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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No.: **CTL120509408-WF**

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Date of issue: July 09, 2012

Representative Laboratory Name: **Shenzhen CTL Electromagnetic Technology Co., Ltd.**

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Test Firm : **Bontek Compliance Testing Laboratory Ltd**

Address : 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

Applicant's name: **Winstars Technology Limited**

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Test specification:

Standard : FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

TRF Originator: Shenzhen CTL Electromagnetic Technology Co., Ltd.

Master TRF: Dated 2011-01

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Test item description : **WIFI Repeater**

FCC ID: **NZ3WS-WN518N2**

Trade Mark : /

Model/Type reference : WS-WN518N2

Modulation : DSSS, OFDM

Work Frequency Range: 2412~2462MHz

Antenna Type: Undetachable

Result : **Positive**

TEST REPORT

Test Report No. : CTL120509408-WF	July 09, 2012 Date of issue
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Equipment under Test : WIFI Repeater

Model /Type : WS-WN518N2

Listed Models : /

Applicant : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Manufacturer : Winstars Technology Limited

Address : Block 4, Taisong Industrial Park, Dalang Street, Longhua Town, Bao'an District, Shenzhen, China

Test Result according to the standards on page 4:

Positive

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.

ANSI C63.4-2003

KDB Publication No. 558074 Guidance on Measurements for Digital Transmission Systems



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	June 20, 2012
Testing commenced on	:	June 20, 2012
Testing concluded on	:	June 30, 2012

2.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	☒ 120V / 60 Hz	☐ 115V / 60Hz
		☐ 12 V DC	☐ 24 V DC
		☐ Other (specified in blank below)	

Description of the test mode

IEEE 802.11b/g/n: Thirteen channels are provided to the EUT, but only eleventh channels used for USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

2.3. Short description of the Equipment under Test (EUT)

2.4GHz (Wireless WIFI Repeater support 802.11bgn)

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.4. EUT operation mode

Test Mode:

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel low (2412MHz), mid (2442MHz) and high (2462MHz) with highest data rate are chosen for full testing.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○ Power Cable

Length (m) : /

Shield : /

Detachable : /

○ Multimeter

Manufacturer : /

Model No. : /

2.6. NOTE

1. The EUT is an 802.11b/g/n wifi repeater, The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN 802.11b/g, 802.11n	FCC Part 15 Subpart C (Section15.247)	CTL120509408-WF
WLAN 802.11b/g, 802.11n	FCC Per 47 CFR 2.1091(b)	CTL120509408-WM

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	✓	—	—	—
802.11g	✓	—	—	—
802.11n(20MHz)	✓	—	—	—
802.11n(40MHz)	✓	—	—	—

3. The EUT incorporates a MIMO function, Physically, the EUT provides two completed transmitter and two completed receivers.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **NZ3WS-WN518N2** filing to comply with of the FCC Part 15.247 Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Bontek Compliance Testing Laboratory Ltd
1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 7631A

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on March, 2011.

FCC-Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

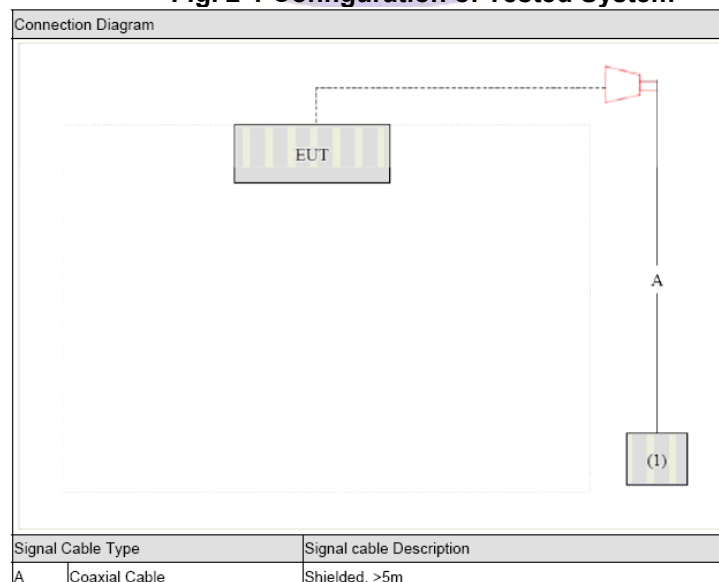
Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Bontek Compliance Testing Laboratory Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Bontek laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	1~12.75GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Last Cal.	Due. Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	2012/04/14	2013/04/13
2	Radio Communication Tester	ROHDE & SCHWARZ	CMU200	2012/04/14	2013/04/13
3	Dual Directional Coupler	Agilent	778D	2012/04/14	2013/04/13
4	10dB attenuator	SCHWARZBECK	MTAIMP-136	2012/04/14	2013/04/13
5	Tunable Bandreject filter	K&L	3TNF-800	2012/04/14	2013/04/13
6	Tunable Bandreject filter	K&L	5TNF-1700	2012/04/14	2013/04/13
7	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	2012/04/14	2013/04/13
8	High-Pass Filter	K&L	41H10-1375/U12750-O/O	2012/04/14	2013/04/13
9	Coaxial Cable	Huber+Suhner	AC4-RF-H	2012/04/14	2013/04/13
10	AC Power Supply	IDRC	CF-500TP	2012/04/14	2013/04/13
11	DC Power Supply	IDRC	CD-035-020PR	2012/04/14	2013/04/13
12	RF Current Probe	FCC	F-33-4	2012/04/14	2013/04/13
13	Temperature /Humidity Meter	zhicheng	ZC1-2	2012/04/14	2013/04/13
14	MICROWAVE AMPLIFIER	HP	8349B	2012/04/14	2013/04/13
15	Amplifier	HP	8447D	2012/04/14	2013/04/13
16	SIGNAL GENERATOR	HP	8647A	2012/04/14	2013/04/13
17	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	2012/04/14	2013/04/13
18	Horn Antenna	Schwarzbeck	BBHA9120A	2012/04/14	2013/04/13
19	EMI Test Receiver	R&S	ESPI	2012/04/14	2013/04/13
20	Loop Antenna	ZHINAN	ZN30900A	2012/04/14	2013/04/13
21	Horn Antenna	Schwarzbeck	BBHA9120D	2012/04/14	2013/04/13
22	Horn Antenna	Schwarzbeck	BBHA9170	2012/04/14	2013/04/13

3.7. Summary of Test Result

FCC PART 15		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge Compliance of RF Emission	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS
FCC Per 47 CFR 2.1091(b)	MPE Evaluation	PASS

Remark: The measurement uncertainty is not included in the test result.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
AC Power Conducted Emission	Normal Link	11 Mbps	1
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	135Mbps	3/6/9
Radiated Emission 30MHz~1GHz	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	135Mbps	3/6/9
Radiated Emission 1GHz~10th Harmonic	11b/DSSS	11 Mbps	1/6/11
	11g/OFDM	54 Mbps	1/6/11
	11n(20MHz)/OFDM	65Mbps	1/6/11
	11n(40MHz)/OFDM	135Mbps	3/6/9
Band Edge Compliance of RF Emission	11b/DSSS	11 Mbps	1/11
	11g/OFDM	54 Mbps	1/11
	11n(20MHz)/OFDM	65Mbps	1/11
	11n(40MHz)/OFDM	135Mbps	3/9

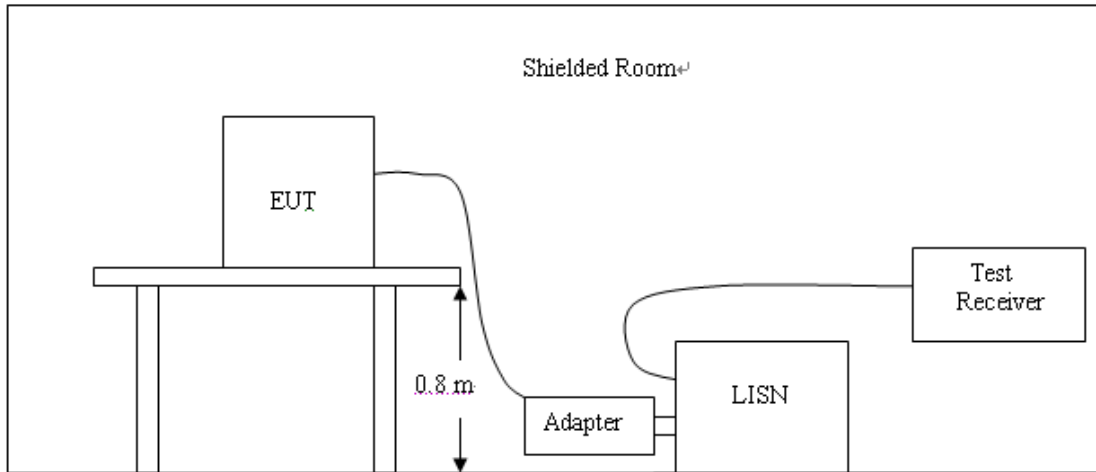
Note1: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

Note2: This device use MIMO 2X2 antennas, for 802.11b/g mode, based exploratory test, when transmit with Antenna 1 have worse emissions, so the final radiated spurious emissions were tested with Antenna 1. For 802.11n mode, all the radiated spurious emissions and band edge test were performed with two antennas transmit synchronous.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

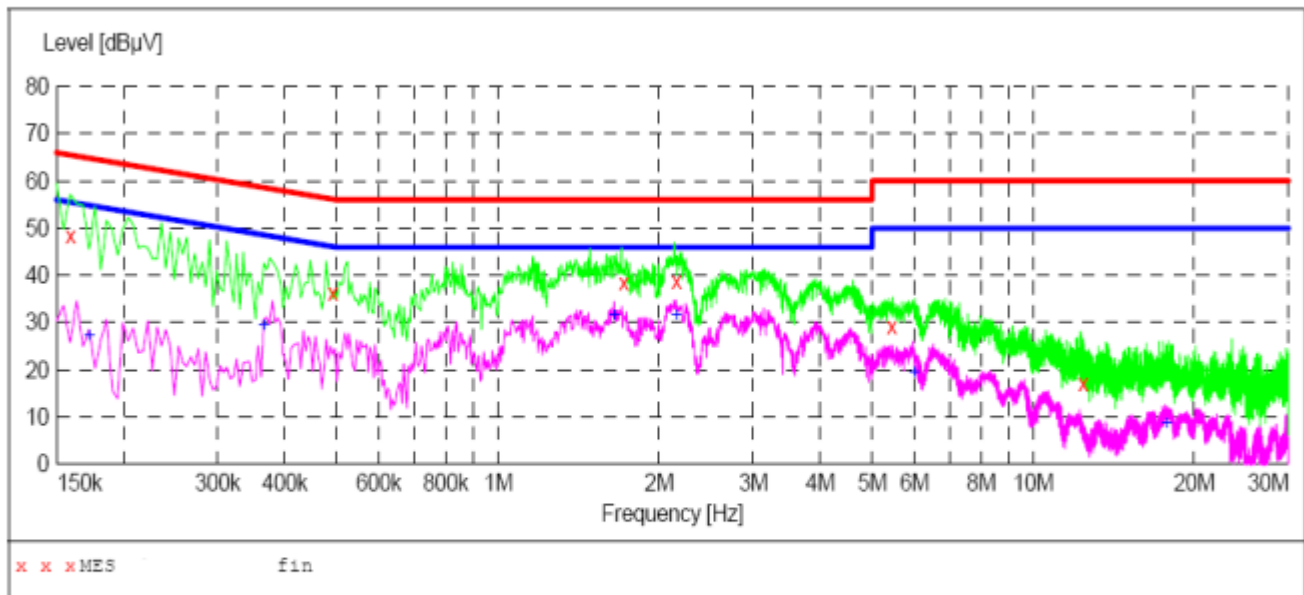
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

The RBW/VBW for 150KHz to 30MHz: 9KHz

TEST RESULTS**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

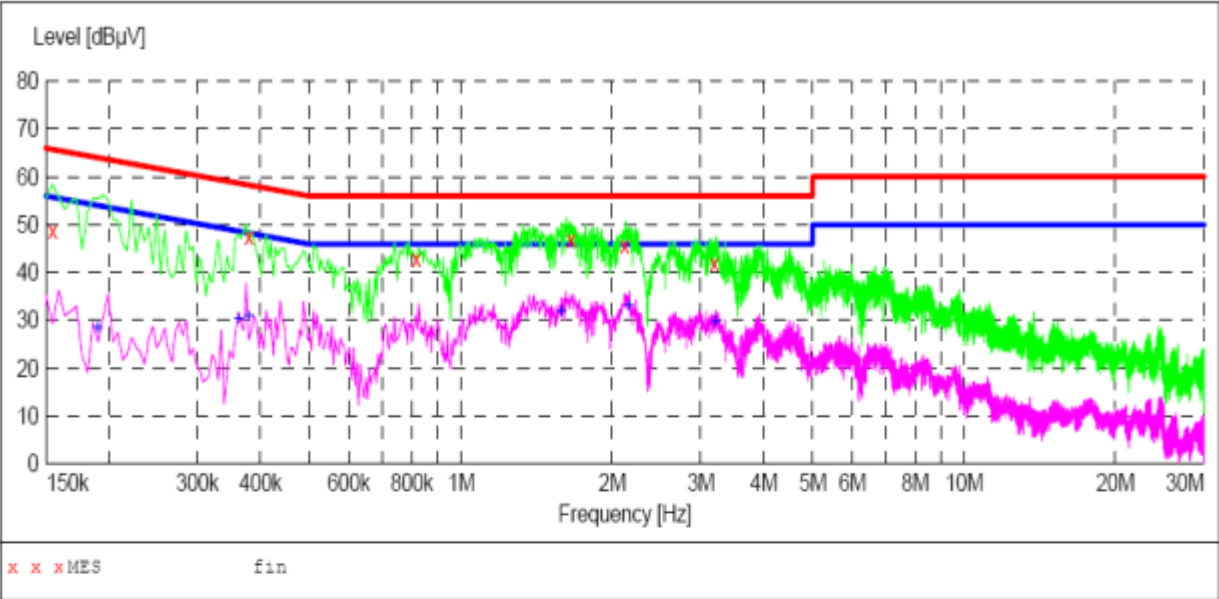
**MEASUREMENT RESULT:**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159000	48.50	10.1	66	17.0	QP	N	GND
0.492000	36.30	10.1	56	19.8	QP	N	GND
1.720500	38.40	10.2	56	17.6	QP	N	GND
2.157000	38.90	10.2	56	17.1	QP	N	GND
5.451000	29.20	10.2	60	30.8	QP	N	GND
12.412500	17.10	10.4	60	42.9	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	27.30	10.1	55	27.5	AV	N	GND
0.366000	29.40	10.1	49	19.2	AV	N	GND
1.653000	31.60	10.2	46	14.4	AV	N	GND
2.157000	31.50	10.2	46	14.5	AV	N	GND
6.000000	19.50	10.2	50	30.5	AV	N	GND
17.745000	8.90	10.4	50	41.1	AV	N	GND

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154500	48.80	10.1	66	17.0	QP	L1	GND
0.379500	47.60	10.1	58	10.7	QP	L1	GND
0.816000	42.90	10.1	56	13.1	QP	L1	GND
1.657500	46.90	10.2	56	9.1	QP	L1	GND
2.116500	45.50	10.2	56	10.5	QP	L1	GND
3.196500	42.00	10.2	56	14.0	QP	L1	GND

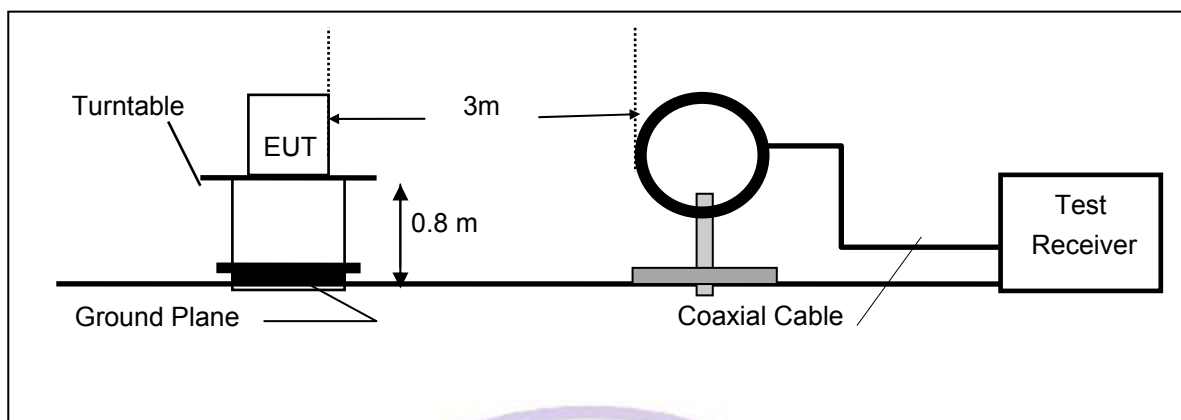
MEASUREMENT RESULT:

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.190500	28.50	10.1	54	25.5	AV	L1	GND
0.361500	30.60	10.1	49	18.1	AV	L1	GND
0.379500	30.90	10.1	48	17.4	AV	L1	GND
1.585500	32.10	10.2	46	13.9	AV	L1	GND
2.161500	33.10	10.2	46	12.9	AV	L1	GND
3.214500	29.80	10.2	46	16.2	AV	L1	GND

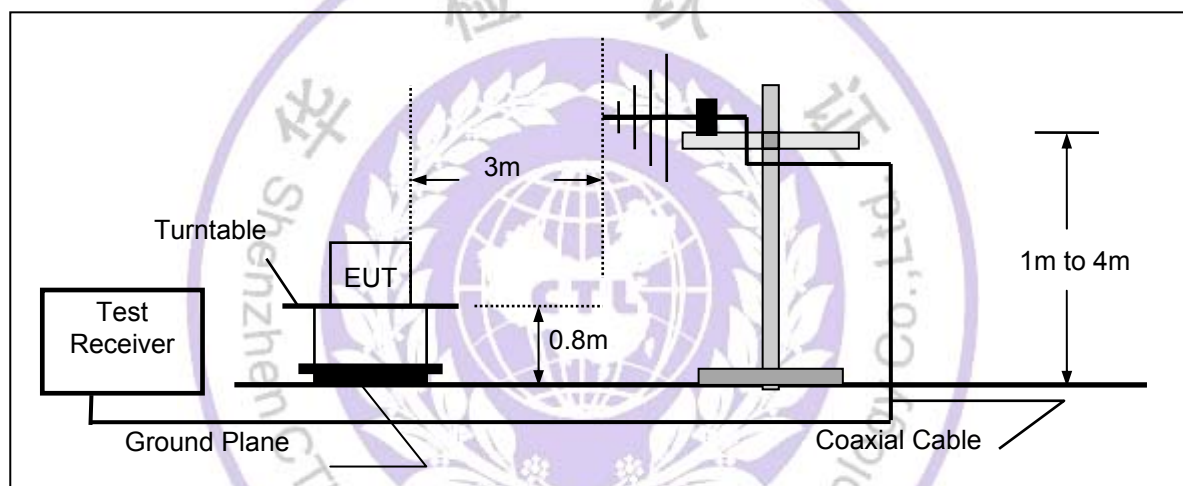
4.2. Radiated Emission Test

TEST CONFIGURATION

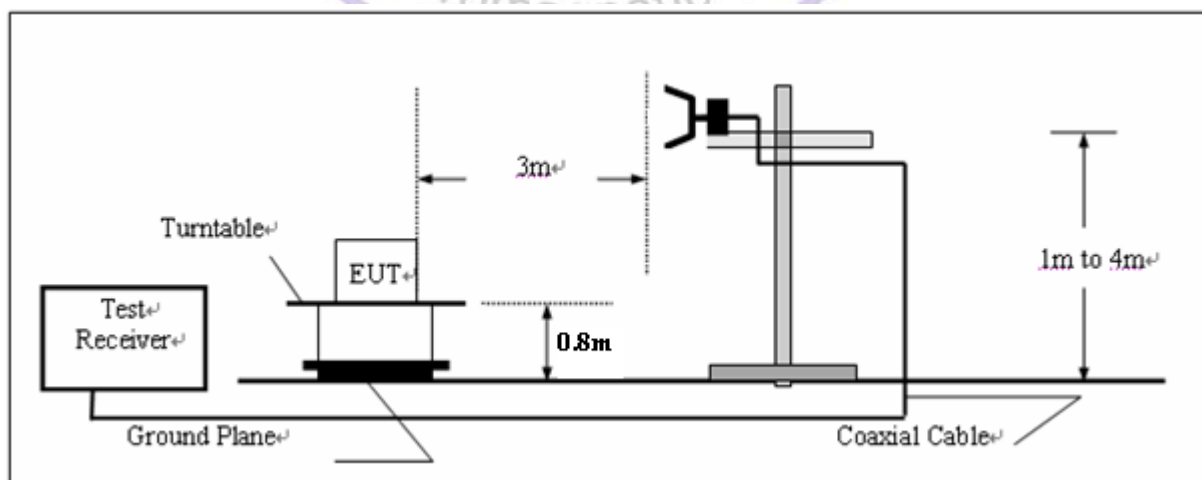
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Span = wide enough to fully capture the emission being measured; RBW = 1 MHz for $f > 1$ GHz, 100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Repeat above procedures until all frequency measurements have been completed.

LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

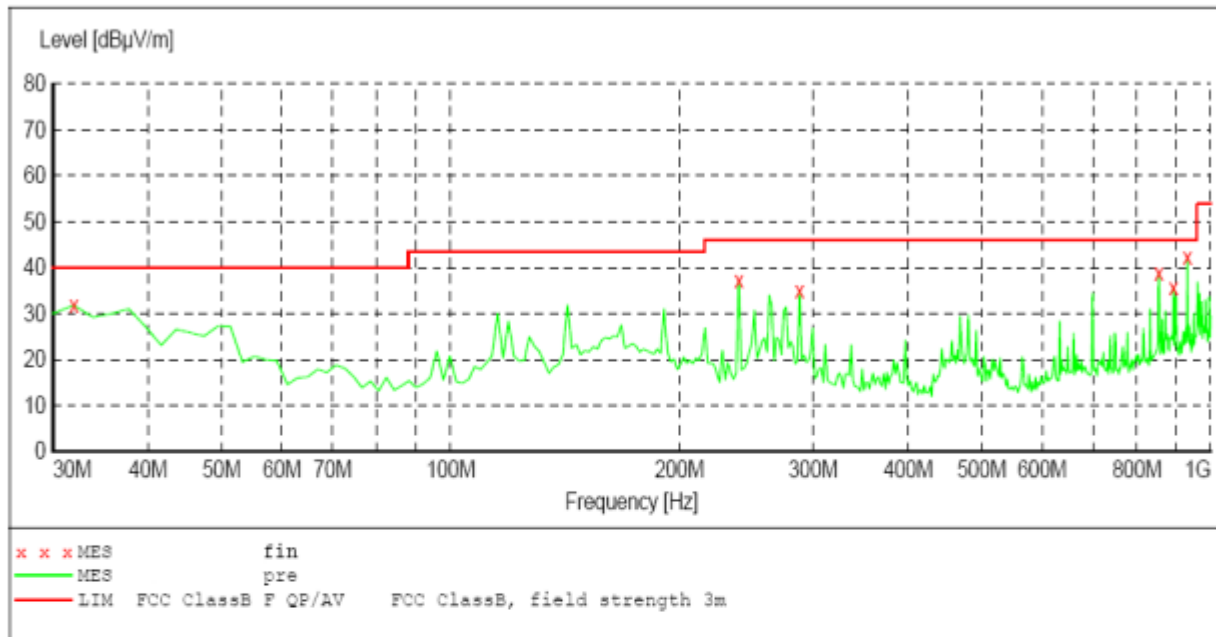
TEST RESULTS

Below 1GHz:

The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode, the middle channel) is the worst case for all the test mode and channel.

SWEEP TABLE: "test (30M-1G)"

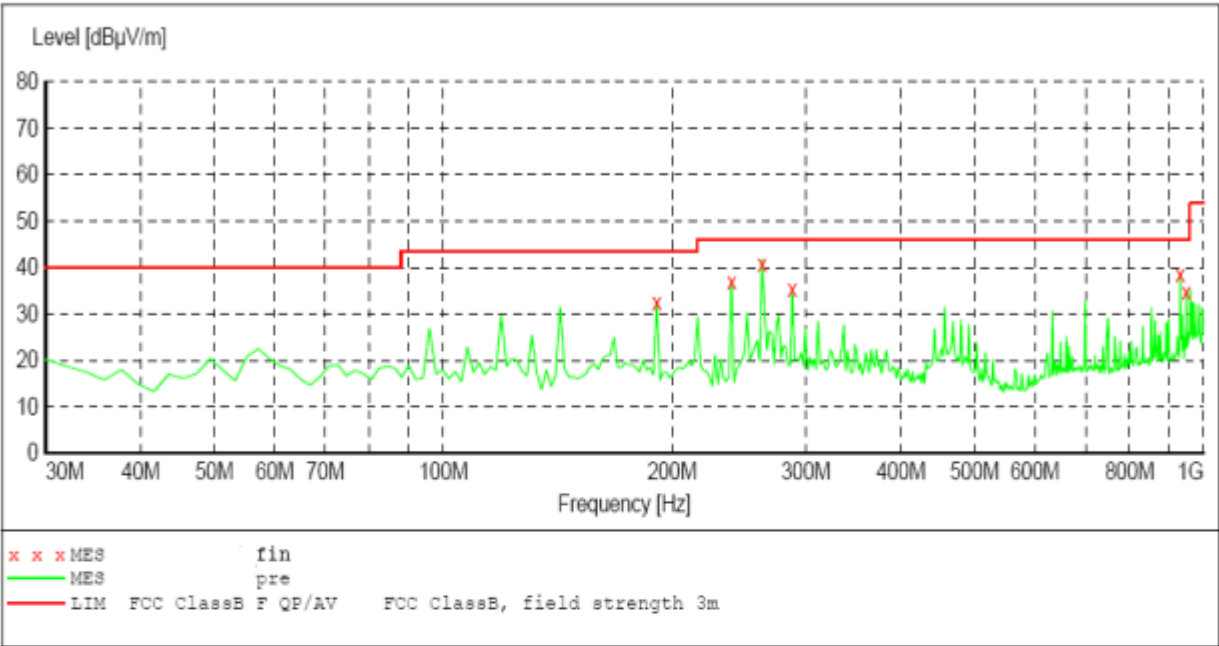
Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106

**MEASUREMENT RESULT:**

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	31.90	-12.3	40.0	8.1	QP	100.0	86.00	VERTICAL
239.520000	37.20	-18.9	46.0	8.8	QP	100.0	211.00	VERTICAL
288.020000	34.90	-17.7	46.0	11.1	QP	100.0	211.00	VERTICAL
854.500000	38.90	-7.5	46.0	7.1	QP	100.0	197.00	VERTICAL
893.300000	35.80	-6.8	46.0	10.2	QP	100.0	205.00	VERTICAL
932.100000	42.40	-7.2	46.0	3.6	QP	100.0	187.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT:

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
191.020000	32.50	-22.2	43.5	11.0	QP	100.0	49.00	HORIZONTAL
239.520000	37.00	-18.9	46.0	9.0	QP	100.0	0.00	HORIZONTAL
262.800000	40.70	-18.1	46.0	5.3	QP	100.0	346.00	HORIZONTAL
288.020000	35.40	-17.7	46.0	10.6	QP	100.0	275.00	HORIZONTAL
932.100000	38.60	-7.2	46.0	7.4	QP	100.0	65.00	HORIZONTAL
949.560000	34.60	-7.4	46.0	11.4	QP	100.0	39.00	HORIZONTAL

Above 1GHz:
802.11b CH1

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	50.46	PK	74.00	23.54	1.00 H	200	53.86	28.3	4.90	36.6	-3.30
1	2390.00	38.49	AV	54.00	15.51	1.00 H	200	41.89	28.3	4.90	36.6	-3.30
2	*2412.00	102.69	PK			1.00 H	333	106.09	28.3	4.90	36.6	-3.30
2	*2412.00	88.75	AV			1.00 H	333	92.15	28.3	4.90	36.6	-3.30
3	4824.00	60.12	PK	74.00	13.88	1.00 H	125	56.92	32.7	7.00	36.5	3.80
3	4824.00	50.00	AV	54.00	4.00	1.00 H	125	46.80	32.7	7.00	36.5	3.80
4	7236.00	62.12	PK	74.00	11.88	1.00 H	66	52.72	35.8	8.90	35.3	9.40
4	7236.00	47.23	AV	54.00	6.77	1.00 H	66	37.83	35.8	8.90	35.3	9.40
5	9648.00	64.20	PK	74.00	9.80	1.00 H	264	51.60	37.2	10.20	34.8	12.60
5	9648.00	50.11	AV	54.00	3.89	1.00 H	264	37.51	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	51.61	PK	74.00	22.39	1.0	236	55.01	28.3	4.90	36.6	-3.30
1	2390.00	44.98	AV	54.00	9.02	1.0	236	48.38	28.3	4.90	36.6	-3.30
2	*2412.00	112.56	PK			1.0	100	115.96	28.3	4.90	36.6	-3.30
2	*2412.00	107.78	AV			1.0	100	111.18	28.3	4.90	36.6	-3.30
3	4824.00	61.10	PK	74.00	12.90	1.0	312	57.90	32.7	7.00	36.5	3.80
3	4824.00	48.23	AV	54.00	5.77	1.0	312	45.03	32.7	7.00	36.5	3.80
4	7236.00	63.56	PK	74.00	10.44	1.0	46	54.16	35.8	8.90	35.3	9.40
4	7236.00	49.44	AV	54.00	4.56	1.0	46	40.04	35.8	8.90	35.3	9.40
5	9648.00	66.00	PK	74.00	8.00	1.0	108	53.40	37.2	10.20	34.8	12.60
5	9648.00	49.14	AV	54.00	4.86	1.0	108	36.54	37.2	10.20	34.8	12.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value - Emission level.
5. The limit value is defined as per 15.247
6. "*" : Fundamental frequency
7. For Wireless 802.11b mode at 11Mbps.

802.11b CH6

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	103.23			1.00 H	153	106.43	28.3	5.10	-36.6	-3.20
1	*2437.00	92.33			1.00 H	153	95.53	28.3	5.10	-36.6	-3.20
2	4874.00	52.23	74.00	21.77	1.00 H	202	48.83	32.3	7.60	-36.5	3.40
2	4874.00	40.14	54.00	13.86	1.00 H	202	36.74	32.3	7.60	-36.5	3.40
3	7311.00	56.45	74.00	17.55	1.00 H	355	47.05	36.1	8.60	-35.3	9.40
3	7311.00	42.23	54.00	11.77	1.00 H	355	32.83	36.1	8.60	-35.3	9.40
4	9748.00	60.14	74.00	13.86	1.00 H	28	47.54	37.2	10.20	-34.8	12.60
4	9748.00	48.14	54.00	5.86	1.00 H	28	35.54	37.2	10.20	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	109.23			1.00 V	121	112.43	28.3	5.10	-36.6	-3.20
1	*2437.00	98.12			1.00 V	121	101.32	28.3	5.10	-36.6	-3.20
2	4874.00	55.44	74.00	18.56	1.00 V	97	52.04	32.3	7.60	-36.5	3.40
2	4874.00	46.17	54.00	7.83	1.00 V	97	42.77	32.3	7.60	-36.5	3.40
3	7311.00	57.23	74.00	16.77	1.00 V	288	47.83	36.1	8.60	-35.3	9.40
3	7311.00	49.10	54.00	4.90	1.00 V	288	39.70	36.1	8.60	-35.3	9.40
4	9748.00	59.36	74.00	14.64	1.00 V	89	46.76	37.2	10.20	-34.8	12.60
4	9748.00	49.20	54.00	4.80	1.00 V	89	36.60	37.2	10.20	-34.8	12.60

REMARKS:

1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB))+ Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. The limit value is defined as per 15.247
6. “* “: Fundamental frequency
7. For Wireless 802.11b mode at 11Mbps.

802.11b CH11

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	103.35			1.00 H	154	106.65	28.6	4.70	-36.6	-3.30
1	*2462.00	92.99			1.00 H	154	96.29	28.6	4.70	-36.6	-3.30
2	2483.50	49.48	74.00	24.52	1.00 H	146	52.78	28.6	4.70	-36.6	-3.30
2	2483.50	38.43	54.00	15.57	1.00 H	146	41.73	28.6	4.70	-36.6	-3.30
3	4022.04	56.12	74.00	17.88	1.00 H	341	54.22	32.2	6.20	-36.5	1.90
3	4022.04	49.01	54.00	4.99	1.00 H	341	47.11	32.2	6.20	-36.5	1.90
4	4924.00	54.63	74.00	19.37	1.00 H	100	50.83	33.0	7.00	-36.2	3.80
4	4924.00	45.11	54.00	8.89	1.00 H	100	41.31	33.0	7.00	-36.2	3.80
5	7386.00	59.00	74.00	15.00	1.00 H	190	49.60	36.2	8.50	-35.3	9.40
5	7386.00	48.03	54.00	5.97	1.00 H	190	38.63	36.2	8.50	-35.3	9.40
6	9848.00	60.22	74.00	13.78	1.00 H	113	47.62	37.2	10.20	-34.8	12.60
6	9848.00	50.07	54.00	3.93	1.00 H	113	37.47	37.2	10.20	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	113.06			1.00 V	247	116.36	28.6	4.70	-36.6	-3.30
1	*2462.00	107.69			1.00 V	247	110.99	28.6	4.70	-36.6	-3.30
2	2483.50	51.86	74.00	22.14	1.00 V	150	55.16	28.6	4.70	-36.6	-3.30
2	2483.50	46.52	54.00	7.48	1.00 V	150	49.82	28.6	4.70	-36.6	-3.30
3	4022.04	52.02	74.00	21.98	1.00 V	299	50.12	32.2	6.20	-36.5	1.90
3	4022.04	44.11	54.00	9.89	1.00 V	299	42.21	32.2	6.20	-36.5	1.90
4	4924.00	54.00	74.00	20.00	1.00 V	90	50.20	33.0	7.00	-36.2	3.80
4	4924.00	43.14	54.00	10.86	1.00 V	90	39.34	33.0	7.00	-36.2	3.80
5	7386.00	58.88	74.00	15.12	1.00 V	29	49.48	36.2	8.50	-35.3	9.40
5	7386.00	46.61	54.00	7.39	1.00 V	29	37.21	36.2	8.50	-35.3	9.40
6	9848.00	60.00	74.00	14.00	1.00 V	222	47.40	37.2	10.20	-34.8	12.60
6	9848.00	49.23	54.00	4.77	1.00 V	222	36.63	37.2	10.20	-34.8	12.60

REMARKS:

1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB))+ Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. The limit value is defined as per 15.247
6. "*" : Fundamental frequency
7. For Wireless 802.11b mode at 11Mbps.

802.11g CH1

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	61.33	PK	74.00	12.67	1.00 H	247	64.63	28.3	5.00	36.6	-3.30
1	2390.00	44.54	AV	54.00	9.46	1.00 H	247	47.84	28.3	5.00	36.6	-3.30
2	*2412.00	100.32	PK			1.00 H	100	103.62	28.3	5.00	36.6	-3.30
2	*2412.00	84.74	AV			1.00 H	100	88.04	28.3	5.00	36.6	-3.30
3	4824.00	58.14	PK	74.00	15.86	1.00 H	89	54.34	32.7	7.30	36.2	3.80
3	4824.00	47.96	AV	54.00	6.04	1.00 H	89	44.16	32.7	7.30	36.2	3.80
4	7236.00	62.22	PK	74.00	11.78	1.00 H	345	52.82	35.8	8.90	35.3	9.40
4	7236.00	48.60	AV	54.00	5.40	1.00 H	345	39.20	35.8	8.90	35.3	9.40
5	9648.00	64.17	PK	74.00	9.83	1.00 H	121	51.57	37.2	10.20	34.8	12.60
5	9648.00	50.25	AV	54.00	3.75	1.00 H	121	37.65	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	69.66	PK	74.00	4.34	1.00 V	288	72.96	28.3	5.00	36.6	-3.30
1	2390.00	50.63	AV	54.00	3.37	1.00 V	288	53.93	28.3	5.00	36.6	-3.30
2	*2412.00	110.40	PK			1.00 V	69	113.70	28.3	5.00	36.6	-3.30
2	*2412.00	94.98	AV			1.00 V	69	98.28	28.3	5.00	36.6	-3.30
3	4824.00	58.88	PK	74.00	15.12	1.00 V	291	55.08	32.7	7.30	36.2	3.80
3	4824.00	46.99	AV	54.00	7.01	1.00 V	291	43.19	32.7	7.30	36.2	3.80
4	7236.00	61.44	PK	74.00	12.56	1.00 V	360	52.04	35.8	8.90	35.3	9.40
4	7236.00	48.00	AV	54.00	6.00	1.00 V	360	38.60	35.8	8.90	35.3	9.40
5	9648.00	65.22	PK	74.00	8.78	1.00 V	155	52.62	37.2	10.20	34.8	12.60
5	9648.00	50.47	AV	54.00	3.53	1.00 V	155	37.87	37.2	10.20	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB))+ Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. “* “: Fundamental frequency
 7. For Wireless 802.11g mode at 54Mbps.

802.11g CH6

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	105.25			1.00 H	100	108.45	28.3	5.10	-36.6	-3.20
1	*2437.00	96.00			1.00 H	100	99.20	28.3	5.10	-36.6	-3.20
2	4874.00	56.50	74.00	17.50	1.00 H	214	53.10	32.8	7.10	-36.5	3.40
2	4874.00	47.23	54.00	6.77	1.00 H	214	43.83	32.8	7.10	-36.5	3.40
3	7311.00	57.70	74.00	16.30	1.00 H	0	48.30	36.1	8.60	-35.3	9.40
3	7311.00	48.60	54.00	5.40	1.00 H	0	39.20	36.1	8.60	-35.3	9.40
4	9748.00	59.63	74.00	14.37	1.00 H	163	47.03	37.2	10.20	-34.8	12.60
4	9748.00	49.50	54.00	4.50	1.00 H	163	36.90	37.2	10.20	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	109.50			1.00 V	122	112.70	28.3	5.10	-36.6	-3.20
1	*2437.00	98.80			1.00 V	122	102.00	28.3	5.10	-36.6	-3.20
2	4874.00	56.90	74.00	17.10	1.00 V	100	53.50	32.8	7.10	-36.5	3.40
2	4874.00	45.45	54.00	8.55	1.00 V	100	42.05	32.8	7.10	-36.5	3.40
3	7311.00	58.17	74.00	15.83	1.00 V	356	48.77	36.1	8.60	-35.3	9.40
3	7311.00	48.65	54.00	5.35	1.00 V	356	39.25	36.1	8.60	-35.3	9.40
4	9748.00	60.58	74.00	13.42	1.00 V	26	47.98	37.2	10.20	-34.8	12.60
4	9748.00	49.20	54.00	4.80	1.00 V	26	36.60	37.2	10.20	-34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. “* “: Fundamental frequency
 7. For Wireless 802.11g mode at 54Mbps.

802.11g CH11

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	100.21			1.00 H	156	103.51	28.2	5.10	-36.6	-3.30
1	*2462.00	84.73			1.00 H	156	88.03	28.2	5.10	-36.6	-3.30
2	2483.50	59.39	74.00	14.61	1.00 H	191	62.69	28.2	5.10	-36.6	-3.30
2	2483.50	42.28	54.00	11.72	1.00 H	191	45.58	28.2	5.10	-36.6	-3.30
3	4924.00	54.26	74.00	19.74	1.00 H	198	50.46	33.0	7.00	-36.2	3.80
3	4924.00	45.22	54.00	8.78	1.00 H	198	41.42	33.0	7.00	-36.2	3.80
4	7386.00	57.36	74.00	16.64	1.00 H	90	47.96	36.2	8.50	-35.3	9.40
4	7386.00	46.65	54.00	7.35	1.00 H	90	37.25	36.2	8.50	-35.3	9.40
5	9848.00	60.14	74.00	13.86	1.00 H	124	47.54	37.3	10.10	-34.8	12.60
5	9848.00	50.00	54.00	4.00	1.00 H	124	37.40	37.3	10.10	-34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	106.70			1.00 V	125	110.00	28.2	5.10	-36.6	-3.30
1	*2462.00	94.49			1.00 V	125	97.79	28.2	5.10	-36.6	-3.30
2	2483.50	66.73	74.00	7.27	1.00 V	348	70.03	28.2	5.10	-36.6	-3.30
2	2483.50	50.92	54.00	3.08	1.00 V	348	54.22	28.2	5.10	-36.6	-3.30
3	4924.00	56.11	74.00	17.89	1.00 V	96	52.31	33.0	7.00	-36.2	3.80
3	4924.00	47.82	54.00	6.18	1.00 V	96	44.02	33.0	7.00	-36.2	3.80
4	7386.00	56.24	74.00	17.76	1.00 V	35	46.84	36.2	8.50	-35.3	9.40
4	7386.00	45.00	54.00	9.00	1.00 V	35	35.60	36.2	8.50	-35.3	9.40
5	9848.00	60.00	74.00	14.00	1.00 V	37	47.40	37.3	10.10	-34.8	12.60
5	9848.00	50.26	54.00	3.74	1.00 V	37	37.66	37.3	10.10	-34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency
 7. For Wireless 802.11g mode at 54Mbps.

802.11n (20MHz) Channel 1

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	56.96	PK	74.00	17.04	1.00 H	144	60.26	28.3	5.00	36.6	-3.30
1	2390.00	44.33	AV	54.00	9.67	1.00 H	144	47.63	28.3	5.00	36.6	-3.30
2	*2412.00	98.38	PK			1.00 H	256	101.68	28.3	5.00	36.6	-3.30
2	*2412.00	81.55	AV			1.00 H	256	84.85	28.3	5.00	36.6	-3.30
3	4824.00	48.25	PK	74.00	25.75	1.00 H	88	44.45	32.7	7.30	36.2	3.80
3	4824.00	40.00	AV	54.00	14.00	1.00 H	88	36.20	32.7	7.30	36.2	3.80
4	7236.00	54.36	PK	74.00	19.64	1.00 H	331	44.96	35.8	8.90	35.3	9.40
4	7236.00	45.22	AV	54.00	8.78	1.00 H	331	35.82	35.8	8.90	35.3	9.40
5	9648.00	59.68	PK	74.00	14.32	1.00 H	105	47.08	37.2	10.20	34.8	12.60
5	9648.00	49.25	AV	54.00	4.75	1.00 H	105	36.65	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	69.20	PK	74.00	4.80	1.00 V	125	72.50	28.3	5.00	36.6	-3.30
1	2390.00	50.90	AV	54.00	3.10	1.00 V	125	54.20	28.3	5.00	36.6	-3.30
2	*2412.00	112.09	PK			1.00 V	236	115.39	28.3	5.00	36.6	-3.30
2	*2412.00	95.33	AV			1.00 V	236	98.63	28.3	5.00	36.6	-3.30
3	4824.00	50.23	PK	74.00	23.77	1.00 V	179	46.43	32.7	7.30	36.2	3.80
3	4824.00	42.02	AV	54.00	11.98	1.00 V	179	38.22	32.7	7.30	36.2	3.80
4	7236.00	56.96	PK	74.00	17.04	1.00 V	313	47.56	35.8	8.90	35.3	9.40
4	7236.00	46.74	AV	54.00	7.26	1.00 V	313	37.34	35.8	8.90	35.3	9.40
5	9648.00	60.23	PK	74.00	13.77	1.00 V	5	47.63	37.2	10.20	34.8	12.60
5	9648.00	50.08	AV	54.00	3.92	1.00 V	5	37.48	37.2	10.20	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. "*" : Fundamental frequency

802.11n (20MHz) Channel 6

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	102.55	PK			1.00 H	223	105.75	28.3	5.10	36.6	-3.20
1	*2437.00	89.47	AV			1.00 H	122	92.67	28.3	5.10	36.6	-3.20
2	4874.00	56.14	PK	74.00	17.86	1.00 H	5	52.74	32.8	7.10	36.5	3.40
2	4874.00	47.58	AV	54.00	6.42	1.00 H	5	44.18	32.8	7.10	36.5	3.40
3	7311.00	58.67	PK	74.00	15.33	1.00 H	124	49.27	36.1	8.60	35.3	9.40
3	7311.00	46.11	AV	54.00	7.89	1.00 H	124	36.71	36.1	8.60	35.3	9.40
4	9748.00	60.56	PK	74.00	13.44	1.00 H	325	47.96	37.2	10.20	34.8	12.60
4	9748.00	49.98	AV	54.00	4.02	1.00 H	325	37.38	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	107.64	PK			1.00 V	125	110.84	28.3	5.10	36.6	-3.20
1	*2437.00	95.47	AV			1.00 V	125	98.67	28.3	5.10	36.6	-3.20
2	4874.00	55.63	PK	74.00	18.37	1.00 V	289	52.23	32.8	7.10	36.5	3.40
2	4874.00	46.85	AV	54.00	7.15	1.00 V	289	43.45	32.8	7.10	36.5	3.40
3	7311.00	58.55	PK	74.00	15.45	1.00 V	0	49.15	36.1	8.60	35.3	9.40
3	7311.00	47.82	AV	54.00	6.18	1.00 V	0	38.42	36.1	8.60	35.3	9.40
4	9748.00	60.28	PK	74.00	13.72	1.00 V	180	47.68	37.2	10.20	34.8	12.60
4	9748.00	50.25	AV	54.00	3.75	1.00 V	180	37.65	37.2	10.20	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. "*" : Fundamental frequency

802.11n (20MHz) Channel 11

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	99.01	PK			1.00 H	122	102.31	28.2	5.10	36.6	-3.30
1	*2462.00	82.48	AV			1.00 H	122	85.78	28.2	5.10	36.6	-3.30
2	2483.50	60.79	PK	74.00	13.21	1.00 H	300	64.09	28.2	5.10	36.6	-3.30
2	2483.50	43.98	AV	54.00	10.02	1.00 H	300	47.28	28.2	5.10	36.6	-3.30
3	4924.00	54.55	PK	74.00	19.45	1.00 H	156	50.75	33.0	7.00	36.2	3.80
3	4924.00	40.29	AV	54.00	13.71	1.00 H	156	36.49	33.0	7.00	36.2	3.80
4	7386.00	58.00	PK	74.00	16.00	1.00 H	334	48.60	36.2	8.50	35.3	9.40
4	7386.00	47.69	AV	54.00	6.31	1.00 H	334	38.29	36.2	8.50	35.3	9.40
5	9848.00	61.23	PK	74.00	12.77	1.00 H	278	48.63	37.3	10.10	34.8	12.60
5	9848.00	50.07	AV	54.00	3.93	1.00 H	278	37.47	37.3	10.10	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2462.00	112.80	PK			1.00 V	125	116.10	28.2	5.10	36.6	-3.30
1	*2462.00	92.96	AV			1.00 V	125	96.26	28.2	5.10	36.6	-3.30
2	2483.50	70.05	PK	74.00	3.95	1.00 V	189	73.35	28.2	5.10	36.6	-3.30
2	2483.50	50.24	AV	54.00	3.76	1.00 V	189	53.54	28.2	5.10	36.6	-3.30
3	4924.00	56.26	PK	74.00	17.74	1.00 V	347	52.46	33.0	7.00	36.2	3.80
3	4924.00	48.11	AV	54.00	5.89	1.00 V	347	44.31	33.0	7.00	36.2	3.80
4	7386.00	58.23	PK	74.00	15.77	1.00 V	12	48.83	36.2	8.50	35.3	9.40
4	7386.00	47.63	AV	54.00	6.37	1.00 V	12	38.23	36.2	8.50	35.3	9.40
5	9848.00	60.12	PK	74.00	13.88	1.00 V	208	47.52	37.3	10.10	34.8	12.60
5	9848.00	50.07	AV	54.00	3.93	1.00 V	208	37.47	37.3	10.10	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

802.11n (40MHz) Channel 3

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	59.53	PK	74.00	14.47	1.00 H	236	62.83	28.3	5.00	36.6	-3.30
1	2390.00	42.51	AV	54.00	11.49	1.00 H	236	45.81	28.3	5.00	36.6	-3.30
2	*2422.00	94.02	PK			1.00 H	100	97.32	28.3	5.00	36.6	-3.30
2	*2422.00	75.18	AV			1.00 H	100	78.48	28.3	5.00	36.6	-3.30
3	4844.00	54.98	PK	74.00	19.02	1.00 H	197	51.18	32.7	7.30	36.2	3.80
3	4844.00	40.11	AV	54.00	13.89	1.00 H	197	36.31	32.7	7.30	36.2	3.80
4	7266.00	58.36	PK	74.00	15.64	1.00 H	306	48.96	35.8	8.90	35.3	9.40
4	7266.00	47.25	AV	54.00	6.75	1.00 H	306	37.85	35.8	8.90	35.3	9.40
5	9688.00	60.00	PK	74.00	14.00	1.00 H	17	47.40	37.2	10.20	34.8	12.60
5	9688.00	49.00	AV	54.00	5.00	1.00 H	17	36.40	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2390.00	70.83	PK	74.00	3.17	1.00 V	122	74.13	28.3	5.00	36.6	-3.30
1	2390.00	50.46	AV	54.00	3.54	1.00 V	122	53.76	28.3	5.00	36.6	-3.30
2	*2422.00	108.32	PK			1.00 V	189	111.62	28.3	5.00	36.6	-3.30
2	*2422.00	90.93	AV			1.00 V	189	94.23	28.3	5.00	36.6	-3.30
3	4844.00	56.03	PK	74.00	17.97	1.00 V	257	52.23	32.7	7.30	36.2	3.80
3	4844.00	45.11	AV	54.00	8.89	1.00 V	257	41.31	32.7	7.30	36.2	3.80
4	7266.00	58.69	PK	74.00	15.31	1.00 V	155	49.29	35.8	8.90	35.3	9.40
4	7266.00	47.82	AV	54.00	6.18	1.00 V	155	38.42	35.8	8.90	35.3	9.40
5	9688.00	60.56	PK	74.00	13.44	1.00 V	334	47.96	37.2	10.20	34.8	12.60
5	9688.00	50.04	AV	54.00	3.96	1.00 V	334	37.44	37.2	10.20	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. “* “: Fundamental frequency

802.11n (40MHz) Channel 6

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	99.15	PK			1.00 H	100	102.35	28.3	5.10	36.6	-3.20
1	*2437.00	84.36	AV			1.00 H	100	87.56	28.3	5.10	36.6	-3.20
2	4874.00	55.89	PK	74.00	18.11	1.00 H	198	52.49	32.3	7.60	36.5	3.40
2	4874.00	46.23	AV	54.00	7.77	1.00 H	198	42.83	32.3	7.60	36.5	3.40
3	7311.00	57.85	PK	74.00	16.15	1.00 H	203	48.45	36.1	8.60	35.3	9.40
3	7311.00	46.89	AV	54.00	7.11	1.00 H	203	37.49	36.1	8.60	35.3	9.40
4	9748.00	60.91	PK	74.00	13.09	1.00 H	56	48.31	37.2	10.20	34.8	12.60
4	9748.00	50.17	AV	54.00	3.83	1.00 H	56	37.57	37.2	10.20	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2437.00	109.14	PK			1.00 V	122	112.34	28.3	5.10	36.6	-3.20
1	*2437.00	96.51	AV			1.00 V	122	99.71	28.3	5.10	36.6	-3.20
2	4874.00	55.99	PK	74.00	18.01	1.00 V	96	52.59	32.3	7.60	36.5	3.40
2	4874.00	46.97	AV	54.00	7.03	1.00 V	96	43.57	32.3	7.60	36.5	3.40
3	7311.00	57.36	PK	74.00	16.64	1.00 V	26	47.96	36.1	8.60	35.3	9.40
3	7311.00	46.57	AV	54.00	7.43	1.00 V	26	37.17	36.1	8.60	35.3	9.40
4	9748.00	60.79	PK	74.00	13.21	1.00 V	299	48.19	37.2	10.20	34.8	12.60
4	9748.00	50.07	AV	54.00	3.93	1.00 V	299	37.47	37.2	10.20	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. “*”: Fundamental frequency

802.11n (40MHz) Channel 9

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2452.00	97.62	PK			1.00 H	125	100.92	28.2	5.20	36.6	-3.20
1	*2452.00	79.66	AV			1.00 H	125	82.96	28.2	5.20	36.6	-3.20
2	2483.50	63.38	PK	74.00	10.62	1.00 H	312	66.68	28.2	5.10	36.6	-3.30
2	2483.50	43.53	AV	54.00	10.47	1.00 H	312	46.83	28.2	5.10	36.6	-3.30
3	4904.00	55.87	PK	74.00	18.13	1.00 H	258	52.07	33.0	7.00	36.2	3.80
3	4904.00	45.23	AV	54.00	8.77	1.00 H	258	41.43	33.0	7.00	36.2	3.80
4	7356.00	58.11	PK	74.00	15.89	1.00 H	12	48.71	36.2	8.50	35.3	9.40
4	7356.00	47.36	AV	54.00	6.64	1.00 H	12	37.96	36.2	8.50	35.3	9.40
5	9808.00	60.25	PK	74.00	13.75	1.00 H	100	47.65	37.3	10.10	34.8	12.60
5	9808.00	50.00	AV	54.00	4.00	1.00 H	100	37.40	37.3	10.10	34.8	12.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	*2452.00	102.05	PK			1.00 V	125	105.35	28.2	5.20	36.6	-3.20
1	*2452.00	86.03	AV			1.00 V	125	89.33	28.2	5.20	36.6	-3.20
2	2483.50	68.26	PK	74.00	5.74	1.00 V	300	71.56	28.2	5.10	36.6	-3.30
2	2483.50	50.94	AV	54.00	3.06	1.00 V	300	54.24	28.2	5.10	36.6	-3.30
3	4904.00	56.01	PK	74.00	17.99	1.00 V	346	52.21	33.0	7.00	36.2	3.80
3	4904.00	46.98	AV	54.00	7.02	1.00 V	346	43.18	33.0	7.00	36.2	3.80
4	7356.00	57.82	PK	74.00	16.18	1.00 V	157	48.42	36.2	8.50	35.3	9.40
4	7356.00	47.96	AV	54.00	6.04	1.00 V	157	38.56	36.2	8.50	35.3	9.40
5	9808.00	60.39	PK	74.00	13.61	1.00 V	287	47.79	37.3	10.10	34.8	12.60
5	9808.00	49.28	AV	54.00	4.72	1.00 V	287	36.68	37.3	10.10	34.8	12.60

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value - Emission level.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

Note:

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor.

Remark: No any other emissions level which are attenuated less than 20dB below the limit

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

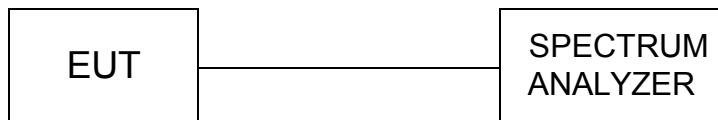
Remark:

- 1). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 2). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.
- 3) Pre-Scan has been conducted to determine the worst-case mode from all possible Combinations between available modulations, data rates and antenna ports, and found the EUT worse case mode: 802.11b (11MHz), 802.11g (54MHz)
- 4) For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the 4th harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4th harmonic.



4.3. 6dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. The testing follows FCC KDB Publication No. 558074 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

LIMIT

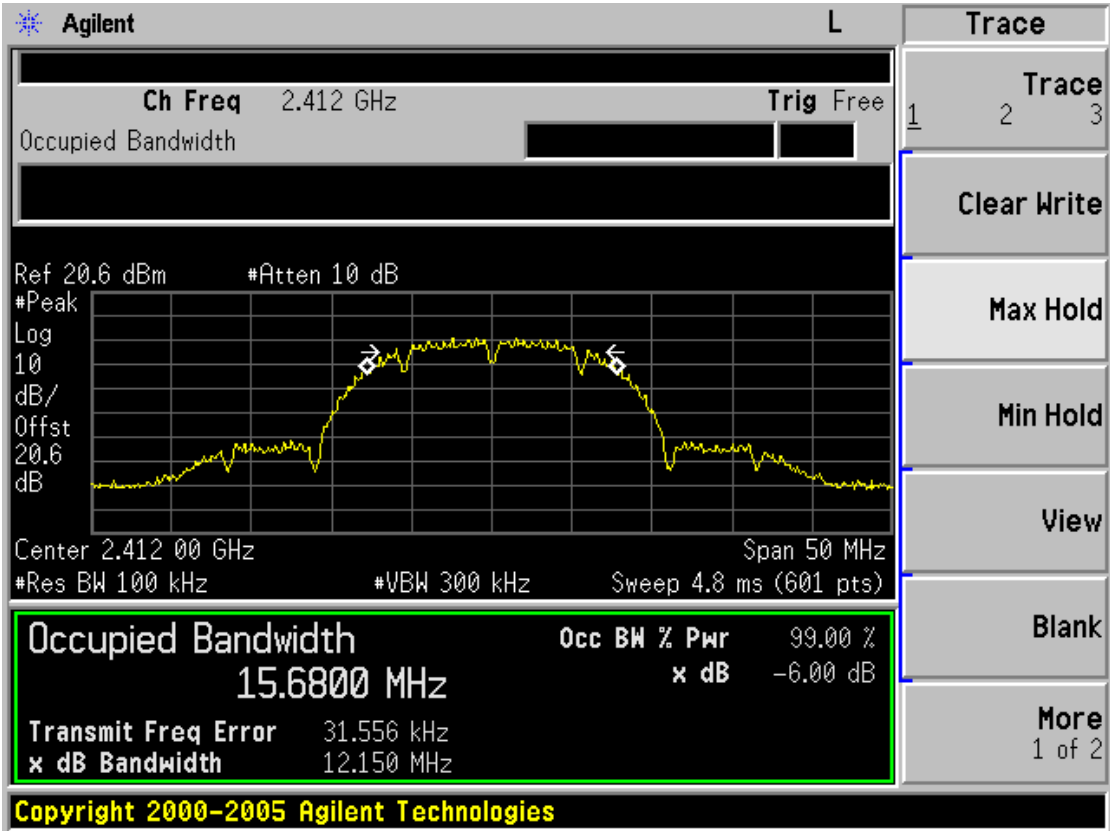
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

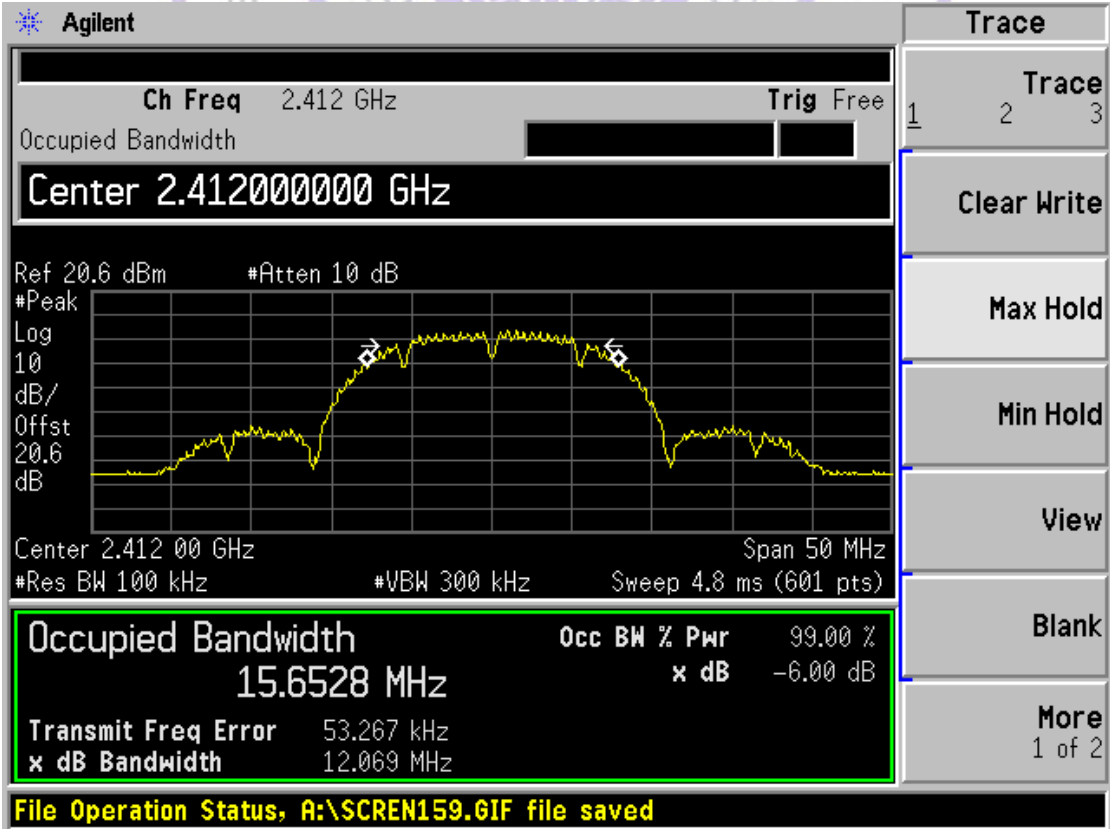
Mode	CHANNEL	6 dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS/FAIL
		Ant 1	Ant 2		
802.11b	1	12.150	12.609	0.5	PASS
	6	13.016	12.116	0.5	PASS
	11	12.131	12.518	0.5	PASS
802.11g	1	16.536	16.442	0.5	PASS
	6	16.552	16.448	0.5	PASS
	11	16.579	16.433	0.5	PASS
802.11n HT20	1	17.807	17.640	0.5	PASS
	6	17.792	17.656	0.5	PASS
	11	17.808	17.686	0.5	PASS
802.11n HT40	3	36.346	36.367	0.5	PASS
	6	36.293	36.156	0.5	PASS
	9	36.380	36.146	0.5	PASS

For 802.11b:

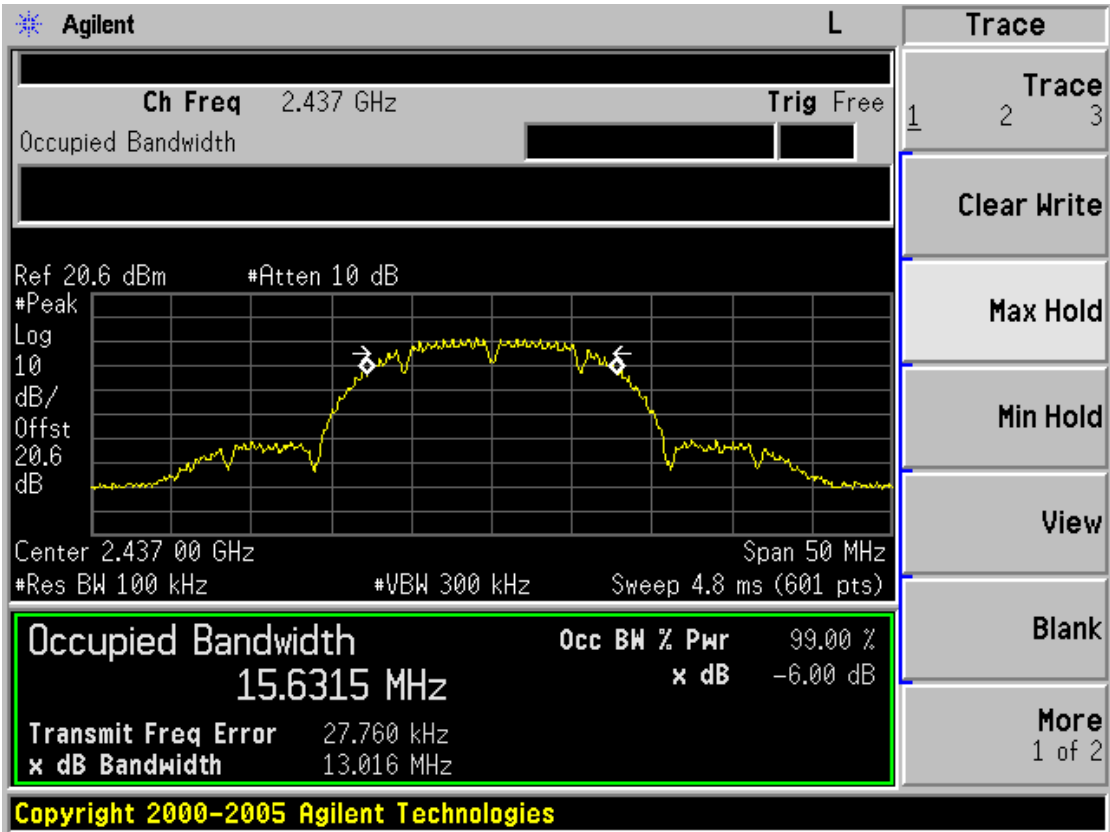
CH1 @ANT 1



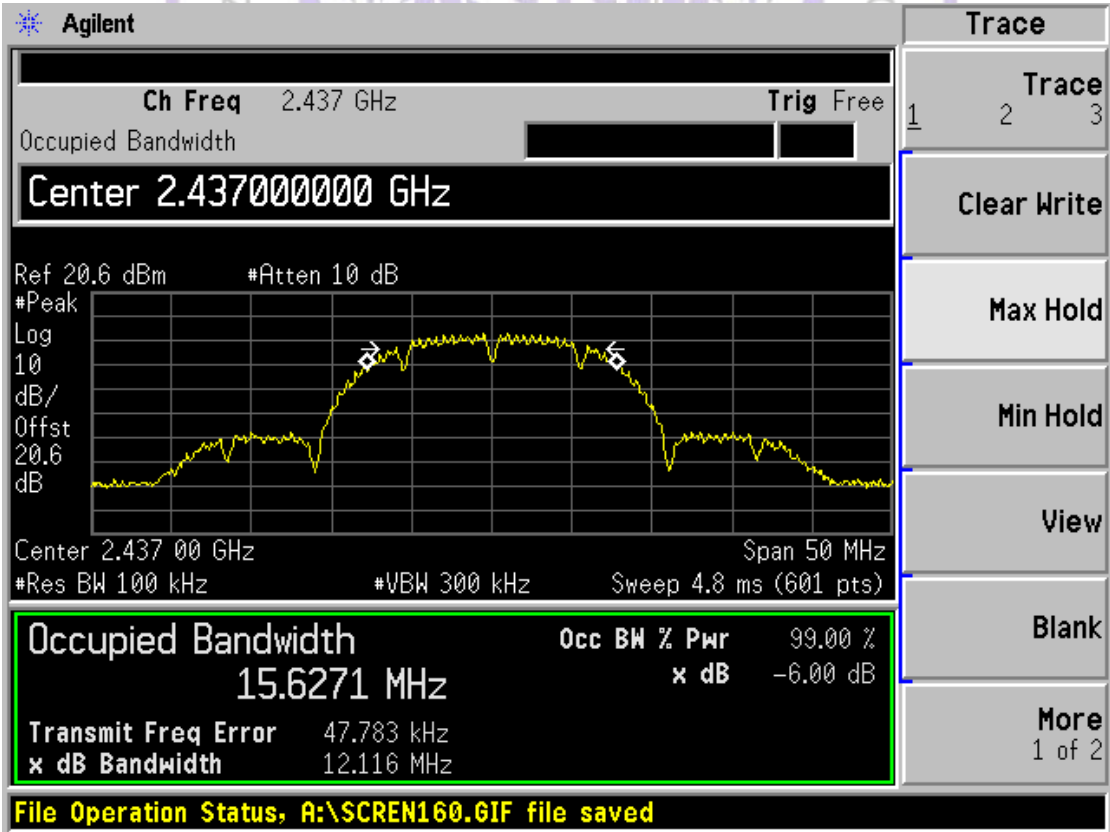
CH2 @ANT 2



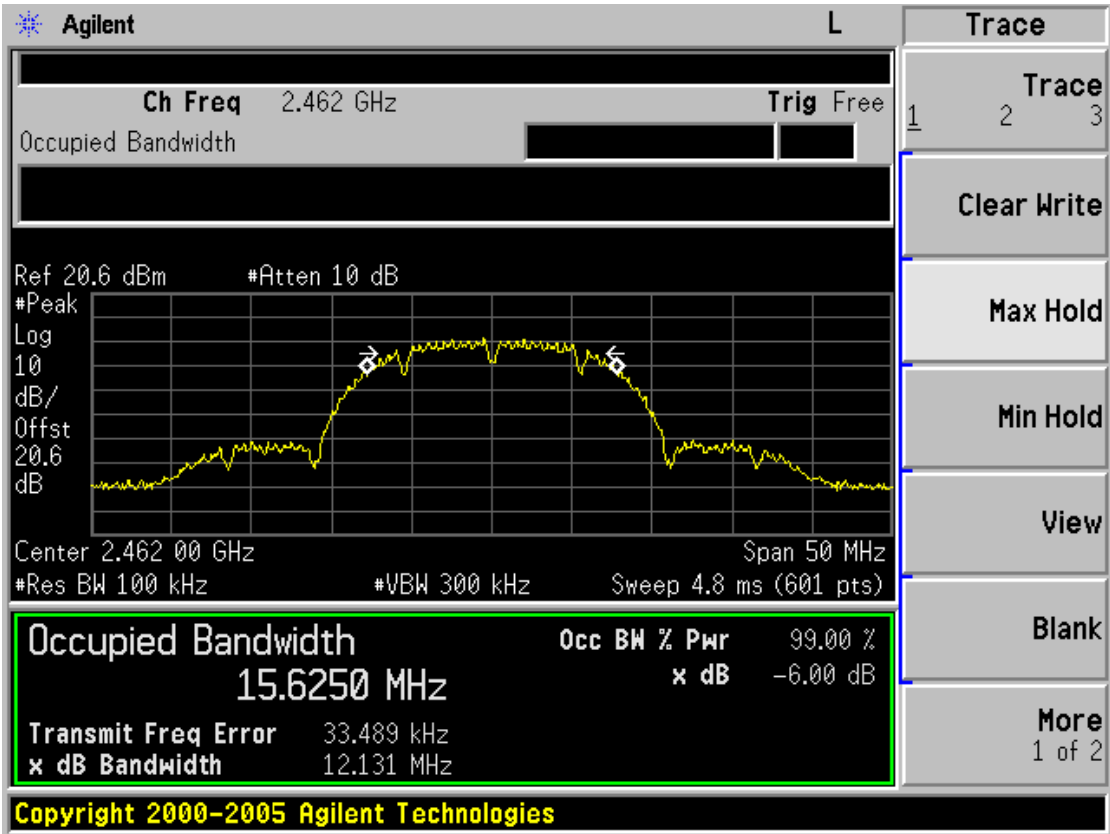
CH6 @ANT 1



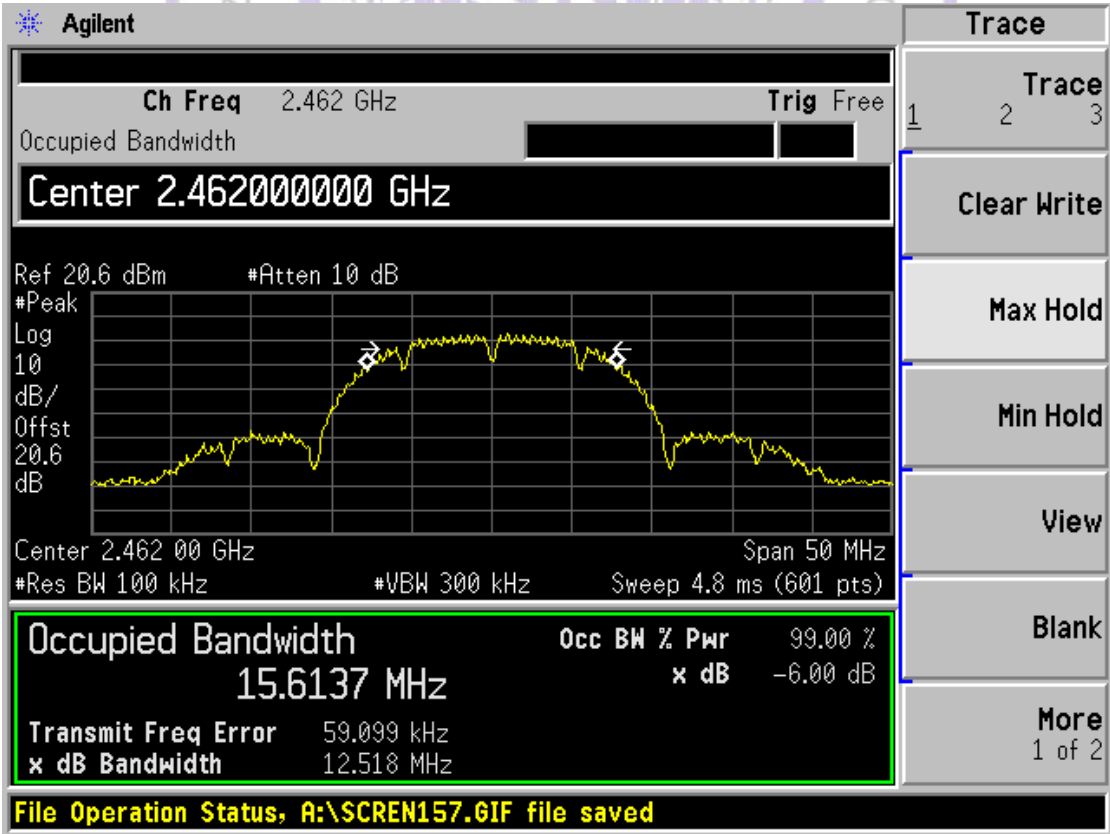
CH6 @ANT 2



CH11 @ANT 1

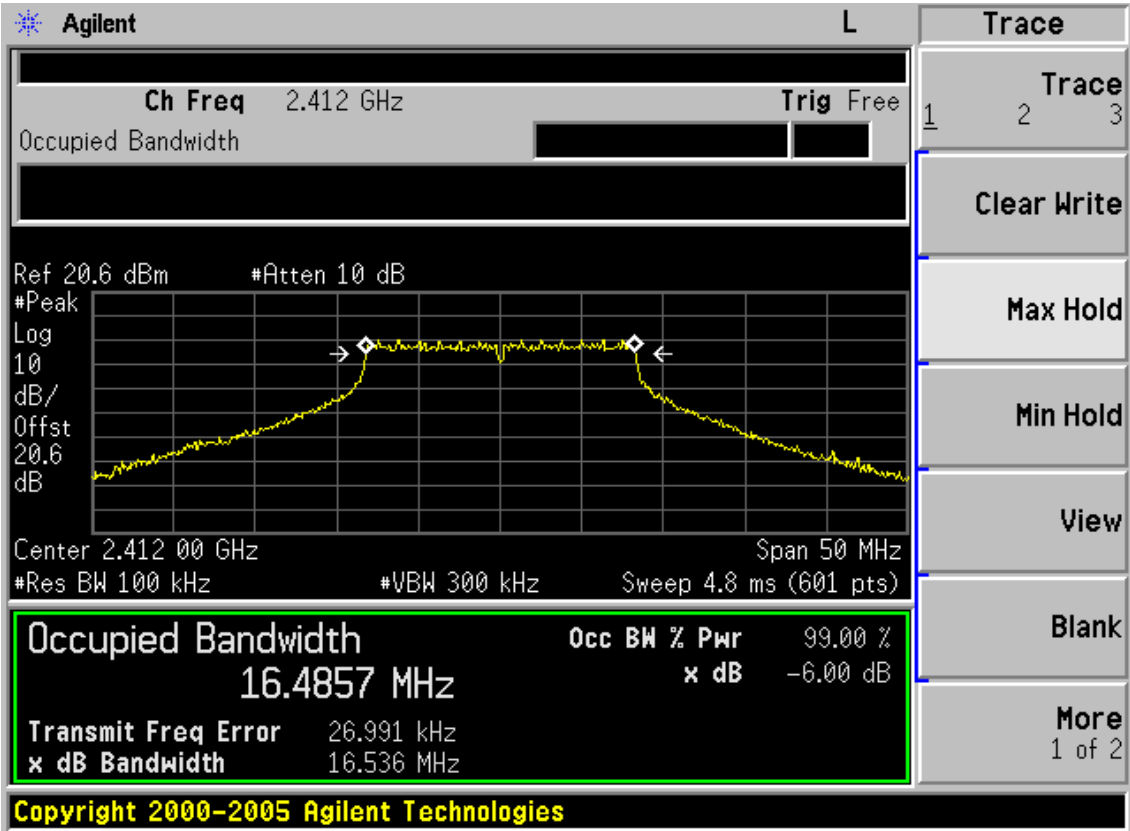


CH11 @ANT 2

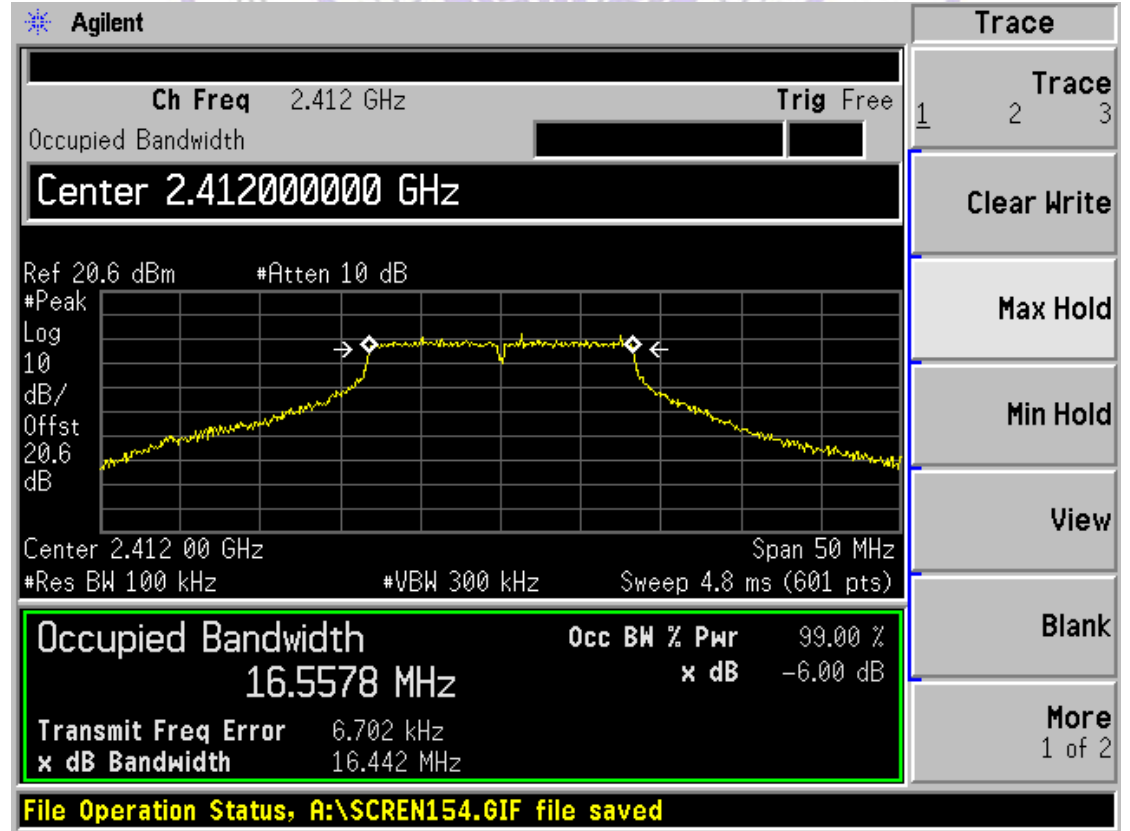


For 802.11g:

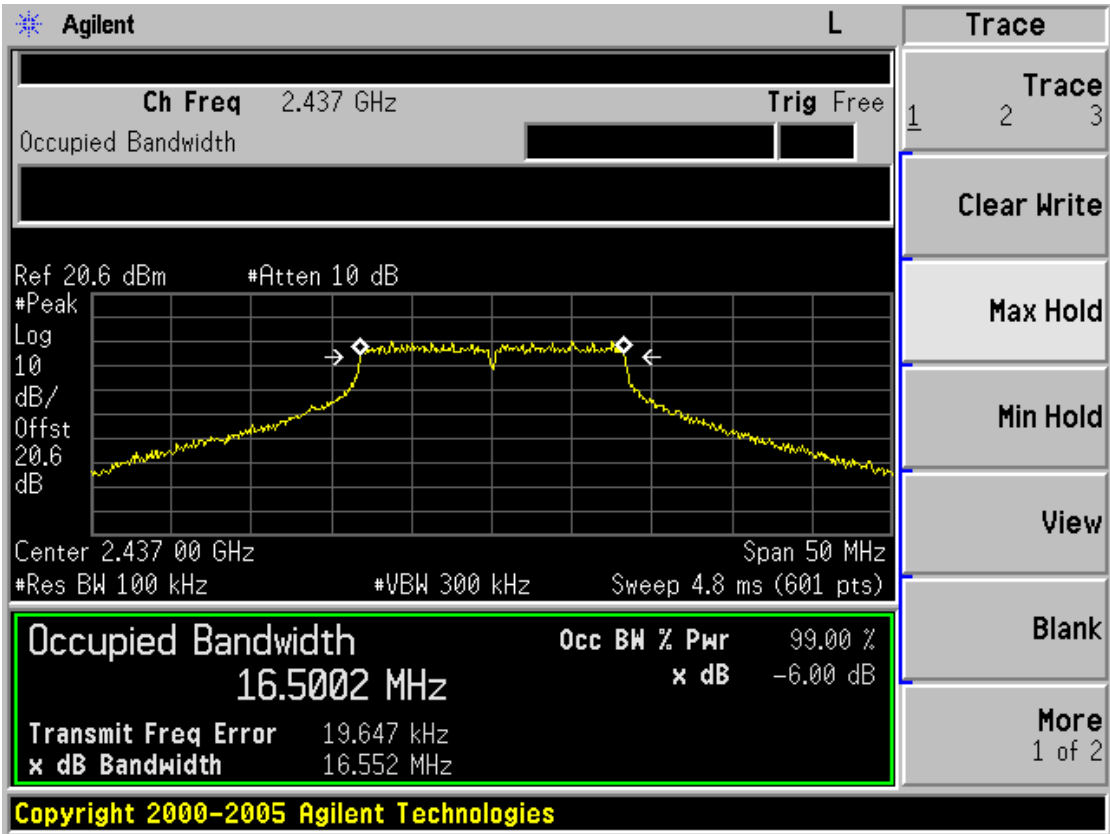
CH1 @ANT 1



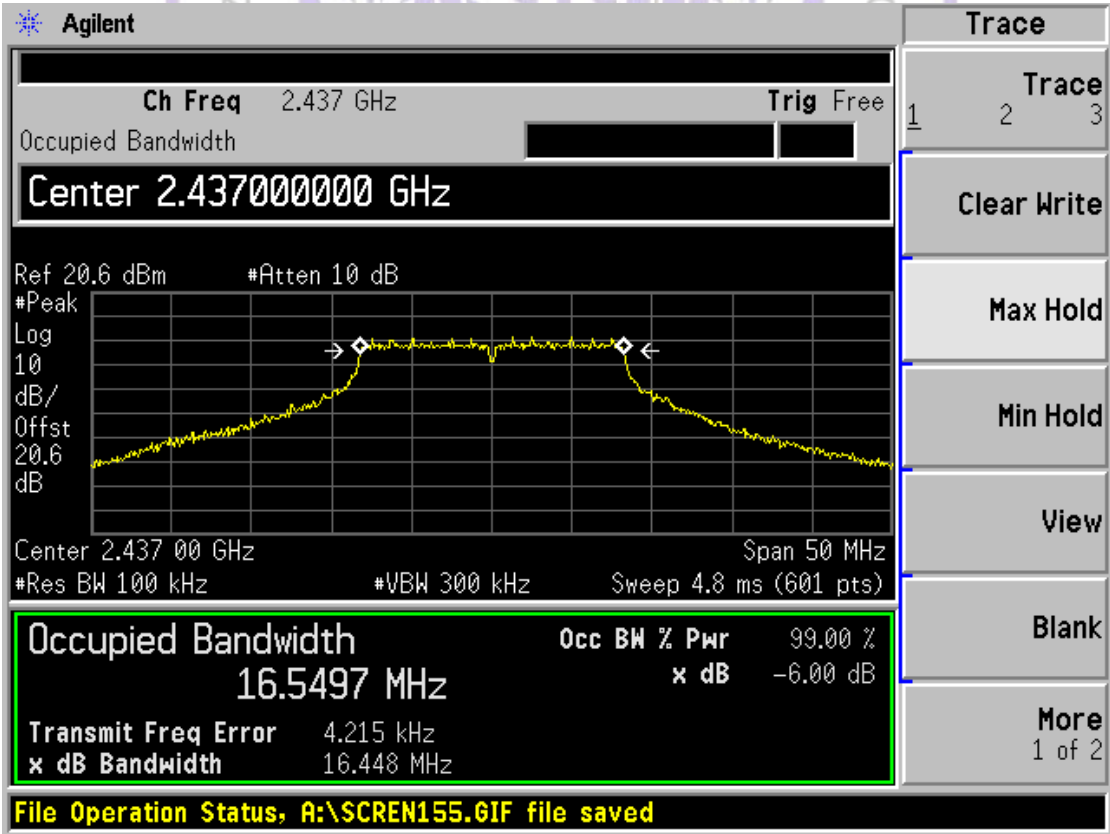
CH1 @ANT 2



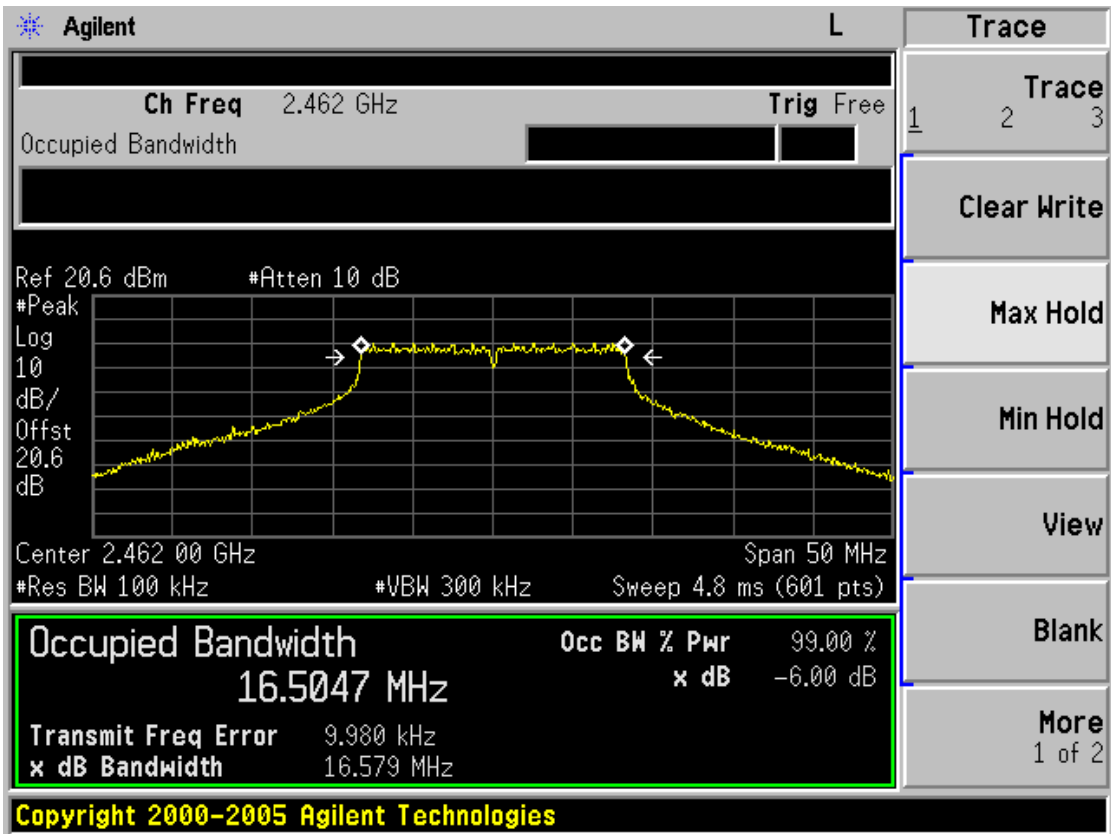
CH6 @ ANT 1



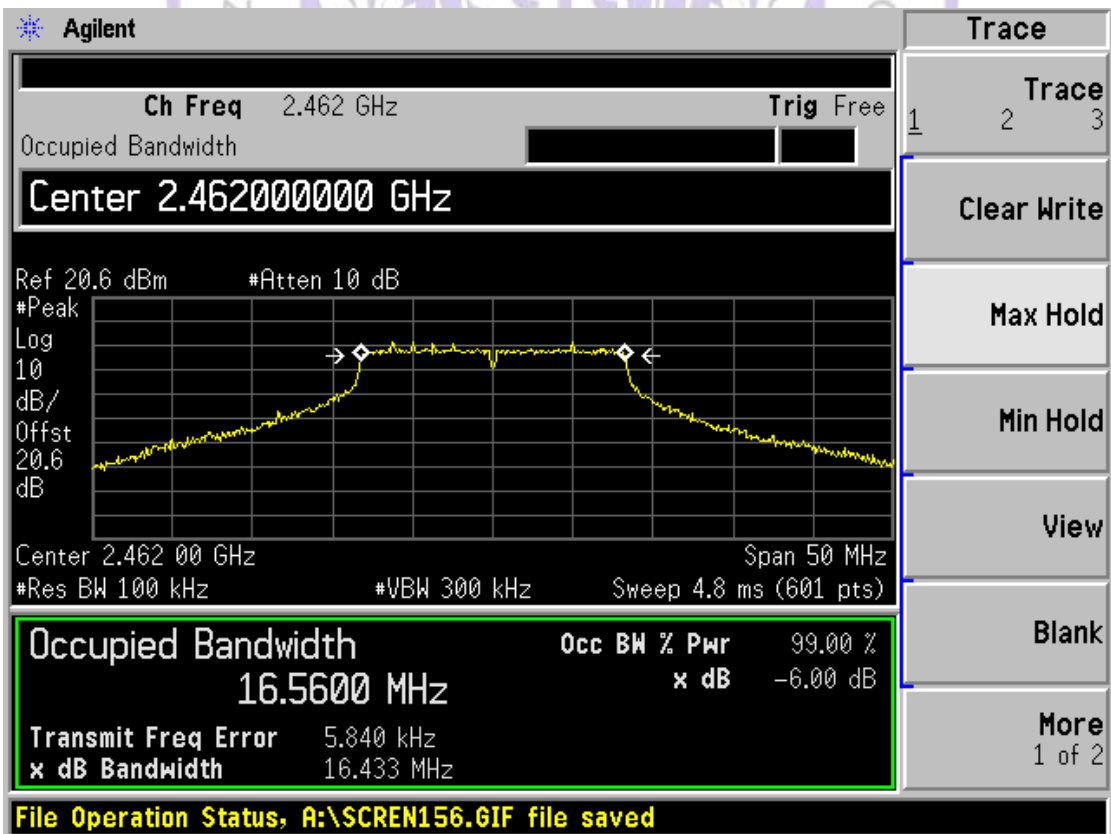
CH6 @ ANT 2



CH11 @ANT 1

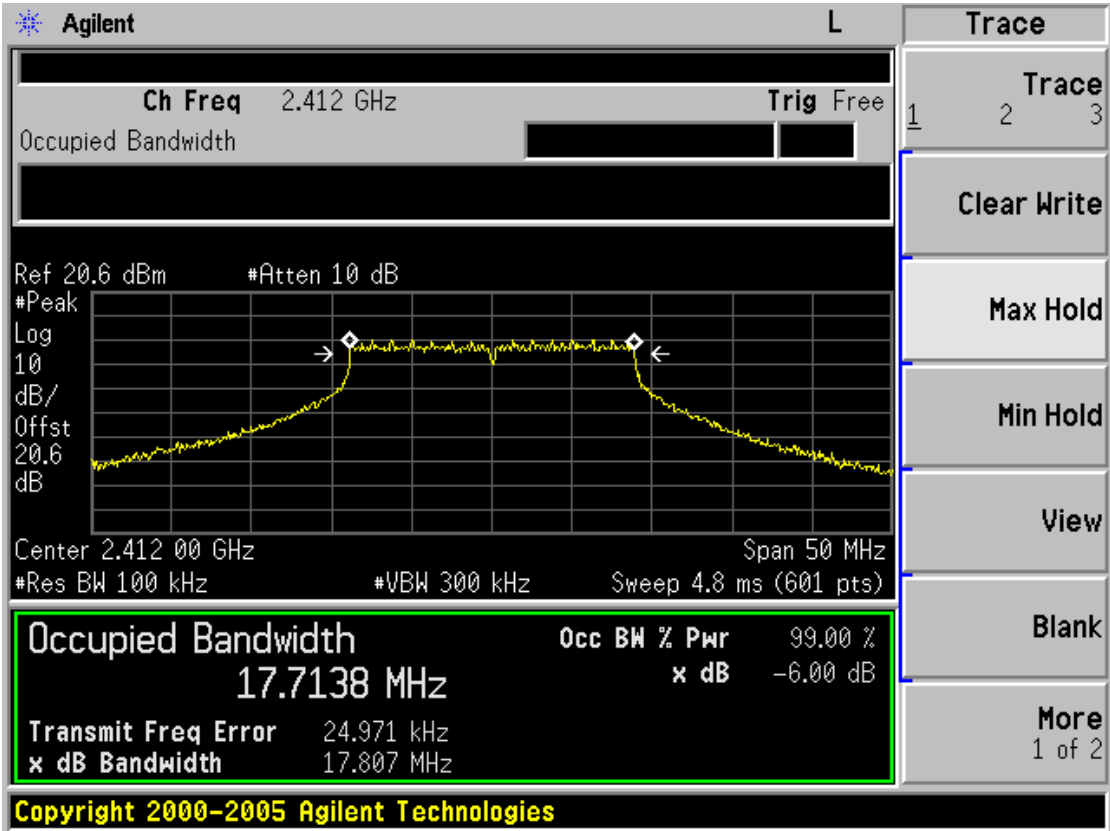


CH11 @ANT 2

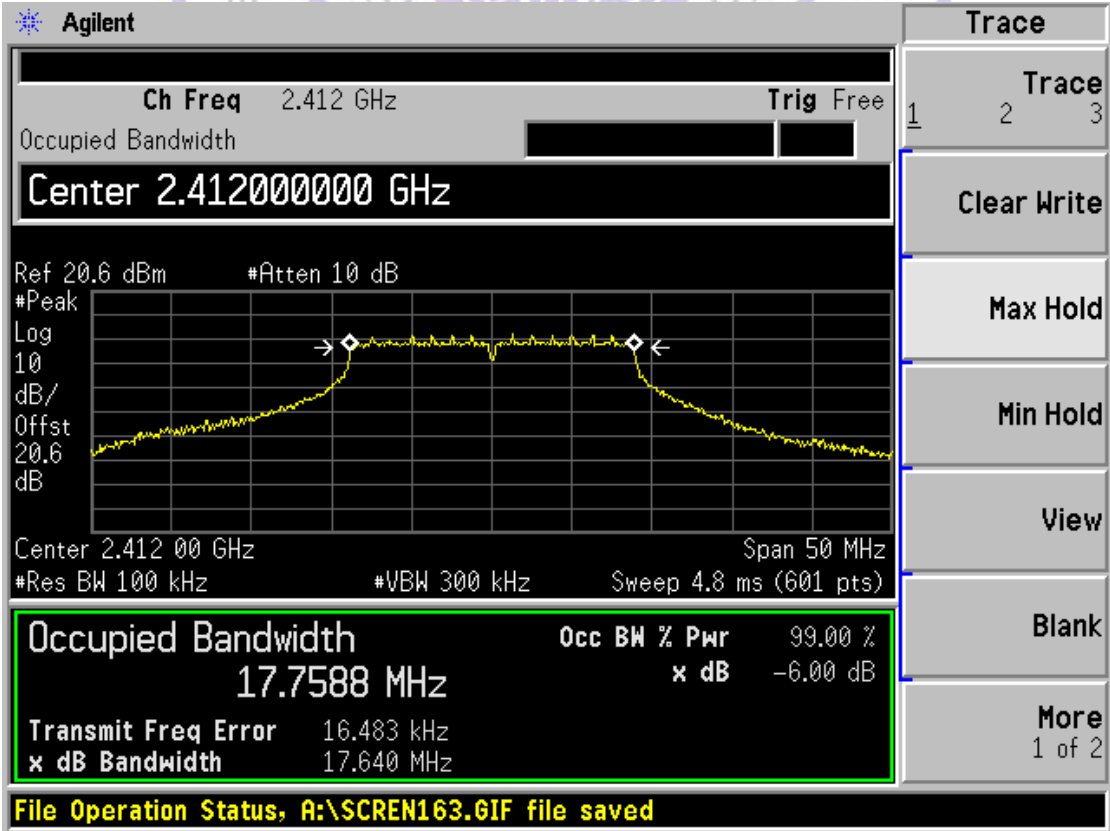


For 802.11n (20MHz) Mode:

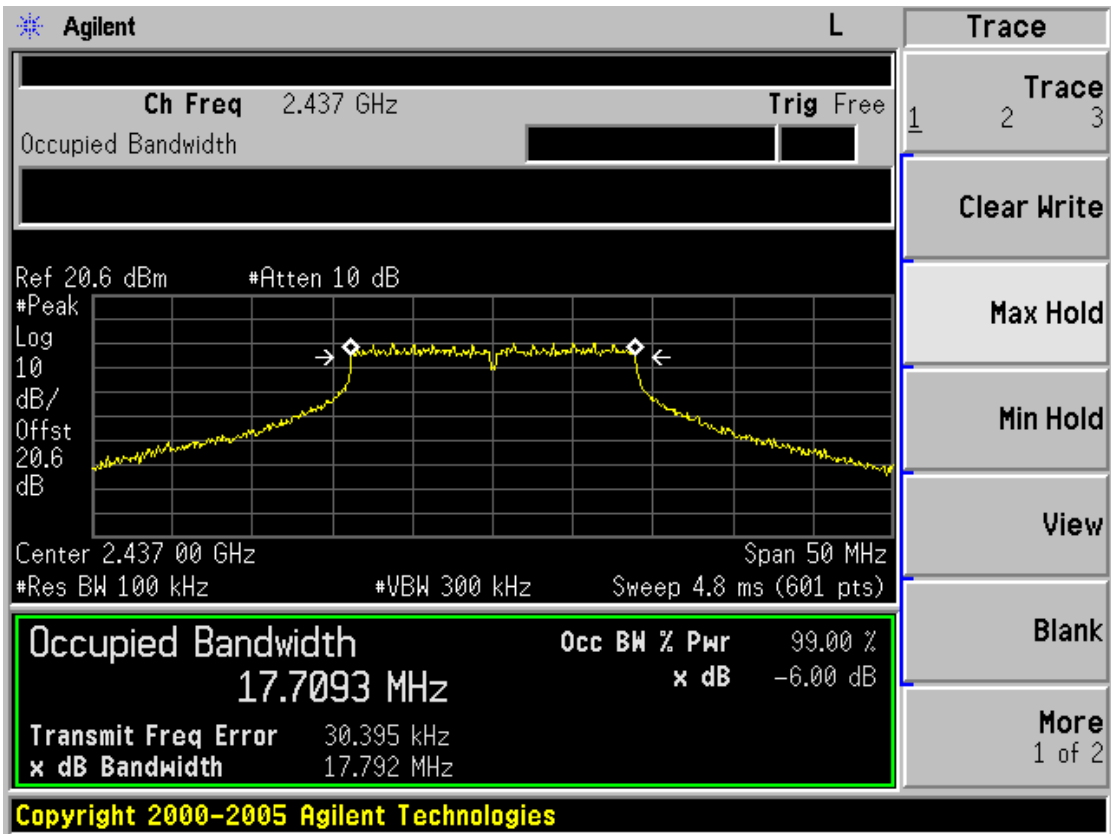
CH1 @ANT 1



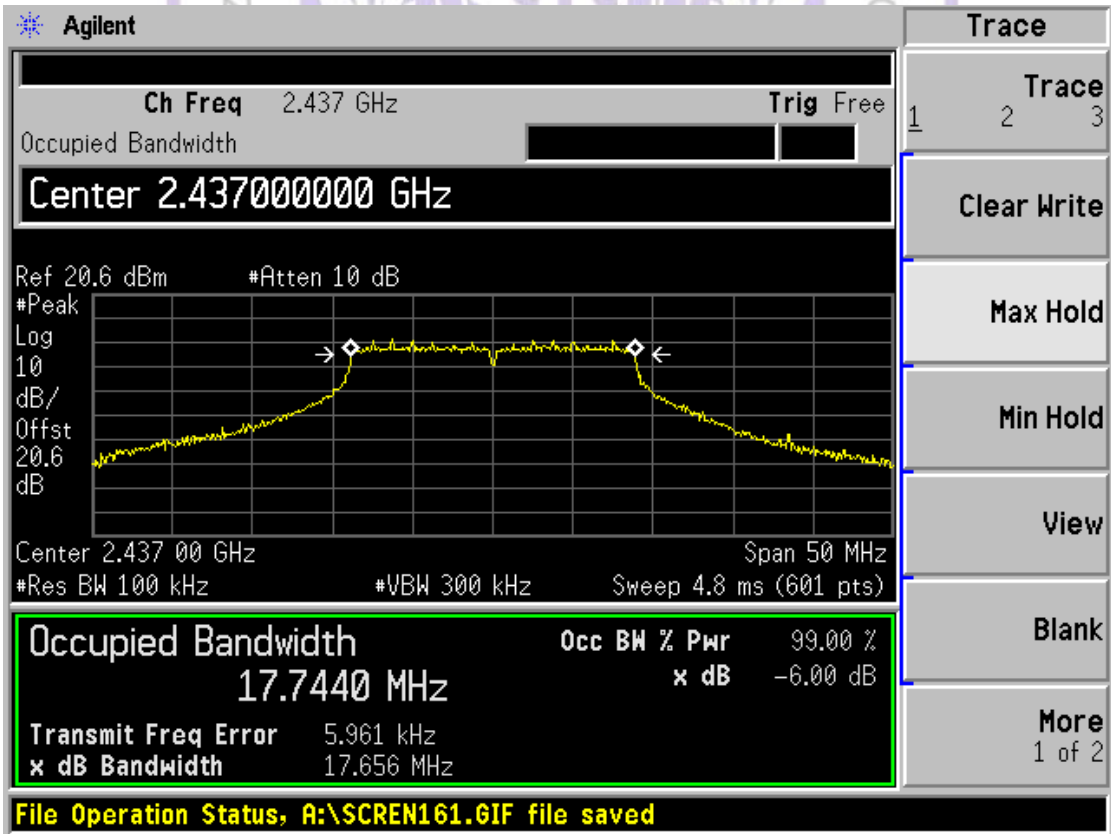
CH1 @ANT 2



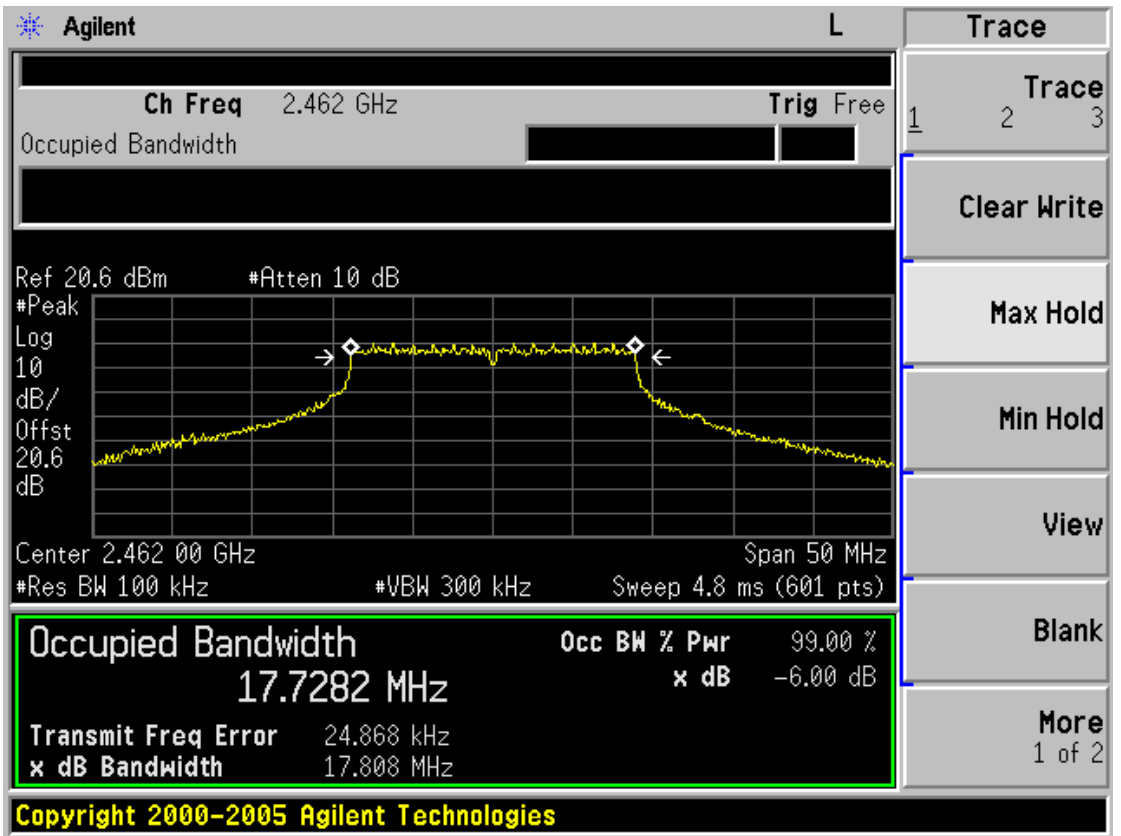
CH6 @ANT 1



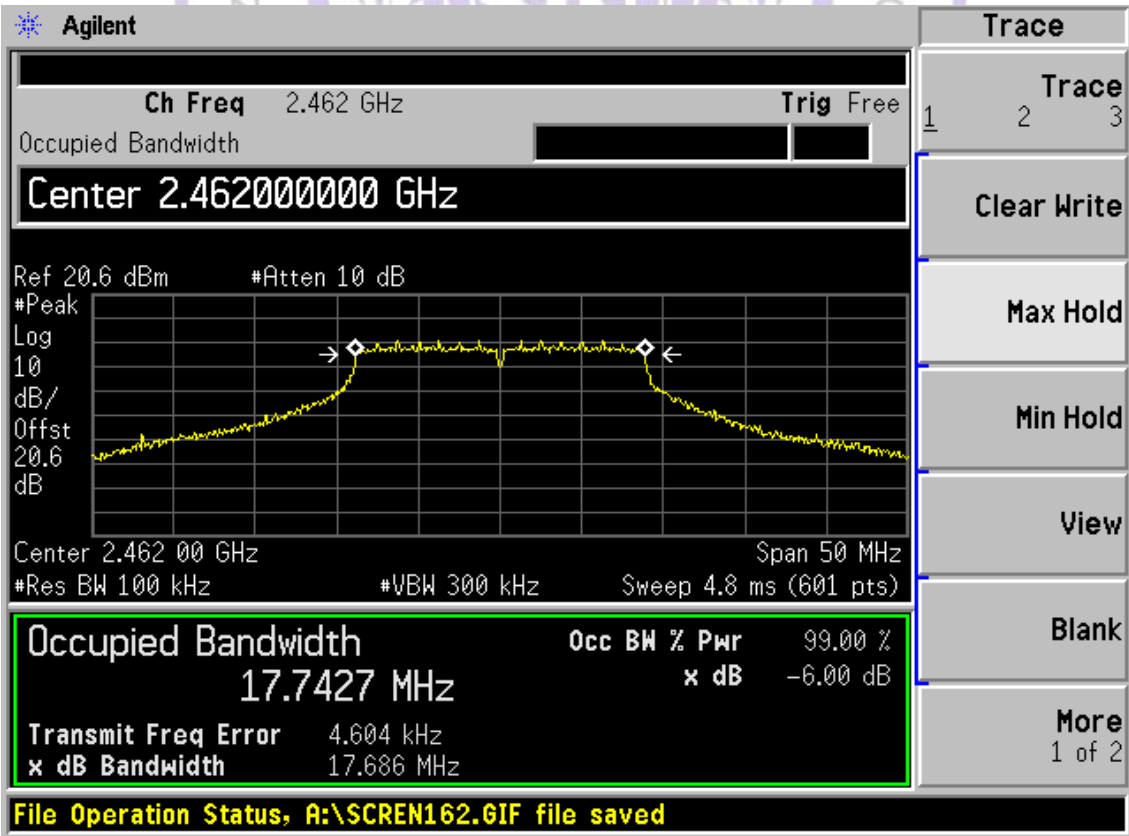
CH6 @ANT 2



CH11 @ANT 1

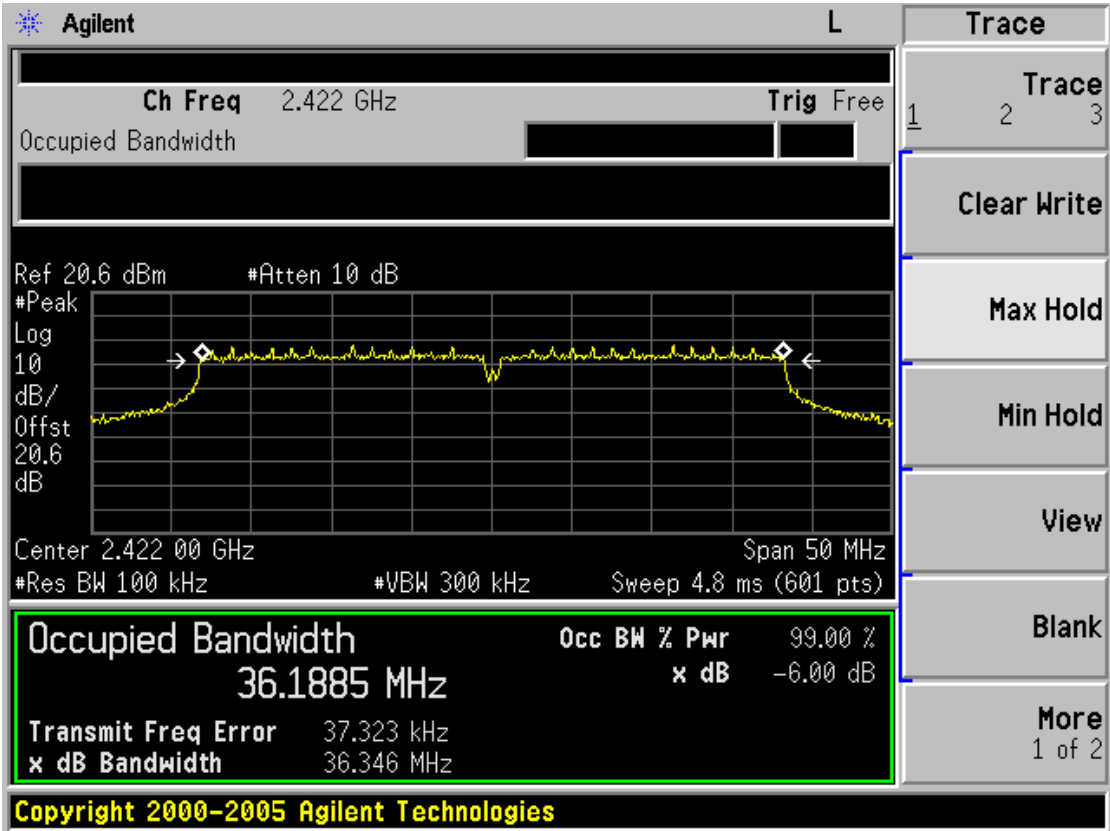


CH11 @ANT 2

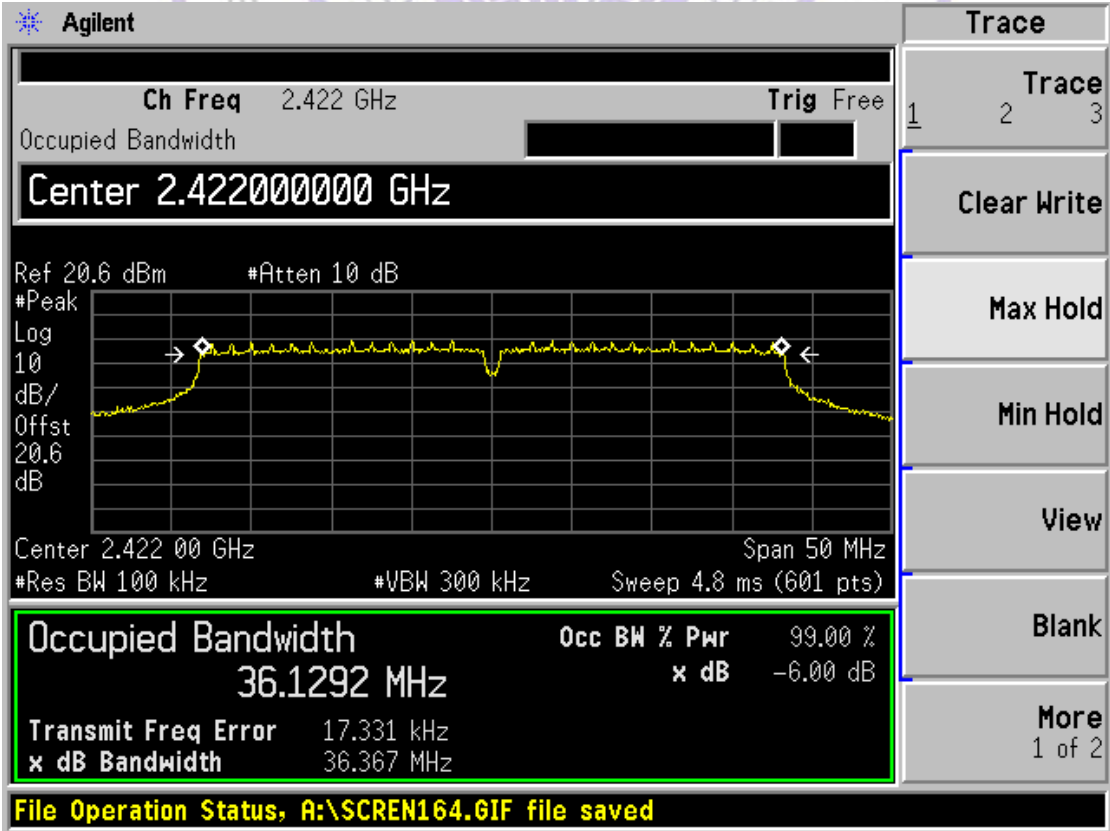


For 802.11n (40MHz) Mode:

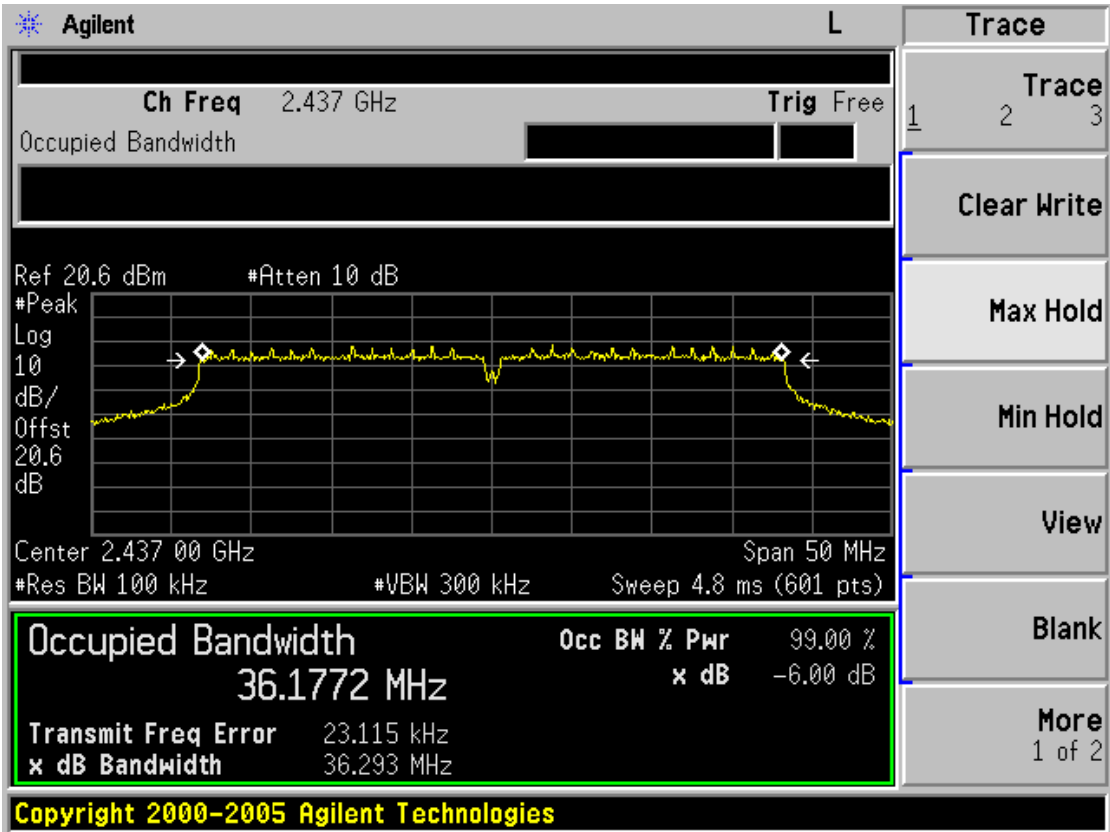
CH3 @ANT 1



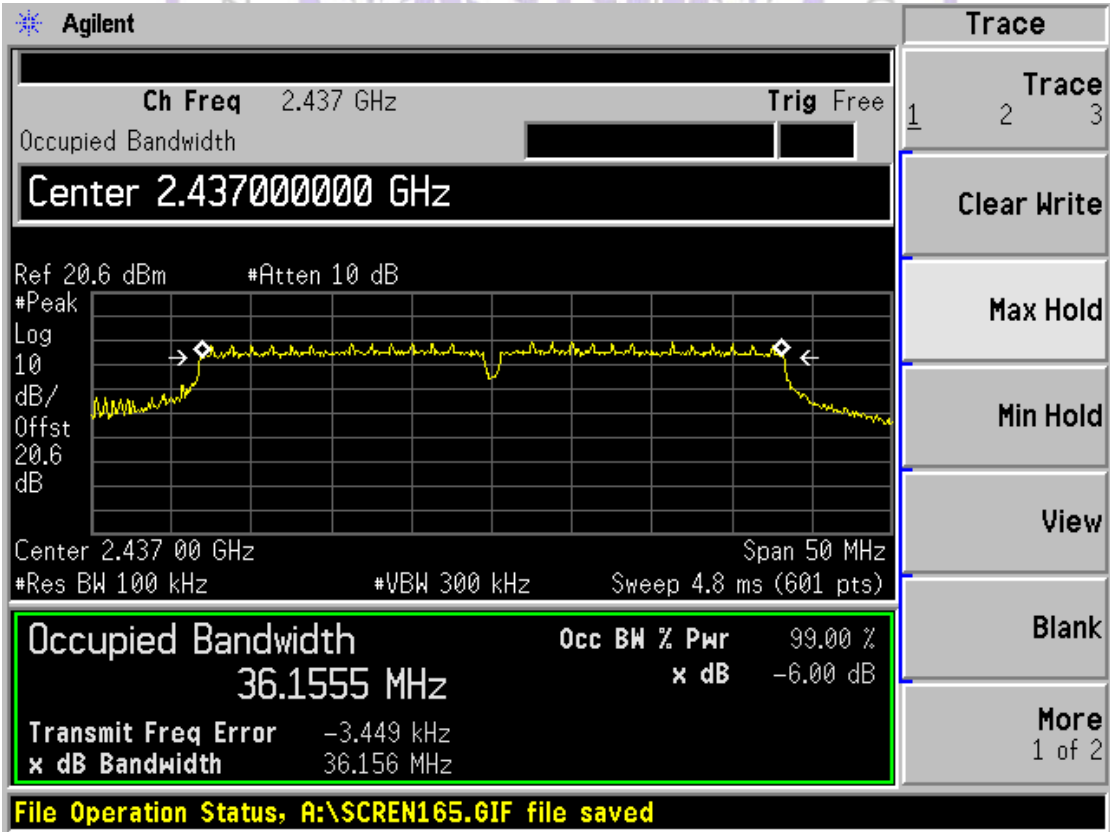
CH3 @ANT 2



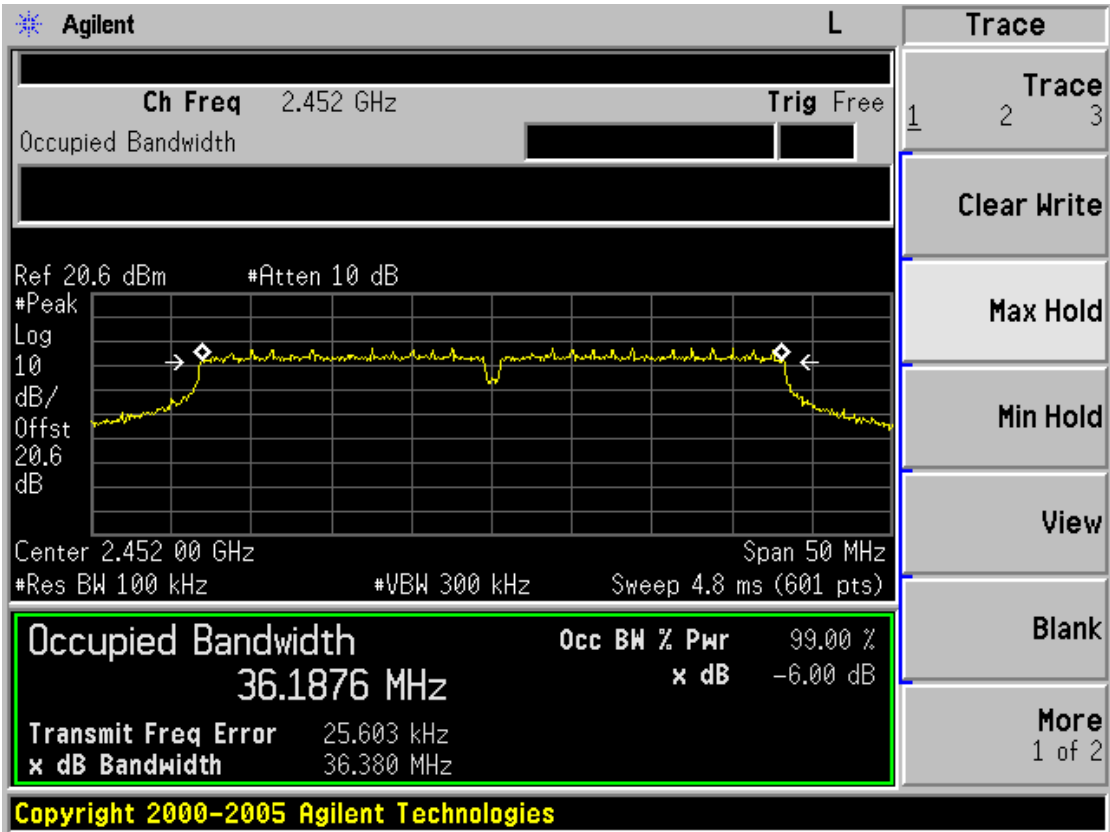
CH6 @ANT 1



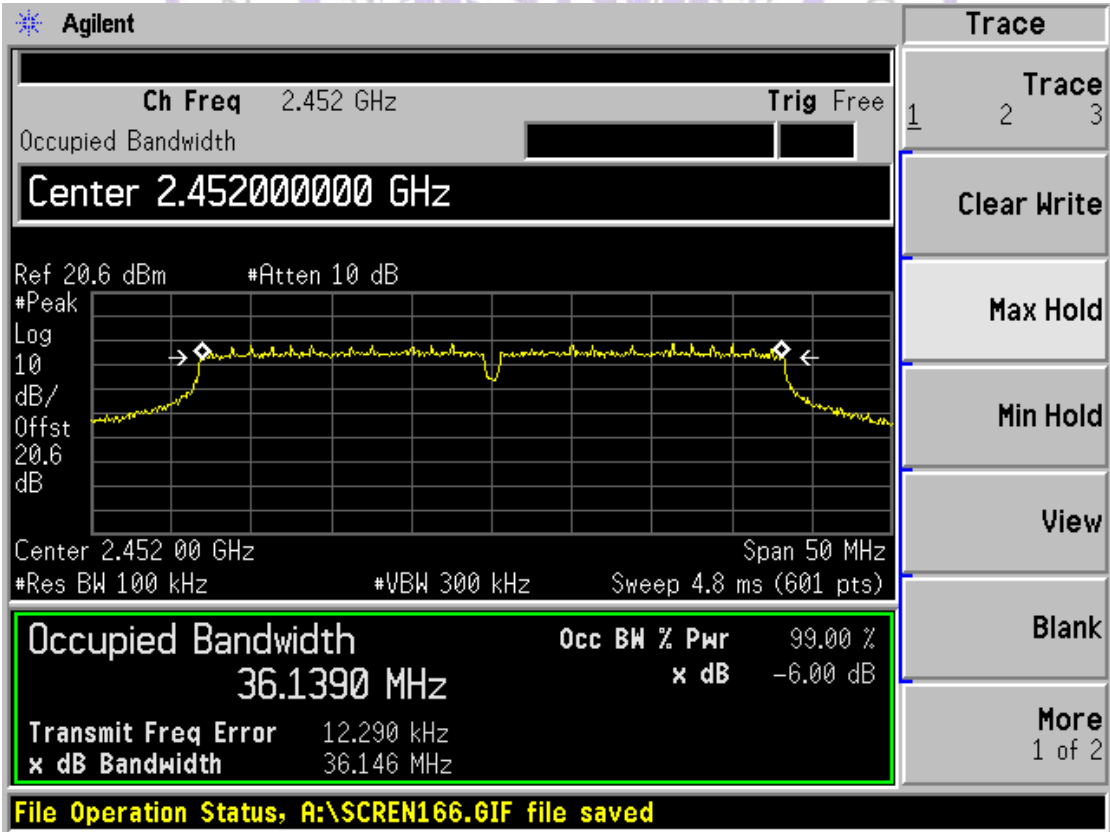
CH6 @ANT 2



CH9 @ANT 1

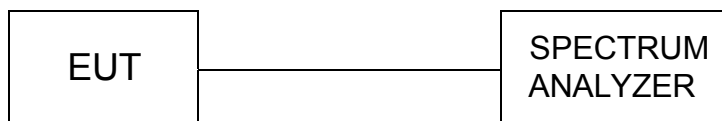


CH9 @ANT 2



4.4. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2009 and KDB558074, The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

1. For IEEE 802.11b/g and IEEE802.11n HT20 mode, use a PK power meter which's bandwidth is above 26dB bandwidth of signal to measure out each test modes' PK output power.
2. Spectrum analyzer only used for 802.11n HT40 measurement.

LIMIT

The Peak Output Power Measurement limits are 30dBm.

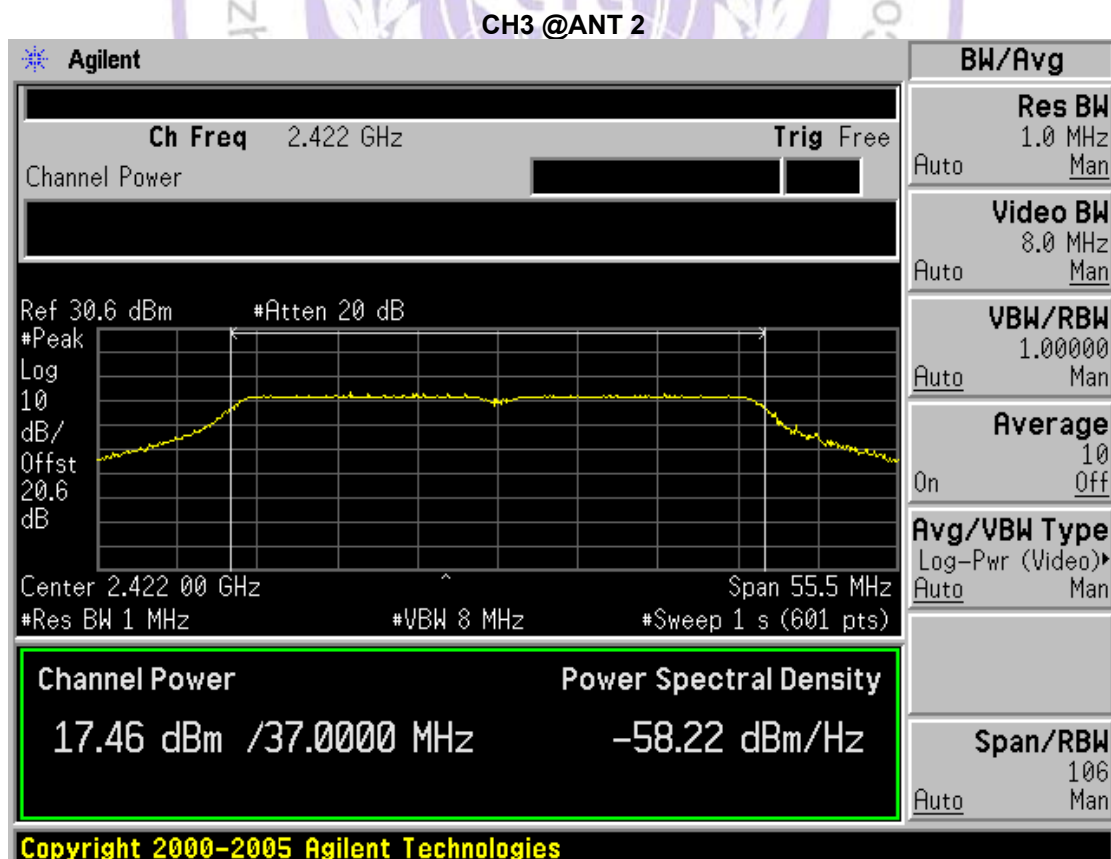
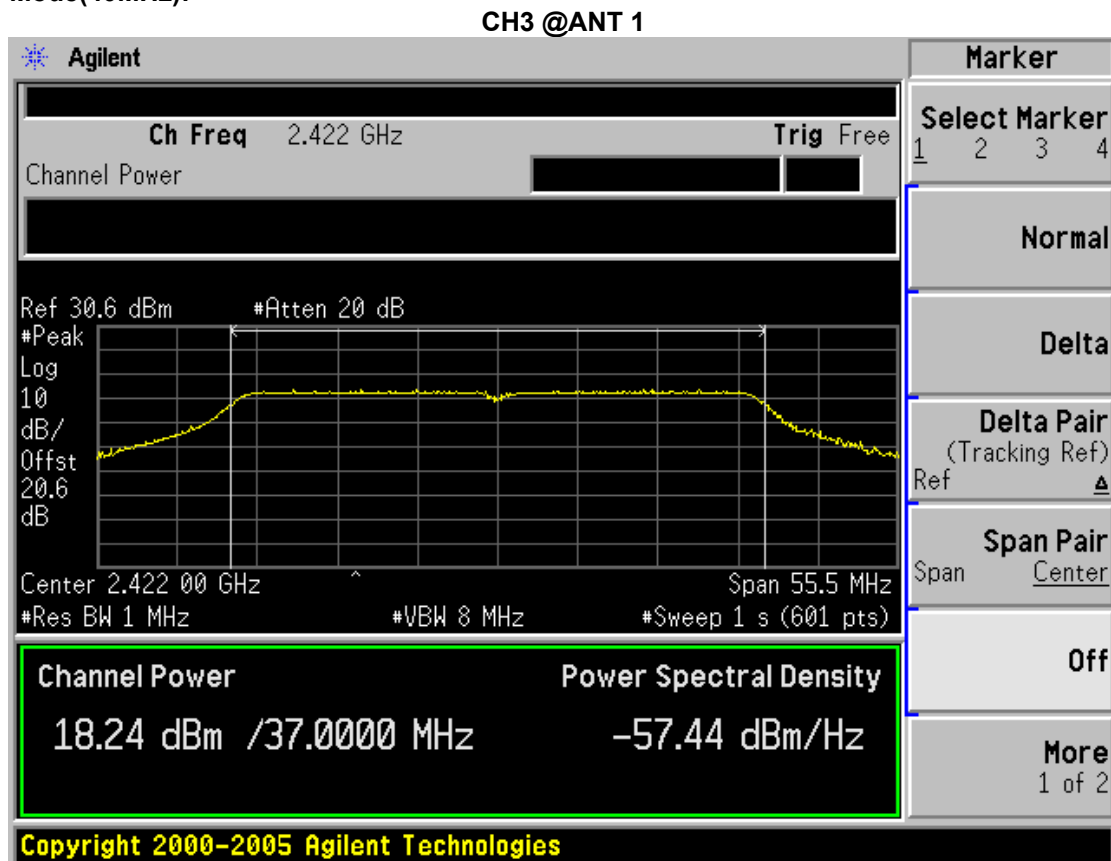
TEST RESULTS

Mode	Channel	Peak Power Output (dBm)			Peak Power Limit (dBm)	PASS / FAIL
		Ant1	Ant 2	Total		
802.11b	1	20.72	20.67	N/A	30	PASS
	6	22.39	20.77	N/A	30	PASS
	11	22.55	21.14	N/A	30	PASS
802.11g	1	19.90	19.13	N/A	30	PASS
	6	24.27	22.80	N/A	30	PASS
	11	20.75	19.37	N/A	30	PASS
802.11n HT20	1	20.64	19.95	23.32	30	PASS
	6	24.14	22.24	26.30	30	PASS
	11	22.24	21.25	24.78	30	PASS
802.11n HT40	3	18.24	17.46	20.88	30	PASS
	6	23.60	21.87	25.83	30	PASS
	9	16.14	14.32	18.33	30	PASS

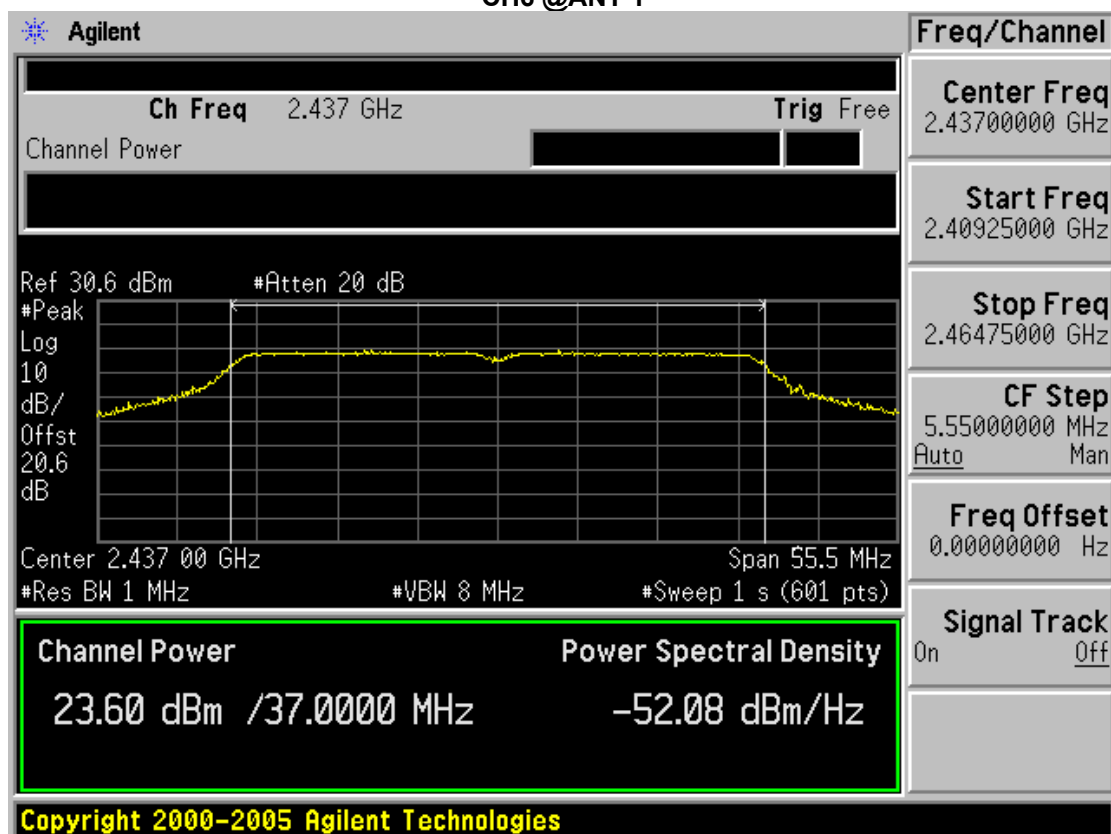
Note: The test results including the cable lose.

Plots of Maximum Peak Output Power Measurement

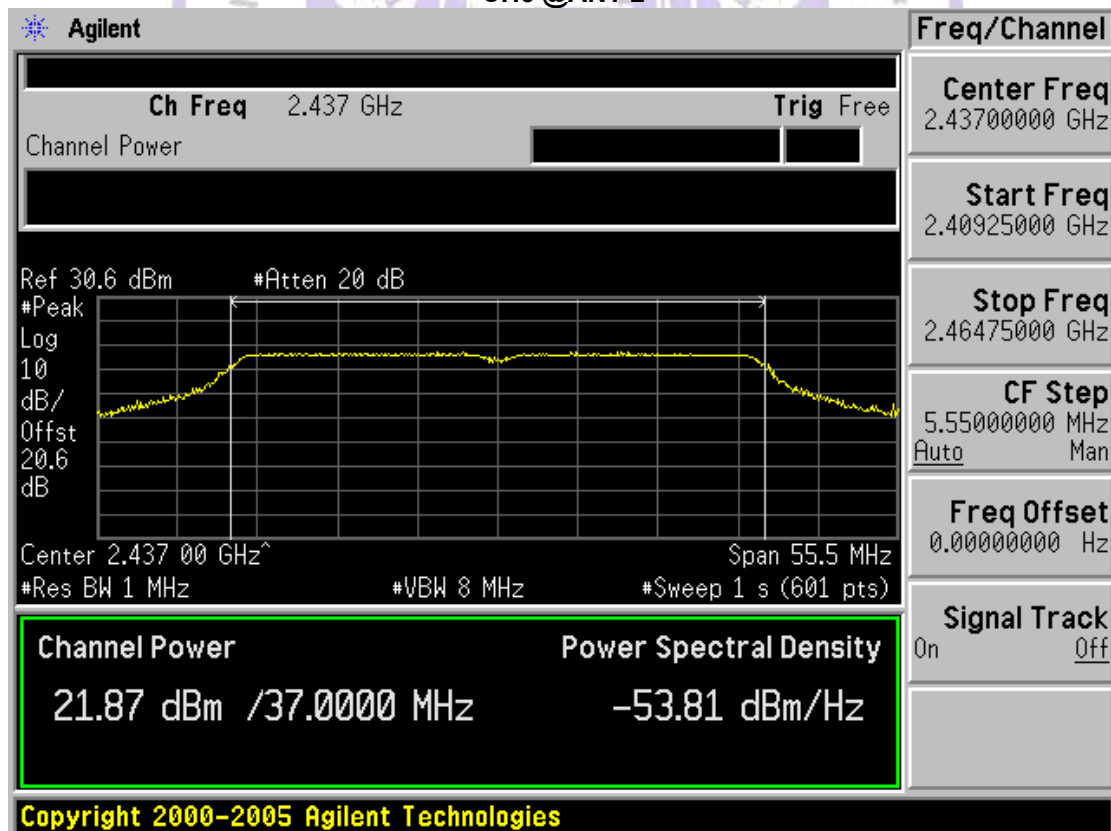
For 802.11N Mode(40MHz):



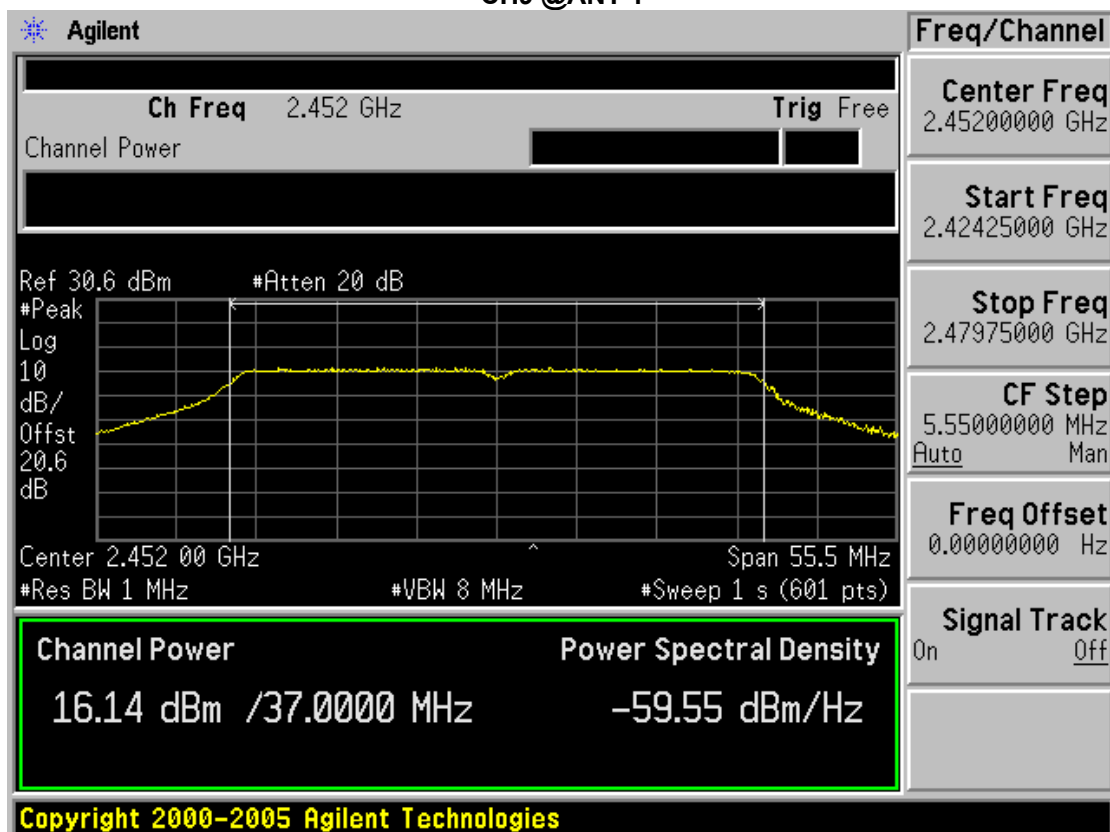
CH6 @ANT 1



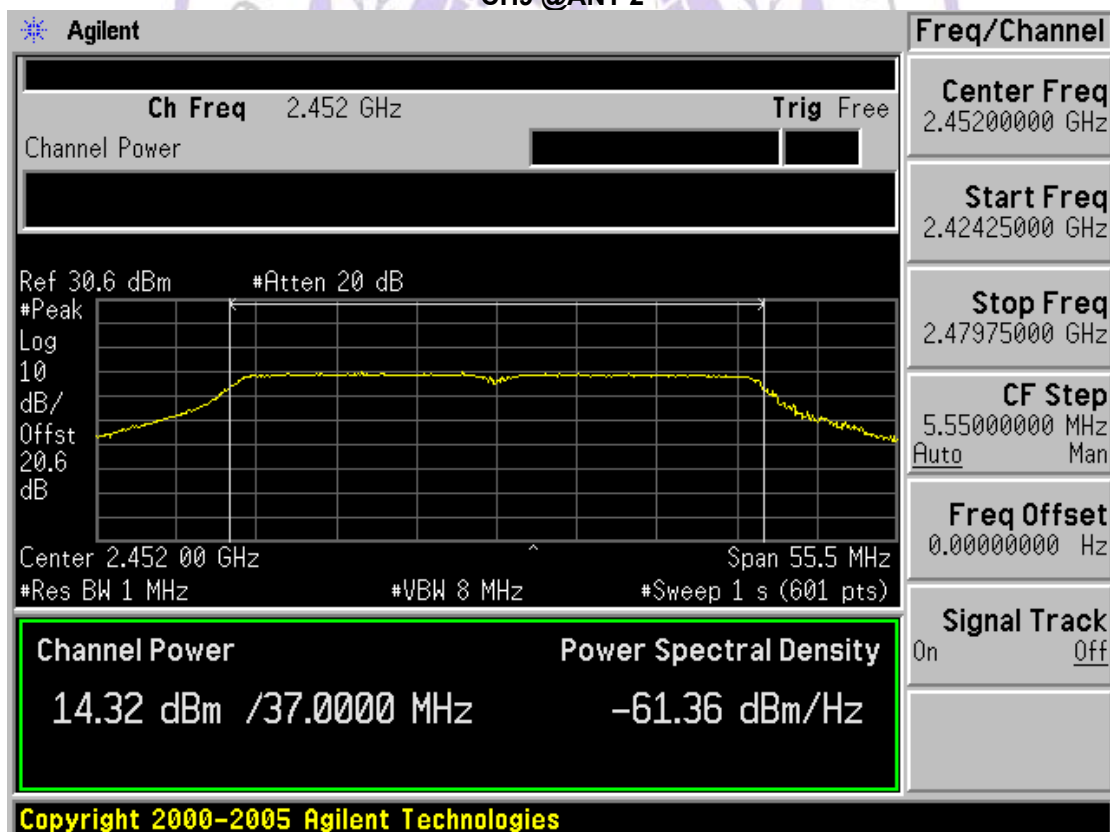
CH6 @ANT 2



CH9 @ANT 1

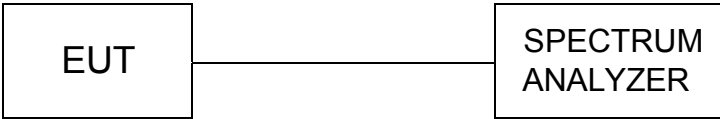


CH9 @ANT 2



4.5. Band Edge Measurement

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 and FCC KDB Publication No. 558074 (Measurement Guidelines of DTS) with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100 kHz, to measure the conducted peak band edge.

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: Set Span for minimum 50 MHz - Reference Level: 110 dB μ V (corrected for gains and losses of test antenna factor, preamp gain and cable loss) - Attenuation: 10 dB
- Sweep Time: Coupled - Resolution Bandwidth: Up to and including 1 GHz = $\geq$ 100 kHz
- Resolution Bandwidth: Above 1 GHz = 1 MHz - Video Bandwidth: Below 1 GHz = 300 kHz
- Video Bandwidth: Up to and including 1 GHz = $\geq$ 3 MHz for peak and 10 Hz for average
- Detector: Peak

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

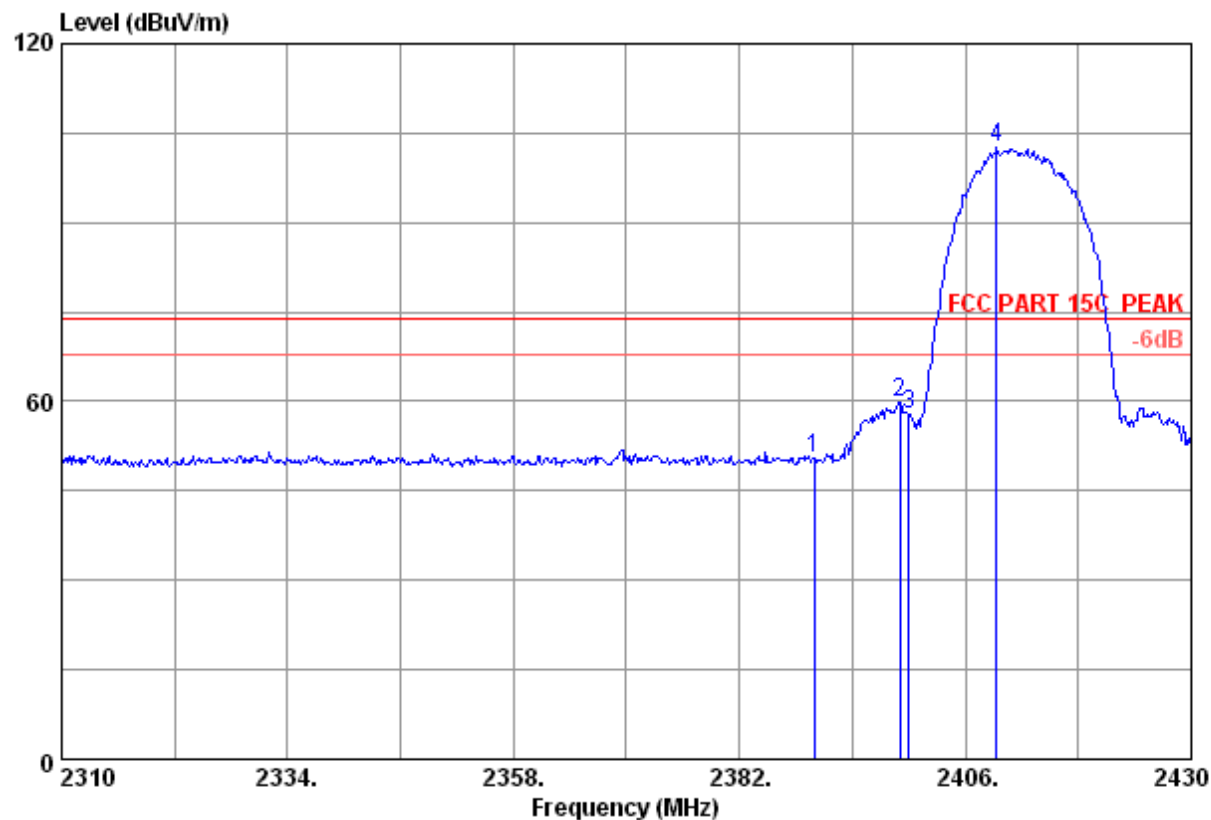
LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

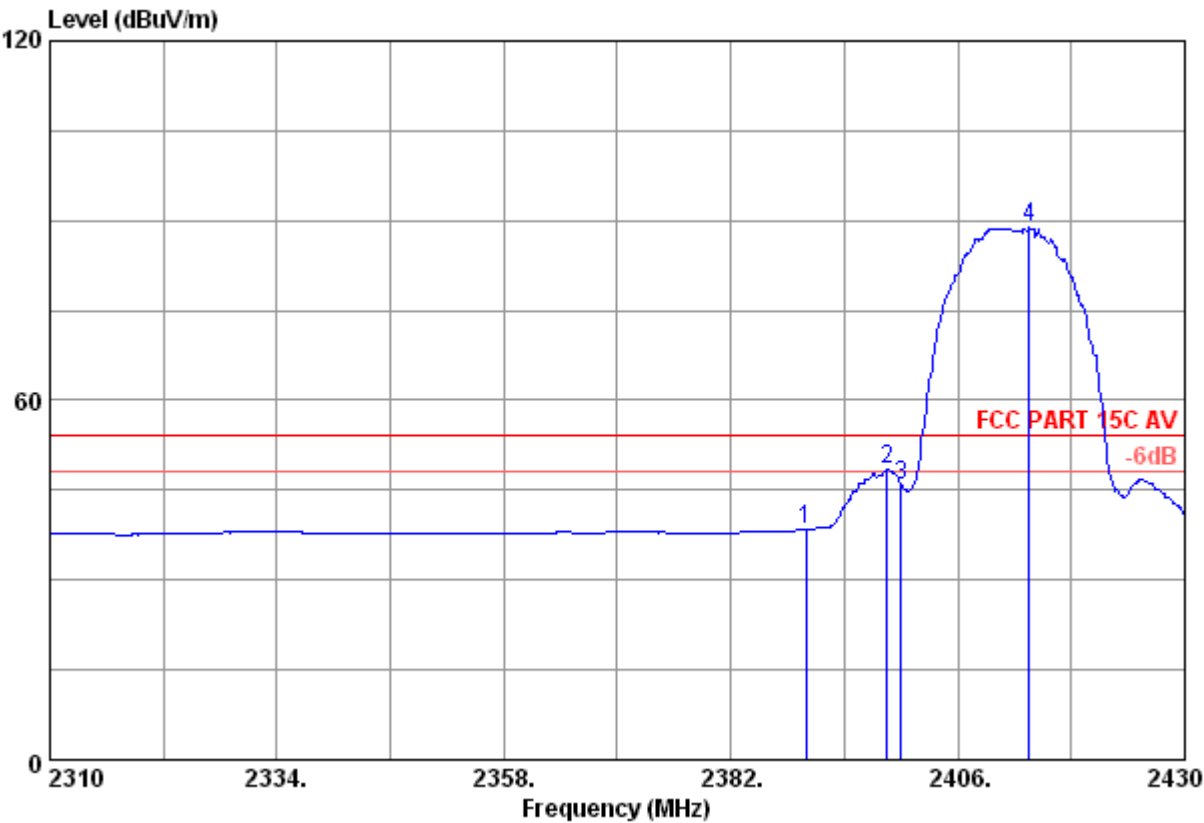
Frequency (MHz)	Limit Average (dBuV/m)	Limit Peak (dBuV/m)
Below 2390 or Above 2483.5	54	74

TEST RESULTS

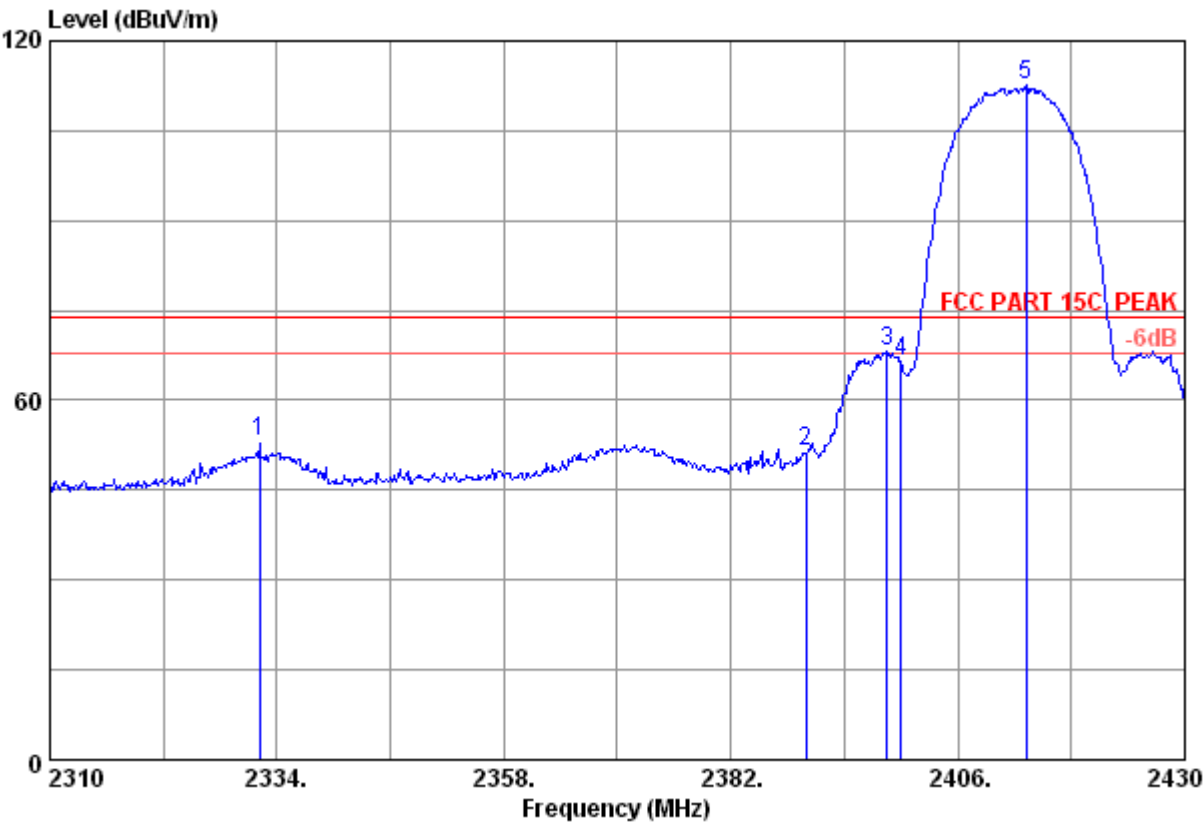
Transmitting mode: 802.11b



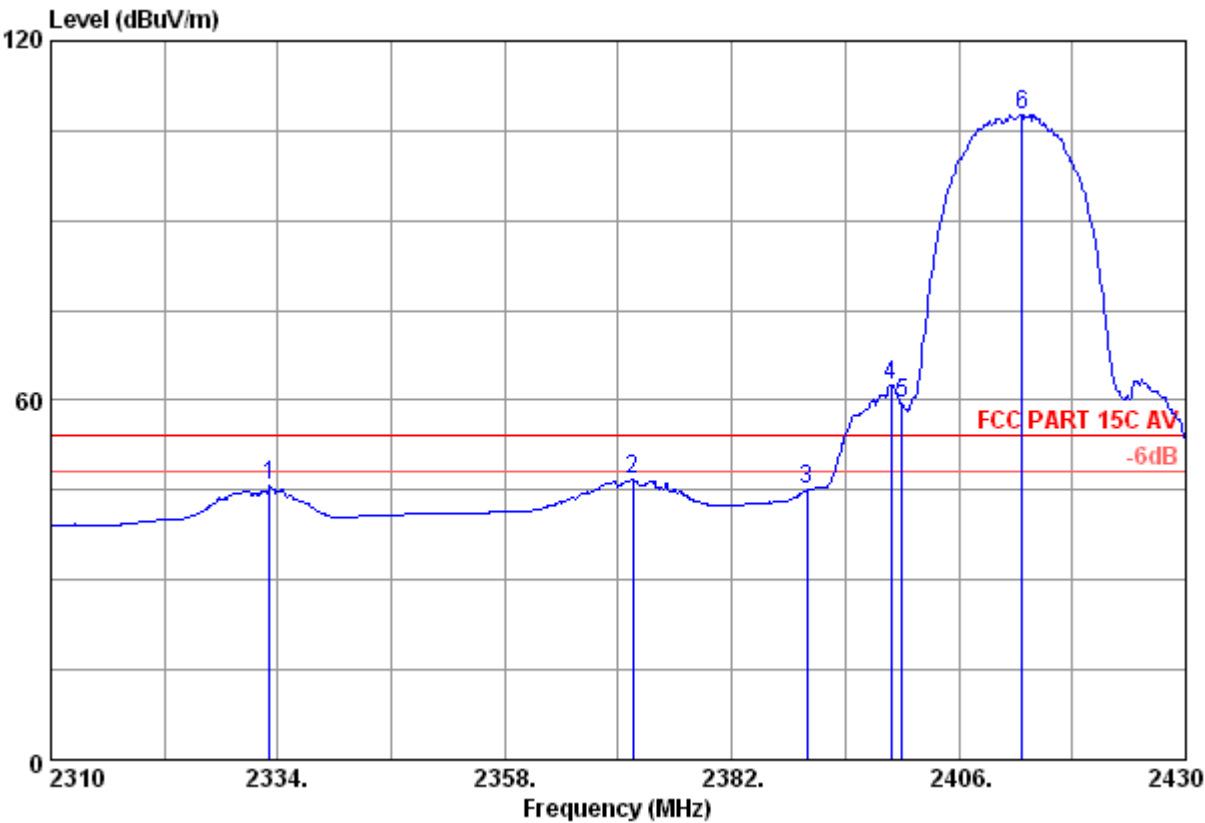
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	50.46	74	23.54	PK	Horizontal
2399.04	59.83	74	14.17	PK	Horizontal
2400.00	57.78	74	16.22	PK	Horizontal
2410.00	102.69	74	-28.69	PK	Horizontal



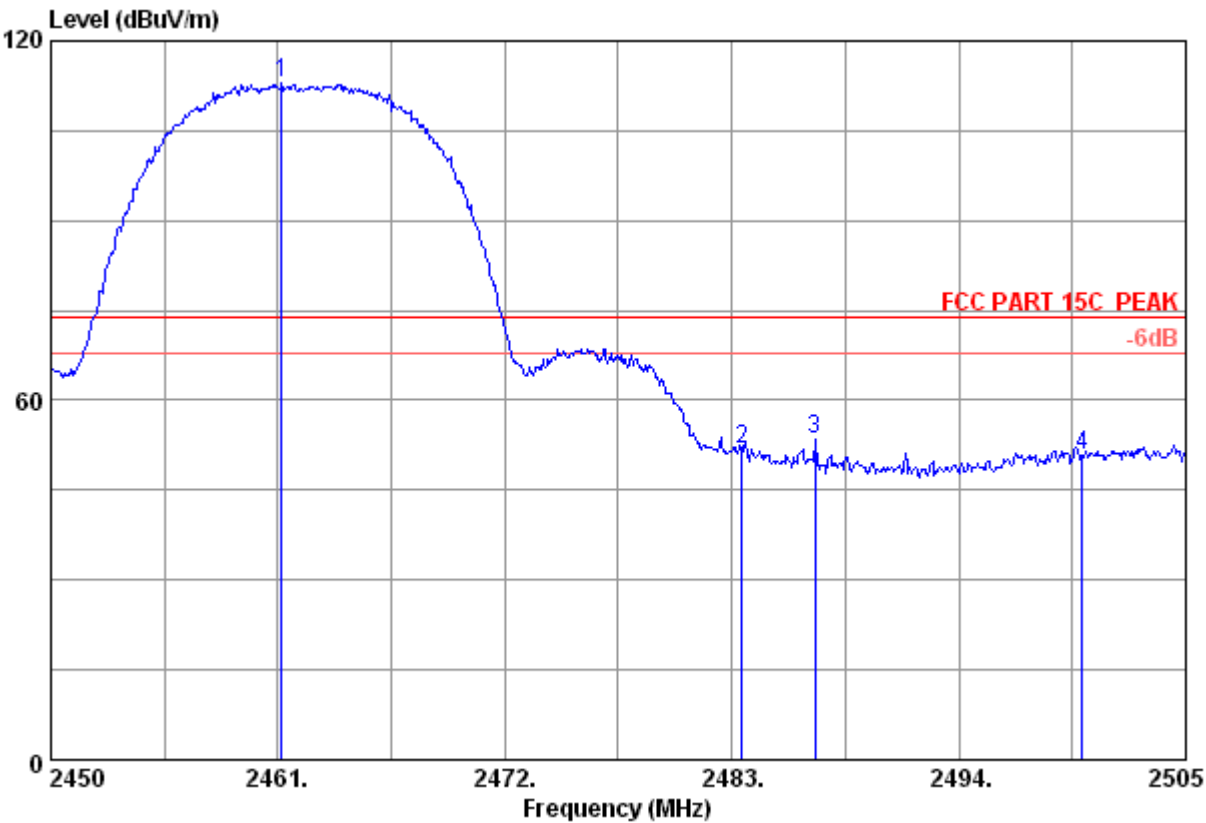
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	38.49	54	15.51	AV	Horizontal
2399.04	48.34	54	5.66	AV	Horizontal
2400.00	45.89	54	8.11	AV	Horizontal
2410.00	88.75	54	-34.75	AV	Horizontal



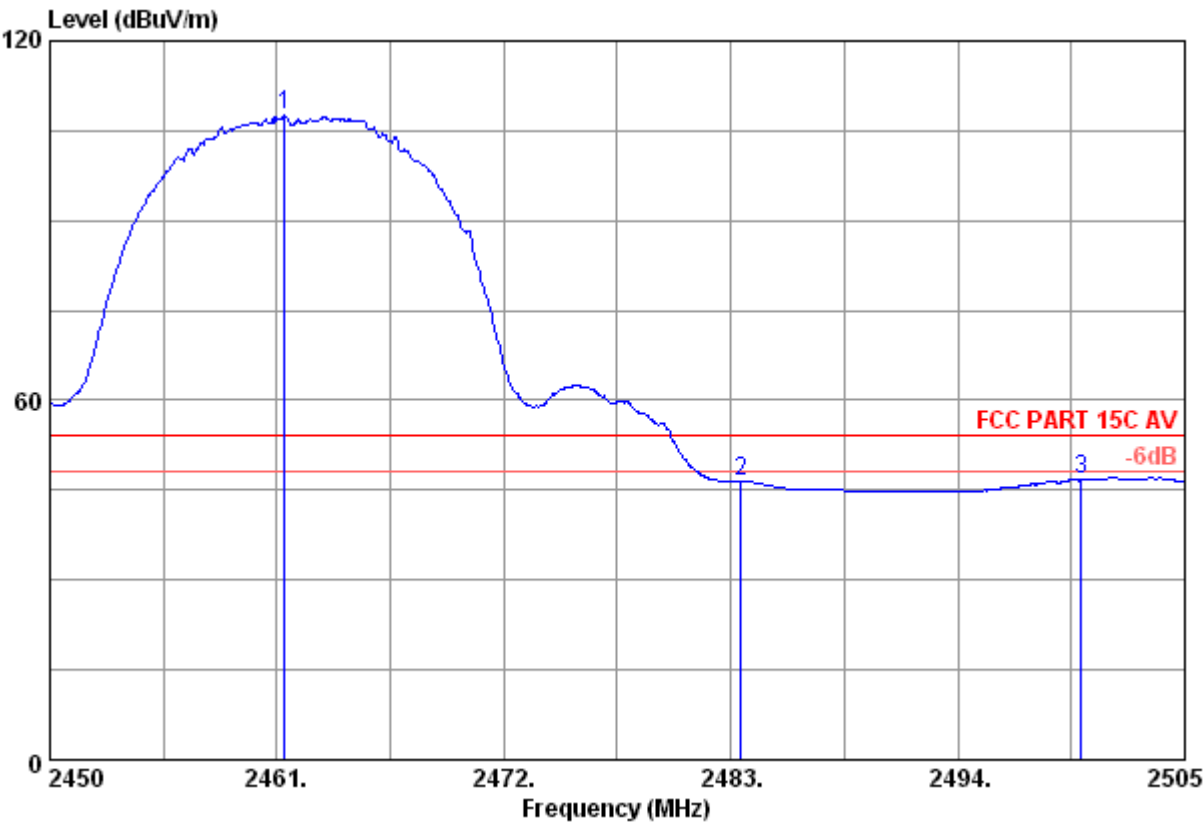
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2332.20	53.01	74	20.99	PK	Vertical
2390.00	51.61	74	22.39	PK	Vertical
2389.56	68.26	74	5.74	PK	Vertical
2400.00	66.47	74	7.53	PK	Vertical
2413.00	112.56	74	-38.56	PK	Vertical



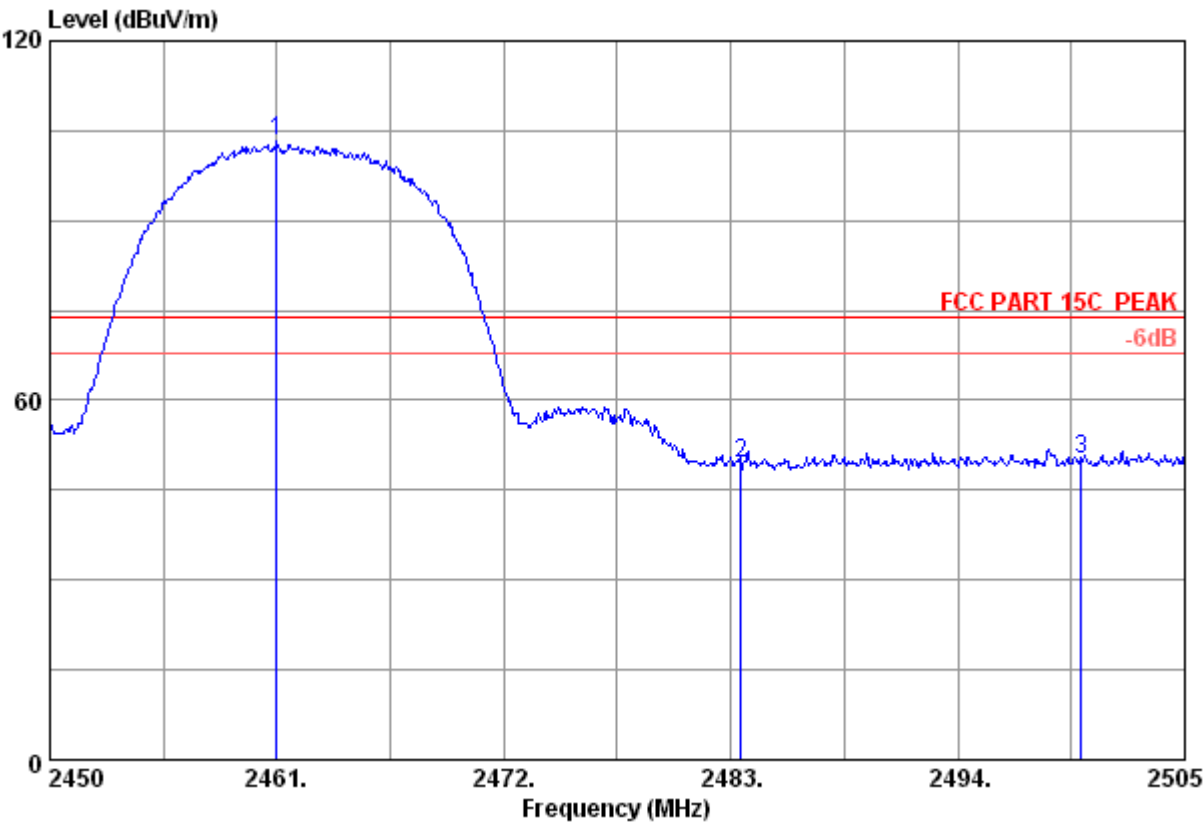
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2332.20	45.76	54	8.24	AV	Vertical
2371.56	46.73	54	7.27	AV	Vertical
2390.00	44.98	54	9.02	AV	Vertical
2398.56	62.64	54	-8.64	AV	Vertical
2400.00	59.46	54	-5.46	AV	Vertical
2413.00	107.78	54	-53.78	AV	Vertical



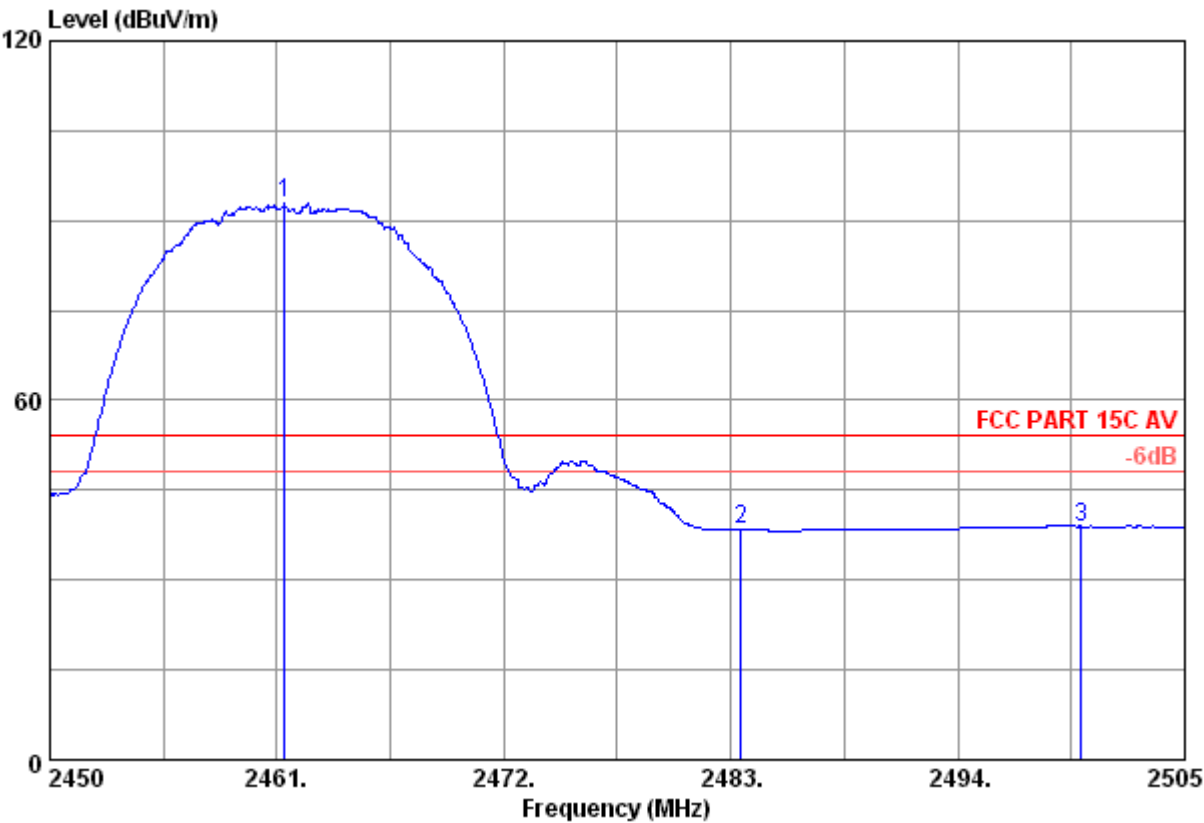
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2461.17	110.78	74	-39.06	PK	Horizontal
2483.50	49.47	74	22.14	PK	Horizontal
2487.00	53.62	74	20.38	PK	Horizontal
2500.00	50.77	74	23.23	PK	Horizontal



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2461.17	107.69	54	-53.69	AV	Horizontal
2483.50	46.52	54	7.48	AV	Horizontal
2500.00	46.66	54	7.34	AV	Horizontal

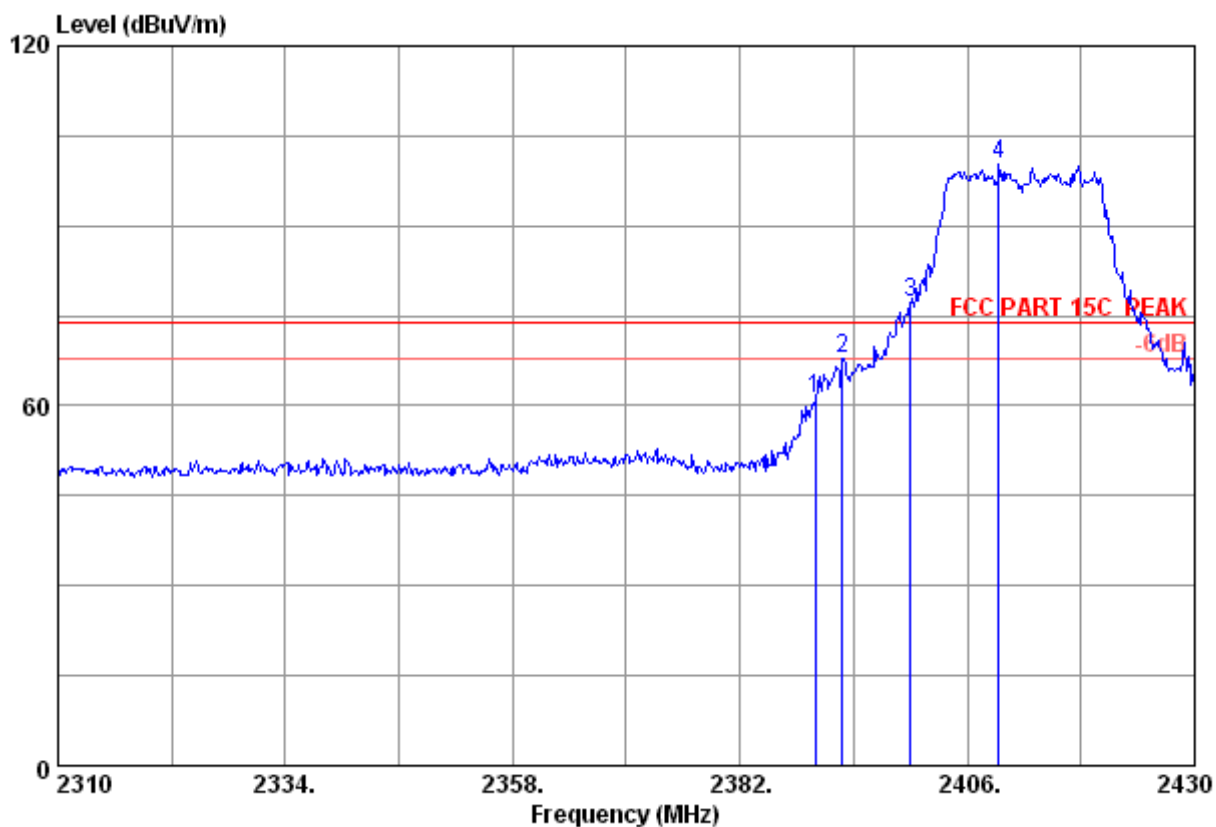


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2461.17	103.35	74	-29.35	PK	Vertical
2483.50	49.48	74	24.52	PK	Vertical
2500.00	50.21	74	23.79	PK	Vertical

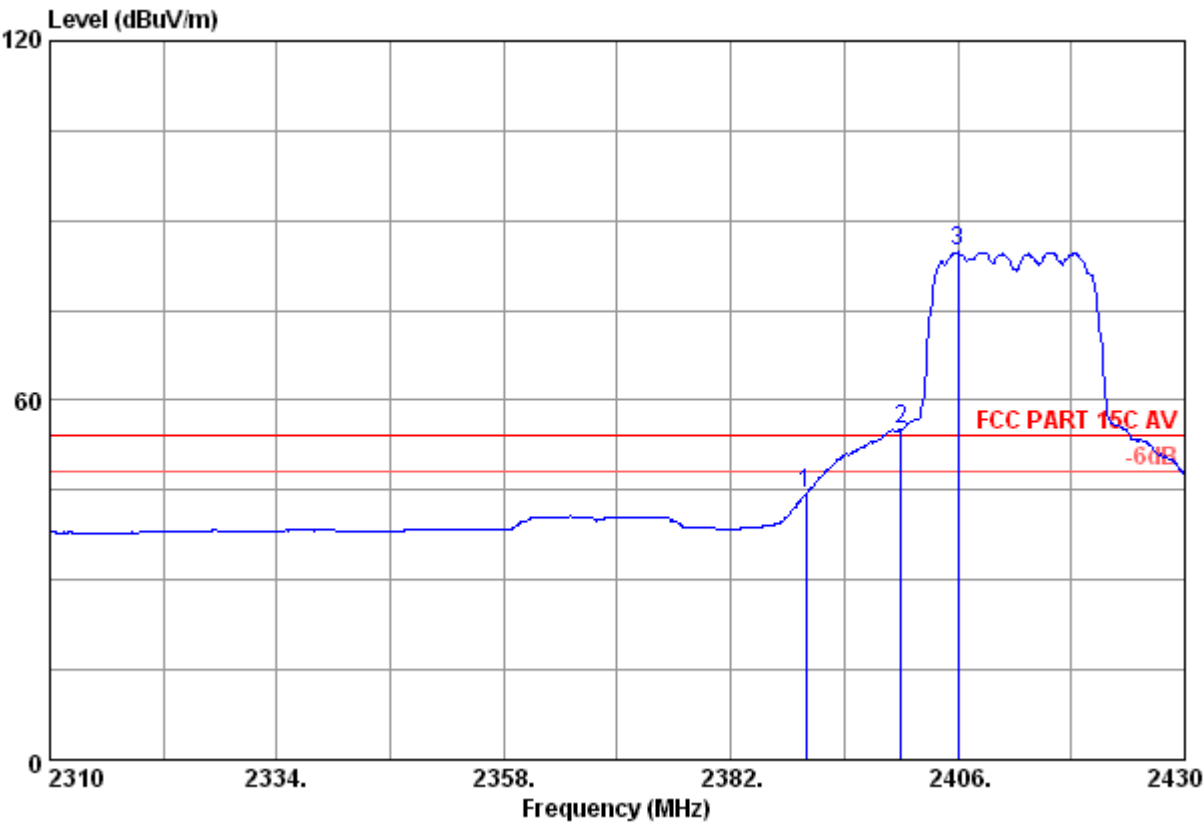


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2461.17	92.99	54	-38.99	AV	Vertical
2483.50	38.43	54	15.57	AV	Vertical
2500.00	38.94	54	15.06	AV	Vertical

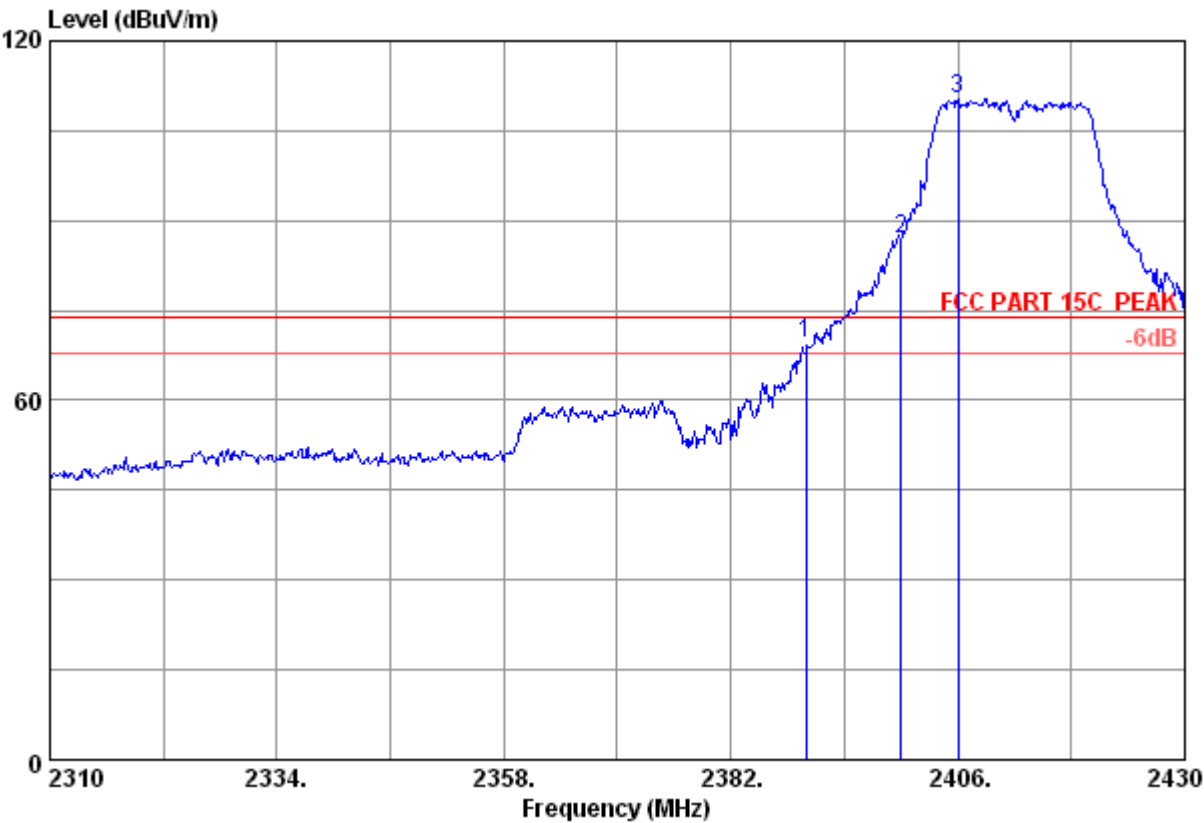
Note : For 802.11g Mode:



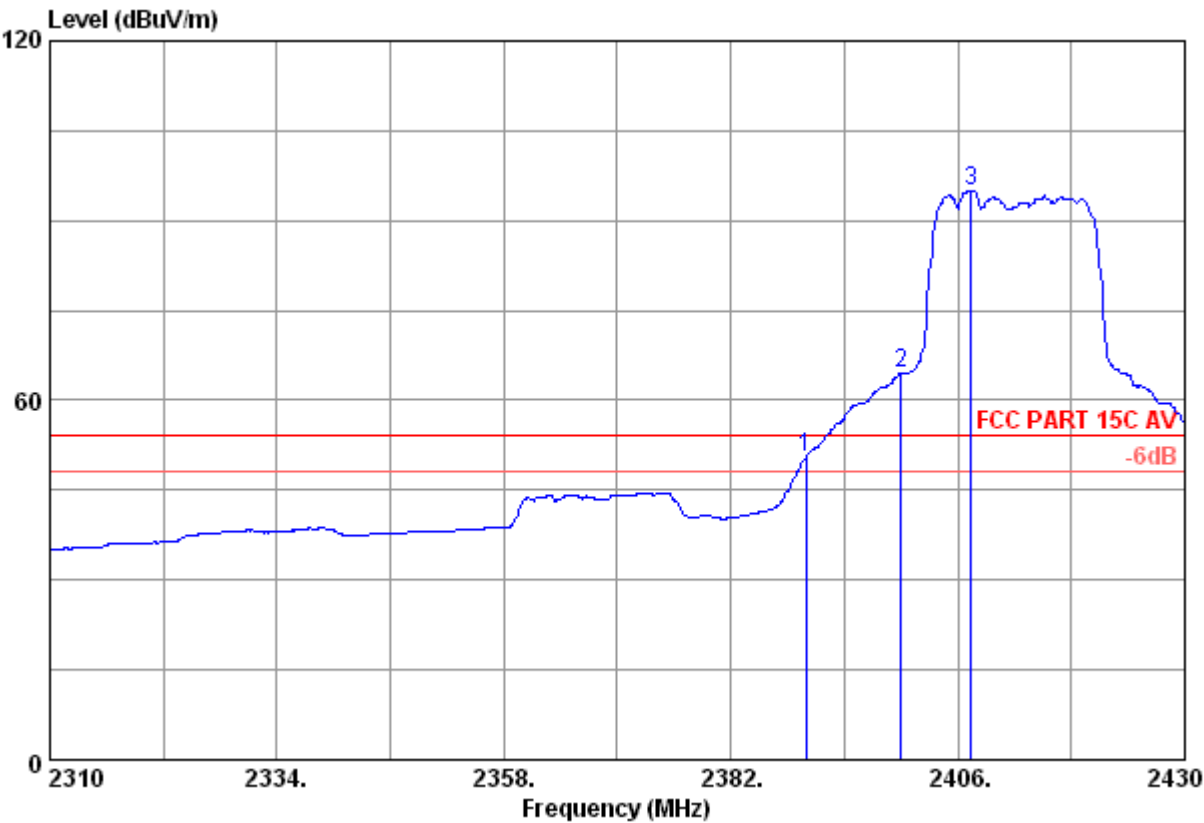
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	61.33	74	-12.67	PK	Horizontal
2392.80	67.94	74	6.06	PK	Horizontal
2400.00	77.09	74	-3.09	PK	Horizontal
2409.00	100.32	74	-26.32	PK	Horizontal



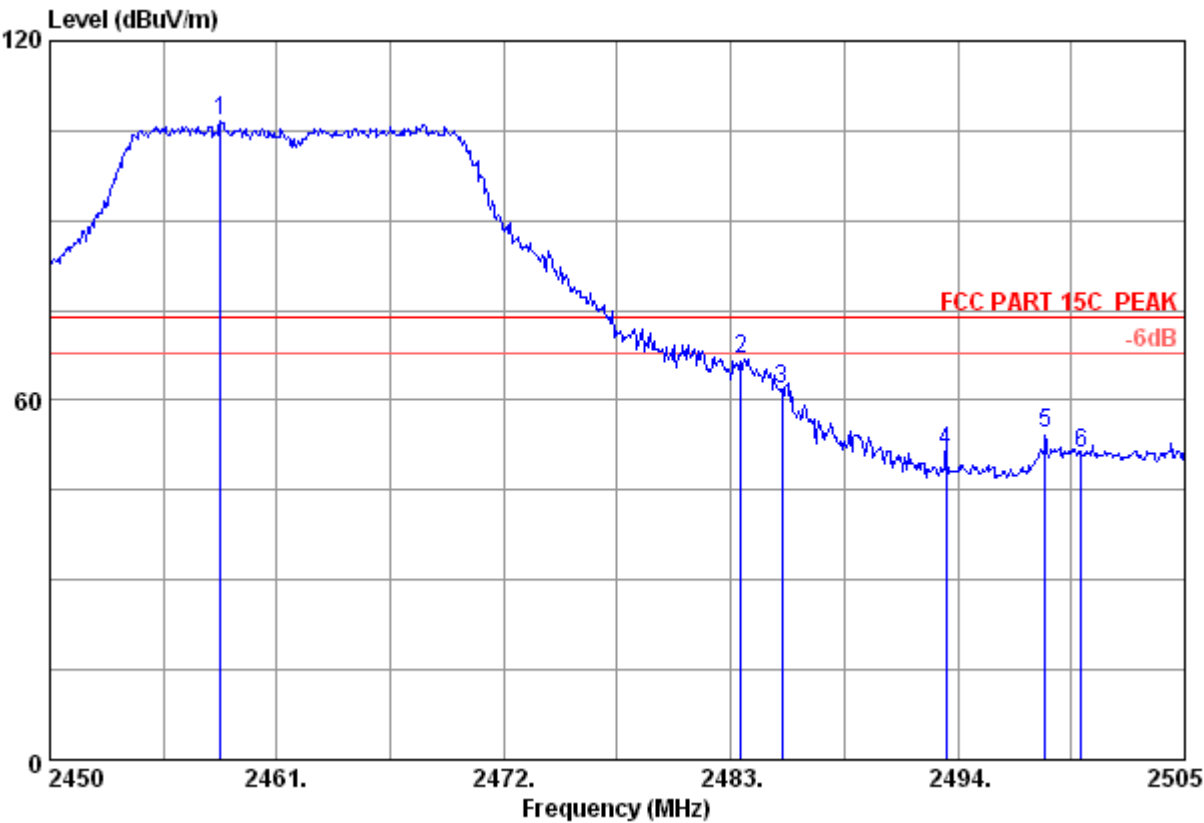
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	44.54	54	9.46	AV	Horizontal
2400.00	55.13	54	-1.13	AV	Horizontal
2409.00	84.74	54	-30.74	AV	Horizontal



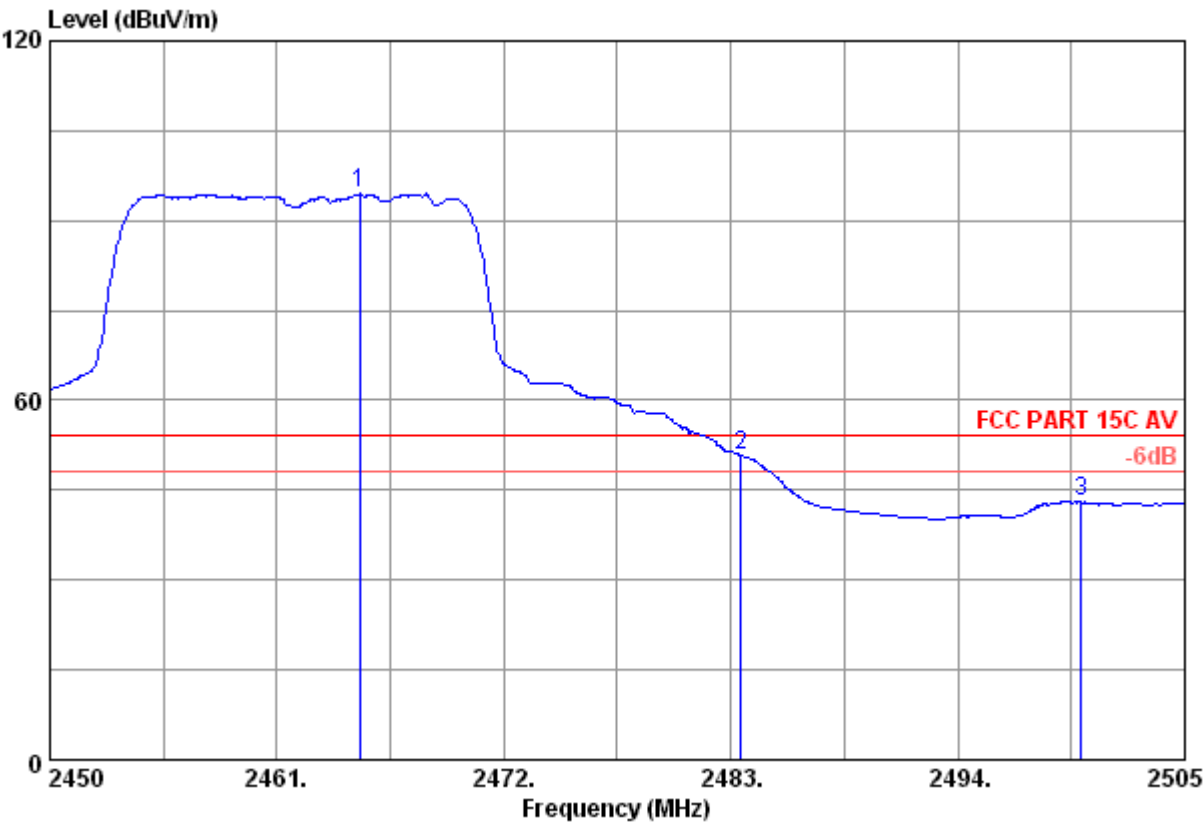
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	69.66	74	4.34	PK	Vertical
2400.00	86.78	74	-12.78	PK	Vertical
2406.50	110.40	74	-36.40	PK	Vertical



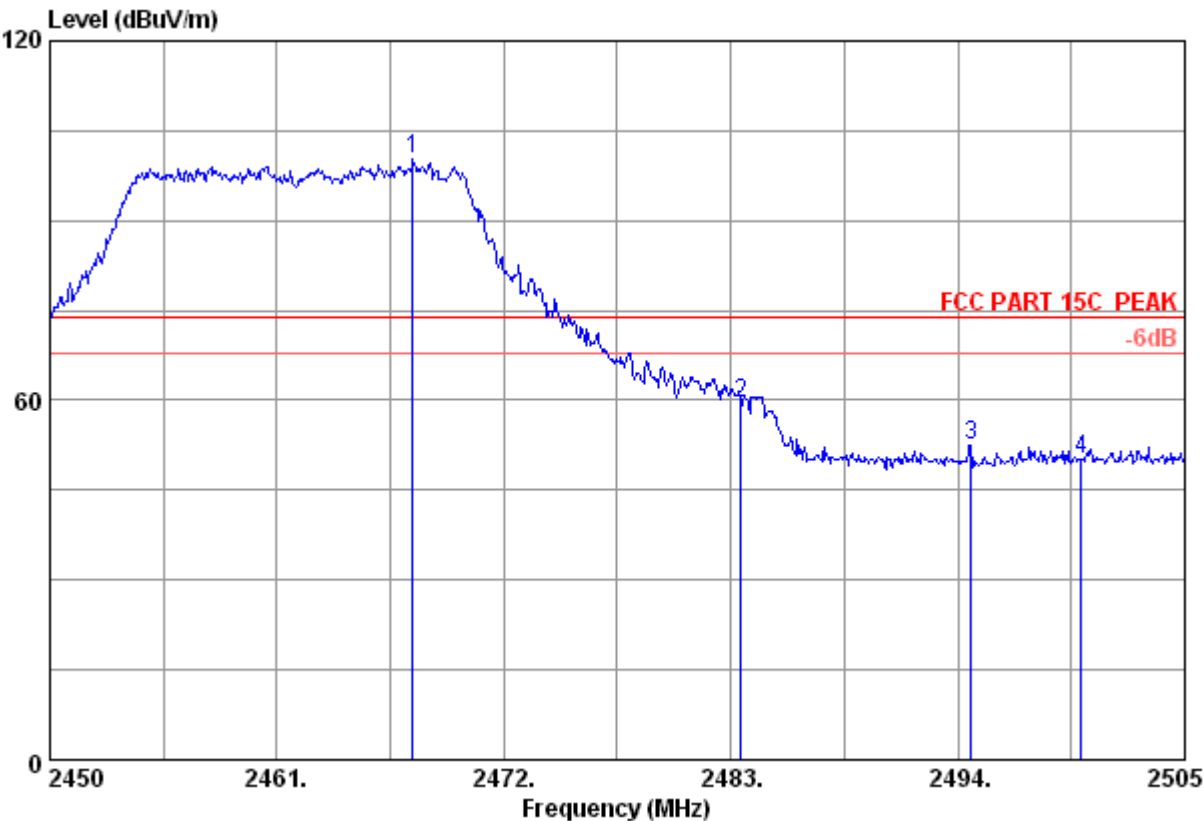
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	50.63	54	3.37	AV	Vertical
2400.00	64.48	54	-10.48	AV	Vertical
2406.50	92.76	54	-40.98	AV	Vertical



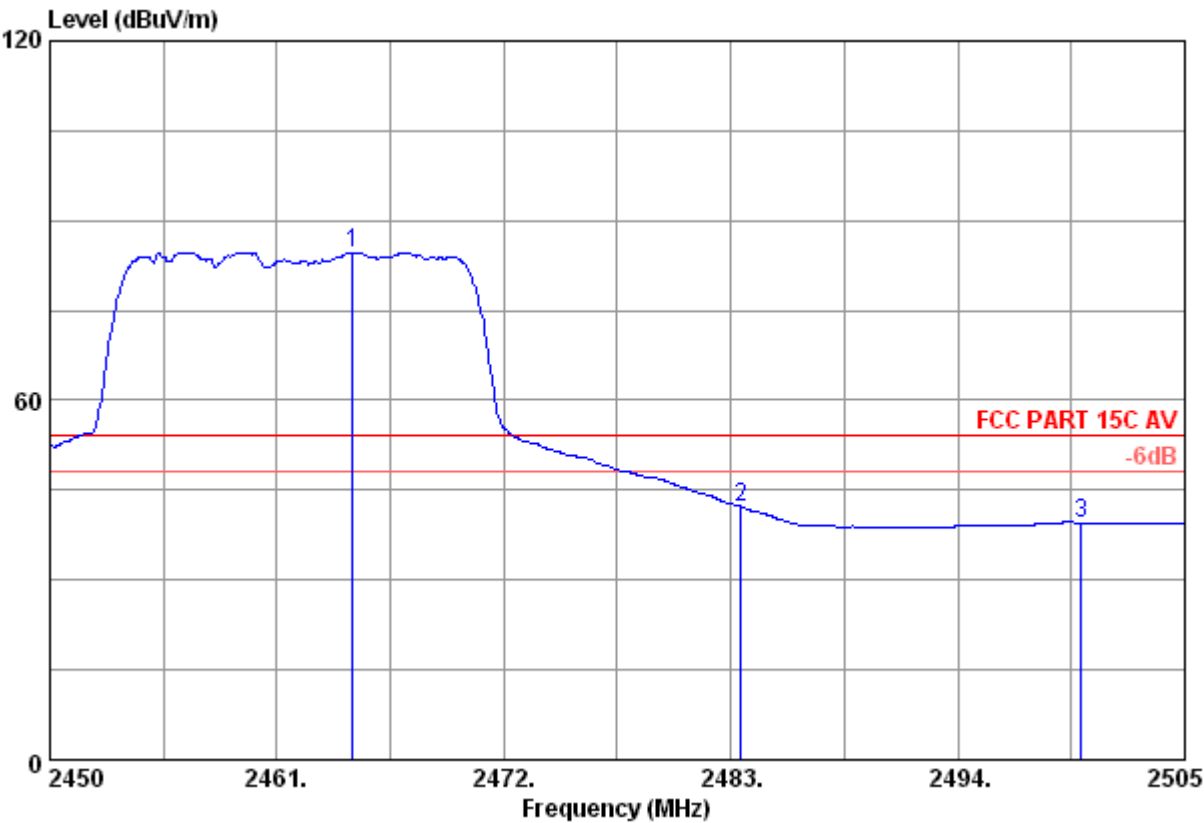
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2458.25	106.70	74	-32.70	PK	Vertical
2483.50	66.73	74	7.27	PK	Vertical
2485.50	61.88	74	12.12	PK	Vertical
2493.45	51.46	74	22.54	PK	Vertical
2498.23	54.33	74	19.67	PK	Vertical
2500.00	48.84	74	22.74	PK	Vertical



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2465.19	94.49	54	-40.49	AV	Vertical
2483.50	50.92	54	3.08	AV	Vertical
2500.00	42.98	54	11.02	AV	Vertical

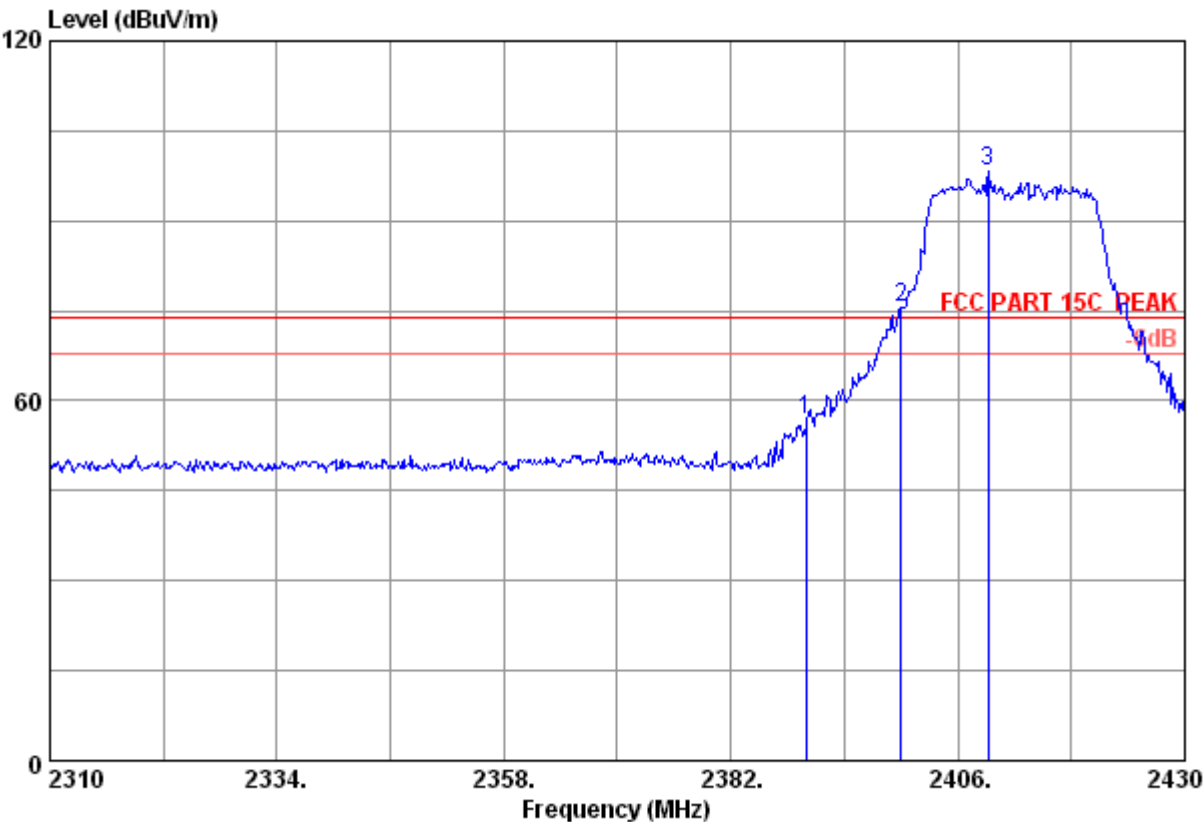


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2467.60	100.21	74	-26.21	PK	Horizontal
2483.50	59.39	74	14.61	PK	Horizontal
2494.66	52.51	74	21.49	PK	Horizontal
2500.00	50.21	74	23.79	PK	Horizontal

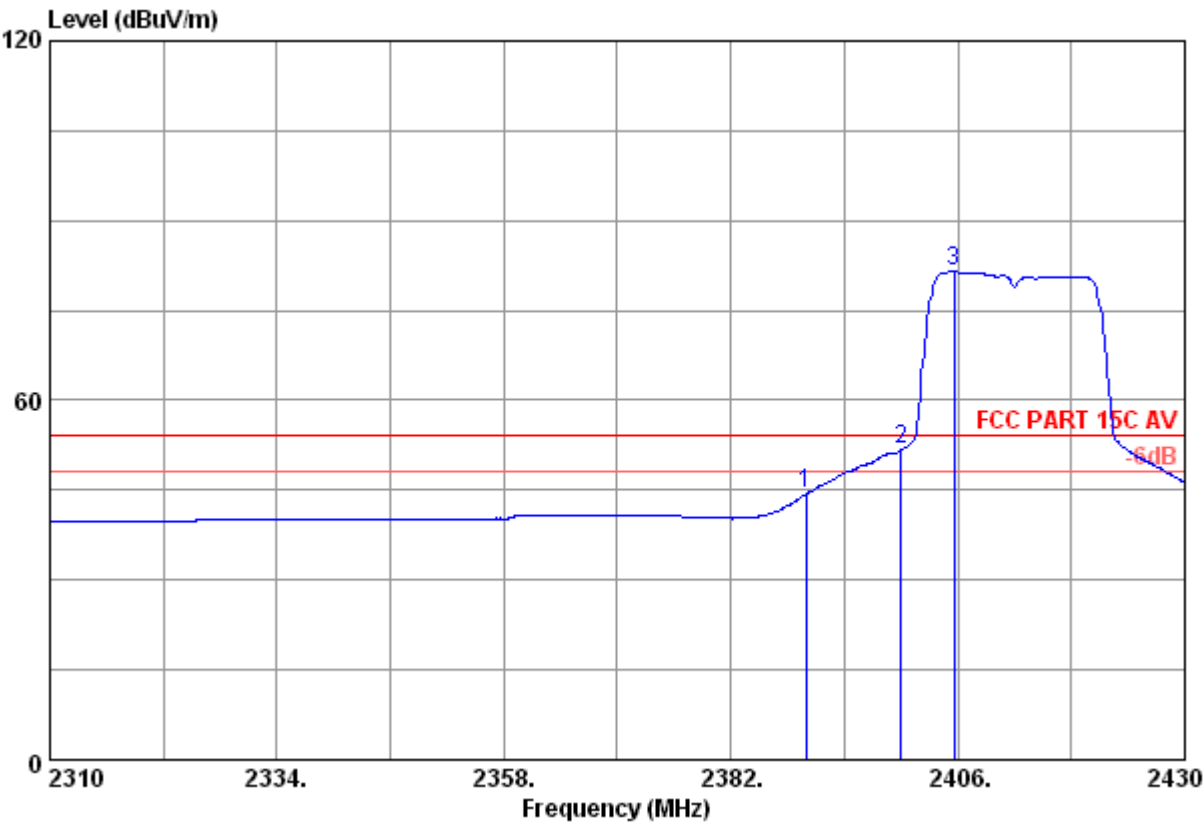


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2464.68	84.73	54	-30.73	AV	Horizontal
2483.50	42.28	54	11.72	AV	Horizontal
2500.00	39.58	54	14.42	AV	Horizontal

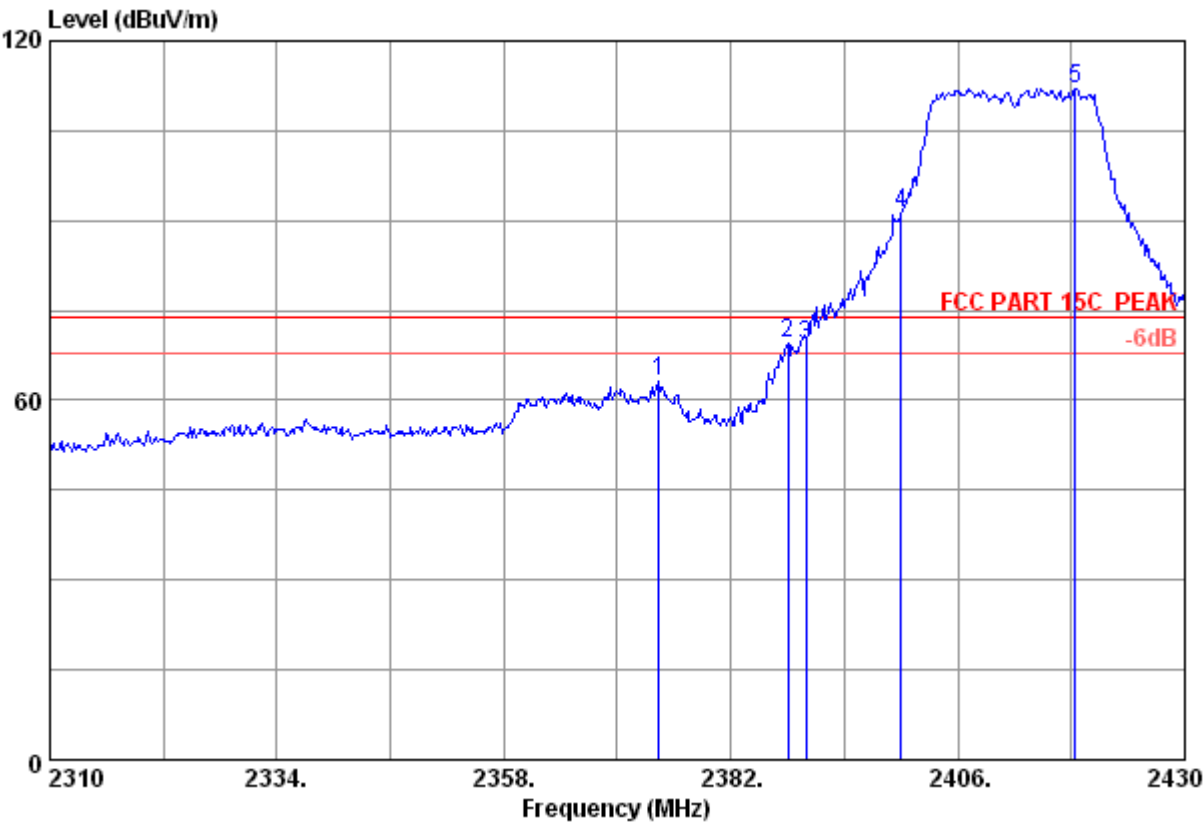
Note : For 802.11n (20MHz) Mode:



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	56.96	74	-17.04	PK	Horizontal
2400.00	75.63	74	-1.63	PK	Horizontal
2409.11	98.38	74	-24.38	PK	Horizontal



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	44.33	54	9.67	AV	Horizontal
2400.00	51.72	54	2.28	AV	Horizontal
2405.60	81.55	54	-27.55	AV	Horizontal

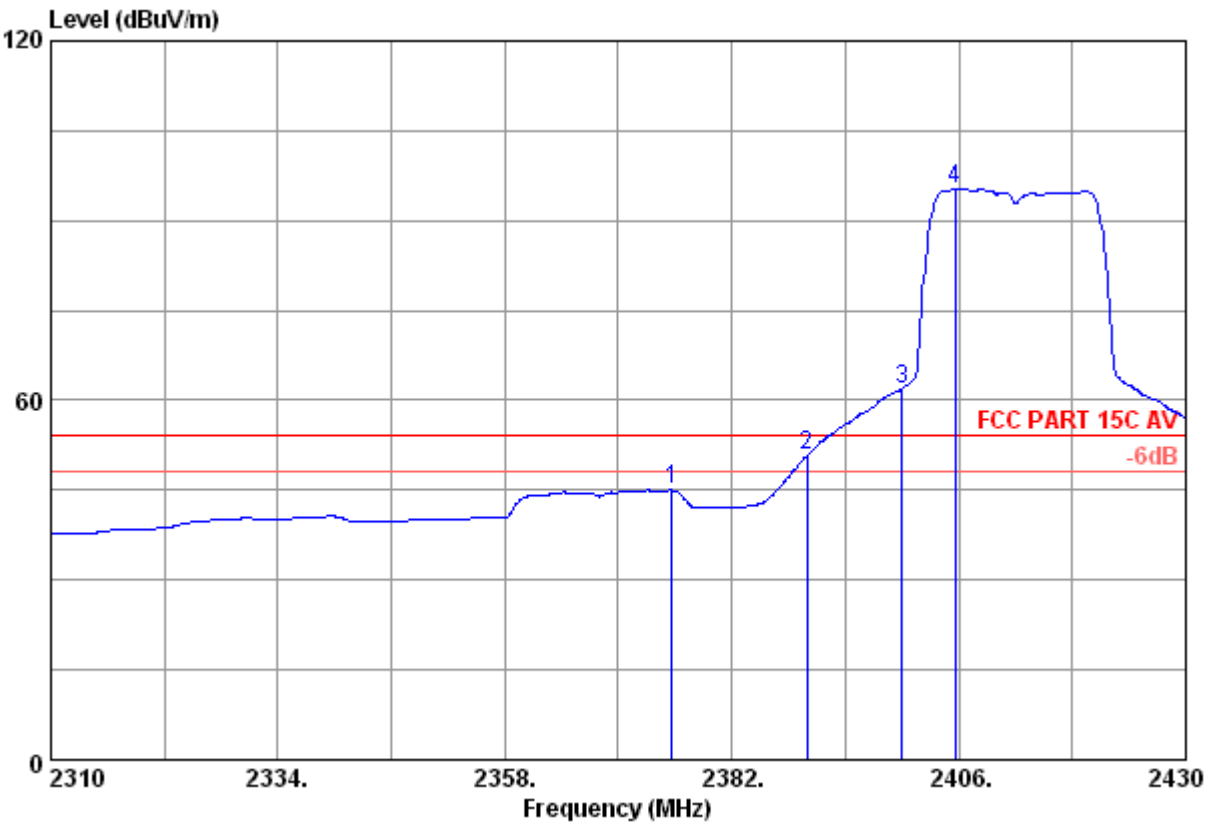


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2374.40	63.11	74	10.89	PK	Vertical
2388.00	69.58	74	4.42	PK	Vertical
2390.00	69.20	74	4.80	PK	Vertical
2400.00	91.23	74	-17.23	PK	Vertical
2418.30	112.09	74	-38.09	PK	Vertical

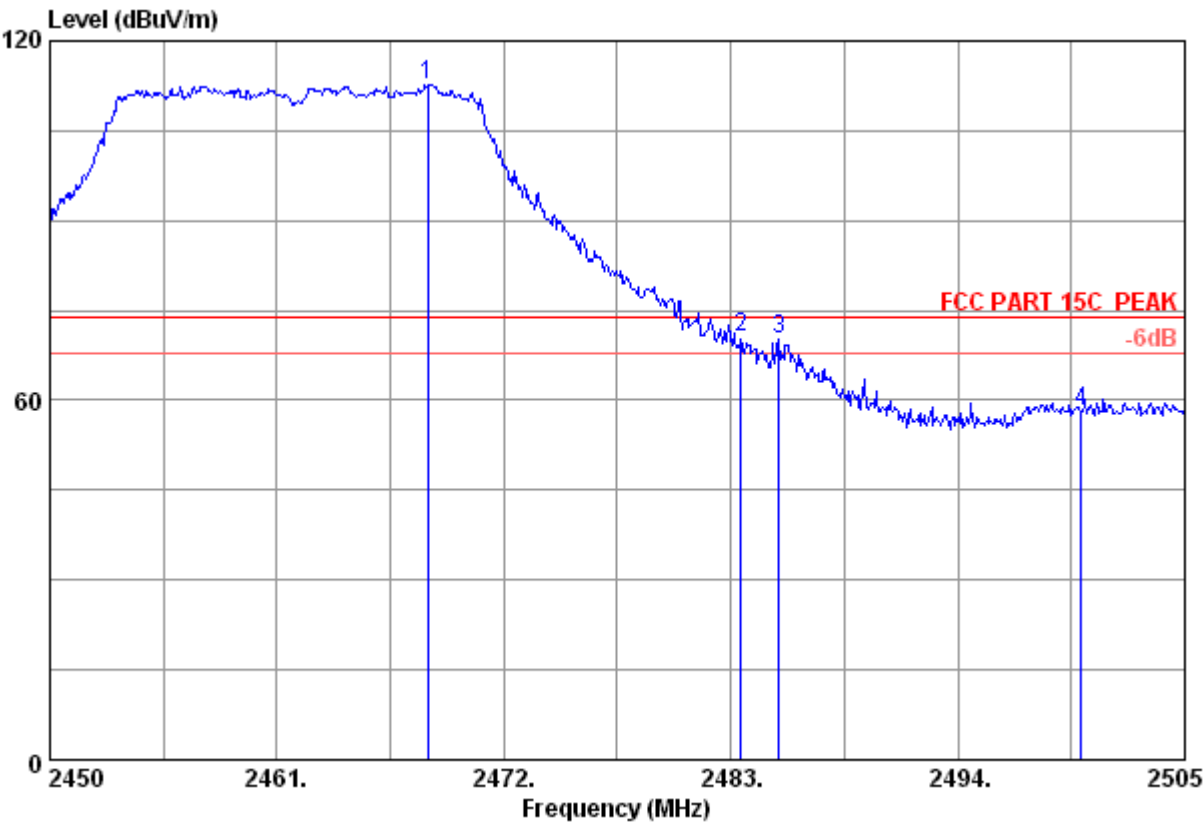
Note:

1. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209, the peak radiated field strength shall blow 74dBμv/m.

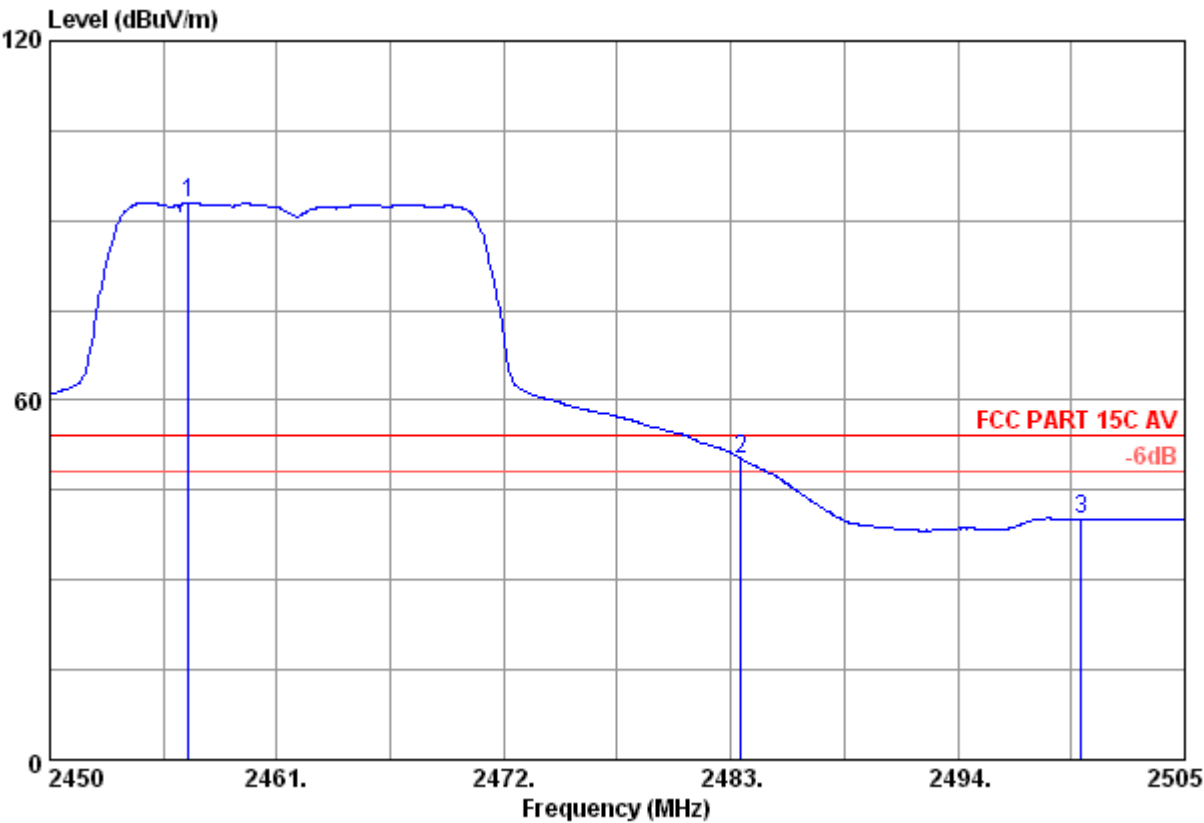
2. Antenna Polarization horizontal.



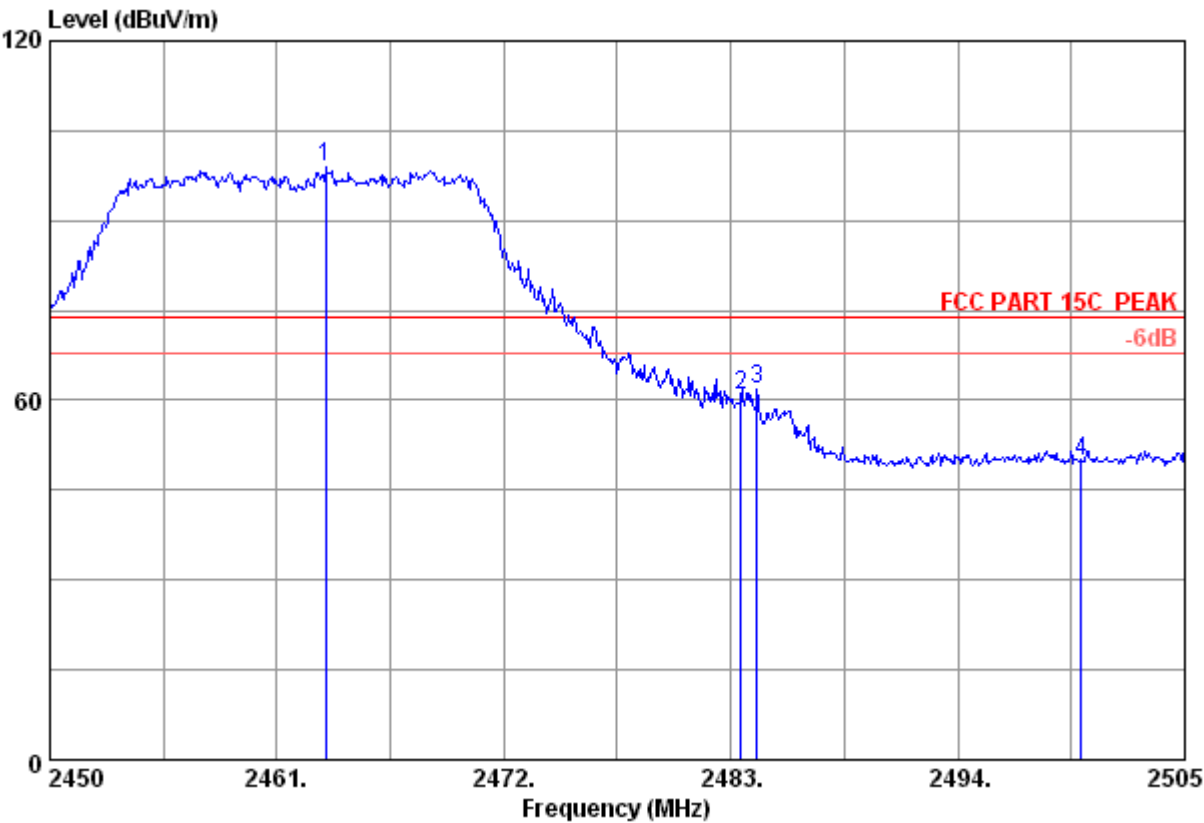
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2375.64	44.97	54	9.03	AV	Vertical
2390.00	50.90	54	3.10	AV	Vertical
2400.00	62.00	54	-8.00	AV	Vertical
2405.60	95.33	54	-41.33	AV	Vertical



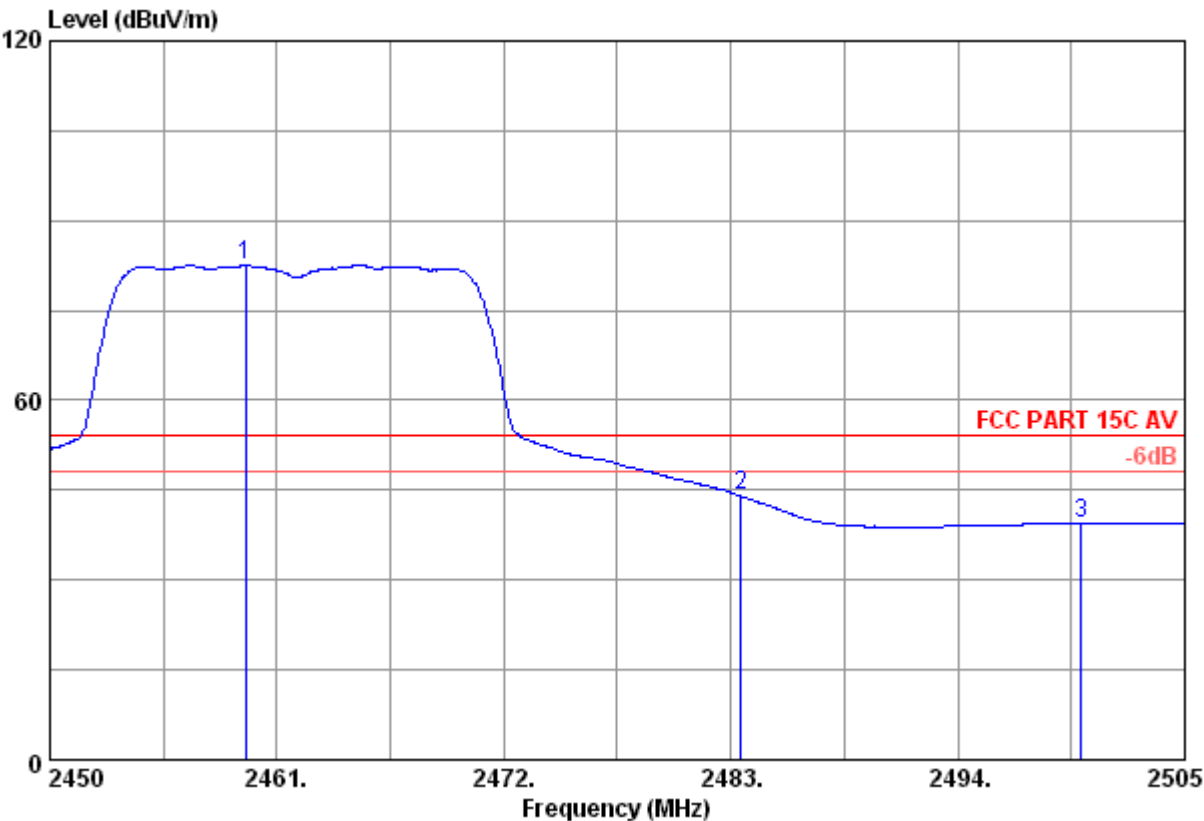
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2465.18	112.80	74	-38.80	PK	Vertical
2483.50	70.51	74	3.49	PK	Vertical
2485.31	70.05	74	3.95	PK	Vertical
2500.00	58.10	74	15.90	PK	Vertical



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2456.71	92.96	54	-38.96	AV	Vertical
2483.50	50.24	54	3.76	AV	Vertical
2500.00	40.18	54	13.82	AV	Vertical

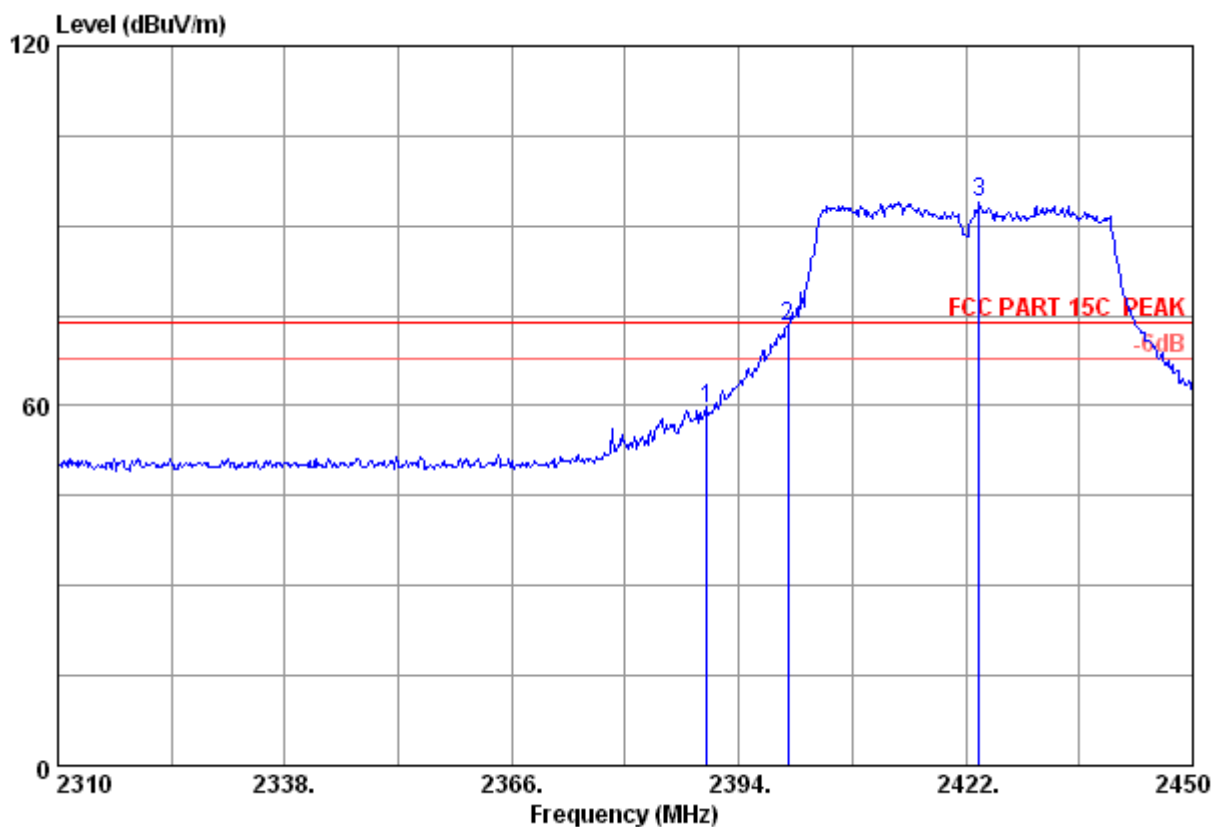


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2463.37	99.01	74	-25.01	PK	Horizontal
2483.50	60.79	74	13.21	PK	Horizontal
2484.26	61.78	74	12.22	PK	Horizontal
2500.00	49.97	74	24.03	PK	Horizontal

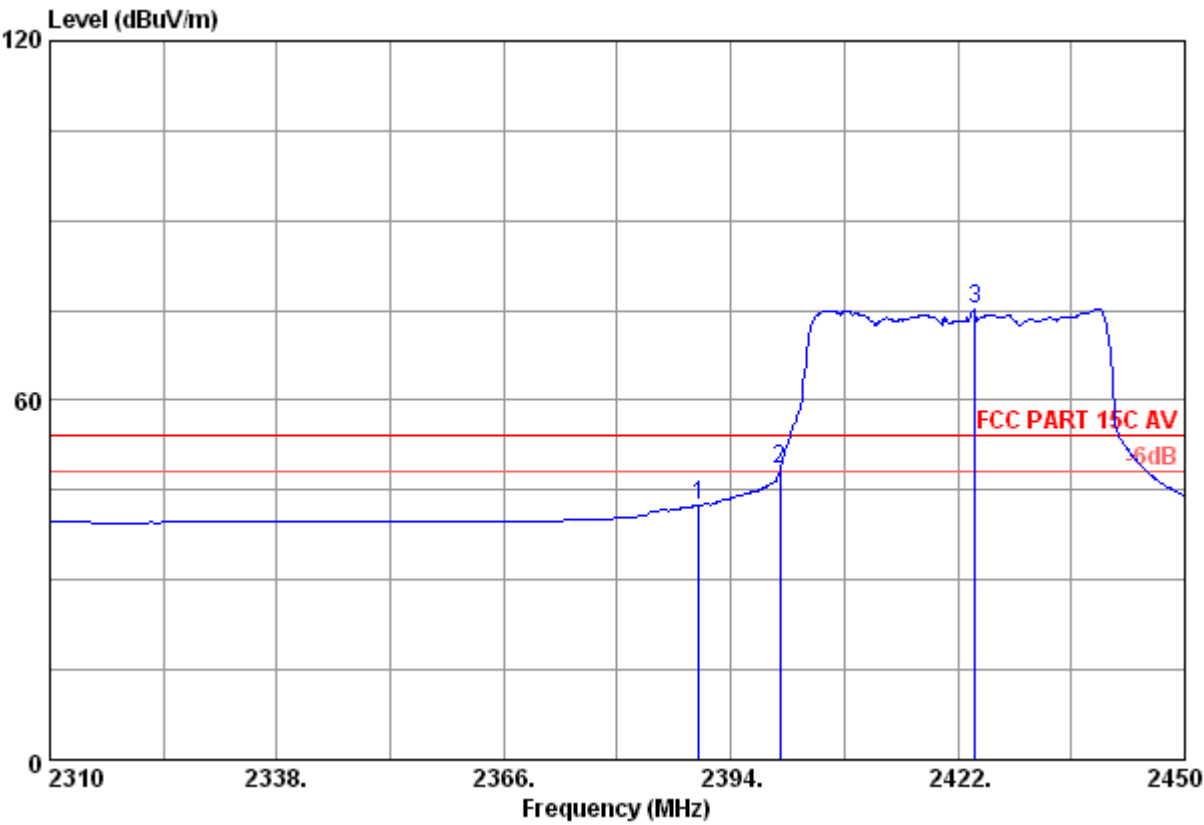


Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2459.46	82.48	54	-28.48	AV	Horizontal
2483.50	43.98	54	10.02	AV	Horizontal
2500.00	39.37	54	14.63	AV	Horizontal

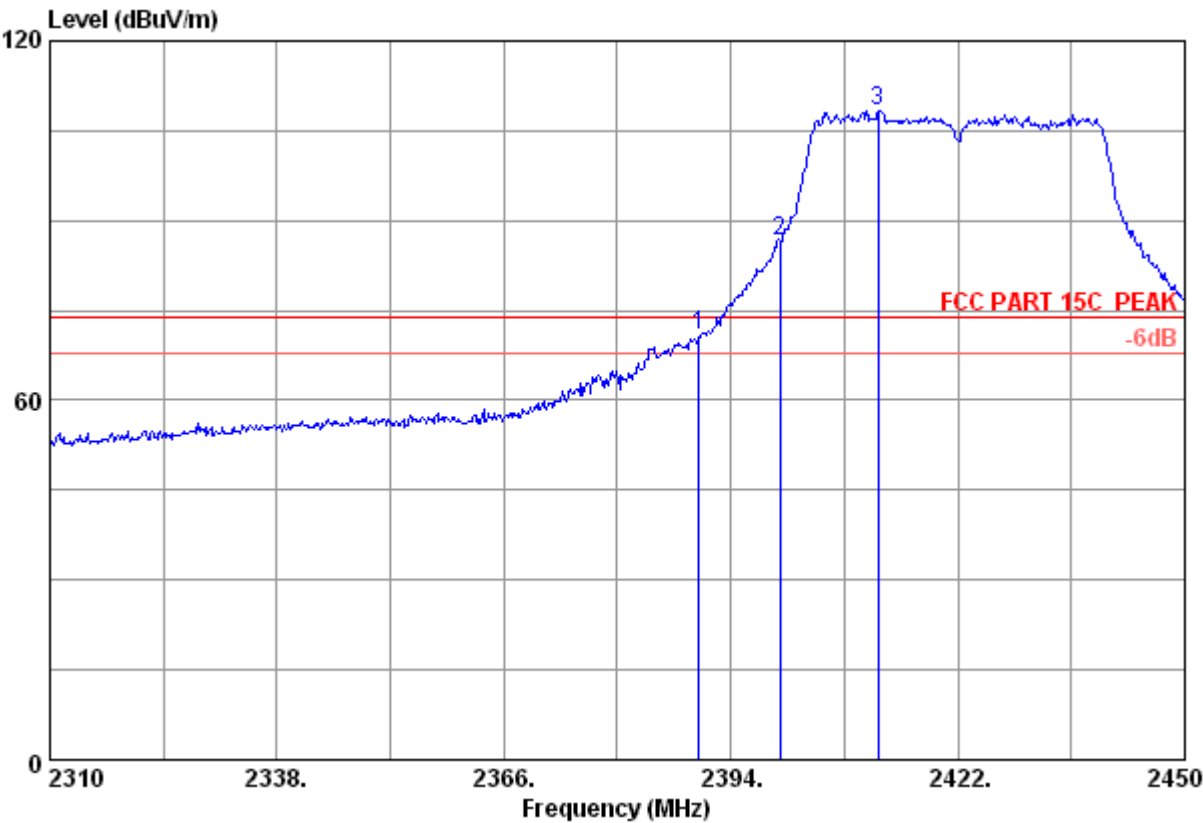
Note : For 802.11n (40MHz) Mode:



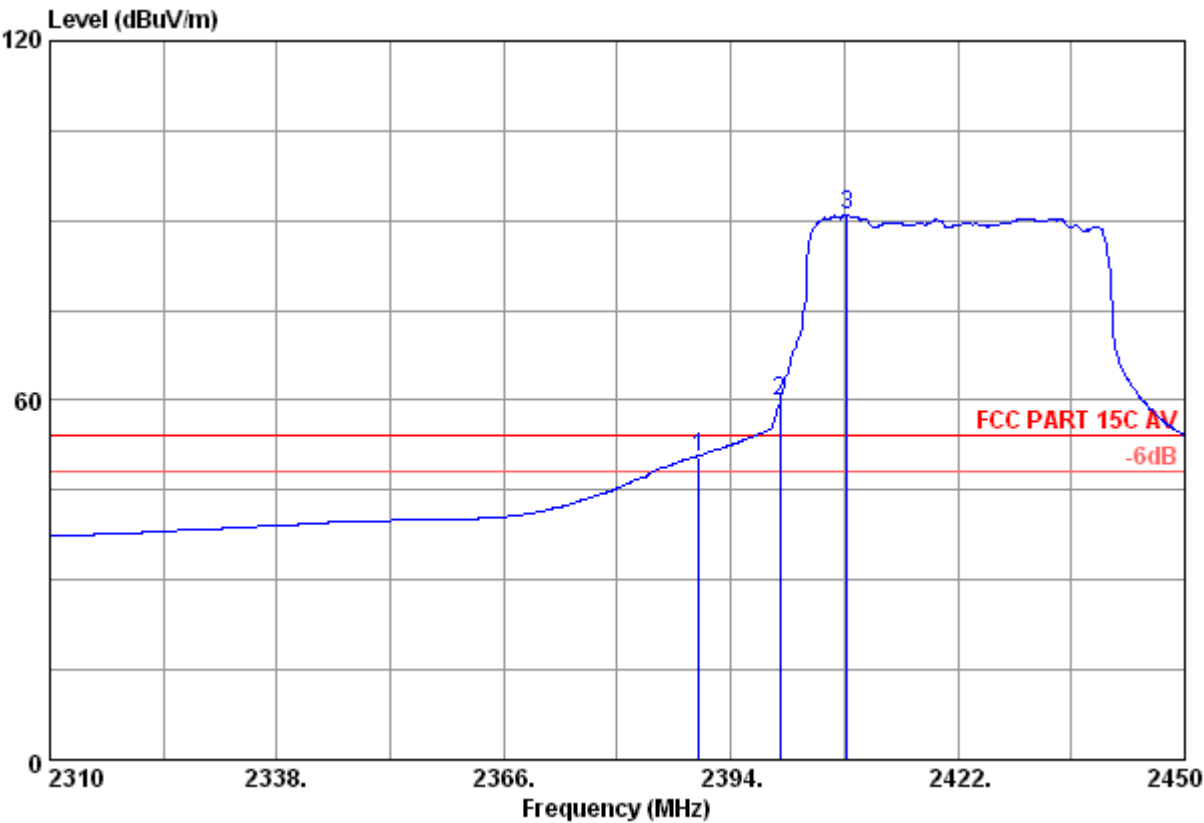
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	59.53	74	14.47	PK	Horizontal
2400.00	73.16	74	0.84	PK	Horizontal
2423.68	94.02	74	-20.02	PK	Horizontal



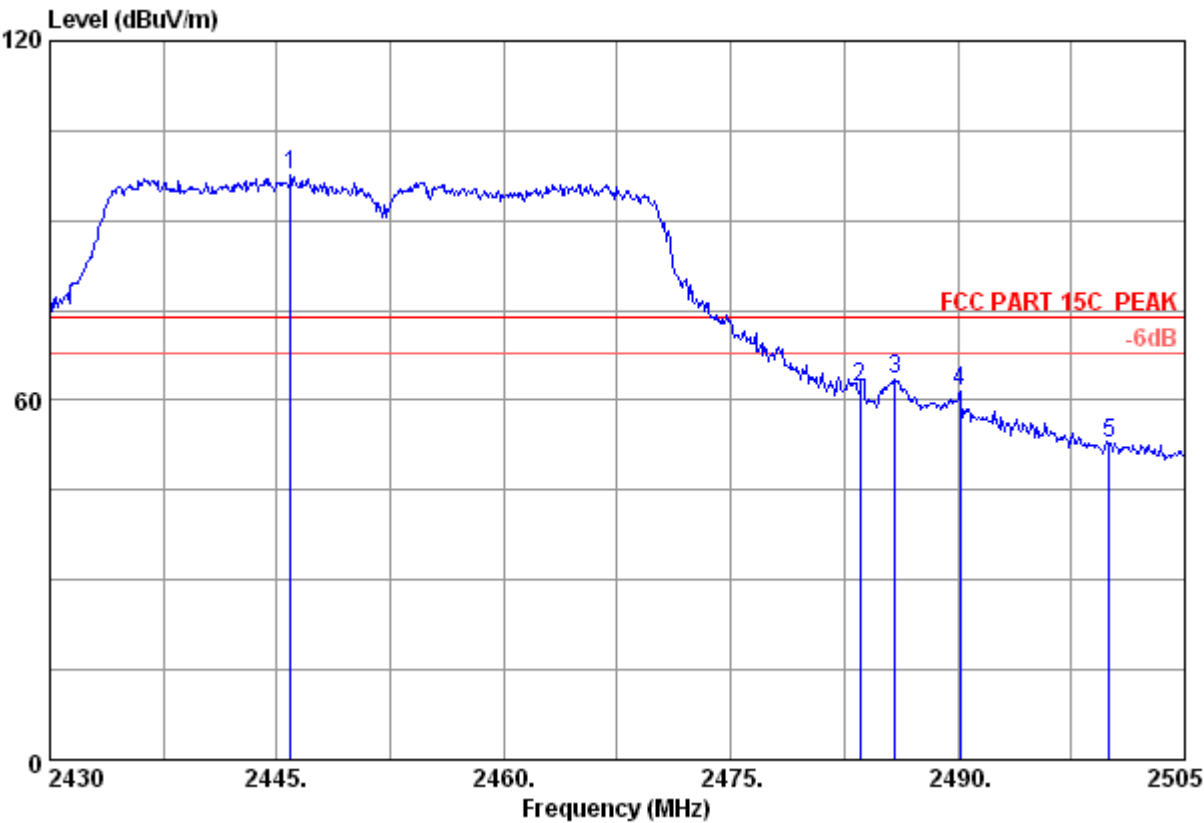
Frequency (MHz)	Corrected Reading (dBUV/m)@3m	FCC Limit (dBUV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	42.51	54	11.49	AV	Horizontal
2400.00	48.48	54	5.52	AV	Horizontal
2424.00	75.15	54	-21.18	AV	Horizontal



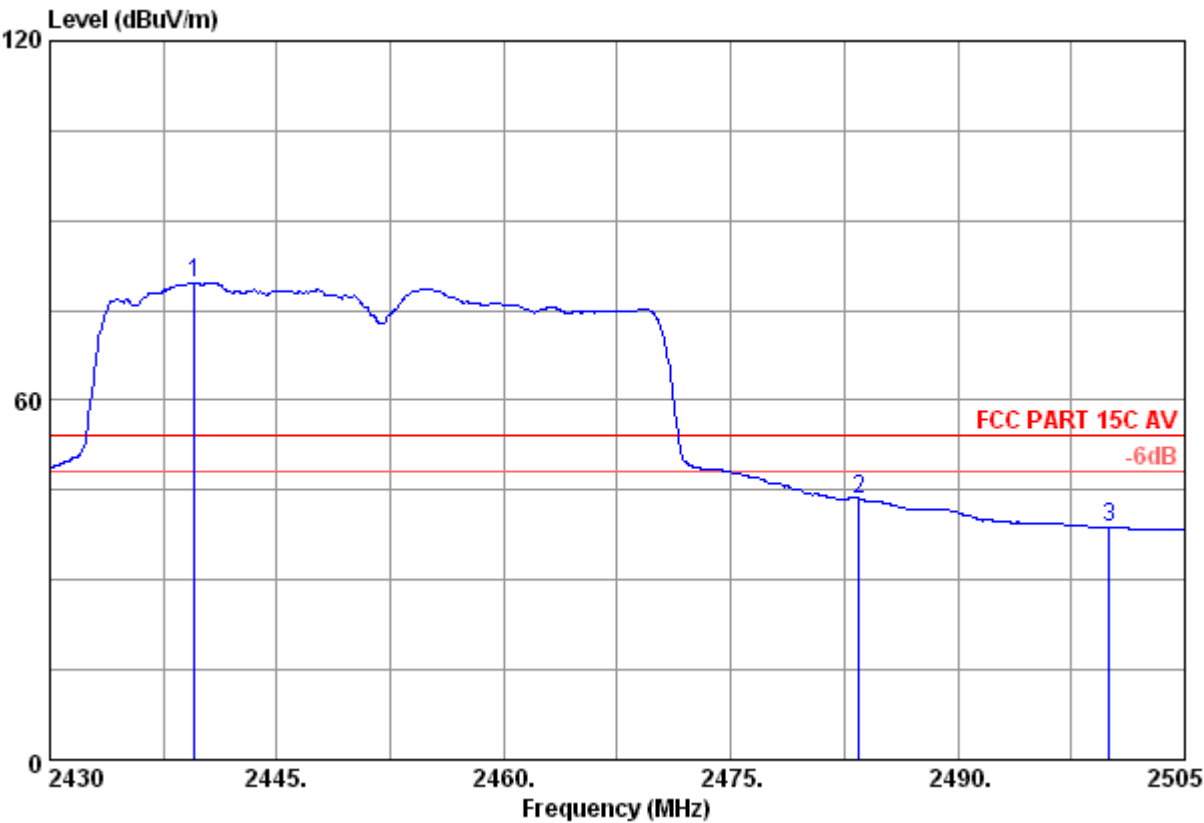
Frequency (MHz)	Corrected Reading (dBUV/m)@3m	FCC Limit (dBUV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	70.83	74	3.17	PK	Vertical
2400.00	86.49	74	-12.49	PK	Vertical
2412.60	108.32	74	-34.32	PK	Vertical



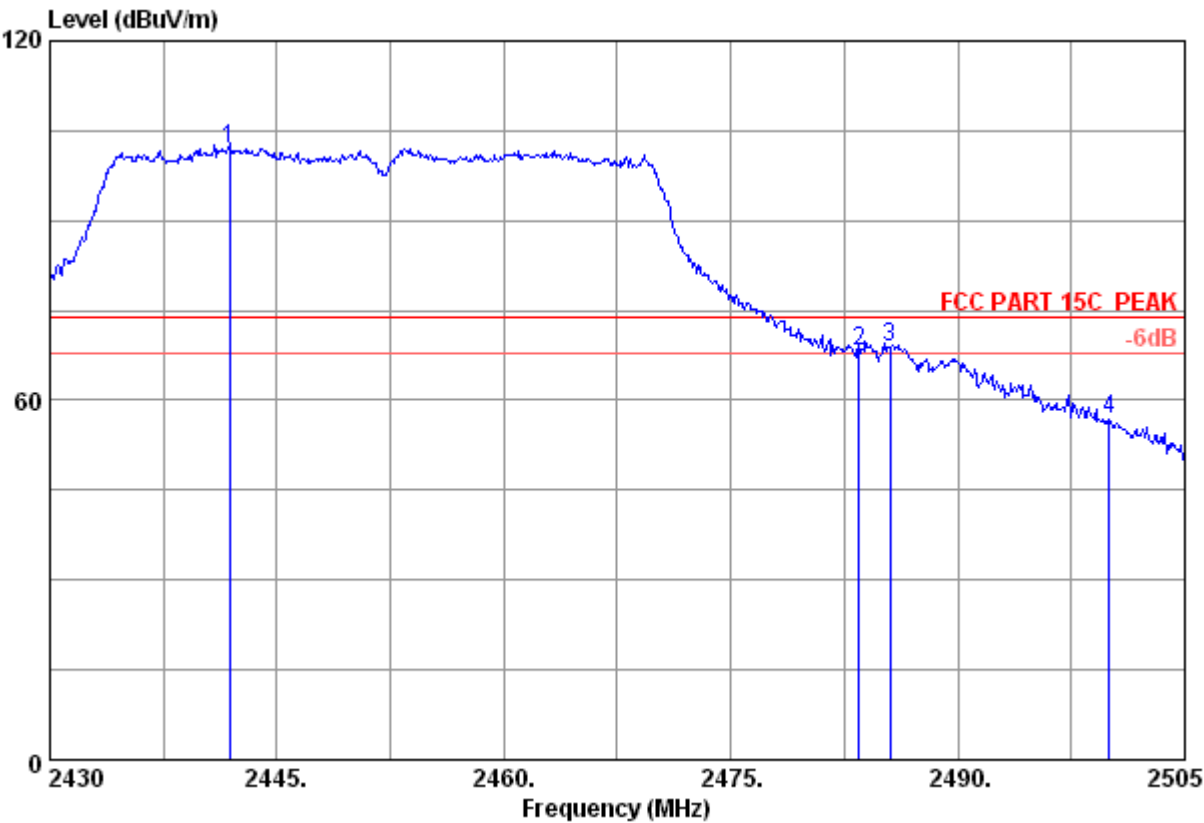
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2390.00	50.46	54	3.54	AV	Vertical
2400.00	59.80	54	-5.80	AV	Vertical
2412.60	90.93	54	-36.93	AV	Vertical



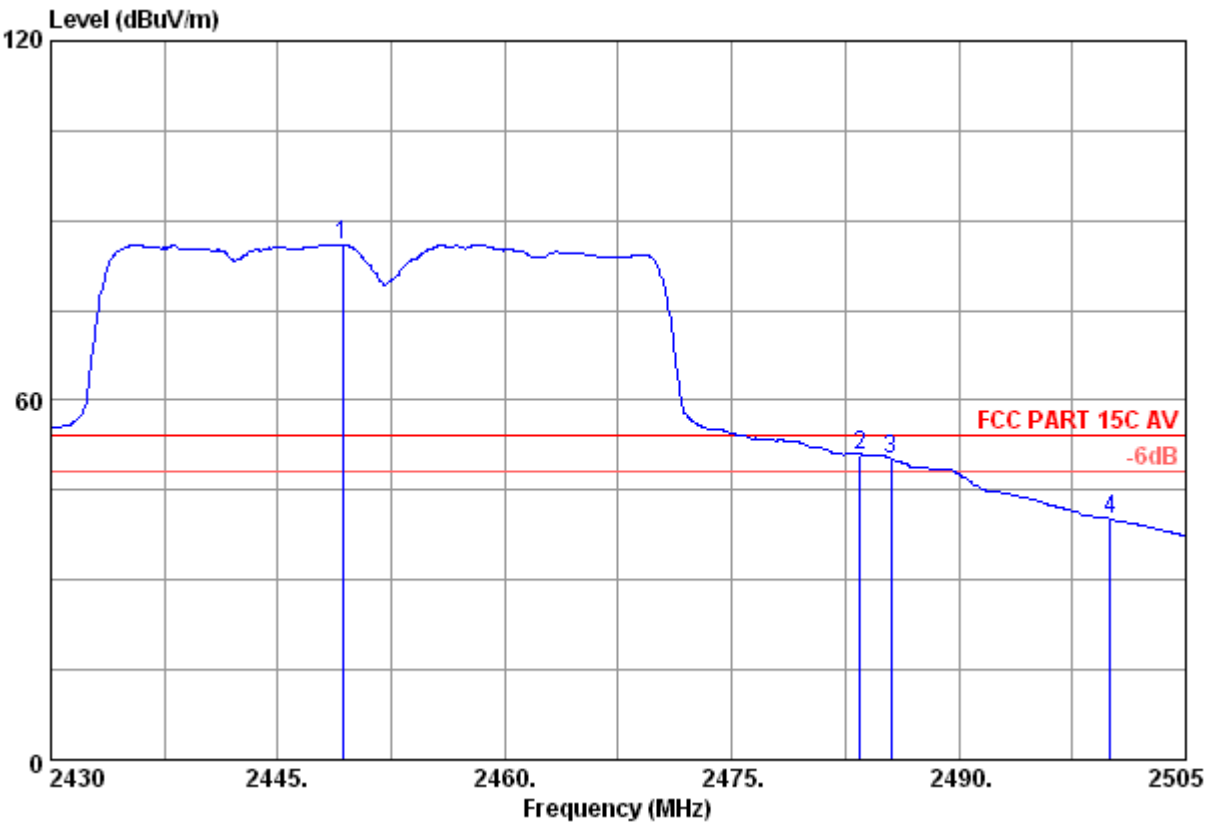
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2445.90	97.62	74	-23.62	PK	Horizontal
2483.50	62.17	74	11.83	PK	Horizontal
2485.88	63.38	74	10.62	PK	Horizontal
2490.12	61.42	74	12.58	PK	Horizontal
2500.00	52.88	74	21.12	PK	Horizontal



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2439.90	79.66	54	-25.66	AV	Horizontal
2483.50	43.53	54	10.47	AV	Horizontal
2500.00	38.71	54	15.29	AV	Horizontal



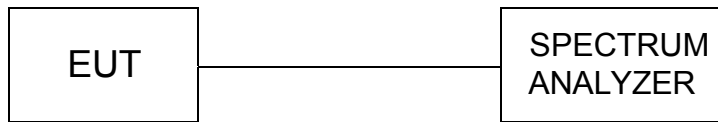
Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2441.85	102.05	74	-28.05	PK	Vertical
2483.50	68.26	74	5.74	PK	Vertical
2485.50	68.90	74	5.10	PK	Vertical
2500.00	56.90	74	17.10	PK	Vertical



Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Polarization
2449.28	86.03	54	-32.03	AV	Vertical
2483.50	50.94	54	3.06	AV	Vertical
2485.50	50.25	54	3.75	AV	Vertical
2500.00	40.18	54	13.82	AV	Vertical

4.6. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. Set CENTER FREQUENCY = Frequency from Power Spectral Density Test Matrix
2. Set SPAN = 20 MHz (For devices with a nominal 40 MHz BW, 50 MHz span will be needed)
3. Set REFERENCE LEVEL = 20 dBm
4. Set ATTENUATION = 0 dB (add internal attenuation, if necessary)
5. Set SWEEP TIME = Coupled
6. Set RBW = 3 kHz
7. Set VBW = 10 kHz
8. Set DETECTOR = Peak
9. Set MKR = Center Frequency
10. Set TRACE = CLEAR WRITE

Place the radio in continuous transmit mode. Set the TRACE to MAX HOLD, and after the trace stabilizes, the TRACE to VIEW. Set the marker on the peak of the signal and then adjust the center frequency of the spectrum analyzer to the marker frequency. After viewing the EUT waveform on the spectrum analyzer, perform the following spectrum analyzer functions to capture the trace:

11. Set SPAN = 300 kHz
12. Set SWEEP TIME = 100 s
13. Set TRACE = MAX HOLD
14. Set MKR = PEAK SEARCH
15. Record the marker level for the particular mode. Repeat these steps for other device modes.

LIMIT

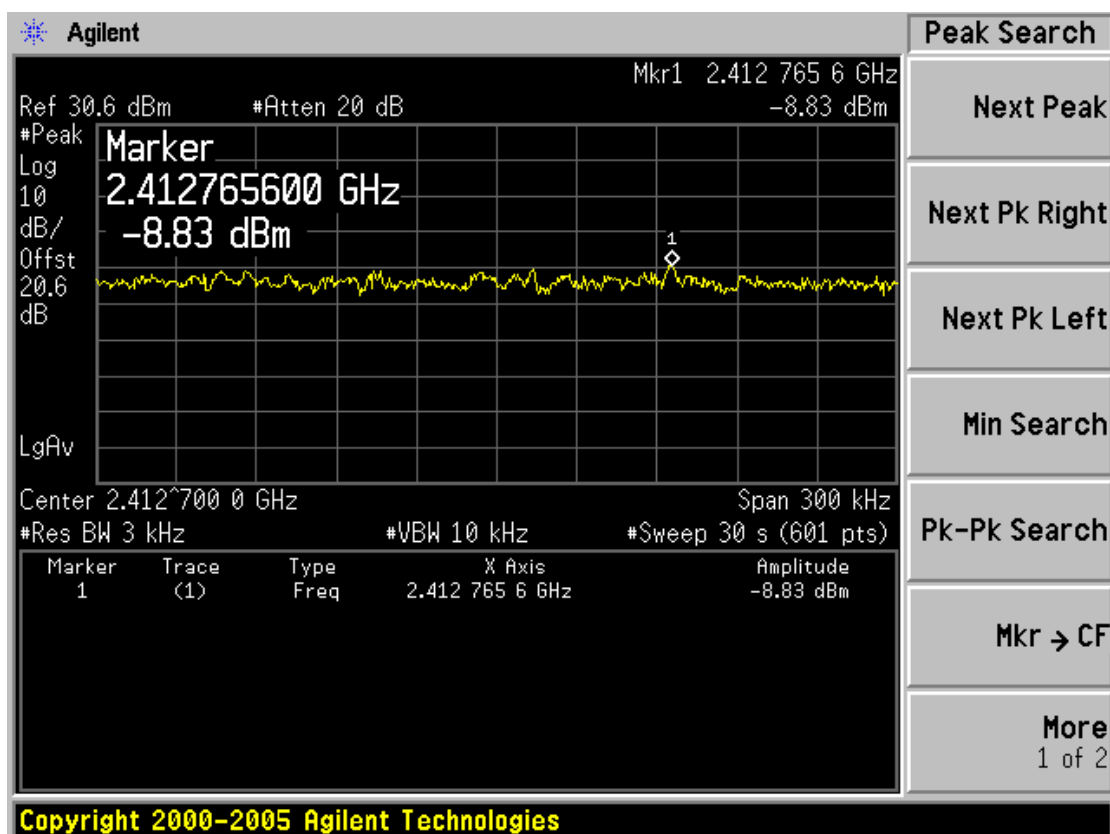
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

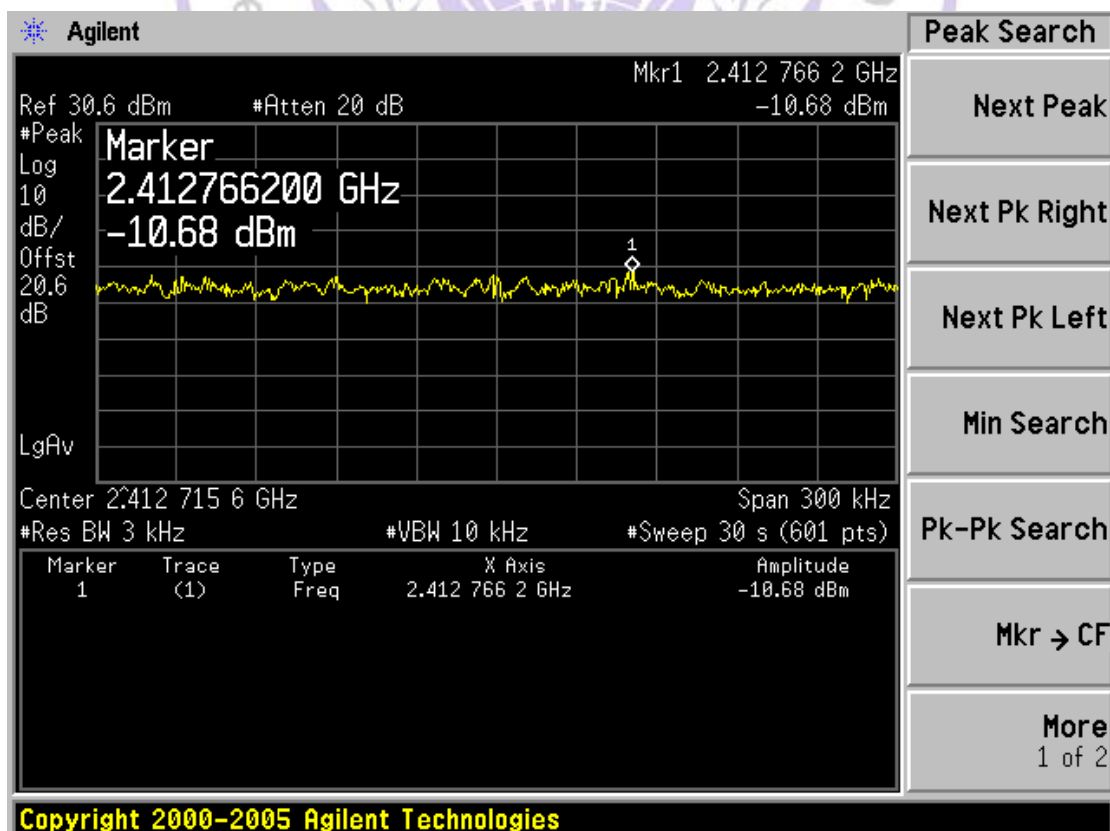
Channel	Channel Frequency (MHz)	PSD (dBm/3KHz)			Maximum limit (dBm)	PASS / FAIL
		Ant1	Ant 2	Total		
1	2412	-8.83	-10.68	N/A	8	PASS
6	2437	-9.47	-10.61	N/A	8	PASS
11	2462	-9.23	-10.25	N/A	8	PASS
1	2412	-15.55	-16.36	N/A	8	PASS
6	2437	-13.02	-14.16	N/A	8	PASS
11	2462	-14.98	-14.98	N/A	8	PASS
1	2412	-14.69	-17.32	-12.80	8	PASS
6	2437	-11.52	-13.05	-9.21	8	PASS
11	2462	-12.70	-14.11	-10.34	8	PASS
3	2422	-18.20	-18.94	-15.54	8	PASS
6	2437	-15.73	-16.91	-13.27	8	PASS
9	2452	-20.71	-21.13	-17.90	8	PASS

For 802.11b Mode:

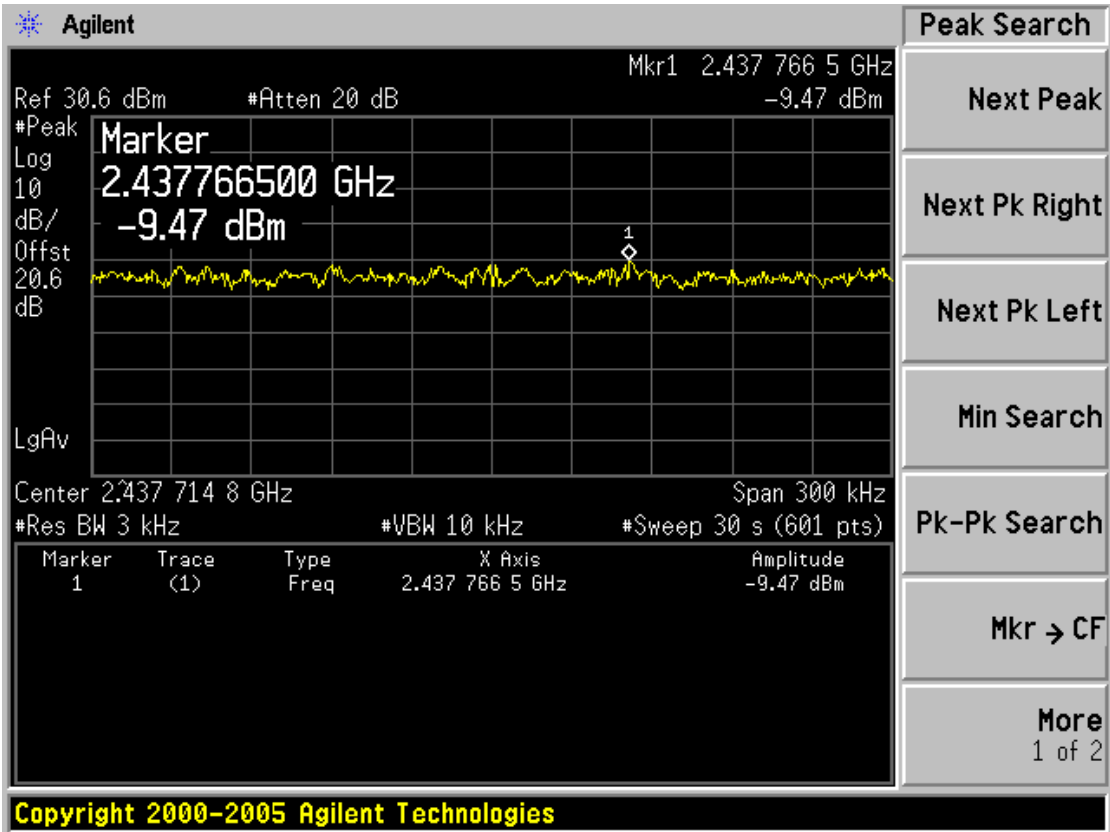
CH1 @ANT 1



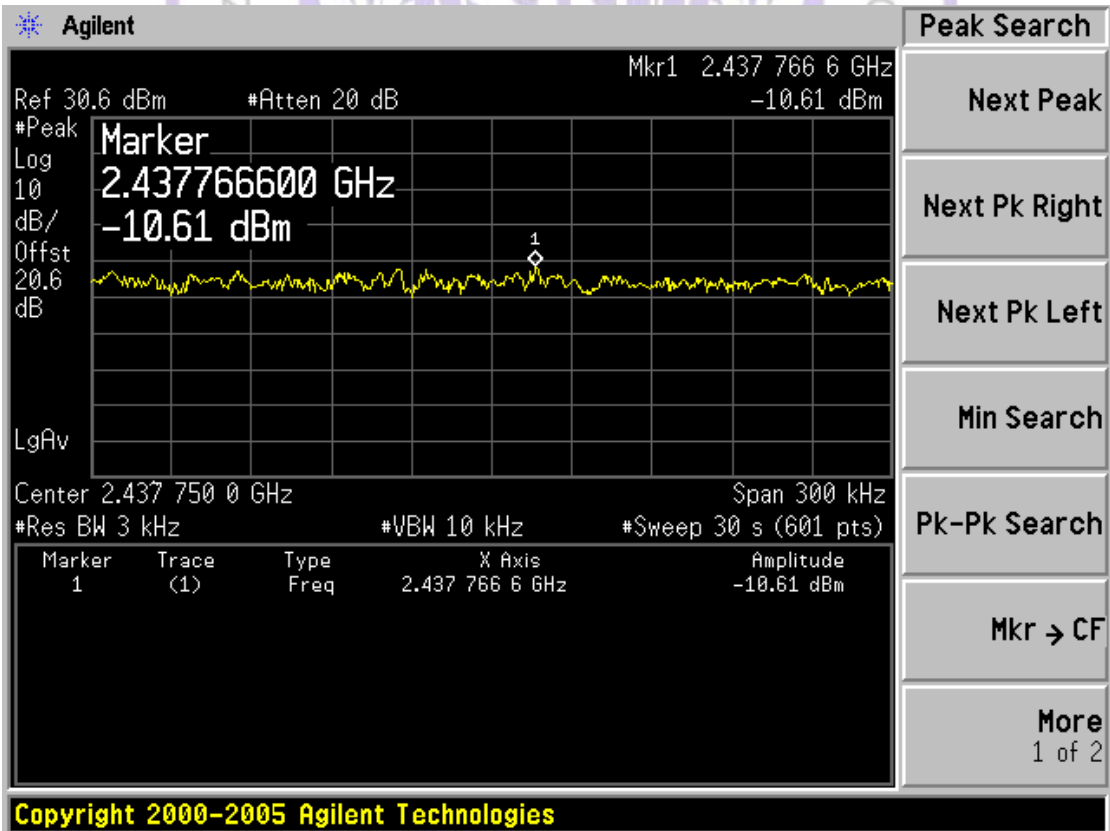
CH1 @ANT 2



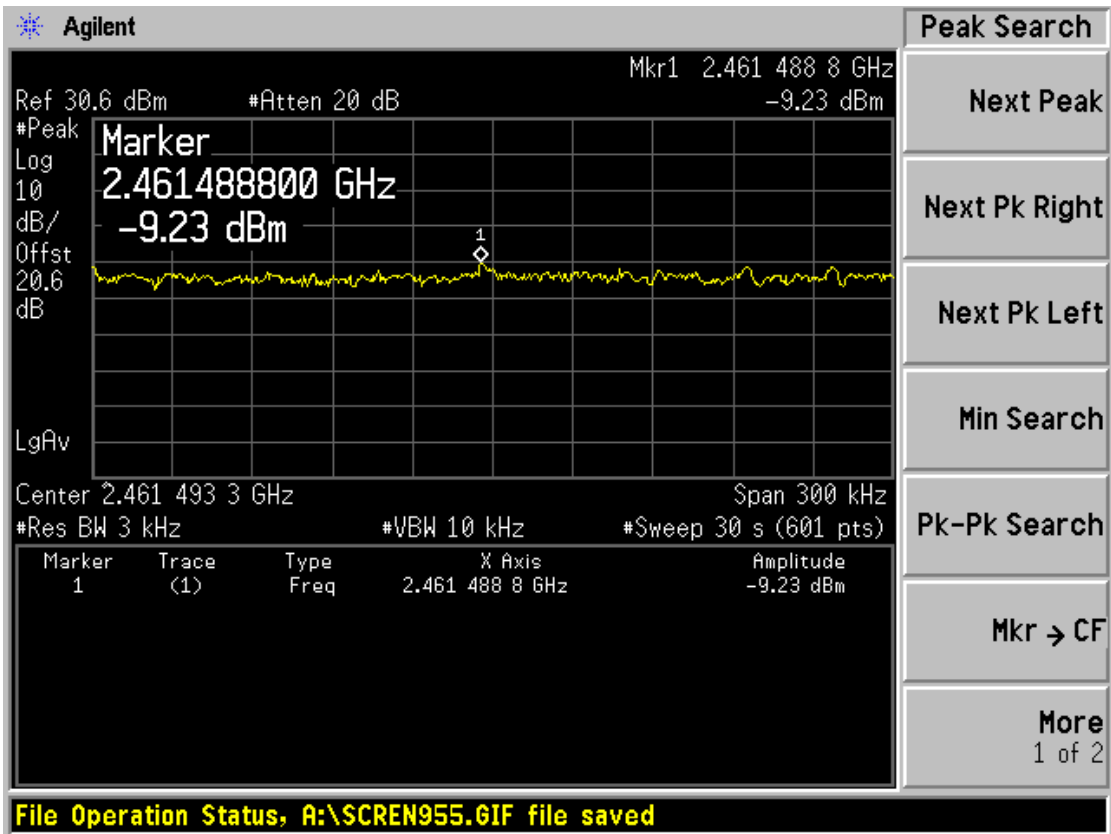
CH6 @ANT 1



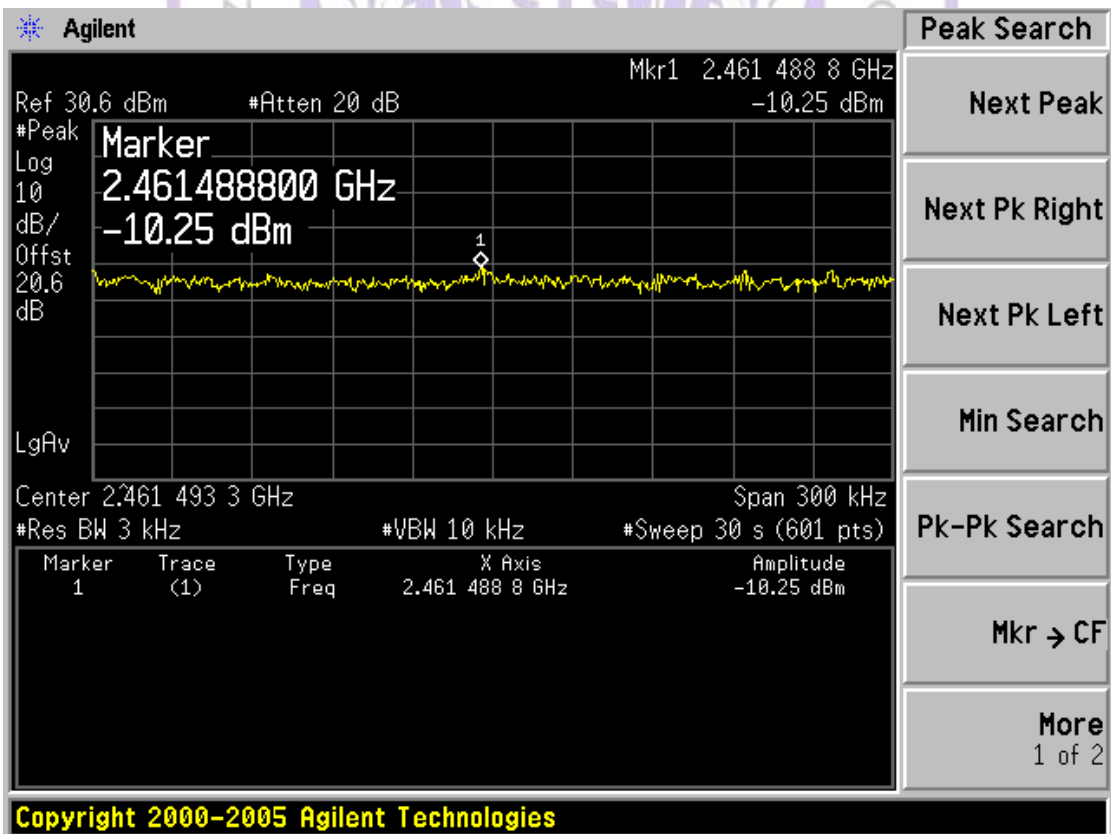
CH6 @ANT 2



CH11 @ANT 1

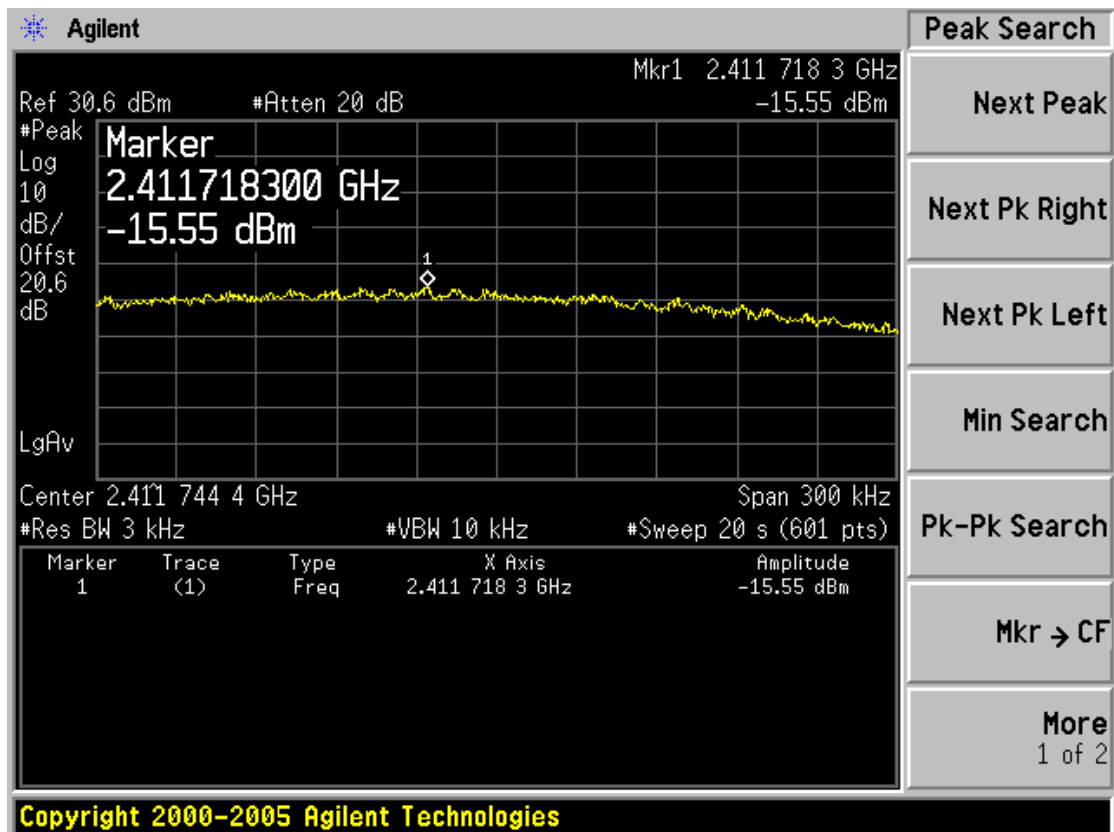


CH11 @ANT 2

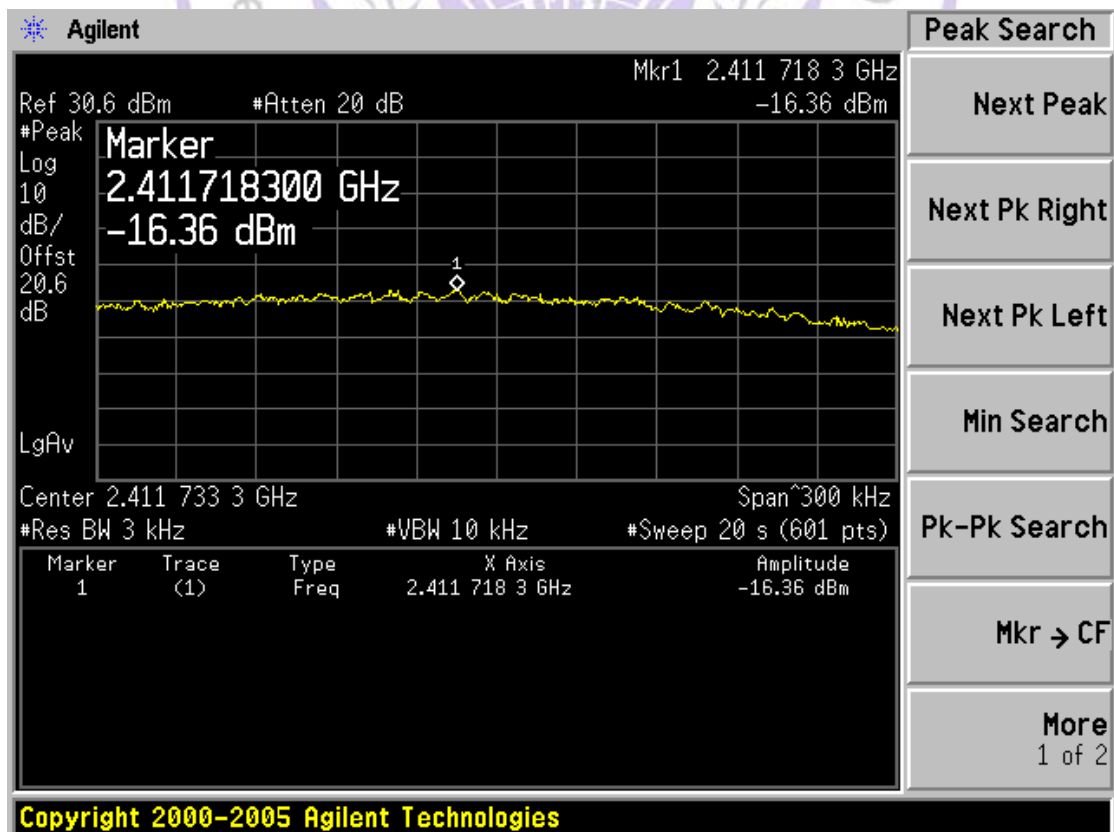


For 802.11g Mode:

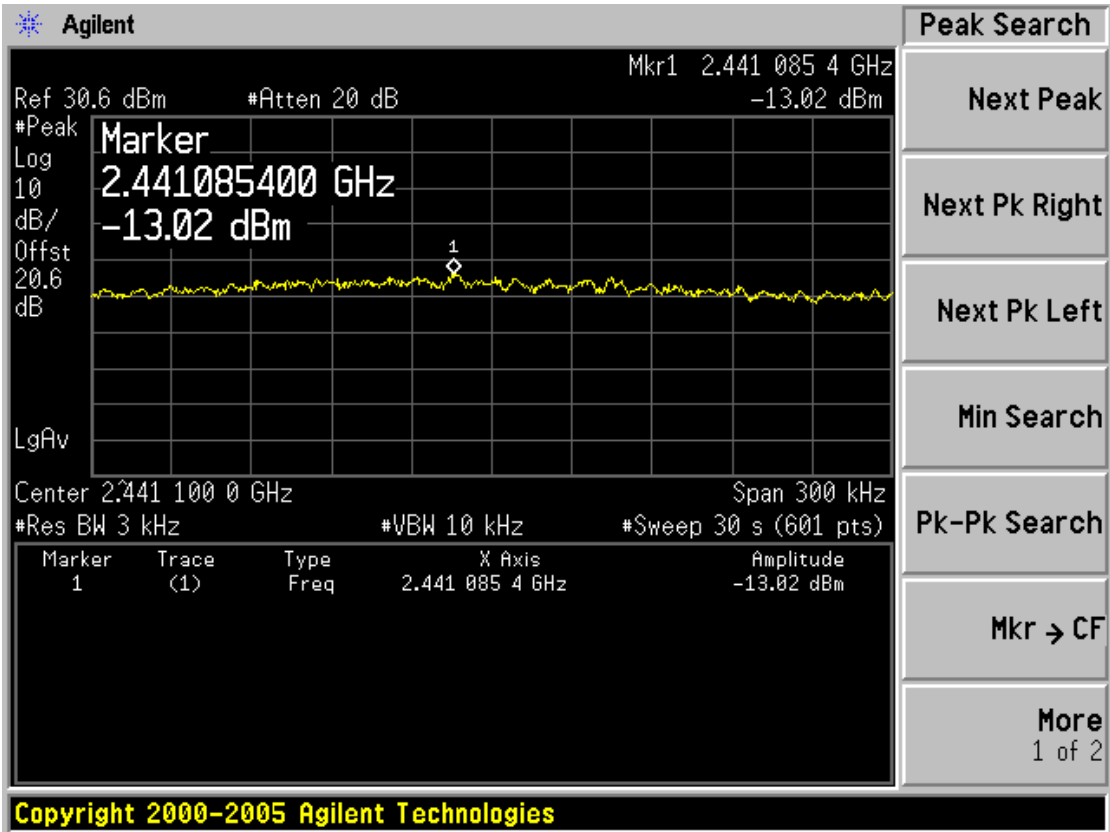
CH1 @ANT 1



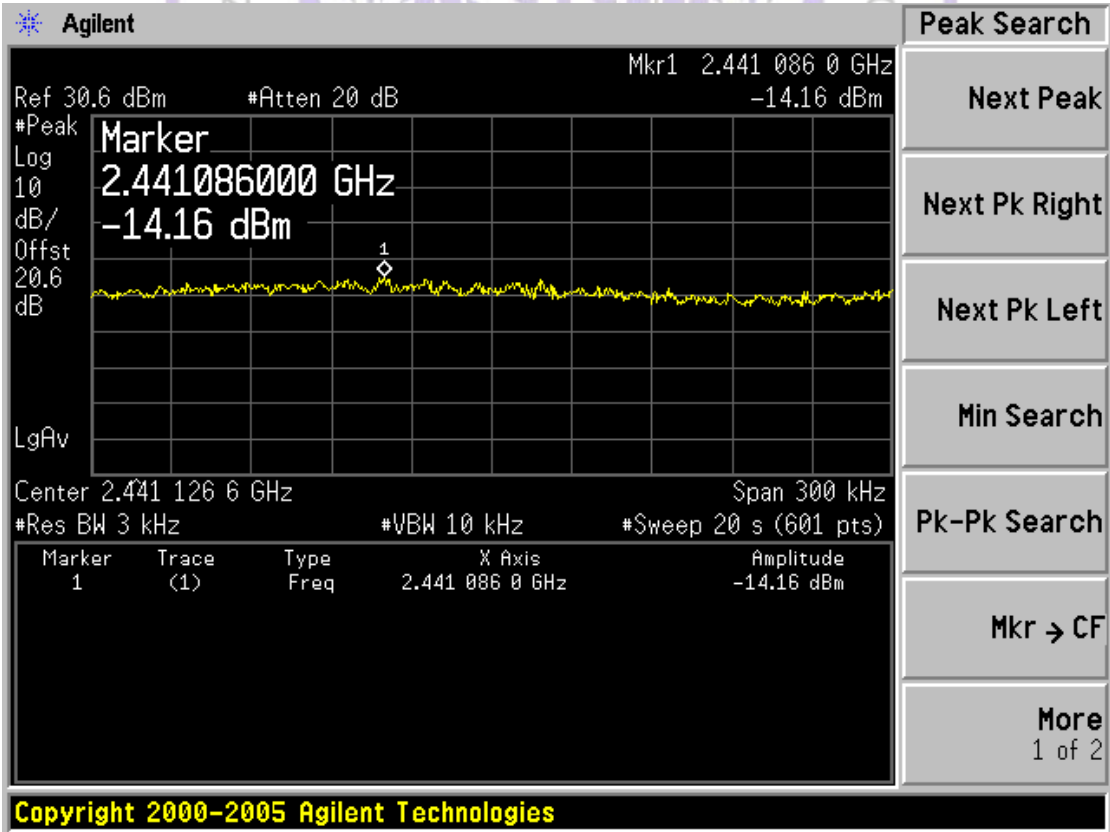
CH1 @ANT 2



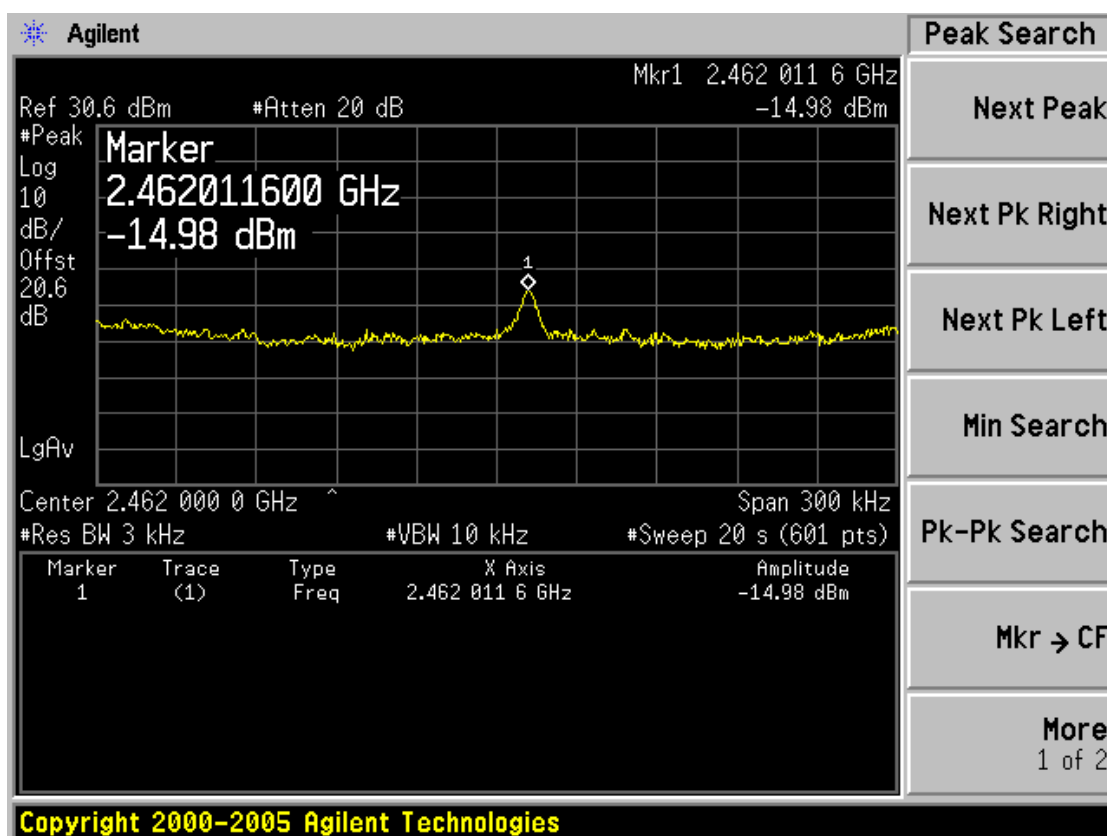
CH6 @ANT 1



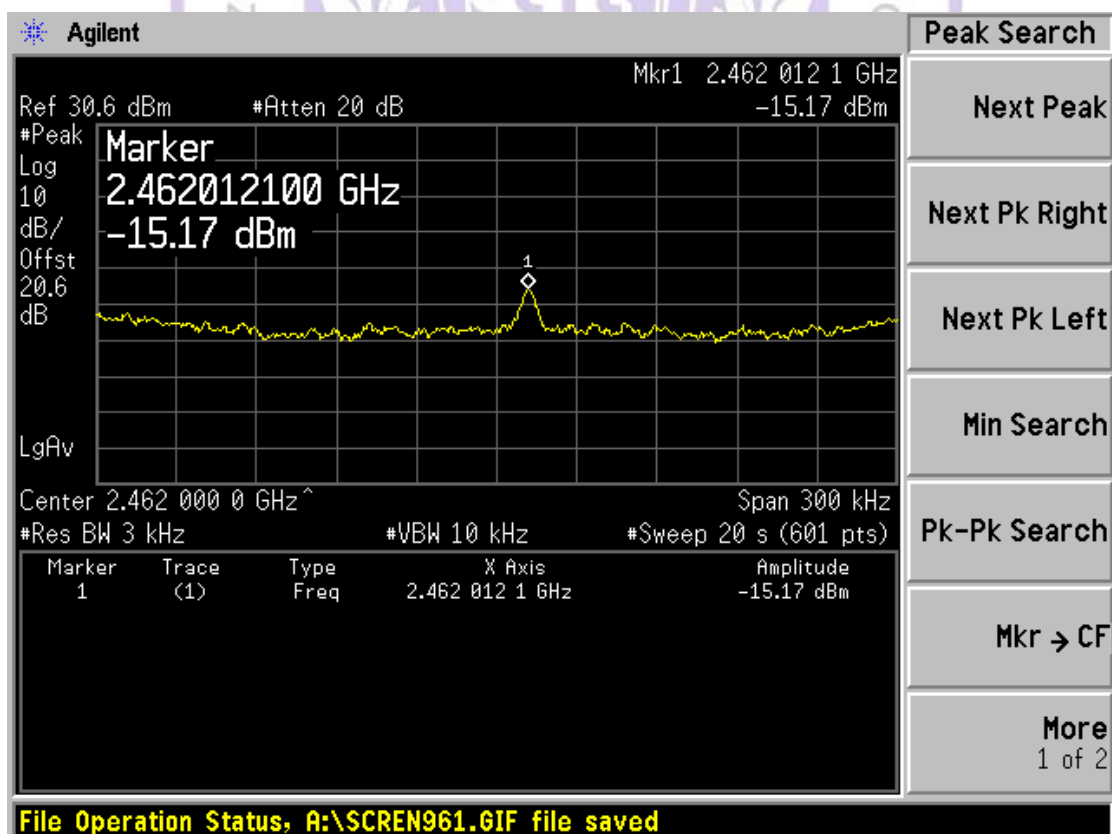
CH6 @ANT 2



CH11 @ANT 1

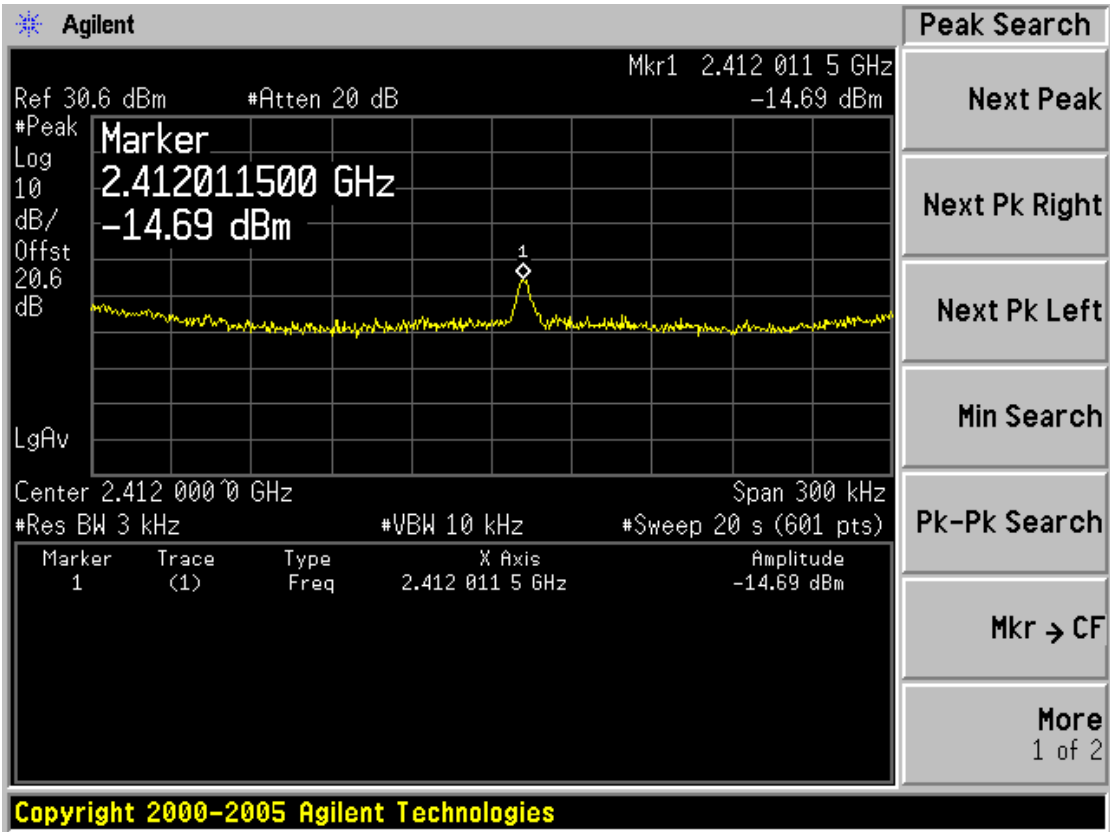


CH11 @ANT 2

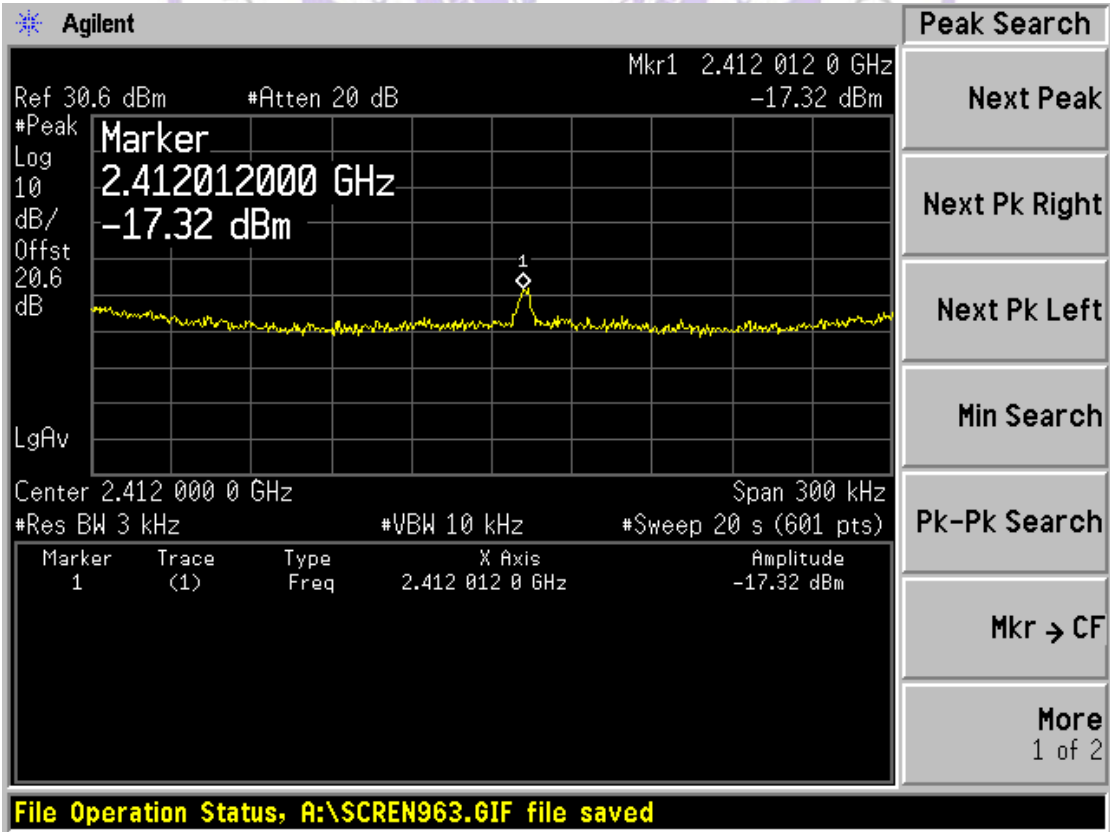


For 802.11n (20MHz) Mode:

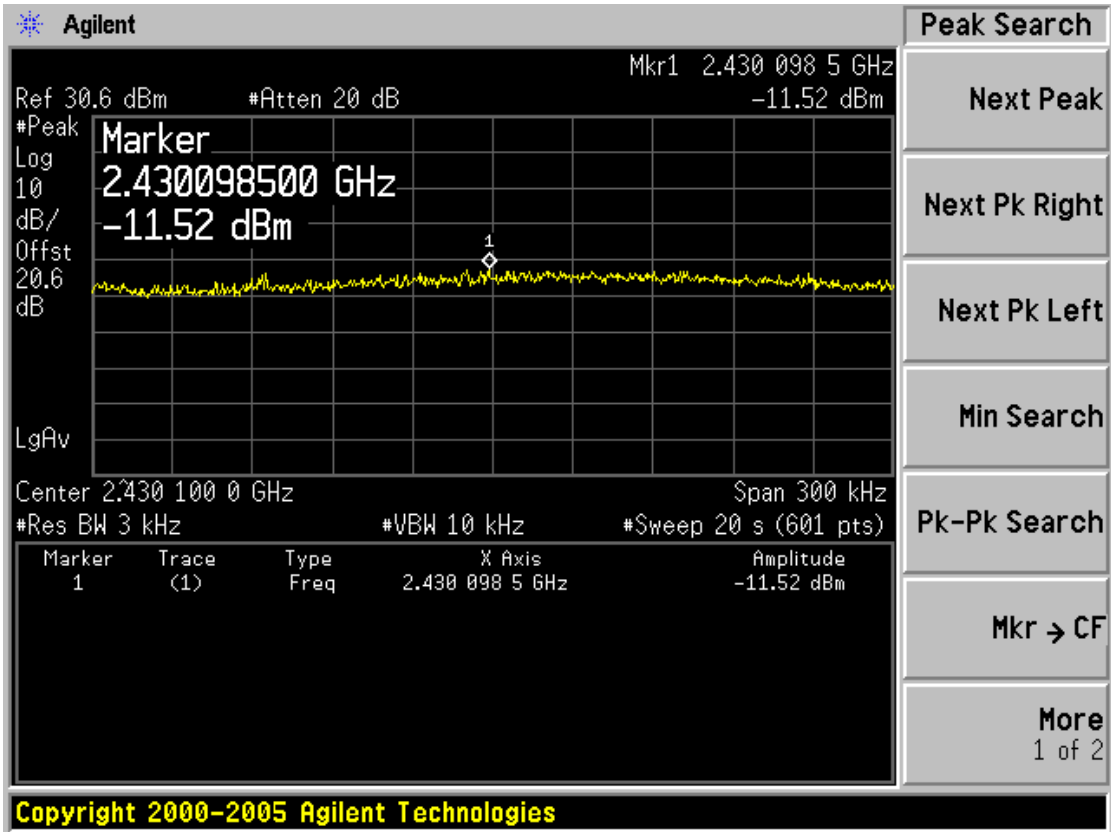
CH1 @ANT 1



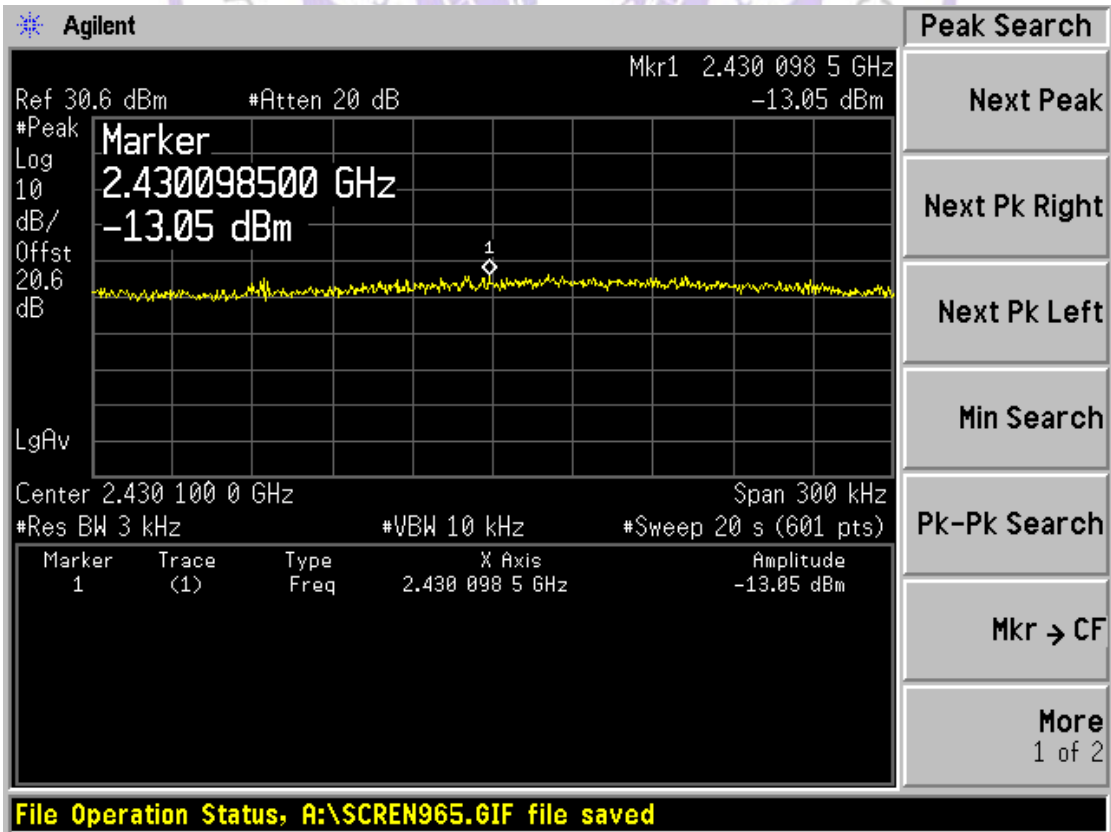
CH1 @ANT 2



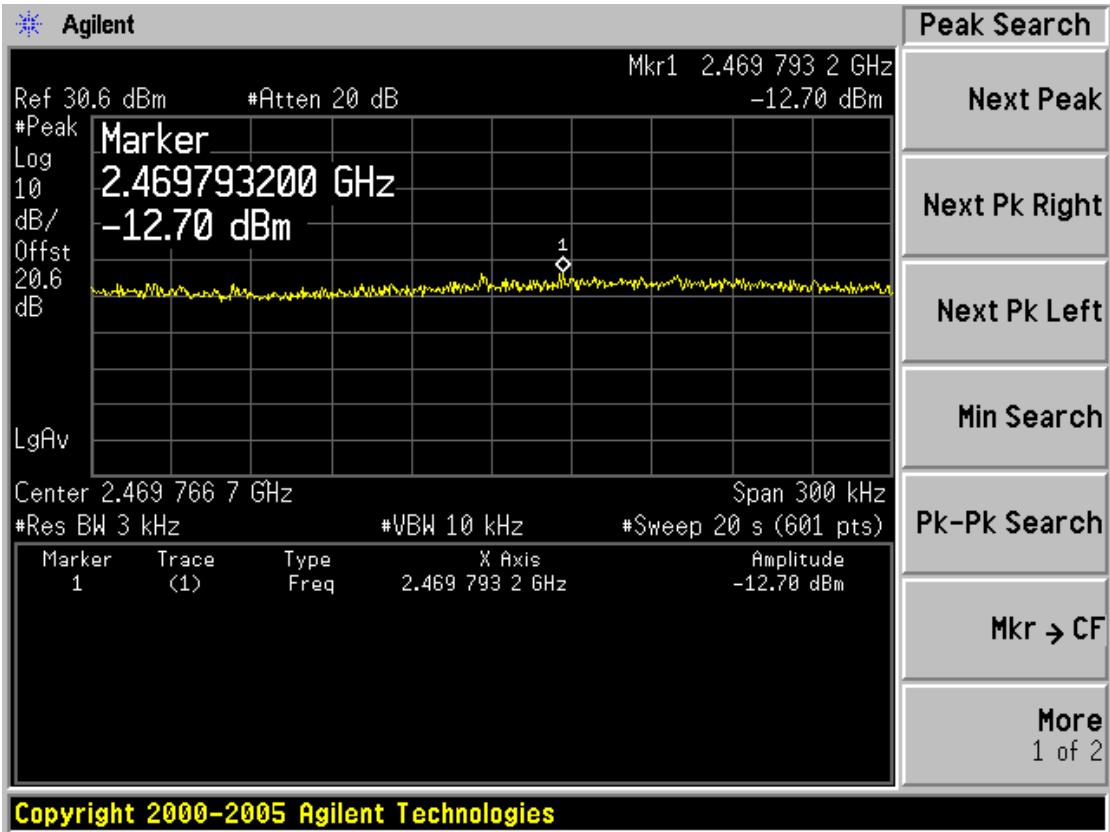
CH6 @ANT 1



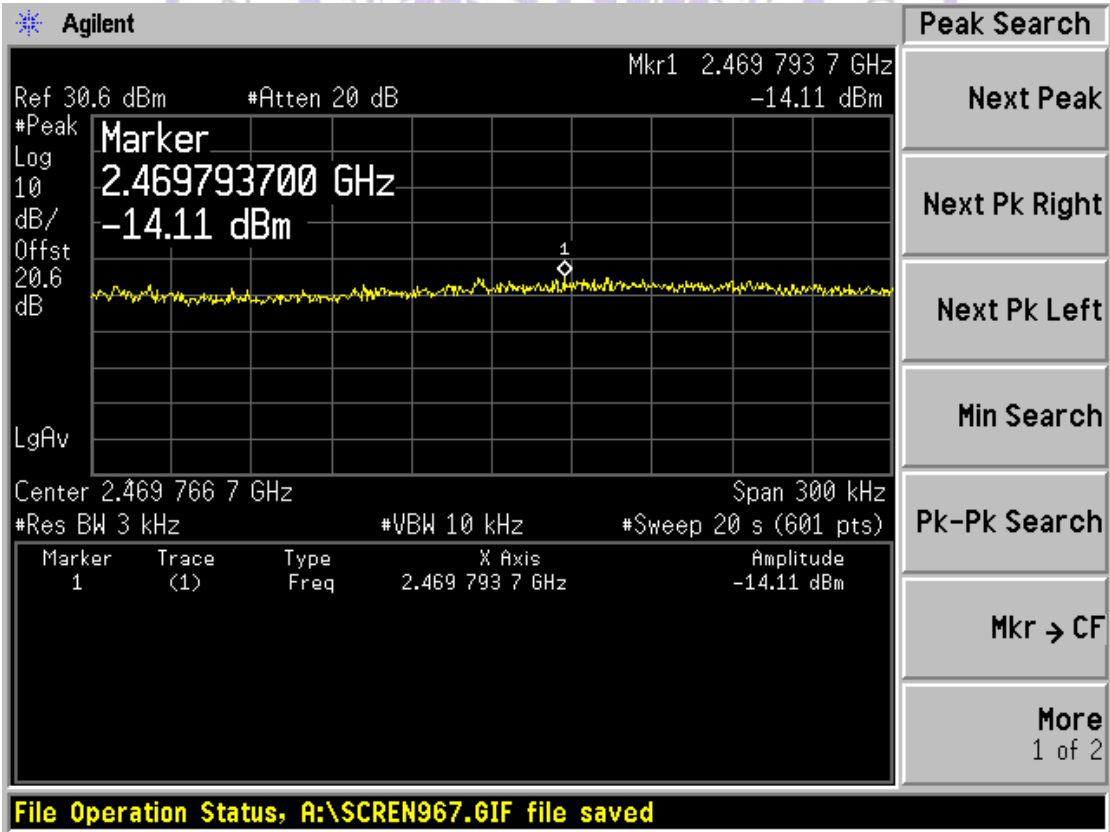
CH6 @ANT 2



CH11 @ANT 1

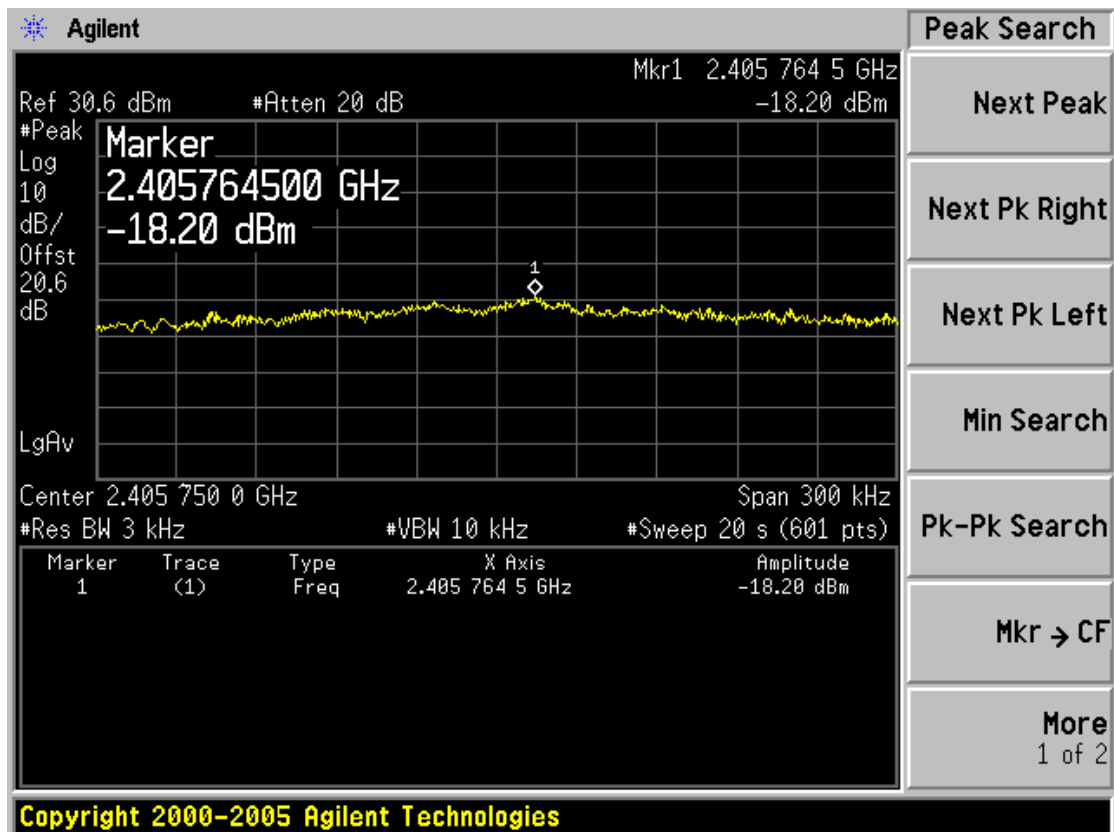


CH11 @ANT 2

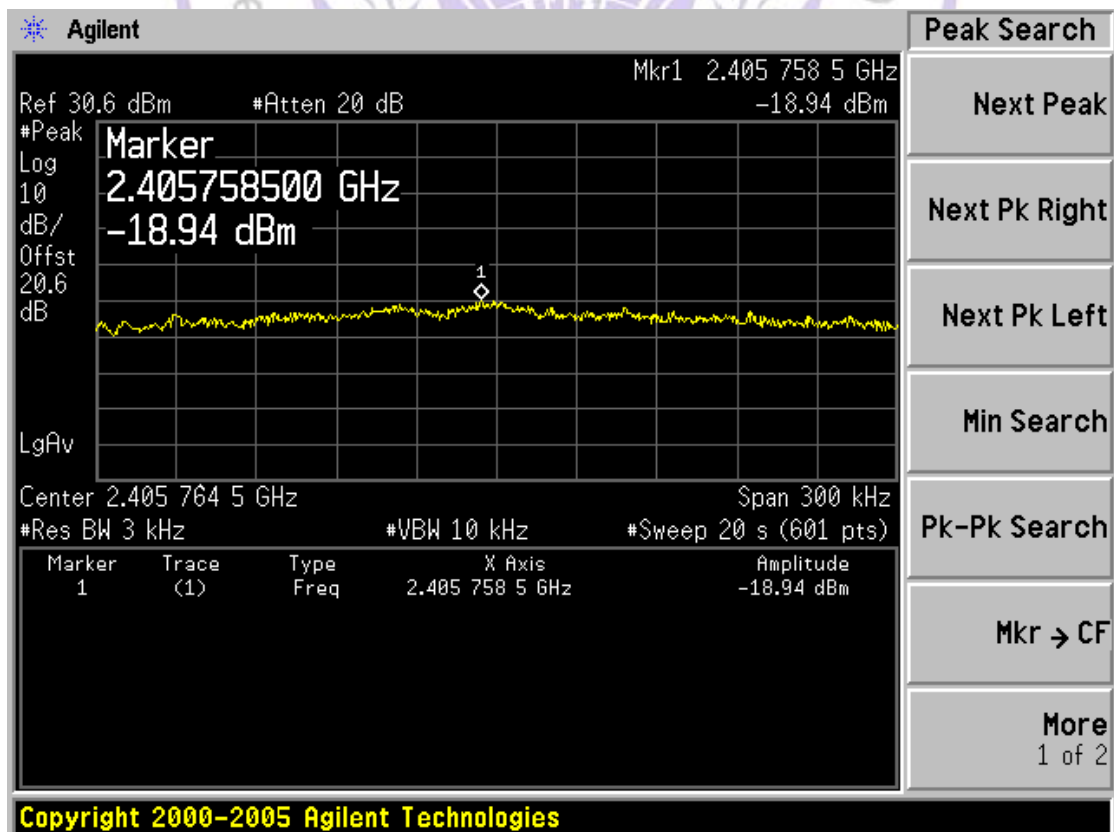


For 802.11n (40MHz) Mode:

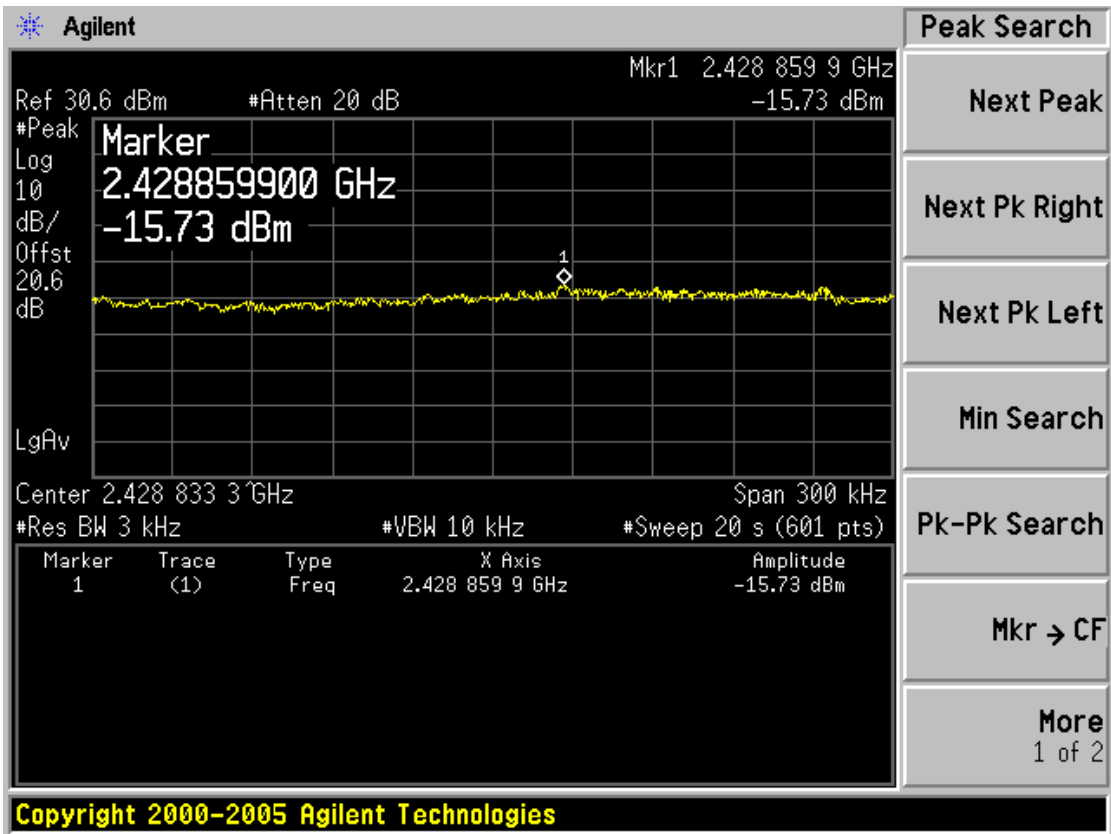
CH3 @ANT 1



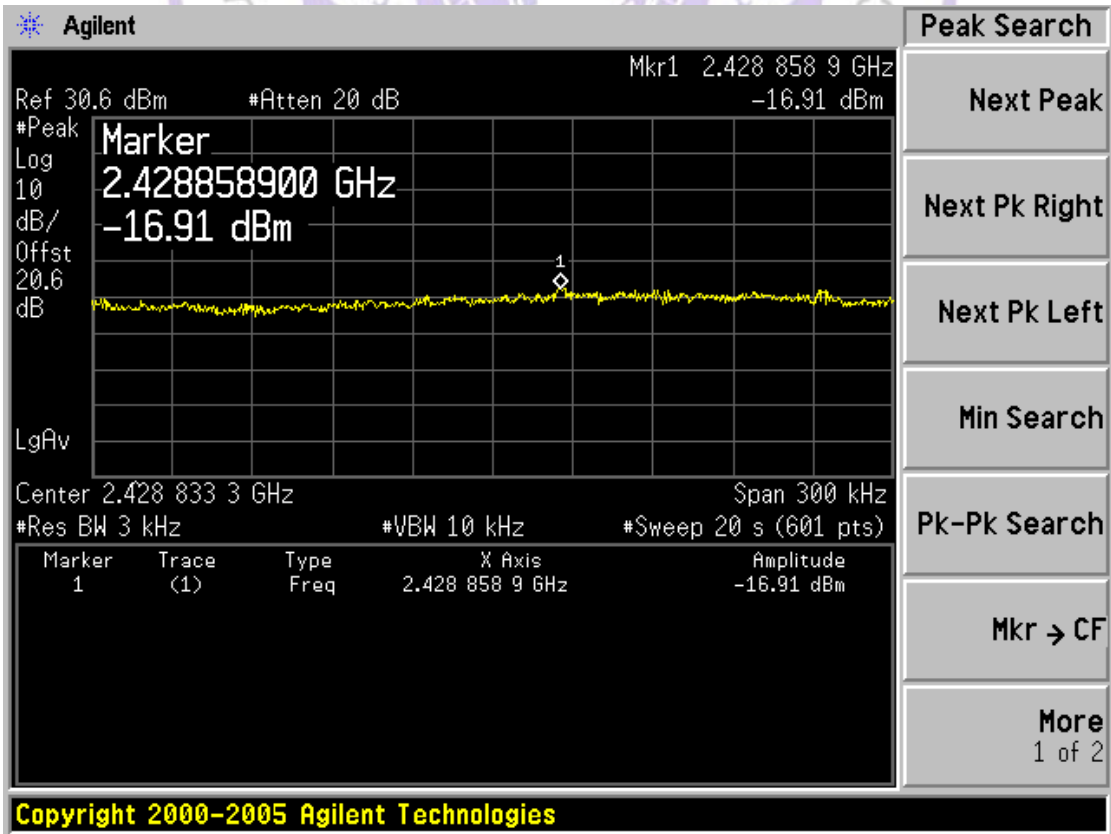
CH3 @ANT 2



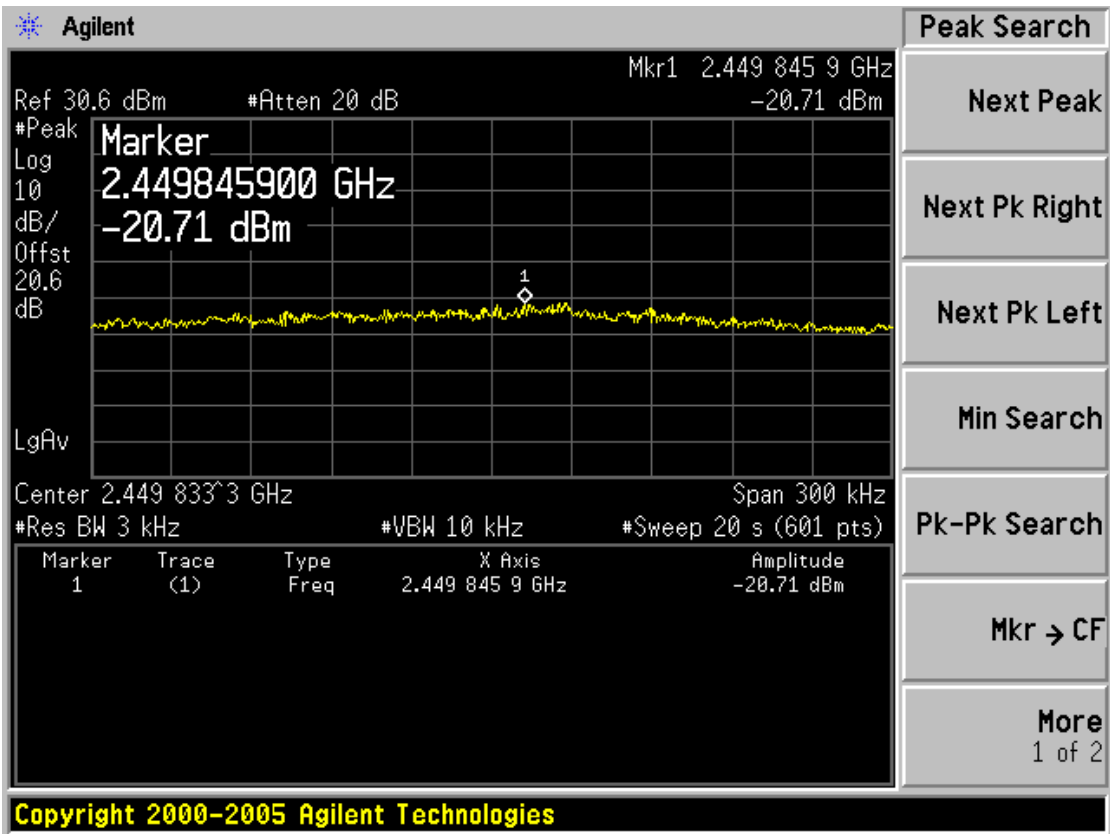
CH6 @ANT 1



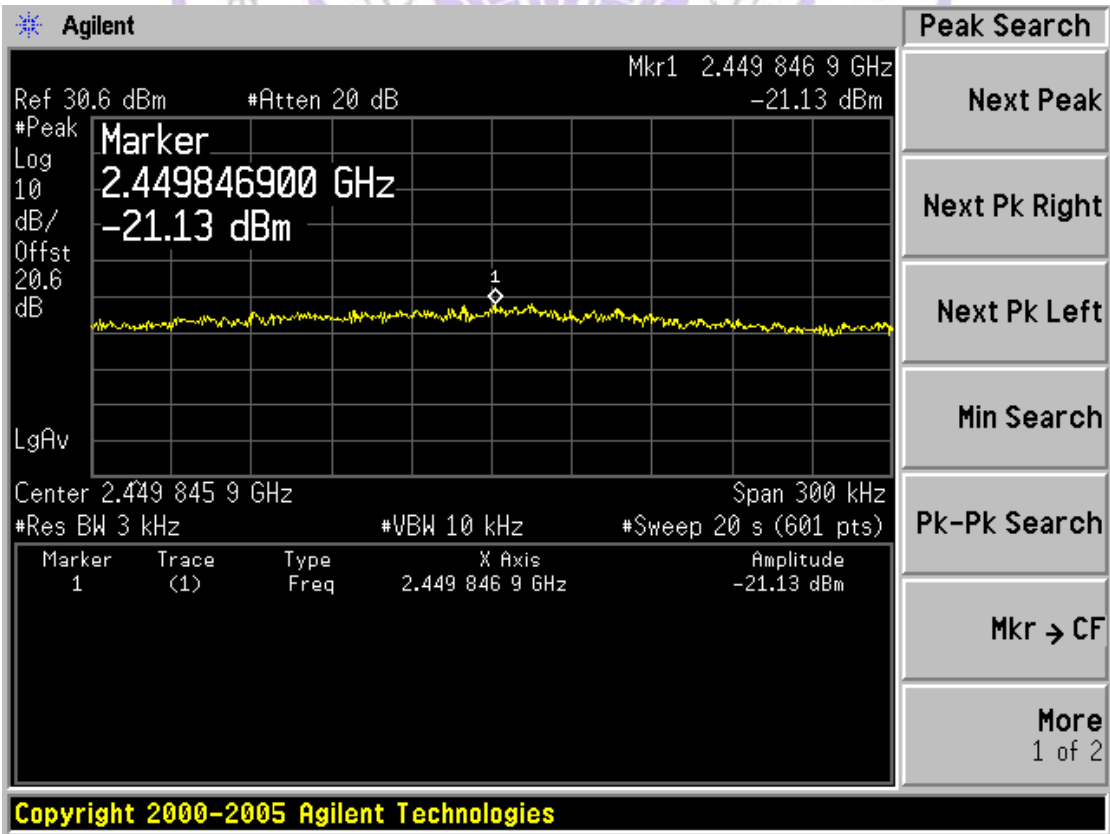
CH6 @ANT 2



CH9 @ANT 1

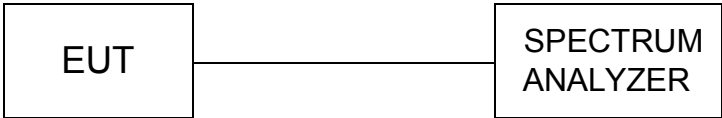


CH9 @ANT 2



4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequency range from 30MHz to 26.5GHz.

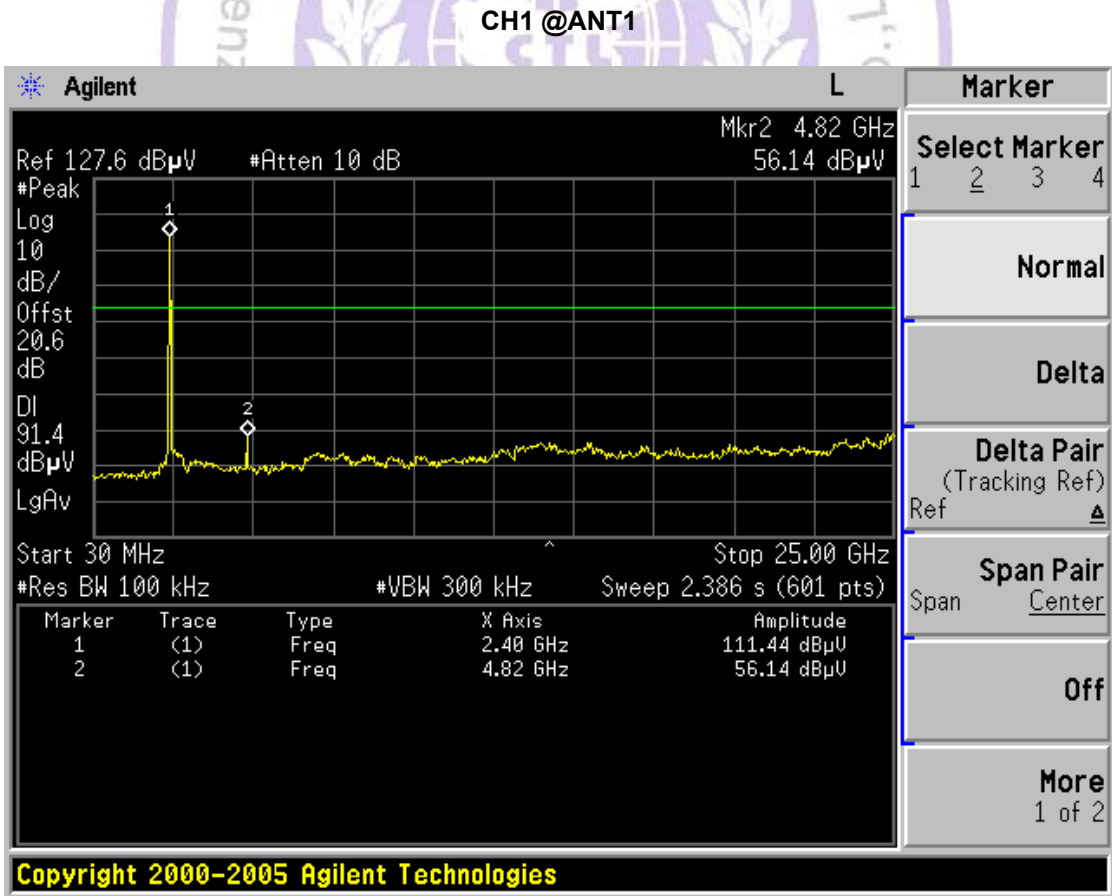
LIMIT

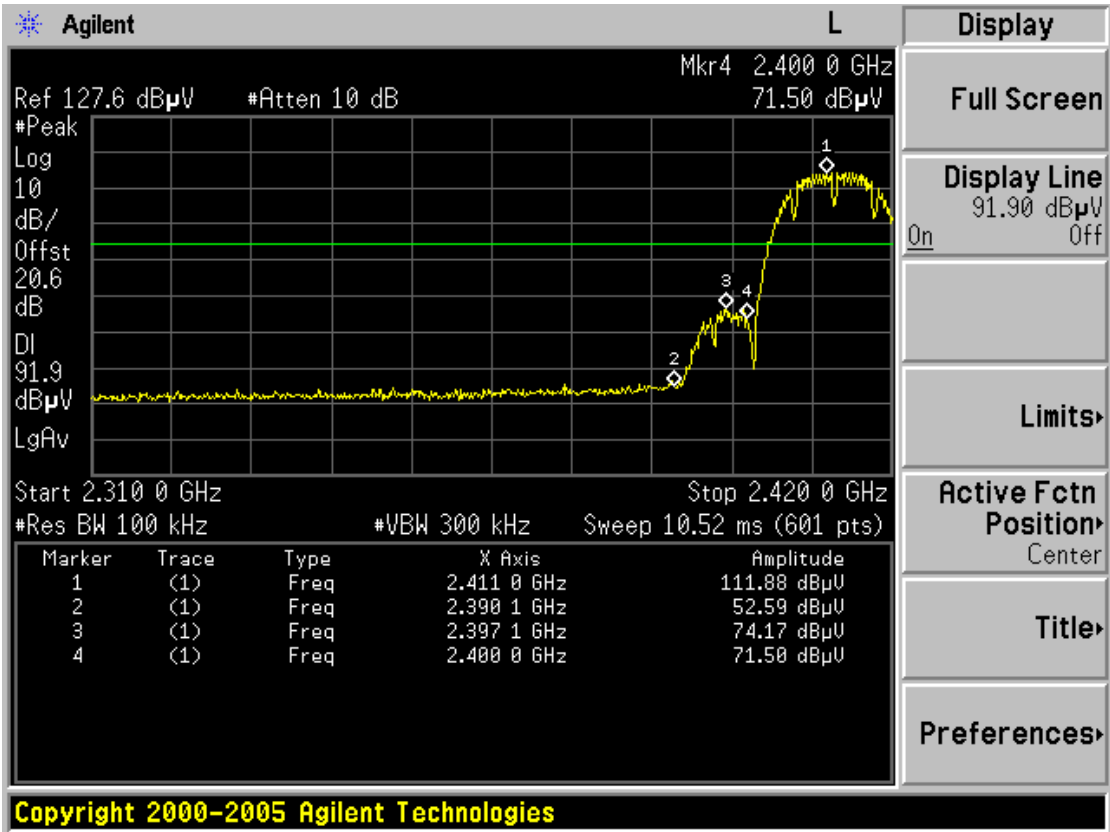
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

TEST RESULTS

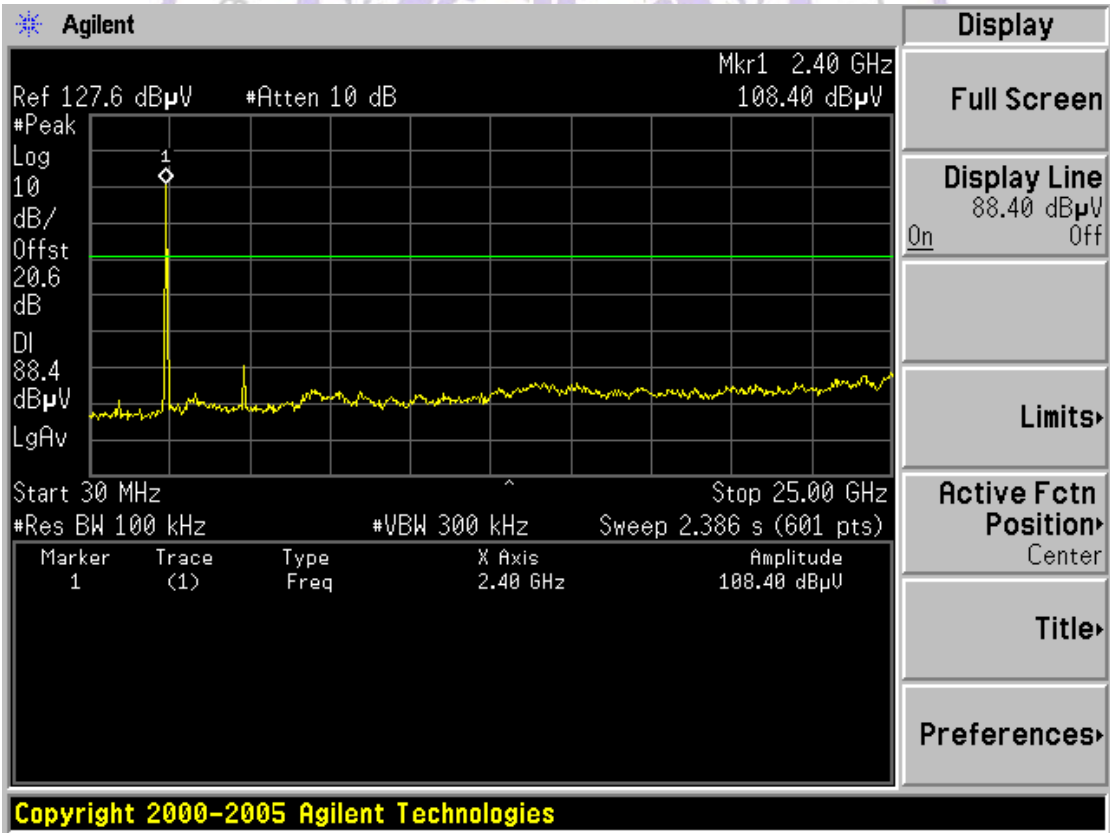
Photos of Spurious RF Conducted Emission Measurement

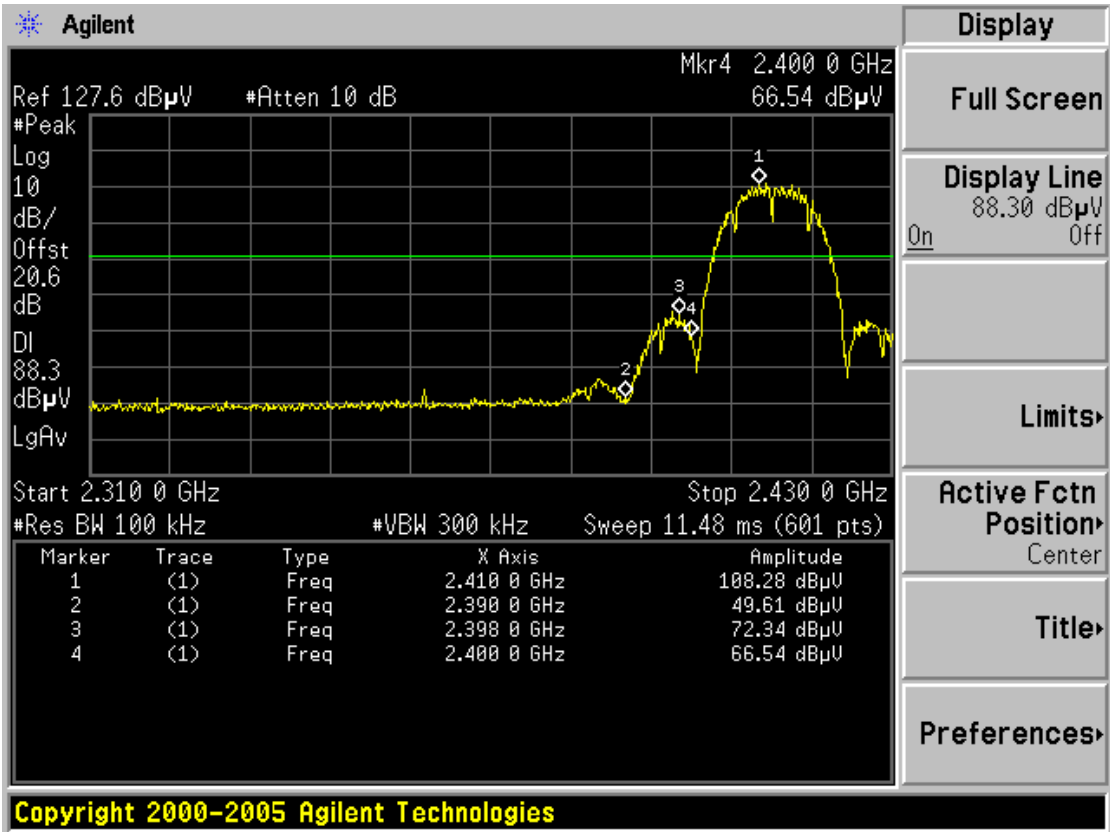
For 802.11b Mode:



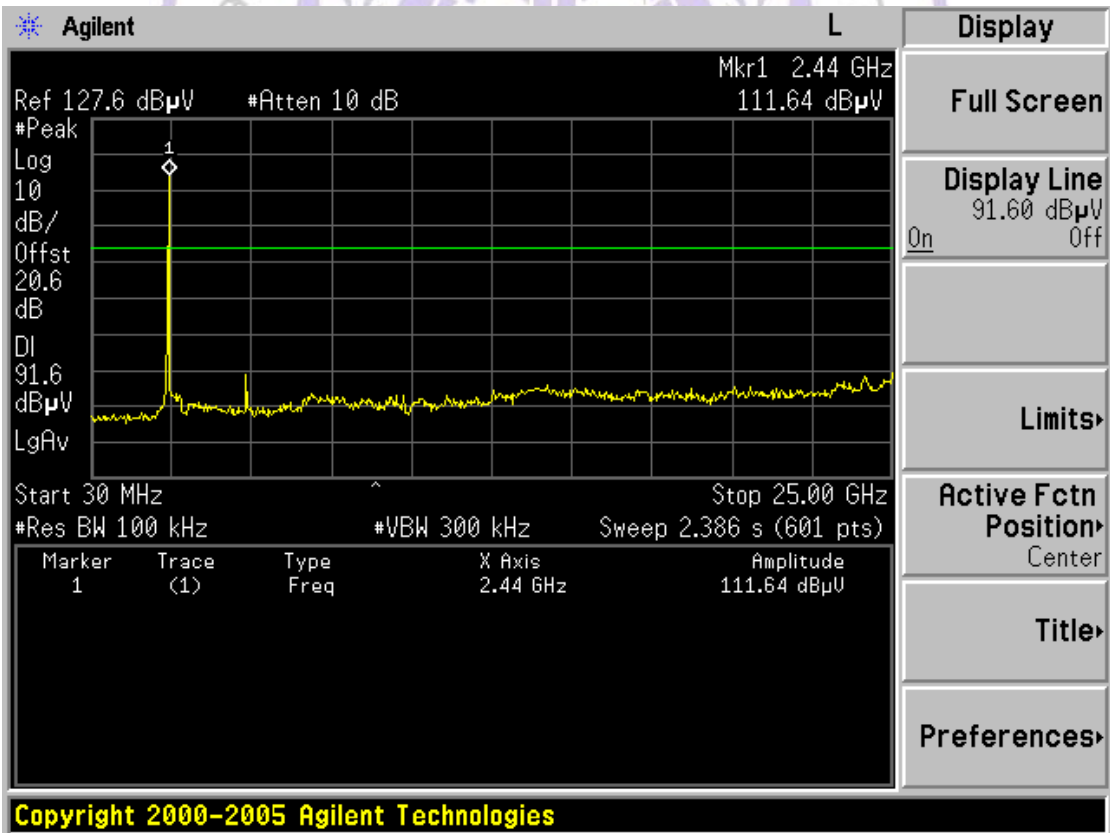


CH1 @ANT 2

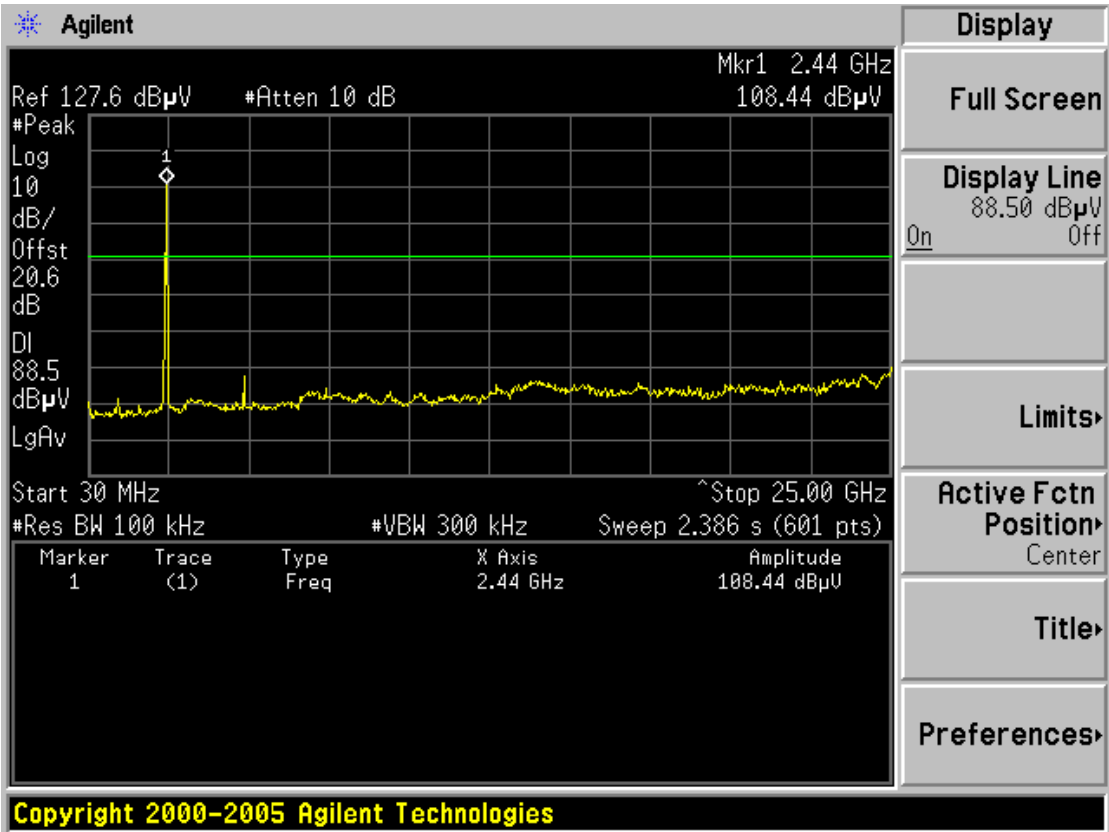




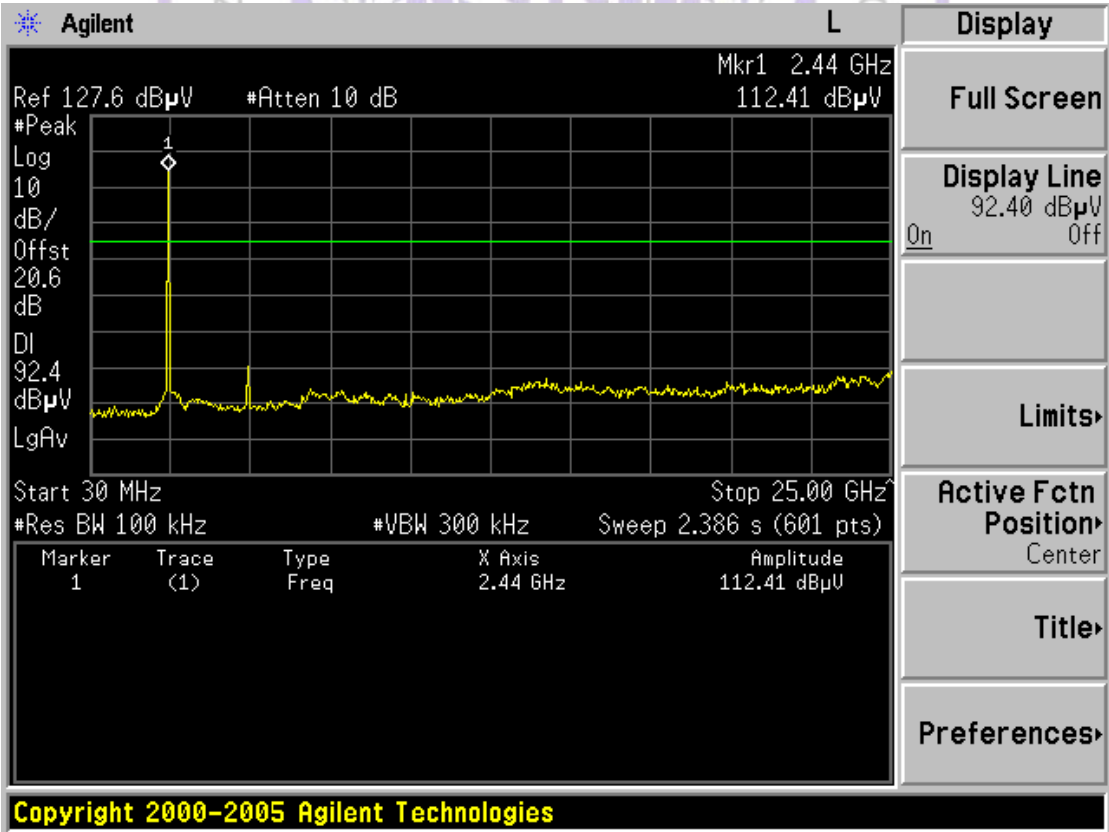
CH6 @ANT 1

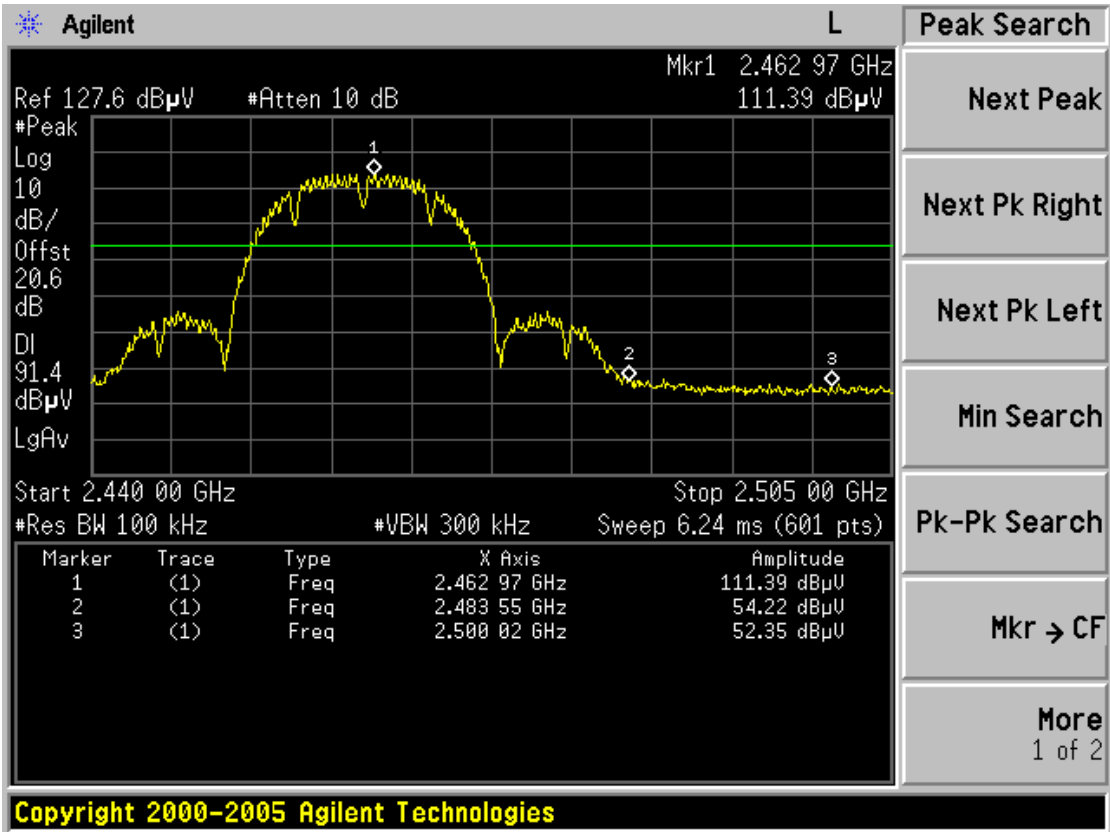


CH6 @ANT 2

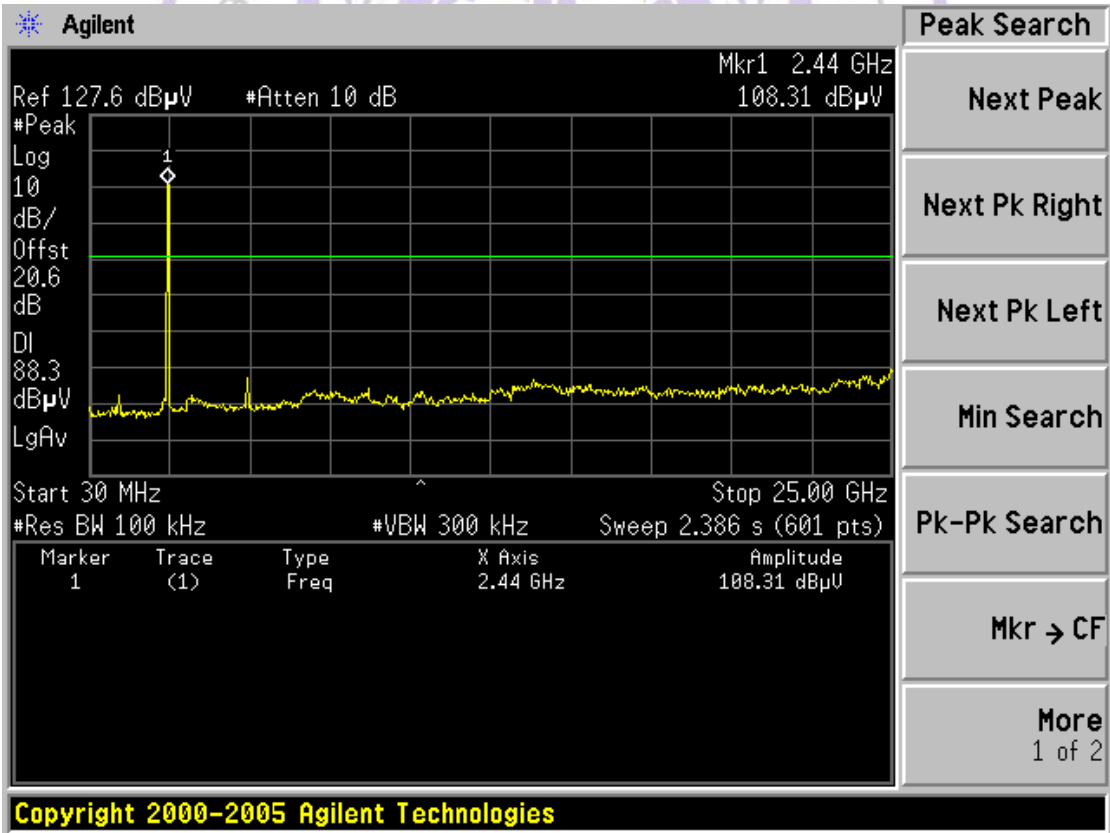


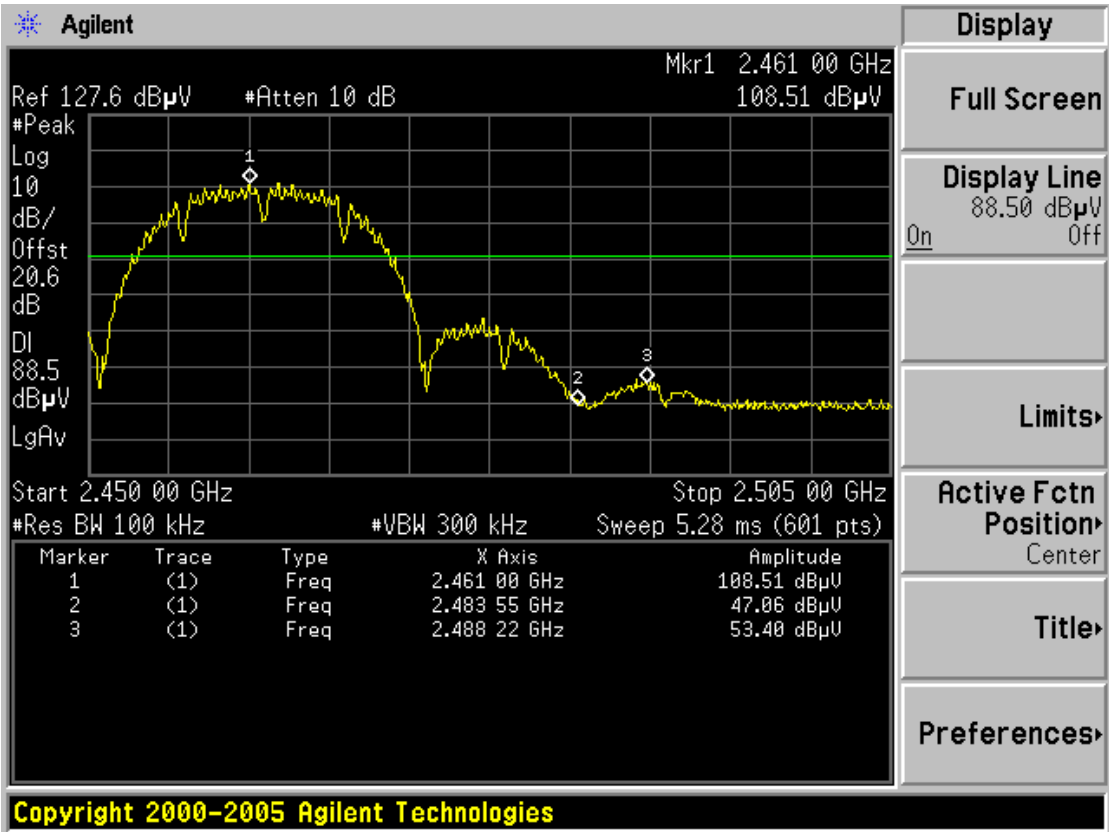
CH11 @ANT 1

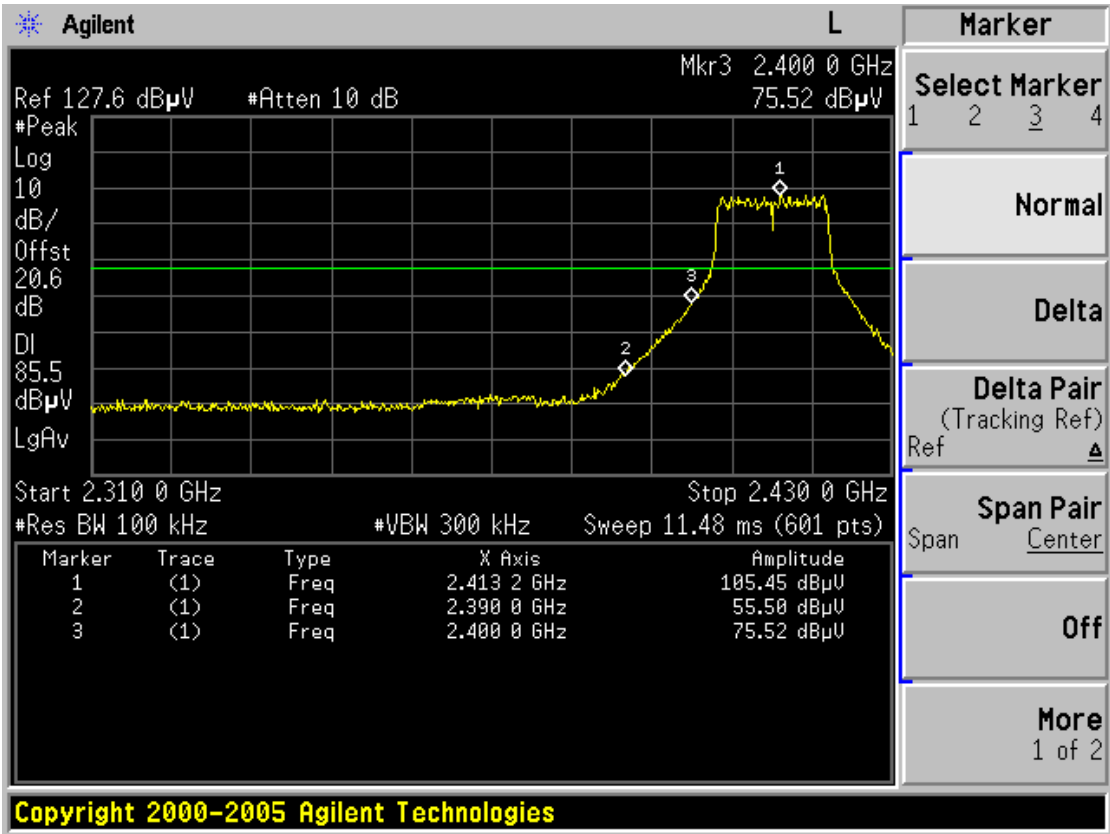




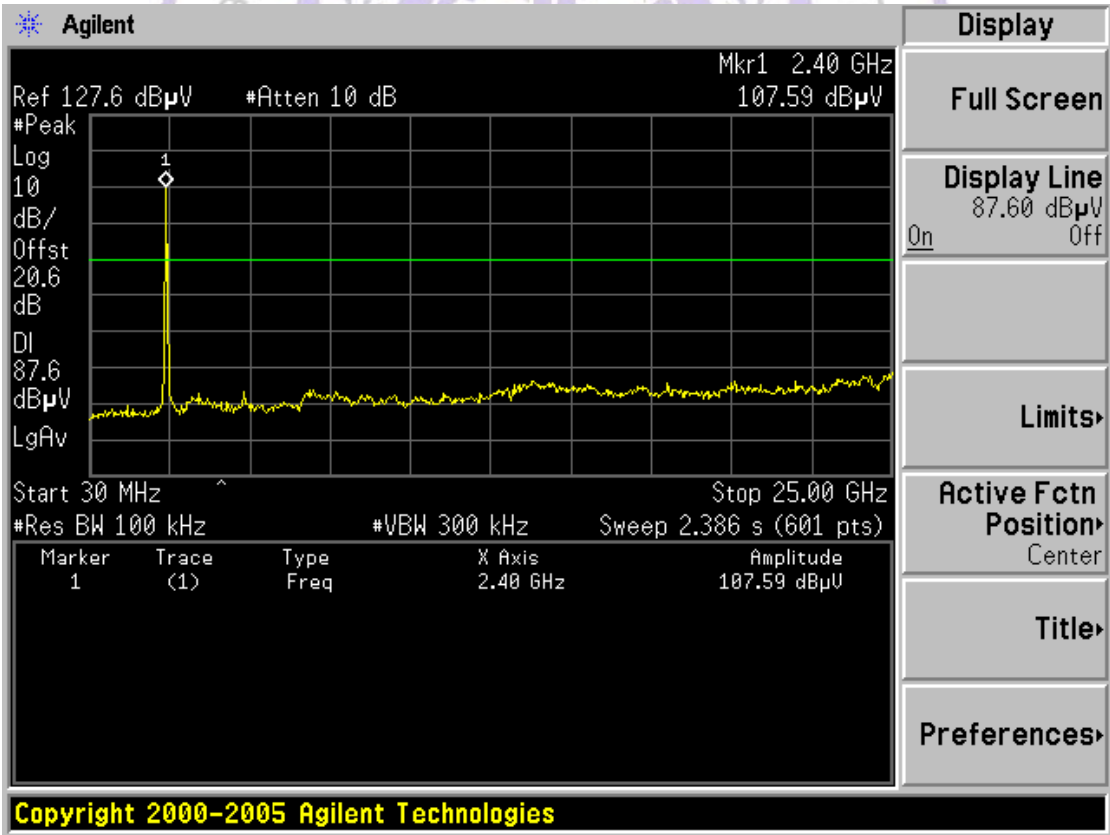
CH11 @ANT 2

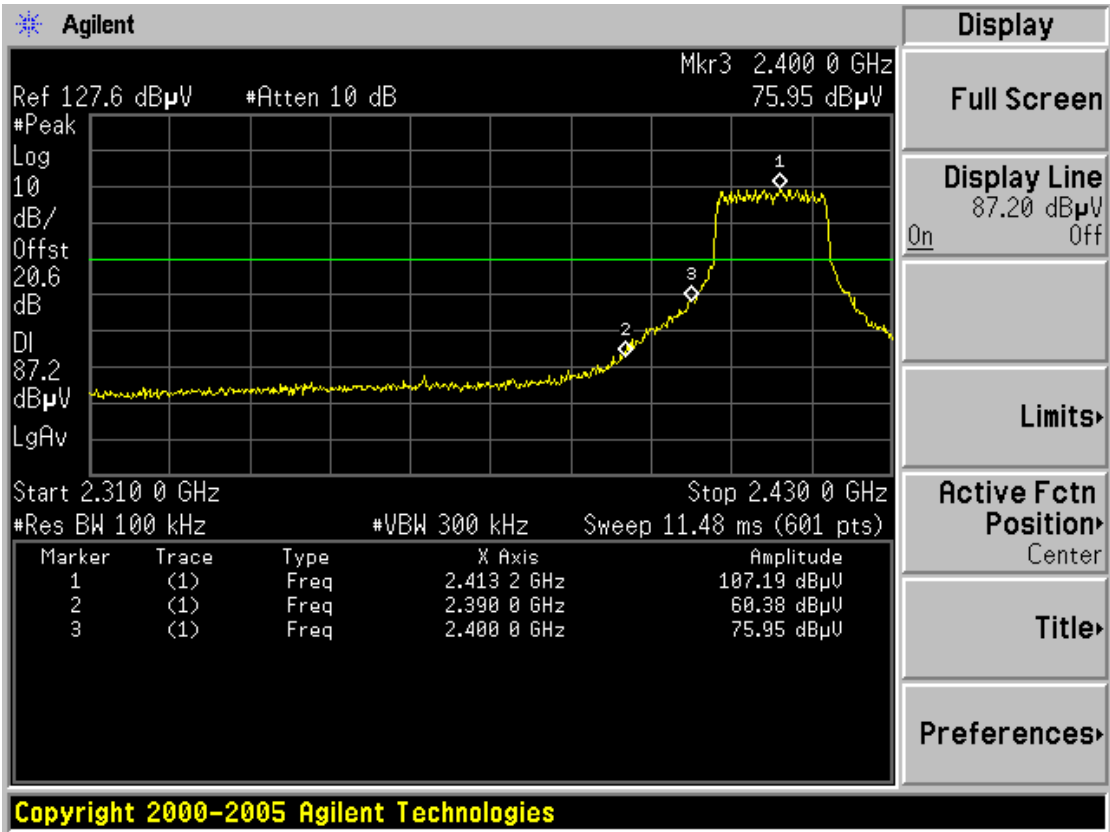




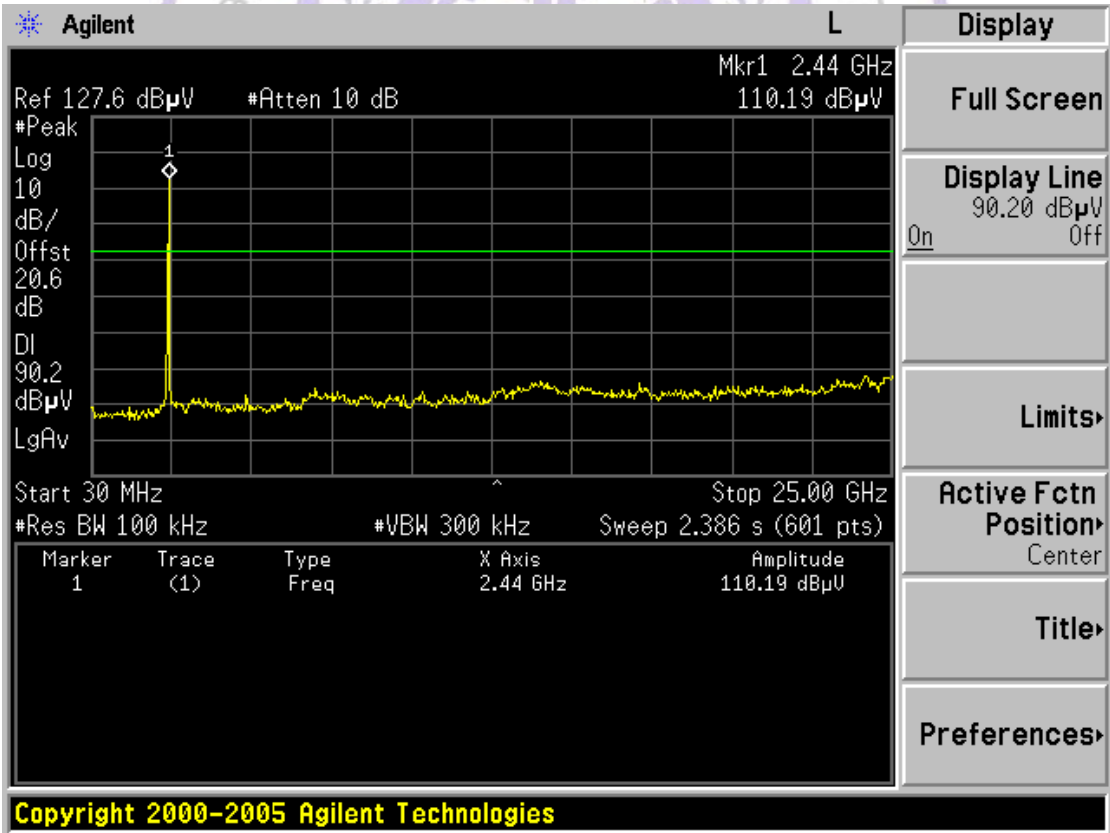


CH1 @ANT 2

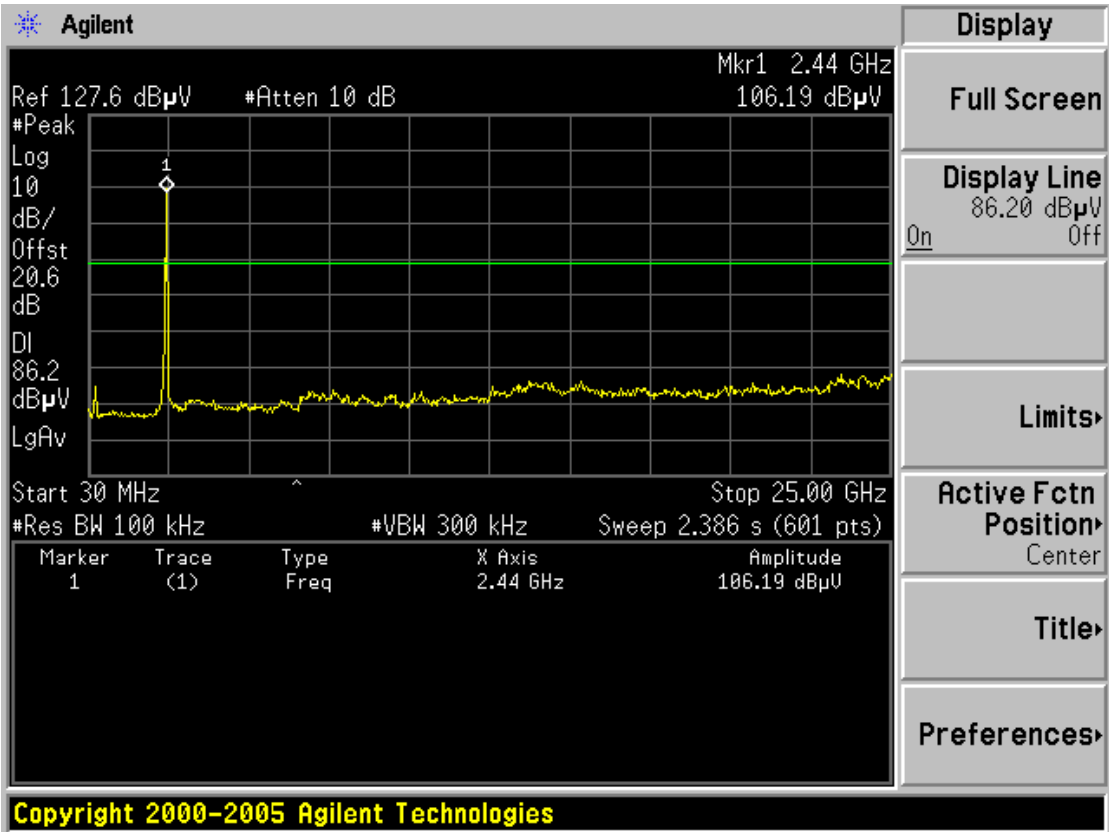




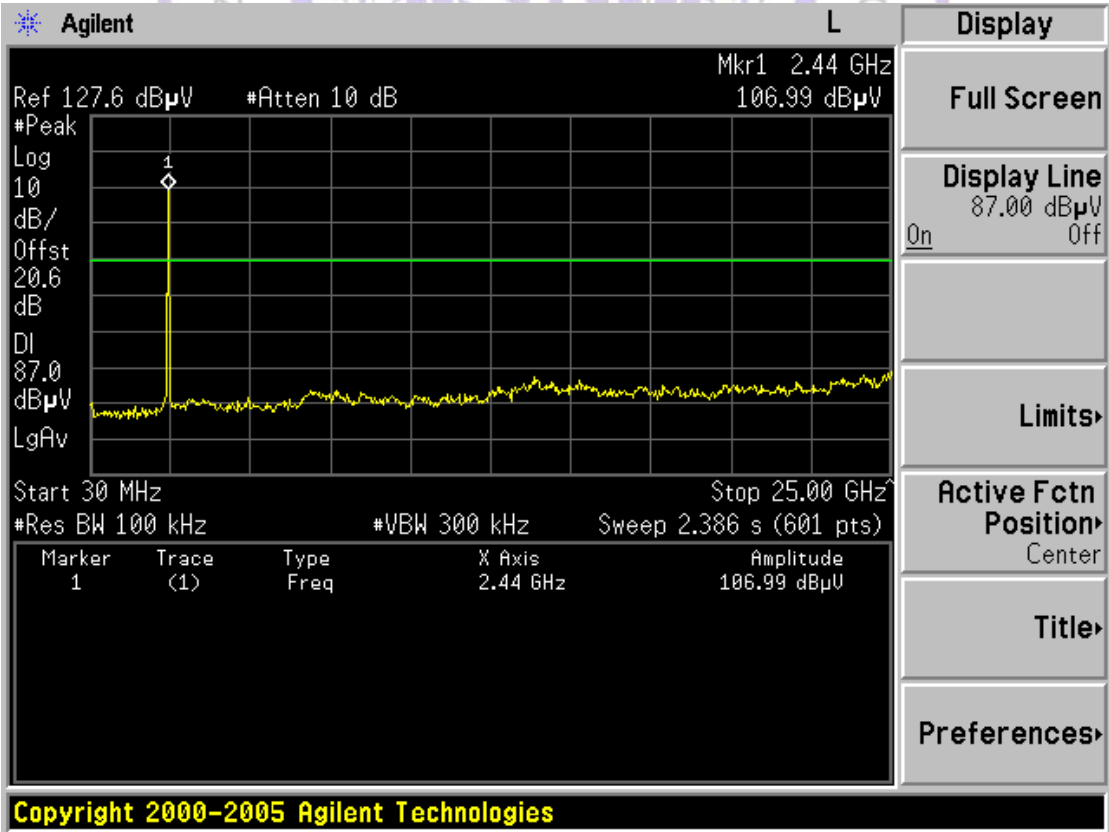
CH6 @ANT 1

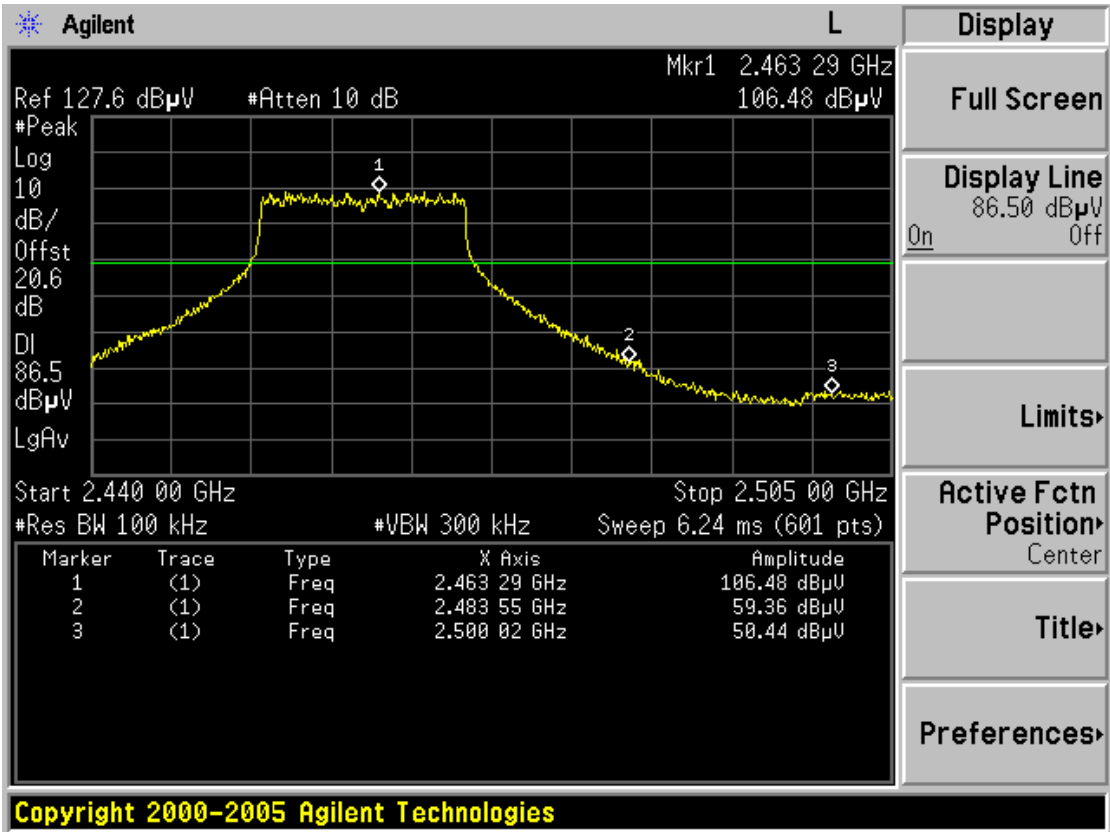


CH6 @ANT 2

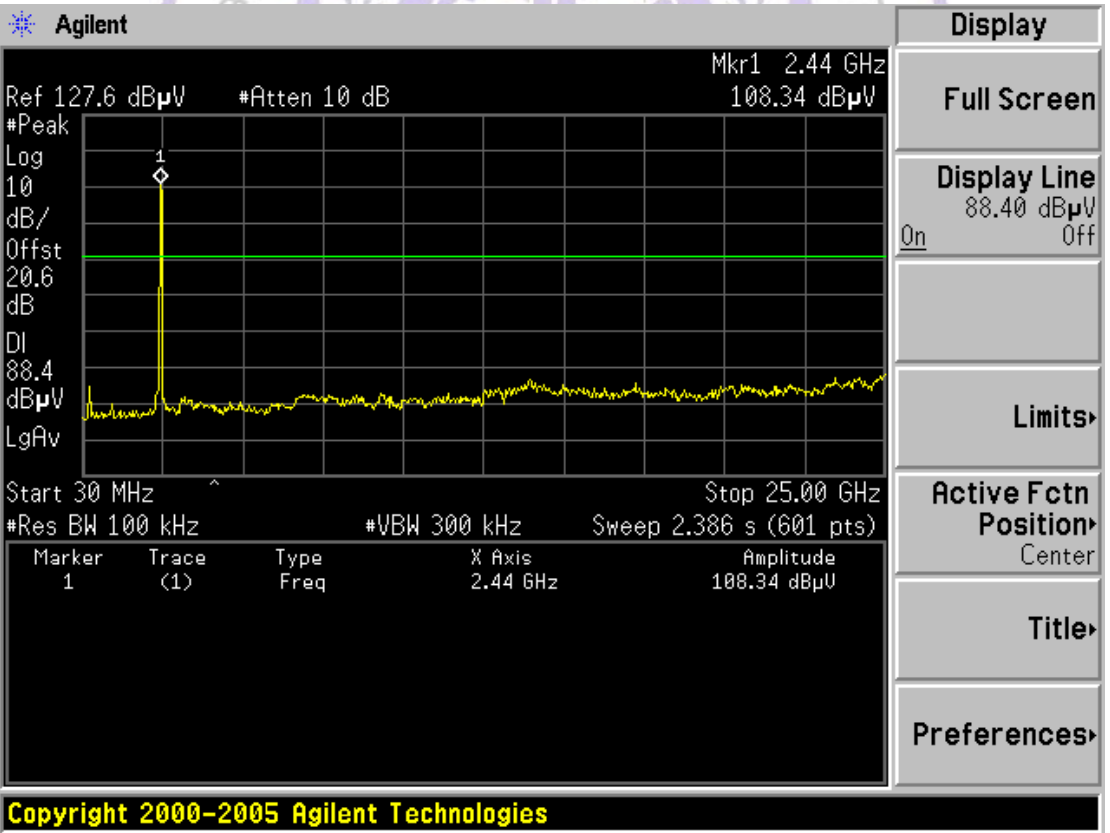


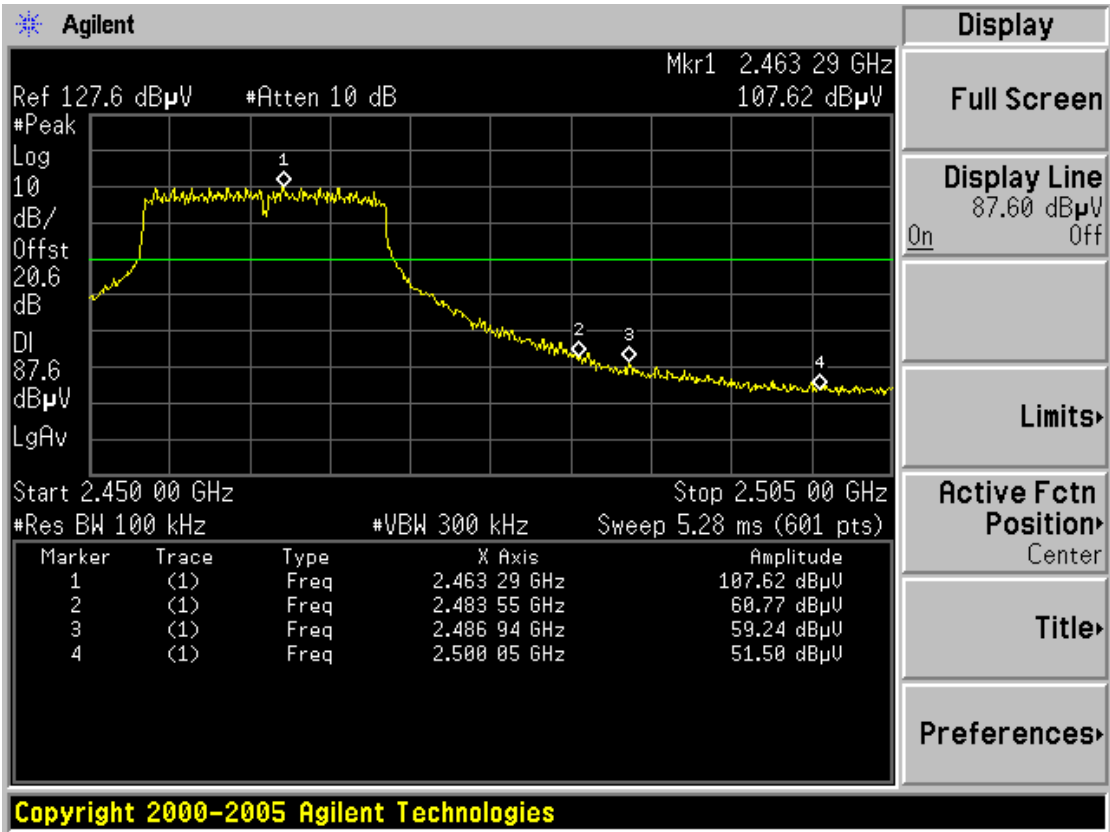
CH11 @ANT 1

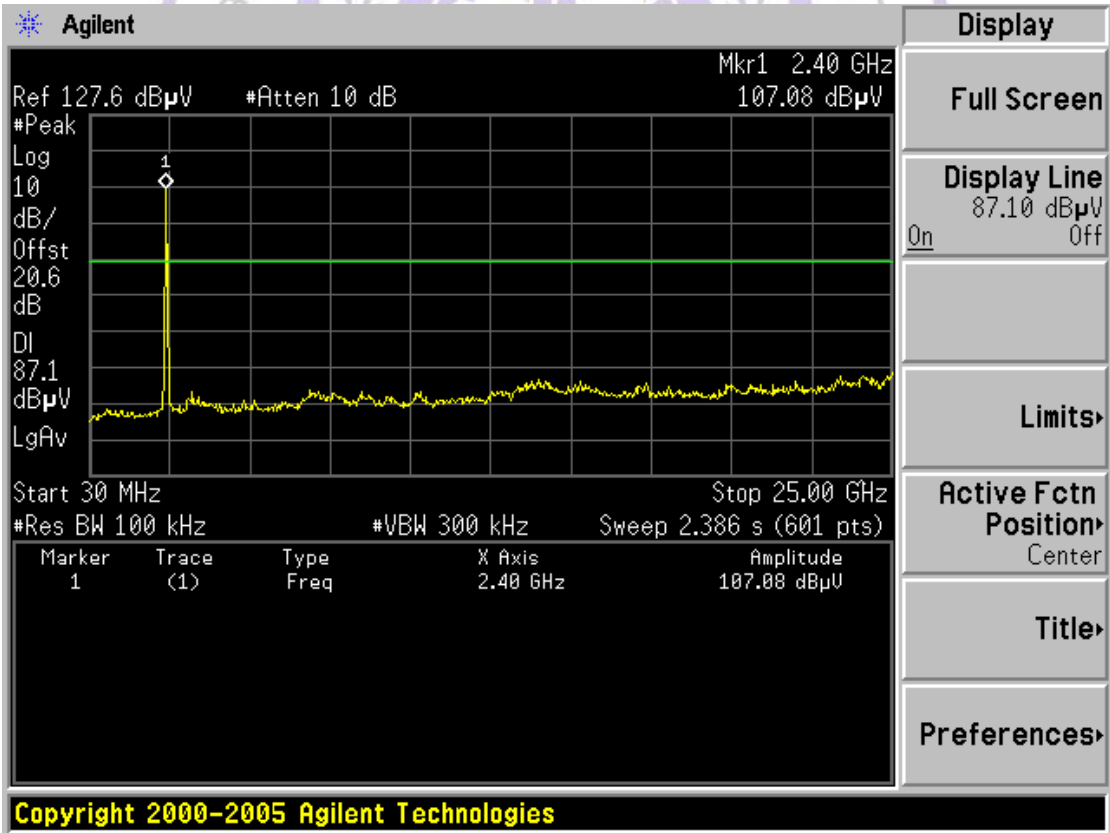
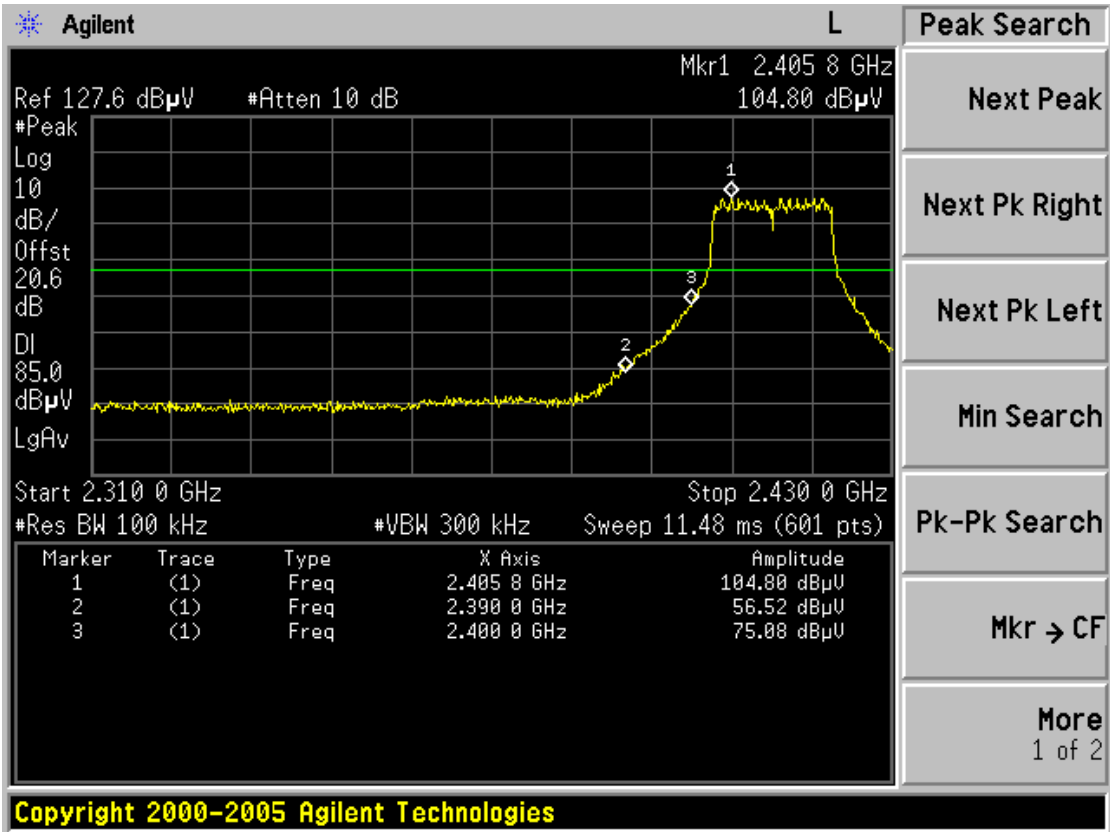


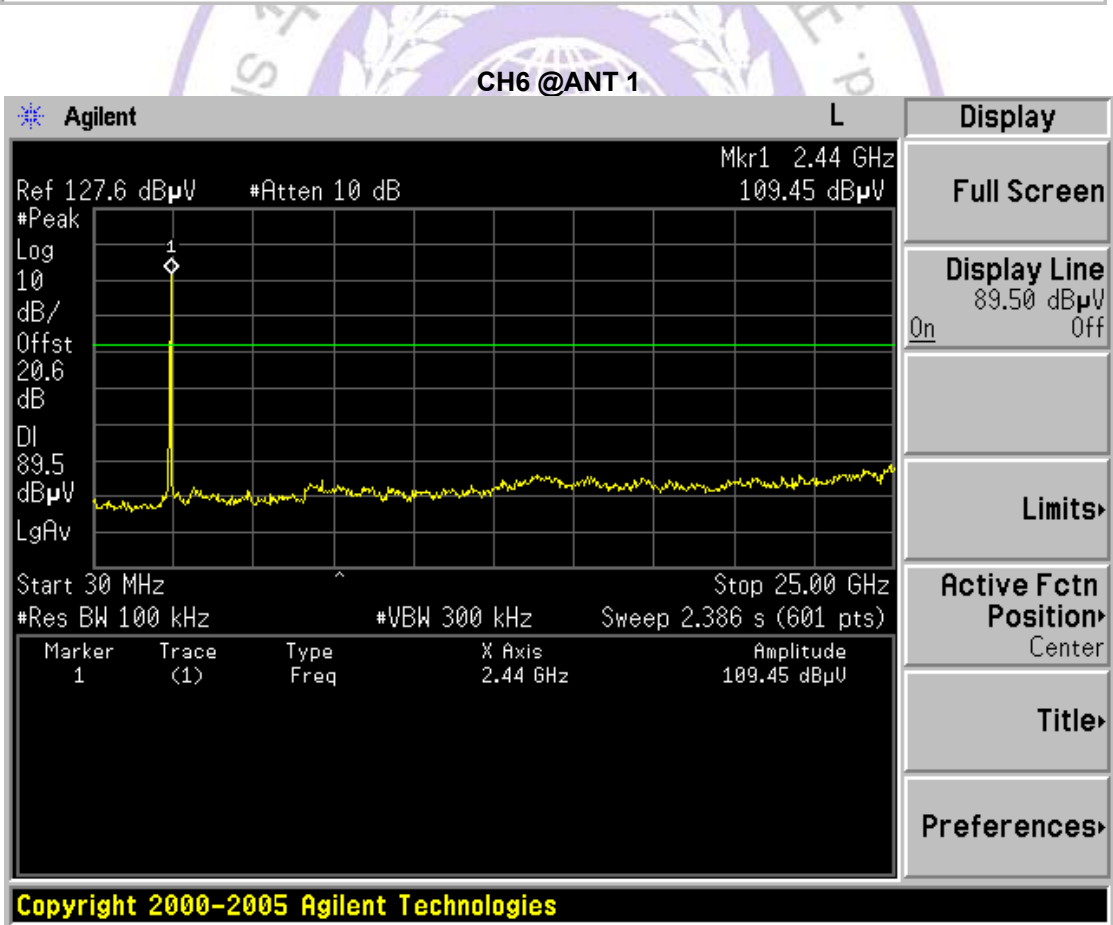
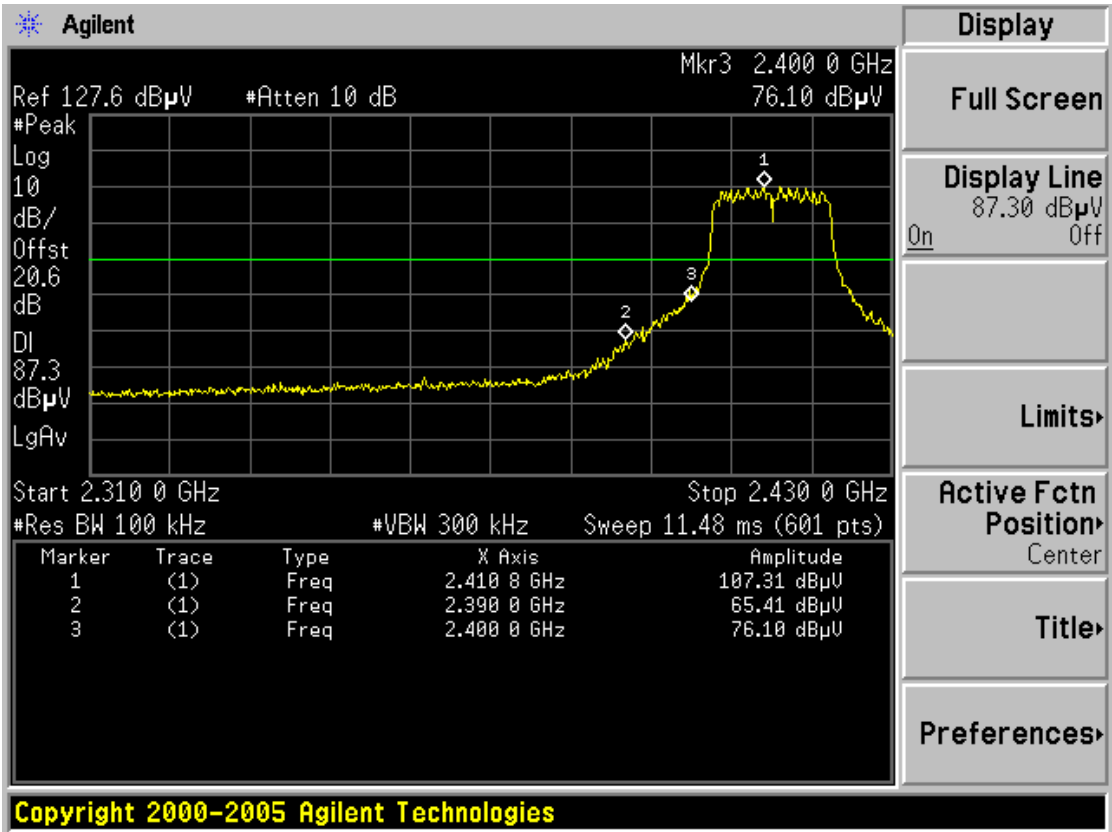


CH11 @ANT 2

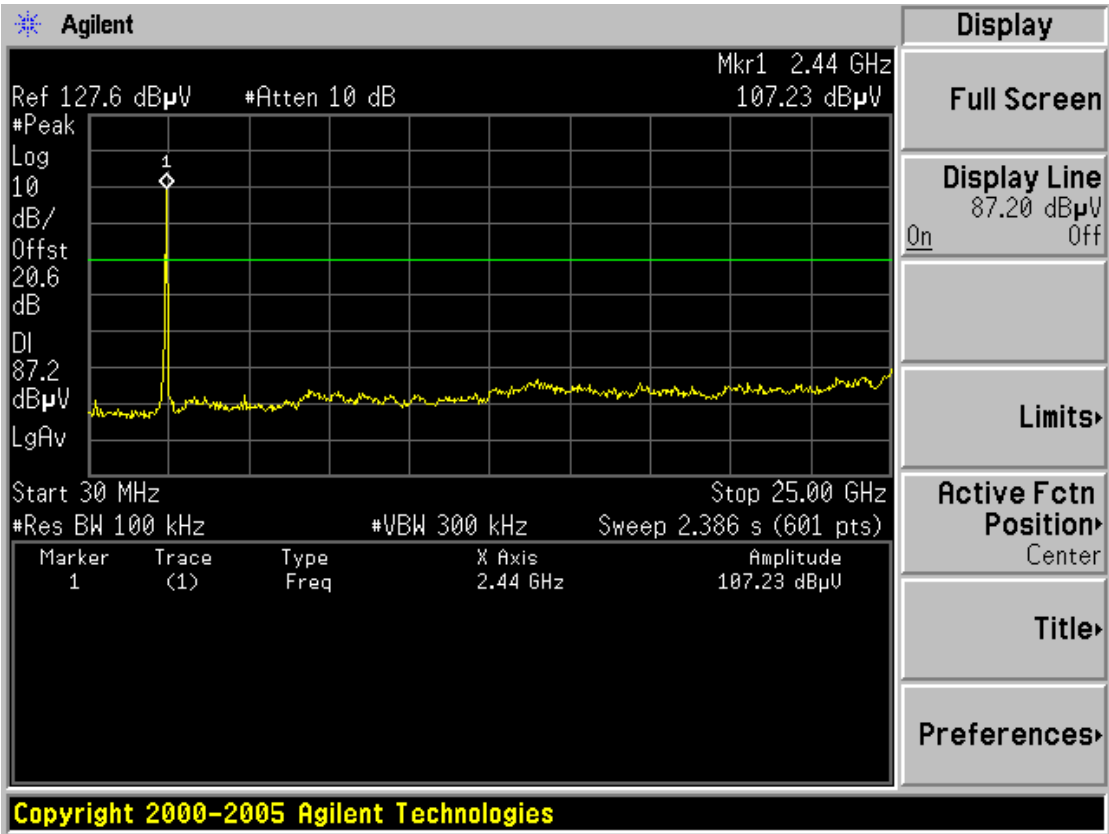




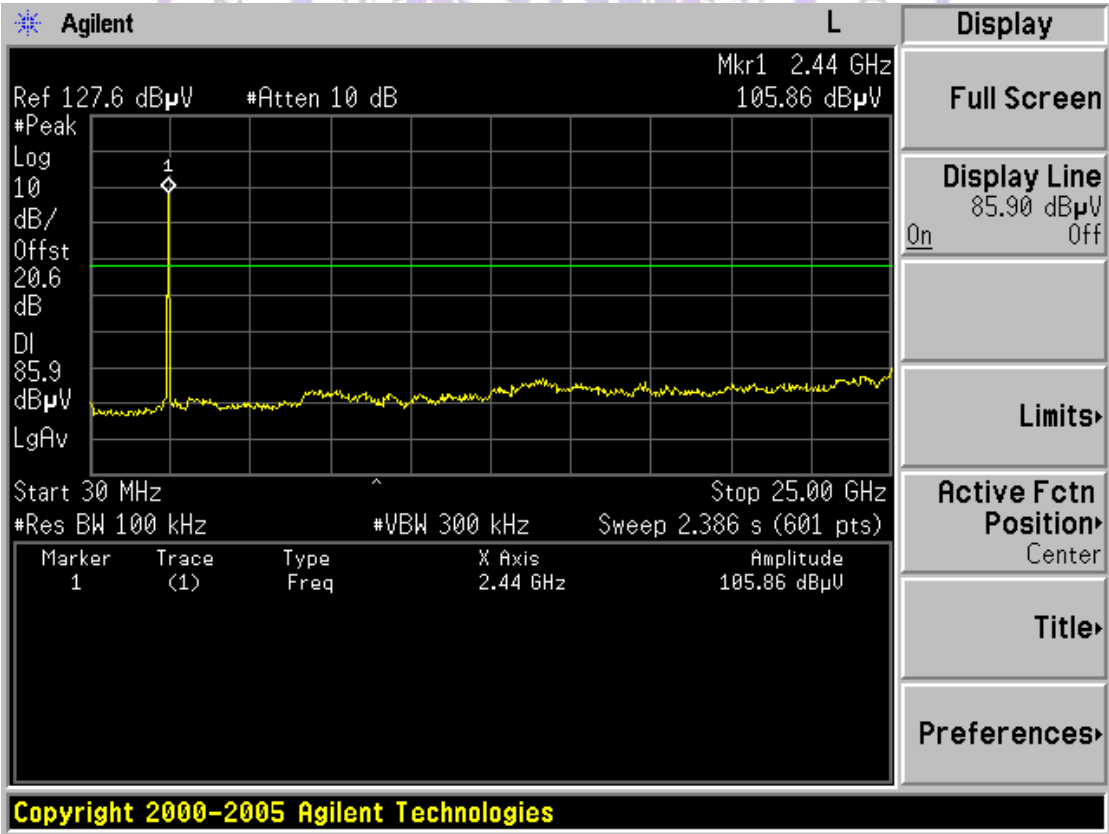


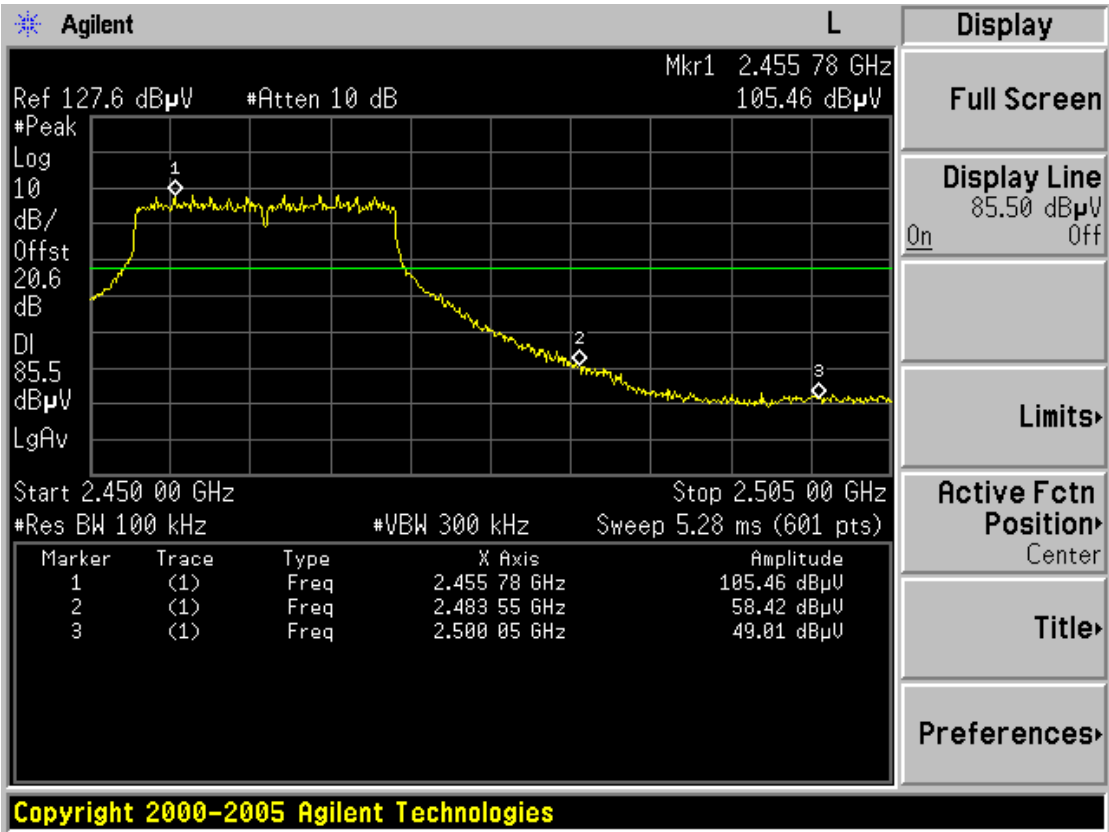


CH6 @ANT 2

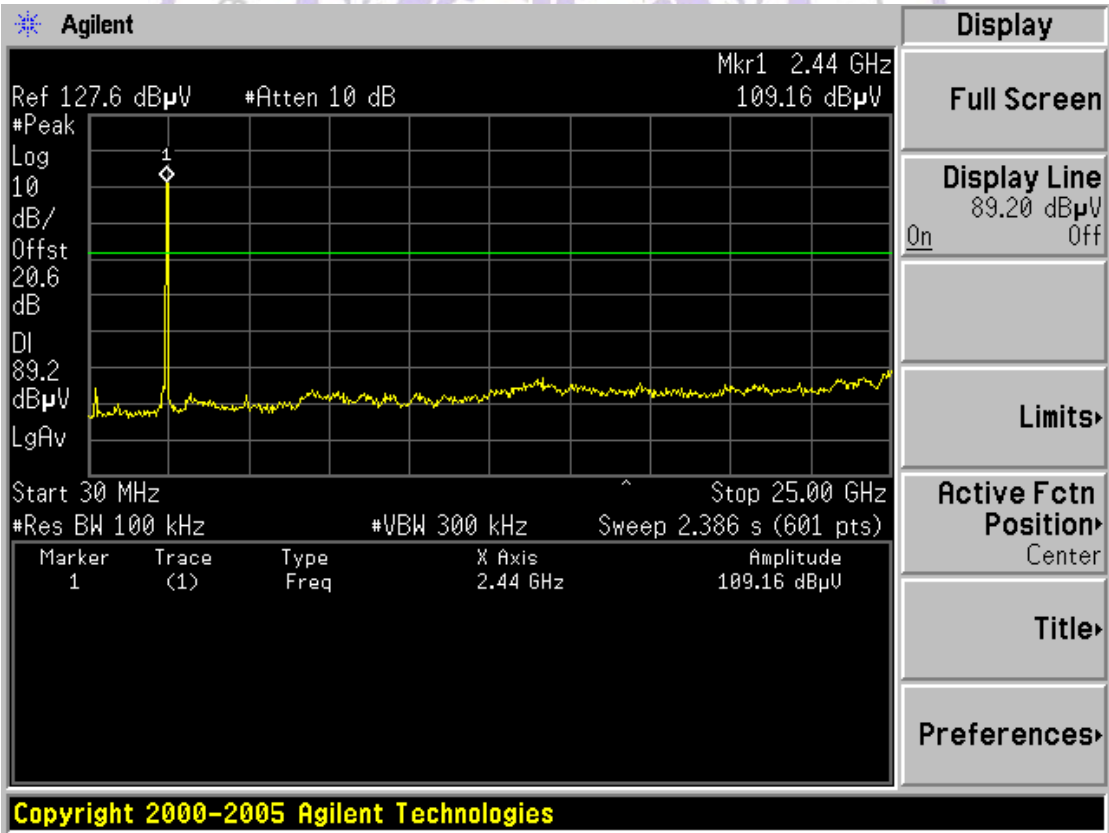


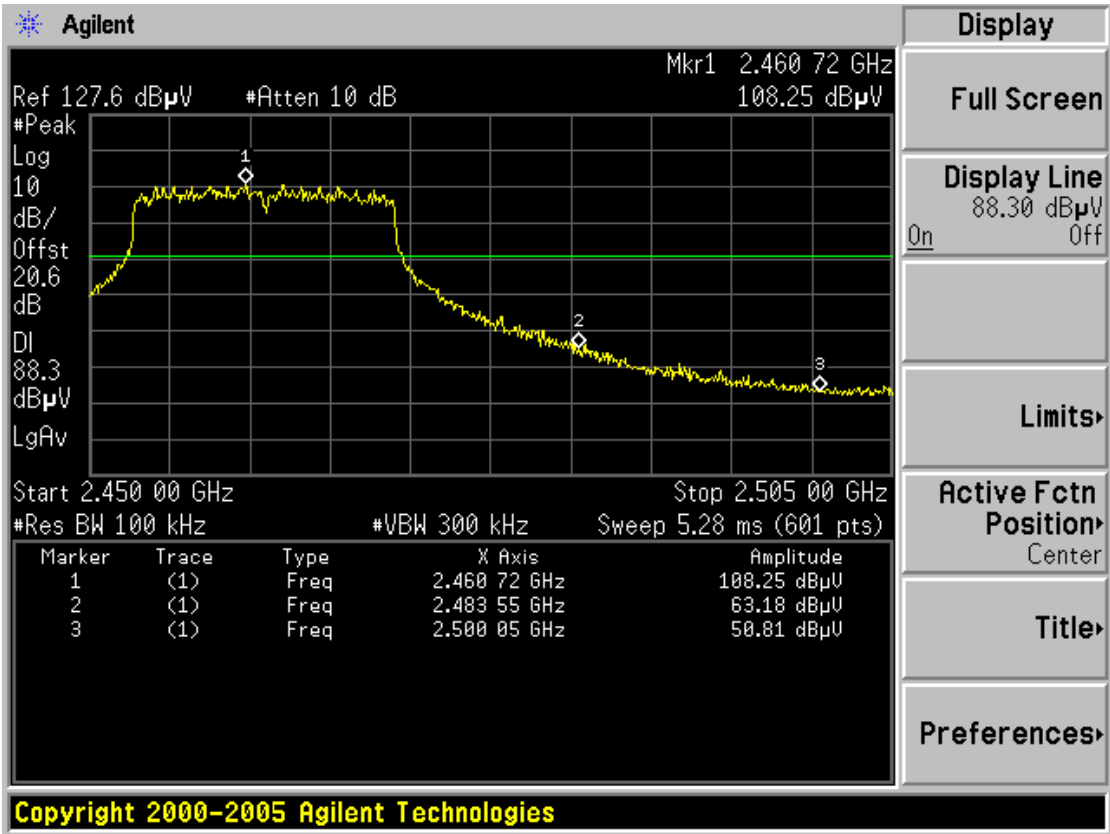
CH11 @ANT 1





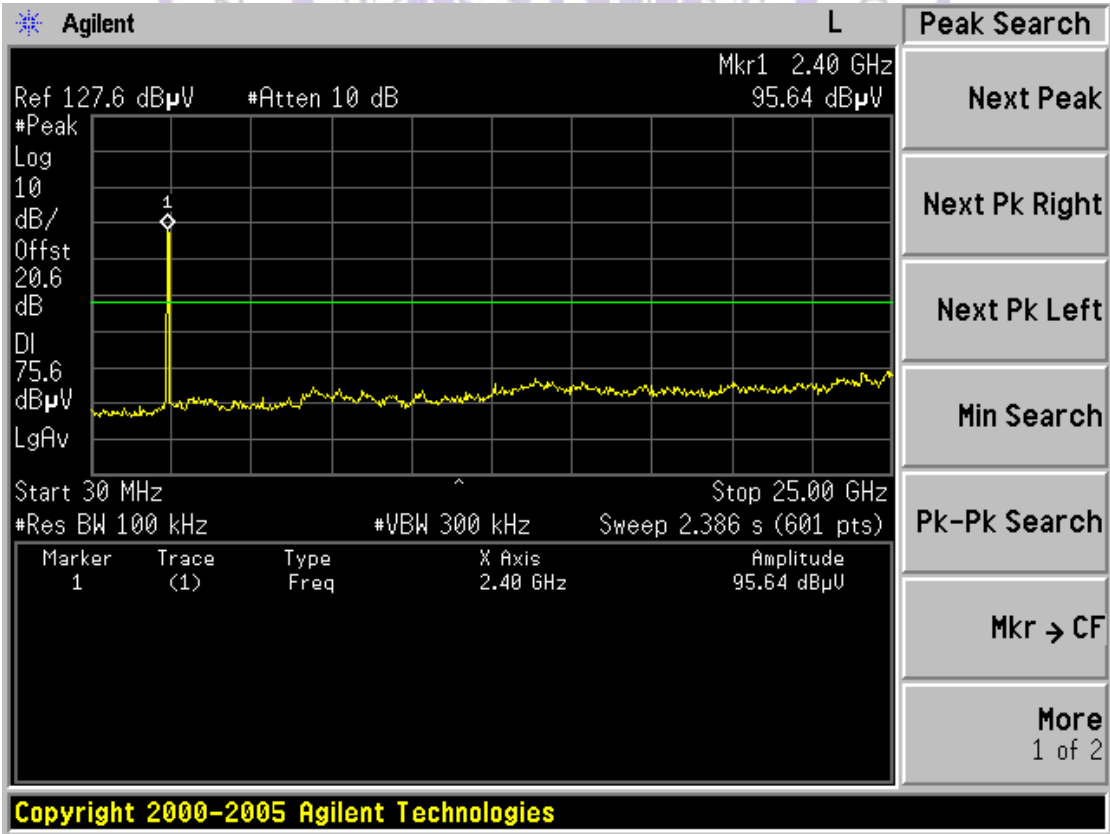
CH11 @ANT 2

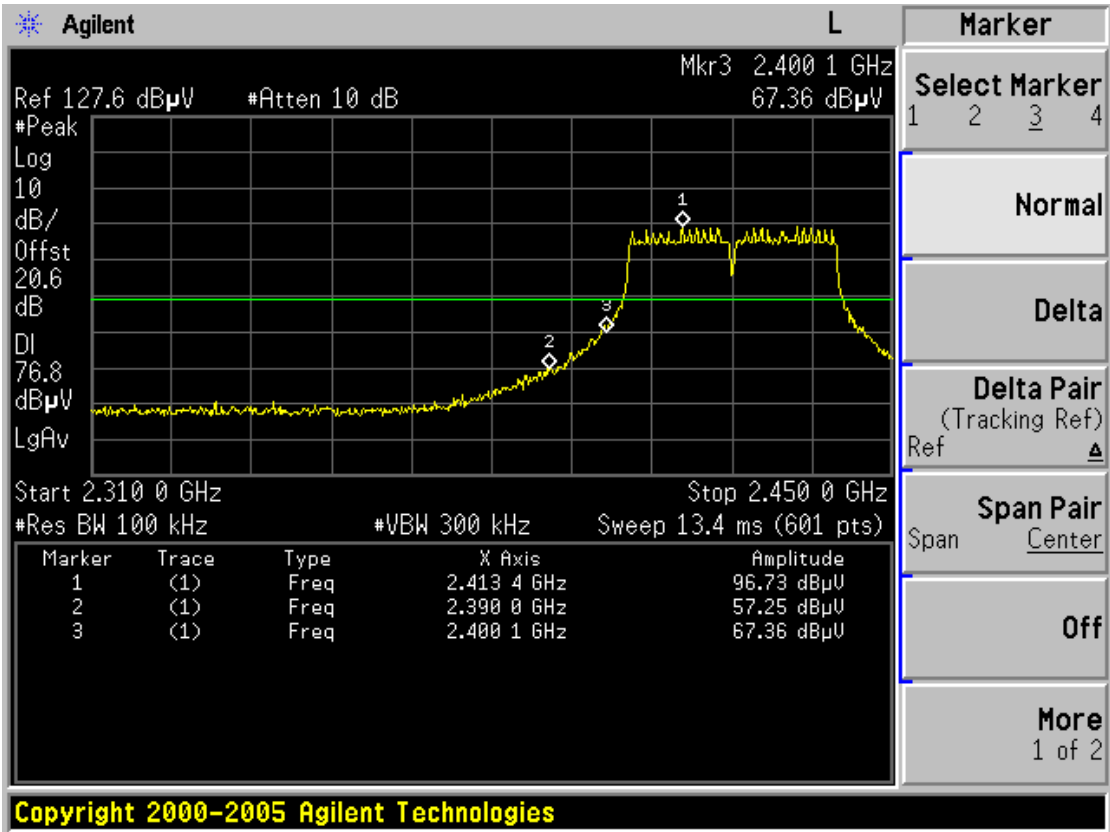




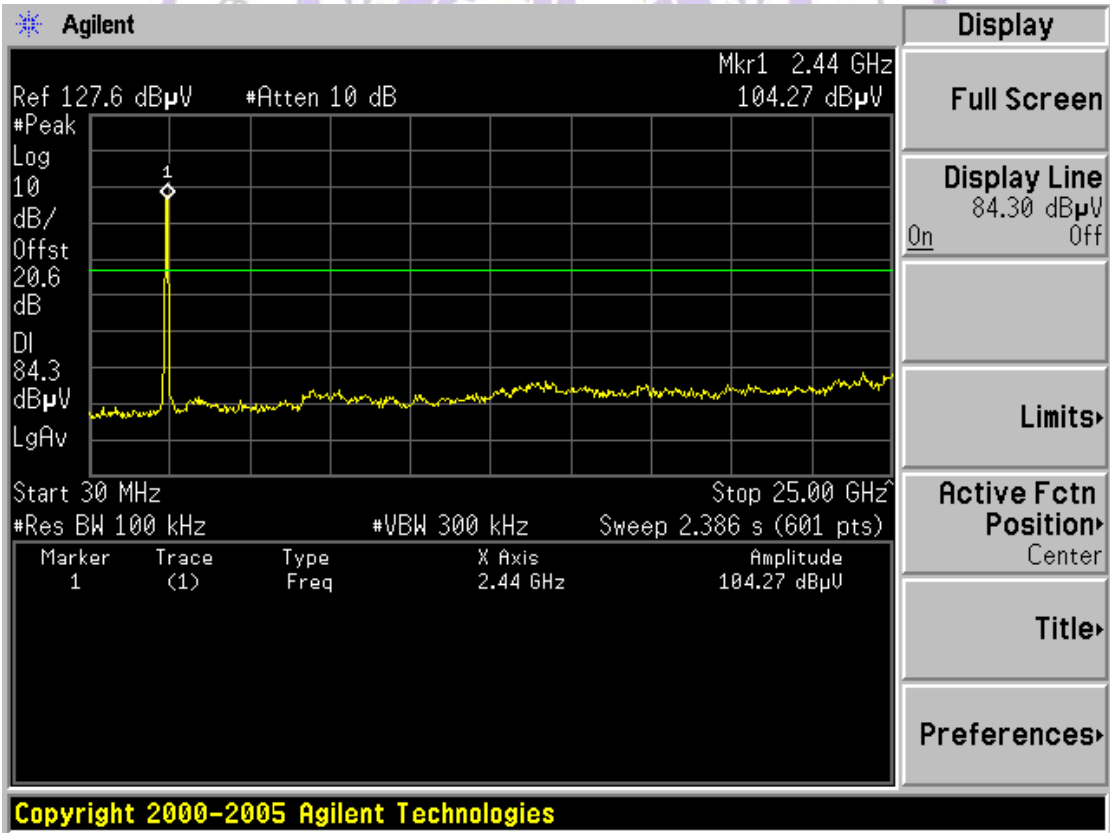
For 802.11n (40MHz) Mode:

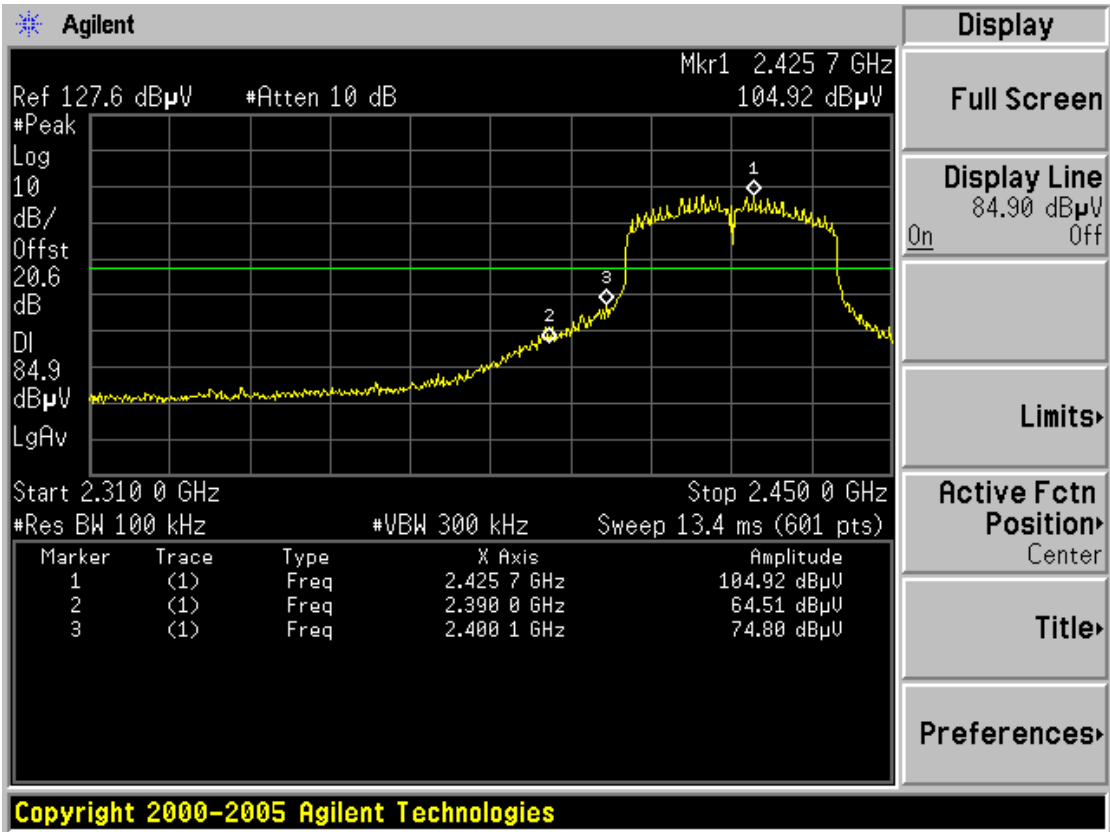
CH3 @ANT1



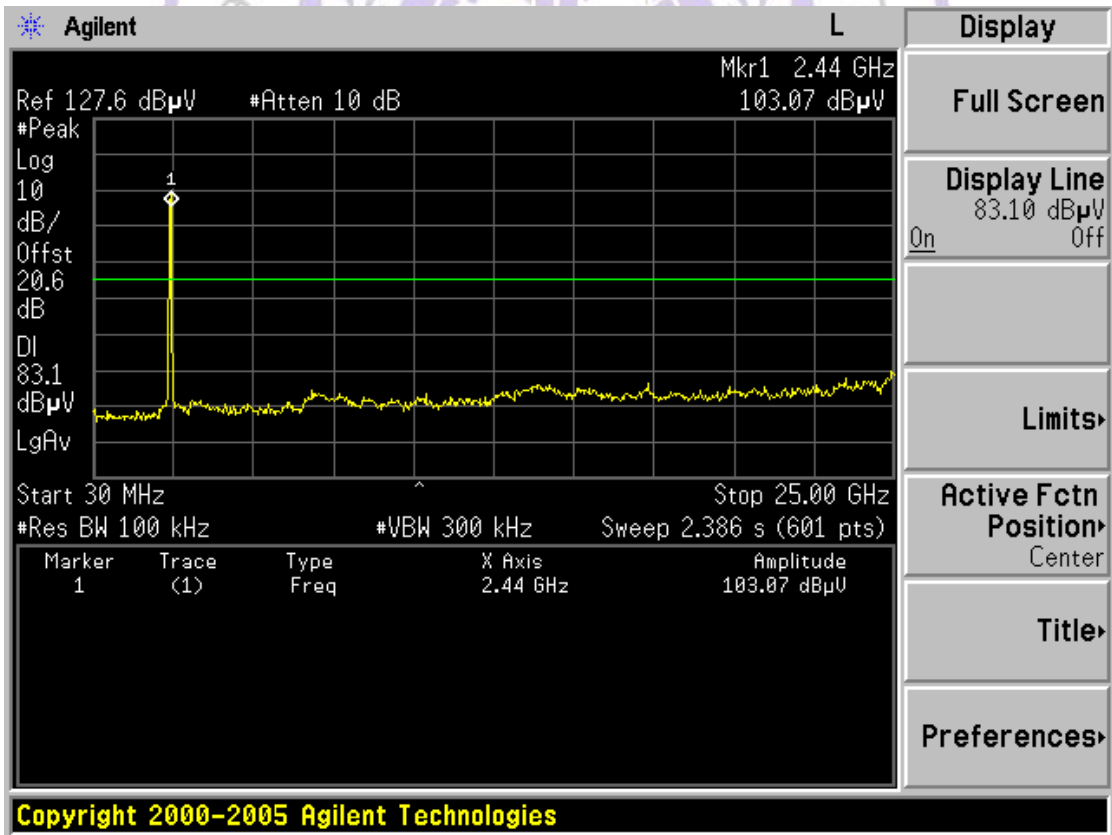


CH3 @ANT 2

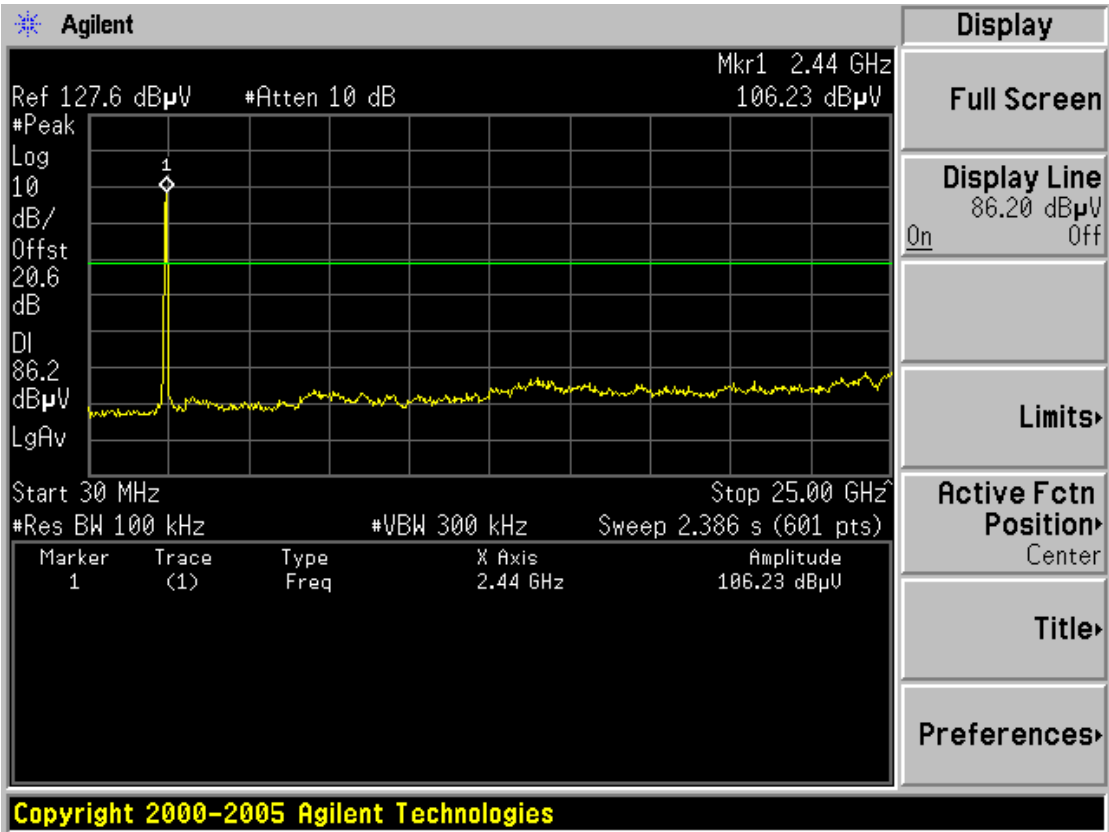




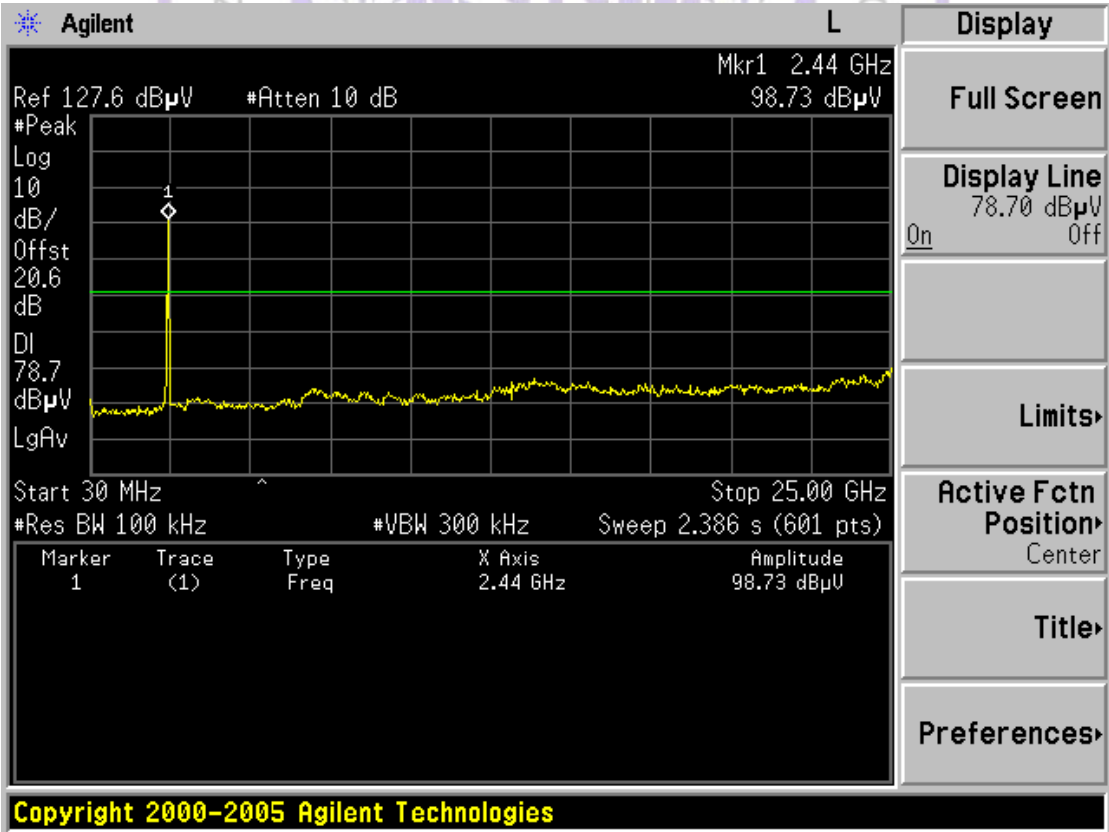
CH6 @ANT 1

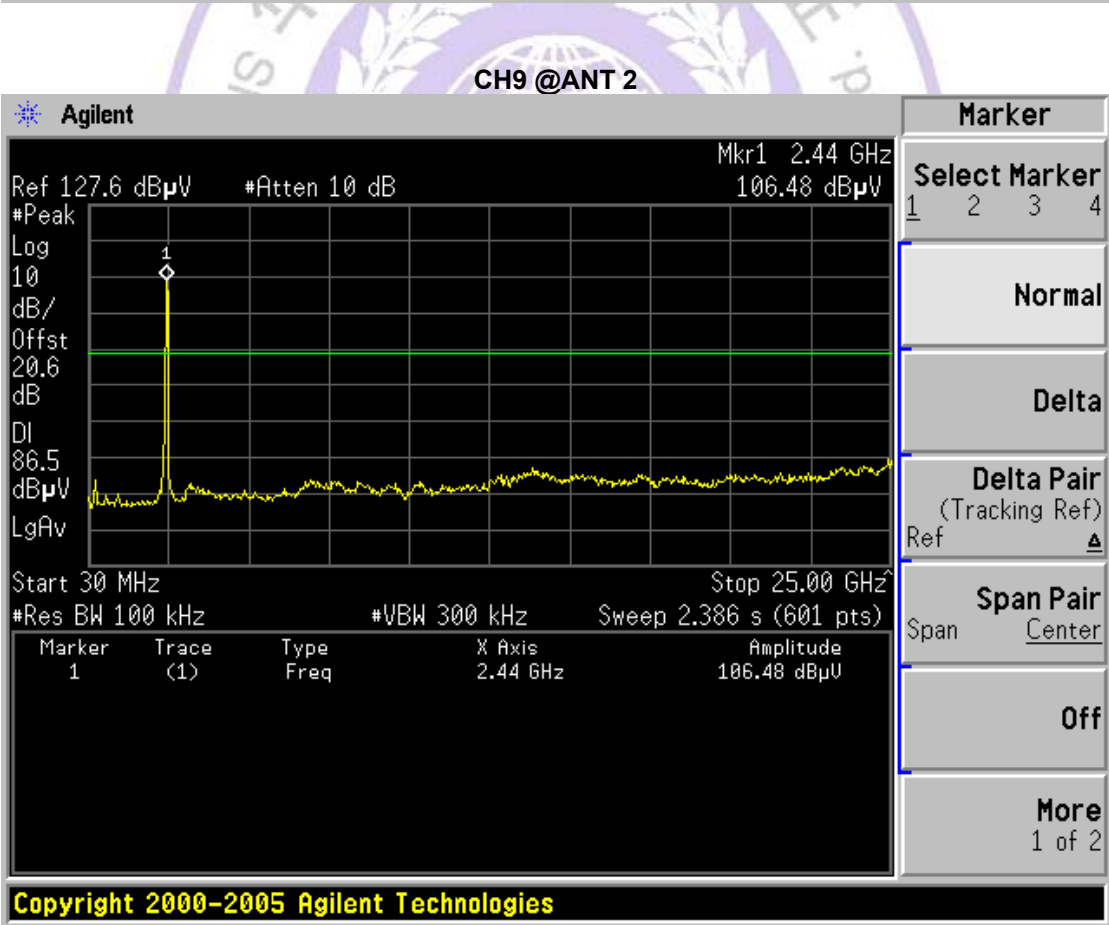
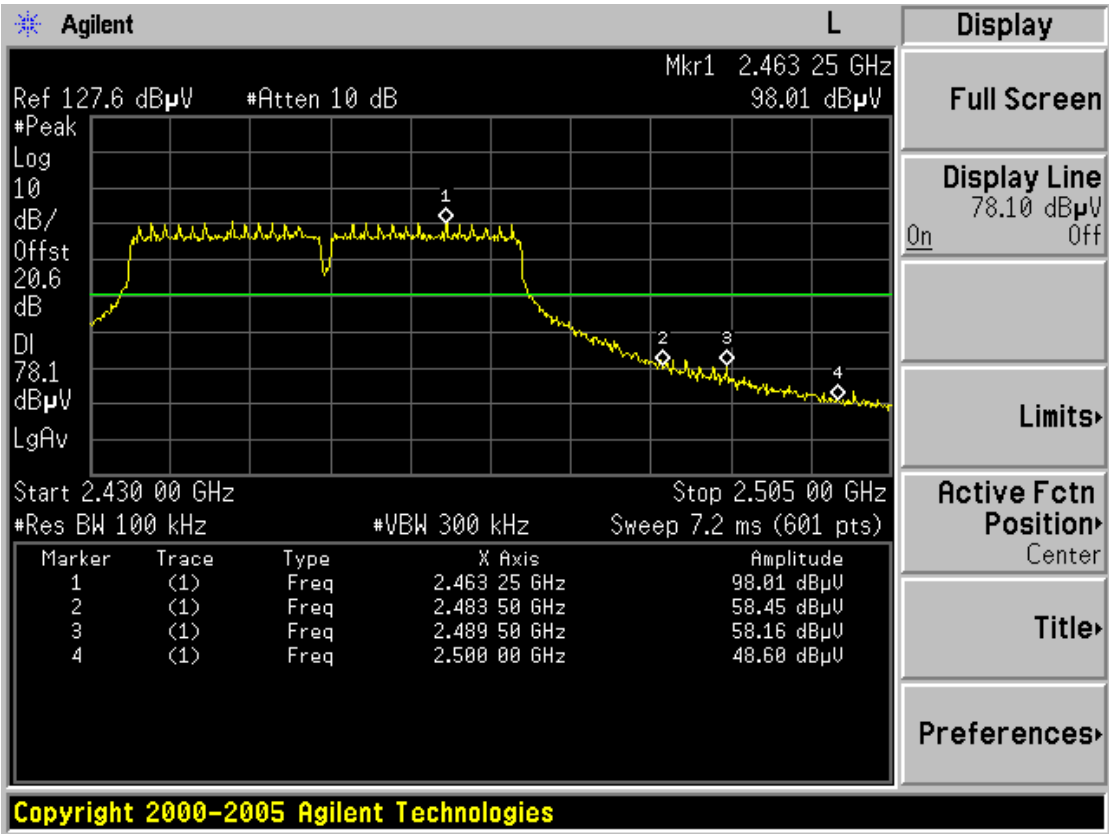


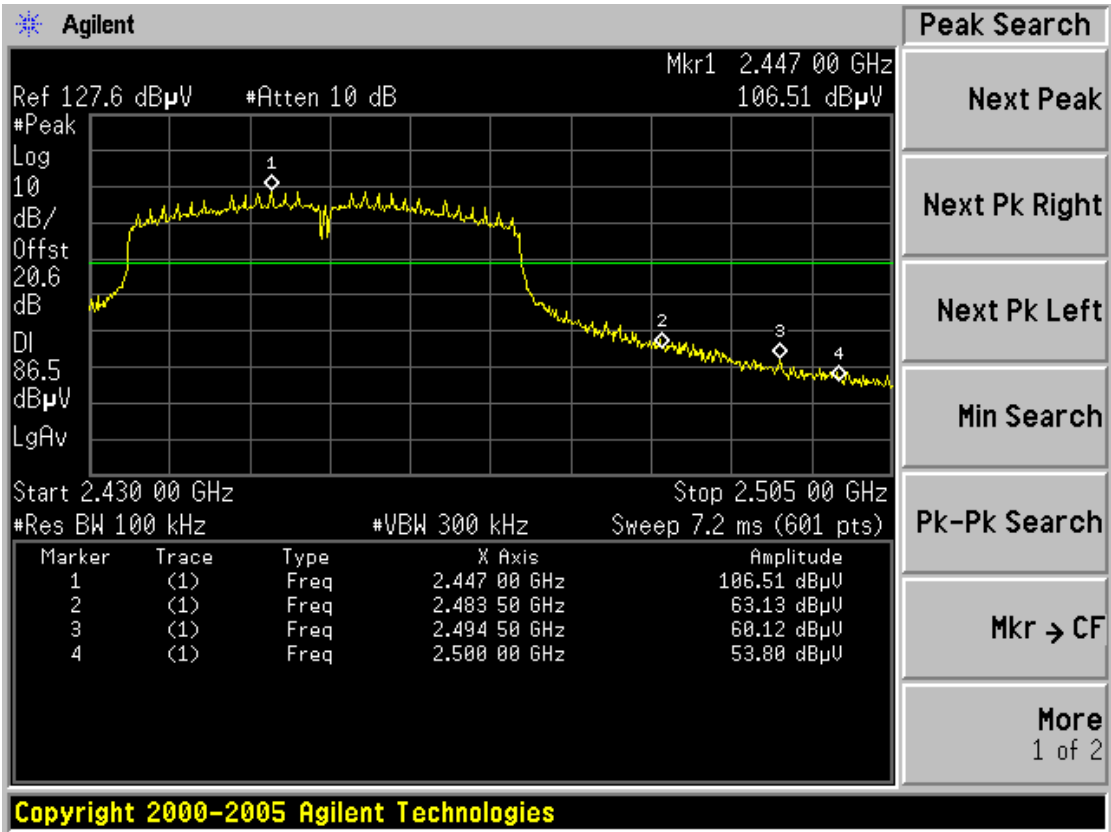
CH6 @ANT 2



CH9 @ANT 1







4.8. Antenna Requirement

STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

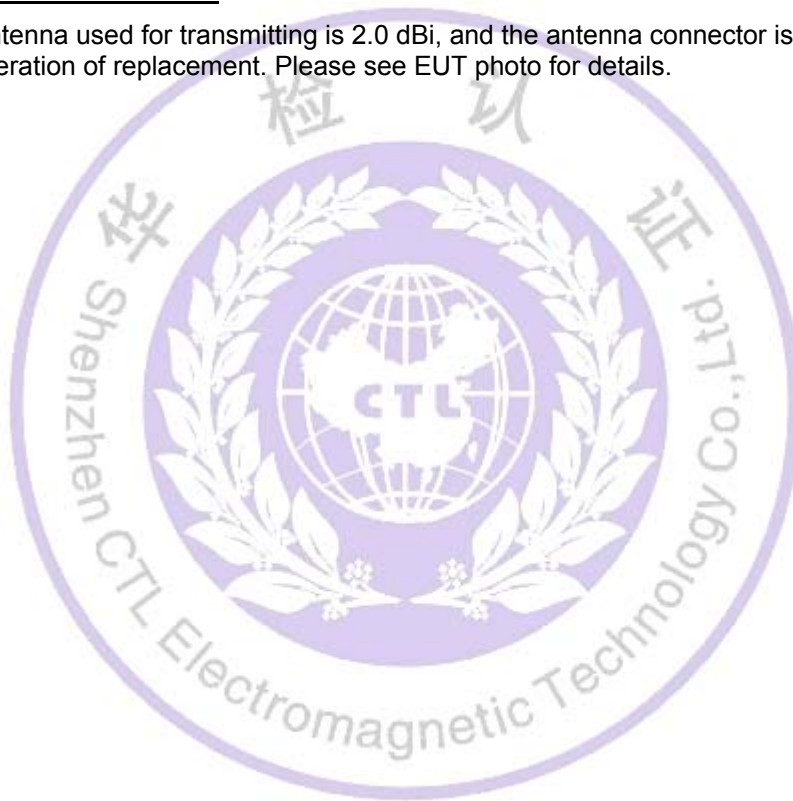
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

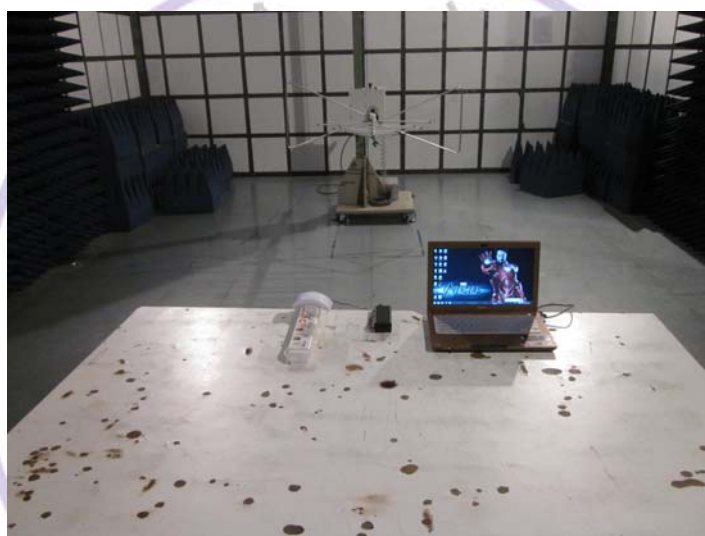
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

ANTENNA CONNECTED CONSTRUCTION

The directional gains of antenna used for transmitting is 2.0 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.



5. Test Setup Photos of the EUT

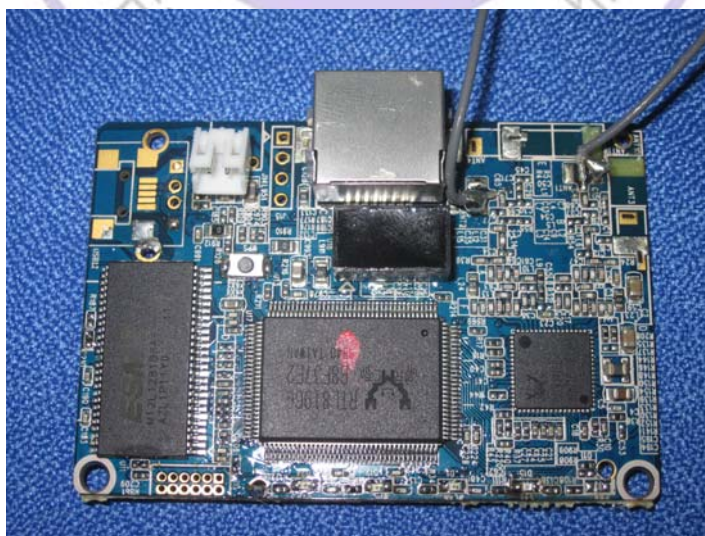
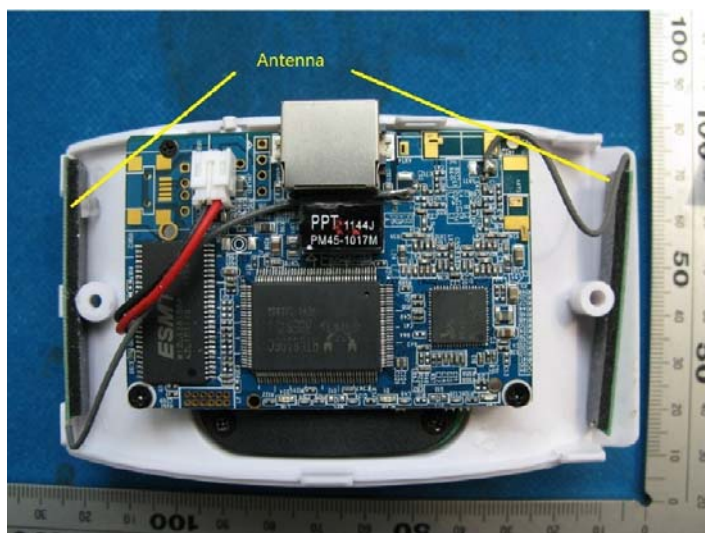


6. External and Internal Photos of the EUT

External Photos





Internal Photos

.....End of Report.....