Electromagnetic Compatibility
Test Report

Test Report No: EXT 080709
Issued on: July 09, 2009

Product Name
Access Point – EXRP 30n

ested According to
FCC 47 CFR, Part 15, Subpart C

Tests Performed for
Extricom Ltd.
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Regis. No: 102724

ELECTRICAL TESTING
CERT #1633.01

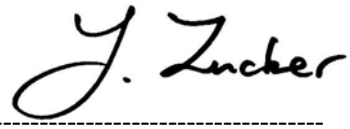
Test personnel

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

Rami Nataf Sergey Kapustin

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

Bina Talkar



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

Y. Zucker
QA and Lab. Manager
QualiTech EMC Laboratory

Test Report details:

Customer's Representative:	A.Y. Erez
Issued on:	09.07.2009

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
§15.247 (a) (2) & RSS-210 section A8.2 (1)	6 dB Bandwidth	Comply
§15.247 (b) (3) & RSS-210 section A8.4 (4)	Maximum Peak Output Power	Comply
§15.247 (e) & RSS-210	Peak power spectral density	Comply
§15.247 (d) & RSS-210 Section A8.5	Conducted Spurious Emissions	Comply
§15.247 (d) & §15.205 & RSS-210 section A8.5	Radiated Emissions, Restricted Bands	Comply
§15.209 & RSS-210 section A8.5	Radiated Emissions	Comply
§15.107/207 & RSS-Gen sec.7.2.2	Power line Emission, 110 VAC	Comply
§15.203 & RSS- Gen.Section 7.1.4	Antenna Connector requirement	Comply

ELECTRICAL TESTING
CERT #1633.01

Table of Contents

1. General Description

Description of the EUT system/test Item:

Product name: IEEE 802.11a/b/g/n Wireless Access Point

Model: Access Point – EXRP 30N

Transmit Power:

802.11b: 236mW
802.11g: 171mW
802.11a: 79mW
802.11n: 87mW

Frequency range:

802.11b/g: 2.412 – 2.462 GHz
802.11a: 5.15-5.250, 5.745-5.825 GHz

Transmit Data rate:

Protocol	Rate [Mbps]								
802.11a	9		12	18	24	36	48	54	
802.11b	1	2	5.5	11					
802.11g	6		12	18	24	36	48	54	
802.11n 20MHz	13		26	39	52	78	104	117	130
802.11n 40MHz	30		60	90	120	180	240	270	300

Type of Modulation:

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

Gain:
2.4GHz/5GHz: 4dBi

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 measuring instrument 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.

DTS Measurements procedures published on Apr. 16 2007 were applied.

a. Maximum Conducted Peak Output Power per §15.247(b)(3): Power output option 1 was applied using a Peak Power Meter.

b. PSD: option 1 was used. Emission peak was zoomed within the pass band with spectrum analyzer's settings as reported (Sweep time=Span/3kHz).

c. Conducted spurious emissions: the spectrum from 30 MHz to 40GHz was investigated with the transmitter set to the lowest, middle and highest channel frequencies.

2.2. 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 emissions.
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 through 360 degrees, 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.

2.3. 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.

2.4. Worst Case Results:

Worst case result is determined as the channel with the highest output power. Worst-case results of various modulation modes were determined as the modulation with the highest output power, and that was reported.

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.	1.8	3.6
	30MHz÷230MHz, Ver. polar.	2.0	3.9
	230MHz÷1000MHz, Horiz. polar.	1.5	3.0
	230MHz÷1000MHz, Vert. polar.	1.5	3.0
Conducted Emission	9 kHz÷150 kHz	1.4	2.8
	150 kHz÷30MHz	1.1	2.2

Note: The compliance/ non-compliance statement of the EUT with the requirements of this standard do not take into account the uncertainties of the measurement stated in this document

Note: The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

4. 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 and 5725 MHz-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.		
Test Method:	See Sec 2.1	**Comply**	
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 to 4.1.69	

Test results

Worst case output of the individual transmitters.

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref. Plot
802.11b						
Low	Output 0	2.412	11	9.113	>500	4.1.1
	Output 1	2.412		11.127		4.1.2
	Output 2	2.412		9.145		4.1.3
Middle	Output 0	2.437		12.073		4.1.4
	Output 1	2.437		12.589		4.1.5
	Output 2	2.437		12.679		4.1.6
High	Output 0	2.462		11.172		4.1.7
	Output 1	2.462		9.126		4.1.8
	Output 2	2.462		11.133		4.1.9

Transmitter model: WLM54AG

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11b						
Low	-	2.412	11	12.068	>500	4.1.10
Middle	-	2.437		12.155		4.1.11
High	-	2.462		12.140		4.1.12

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11g						
Low	Output 0	2.412	54	17.394	>500	4.1.13
	Output 1	2.412		17.680		4.1.14
	Output 2	2.412		16.716		4.1.15
Middle	Output 0	2.437		17.731		4.1.16
	Output 1	2.437		17.656		4.1.17
	Output 2	2.437		17.694		4.1.18
High	Output 0	2.462		17.745		4.1.19
	Output 1	2.462		17.720		4.1.20
	Output 2	2.462		17.695		4.1.21

Transmitter model: WLM54AG

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 g						
Low		2.412	54	16.637	>500	4.1.22
Middle		2.437		16.582		4.1.23
High		2.462		16.617		4.1.24

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 N 20 MHz						
Low	Output 0	2.412	130	17.588	>500	4.1.25
	Output 1	2.412		17.619		4.1.26
	Output 2	2.412		17.395		4.1.27
Middle	Output 0	2.437		17.698		4.1.28
	Output 1	2.437		17.670		4.1.29
	Output 2	2.437		17.690		4.1.30
High	Output 0	2.462		17.629		4.1.31
	Output 1	2.462		17.697		4.1.32
	Output 2	2.462		16.416		4.1.33

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 N 40 MHz						
Low	Output 0	2422	300	35.870	>500	4.1.34
	Output 1	2422		36.444		4.1.35
	Output 2	2422		36.463		4.1.36
Middle	Output 0	2437		36.460		4.1.37
	Output 1	2437		36.462		4.1.38
	Output 2	2437		36.511		4.1.39
High	Output 0	2452		35.829		4.1.40
	Output 1	2452		35.818		4.1.41
	Output 2	2452		35.848		4.1.42

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 a						
Low	Output 0	5745	54	16.563	>500	4.1.43
	Output 1	5745		16.509		4.1.44
	Output 2	5745		16.502		4.1.45
Middle	Output 0	5785		16.529		4.1.46
	Output 1	5785		16.474		4.1.47
	Output 2	5785		16.492		4.1.48
High	Output 0	5825		16.538		4.1.49
	Output 1	5825		16.552		4.1.50
	Output 2	5825		16.525		4.1.51

Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 N 20 MHz						
Low	Output 0	5745	130	17.704	>500	4.1.52
	Output 1	5745		17.710		4.1.53
	Output 2	5745		17.682		4.1.54
Middle	Output 0	5785		17.609		4.1.55
	Output 1	5785		17.715		4.1.56
	Output 2	5785		17.710		4.1.57
High	Output 0	5825		17.728		4.1.58
	Output 1	5825		17.633		4.1.59
	Output 2	5825		17.570		4.1.60

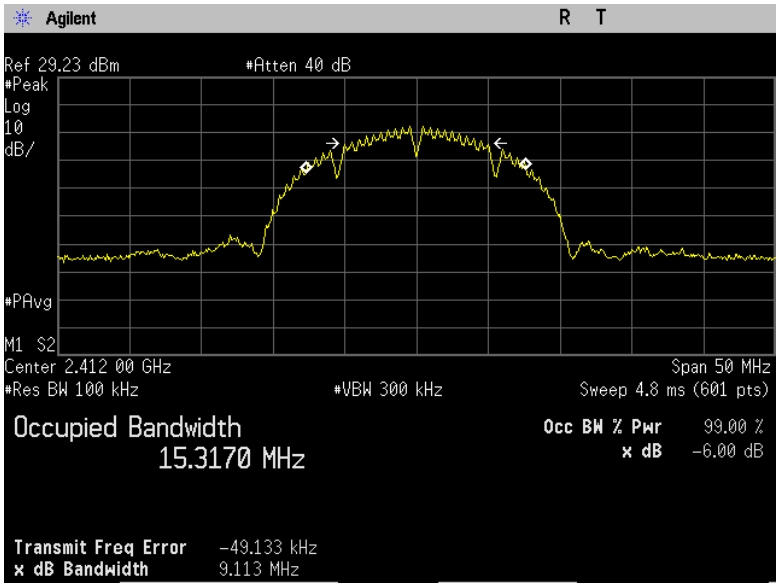
Transmitter model: WMIA-199/EU

		Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 N 40 MHz						
Low	Output 0	5755	300	36.432	>500	4.1.61
	Output 1	5755		36.467		4.1.62
	Output 2	5755		36.392		4.1.63
High	Output 0	5795		36.501		4.1.64
	Output 1	5795		36.391		4.1.65
	Output 2	5795		36.426		4.1.66

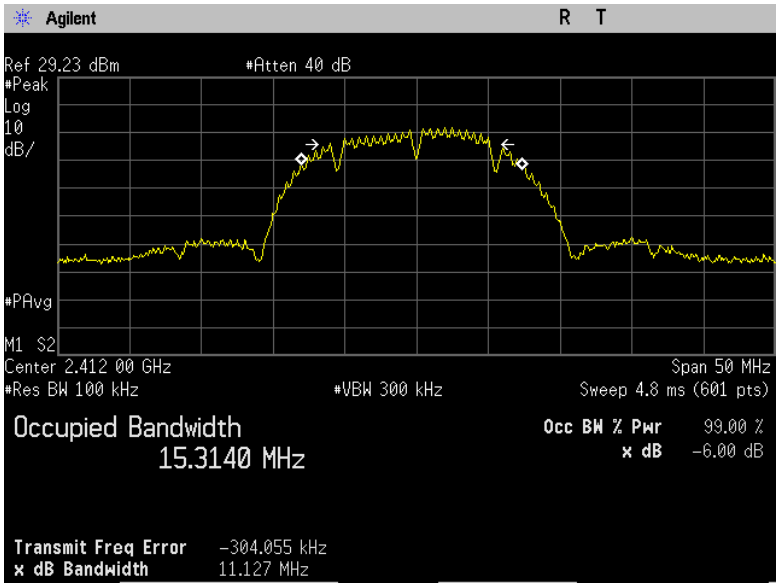
Transmitter model: WLM54AG

	Frequency [GHz]	Data Rate [Mbps]	6 dB Bandwidth [MHz]	Limit [kHz]	Ref Plot
802.11 a					
Low	5745	54	16.614	>500	4.1.67
Middle	5785		16.601		4.1.68
High	5825		16.591		4.1.69

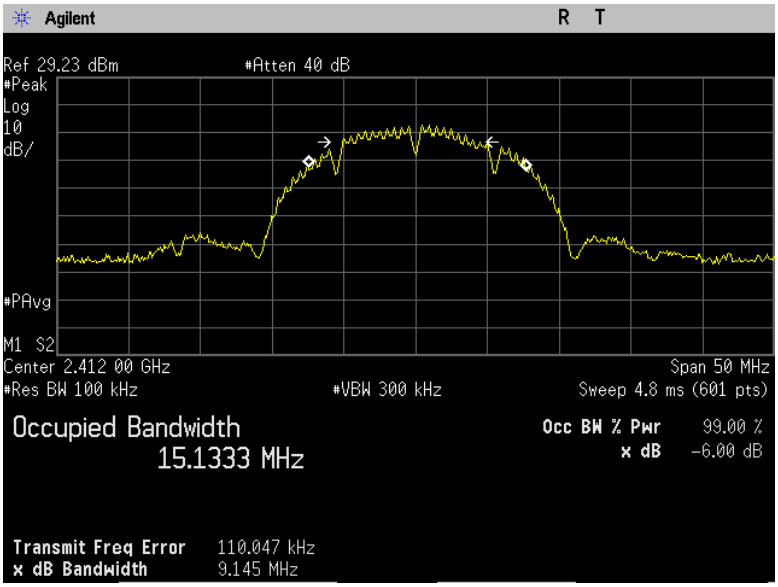
Transmitter model: WMIA-199/EU
802.11b
Low Frequency, output 0
Plot 4.1.1



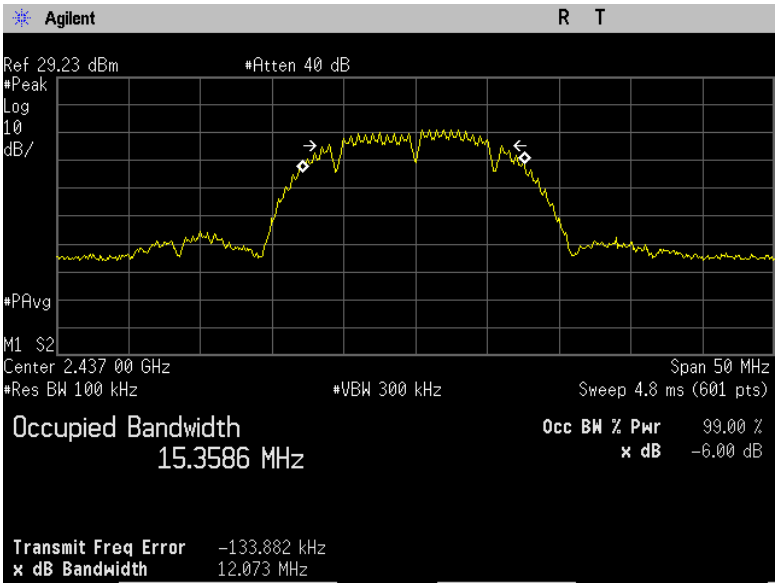
Low Frequency, Output 1
Plot 4.1.2



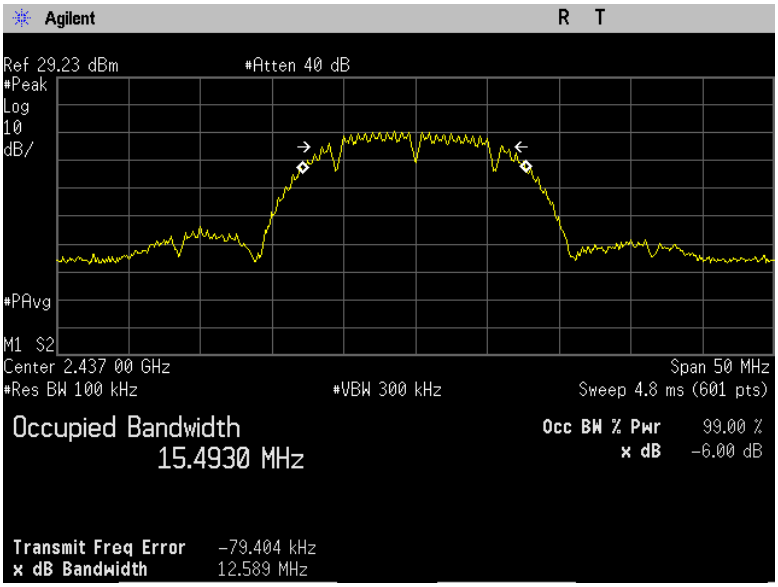
Low Frequency, Output 2
Plot 4.1.3



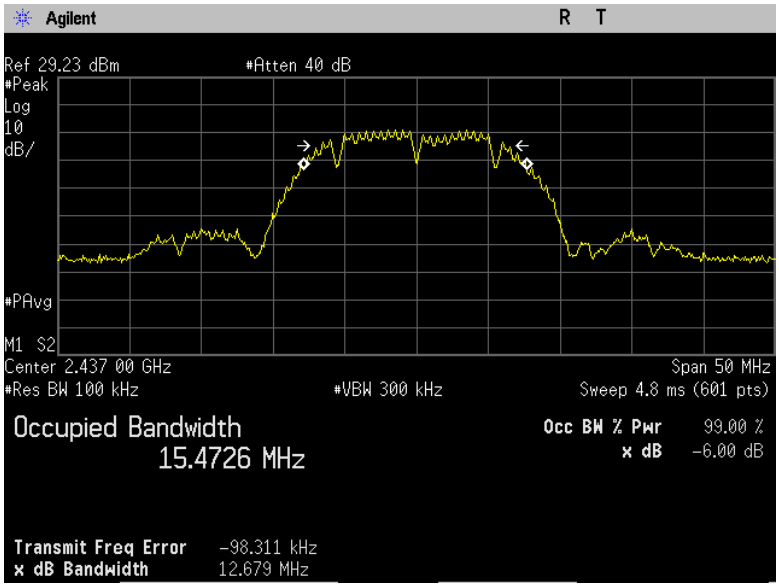
Middle Frequency, Output 0
Plot 4.1.4



Middle Frequency, Output 1
Plot 4.1.5



Middle Frequency, Output 2
Plot 4.1.6



High Frequency, Output 0
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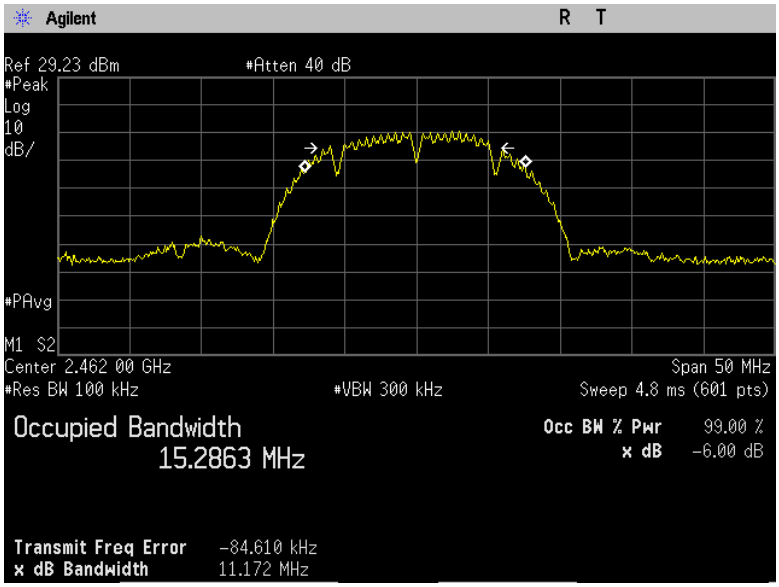
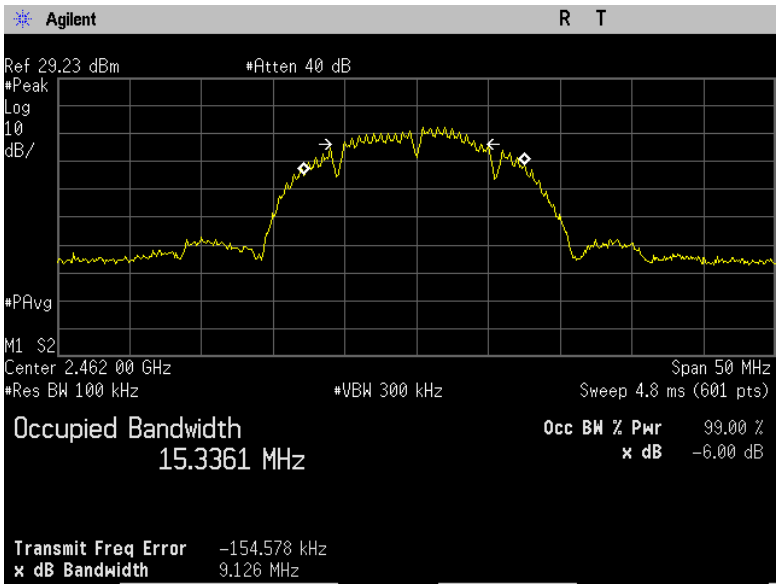
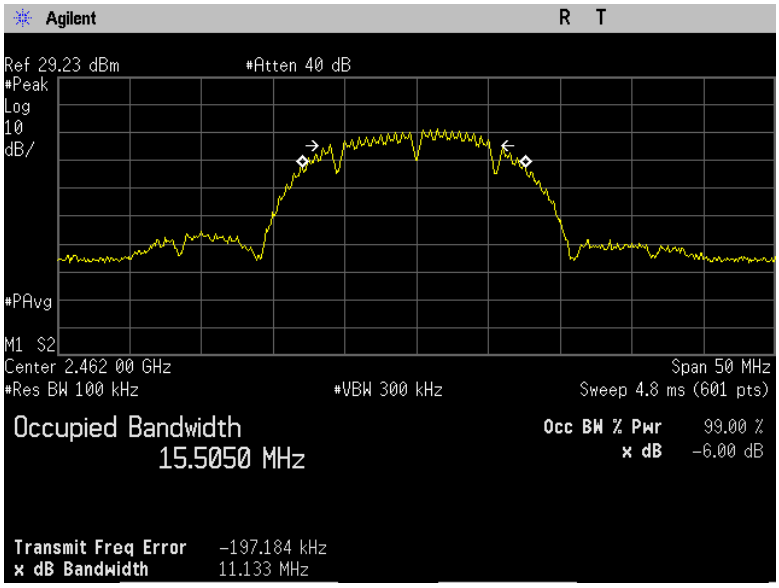


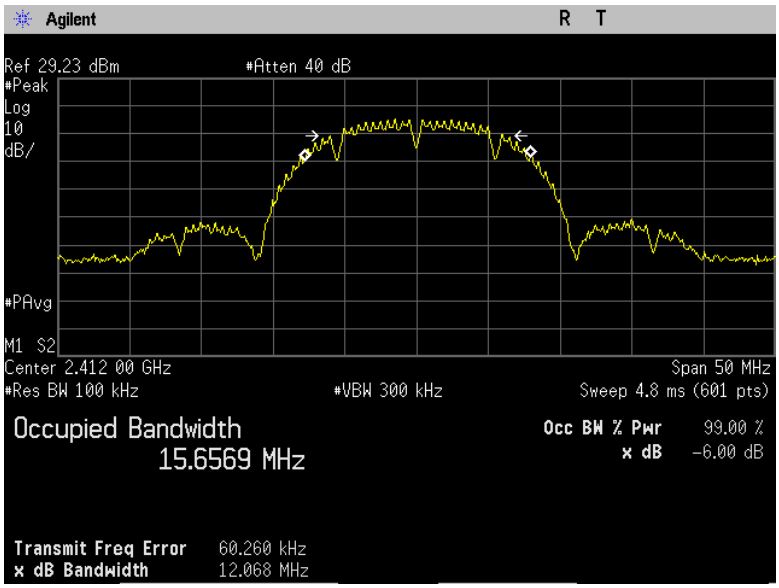
High Frequency, Output 1
Plot 4.1.8



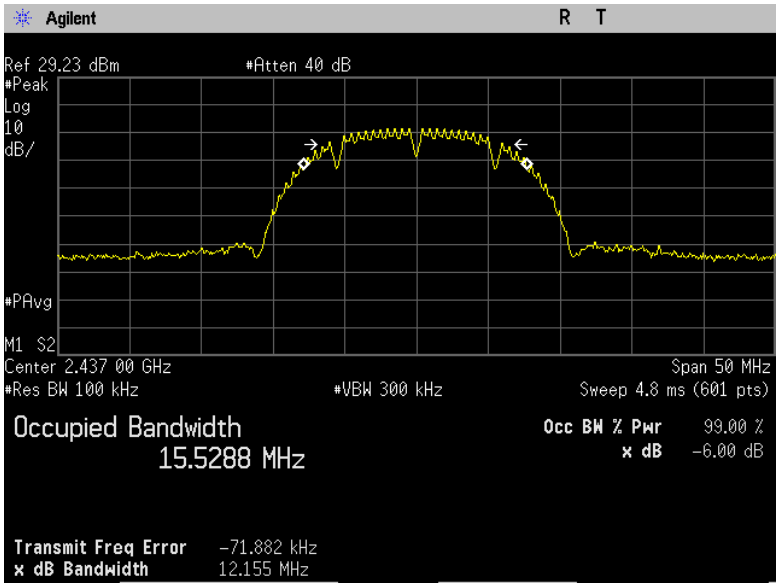
High Frequency, Output 2
Plot 4.1.9



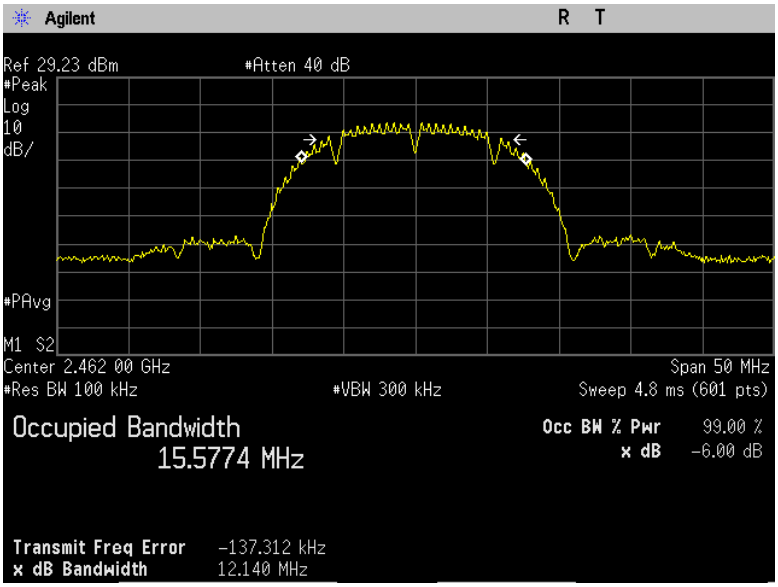
Transmitter model: WLM54AG
802.11b
Low Frequency
Plot 4.1.10



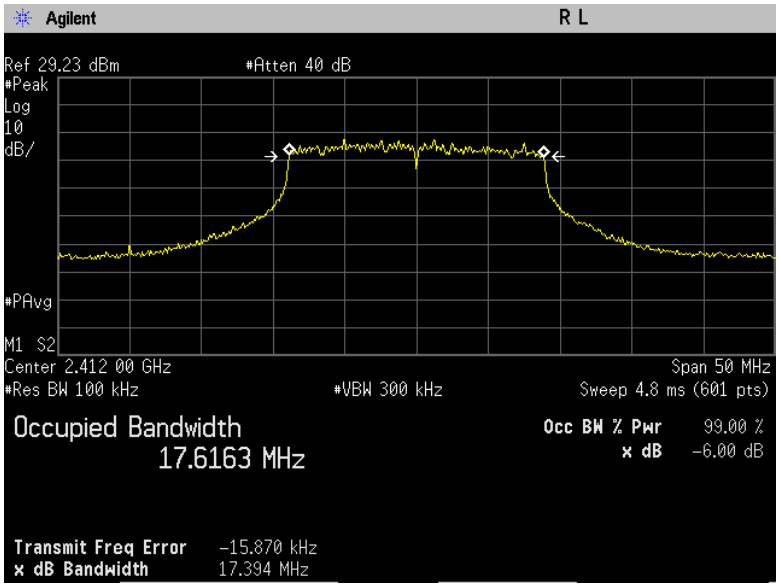
Middle Frequency
Plot 4.1.11



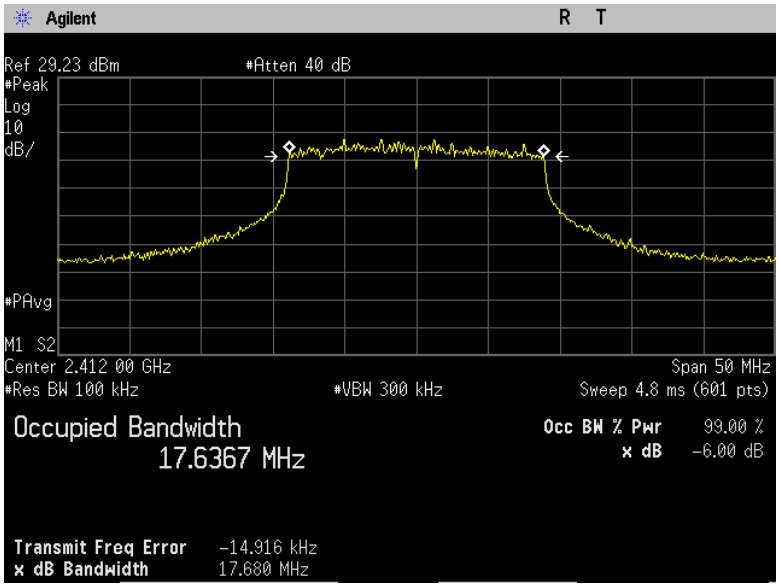
High Frequency
Plot 4.1.12



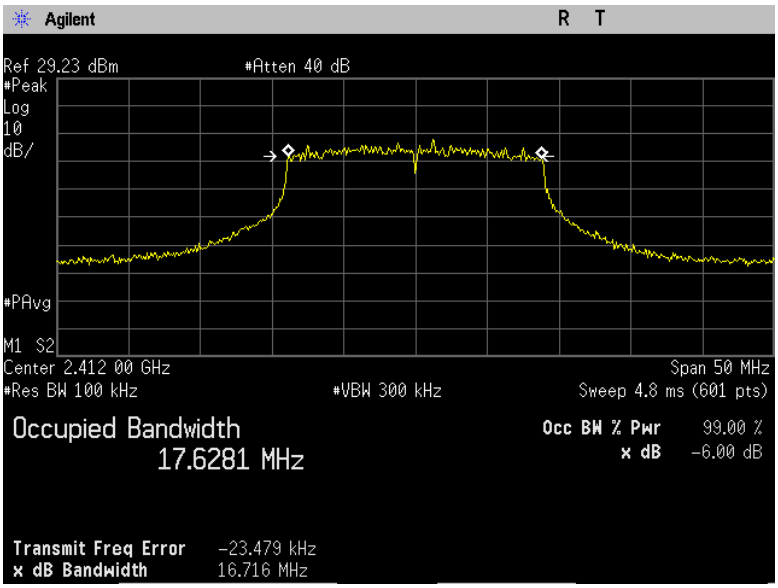
Transmitter model: WMIA-199/EU
802.11 g
Low Frequency, Output 0
Plot 4.1.13



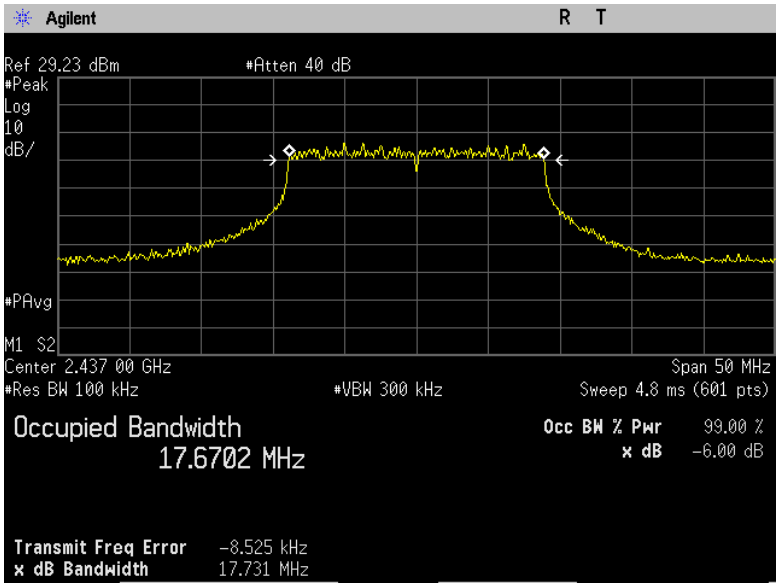
Low Frequency, Output 1
Plot 4.1.14



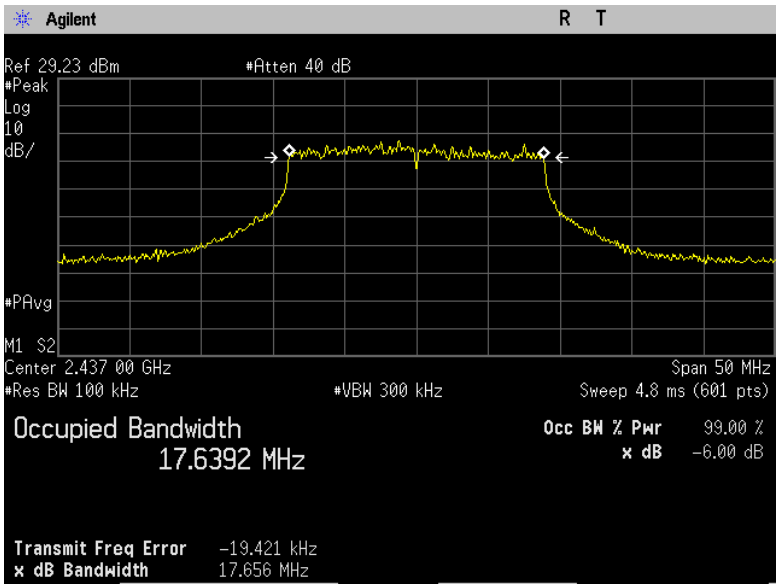
Low Frequency, Output 2
Plot 4.1.15



Middle Frequency, Output 0
Plot 4.1.16



Middle Frequency, Output 1
Plot 4.1.17



Middle Frequency, Output 2
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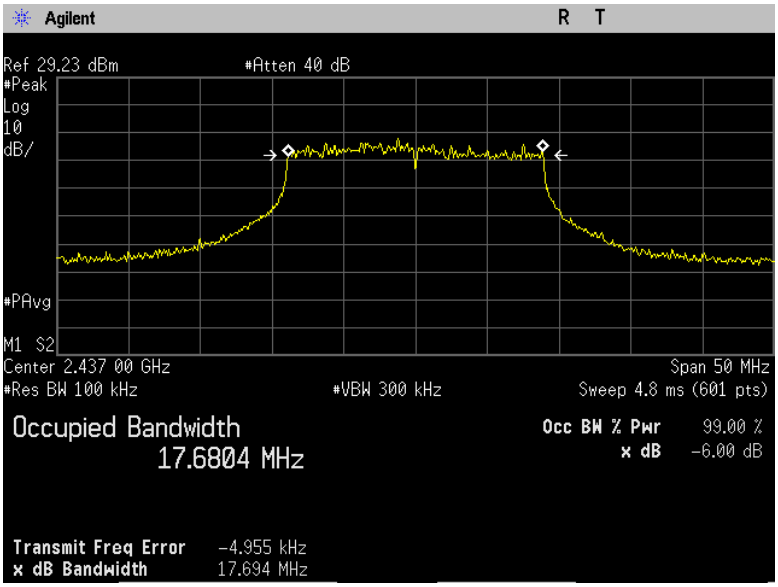
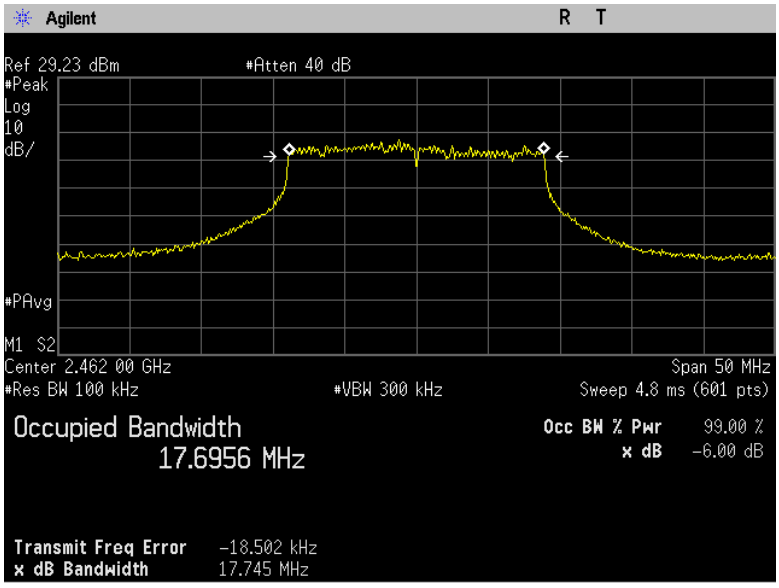
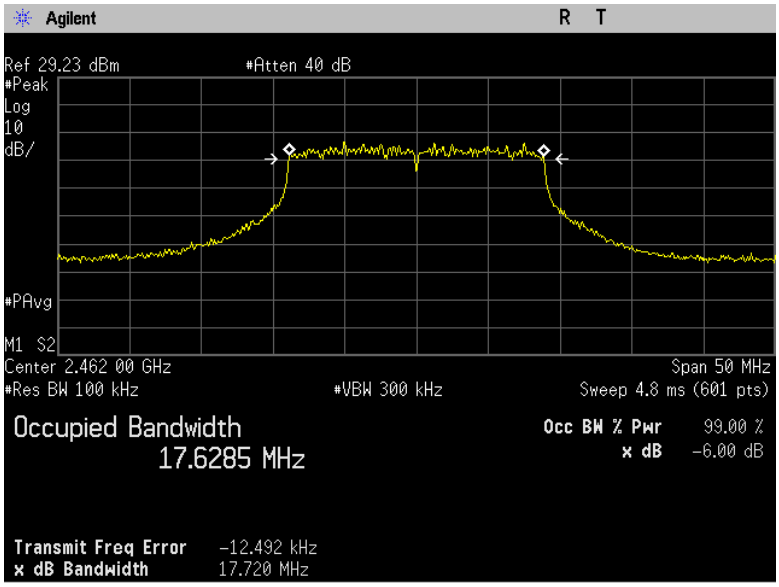


High Frequency, Output 0
Plot 4.1.19



High Frequency, Output 1
Plot 4.1.20



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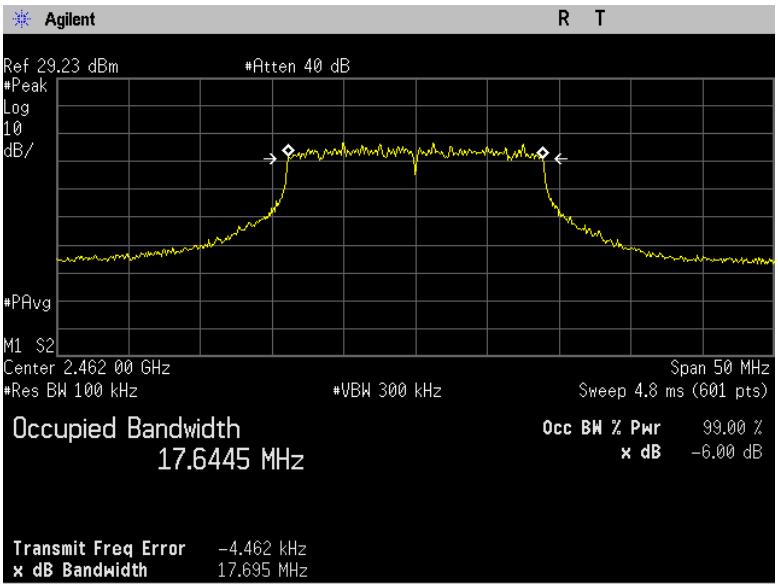
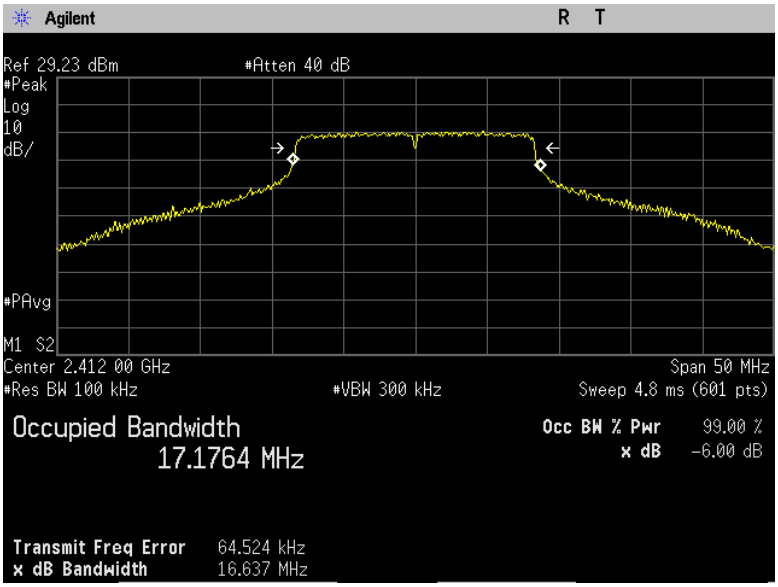
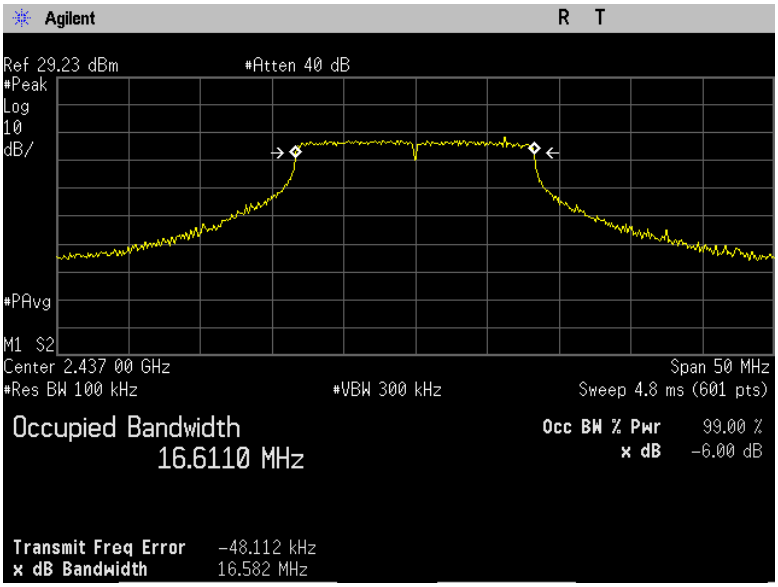
High Frequency, Output 2
Plot 4.1.21



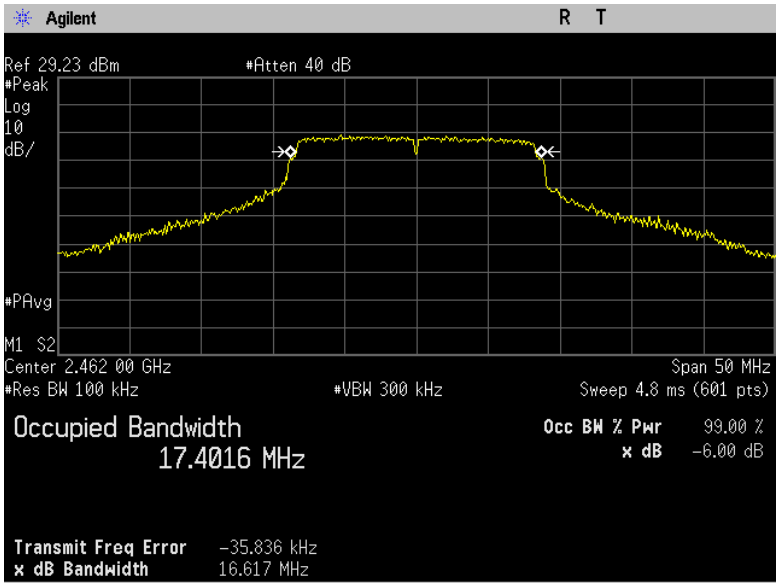
Transmitter model: WLM54AG
802.11 g
Low Frequency
Plot 4.1.22



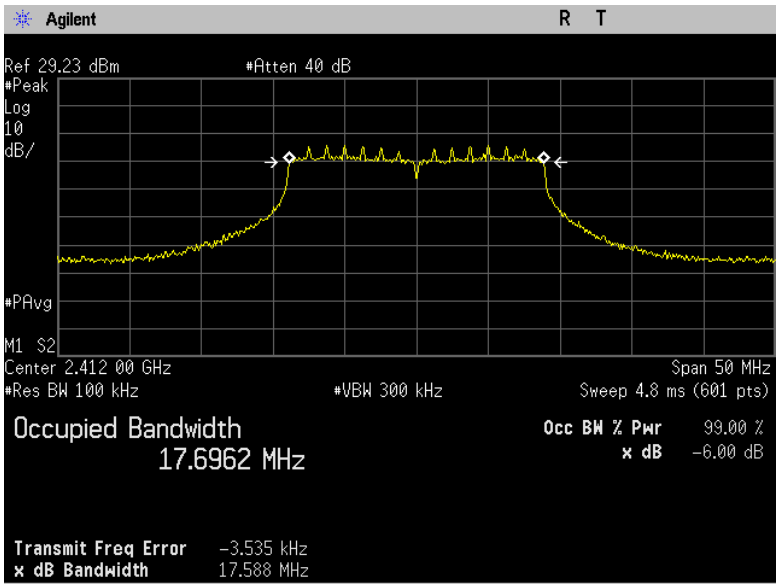
Middle Frequency
Plot 4.1.23



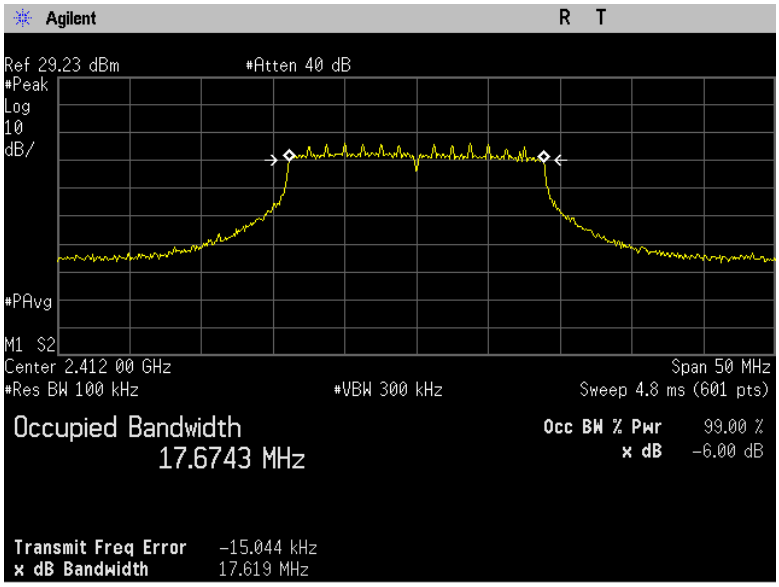
High Frequency
Plot 4.1.24



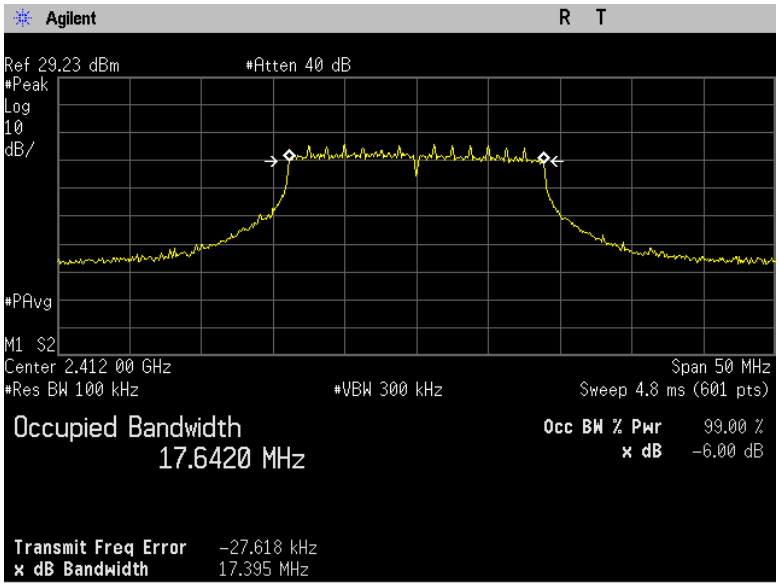
Transmitter model: WMIA-199/EU
802.11 N, 20 MHz
Low Frequency, Output 0
Plot 4.1.25



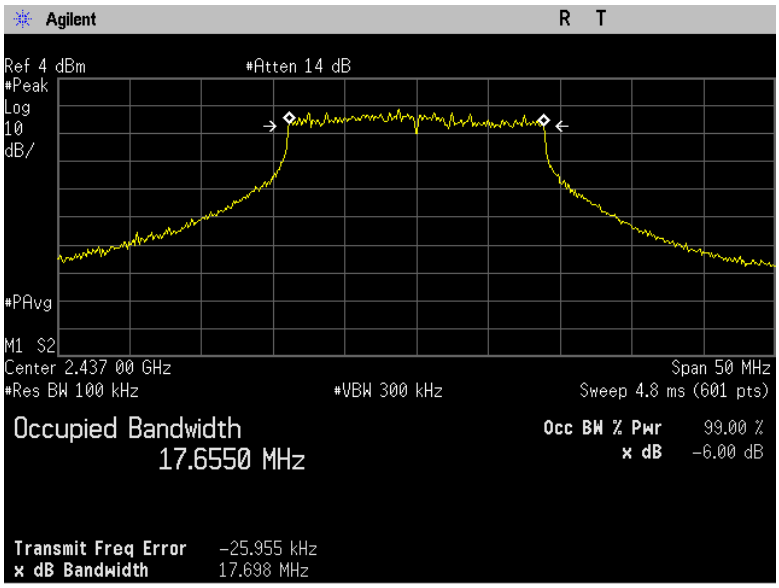
Low Frequency, Output 1
Plot 4.1.26



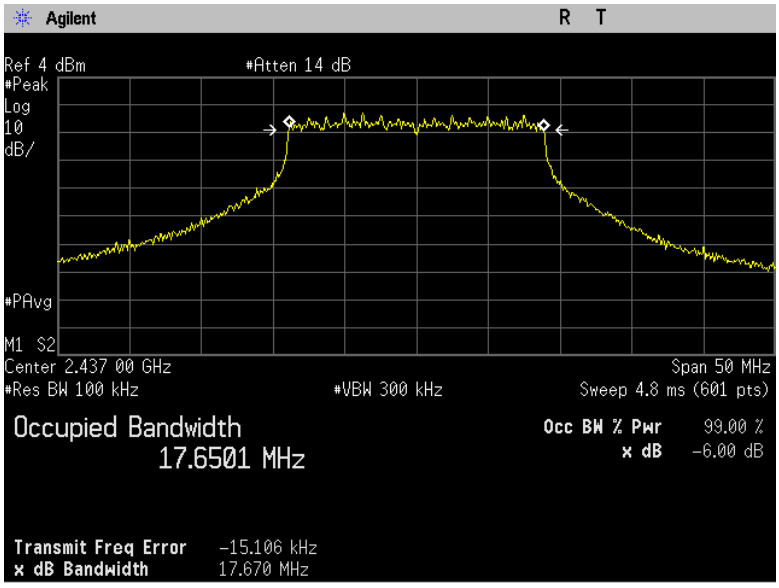
Low Frequency, Output 2
Plot 4.1.27



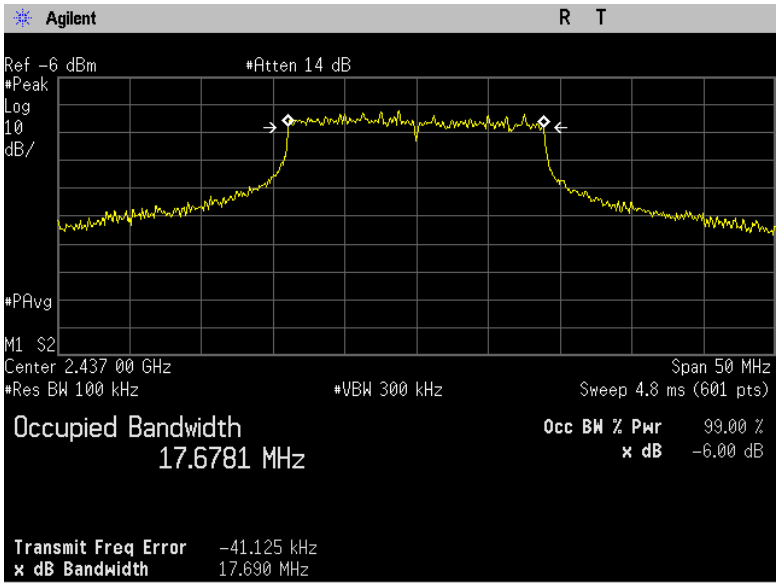
Middle Frequency, Output 0
Plot 4.1.28



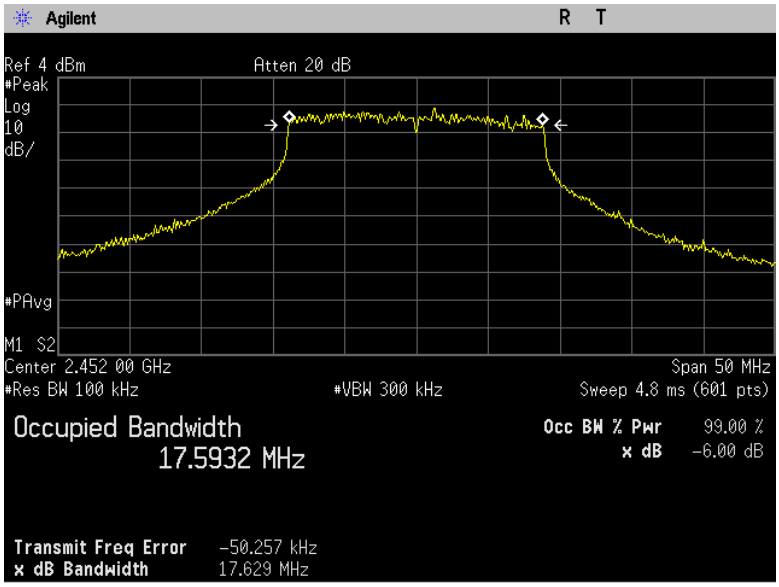
Middle Frequency, Output 1
Plot 4.1.29



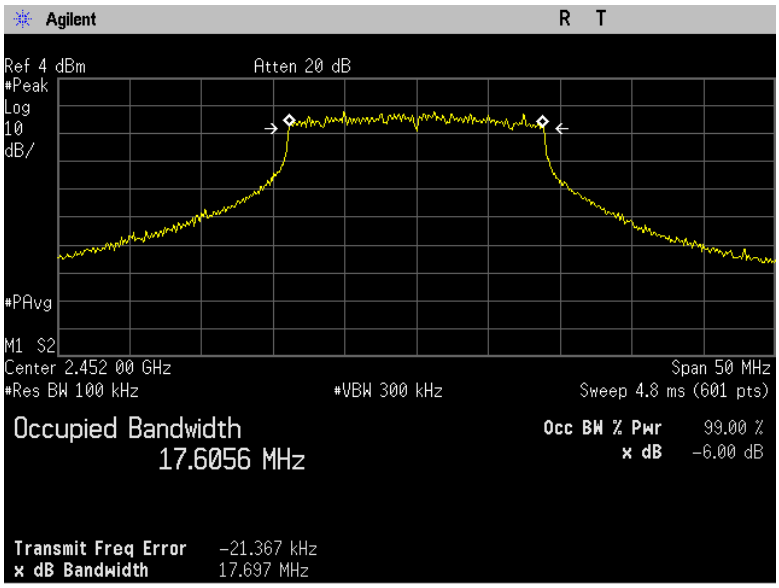
Middle Frequency, Output 2
Plot 4.1.30



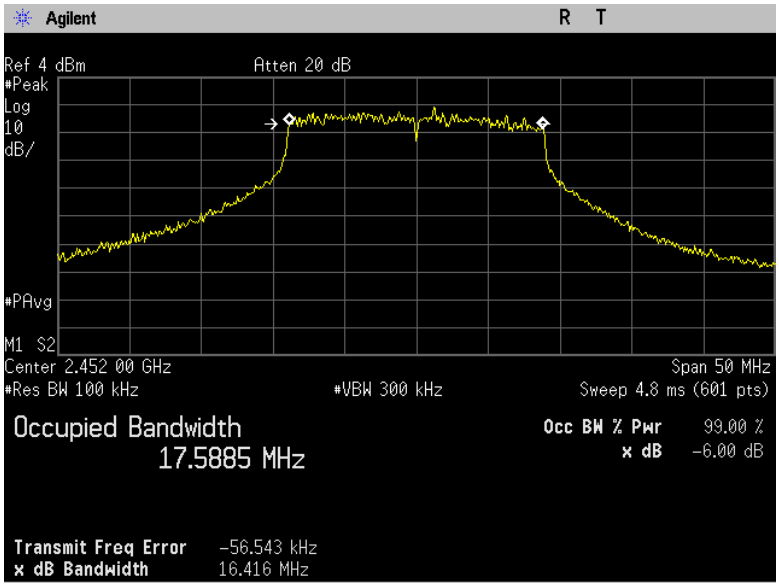
High Frequency, Output 0
Plot 4.1.31



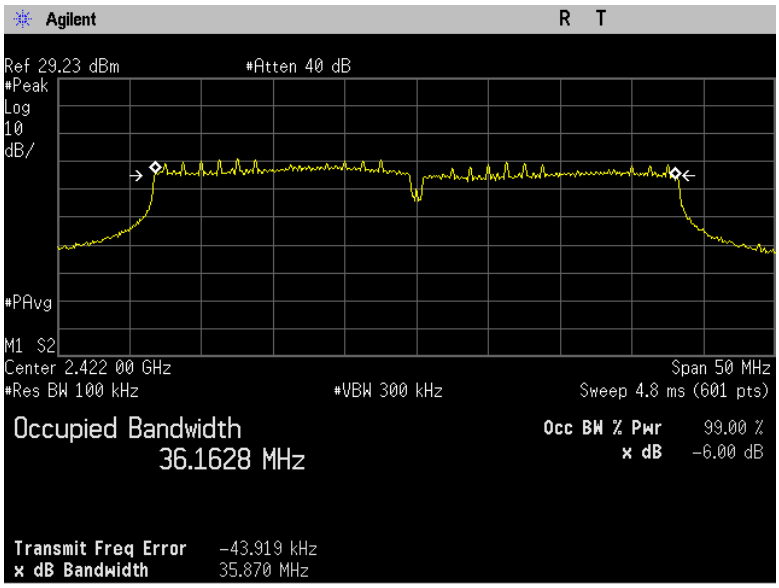
High Frequency, Output 1
Plot 4.1.32



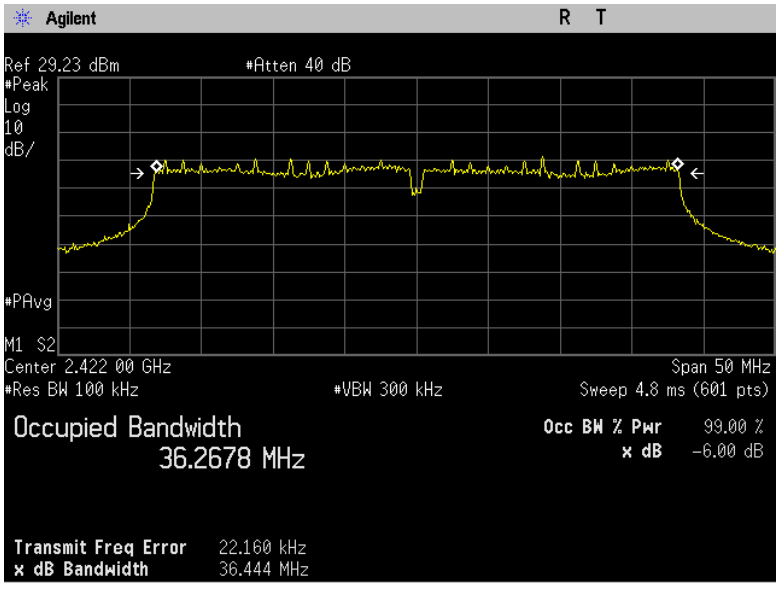
High Frequency, Output 2
Plot 4.1.33



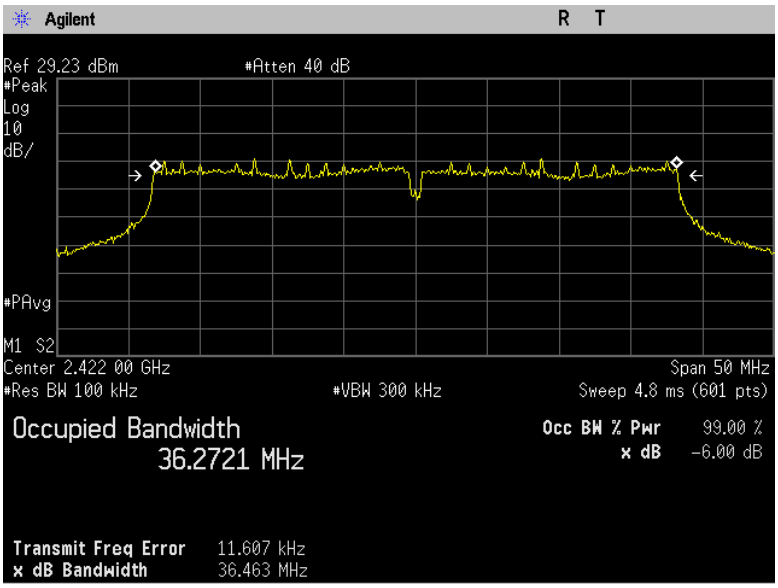
Transmitter model: WMIA-199/EU
802.11 N, 40 MHz
Low Frequency, Output 0
Plot 4.1.34



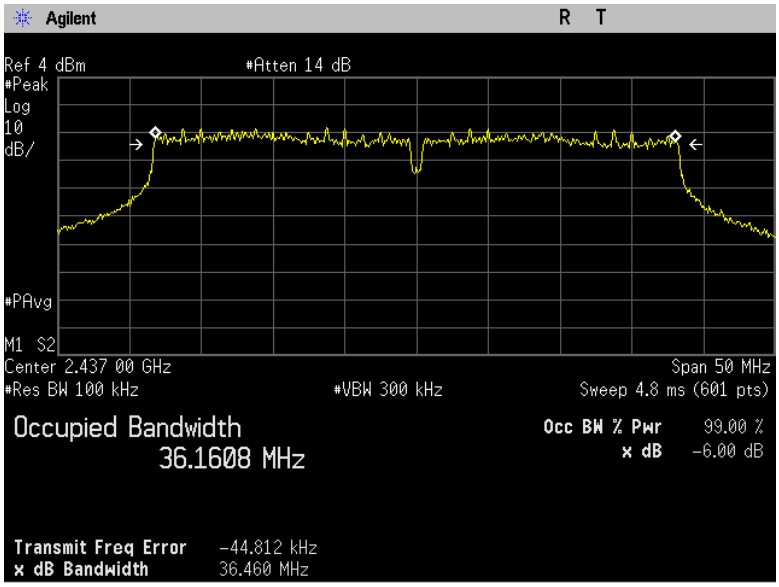
Low Frequency, Output 1
Plot 4.1.35



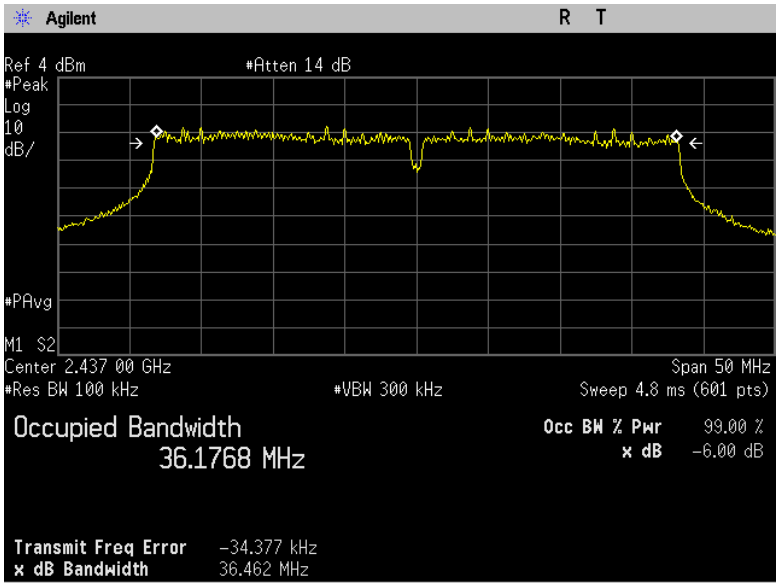
Low Frequency, Output 2
Plot 4.1.36



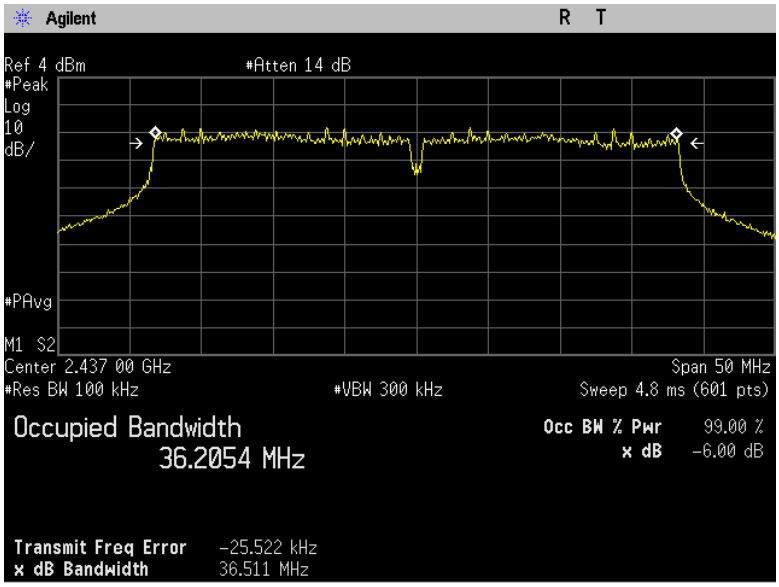
Middle Frequency, Output 0
Plot 4.1.37



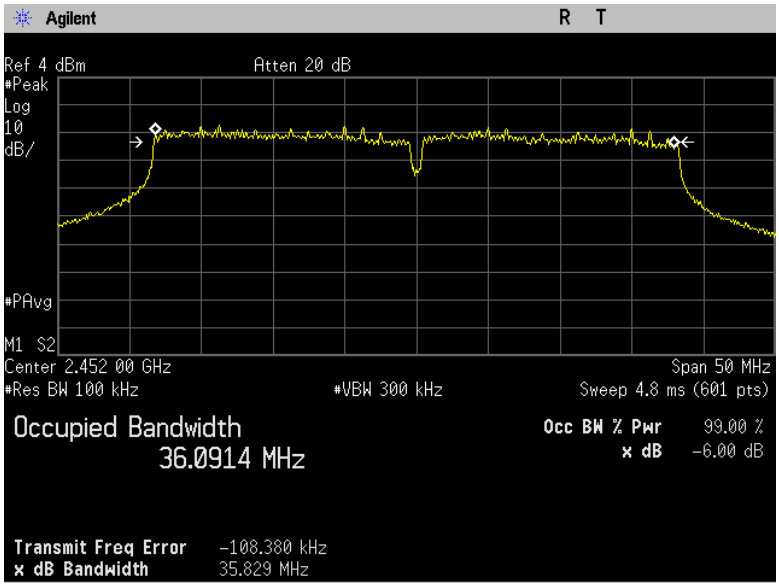
Middle Frequency, Output 1
Plot 4.1.38



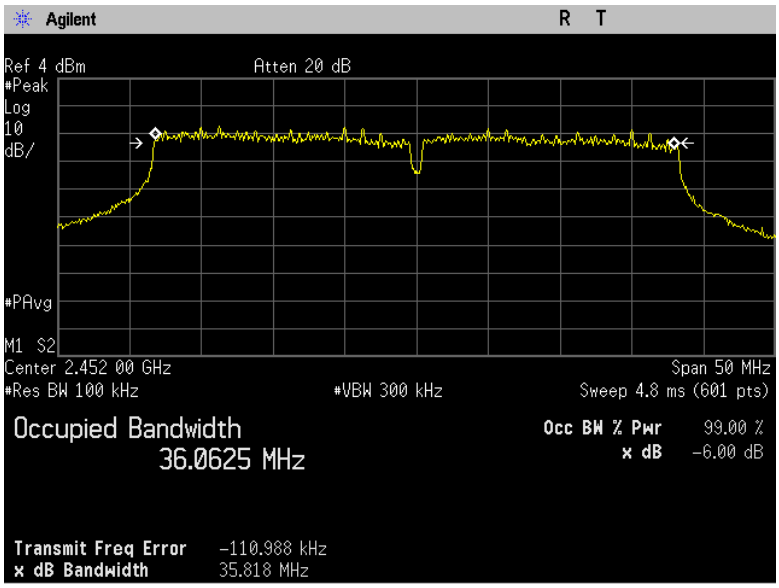
Middle Frequency, Output 2
Plot 4.1.39



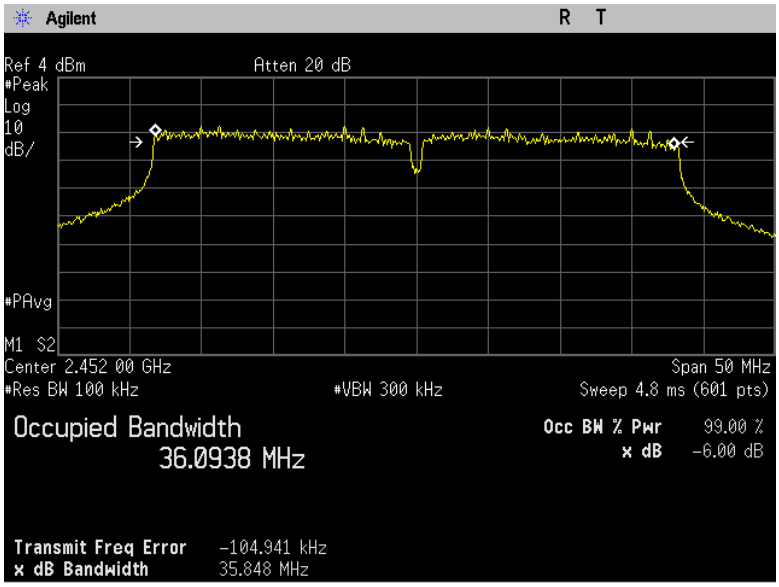
High Frequency, Output 0
Plot 4.1.40



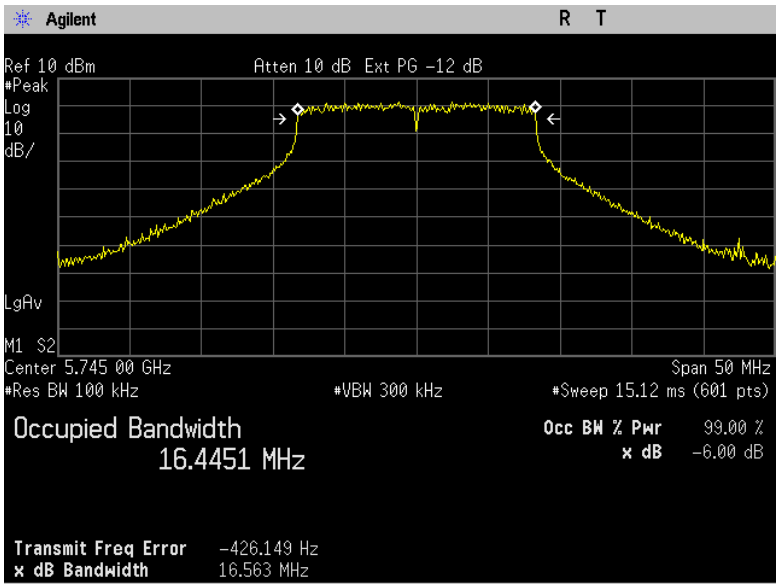
High Frequency, Output 1
Plot 4.1.41



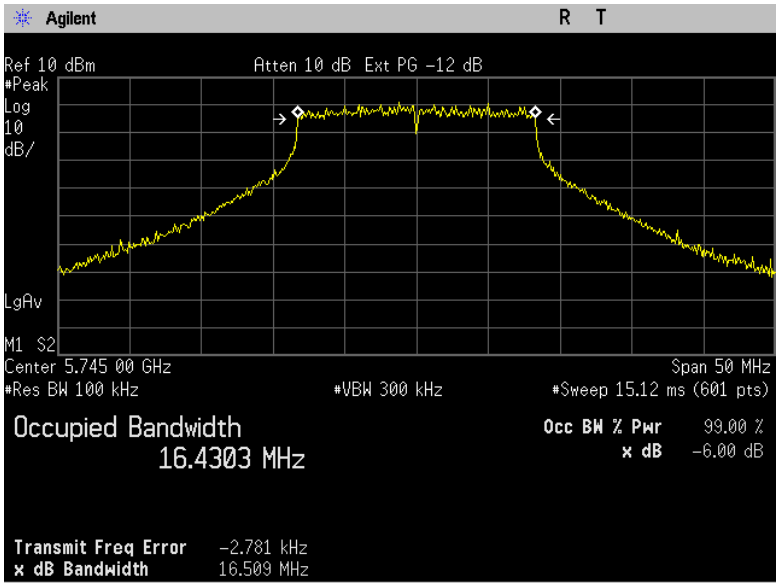
High Frequency, Output 2
Plot 4.1.42



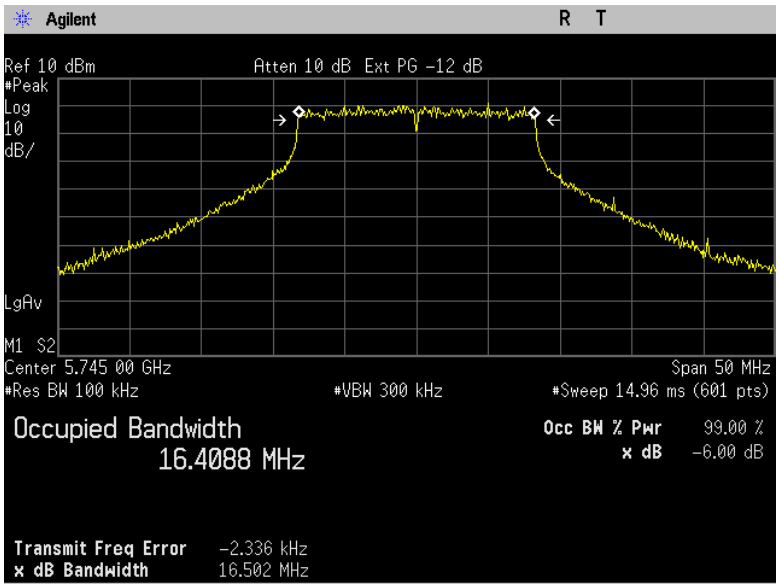
Transmitter model: WMIA-199/EU
802.11a
Low Frequency, Output 0
Plot 4.1.43



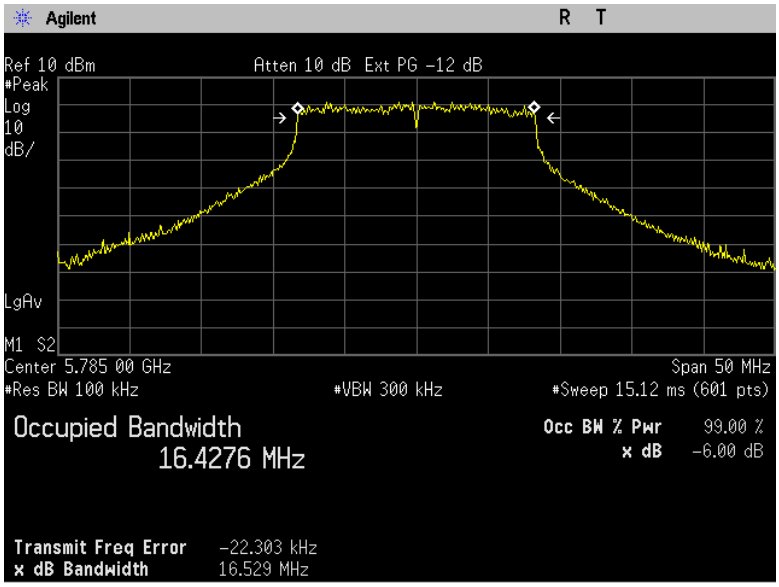
Low Frequency, Output 1
Plot 4.1.44



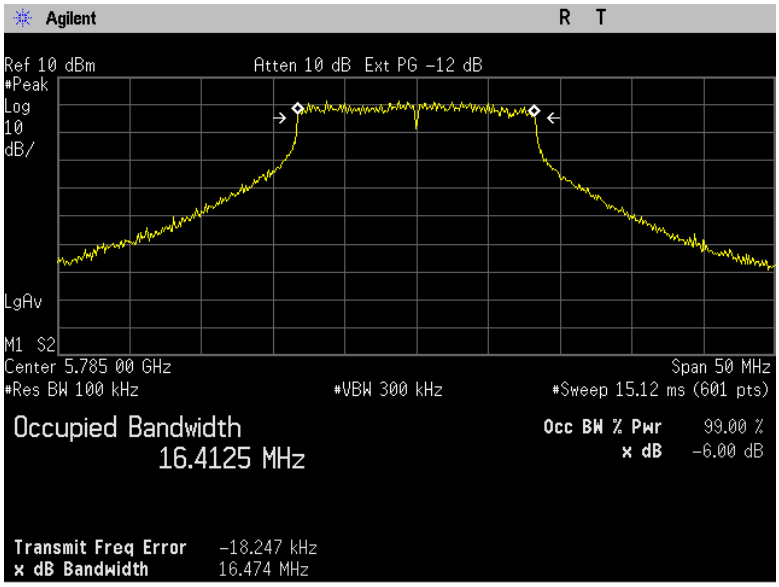
Low Frequency, Output 2
Plot 4.1.45



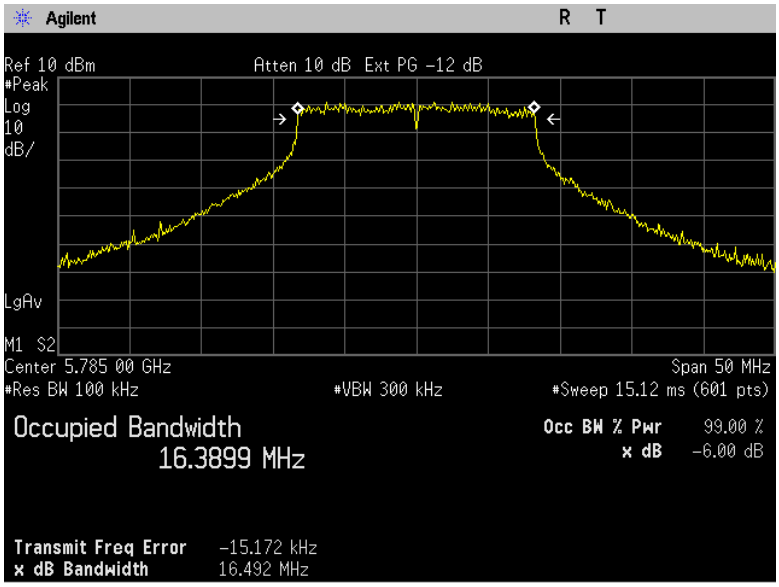
Middle Frequency, Output 0
Plot 4.1.46



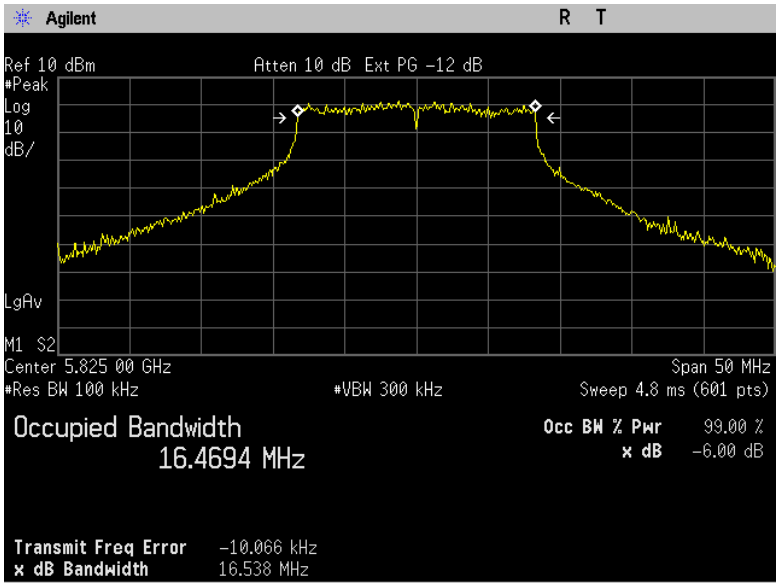
Middle Frequency, Output 1
Plot 4.1.47



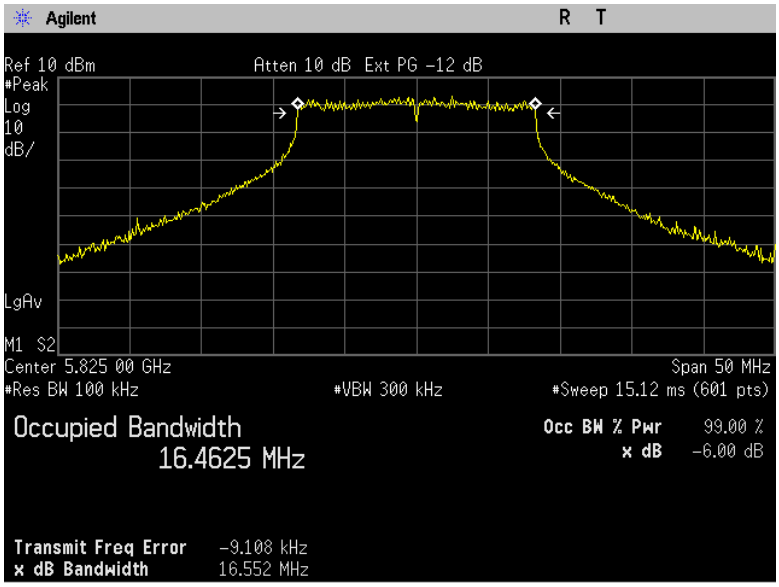
Middle Frequency, Output 2
Plot 4.1.48



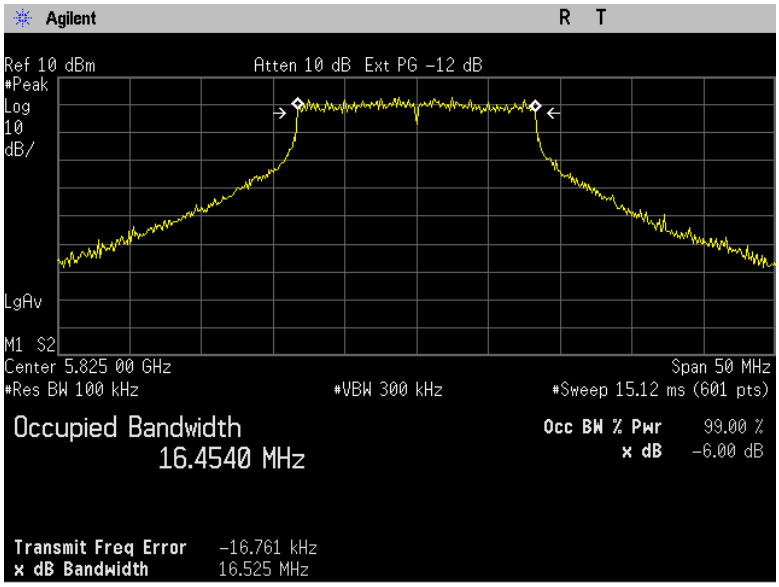
High Frequency, Output 0
Plot 4.1.49



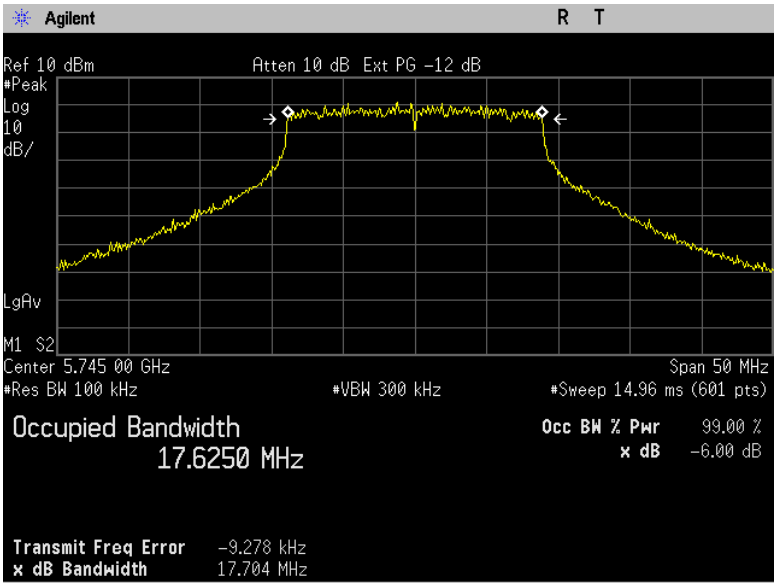
High Frequency, Output 1
Plot 4.1.50



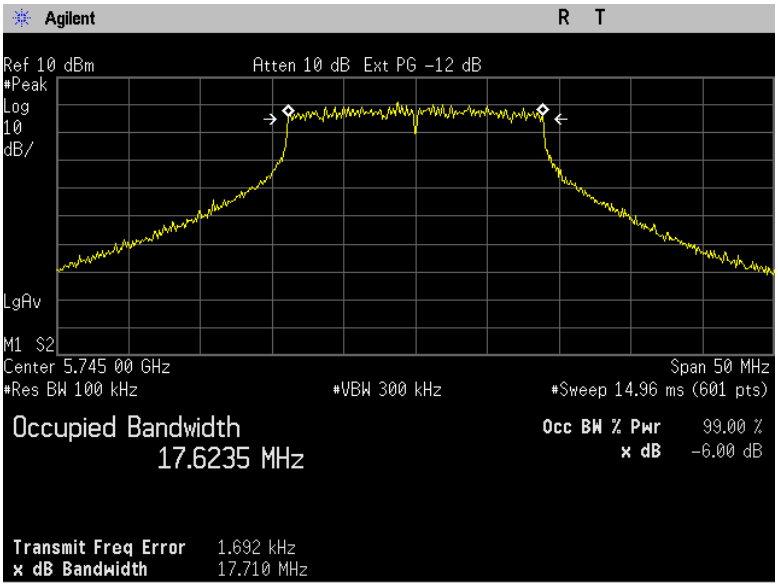
High Frequency, Output 2
Plot 4.1.51



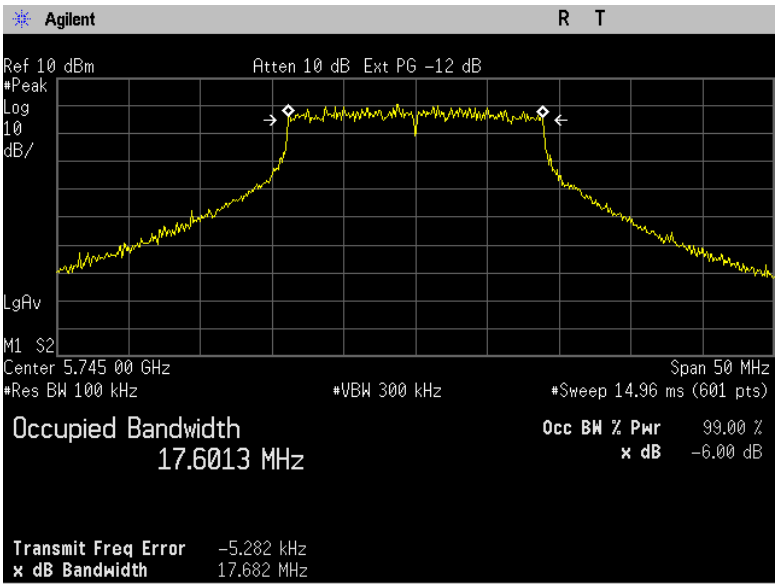
Transmitter model: WMIA-199/EU
802.11 N, 20 MHz
Low Frequency, Output 0
Plot 4.1.52



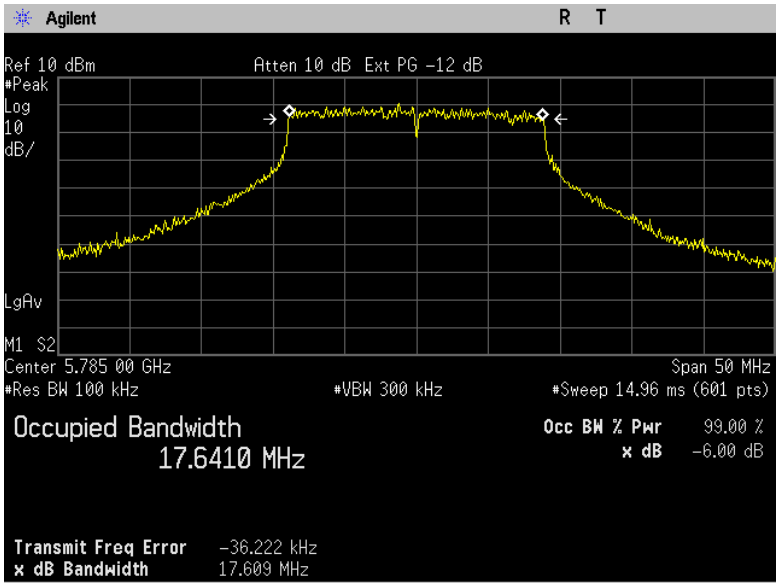
Low Frequency, Output 1
Plot 4.1.53



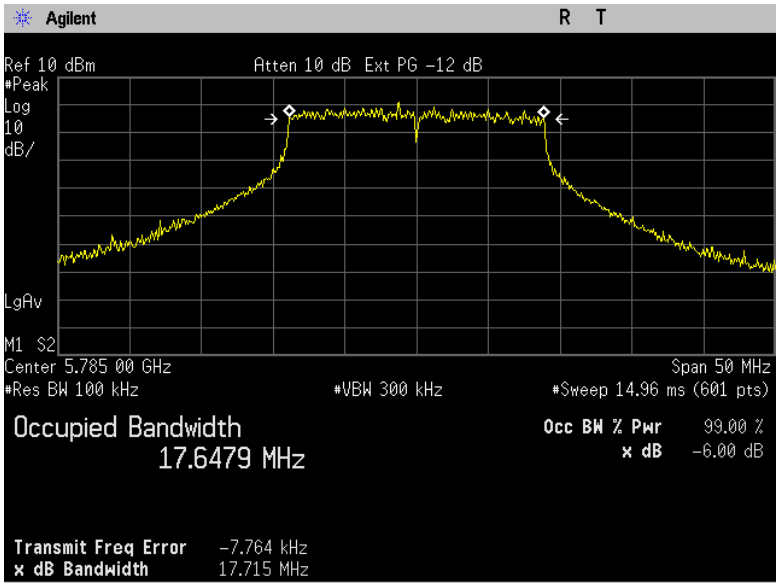
Low Frequency, Output 2
Plot 4.1.54



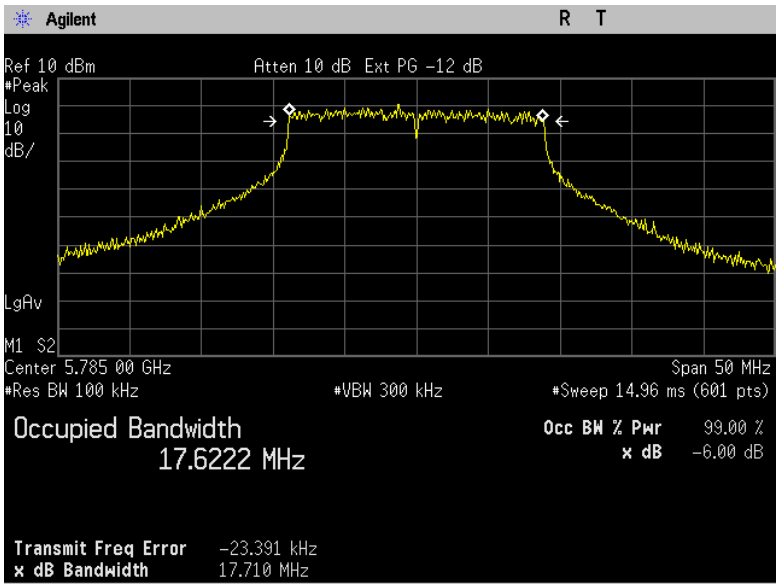
Middle Frequency, Output 0
Plot 4.1.55



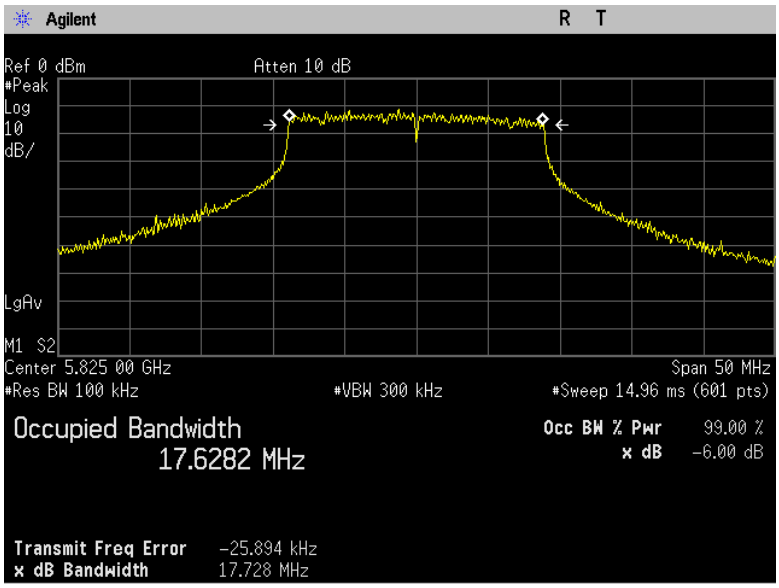
Middle Frequency, Output 1
Plot 4.1.56



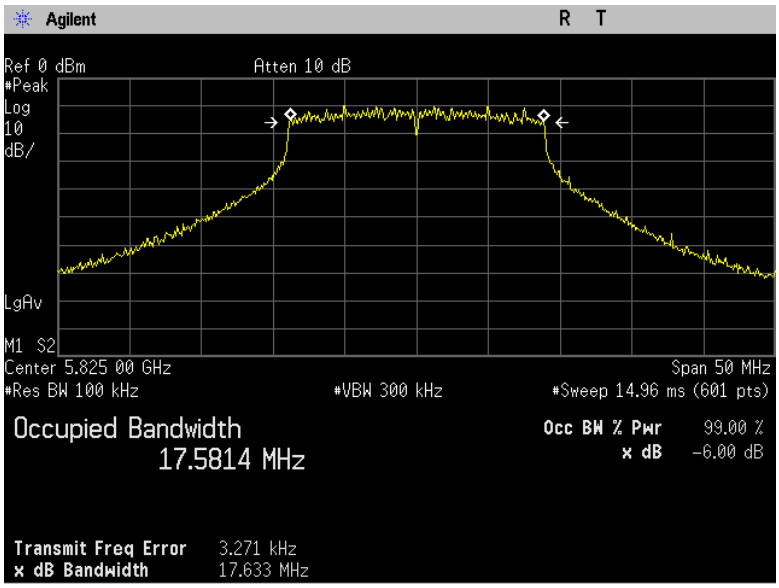
Middle Frequency, Output 2
Plot 4.1.57



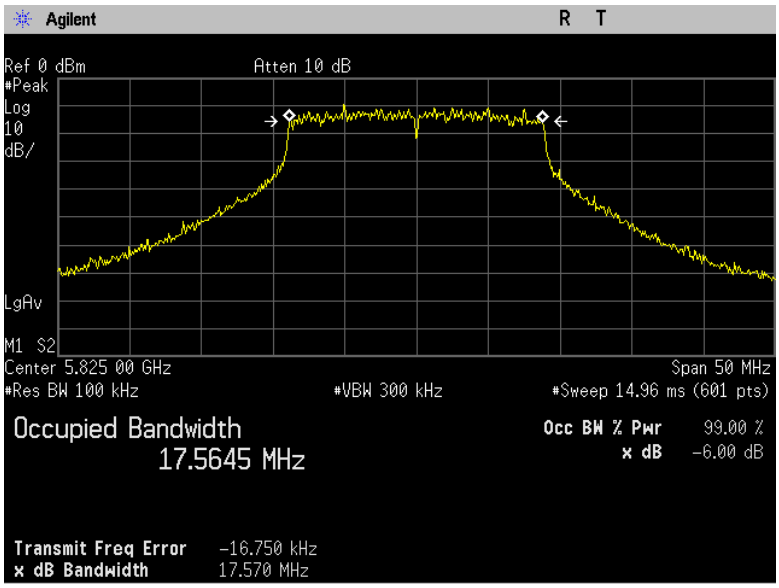
High Frequency, Output 0
Plot 4.1.58



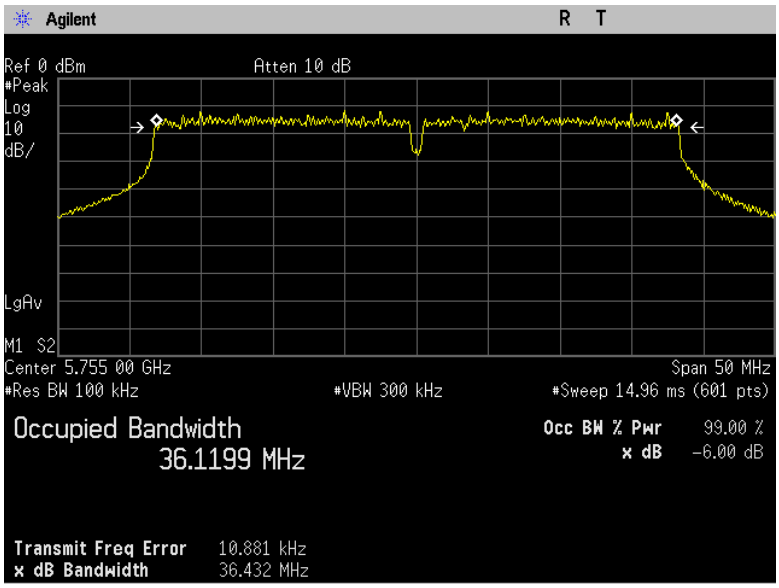
High Frequency, Output 1
Plot 4.1.59



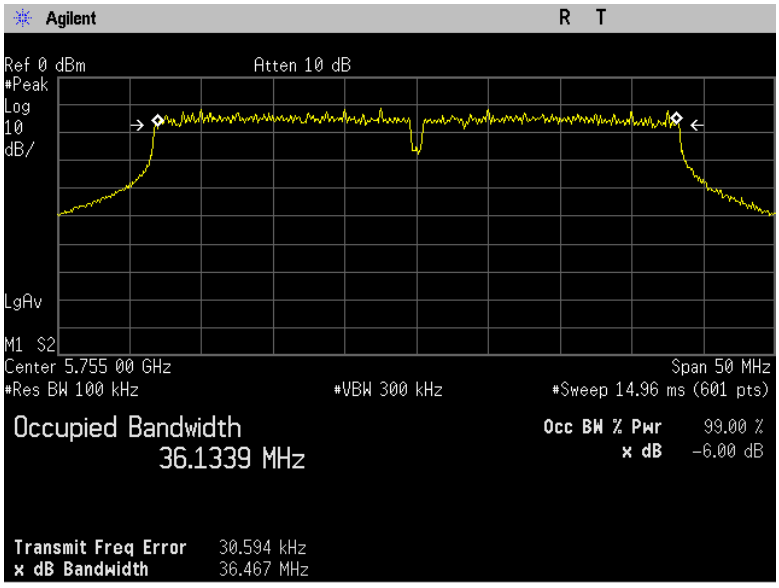
High Frequency, Output 2
Plot 4.1.60



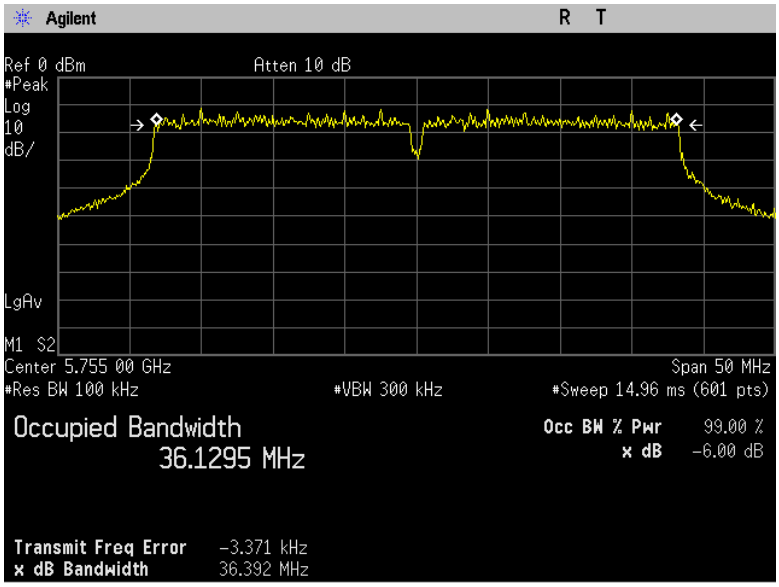
Transmitter model: WMIA-199/EU
802.11 N, 40 MHz
Low Frequency, Output 0
Plot 4.1.61



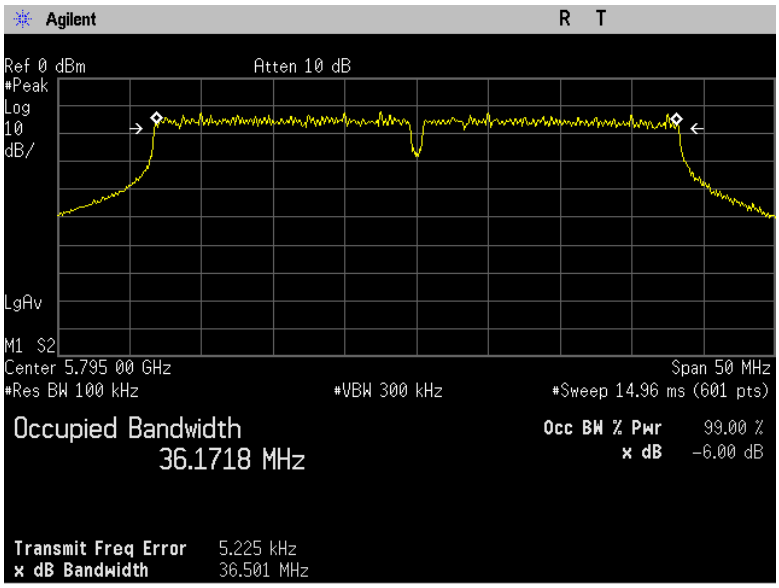
Low Frequency, Output 1
Plot 4.1.62



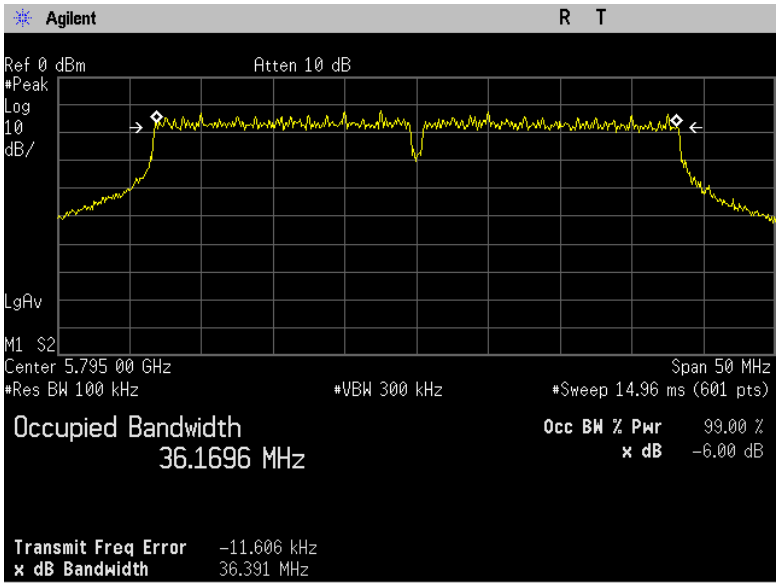
Low Frequency, Output 2
Plot 4.1.63



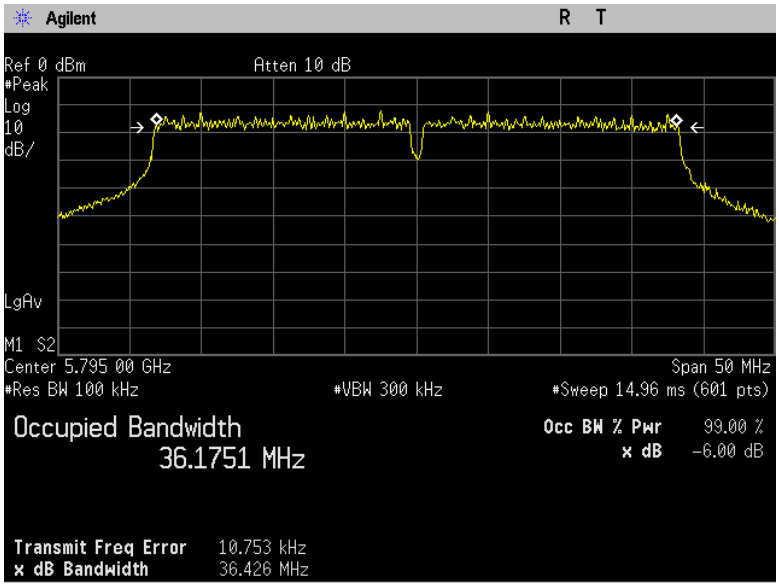
High Frequency, Output 0
Plot 4.1.64



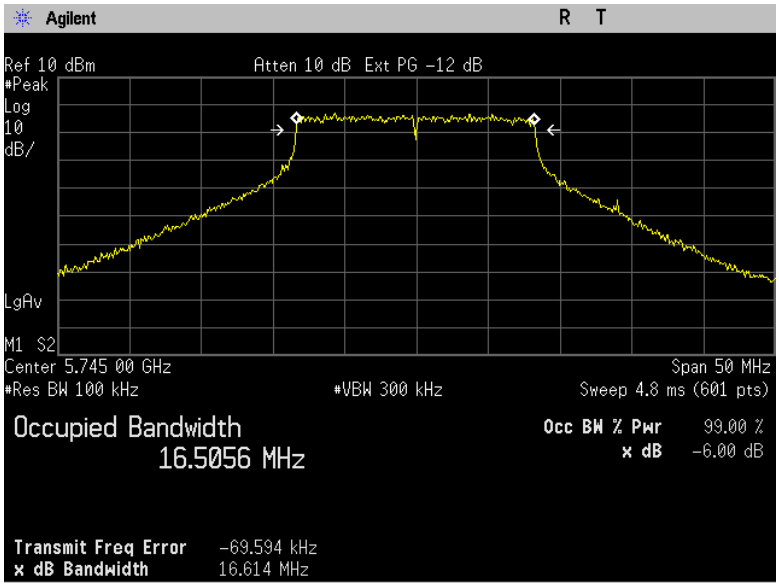
High Frequency, Output 1
Plot 4.1.65



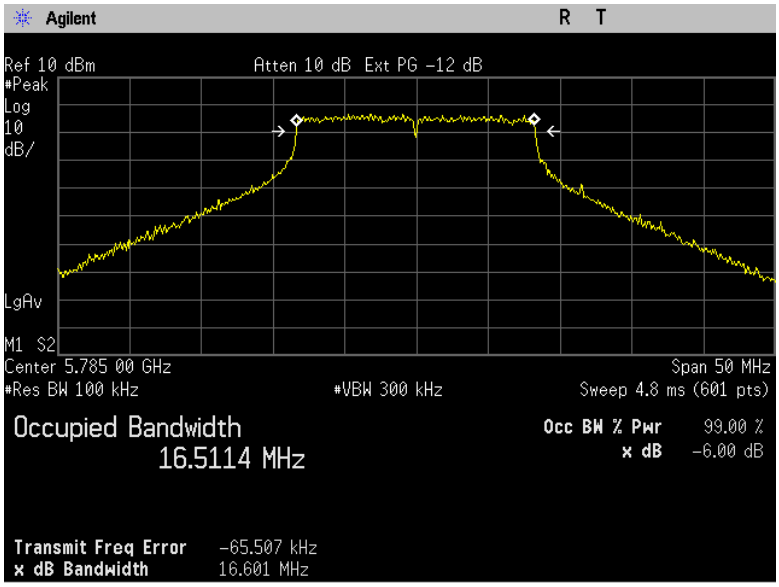
High Frequency, Output 2
Plot 4.1.66



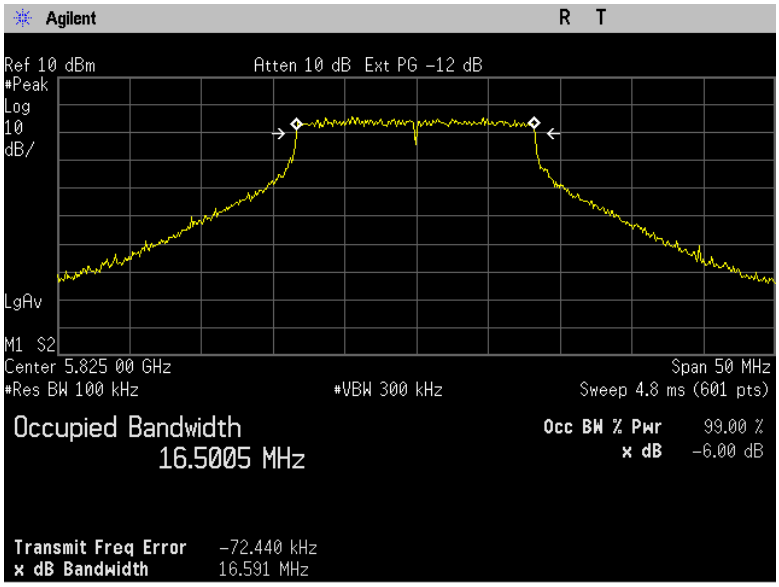
Transmitter model: WLM54AG
Low Frequency
Plot 4.1.67



Middle Frequency
Plot 4.1.68



High Frequency
Plot 4.1.69



4.2. Maximum Peak Output Power, 2400-2483.5 MHz

Reference document:	**47 CFR §15.247 (b) (3) & §15.247 (c) (2)(ii) & §15.247 (c) (2)(iii)**		
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. If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels, and if the transmitted beams overlap, the power shall be reduced to ensure that their aggregate power transmitted simultaneously on all beams does not exceed the limit calculated above by more than 8dB.		
Test Method:	See sec 2.1a (Option 1)	**Comply**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity: 47%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	-	

Maximum Peak Output Power, 5725-5850MHz

Reference document:	**47 CFR §15.247 (b) (3) & §15.247 (c) (1)(ii).**		
Test Requirements:	The maximum peak output power of the intentional radiator for systems using digital modulation in the 5725–5850 MHz band shall not exceed 1 Watt. Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.		
Test setup:	See sec 2.1a (Option 1)	**Comply**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	-	

Test Results:

Worst case outputs

Transmitter Model: WLM54AG

2400-2483.5 MHz Band:

Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Maximum Peak Output Power [mW]	Limit [P_L] [dBm]	Margin [dB]
802.11b					
2412	1	18.97	79	30.00	-11.03
2437	1	20.06	101	30.00	-9.94
2462	1	19.64	92	30.00	-10.36
802.11g					
2412	6	22.32	171	30.00	-7.68
2437	6	18.90	78	30.00	11.10
2462	6	19.12	82	30.00	-10.88
802.11a					
5745	6	17.36	54	30.00	-12.64
5785	6	17.29	54	30.00	-12.71
5825	6	17.64	58	30.00	-12.36

Transmitter model: WMIA-199/EU

2400-2483.5 MHz Band:

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total power [dBm]	Limit[P_L] [dBm]	Margin [dB]
802.11b								
Low	Output 0	2412	1	18.81	227	23.57	30.00	-6.43
	Output 1	2412	1	18.71				
	Output 2	2412	1	18.86				
Middle	Output 0	2437	1	18.89	236	23.74	30.00	-6.26
	Output 1	2437	1	18.93				
	Output 2	2437	1	19.07				
High	Output 0	2462	1	18.82	228	23.59	30.00	-6.41
	Output 1	2462	1	18.73				
	Output 2	2462	1	18.89				

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11g								
Low	Output 0	2412	6	15.62	111	20.47	30.00	-9.53
	Output 1	2412	6	15.71				
	Output 2	2412	6	15.75				
Middle	Output 0	2437	6	15.72	113	20.53	30.00	-9.47
	Output 1	2437	6	15.65				
	Output 2	2437	6	15.89				
High	Output 0	2462	6	15.49	107	20.28	30.00	-9.72
	Output 1	2462	6	15.45				
	Output 2	2462	6	15.57				

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11N 40 MHz								
Low	Output 0	2422	13.5	10.56	36	15.58	30.00	-14.42
	Output 1	2422	13.5	10.70				
	Output 2	2422	13.5	11.14				
Middle	Output 0	2437	13.5	10.45	34	15.31	30.00	-14.69
	Output 1	2437	13.5	10.35				
	Output 2	2437	13.5	10.81				
High	Output 0	2452	13.5	10.32	32	15.08	30.00	-14.92
	Output 1	2452	13.5	10.21				
	Output 2	2452	13.5	10.38				

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total Power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11N, 20 MHz								
Low	Output 0	2412	6.5	14.65	87	19.41	30.00	-10.59
	Output 1	2412	6.5	14.54				
	Output 2	2412	6.5	14.73				
Middle	Output 0	2437	6.5	14.49	85	19.27	30.00	-10.73
	Output 1	2437	6.5	14.34				
	Output 2	2437	6.5	14.67				
High	Output 0	2462	6.5	13.82	75	18.73	30.00	-11.27
	Output 1	2462	6.5	13.93				
	Output 2	2462	6.5	14.12				

5725-5850MHz Band:

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total Power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11 a								
Low	Output 0	5745	6	13.97	76	18.80	30.00	11.20
	Output 1	5745	6	13.78				
	Output 2	5745	6	14.32				
Middle	Output 0	5785	6	12.87	66	18.21	30.00	11.79
	Output 1	5785	6	13.54				
	Output 2	5785	6	13.86				
High	Output 0	5825	6	13.89	79	18.96	30.00	11.04
	Output 1	5825	6	14.09				
	Output 2	5825	6	14.56				

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11N 40 MHz								
Low	Output 0	5755	13.5	13.21	71	18.50	30.00	-11.50
	Output 1	5755	13.5	13.56				
	Output 2	5755	13.5	14.34				
High	Output 0	5795	13.5	13.91	72	18.58	30.00	-11.42
	Output 1	5795	13.5	13.31				
	Output 2	5795	13.5	14.17				

		Frequency [MHz]	Data Rate [Mbps]	Maximum Peak Output Power [dBm]	Total Peak Power [mW]	Total power [dBm]	Limit [P_L] [dBm]	Margin [dB]
802.11N 20 MHz								
Low	Output 0	5745	6.5	13.13	63	17.97	30.00	-12.03
	Output 1	5745	6.5	12.74				
	Output 2	5745	6.5	13.67				
Middle	Output 0	5785	6.5	12.95	72	18.56	30.00	-11.44
	Output 1	5785	6.5	13.56				
	Output 2	5785	6.5	14.67				
High	Output 0	5825	6.5	12.63	67	18.28	30.00	-11.72
	Output 1	5825	6.5	13.78				
	Output 2	5825	6.5	14				

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 8 dBm in any 3 kHz band during any time interval of continuous transmission.		
Test Method:	See sec 2.1b (Option 1)	**Comply**	
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 to 4.3.29	

Test Results:

Worst case output

Transmitter model: WMIA-199/EU, 3 Outputs combined

2400-2483.5 MHz Band:

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11b						
Low	2.412	1	-0.15	8	-8.15	4.3.1
Middle	2.437	1	0.03	8	-7.97	4.3.2
High	2463	1	-2.59	8	-10.59	4.3.3

Channel	Frequency [GHz]]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11g						
Low	2.412	6	-2.00	8	-10	4.3.4
Middle	2.437	6	-3.10	8	-11.1	4.3.5
High	2463	6	-5.11	8	-13.11	4.3.6

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 N, 20 MHz						
Low	2.412	6.5	-4.20	8	-12.2	4.3.7
Middle	2.437	6.5	-7.70	8	-15.7	4.3.8
High	2463	6.5	-7.61	8	-15.61	4.3.9

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 N 40 MHz						
Low	2.422	13.5	-10.82	8	-18.82	4.3.10
Middle	2.437	13.5	-11.24	8	-19.24	4.3.11
High	2.452	13.5	-12.46	8	-20.46	4.3.12

5725-5850MHz Band:

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 a						
Low	5.745	6	1.33	8	-6.67	4.3.13
Middle	5.785	6	-0.35	8	-8.35	4.3.14
High	5.825	6	-0.34	8	-8.34	4.3.15

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 N 20 MHz						
Low	5.745	6.5	-2.72	8	-10.72	4.3.16
Middle	5.785	6.5	-4.10	8	-12.1	4.3.17
High	5.825	6.5	-4.65	8	-12.65	4.3.18

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 N 40 MHz						
Low	5.755	13.5	-7.34	8	-15.34	4.3.19
High	5.795	13.5	-8.01	8	-16.01	4.3.20

Transmitter Model: WLM54AG

2400-2483.5 MHz Band:

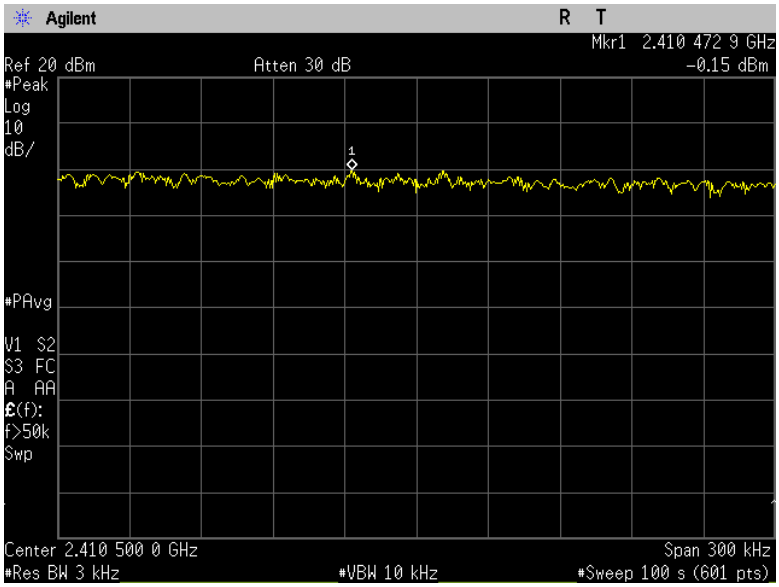
Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 b						
Low	2.412	1	-2.58	8	-10.58	4.3.21
Middle	2.437	1	-1.31	8	-9.31	4.3.22
High	2463	1	-1.47	8	-9.47	4.3.23

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 g						
Low	2.412	6	-3.55	8	-11.55	4.3.24
Middle	2.437	6	-4.07	8	-12.07	4.3.25
High	2463	6	-4.92	8	-12.92	4.3.26

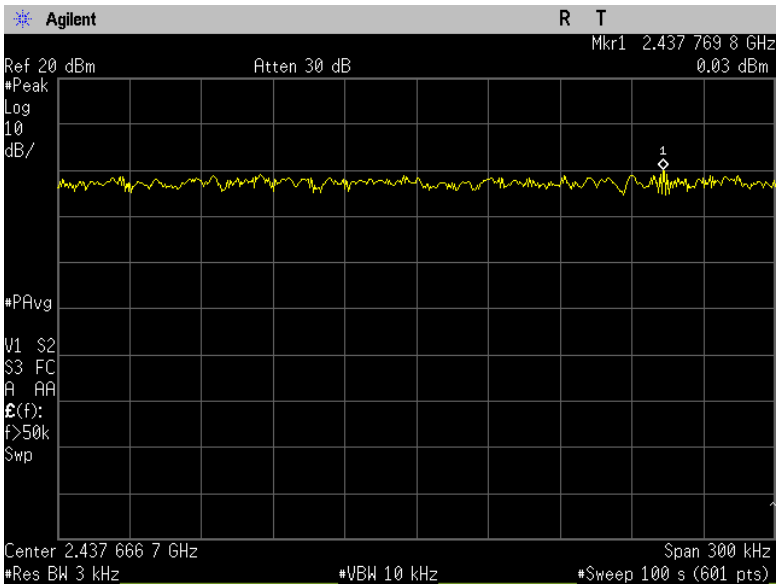
5725-5850MHz Band:

Channel	Frequency [GHz]	Data Rate [Mbps]	PPSD [dBm/3 kHz]	PPSD Limit [dBm/ 3 kHz]	Margin [dB]	Ref Plot
802.11 a						
Low	5.745	6	-3.42	8	-11.42	4.3.27
Middle	5.785	6	-3.88	8	-11.88	4.3.28
High	5.825	6	-3.97	8	-11.97	4.3.29

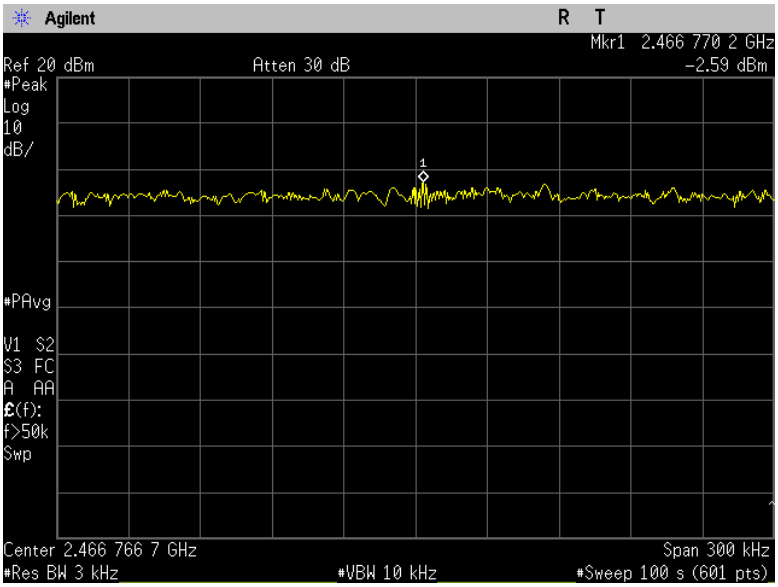
Transmitter model: WMIA-199/EU
802.11 b
Low Frequency
Plot 4.3.1



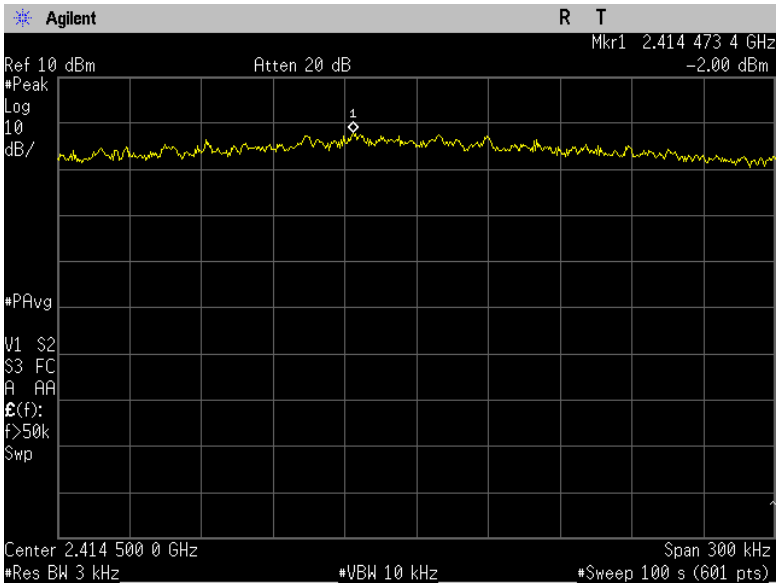
Middle Frequency
Plot 4.3.2



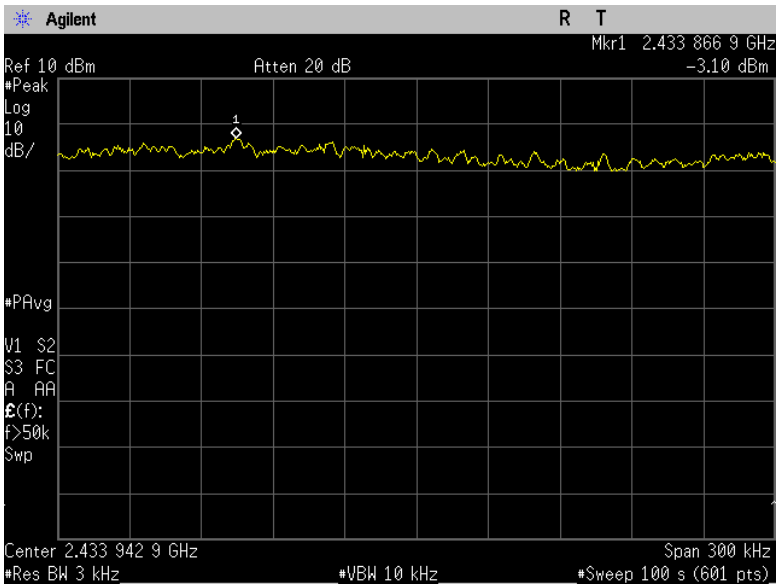
High Frequency
Plot 4.3.3



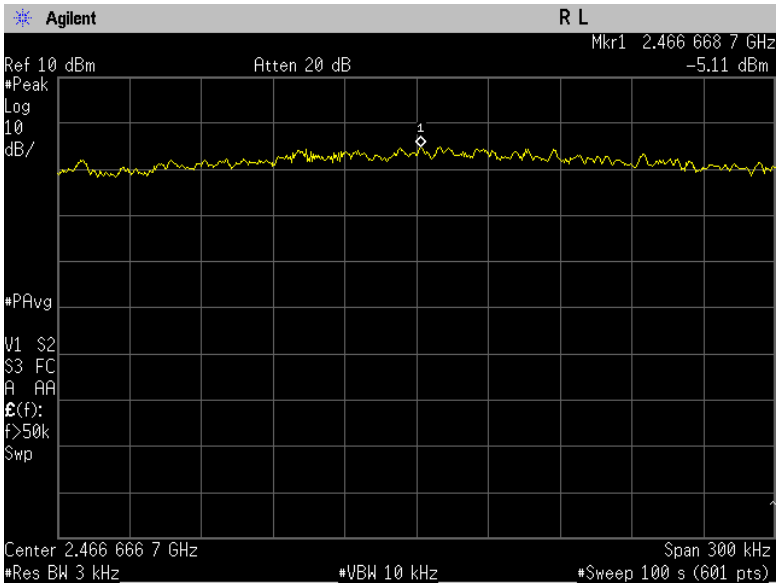
802.11g
Low Frequency
Plot 4.3.4



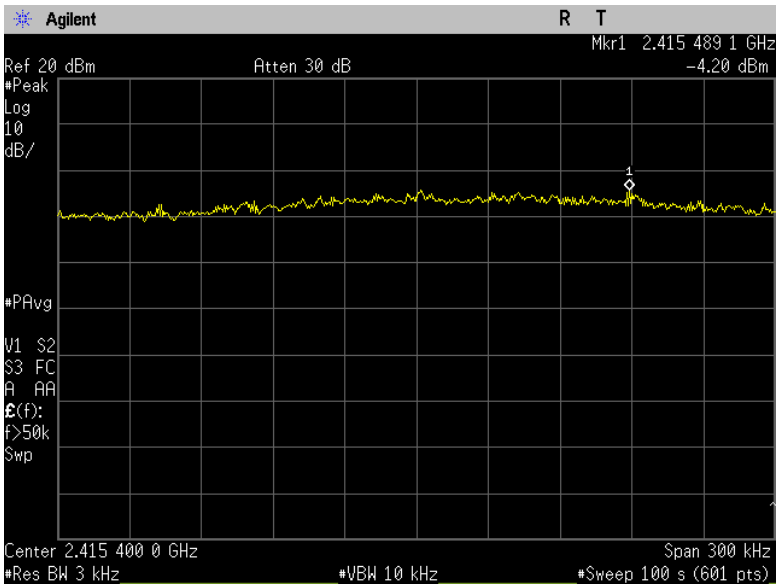
Middle Frequency
Plot 4.3.5



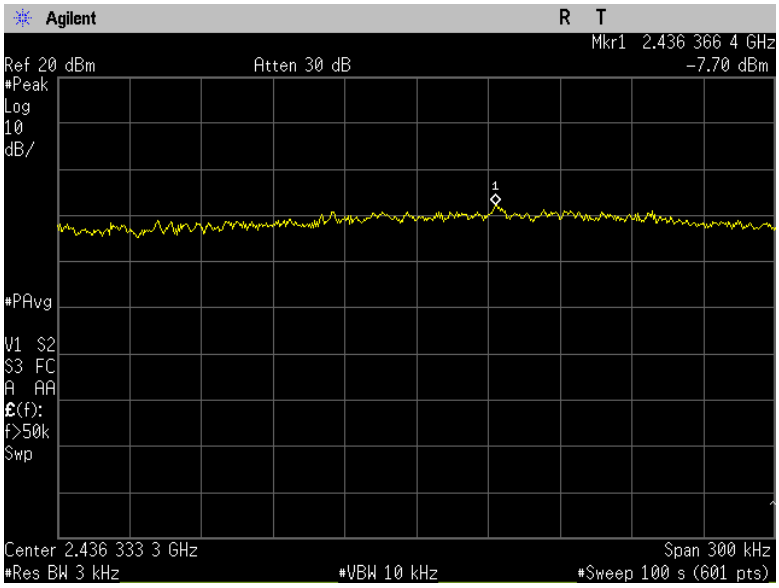
High Frequency
Plot 4.3.6



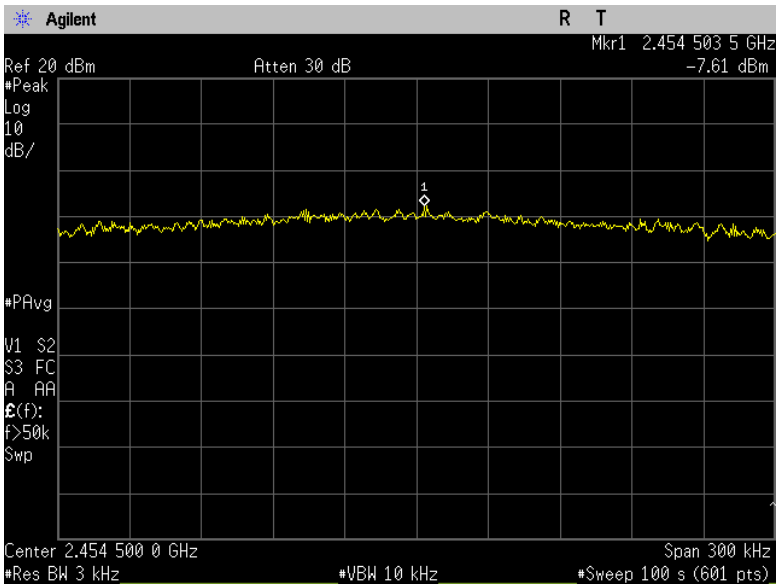
802.11 N, 20 MHz
Low Frequency
Plot 4.3.7



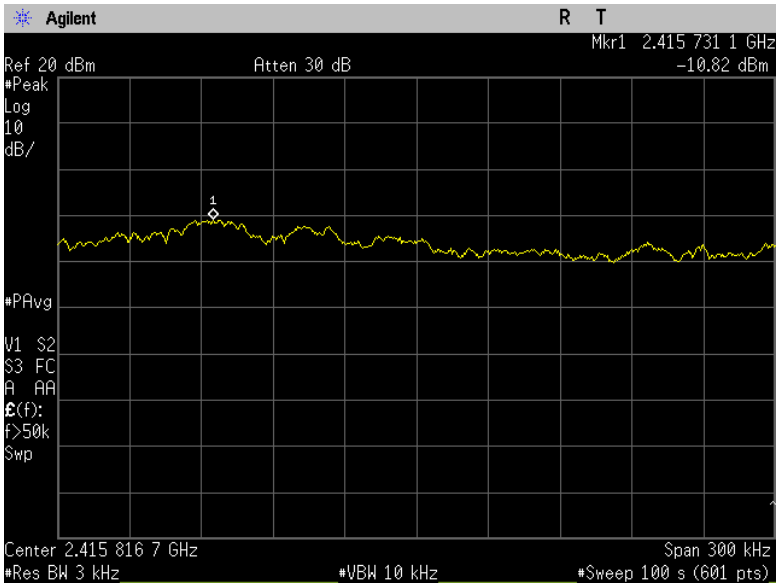
Middle Frequency
Plot 4.3.8



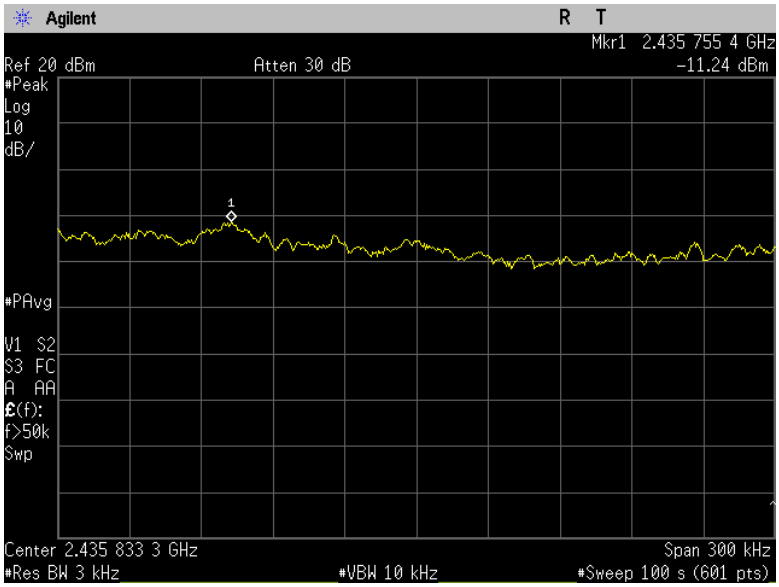
High Frequency
Plot 4.3.9



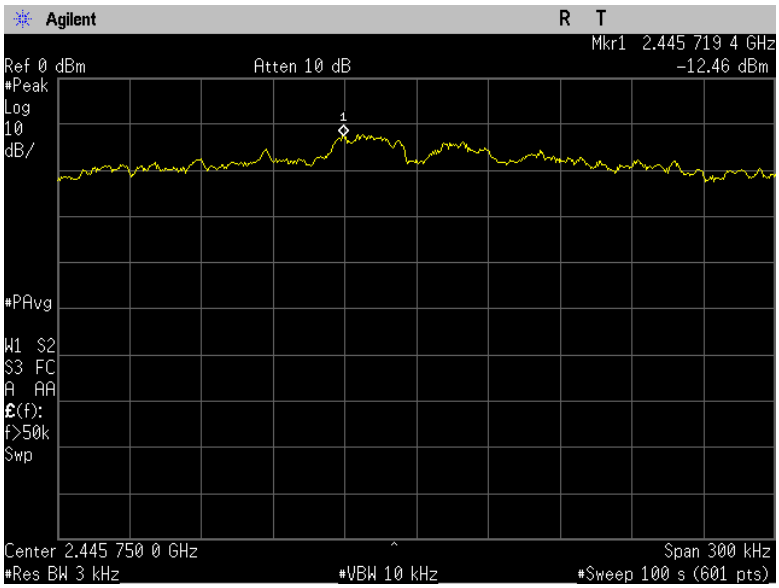
802.11 N, 40 MHz
Low Frequency
Plot 4.3.10



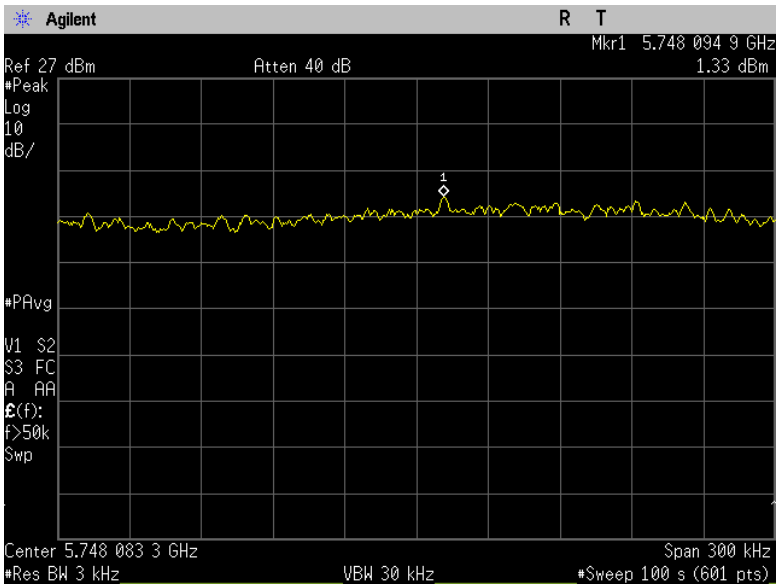
Middle Frequency
Plot 4.3.11



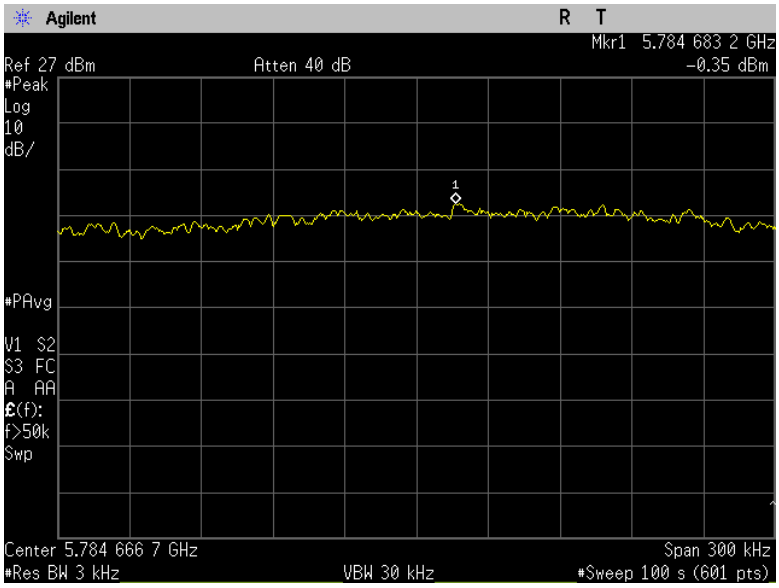
High Frequency
Plot 4.3.12



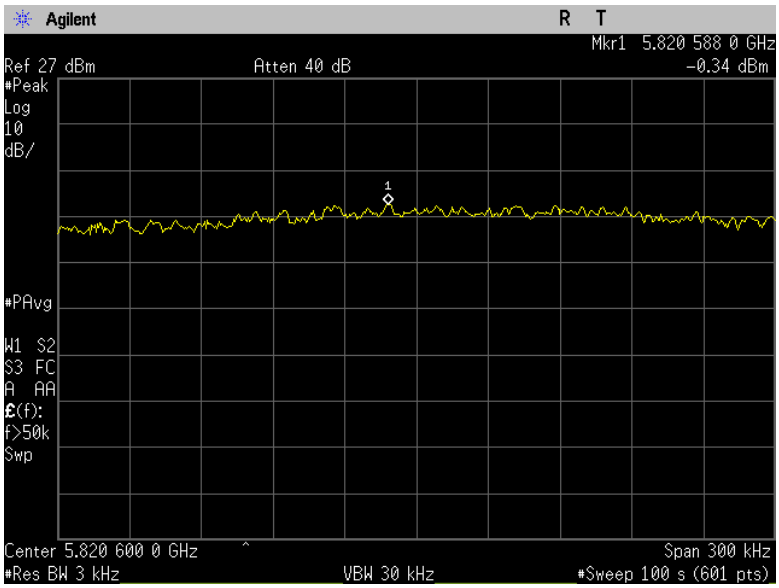
Transmitter model: WMIA-199/EU
802.11 a
Low Frequency
Plot 4.3.13



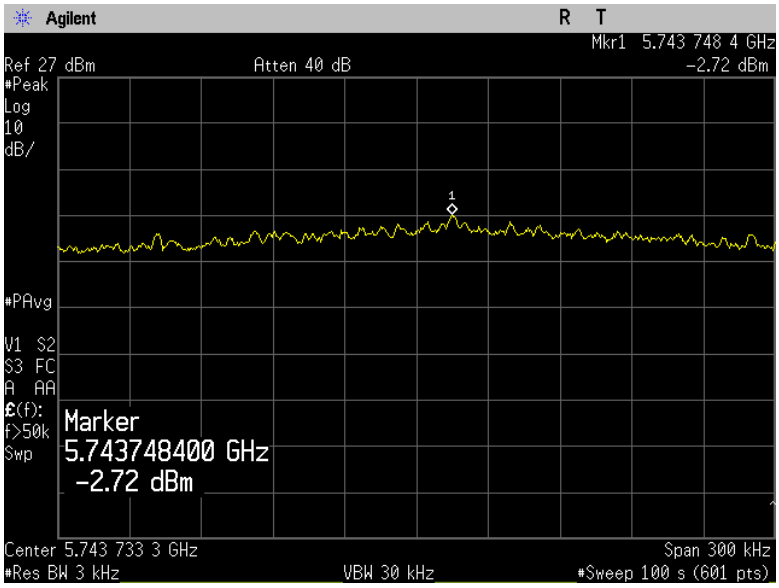
Middle Frequency
Plot 4.3.14



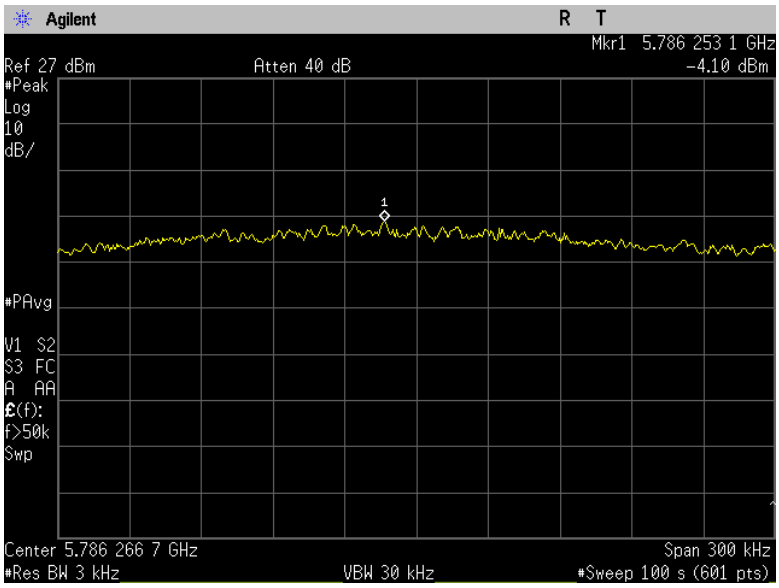
High Frequency
Plot 4.3.15



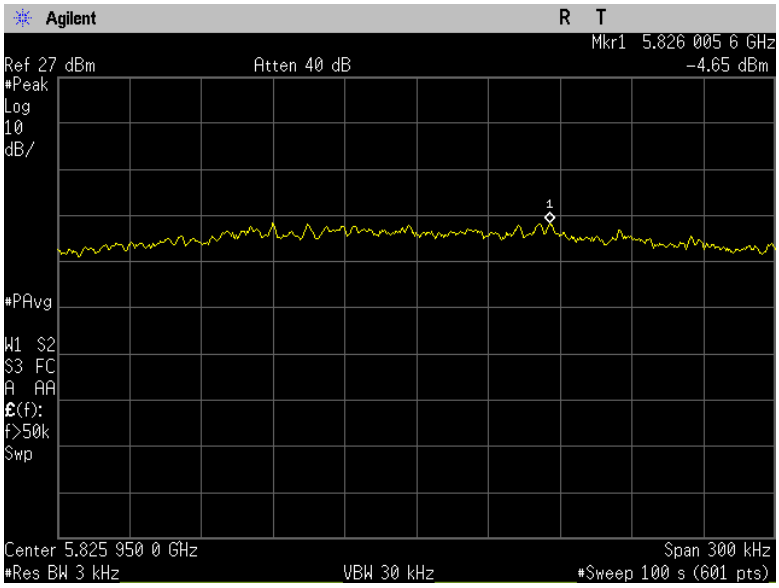
802.11 N, 20 MHz
Low Frequency
Plot 4.3.16



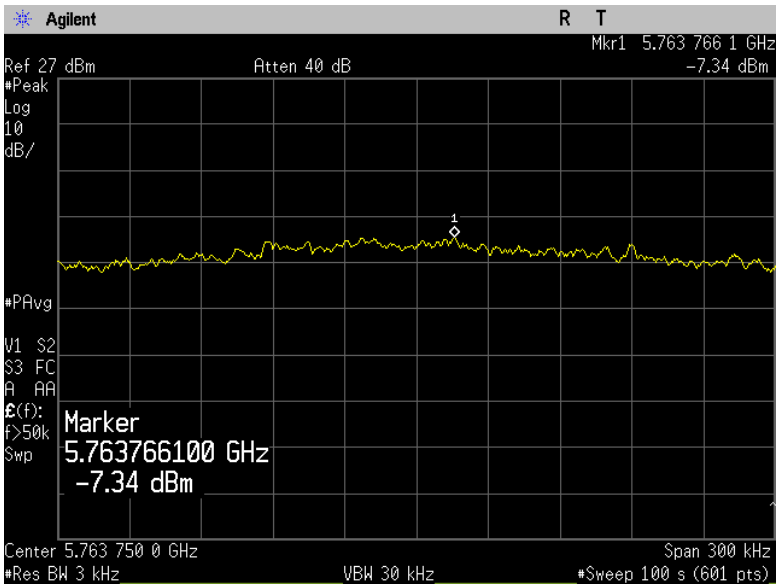
Middle Frequency
Plot 4.3.17



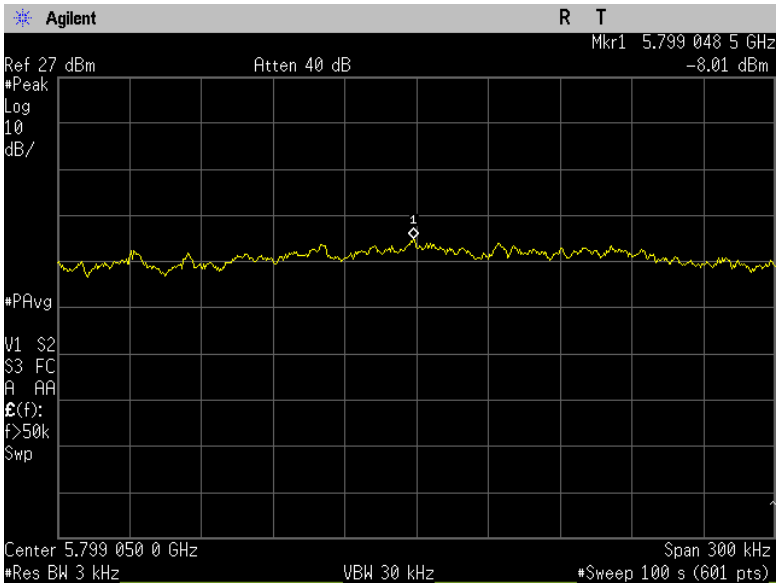
High Frequency
Plot 4.3.18



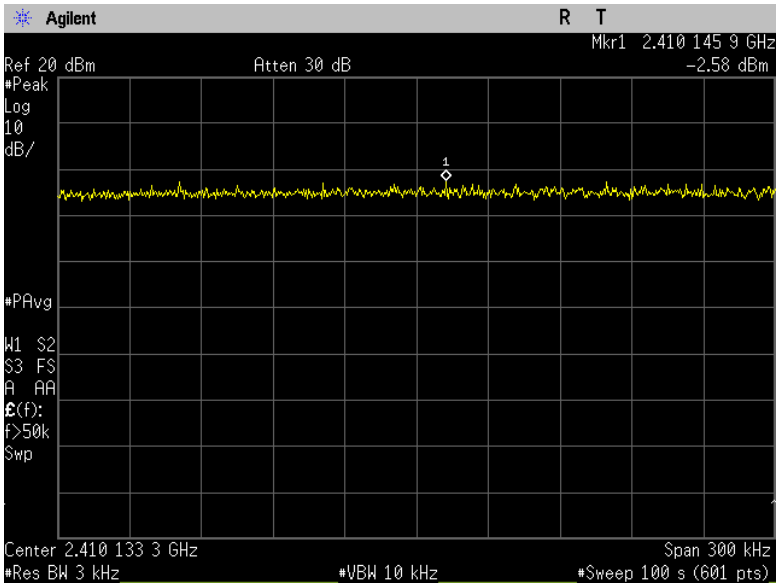
802.11 N, 40 MHz
Low Frequency
Plot 4.3.19



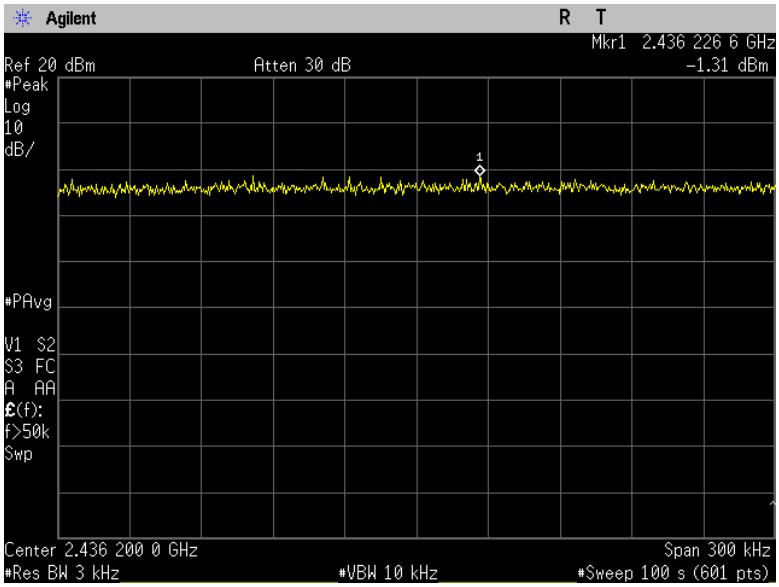
High Frequency
Plot 4.3.20



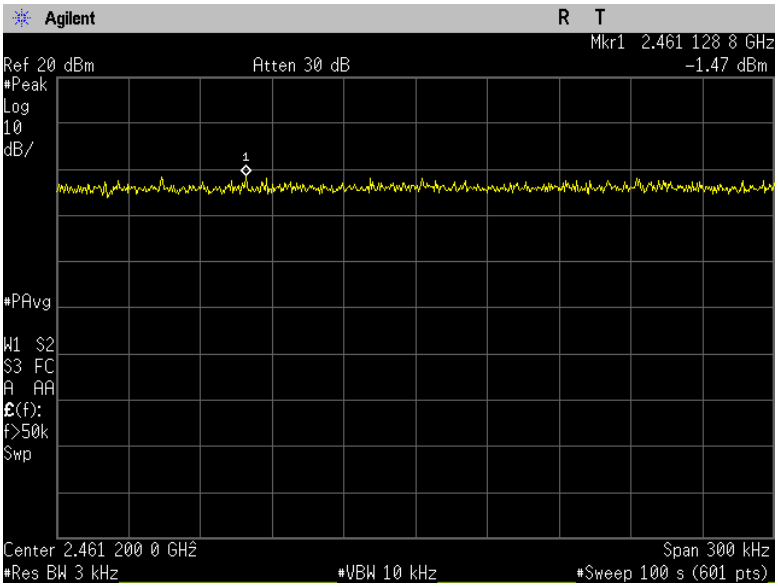
Transmitter Model: WLM54AG
802.11 b
Low Frequency
Plot 4.3.21



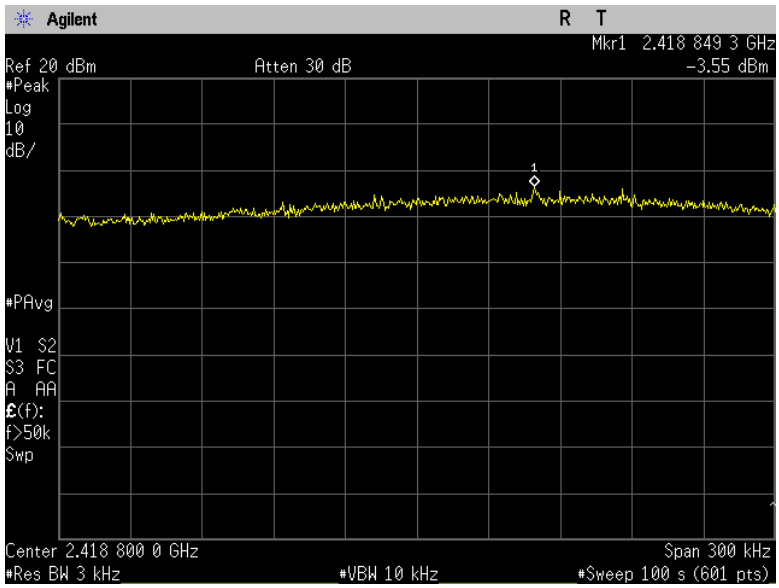
Middle Frequency
Plot 4.3.22



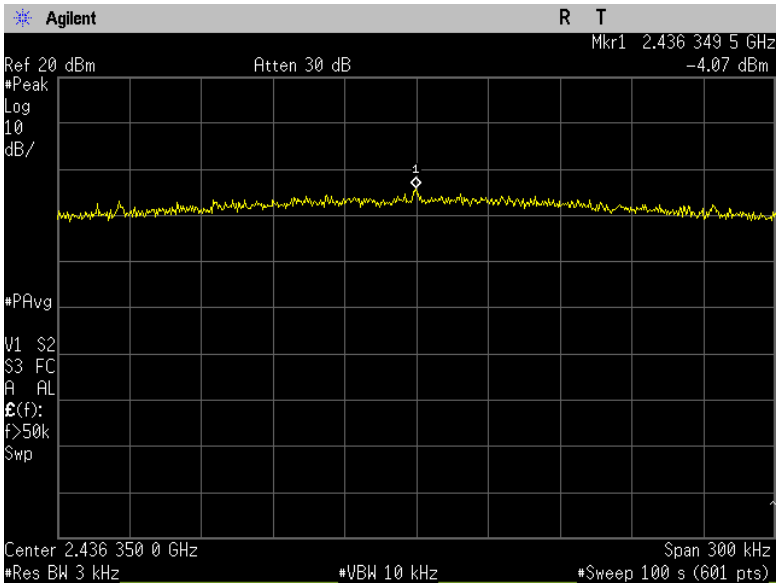
High Frequency
Plot 4.3.23



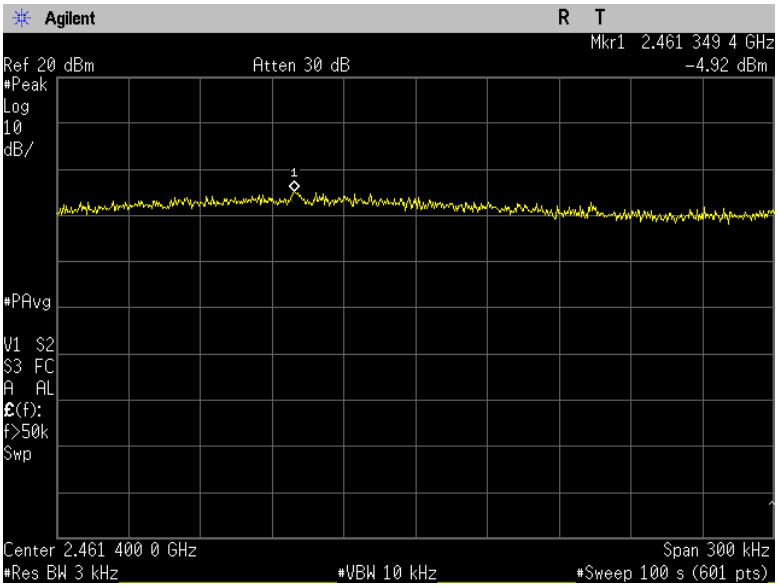
802.11 g
Low Frequency
Plot 4.3.24



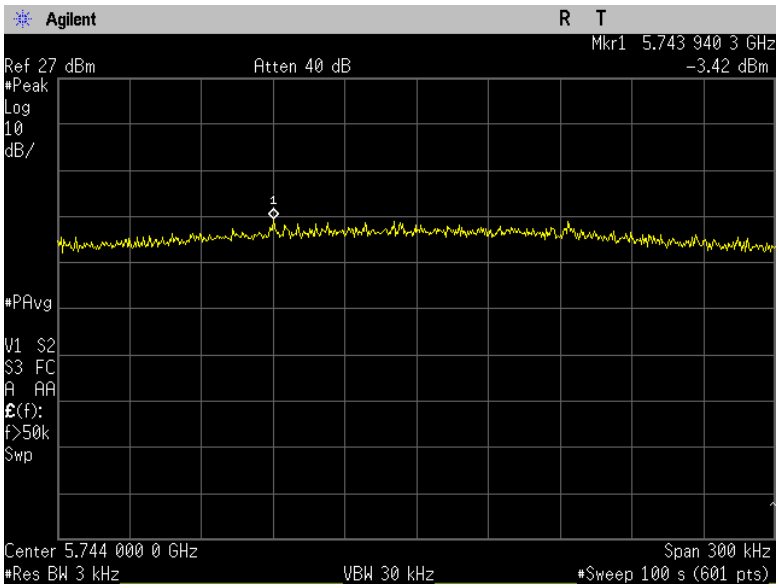
Middle Frequency
Plot 4.3.25



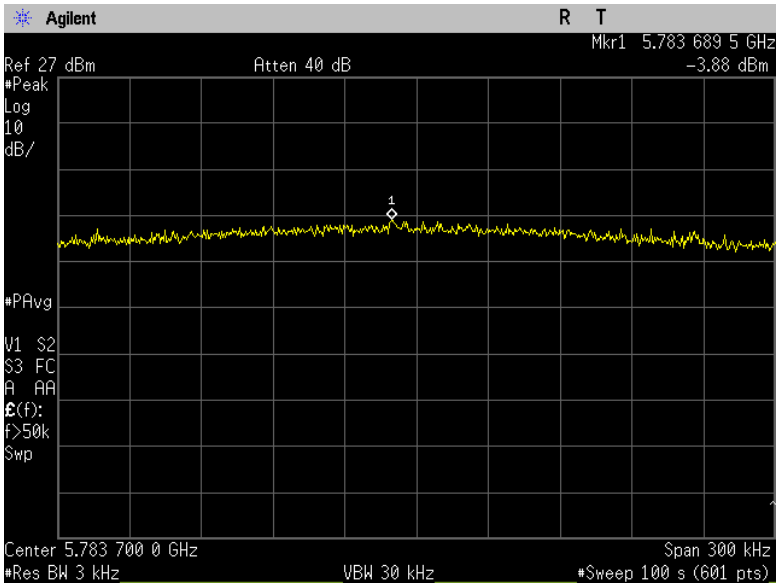
High Frequency
Plot 4.3.26



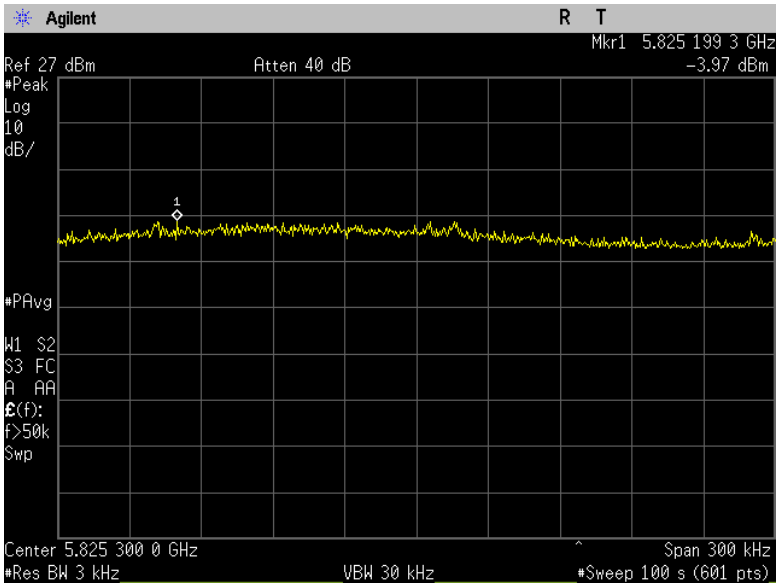
802.11 a
Low Frequency
Plot 4.3.27



Middle Frequency
Plot 4.3.28



High Frequency
Plot 4.3.29



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 Method:	See sec 2.1c	**Comply**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 100kHz, VBW:300kHz		
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity: 47%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1 to 4.4.89	

Test results:

Transmitter model: WMIA-199/EU

3 Outputs combined

2400-2483.5 MHz Band:

Spurious

Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference Plot*	
802.11b					
2412	11	*	-20	4.4.1 - 4.4.2	Comply
2437	11	*	-20	4.4.3 - 4.4.4	Comply
2462	11	*	-20	4.4.5 - 4.4.6	Comply
802.11g					
2412	54	*	-20	4.4.7 - 4.4.8	Comply
2437	54	*	-20	4.4.9 - 4.4.10	Comply
2462	54	*	-20	4.4.11 - 4.4.12	Comply
802.11 N 20 MHz					
2412	54	*	-20	4.4.13 - 4.4.14	Comply
2437	54	*	-20	4.4.15 - 4.4.16	Comply
2462	54	*	-20	4.4.17 - 4.4.18	Comply
802.11 N 40 MHz					
2422	54	*	-20	4.4.19 - 4.4.20	Comply
2437	54	*	-20	4.4.21 - 4.4.22	Comply
2452	54	*	-20	4.4.23 - 4.4.24	Comply

*All emissions at least 25 dB below the limit (45dBc)

5725-5850MHz Band:

Spurious

Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference	Result
802.11a					
5745	54	*	-20	4.4.25 - 4.4.27	Comply
5785	54	*	-20	4.4.28 - 4.4.30	Comply
5825	54	*	-20	4.4.31 - 4.4.33	Comply
802.11 N 20 MHz					
5745	130	*	-20	4.4.34 - 4.4.36	Comply
5785	130	*	-20	4.4.37 - 4.4.39	Comply
5825	130	*	-20	4.4.40 - 4.4.42	Comply
802.11 N 40 MHz					
5755	300	*	-20	4.4.43 - 4.4.45	Comply
5795	300	*	-20	4.4.46 - 4.4.48	Comply

*All emissions at least 25 dB below the limit (45dBc)

2400-2483.5 MHz Band:

Band edge

Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference	Result
802.11b					
2412	11	-38.8	-20	4.4.76	Comply
2462	11	-51.33	-20	4.4.77	Comply
802.11g					
2412	54	-32.82	-20	4.4.78	Comply
2462	54	-47.52	-20	4.4.79	Comply
802.11 N 20 MHz					
2412	54	-31.94	-20	4.4.80	Comply
2462	54	-47.52	-20	4.4.81	Comply
802.11 N 40 MHz					
2412	54	-30.66	-20	4.4.82	Comply
2462	54	-42.64	-20	4.4.83	Comply

5725-5850MHz Band:

Band edge

Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference	Result
802.11a					
5745	54	-46.97	-20	4.4.84	Comply
5825	54	-56.55	-20	4.4.87	Comply
802.11a N 20 MHz					
5745	54	-51.4	-20	4.4.85	Comply
5825	54	-61.12	-20	4.4.88	Comply
802.11aN 40 MHz					
5755	54	-39.31	-20	4.4.86	Comply
5795	54	-58.76	-20	4.4.89	Comply

Transmitter Model: WLM54AG

Spurious

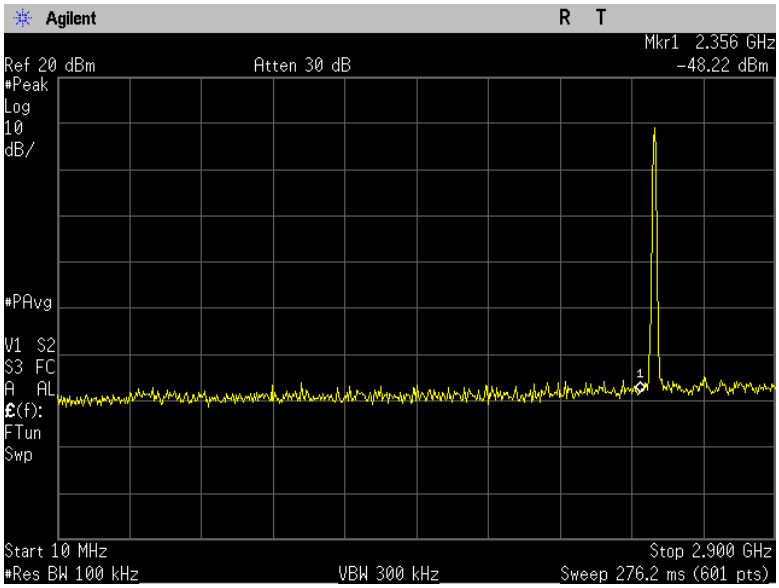
Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference Plot*	Result
802.11b					
2412	11	*	-20	4.4.49 - 4.4.50	Comply
2437	11	*	-20	4.4.51 - 4.4.52	Comply
2462	11	*	-20	4.4.53 - 4.4.54	Comply
802.11g					
2412	54	*	-20	4.4.55 - 4.4.56	Comply
2437	54	*	-20	4.4.57 - 4.4.58	Comply
2462	54	*	-20	4.4.59 - 4.4.60	Comply
802.11 a					
5745	54	*	-20	4.4.61 - 4.4.63	Comply
5785	54	*	-20	4.4.64 - 4.4.66	Comply
5825	54	*	-20	4.4.67 - 4.4.69	Comply

All emissions at least 25 dB below the limit (45dBc)

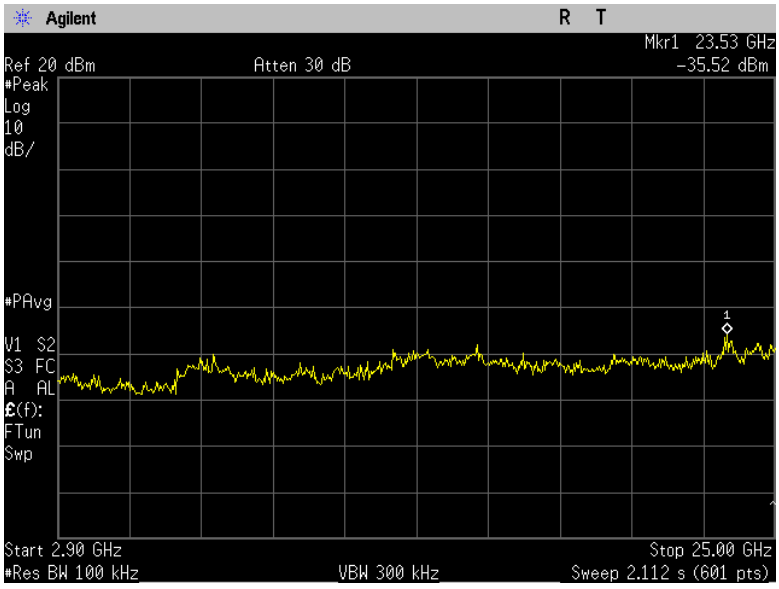
Band edge

Frequency [MHz]	Data Rate [Mbps]	Delta value [dBc]	Delta value Limit [dBc]	Reference	Result
802.11b					
2412	11	-43.7	-20	4.4.70	Comply
2462	11	-57.47	-20	4.4.71	Comply
802.11g					
2412	54	-30.47	-20	4.4.72	Comply
2462	54	- 49.57	-20	4.4.73	Comply
802.11a					
5745	54	-44.5	-20	4.4.74	Comply
5825	54	-58.17	-20	4.4.75	Comply

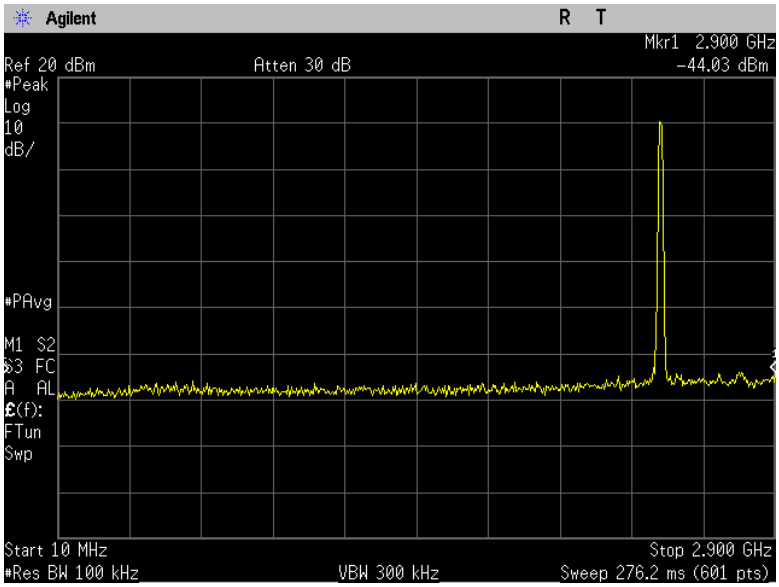
Transmitter model: WMIA-199/EU
802.11b
Low Frequency
Plot 4.4.1



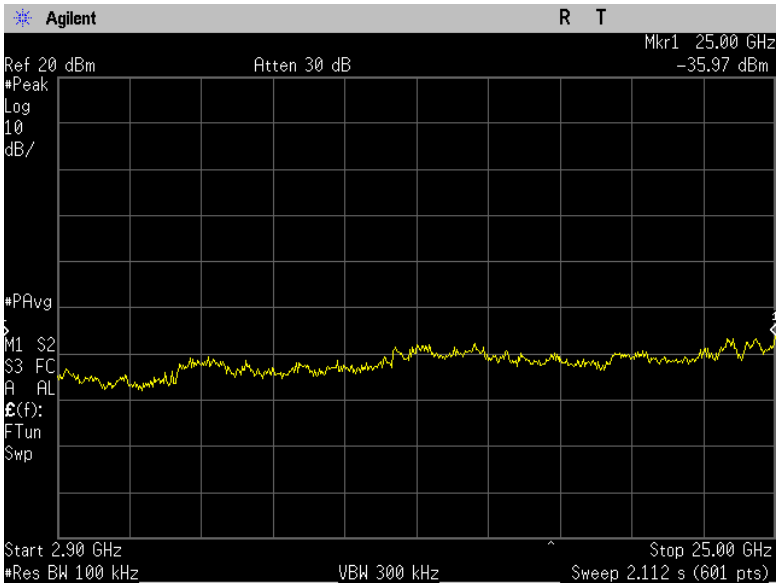
Plot 4.4.2



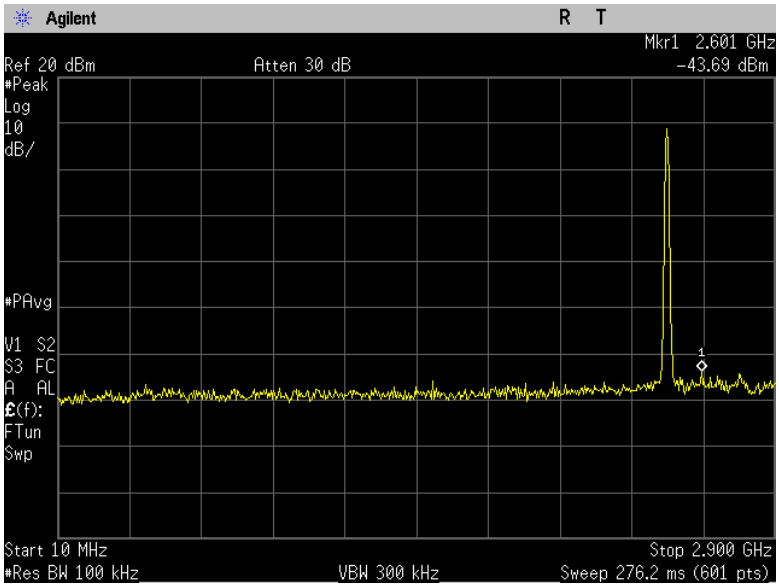
Middle Frequency
Plot 4.4.3



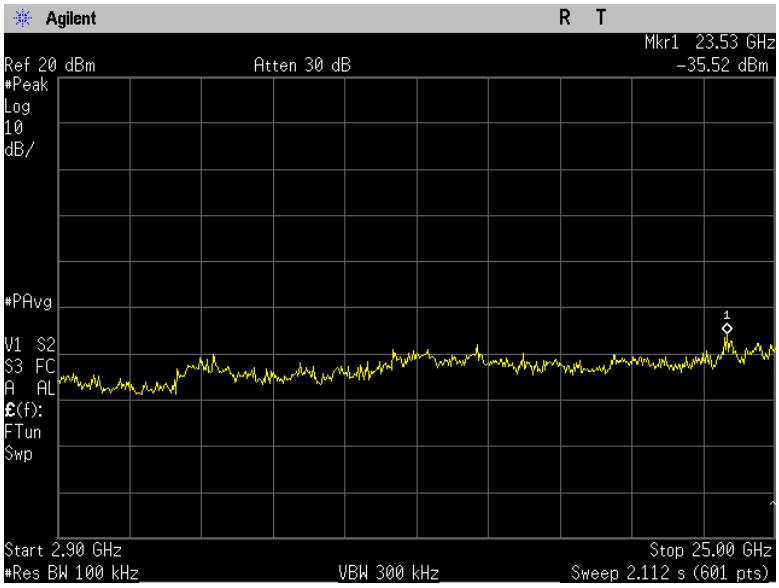
Plot 4.4.4



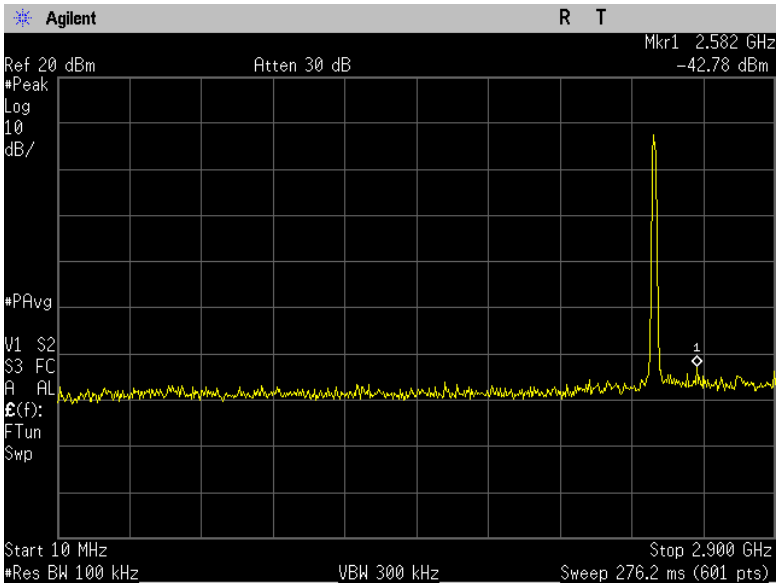
High Frequency
Plot 4.4.5



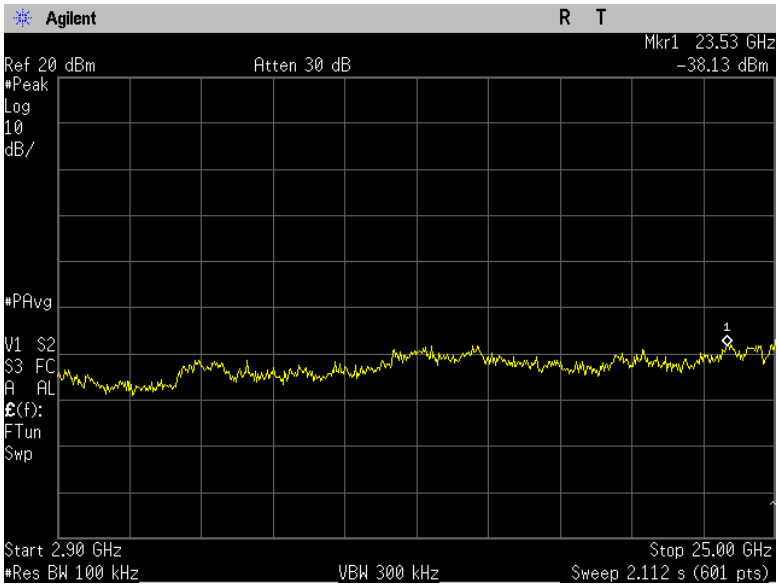
Plot 4.4.6



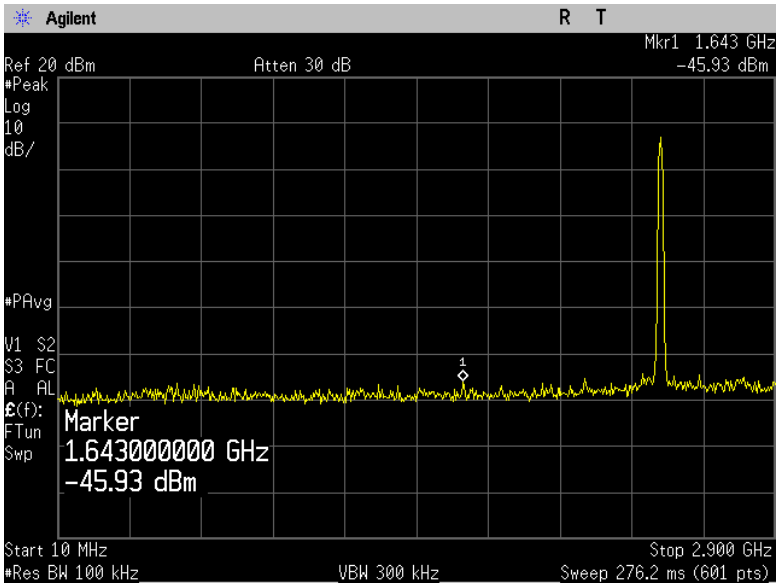
802.11 g
Low Frequency
Plot 4.4.7



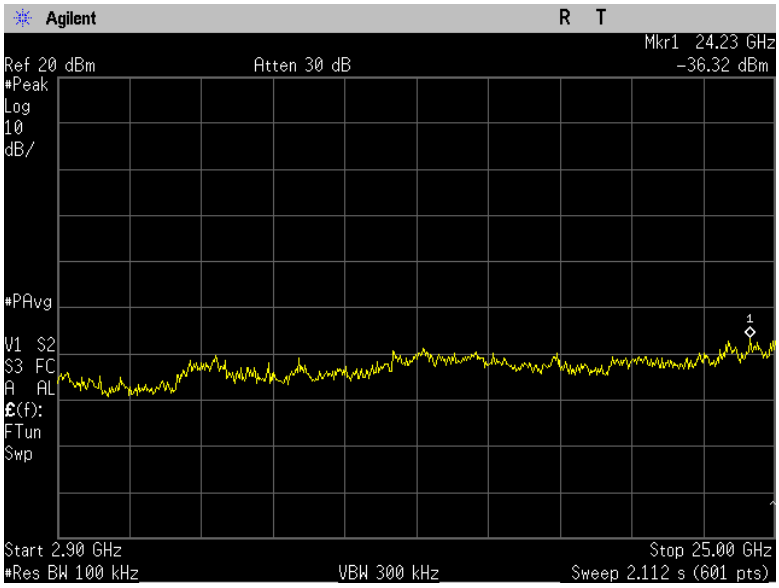
Plot 4.4.8



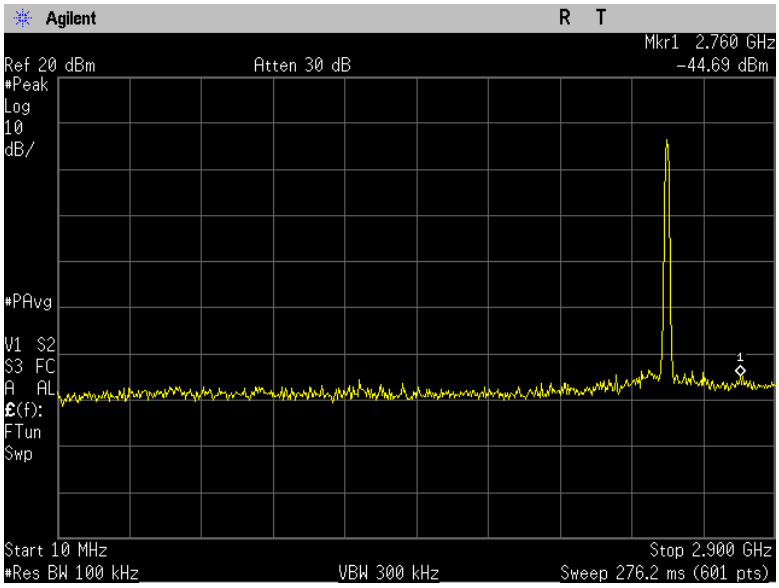
Middle Frequency
Plot 4.4.9



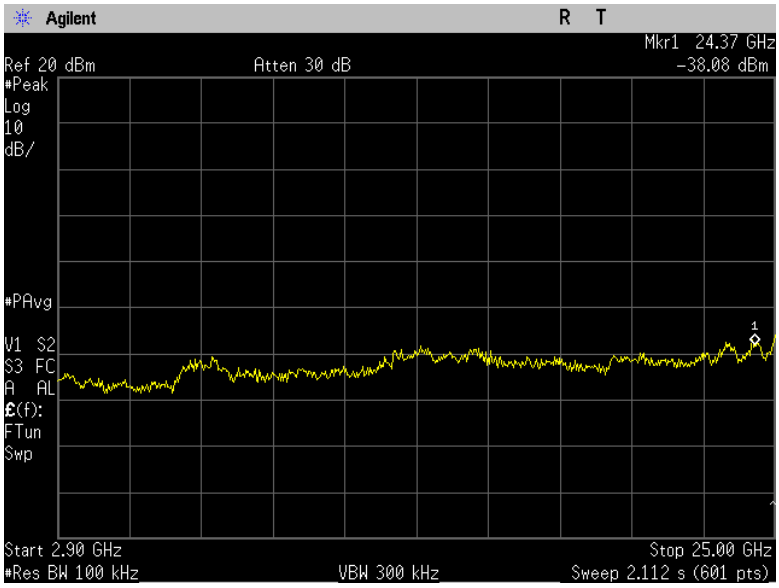
Plot 4.4.10



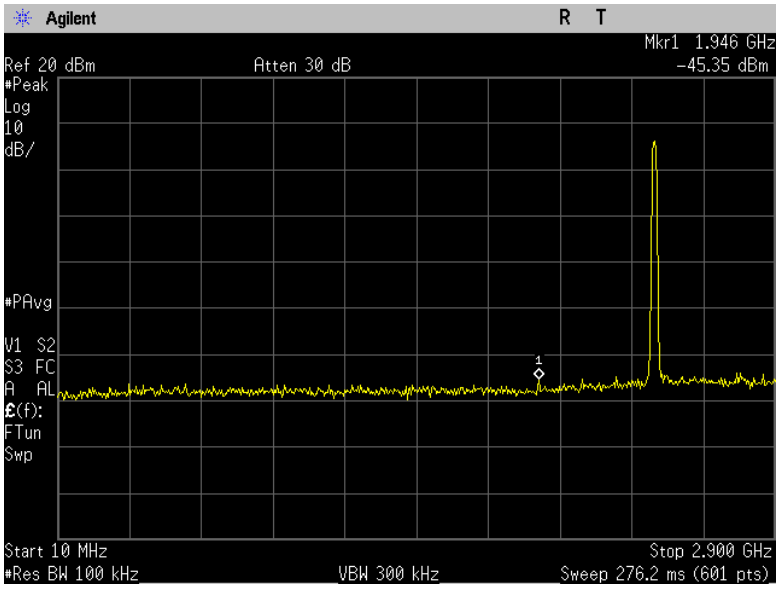
High Frequency
Plot 4.4.11



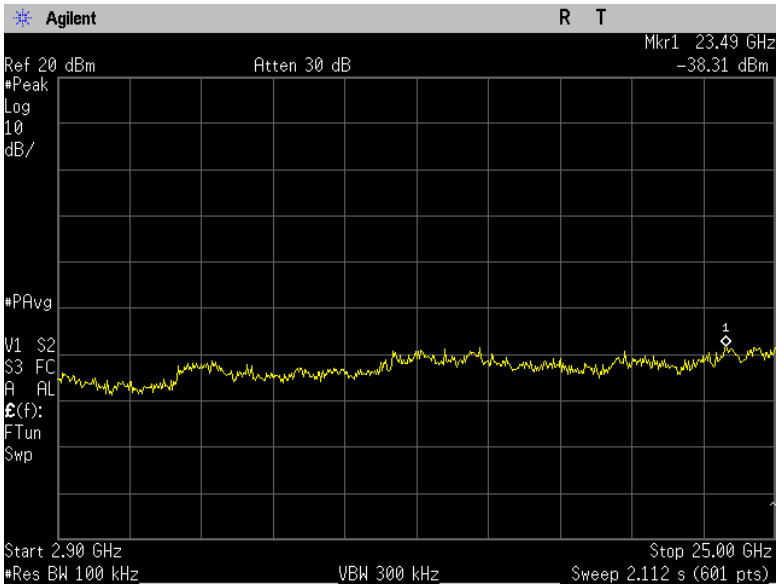
Plot 4.4.12



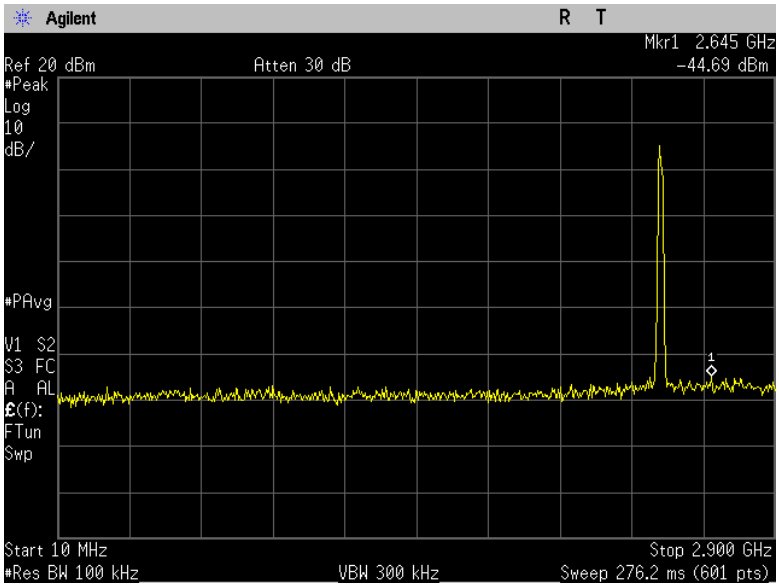
802.11 N, 20 MHz
Low Frequency
Plot 4.4.13



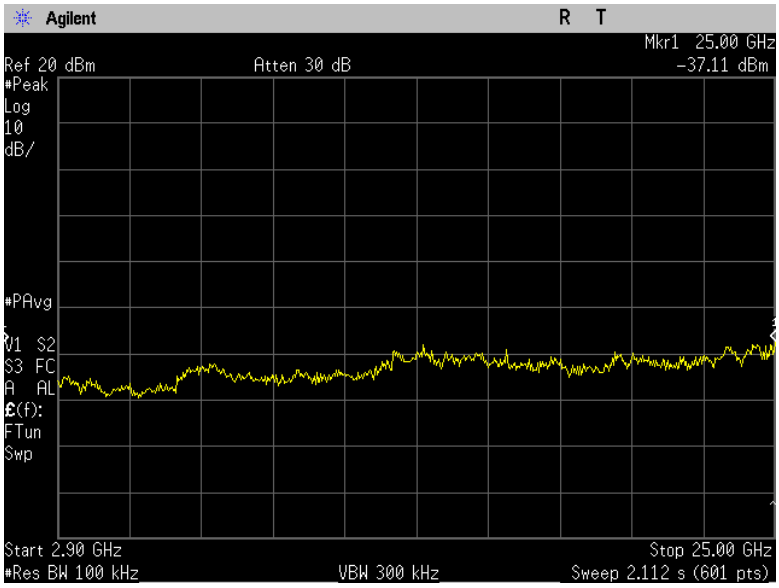
Plot 4.4.14



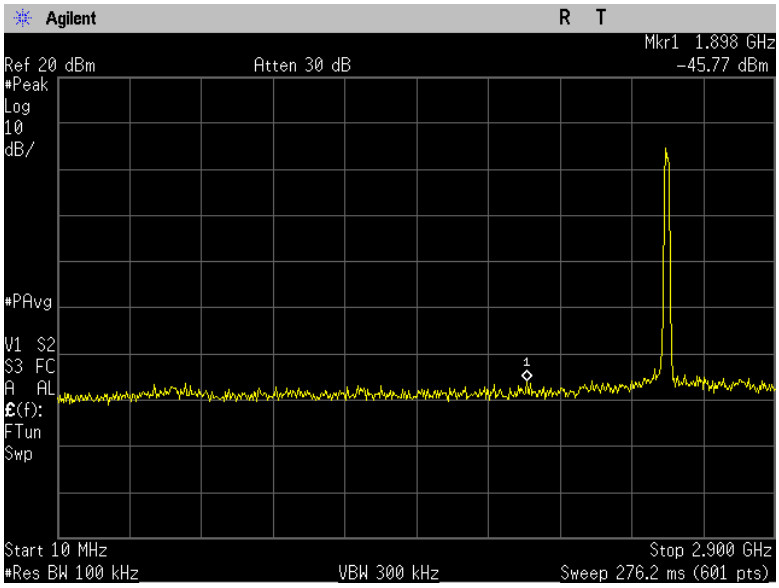
Middle Frequency
Plot 4.4.15



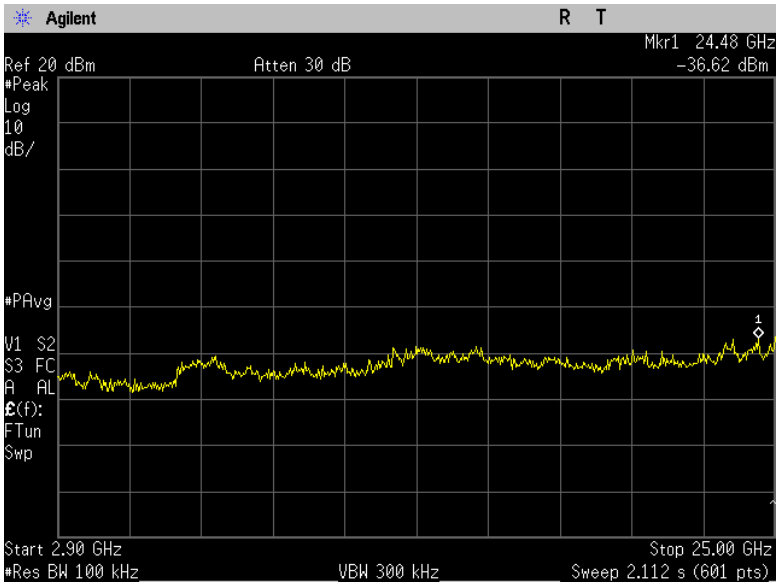
Plot 4.4.16



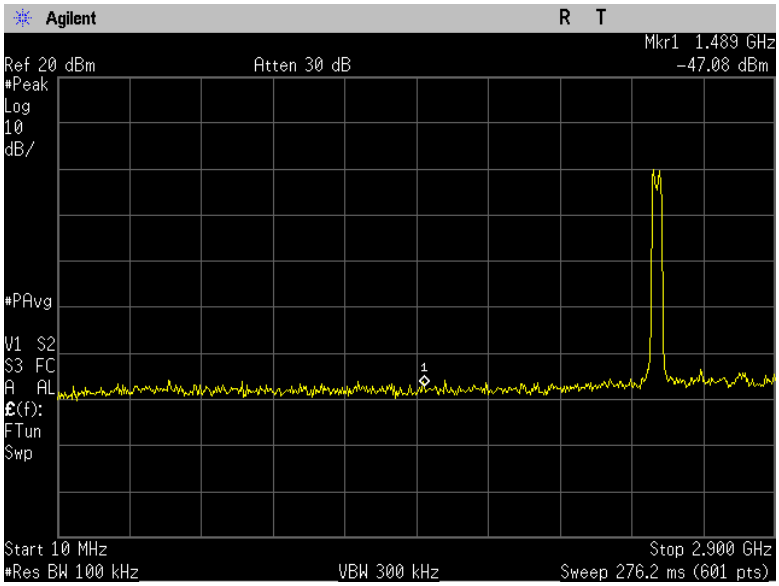
High Frequency
Plot 4.4.17



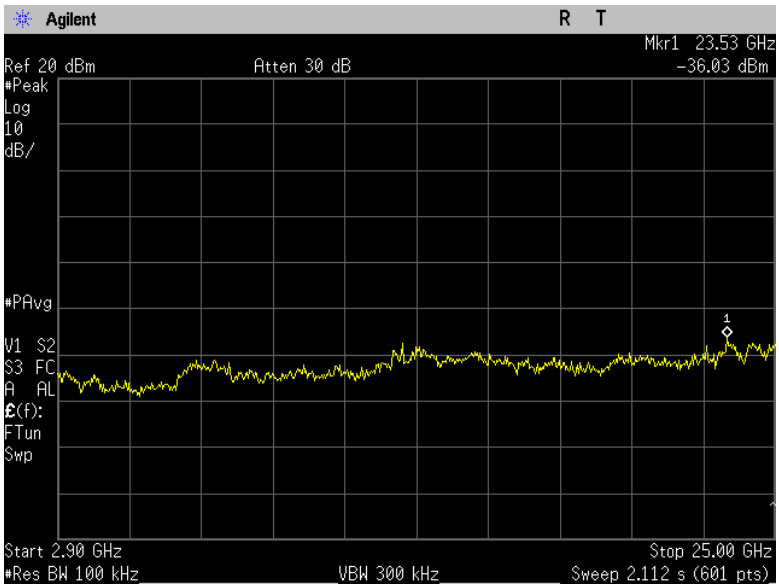
Plot 4.4.18



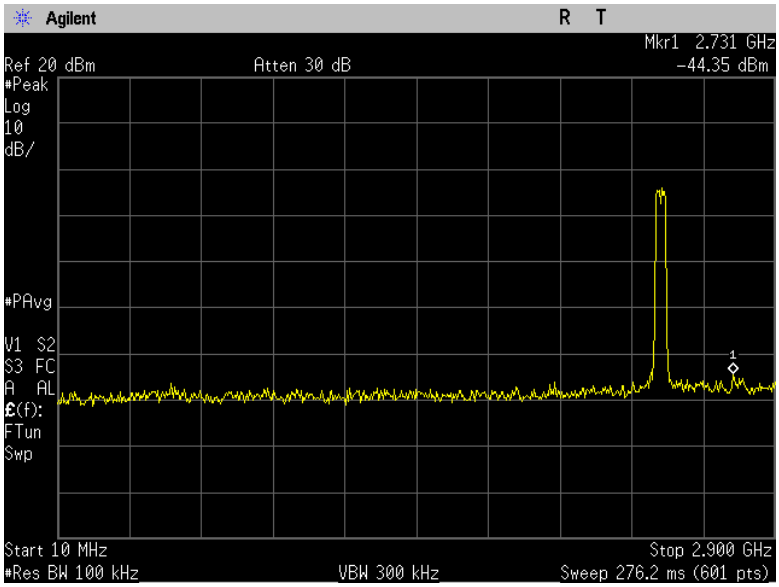
802.11 N, 40 MHz
Low Frequency
Plot 4.4.19



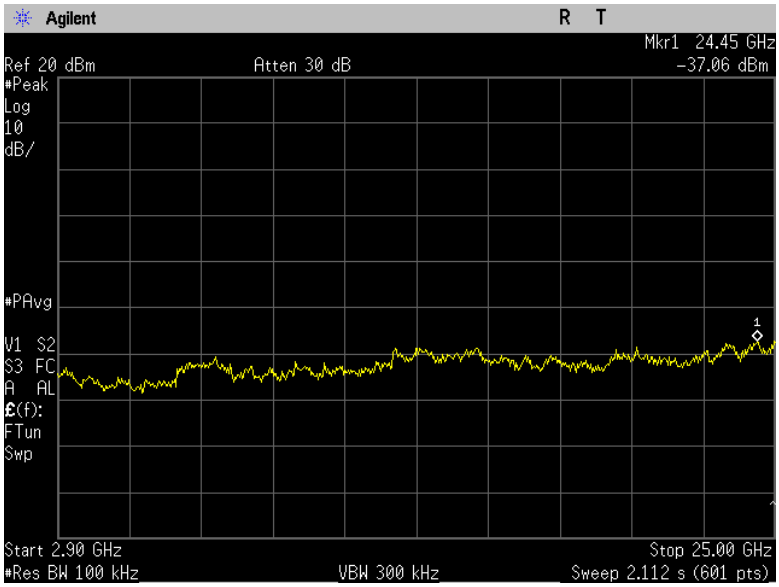
Plot 4.4.20



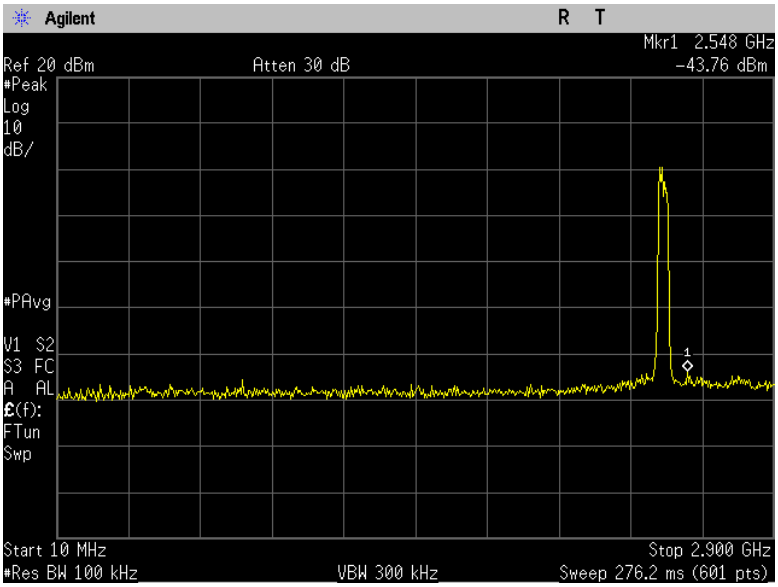
Middle Frequency
Plot 4.4.21



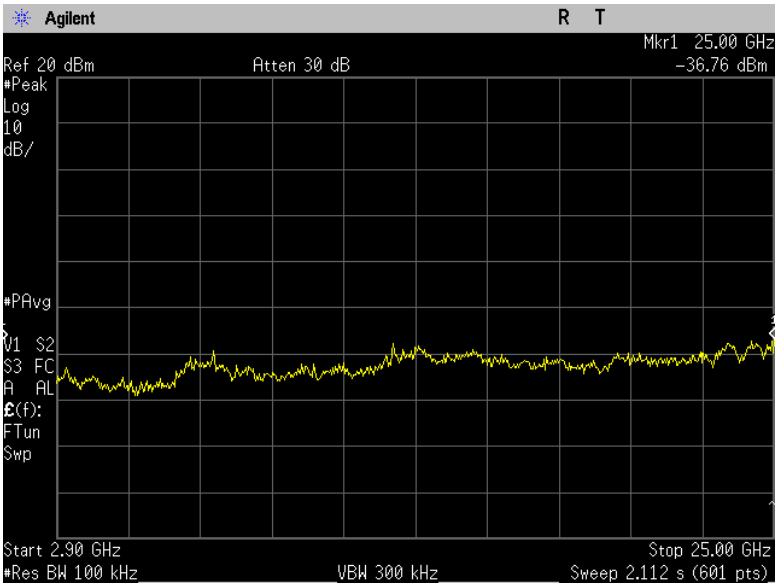
Plot 4.4.22



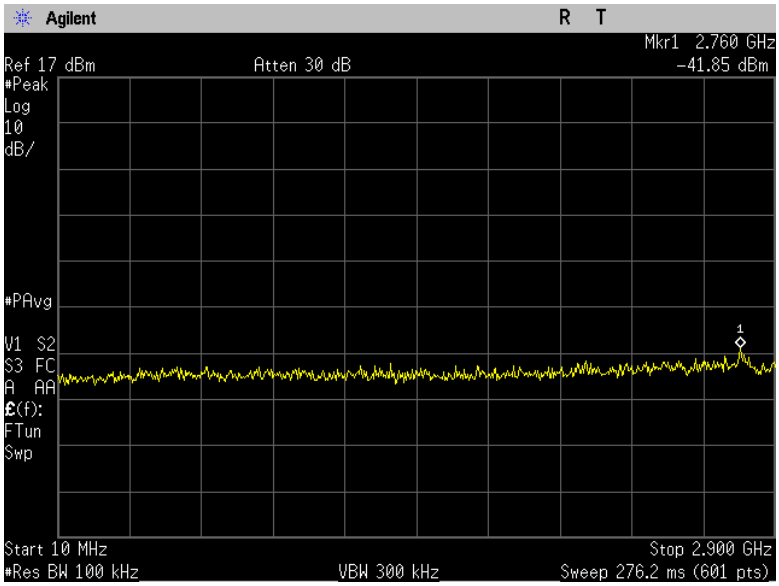
High Frequency
Plot 4.4.23



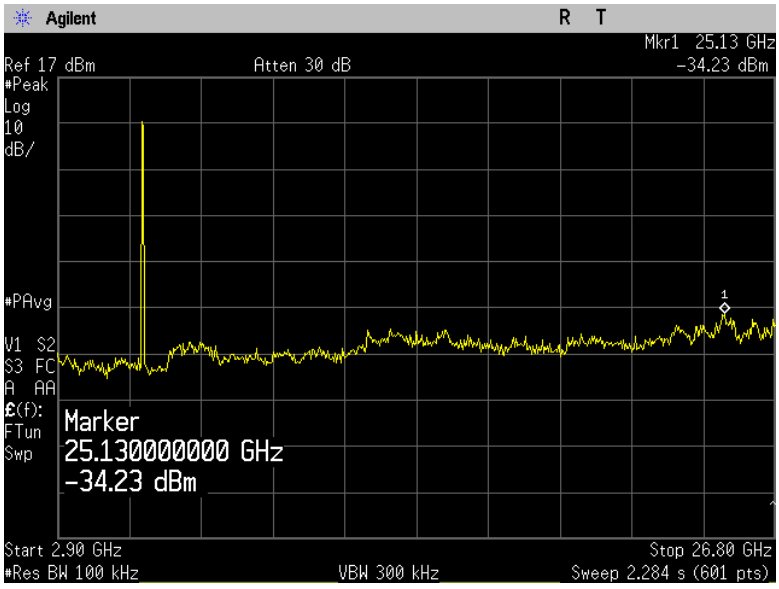
Plot 4.4.24



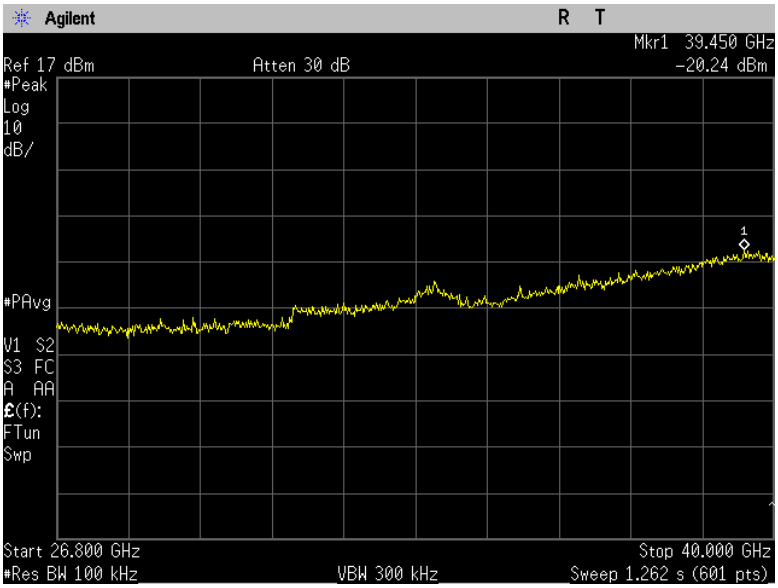
802.11 a
Low Frequency
Plot 4.4.25



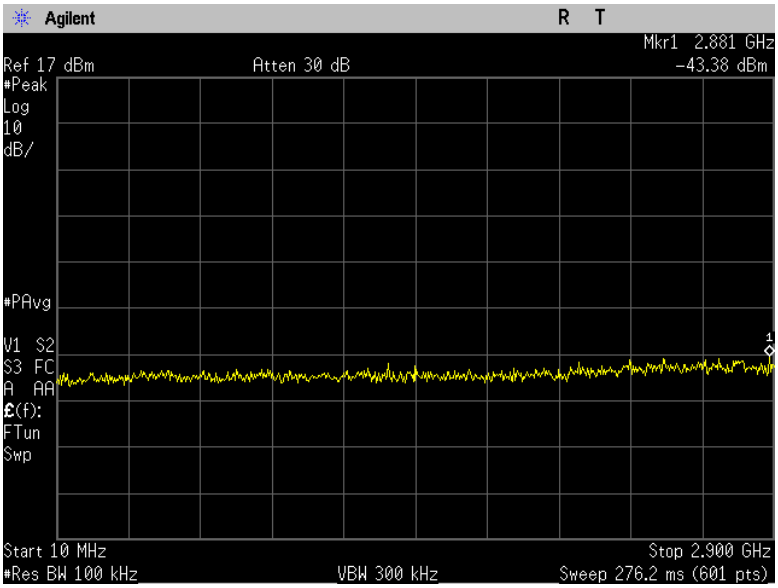
Plot 4.4.26



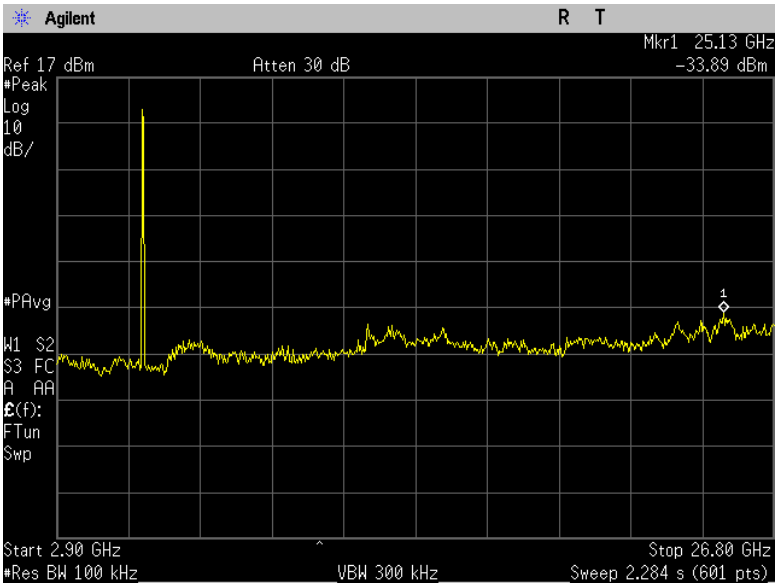
Plot 4.4.27


Agilent
R T
Mkr1 39.450 GHz
Ref 17 dBm
Atten 30 dB
-20.24 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

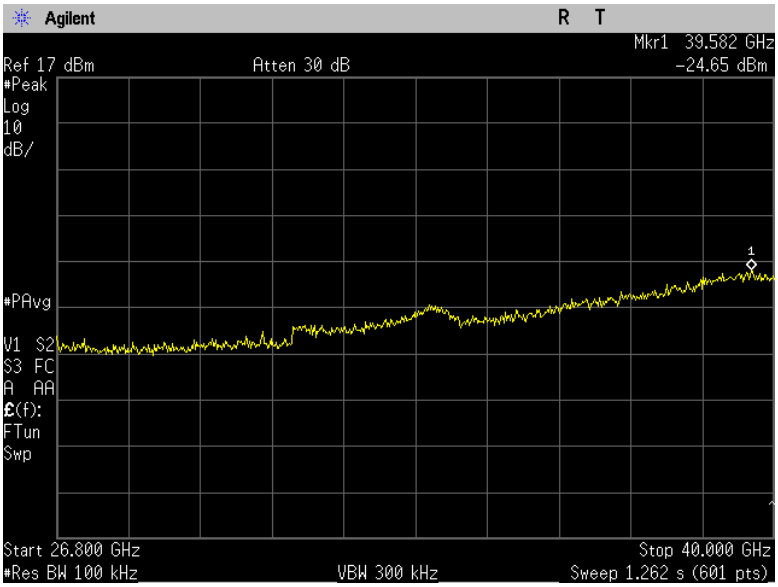
Middle Frequency
Plot 4.4.28



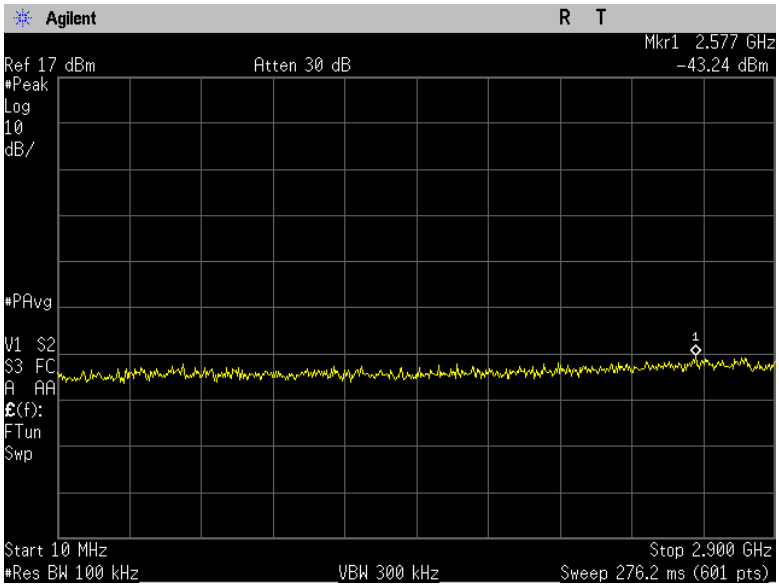
Plot 4.4.29



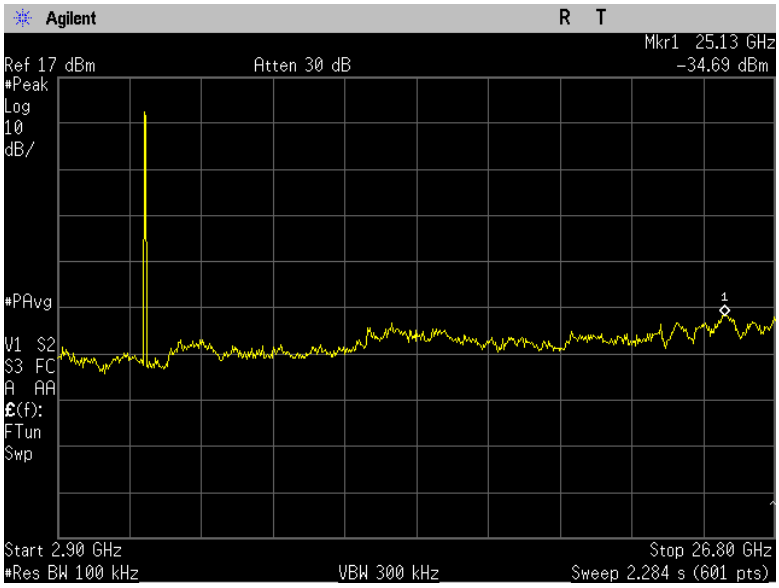
Plot 4.4.30


Agilent
R T
Mkr1 39.582 GHz
Ref 17 dBm
Atten 30 dB
-24.65 dBm
#Peak
Log
10
dB/
1
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

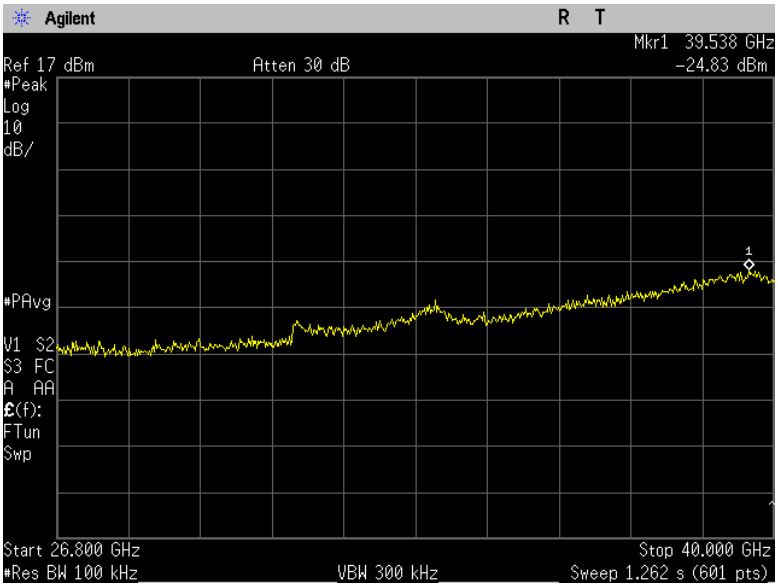
High Frequency
Plot 4.4.31



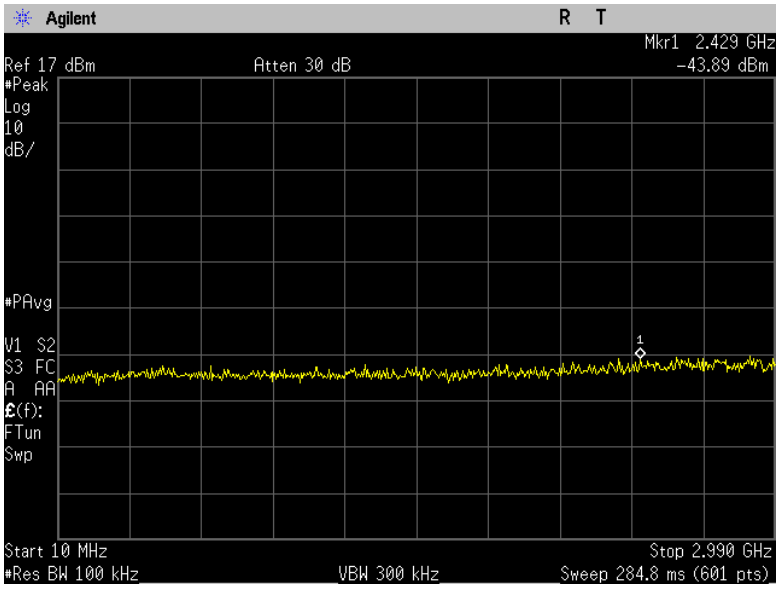
Plot 4.4.32



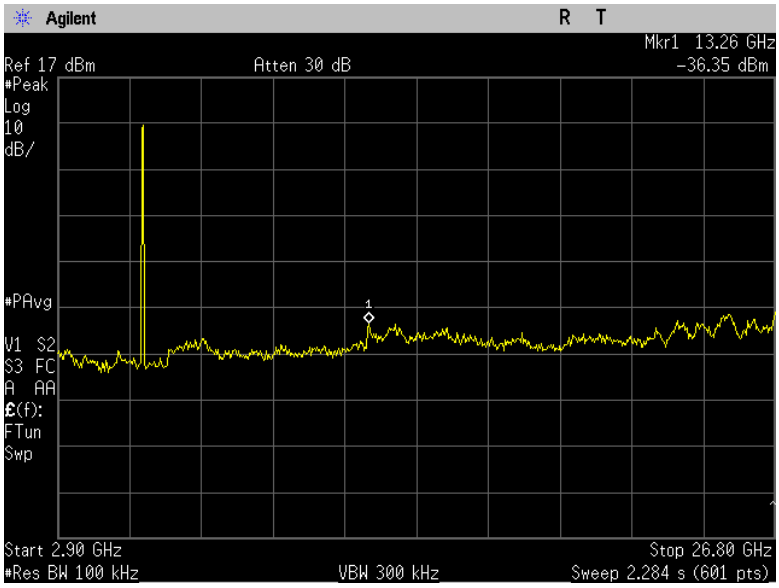
Plot 4.4.33


Agilent
R T
Mkr1 39.538 GHz
Ref 17 dBm
Atten 30 dB
-24.83 dBm
#Peak
Log
10
dB/
1
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

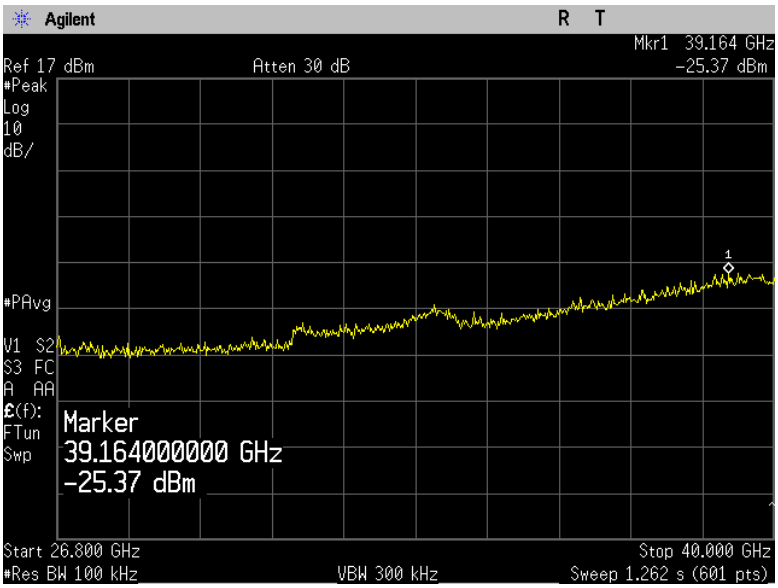
802.11 N, 20MHz
Low Frequency
Plot 4.4.34



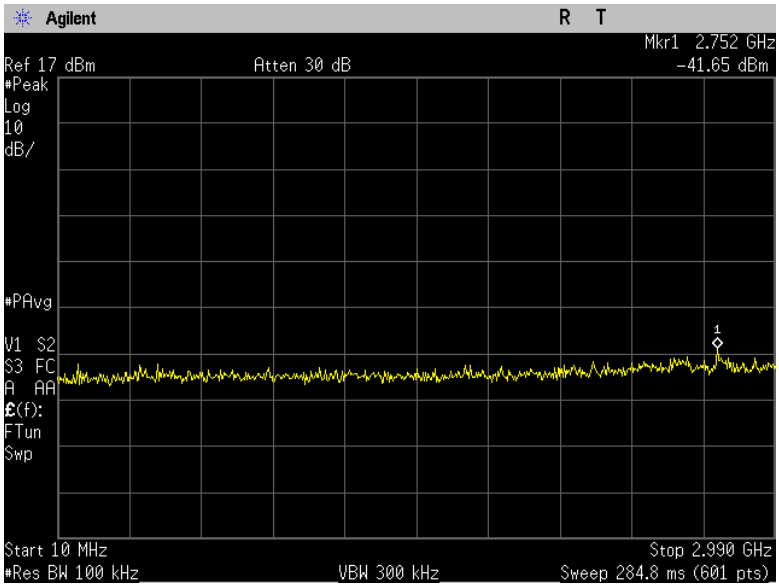
Plot 4.4.35



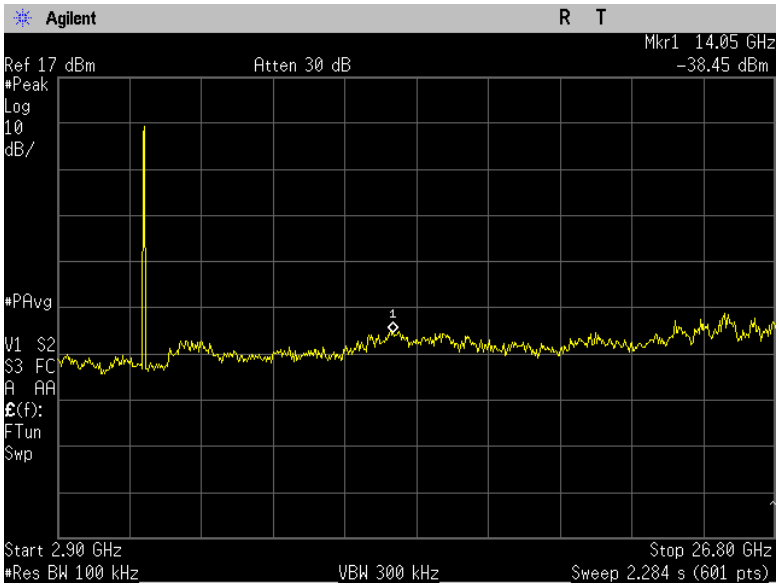
Plot 4.4.36


Agilent
R T
Mkr1 39.164 GHz
Ref 17 dBm
Atten 30 dB
-25.37 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Marker
39.164000000 GHz
-25.37 dBm
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

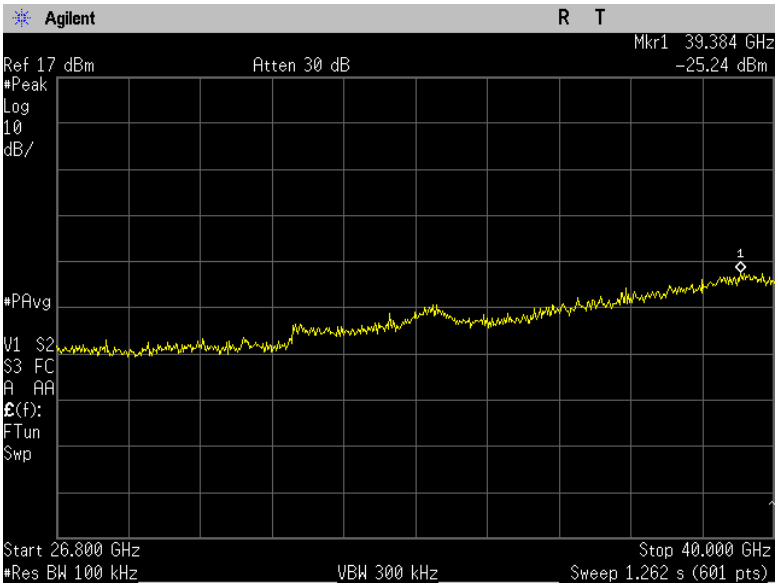
Middle Frequency
Plot 4.4.37



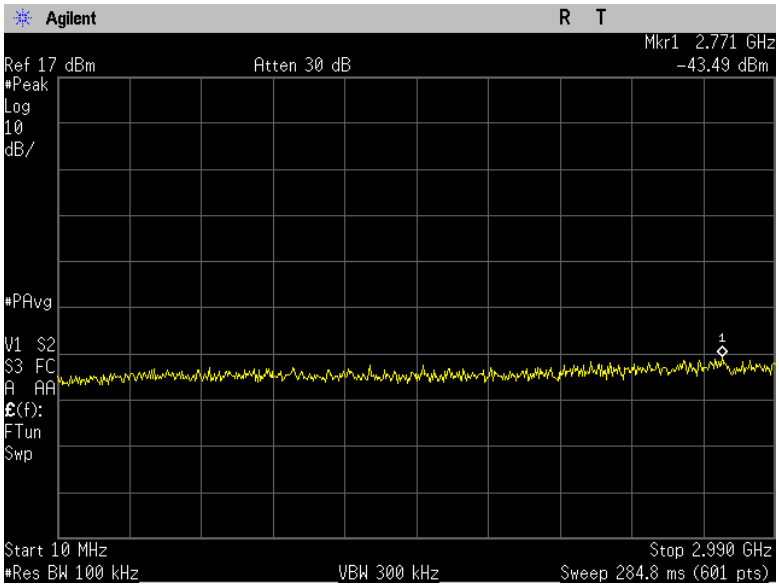
Plot 4.4.38



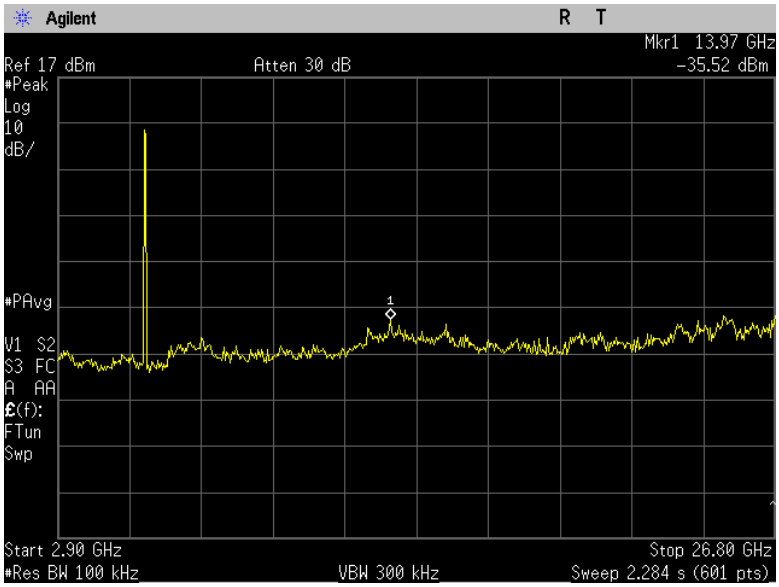
Plot 4.4.39


Agilent
R T
Mkr1 39.384 GHz
Ref 17 dBm
Atten 30 dB
-25.24 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

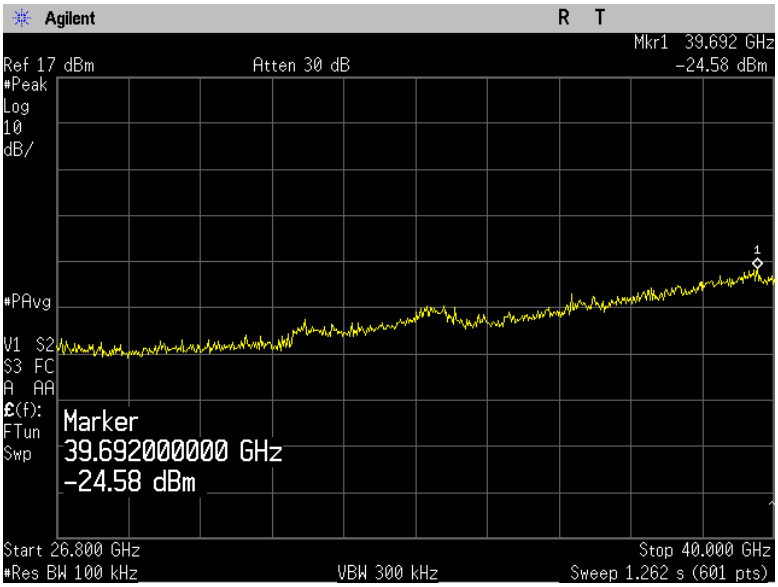
High Frequency
Plot 4.4.40



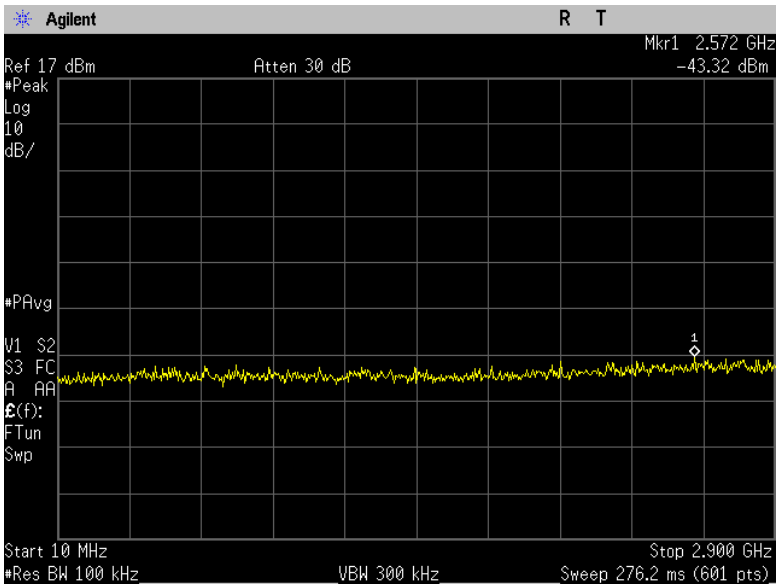
Plot 4.4.41



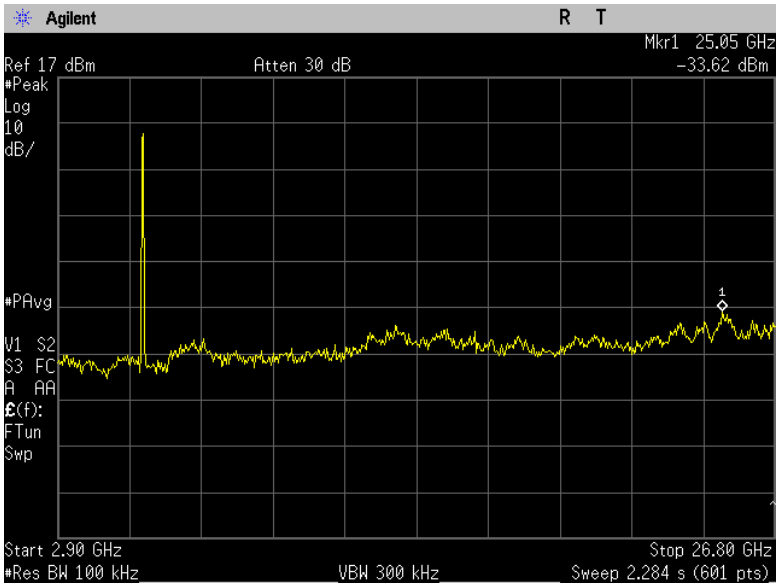
Plot 4.4.42


Agilent
R T
Mkr1 39.692 GHz
Ref 17 dBm
Atten 30 dB
-24.58 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Marker
39.692000000 GHz
-24.58 dBm
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

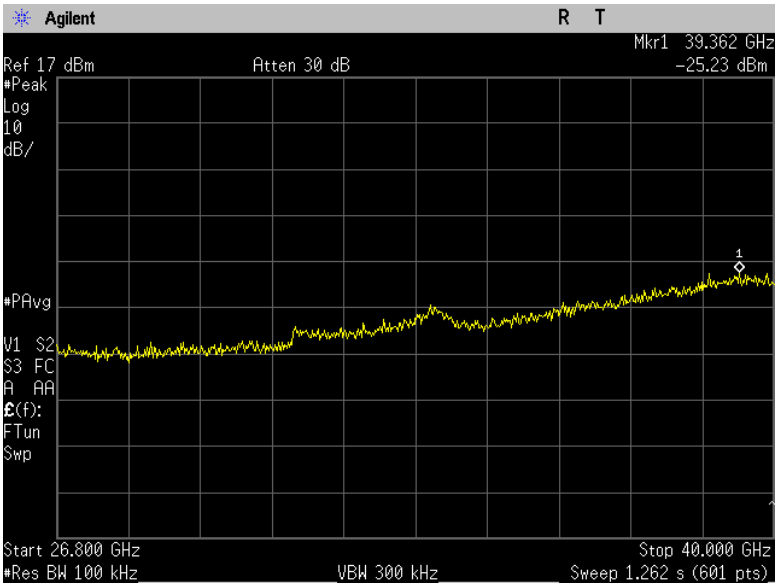
802.11 N, 40 MHz
Low Frequency
Plot 4.4.43



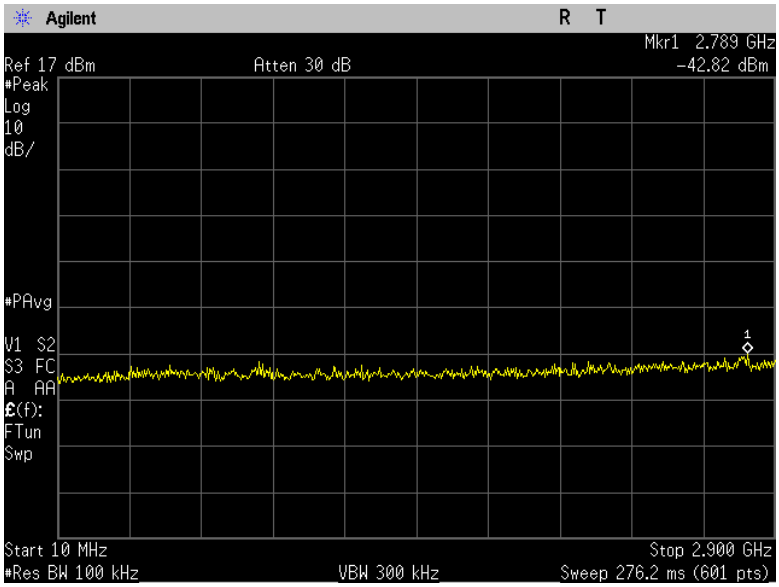
Plot 4.4.44



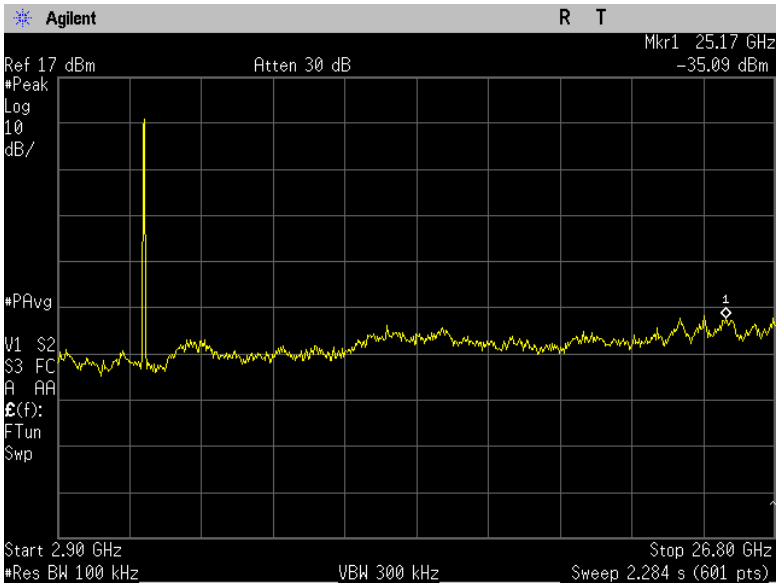
Plot 4.4.45


Agilent
R T
Mkr1 39.362 GHz
Ref 17 dBm
Atten 30 dB
-25.23 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
1
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

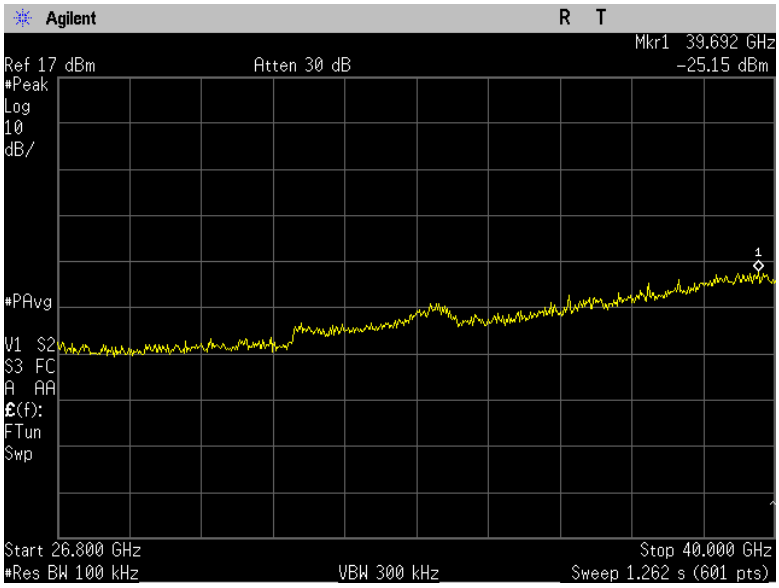
High Frequency
Plot 4.4.46



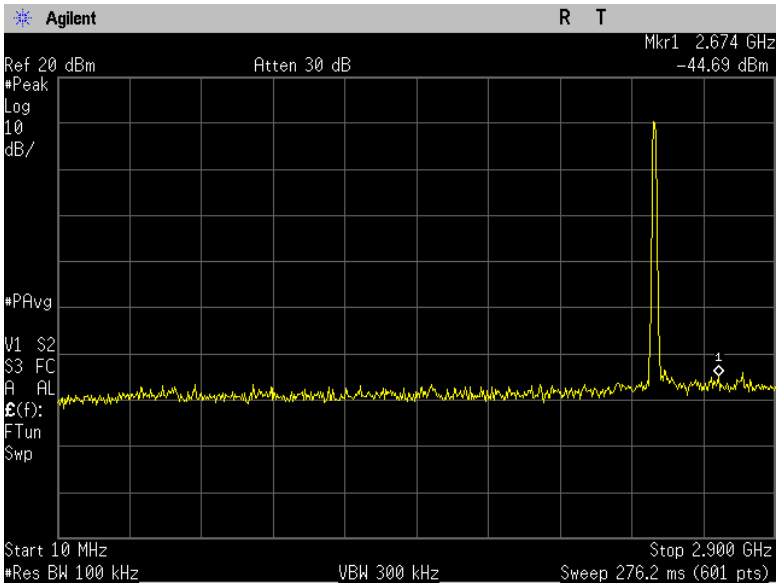
Plot 4.4.47



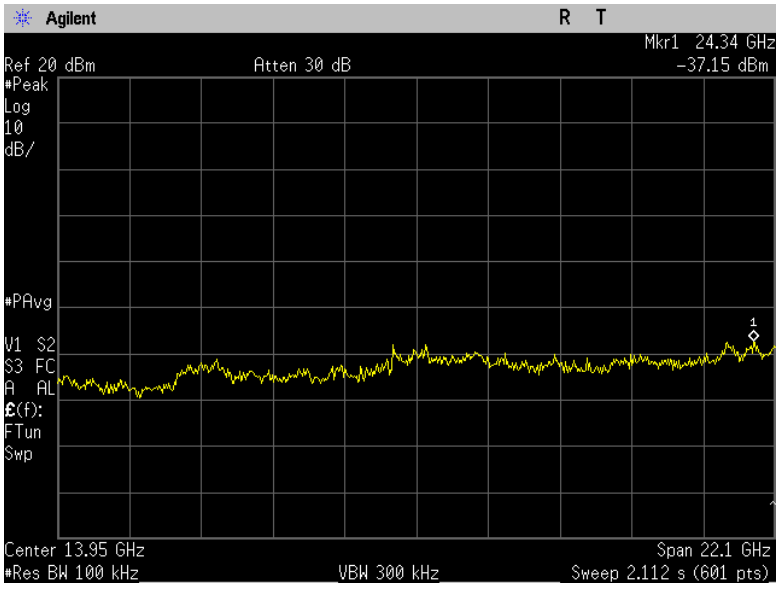
Plot 4.4.48


Agilent
R T
Mkr1 39.692 GHz
Ref 17 dBm
Atten 30 dB
-25.15 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

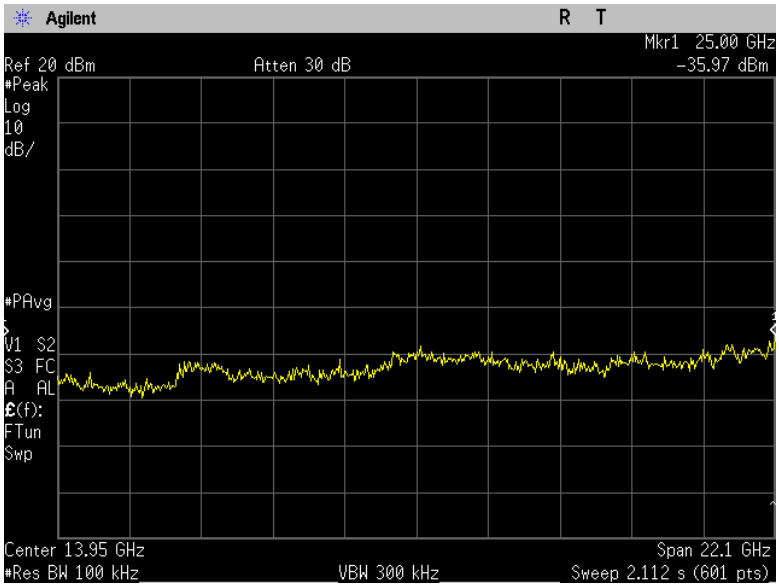
Transmitter Model: WLM54AG
802.11 b
Low Frequency
Plot 4.4.49



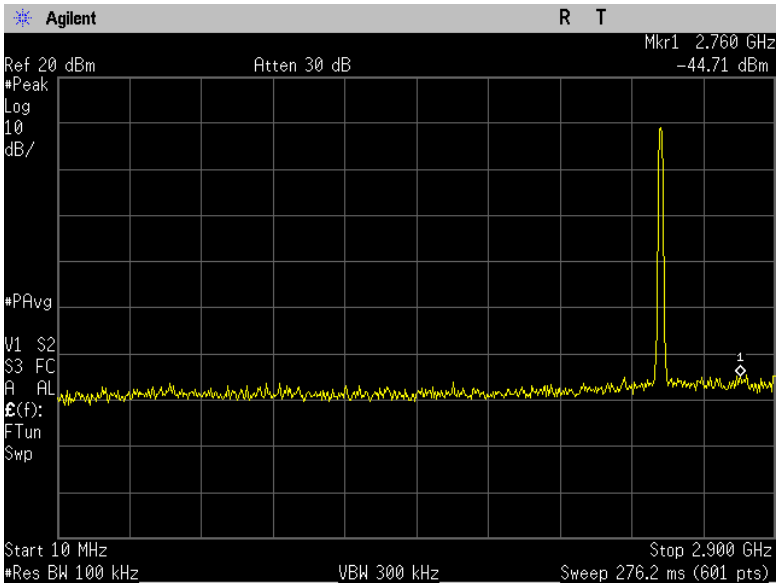
Plot 4.4.50



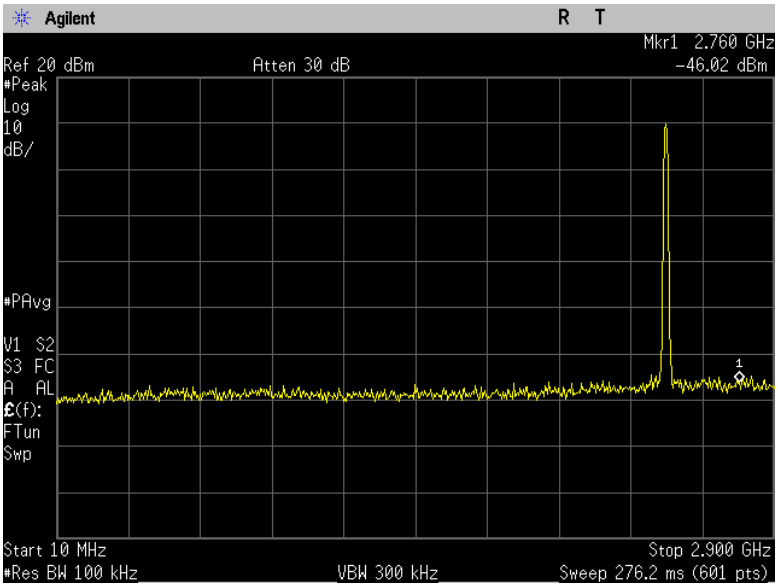
Middle Frequency
Plot 4.4.51



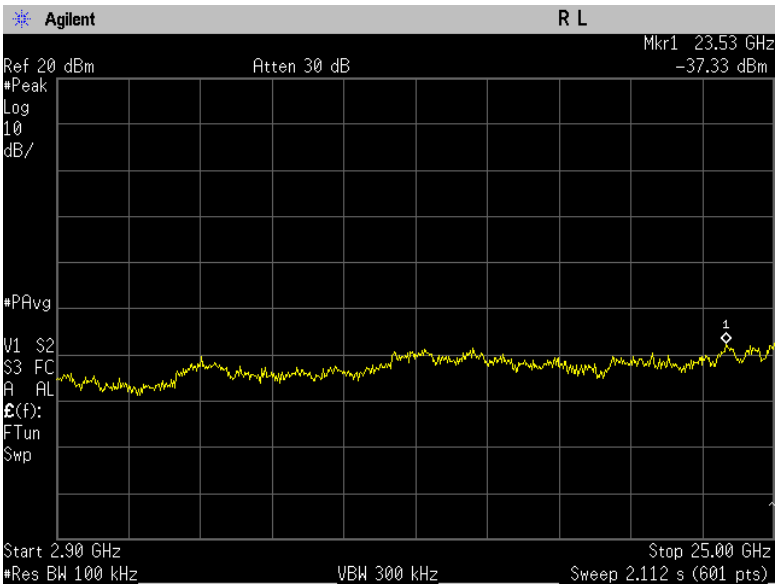
Plot 4.4.52



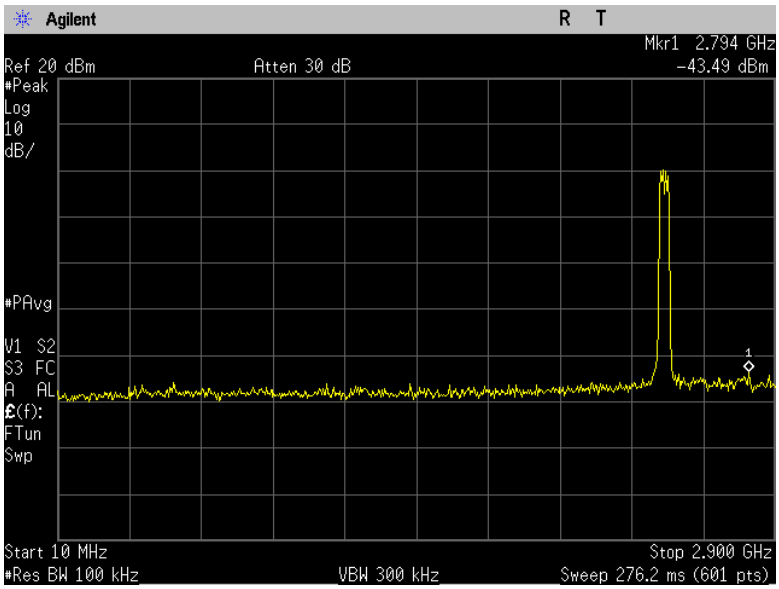
High Frequency
Plot 4.4.53



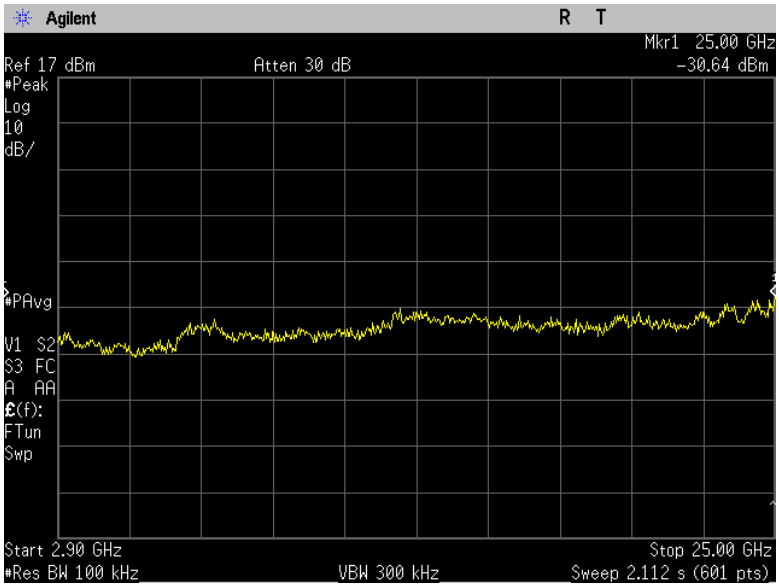
Plot 4.4.54



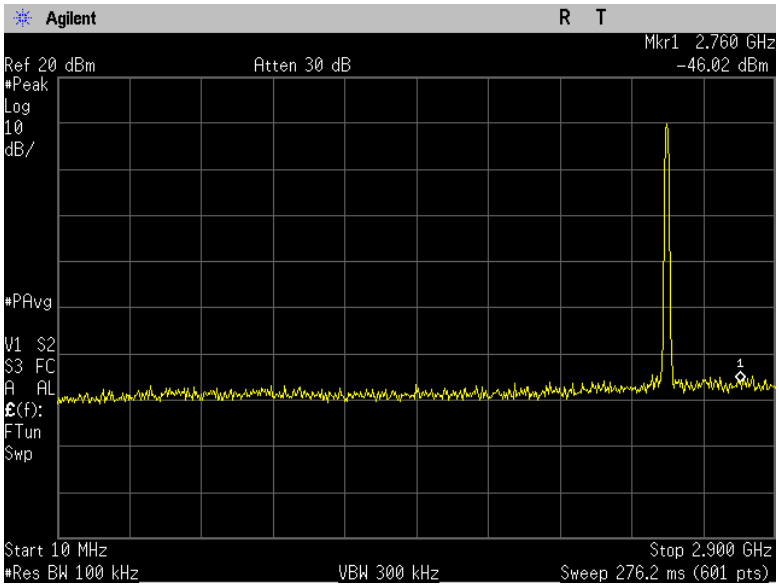
802.11 g
Low Frequency
Plot 4.4.55



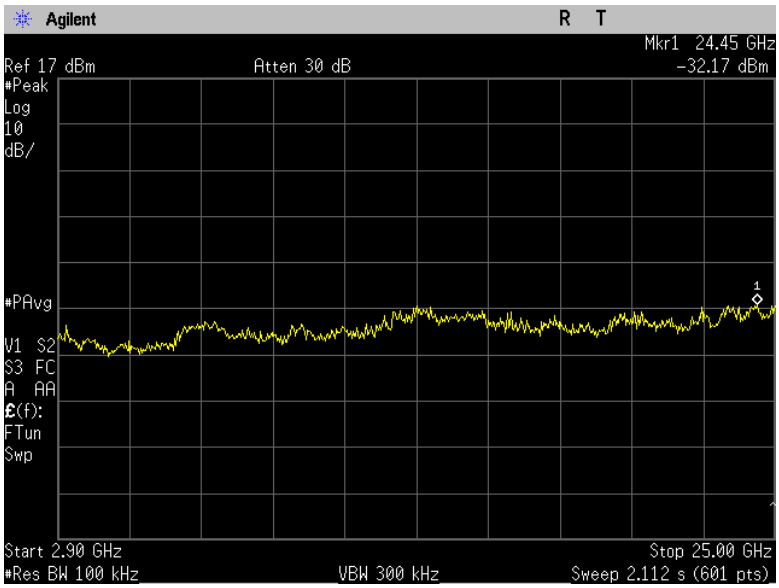
Plot 4.4.56



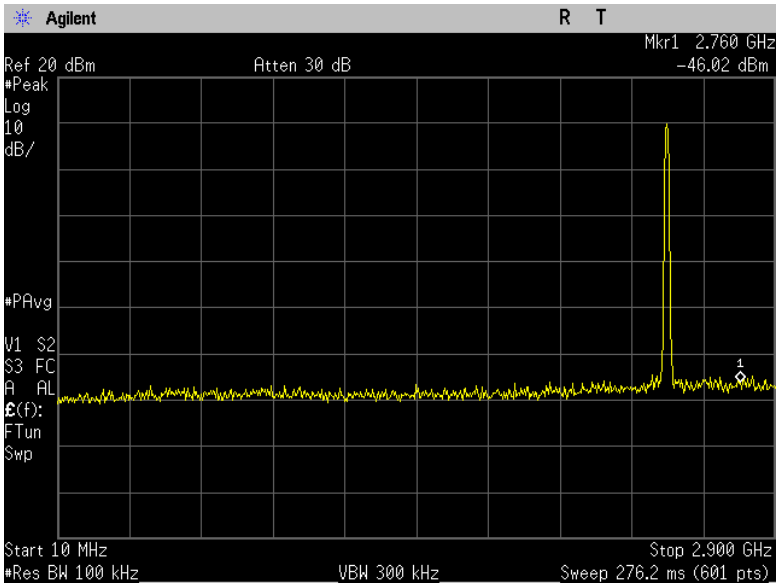
Middle Frequency
Plot 4.4.57



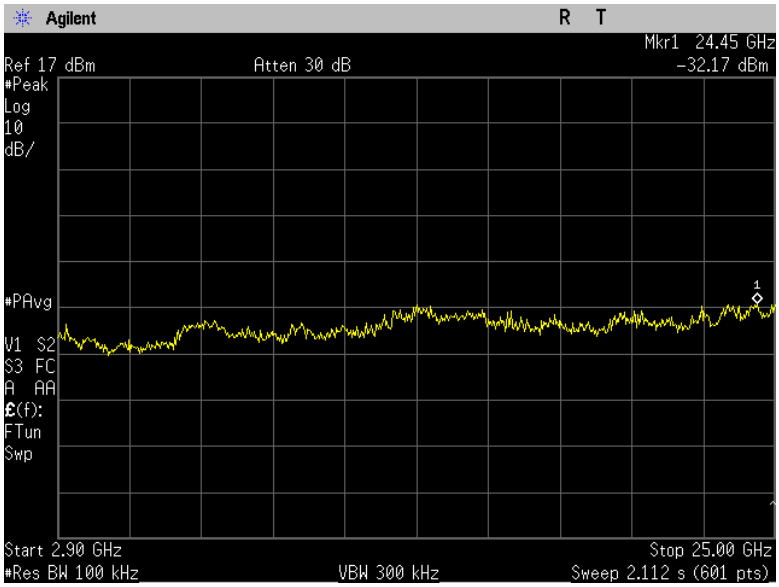
Plot 4.4.58



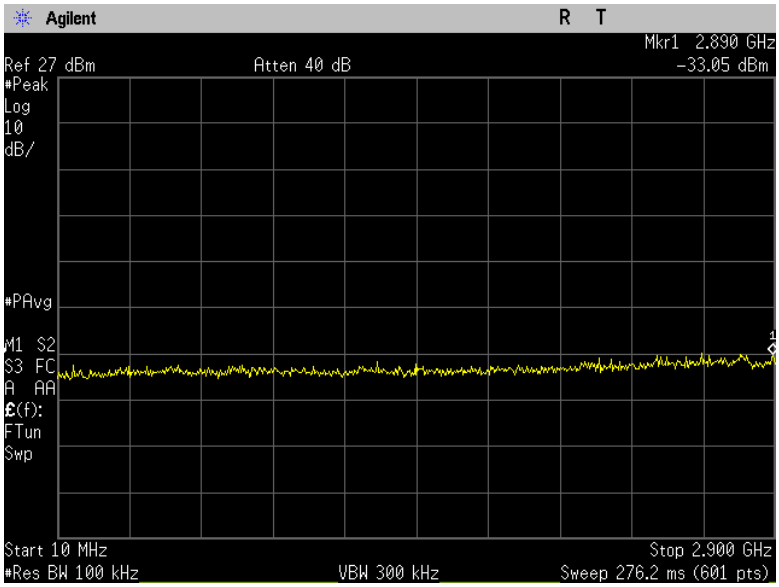
High Frequency
Plot 4.4.59



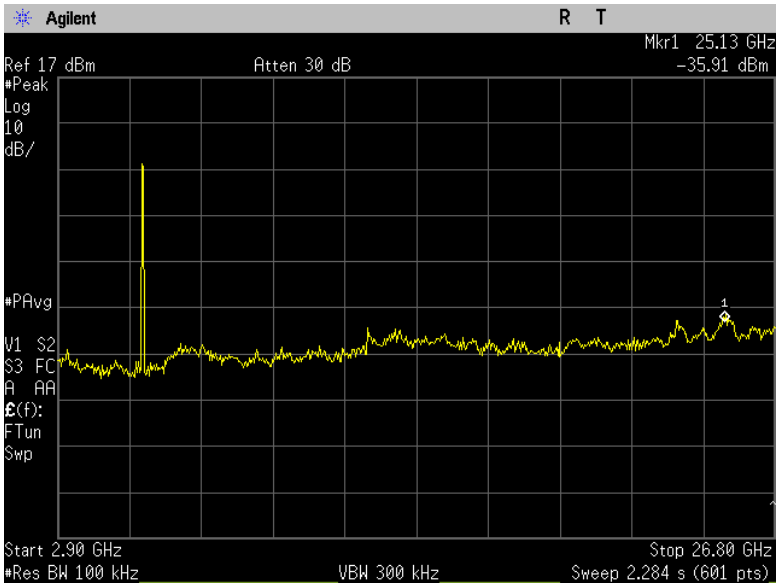
Plot 4.4.60



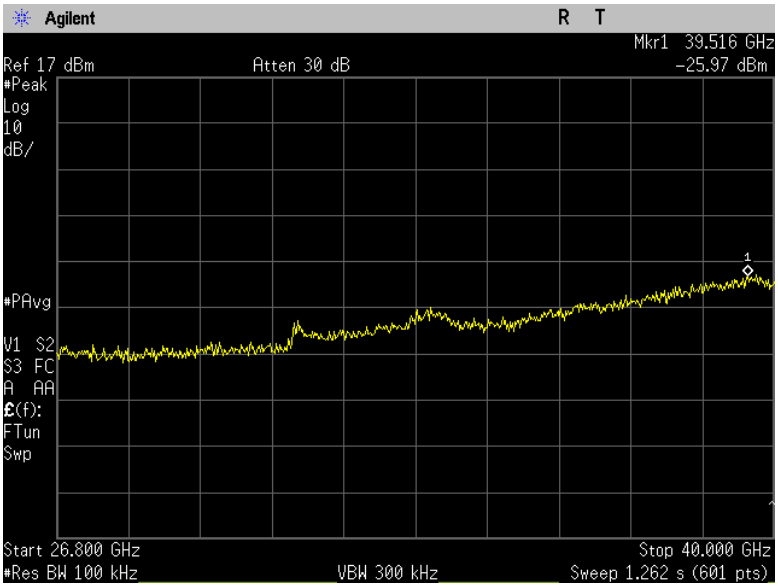
802.11 a
Low Frequency
Plot 4.4.61



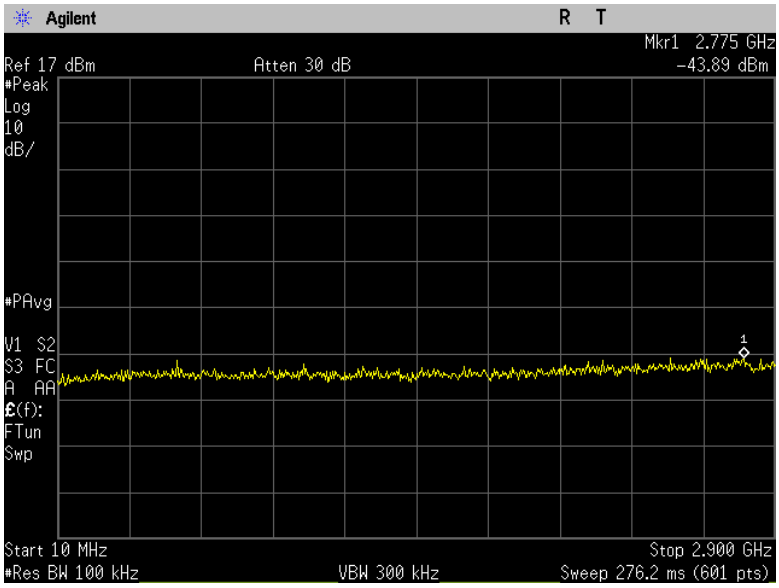
Plot 4.4.62



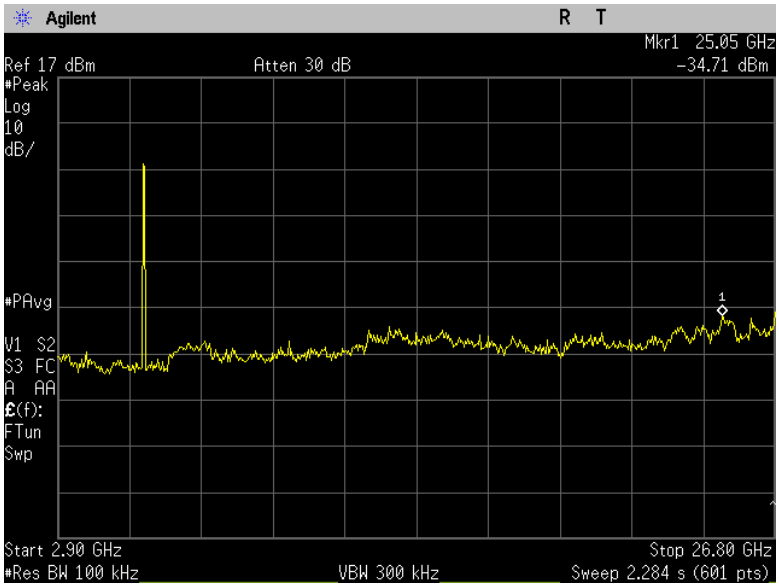
Plot 4.4.63


Agilent
R T
Mkr1 39.516 GHz
Ref 17 dBm
Atten 30 dB
-25.97 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

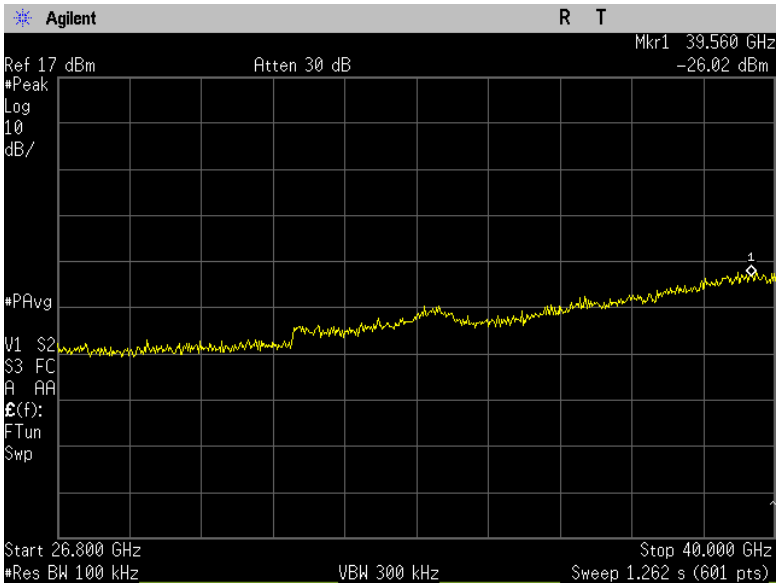
Middle Frequency
Plot 4.4.64



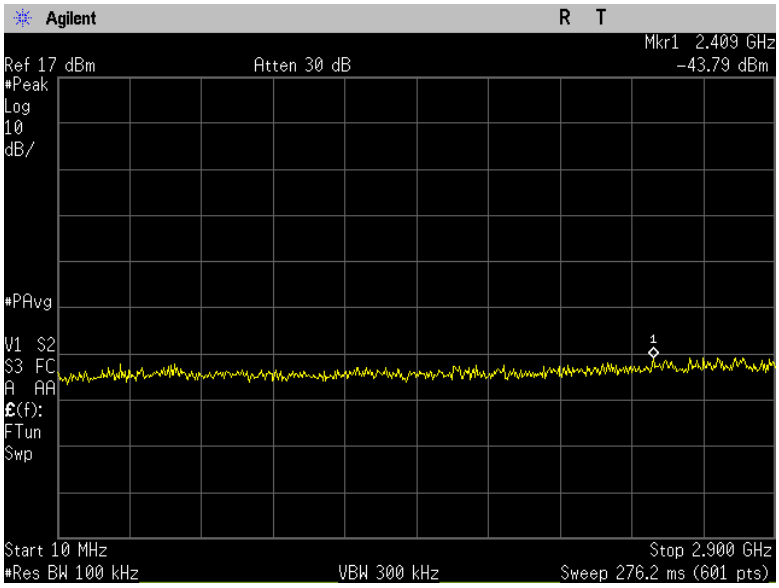
Plot 4.4.65



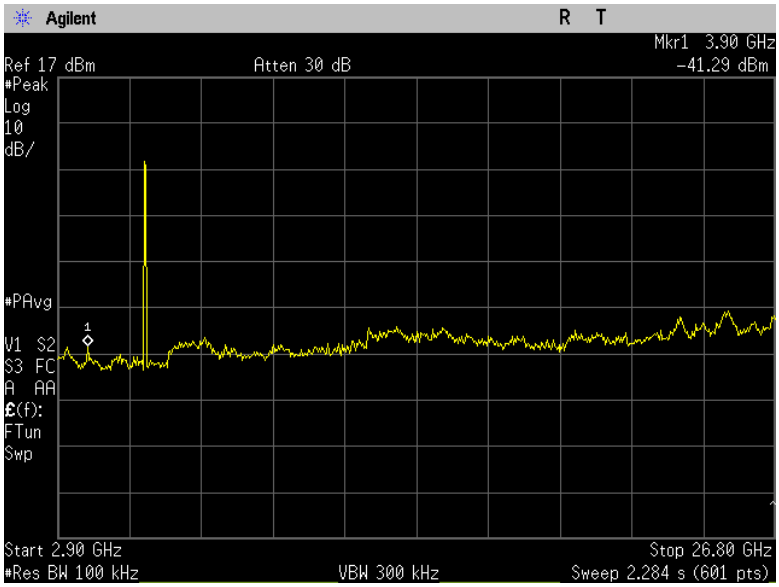
Plot 4.4.66


Agilent
R T
Mkr1 39.560 GHz
Ref 17 dBm
Atten 30 dB
-26.02 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

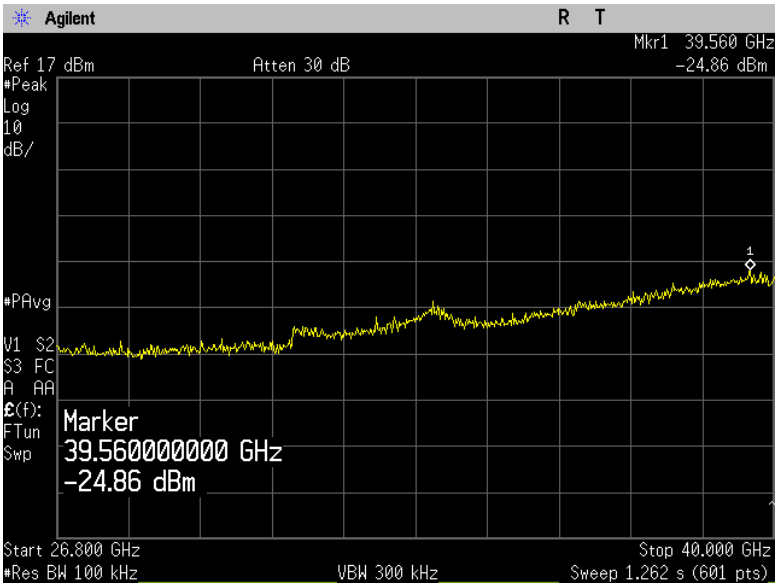
High Frequency
Plot 4.4.67



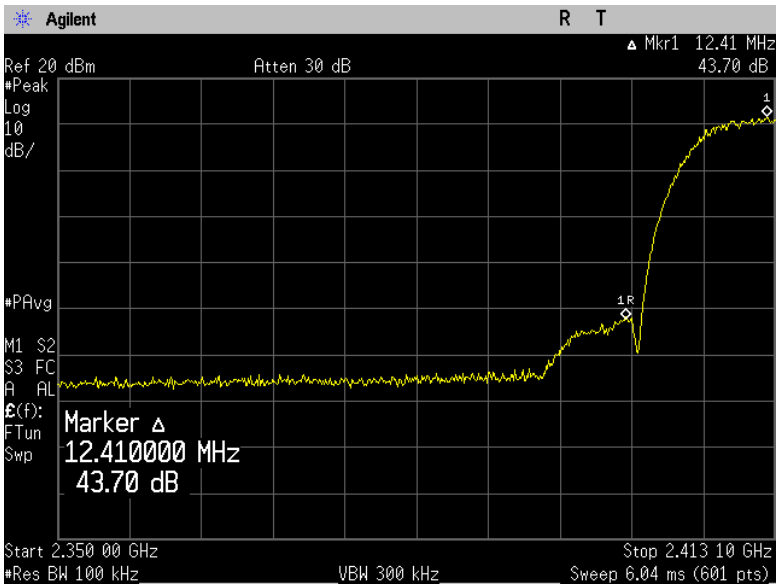
Plot 4.4.68



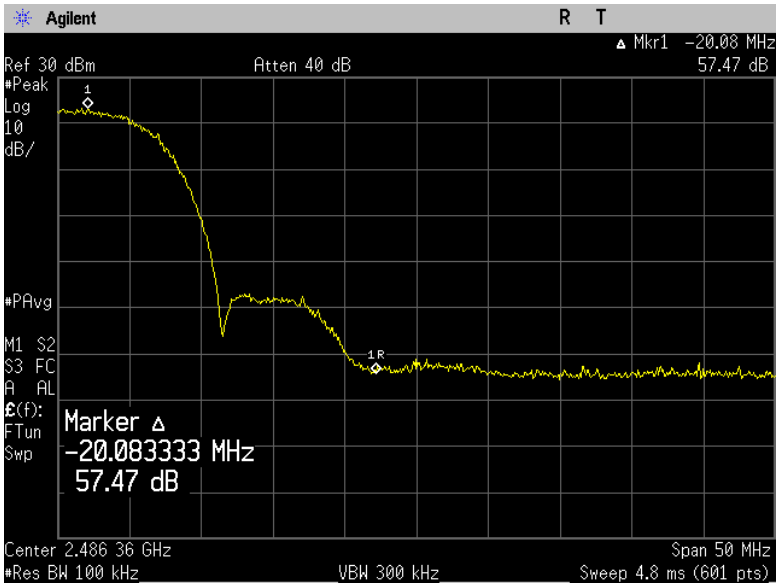
Plot 4.4.69


Agilent
R T
Mkr1 39.560 GHz
Ref 17 dBm
Atten 30 dB
-24.86 dBm
#Peak
Log
10
dB/
#PAvg
V1 S2
S3 FC
A AA
£(f):
FTun
Swp
Marker
39.560000000 GHz
-24.86 dBm
Start 26.800 GHz
Stop 40.000 GHz
#Res BW 100 kHz
VBW 300 kHz
Sweep 1.262 s (601 pts)

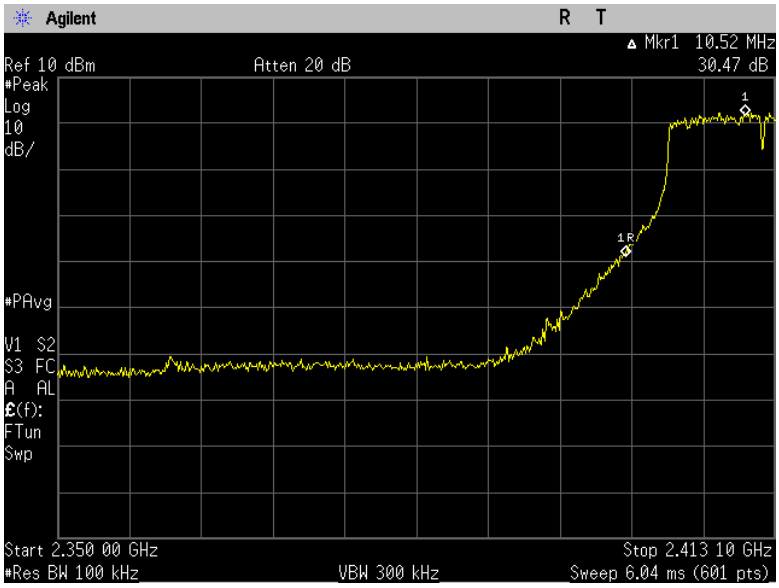
Transmitter Model: WLM54AG
802.11b
Plot 4.4.70



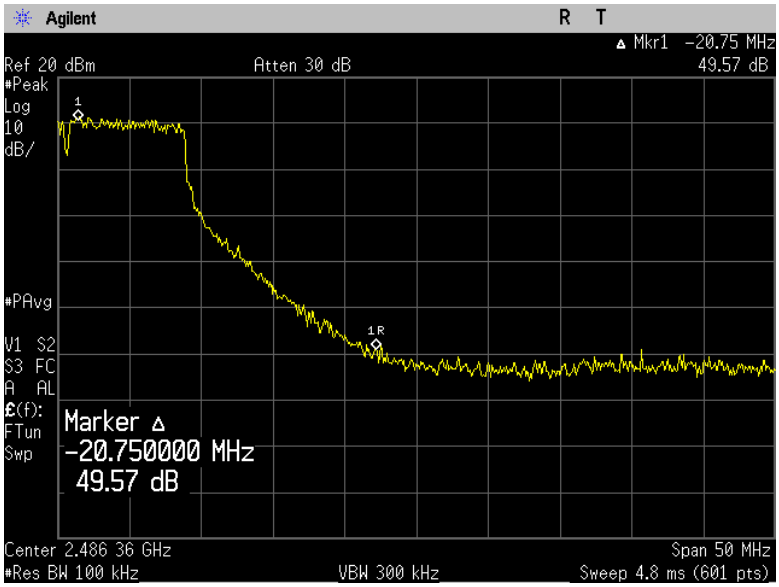
Plot 4.4.71



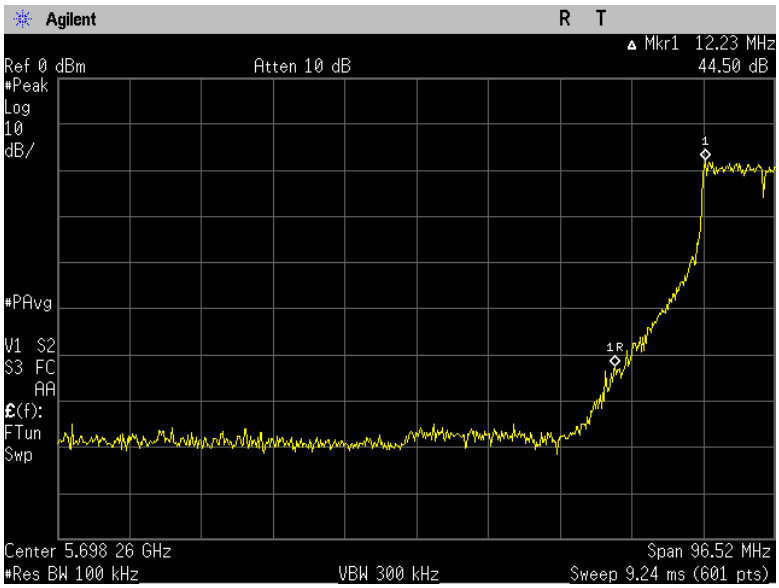
802.11g Mode
Plot 4.4.72



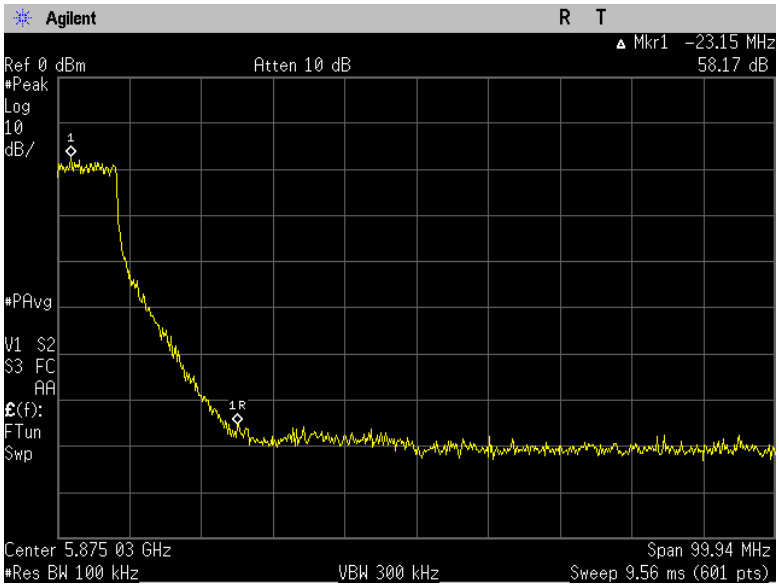
Plot 4.4.73



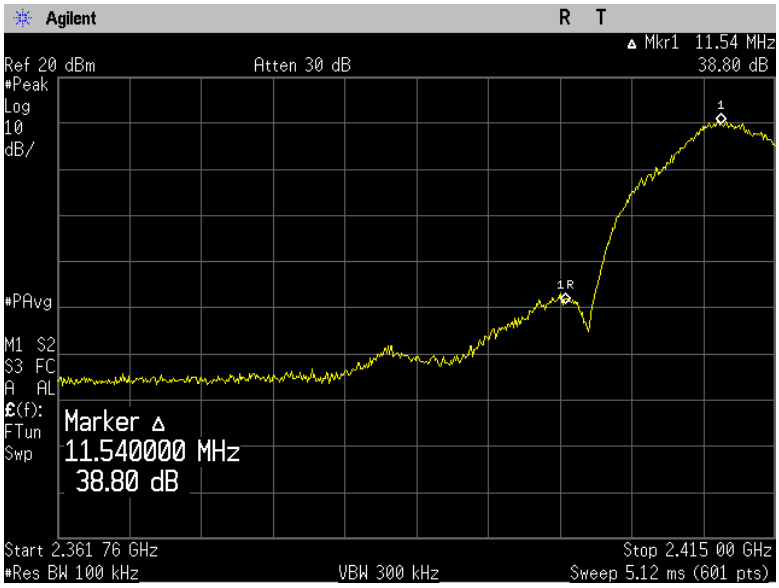
802.11 a
Low Frequency
Plot 4.4.74



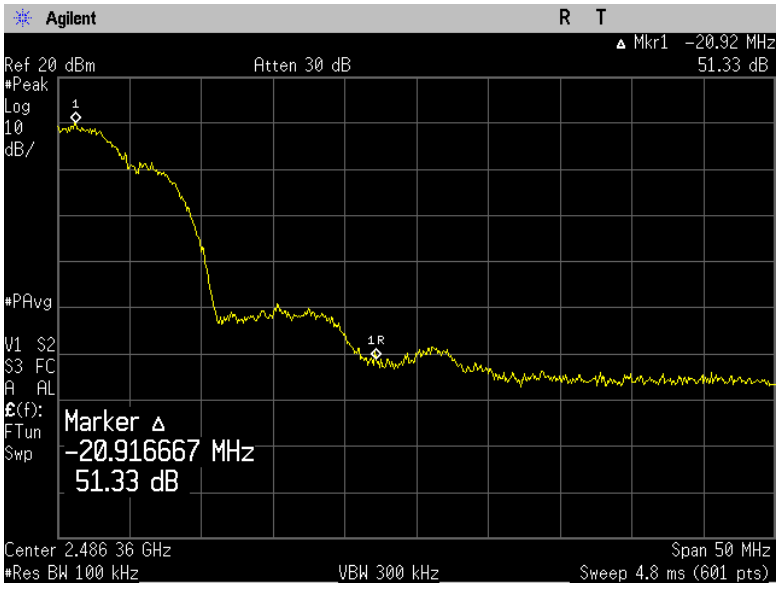
High Frequency
Plot 4.4.75



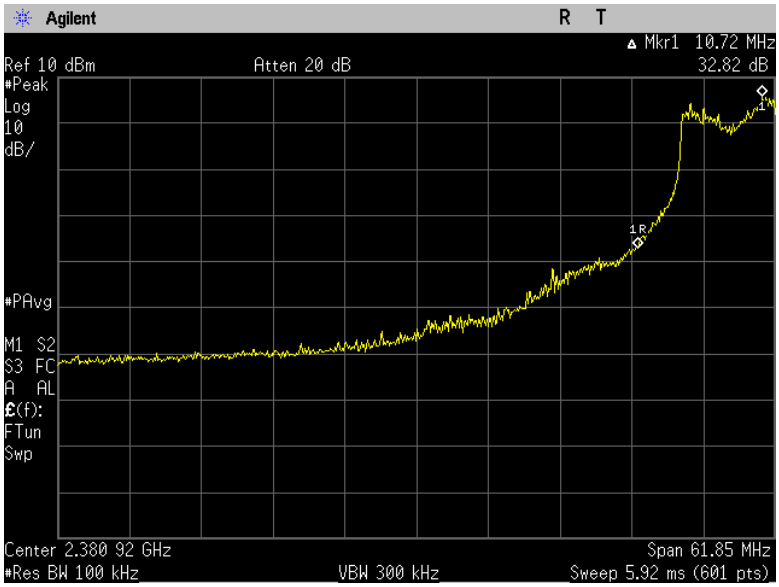
Transmitter model: WMIA-199/EU
802.11 b
Low Frequency
Plot 4.4.76



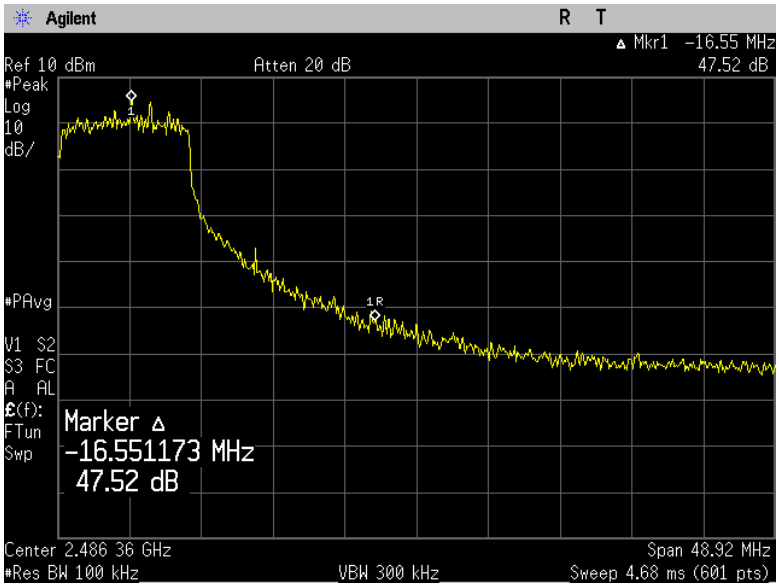
High Frequency
Plot 4.4.77



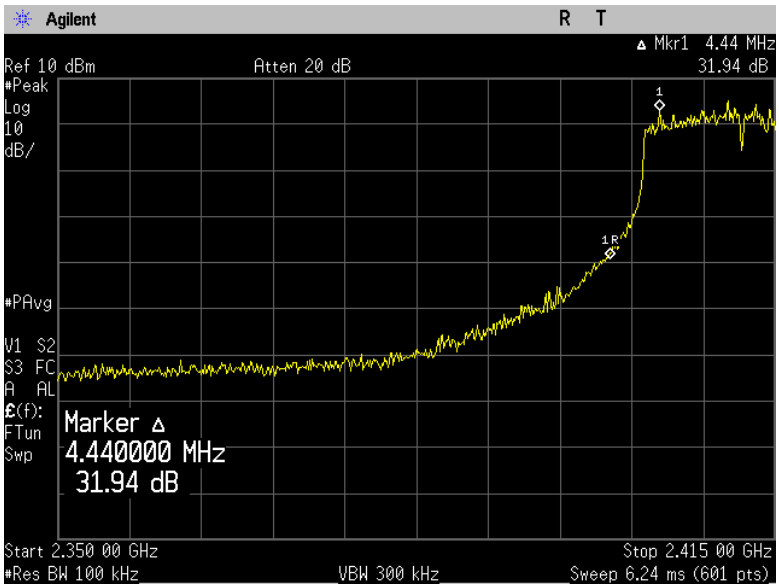
802.11 g
Low Frequency
Plot 4.4.78



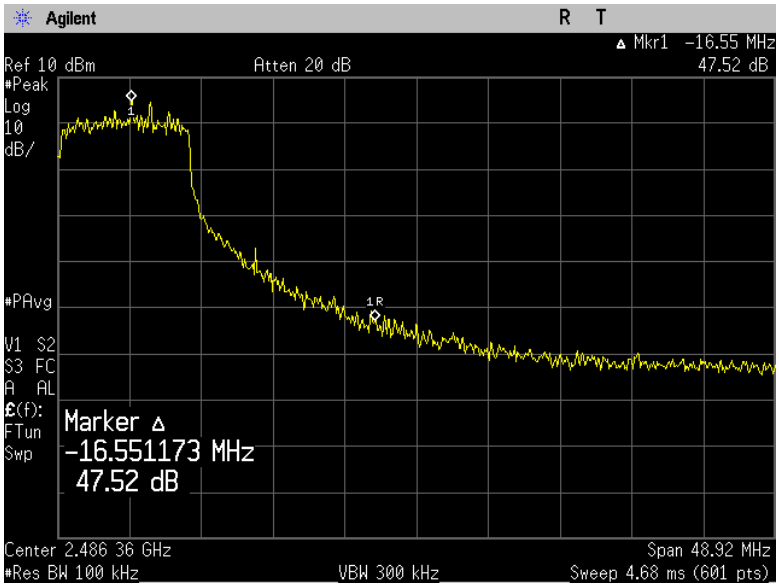
High Frequency
Plot 4.4.79



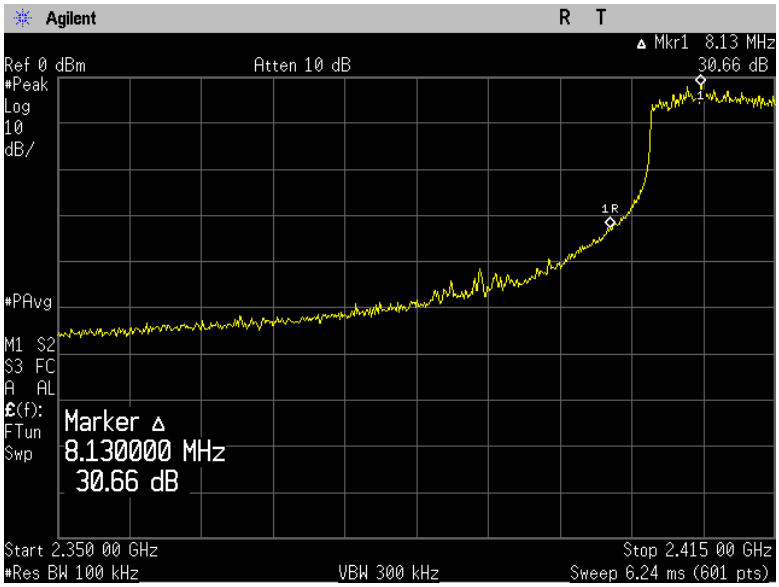
802.11 N, 20 MHz
Low Frequency
Plot 4.4.80



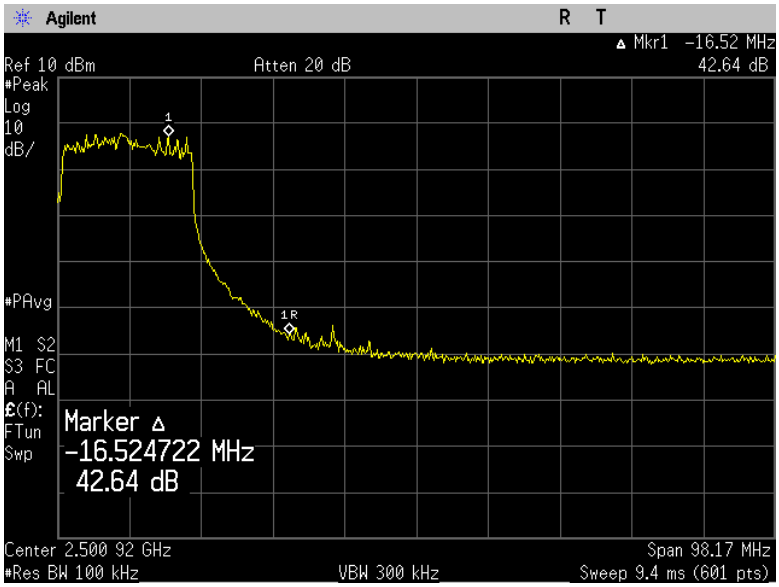
High Frequency
Plot 4.4.81



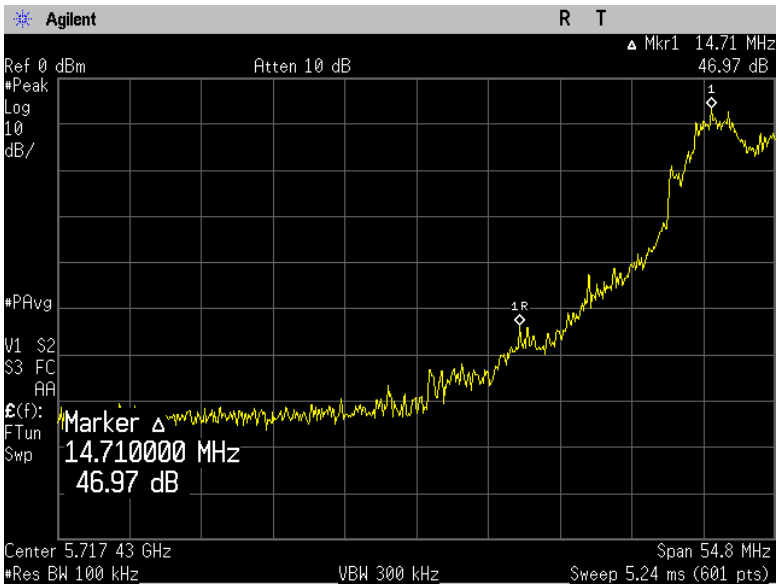
802.11 N, 40 MHz
Low Frequency
Plot 4.4.82



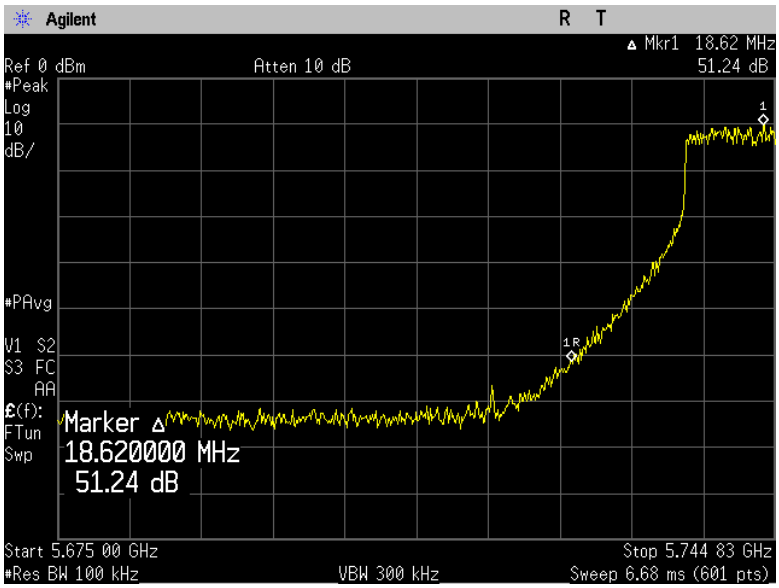
High Frequency
Plot 4.4.83



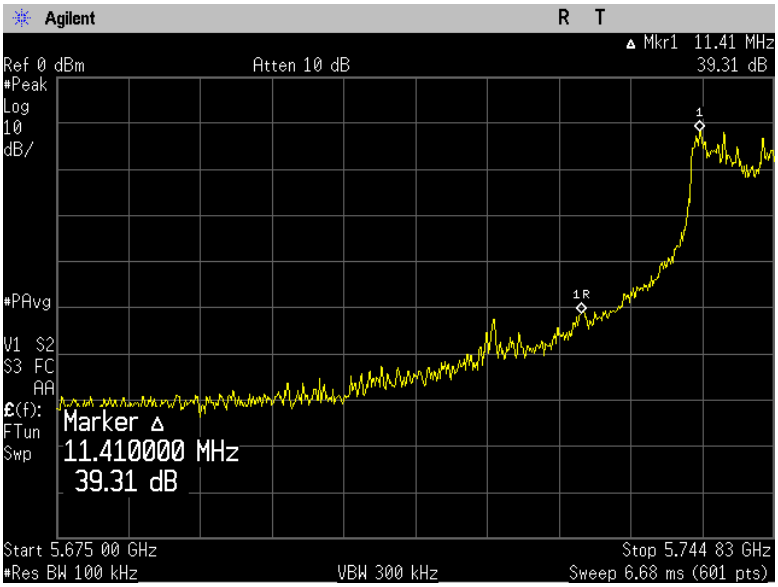
802.11 a
Low Frequency
Plot 4.4.84



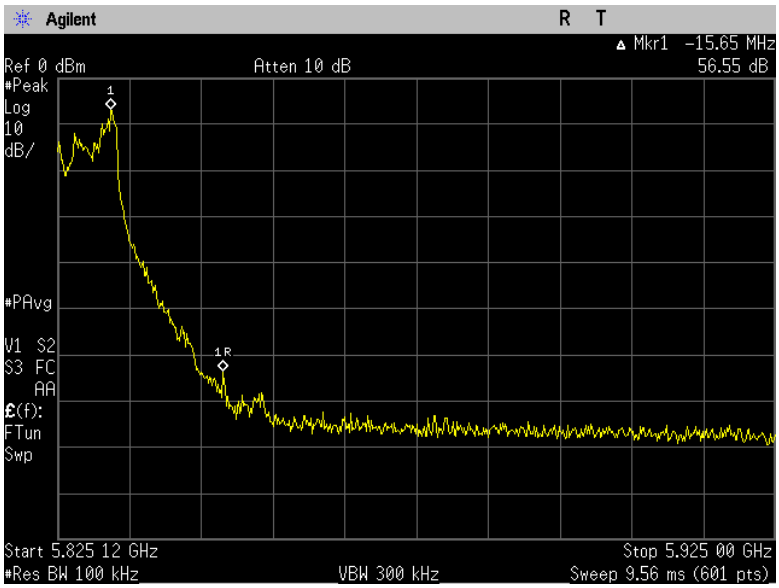
802.11 N, 20 MHz
Plot 4.4.85



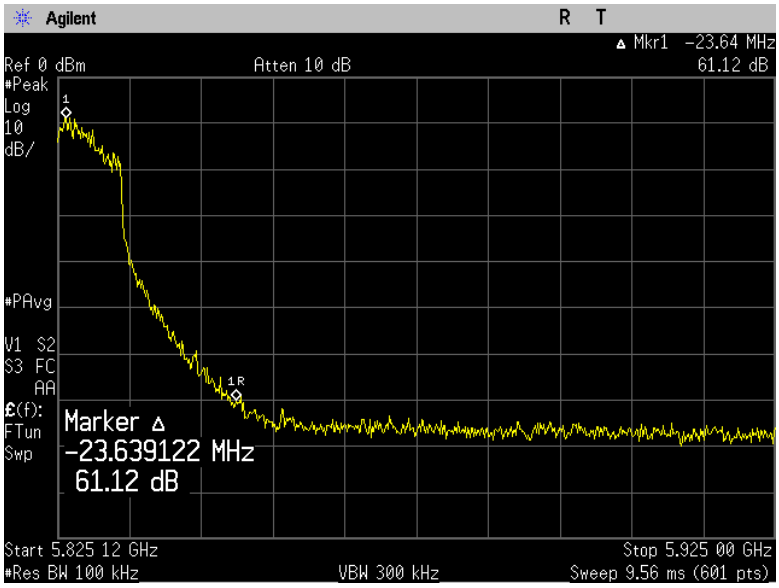
802.11 N, 40 MHz
Plot 4.4.86



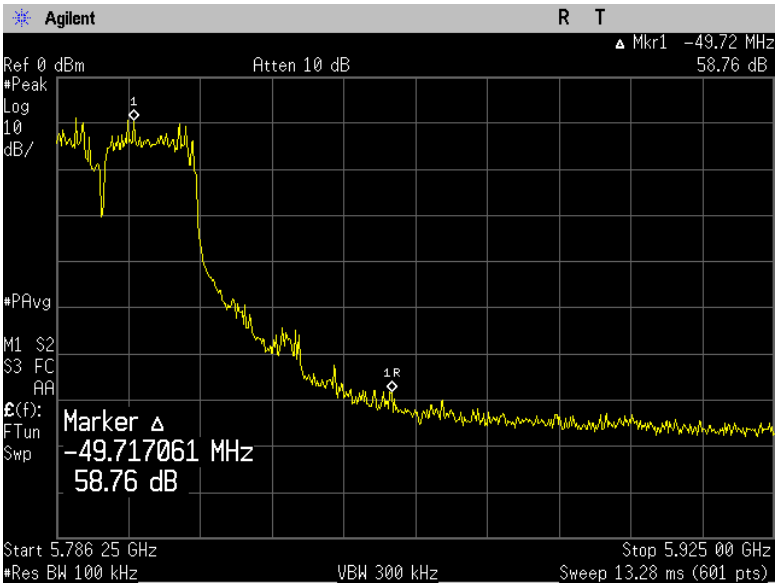
802.11 a
High Frequency
Plot 4.4.87



802.11 N, 20 MHz
Plot 4.4.88



802.11 N, 40 MHz
Plot 4.4.89



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 Method:	See sec 2.2	**Comply**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	Peak: RBW= 1MHz, VBW= 1MHz, 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 4.5.48	

Test results:

Worst case emission while three transmitters operating simultaneously.

Transmitter model: WMIA-199/EU

Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11b Mode							
2412	11	2361.6	Avg	V	53.49	54	-0.51
2412	11	2361.6	Peak	V	65.76	74	-8.24
2462	11	2486.7	Avg	V	51.22	54	-2.78
2462	11	2486.7	Peak	V	64.29	74	-9.71
802.11g Mode							
2412	54	2361.6	Avg	V	47.82	54	-6.18
2412	54	2361.6	Peak	V	62.08	74	-11.92
2462	54	2485.5	Avg	V	48.27	54	-5.73
2462	54	2485.5	Peak	V	64.02	74	-9.98
802.11 N-20 MHz							
2412	54	2388.8	Avg	V	49.44	54	-4.56
2412	54	2388.8	Peak	V	65.64	74	-8.36
2462	54	2484.0	Avg	V	44.96	54	-9.04
2462	54	2484.16	Avg	V	60.58	54	6.58
802.11 N-40 MHz							
2412	54	2389.1	Avg	V	44.79	54	-9.21
2412	54	2350.63	Peak	V	59.56	74	-14.44
2462	54	2483.62	Avg	V	50.00	54	-4
2462	54	2483.58	Peak	V	67.26	74	-6.74

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

Transmitter Model: WLM54AG

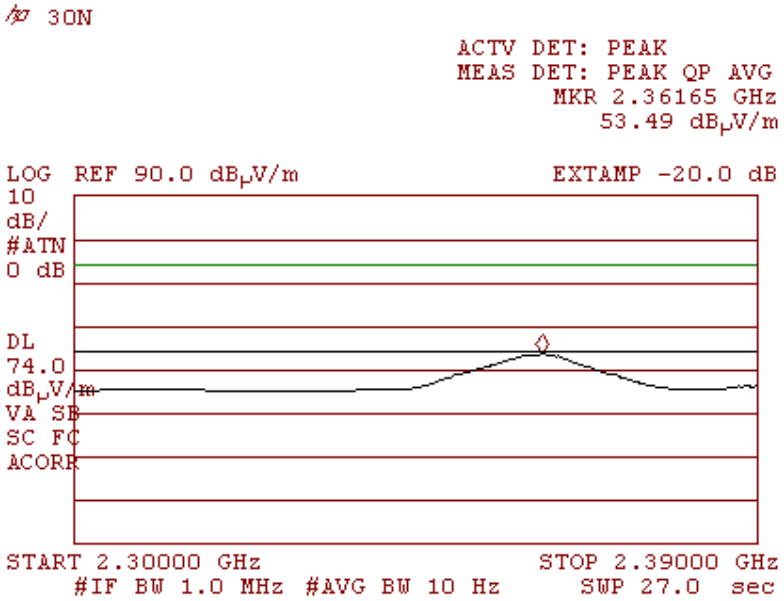
Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11 b Mode							
2412	11	2390.0	Avg	V	45.66	54	-8.34
2412	11	2357.38	Peak	V	60.24	74	-13.76
2462	11	2499.67	Avg	V	44.98	54	-9.02
2462	11	2500.00	Peak	V	58.99	74	-15.01

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

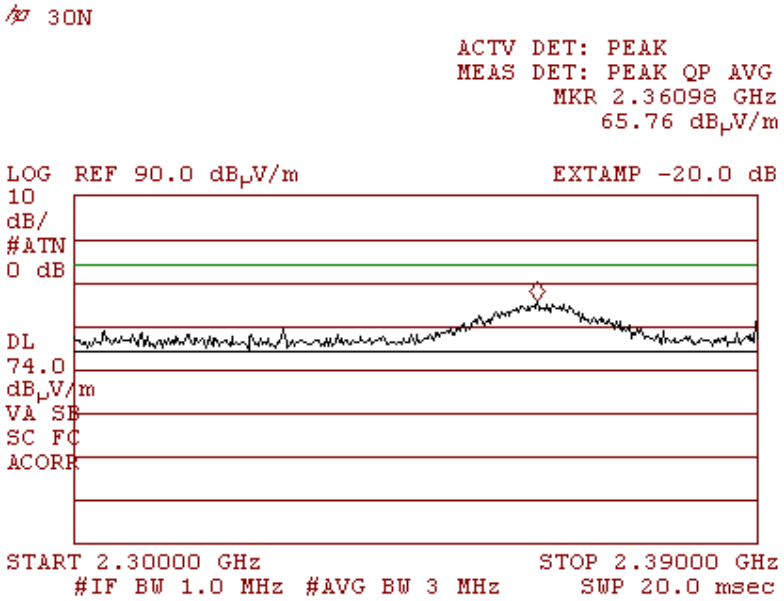
Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11 g Mode							
2412	54	2390.00	Avg	V	52.28	54	-1.72
2412	54	2390.00	Peak	V	71.01	74	-2.99
2462	54	2483.50	Avg	V	45.64	54	-8.36
2462	54	2483.50	Peak	V	61.36	74	-12.64

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

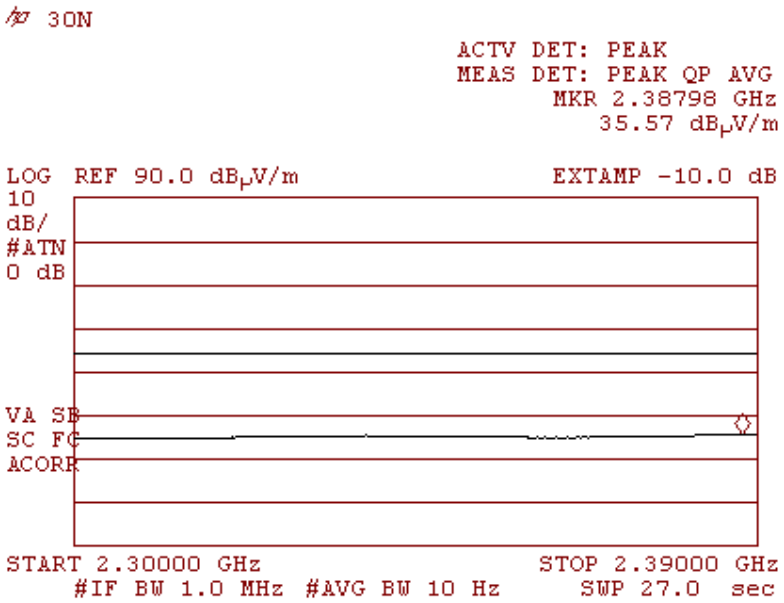
Transmitter model: WMIA-199/EU
802.11 b
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.1



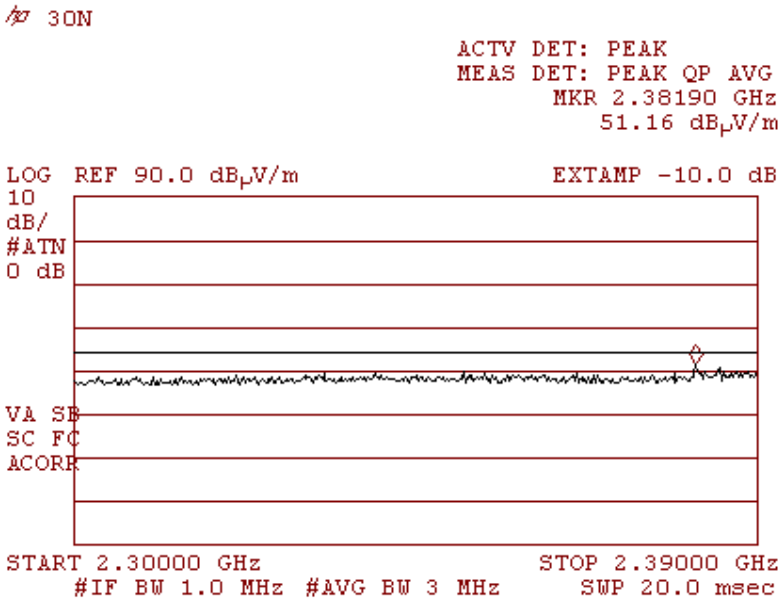
Peak
Plot 4.5.2



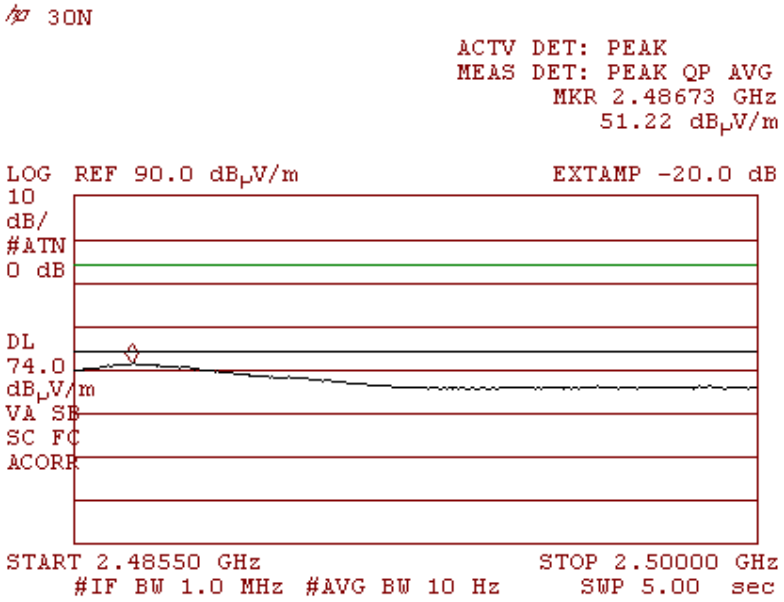
Horizontal Polarization
Average
Plot 4.5.3



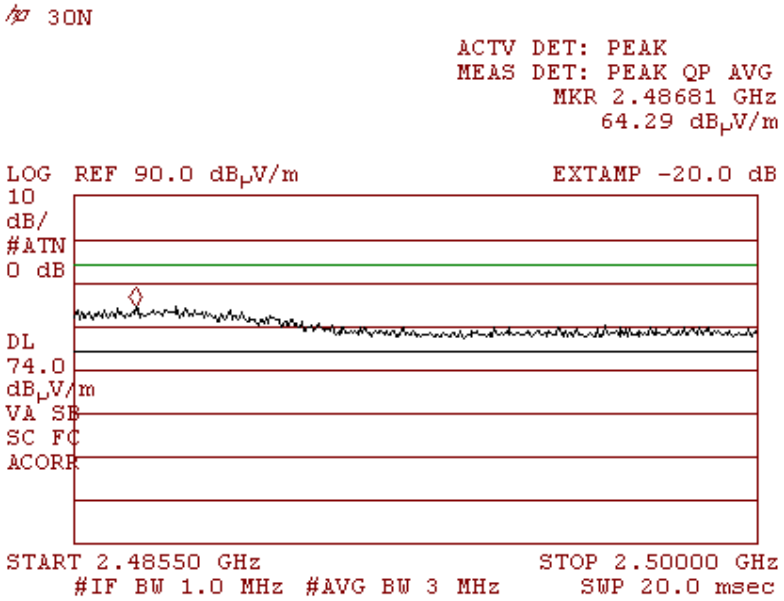
Peak
Plot 4.5.4



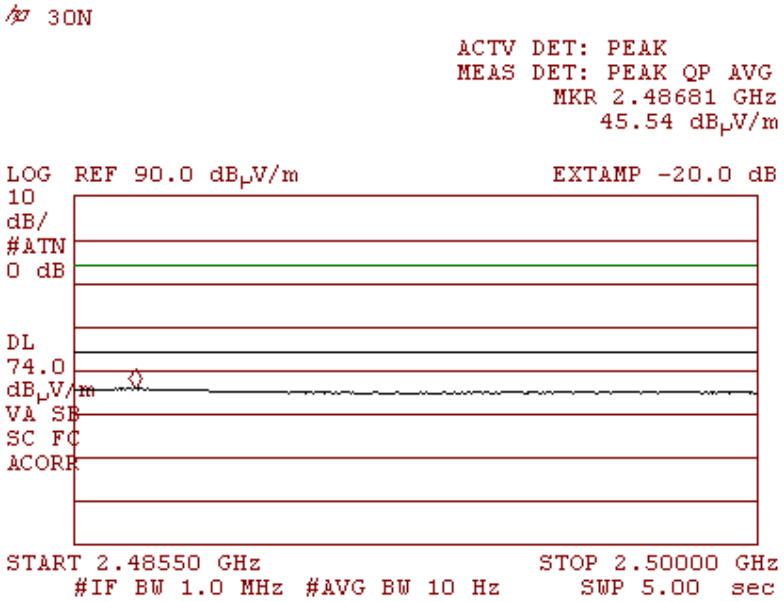
Transmitter model: WMIA-199/EU
802.11 b
Highest Frequency
Vertical Polarization
Average
Plot 4.5.5



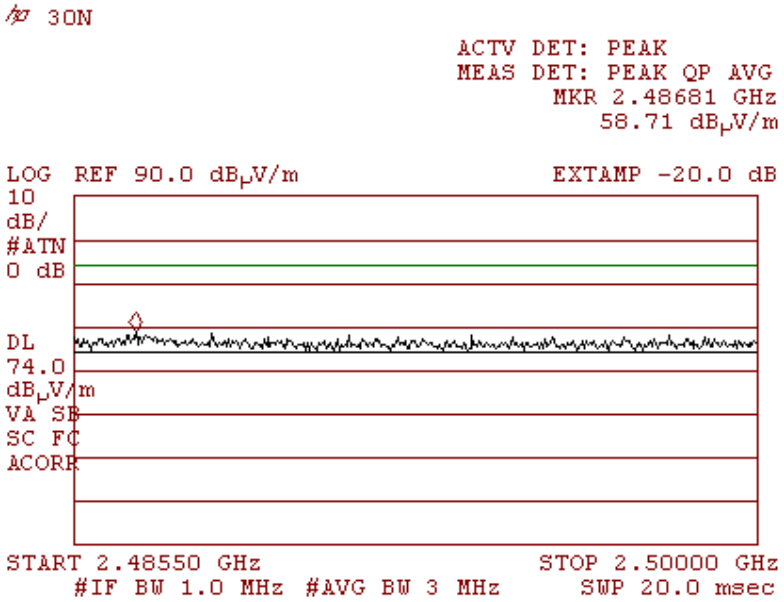
Peak
Plot 4.5.6



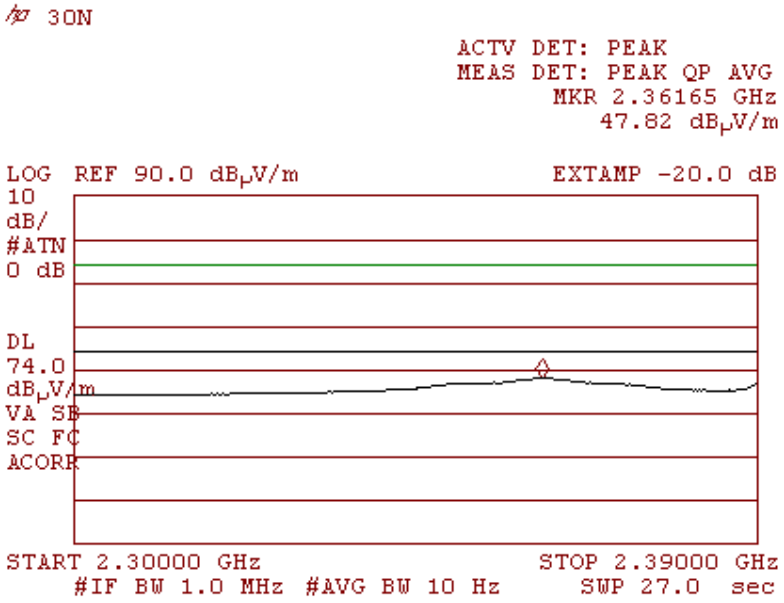
Horizontal Polarization
Average
Plot 4.5.7



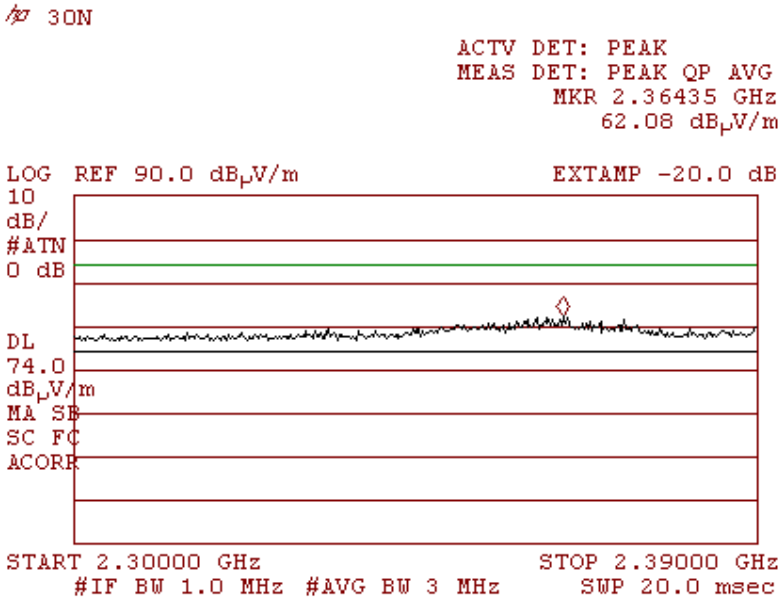
Peak
Plot 4.5.8



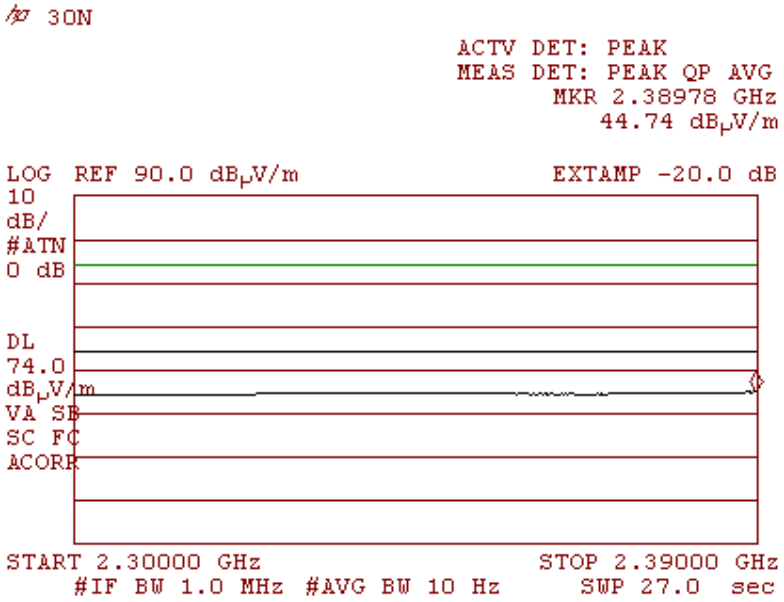
802.11 g
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.9



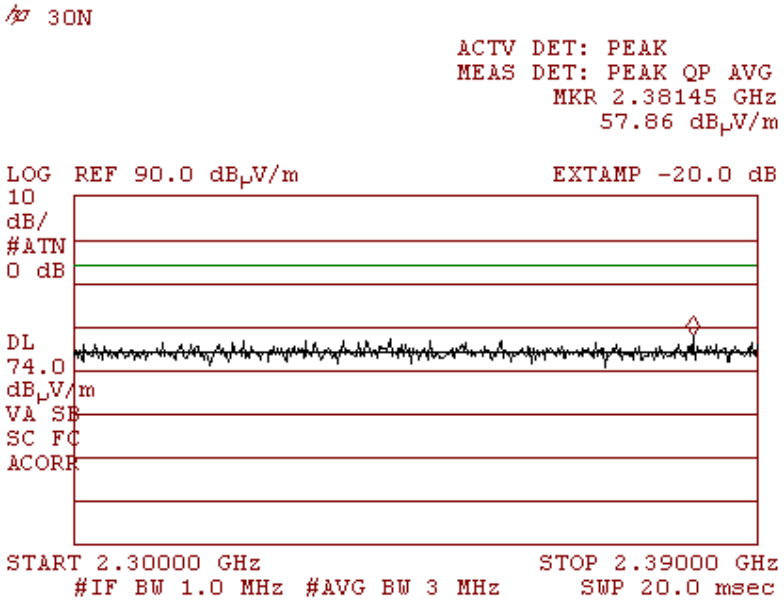
Peak
Plot 4.5.10



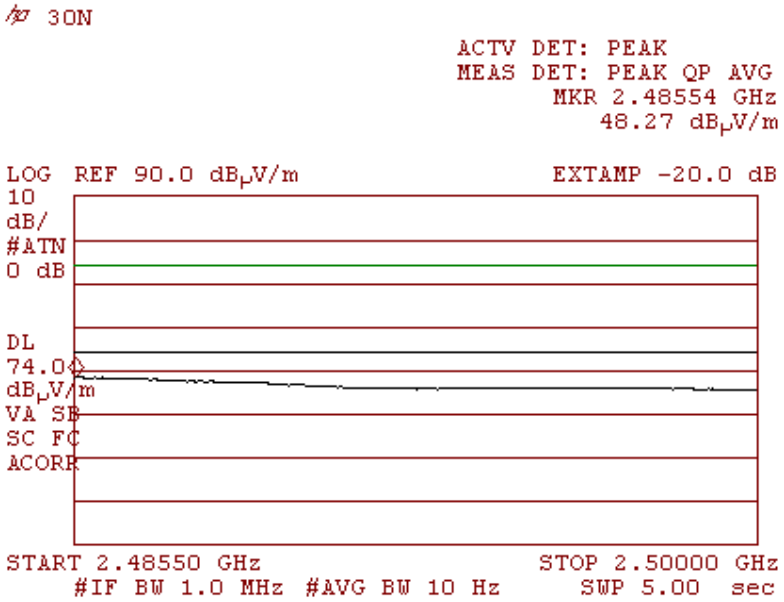
Horizontal Polarization
Average
Plot 4.5.11



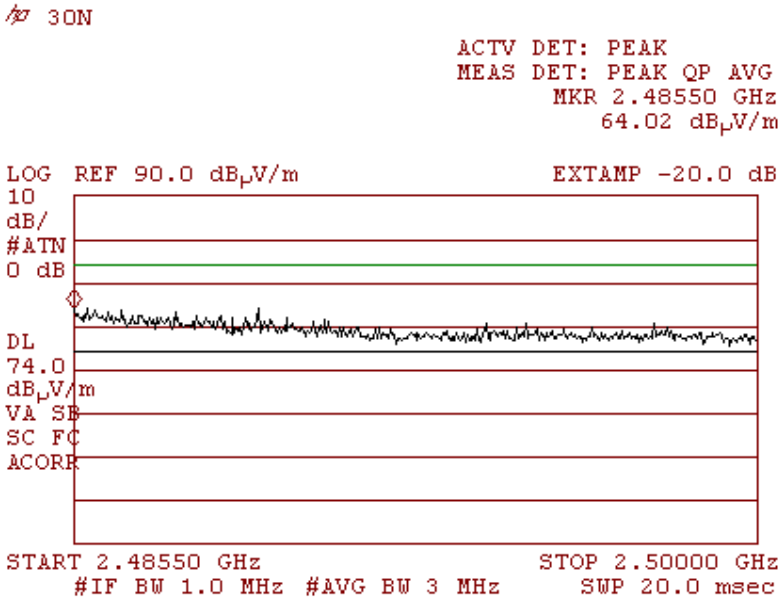
Peak
Plot 4.5.12



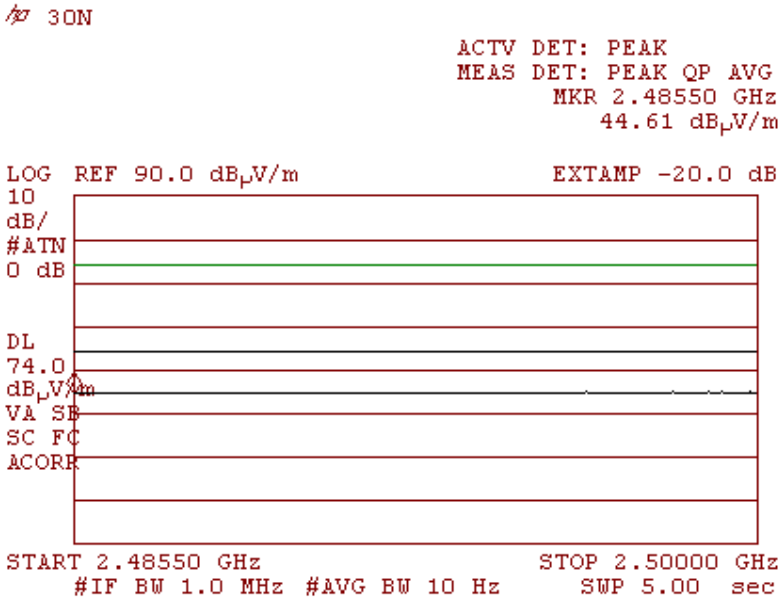
Highest Frequency
Vertical Polarization
Average
Plot 4.5.13



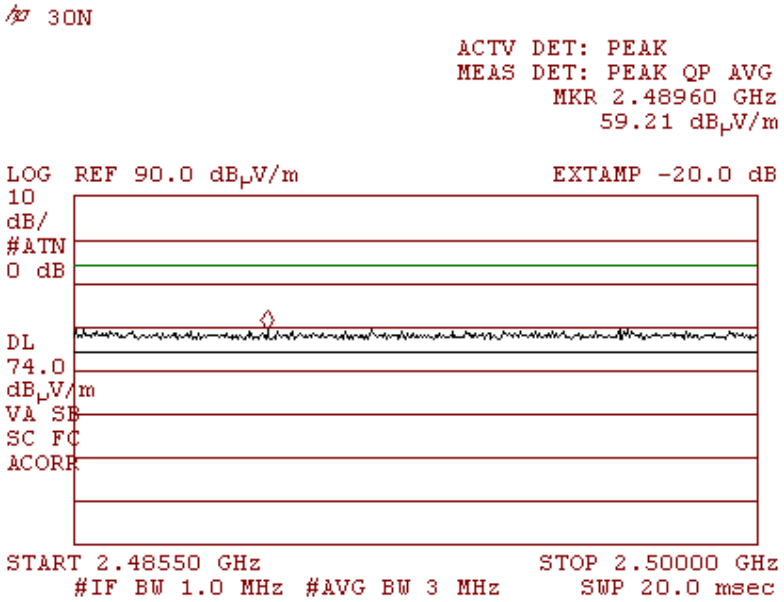
Peak
Plot 4.5.14



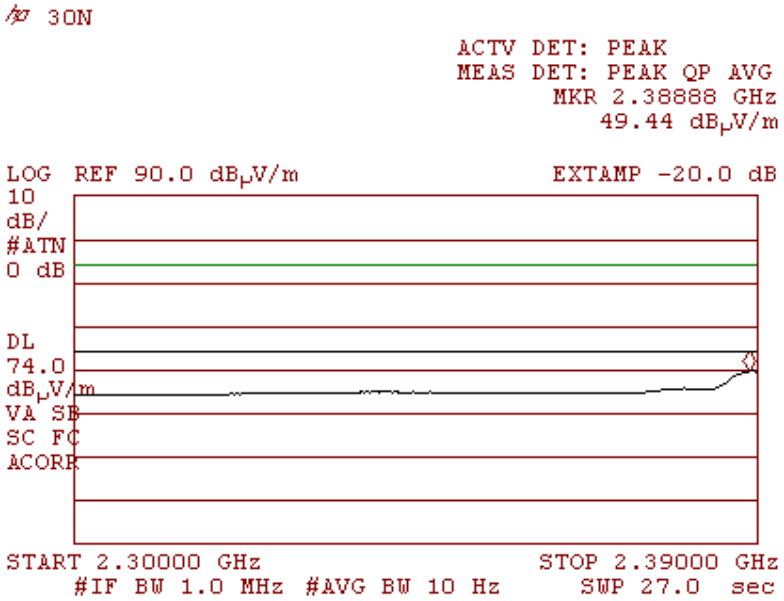
Horizontal Polarization
Average
Plot 4.5.15



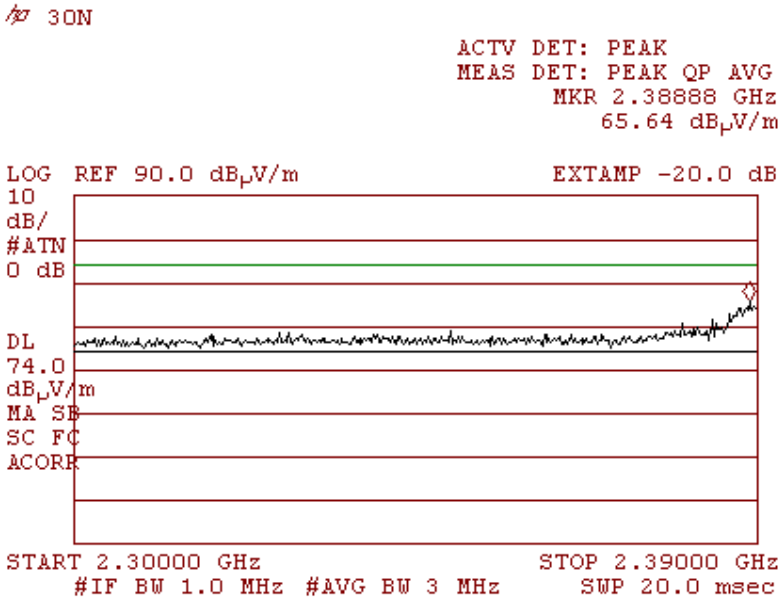
Peak
Plot 4.5.16



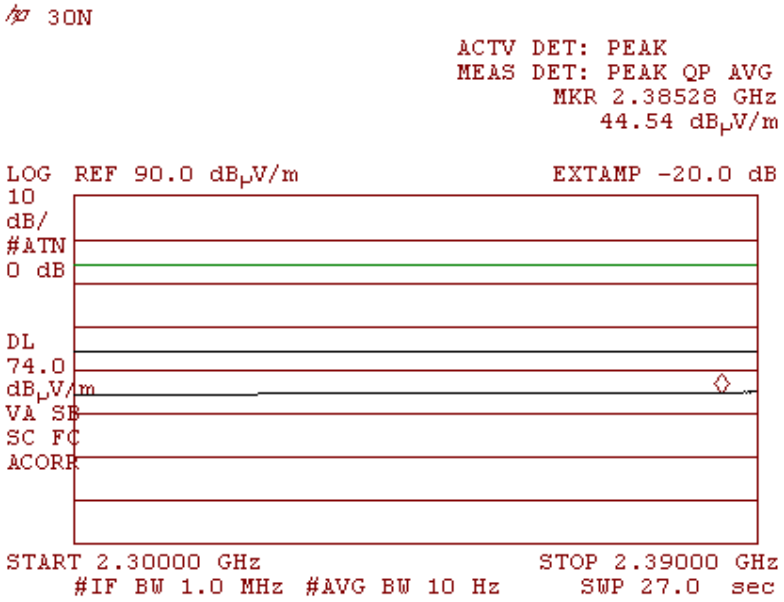
Transmitter model: WMIA-199/EU
802.11 N, 20 MHz
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.17



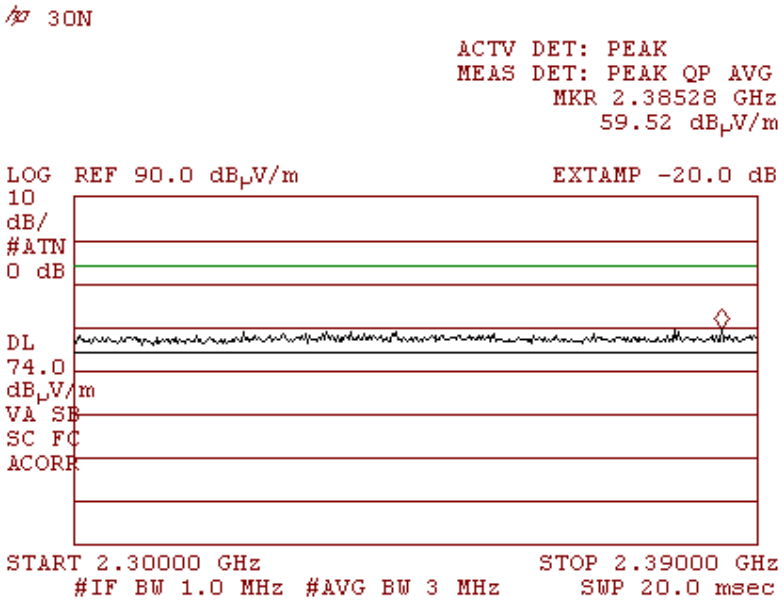
Peak
Plot 4.5.18



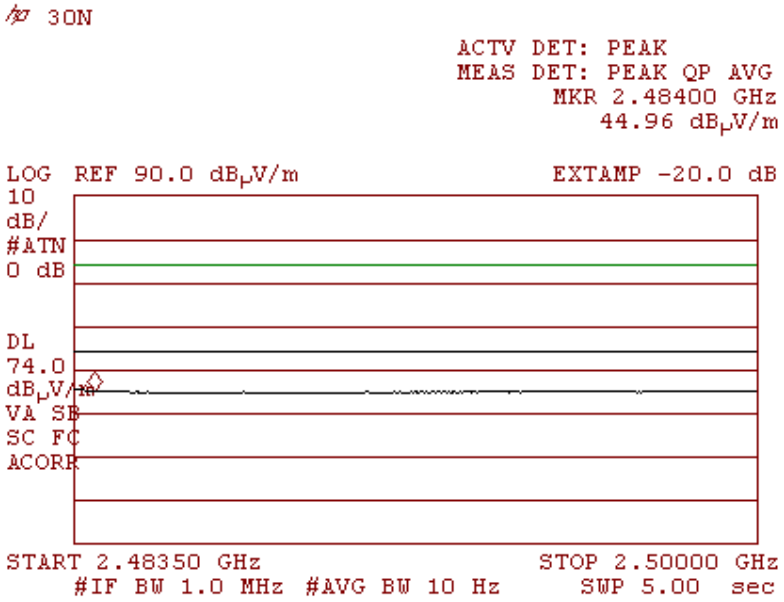
Horizontal Polarization
Average
Plot 4.5.19



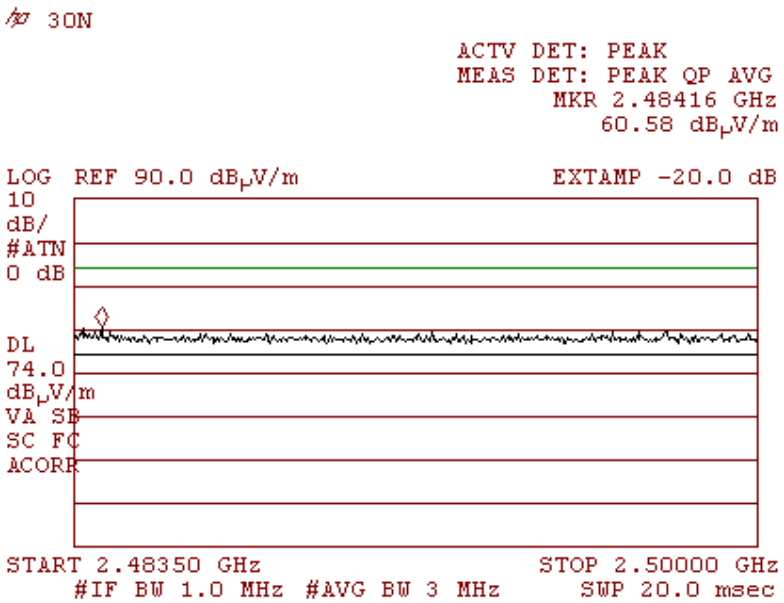
Peak
Plot 4.5.20



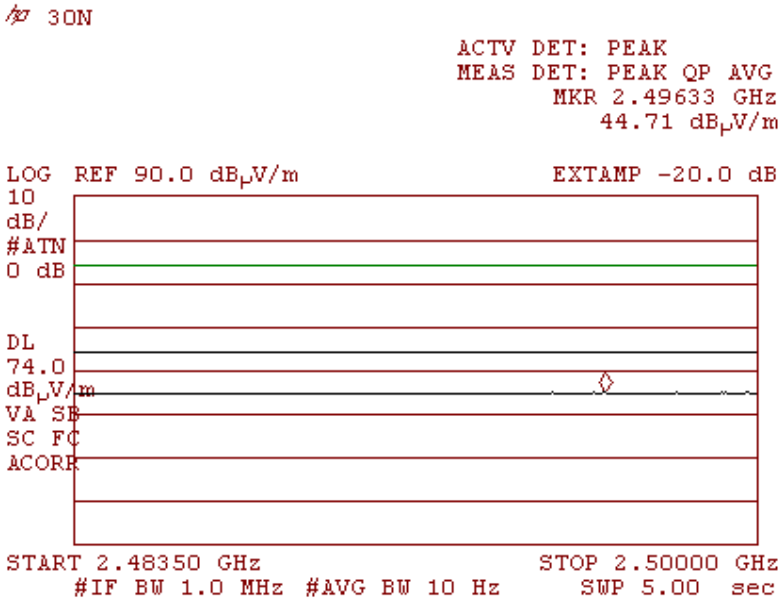
Transmitter model: WMIA-199/EU
802.11 N, 20 MHz
Highest Frequency
Vertical Polarization
Average
Plot 4.5.21



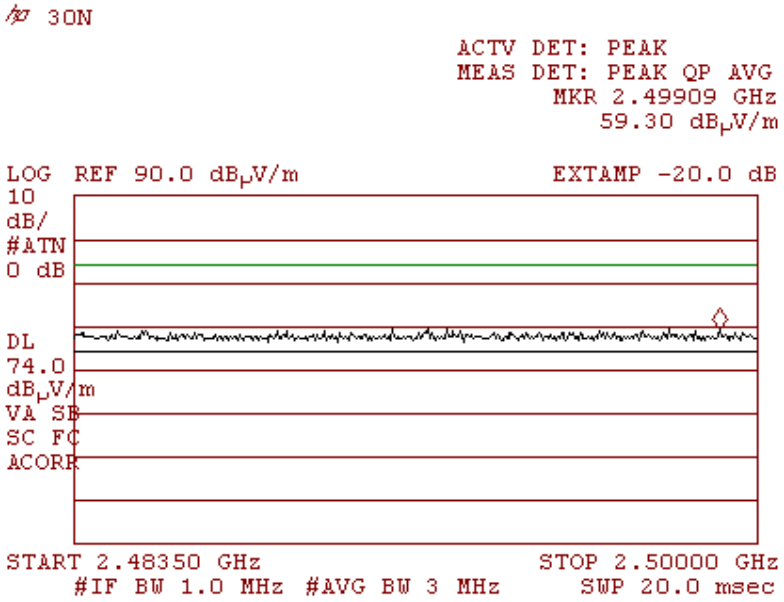
Peak
Plot 4.5.22



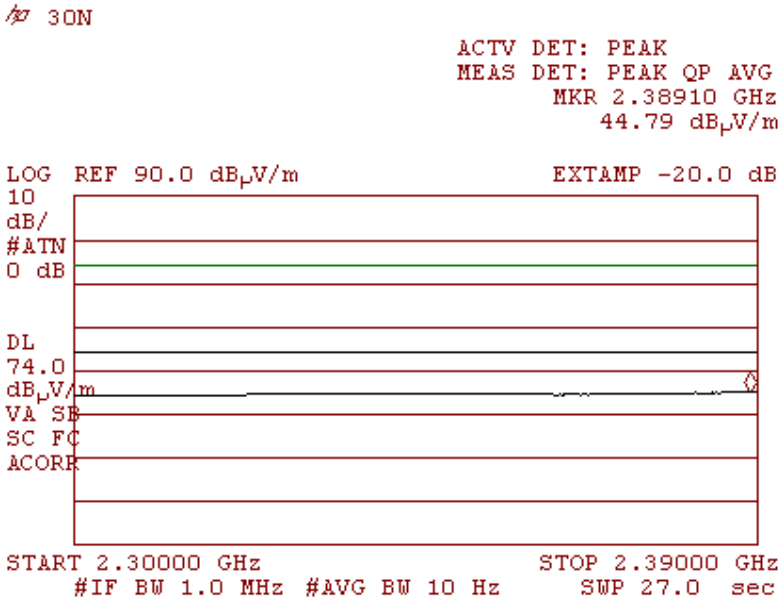
Horizontal Polarization
Average
Plot 4.5.23



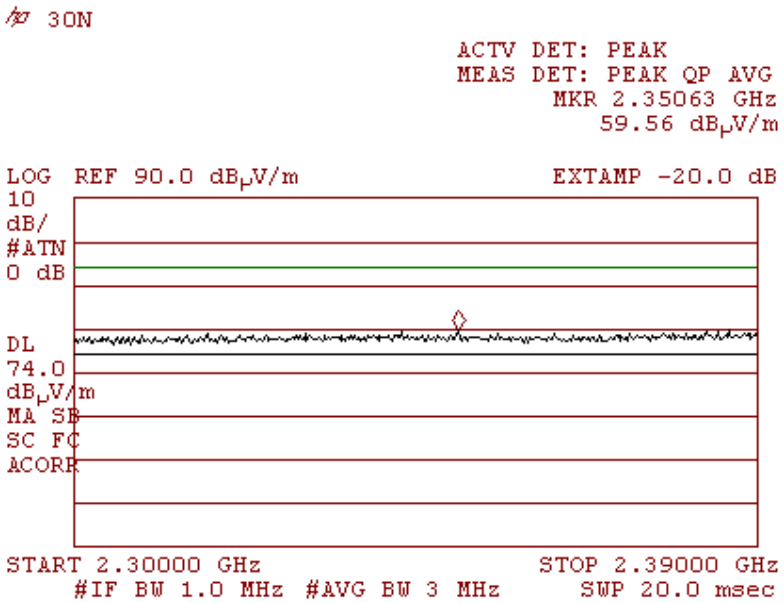
Peak
Plot 4.5.24



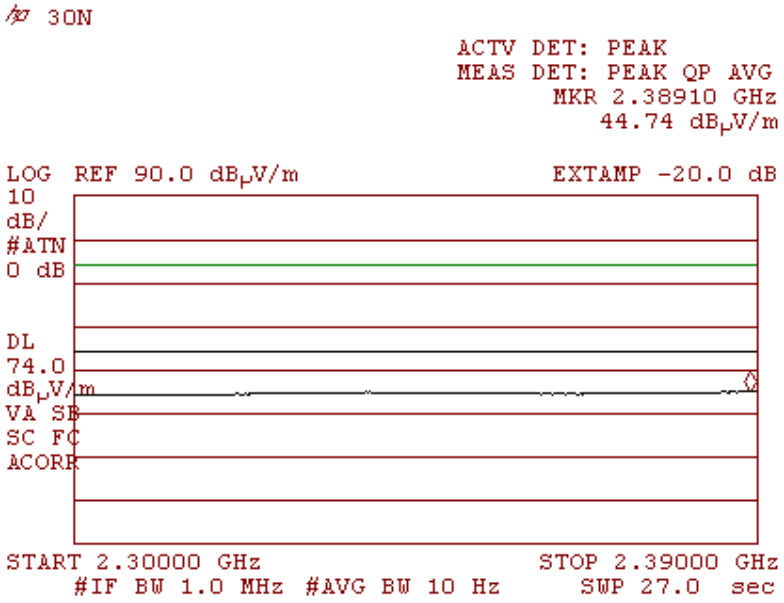
Transmitter model: WMIA-199/EU
802.11 N, 40 MHz
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.25



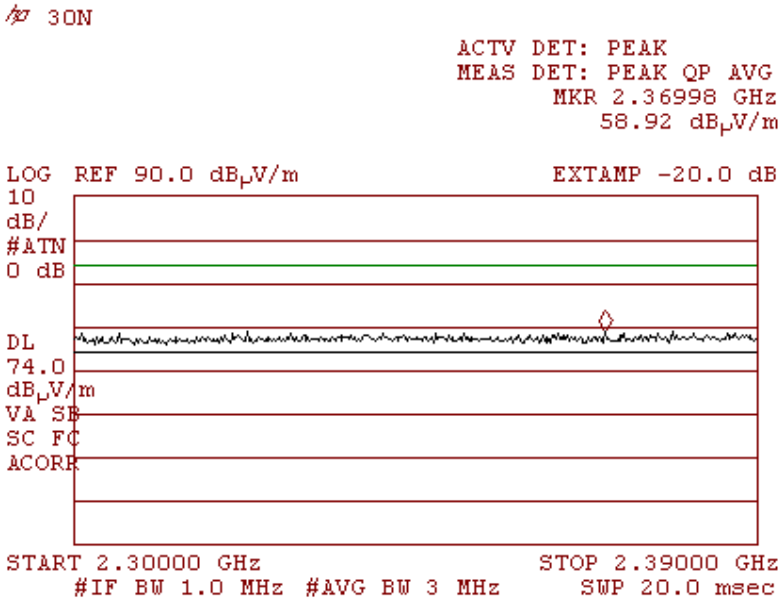
Peak
Plot 4.5.26



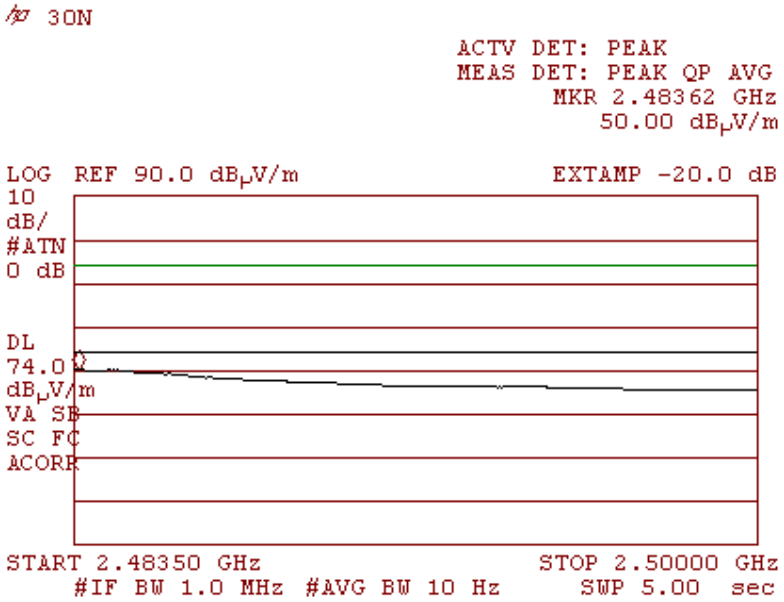
Horizontal Polarization
Average
Plot 4.5.27



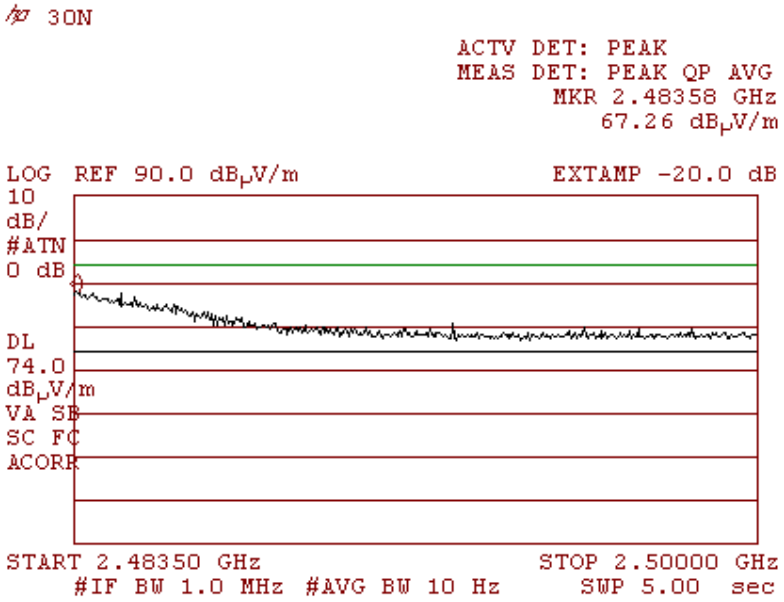
Peak
Plot 4.5.28



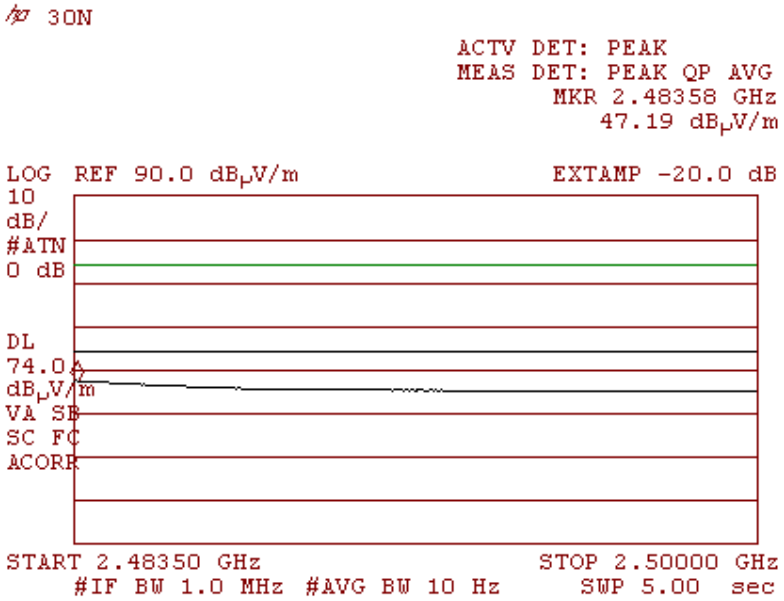
Highest Frequency
Vertical Polarization
Average
Plot 4.5.29



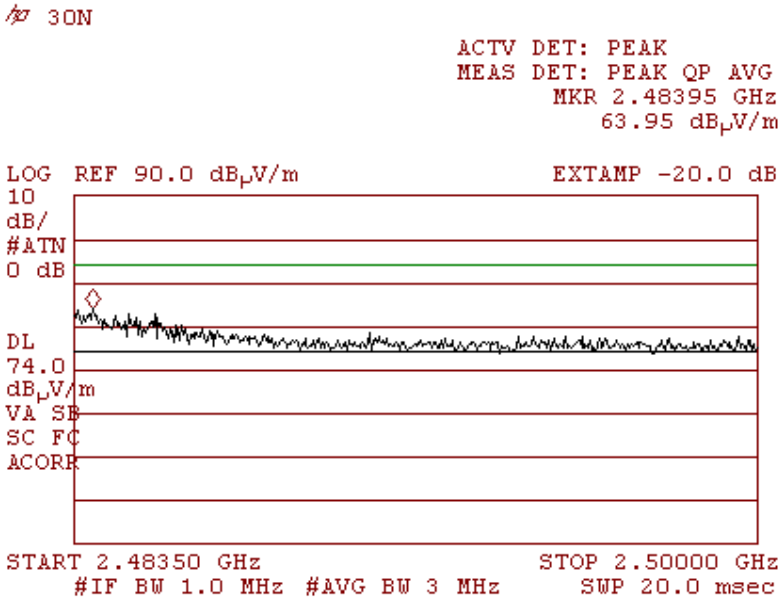
Peak
Plot 4.5.30



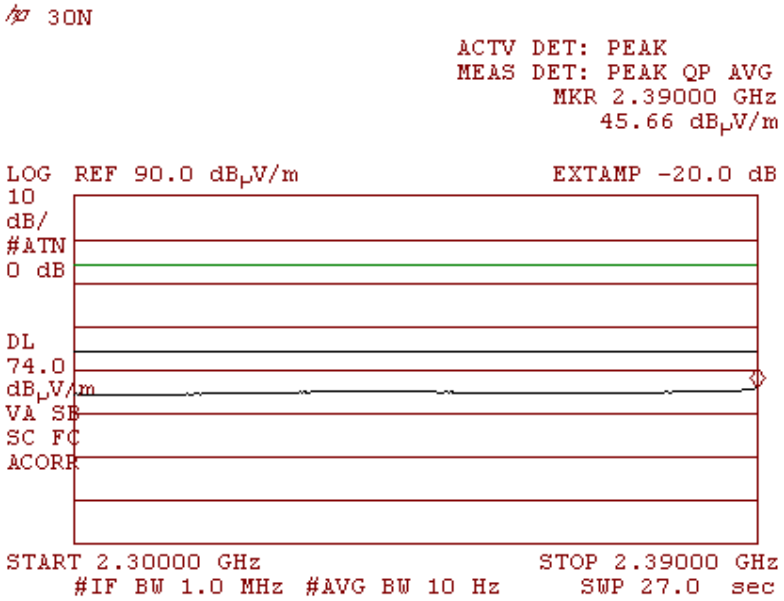
Horizontal Polarization
Average
Plot 4.5.31



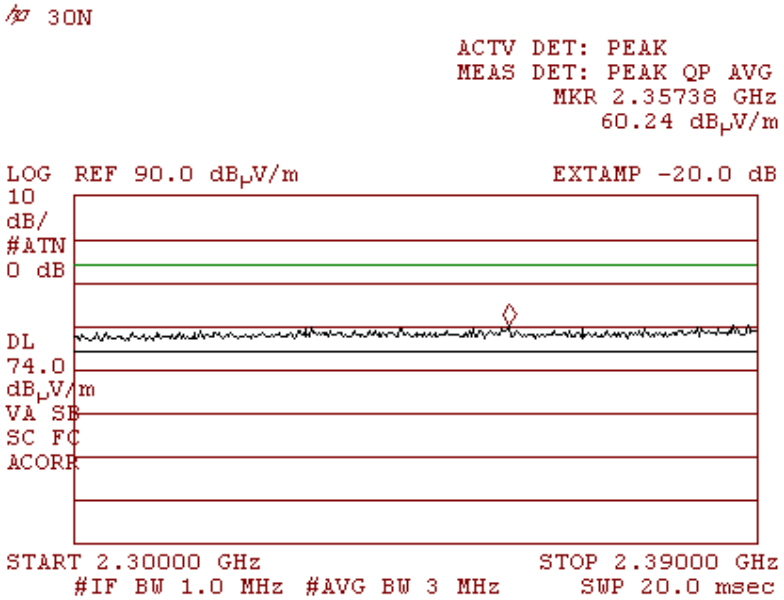
Peak
Plot 4.5.32



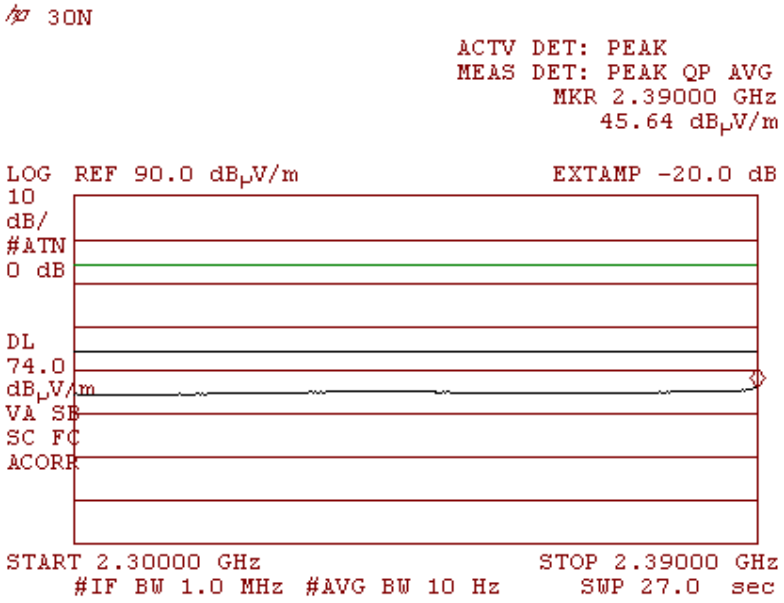
Transmitter Model: WLM54AG
802.11 b
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.33



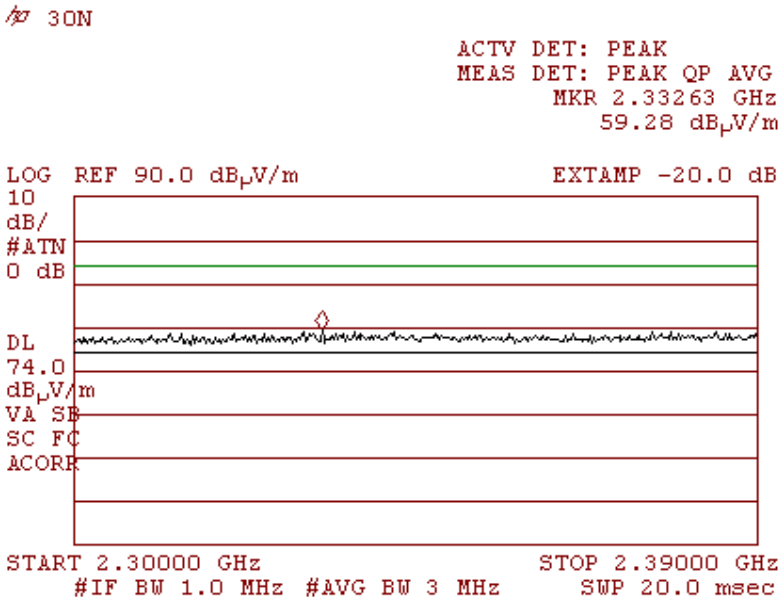
Peak
Plot 4.5.34



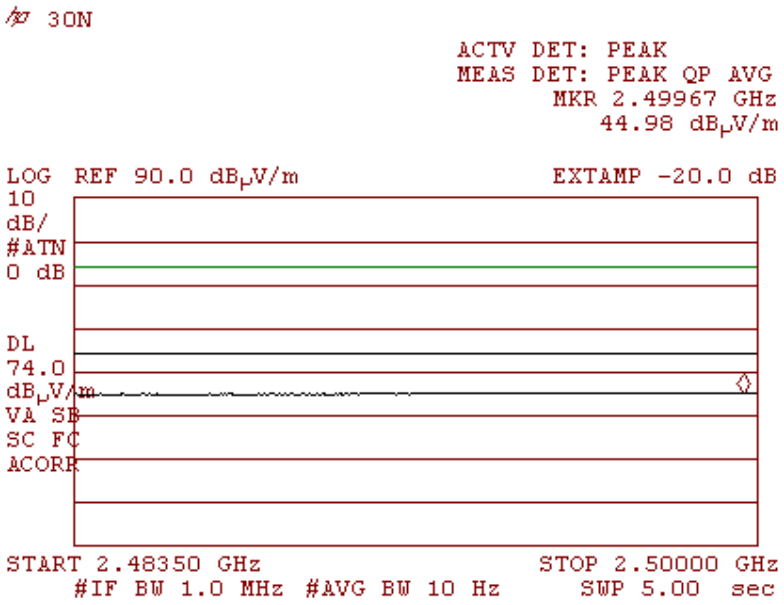
Horizontal Polarization
Average
Plot 4.5.35



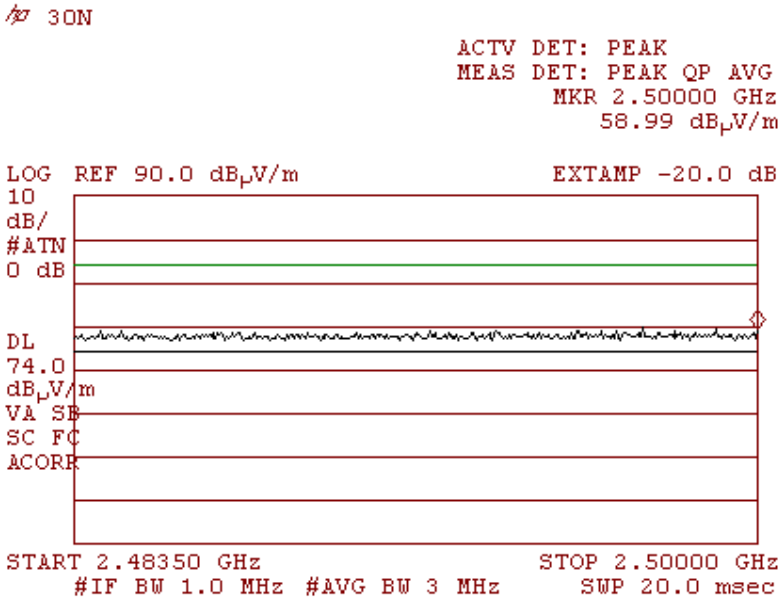
Peak
Plot 4.5.36



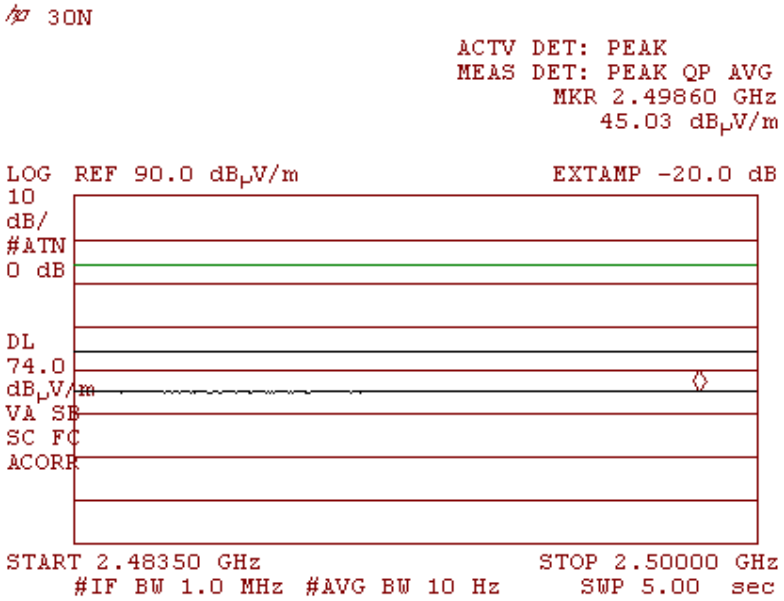
Highest Frequency
Vertical Polarization
Average
Plot 4.5.37



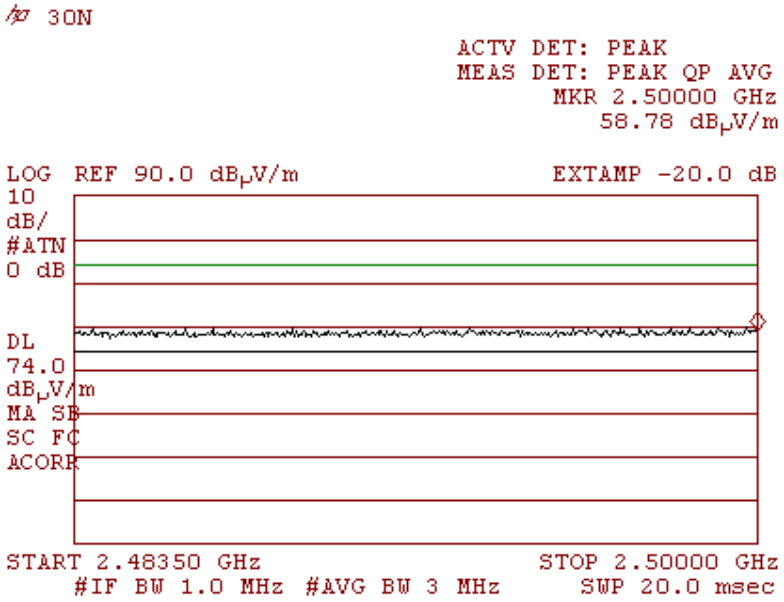
Peak
Plot 4.5.38



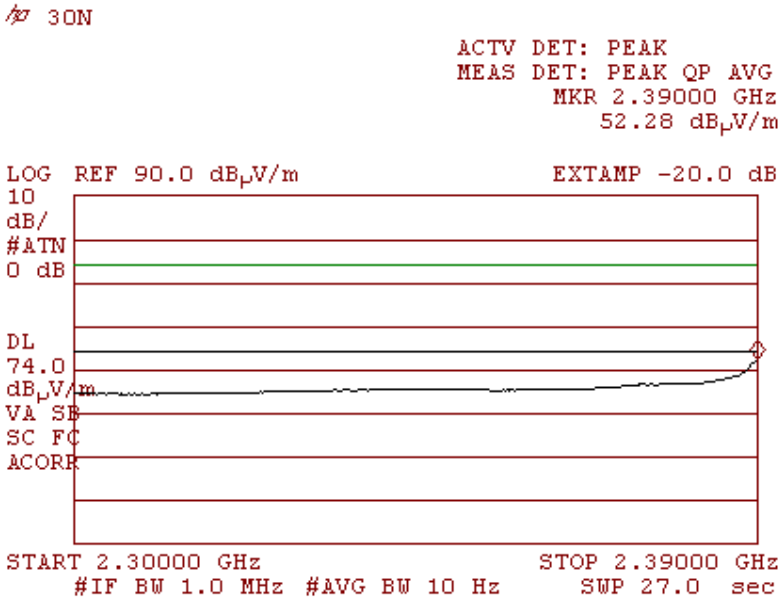
Horizontal Polarization
Average
Plot 4.5.39



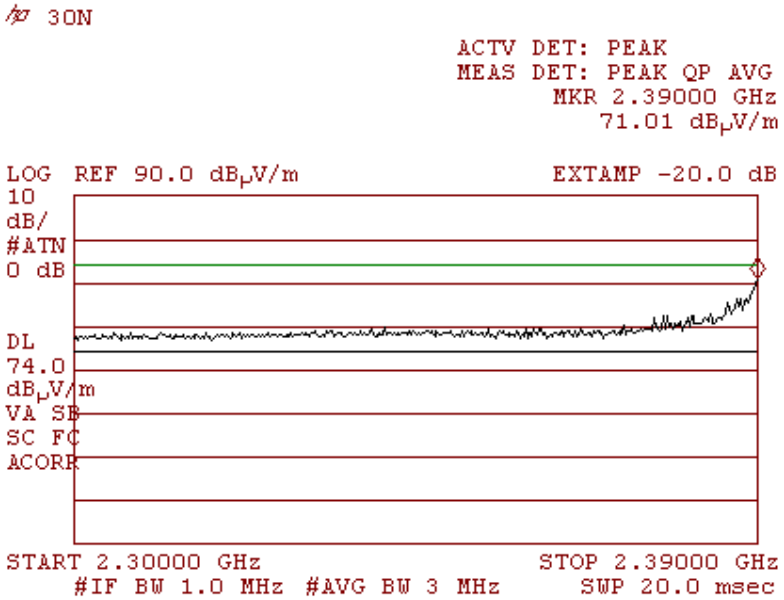
Peak
Plot 4.5.40



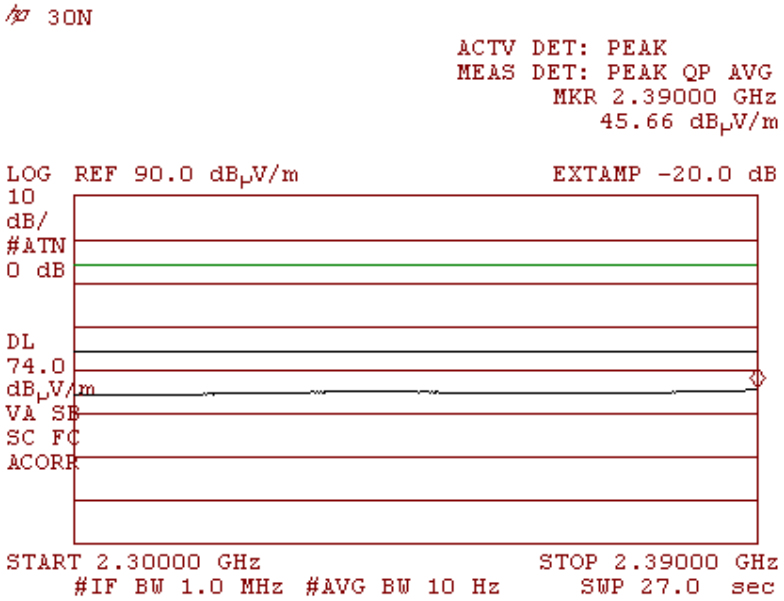
Transmitter Model: WLM54AG
802.11 g
Lowest Frequency
Vertical Polarization
Average
Plot 4.5.41



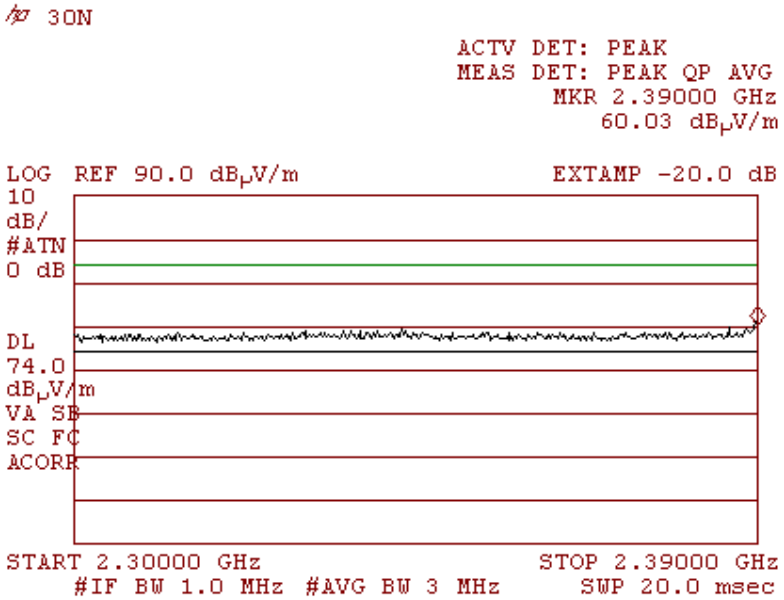
Peak
Plot 4.5.42



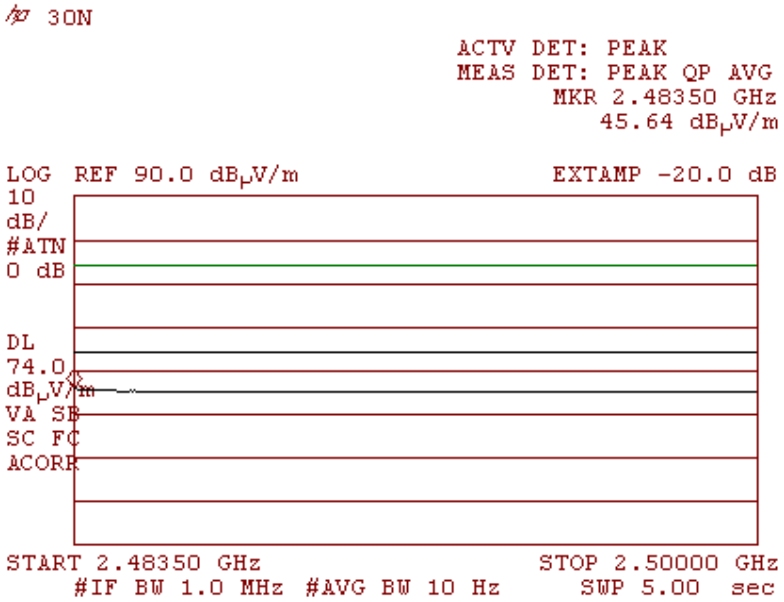
Horizontal Polarization
Average
Plot 4.5.43



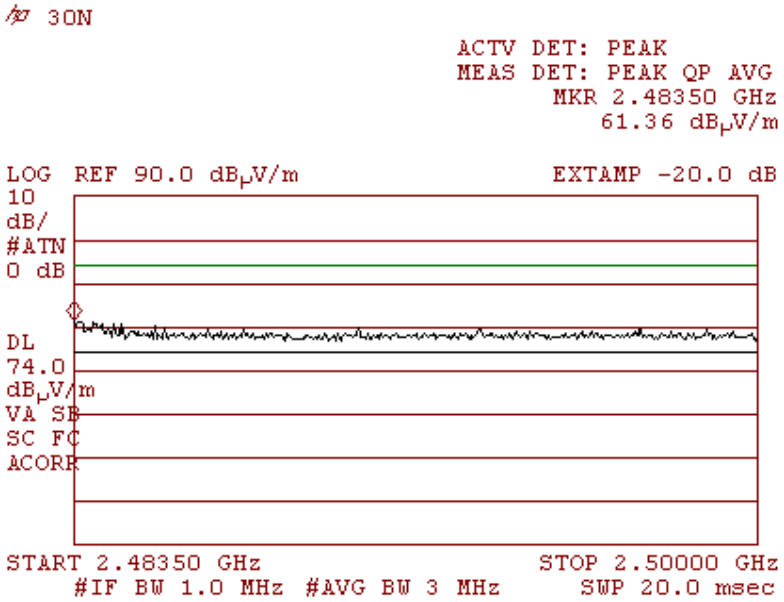
Peak
Plot 4.5.44



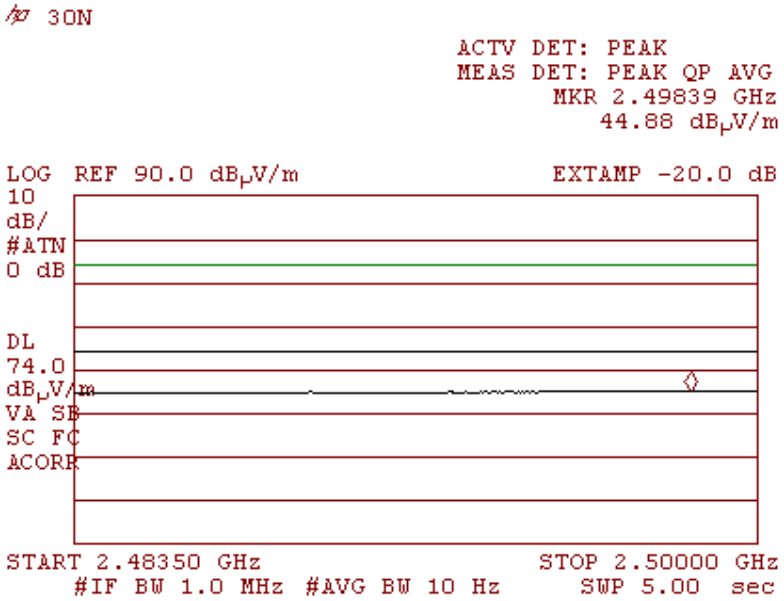
Highest Frequency
Vertical Polarization
Average
Plot 4.5.45



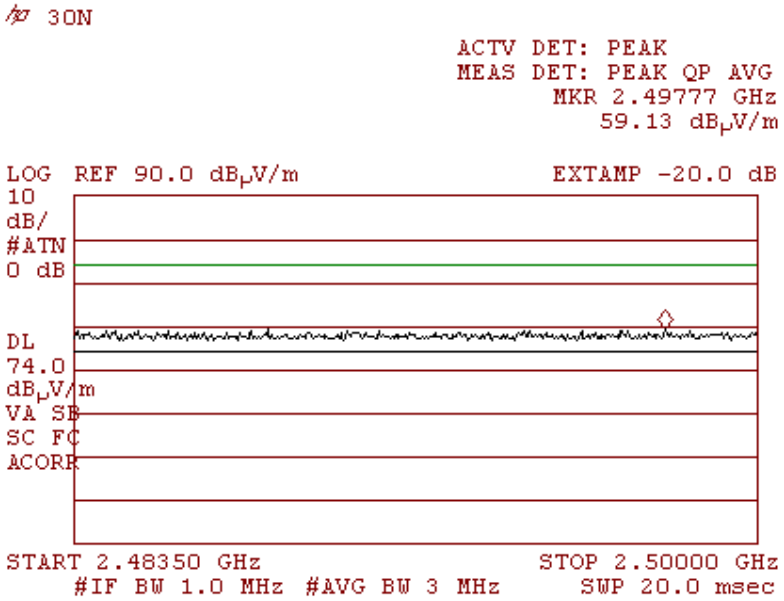
Peak
Plot 4.5.46



Horizontal Polarization
Average
Plot 4.5.47



Peak
Plot 4.5.48



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 Method:	See sec 2.2, with Band Reject filter where appropriate	**Comply**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	f>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 to 4.6.48	

Test result:

Worst case emission while three transmitters operating simultaneously.
Operation 1, transmitting in 802.11b modes:

Transmitter 0: WMIA-199/EU, frequency 2412 MHz
Transmitter 1: WMIA-199/EU, frequency 2437 MHz
Transmitter 2: WLM54AG, frequency 2462 MHz

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11b Mode							
Operation 1	11	1125	Peak	V	52.1	74	-21.9
Operation 1	11	1125	Avg	V	50.3	54	-3.7
Operation 1	11	1375	Peak	V	47.7	74	-26.3
Operation 1	11	1375	Avg	V	45.4	54	-8.6
Operation 1	11	1875	Peak	V	47.6	74	-26.4
Operation 1	11	1875	Avg	V	44.3	54	-9.7
Operation 1	11	4870	Peak	H	55.8	74	-18.2
Operation 1	11	4870	Avg	H	33.2	54	-20.8

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 2, transmitting in 802.11b modes:

Transmitter 0: WMIA-199/EU, frequency 2437 MHz
Transmitter 1: WMIA-199/EU, frequency 2462 MHz
Transmitter 2: WLM54AG, frequency 2412 MHz

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11b Mode							
Operation 2	11	1000	Peak	V	49.9	74	-24.1
Operation 2	11	1000	Avg	V	45.5	54	-8.5
Operation 2	11	1125	Peak	V	51.9	74	-22.1
Operation 2	11	1125	Avg	V	50.4	54	-3.6
Operation 2	11	1375	Peak	V	47	74	-27
Operation 2	11	1375	Avg	V	44.7	54	-9.3
Operation 2	11	4874	Peak	H	62.1	74	-11.9
Operation 2	11	4874	Avg	H	34	54	-20

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 3, transmitting in 802.11b & 802.11g modes:

Transmitter 0: WMIA-199/EU, frequency 2462 MHz, Mode 802.11g
Transmitter 1: WMIA-199/EU, frequency 2412 MHz, Mode 802.11g
Transmitter 2: WLM54AG, frequency 2437 MHz, Mode 802.11b

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11b & 802.11g Modes							
Operation 3	11 & 54	1125	Peak	V	51.9	74	-22.1
Operation 3	11 & 54	1125	Avg	V	50	54	-4
Operation 3	11 & 54	1375	Peak	V	47.4	74	-26.6
Operation 3	11 & 54	1375	Avg	V	44.7	54	-9.3
Operation 3	11 & 54	1625	Peak	V	45.9	74	-28.1
Operation 3	11 & 54	1625	Avg	V	42.6	54	-11.4
Operation 3	11 & 54	4828	Peak	H	63.6	74	-10.4
Operation 3	11 & 54	4828	Avg	H	34.9	54	-19.1

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 4, transmitting in 802.11b & 802.11g modes:

Transmitter 0: WMIA-199/EU, frequency 2437 MHz, Mode 802.11g
Transmitter 1: WMIA-199/EU, frequency 2462 MHz, Mode 802.11b
Transmitter 2: WLM54AG, frequency 2412 MHz, Mode 802.11g

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 4, 802.11b & 802.11g Modes							
Operation 4	11 & 54	1125	Peak	V	52	74	-22
Operation 4	11 & 54	1125	Avg	V	50.3	54	-3.7
Operation 4	11 & 54	1375	Peak	V	48.2	74	-25.8
Operation 4	11 & 54	1375	Avg	V	46.2	54	-7.8
Operation 4	11 & 54	4876	Peak	H	61.2	74	-12.8
Operation 4	11 & 54	4876	Avg	H	35.2	54	-18.8
Operation 4	11 & 54	4923	Peak	V	54.8	74	-19.2
Operation 4	11 & 54	4923	Avg	V	33.4	54	-20.6

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 5, transmitting in 802.11n (20MHz) & 802.11g modes:

Transmitter 0: WMIA-199/EU, frequency 2412 MHz, Mode 802.11n (20MHz)
Transmitter 1: WMIA-199/EU, frequency 2437 MHz, Mode 802.11n (20MHz)
Transmitter 2: WLM54AG, frequency 2462 MHz, Mode 802.11g

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 5, 802.11n (20MHz) & 802.11g Modes							
Operation 5	54 & 130	1125	Peak	V	53.3	74	-20.7
Operation 5	54 & 130	1125	Avg	V	51.6	54	-2.4
Operation 5	54 & 130	1375	Peak	V	49.7	74	-24.3
Operation 5	54 & 130	1375	Avg	V	47.8	54	-6.2
Operation 5	54 & 130	4821	Peak	H	67.2	74	-6.8
Operation 5	54 & 130	4821	Avg	H	42.2	54	-11.8
Operation 5	54 & 130	4869	Peak	H	65.1	74	-8.9
Operation 5	54 & 130	4869	Avg	H	34.7	54	-19.3

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 6, transmitting in 802.11n (20MHz), 802.11n (40MHz) & 802.11g modes:

Transmitter 0: WMIA-199/EU, frequency 2462 MHz, Mode 802.11n (20MHz)
Transmitter 1: WMIA-199/EU, frequency 2422 MHz, Mode 802.11n (40MHz)
Transmitter 2: WLM54AG, frequency 2437 MHz, Mode 802.11g

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 6, 802.11n (20MHz), 802.11n (40MHz) & 802.11g Modes							
Operation 6	54, 130 & 300	1125	Peak	V	51.4	74	-22.6
Operation 6	54, 130 & 300	1125	Avg	V	49.5	54	-4.5
Operation 6	54, 130 & 300	1250	Peak	V	46	74	-28
Operation 6	54, 130 & 300	1250	Avg	V	42.9	54	-11.1
Operation 6	54, 130 & 300	1375	Peak	V	48.5	74	-25.5
Operation 6	54, 130 & 300	1375	Avg	V	46.4	54	-7.6
Operation 6	54, 130 & 300	4922	Peak	H	60.2	74	-13.8
Operation 6	54, 130 & 300	4922	Avg	h	34.7	54	-19.3

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 7, transmitting in 802.11n (40MHz) & 802.11g modes:

Transmitter 0: WMIA-199/EU, frequency 2437 MHz, Mode 802.11n (40MHz)
Transmitter 1: WMIA-199/EU, frequency 2452 MHz, Mode 802.11n (40MHz)
Transmitter 2: WLM54AG, frequency 2412 MHz, Mode 802.11g

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 7, 802.11n (40MHz) & 802.11g Modes							
Operation 7	54 & 300	1125	Peak	V	55	74	-19
Operation 7	54 & 300	1125	Avg	V	51.6	54	-2.4
Operation 7	54 & 300	1375	Peak	V	48.7	74	-25.3
Operation 7	54 & 300	1375	Avg	V	43.7	54	-10.3
Operation 7	54 & 300	1875	Peak	V	46.9	74	-27.1
Operation 7	54 & 300	1875	Avg	V	40.7	54	-13.3
Operation 7	54 & 300	4914	Peak	H	51.2	74	-22.8
Operation 7	54 & 300	4914	Avg	H	32.7	54	-21.3

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 8, transmitting in 802.11a mode:

Transmitter 0: WMIA-199/EU, frequency 5825 MHz
Transmitter 1: WMIA-199/EU, frequency 5785 MHz
Transmitter 2: WLM54AG, frequency 5745 MHz

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 8, 802.11a Mode							
Operation 8	54	1125	Peak	H	47.6	74	-26.4
Operation 8	54	1125	Avg	H	45.2	54	-8.8
Operation 8	54	1250	Peak	V	47.9	74	-26.1
Operation 8	54	1250	Avg	V	45.6	54	-8.4
Operation 8	54	1375	Peak	V	50.2	74	-23.8
Operation 8	54	1375	Avg	V	48.4	54	-5.6
Operation 8	54	5085	Peak	H	51.4	74	-22.6
Operation 8	54	5085	Avg	H	37.7	54	-16.3

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 9, transmitting in 802.11n (20MHz) & 802.11a modes:

Transmitter 0: WMIA-199/EU, frequency 5745 MHz, Mode 802.11a
Transmitter 1: WMIA-199/EU, frequency 5825 MHz, Mode 802.11n (20MHz)
Transmitter 2: WLM54AG, frequency 5785 MHz, Mode 802.11a

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 9, 802.11n (20MHz) & 802.11a Modes							
Operation 9	54 & 130	1250	Peak	V	48	74	-26
Operation 9	54 & 130	1250	Avg	V	45.9	54	-8.1
Operation 9	54 & 130	1375	Peak	V	49.7	74	-24.3
Operation 9	54 & 130	1375	Avg	V	47.9	54	-6.1
Operation 9	54 & 130	5663	Peak	V	62.9	74	-11.1
Operation 9	54 & 130	5633	Avg	V	44.7	54	-9.3
Operation 9	54 & 130	5904	Peak	V	73.2	74	-0.8
Operation 9	54 & 130	5904	Avg	V	51	54	-3

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 10, transmitting in 802.11n (20MHz) & 802.11a modes:

Transmitter 0: WMIA-199/EU, frequency 5745 MHz, Mode 802.11n (20MHz)
Transmitter 1: WMIA-199/EU, frequency 5785 MHz, Mode 802.11n (20MHz)
Transmitter 2: WLM54AG, frequency 5825 MHz, Mode 802.11a

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

Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 10, 802.11n (20MHz) & 802.11a Modes							
Operation 10	54 & 130	1000	Peak	H	50.3	74	-23.7
Operation 10	54 & 130	1000	Avg	H	45.4	54	-8.6
Operation 10	54 & 130	1125	Peak	V	53.1	74	-20.9
Operation 10	54 & 130	1125	Avg	V	50.4	54	-3.6
Operation 10	54 & 130	1250	Peak	V	50.6	74	-23.4
Operation 10	54 & 130	1250	Avg	V	46.6	54	-7.4
Operation 10	54 & 130	1375	Peak	V	48.4	74	-25.6
Operation 10	54 & 130	1375	Avg	V	44.2	54	-9.8

Test result:
Worst case emission while three transmitters operating simultaneously.
Operation 11, transmitting in 802.11n (40MHz) & 802.11a modes:

Transmitter 0: WMIA-199/EU, frequency 5755 MHz, Mode 802.11n (40MHz)
Transmitter 1: WMIA-199/EU, frequency 5795 MHz, Mode 802.11n (40MHz)
Transmitter 2: WLM54AG, frequency 5825 MHz, Mode 802.11a

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

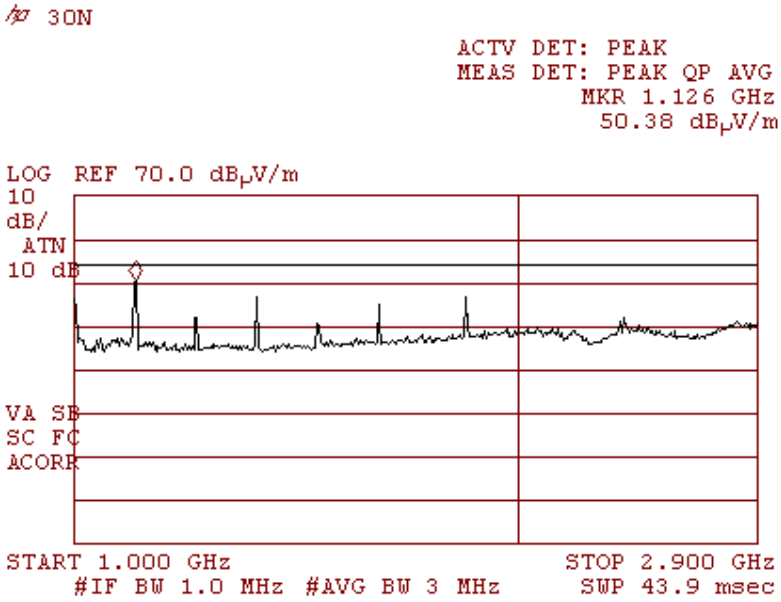
Channel Frequency [MHz]	Data Rate [Mbps]	Emission Frequency [MHz]	Detector Type	Polarization V/H	Emission Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
Operation 11, 802.11n (40MHz) & 802.11a Modes							
Operation 11	54 & 300	1000	Peak	H	52.3	74	-21.7
Operation 11	54 & 300	1000	Avg	H	47.3	54	-6.7
Operation 11	54 & 300	1125	Peak	V	48.2	74	-25.8
Operation 11	54 & 300	1125	Avg	V	46	54	-8
Operation 11	54 & 300	1250	Peak	V	49.2	74	-24.8
Operation 11	54 & 300	1250	Avg	V	47	54	-7
Operation 11	54 & 300	5417	Peak	H	52.4	74	-21.6
Operation 11	54 & 300	5417	Avg	H	45.9	54	-8.1

Test results below 1GHz:
All measurements were done in horizontal and vertical polarizations; the results show the worst case for all mode and channel.

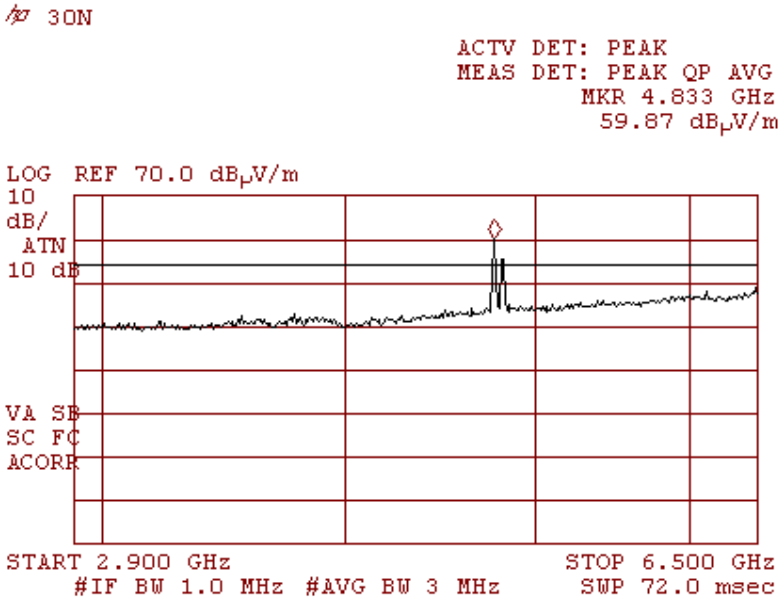
Frequency [MHz]	Emission Level [dBµV/m]	Detector Type	Polarization V/H	Limit [dBµV/m]	Margin [dB]
30.59	36.3	QP	V	40	-3.7
67.95	37.9	QP	V	40	-2.1
100	35.6	QP	V	43.5	-7.9
200	38.7	QP	H	43.5	-4.8
250	42.3	QP	H	46.5	-4.2
500	45.6	QP	H	46.5	-0.9
625	44.7	QP	H	46.5	-1.8

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

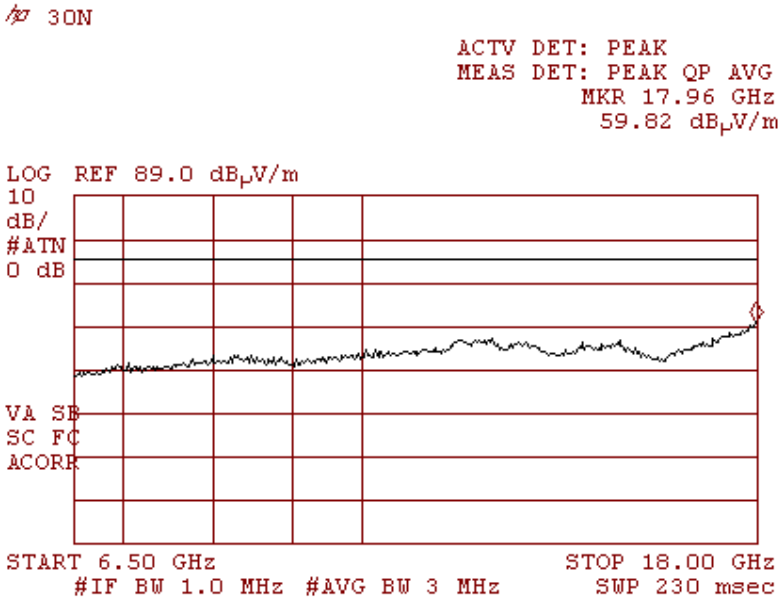
Operation 1
Vertical & Horizontal Polarization
Plot 4.6.1



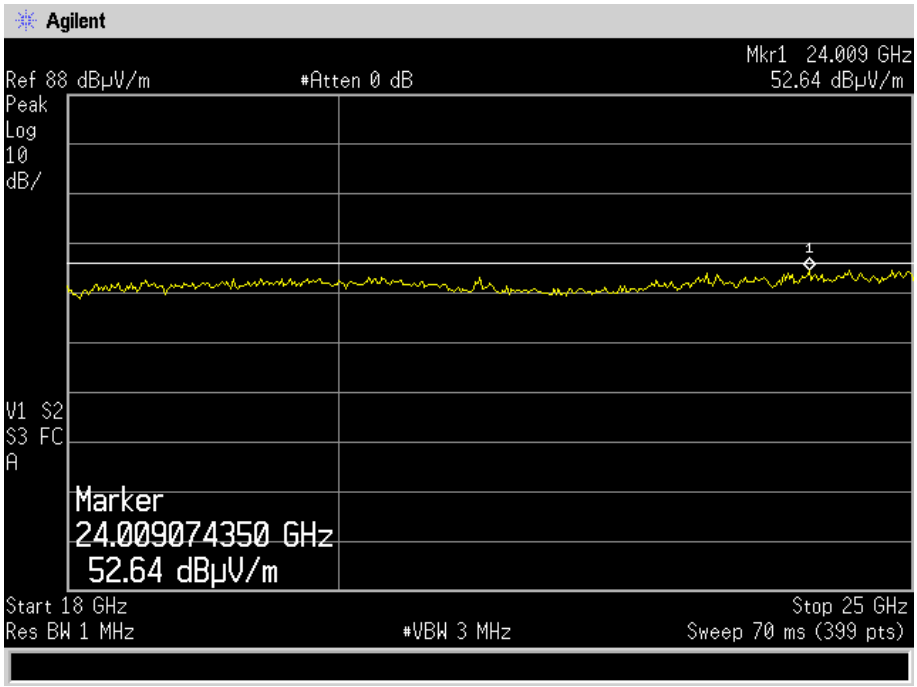
Operation 1
Vertical & Horizontal Polarization
Plot 4.6.2



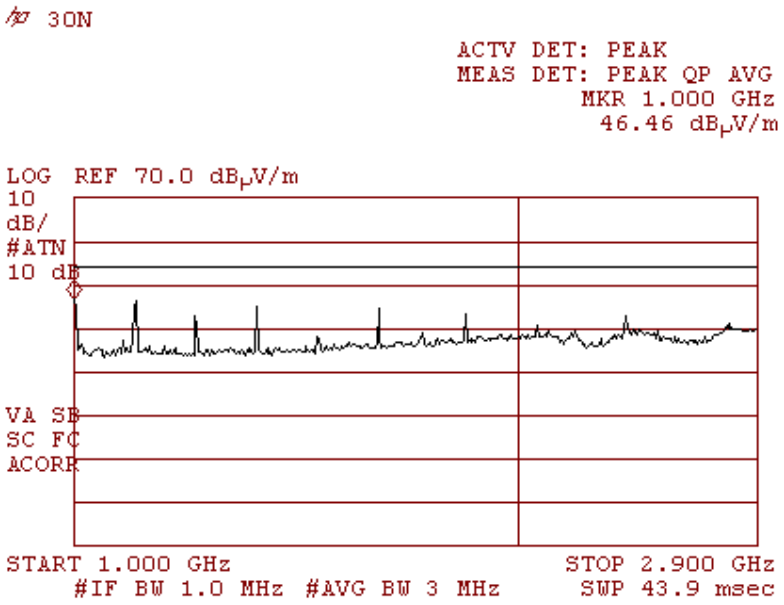
Operation 1
Vertical & Horizontal Polarization
Plot 4.6.3



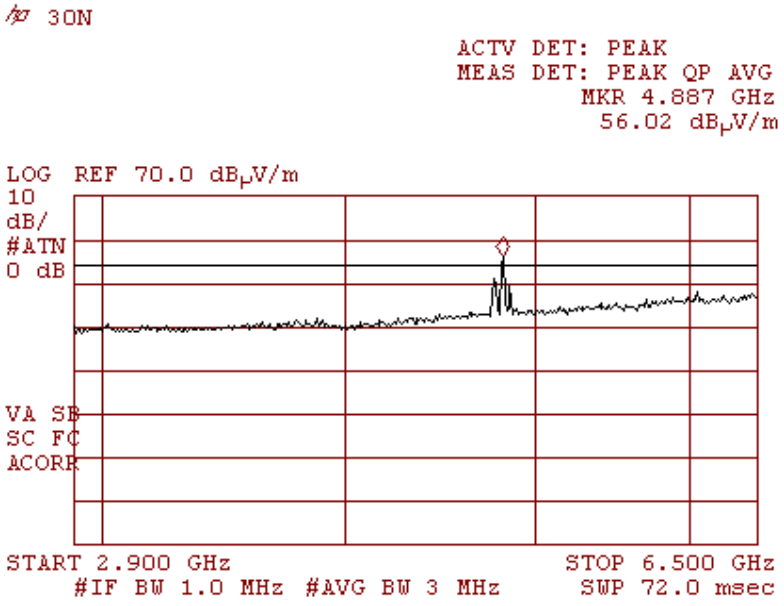
Operation 1
Vertical & Horizontal Polarization
Plot 4.6.4



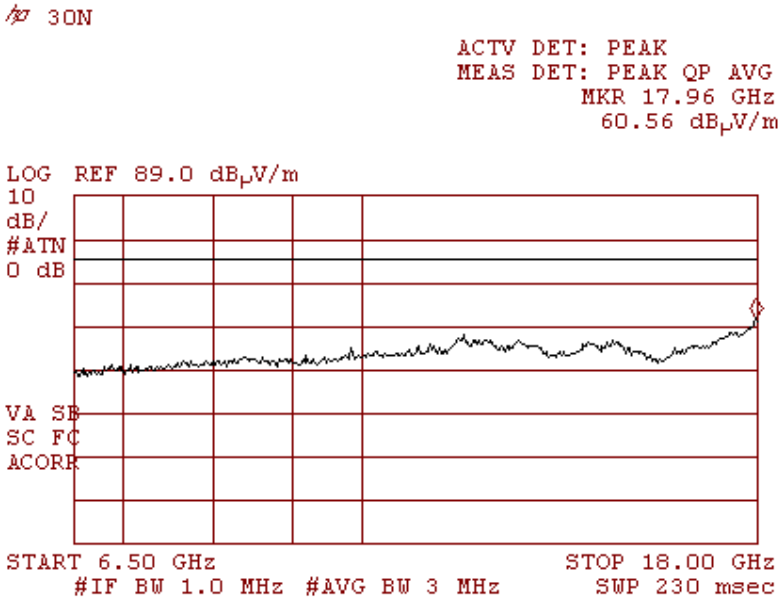
Operation 2
Vertical & Horizontal Polarization
Plot 4.6.5



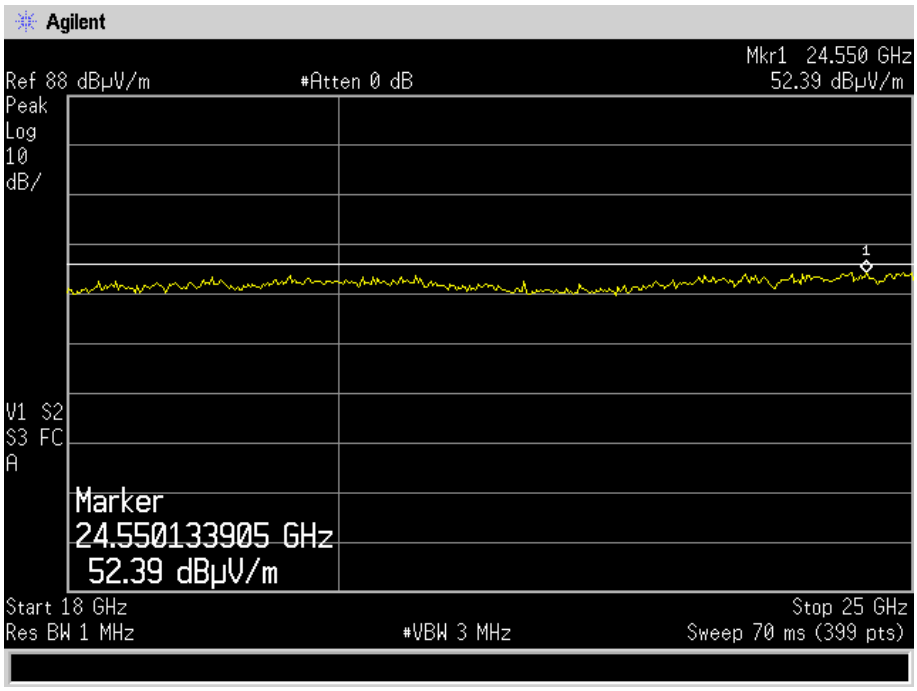
Operation 2
Vertical & Horizontal Polarization
Plot 4.6.6



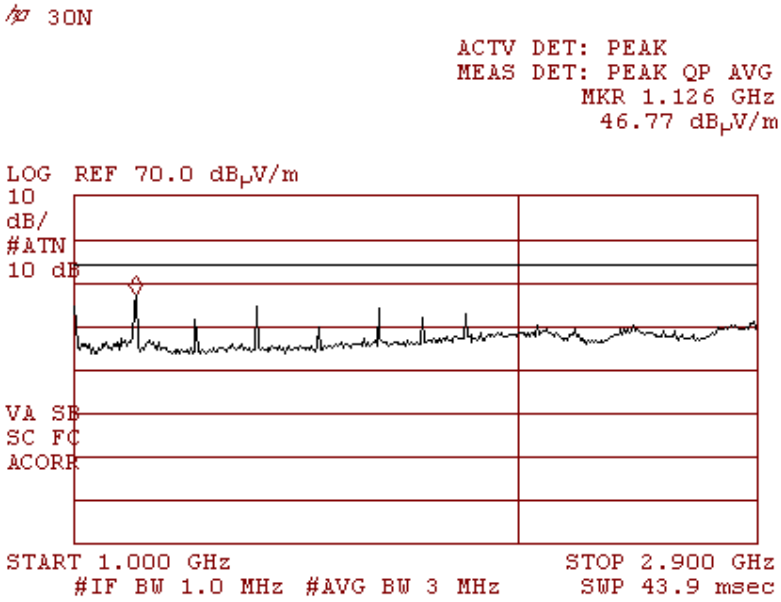
Operation 2
Vertical & Horizontal Polarization
Plot 4.6.7



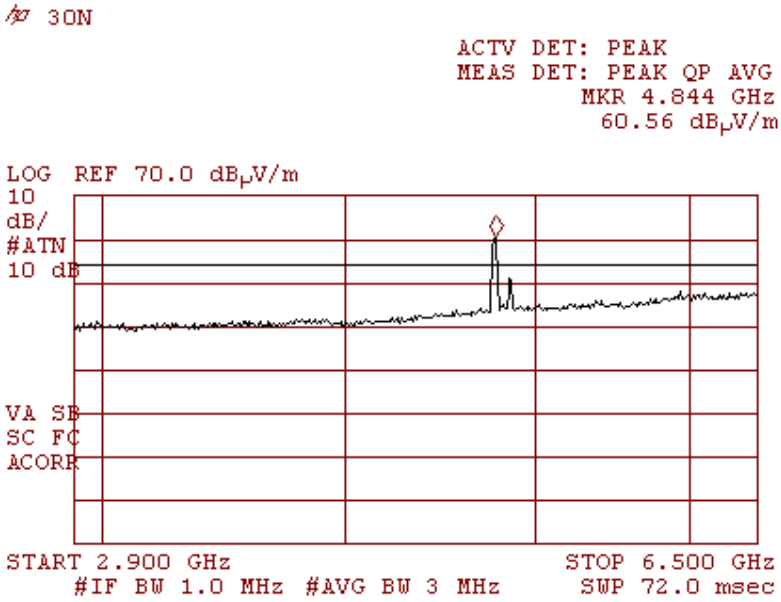
Operation 2
Vertical & Horizontal Polarization
Plot 4.6.8



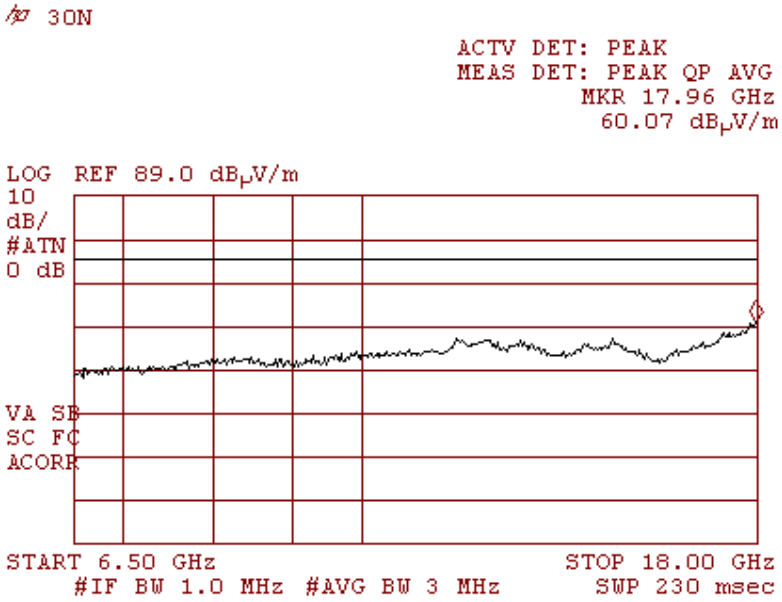
Operation 3
Vertical & Horizontal Polarization
Plot 4.6.9



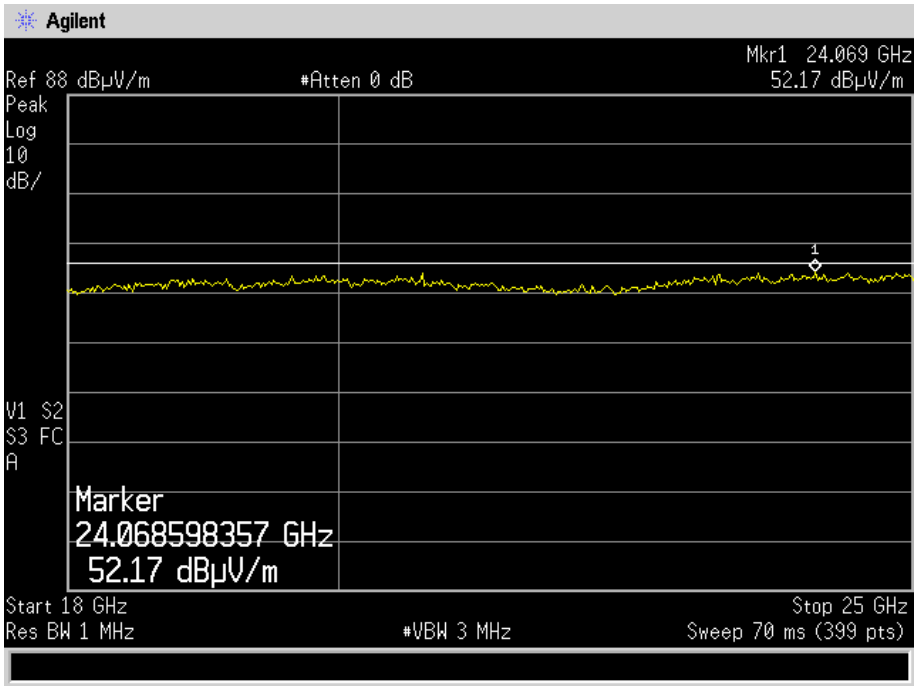
Operation 3
Vertical & Horizontal Polarization
Plot 4.6.10



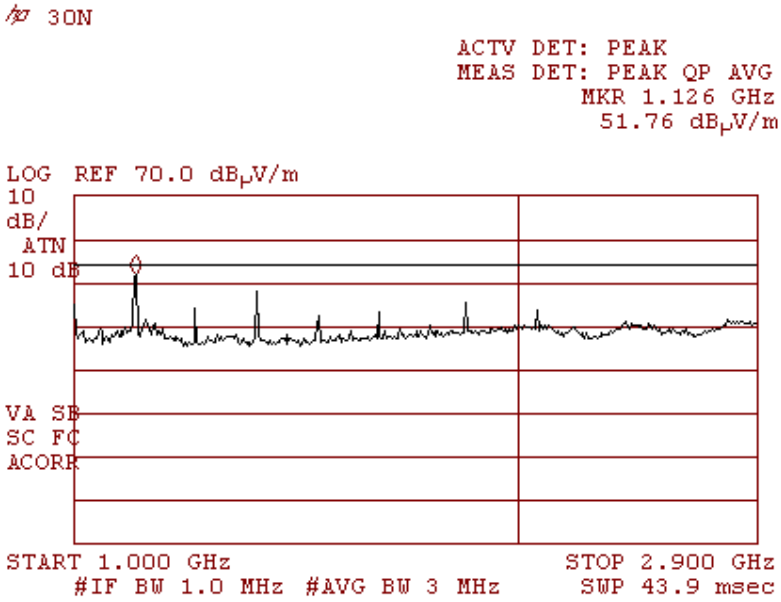
Operation 3
Vertical & Horizontal Polarization
Plot 4.6.11



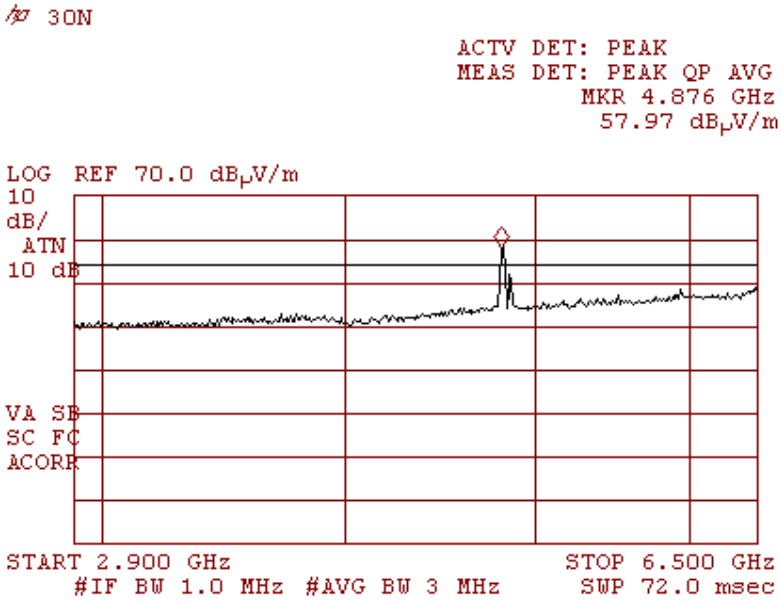
Operation 3
Vertical & Horizontal Polarization
Plot 4.6.12



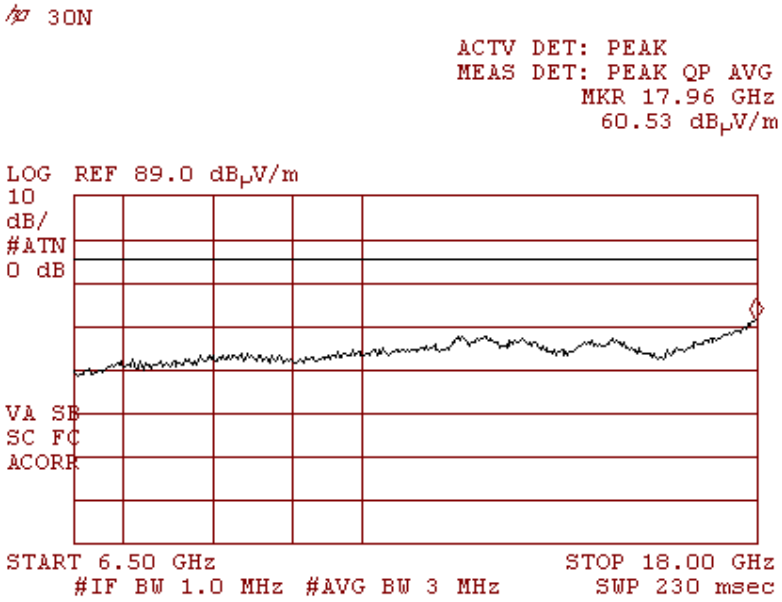
Operation 4
Vertical & Horizontal Polarization
Plot 4.6.13



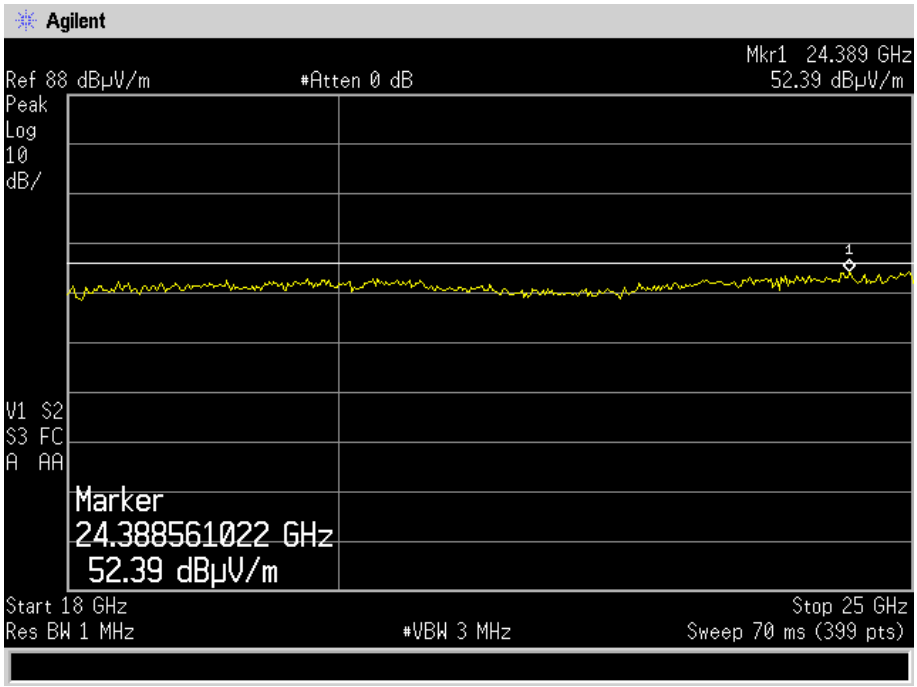
Operation 4
Vertical & Horizontal Polarization
Plot 4.6.14



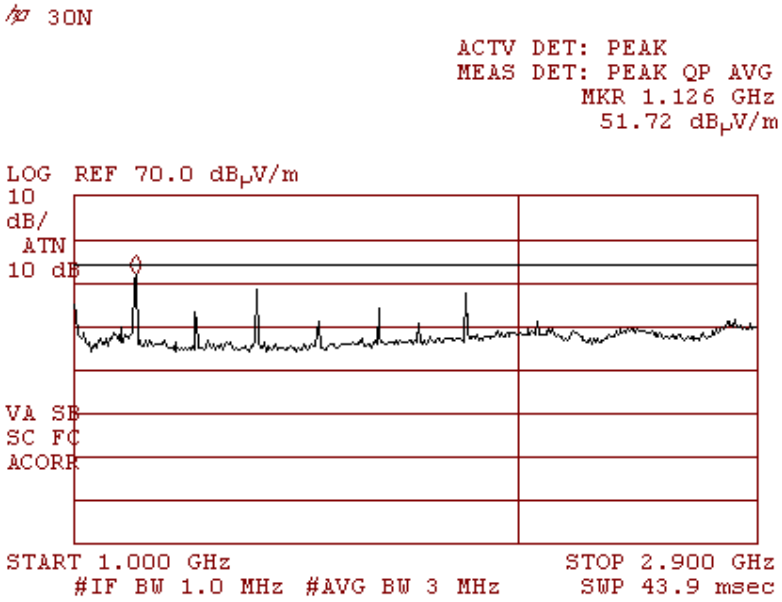
Operation 4
Vertical & Horizontal Polarization
Plot 4.6.15



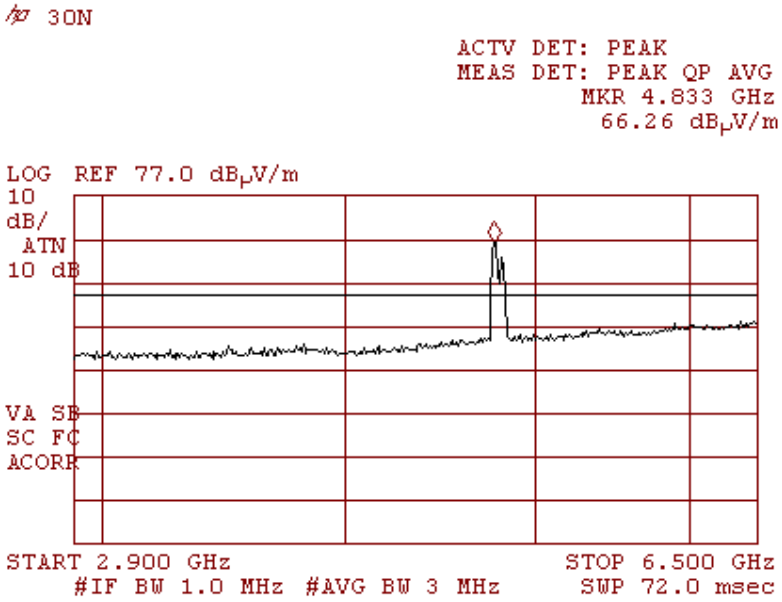
Operation 4
Vertical & Horizontal Polarization
Plot 4.6.16



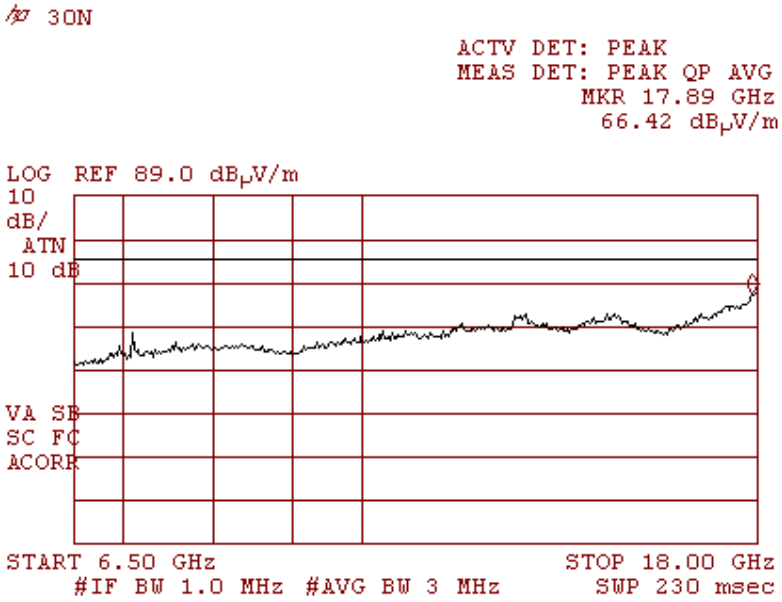
Operation 5
Vertical & Horizontal Polarization
Plot 4.6.17



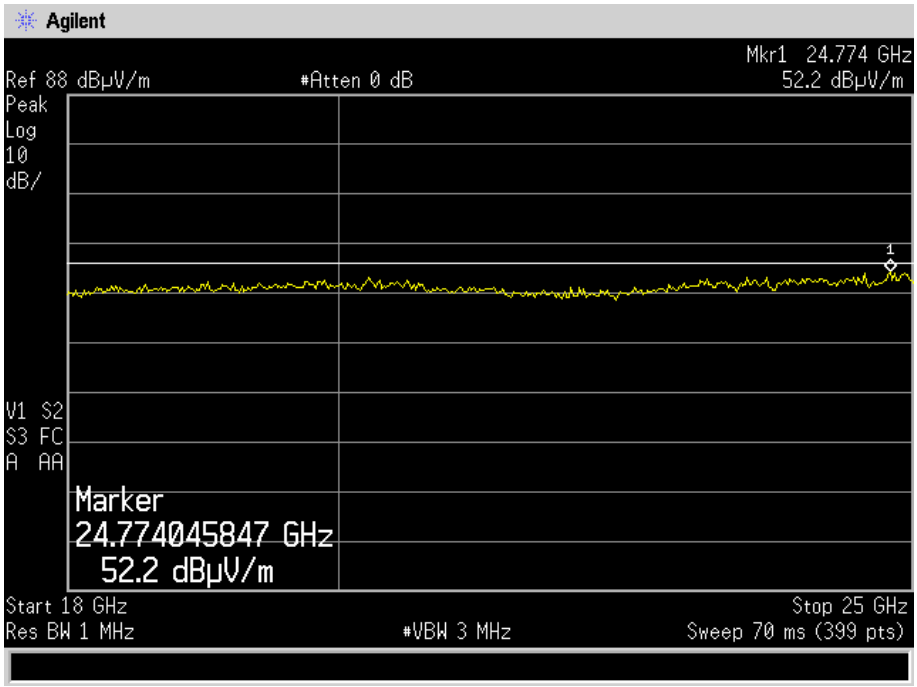
Operation 5
Vertical & Horizontal Polarization
Plot 4.6.18



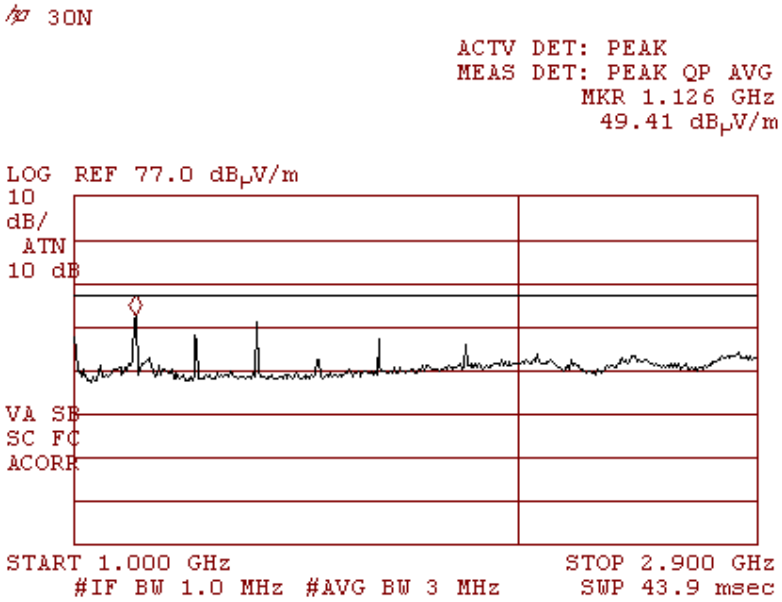
Operation 5
Vertical & Horizontal Polarization
Plot 4.6.19



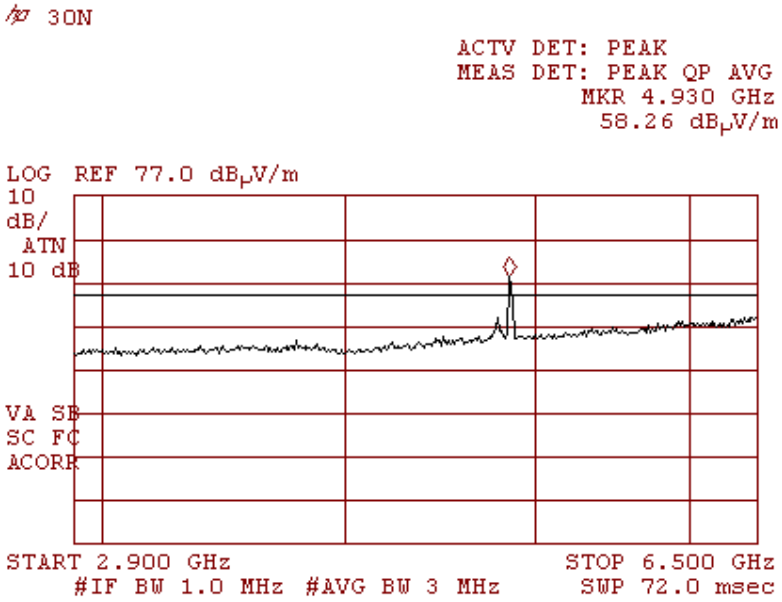
Operation 5
Vertical & Horizontal Polarization
Plot 4.6.20



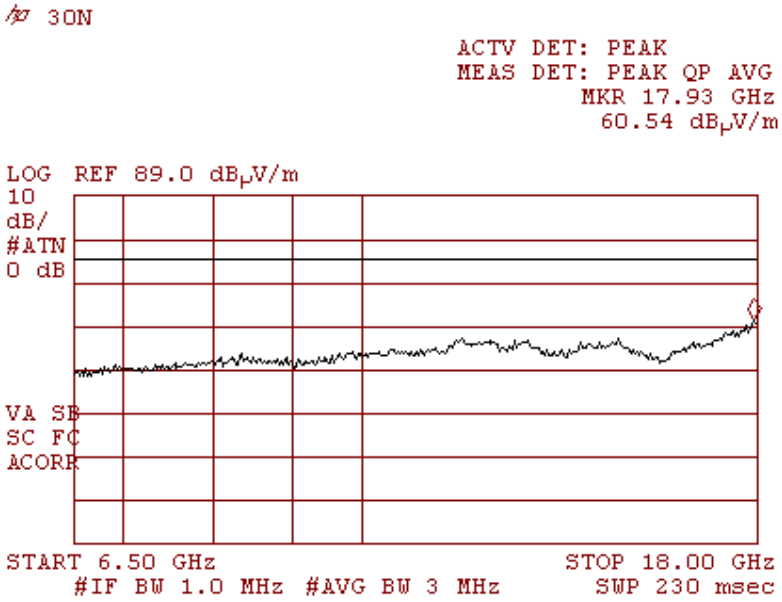
Operation 6
Vertical & Horizontal Polarization
Plot 4.6.21



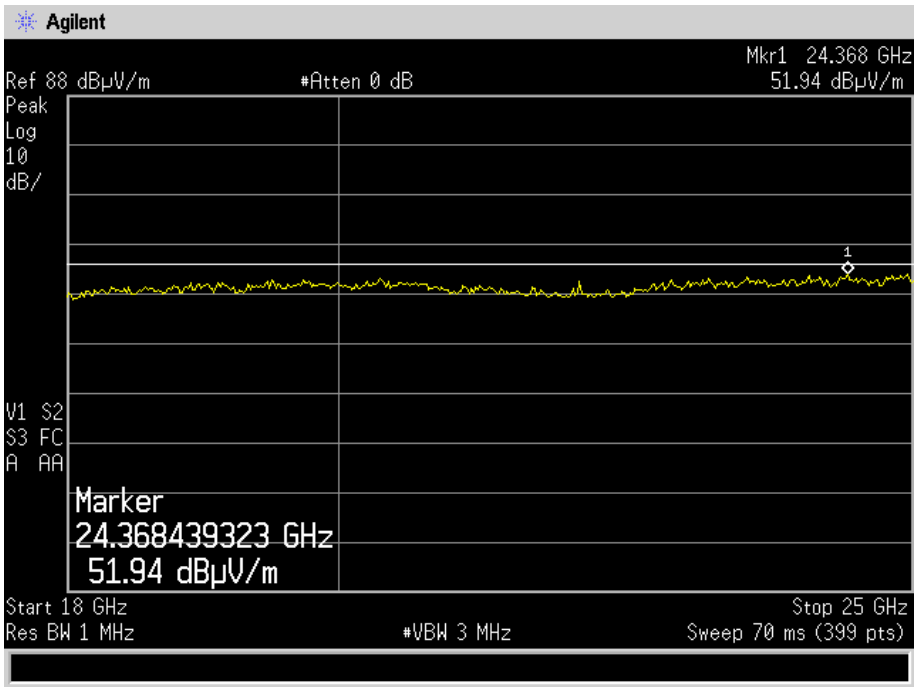
Operation 6
Vertical & Horizontal Polarization
Plot 4.6.22



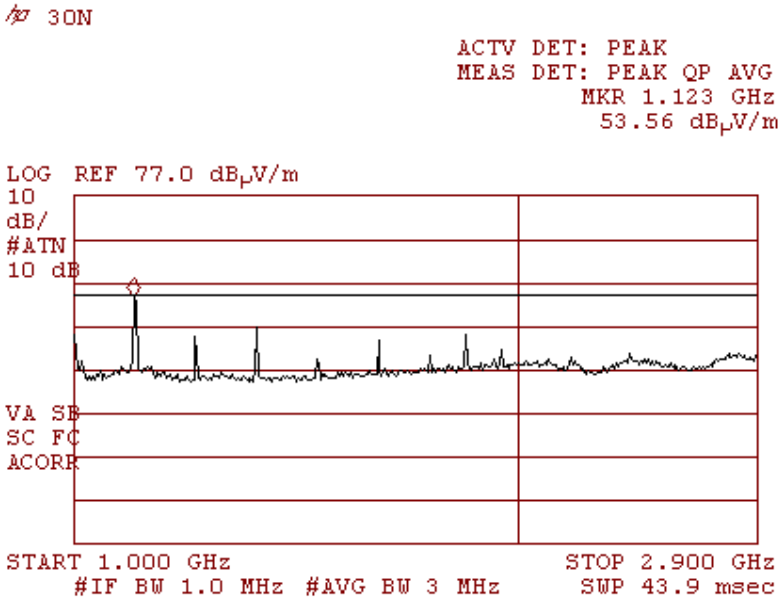
Operation 6
Vertical & Horizontal Polarization
Plot 4.6.23



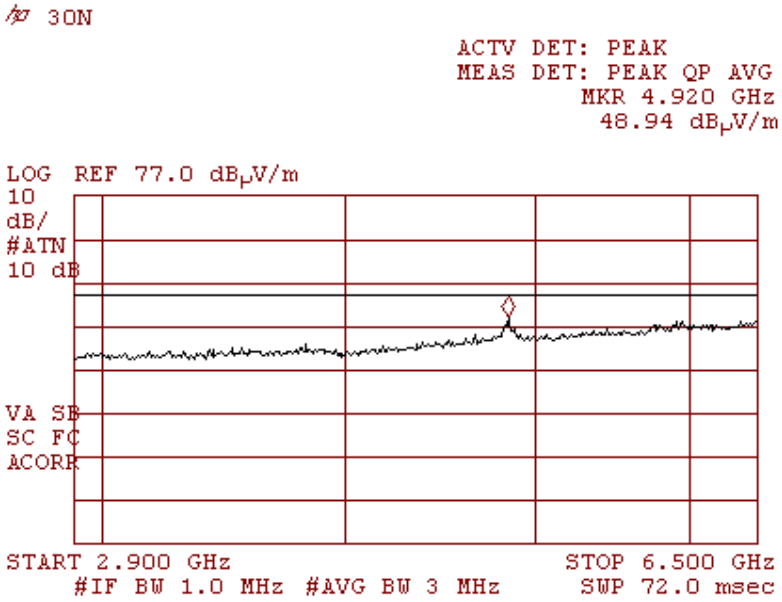
Operation 6
Vertical & Horizontal Polarization
Plot 4.6.24



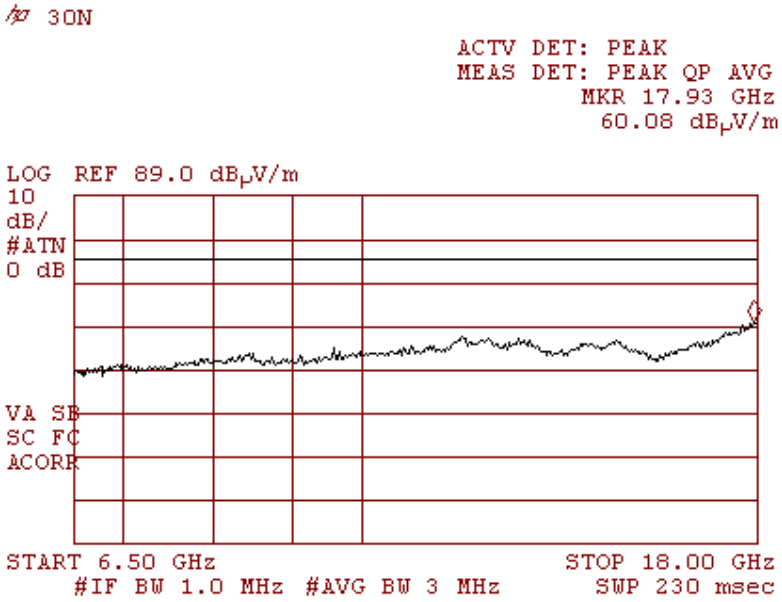
Operation 7
Vertical & Horizontal Polarization
Plot 4.6.25



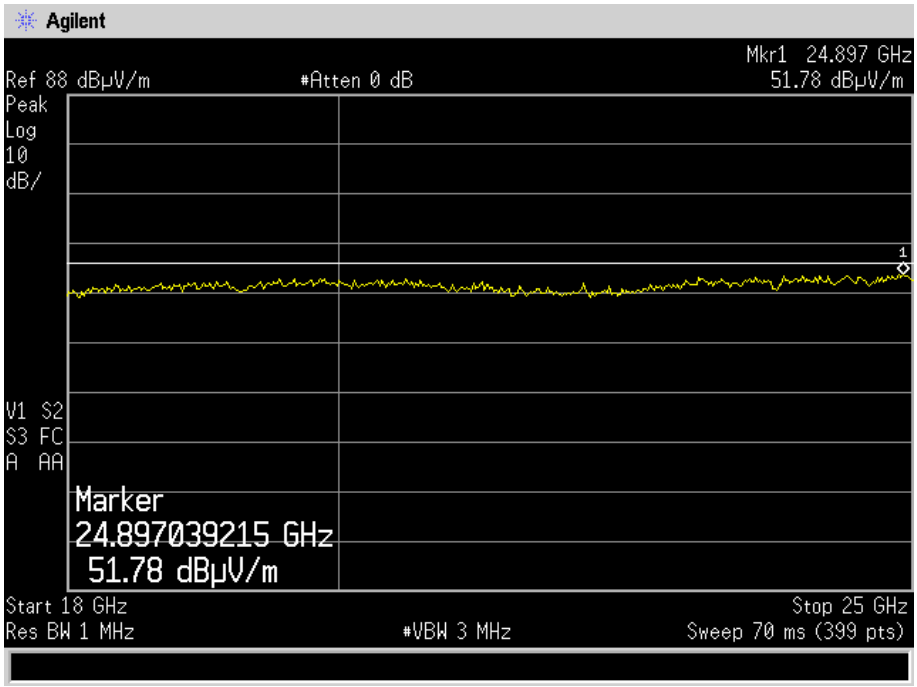
Operation 7
Vertical & Horizontal Polarization
Plot 4.6.26



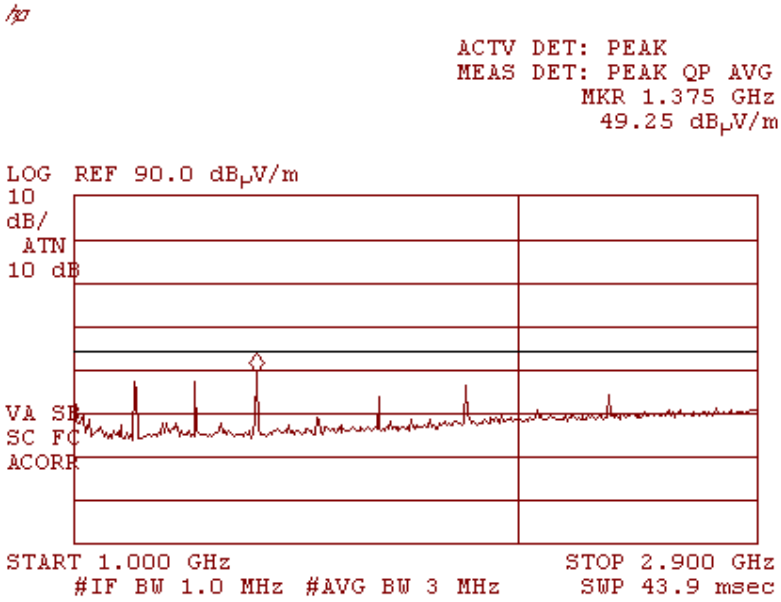
Operation 7
Vertical & Horizontal Polarization
Plot 4.6.27



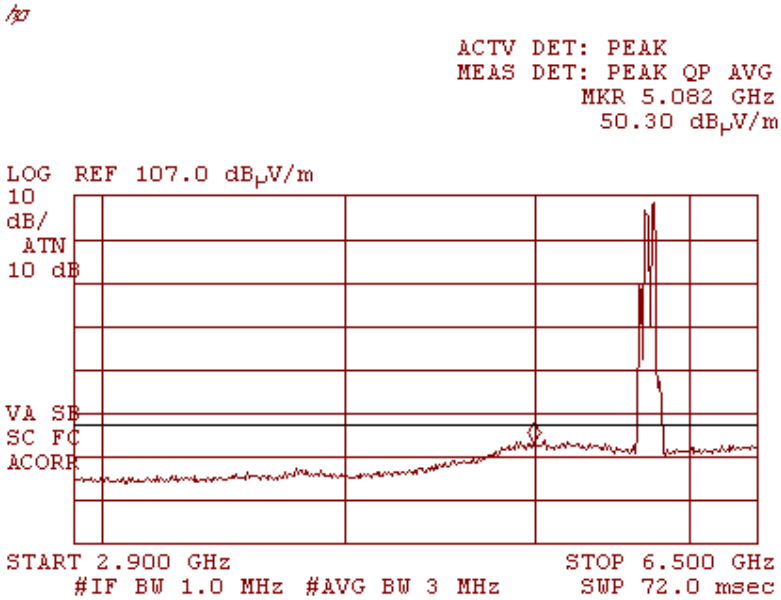
Operation 7
Vertical & Horizontal Polarization
Plot 4.6.28



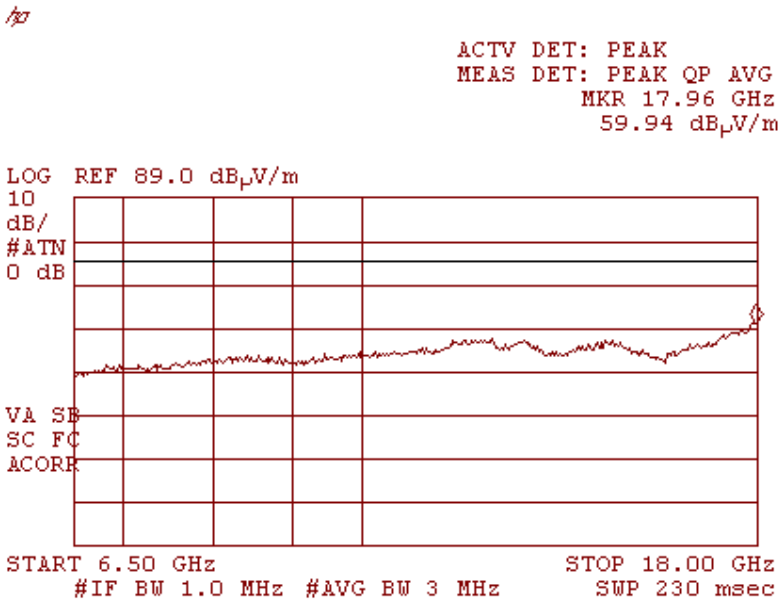
Operation 8
Vertical & Horizontal Polarization
Plot 4.6.29



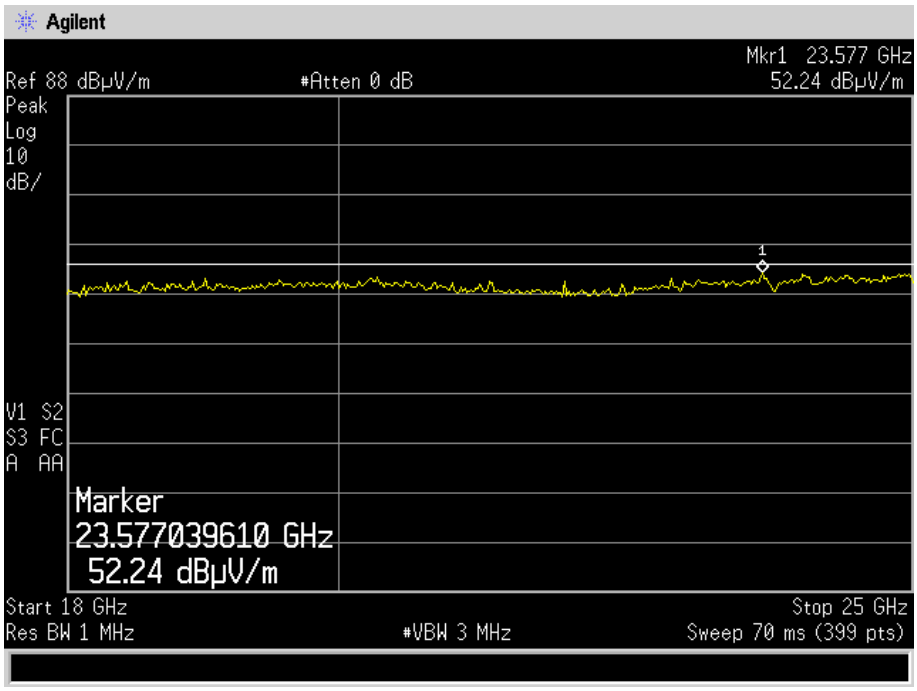
Operation 8
Vertical & Horizontal Polarization
Plot 4.6.30



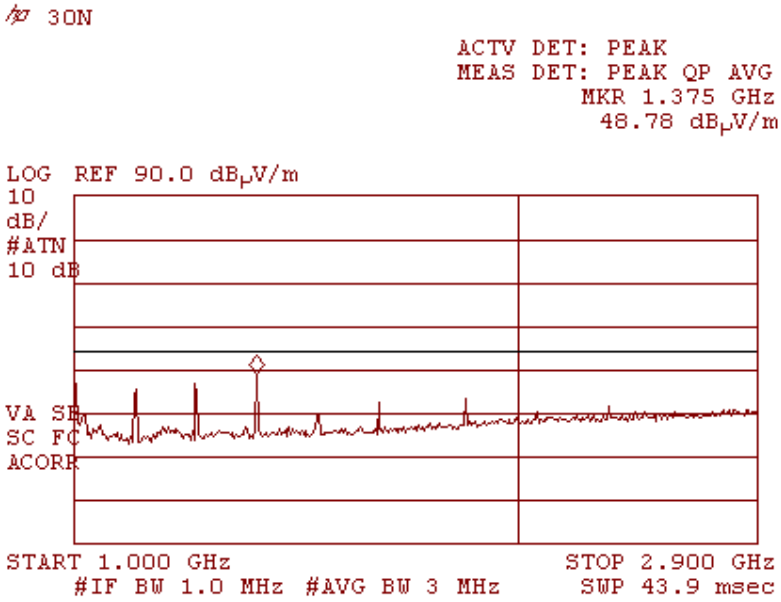
Operation 8
Vertical & Horizontal Polarization
Plot 4.6.31



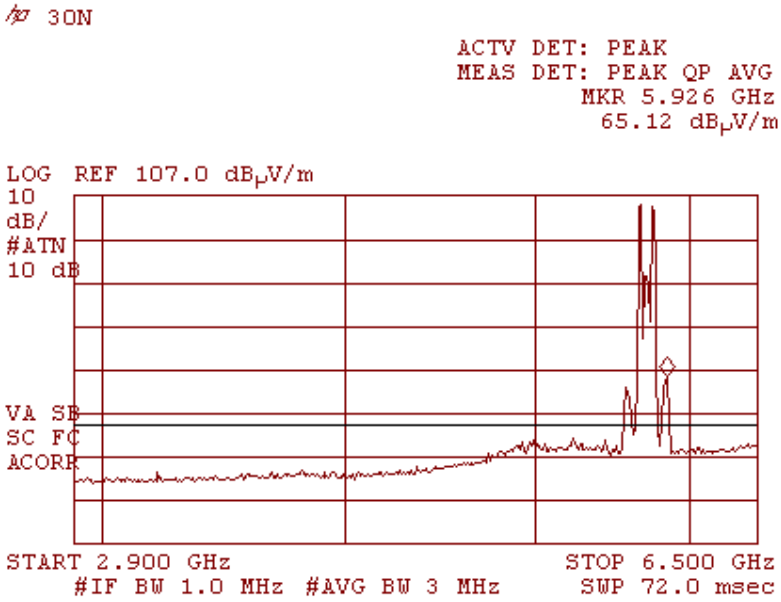
Operation 8
Vertical & Horizontal Polarization
Plot 4.6.32



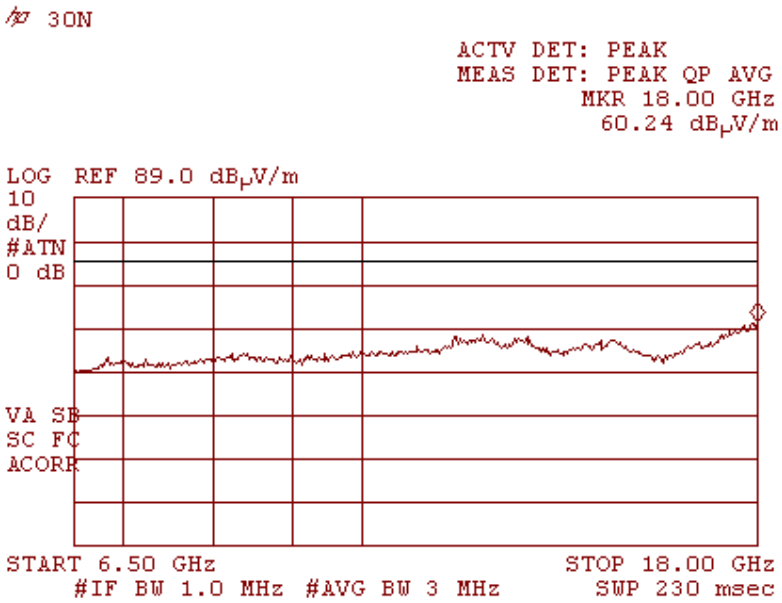
Operation 9
Vertical & Horizontal Polarization
Plot 4.6.33



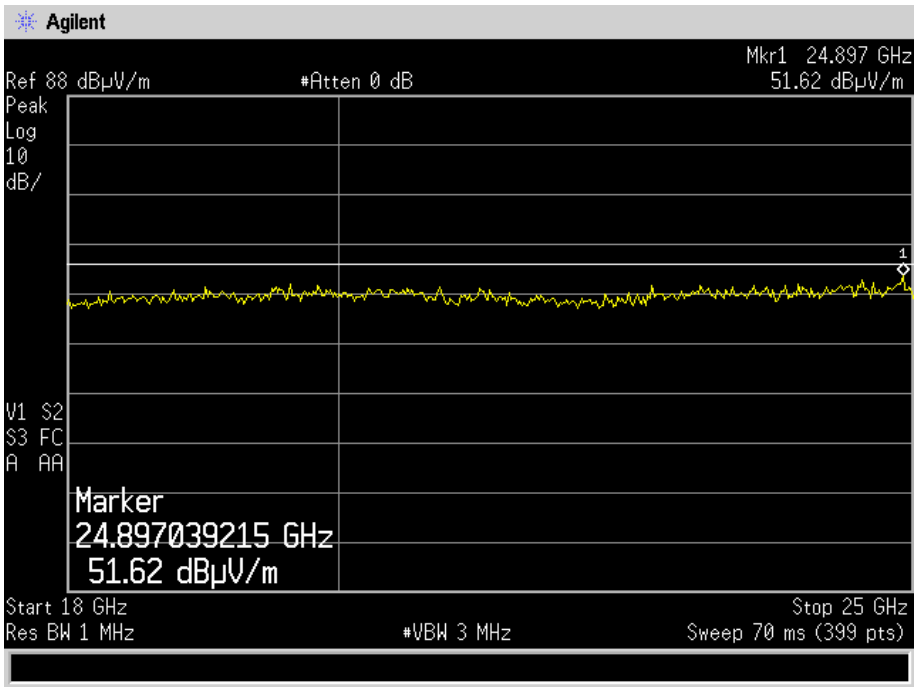
Operation 9
Vertical & Horizontal Polarization
Plot 4.6.34



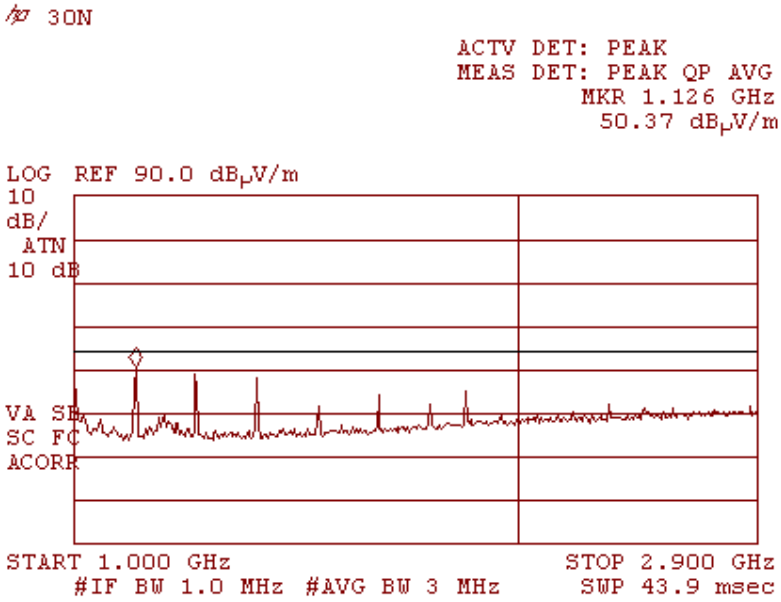
Operation 9
Vertical & Horizontal Polarization
Plot 4.6.35



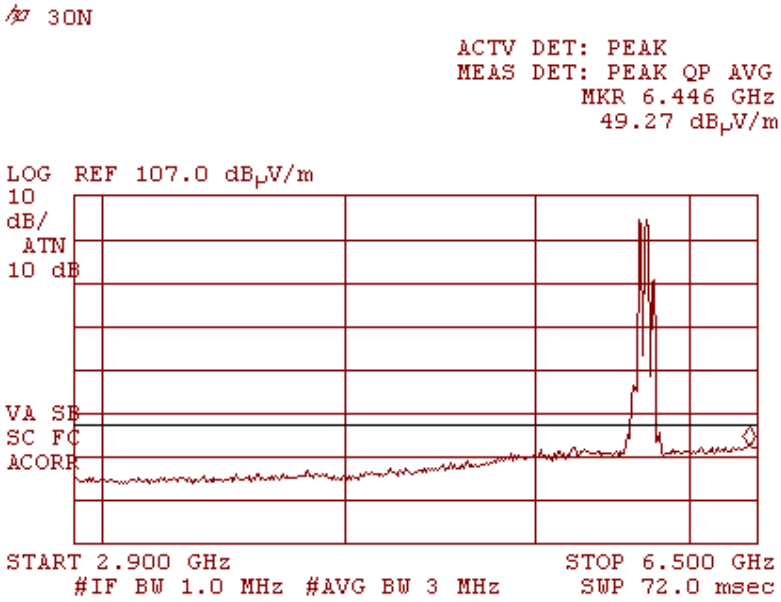
Operation 9
Vertical & Horizontal Polarization
Plot 4.6.36



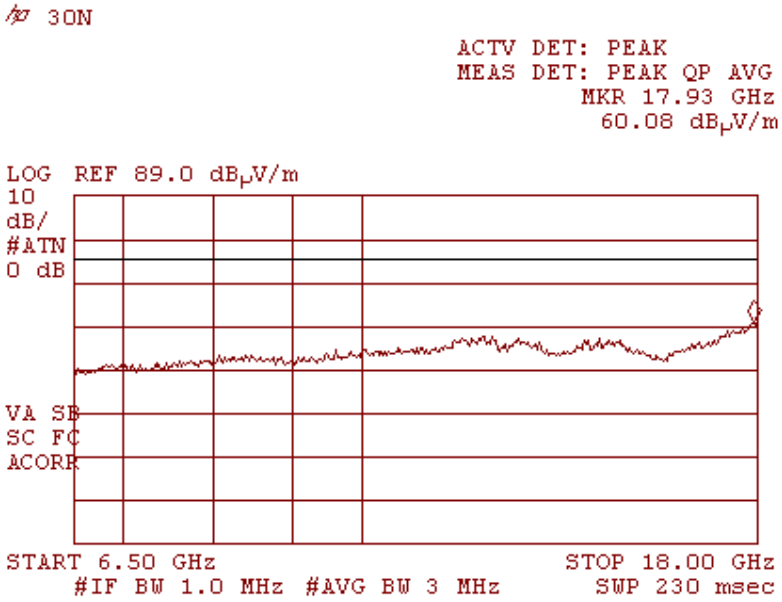
Operation 10
Vertical & Horizontal Polarization
Plot 4.6.37



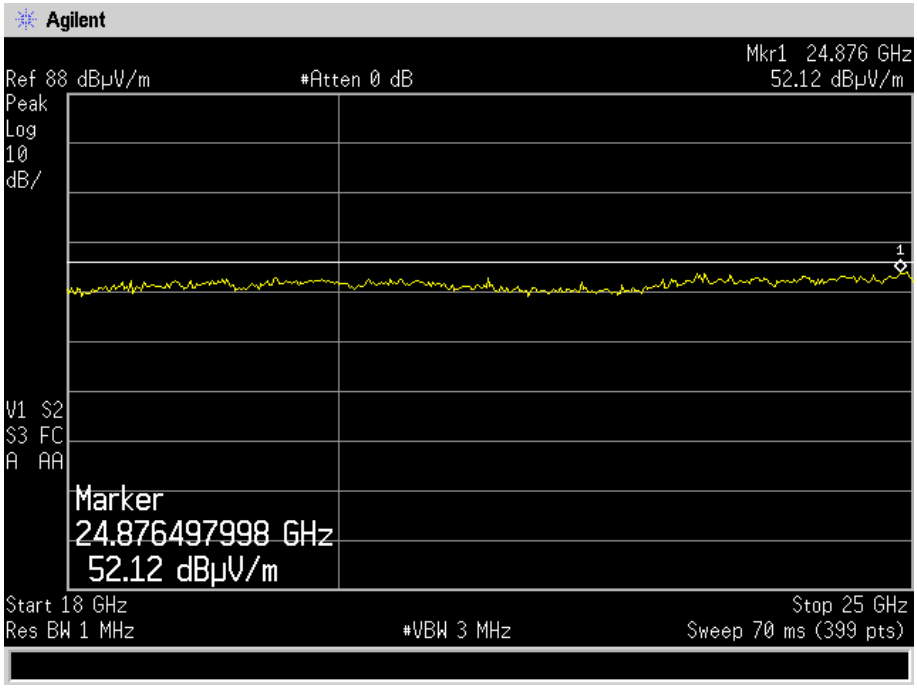
Operation 10
Vertical & Horizontal Polarization
Plot 4.6.38



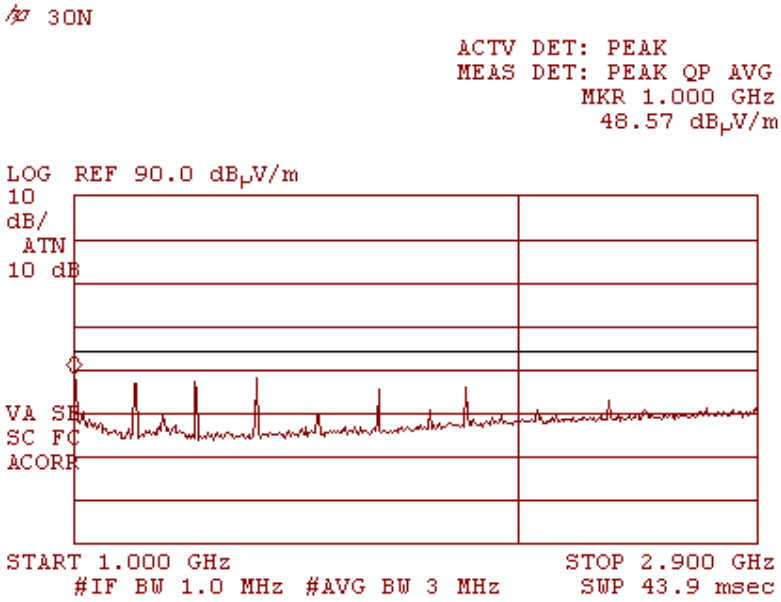
Operation 10
Vertical & Horizontal Polarization
Plot 4.6.39



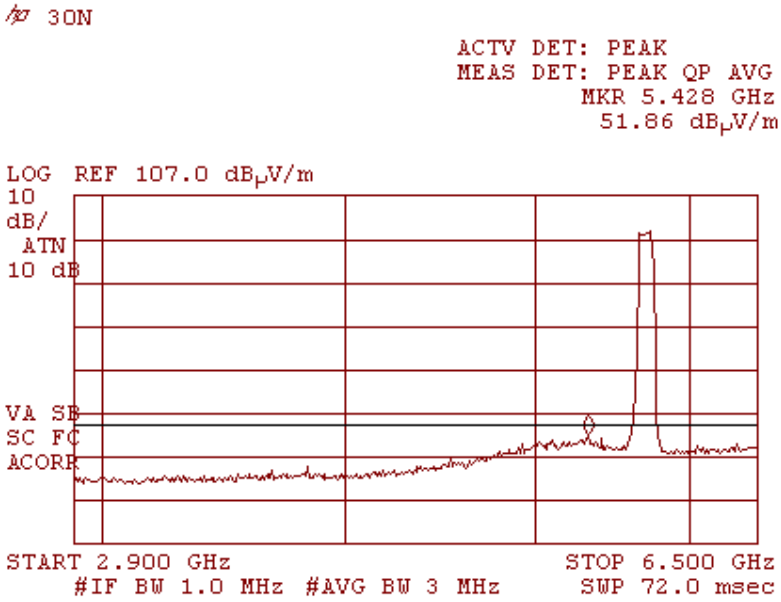
Operation 10
Vertical & Horizontal Polarization
Plot 4.6.40



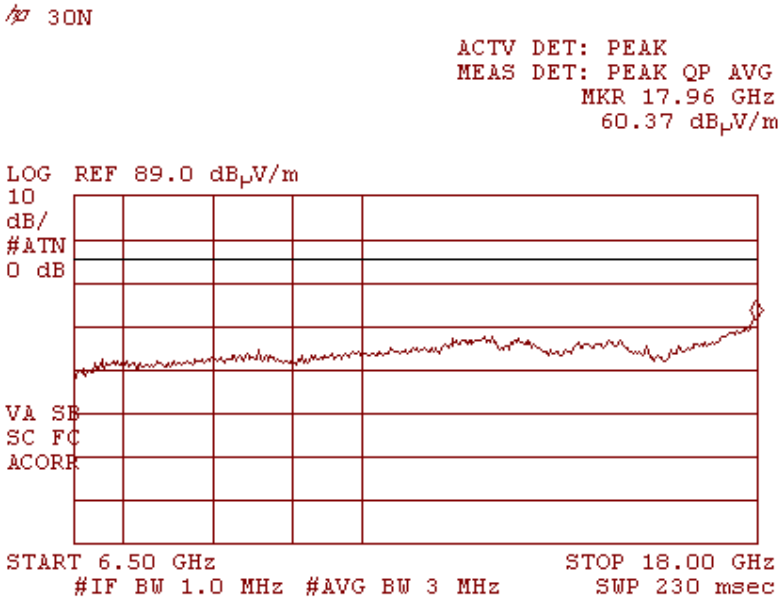
Operation 11
Vertical & Horizontal Polarization
Plot 4.6.41



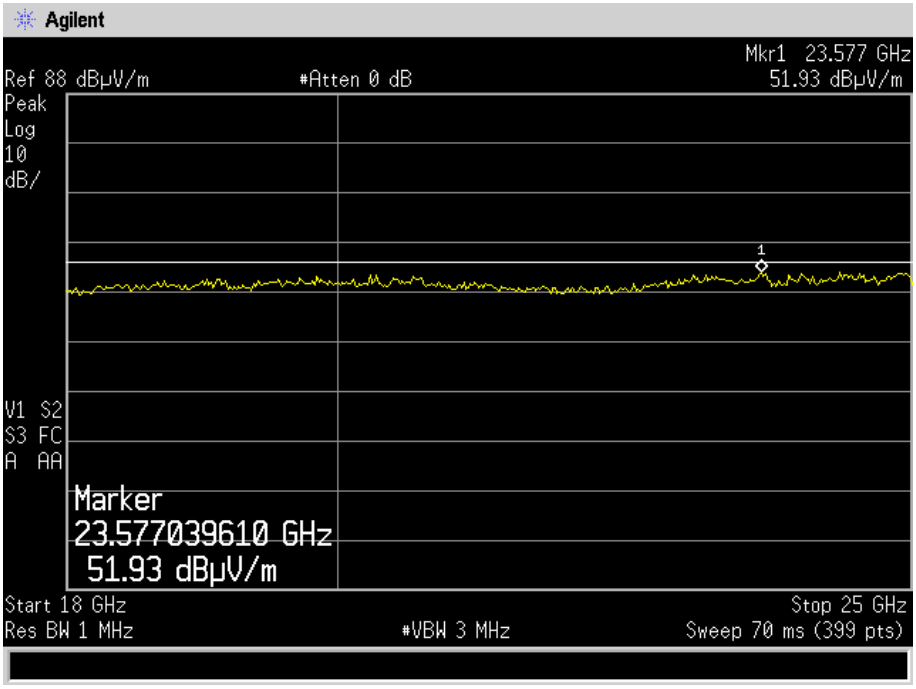
Operation 11
Vertical & Horizontal Polarization
Plot 4.6.42



Operation 11
Vertical & Horizontal Polarization
Plot 4.6.43

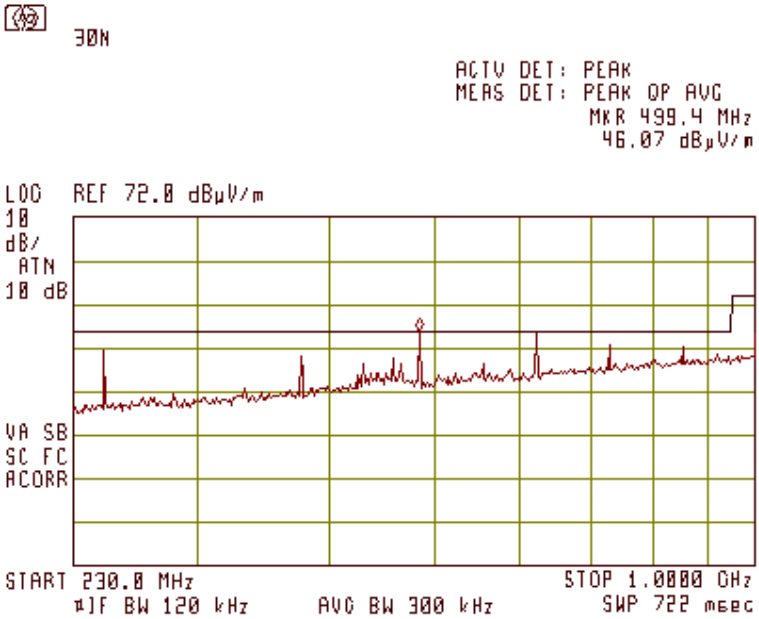


Operation 11
Vertical & Horizontal Polarization
Plot 4.6.44

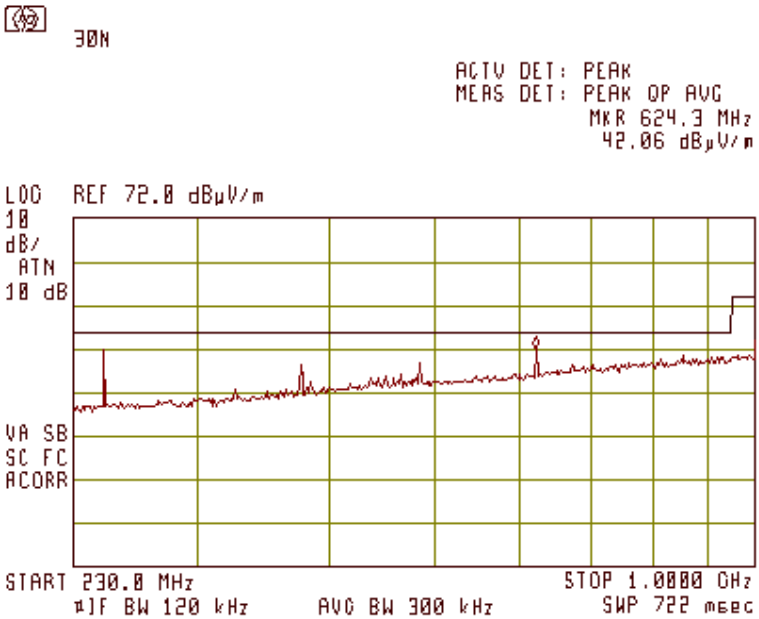


Test results:
Radiated Emission below 1 GHz, Worst case
Transmit mode: while three transmitters operating simultaneously.
Radio 0 model: WMIA-199N/EU, frequency 2412 MHz, mode 802.11g
Radio 1 model: WMIA-199N/EU, frequency 5230 MHz, mode 802.11n 40MHz
Radio 2 model: WLM54AG, frequency 2462 MHz, mode 802.11b

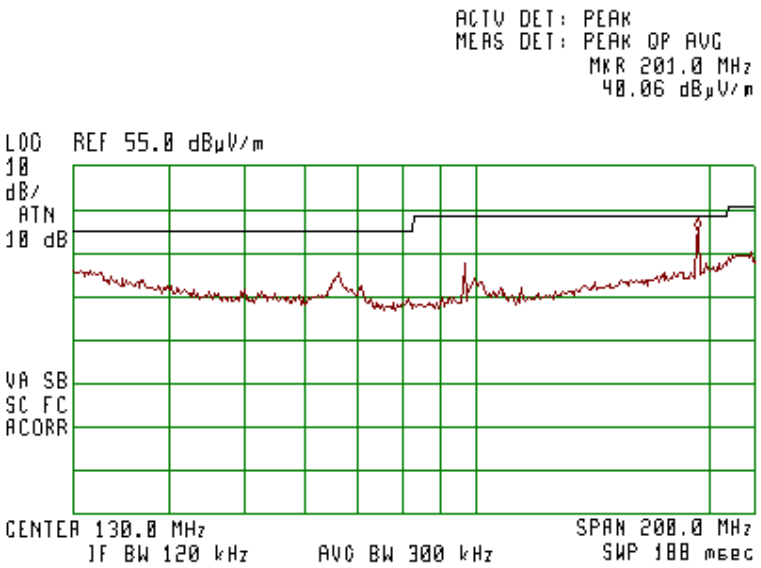
Vertical Polarization
Plot 4.6.45



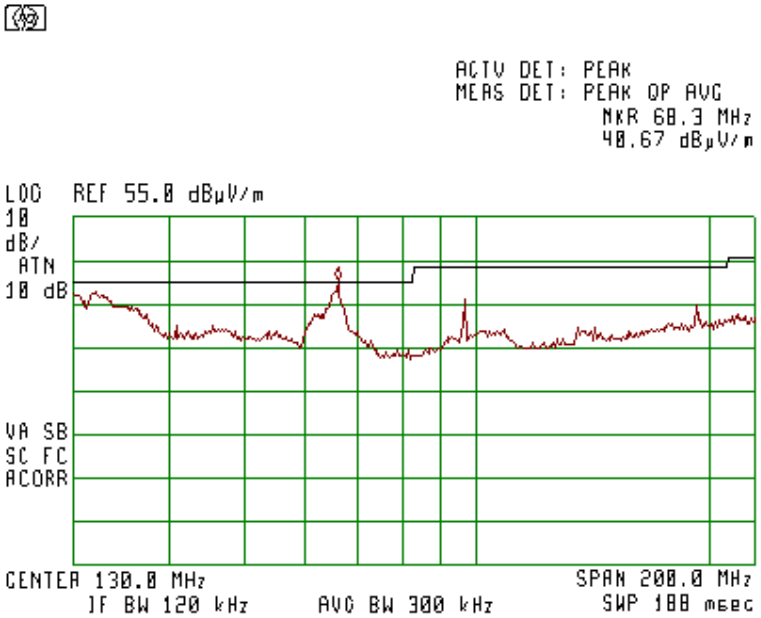
Horizontal Polarization
Plot 4.6.46



Horizontal Polarization
Plot 4.6.47



Vertical Polarization
Plot 4.6.48



4.7. Radiated Emission, Receive Mode

Reference document:	**47 CFR §15.109**		
Test Requirements:	Emission Level shall not exceed §15.109 limits		
Test Method:	See sec 2.2	**Comply**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	f<1GHz: RBW= 120kHz, VBW= 300kHz, QP f> RBW= 1MHz, VBW= 3MHz for peak and 10 Hz for Average		
Mode of operation:	Receive		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.7.1 to Plot 4.7.4	

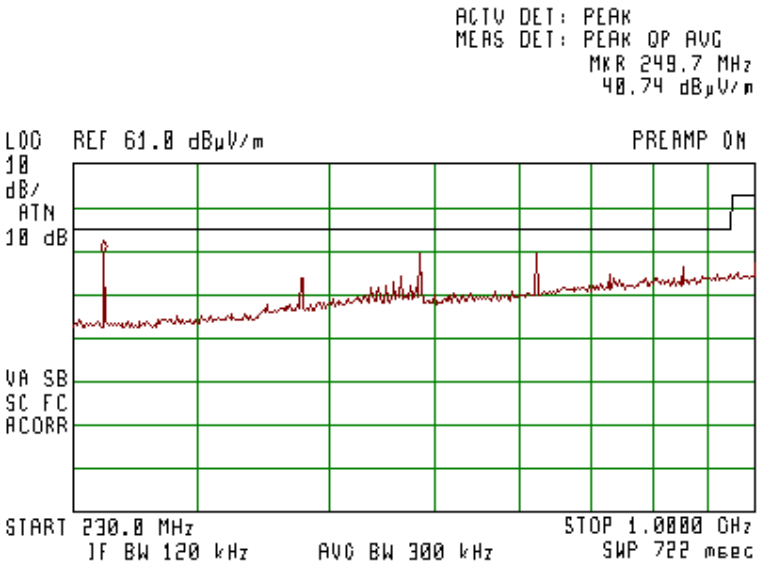
Test results:

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

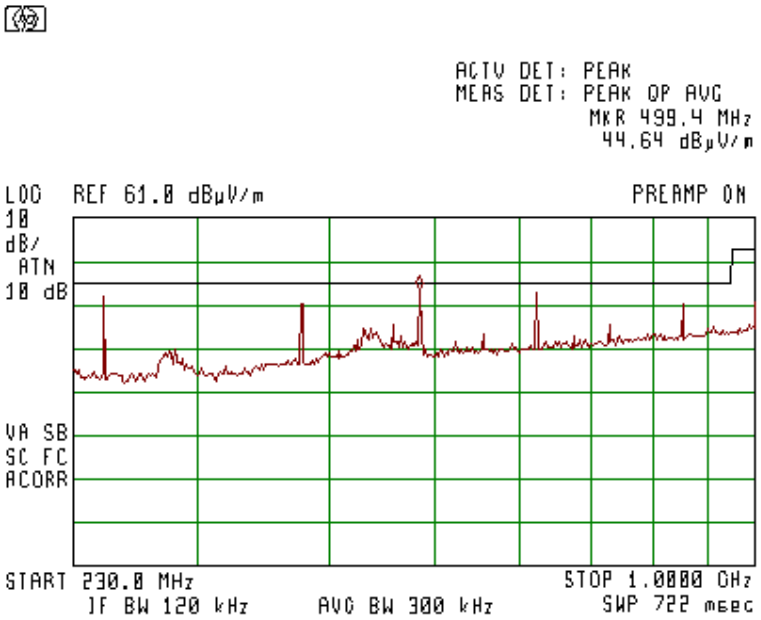
Frequency [MHz]	Emission Level [dBµV/m]	Detector Type	Polarization V/H	Limit [dBµV/m]	Margin [dB]
30.168	33.8	QP	V	40	-6.2
84.230	35.0	QP	H	40	-5
124.996	30.3	QP	H	43.5	-13.2
249.987	43.6	QP	V	46.5	-2.9
499.988	45.8	QP	H	46.5	-0.7
624.987	43.0	QP	H	46.5	-3.5

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

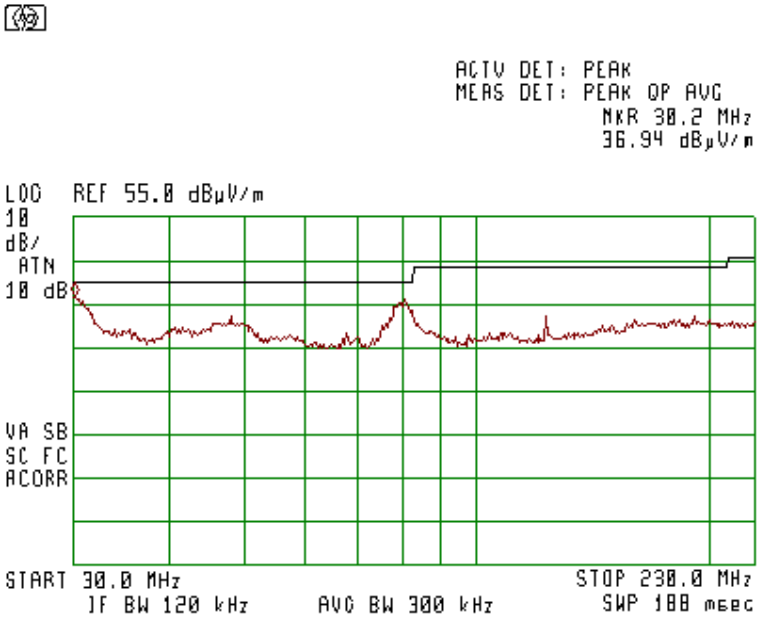
Vertical Polarization
Plot 4.7.1



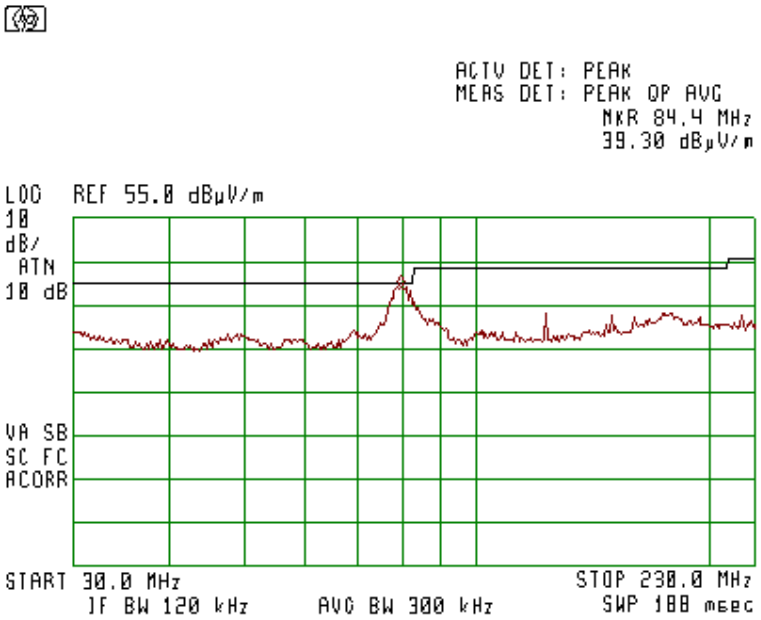
Horizontal Polarization
Plot 4.7.2



Vertical polarization
Plot 4.7.3



Horizontal polarization
Plot 4.7.4



4.8. Conducted Power line Emission measurements

Reference document:	**47 CFR §15.107/207**		
Test Requirements:	The radio frequency voltage that is conducted back onto the AC power line shall not exceed the limits specified in § 15.107/207		
Test setup:	See Sec. 2.3	**Pass**	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted		
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plots 4.81 – 4.8.2	

Test Results:

Worst-case results of Transmit and Receive modes.

Transmit mode: while three transmitters operating simultaneously.
Radio 0 model: WMIA-199N/EU, frequency 2412 MHz, mode 802.11g
Radio 1 model: WMIA-199N/EU, frequency 5230 MHz, mode 802.11n 40MHz
Radio 2 model: WLM54AG, frequency 2462 MHz, mode 802.11b

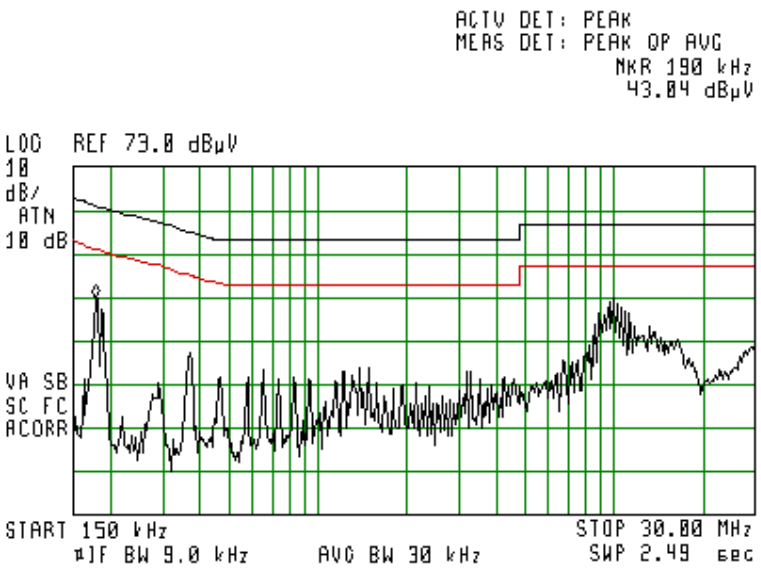
"Phase" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.196305	54.5	42.4	63.77	53.77	-9.27	-11.37	Pass
0.391042	41	35.7	58.04	48.04	-17.04	-12.34	Pass
0.685091	28.1	24.8	56.00	46.00	-27.90	-21.20	Pass
1.470231	27.9	23.8	56.00	46.00	-28.10	-22.20	Pass
3.526337	26.2	21.3	56.00	46.00	-29.80	-24.70	Pass
10.132483	42.3	42.1	60.00	50.00	-17.70	-7.90	Pass

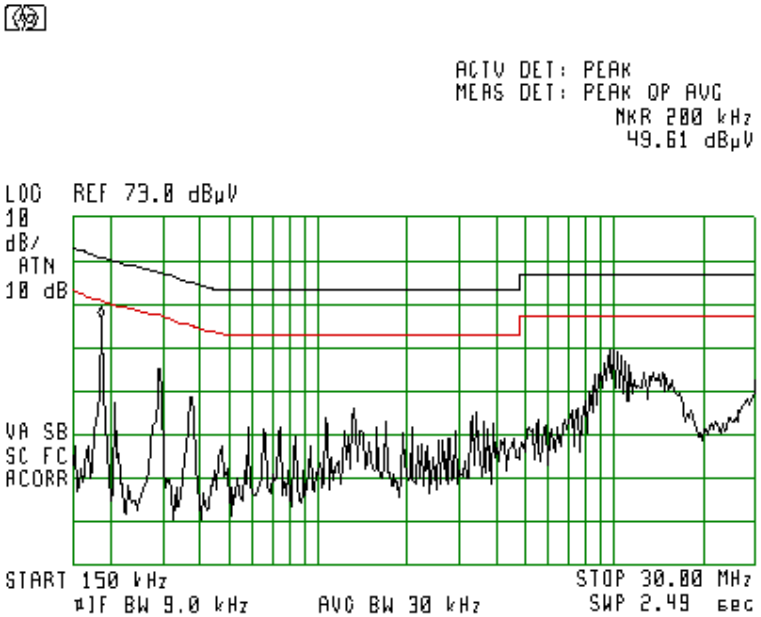
"Neutral" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.197603	54.6	46.3	63.71	53.71	-9.11	-7.41	Pass
0.295885	42	36	60.36	50.36	-18.36	-14.36	Pass
0.394821	40.6	36.5	57.96	47.96	-17.36	-11.46	Pass
1.376385	27.8	25.6	56.00	46.00	-28.20	-20.40	Pass
3.535531	25.8	18.3	56.00	46.00	-30.20	-27.70	Pass
10.440002	42.4	42.3	60.00	50.00	-17.60	-7.70	Pass

"Phase" Lead
Plot 4.8.1



"Neutral" Lead
Plot 4.8.2



4.9. 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:	The Access Point EXRP 30N employs internal PCB antennas.	**Comply**

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

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
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