Electromagnetic Compatibility
Test Report

Test Report No: MOT 270110
Issued on: January 27, 2010

Product Name
EWP3100 Semi Rugged VoWLAN Phone

Tested According to
FCC 47 CFR, Part 15, Subparts C
IC RSS-210

Tests Performed for
Motorola Inc.
One Motorola Plaza, Holtsville, N.Y 11742, USA

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ELECTRICAL TESTING
CERT #1633.01

Test Personnel


Tests Performed By: ----------

Rami Nataf Sergey Kapustin

Report Prepared By: ----------

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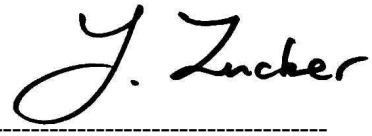


Report Reviewed By: ----------

Y. Zucker
QA and Lab. Manager
QualiTech EMC Laboratory

Test Report details:

Test commencement date:	10.01.2010
Test completion date:	13.01.2010
Customer's representative:	Eli Basri
Issued on:	27.01.2010

Assessment information:

This report contains an assessment of the EUT against Electromagnetic Compatibility based upon tests carried out on the samples submitted. The results contained in this report relate only to the items tested. Manufactured products will not necessarily give identical results due to production and measurement tolerances. QualiTech, EMC Lab does not assume responsibility for any conclusion and generalization drawn from the test results with regards to other specimens or samples of type of the equipment represented by test item.

The EUT was set up and exercised using the configuration, modes of operation and arrangements defined in this report only.

Modifications:

Modifications made to the EUT

None

Modifications made to the Test Standard

None

Summary of Compliance Status

WLAN 802.11b/g

Test Spec. Clause	Test Case	Remarks
47 CFR §15.247 (a) (2) RSS-210 section A8.2 (1)	6 dB Bandwidth	Comply
47 CFR §15.247 (b) (3) & RSS-210 section A8.4 (4)	Maximum Peak Output Power, 2400-2483.5 MHz	Comply
47 CFR §15.247 (e) & RSS-210 Section A8.2 (2)	Peak power spectral density	Comply
47 CFR §15.247 (d) & RSS-210 Section A8.5	Conducted Spurious Emissions	Comply
47 CFR §15.247 (d) & §15.205 & RSS-210 section A8.5	Spurious Radiated Emissions, Restricted Bands 2310-2390MHz & 2483.5-2500MHz	Comply
47 CFR §15.247 (d), & §15.205, & §15.209(a)	Spurious Radiated Emissions, Restricted Bands	Comply
47 CFR §15.109/209 & RSS-GEN section 7.2.3.2	Radiated Emission, Receive Mode	Comply
47 CFR §15.203 & RSS - Gen. Section 7.1.4	Antenna Connector Requirements	Comply
47 CFR §15.407(b)(6) & §15.107/207, ICES-003 RSS-GEN section 7.2.3.2	Power line Emission measurements	Comply

Table of Contents

1. General Description

Description of the EUT system/test Item:

Product name: EWP3100 Semi Rugged VoWLAN Phone

Model: EWP3100

FCC ID: AZ489FT7038
IC: 109U-89FT7038

Description:

The EUT is a Smartphone which provides mobile voice and data communications over wireless network to users inside an enterprise.
The Smartphone includes: Smartphone with voice recognition for hands-free dialing, Walkie-talkie call button for dispatch and PTT calls (including private talk groups), two way SMS and Instant Text Messaging, Email, Contacts, Calendar, Tasks etc, including viewing mail attachments and many other built-in tools. Also includes access to enterprise applications, standard mobile internet browser, and the ability to pair with Bluetooth headsets and other Bluetooth devices such as personal computers.
Voice is transmitted/received through WLAN in digital fashion only, using Voice-over-IP protocols. The phone has no other wide area (WAN) voice transceivers, hence the term “Single mode”.
The Single Mode VoWLAN solution is intended to leverage unlicensed WiFi spectrum, WLAN infrastructure, and existing telephony infrastructure to provide wireless services, including voice, within an enterprise campus.
It is capable of operating in the unlicensed 2.4 GHz band using 802.11b/g protocols or in applicable 5 GHz bands using the 802.11a protocol.
The EUT also contains a Bluetooth technology for short range interfaces and 3.2Mp auto-focus camera.

Maximum Peak Output Power:

73.9mW for WLAN 802.11b
65.8mW for WLAN 802.11g

Frequency range:

802.11b/g: 2.412 – 2.462 GHz

Transmit Data rate:

Protocol	Rate [Mbps]							
802.11b	1	2	5.5	11				
802.11g	6	9	12	18	24	36	48	54

Type of Modulation:

Protocol	Modulation
802.11b	DSSS (DQPSK, DBPSK), CCK
802.11g	DSSS/OFDM (64QAM, 16QAM, QPSK, BPSK, DQPSK, DBPSK)

Antenna Specification:

Type: WLAN a/b/g**:** Integral (on board) PIFA Dual Band

Gain: 802.11b/g: 3.1 dBi max, free space.

2. Method of Measurements

2.1. Conducted RF Measurements:

The RF output of the transmitter under test was directly connected to the input of the Spectrum analyzer through a specialized antenna connector provided by the manufacturer, and an attenuator as specified. The external attenuator and cable loss were added to the reading. Worst-case results of the various modulation modes (where applicable) were reported.

For PSD, emission peak was zoomed within the pass band with spectrum analyzer's settings as reported (Sweep time=Span/3kHz). Transmitter outputs transmitting simultaneously were aggregated through a combiner.

For Maximum Conducted Output Power, the spectrum analyzer was set for free ran, and 100 traces were averaged in power averaging mode. The transmitter was continuously transmitting, at a duty cycle of about 99%, and power was integrated across a bandwidth of the 26dB EBW of the signal, using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. Alternatively, Peak Output Power was measured using a Peak Power Meter.

For spurious emissions measurement, the spectrum from 9 KHz to 40GHz was investigated with the transmitter set to the lowest, middle and highest channel frequencies.

2.2. Radiated Emissions Measurements in the restricted bands:

For radiated emissions, which fall in the restricted bands the spectrum from 1MHz to 25GHz was investigated following the guidelines in ANSI C63.4-2003, with the transmitter set to the lowest, middle and highest channel frequencies. Measurements were performed with peak detector and repeated averaged with VBW=10Hz. Only Peak detection plots are presented.

2.3. Radiated Emission measurements:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table/support, 0.8m above the turntable, was configured, arranged and operated in a manner consistent with typical application and load conditions. The test program of exercising the equipment ensured that various parts of the EUT were exercised to permit detection of all EUT disturbances.
An appropriate antenna depending upon the frequency range, per ANSI C63.4-2003 clause 4.1.5 was used. While the turntable was being rotated, the height of the antenna was varied from 1 to 4m for the frequency range of 30MHz to 1GHz. The highest radiated emission was detected by manipulating the system cables to the worst-case position. This process was repeated for both antenna polarizations. The spectrum up to 40GHz was investigated for spurious emissions, using a band-reject filter where appropriate.
The amplitudes of worst-case emission were measured with the detector modes and resolution bandwidths over various frequency ranges according to the requirements of ANSI C63.4-2003 clause 4.2.

2.4. Worst Case Results:

Worst case result is determined as the channel with the highest output power. Pre-scan has been conducted to determine the worst-case. Worst-case results of various modulation modes/data rates were determined as the modulation with the highest output power, and that was reported.

2.5. Power Line Emission measurements:

The EUT was placed on a non-conductive table/support 80 cm above the reference ground plane. The EUT was configured in accordance with ANSI C63.4-2003 using a 50µH/50 ohm LISN.

Compliance with the provisions was based on the measurements of the radio frequency voltage between each line and the ground at the power terminal.

The EUT was operated in receive mode and then with both DSS and DTS transmitters operating alternately and the worst case results were presented.

3. Test Facility & Uncertainty of Measurement

3.1. Accreditation/ Registration reference:

- *A2LA Certificate Number: 1633.01*

3.2. Test Facility description

The tests were performed at the EMC Laboratory, QualiTech Division, ECI Telecom Group

Address: 30, Hasivim St., Petah Tikva, Israel.
Tel: 972-3-926-8443

3m Anechoic Chamber:

The 3m-screened chamber is used in two configurations: the semi-anechoic configuration for Radiated Emission measurements and the full-anechoic configuration for Radiated Immunity tests.

Semi Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field ≥80dB at 15 kHz ≥90dB at 100 kHz Electric field >120dB from 1MHz to 1GHz >110dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	±3.49dB, 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	±3dB, 1GHz to 18GHz

Full-Anechoic Configuration:

Measurement distance	3m
Chamber dimensions	7m x 4m x 3m
Antenna height	1.55m at Horizontal & Vertical polarizations
Shielding Effectiveness	Magnetic field ≥80dB at 15 kHz ≥90dB at 100 kHz Electric field >120dB from 1MHz to 1GHz >110dB from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls and floor
Field Uniformity to EN61000-4-3	±3dB 80MHz to 18GHz

3.3. Uncertainty of Measurement:

Test Name	Test Method & Range	Uncertainty	
		Combined std. Uc(y) [dB]	**Expanded U** [dB]
Radiated Emission	30MHz÷230MHz, Horiz. polar. 30MHz÷230MHz, Ver. polar. 230MHz÷1000MHz, Horiz. polar. 230MHz÷1000MHz, Vert. polar.	1.8 2.0 1.5 1.5	3.6 3.9 3.0 3.0
Conducted Emission	9 kHz÷150 kHz 150 kHz÷30MHz	1.4 1.1	2.8 2.2

4. WLAN 802.11b/g: Report of Measurements and Examinations

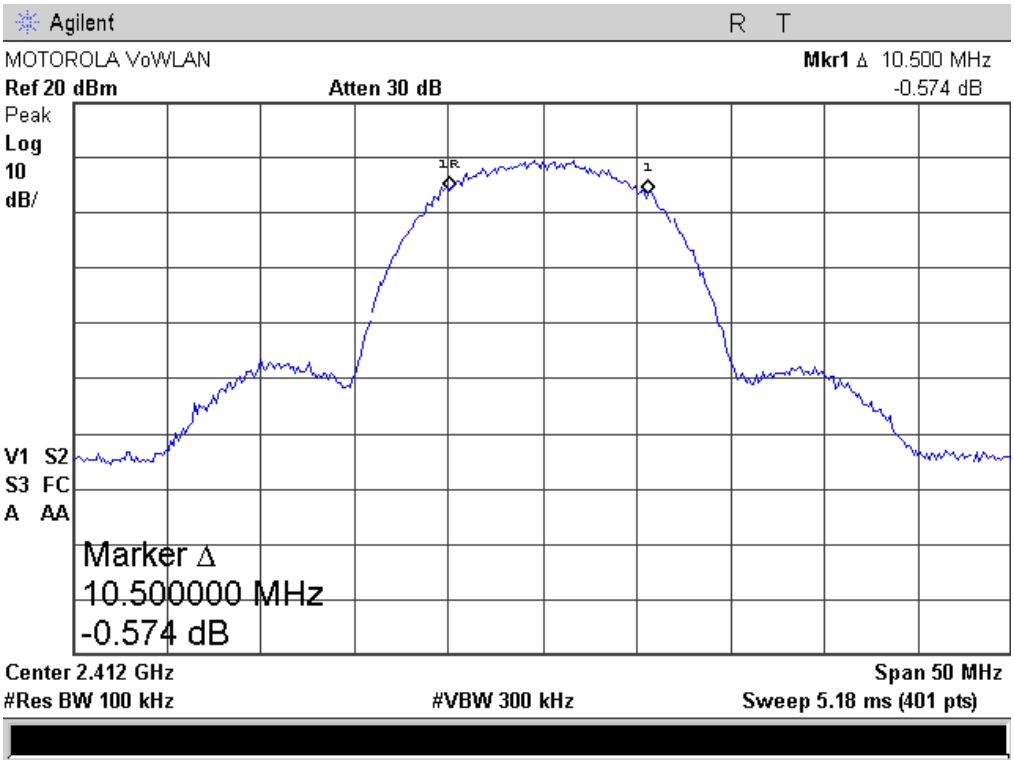
4.1. 6 dB Bandwidth

Reference document:	**47 CFR §15.247 (a) (2)**		
Test Requirements:	Systems using digital modulation techniques may operate in 2400-2483.5 MHz MHz-z band. The minimum 6dB bandwidth shall be at least 500 kHz.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 - Plot 4.1.6	

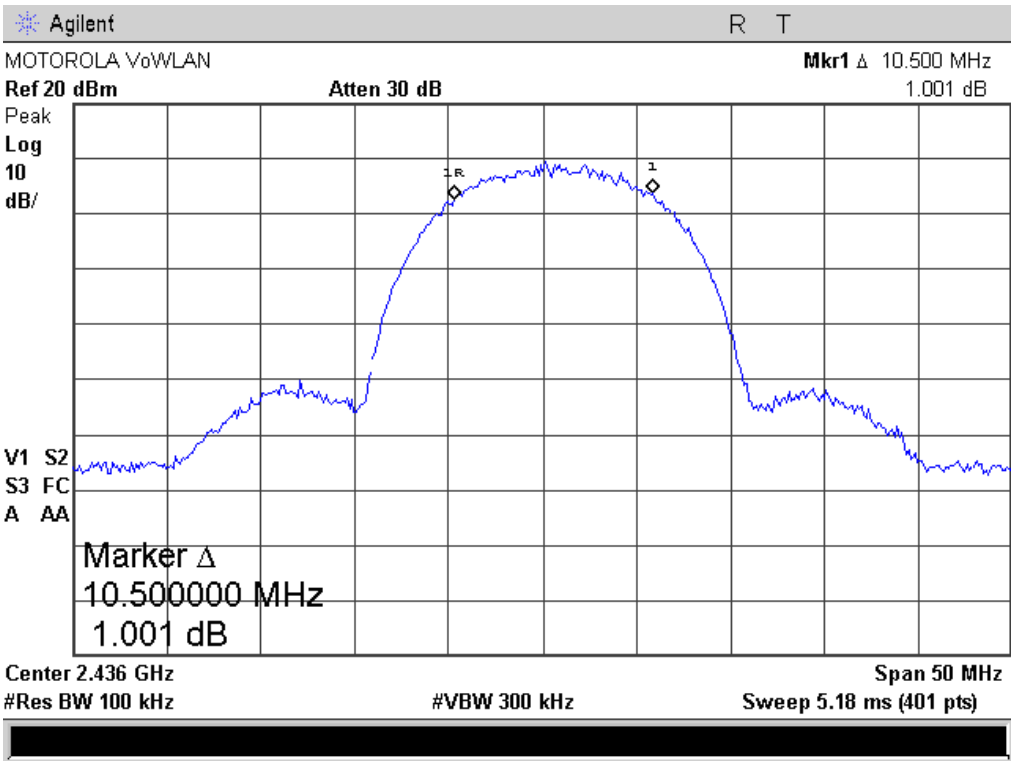
Test results

Frequency [MHz]	Data Rate [Mbps]	6 dB Bandwidth [kHz]	Limit [kHz]	Ref Plots
802.11b Mode				
2412	11	10500	>500	4.1.1
2437	11	10500	>500	4.1.2
2462	11	10750	>500	4.1.3
802.11g Mode				
2412	54	16500	>500	4.1.4
2437	54	16500	>500	4.1.5
2462	54	16375	>500	4.1.6

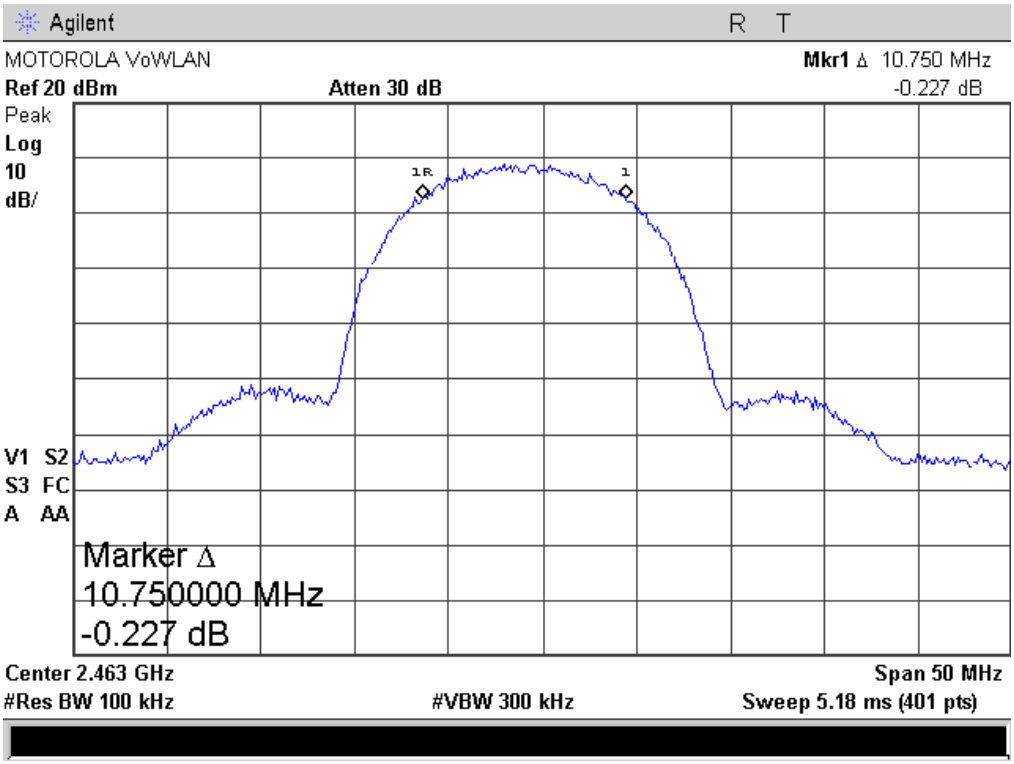
802.11b Mode
Plot 4.1.1



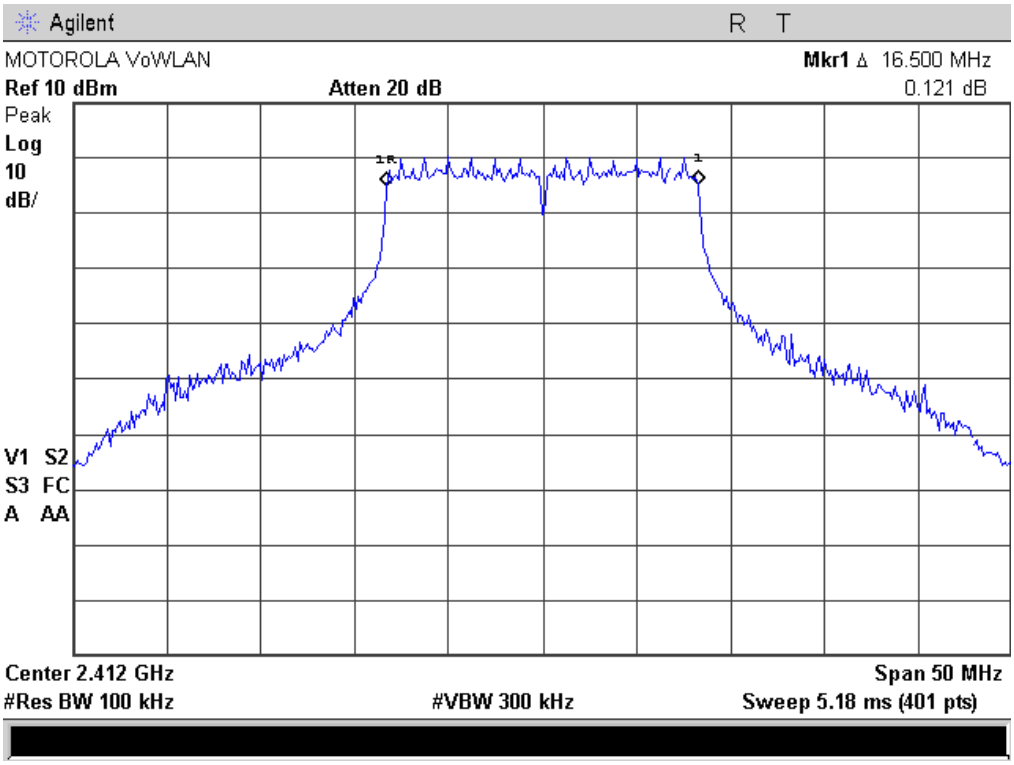
Plot 4.1.2



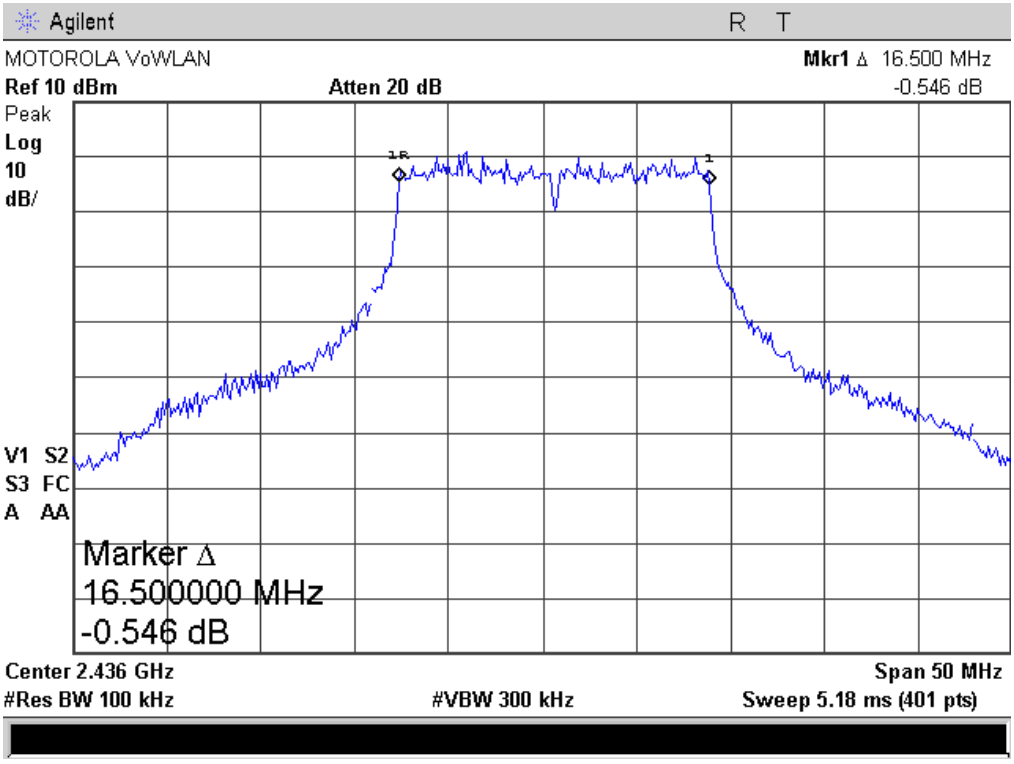
Plot 4.1.3



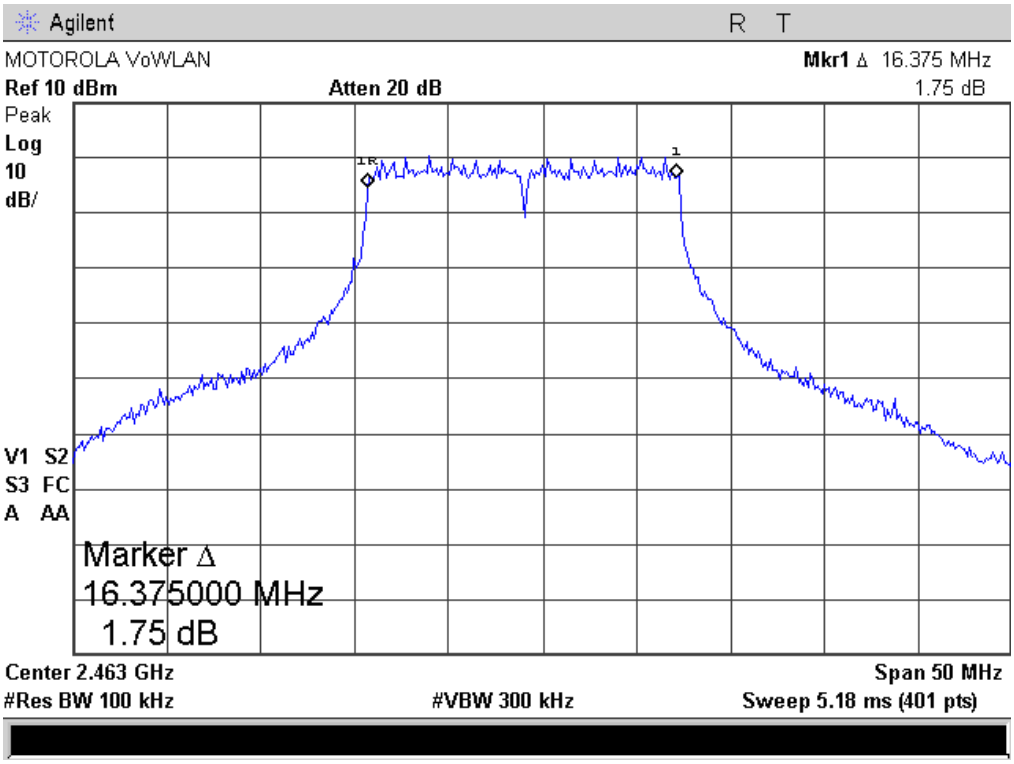
802.11g Mode
Plot 4.1.4



Plot 4.1.5



Plot 4.1.6



4.2. Maximum Peak Output Power, 2400-2483.5 MHz

Reference document:	**47 CFR §15.247 (b) (3)**		
Test Requirements:	The maximum peak output power of the intentional radiator for systems using digital modulation in the 2400-2483.5 MHz band shall not exceed 1 Watt. Transmitters operating in the 2400-2483.5 MHz bands that emits multiple directional beams but does not emit multiple directional beams simultaneously, the total output power conducted to the arrays, i.e. the sum of the power sullied to the antenna elements, shall not exceed the limit calculated below. The total conducted output power shall be reduced by 1dB below the specified limit for each 3 dB that the directional gain of the antenna array exceeds 6dBi.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 1MHz, VBW: 3MHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	---	

Test Results:

2400-2483.5 MHz Band

Frequency [MHz]	Data Rate [Mbps]	Peak Output Power* [dBm]	Peak Output Power* [mW]	Average Output power** [dBm]	Limit [dBm]	Margin [dB]
802.11bMode						
2412	1	18.7	73.9	15.7	30	-11.3
2437	1	18.3	66.8	15.3	30	-11.7
2462	1	18.1	64.9	15.1	30	-11.9
802.11g Mode						
2412	6	14.0	25.4	11.0	30	-15.9
2437	6	18.2	65.8	15.2	30	-11.8
2462	6	13.9	24.7	10.9	30	-16.1

* Corrected for external attenuations.
**Calculated (50% duty cycle), for reporting purposes only.

4.3. Peak power spectral density

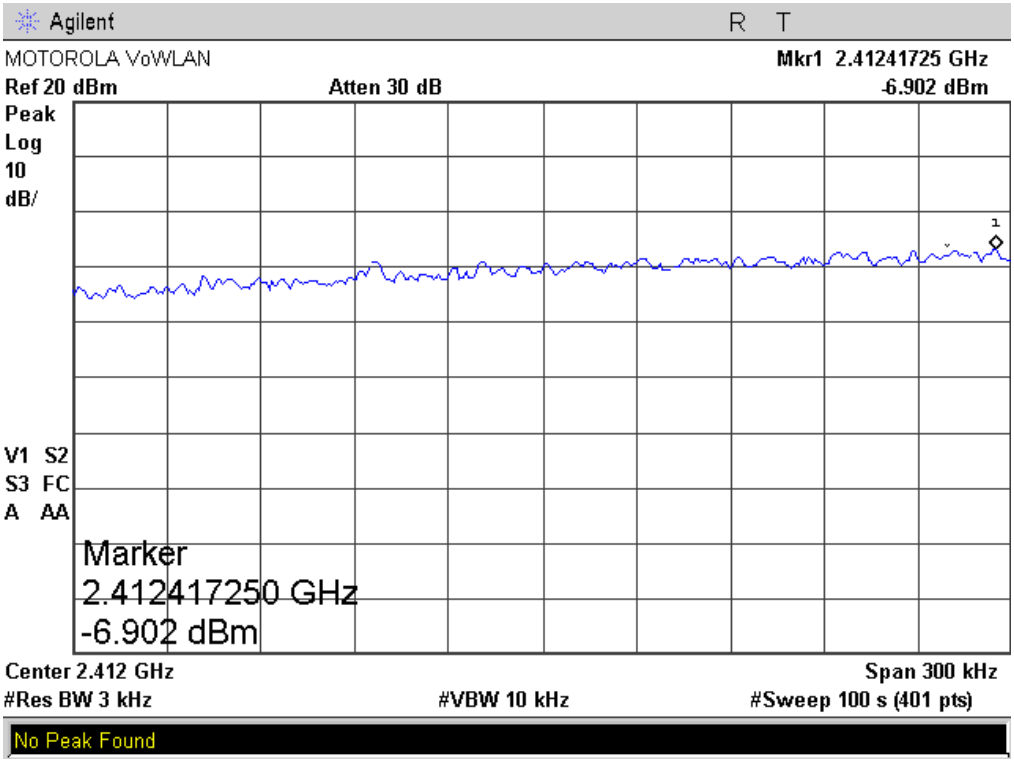
Reference document:	**47 CFR §15.247 (e)**		
Test Requirements:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.		
Test setup:	See sec 2.1,	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 3 kHz, VBW: 10 kHz, Sweep Time: 100s		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.3.1 - Plot 4.3.6	

Test Results:

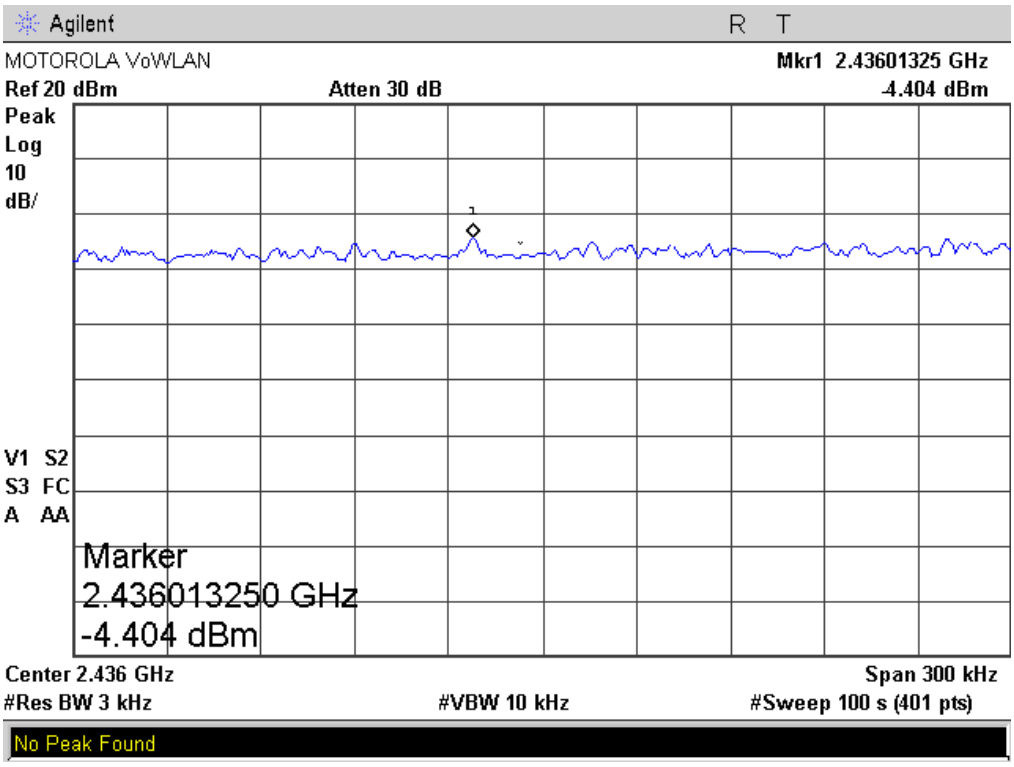
Frequency [MHz]	Data Rate [Mbps]	Measured PSD [dBm/3kHz]	Limit PSD [dBm/3kHz]	Margin [dB]	Reference Plots
802.11b Mode					
2412	1	-6.9	8	-14.9	4.3.1
2437	1	-4.4	8	-12.4	4.3.2
2462	1	-3.5	8	-11.5	4.3.3
802.11g Mode					
2412	6	-12.5	8	-20.5	4.3.4
2437	6	-8.8	8	-16.8	4.3.5
2462	6	-12.3	8	-20.3	4.3.6

802.11b Mode

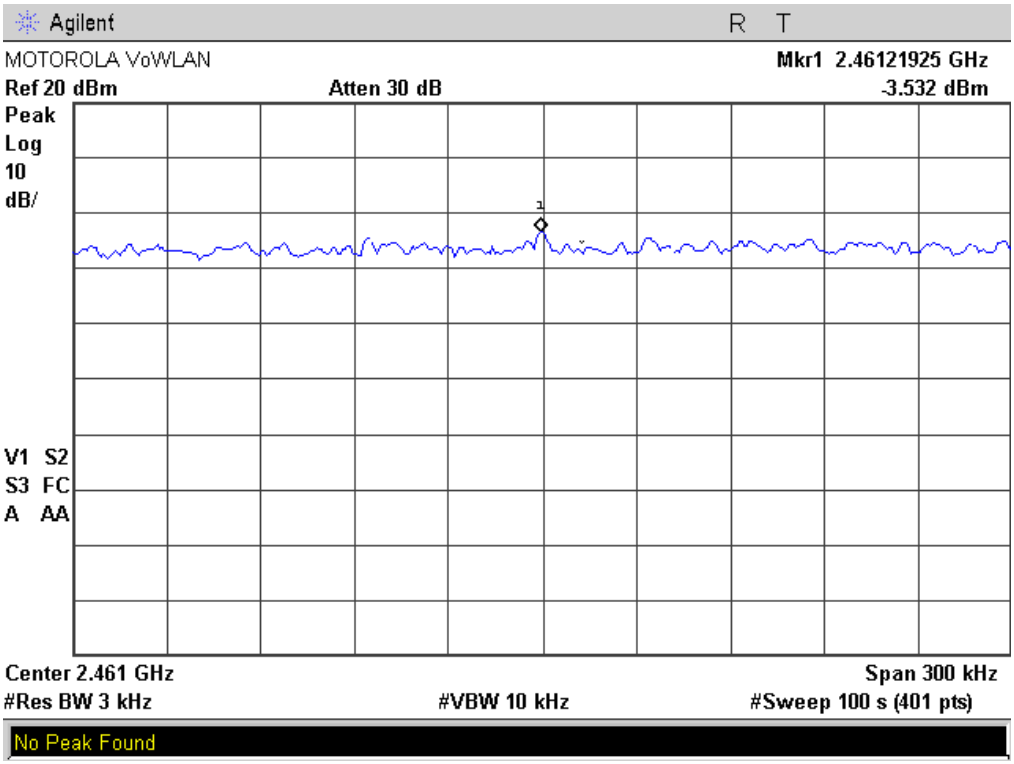
Plot 4.3.1



Plot 4.3.2

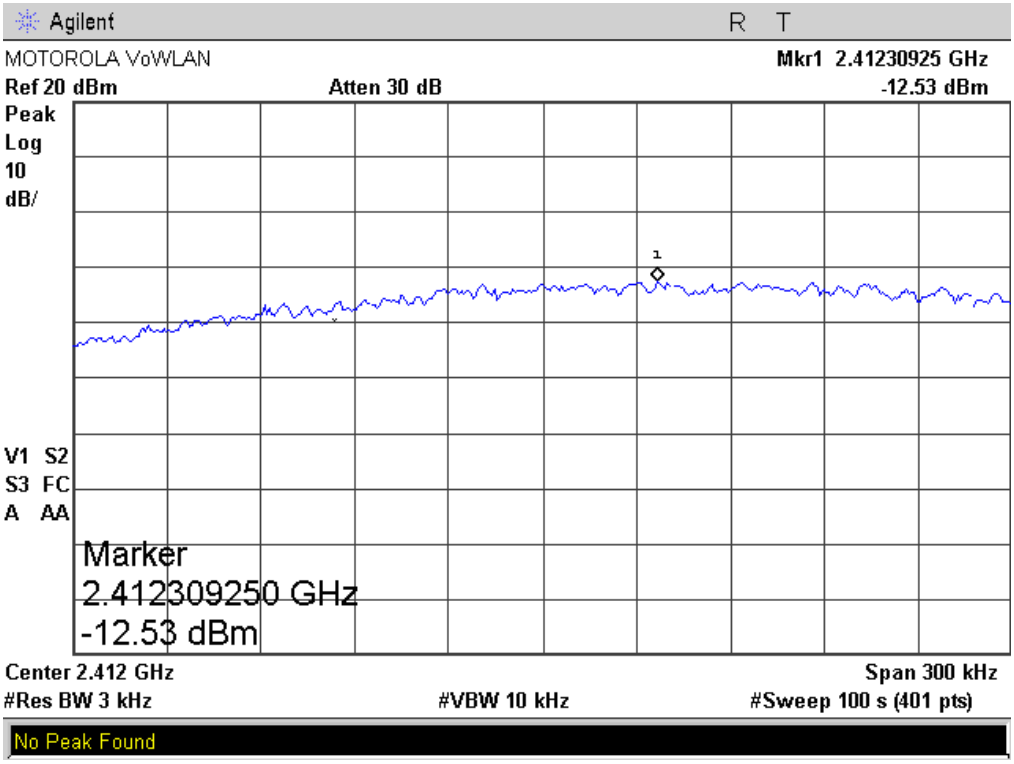


Plot 4.3.3

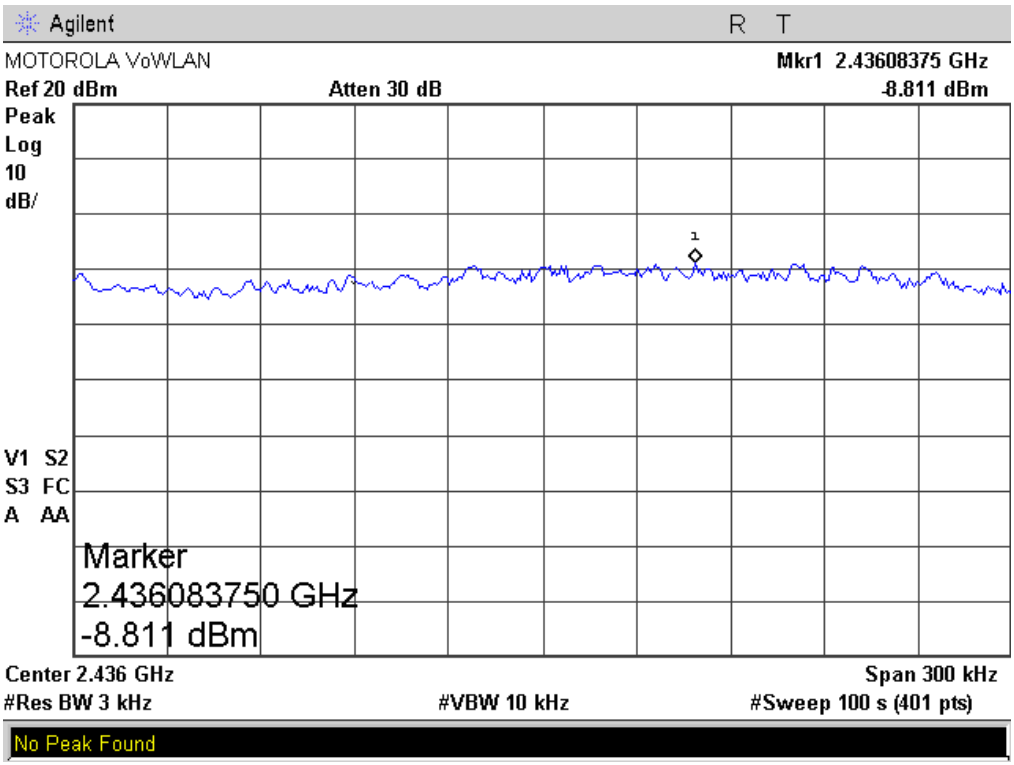


802.11g Mode

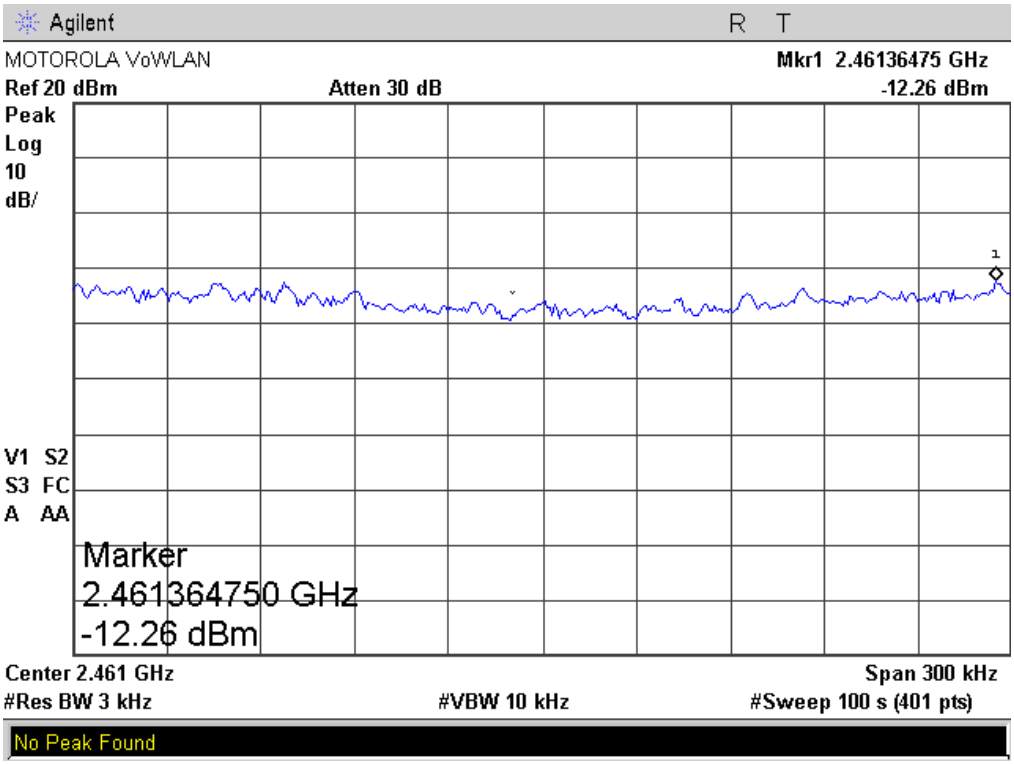
Plot 4.3.4



Plot 4.3.5



Plot 4.3.6



4.4. Conducted Spurious Emissions

Reference document:	**47 CFR §15.247 (d)**		
Test Requirements:	In any 100 kHz bandwidth outside the frequency band in which the digitally modulated radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in Section §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (See §15.205(c).		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 100kHz, VBW:300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1- Plot 4.4.16	

Test results:

2400-2483.5 MHz Band:

Spurious

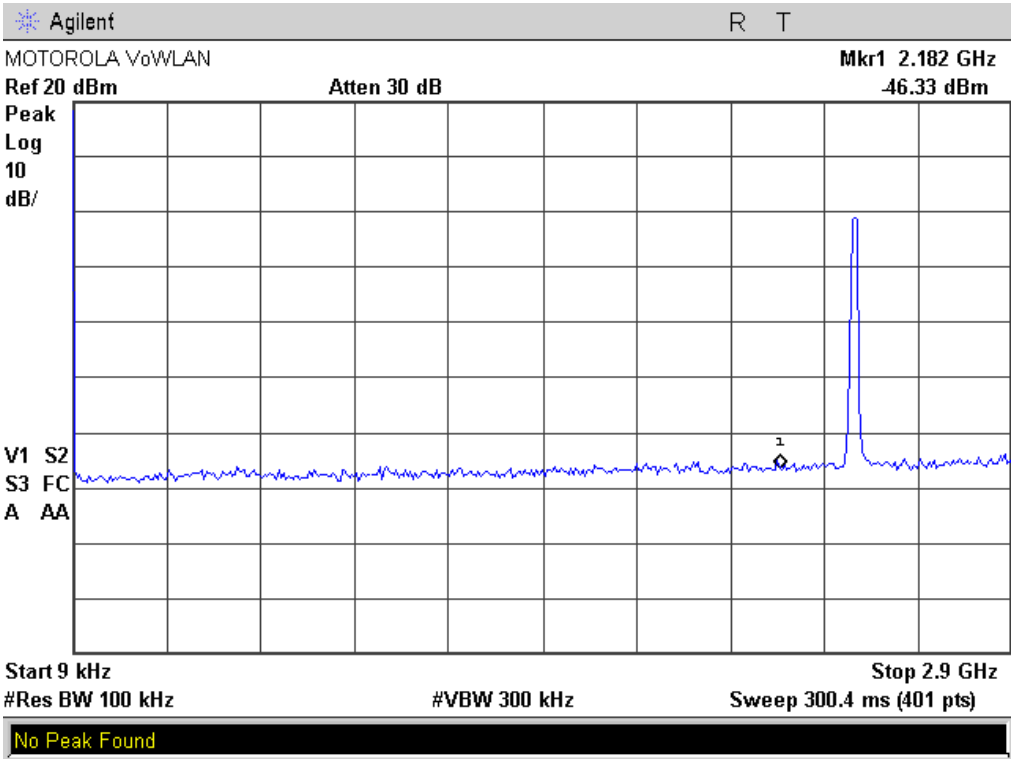
Frequency [MHz]	Data Rate [Mbps]	Measured [dBc]	Limit [dBc]	Reference Plots*	Result
802.11b Mode					
2412	11	*	-30	4.4.1 - 4.4.2	Comply
2437	11	*	-30	4.4.3 - 4.4.4	Comply
2462	11	*	-30	4.4.5 - 4.4.6	Comply
802.11g Mode					
2412	54	*	-30	4.4.7 – 4.4.8	Comply
2437	54	*	-30	4.4.9 - 4.4.10	Comply
2462	54	*	-30	4.4.11 - 4.4.12	Comply

*All emissions at least 15 dB below the limit (45dBc)

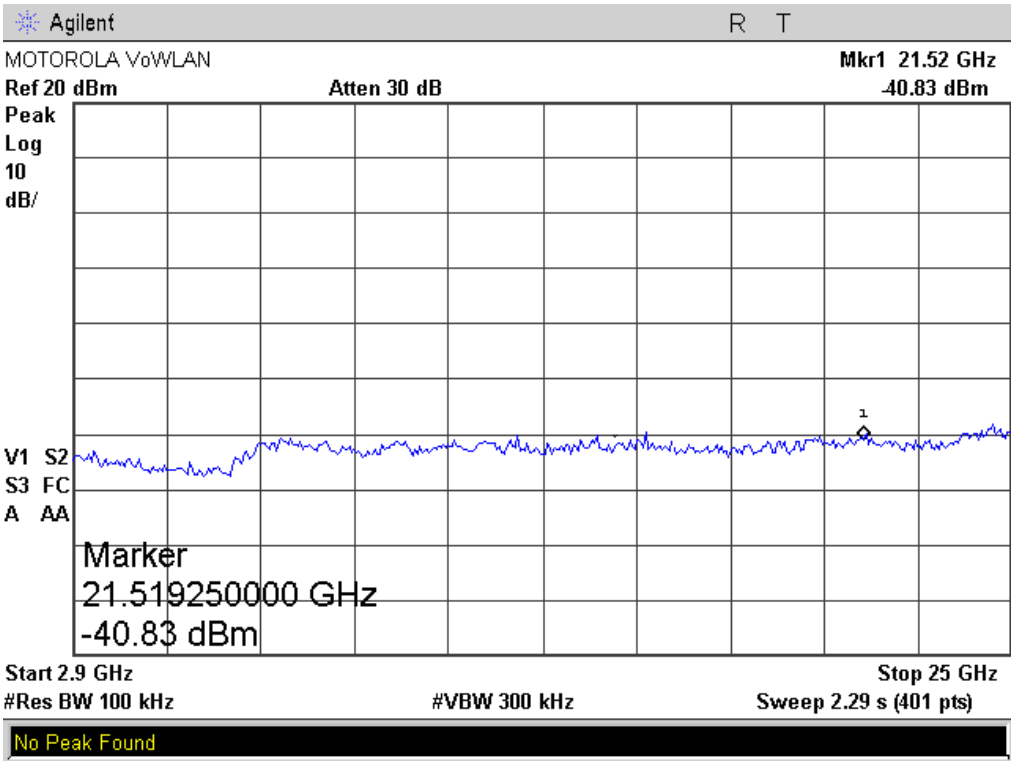
Band Edge

Frequency [MHz]	Data Rate [Mbps]	Measured [dBc]	Limit [dBc]	Reference	Result
802.11b Mode					
2412	11	-34.95	-30	4.4.13	Comply
2462	11	-48.77	-30	4.4.14	Comply
802.11g Mode					
2412	54	-33.26	-30	4.4.15	Comply
2462	54	-42.85	-30	4.4.16	Comply

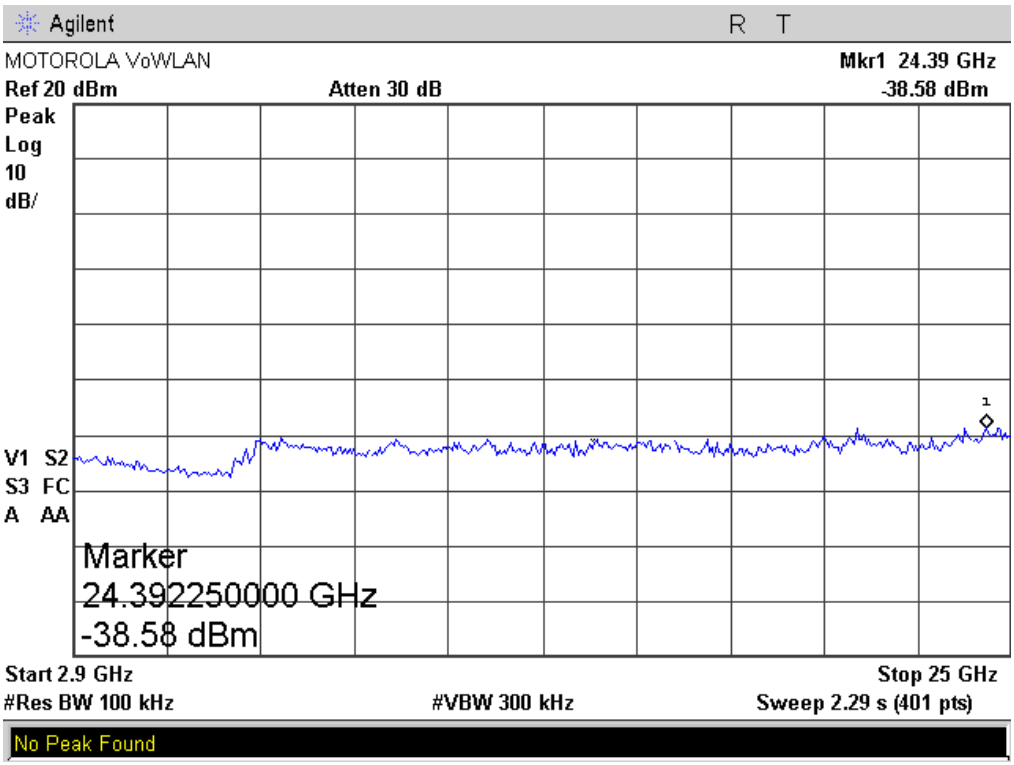
802.11b Mode
Plot 4.4.1



Plot 4.4.2



Plot 4.4.3



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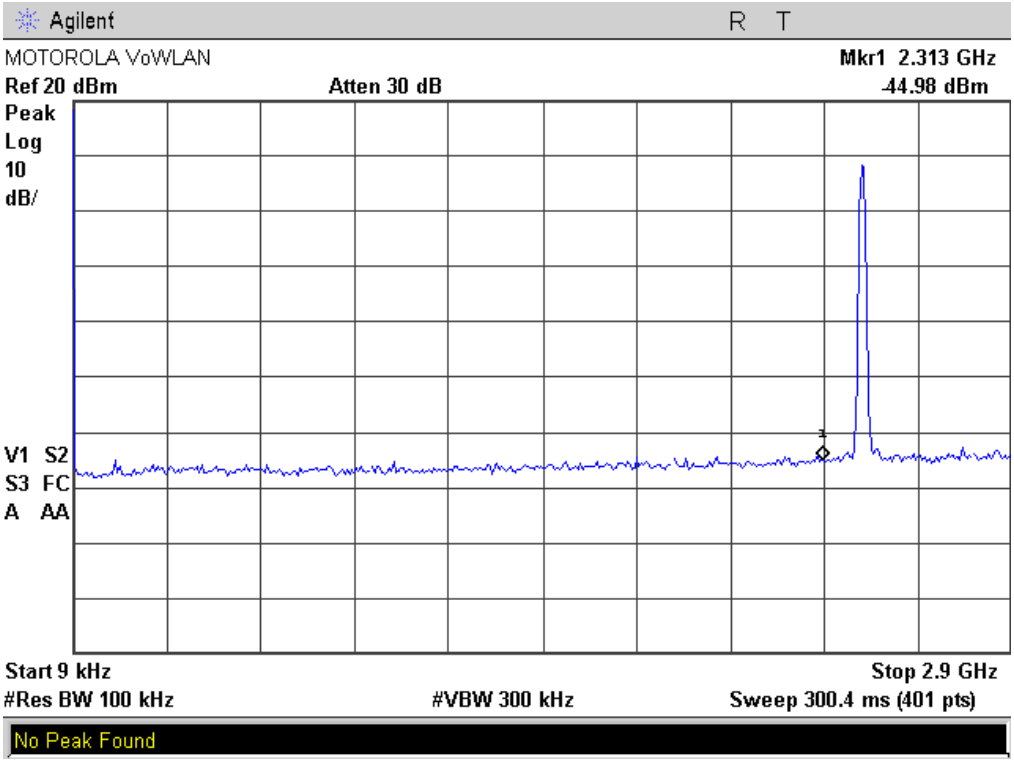

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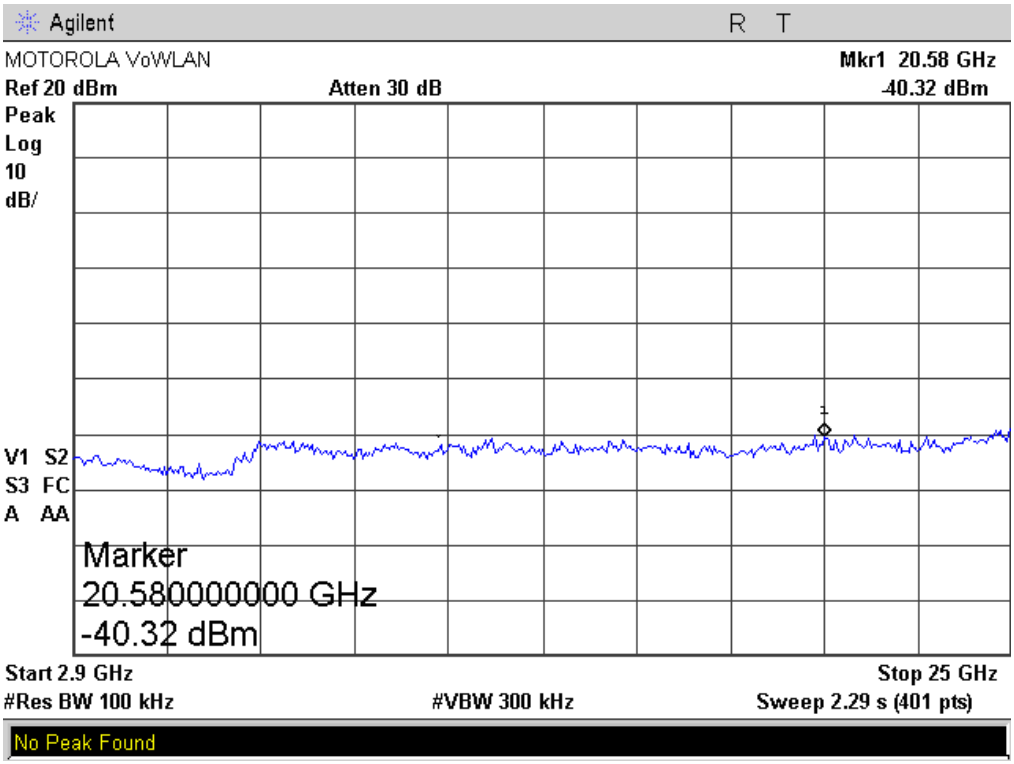

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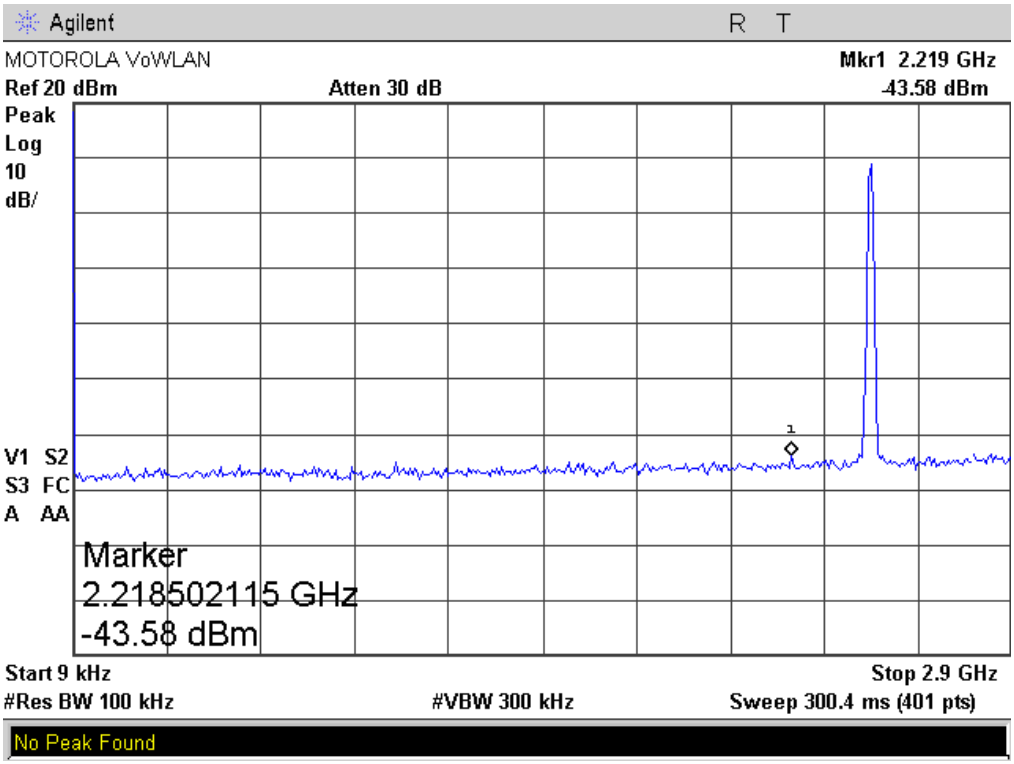
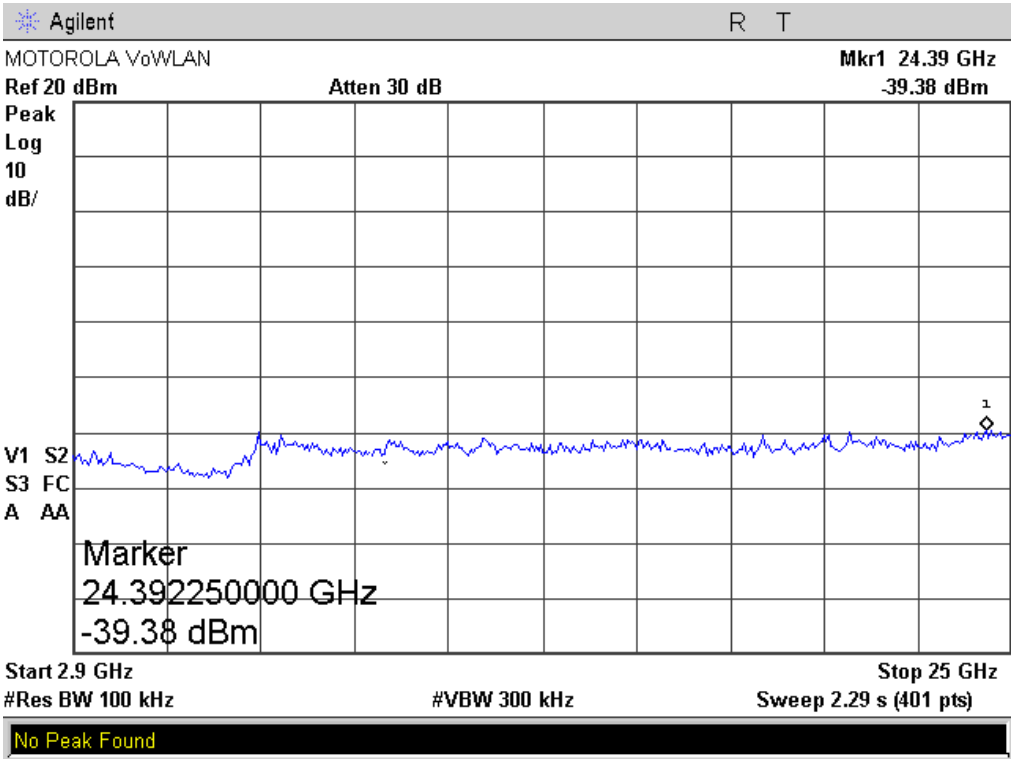


802.11g Mode
Plot 4.4.7



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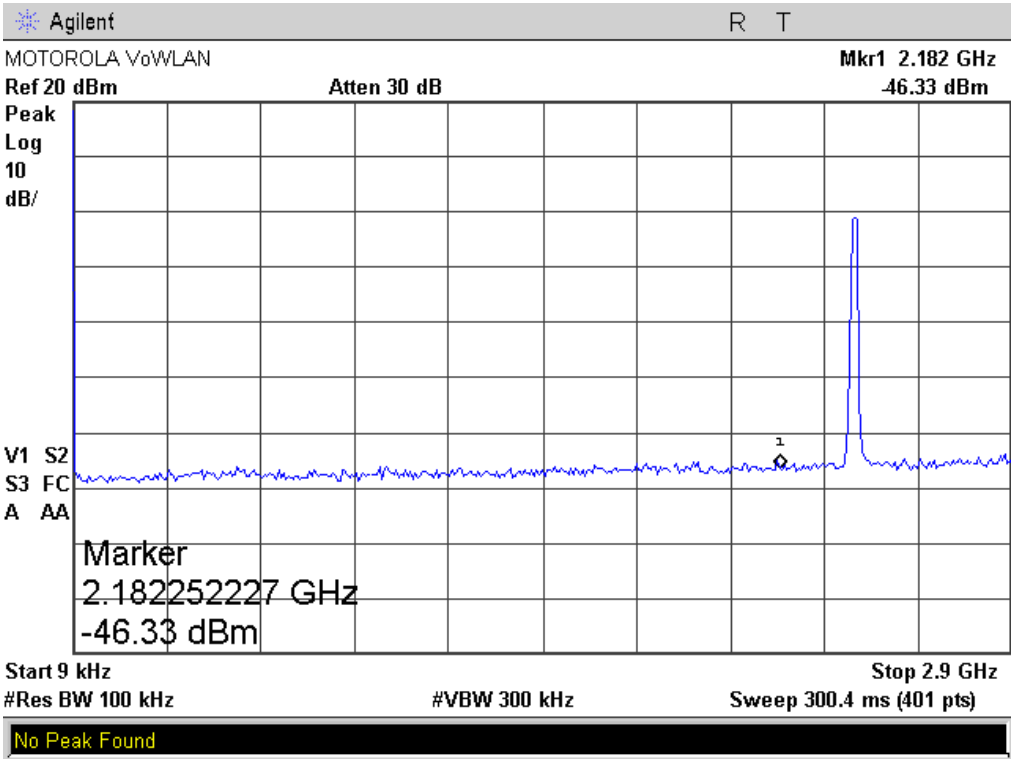

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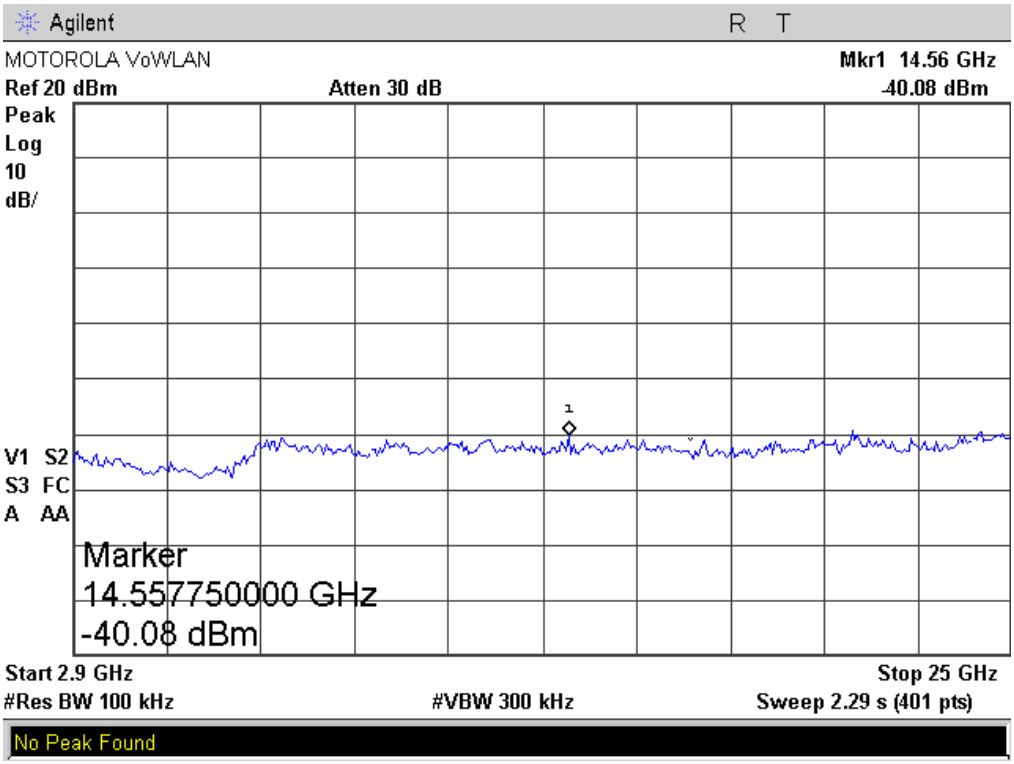
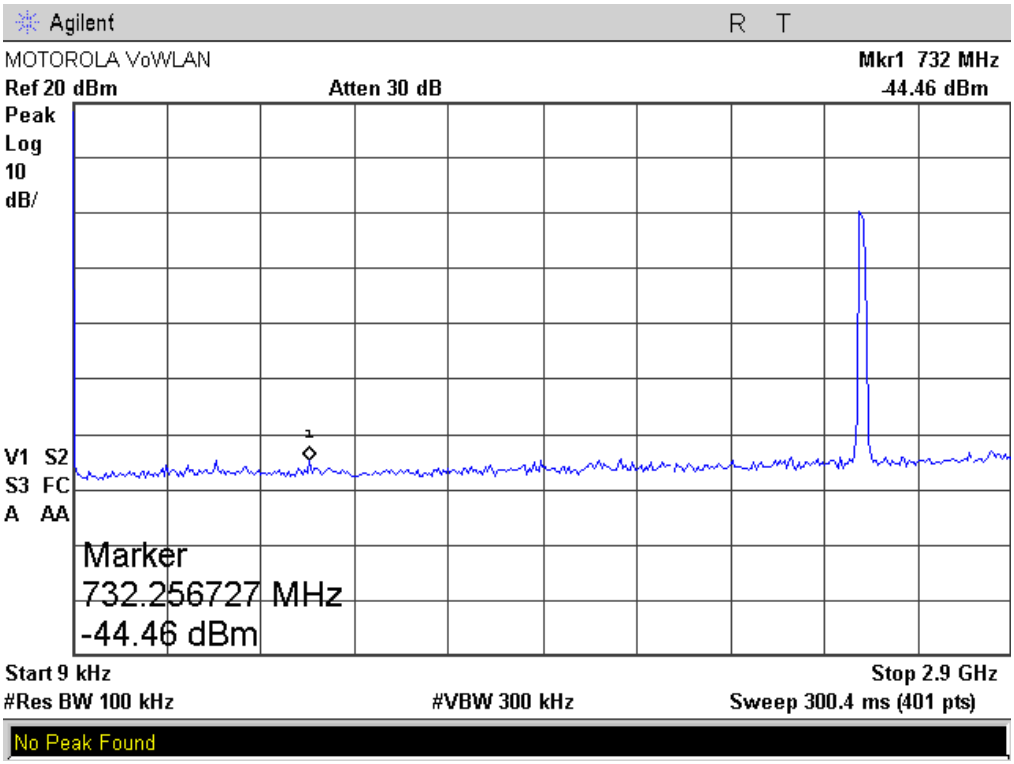
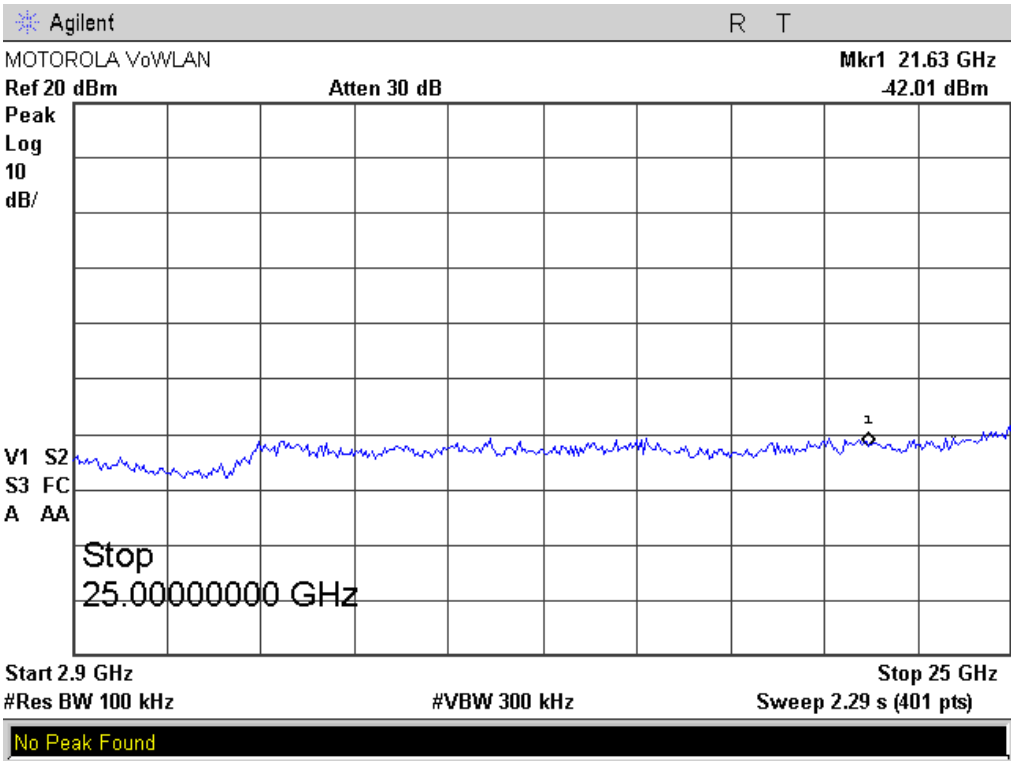


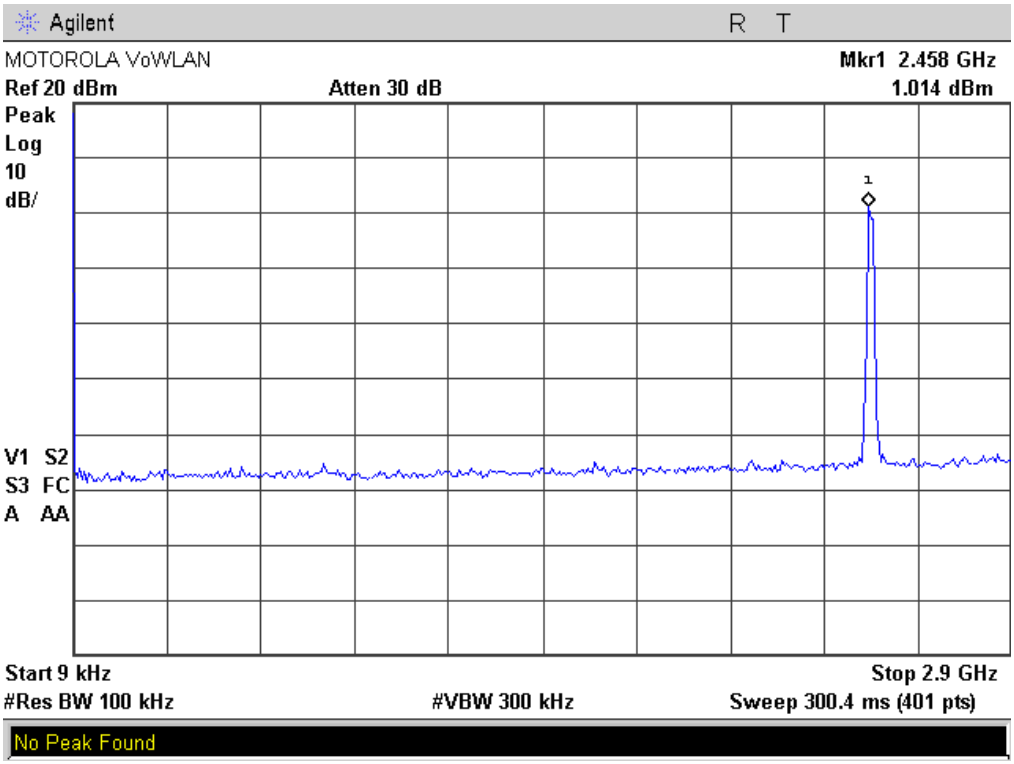
Plot 4.4.10



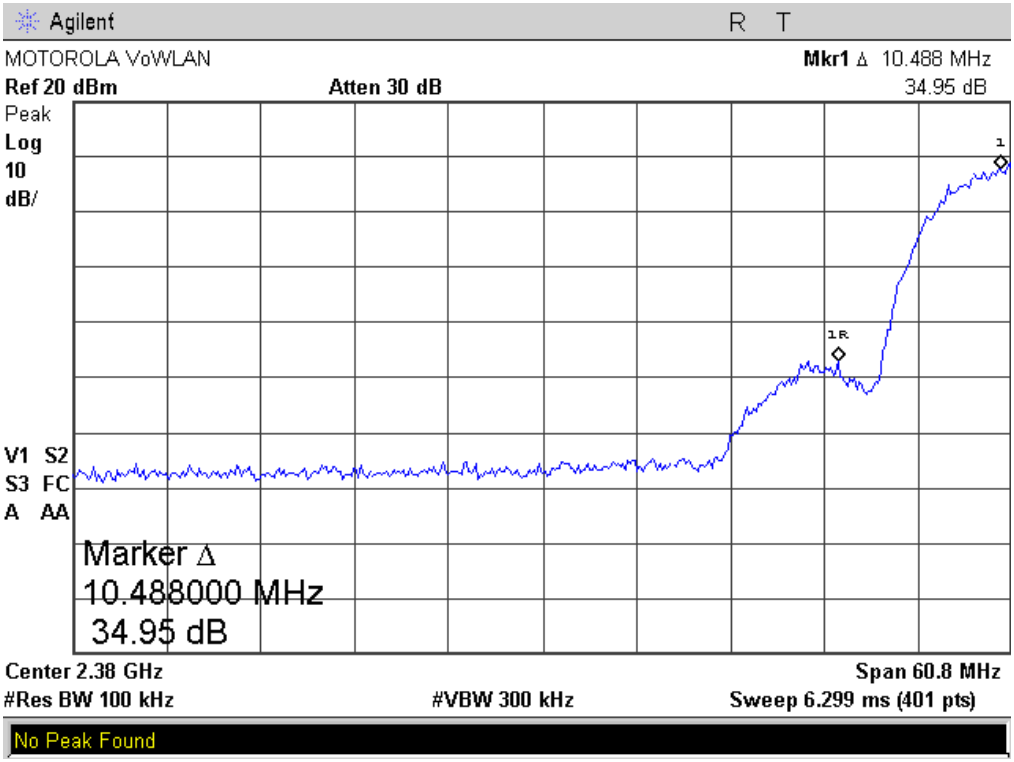
Plot 4.4.11



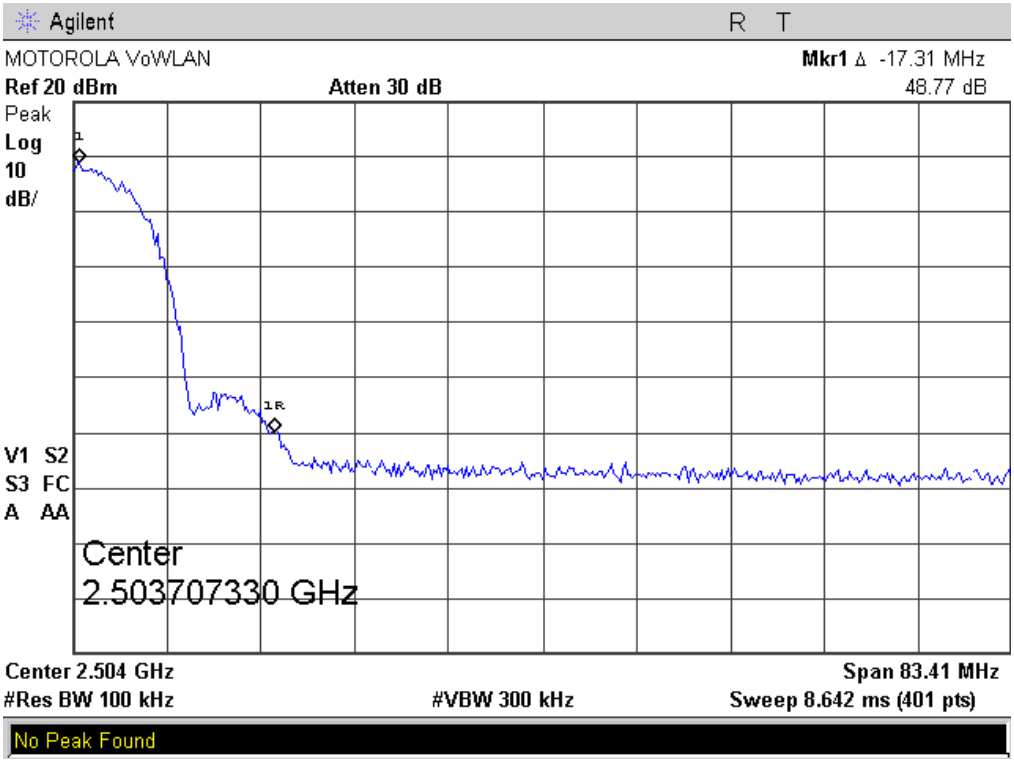
Plot 4.4.12



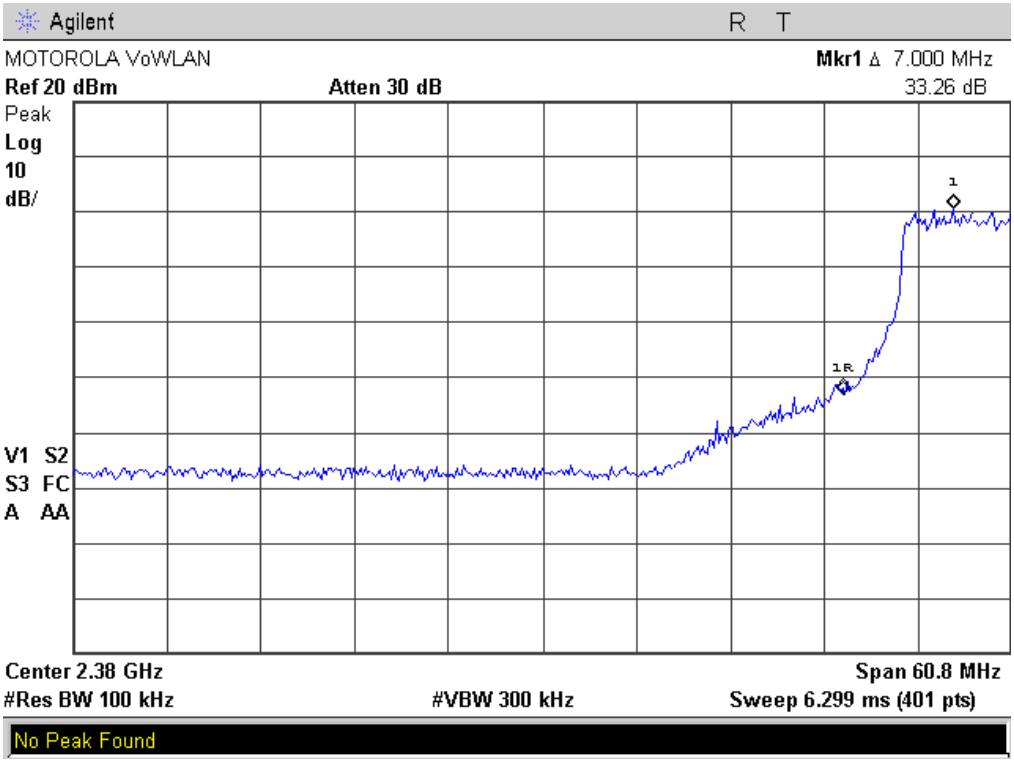
802.11b Mode
Plot 4.4.13



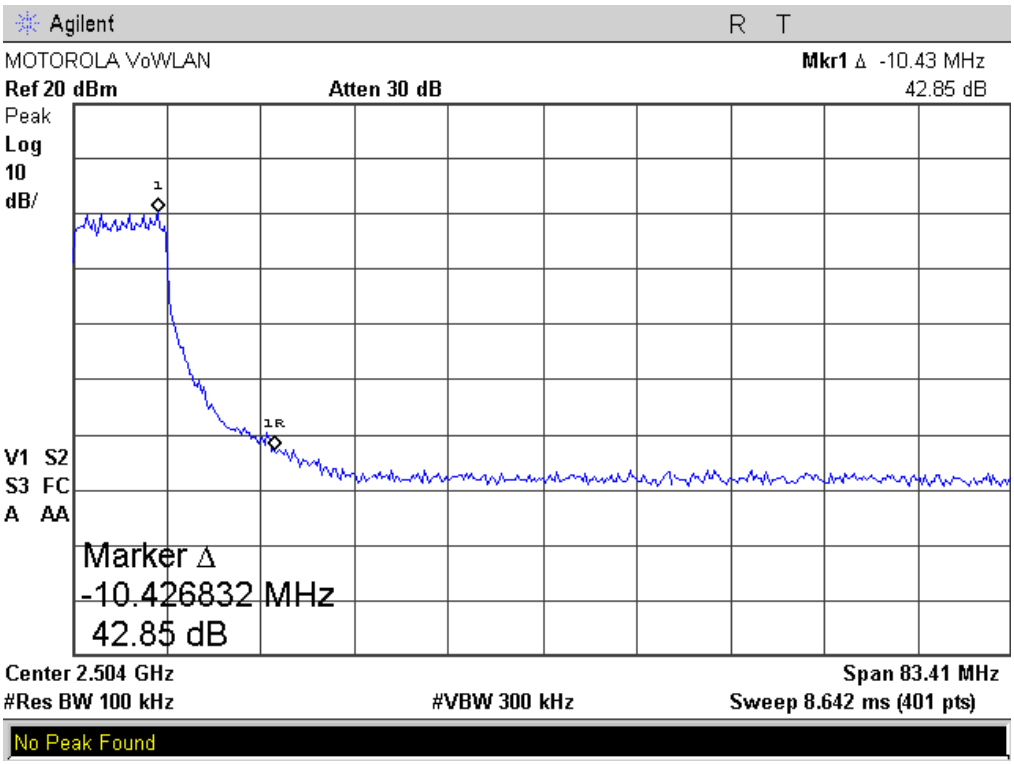
Plot 4.4.14



802.11g Mode
Plot 4.4.15



Plot 4.4.16



4.5. Spurious Radiated Emissions, Restricted Bands 2310-2390MHz & 2483.5-2500MHz

Reference document:	**47 CFR §15.247 (d) & §15.205**		
Test Requirements:	Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (See §15.205(c)).		
Test setup:	See sec 2.2	**Pass**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	Peak: RBW= 1MHz, VBW= 3MHz, Average: VBW= 10 Hz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.5.1 to Plot 4.5.16	

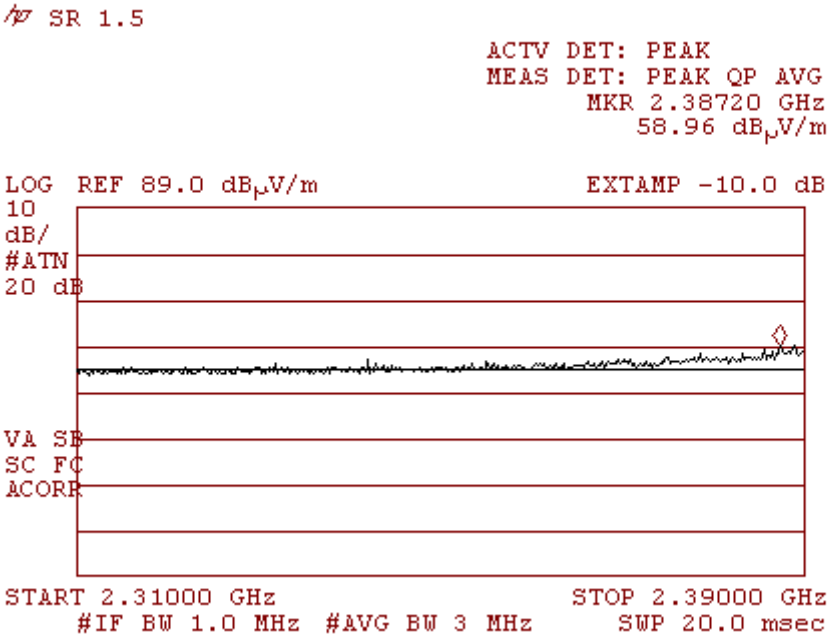
Test results:

All measurements were performed in horizontal and vertical polarizations; the results show the worst case.

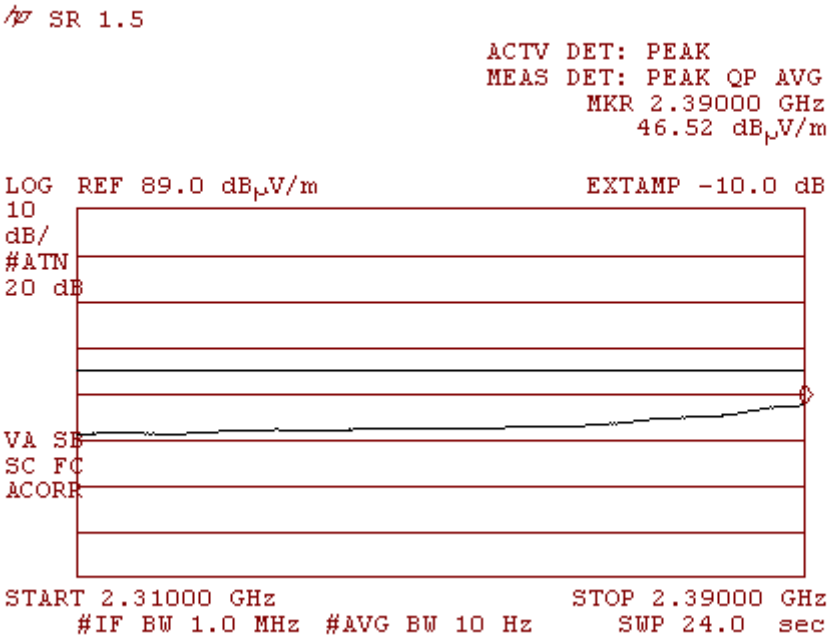
Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
WLAN 802.11b							
2412	11	2387.20	Peak	H	58.96	74	-15.04
2412	11	2390.00	Avg	H	46.52	54	-7.48
2462	11	2483.87	Peak	H	59.58	74	-14.42
2462	11	2483.71	Avg	H	44.73	54	-9.27
WLAN 802.11g							
2412	54	2389.60	Peak	H	66.11	74	-7.89
2412	54	2390.00	Avg	H	47.80	54	-6.20
2462	54	2484.12	Peak	H	67.31	74	-6.69
2462	54	2483.54	Avg	H	46.93	54	-7.07

Note: Spurious Emission [dBµV/m] = measured [dBµV] + Correction-factor [dB (1/m)]
Correction Factor = Antenna factor + Cable Loss

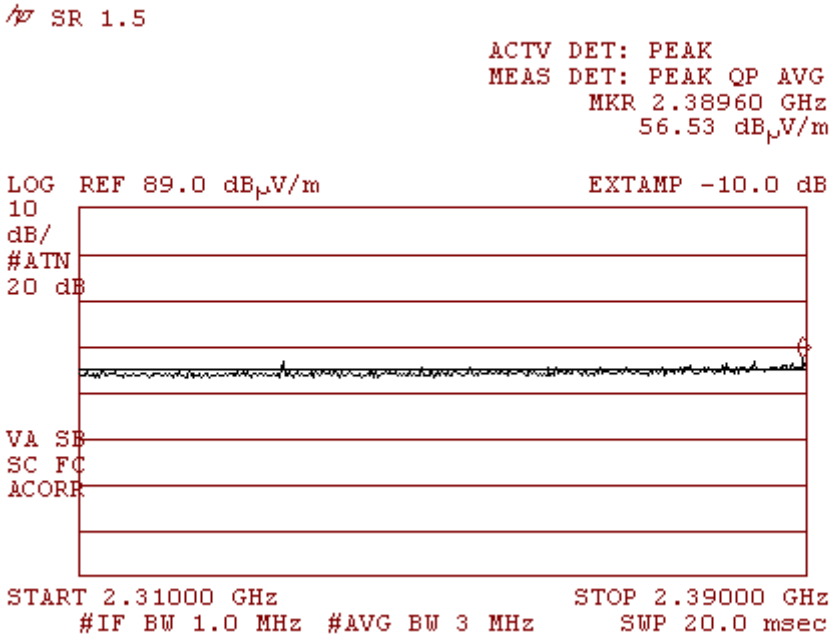
WLAN 802.11b, 2412 MHz, 11Mbps
Lowest Frequency
Horizontal Polarization
Peak
Plot 4.5.1



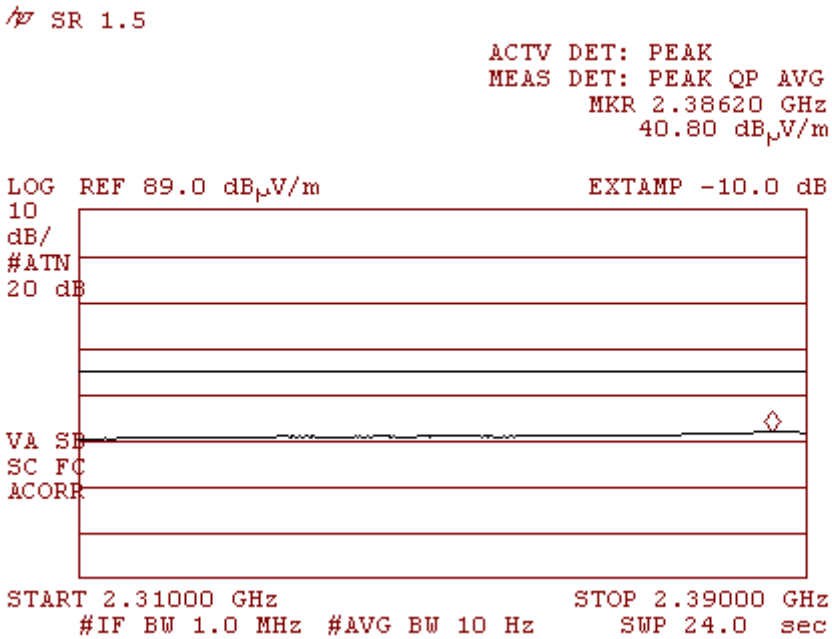
Horizontal Polarization
Average
Plot 4.5.2



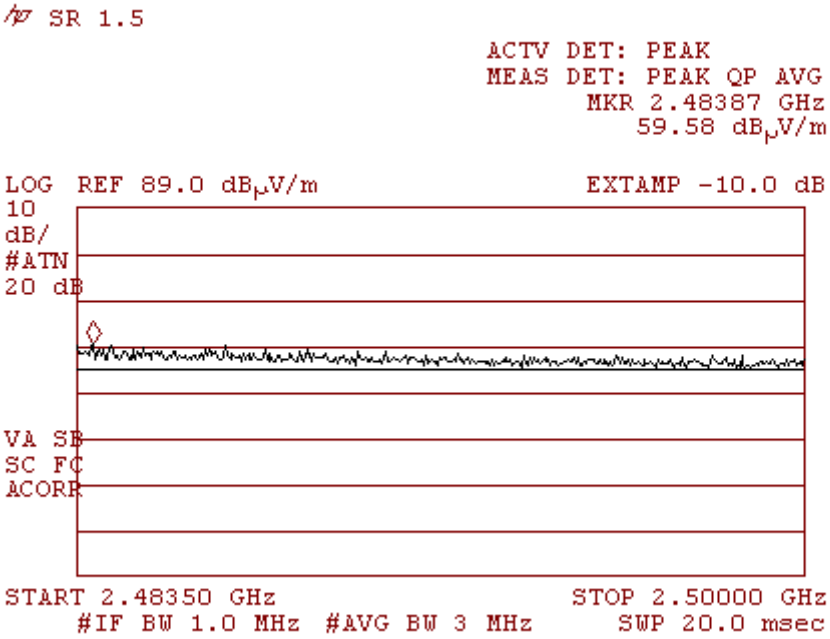
Vertical Polarization
Peak
Plot 4.5.3



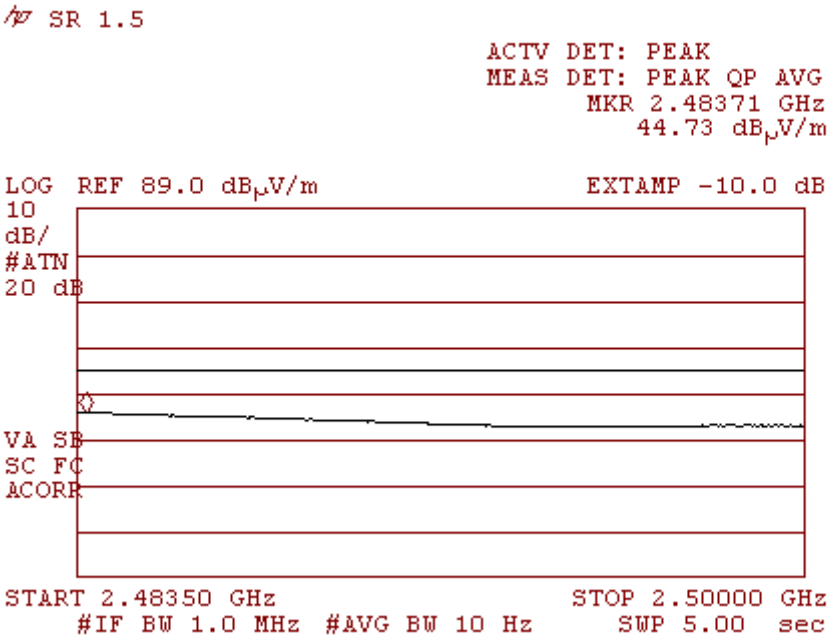
Vertical Polarization
Average
Plot 4.5.4



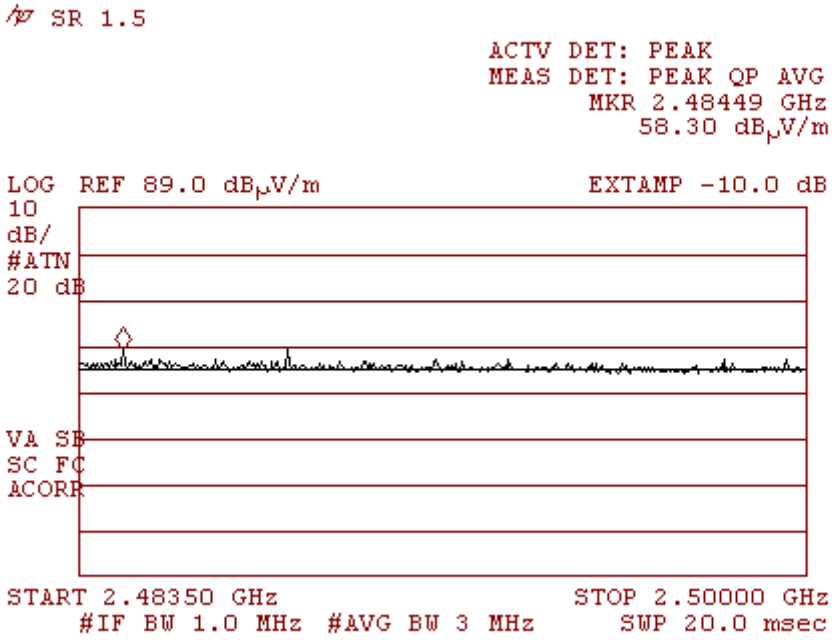
WLAN 802.11b, 2462 MHz, 11Mbps
Highest Frequency
Horizontal Polarization
Peak
Plot 4.5.5



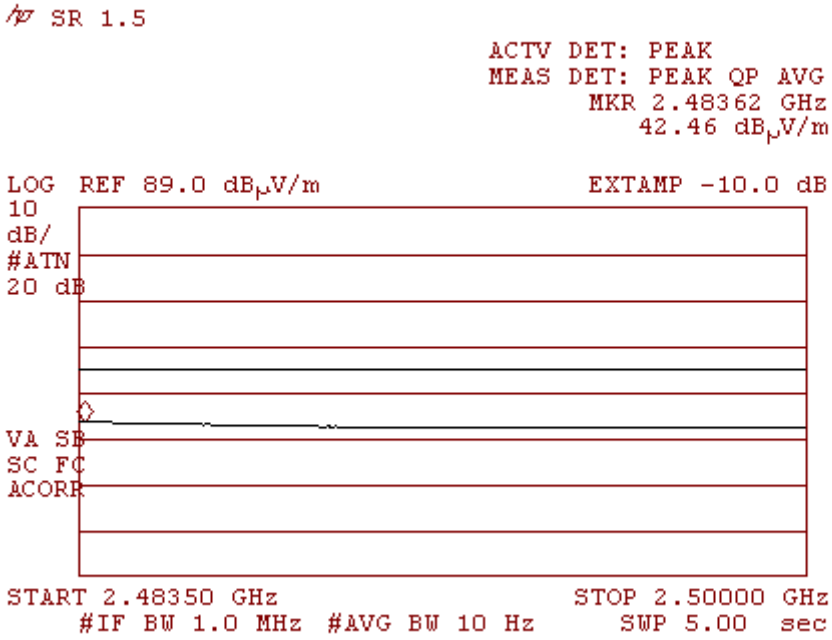
Horizontal Polarization
Average
Plot 4.5.6



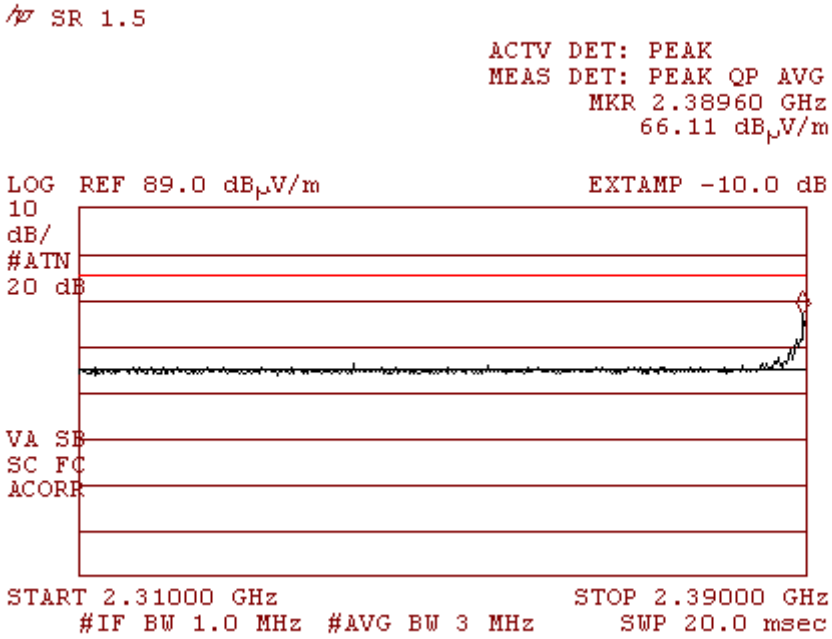
Vertical Polarization
Peak
Plot 4.5.7



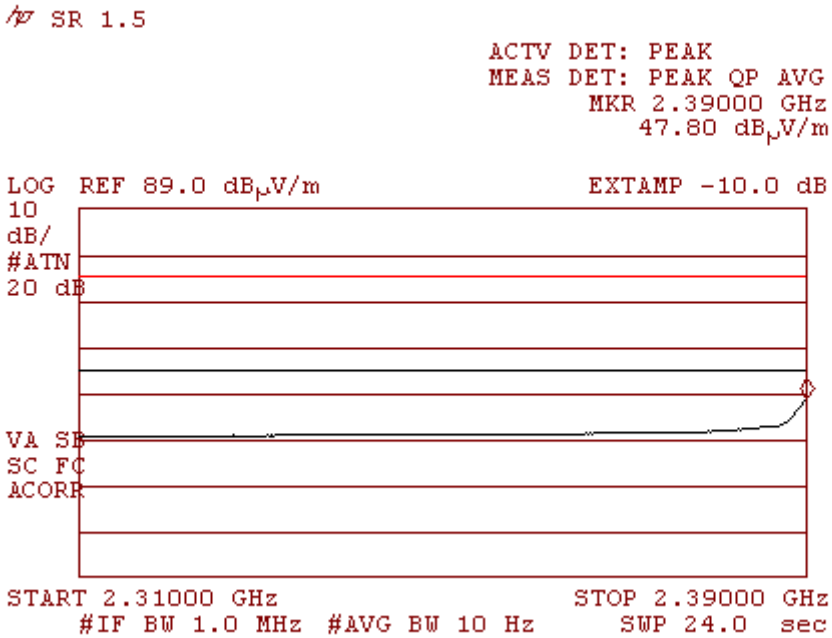
Vertical Polarization
Average
Plot 4.5.8



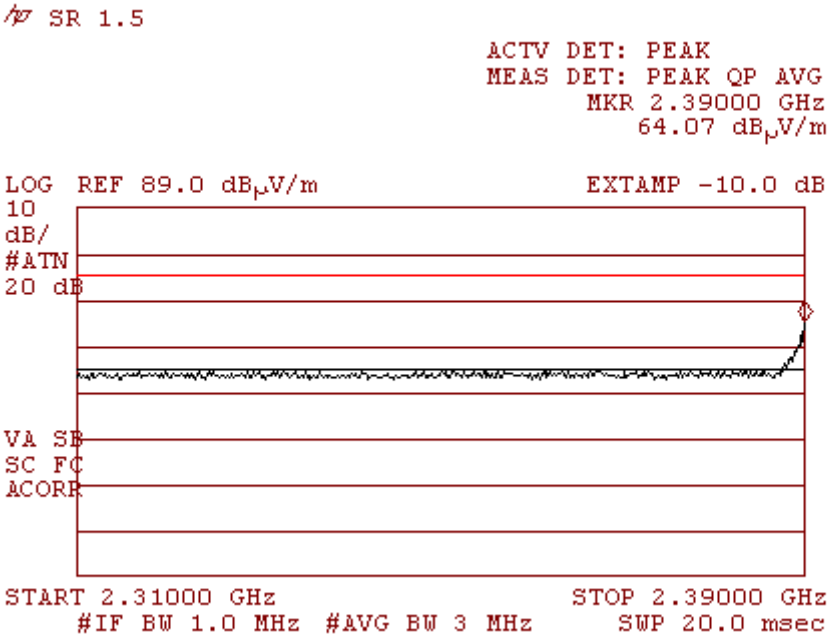
WLAN 802.11g, 2412 MHz, 54Mbps
Lowest Frequency
Horizontal Polarization
Peak
Plot 4.5.9



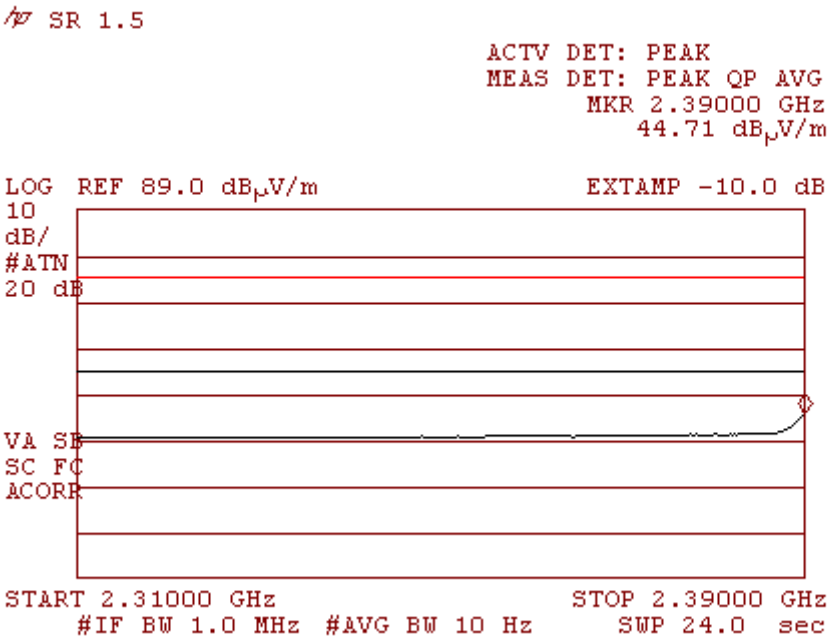
Horizontal Polarization
Average
Plot 4.5.10



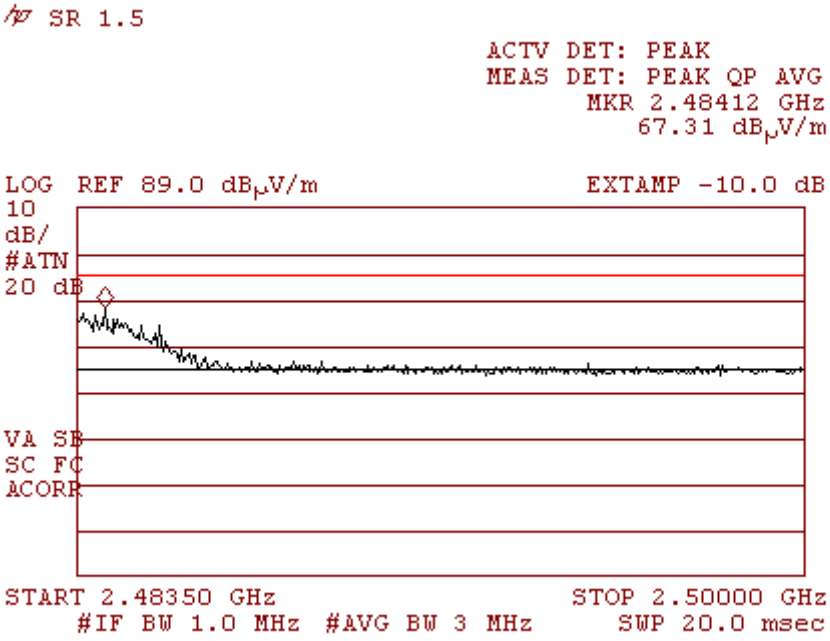
Vertical Polarization
Peak
Plot 4.5.11



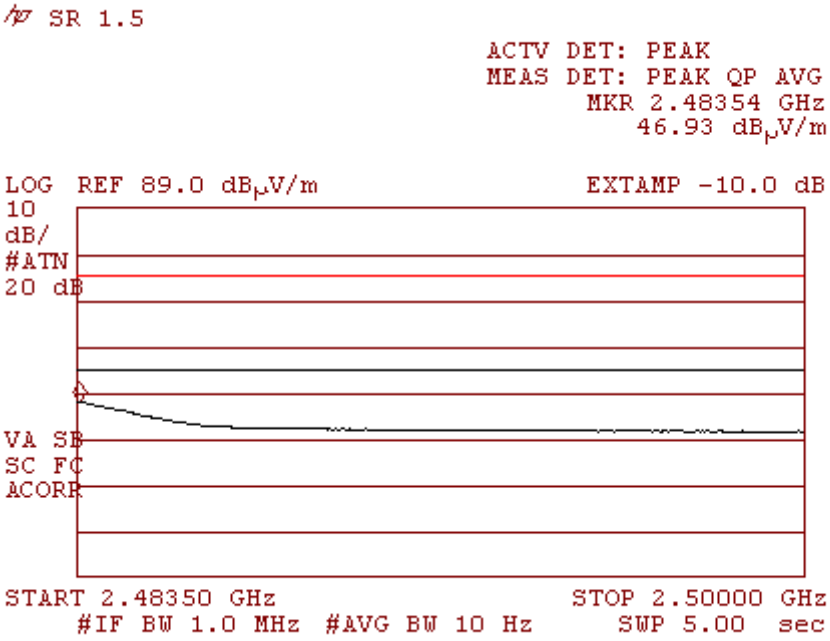
Vertical Polarization
Average
Plot 4.5.12



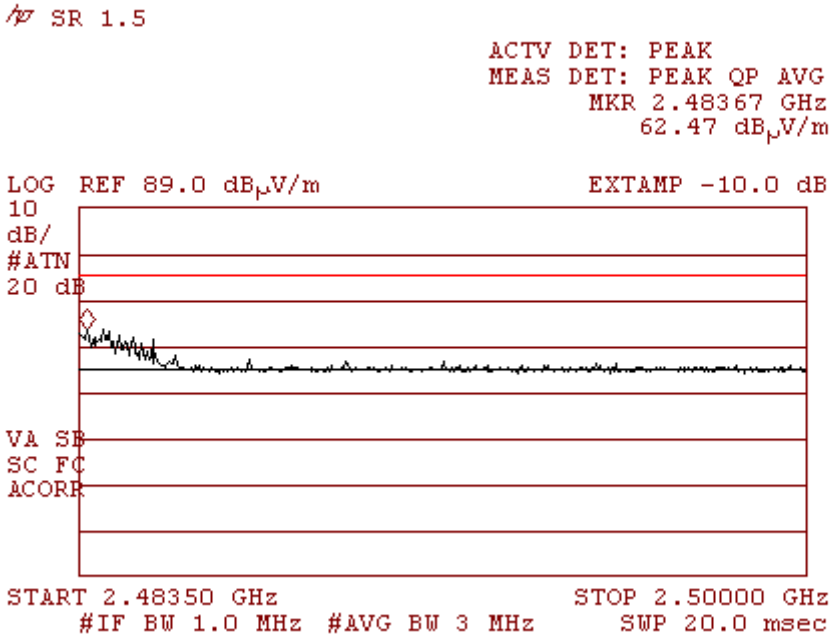
WLAN 802.11g, 2462 MHz, 54Mbps
Highest Frequency
Horizontal Polarization
Peak
Plot 4.5.13



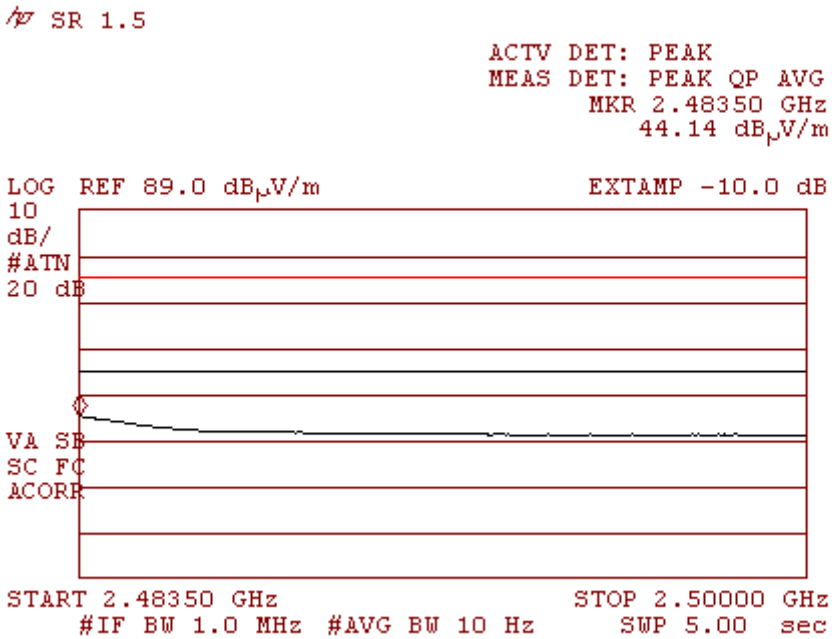
Horizontal Polarization
Average
Plot 4.5.14



Vertical Polarization
Peak
Plot 4.5.15



Vertical Polarization
Average
Plot 4.5.16



4.6. Spurious Radiated Emissions, Restricted Bands

Reference document:	**47 CFR §15.247 (d), & §15.205, & §15.209(a)**		
Test Requirements:	The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.209(a).		
Test setup:	See sec 2.2, with Band Reject filter	**Pass**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	f >1GHz: Peak: RBW= 1MHz, VBW= **3**MHz, Average: VBW= 10 Hz f<1GHz: RBW: 120kHz,VBW: 300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.6.1 - Plot 4.6.34	

Test results:

All measurements were performed in horizontal and vertical polarizations; the results show the worst case.

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
WLAN 802.11b							
2412	11	4824	Peak	H	58.4	74	-15.6
2412	11	4824	Avg	H	42.5	54	-11.5
2437	11	4874	Peak	H	52.6	74	-21.4
2437	11	4874	Avg	H	38.4	54	-15.6
All other emissions at least 10 dB below the limit							

WLAN 802.11g							
Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2412	54	4824	Peak	H	50.5	74	-23.5
2412	54	4824	Avg	H	36.6	54	-17.4
All other emissions at least 10 dB below the limit							

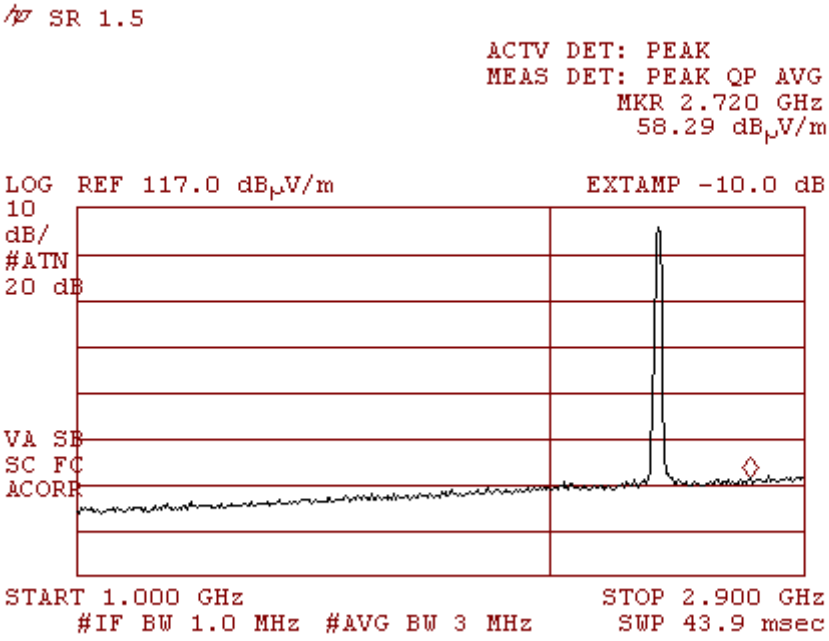
Test results below 1GHz:

All measurements were done in horizontal and vertical polarizations; the results show the worst case for all frequencies.

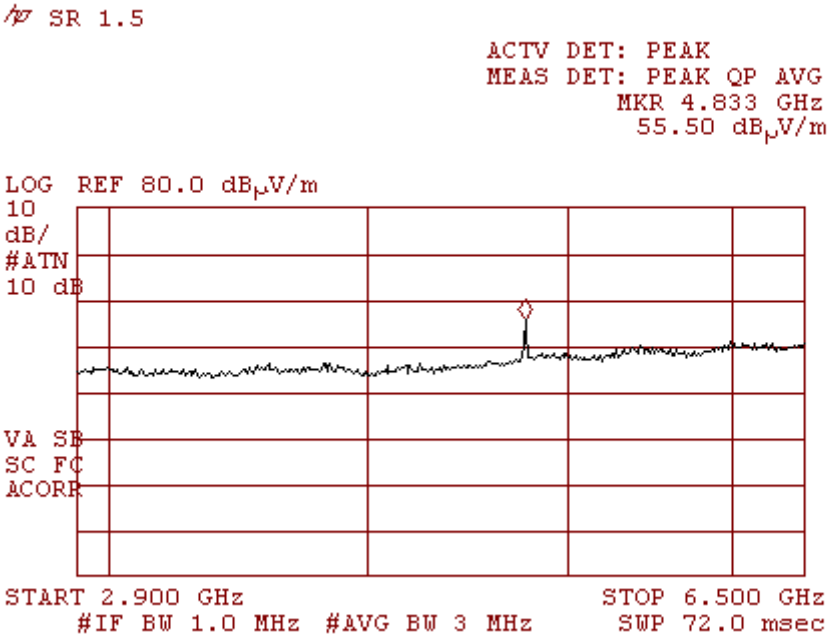
Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
32.61	QP	V	29.5	40	-10.5

Note: Spurious Emission [dBµV/m] = measured [dBµV] + Correction-factor [dB (1/m)]
Correction Factor = Antenna factor + Cable Loss +Filter I/L.

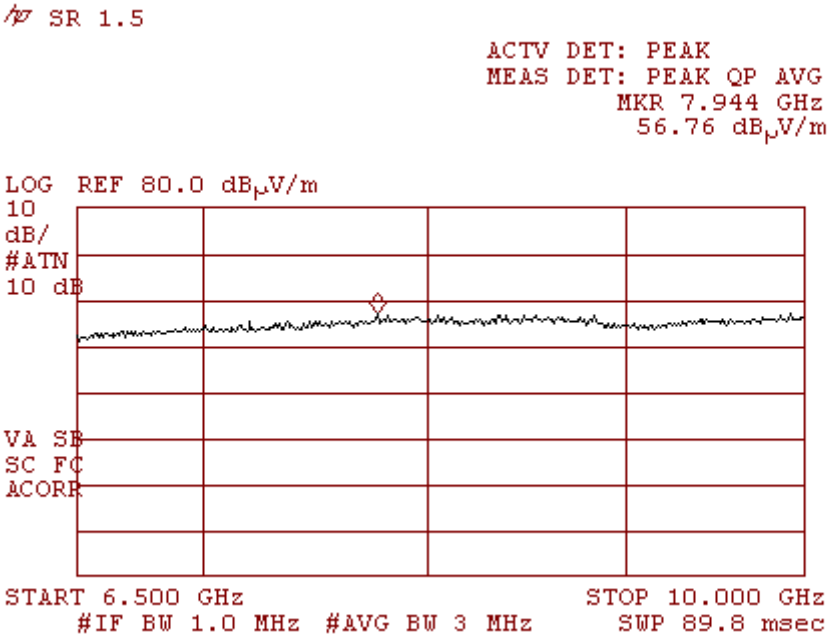
WLAN 802.11b, 2412 MHz, 11 Mbps
Lowest Frequency
Horizontal & Vertical Polarization
Plot 4.6.1



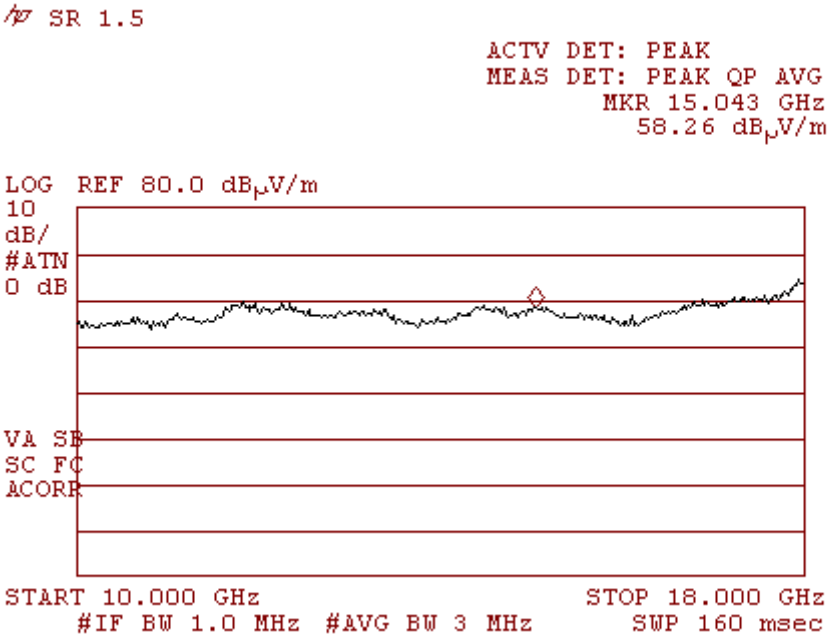
Horizontal & Vertical Polarization
Plot 4.6.2



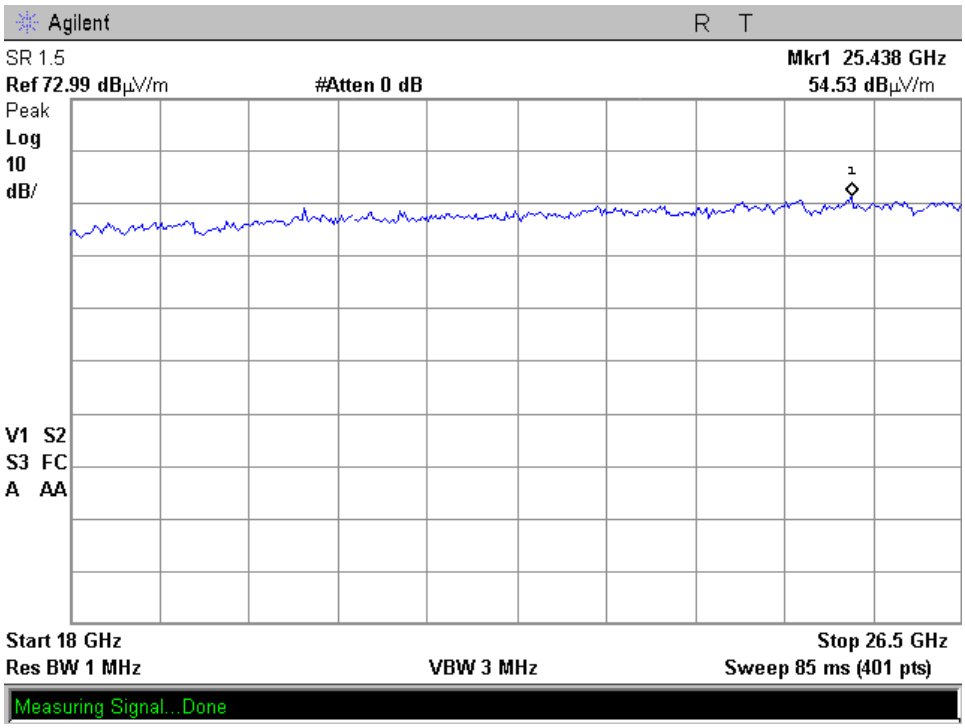
Horizontal & Vertical Polarization
Plot 4.6.3



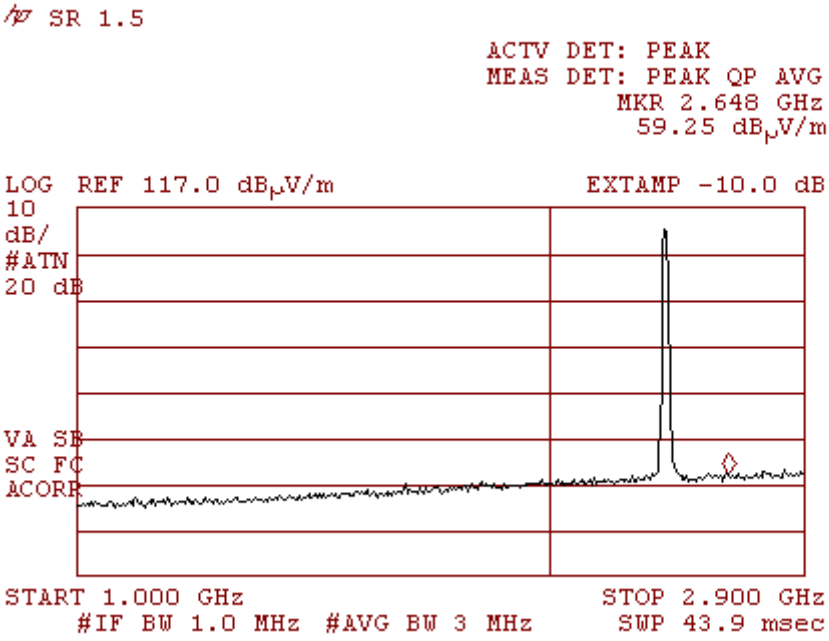
Horizontal & Vertical Polarization
Plot 4.6.4



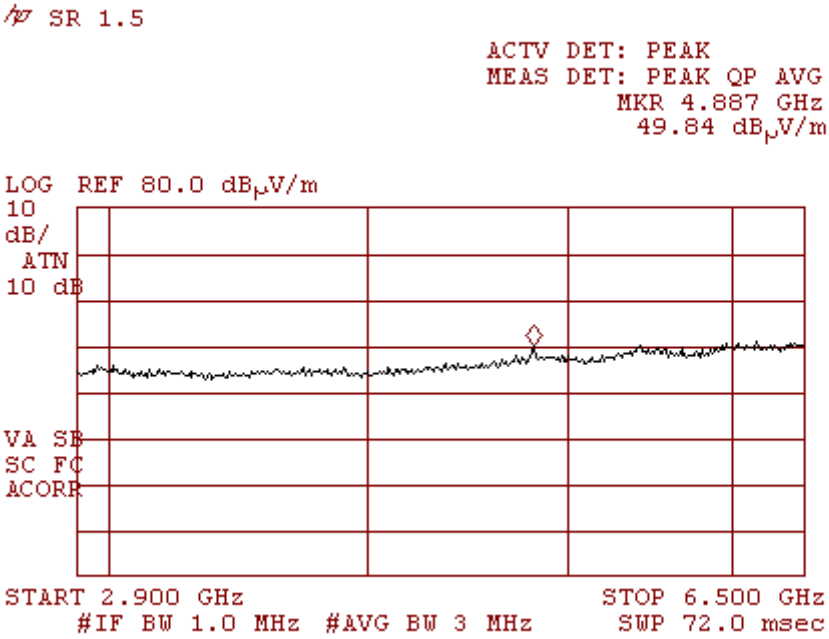
Horizontal & Vertical Polarization
Plot 4.6.5



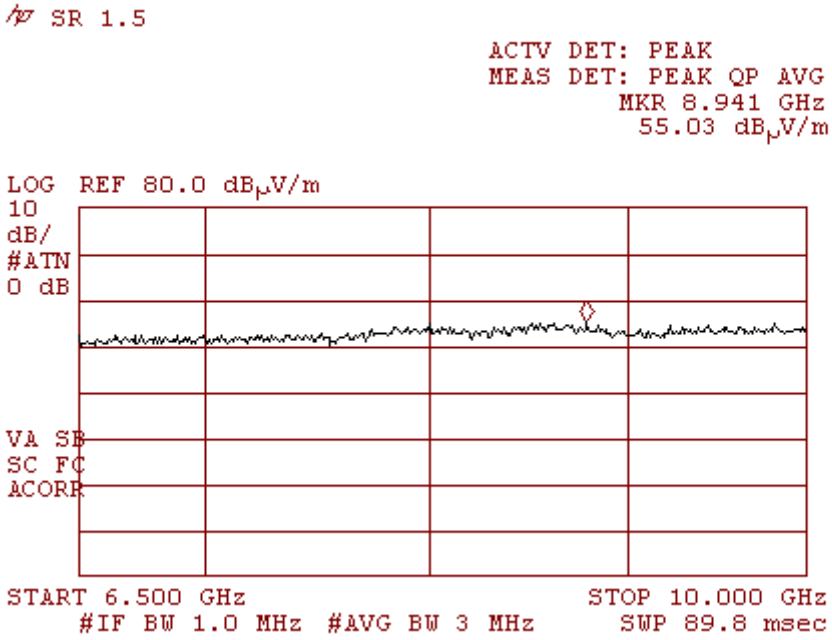
WLAN 802.11b, 2437 MHz, 11 Mbps
Middle Frequency
Horizontal & Vertical Polarization
Plot 4.6.6



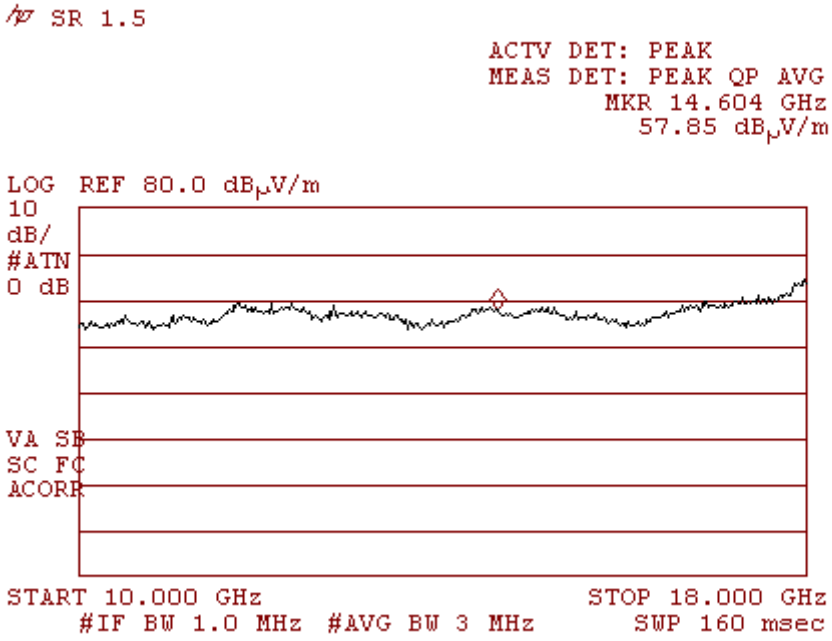
Horizontal & Vertical Polarization
Plot 4.6.7



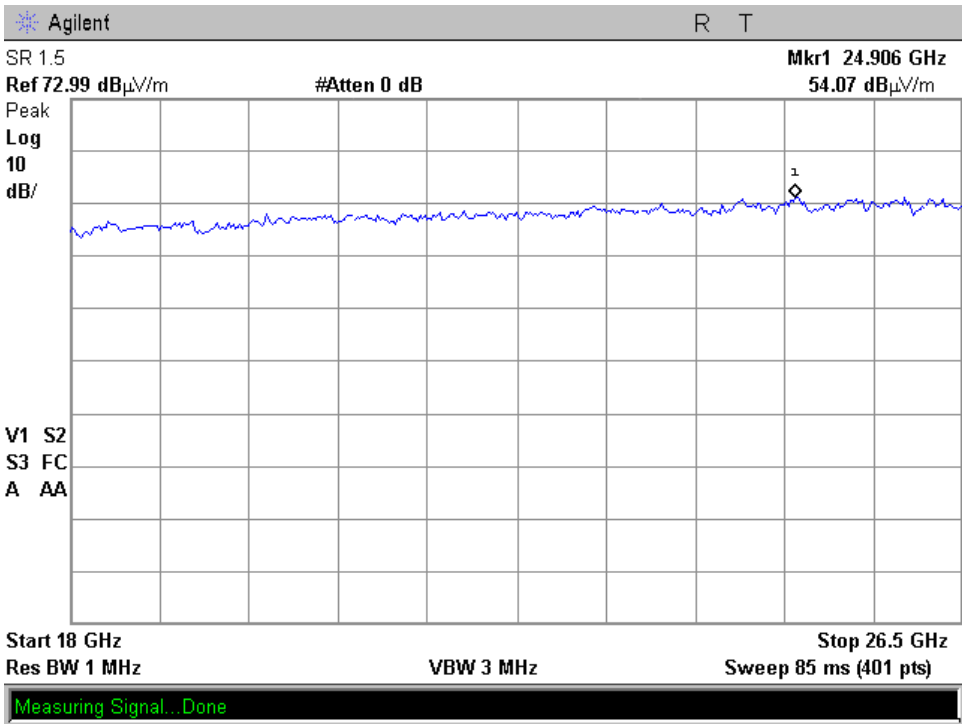
Horizontal & Vertical Polarization
Plot 4.6.8



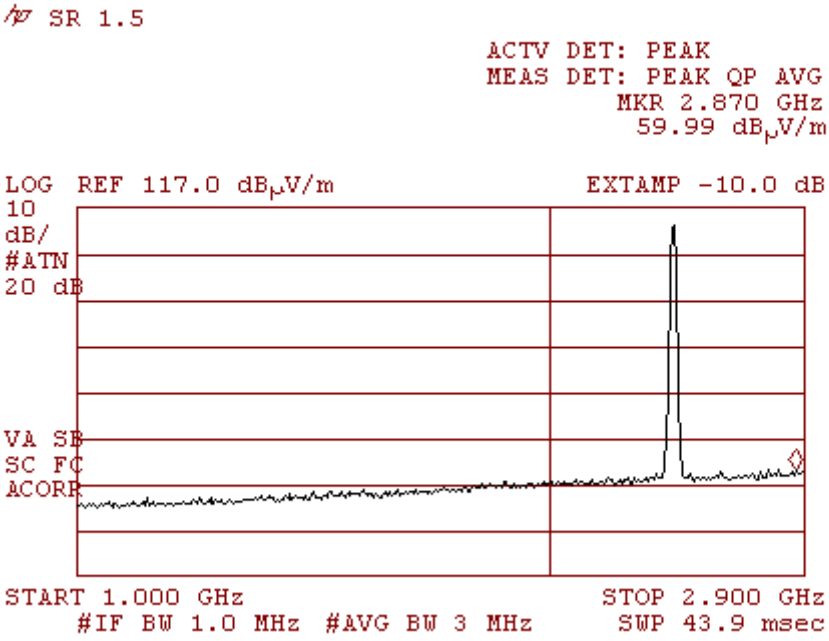
Horizontal & Vertical Polarization
Plot 4.6.9



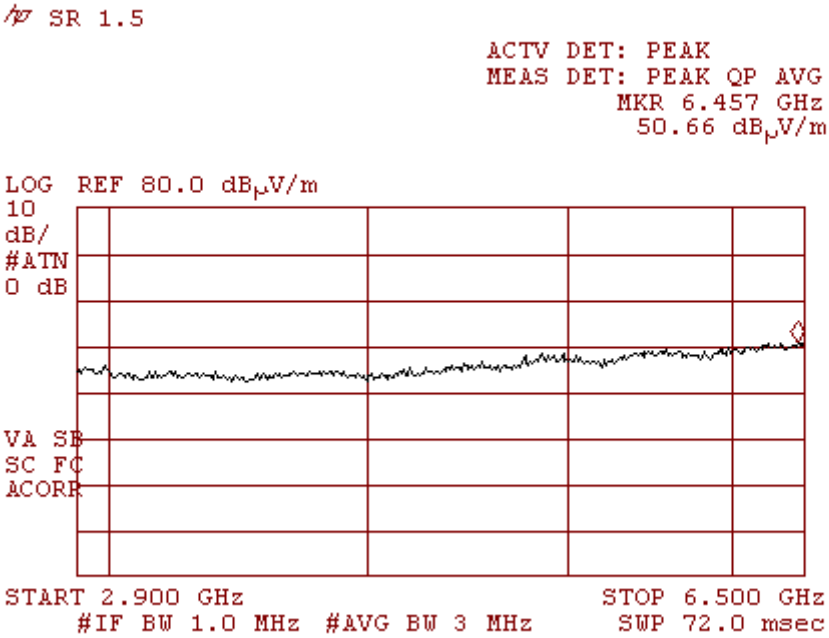
Horizontal & Vertical Polarization
Plot 4.6.10



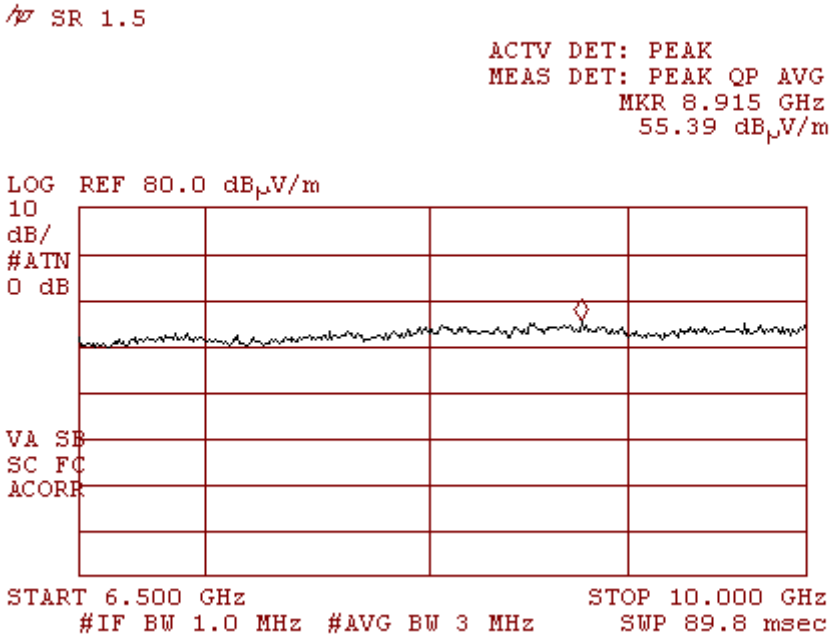
WLAN 802.11b, 2462 MHz, 11 Mbps
Highest Frequency
Horizontal & Vertical Polarization
Plot 4.6.11



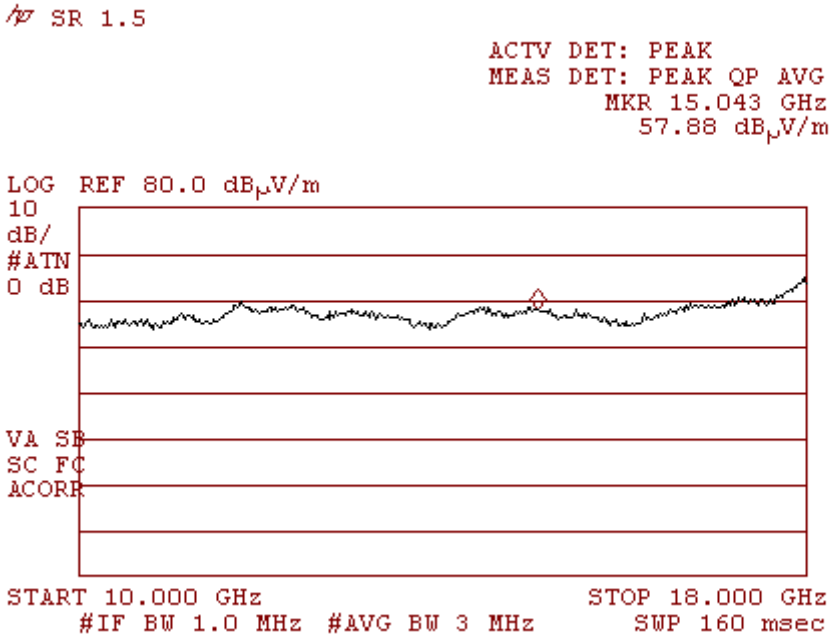
Horizontal & Vertical Polarization
Plot 4.6.12



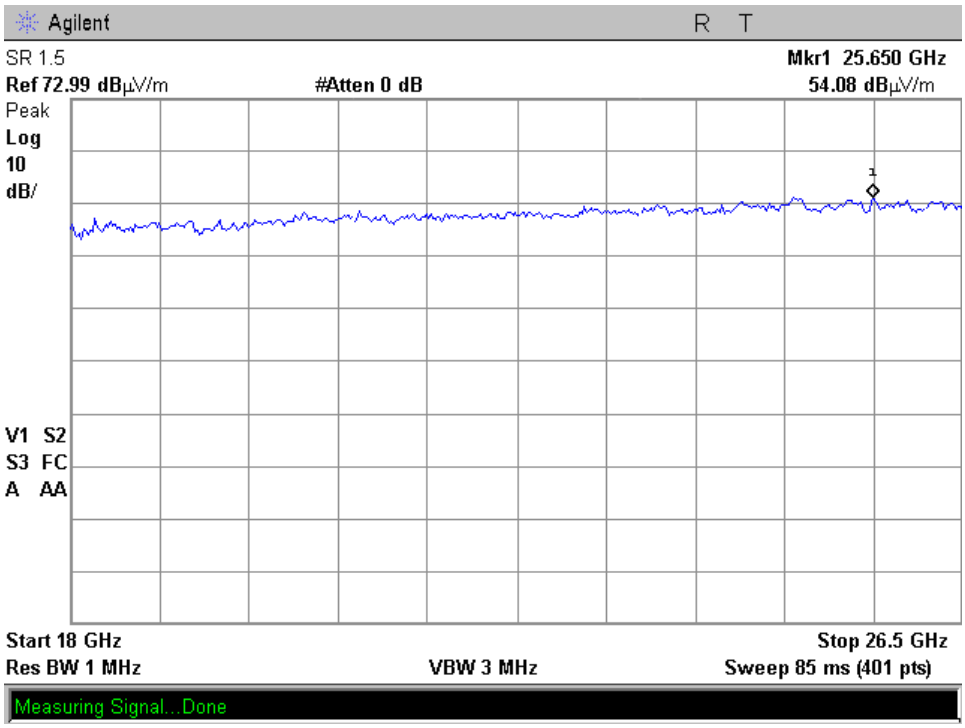
Horizontal & Vertical Polarization
Plot 4.6.13



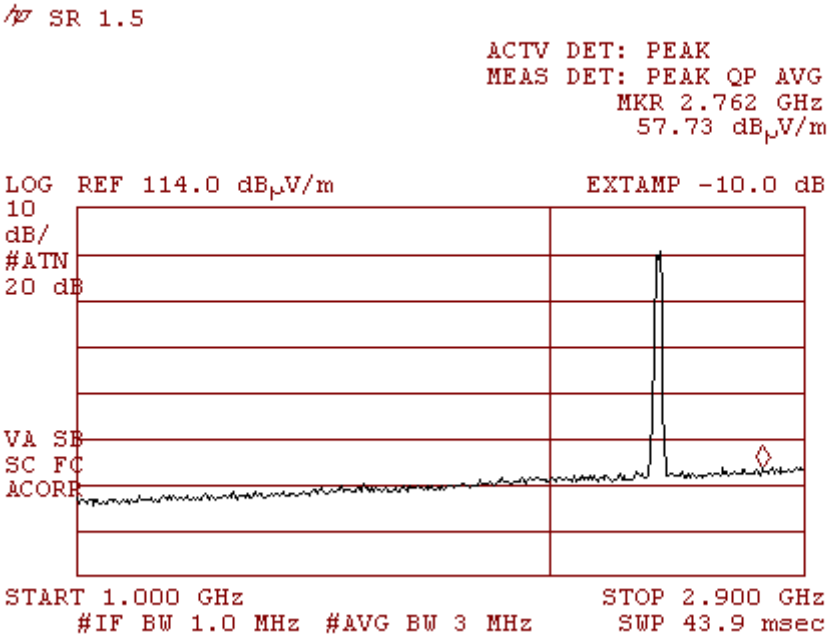
Horizontal & Vertical Polarization
Plot 4.6.14



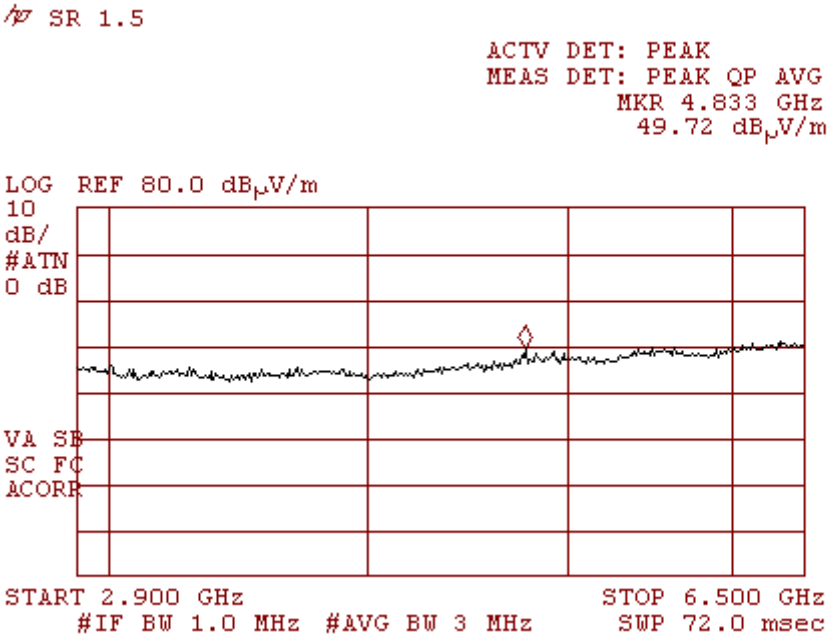
Horizontal & Vertical Polarization
Plot 4.6.15



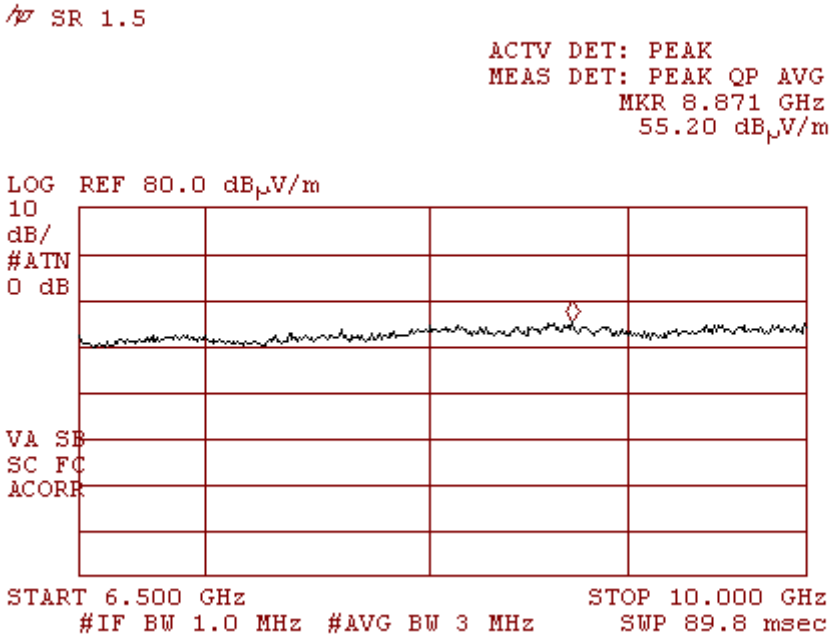
WLAN 802.11g, 2412 MHz, 54 Mbps
Lowest Frequency
Horizontal & Vertical Polarization
Plot 4.6.16



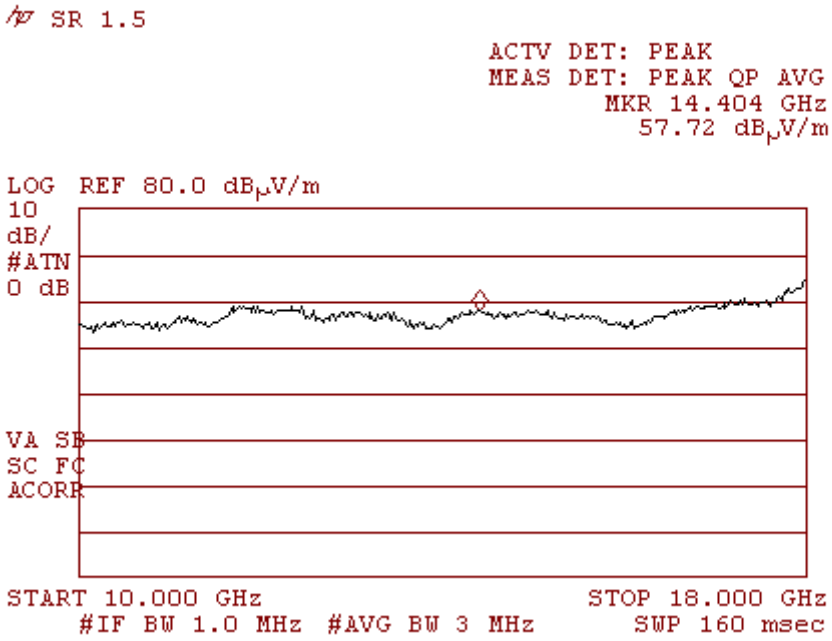
Horizontal & Vertical Polarization
Plot 4.6.17



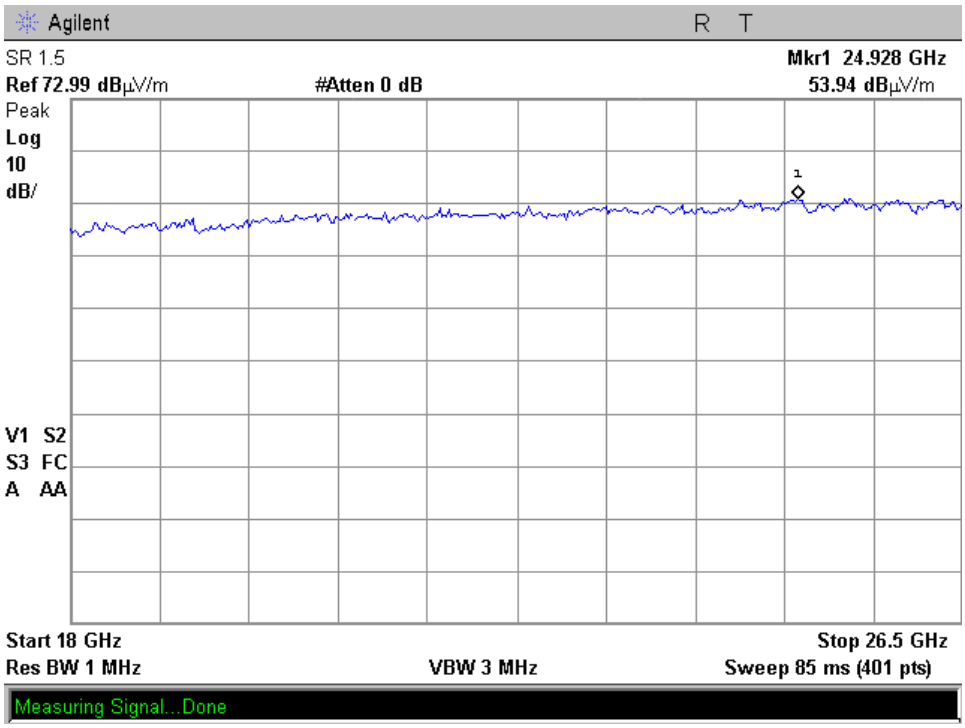
Horizontal & Vertical Polarization
Plot 4.6.18



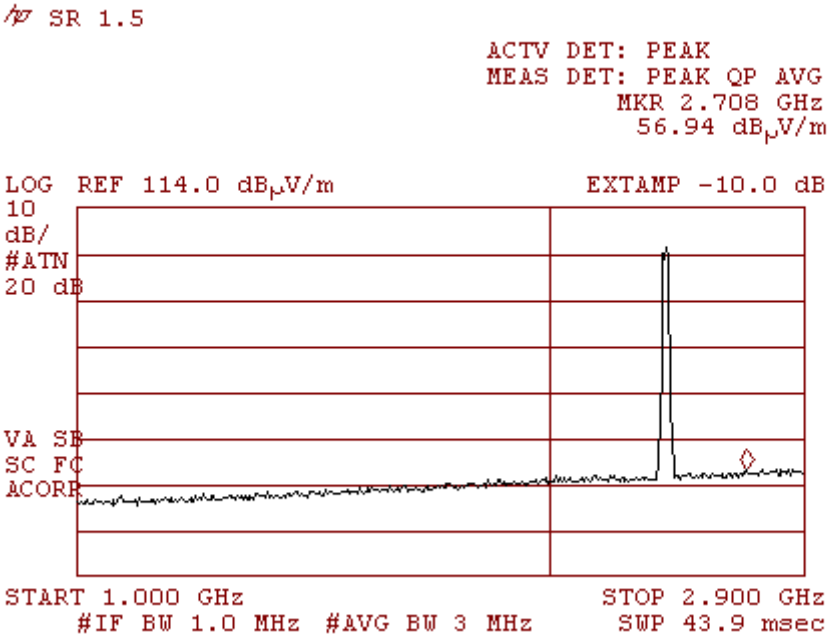
Horizontal & Vertical Polarization
Plot 4.6.19



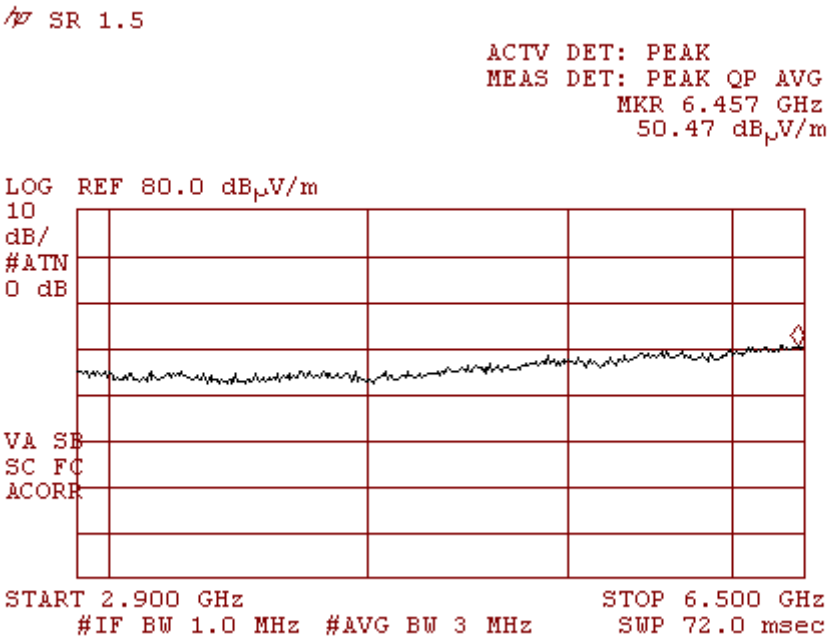
Horizontal & Vertical Polarization
Plot 4.6.20



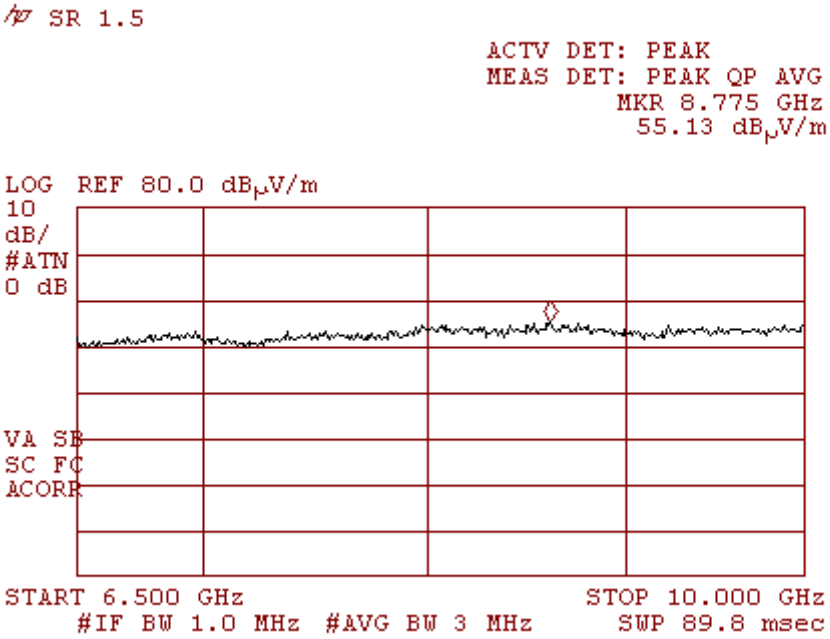
WLAN 802.11g, 2437 MHz, 54 Mbps
Middle Frequency
Horizontal & Vertical Polarization
Plot 4.6.21



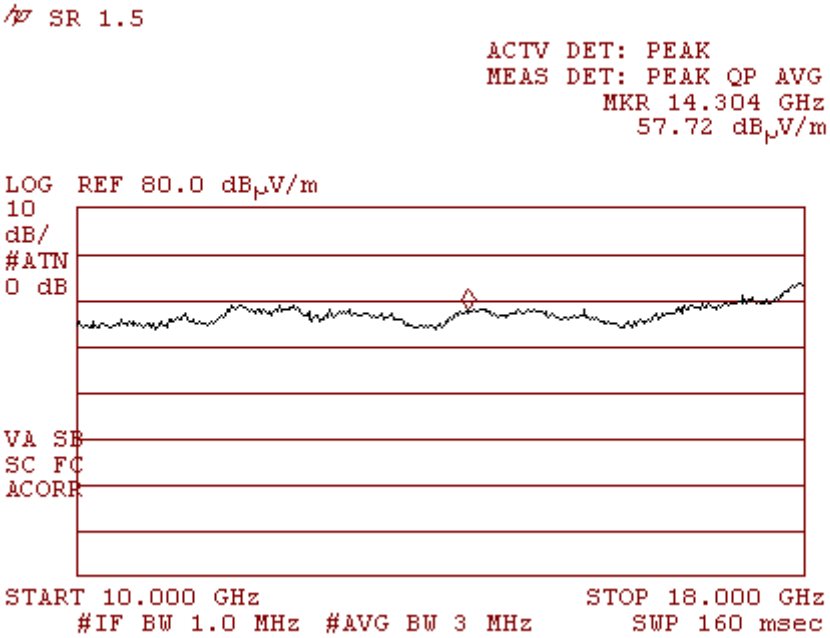
Horizontal & Vertical Polarization
Plot 4.6.22



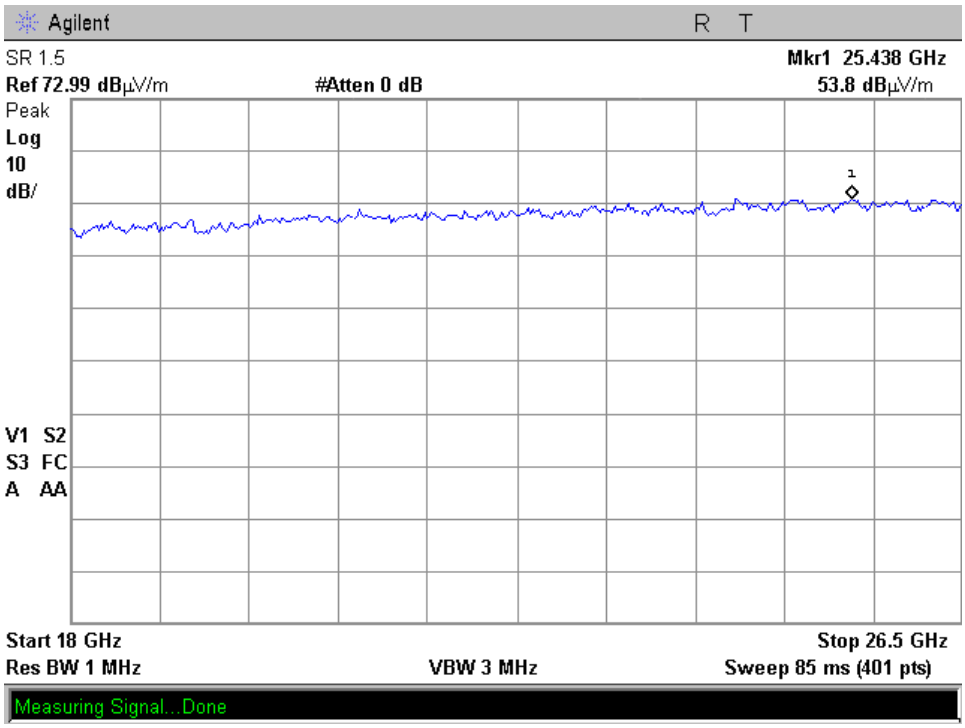
Horizontal & Vertical Polarization
Plot 4.6.23



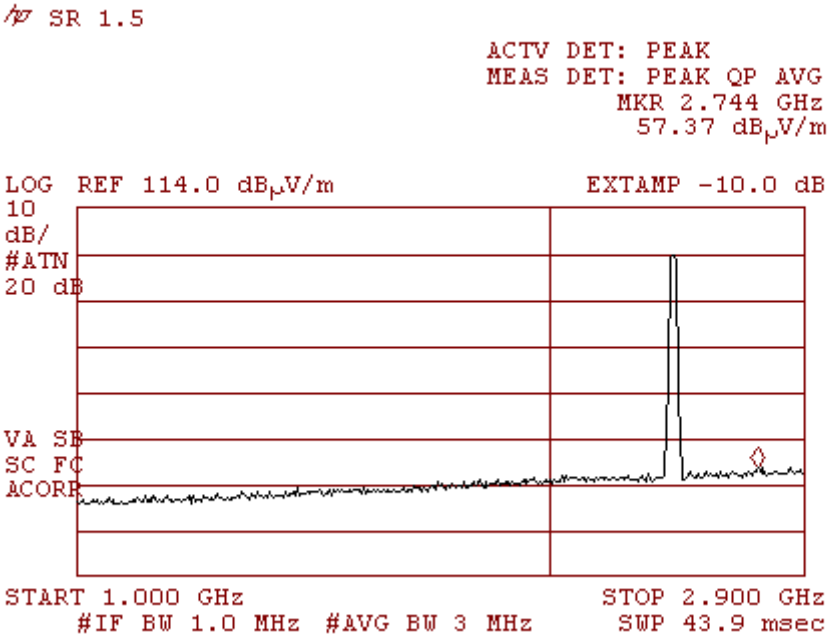
Horizontal & Vertical Polarization
Plot 4.6.24



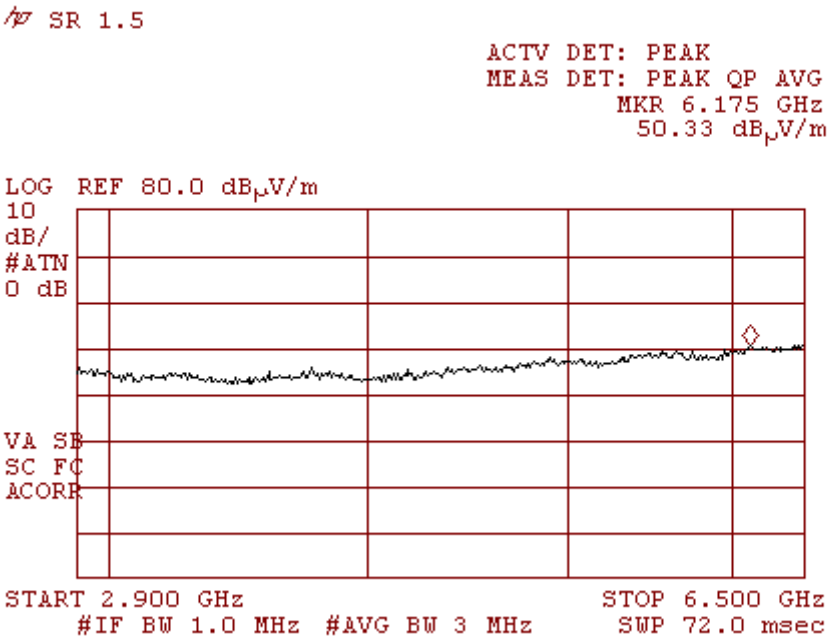
Horizontal & Vertical Polarization
Plot 4.6.25



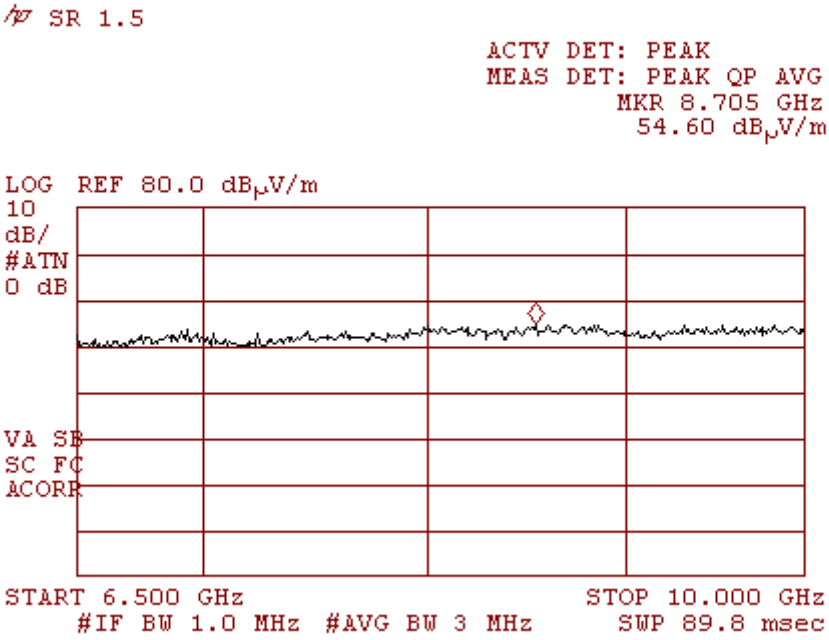
WLAN 802.11g, 2462 MHz, 54 Mbps
Highest Frequency
Horizontal & Vertical Polarization
Plot 4.6.26



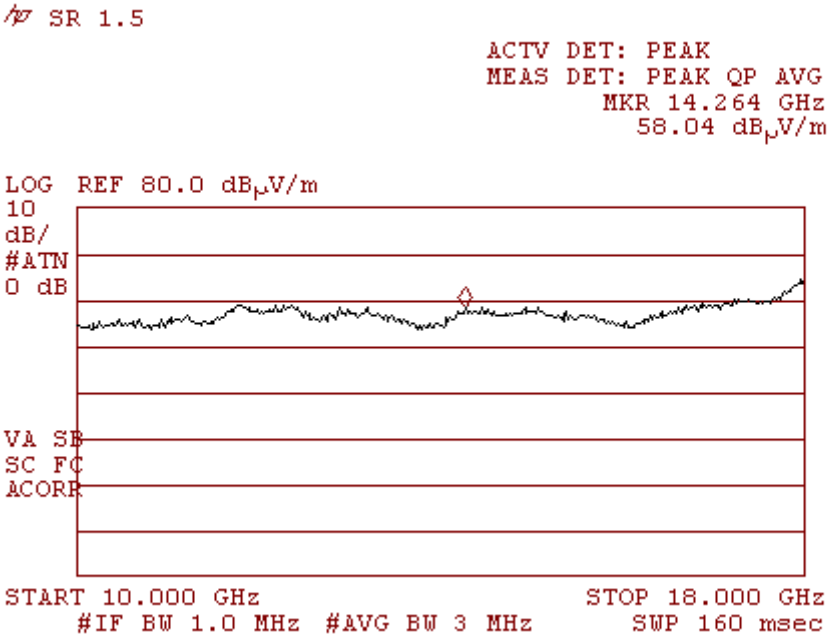
Horizontal & Vertical Polarization
Plot 4.6.27



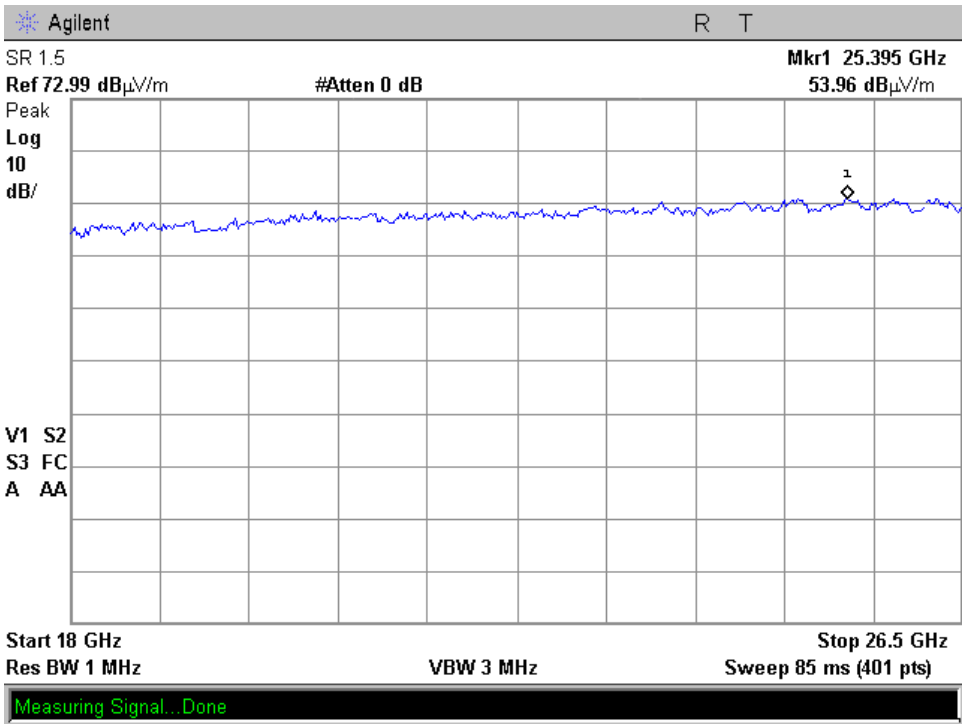
Horizontal & Vertical Polarization
Plot 4.6.28



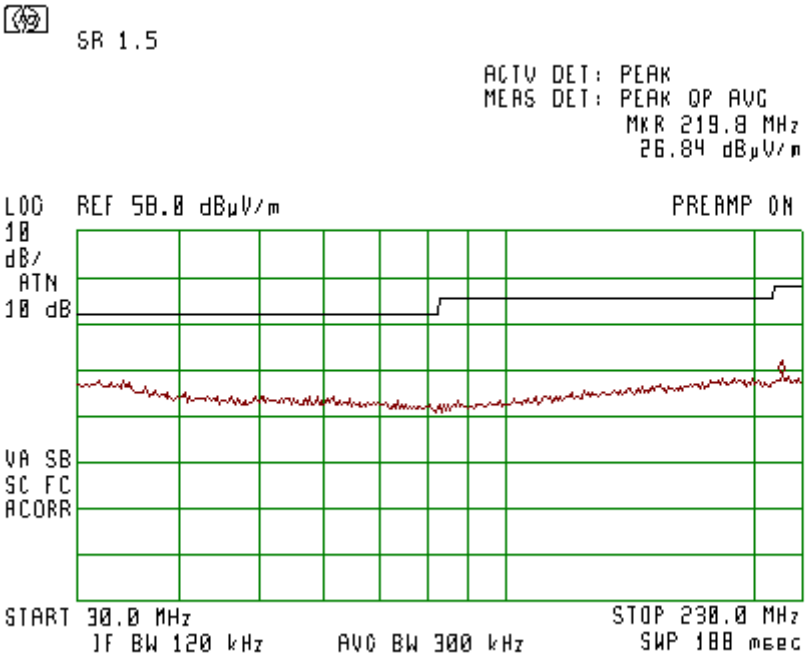
Horizontal & Vertical Polarization
Plot 4.6.29



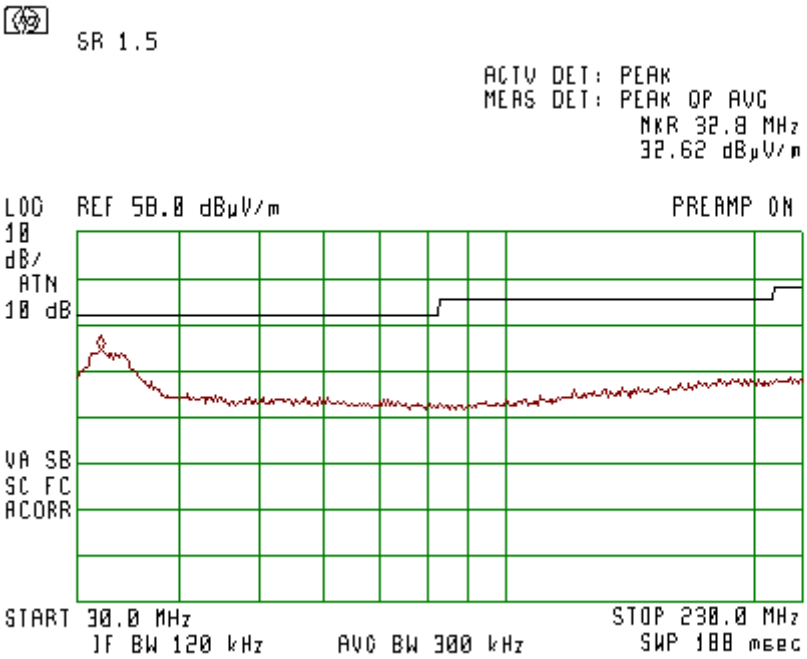
Horizontal & Vertical Polarization
Plot 4.6.30



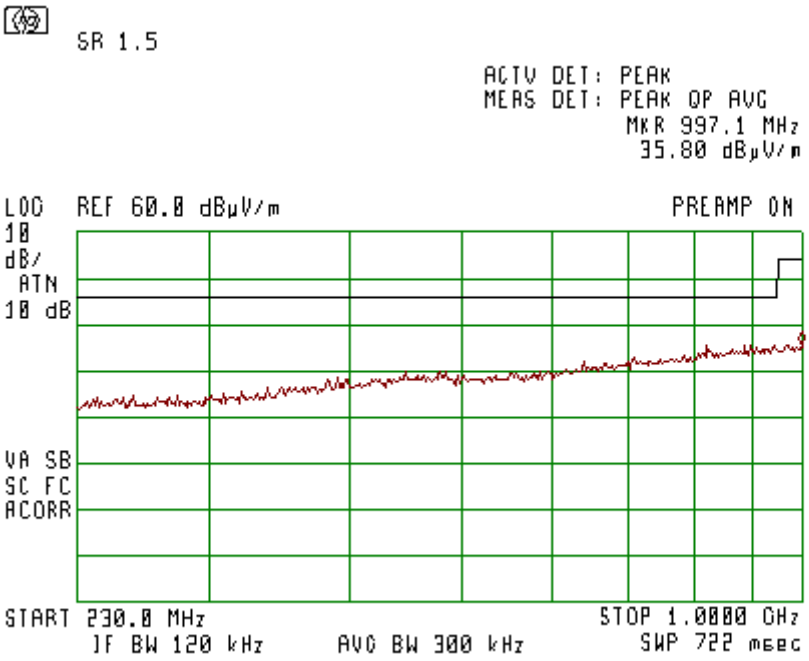
Radiated Spurious Emissions Below 1 GHz
Worst case for all modes and all frequencies
Horizontal Polarization
Plot 4.6.31



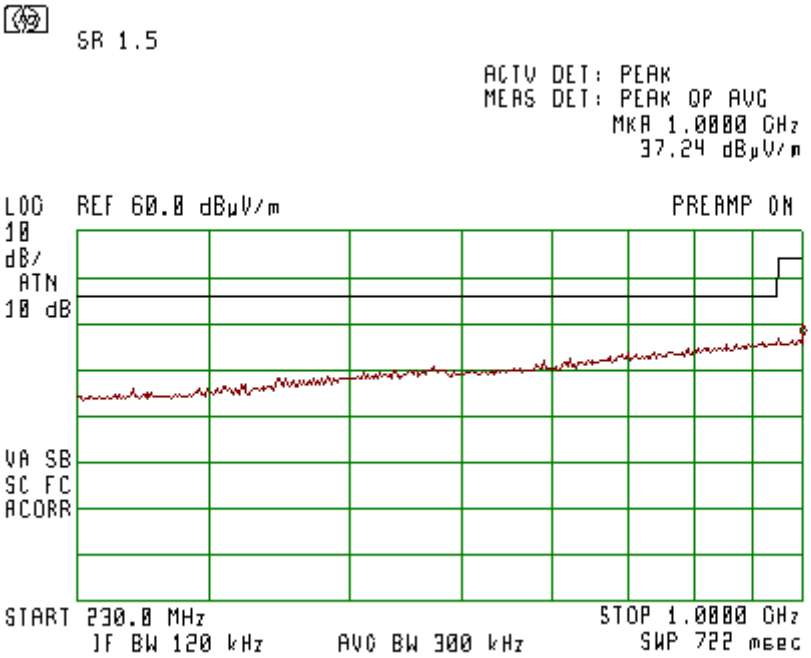
Vertical Polarization
Plot 4.6.32



Horizontal Polarization
Plot 4.6.33



Vertical Polarization
Plot 4.6.34



4.7. Power Line Emissions measurements

Reference document:	**47 CFR §15.107/207**		
Test Requirements:	The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in §15.107. The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.207. Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Sec.15.207.		
Test setup:	See Sec. 2.5	**Pass**	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted Emissions		
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz		
Radio device:	Idle		
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity: 54%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.7.1 - Plot 4.7.4	

Test Results:

Worst case results of unintentional emissions and emissions while transmitters operating alternately, measured at the charger 110VAC port.

"Phase" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.15	40.3	30.5	66.00	56.00	-25.70	-25.50	Pass
0.220448	35.3	26.6	62.80	52.80	-27.50	-26.20	Pass
0.284895	36.3	24.4	60.67	50.67	-24.37	-26.27	Pass
0.366658	39.9	30.5	58.58	48.58	-18.68	-18.08	Pass
0.584853	37.6	25.9	56.00	46.00	-18.40	-20.10	Pass
1.168865	39.2	23.2	56.00	46.00	-16.80	-22.80	Pass

"Neutral" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.15	40.6	31.2	66.00	56.00	-25.40	-24.80	Pass
0.376575	39.3	29.2	58.35	48.35	-19.05	-19.15	Pass
0.45948	36.1	21.2	56.70	46.70	-20.60	-25.50	Pass
0.600415	35	24	56.00	46.00	-21.00	-22.00	Pass
1.58375	35.5	20.4	56.00	46.00	-20.50	-25.60	Pass
2.119013	31.4	15.3	56.00	46.00	-24.60	-30.70	Pass

Measured at the PC 110VAC port

"Phase" Lead

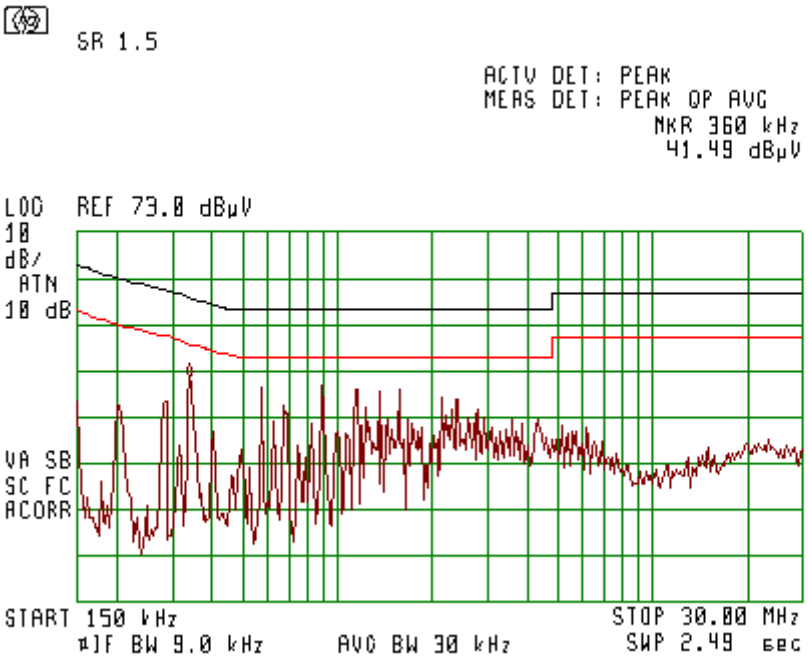
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.17289	44.6	30.8	64.82	54.82	-20.22	-24.02	Pass
0.24235	38.1	26.3	62.02	52.02	-23.92	-25.72	Pass
0.329115	41	36.2	59.47	49.47	-18.47	-13.27	Pass
0.66912	36.2	30.6	56.00	46.00	-19.80	-15.40	Pass
9.168983	36	29.9	60.00	50.00	-24.00	-20.10	Pass
15.425173	37.8	31.8	60.00	50.00	-22.20	-18.20	Pass

"Neutral" Lead

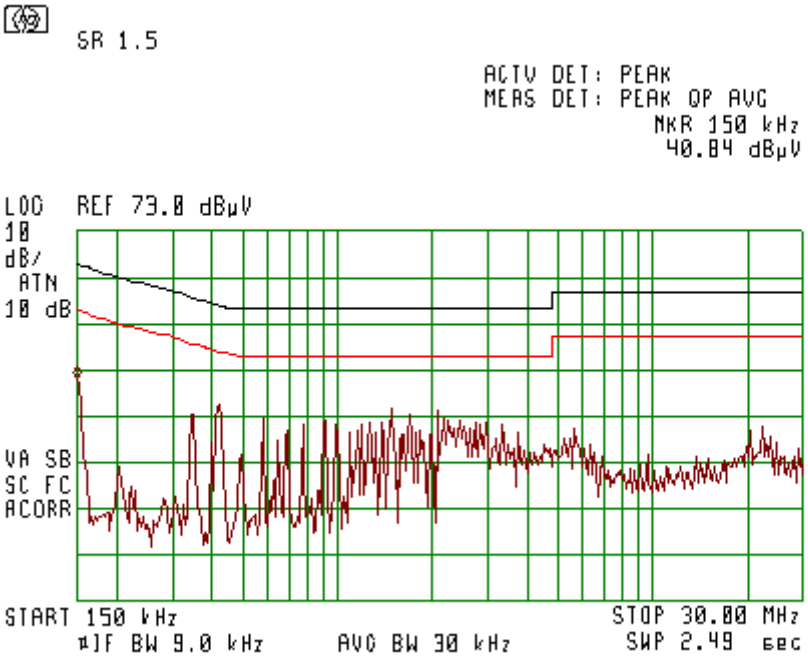
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.20593	46.4	29.6	63.37	53.37	-16.97	-23.77	Pass
0.274975	46.3	28.1	60.97	50.97	-14.67	-22.87	Pass
0.331725	46.3	37.6	59.41	49.41	-13.11	-11.81	Pass
0.486295	41	26.6	56.23	46.23	-15.23	-19.63	Pass
0.66001	37.7	29.3	56.00	46.00	-18.30	-16.70	Pass
0.755735	38.6	25.5	56.00	46.00	-17.40	-20.50	Pass

Measured at the charger 110VAC port

Phase Lead
Plot 4.7.1

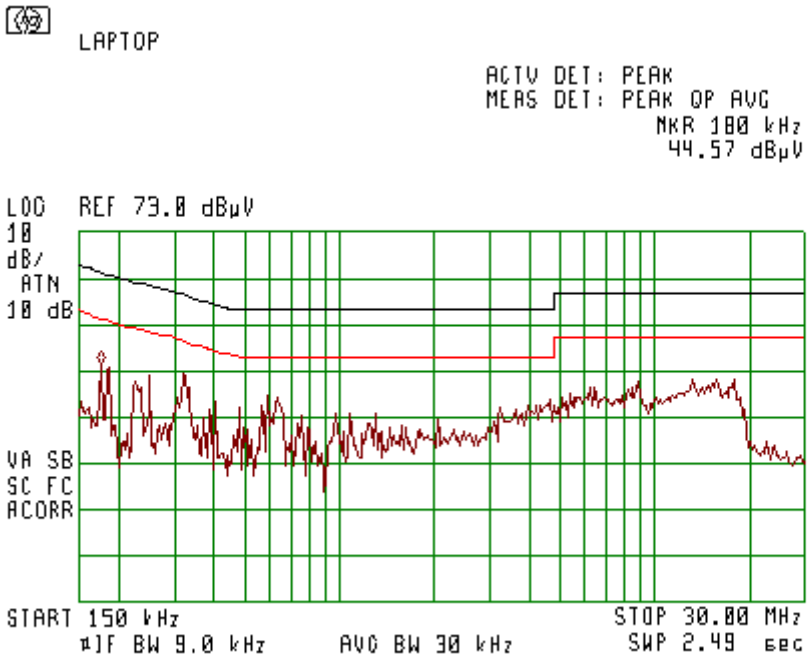


Neutral Lead
Plot 4.7.2

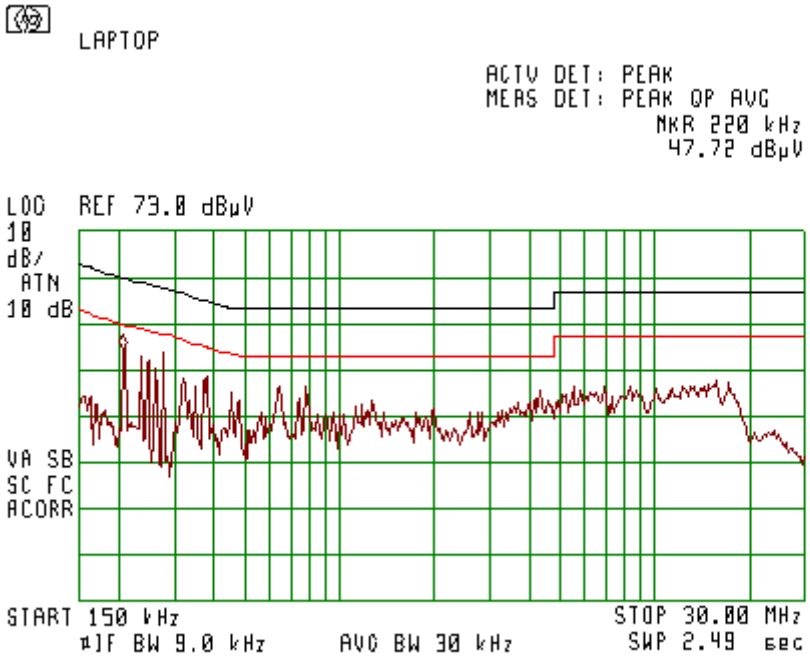


Measured at the PC 110VAC port

Phase Lead
Plot 4.7.3



Neutral Lead
Plot 4.7.4



5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	30-06-10
Spectrum Analyzer 9kHz ÷ 22 GHz	HP 8593EM	3536A00131	30-06-10
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	30-06-10
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	30-06-10
Power meter	Agilent N1911A	MY45100784	23-02-10
Dual Ridged Guide Ant.1-18 GHz	EMCO 3115	9602-4677	30-06-10
Antenna 18 GHz ÷ 26.5 GHz	Alpha Industry 861A/599	505	30-06-10
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Schwarzbeck VHBB9124	9124/0255	16-05-10
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	16-05-10
Pre-Amplifier	MiTeq, AMF-5F-18002650-30-10P	945372	30-06-10
LISN	Fischer 50/250-25-2	-	30-06-10
Transient Limiter	HP11947A	-	30-06-10
Notch Filter	Micro-Tronics BRM50702-05	0001	30-06-10

Appendix B: Accreditation Certificate

ilac-MRA

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

QUALITECH (ECI TELECOM)

Petach-Tikva, Israel

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 27th day of May 2009.

President & CEO
For the Accreditation Council
Certificate Number 1633.01
Valid to September 30, 2010

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

End of the Test Report