



Product Name: 3G/4G Dual Mode Wireless Router

Model Number: EC5072/PCDH5072HS

Report No: SYBH(Z-RF)014032011-2004

FCC ID: QISEC5072

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REPORT ON **FCC 47CFR part 15 subpart C Test of 3G/4G Dual Mode**
Wireless Router

M/N: **EC5072/PCDH5072HS**

Report No: **BASEREPORNTNO**

FCC ID: QISEC5072

REGULATION **FCC CFR47 Part 2: Subpart J;**
FCC CFR47 Part 15: Subpart C;

CONCLUSION **PASS**

Chen Xiaohong

Approved By 2011-03-16 Chen Xiaohong _____

Date **Name** **Signature**

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Reviewed By 2011-03-16 Xu Guangyi _____

Date **Name** **Signature**

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Operator 2011-03-16 Jingjinhua _____

Date **Name**



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1 Summary

The table below summarizes the measurements and results for the EC5072. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	Description	Result
15.247 (a) (2)	6dB bandwidth measurement	PASS
15.247 (b) (3)	Conducted Peak output power	PASS
15.247 (d)	Band edge compliance measurement	PASS
15.247 (d)	Conducted RF spurious	PASS
15.247 (e)	Power spectral density	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

EC5072 is a WiMAX/EVDO dual mode and WiFi Wireless mobile Router; it can be used as a WiFi Access Point based on standard of IEEE802.11b/g/n, max to 5 WiFi stations can be associating with EC5072 simultaneously. It also can be used as a USB modem by connecting with PC via USB cable. It supports 3G CDMA and 4G WiMAX wireless internet accessing function and GPS function. About 3G CDMA wireless mode, it supports CDMA2000 1x and 1xEV-DO Rev.0/Rev.A, operating in Band Class 0(800MHz) and Band Class 1(1900M), and the 4G WiMAX supports IEEE802.16e, operating in frequency of 2.5GHz.The WiFi frequency is 2.4GHz.

EC5072 supports 1Tx2Rx for 3G CDMA and 4G WiMAX, but there are also two antenna for 4G WiMAX to realize TxD(TX Switching Diversity), WiFi only supports 1Tx1Rx, the GPS is only used for receiver.

Note: Only WLAN function was considered in this report.

2.1.2 Support function and Service

The EC5072 support the function and service as follows:

Table 2 Service and Test mode List

Service Name	mode	Characteristic	Corresponding Test Mode	Note
Data	DSSS	Modulation: QPSK	TM1	
Data	OFDM	Modulation: BPSK	TM2	
Data	OFDM	Modulation: 64QAM 16QAM,BPSK,QPSK	TM3	

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.11, 2011 to Mar.15, 2011

3.2 General Set up Description

The WLAN digitally modulated systems of the EUT can Support 2.4GHz Band. For compliance with FCC regulation 47CFR part15 subpart C, we set the EUT as following test modes to do all compliance tests.

WLAN MODE:

TM1: DSSS mode ,QPSK Modulation,1Mbps data rate

TM2: OFDM mode, BPSK Modulation,6 Mbps data rate

TM3: OFDM mode, MCS0 Modulation,6.5Mbps data rate



4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	2400 to 2472MHz	
Downlink band:	2400 to 2472 MHz	
Hop frequency support:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / raster

Channel spacing:	22 MHz
Channel raster:	5 MHz

4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	-
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According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Antenna Information

Table 7 Antenna Information

Type:	Integrated / Internal
Maximum Gain(dBi):	0 (from 2400MHz to 2500MHz)



4.1.5 Environmental Requirements

Table 8 Environmental Requirements

Minimum temperature:	0 °C
Maximum temperature:	+ 35 °C
Relative Humidity:	5%-95%

4.1.6 Power Source

Table 9 Power Source

AC voltage nominal:	~120V
AC voltage range	~100V-240V
AC current maximal:	0.2A

4.1.7 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.

4.1.8 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 10 Applied RF module DC Voltages and Currents

Voltage:	 +3.7V
Current:	2200mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



4.2 EUT Identification List

4.2.1 Board Information

Table 11 Board Information

3G/4G Dual Mode Wireless Router		
EC5072/PCDH5072HS		
Board and Module		
Equipment Designation / Description	Equipment Designation / Description	Equipment Designation / Description
EC5072	CE1EC5072M	Main board
	CE1EC5072S	Slave board

4.2.2 Battery

Name	Qty.	Manufacture	Serials number	Description
Li-ion Battery	1	Huawei	NA	Battery Model: BTR5072B Rated capacity: 2200mAh Nominal Voltage: === +3.7V Charging Voltage: === +4.2V

4.2.3 FCC Identification

Grantee Code: QIS
 Product Code: EC5072
 FCC Identification: QISEC5072



5 Main Test Instruments

Table 12 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2011
Wireless Communication Test set	Agilent	N4010A	MY49081592	Dec.14.2011
Universal Radio Communication Tester	R&S	CMU200	105822	Oct.24.2011
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.04,2011
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.24,2011
Signal Analyzer	R&S	FSQ40	100025	Oct.09,2011
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2011
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2012
Signal Generator	R&S	SMR40	100325	May.12,2012
Vector Signal Generator	R&S	SMU200A	104162	Sep.07,2011
Spectrum Analyzer	R&S	FSU26	EG26725	Mar.07,2012
Test receiver	R&S	ESIB26	100318	May.04.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Dec.13.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Dec.13.2011
Horn Antenna	R & S	HF906	359287/005	May.07, 2012
Horn Antenna	R & S	HF906	359287/006	April.27, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2536	Sep.21, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2941	Jun.11, 2011
Horn Antenna	ETS-LINDGREN	3160	60008	Sep.20.2011



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FCC ID: QISEC5072

Security Level: Public

Horn Antenna	ETS-LINDGREN	3160	60006	Oct.27.2011
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6 Transmitter Measurements

6.1 6dB bandwidth measurement

6.1.1 Test Conditions

Table 13 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	24.8°C
Relative humidity:	45%
Test Configurations:	TM1/TM2/TM3 at channel No.1, 6, 11

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (2) and KDB 558074

6.1.2.2 Supporting Standards

Table 14 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

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Table 15 Limits

Limits	≥ 500kHz
--------	----------

6.1.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz, then set the measured frequency number and test the 6dB bandwidth with spectrum analyzer.

Test setup

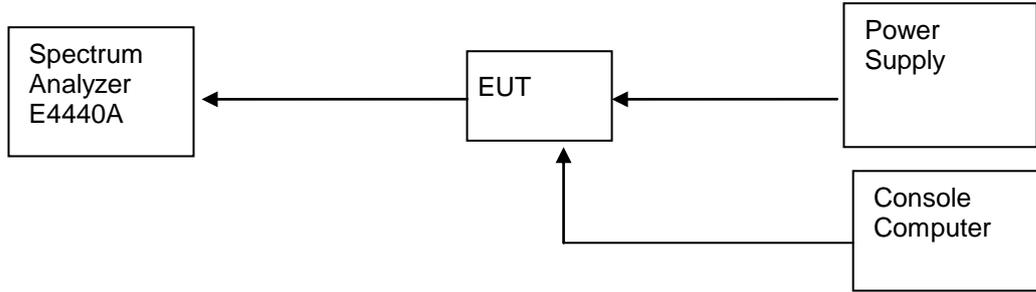


Figure 1. Test Set-up

6.1.4 Measurement Results

Table 16 Measurement Results

Test condition	Channel Position	Bandwidth Type	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
TM1	B	6dB Bandwidth	1	2.412	13.976M	Pass
	M	6dB Bandwidth	6	2.437	13.810M	Pass
	T	6dB Bandwidth	11	2.462	13.562M	Pass
TM2	B	6dB Bandwidth	1	2.412	16.403M	Pass
	M	6dB Bandwidth	6	2.437	16.369M	Pass
	T	6dB Bandwidth	11	2.462	16.327M	Pass
TM3	B	6dB Bandwidth	1	2.412	16.404M	Pass
	M	6dB Bandwidth	6	2.437	17.535M	Pass
	T	6dB Bandwidth	11	2.462	17.479M	Pass

6.1.5 Conclusion

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



6.2 Peak output power

6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	24.8°C
Relative humidity:	45%
Test Configurations:	TM1/TM2/TM3 at channel No.1, 6, 11

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 15.247 (b) (3) and KDB 558074

6.2.2.2 Supporting Standards

Table 18 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

Compliance with part 15.247 (b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

Table 19 Limits

2.4GHz and 5.8GHz system using digital modulation	1 Watt / 30 dBm
---	-----------------

6.2.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer.
- Set the EUT to transmit maximum output power.
- Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

Test setup

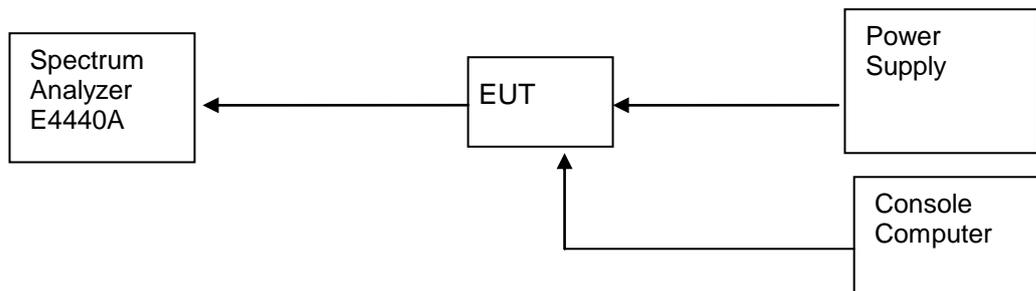


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 20 Measurement Results

Test condition	Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
TM1	Bottom	1	2412	14.32	< 30	Pass
	Middle	6	2437	14.99	< 30	Pass
	Top	11	2462	14.91	< 30	Pass
TM2	Bottom	1	2412	12.29	< 30	Pass
	Middle	6	2437	12.68	< 30	Pass
	Top	11	2462	12.39	< 30	Pass
TM3	Bottom	1	2412	12.16	< 30	Pass
	Middle	6	2437	12.52	< 30	Pass
	Top	11	2462	12.12	< 30	Pass

6.2.5 Conclusion

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



6.3 Band edge spurious emission

6.3.1 Test Conditions

Table 21 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	24.8°C
Relative humidity:	45%
Test Configurations:	TM1/TM2/TM3 at channel No. 1, 11

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 15.247(d) and KDB 558074

6.3.2.2 Supporting Standards

Table 22 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

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 23 Limits

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

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.

Test setup

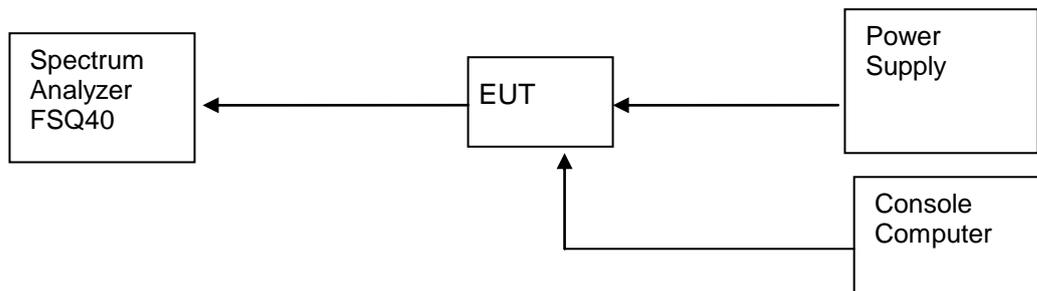


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 24 Measurement Results

Test condition		Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Result
TM1	Low Edge	1	2412	4.68	-28.06	-15.32	Pass
	High Edge	11	2462	2.88	-43.02	-17.12	Pass
TM2	Low Edge	1	2412	2.84	-24.24	-17.16	Pass
	High Edge	11	2462	2.88	-42.46	-17.12	Pass
TM3	Low Edge	1	2412	2.88	-24	-17.12	Pass
	High Edge	11	2462	2.88	-43.38	-17.12	Pass

6.3.5 Conclusion

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



6.4 Conducted RF spurious

6.4.1 Test Conditions

Table 25 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	24.8°C
Relative humidity:	45%
Test Configurations:	TM1/TM2/TM3 at channel No.1, 6, 11

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and KDB 558074

6.4.2.2 Supporting Standards

Table 26 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

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 27 Limits

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

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz and.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.

Test setup

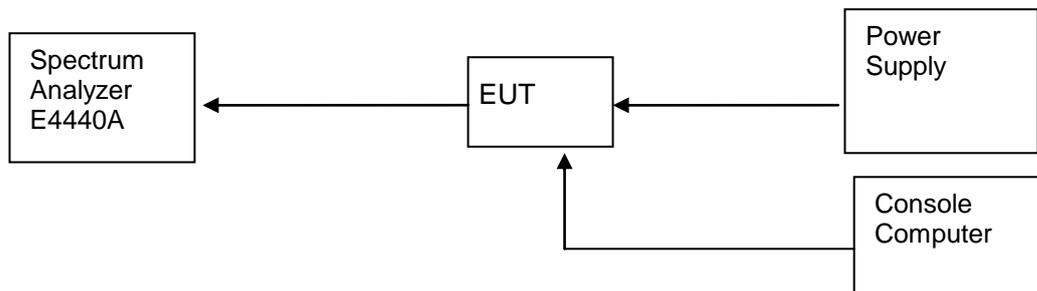


Figure 4. Test Set-up

6.4.4 Measurement Results

Table 28 Measurement Results

Test condition	Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Result
TM1	9kHz-26GHz	1	2412	11.22	-34.99	-8.78	Pass
	9kHz-26GHz	6	2437	12.96	-36.57	-7.04	Pass
	9kHz-26GHz	11	2462	11.75	-35.47	-8.25	Pass
TM2	9kHz-26GHz	1	2412	10.08	-35.26	-9.92	Pass
	9kHz-26GHz	6	2437	11.66	-34.93	-8.34	Pass
	9kHz-26GHz	11	2462	10.41	-35.98	-9.59	Pass
TM3	9kHz-26GHz	1	2412	8.53	-35.66	-11.47	Pass
	9kHz-26GHz	6	2437	8.5	-36.65	-11.5	Pass
	9kHz-26GHz	11	2462	7.27	-34.61	-12.73	Pass

6.4.5 Conclusion

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



6.5 Power spectral density

6.5.1 Test Conditions

Table 29 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	24.8°C
Relative humidity:	45%
Test Configurations:	TM1/TM2/TM3 at channel No.1, 6, 11

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 15.247 (e) and KDB 558074

6.5.2.2 Supporting Standards

Table 30 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 (e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. The same method of determining the conducted output power shall be used to determine the power spectral density.

Table 31 Limits

Band edge spurious:	8 dBm/3kHz
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6.5.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz and.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.

Test setup

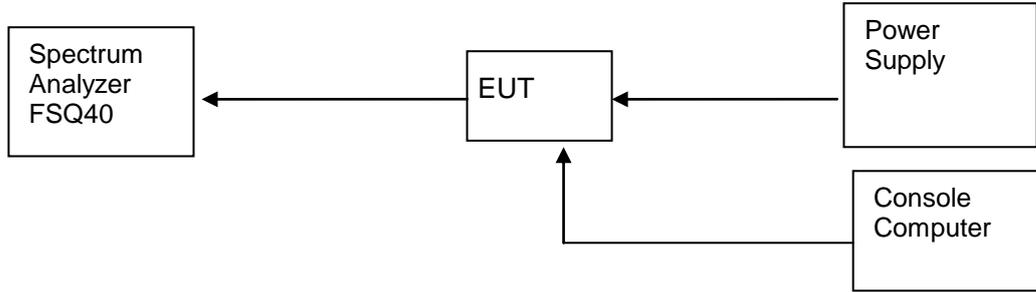


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 32 Measurement Results

Test condition	Channel No.	Carrier Frequency [MHz]	Measured Power spectral density [dBm]	Limit [dBm]	Result
TM1	1	2412	-9.59	8	Pass
	6	2437	-7.5	8	Pass
	11	2462	-8.16	8	Pass
TM2	1	2412	-13.07	8	Pass
	6	2437	-10.8	8	Pass
	11	2462	-11.97	8	Pass
TM3	1	2412	-13.13	8	Pass
	6	2437	-14.95	8	Pass
	11	2462	-12.65	8	Pass

6.5.5 Conclusion

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



6.6 Radiated spurious emission & spurious in restricted band

6.6.1 Test Conditions

Table 33 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25.1 °C
Relative humidity:	43%
Test Configurations:	TM1/TM2/TM3 at channel No.1, 6, 11

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 15.247 (d), 15.205 & 15.209 and KDB 558074

6.6.2.2 Supporting Standards

Table 34 Supporting Standards:

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

6.6.2.3 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 35 Limits

Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)	Detector
0.009 - 0.490	2400/F(kHz)	20*lg(2400/F(kHz))	300	QP
0.490 - 1.705	24000/F(kHz)	20*lg(24000/F(kHz))	30	QP
1.705 - 30	30	29.5	30	QP
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	AV
Above 1000	500	74	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)(above table 42).

6.6.3 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. 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.

The EUT was communicated with the BTS simulator through Air interface. The EUT operated on the typical channel.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz
Measurement bandwidth: 1000 MHz – 10th Carrier Frequency: 1 MHz

Test set up

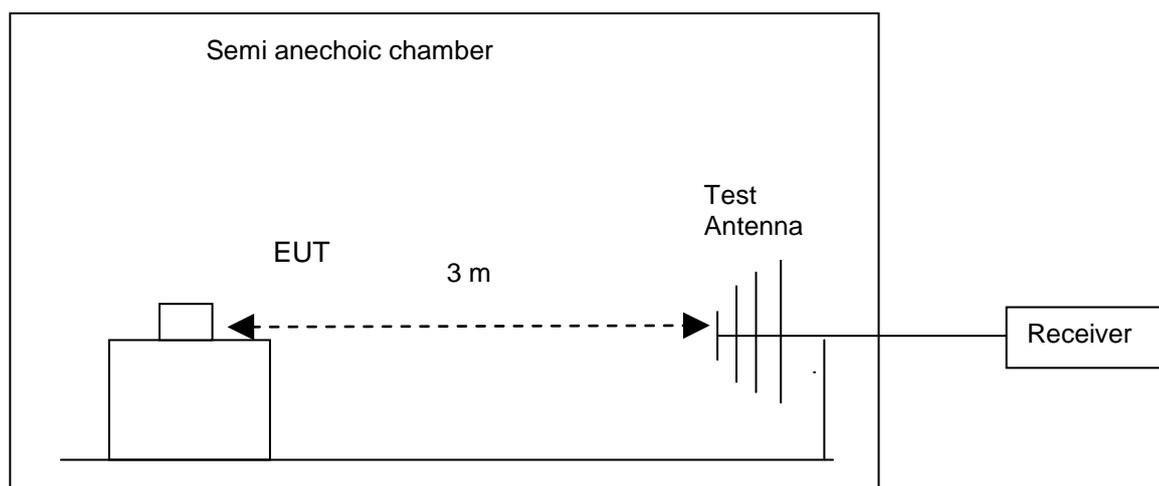


Figure 6. Test Set up

6.6.4 Measurement Results

Note 1: The following measurement results exceed the limit line is the carrier frequency.

Note 2: This test was carried out in all the test modes, here only the worst test result was shown.

Measured Result of channel: 1 (2412MHz)

Table 36 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.300000	26.50	11.7	40.0	13.5	110.0	192.00	VERTICAL
64.804000	21.10	10.5	40.0	18.9	100.0	105.00	VERTICAL
129.628000	23.30	9.3	43.5	20.2	101.0	151.00	VERTICAL
200.656000	20.00	12.1	43.5	23.5	100.0	327.00	VERTICAL
512.016000	39.50	20.5	46.0	6.5	124.0	120.00	HORIZONTAL
947.168000	34.80	26.6	46.0	11.2	158.0	124.00	HORIZONTAL
3199.200000	13.80	-8.3	54.0	40.2	200.0	191.00	VERTICAL
4024.700000	15.70	-5.7	54.0	38.3	193.0	4.00	HORIZONTAL
6795.600000	20.10	-0.4	54.0	33.9	100.0	342.00	VERTICAL
11030.800000	23.90	6.8	54.0	30.1	187.0	16.00	HORIZONTAL
14596.500000	29.00	12.1	54.0	25.0	155.0	138.00	VERTICAL
17984.900000	32.90	17.2	54.0	21.1	120.0	357.00	VERTICAL



2310.000000	38.40	33.3	54.0	15.6	181.0	215.00	VERTICAL
2390.000000	38.80	33.5	54.0	15.2	171.0	205.00	VERTICAL
2483.500000	38.10	33.7	54.0	15.9	196.0	145.00	VERTICAL
2500.000000	38.20	33.8	54.0	15.8	178.0	25.00	VERTICAL

Measured Result of channel: 6 (2437MHz)

Table 37 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.360000	26.50	11.7	40.0	13.5	102.0	13.00	VERTICAL
60.976000	19.70	11.9	40.0	20.3	102.0	213.00	VERTICAL
129.508000	24.80	9.3	43.5	18.7	100.0	113.00	VERTICAL
214.928000	21.30	12.7	43.5	22.2	156.0	226.00	HORIZONTAL
512.016000	41.40	20.5	46.0	4.6	184.0	218.00	HORIZONTAL
909.744000	34.10	26.3	46.0	11.9	102.0	346.00	VERTICAL
3710.900000	15.20	-6.6	54.0	38.8	143.0	108.00	VERTICAL
4929.900000	18.50	-3.8	54.0	35.5	100.0	342.00	HORIZONTAL
6726.100000	19.70	-0.6	54.0	34.3	197.0	9.00	VERTICAL
9300.000000	22.90	4.6	54.0	31.1	170.0	319.00	VERTICAL
14520.400000	29.80	12.3	54.0	24.2	200.0	211.00	HORIZONTAL
17818.200000	32.40	16.1	54.0	21.6	130.0	355.00	HORIZONTAL

Measured Result of channel: 11 (2462MHz)

Table 38 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.004000	25.60	11.7	40.0	14.4	120.0	47.00	VERTICAL
54.536000	20.90	12.7	40.0	19.1	122.0	151.00	VERTICAL
129.628000	24.30	9.3	43.5	19.2	100.0	166.00	VERTICAL
194.692000	20.40	12.0	43.5	23.1	100.0	120.00	VERTICAL
512.016000	40.10	20.5	46.0	5.1	182.0	33.00	HORIZONTAL
894.468000	33.90	26.1	46.0	12.1	200.0	216.00	VERTICAL
4000.100000	16.50	-5.8	54.0	37.5	200.0	74.00	VERTICAL
5401.400000	18.90	-2.5	54.0	35.1	131.0	242.00	VERTICAL
8346.500000	22.00	2.9	54.0	32.0	118.0	276.00	HORIZONTAL
10942.600000	24.30	6.6	54.0	29.7	163.0	40.00	HORIZONTAL
14542.100000	29.70	12.3	54.0	24.3	108.0	53.00	HORIZONTAL
17988.900000	32.90	17.2	54.0	21.1	200.0	134.00	HORIZONTAL
2310.000000	38.60	33.3	54.0	15.4	141.0	15.00	VERTICAL
2390.000000	38.70	33.5	54.0	15.3	141.0	255.00	VERTICAL
2483.500000	38.60	33.7	54.0	15.4	101.0	345.00	VERTICAL
2500.000000	38.70	33.8	54.0	15.3	121.0	5.00	VERTICAL

6.6.5 Conclusion

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



6.7 Conducted Emission at Power Port

6.7.1 Test Conditions

Table 39 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	25.1 °C
Relative humidity:	43%
Test Configurations:	TM1 at channel No. 7

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 15.207 and KDB 558074

6.7.2.2 Supporting Standards

Table 40 Supporting Standards:

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

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

Table 41 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.

6.7.3 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.

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.

The EUT was communicated with the BTS simulator through Air interface, the BTS simulator controls the Wireless Modem to transmitter the maximum power which defined in specification of product. The Wireless Modem operated on the typical channel.

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

Test Set-up

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

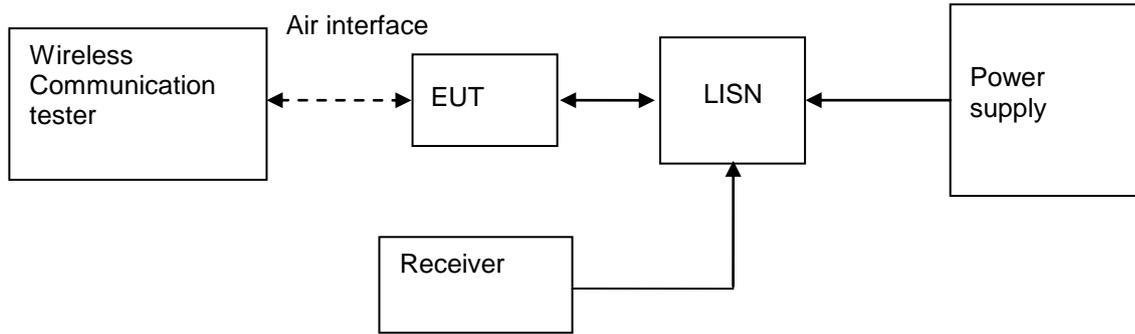


Figure 7. Test Set-up

6.7.4 Measurement Results

Table 42 MEASUREMENT RESULT:QP DECTER

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.426000	40.50	10.0	57	16.5	N	FLO
0.750000	39.30	10.1	56	16.7	N	FLO
1.060000	37.70	10.1	56	18.3	N	FLO
2.116000	35.90	10.1	56	20.1	N	FLO
5.294000	26.00	10.2	60	34.0	L1	FLO
23.580000	25.20	10.4	60	34.8	N	FLO

Table 43 MEASUREMENT RESULT:AV DECTER

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.312000	30.20	10.0	50	19.8	N	FLO
0.746000	29.50	10.1	46	16.5	N	FLO
1.134000	28.90	10.1	46	17.1	N	FLO
2.436000	26.10	10.1	46	19.9	N	FLO
5.412000	18.50	10.2	50	31.5	L1	FLO
23.206000	16.70	10.4	50	33.3	N	FLO

6.7.5 Conclusion

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



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 44 System Measurement Uncertainty

Items		Extended Uncertainty
20dB bandwidth measurement	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=0.4dB; k=2
Power spectral density	Disturbance Power(dBm)	U=0.4dB; k=2
Radiated spurious emission & Radiated restricted band measurement	Field strength (dB μ V/m)	U=4.1dB; k=2 U=4.1dB; k=2
Conducted emission test for power port	Disturbance Voltage(dB μ V)	U=3.4dB; k=2



8 Appendices

Appendix A	Measurement Results 6dB bandwidth measurement	10 pages
Appendix B	Measurement Results Peak output power	10 pages
Appendix C	Measurement Results Band edge compliance measurement	7 pages
Appendix D	Measurement Results Conducted RF spurious	28 pages
Appendix E	Measurement Results Power spectral density	10 pages
Appendix F	Measurement Results Radiated spurious emission	15 pages
Appendix G	Measurement Results Conducted emission test for power port	3 pages
Appendix H	Photos of Test Setup	3 pages

(END OF REPORT)



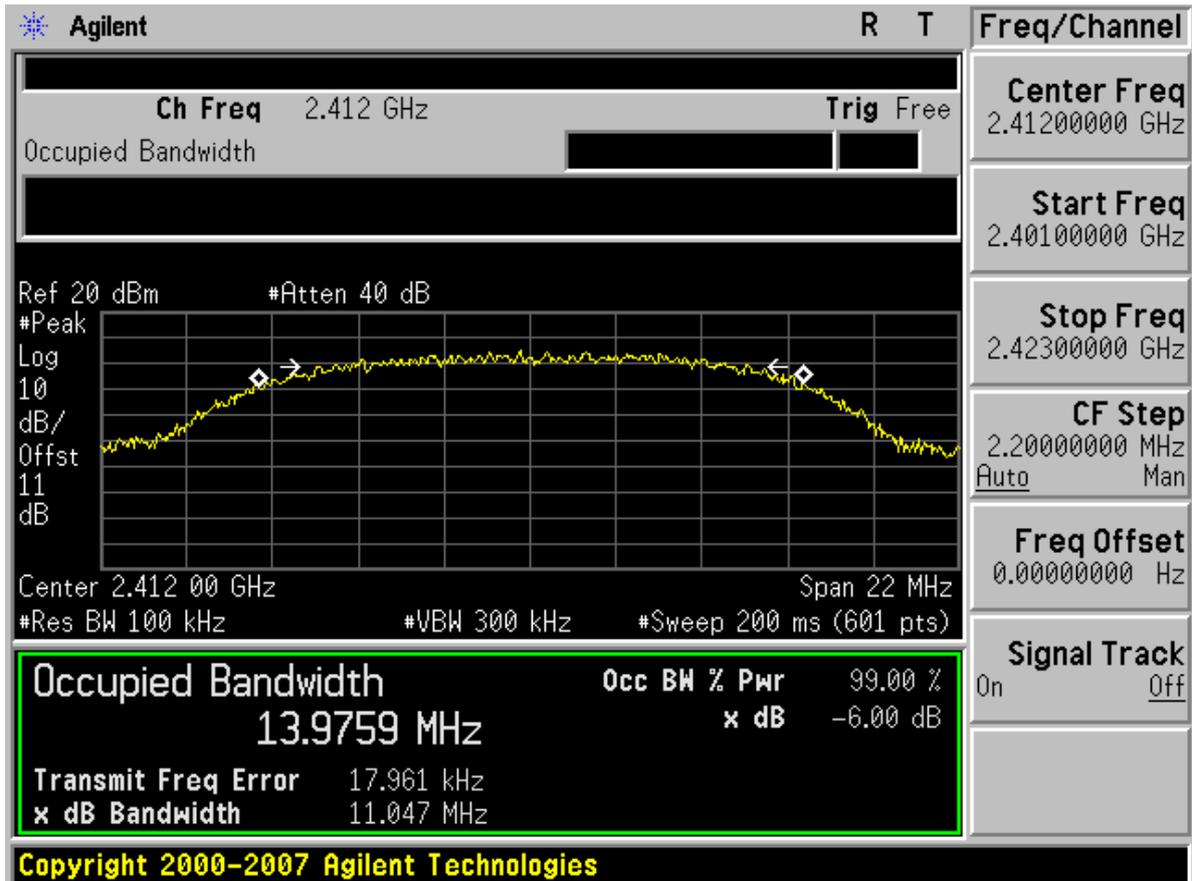
Appendix A

6dB bandwidth measurement

According to FCC Part 15.247 (a) (2)

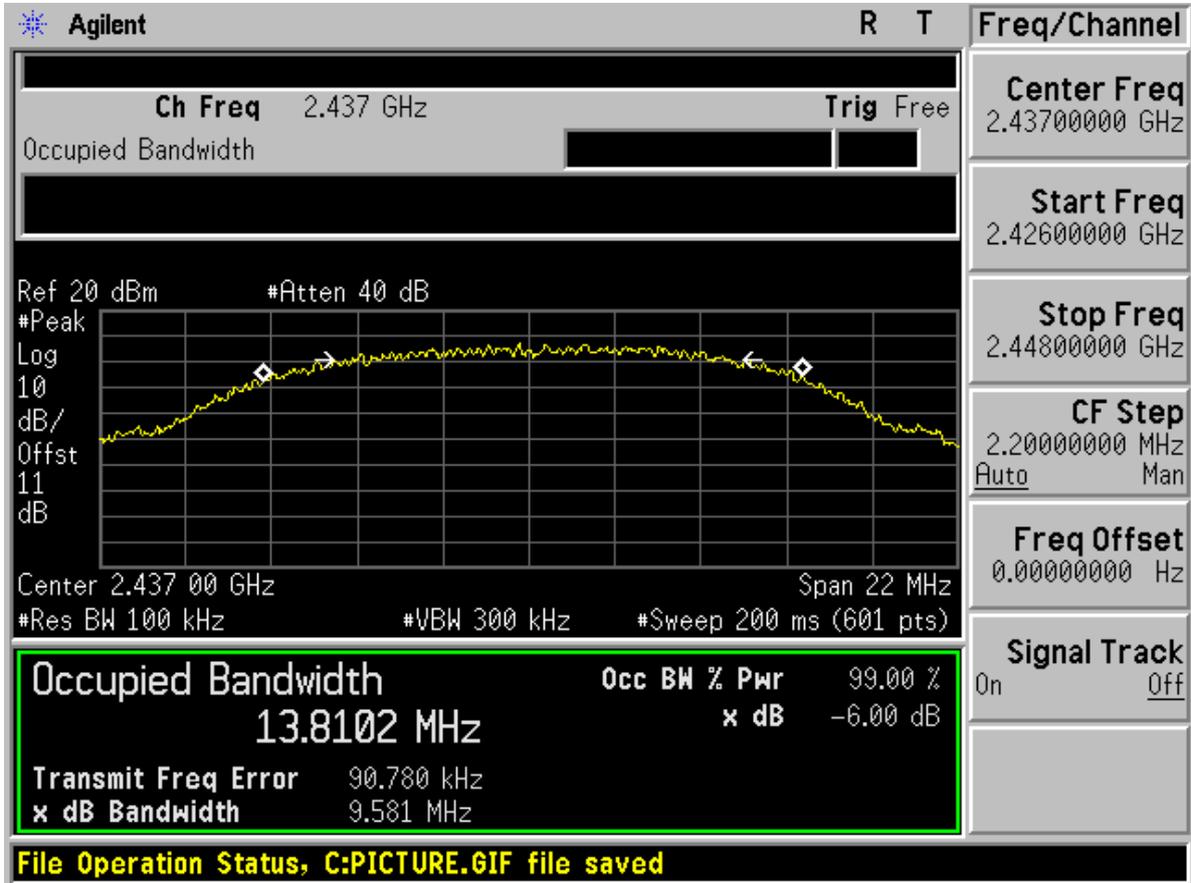


TM1 Channel 1 (2412MHz)



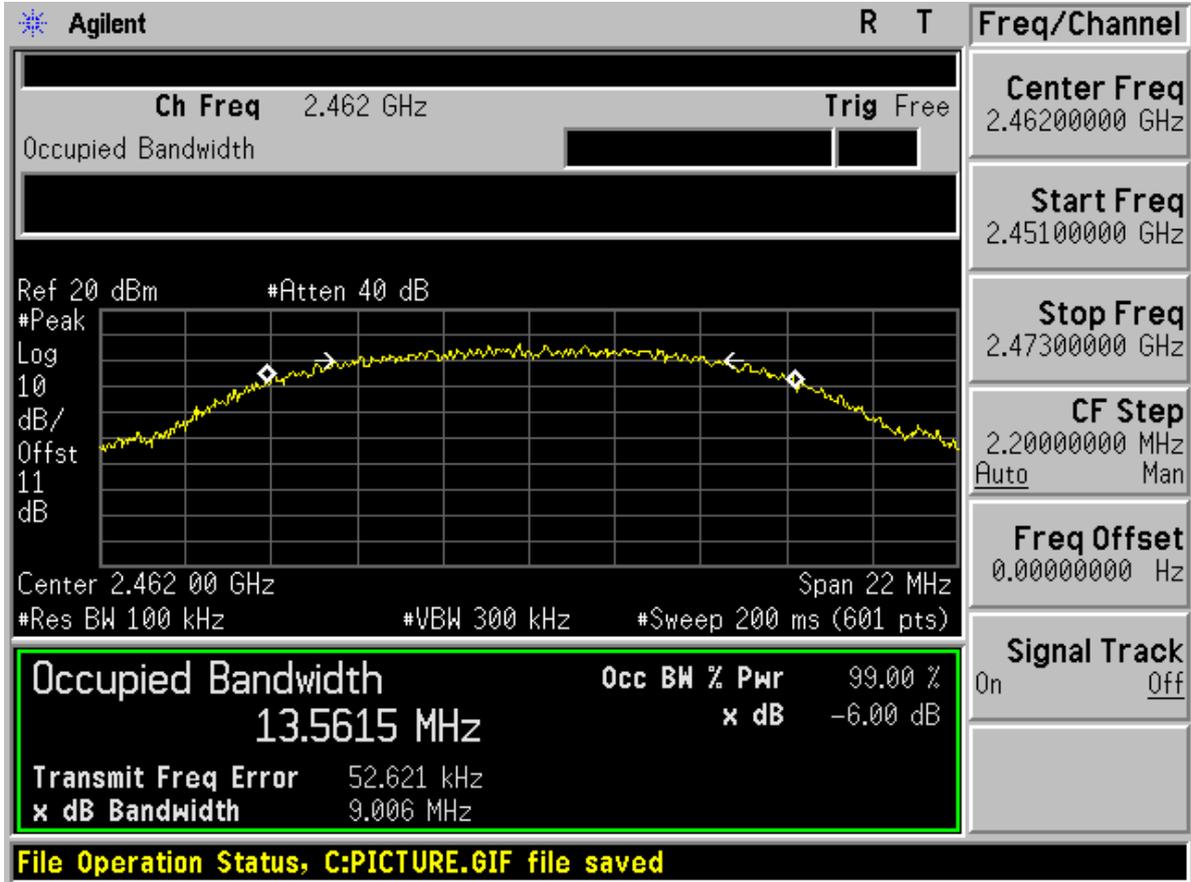


Channel 6 (2437MHz)



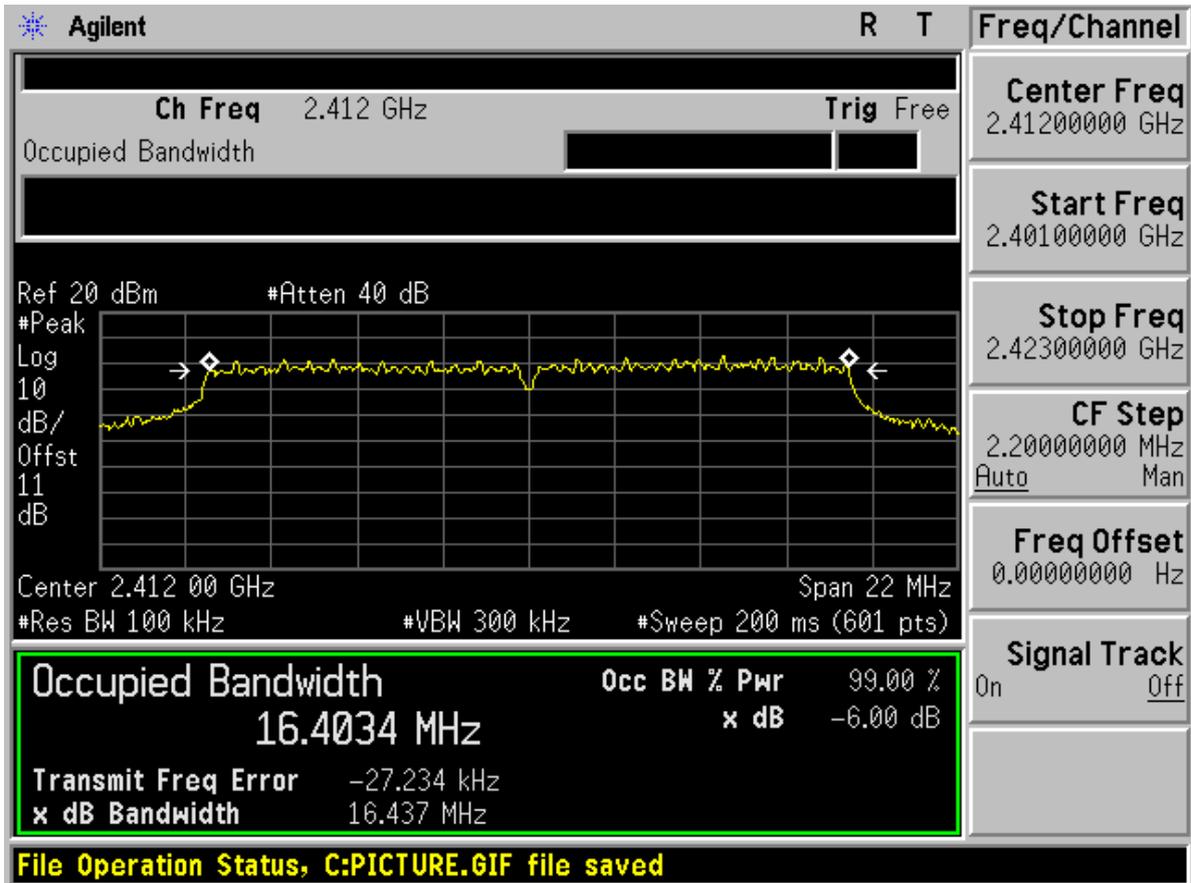


Channel 11 (2462MHz)



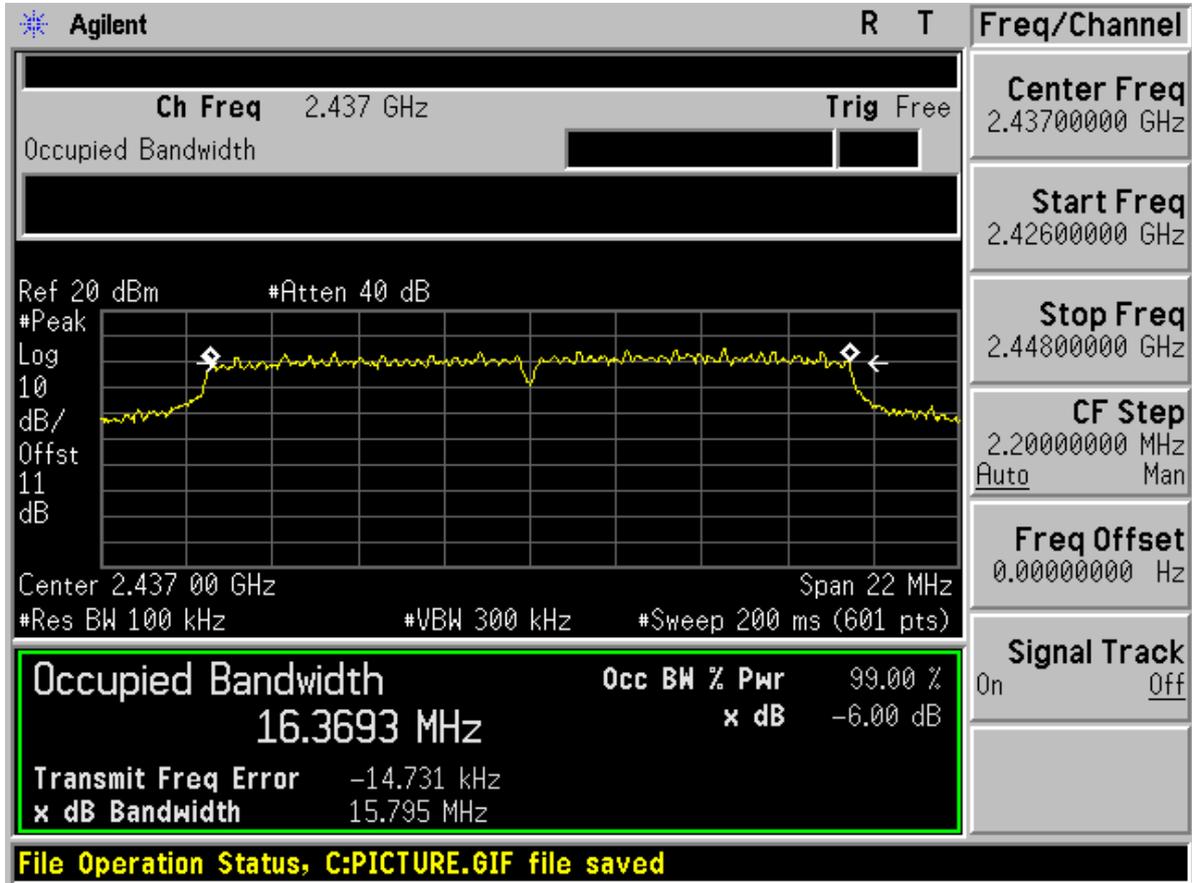


TM2 Channel 1 (2412MHz)



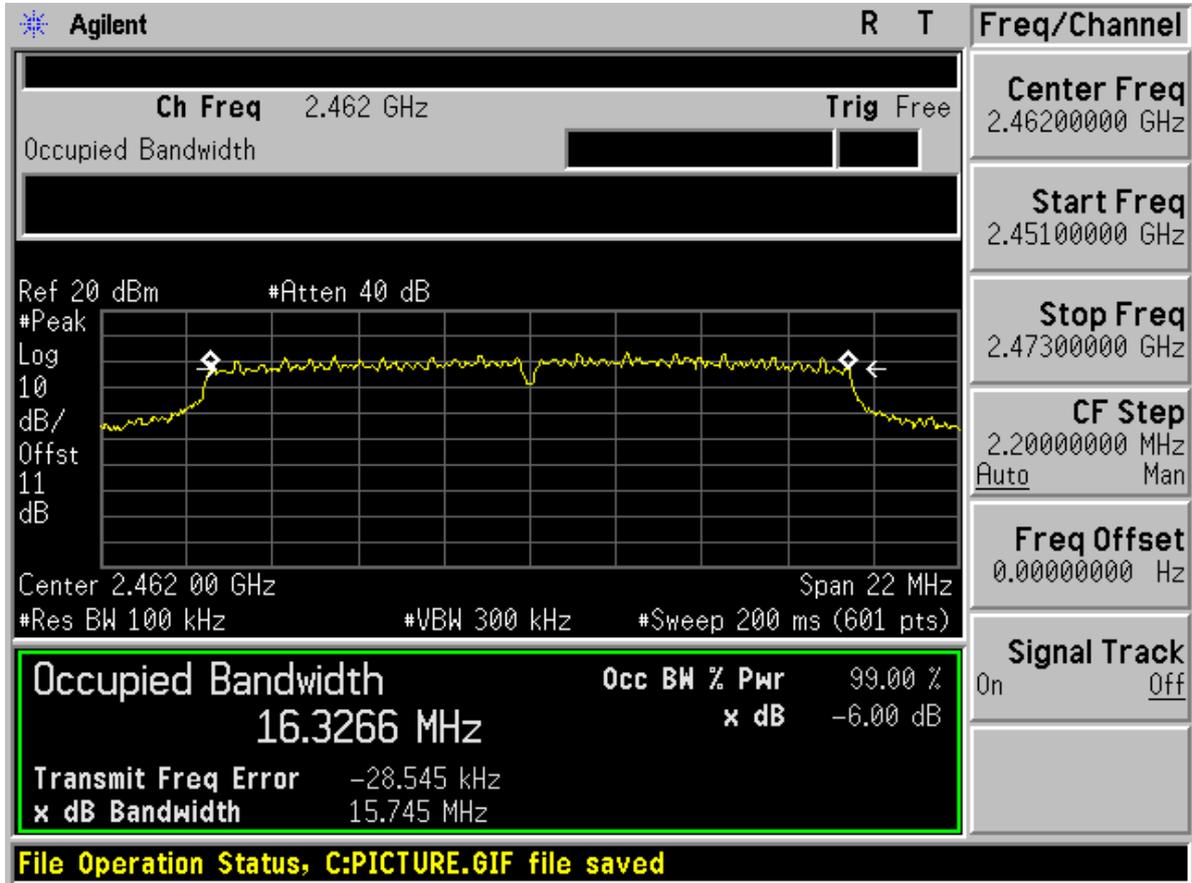


Channel 6 (2437MHz)





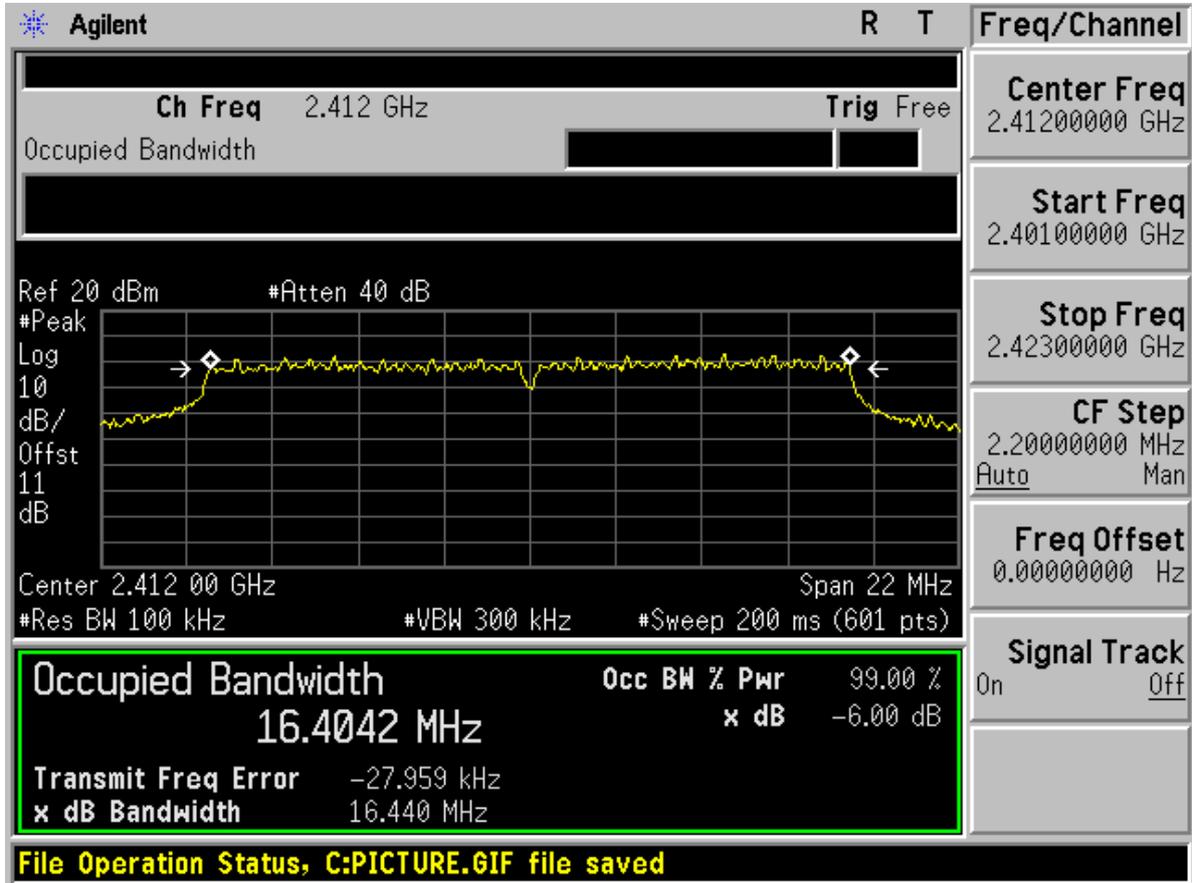
Channel 11 (2462MHz)



TM3

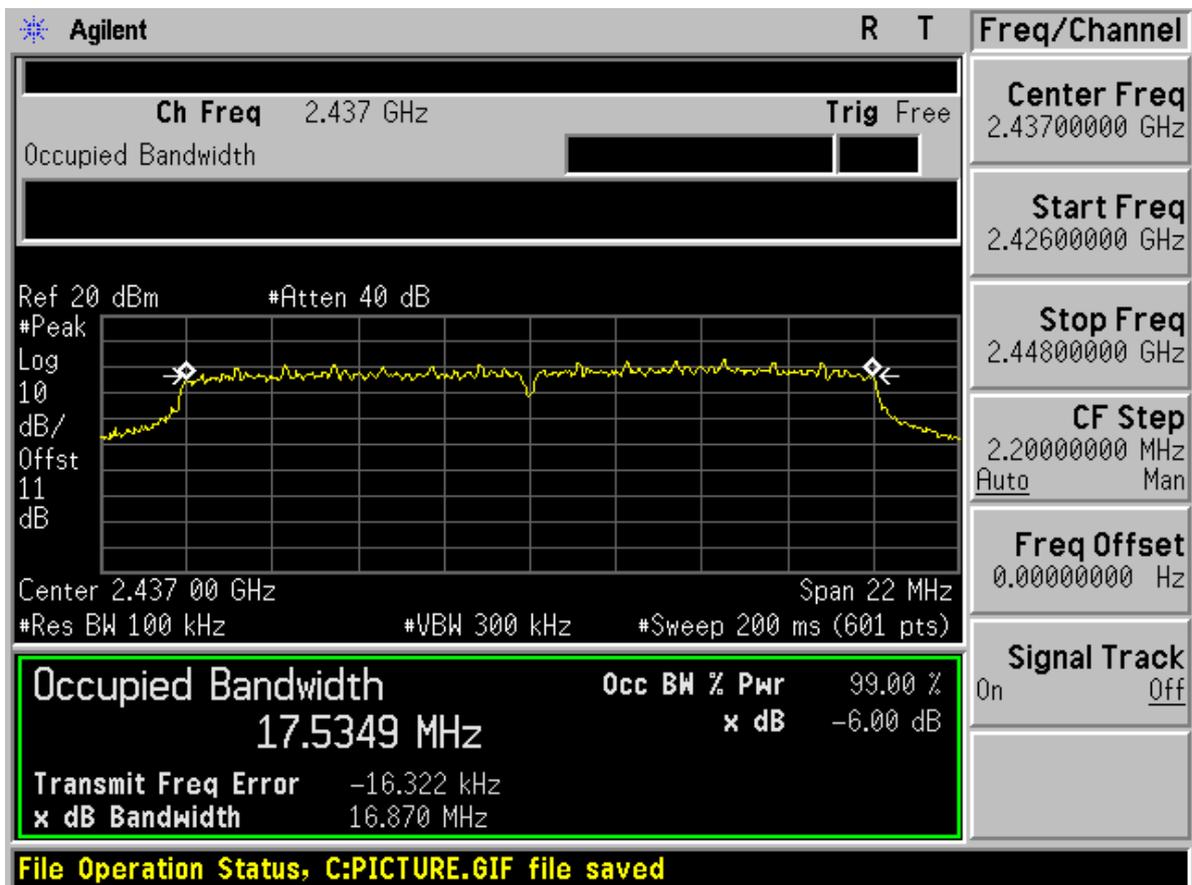


Channel 1 (2412MHz)



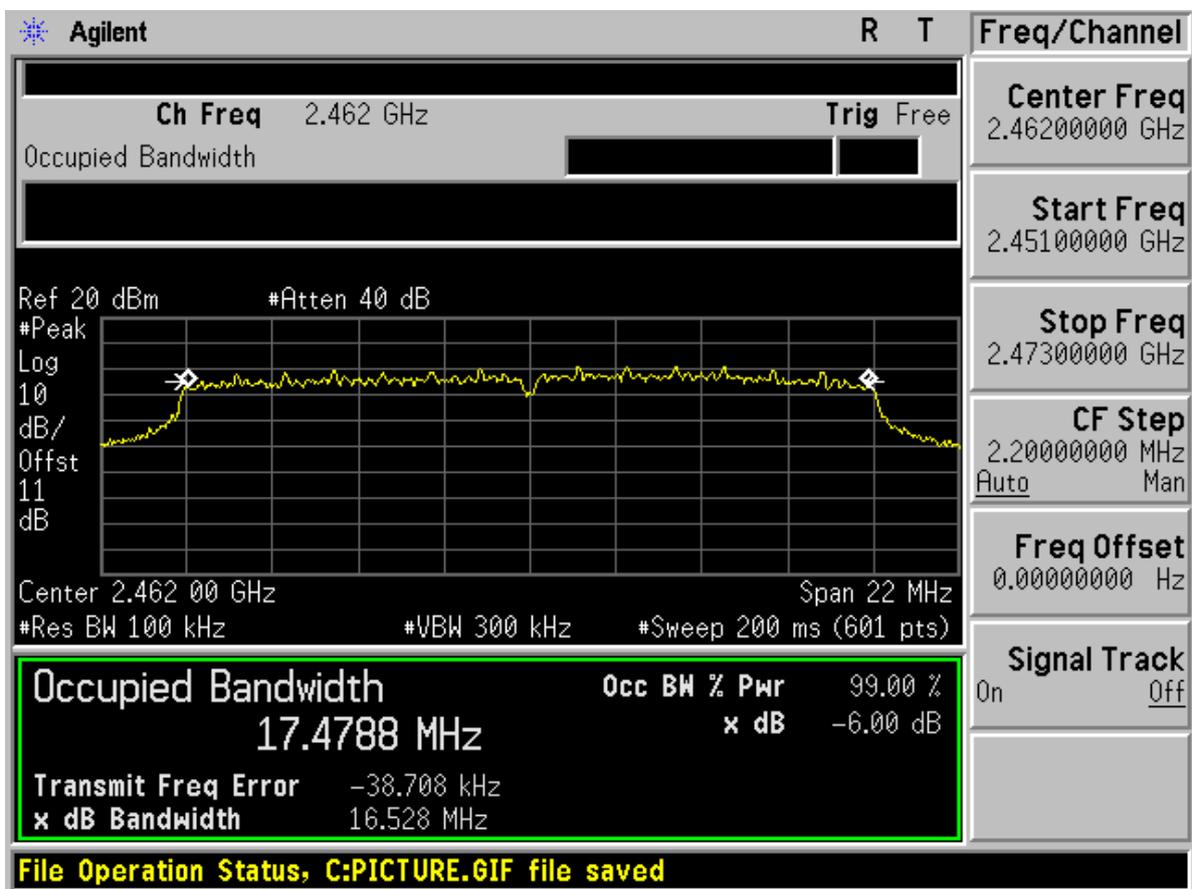


Channel 6 (2437MHz)





Channel 11 (2462MHz)





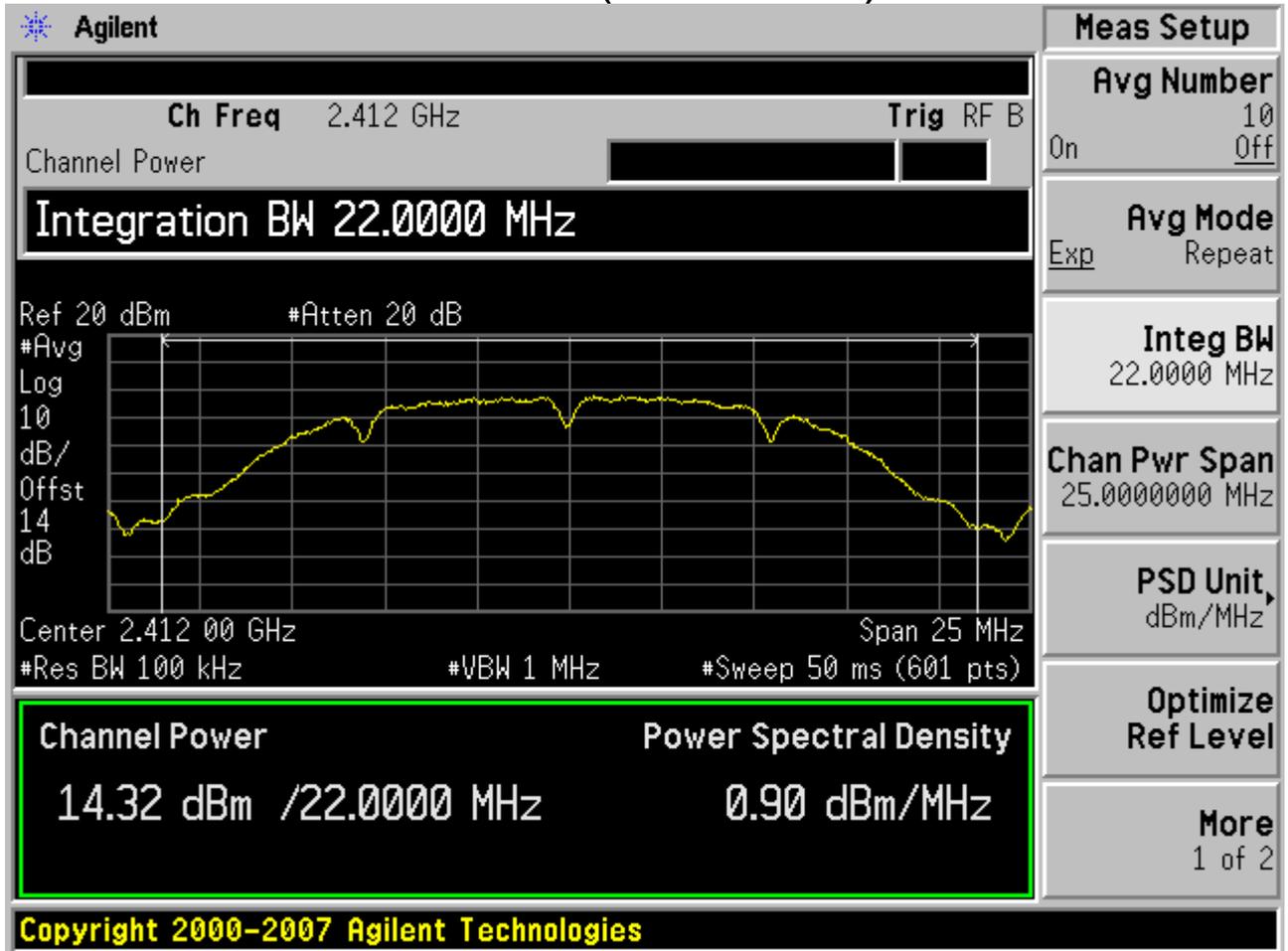
Appendix B

Conducted Peak output power

According to FCC Part 15.247 (b) (3)

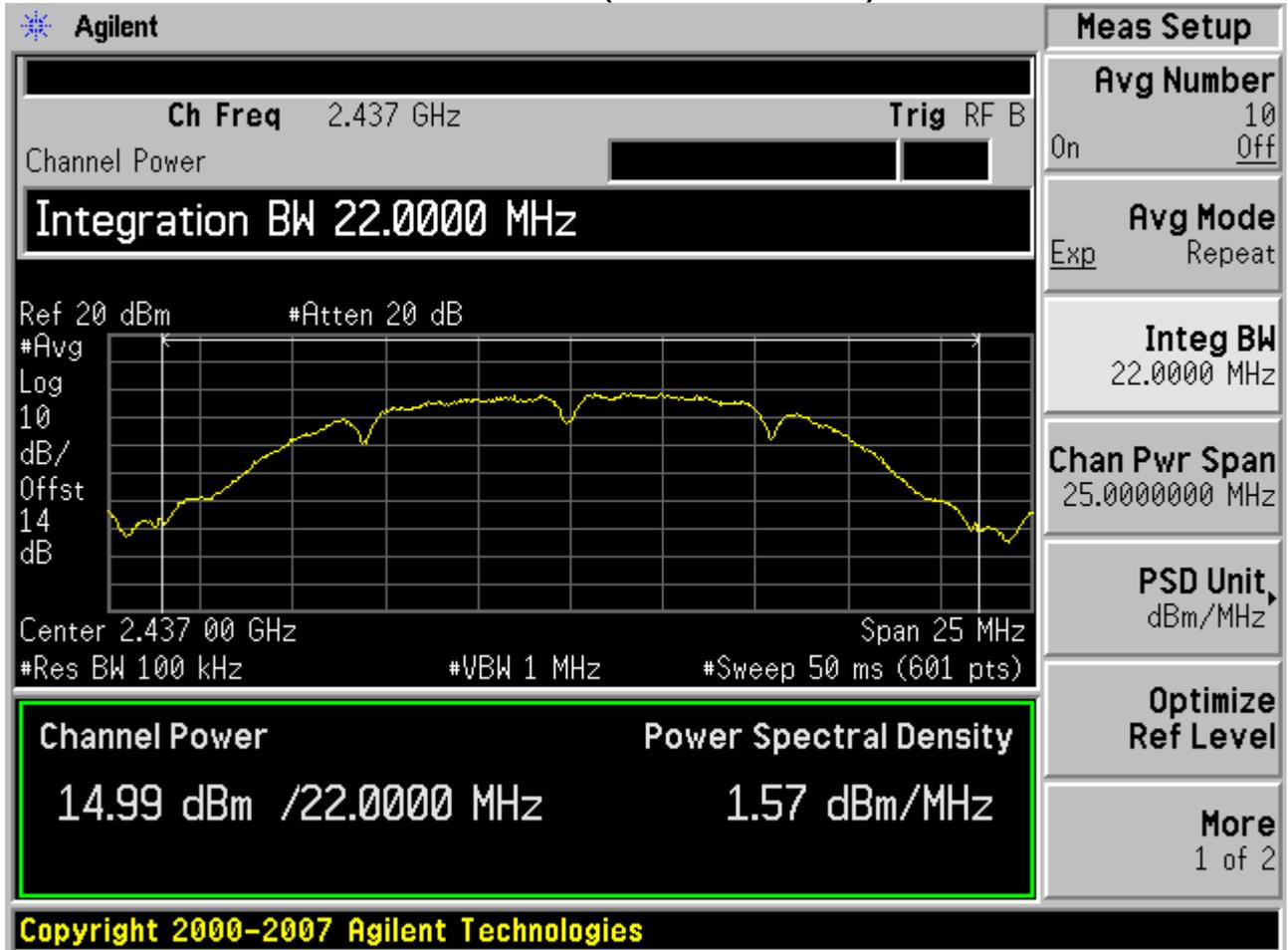


TM1 Channel 1 (2412MHz)



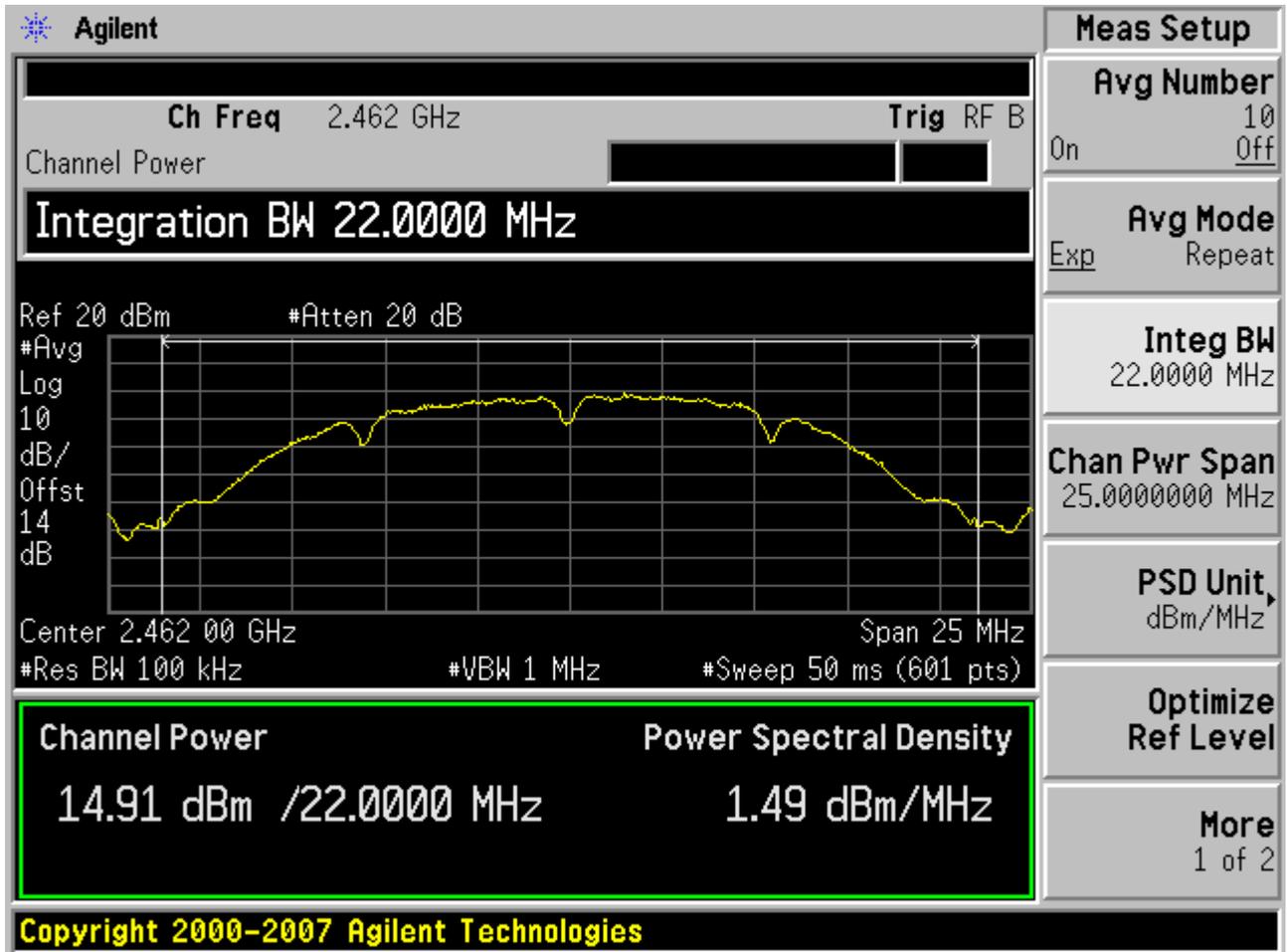


Channel 6 (2437MHz)



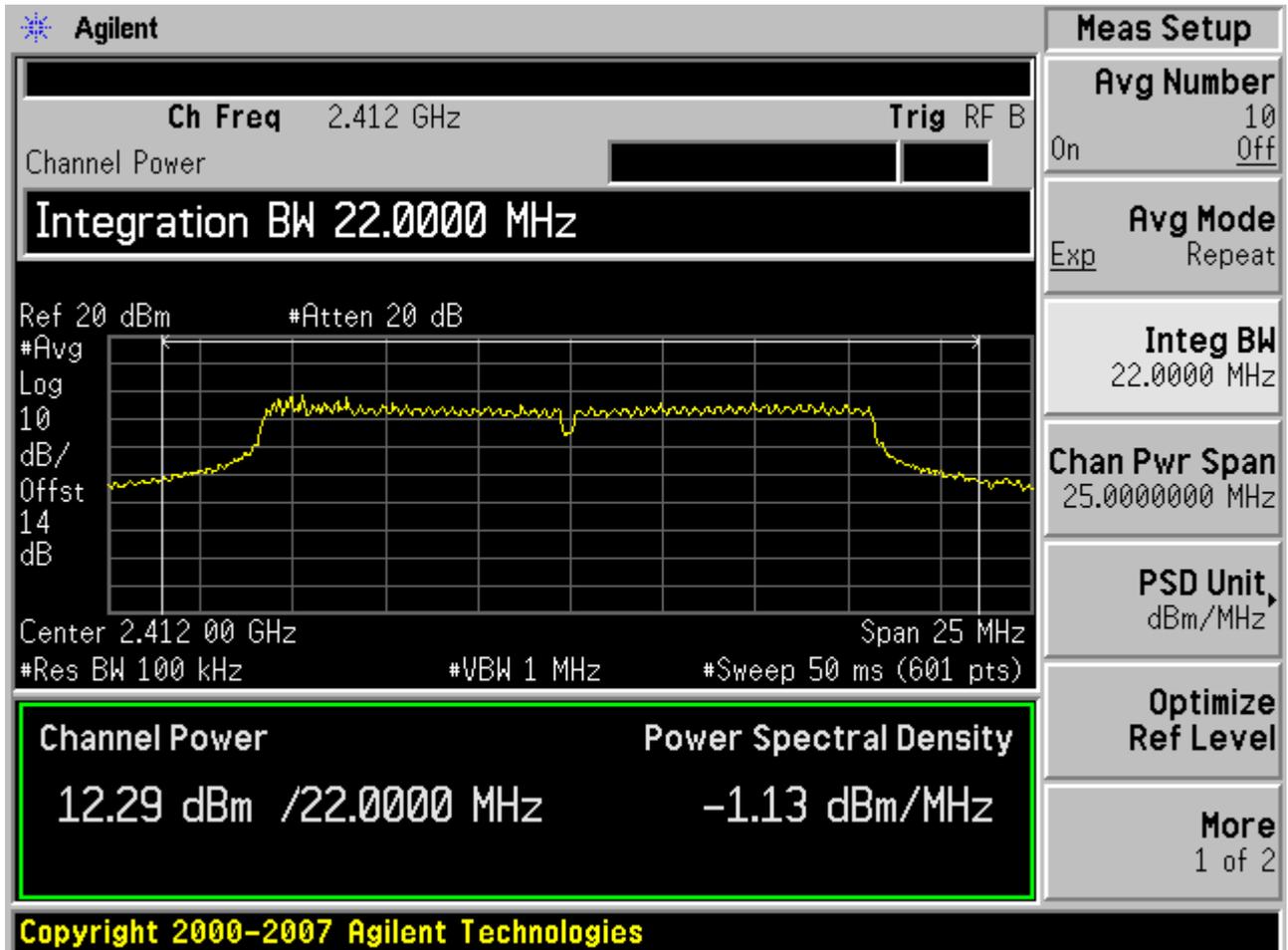


Channel 11 (2462MHz)



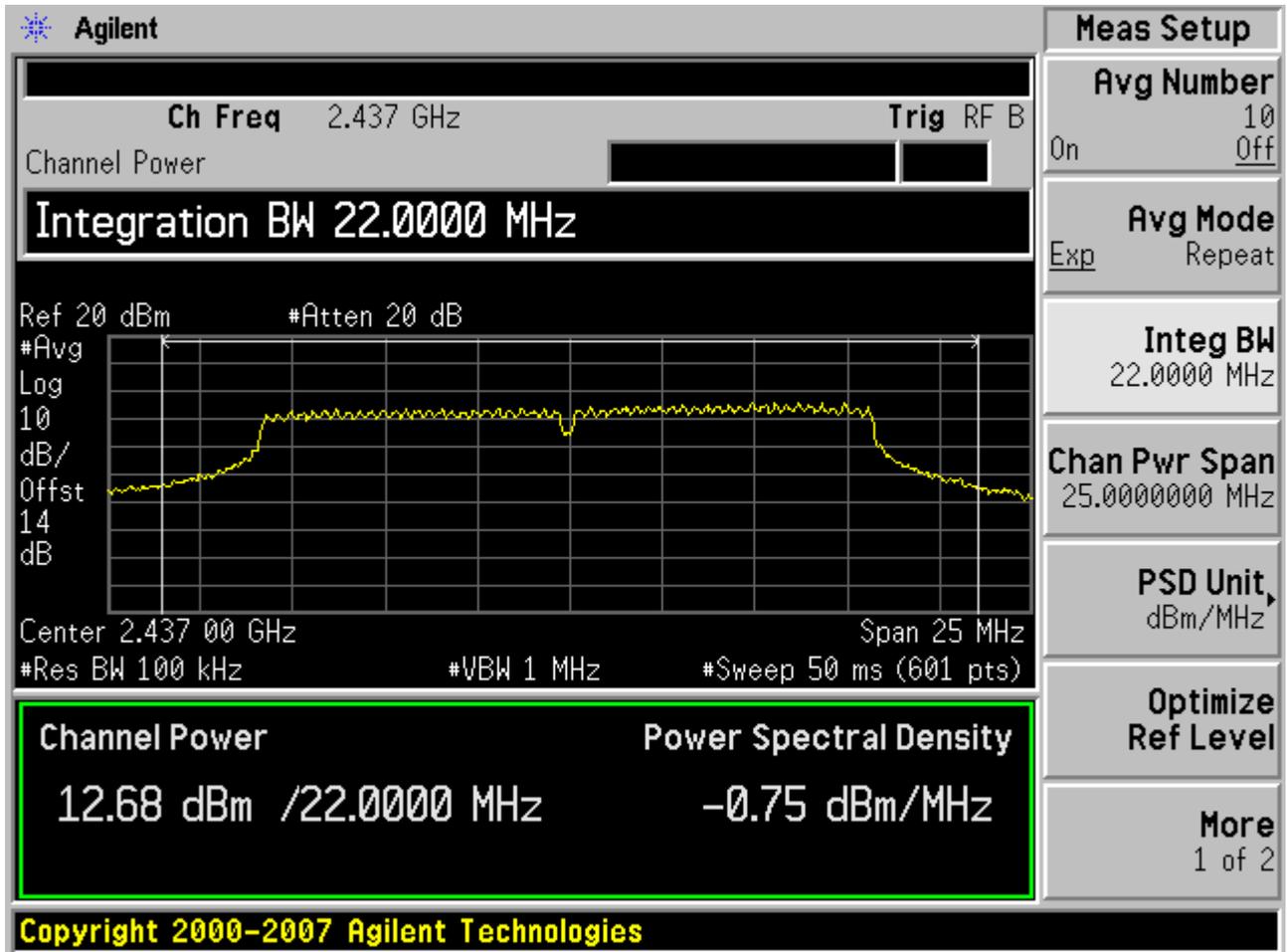


TM2 Channel 1 (2412MHz)



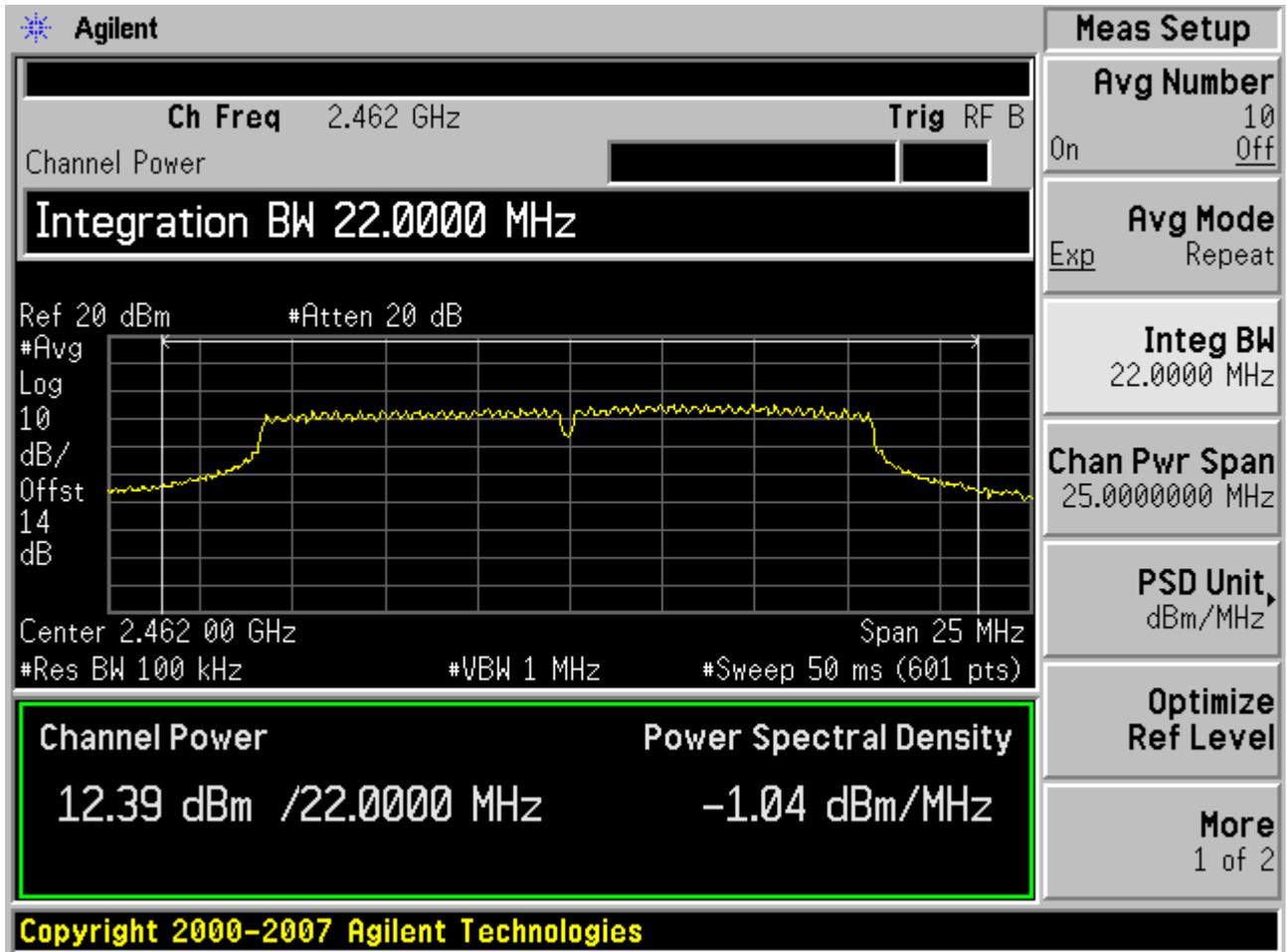


Channel 6 (2437MHz)





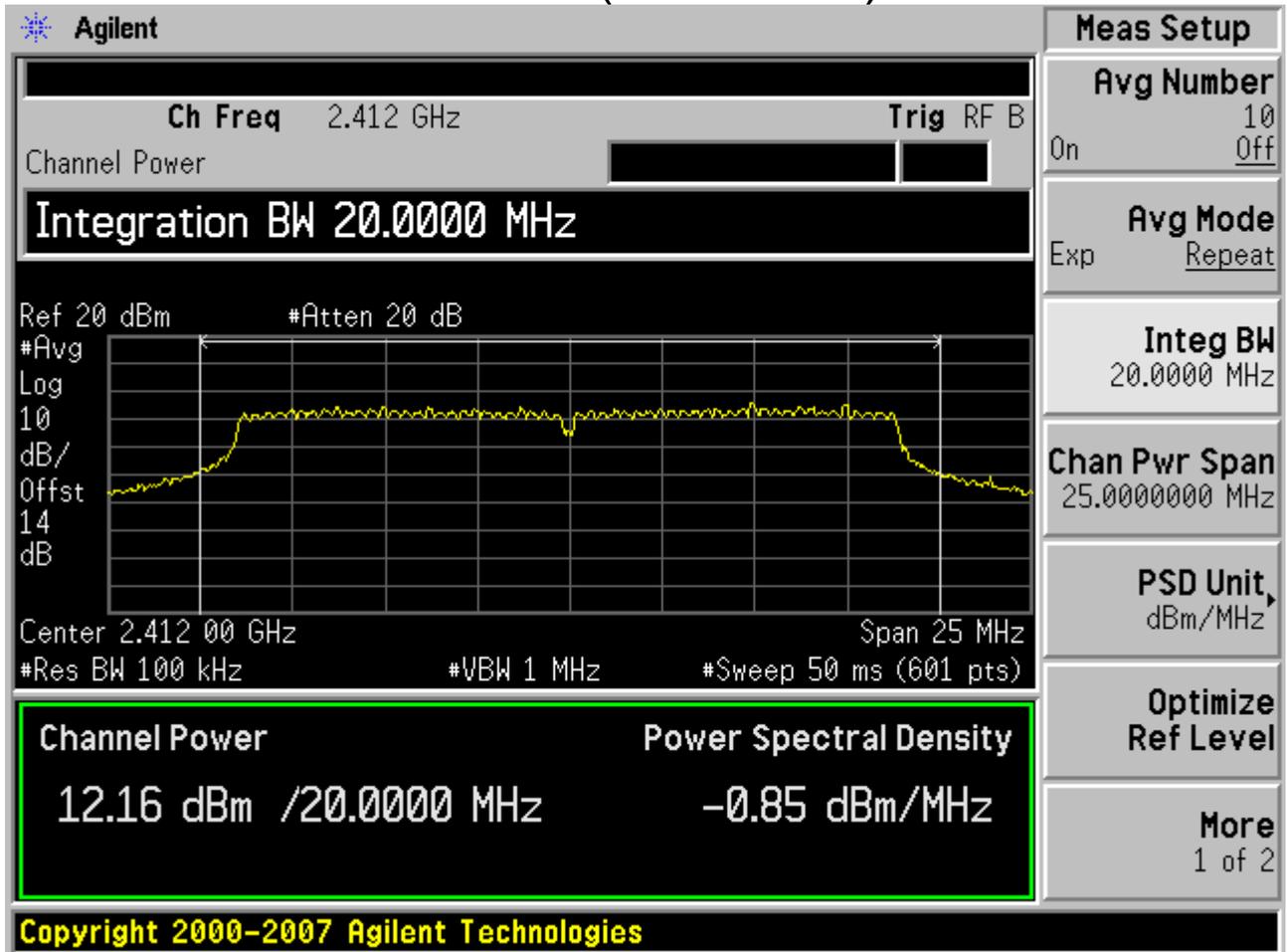
Channel 11 (2462MHz)





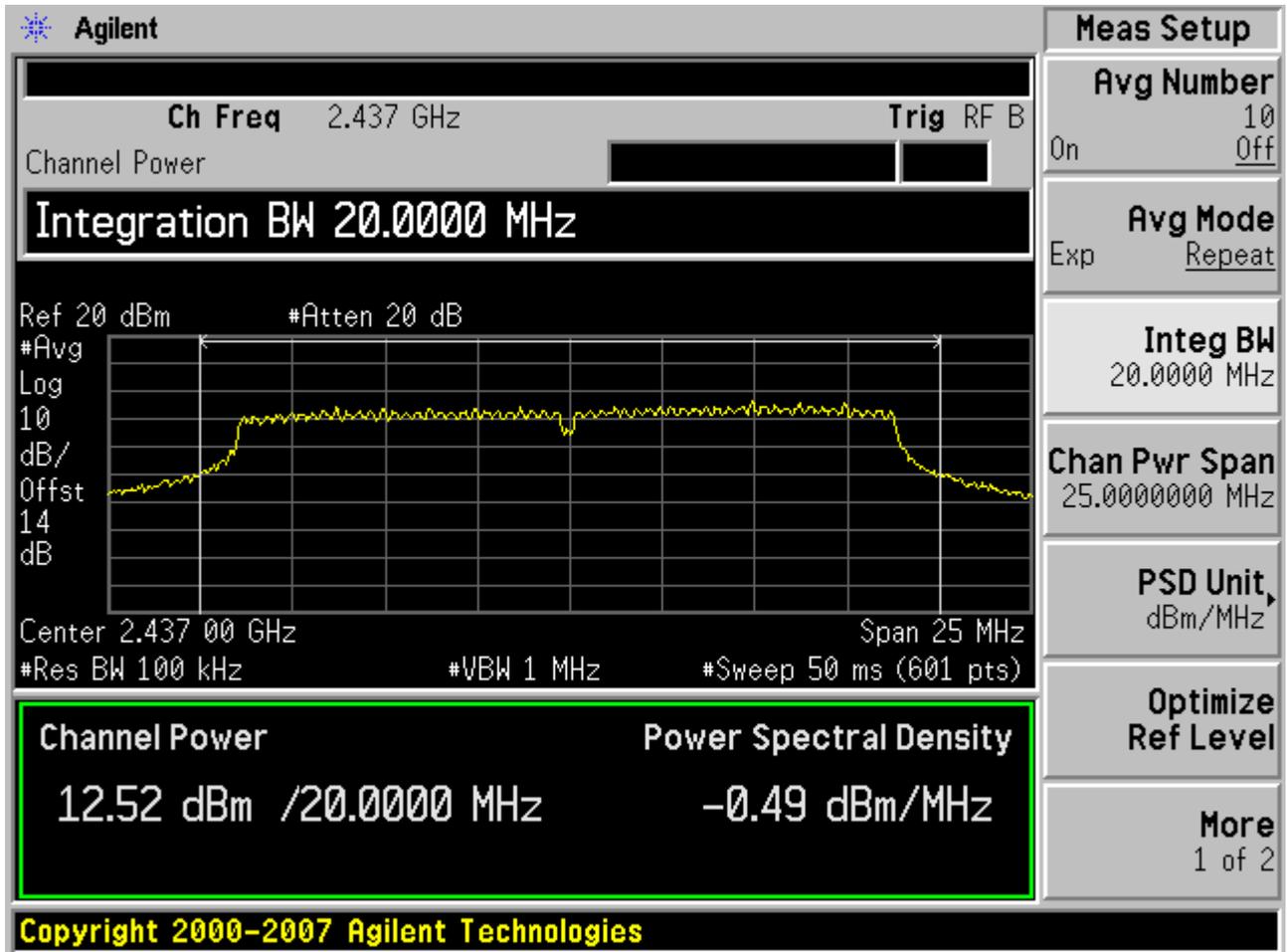
TM3

Channel 1 (2412MHz)



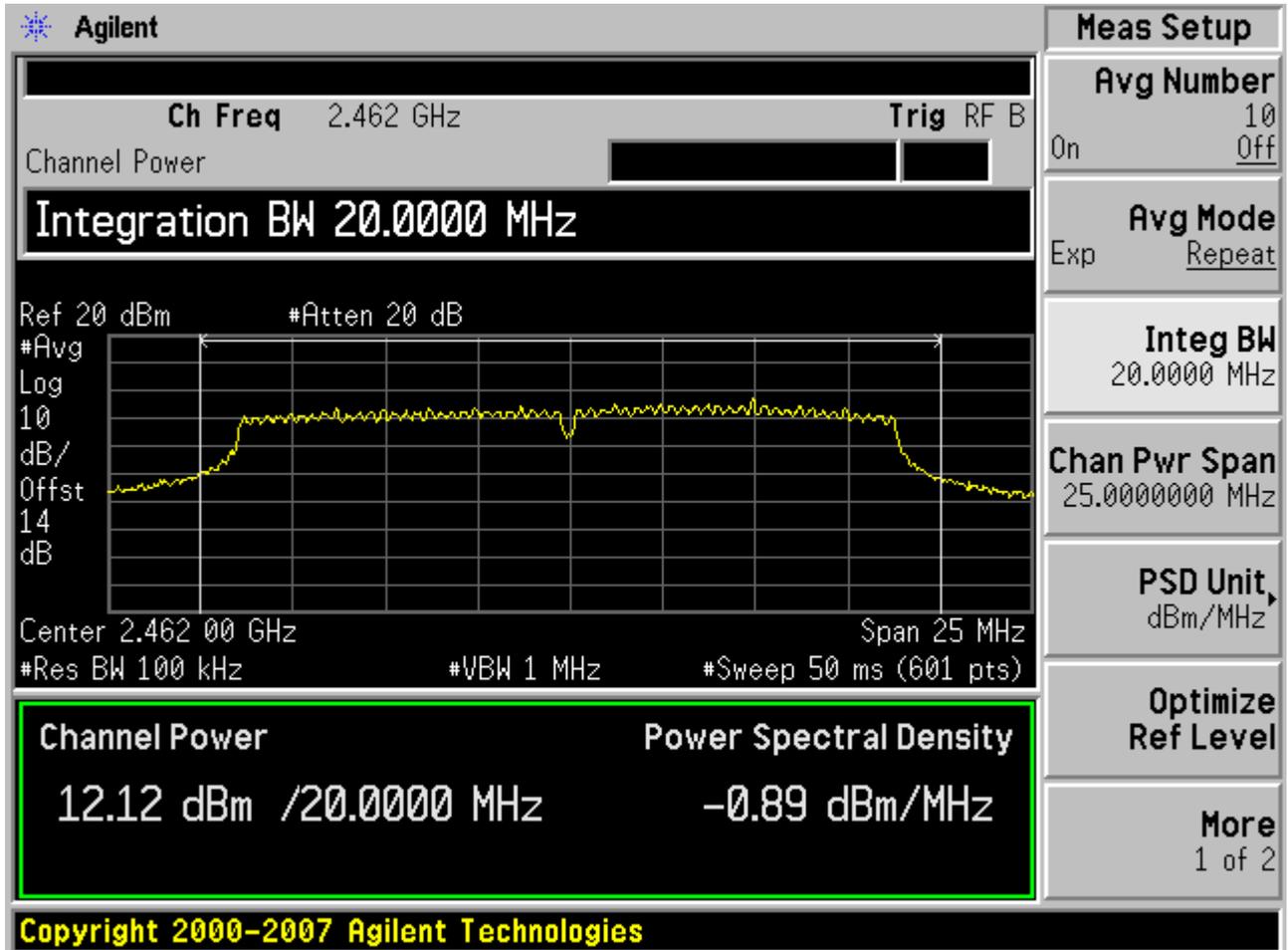


Channel 6 (2437MHz)





Channel 11 (2462MHz)





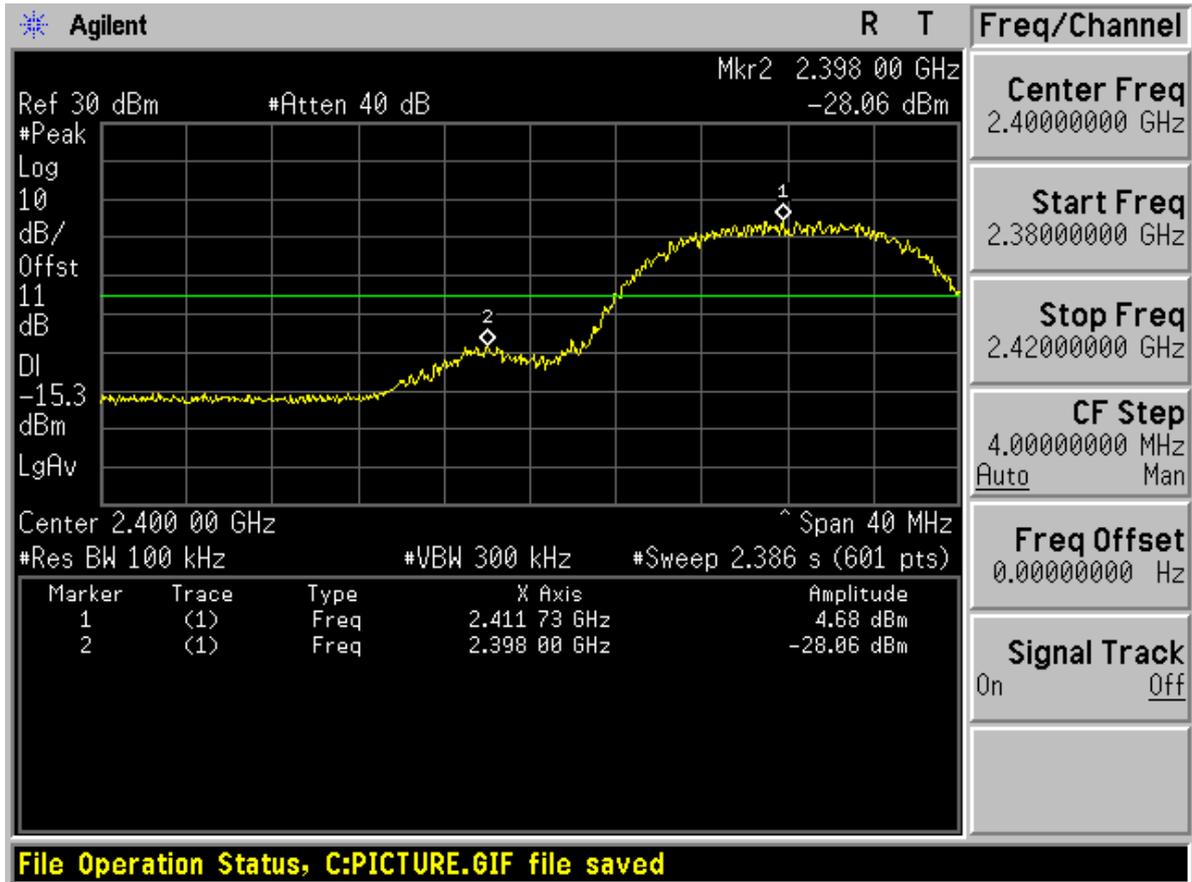
Appendix C

Band edge spurious emission

According to FCC Part 15.247 (d)

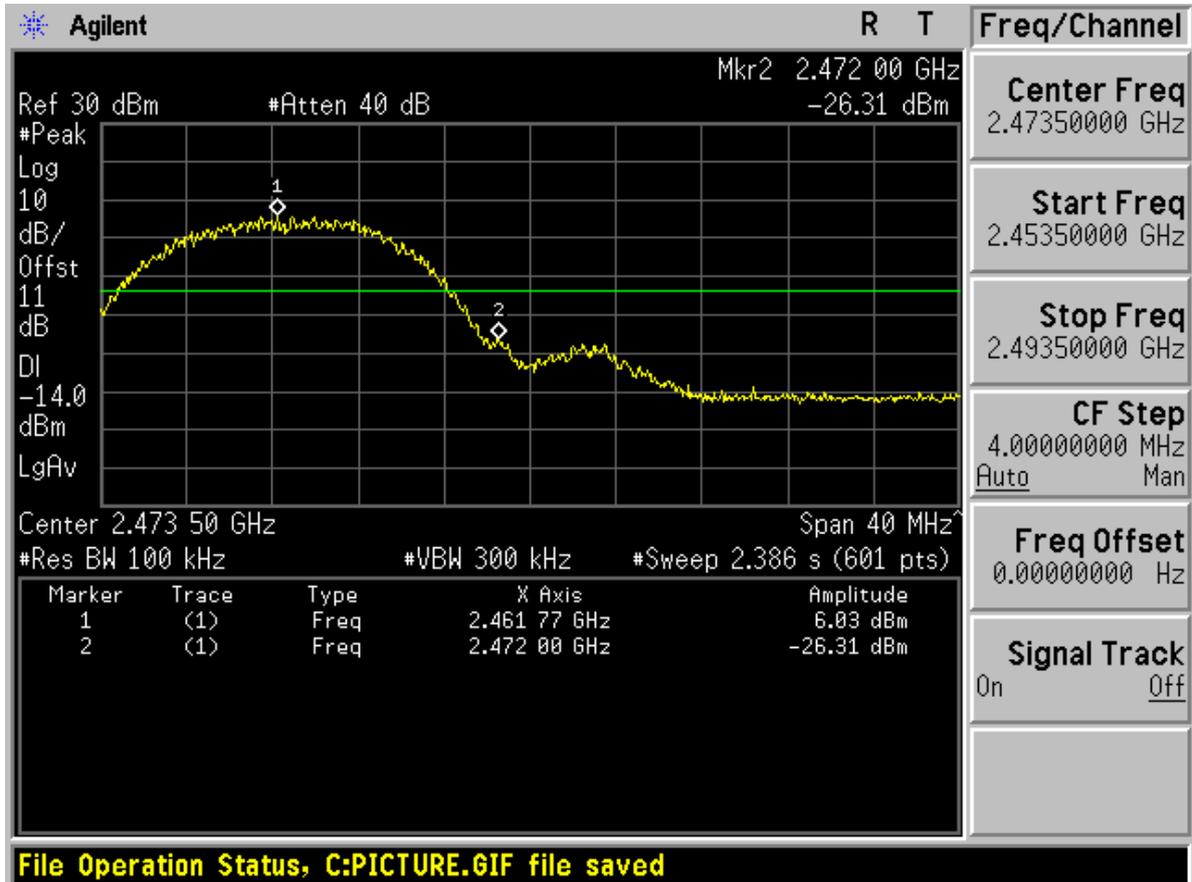


TM1 Low edge



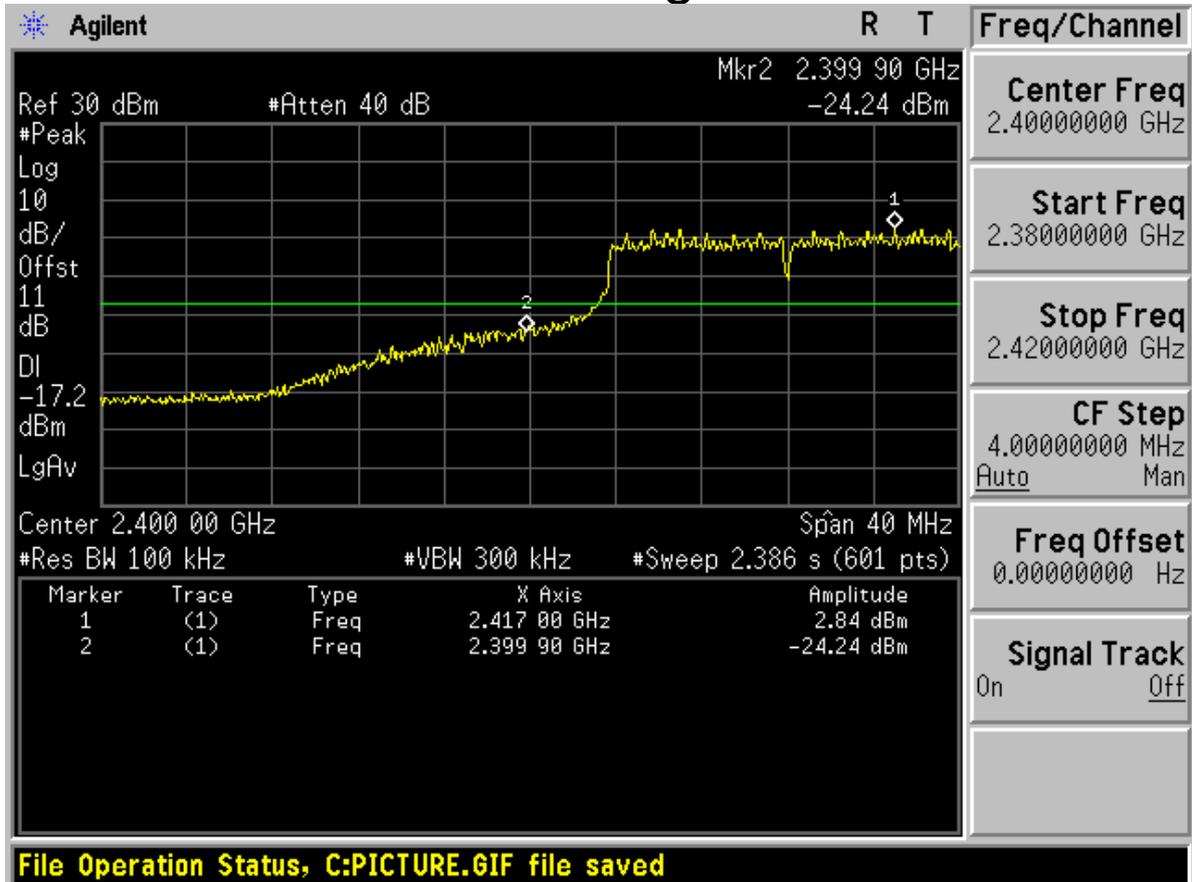


High edge



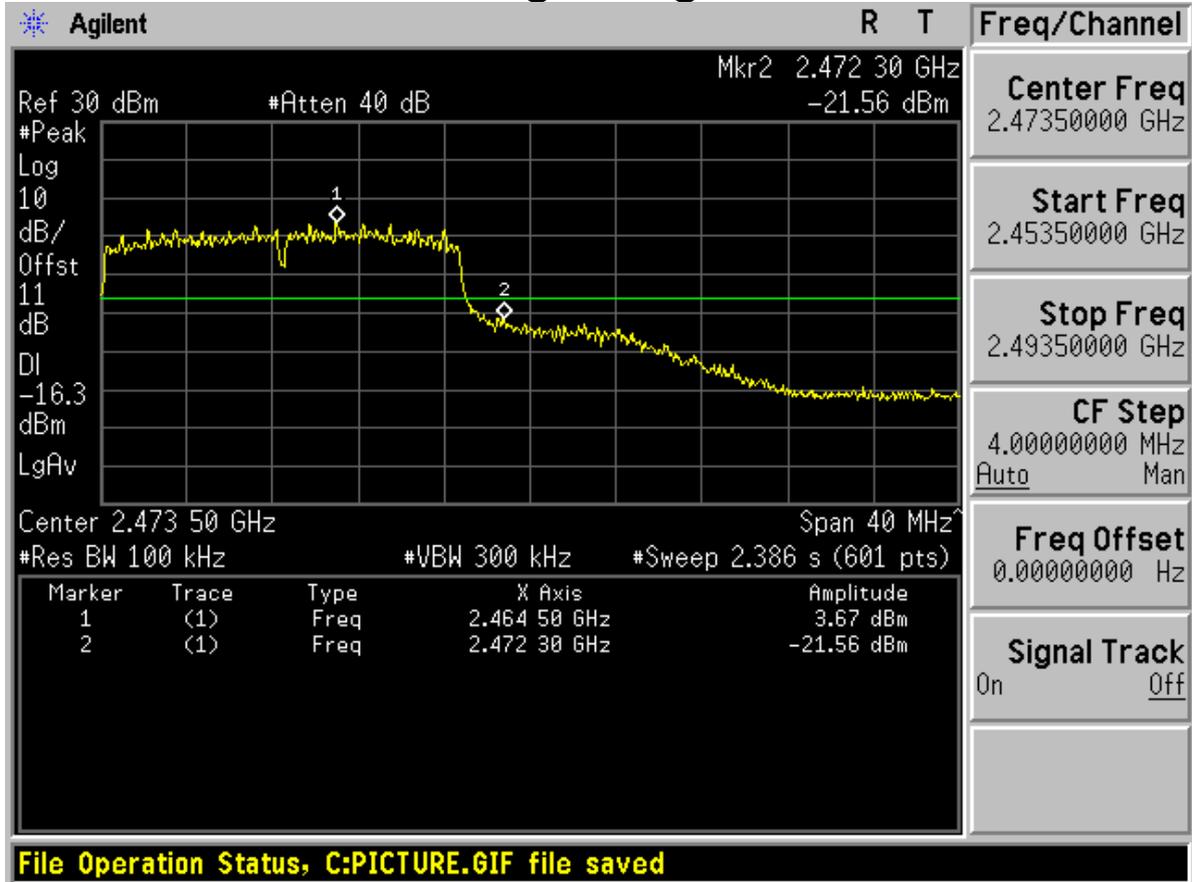


TM2 Low edge





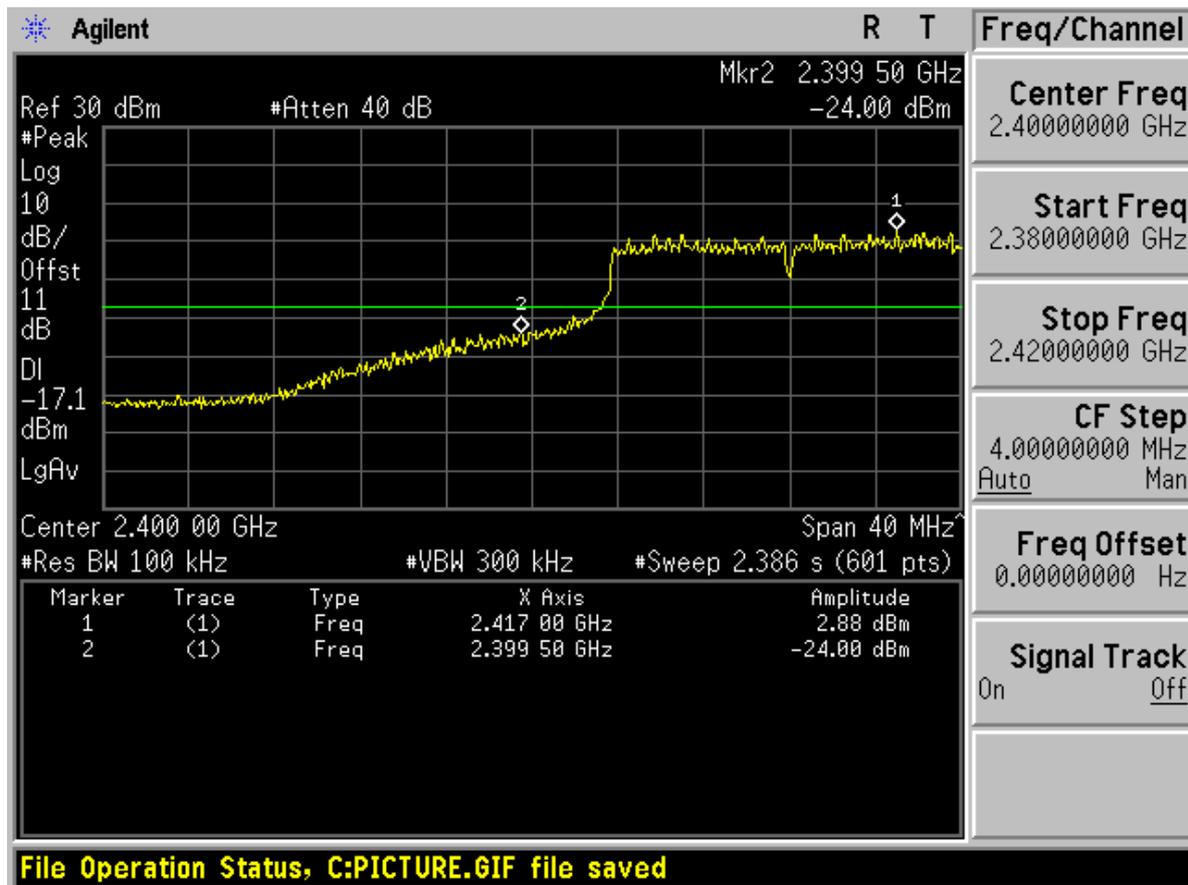
High edge





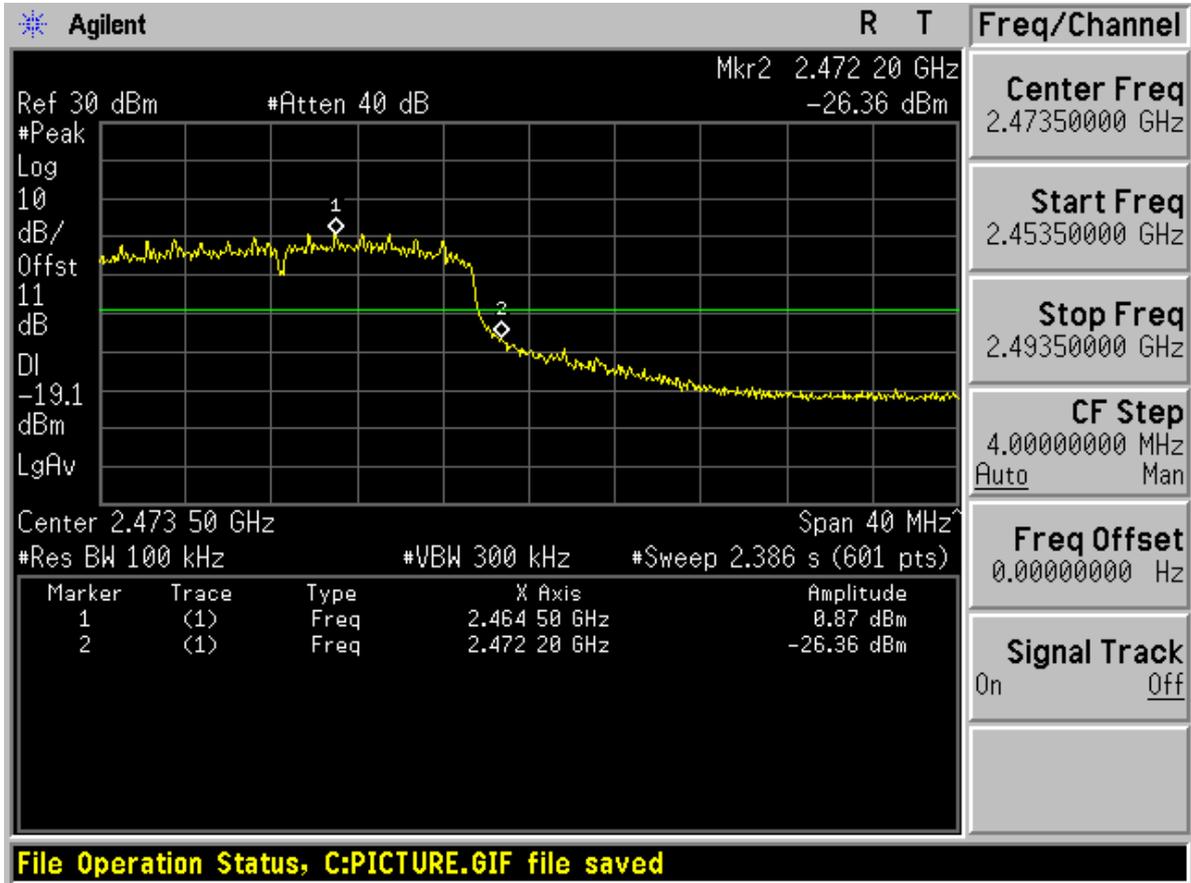
TM3

Low edge





High edge





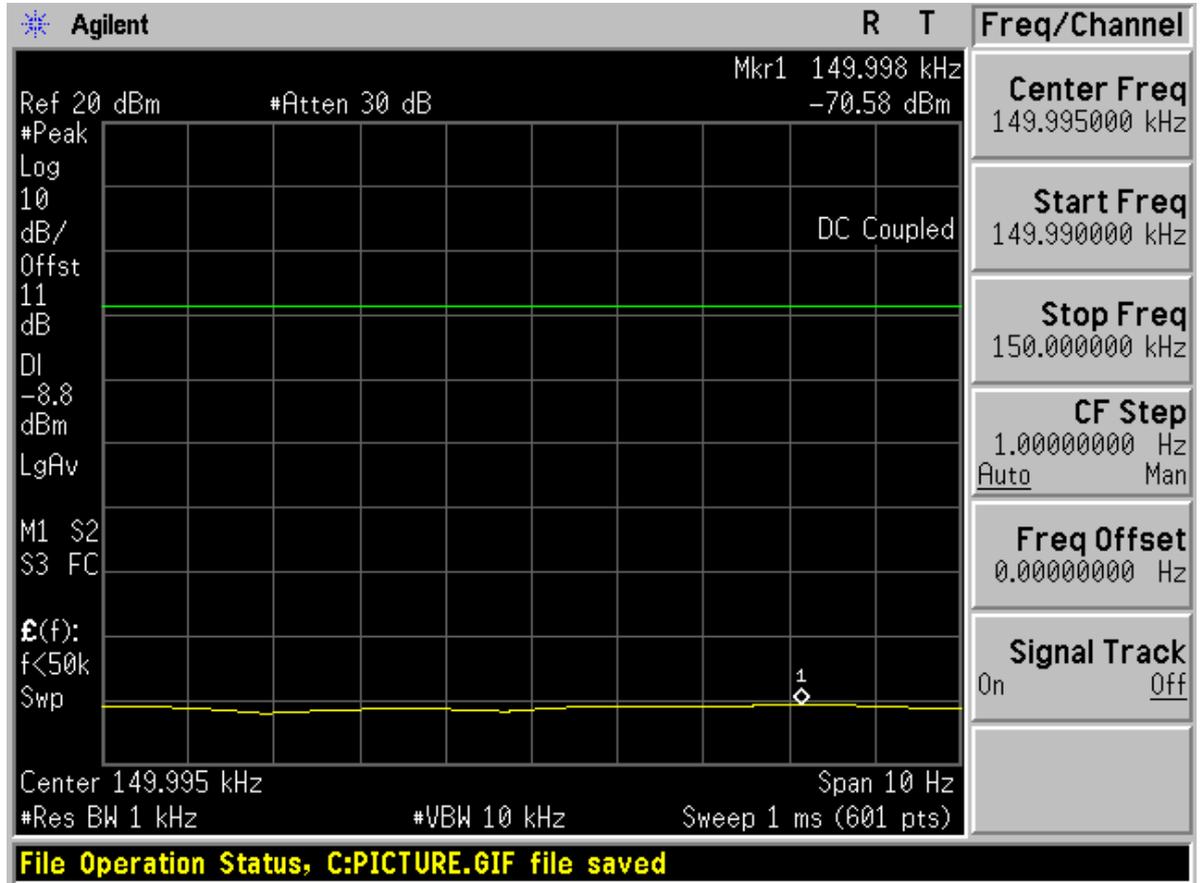
Appendix D

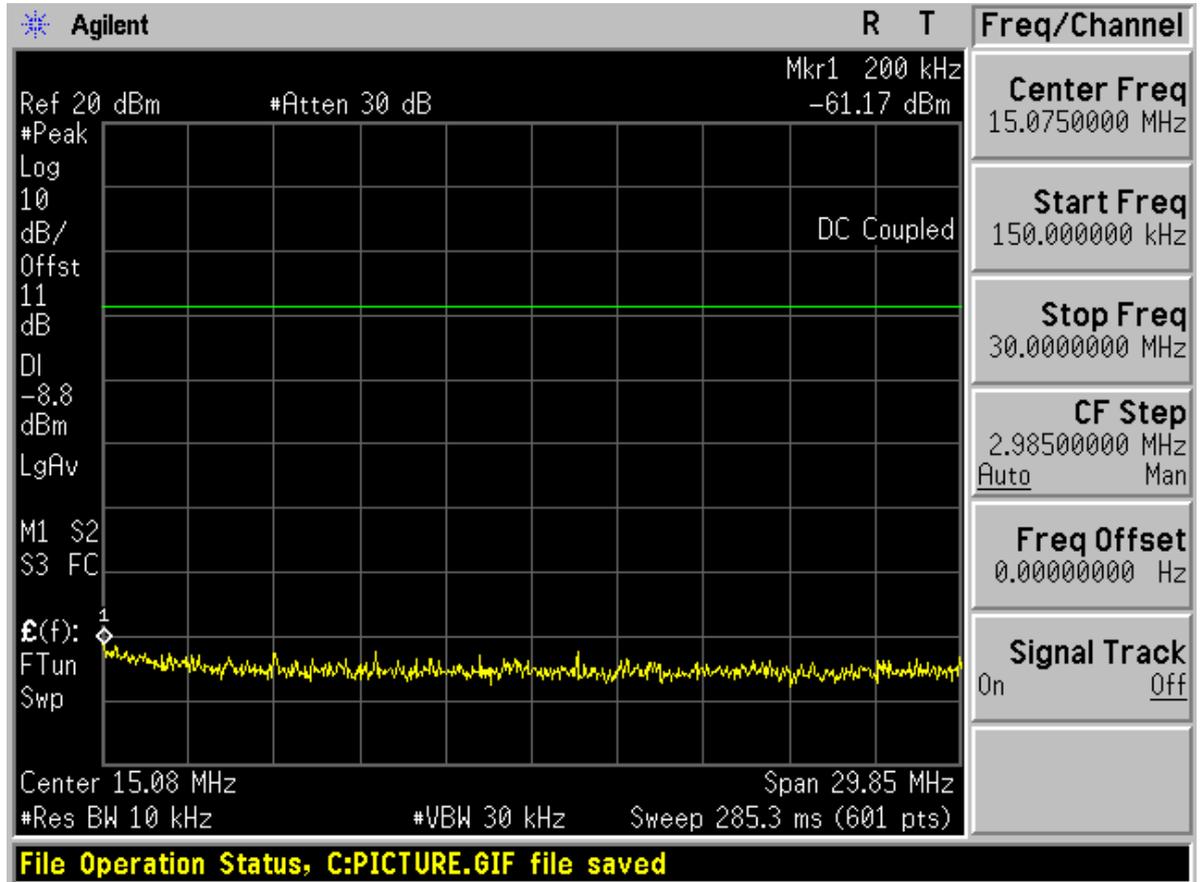
Conducted RF spurious

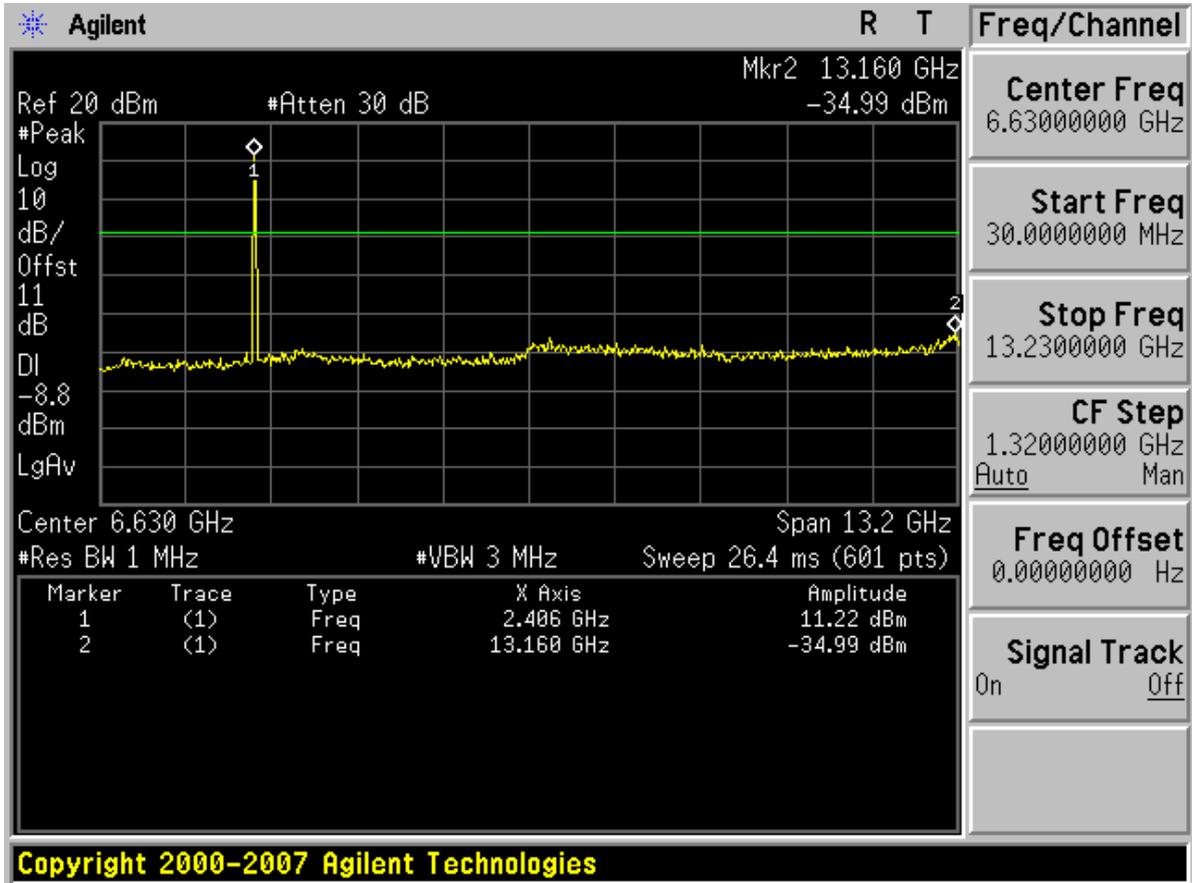
According to FCC Part 15.247 (d)



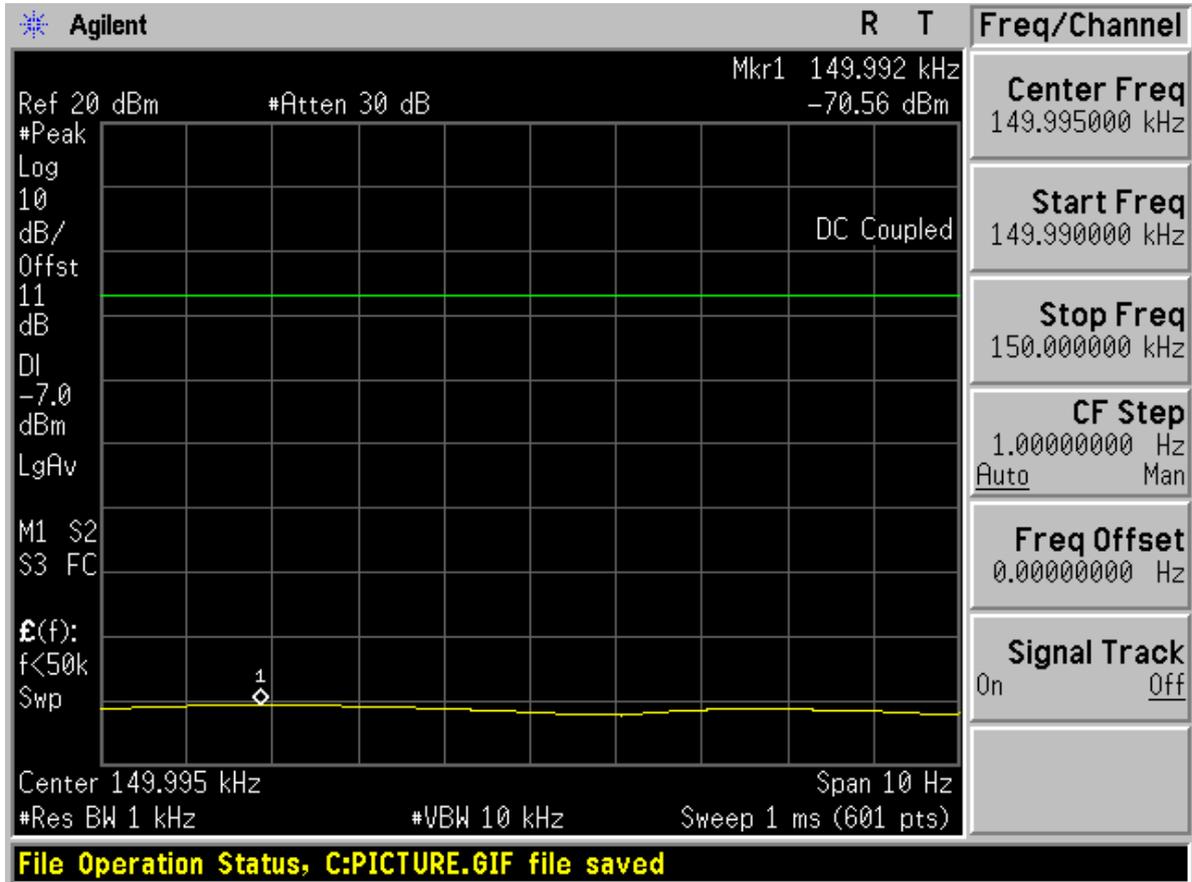
TM1 Channel 1

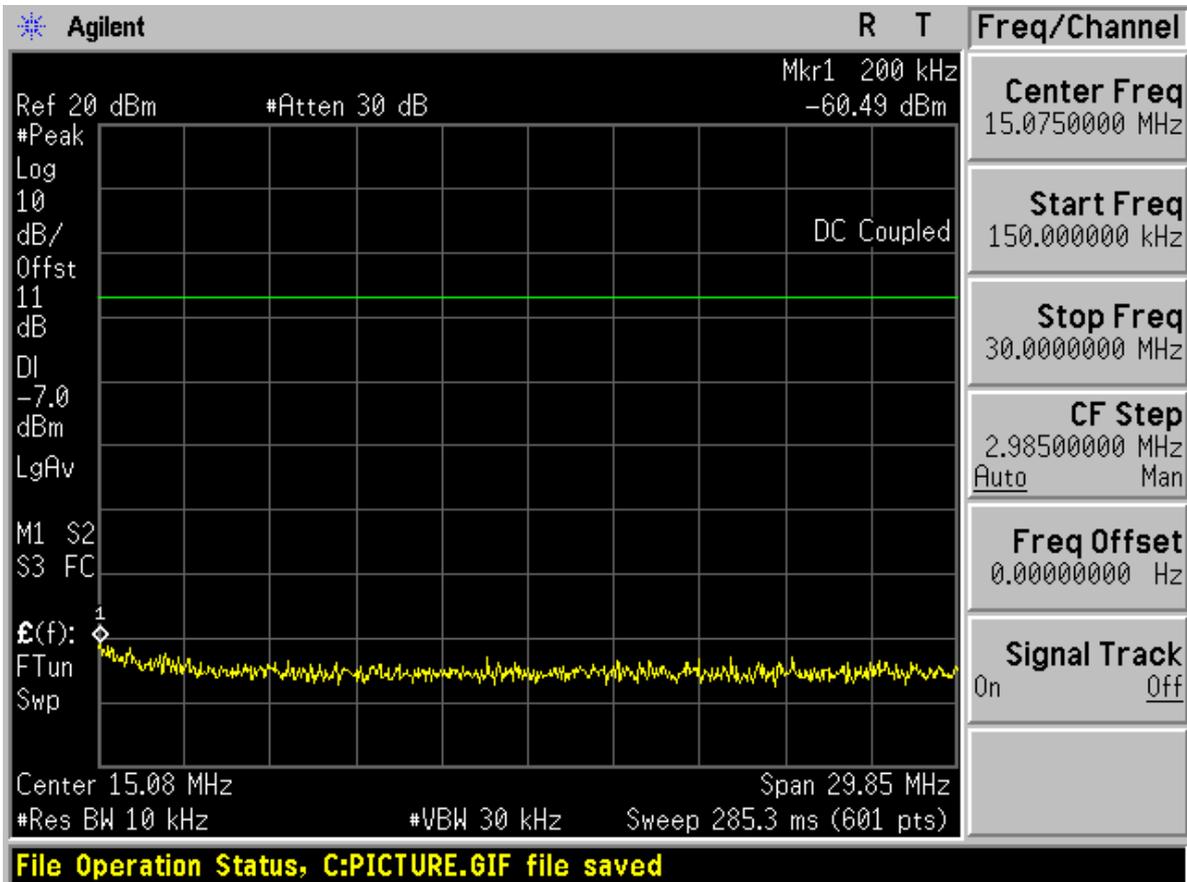


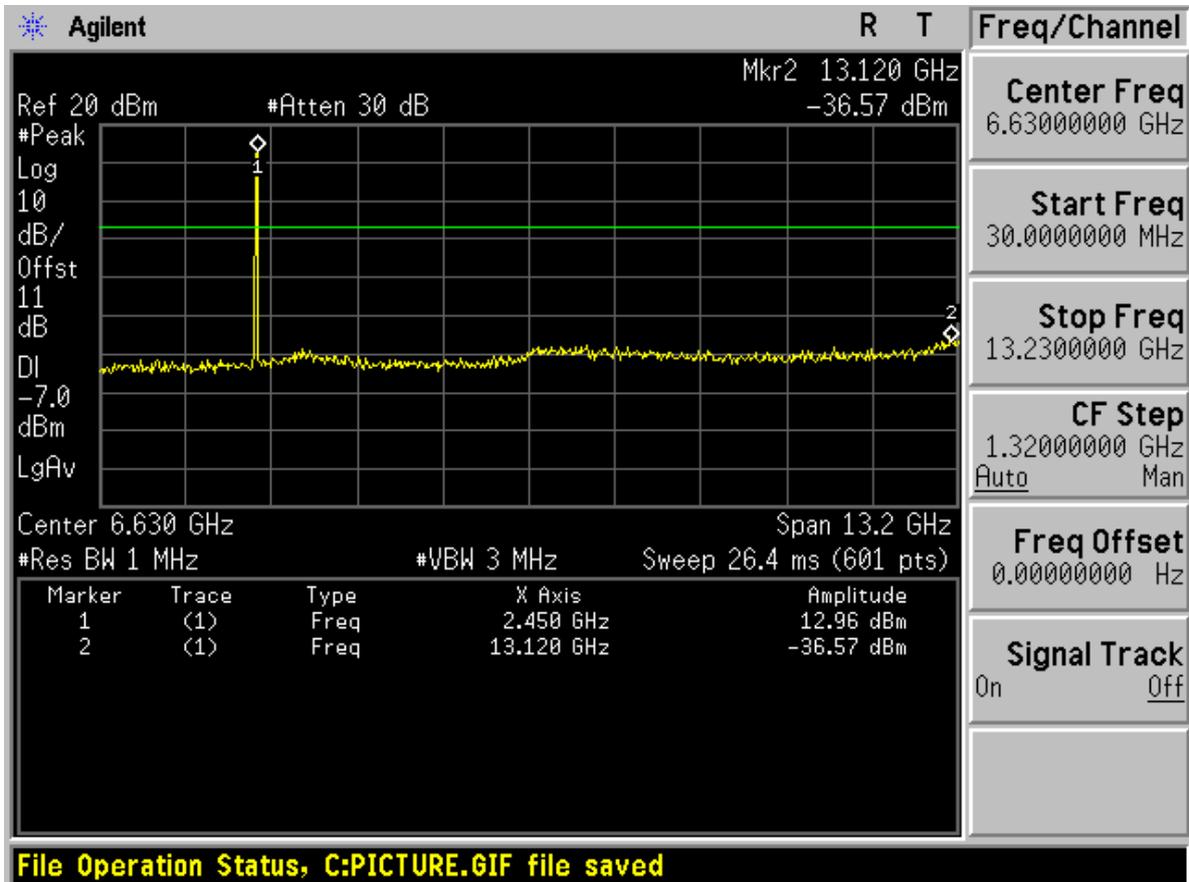




Channel 6

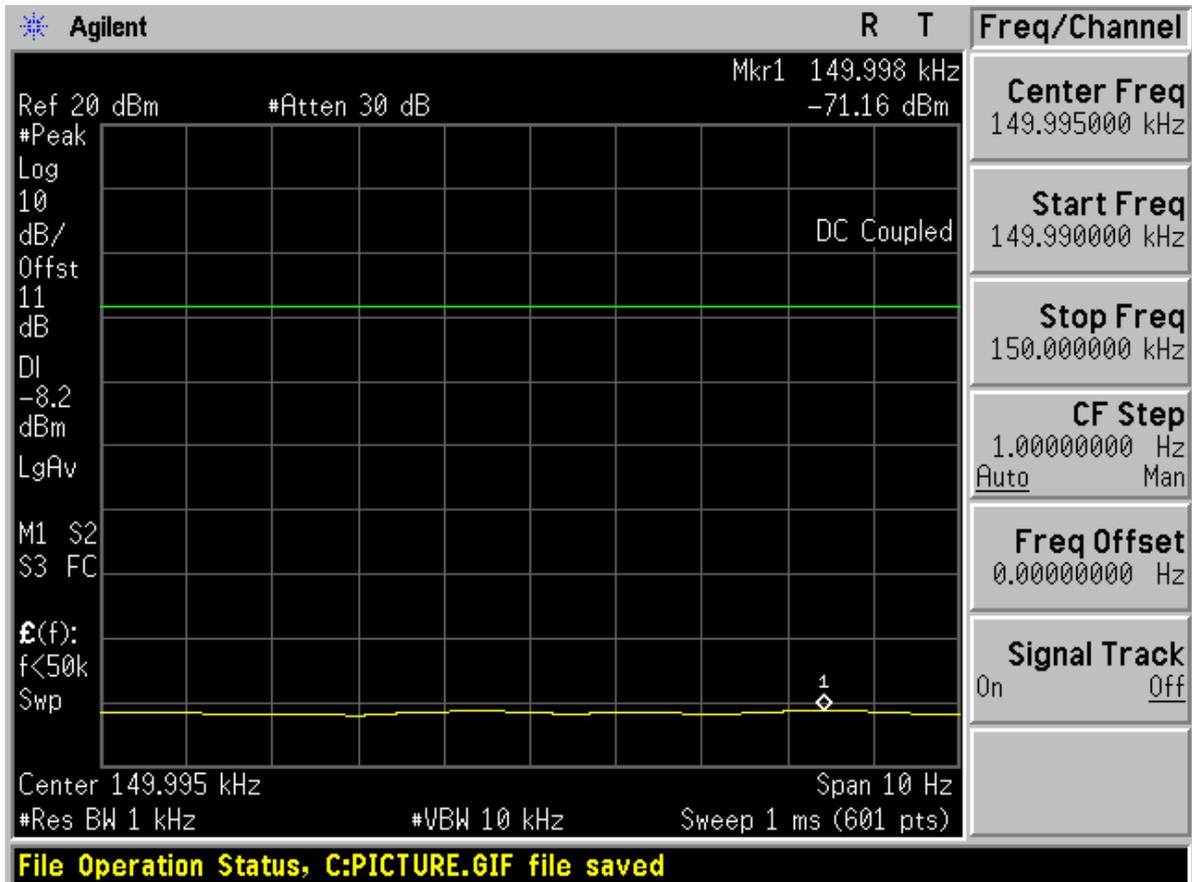


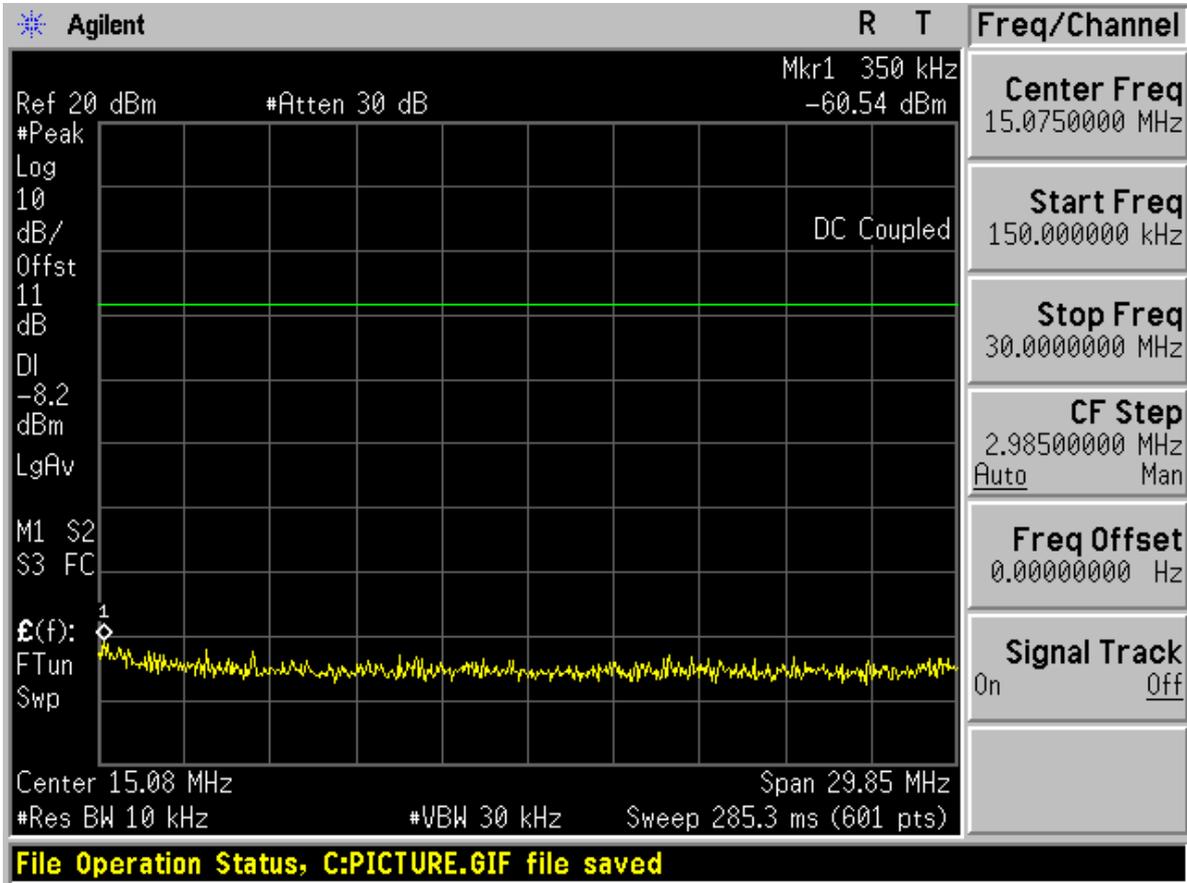


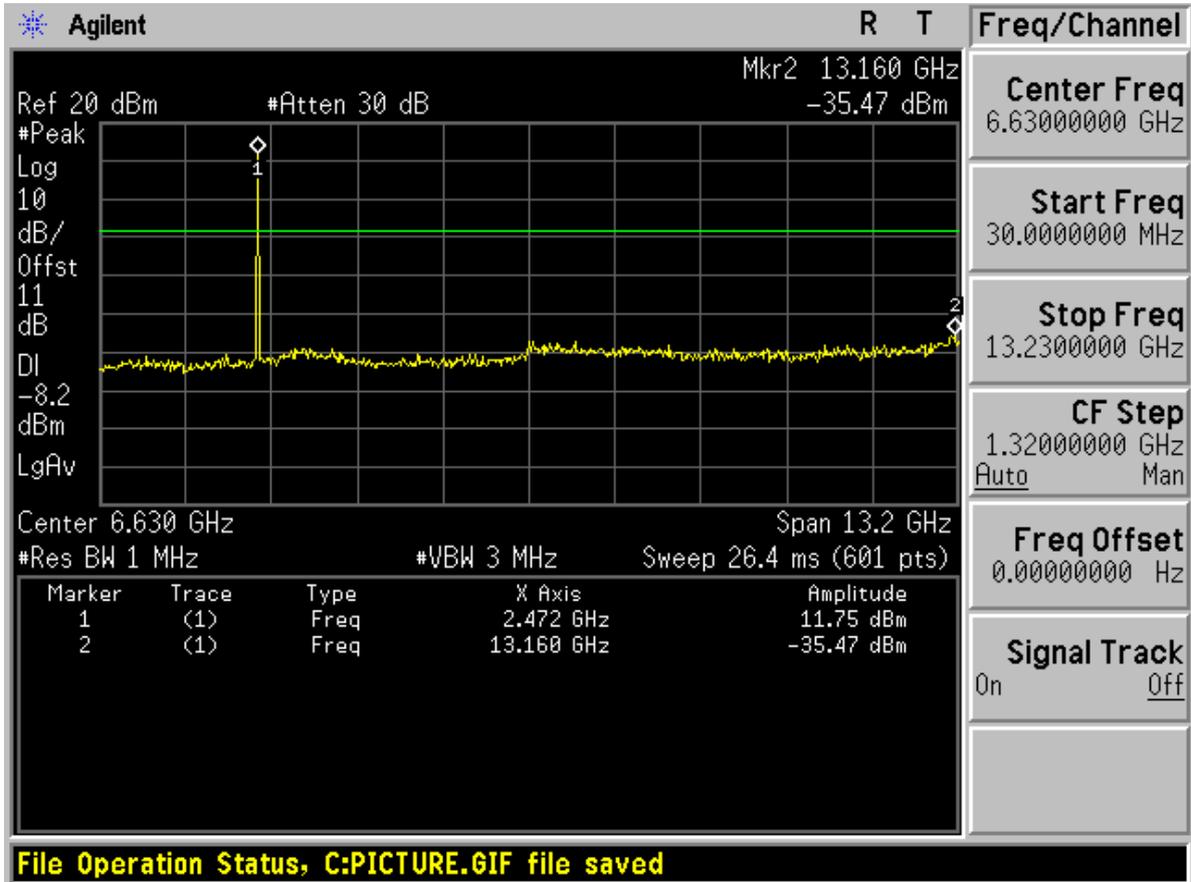




Channel 11

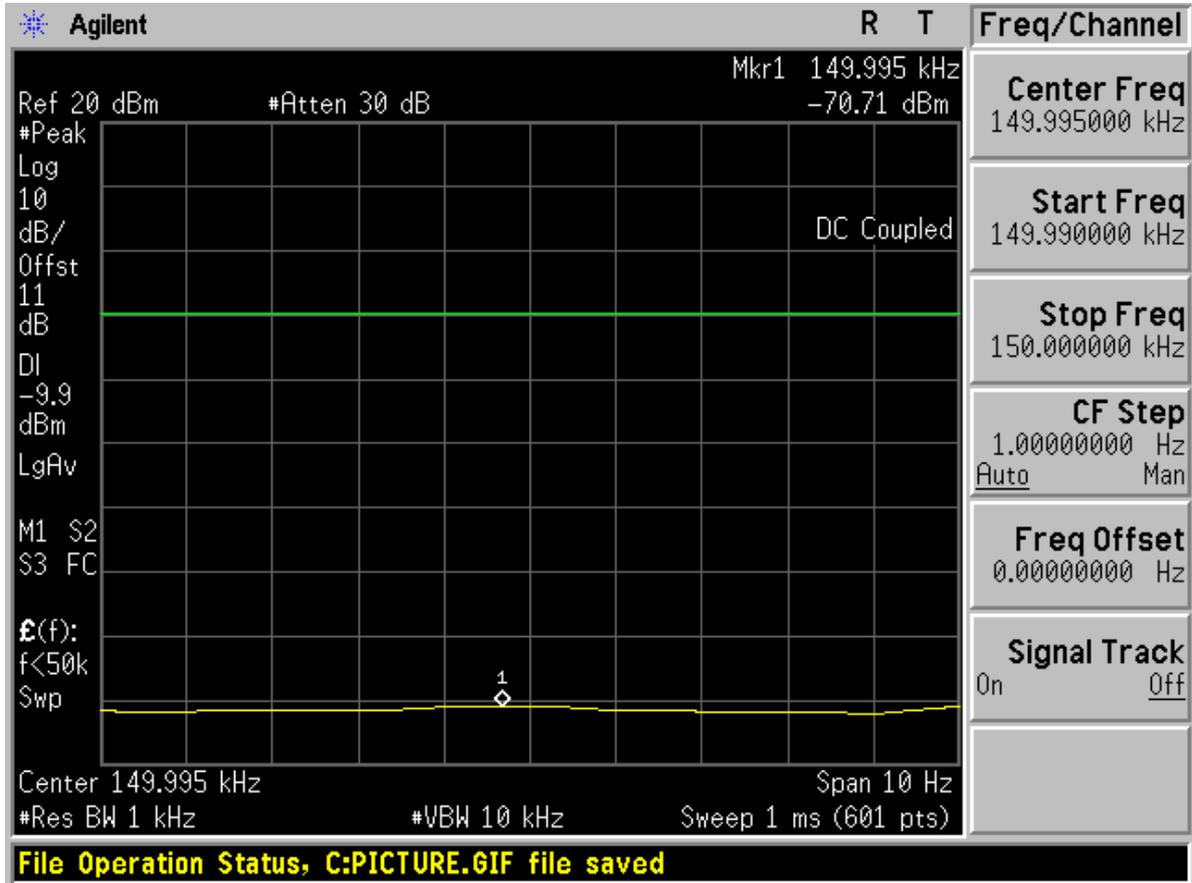


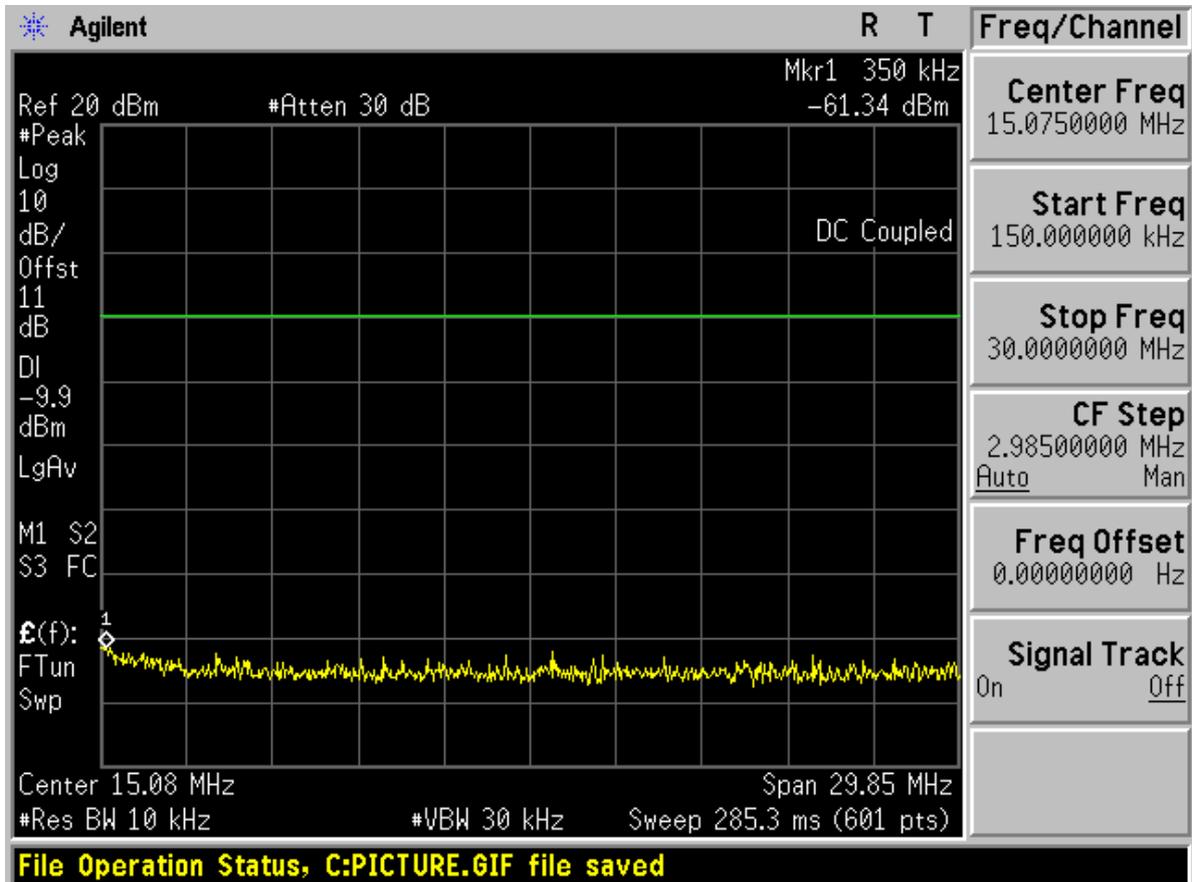


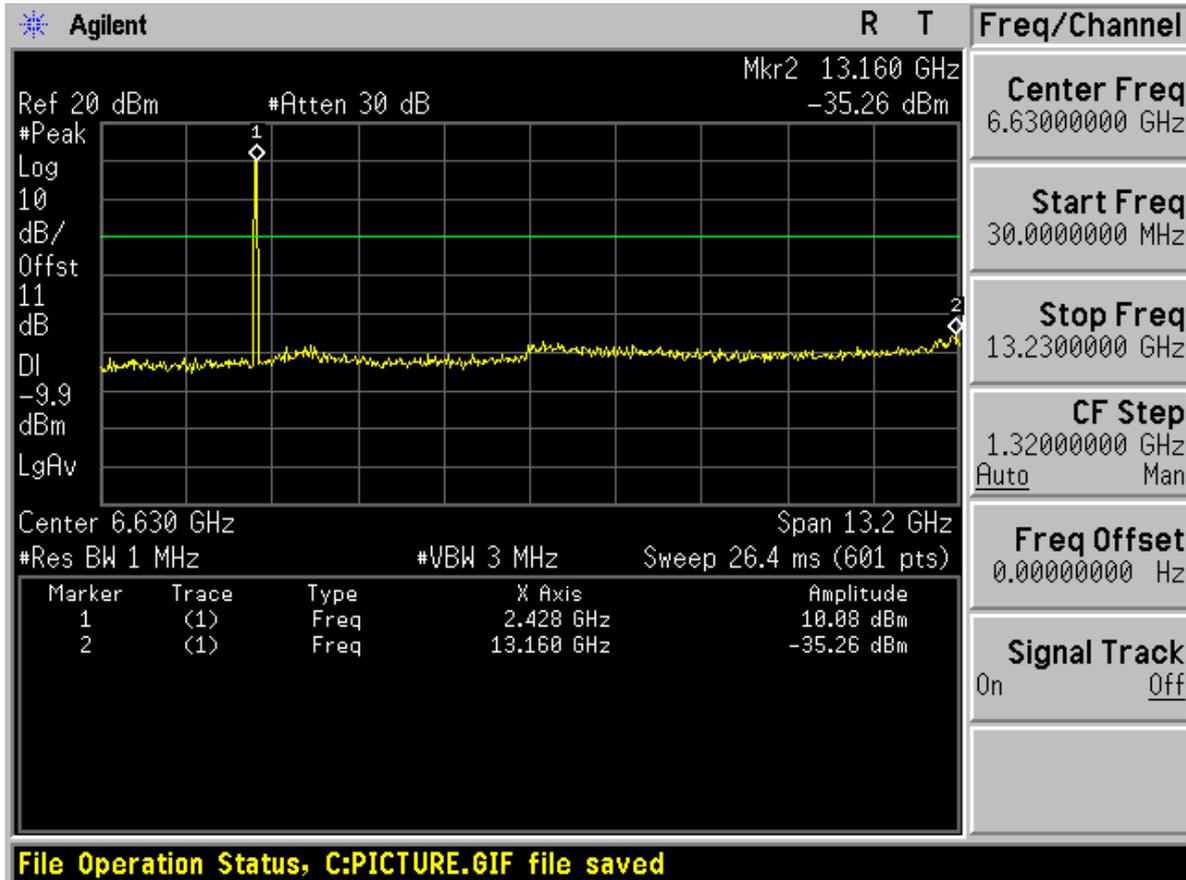




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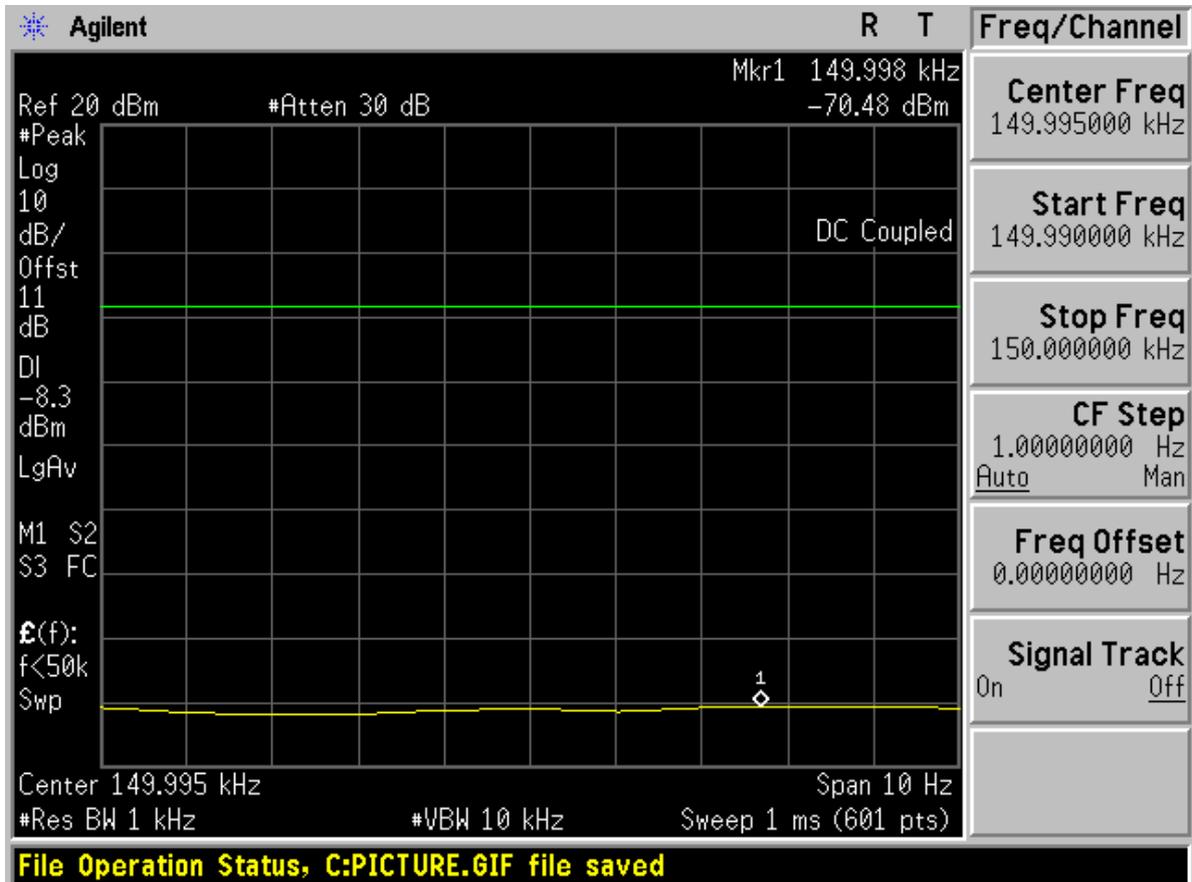


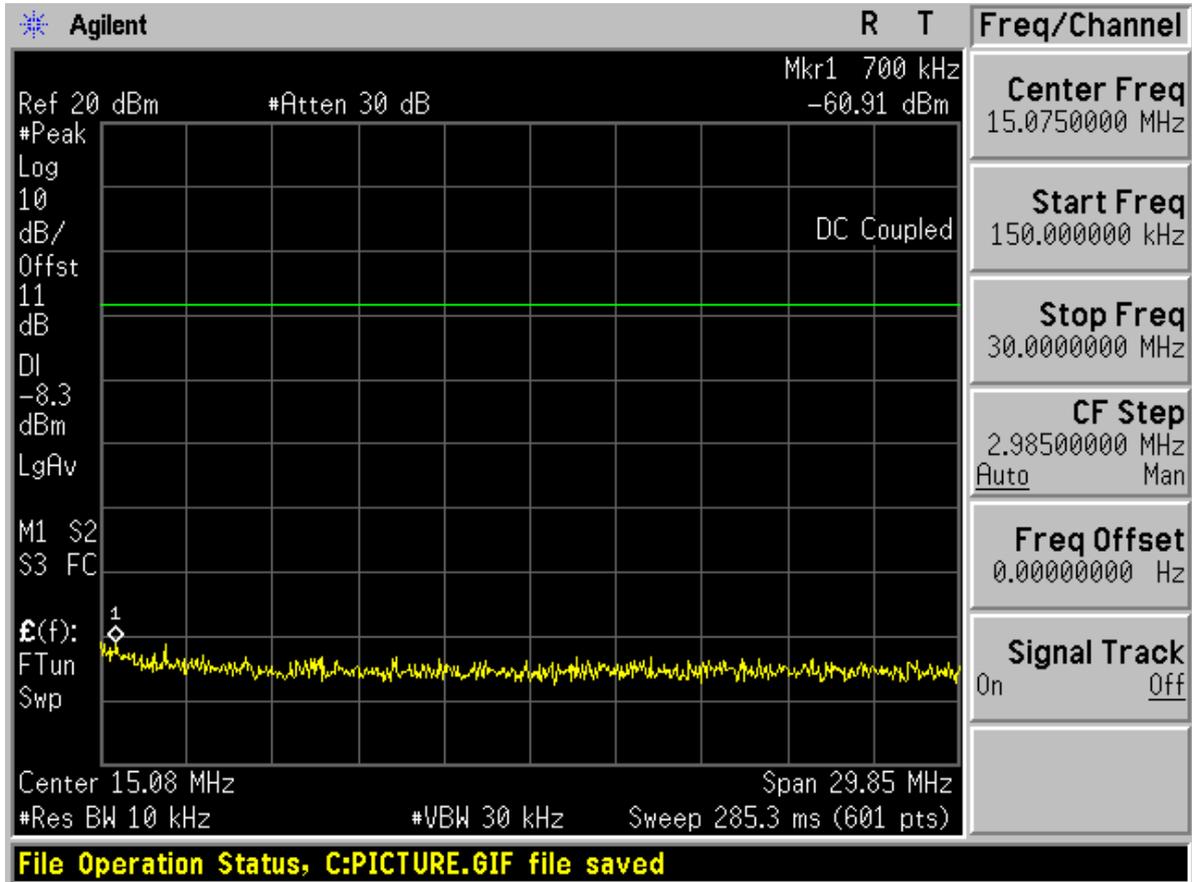


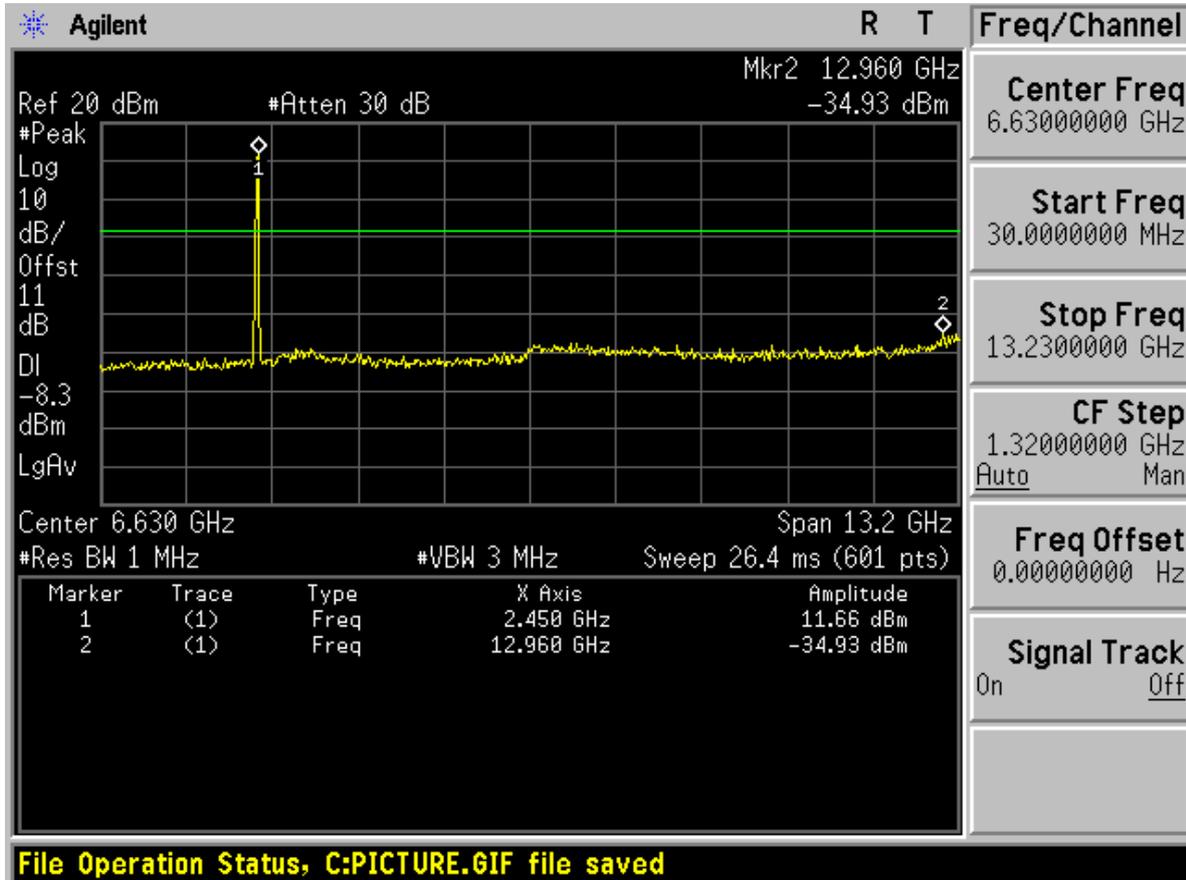




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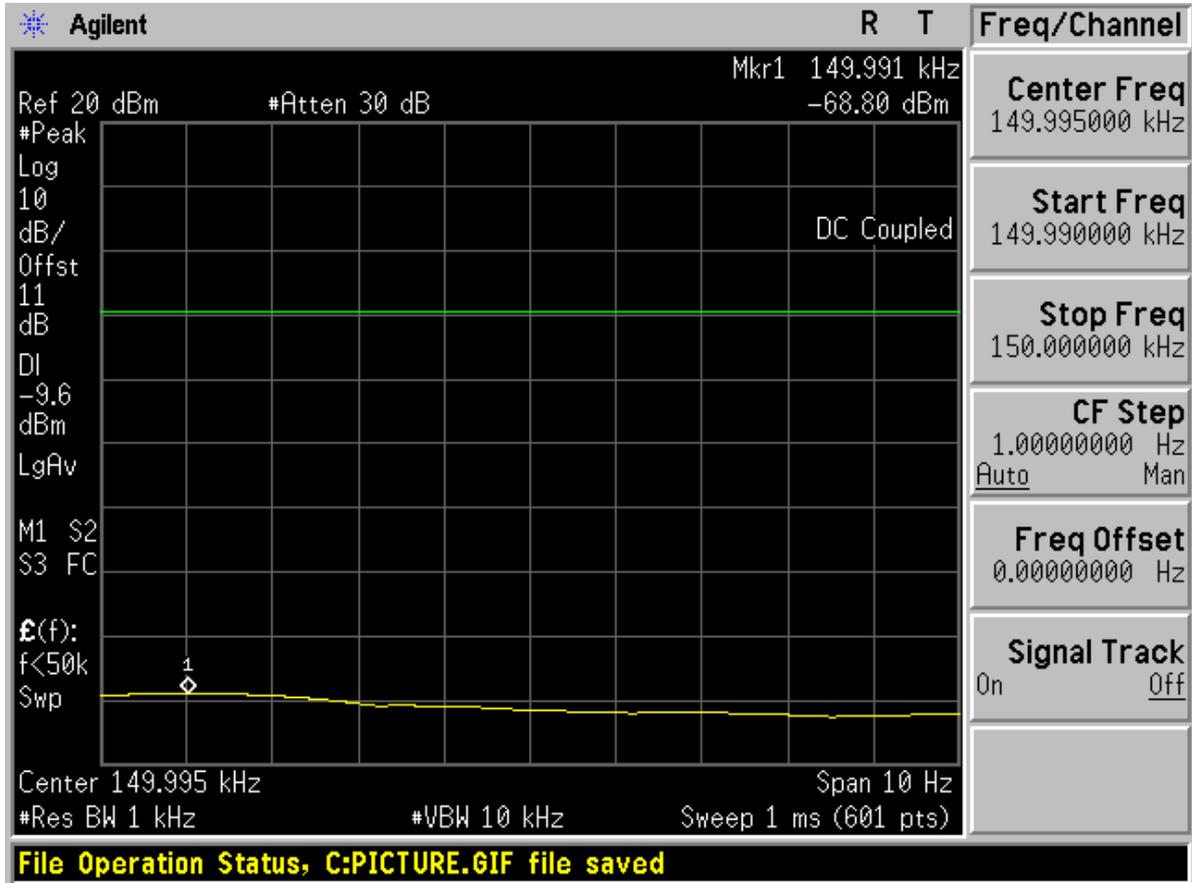


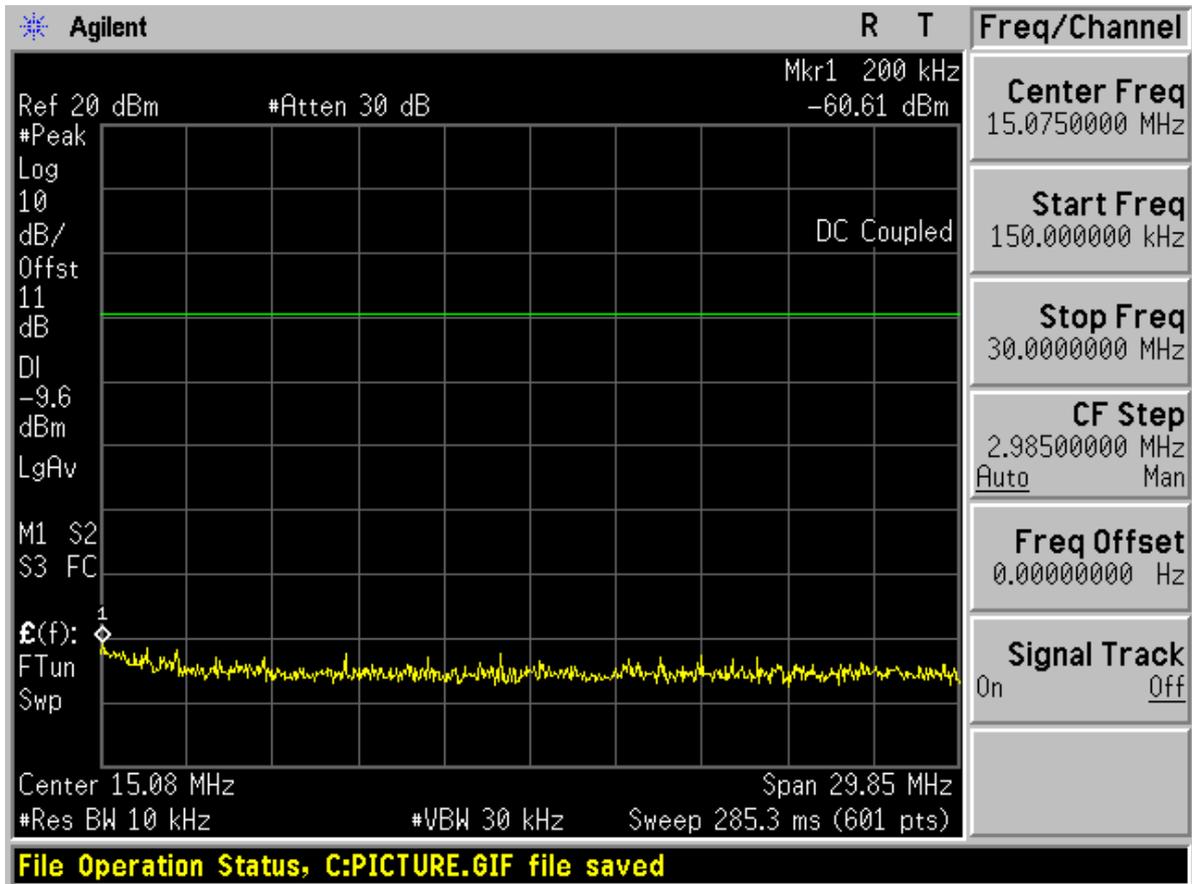


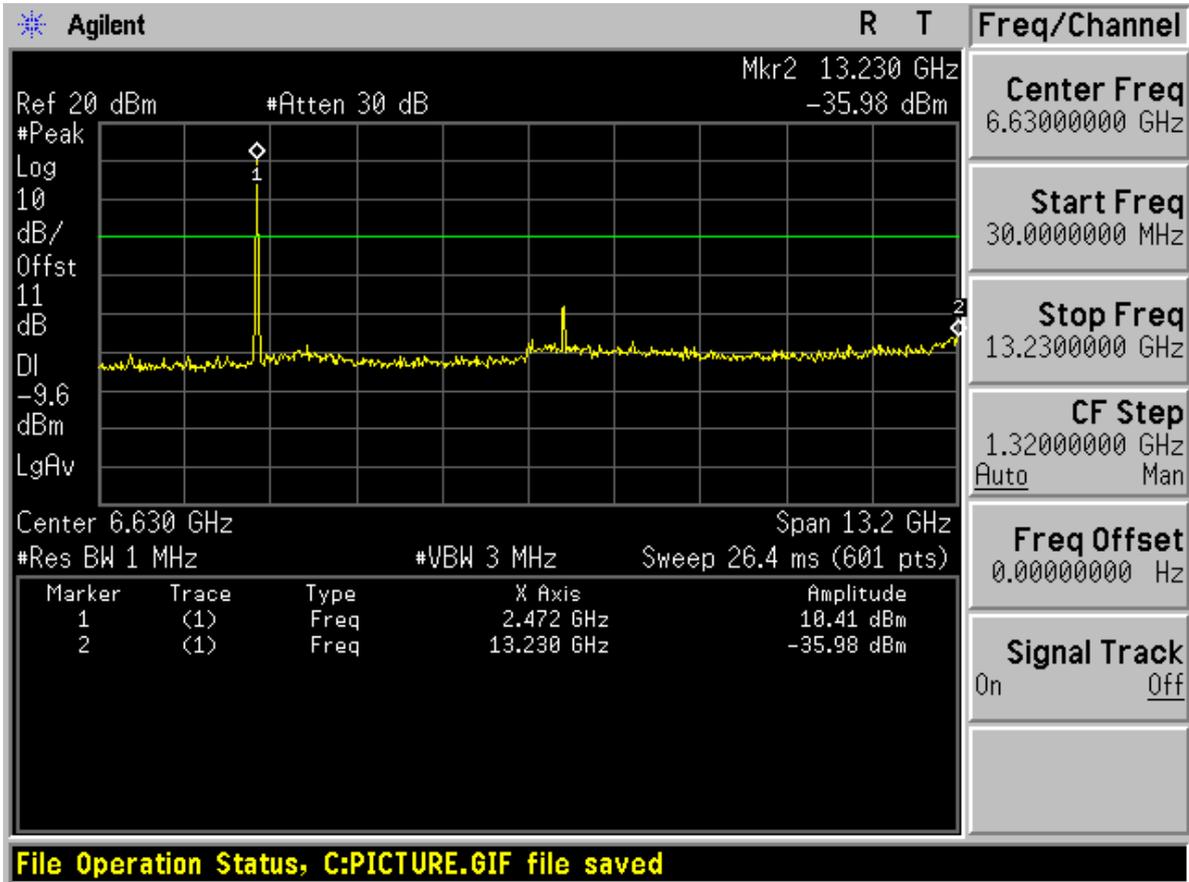




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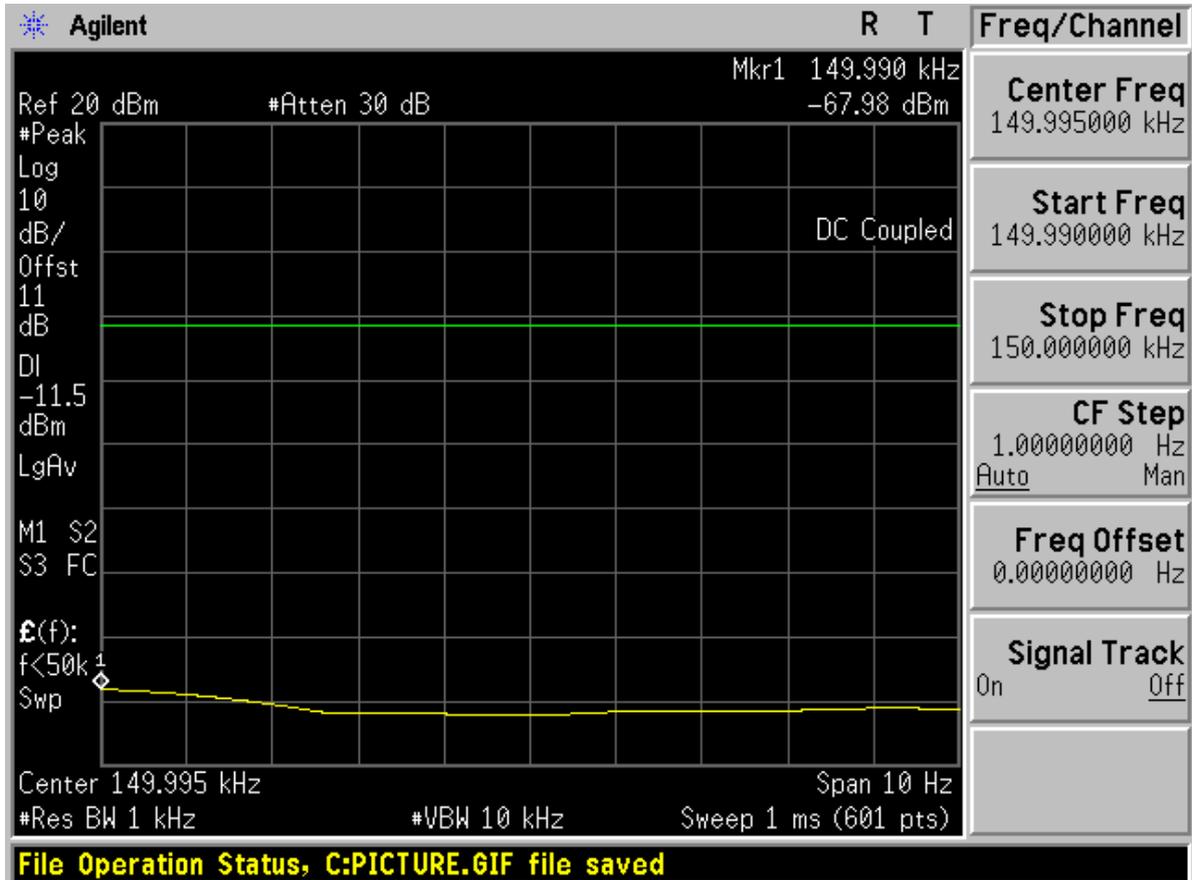


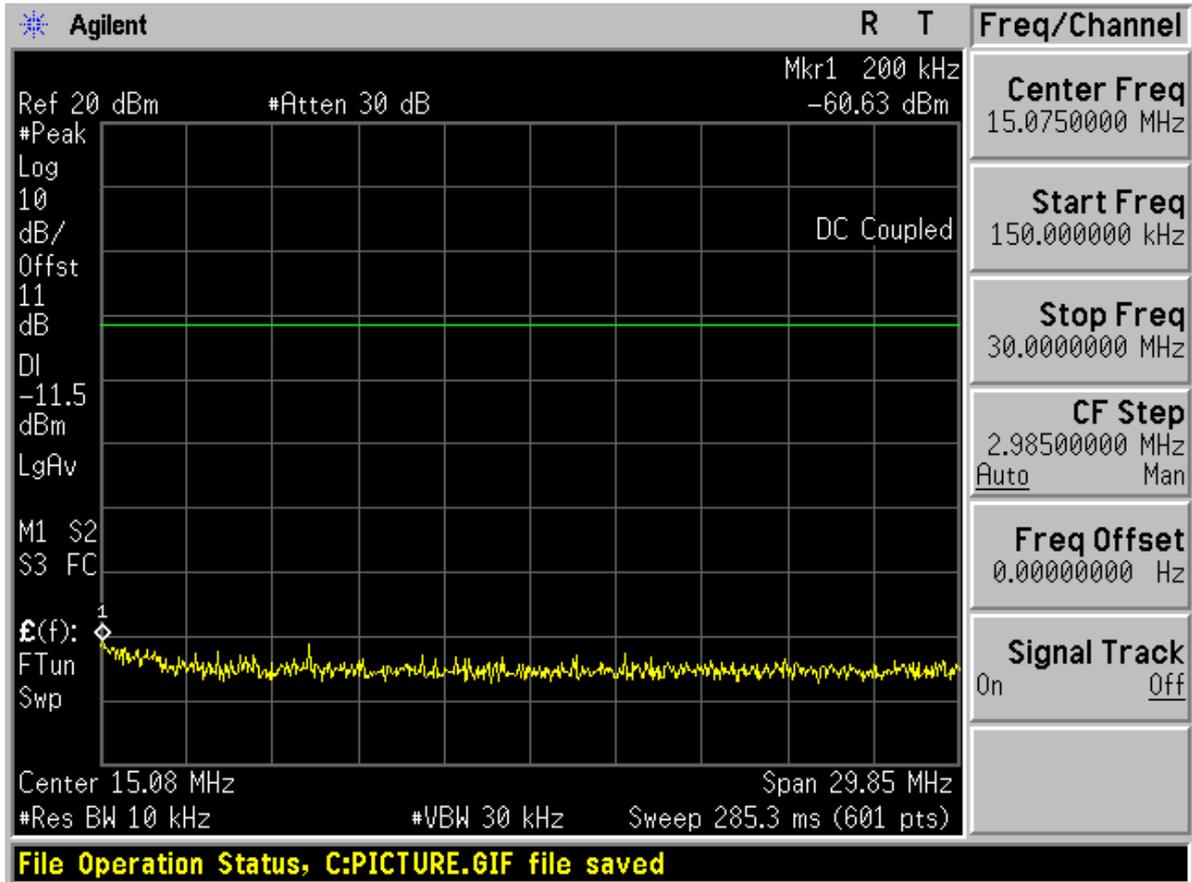


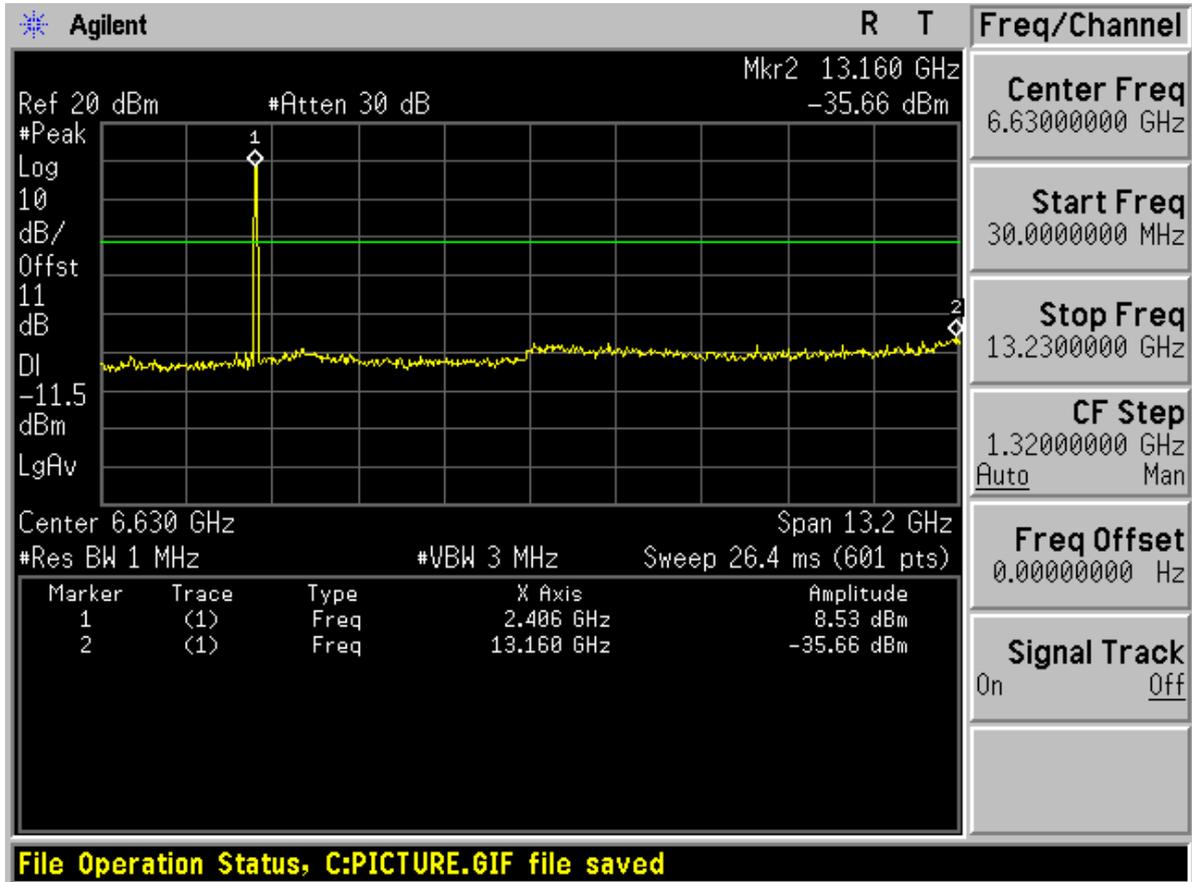




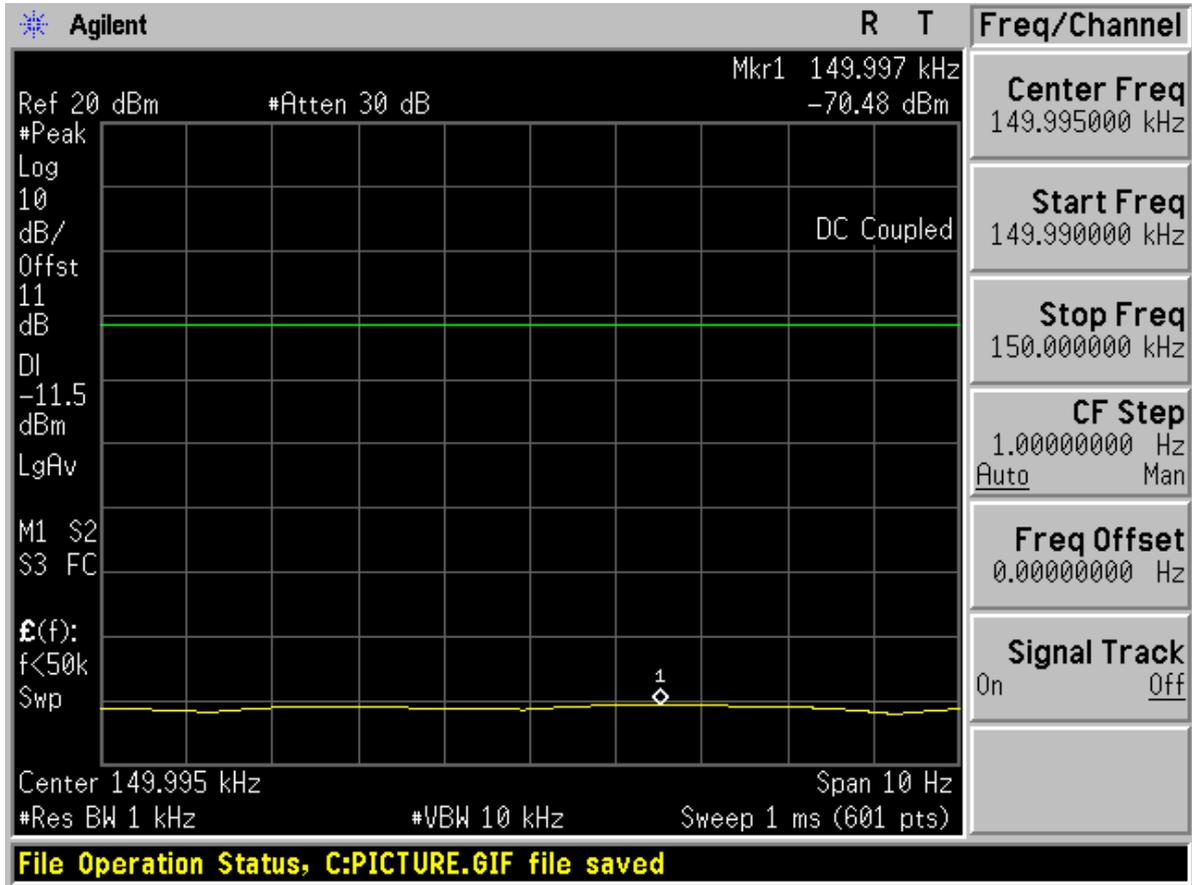
TM3 Channel 1

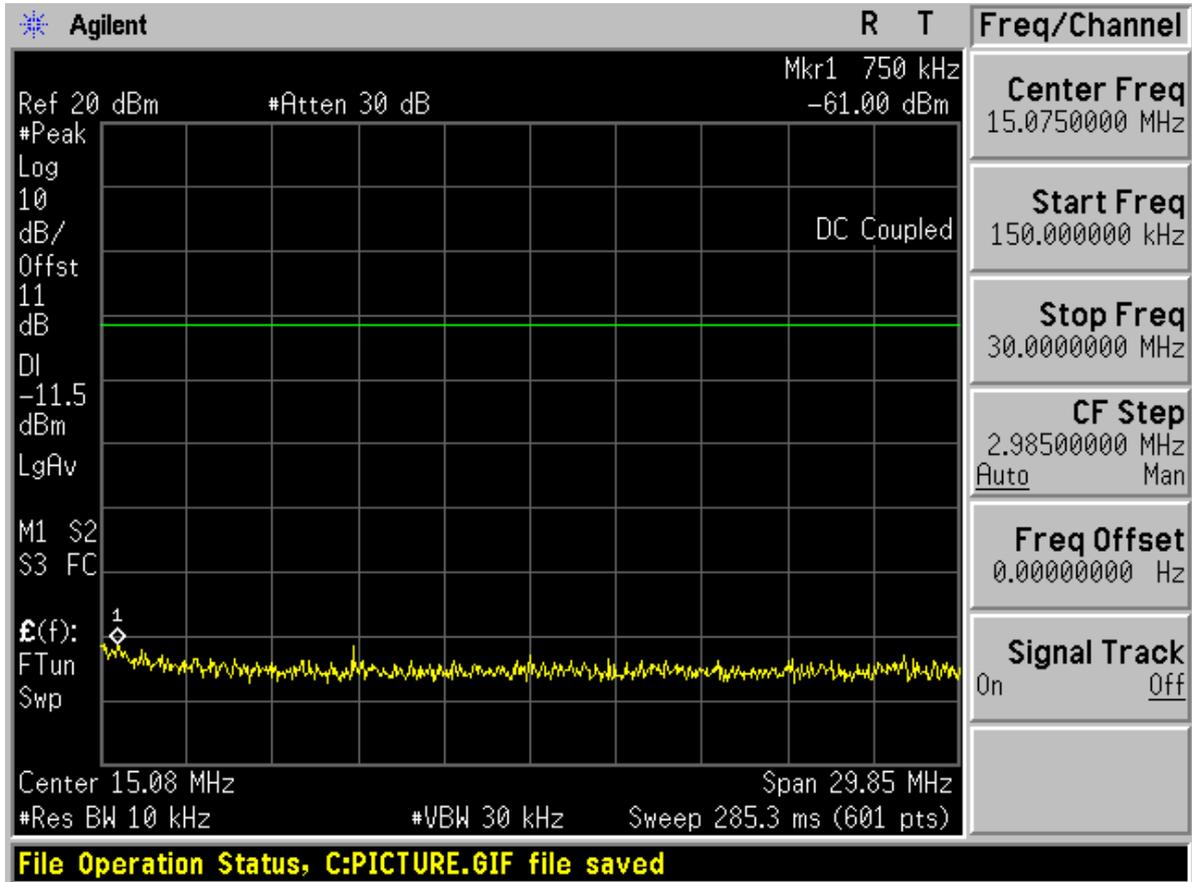


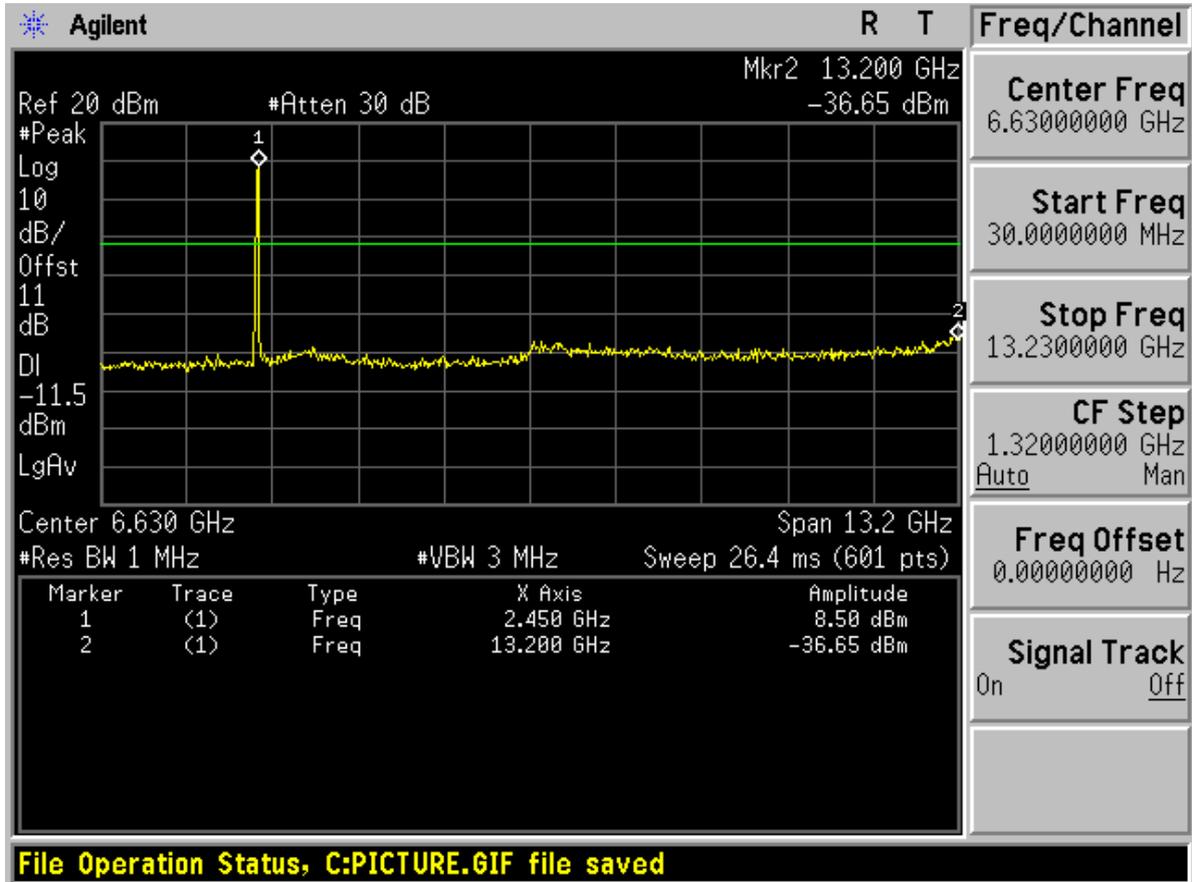




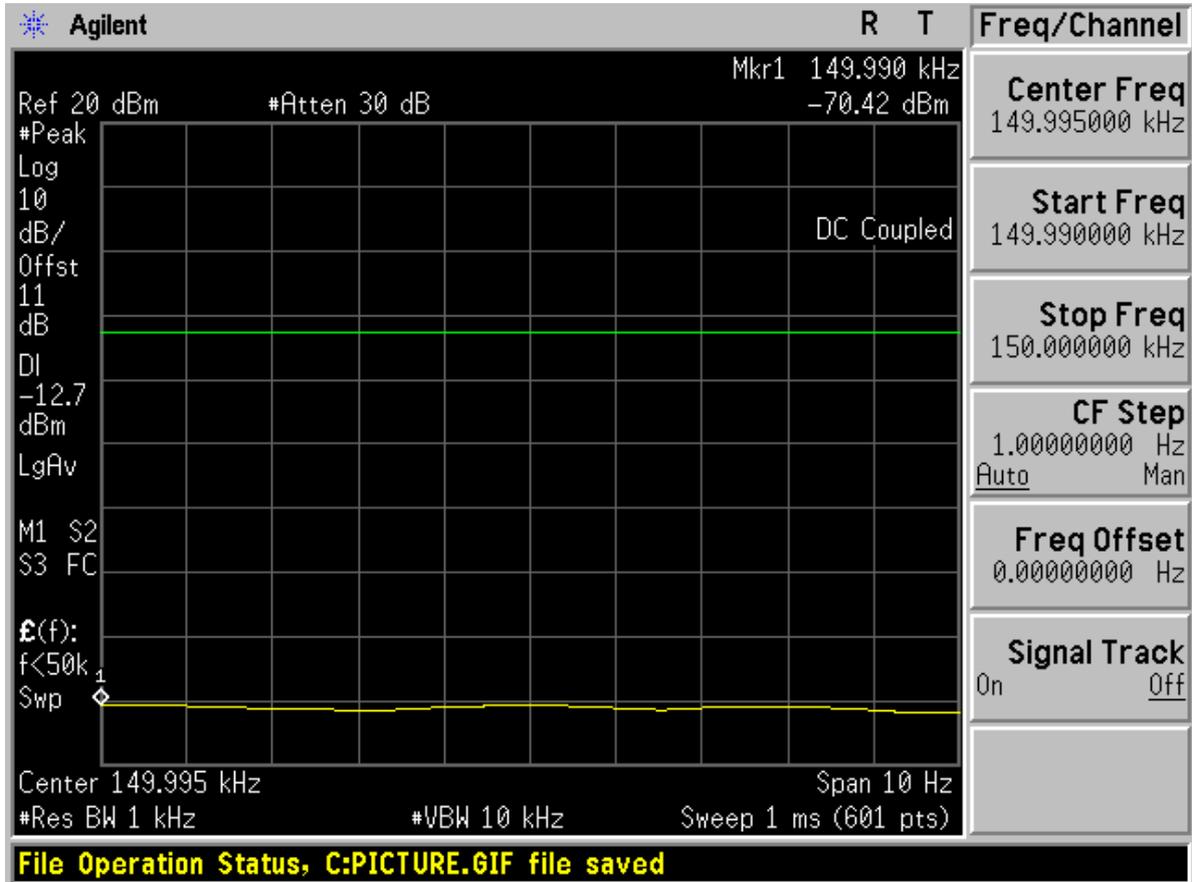
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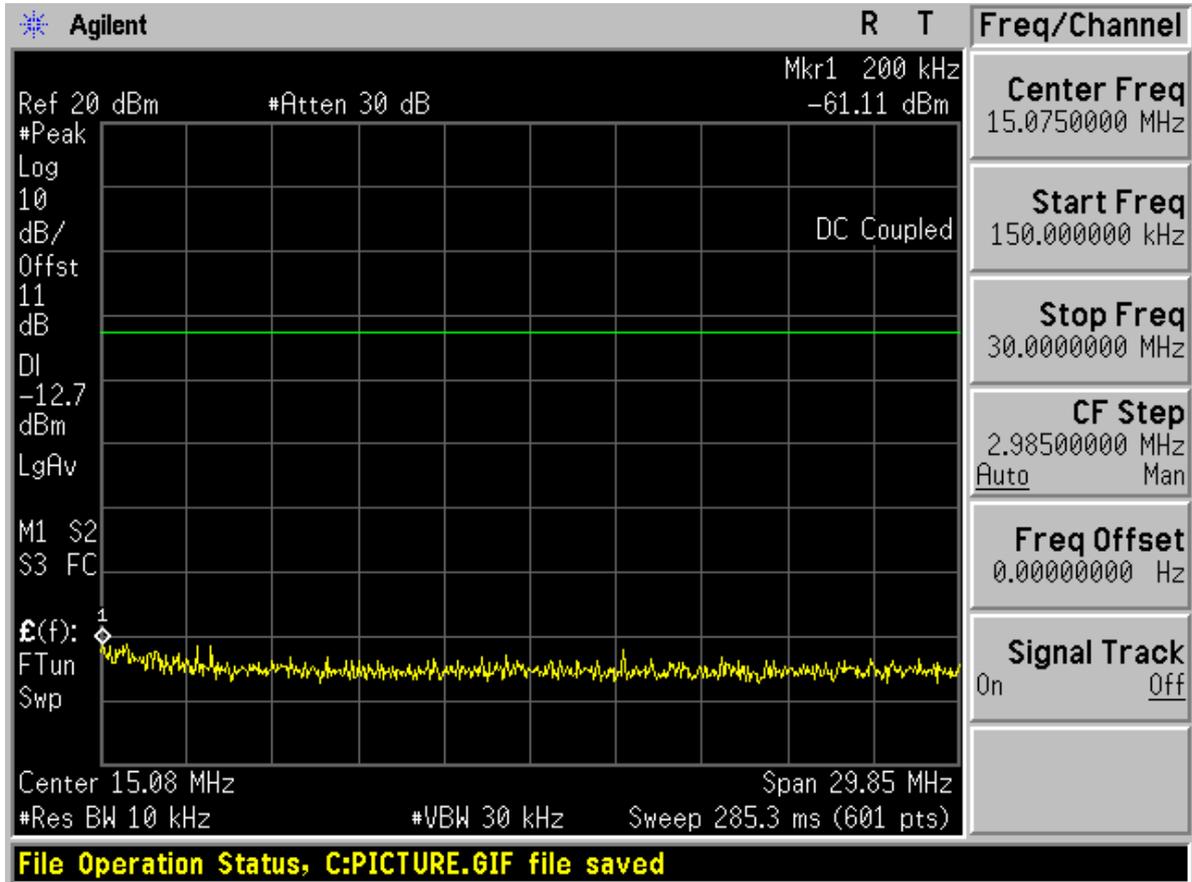


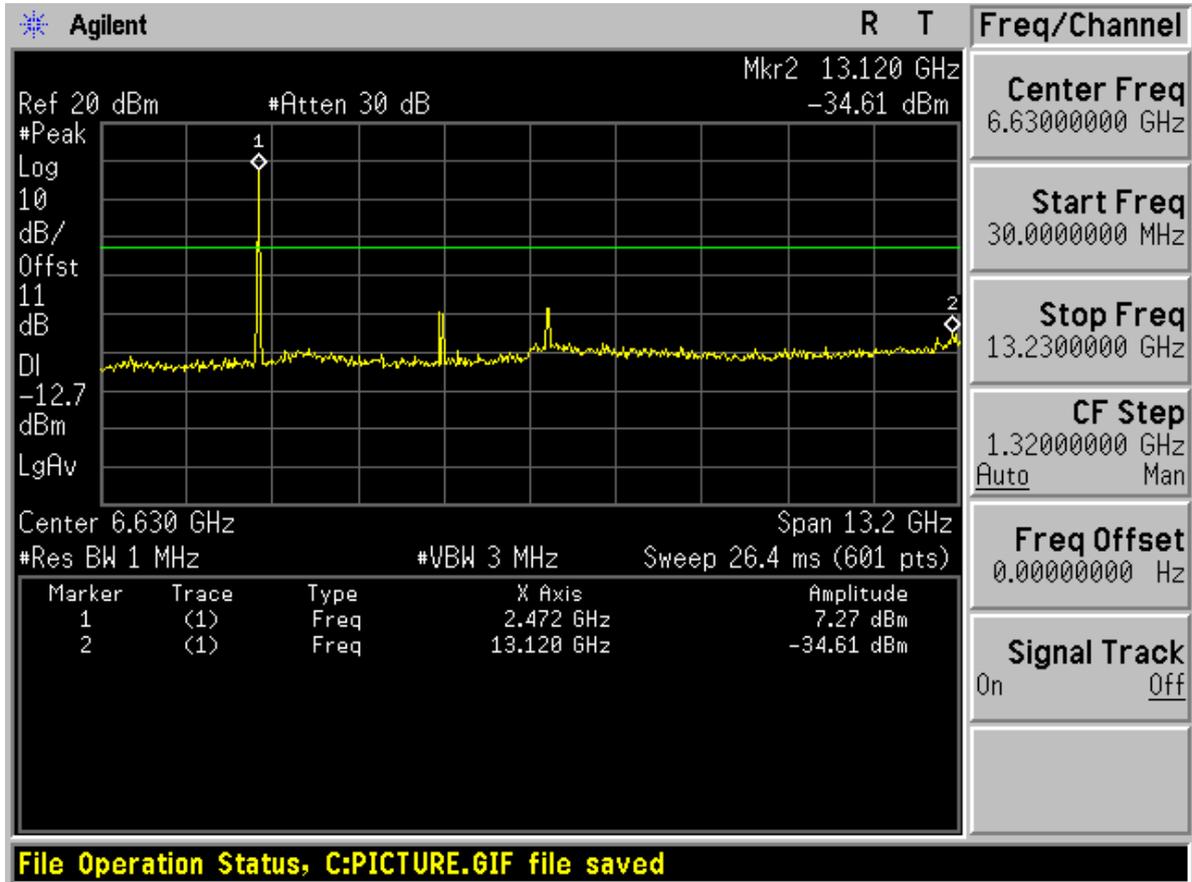




Channel 11









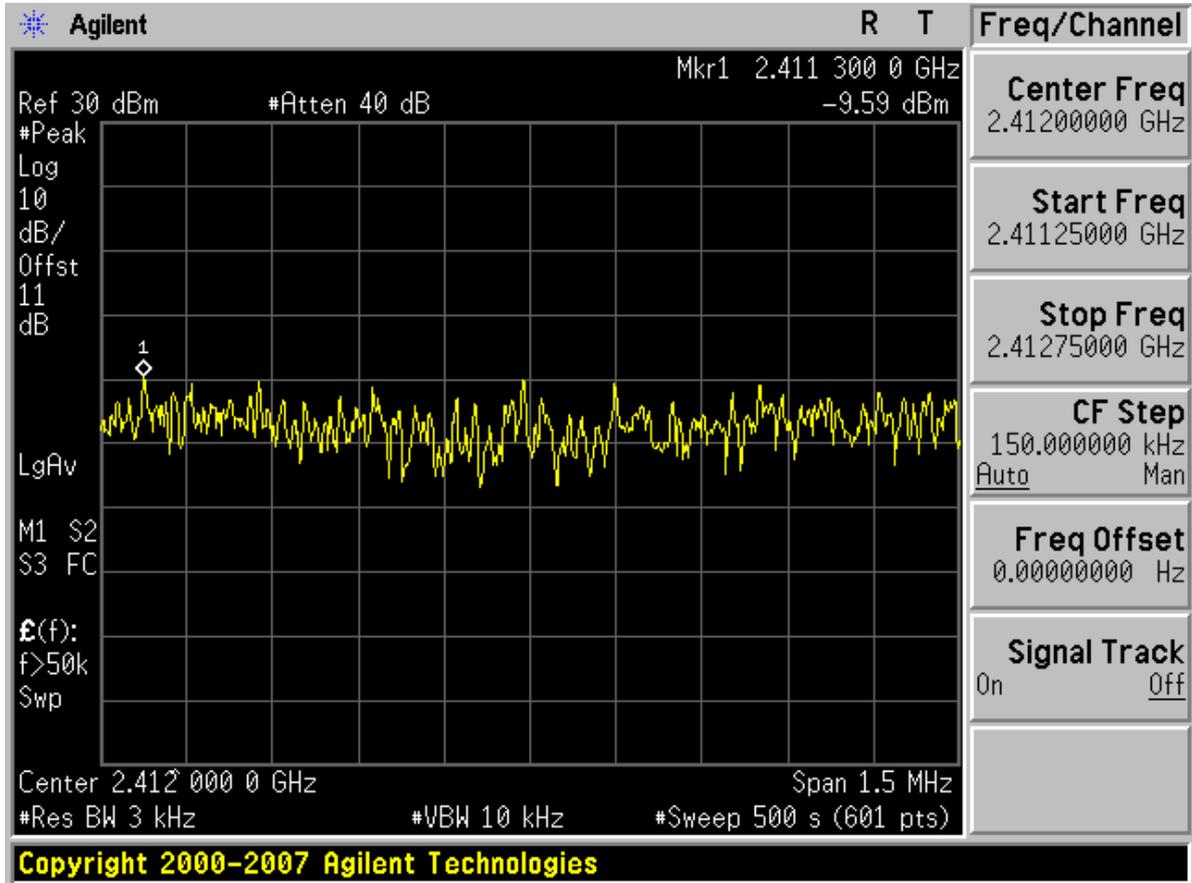
Appendix E

Power spectral density

According to FCC Part 15.247 (e)

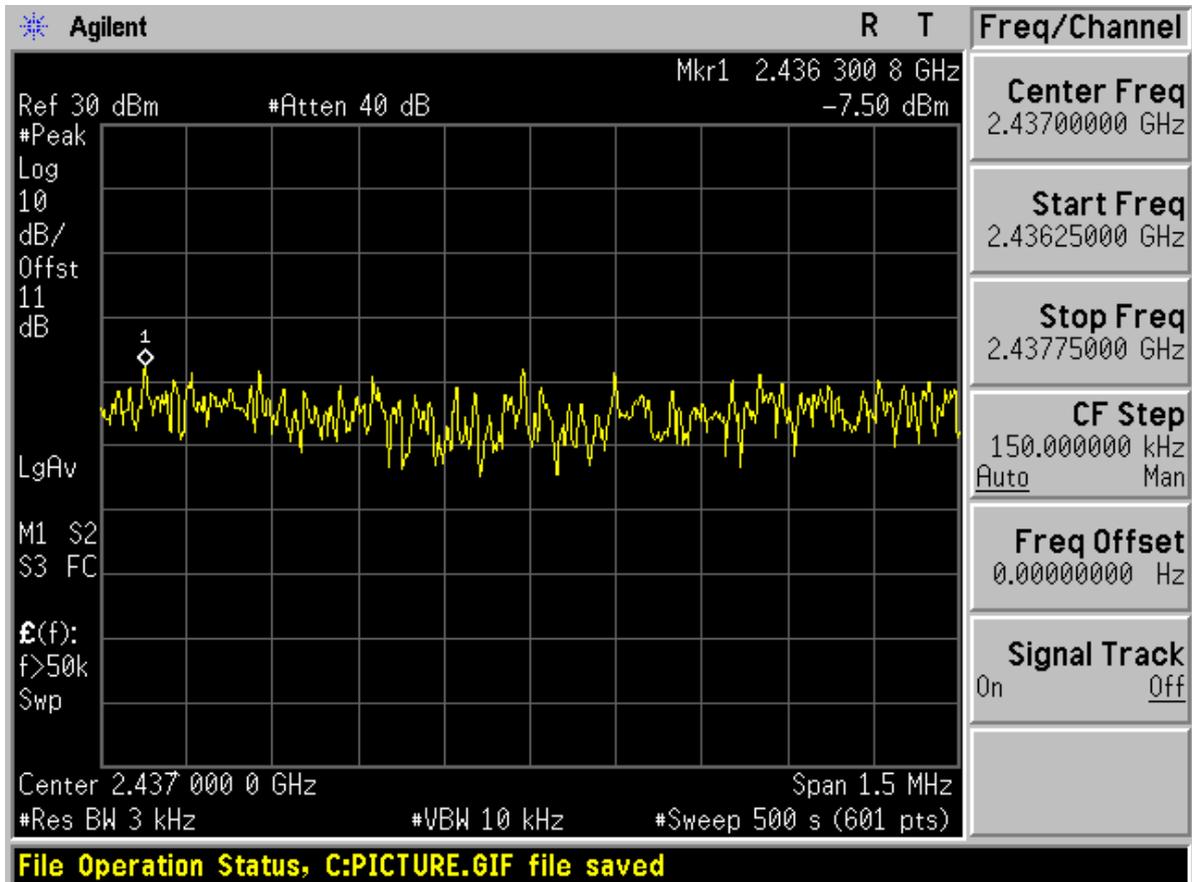


TM1 Channel 1



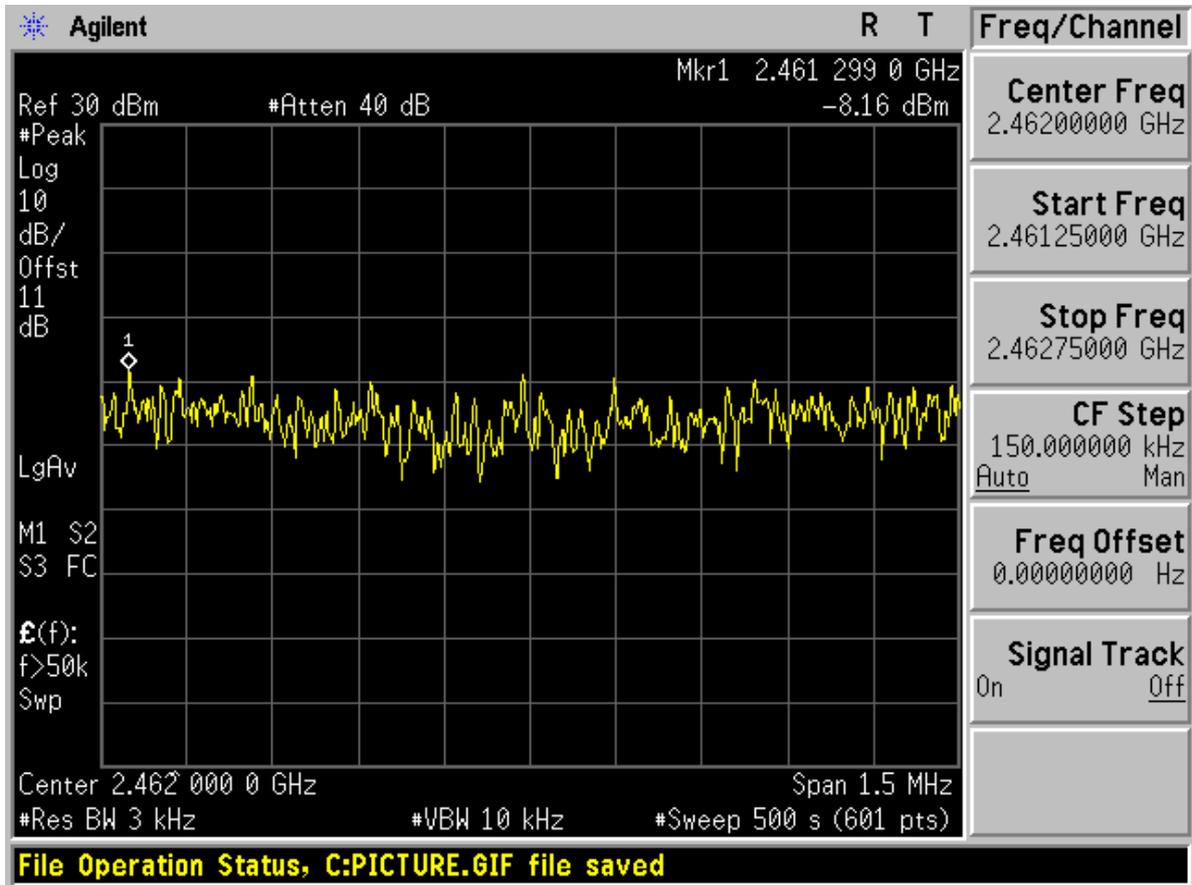


Channel 6



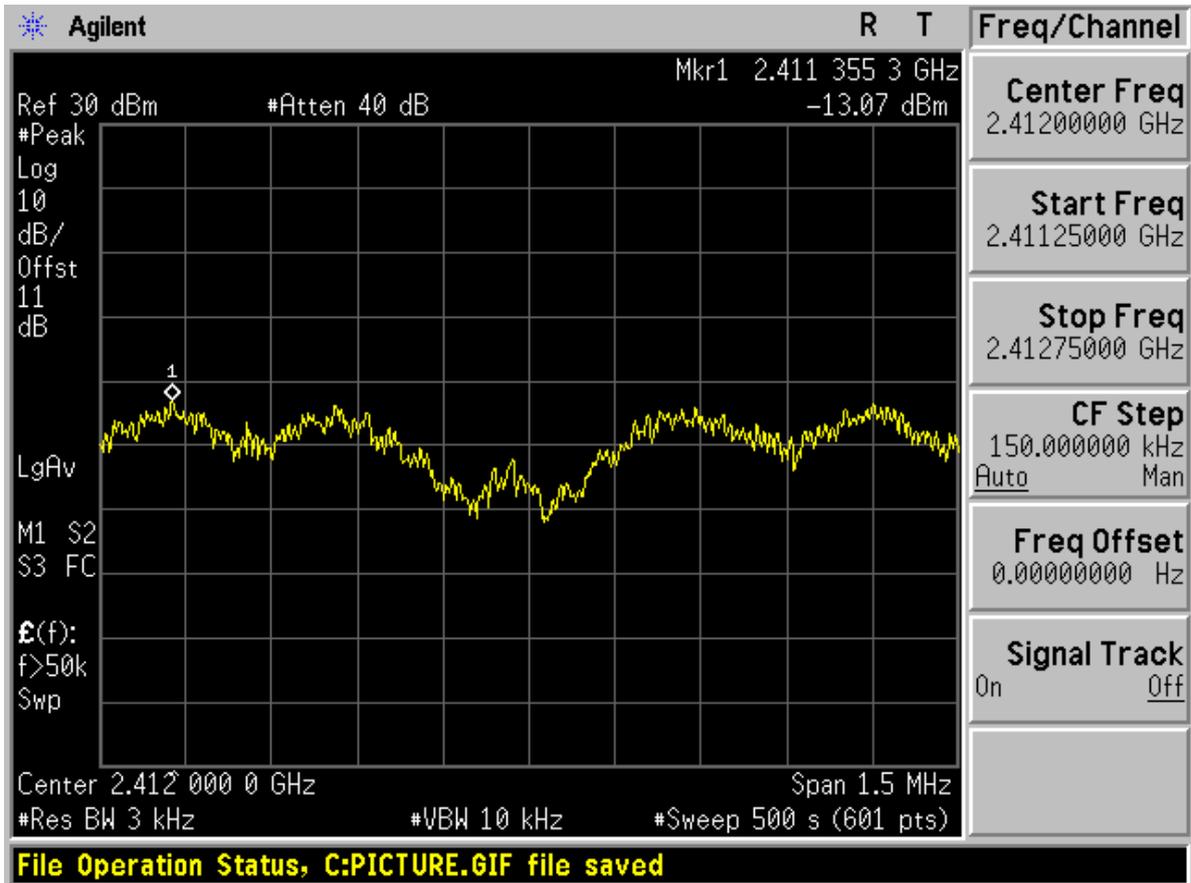


Channel 11



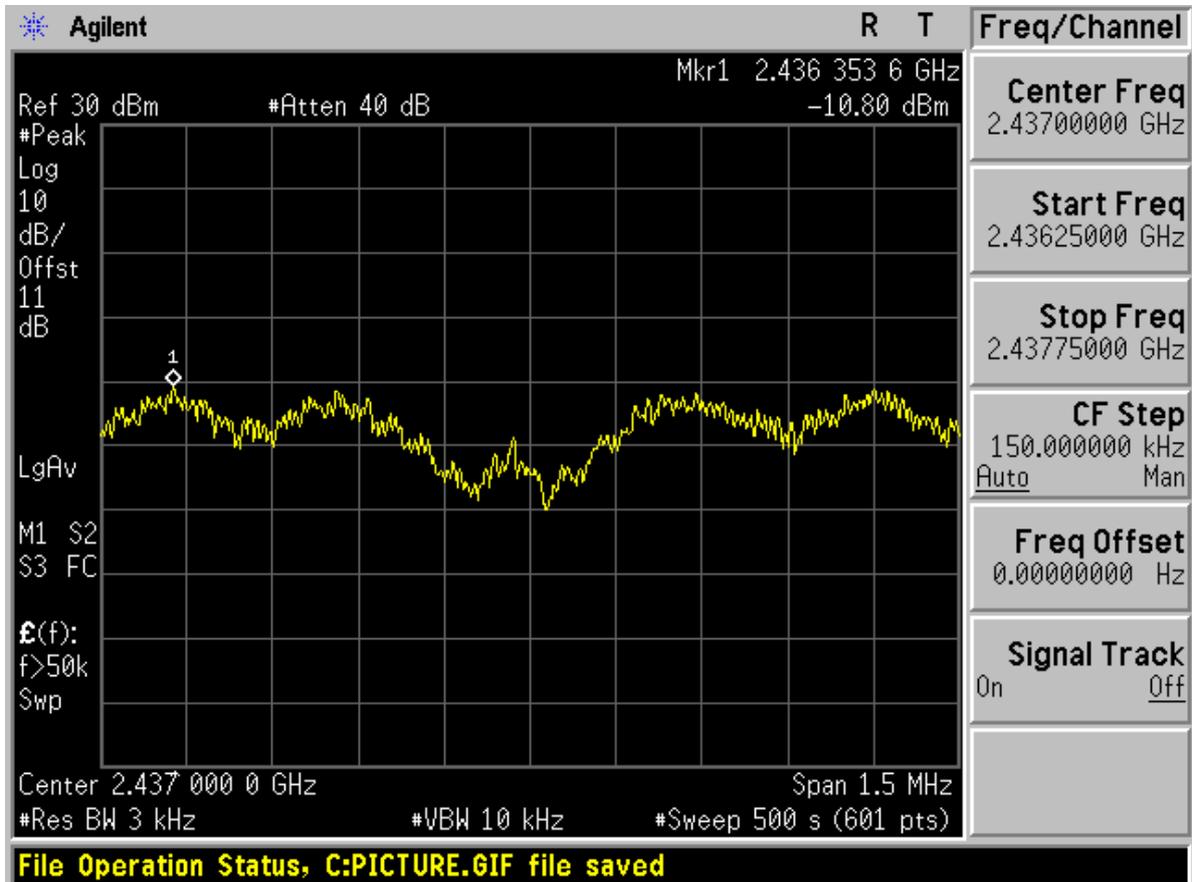


TM2 Channel 1



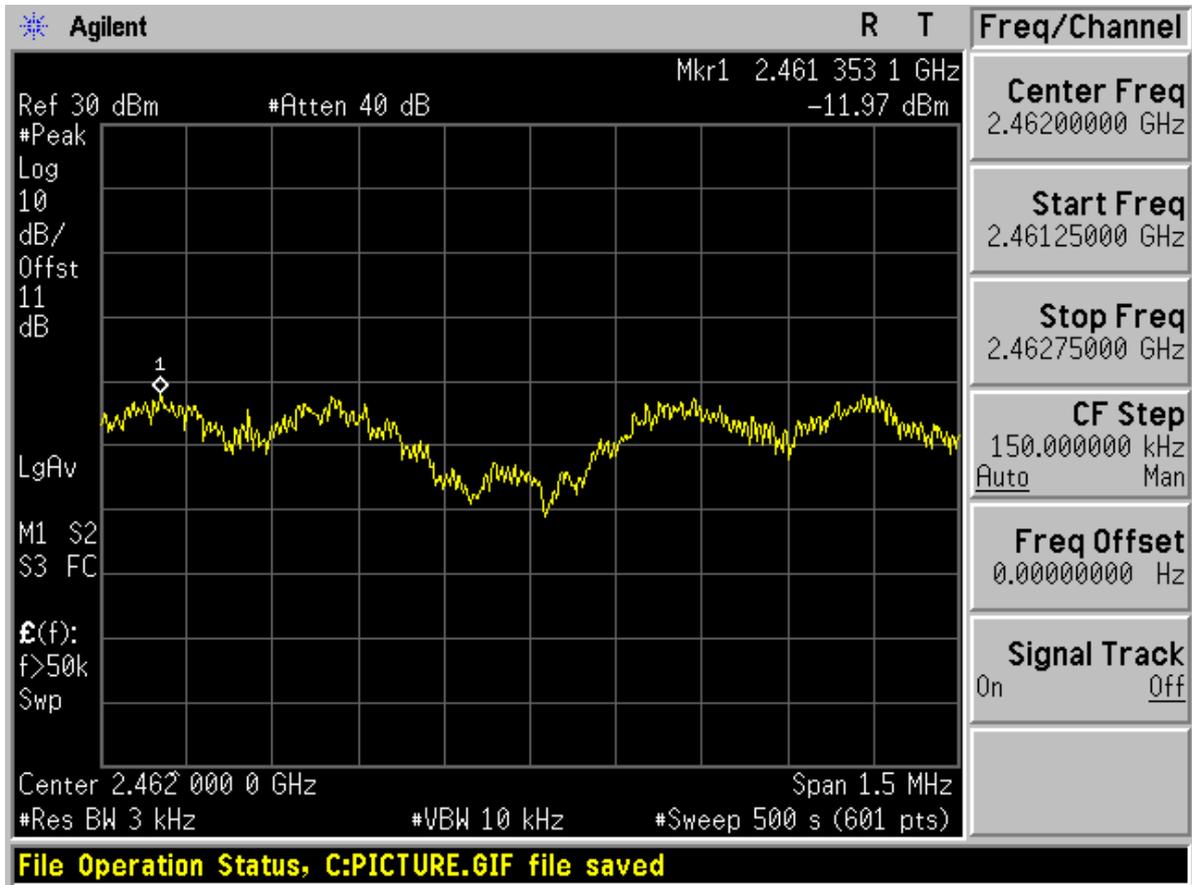


Channel 6

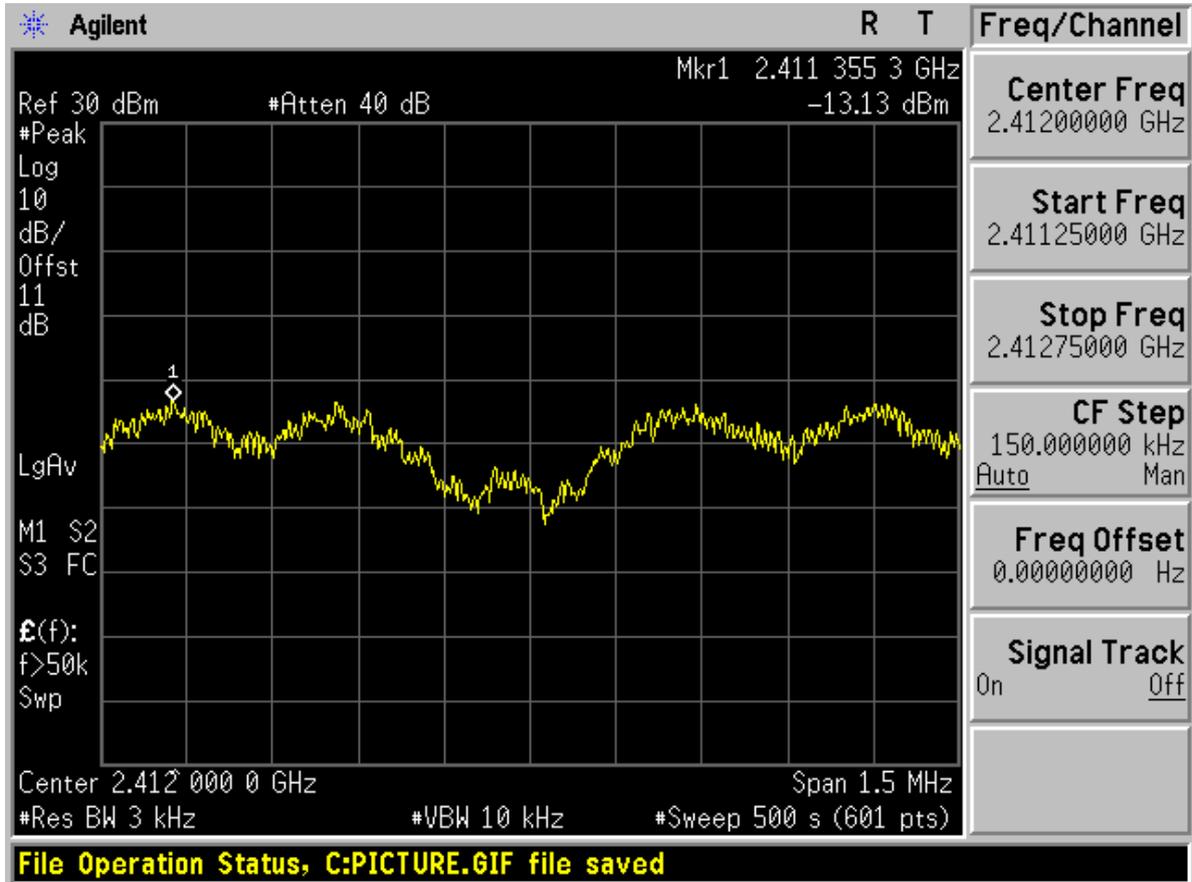




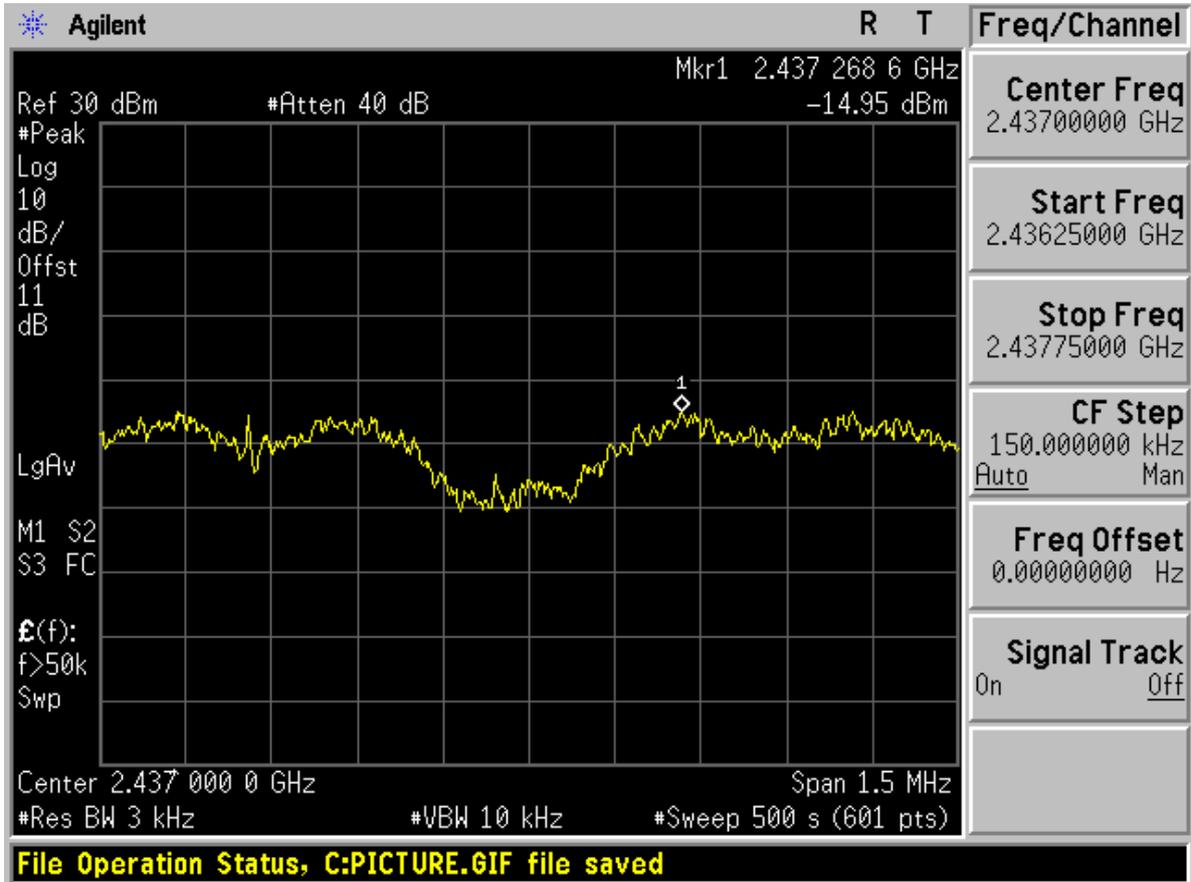
Channel 11



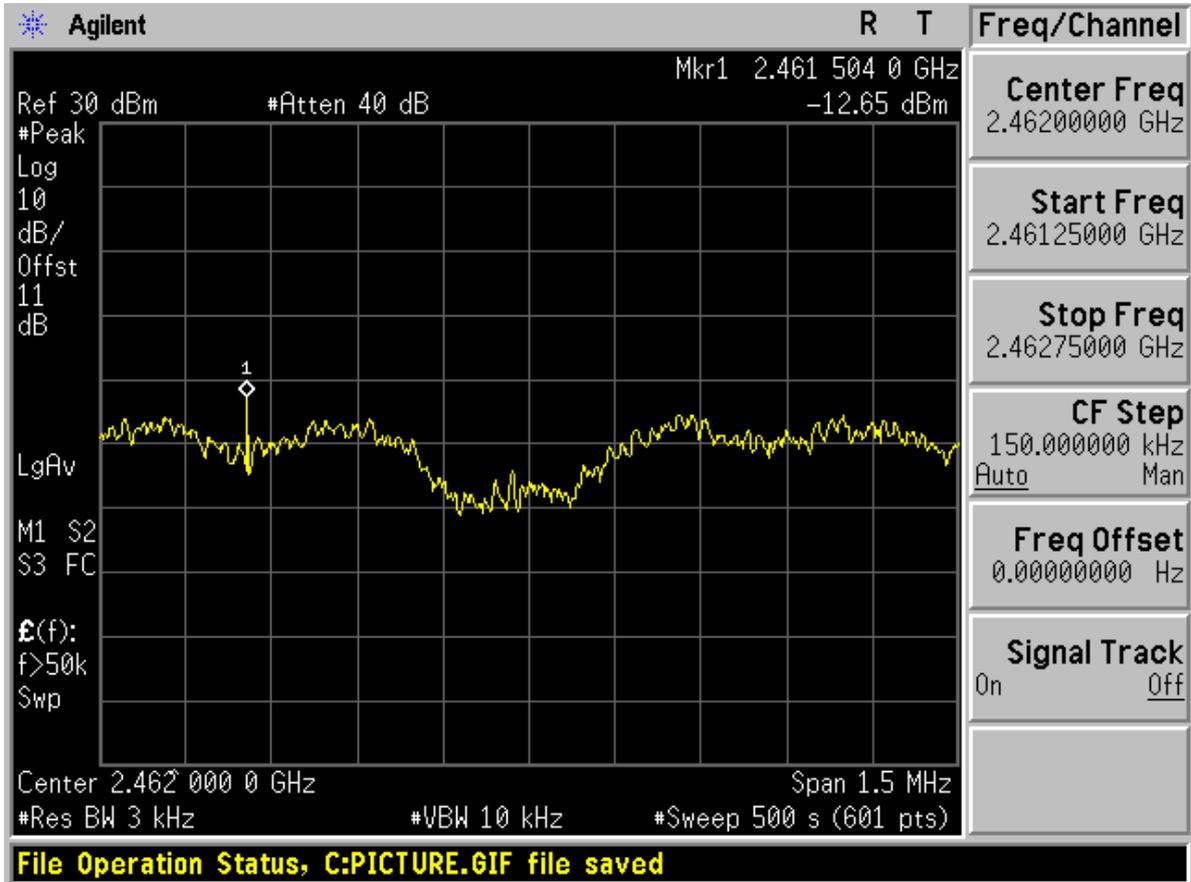
TM3 Channel 1



Channel 6



Channel 11





Appendix F

Radiated spurious emission & spurious in restricted band

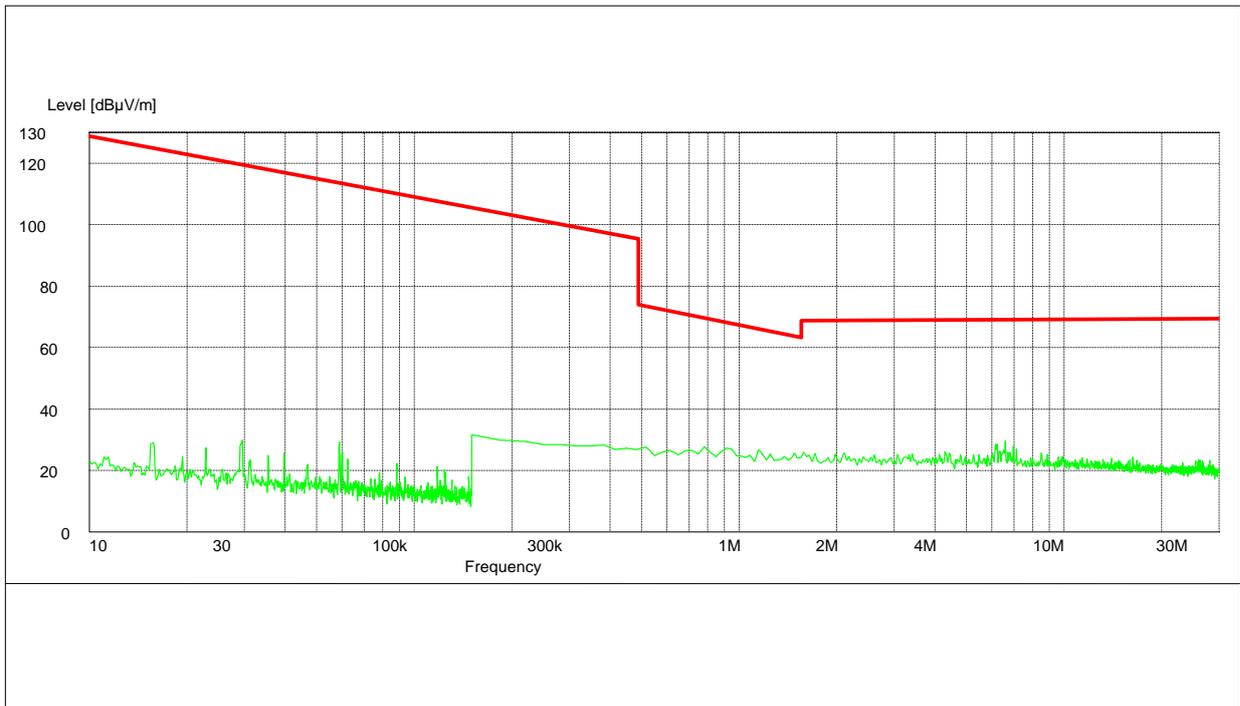
According to FCC Part 15.247 (d) & 15.205 & 15.209



Note: This test was carried out in all the test modes, here only the worst test result was shown.

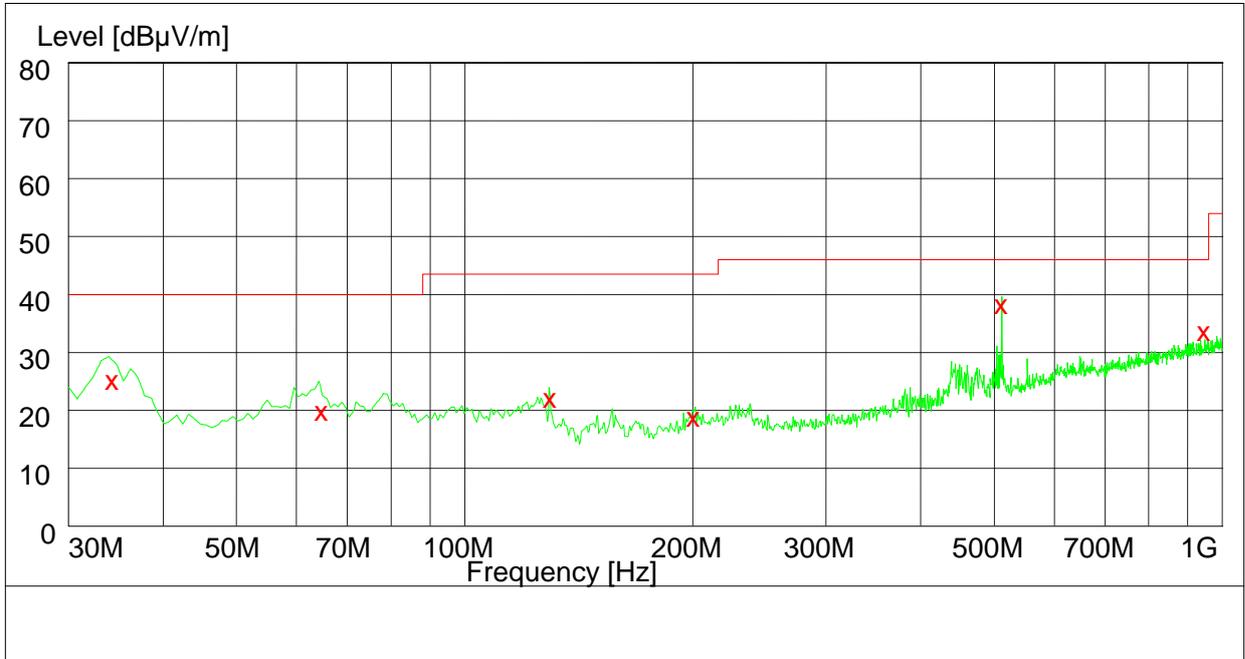
Channel 1

10kHz to 30MHz





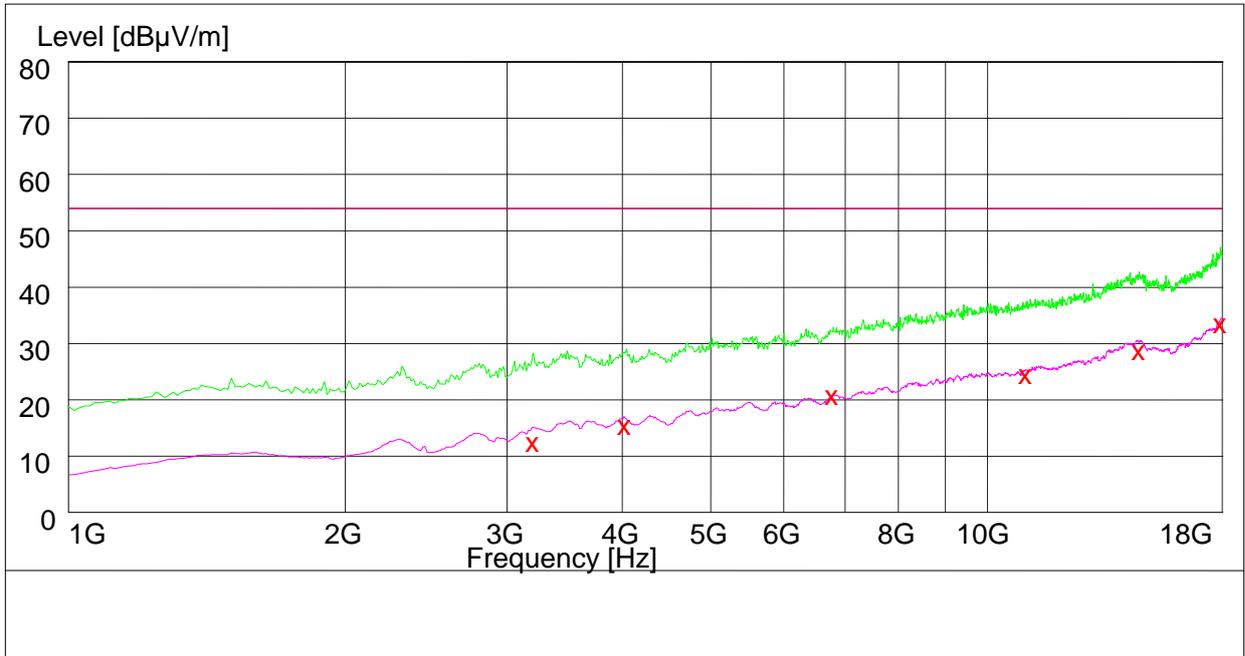
30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Plarization
34.300000	26.50	11.7	40.0	13.5	110.0	192.00	VERTICAL
64.804000	21.10	10.5	40.0	18.9	100.0	105.00	VERTICAL
129.628000	23.30	9.3	43.5	20.2	101.0	151.00	VERTICAL
200.656000	20.00	12.1	43.5	23.5	100.0	327.00	VERTICAL
512.016000	39.50	20.5	46.0	6.5	124.0	120.00	HORIZONTAL
947.168000	34.80	26.6	46.0	11.2	158.0	124.00	HORIZONTAL



1GHz to 18GHz



Note: Signal suppressed with a 2.4 GHz band rejection filter

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
3199.200000	13.80	-8.3	54.0	40.2	200.0	191.00	VERTICAL
4024.700000	15.70	-5.7	54.0	38.3	193.0	4.00	HORIZONTAL
6795.600000	20.10	-0.4	54.0	33.9	100.0	342.00	VERTICAL
11030.800000	23.90	6.8	54.0	30.1	187.0	16.00	HORIZONTAL
14596.500000	29.00	12.1	54.0	25.0	155.0	138.00	VERTICAL
17984.900000	32.90	17.2	54.0	21.1	120.0	357.00	VERTICAL



FCC Test Report of EC5072
FCC ID: QISEC5072

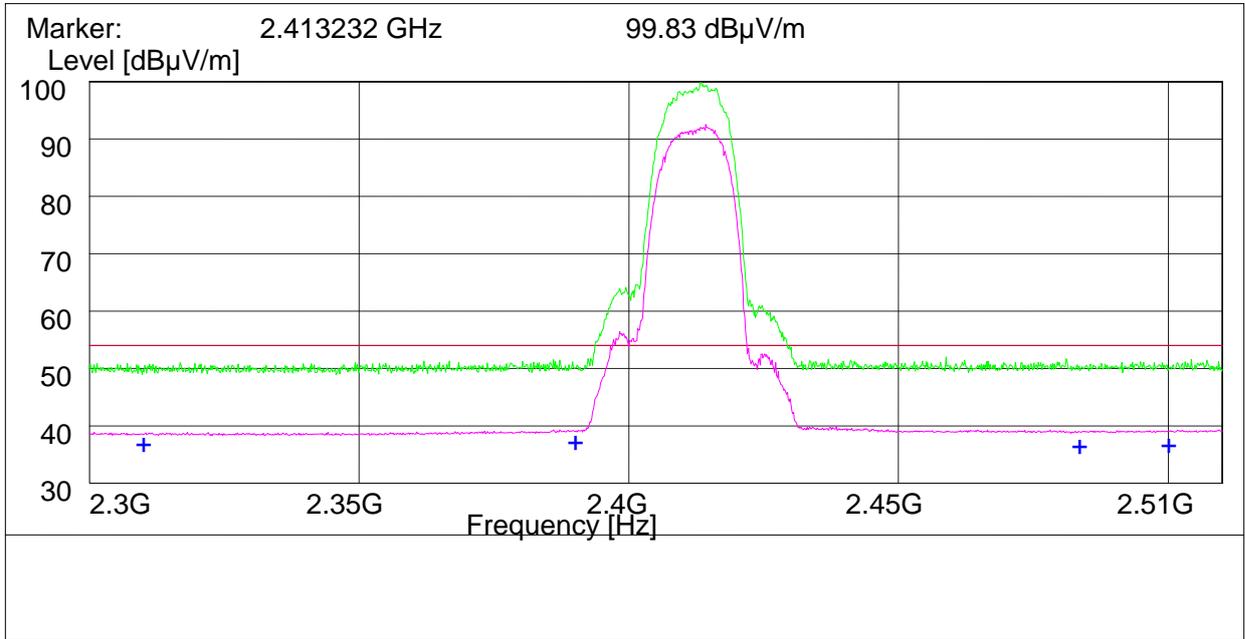
Security Level:
Public

18GHz to 26GHz

Note: No peak found in pre- test.



2GHz to 3GHz



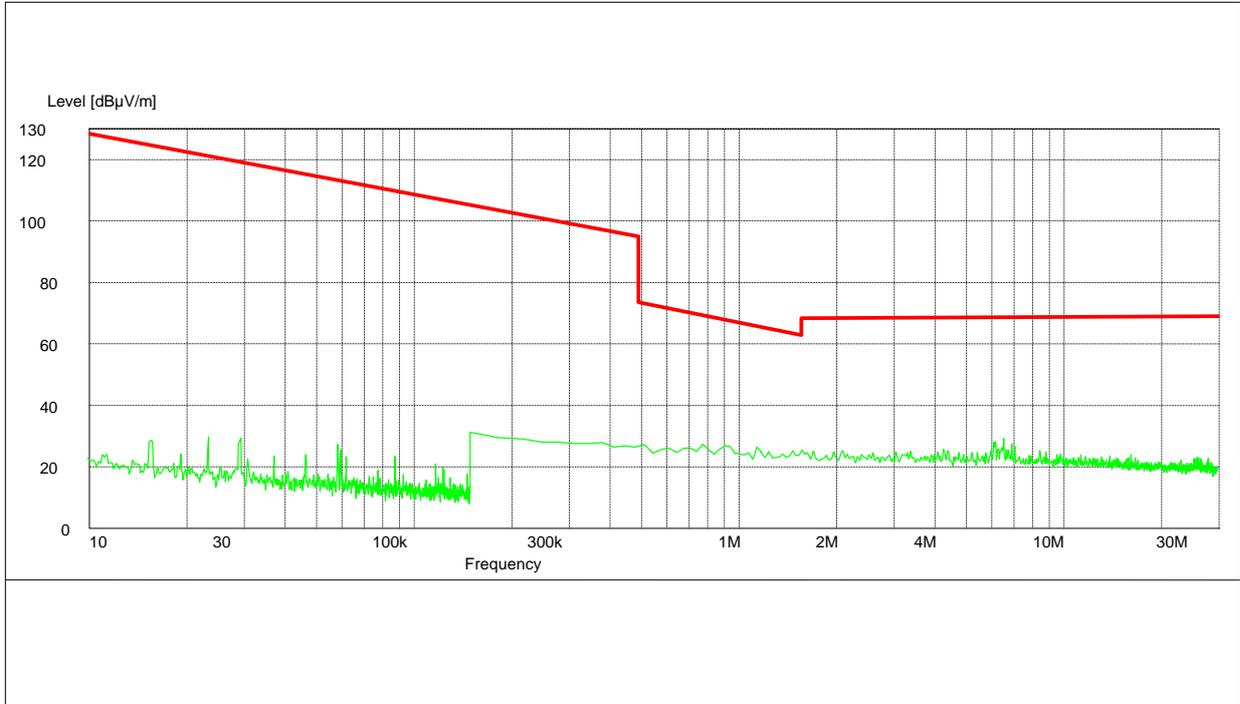
Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarization
2310.000000	38.40	33.3	54.0	15.6	181.0	215.00	VERTICAL
2390.000000	38.80	33.5	54.0	15.2	171.0	205.00	VERTICAL
2483.500000	38.10	33.7	54.0	15.9	196.0	145.00	VERTICAL
2500.000000	38.20	33.8	54.0	15.8	178.0	25.00	VERTICAL



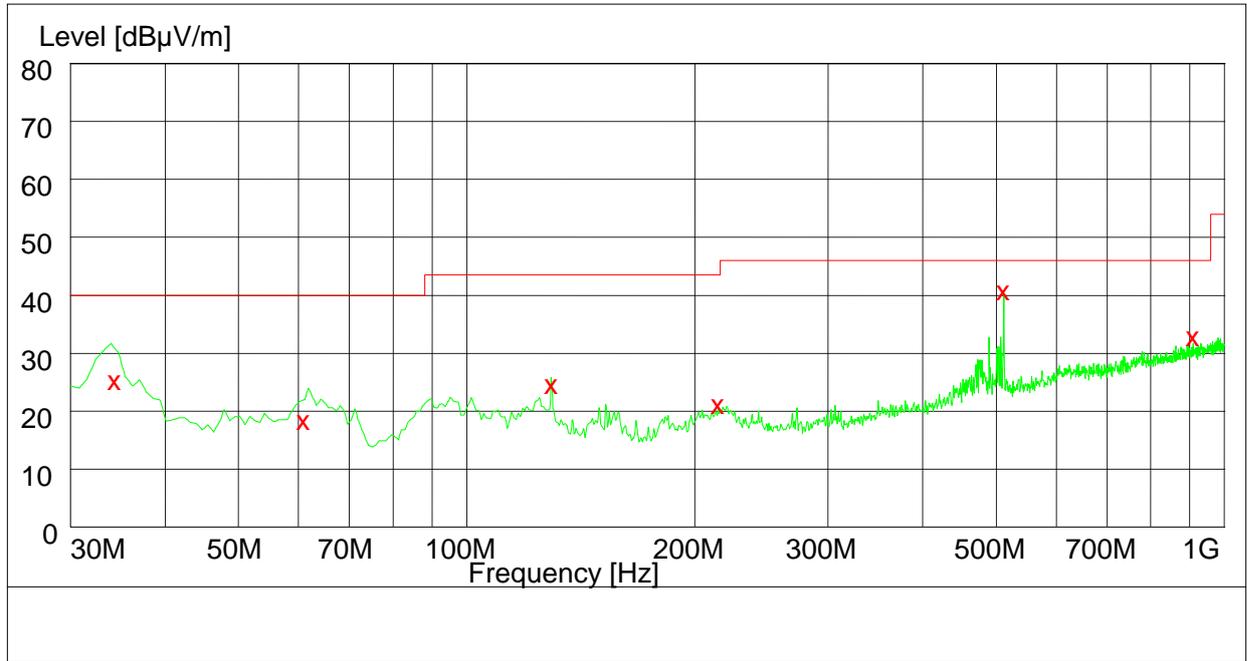
Channel 6

10 kHz to 30MHz





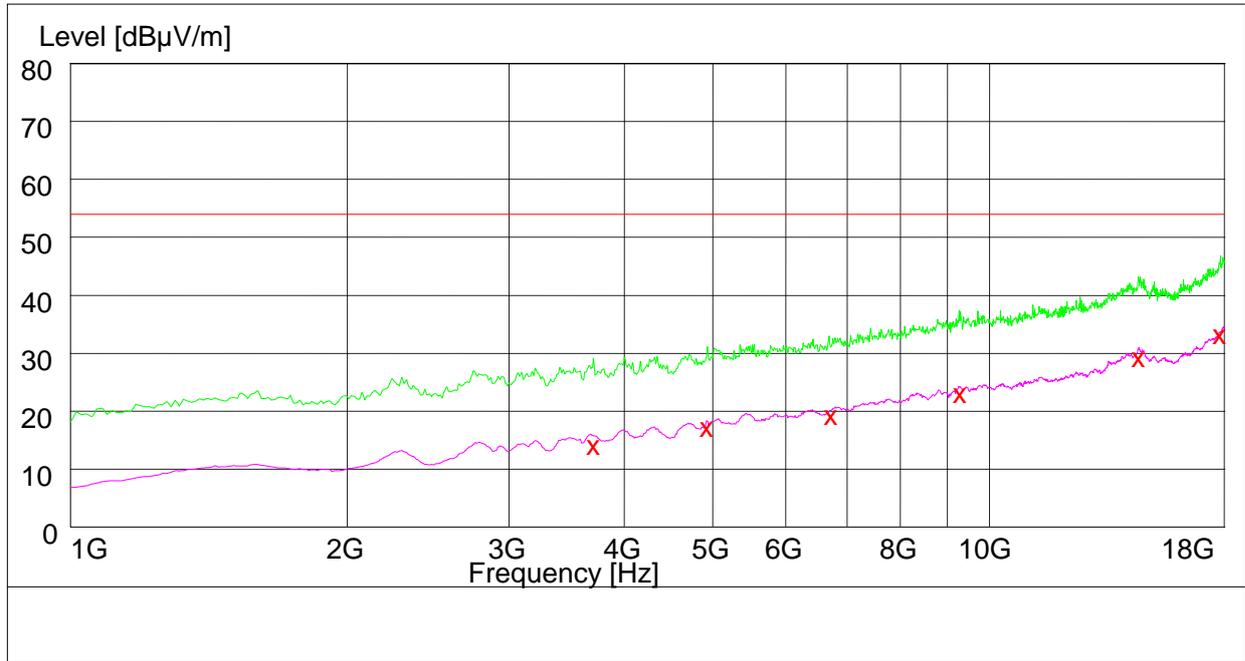
30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
34.360000	26.50	11.7	40.0	13.5	102.0	13.00	VERTICAL
60.976000	19.70	11.9	40.0	20.3	102.0	213.00	VERTICAL
129.508000	24.80	9.3	43.5	18.7	100.0	113.00	VERTICAL
214.928000	21.30	12.7	43.5	22.2	156.0	226.00	HORIZONTAL
512.016000	41.40	20.5	46.0	4.6	184.0	218.00	HORIZONTAL
909.744000	34.10	26.3	46.0	11.9	102.0	346.00	VERTICAL



1GHz to 18GHz



Note: Signal suppressed with a 2.4 GHz band rejection filter

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
3710.900000	15.20	-6.6	54.0	38.8	143.0	108.00	VERTICAL
4929.900000	18.50	-3.8	54.0	35.5	100.0	342.00	HORIZONTAL
6726.100000	19.70	-0.6	54.0	34.3	197.0	9.00	VERTICAL
9300.000000	22.90	4.6	54.0	31.1	170.0	319.00	VERTICAL
14520.400000	29.80	12.3	54.0	24.2	200.0	211.00	HORIZONTAL
17818.200000	32.40	16.1	54.0	21.6	130.0	355.00	HORIZONTAL



FCC Test Report of EC5072
FCC ID: QISEC5072

Security Level:
Public

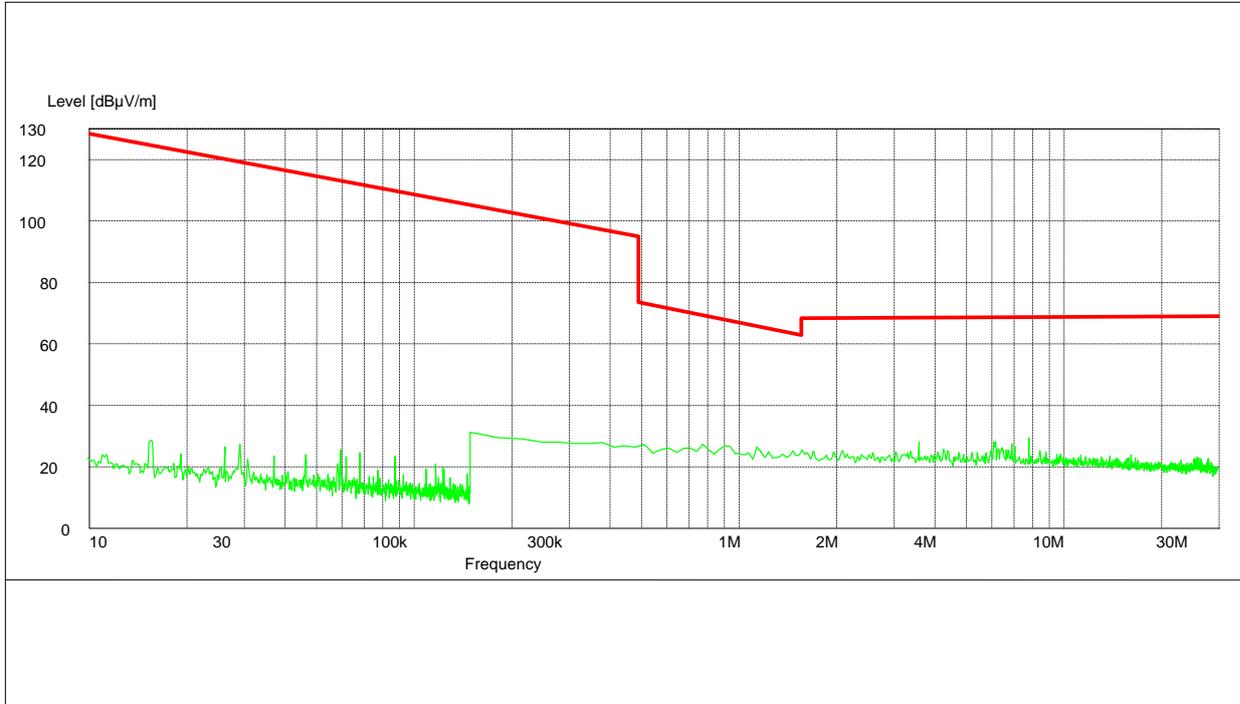
18GHz to 26GHz

Note: No peak found in pre- test.



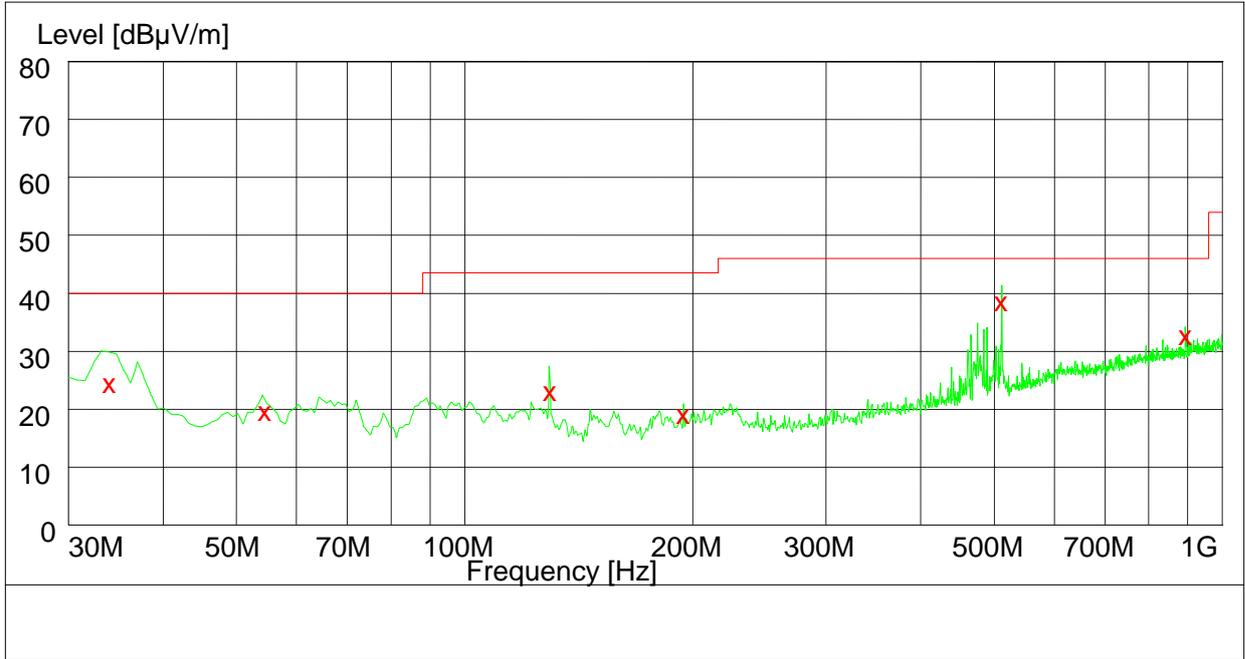
Channel 11

10 kHz to 30 MHz





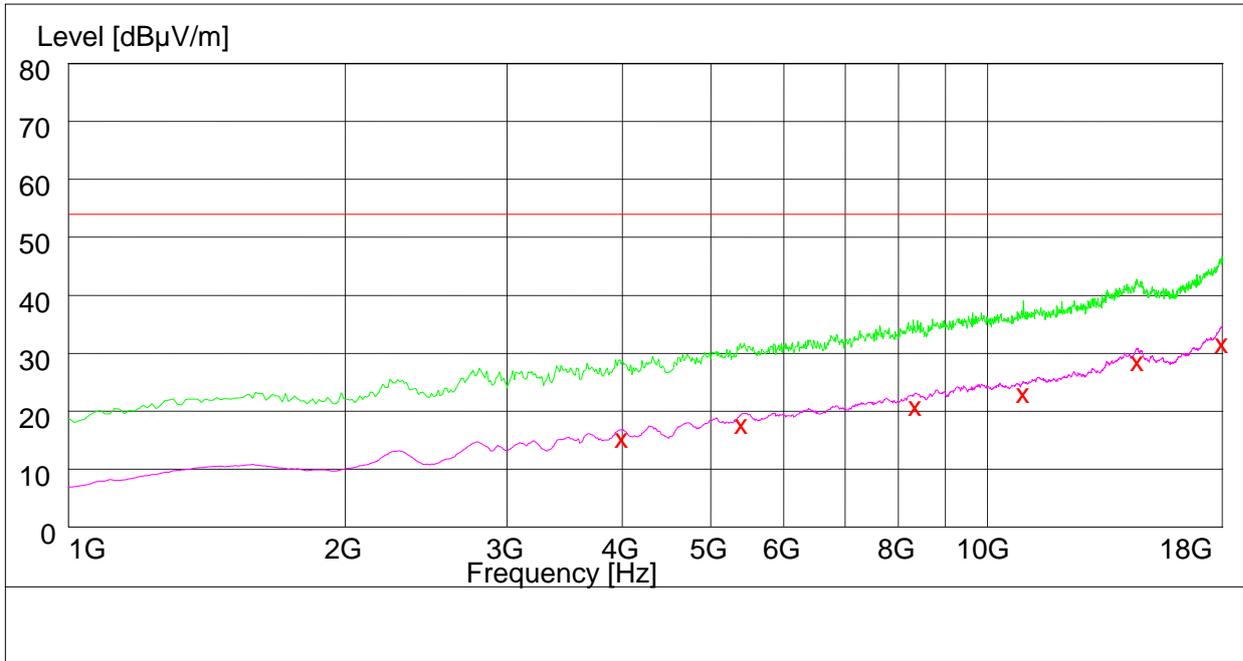
30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
34.004000	25.60	11.7	40.0	14.4	120.0	47.00	VERTICAL
54.536000	20.90	12.7	40.0	19.1	122.0	151.00	VERTICAL
129.628000	24.30	9.3	43.5	19.2	100.0	166.00	VERTICAL
194.692000	20.40	12.0	43.5	23.1	100.0	120.00	VERTICAL
512.016000	40.10	20.5	46.0	5.1	182.0	33.00	HORIZONTAL
894.468000	33.90	26.1	46.0	12.1	200.0	216.00	VERTICAL



1GHz to 18GHz



Note: Signal suppressed with a 2.4 GHz band rejection filter

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
4000.100000	16.50	-5.8	54.0	37.5	200.0	74.00	VERTICAL
5401.400000	18.90	-2.5	54.0	35.1	131.0	242.00	VERTICAL
8346.500000	22.00	2.9	54.0	32.0	118.0	276.00	HORIZONTAL
10942.600000	24.30	6.6	54.0	29.7	163.0	40.00	HORIZONTAL
14542.100000	29.70	12.3	54.0	24.3	108.0	53.00	HORIZONTAL
17988.900000	32.90	17.2	54.0	21.1	200.0	134.00	HORIZONTAL



FCC Test Report of EC5072
FCC ID: QISEC5072

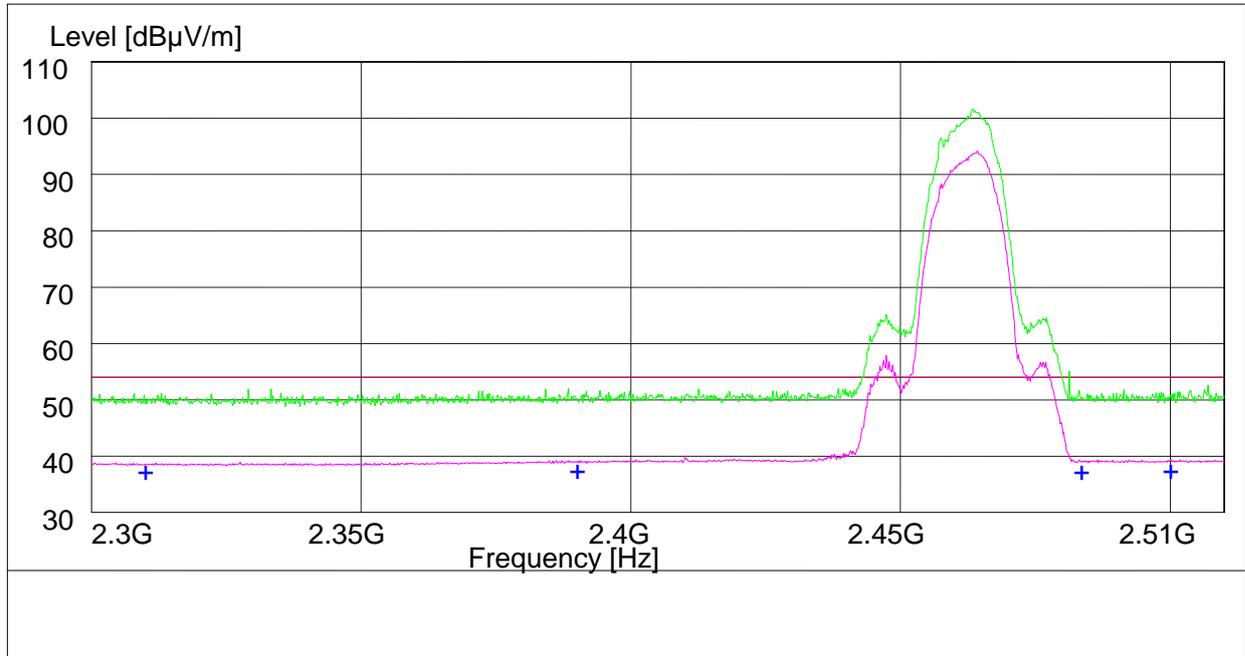
Security Level:
Public

18GHz to 26GHz

Note: No peak found in pre- test.



2GHz to 3GHz



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

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2310.000000	38.60	33.3	54.0	15.4	141.0	15.00	VERTICAL
2390.000000	38.70	33.5	54.0	15.3	141.0	255.00	VERTICAL
2483.500000	38.60	33.7	54.0	15.4	101.0	345.00	VERTICAL
2500.000000	38.70	33.8	54.0	15.3	121.0	5.00	VERTICAL



FCC Test Report of EC5072
FCC ID: QISEC5072

Security Level:
Public

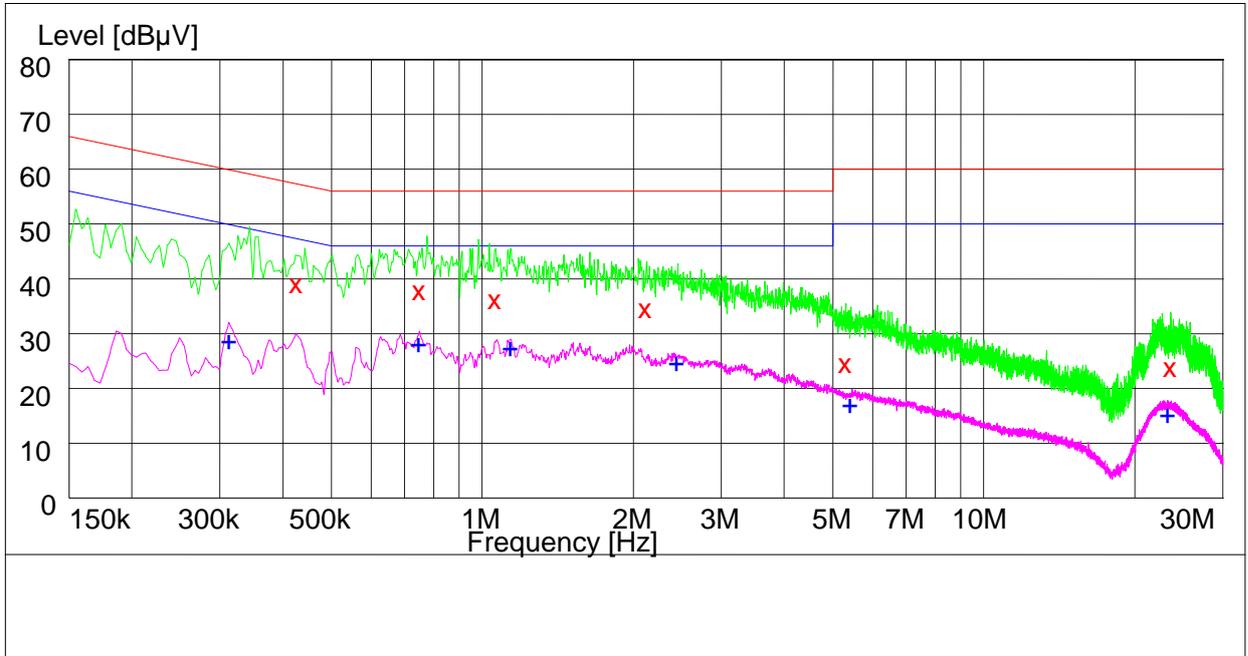
Appendix G

Conducted Emission at Power Port

According to FCC Part 15.207



Channel 6



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.426000	40.50	10.0	57	16.5	N	FLO
0.750000	39.30	10.1	56	16.7	N	FLO
1.060000	37.70	10.1	56	18.3	N	FLO
2.116000	35.90	10.1	56	20.1	N	FLO
5.294000	26.00	10.2	60	34.0	L1	FLO
23.580000	25.20	10.4	60	34.8	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.312000	30.20	10.0	50	19.8	N	FLO
0.746000	29.50	10.1	46	16.5	N	FLO
1.134000	28.90	10.1	46	17.1	N	FLO
2.436000	26.10	10.1	46	19.9	N	FLO
5.412000	18.50	10.2	50	31.5	L1	FLO
23.206000	16.70	10.4	50	33.3	N	FLO