Electromagnetic Compatibility
Test Report

Test Report No: MOT 260611
Issued on: June 26, 2011

Product Name
VML700
Model: F4080A

Tested According to
FCC 47 CFR, Part 15 Subpart C
Industry Canada & RSS-210

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

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ELECTRICAL TESTING
CERT #1633.01

Test Personnel

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Test Report details:

Test commencement date:	01.06.2011
Test completion date:	24.06.2011
Customer's representative:	Eyal Hillel
Issued on:	26.06.2011

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

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 Out of Band Spurious Emissions	Comply
47 CFR §15.247 (d) & RSS-210 section A8.5	Spurious Radiated Emissions, Restricted Bands 2310-2390 MHz & 2483.5-2500 MHz	Comply
47 CFR §15.247 (d), §15.205 & §15.209(a)& RSS-210 section A8.5	Spurious Radiated Emissions, Restricted Bands	Comply
47 CFR §15.203& RSS-Gen.Section 7.1.4	Antenna Connector Requirements	Comply

Table of Contents

1. General Description

Description of the EUT System/Test Item: LTE User Equipment (Modem)

Product Name: VML700

Model: F4080A

FCC ID: AZ492FT7045

IC: 109U-92FT7045

Description: Its basic purpose is used for communication the VML700 consists of LTE band 13, LTE band 14, EVDO Rev A (CDMA), WiFi 802.11b/g

In case of no coverage in LTE band the device will switch automatically to CDMA/EVDO cellular band (BC0 /BC1)

Maximum Peak Output Power: 13.5dBm

Nominal Output Power: 12.5dBm

Frequency Range: WiFi 802.11b/g Tx/Rx: 2401-2472 MHz

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 , CCK
802.11g	OFDM (64QAM,16QAM,QPSK,BPSK)

Antenna Specification:

Type: Folded Monopole

Gain (including 12ft coaxial cable): 1.46dBi

2. Method of Measurements

2.1. Conducted RF Measurements:

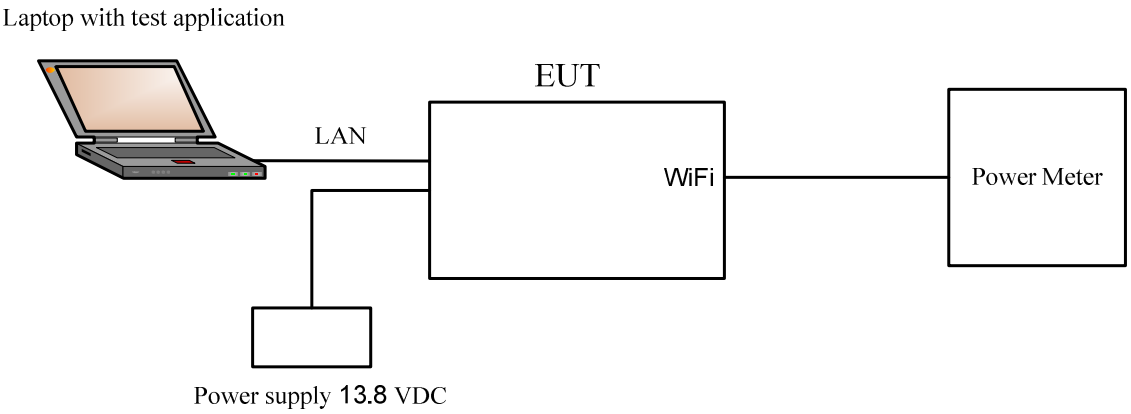
The RF output of the transmitter under test was directly connected to the input of the Spectrum analyzer through a specialized antenna connector provided by the manufacturer, and an attenuator as specified. The external attenuator and cable loss were added to the reading. Worst-case results of the various 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 26.5 GHz was investigated with the transmitter set to the lowest, middle and highest channel frequencies.

Test Setup:



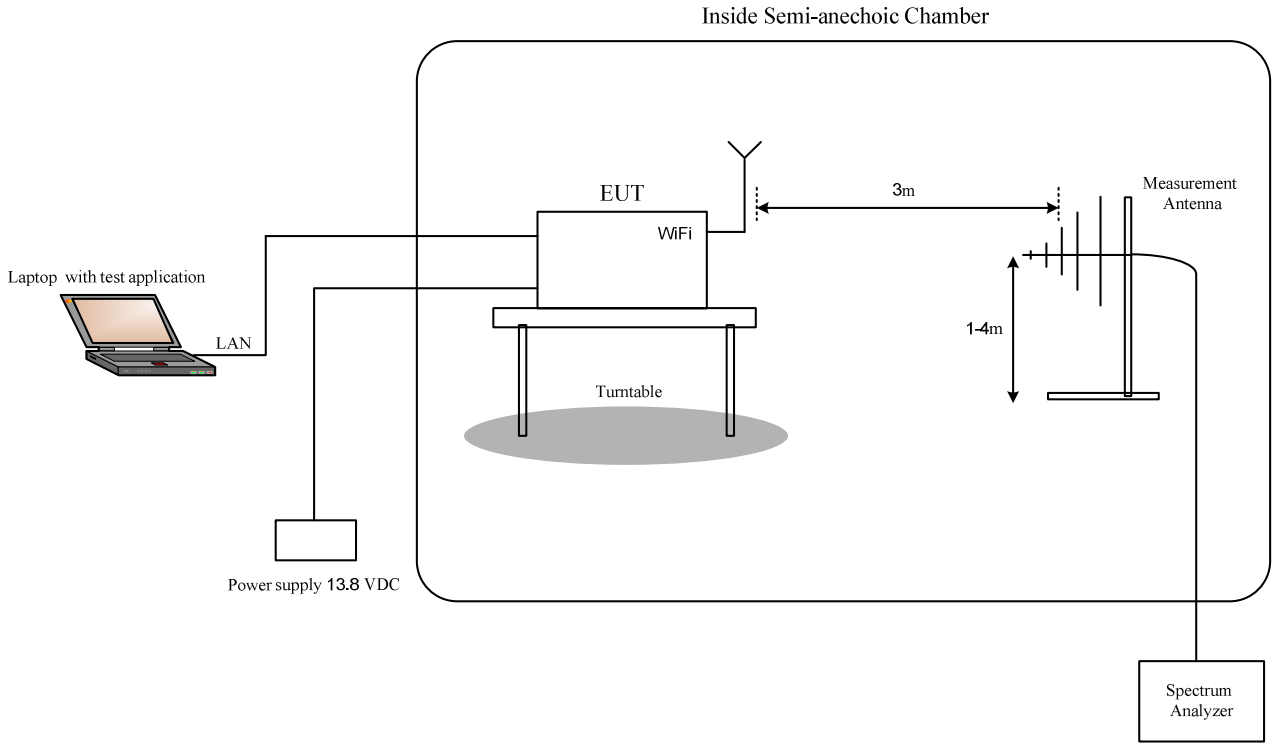
2.2. Radiated Emissions Measurements in the restricted bands:

For radiated emissions, which fall in the restricted bands the spectrum from 1MHz to 26.5 GHz 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=10/30 Hz. 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 4 m for the frequency range of 30 MHz 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 26.5 GHz 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.

Test Setup:



2.4. Worst Case Results:

Worst case result is determined for applicable modulation types and data rates. Pre-scan has been conducted to determine the worst-case.

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

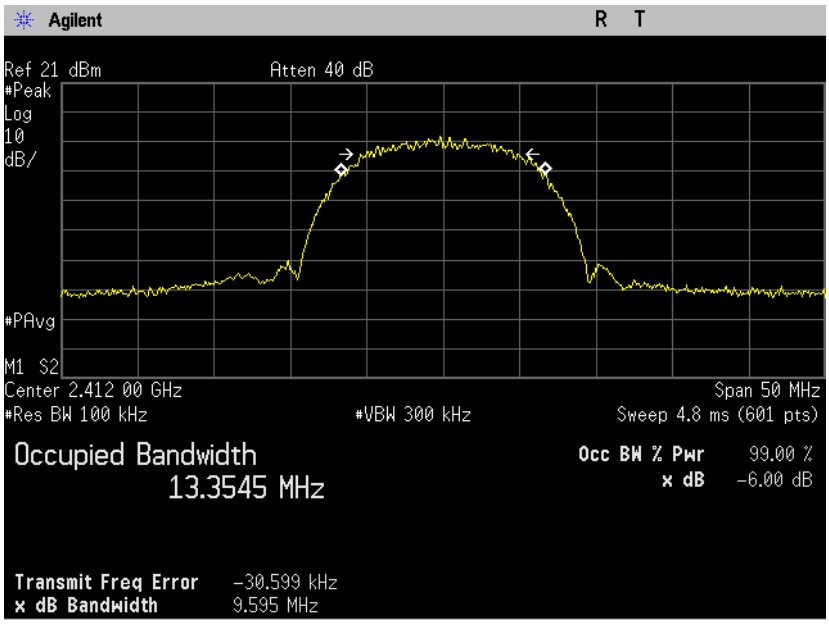
4.1. 6 dB Bandwidth

Reference document:	47 CFR §15.247 (a)(2)		
Test Requirements:	Systems using digital modulation techniques may operate in 2400-2483.5 MHz 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: 100 kHz, VBW: 300 kHz		
Environment conditions:	Ambient Temperature: 23.1°C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 - Plot 4.1.6	

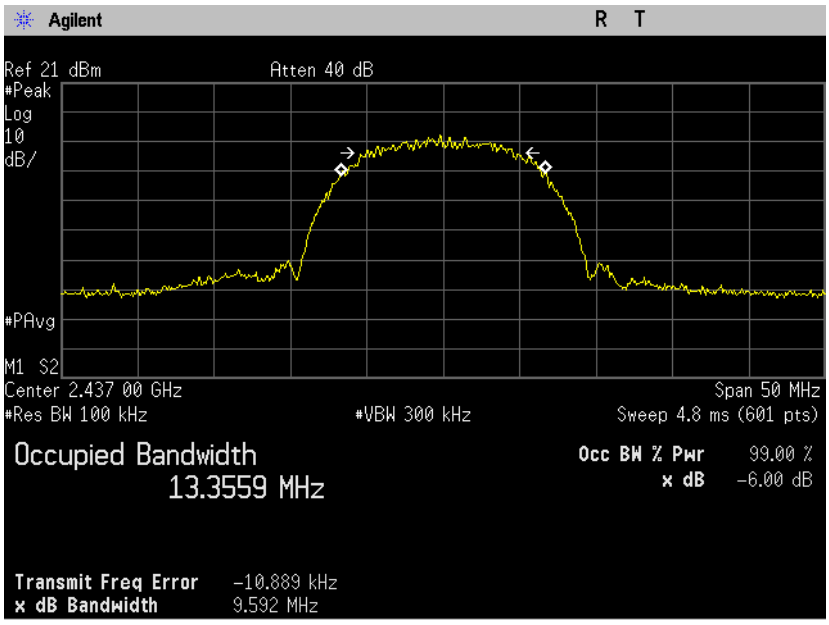
Test results:

Frequency [MHz]	Data Rate [Mbps]	6 dB Bandwidth [kHz]	Limit [kHz]	Ref Plots	Results
WLAN 802.11b					
2412	11	9595	>500	4.1.1	Comply
2437	11	9592	>500	4.1.2	Comply
2462	11	9591	>500	4.1.3	Comply
WLAN 802.11g					
2412	54	16635	>500	4.1.4	Comply
2437	54	16627	>500	4.1.5	Comply
2462	54	17881	>500	4.1.6	Comply

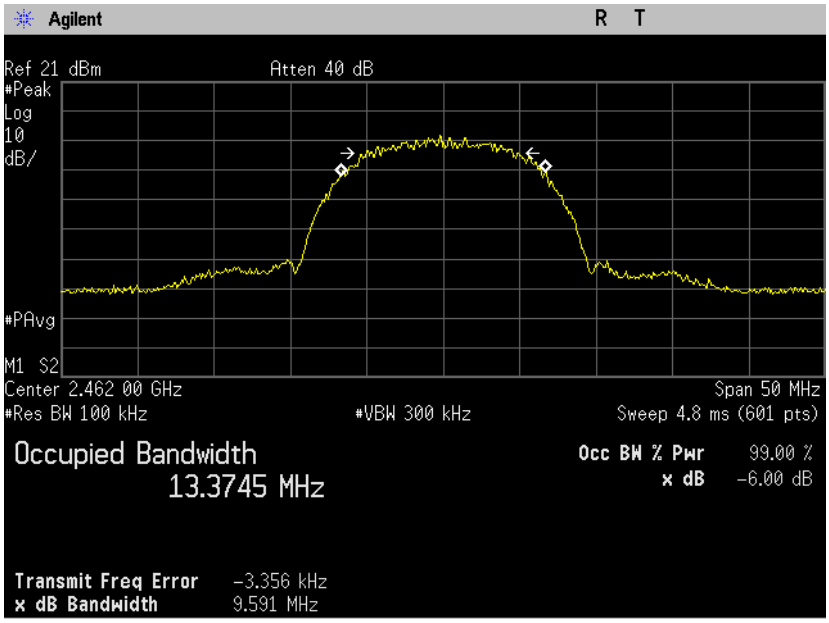
WLAN 802.11b, 2412 MHz, 11 Mbps
Lowest frequency
Plot 4.1.1



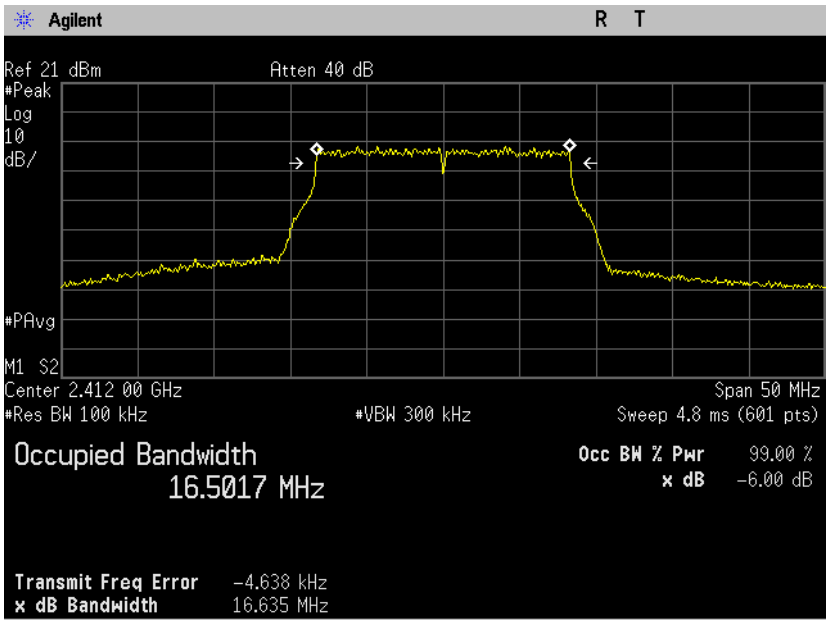
WLAN 802.11b, 2437 MHz, 11 Mbps
Middle frequency
Plot 4.1.2



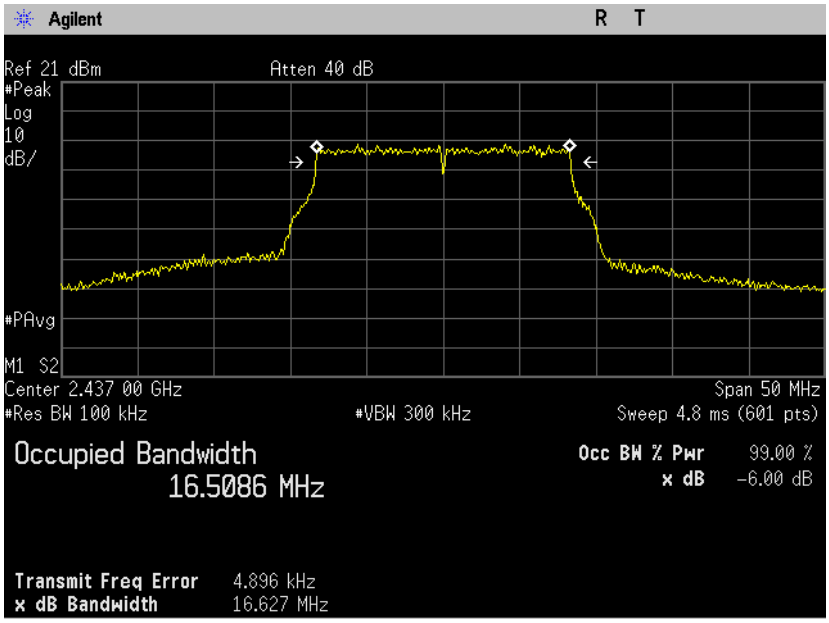
WLAN 802.11b, 2462 MHz, 11 Mbps
Highest frequency
Plot 4.1.3



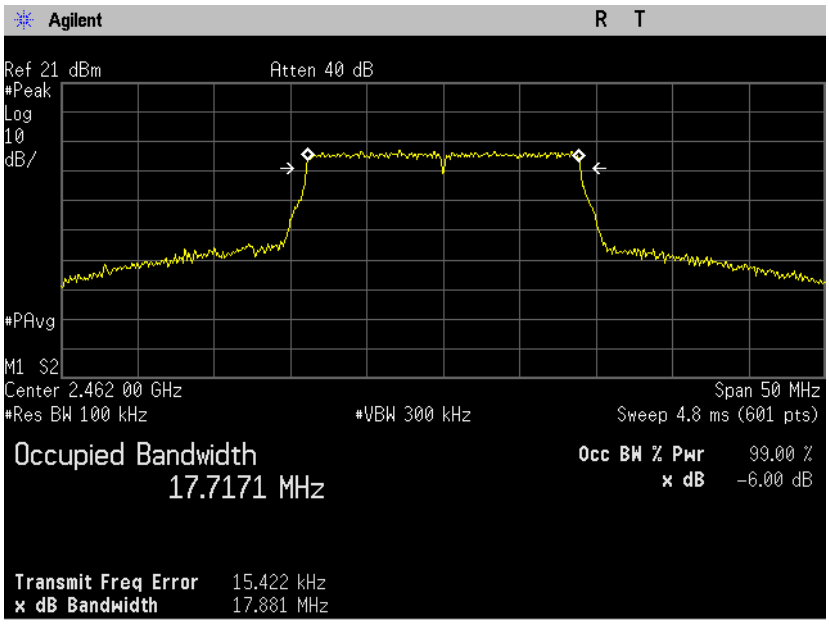
WLAN 802.11g, 2412 MHz, 54 Mbps
Lowest frequency
Plot 4.1.4



WLAN 802.11g, 2437 MHz, 54 Mbps
Middle frequency
Plot 4.1.5



WLAN 802.11g, 2462 MHz, 54 Mbps
Highest frequency
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 6 dBi.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
Power meter settings:	Peak		
Environment conditions:	Ambient Temperature: 23.1 °C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	---	

Test Results:

2400-2483.5 MHz Band

Frequency [MHz]	Data Rate [Mbps]	Output Power* [dBm]	Output Power* [mW]	Limit [dBm]	Margin [dB]
WLAN 802.11b					
2412	1	12.161	16.448	30.00	17.839
2437	1	12.875	19.387	30.00	17.125
2462	1	12.629	18.319	30.00	17.371
WLAN 802.11g					
2412	6	12.882	19.418	30.00	17.118
2437	6	13.195	20.869	30.00	16.805
2462	6	13.461	22.187	30.00	16.539

* Using a Peak Power Meter & corrected for external attenuations.
** As provided by the manufacturer (maximum antenna gain including cable loss).

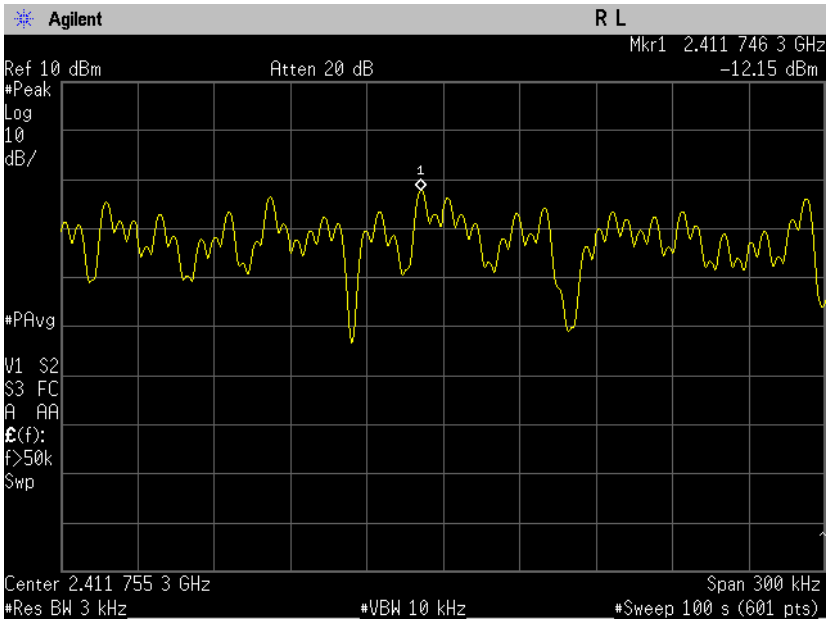
4.3. Peak power spectral density

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: 22.3 °C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.3.1 - Plot 4.3.6	

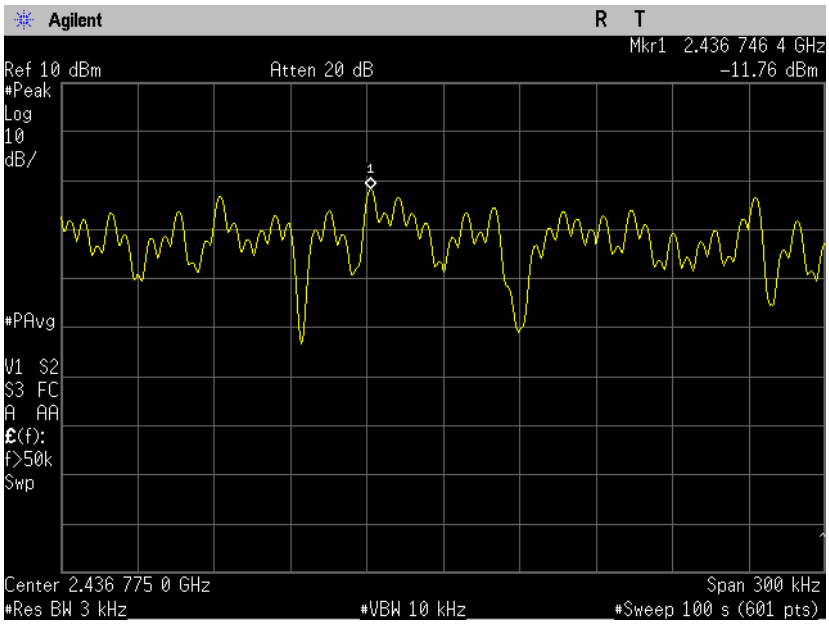
Test Results:

Frequency [MHz]	Data Rate [Mbps]	Measured PSD [dBm/3kHz]	Limit PSD [dBm/3kHz]	Margin [dB]	Reference Plots	Results
WLAN 802.11b						
2412	11	-12.15	8	-20.15	4.3.1	Comply
2437	11	-11.76	8	-19.76	4.3.2	Comply
2462	11	-12.19	8	-20.19	4.3.3	Comply
WLAN 802.11g						
2412	54	-15.08	8	-23.08	4.3.4	Comply
2437	54	-14.88	8	-22.88	4.3.5	Comply
2462	54	-14.15	8	-22.15	4.3.6	Comply

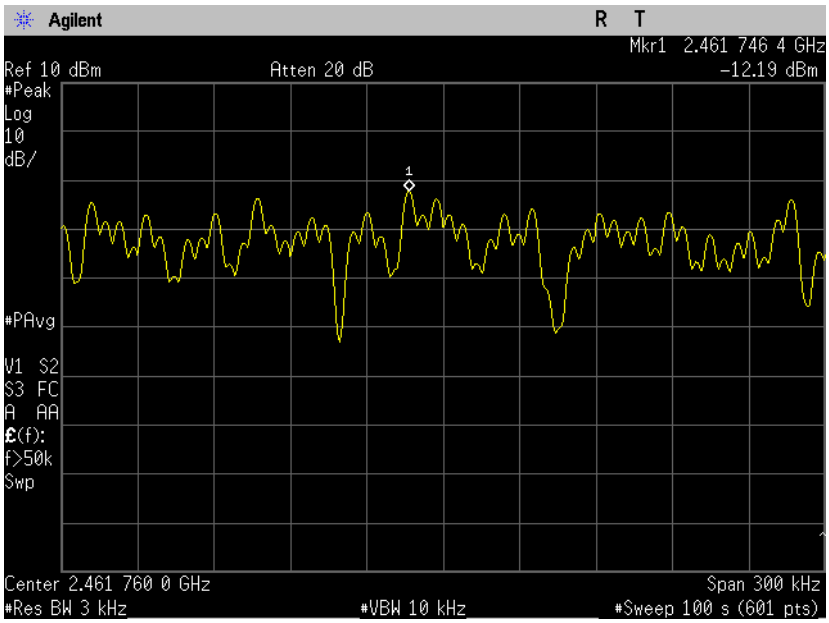
WLAN 802.11b, 2412 MHz, 11 Mbps
Lowest frequency
Plot 4.3.1



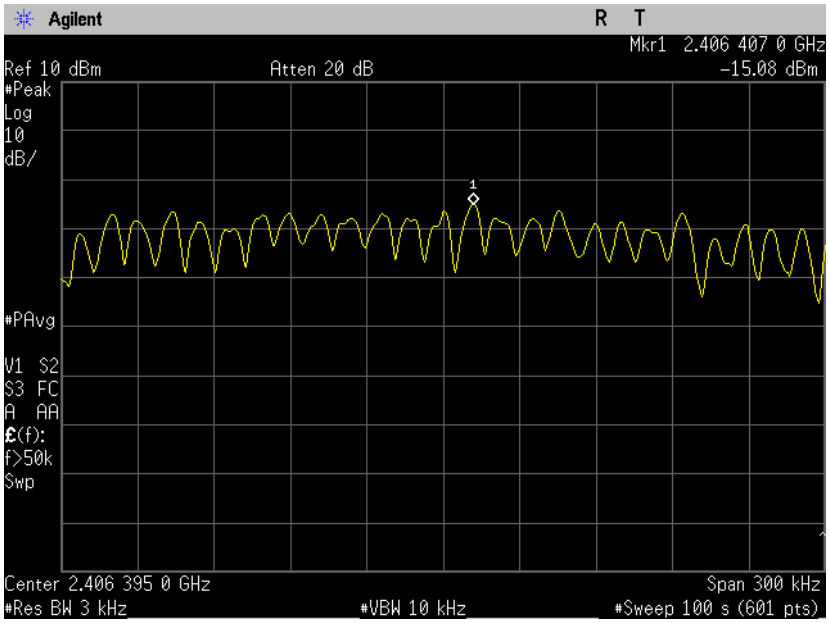
WLAN 802.11b, 2437 MHz, 11 Mbps
Middle frequency
Plot 4.3.2



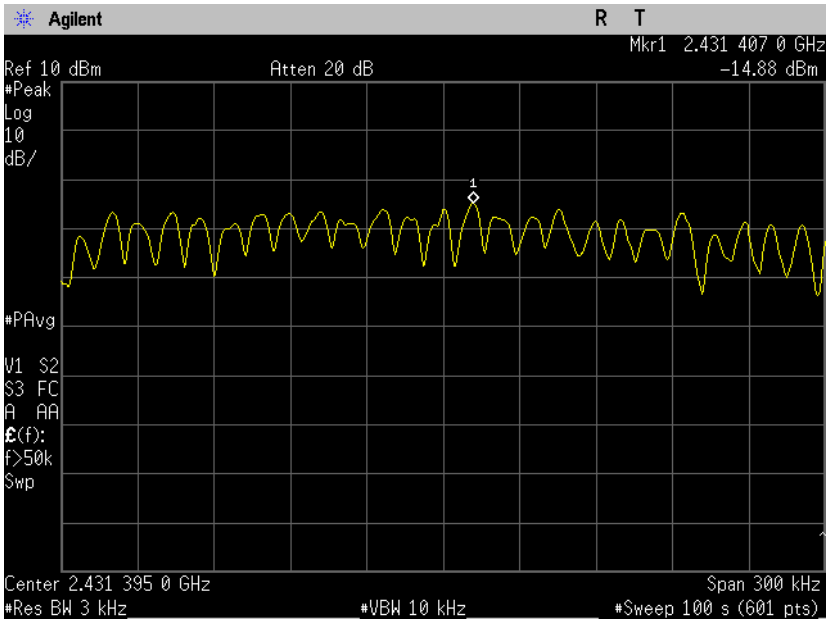
WLAN 802.11b, 2462 MHz, 11 Mbps
Highest frequency
Plot 4.3.3



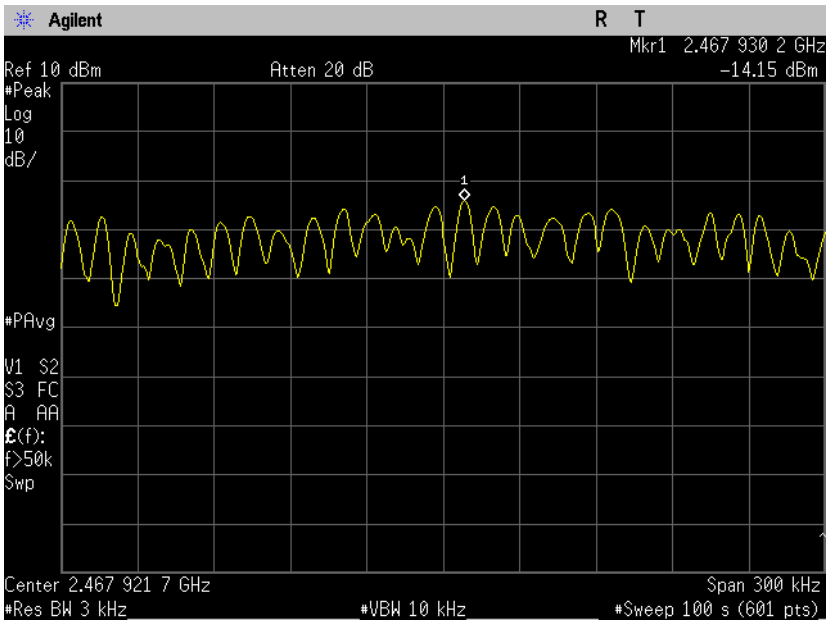
WLAN 802.11g, 2412 MHz, 54 Mbps
Lowest frequency
Plot 4.3.4



WLAN 802.11g, 2437 MHz, 54 Mbps
Middle frequency
Plot 4.3.5



WLAN 802.11g, 2462 MHz, 54 Mbps
Highest frequency
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: 23.1 °C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1- Plot 4.4.16	

Test results:

Spurious

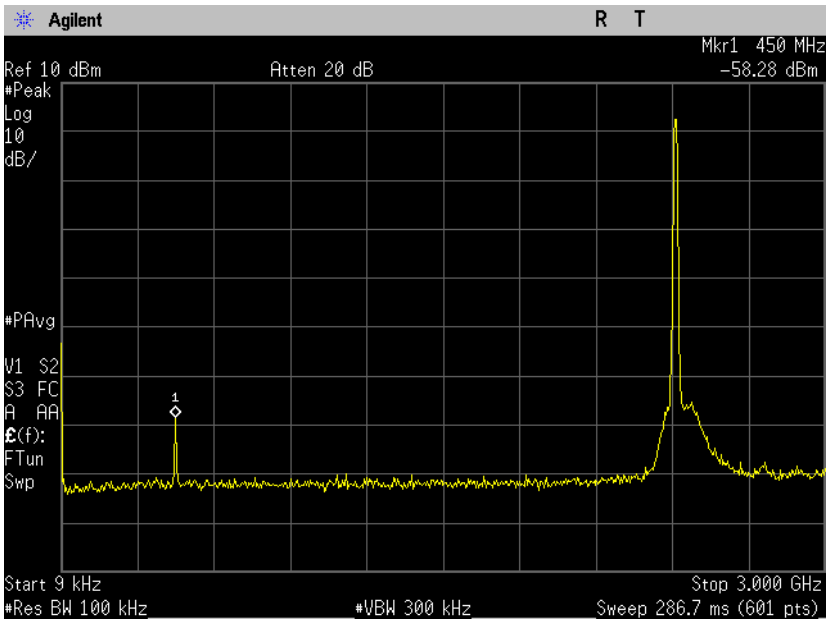
Frequency [MHz]	Data Rate [Mbps]	Measured [dBc]	Limit [dBc]	Reference Plots*	Result
WLAN 802.11b					
2412	1	*	-20	4.4.1 - 4.4.2	Comply
2437	1	*	-20	4.4.3 - 4.4.4	Comply
2462	1	*	-20	4.4.5 - 4.4.6	Comply
WLAN 802.11g					
2412	6	*	-20	4.4.7 – 4.4.8	Comply
2437	6	*	-20	4.4.9 - 4.4.10	Comply
2462	6	*	-20	4.4.11 - 4.4.12	Comply

*All emissions at least 40 dB below the limit (40 dBc)

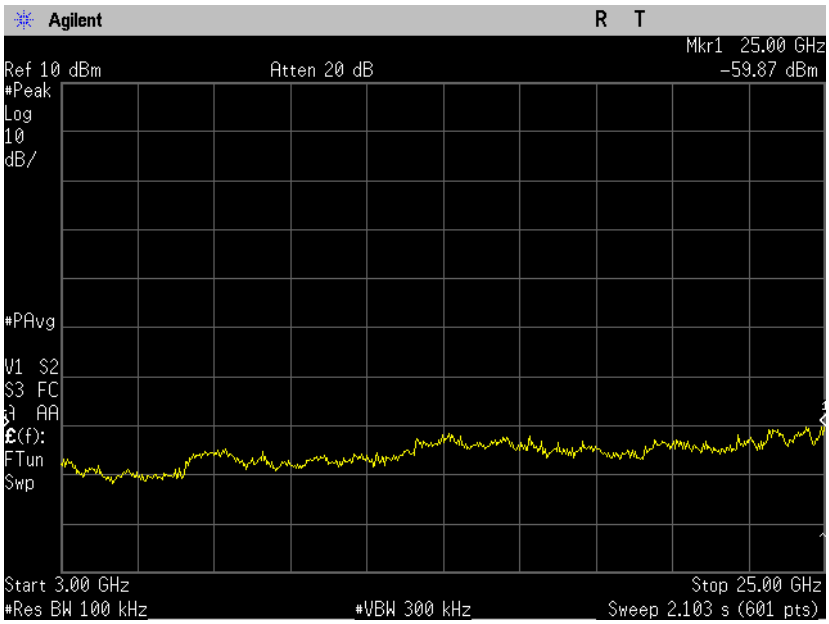
Band Edge

Frequency [MHz]	Data Rate [Mbps]	Measured [dBc]	Limit [dBc]	Reference	Result
WLAN 802.11b					
2412	1	-44.16	-20	4.4.13	Comply
2462	1	-55.02	-20	4.4.14	Comply
WLAN 802.11g					
2412	6	-34.42	-20	4.4.15	Comply
2462	6	-39.93	-20	4.4.16	Comply

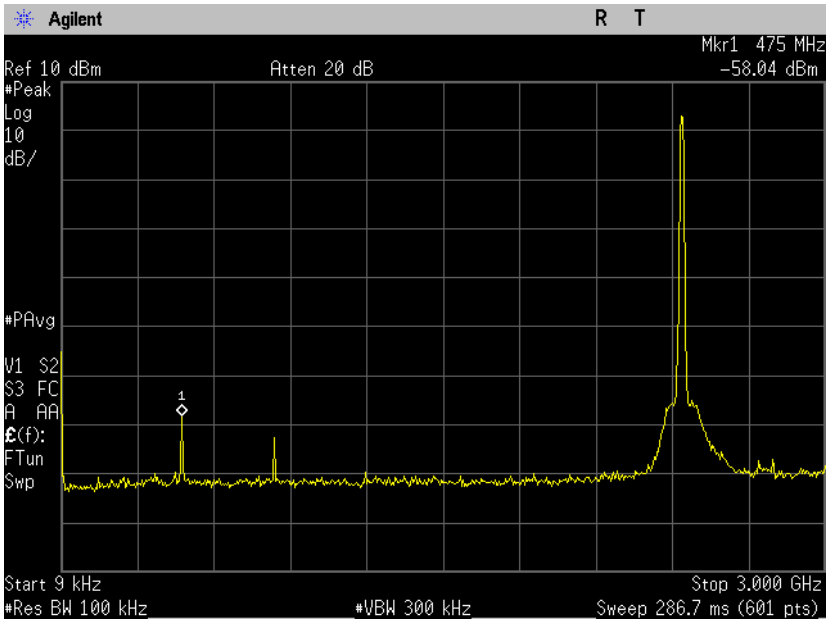
WLAN 802.11b, 2412 MHz, 1 Mbps
Lowest frequency
Plot 4.4.1



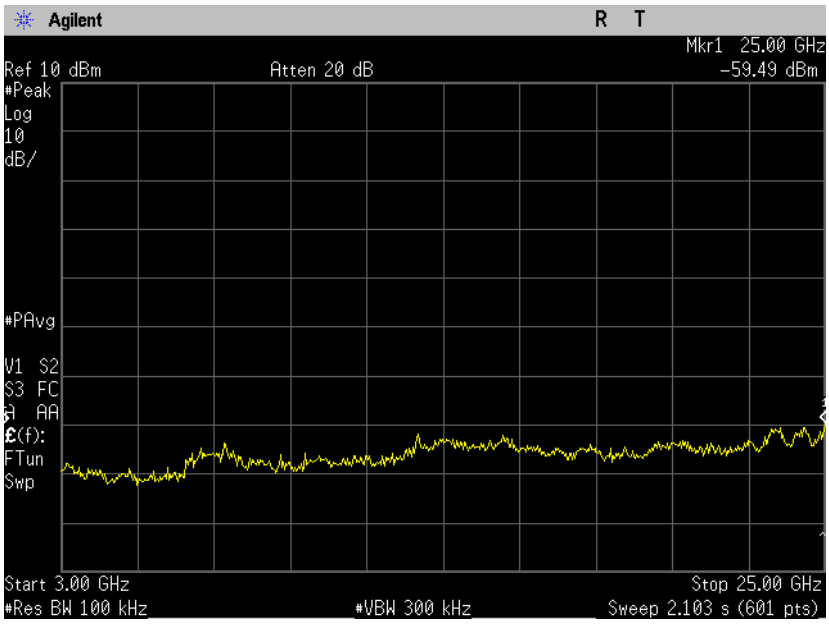
Plot 4.4.2



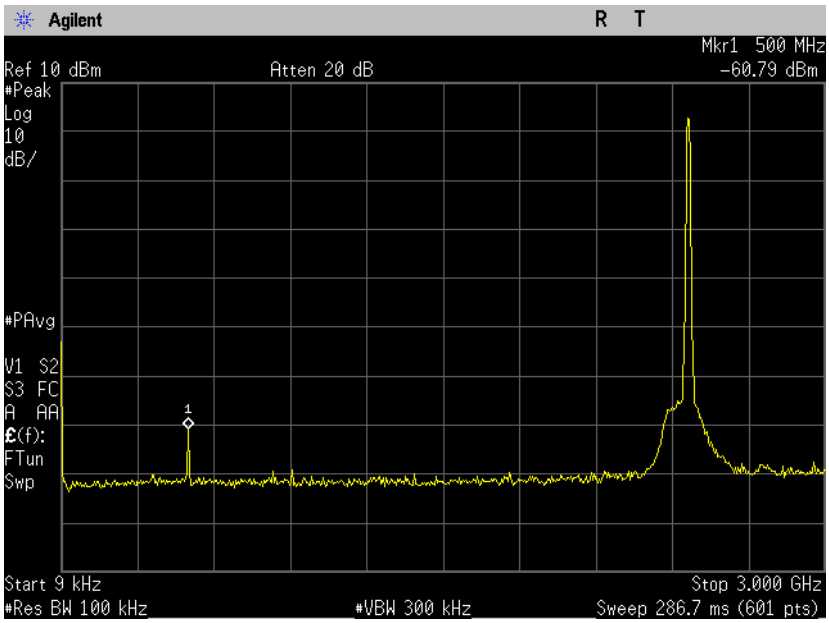
WLAN 802.11b, 2437 MHz, 1 Mbps
Middle frequency
Plot 4.4.3



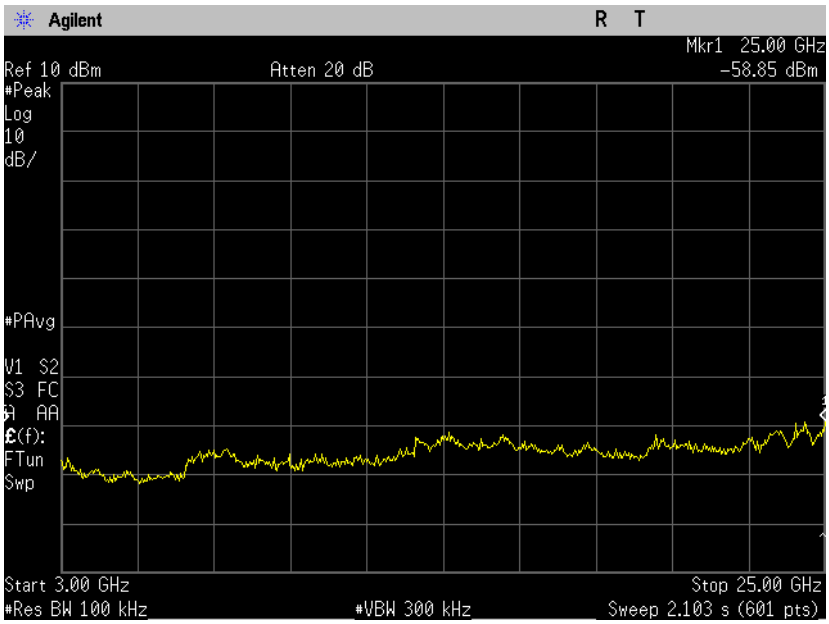
Plot 4.4.4



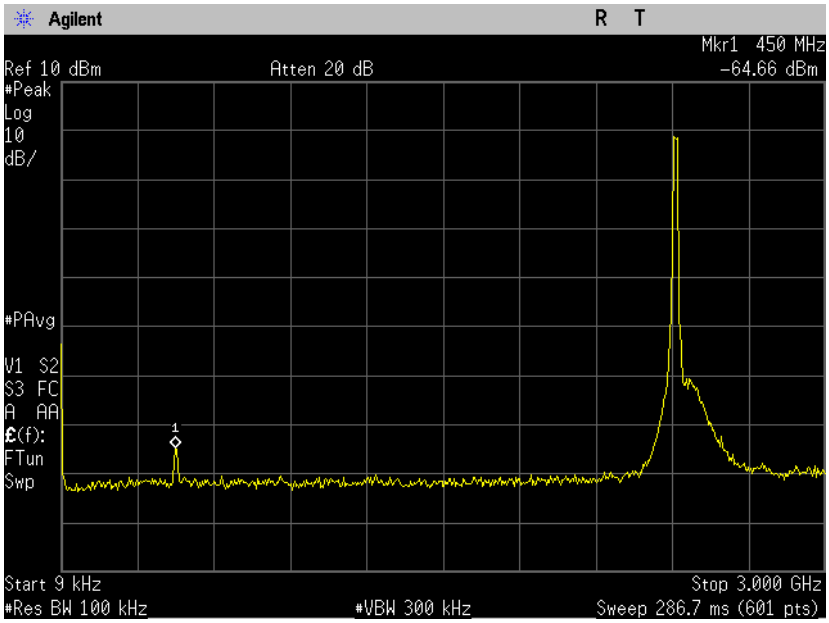
WLAN 802.11b, 2462 MHz, 1 Mbps
Highest frequency
Plot 4.4.5



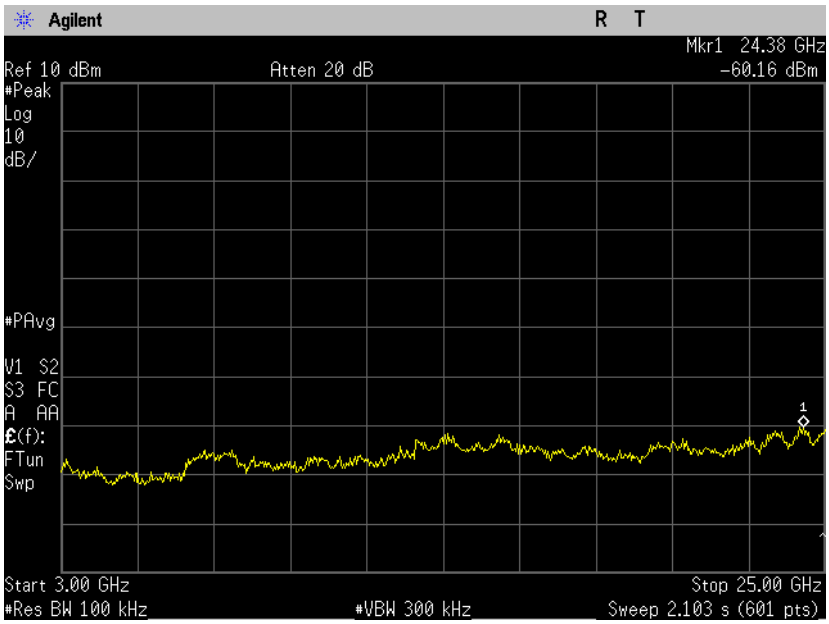
Plot 4.4.6



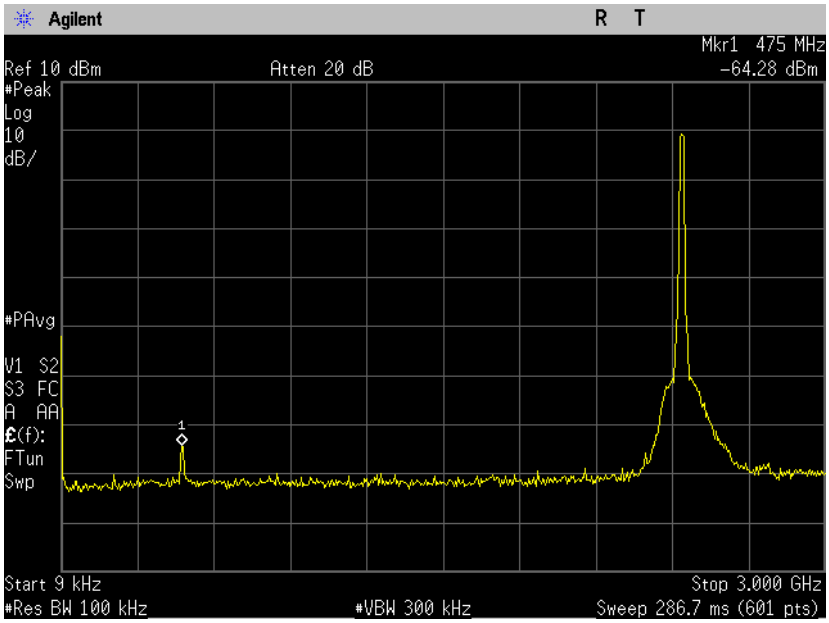
WLAN 802.11g, 2412 MHz, 6 Mbps
Lowest frequency
Plot 4.4.7



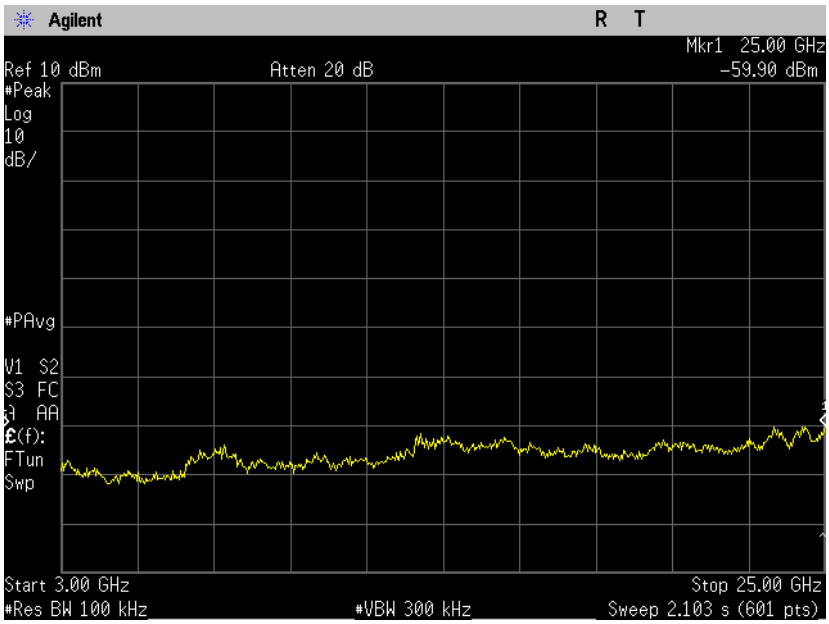
Plot 4.4.8



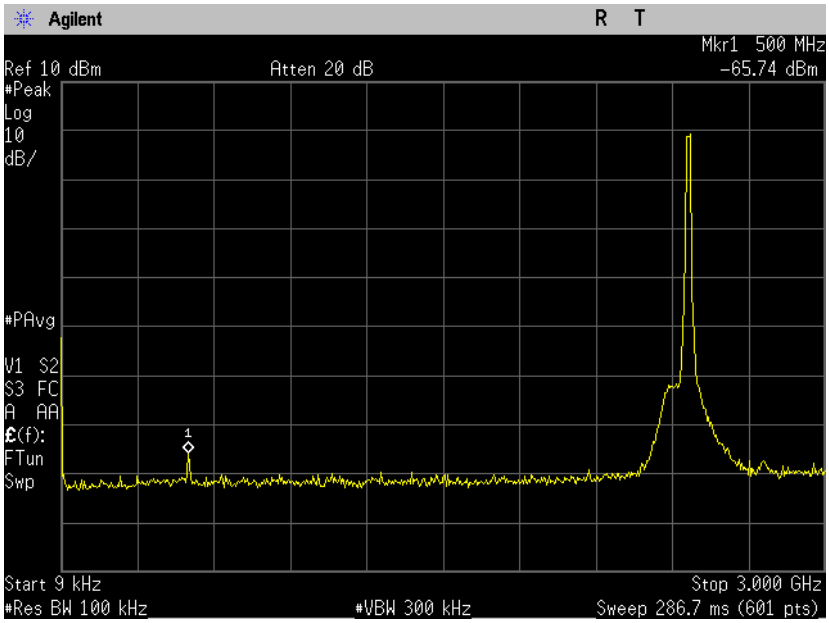
WLAN 802.11g, 2437 MHz, 6 Mbps
Middle frequency
Plot 4.4.9



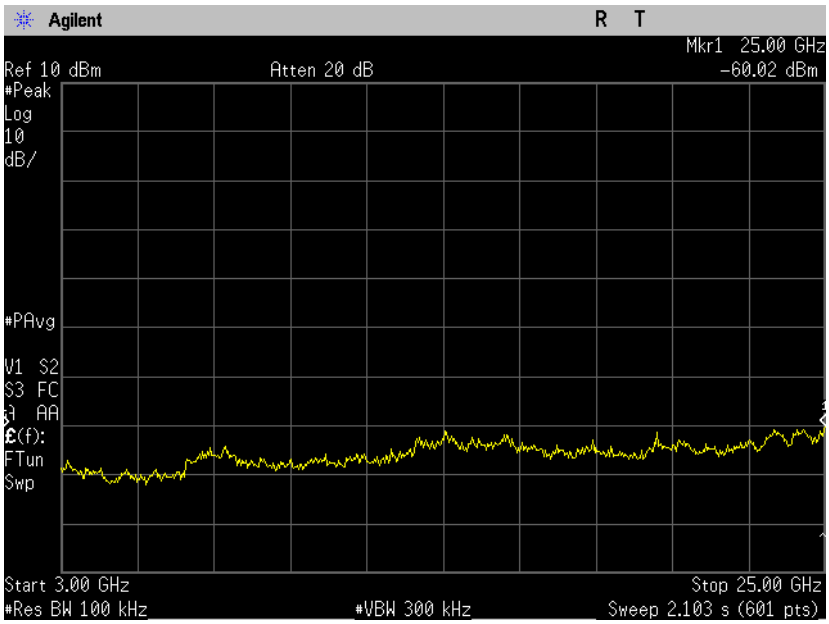
Plot 4.4.10



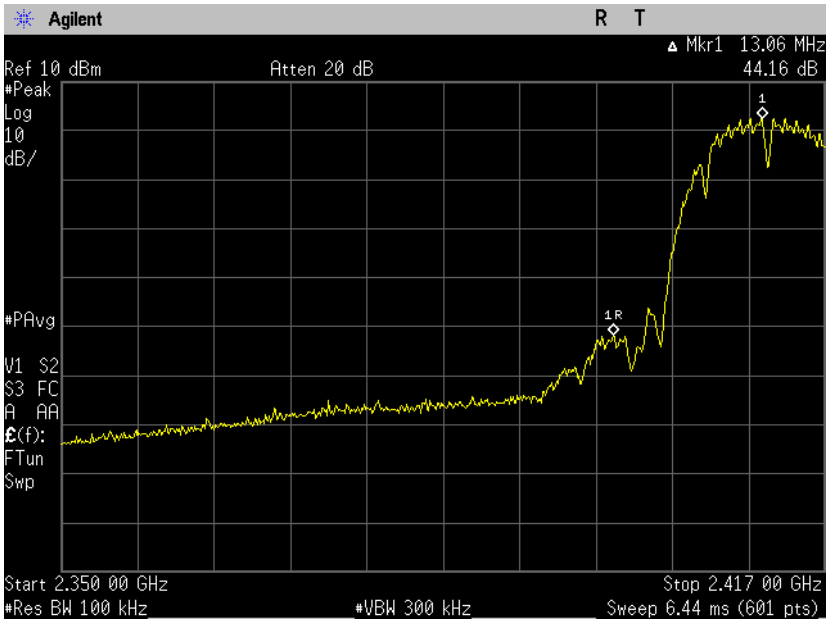
WLAN 802.11g, 2462 MHz, 6 Mbps
Highest frequency
Plot 4.4.11



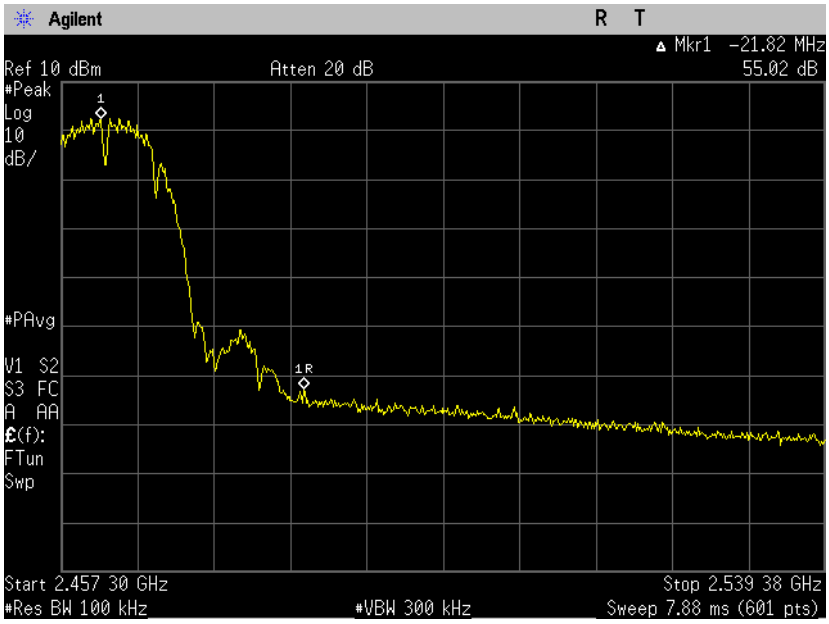
Plot 4.4.12



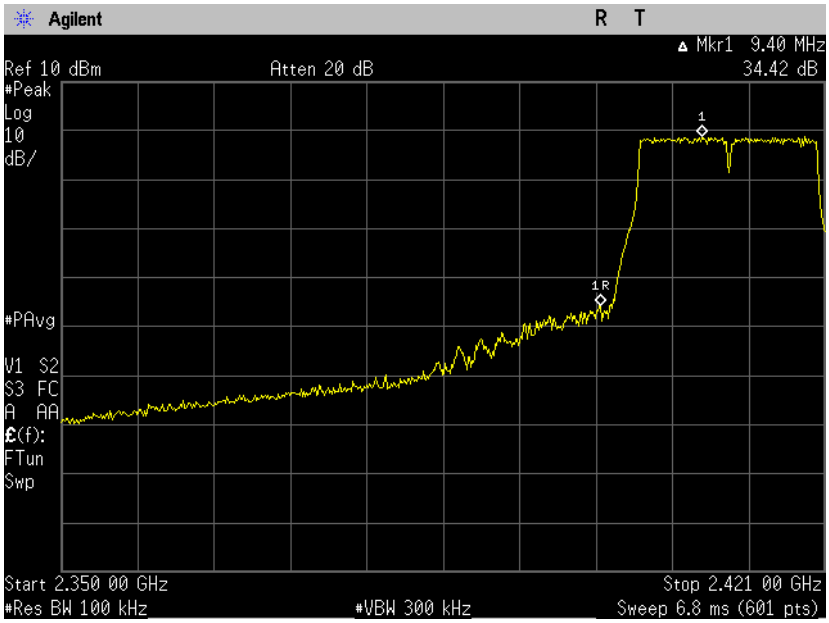
WLAN 802.11b, 2412 MHz, 1 Mbps
Lowest frequency
Plot 4.4.13



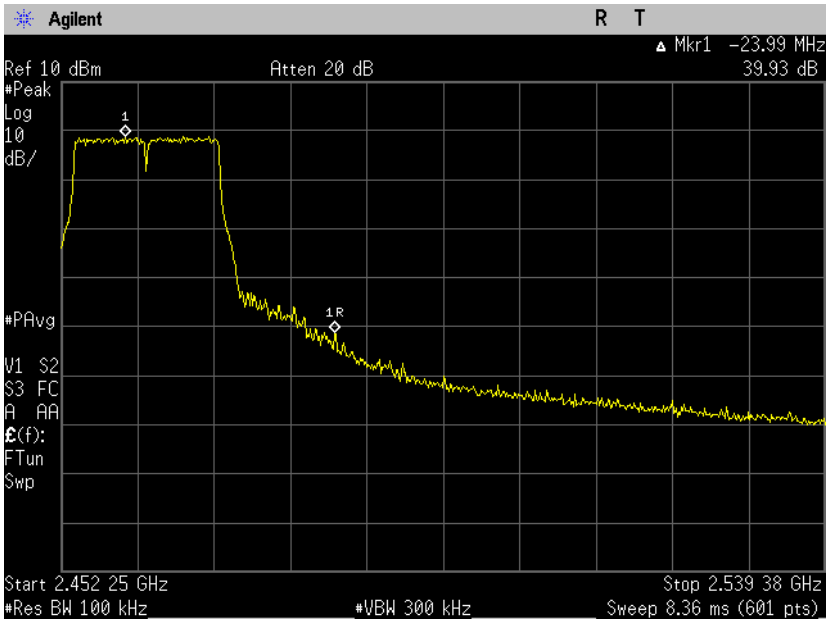
WLAN 802.11b, 2462 MHz, 1 Mbps
Highest frequency
Plot 4.4.14



WLAN 802.11g, 2412 MHz, 6 Mbps
Lowest frequency
Plot 4.4.15



WLAN 802.11g, 2462 MHz, 6 Mbps
Highest frequency
Plot 4.4.16



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

Reference document:	47 CFR §15.247 (d)		
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= 30 Hz		
Environment conditions:	Ambient Temperature: 23.1 °C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.5.1 to Plot 4.5.16	

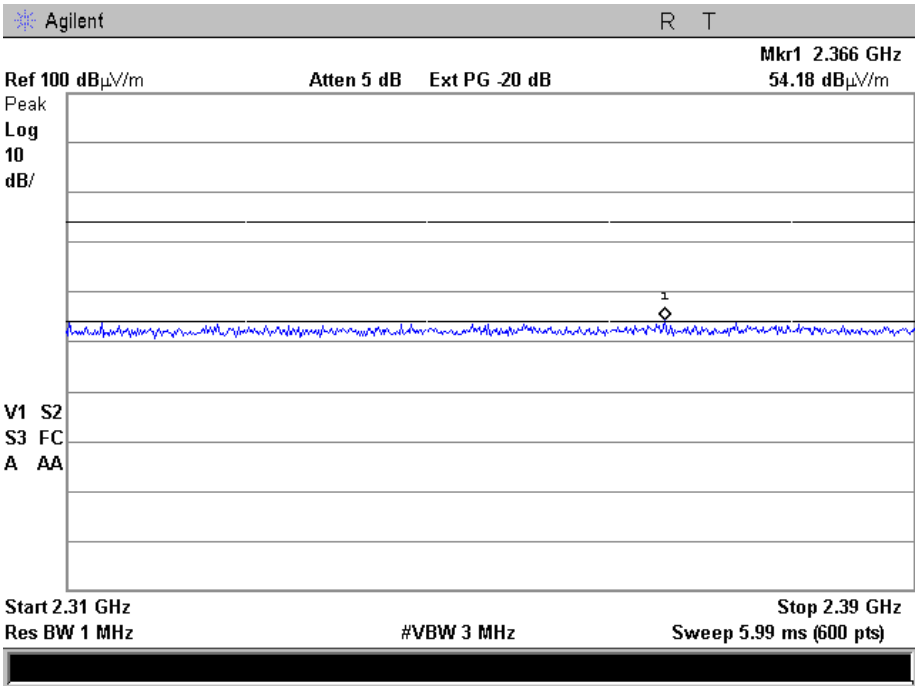
Test results:

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

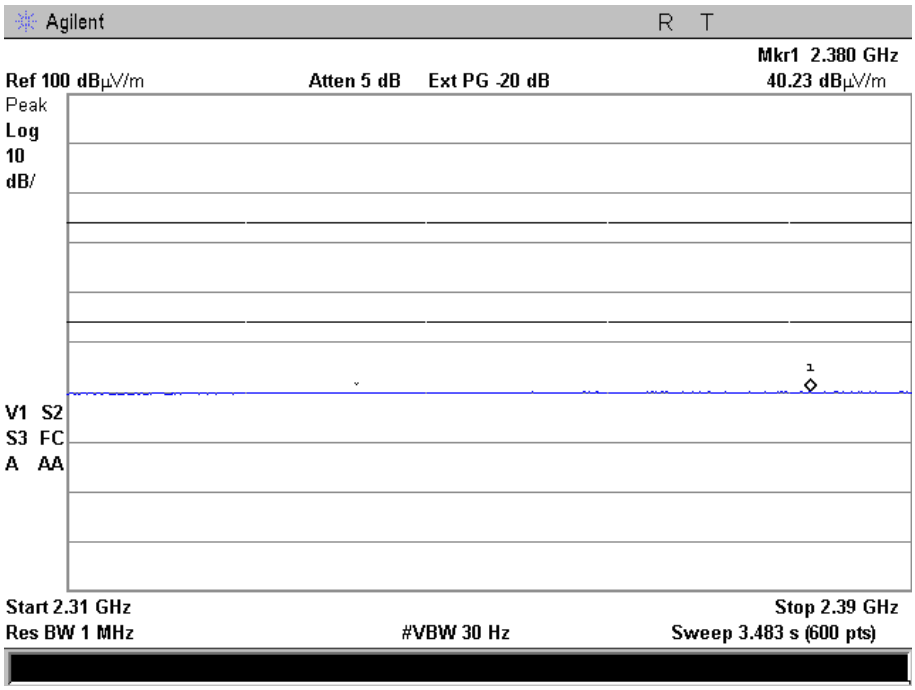
Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
WLAN 802.11b							
2412	1	2366.5	Peak	H	54.18	74	-19.82
2412	1	2380.2	Avg	H	40.23	54	-13.77
2462	1	2492.4	Peak	V	55.28	74	-18.72
2462	1	2498.8	Avg	V	40.36	54	-13.64
WLAN 802.11g							
2412	6	2314.9	Peak	V	54.19	74	-19.81
2412	6	2390.0	Avg	V	41.25	54	-12.75
2462	6	2484.2	Peak	V	55.47	74	-18.53
2462	6	2483.6	Avg	V	40.87	54	-13.13

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

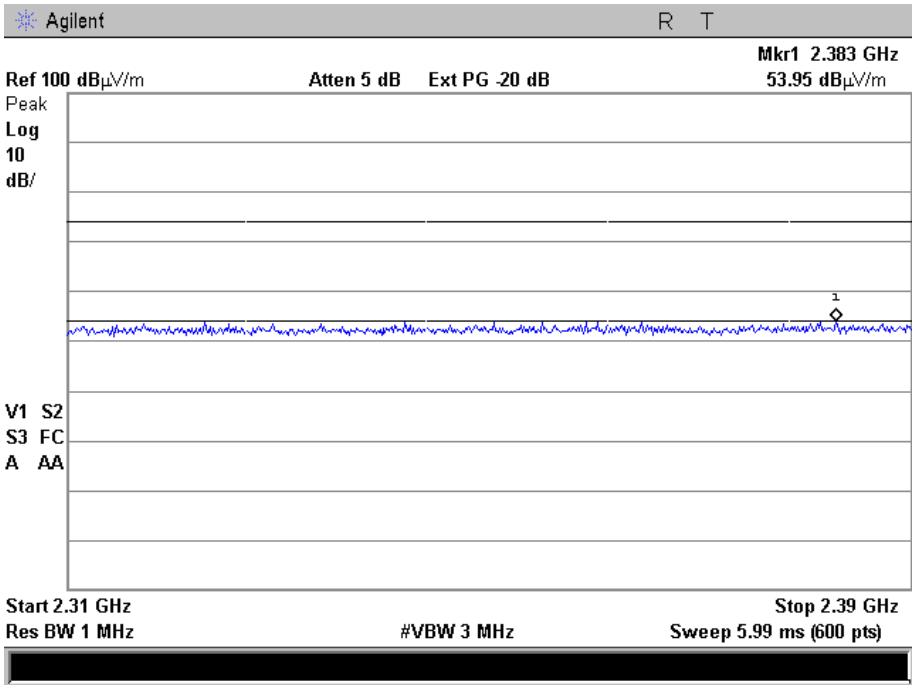
WLAN 802.11b, 2412 MHz, 1 Mbps
Lowest Frequency
Horizontal Polarization
Peak
Plot 4.5.1



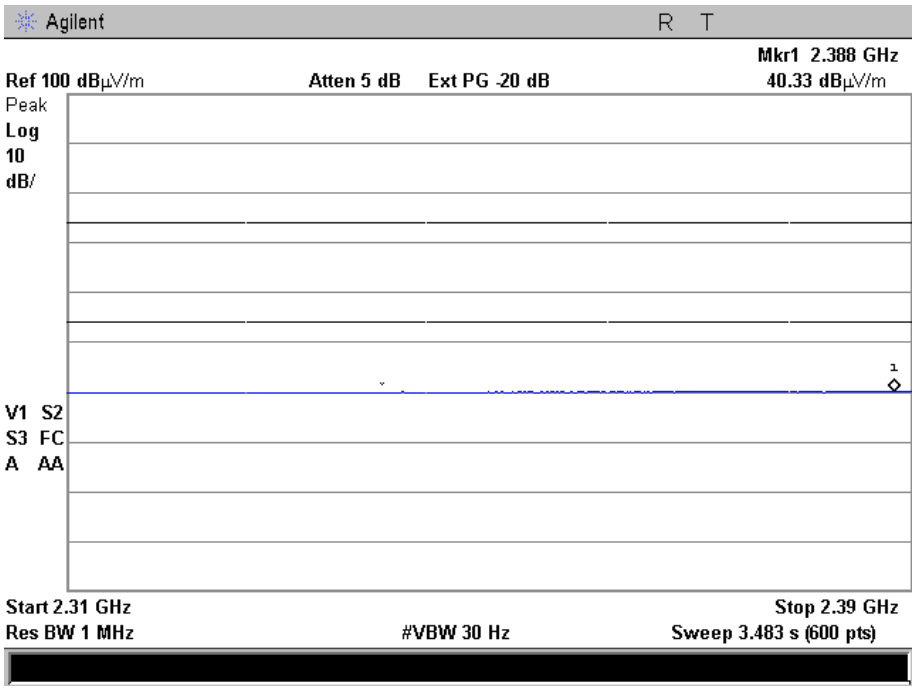
Horizontal Polarization
Average
Plot 4.5.2



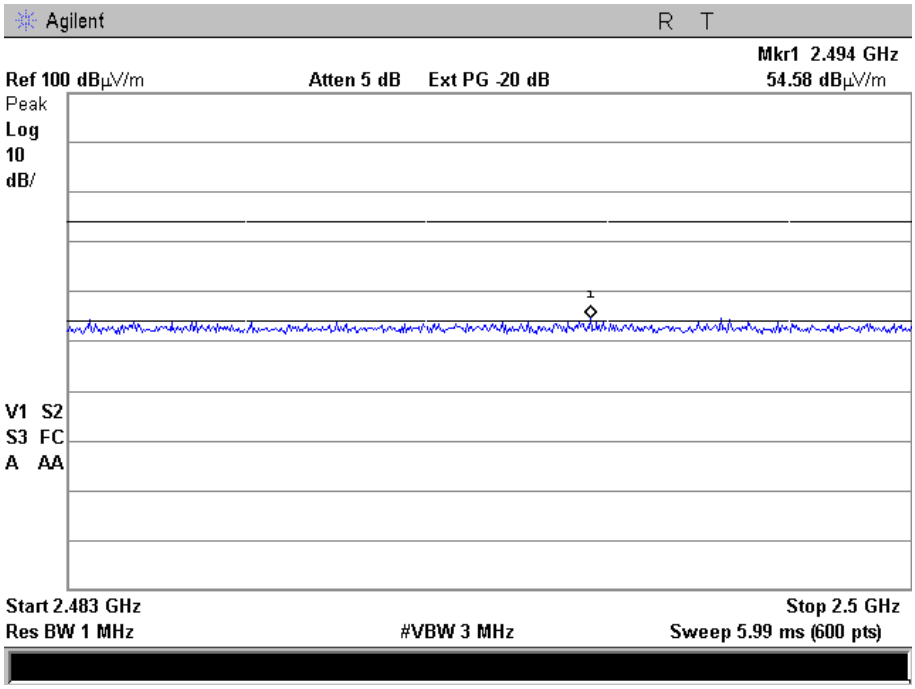
Vertical Polarization
Peak
Plot 4.5.3



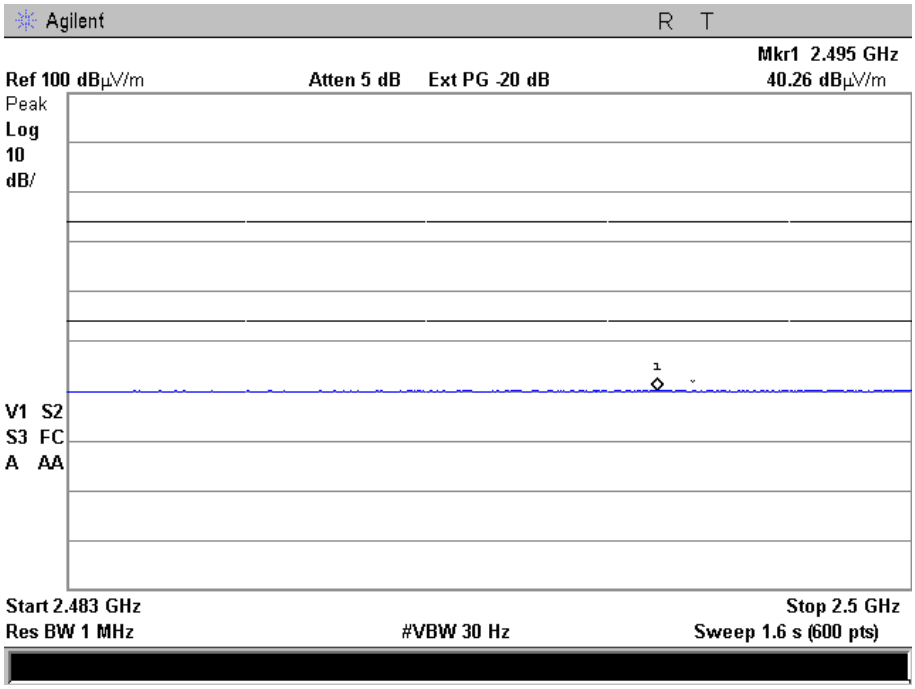
Vertical Polarization
Average
Plot 4.5.4



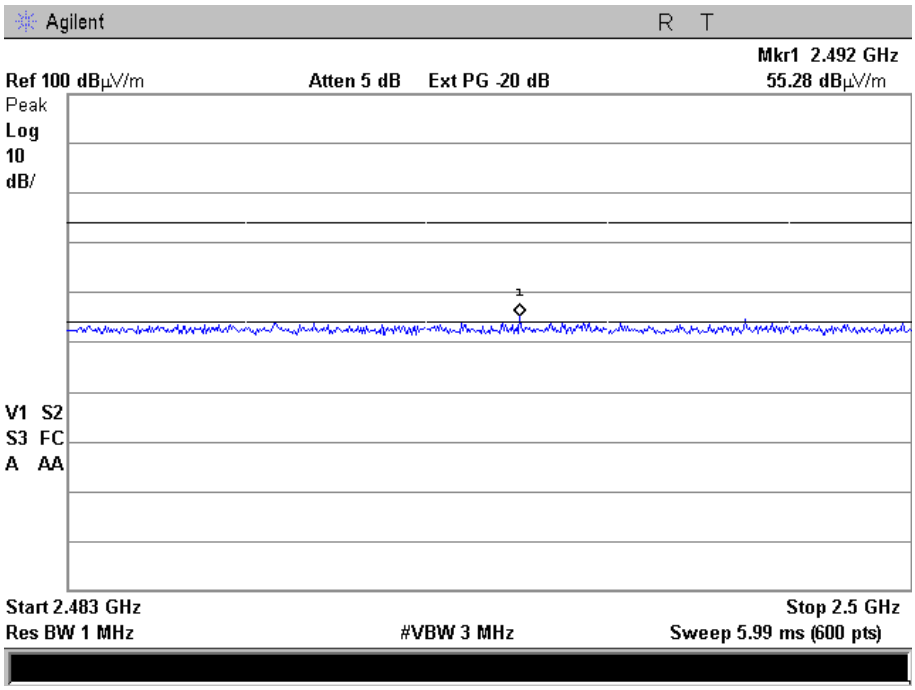
WLAN 802.11b, 2462 MHz, 1 Mbps
Highest Frequency
Horizontal Polarization
Peak
Plot 4.5.5



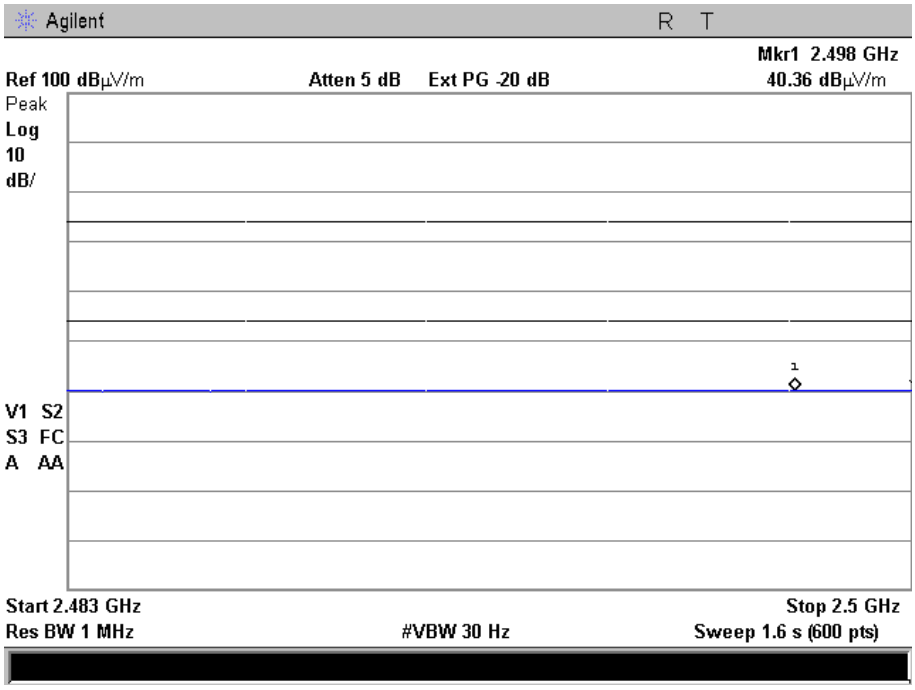
Horizontal Polarization
Average
Plot 4.5.6



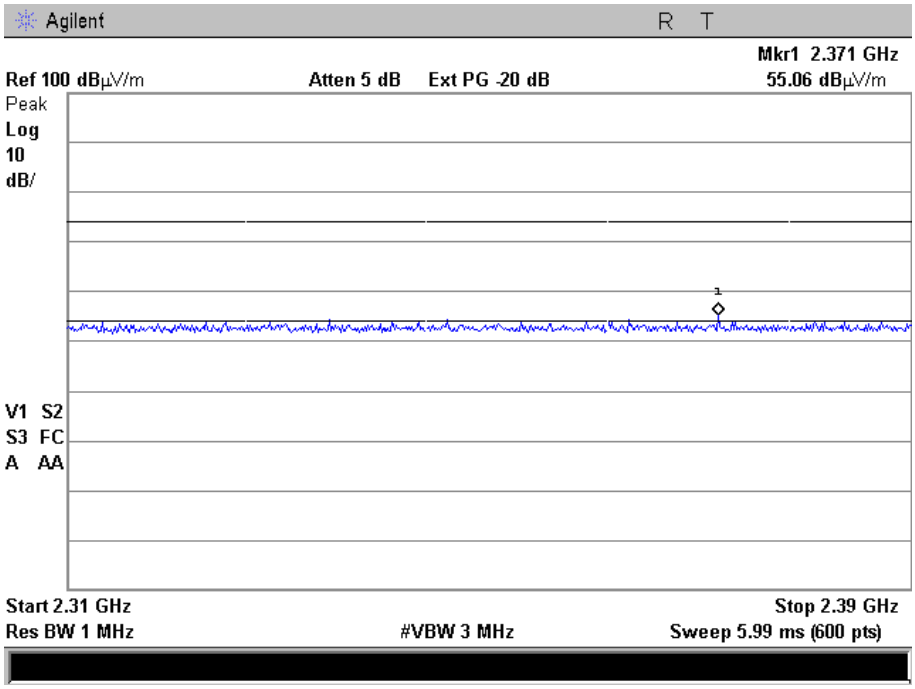
Vertical Polarization
Peak
Plot 4.5.7



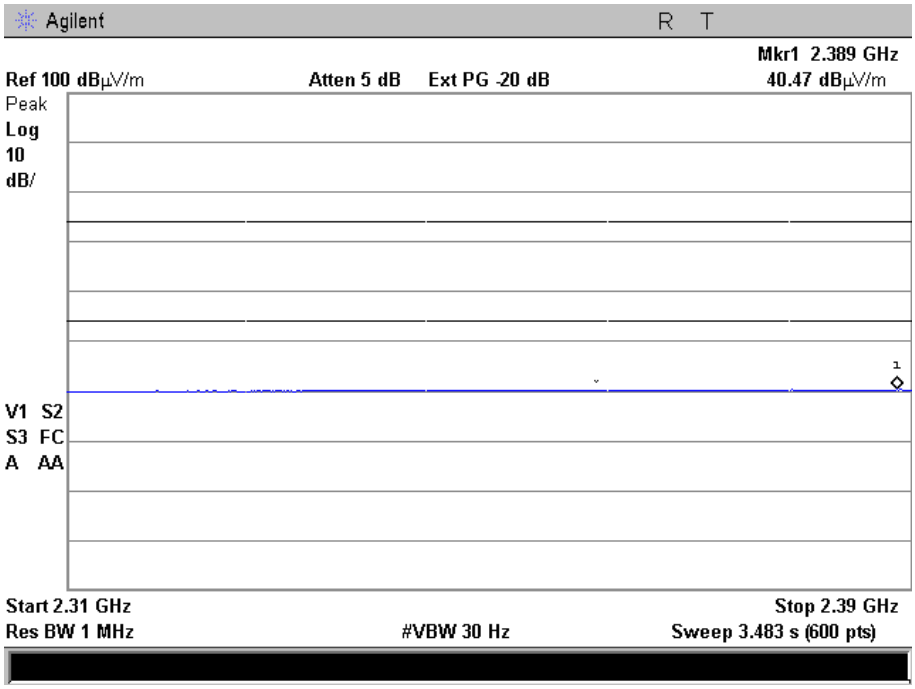
Vertical Polarization
Average
Plot 4.5.8



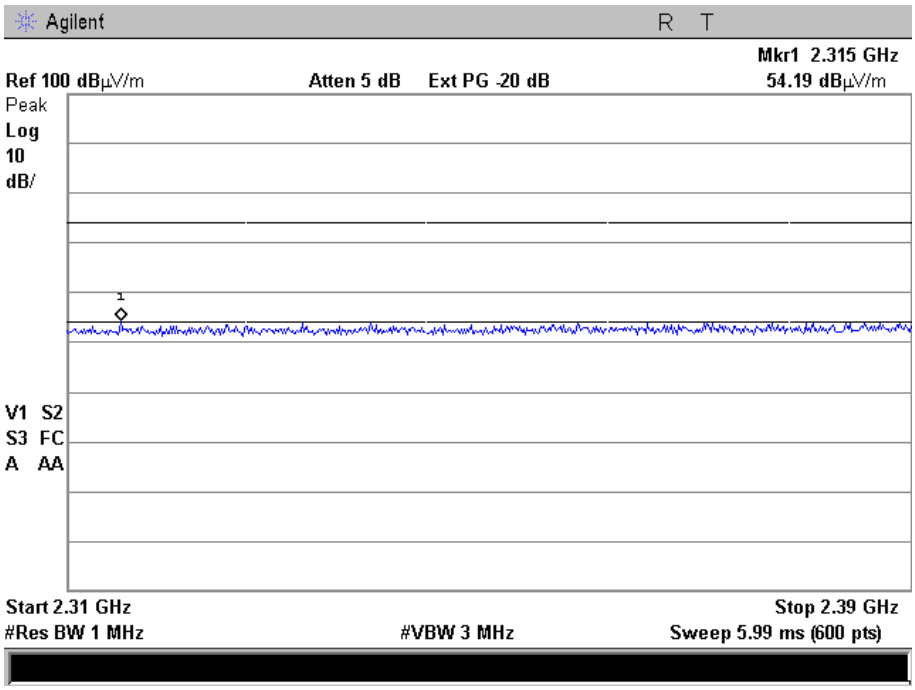
WLAN 802.11g, 2412 MHz, 6 Mbps
Lowest Frequency
Horizontal Polarization
Peak
Plot 4.5.9



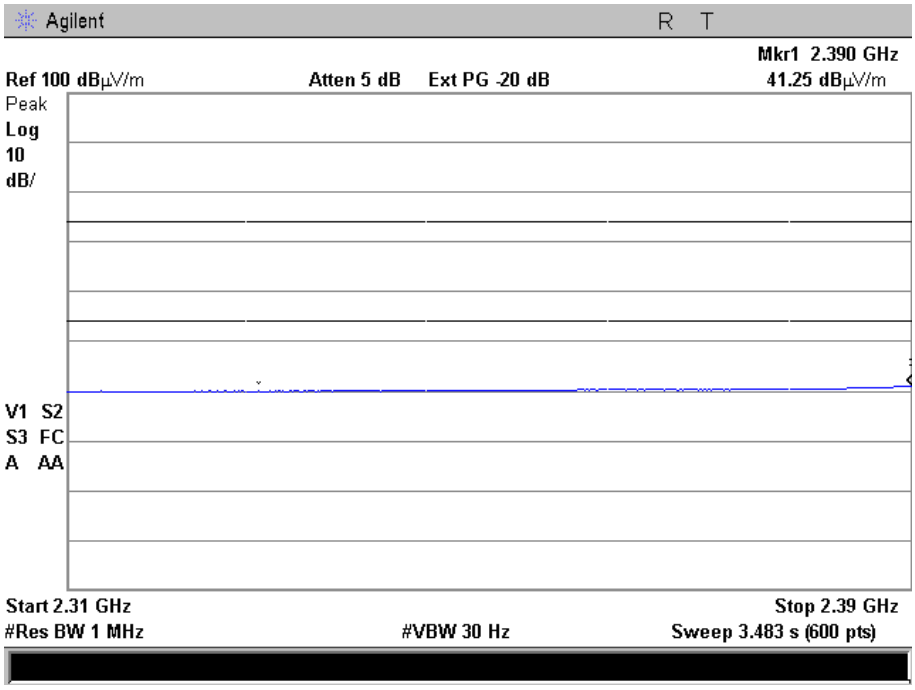
Horizontal Polarization
Average
Plot 4.5.10



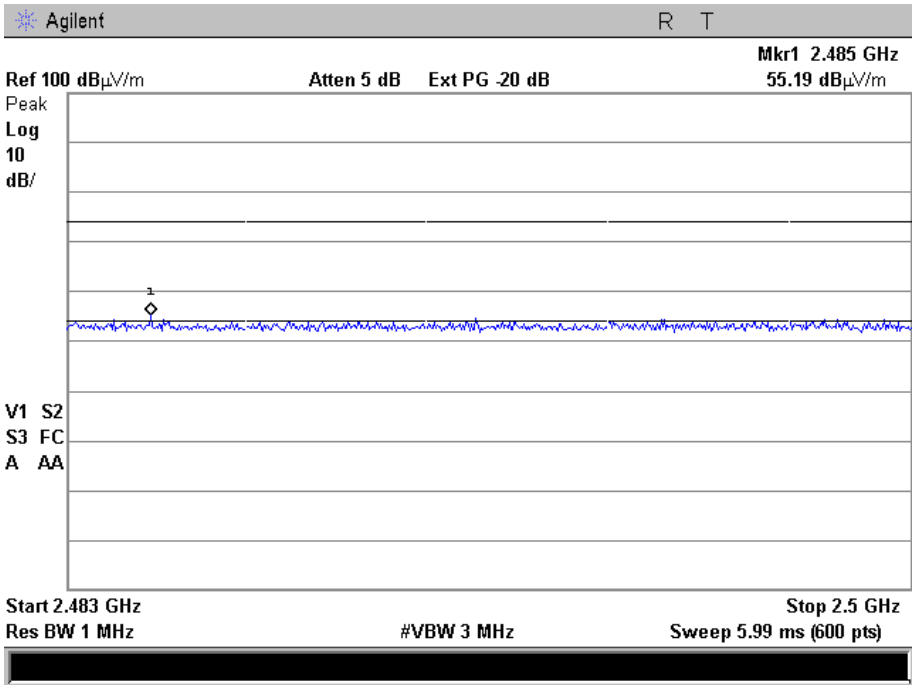
Vertical Polarization
Peak
Plot 4.5.11



Vertical Polarization
Average
Plot 4.5.12

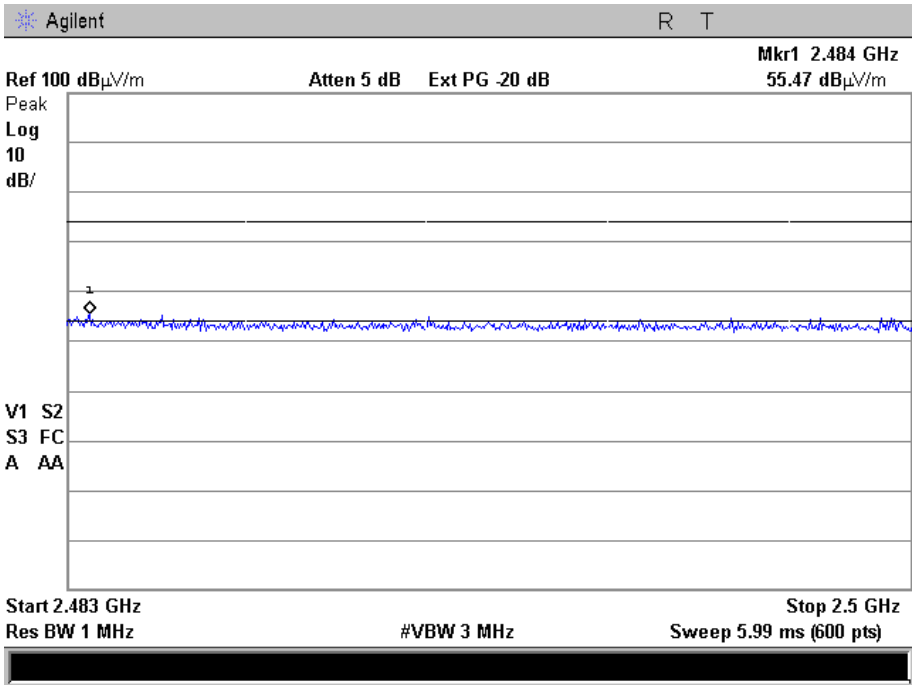


WLAN 802.11g, 2462 MHz, 6 Mbps
Highest Frequency
Horizontal Polarization
Peak
Plot 4.5.13

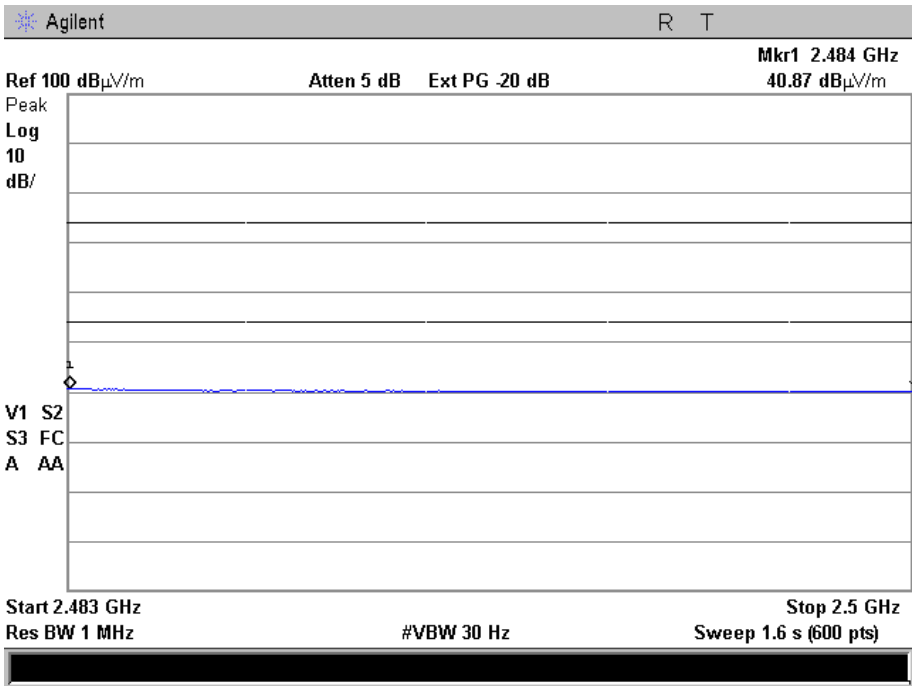


Horizontal Polarization
Average
Plot 4.5.14

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: RBW: 120 kHz,VBW: 300 kHz f >1GHz: Peak: RBW= 1 MHz, VBW= 3 MHz		
Environment conditions:	Ambient Temperature: 23.1 °C	Relative Humidity: 55.4 %	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.6.1 - Plot 4.6.26	

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	1	All spurious emissions at least 10 dB below the limit					
2422	1						
2437	1						

Channel/ Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
WLAN 802.11g							
2412	6	All spurious emissions at least 10 dB below the limit					
2422	6						
2437	6						

Note: Measurements were taken using band reject filter (where appropriate) at the spectrum analyzer input.

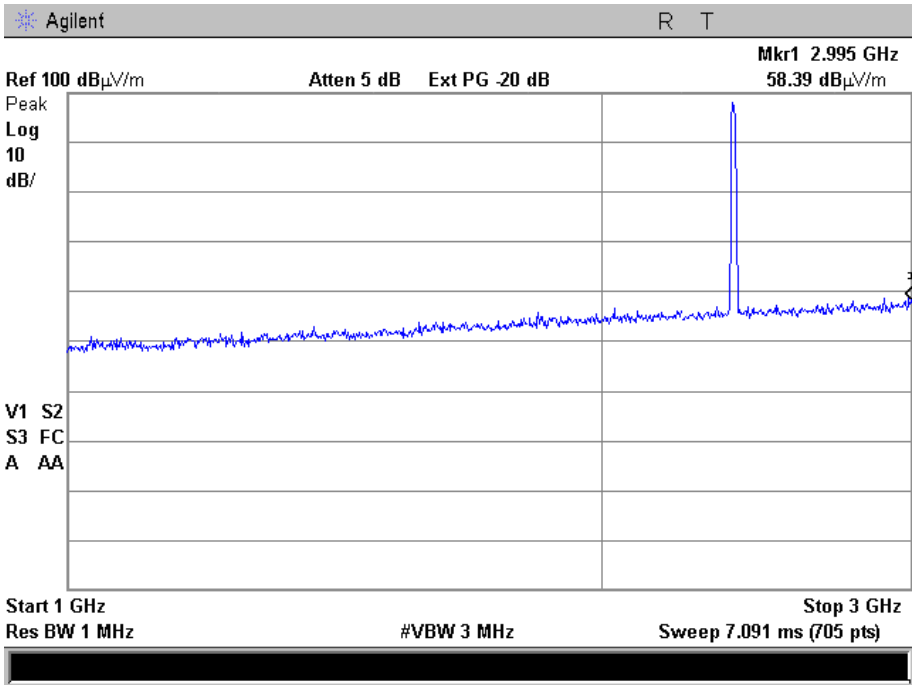
Test results below 1GHz:

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

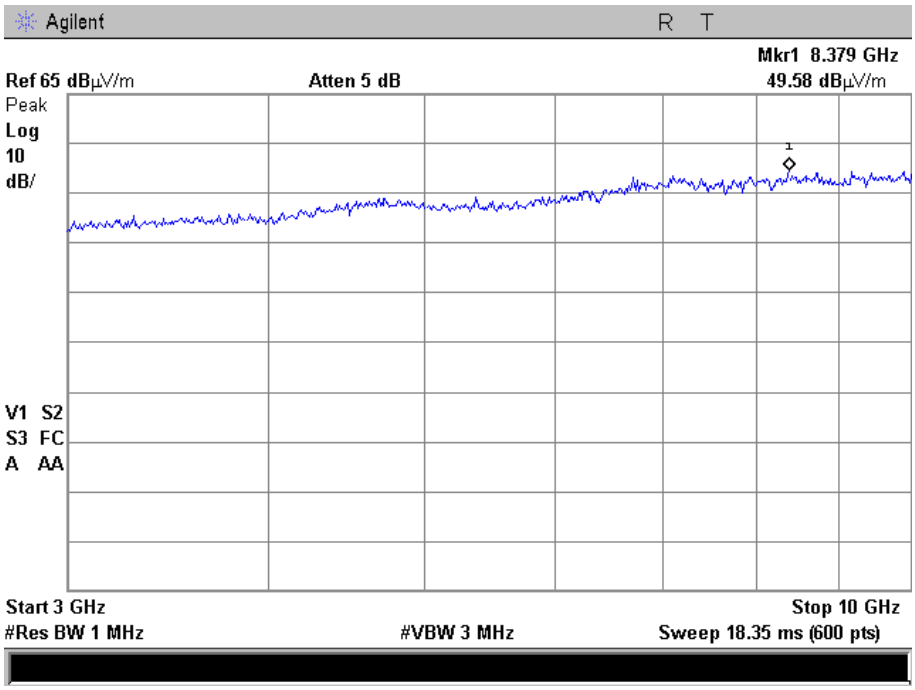
Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
528	QP	H	33.9	46	-12.1

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

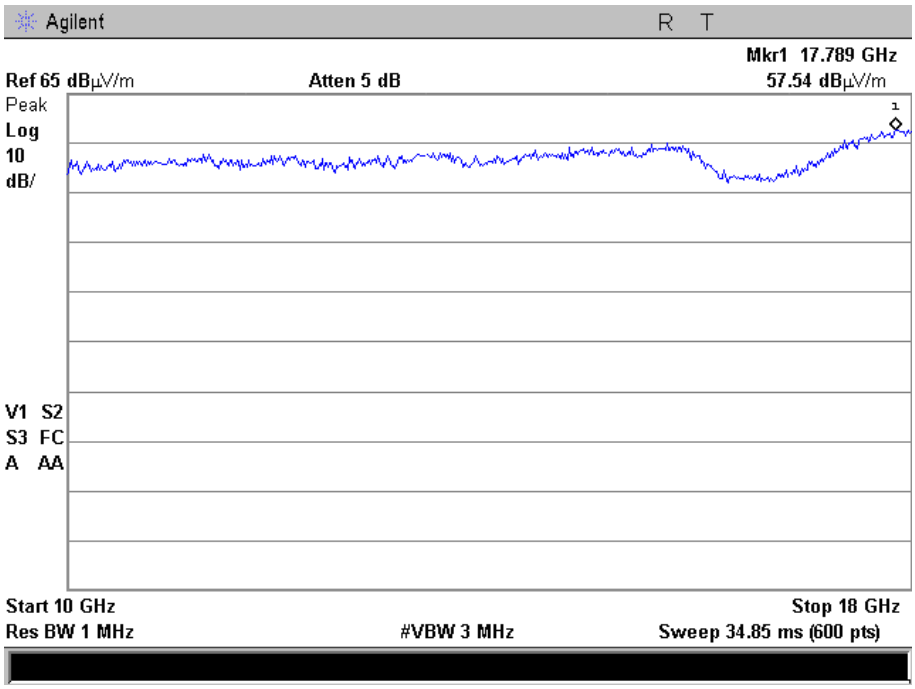
WLAN 802.11b, 2412 MHz, 1 Mbps
Lowest Frequency
Horizontal & Vertical Polarization
Plot 4.6.1



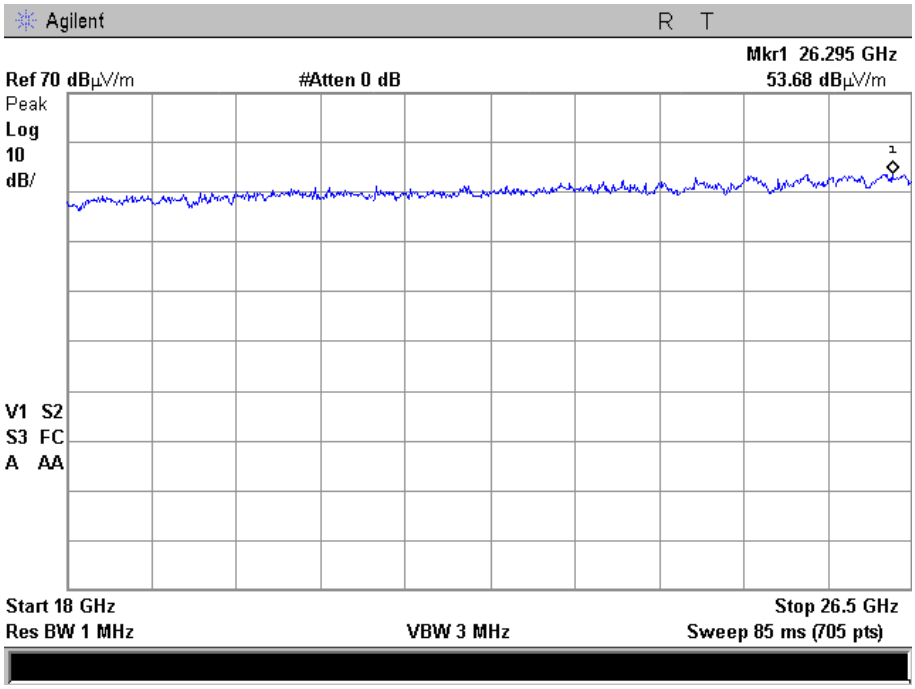
Horizontal & Vertical Polarization
Plot 4.6.2



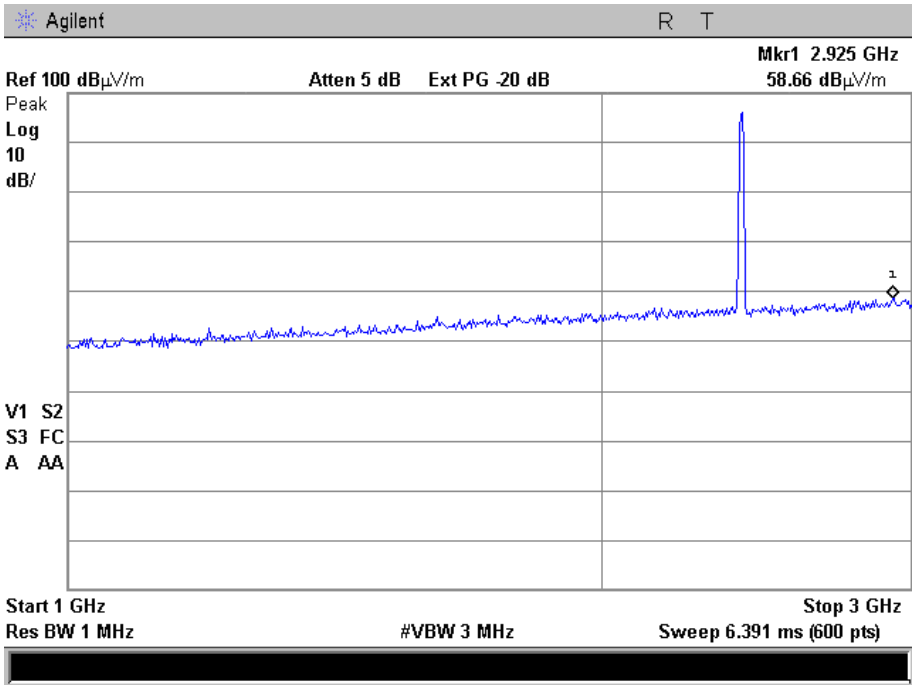
Horizontal & Vertical Polarization
Plot 4.6.3



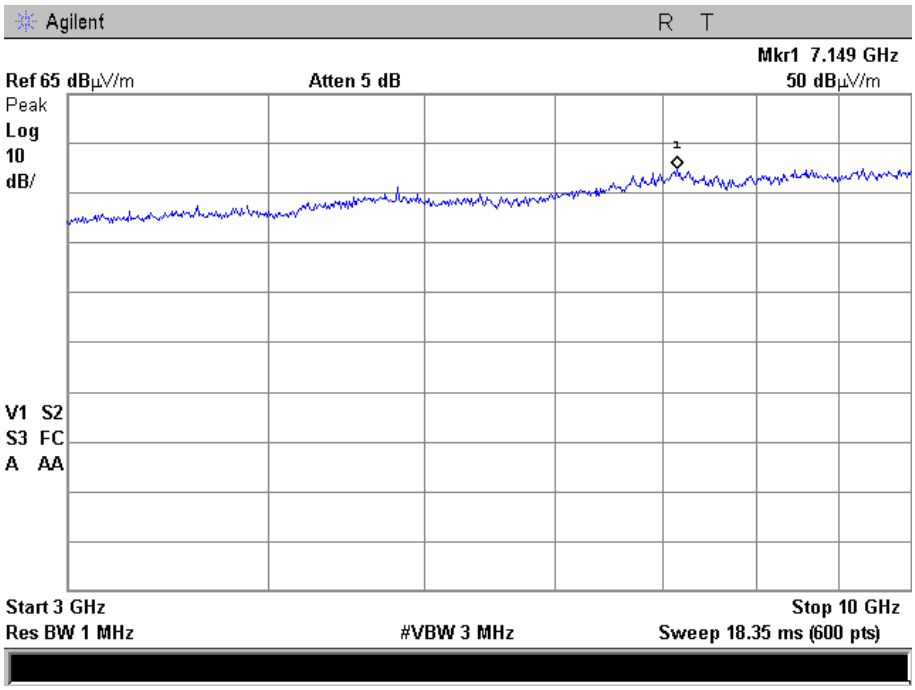
Horizontal & Vertical Polarization
Plot 4.6.4



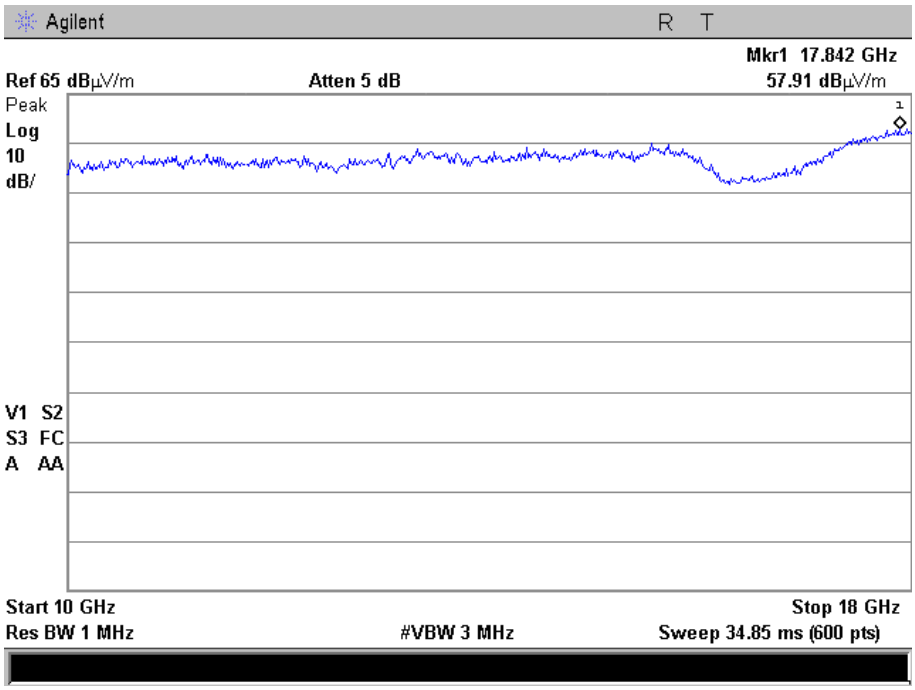
WLAN 802.11b, 2437 MHz, 1 Mbps
Middle Frequency
Horizontal & Vertical Polarization
Plot 4.6.5



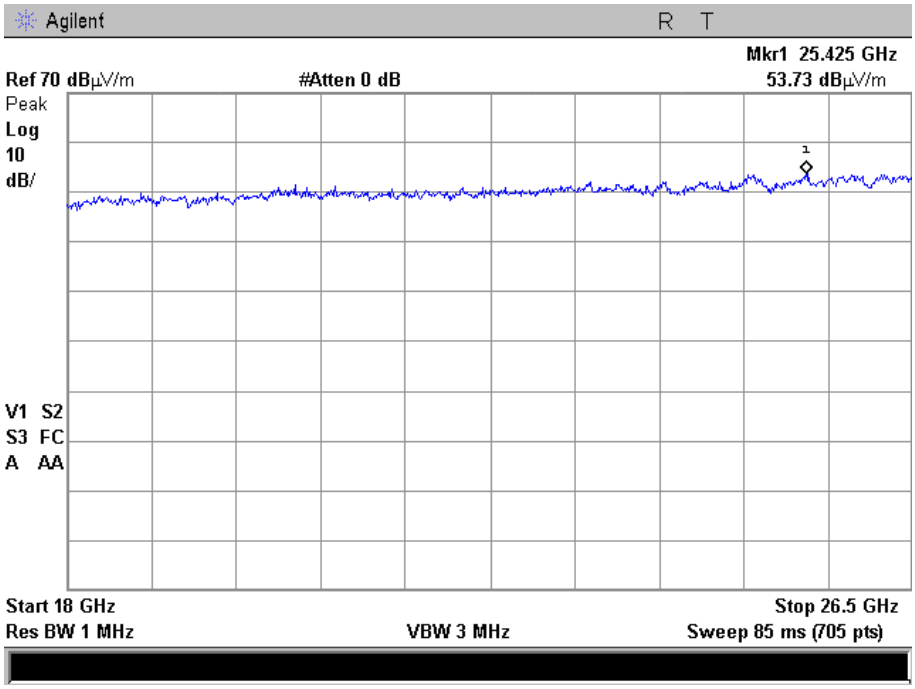
Horizontal & Vertical Polarization
Plot 4.6.6



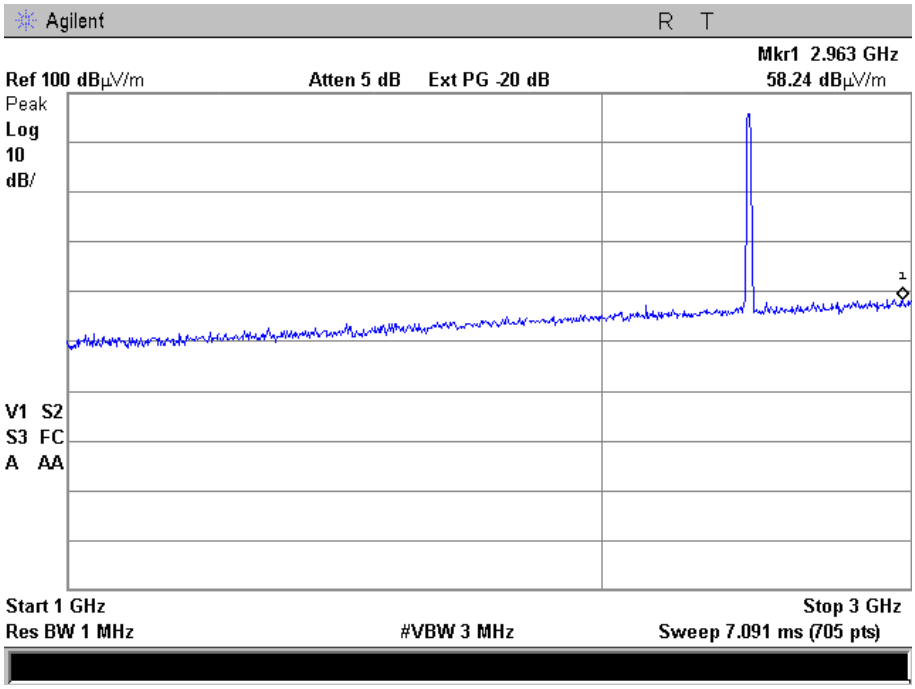
Horizontal & Vertical Polarization
Plot 4.6.7



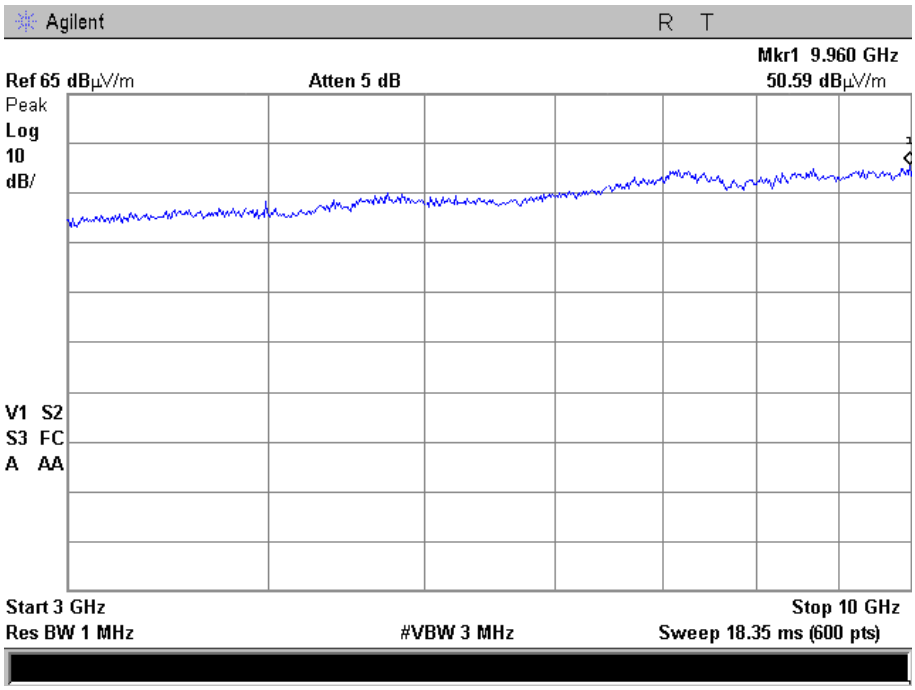
Horizontal & Vertical Polarization
Plot 4.6.8



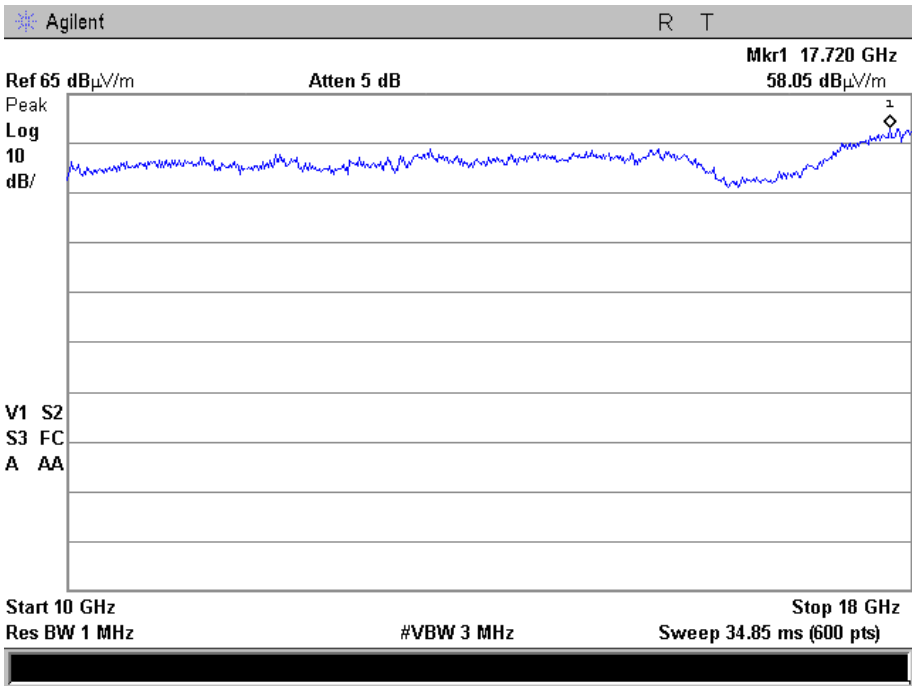
WLAN 802.11b, 2462 MHz, 1 Mbps
Highest Frequency
Horizontal & Vertical Polarization
Plot 4.6.9



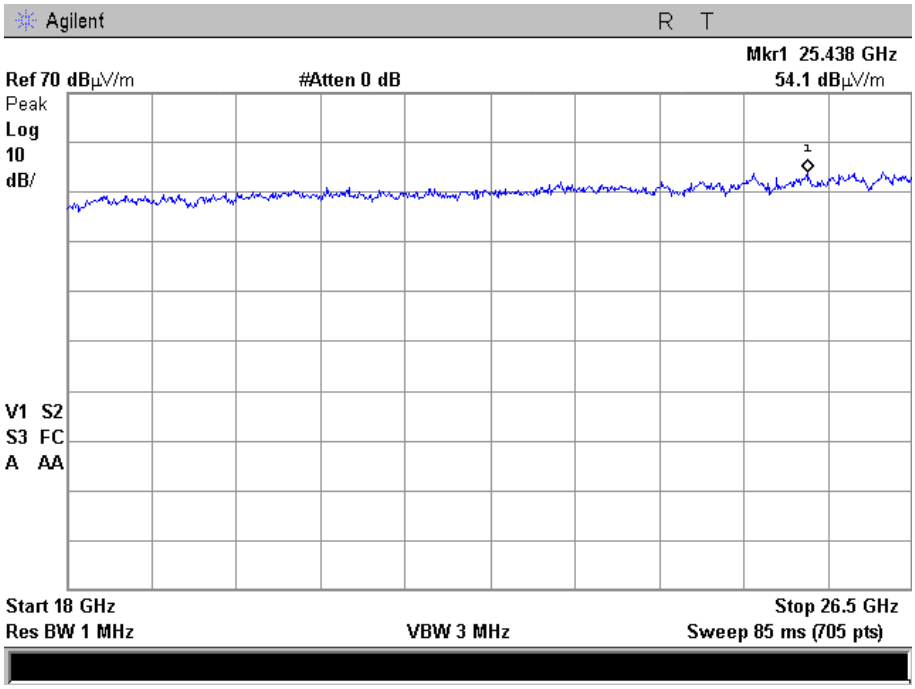
Horizontal & Vertical Polarization
Plot 4.6.10



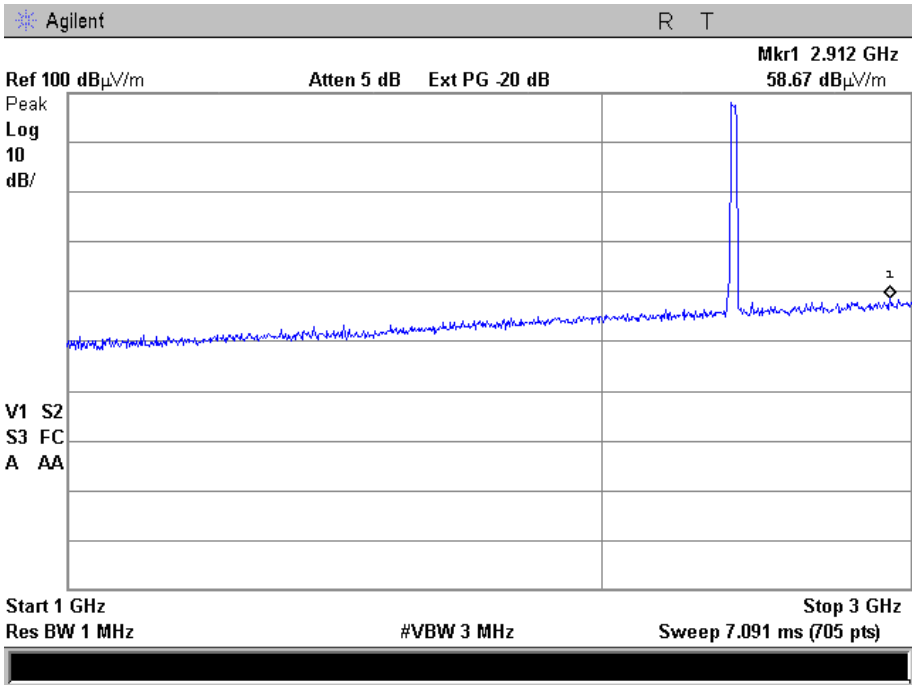
Horizontal & Vertical Polarization
Plot 4.6.11



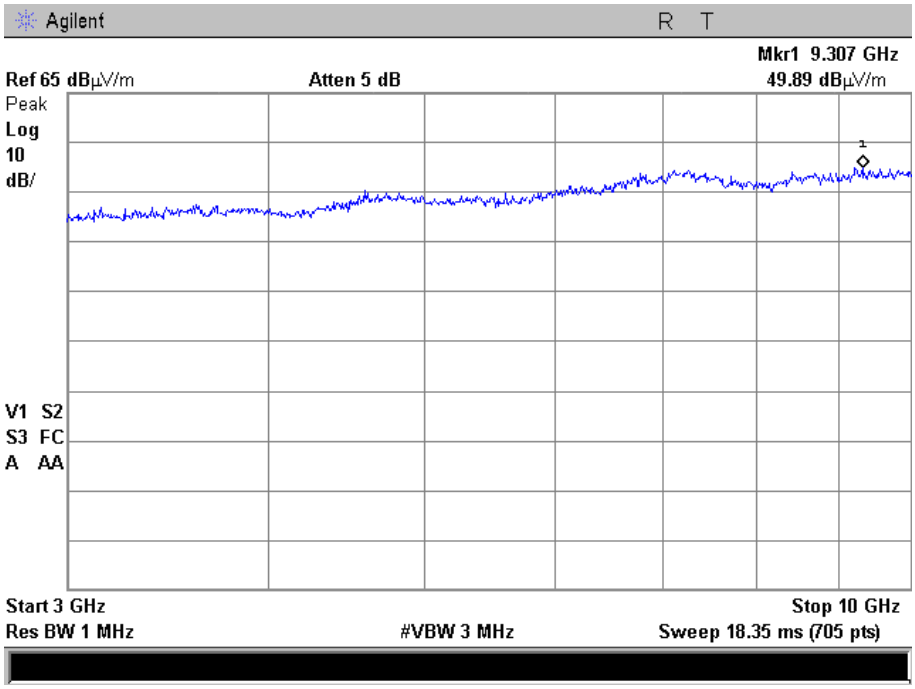
Horizontal & Vertical Polarization
Plot 4.6.12



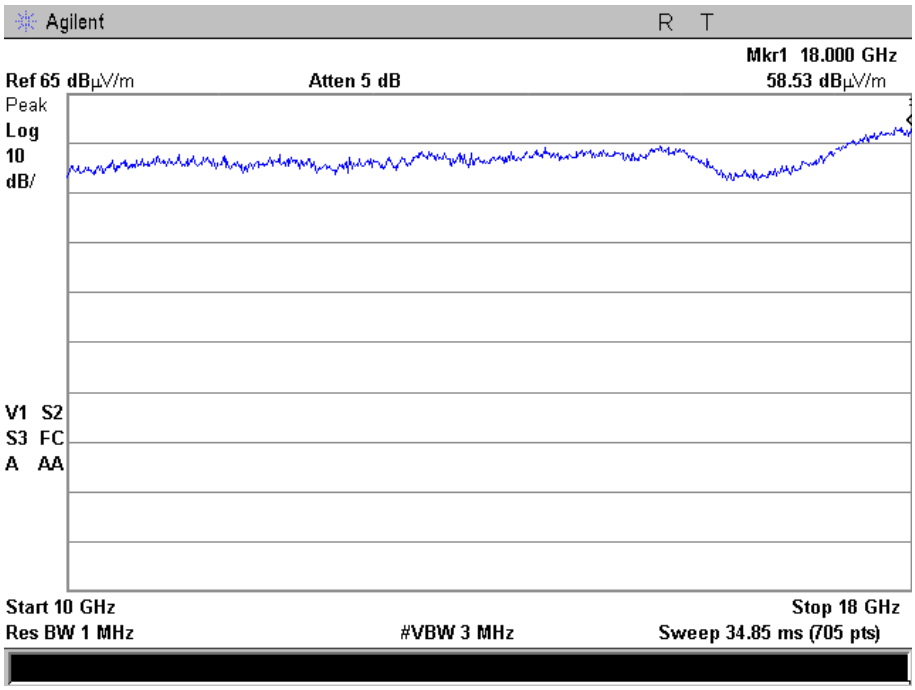
WLAN 802.11g, 2412 MHz, 6 Mbps
Lowest Frequency
Horizontal & Vertical Polarization
Plot 4.6.13



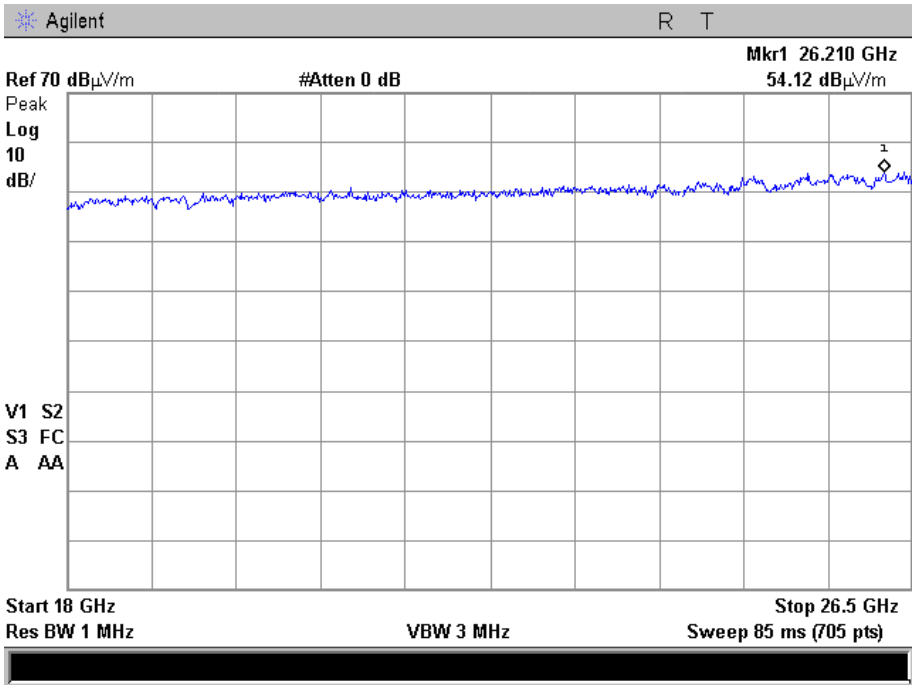
Horizontal & Vertical Polarization
Plot 4.6.14



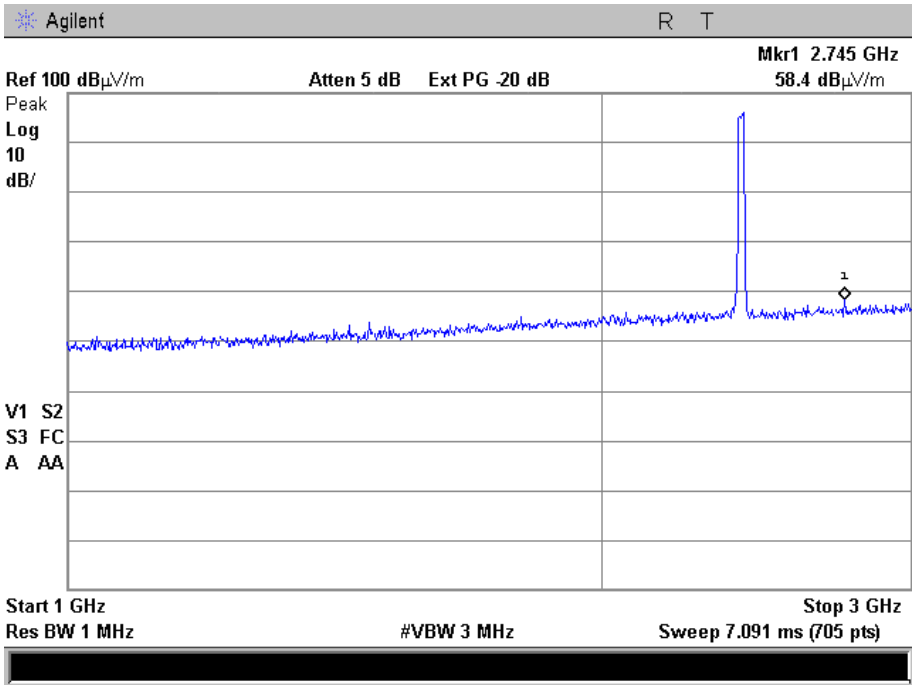
Horizontal & Vertical Polarization
Plot 4.6.15



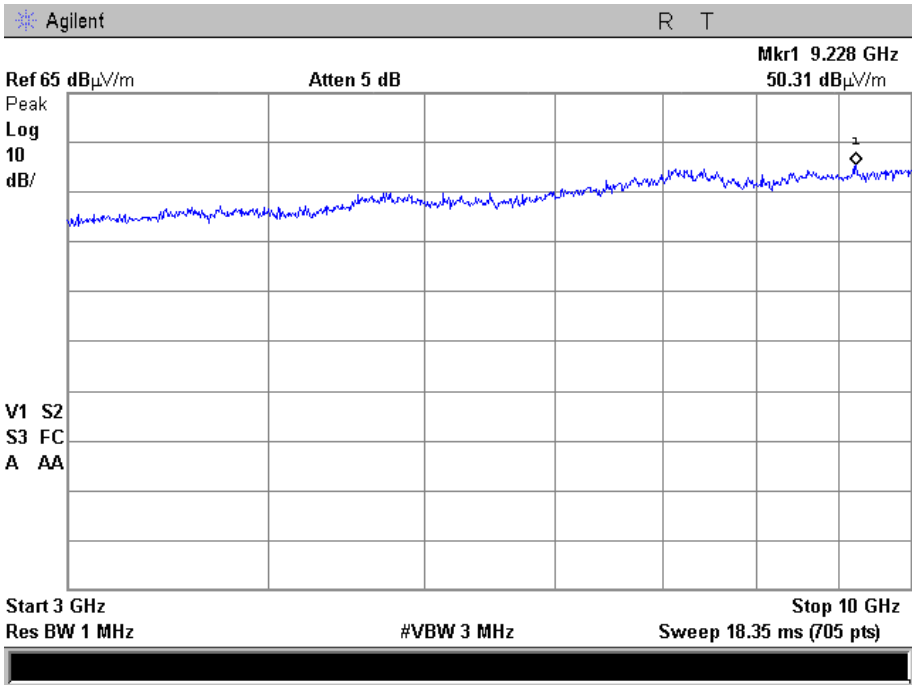
Horizontal & Vertical Polarization
Plot 4.6.16



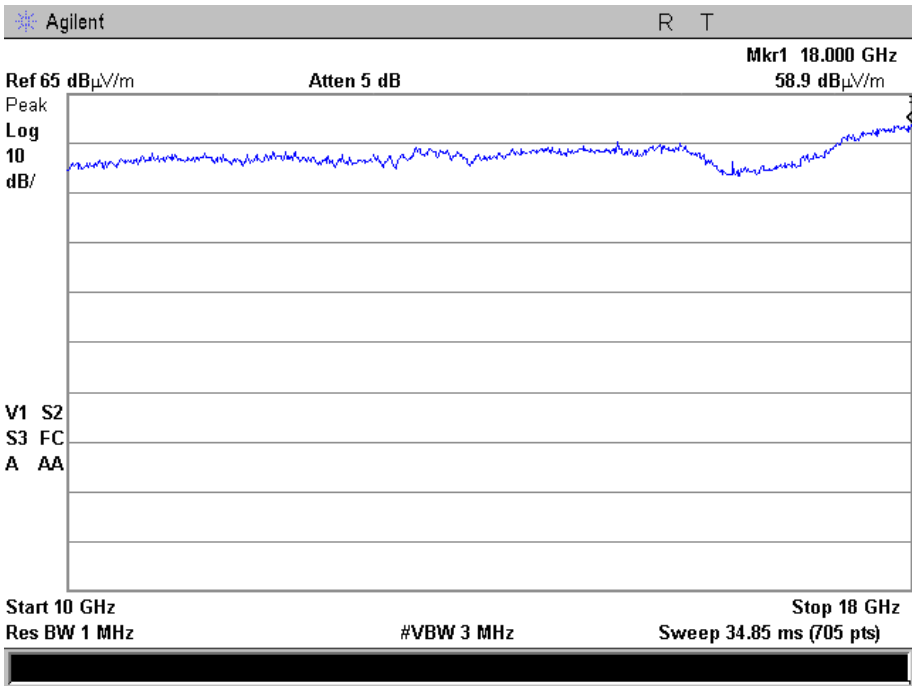
WLAN 802.11g, 2437 MHz, 6 Mbps
Middle Frequency
Horizontal & Vertical Polarization
Plot 4.6.17



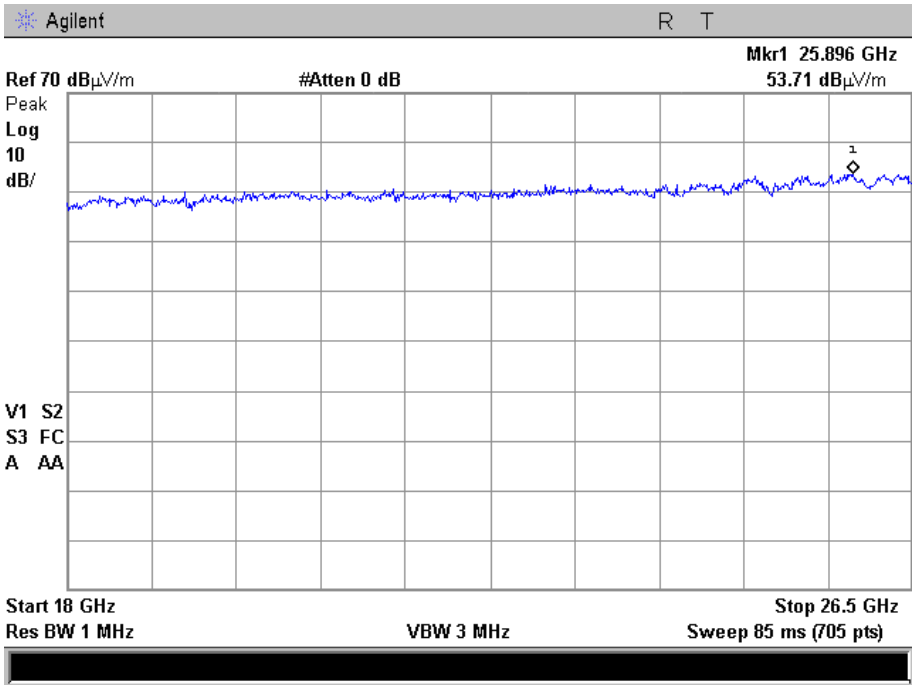
Horizontal & Vertical Polarization
Plot 4.6.18



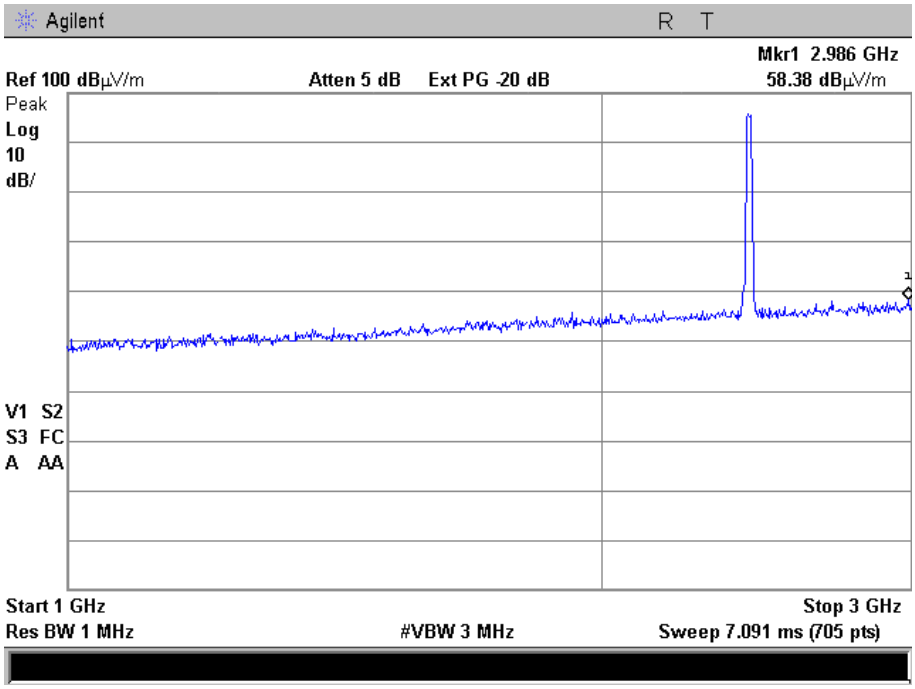
Horizontal & Vertical Polarization
Plot 4.6.19



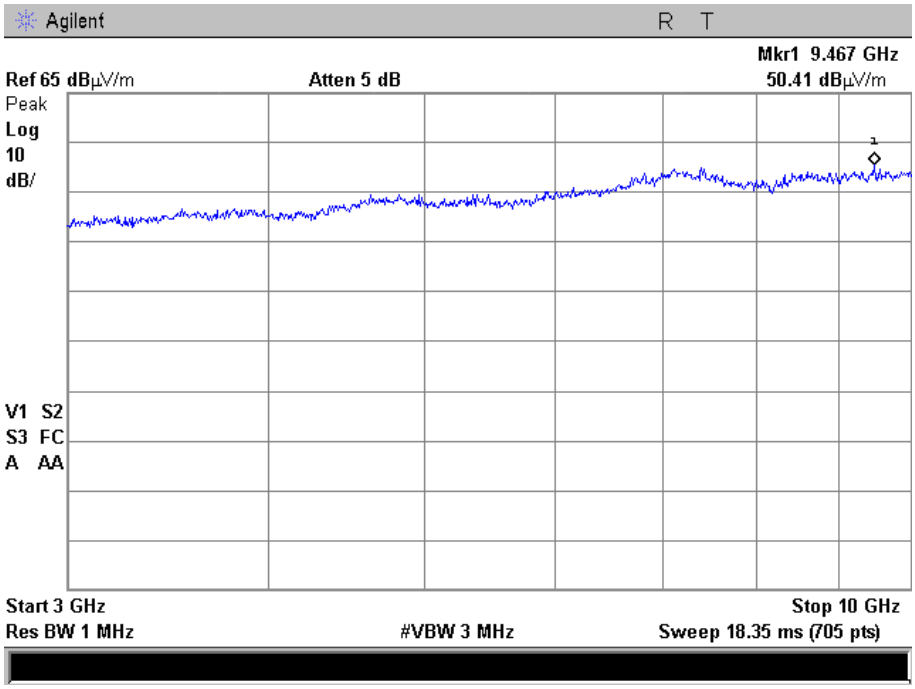
Horizontal & Vertical Polarization
Plot 4.6.20



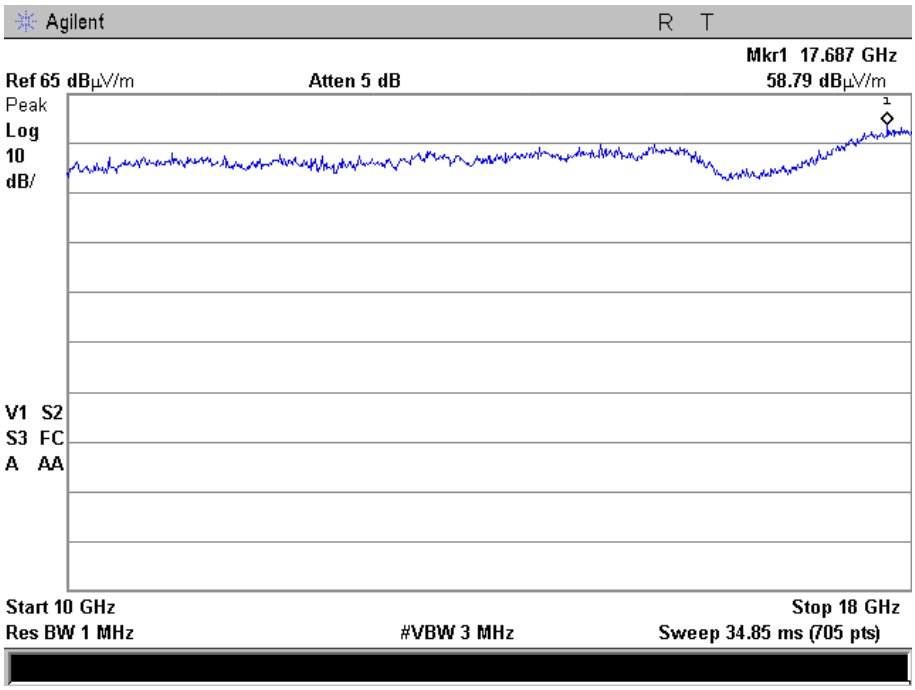
WLAN 802.11g, 2462 MHz, 6 Mbps
Highest Frequency
Horizontal & Vertical Polarization
Plot 4.6.21



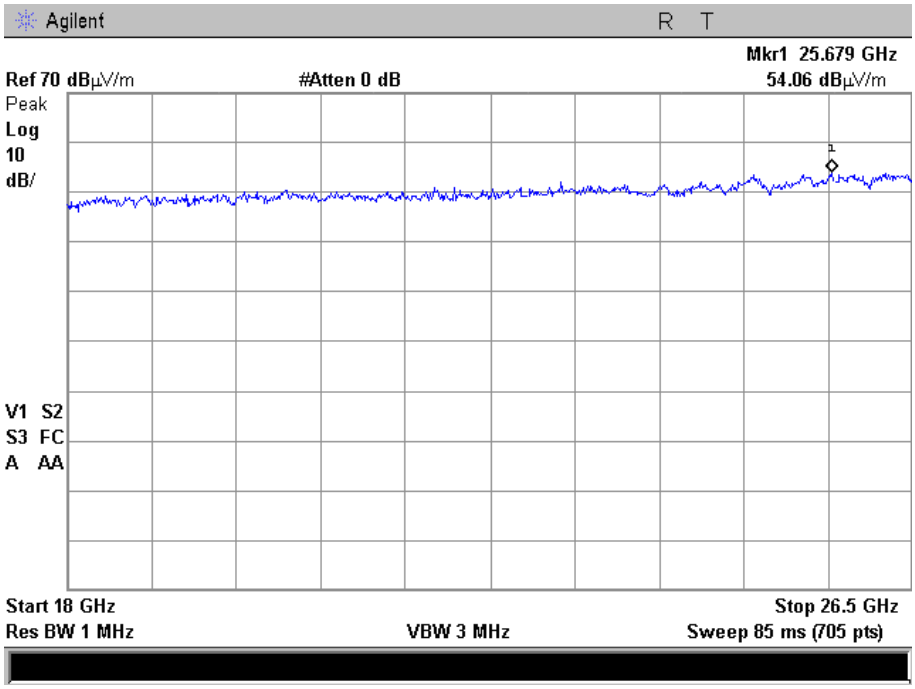
Horizontal & Vertical Polarization
Plot 4.6.22



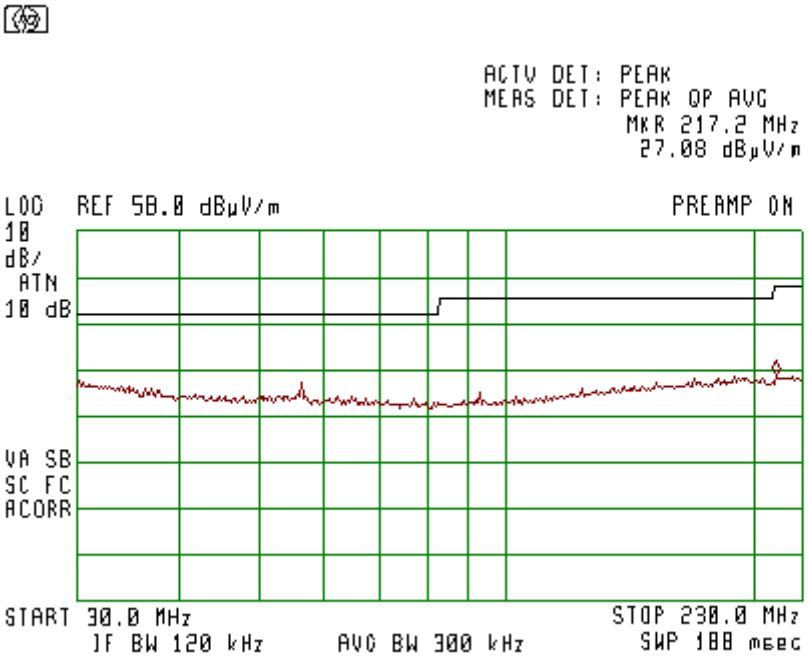
Horizontal & Vertical Polarization
Plot 4.6.23



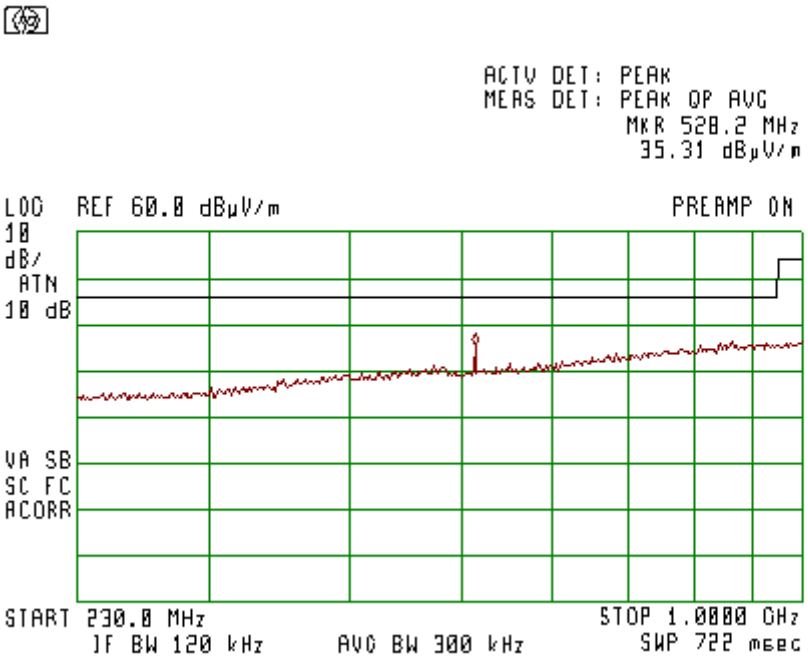
Horizontal & Vertical Polarization
Plot 4.6.24



Radiated Spurious Emissions Below 1 GHz
Worst case for all modes and all frequencies
Horizontal & Vertical Polarization
Plot 4.6.25



Horizontal & Vertical Polarization
Plot 4.6.26



4.7. Antenna Connector Requirements

Reference document:	**47 CFR §15.203**	
Test Requirements:	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 provisions of this section.	
Result:	This WiFi transceiver is permanently attached to its antenna using unique connector of reverse SMA. This product is for vehicular uses and its installation shall be performed in certified facility.	Comply

5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR 16 EMI Receiver, 9 kHz - 6.5 GHz	HP 8546A	3710A00392	30-06-2012
Spectrum Analyzer, 9 kHz - 22 GHz	HP 8593EM	3536A00131	30-06-2012
Spectrum Analyzer, 100 Hz - 26.5 GHz	Agilent E7405A	US41160436	30-06-2012
Spectrum Analyzer, 3 Hz - 44 GHz	Agilent E4446A	MY46180602	30-06-2012
Power Meter	Agilent N1911A	MY45100784	30-06-2012
Wideband power sensor	Agilent N1921A	MY45241242	30-06-2012
Low-Noise Amplifier, 0.1 - 18 GHz	MITEQ, AMF–7D-00101800-30-10P	1544443	30-06-2012
Low-Noise Amplifier, 18 - 26.5 GHz	MITEQ, AMF-5F-18002650-30-10P	945372	16-05-2012
Biconical Antenna, 20 - 200 MHz	Schwarzbeck VHBB 9124	9124/0255	16-05-2012
Log-Periodic Antenna, 200 - 1000 MHz	Schwarzbeck VUSLP 9111	VUSLP 9111184	16-05-2012
Double Ridged Guide Antenna, 1 - 18 GHz	A.R.A., DRG-118/A	17188	30-06-2012
SHF-EHF Horn, 15 – 40 GHz	Schwarzbeck BBHA 9170	BBHA9170214	30-06-2012
Turn table	HD 100	100/693	-
Antenna Mast	HD 100	100/693	-
LISN	Fischer 50/250-25-2	9705	30-06-2012
Transient Limiter, 9 kHz ÷ 200 MHz	HP 11947A	3107A04119	30-06-2012
Notch Filter	Micro-Tronics, BRM50702-05	0001	16-05-2012
Tunable Bandreject Filter	K&L, 3TNF-800/1000-0.2-N/N	336	16-05-2012
Tunable Bandreject Filter	K&L, 5TNF-1700/2000-0.1-N/N	212	16-05-2012
Highpass Filter, 1.2 ÷ 15 GHz	WAINWRIGHT, WHK1.2/15G-10EF	SN 3	16-05-2012
Highpass Filter, 2.4 ÷ 18 GHz	WAINWRIGHT, WHK2.4/18G-10EF	SN 1	16-05-2012
Highpass Filter, 7 ÷ 18 GHz	WAINWRIGHT, WHKX7.0/18G-8SS	SN 12	16-05-2012

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 22nd day of March 2011.

President & CEO
For the Accreditation Council
Certificate Number 1633.01
Valid to September 30, 2012

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