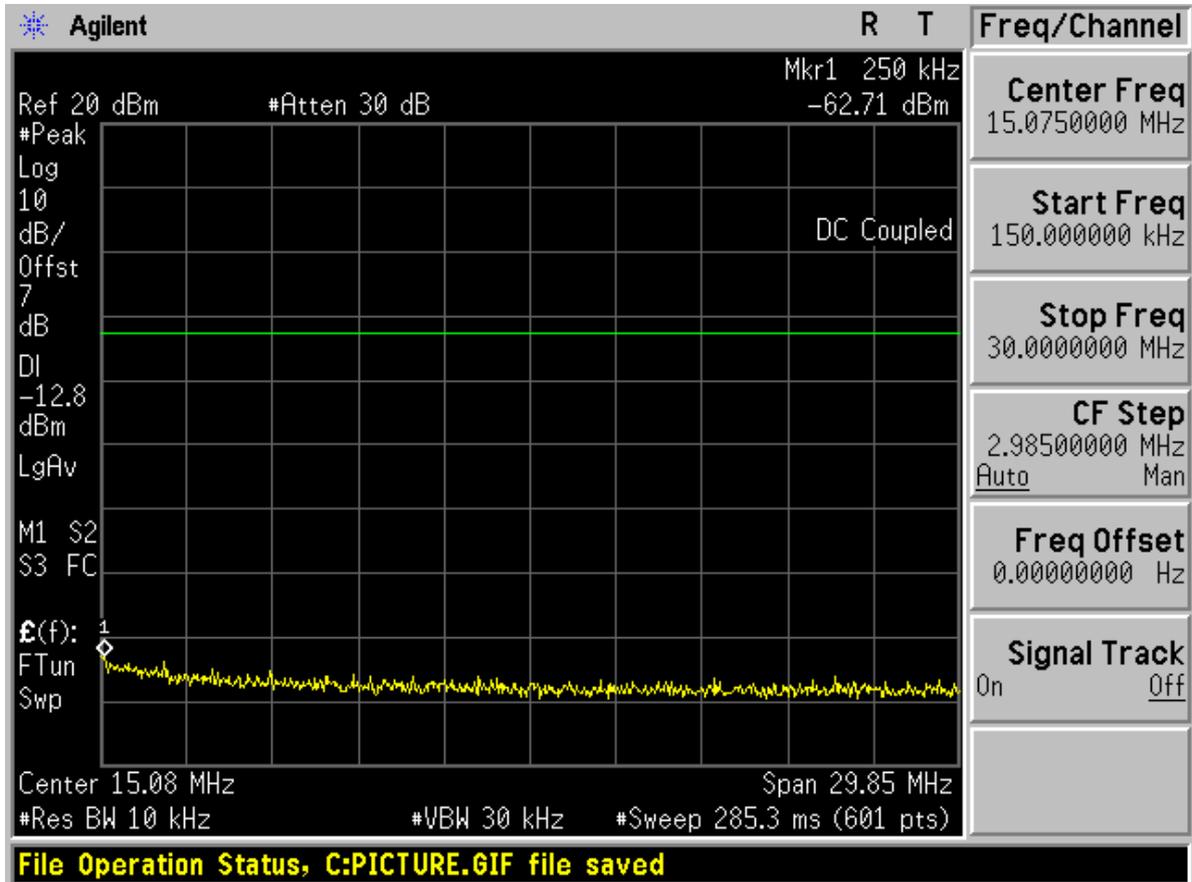


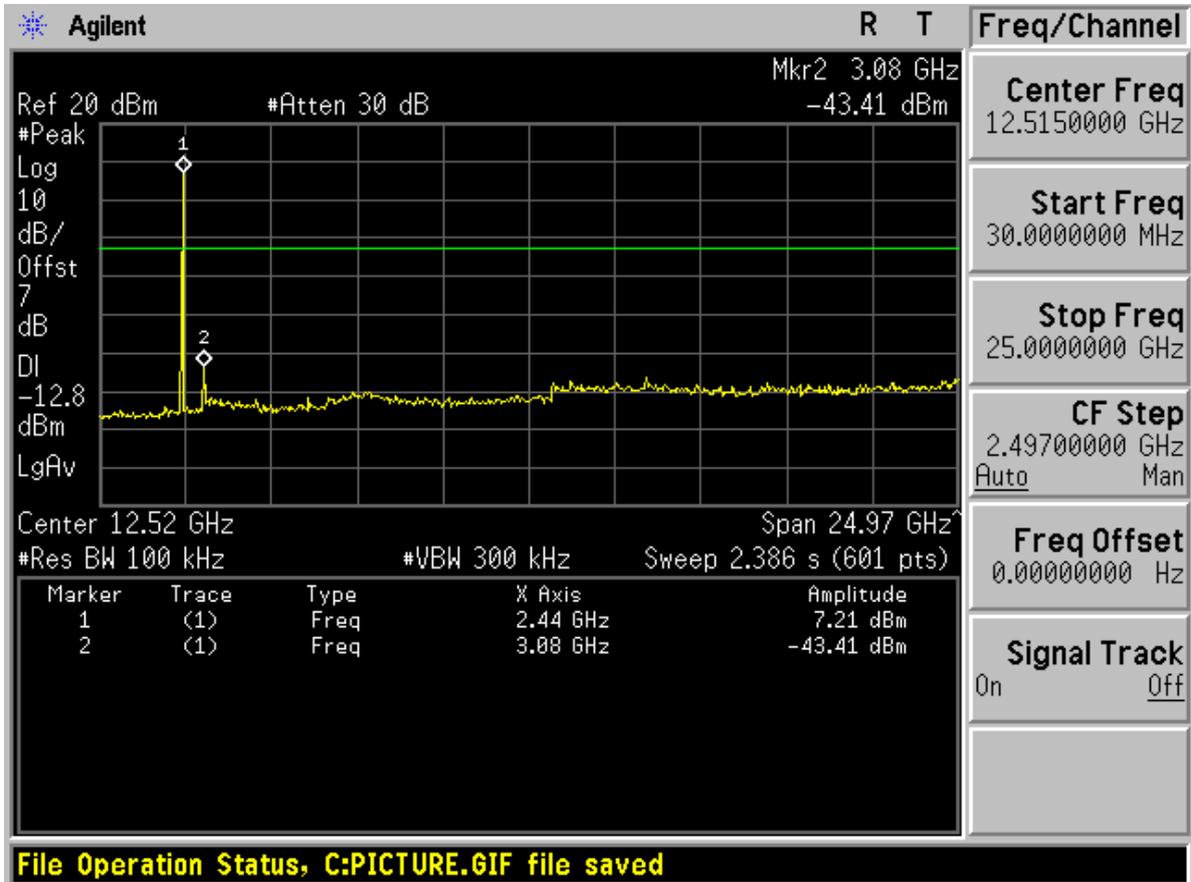




Channel 40

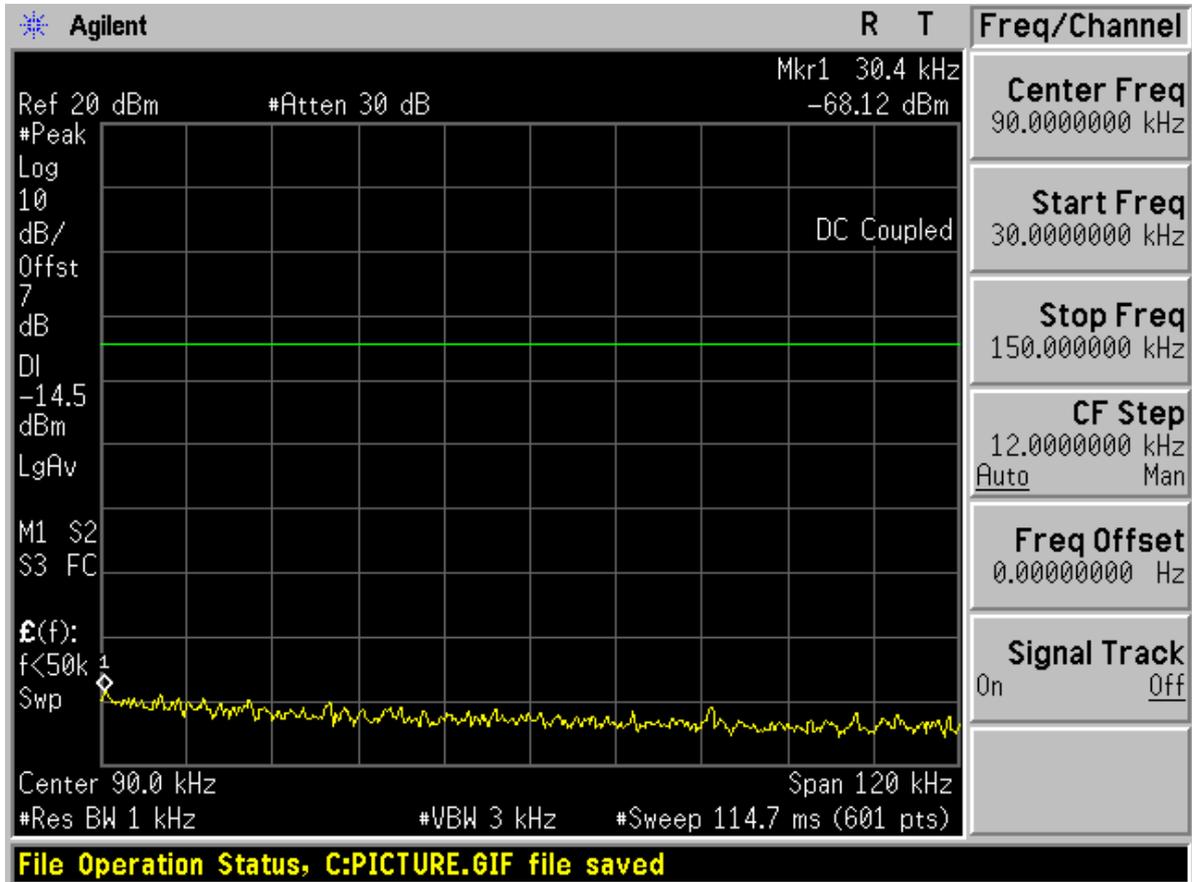


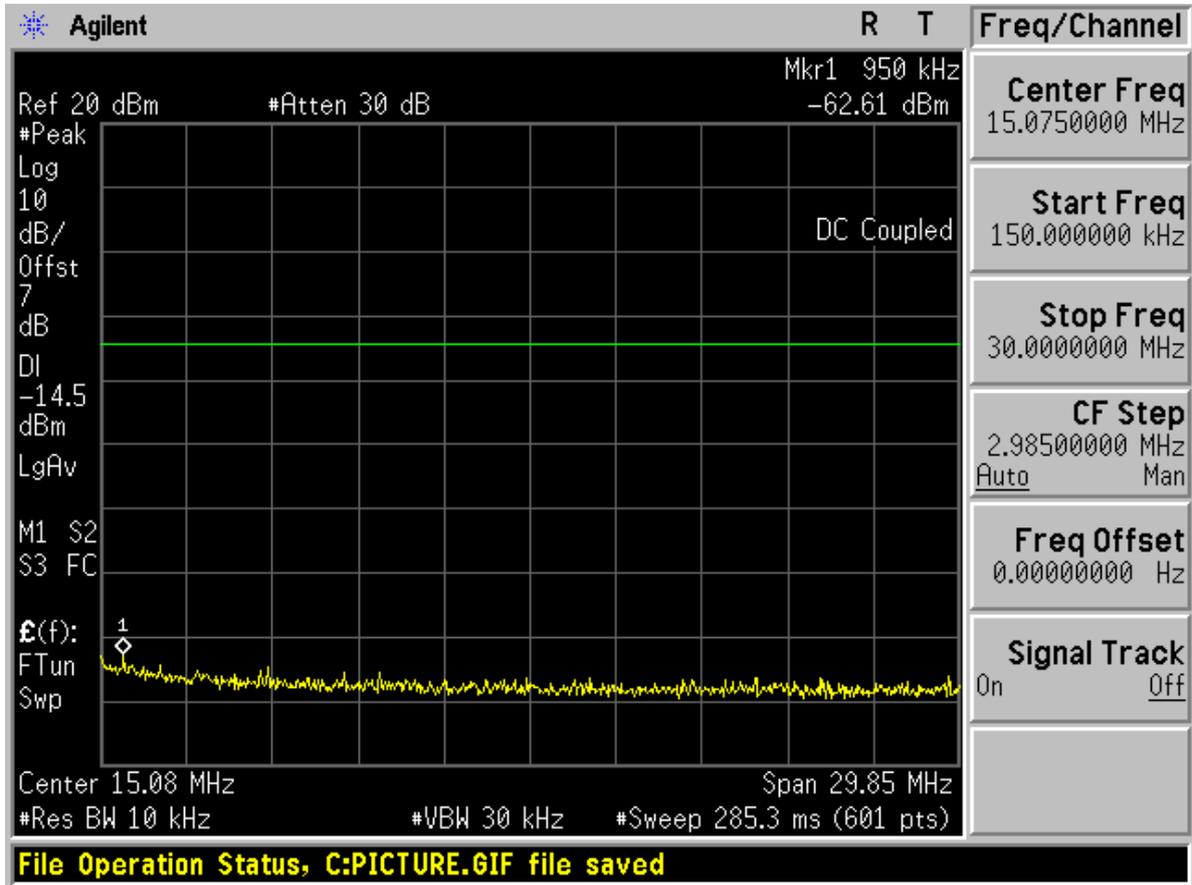


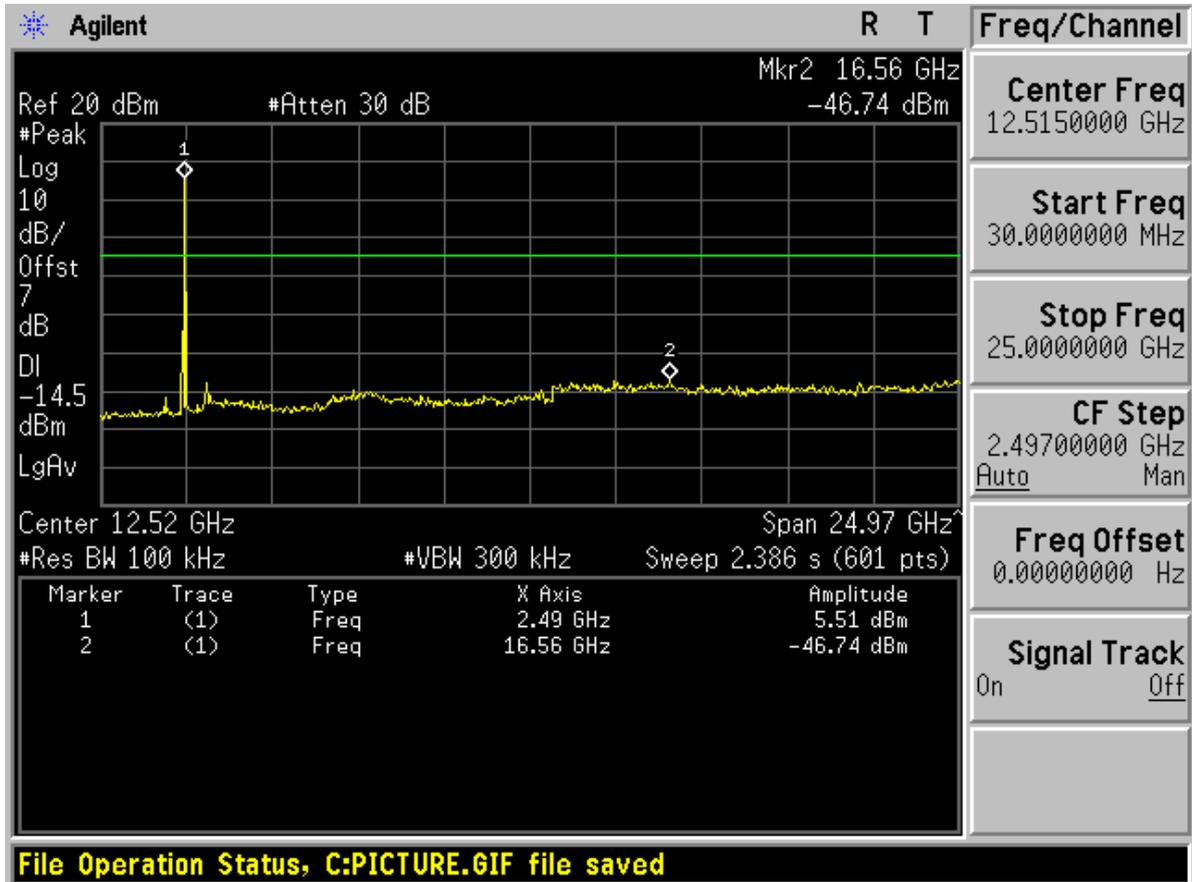




Channel 78







The END



Appendix H

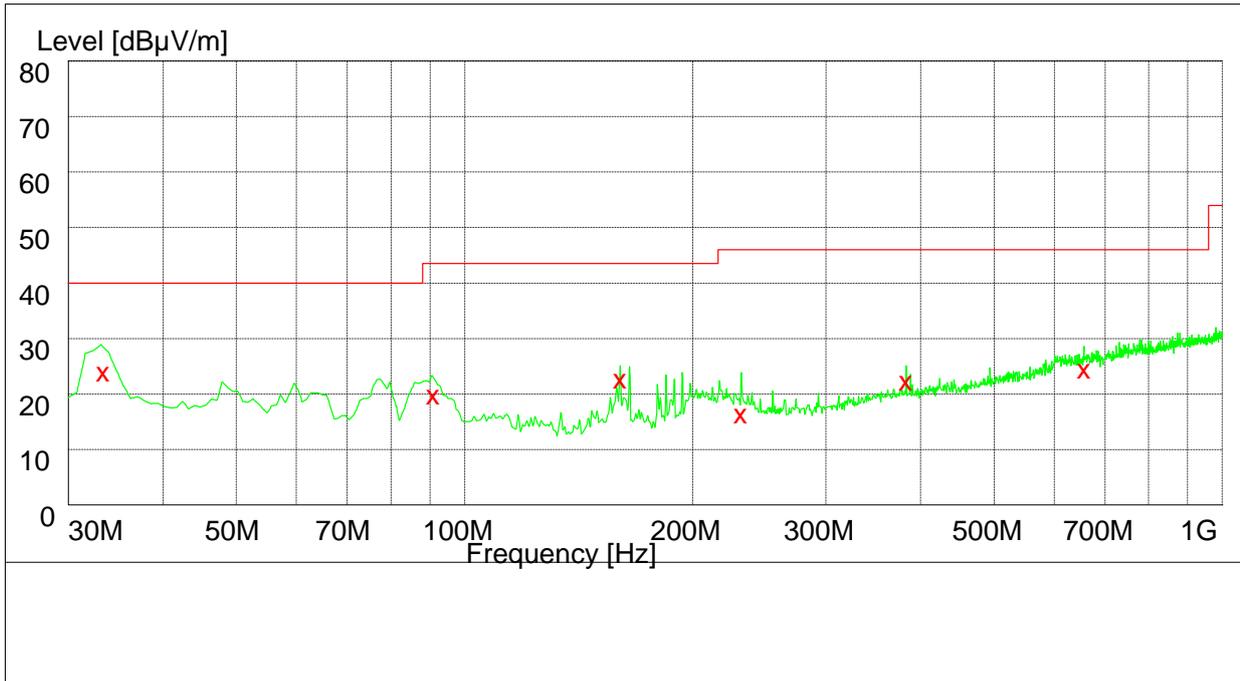
Radiated spurious emission

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 |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|-------------|
| 33.420000 | 23.20 | 14.8 | 40.0 | 16.8 | 141.0 | 334.00 | VERTICAL |
| 91.020000 | 19.50 | 12.1 | 43.5 | 24.0 | 120.0 | 55.00 | VERTICAL |
| 160.680000 | 22.70 | 10.1 | 43.5 | 20.8 | 100.0 | 95.00 | VERTICAL |
| 231.540000 | 16.30 | 13.5 | 46.0 | 29.7 | 124.0 | 359.00 | VERTICAL |
| 382.800000 | 21.90 | 17.0 | 46.0 | 24.1 | 100.0 | 130.00 | HORIZONTAL |
| 657.900000 | 22.40 | 21.8 | 46.0 | 23.6 | 131.0 | 53.00 | VERTICAL |



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

Note: No peak found in pre- test.

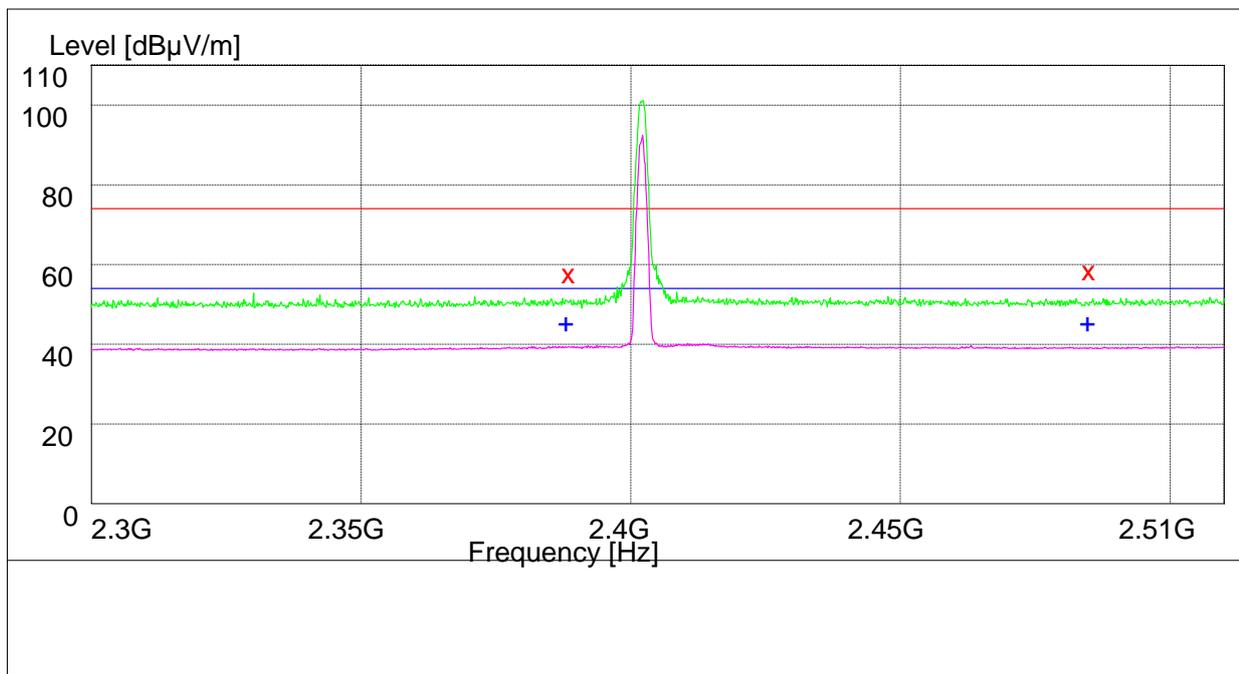


Part 3: Testing Range of “2.3GHz to 2.5GHz”

- 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 dBμV/m) and Average Limit (54 dBμV/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

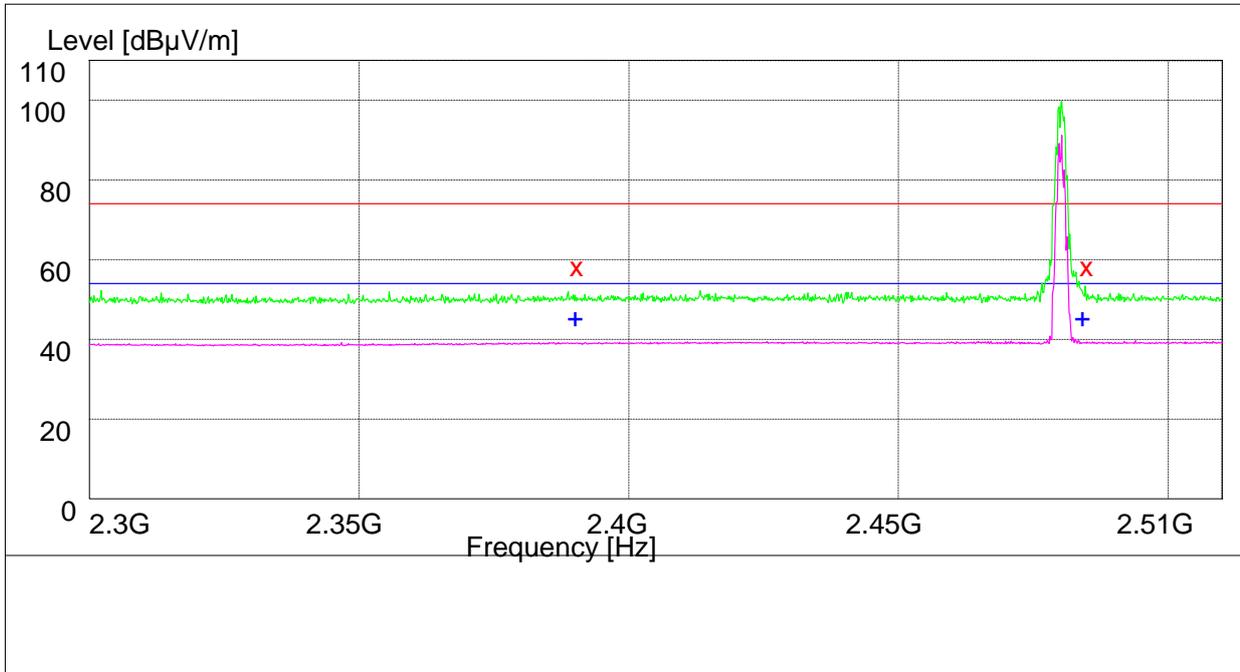
| Frequency MHz | Level dBμV/m | Transd dB | Limit dBμV/m | Margin dB | Height cm | Azimuth deg | Polarization |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|--------------|
| 2390.000000 | 58.80 | 33.5 | 74.0 | 15.2 | 172.0 | 178.00 | VERTICAL |
| 2483.500000 | 59.40 | 33.8 | 74.0 | 14.6 | 177.0 | 232.00 | 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 | 160.0 | 261.00 | HORIZONTAL |
| 2483.500000 | 46.50 | 33.8 | 54.0 | 7.5 | 195.0 | 246.00 | 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 | 59.30 | 33.5 | 74.0 | 14.7 | 135.0 | 204.00 | VERTICAL |
| 2483.500000 | 59.20 | 33.8 | 74.0 | 14.8 | 200.0 | 103.00 | HORIZONTAL |

MEASUREMENT RESULT: AVDetector

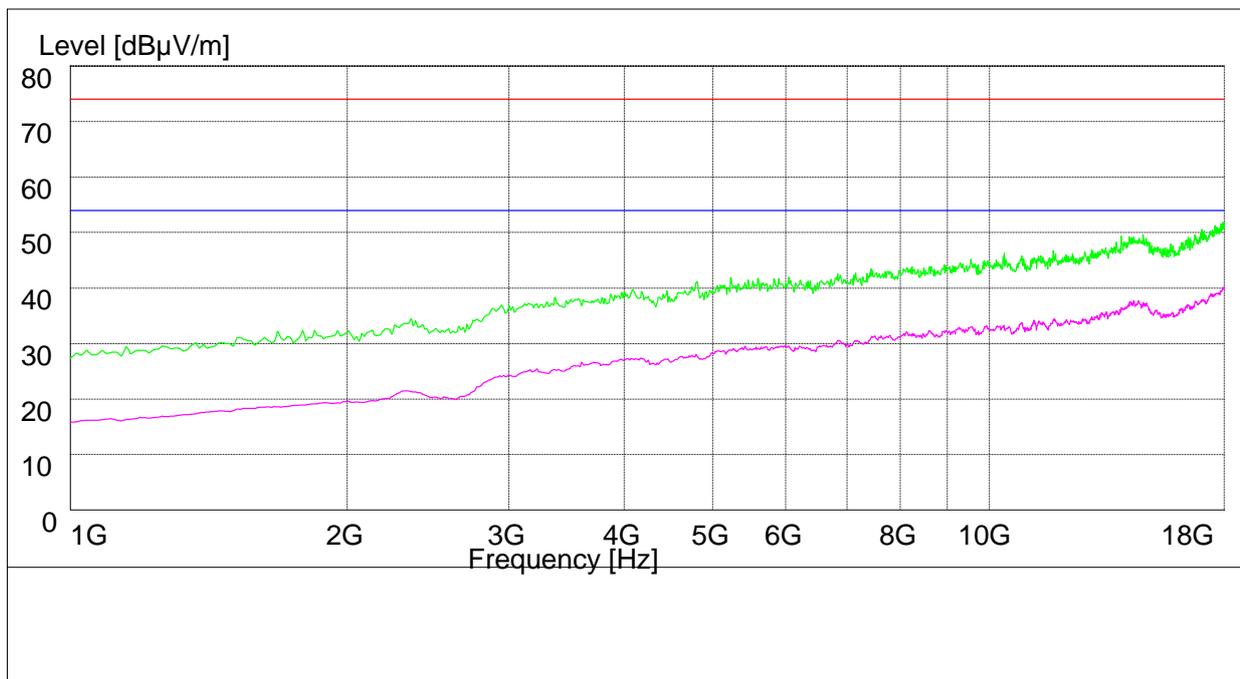
| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarization |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|--------------|
| 2390.000000 | 46.40 | 33.5 | 54.0 | 7.6 | 100.0 | 32.00 | VERTICAL |
| 2483.500000 | 46.50 | 33.8 | 54.0 | 7.5 | 129.0 | 0.00 | VERTICAL |



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 μ V/m) and Average Limit (54 dB μ V/m).



The END



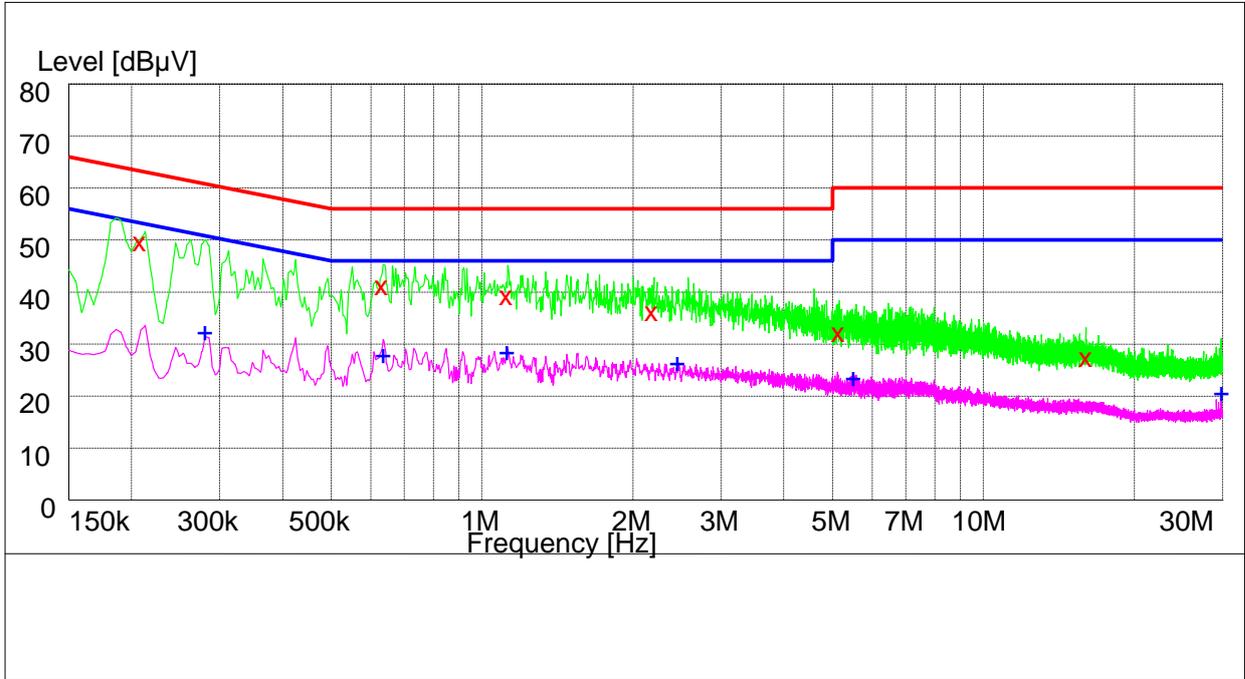
Appendix I

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 |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.208000 | 48.10 | 10.0 | 63 | 14.9 | L1 | FLO |
| 0.632000 | 40.90 | 10.1 | 56 | 15.1 | L1 | FLO |
| 1.120000 | 38.90 | 10.1 | 56 | 17.1 | N | FLO |
| 2.184000 | 33.10 | 10.1 | 56 | 22.9 | L1 | FLO |
| 5.150000 | 30.30 | 10.2 | 60 | 29.7 | N | FLO |
| 16.038000 | 25.80 | 10.3 | 60 | 34.2 | L1 | FLO |

MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.280000 | 31.50 | 10.0 | 51 | 19.5 | L1 | FLO |
| 0.636000 | 28.40 | 10.1 | 46 | 17.6 | L1 | FLO |
| 1.120000 | 28.60 | 10.1 | 46 | 17.4 | N | FLO |
| 2.452000 | 24.60 | 10.1 | 46 | 21.4 | N | FLO |
| 5.492000 | 22.30 | 10.2 | 50 | 27.7 | N | FLO |
| 29.848000 | 20.30 | 10.4 | 50 | 29.7 | L1 | FLO |

The END