



Radio Intentional EMC Test Report: EDCS - 1394241

For
CP-DX70
Desktop TelePresence

FCC ID: LDKDX700976
IC: 2461B-DX700976

Against the following Specifications :

47 CFR 15.247
RSS-210
RSS-102

Cisco Systems
EMC Laboratory
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Approved By: See EDCS
Title: See EDCS

This report replaces any previously entered test report under EDCS - 1394241



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Section 1: Overview

Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following standards:

Emissions:

CFR47 Part 15.247

RSS-210

RSS102

Notes:

- 1) Measurements were made in accordance with KDB Publication No. 558074 D01 DTS Meas Guidance v03r01 & measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.



Section 2: Assessment Information

2.1 General

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal Government.

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results, due to production tolerances and measurement uncertainties.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%
- e) All AC testing was performed at the following supply voltage:

110V (+/-10%) 60Hz

- f) Cisco Systems, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). The scope of accreditation, certificate number 1178-01 is referenced in appendix C, along with further details.

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2.2 Start Date of Testing

04-MAR-2014

2.3 Report Issue Date

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2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.,
170 West Tasman Drive
San Jose, CA 95134,
USA

Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 2461N-2
Building P, 5m Chamber	Company #: 2461N-1
Building I, 5m Chamber	Company #: 2461M-1

Test Engineers

Allan Beecroft, Technical Leader, Cisco Systems Inc.

2.5 Equipment Assessed (EUT)

CP-DX70 Desktop TelePresence



2.6 EUT Description

The Cisco DX70 offers uncompromised collaboration for every desk. Experience best in class HD video and expanded collaboration capabilities such as UC features, Android applications and email all within a single integrated device. Now is the time for simple to use Collaboration experience at a price so affordable you can empower every office and home office desktop.

2.7 Scope of Assessment

Tests have been performed in accordance with the relevant Test and Assessment Plan (TAP), a copy of which is contained in Appendix F of this report, and the relevant Cisco Systems, Inc. radio test procedures (EDCS-420238). This test report may not cover all of the tests highlighted in the test plan.

2.8 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

$$\text{Emission level [dBuV]} = \text{Indicated voltage level [dBuV]} + \text{Cable Loss [dB]} + \text{Other correction factors [dB]}$$

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

$$\text{Level in uV/m} = \text{Common Antilogarithm } [(X \text{ dBuV/m})/20] = Y \text{ uV/m}$$



2.9 Report Template Control No.

EDCS#: 703456

Section 3: Result Summary

3.1 Results Summary Table

Conducted Tests

Basic Standard	Result
6dB Bandwidth	Pass
Peak Output Power	Pass
Power Spectral Density	Pass
Conducted Spurious Emissions	Pass
Band Edge	Pass
AC Power Line Conducted Emissions	Pass

Radiated Tests

Basic Standard	Result
Tx Radiated Spurious and Harmonic Emissions	Pass
Rx Radiated Spurious and Harmonic Emissions	Pass
Co-Locator Spurious Emissions	Pass
Radiated Emissions 30MHz to 1GHz	Pass

* SAR measurements to be reported in test report EDCS-1401425



Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. During preliminary testing all three planes (X, Y & Z) were evaluated to determine "Worst Case". The data collected determine that the orientation used for this report was deemed "Worst Case".

4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9SE	CP-DX70
S02	LITEON PA-1600-2A-LF AC/DC Adapter	LIT1748098P	N/A
S03	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9PR	CP-DX70
S04	AIR-CAP2702I-A-K9 Access Point	RFDP1BVZ017	N/A
S05	SAMSUNG SCH-I200 Mobile Phone	N/A	N/A

The following antennas were evaluated as part of this testing process. The antennas listed reflect the maximum gain allowed for each family type of antenna:

Fixed internal Amphenol Dual Band Antenna, Gain = 2.6dBi (no external antenna can be used.)

4.2 System Details

System #	Description	Samples
1	Radio Test Sample.	S01 & S02
2	Radio Test Sample for Co-Located Tests.	S03, S02, S04 & S05

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11b/g/n Test Mode	System is placed in a continuous Tx State at a Low, Middle, High Channel per Test Requirements. 802.11 running 1Mbps, 802.11b running at 11Mbps while 802.11g running at 6Mbps, HT20 at MCS0 & HT40 at MCS0.
2	802.11b/g/n Test Mode	System is placed in a continuous Tx 802.11b/g/n & Bluetooth state. The 802.11 wi-fi has an established connection with an Access Point, whilst the Bluetooth is paired with a mobile phone transferring a 150Mbyte.



Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.



Appendix A: Formal Test Results

6 dB Bandwidth

15.247 & RSS-210 A8.2:

Systems using digital modulation techniques may operate in the 2400-2483.5MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency:	Frequency from table below
Span:	2 X Nominal Channel Bandwidth
Reference Level:	10 dBm
Attenuation:	30 dB
Sweep Time:	5 s
Resolution Bandwidth:	100kHz & 430kHz
Video Bandwidth:	300kHz & 1.3MHz
X dB Bandwidth:	-6 dB
Detector:	Peak
Trace:	Single

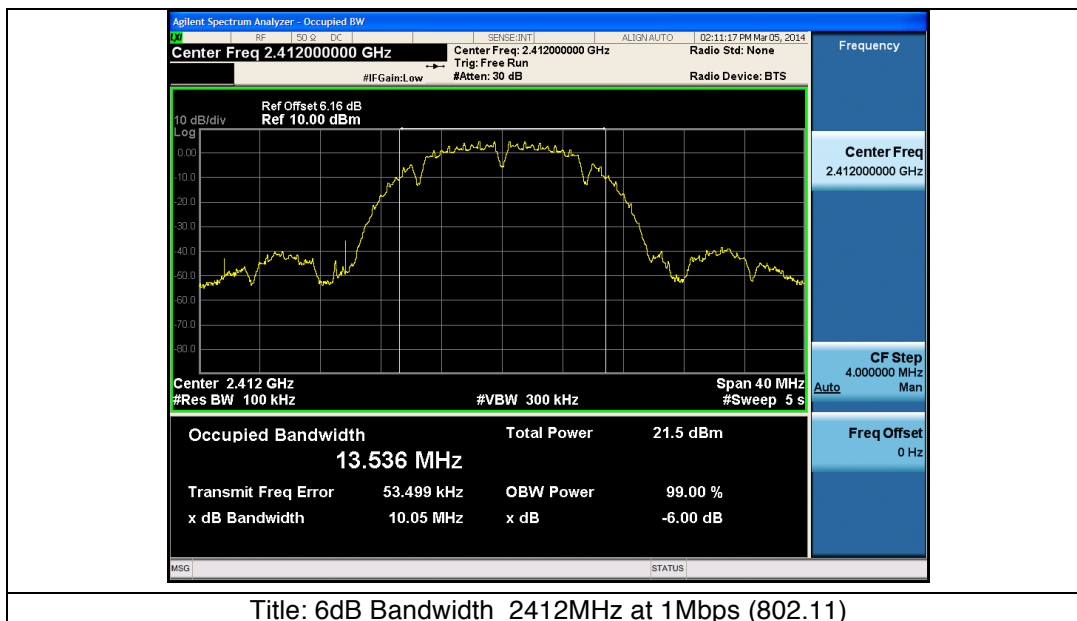
Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

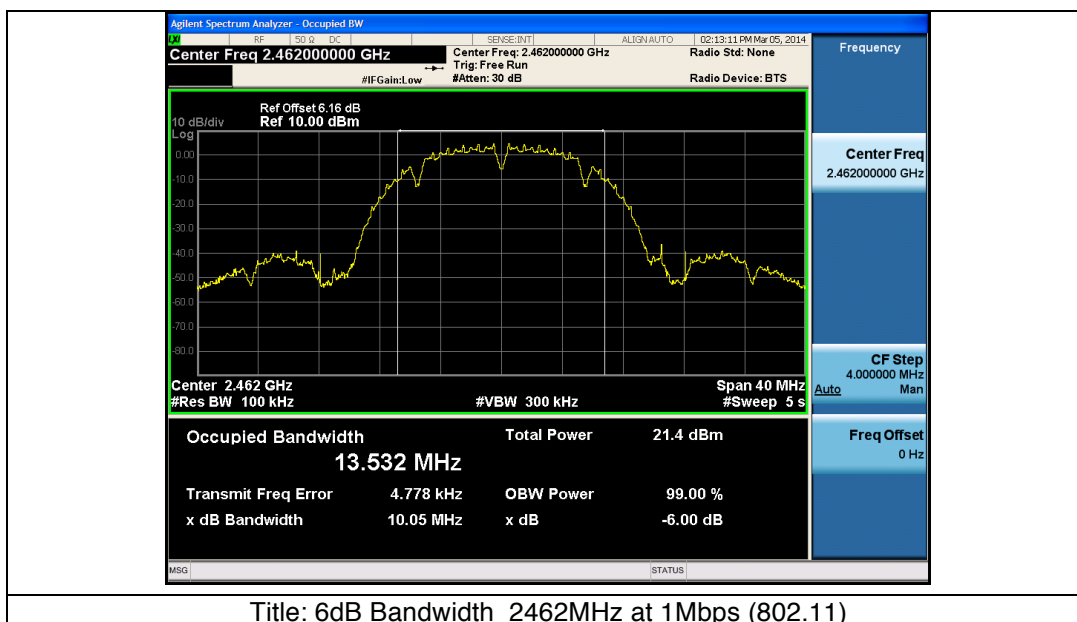
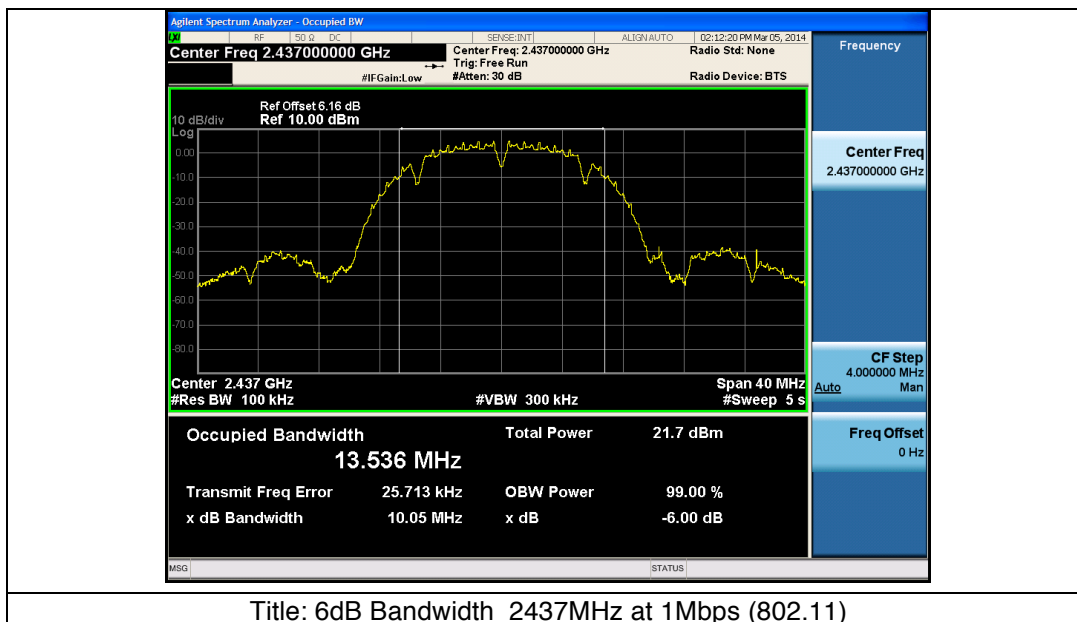
FREQUENCY (MHz)	DATA RATE (Mbps)	-6dB BANDWIDTH (kHz)	LIMIT (kHz)	MARGIN (kHz)
2412	1	10050	>500	-9550
2437	1	16540	>500	-16040
2462	1	9540	>500	-9040
2412	11	10050	>500	-9550
2437	11	16600	>500	-16100
2462	11	9540	>500	-9040
2412	6	10050	>500	-9550
2437	6	16590	>500	-16090
2462	6	9540	>500	-9040
2412	MCS0	17810	>500	-17310
2437	MCS0	17830	>500	-17330
2462	MCS0	17830	>500	-17330
2422	MCS0	36590	>500	-36090
2437	MCS0	36550	>500	-36050
2452	MCS0	36590	>500	-36090

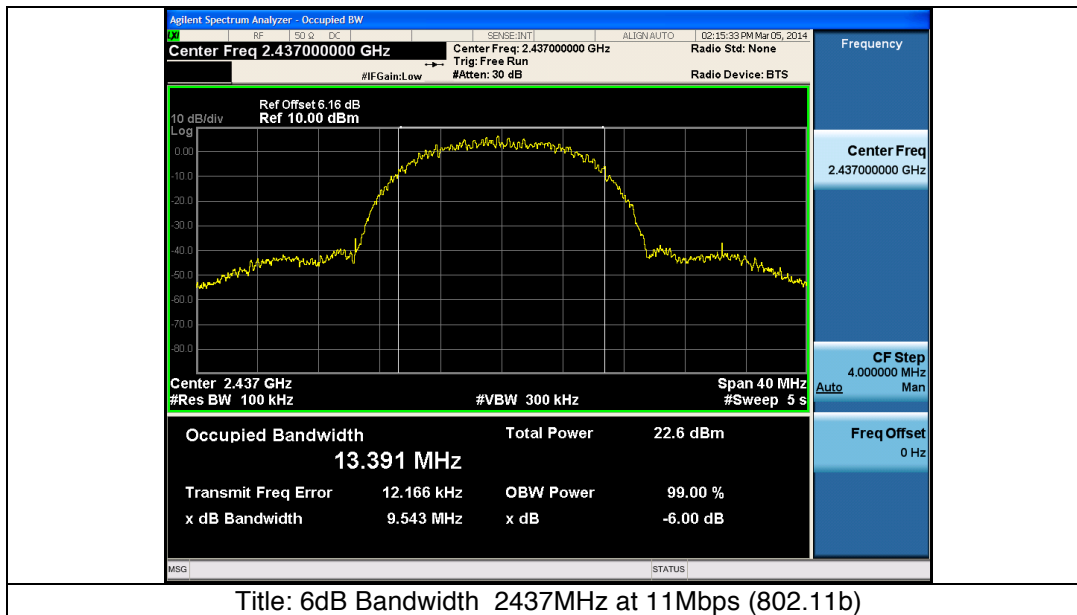
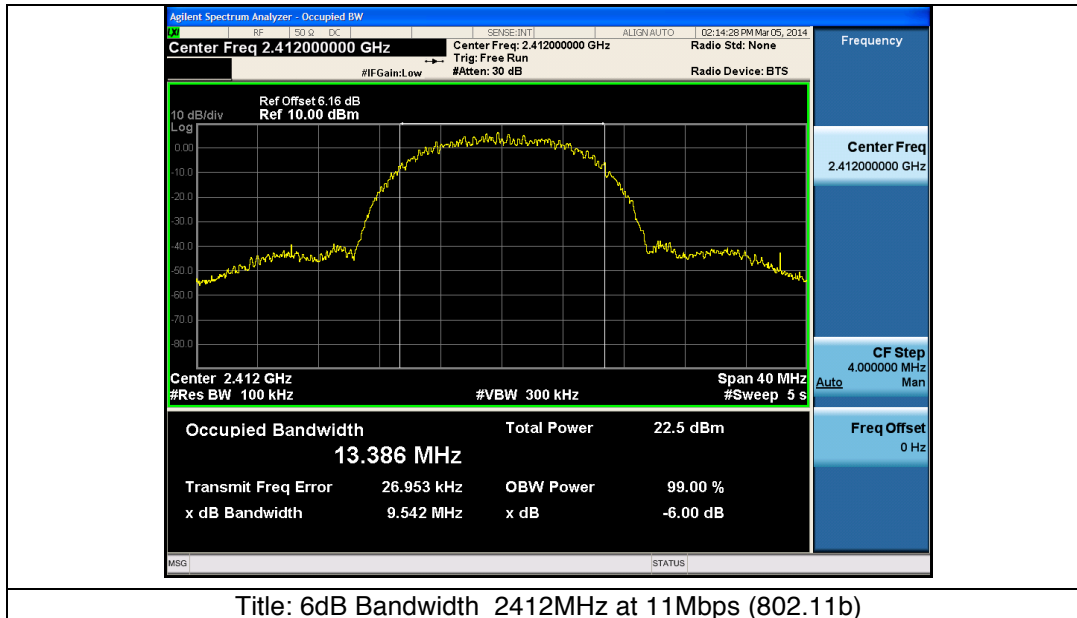


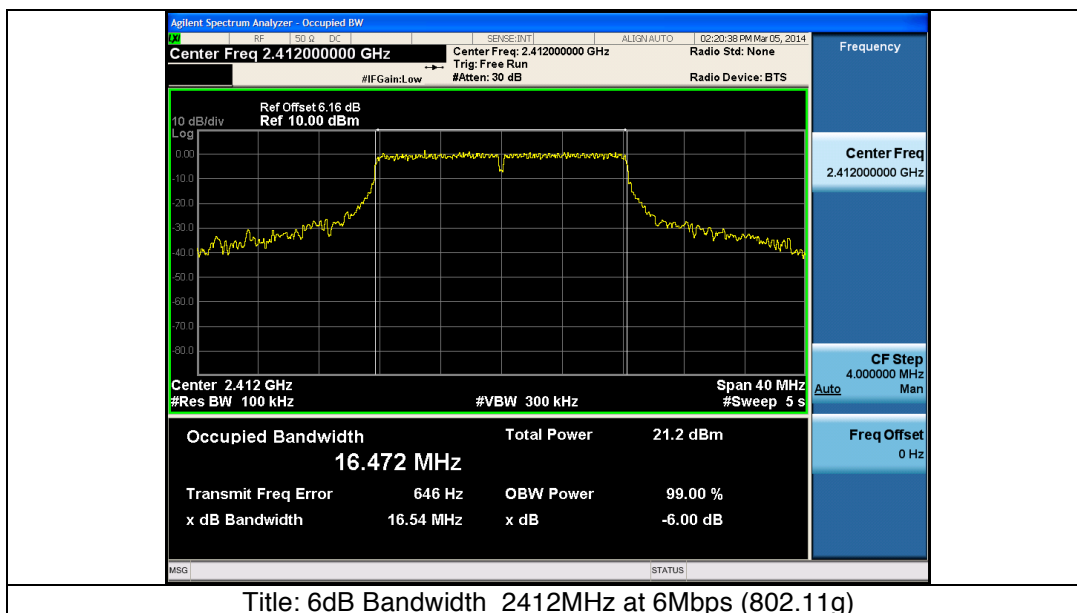
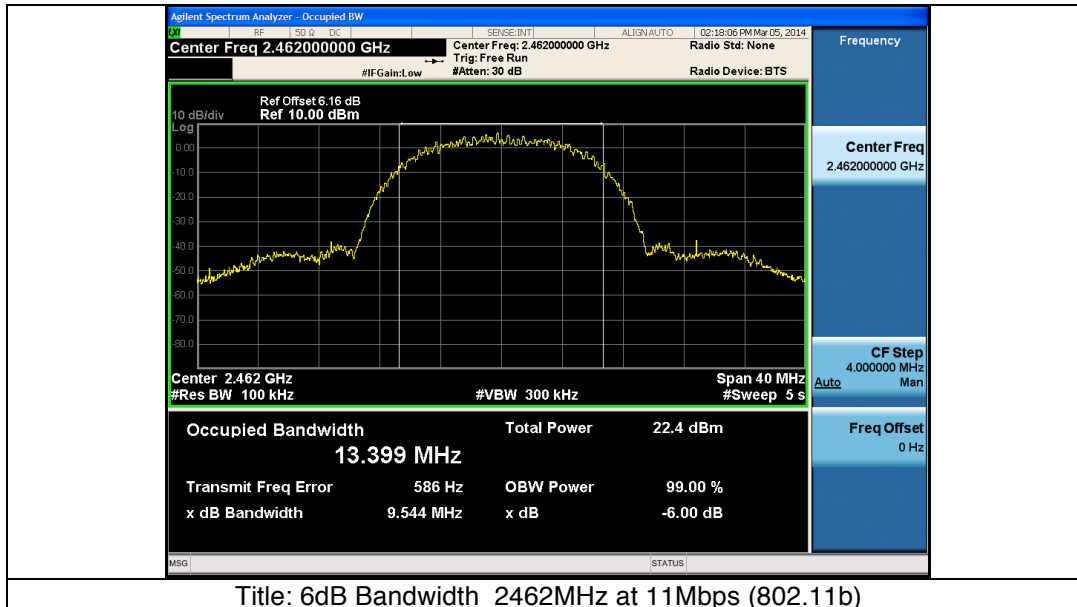
FREQUENCY (MHz)	DATA RATE (Mbps)	99% -26dB BANDWIDTH (kHz)
2412	1	17170
2437	1	17170
2462	1	17190
2412	11	16840
2437	11	16830
2462	11	16840
2412	6	23410
2437	6	23740
2462	6	20260
2412	MCS0	23410
2437	MCS0	20570
2462	MCS0	20610
2422	MCS0	41110
2437	MCS0	41150
2452	MCS0	41210

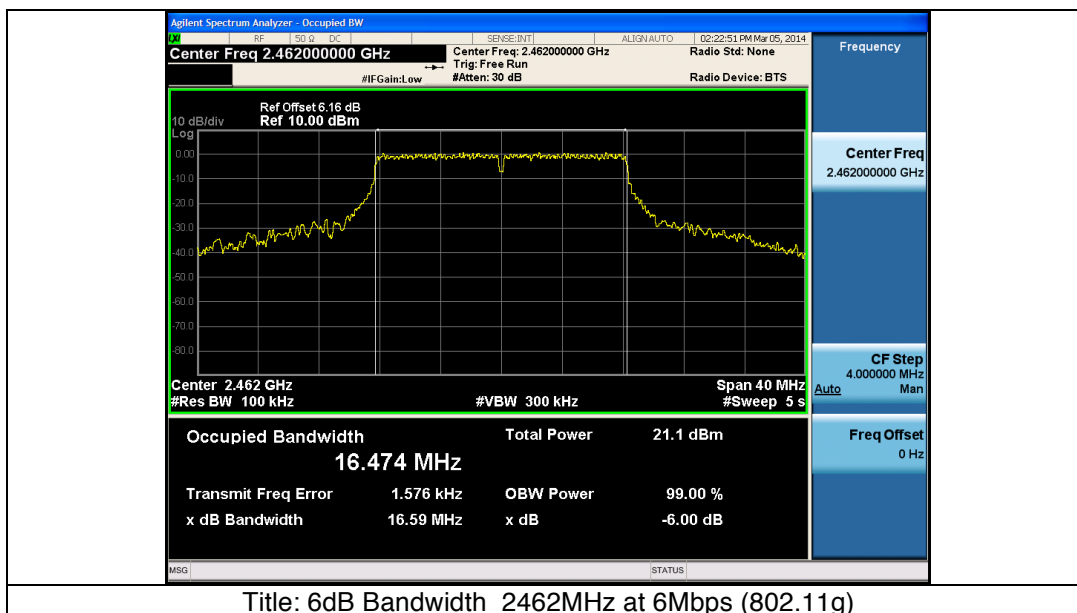
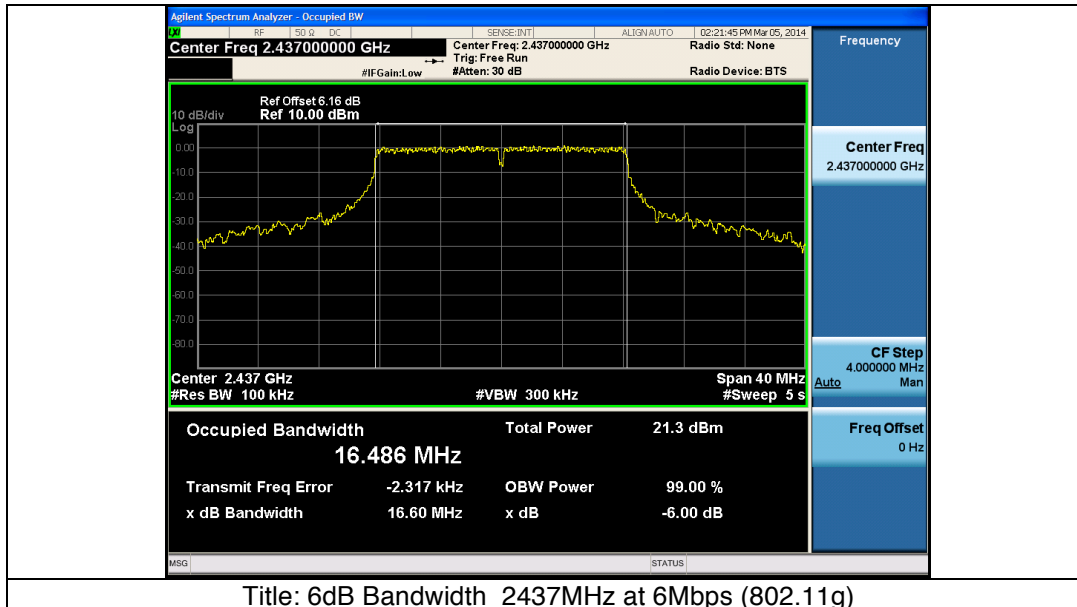
Graphical Test Results for 15.247 (6dB Bandwidth)

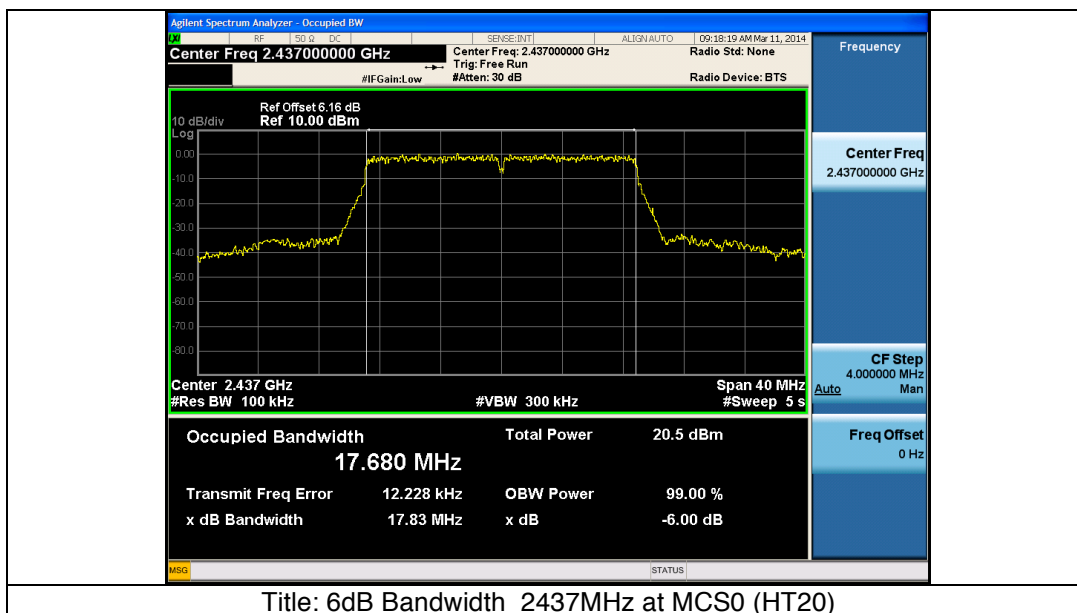
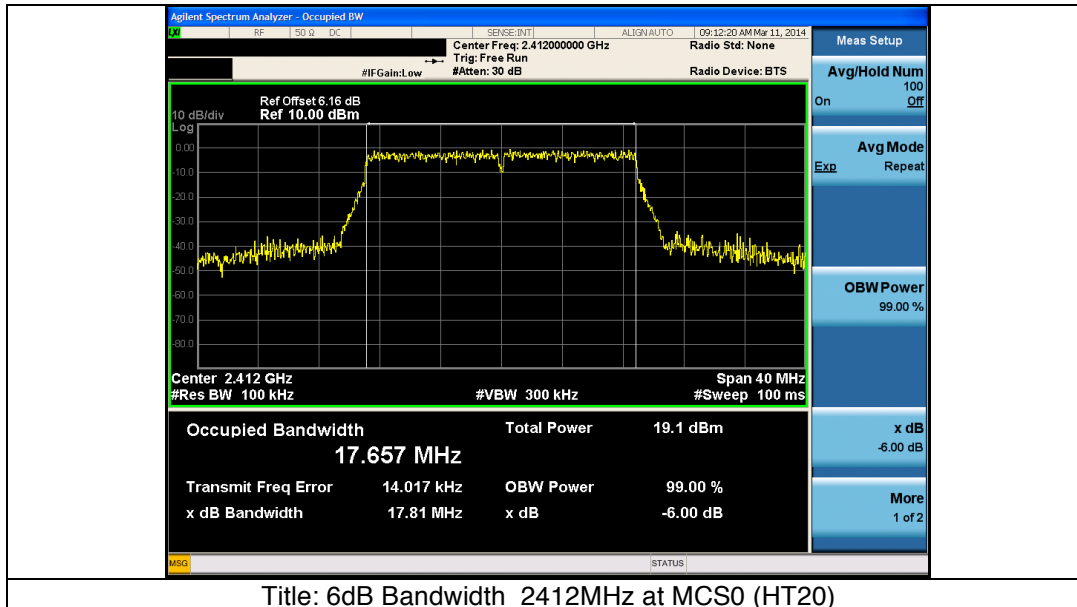


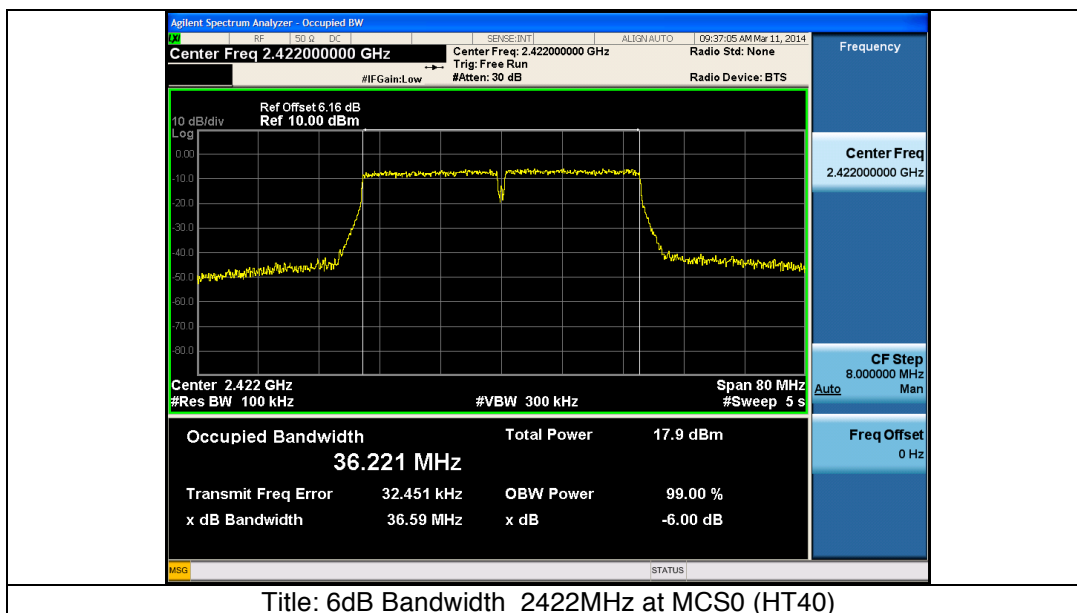
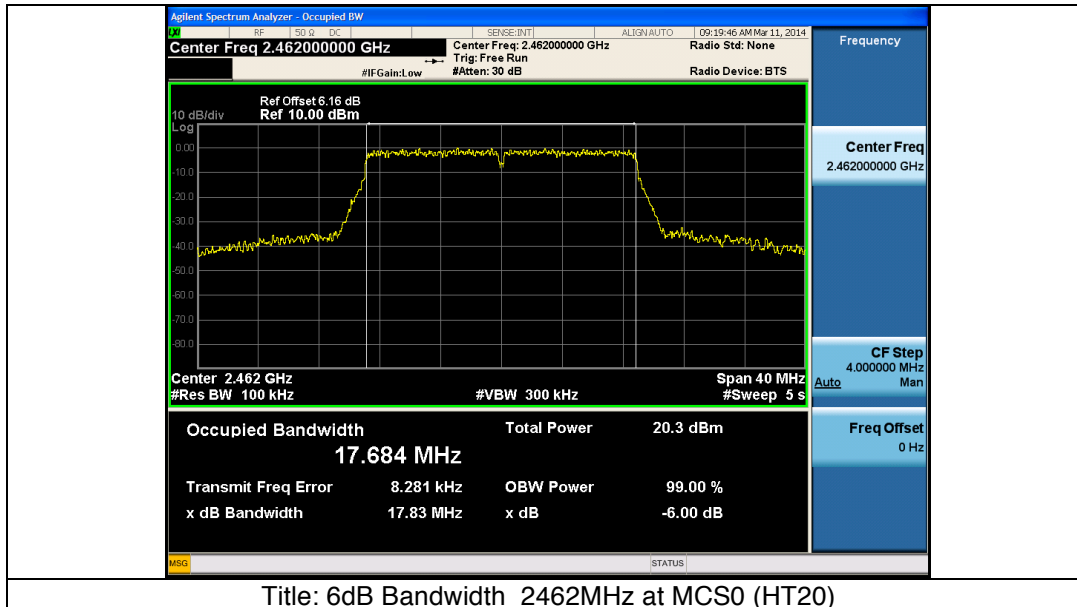


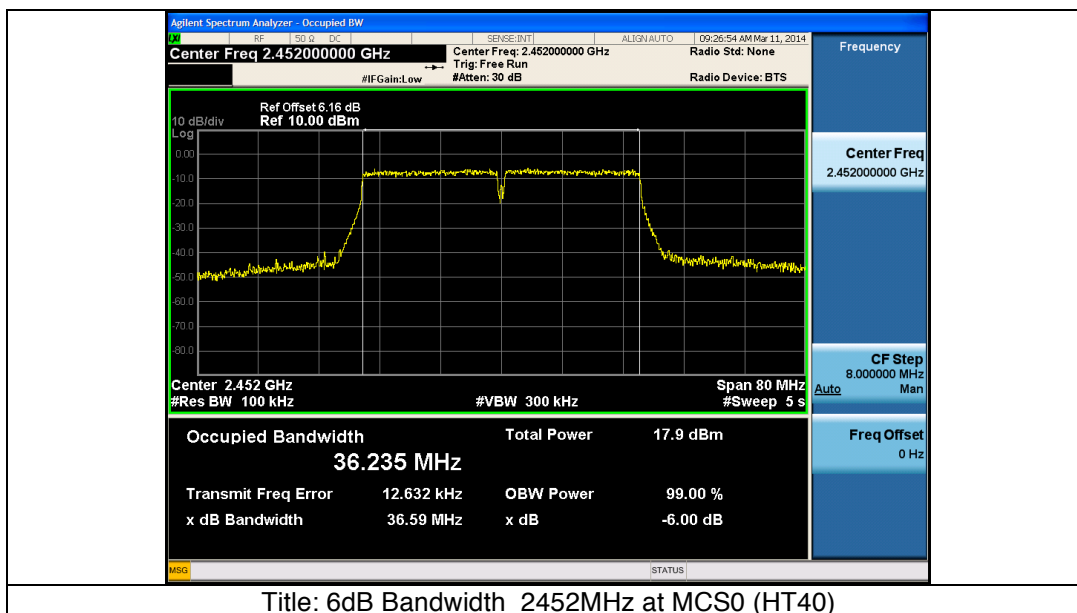
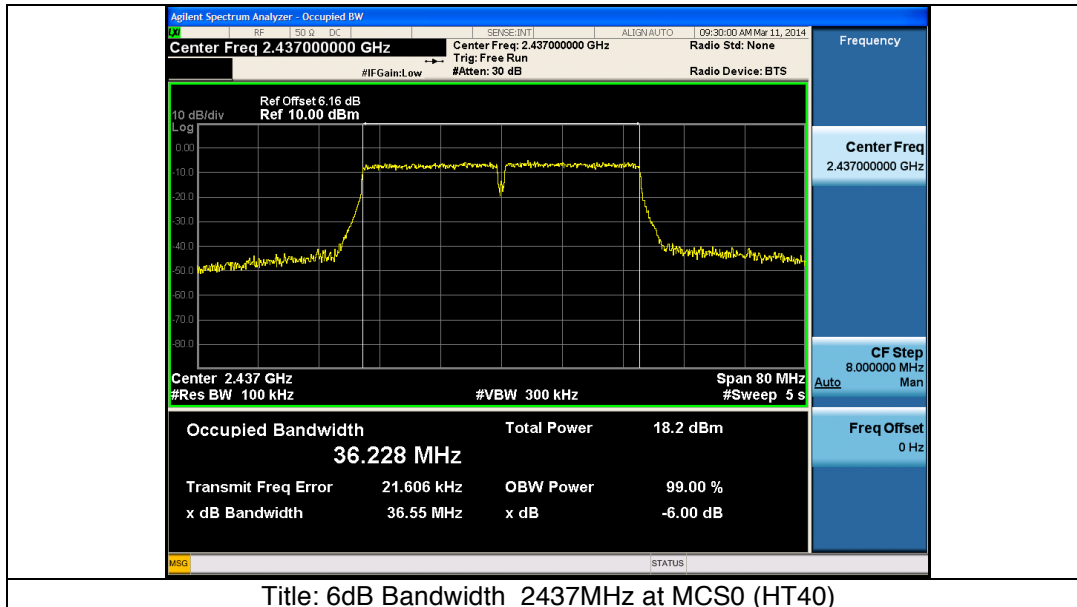






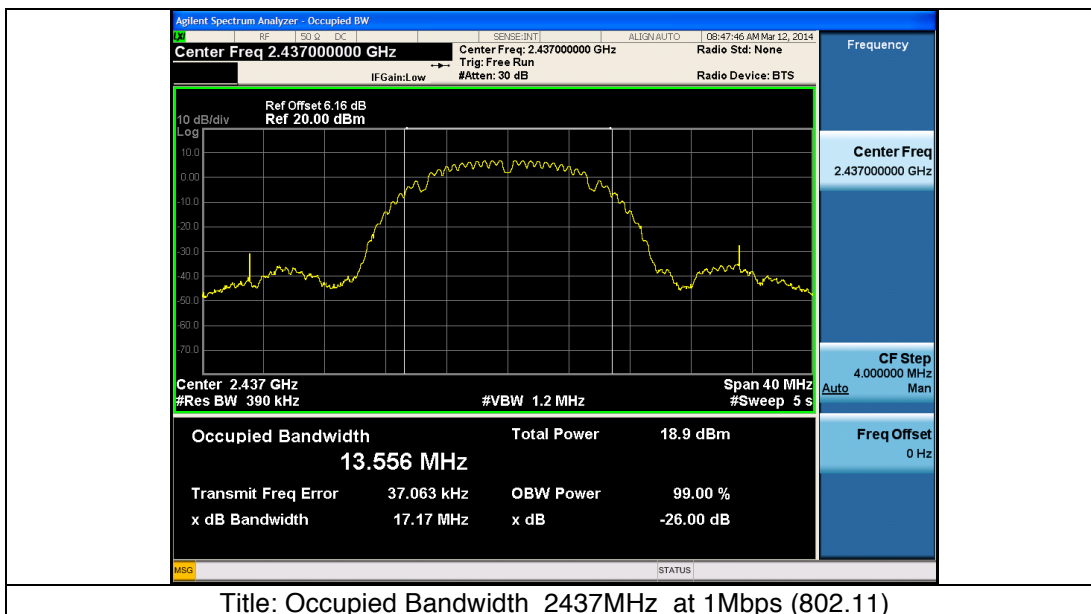
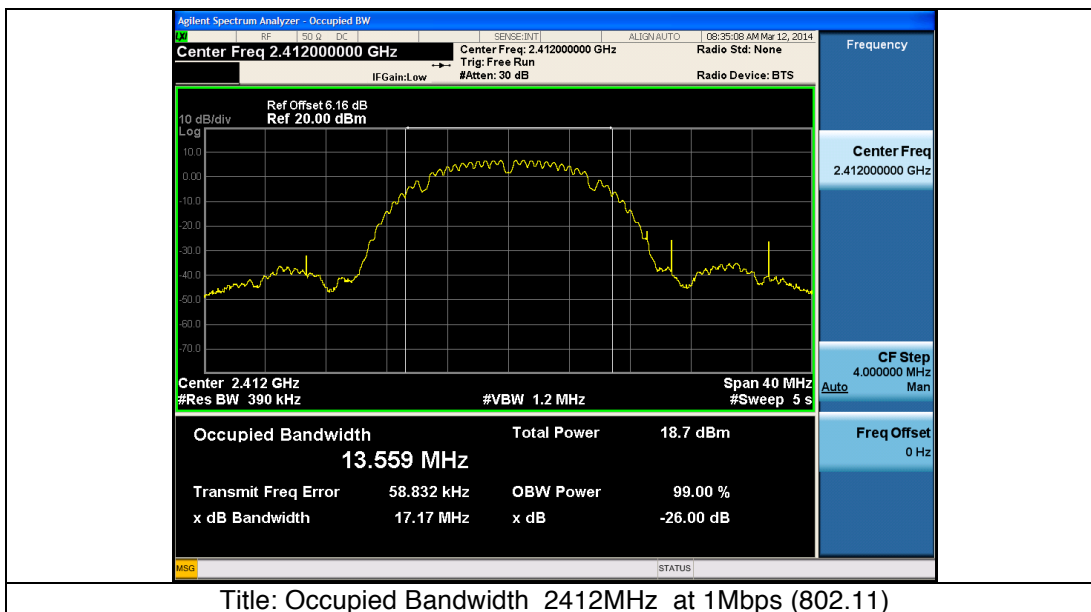


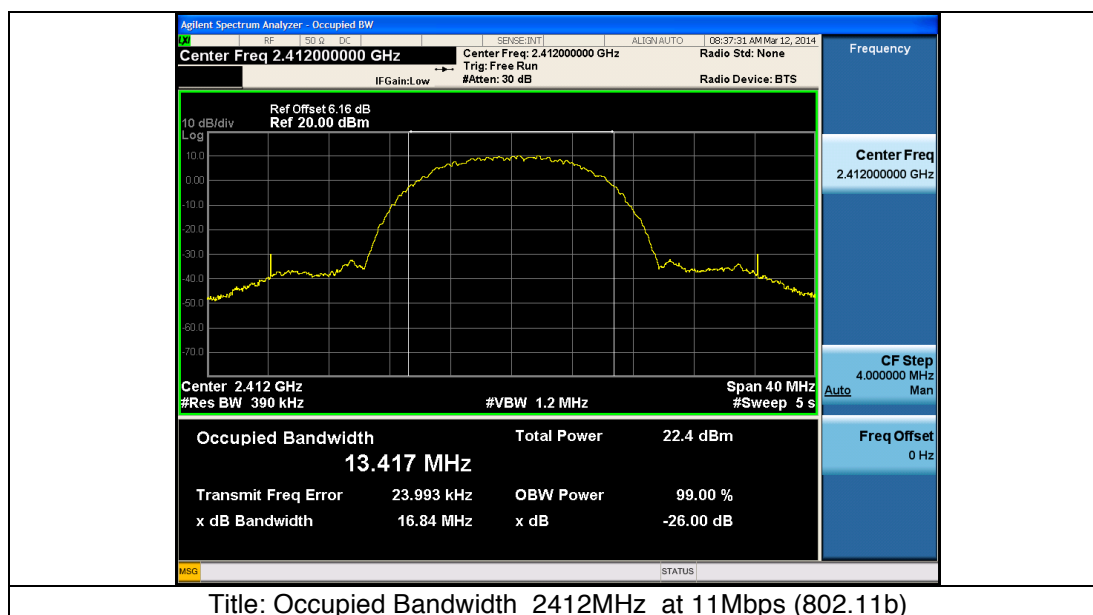
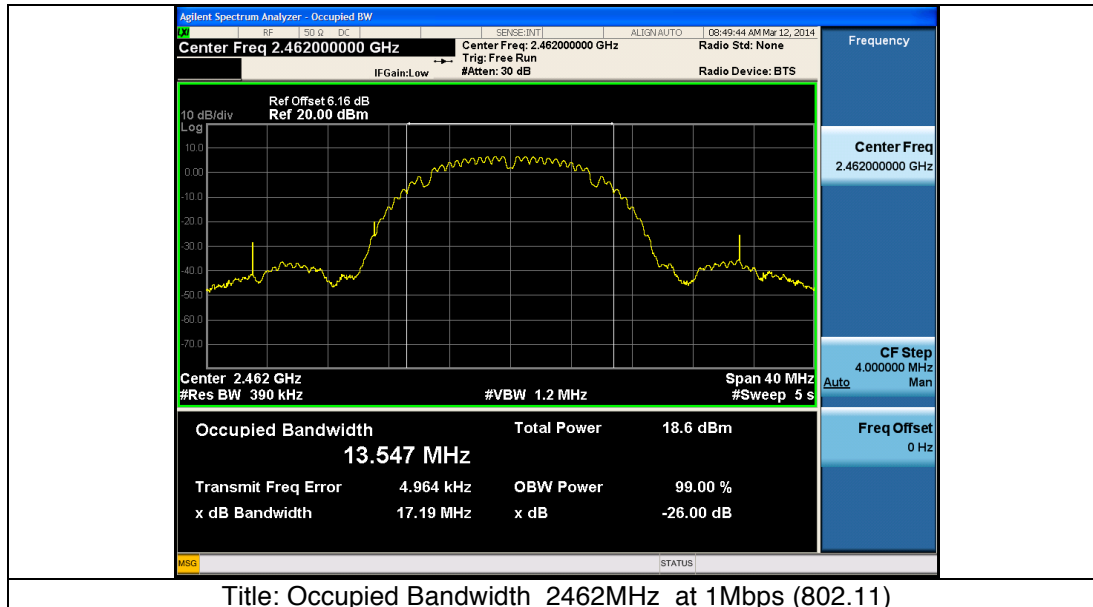


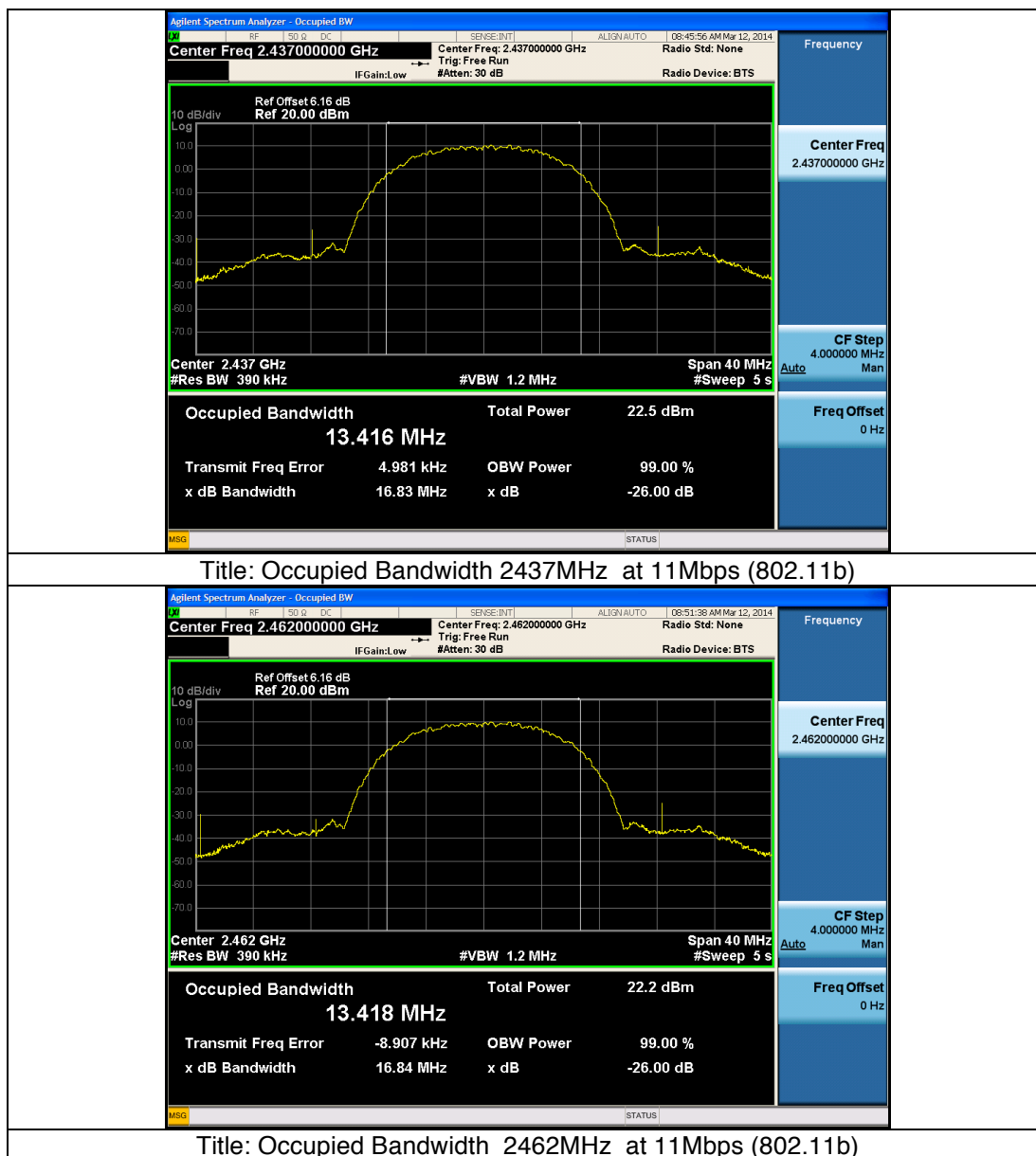


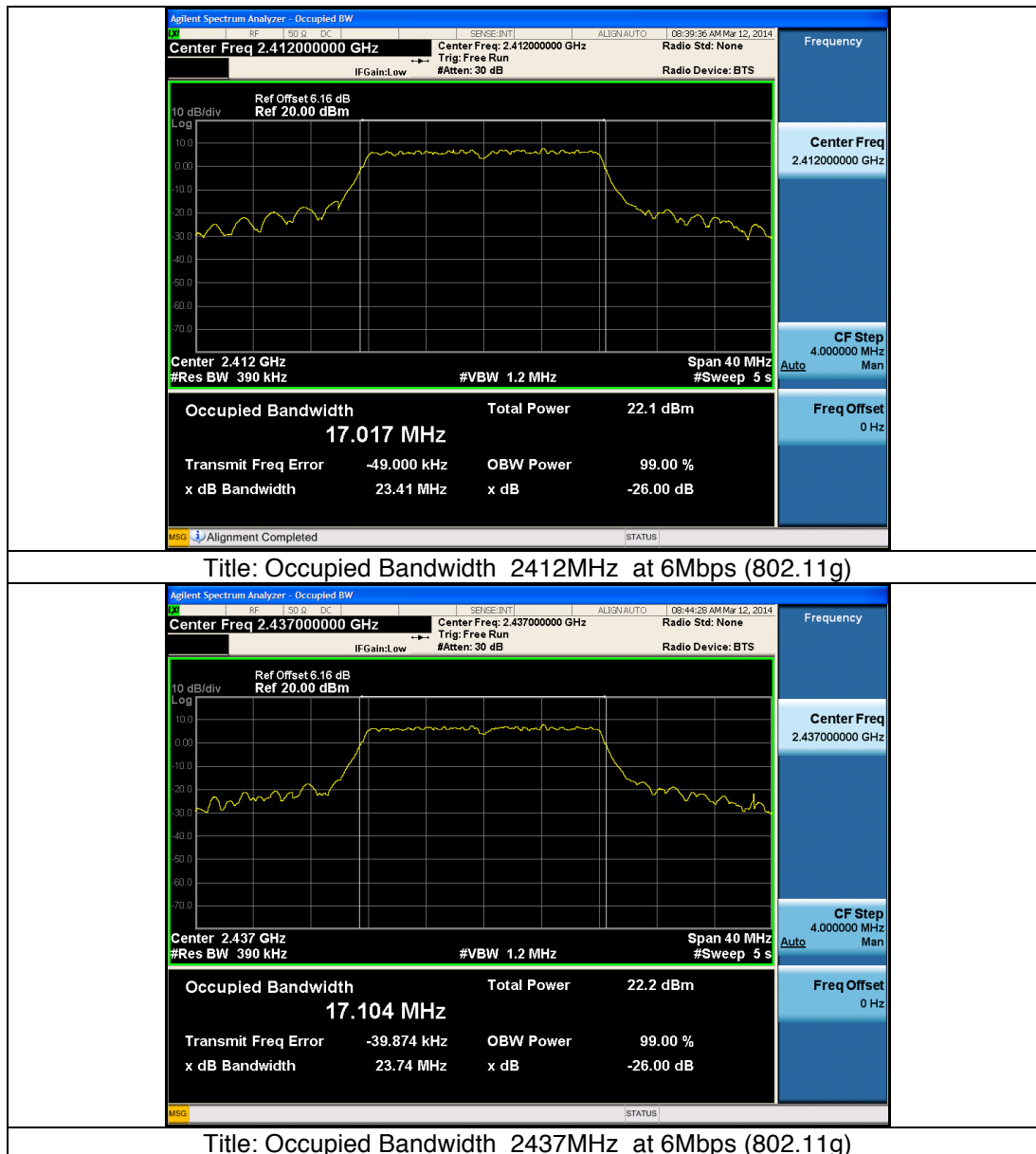


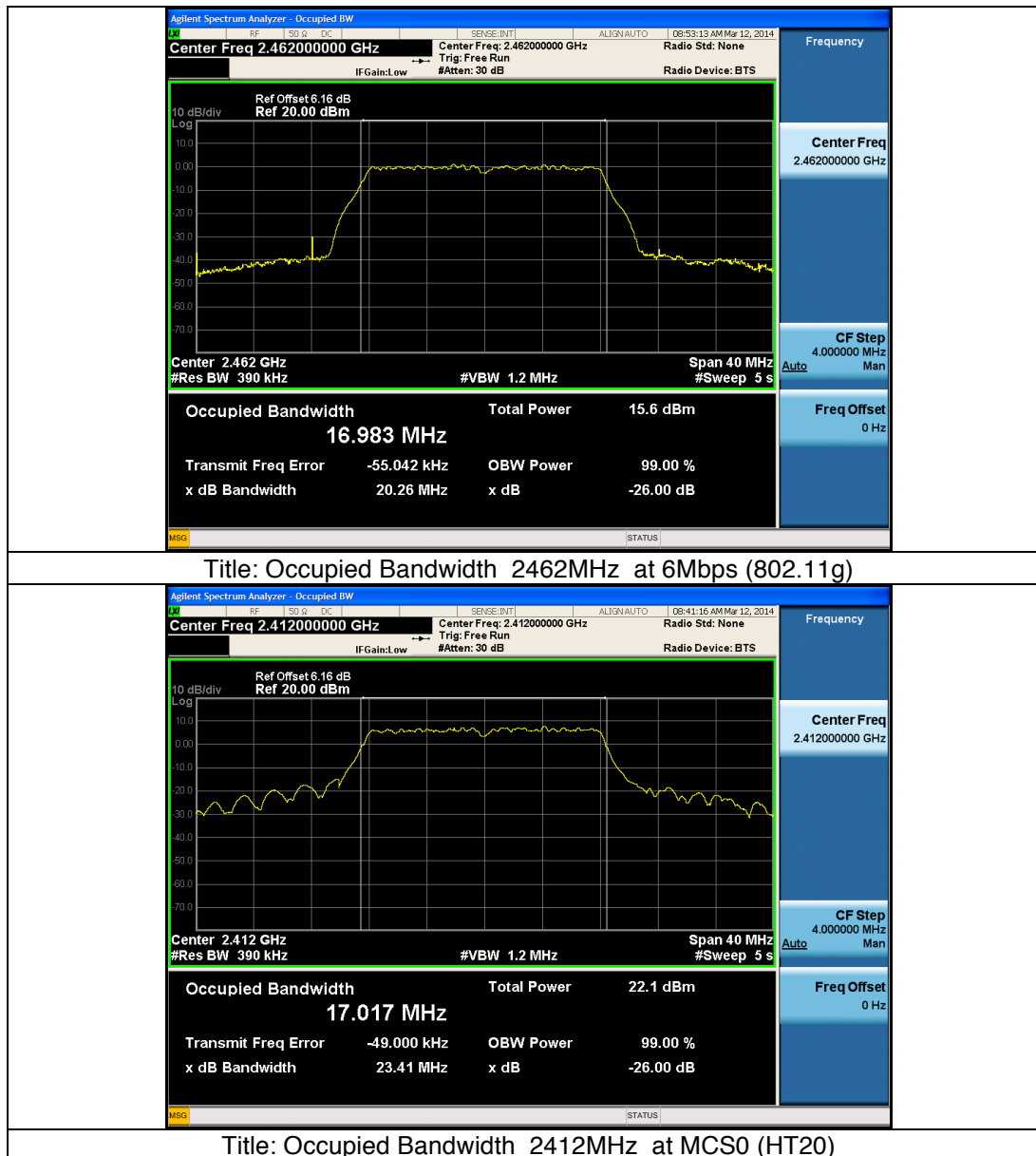
Graphical Test Results RSS210 (Occupied Bandwidth)

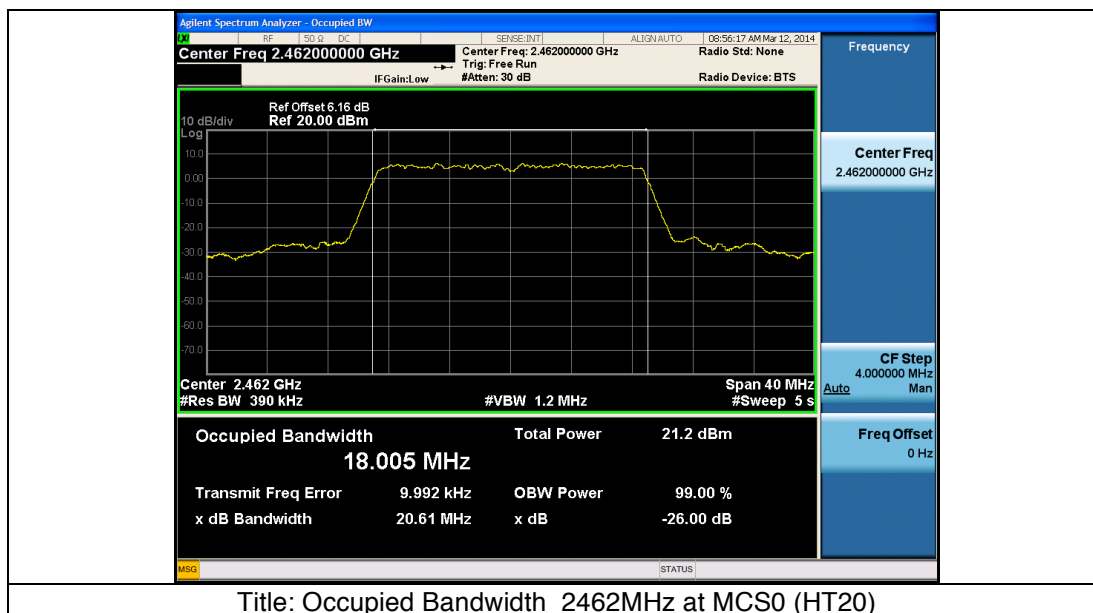
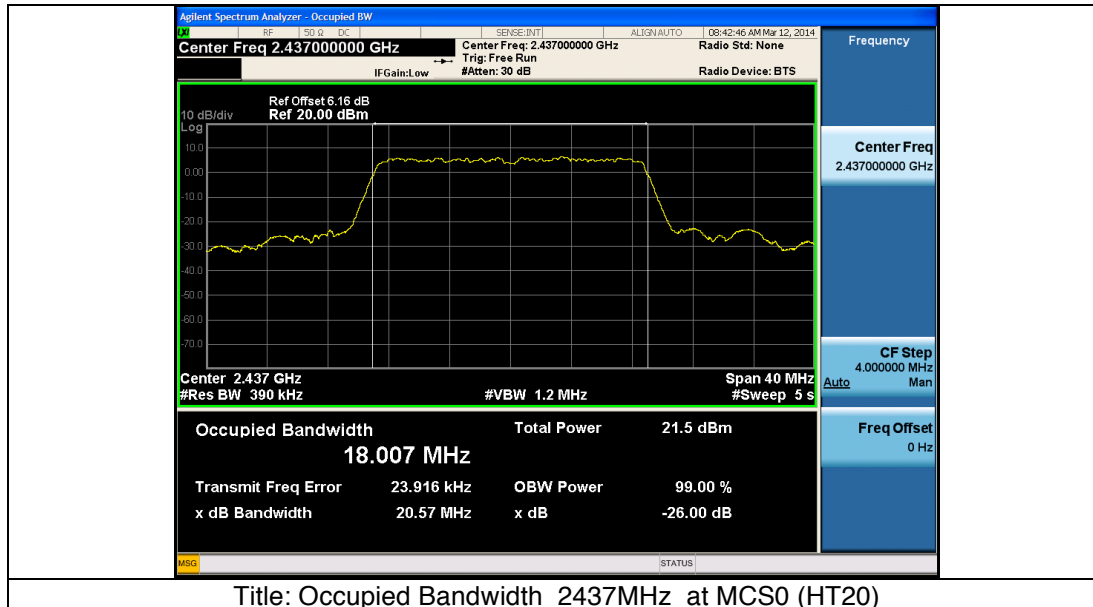


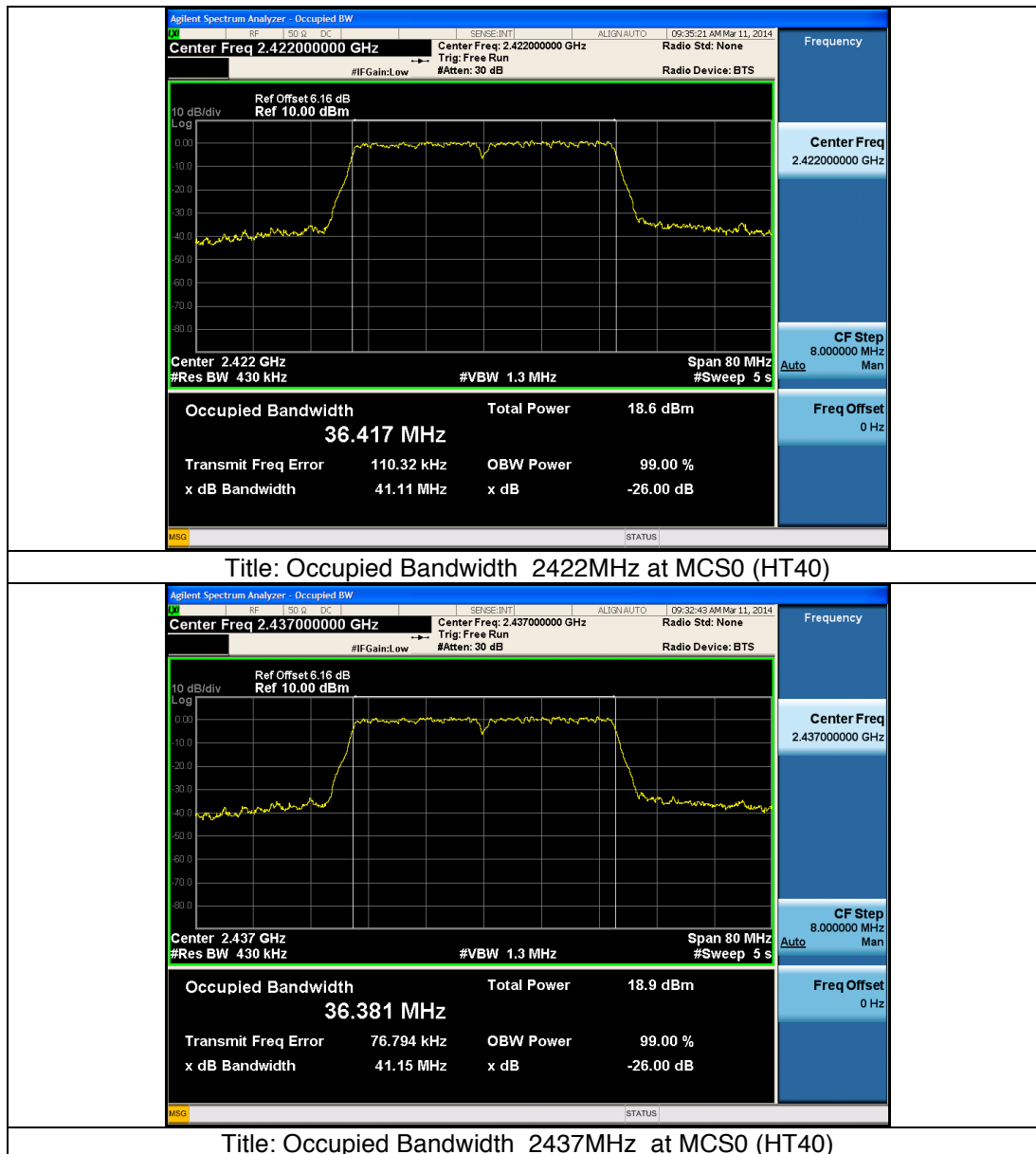


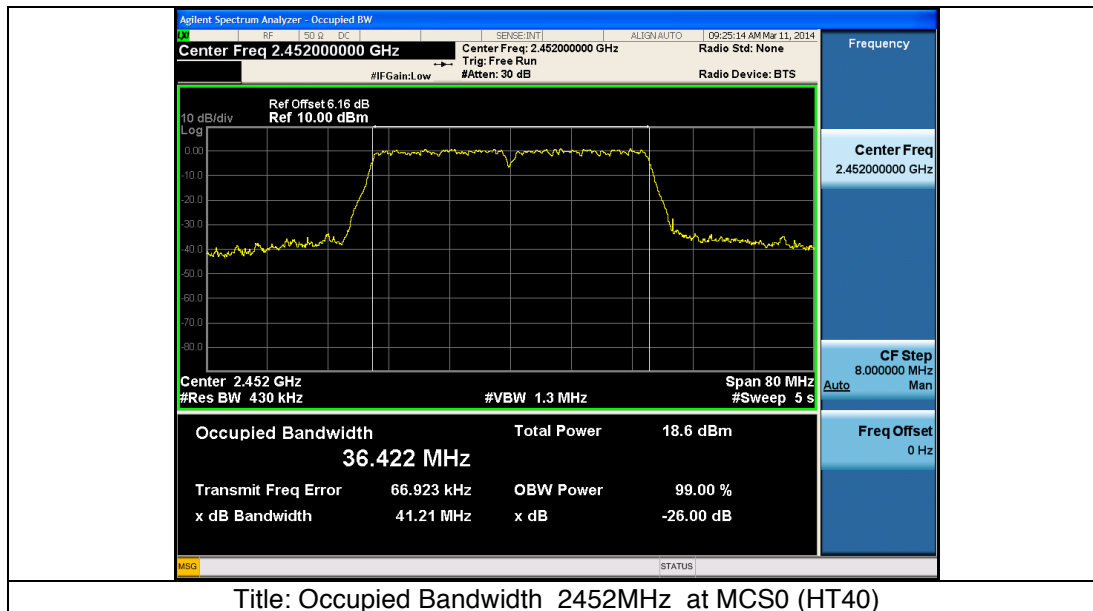




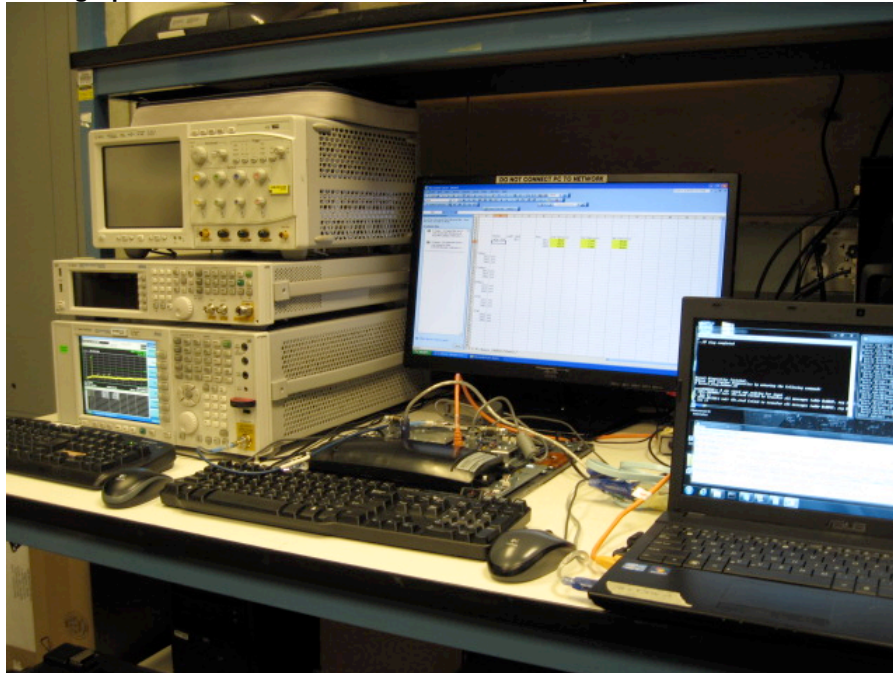








Photograph of Conducted Measurement Test Setup:





Peak Output Power

15.247 & RSS-210 A8.4:

The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 2.6dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

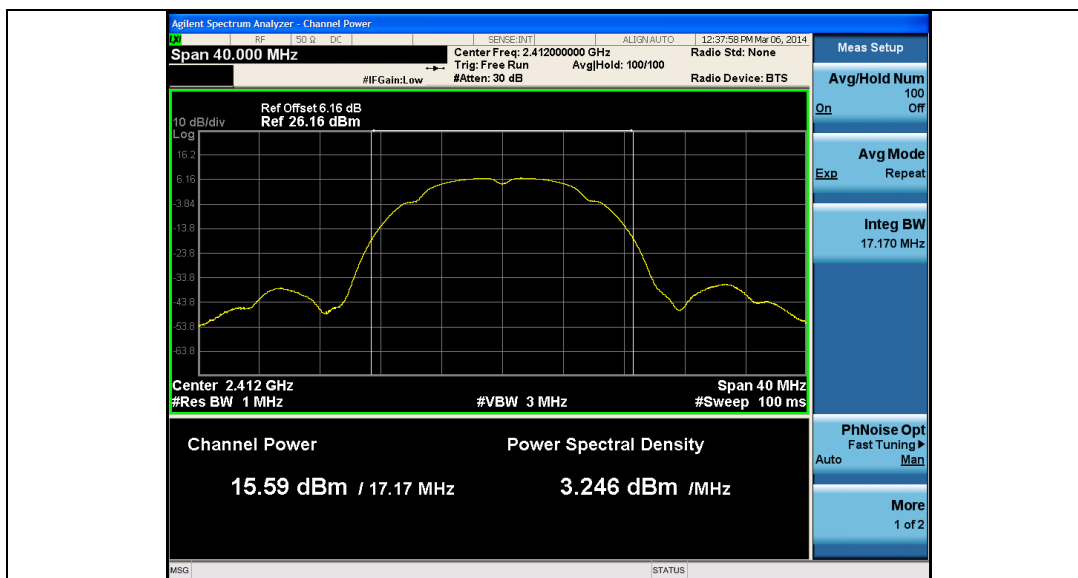
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Enable "Channel Power" function of analyzer
Center Frequency: Frequency from table below
Span: Must be greater than 26dB bandwidth, adjust as necessary
Ref Level Offset: Correct for attenuator and cable loss.
Reference Level: 26 dBm
Attenuation: 30 dB
Sweep Time: 100ms, Single sweep
Resolution Bandwidth: 1 MHz
Video Bandwidth: 3 MHz
Detector: Sample
Trace: Trace Average 100 traces in Power Averaging Mode
Integration BW: =26 dB BW from 26 dB Bandwidth Data

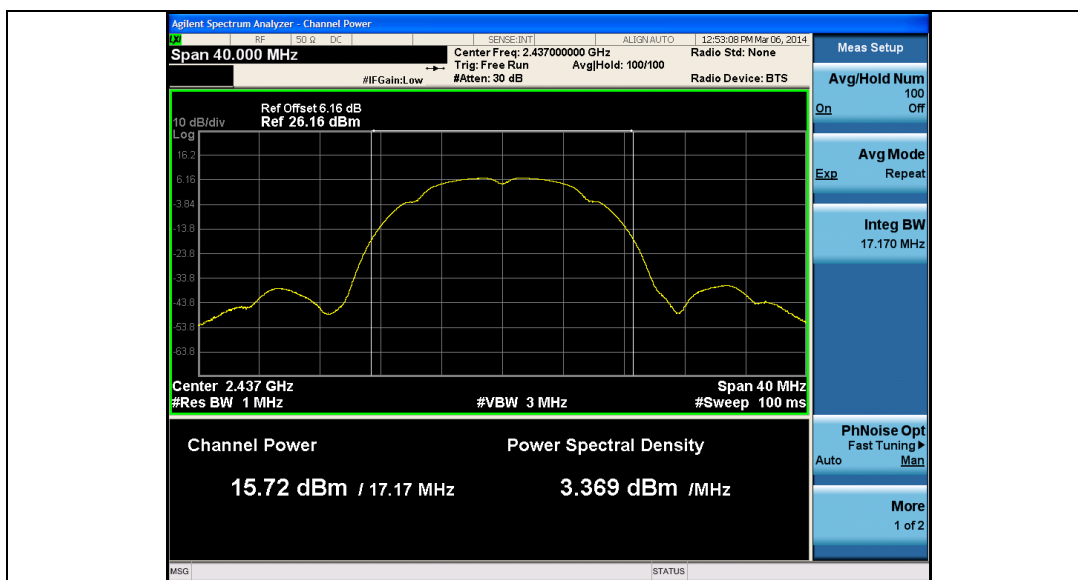
After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power.

FREQUENCY (MHz)	DATA RATE (Mbps)	PEAK OUTPUT POWER (dBm)	LIMIT (dBm)	MARGIN (dB)
2412	1	15.59	30	-14.41
2437	1	15.72	30	-14.28
2462	1	15.46	30	-14.54
2412	11	15.54	30	-14.46
2437	11	15.71	30	-14.29
2462	11	15.40	30	-14.60
2412	6	15.47	30	-14.53
2437	6	15.61	30	-14.39
2462	6	15.31	30	-14.69
2412	MCS0	14.53	30	-15.47
2437	MCS0	14.66	30	-15.34
2462	MCS0	14.37	30	-15.63
2422	MCS0	11.75	30	-18.25
2437	MCS0	12.07	30	-17.93
2452	MCS0	11.77	30	-18.23

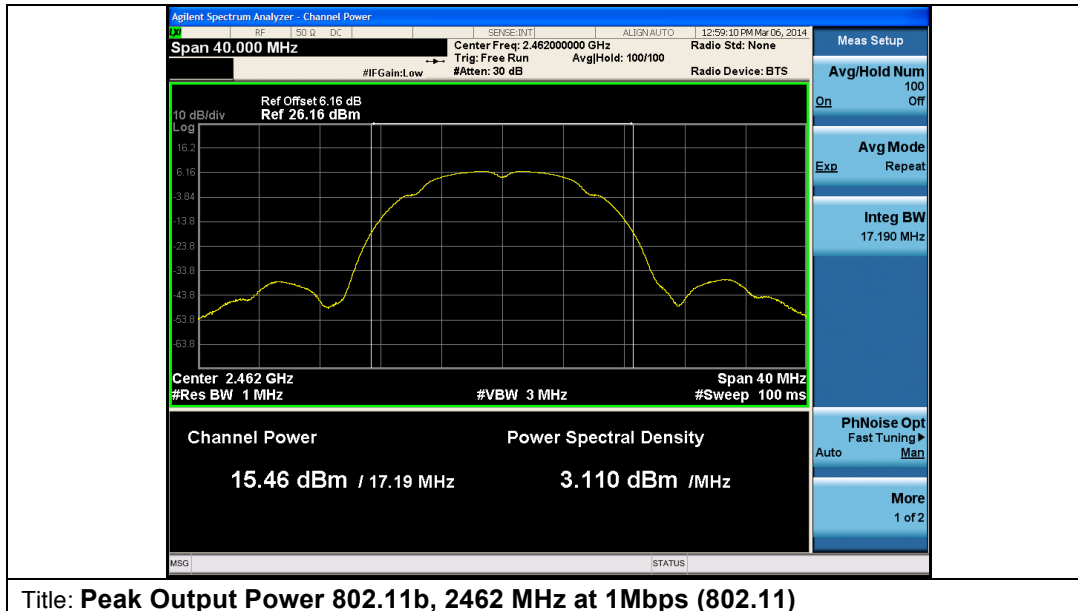
Graphical Results:



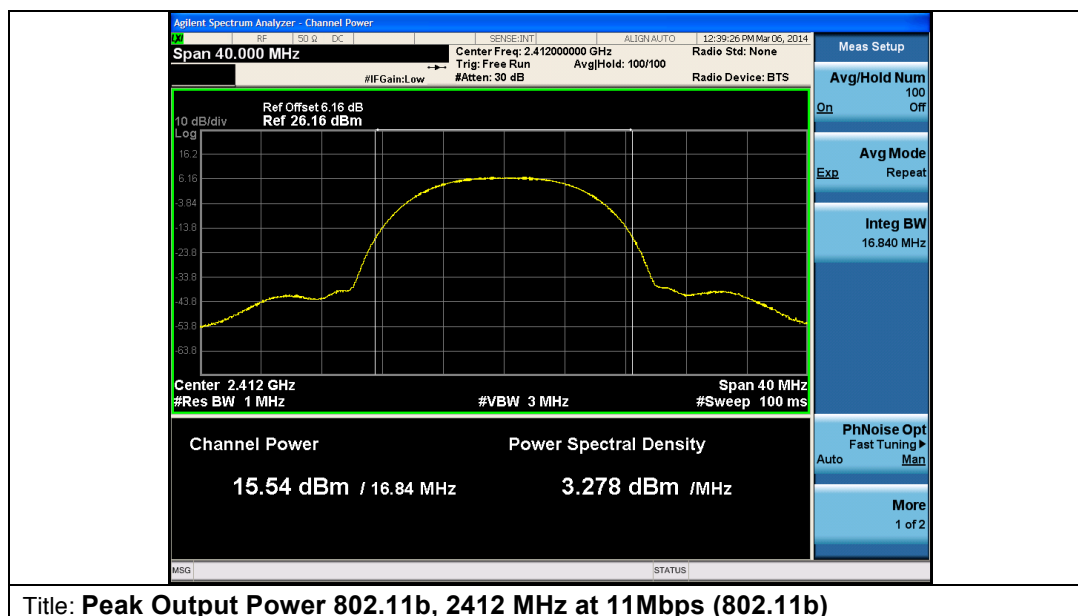
Title: **Peak Output Power 802.11b, 2412 MHz at 1Mbps (802.11)**



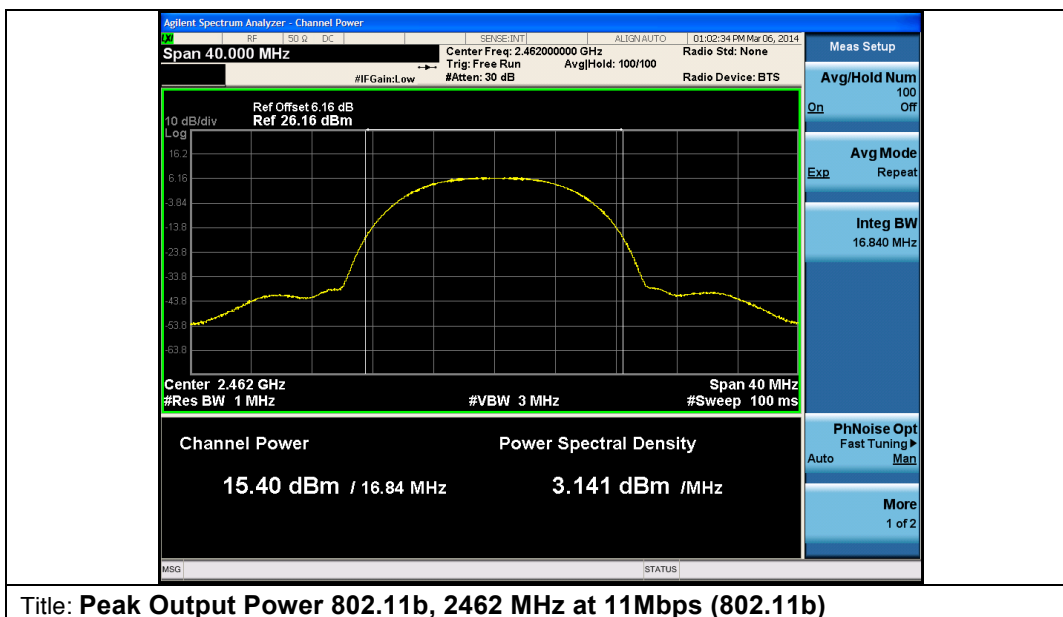
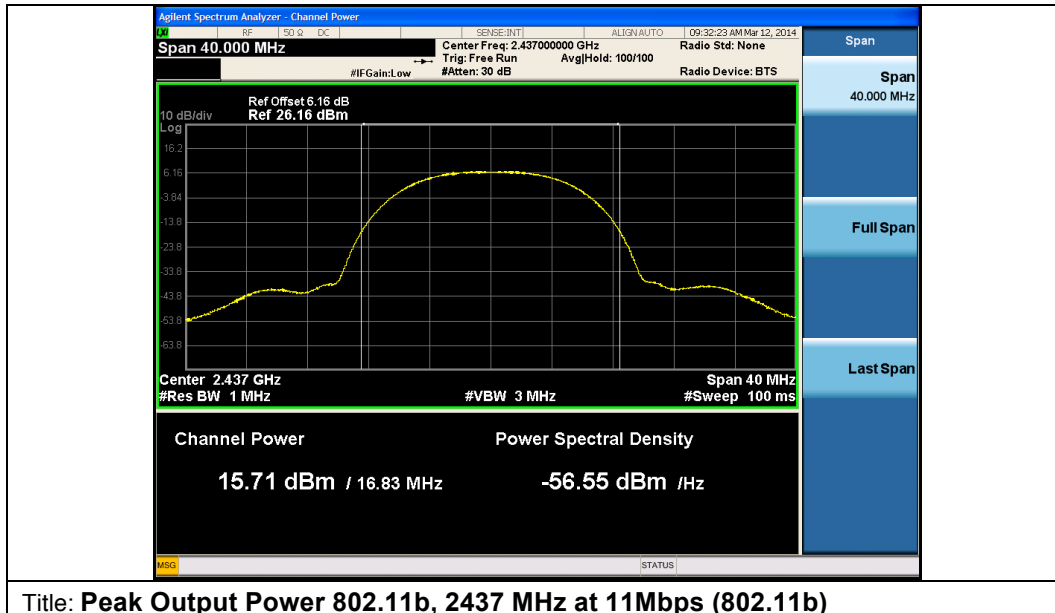
Title: **Peak Output Power 802.11b, 2437 MHz at 1Mbps (802.11)**

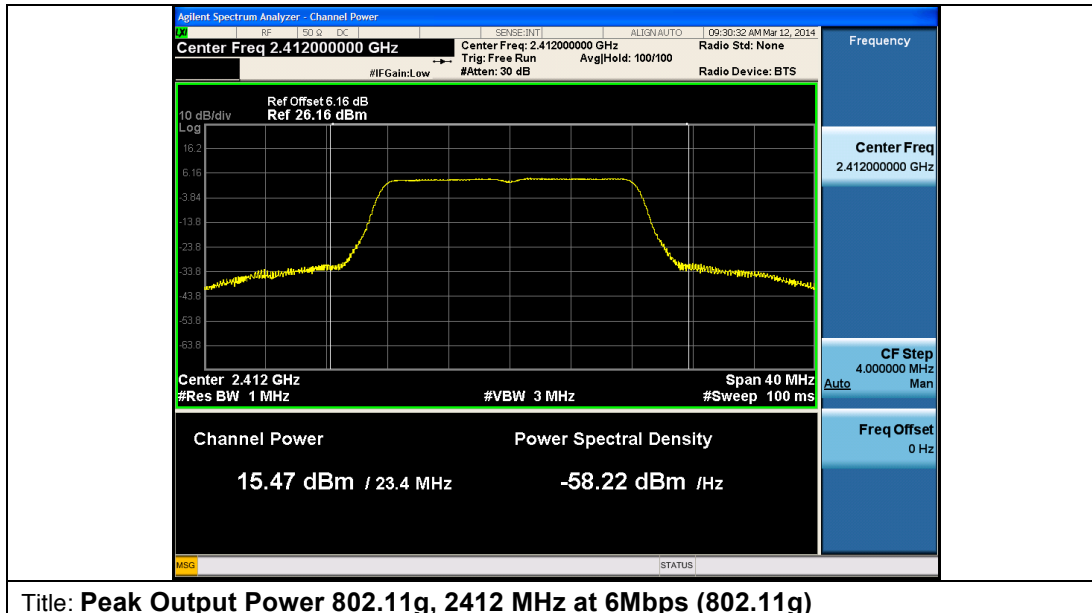


Title: Peak Output Power 802.11b, 2462 MHz at 1Mbps (802.11)

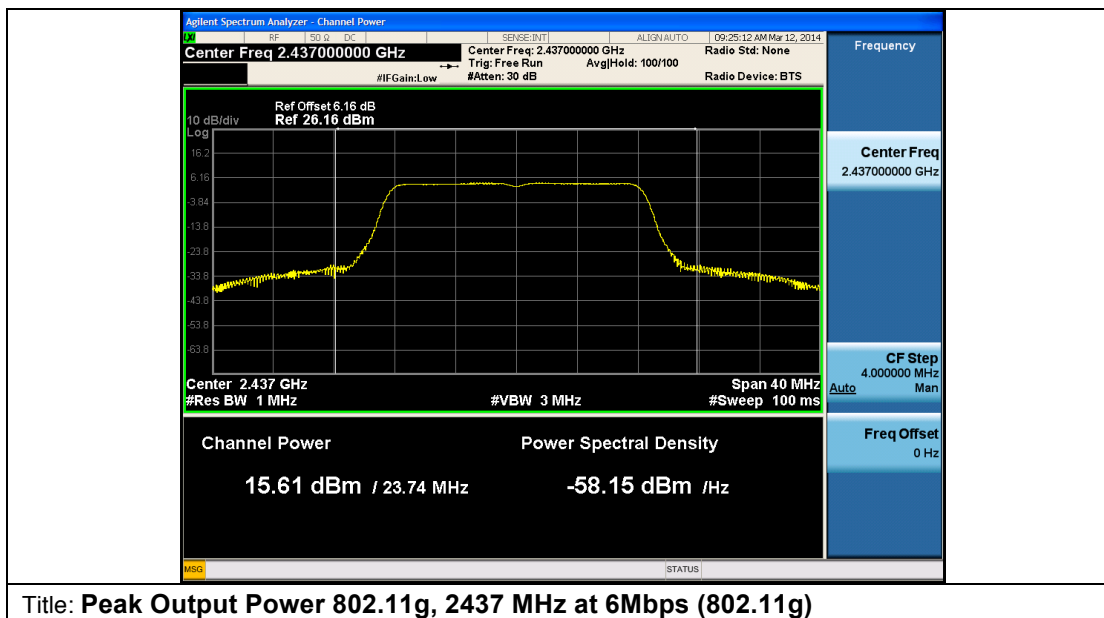


Title: Peak Output Power 802.11b, 2412 MHz at 11Mbps (802.11b)

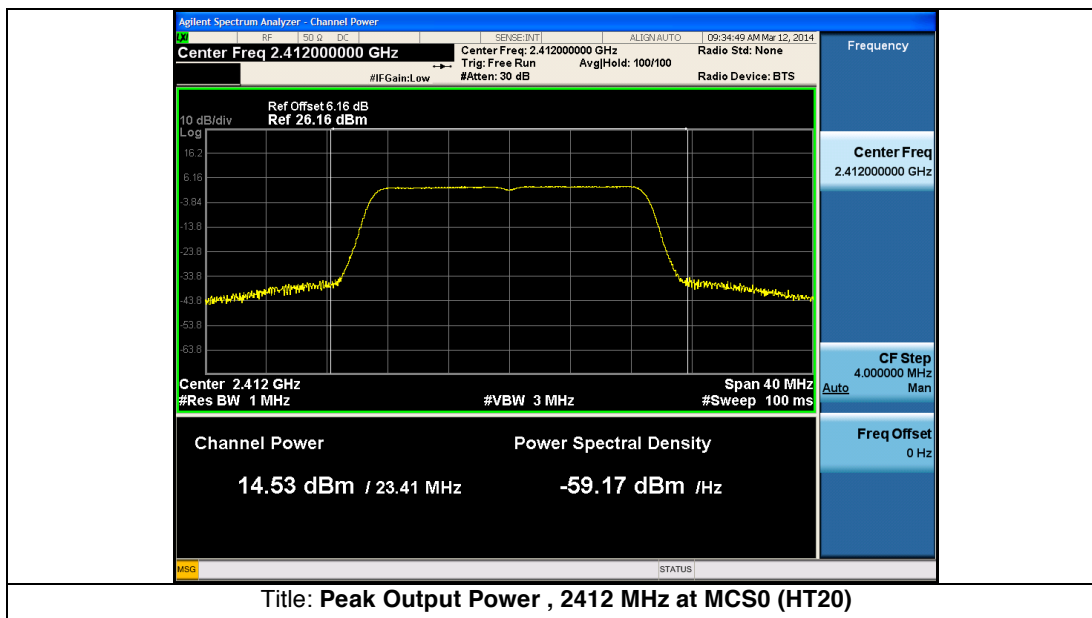
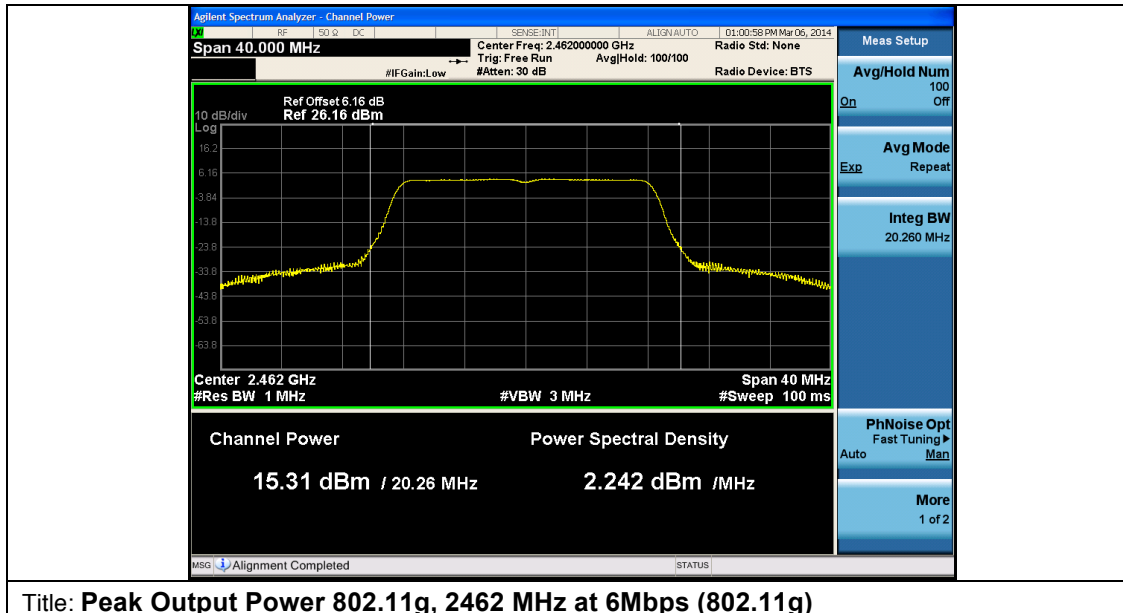


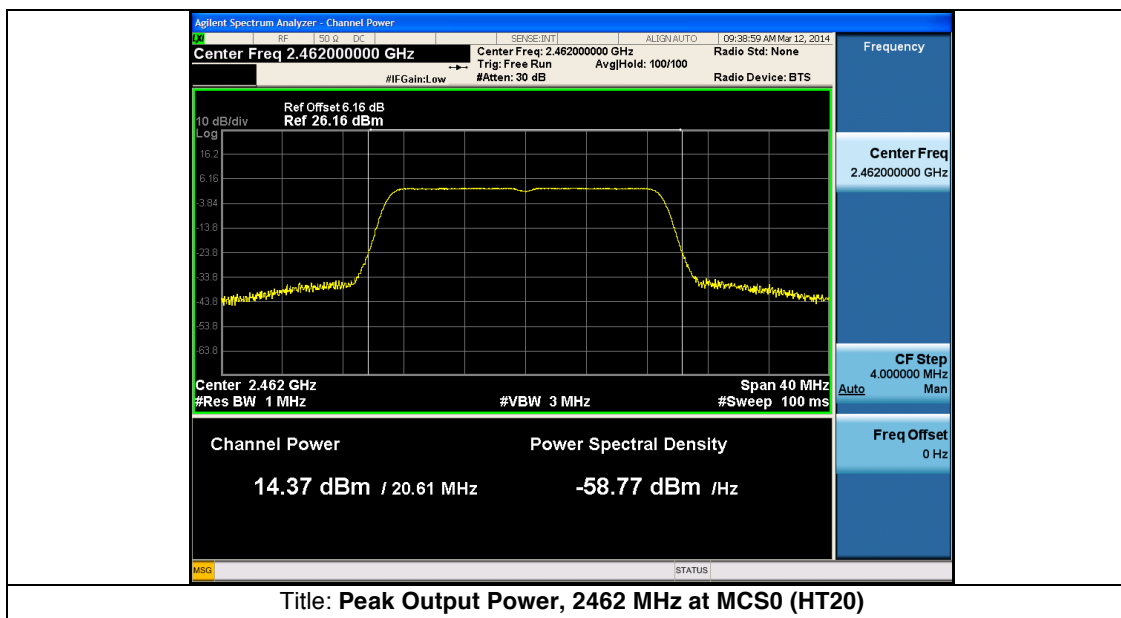
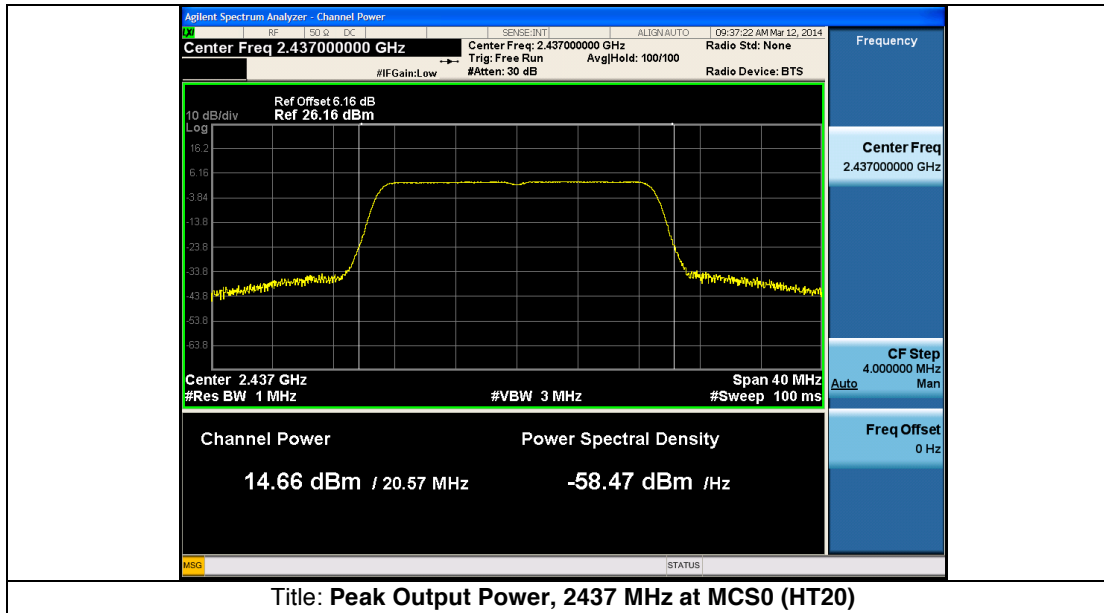


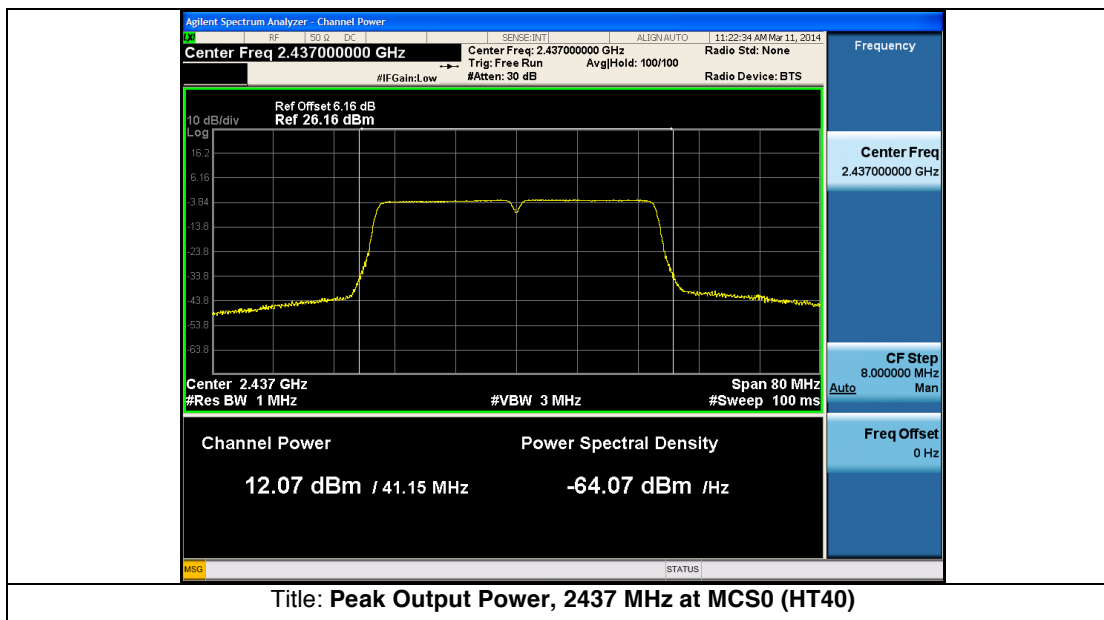
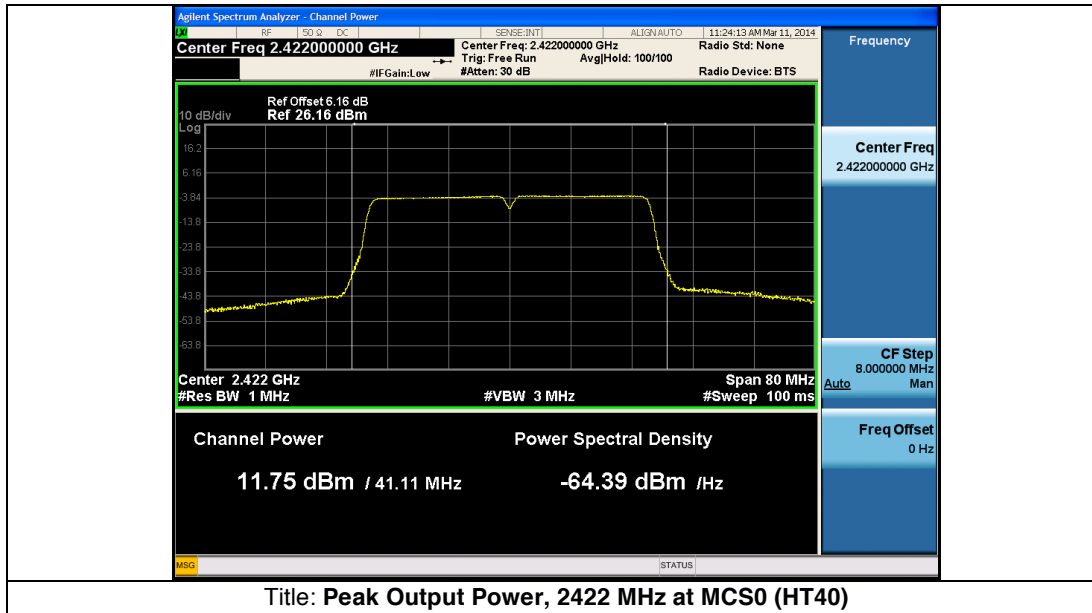
Title: Peak Output Power 802.11g, 2412 MHz at 6Mbps (802.11g)

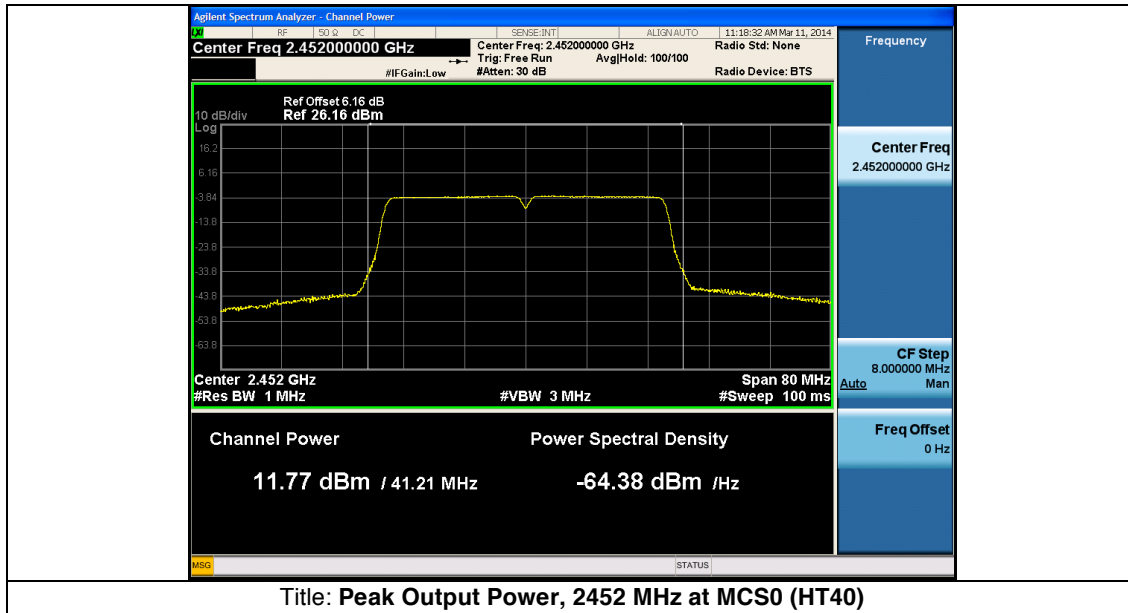


Title: Peak Output Power 802.11g, 2437 MHz at 6Mbps (802.11g)









Title: Peak Output Power, 2452 MHz at MCS0 (HT40)



Power Spectral Density

15.247 & RSS-210 A8.2:

For digitally modulated systems, the peak 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.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Center Frequency:	Frequency from table below
Span:	20 MHz & 40MHz
Ref Level Offset:	Correct for attenuator and cable loss.
Reference Level:	0 dBm
Attenuation:	30 dB
Sweep Time:	Auto
Resolution Bandwidth:	3 kHz
Video Bandwidth:	10 kHz
Detector:	Peak
Trace:	Single
Marker:	Peak Search

Record the Marker value.

FREQUENCY (MHz)	DATA RATE (Mbps)	PEAK POWER SPECTRAL DENSITY (dBm/3kHz)	LIMIT (dBm)	MARGIN (dB)
2412	1	-13.66	8	-21.66
2437	1	-13.45	8	-21.45
2462	1	-13.77	8	-21.77
2412	11	-8.16	8	-21.45
2437	11	-7.97	8	-21.19
2462	11	-8.19	8	-15.97
2412	6	-13.21	8	-21.77
2437	6	-13.19	8	-21.10
2462	6	-13.10	8	-16.19
2412	MCS0	-12.61	8	-20.61
2437	MCS0	-12.03	8	-20.03
2462	MCS0	-12.40	8	-20.40
2422	MCS0	-18.44	8	-26.44
2437	MCS0	-18.65	8	-26.65
2452	MCS0	-17.75	8	-25.75



Graphical Test Results

