Testing Tomorrow's Technology

Application

For

Part 2, Subpart J, Paragraph 2.907 Equipment Authorization of Certification for an Intentional Radiator per Part 15, Subpart C, paragraphs 15.207, 15.209 and 15.247

And

RSS-247 Issue 1 for Industry Canada

For the

Inventek Systems

Model: ISM4334X-M4G-L44

FCC ID: O7P-341
IC:10147A-341

UST Project: 15-0108A
Issue Date: November 9, 2015

Total Pages in This Report: 190

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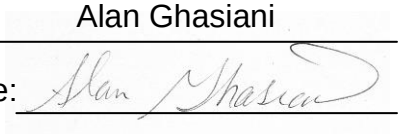
I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name: 

Title: Compliance Engineer – President

Date November 9, 2015

NVLAP LAB CODE 200162-0

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MEASUREMENT TECHNICAL REPORT

COMPANY NAME: Inventek Systems

MODEL: ISM4334X-M4G-L44

FCC ID: O7P-341

IC: 10147A-341

DATE: November 9, 2015

This report concerns (check one): Original grant [X]
Class II change [ ]

Equipment type: 2412 - 2462 MHz Transmitter Module

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until: _____N/A_____
date
agrees to notify the Commission by N/A
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

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1 General Information

1.1 Purpose of this Report

This report is prepared as a means of conveying test results and information concerning the suitability of this exact product for public distribution according to the FCC Rules and Regulations Part 15, Section 247 and IC RSS 247 Issue 1.

1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on June 18, 2015 in good operating condition.

1.3 Product Description

The Equipment Under Test (EUT) is the Inventek Systems Model ISM4334X-M4G-L44 Module. The ISM4334X-M4G-L44 Module is an embedded wireless internet connectivity module that operates in the 2.4 and 5.0 GHz spectrum. The Wi-Fi modules' hardware consists of an ARM Cortex M4 host processor, Broadcom BCM43341/0 Dual-Band 802.11 g/n MAC/Baseband/Radio with integrated Bluetooth 4.0 and NFC support.

The Model Numbers to be included in the approval are:

ISM43340-M4G-L44-C
ISM43340-M4G-L44-U
ISM43341-M4G-L44-C
ISM43341-M4G-L44-U
ISM43340-M4G-L44-10CFH
ISM43340-M4G-L44-10UFH
ISM43341-M4G-L44-10CFH
ISM43341-M4G-L44-10UFH
ISM341-USB

The different model numbers for are marketing purposes: The ISM4330 does not support NFC, the ISM43341 supports NFC. The C or U is for the antenna to be used, either the chip (C) or the external antenna path (U). The F is for an optional external Flash memory, and the H is for Apple HomeKit. The final part number, ISM341-USB, is for a specific customer and includes the NFC filter circuit.

The EUT has two antenna options, a dual band chip antenna or a U.FL connector for use with an approved external antenna.

The 5.0 GHz Wi-Fi, integrated Bluetooth, and NFC radio features have been tested and the results detailed in a separate report.

Antenna Gain: 1.4 dBi (Chip-AA077); 2.6 dBi (u.fl external antenna-W2.4-5P-U)
Modulation: 20 MHz bandwidth modulation at up to 144 Mbps
Maximum Output Power: 18.0 dBm (as reported herein)

1.4 Configuration of Tested System

The Test Sample was tested per *ANSI C63.4:2009/2014, Methods of Measurement of Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2009/2014)*, *ANSI C63.10:2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices* and per FCC KDB Publication number 558074 for Digital Transmission Systems Operating Under section 15.247. Also, FCC, KDB Publication No. 558074 was used as a test procedure guide.

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs are provided in separate Appendices.

1.5 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC. Its designation number is 186022. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 9900A-1.

1.6 Related Submittals

1.6.1 The EUT is subject to the following FCC Authorizations:

a) Certification under section 15.247 as a transmitter.
b) Verification under 15.101 as a digital device and receiver.
c) Certification under section 15.249 as a transmitter.
d) Certification under section 15.407 as a transmitter.
e) Certification under section 15.225 as a transmitter.

1.6.2 Verification of the Digital Apparatus

The Verification requirement shares many common report elements with the Certification report. Therefore, though this report is mostly intended to provide data for the Certification process, the Verification authorization report (part 15.107 and 15.109) for the EUT is included herein.

Table 1. EUT and Peripherals

PERIPHERAL MANUFACTURER.	MODEL NUMBER	SERIAL NUMBER	FCC/IC ID:	CABLES P/D
Inventek Systems	ISM4334X-M4G-L44 Module	Engineering Sample	O7P-341 10147A-341	N/A
Antenna See antenna details	--	--	--	--

U= Unshielded
S= Shielded
P= Power
D= Data

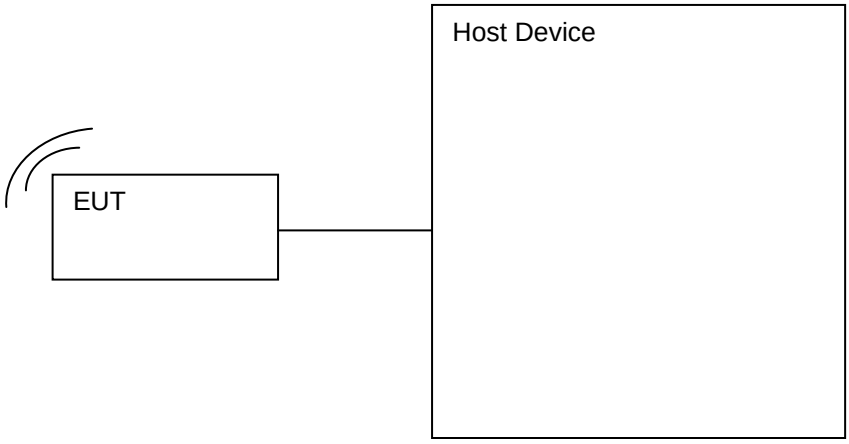


Figure 1. Block Diagram of Test Configuration

2 Tests and Measurements

2.1 Test Equipment

The table below lists test equipment used to evaluate this product. Model numbers, serial numbers, and calibration status are indicated.

Table 2. Test Instruments

TEST INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8566B	HEWLETT-PACKARD	2747A05665	5/7/2015
SPECTRUM ANALYZER	E4407B	AGILENT	US41442935	1/28/2015
LOOP ANTENNA	SAS-200/562	A.H. Systems	142	9/28/2015 2 yr.
BICONICAL ANTENNA	3110B	EMCO	9306-1708	11/24/2014 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9110-3236	11/19/2014 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9305-3600	7/1/2014 2 yr.
HORN ANTENNA	SAS-571	A.H. Systems	605	8/25/15 2 yr.
HORN ANTENNA	3115	EMCO	9107-3723	7/8/2014 2 yr.
HORN ANTENNA	3116	EMCO	9505-2255	1/27/2015 2 yr.
AMPLIFIER	11975A	HEWLETT-PACKARD	2517A00647	12/05/2014
HARMONIC MIXER	11970K	HEWLETT-PACKARD	2332A01241	Not Required
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00480	12/5/2014
PRE-AMPLIFIER	8477E	HEWLETT-PACKARD	1145A00307	11/21/2014
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	12/4/2014
LISN x 2	9247-50-TS-50-N	SOLAR ELECTRONICS	955824 and 955825	12/30/2014

Note: The calibration interval of the above test instruments are 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.2 Modifications to EUT Hardware

No physical modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 15, Subpart C Intentional Radiator Limits for the transmitter portion of the EUT or the Subpart B Unintentional Radiator Limits (Receiver and Digital Device) Requirements.

2.3 Number of Measurements for Intentional Radiators (15.31(m))

Measurements of intentional radiators or receivers shall be performed and reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in Table 3 below.

Table 3. Number of Test Frequencies for Intentional Radiators

Frequency Range over which the device operates	Number of Frequencies	Location in the Range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near the top 1 near the bottom
Greater than 10 MHz	3	1 near top 1 near middle 1 near bottom

Because the EUT operates at 2412 MHz to 2462 MHz, 3 test frequencies were used.

2.4 Frequency Range of Radiated Measurements (Part 15.33)

2.4.1 Intentional Radiator

The spectrum shall be investigated for the intentional radiator from the lowest RF signal generated in the EUT, without going below 9 kHz to the 10^{th} harmonic of the highest fundamental frequency generated or 40 GHz, whichever is the lowest.

2.4.2 Unintentional Radiator

For the digital device, an unintentional radiator, the frequency range shall be 30 MHz to 1000 MHz, or to 5 times the highest internal clock frequency.

2.5 Measurement Detector Function and Bandwidth (CFR 15.35)

The radiated and conducted emissions limits shown herein are based on the following:

2.5.1 Detector Function and Associated Bandwidth

On frequencies below 1000 MHz, the limits herein are based upon measurement equipment employing a CISPR Quasi-peak detector function and related measurement bandwidths (i.e. 9 kHz from 150 kHz to 30 MHz and 120 kHz from 30 MHz to 1000 MHz). Alternatively, measurements may be made with equipment employing a peak detector function as long as the same bandwidths specified for the Quasi-peak device are used.

2.5.2 Corresponding Peak and Average Requirements

Above 1000 MHz, radiated limits are based on measuring instrumentation employing an average detector function. When average radiated emissions are specified there is also a corresponding Peak requirement, as measured using a peak detector, of 20 dB greater than the average limit. For all measurements above 1000 MHz the Resolution Bandwidth shall be at least 1 MHz.

2.5.3 Pulsed Transmitter Averaging

When the radiated emissions limit is expressed as an average value, and the transmitter is pulsed, the measured field strength shall be determined by applying a Duty Cycle Correction Factor based upon dividing the total ON time during the first 100 ms period by 100 ms (or by the period if less than 100 ms). The duty cycle may be expressed logarithmically in dB.

NOTE: If the transmitter was programmed to transmit at >98% duty cycle, then, wherever applicable (where the detection mode was AVG) the duty cycle factor calculated will be applied.

2.6 EUT Antenna Requirements (CFR 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. Only the antenna(s) listed in Table 4 will be used with this module.

Table 4. Allowed Antenna(s)

REPORT REFERENCE	MANUFACTURER	TYPE OF ANTENNA	MODEL	GAIN dB_i	TYPE OF CONNECTOR
Chip	Unictron Technologies Corp.	Chip	AA077	1.4	Soldered
U.FL	Inventek Systems	U.FL	W2.4-5P-U	2.6	U.FL

2.7 Restricted Bands of Operation (Part 15.205)

Only spurious emissions can fall in the frequency bands of CFR 15.205. The field strength of these spurious emissions cannot exceed the limits of 15.209. Radiated harmonics and other spurious emissions are examined for this requirement; see paragraph 2.10.

2.8 Transmitter Duty Cycle (CFR 35 (c))

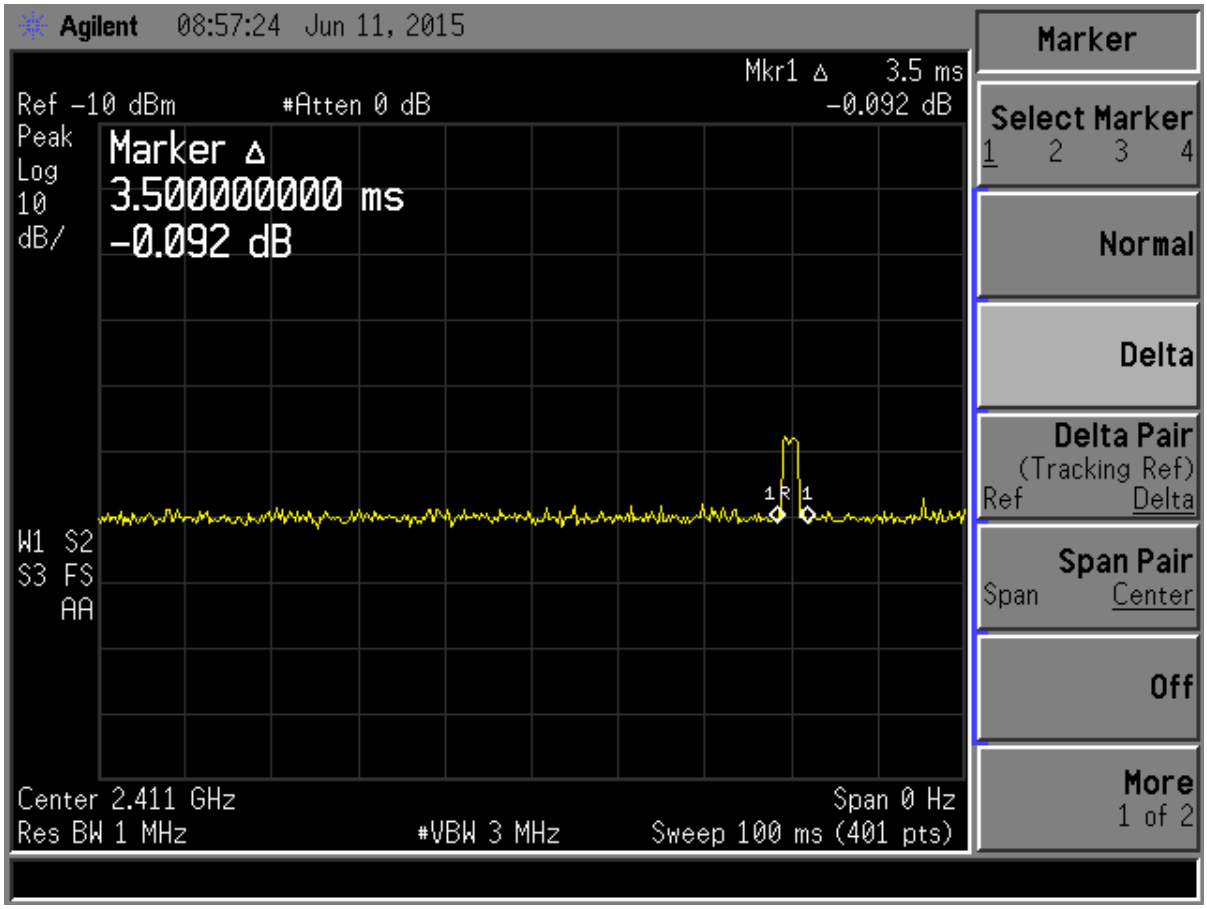


Figure 2. Duty Cycle 100ms Sweep

Total Time On from Figure 2 = 3.5 ms (Transmitter Pulse Width)
Total Pulse Train from Figure 3 = 101.25 ms (Pulse Train)

(3.5 ms Total Time On)/(100 ms Total Pulse Train) = .035 Numeric Duty Cycle
Duty Cycle = 20 Log (A/B) = -29.12 dB

Since the Duty Cycle less is than -20 dB, the Duty Cycle utilized in this test report is -20 dB.

NOTE: The transmitter was programmed to transmit at >98% duty cycle, therefore wherever applicable (where the detection mode was AVG) the duty cycle factor calculated above will be applied.

2.9 Intentional Radiator, Power Line Conducted Emissions (CFR 15.207)

The EUT is powered by 3.3 VDC through a host device, since the host device was connected to the AC mains, power line conducted emissions testing was performed. Power line conducted emissions testing was performed to ensure that with the EUT in operation (exercising all transmitter functions), the complete system continues to meet the applicable requirements for CFR 15.207. These measurements were completed and are displayed along with the 15.107 power line test data in the sections below.

Table 5. Transmitter Power Line Conducted Emissions Test Data, Part 15.207

150 KHz to 30 MHz with Class B Limits						
Test: Power Line Conducted Emissions				**Client:** Inventek Systems		
Project: 15-0108				**Model:** ISM4334X-M4G-L44		
Frequency (MHz)	**Test Data (dBuv)**	**LISN+CL-PA (dB)**	**Results (dBuV)**	**AVG Limits (dBuV)**	**Margin (dB)**	**Detector PK, QP, or AVG**
120 VAC, 60 Hz Phase						
0.21	50.70	0.88	51.58	63.1*	11.5	**QP**
0.21	46.80	0.88	47.68	53.1	5.4	**AVG**
0.53	39.80	0.42	40.22	46.0	5.8	**AVG**
1.94	39.00	0.36	39.36	46.0	6.6	**AVG**
6.03	42.70	0.47	43.17	50.0	6.8	**AVG**
19.35	42.30	0.61	42.91	50.0	7.1	**AVG**
20.26	42.00	0.62	42.62	50.0	7.4	**AVG**
120VAC, 60 Hz Neutral						
0.1511	61.30	1.41	62.71	65.9*	3.2	**QP**
0.1511	44.30	1.41	45.71	55.9	10.2	**AVG**
0.5992	40.40	0.39	40.79	46.0	5.2	**AVG**
1.1920	39.00	0.35	39.35	46.0	6.6	**AVG**
5.2000	41.10	0.44	41.54	50.0	8.5	**AVG**
12.7600	40.80	0.64	41.44	50.0	8.6	**AVG**
22.4800	40.90	0.65	41.55	50.0	8.4	**AVG**

Note: * denotes QP Limits

SAMPLE CALCULATION at 0.21 MHz:

Magnitude of Measured Frequency	50.70	dBuV
+ Cable Loss+ LISN Loss	0.88	dB
=Corrected Result	51.58	dBuV
Limit	63.10	dBuV
-Corrected Result	51.58	dBuV
Margin	11.5	dB

Test Date: August 3, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

2.10 Intentional Radiator, Radiated Emissions (CFR 15.209, 15.247(d)) (IC RSS 247, 5.4)

Radiated Spurious measurements: the EUT was placed into a continuous transmit mode of operation (>98% duty cycle) and tested per FCC KDB Publication 558074 v03r03 and ANSI C63.10:2013. A preliminary scan was performed on the EUT to find signal frequencies that were caused by the transmitter part of the device. To obtain worst case results, the EUT was tested in X, Y, and Z axes or in the orientation of normal operation if the device is designed to operate in a fixed position.

Radiated measurements were then conducted between the frequency range of 9 KHz (or lowest frequency used/generated by the device) up to the tenth harmonic of the device (no greater than 40 GHz). In the band below 30 MHz, a resolution bandwidth (RBW) of 9 kHz was used; emissions below 1 GHz were tested with a RBW of 120 KHz and emissions above 1 GHz were tested with a RBW of 1 MHz. All video bandwidth settings were at least three times the RBW value.

The EUT was investigated to CFR 15.209, General requirements for unwanted spurious emissions. The conducted spurious method as described below was use to investigate all other emissions emanating from the antenna port.

Conducted Spurious measurements: the EUT was put into a continuous-transmit mode of operation (>98% duty cycle) and tested per FCC KDB Publication 558074 D01 v03r03 for conducted out of band emissions emanating from the antenna port over the frequency range of 30 MHz to 25 GHz. A conducted scan was performed on the EUT to identify and record spurious signals that were related to the transmitter.

The results are displayed in the plots below. Radiated emissions per CFR 15.209 were performed with to address the concerns of unwanted emissions that may radiate from the EUT cabinet, control circuits, or power leads. The results for this test can be found in section 2.18 below.

Note 1: The results below are compared to Peak limits.
Note 2: For emissions levels below 1000 MHz, the restricted band limits were applied to show worst case

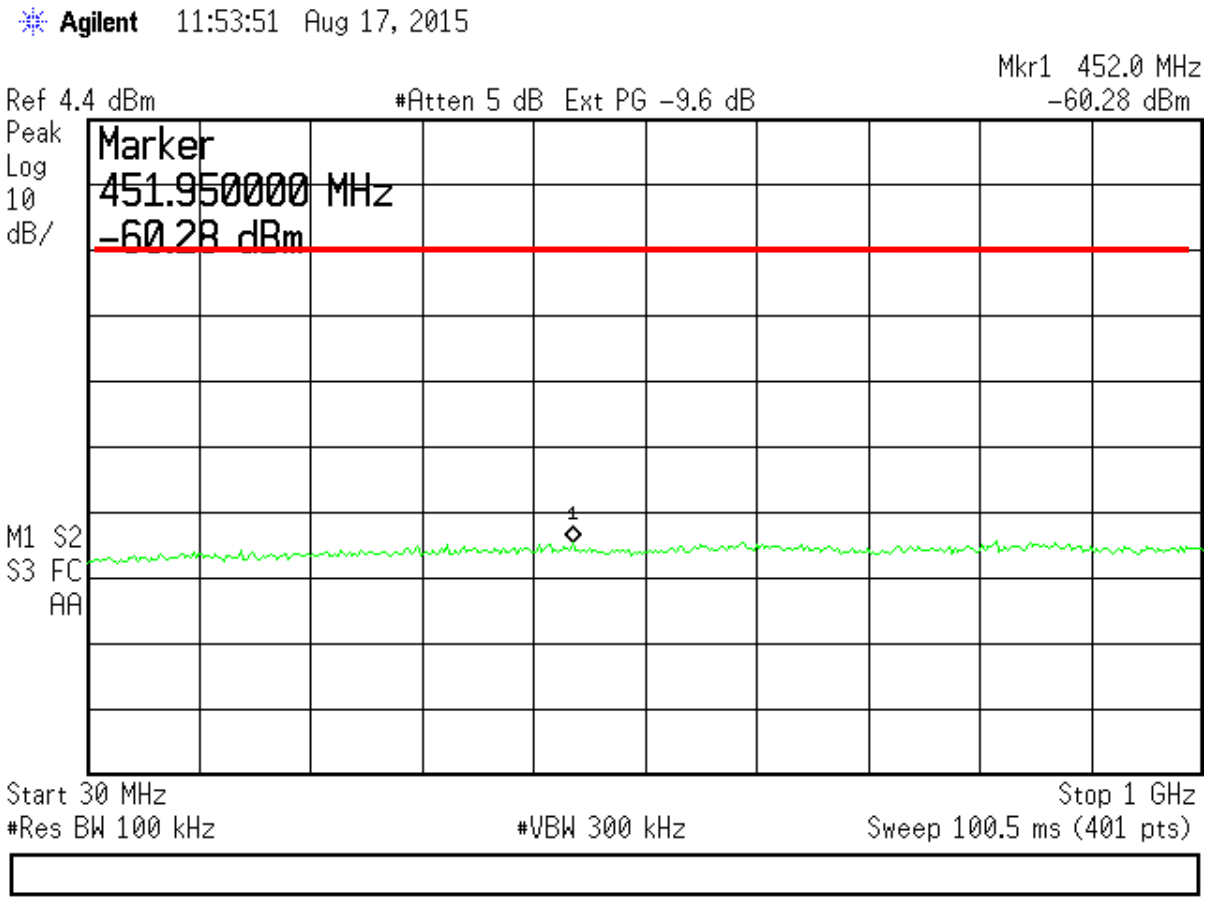


Figure 3. Antenna Conducted Emissions 802.11n Low, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

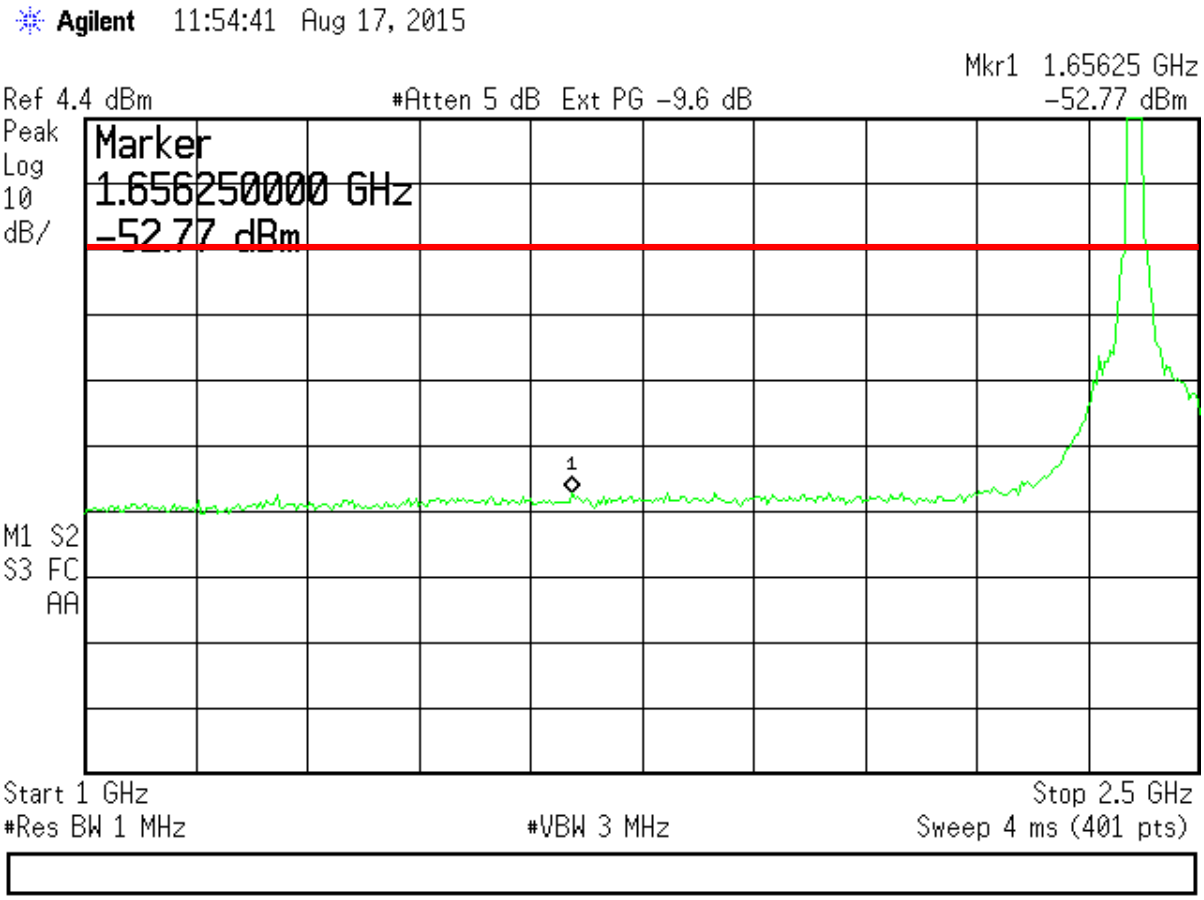


Figure 4. Antenna Conducted Emissions 802.11n Low, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

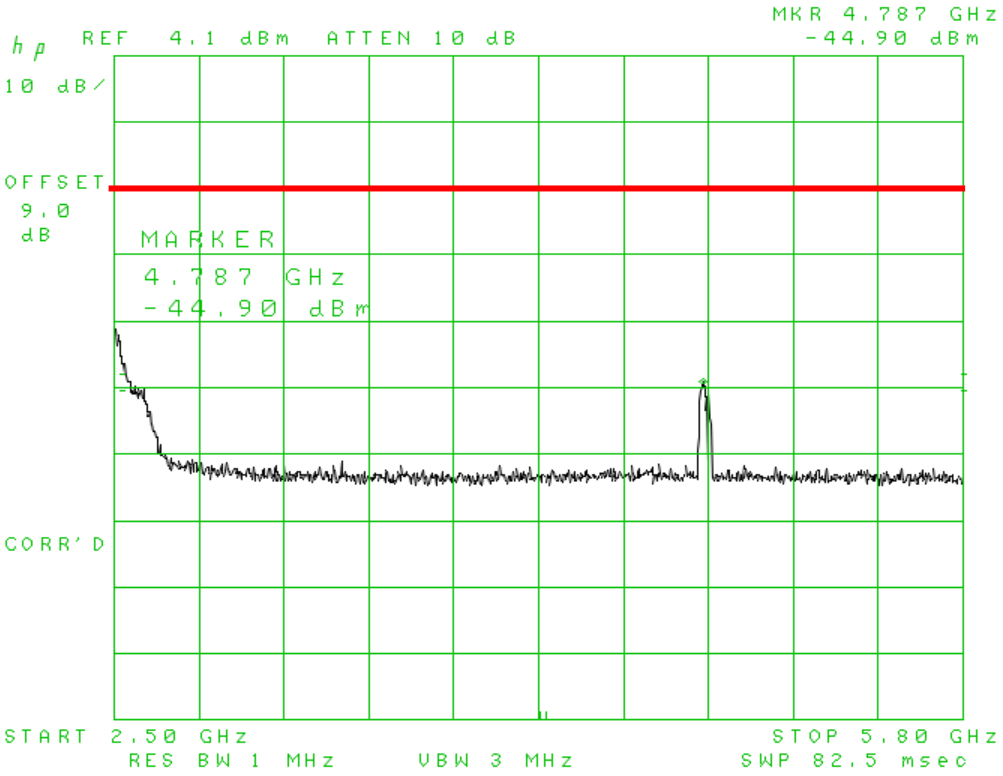


Figure 5. Antenna Conducted Emissions 802.11n Low, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

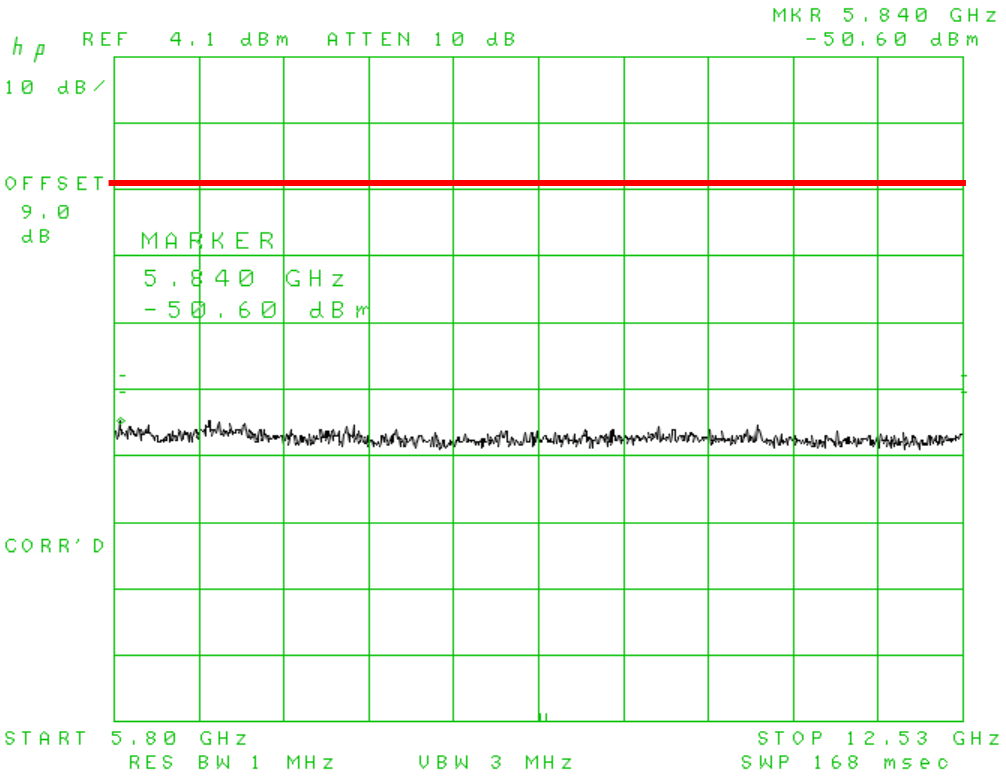


Figure 6. Antenna Conducted Emissions 802.11n Low, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

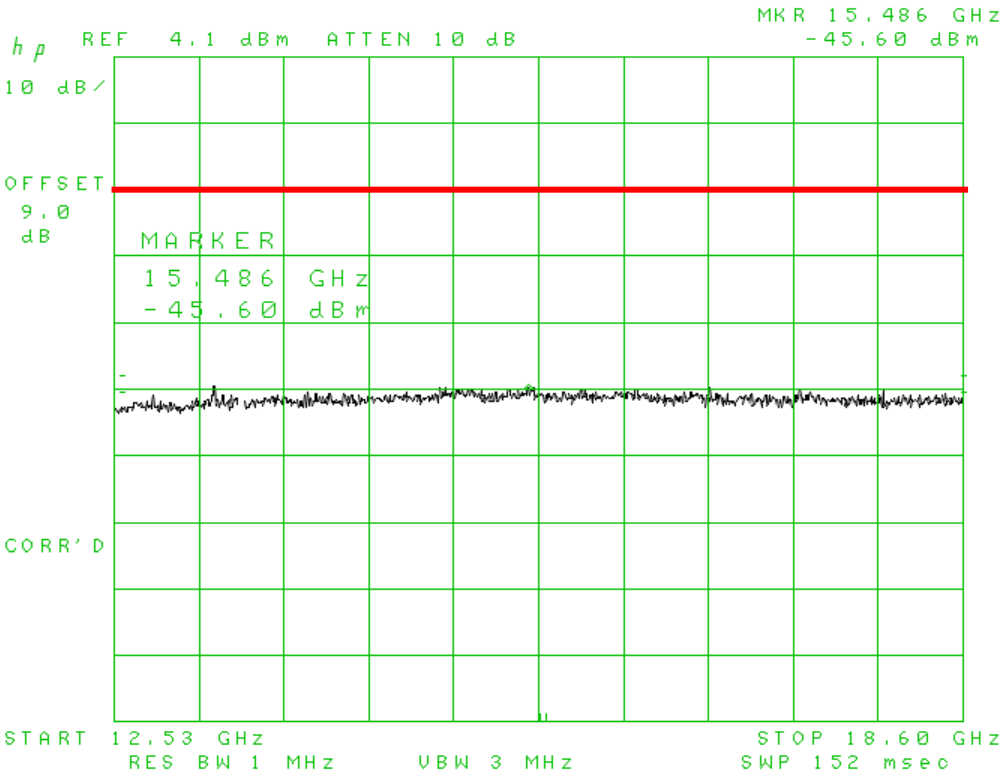


Figure 7. Antenna Conducted Emissions 802.11n Low, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

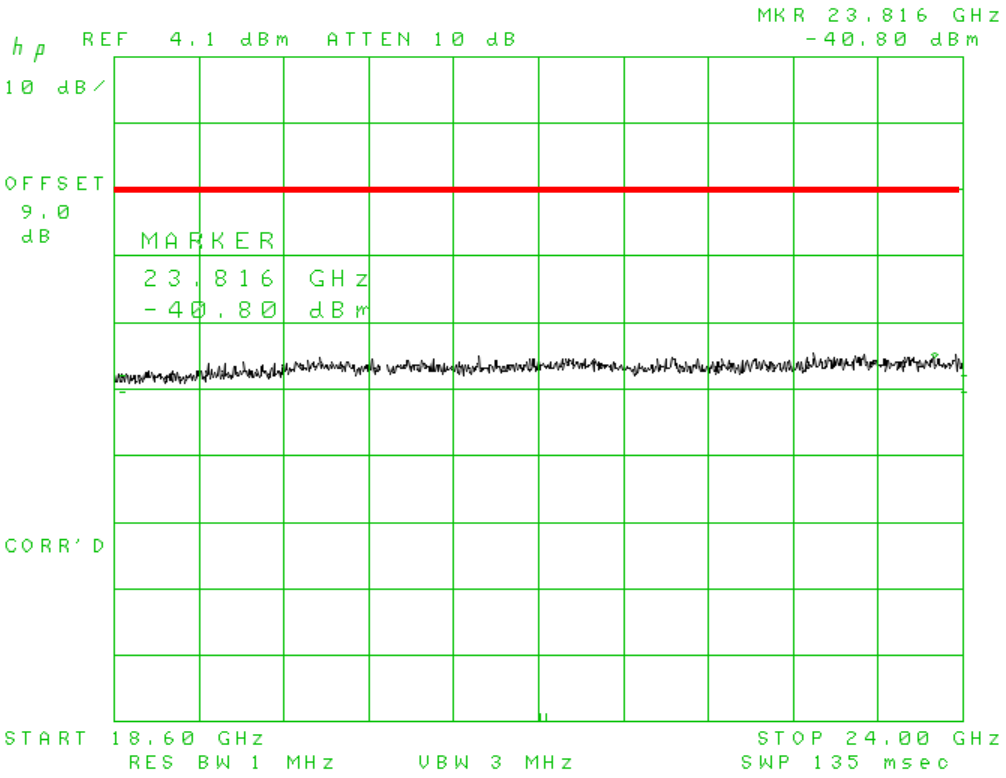


Figure 8. Antenna Conducted Emissions 802.11n Low, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

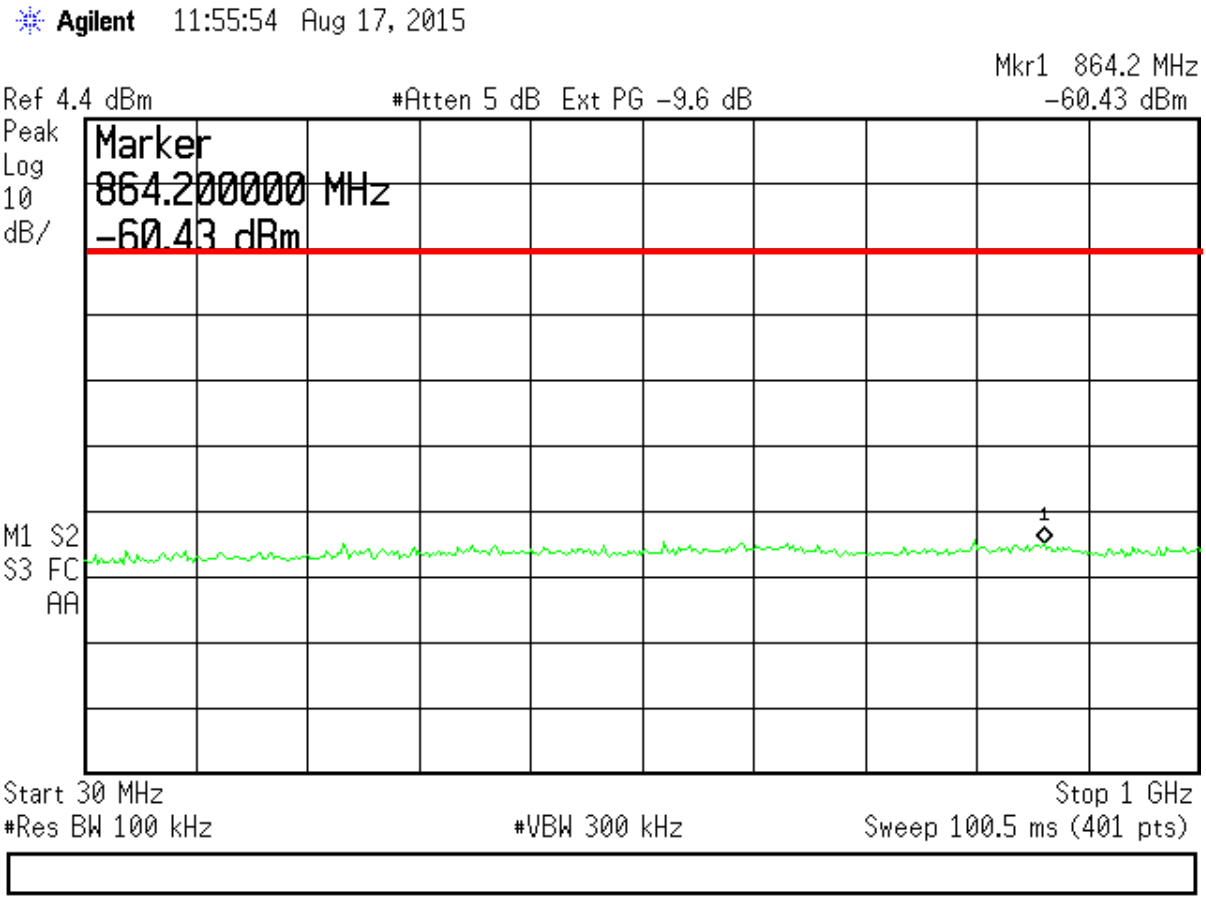


Figure 9. Antenna Conducted Emissions 802.11n Mid, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

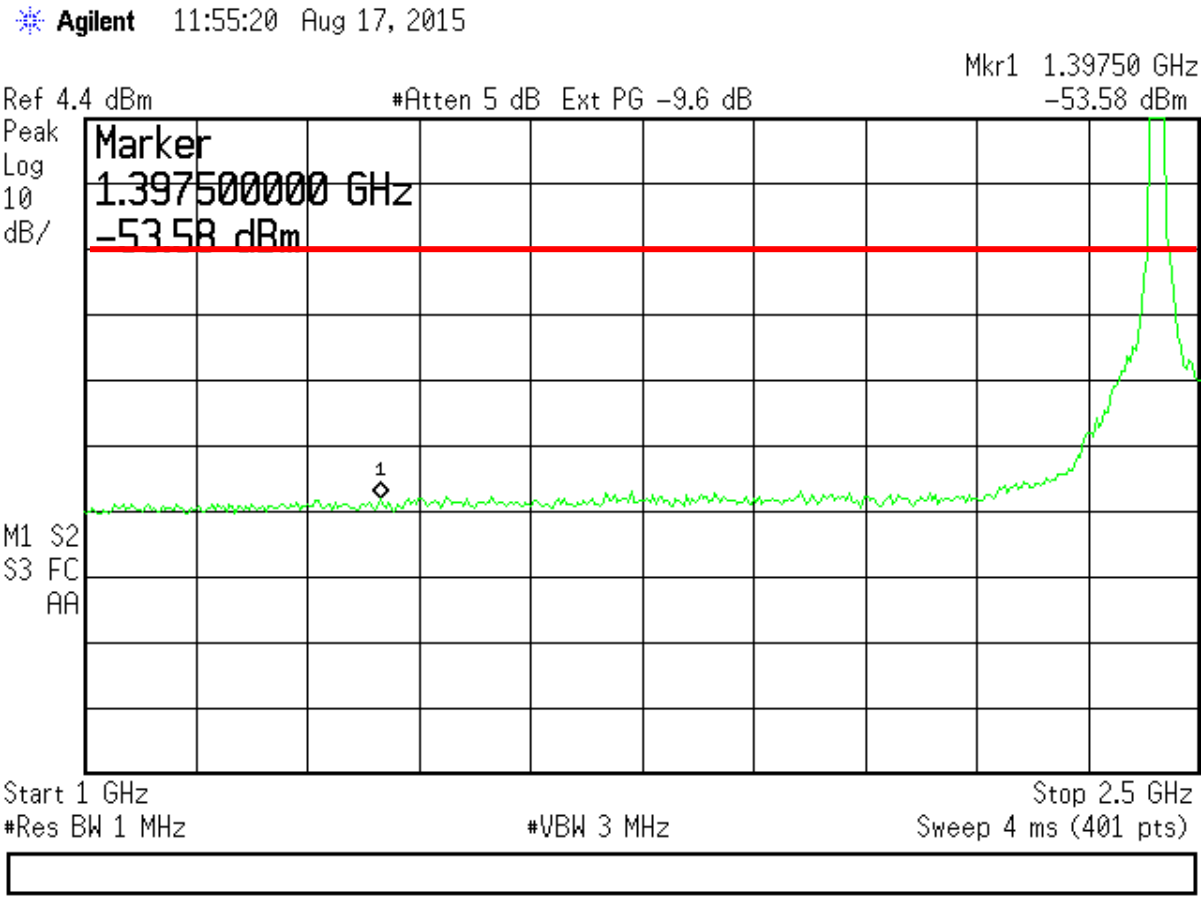


Figure 10. Antenna Conducted Emissions 802.11n Mid, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

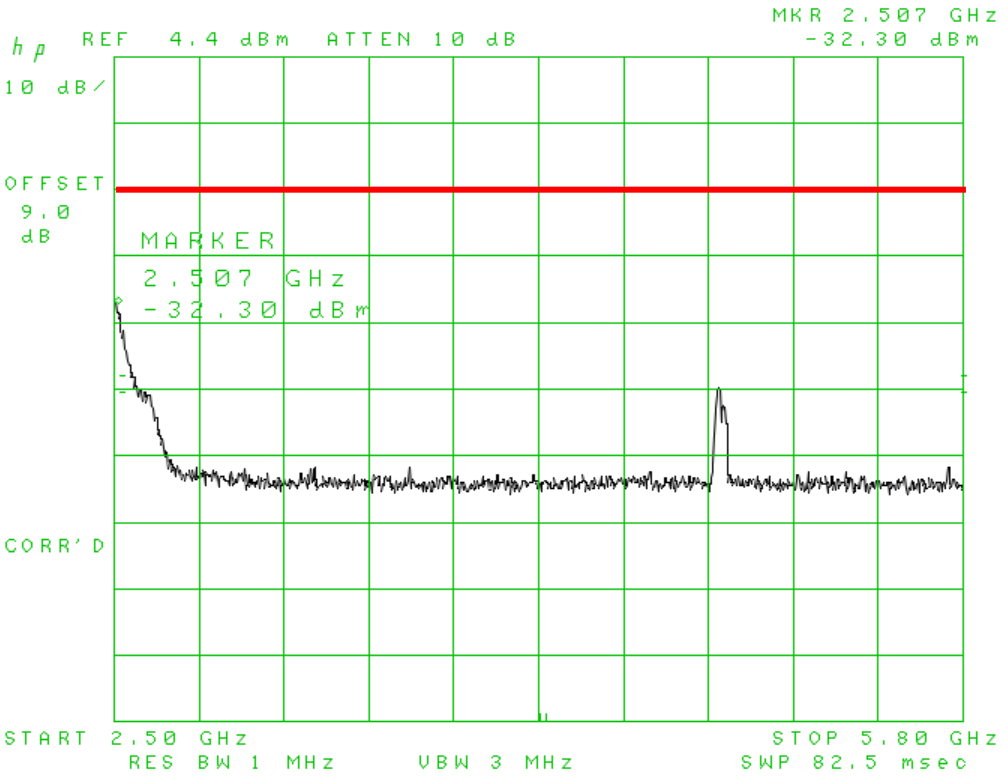


Figure 11. Antenna Conducted Emissions 802.11n Mid, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

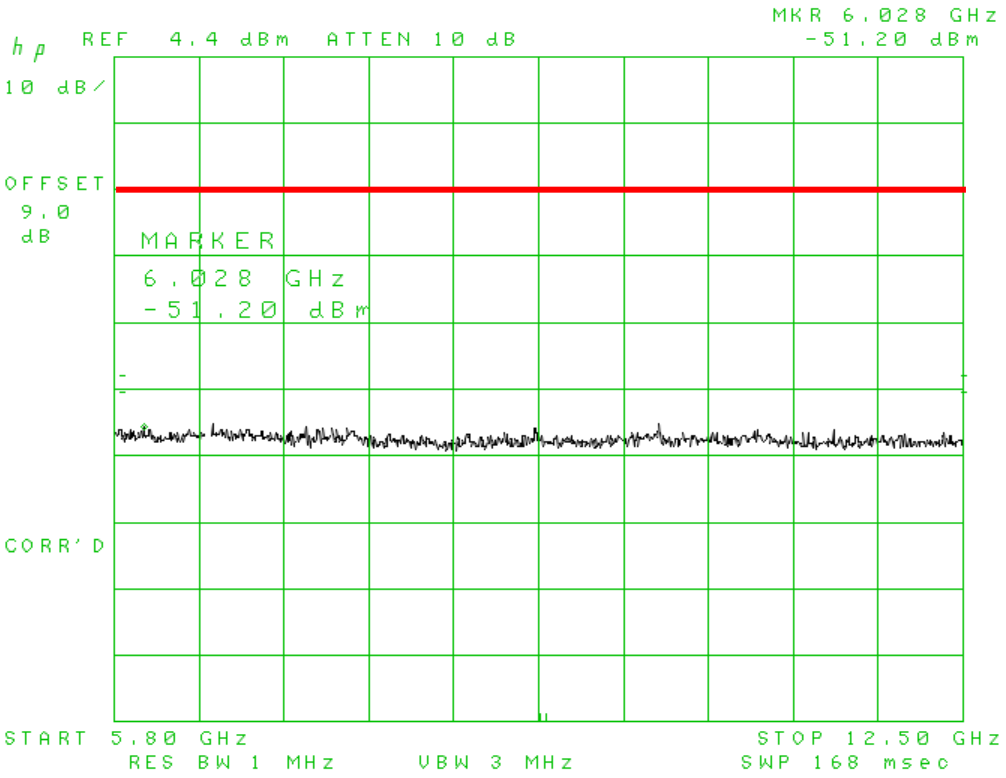


Figure 12. Antenna Conducted Emissions 802.11n Mid, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

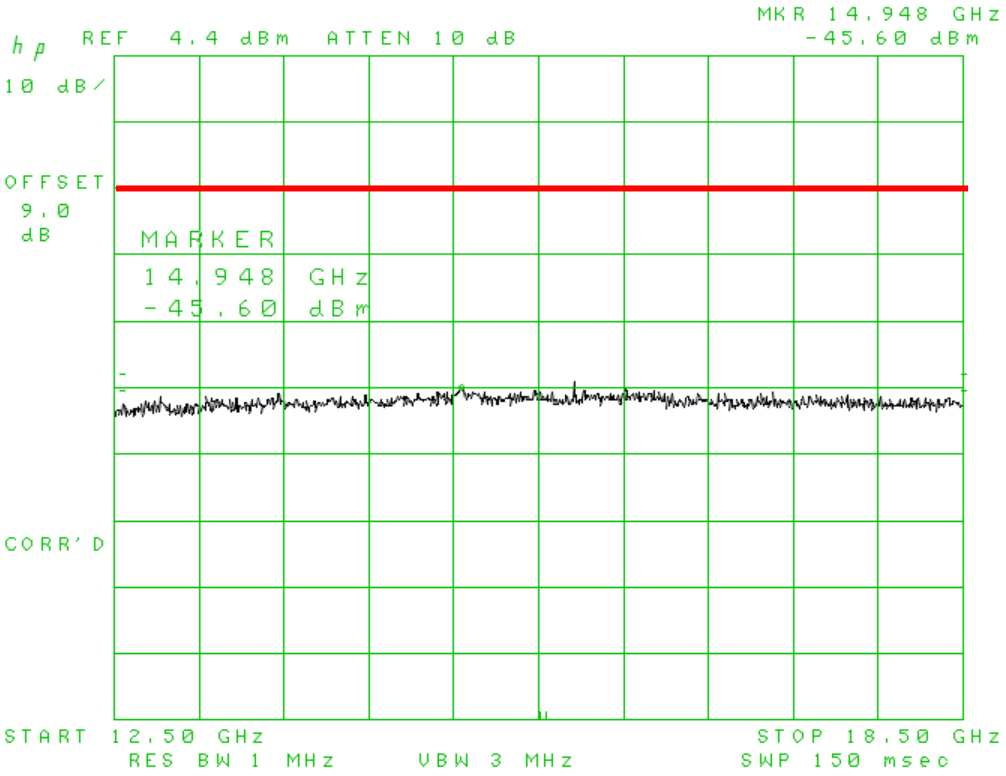


Figure 13. Antenna Conducted Emissions 802.11n Mid, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

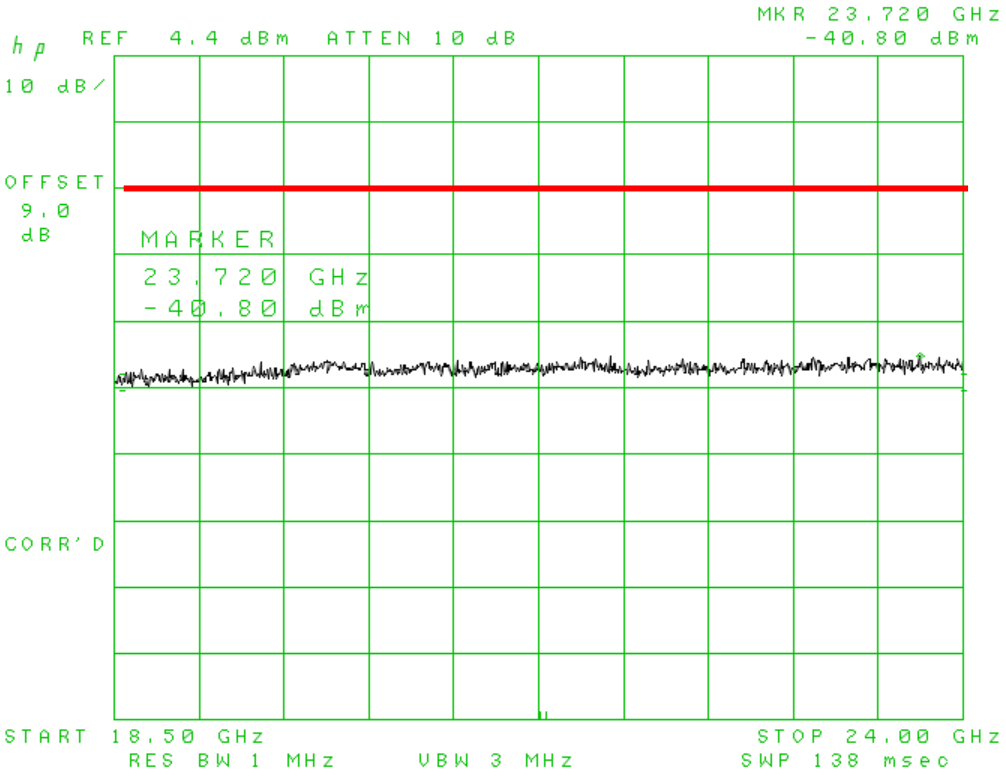


Figure 14. Antenna Conducted Emissions 802.11n Mid, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

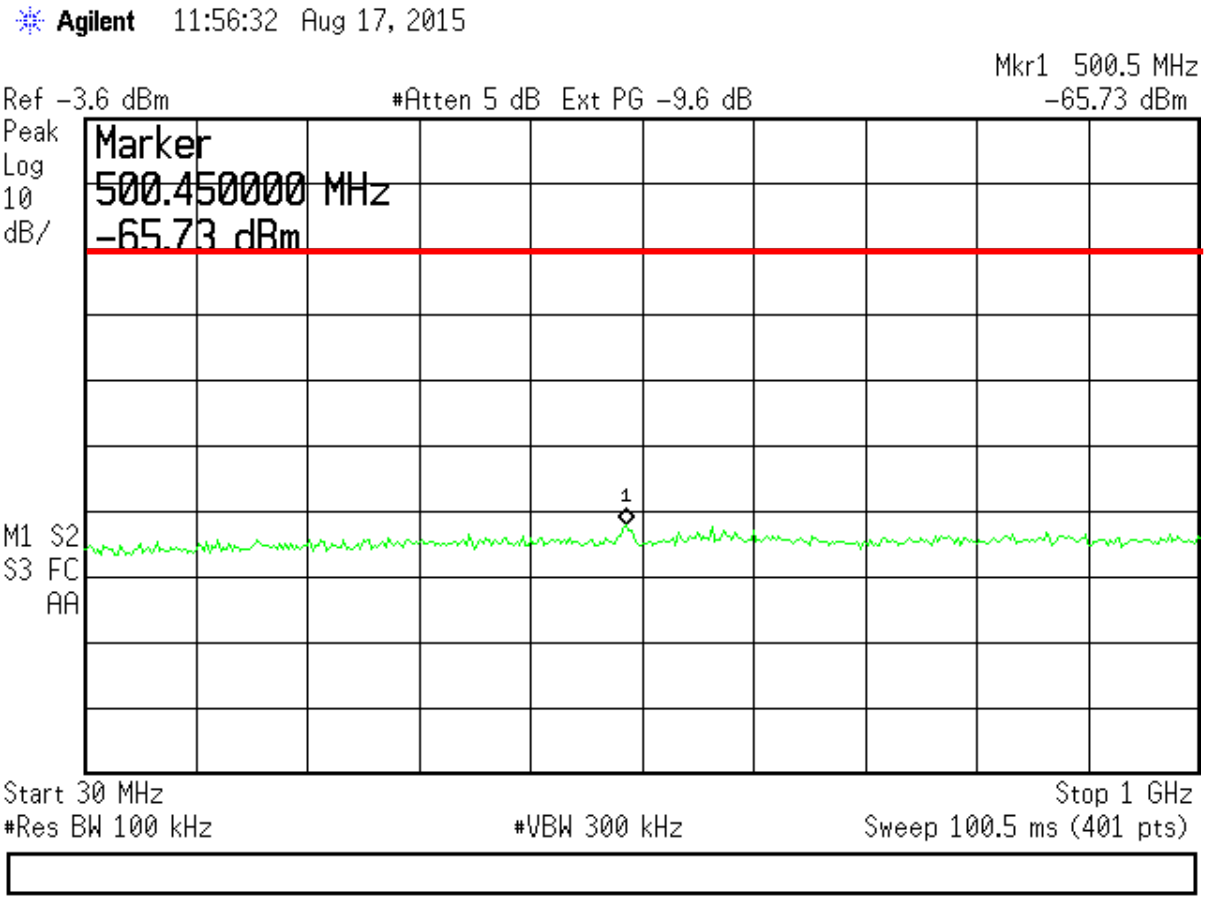


Figure 15. Antenna Conducted Emissions 802.11n High, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

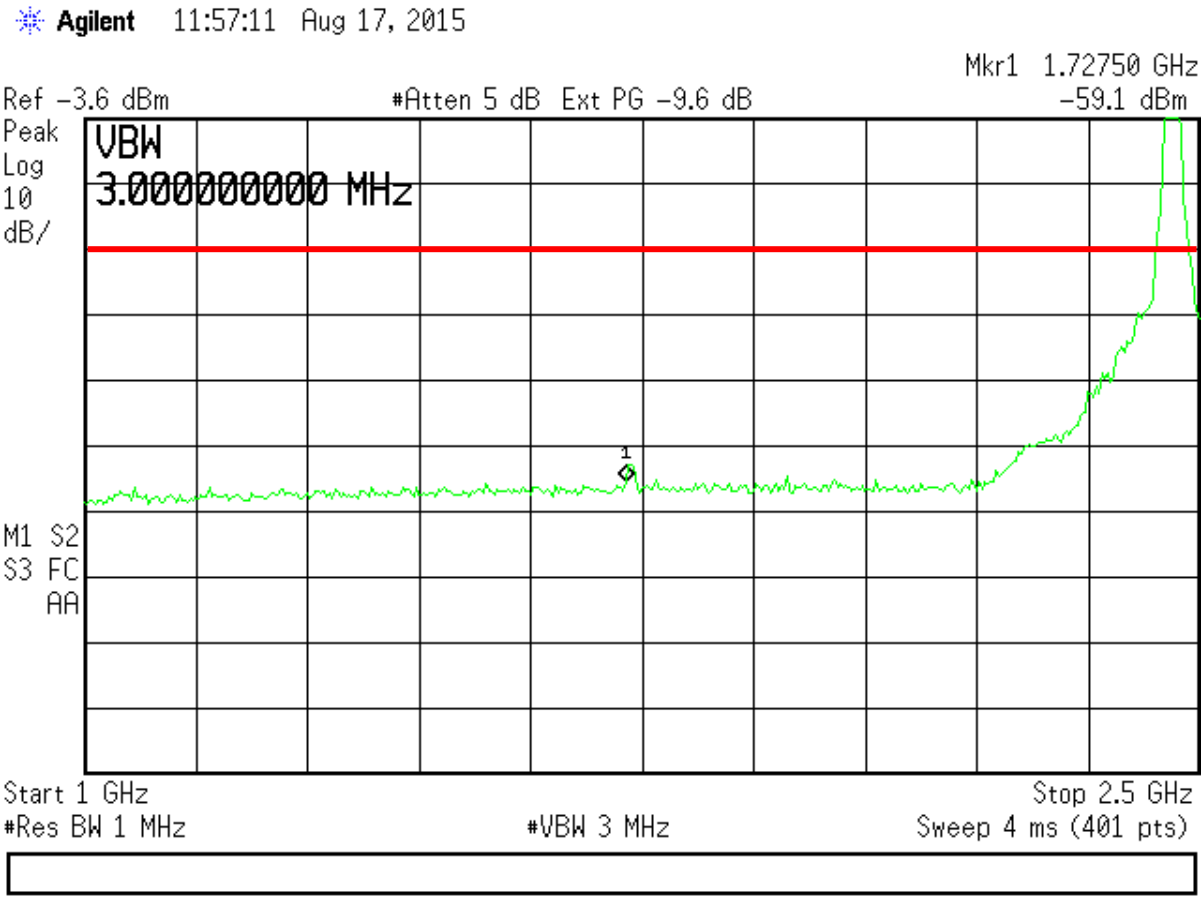


Figure 16. Antenna Conducted Emissions 802.11n High, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

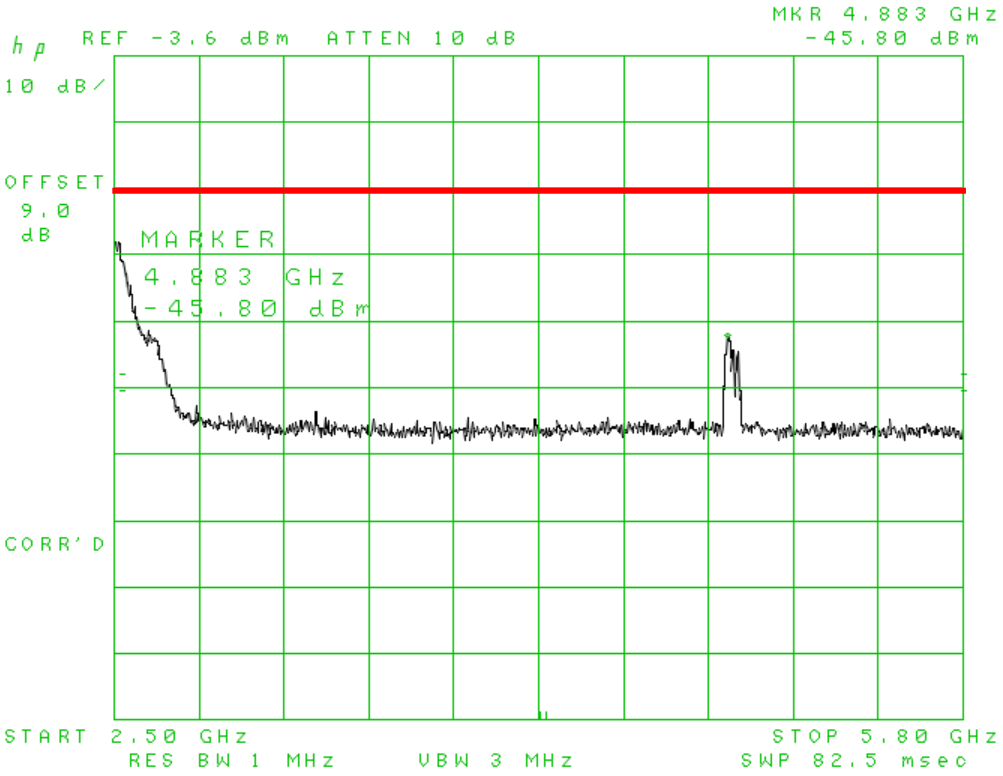


Figure 17. Antenna Conducted Emissions 802.11n High, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

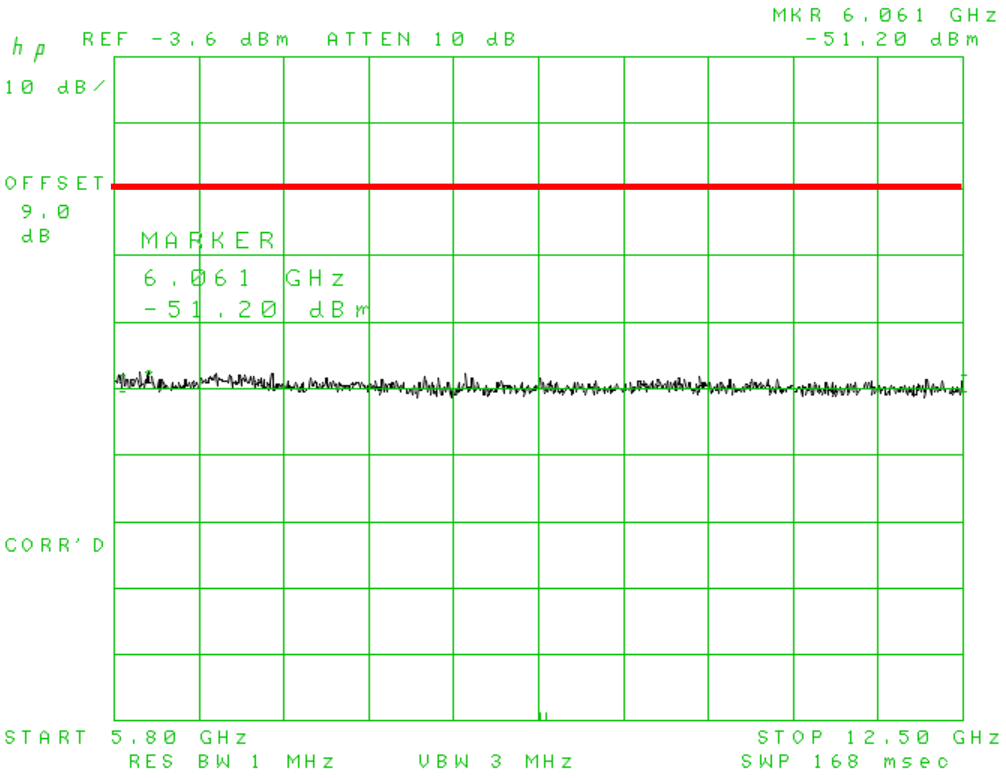


Figure 18. Antenna Conducted Emissions 802.11n High, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

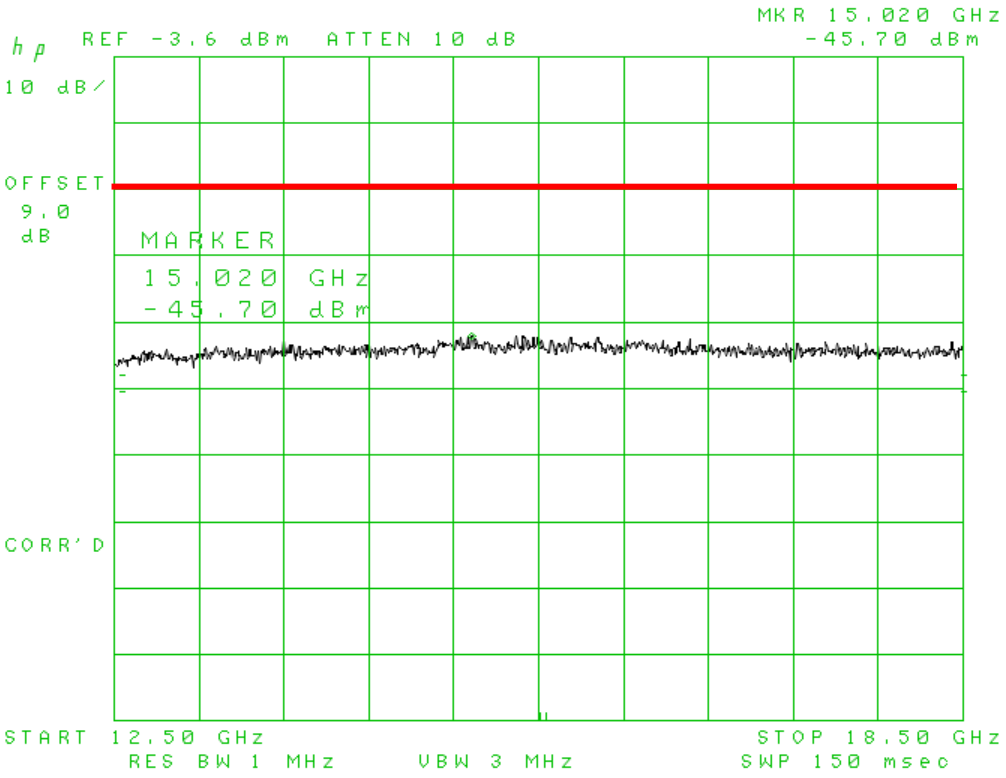


Figure 19. Antenna Conducted Emissions 802.11n High, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

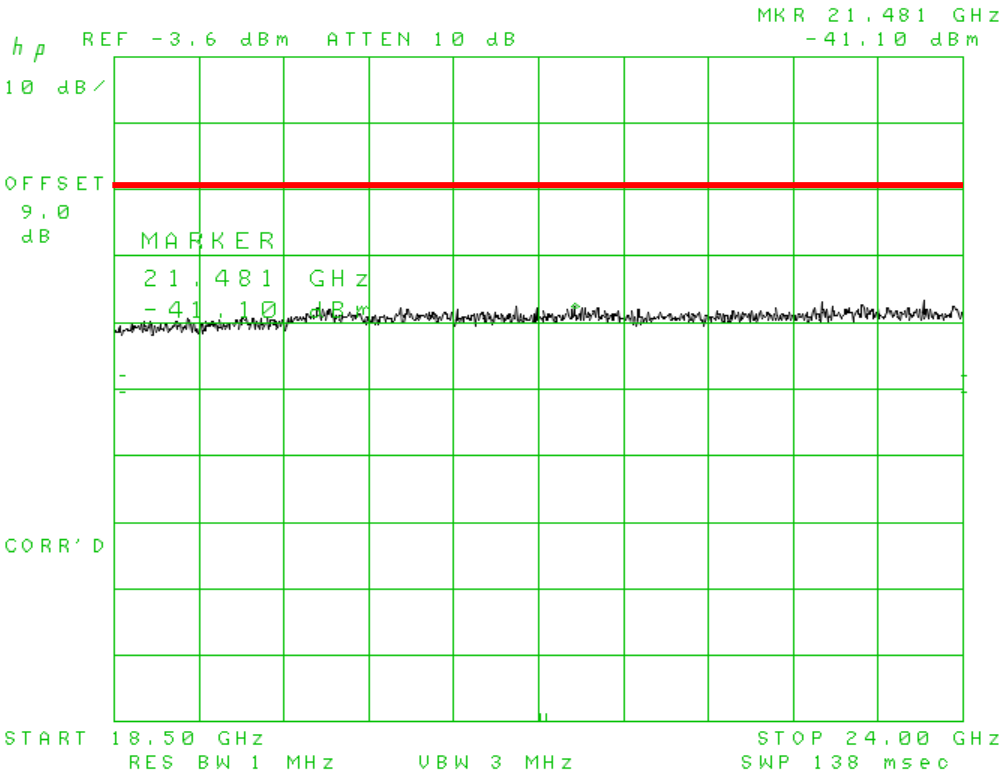


Figure 20. Antenna Conducted Emissions 802.11n High, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

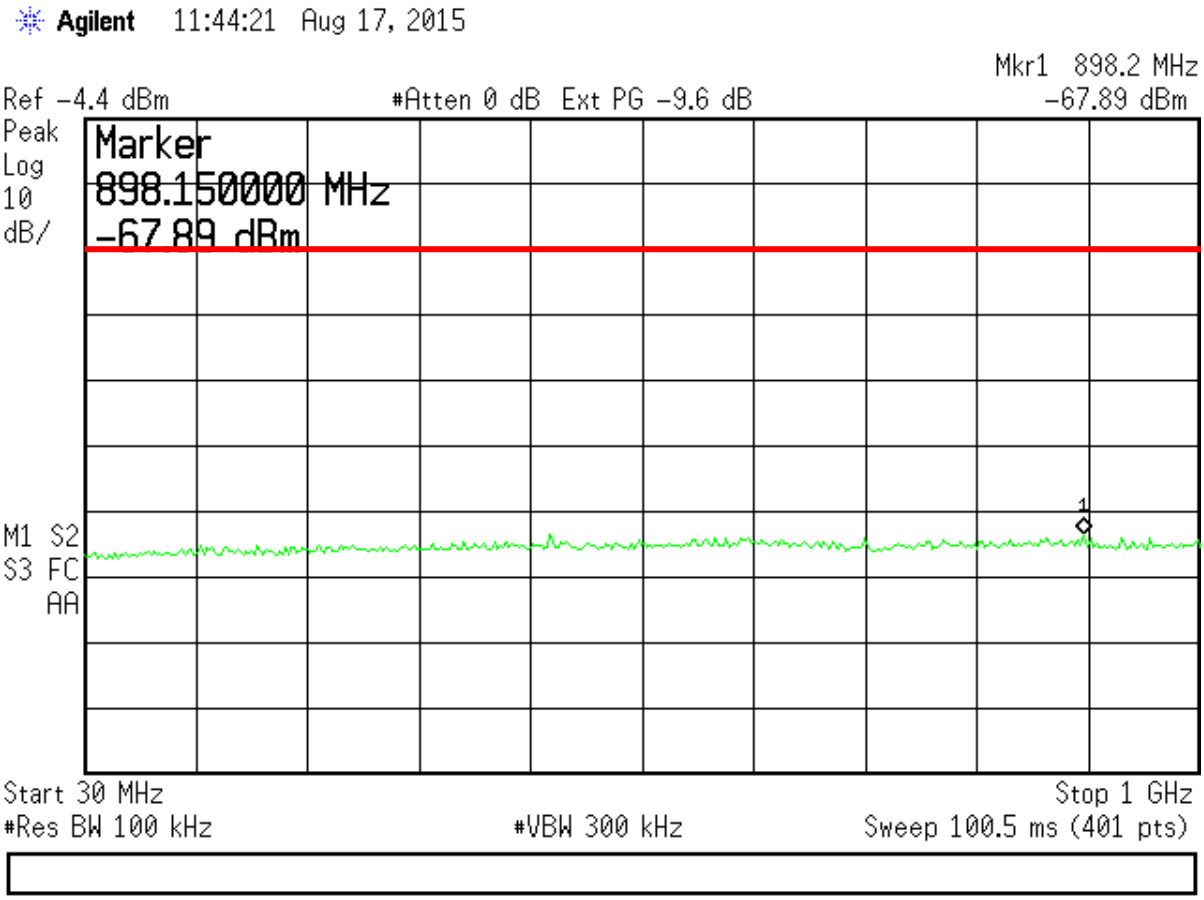


Figure 21. Antenna Conducted Emissions 802.11b Low, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

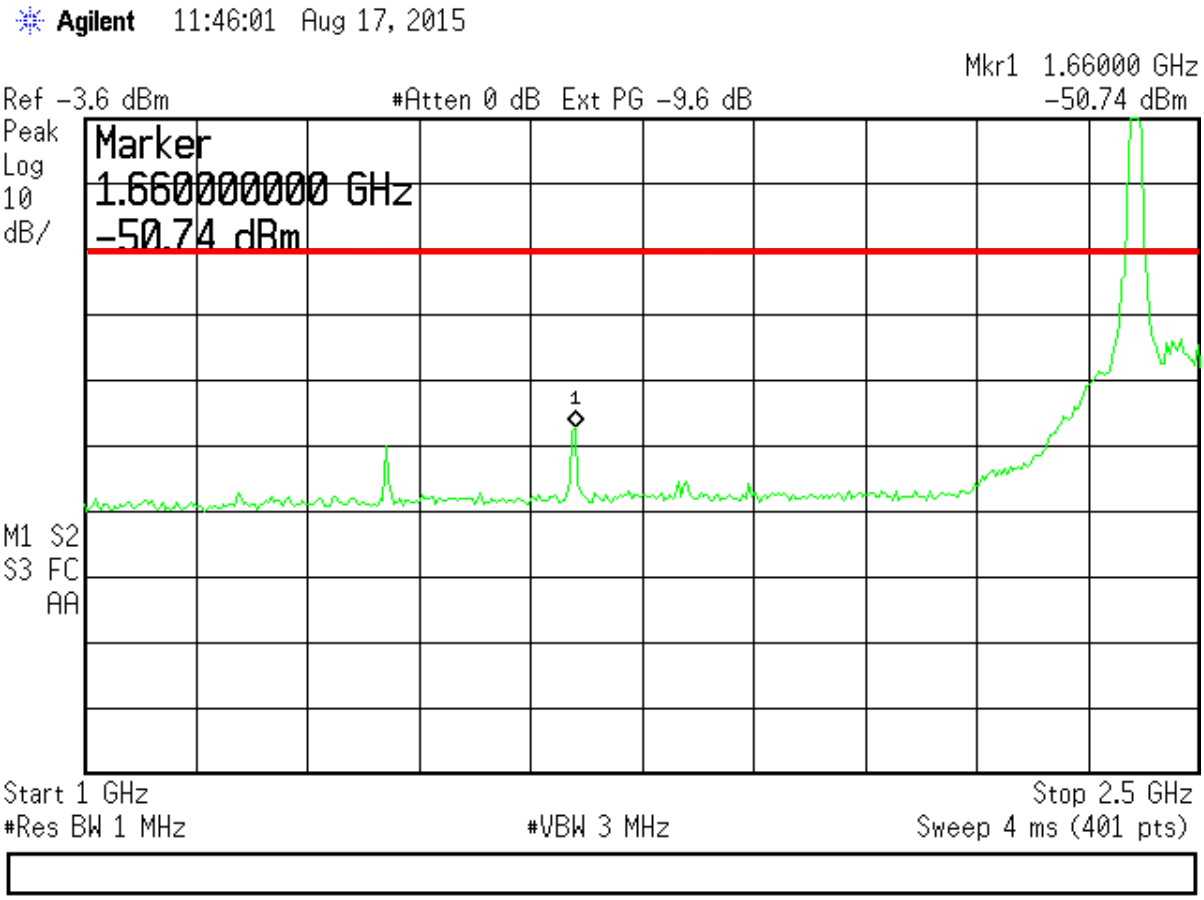


Figure 22. Antenna Conducted Emissions 802.11b Low, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

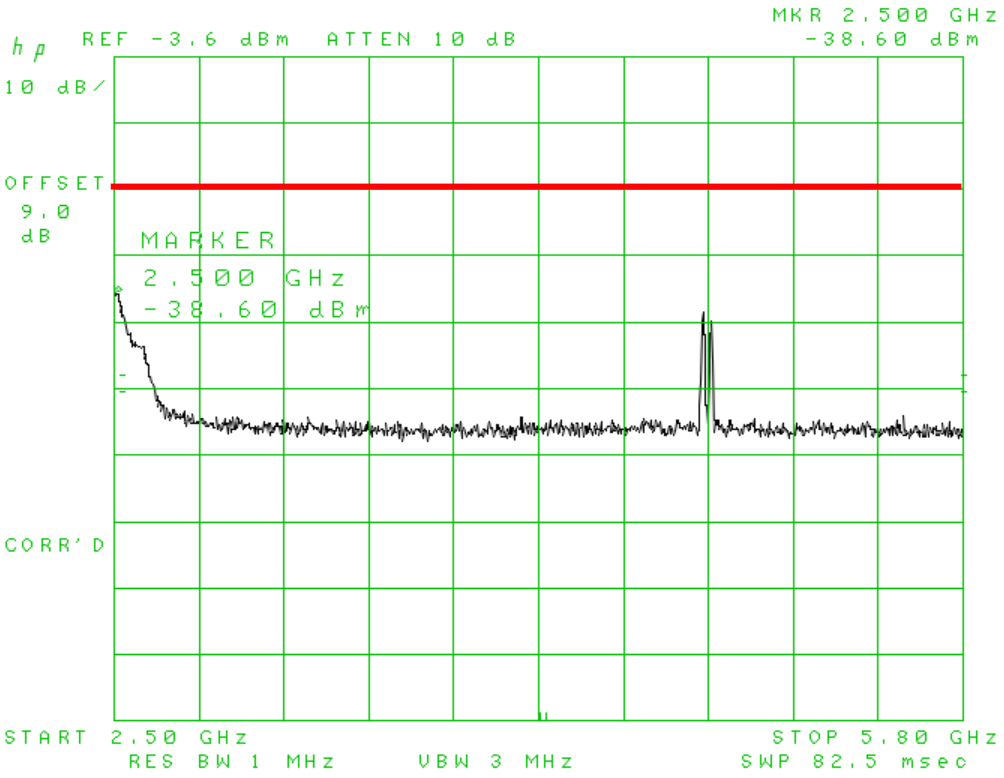


Figure 23. Antenna Conducted Emissions 802.11b Low, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

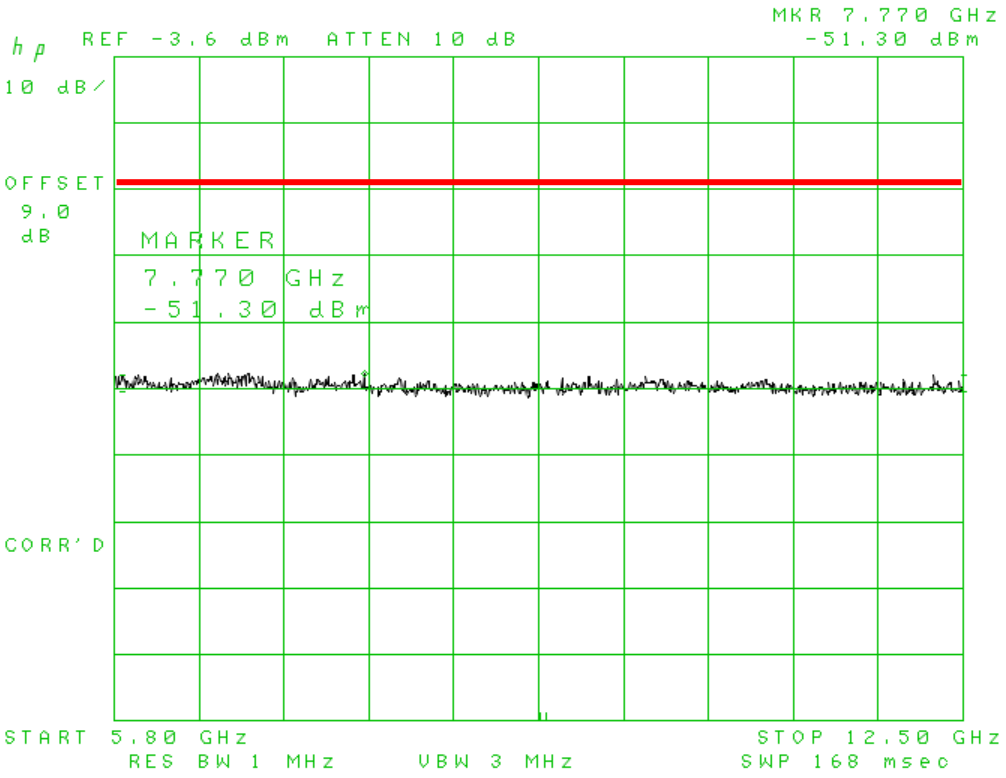


Figure 24. Antenna Conducted Emissions 802.11b Low, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

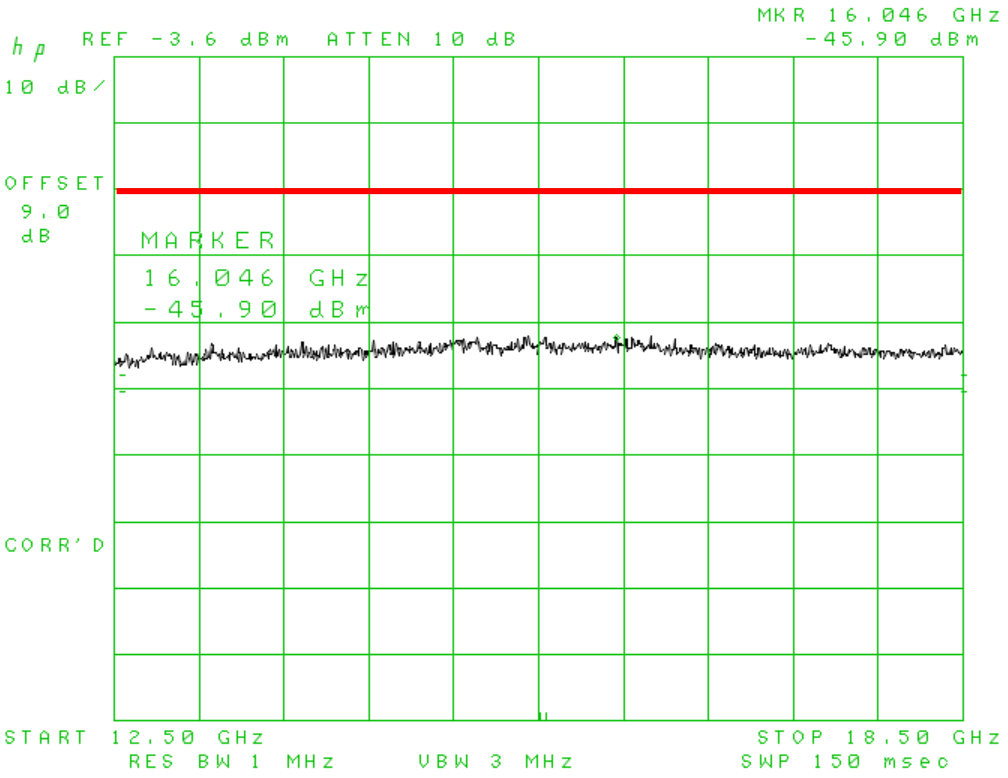


Figure 25. Antenna Conducted Emissions 802.11b Low, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

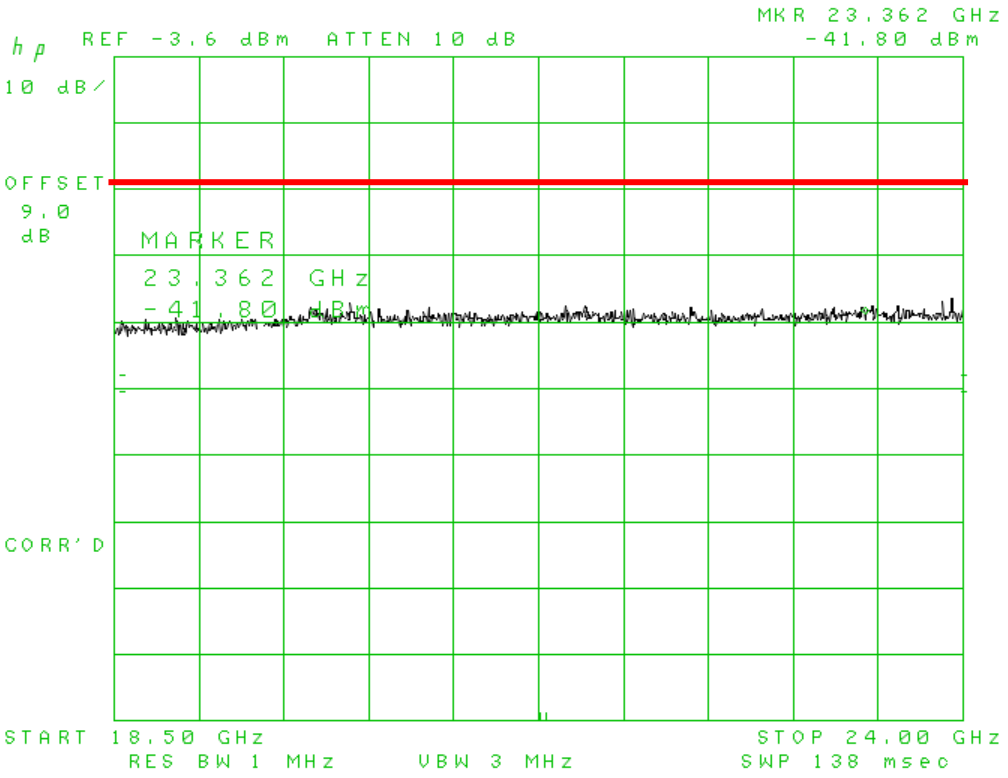


Figure 26. Antenna Conducted Emissions 802.11b Low, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

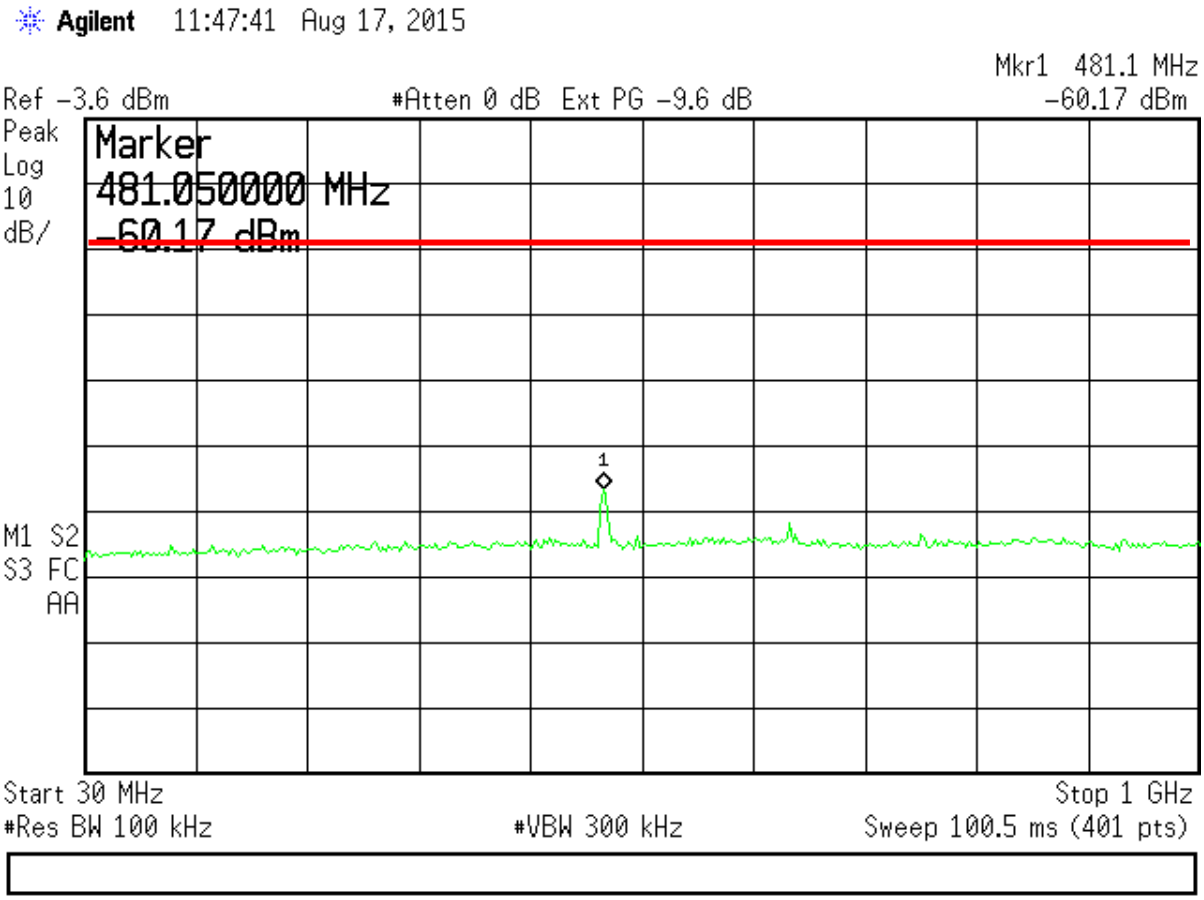


Figure 27. Antenna Conducted Emissions 802.11b Mid, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

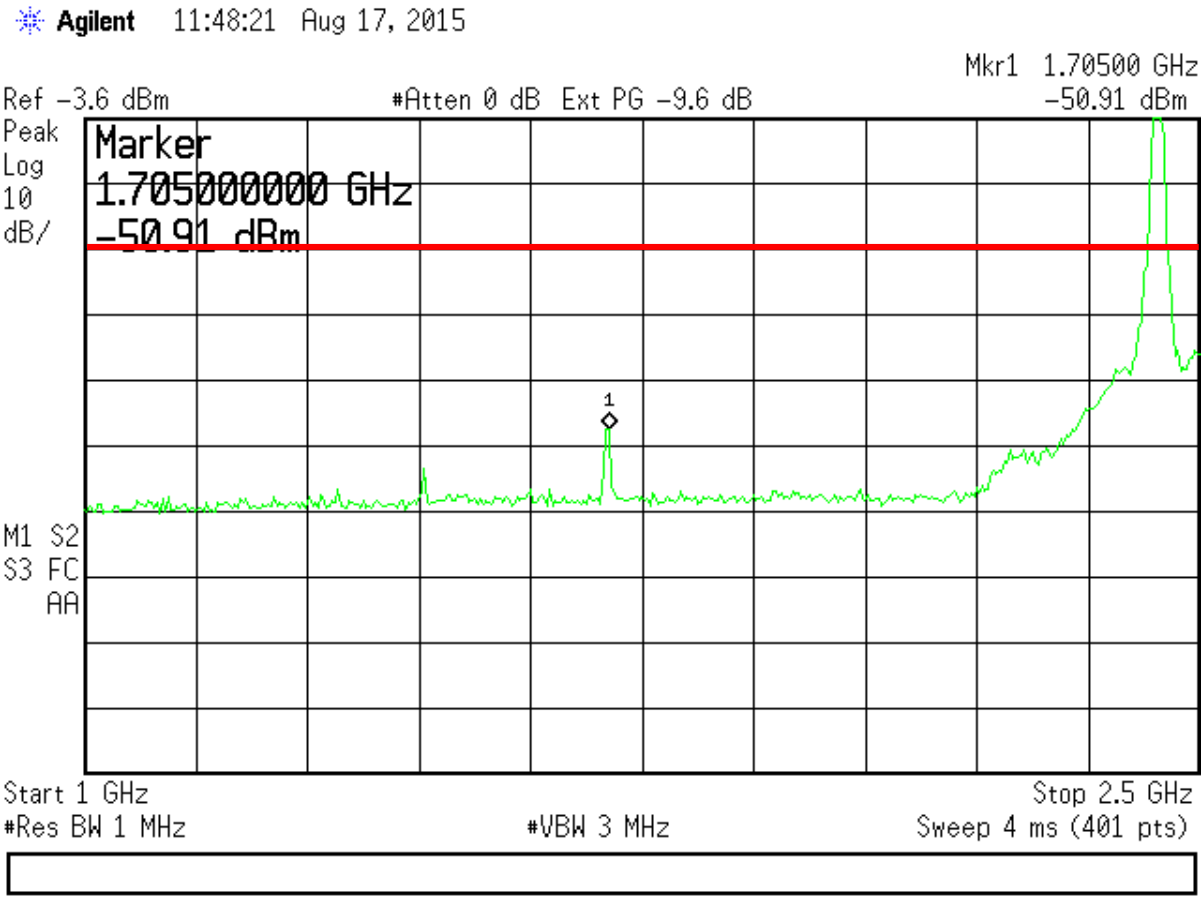


Figure 28. Antenna Conducted Emissions 802.11b Mid, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

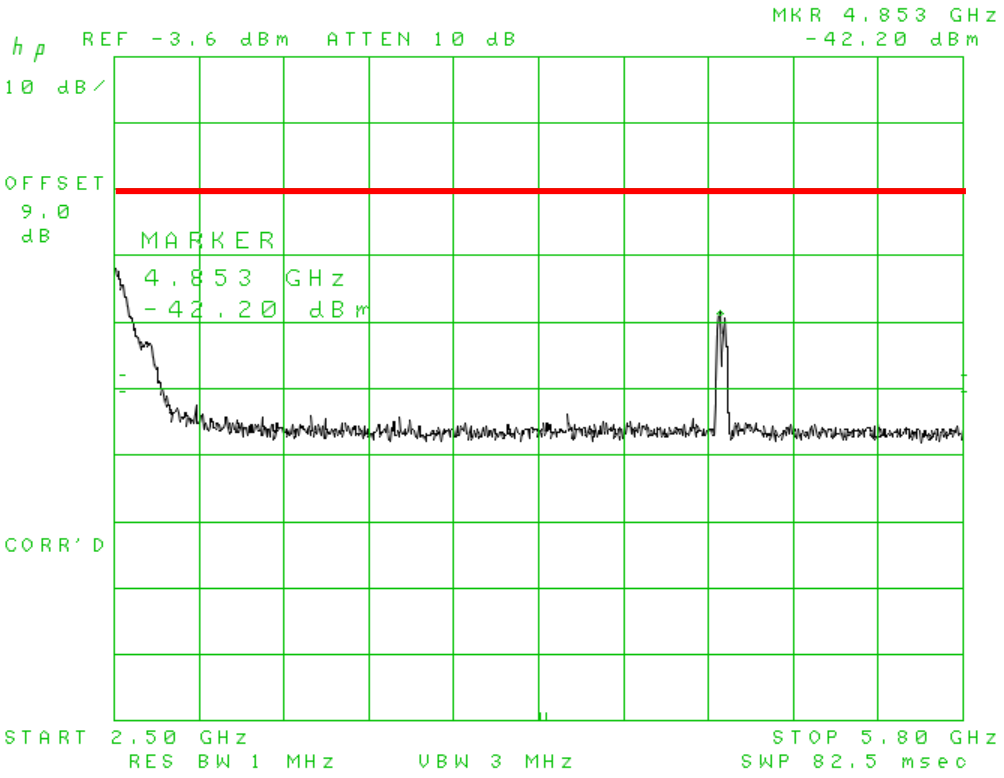


Figure 29. Antenna Conducted Emissions 802.11b Mid, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

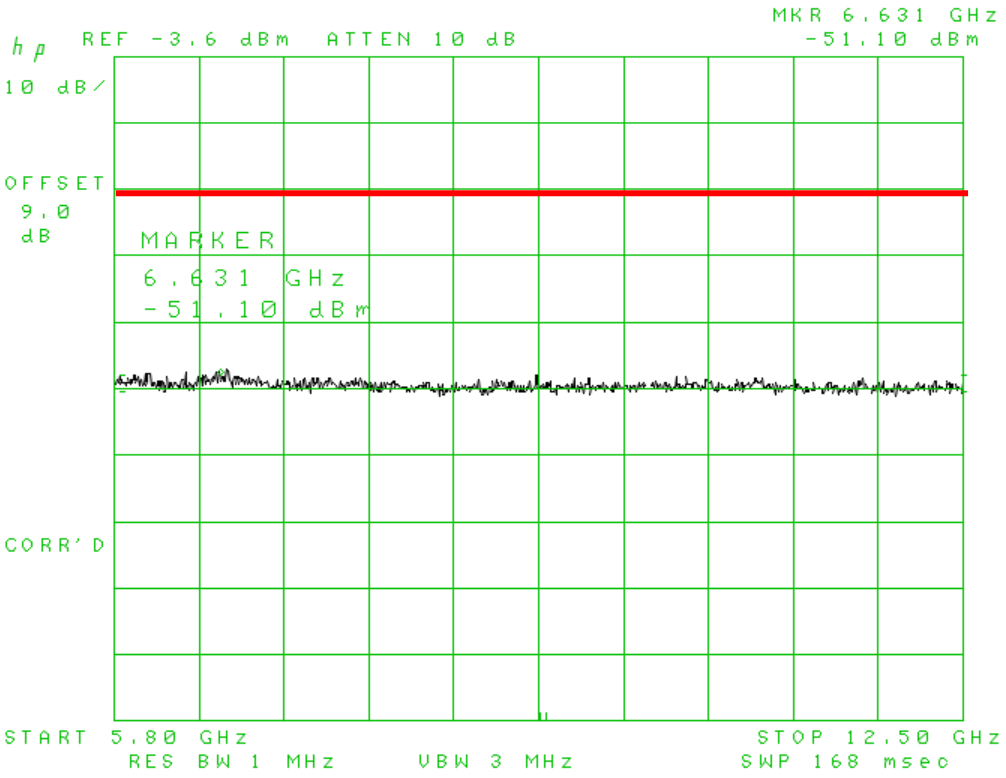


Figure 30. Antenna Conducted Emissions 802.11b Mid, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

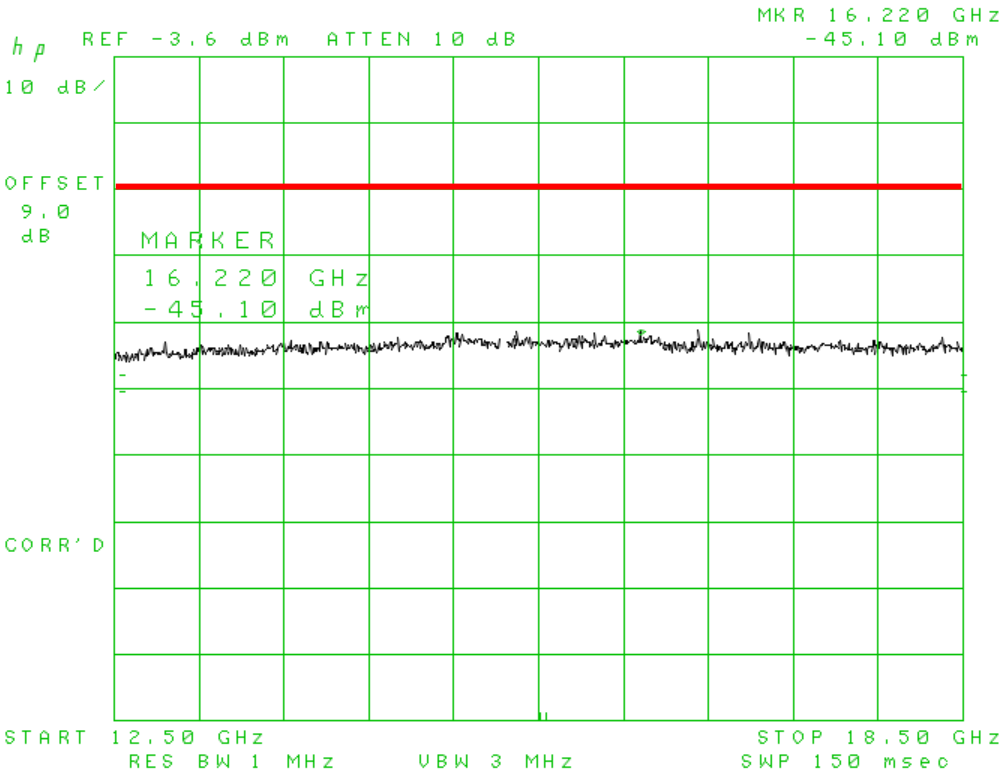


Figure 31. Antenna Conducted Emissions 802.11b Mid, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

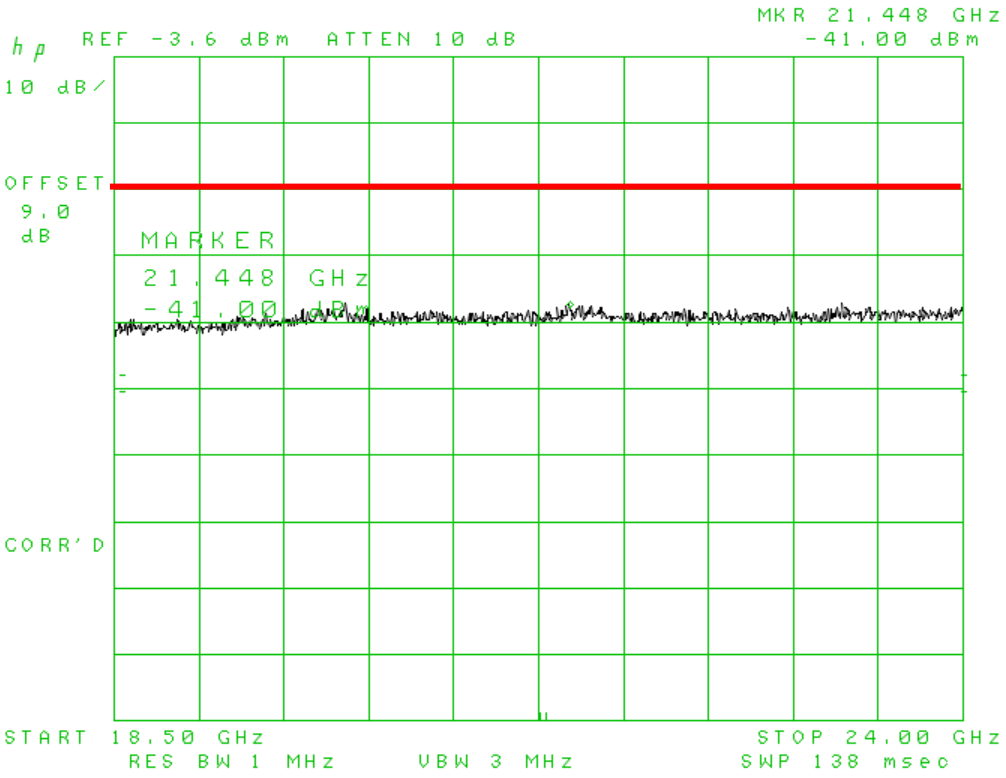


Figure 32. Antenna Conducted Emissions 802.11b Mid, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

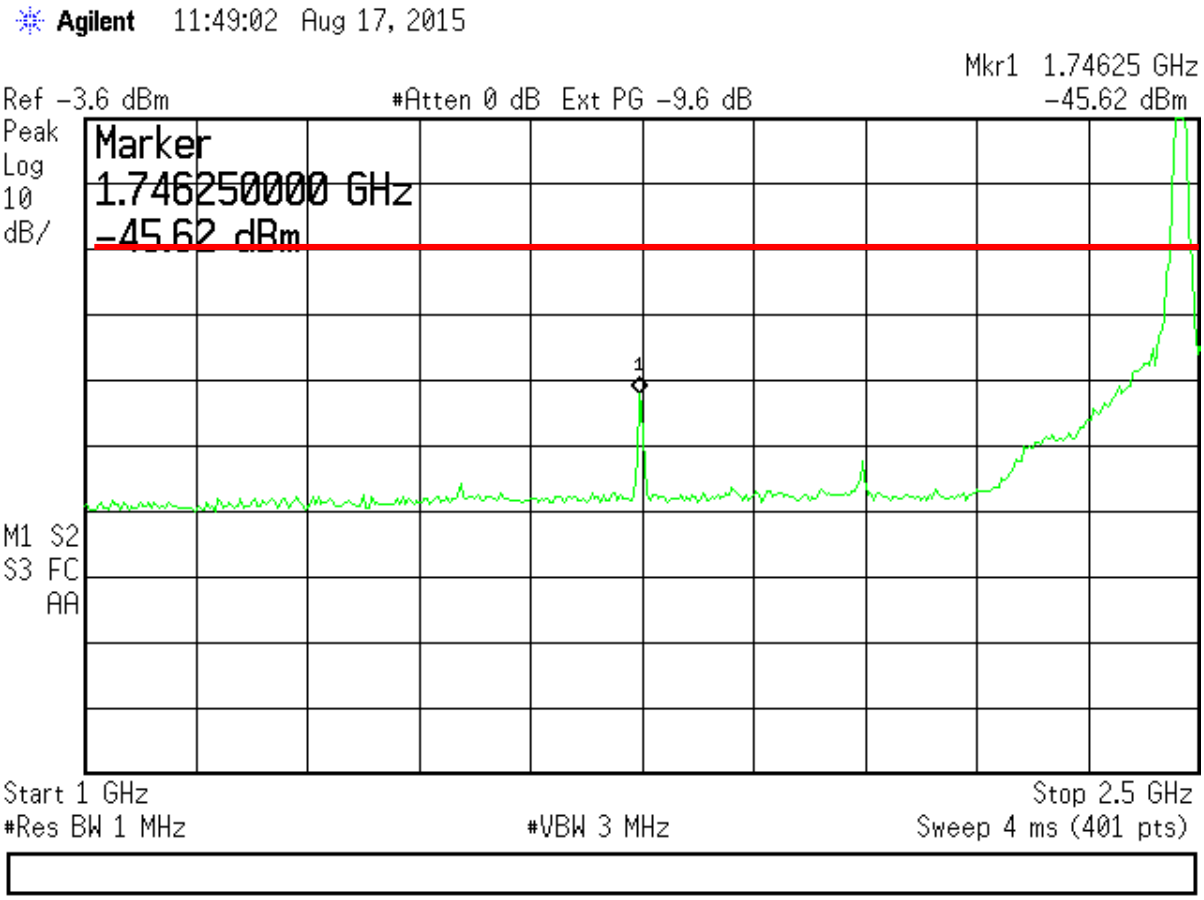


Figure 33. Antenna Conducted Emissions 802.11b High, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

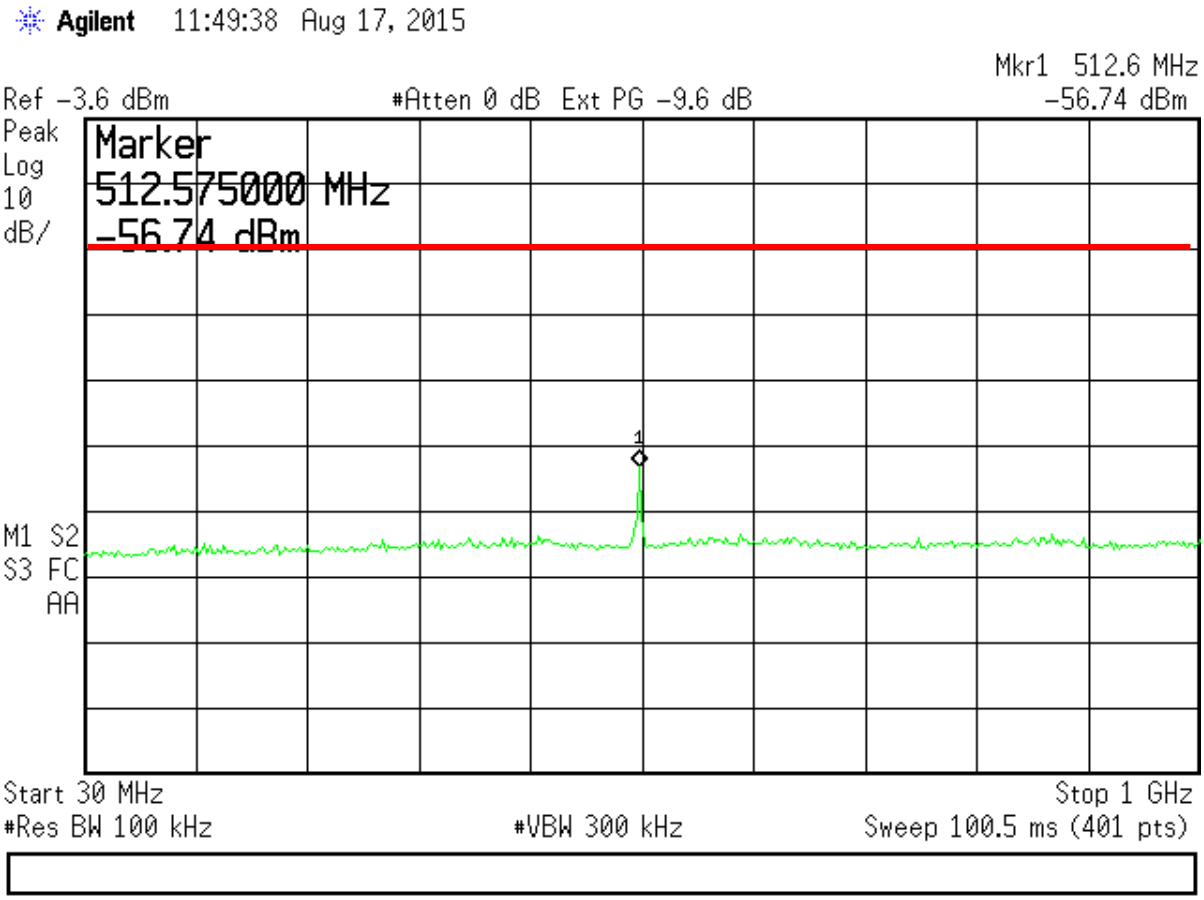


Figure 34. Antenna Conducted Emissions 802.11b High, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

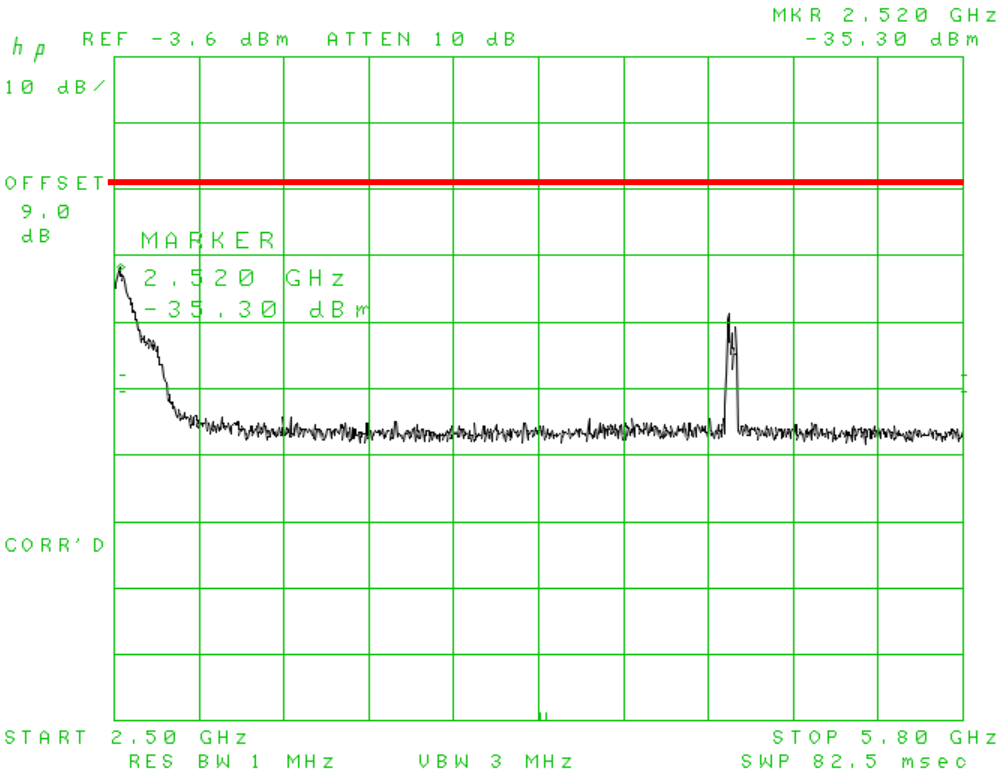


Figure 35. Antenna Conducted Emissions 802.11b High, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

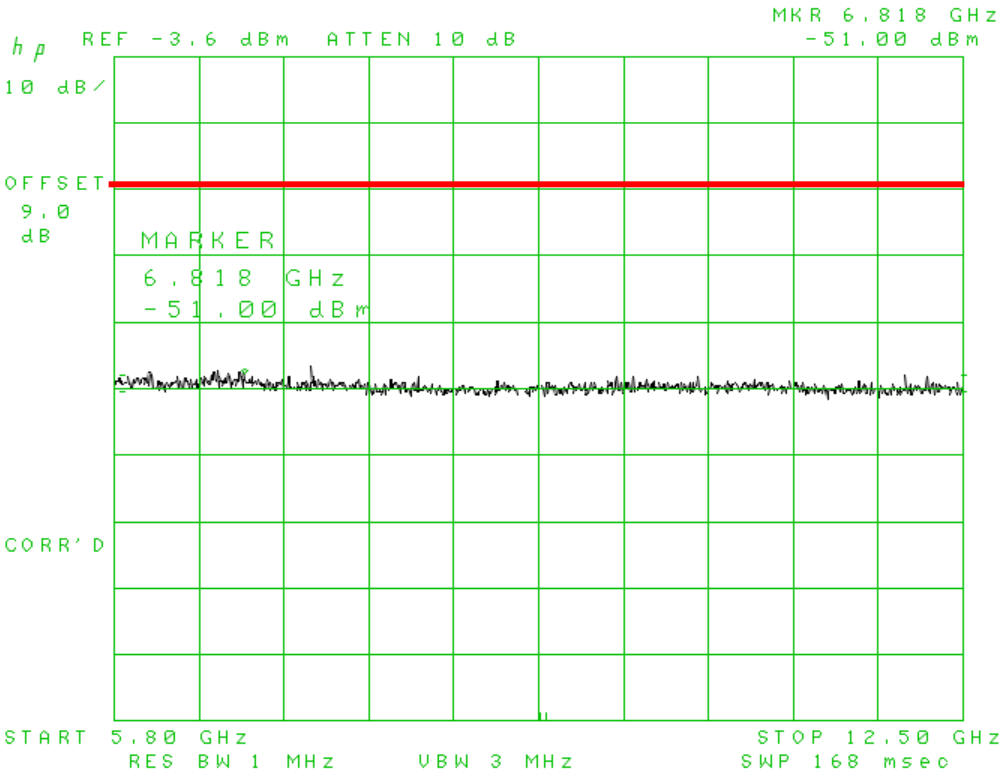


Figure 36. Antenna Conducted Emissions 802.11b High, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

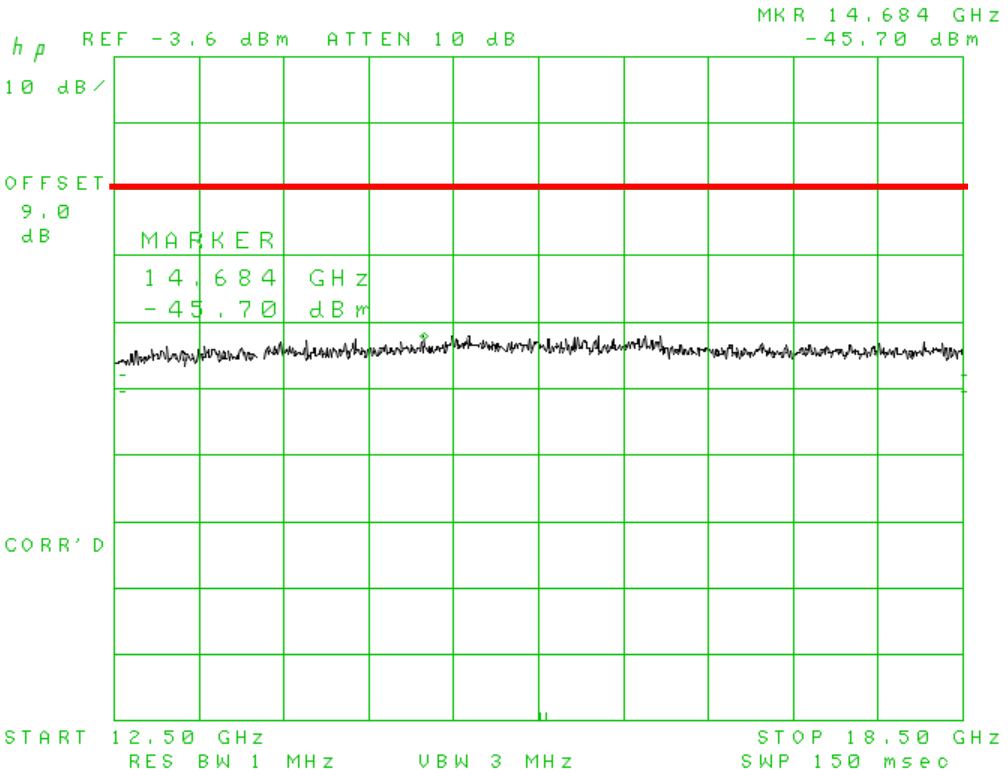


Figure 37. Antenna Conducted Emissions 802.11b High, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

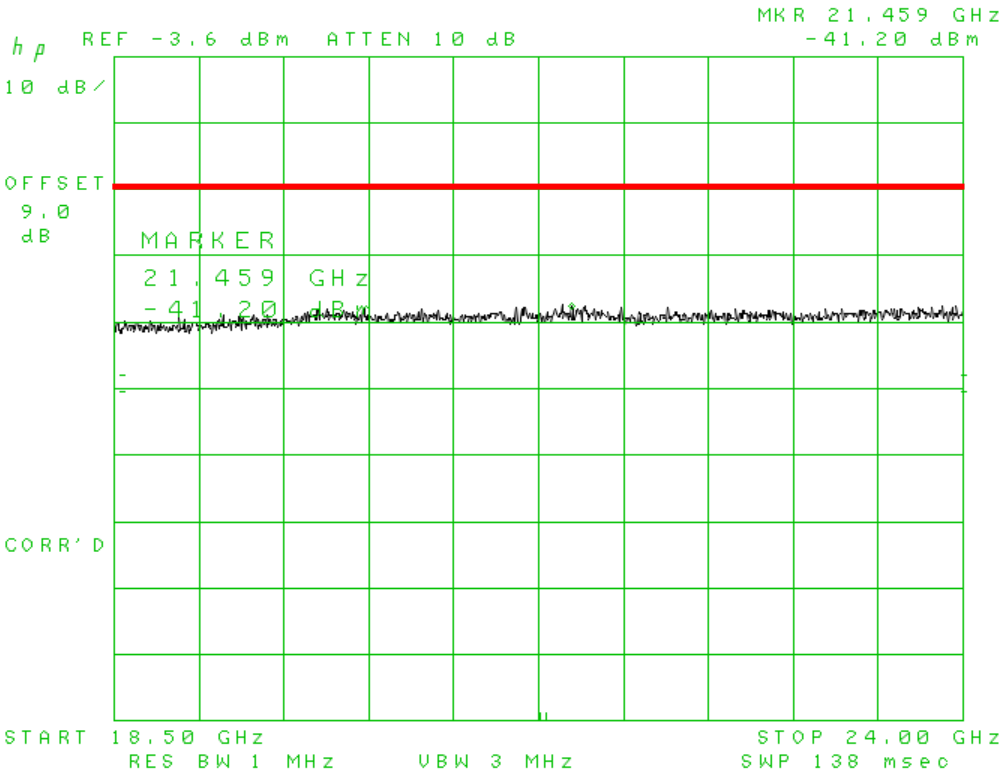


Figure 38. Antenna Conducted Emissions 802.11b High, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

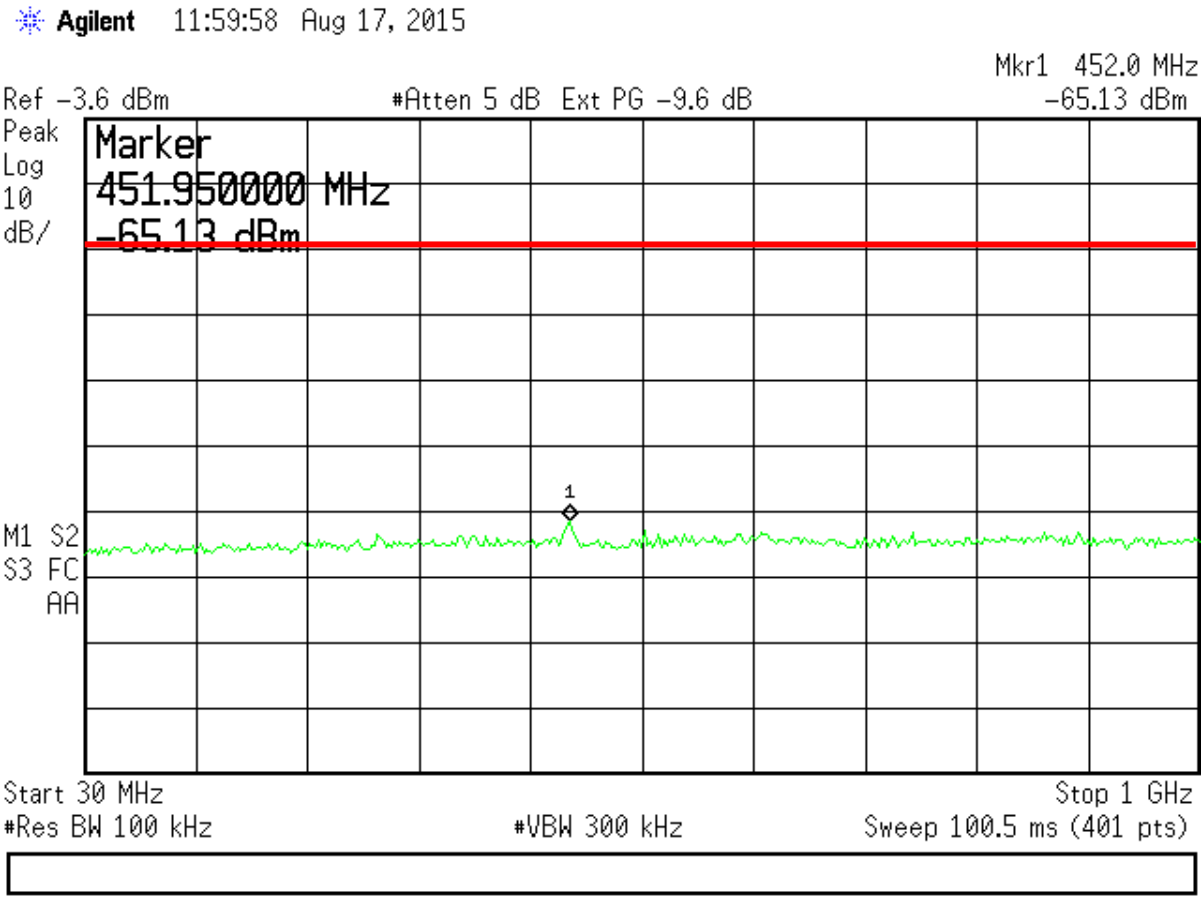


Figure 39. Antenna Conducted Emissions 802.11g Low, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

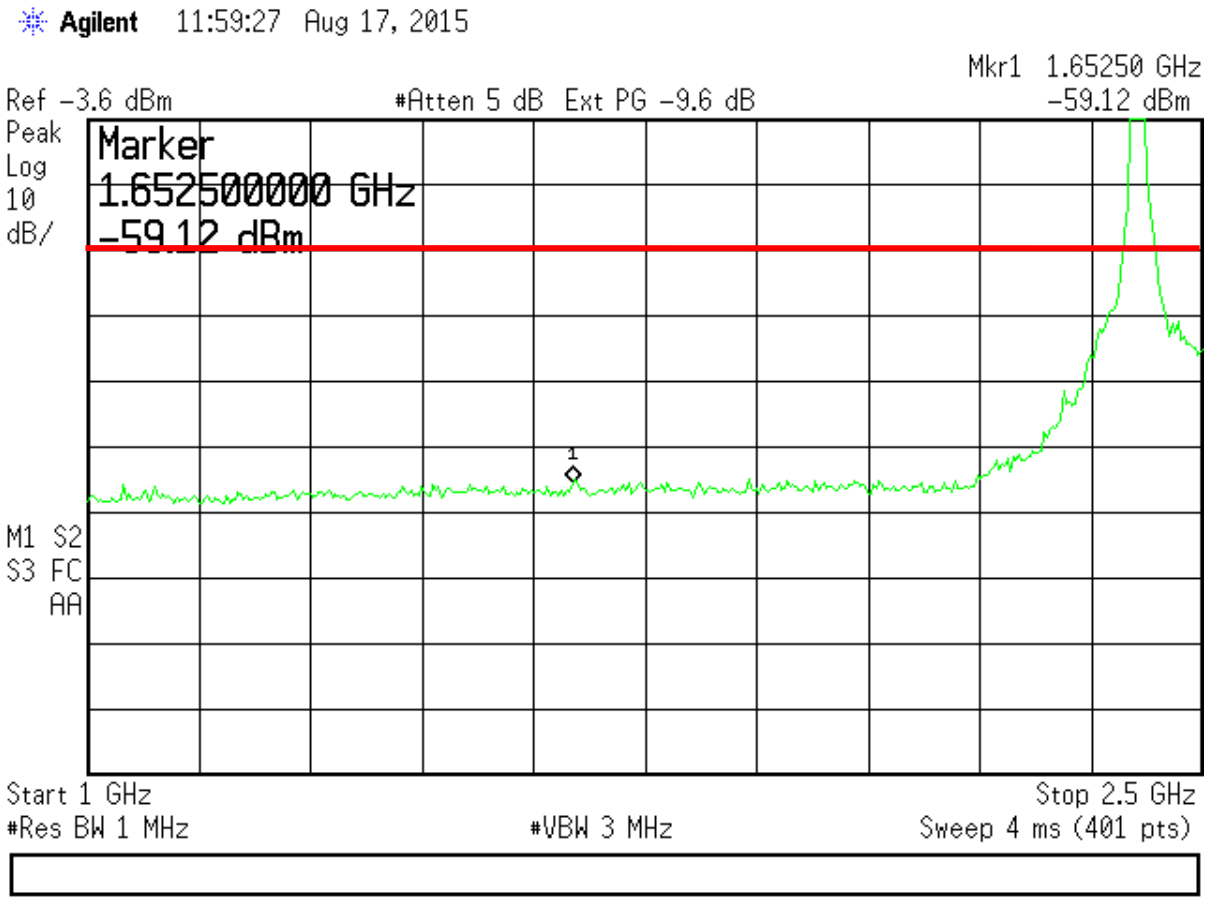


Figure 40. Antenna Conducted Emissions 802.11g Low, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

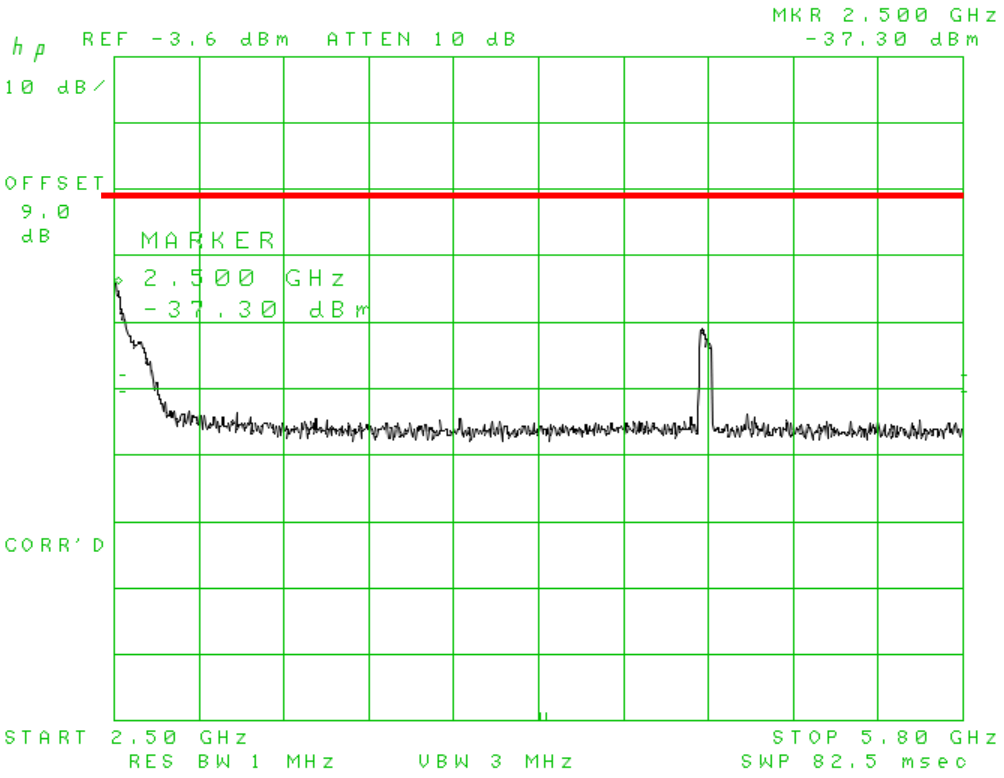


Figure 41. Antenna Conducted Emissions 802.11g Low, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

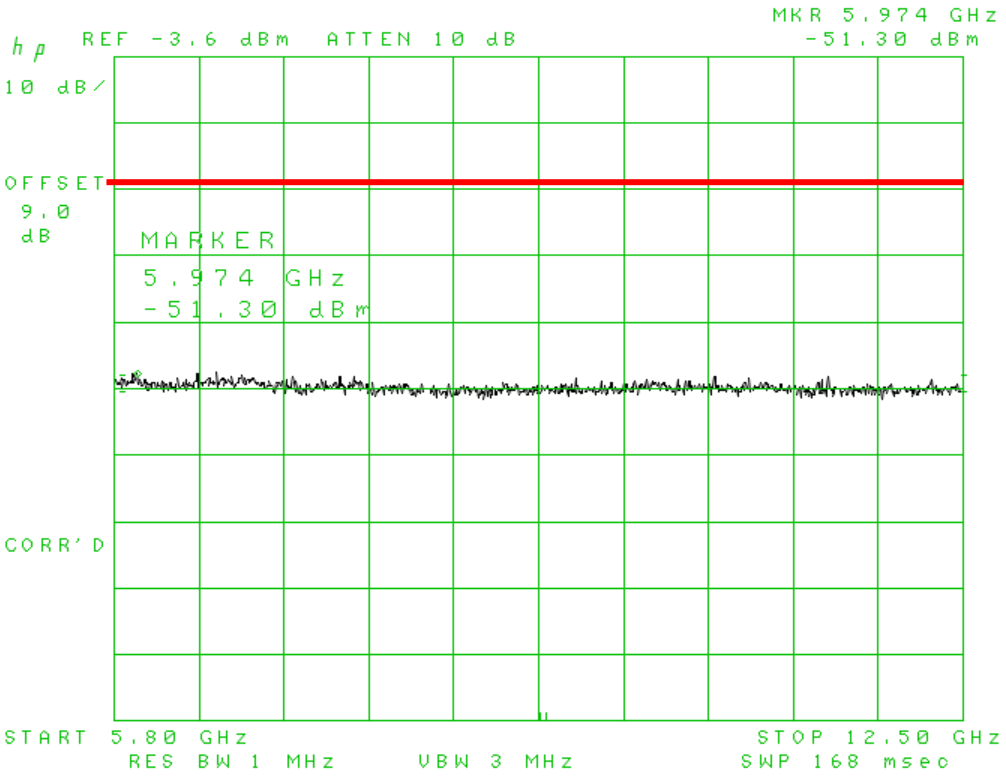


Figure 42. Antenna Conducted Emissions 802.11g Low, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

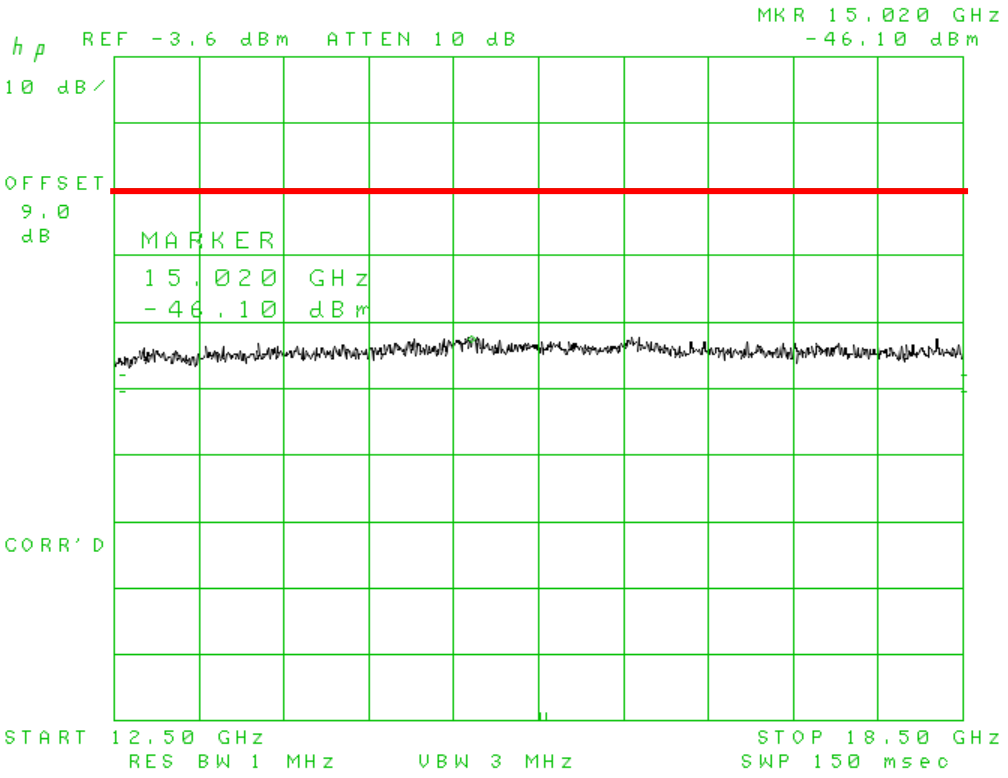


Figure 43. Antenna Conducted Emissions 802.11g Low, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

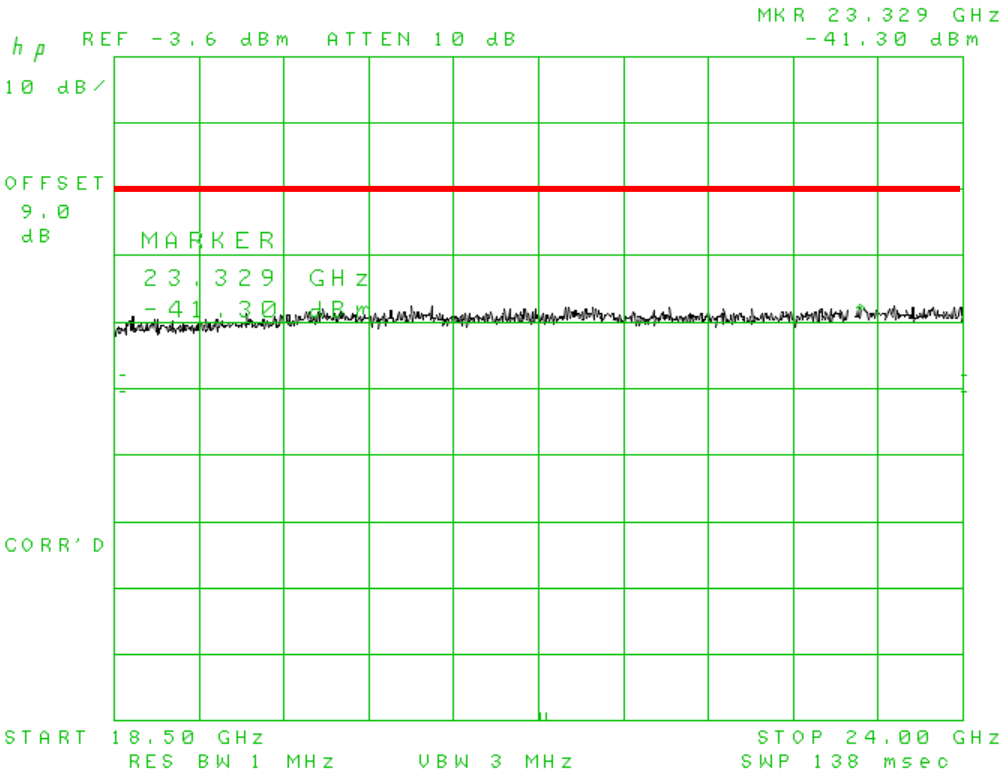


Figure 44. Antenna Conducted Emissions 802.11g Low, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

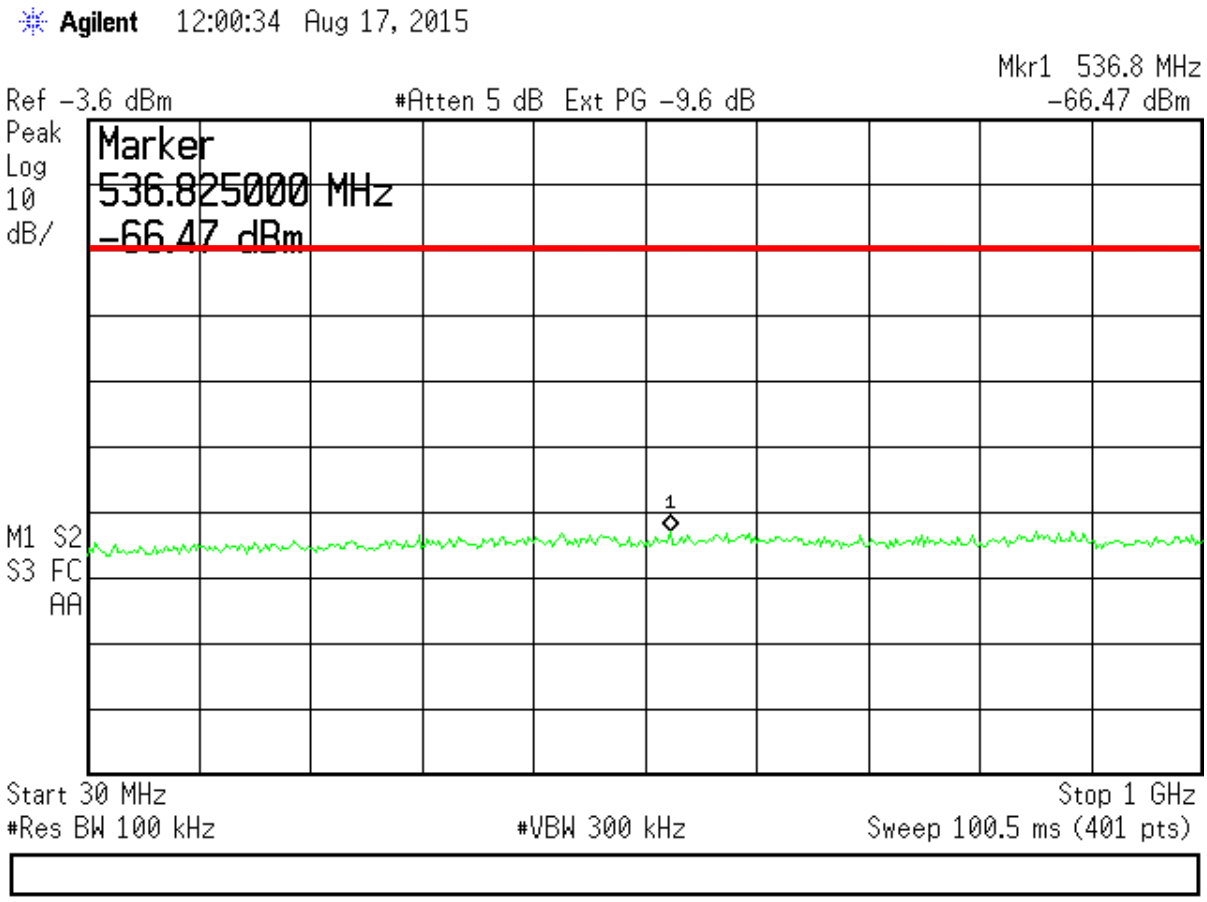


Figure 45. Antenna Conducted Emissions 802.11g Mid, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

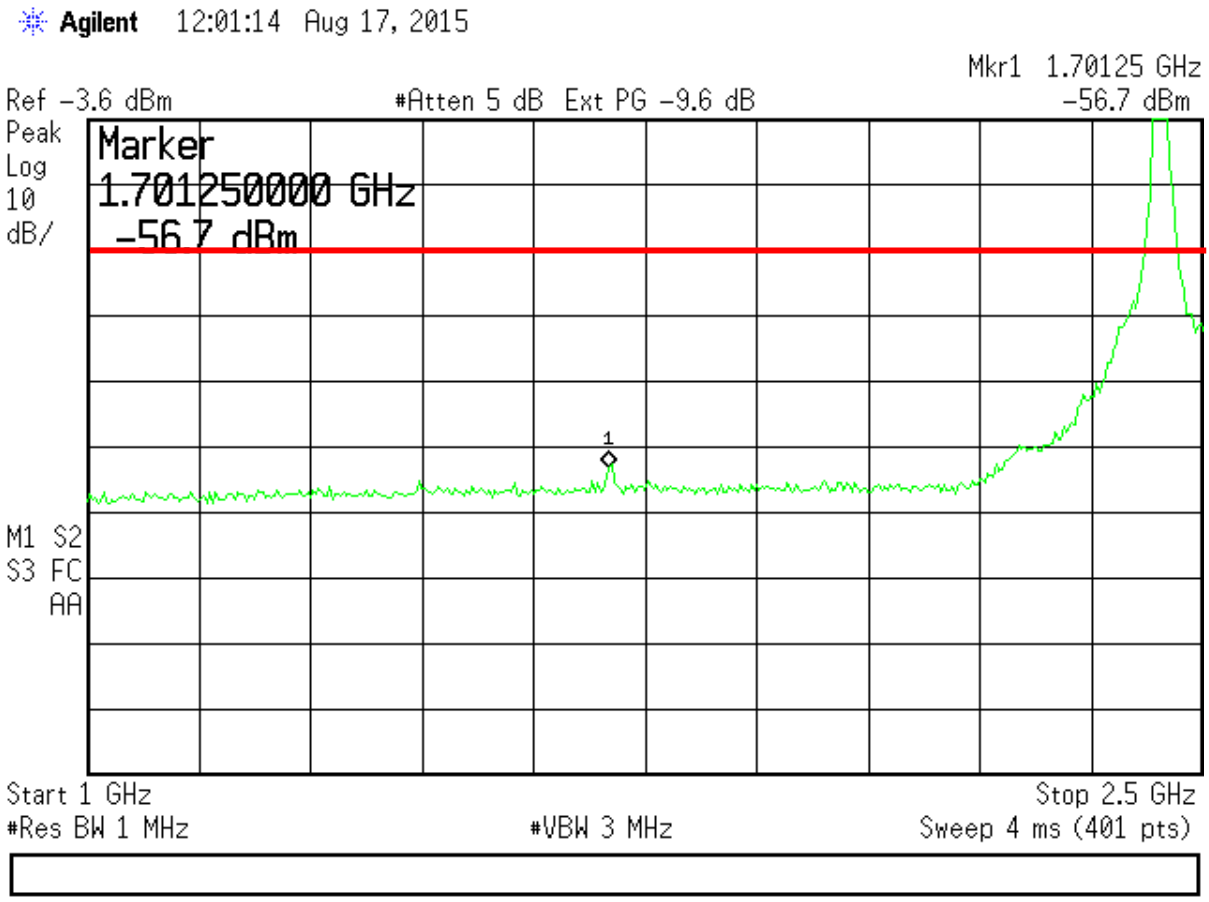


Figure 46. Antenna Conducted Emissions 802.11g Mid, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

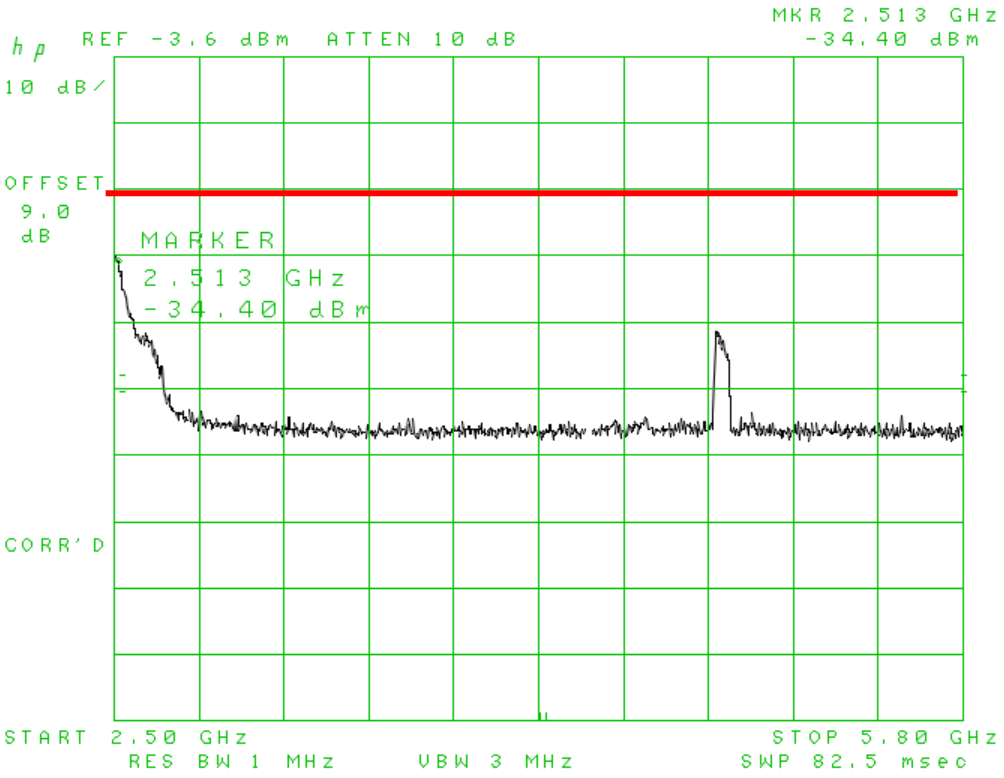


Figure 47. Antenna Conducted Emissions 802.11g Mid, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

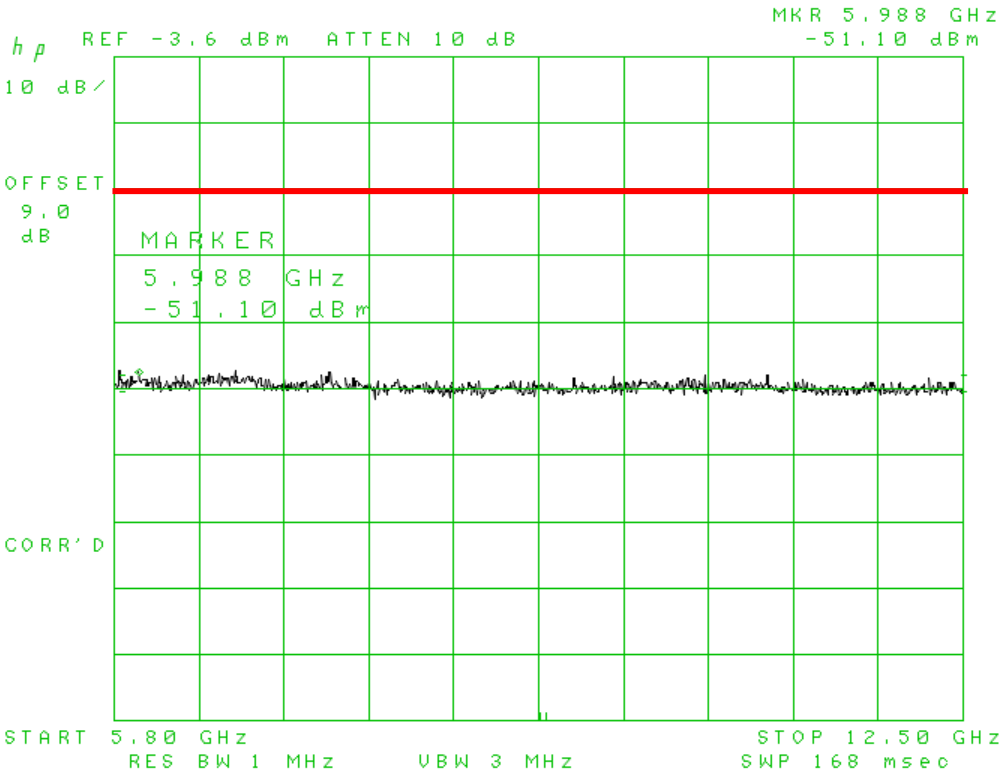


Figure 48. Antenna Conducted Emissions 802.11g Mid, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

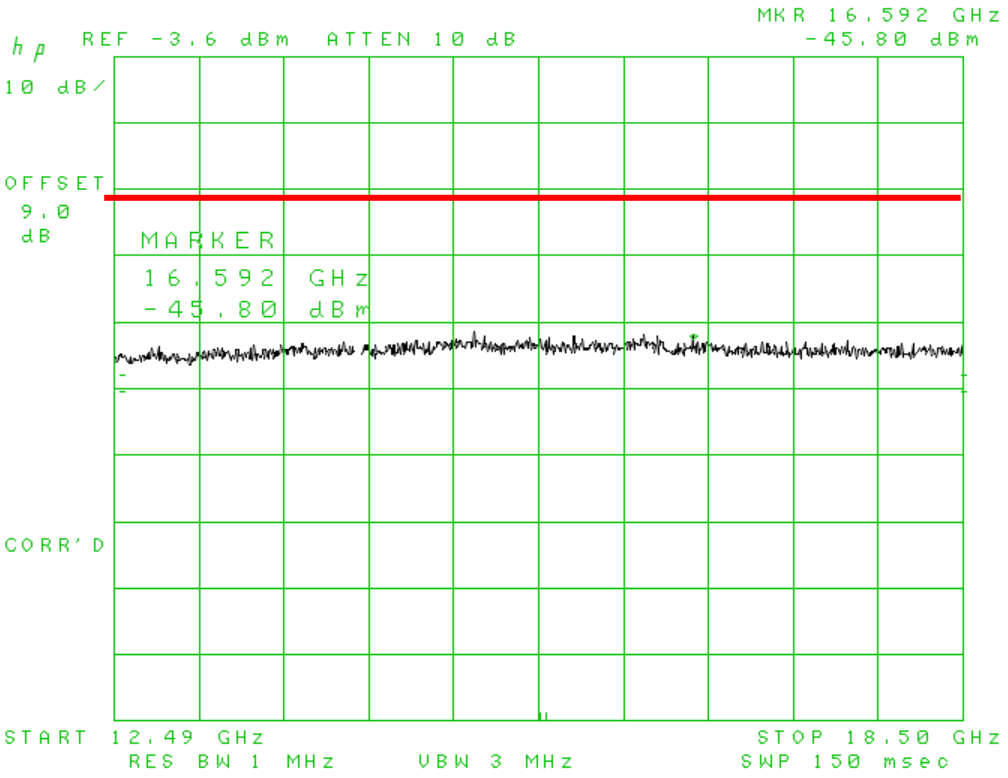


Figure 49. Antenna Conducted Emissions 802.11g Mid, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

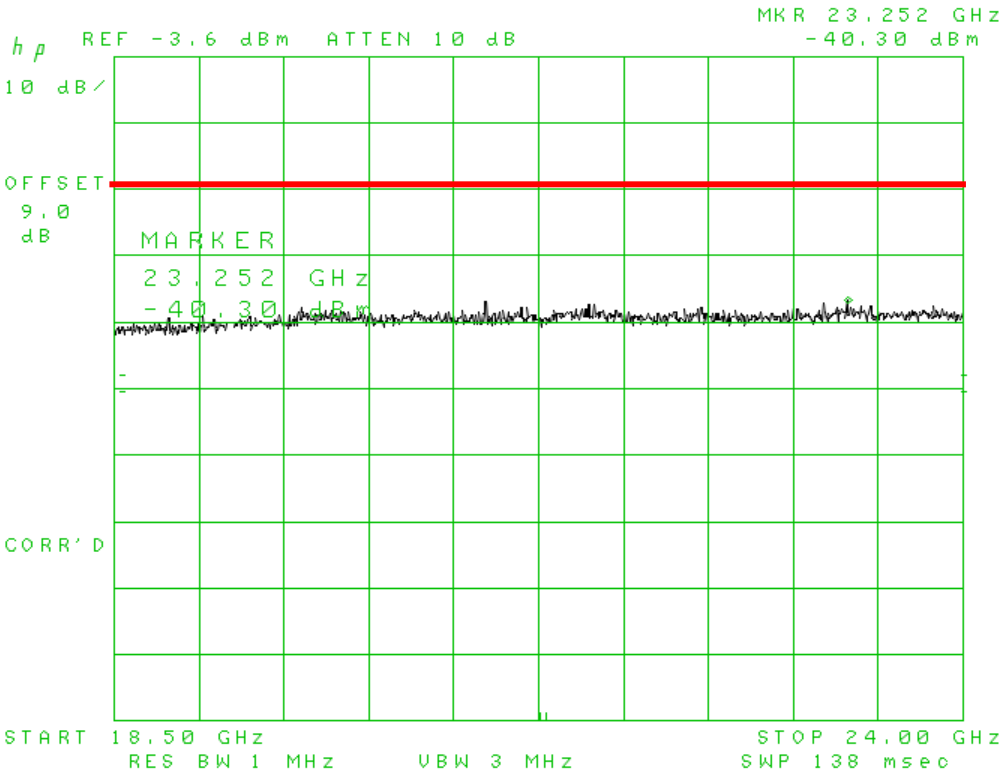


Figure 50. Antenna Conducted Emissions 802.11g Mid, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

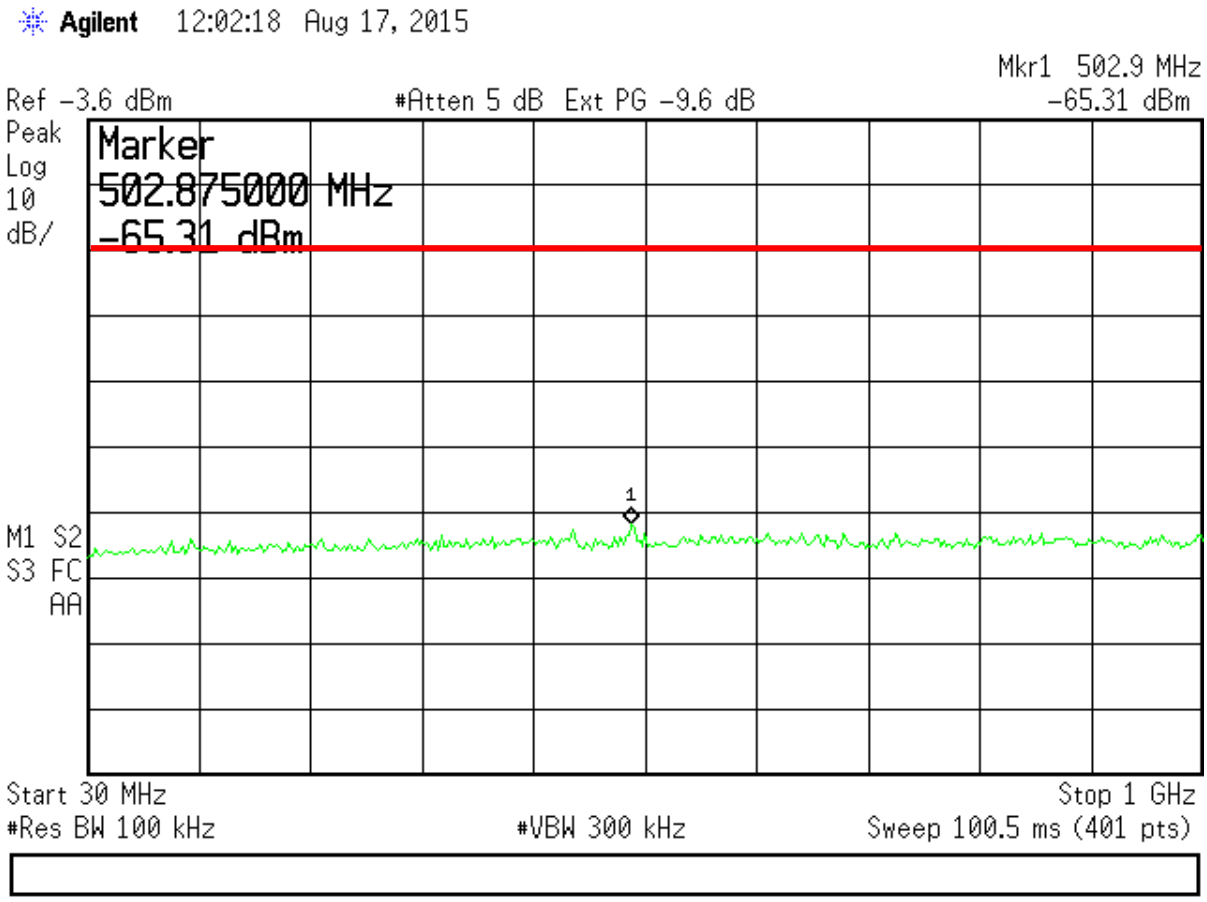


Figure 51. Antenna Conducted Emissions 802.11g High, Part 1

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

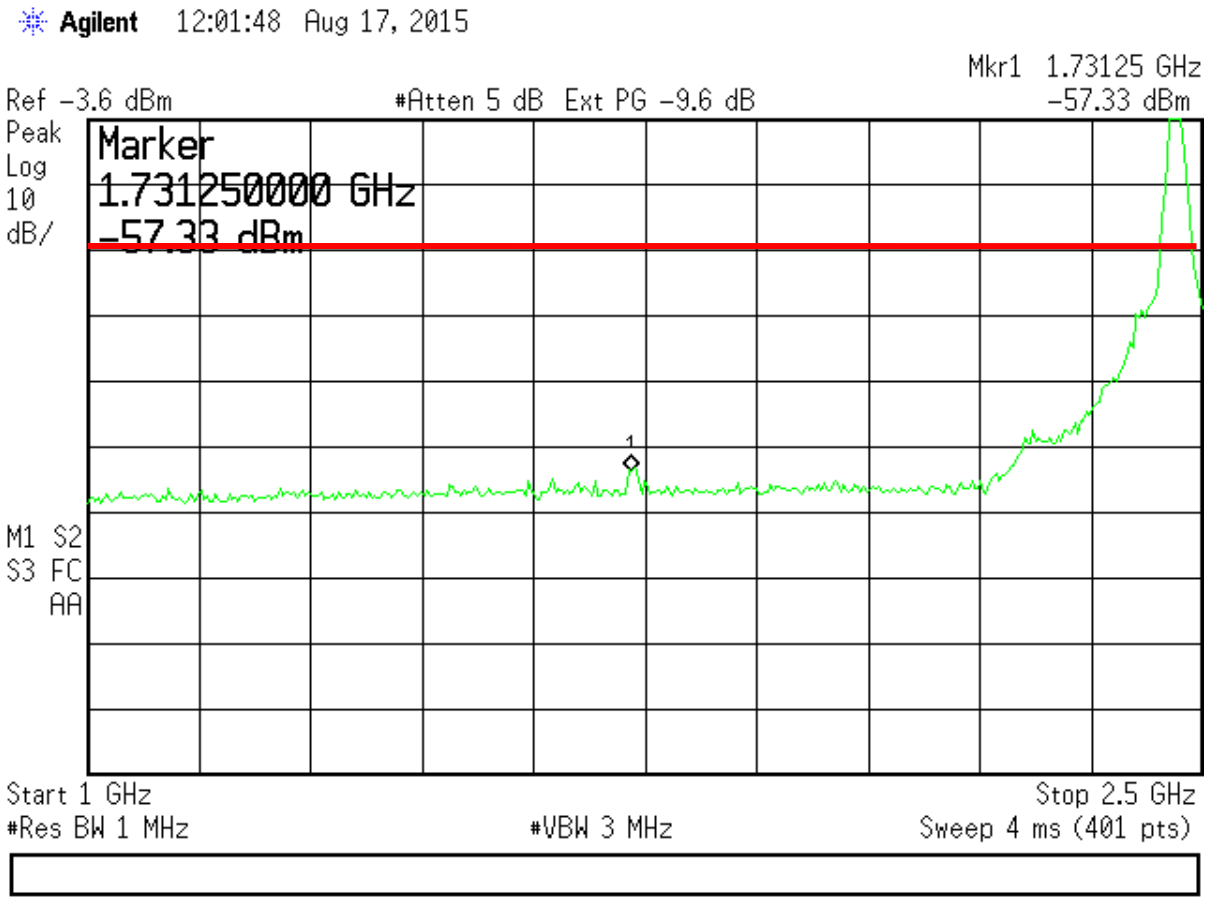


Figure 52. Antenna Conducted Emissions 802.11g High, Part 2

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental. The larger peak to the right is the fundamental emission.

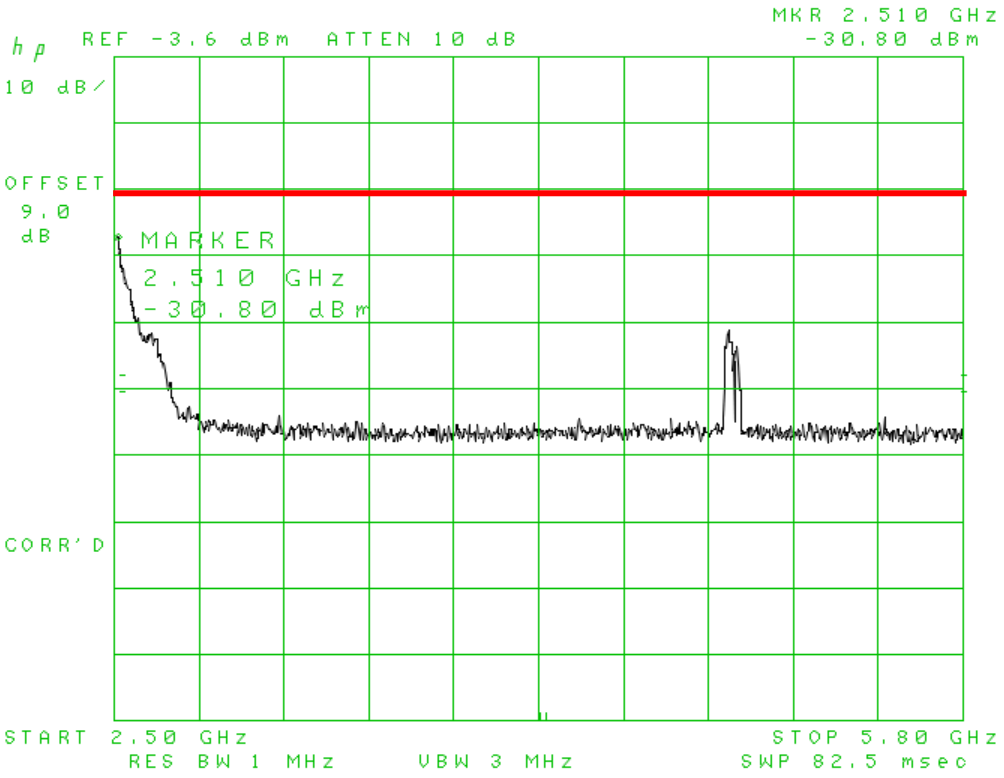


Figure 53. Antenna Conducted Emissions 802.11g High, Part 3

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

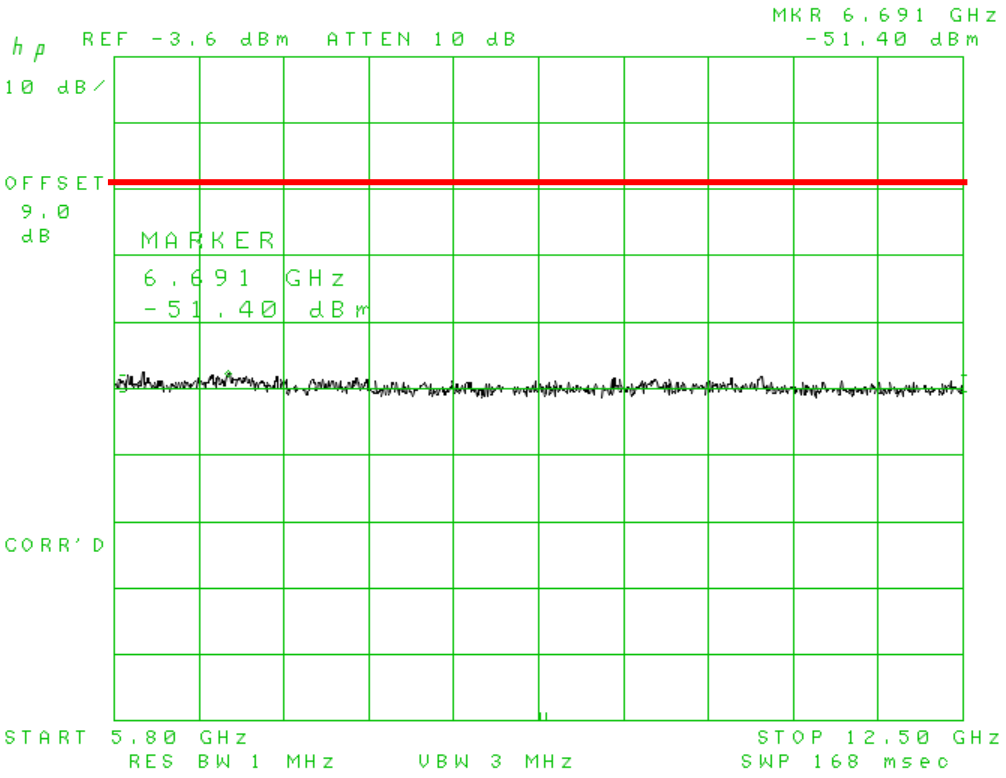


Figure 54. Antenna Conducted Emissions 802.11g High, Part 4

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

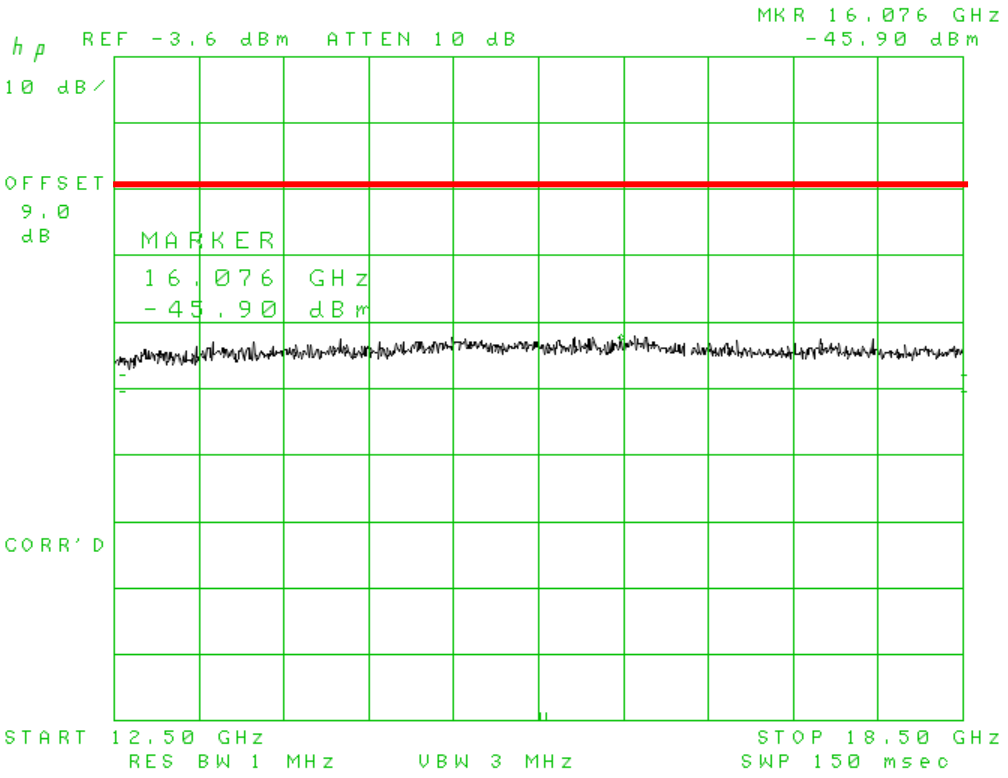


Figure 55. Antenna Conducted Emissions 802.11g High, Part 5

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

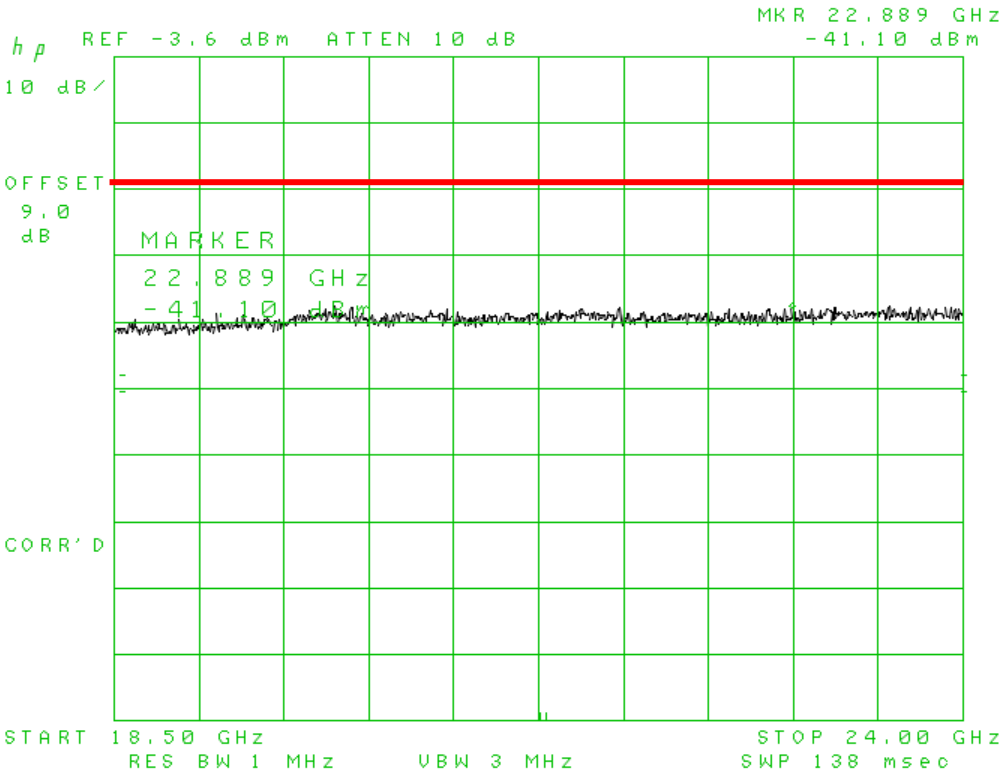


Figure 56. Antenna Conducted Emissions 802.11g High, Part 6

Note: Offset is used to correct for cable loss and attenuator used. The red line is at least 20 dB down from the measured fundamental.

Table 6. 802.11n Peak Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	69.40	-	31.03	100.43	-	3.0m./Horz	-	**PK**
4824	53.81	-9.5	4.73	49.04	74.0	1.0m./Horz	25.0	**PK**
Mid Channel								
2442	74.75	-	31.03	105.78	-	3.0m./Horz	-	**PK**
4884	58.43	-9.5	4.60	53.53	74.0	1.0m./Horz	20.5	**PK**
High Channel								
2462	77.33	-	31.03	108.36	-	3.0m./Horz	-	**PK**
4924	57.42	-9.5	4.85	52.77	74.0	1.0m./Horz	21.2	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of -9.5 dB.
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	53.81	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	49.04	dBuV/m

Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 7. 802.11n Average Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	50.75	-	31.03	81.78	-	3.0m./Horz	-	**AVG**
4824	40.71	-9.5	4.73	35.94	54.0	1.0m./Horz	18.1	**AVG**
Mid Channel								
2442	56.82	-	31.03	87.85	-	3.0m./Horz	-	**AVG**
4884	45.12	-9.5	4.60	40.22	54.0	1.0m./Horz	13.8	**AVG**
High Channel								
2462	59.49	-	31.03	90.52	-	3.0m./Horz	-	**AVG**
4924	43.24	-9.5	4.85	38.59	54.0	1.0m./Horz	15.4	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	40.71	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	35.94	dBuV/m

Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 8. 802.11b Peak Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek Systems			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	70.40	-	31.03	101.43	-	3.0m./Horz	-	**PK**
4824	57.21	-9.5	4.73	52.44	74.0	1.0m./Horz	21.6	**PK**
Mid Channel								
2442	73.36	-	31.03	107.39	-	3.0m./Horz	-	**PK**
4884	62.07	-9.5	4.60	57.17	74.0	1.0m./Horz	16.8	**PK**
High Channel								
2462	78.83	-	31.03	110.01		3.0m./Horz	-	**PK**
4924	58.43	-9.5	4.85	53.78	74.0	1.0m./Horz	20.2	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	57.21	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	52.44	dBuV/m

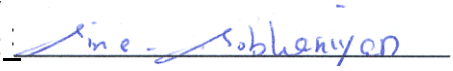
Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature:  Name: Sina Sobhaniyan

Table 9. 802.11b Average Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	61.78	--	31.03	92.81	-	3.0m./Horz	-	**AVG**
4824	44.19	-9.5	4.73	39.42	54.0	1.0m./Horz	14.6	**AVG**
Mid Channel								
2442	67.25	--	31.03	98.28	-	3.0m./Horz	-	**AVG**
4884	48.40	-9.5	4.60	43.50	54.0	1.0m./Horz	10.5	**AVG**
High Channel								
2462	68.59	--	31.03	99.62	-	3.0m./Horz	-	**AVG**
4924	45.76	-9.5	4.85	41.11	54.0	1.0m./Horz	12.9	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	44.19	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	39.42	dBuV/m

Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 10. 802.11g Peak Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	71.06	-	31.03	102.09	-	3m./Horz	-	**PK**
4824	54.76	-9.5	4.73	49.99	74.00	1m./Horz	24.0	**PK**
Mid Channel								
2442	76.78	-	31.03	107.81	-	3m./Horz	-	**PK**
4884	58.86	-9.5	4.60	53.96	74.00	1m./Horz	20.0	**PK**
High Channel								
2462	78.00	-	31.03	109.03	-	3m./Horz	-	**PK**
4924	57.39	-9.5	4.85	52.74	74.00	1m./Horz	21.3	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	54.76	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	49.99	dBuV/m

Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 11. 802.11g Average Radiated Fundamental & Harmonic Emissions with Chip Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	53.21	-	31.03	84.24	-	3m./Horz	-	**AVG**
4824	40.82	-9.5	4.73	36.05	54.0	1m./Horz	14.9	**AVG**
Mid Channel								
2442	58.34	-	31.03	89.37	-	3m./Horz	-	**AVG**
4884	43.81	-9.5	4.60	38.91	54.0	1m./Horz	15.1	**AVG**
High Channel								
2462	58.77	-	31.03	89.80	-	3m./Horz	-	**AVG**
4924	43.35	-9.5	4.85	38.70	54.0	1m./Horz	15.3	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	40.82	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.73	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	36.05	dBuV/m

Test Date: July 29-30, 2015 and August 3-4, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 12. 802.11n Peak Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	79.43	-	31.03	110.46	-	3m./Horz	-	**PK**
4824	61.71	-9.5	4.63	56.84	74.0	1m./Horz	17.2	**PK**
Mid Channel								
2442	81.90	-	31.03	112.93	-	3m./Horz	-	**PK**
4884	59.70	-9.5	4.50	54.70	74.0	1m./Horz	19.3	**PK**
High Channel								
2462	82.35	-	31.03	113.38	-	3m./Horz	-	**PK**
4924	56.76	-9.5	4.64	51.90	74.0	1m./Horz	22.1	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of -9.5 dB.
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	61.71	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	56.84	dBuV/m

Test Date: August 11-12, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 13. 802.11n Average Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	60.31	-	31.03	91.34	-	3m./Horz	-	**AVG**
4824	45.50	-9.5	4.63	40.63	54.0	1m./Horz	13.4	**AVG**
Mid Channel								
2442	62.96	-	31.03	93.99	-	3m./Horz	-	**AVG**
4884	43.48	-9.5	4.50	38.48	54.0	1m./Horz	15.5	**AVG**
High Channel								
2462	63.54	-	31.03	94.57	-	3m./Horz	-	**AVG**
4924	40.32	-9.5	4.64	35.46	54.0	1m./Horz	18.5	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	45.50	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	40.63	dBuV/m

Test Date: August 11-12, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 14. 802.11b Peak Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek Systems			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	80.76	-	31.03	111.79	-	3m./Horz	-	**PK**
4824	62.23	-9.5	4.63	57.36	74.0	1m./Horz	16.6	**PK**
Mid Channel								
2442	82.60	-	31.03	113.63	-	3m./Horz	-	**PK**
4884	60.76	-9.5	4.50	55.76	74.0	1m./Horz	18.2	**PK**
High Channel								
2462	82.46	-	31.03	113.49	-	3m./Horz	-	**PK**
4924	58.67	-9.5	4.64	53.81	74.0	1m./Horz	20.2	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	62.23	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	57.36	dBuV/m

Test Date: August 11-12, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 15. 802.11b Average Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	69.88	-	31.03	100.91	-	3m./Horz	-	**AVG**
4824	49.26	-9.5	4.63	44.39	54.0	1m./Horz	9.6	**AVG**
Mid Channel								
2442	70.98	-	31.03	102.01	-	3m./Horz	-	**AVG**
4884	47.36	-9.5	4.50	42.36	54.0	1m./Horz	11.6	**AVG**
High Channel								
2462	70.63	-	31.03	101.66	-	3m./Horz	-	**AVG**
4924	43.66	-9.5	4.64	38.80	54.0	1m./Horz	15.2	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	49.26	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	44.39	dBuV/m

Test Date: August 11-12, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

Table 16. 802.11g Peak Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	80.19	-	31.03	111.22	-	3m./Horz	-	**PK**
4824	62.09	-9.5	4.63	57.22	74.0	1m./Horz	16.8	**PK**
Mid Channel								
2442	81.67	-	31.03	112.70	-	3m./Horz	-	**PK**
4884	61.00	-9.5	4.5	56.00	74.0	1m./Horz	18.0	**PK**
High Channel								
2462	81.82	-	31.03	112.85	-	3m./Horz	-	**PK**
4924	56.54	-9.5	4.64	51.68	74.0	1m./Horz	22.3	**PK**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	62.09	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	57.22	dBuV/m

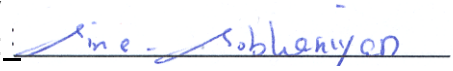
Test Date: August 11-12, 2015
Tested By
Signature:  Name: Sina Sobhaniyan

Table 17. 802.11g Average Radiated Fundamental & Harmonic Emissions with U.FL Antenna

Test: FCC Part 15, Para 15.209, 15.247(d)					**Client:** Inventek			
Project: 15-0108					**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuV)**	**Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
2412	62.13	-	31.03	93.16	-	3m./Horz	-	**AVG**
4824	45.72	-9.5	4.63	40.85	54.0	1m./Horz	13.2	**AVG**
Mid Channel								
2442	63.40	-	31.03	94.43	-	3m./Horz	-	**AVG**
4884	44.42	-9.5	4.5	39.42	54.0	1m./Horz	14.6	**AVG**
High Channel								
2462	63.24	-	31.03	94.27	-	3m./Horz	-	**AVG**
4924	41.66	-9.5	4.64	36.80	54.0	1m./Horz	17.2	**AVG**

1. (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
3. Measurements taken at 1 meter were extrapolated to 3 meters using a factor of (-9.5 dB).
4. The EUT was placed in three orthogonal positions, tested while broadcasting from each antenna, and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 4824 MHz:

Magnitude of Measured Frequency	45.72	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	4.63	dB/m
1 meter to 3 meter extrapolation	-9.50	dB
Corrected Result	40.85	dBuV/m

Test Date: August 11-12, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

2.11 Band Edge Measurements – (CFR 15.247 (d))

Band Edge measurements are made following the guidelines in FCC KDB Publication No. 558074 with the EUT initially operating on the Lowest Channel and then operating on the Highest Channel within its band of operation. Antenna port conducted measurements are performed to demonstrate compliance with the requirement of 15.247(d) that all emissions outside of the band edges be attenuated by at least 20 dB when compared to its highest in-band value (contained in a 100 kHz band).

To capture the band edge, set the Spectrum Analyzer frequency span set to 2 MHz to capture the peak level of the emission operating on the channel closest to the band edge as well as any modulation products falling outside of the authorized band of operation. Conducted measurements are performed with RBW approximately 1.5X Span. In all cases, the VBW is set ≥ RBW. See figure and calculations below for more detail.

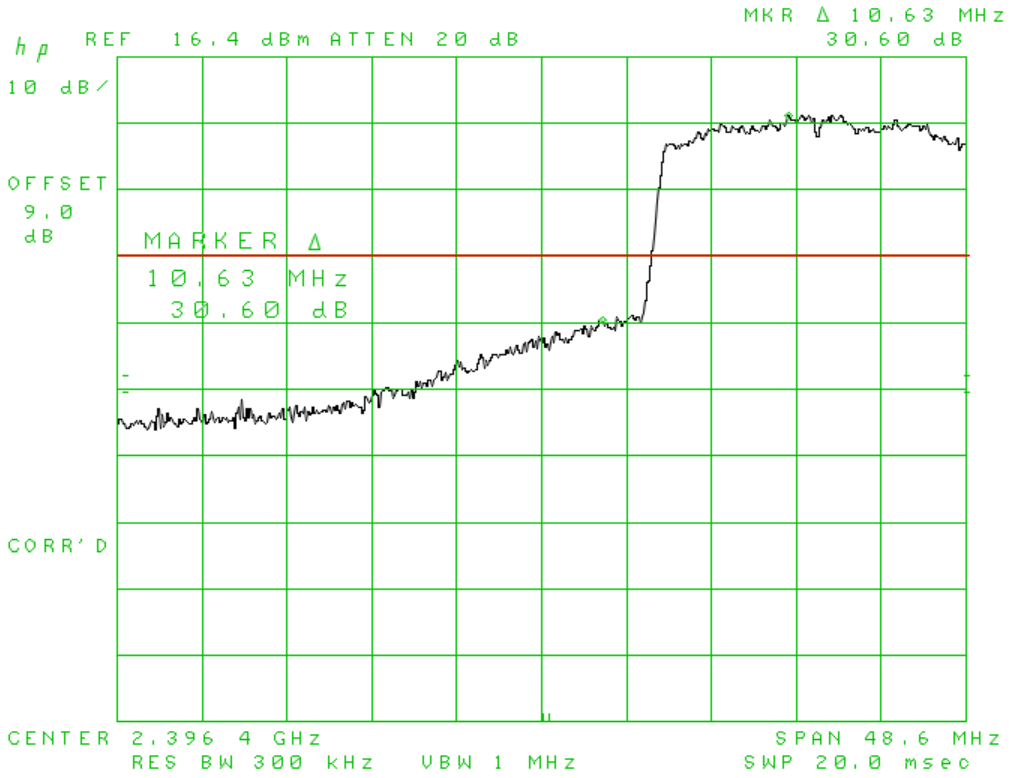


Figure 57. Band Edge Compliance, 802.11n Low Channel Delta - Peak

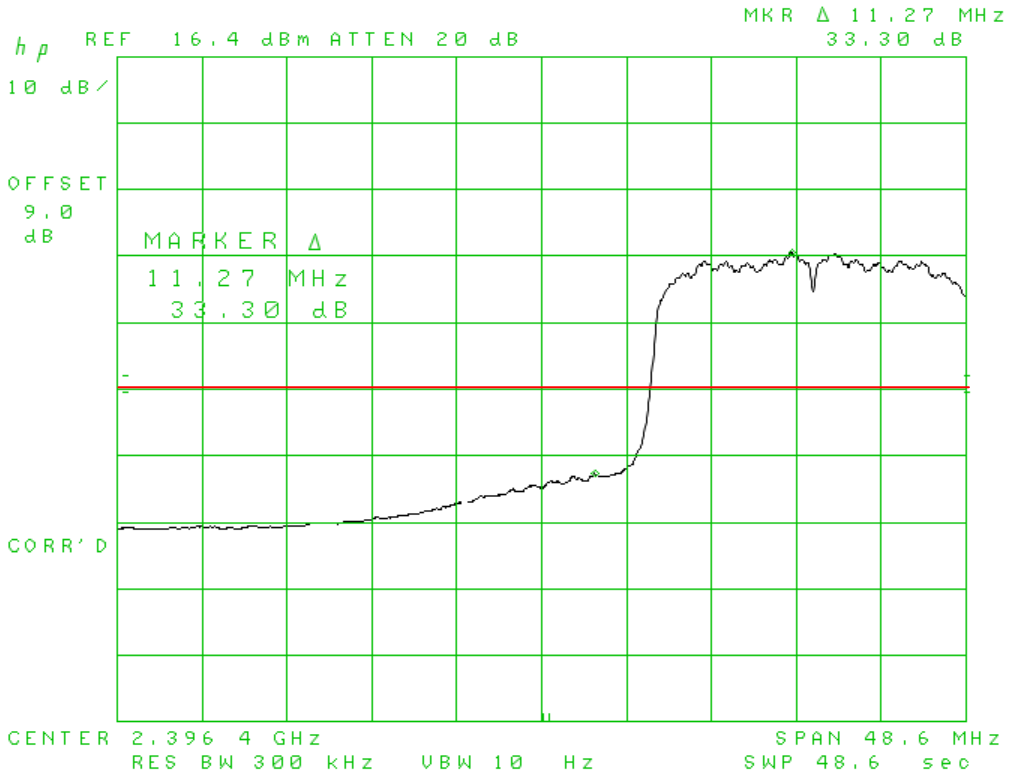


Figure 58. Band Edge Compliance, 802.11n Low Channel Delta - Average

Calculation of worst case lower band edge measurement:

Band Edge Calculated Result	30.60	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	10.60	dB

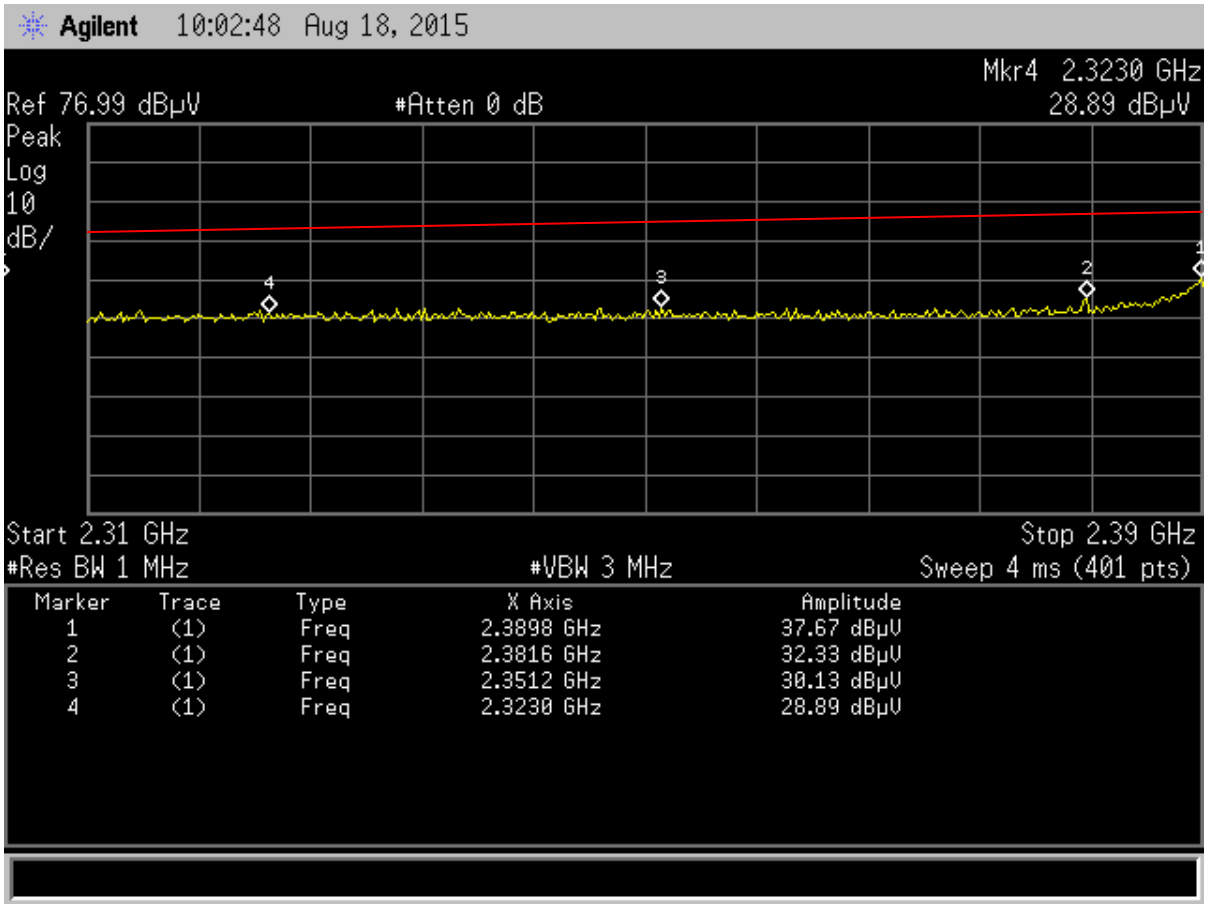


Figure 59. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11n – Peak with Chip Antenna

Table 18. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11n – Peak with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2389.80	37.67	32.12	60.29	74.0	1.0m./HORZ	13.7	**PK**
2381.60	32.33	32.12	54.95	74.0	1.0m./HORZ	19.1	**PK**
2351.20	30.13	31.95	52.58	74.0	1.0m./HORZ	21.4	**PK**
2323.00	28.89	31.95	51.34	74.0	1.0m./HORZ	22.7	**PK**

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

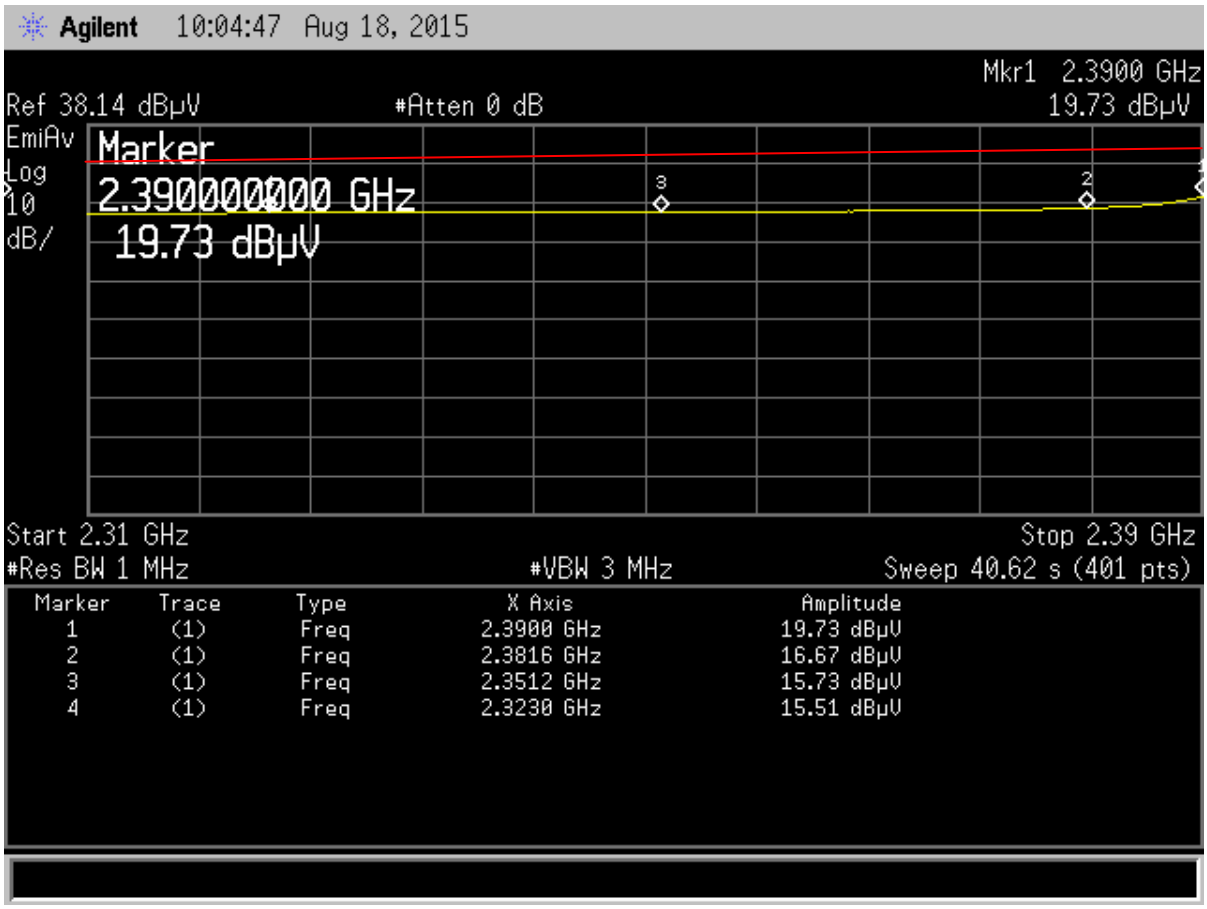
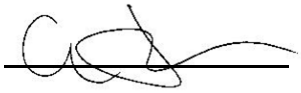


Figure 60. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11n – Average with Chip Antenna

Table 19. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11n – Average with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2390.00	19.73	32.12	42.35	54.0	1.0m./HORZ	11.7	**AVG**
2381.60	16.67	32.12	39.29	54.0	1.0m./HORZ	14.7	**AVG**
2351.20	15.73	31.95	38.18	54.0	1.0m./HORZ	15.8	**AVG**
2323.00	15.51	31.95	37.96	54.0	1.0m./HORZ	16.0	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

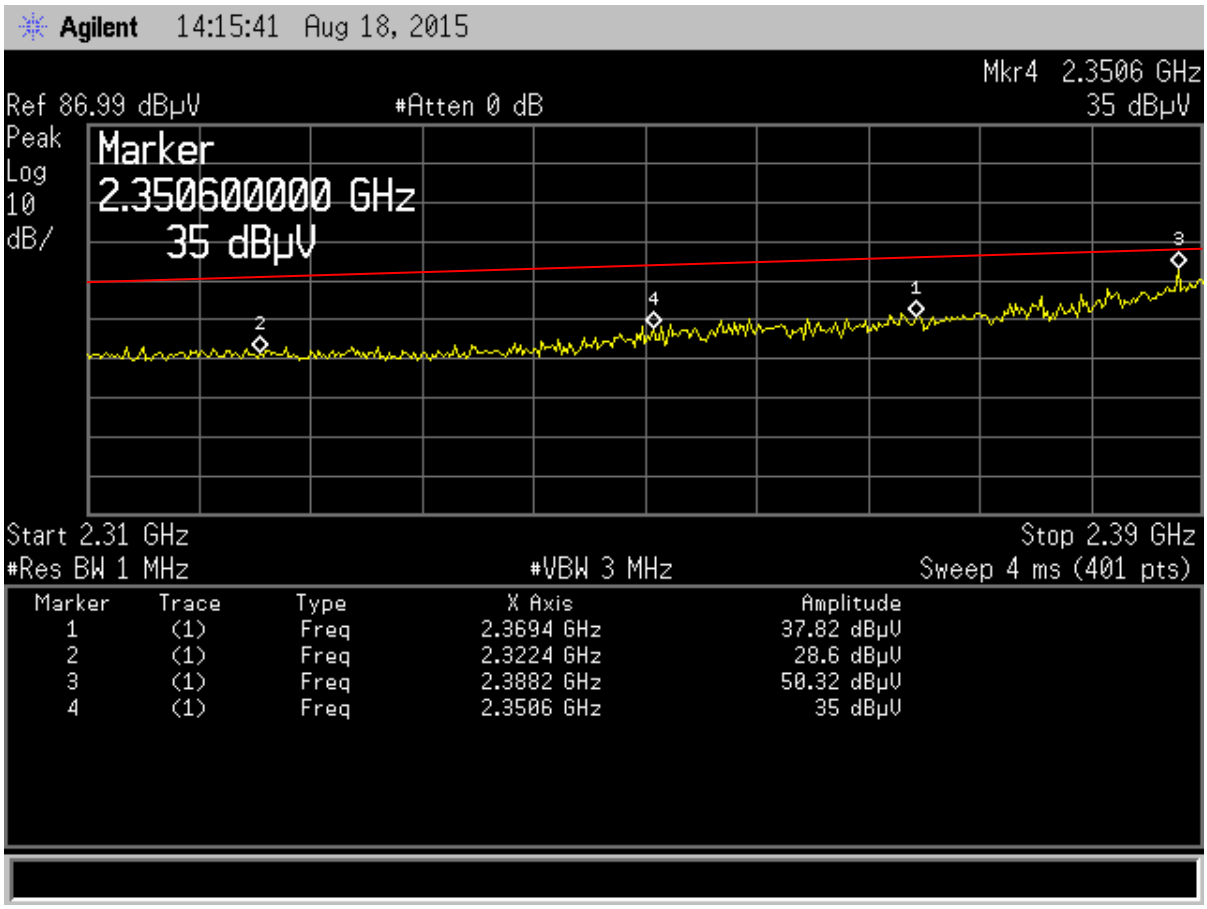
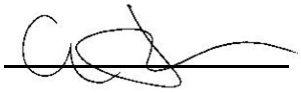


Figure 61. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11n – Peak with U.FL Antenna

Table 20. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11n – Peak with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	37.82	32.12	60.44	74.0	1.0m./HORZ	13.6	**PK**
2322.40	28.60	31.95	51.05	74.0	1.0m./HORZ	23.0	**PK**
2388.20	50.32	32.12	72.94	74.0	1.0m./HORZ	1.1	**PK**
2350.60	35.00	31.95	57.45	74.0	1.0m./HORZ	16.6	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

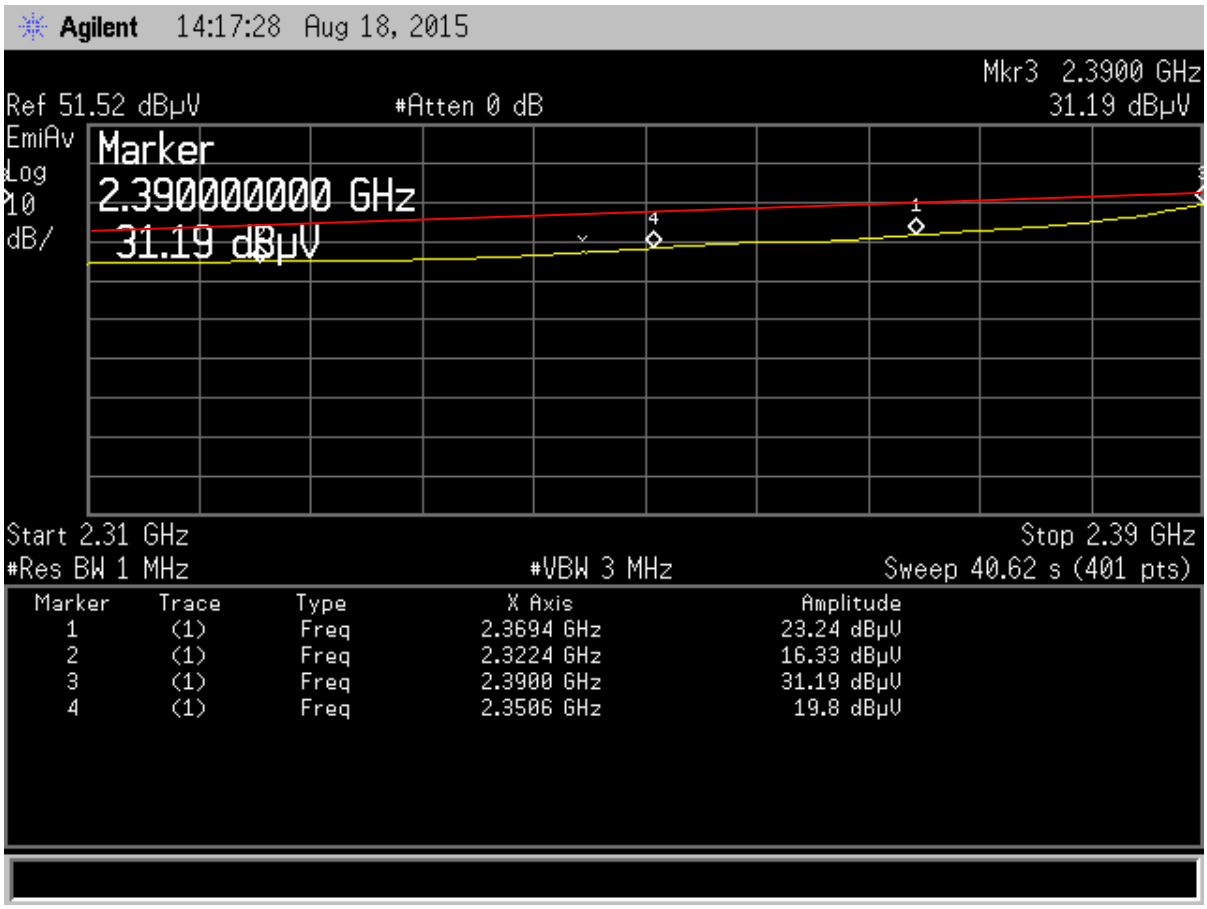
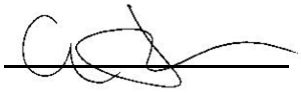


Figure 62. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11n – Average with U.FL Antenna

Table 21. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11n – Average with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	23.24	32.12	45.86	54.0	1.0m./HORZ	8.1	**AVG**
2322.40	16.33	31.95	38.78	54.0	1.0m./HORZ	15.2	**AVG**
2390.00	31.19	32.12	53.81	54.0	1.0m./HORZ	0.2	**AVG**
3250.60	19.80	35.86	46.16	54.0	1.0m./HORZ	7.8	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

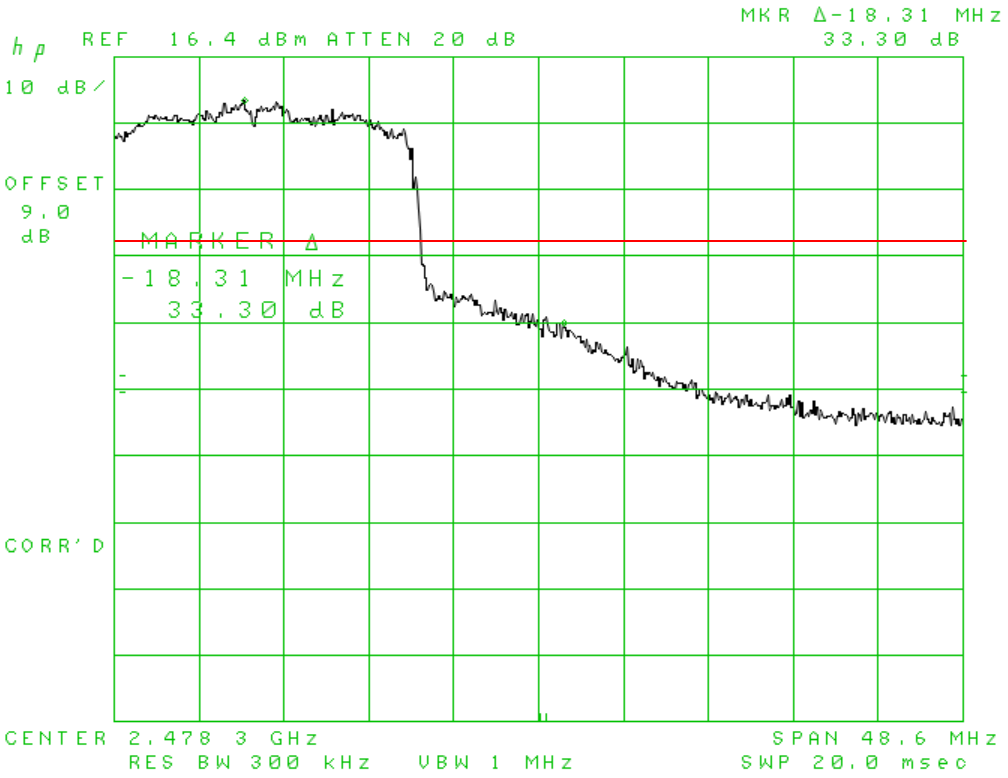


Figure 63. Band Edge Compliance,802.11n High Channel Delta – Peak

Note: Plots shows 20 dB in-band limits. Restricted band emissions evaluated below.

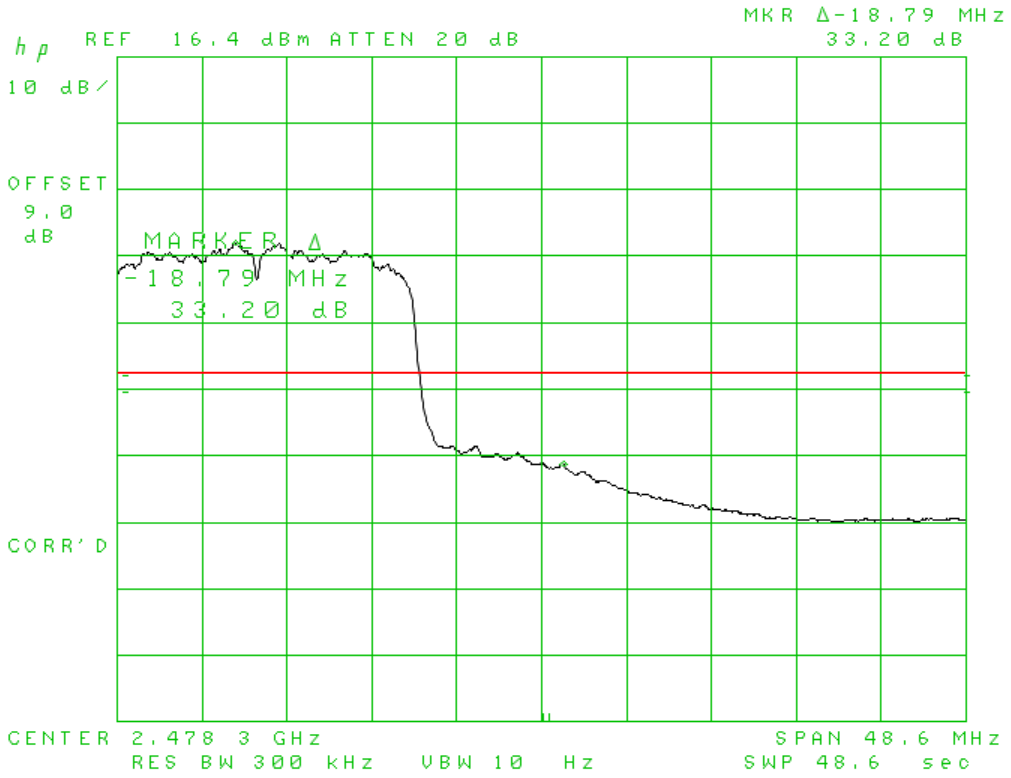


Figure 64. Band Edge Compliance, 802.11n High Channel Delta – Average

Note: Plots shows 20 dB in-band limit. Restricted band emissions evaluated below.

Calculation of worst case lower band edge measurement:

Band Edge Calculated Result	33.20	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	13.20	dB

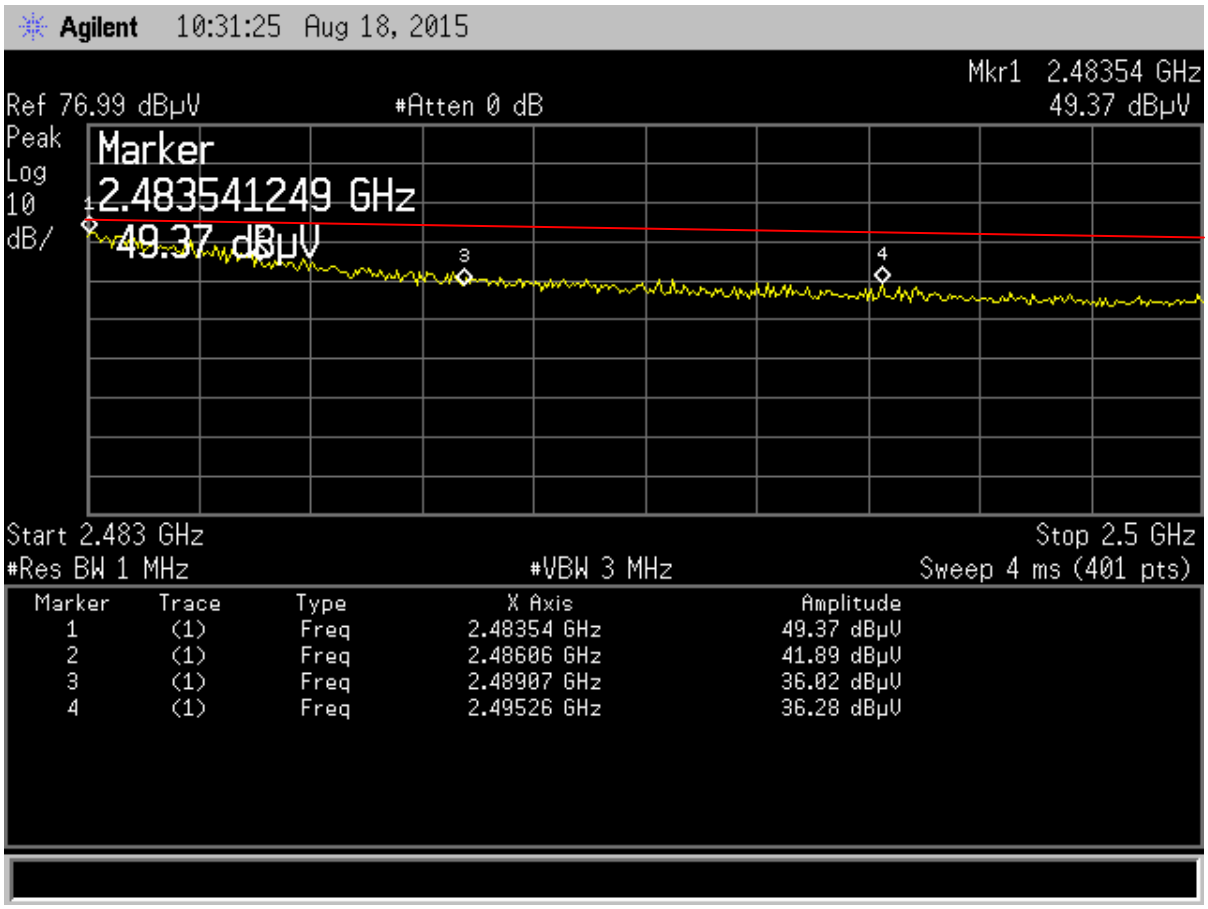
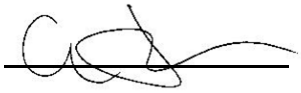


Figure 65. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11n – Peak with Chip Antenna

Table 22. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11n – Peak with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.54	49.37	32.40	72.27	74.0	1.0m./HORZ	1.7	**PK**
2486.06	41.89	32.40	64.79	74.0	1.0m./HORZ	9.2	**PK**
2489.07	36.02	32.40	58.92	74.0	1.0m./HORZ	15.1	**PK**
2495.26	36.28	32.40	59.18	74.0	1.0m./HORZ	14.8	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

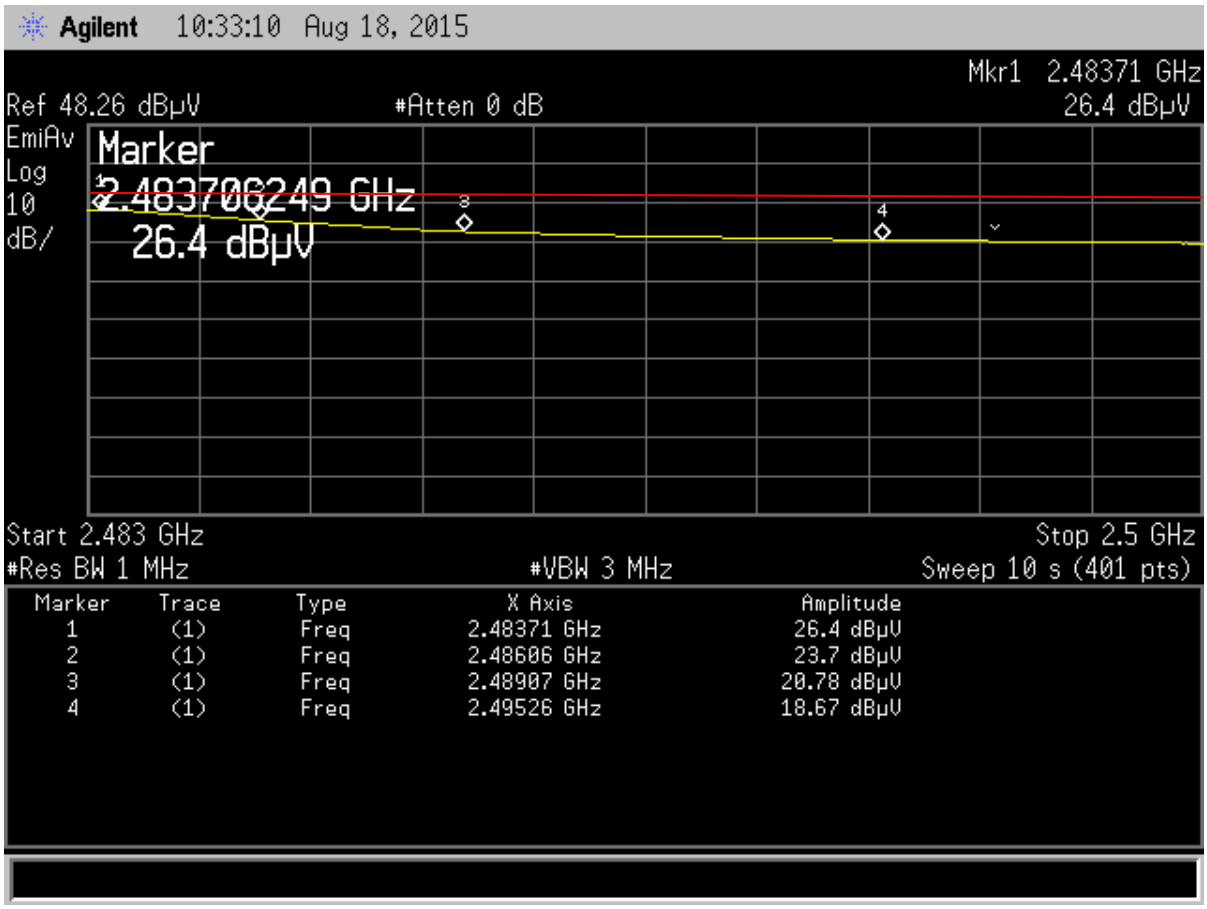
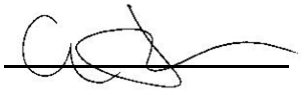


Figure 66. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11n – Average with Chip Antenna

Table 23. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11n – Average with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.71	26.40	32.40	49.30	54.0	1.0m./HORZ	4.7	**AVG**
2486.06	23.70	32.40	46.60	54.0	1.0m./HORZ	7.4	**AVG**
2489.07	20.78	32.40	43.68	54.0	1.0m./HORZ	10.3	**AVG**
2495.26	18.67	32.40	41.57	54.0	1.0m./HORZ	12.4	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

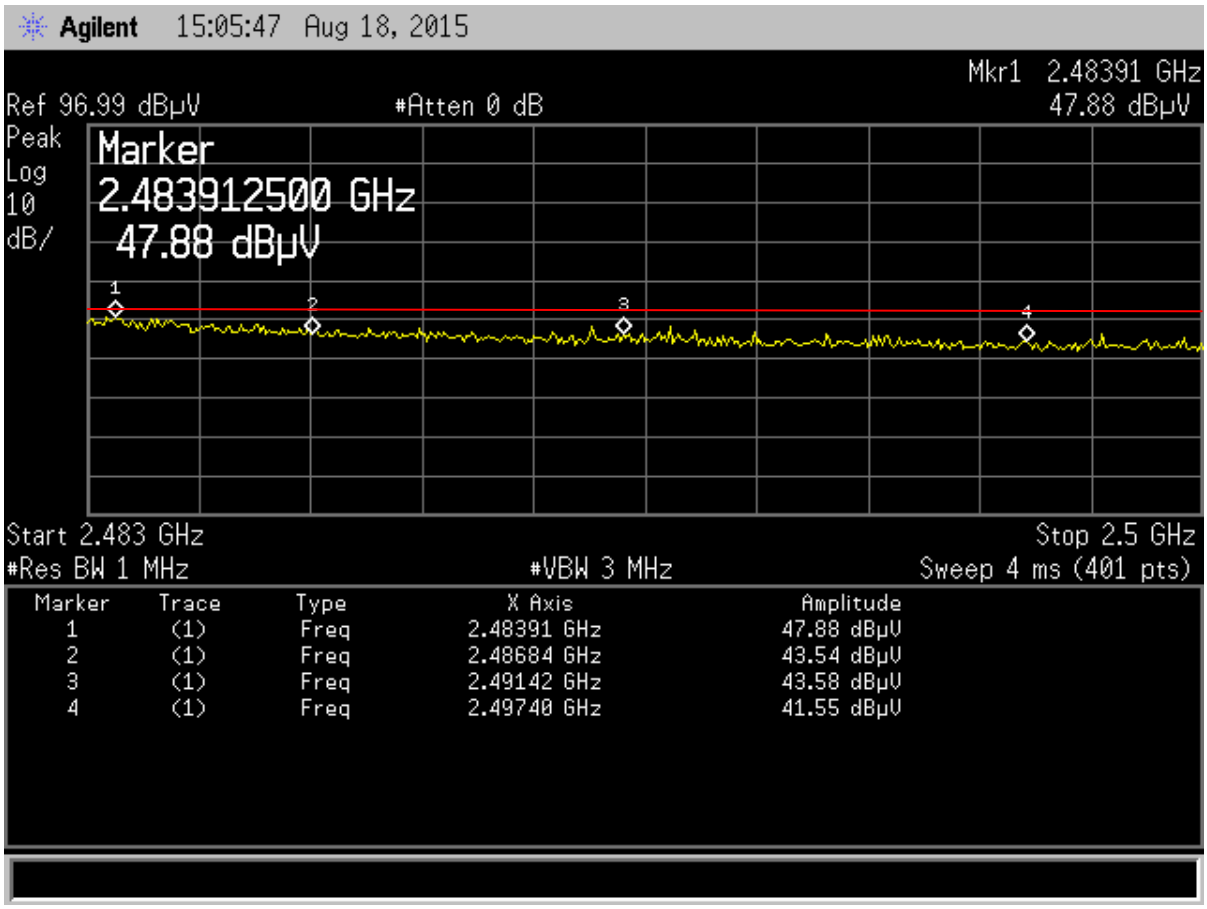
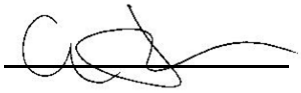


Figure 67. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11n – Peak with U.FL Antenna

Table 24. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11n – Peak with U.FL Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2493.91	47.88	32.40	70.78	74.0	1.0m./HORZ	3.2	**PK**
2486.84	43.54	32.40	66.44	74.0	1.0m./HORZ	7.6	**PK**
2491.42	43.58	32.40	66.48	74.0	1.0m./HORZ	7.5	**PK**
2497.40	41.55	32.40	64.45	74.0	1.0m./HORZ	9.5	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

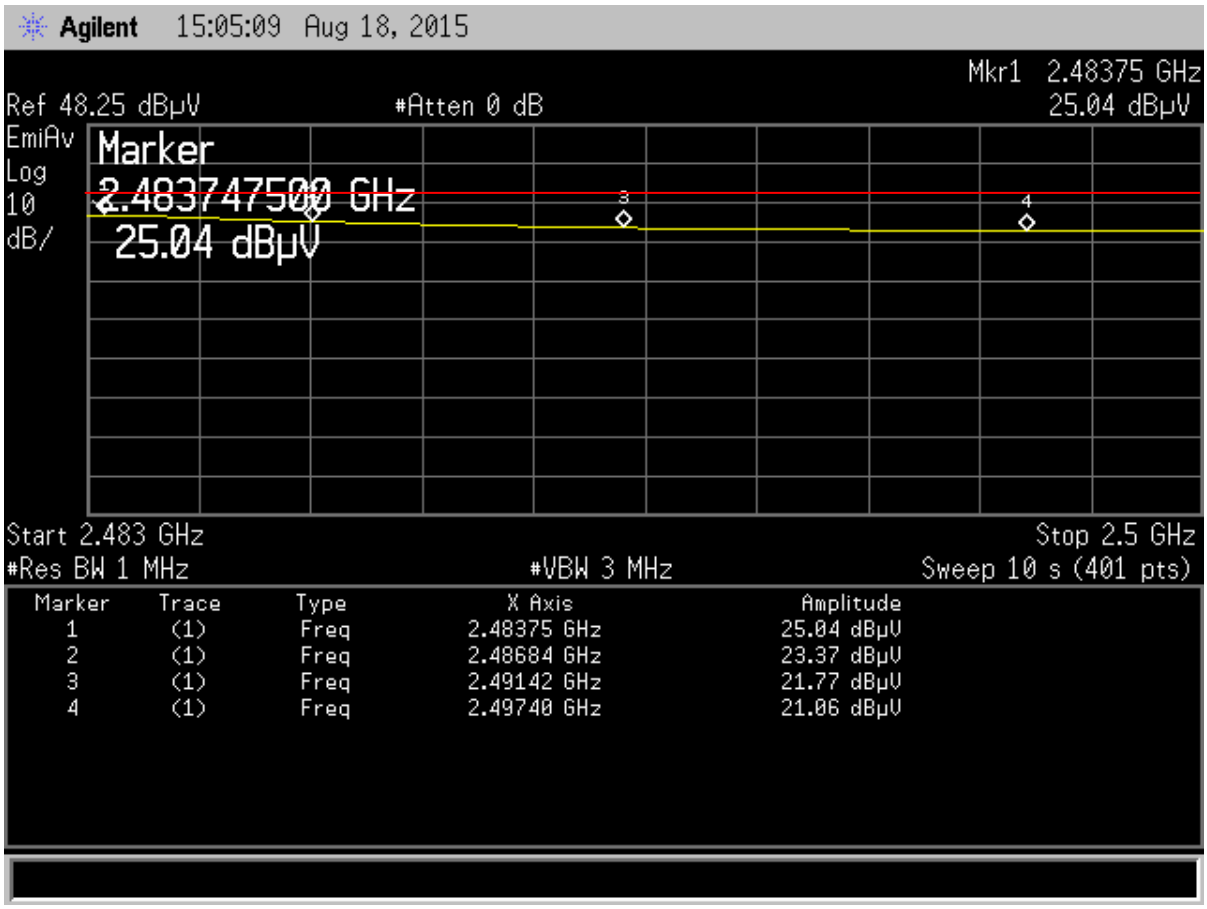
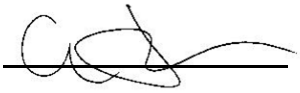


Figure 68. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11n – Average with U.FL Antenna

Table 25. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11n – Average with U.FL Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.75	25.04	32.40	47.94	54.0	1.0m./HORZ	6.1	**AVG**
2486.84	23.37	32.40	46.27	54.0	1.0m./HORZ	7.7	**AVG**
2491.42	21.77	32.40	44.67	54.0	1.0m./HORZ	9.3	**AVG**
2497.40	21.06	32.40	43.96	54.0	1.0m./HORZ	10.0	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

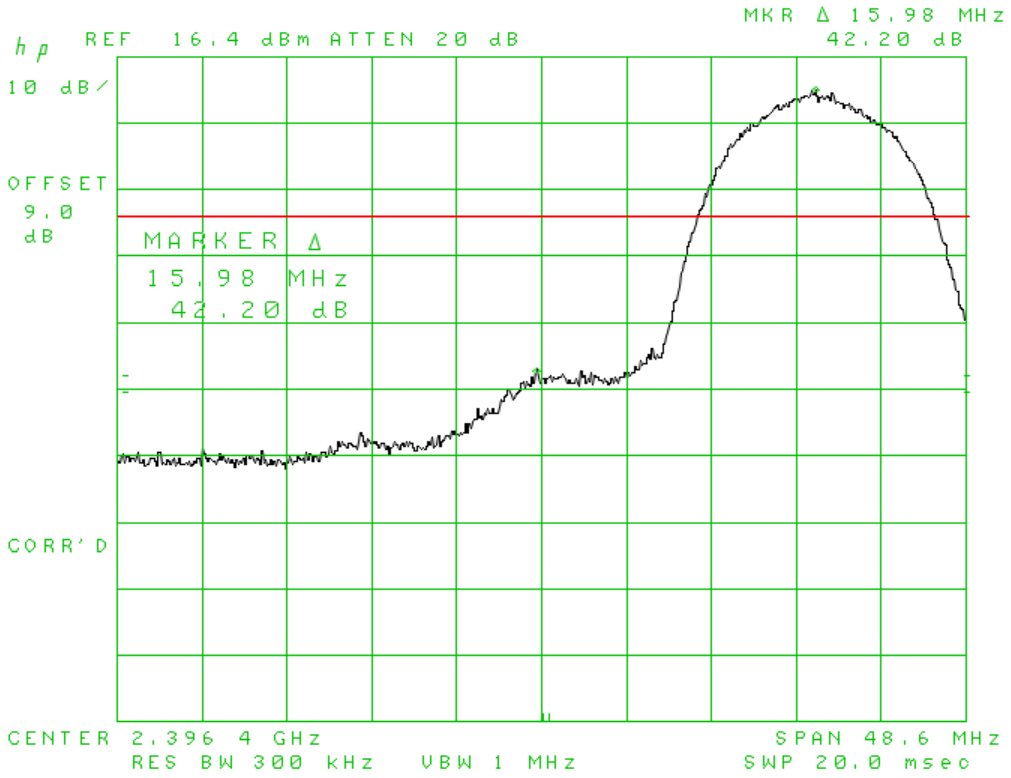


Figure 69. Band Edge Compliance, 802.11b Low Channel Delta - Peak

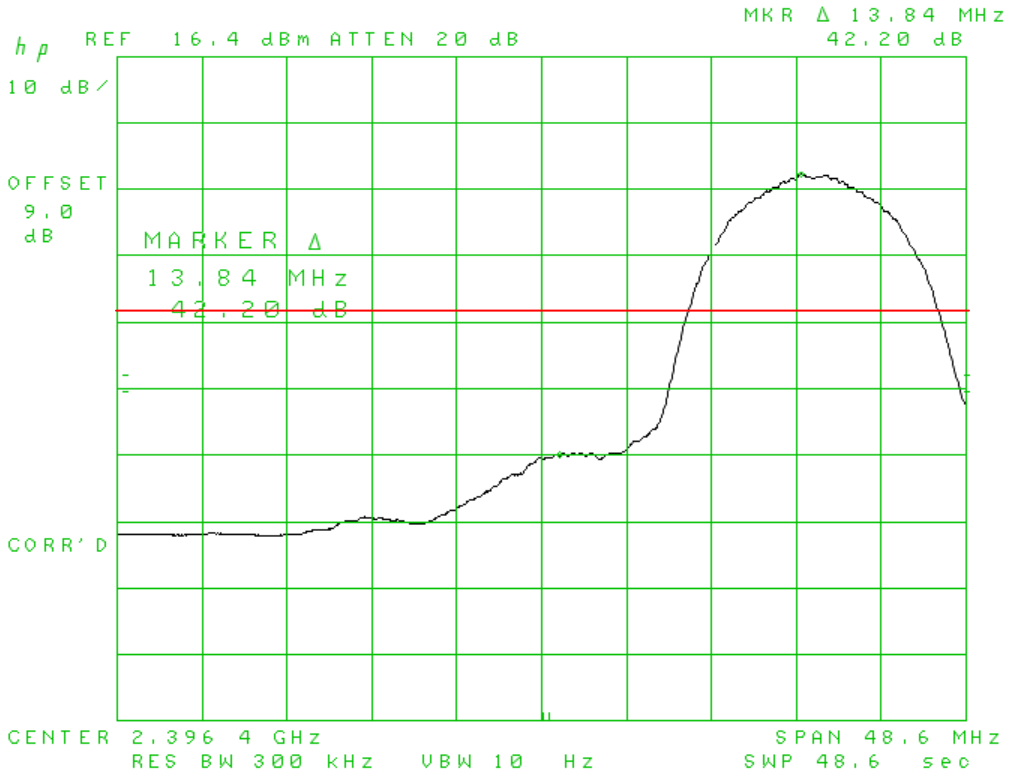


Figure 70. Band Edge Compliance, 802.11b Low Channel Delta - Average

Calculation of worst case lower band edge measurement:

Band Edge Calculated Result	42.20	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	20.20	dB

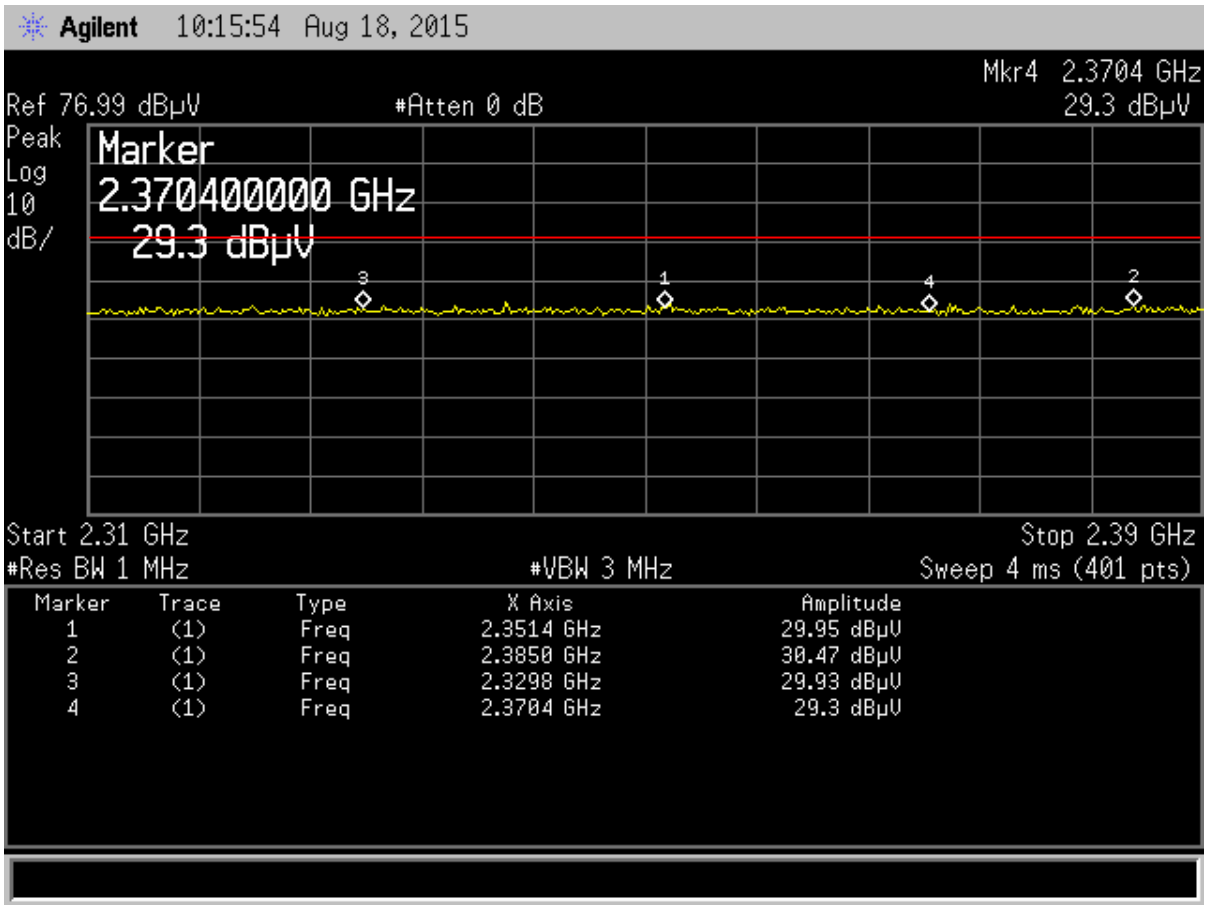


Figure 71. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11b – Peak with Chip Antenna

Table 26. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11b – Peak with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2351.40	29.95	31.95	52.40	74.0	1.0m./HORZ	21.6	**PK**
2385.00	30.47	32.12	53.09	74.0	1.0m./HORZ	20.9	**PK**
2329.80	29.93	31.95	52.38	74.0	1.0m./HORZ	21.6	**PK**
2370.40	29.30	32.12	51.92	74.0	1.0m./HORZ	22.1	**PK**

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

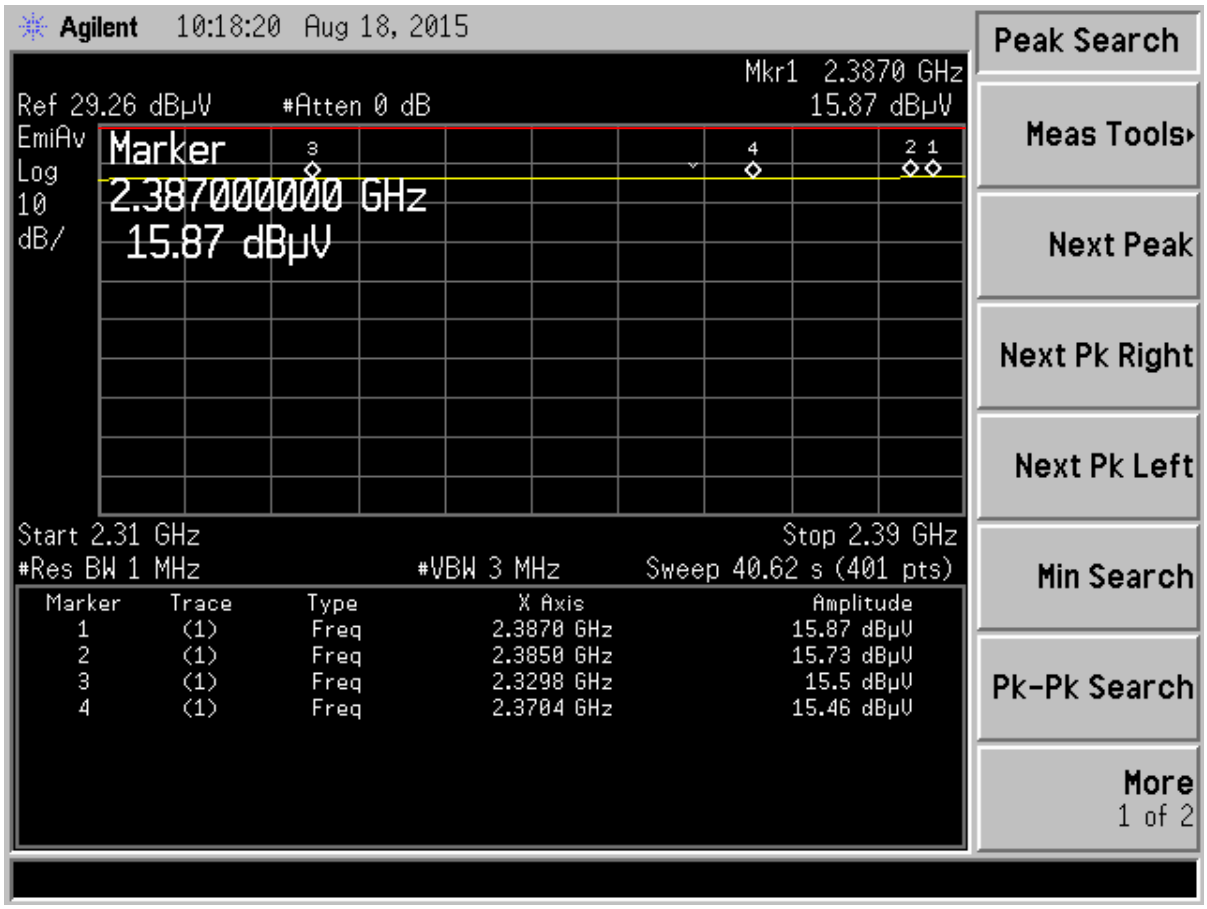
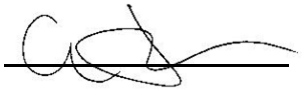


Figure 72. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11b –Average with Chip Antenna

Table 27. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11b – Average with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2387.00	15.87	32.12	38.49	54.0	1.0m./HORZ	15.5	**AVG**
2385.00	15.73	32.12	38.35	54.0	1.0m./HORZ	15.7	**AVG**
2329.80	15.50	31.95	37.95	54.0	1.0m./HORZ	16.1	**AVG**
2370.40	15.46	32.12	38.08	54.0	1.0m./HORZ	15.9	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

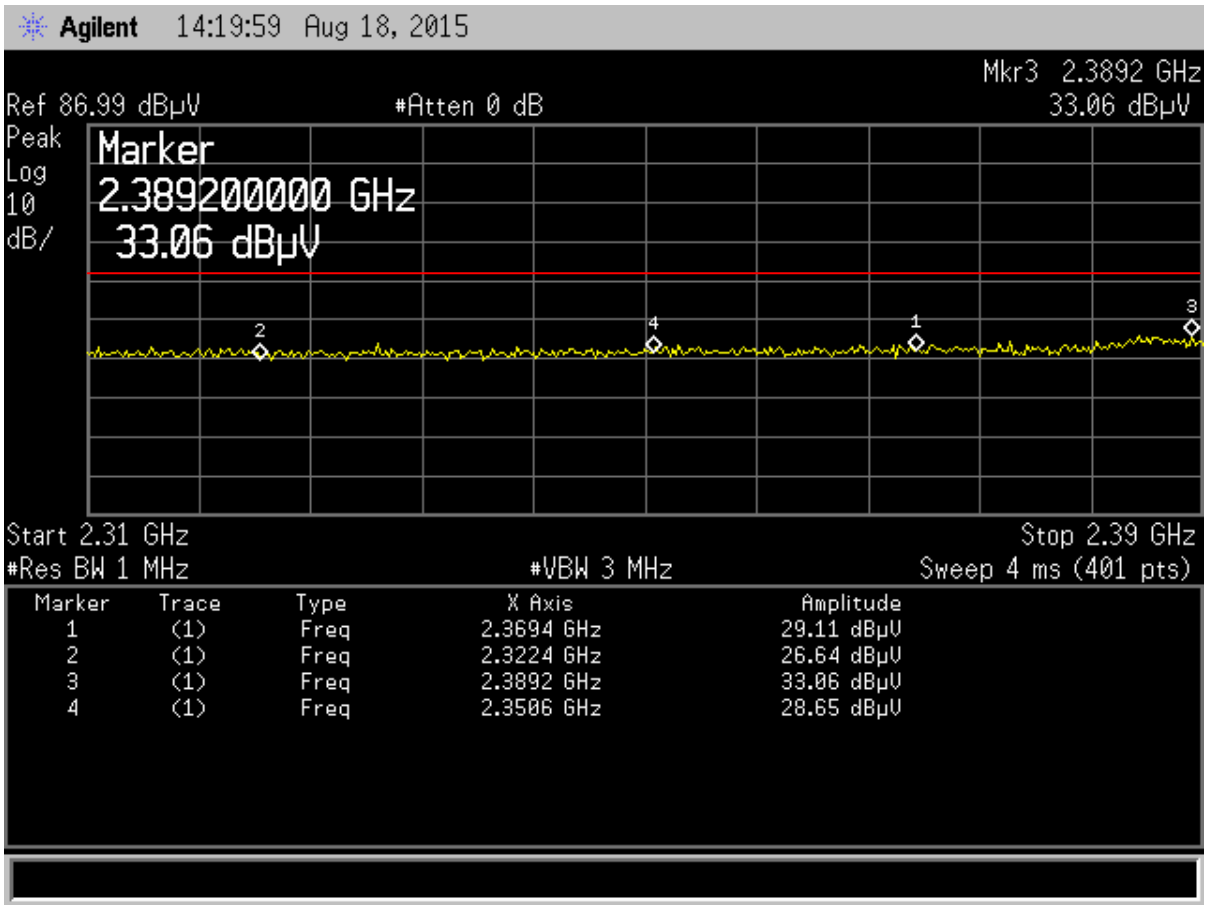
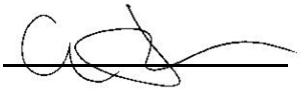


Figure 73. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11b – Peak with U.FL Antenna

Table 28. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11b – Peak with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	29.11	32.12	51.73	74.0	1.0m./HORZ	22.3	**PK**
2322.40	26.64	31.95	49.09	74.0	1.0m./HORZ	24.9	**PK**
2389.20	33.06	32.12	55.68	74.0	1.0m./HORZ	18.3	**PK**
2350.60	28.65	31.95	51.10	74.0	1.0m./HORZ	22.9	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

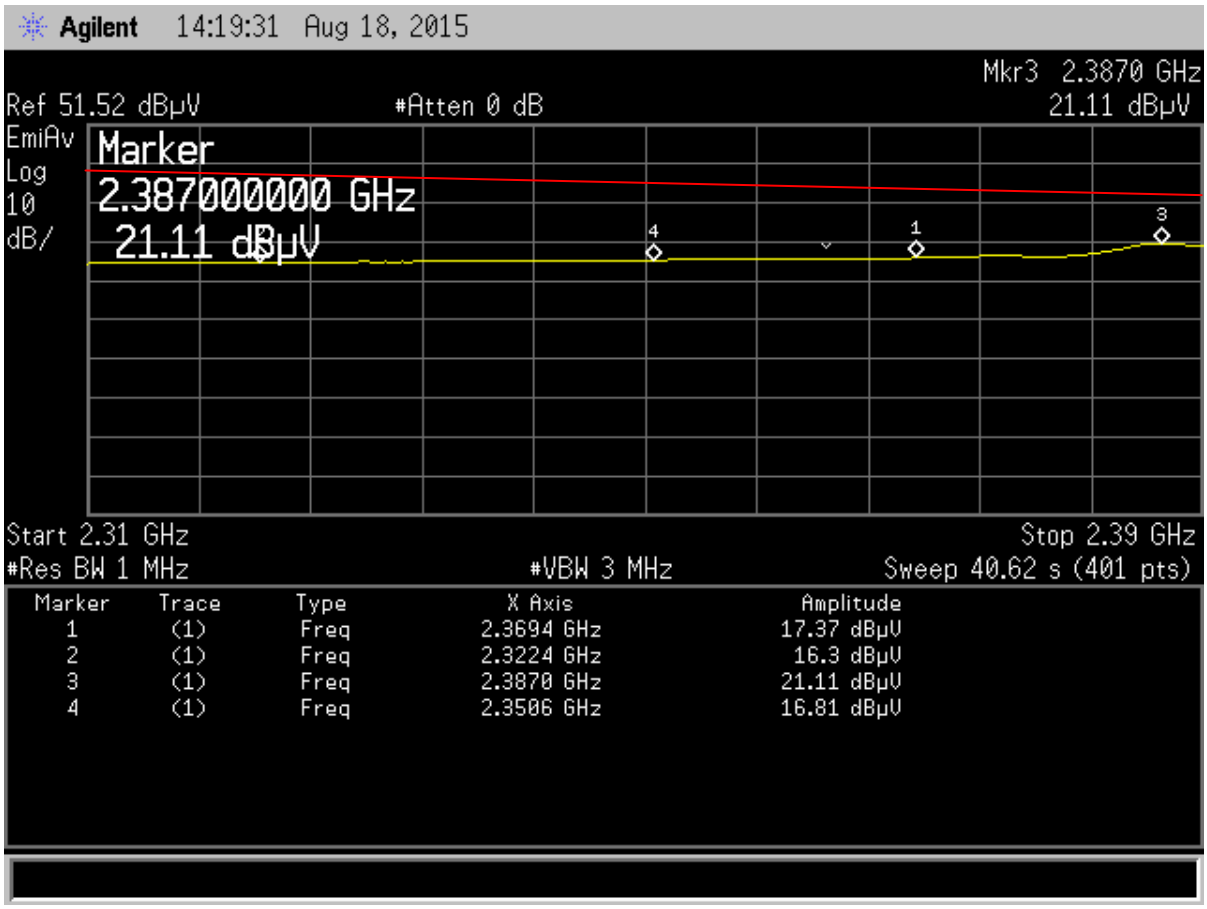


Figure 74. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11b –Average with U.FL Antenna

Table 29. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11b – Average with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	17.37	32.12	39.99	54.0	1.0m./HORZ	14.0	**AVG**
2322.40	6.30	31.95	28.75	54.0	1.0m./HORZ	25.3	**AVG**
2387.00	21.11	32.12	43.73	54.0	1.0m./HORZ	10.3	**AVG**
2350.60	16.81	31.95	39.26	54.0	1.0m./HORZ	14.7	**AVG**

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

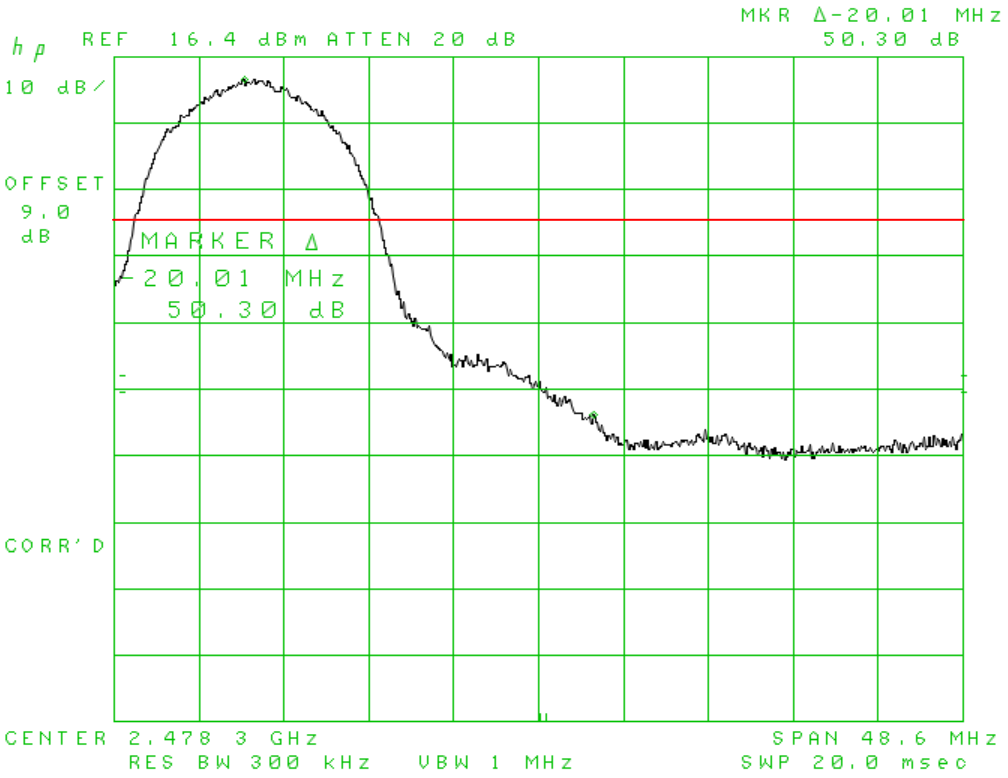


Figure 75. Band Edge Compliance, 802.11b High Channel Delta – Peak

Note: Plots shows 20 dB in-band limit. Restricted band emissions evaluated below.

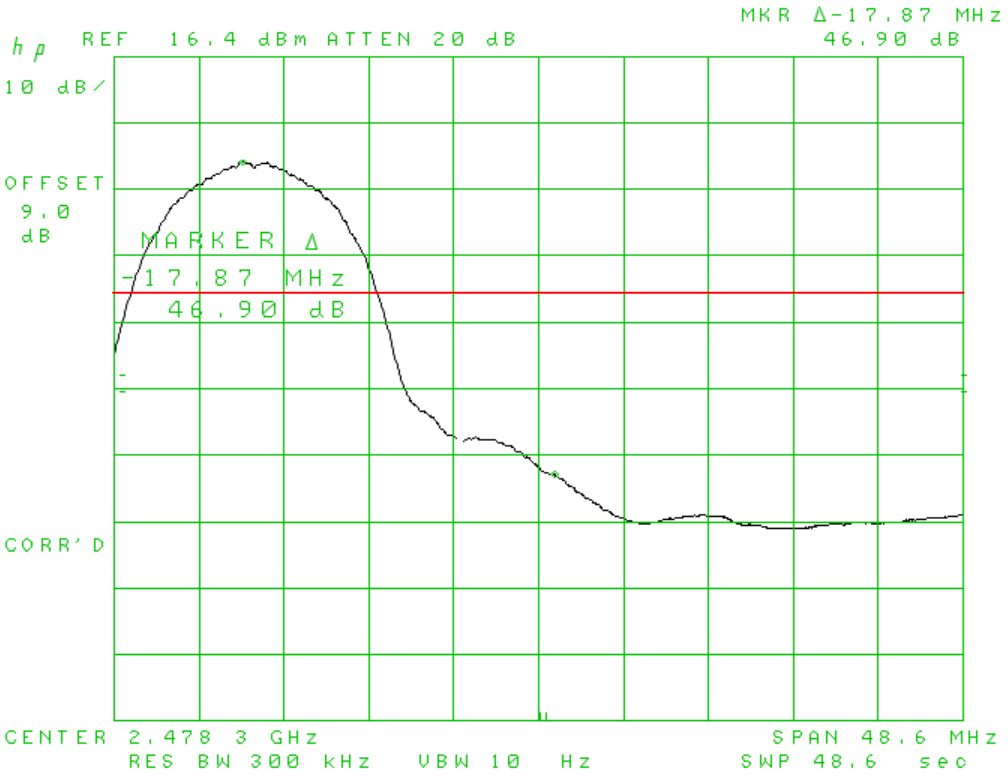


Figure 76. Band Edge Compliance, 802.11b High Channel Delta – Average

Note: Plots shows 20 dB in-band limit. Restricted band emissions evaluated below.

Calculation of worst case upper band edge measurement:

Band Edge Calculated Result	46.90	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	26.90	dB

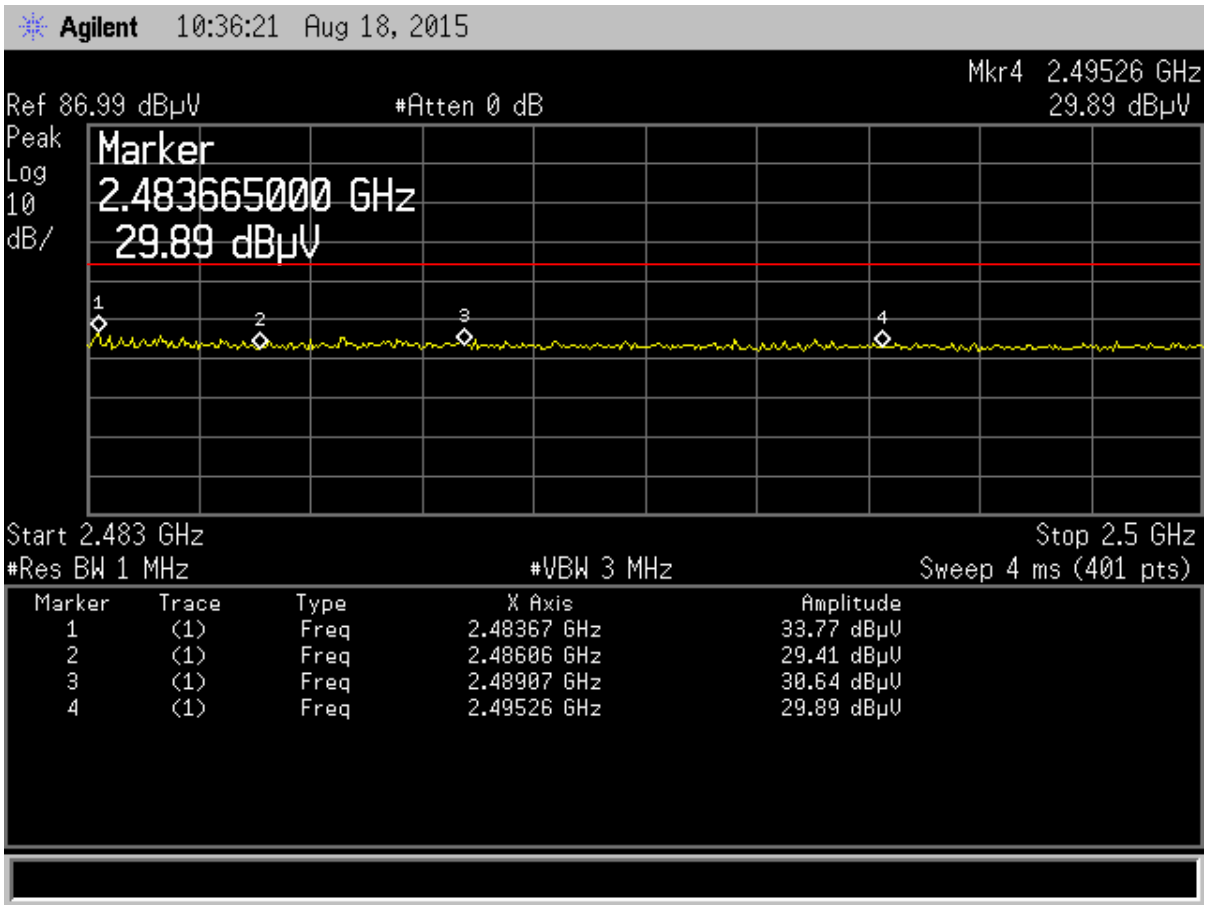
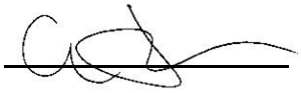


Figure 77. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Peak with Chip Antenna

Table 30. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Peak with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.67	33.77	32.40	56.67	54.0	1.0m./HORZ	17.3	**PK**
2486.06	29.41	32.40	52.31	54.0	1.0m./HORZ	21.7	**PK**
2489.07	30.64	32.40	53.54	54.0	1.0m./HORZ	20.5	**PK**
2495.26	29.89	32.40	52.79	54.0	1.0m./HORZ	21.2	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

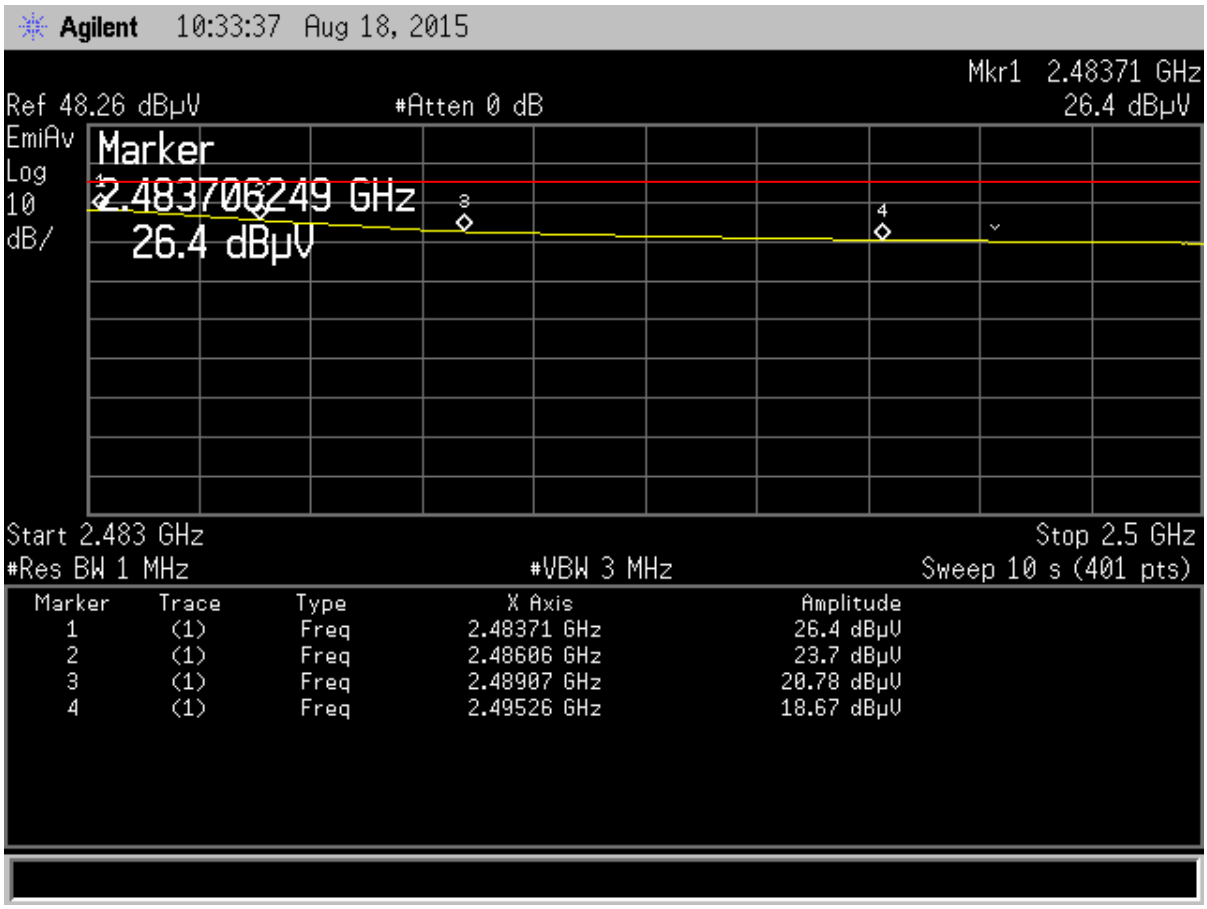
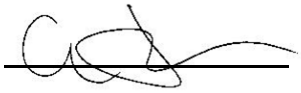


Figure 78. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11b – Average with Chip Antenna

Table 31. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Average with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.71	26.40	32.40	49.30	74.0	1.0m./HORZ	4.7	**AVG**
2486.06	23.70	32.40	46.60	74.0	1.0m./HORZ	7.4	**AVG**
2489.07	20.78	32.40	43.68	74.0	1.0m./HORZ	10.3	**AVG**
2495.26	18.67	32.40	41.57	74.0	1.0m./HORZ	12.4	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

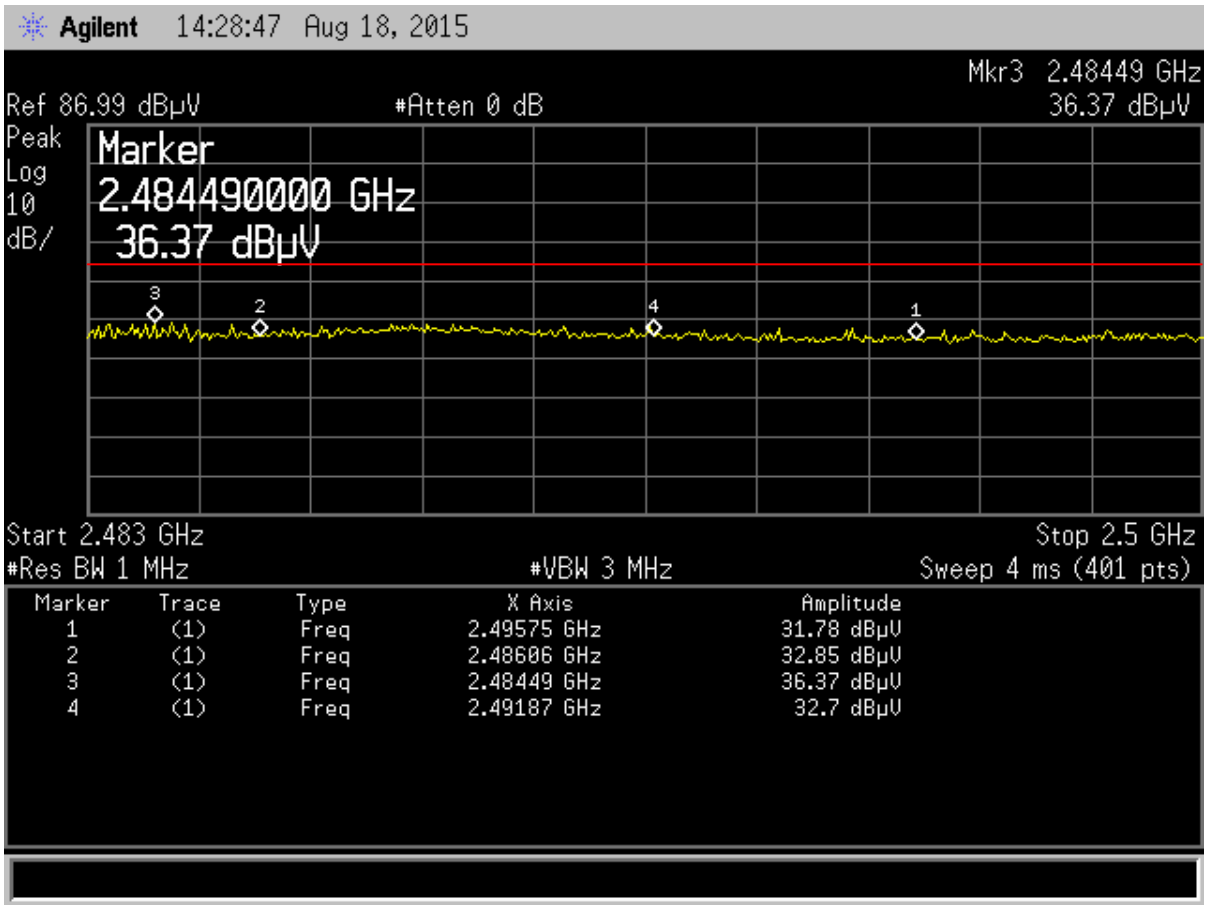
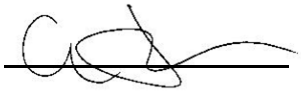


Figure 79. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11b – Peak with U.FL Antenna

Table 32. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Peak with U.FL Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2495.75	31.78	32.40	54.68	74.0	1.0m./HORZ	19.3	**PK**
2486.06	32.85	32.40	55.75	74.0	1.0m./HORZ	18.2	**PK**
2484.49	36.37	32.40	59.27	74.0	1.0m./HORZ	14.7	**PK**
2491.87	32.70	32.40	55.60	74.0	1.0m./HORZ	18.4	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

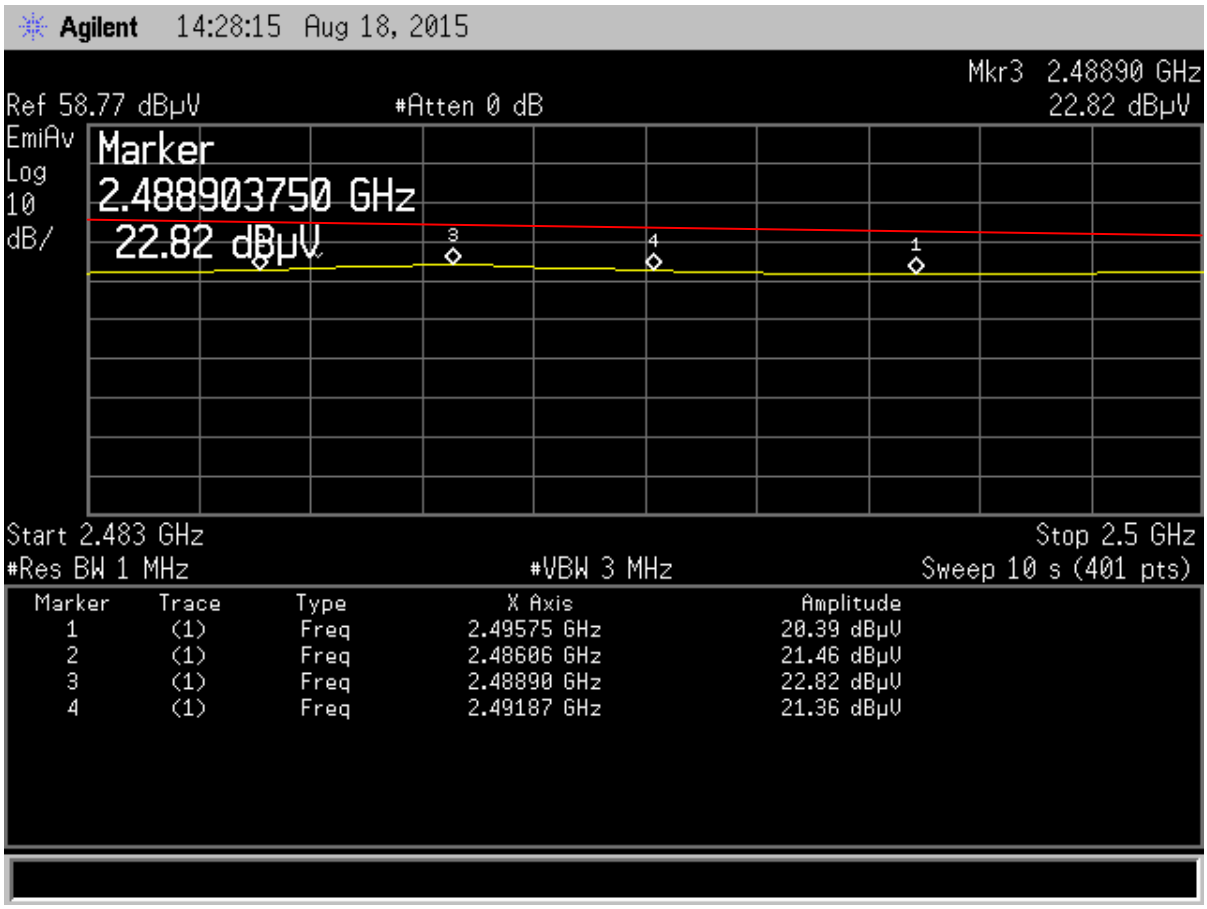
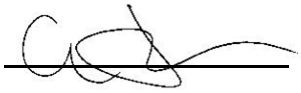


Figure 80. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Average with U.FL Antenna

Table 33. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11b – Average with U.FL Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2495.75	20.39	32.40	43.29	54.0	1.0m./HORZ	10.7	**AVG**
2486.06	21.46	32.40	44.36	54.0	1.0m./HORZ	9.6	**AVG**
2488.90	22.82	32.40	45.72	54.0	1.0m./HORZ	8.3	**AVG**
2491.87	21.36	32.40	44.26	54.0	1.0m./HORZ	9.7	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

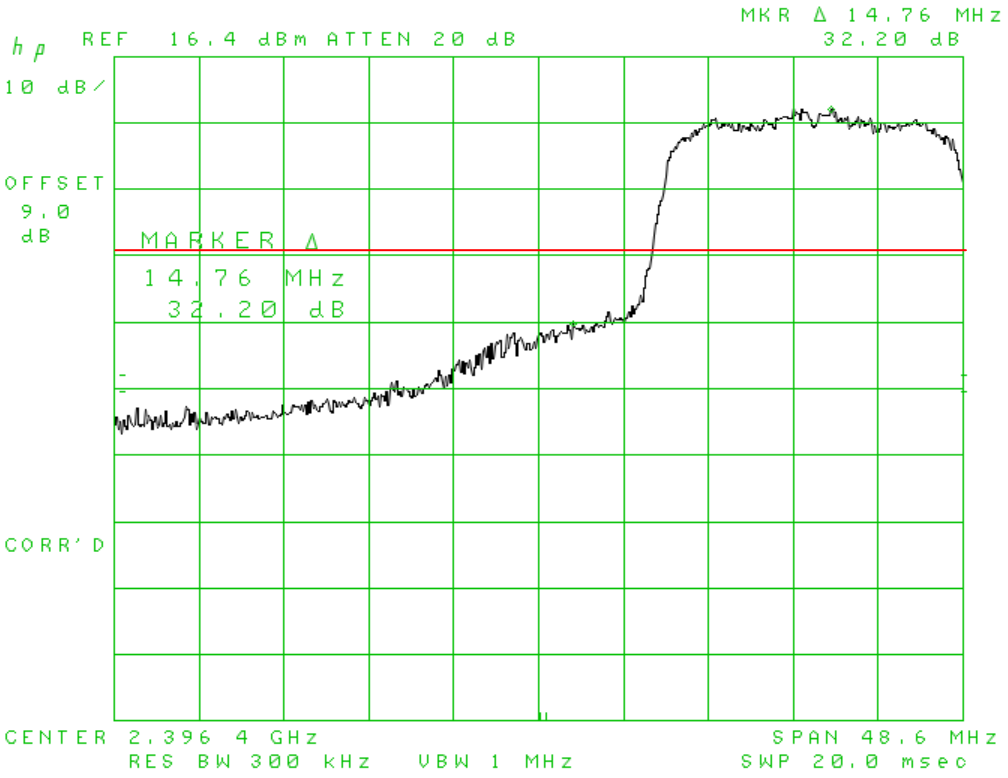


Figure 81. Band Edge Compliance, 802.11g Low Channel Delta – Peak

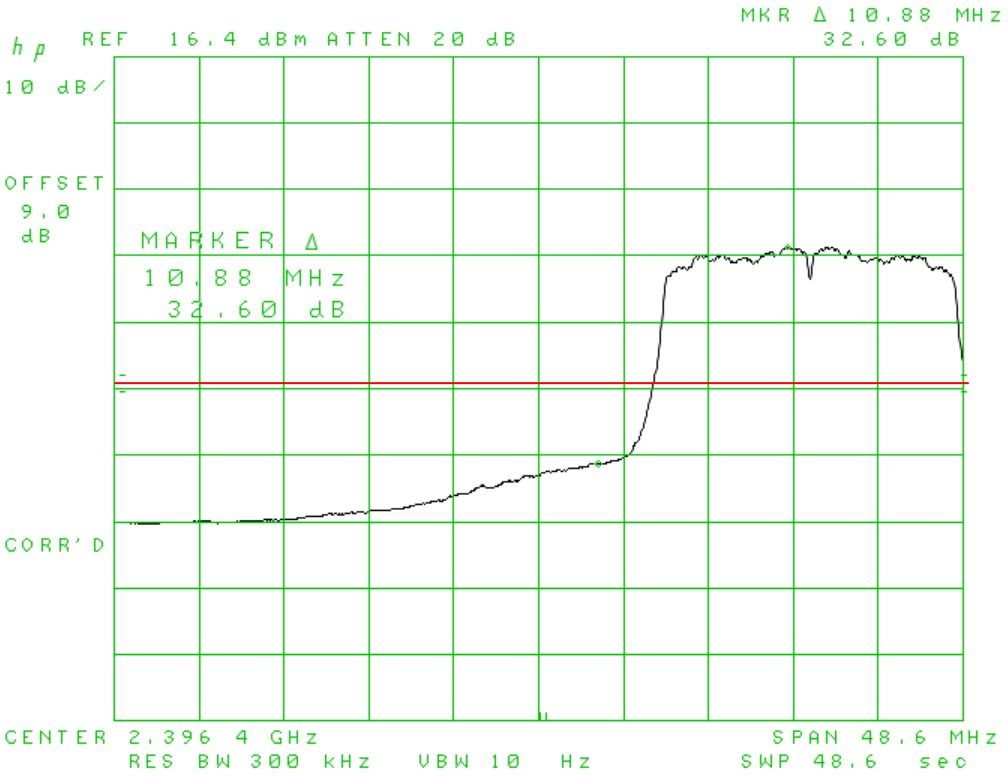


Figure 82. Band Edge Compliance, 802.11g Low Channel Delta - Average

Calculation of worst case lower band edge measurement:

Band Edge Calculated Result	32.20	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	12.20	dB

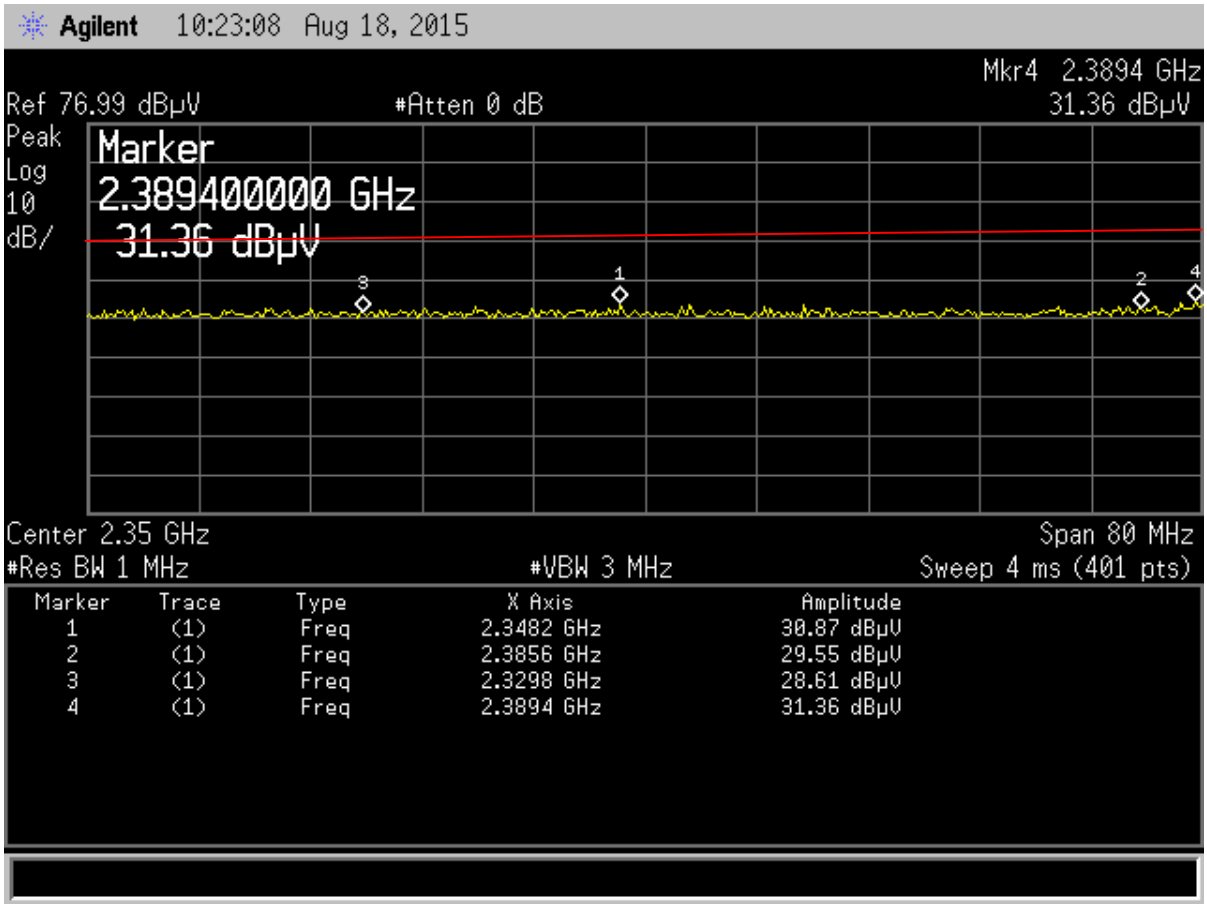


Figure 83. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g – Peak with Chip Antenna

Table 34. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11g – Peak with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2348.20	30.87	31.95	53.32	74.0	1.0m./HORZ	20.7	**PK**
2385.60	29.55	32.12	52.17	74.0	1.0m./HORZ	21.8	**PK**
2329.80	28.61	31.95	51.06	74.0	1.0m./HORZ	22.9	**PK**
2389.40	31.36	32.12	53.98	74.0	1.0m./HORZ	20.0	**PK**

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

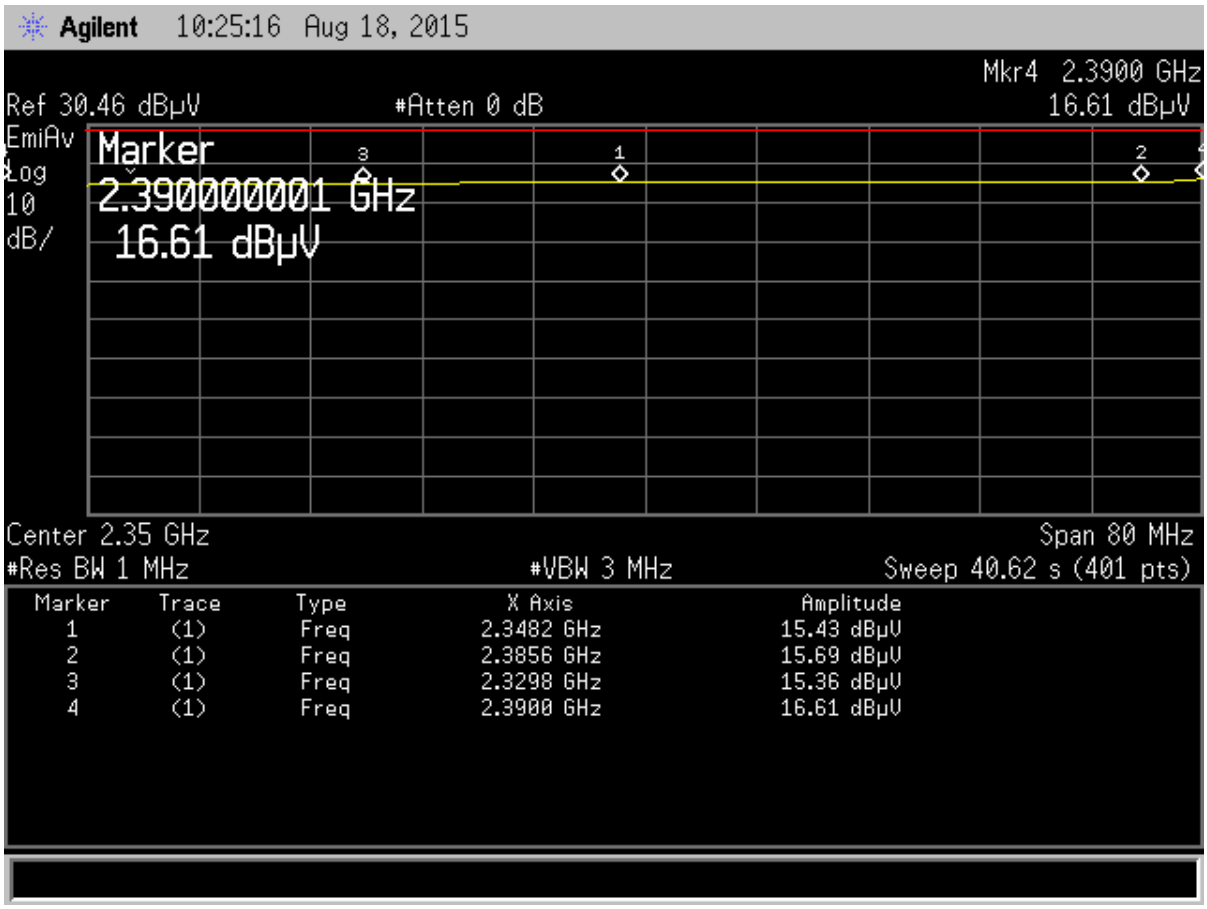


Figure 84. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g –Average with Chip Antenna

Table 35. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11g – Average with Chip Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2348.20	15.43	31.95	37.88	54.0	1.0m./HORZ	16.1	**AVG**
2385.60	15.69	32.12	38.31	54.0	1.0m./HORZ	15.7	**AVG**
2329.80	15.36	31.95	37.81	54.0	1.0m./HORZ	16.2	**AVG**
2390.00	16.61	32.12	39.23	54.0	1.0m./HORZ	14.8	**AVG**

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

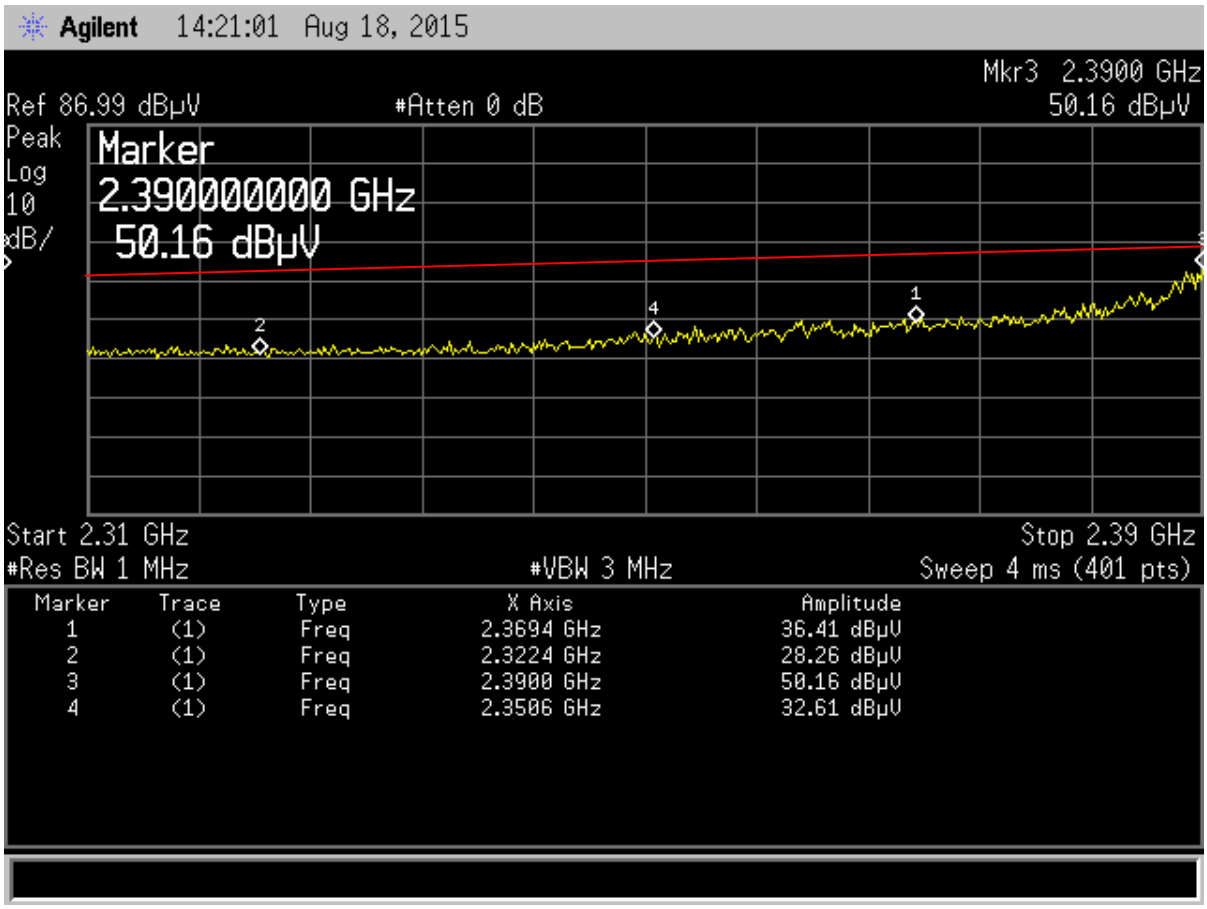
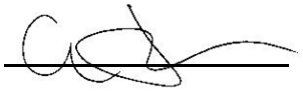


Figure 85. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g – Peak with U.FL Antenna

Table 36. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11g – Peak with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	36.41	32.12	59.03	74.0	1.0m./HORZ	15.0	**PK**
2322.40	28.26	31.95	50.71	74.0	1.0m./HORZ	23.3	**PK**
2390.00	50.16	32.12	72.78	74.0	1.0m./HORZ	1.2	**PK**
2350.60	32.61	31.95	55.06	74.0	1.0m./HORZ	18.9	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

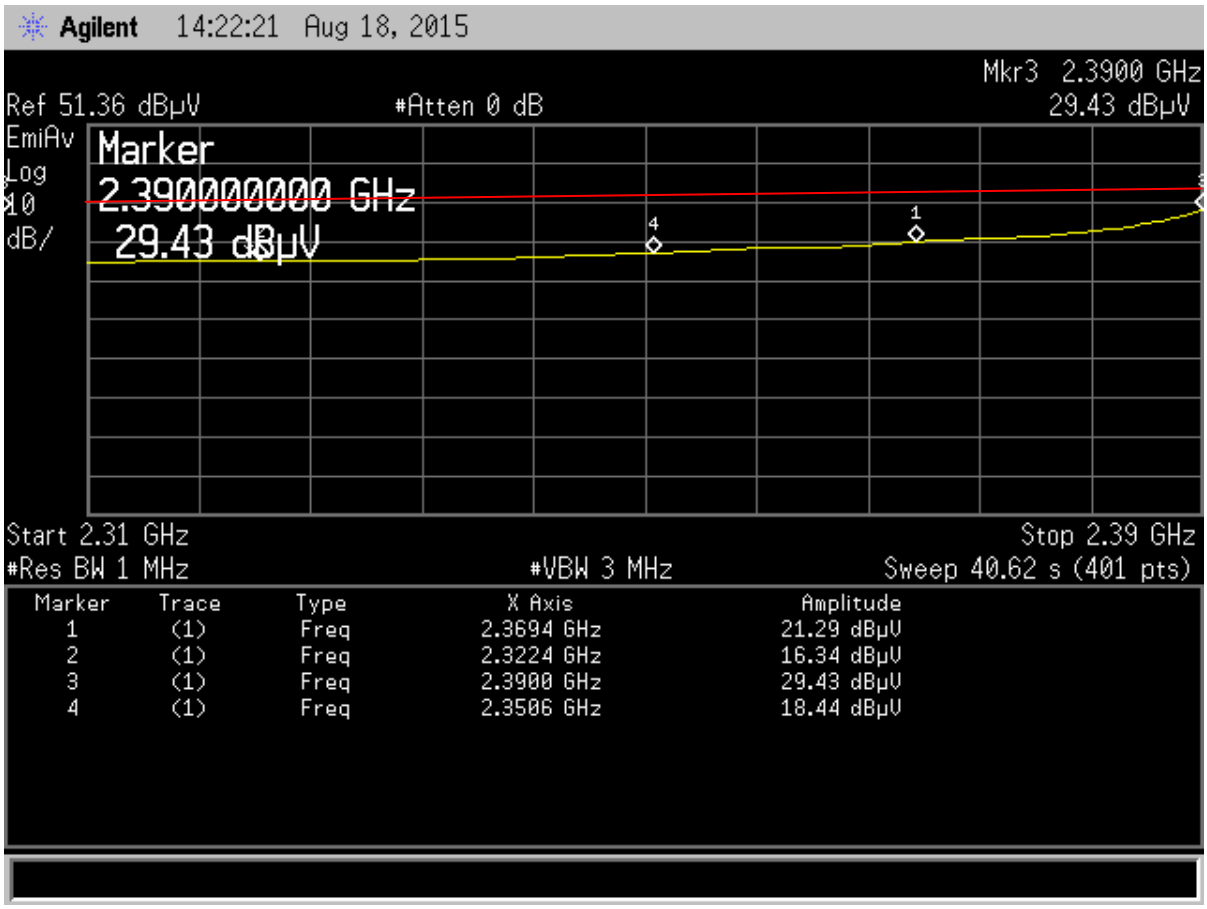
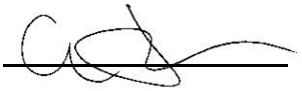


Figure 86. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g –Average with U.FL Antenna

Table 37. Radiated Restricted Band 2310 MHz to 2390 MHz, 802.11g – Average with U.FL Antenna

2310 MHz to 2390 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2369.40	21.29	32.12	43.91	54.0	1.0m./HORZ	10.1	**AVG**
2322.40	16.34	31.95	38.79	54.0	1.0m./HORZ	15.2	**AVG**
2390.00	29.43	32.12	52.05	54.0	1.0m./HORZ	2.0	**AVG**
2350.60	18.44	31.95	40.89	54.0	1.0m./HORZ	13.1	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

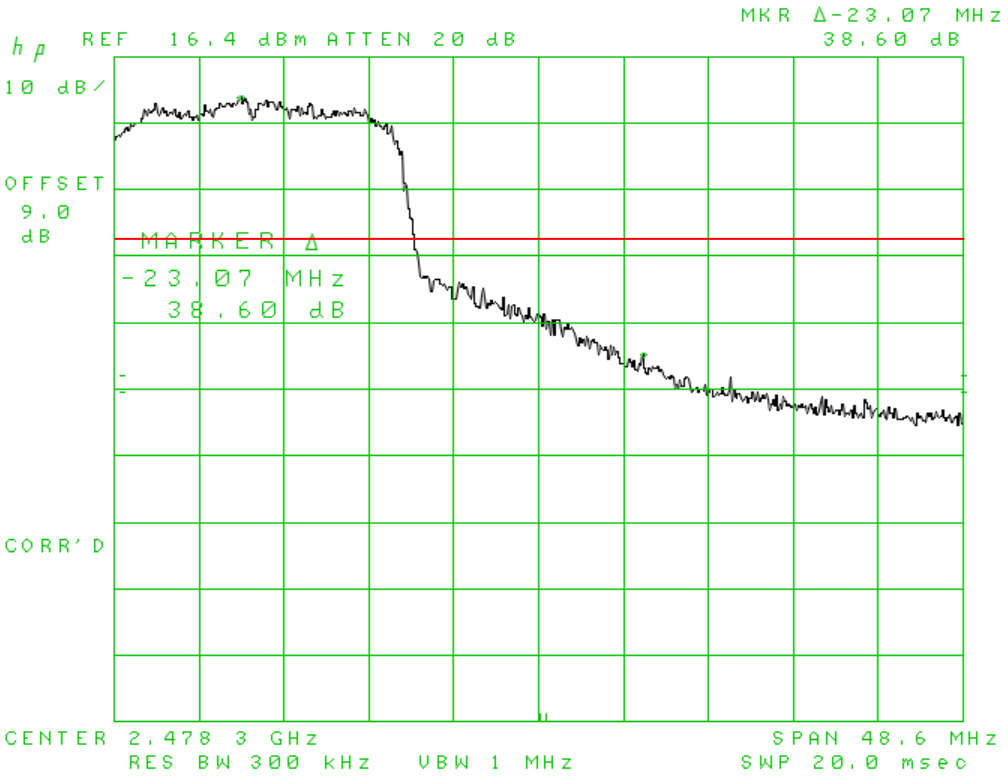


Figure 87. Band Edge Compliance, 802.11g High Channel Delta – Peak

Note: Plots shows 20 dB in-band limits. Restricted band emissions evaluated below.

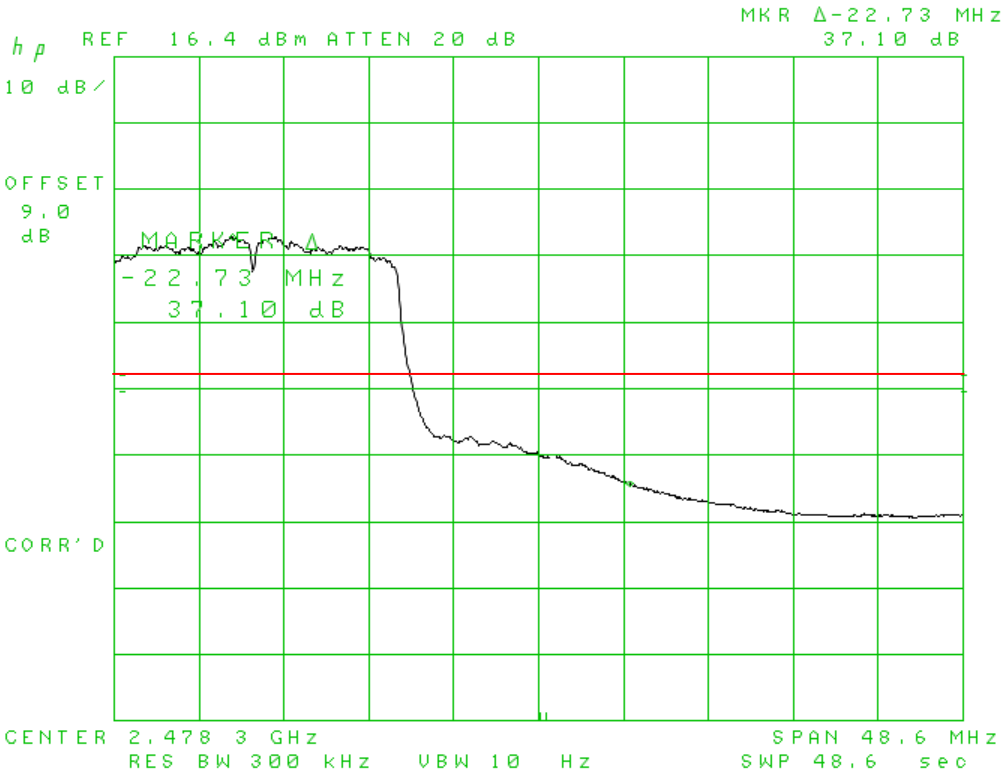


Figure 88. Band Edge Compliance, 802.11g High Channel Delta – Average

Note: Plots shows 20 dB in-band limits. Restricted band emissions evaluated below.

Calculation of worst case upper band edge measurement:

Band Edge Calculated Result	37.10	dB
Band Edge Limit (20 dB from Fundamental)	20.00	dB
Band Edge Margin	17.10	dB

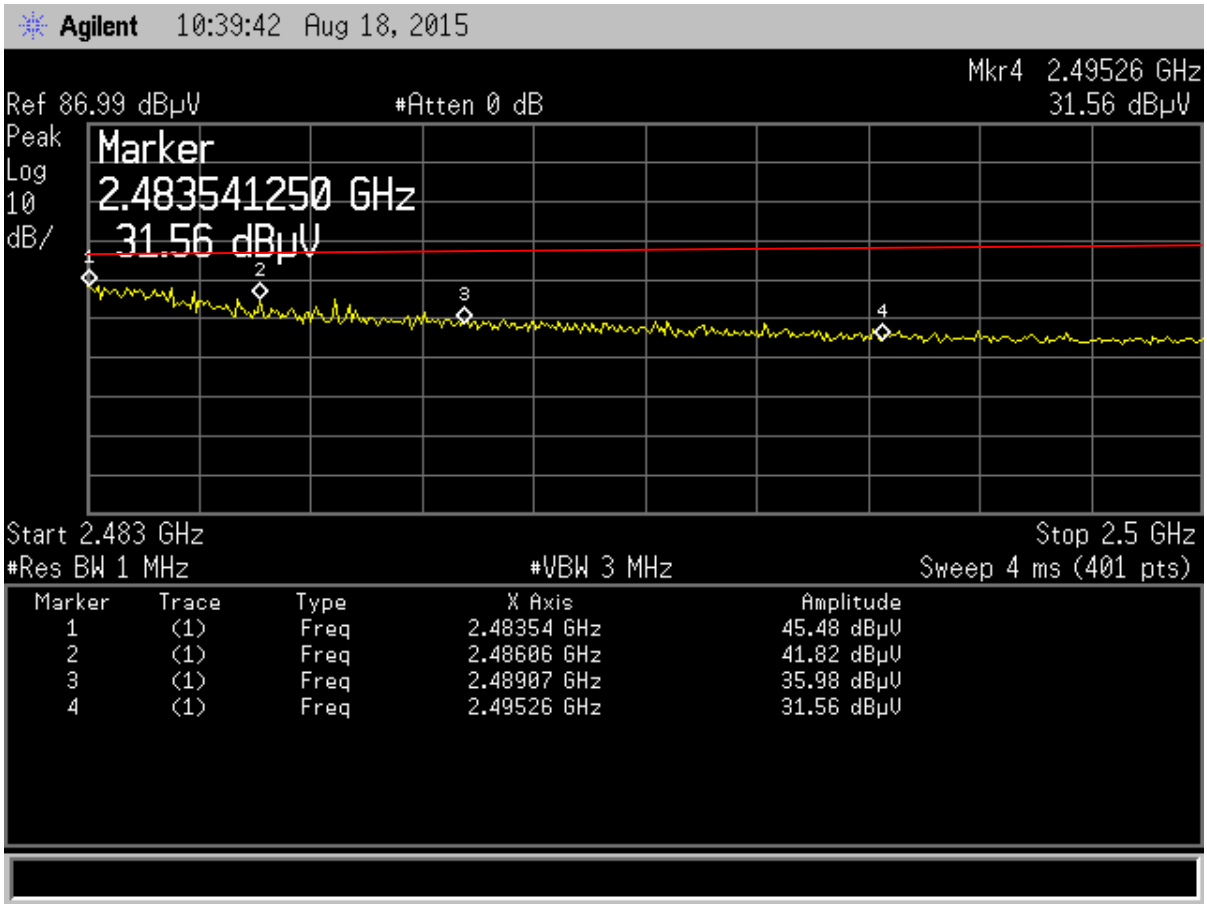
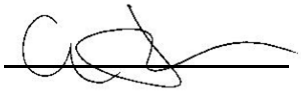


Figure 89. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11g – Peak with Chip Antenna

Table 38. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11g – Peak with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.54	45.48	32.40	68.38	74.0	1.0m./HORZ	5.6	**PK**
2486.06	41.82	32.40	64.72	74.0	1.0m./HORZ	9.3	**PK**
2489.07	35.98	32.40	58.88	74.0	1.0m./HORZ	15.1	**PK**
2495.26	31.56	32.40	54.46	74.0	1.0m./HORZ	19.5	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

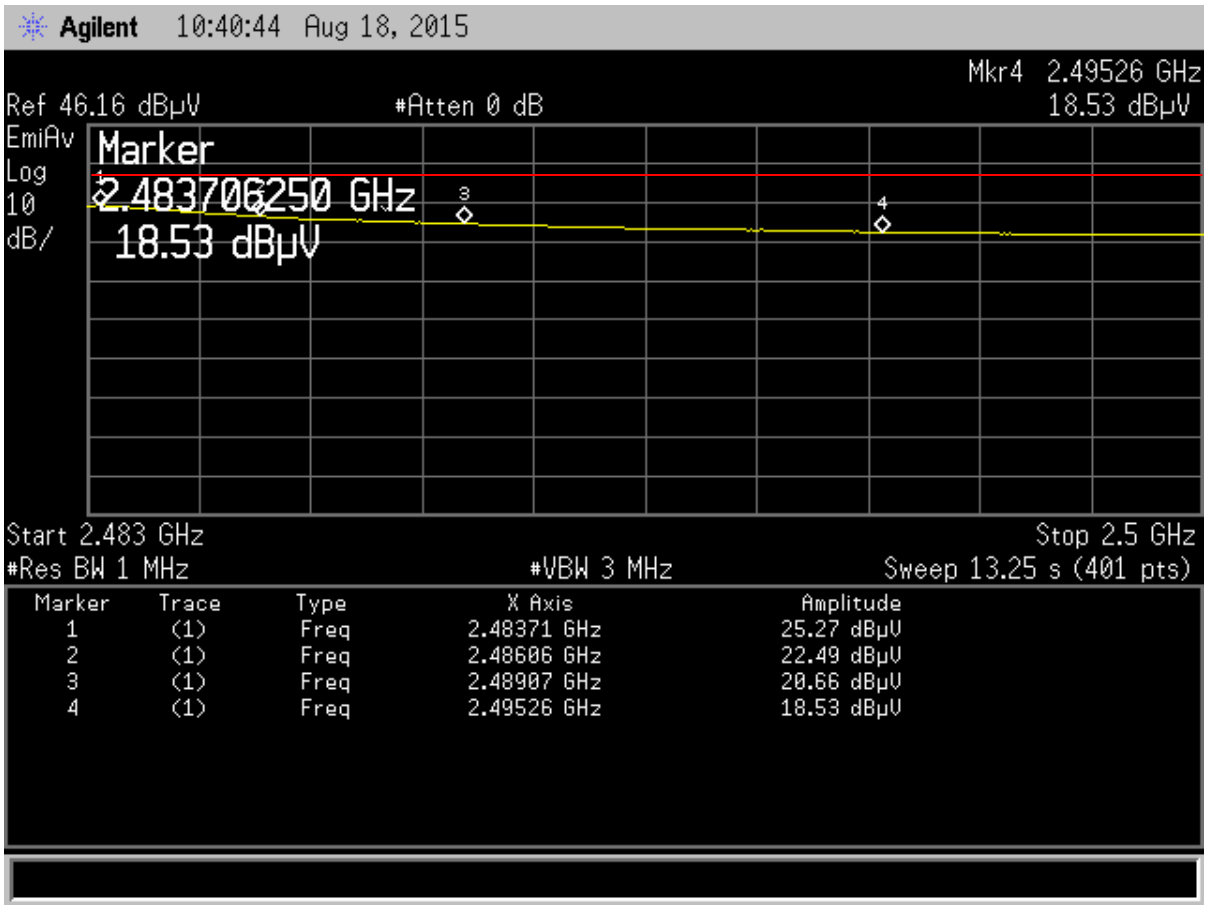
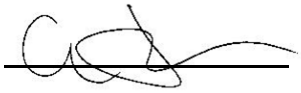


Figure 90. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g –Average with Chip Antenna

Table 39. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11g – Average with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.71	25.27	32.40	48.17	54.0	1.0m./HORZ	5.8	**AVG**
2486.06	22.49	32.40	45.39	54.0	1.0m./HORZ	8.6	**AVG**
2489.07	20.66	32.40	43.56	54.0	1.0m./HORZ	10.4	**AVG**
2495.26	18.53	32.40	41.43	54.0	1.0m./HORZ	12.6	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

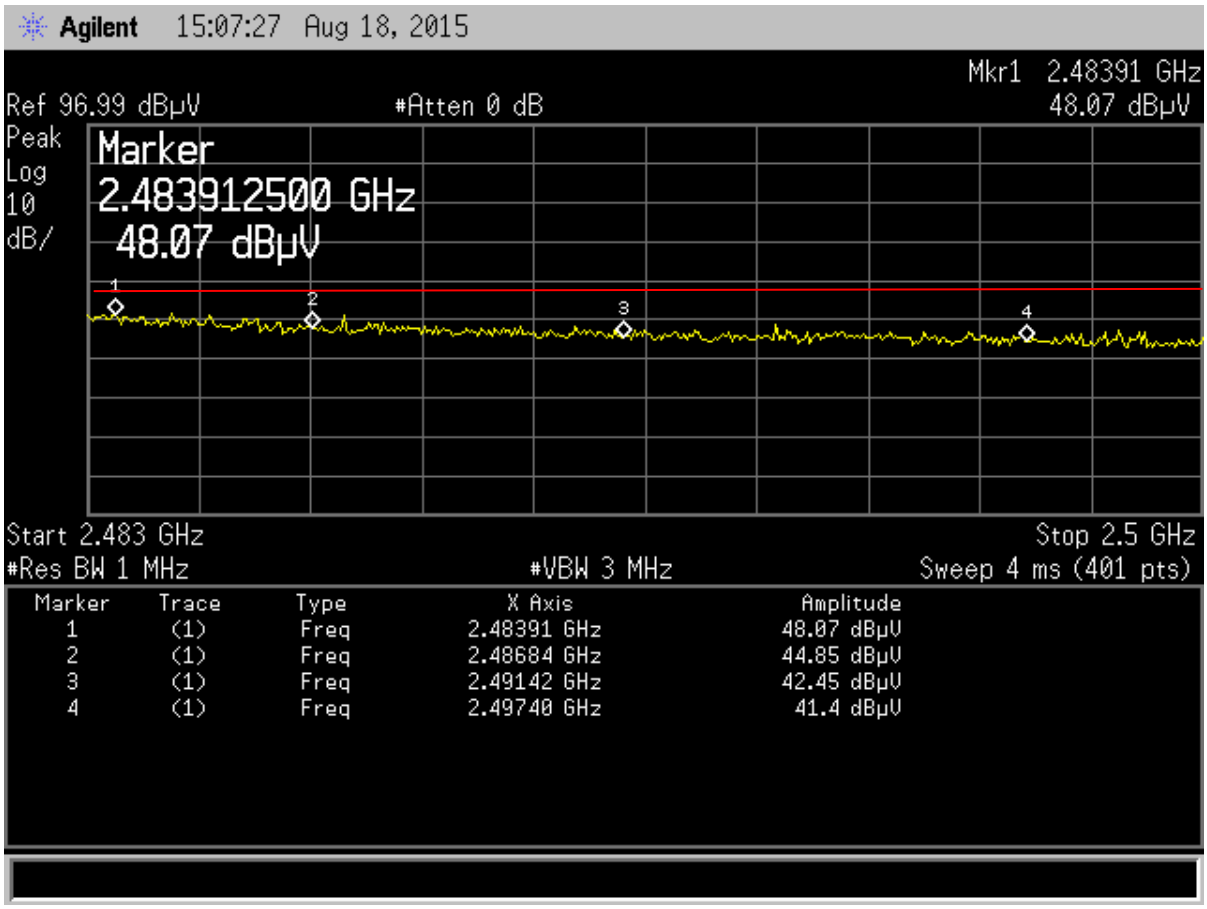


Figure 91. Radiated Restricted band 2483.5 MHz to 2500 MHz, 802.11g – Peak with Chip Antenna

Table 40. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11g – Peak with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Peak Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44 SIP Application Module			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**PK Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.91	48.07	32.40	70.97	74.0	1.0m./HORZ	3.0	**PK**
2486.84	44.85	32.40	67.75	74.0	1.0m./HORZ	6.2	**PK**
2491.42	42.45	32.40	65.35	74.0	1.0m./HORZ	8.6	**PK**
2497.40	41.40	32.40	64.30	74.0	1.0m./HORZ	9.7	**PK**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

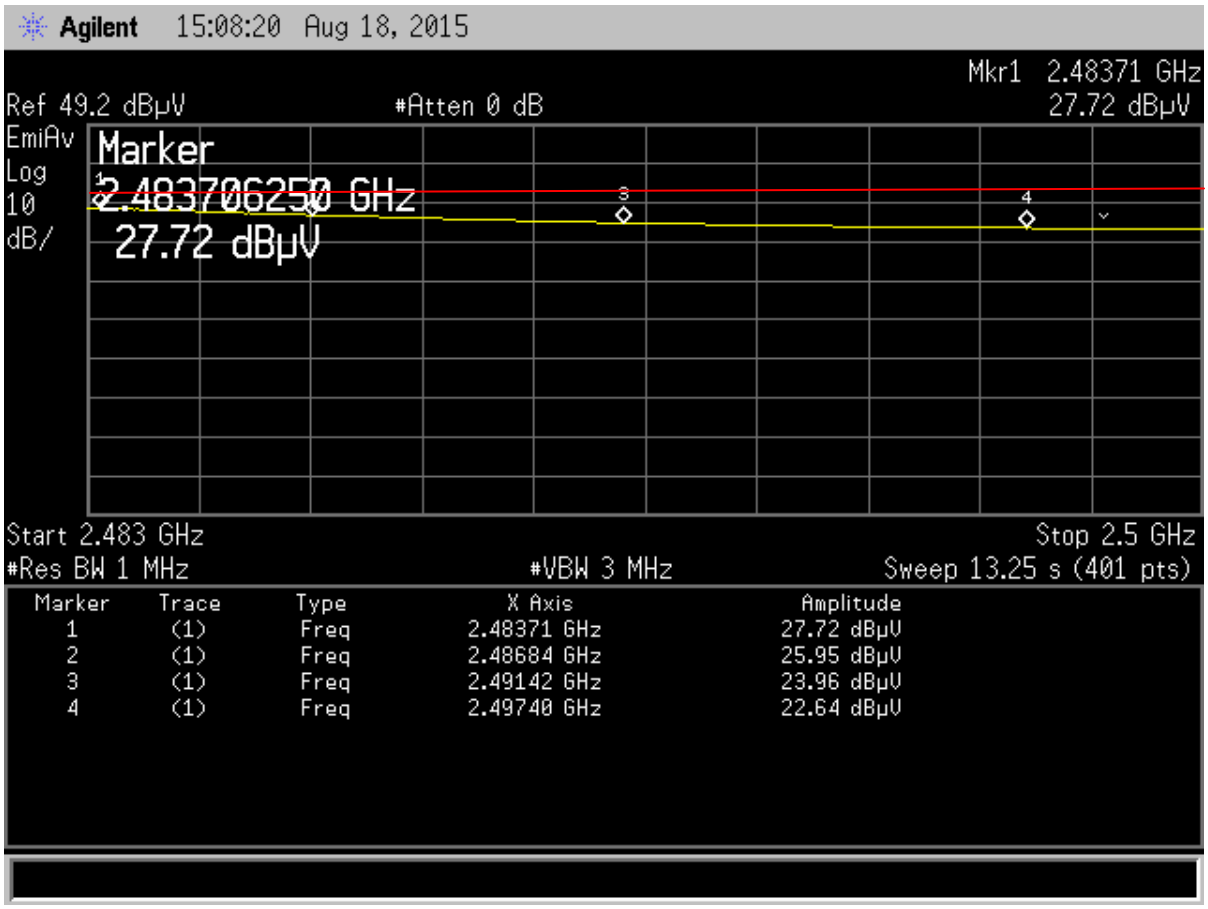
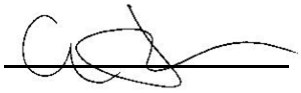


Figure 92. Radiated Restricted band 2310 MHz to 2390 MHz, 802.11g –Average with Chip Antenna

Table 41. Radiated Restricted Band 2483.5 MHz to 2500 MHz, 802.11g – Average with Chip Antenna

2483.5 MHz to 2500 MHz Restricted Band Average Measurements							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
2483.71	27.72	32.40	50.62	54.0	1.0m./HORZ	3.4	**AVG**
2486.84	25.95	32.40	48.85	54.0	1.0m./HORZ	5.1	**AVG**
2491.42	23.95	32.40	46.85	54.0	1.0m./HORZ	7.1	**AVG**
2497.40	22.64	32.40	45.54	54.0	1.0m./HORZ	8.5	**AVG**

Test Date: August 18, 2015
Tested By
Signature:  Name: Carrie Ingram

2.12 Six (6) dB Bandwidth per CFR 15.247(a)(2),

The EUT antenna port was connected to a spectrum analyzer having a 50 Ω input impedance. Measurements were performed using the test procedure outlined in ANSI C63.10: 2013, paragraph 6.9.2, for a bandwidth of 6 dB. The RBW was set to > 1.0% of the OBW and the VBW ≥ RBW. The results of this test are given in the table below and Figures below.

Table 42. 802.11n Six (6) dB Bandwidth

Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum FCC Bandwidth (MHz)
2412	17.11	0.500
2442	17.26	0.500
2462	17.20	0.500

Table 43. 802.11b Six (6) dB Bandwidth

Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum FCC Bandwidth (MHz)
2412	8.65	0.500
2442	8.82	0.500
2462	8.80	0.500

Table 44. 802.11g Six (6) dB Bandwidth

Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum FCC Bandwidth (MHz)
2412	17.12	0.500
2442	17.00	0.500
2462	15.82	0.500

Test Date: August 17, 2015
Tested By
Signature: _____ Name: Carrie Ingram

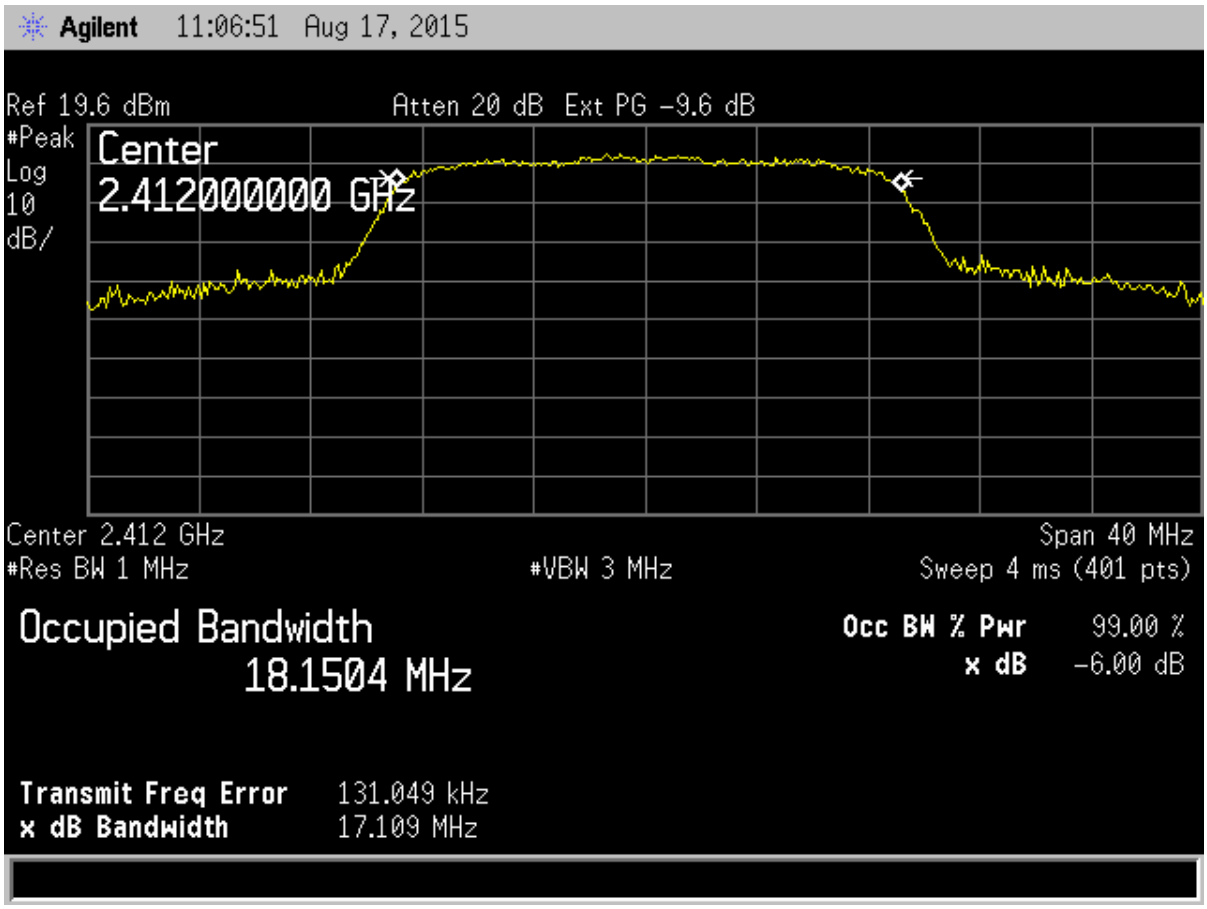


Figure 93. Six dB Bandwidth - 15.247 – 802.11n Low Channel

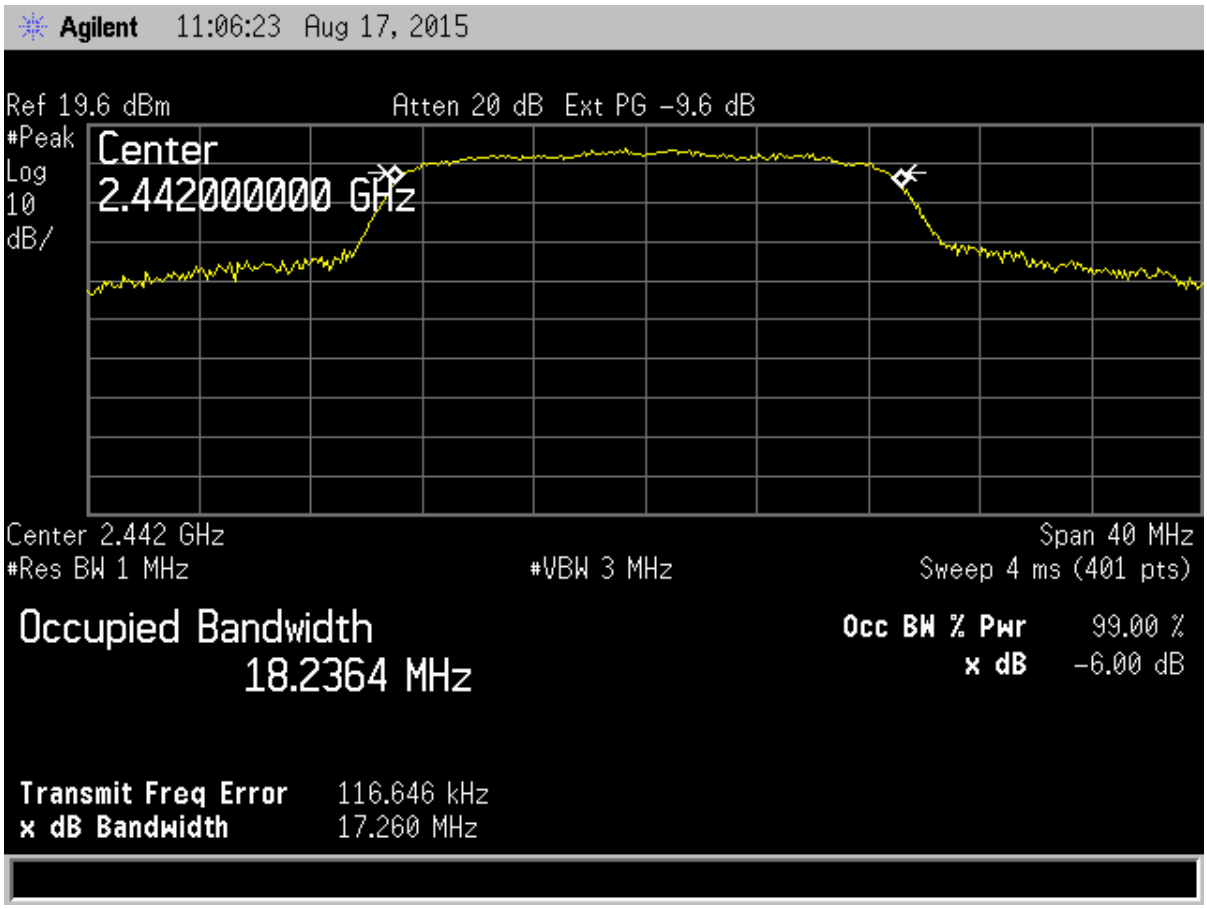


Figure 94. Six dB Bandwidth - 15.247 – 802.11n Mid Channel

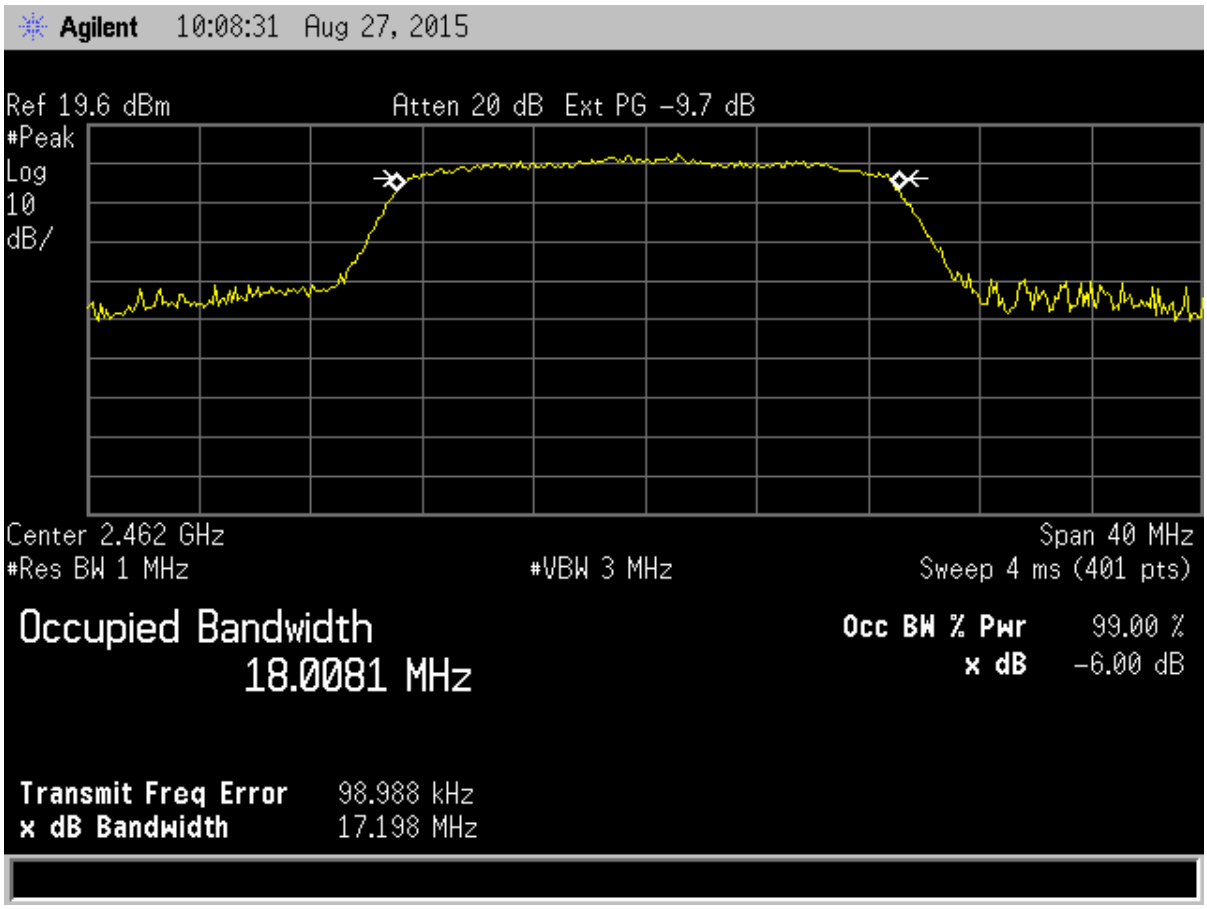


Figure 95. Six dB Bandwidth - 15.247 – 802.11n High Channel

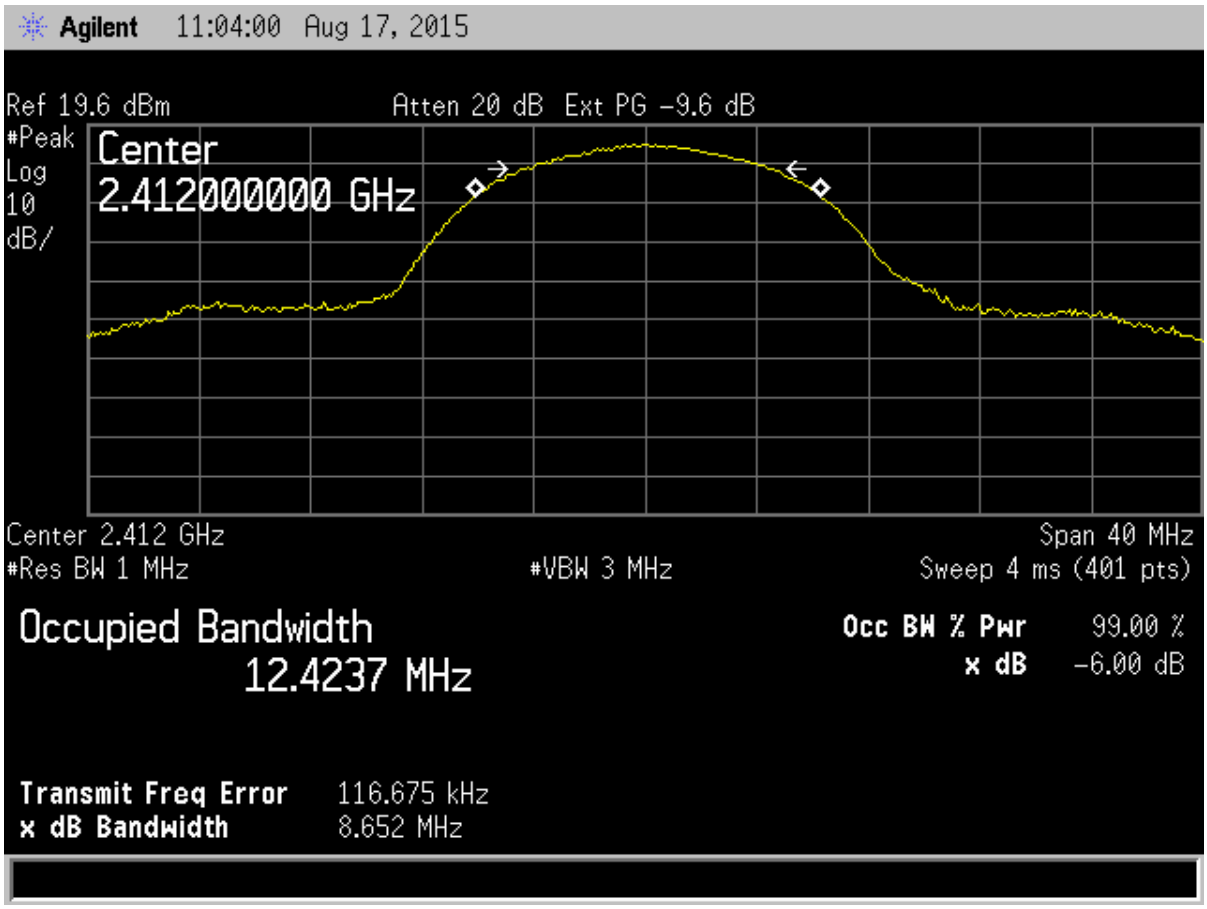


Figure 96. Six dB Bandwidth - 15.247 – 802.11b Low Channel

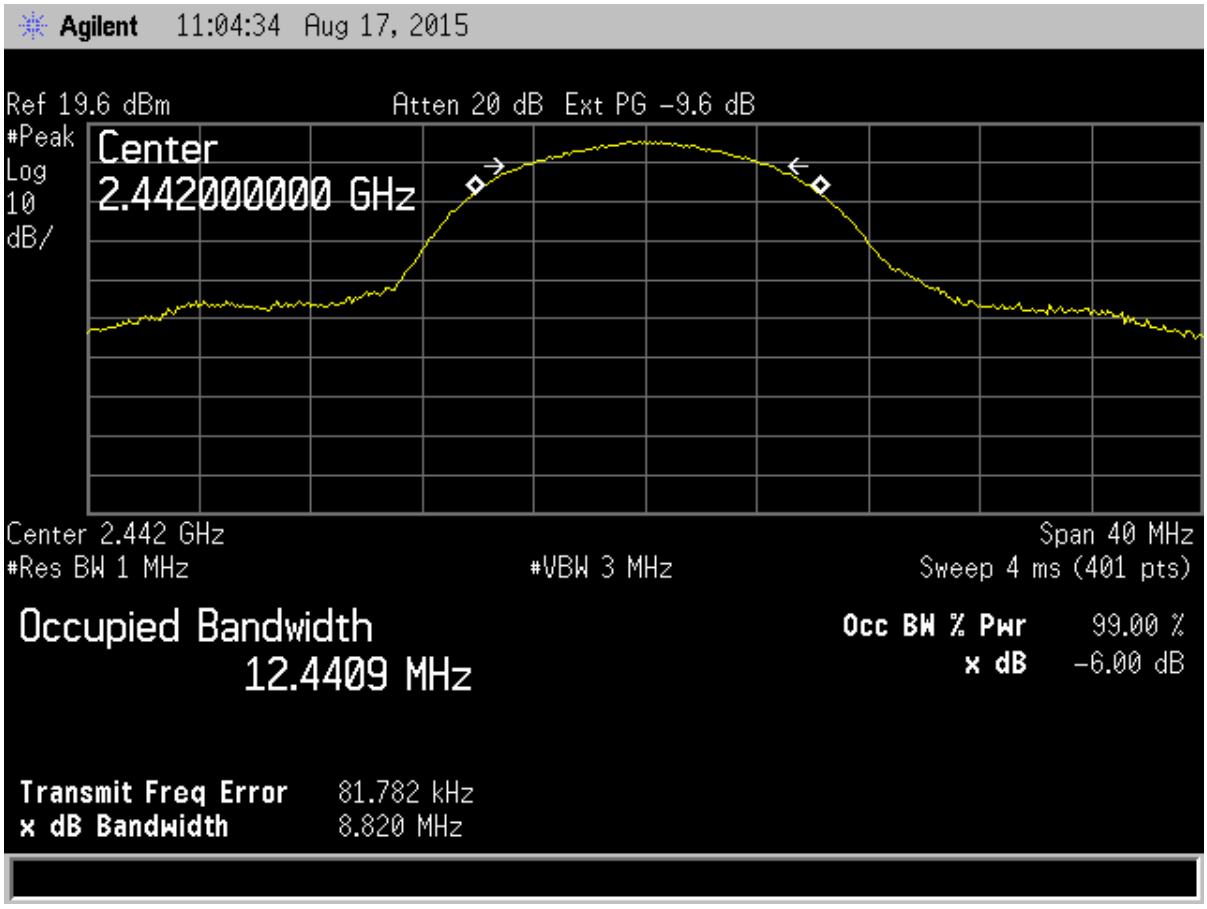


Figure 97. Six dB Bandwidth - 15.247 – 802.11b Mid Channel

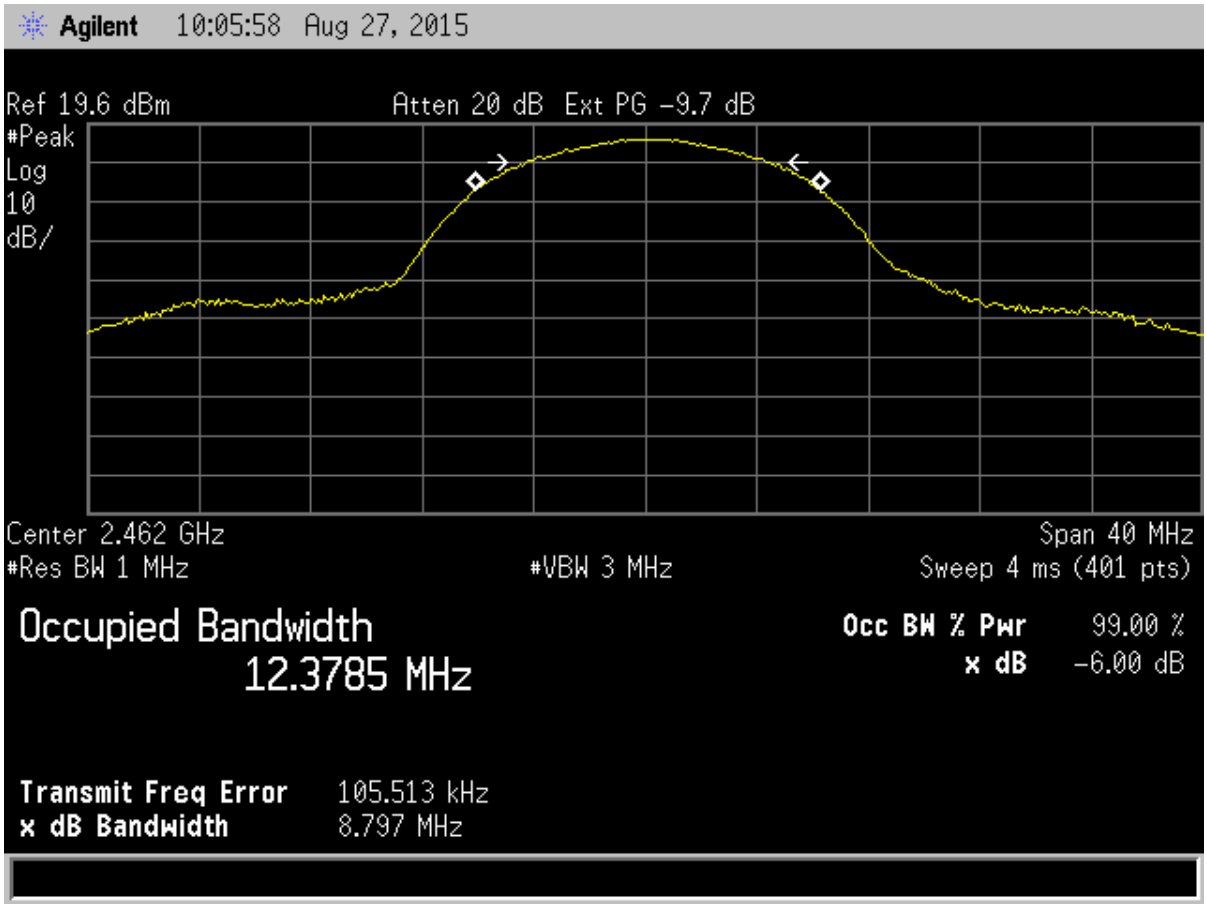


Figure 98. Six dB Bandwidth - 15.247 – 802.11b High Channel

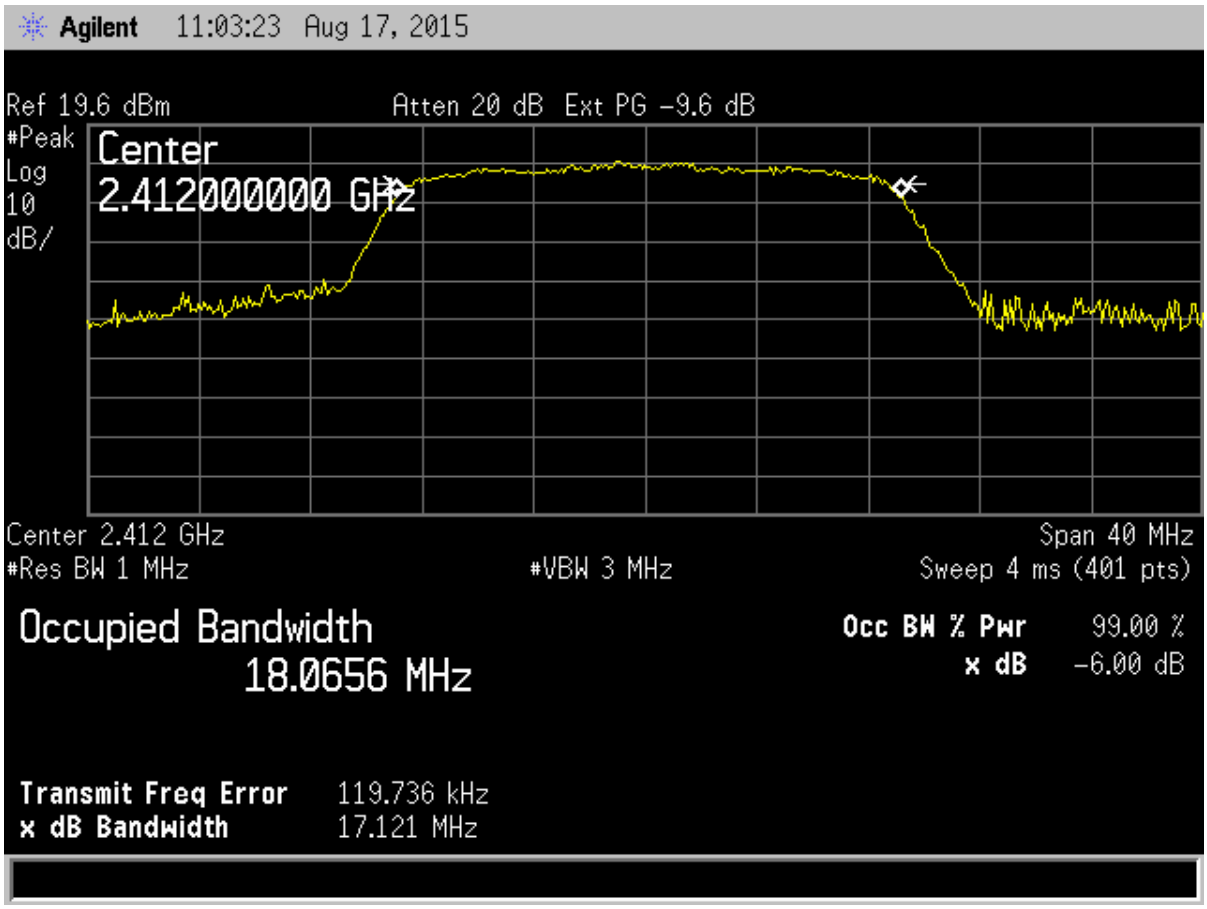


Figure 99. Six dB Bandwidth - 15.247 – 802.11g Low Channel

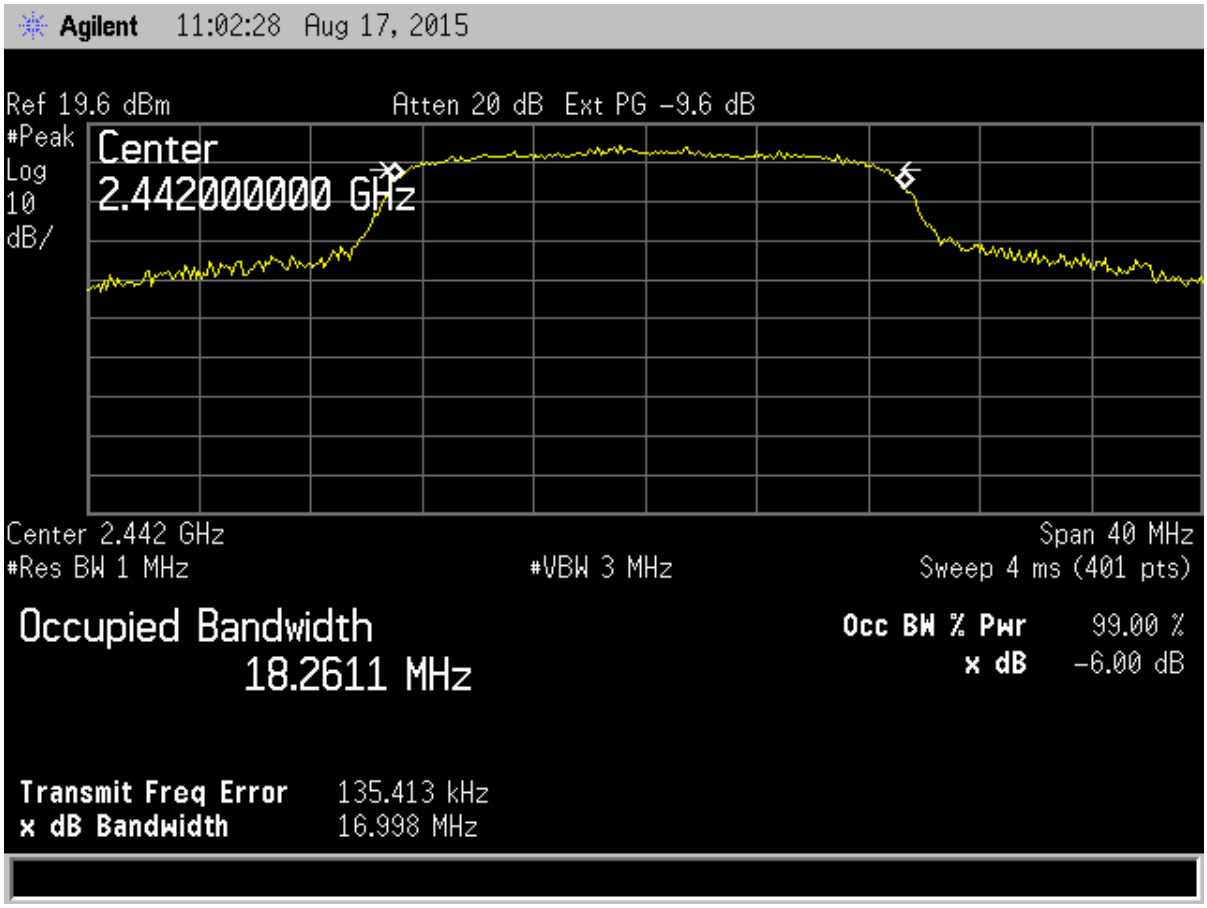


Figure 100. Six dB Bandwidth - 15.247 – 802.11g Mid Channel

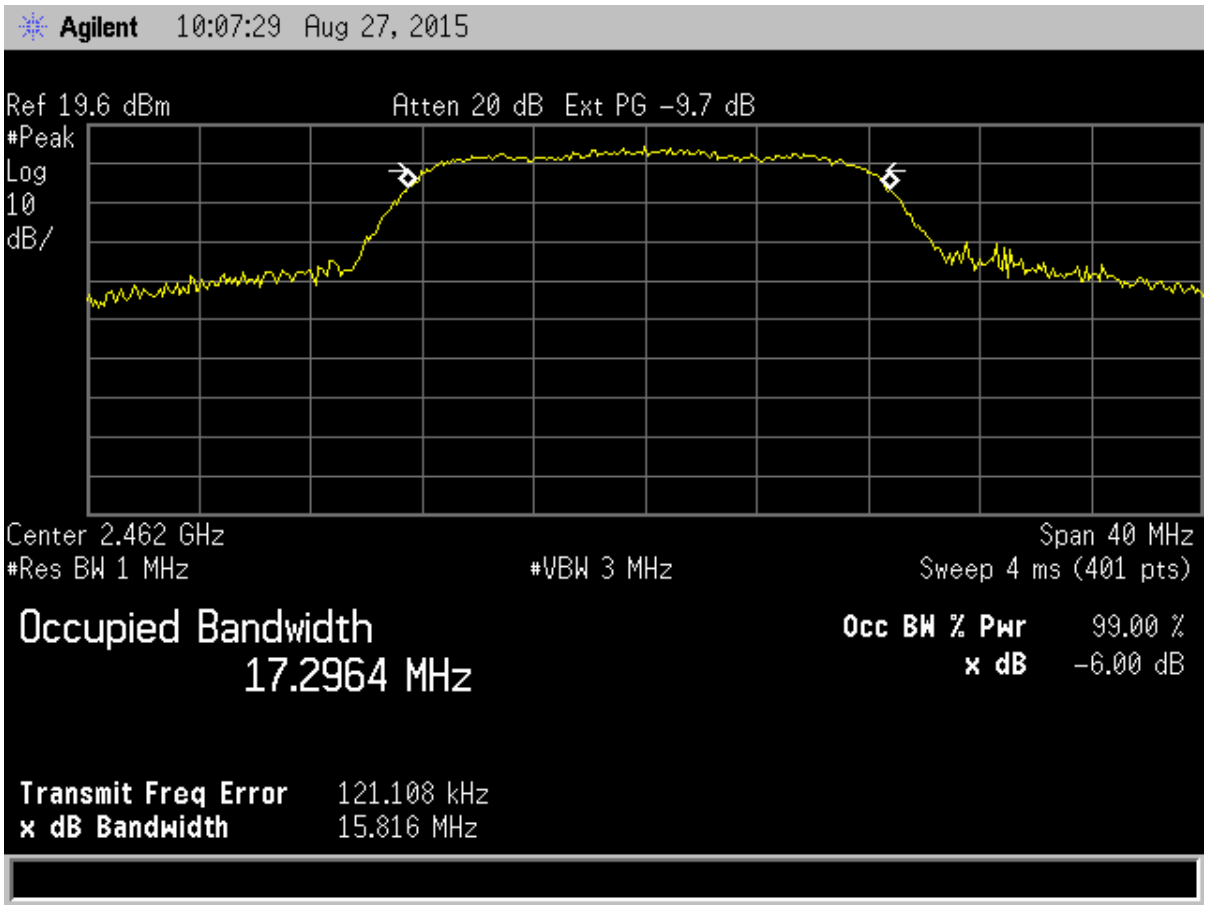


Figure 101. Six dB Bandwidth - 15.247 – 802.11g High Channel

2.13 99% Occupied Bandwidth (IC RSS Gen, 6.6)

These measurements were performed while the EUT was in a constant transmit mode. The test procedure in RSS Gen, section 6.6 was used. The RBW was set to 1% - 5% of the OBW and the VBW was set to 3 times the RBW. The results of this test are given in the Tables below. Screen shots of the measurements can be found in the Figures above.

Table 45. 802.11n 99% Occupied Bandwidth

Frequency (MHz)	99% Occupied Bandwidth (MHz)
2412	18.2
2442	18.2
2462	18.0

Table 46. 802.11b 99% Occupied Bandwidth

Frequency (MHz)	99% Occupied Bandwidth (MHz)
2412	12.4
2442	12.4
2462	12.4

Table 47. 802.11g 99% Occupied Bandwidth

Frequency (MHz)	99% Occupied Bandwidth (MHz)
2412	18.1
2442	18.3
2462	17.3

Test Date: August 18, 2015
Tested By
Signature: _____ Name: Carrie Ingram

2.14 Maximum Peak Conducted Output Power (CFR 15.247 (b) (3))

For this test, the transmitter was programmed to operate at a maximum output power across the bandwidth.

Peak power within the band 2.4 GHz to 2.4835 GHz was measured per FCC KDB Publication 558074 v03r03 as an Antenna Conducted test with a spectrum analyzer by connecting the spectrum analyzer directly, via a short RF cable, and attenuators to the antenna output terminals on the EUT. The spectrum analyzer and the antenna port both have an impedance of 50 Ω with the RBW set greater than the 6 dB bandwidth of the EUT, and the VBW ≥ RBW. Peak antenna conducted output power is tabulated in the table below.

Table 48. 802.11n BW Peak Antenna Conducted Output Power per Part 15.247 (b) (3)

Frequency of Fundamental (MHz)	Raw Test Data (dBm)	Output Power (mW)	FCC Limit (mW)
2412	17.70	58.88	1000
2442	17.80	60.26	1000
2462	17.70	58.88	1000
2462*	14.70	29.51	1000

Note (*): only required for u.fl antenna configuration. The output power on this channel was reduced to meet the restricted band requirements of 15.247.

Test Date: August 11, 2015
Tested By
Signature: _____ Name: Carrie Ingram

Table 49. 802.11b BW Peak Antenna Conducted Output Power per Part 15.247 (b) (3)

Frequency of Fundamental (MHz)	Raw Test Data dBm	Output Power (mW)	FCC Limit (mW)
2412	17.90	61.66	1000
2442	17.90	61.66	1000
2462	17.90	61.66	1000

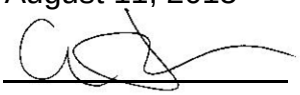
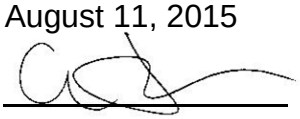
Test Date: August 11, 2015
Tested By
Signature:  Name: Carrie Ingram

Table 50. 802.11g BW Peak Antenna Conducted Output Power per Part 15.247 (b) (3)

Frequency of Fundamental (MHz)	Raw Test Data dBm	Output Power (mW)	FCC Limit (mW)
2412	17.90	61.66	1000
2442	18.00	63.10	1000
2462	17.90	61.66	1000
2462*	15.75	37.60	1000

Note (*): only required for u.fl antenna configuration. The output power on this channel was reduced to meet the restricted band requirements of 15.247.

Test Date: August 11, 2015
Tested By
Signature:  Name: Carrie Ingram

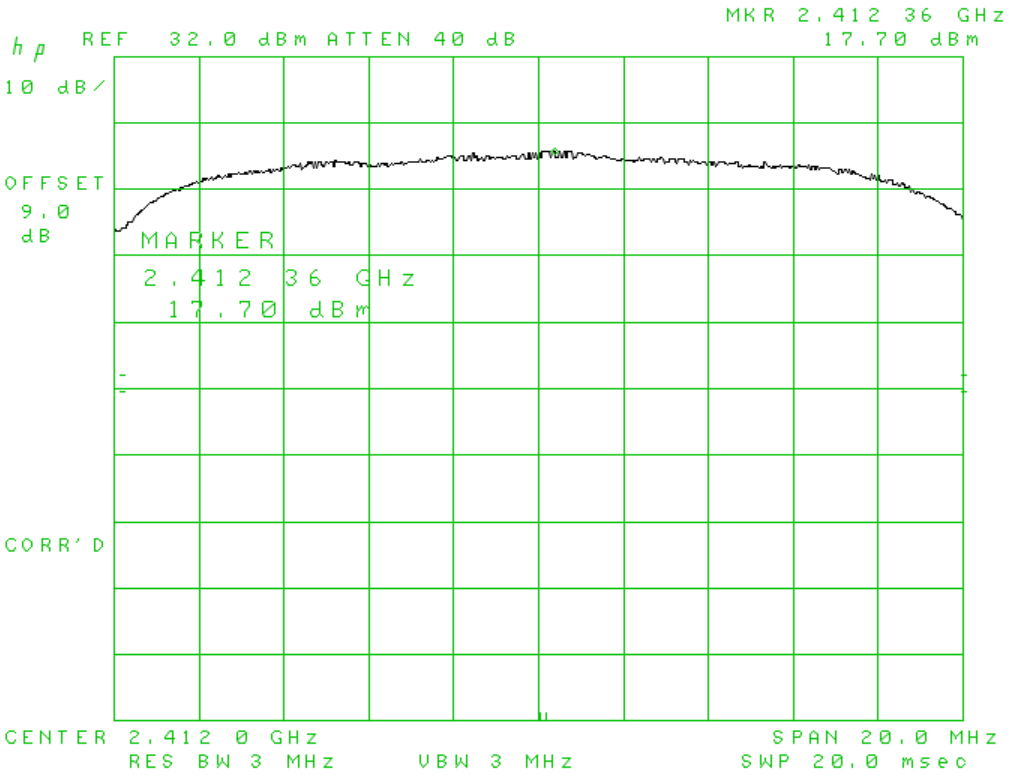


Figure 102. Peak Antenna Conducted Output Power, 802.11n Low Channel

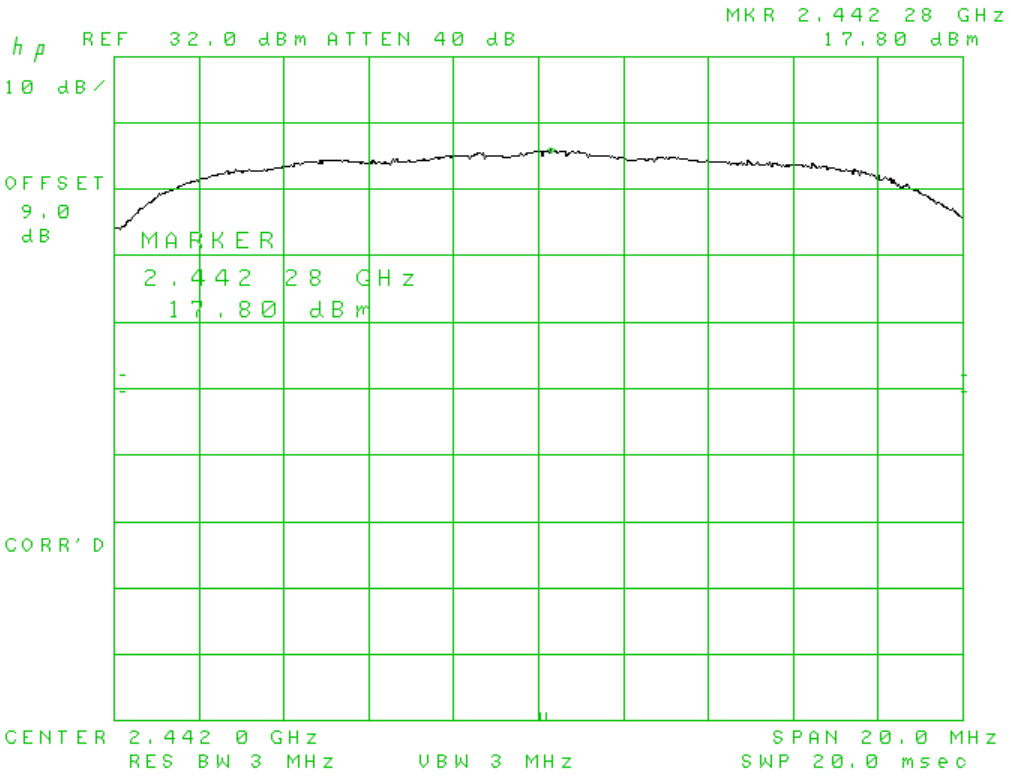


Figure 103. Peak Antenna Conducted Output Power, 802.11n Mid Channel

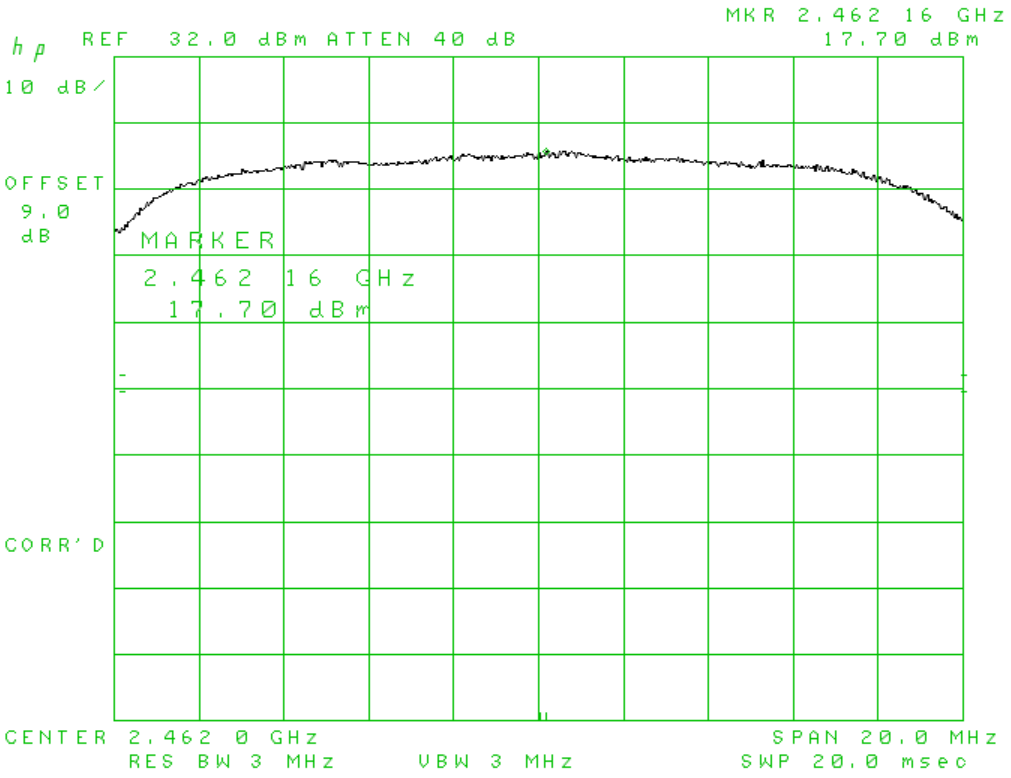


Figure 104. Peak Antenna Conducted Output Power, 802.11n High Channel (Chip antenna configuration ONLY)

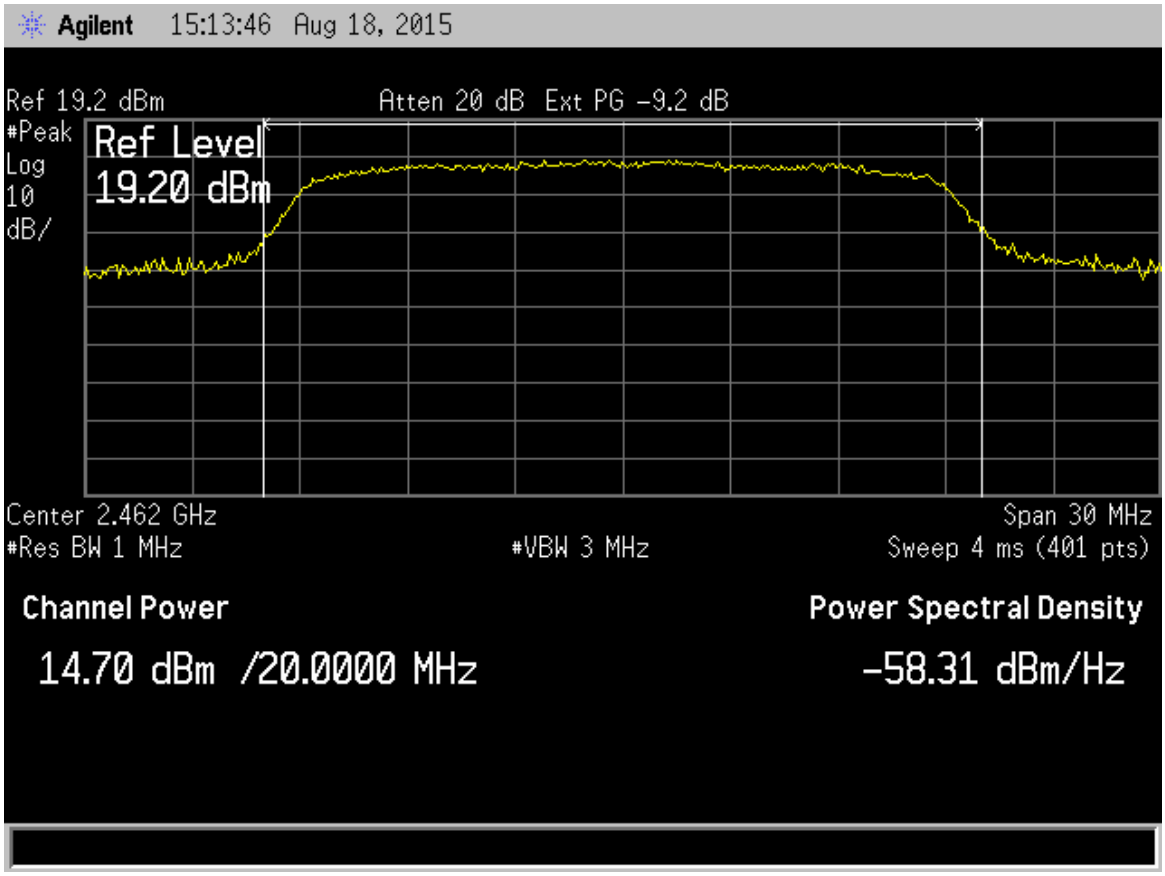


Figure 105. Peak Antenna Conducted Output Power, 802.11n High Channel (U.FL antenna configuration ONLY)

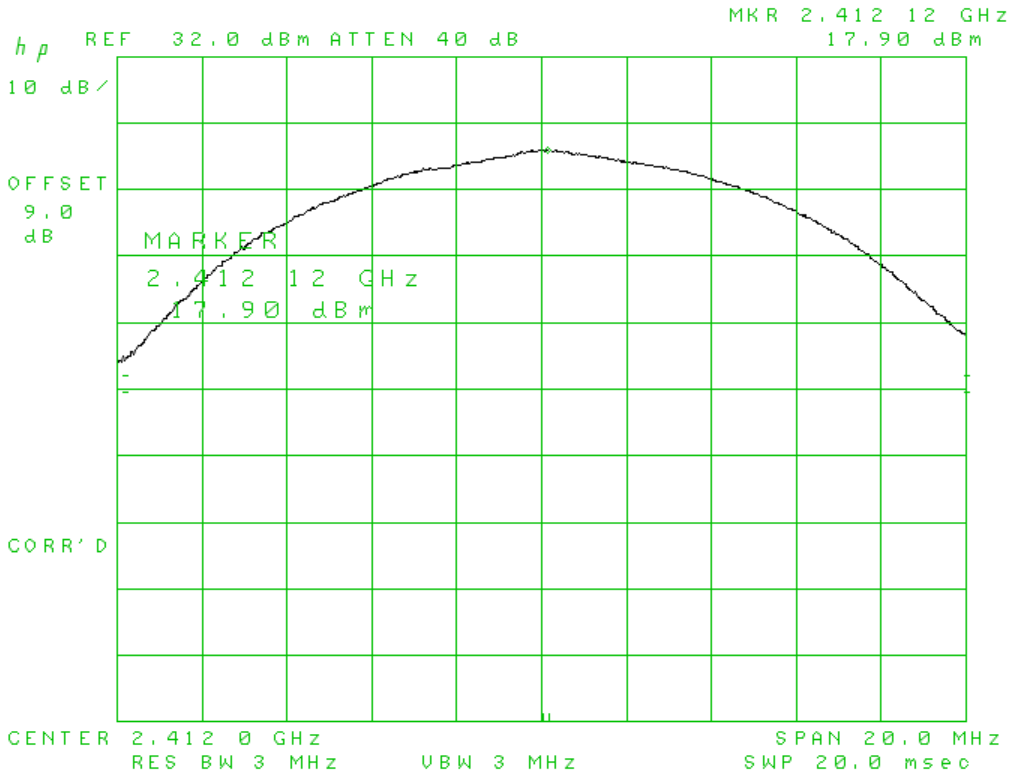


Figure 106. Peak Antenna Conducted Output Power, 802.11b Low Channel

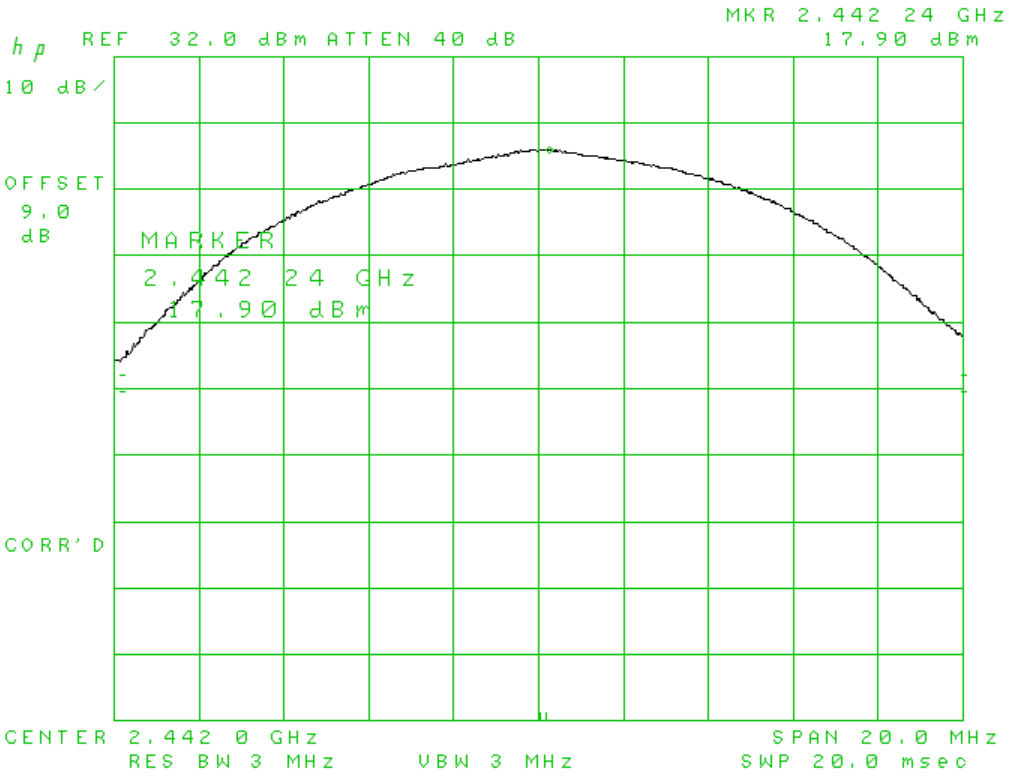


Figure 107. Peak Antenna Conducted Output Power, 802.11b Mid Channel

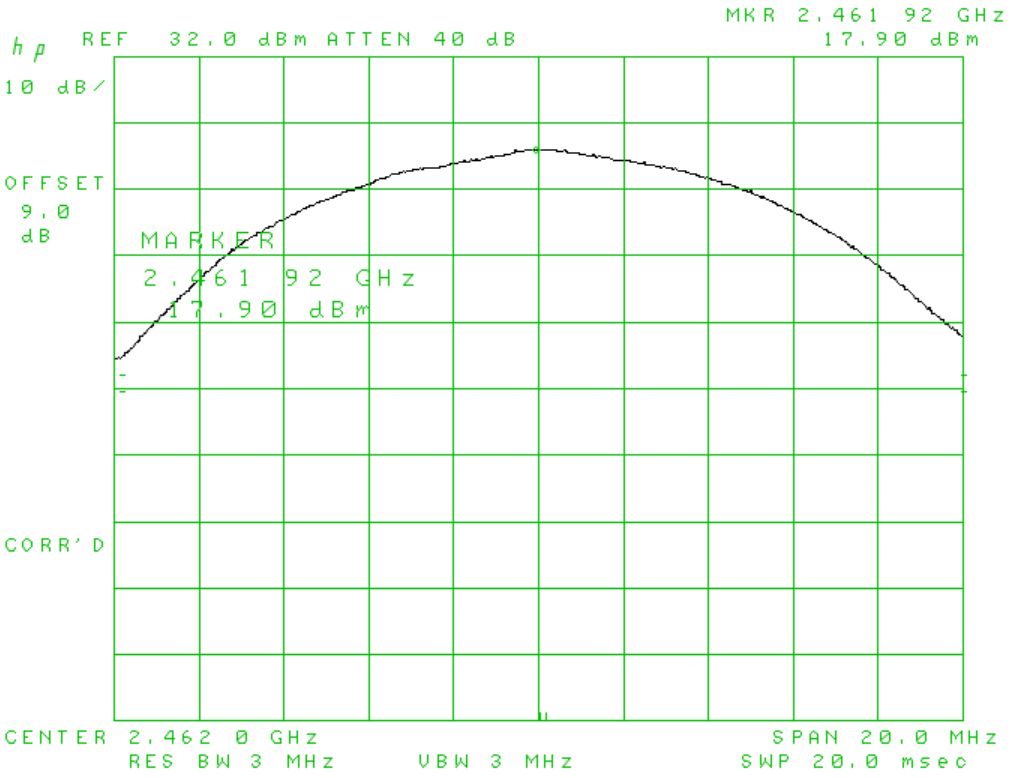


Figure 108. Peak Antenna Conducted Output Power, 802.11b High Channel

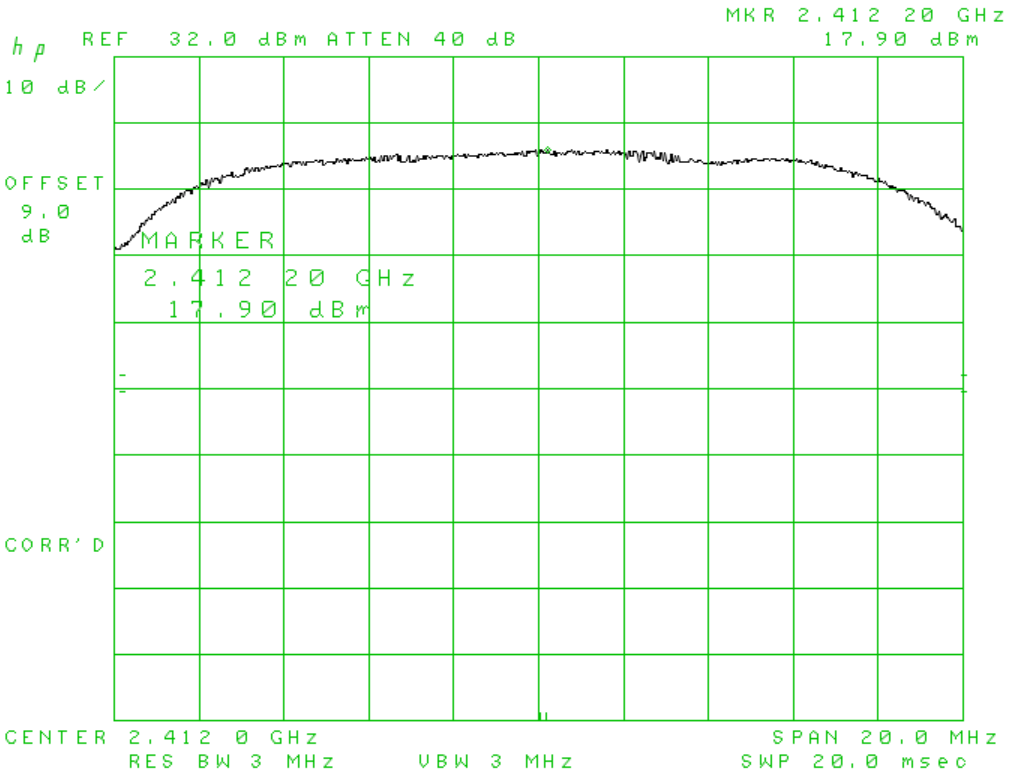


Figure 109. Peak Antenna Conducted Output Power, 802.11g Low Channel

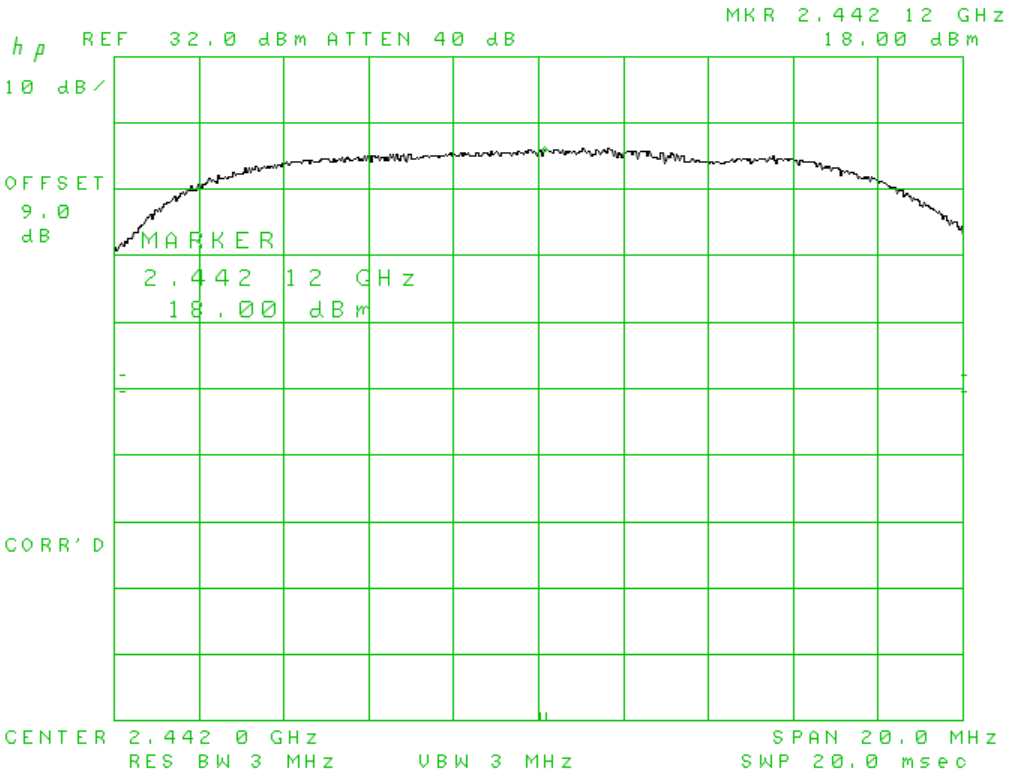


Figure 110. Peak Antenna Conducted Output Power, 802.11g Mid Channel

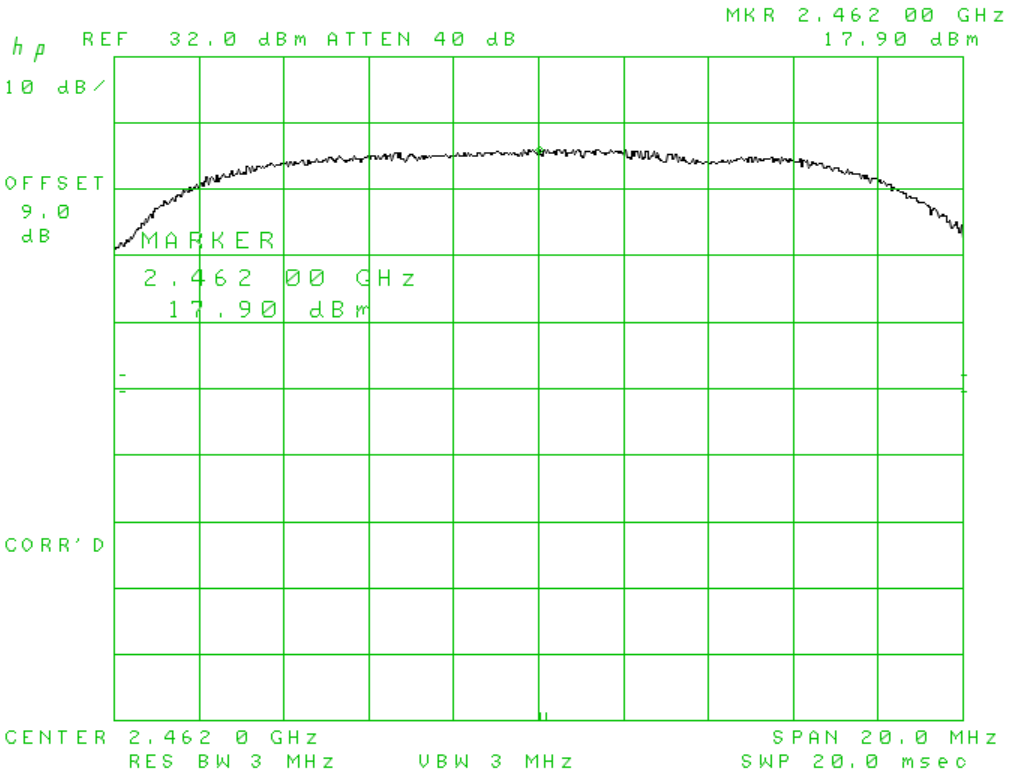


Figure 111. Peak Antenna Conducted Output Power, 802.11g High Channel (Chip antenna configuration ONLY)

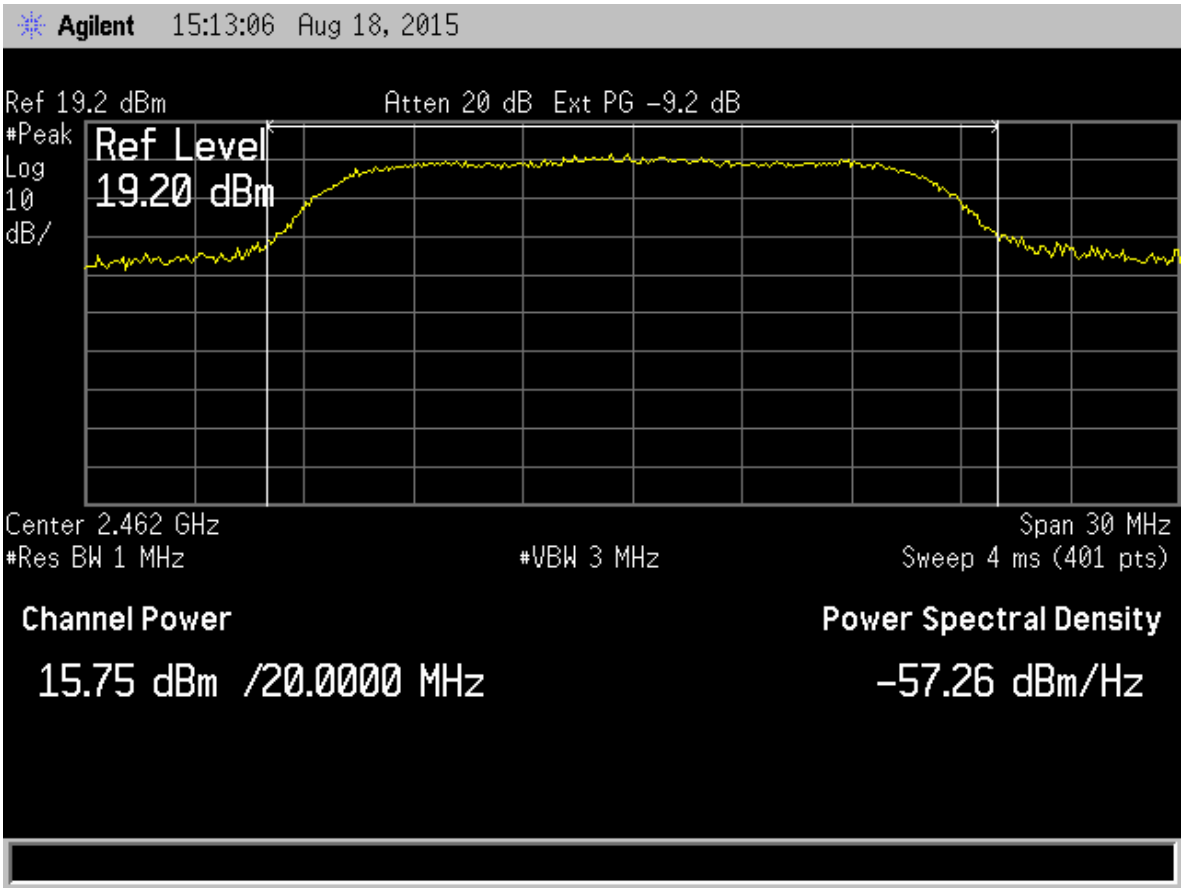


Figure 112. Peak Antenna Conducted Output Power, 802.11g High Channel (U.FL antenna configuration ONLY)

2.15 Power Spectral Density (CFR 15.247(e)) (IC RSS 210 A8.5)

The transmitter was placed into a continuous mode of operation at all applicable frequencies. The measurements were performed per the procedures of FCC KDB Procedure 558074 v03r03. The RBW was set to 3 kHz and the Video Bandwidth was set to ≥ RBW. The span was set to 1.5 times the OBW.

In accordance with 15.247 (e), the power spectral density shall be no greater than +8 dBm per any 3 kHz band.

The following results show that all are less than +8 dBm per 3 kHz band.

Table 51. 802.11n MHz BW Power Spectral Density for Low, Mid and High Bands

Frequecy (MHz)	Test Data (dBm/ 3 kHz)	Limit (dBm/kHz)	Margin (dB)
2412	-10.1	8.0	18.1
2442	-10.2	8.0	18.2
2462	-9.7	8.0	17.7

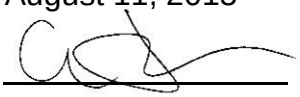
Test Date: August 11, 2015
Tested By
Signature:  Name: Carrie Ingram

Table 52. 802.11b MHz BW Power Spectral Density for Low, Mid and High Bands

Frequecy (MHz)	Test Data (dBm/ 3 kHz)	Limit (dBm/kHz)	Margin (dB)
2412	-7.8	8.0	15.8
2442	-6.8	8.0	14.8
2462	-6.6	8.0	14.6

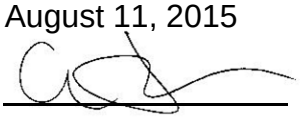
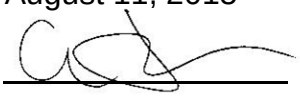
Test Date: August 11, 2015
Tested By
Signature:  Name: Carrie Ingram

Table 53. 802.11g MHz BW Power Spectral Density for Low, Mid and High Bands

Frequecy (MHz)	Test Data (dBm/ 3 kHz)	Limit (dBm/kHz)	Margin (dB)
2412	-9.4	8.0	17.4
2442	-9.9	8.0	17.9
2462	-8.7	8.0	16.7

Test Date: August 11, 2015
Tested By
Signature:  Name: Carrie Ingram

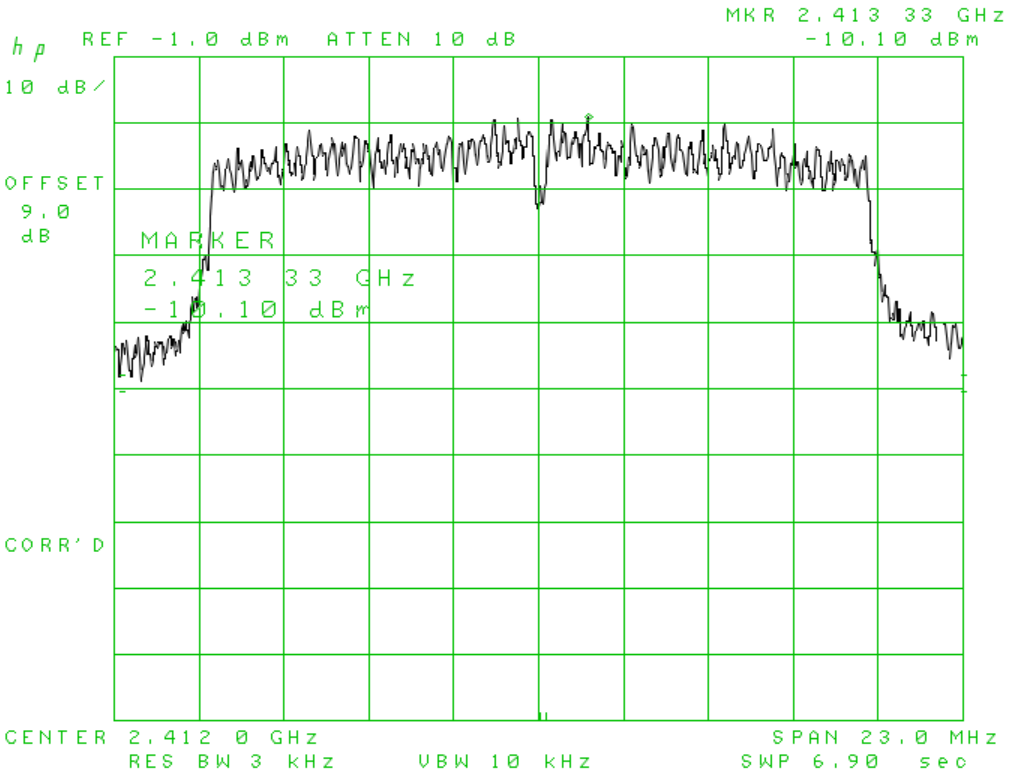


Figure 113. Peak Power Spectral Density, 802.11n Low Channel

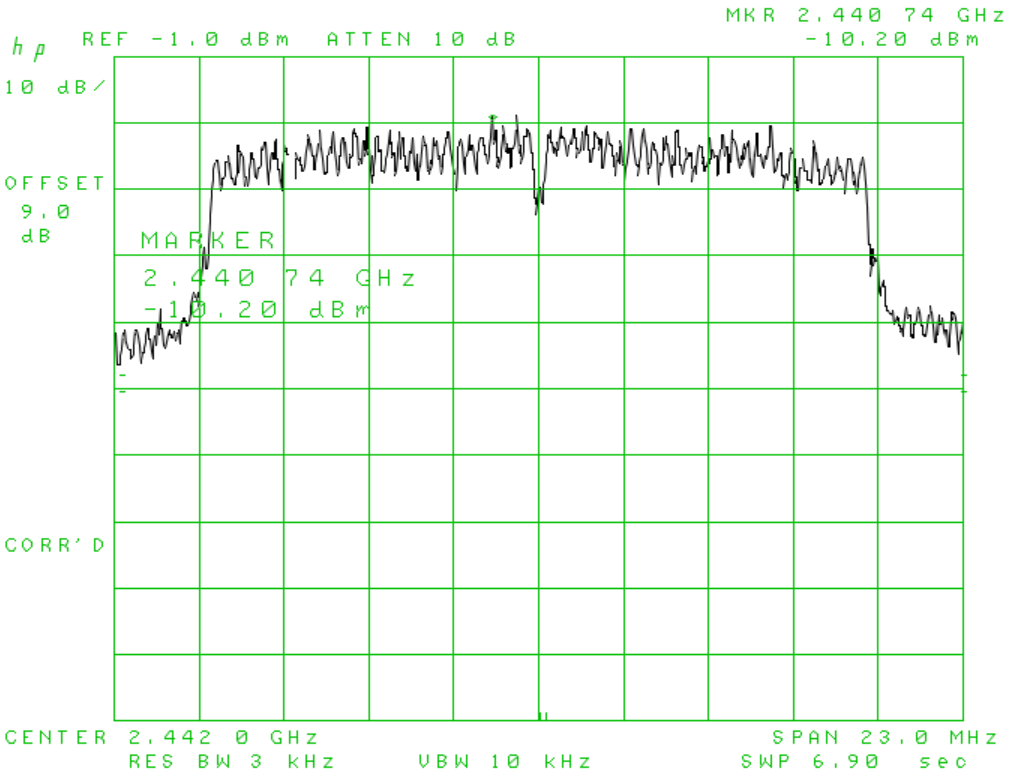


Figure 114. Peak Power Spectral Density, 802.11n Mid Channel

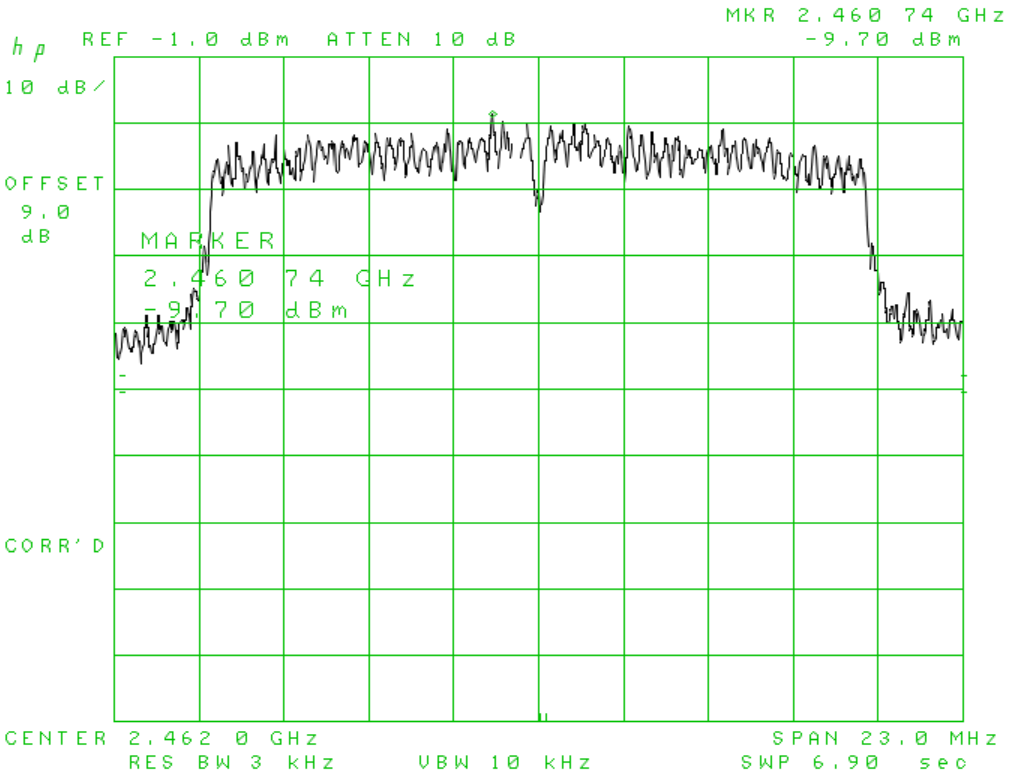


Figure 115. Peak Power Spectral Density, 802.11n High Channel

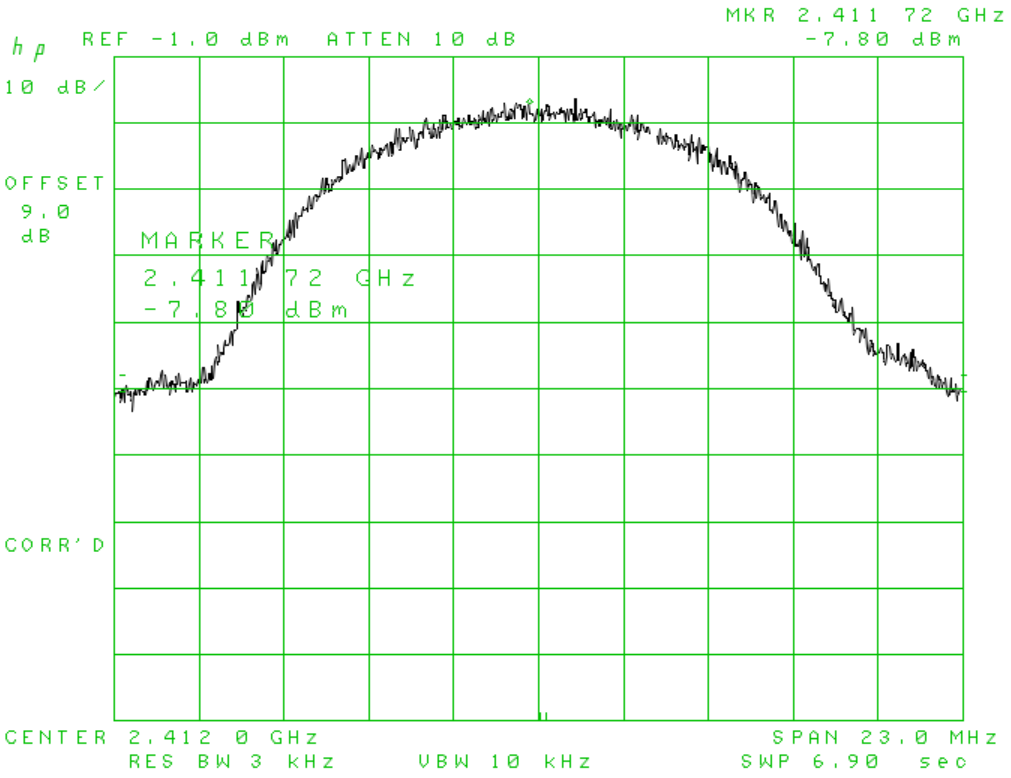


Figure 116. Peak Power Spectral Density, 802.11b Low Channel

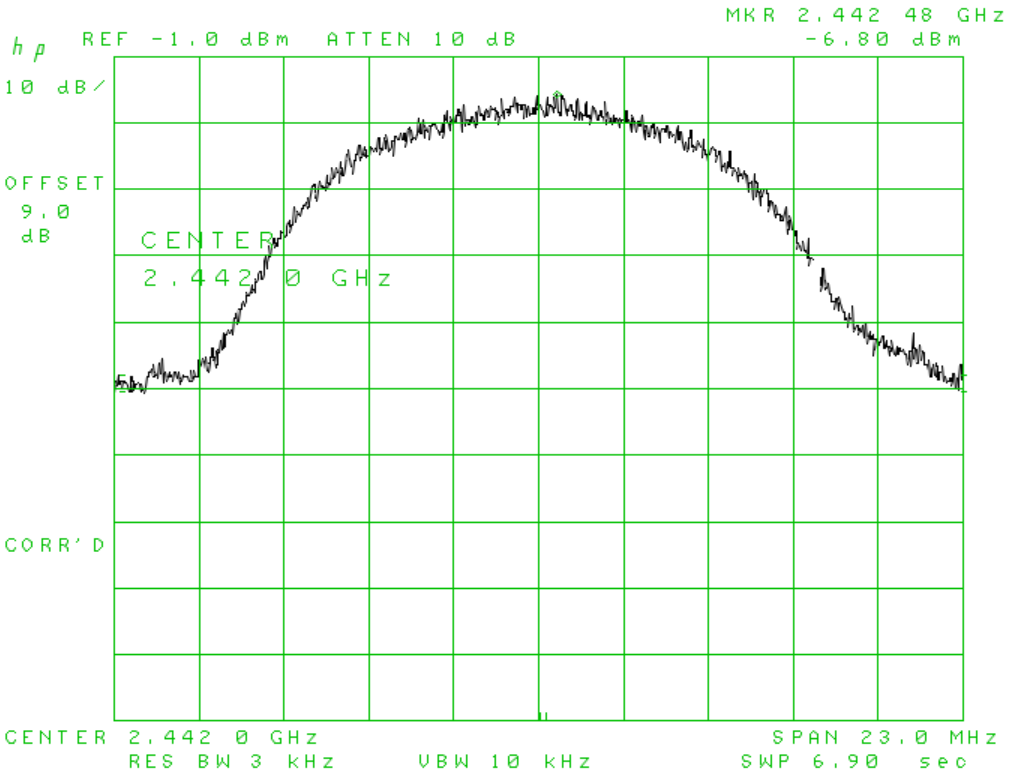


Figure 117. Peak Power Spectral Density, 802.11b Mid Channel

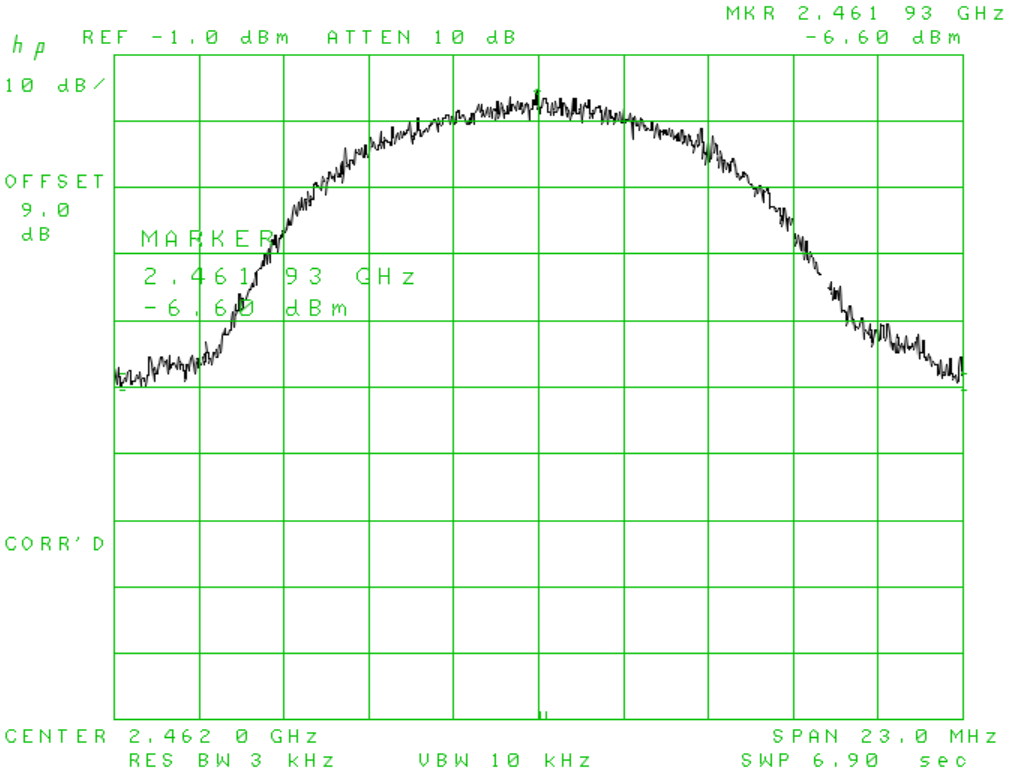


Figure 118. Peak Power Spectral Density, 802.11b High Channel

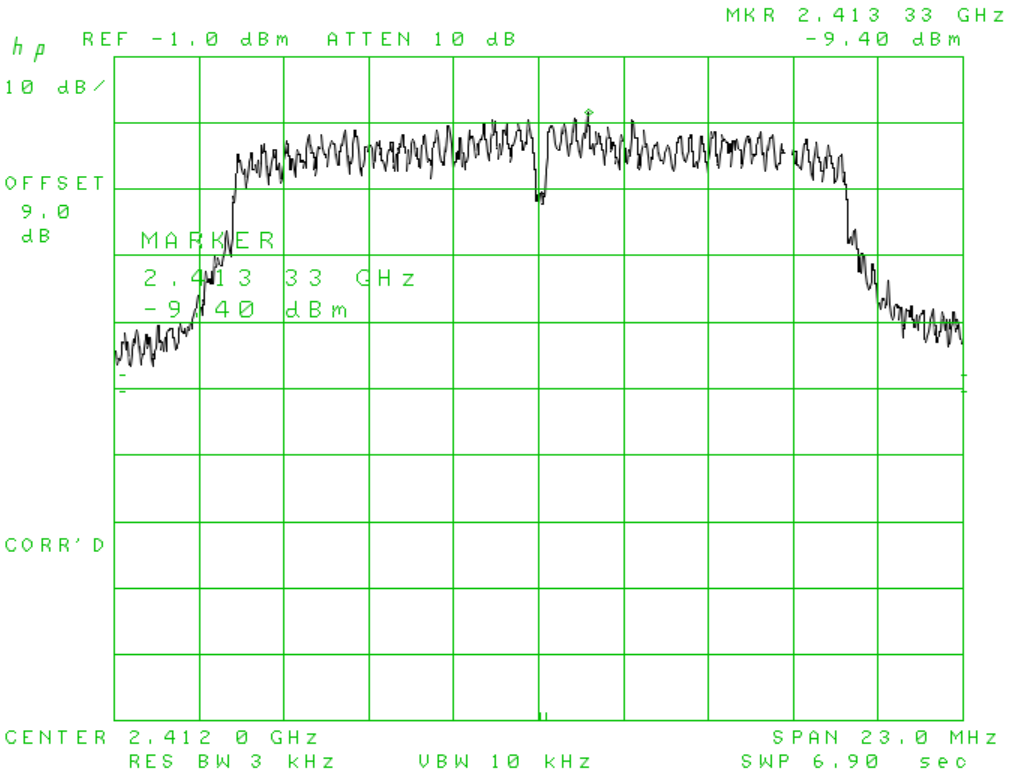


Figure 119. Peak Power Spectral Density, 802.11g Low Channel

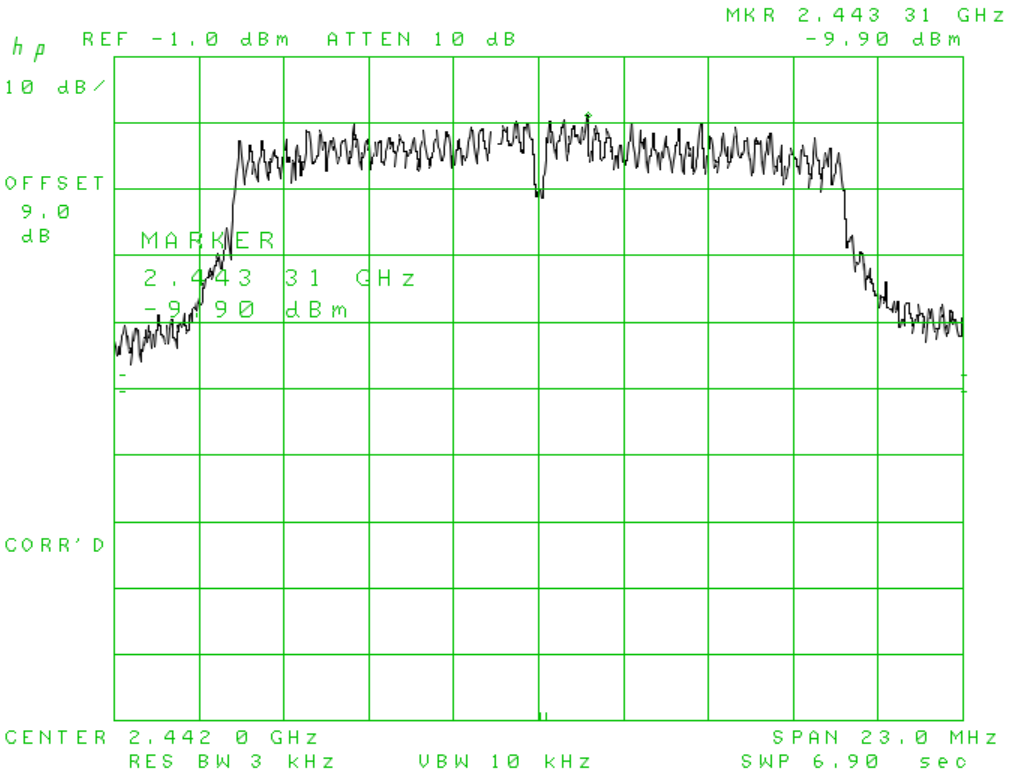


Figure 120. Peak Power Spectral Density, 802.11g Mid Channel

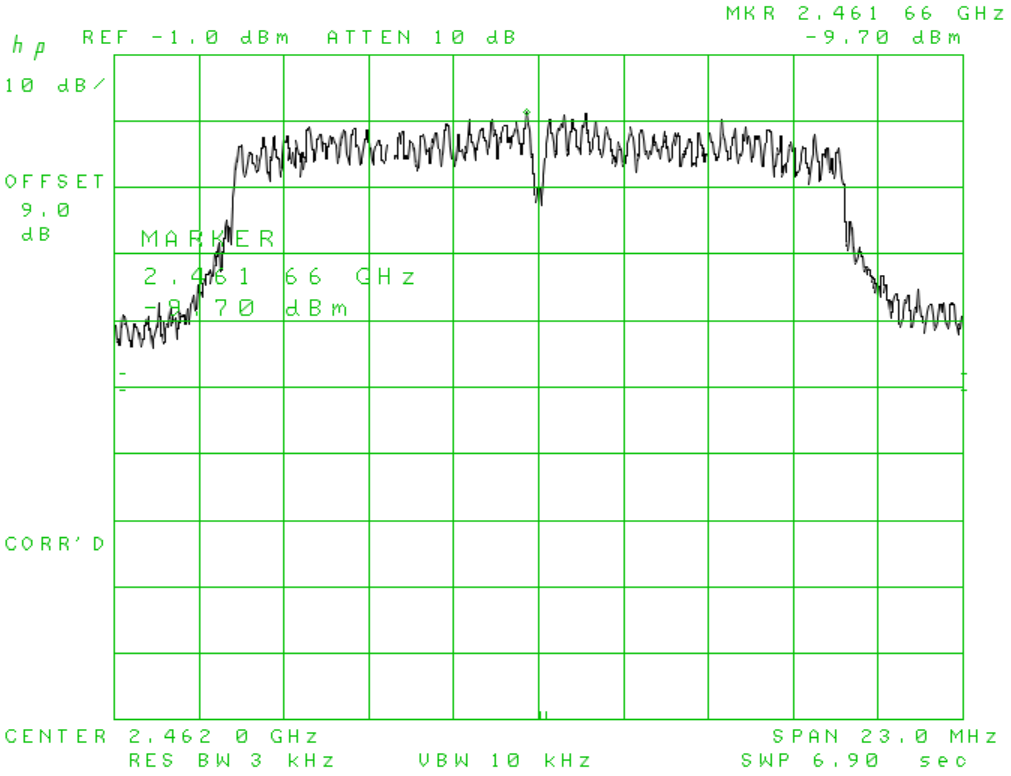


Figure 121. Peak Power Spectral Density, 802.11g High Channel

2.16 Unintentional Radiator, Powerline Emissions (CFR 15.107)

The power line conducted voltage emission measurements have been carried out in accordance with CFR 15.107, per ANSI C63.4:2009, Paragraph 7, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmission.

The worst-case results for conducted emissions were determined to be produced when the EUT was operating under continuous transmission. The worst case measurement occurred on the Phase line at 0.15 MHz. The emission level was 3.2 dB from the applicable limit. All other emissions were at least 5.2 dB from the limit. Those results are given in the table following.

NOTE: The test data provided in this section is to support the Verification and co-location requirement for the digital apparatus and the radios within.

Table 54. Transmitter Power Line Conducted Emissions Test Data, Part 15.107

150KHz to 30 MHz with Class B Limits						
Test: Power Line Conducted Emissions				**Client:** Inventek Systems		
Project: 15-0108				**Model:** ISM4334X-M4G-L44		
Frequency (MHz)	**Test Data (dBuv)**	**LISN+CL-PA (dB)**	**Results (dBuV)**	**AVG Limits (dBuV)**	**Margin (dB)**	**Detector PK, QP, or AVG**
120 VAC, 60 Hz Phase						
0.21	50.70	0.88	51.58	63.1*	11.5	**QP**
0.21	46.80	0.88	47.68	53.1	5.4	**AVG**
0.53	39.80	0.42	40.22	46.0	5.8	**AVG**
1.94	39.00	0.36	39.36	46.0	6.6	**AVG**
6.03	42.70	0.47	43.17	50.0	6.8	**AVG**
19.35	42.30	0.61	42.91	50.0	7.1	**AVG**
20.26	42.00	0.62	42.62	50.0	7.4	**AVG**
120VAC, 60 Hz Neutral						
0.1511	61.30	1.41	62.71	65.9*	3.2	**QP**
0.1511	44.30	1.41	45.71	55.9	10.2	**AVG**
0.5992	40.40	0.39	40.79	46.0	5.2	**AVG**
1.1920	39.00	0.35	39.35	46.0	6.6	**AVG**
5.2000	41.10	0.44	41.54	50.0	8.5	**AVG**
12.7600	40.80	0.64	41.44	50.0	8.6	**AVG**
22.4800	40.90	0.65	41.55	50.0	8.4	**AVG**

Note: * denotes QP Limits

SAMPLE CALCULATION at 0.21 MHz:

Magnitude of Measured Frequency	50.70	dBuV
+ Cable Loss+ LISN Loss	0.88	dB
=Corrected Result	51.58	dBuV
Limit	63.10	dBuV
-Corrected Result	51.58	dBuV
Margin	11.5	dB

Test Date: August 3, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

2.17 Unintentional Radiator, Radiated Emissions (CFR 15.109)

Radiated emissions disturbance Measurements were performed with an instrument having both peak and quasi-peak detectors over the frequency range of 30 MHz to 5 times the highest frequency used or generated by the test unit. Measurements of the radiated emissions were made with the receiver antenna at a distance of 3 m from the boundary of the test unit.

The test antenna was varied from 1 m to 4 m in height while watching the analyzers' display for the maximum magnitude of the signal at the test frequency. The antenna polarization (horizontal or vertical) and test sample azimuth were varied during the measurements to find the maximum field strength readings to record.

The worst-case radiated emission in the range of 30MHz to 1 GHz was 5.2 dB below the limit at 150.30 MHz. This signal is found in Table 55. All other radiated emissions in this range were 5.5 dB or more below the limit.

The worst-case radiated emissions in the range of 1 GHz to 30 GHz was 9.5 dB below the limit at 1596.0 MHz. This signal is found in Table 56. All other radiated emissions in this range were 12.5 dB or more below the limit.

NOTE: The test data provided in this section is to support the Verification and co-location requirement for the digital apparatus and the radios within. During this testing the radio were placed into normal operation mode.

Table 55. Unintentional Radiator, Peak Radiated Emissions (CFR 15.109), 30 MHz to 1000 MHz

30 MHz to 1000 MHz with Class B Limits							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**QP Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or QP**
59.98	45.90	-16.67	29.23	40.0	3m./HORZ	10.8	**PK**
146.79	45.30	-13.43	31.87	43.5	3m./HORZ	11.6	**PK**
147.73	42.10	-13.43	28.67	43.5	3m./HORZ	14.8	**PK**
173.33	40.60	-12.72	27.88	43.5	3m./HORZ	15.6	**PK**
47.96	51.10	-16.83	34.27	40.0	3m./VERT	5.7	**PK**
48.09	51.50	-17.03	34.47	40.0	3m./VERT	5.5	**PK**
80.70	50.50	-17.88	32.62	40.0	3m./VERT	7.4	**PK**
83.89	46.00	-17.76	28.24	40.0	3m./VERT	11.8	**PK**
120.00	52.10	-14.57	37.53	43.5	3m./VERT	6.0	**PK**
128.00	52.00	-14.24	37.76	43.5	3m./VERT	5.7	**PK**
150.30	51.00	-12.73	38.27	43.5	3m./VERT	5.2	**PK**
156.24	49.90	-12.34	37.56	43.5	3m./VERT	5.9	**PK**

Tested from 30 MHz to 1 GHz

SAMPLE CALCULATION at 59.98 MHz:

Magnitude of Measured Frequency	45.90	dBuV
+ Cable Loss+ LISN Loss	-16.67	dB
=Corrected Result	29.23	dBuV
Limit	40.00	dBuV
-Corrected Result	29.23	dBuV
Margin	10.80	dB

Test Date: September 25, 2015
Tested By
Signature: Sina Sobhaniyan Name: Sina Sobhaniyan

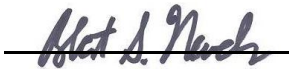
Table 56. Unintentional Radiator, Peak Radiated Emissions (CFR 15.109), Above 1 GHz

1 GHz to 30 GHz with Class B Limits							
Test: Radiated Emissions				**Client:** Inventek Systems			
Project: 15-0108				**Model:** ISM4334X-M4G-L44 SIP Application Module			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
1596.3	49.80	-8.33	41.47	54.0	3.0m./HORZ	12.5	**PK**
1596.0	52.50	-8.31	44.19	54.0	3.0m./VERT	9.5	**PK**

SAMPLE CALCULATION at 1596.3 MHz:

Magnitude of Measured Frequency	49.80	dBuV
+ Cable Loss+ LISN Loss	-8.33	dB
=Corrected Result	41.47	dBuV
Limit	54.0	dBuV
-Corrected Result	41.47	dBuV
Margin	12.5	dB

Test Date: September 29-30, 2015

Signature:  Name: Robert Nevels

2.18 Measurement Uncertainty

The measurement uncertainties given were calculated using the method detailed in CISPR 16-4. A coverage factor of k=2 was used to give a level of confidence of approximately 95%.

2.18.1 Conducted Emissions Measurement Uncertainty

Measurement Uncertainty (within a 95% confidence level) for this test is ± 2.78 dB.

The data listed in this test report does have sufficient margin to negate the effects of uncertainty. Therefore, the EUT unconditionally meets this requirement.

2.18.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.39 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.18 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.21dB.

The data listed in this test report does have sufficient margin to negate the effects of uncertainty. Therefore, the EUT unconditionally meets this requirement.