Electromagnetic Compatibility
Test Report

Test Report No: MOT 191011
Issued on: June 06, 2012 Rev.4

Product Name
EWP2200 Semi Rugged VoWLAN Phone

Tested According to
FCC 47 CFR, Part 15, Subparts E
IC RSS-210, Issue 8

Tests Performed for
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ELECTRICAL TESTING
CERT #1633.01

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Test Report details:

Test commencement date: 08.09.2011
Test completion date: 03.10.2011
Customer's representative: Eli Basri
Issued on: 30.05.2012

Version	Date	Details/Reasons	Page no
Rev. 1	19.10.2011	-	-
Rev. 2	08.05.2012	Comment 1: Reference to 5.8 GHz band was removed	7
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		Comment 13: Method of testing was revised	9
		Comment 14: The PSD procedure revised	9
		Comment 11: Test Method of bandedge measurement was corrected	9
		Comment 7: Test procedure of Radiated Emissions Measurements in the restricted bands was corrected	9
		Comment 6: Test procedure of Radiated Emission measurements was corrected	9
		Comment 8: Worst Case Result definition was corrected	10
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		Comment 13: Method of testing was revised	14
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		Comment 17: The test result presentation was changed	156
		Comment 17: A note "& on time (inside the makers)" was added to the Header of Plot 4.9.2	157

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Rev. 3	30.05.2012	Comment 2: In Sec.4.5 Band edge locations indicated on the plots 4.5.45 – 4.5.56	73-78
		Comment 3: Retested at 5560 MHz and test results/plots were replaced in sec.4.1 - 4.6	16-120
		Comment 4: Section 2.1 updated	9
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		Comment 6: In Section 4.2 “Measured Peak Power” was replaced with “Measured Average Power”	25/26
		Comment 7: In sec.4.3, a note “ On plots figure 601 pts, span is 50 MHz and resolution band 1MHz, so 2x50/1 =100 and 601>100” was added	29
		Comment 8: Note added to Sec.4.5	49
		Comment 9: Test results Table was resized.	156
		Comment 17: Test results sentence corrected in Sec.4.10	159
Rev .4	10.06.12	Maximum Conducted Output Power for 5470-5725 MHz updated	7
	10.06.12	Comment 2:Retesting was performed in order to clarify the location of bandedge	74-79
	10.06.12	Comment 3: the list of measuring equipment used was revised according to the last calibration data	167
	10.06.12	Comment 4: Retesting for channel move time and closing & additional testing for channel move time for band III	158
	10.06.12	Comment 7 (former 17) :the statement was removed	11

Assessment information:

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

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

Modifications:

Modifications made to the EUT

None

Modifications made to the Test Standard

None

Summary of Compliance Status

WLAN 802.11a/n

Test Spec. Clause	Test Case	Remarks
47 CFR §15.403(h)(i) & RSS-210 A9.2(1)	Emission Bandwidth (26dB BW)	Comply
47 CFR §15.407 (a) (1), (2), (3) & RSS-210A9.2(1)	Maximum Conducted Output Power	Comply
47 CFR §15.407 (a) (1), (2), (3), (5) & RSS-210A9.2(1)	Peak Power Spectral Density	Comply
47 CFR §15.407 (a) (6)	Peak Excursion	Comply
47 CFR §15.407 (b) (1),(2),(3),(4) & §15.407 (b)(6) & RSS-210A3.3(1)	Conducted Spurious Emissions	Comply
47 CFR §15.407 (b) (7) & RSS-210A3.3(1)	Spurious Radiated Emissions, Restricted Bands	Comply
47 CFR §15.407(g)	Frequency Stability	Comply
47 CFR §15.203 & RSS - Gen. Section 7.1.4	Antenna Connector Requirements	Comply
47 CFR §15.407(h)(2)(i)(B) & §15.407(h)(2)(iii) and FCC 06-96 & RSS-210 Annex 9.	Dynamic Frequency Selection (DFS)	Comply
47 CFR §15.407(b)(6) & §15.107/207, ICES-003 RSS-GEN section 7.2.3.2	Power line Emission measurements	Comply

Table of Contents

1. General Description

Description of the EUT system/test Item:

Product name: EWP2200 Semi Rugged VoWLAN Phone

Model: EWP2200

FCC ID: AZ489FT7052

IC ID: 109U-89FT7052

Description:

The EUT is a Smartphone which provides mobile voice and data communications over wireless network to users inside an enterprise.
It is capable of operating in the unlicensed 2.4 GHz band using 802.11b/g/n protocols or in applicable 5 GHz bands using the 802.11a/n protocol.
The EUT also contains a Bluetooth technology for short range interfaces and EWP2200 has an additional 3.2Mp auto-focus camera.

Maximum Conducted Output Power:

5150-5250 MHz

36.90mW for WLAN 802.11a

38.82mW for WLAN 802.11n

5250-5350 MHz

73.28mW for WLAN 802.11a

74.82mW or WLAN 802.11n

5470-5725 MHz

72.95mW for WLAN 802.11a

71.61mW or WLAN 802.11n

Frequency range:

802.11a/n: 5.15-5.350, 5.470-5.725

Transmit Data rate:

Protocol	Rate [Mbps]							
802.11a	6	9	12	18	24	36	48	54
802.11n	6.5	13	19.5	26	39	52	58.5	65

Type of Modulation:

Protocol	Modulation
802.11a	OFDM (64QAM, 16QAM, QPSK, BPSK)
802.11n	OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Specification:

Type: WLAN a/b/g/n and BT**:** Integral (on board) PIFA Dual Band
Antenna max gain at 5GHz is 2.4dBi

5180MHz +2.0dBi
5320MHz +2.4dBi
5540MHz +2.0dBi
5660MHz +1.9dBi

2. Method of Measurements according to KDB 789033 v01r01

2.1. Conducted RF Measurements:

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

For PSD, Set RBW= 1MHz and VBW > 1 MHz. at least 100 traces average. The PPSD is the highest level found across the emission in any 1-MHz band.

For Maximum Conducted Output Power an Average Power Meter was used.

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

For frequency stability, the 26dB Emission Bandwidth measurement was performed under extreme conditions with the DUT tuned to the band-edge channel. Worst case results were compared with the band-edge.

For bandedge measurements allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge, take into account antenna gain for appropriate frequency .

2.2. Radiated Emissions Measurements in the restricted bands:

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

2.3. Radiated Emission measurements:

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

2.4. Worst Case Results:

In order to determine the worst case emissions for all modes/data rates/tests, all modes/data rates were investigated for each required test to determine which produces the worst- case data and then full testing was performed in that mode/data rate.

2.5. DFS Response Requirements measurements, Client Device:

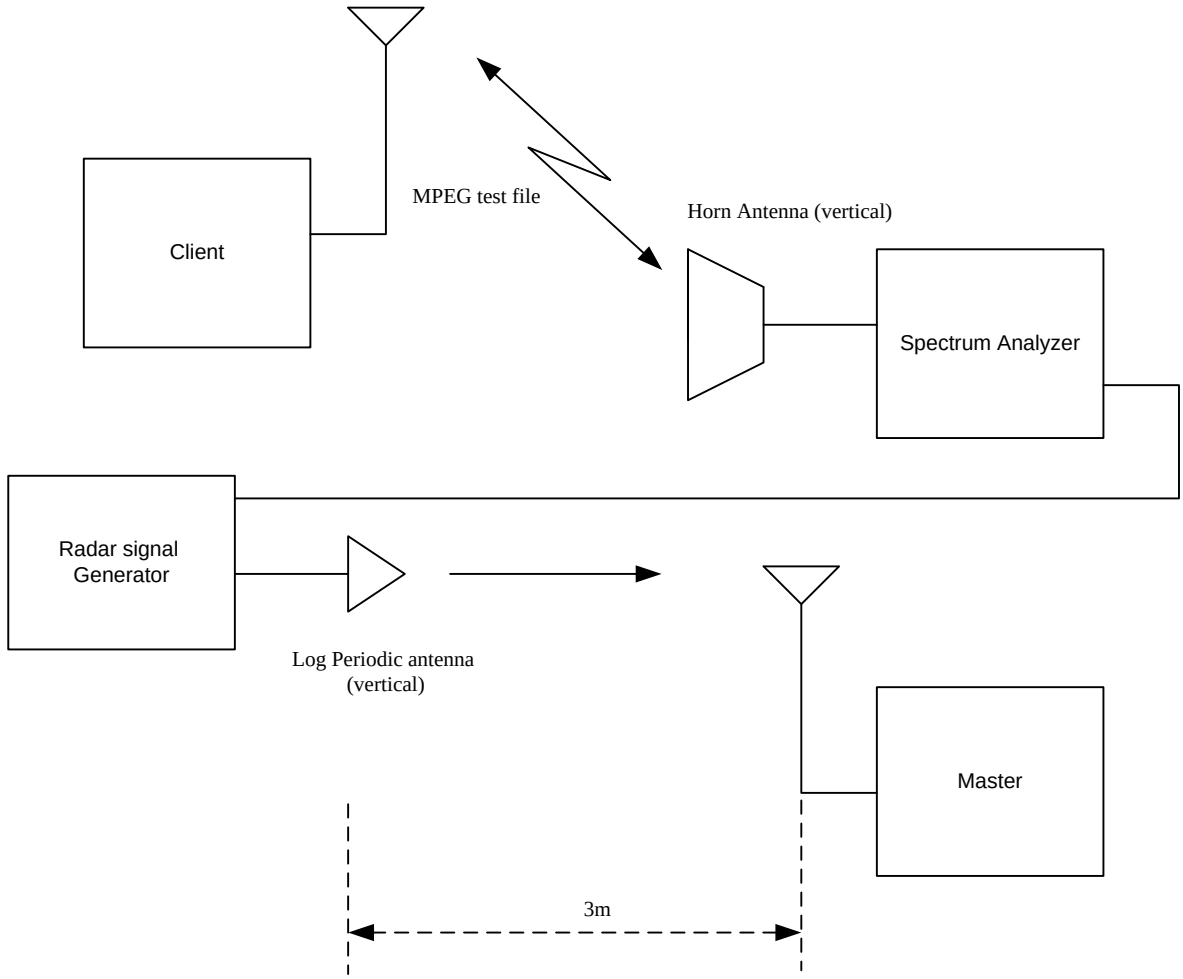
Radar Waveform Calibration: the following equipment setup was used to generate and calibrate the radiated radar waveform. The Spectrum Analyzer was set to span zero at a selected radar frequency, 3kHz RBW and VBW, and Peak detection.

Test Procedure:

The IP master device was operated upon start-up and performed a Channel Availability Check and continued normal operation on the selected channel, transmitting MPEG Test File to the client.
The selected channel frequency was also set as the RF frequency of the Radar Signal Generation devices. A burst of 25 pulses was generated for a minimum of 30 trials (Radar Type 2) pre-calibrated at appropriate levels above the threshold level to ensure "Radar detection" by the Master device.
The Spectrum Analyzer was used as a monitor to verify that the Client EUT has vacated the channel within the Channel Move Time and to verify the Channel Closing Transmission Time do not exceed 200ms starting at the beginning of the Channel Move Time plus any additional intermittent control signals up to an aggregate of 60ms, during the remaining of the 10seconds period.

For "30 Minute Non-Occupancy", Associated Test: The client was associated with the master and after master detection of radar pulse, the client moved with the master to the next chosen channel, and while streaming the MPEG test file, the vacated channel was monitored to verify that the DUT does not resume any transmission on this channel. The spectrum analyzer was running in max hold on the center of the vacated channel for more than 30 minutes. The 30 minute observation started immediately following the 10 second channel move time.
For "30 Minute Non-Occupancy", Non - Associated Test: The client device was powered on and the master device was powered off, and a scan was taken across all channels. The spectrum analyzer was running in max hold and sweep time of 20ms. Sweeping was left for a period of more than 30 minutes to verify that the client is not employing active scanning and not transmitting on any channel without being associated with the master device.

Radiated Setup: EUT is a client and Radar test Waveform is injected into the Master.



2.6. 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.

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3. Test Facility & Uncertainty of Measurement

3.1. Accreditation/ Registration reference:

- *A2LA Certificate Number: 1633.01*

3.2. Test Facility description

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

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

3m Anechoic Chamber:

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

Semi Anechoic Configuration:

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

Full-Anechoic Configuration:

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

3.3. Uncertainty of Measurement:

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

4. WLAN 802.11a/n: Report of Measurements and Examinations

4.1. Emission Bandwidth (26dB BW)

Reference document:	**47 CFR §15.403 (h) (i)**		
Test Requirements:	For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	KDB 789033 v01r01,sec D, Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.1.1 - Plot 4.1.18	

Test results:

5150-5250 MHz

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth [kHz]
802.11a Mode		
5180	54	21039
5200	54	19141
5240	54	19224
802.11n Mode		
5180	65	20356
5200	65	20264
5240	65	20856

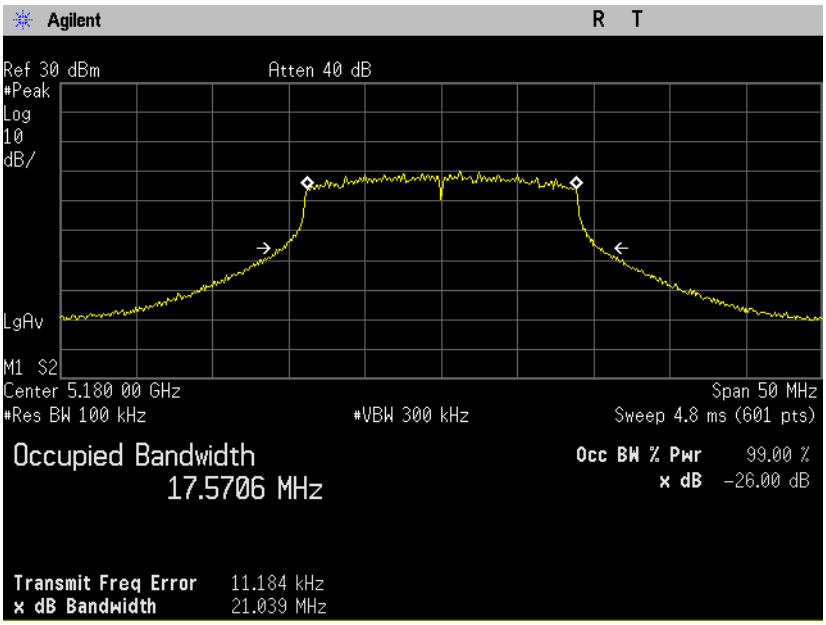
5250-5350 MHz

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth [kHz]
802.11a Mode		
5260	54	19596
5300	54	19244
5320	54	19578
802.11n Mode		
5260	65	20761
5300	65	20386
5320	65	20525

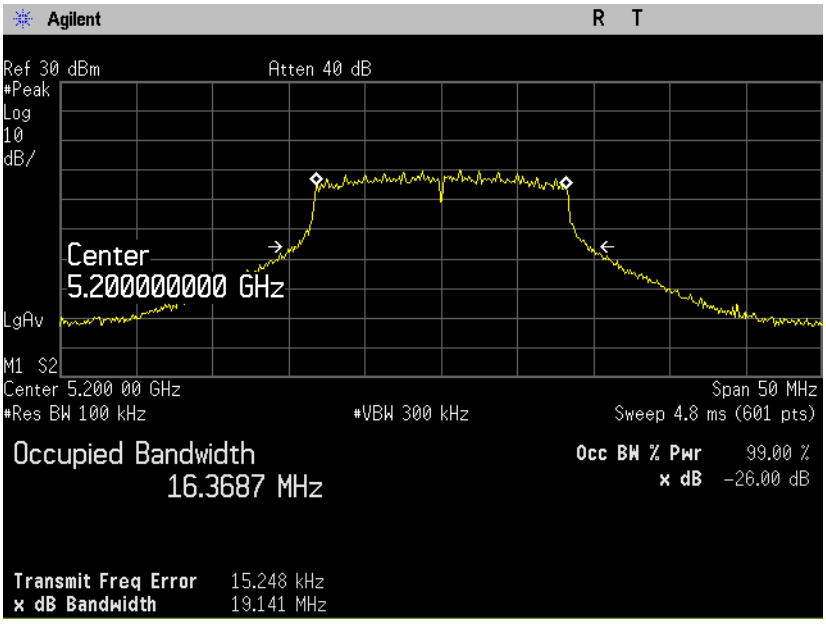
5470-5725 MHz

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth [kHz]
802.11a Mode		
5500	54	19865
5560	54	19713
5700	54	19394
802.11n Mode		
5500	65	20697
5560	65	20394
5700	65	21268

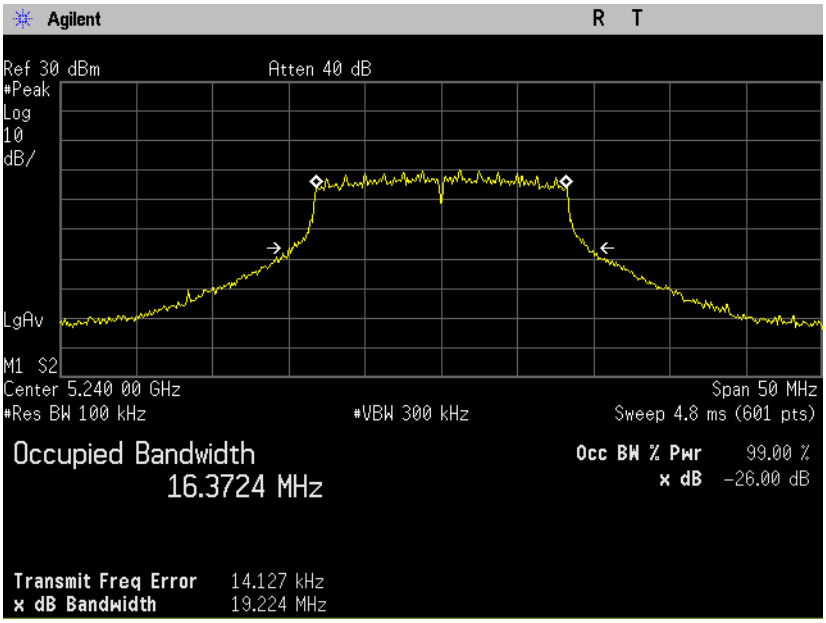
5150-5250 MHz 802.11a Mode
Plot 4.1.1



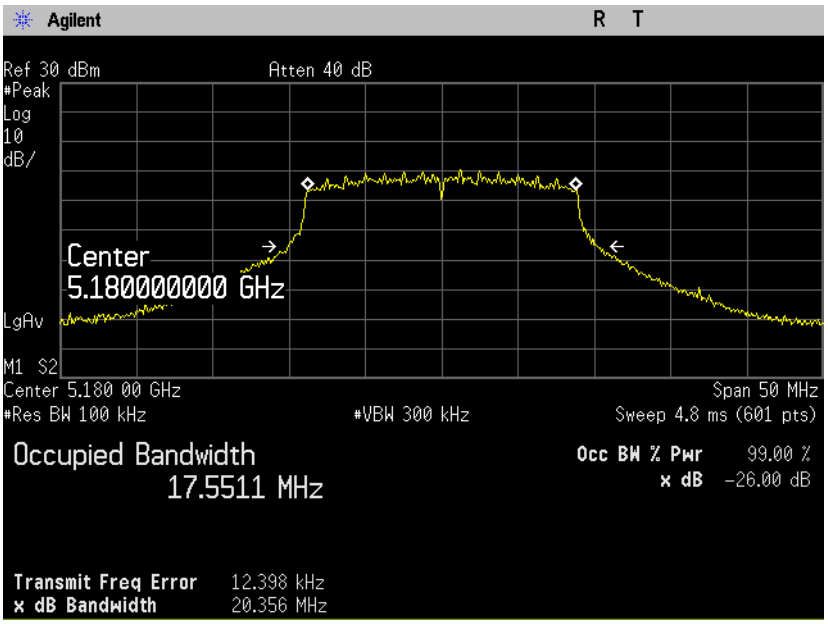
Plot 4.1.2



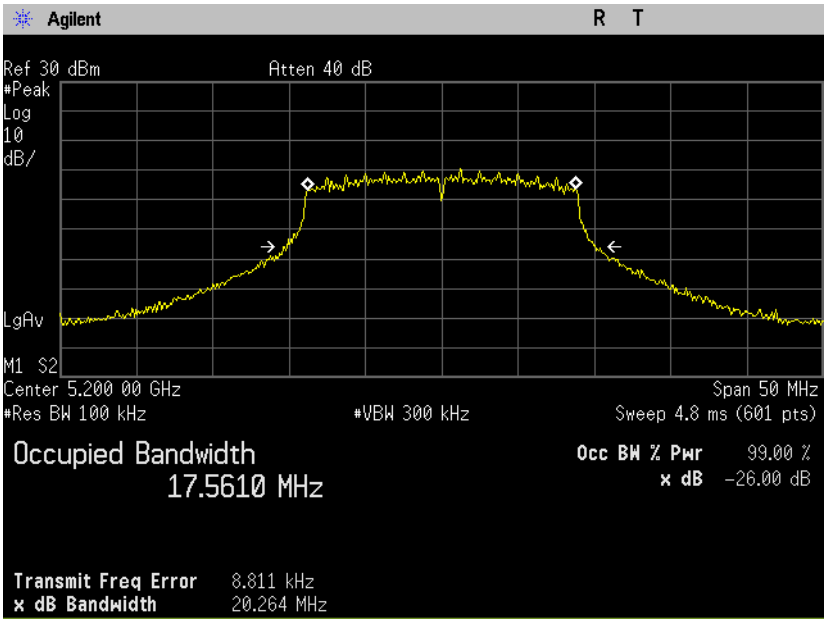
Plot 4.1.3



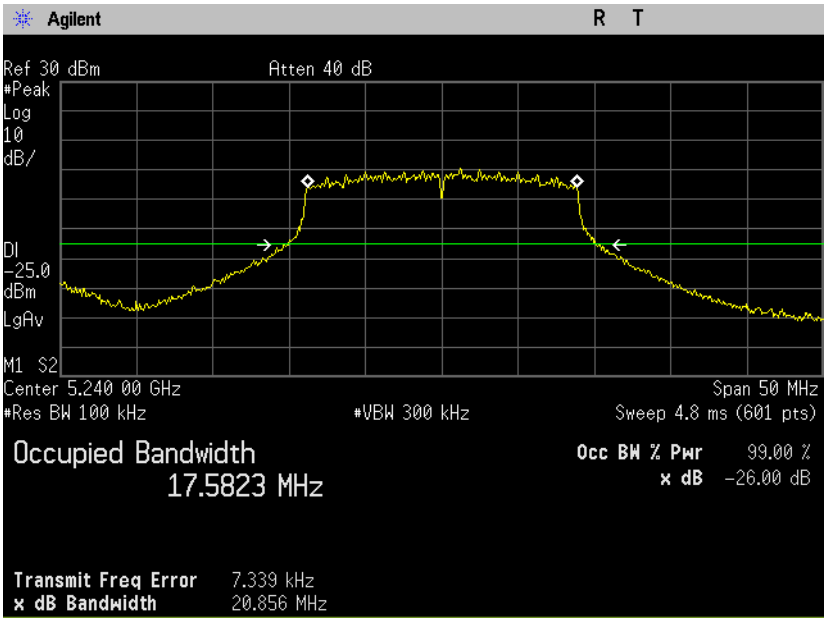
5150-5250 MHz 802.11n Mode
Plot 4.1.4



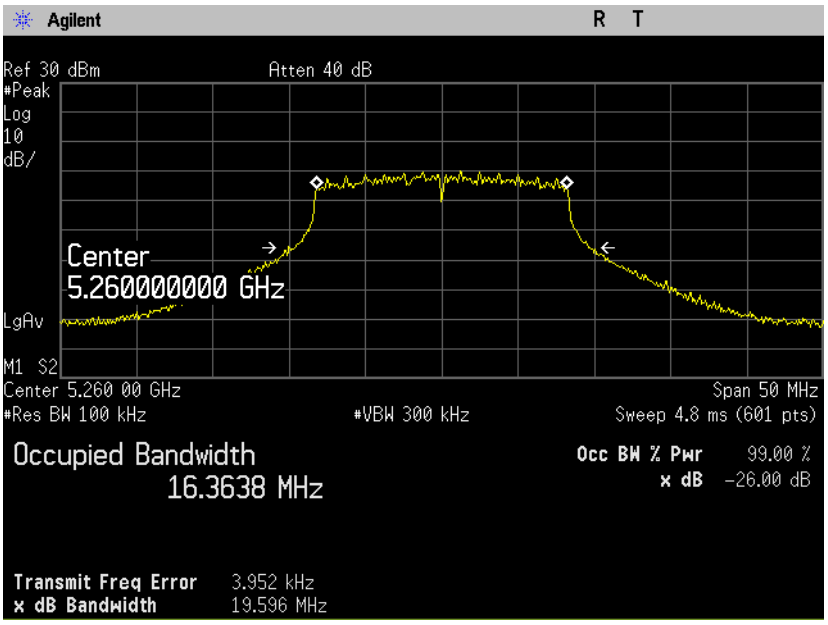
Plot 4.1.5



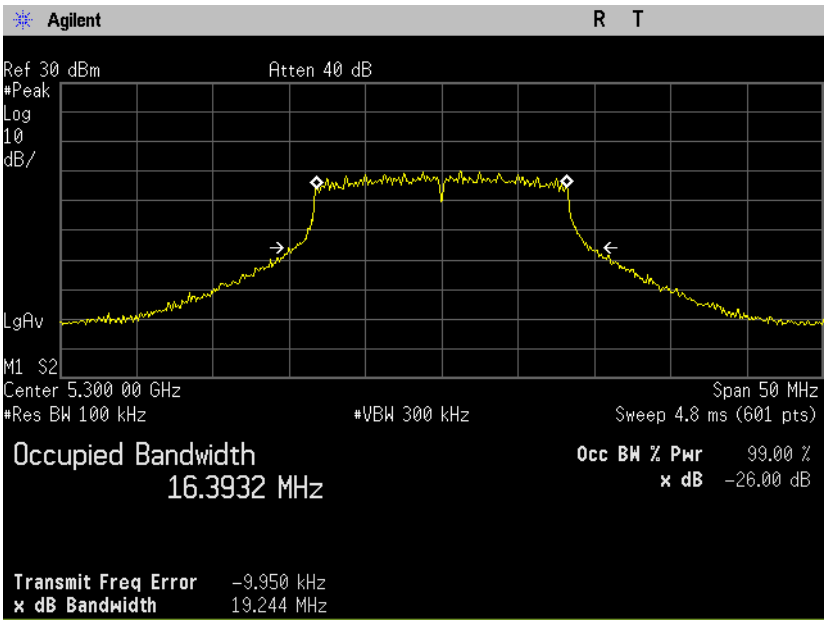
Plot 4.1.6



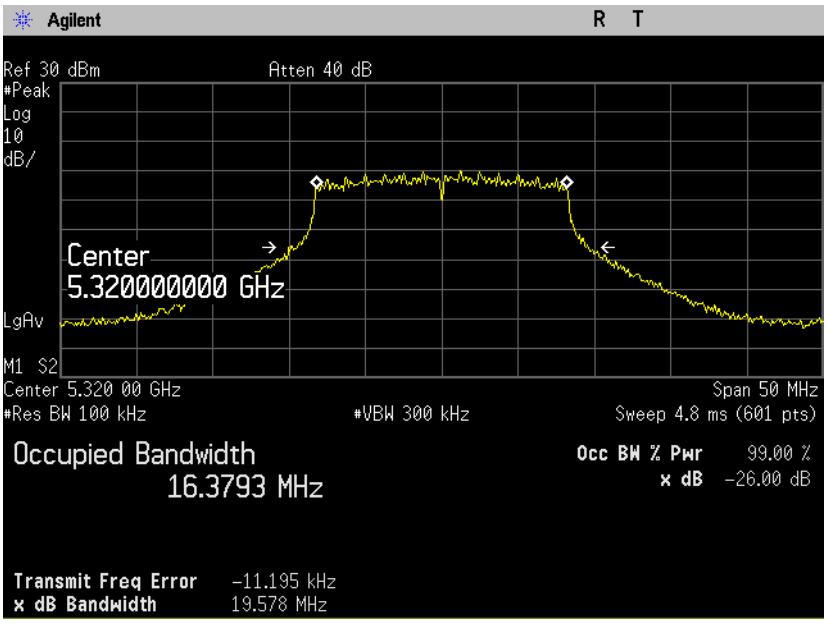
802.11a Mode 5250-5350 MHz
Plot 4.1.7



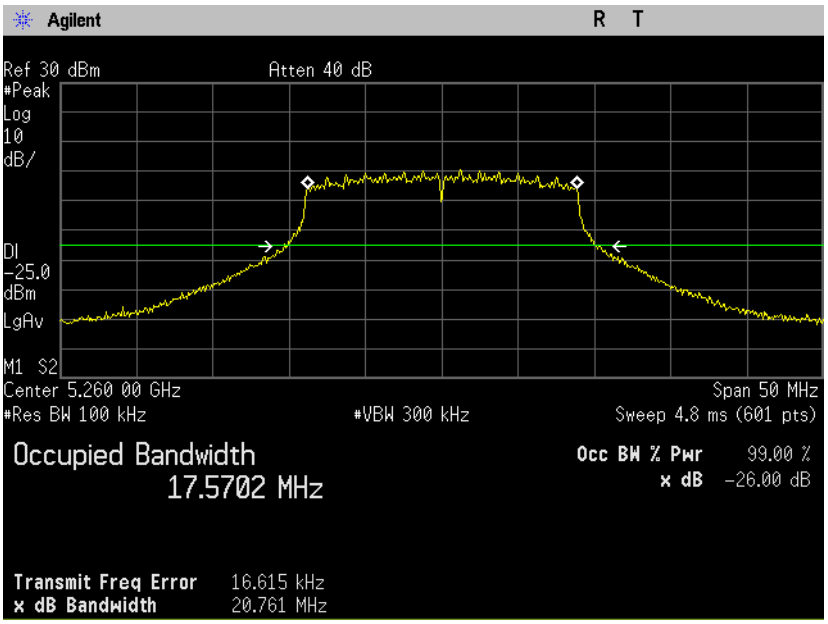
Plot 4.1.8



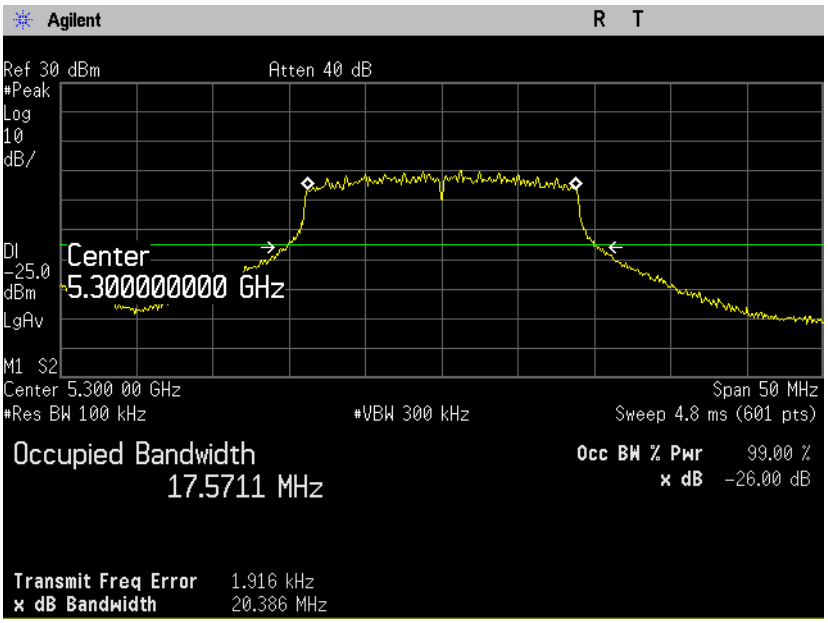
Plot 4.1.9



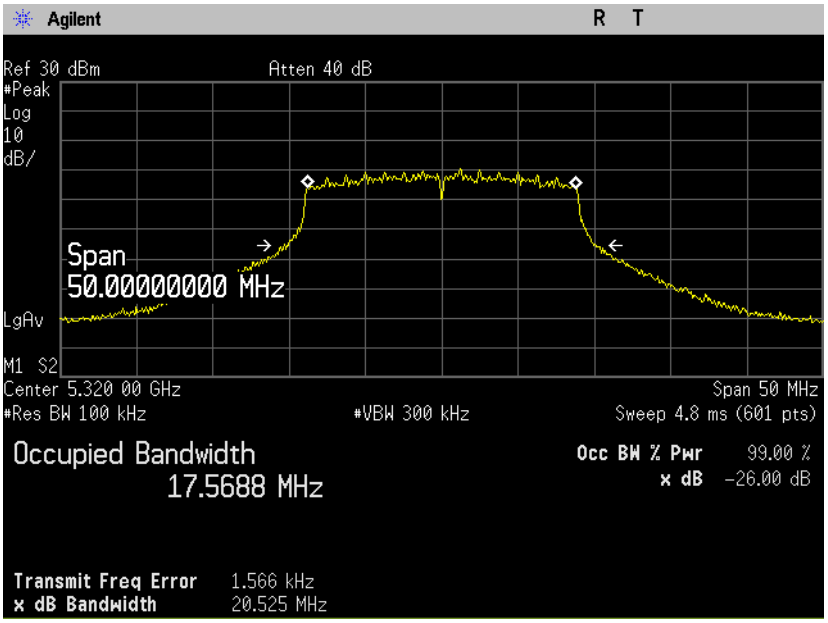
802.11n Mode 5250-5350 MHz
Plot 4.1.10



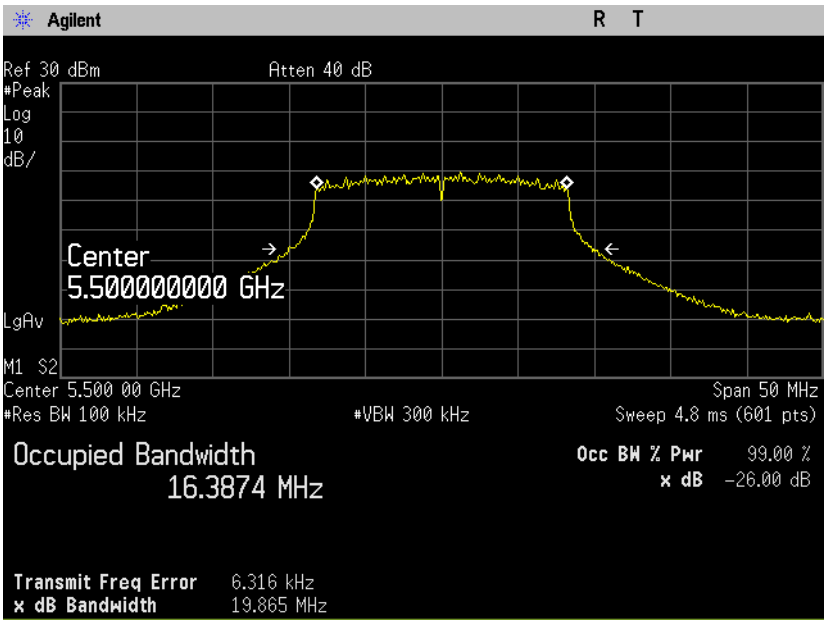
Plot 4.1.11



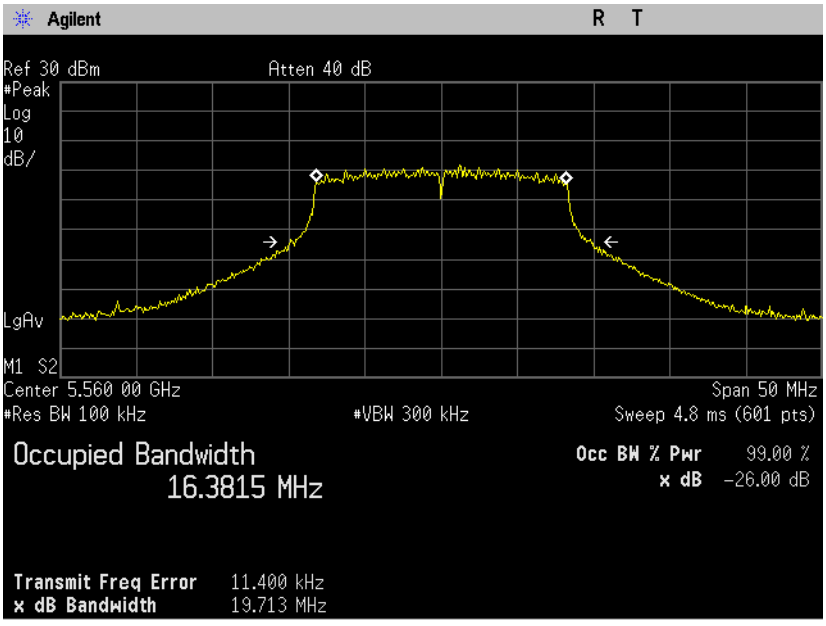
Plot 4.1.12



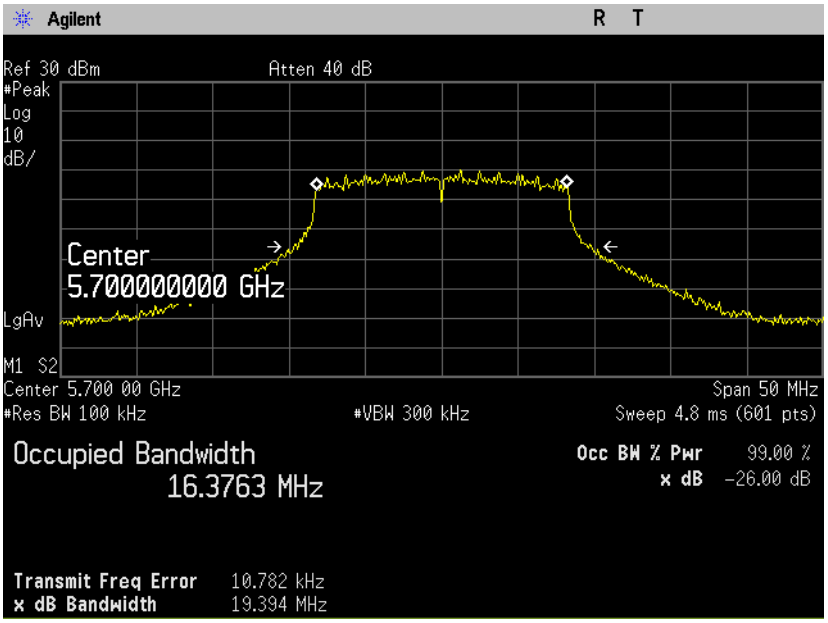
802.11a Mode 5470-5725 MHz
Plot 4.1.13



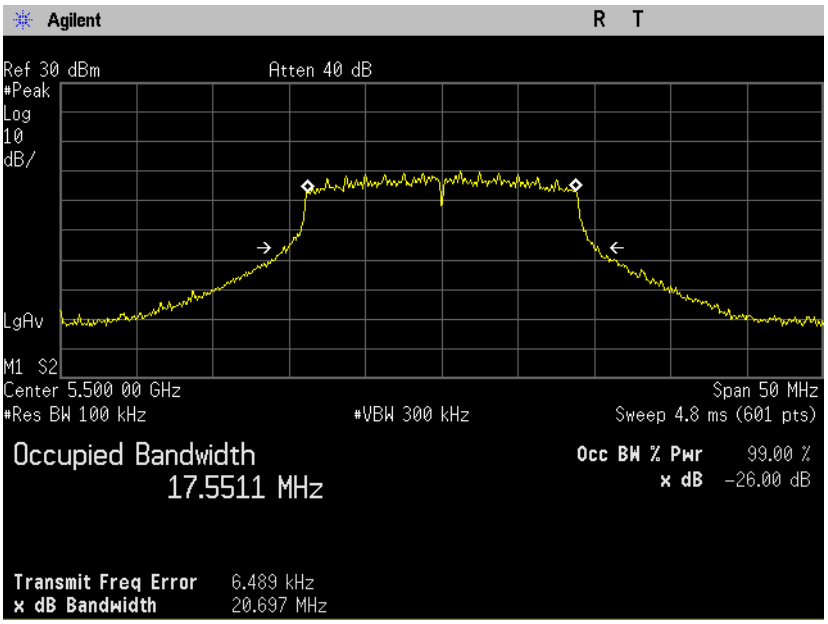
Plot 4.1.14



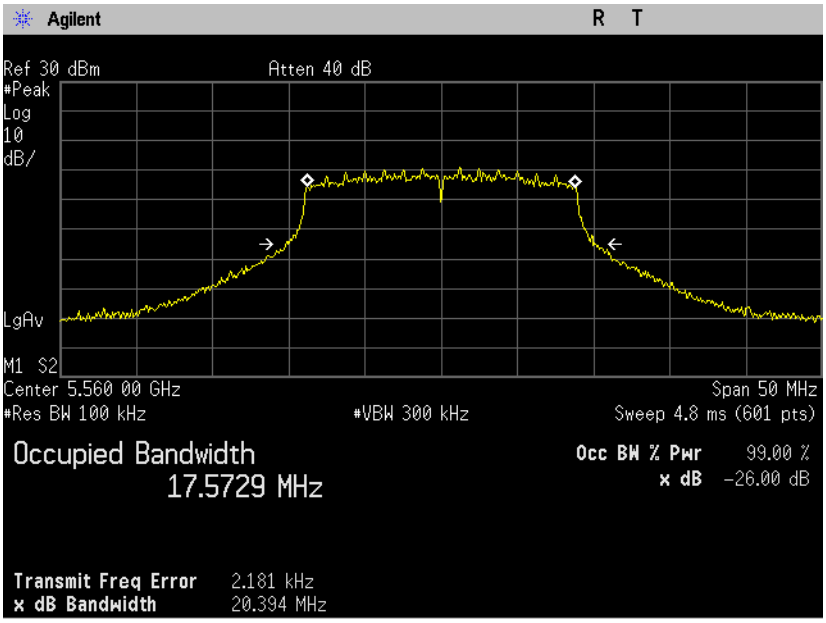
Plot 4.1.15



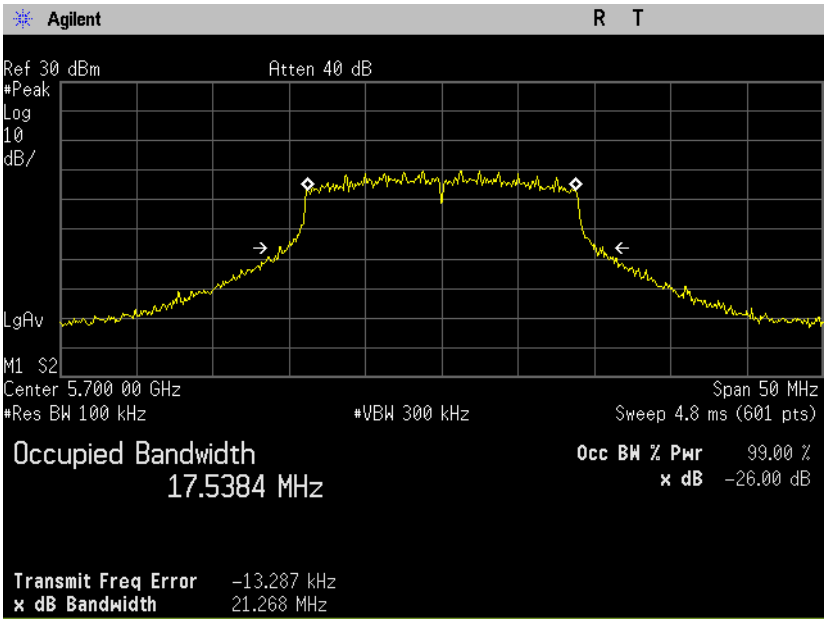
5470-5725 MHz 802.11n Mode
Plot 4.1.16



Plot 4.1.17



Plot 4.1.18



4.2. Maximum Conducted Output Power

Reference document:	**47 CFR §15.407 (a) (1), (2), (3)**		
Test Requirements:	(1) For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB,emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, (2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (3). In addition, the peak power spectral density shall not exceed 17 dBm in any 1–MHz band both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	KDB 789033 v01r01,sec C)4, 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:
5150-5250MHz Band:

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth (B) [Hz]	4 + 10Log B [dBm]	Measured Average Power [dBm]	Power Limit [dBm]	Margin [dB]
			802.11a Mode			
5180	6	21.039	17.23	15.32	17	-1.68
5200	6	19.141	16.82	15.24	16.82	-1.58
5240	6	19.224	16.84	15.67	16.84	-1.17
			802.11n Mode			
5180	6.5	20.356	17.09	15.89	17	-1.11
5200	6.5	20.264	17.07	15.46	17	-1.54
5240	6.5	20.856	17.19	15.62	17	-1.38

5250-5350MHz Band:

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth (B) [MHz]	11 + 10Log B [dBm]	Measured Average Power [dBm]	Power Limit [dBm]	Margin [dB]
			802.11a Mode			
5260	6	19.596	23.98	18.53	23.98	-5.45
5300	6	19.244	23.99	18.65	23.99	-5.34
5320	6	19.578	23.88	18.47	23.88	-5.41
			802.11n Mode			
5260	6.5	20.761	24.17	18.21	24	-5.79
5300	6.5	20.386	24.09	18.74	24	-5.26
5320	6.5	20.525	24.12	18.41	24	-5.59

5470-5725 MHz Band:

Frequency [MHz]	Data Rate [Mbps]	26 dB Bandwidth (B) [MHz]	11 + 10Log B [dBm]	Measured Average Power [dBm]	Power Limit [dBm]	Margin [dB]
802.11a Mode						
5500	6	19.865	23.98	18.36	23.98	-5.62
5560	6	19.713	23.95	18.85	23.95	-5.09
5700	6	19.394	23.88	18.63	23.88	-5.25
802.11n Mode						
5500	6.5	20.697	24.16	18.55	24.00	-5.45
5560	6.5	20.394	24.10	18.88	24.00	-5.12
5700	6.5	21.268	24.28	18.47	24.00	-5.53

4.3. Peak Power Spectral Density

Reference document:	**47 CFR §15.407 (a) (1), (2), (3), (5)**		
Test Requirements:	For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, , the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall, maximum conducted output power over the frequency ,If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density ,shall be reduced by the amount in dBthat the directional gain of the antenna exceeds 6 dB		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	KDB 789033 v01r01,sec E, SA-1, Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 1MHz , VBW: 3MHz , Sweep Time: Auto, Averaging :100 traces		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.3.1 - Plot 4.3.18	

Test Results

5150-5250MHz Band:

Frequency [MHz]	Data Rate [Mbps]	PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]	Margin [dB]
802.11a Mode				
5180	6	2.035	4	-1.96
5200	6	2.256	4	-1.74
5240	6	2.143	4	-1.85
802.11n Mode				
5180	6.5	1.951	4	-2.04
5200	6.5	1.817	4	-2.18
5240	6.5	1.928	4	-2.07

5250-5350MHz Band:

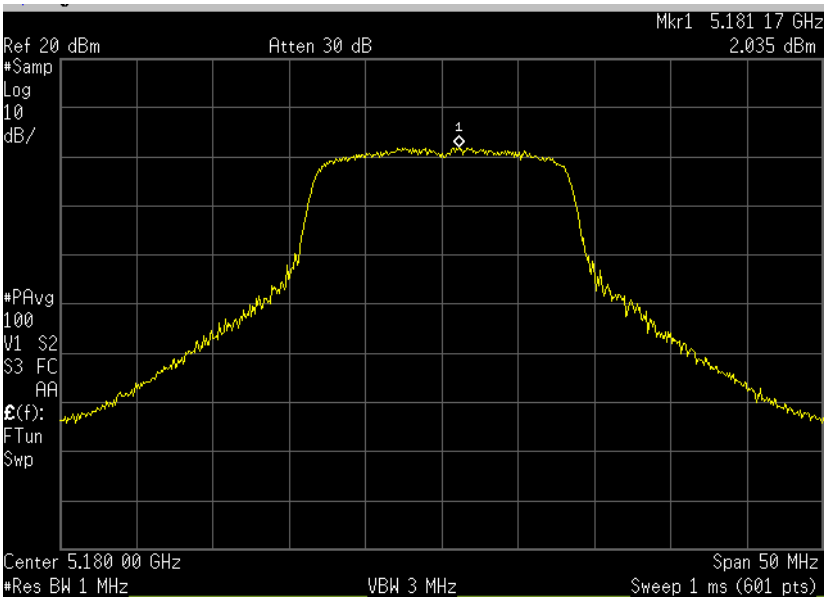
	Data Rate [Mbps]	PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]	Margin [dB]
802.11a Mode				
5260	6	5.132	11	-5.86
5300	6	4.771	11	-6.22
5320	6	4.108	11	-6.89
802.11n Mode				
5260	6.5	4.414	11	-6.58
5300	6.5	4.096	11	-6.90
5320	6.5	4.197	11	-6.80

5470-5725 MHz Band:

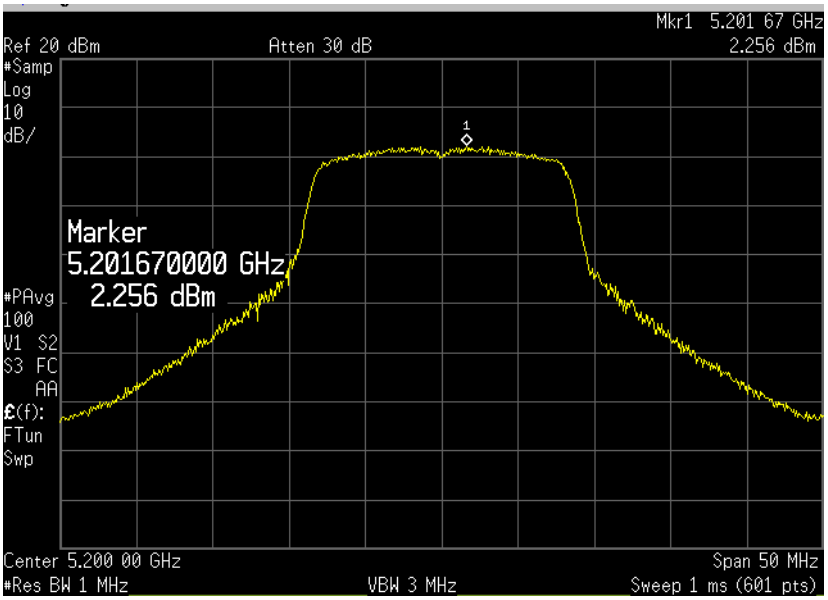
Frequency [MHz]	Data Rate [Mbps]	PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]	Margin [dB]
802.11a Mode				
5500	6	4.269	11	-6.73
5560	6	5.600	11	-5.40
5700	6	4.707	11	-6.29
802.11n Mode				
5500	6.5	4.026	11	-6.97
5560	6.5	5.550	11	-5.45
5700	6.5	4.763	11	-6.23

Note: On plots figure 601 pts, span is 50 MHz and resolution bandwidth 1MHz, so 2x50/1 =100 and 601>100

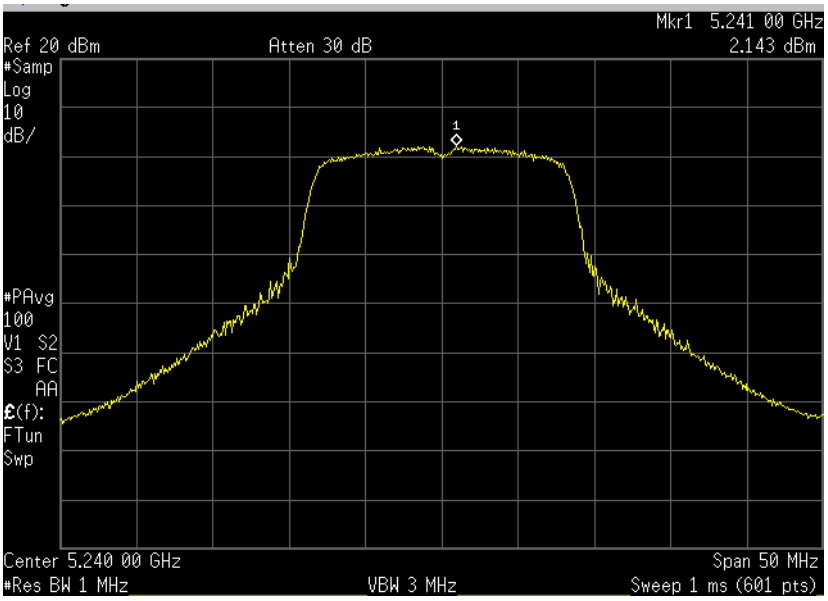
5150-5250MHz Band: 802.11a Mode
Plot 4.3.1



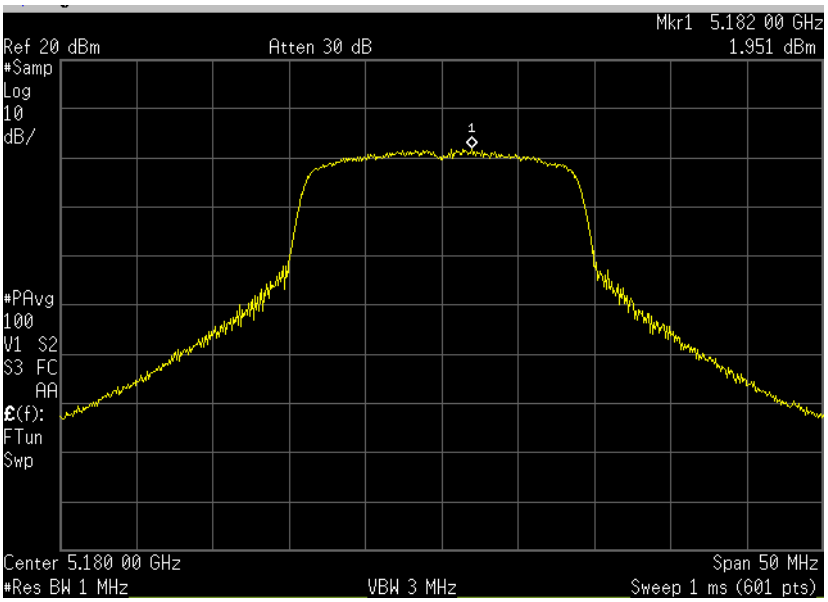
Plot 4.3.2



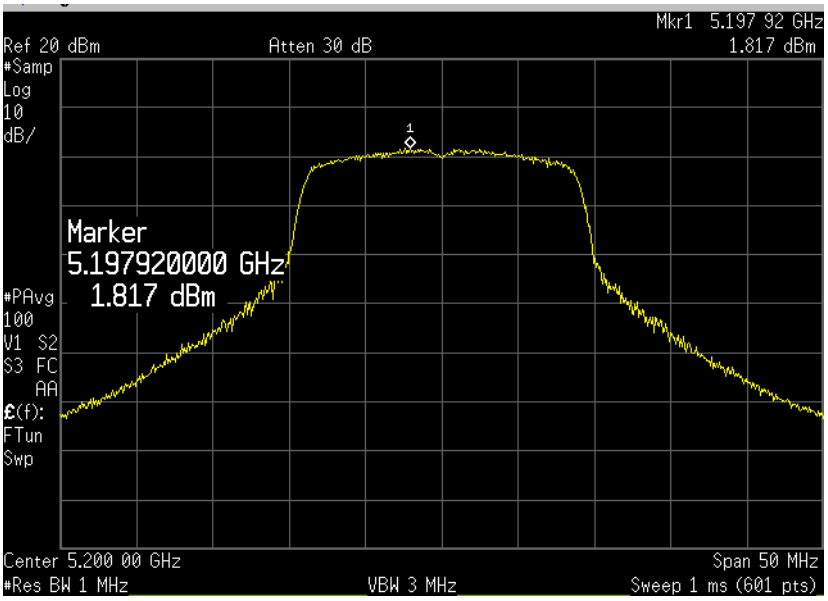
Plot 4.3.3



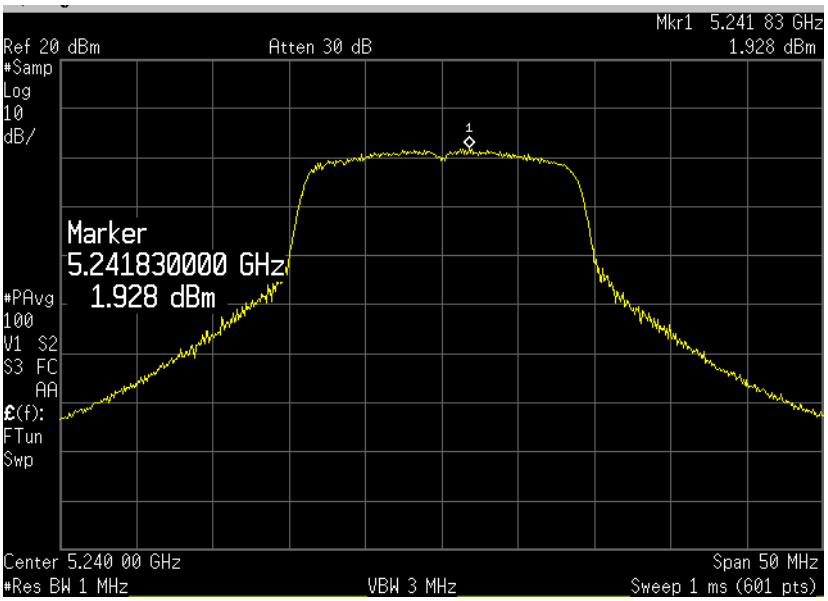
5150-5250MHz Band: 802.11n Mode
Plot 4.3.4



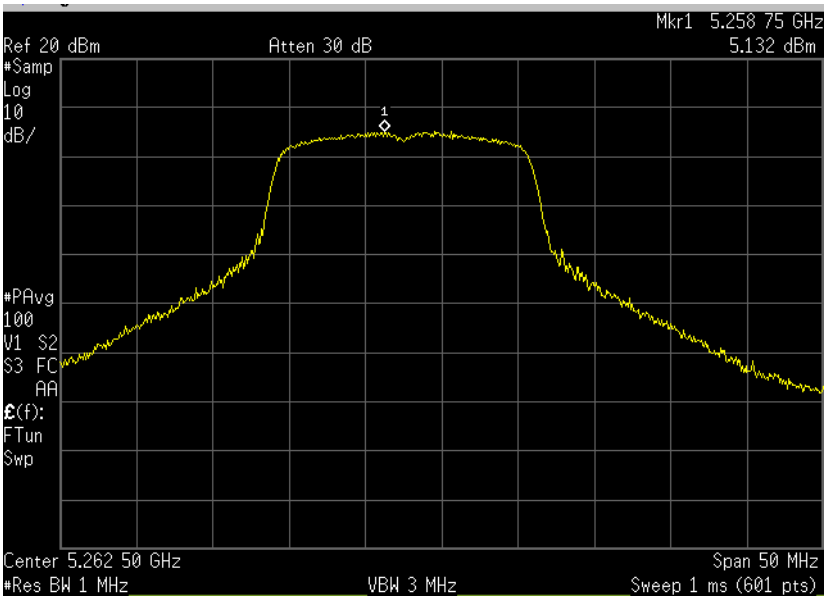
Plot 4.3.5



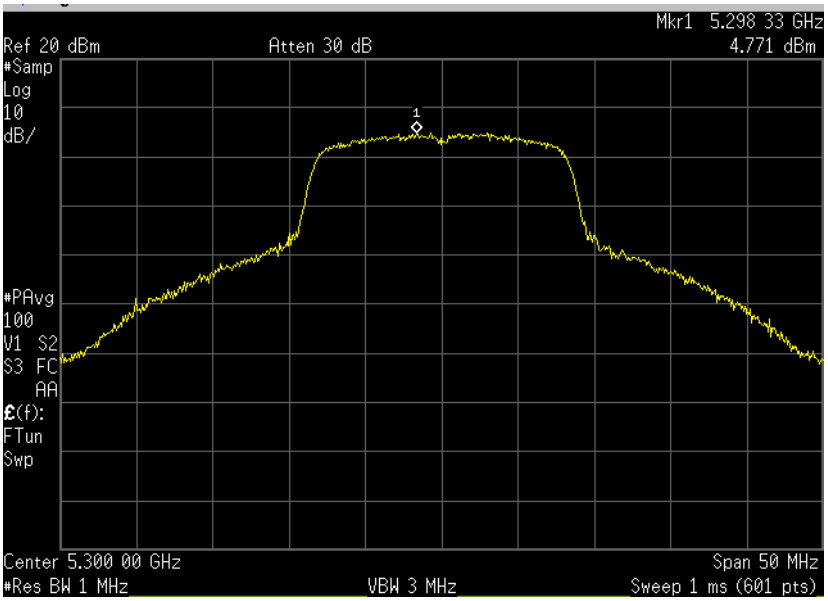
Plot 4.3.6



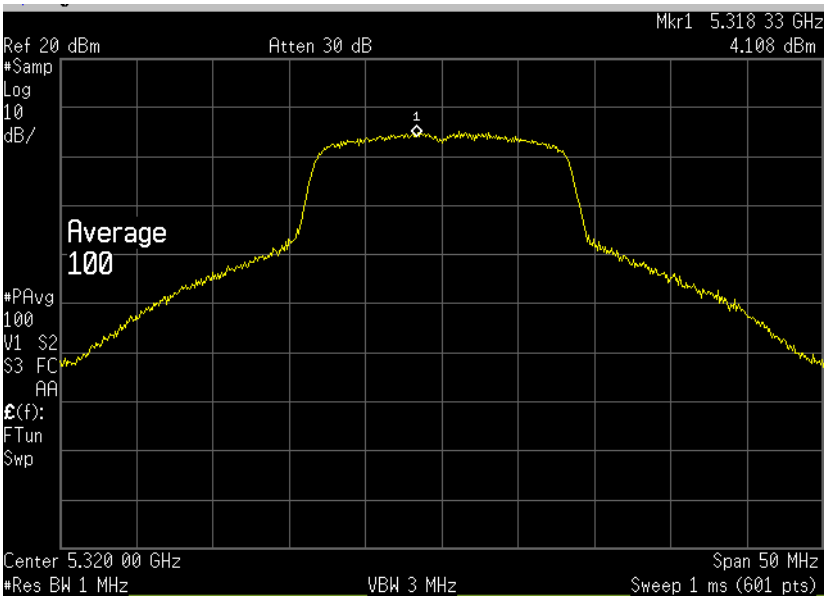
5250-5350MHz Band: 802.11a Mode
Plot 4.3.7



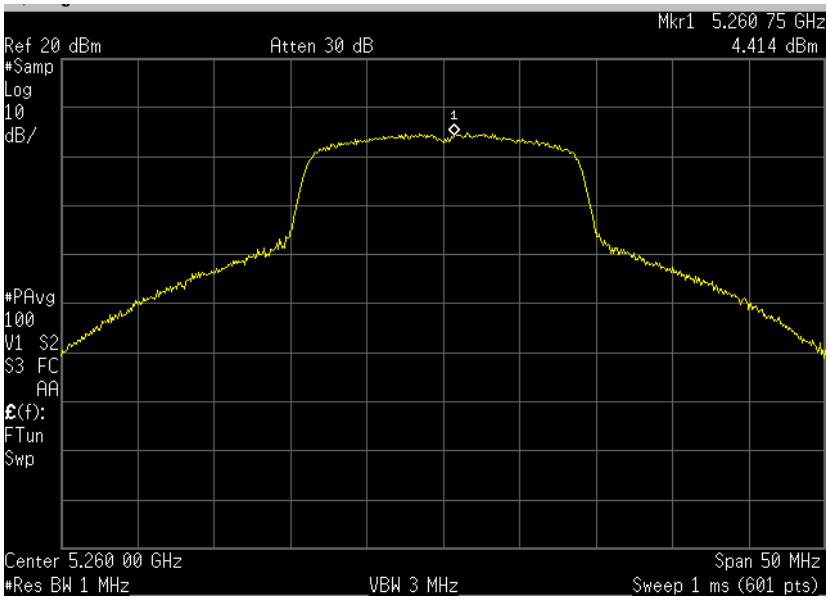
Plot 4.3.8



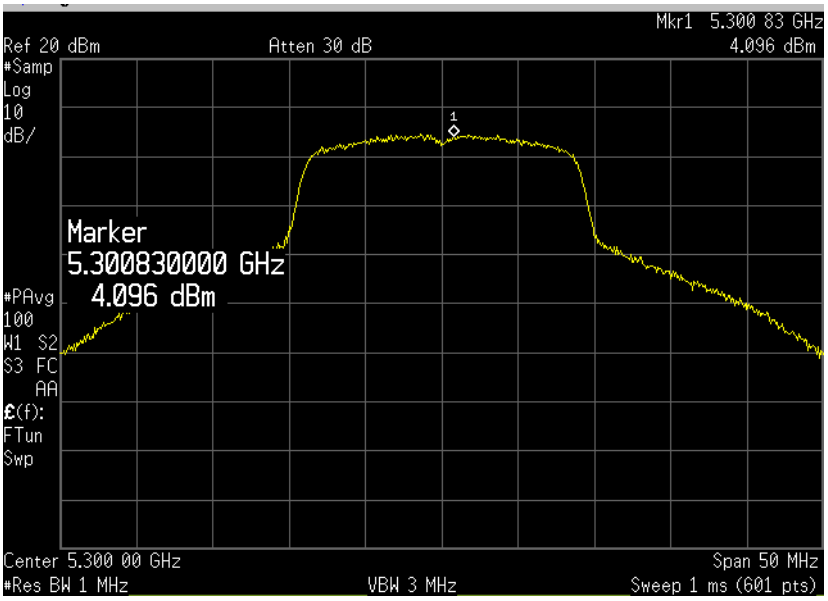
Plot 4.3.9



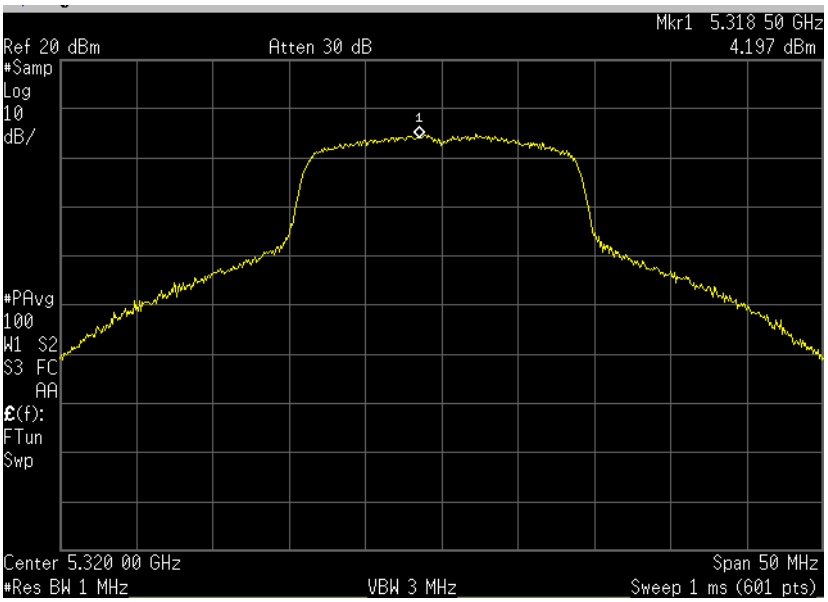
5250-5350MHz Band: 802.11n Mode
Plot 4.3.10



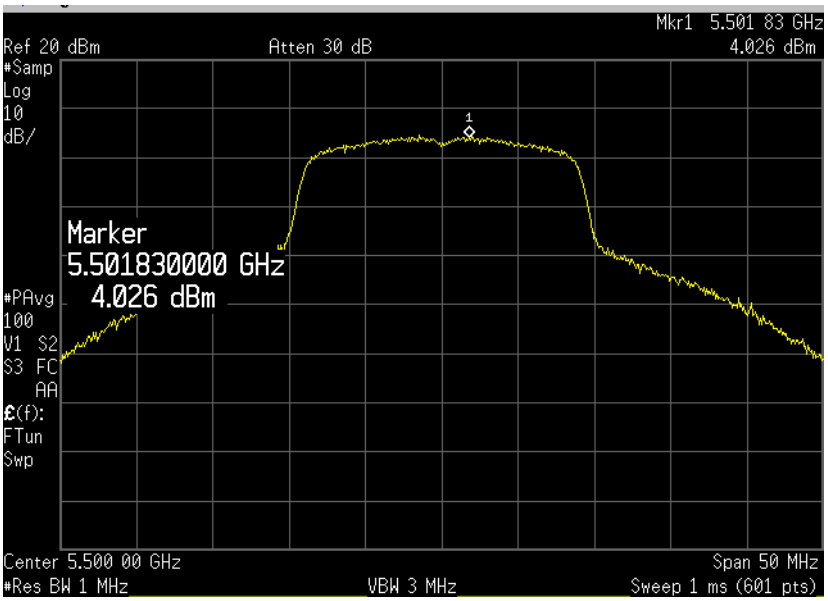
Plot 4.3.11



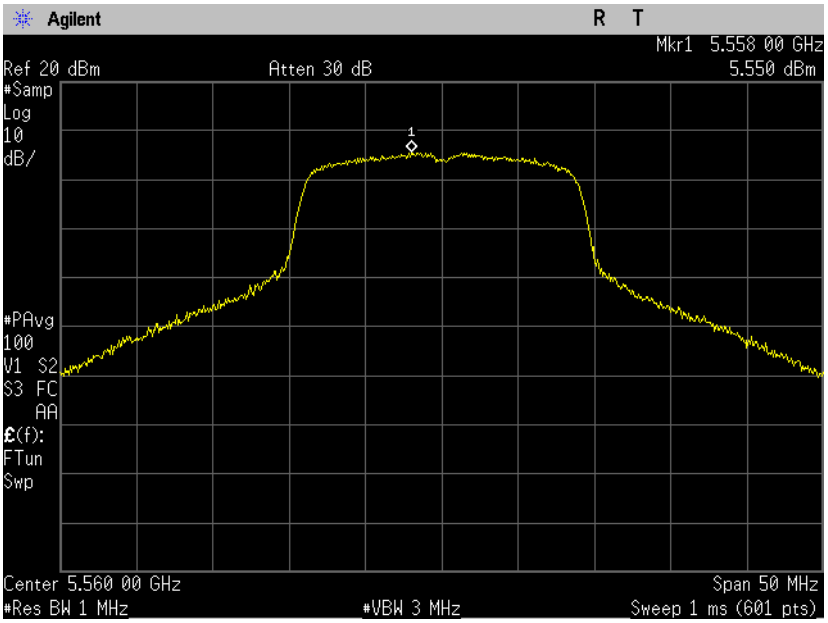
Plot 4.3.12



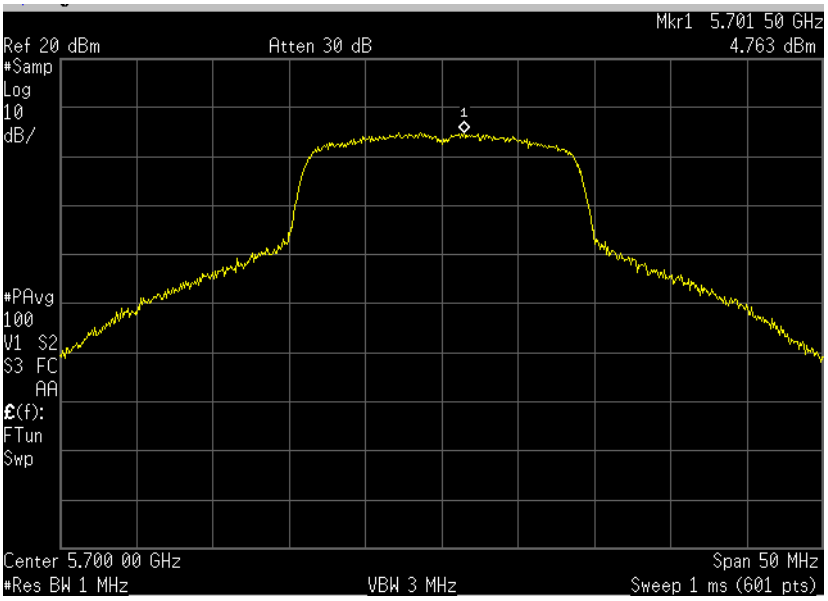
5470-5725 MHz Band: 802.11n Mode
Plot 4.3.13



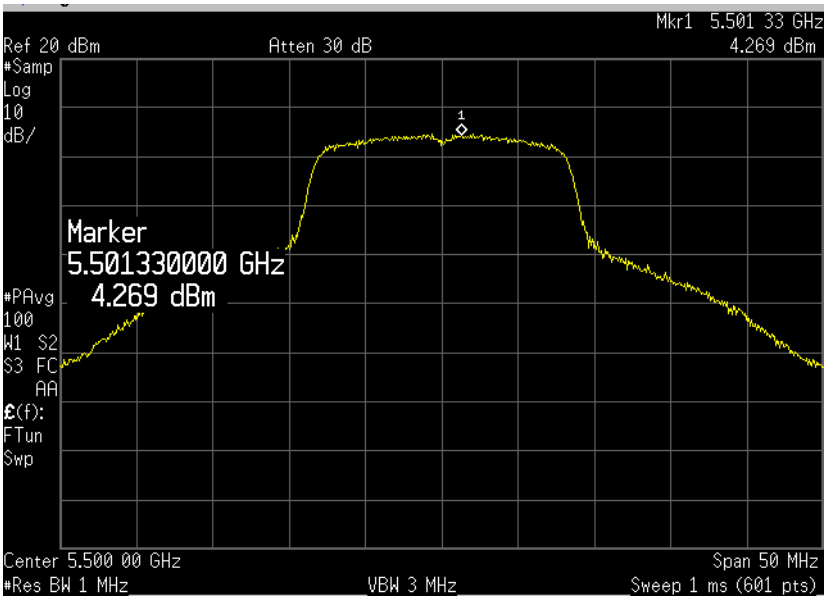
Plot 4.3.14



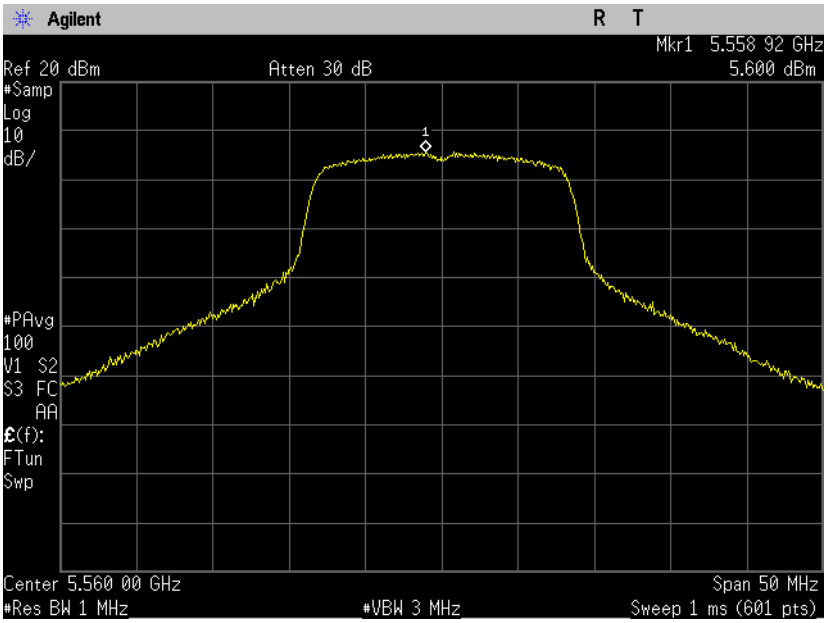
Plot 4.3.15



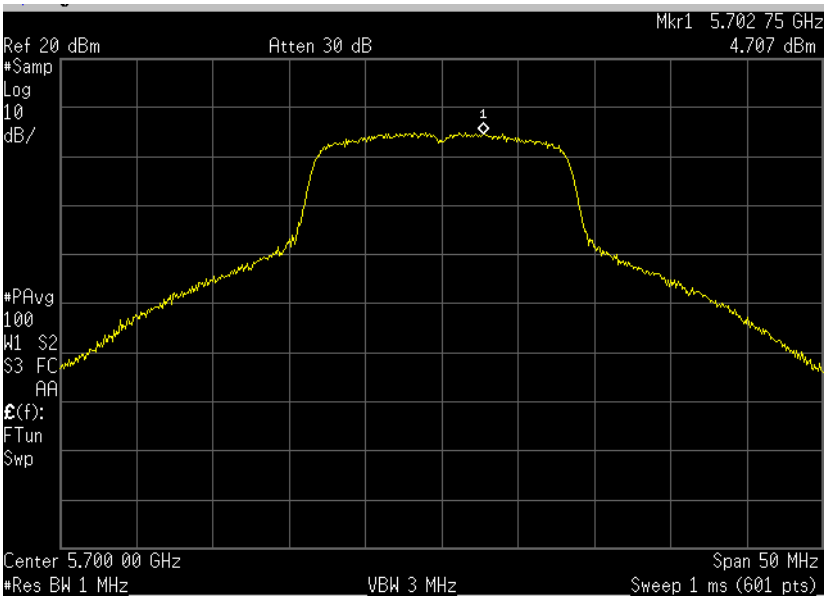
5470-5725 MHz Band: 802.11a Mode
Plot 4.3.16



Plot 4.3.17



Plot 4.3.18



4.4. Peak Excursion

Reference document:	**47 CFR §15.407 (a) (6)**		
Test Requirements:	The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	KDB 789033 v01r01,sec F, Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	Trace 1:RBW: 1MHz , VBW: 3MHz , Peak Max Hold, Trace 2: same setting as used for PSD measurements		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.4.1 - 4.4.18	

Test Results:

5150-5250 MHz:

Frequency [MHz]	Data Rate [Mbps]	Peak Excursion [dB]	Limit [dB]	Margin [dB]
802.11a Mode				
5180	6	4.126	13	-8.87
5200	6	3.363	13	-9.63
5240	6	3.316	13	-9.68
802.11n Mode				
5180	6.5	4.482	13	-8.51
5200	6.5	4.282	13	-8.71
5240	6.5	3.050	13	-9.95

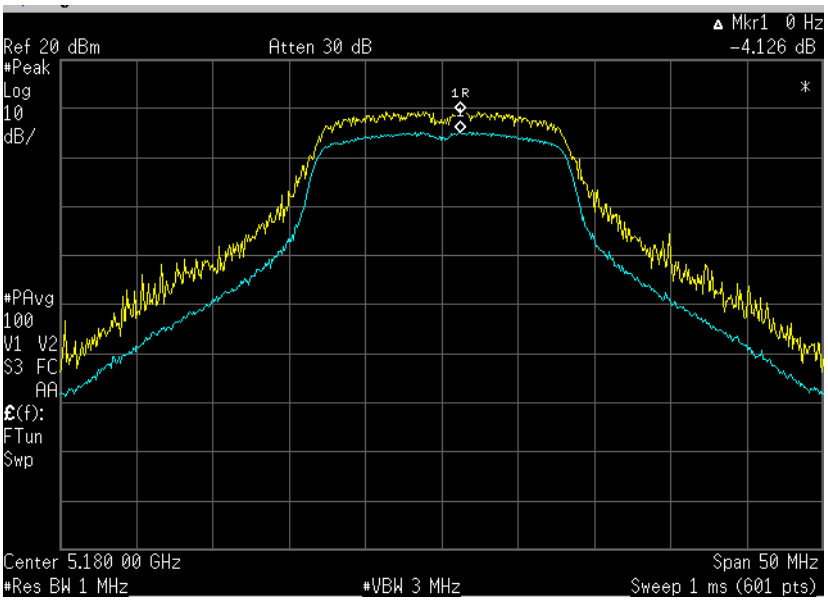
5250-5350 MHz

Frequency [MHz]	Data Rate [Mbps]	Peak Excursion [dB]	Limit [dB]	Margin [dB]
802.11a Mode				
5260	6	4.987	13	-8.01
5300	6	4.294	13	-8.70
5320	6	4.758	13	-8.24
802.11n Mode				
5260	6.5	4.7	13	-8.3
5300	6.5	4.753	13	-8.24
5320	6.5	5.090	13	-7.91

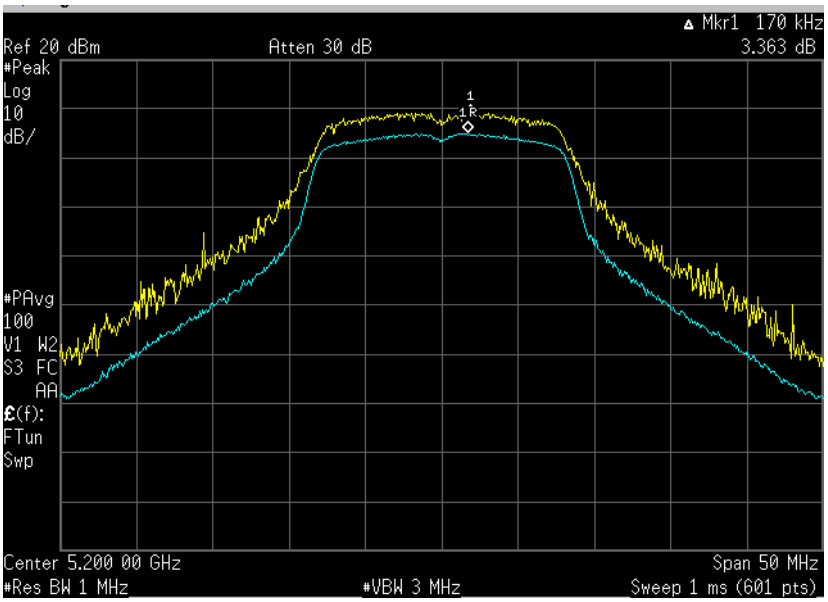
5470-5725 MHz

Frequency [MHz]	Data Rate [Mbps]	Peak Excursion [dB]	Limit [dB]	Margin [dB]
802.11a Mode				
5500	6	3.947	13	-9.053
5560	6	4.923	13	-8.077
5700	6	4.750	13	-8.250
802.11n Mode				
5500	6.5	4.626	13	-8.374
5560	6.5	4.826	13	-8.174
5700	6.5	4.142	13	-8.858

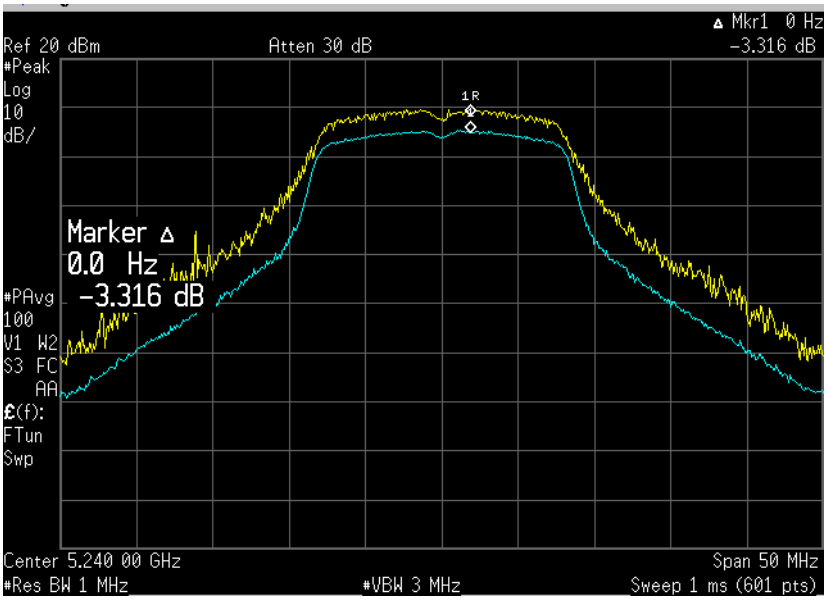
5150-5250 MHz: 802.11a Mode
Plot 4.4.1



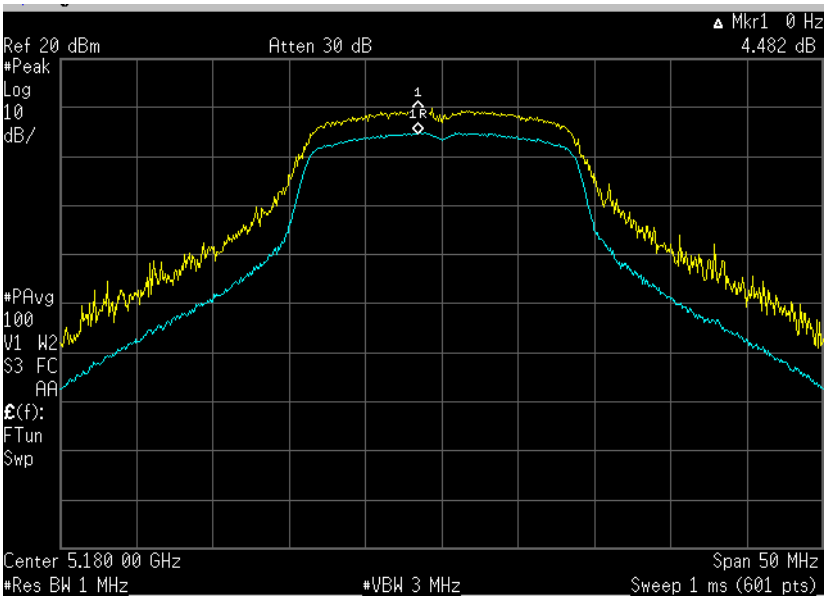
Plot 4.4.2



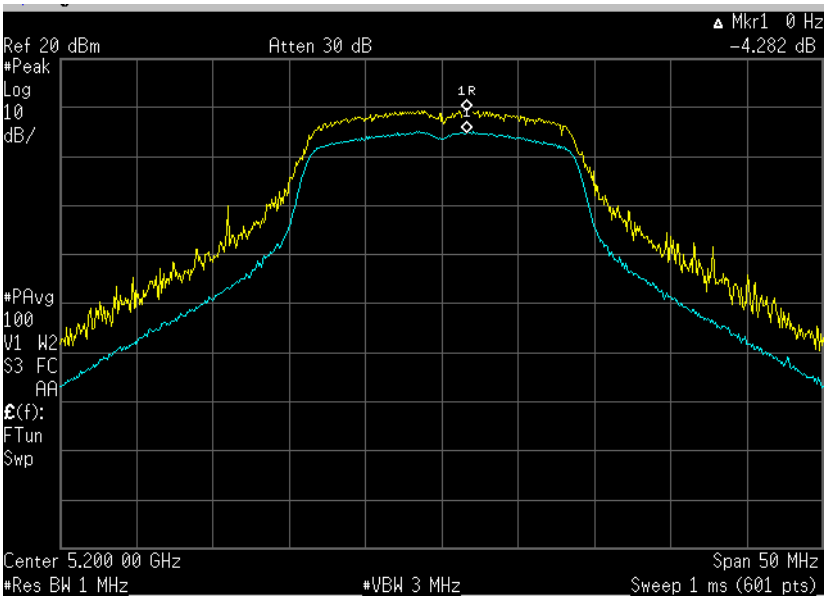
Plot 4.4.3



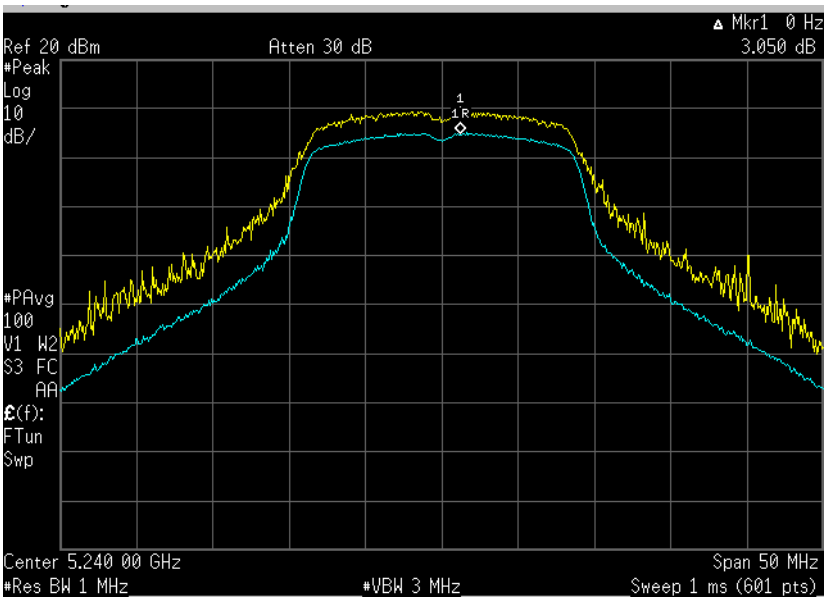
5150-5250 MHz: 802.11n Mode
Plot 4.4.4



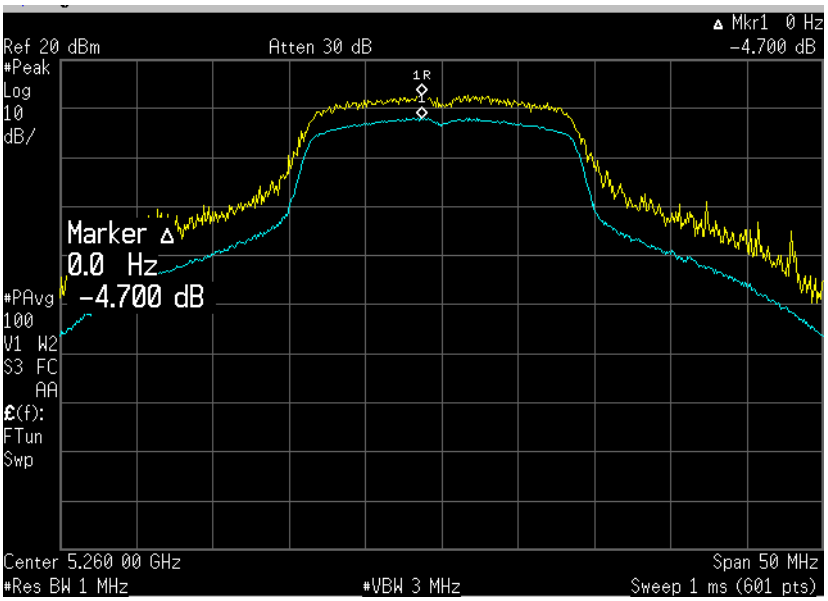
Plot 4.4.5



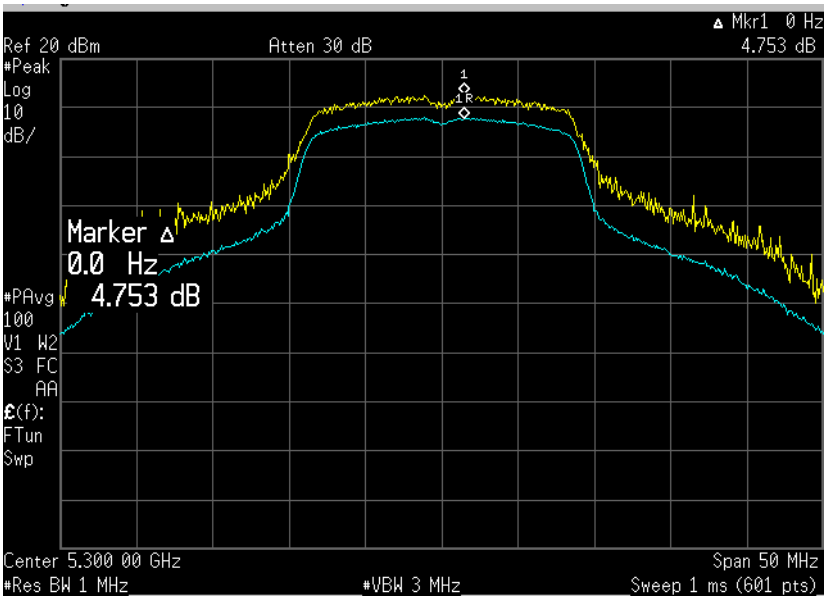
Plot 4.4.6



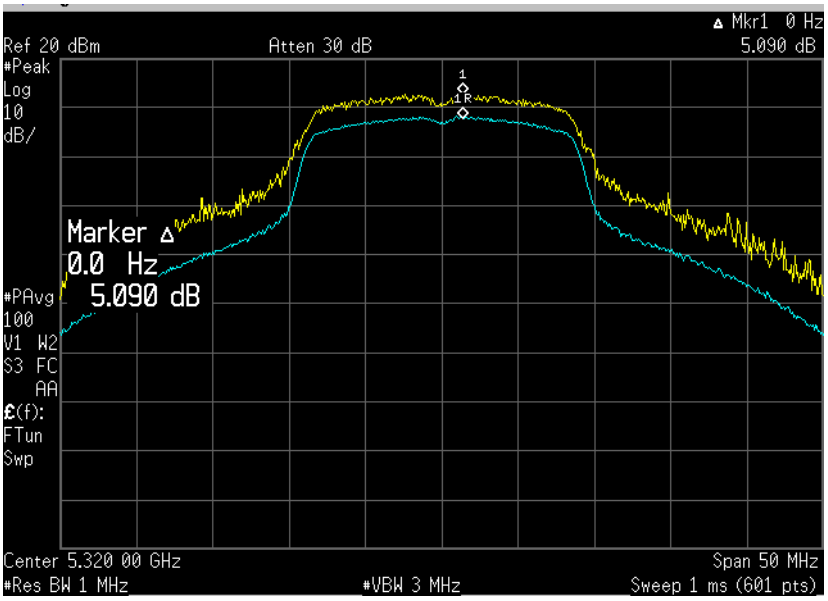
5250-5350 MHz 802.11n Mode
Plot 4.4.7



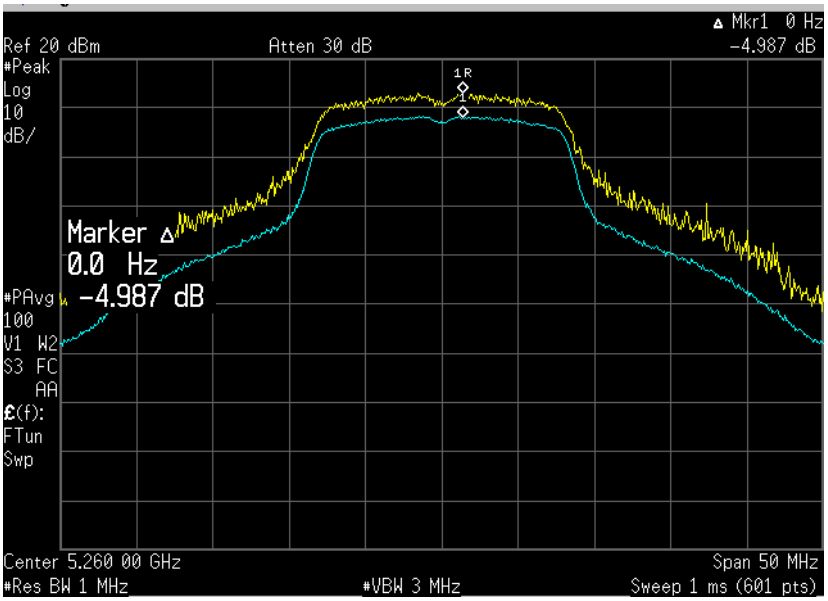
Plot 4.4.8



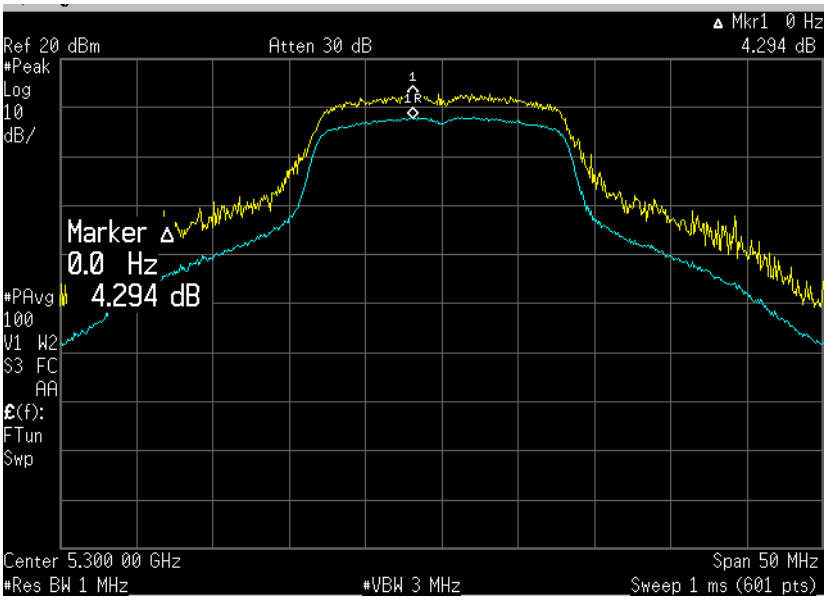
Plot 4.4.9



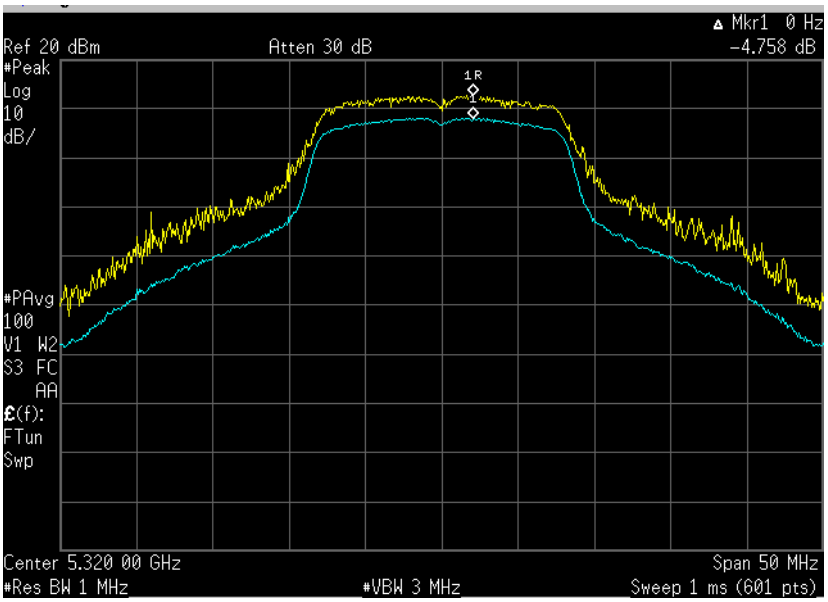
5250-5350 MHz 802.11a Mode
Plot 4.4.10



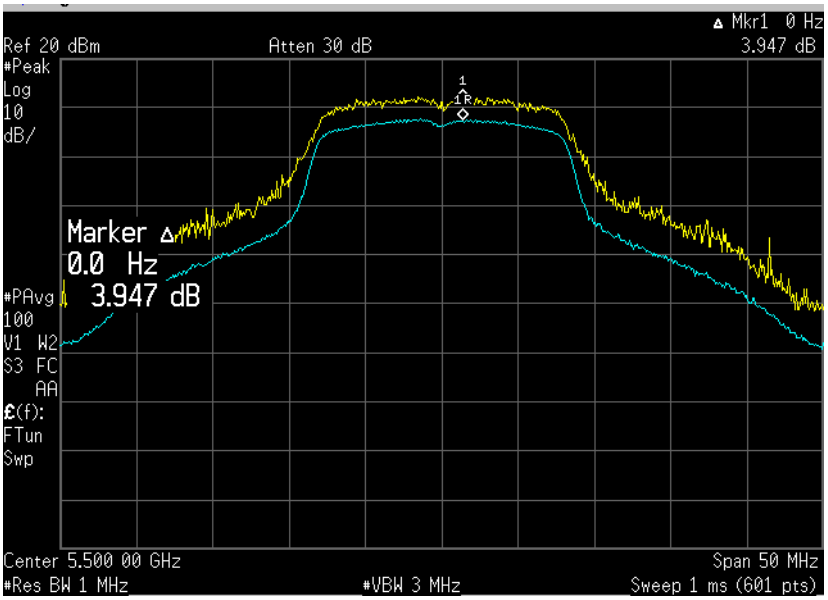
Plot 4.4.11



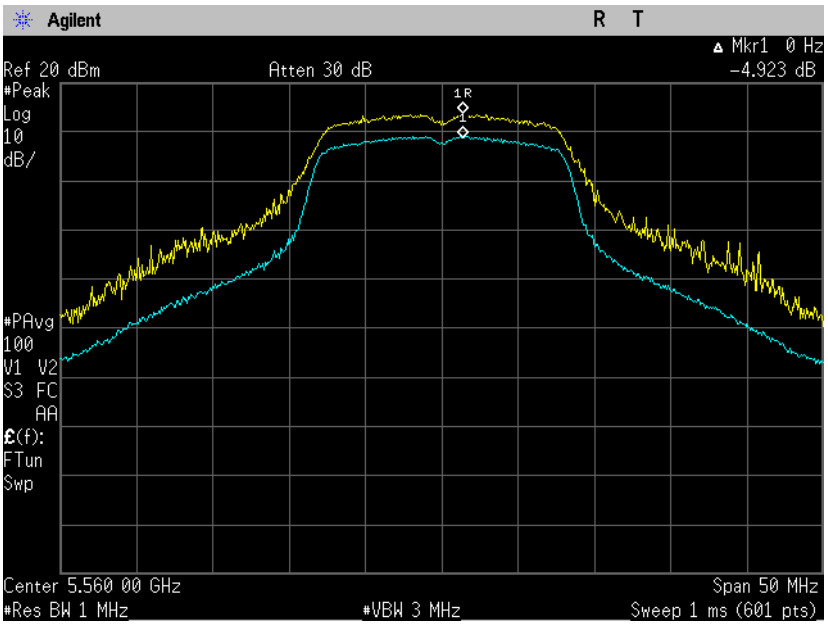
Plot 4.4.12



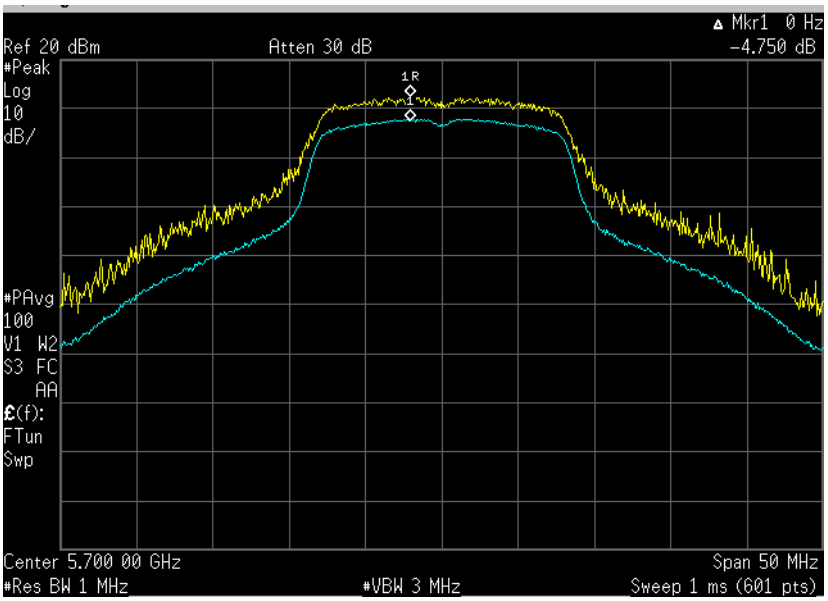
5470-5725 MHz 802.11a Mode
Plot 4.4.13



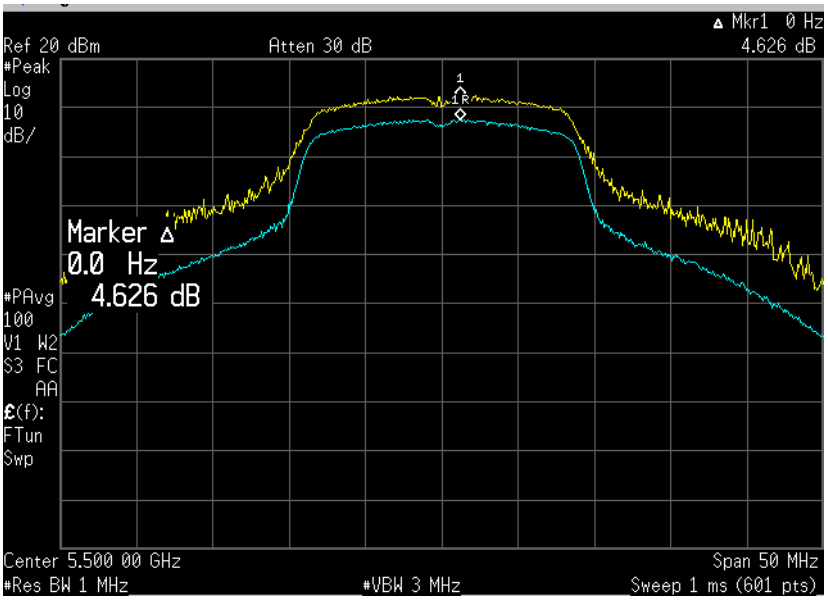
Plot 4.4.14



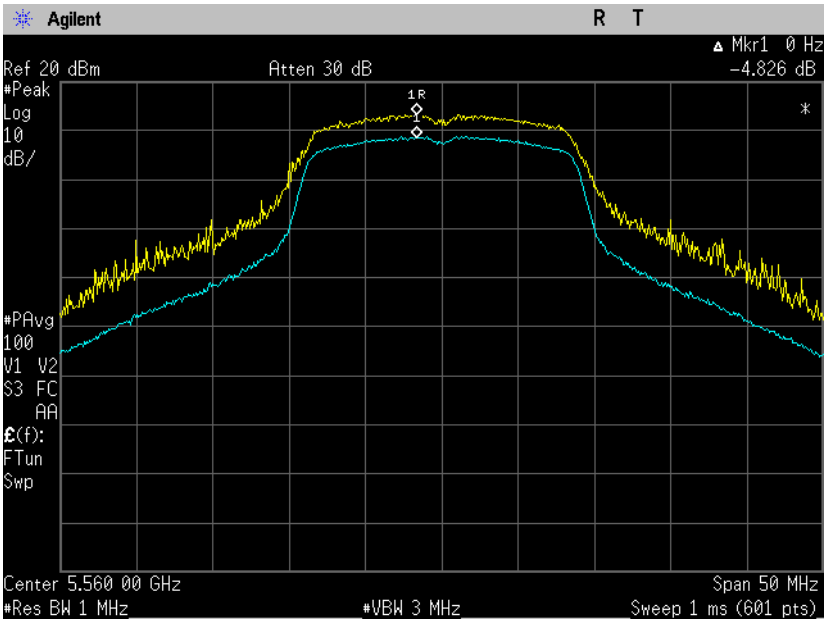
Plot 4.4.15



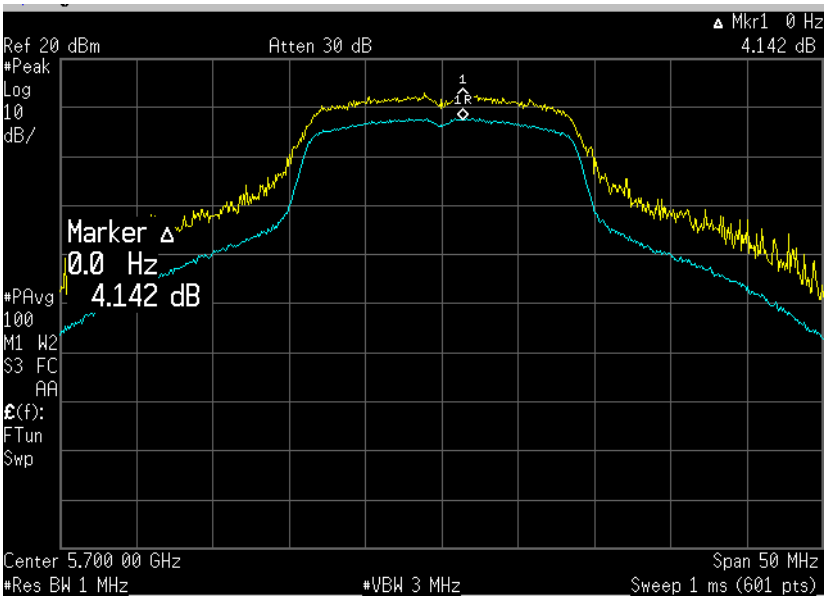
5470-5725 MHz 802.11n Mode
Plot 4.4.16



Plot 4.4.17



Plot 4.4.18



4.5. Conducted Spurious Emissions

Reference document:	**47 CFR §15.407 (b) (1),(2),(3),(4) & §15.407 (b)(6)**		
Test Requirements:	The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits: For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz. Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Sec. 15.209.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	KDB 789033 v01r01,sec G 3)4), Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 1 MHz, VBW ≥1 MHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.5.1- Plot 4.5.56	

Note: The EUT was tested with its internal antenna to radiated emission (see NII EMC section 4.6) and we did not perform rad. Cabinet testing because it was not required in this case. We also performed Conducted emissions although it was not required to demonstrate compliance (refer to KDB 789033 Section G)3)b))

Test results:

5150-5250 MHz: Spurious

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5180	6	2	All emission at least 10 dB below limit		-27	>10	Comply
5220	6						Comply
5240	6						Comply
802.11n Mode							
5180	6.5	2	All emission at least 10 dB below limit		-27	>10	Comply
5220	6.5						Comply
5240	6.5						Comply

5250-5350 MHz: Spurious

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5260	6	2.4	All emission at least 10 dB below limit		-27	>10	Comply
5300	6						Comply
5320	6						Comply
802.11n Mode							
5260	6.5	2.4	All emission at least 10 dB below limit		-27	>10	Comply
5300	6.5						Comply
5320	6.5						Comply

5470-5725 MHz: Spurious

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5500	6	2	All emission at least 10 dB below limit		-27	>10	Comply
5560	6	1.9					Comply
5700	6	1.9					Comply
802.11n Mode							
5500	6.5	2	All emission at least 10 dB below limit		-27	>10	Comply
5560	6.5	1.9					Comply
5700	6.5	1.9					Comply

5150-5250 MHz: Band edge

	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5180	54	2	All emission at least 10 dB below limit		-27	>10	Comply
5240	54	2.4			-27	>10	Comply
802.11n Mode							
5180	65	2	All emission at least 10 dB below limit		-27	>10	Comply
5240	65	2.4			-27	>10	Comply

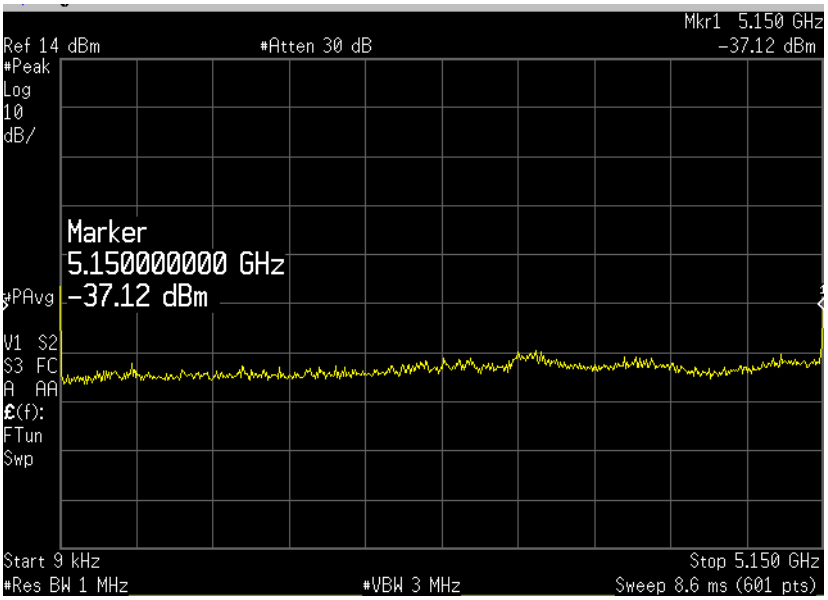
5250-5350 MHz: Band edge

	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5260	54	2.4	All emission at least 10 dB below limit		-27	>10	Comply
5320	54	2.4			-27	>10	Comply
802.11n Mode							
5260	65	2.4	All emission at least 10 dB below limit		-27	>10	Comply
5320	65	2.4			-27	>10	Comply

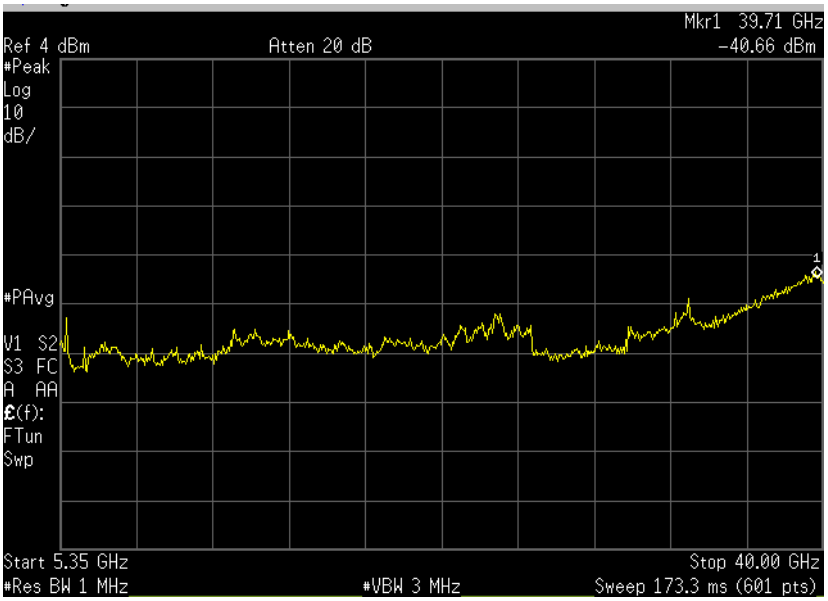
5470-5725 MHz: Band edge

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5500	54	1.9	All emission at least 10 dB below limit		-27	>10	Comply
5700	54	1.9			-27	>10	Comply
802.11n Mode							
5500	65	1.9	All emission at least 10 dB below limit		-27	>10	Comply
5700	65	1.9			-27	>10	Comply

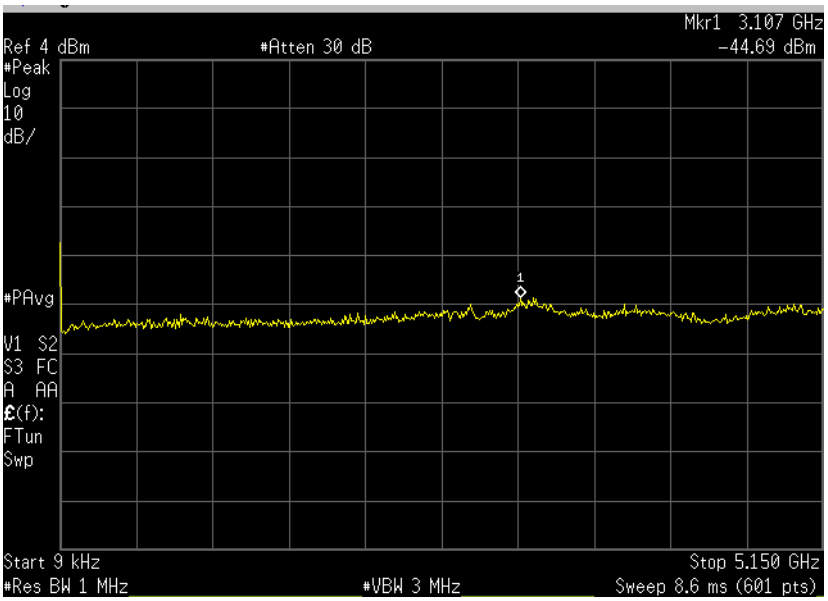
802.11a Mode
Frequency 5150-5250 MHz
Frequency 5180
Plot 4.5.1



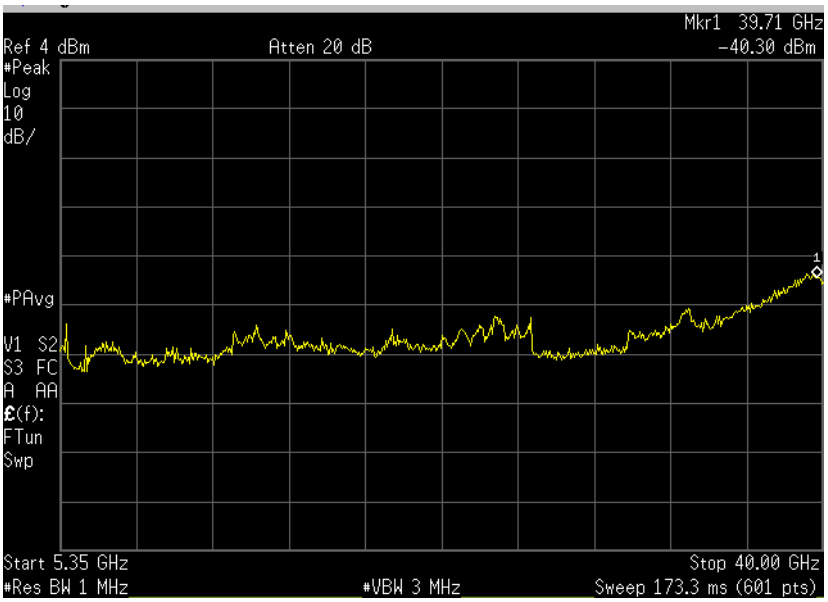
Plot 4.5.2



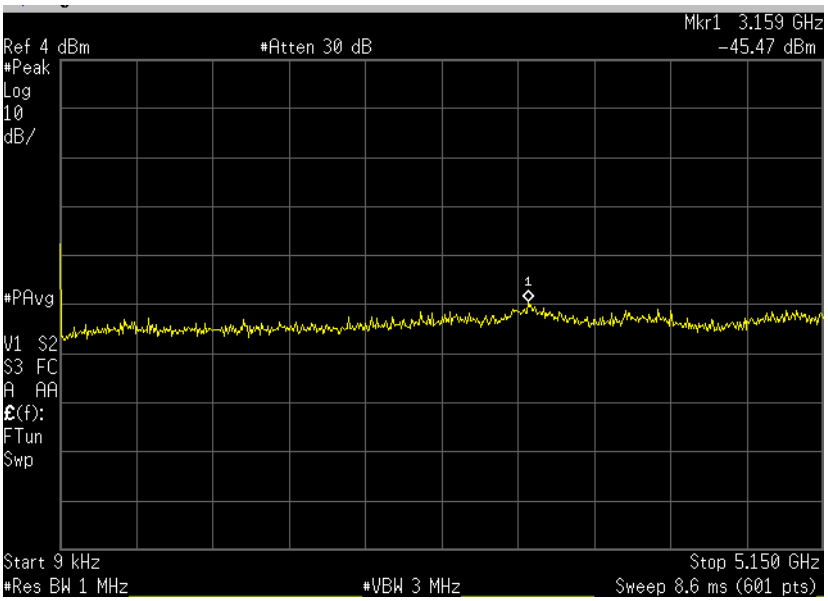
Frequency 5220
Plot 4.5.3



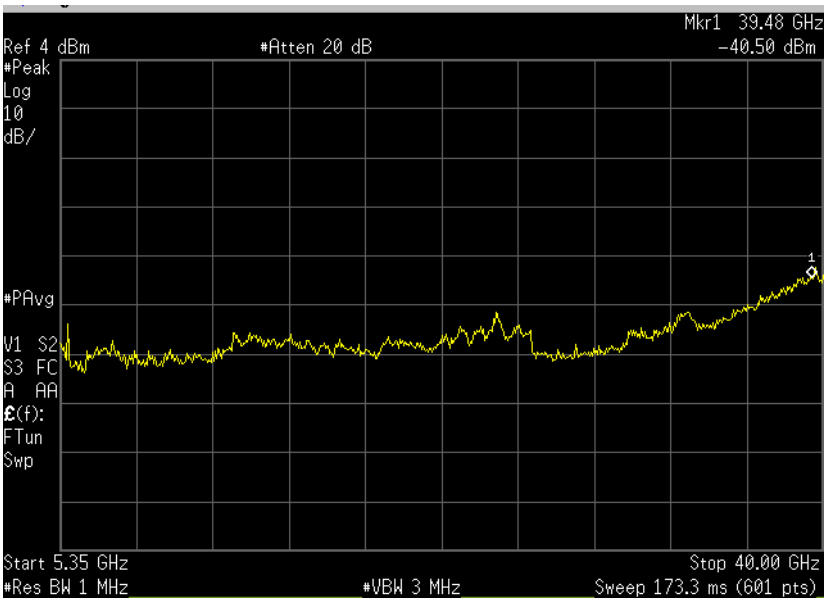
Plot 4.5.4



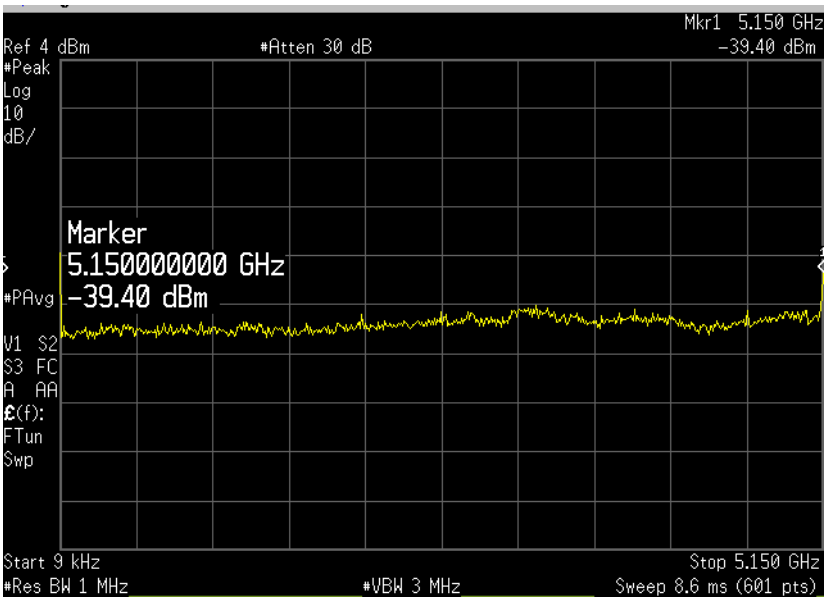
Frequency 5240
Plot 4.5.5



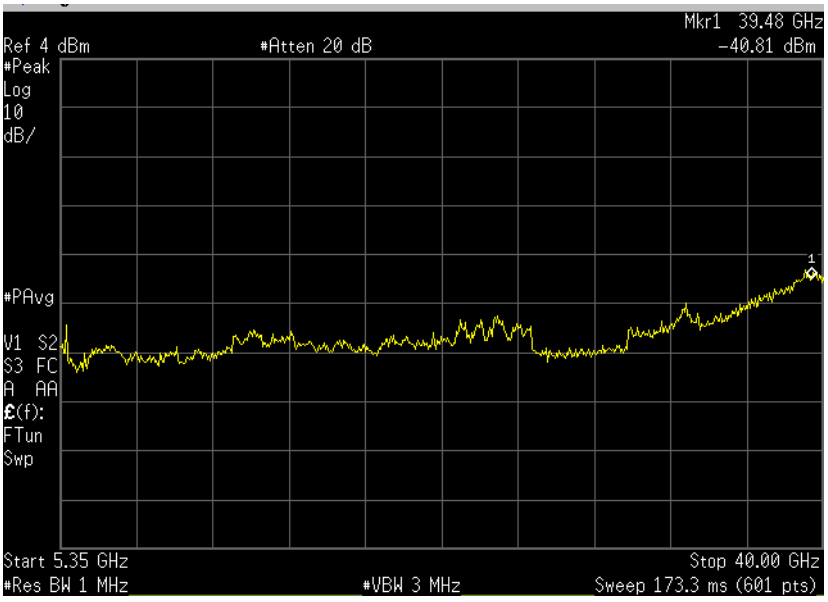
Plot 4.5.6



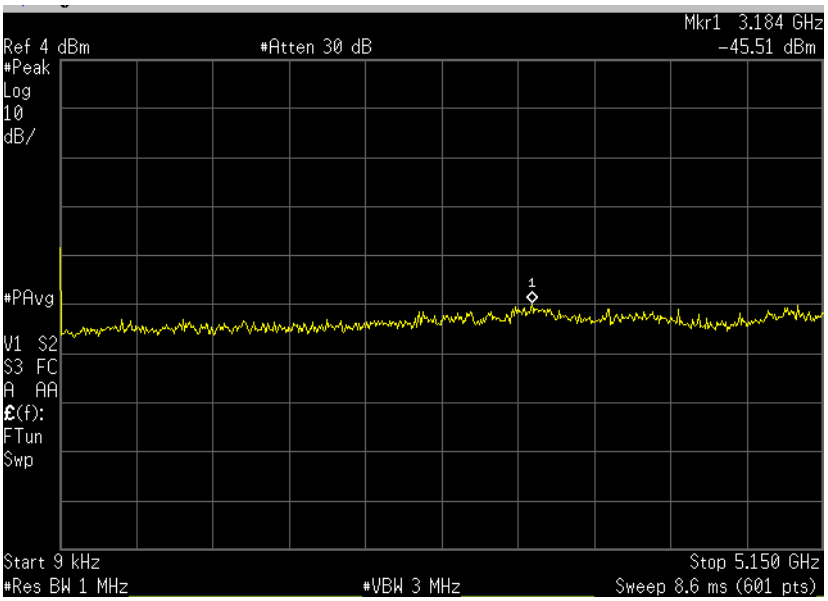
802.11n Mode
Frequency 5150-5250 MHz
Frequency 5180
Plot 4.5.7



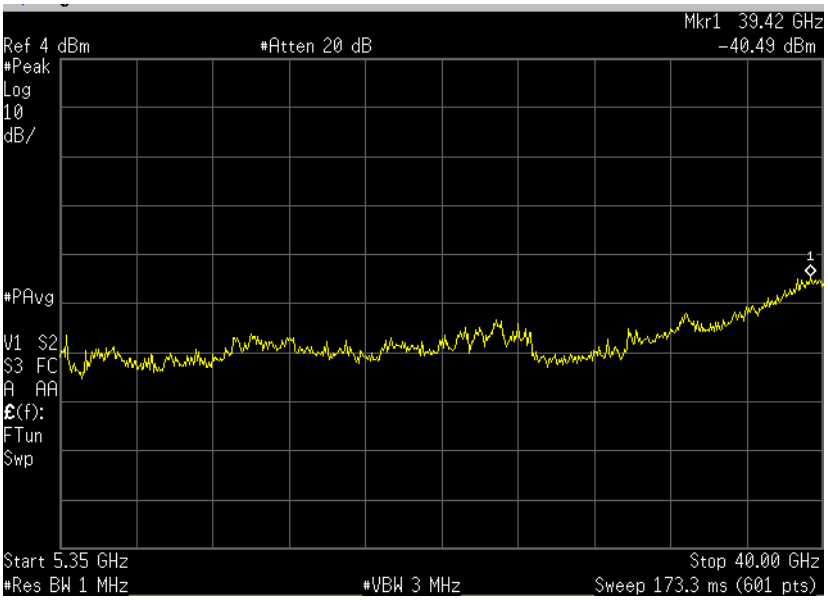
Plot 4.5.8



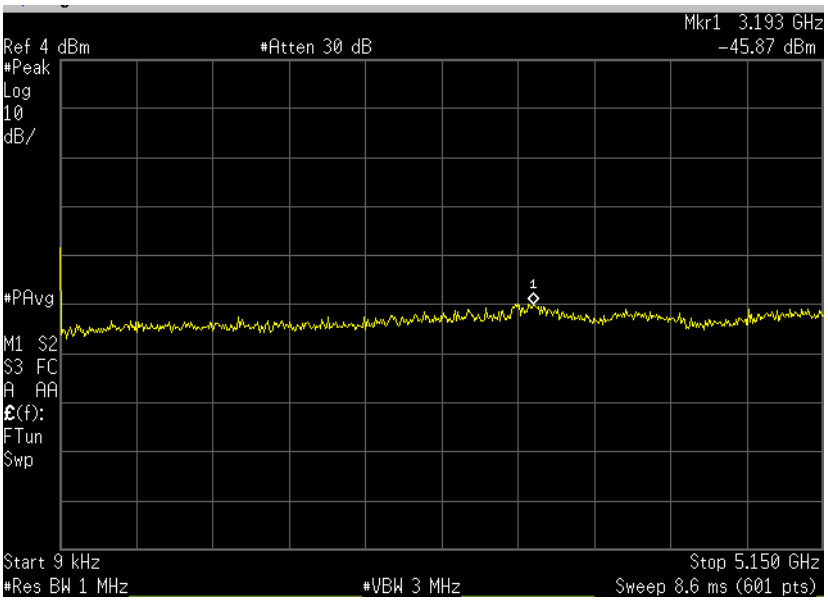
Frequency 5220
Plot 4.5.9



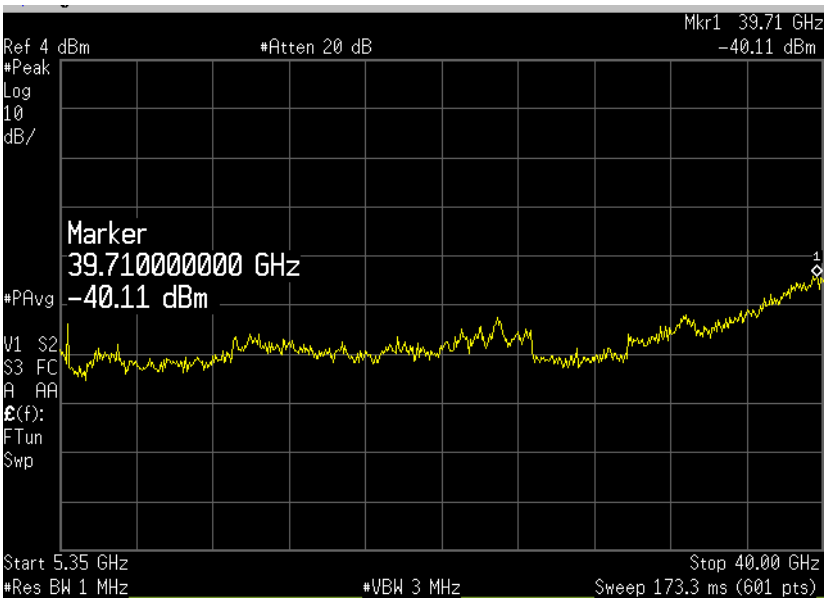
Plot 4.5.10



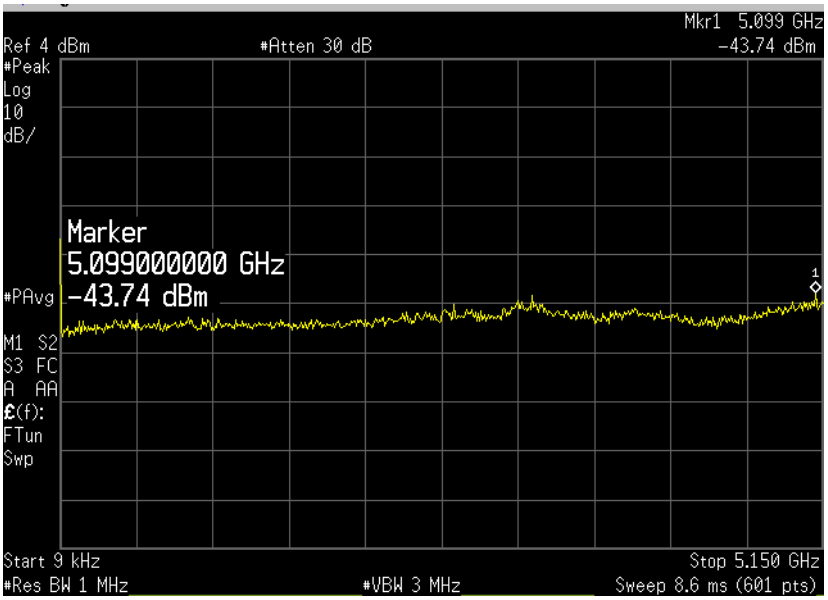
Frequency 5240
Plot 4.5.11



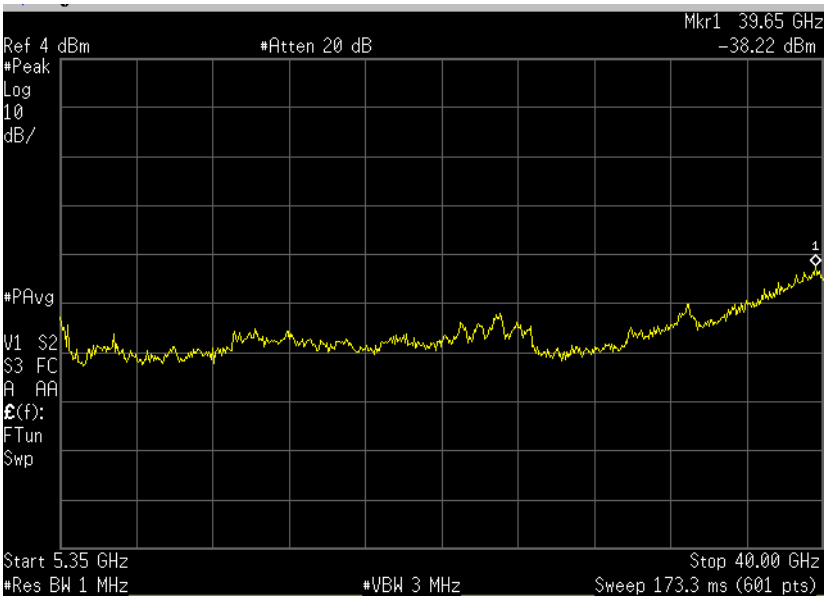
Plot 4.5.12



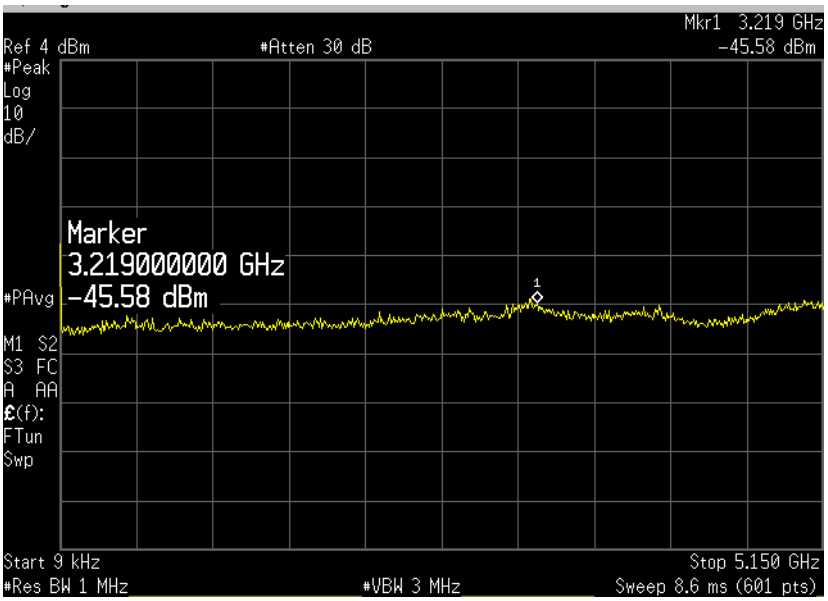
Spurious 802.11a Mode
Frequency 5250-5350 MHz
Frequency 5260
Plot 4.5.13



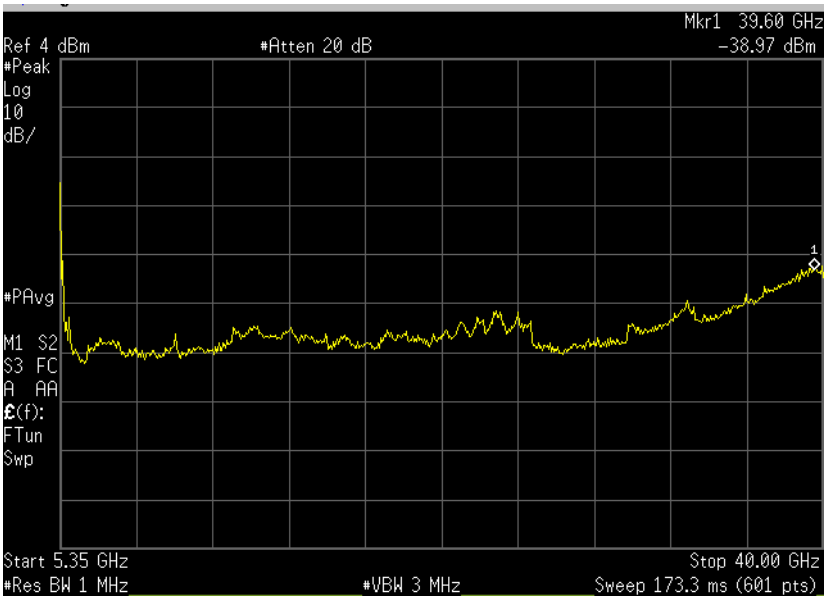
Plot 4.5.14



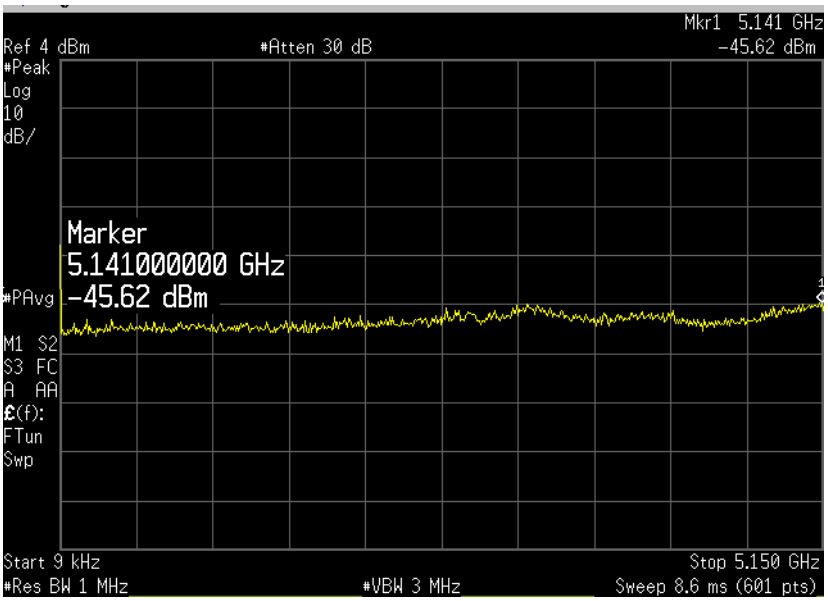
Frequency 5300
Plot 4.5.15



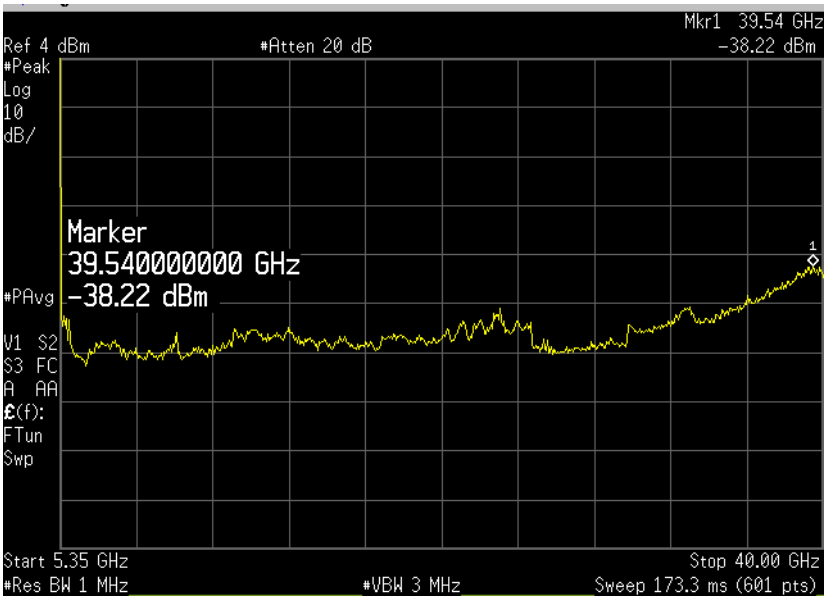
Plot 4.5.16



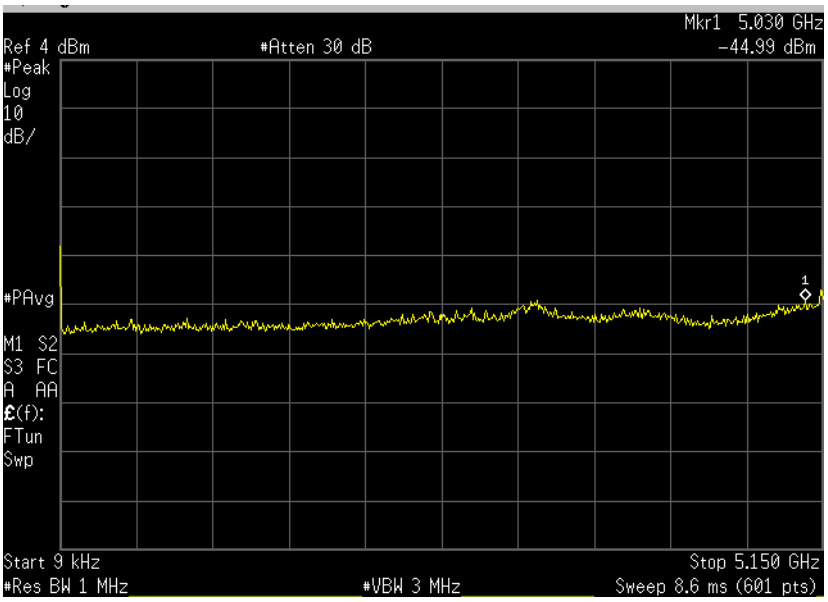
Frequency 5320
Plot 4.5.17



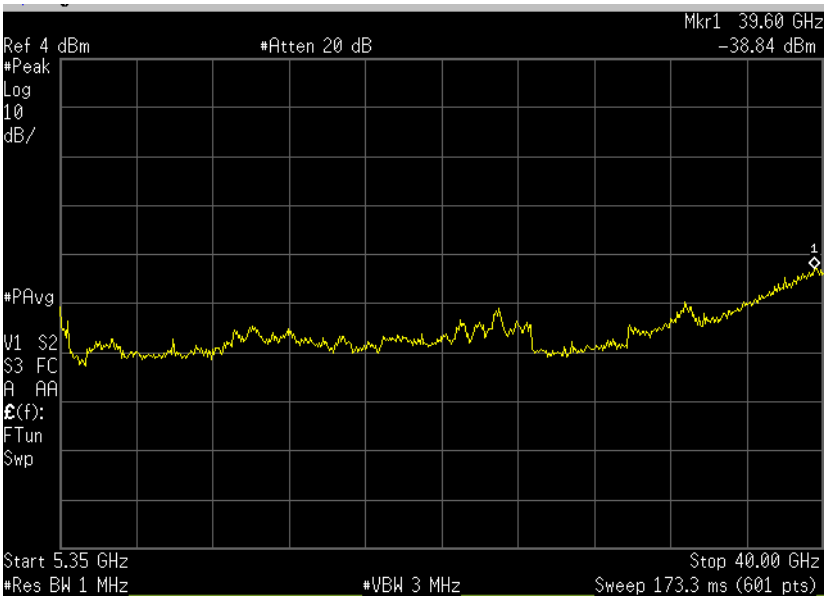
Plot 4.5.18



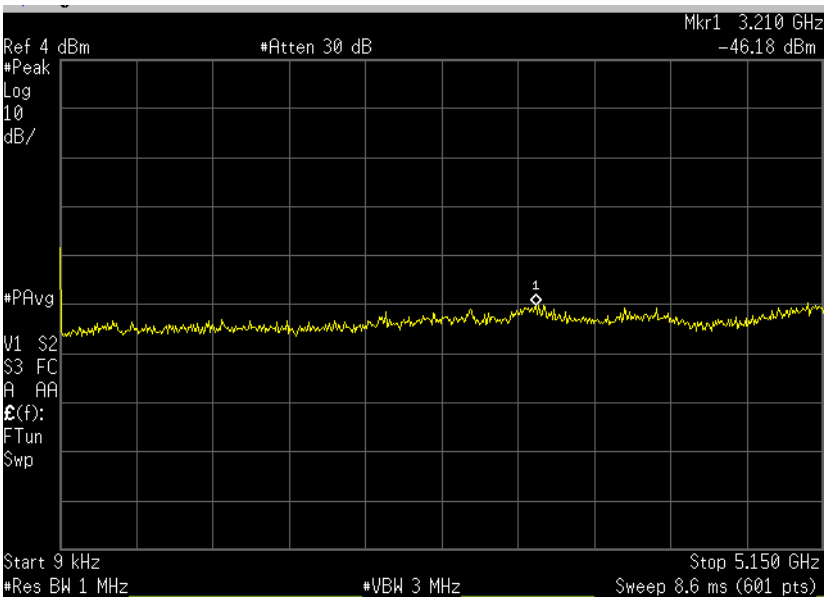
Spurious 802.11n Mode
Frequency 5250-5350 MHz
Frequency 5260
Plot 4.5.19



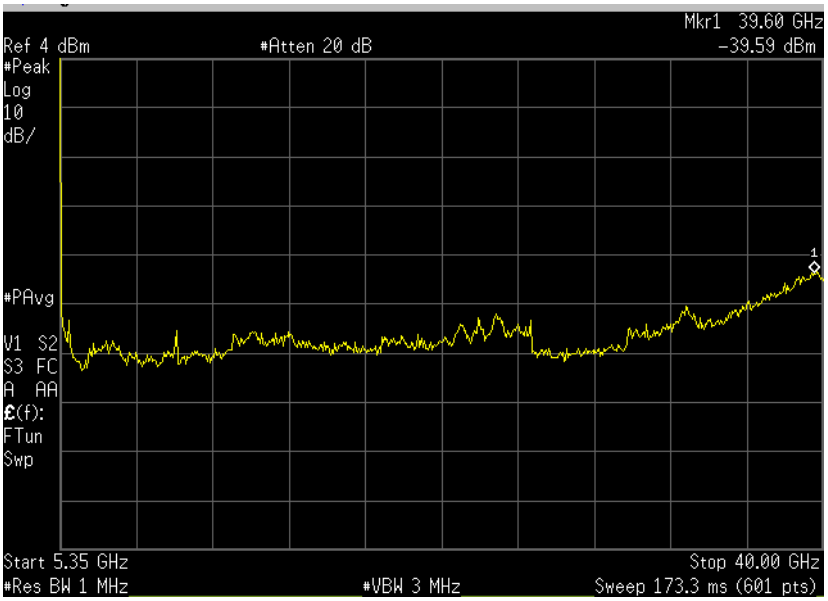
Plot 4.5.20



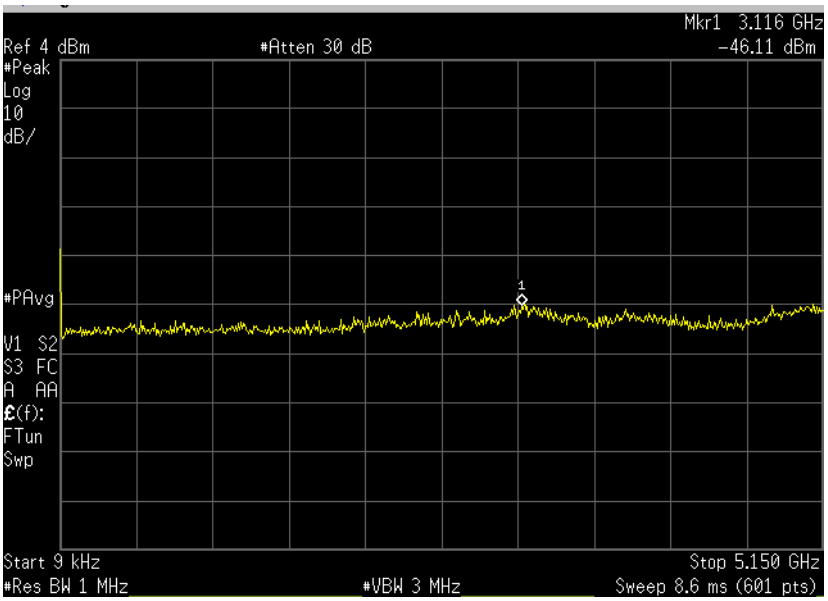
Frequency 5300
Plot 4.5.21



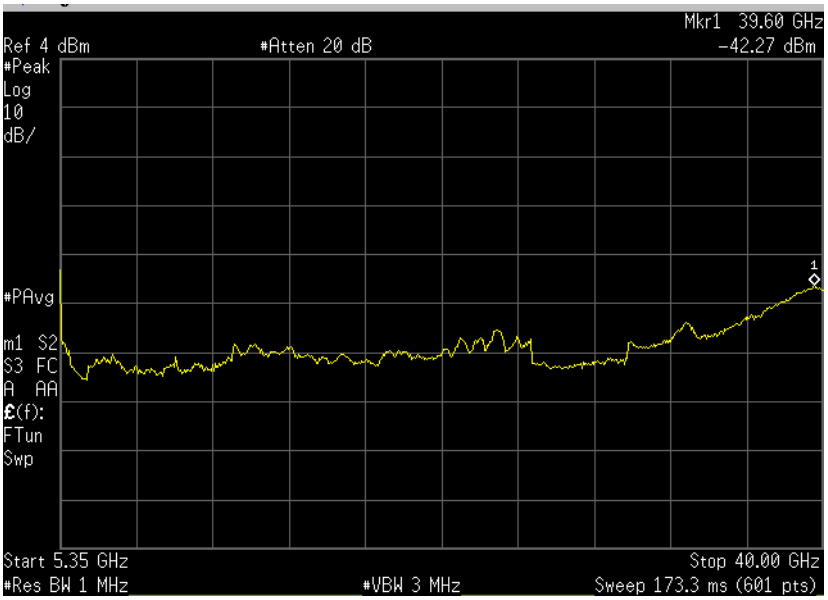
Plot 4.5.22



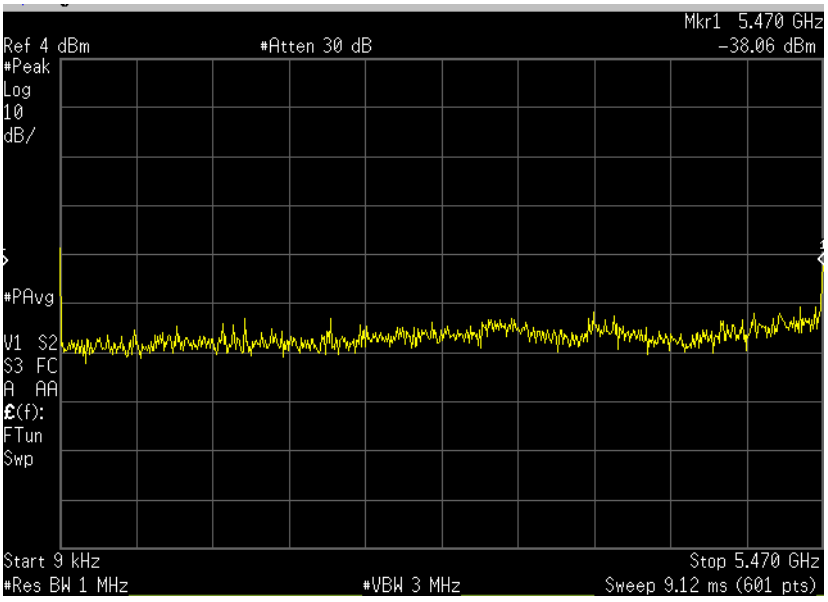
Frequency 5320
Plot 4.5.23



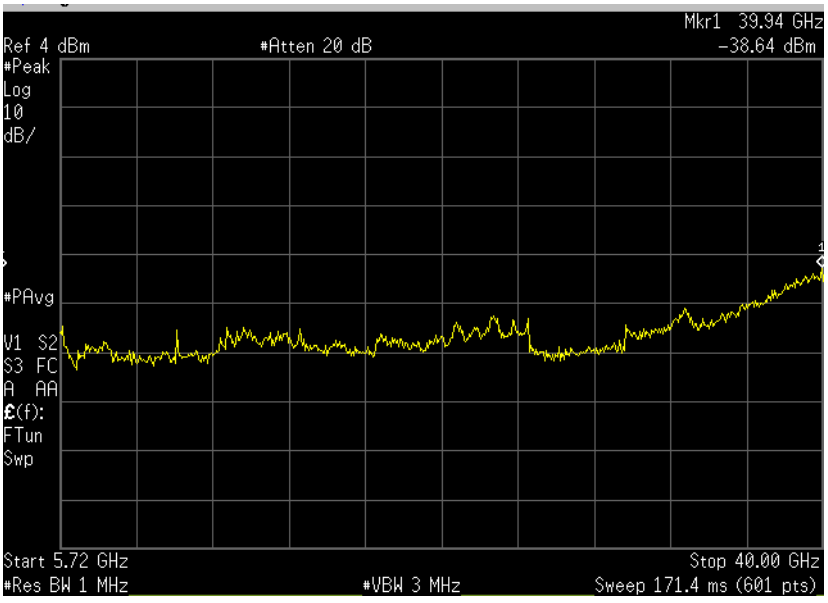
Plot 4.5.24



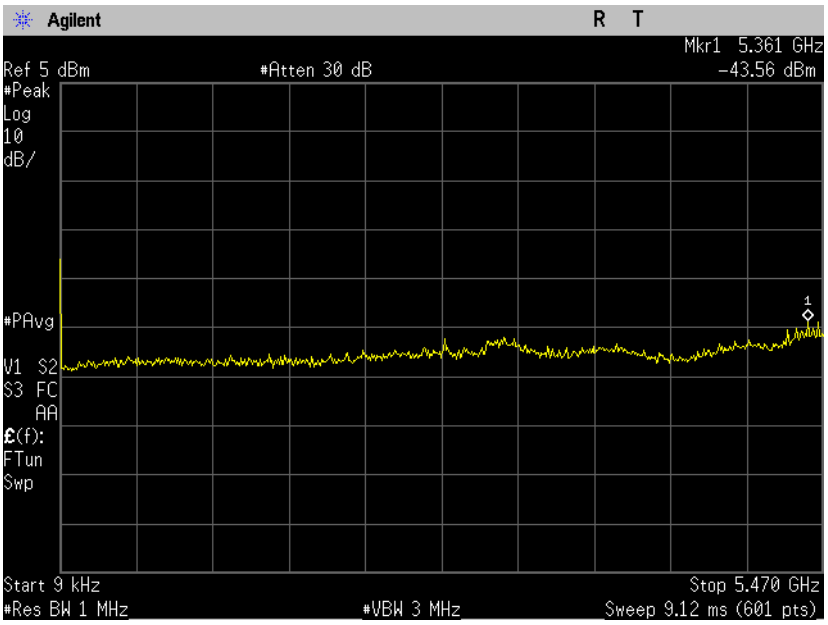
Spurious 802.11a Mode
Frequency 5470-5725 MHz
Frequency 5500
Plot 4.5.25



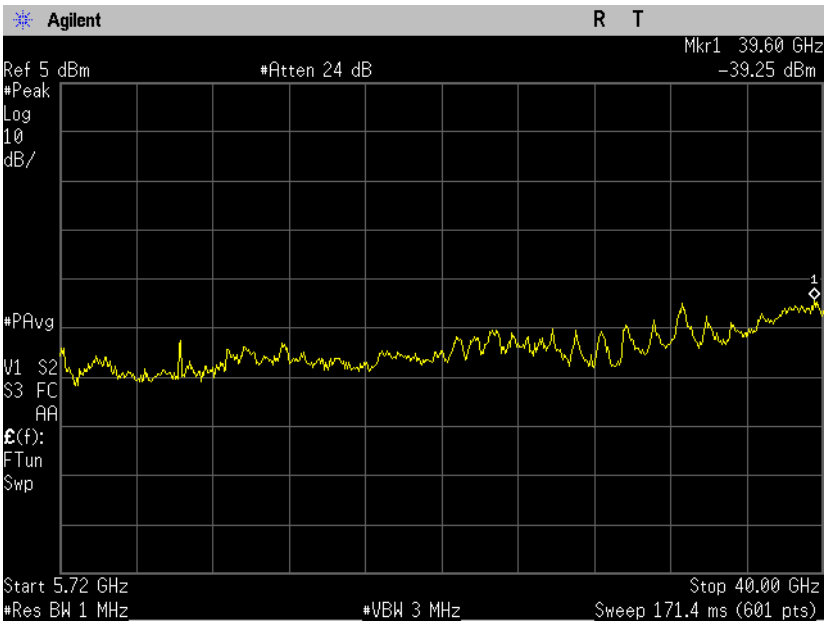
Plot 4.5.26



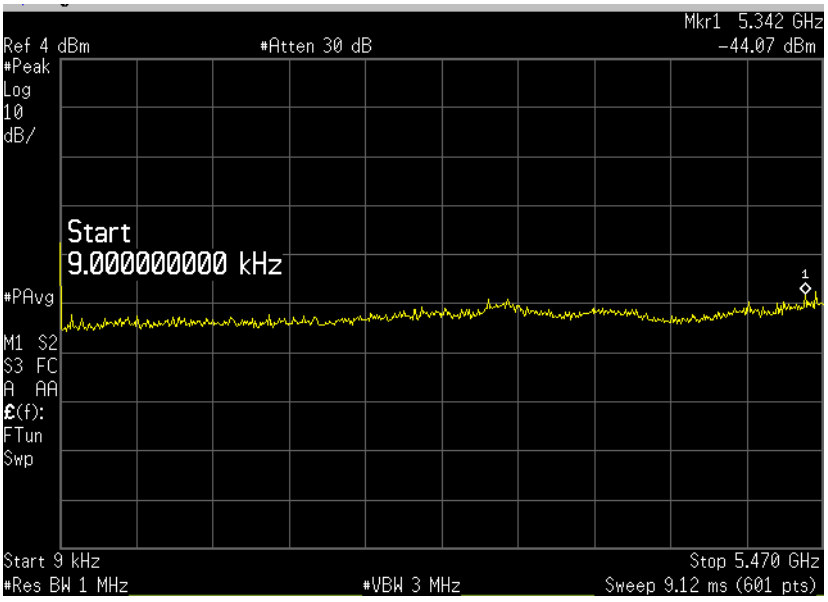
Frequency 5560
Plot 4.5.27



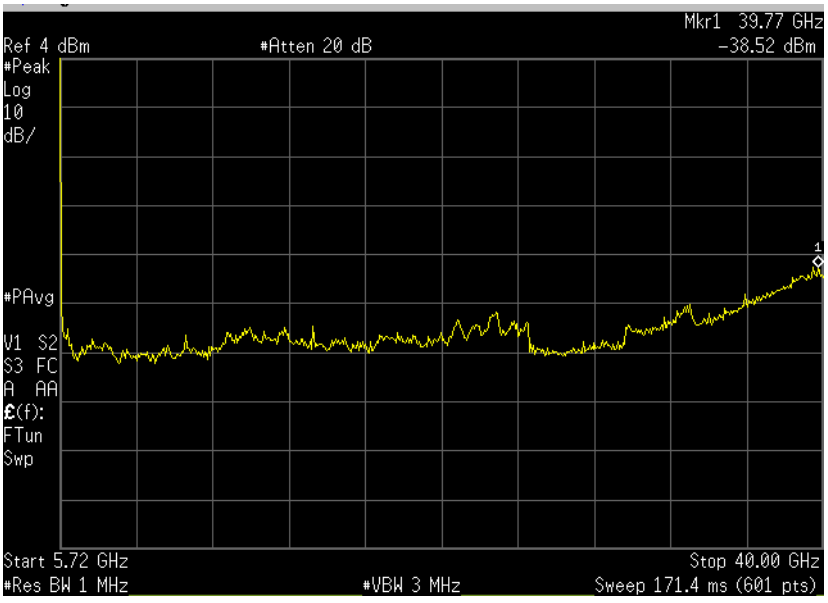
Plot 4.5.28



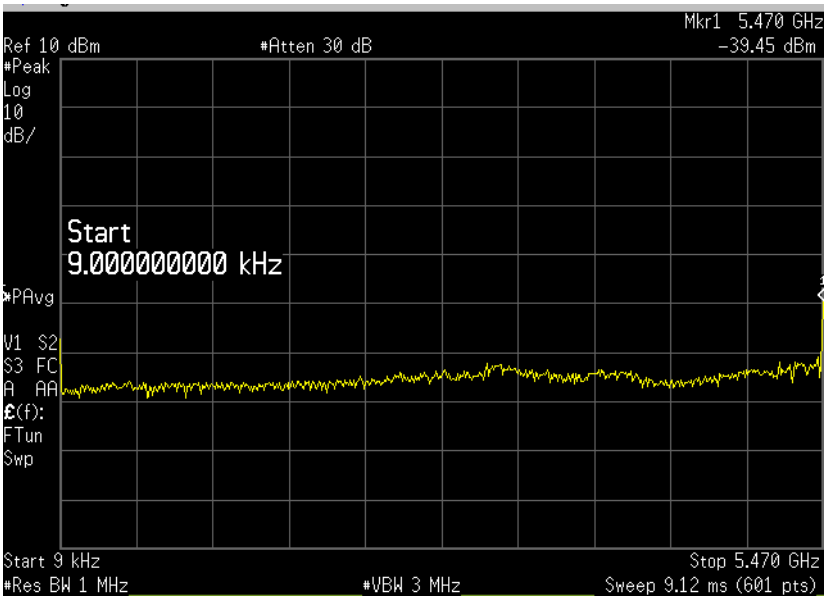
Frequency 5700
Plot 4.5.29



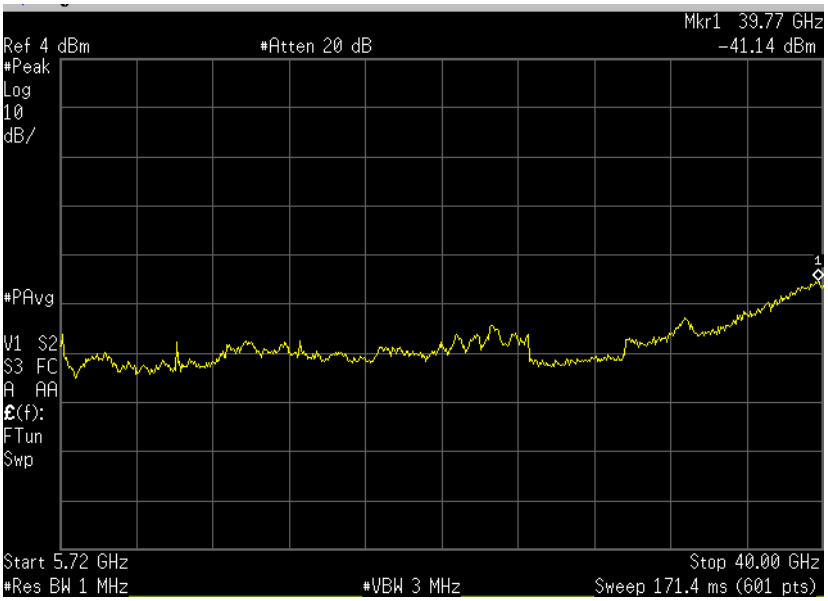
Plot 4.5.30



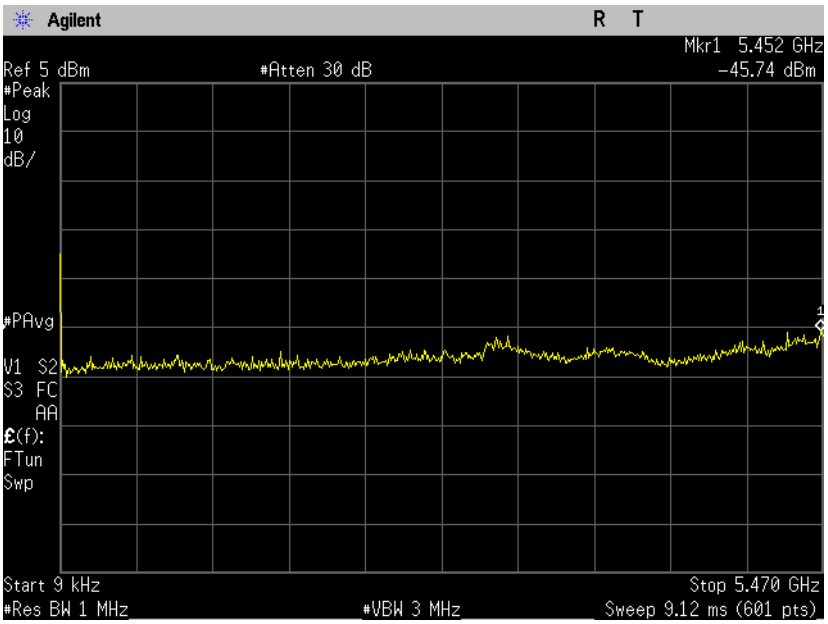
Spurious 802.11n Mode
Frequency 5470-5725 MHz
Frequency 5500
Plot 4.5.31



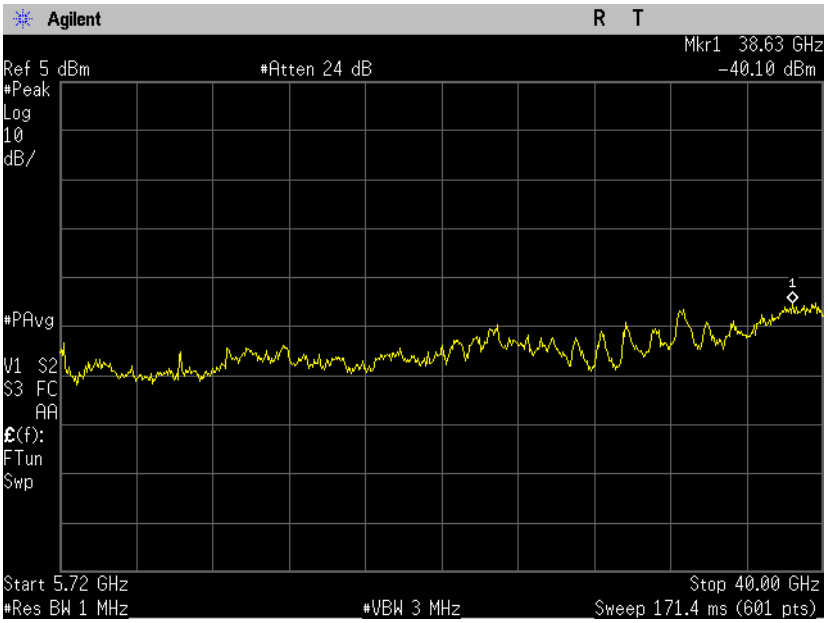
Plot 4.5.32



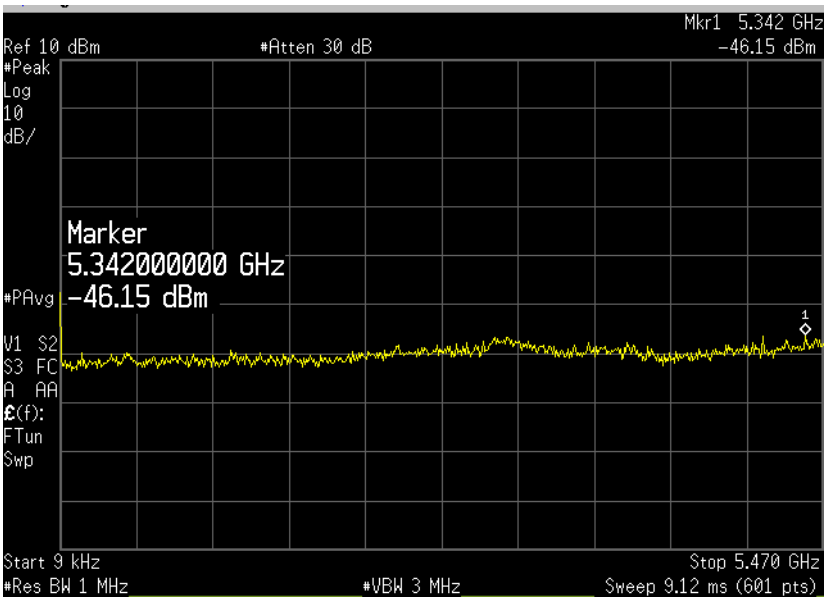
Frequency 5560
Plot 4.5.33



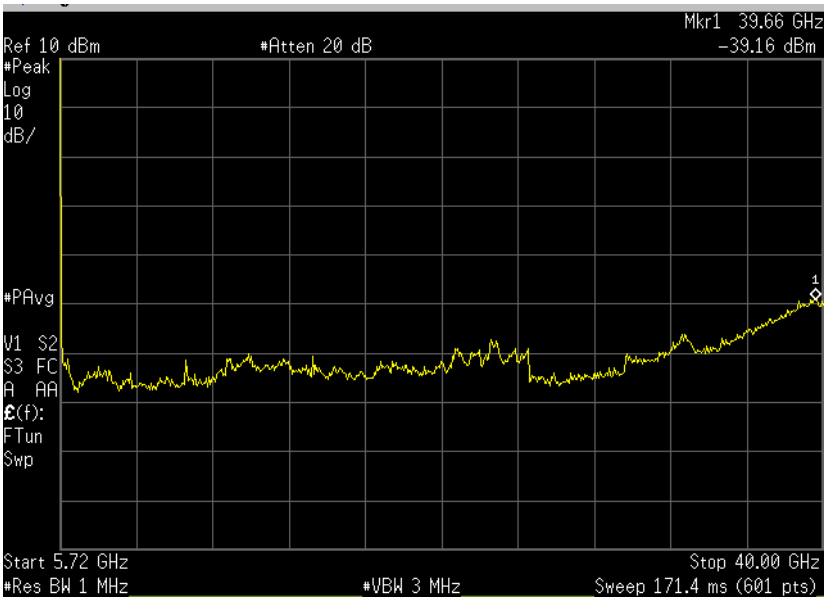
Plot 4.5.34



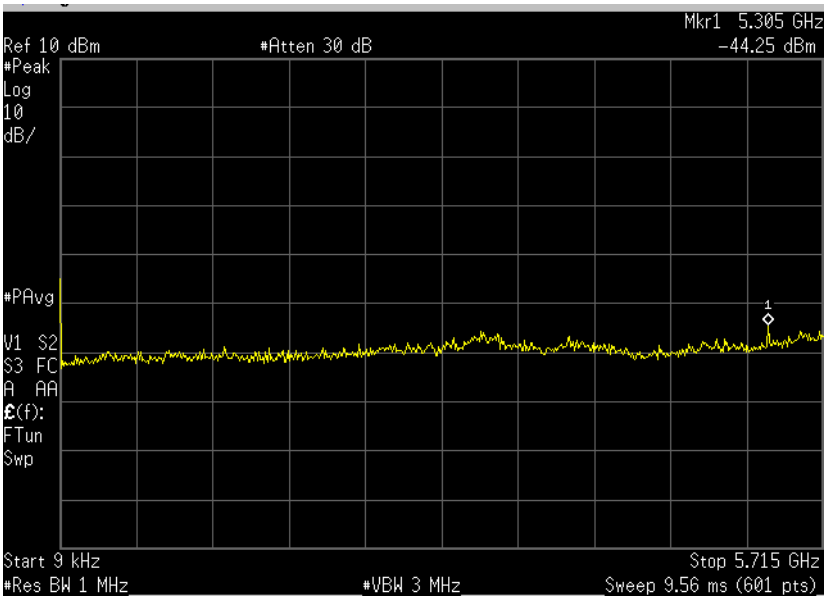
Frequency 5700
Plot 4.5.35



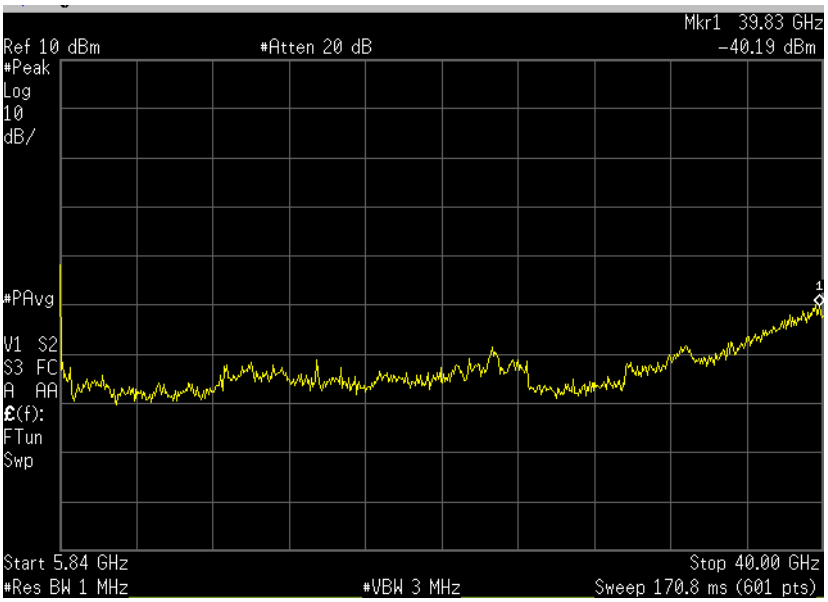
Plot 4.5.36



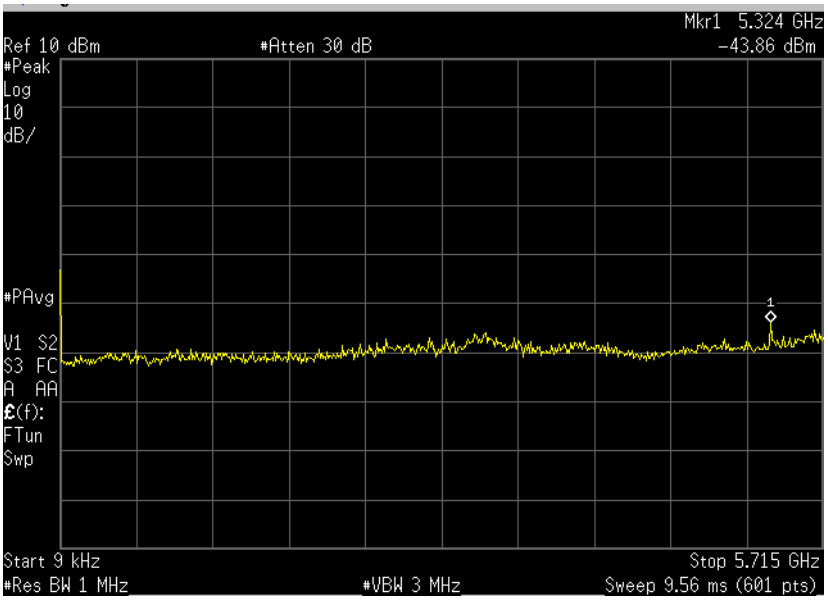
Frequency 5600
Plot 4.5.37



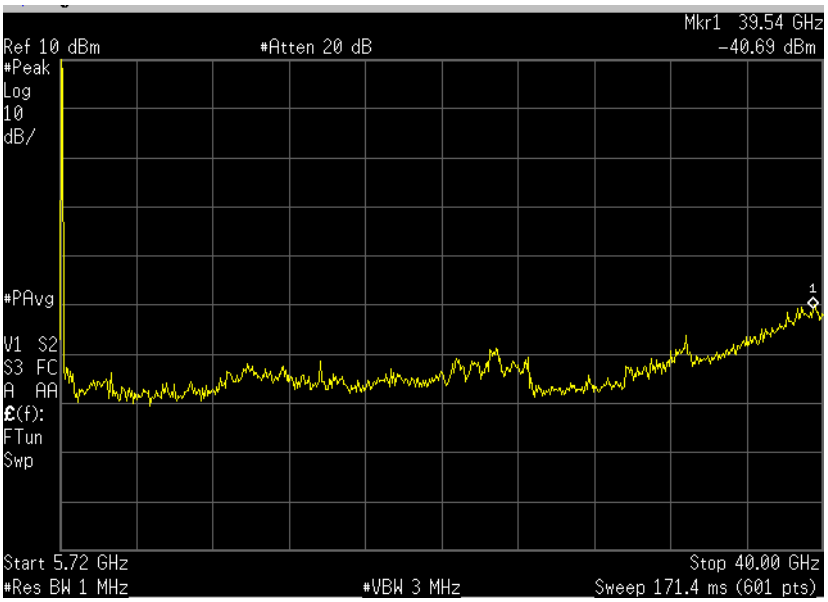
Plot 4.5.38



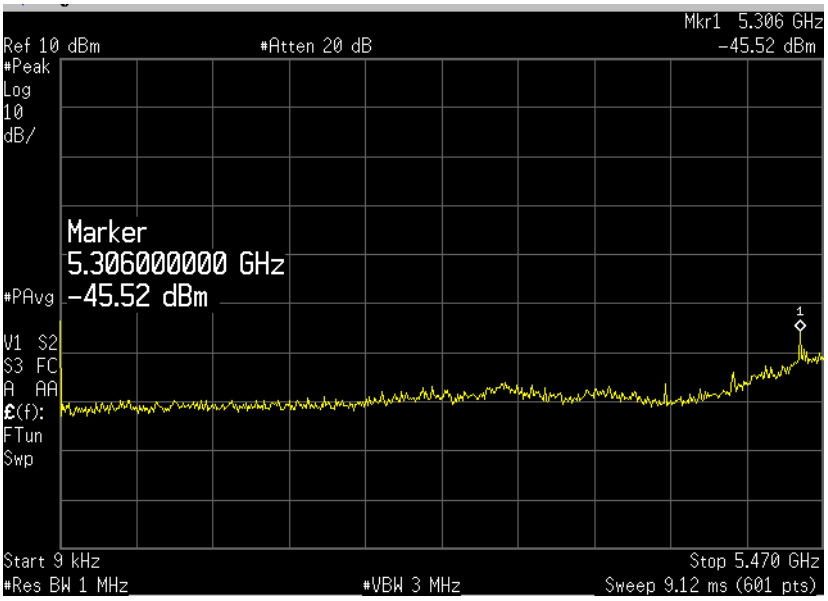
Frequency 5700
Plot 4.5.39



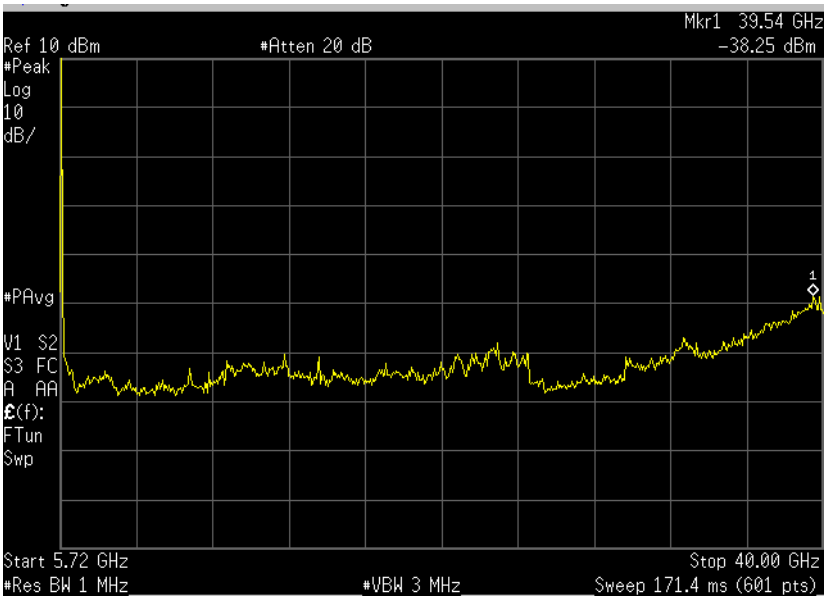
Plot 4.5.40



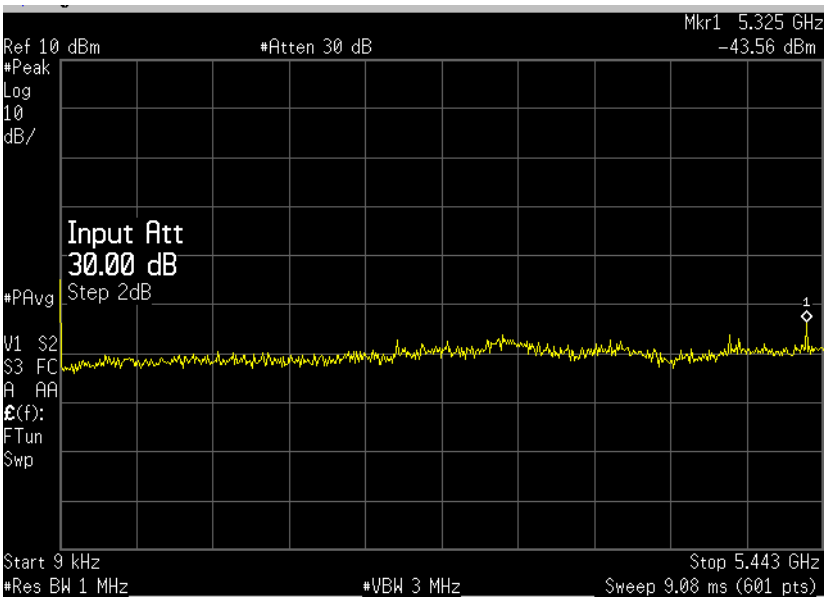
Frequency 5600
Plot 4.5.41



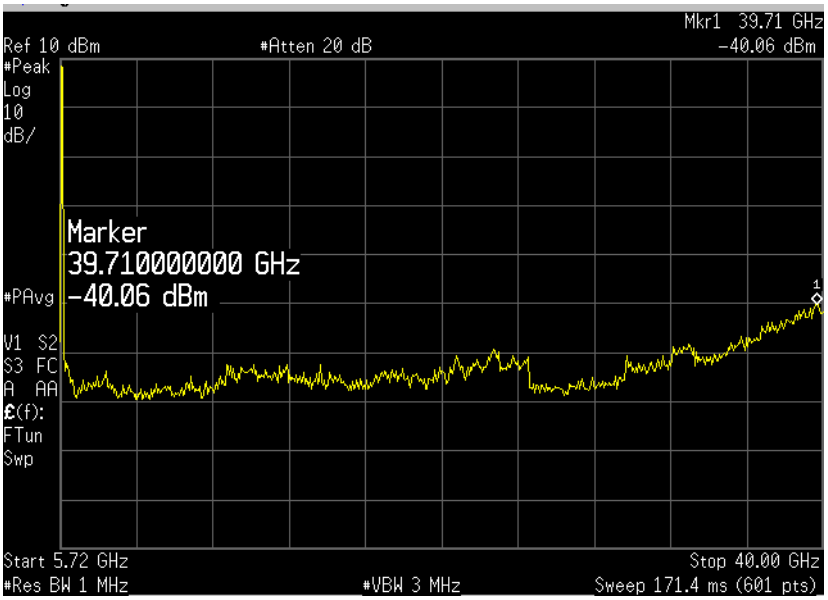
Plot 4.5.42



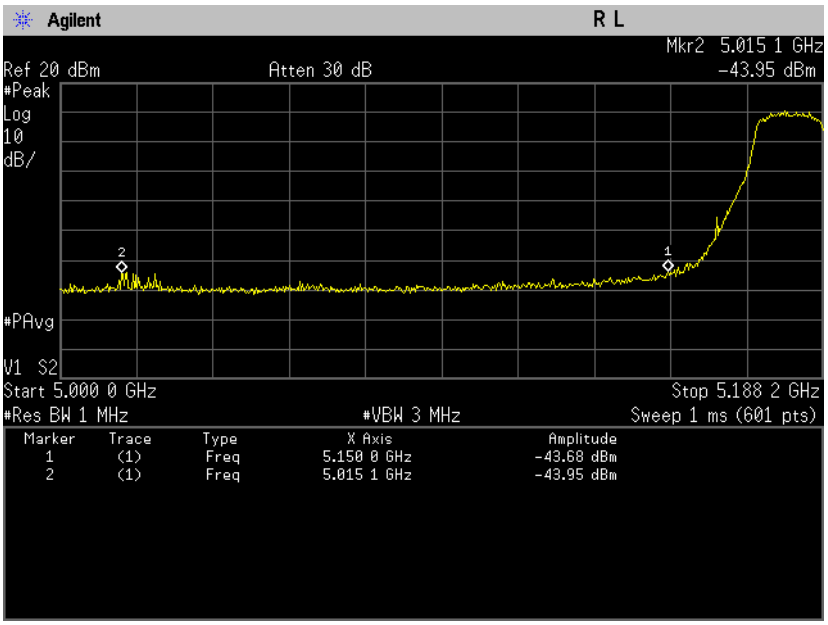
Frequency 5700
Plot 4.5.43



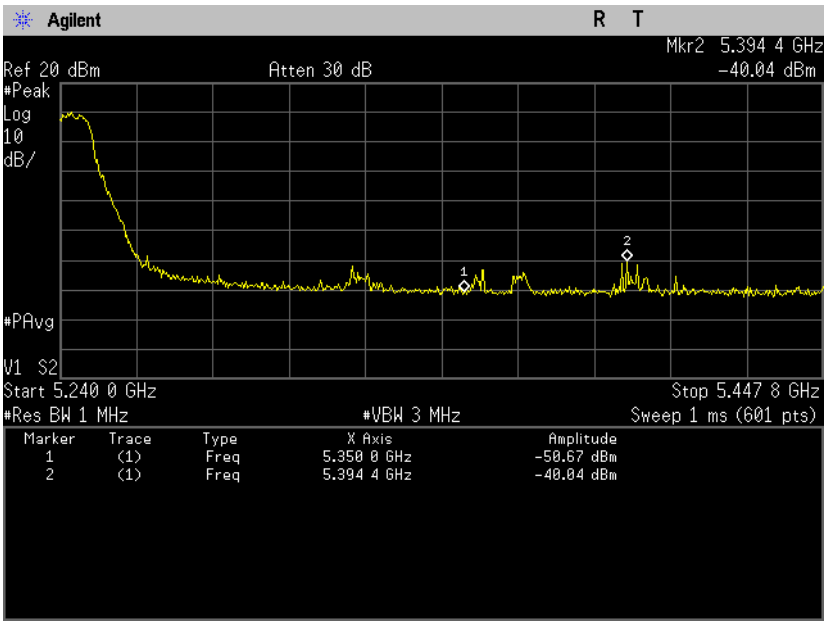
Plot 4.5.44



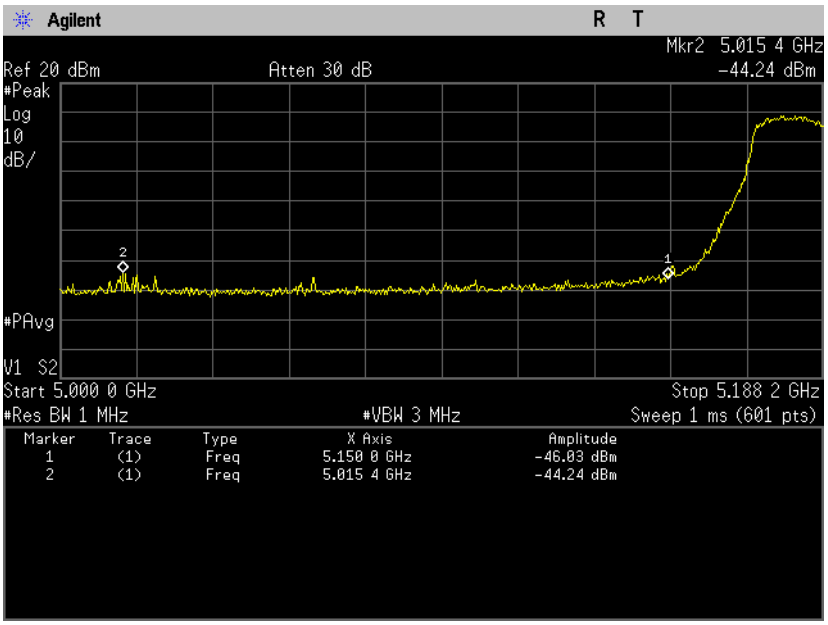
802.11a Mode Band edge
Band Edge 5150-5250 MHz
Frequency 5180
Plot 4.5.45



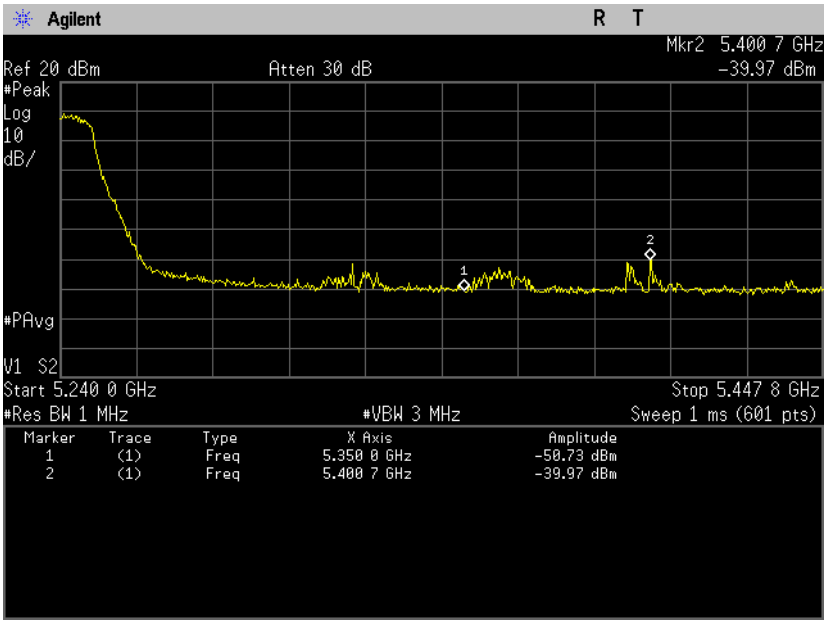
Frequency 5240
Plot 4.5.46



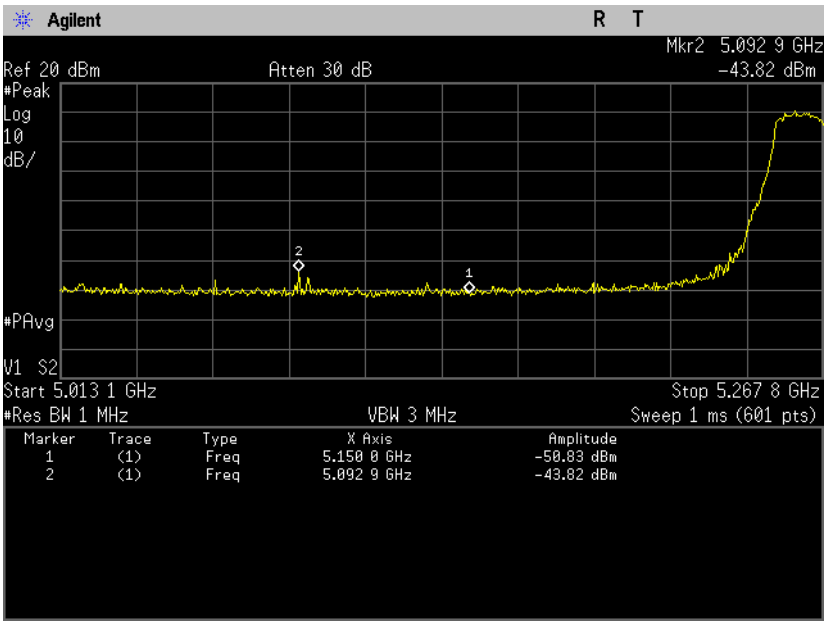
802.11n Mode Band edge
Band Edge 5150-5250 MHz
Frequency 5180
Plot 4.5.47



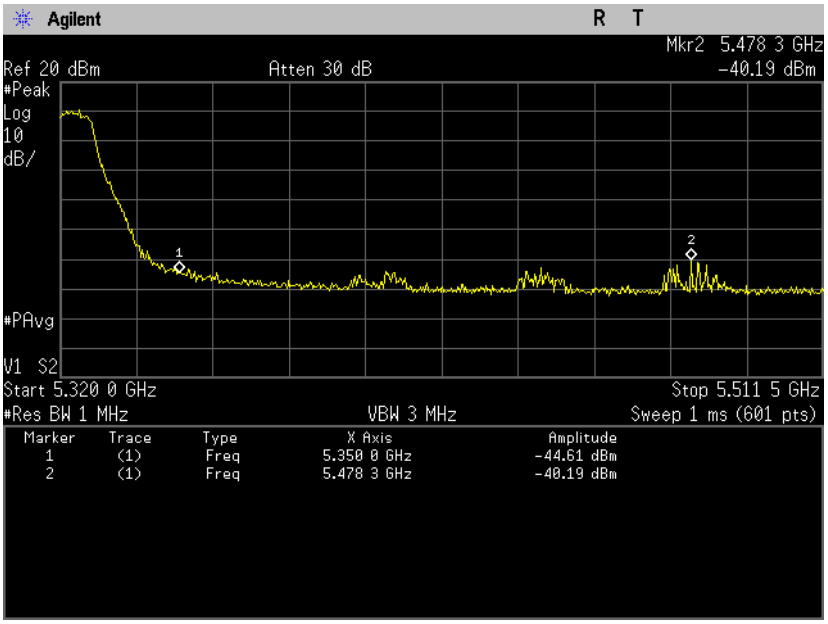
Frequency 5240
Plot 4.5.48



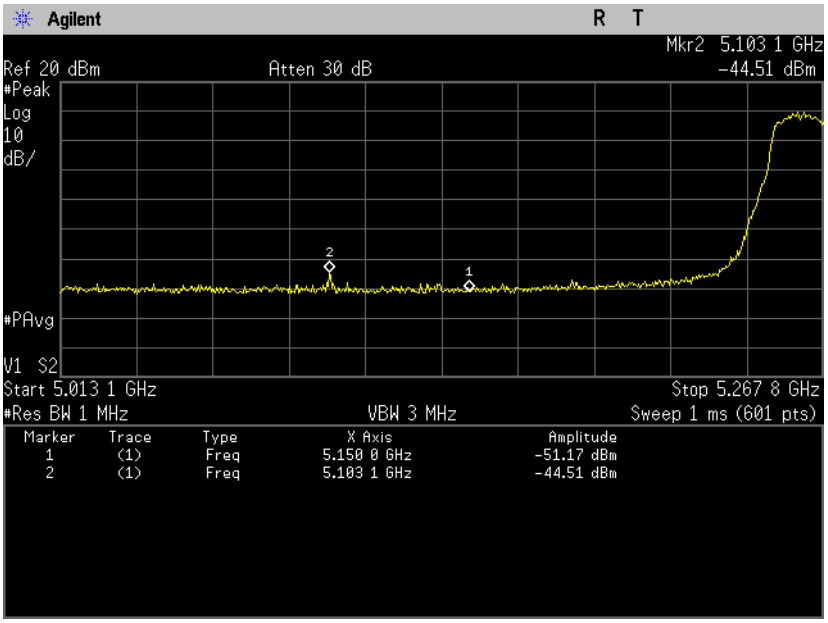
Band edge 802.11a Mode
Frequency 5250-5350 MHz
Frequency 5260
Plot 4.5.49



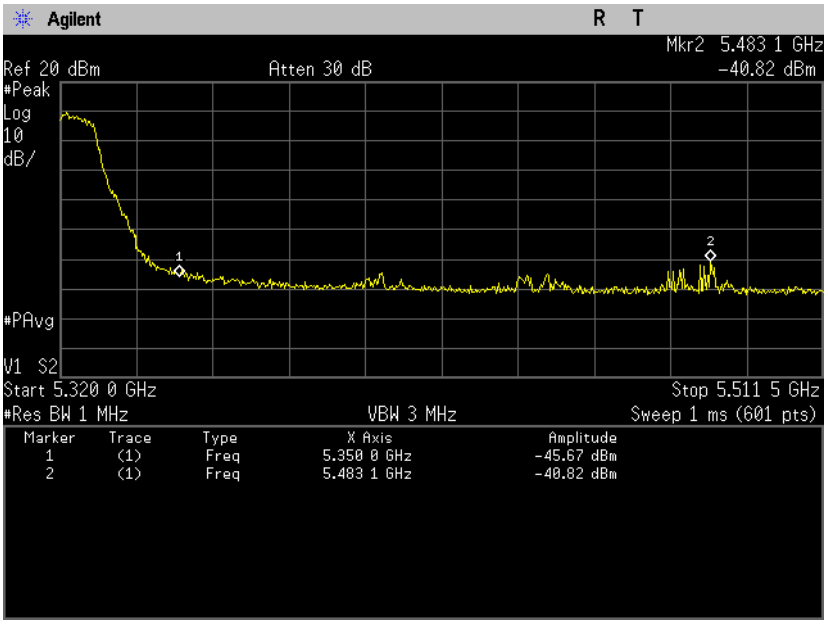
Frequency 5320
Plot 4.5.50



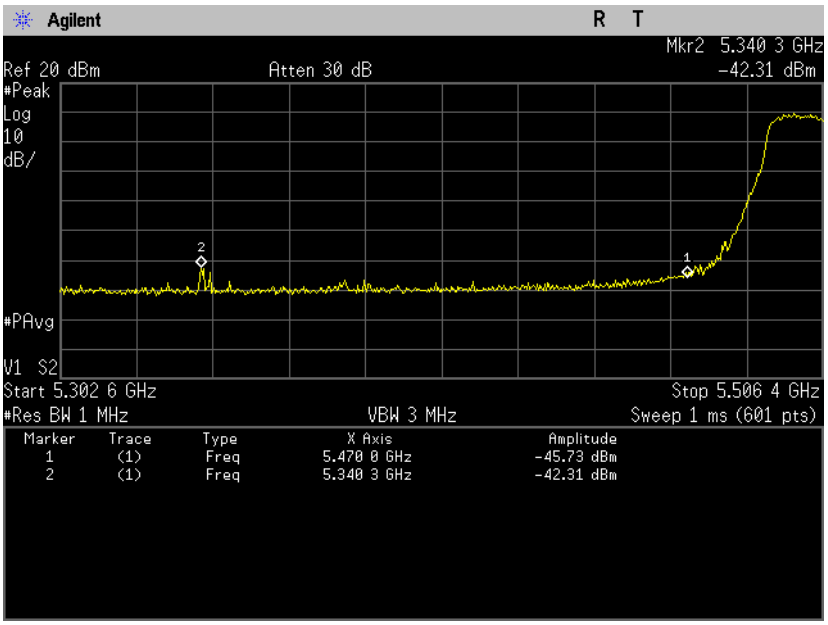
Band edge, 802.11n mode
Frequency 5250-5350 MHz
Frequency 5260
Plot 4.5.51



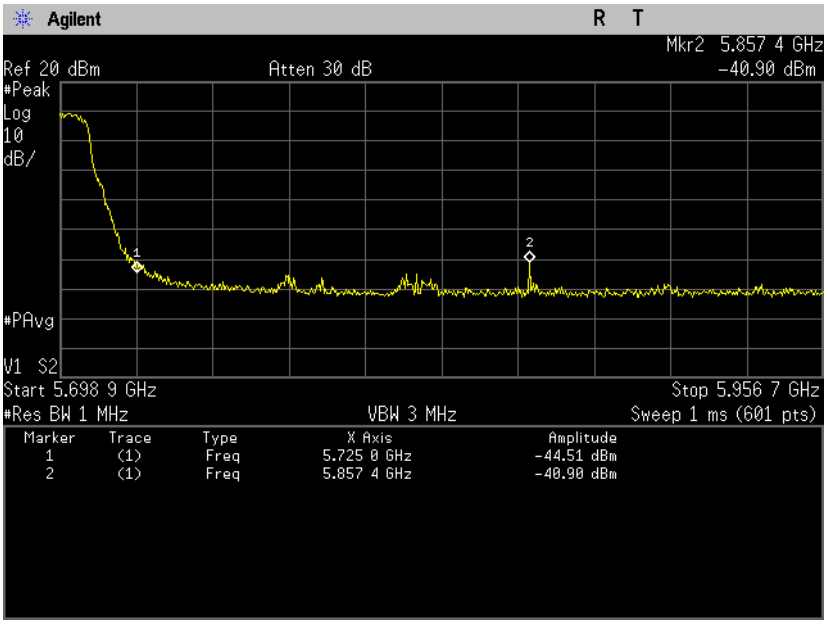
Frequency 5320
Plot 4.5.52



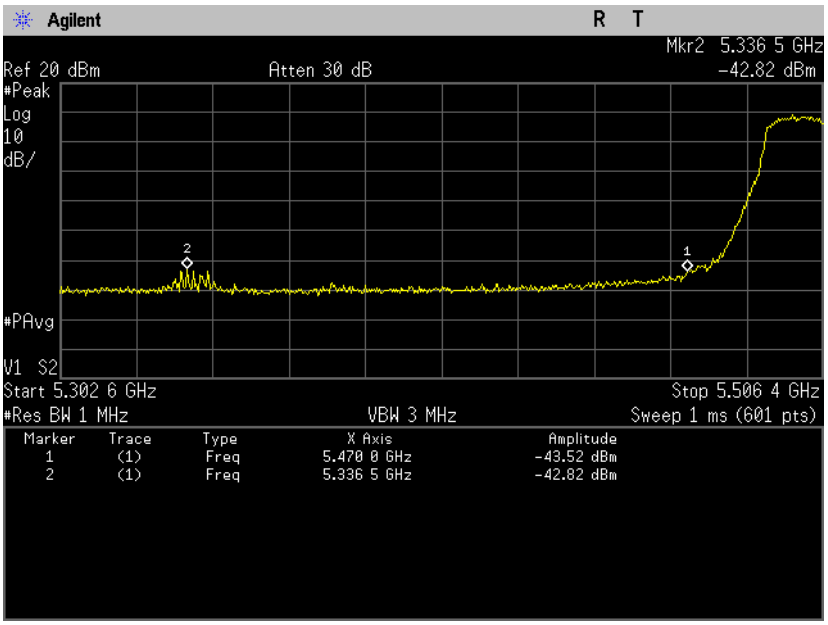
Band edge, 802.11a Mode
Frequency 5470-5725 MHz
Frequency 5500
Plot 4.5.53



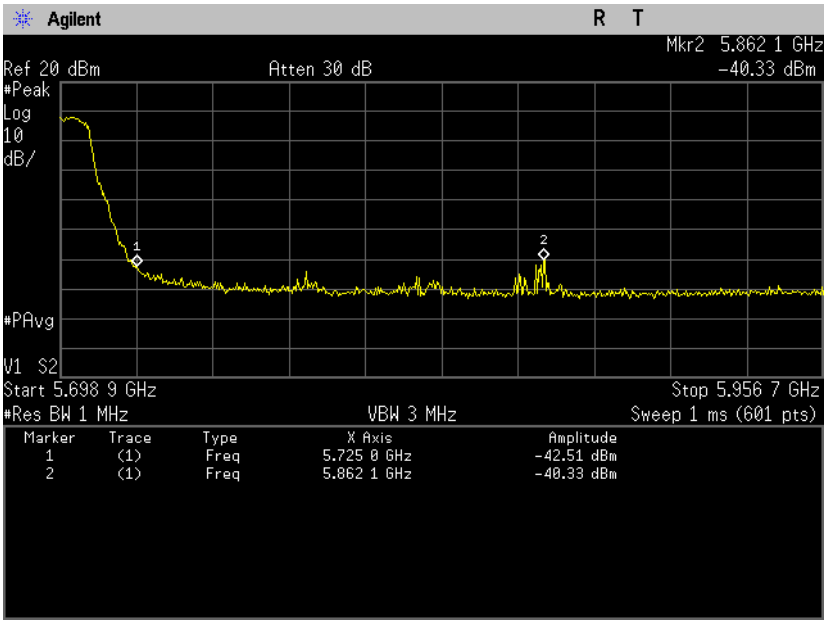
Frequency 5700
Plot 4.5.54



Band edge, 802.11n Mode
Frequency 5470-5725 MHz
Frequency 5500
Plot 4.5.55



Frequency 5700
Plot 4.5.56



4.6. Spurious Radiated Emissions, Restricted Bands

Reference document:	**47 CFR §15.407 (b) (7)**		
Test Requirements:	The provisions of Sec. 15.205 apply to intentional radiators operating under this section.		
Test setup:	See sec 2.2, with High Pass Filter	**Pass**	
Method of testing:	KDB 789033 v01r01,sec G3)4)5)6)d. radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	f >1GHz: Peak: RBW= 1MHz, VBW= 3MHz, Average: VBW= 10 Hz f<1GHz: RBW: 120kHz,VBW: 300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.6.1- Plot 4.6.88	

Test results:

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

Test results:

5150-5250 MHz: Spurious

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5180	54	2	No emissions were found		-27	>20	Comply
5220	54						Comply
5240	54						Comply
802.11n Mode							
5180	65	2	No emissions were found		-27	>20	Comply
5220	65						Comply
5240	65						Comply

5250-5350 MHz: Spurious

Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5260	54	2.4	No emissions were found		-27	>20	Comply
5300	54						Comply
5320	54						Comply
802.11n Mode							
5260	65	2.4	No emissions were found		-27	>20	Comply
5300	65						Comply
5320	65						Comply

5470-5725 MHz: Spurious

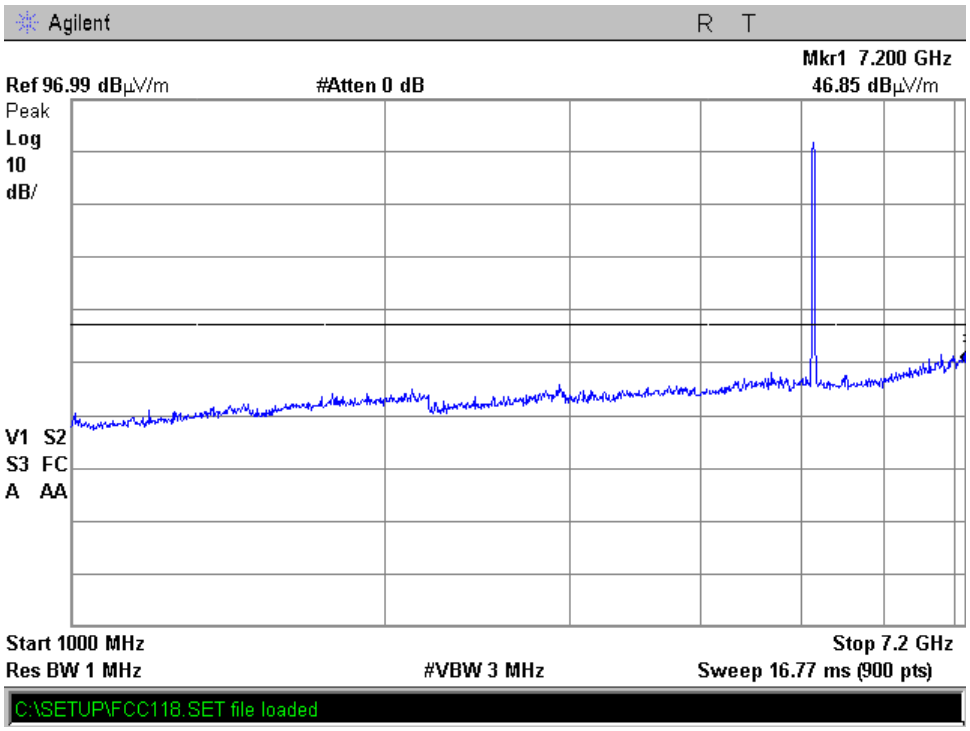
Frequency [MHz]	Data Rate [Mbps]	Antenna Gain [dBi]	Measured Value [dBm/MHz]	Calculated EIRP [dBm/MHz]	EIRP Value Limit [dBm/MHz]	Margin [dB]	Result
802.11a Mode							
5500	54	2	No emissions were found		-27	>20	Comply
5560	54	1.9					Comply
5700	54	1.9					Comply
802.11n Mode							
5500	65	2	No emissions were found		-27	>20	Comply
5560	65	1.9					Comply
5700	65	1.9					Comply

Test results below 1GHz:

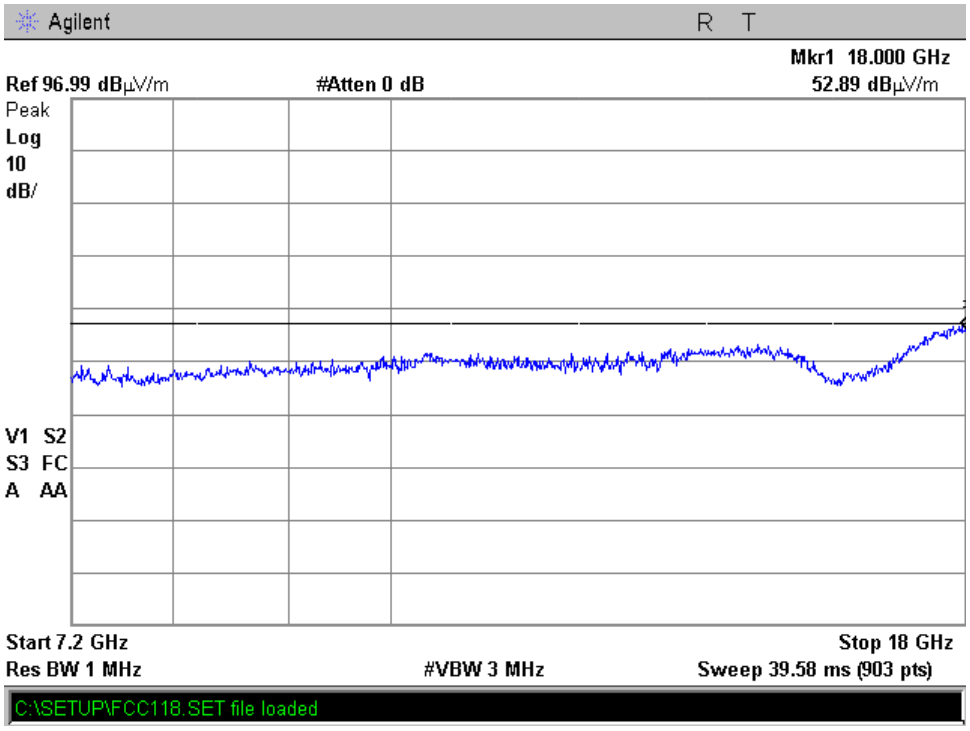
All measurements were done in horizontal and vertical polarizations; the results show the worst case for all frequencies.

Emission Frequency [MHz]	Detector Type	Polarization H/V	Emission Level [dBµV/m]	Limit [dBµV/m]	Result
No emissions were found					Comply

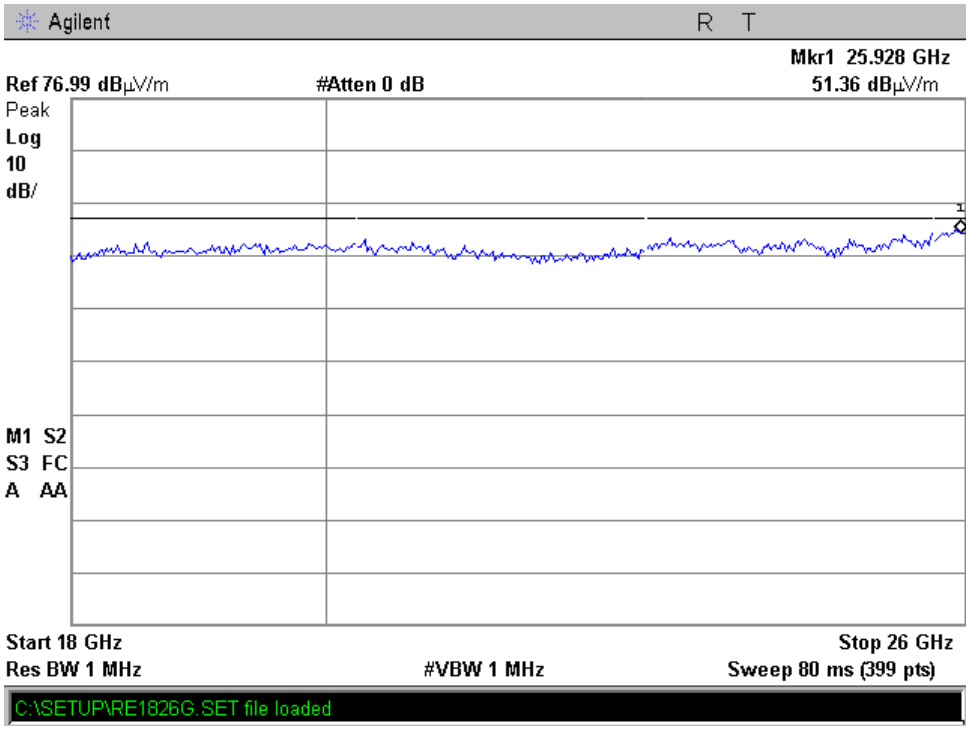
802.11a Mode
Frequency 5180 MHz
Horizontal & Vertical Polarization
Plot 4.6.1



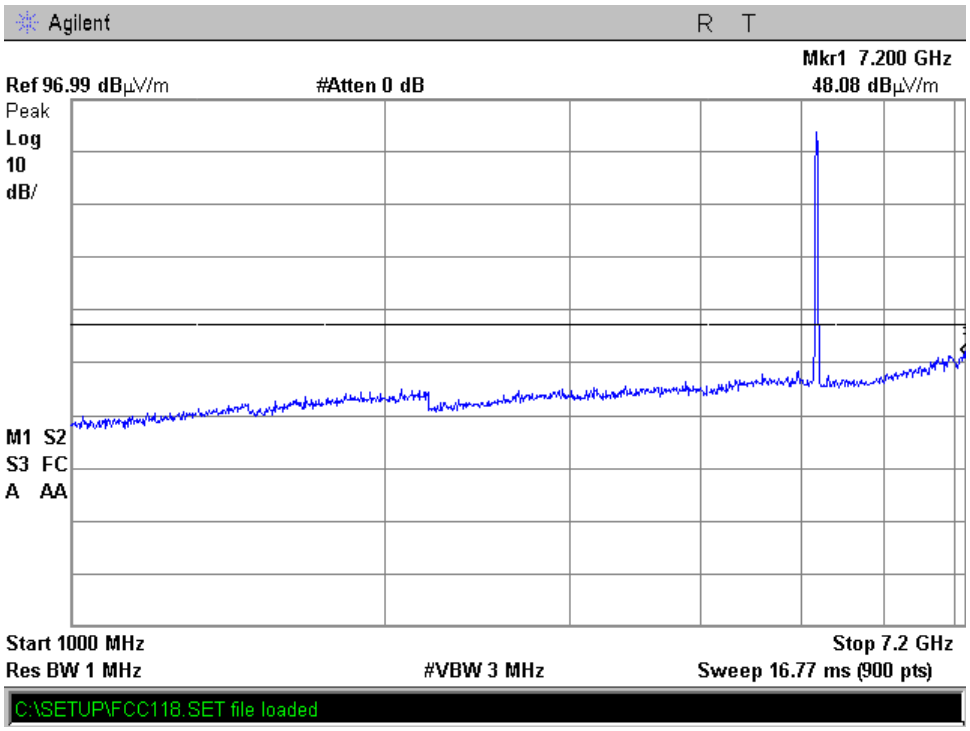
Plot 4.6.2



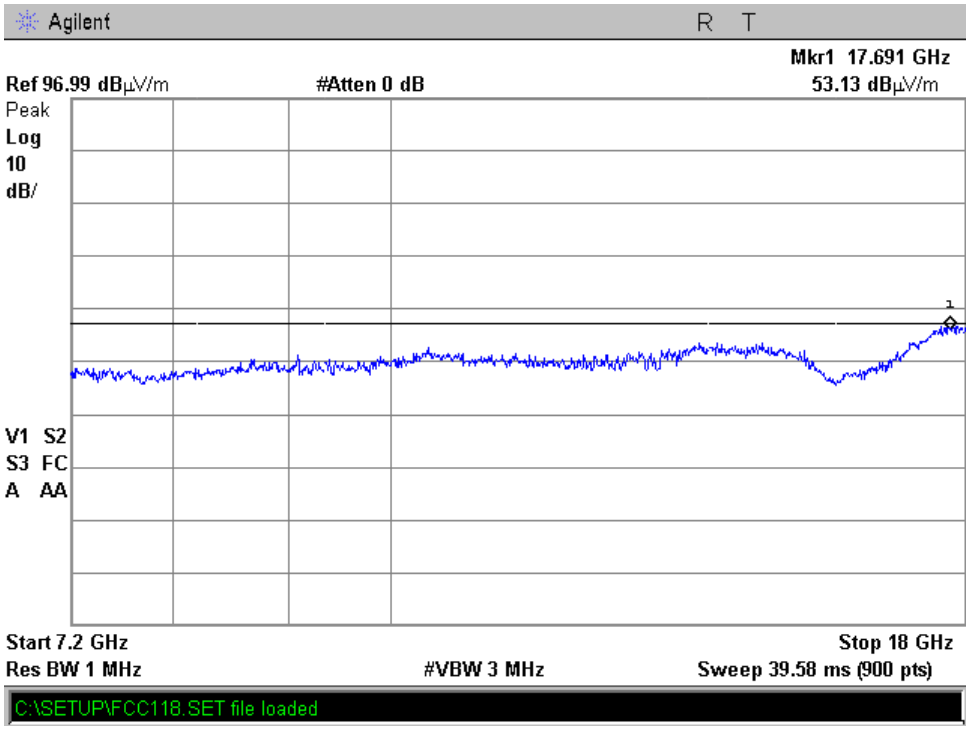
Plot 4.6.3


Agilent
R T
Mkr1 25.928 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.36 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

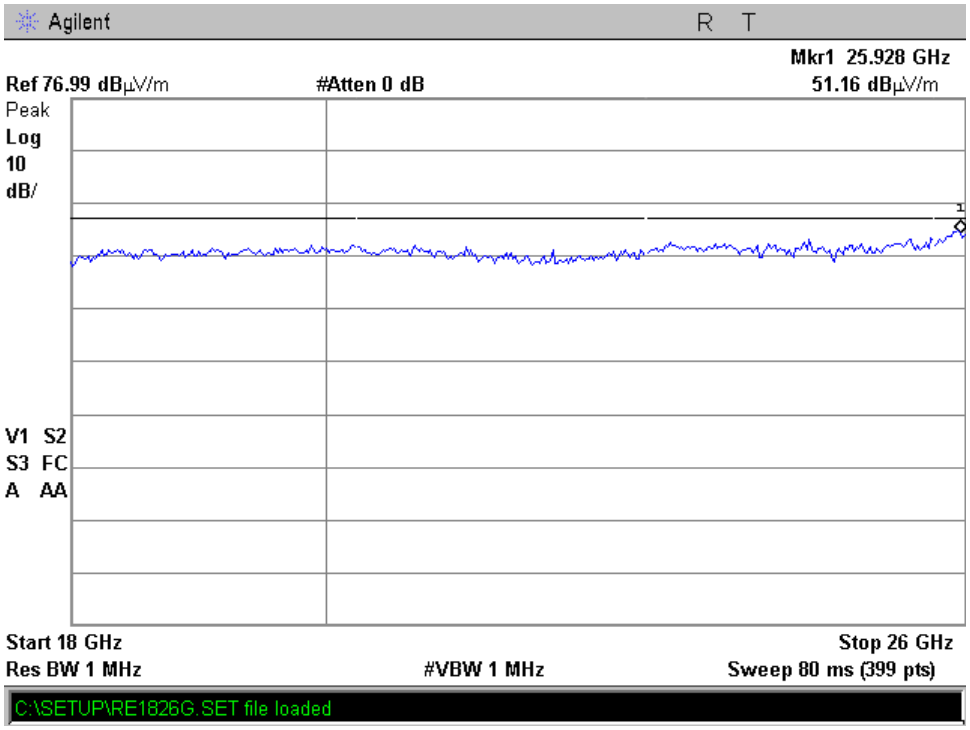
Frequency 5220 MHz
Horizontal & Vertical Polarization
Plot 4.6.4



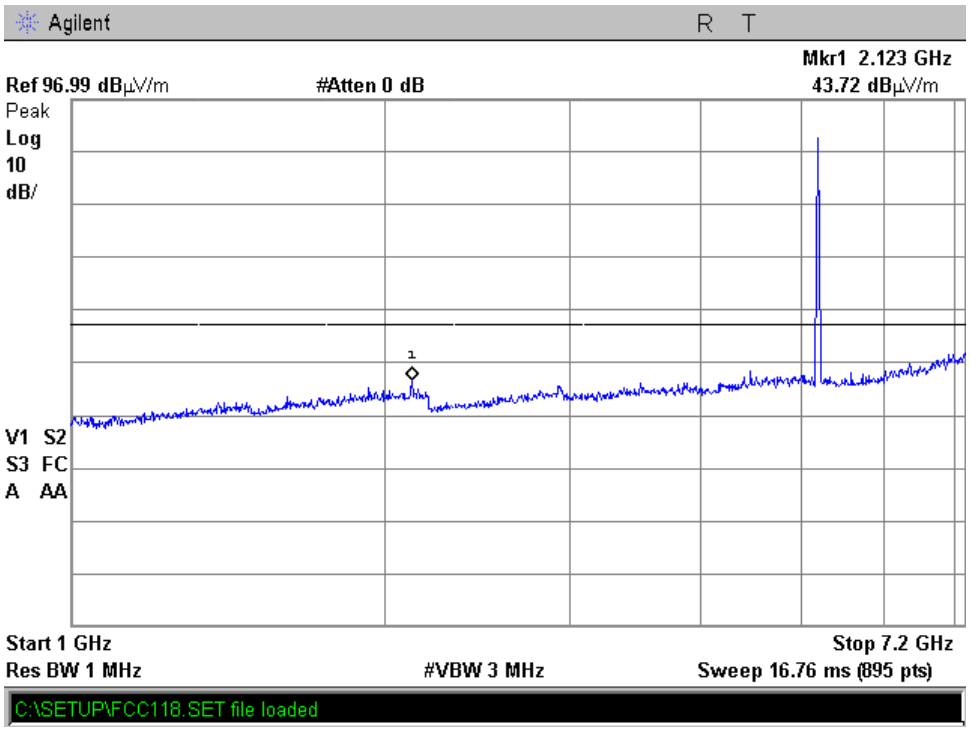
Plot 4.6.5



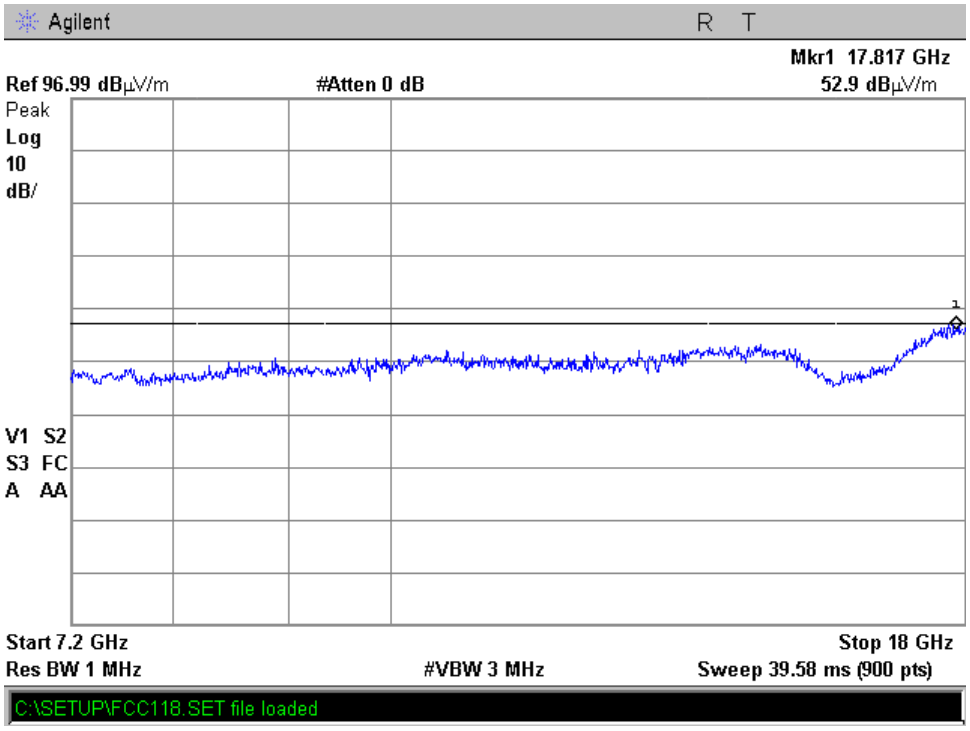
Plot 4.6.6


Agilent
R T
Mkr1 25.928 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.16 dBµV/m
Peak
Log
10
dB/
V1 S2
S3 FC
A AA
Start 18 GHz
Res BW 1 MHz
#VBW 1 MHz
Stop 26 GHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

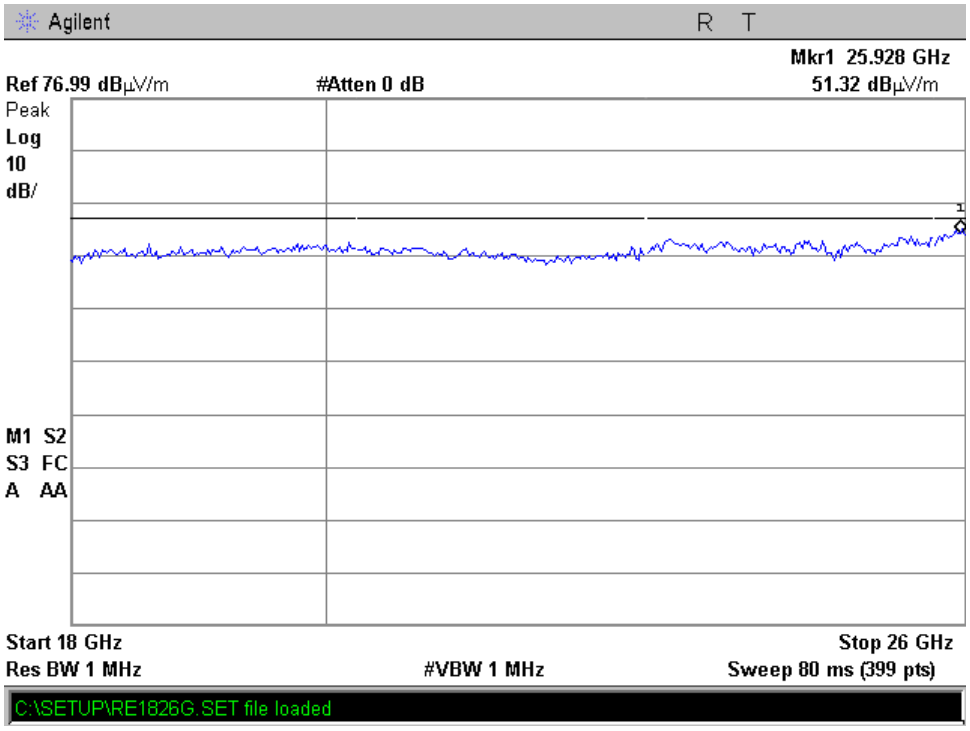
Frequency 5240 MHz
Horizontal & Vertical Polarization
Plot 4.6.7



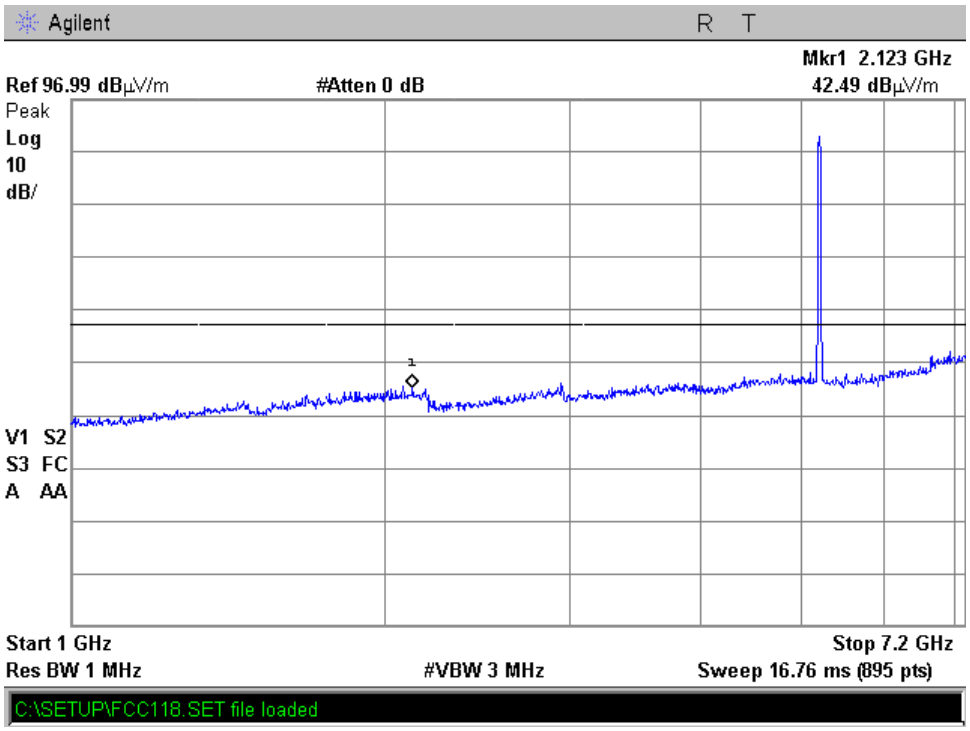
Plot 4.6.8



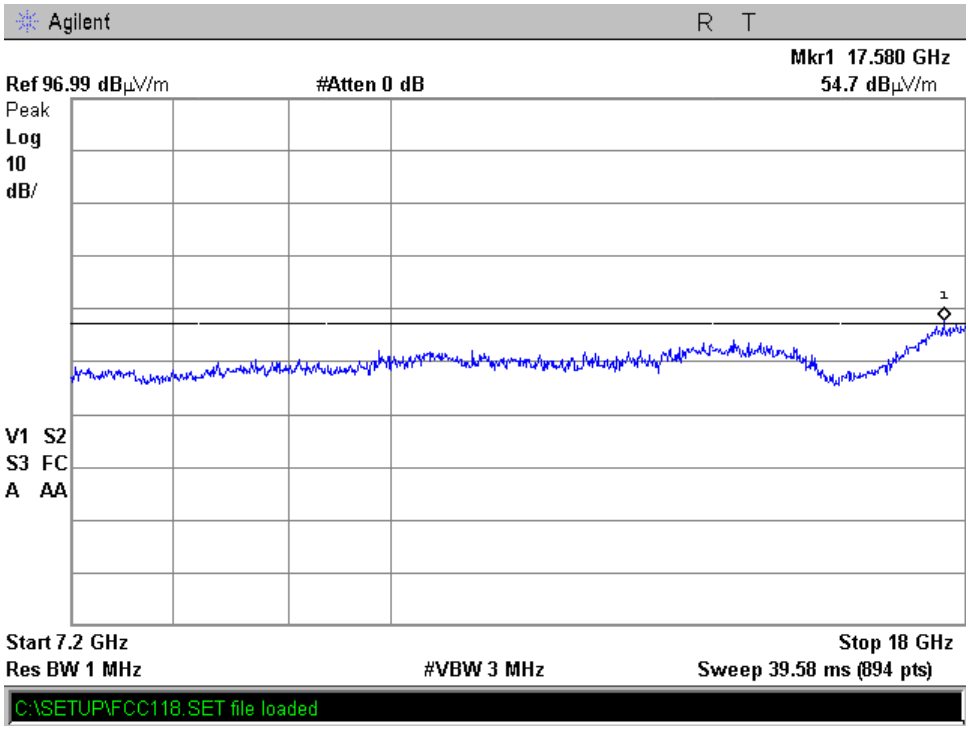
Plot 4.6.9


Agilent
R T
Mkr1 25.928 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.32 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

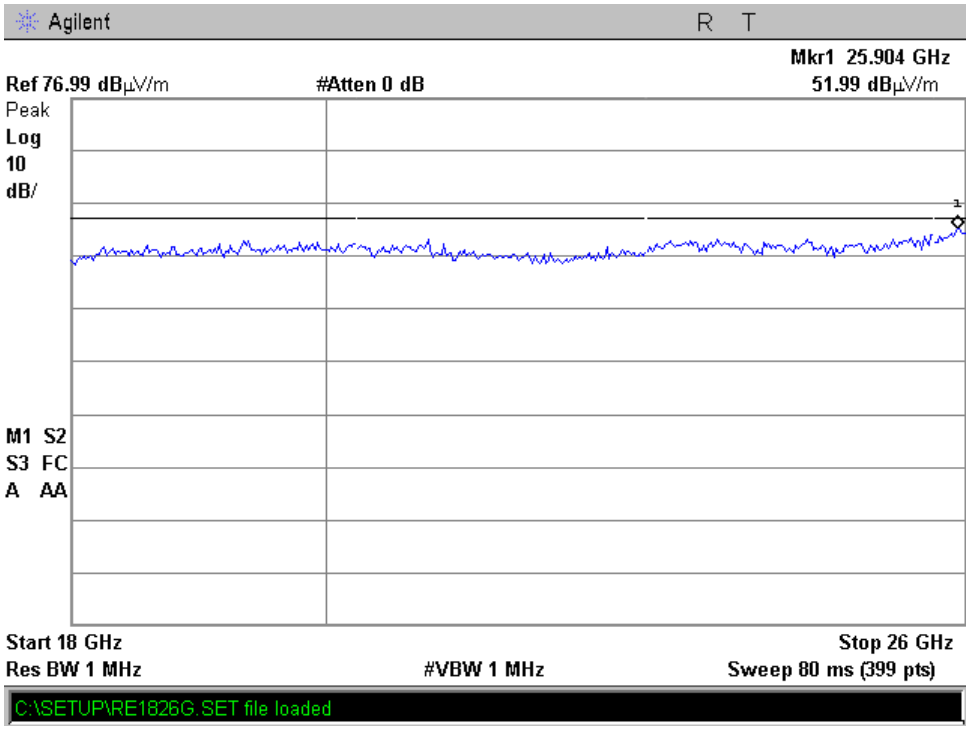
Frequency 5260 MHz
Horizontal & Vertical Polarization
Plot 4.6.10



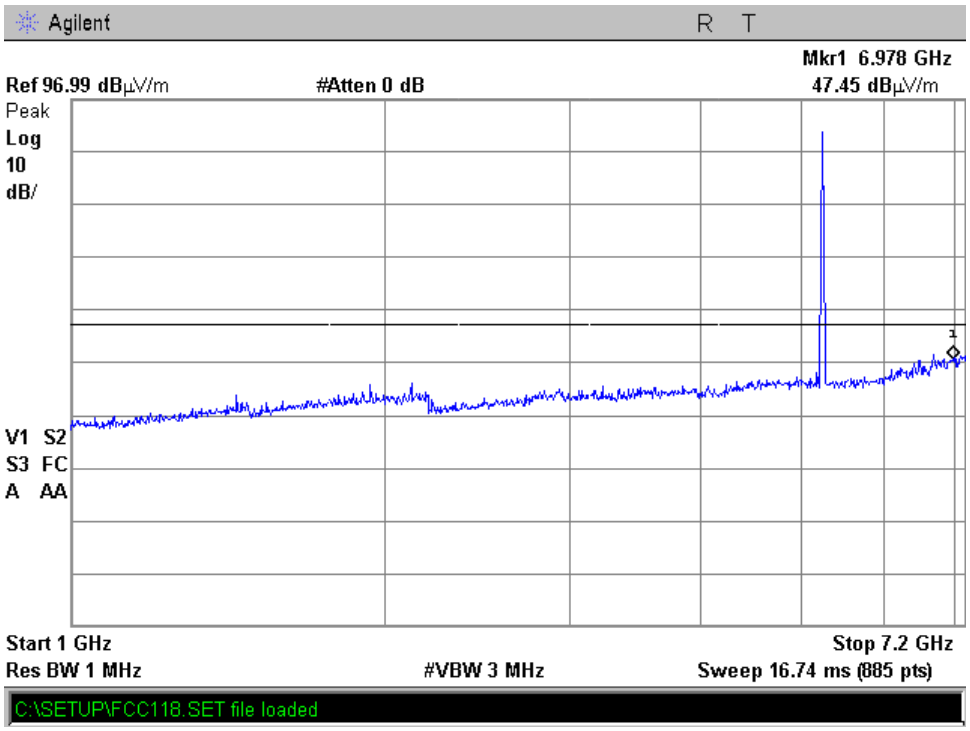
Plot 4.6.11



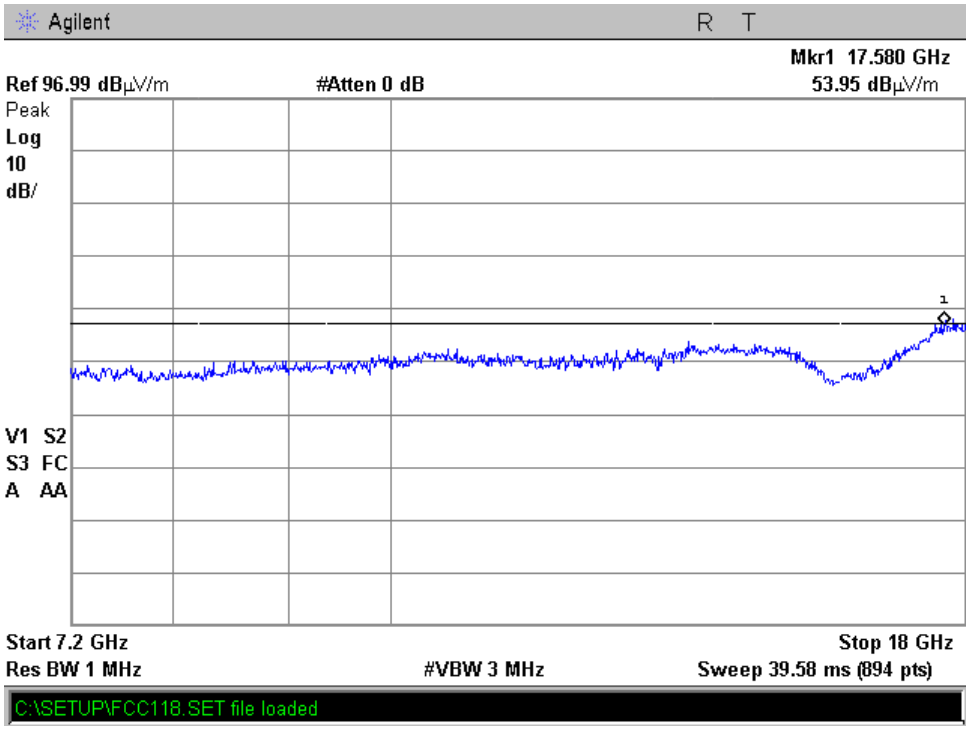
Plot 4.6.12


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.99 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

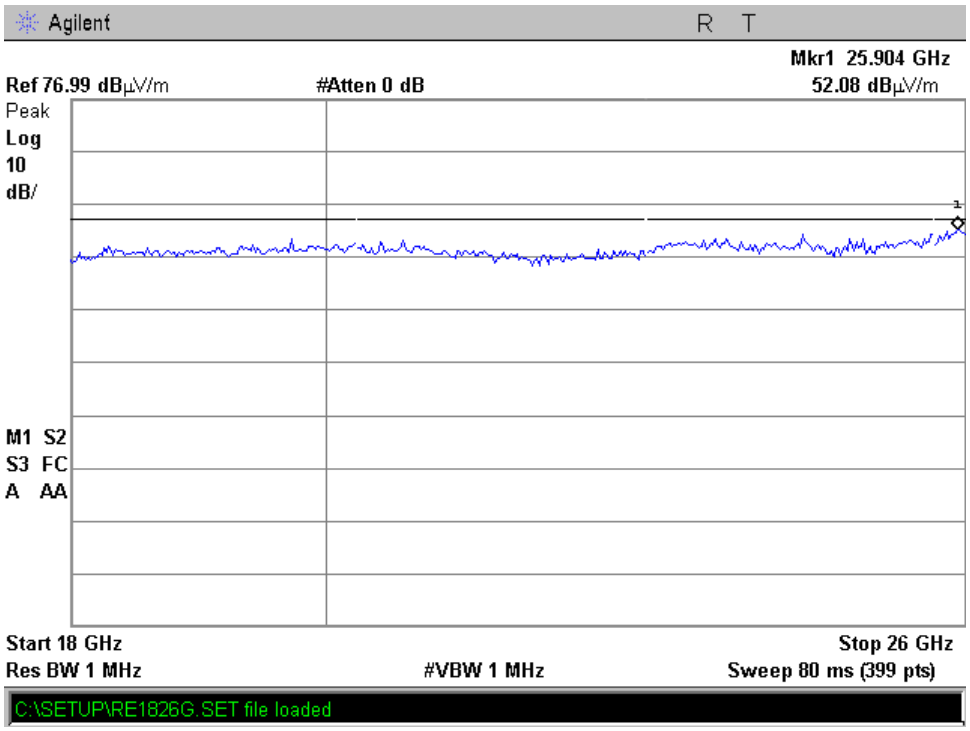
Frequency 5300 MHz
Horizontal & Vertical Polarization
Plot 4.6.13



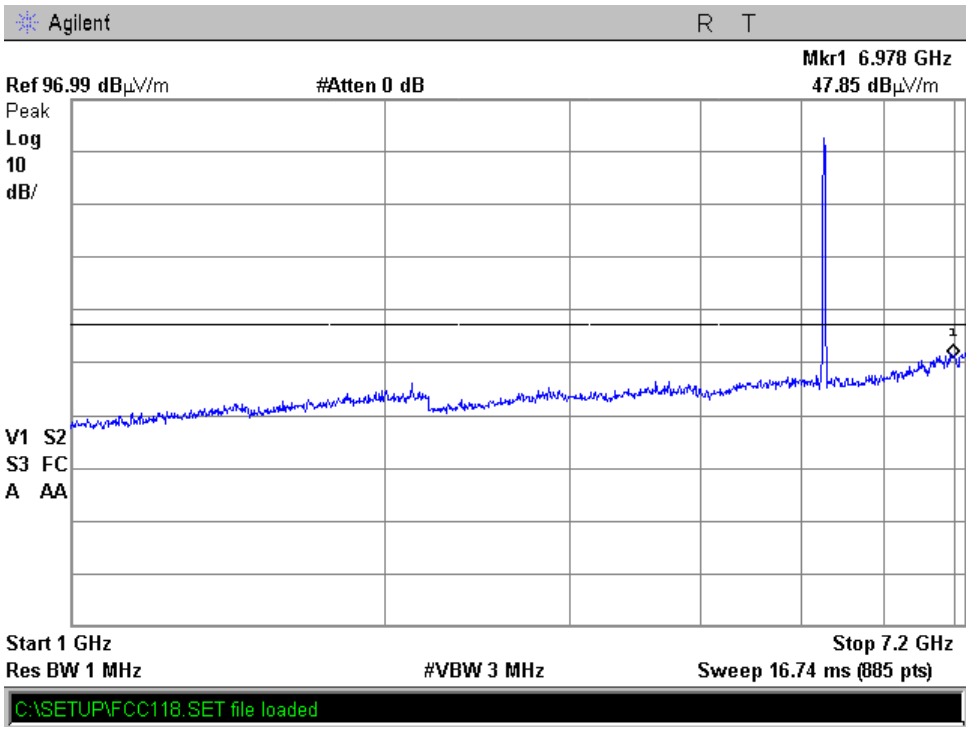
Plot 4.6.14



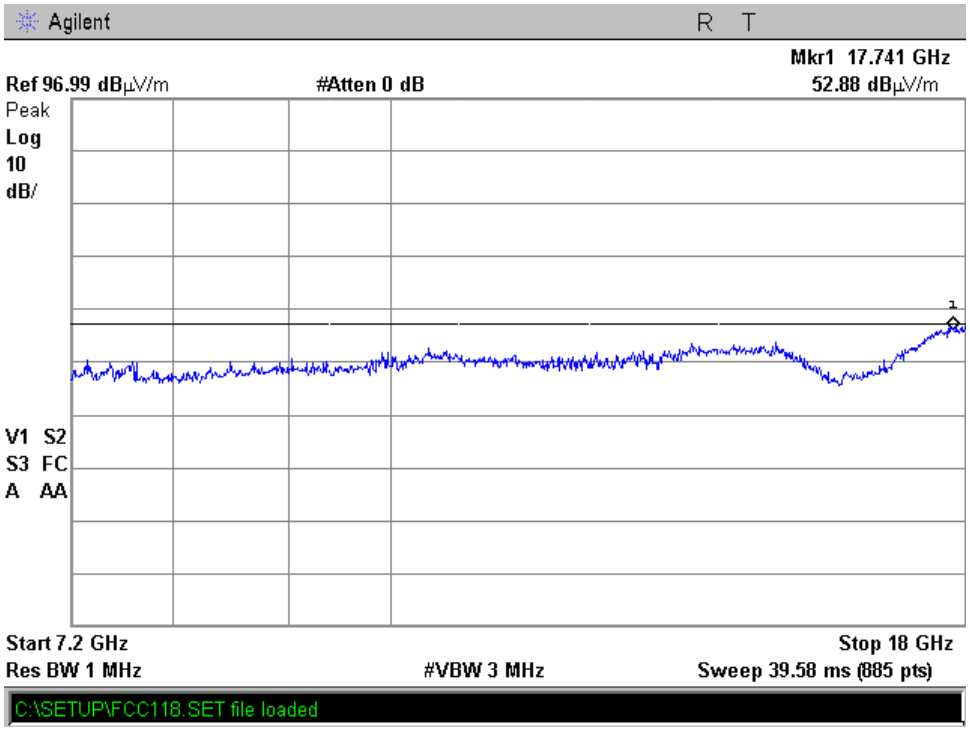
Plot 4.6.15


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.08 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

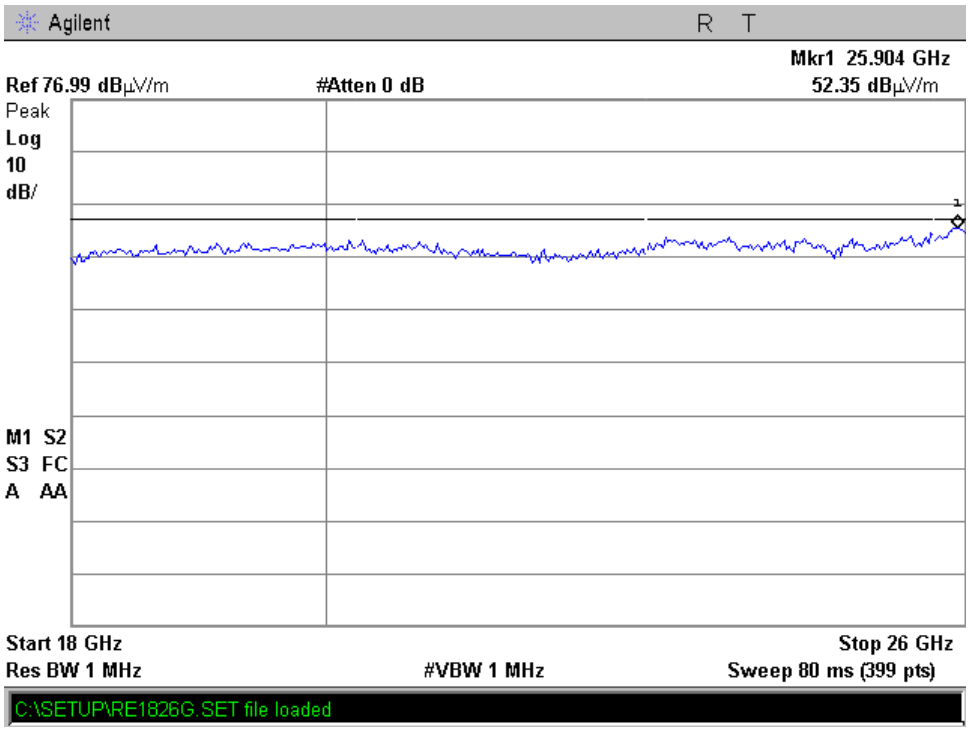
Frequency 5320 MHz
Horizontal & Vertical Polarization
Plot 4.6.16



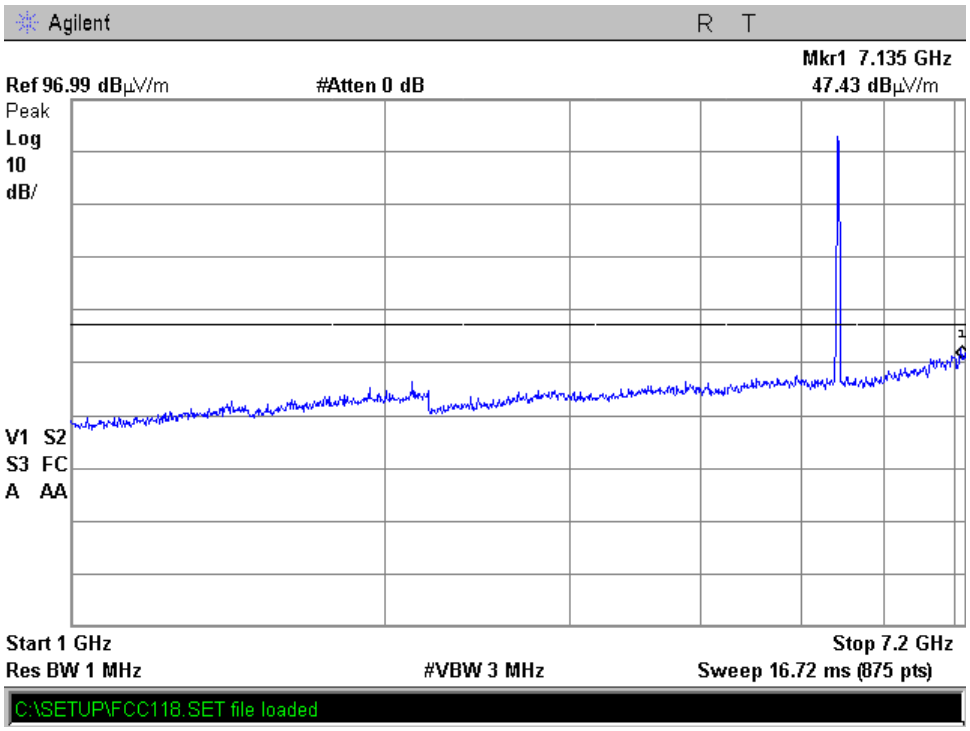
Plot 4.6.17



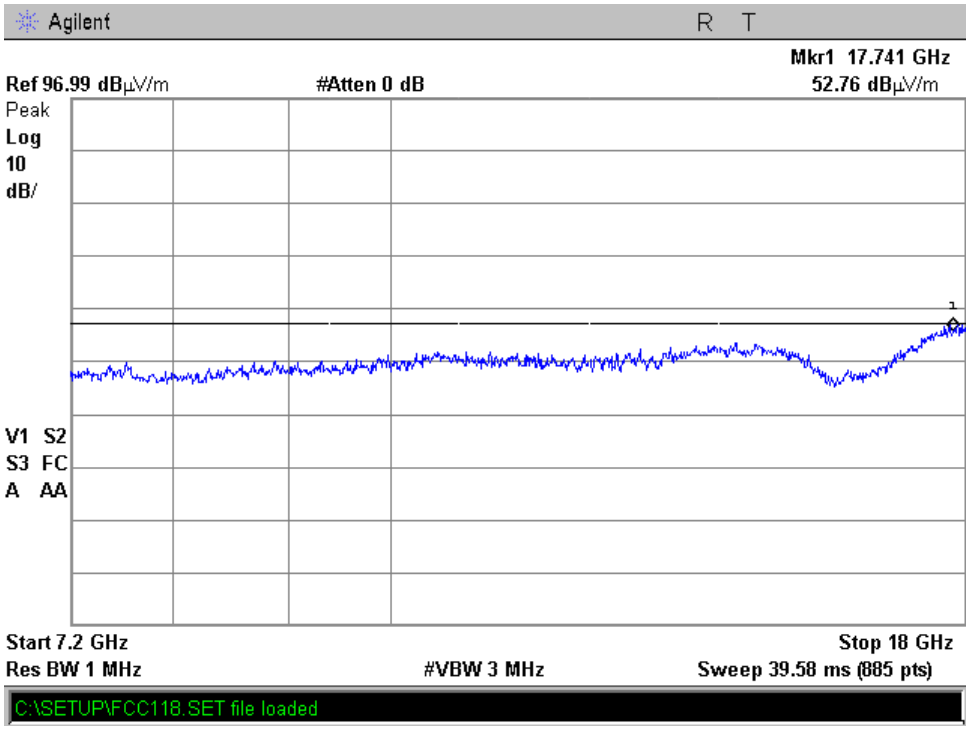
Plot 4.6.18


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.35 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

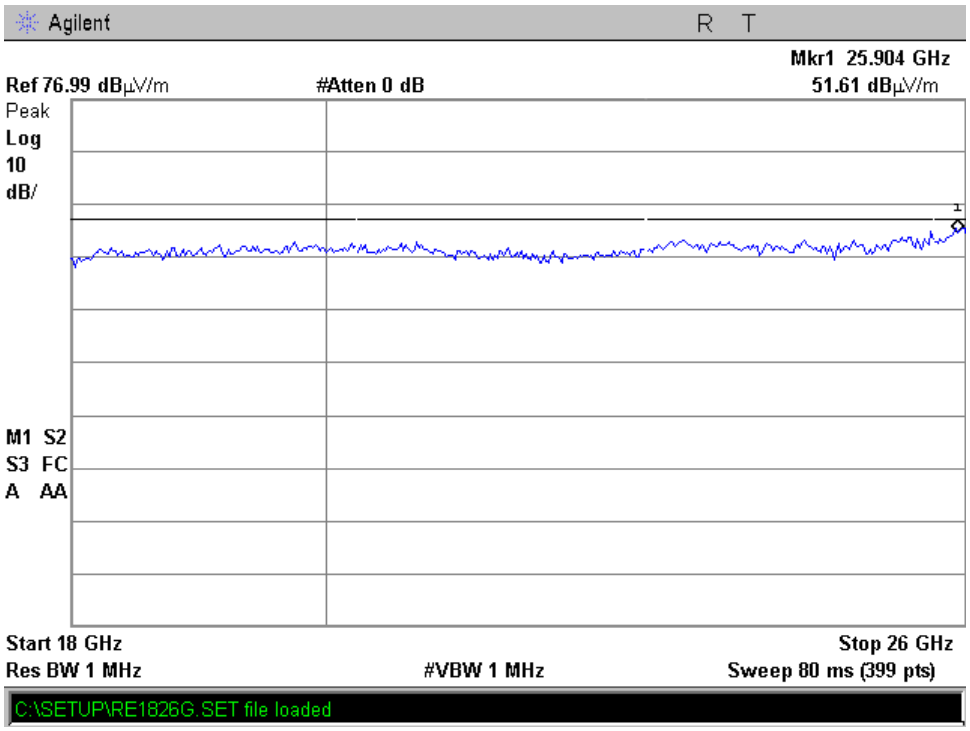
Frequency 5500 MHz
Horizontal & Vertical Polarization
Plot 4.6.19



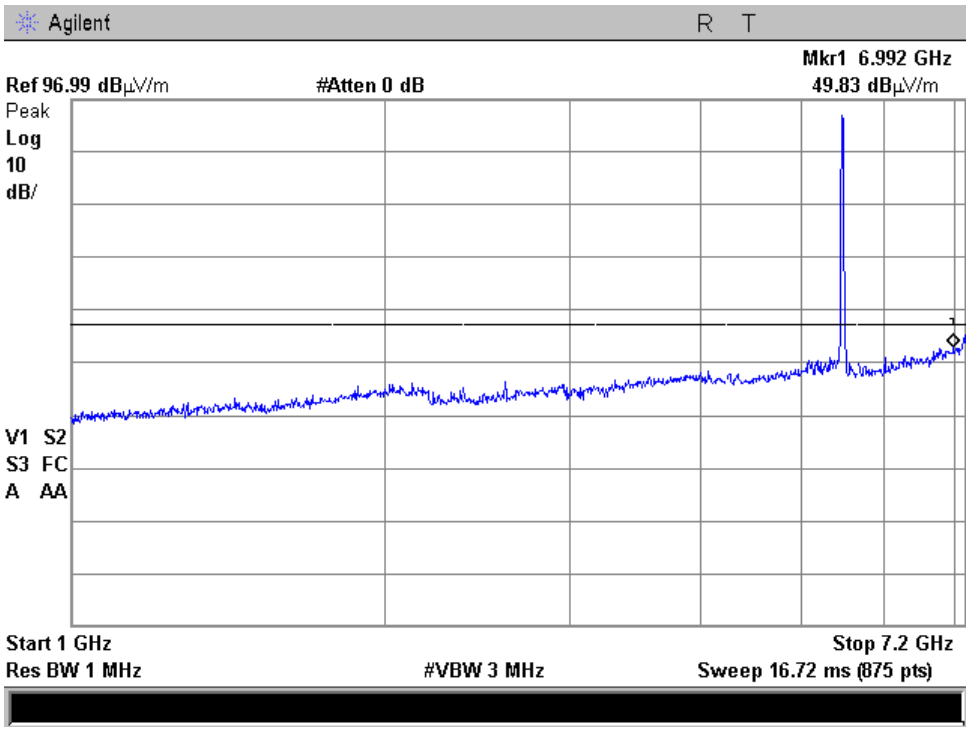
Plot 4.6.20



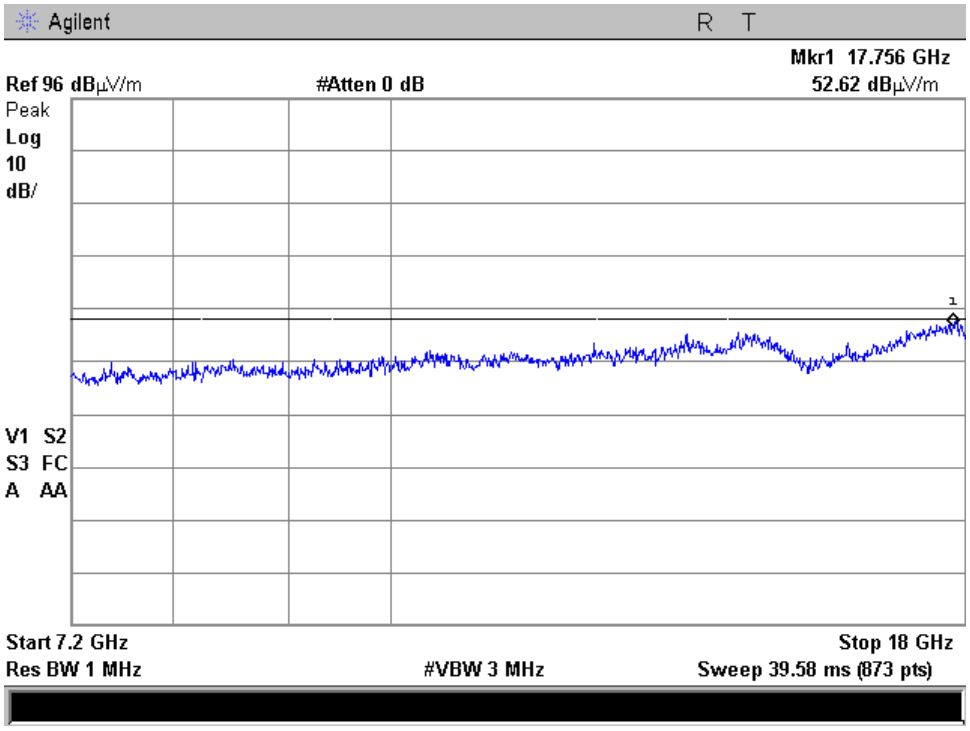
Plot 4.6.21


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.61 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

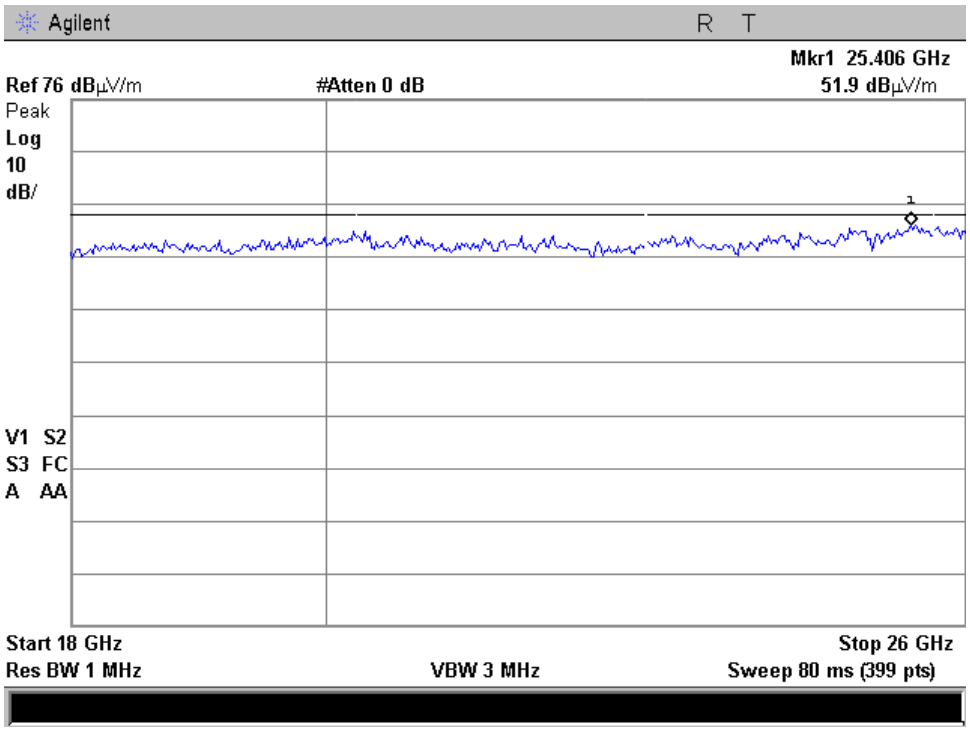
Frequency 5560 MHz
Horizontal & Vertical Polarization
Plot 4.6.22



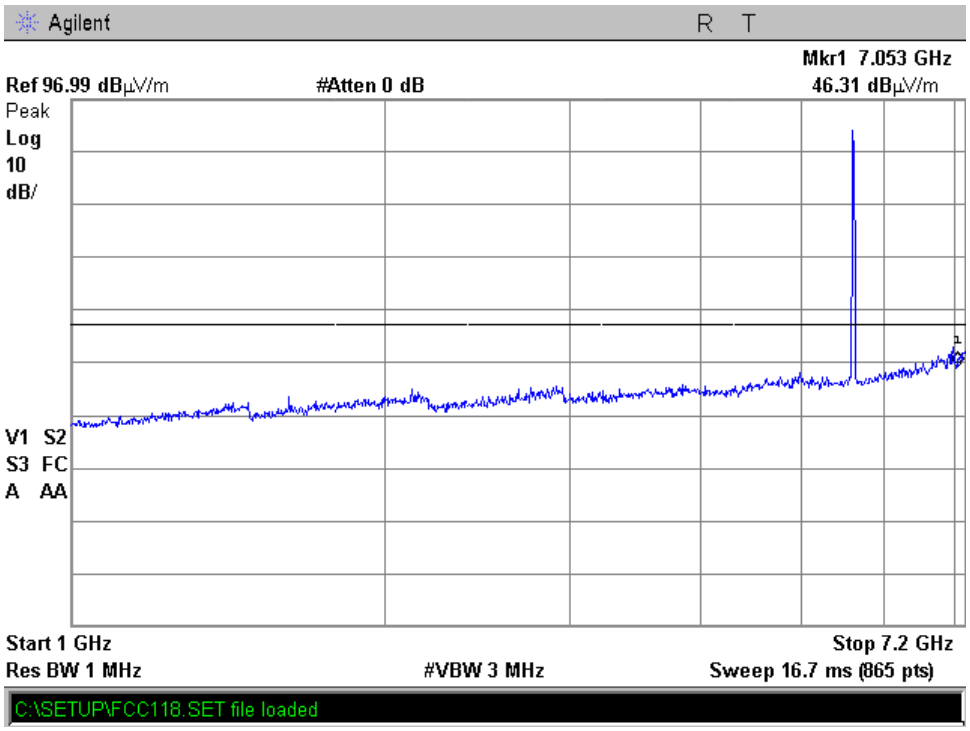
Plot 4.6.23



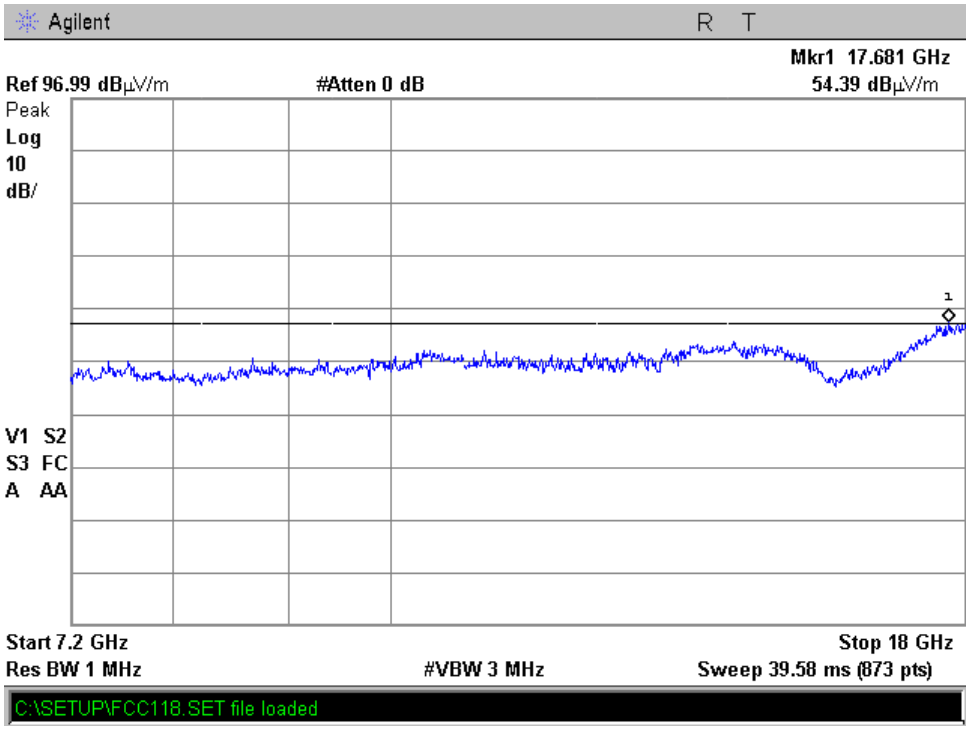
Plot 4.6.24


Agilent
R T
Mkr1 25.406 GHz
Ref 76 dBµV/m
#Atten 0 dB
51.9 dBµV/m
Peak
Log
10
dB/
V1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
VBW 3 MHz
Sweep 80 ms (399 pts)

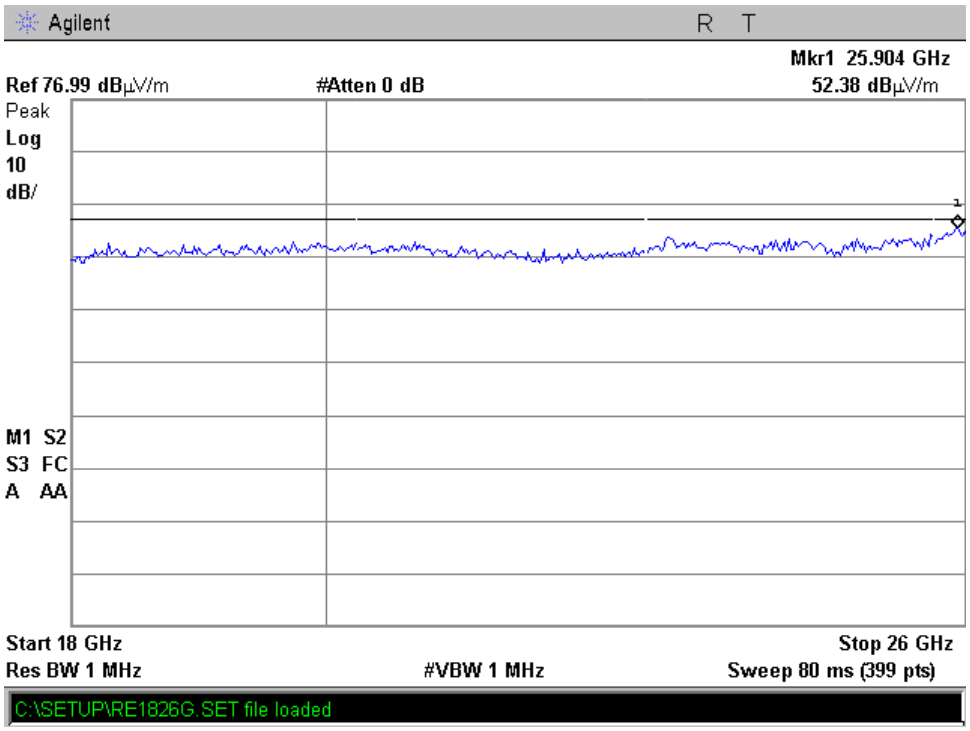
Frequency 5700 MHz
Horizontal & Vertical Polarization
Plot 4.6.25



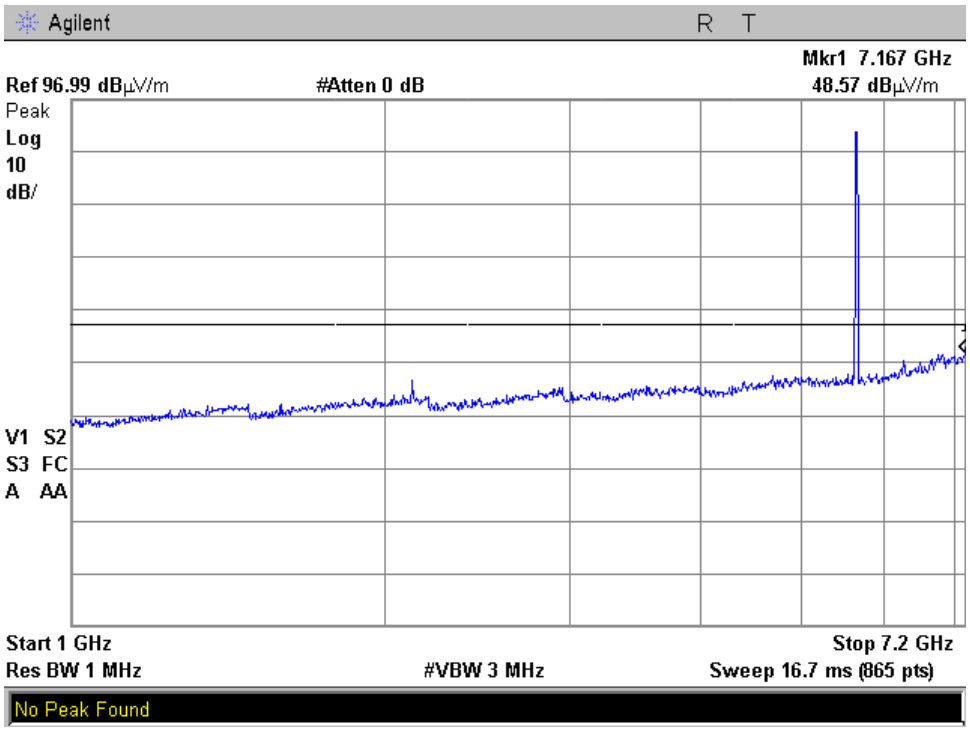
Plot 4.6.26



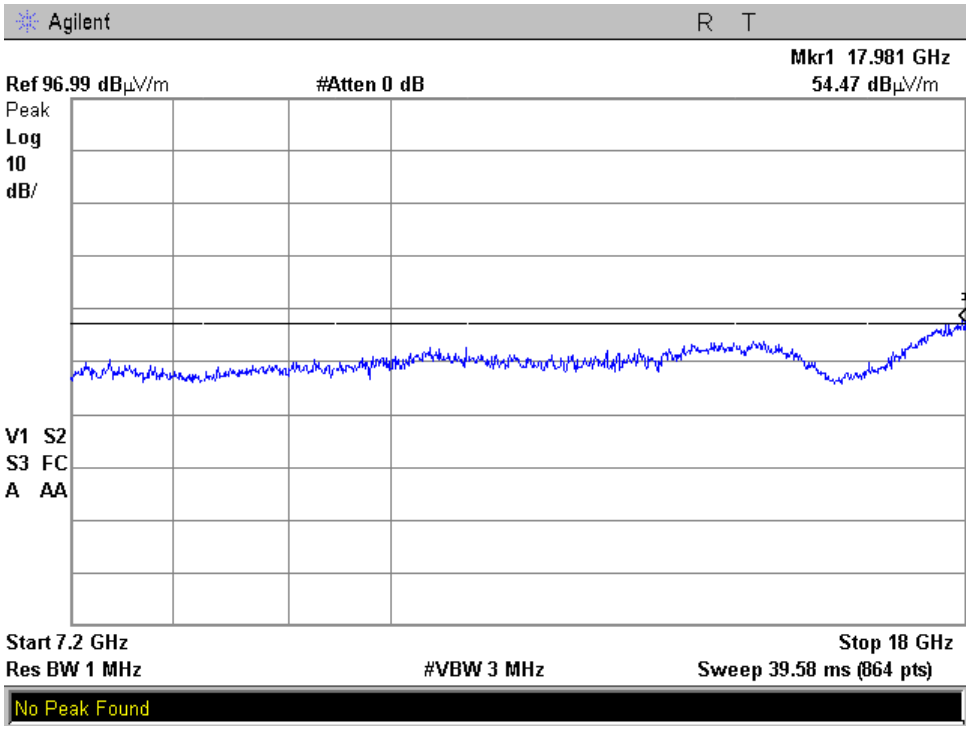
Plot 4.6.27


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.38 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

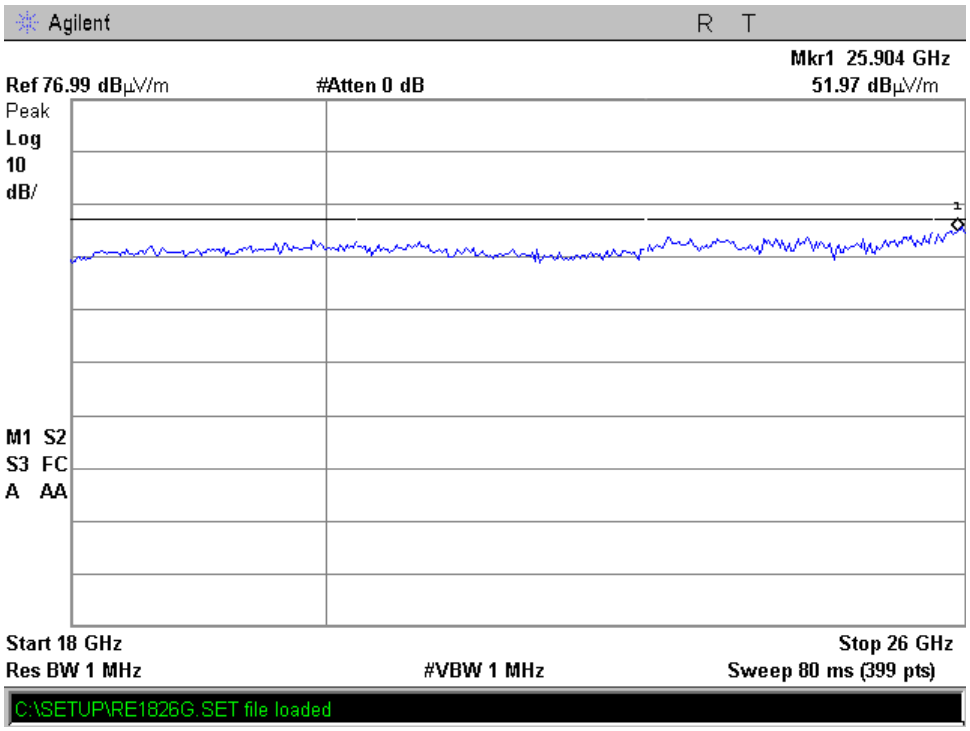
Frequency 5745 MHz
Horizontal & Vertical Polarization
Plot 4.6.28



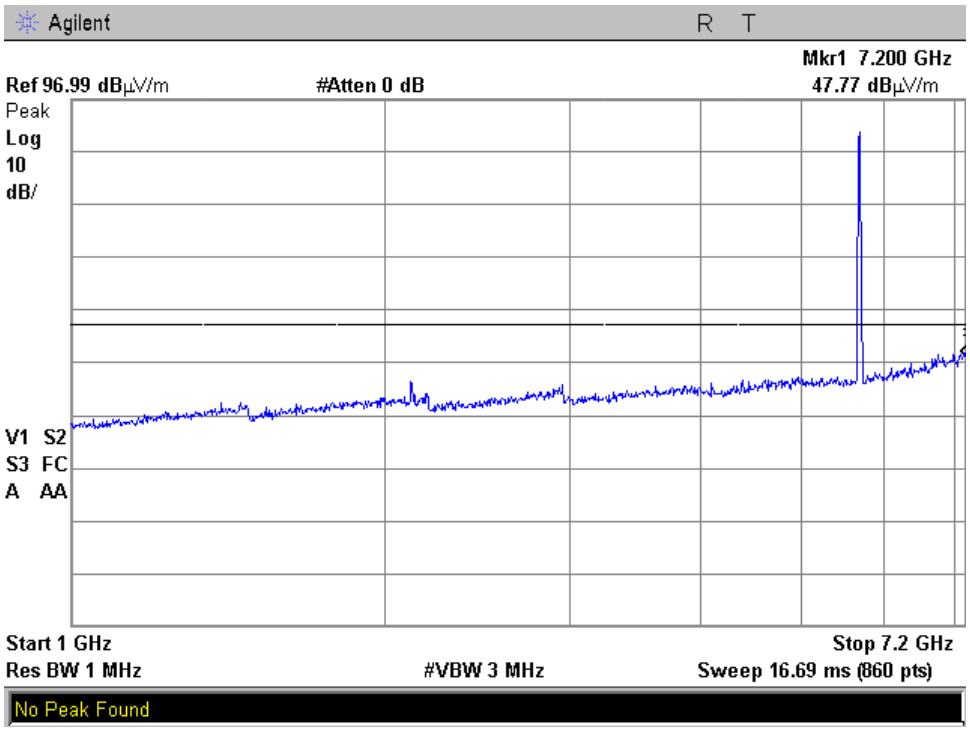
Plot 4.6.29



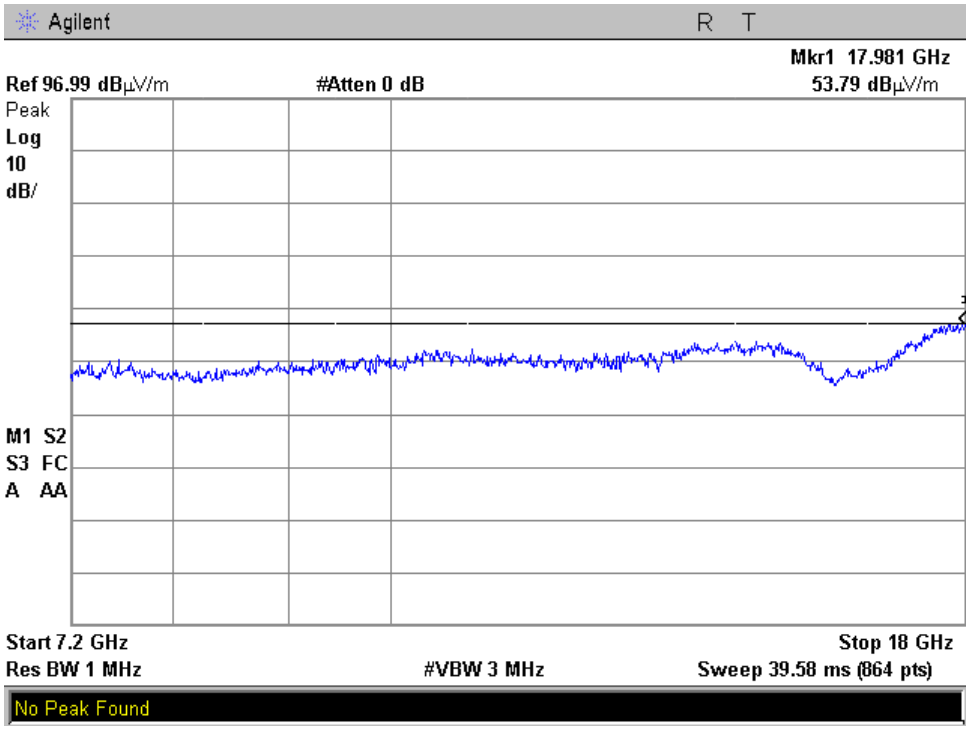
Plot 4.6.30


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.97 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

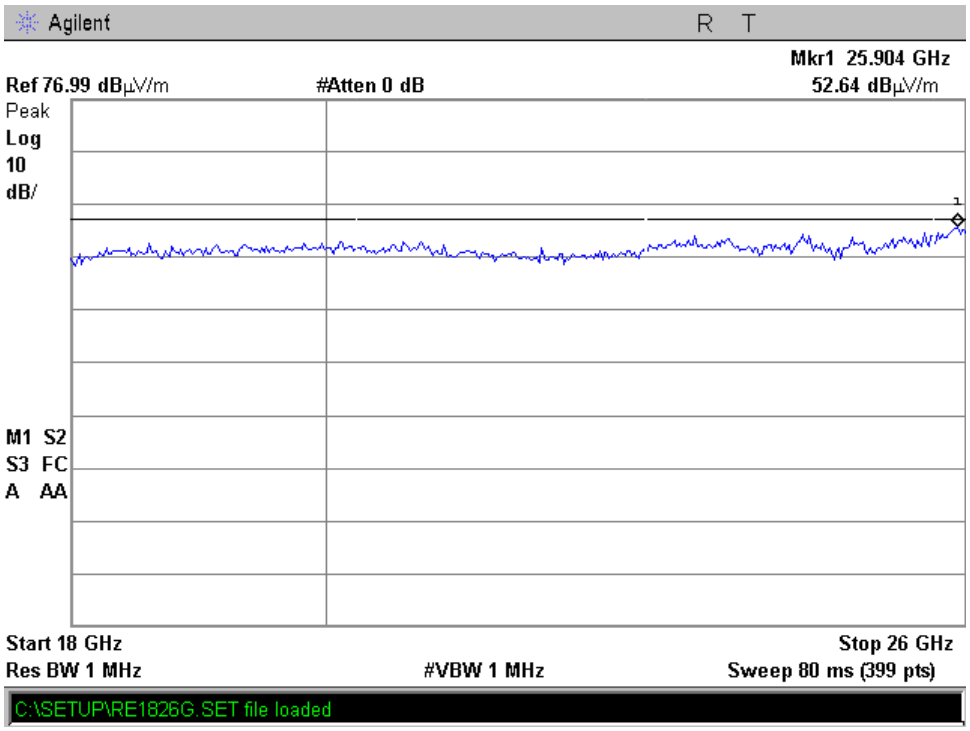
Frequency 5785 MHz
Horizontal & Vertical Polarization
Plot 4.6.31



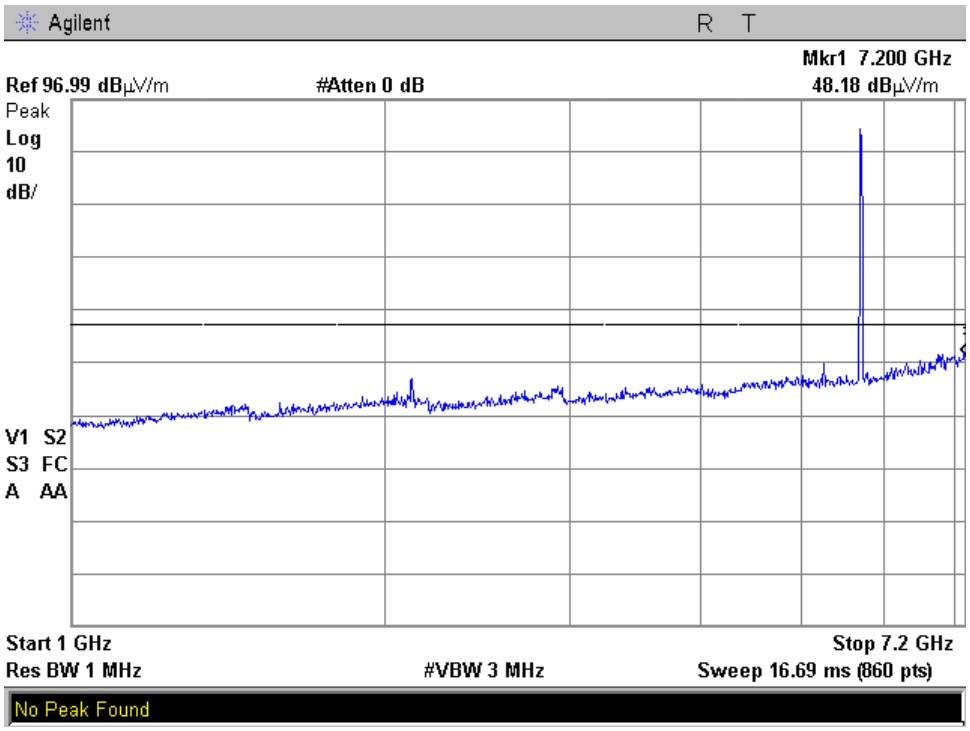
Plot 4.6.32



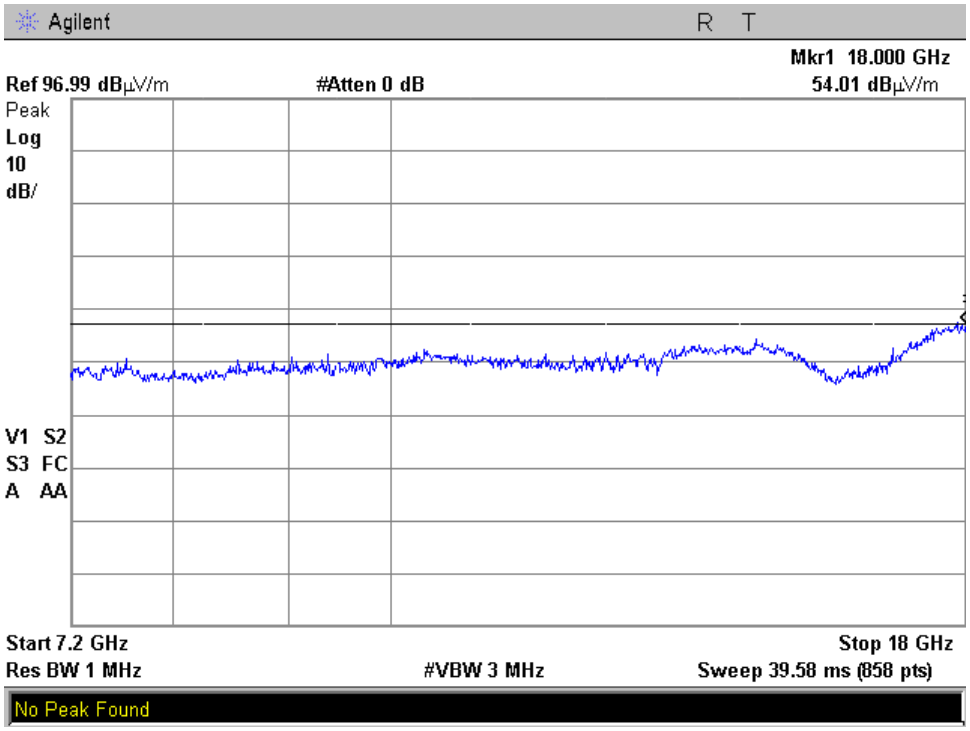
Plot 4.6.33


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.64 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

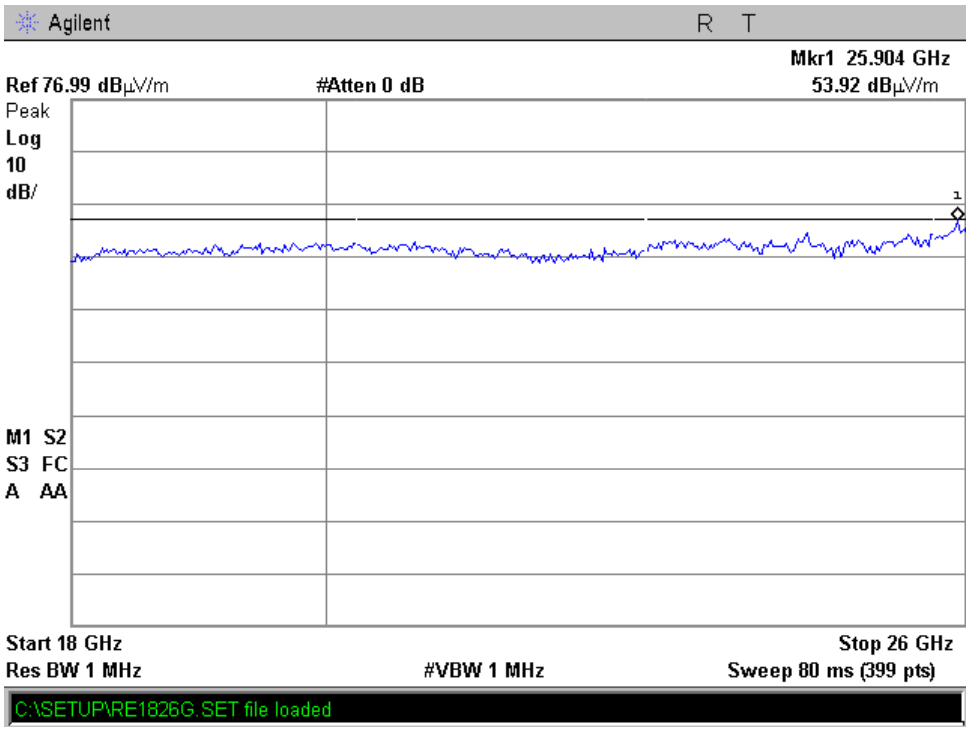
Frequency 5805 MHz
Horizontal & Vertical Polarization
Plot 4.6.34



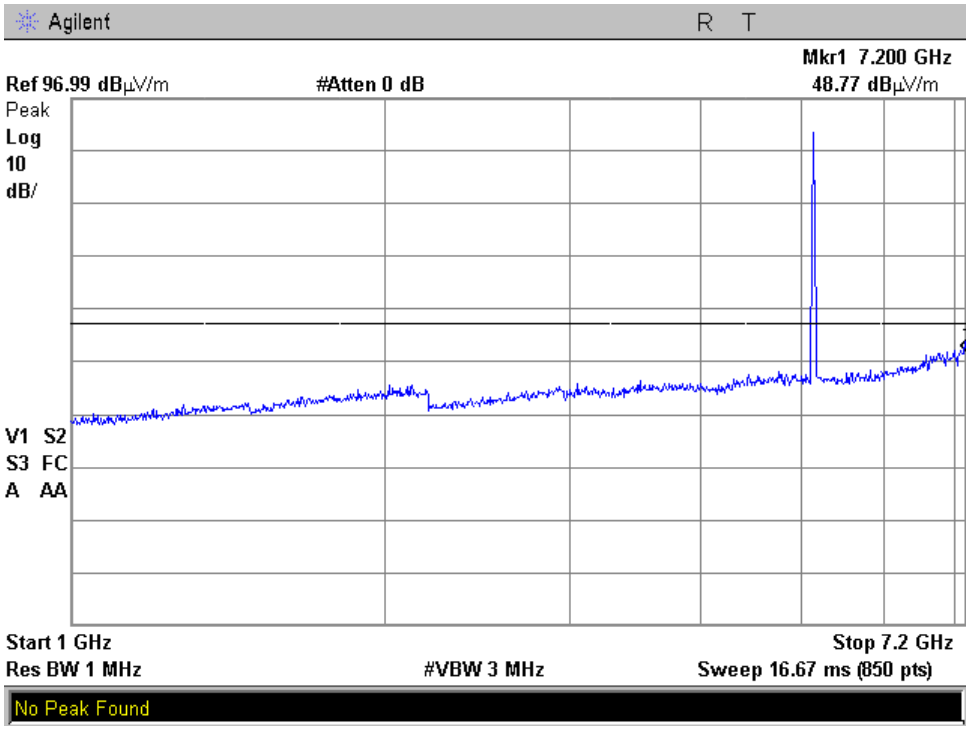
Plot 4.6.35



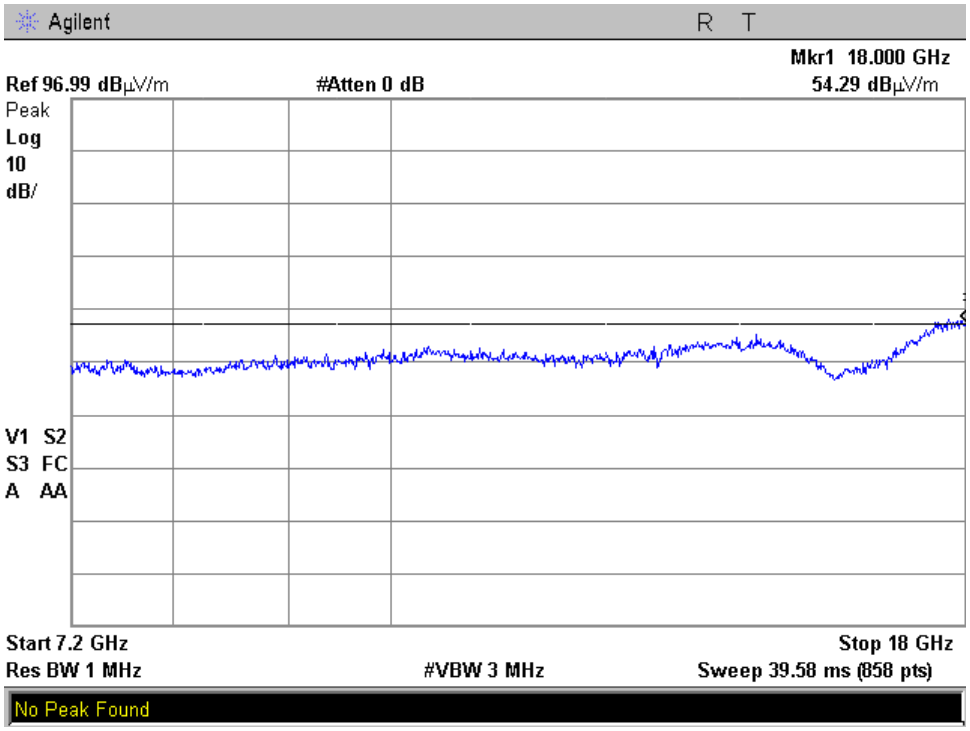
Plot 4.6.36


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
53.92 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

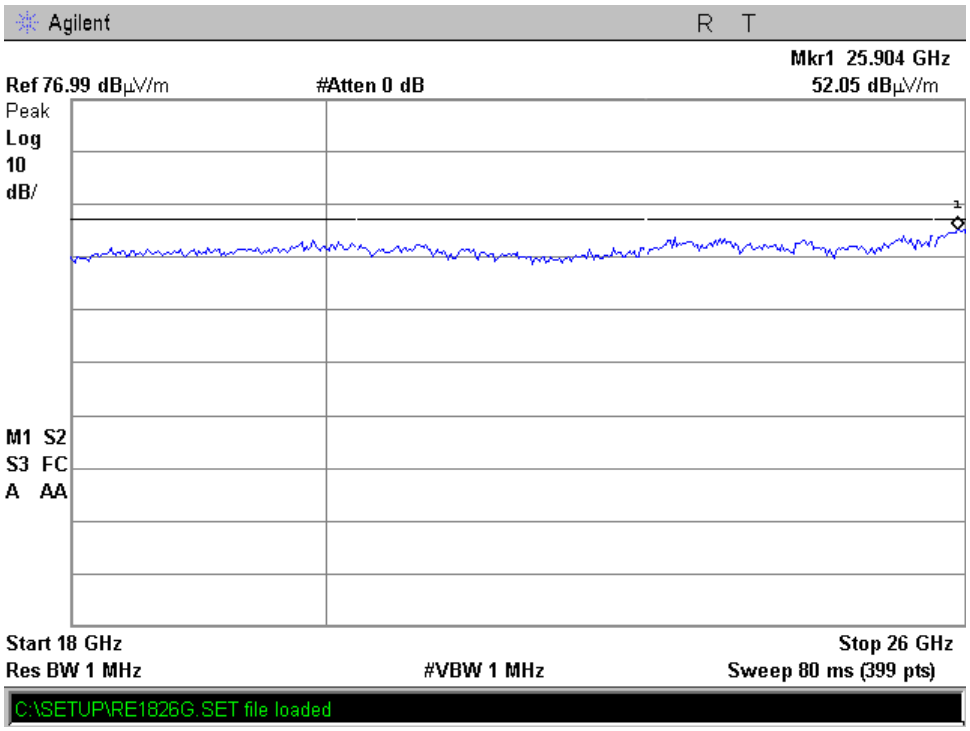
802.11n Mode
Frequency 5180 MHz
Horizontal &Vertical Polarization
Plot 4.6.37



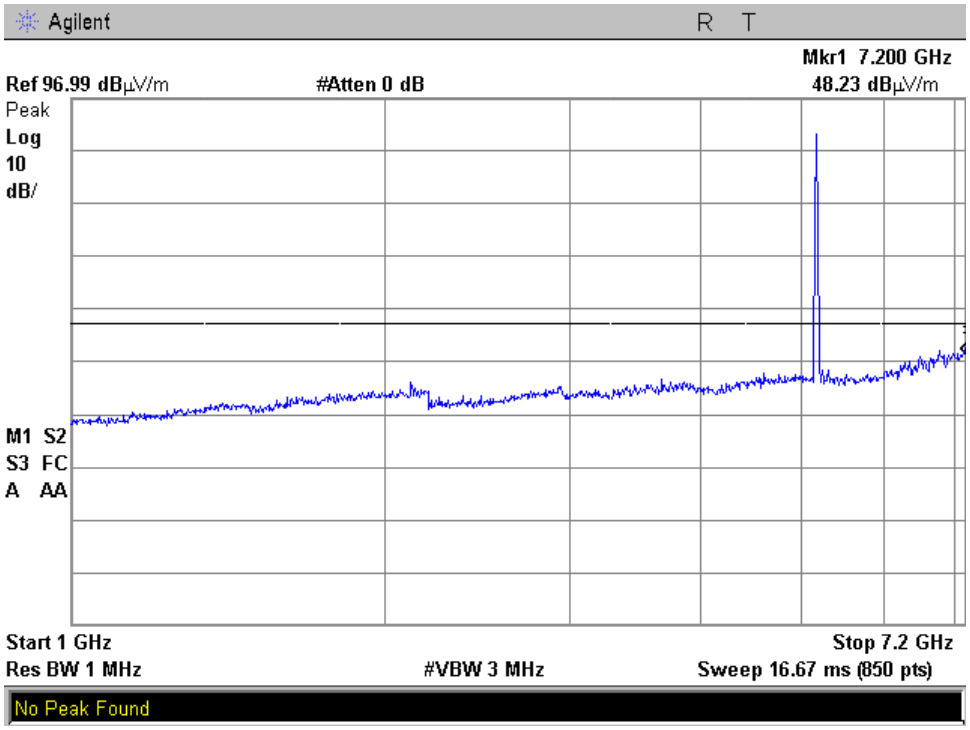
Plot 4.6.38



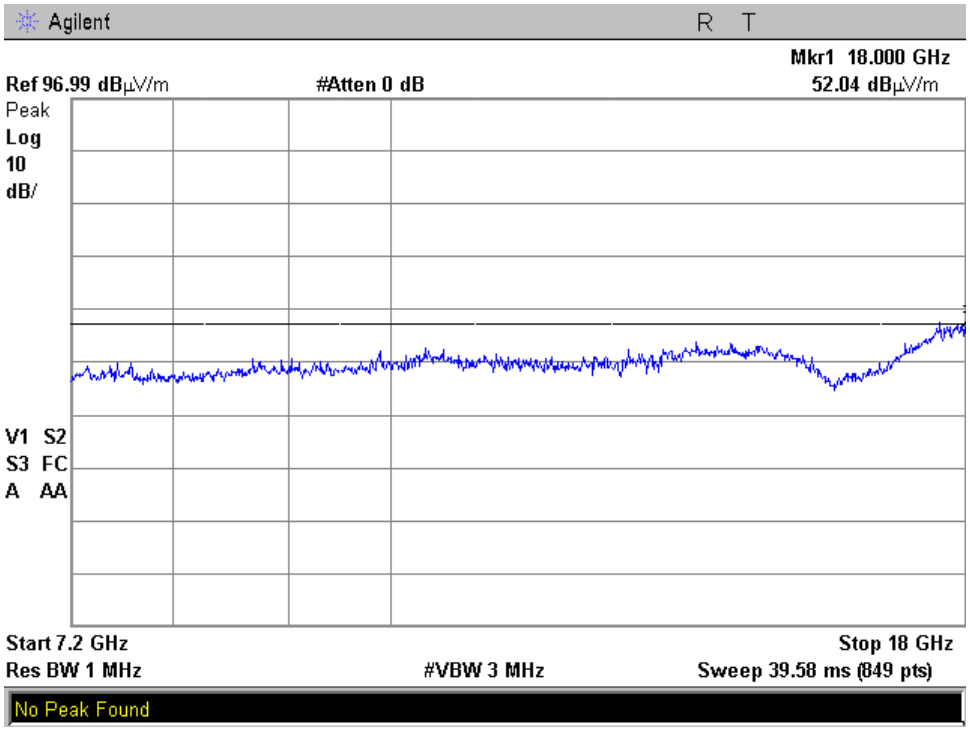
Plot 4.6.39


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.05 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

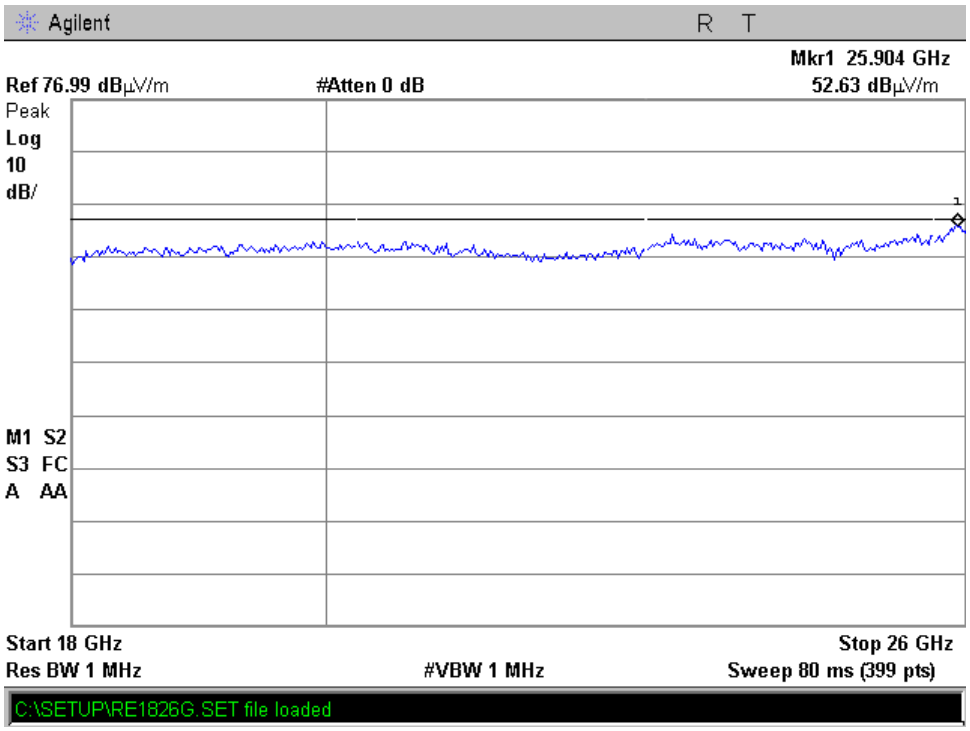
Frequency 5220 MHz
Horizontal & Vertical Polarization
Plot 4.6.40



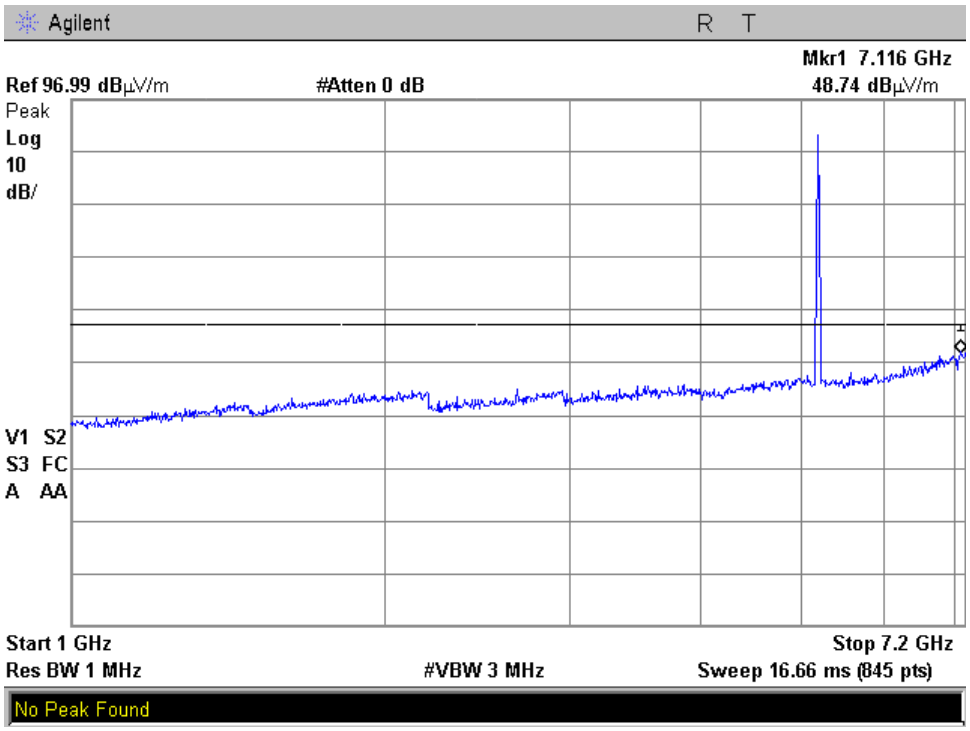
Plot 4.6.41



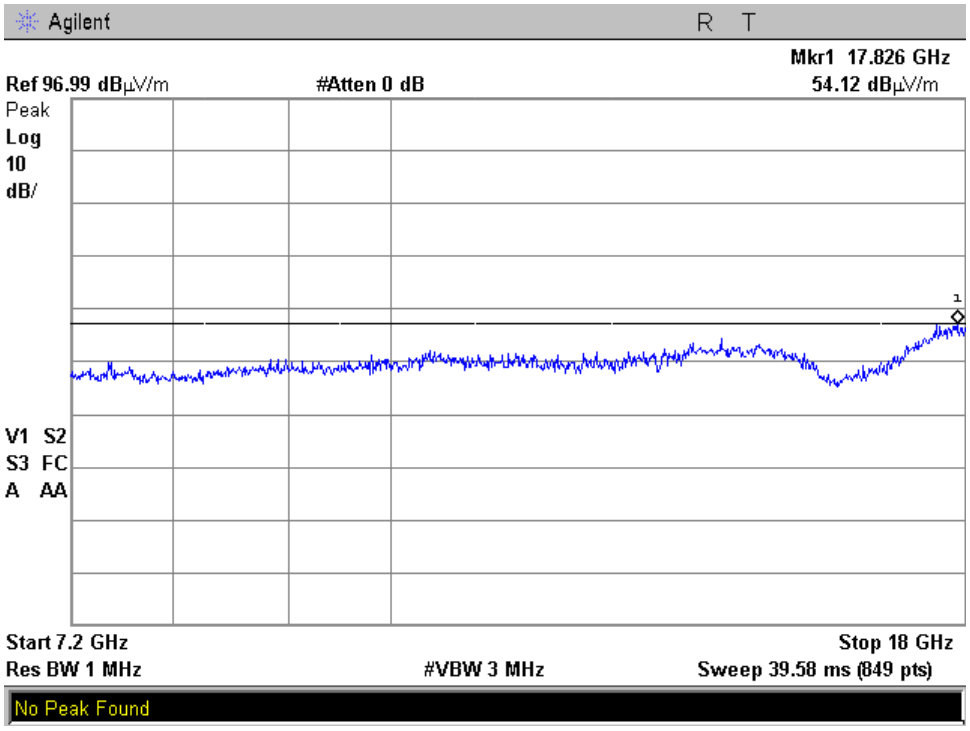
Plot 4.6.42


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.63 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

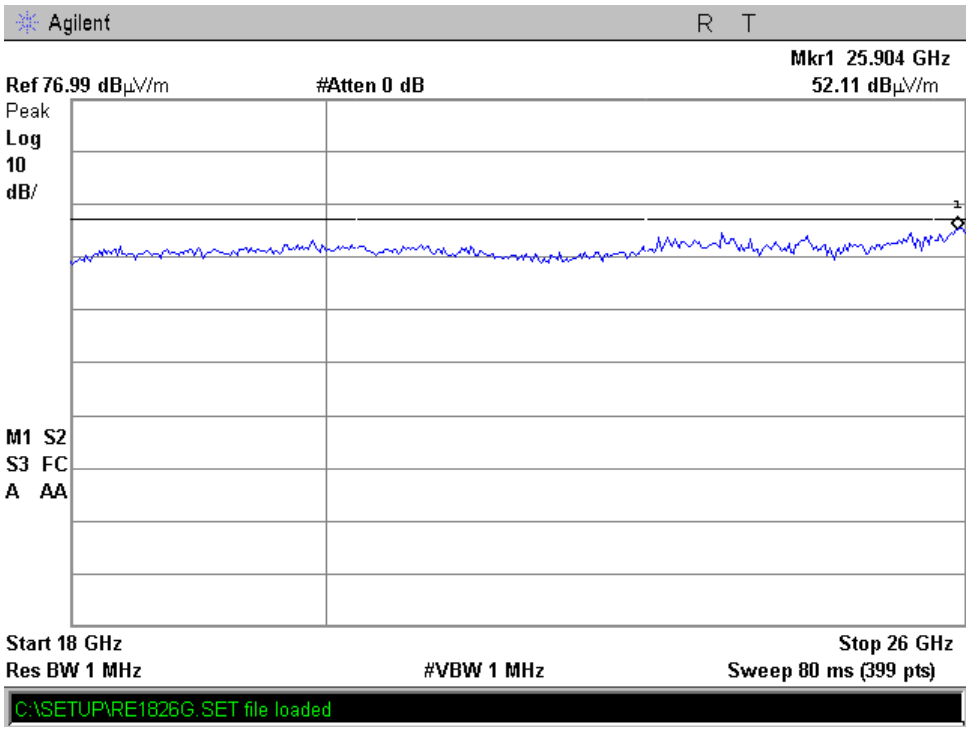
Frequency 5240 MHz
Horizontal &Vertical Polarization
Plot 4.6.43



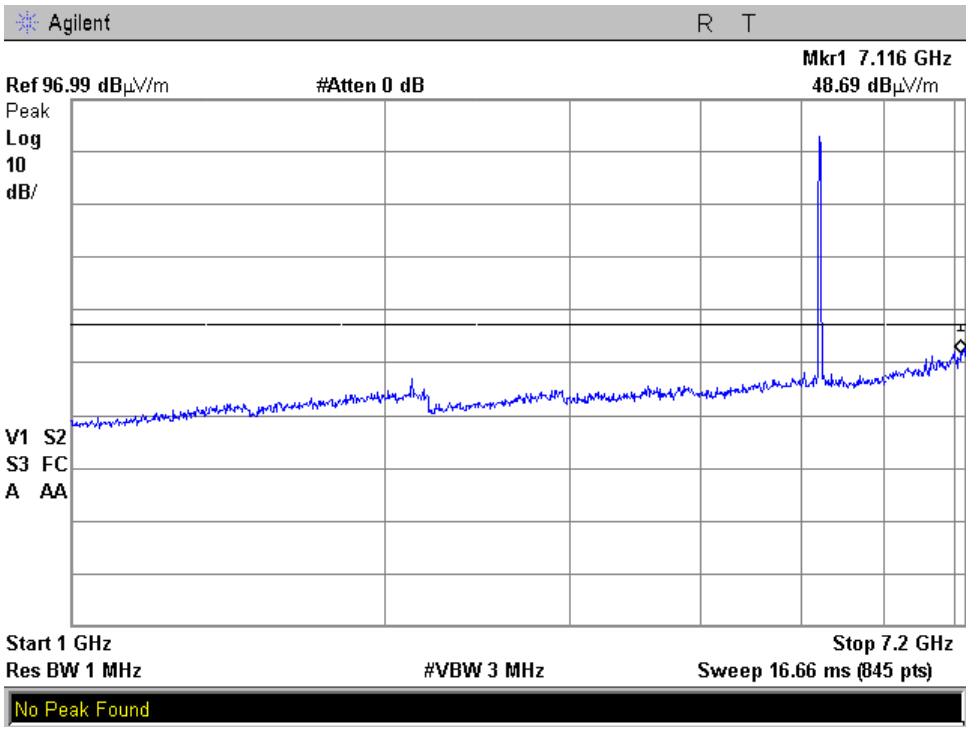
Plot 4.6.44



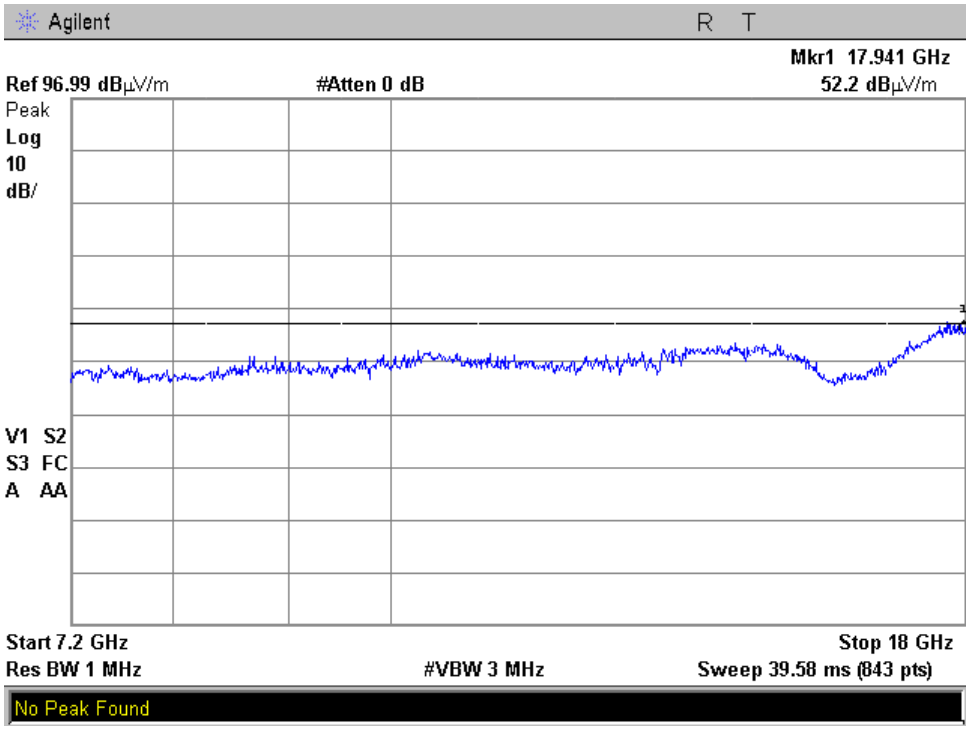
Plot 4.6.45


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.11 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

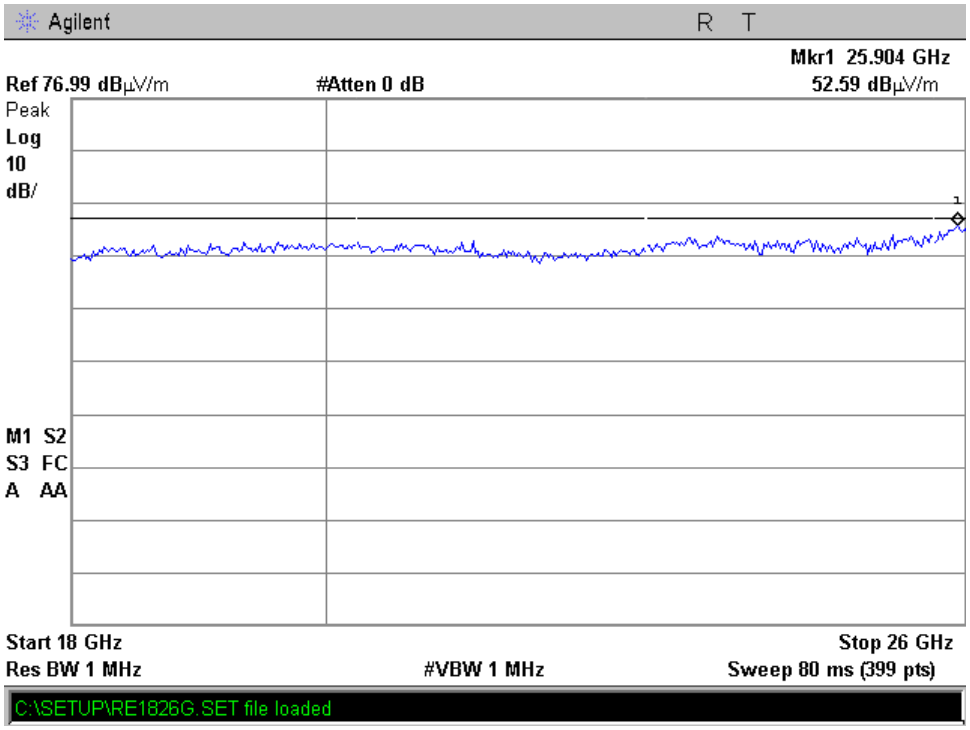
Frequency 5260 MHz
Horizontal &Vertical Polarization
Plot 4.6.46



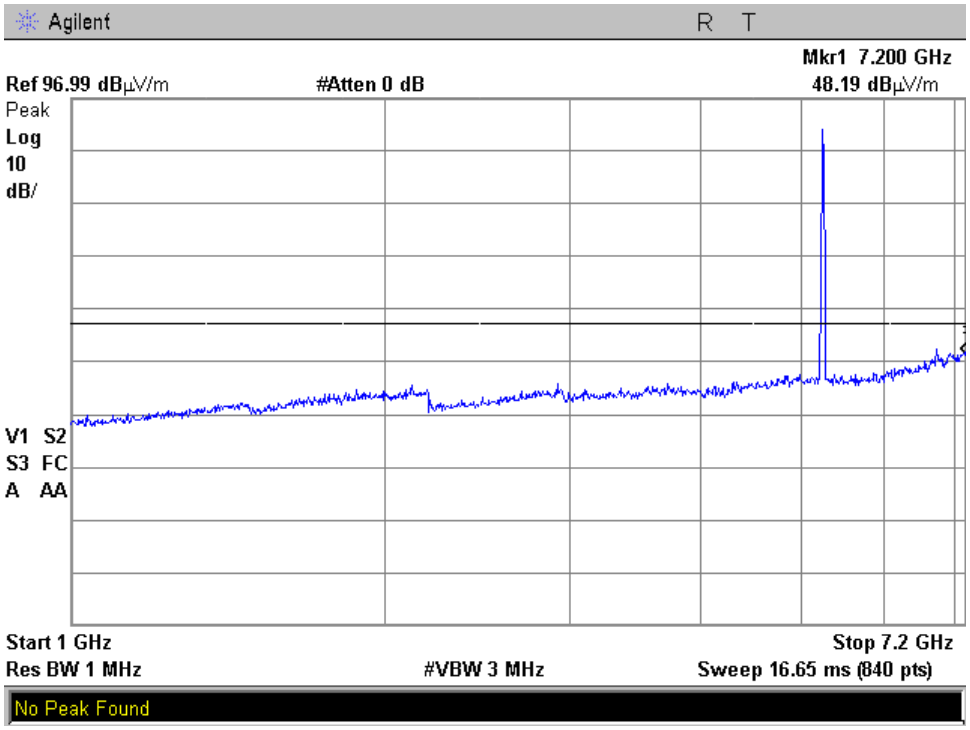
Plot 4.6.47



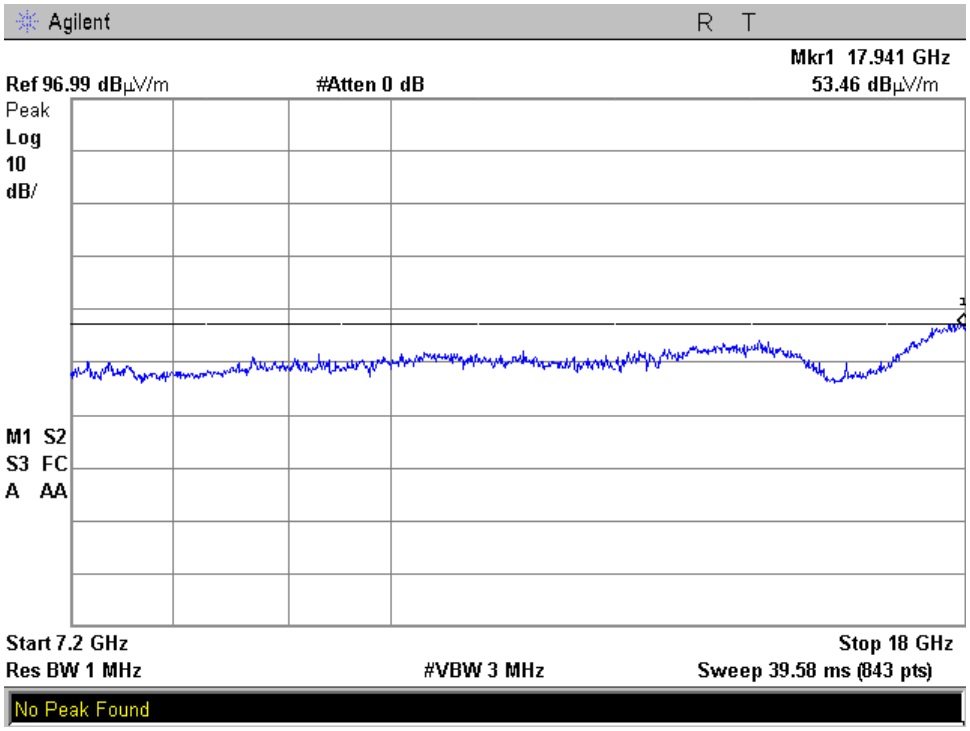
Plot 4.6.48


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.59 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Res BW 1 MHz
#VBW 1 MHz
Stop 26 GHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

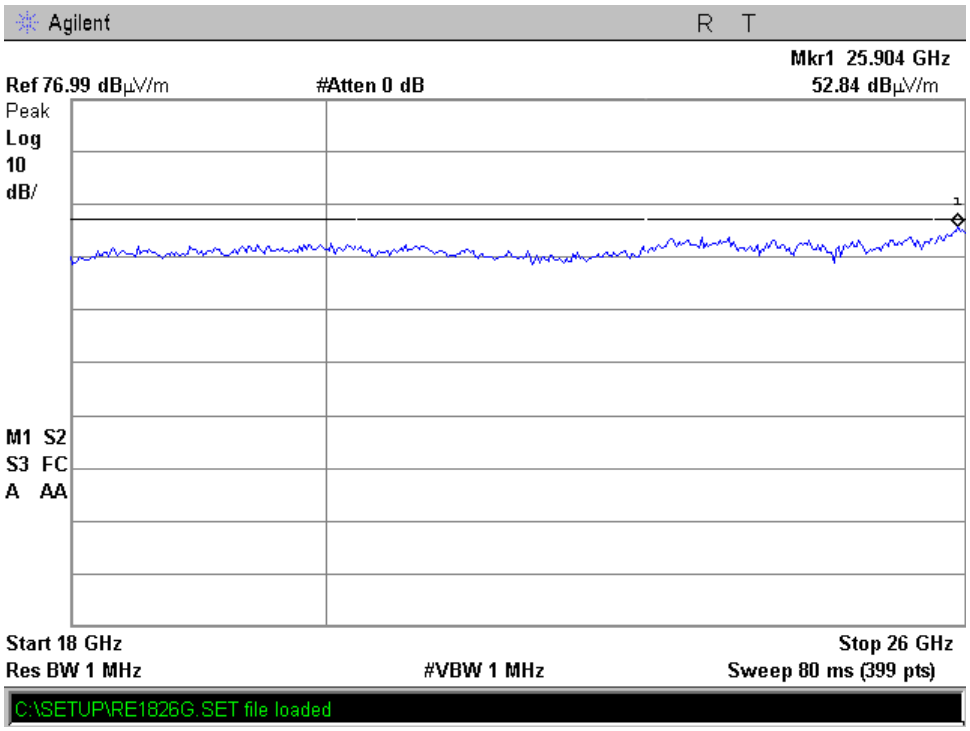
Frequency 5300 MHz
Horizontal & Vertical Polarization
Plot 4.6.49



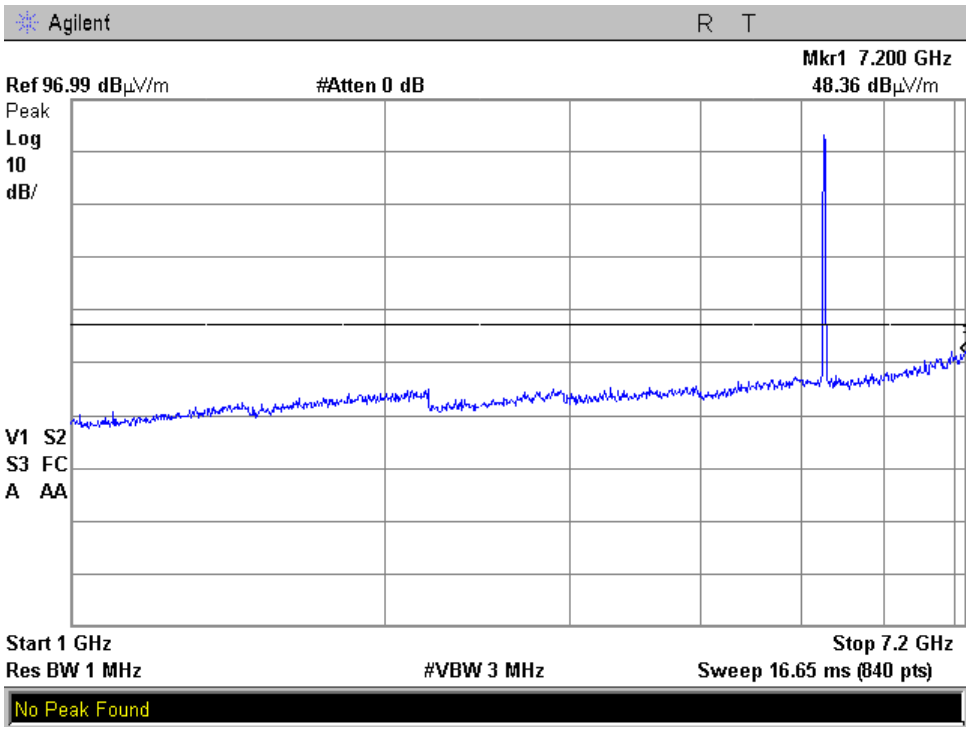
Plot 4.6.50



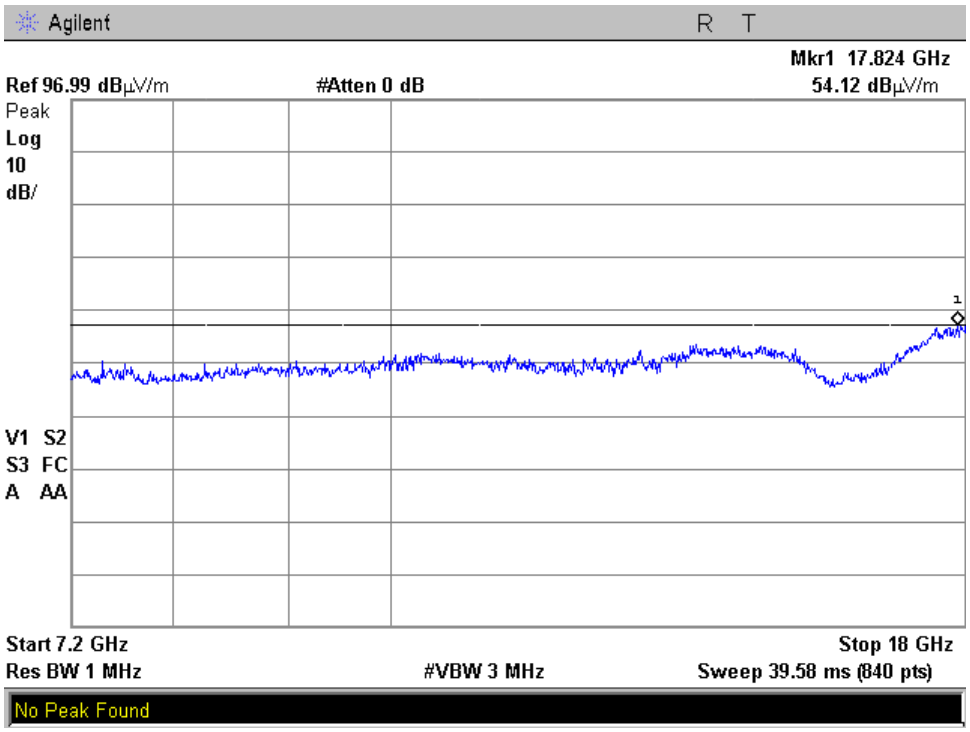
Plot 4.6.51


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.84 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

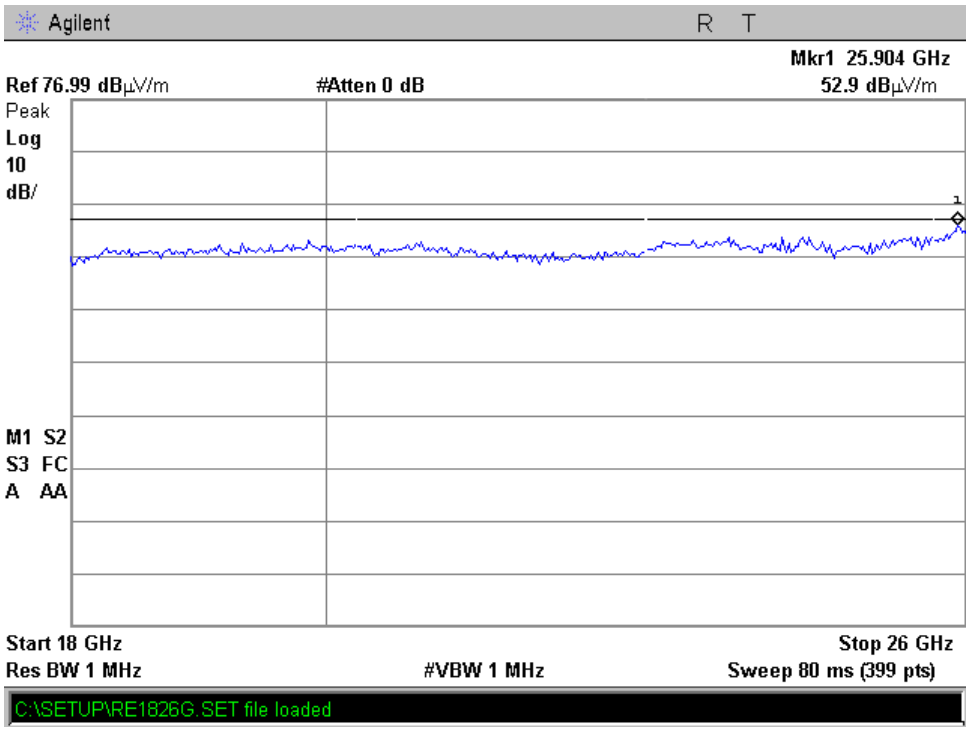
Frequency 5320 MHz
Horizontal & Vertical Polarization
Plot 4.6.52



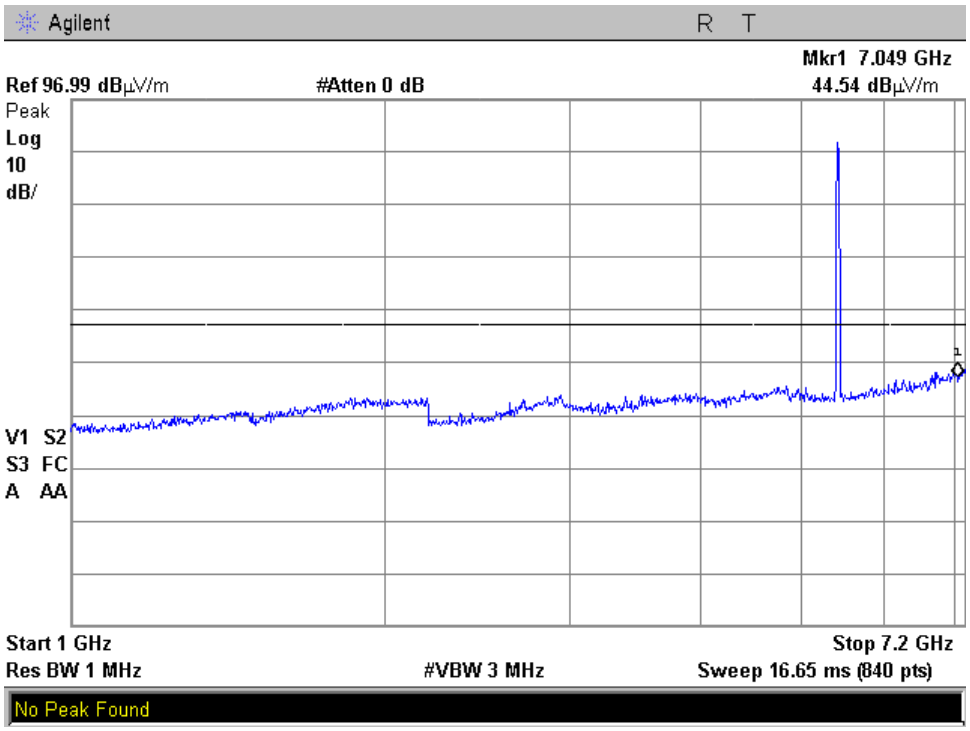
Plot 4.6.53



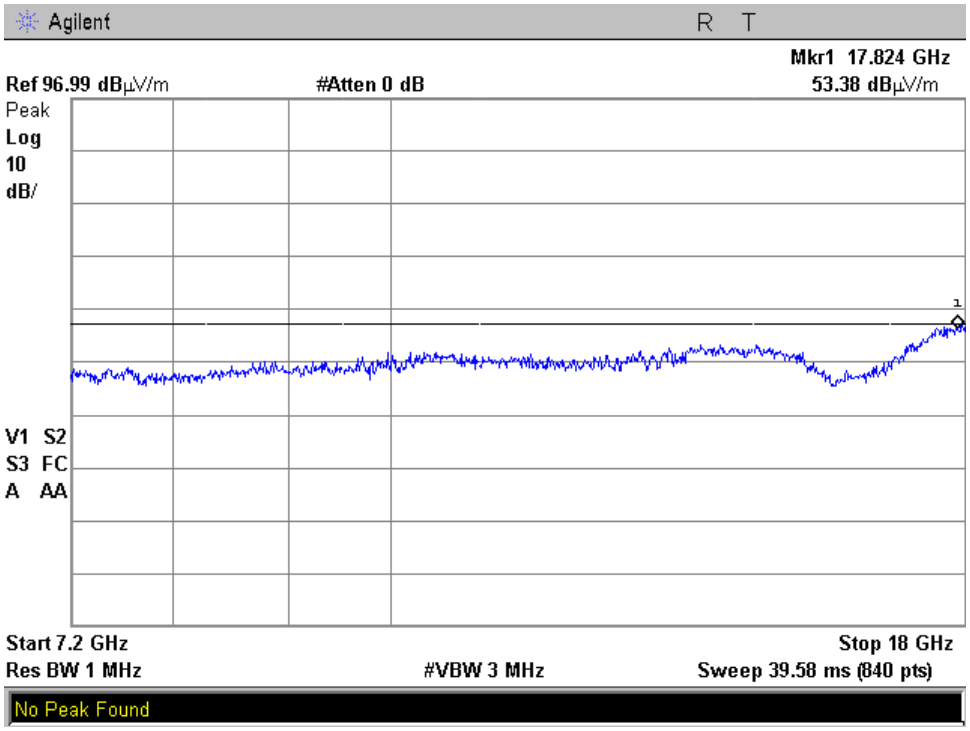
Plot 4.6.54


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.9 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

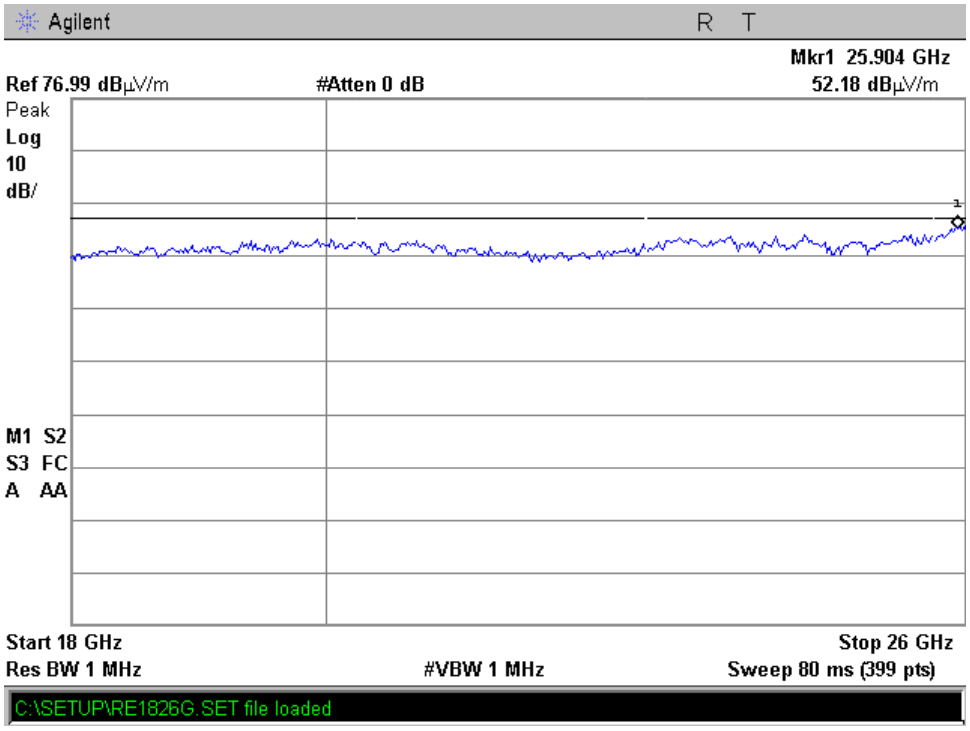
Frequency 5500 MHz
Horizontal & Vertical Polarization
Plot 4.6.55



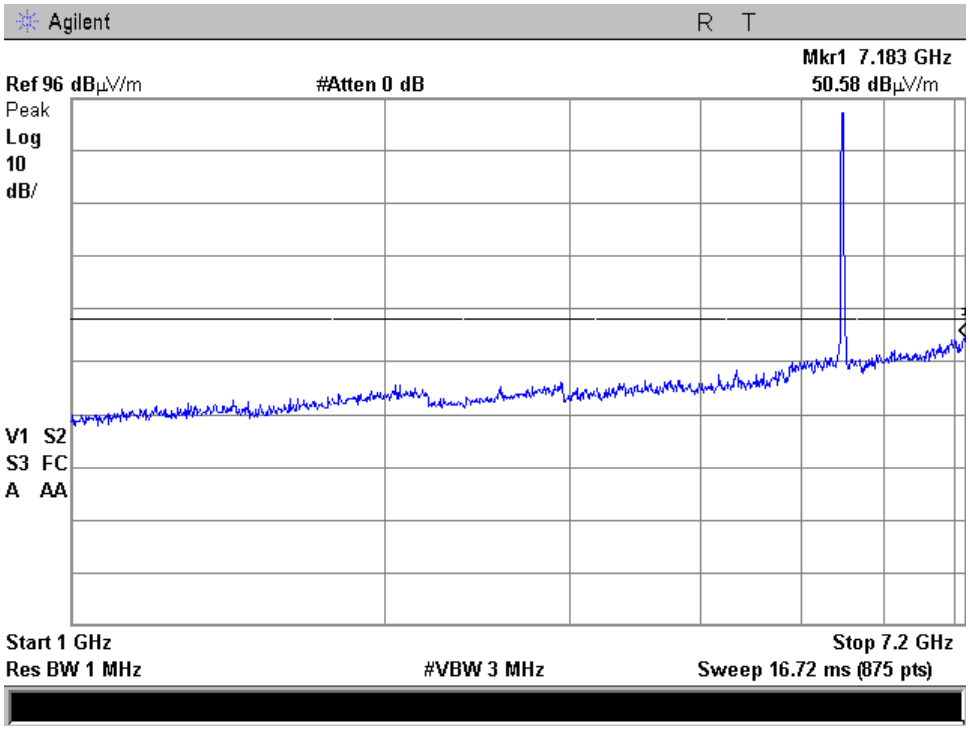
Plot 4.6.56



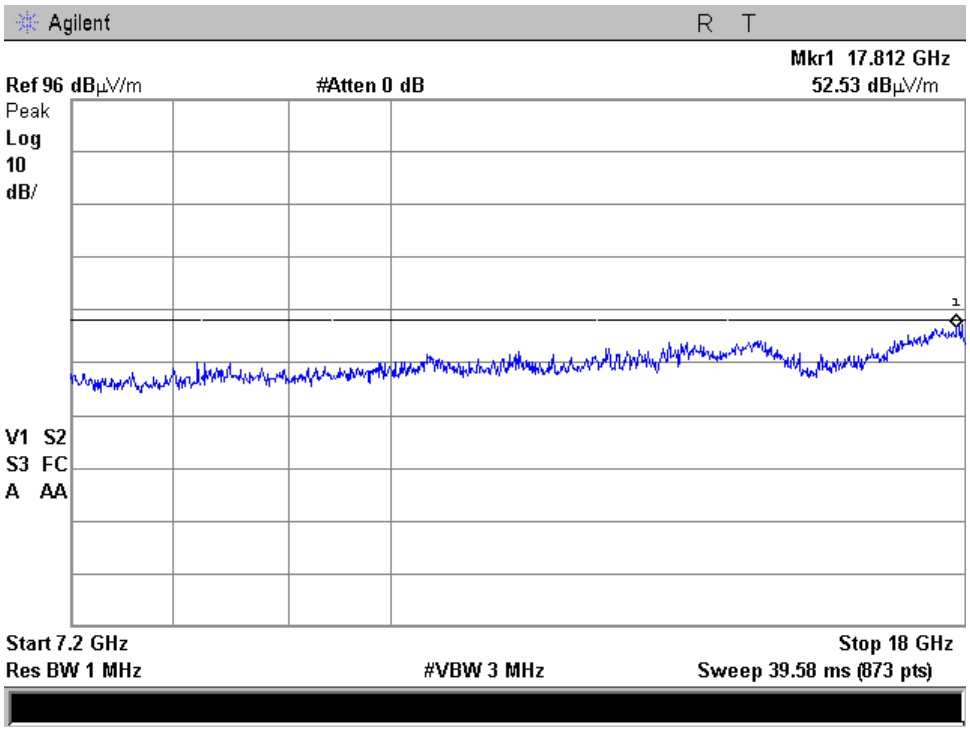
Plot 4.6.57


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.18 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

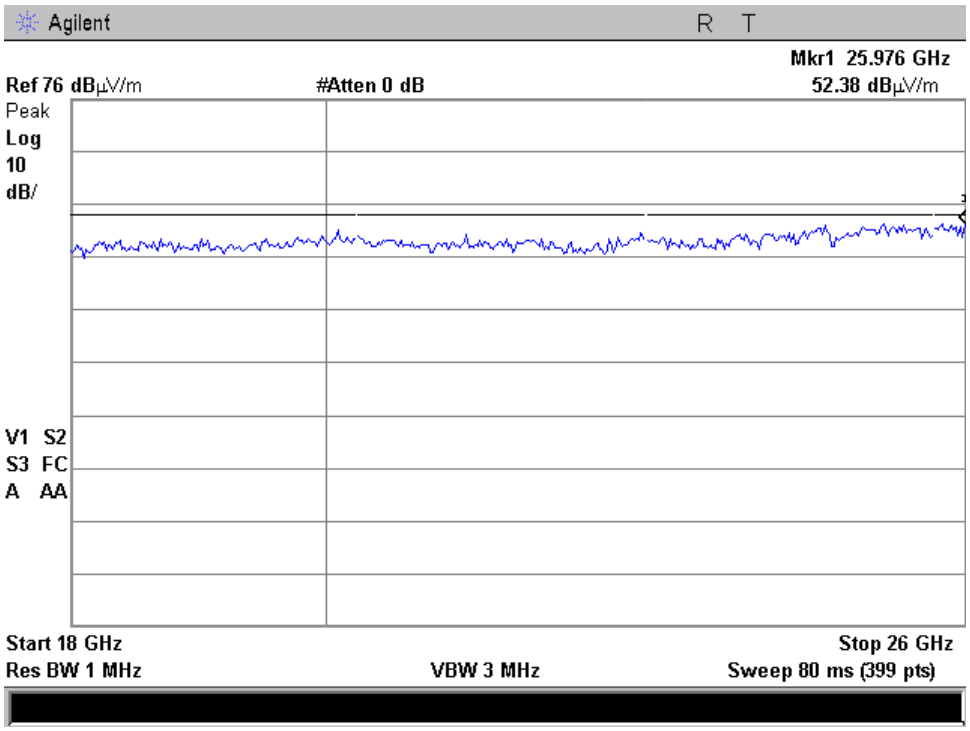
Frequency 5560 MHz
Horizontal & Vertical Polarization
Plot 4.6.58



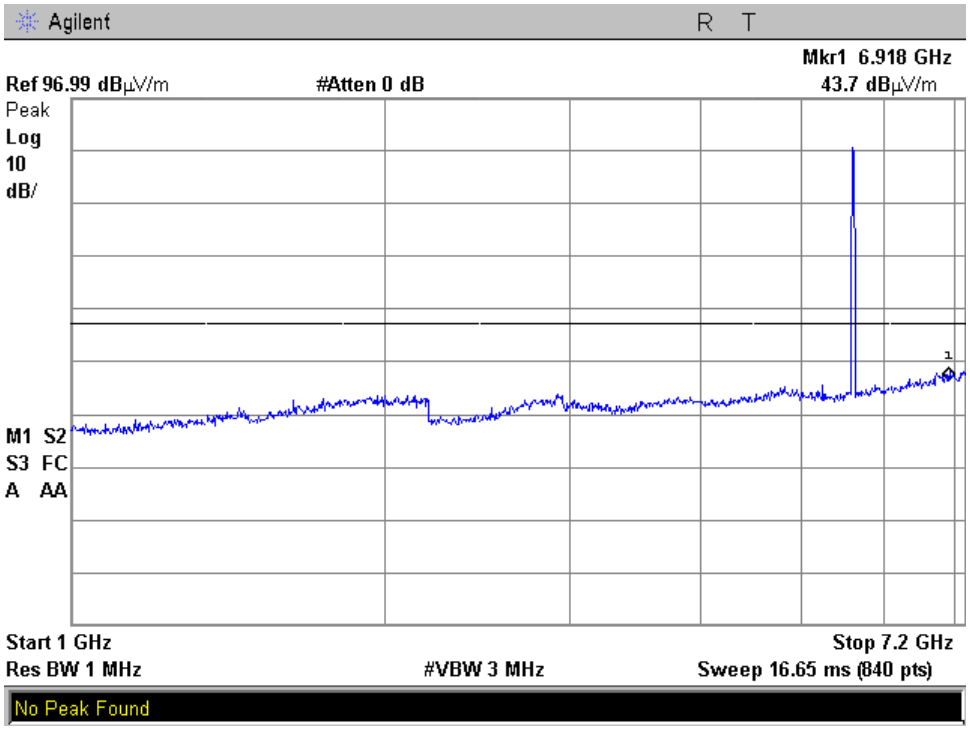
Plot 4.6.59



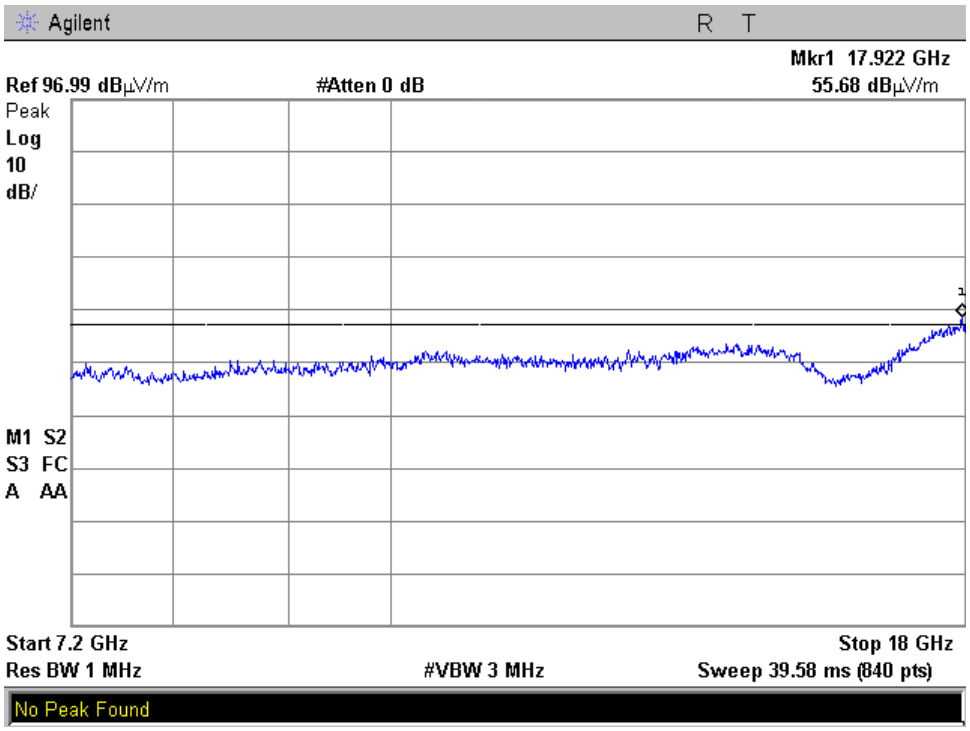
Plot 4.6.60


Agilent
R T
Mkr1 25.976 GHz
Ref 76 dBµV/m
#Atten 0 dB
52.38 dBµV/m
Peak
Log
10
dB/
V1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
VBW 3 MHz
Sweep 80 ms (399 pts)

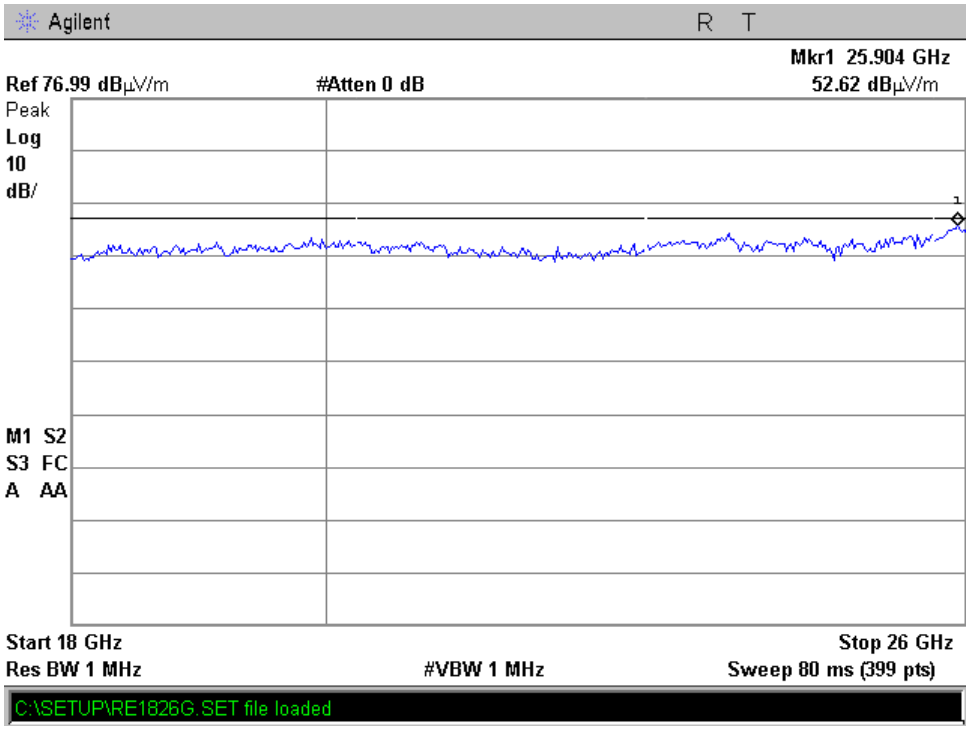
Frequency 5700 MHz
Horizontal & Vertical Polarization
Plot 4.6.61



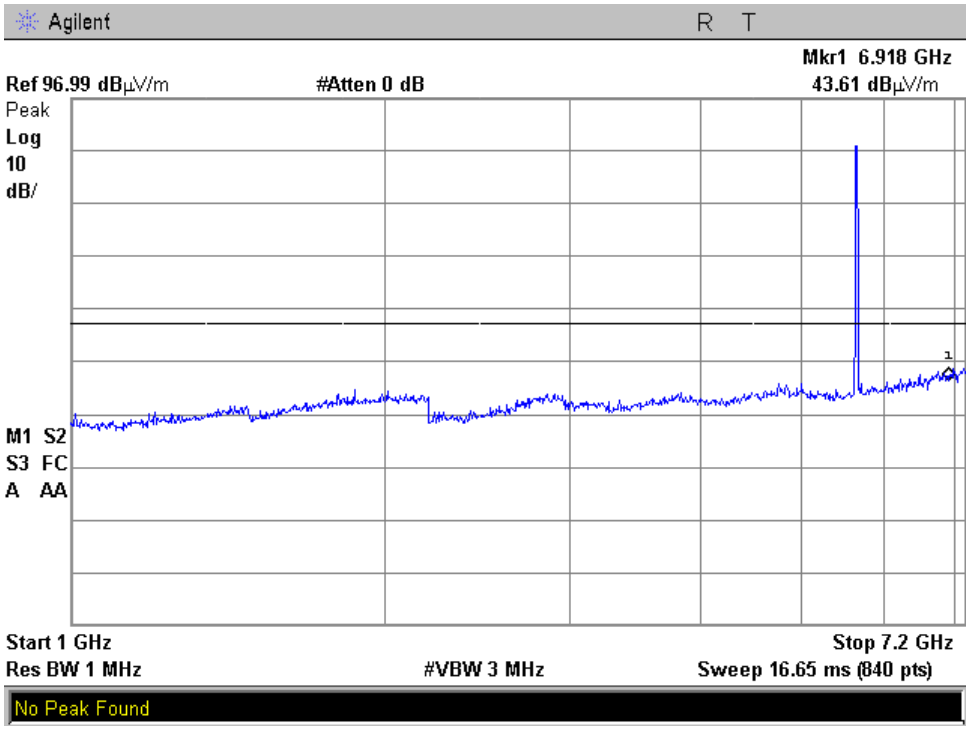
Plot 4.6.62



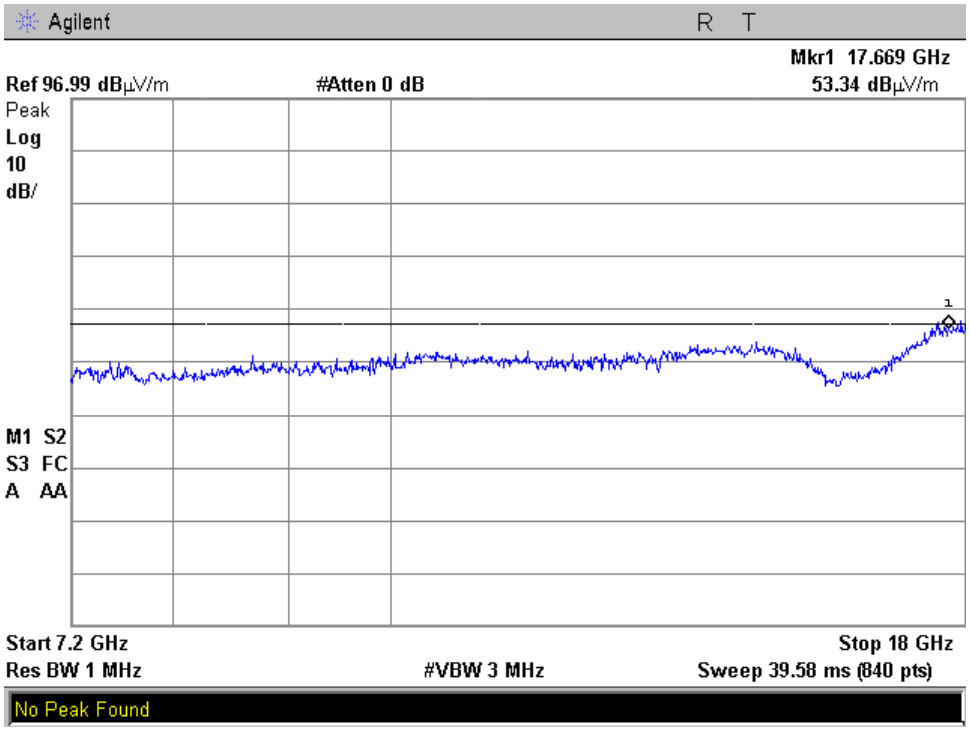
Plot 4.6.63


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.62 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

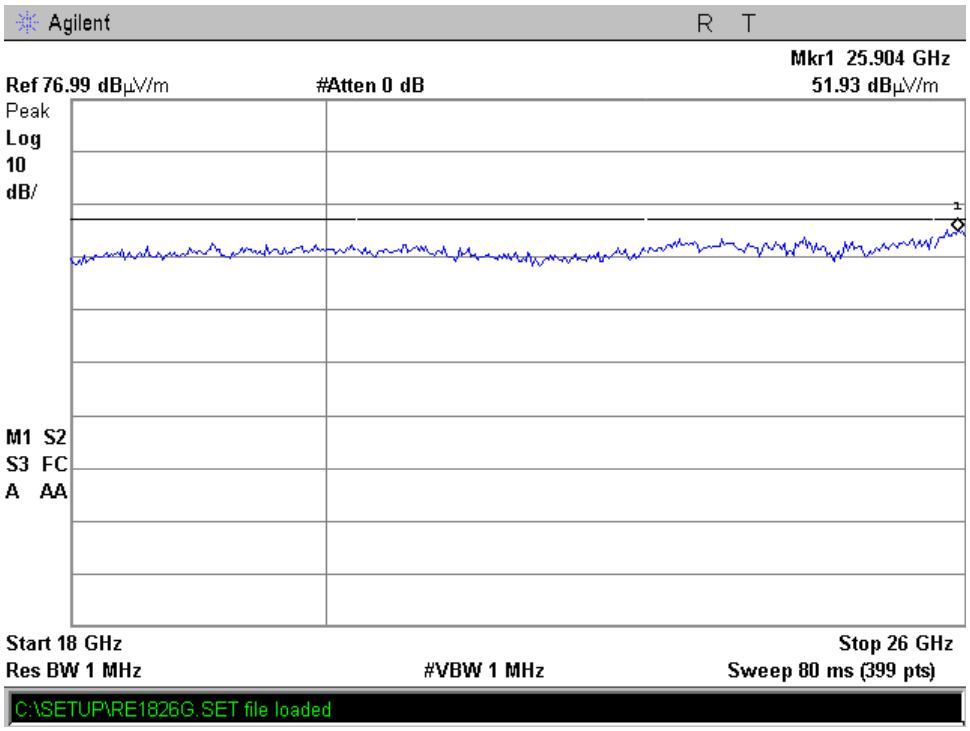
Frequency 5745 MHz
Horizontal & Vertical Polarization
Plot 4.6.64



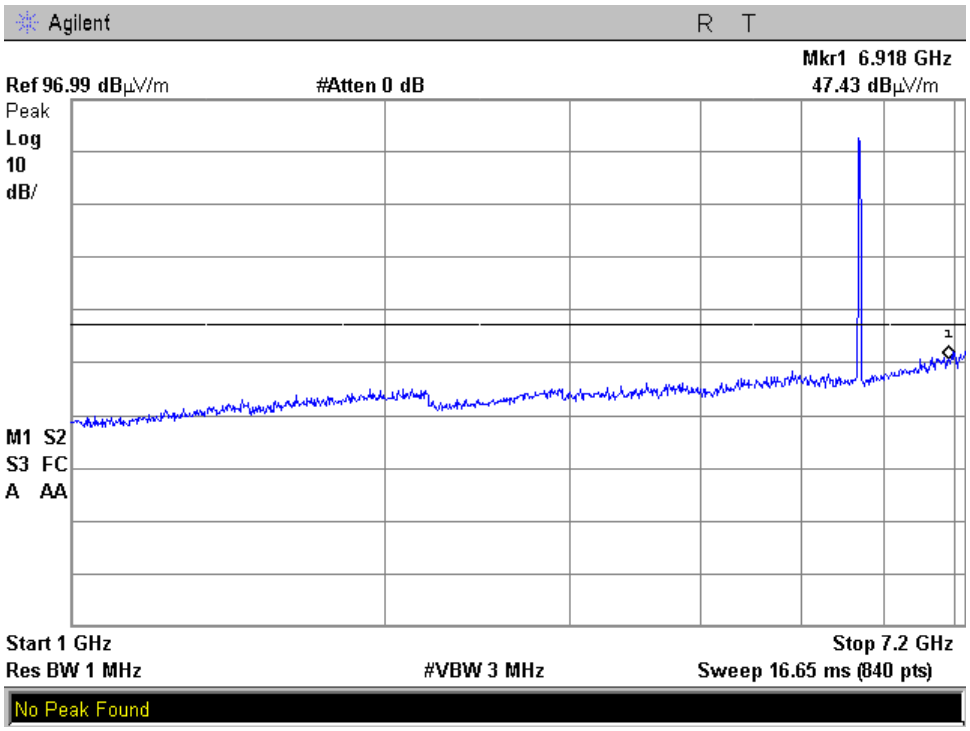
Plot 4.6.65



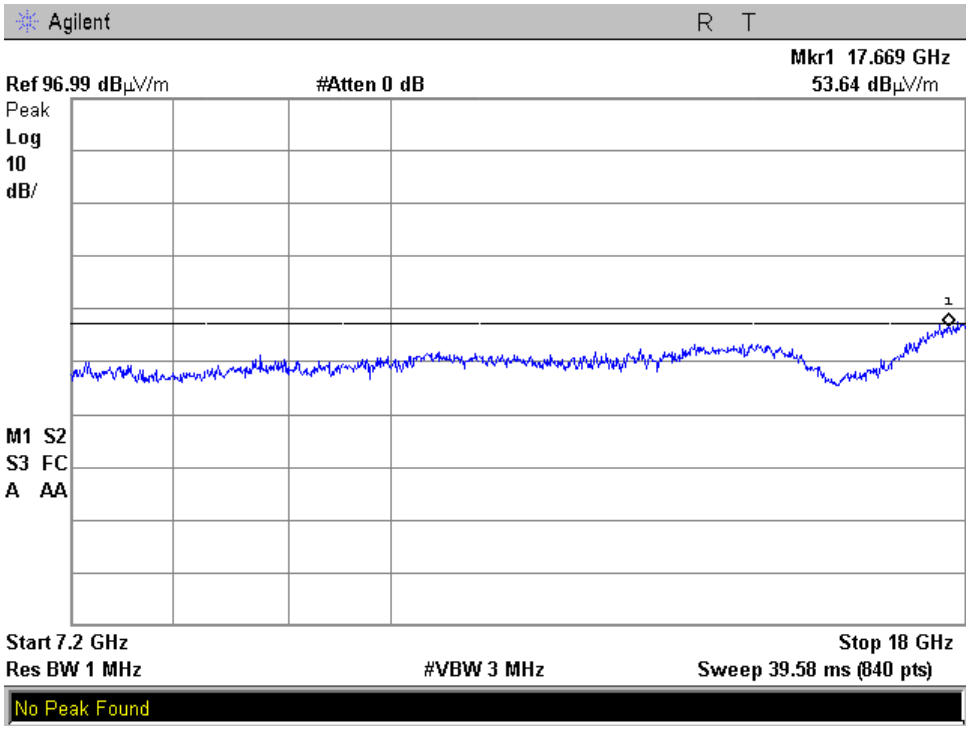
Plot 4.6.66


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
51.93 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

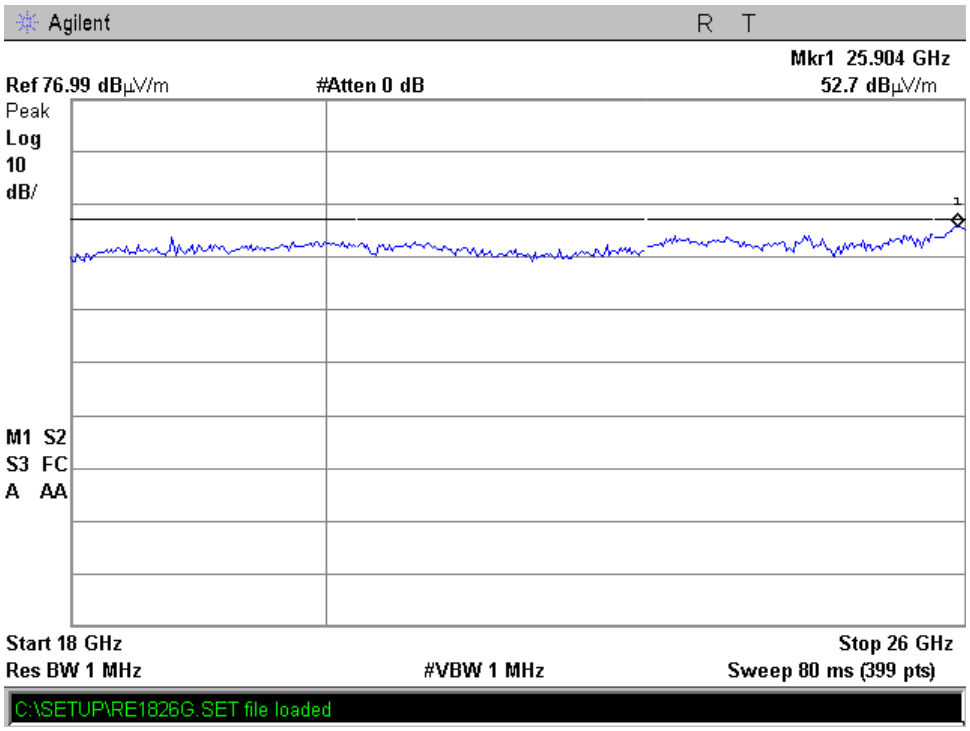
Frequency 5785 MHz
Horizontal & Vertical Polarization
Plot 4.6.67



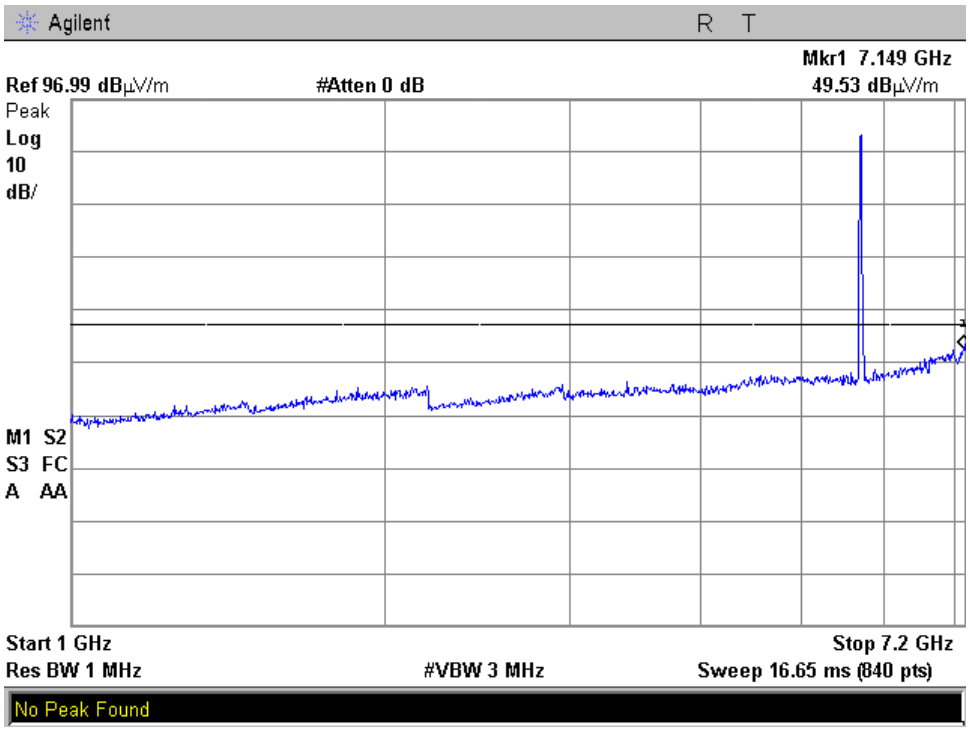
Plot 4.6.68



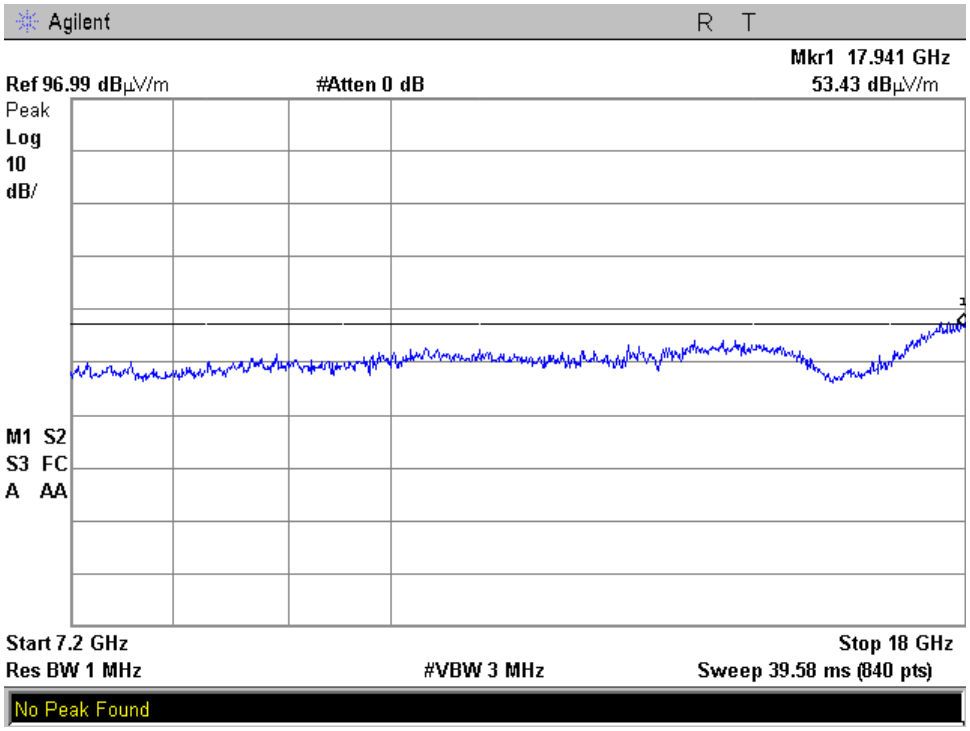
Plot 4.6.69


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.7 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

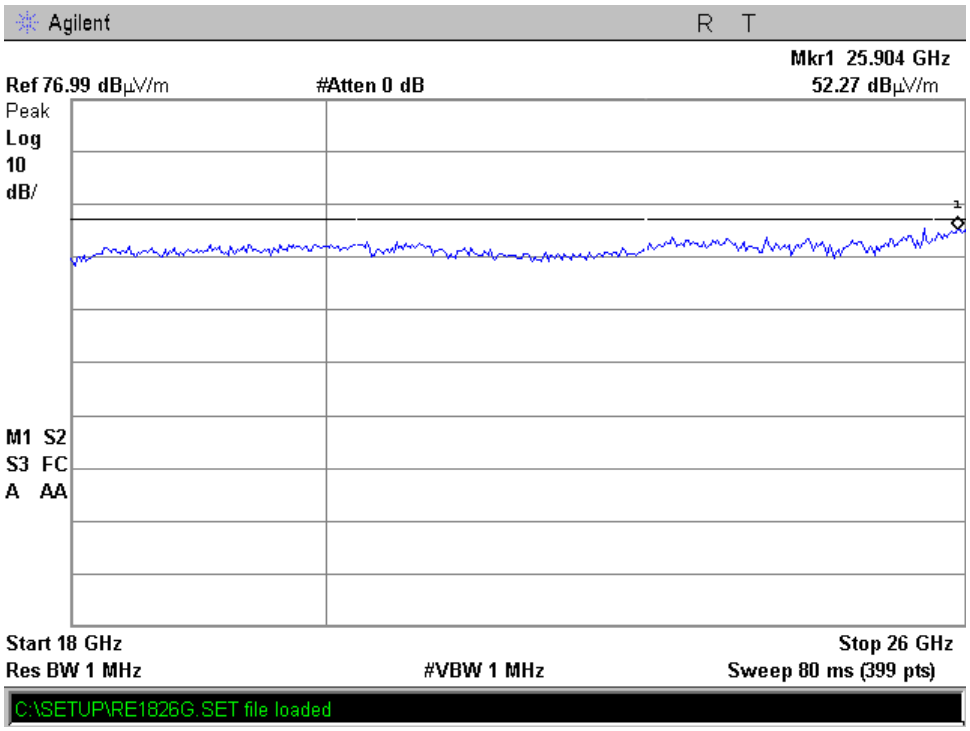
Frequency 5805 MHz
Horizontal & Vertical Polarization
Plot 4.6.70



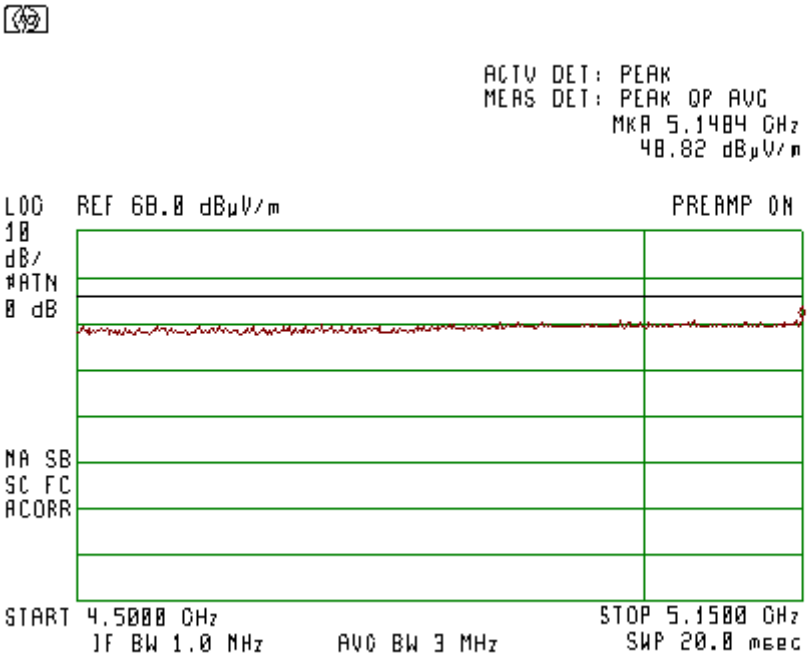
Plot 4.6.71



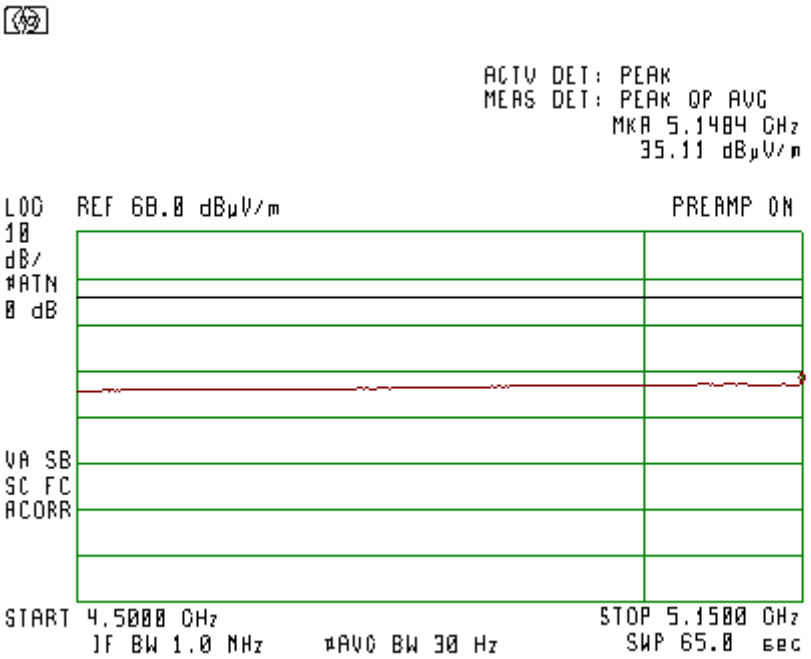
Plot 4.6.72


Agilent
R T
Mkr1 25.904 GHz
Ref 76.99 dBµV/m
#Atten 0 dB
52.27 dBµV/m
Peak
Log
10
dB/
M1 S2
S3 FC
A AA
Start 18 GHz
Stop 26 GHz
Res BW 1 MHz
#VBW 1 MHz
Sweep 80 ms (399 pts)
C:\SETUP\RE1826G.SET file loaded

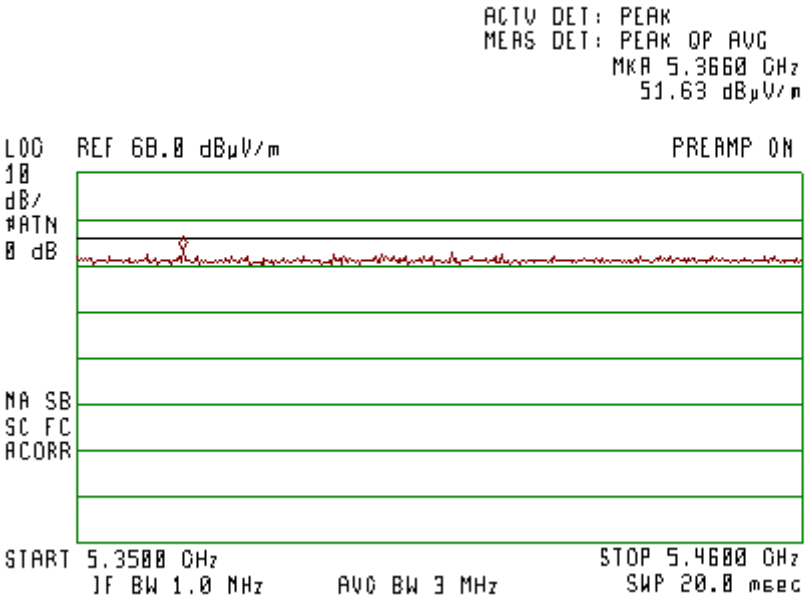
mode a 5180 MHz
Restricted Band (4.5-5.15 GHz)
Horizontal & Vertical Polarization
Peak
Plot 4.6.73



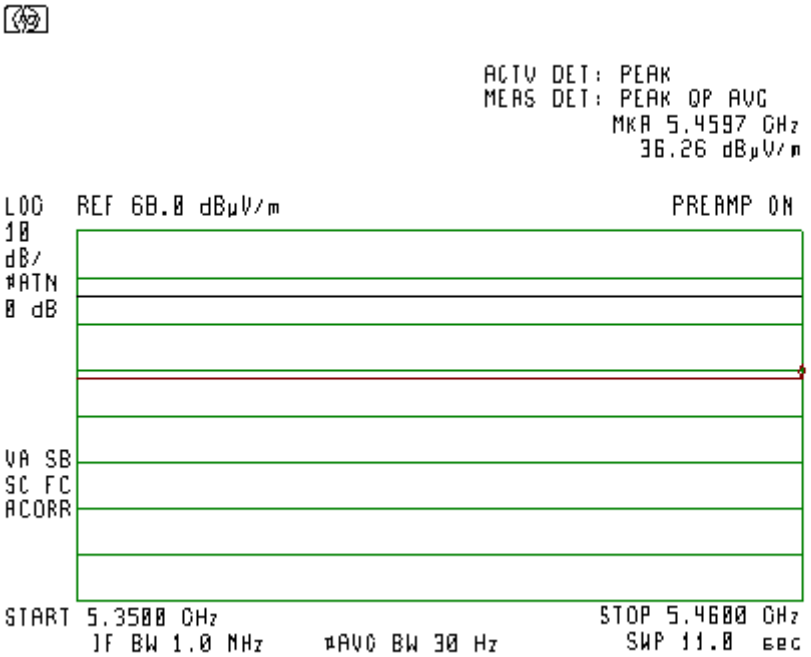
Horizontal Vertical Polarization
Average
Plot 4.6.74



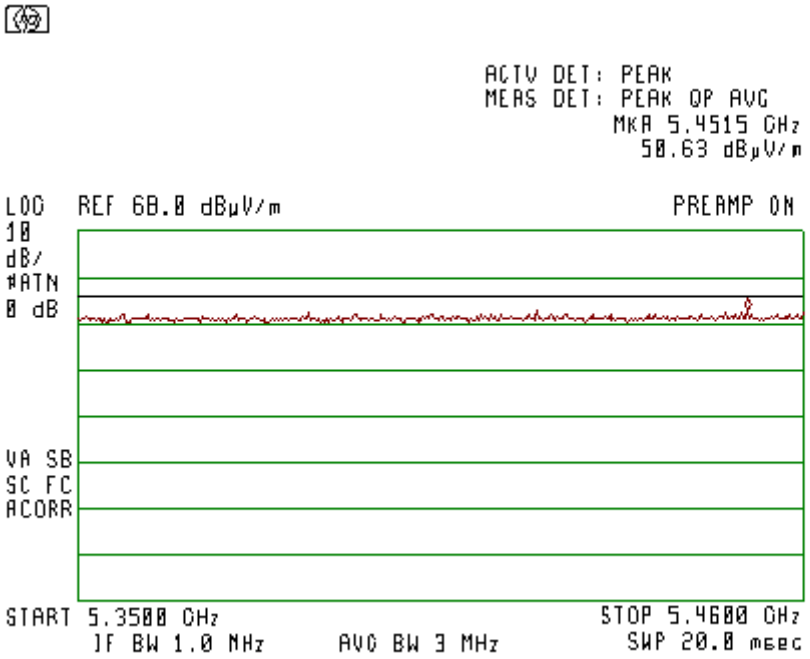
Restricted Band (5.35-5.46 GHz)
5320 MHz
Horizontal & Vertical Polarization
Peak
Plot 4.6.75



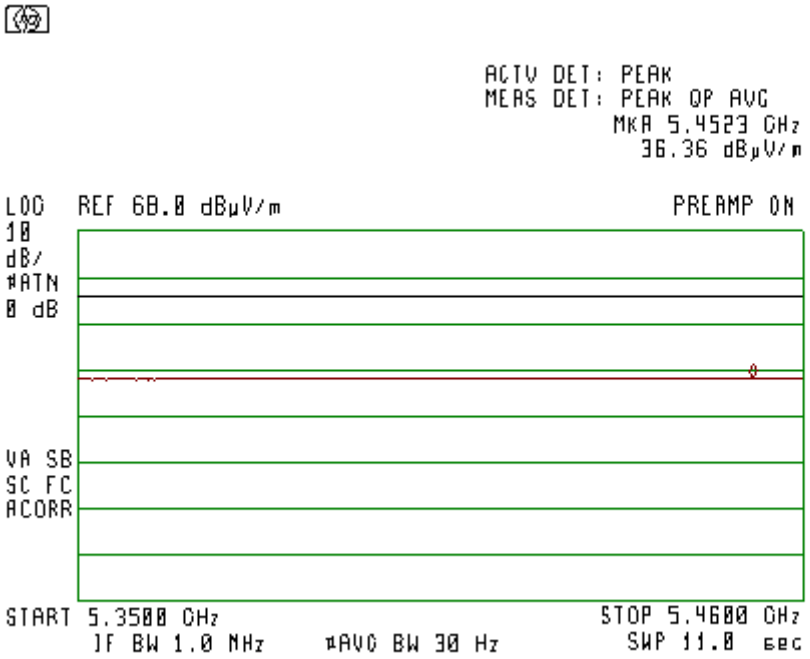
Horizontal Vertical Polarization
Average
Plot 4.6.76



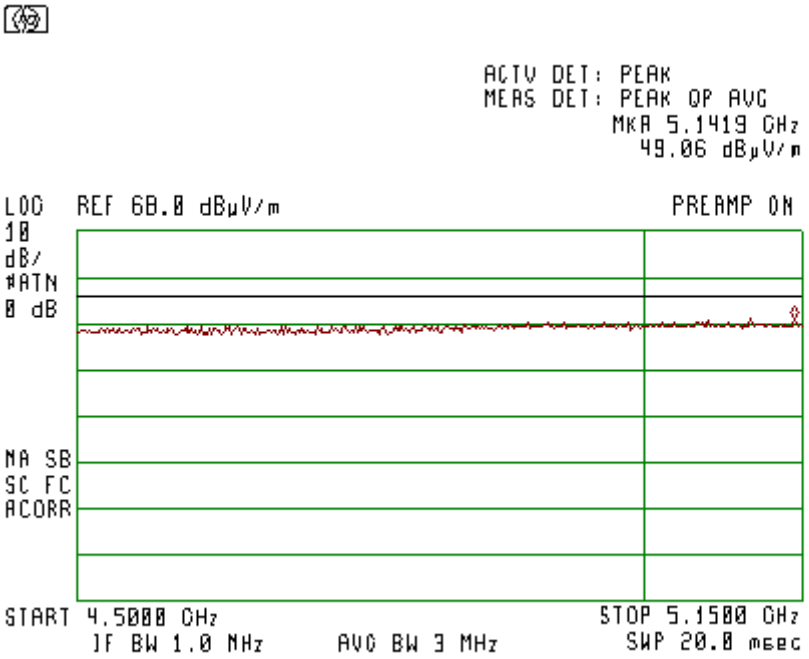
mode a 5500 MHz
Restricted Band (5.35-5.46 GHz)
Horizontal Polarization
Peak
Plot 4.6.77



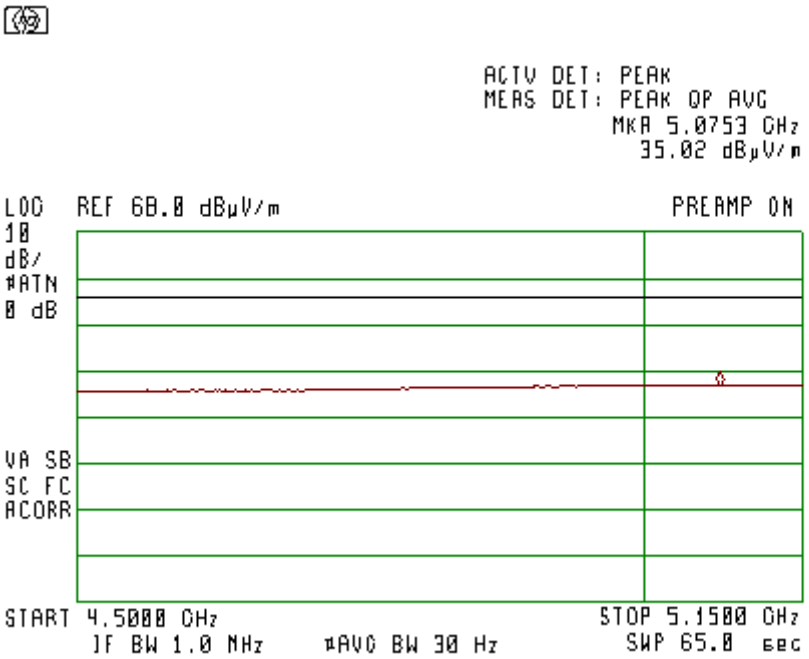
Horizontal Polarization
Average
Plot 4.6.78



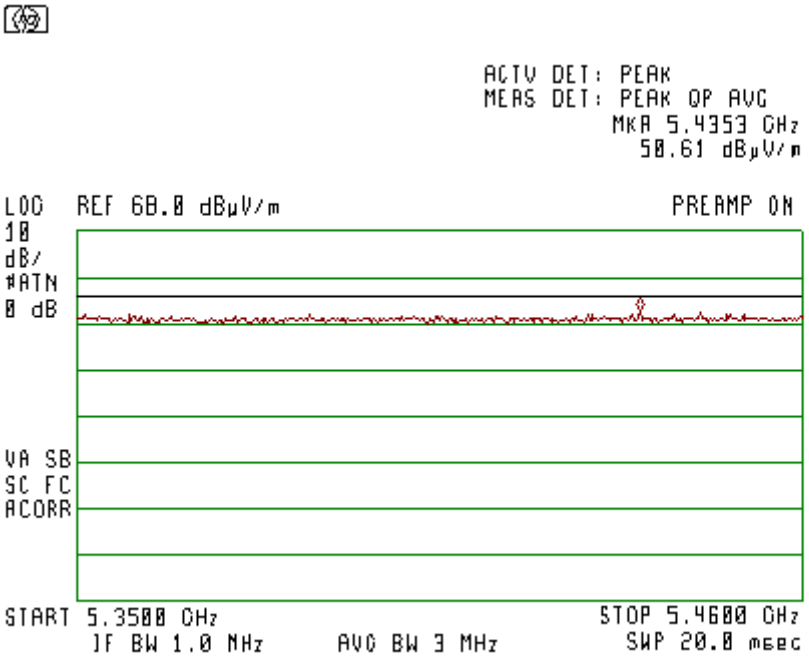
5180 MHz mode n
Restricted Band (4.5-5.15 GHz)
Horizontal Vertical Polarization
Peak
Plot 4.6.79



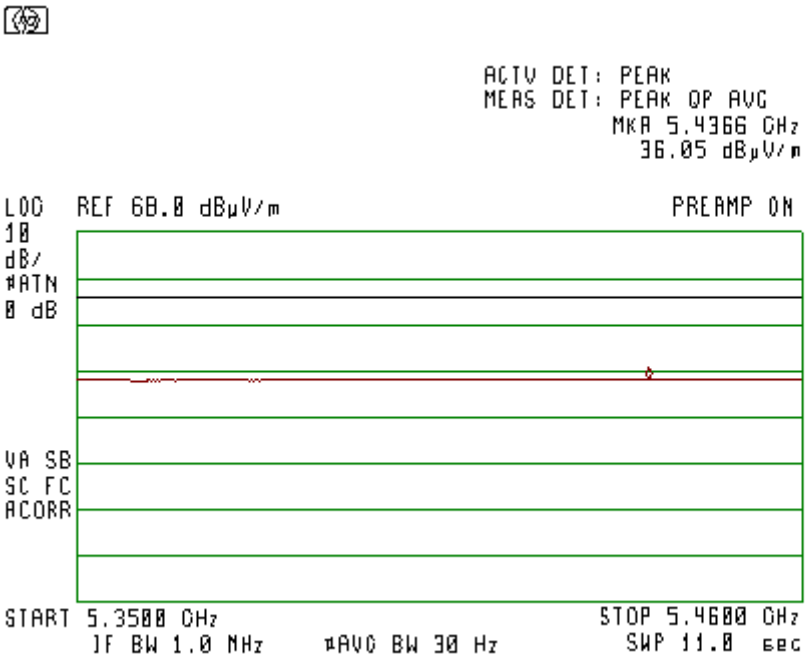
Horizontal Vertical Polarization Average
Plot 4.6.80



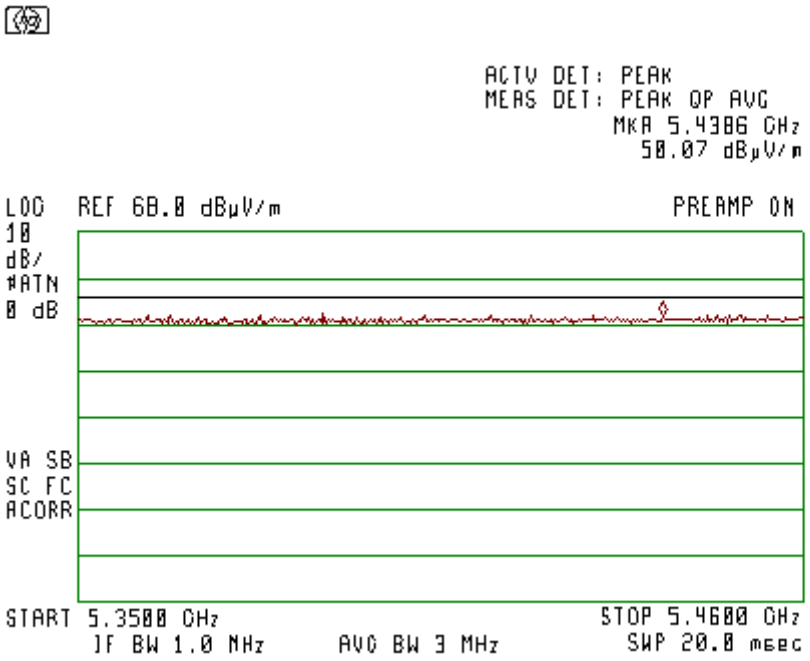
mode n 5320 MHz
Restricted Band (5.35-5.46 GHz)
Horizontal Polarization
Peak
Plot 4.6.81



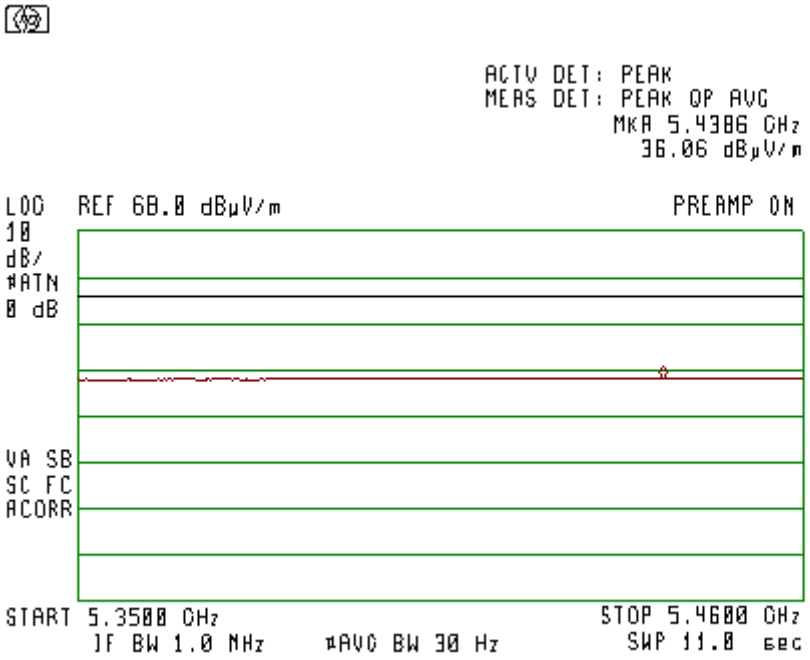
Horizontal & Vertical Polarization
Average
Plot 4.6.82



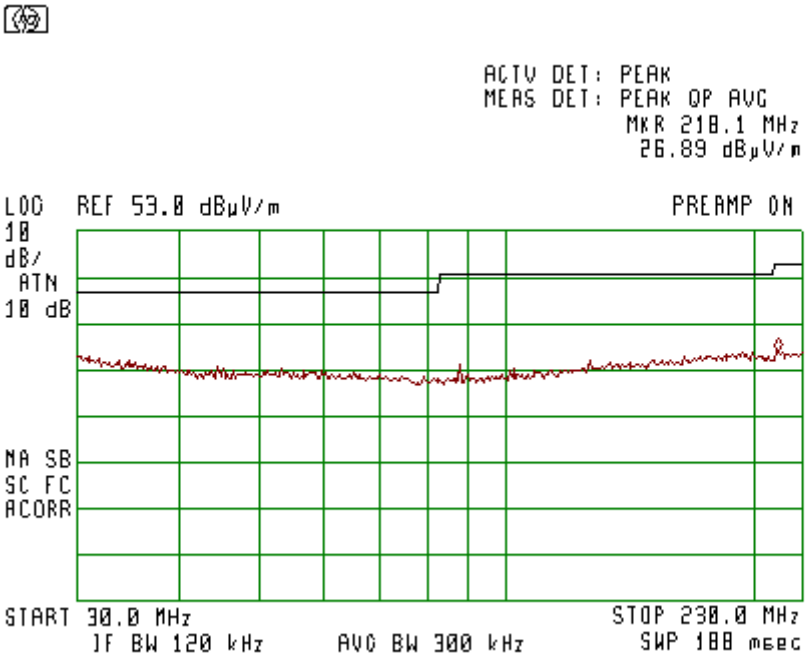
mode n 5500 MHz
Restricted Band (5.35-5.46 GHz)
Horizontal Polarization
Peak
Plot 4.6.83



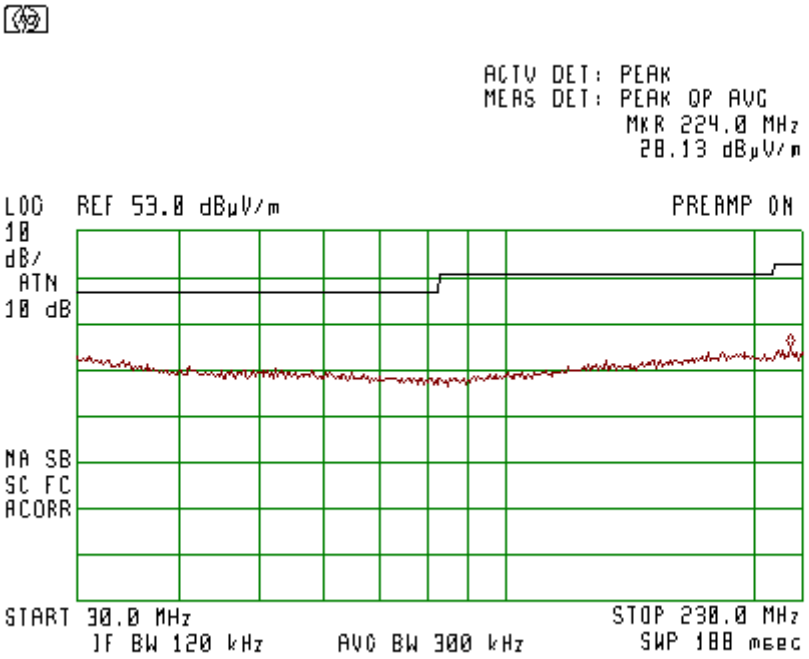
Horizontal Polarization
Average
Plot 4.6.84



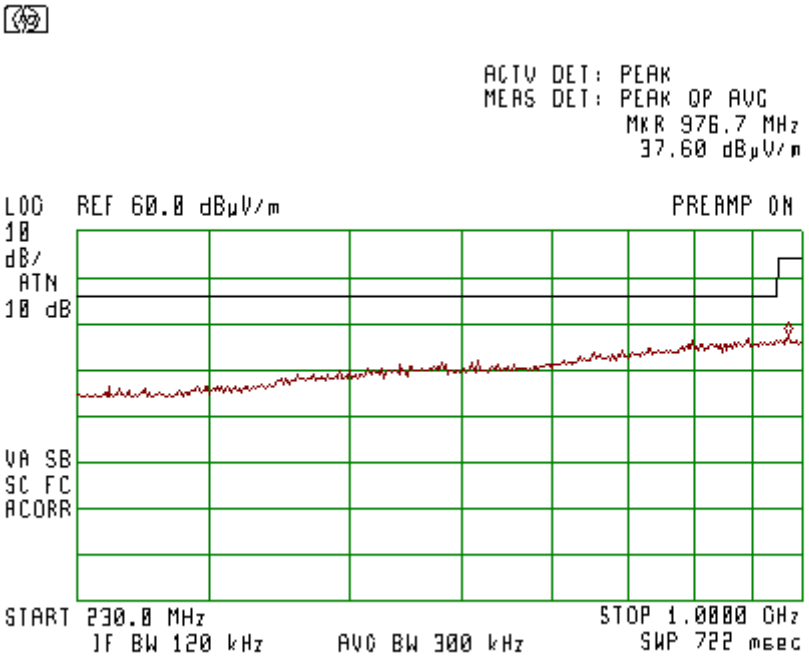
Radiated Spurious Emissions Below 1 GHz
Worst case for all modes and all frequencies
Horizontal Polarization
Plot 4.6.85



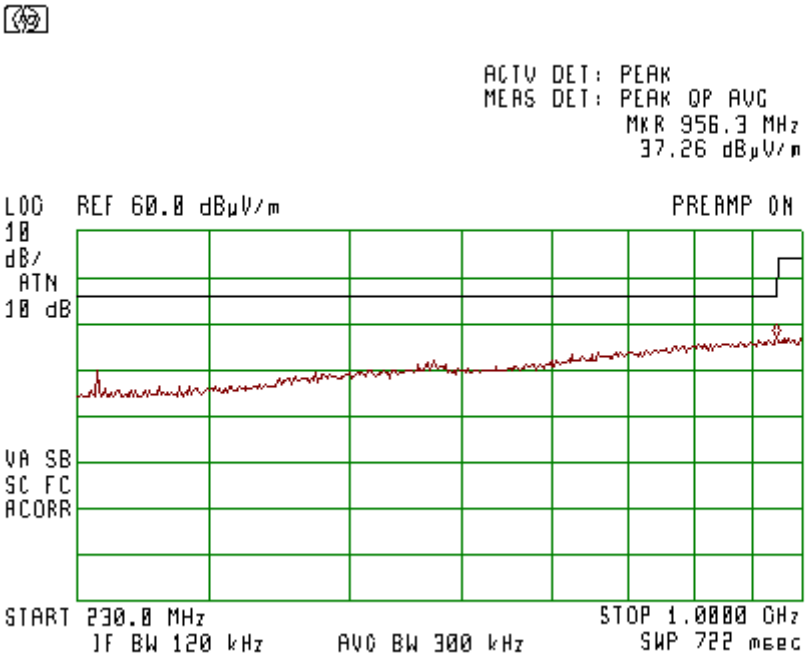
Vertical Polarization
Plot 4.6.86



Horizontal Polarization
Plot 4.6.87



Vertical Polarization
Plot 4.6.88



4.7. Frequency Stability

Reference document:	**47 CFR §15.407(g)**		
Test Requirements:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.		
Test setup:	See sec 2.1	**Pass**	
Method of testing:	Conducted		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 100kHz, VBW: 300kHz		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	Data indicates that the fundamental emission is maintained within the band of operation under extreme conditions.	See Plot 4.7.1 to Plot 4.7.32	

Test results:

Voltage Variation

5150-5350 MHz

Frequency [MHz]	Data Rate [Mbps]	Extreme Conditions	Edge of 26 dB Bandwidth [MHz]	Margin [MHz]
802.11a Mode				
5180	54	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5170	20.22
5320	54	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5330	20.09
802.11n Mode				
5180	65	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5170	20.22
5320	65	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5330	20.09

5470-5725 MHz

Frequency [MHz]	Data Rate [Mbps]	Extreme Conditions	Edge of 26 dB Bandwidth [MHz]	Margin [MHz]
802.11a Mode				
5500	54	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5485	14.61
5700	54		5710	14.79
802.11n Mode				
5500	65	Ambient temperature 22 °c, Input Voltage 3.145-4.255 Vdc	5485	14.61
5700	65		5710	14.79

Temperature Variation

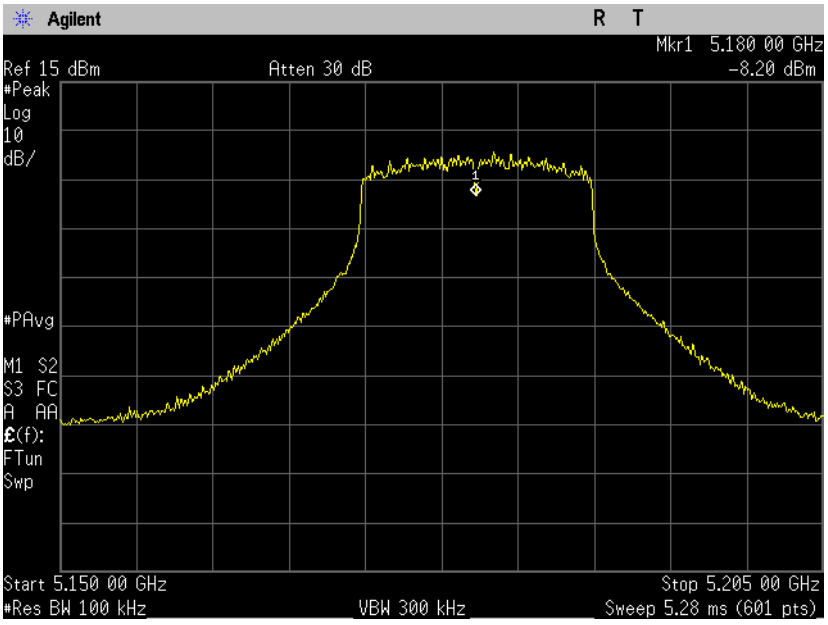
5150-5350 MHz

Frequency [MHz]	Data Rate [Mbps]	Extreme Conditions	Edge of 26 dB Bandwidth [MHz]	Margin [MHz]
802.11a Mode				
5180	54	Ambient temperature -10 to +50°c, Input Voltage 3.7Vdc	5170	20.45
5320	54	Ambient temperature -10 to +50 °c, Input Voltage 3.7Vdc	5330	19.94
802.11n Mode				
5180	65	Ambient temperature -10 to +50°c, Input Voltage 3.7Vdc	5170	20.45
5320	65	Ambient temperature -10 to +50 °c, Input Voltage 3.7Vdc	5330	19.94

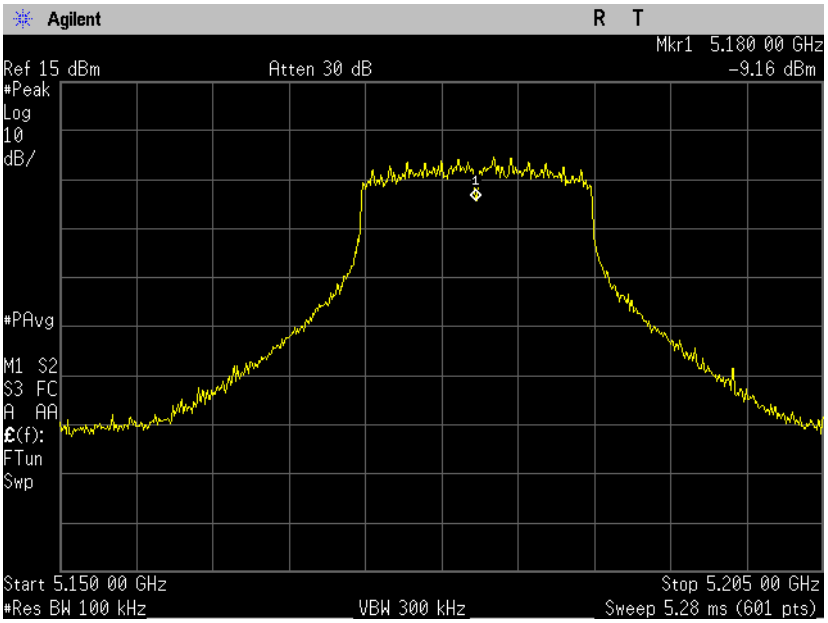
5470-5725 MHz

Frequency [MHz]	Data Rate [Mbps]	Extreme Conditions	Edge of 26 dB Bandwidth [MHz]	Margin [MHz]
802.11a Mode				
5500	54	Ambient temperature -10 to +50°c, Input Voltage 3.7Vdc	5485	15.05
5700	54		5701	15.18
802.11n Mode				
5500	65	Ambient temperature -10 to +50°c, Input Voltage 3.7Vdc	5485	15.05
5700	65		5701	15.18

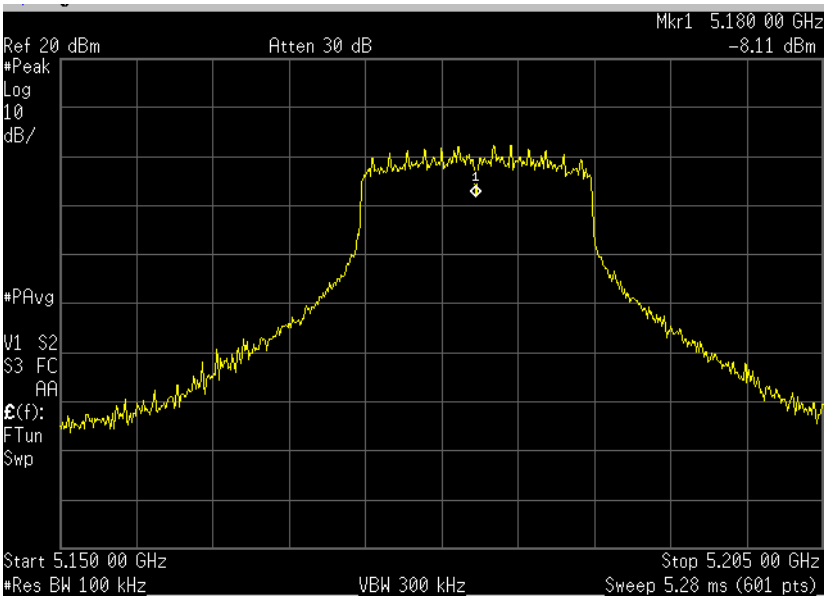
Voltage Variation
Frequency 5150-5350 MHz, Carrier frequency 5180 MHz,
115% of Vnom a mode
Plot 4.7.1



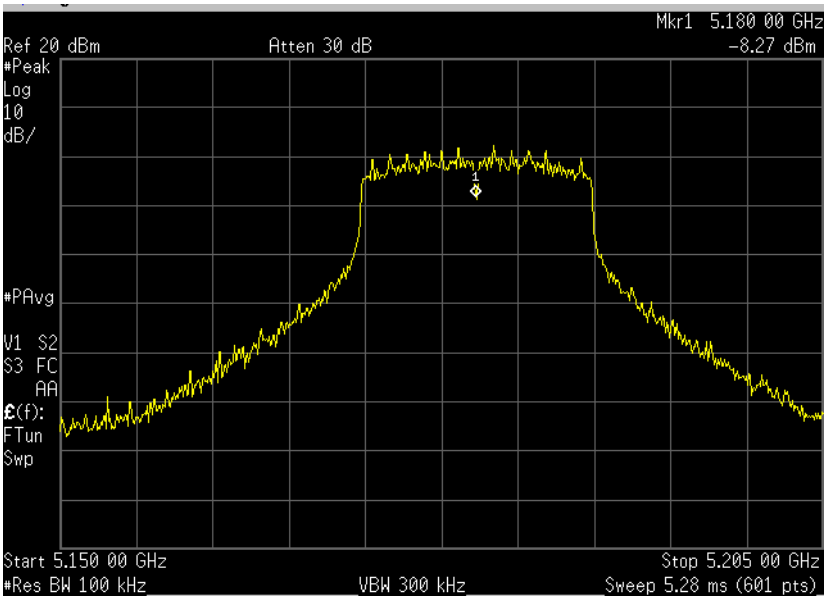
85% of Vnom
Plot 4.7.2



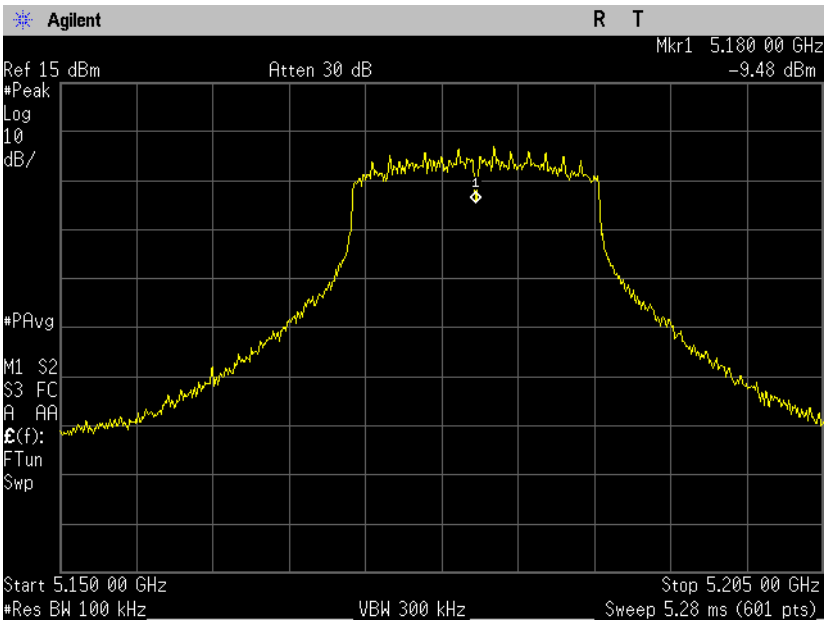
Voltage Variation
Frequency 5150-5350 MHz, Carrier frequency 5180 MHz, A mode
Ambient temperature -10 °c
Plot 4.7.3



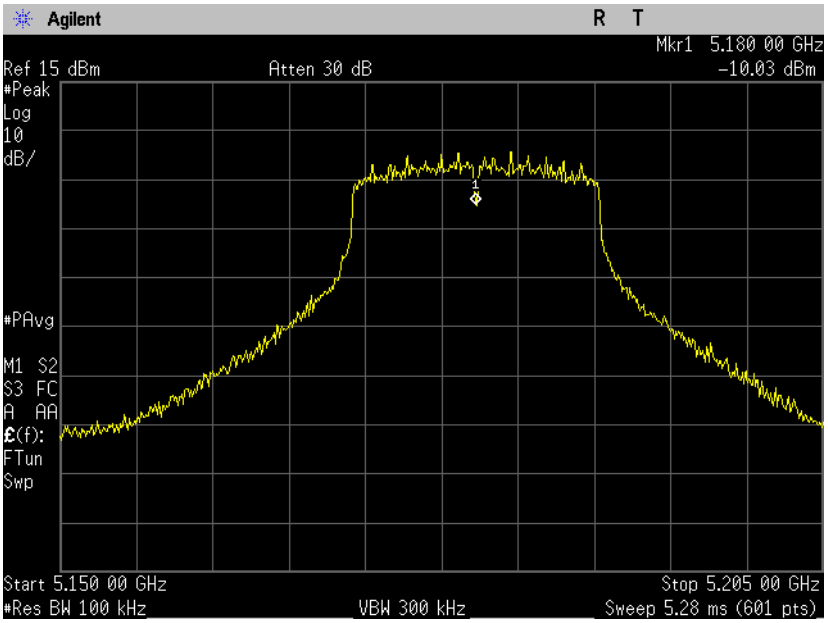
Ambient temperature +50 °c
Plot 4.7.4



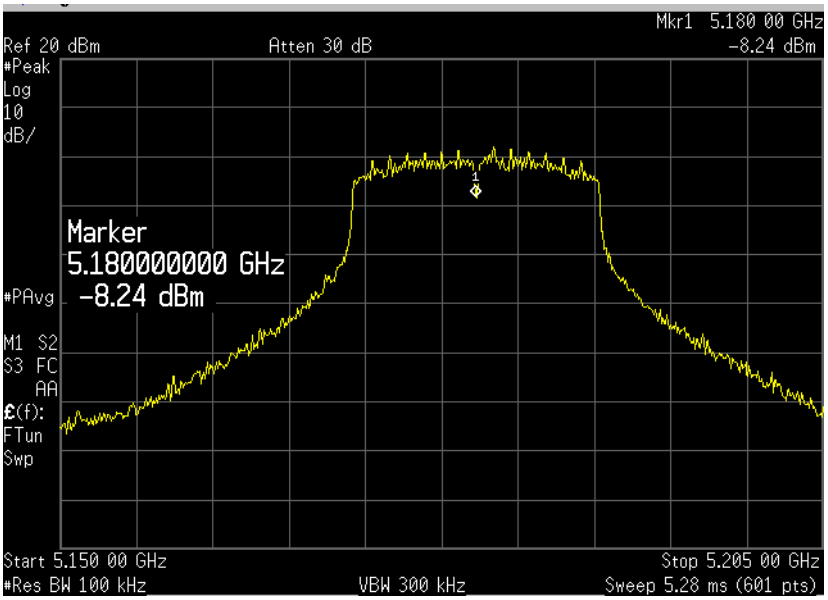
Frequency 5150-5350 MHz, Carrier frequency 5180 MHz,
115% of Vnom n mode
Plot 4.7.5



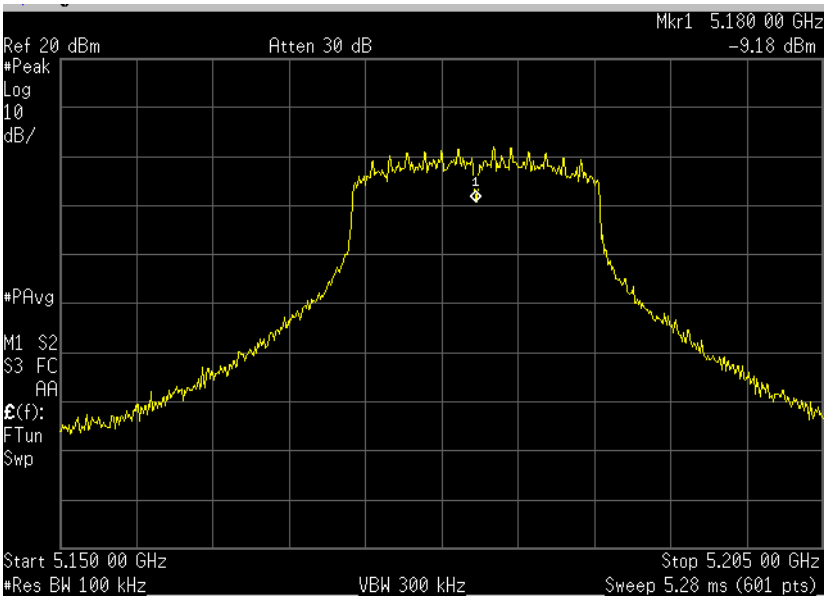
85% of Vnom
Plot 4.7.6



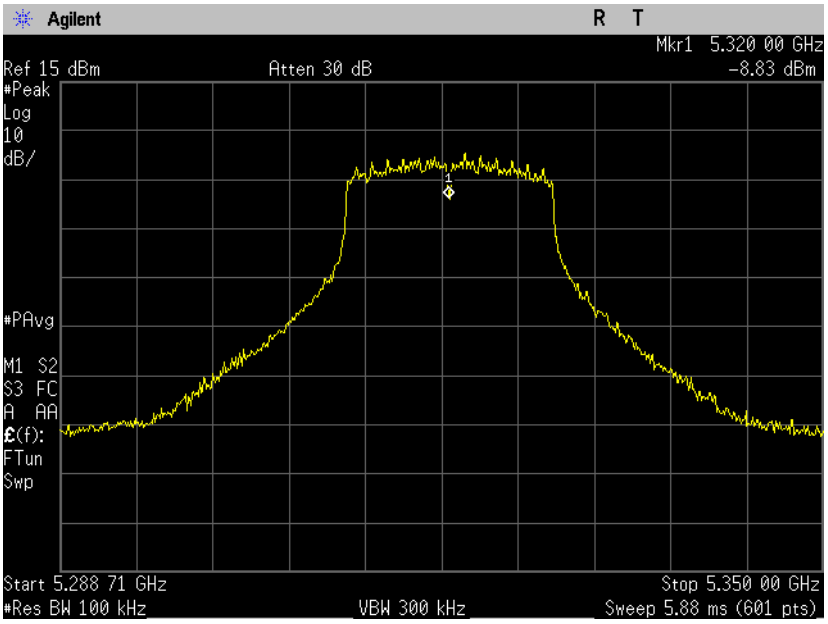
Frequency 5150-5350 MHz, Carrier frequency 5180 MHz, N mode
Ambient temperature -10 °c
Plot 4.7.7



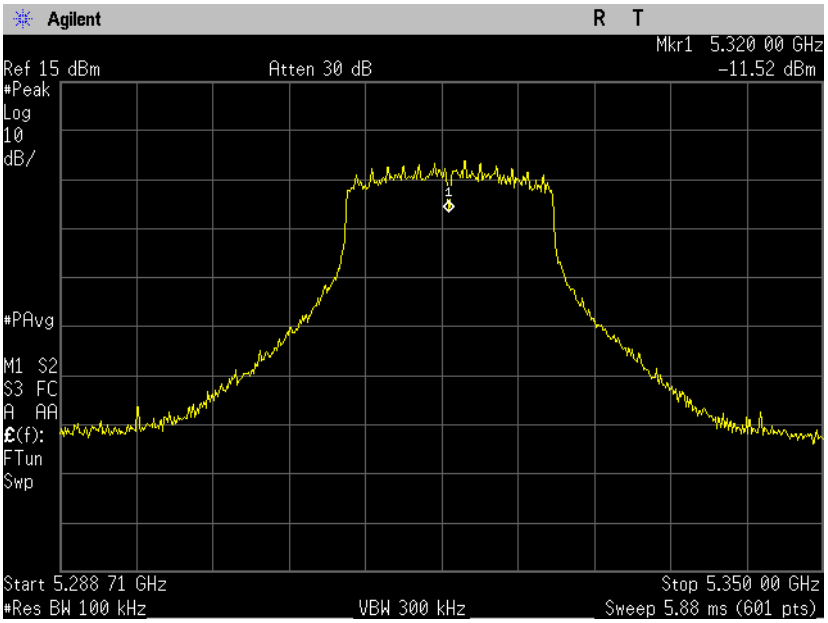
Ambient temperature +50 °c
Plot 4.7.8



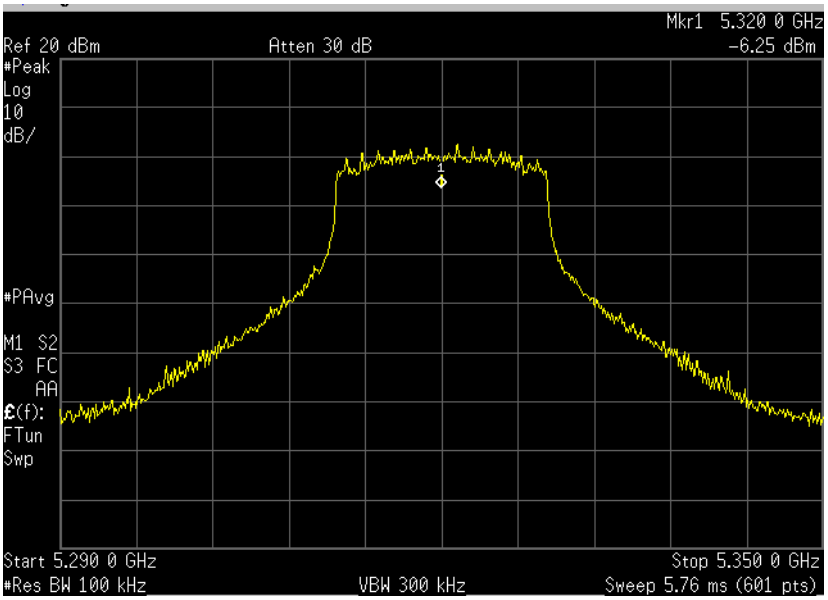
Carrier frequency 5320 MHz,a mode
115% of Vnom
Plot 4.7.9



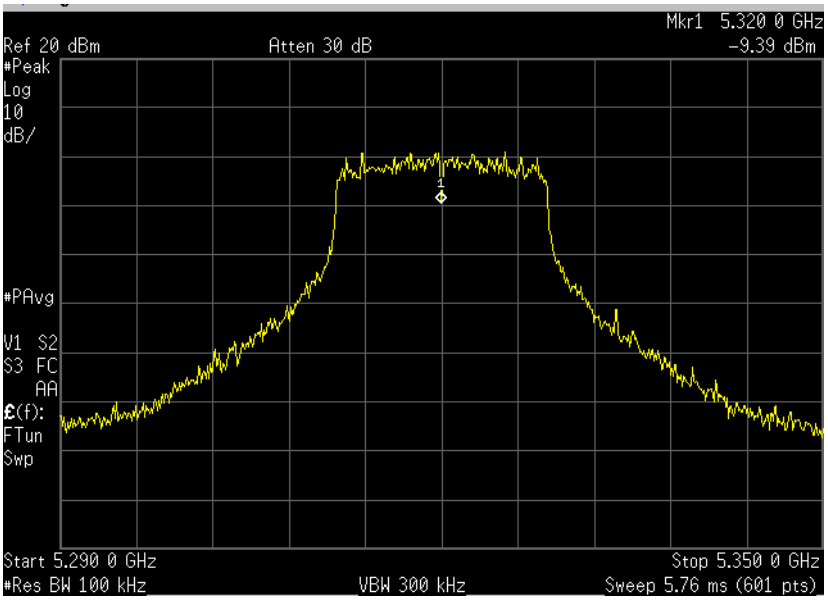
85% of Vnom
Plot 4.7.10



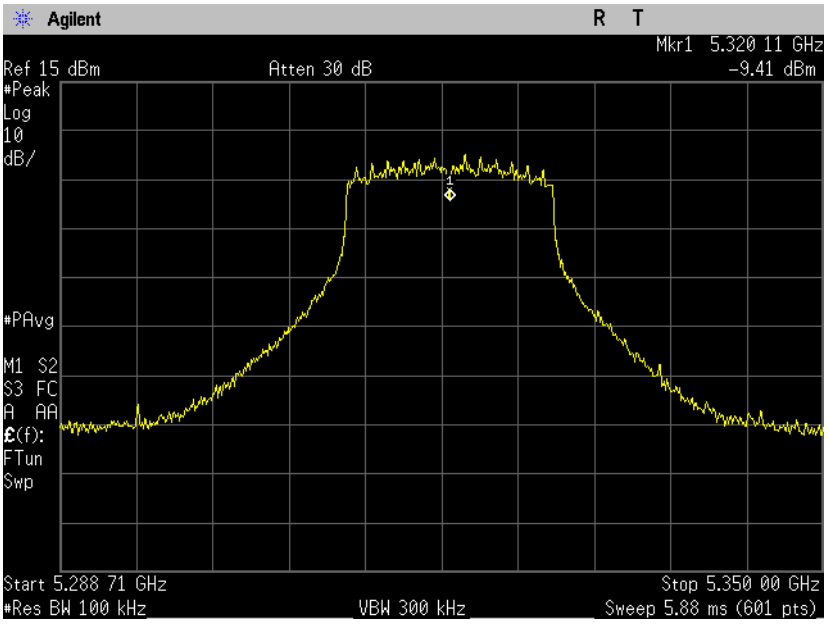
Carrier frequency 5320 MHz a mode
Ambient temperature -10 °c
Plot 4.7.11



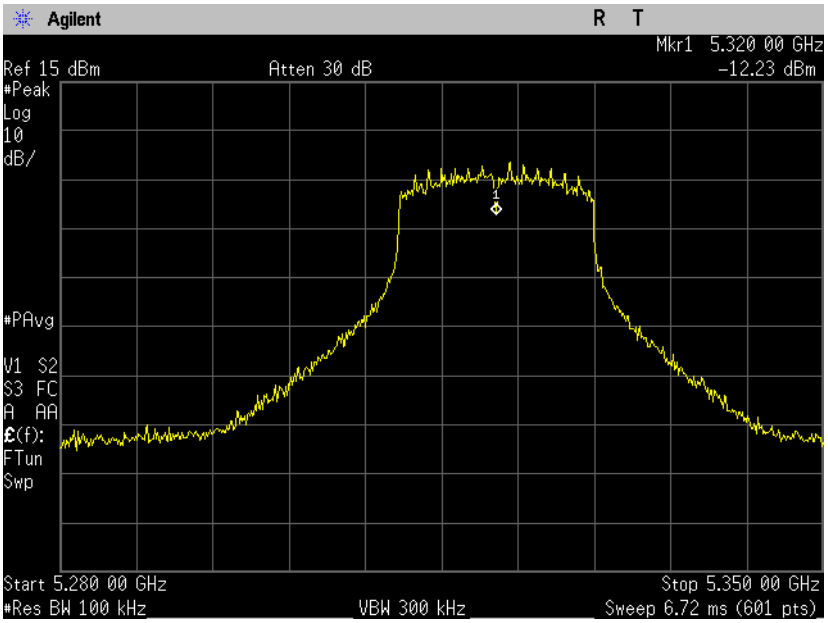
Ambient temperature +50 °c
Plot 4.7.12



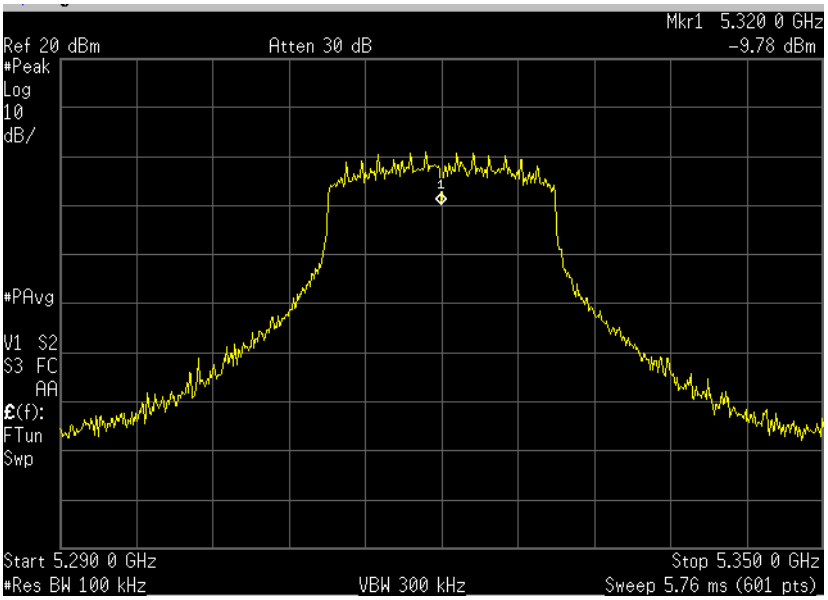
Carrier frequency 5320 MHz n mode
115% of Vnom
Plot 4.7.13



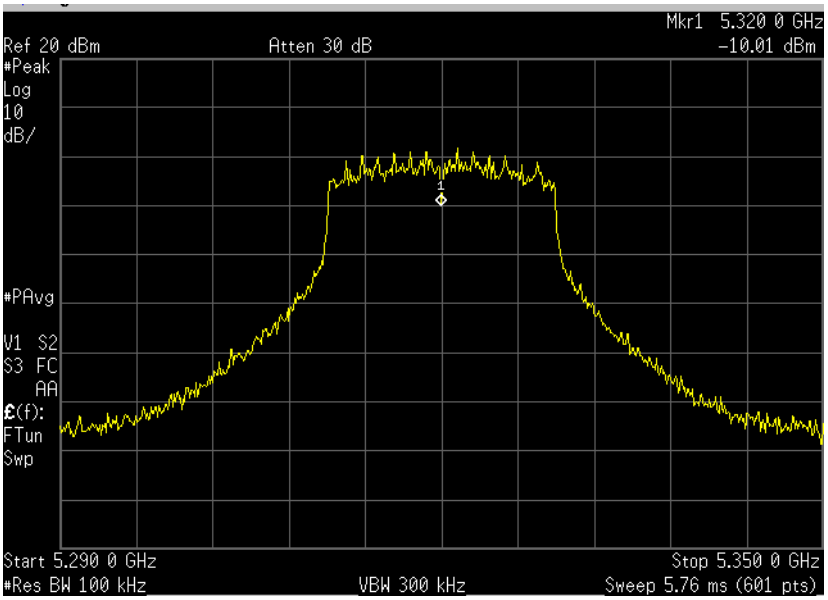
85% of Vnom N mode
Plot 4.7.14



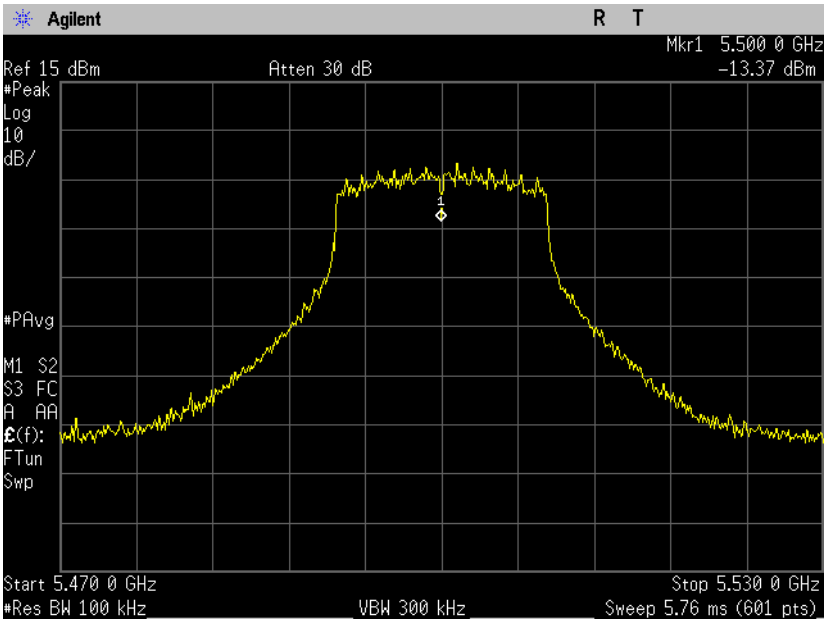
Carrier frequency 5320 MHz n mode
Ambient temperature -10 °c
Plot 4.7.15



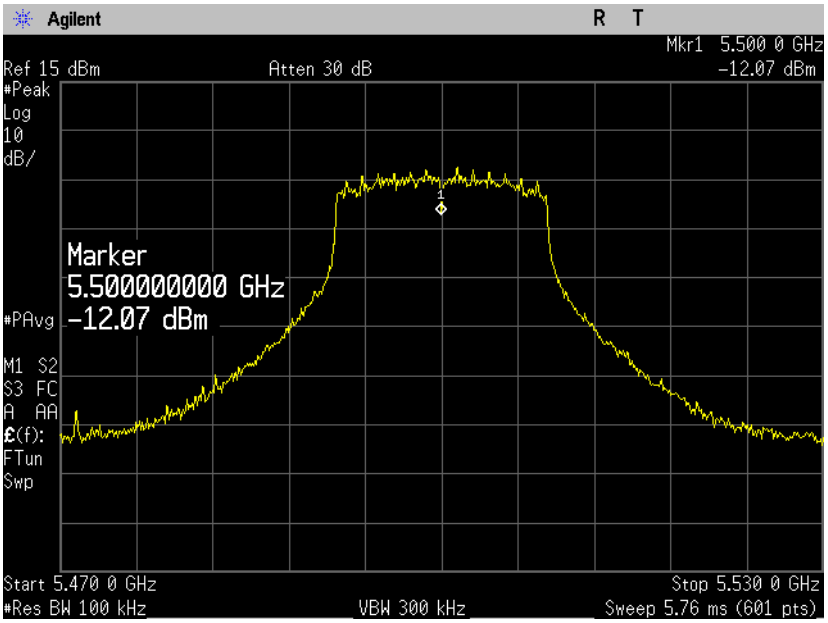
Ambient temperature +50 °c
Plot 4.7.16



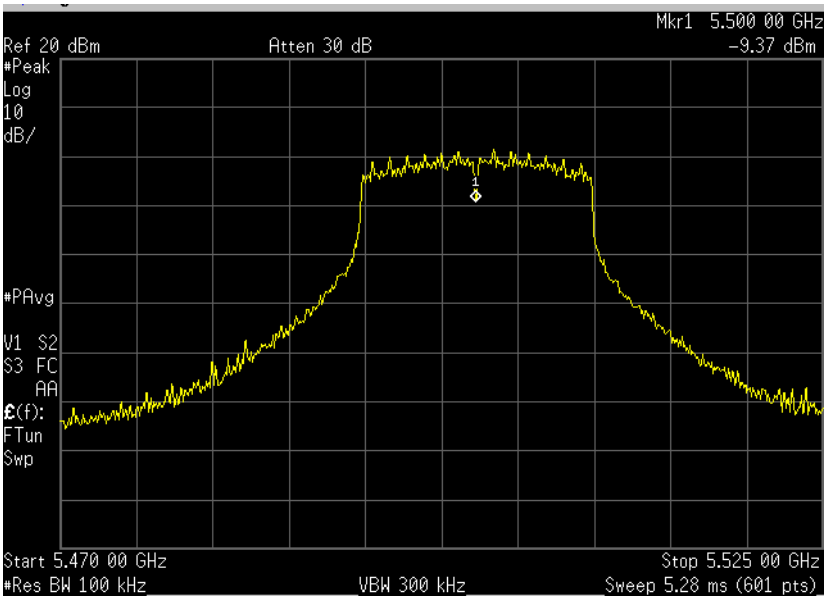
Frequency 5470-5725 MHz
Carrier frequency 5500 MHz a mode
115% of V mon
Plot 4.7.17



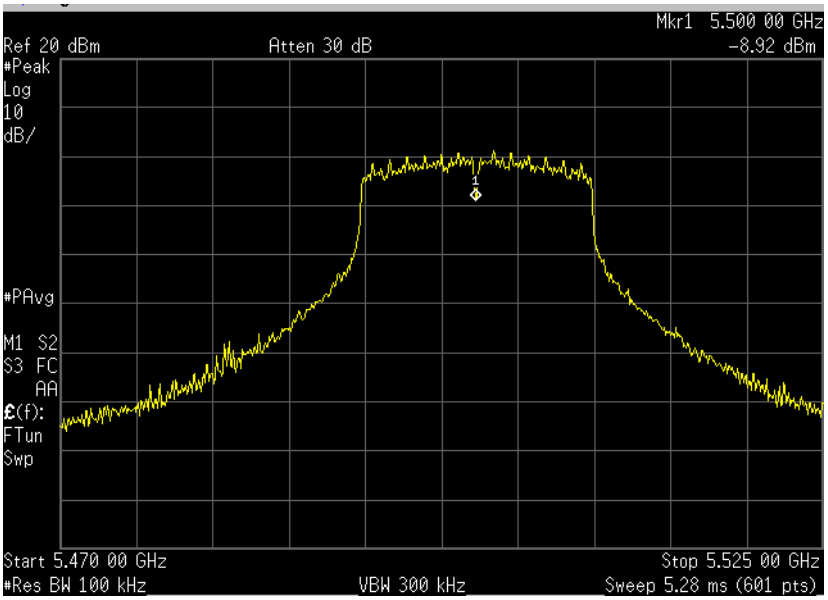
85% of V mon
Plot 4.7.18



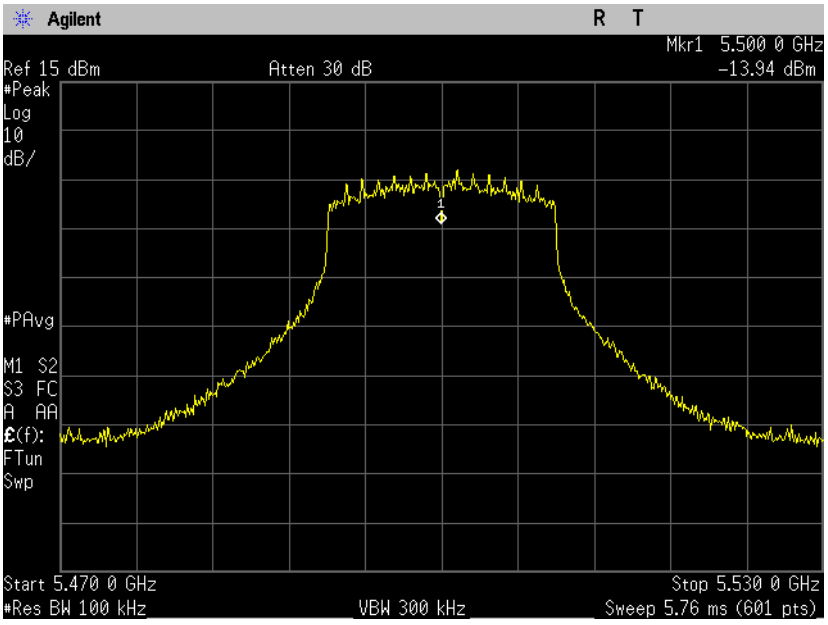
Frequency 5470-5725 MHz
Carrier frequency 5500 MHz a mode
Ambient temperature -10 °c
Plot 4.7.19



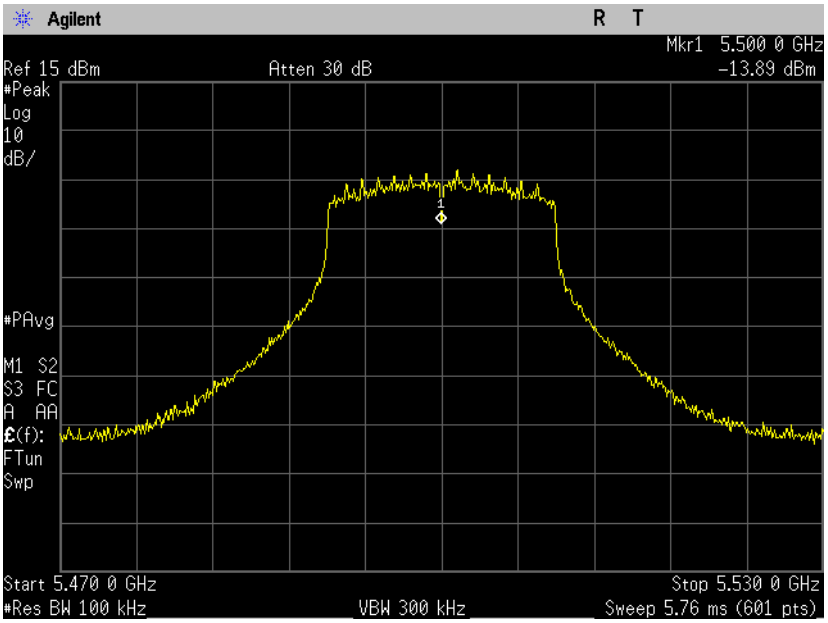
Ambient temperature +50°c
Plot 4.7.20



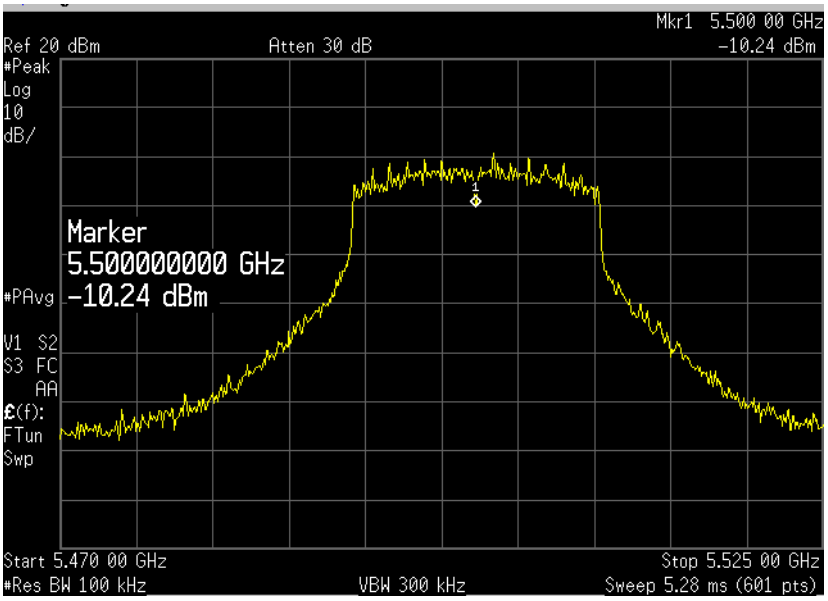
Frequency 5470-5725 MHz
Carrier frequency 5500 MHz n mode
115% of V mon
Plot 4.7.21



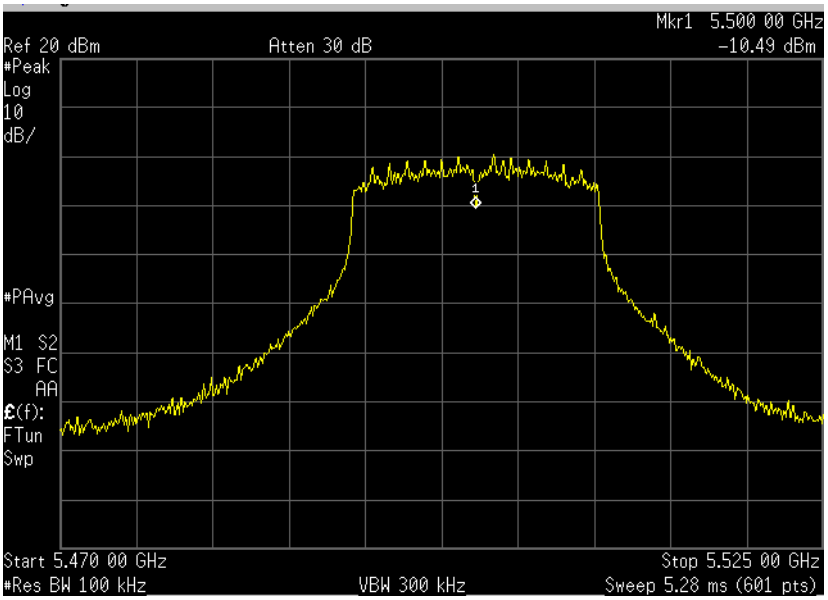
85% of V mon
Plot 4.7.22



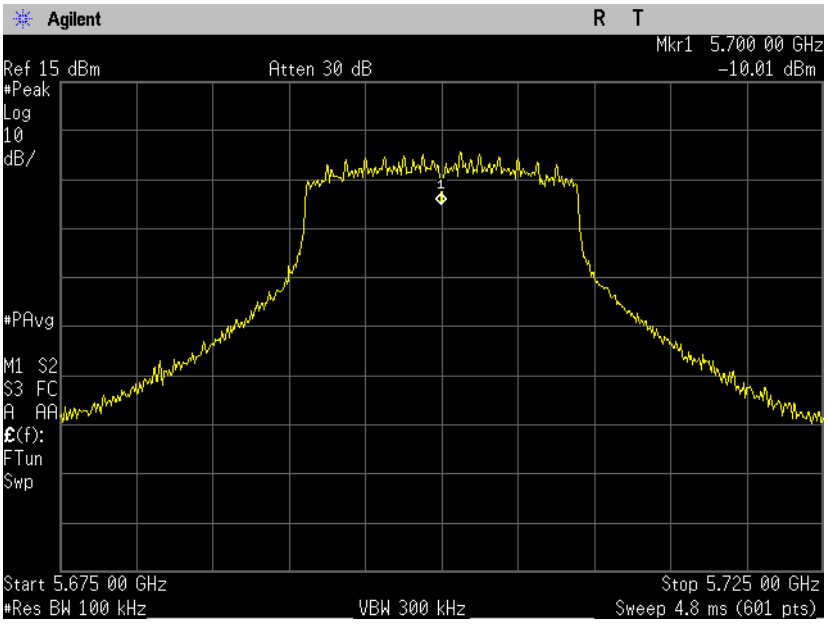
Frequency 5470-5725 MHz
Carrier frequency 5500 MHz n mode
Ambient temperature -10 °c
Plot 4.7.23



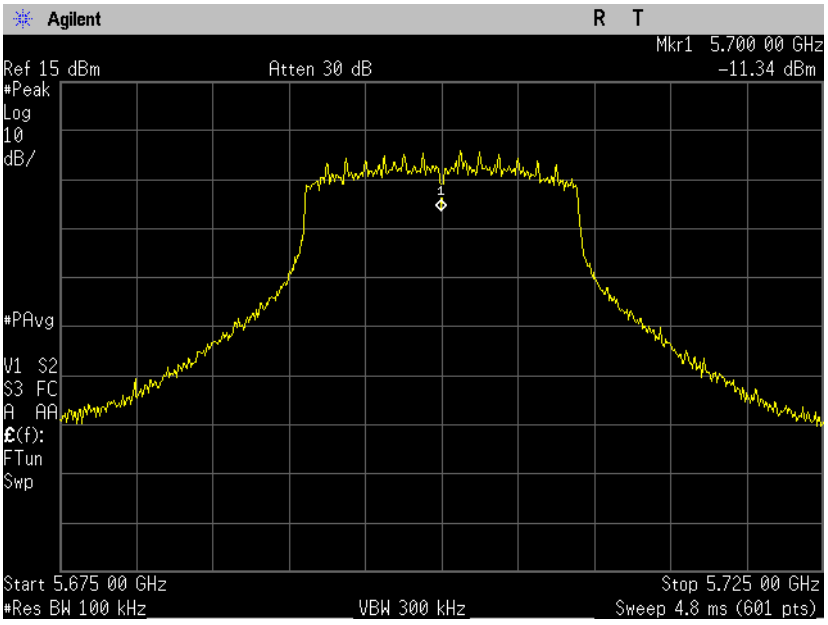
Ambient temperature +50°c
Plot 4.7.24



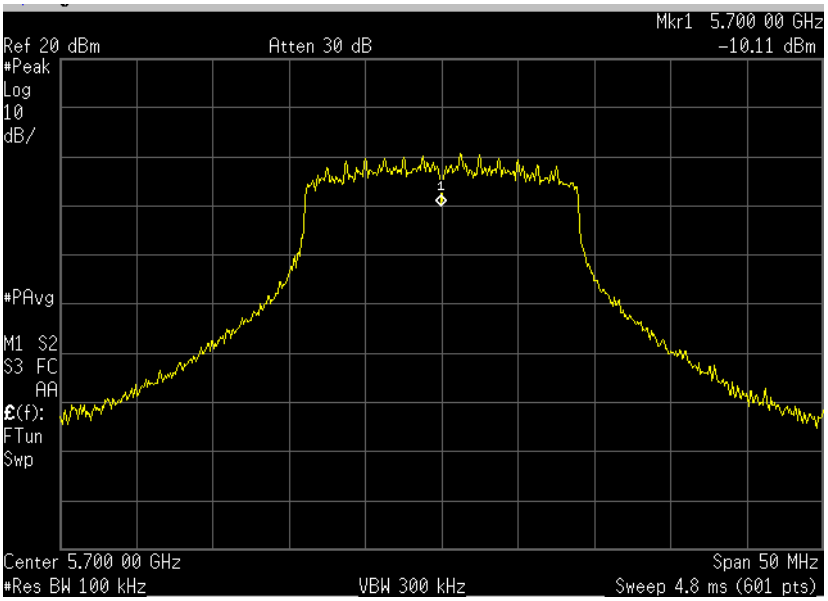
Frequency 5470-5725 MHz
Carrier frequency 5700 MHz n mode
85% of V mon
Plot 4.7.25



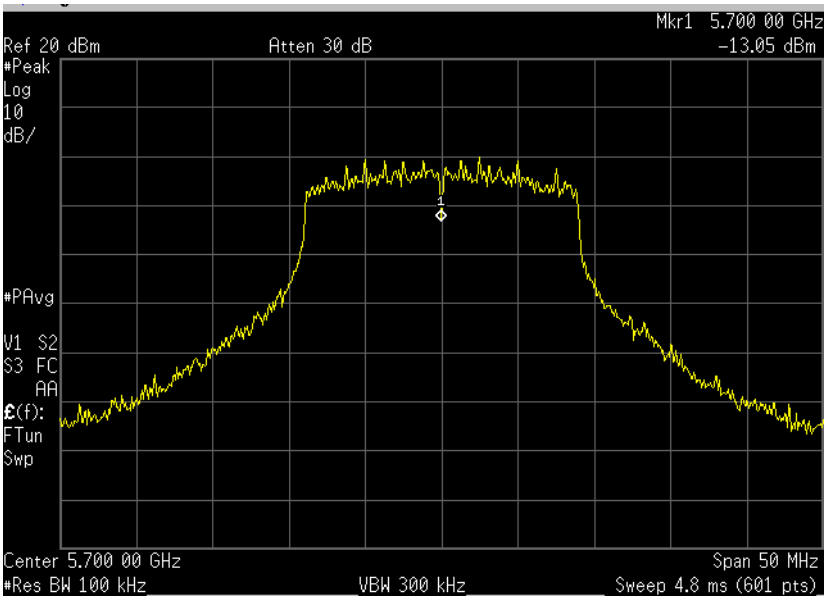
115% of V mon
Plot 4.7.26



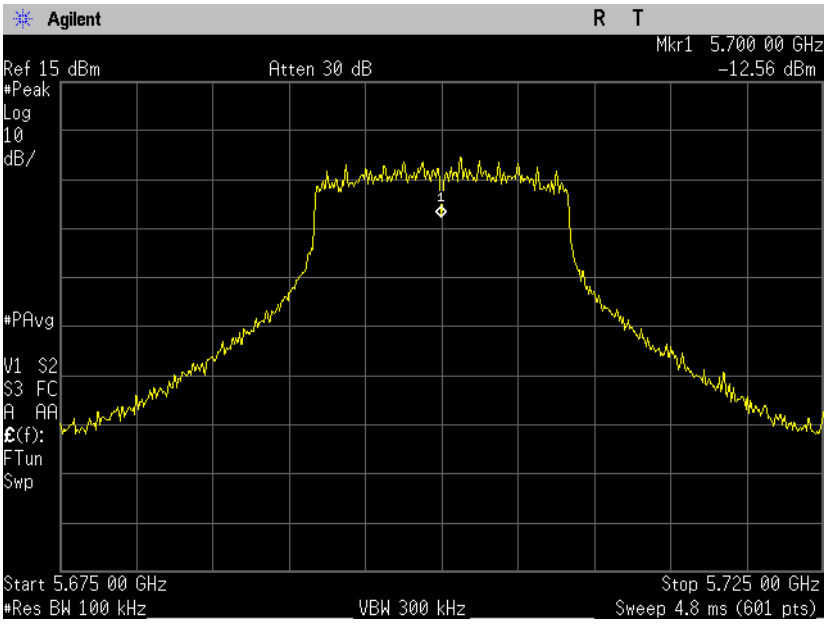
Frequency 5470-5725 MHz
Carrier frequency 5700 MHz n mode
Ambient temperature -10 °c
Plot 4.7.27



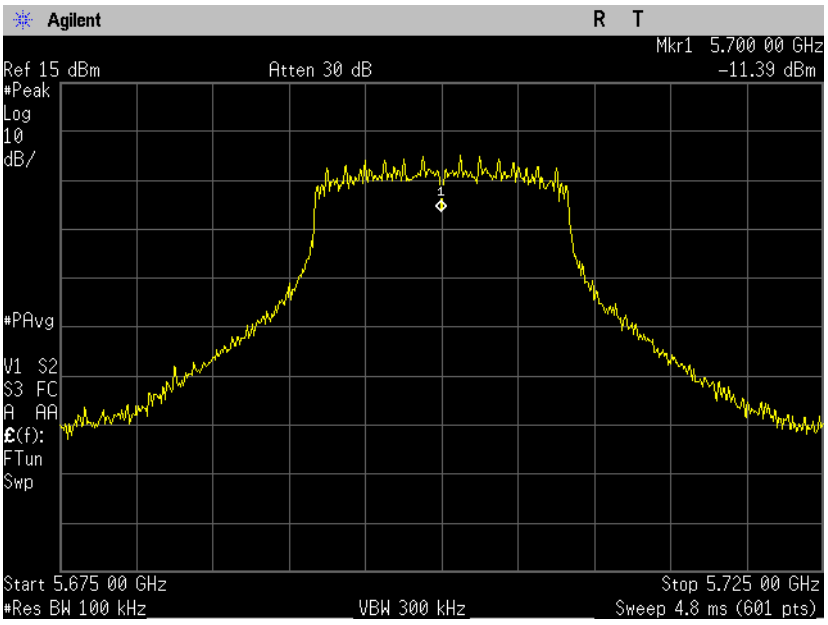
Ambient temperature +50°c
Plot 4.7.28



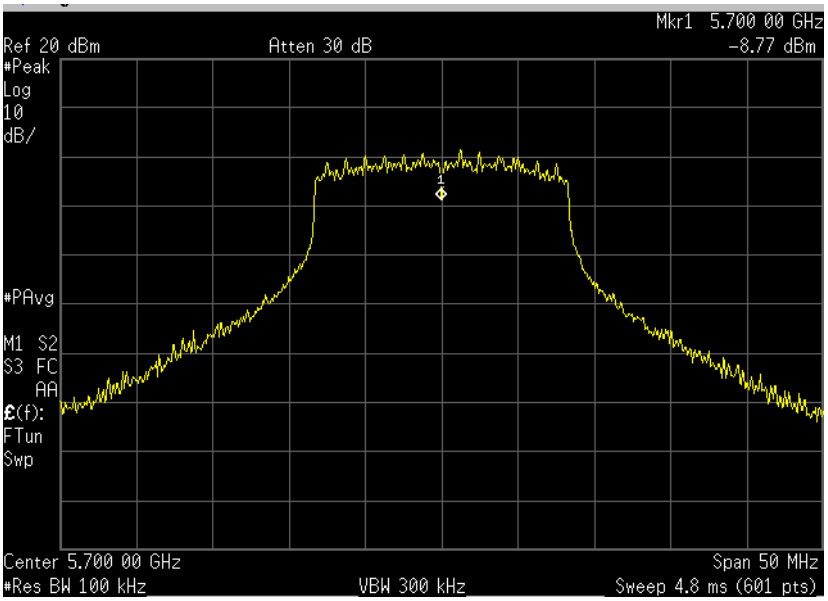
Frequency 5470-5725 MHz
Carrier frequency 5700 MHz a mode
85% of V mon
Plot 4.7.29



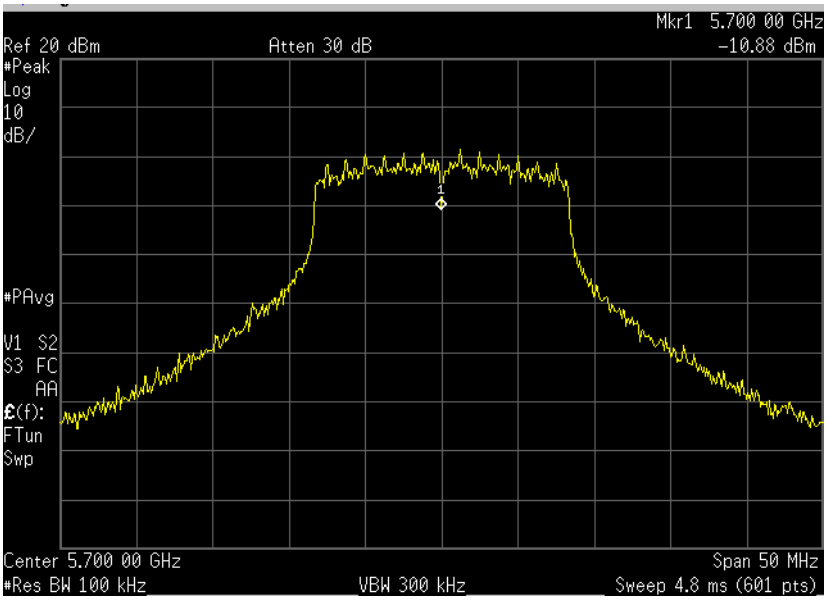
Carrier frequency 5700MHz
115 % of V nom
Plot 4.7.30



Frequency 5470-5725 MHz
Carrier frequency 5700 MHz a mode
Ambient temperature -10 °c
Plot 4.7.31



Ambient temperature +50°c
Plot 4.7.32



4.8. 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 EWP2200 Semi Rugged VoWLAN Phone employs for WLAN a/b/g an Integral (on board) PIFA Dual Band.	**Comply**

4.9. Dynamic Frequency Selection (DFS)

Reference document:	**47 CFR §15.407(h)(2)(i)(B) & §15.407(h)(2)(iii) and FCC 06-96**		
Test Requirements:	Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating in the 5.25-5.35GHz and 5.47-5.725 GHz bands. Operational Modes. The DFS requirement applies to the following: (B) The requirement for channel move time applies in both the master and slave operational modes. DFS Response Requirements: (iii) Channel Move Time. After the radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.		
Test setup:	See sec 2.5	**Pass**	
Method of testing:	Radiated		
Operating conditions:	Under normal test conditions		
S.A. Settings:	RBW: 3 MHz, VBW:3 MHz, Span 0		
Environment conditions:	Ambient Temperature: 22°c	Relative Humidity: 48%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.9.1 to Plot 4.9.4	

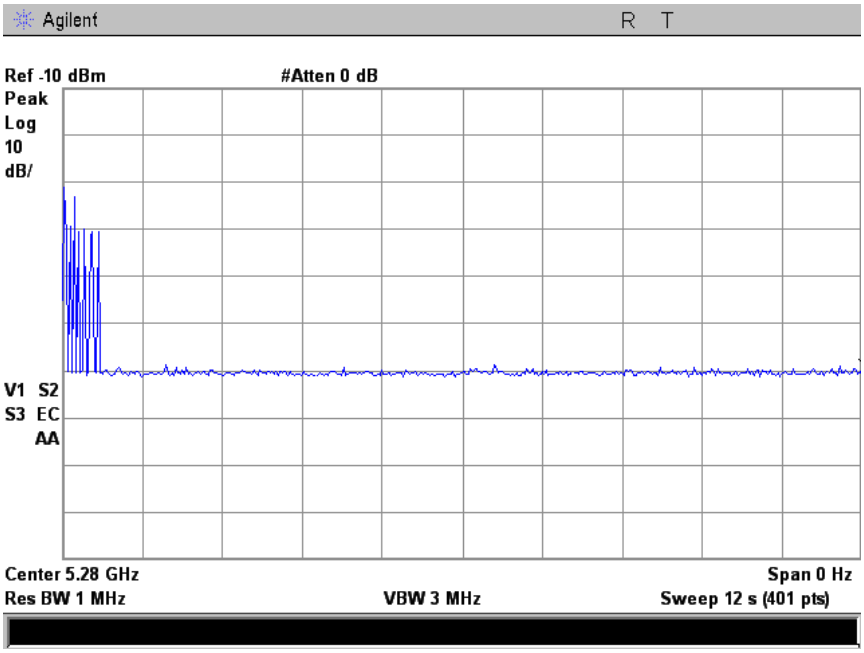
The WiFi Firmware doesn't distinguish between NII band III & NII band II.

Test Results:

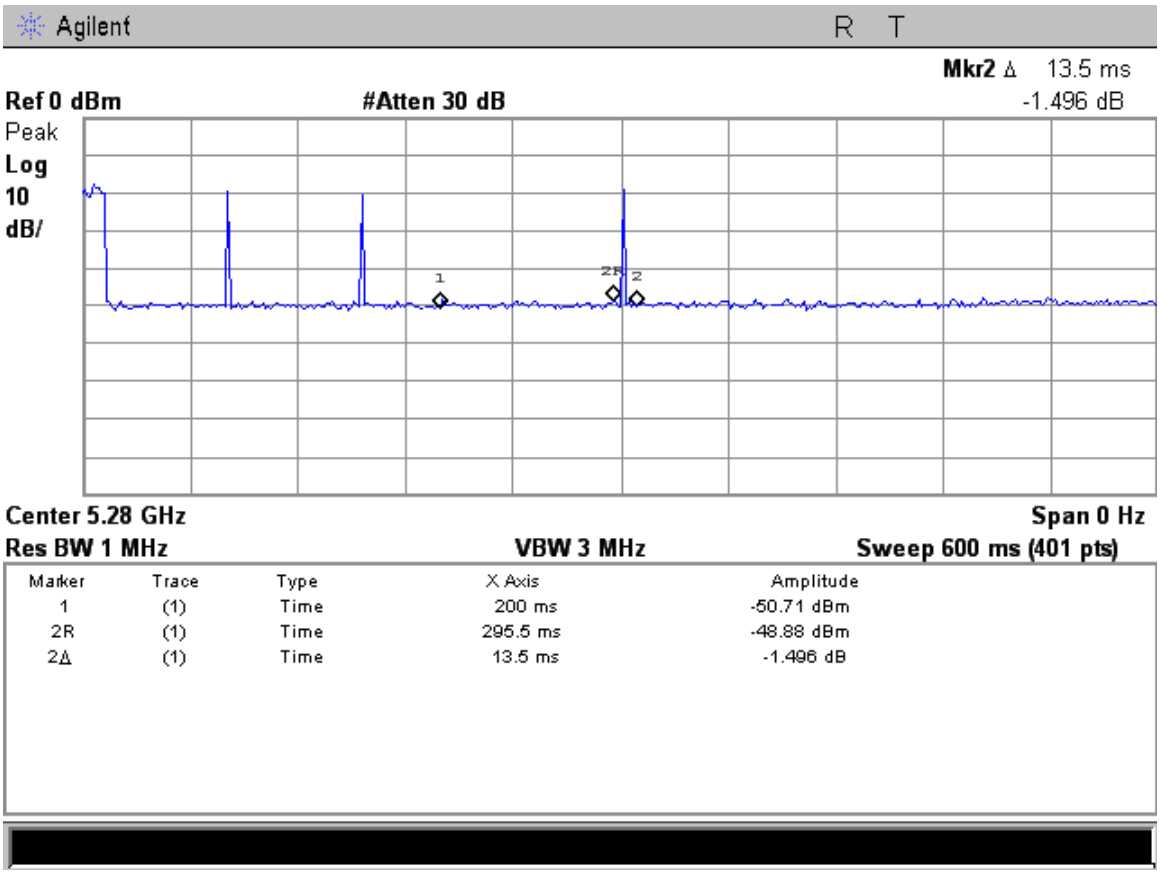
Channel Frequency [MHz]	Type of plot	Measured OnTime		Measured Channel Closing Transmission Time		Limit Channel Closing Transmission Time	Measured Move Time		Limit Move Time	Result
5280	Transmission of the EUT on the operating channel at the end of the radar burst during the Channel Move Time	<200 msec	Reference Plot - 4.9.2	<200 msec +aggregated 13.5 msec	Reference Plot - 4.9.2	200ms + aggregated 60ms	0.6 s	Reference Plot - 4.9.1	10s	Pass
5280										
5260	30 Minute Non - Occupancy – Associated test			The client device did not transmit on this channel once the channel was cleared.					Reference Plot - 4.9.3	
5250 - 5725	30 Minute Non - Occupancy – Non - Associated test			The client device did not employ active scanning and did not transmit without being associated with the master device.					Reference Plot - 4.9.4	
5680	Transmission of the EUT on the operating channel at the end of the radar burst during the Channel Move Time	<200 msec	Reference Plot - 4.9.5	<200 msec +aggregated 0 msec	Reference Plot -4.9.5	200ms + aggregated 60ms				

Note: The WiFi Firmware doesn't distinguish between NII band III & NII band II.

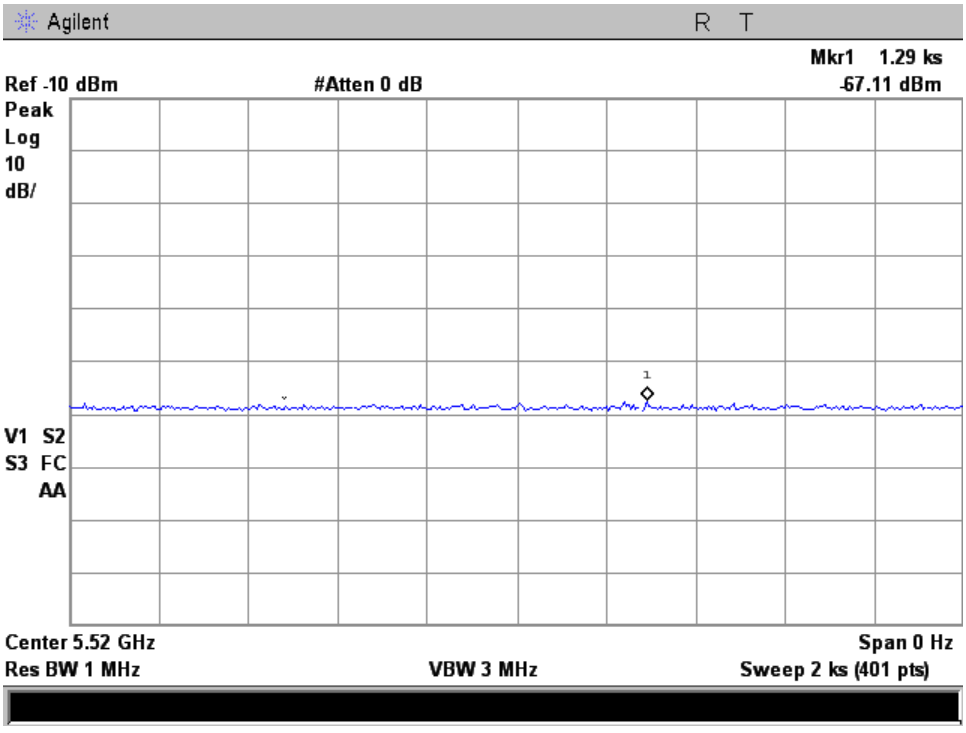
Channel Move Time
Plot 4.9.1



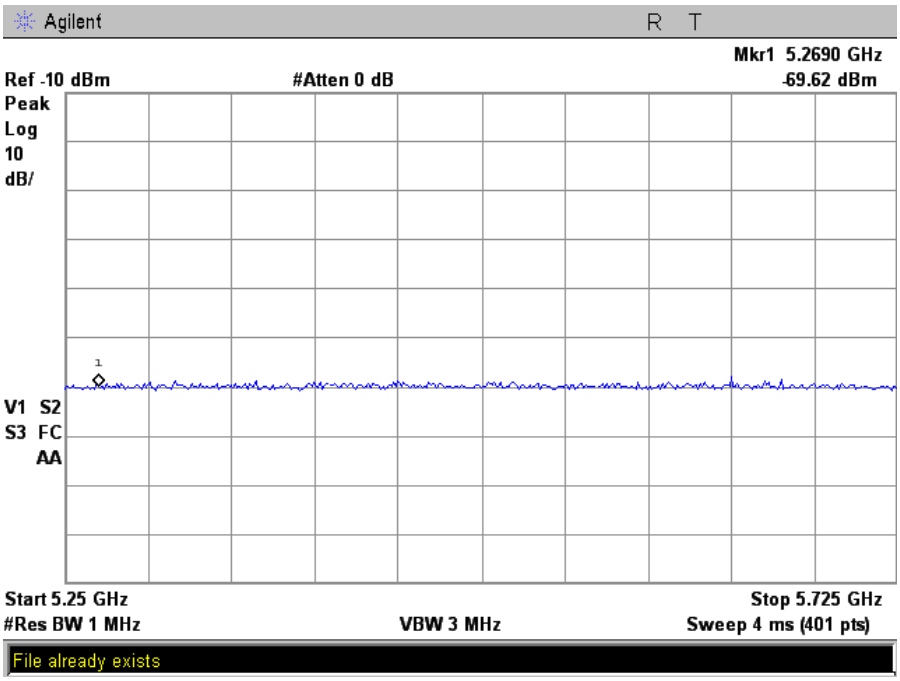
Retesting for Channel Closing Transmission & on time
Plot 4.9.2



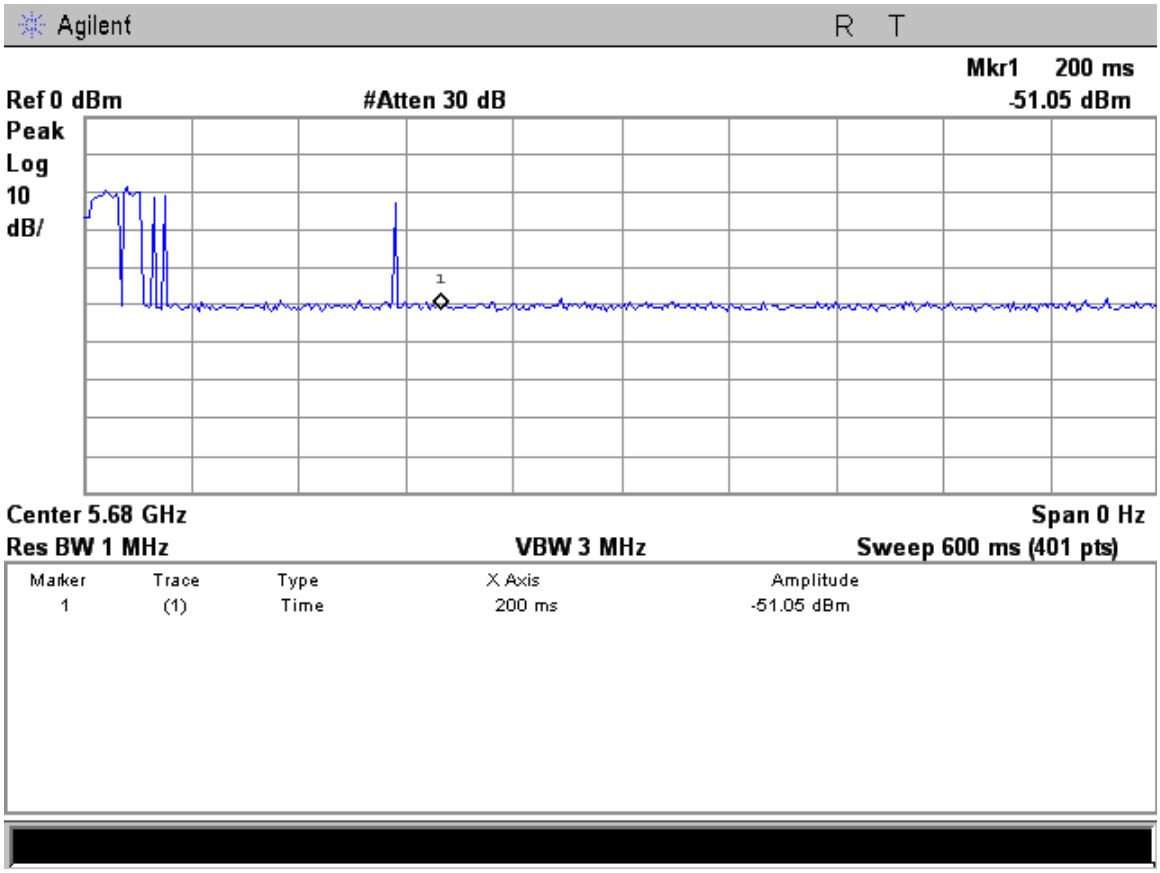
30 Minutes Non-Occupancy, Associated test
Plot 4.9.3



30 Minutes Non-Occupancy, Non-Associated test
Plot 4.9.4



Additional Testing for Band III
Plot 4.9.5



4.10. Power Line Emissions measurements

Reference document:	**47 CFR §15.107/207**		
Test Requirements:	The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in §15.107. The emissions from an intentional radiator shall not exceed the field strength levels specified in §15.207. Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Sec.15.207.		
Test setup:	See Sec. 2.6	**Pass**	
Operating conditions:	Under normal test conditions		
Method of testing:	Conducted Emissions		
S.A. Settings:	f <30MHz: RBW: 9kHz, VBW:30kHz		
Radio device:	Idle		
Environment conditions:	Ambient Temperature: 21°c	Relative Humidity: 54%	Atmospheric Pressure: 1011.4 hPa
Test Result:	See below	See Plot 4.10.1 - Plot 4.10.4	

Test Results:

Worst case results of unintentional emissions and emissions measured at the 110VAC charger port.

"Phase" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.767768	38	23.6	56.00	46.00	-18.00	-22.40	Pass
0.508303	38.9	24	56.00	46.00	-17.10	-22.00	Pass
0.320533	39.4	29.4	59.69	49.69	-20.29	-20.29	Pass
1.602735	37	18.8	56.00	46.00	-19.00	-27.20	Pass
1.783115	36.6	22.9	56.00	46.00	-19.40	-23.10	Pass
2.051	34.4	22.4	56.00	46.00	-21.60	-23.60	Pass

"Neutral" Lead

Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.593063	36.3	26.2	56.00	46.00	-19.70	-19.80	Pass
0.191489	36.5	25.8	63.97	53.97	-27.47	-28.17	Pass
0.329369	37.9	30.5	59.47	49.47	-21.57	-18.97	Pass
0.790036	35.8	25.2	56.00	46.00	-20.20	-20.80	Pass
2.43638	33.6	19.2	56.00	46.00	-22.40	-26.80	Pass
1.587	32	15.8	56.00	46.00	-24.00	-30.20	Pass

Measured at the PC 110VAC port

"Phase" Lead

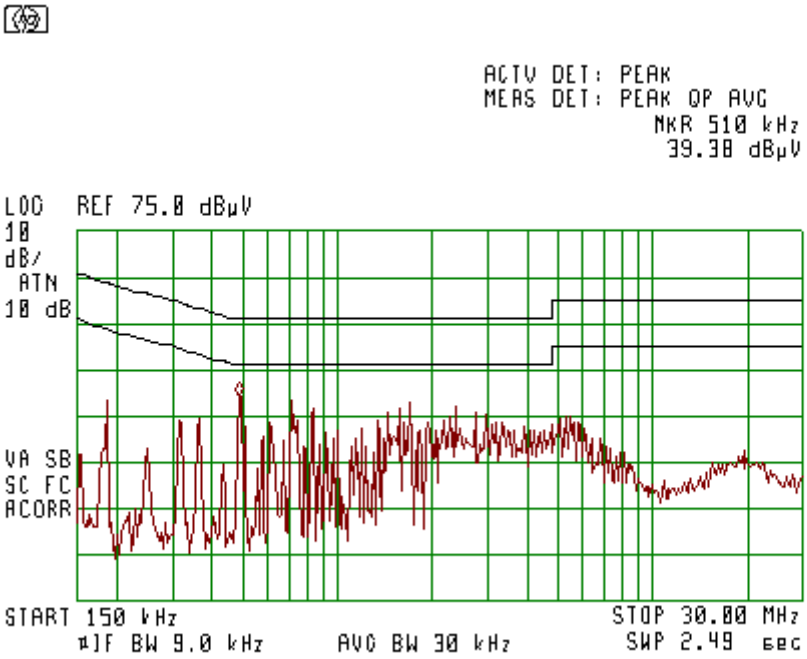
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.15	39.4	19	66.00	56.00	-26.60	-37.00	Pass
0.164974	60.9	39.7	65.21	55.21	-4.31	-15.51	Pass
0.19671	51.6	29.1	63.75	53.75	-12.15	-24.65	Pass
0.220327	50.2	28.6	62.81	52.81	-12.61	-24.21	Pass
0.41442	36.9	7.3	57.56	47.56	-20.66	-40.26	Pass
21.96	33.3	27.3	60.00	50.00	-26.70	-22.70	Pass

"Neutral" Lead

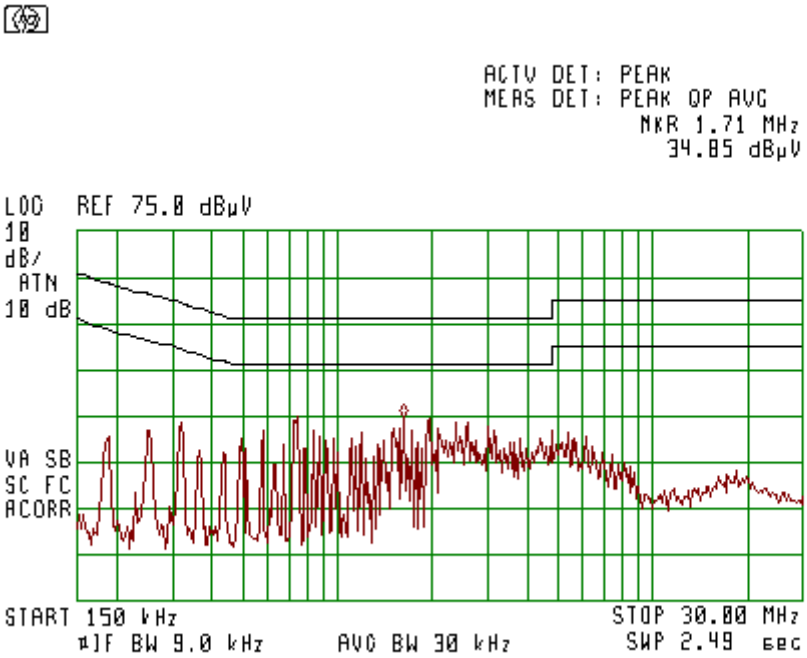
Frequency [MHz]	Measured Result [dBµV]		Class B Limits [dBµV]		Margin [dB]		Pass/Fail
	QP	AVR	QP	AVR	QP	AVR	
0.160989	53.7	48.1	65.41	55.41	-11.71	-7.31	Pass
0.150000	36.7	17.5	66.00	56.00	-29.30	-38.50	Pass
0.230453	54.7	27	62.43	52.43	-7.73	-25.43	Pass
0.382123	43.7	10.3	58.23	48.23	-14.53	-37.93	Pass
0.56082	31	10.8	56.00	46.00	-25.00	-35.20	Pass
3.028	28.6	22.4	56.00	46.00	-27.40	-23.60	Pass

Measured at the charger 110VAC port

Phase Lead
Plot 4.10.1

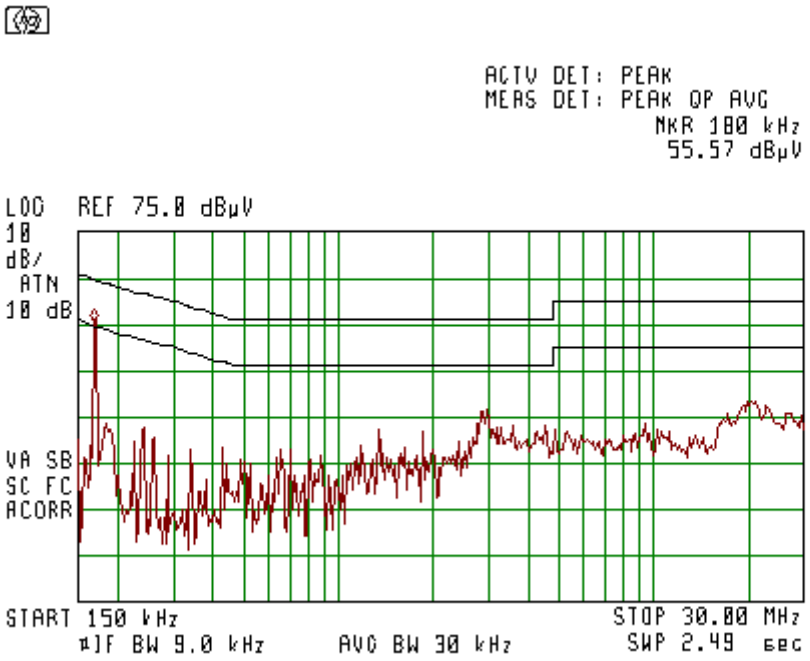


Neutral Lead
Plot 4.10.2

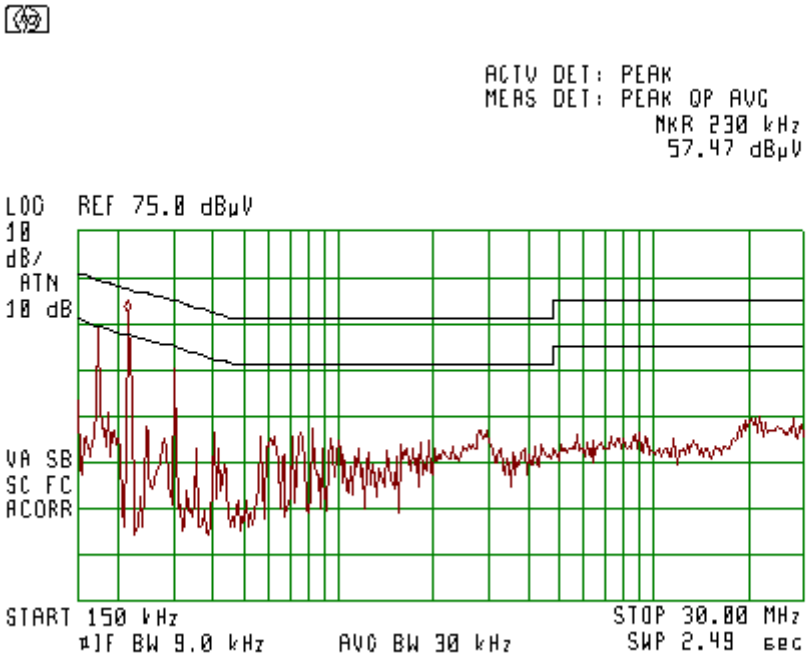


Measured at the PC 110VAC port

Phase Lead
Plot 4.10.3



Neutral Lead
Plot 4.10.4



5. Appendix

Appendix A: List of Measuring Equipment used:

Equipment	Manufacturer/ Model	Serial Number	Due date
CISPR16 EMI Receiver	HP8546A	3710A00392	17-11-12
Spectrum Analyzer 100 Hz ÷ 26.5 GHz	Agilent E7405A	US41160436	24-11-12
LNA Amplifier 1 GHz ÷ 18 GHz	AMP – 5D-010180-30-10P-GW	618653	07-03-13
Power meter	Agilent N1911A	MY45100784	12-10-12
Dual Ridged Guide Ant.1-18 GHz	A.R.A DRG 118/A	17188	23-01-13
Antenna 15 GHz ÷ 40 GHz	Schwarzbeck BBHA 9170	BBHA9170214	03-02-13
Turn table	HD100	100/693	-
Antenna Mast	HD 100	100/693	-
Biconical 20 –200 MHz	Seibersdorf, PBA 320	301	20-01-15
Log-Periodic 200 – 1000 MHz	Schwarzbeck VUSLP9111	VUSLP9111184	20-01-15
Pre-Amplifier	MiTeq, AMF-5F-18002650-30-10P	945372	07-03-13
LISN	Fischer 50/250-25-2	-	05-03-13
Transient Limiter	HP11947A	-	05-03-13
Notch Filter	Micro-Tronics BRM50702-05	0001	04-03-13

Appendix B: Accreditation Certificate

ilac-MRA

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

QUALITECH (ECI TELECOM)

Petach-Tikva, ISRAEL

for technical competence in the field of

Electrical Testing

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

Presented this 22nd day of March 2011.

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

A2LA

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