MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY

EMC TEST REPORT

Test Report Number – 24229-1 WLAN

Report Date – December 1, 2010

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature:  Name: Albert J. Patapack

Title: EMC Engineer Date: December 1, 2010

UKAS Certificate Number: 2404

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Test Report Details

Tests Performed By:	ADR Testing Service Location Code: ADR LV Motorola Mobility Inc Product Safety and Compliance Group 600 North US Hwy 45 Libertyville, IL 60048 PH (847) 523-6167 Fax (847) 523-4538 FCC Registration Number: 316588 Industry Canada Number: 109O-1
Tests Requested By:	Motorola Mobility Inc. 600 North US Hwy 45 Libertyville, IL 60048
Product Type:	Cellular Phone
Signaling Capability:	WCDMA 850/1900, GSM 850/900/1800/1900, HSDP, EDGE, Bluetooth, 802.11a/b/g/n
FCC ID:	IHDP56LS1
Serial Numbers:	LOLAAD0021
Testing Complete Date:	December 1, 2010

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

__X__Part 15 Subpart C – Intentional Radiators

Applicable Standards: ANSI 63.4 2003, RSS-210 Issue 7

Summary of Testing

Test	Test Name	Pass/Fail
1	Spectrum Bandwidth	Pass
2	Peak Power	Pass
3	Power Spectral Density	Pass
4	Spurious RF Conducted Emissions	Pass
5	AC Line Conducted Emissions	Pass

Test	Test Name	Results
1	Spectrum Bandwidth	See plots
2	Peak Power	See plots
3	Power Spectral Density	See tables
4	Spurious RF Conducted Emissions	See plots
5	AC Line Conducted Emissions	See Plots

General and Special Conditions

All testing for this report was performed with a fully charged Model SNN5880A 1880mAH Battery.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Manufacturer	Equipment Type	Model No.	Serial Number	Calibration Due Date
Rohde Schwarz	Receiver	ESI26	100001	9/23/2011
Agilent	Signal Analyzer	N9020A	US46470586	12/18/2010
Attenuator	Weinschel	AS-6	6675	NCR
Attenuator	Weinschel	AS-6	6677	NCR
ETS	LISN	3810/2	00062907	9/08/2011
ETS	LISN	3810/2	00062912	9/08/2011

All test equipment was within their calibration date during the time of testing. When equipment went out of calibration during testing it was replaced using a similar piece of calibrated equipment. All these equipments are listed in the equipment list. All equipment is on a one-year calibration cycle.

Description of WLAN Transmitter

The EUT offers WLAN, operating in the 2.4GHz and 5GHz bands, as a feature. This report covers operation in the 2.4GHz band only. The WLAN antenna is mounted inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a WLAN transmitter, it is designed operate with other WLAN devices as defined by the industrial standard. In this application, the device is battery operated.

De Facto EIRP Limit – Pursuant 47 CFR 15.247(b)(4); RSS-210 Section A8.4.

Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB_i. If transmitting antennas of directional gain greater than 6 dB_i are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB_i.

The antenna employed by this transmitter is intended to be omni-directional, and thus will not exhibit directional gain in excess of 6 dB_i. The conducted power is less than the limits set forth (see elsewhere in this report for details).

Measurement Procedures and Data

Spectrum Bandwidth

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. RBW ≥ 100 kHz
2. VBW ≥ RBW
3. Sweep = auto
4. Detector function = peak
5. Trace = max hold

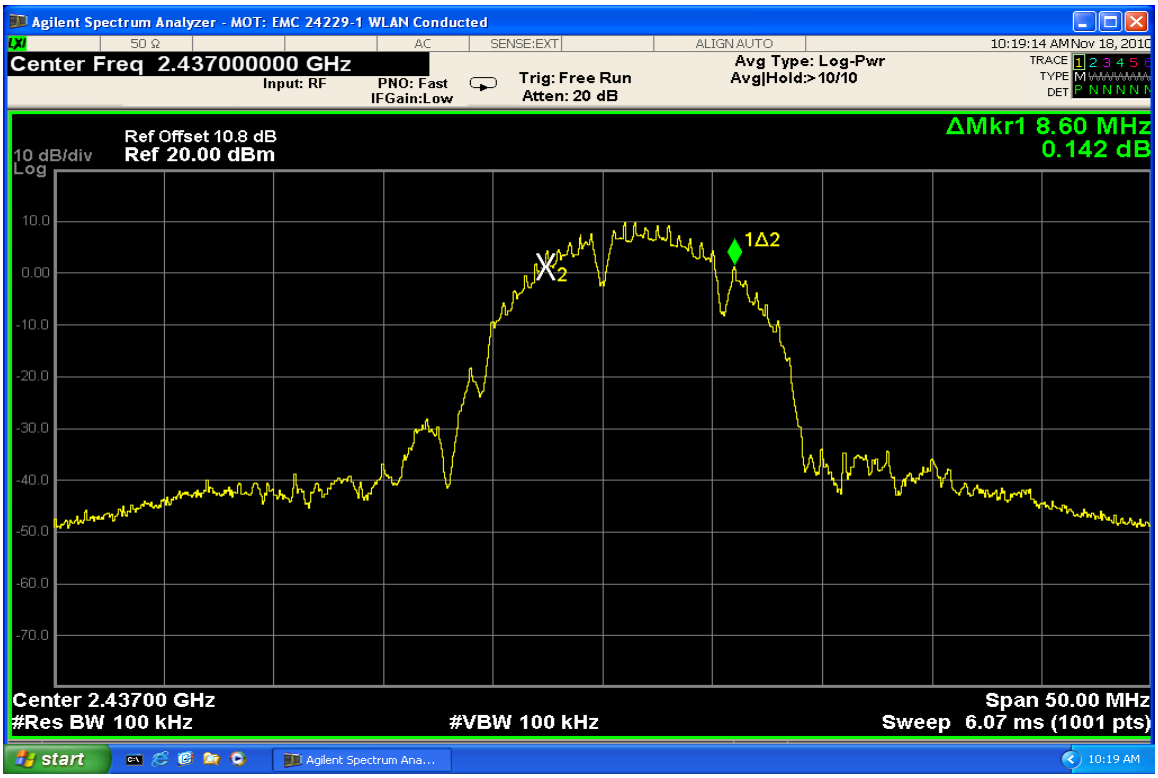
The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 6 dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 6 dB bandwidth of the emission. The same procedure was repeated for 20 dB bandwidth.

Measurement Results

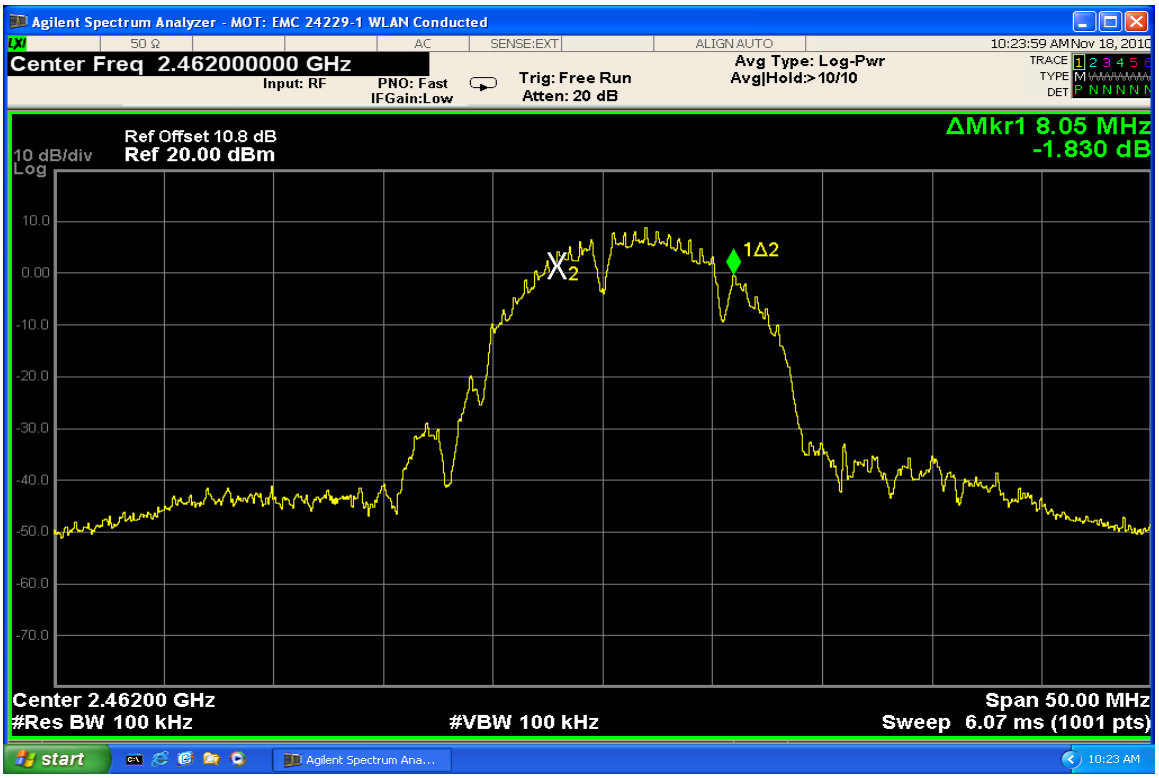
See attached

802.11b Mode

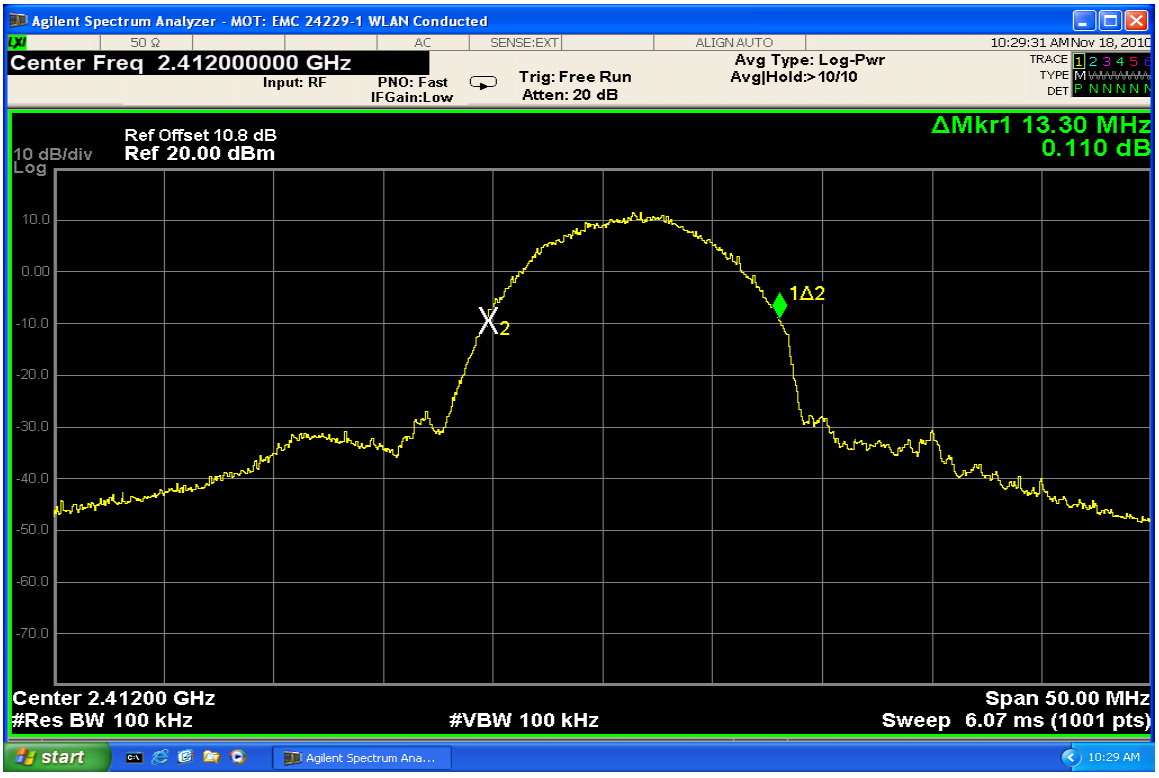
6 dB Bandwidth Channel 1 @ 1Mbps



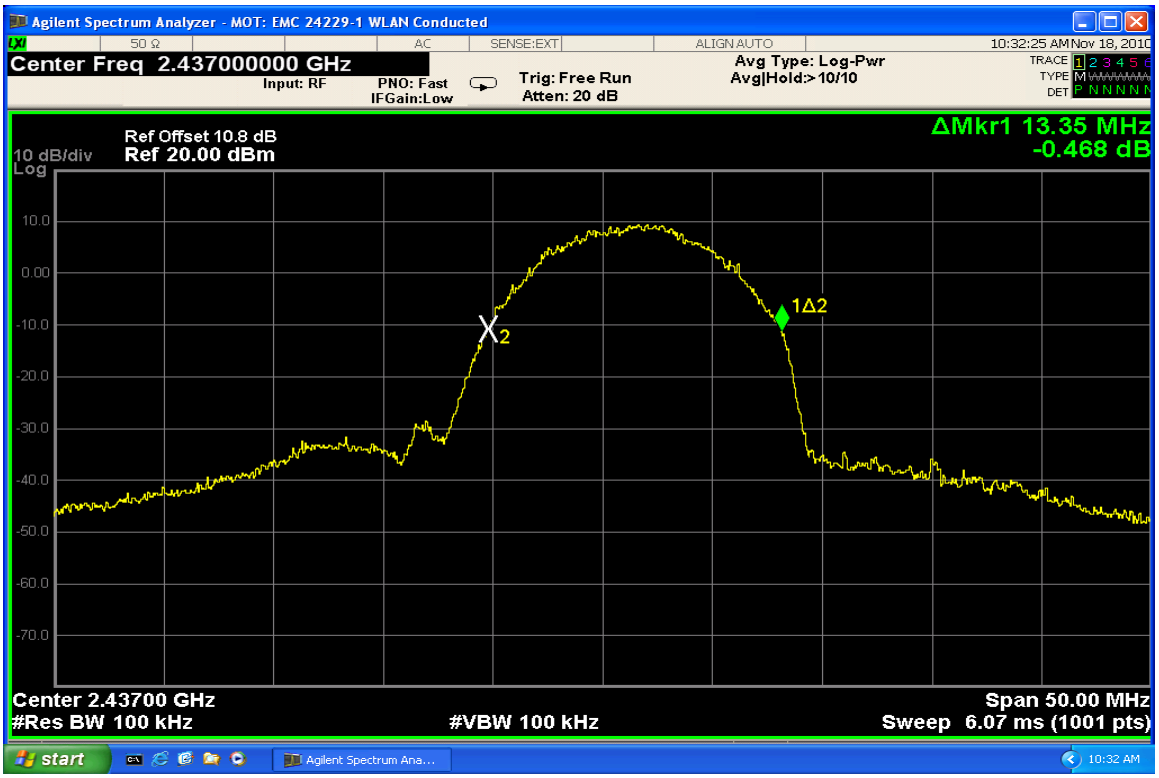
6 dB Bandwidth Channel 6 @ 1Mbps



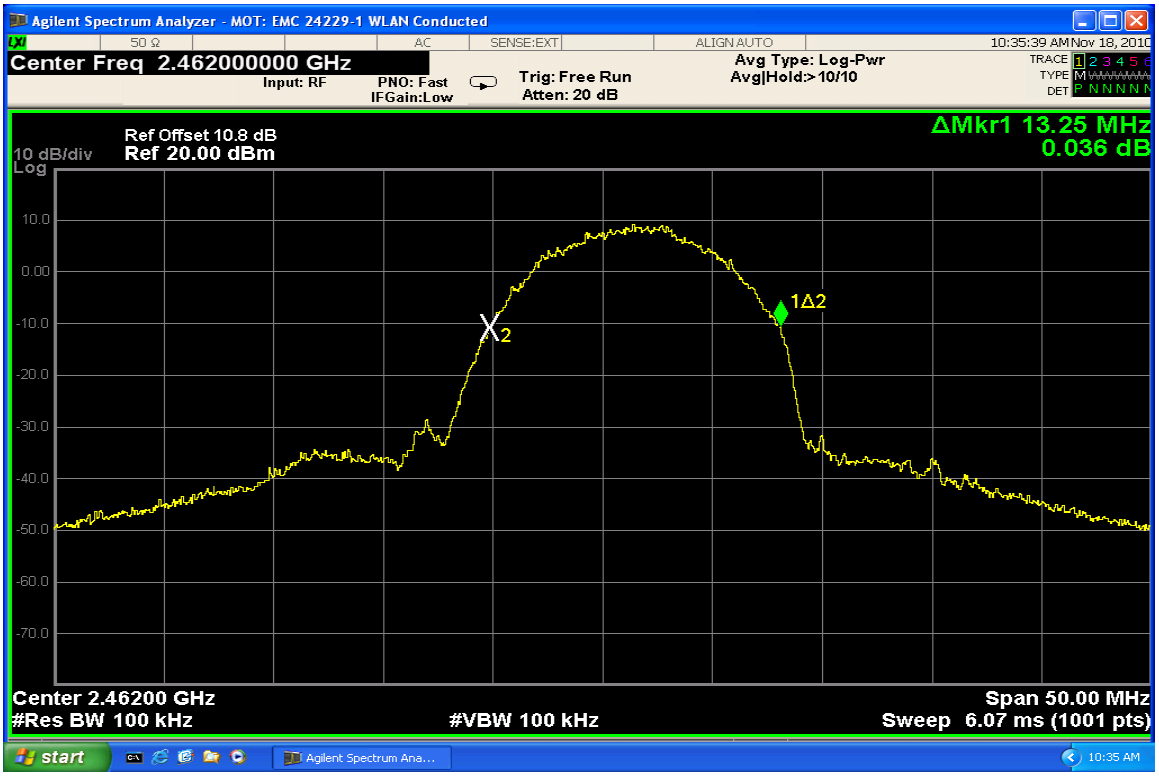
6 dB Bandwidth Channel 11 @ 1Mbps



20 dB Bandwidth Channel 1 @ 5.5Mbps

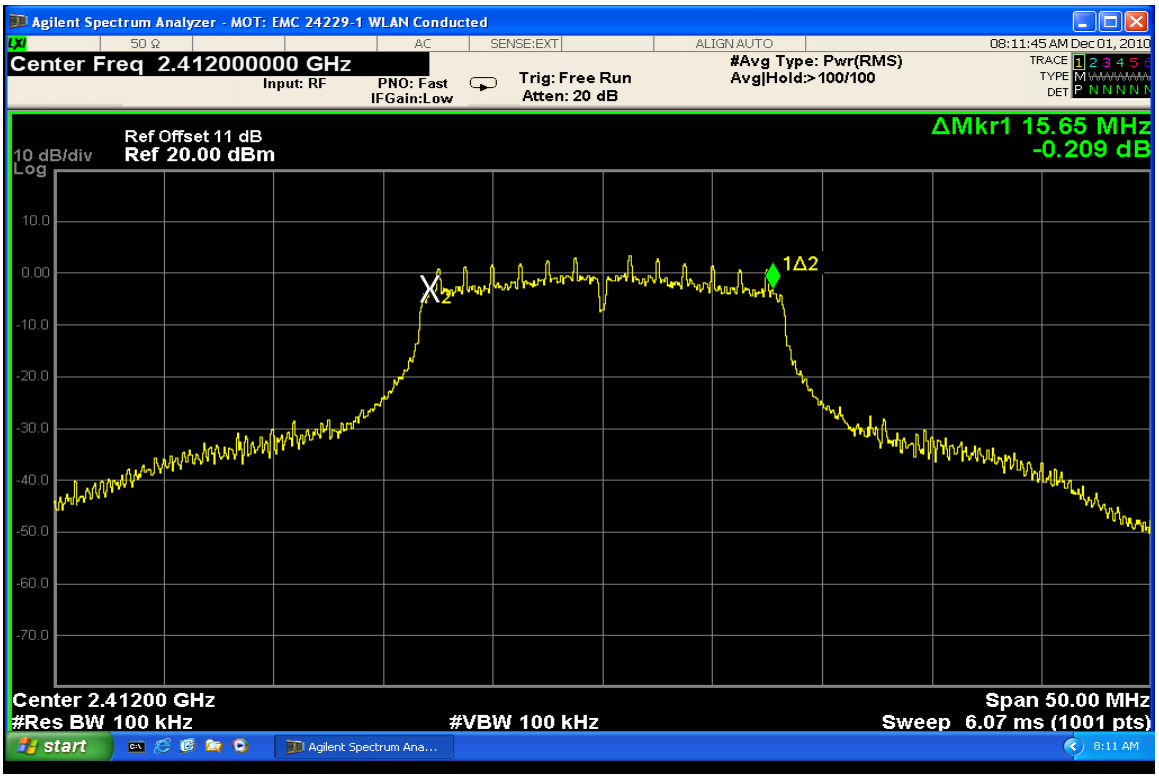


20 dB Bandwidth Channel 6 @ 5.5Mbps

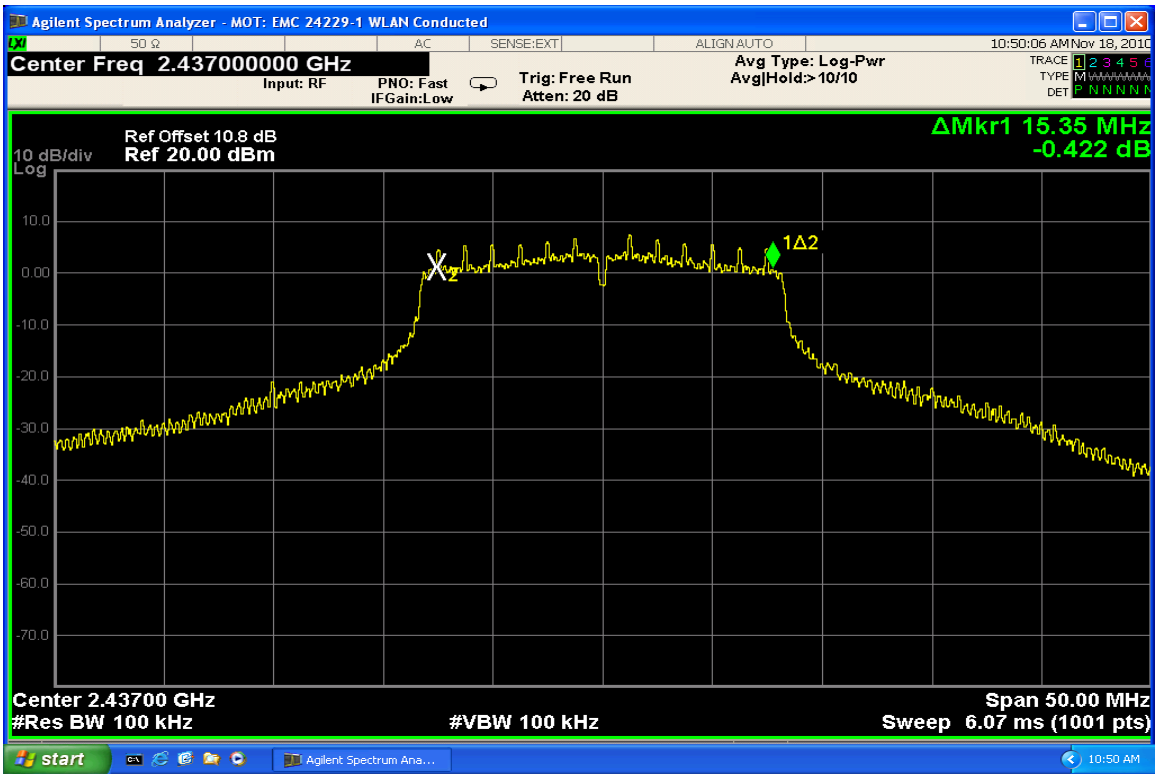


20 dB Bandwidth Channel 11 @ 5.5Mbps

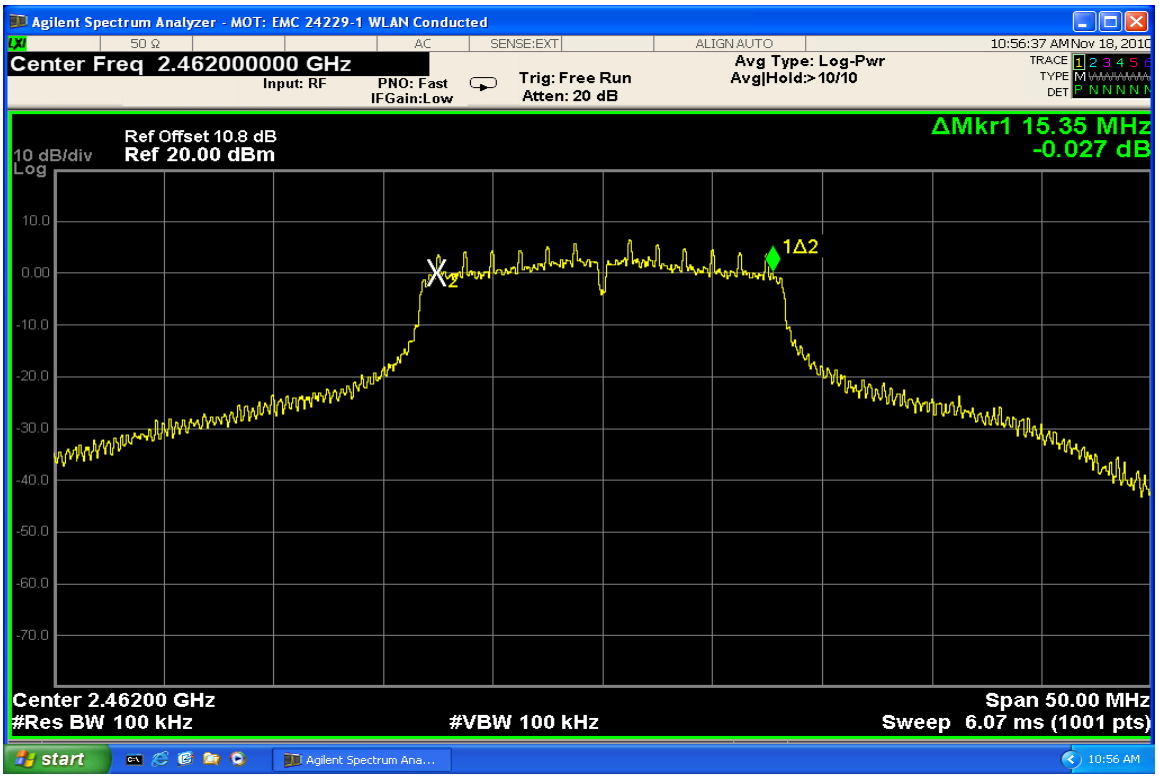
802.11g Mode



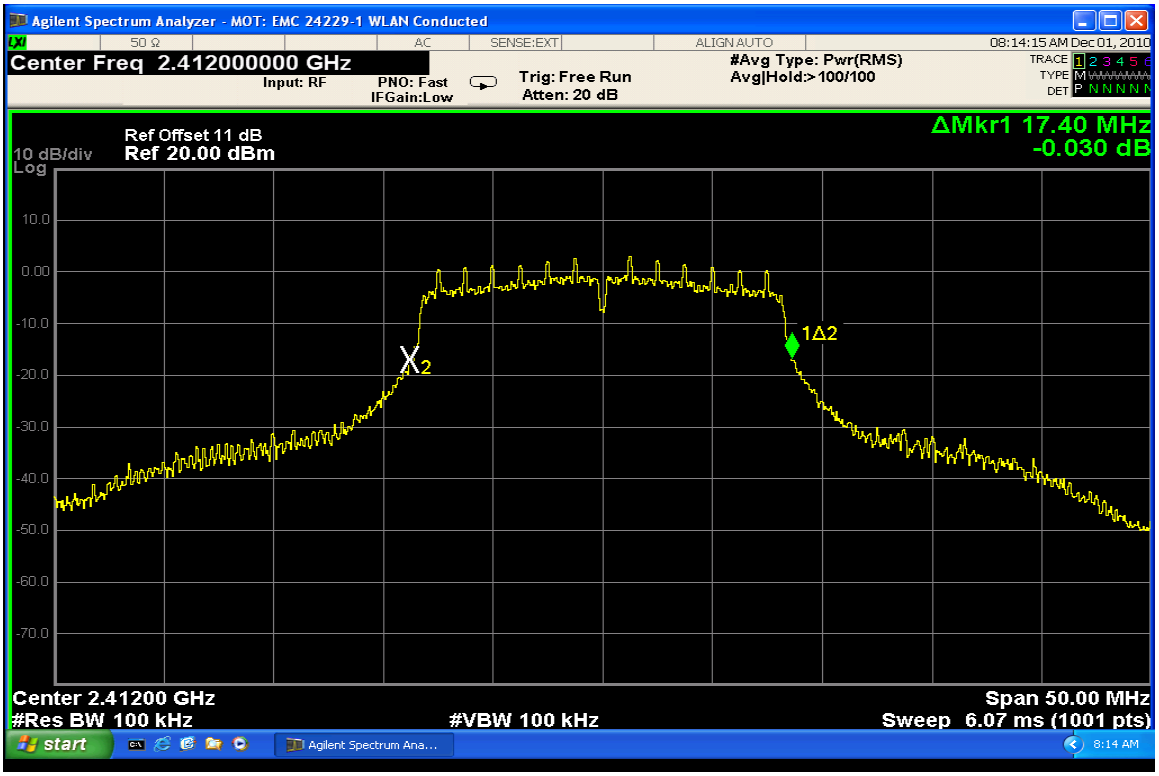
6 dB Bandwidth Channel 1 @ 6Mbps



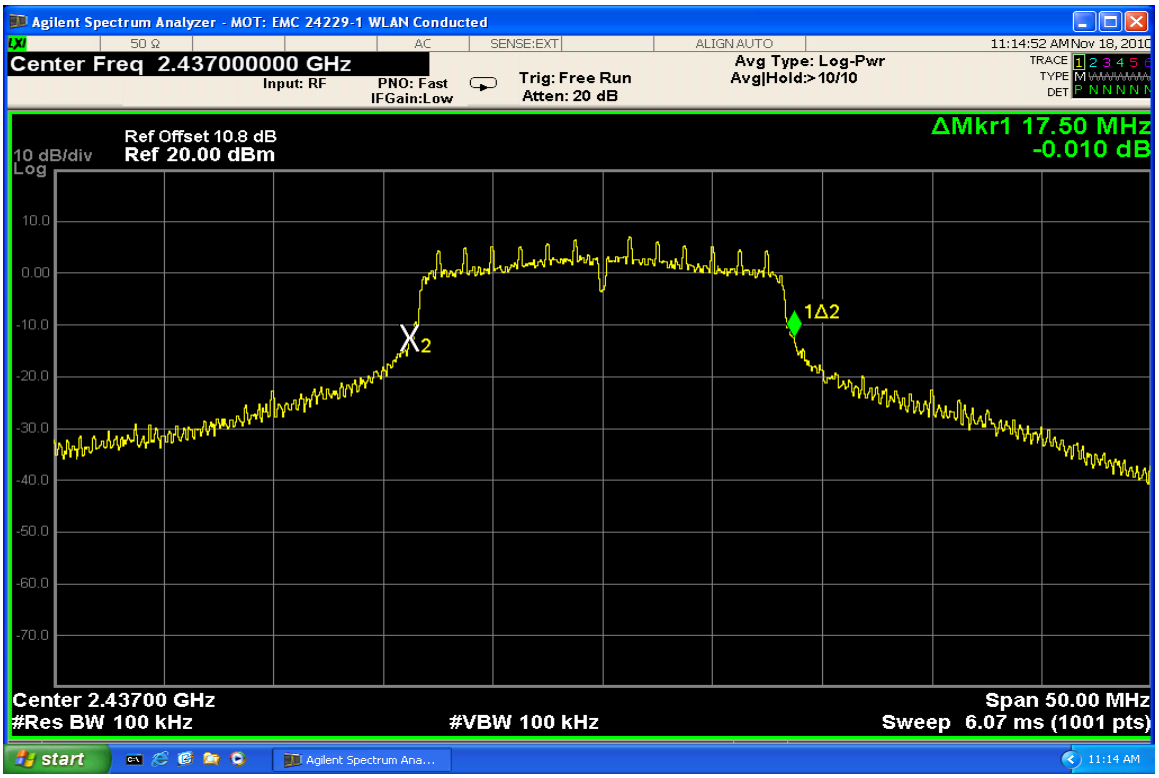
6 dB Bandwidth Channel 6 @ 6Mbps



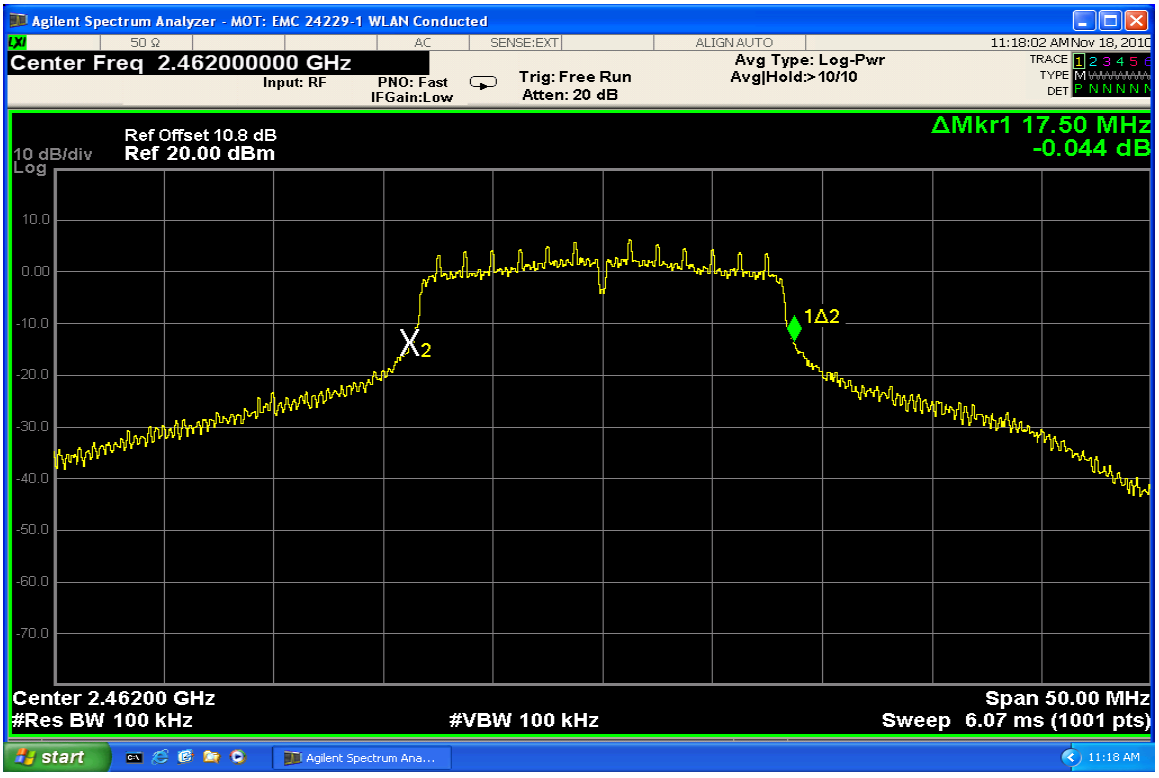
6 dB Bandwidth Channel 11 @ 6Mbps



20 dB Bandwidth Channel 1 @ 9Mbps

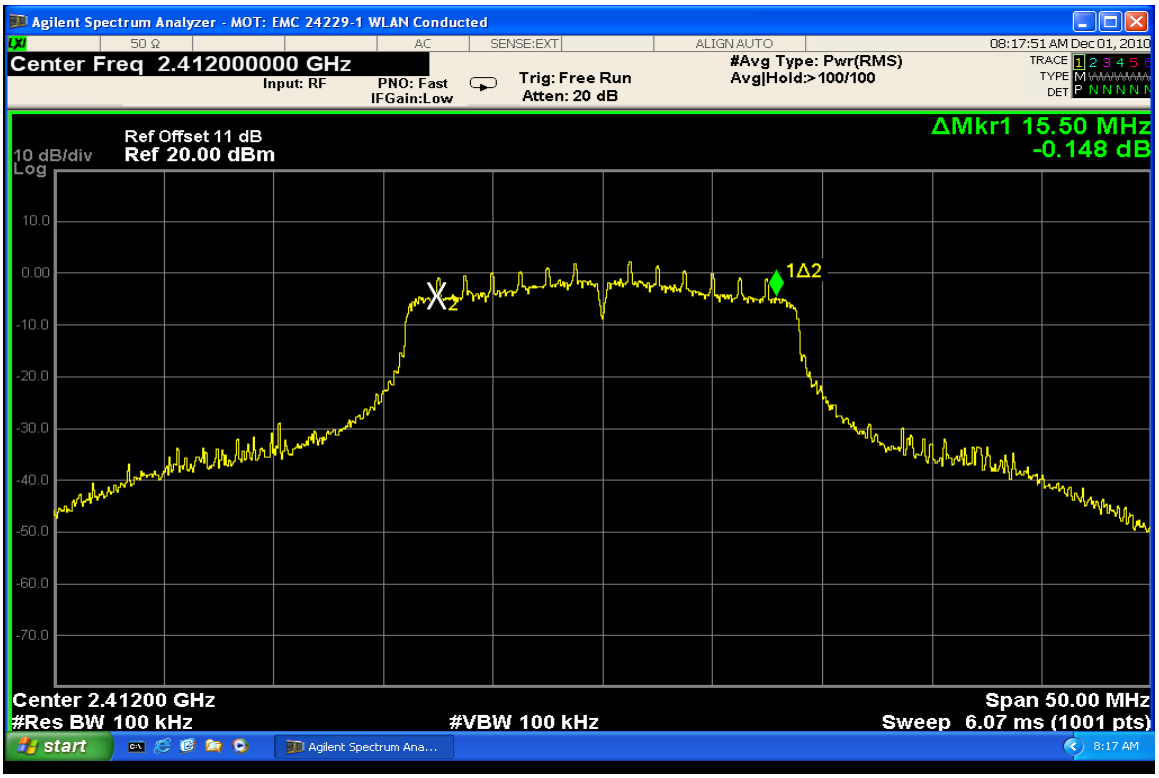


20 dB Bandwidth Channel 6 @ 9Mbps

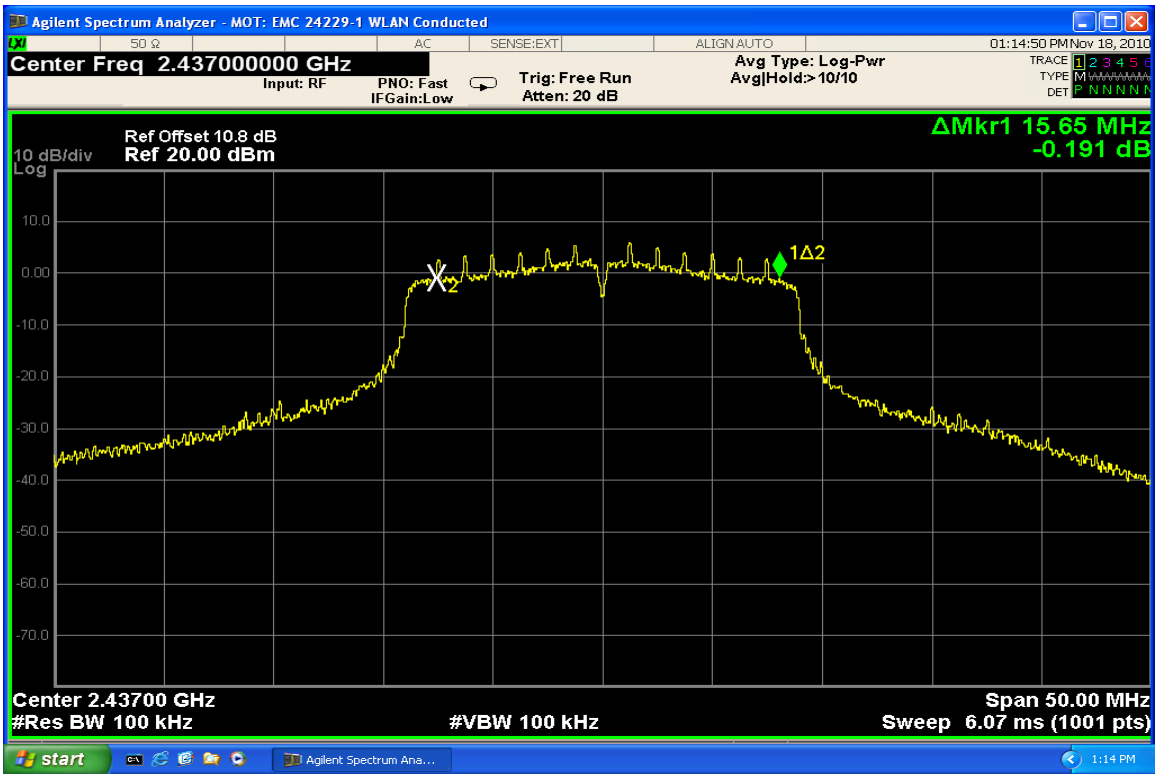


20 dB Bandwidth Channel 11 @ 9Mbps

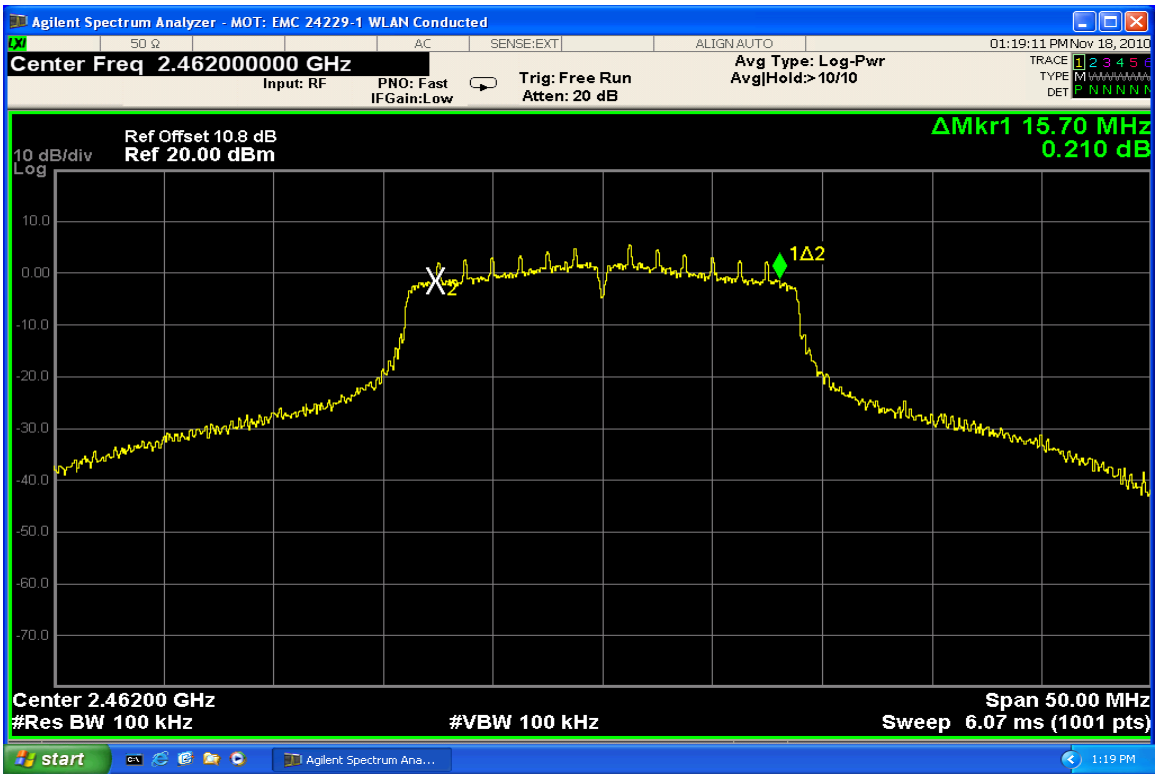
802.11n 400ns GI Mode



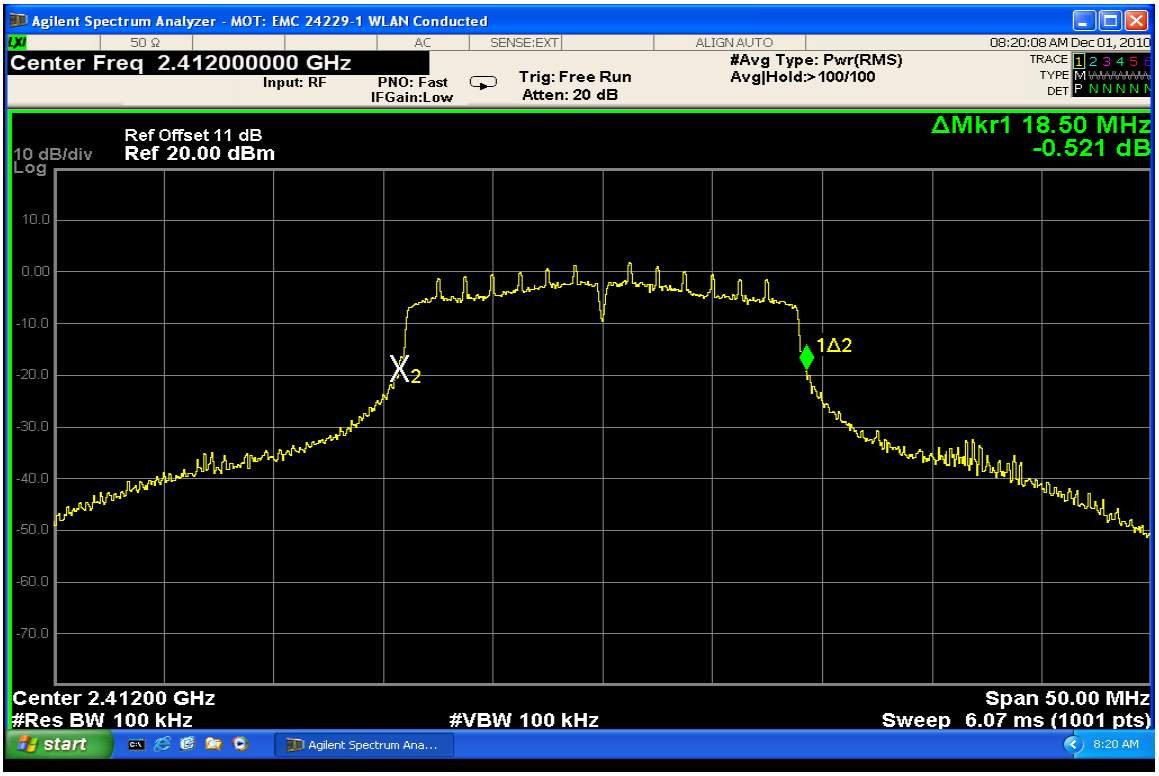
6dB Bandwidth Channel 1 @ 7.2Mbps



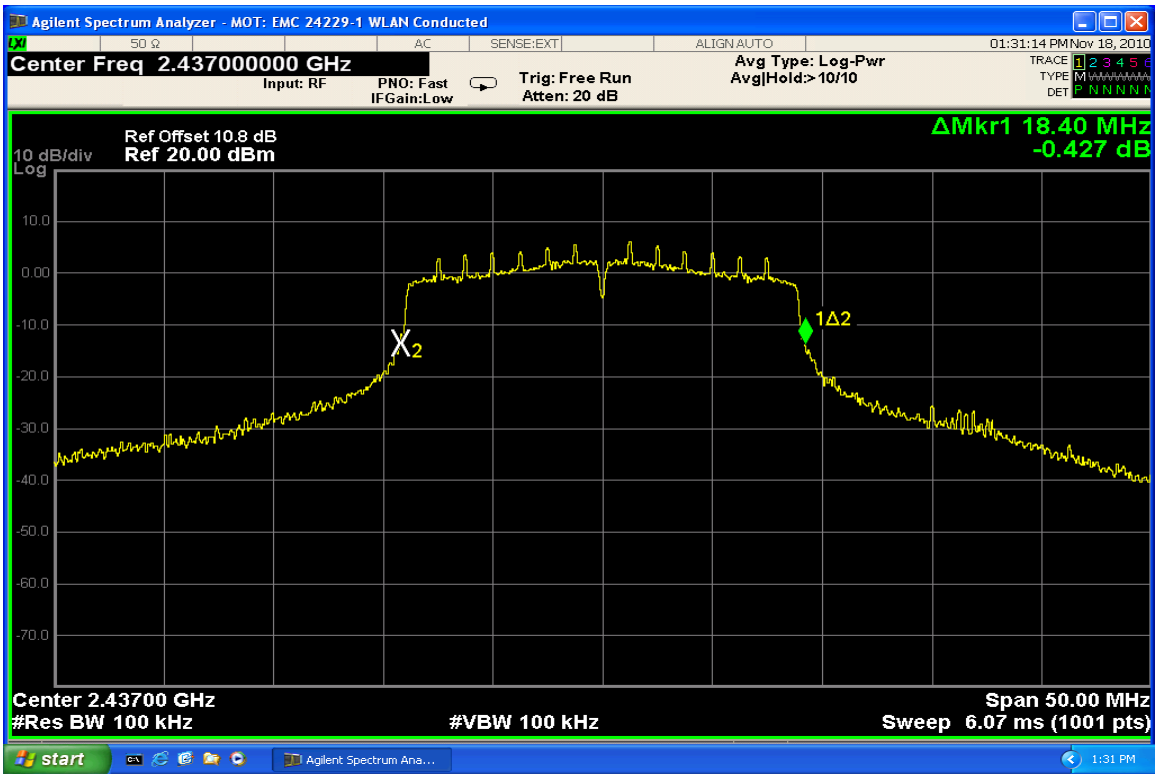
6dB Bandwidth Channel 6 @ 7.2Mbps



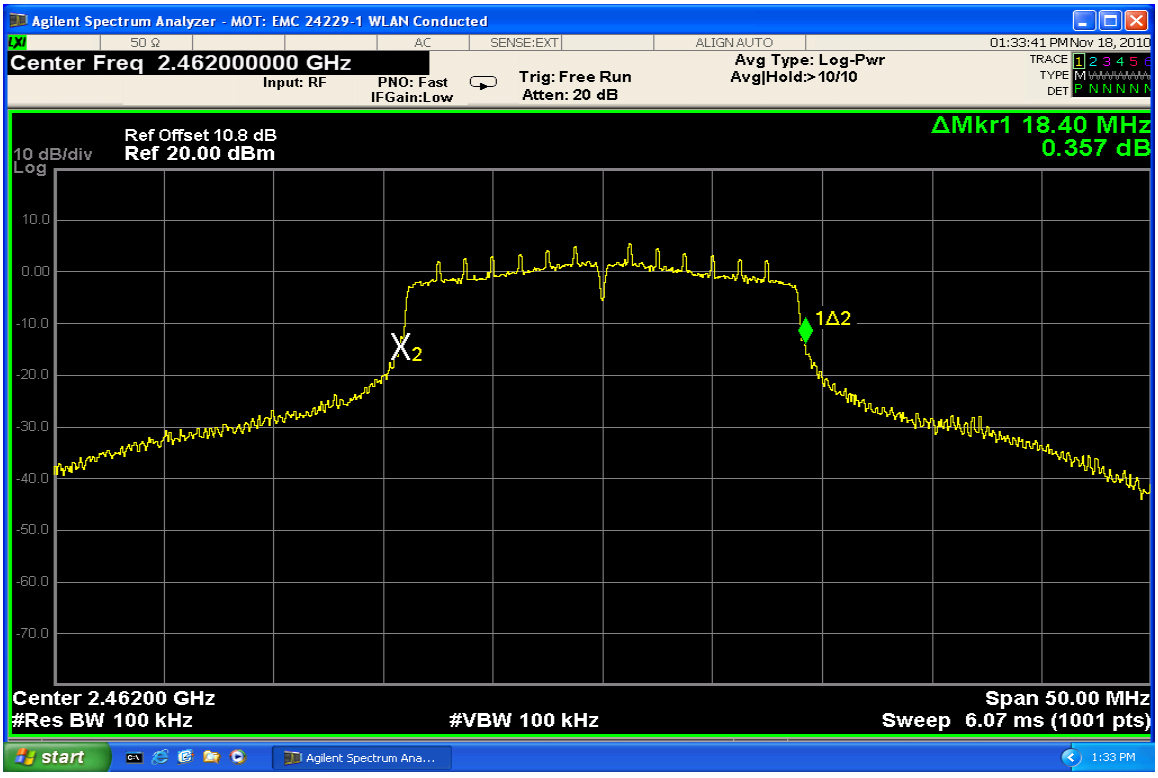
6dB Bandwidth Channel 11 @ 7.2Mbps



20dB Bandwidth Channel 1 @ 14.4Mbps

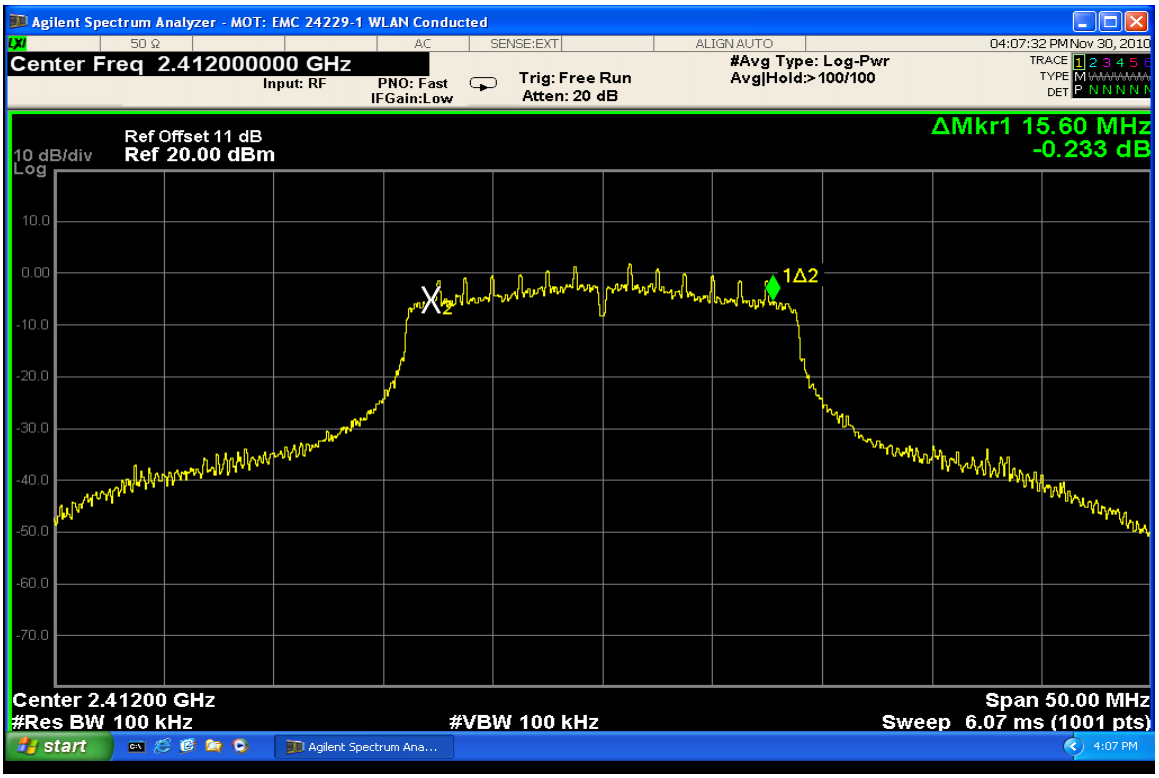


20dB Bandwidth Channel 6 @ 14.4Mbps

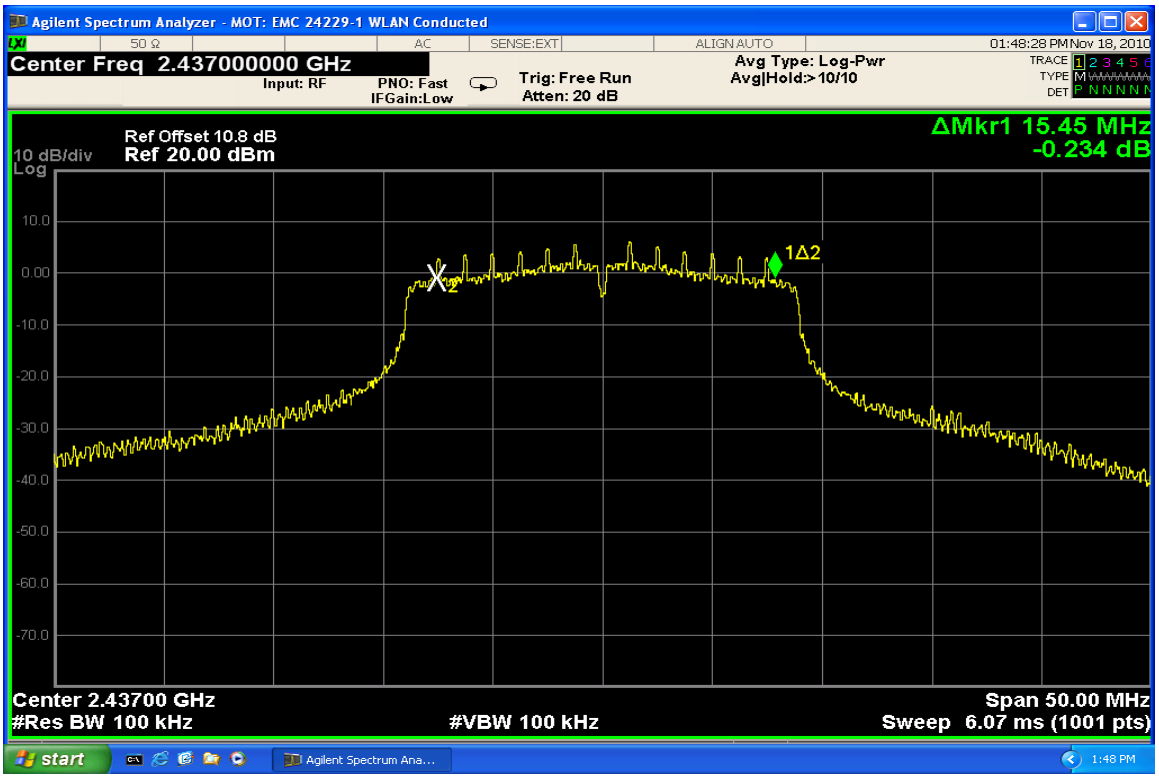


20dB Bandwidth Channel 11 @ 14.4Mbps

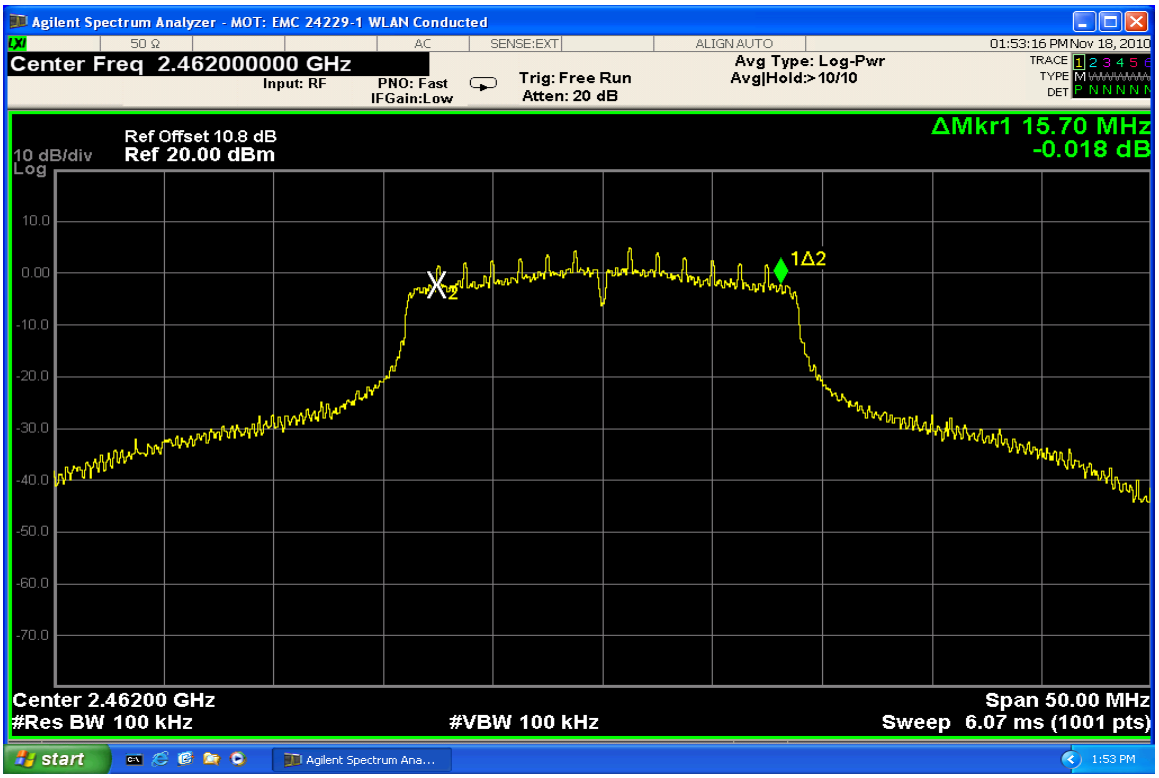
802.11n 800ns GI Mode



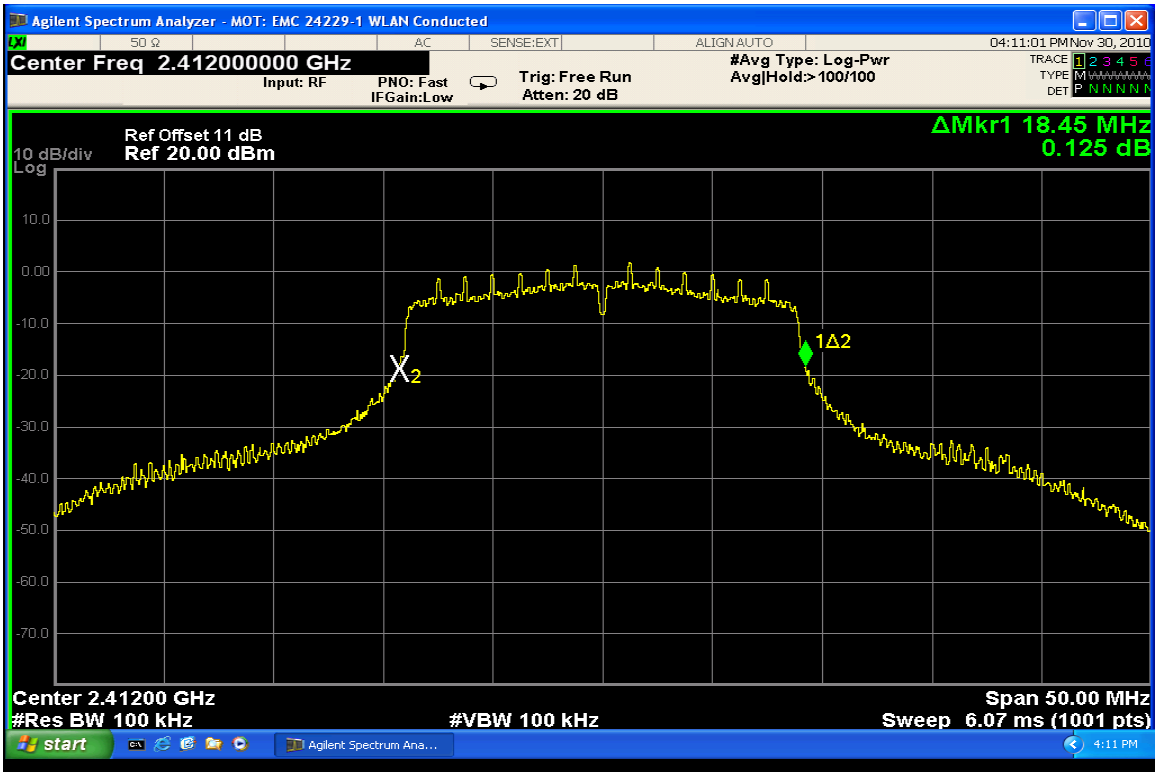
6 dB Bandwidth Channel 1 @ 6.5Mbps



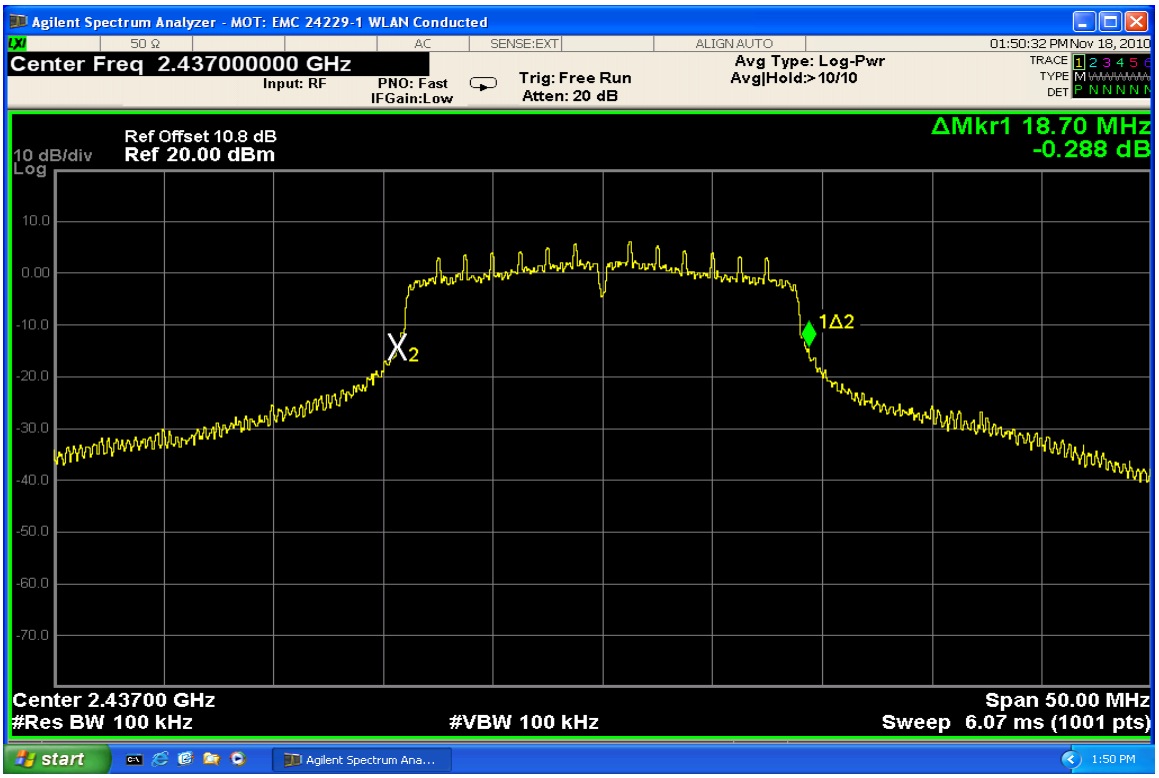
6 dB Bandwidth Channel 6 @ 6.5Mbps



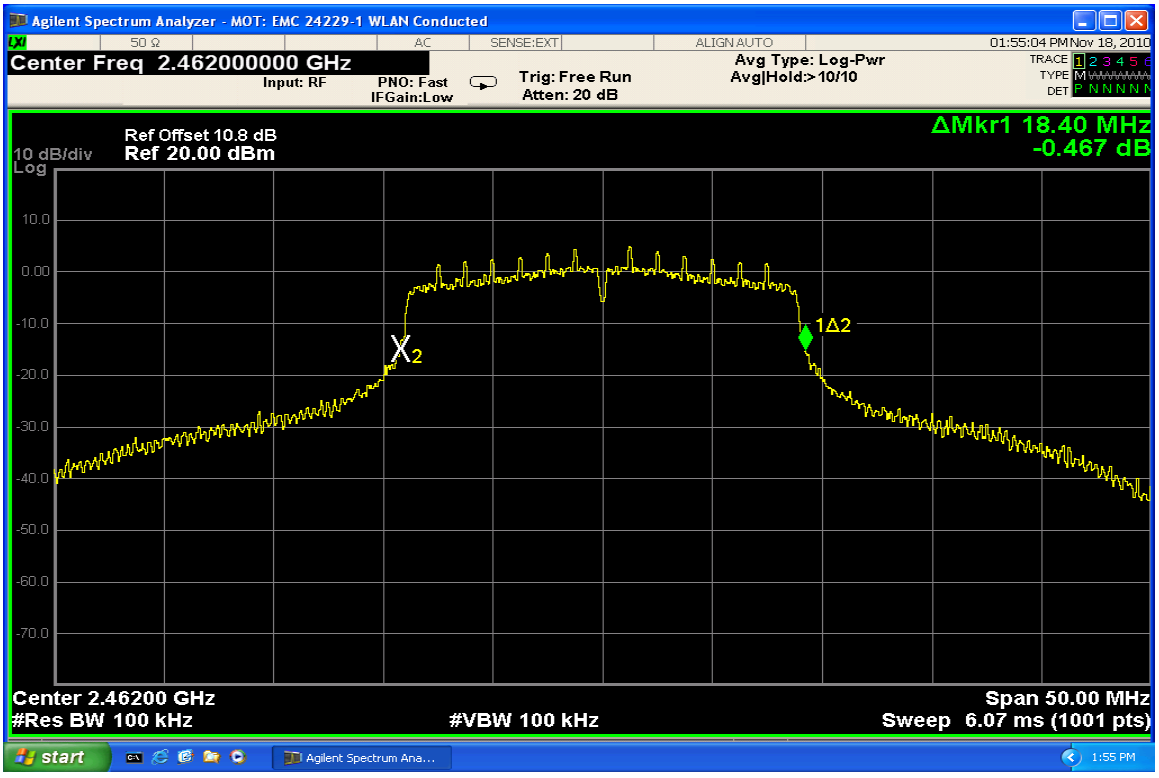
6 dB Bandwidth Channel 11 @ 6.5Mbps



20 dB Bandwidth Channel 1 @ 6.5Mbps



20 dB Bandwidth Channel 6 @ 6.5Mbps



20 dB Bandwidth Channel 11 @ 6.5Mbps

PEAK OUTPUT POWER

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the Spectrum analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage. Initially, an average detector is used to measure power in the low, middle and high channels for all data rates. The average measurements are used to determine which data rate is to be fully tested for each supported mode. Using a peak detector, the power is then measured for the applicable data rates.

Measurement Results

See Attached

Initial average power measurments in the 2.4GHz band

Channel	Average power (dBm) for 802.11b Data Rates			
	1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
1	18.62	19.34	19.31	19.42
6	17.64	18.43	18.77	18.26
11	16.79	17.43	17.83	17.39

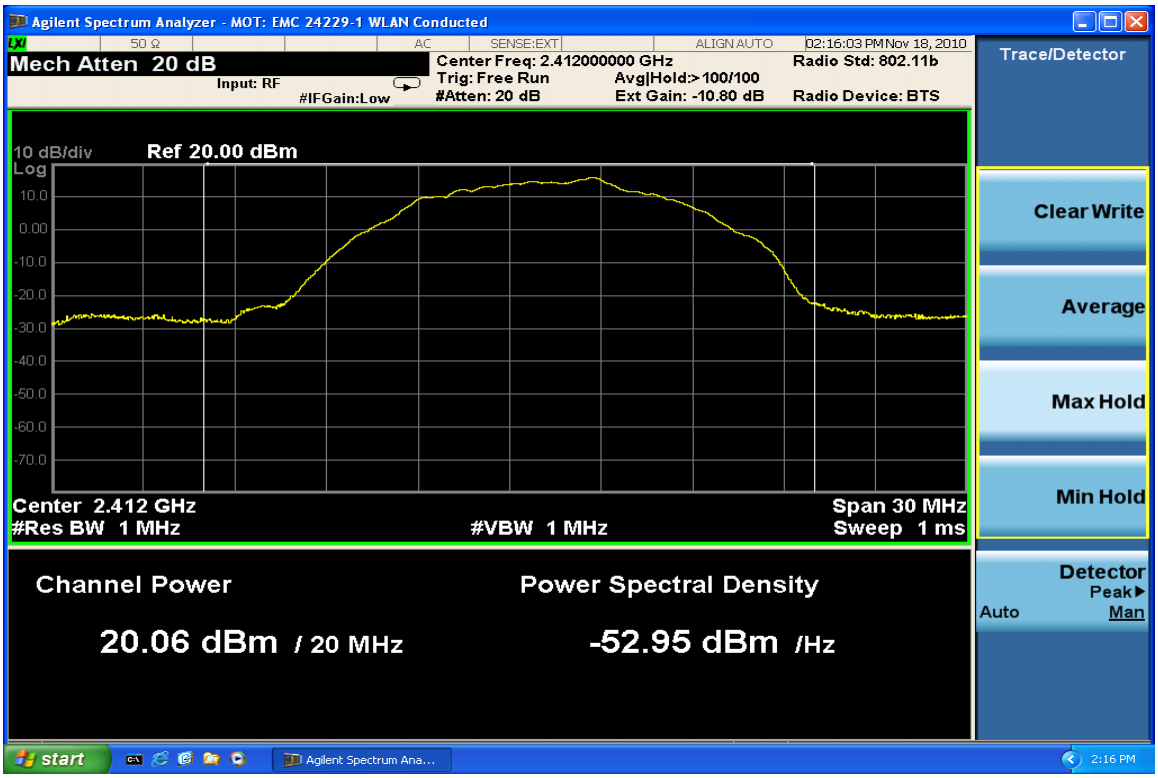
Channel	Average power (dBm) for 802.11g Data Rates							
	6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
1	12.21	12.12	12.07	11.87	11.82	11.9	11.87	11.85
6	16.9	17.09	16.83	16.45	13.87	15.43	14.35	14.37
11	16.25	16.17	16.03	15.69	13.05	14.48	14.81	13.56

Channel	Average power (dBm) for 802.11n Data Rates							
	20 MHz BW, 400 ns GI							
	7.2 Mbps	14.4 Mbps	21.7 Mbps	28.9 Mbps	43.3 Mbps	57.8 Mbps	65 Mbps	72.2 Mbps
1	10.8	10.68	10.47	10.48	10.5	10.49	10.46	10.46
6	15.21	15.42	14.97	13.66	13.75	13.87	13.69	11.64
11	14.76	14.63	14.2	13.03	12.99	13.28	12.96	11.25

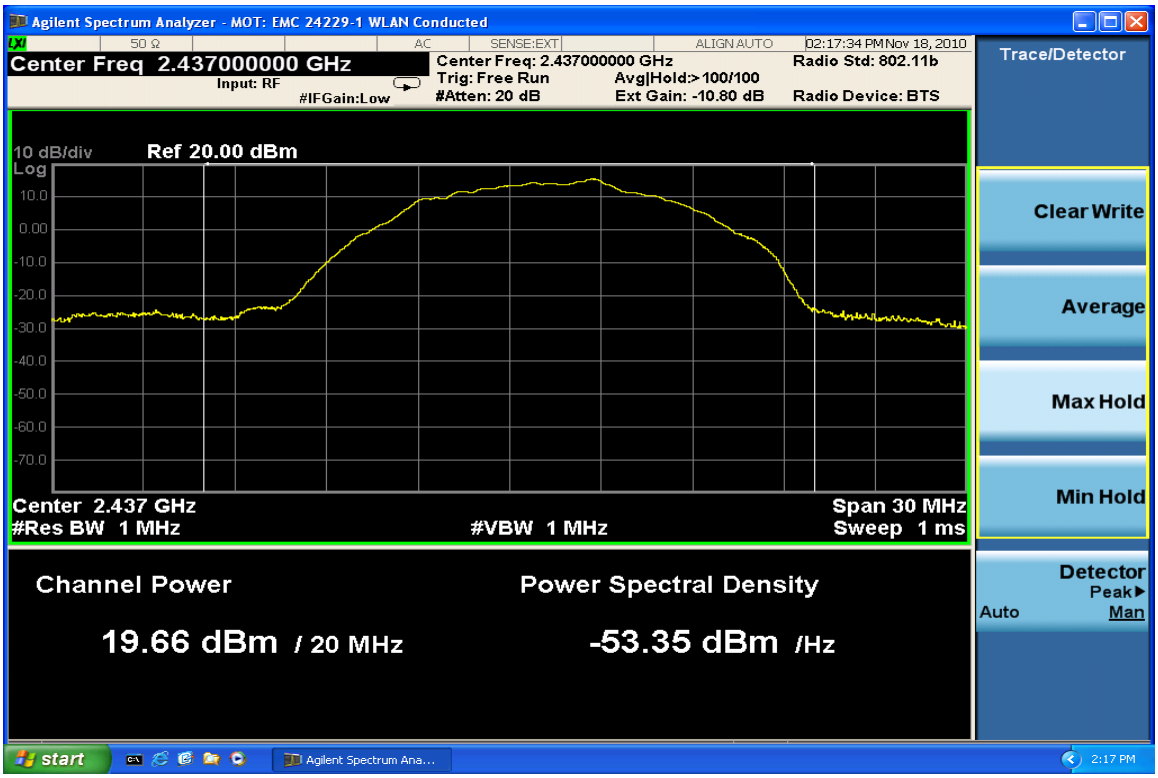
Channel	Average power (dBm) for 802.11n Data Rates							
	20 MHz BW, 800 ns GI							
	6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
1	10.82	10.73	10.50	10.48	10.60	10.46	10.39	10.47
6	15.65	15.49	15.01	13.95	13.65	13.93	13.51	11.82
11	14.83	14.61	14.53	13.31	13.09	13.24	13.25	11.26

Based on these initial measurements, it was determined that testing will be performed in the 5.5Mbps data rate for the 802.11b mode, the 9Mbps data rate for the 802.11g mode, the 14.4Mbps data rate for the 802.11n 400ns GI mode and 6.5Mbps data rate for 802.11n 800ns GI mode. Plots showing the peak power measurements for the applicable data rates follow.

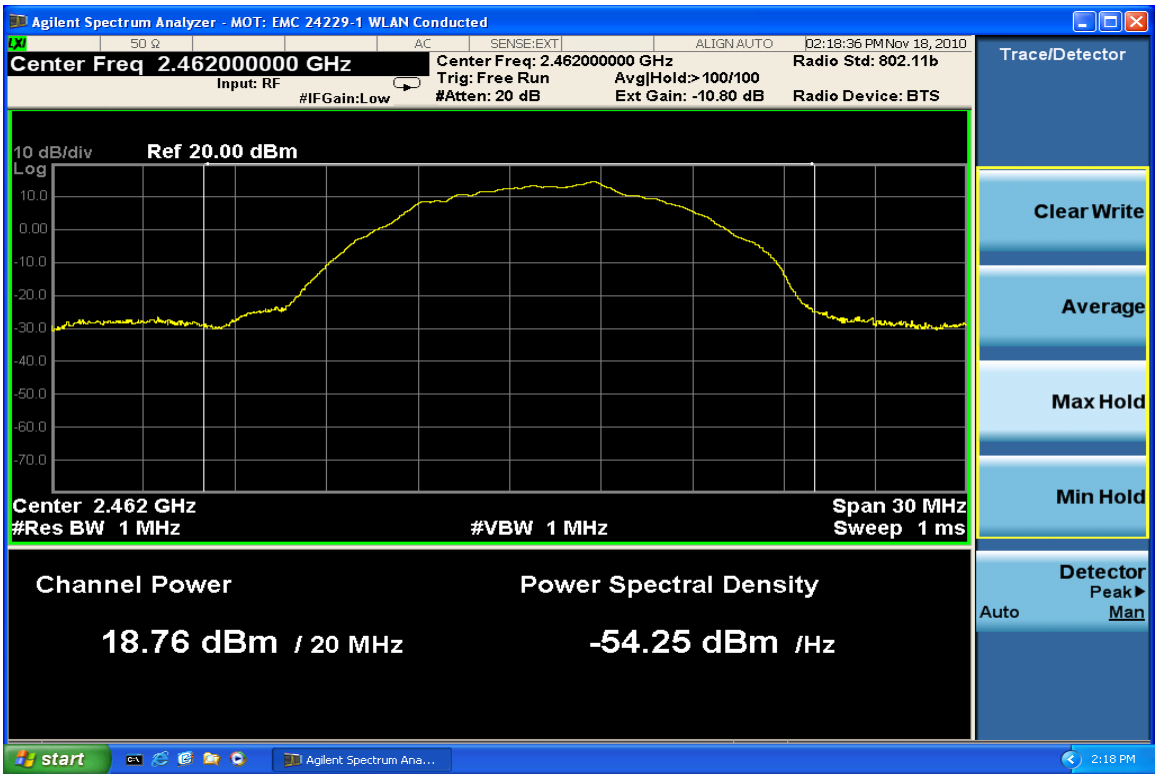
802.11b Mode



Max. Power Channel 1 @ 5.5Mbps

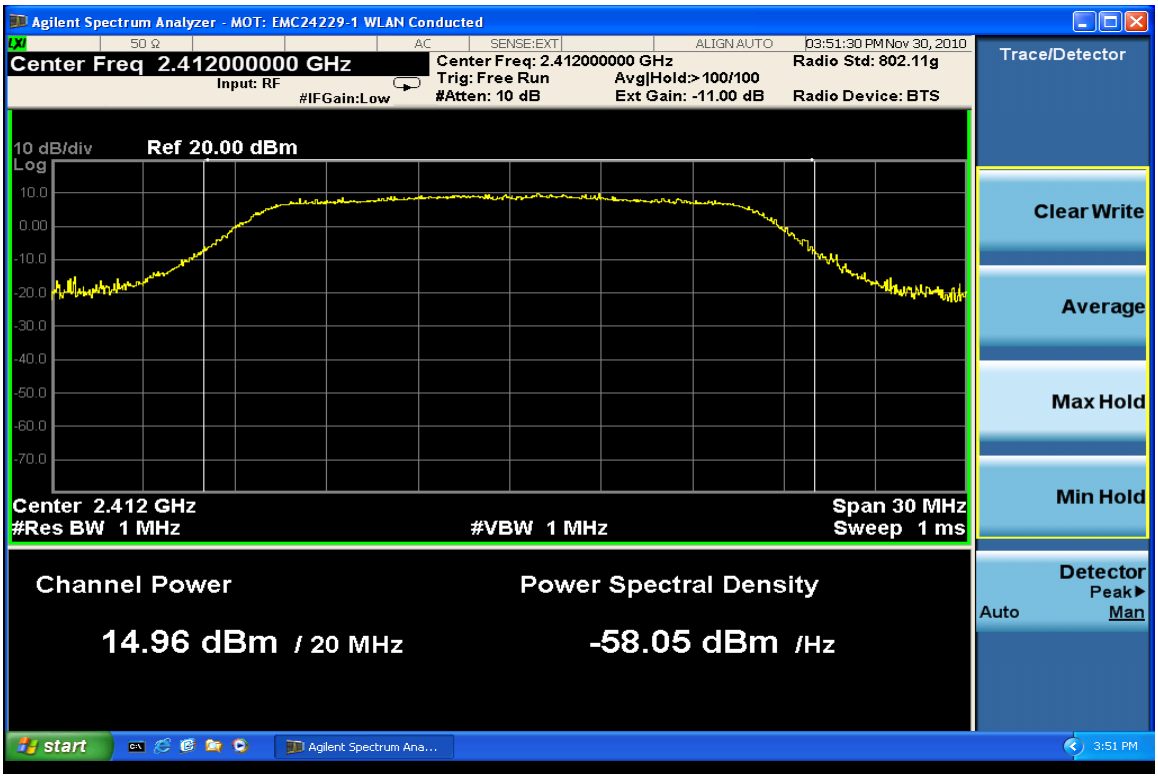


Max. Power Channel 6 @ 5.5Mbps

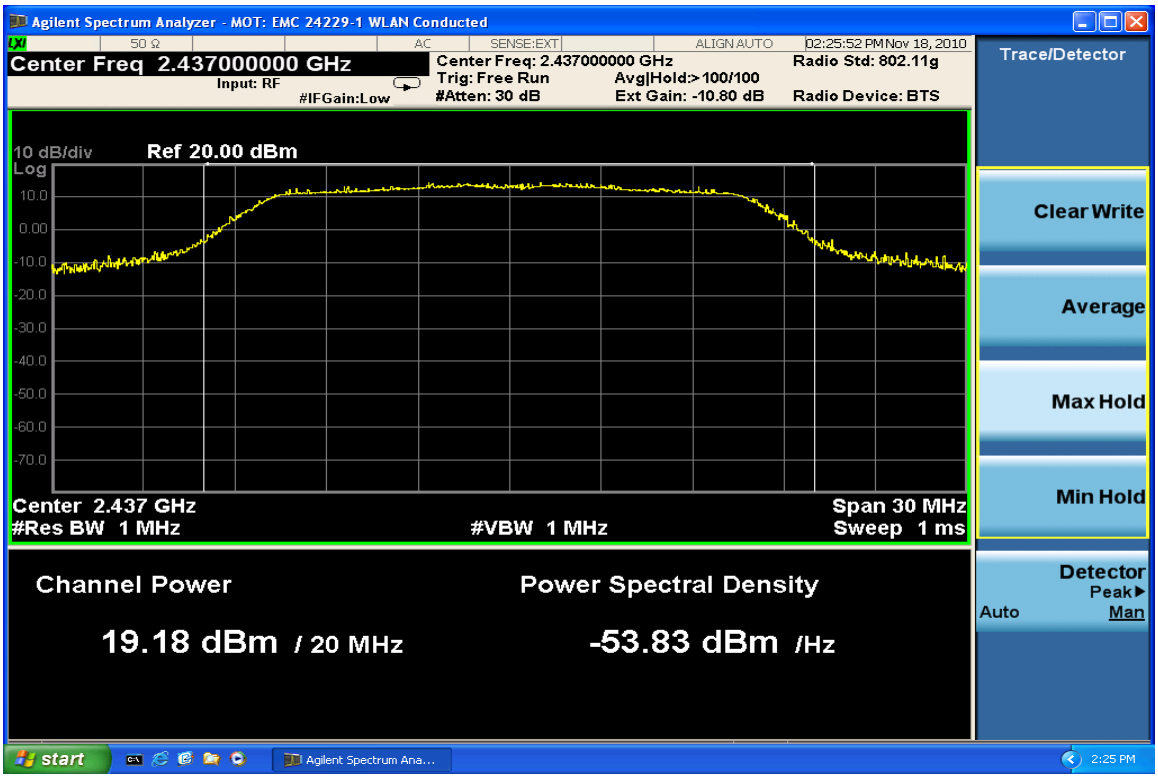


Max. Power Channel 11 @ 5.5Mbps

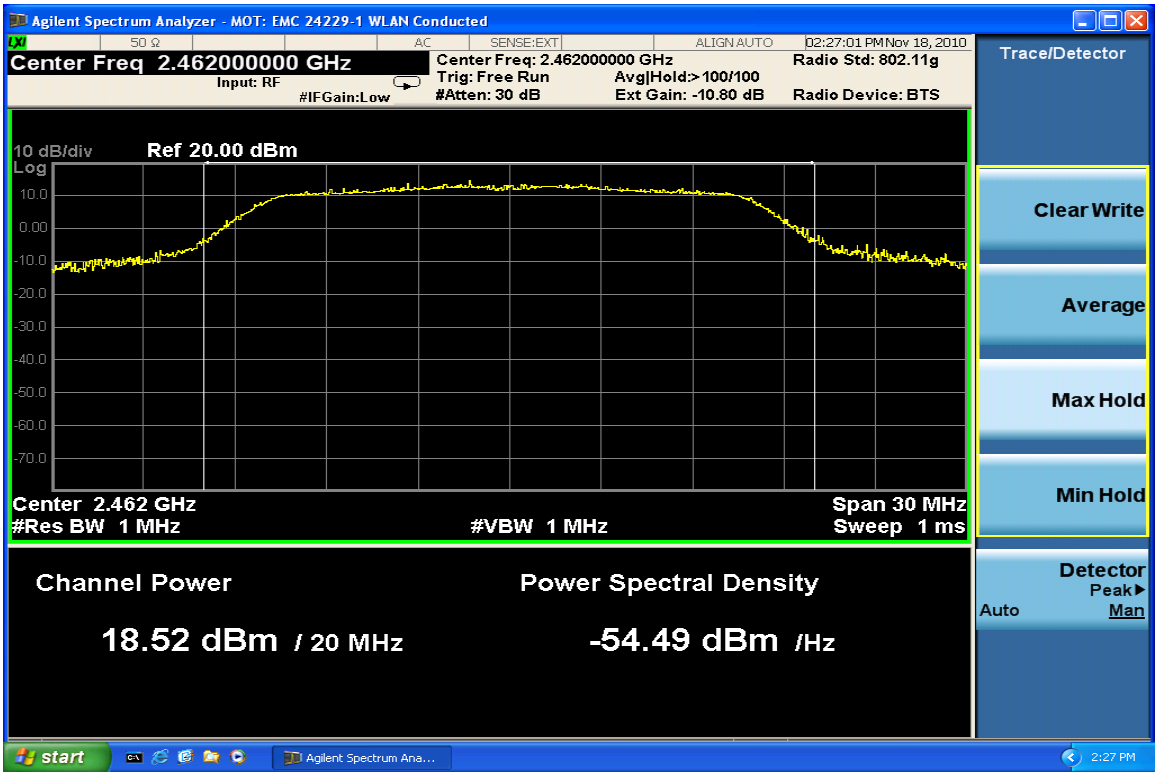
802.11g Mode



Max. Power Channel 1 @ 9Mbps

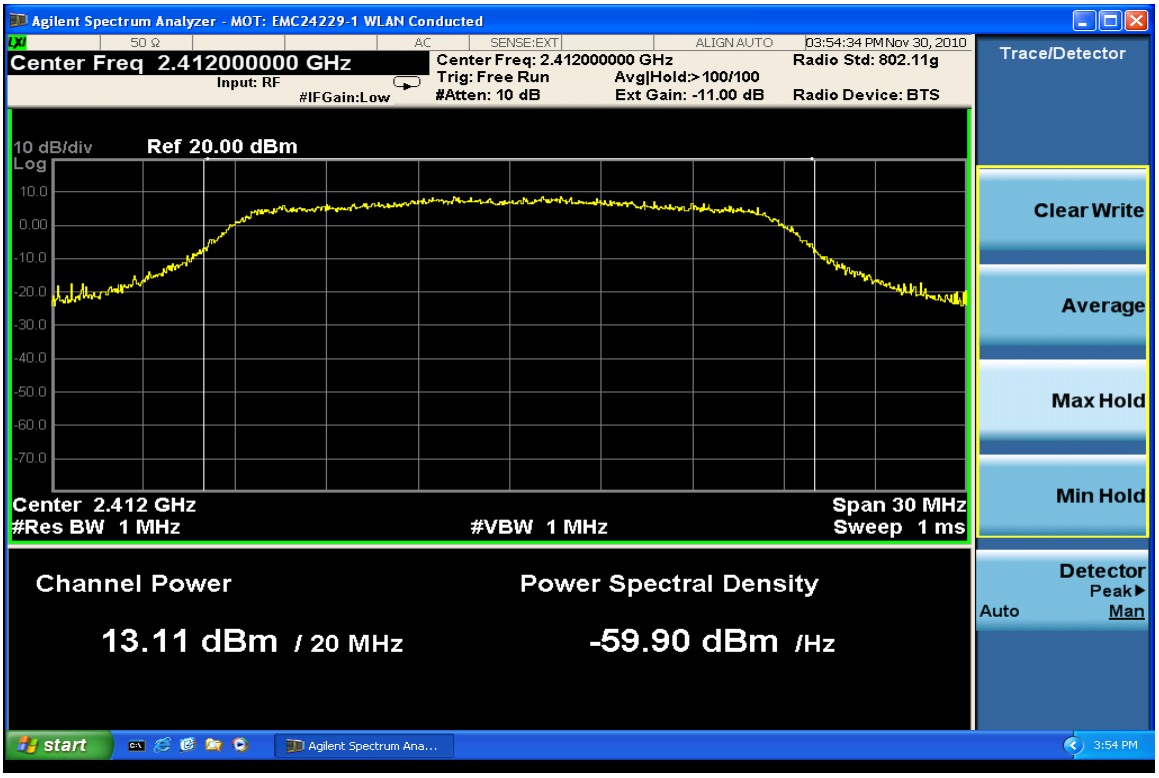


Max. Power Channel 6 @ 9Mbps

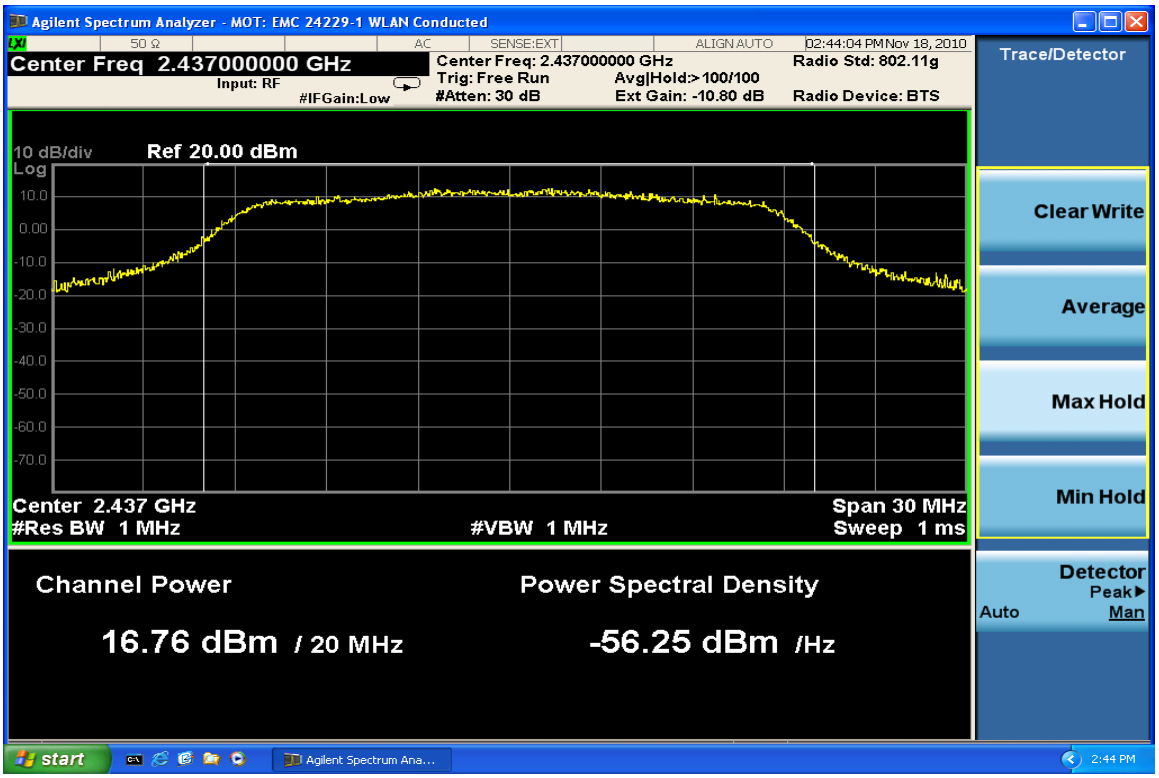


Max. Power Channel 11 @ 9Mbps

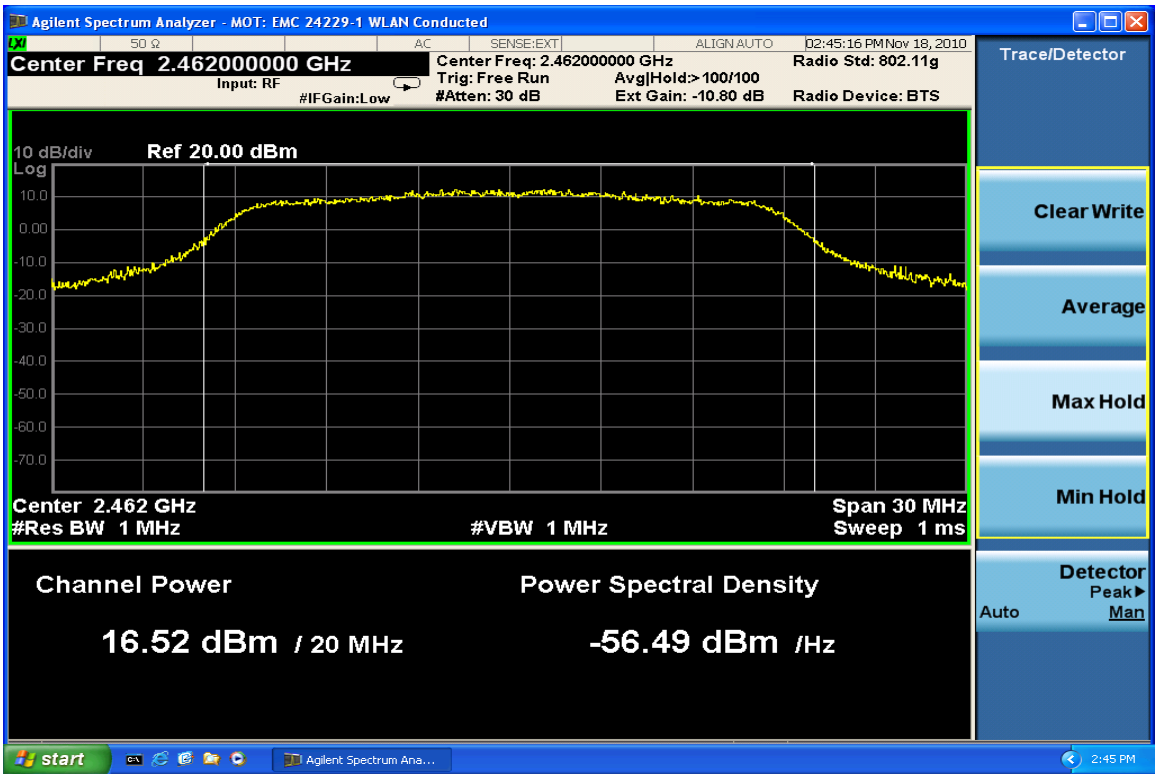
802.11n 400ns GI Mode



Max. Power Channel 1 @ 14.4Mbps

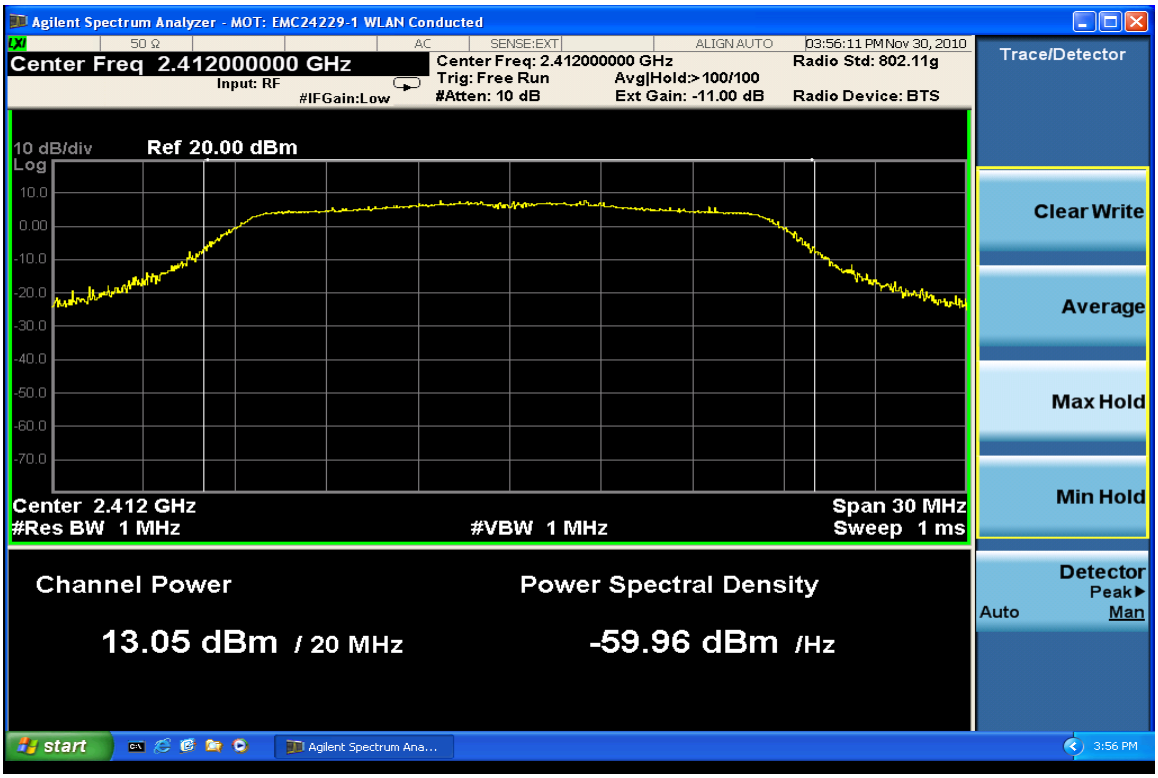


Max. Power Channel 6 @ 14.4Mbps

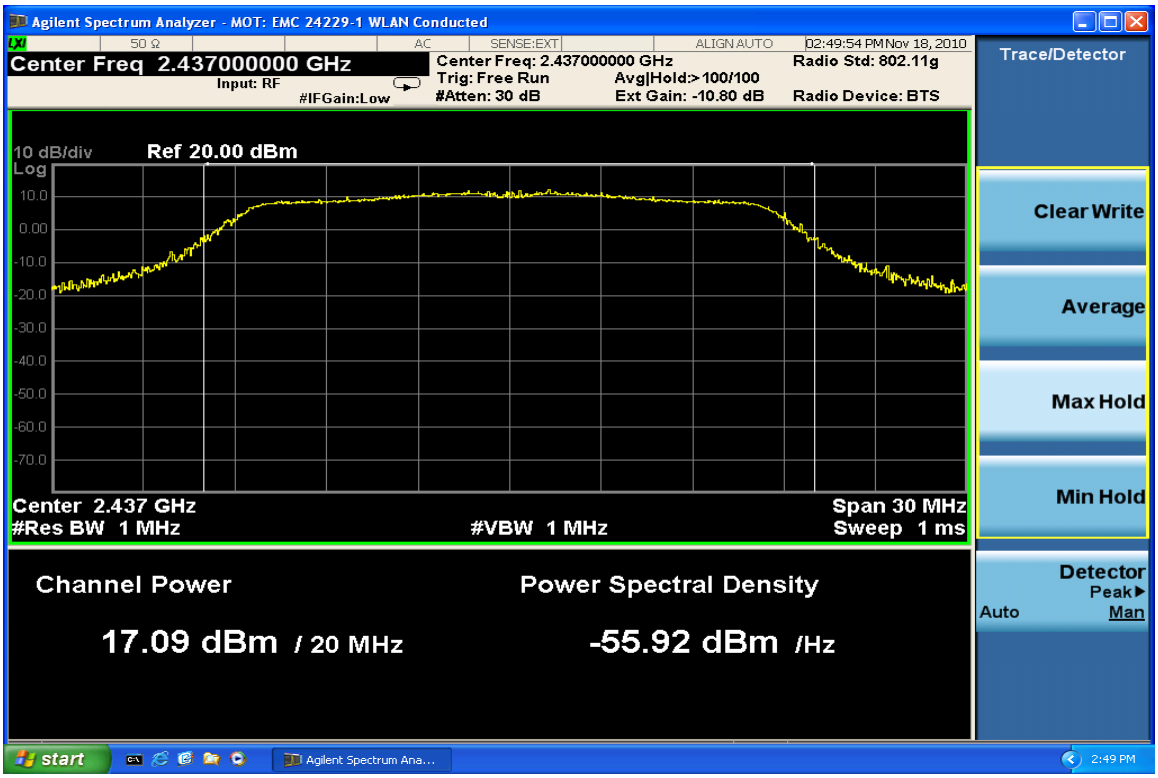


Max. Power Channel 11 @ 14.4Mbps

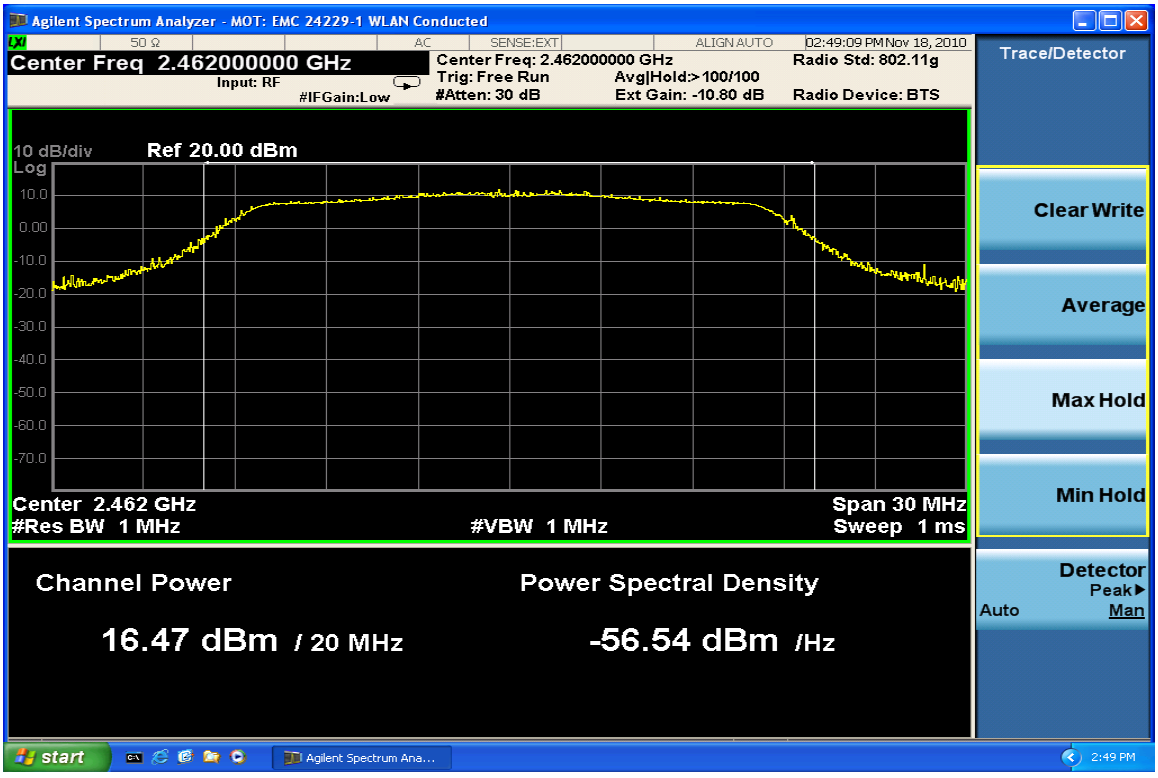
802.11n 800ns GI Mode



Max. Power Channel 1 @ 6.5Mbps



Max. Power Channel 6 @ 6.5Mbps



Max. Power Channel 11 @ 6.5Mbps

Power Spectral Density

CFR 47 Part 15.247

Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

The WLAN DSSS function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = 300 kHz
2. VBW =30 kHz
3. RBW=3 kHz
4. Sweep = 50 ms
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate.

Measurement Results

2412 MHz	2437MHz	2462MHz
-5.723dBm	-5.622dBm	-7.636dBm

802.11 b @ 5.5Mbps

2412 MHz	2437MHz	2462MHz
-18.161dBm	-14.833 dBm	-14.554dBm

802.11 g @ 9Mbps

2412 MHz	2437MHz	2462MHz
-19.533dBm	-15.301 dBm	-16.108 dBm

802.11n 400ns GI @ 14.4Mbps

2412 MHz	2437MHz	2462MHz
-20.587dBm	-16.676dBm	-17.011dBm

802.11n 800ns GI @ 6.5Mbps

SPURIOUS RF CONDUCTED EMISSIONS

CFR 47 Part 15.247

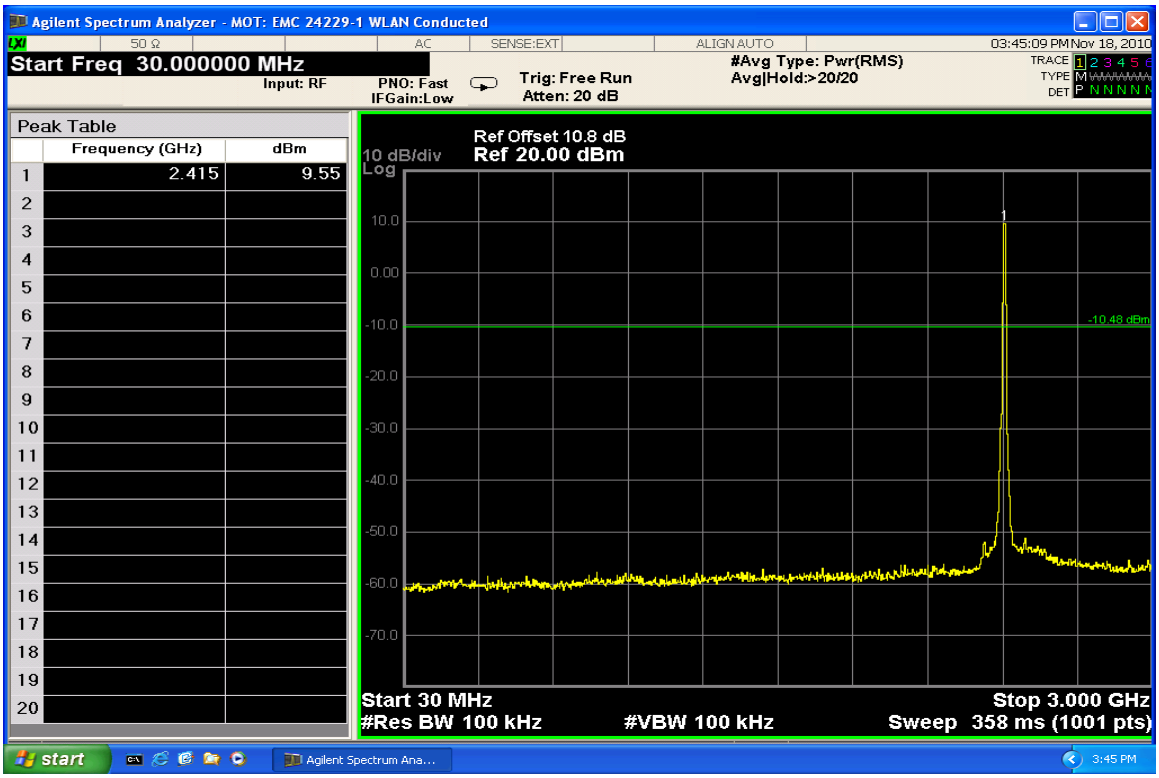
Measurement Procedure

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

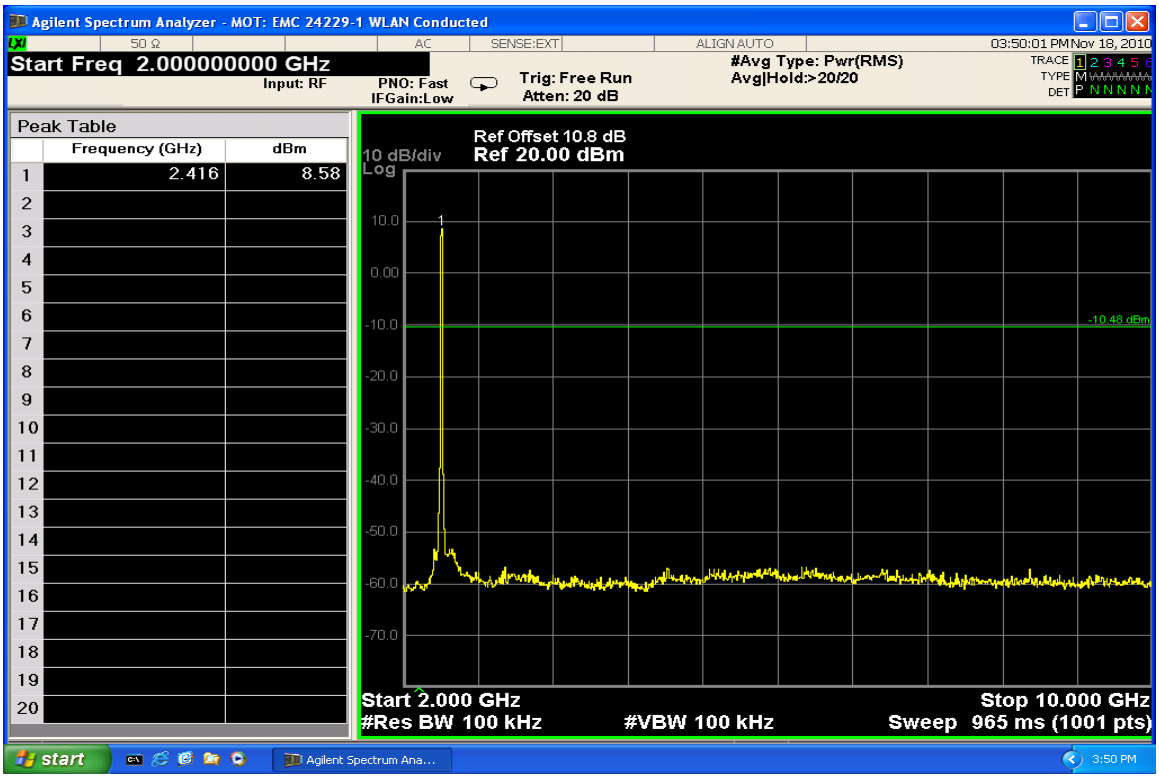
Measurement Results

See attached:

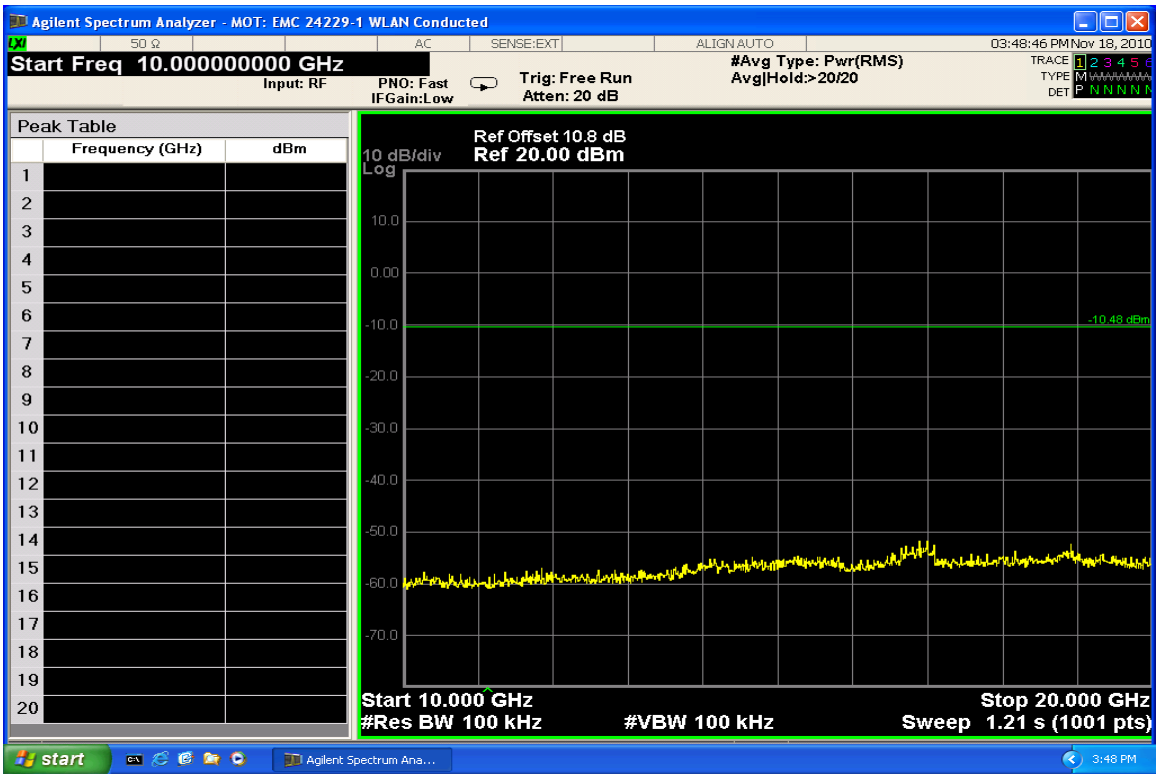
802.11b Mode @ 5.5Mbps



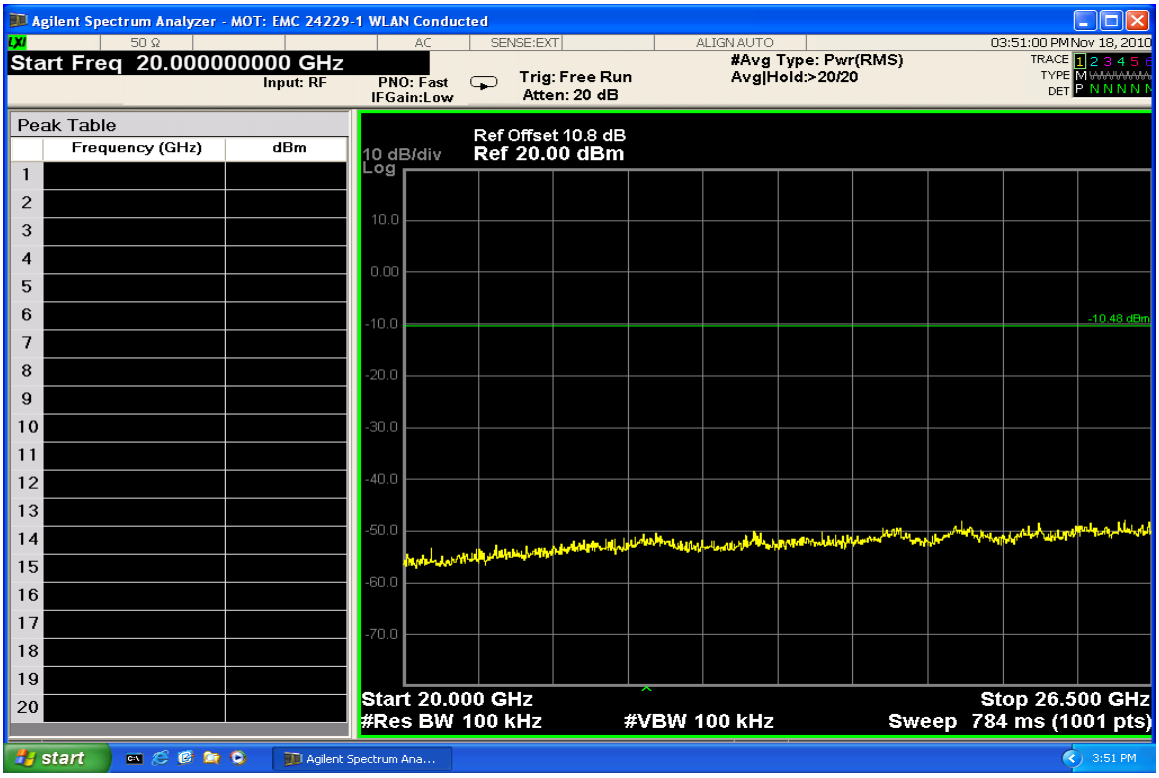
Conducted Spurious Emissions 30-3000 MHz (Low Channel)



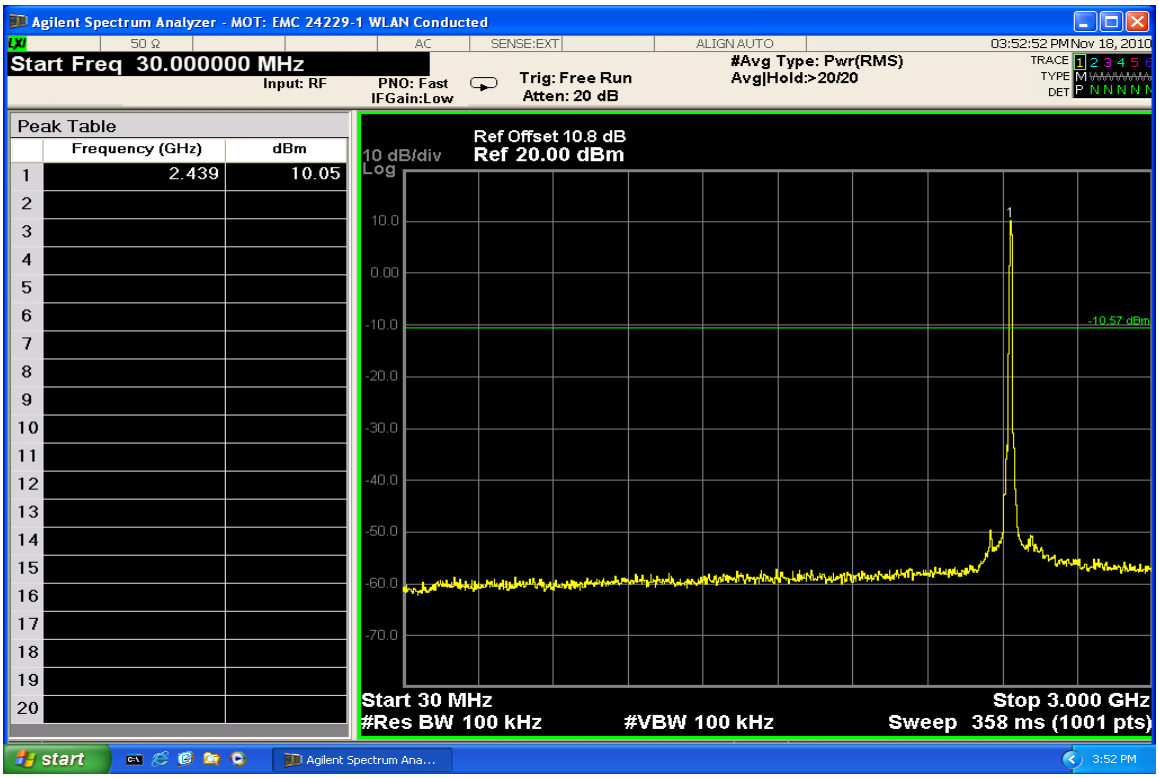
Conducted Spurious Emissions 2-10 GHz (Low Channel)



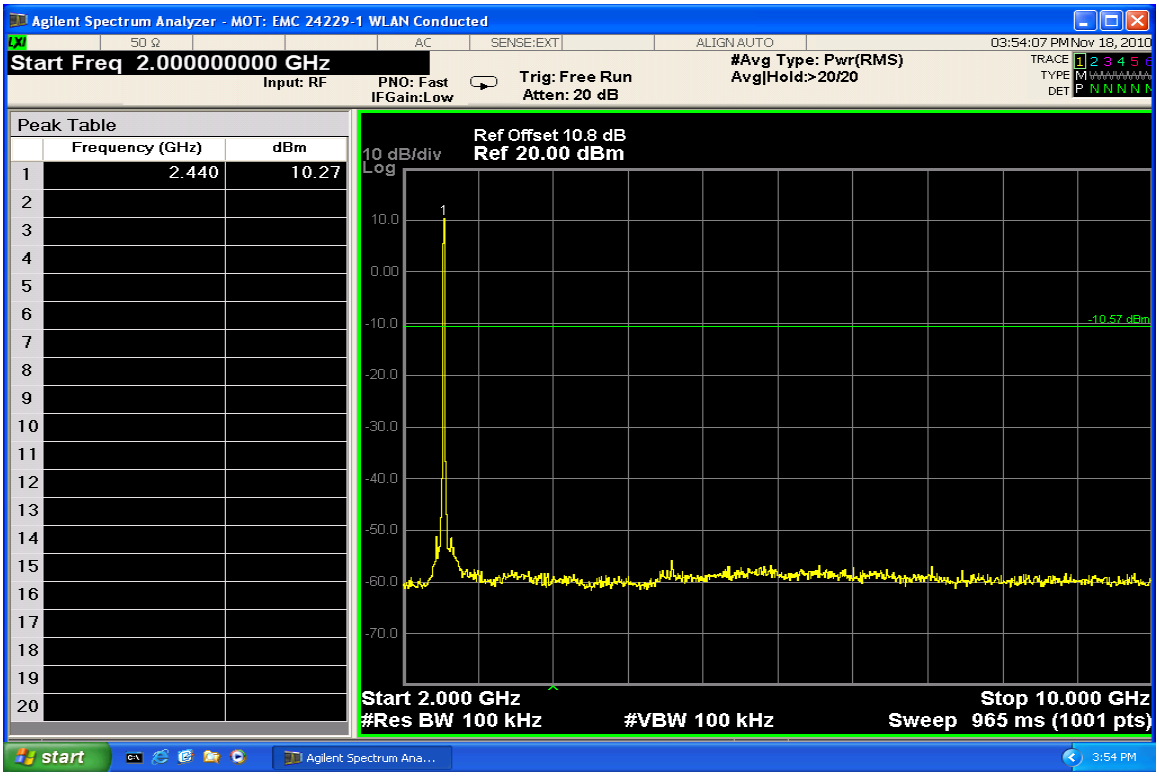
Conducted Spurious Emissions 10-20 GHz (Low Channel)



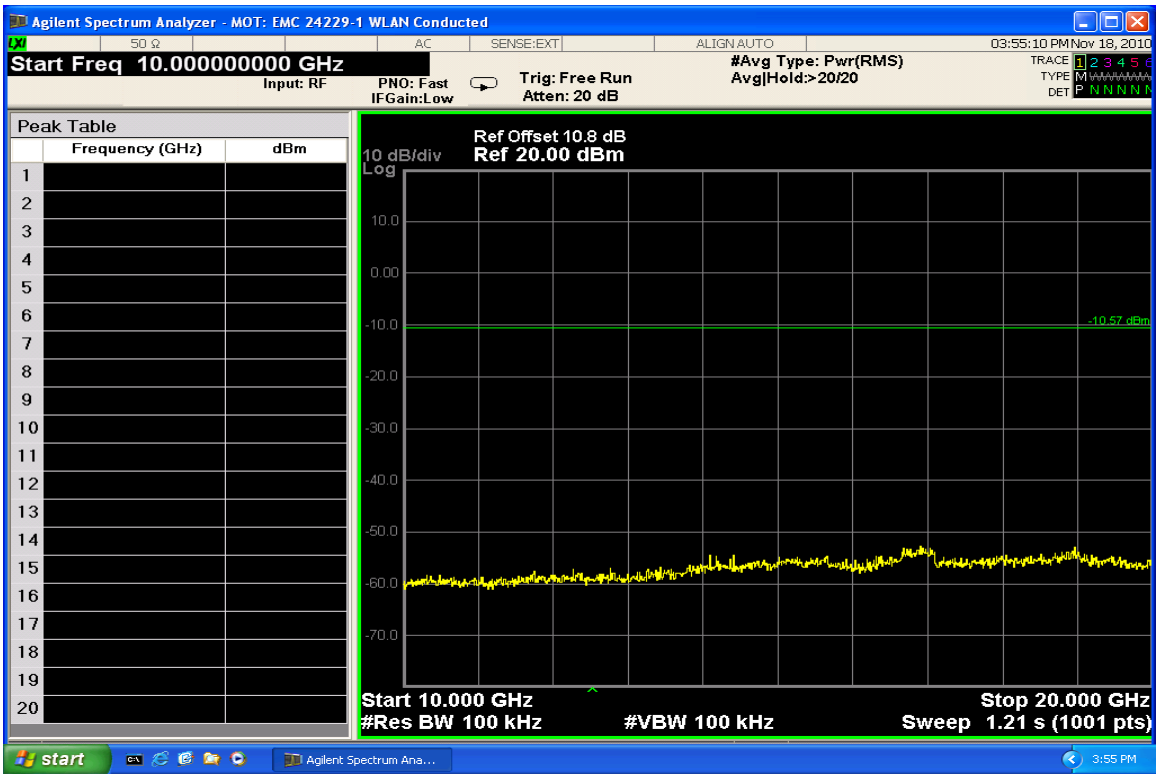
Conducted Spurious Emissions 20-26.5 GHz (Low Channel)



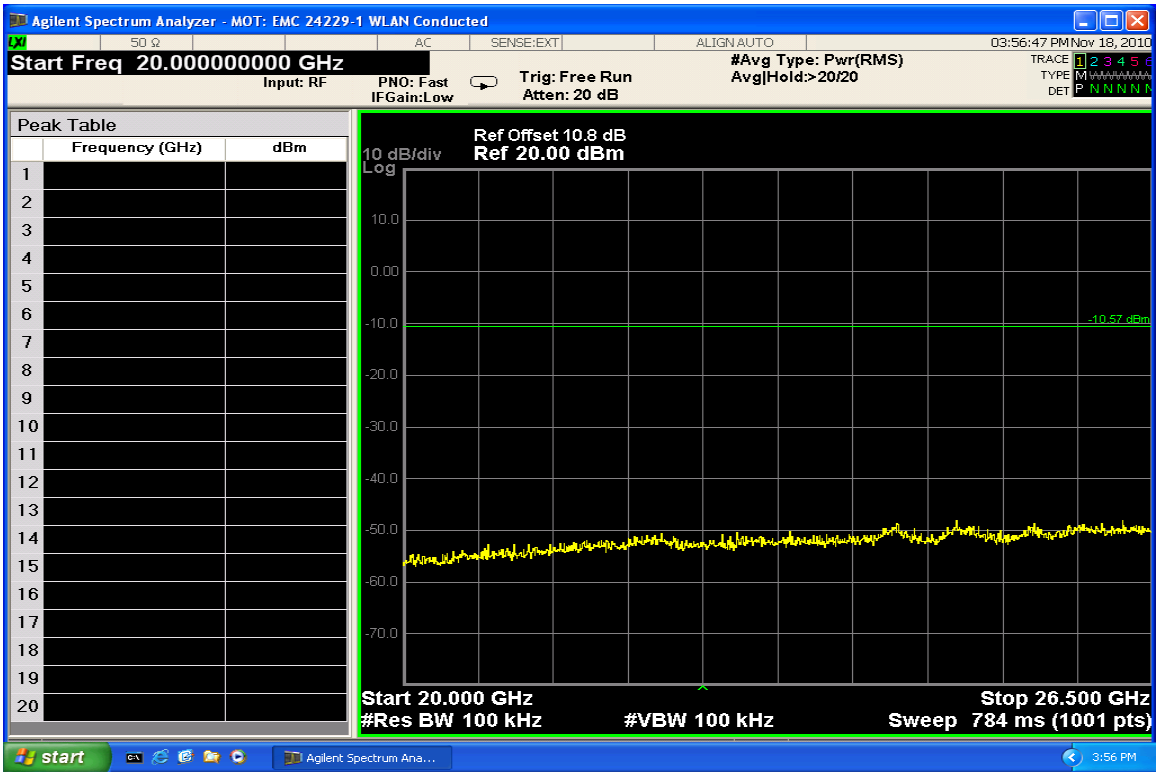
Conducted Spurious Emissions 30-3000 MHz (Mid Channel)



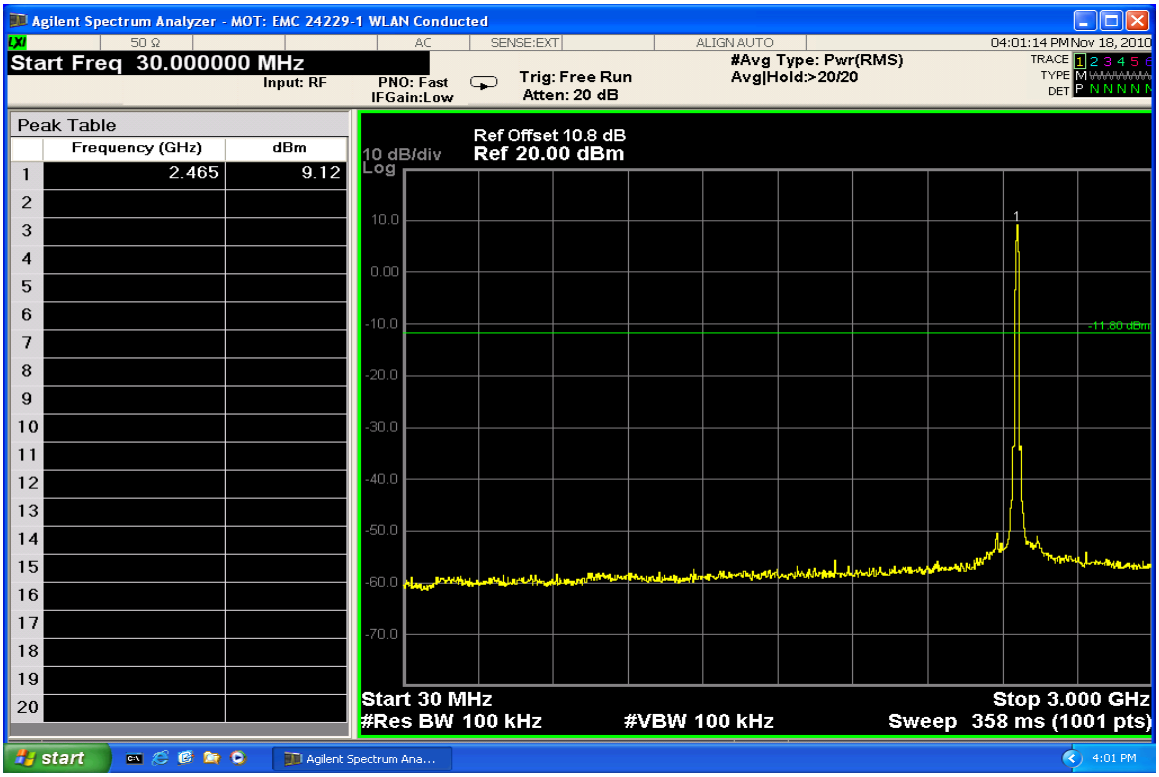
Conducted Spurious Emissions 2-10 GHz (Mid Channel)



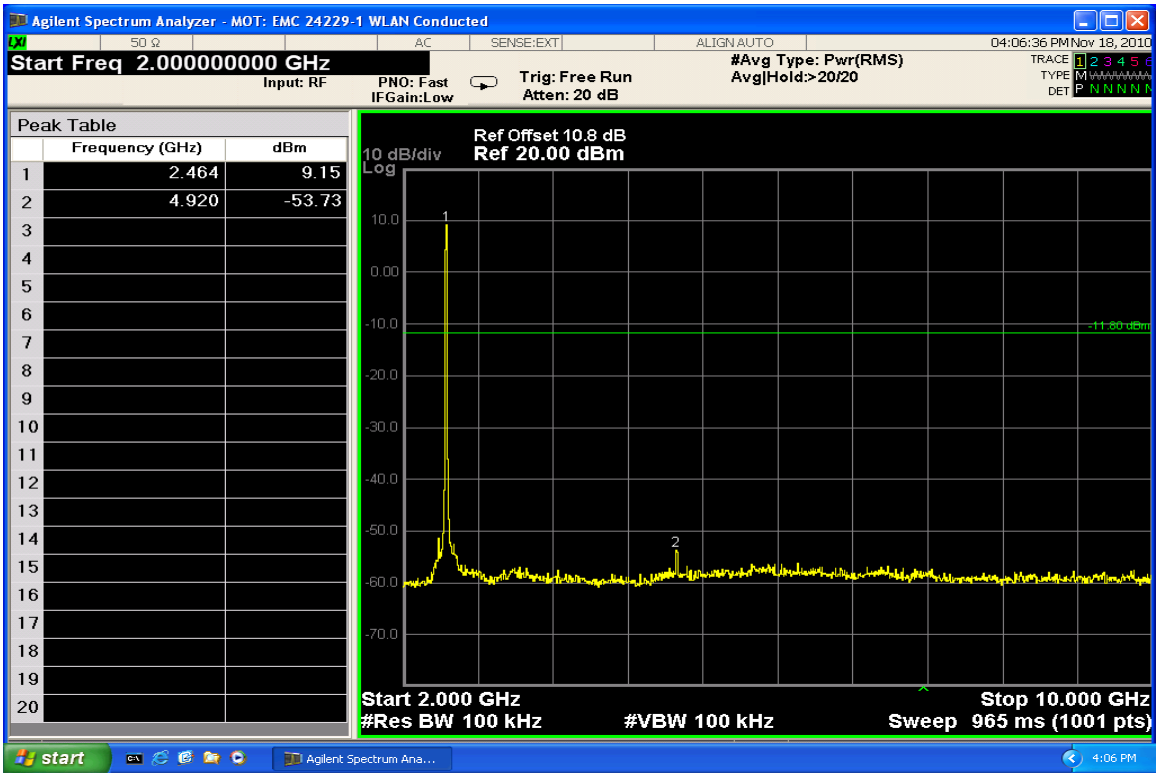
Conducted Spurious Emissions 10-20 GHz (Mid Channel)



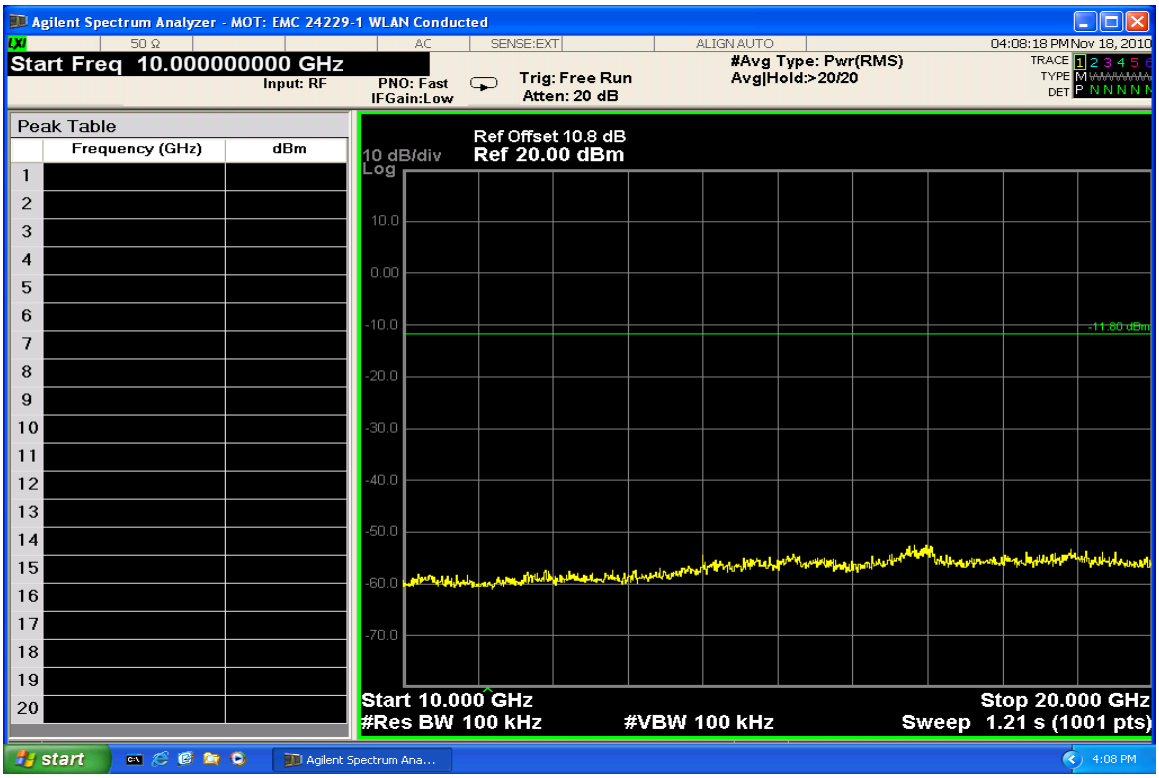
Conducted Spurious Emissions 20-26.5 GHz (Mid Channel)



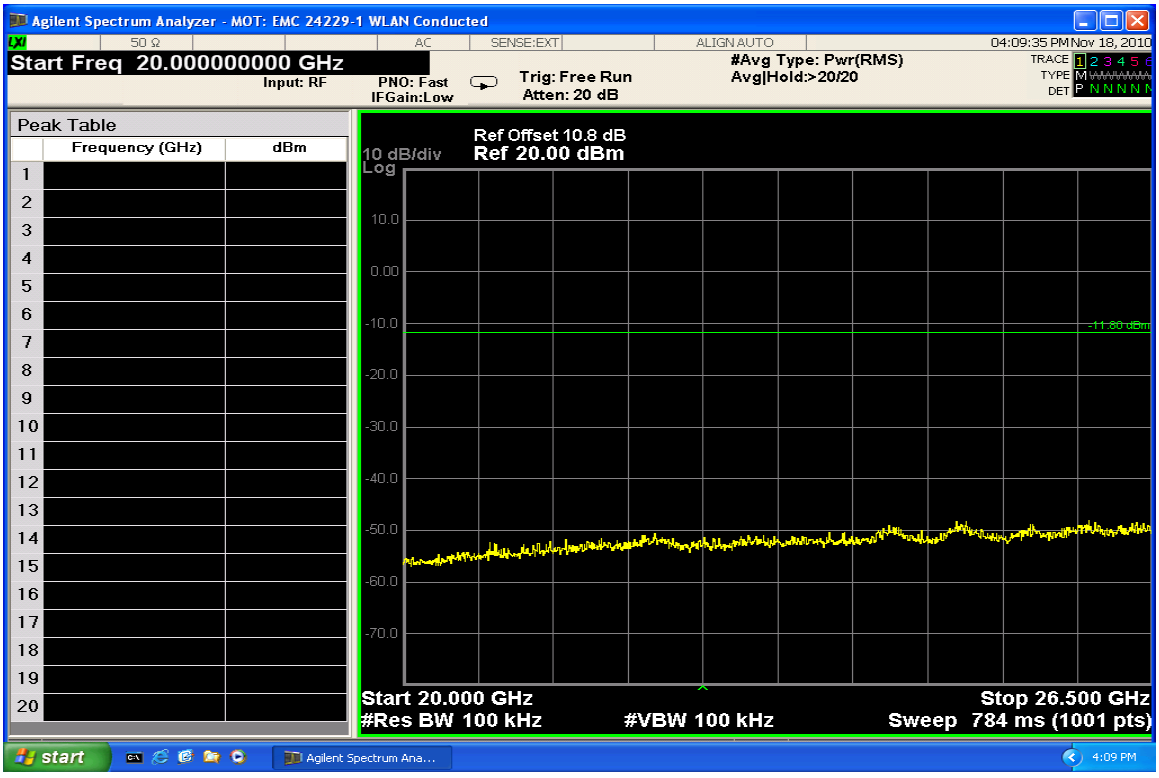
Conducted Spurious Emissions 30-3000 MHz (High Channel)



Conducted Spurious Emissions 2-10 GHz (High Channel)

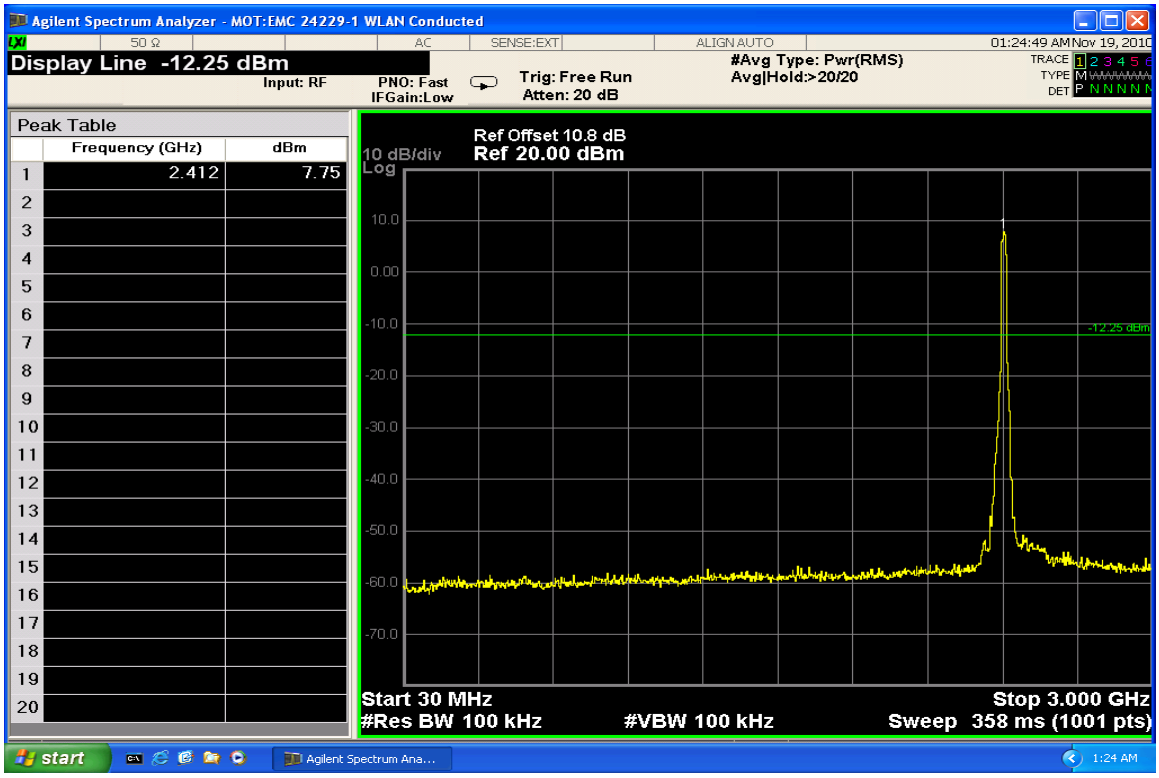


Conducted Spurious Emissions 10-20 GHz (High Channel)

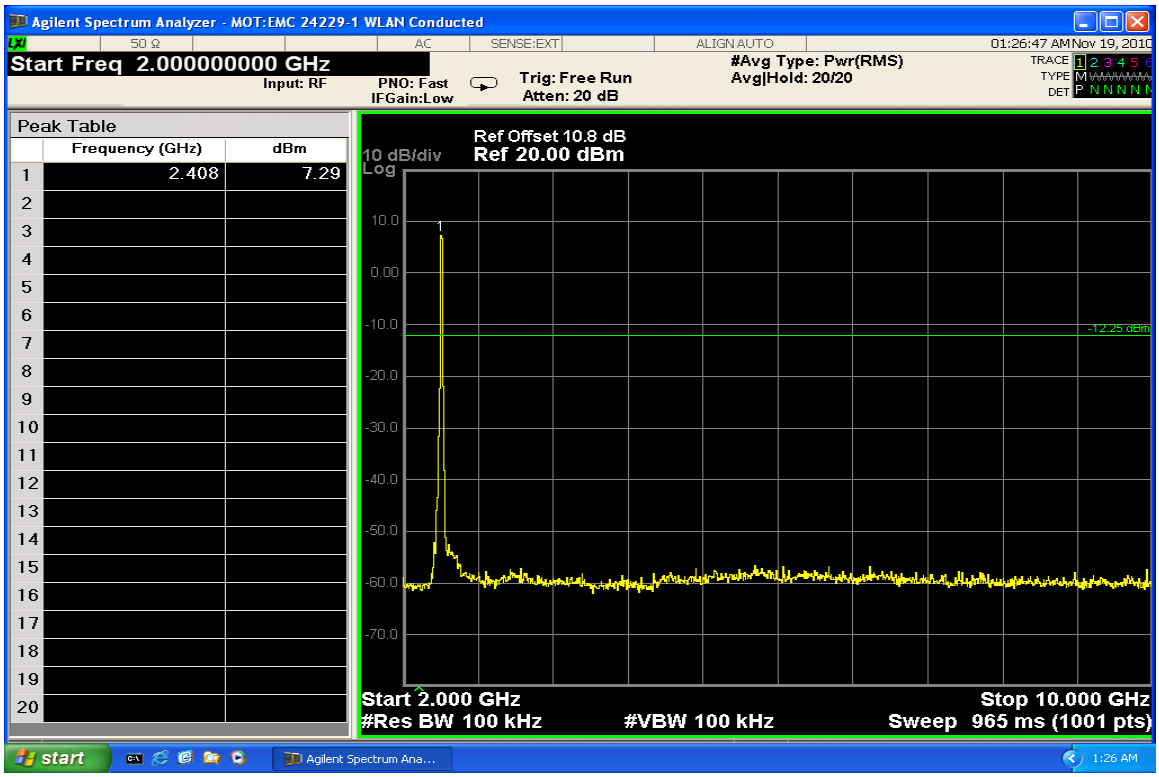


Conducted Spurious Emissions 20-26.5 GHz (High Channel)

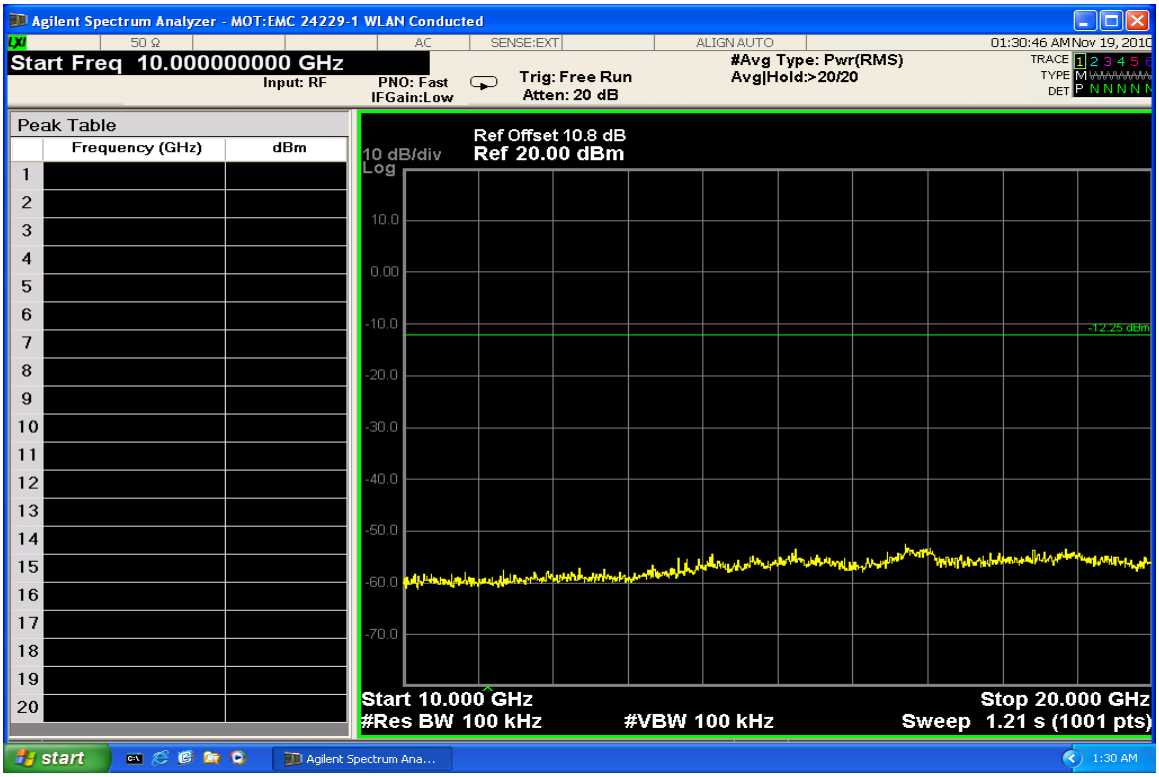
802.11g @ 9Mbps



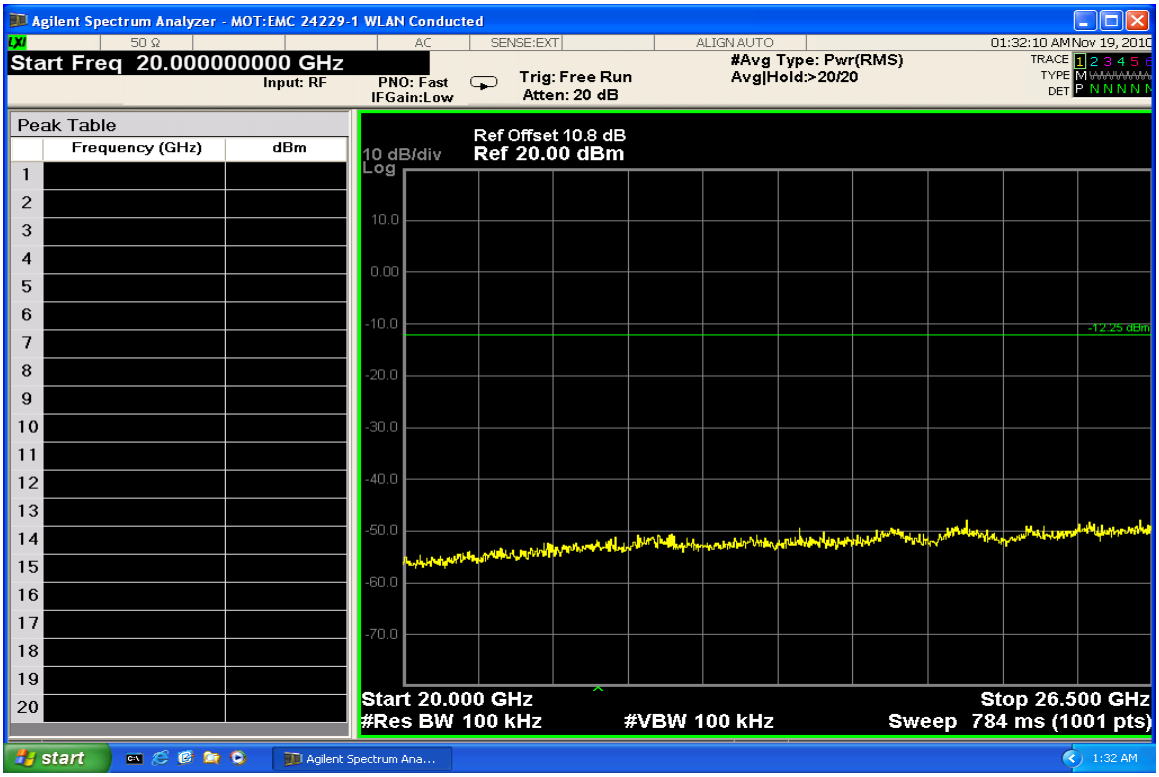
Conducted Spurious Emissions 30-3000MHz (Low Channel)



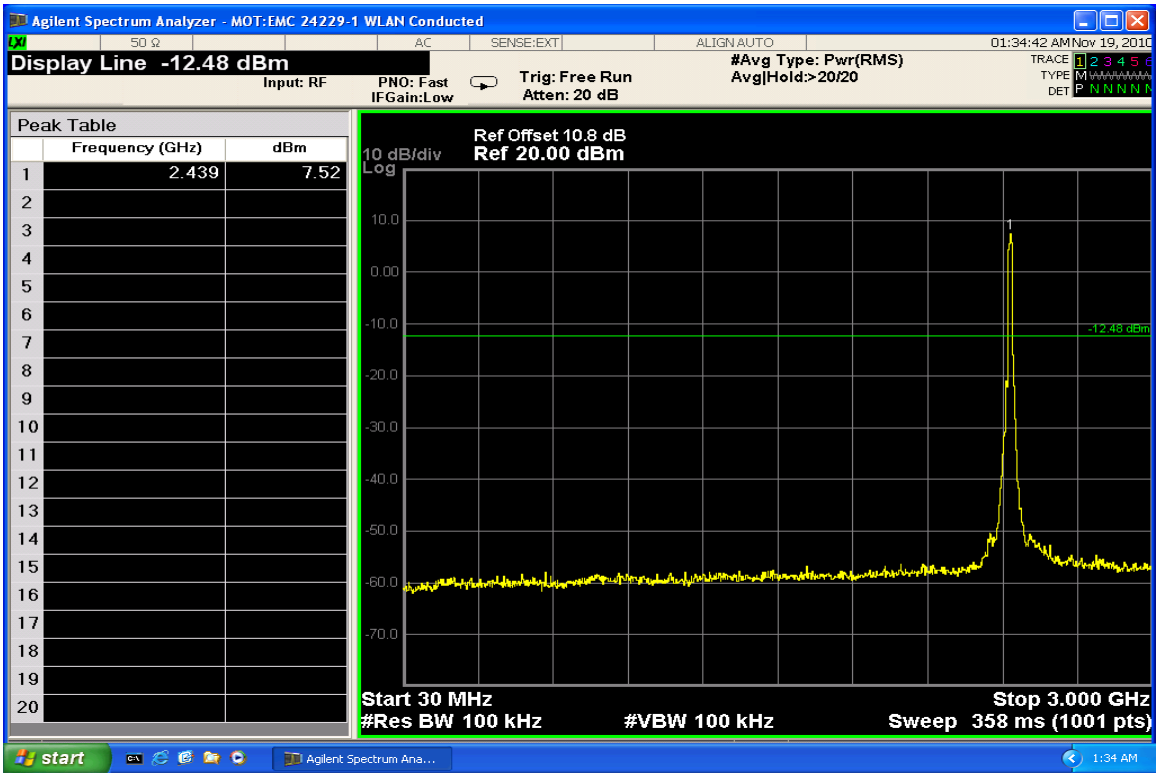
Conducted Spurious Emissions 2-10GHz (Low Channel)



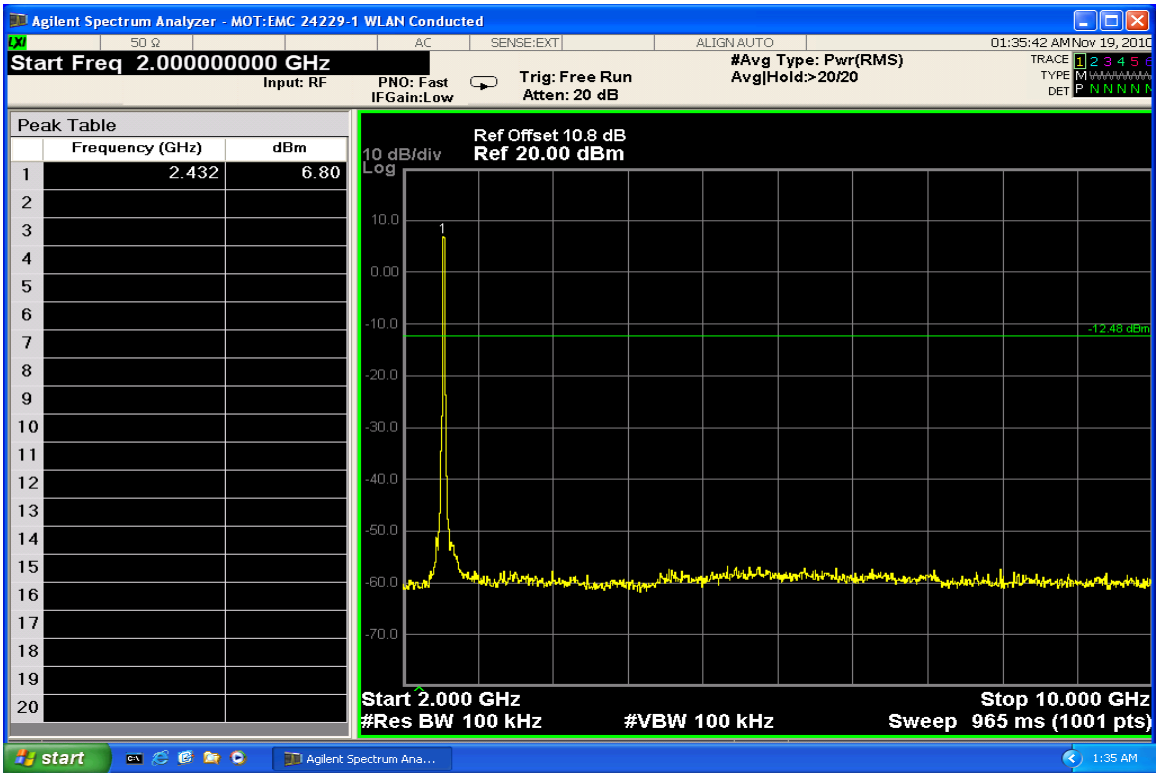
Conducted Spurious Emissions 10-20GHz (Low Channel)



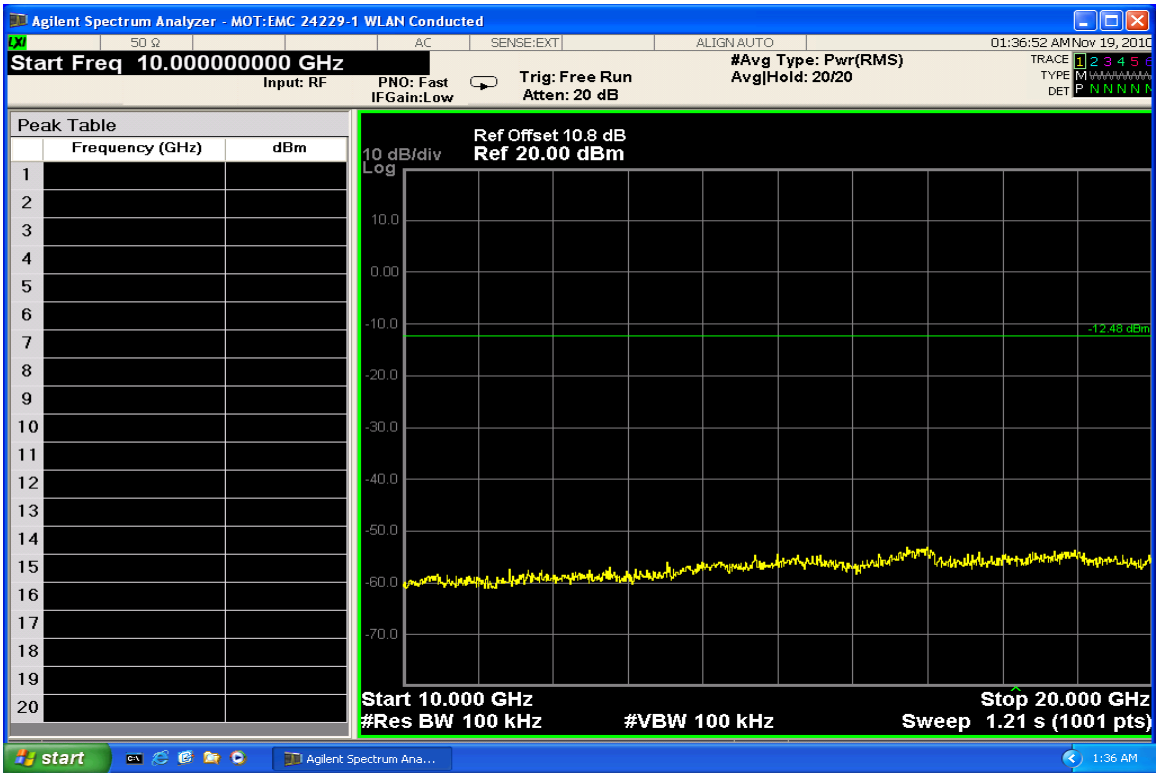
Conducted Spurious Emissions 20-26.5GHz (Low Channel)



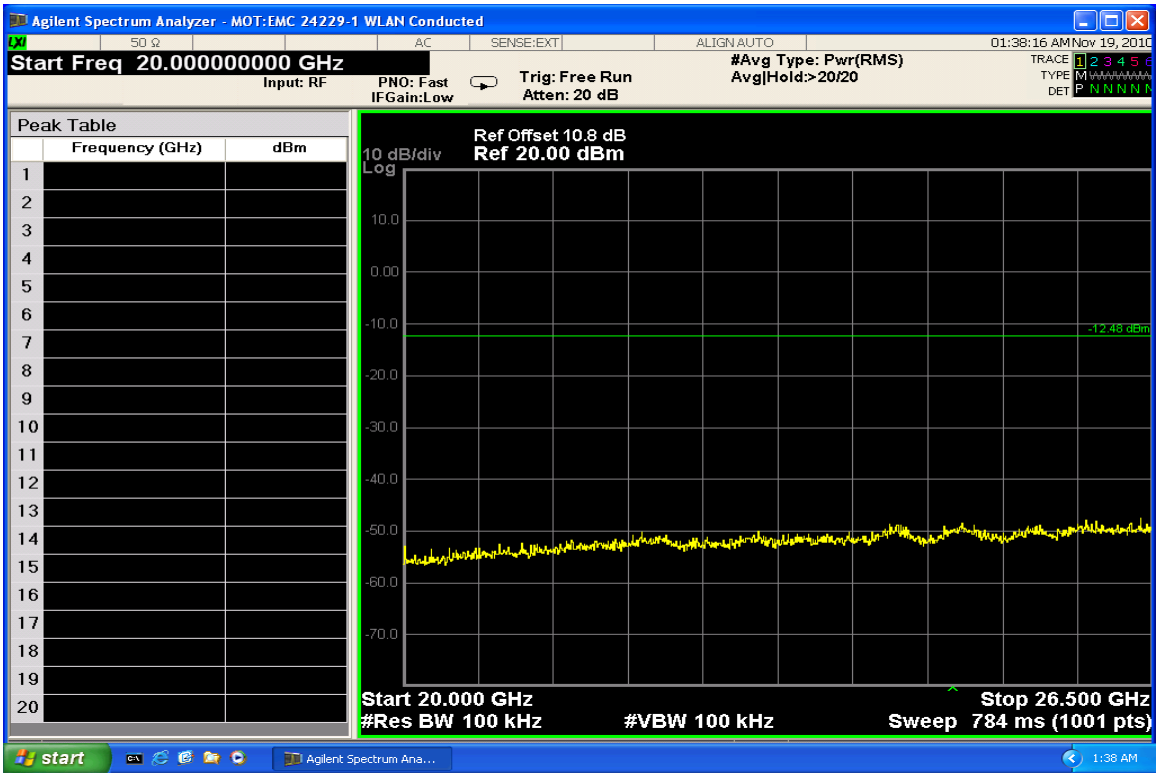
Conducted Spurious Emissions 30-3000MHz (Mid Channel)



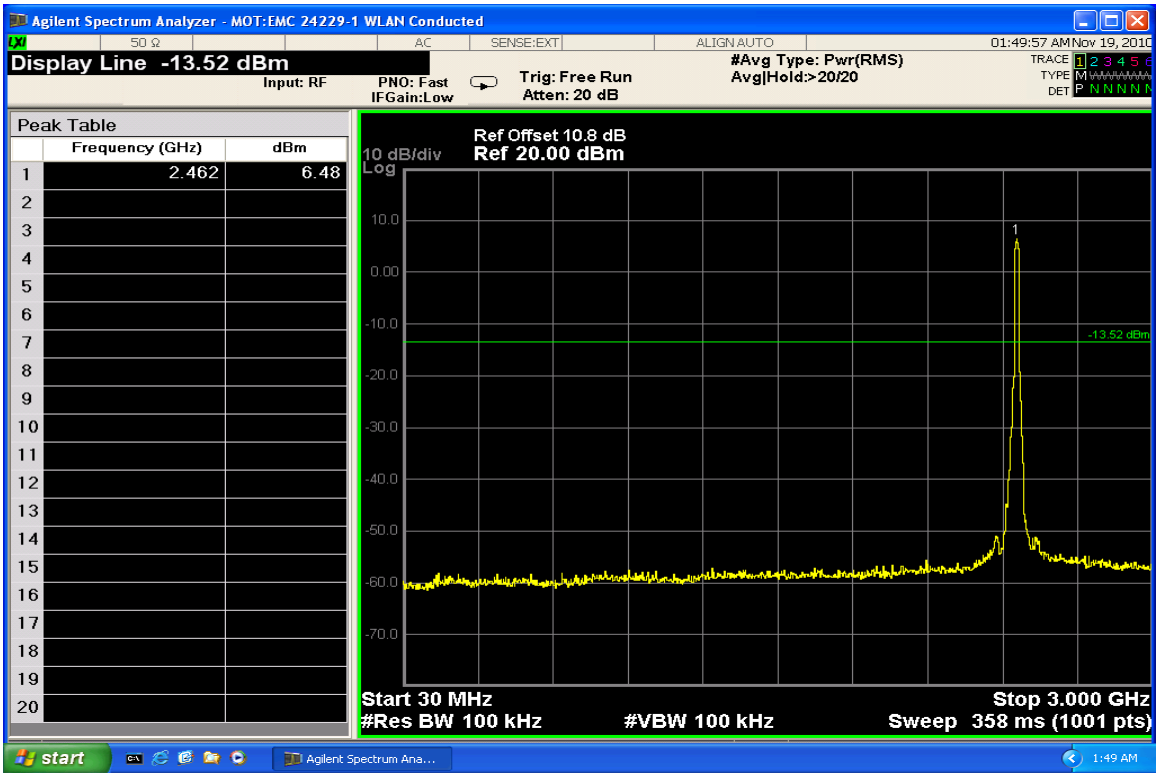
Conducted Spurious Emissions 2-10GHz (Mid Channel)



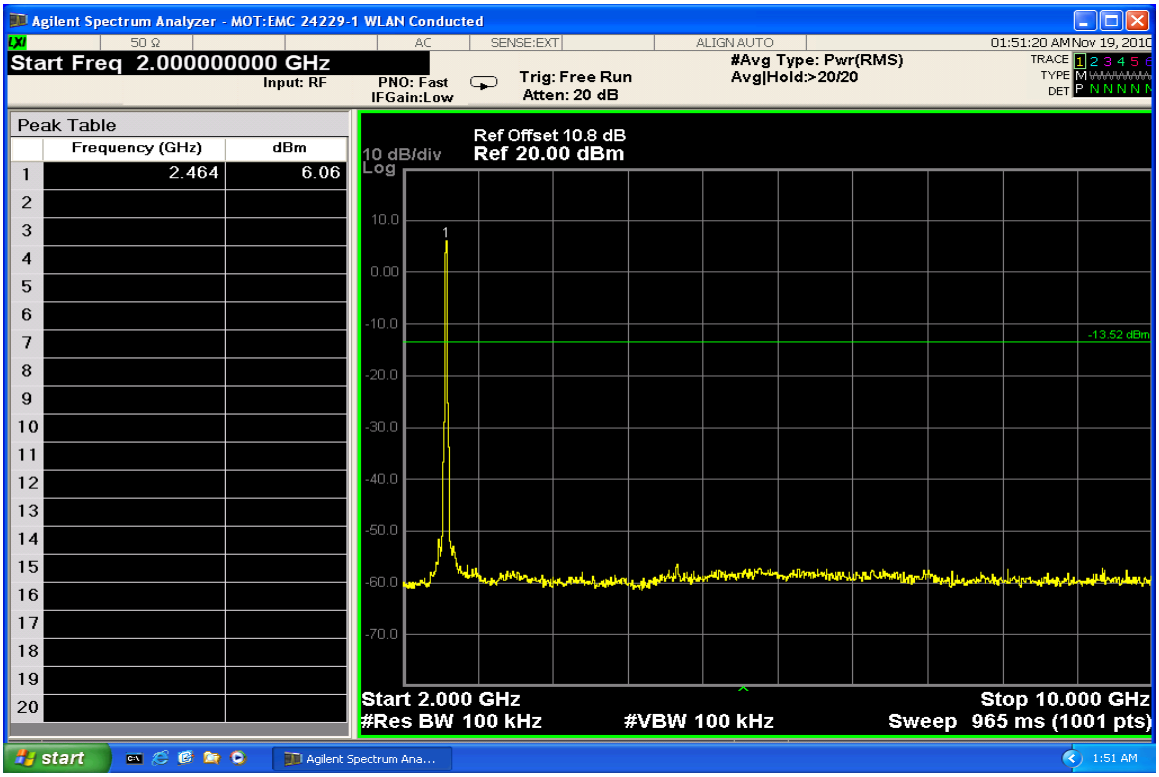
Conducted Spurious Emissions 10-20GHz (Mid Channel)



Conducted Spurious Emissions 20-26.5GHz (Mid Channel)

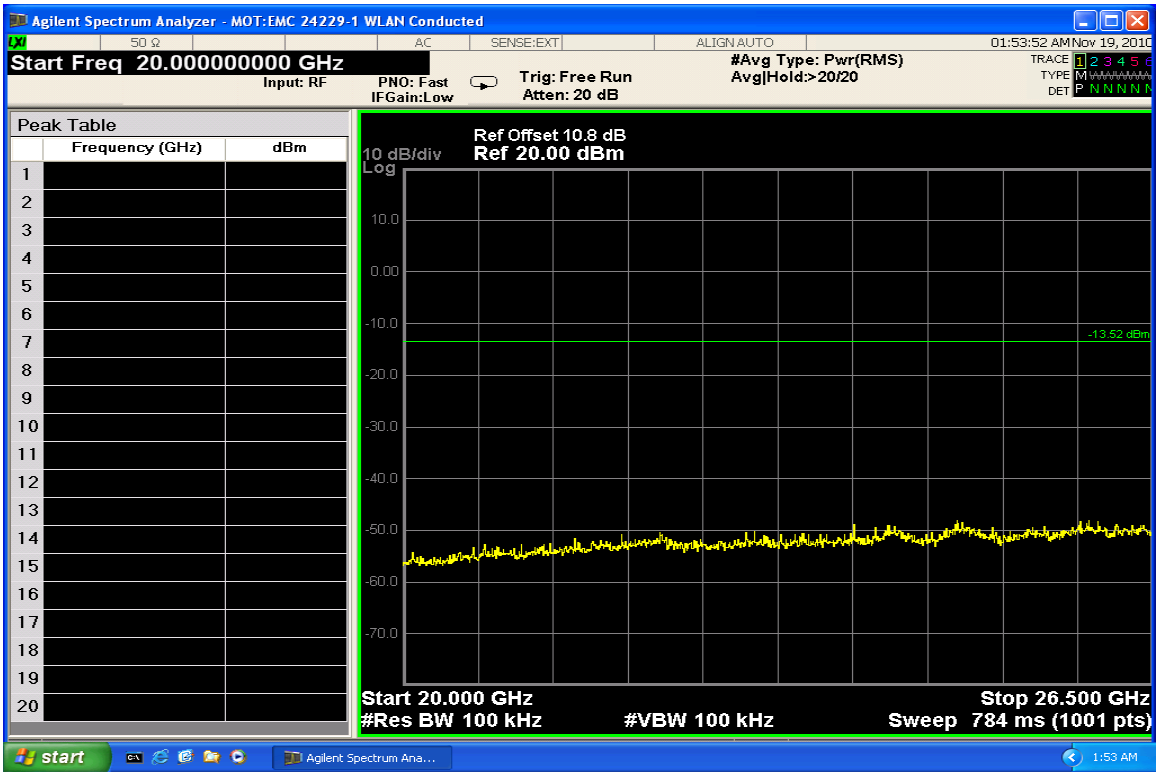


Conducted Spurious Emissions 30-3000MHz (High Channel)



Conducted Spurious Emissions 2-10GHz (High Channel)

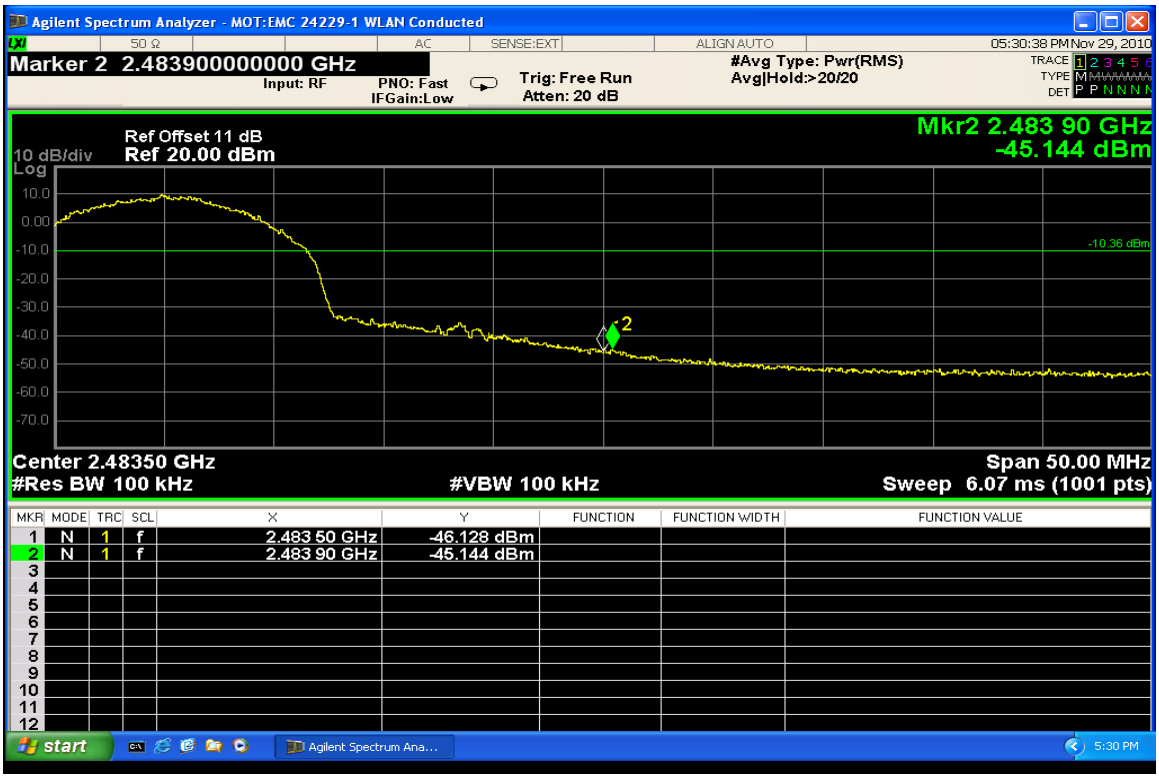
Conducted Spurious Emissions 10-20GHz (High Channel)



Conducted Spurious Emissions 20-26.5GHz (High Channel)

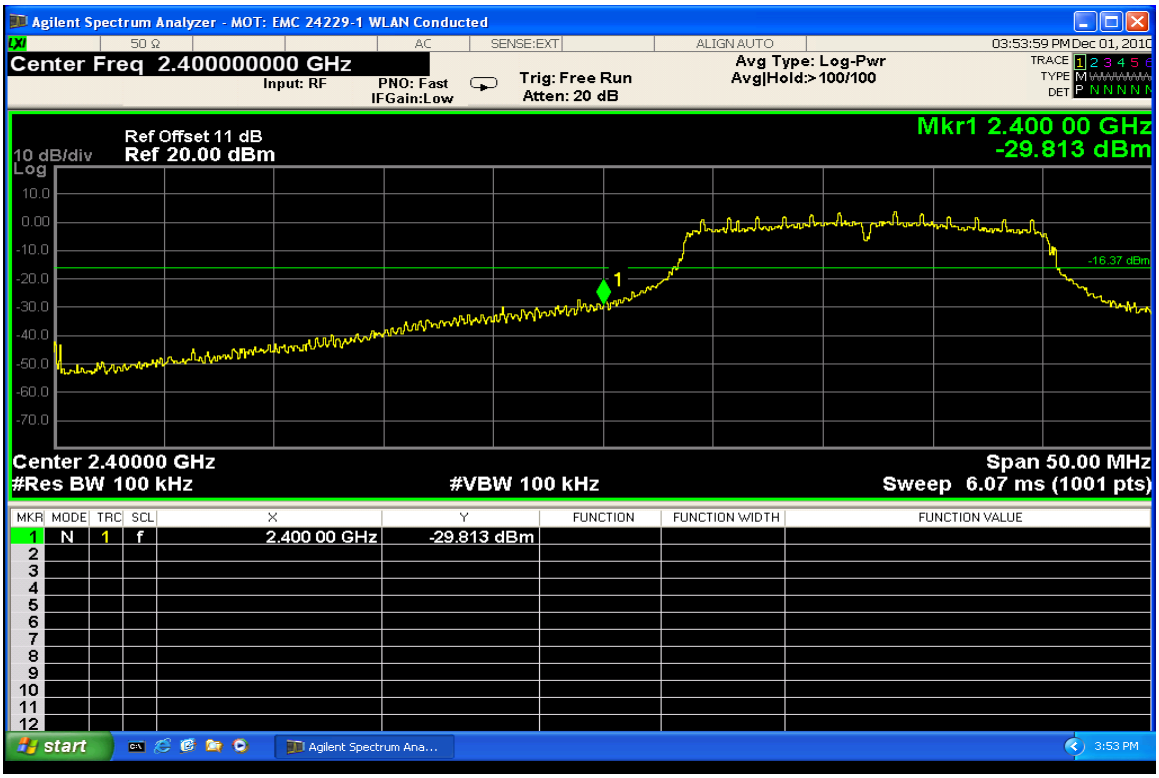
802.11b @ 5.5Mbps Band Edge

Channel 1 – Lower Band Edge



Channel 11 – Upper Band Edge

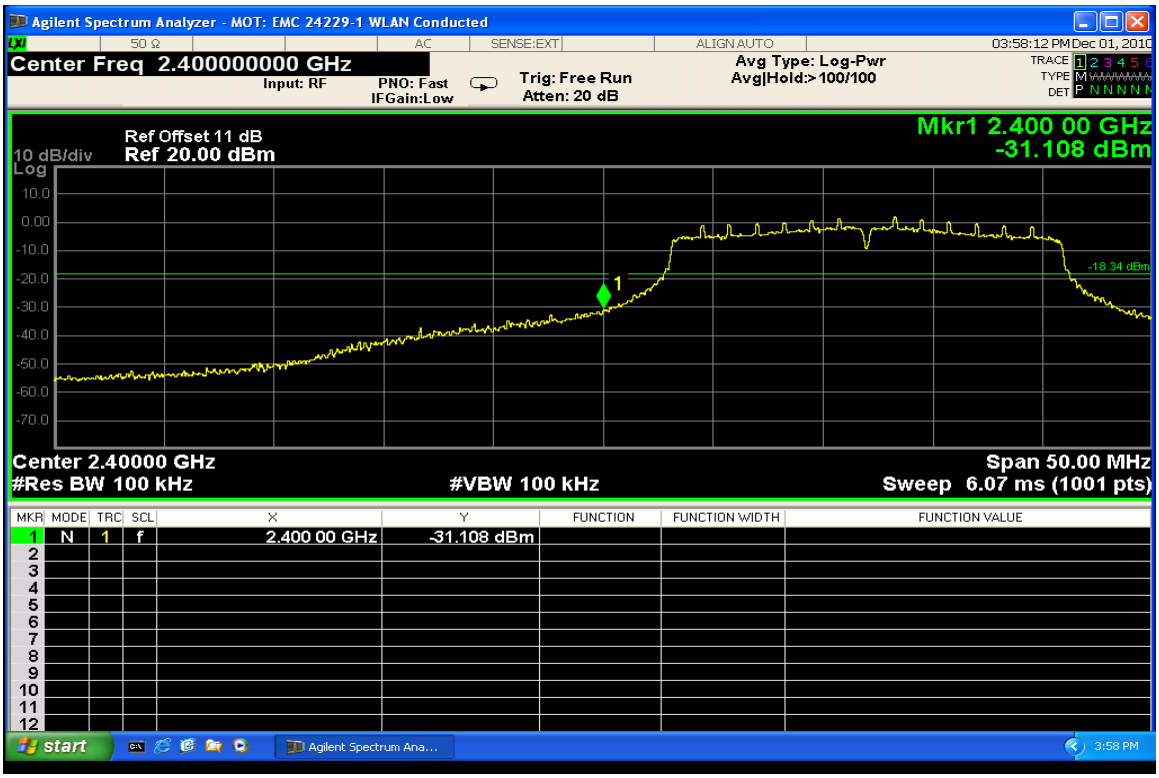
802.11g @ 9Mbps Band Edge



Channel 1 – Lower Band Edge

Channel 11 – Upper Band Edge

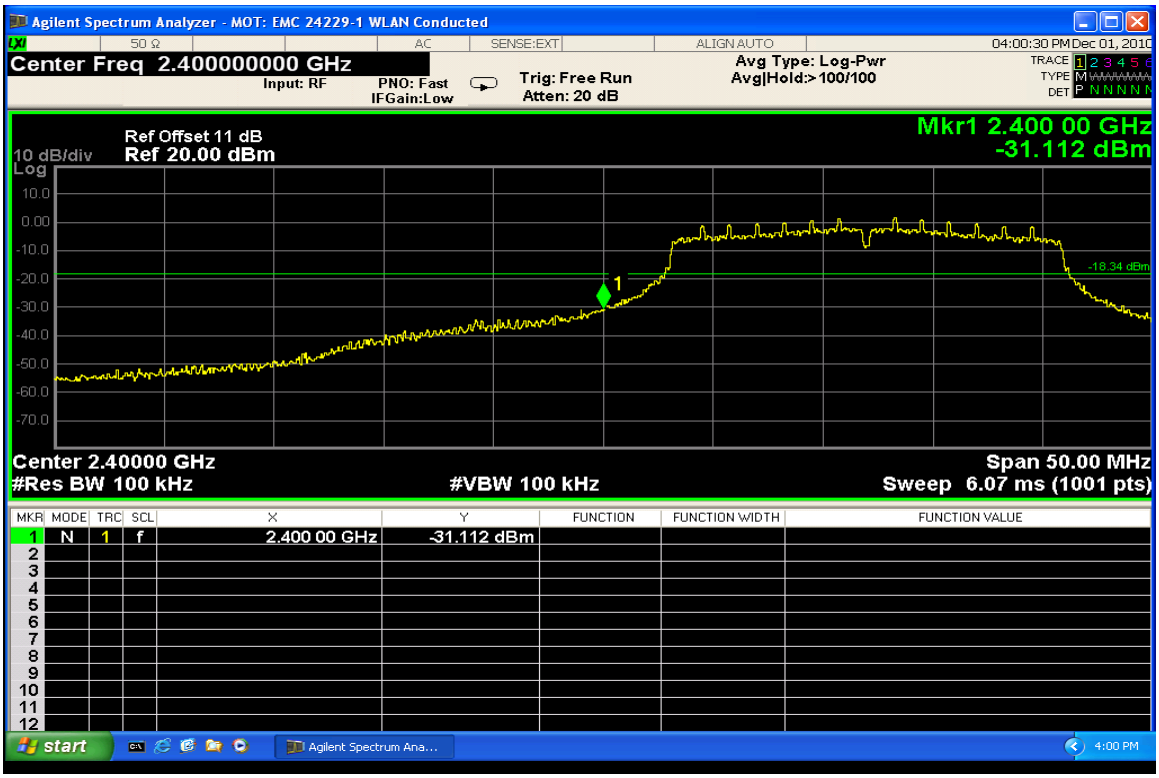
802.11n 400ns GI @ 14.4Mbps Band Edge



Channel 1 – Lower Band Edge

Channel 11 @ 9Mbps – Upper Band Edge

802.11n 800ns GI @ 6.5Mbps Band Edge



Channel 1 – Lower Band Edge

Channel 11 @ 6.5Mbps – Upper Band Edge

AC LINE CONDUCTED EMISSIONS

CFR 47 Part 15.207

Measurement Procedure

Measured levels of ac power line conducted emission shall be the radio-noise voltage from the line probe or across the 50 Ω LISN port, where permitted, terminated into a 50 Ω noise meter, or where permitted or required, the radio-noise current on the power line sensed by a current probe.

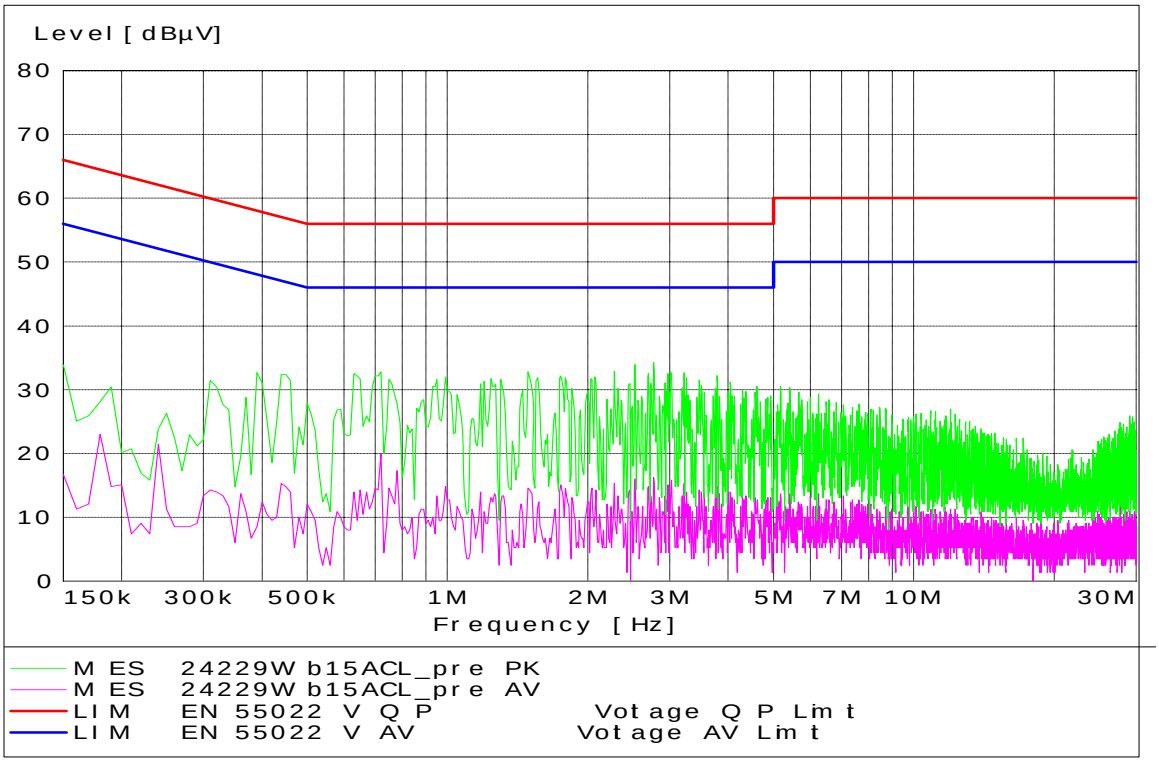
All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50 Ω measuring port is terminated by a 50 Ω radio-noise meter or a 50 Ω resistive load. All other ports are terminated in 50 Ω.

Detectors – Quasi Peak and Average Detector.

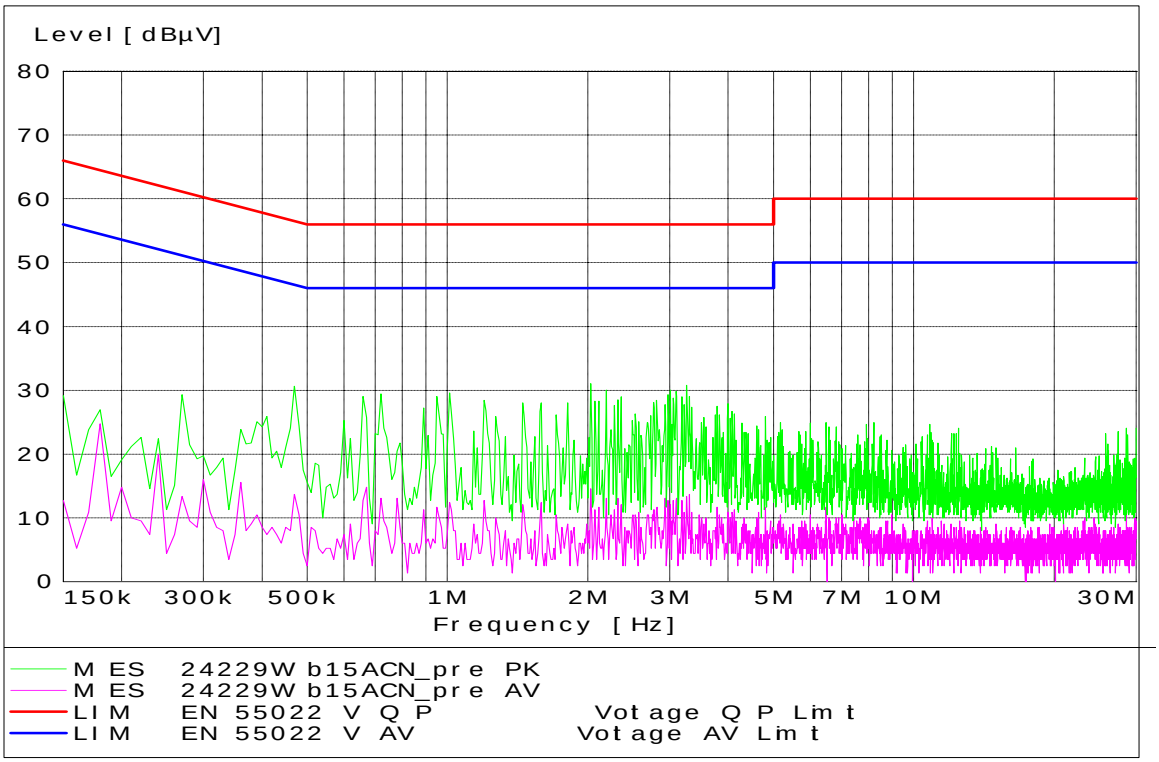
Measurement Results

See attached:

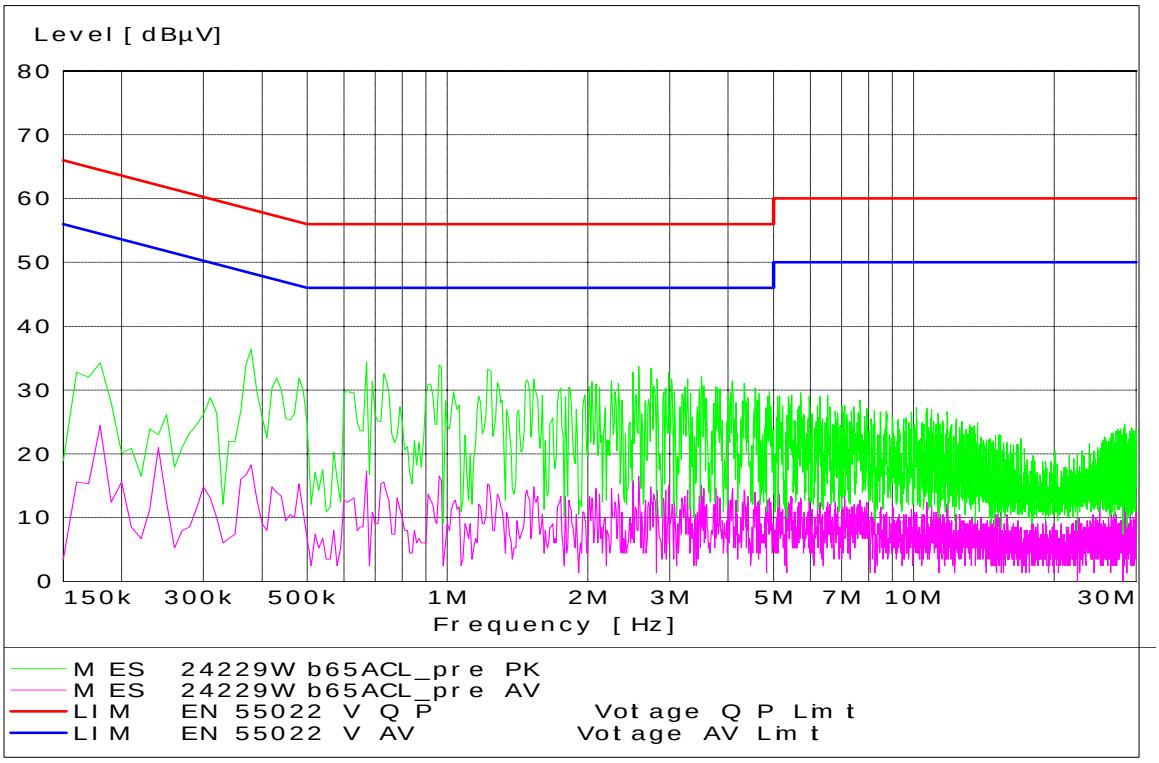
802.11b @ 5.5Mbps



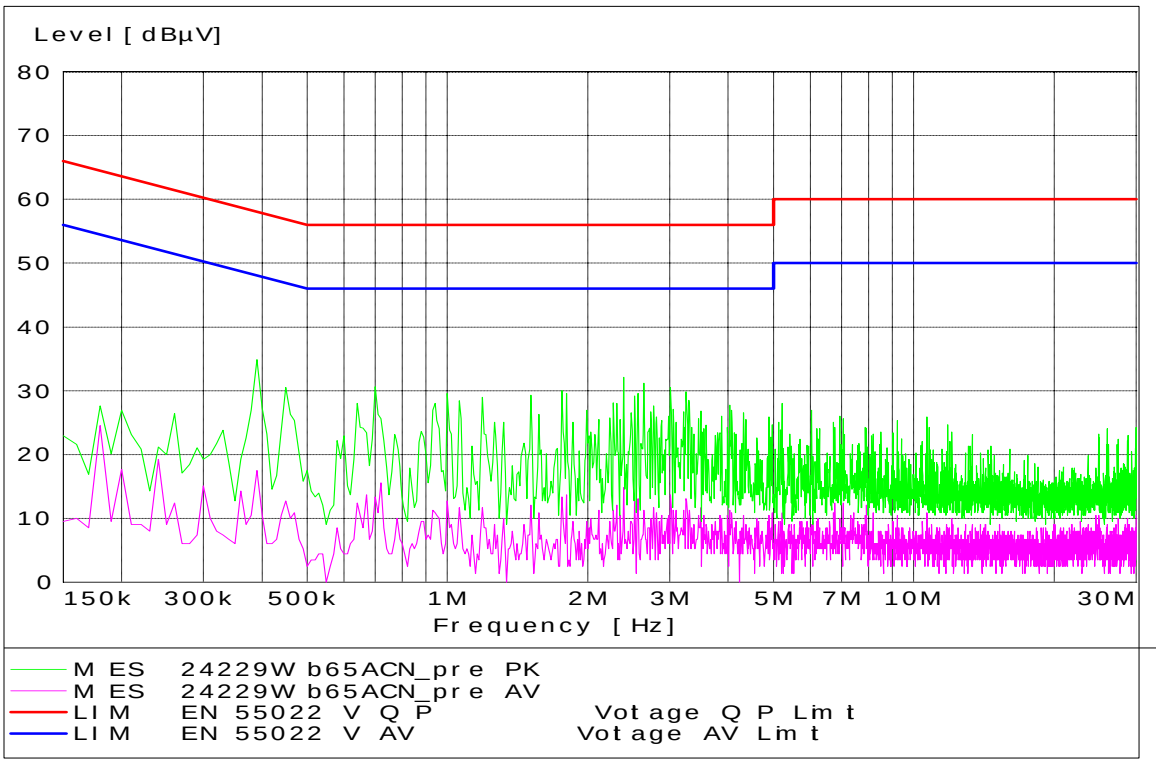
WLAN Channel 1 - Tx Mode - Line Coupling



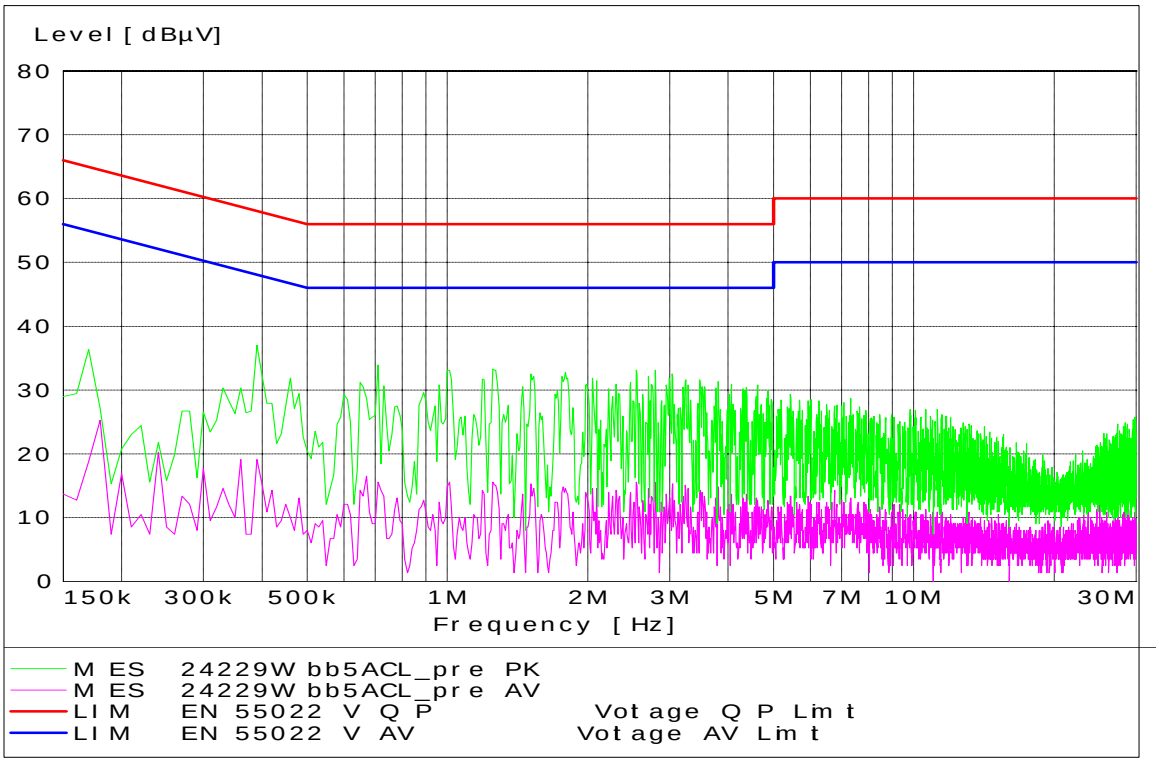
WLAN Channel 1 - Tx Mode – Neutral Coupling



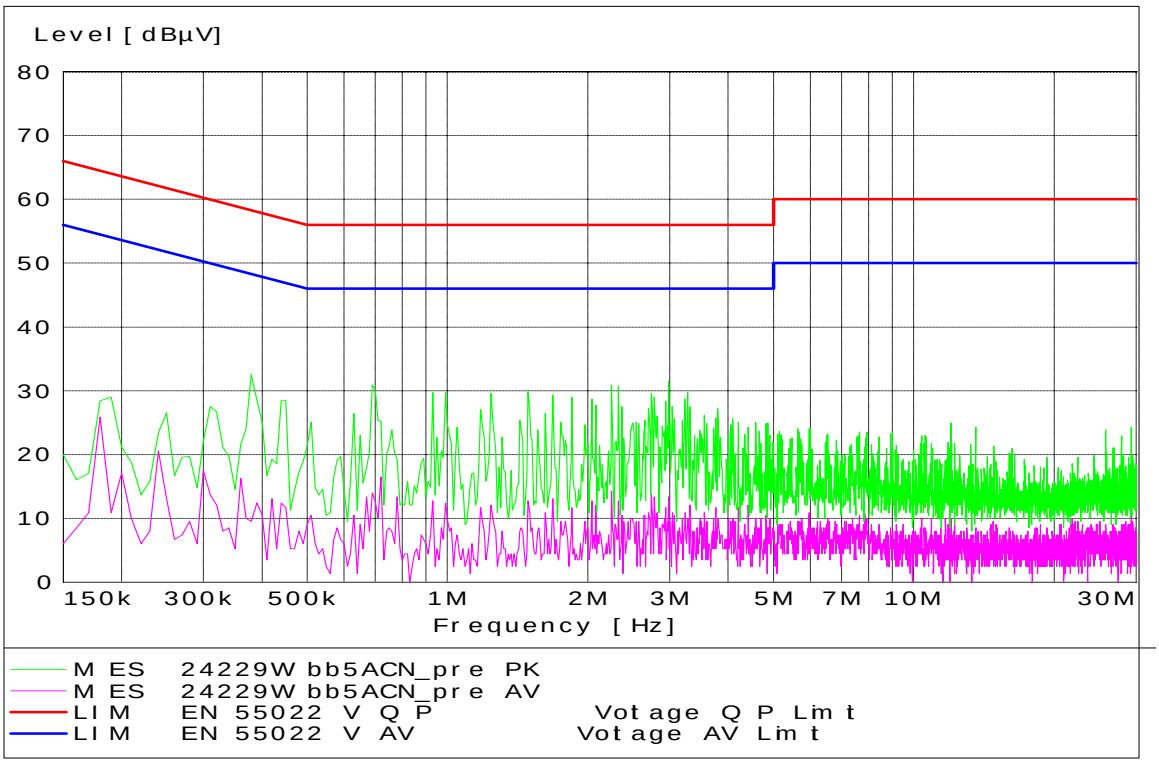
WLAN Channel 6 - Tx Mode - Line Coupling



WLAN Channel 6 - Tx Mode - Neutral Coupling

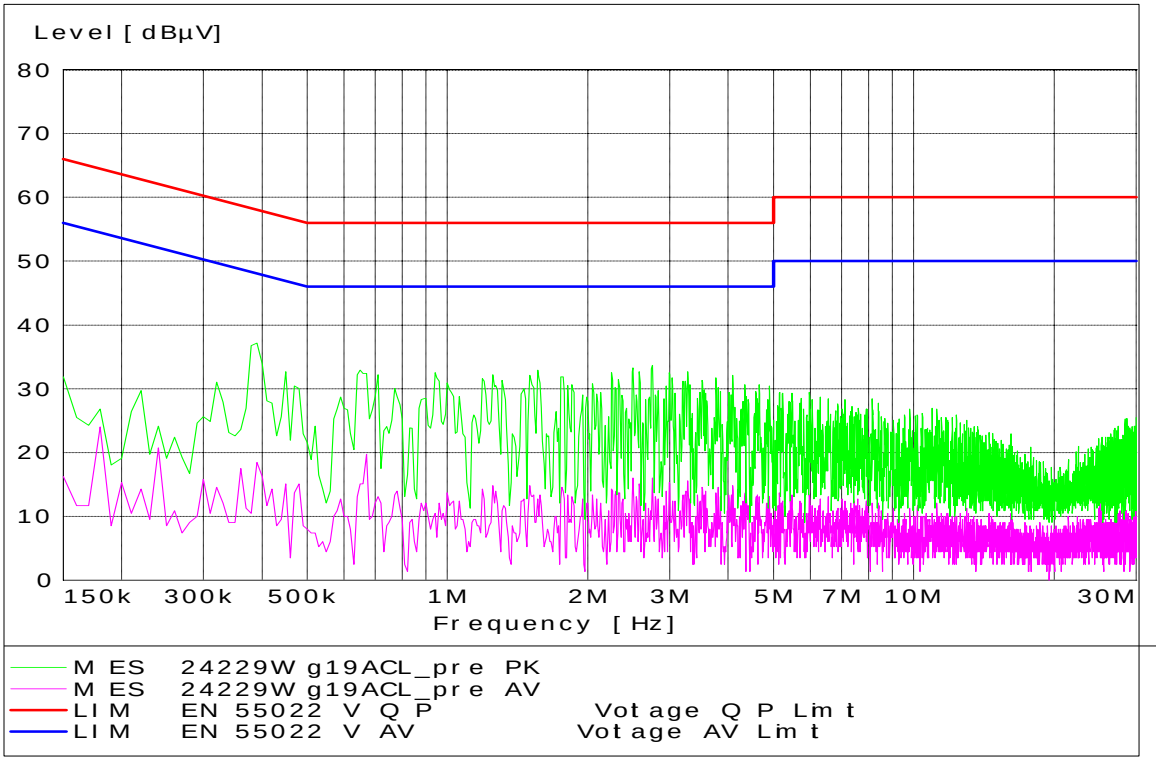


WLAN Channel 11 - Tx Mode - Line Coupling

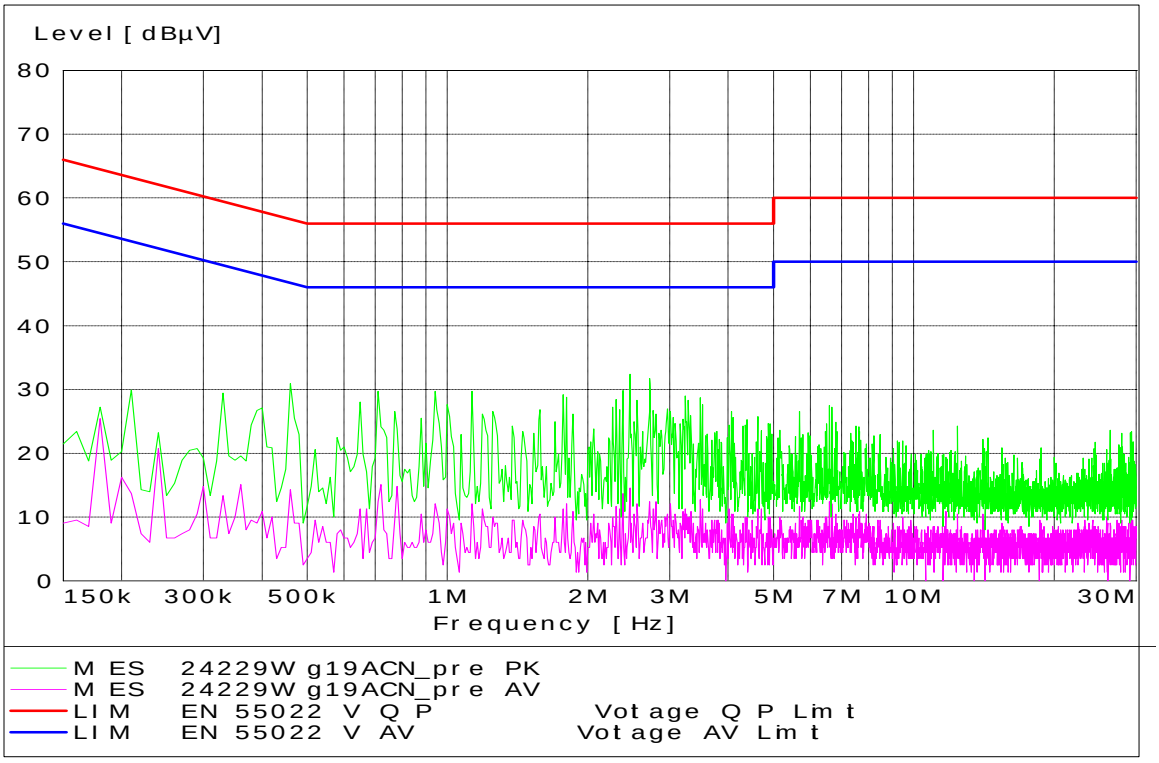


WLAN Channel 11 - Tx Mode - Neutral Coupling

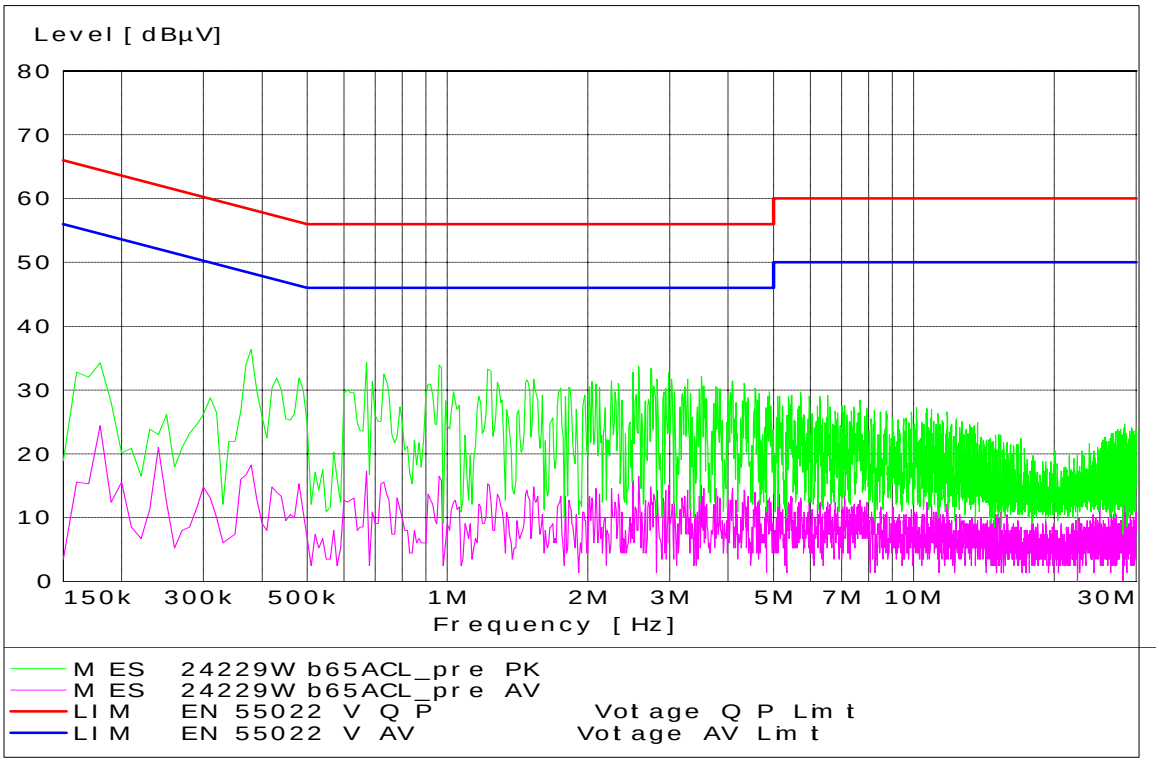
802.11g @ 9Mbps



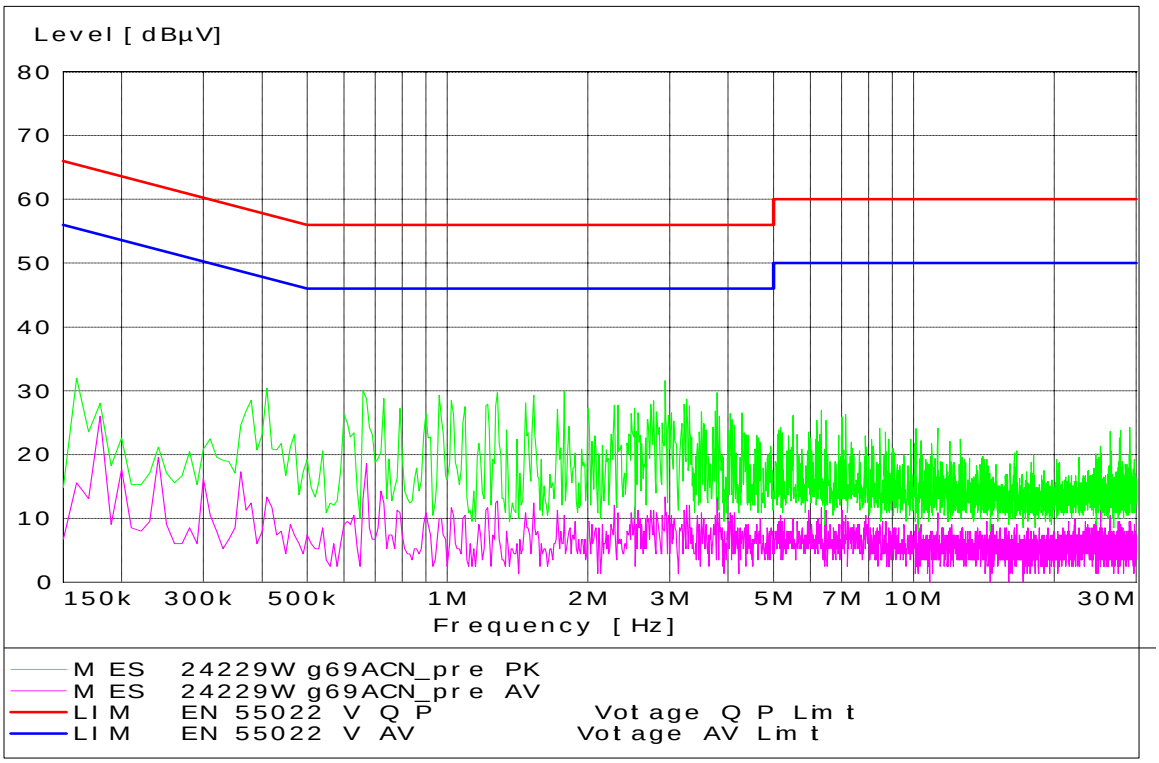
WLAN Channel 1 - Tx Mode - Line Coupling



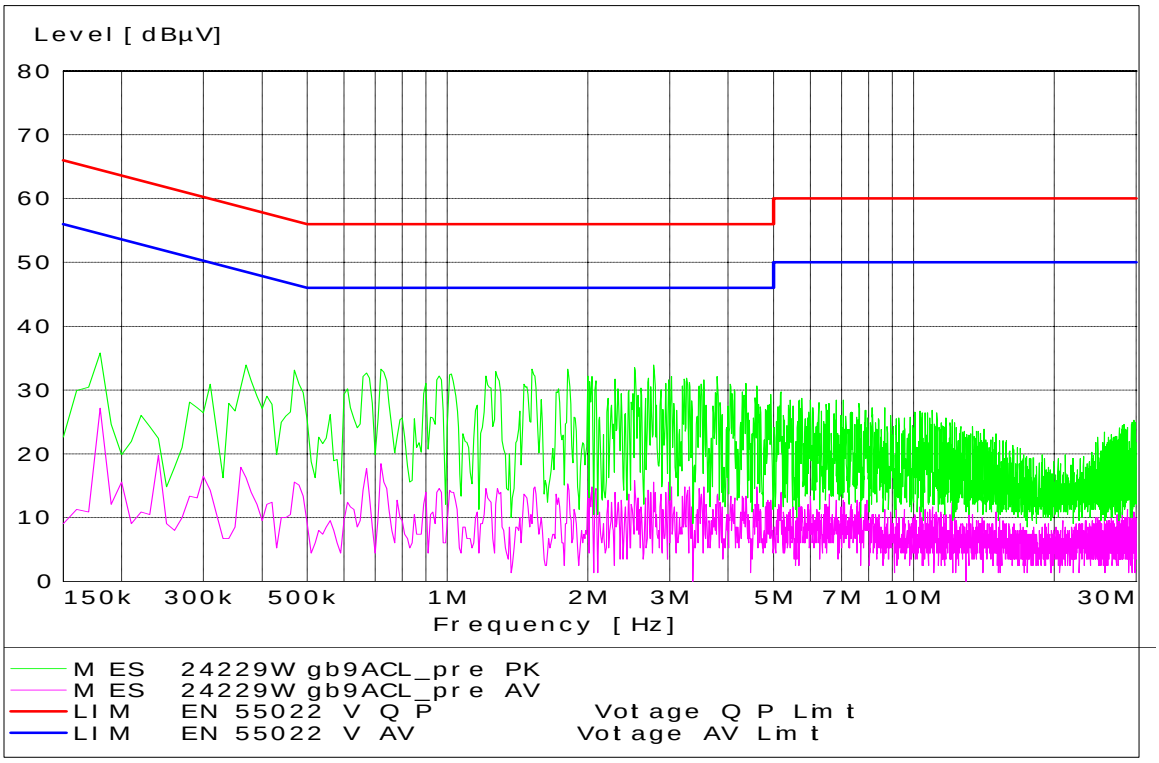
WLAN Channel 1 - Tx Mode – Neutral Coupling



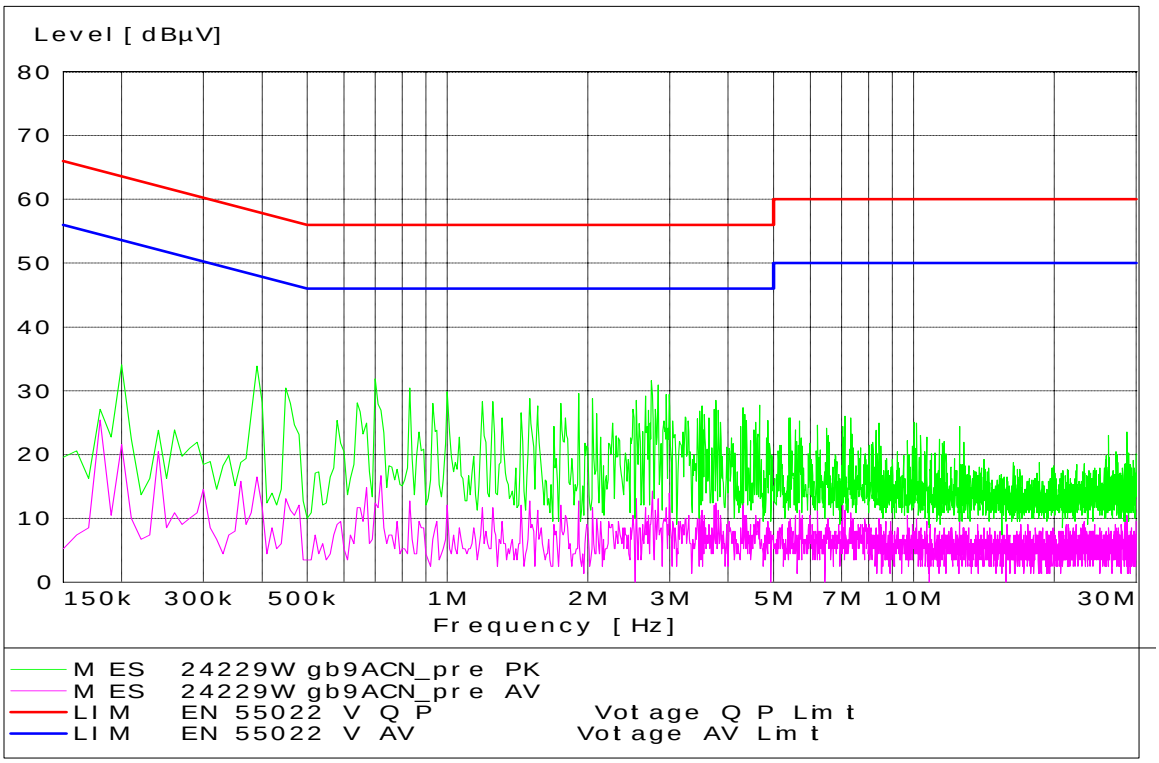
WLAN Channel 6 - Tx Mode - Line Coupling



WLAN Channel 6 - Tx Mode - Neutral Coupling



WLAN Channel 11 - Tx Mode - Line Coupling



WLAN Channel 11 - Tx Mode - Neutral Coupling

End of Test Report