TEST REPORT 2

VERIWAVE

WF1101

FCC ID: YATA001Y10

IC: 8936A-A001Y10

5.15-5.25 GHz
5.25-5.35 GHz
5.47-5.725 GHz

VeriWave, Inc.

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0.1 Introduction

A summary of the measurements made of the VeriWave WF1101 to support application for FCC ID YATA001Y10 and IC ID 8936A-A001Y10 .

This report covers the measurements made in the following frequency bands.

- 5.15-5.25 GHz
- 5.25-5.35 GHz
- 5.47-5.725 GHz

Test methodology is taken primarily from ANSI C63.10-2009

The testing was performed April 15 through 23, 2010 at VeriWave for unit with controller serial number 00-13-E9-1D-00-E3 and radio serial number M33142-001-0007 .

0.2 Test Equipment

Manufacturer	Model	Description	Next Cal Date
Agilent	E4445A	Spectrum Analyzer 3Hz-13.2GHz	10 Aug 10
Agilent	E4405B	Spectrum Analyzer 9kHz-13.2GHz	26 Feb 11
Agilent	E4418B	Power Meter	10 Aug 10
Agilent	E4412A	Power Sensor	10 Aug 10
Cisco	AIR-RM1252G-A-K9 FCC ID: LDK102061	802.11a Access Point	N/A
Tenney	T10C	Temperature Chamber	N/A
Watlow	942	Temperature Controller	N/A
Partlow	MRC5000	Chart Recorder	17 Jun 10
Fluke	177	Multimeter	24 Sep 10
Technipower	Variac	W20MT3A	N/A

Table 1: Equipment List

0.3 Average Power

0.3.1 Specification

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.

50 mW = 17.0 dBm

This power exceeds the bandwidth limited power for any $B > 20MHz$. Since all of the 802.11x modes have a 26dB bandwidth of greater than 20MHz, the power limit in the 5.15–5.25 GHz band is +17.0dBm.

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.

250mW = 24.0 dBm

Again, the bandwidth limited power is greater than 24.0dBm for $B > 20MHz$, therefore the power limit for the 5.25–5.35 GHz and 5.47–5.725 GHz bands is +24.0dBm.

0.3.2 Measurement Procedure

The unit is connected to the power meter. The appropriate operating mode is enabled using Continuous transmit operation. Several readings are made and averaged.

Freq (MHz)	Operating Mode	Data Rate	Power (dBm)	Limit	Margin
5180.0	20MHz OFDM	54	14.0	17.0	3.0
5240.0	20MHz OFDM	54	14.0	17.0	3.0
5260.0	20MHz OFDM	54	16.7	24.0	7.3
5320.0	20MHz OFDM	54	16.3	24.0	7.7
5500.0	20MHz OFDM	54	17.4	24.0	6.6
5580.0	20MHz OFDM	54	16.8	24.0	7.2
5700.0	20MHz OFDM	54	17.5	24.0	6.5
5180.0	40MHz M7	M7	14.4	17.0	2.6
5240.0	40MHz M7	M7	13.6	17.0	3.4
5260.0	40MHz M7	M7	16.3	24.0	7.7
5320.0	40MHz M7	M7	16.6	24.0	7.4
5500.0	40MHz M7	M7	15.9	24.0	8.1
5580.0	40MHz M7	M7	16.5	24.0	7.5
5700.0	40MHz M7	M7	17.1	24.0	6.9
5180.0	40MHz M7	M7	14.5	17.0	2.5
5240.0	40MHz M7	M7	13.6	17.0	3.4
5260.0	40MHz M7	M7	16.3	24.0	7.7
5320.0	40MHz M7	M7	16.0	24.0	8.0
5500.0	40MHz M7	M7	15.8	24.0	8.2
5580.0	40MHz M7	M7	16.5	24.0	7.5
5700.0	40MHz M7	M7	16.6	24.0	7.4

Table 2: Output Power

0.4 Peak Power

0.4.1 Specification

0.4.2 Measurement Procedure

Reference ANSI C63.10-2009 6.10.3.1

Testing was performed with the radio in continuous transmit mode.

1. Ref Level Offset = DUT/Spectrum Analyzer path loss
2. Detector ← Peak
3. Enable Spectrum Analyzer “Channel Power Measurement mode”
4. Ref Level ← +20dBm
5. x dB ← 6dB
6. RBW ← 1MHz
7. VBW ← 3MHz

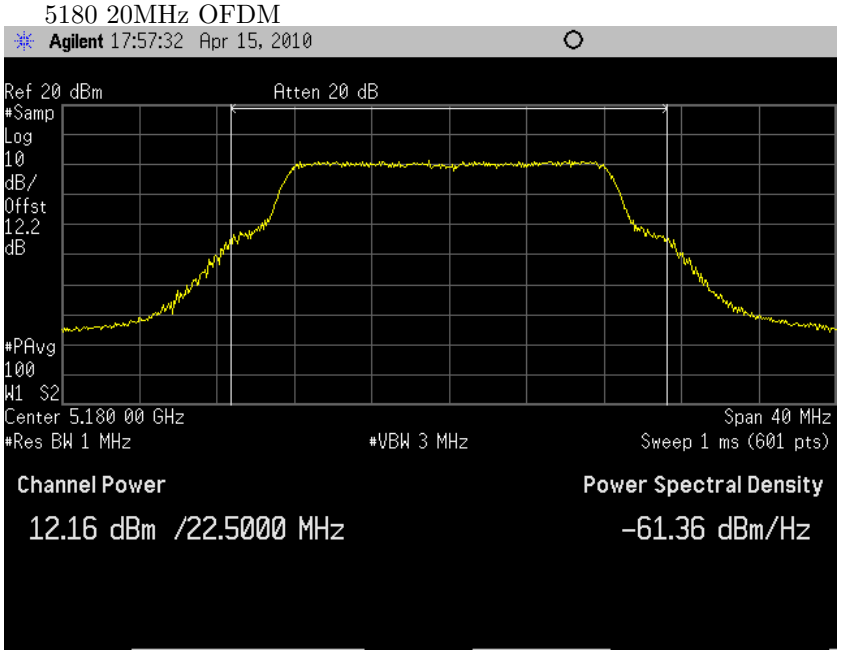
8. Sweep Time ← AUTO

9. Query “Channel Power Measurement mode” for measurement result

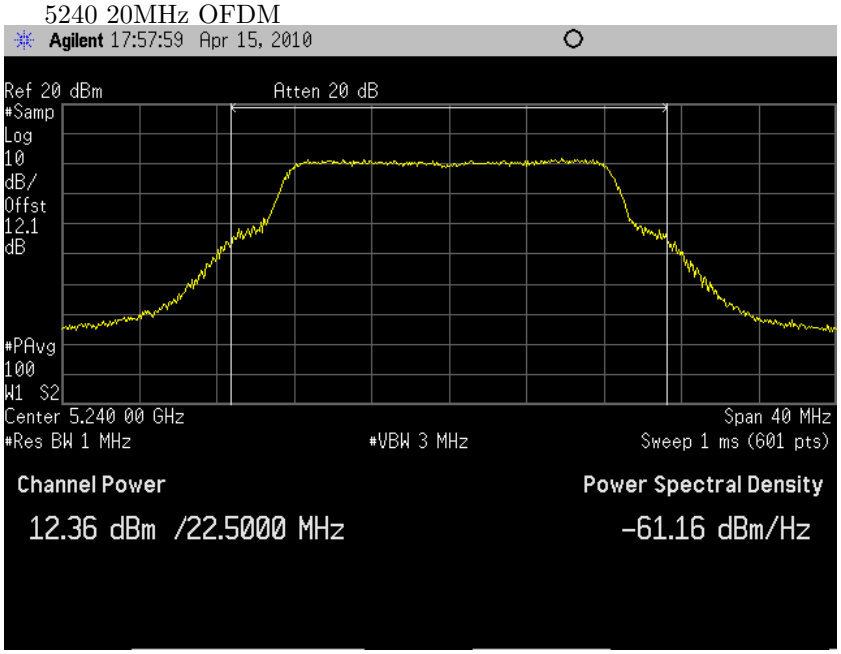
Freq (MHz)	Operating Mode	Data Rate	Power (dBm)
5180.0	20MHz OFDM	54	12.2
5240.0	20MHz OFDM	54	12.4
5260.0	20MHz OFDM	54	14.8
5320.0	20MHz OFDM	54	14.7
5500.0	20MHz OFDM	54	15.6
5580.0	20MHz OFDM	54	15.1
5700.0	20MHz OFDM	54	15.6
5180.0	40MHz M7	M7	12.4
5240.0	40MHz M7	M7	11.7
5260.0	40MHz M7	M7	14.2
5320.0	40MHz M7	M7	14.7
5500.0	40MHz M7	M7	14.1
5580.0	40MHz M7	M7	14.5
5700.0	40MHz M7	M7	15.1
5180.0	40MHz M7	M7	12.4
5240.0	40MHz M7	M7	11.7
5260.0	40MHz M7	M7	14.2
5320.0	40MHz M7	M7	14.1
5500.0	40MHz M7	M7	14.0
5580.0	40MHz M7	M7	14.5
5700.0	40MHz M7	M7	14.6

Table 3: Output Power

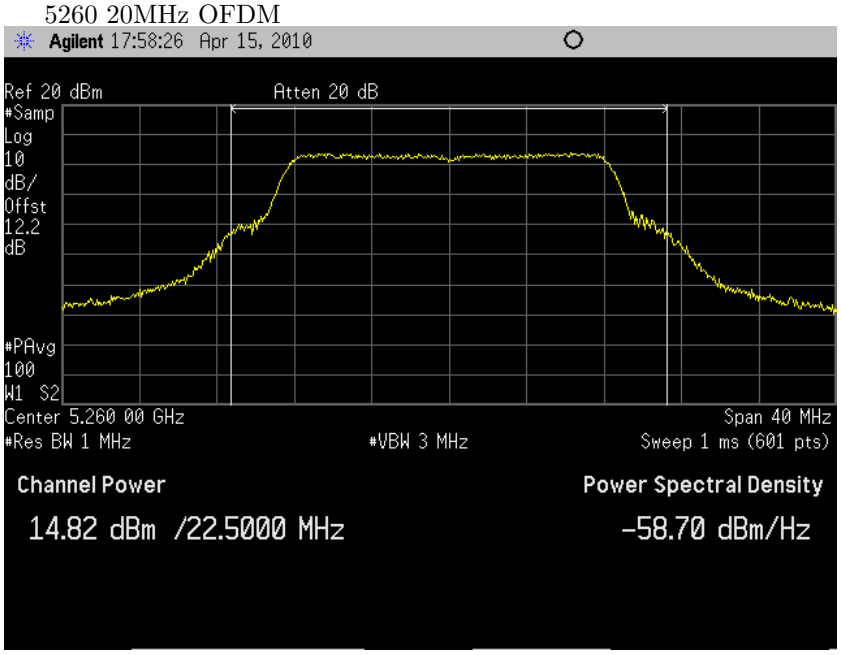
5180 20MHz OFDM



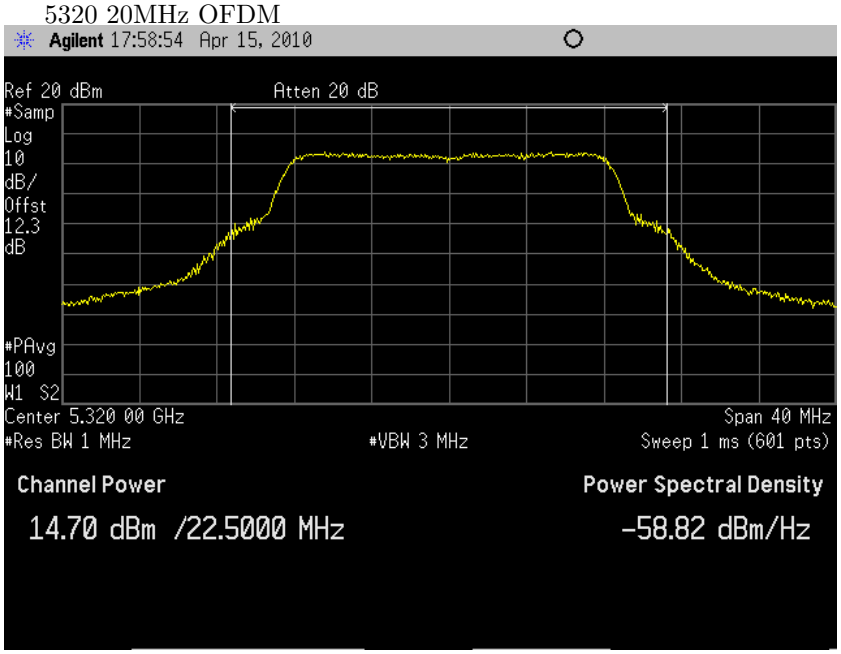
5240 20MHz OFDM



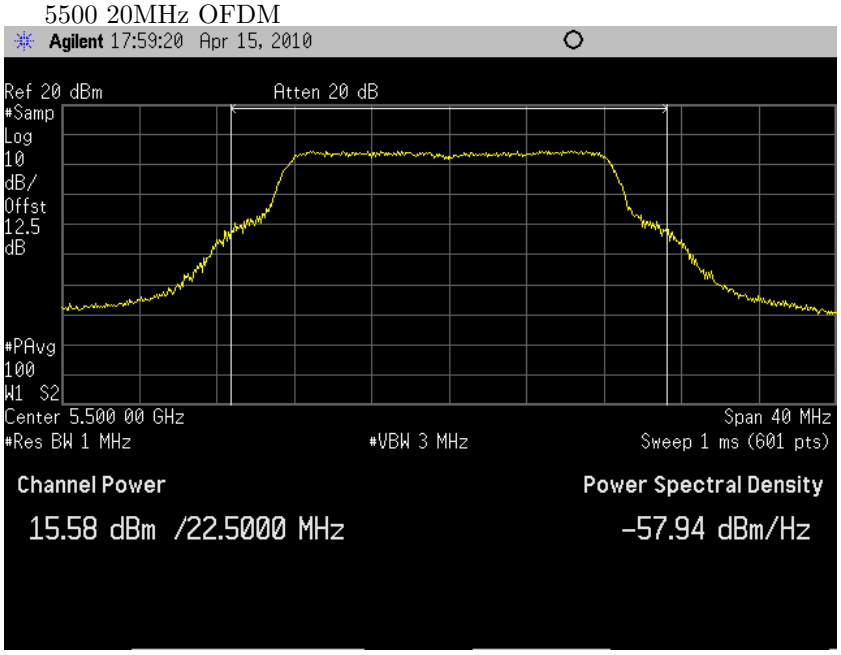
5260 20MHz OFDM



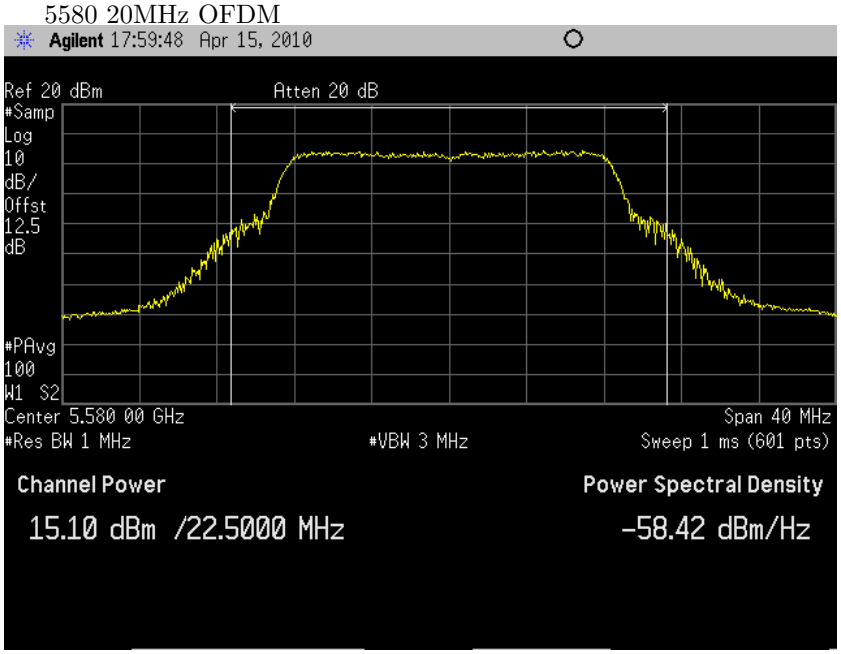
5320 20MHz OFDM



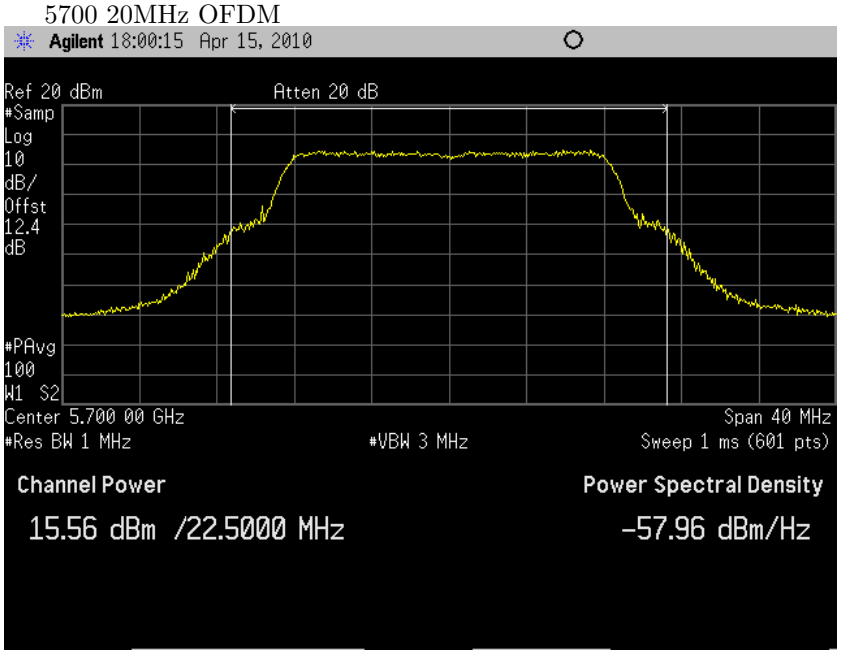
5500 20MHz OFDM



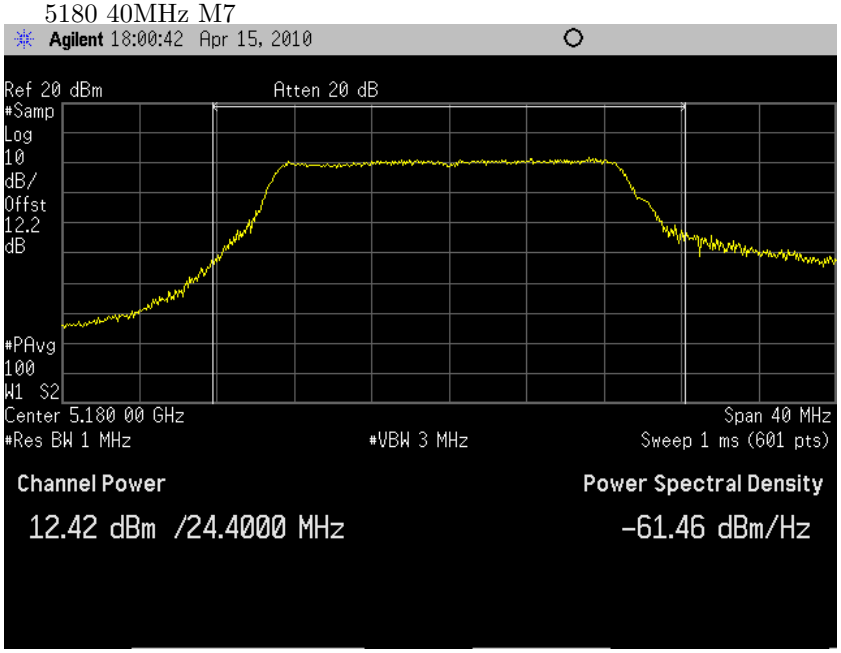
5580 20MHz OFDM



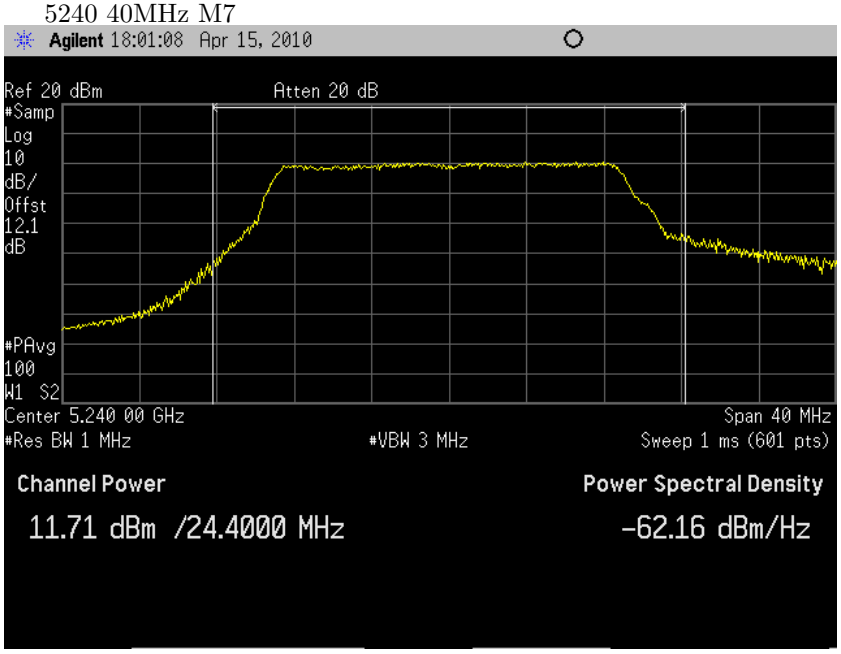
5700 20MHz OFDM



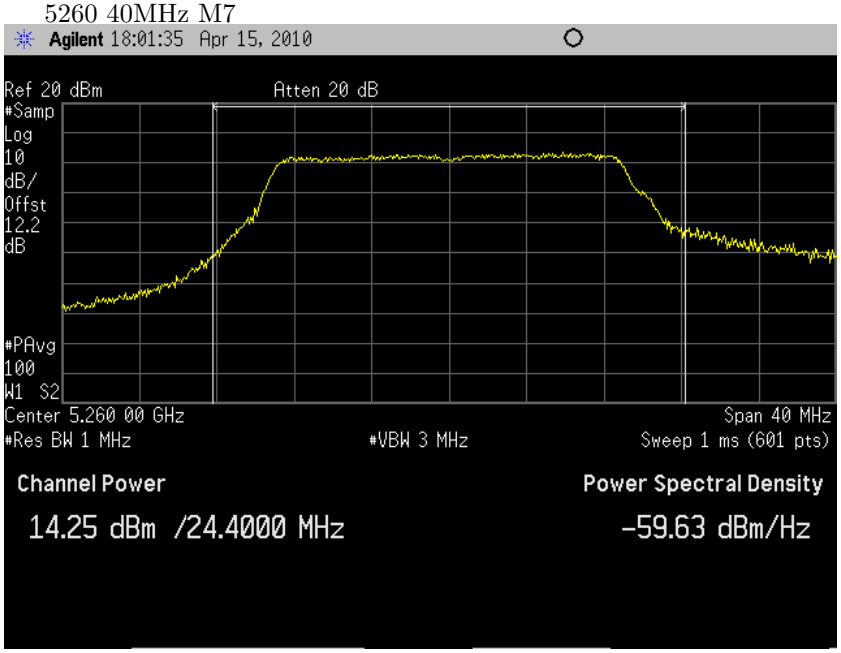
5180 40MHz M7



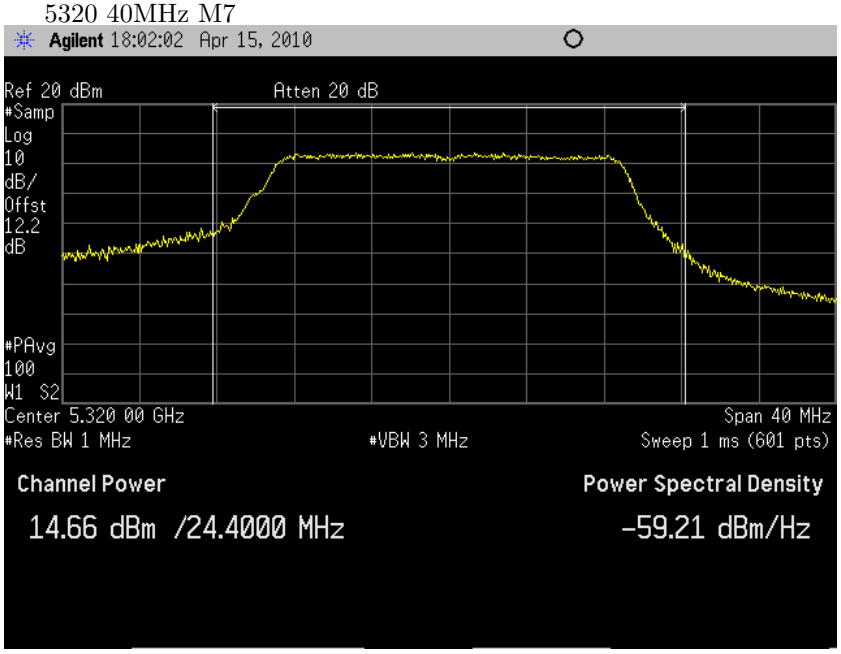
5240 40MHz M7



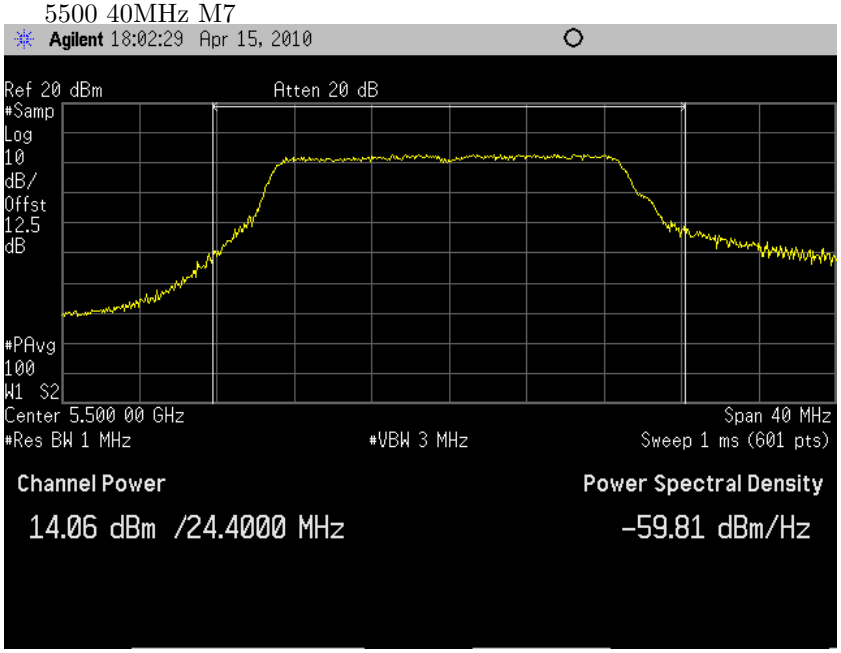
5260 40MHz M7



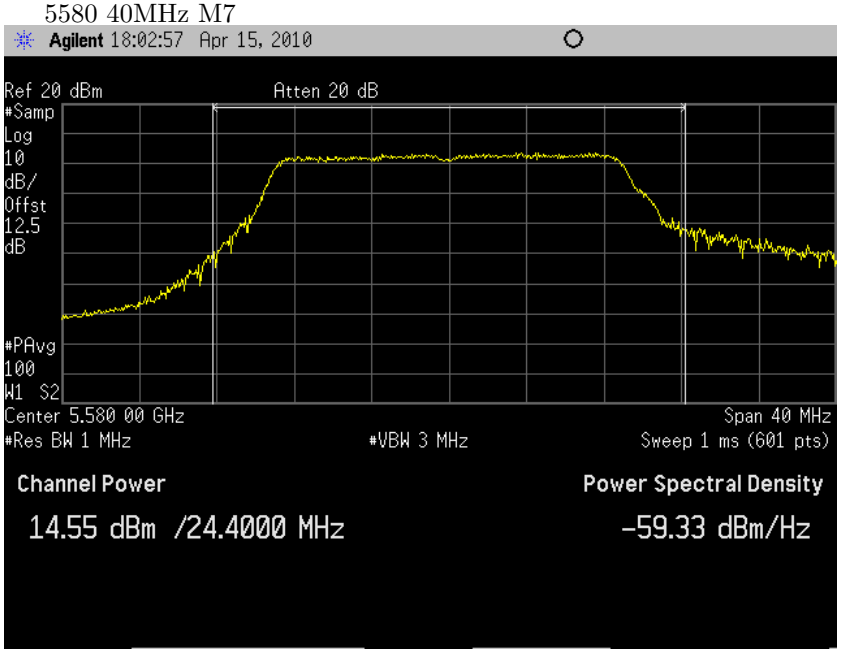
5320 40MHz M7



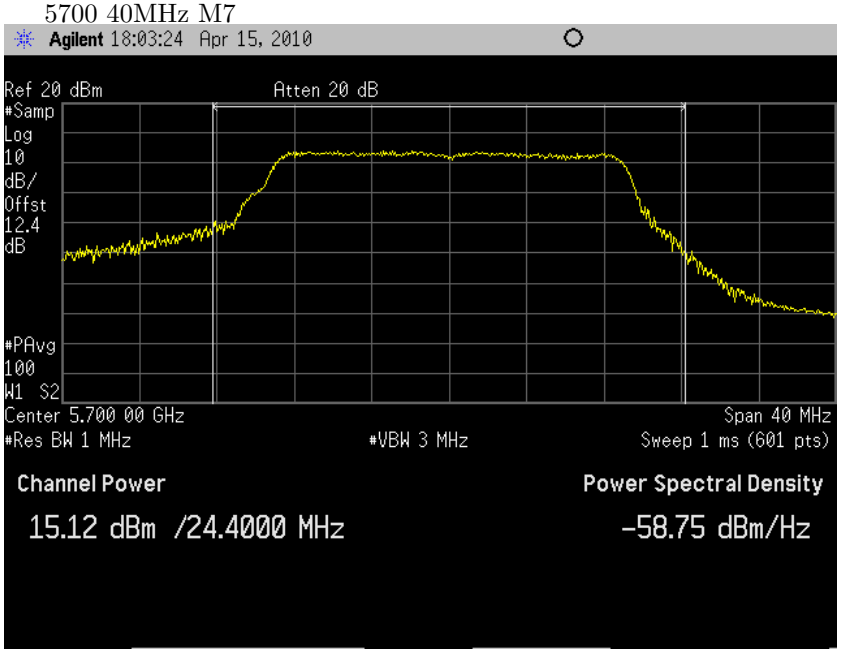
5500 40MHz M7



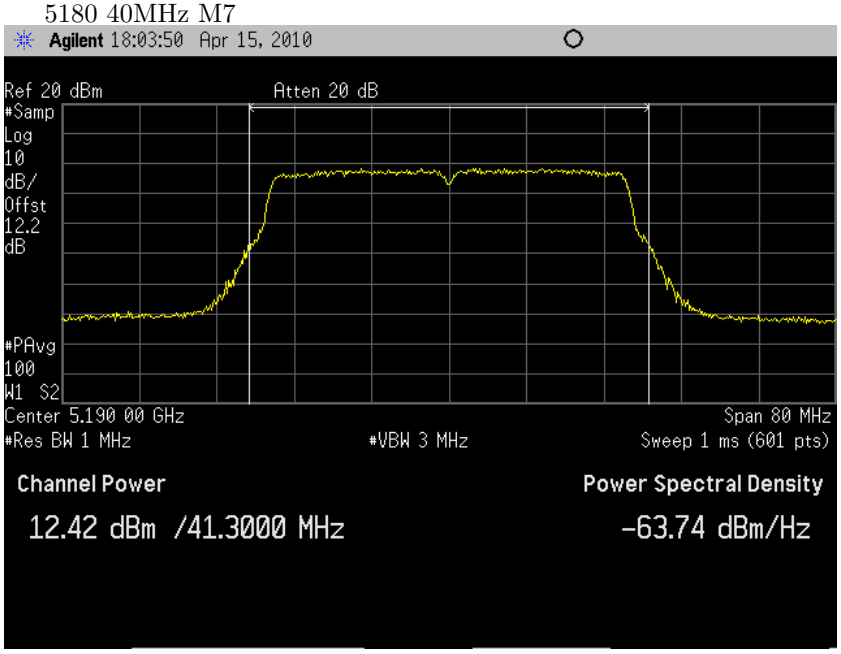
5580 40MHz M7



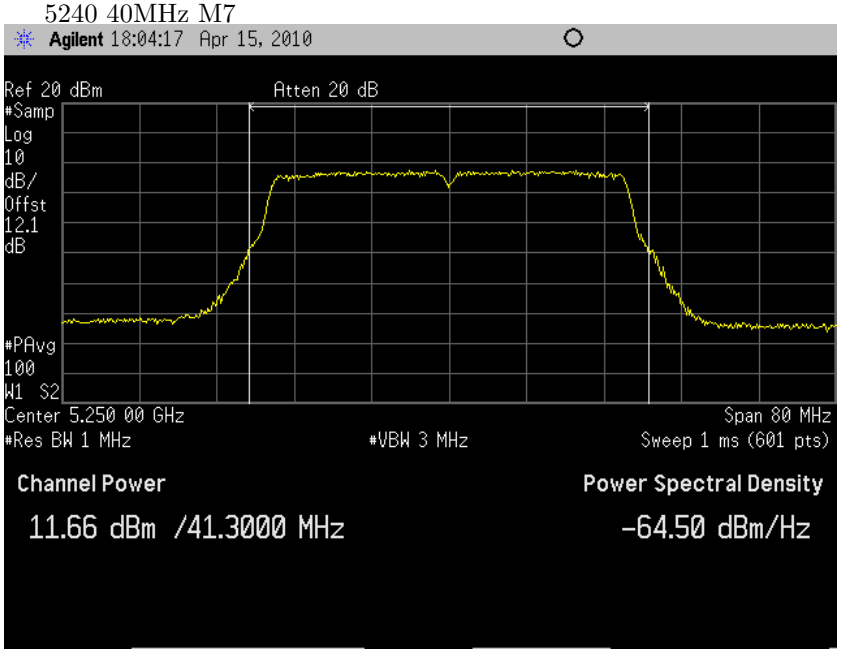
5700 40MHz M7



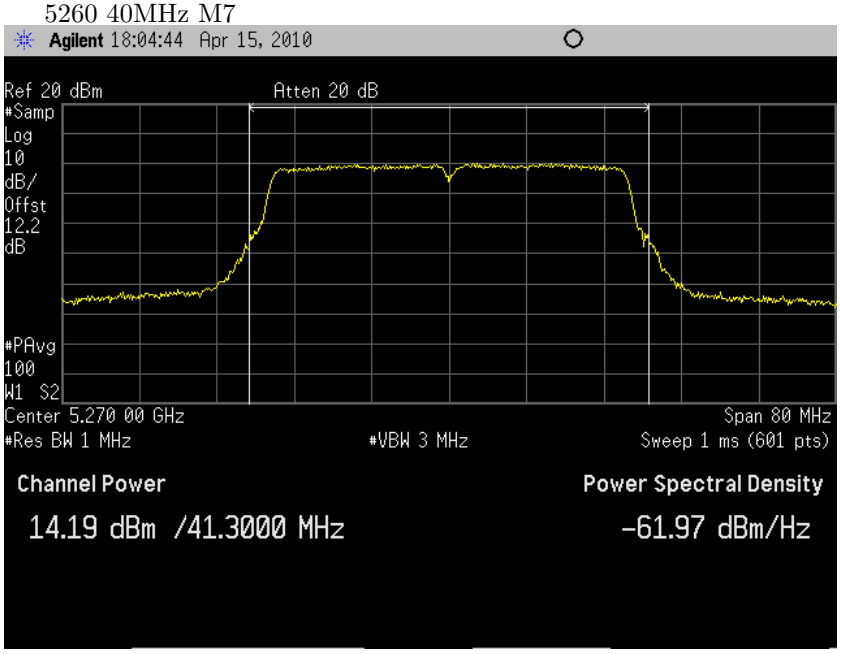
5180 40MHz M7



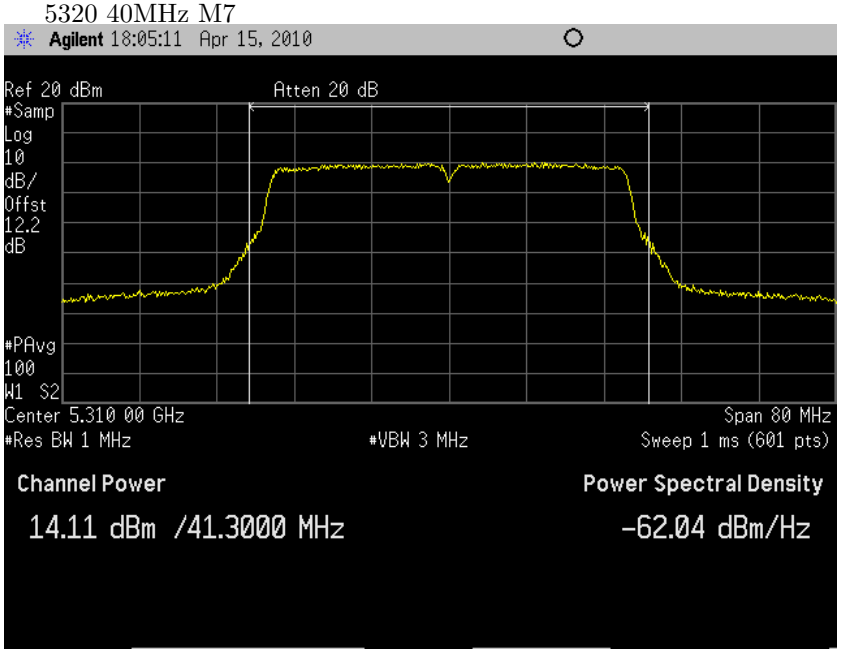
5240 40MHz M7



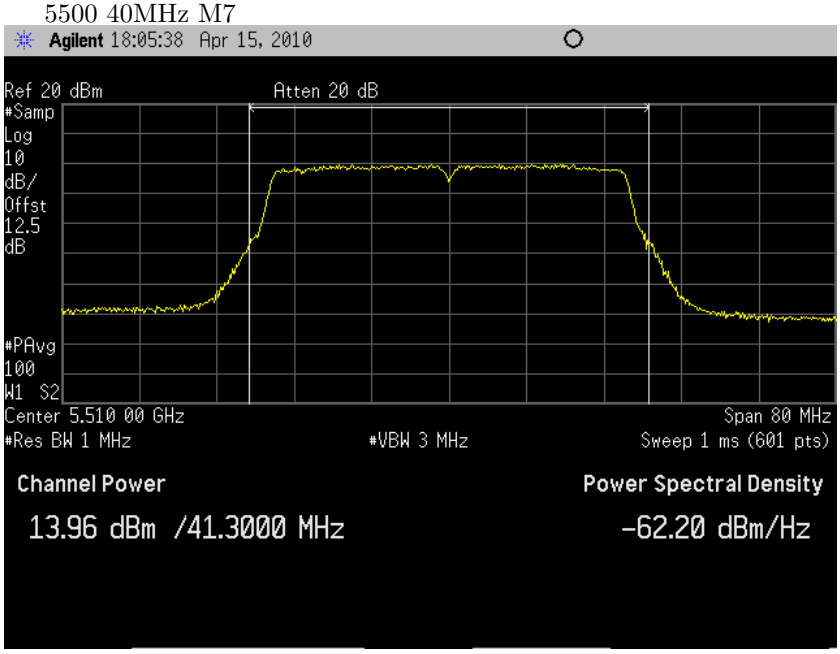
5260 40MHz M7



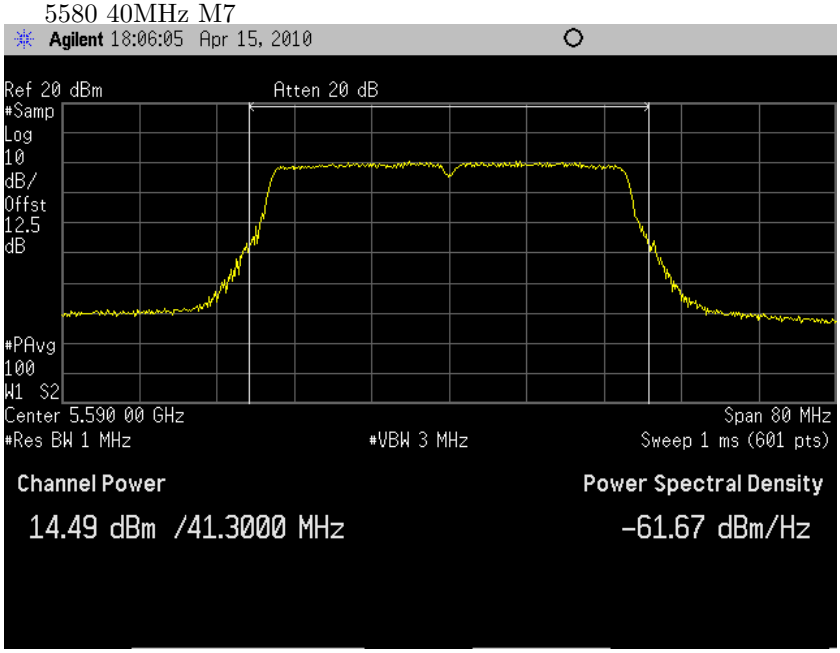
5320 40MHz M7



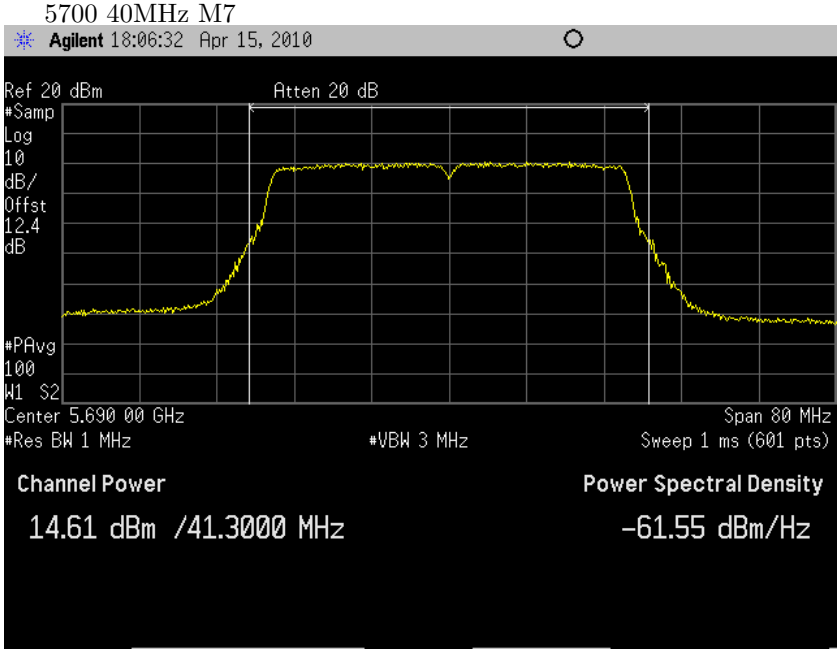
5500 40MHz M7



5580 40MHz M7



5700 40MHz M7



0.5 Occupied Bandwidth, 26dB Threshold

0.5.1 Specification

15.407 (i) Emission bandwidth. 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.

0.5.2 Measurement Procedure

Reference ANSI C63.10-2009 6.9

Measurements performed Apr 15 2010.

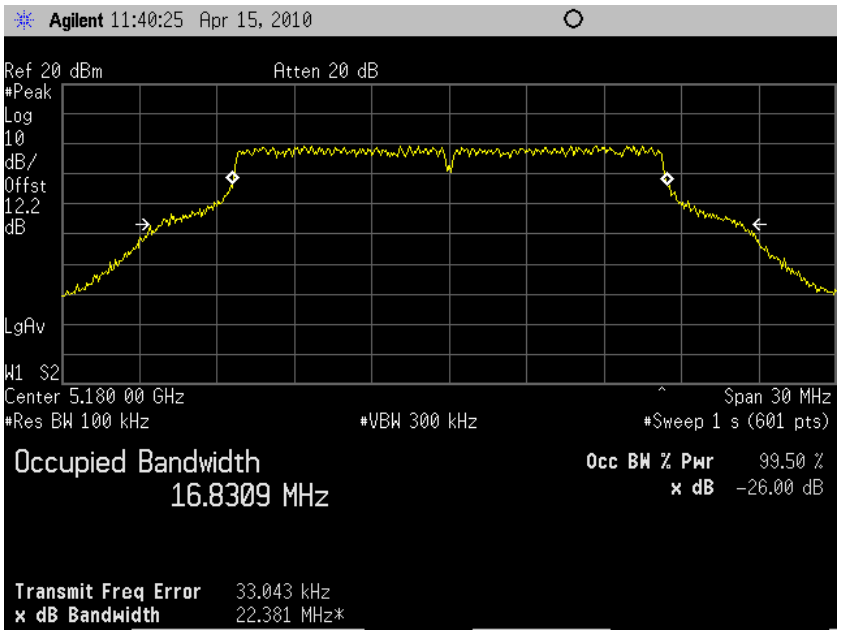
Testing was performed with the radio in continuous transmit mode.

1. Detector ← Peak
2. Enable Spectrum Analyzer "Occupied Bandwidth Measurement mode"
3. Ref Level ← +20dBm
4. Ref Level Offset = DUT/Spectrum Analyzer path loss
5. x dB ← 26dB
6. RBW ← 100kHz
7. VBW ← 300kHz
8. Sweep Time ← 1s
9. Query "Occupied Bandwidth Measurement mode" for x dB bandwidth

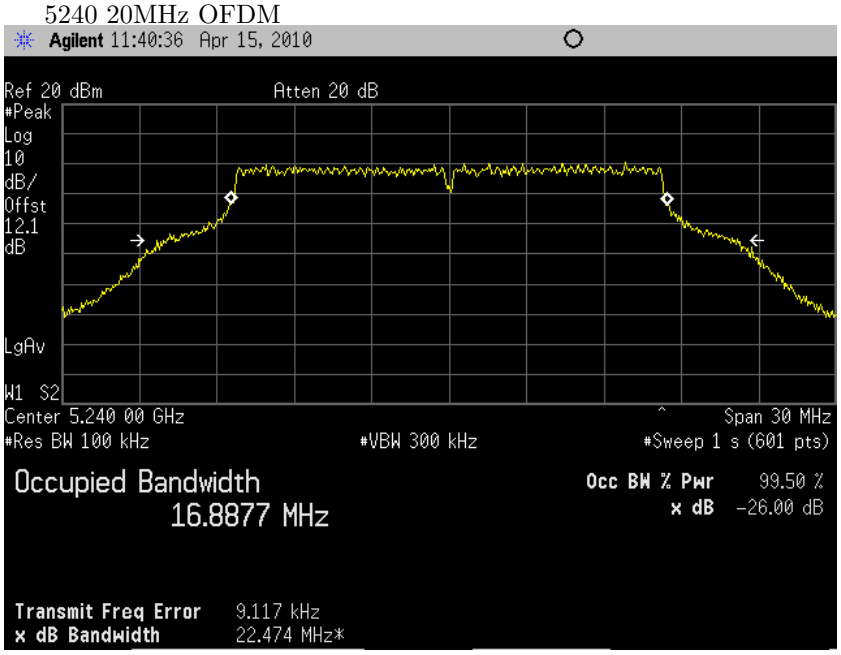
Freq (MHz)	Operating Mode	Data Rate	6dB BW (MHz)
5180.0	20MHz OFDM	54	22.4
5240.0	20MHz OFDM	54	22.5
5260.0	20MHz OFDM	54	22.4
5320.0	20MHz OFDM	54	22.4
5500.0	20MHz OFDM	54	22.3
5580.0	20MHz OFDM	54	22.5
5700.0	20MHz OFDM	54	22.3
5180.0	40MHz M7	M7	23.2
5240.0	40MHz M7	M7	24.1
5260.0	40MHz M7	M7	23.8
5320.0	40MHz M7	M7	23.8
5500.0	40MHz M7	M7	23.4
5580.0	40MHz M7	M7	23.8
5700.0	40MHz M7	M7	24.1
5180.0	40MHz M7	M7	41.0
5240.0	40MHz M7	M7	41.1
5260.0	40MHz M7	M7	41.3
5320.0	40MHz M7	M7	40.9
5500.0	40MHz M7	M7	41.3
5580.0	40MHz M7	M7	41.4
5700.0	40MHz M7	M7	40.9

Table 4: Occupied Bandwidth 26dB

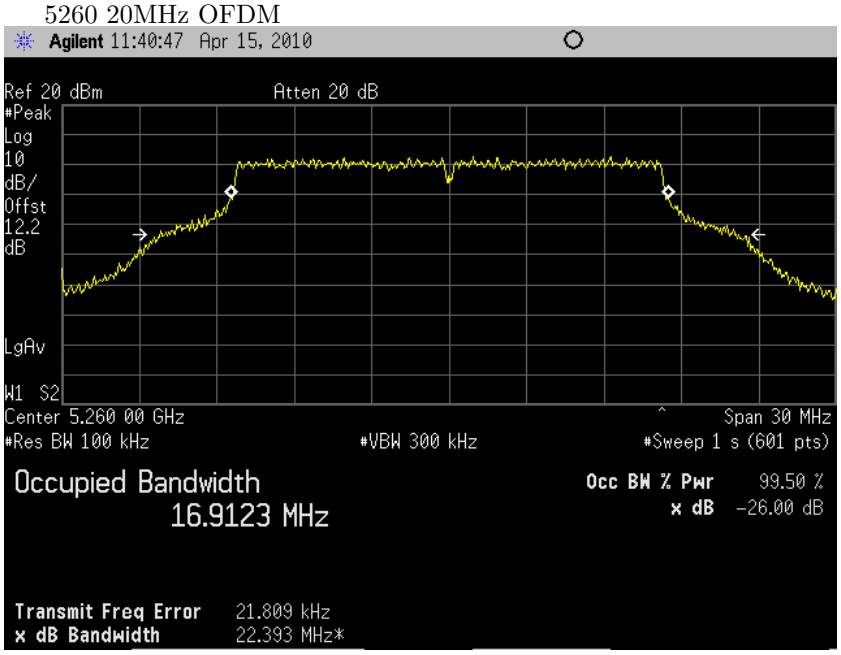
5180 20MHz OFDM



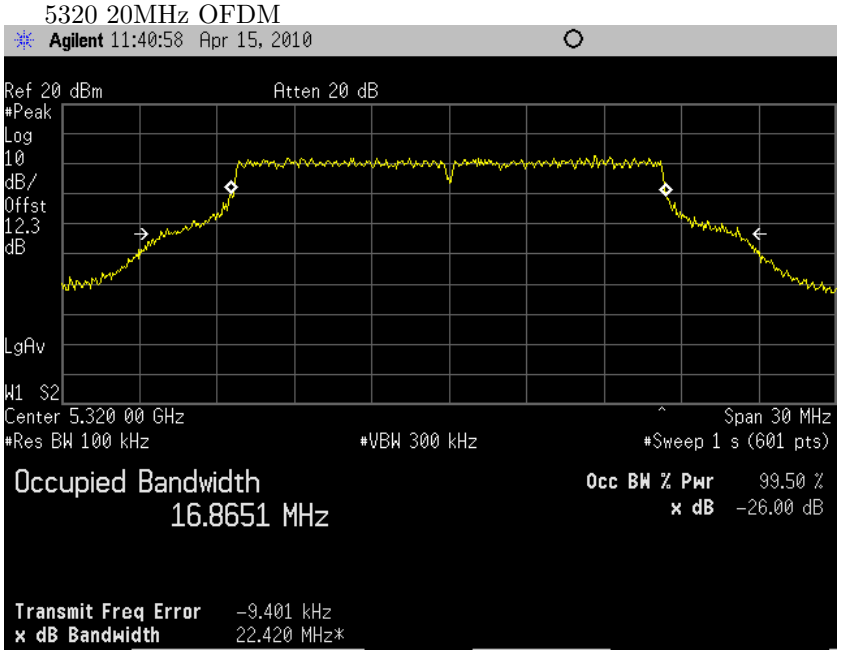
5240 20MHz OFDM



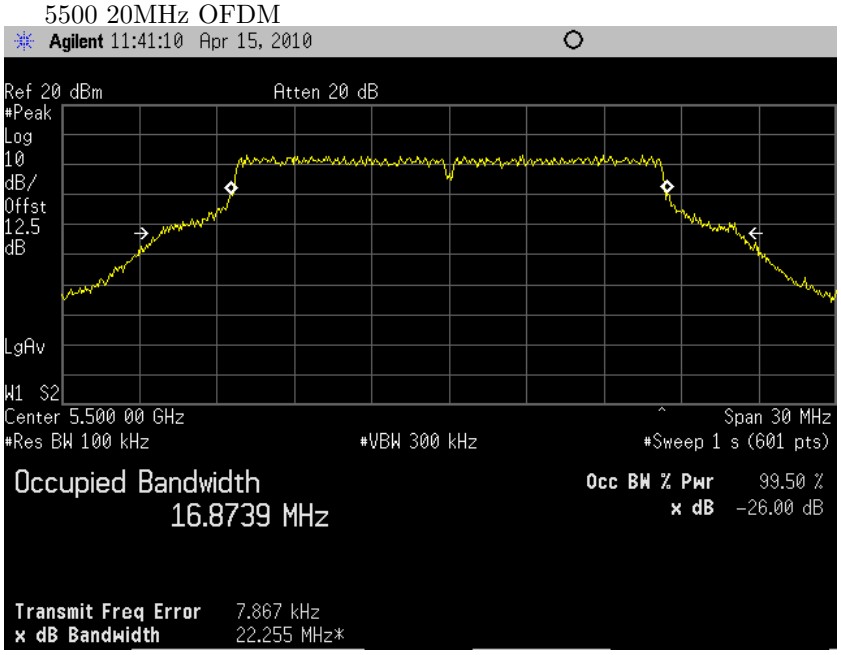
5260 20MHz OFDM



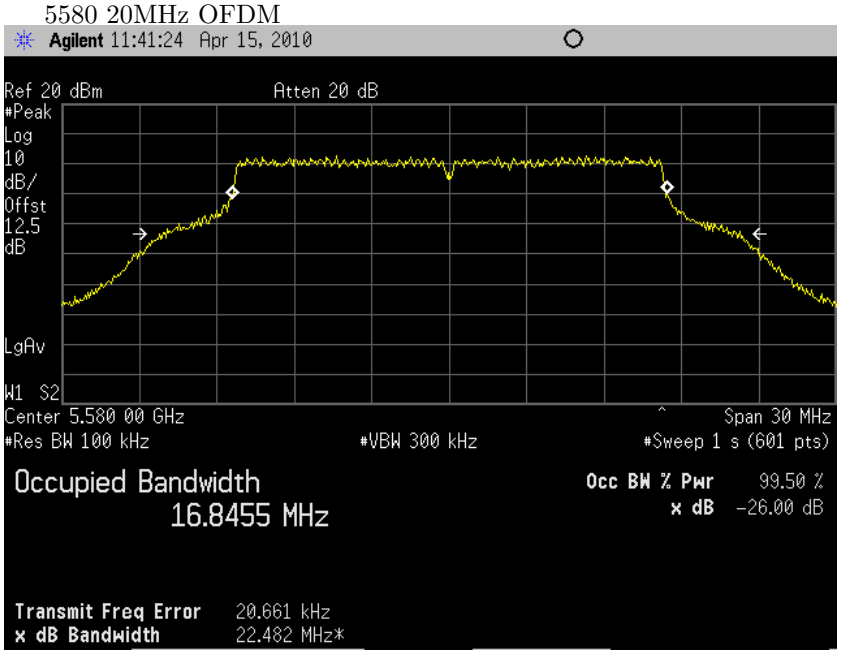
5320 20MHz OFDM



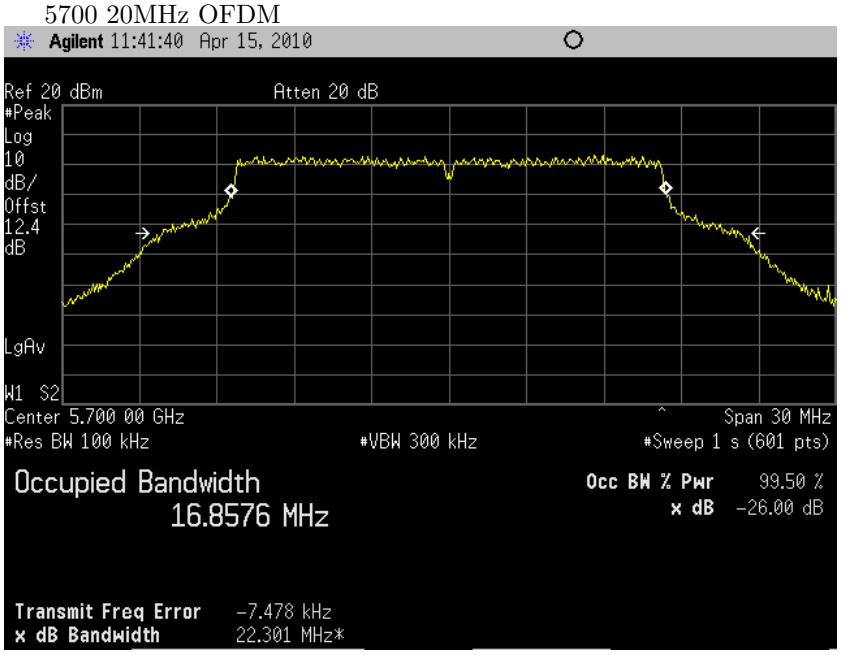
5500 20MHz OFDM



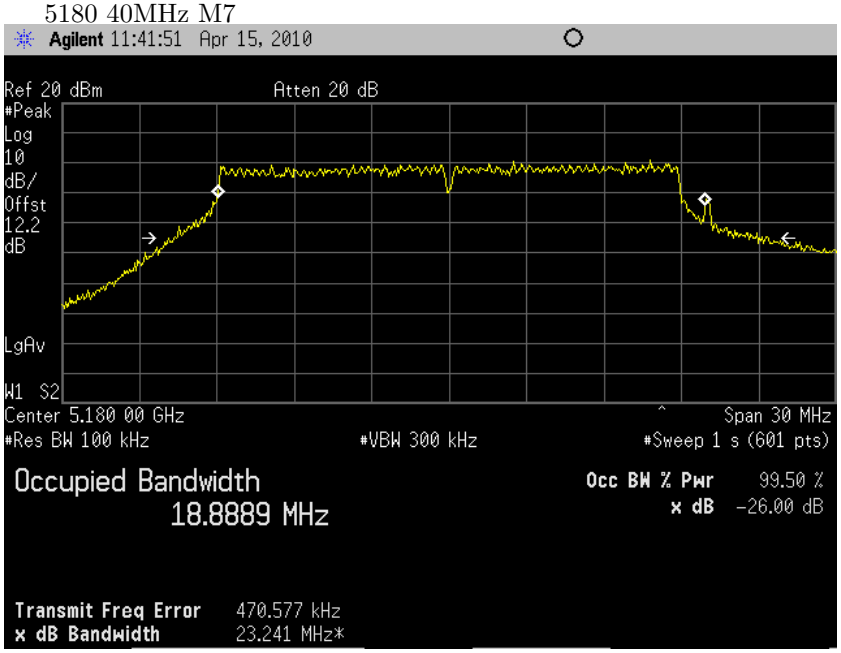
5580 20MHz OFDM



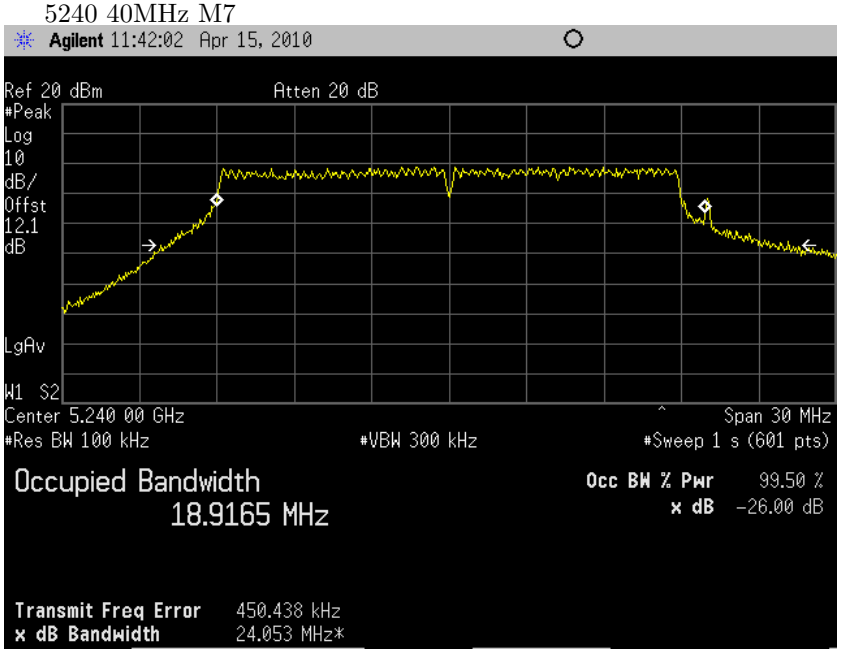
5700 20MHz OFDM



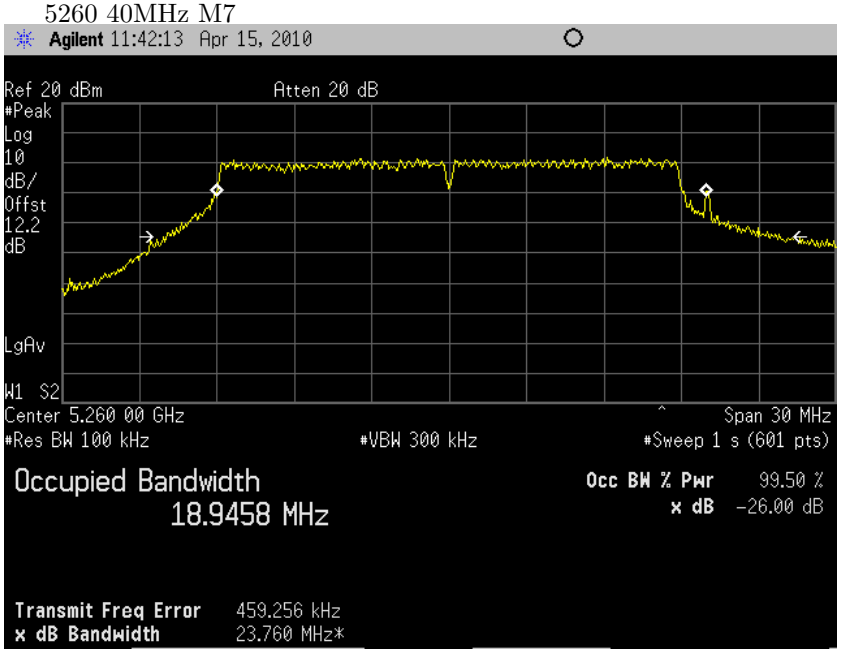
5180 40MHz M7



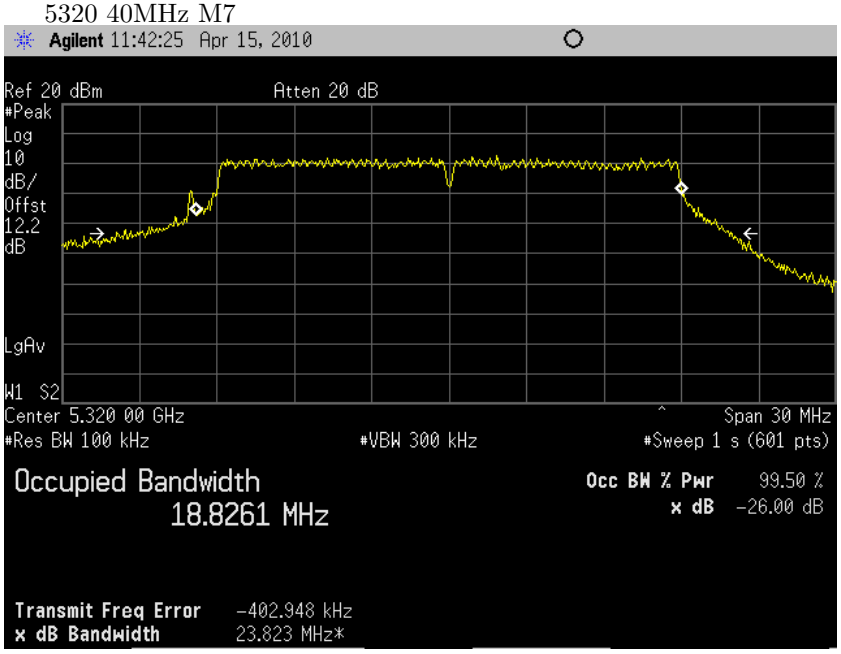
5240 40MHz M7



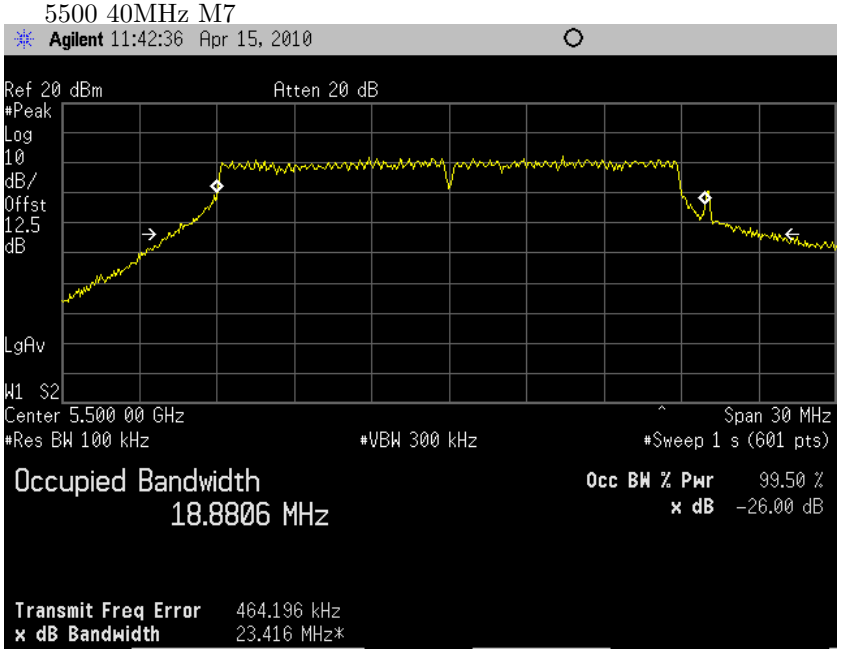
5260 40MHz M7



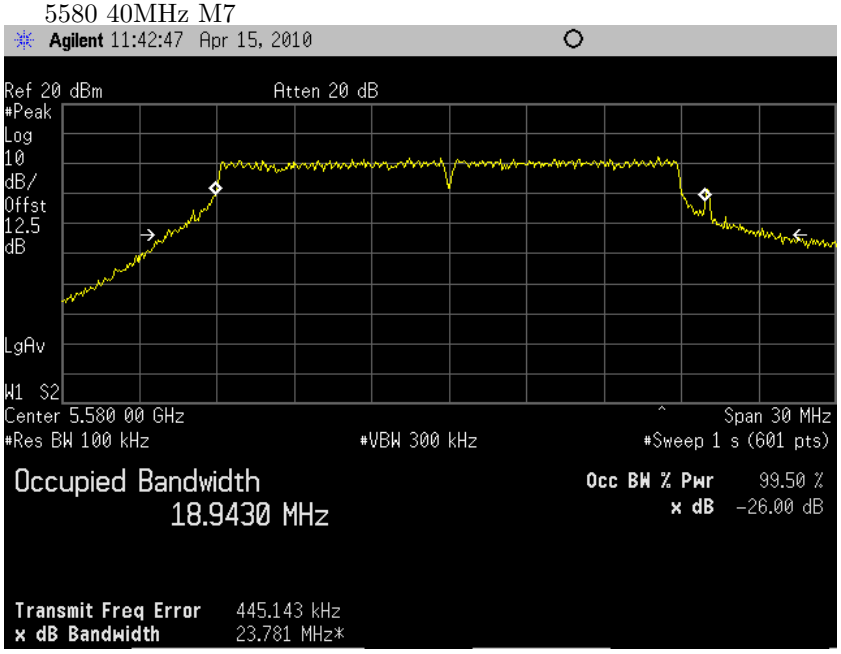
5320 40MHz M7



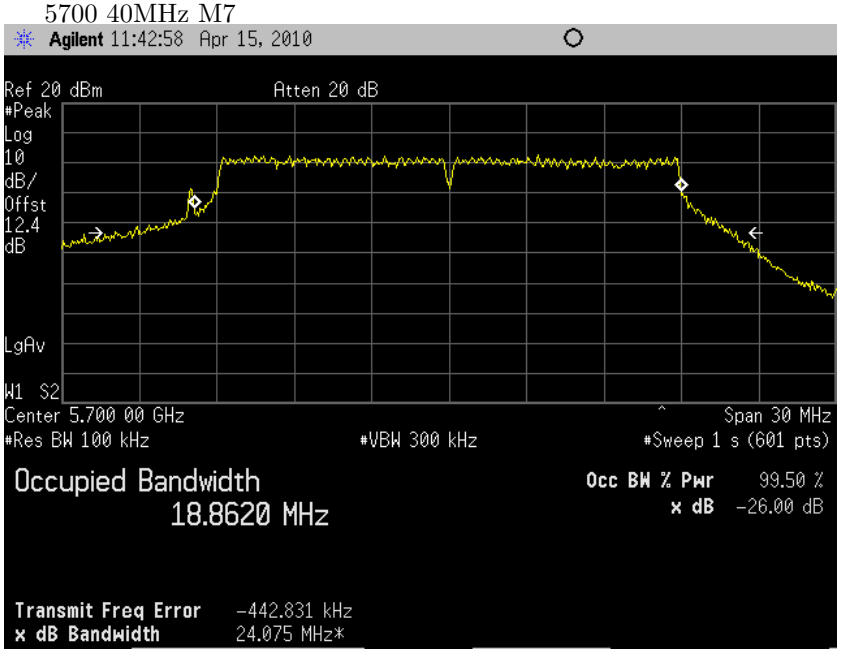
5500 40MHz M7



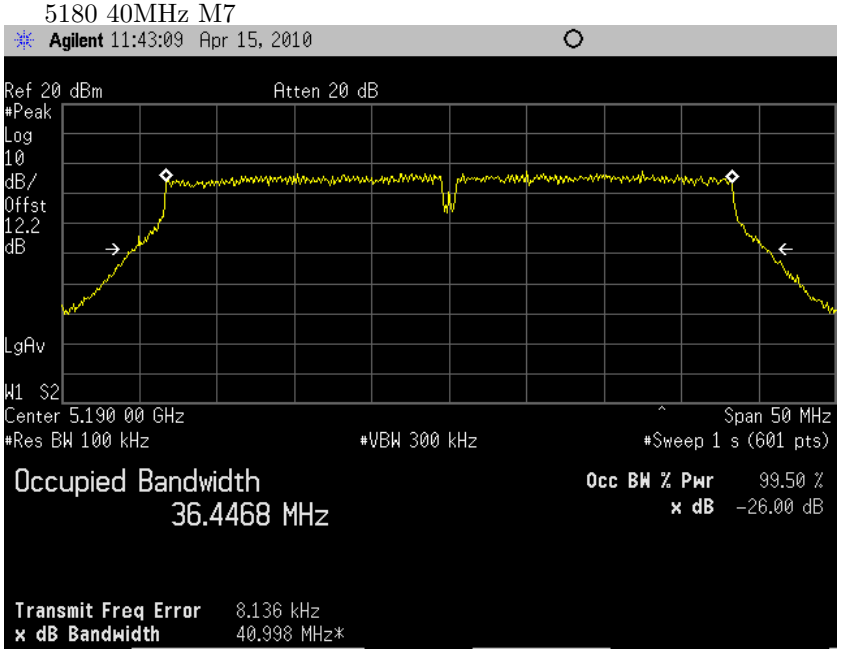
5580 40MHz M7



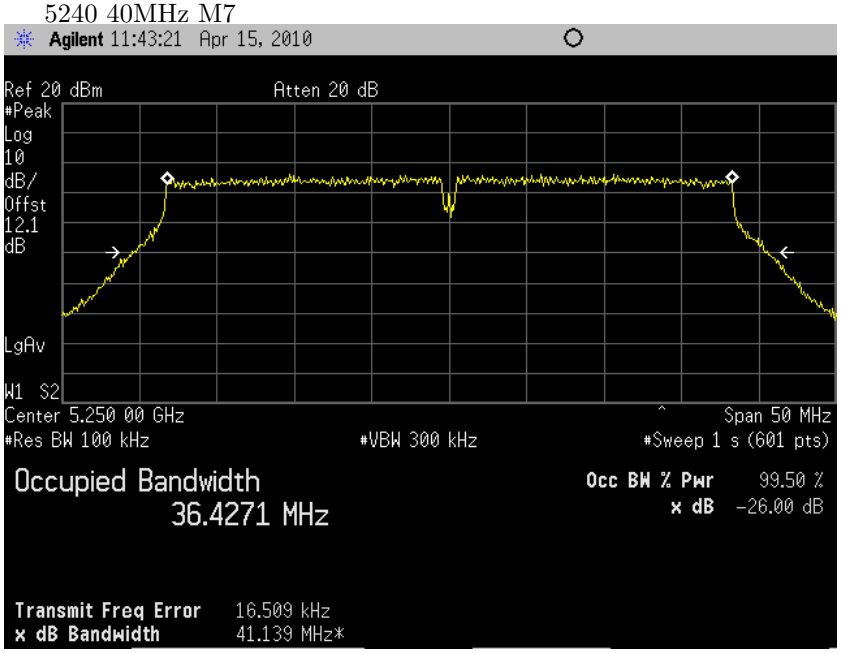
5700 40MHz M7



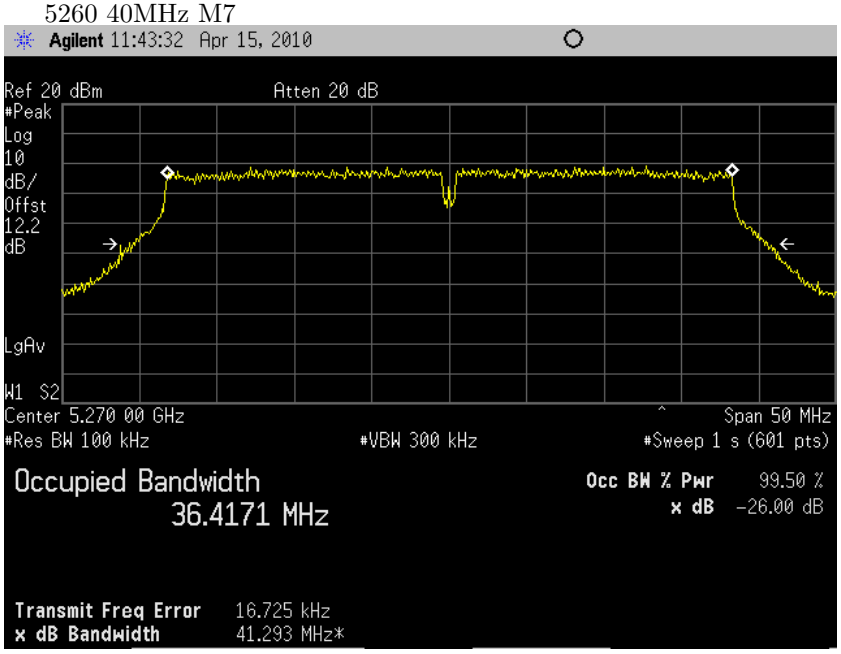
5180 40MHz M7



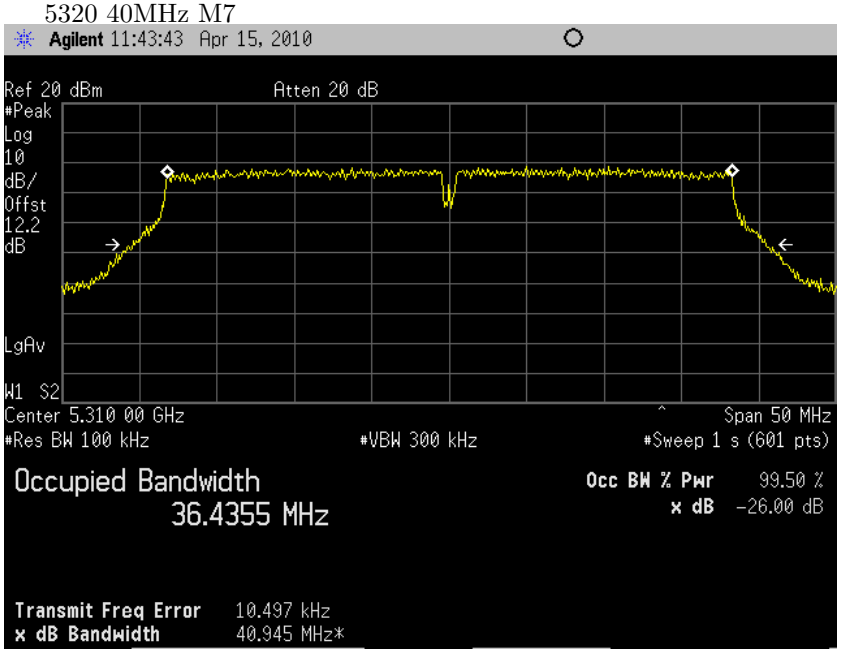
5240 40MHz M7



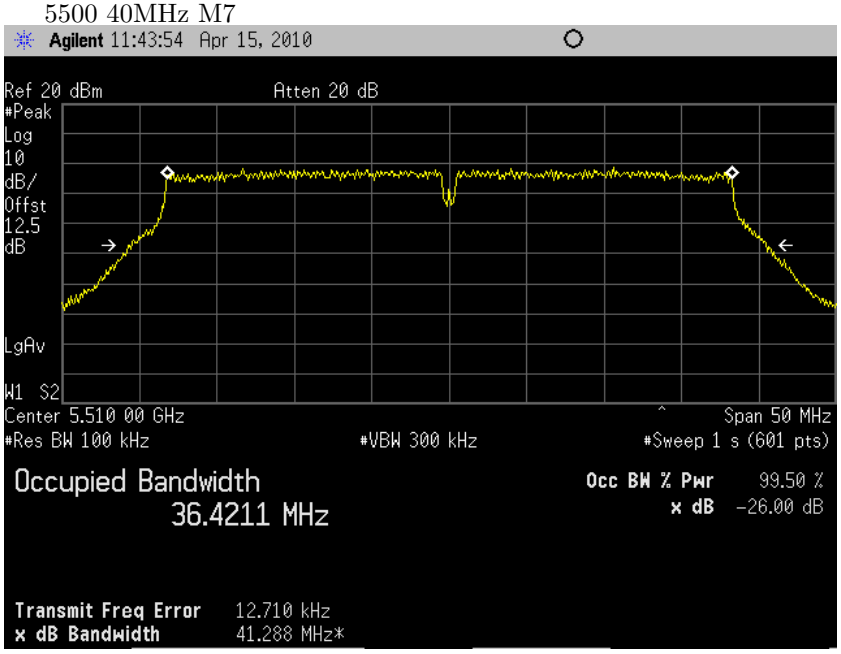
5260 40MHz M7



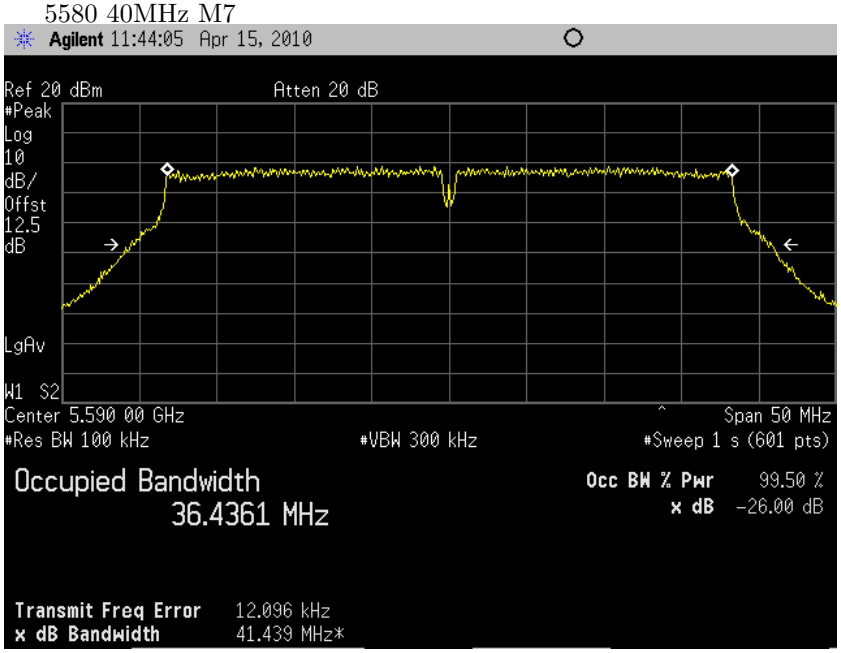
5320 40MHz M7



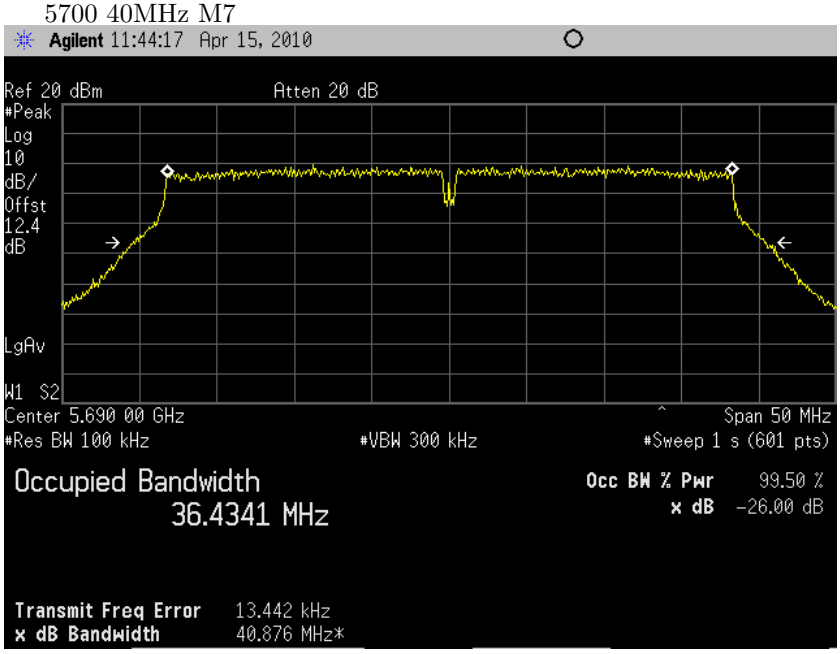
5500 40MHz M7



5580 40MHz M7



5700 40MHz M7



0.6 Power Spectral Density

0.6.1 Specification

15.407 (a) 5.15–5.25 GHz 4dBm, 5.25–5.35 GHz and 5.47 – 5.725 GHz 11 dBm, in a 1 MHz bandwidth.

0.6.2 Measurement Procedure

see ANSI C63.10 6.11.1.2.2

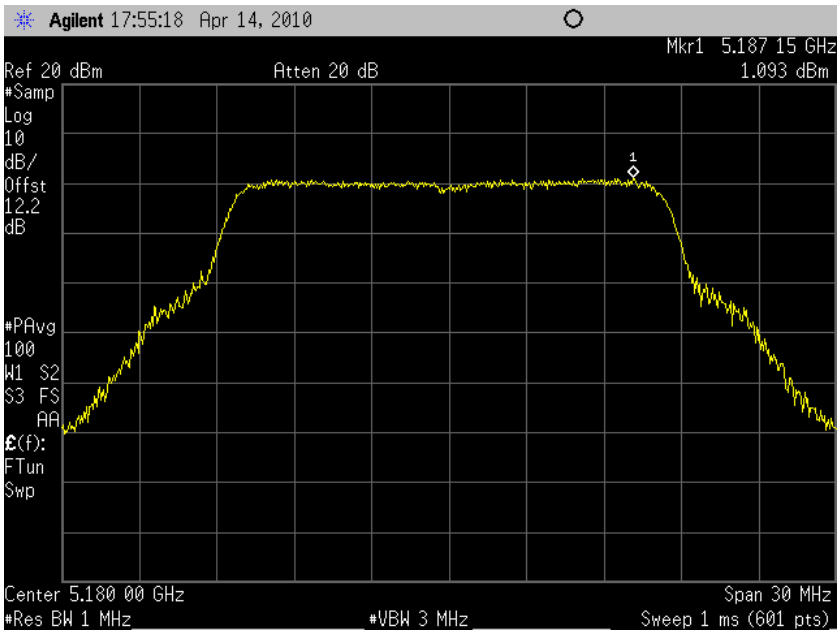
Testing was performed with the radio in continuous transmit mode.

1. Detector ← Sample
2. Ref Level ← +20dBm
3. Ref Level Offset = DUT/Spectrum Analyzer path loss
4. RBW ← 1MHz
5. VBW ← 3MHz
6. Sweep Time ← 1 ms
7. Marker 1 → Peak Trace 1

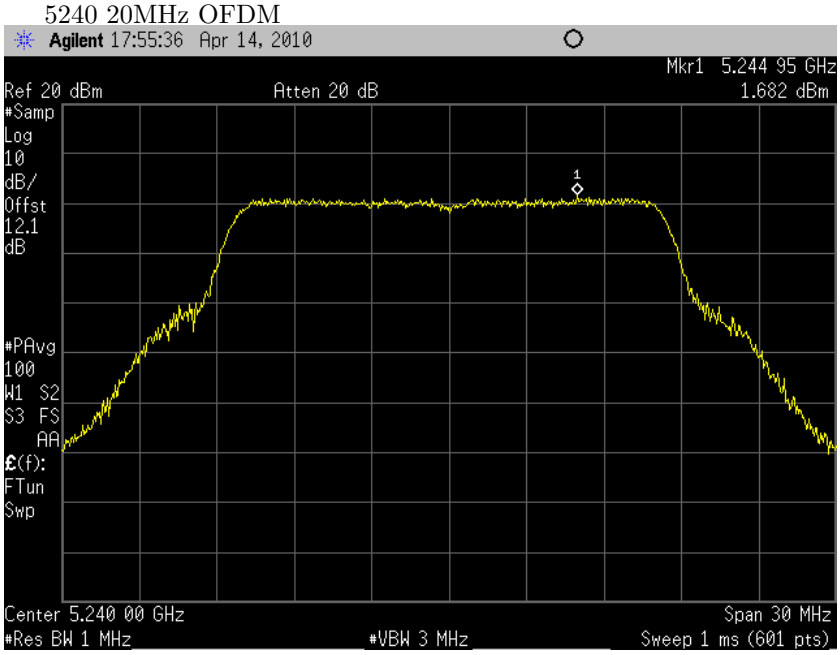
Freq (MHz)	Operating Mode	Data Rate	PSD (dBm/3 kHz)	Limit	Margin
5180.0	20MHz OFDM	54	1.1	4.0	2.9
5240.0	20MHz OFDM	54	1.7	4.0	2.3
5260.0	20MHz OFDM	54	4.0	11.0	7.0
5320.0	20MHz OFDM	54	3.7	11.0	7.3
5500.0	20MHz OFDM	54	4.8	11.0	6.2
5580.0	20MHz OFDM	54	4.4	11.0	6.6
5700.0	20MHz OFDM	54	4.6	11.0	6.4
5180.0	40MHz M7	M7	1.3	4.0	2.7
5240.0	40MHz M7	M7	0.7	4.0	3.3
5260.0	40MHz M7	M7	3.3	11.0	7.7
5320.0	40MHz M7	M7	3.5	11.0	7.5
5500.0	40MHz M7	M7	3.3	11.0	7.7
5580.0	40MHz M7	M7	3.7	11.0	7.3
5700.0	40MHz M7	M7	4.1	11.0	6.9
5180.0	40MHz M7	M7	-1.4	4.0	5.4
5240.0	40MHz M7	M7	-2.3	4.0	6.3
5260.0	40MHz M7	M7	0.3	11.0	10.7
5320.0	40MHz M7	M7	0.2	11.0	10.8
5500.0	40MHz M7	M7	-0.1	11.0	11.1
5580.0	40MHz M7	M7	0.5	11.0	10.5
5700.0	40MHz M7	M7	0.9	11.0	10.1

Table 5: Power Spectral Density

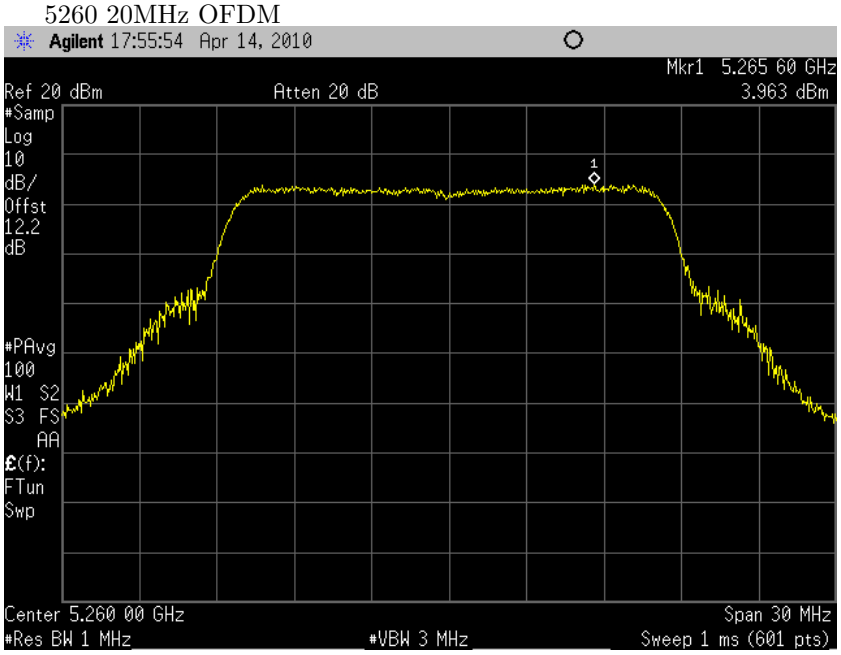
5180 20MHz OFDM



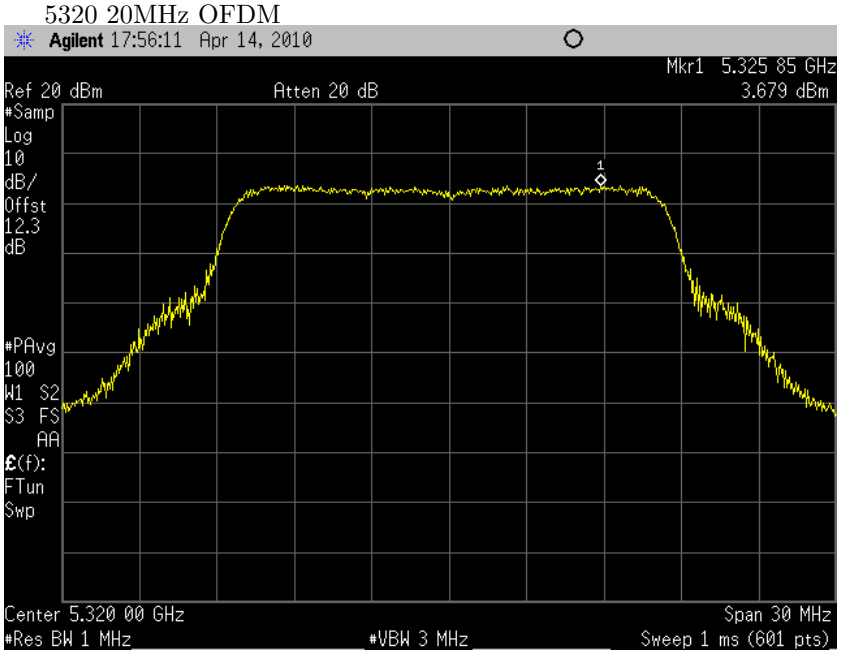
5240 20MHz OFDM



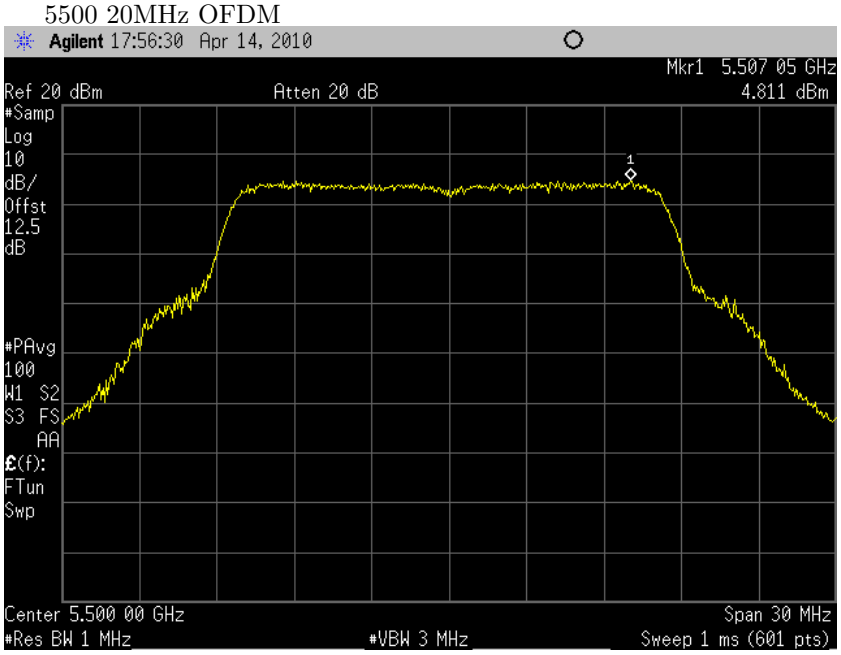
5260 20MHz OFDM



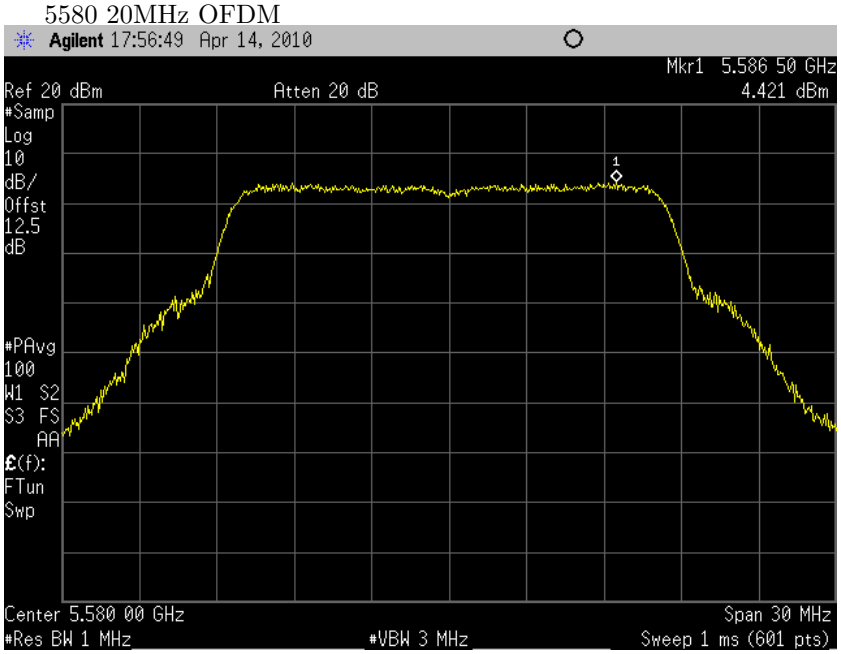
5320 20MHz OFDM



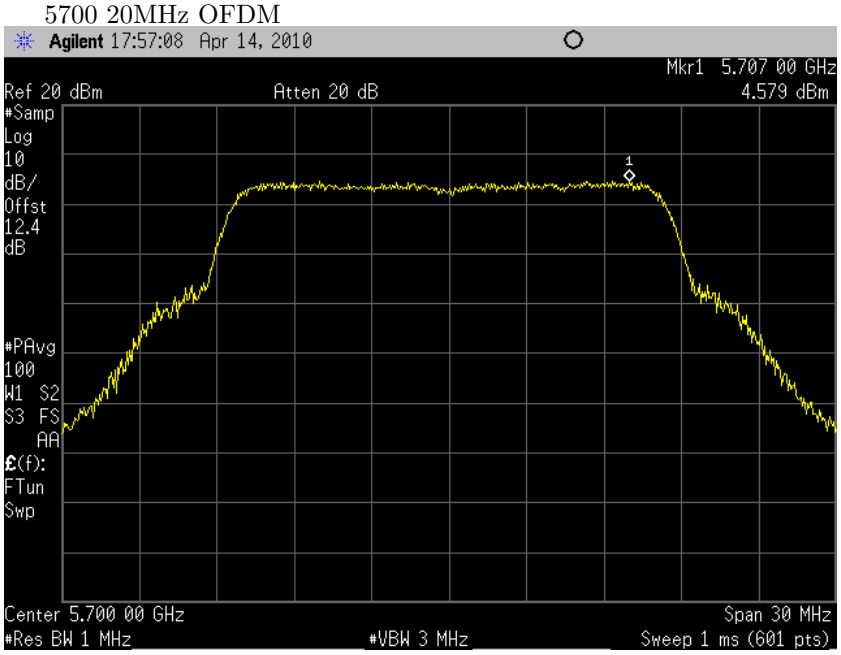
5500 20MHz OFDM



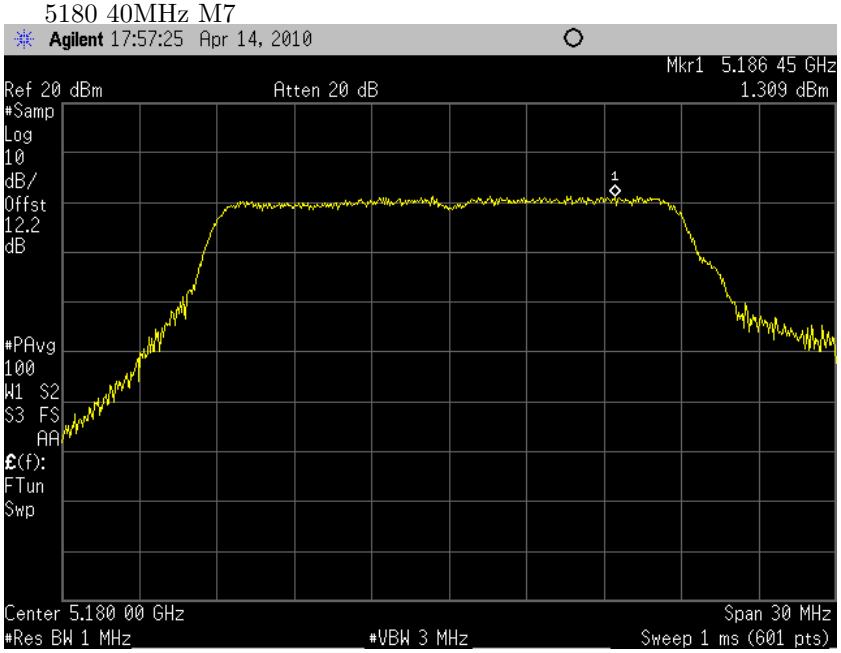
5580 20MHz OFDM



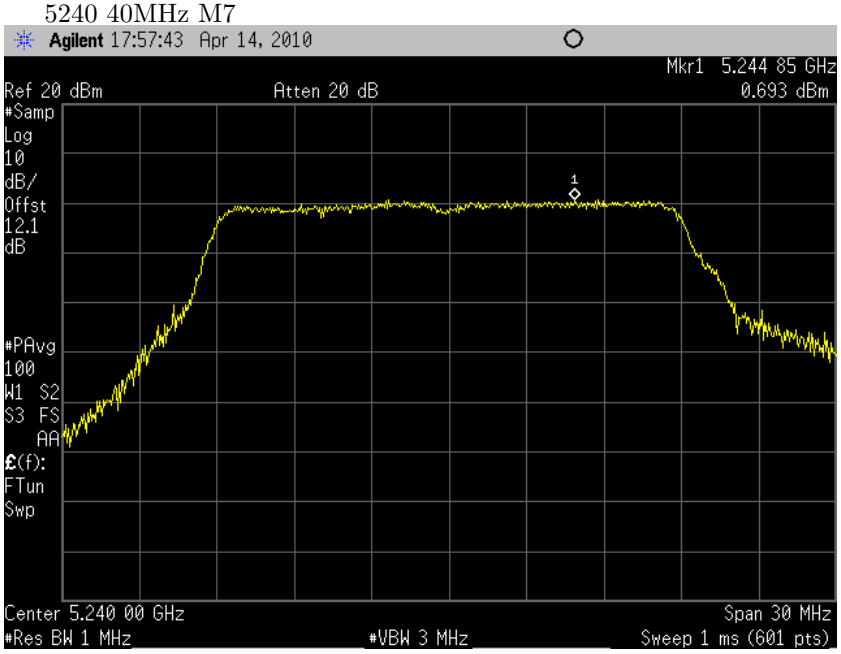
5700 20MHz OFDM



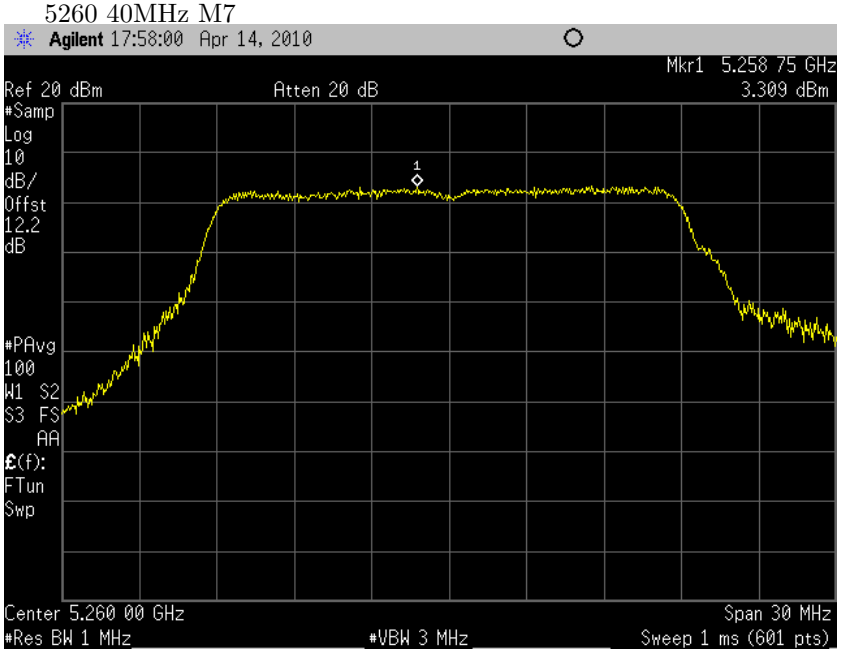
5180 40MHz M7



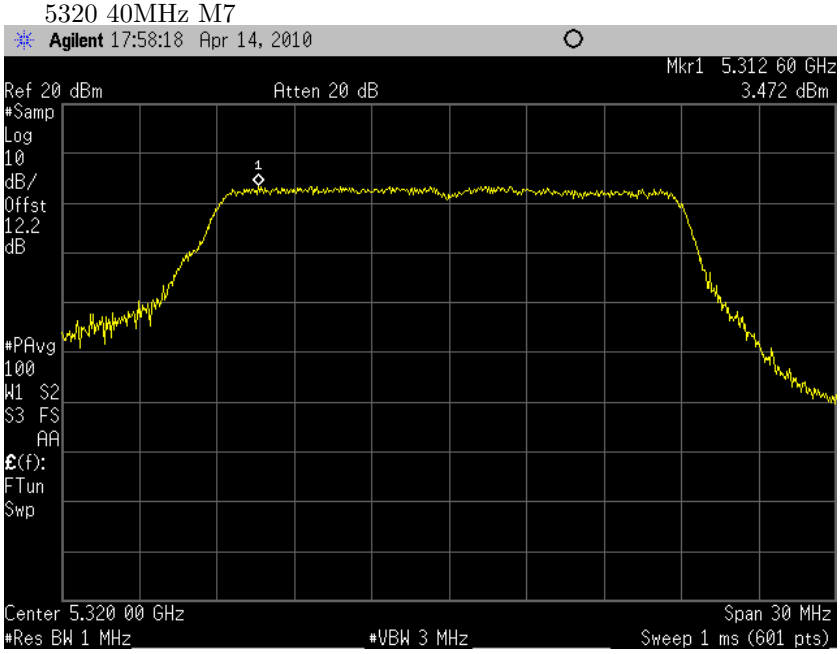
5240 40MHz M7



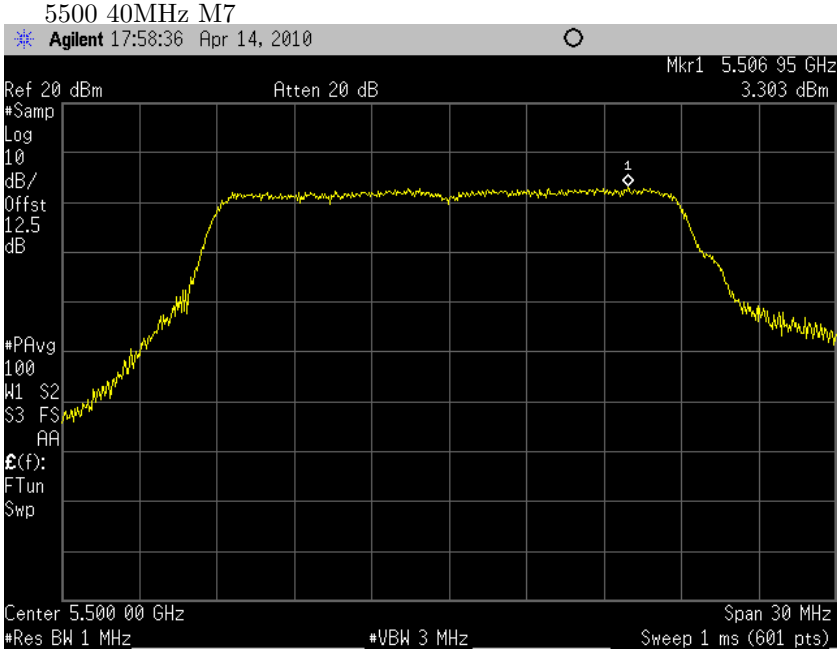
5260 40MHz M7



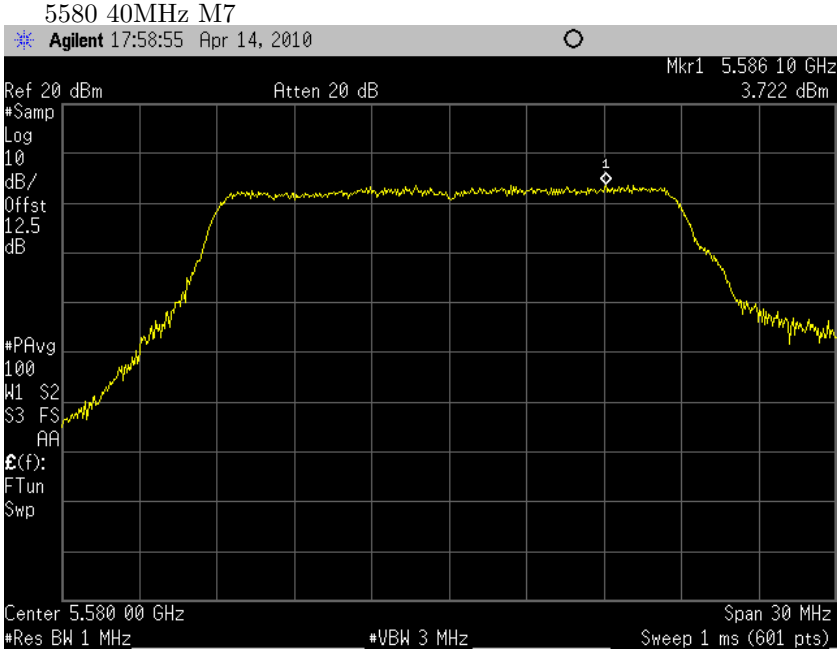
5320 40MHz M7



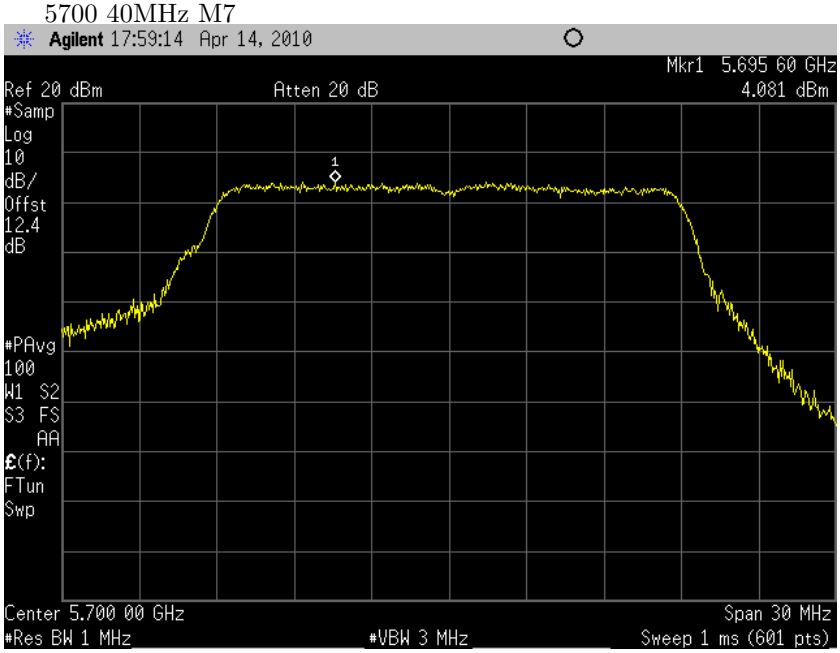
5500 40MHz M7



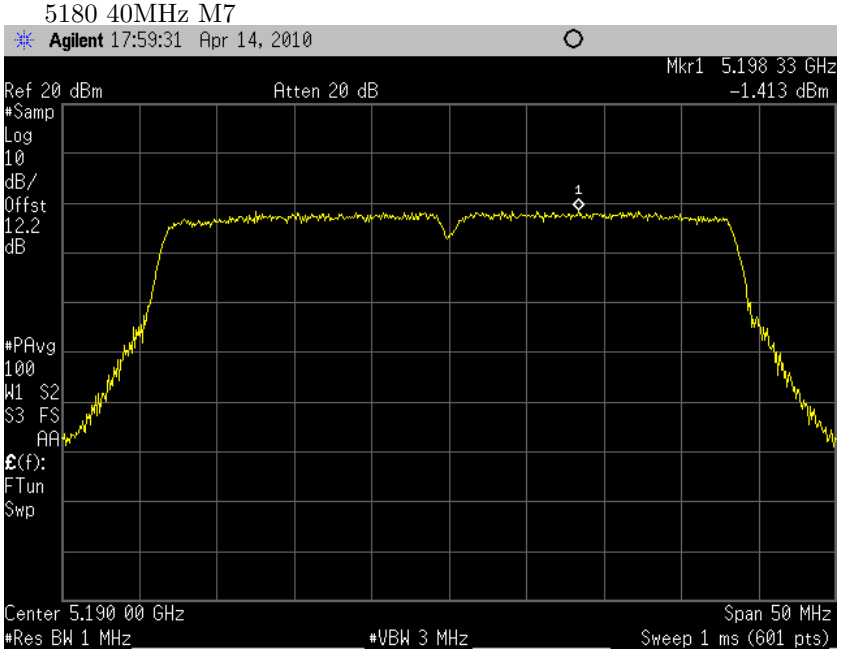
5580 40MHz M7



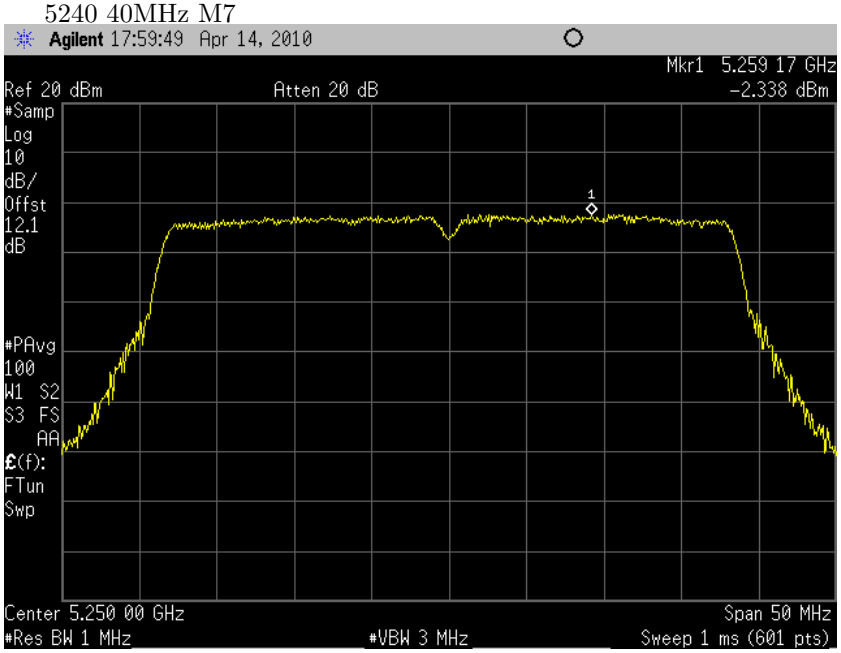
5700 40MHz M7



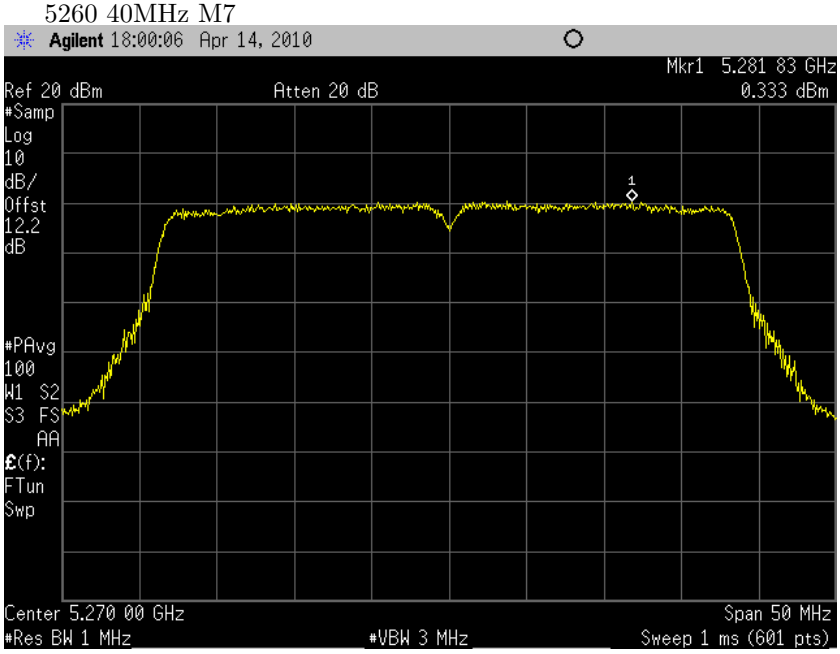
5180 40MHz M7



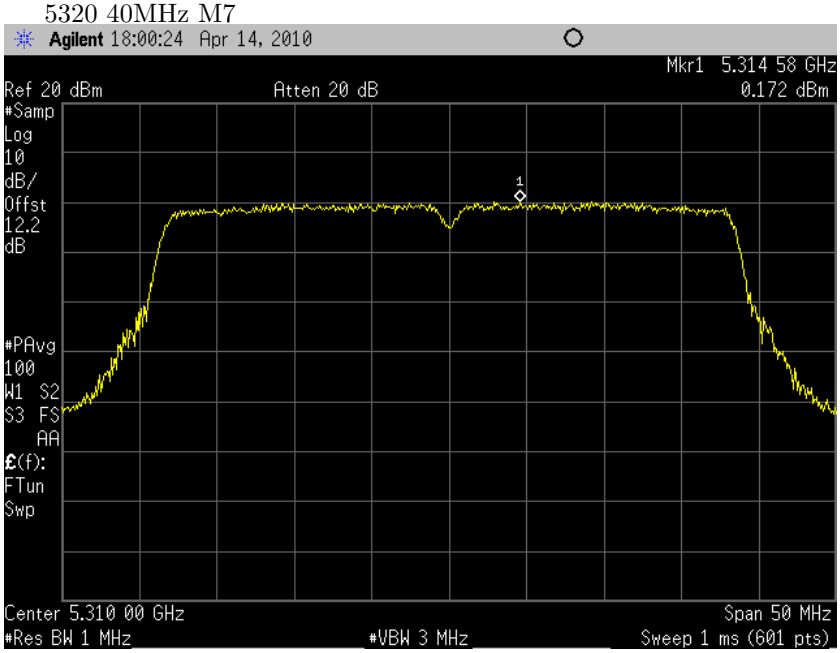
5240 40MHz M7



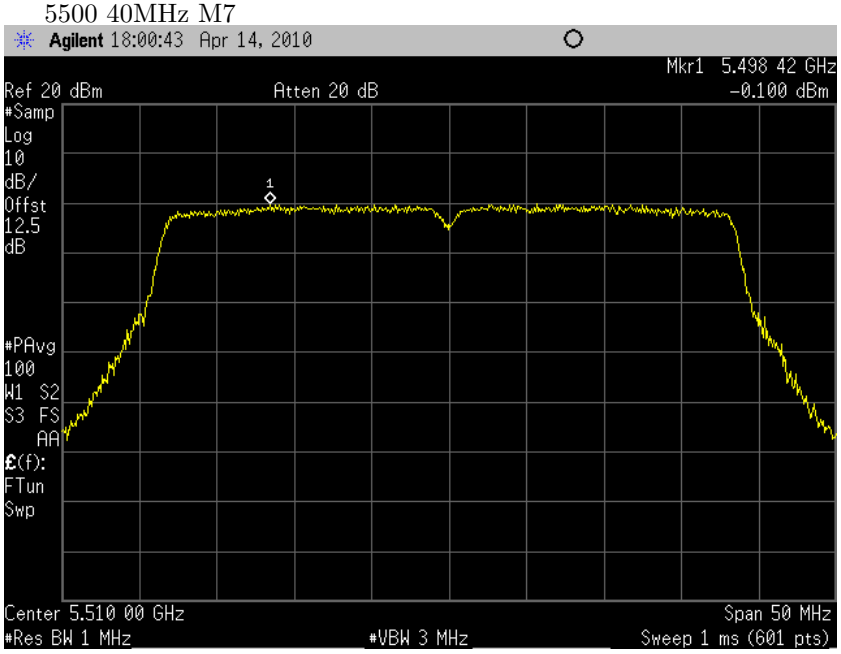
5260 40MHz M7



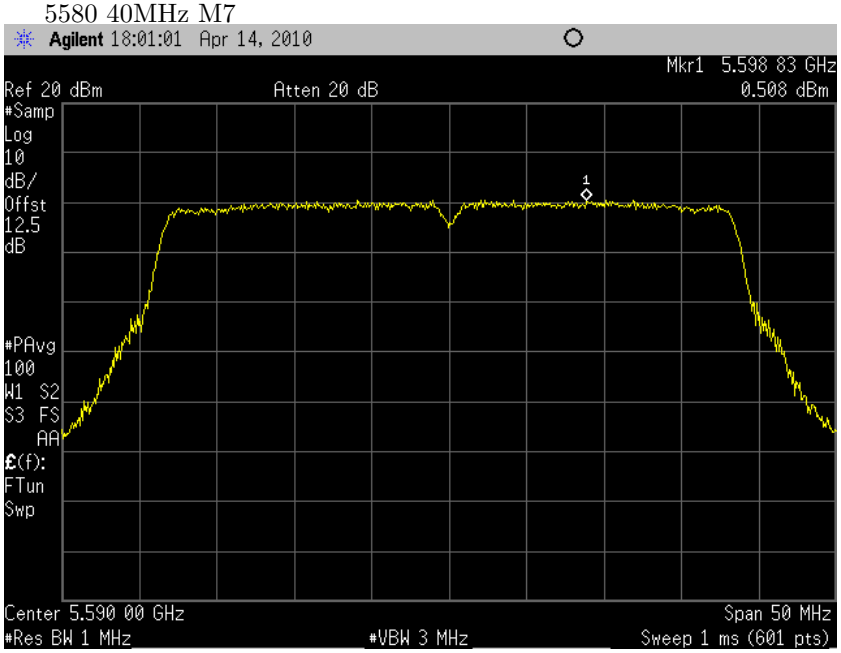
5320 40MHz M7



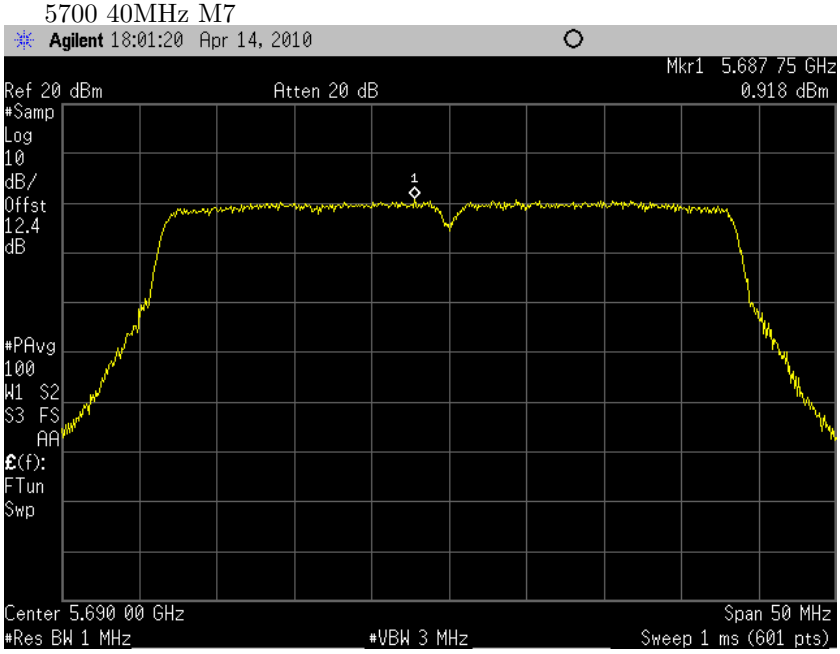
5500 40MHz M7



5580 40MHz M7



5700 40MHz M7



0.7 Peak Excursion

0.7.1 Specification

15.407 (a) (6) 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.

0.7.2 Measurement Procedure

Reference ANSI C63.10-2009 6.10.4.2

Testing was performed with the radio in continuous transmit mode.

1. Ref Level Offset = DUT/Spectrum Analyzer path loss
2. RBW ← 1MHz
3. VBW ← 3MHz
4. Ref Level ← +20dBm
5. Ref Level Offset = DUT/Spectrum Analyzer path loss

Measure trace 1

1. Peak Detector
2. Max Hold
3. Marker 1 → Peak Trace 1

Measure trace 2

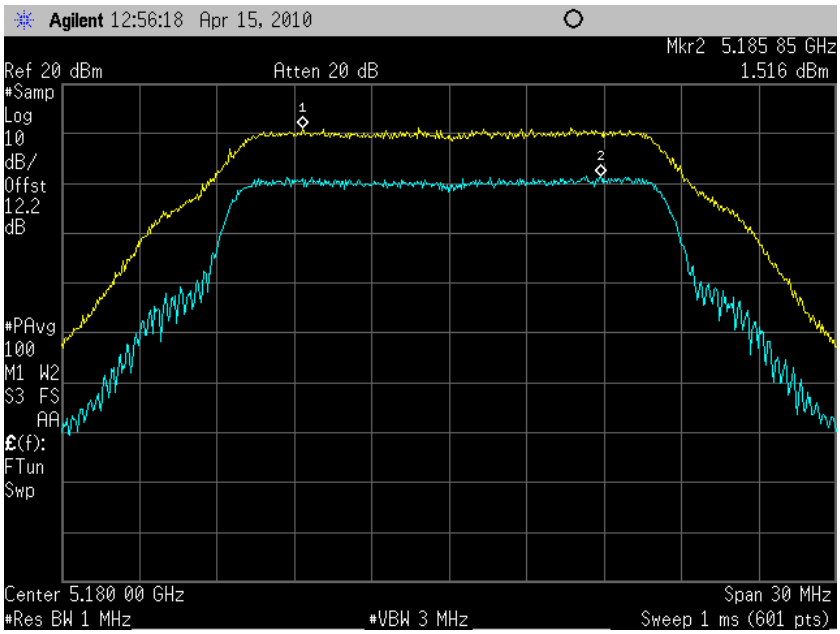
1. Sampling Detector
2. Power Averaging
3. 100 Averages
4. Marker 2 → Peak Trace 2

The level of each marker is retrieved from the spectrum analyzer and the difference between the marker levels is recorded as the peak excursion.

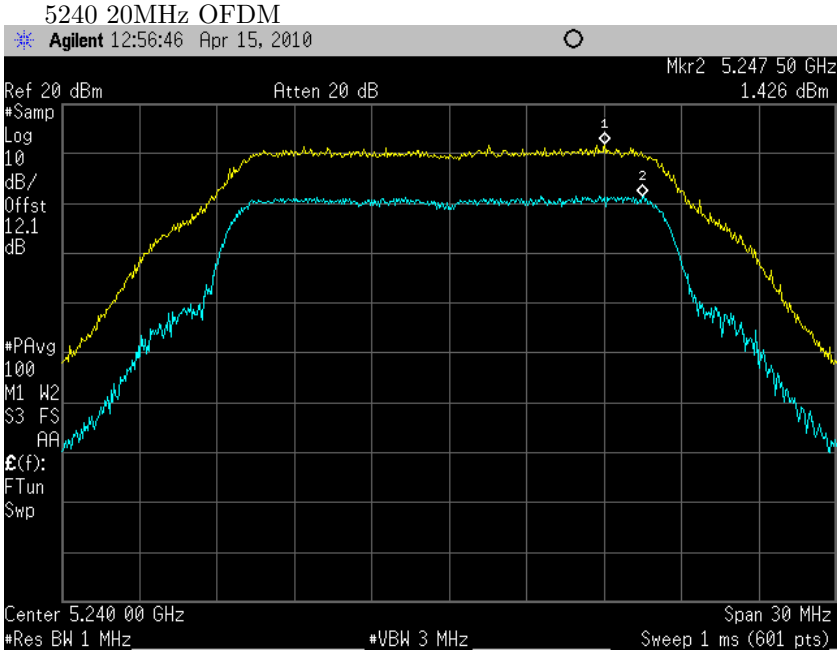
Freq (MHz)	Operating Mode	Data Rate	Peak Excursion (dB)	Limit	Margin
5180.0	20MHz OFDM	54	9.7	13.0	3.3
5240.0	20MHz OFDM	54	10.4	13.0	2.6
5260.0	20MHz OFDM	54	10.1	13.0	2.9
5320.0	20MHz OFDM	54	9.7	13.0	3.3
5500.0	20MHz OFDM	54	9.6	13.0	3.4
5580.0	20MHz OFDM	54	9.9	13.0	3.1
5700.0	20MHz OFDM	54	9.8	13.0	3.2
5180.0	40MHz M7	M7	10.1	13.0	2.9
5240.0	40MHz M7	M7	10.0	13.0	3.0
5260.0	40MHz M7	M7	9.8	13.0	3.2
5320.0	40MHz M7	M7	9.9	13.0	3.1
5500.0	40MHz M7	M7	10.2	13.0	2.8
5580.0	40MHz M7	M7	10.3	13.0	2.7
5700.0	40MHz M7	M7	10.3	13.0	2.7
5180.0	40MHz M7	M7	10.9	13.0	2.1
5240.0	40MHz M7	M7	10.9	13.0	2.1
5260.0	40MHz M7	M7	10.2	13.0	2.8
5320.0	40MHz M7	M7	10.6	13.0	2.4
5500.0	40MHz M7	M7	10.2	13.0	2.8
5580.0	40MHz M7	M7	10.0	13.0	3.0
5700.0	40MHz M7	M7	10.1	13.0	2.9

Table 6: Peak Excursion

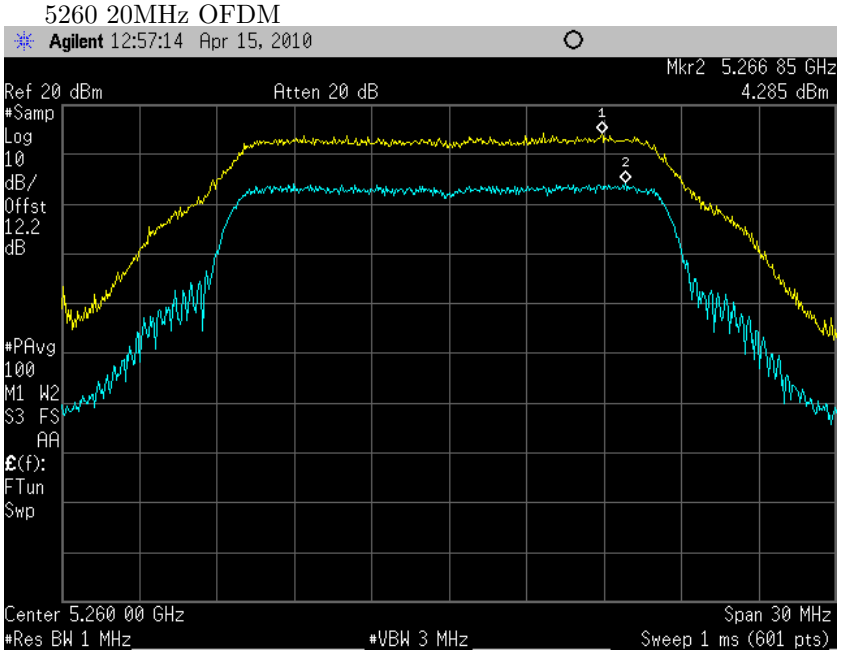
5180 20MHz OFDM



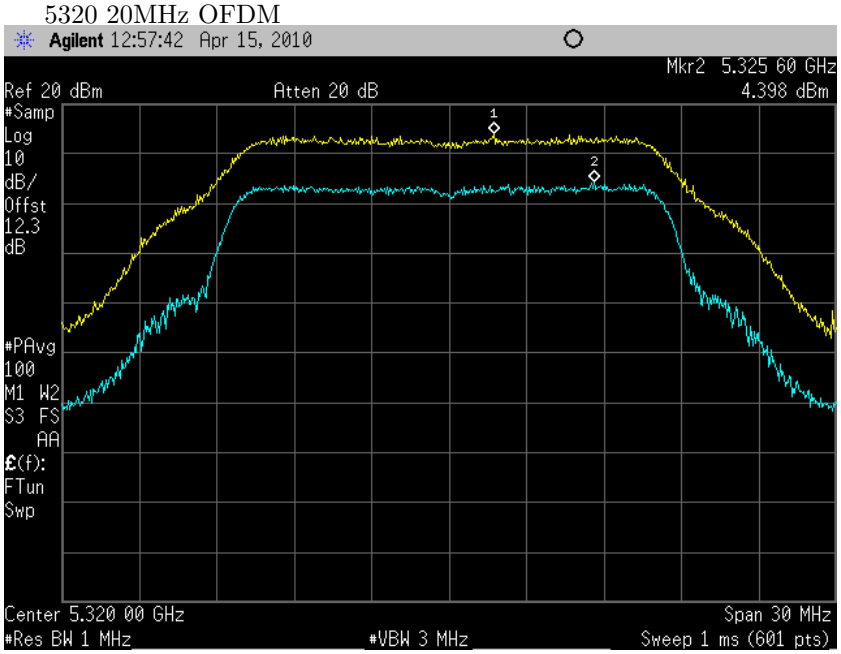
5240 20MHz OFDM



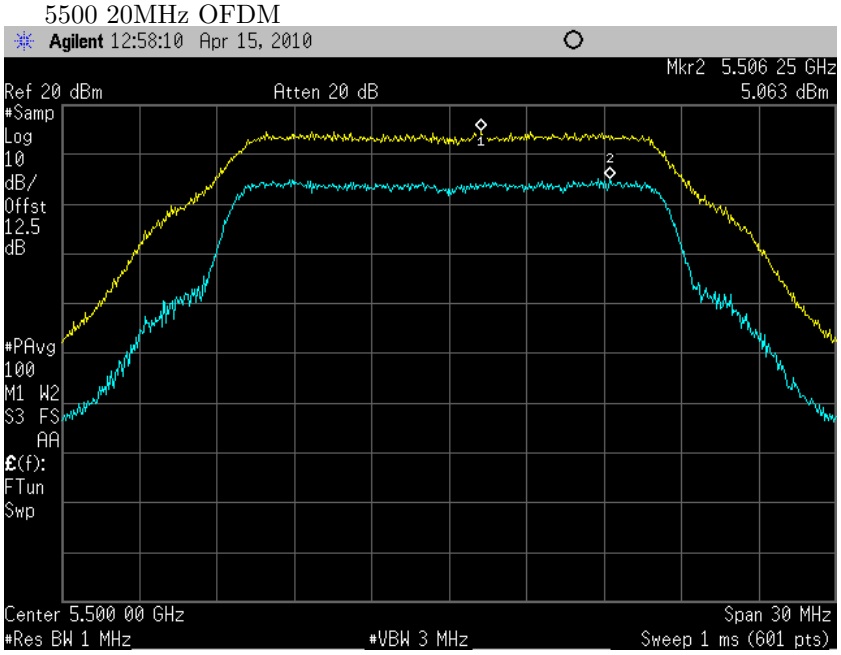
5260 20MHz OFDM



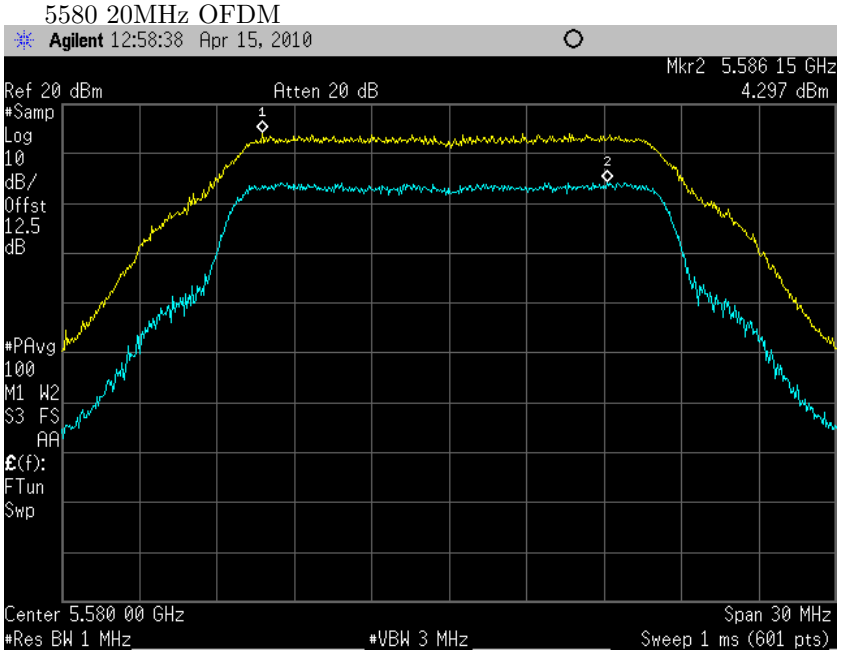
5320 20MHz OFDM



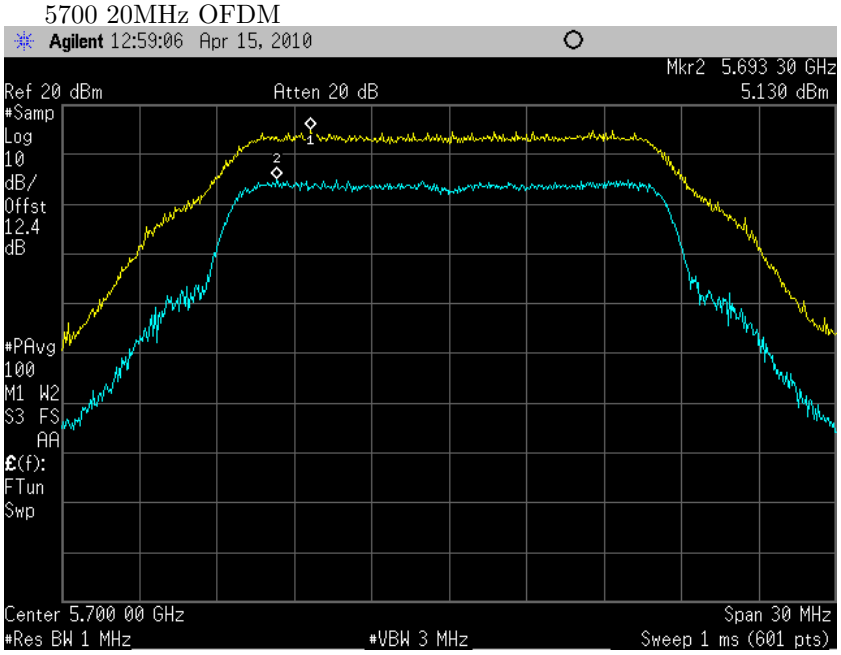
5500 20MHz OFDM



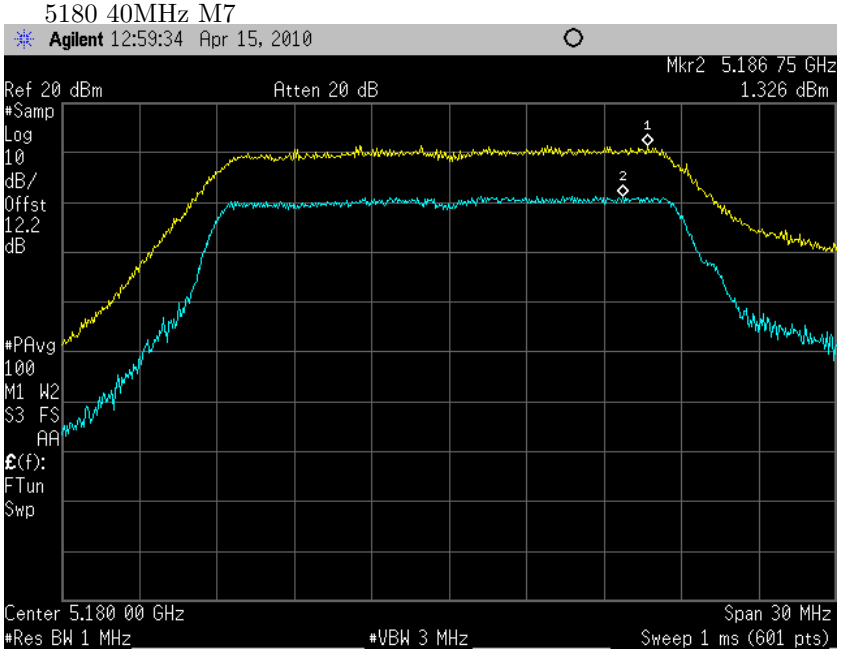
5580 20MHz OFDM



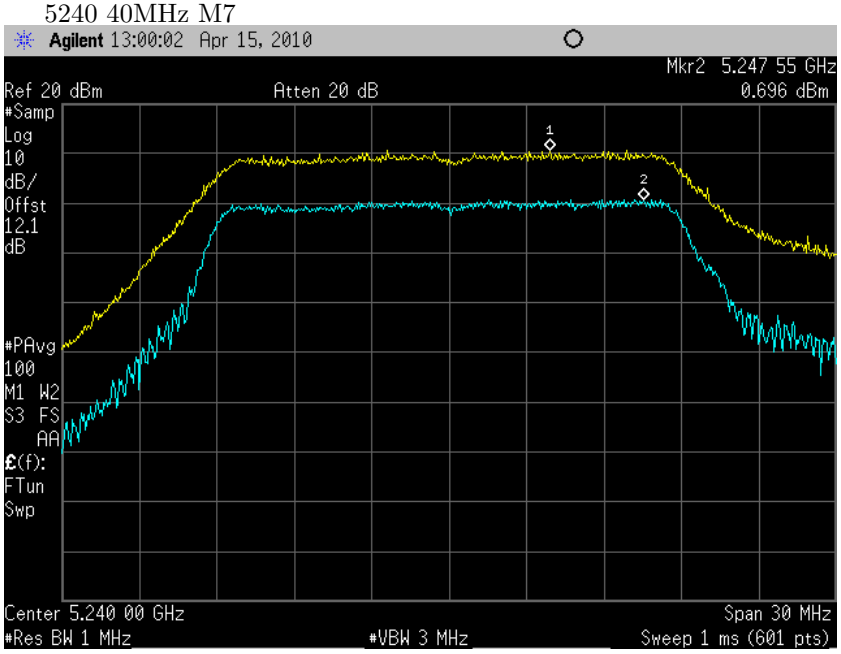
5700 20MHz OFDM



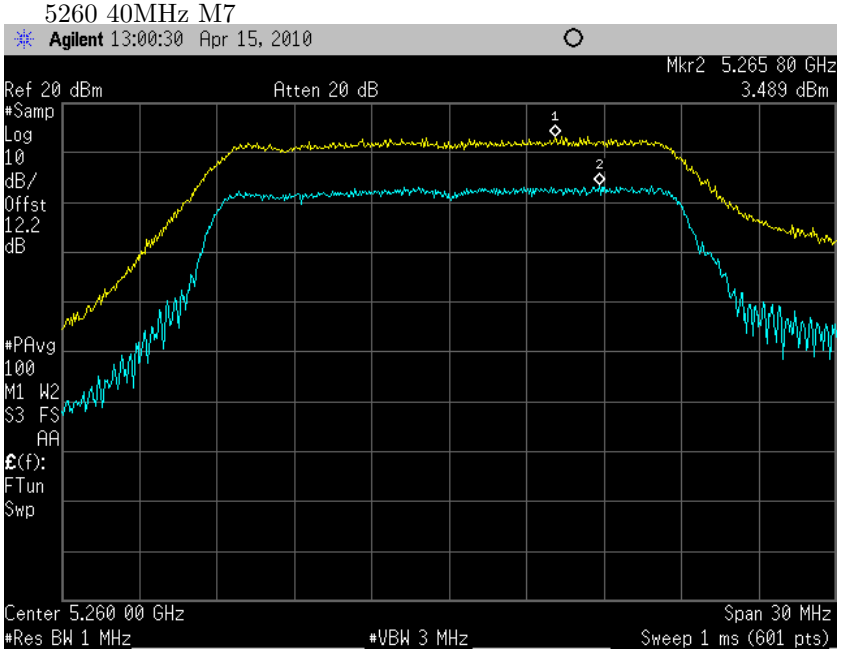
5180 40MHz M7



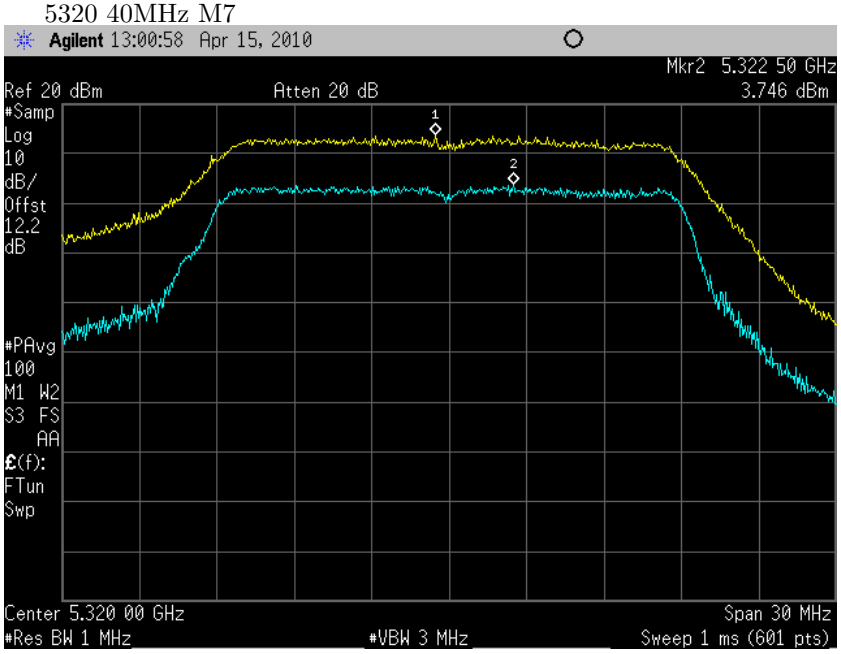
5240 40MHz M7



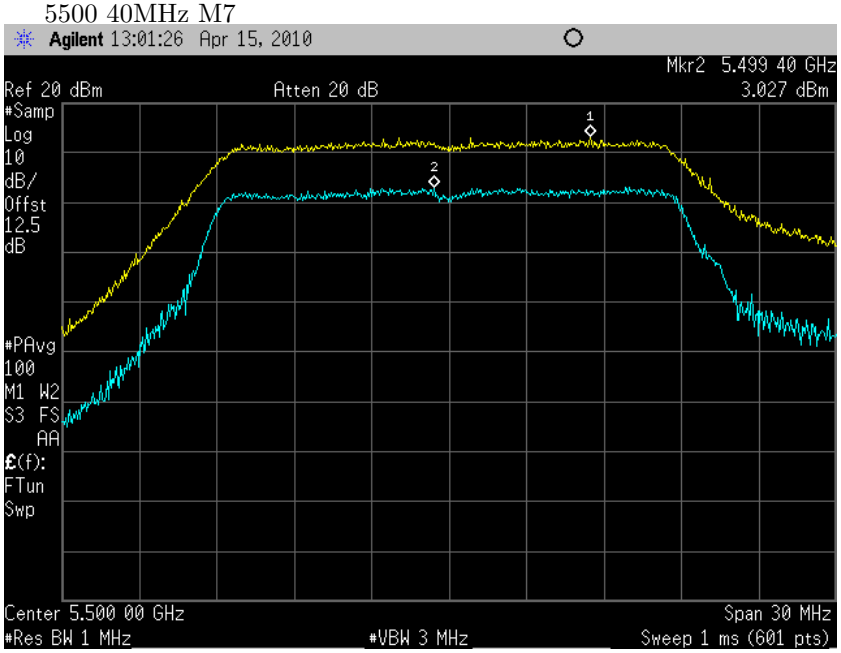
5260 40MHz M7



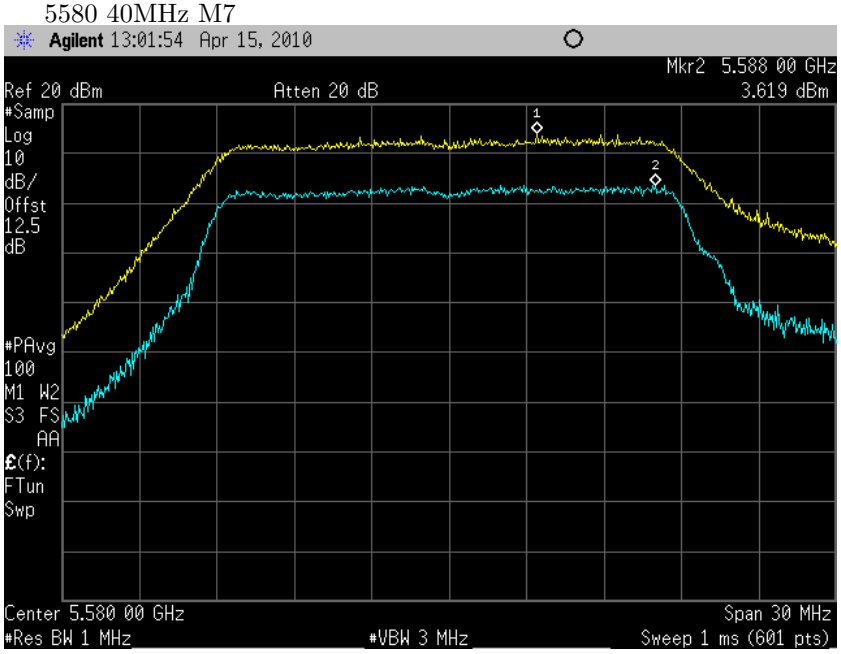
5320 40MHz M7



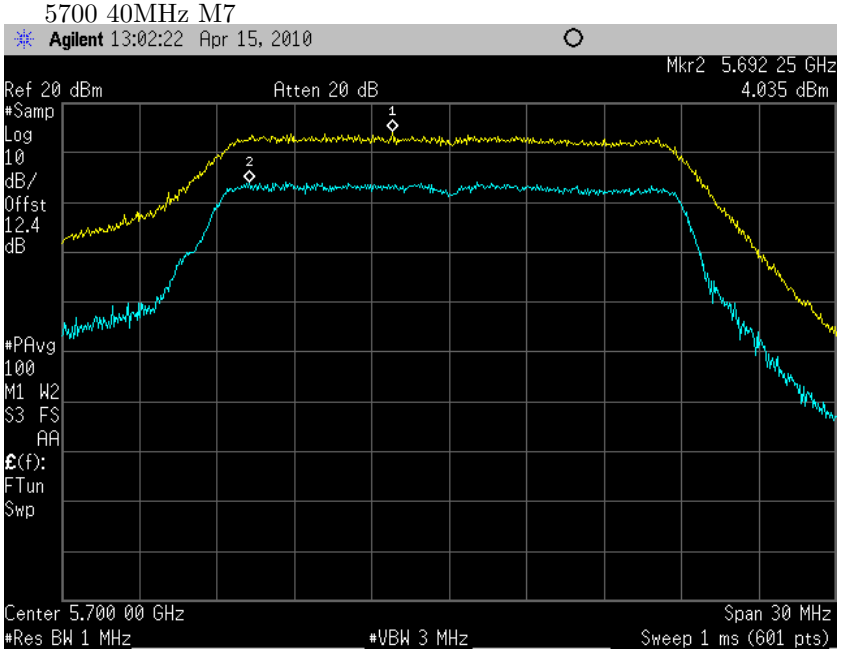
5500 40MHz M7



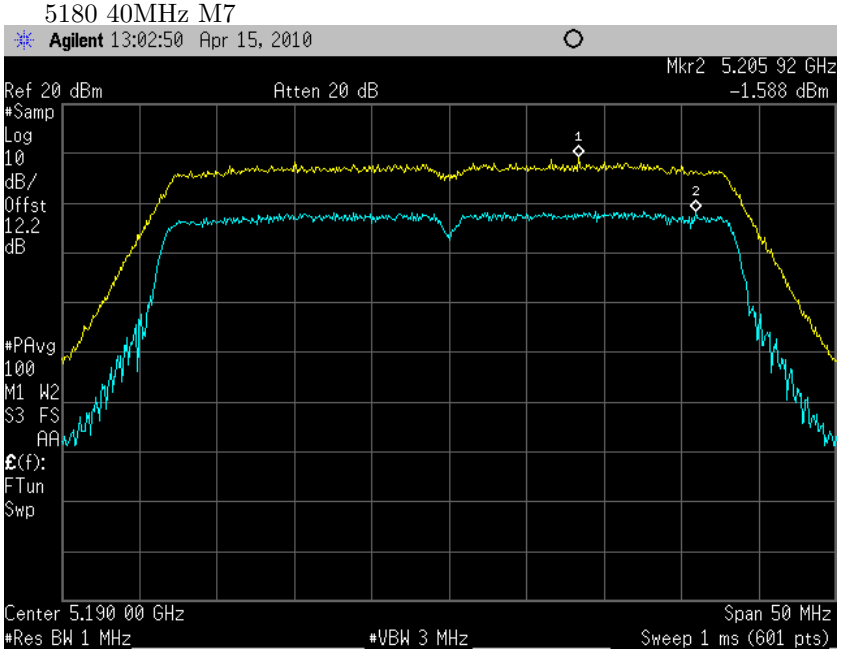
5580 40MHz M7



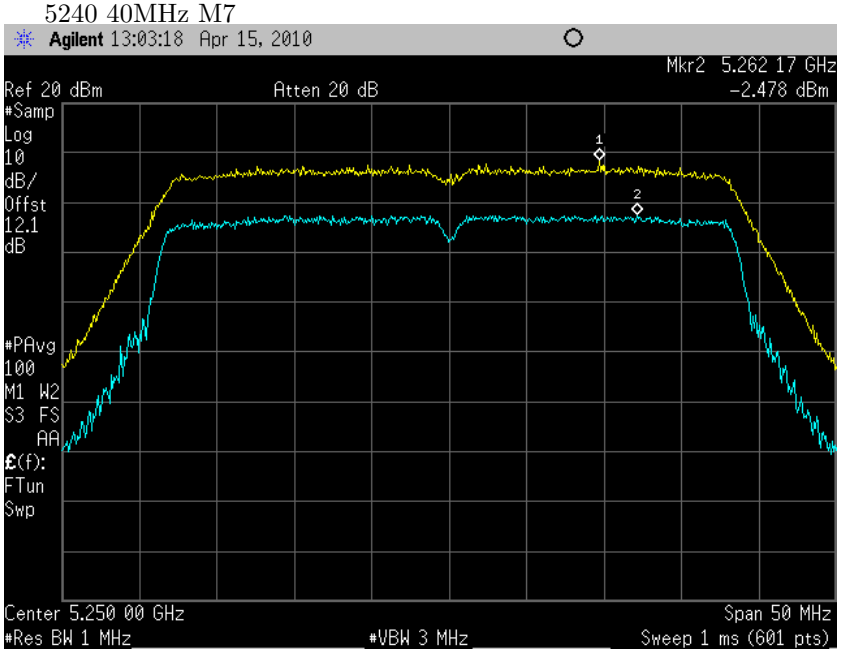
5700 40MHz M7



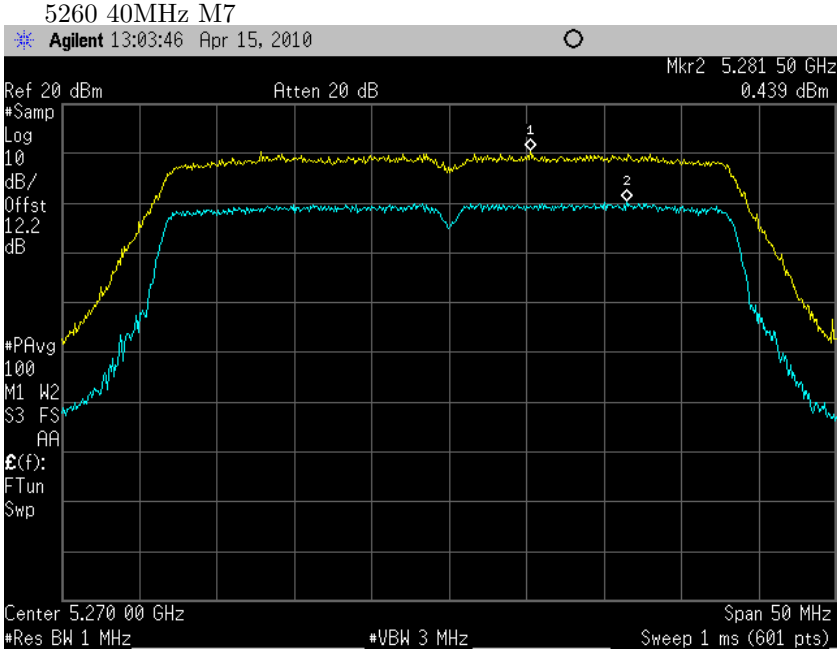
5180 40MHz M7



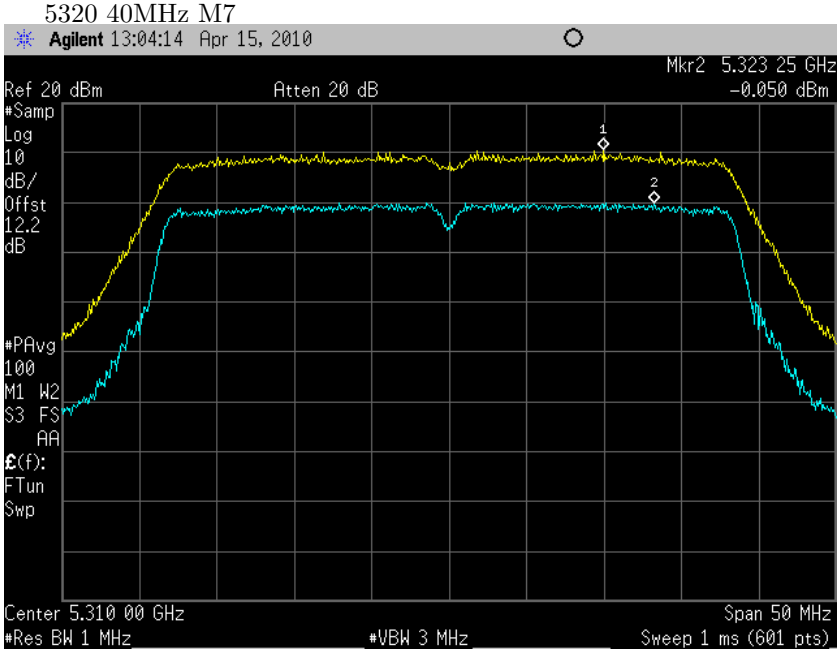
5240 40MHz M7



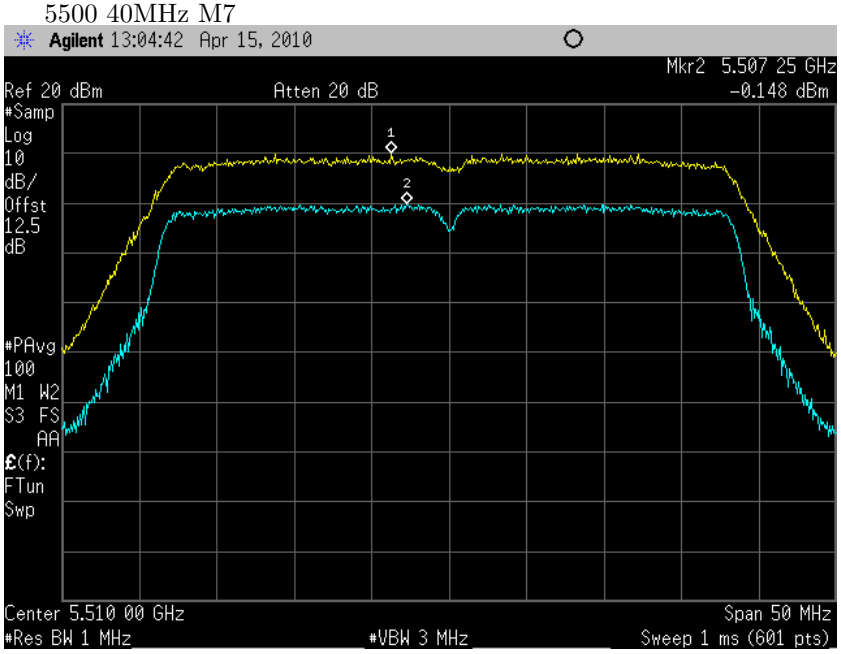
5260 40MHz M7



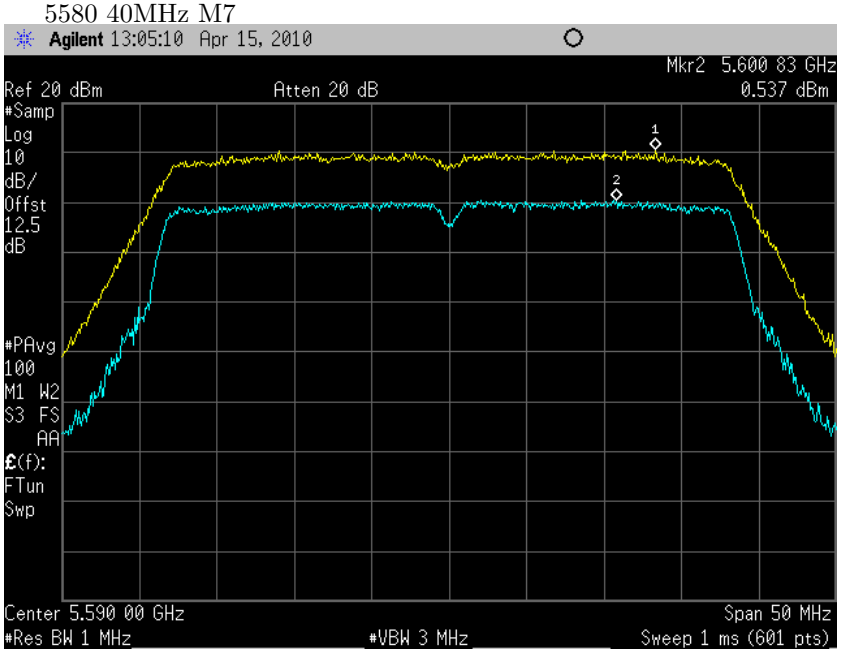
5320 40MHz M7



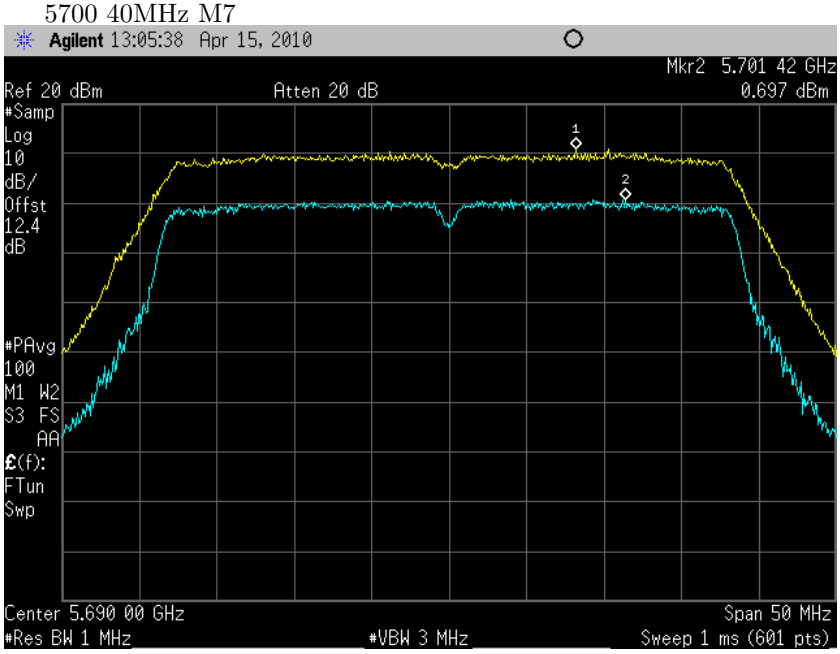
5500 40MHz M7



5580 40MHz M7



5700 40MHz M7



0.8 Conducted Spurious Emissions

0.8.1 Specification

47 CFR 15.407 (b) -27dBm/MHz
Measurements performed May 17 2010.

0.8.2 Band Edge

Measurement Procedure

The start/stop frequency for each measurement is set to allow measurement of the signal and band edge of interest.

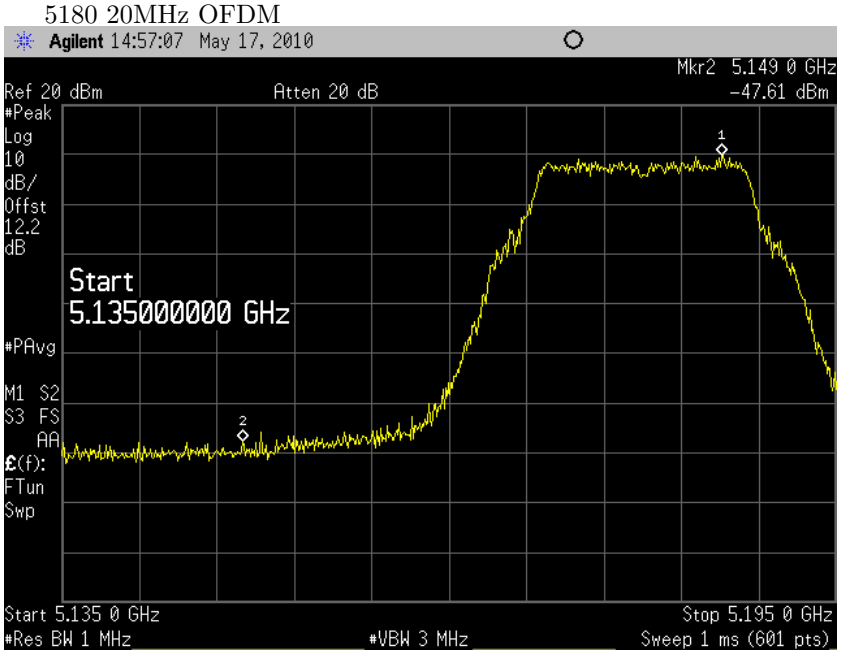
1. Ref Level Offset = DUT/Spectrum Analyzer path loss
2. detector ← PEAK
3. RBW ← 1MHz
4. VBW ← 3MHz
5. SWEEP TIME ← AUTO
6. REF LEVEL ← 20.0

Due to the noisy trace, Peak Hold is used and the trace allowed to stabilize (50 sweeps). The data is searched for the maximum level and the maximum level found in the region immediately outside of the allowed band. This value is recorded.

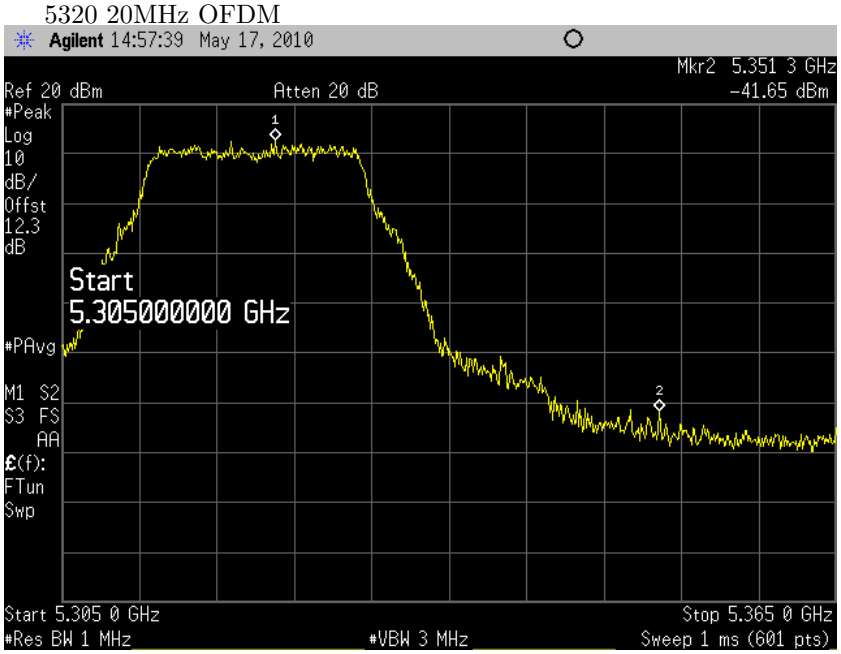
Freq (MHz)	Operating Mode	Data Rate	PSD (dBm/3 kHz)	Limit	Margin
5180.0	20MHz OFDM	54	-47.6	-27.0	20.6
5320.0	20MHz OFDM	54	-41.6	-27.0	14.6
5500.0	20MHz OFDM	54	-42.0	-27.0	15.0
5700.0	20MHz OFDM	54	-41.0	-27.0	14.0
5180.0	40MHz M7	M7	-47.1	-27.0	20.1
5320.0	40MHz M7	M7	-36.9	-27.0	9.9
5500.0	40MHz M7	M7	-41.9	-27.0	14.9
5700.0	40MHz M7	M7	-39.8	-27.0	12.8
5180.0	40MHz M7	M7	-39.5	-27.0	12.5
5320.0	40MHz M7	M7	-33.8	-27.0	6.8
5500.0	40MHz M7	M7	-37.1	-27.0	10.1
5700.0	40MHz M7	M7	-37.7	-27.0	10.7

Table 7: Power Spectral Density

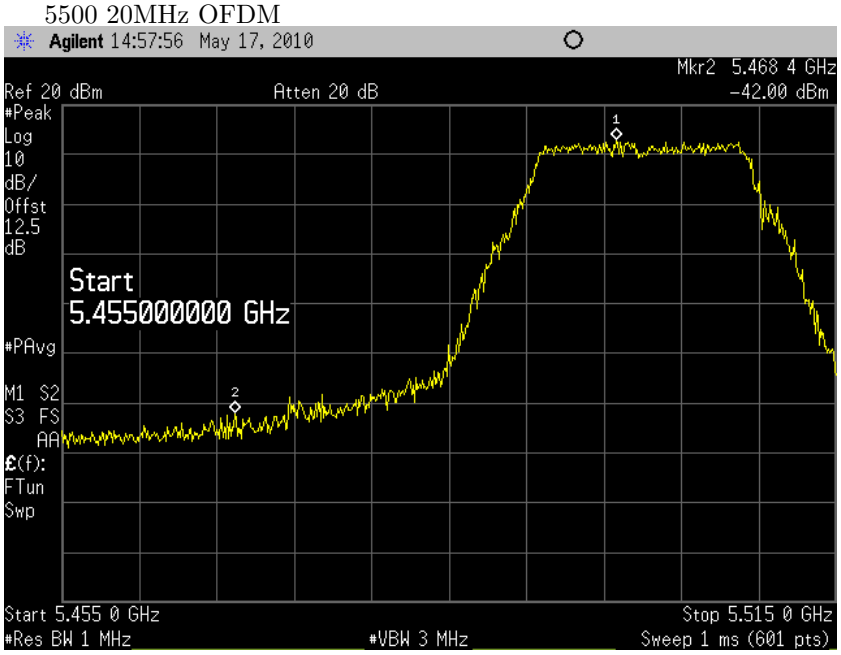
5180 20MHz OFDM



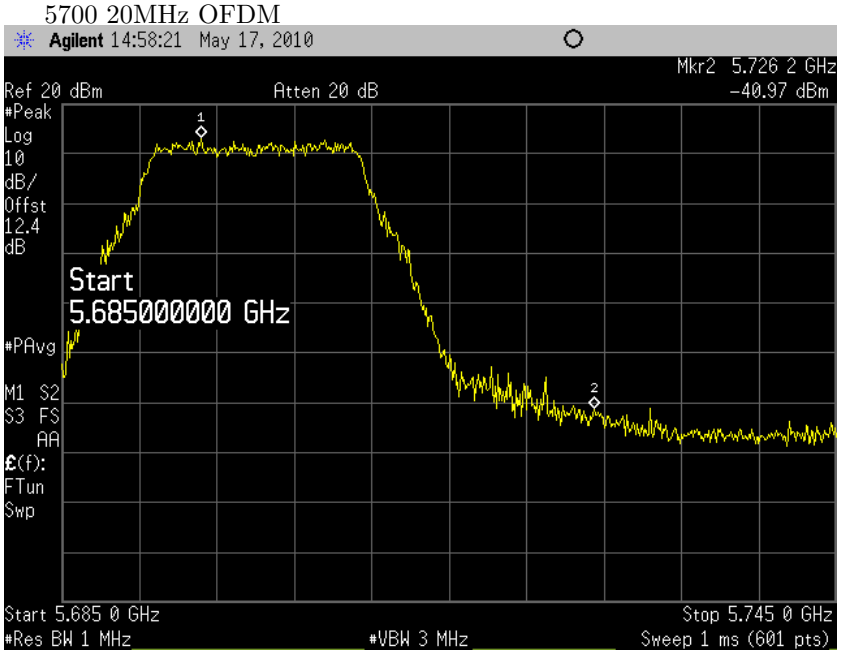
5320 20MHz OFDM



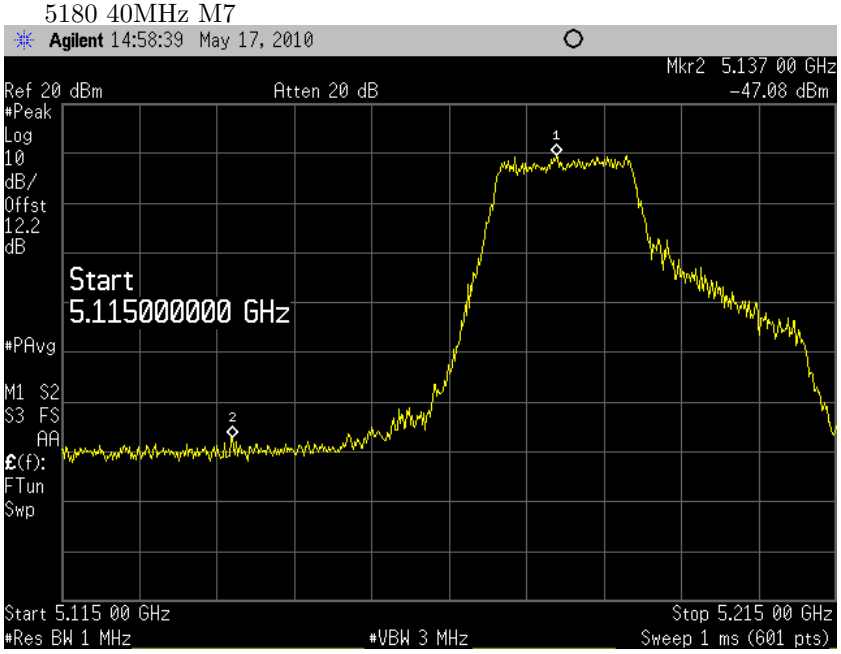
5500 20MHz OFDM



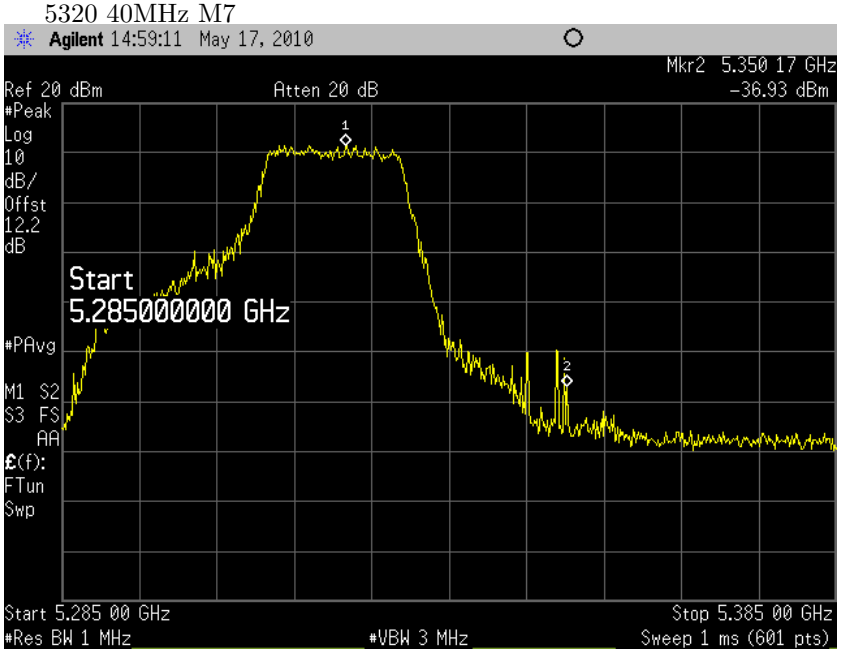
5700 20MHz OFDM



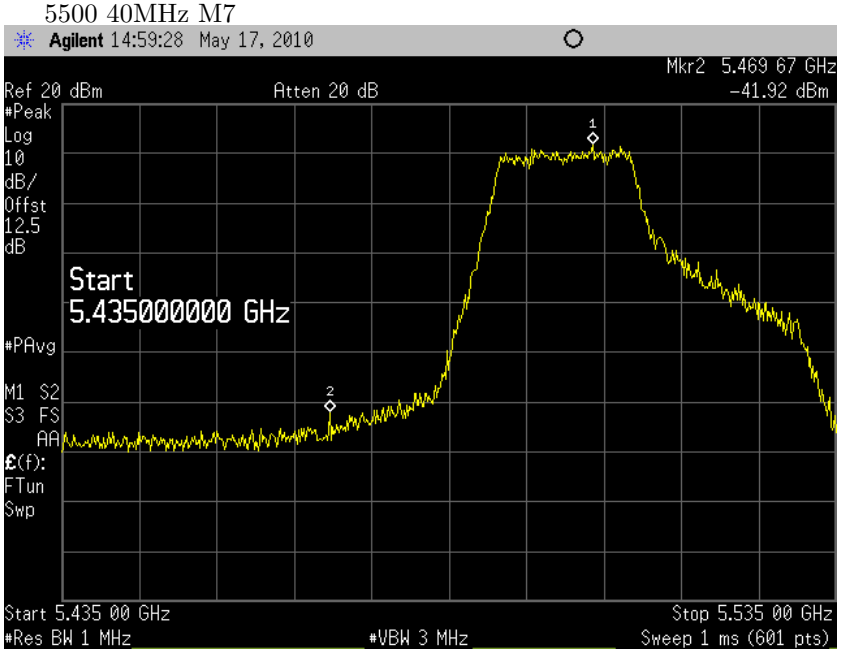
5180 40MHz M7



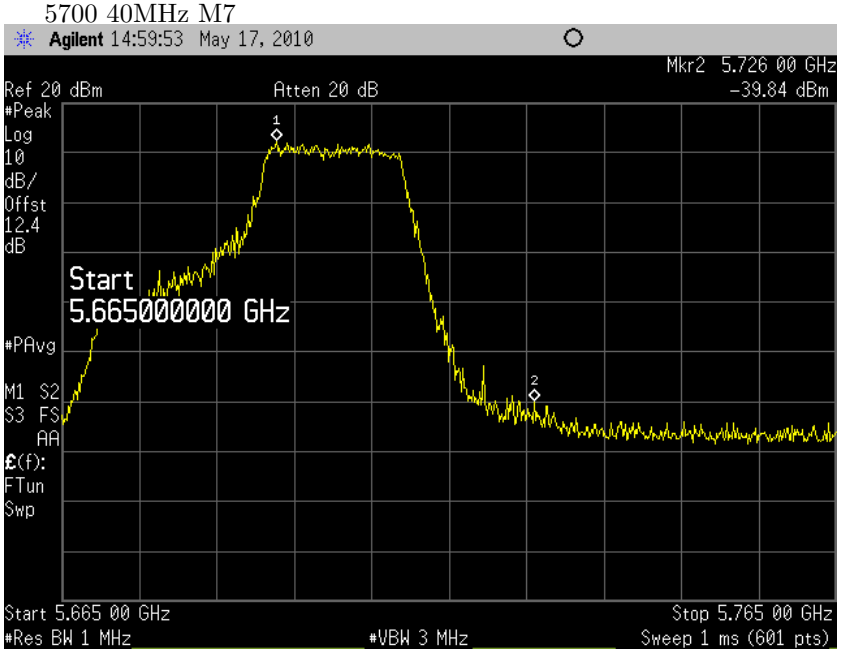
5320 40MHz M7



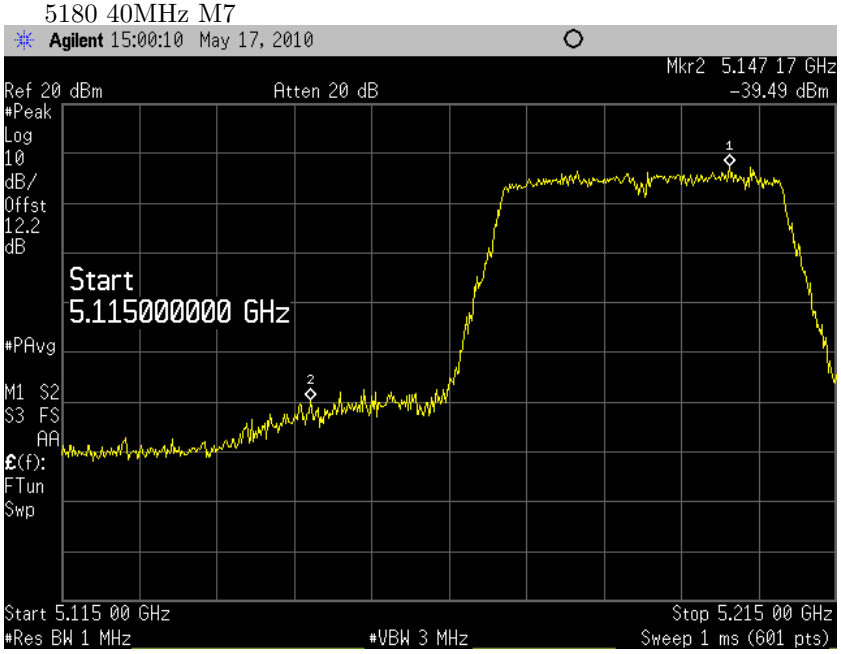
5500 40MHz M7



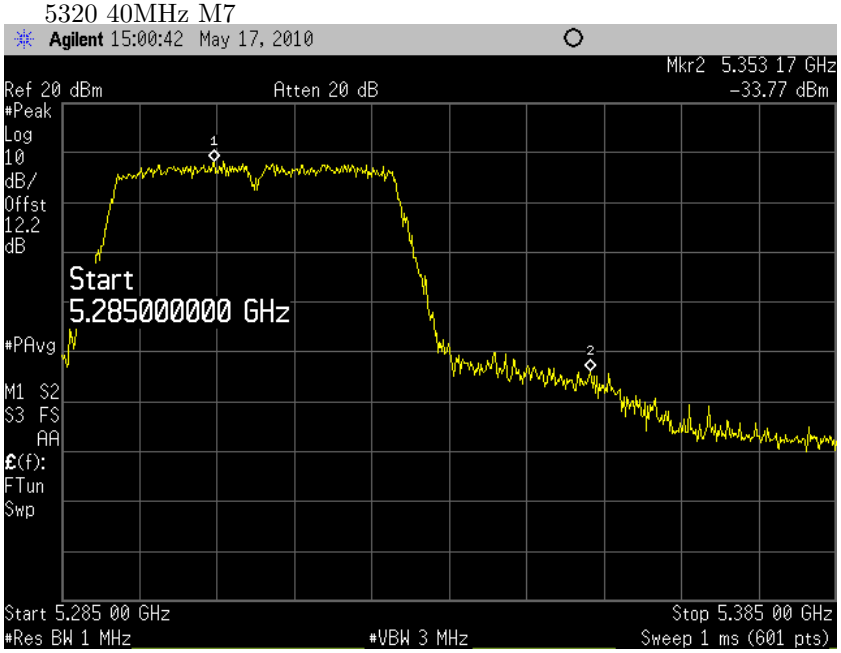
5700 40MHz M7



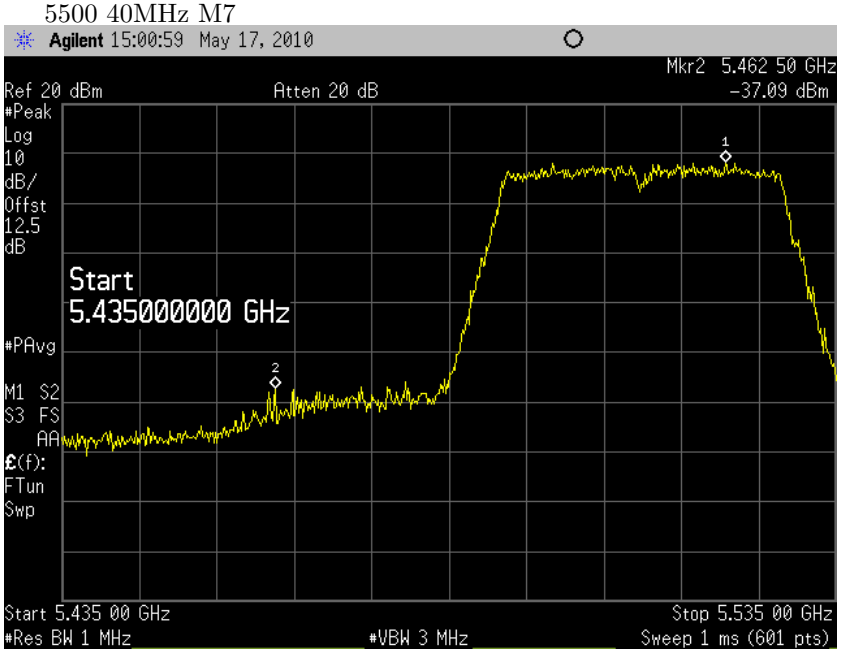
5180 40MHz M7



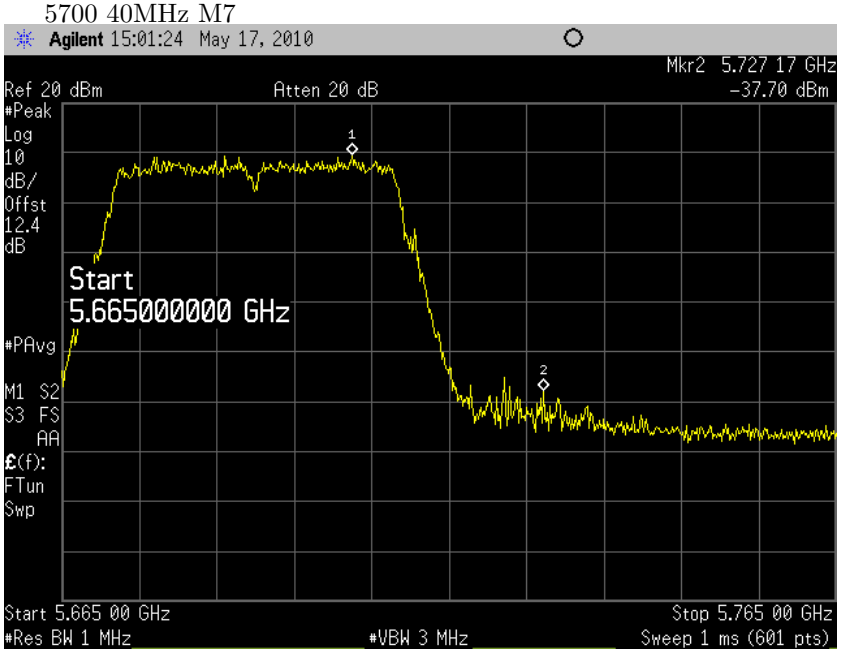
5320 40MHz M7



5500 40MHz M7



5700 40MHz M7

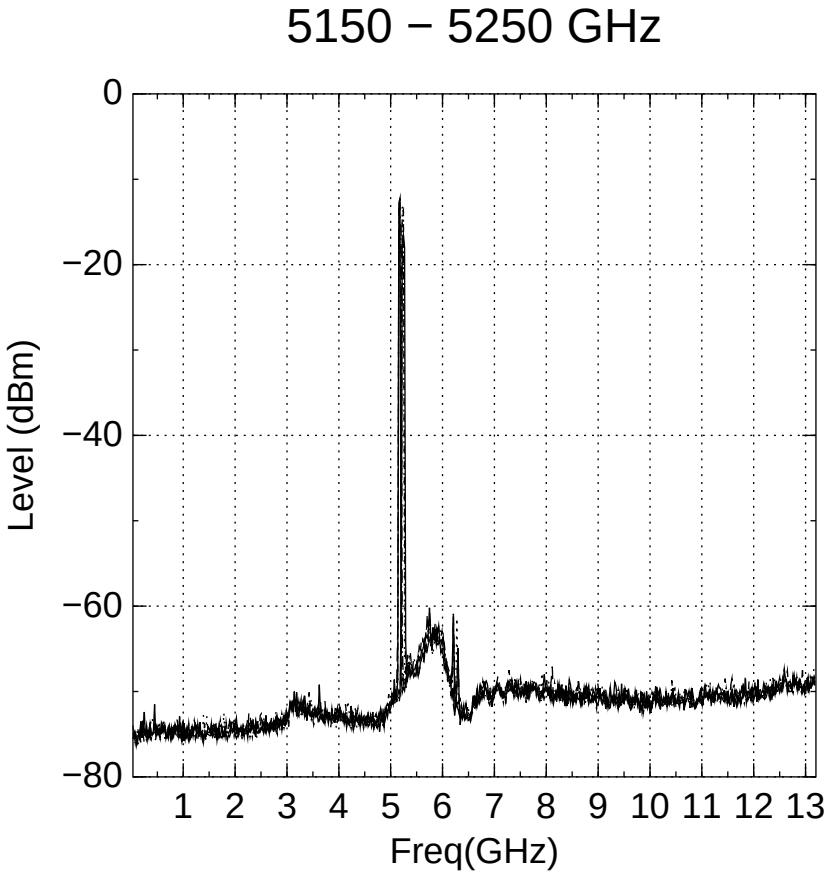


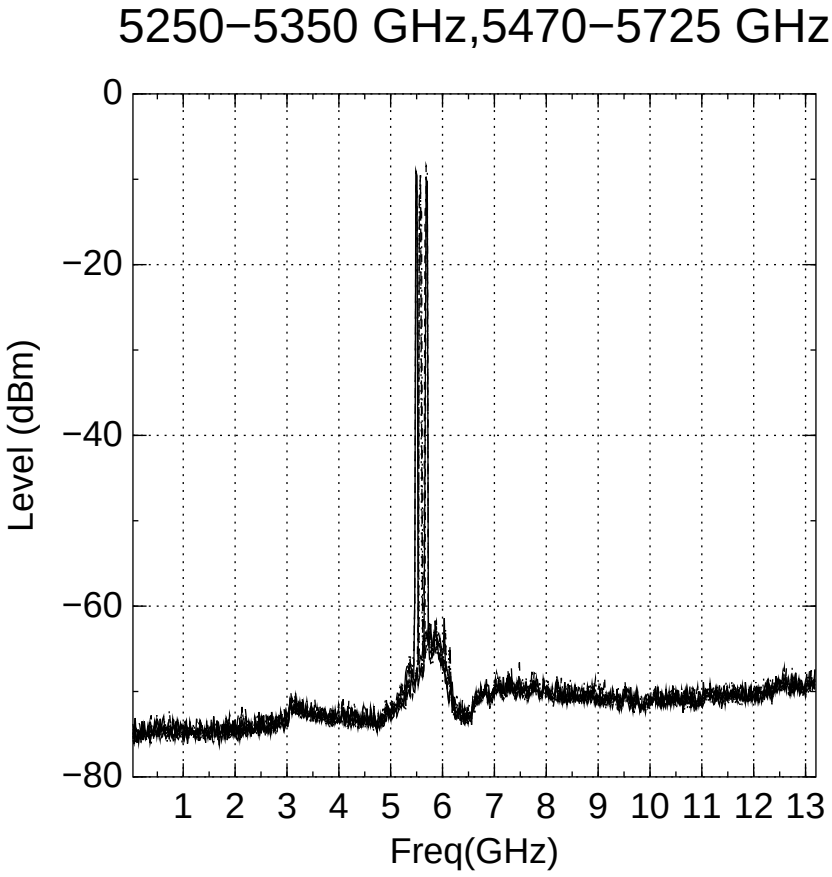
0.8.3 Wide Band

Measurement Procedure

Reference ANSI C63.10-2009 6.9

1. Ref Level Offset = DUT/Spectrum Analyzer path loss
2. detector ← PEAK
3. RBW ← 1MHz
4. VBW ← 3MHz
5. Frequency Start/Stop 30 MHz - 13.2 GHz
6. SWEEP TIME ← 10.0s
7. REF LEVEL ← 10.0


5150 − 5250 GHz
0
−20
−40
−60
−80
Level (dBm)
1 2 3 4 5 6 7 8 9 10 11 12 13
Freq(GHz)


5250−5350 GHz,5470−5725 GHz
0
−20
−40
−60
−80
Level (dBm)
1 2 3 4 5 6 7 8 9 10 11 12 13
Freq(GHz)

0.9 Frequency Accuracy

0.9.1 Introduction

2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From –30 to +50 centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

All testing in this document was performed May 18, 2010 at CascadeTek for unit with controller serial number 00-13-E9-1D-00-E3 and radio serial number M33142-001-0007 .

The nominal supply voltage to the unit is 120V.

0.9.2 Measurement Procedure - Temperature

The carrier can be observed during OFDM transmit operation if the span is narrow enough. The marker count function can is then used to measure the accuracy of the carrier, which represents the frequency accuracy over all modes of operation.

Dwell time per temperature setting is at least 25 minutes.

1. Detector ← Normal
2. Ref Level ← +20dBm
3. Span ← 50kHz
4. RBW ← AUTO
5. VBW ← AUTO
6. Sweep Time ← AUTO
7. Marker Function ← COUNT

   The marker peak function is used to find the frequency of the carrier.

Freq MHz	Measured Hz	Freq Error Hz	Freq Error ppm
Temp = -30.0 C			
2412	2412001584	1584	0.66
2462	2462001535	1535	0.62
5180	5180003211	3211	0.62
5700	5700003601	3601	0.63
5825	5825003675	3675	0.63
Temp = -20.0 C			
2412	2412001525	1525	0.63
2462	2462001482	1482	0.6
5180	5180003112	3112	0.6
5700	5700003415	3415	0.6
5825	5825003491	3491	0.6
Temp = -10.0 C			
2412	2412000908	908	0.38
2462	2462000880	880	0.36
5180	5180001935	1935	0.37
5700	5700002360	2360	0.41
5825	5825002519	2519	0.43
Temp = 0.0 C			
2412	2412000776	776	0.32
2462	2462000736	736	0.3
5180	5180001596	1596	0.31
5700	5700001867	1867	0.33
5825	5825002029	2029	0.35
Temp = 10.0 C			
2412	2412001037	1037	0.43
2462	2462001044	1044	0.42
5180	5180002338	2338	0.45
5700	5700002778	2778	0.49
5825	5825002961	2961	0.51

Freq MHz	Measured Hz	Freq Error Hz	Freq Error ppm
Temp = Room Temp			
2412	2412000485	485	0.2
2462	2462000422	422	0.17
5180	5180000937	937	0.18
5700	5700000715	715	0.13
5825	5825001103	1103	0.19
Temp = 30 C			
2412	2412000509	509	0.21
2462	2462000247	247	0.1
5180	5180001111	1111	0.21
5700	5700001043	1043	0.18
5825	5825000679	679	0.12
Temp = 40 C			
2412	2411999611	-389	-0.16
2462	2461999513	-487	-0.2
5180	5179998974	-1026	-0.2
5700	5699998928	-1072	-0.19
5825	5824998899	-1101	-0.19
Temp = 50 C			
2412	2411999030	-970	-0.4
2462	2461998937	-1063	-0.43
5180	5179997773	-2227	-0.43
5700	5699997601	-2399	-0.42
5825	5824997527	-2473	-0.42

0.9.3 Measurement Procedure - Supply Variation

2.1055

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Using a variac to vary the supply voltage, set the voltage to -15% and +15% of nominal (120V). The actual supply voltage is verified with a multimeter.

The frequency measurement is then made in the same manner as for temperature testing.

Freq MHz	Measured Hz	Freq Error Hz	Freq Error ppm
Supply = Nominal+15% (102V)			
2412	2412001084	1084	0.45
2462	2462000835	835	0.34
5180	5180001920	1920	0.37
5700	5700001808	1808	0.32
5825	5825002162	2162	0.37
Supply = Nominal-15% (138V)			
2412	2412000860	860	0.36
2462	2462000992	992	0.4
5180	5180001751	1751	0.34
5700	5700002141	2141	0.38
5825	5825002274	2274	0.39

0.10 DFS Client Testing

0.10.1 Introduction

15.407 (h) (2) Radar Detection Function of Dynamic Frequency Selection (DFS). UNII devices operating in the 5.255.35 GHz and 5.475.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

The DUT for this application is a WLAN *client* which does NOT include ad-hoc or peer-to-peer modes, i.e. TX activity by the DUT is strictly controlled by the access point behavior. Unless there is a request by an access point, the DUT will not transmit.

0.10.2 Test Setup

The Access Point (AP), DUT, spectrum analyzer, oscilloscope and radar pulse generator are configured as shown in figure 1.

Since both the DUT and access point used for the DFS testing have output power less than 200mW, -62dBm was used for the radar pulse signal level.

The radar pulse level is calibrated to -62dBm at the input of the AP using a spectrum analyzer by varying the attenuation in the path from the radar pulse generator and the AP.

The DUT and radar signals are both visible at the monitoring spectrum analyzer. The TX power level of the DUT is adjusted such that the radar pulses are at a higher level than the DUT TX level (at the monitoring spectrum analyzer). This allow the spectrum analyzer to be triggered (using Video trigger) on the radar pulse level alone.

0.10.3 Data Transfer Setup

The DUT is a standalone client device which does not have the capability of displaying video data transferred to the unit. Therefore the standard multimedia file was not used, an alternate method was used instead.

The DUT unit is able to establish datastreams with the AP of specified packet size and data rate. The test was conducted with the following data transfer parameters

- Downstream (AP to DUT) 4 Mbit/s
- Upstream (DUT to AP) 2 Mbit/s
- 54 Mbit/s datarate in both directions
- 1518 byte TCP packets in both directions

The fact that the DUT and AP are using TCP, means that there is additional channel activity due to the TCP ack frames being sent in both directions in

addition to the WLAN ack frames. The overall channel utilization and activity is therefore much higher than experienced during the standard test.

It is important to note that the client is actively transmitting data upstream, i.e. to the AP, and not simply in response to the AP, which makes it readily apparent when it has stopped transmitting data due to the channel change order. This can be seen in the spectrum analyzer screen captures provided.

0.10.4 Test Results

Figures 2 and 3 show the AP (lower level) and DUT/client (higher level) traffic pulses.

The radar pulse causes the AP to issue a channel change command. The DUT, upon recognizing the channel change command, ceases transmission. This is shown in figure 4. The screen captures shows that the client ceases transmission in approximately 41ms.

The DUT must also stay off the air for the next 30 minutes. The spectrum analyzer sweep time is set to 1801 sec (30 min + 1 s). The radar pulses are transmitted which triggers the spectrum analyzer and the sweep allowed to proceed.

The full 30 minute sweep is shown in figure 5.

The image in figure 6, recorded simultaneously during the 30 minute test, shows the radar pulse and the client TX.

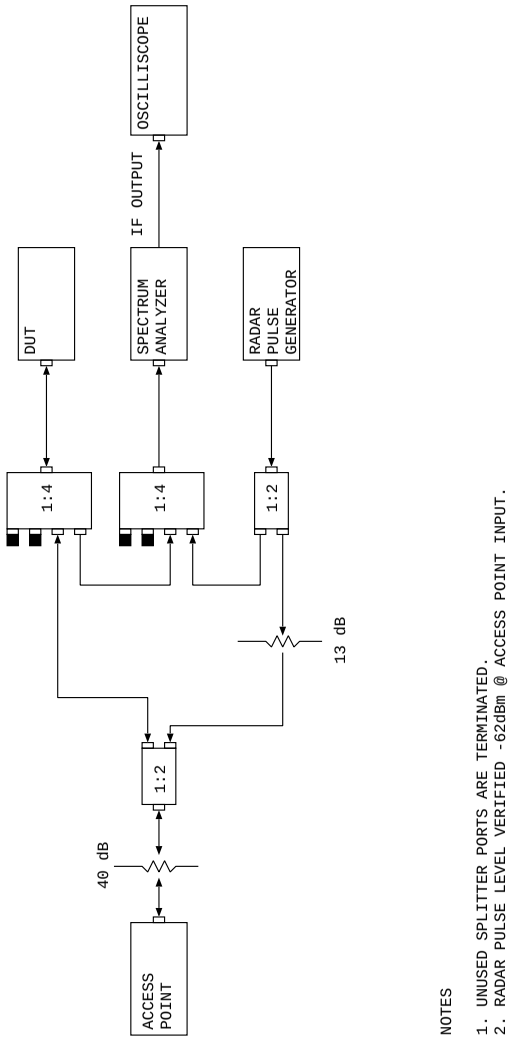


Figure 1: DFS Testing Setup

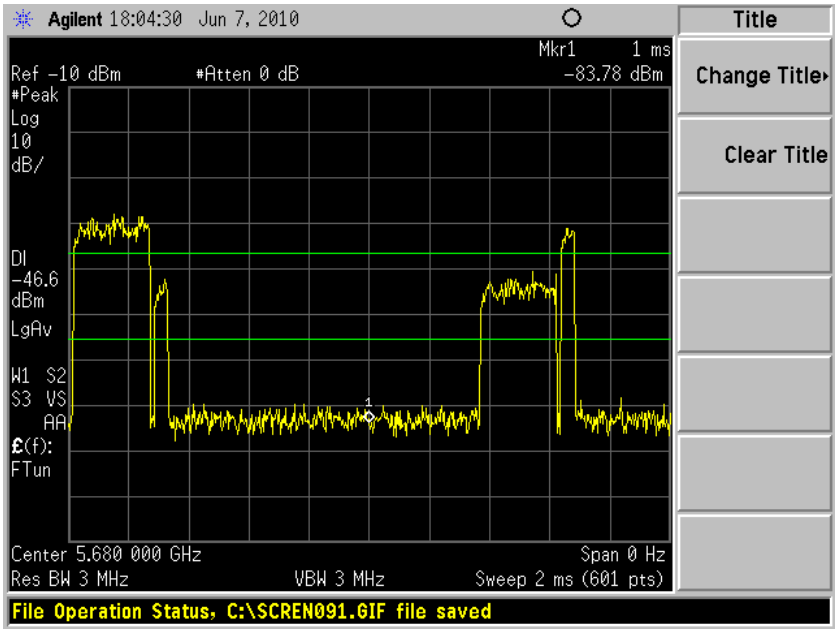


Figure 2: AP and DUT traffic (close in).

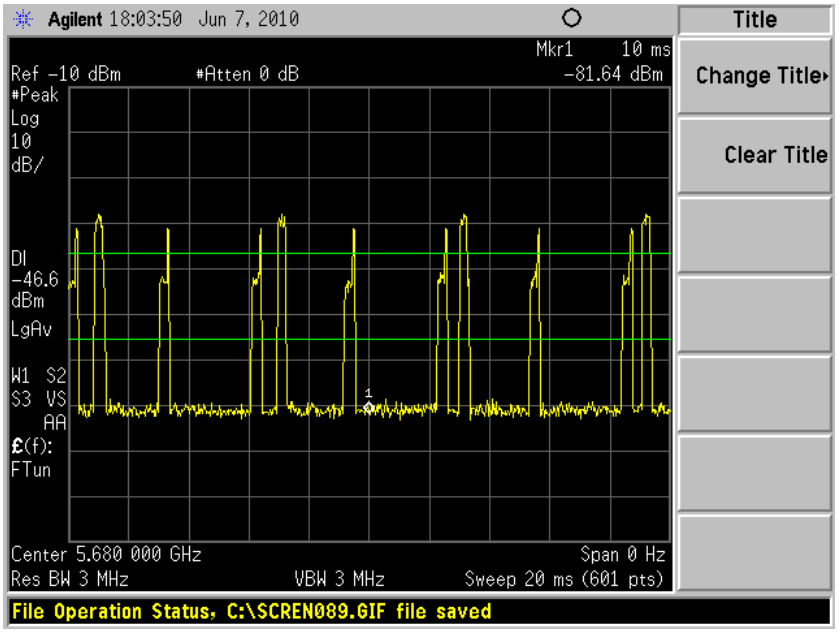


Figure 3: AP and DUT traffic (wider view).

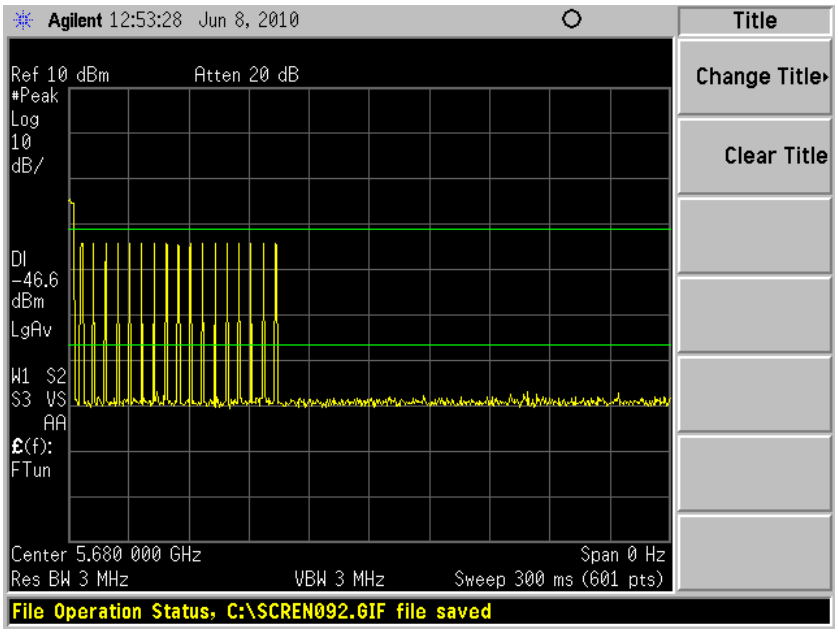


Figure 4: Radar Pulse and Client TX

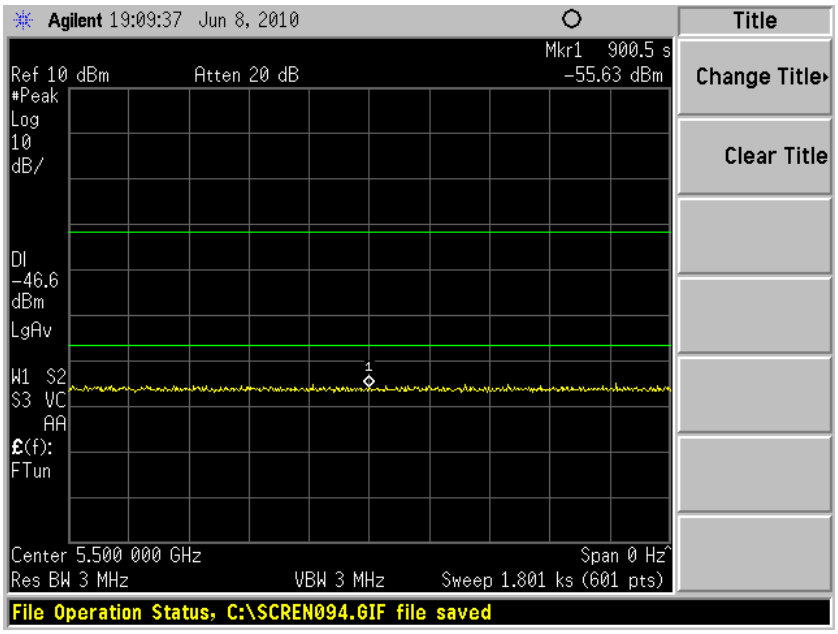


Figure 5: 30 minute sweep.

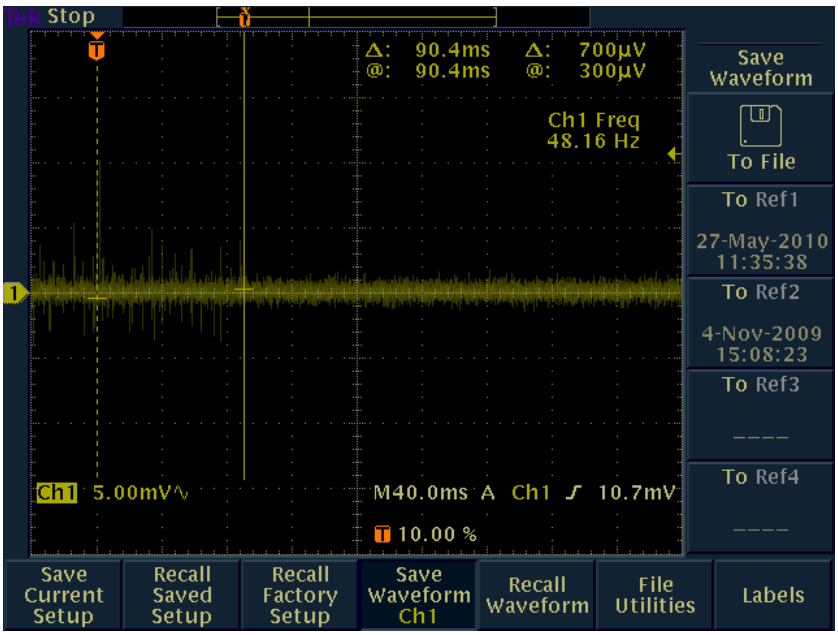


Figure 6: Close in view of trigger and TX halt for 30 min sweep.

0.11 Radiated Measurements

The following measurements were completed at the facilities of NWEMC.

SPURIOUS CONDUCTED EMISSIONS

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAQ	1/6/2010	13
Attenuator	Weinschel Corp.	54A-20	RBL	10/9/2009	13
40GHz DC Block	Miteq	DCB4000	AMD	8/19/2009	13
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

NORTHWEST

EMC

SPURIOUS CONDUCTED EMISSIONS

XMit 2010.01.14

EUT:	WF1101			**Work Order:**	VERW0038
Serial Number:				**Date:**	04/01/10
Customer:	Veriwave, Inc.			**Temperature:**	22°C
Attendees:	none			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.05
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.247:2010	ANSI C63.10:2009

COMMENTS

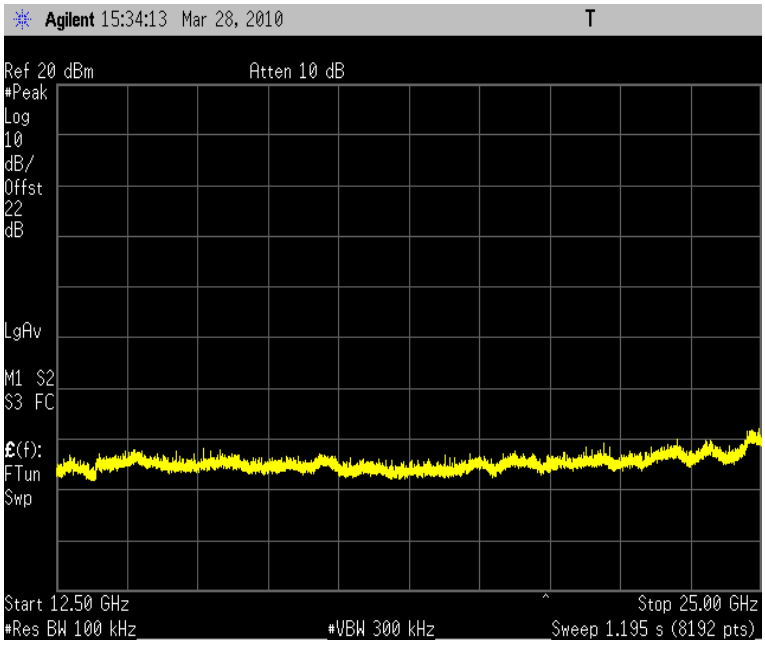
802.11n mode testing done at MCS0

DEVIATIONS FROM TEST STANDARD

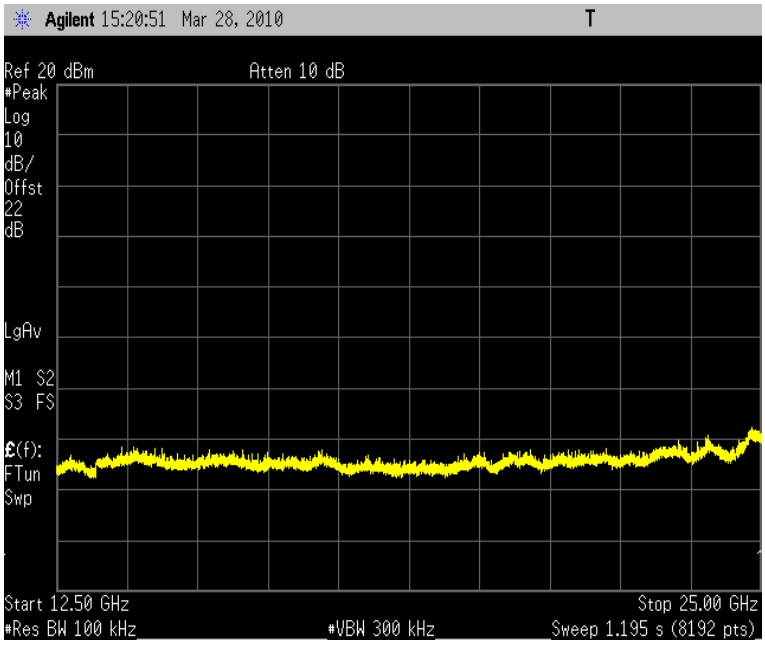
Configuration #	2	Signature

		Value	Limit	Results
802.11(b) 1 Mbps				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(b) 11 Mbps				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(g) 6 Mbps				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(g) 36 Mbps				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(g) 54 Mbps				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(n), 2.4 20MHz, 15 dBm				
	Low Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(n), 2.4 40MHz, 13 dBm				
	Mid Channel			
	12.5 GHz - 25 GHz	< -40 dBc	= -20 dBc	Pass
802.11(a) 6 Mbps				
	Low Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
802.11(a) 36 Mbps				
	Low Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
802.11(a) 54 Mbps				
	Low Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
802.11(n), 5GHz 20MHz				
	Low Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
802.11(n), 5GHz 40MHz				
	Low Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	Mid Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -40 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -30 dBc	= -20 dBc	Pass
	High Channel			
	12.5 GHz - 26.5 GHz	< -40 dBc	= -20 dBc	Pass
	26.5 GHz - 31 GHz	< -30 dBc	= -20 dBc	Pass
	31 GHz - 40 GHz	< -40 dBc	= -20 dBc	Pass

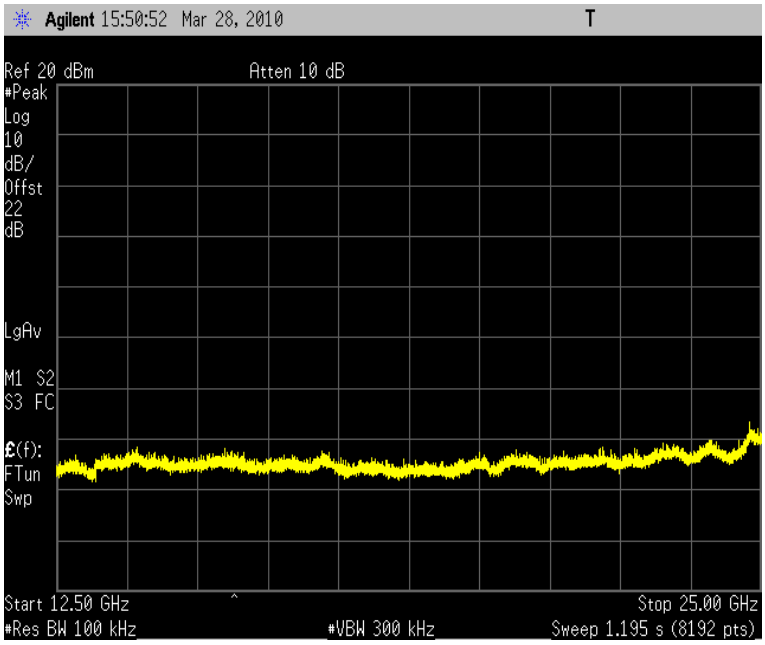
802.11(b) 1 Mbps, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



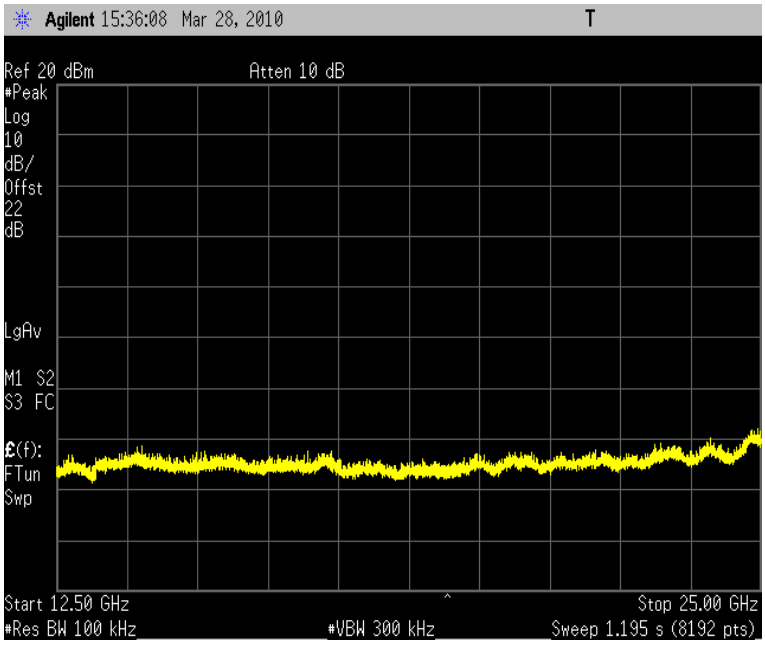
802.11(b) 1 Mbps, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



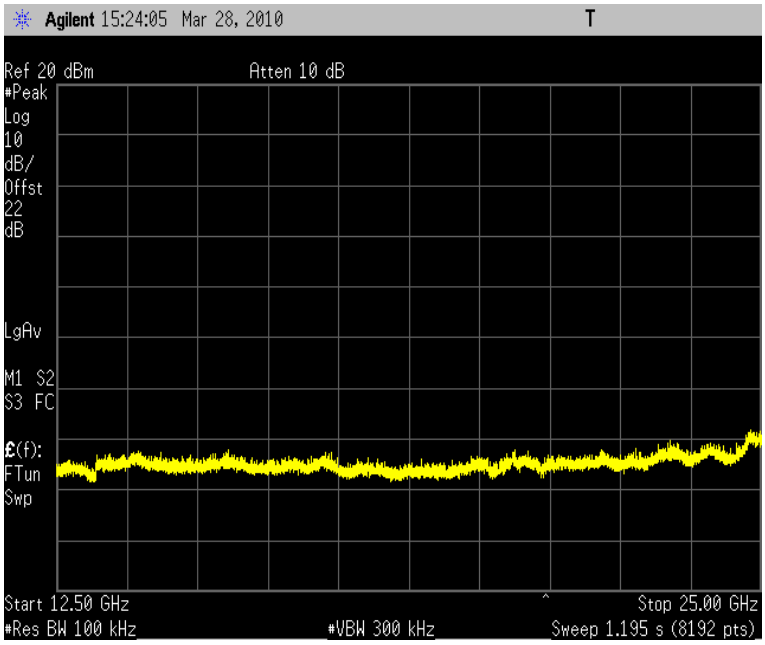
802.11(b) 1 Mbps, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



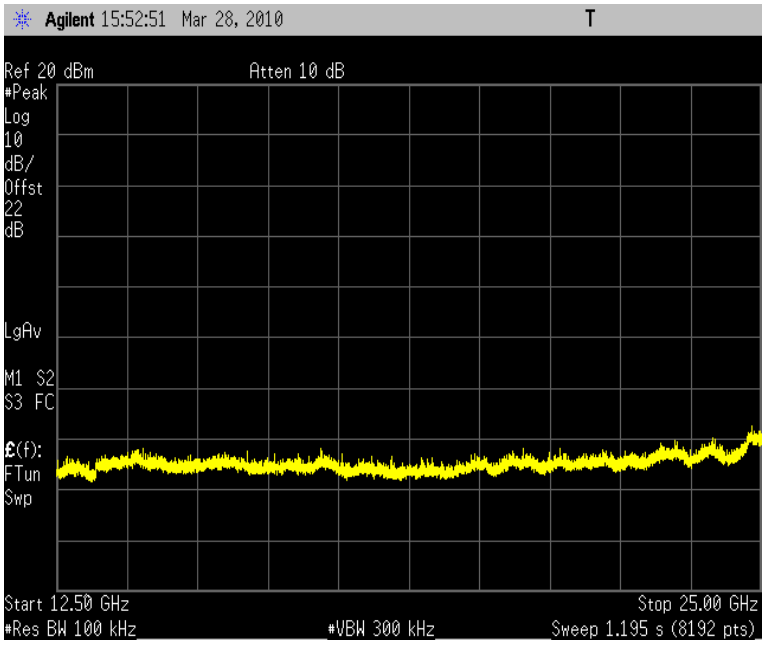
802.11(b) 11 Mbps, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



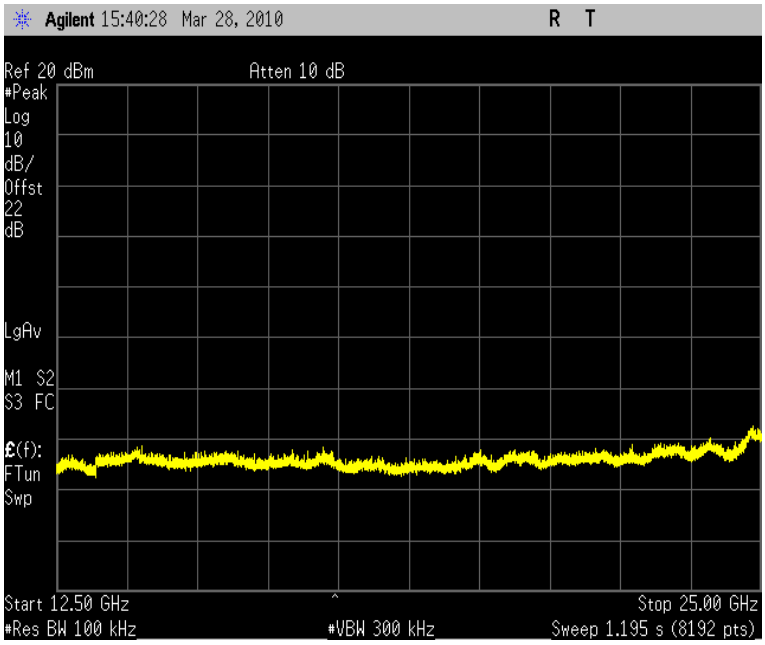
802.11(b) 11 Mbps, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



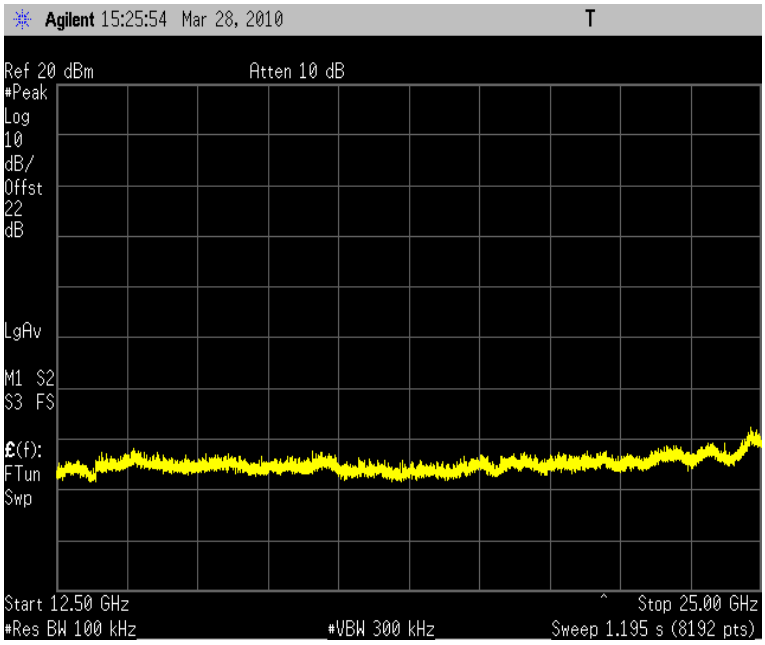
802.11(b) 11 Mbps, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



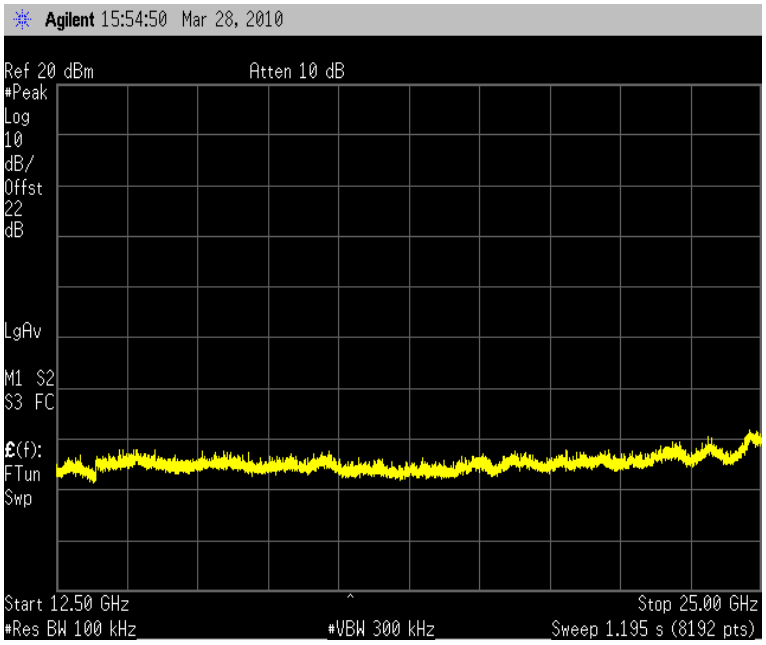
802.11(g) 6 Mbps, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



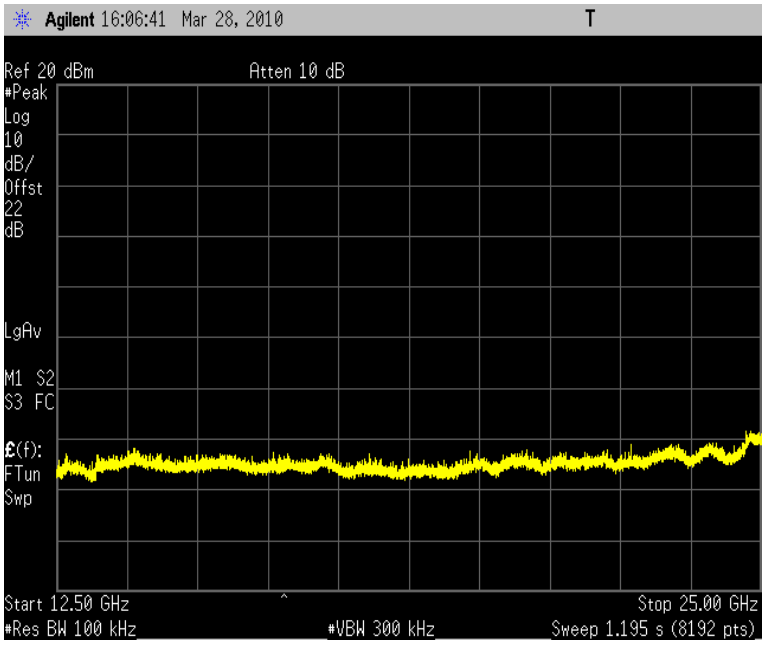
802.11(g) 6 Mbps, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



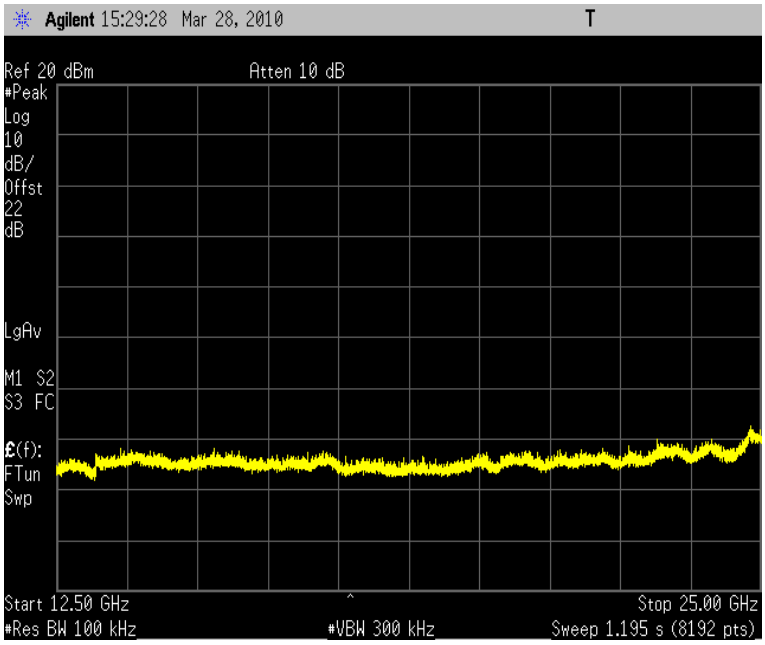
802.11(g) 6 Mbps, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



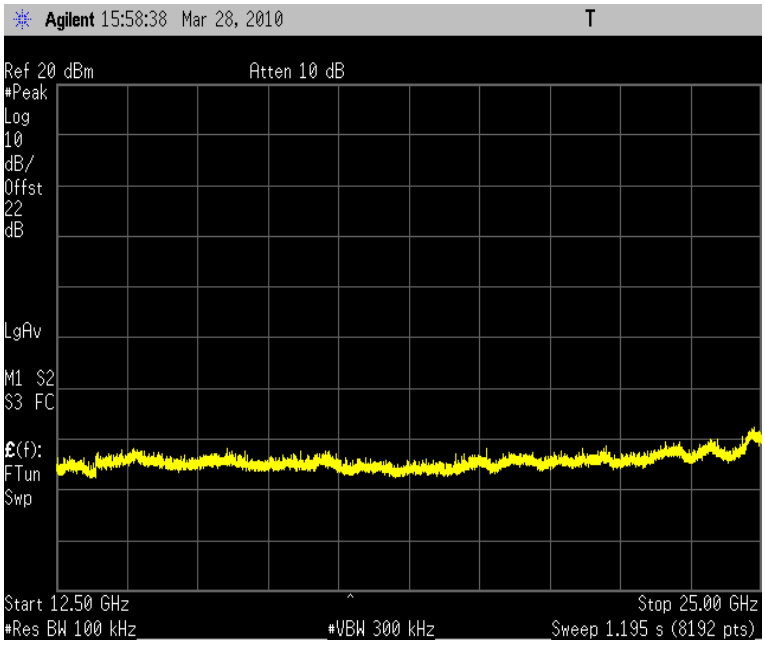
802.11(g) 36 Mbps, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



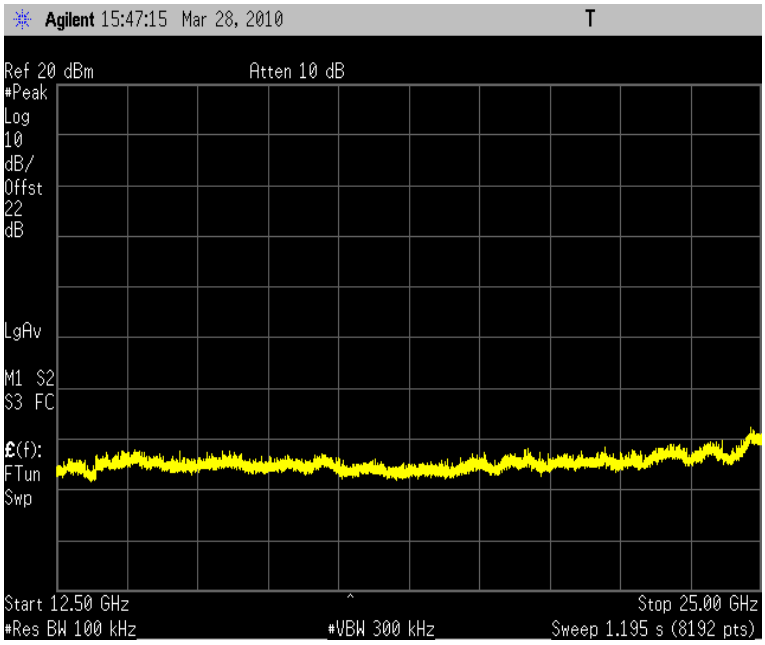
802.11(g) 36 Mbps, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



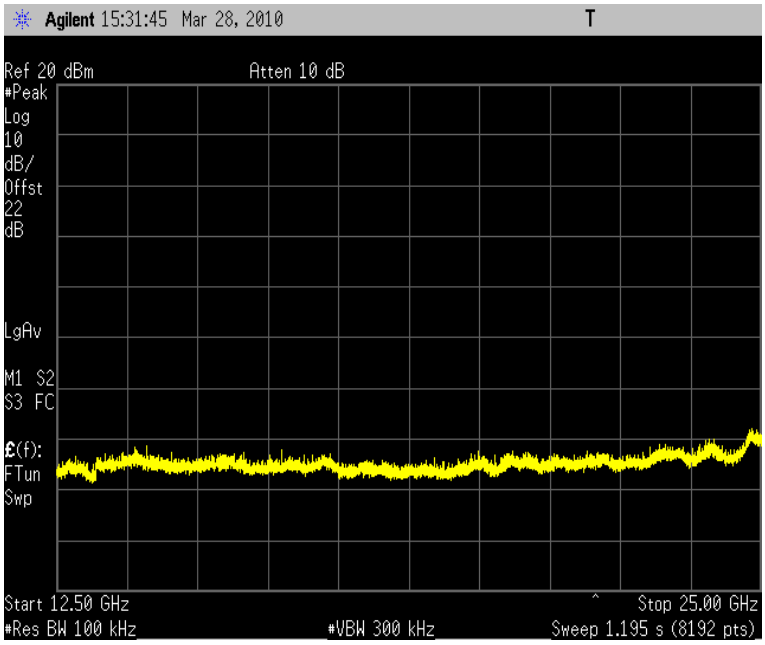
802.11(g) 36 Mbps, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



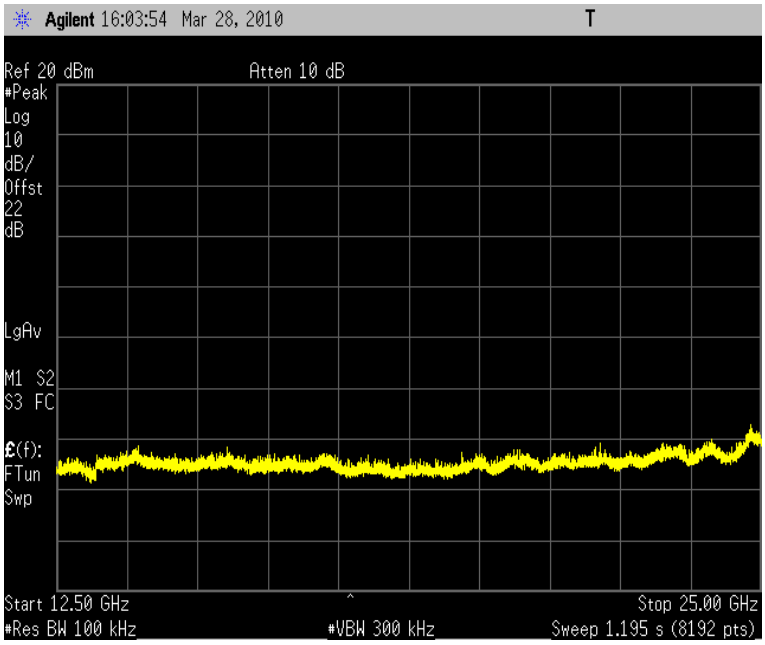
802.11(g) 54 Mbps, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



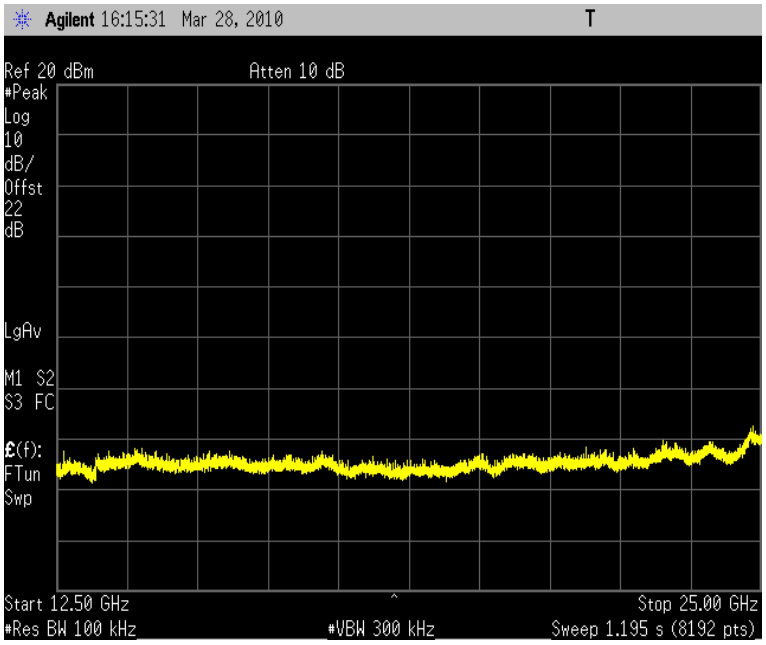
802.11(g) 54 Mbps, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



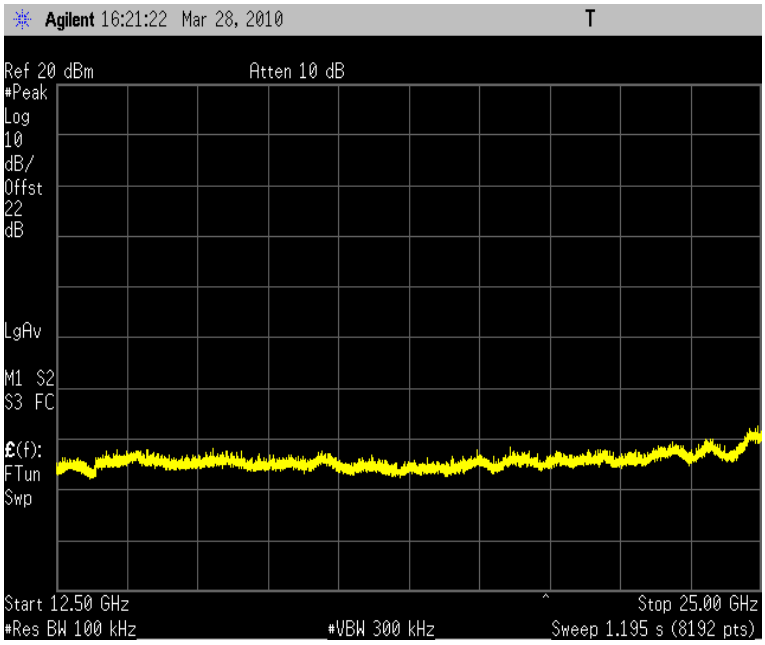
802.11(g) 54 Mbps, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



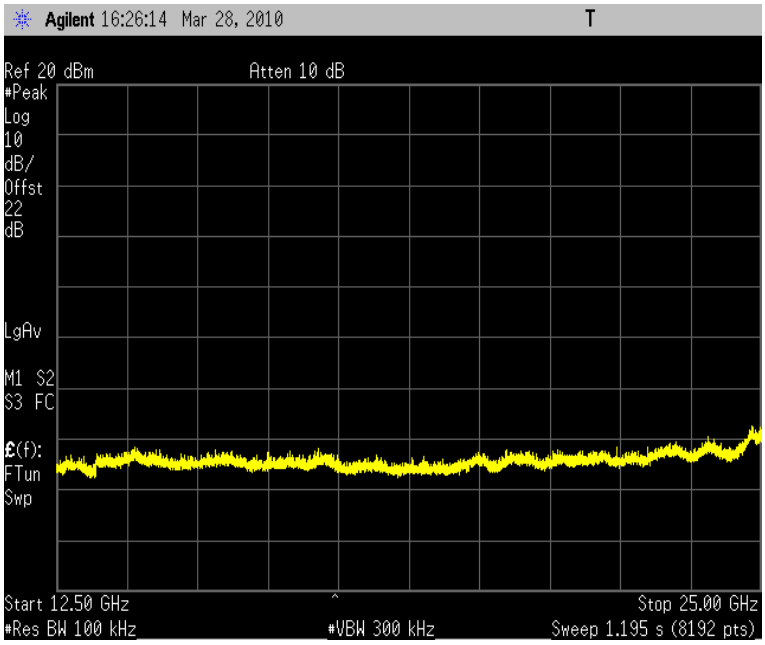
802.11(n), 2.4 20MHz, Low Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



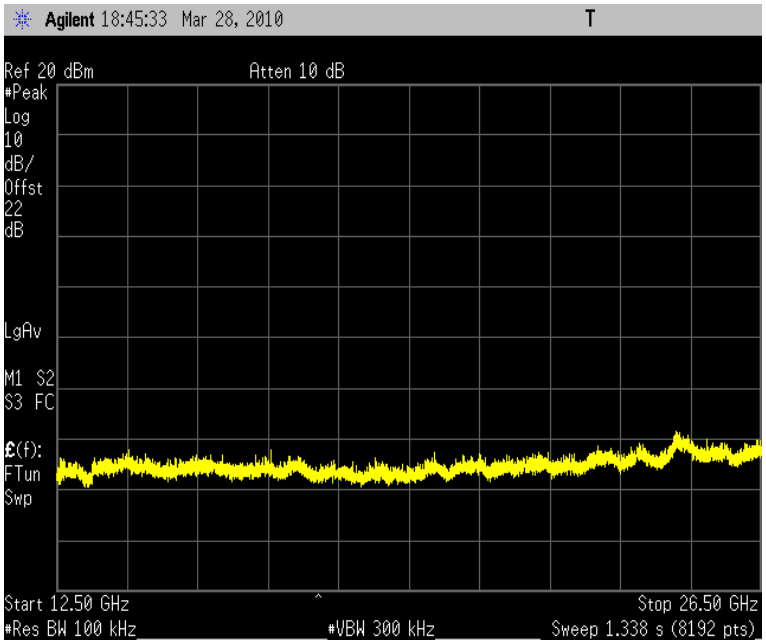
802.11(n), 2.4 20MHz, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



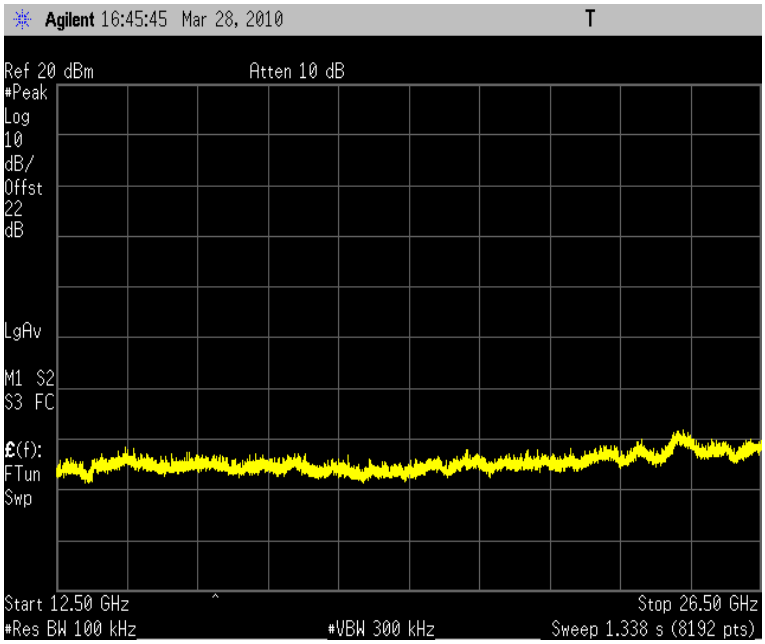
802.11(n), 2.4 20MHz, High Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



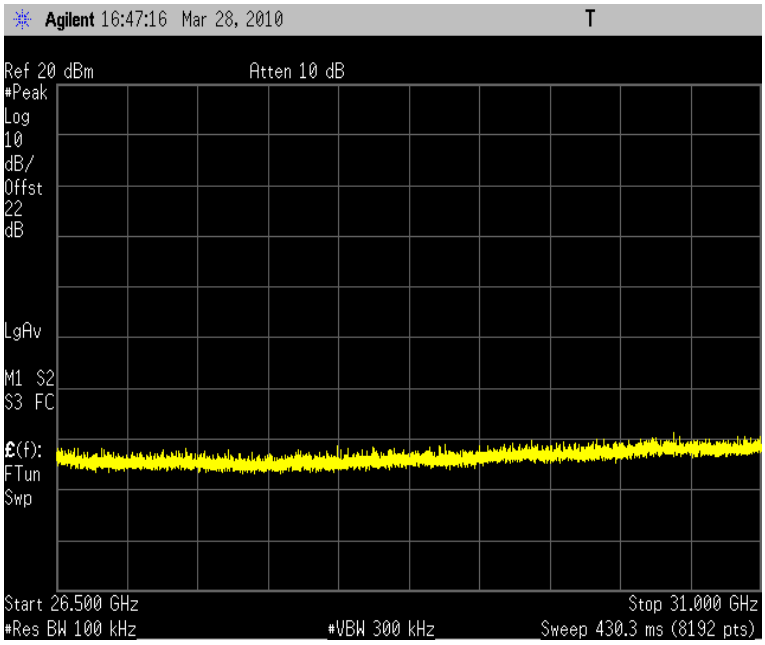
802.11(n), 2.4 40MHz, Mid Channel, 12.5 GHz - 25 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



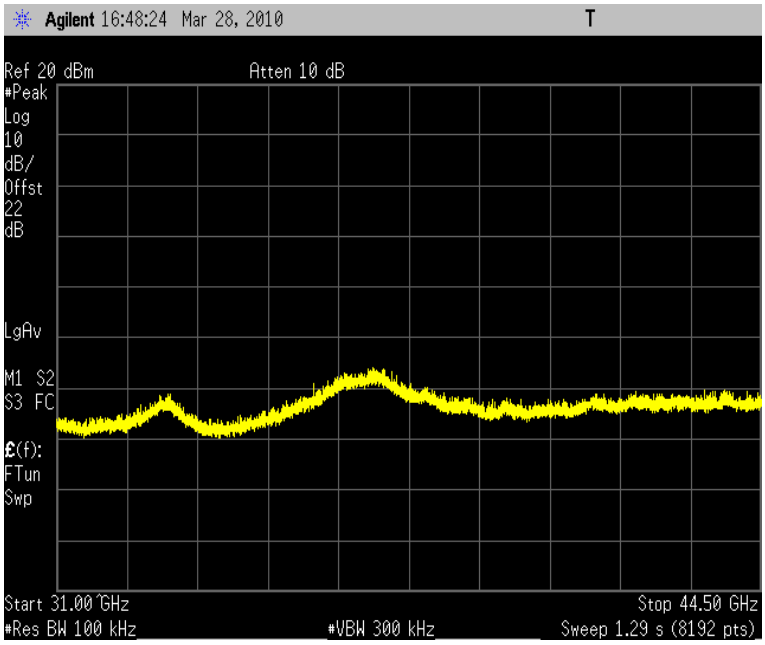
802.11(a) 6 Mbps, Low Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



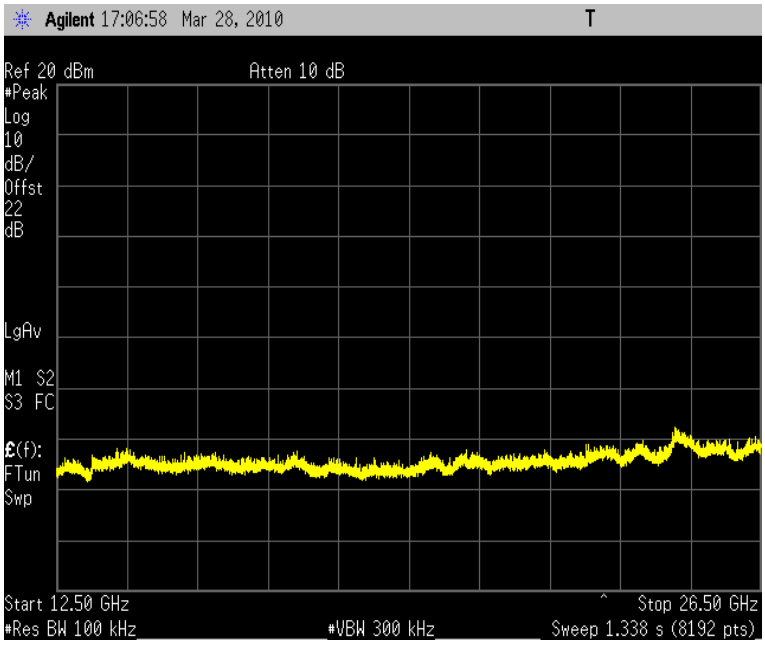
802.11(a) 6 Mbps, Low Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



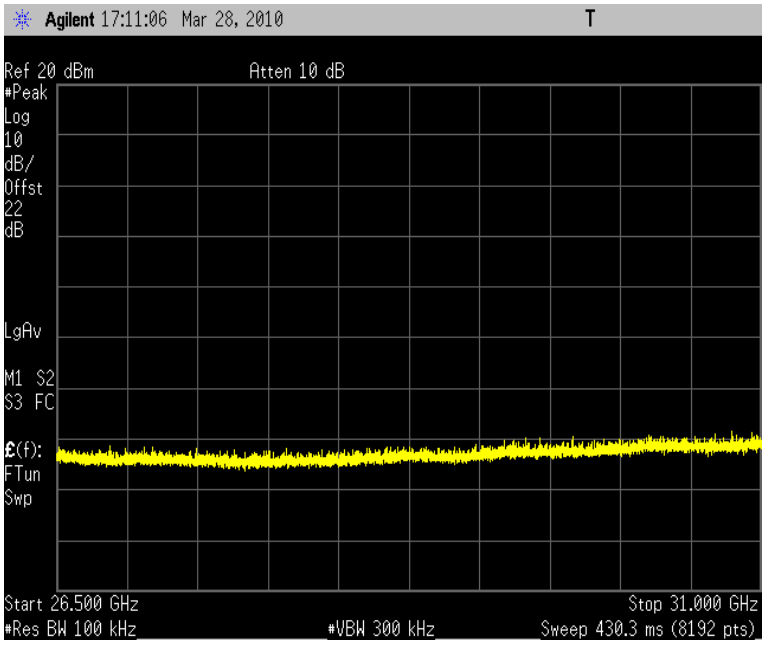
802.11(a) 6 Mbps, Low Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



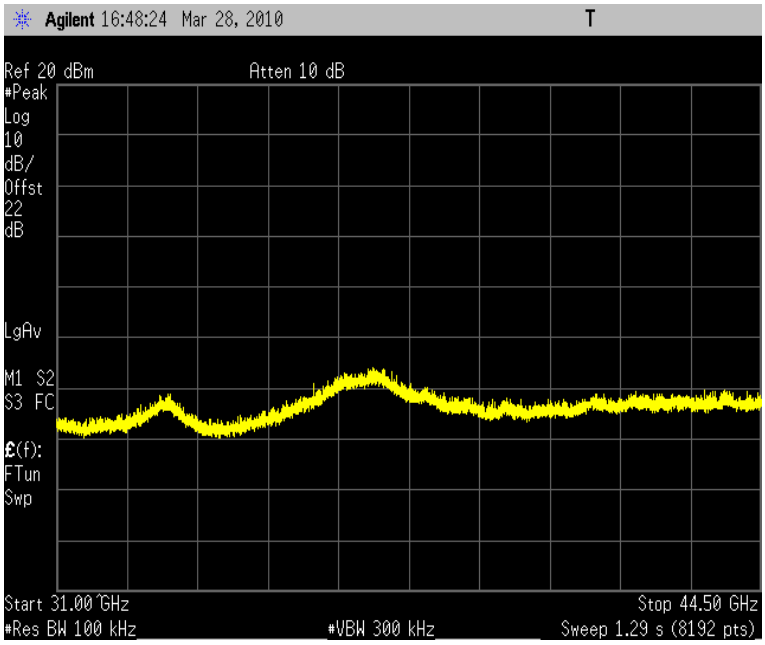
802.11(a) 6 Mbps, Mid Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



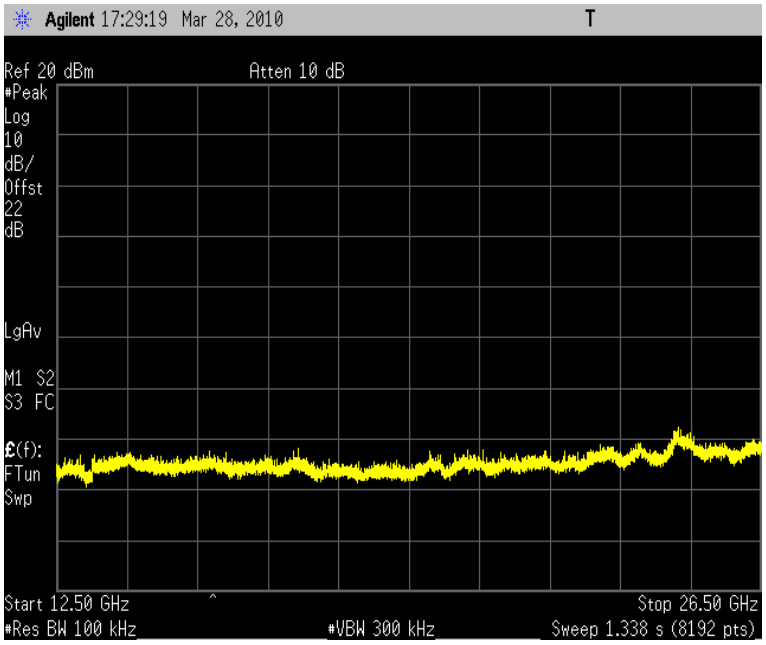
802.11(a) 6 Mbps, Mid Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



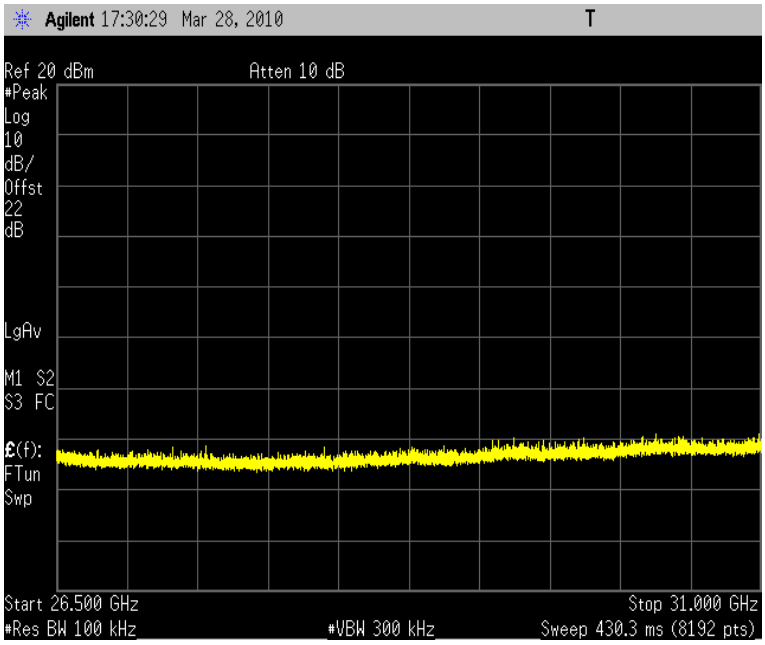
802.11(a) 6 Mbps, Mid Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



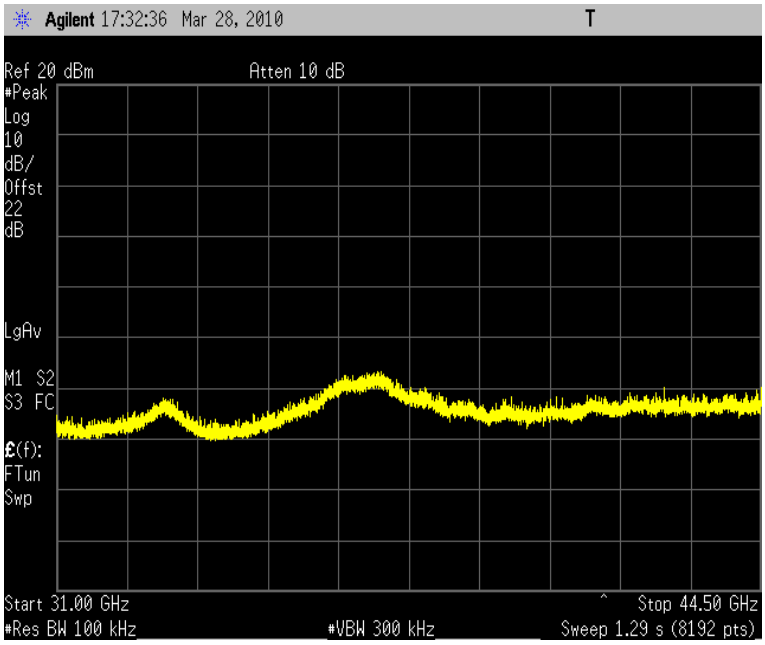
802.11(a) 6 Mbps, High Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



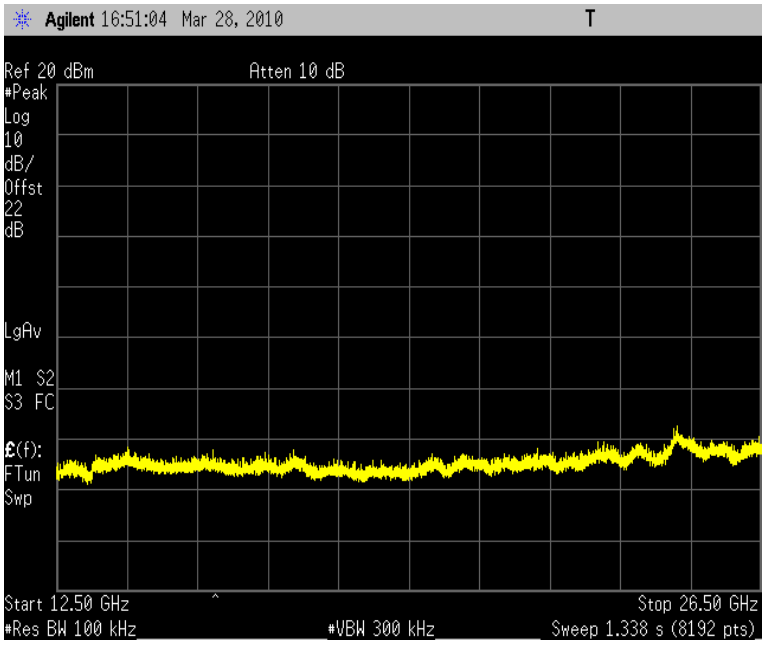
802.11(a) 6 Mbps, High Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



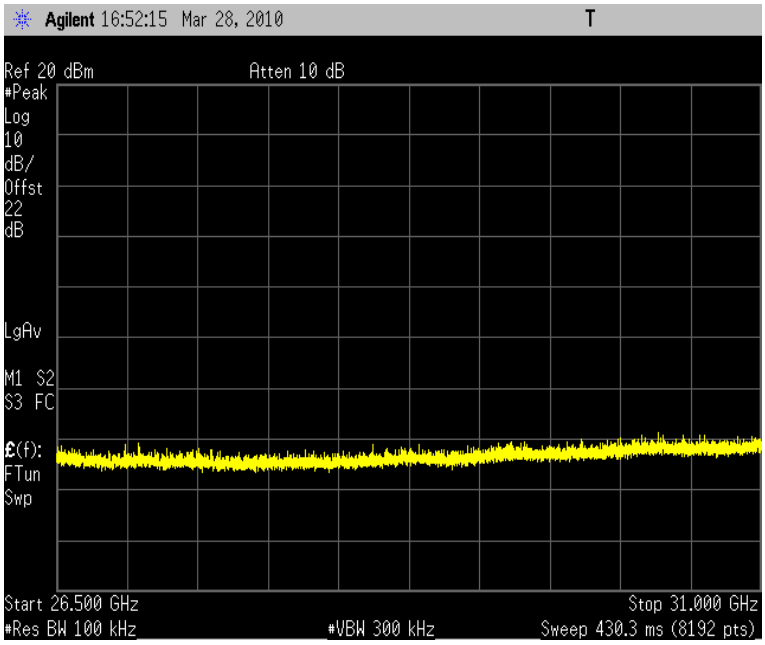
802.11(a) 6 Mbps, High Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



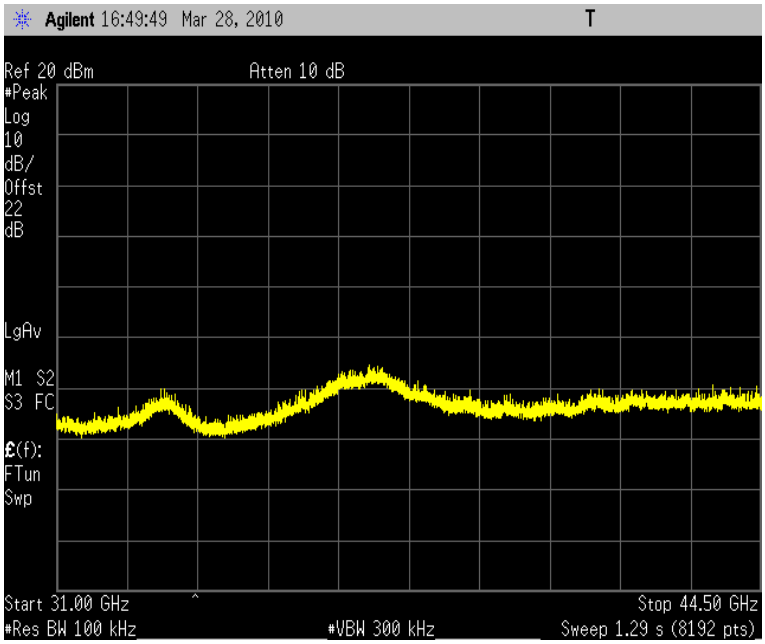
802.11(a) 36 Mbps, Low Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



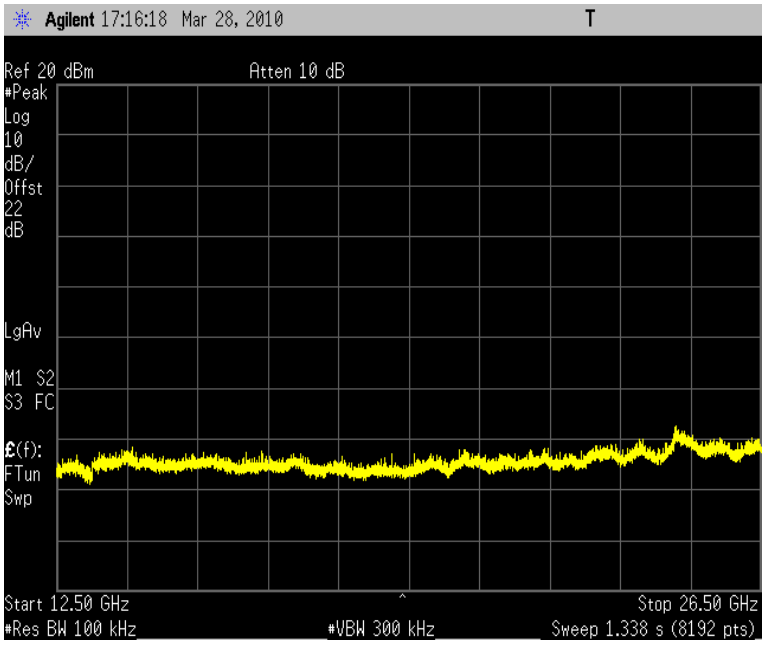
802.11(a) 36 Mbps, Low Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



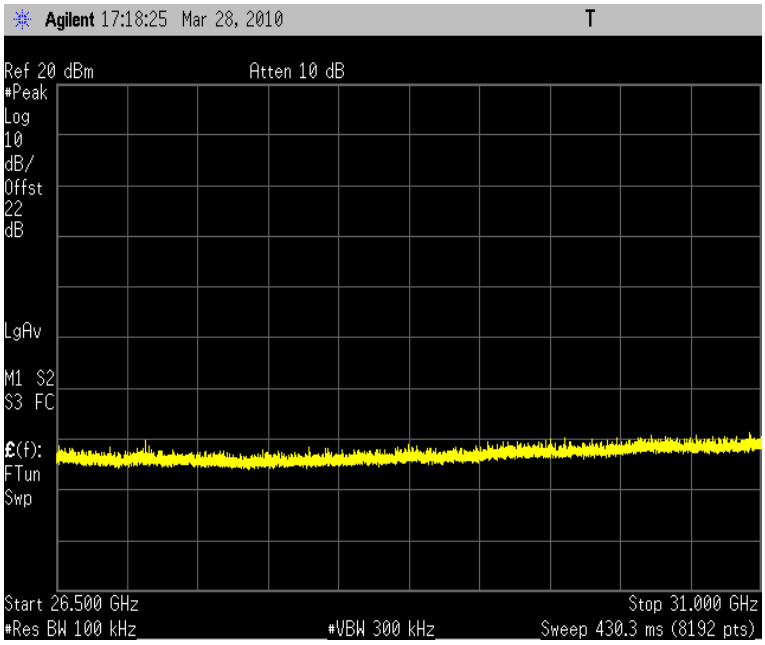
802.11(a) 36 Mbps, Low Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



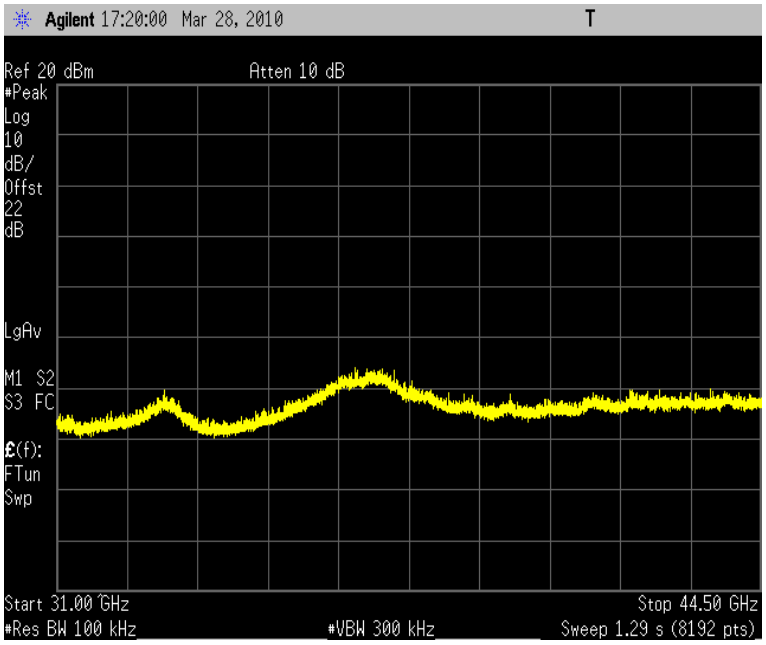
802.11(a) 36 Mbps, Mid Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



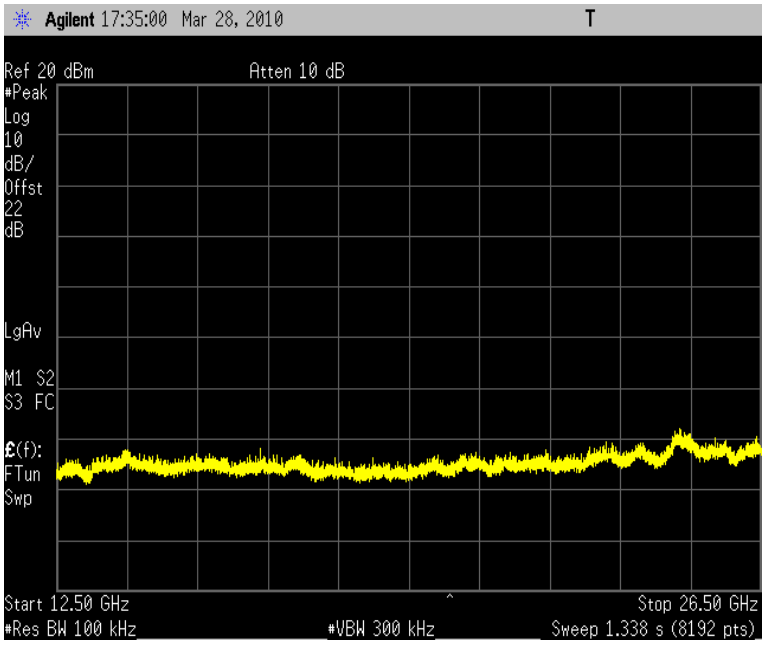
802.11(a) 36 Mbps, Mid Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



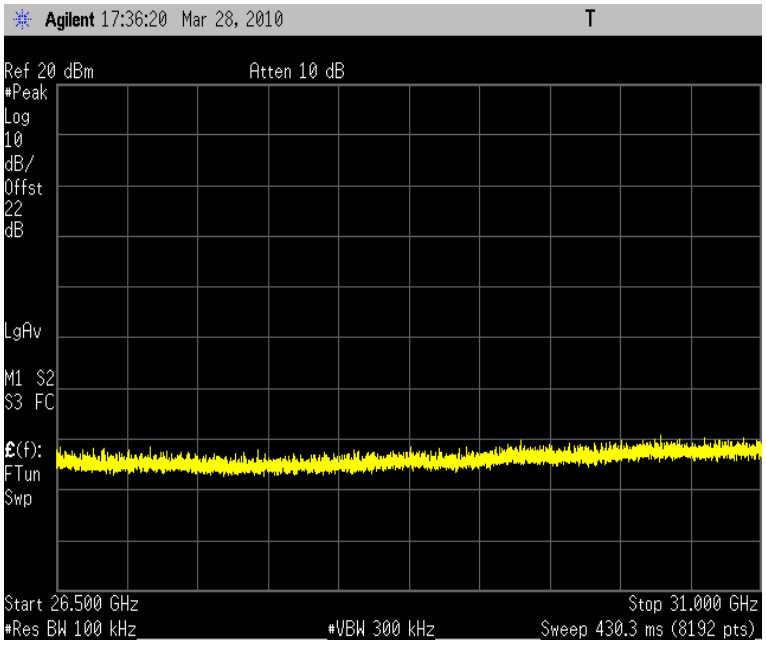
802.11(a) 36 Mbps, Mid Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



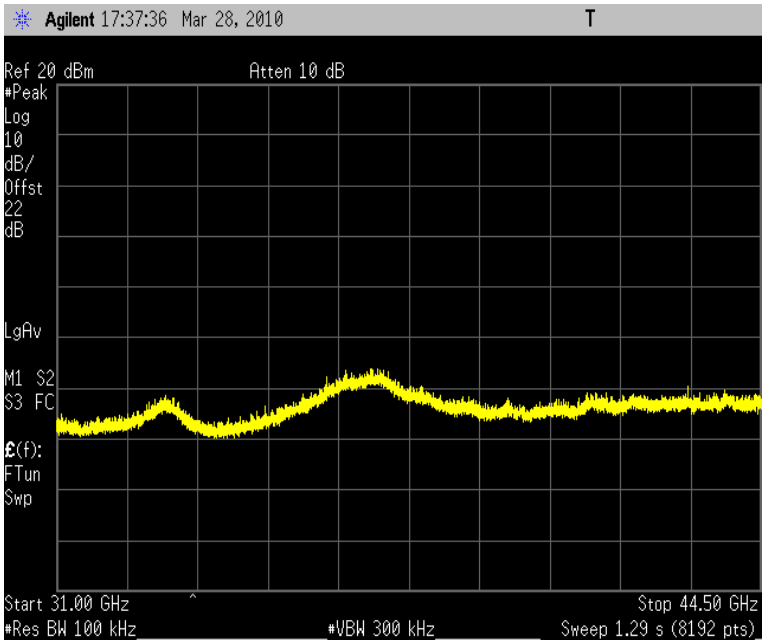
802.11(a) 36 Mbps, High Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



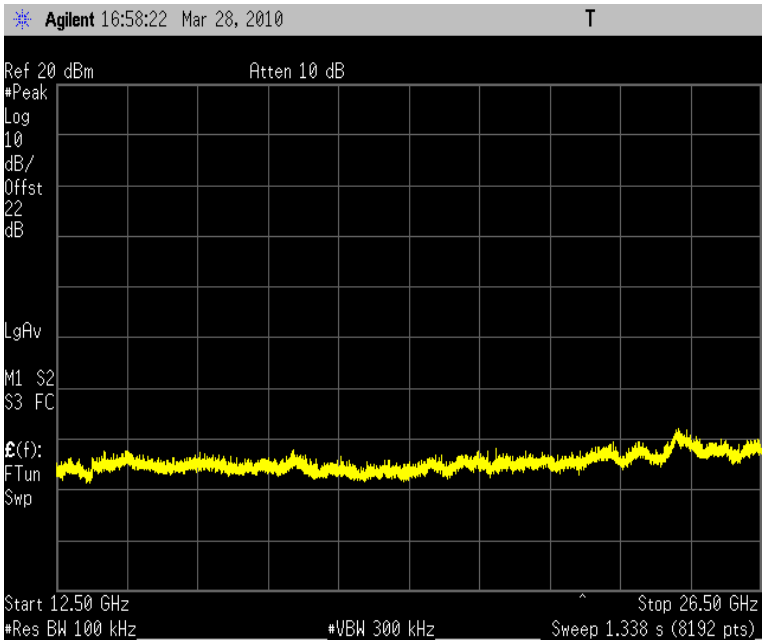
802.11(a) 36 Mbps, High Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



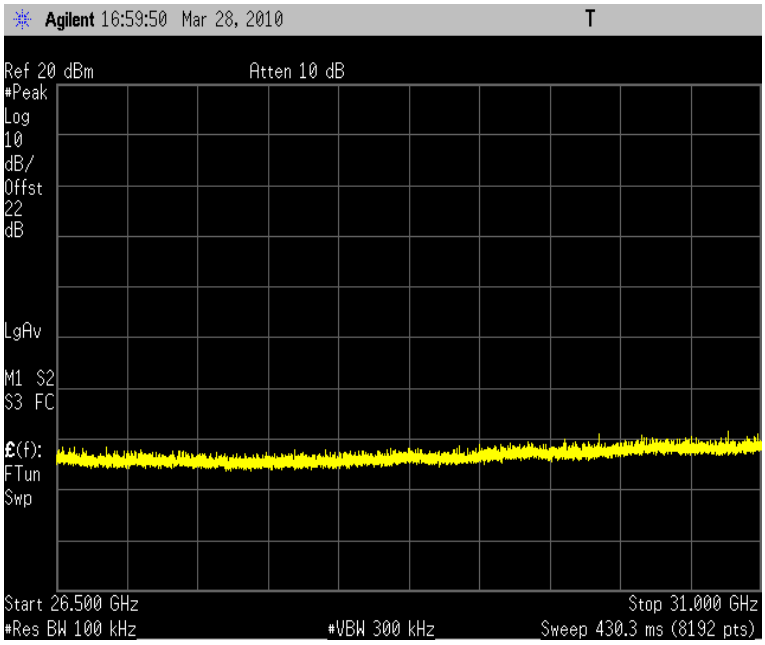
802.11(a) 36 Mbps, High Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



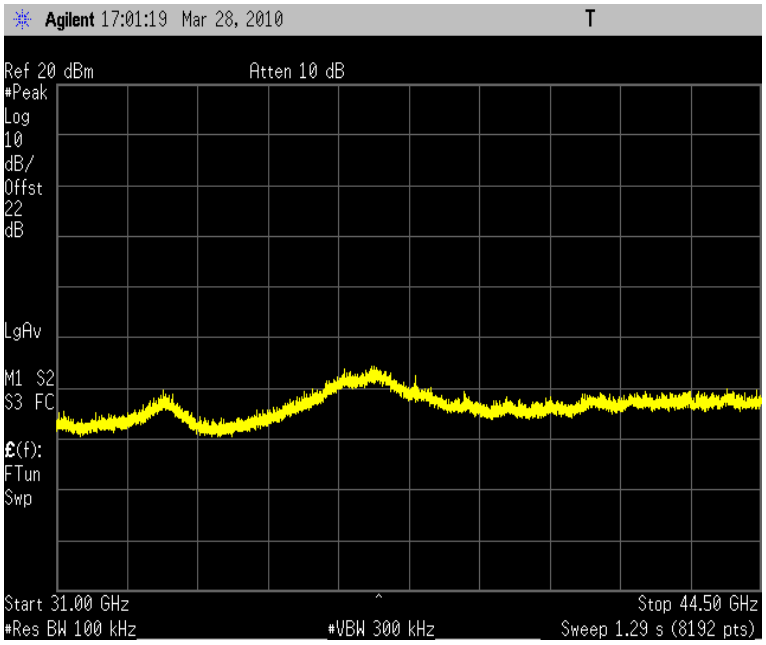
802.11(a) 54 Mbps, Low Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



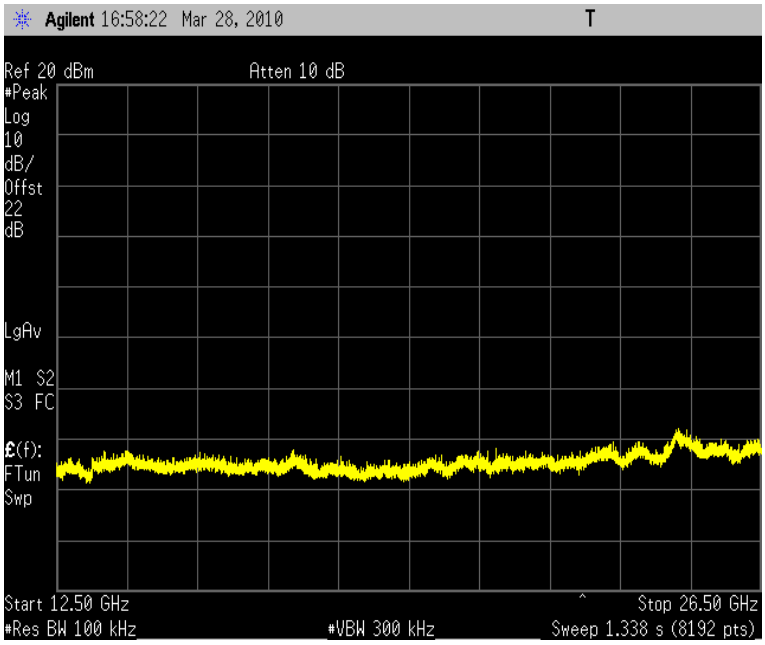
802.11(a) 54 Mbps, Low Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



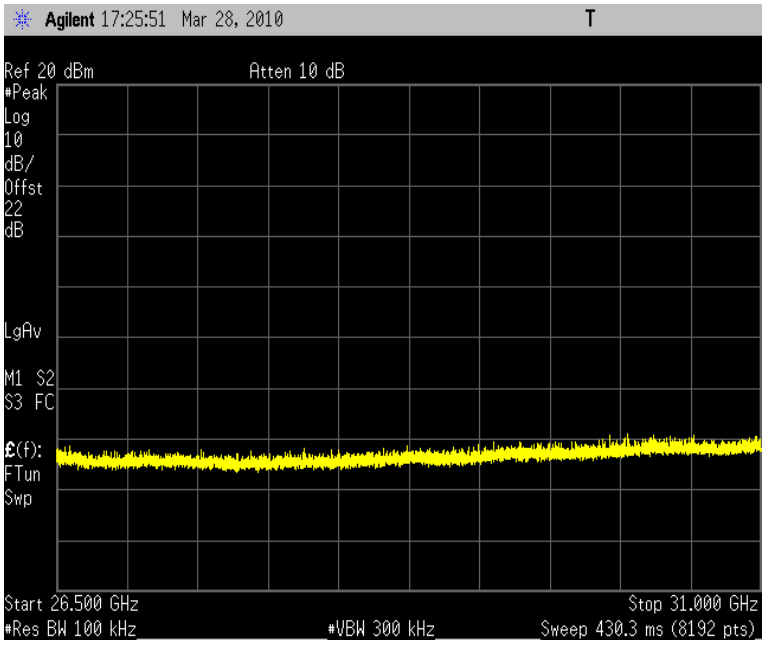
802.11(a) 54 Mbps, Low Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



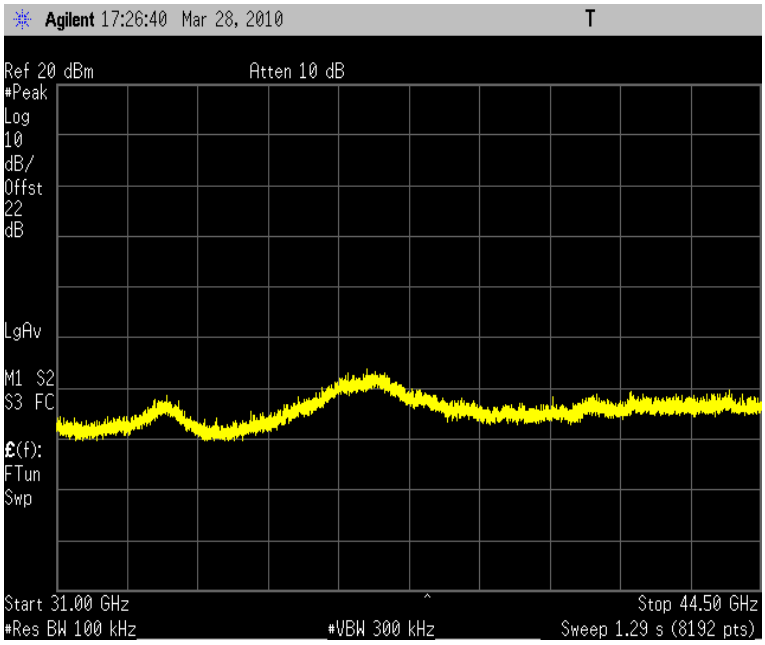
802.11(a) 54 Mbps, Mid Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



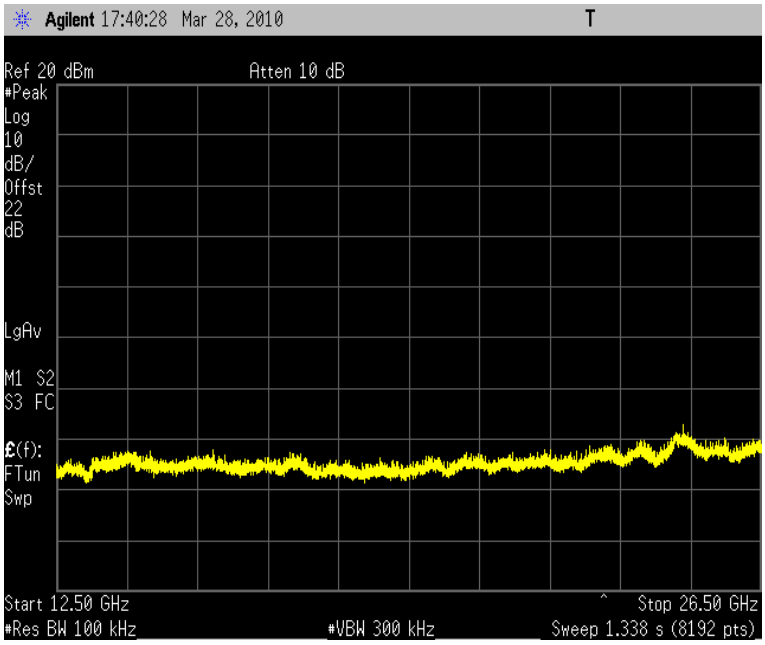
802.11(a) 54 Mbps, Mid Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



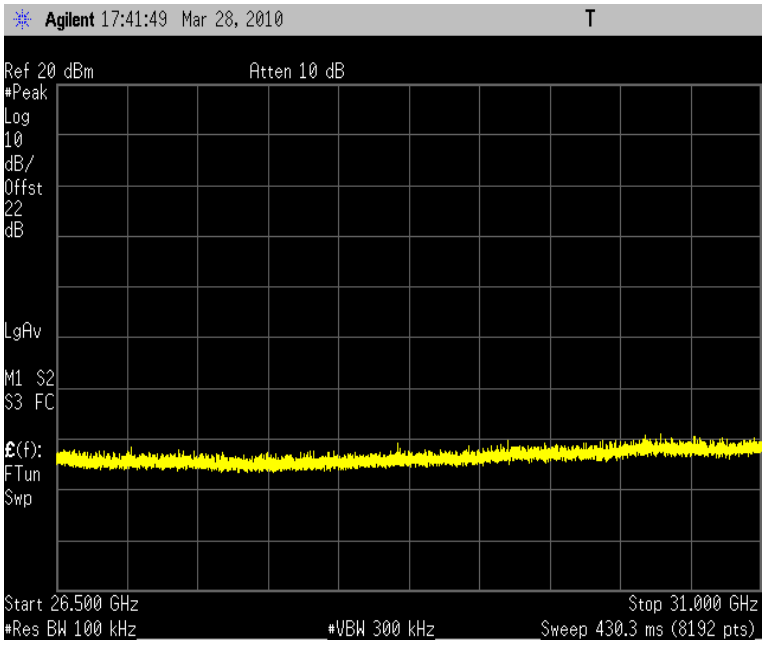
802.11(a) 54 Mbps, Mid Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



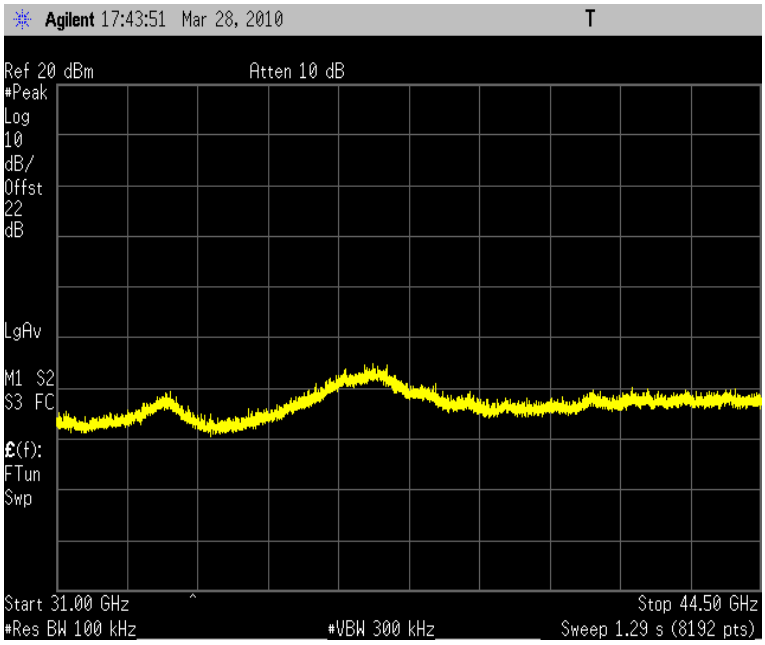
802.11(a) 54 Mbps, High Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



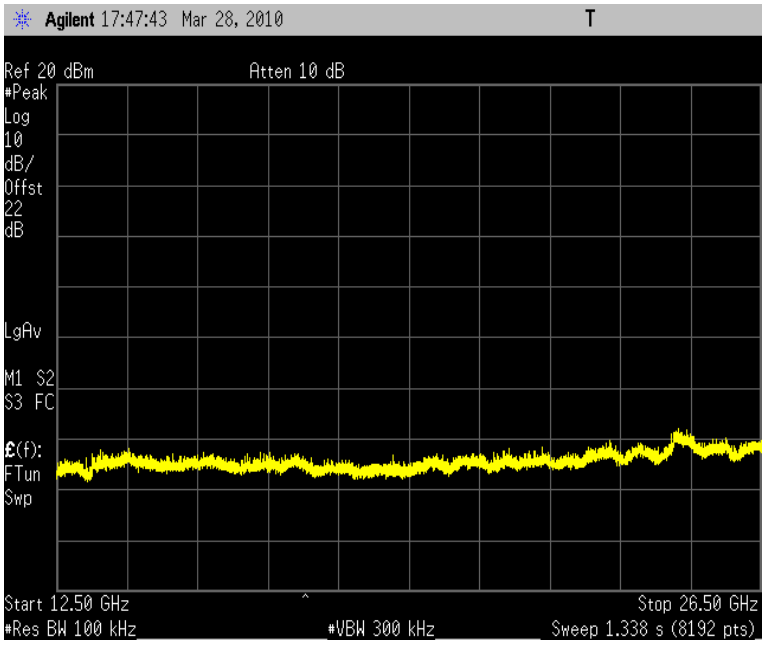
802.11(a) 54 Mbps, High Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



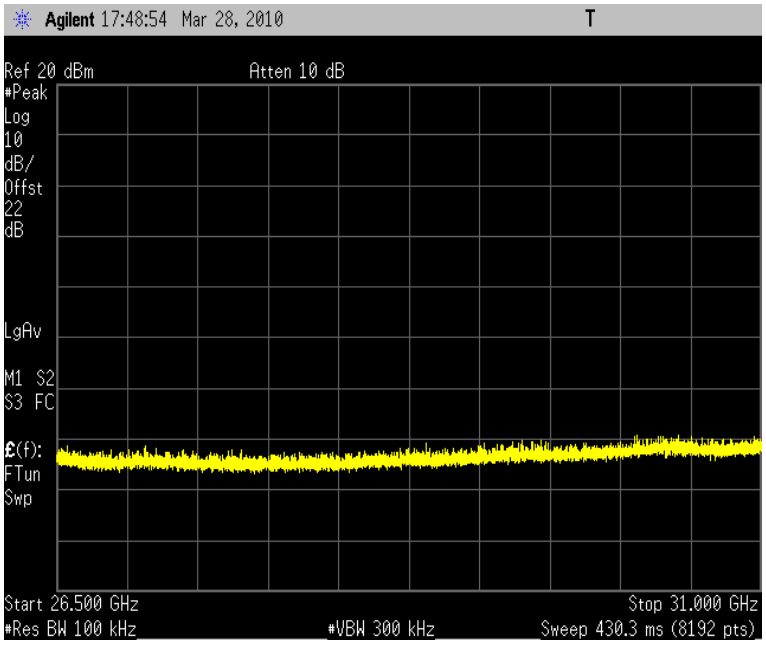
802.11(a) 54 Mbps, High Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



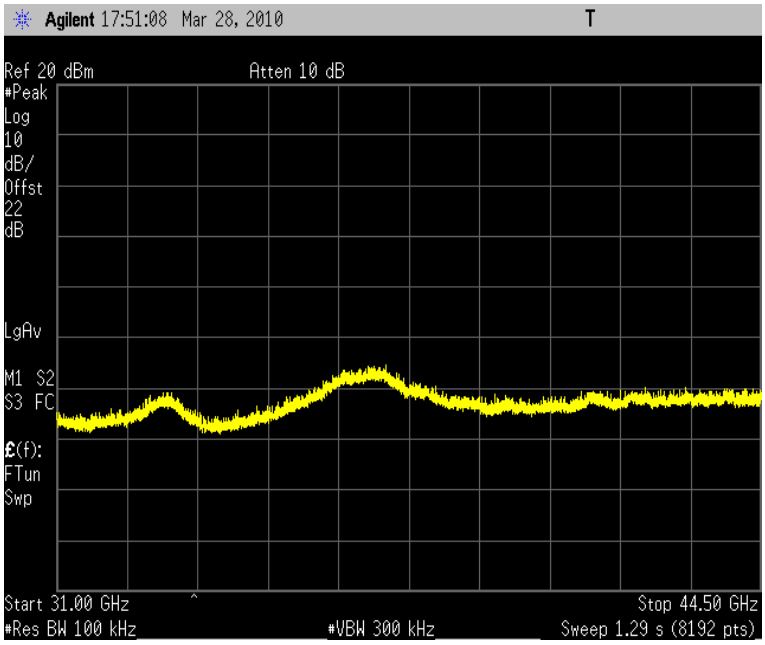
802.11(n), 5GHz 20MHz, Low Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



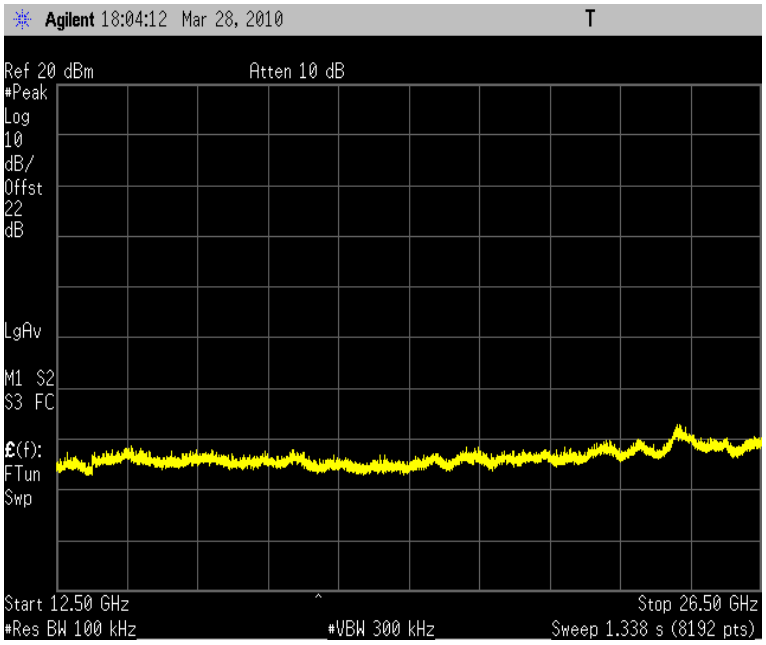
802.11(n), 5GHz 20MHz, Low Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



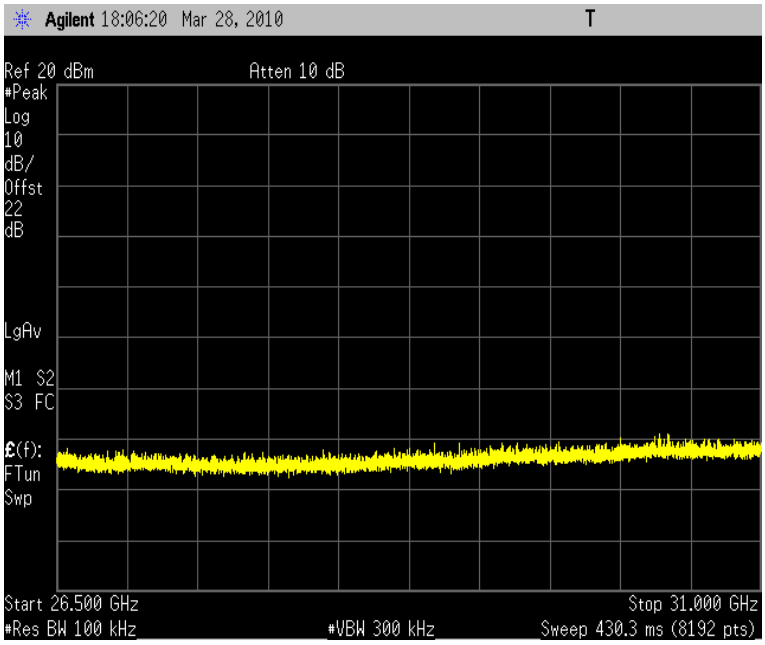
802.11(n), 5GHz 20MHz, Low Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



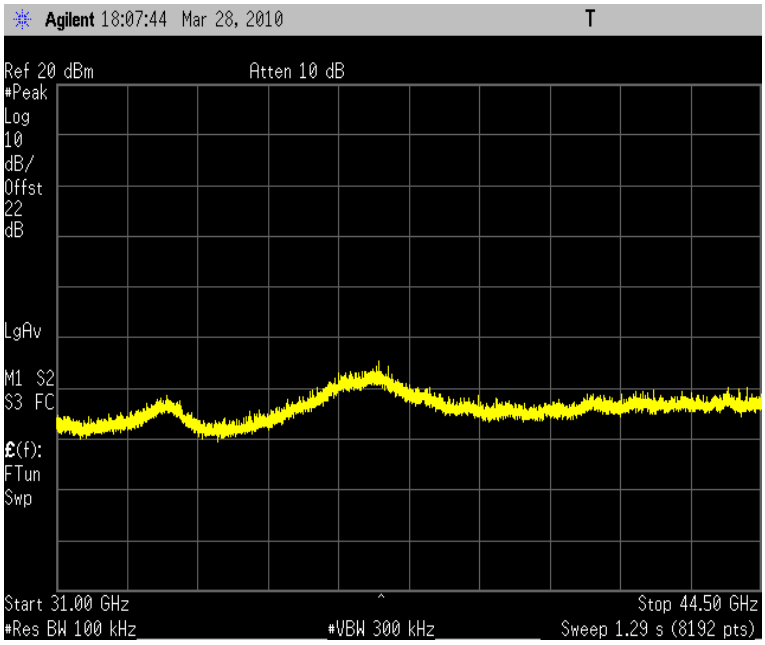
802.11(n), 5GHz 20MHz, Mid Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



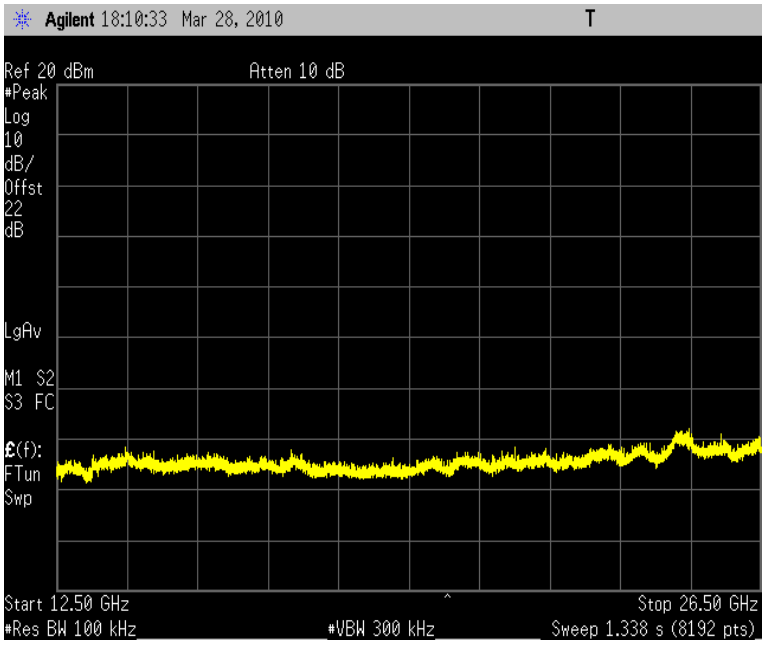
802.11(n), 5GHz 20MHz, Mid Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



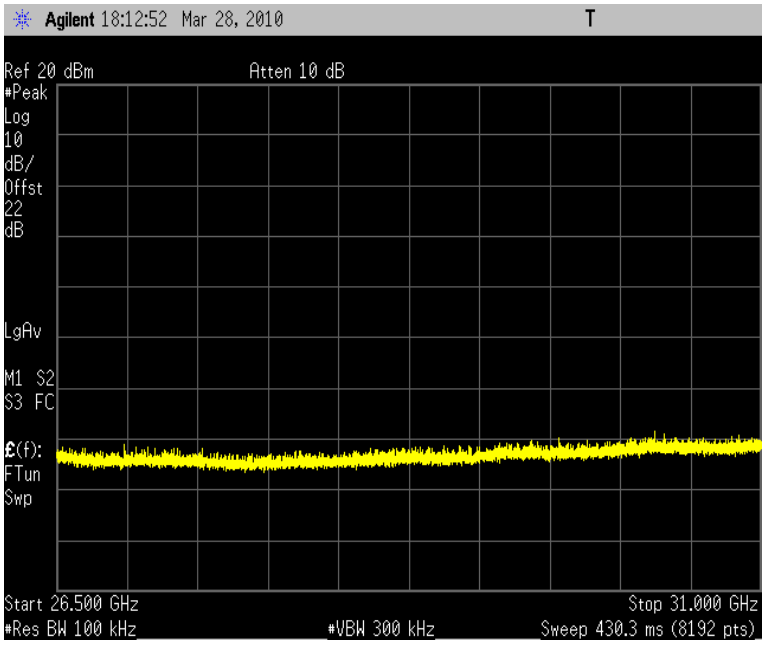
802.11(n), 5GHz 20MHz, Mid Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



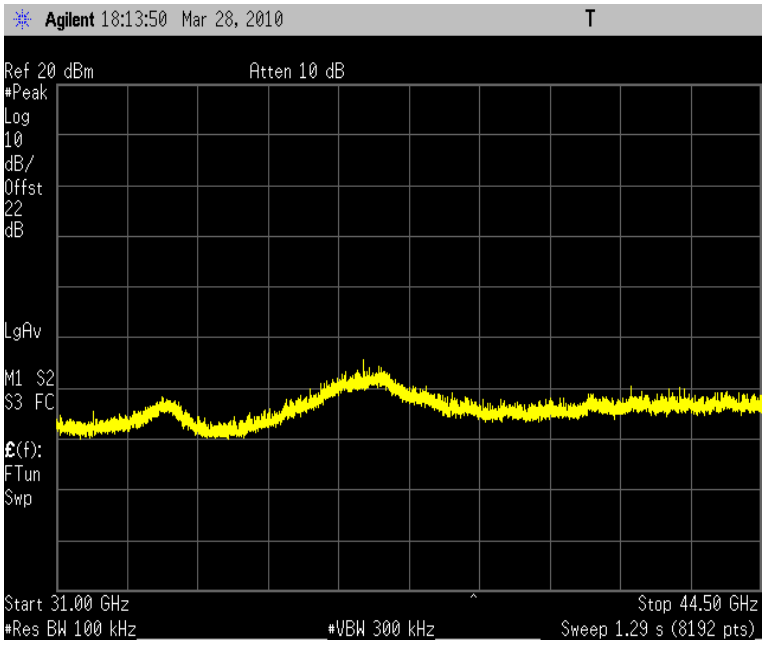
802.11(n), 5GHz 20MHz, High Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



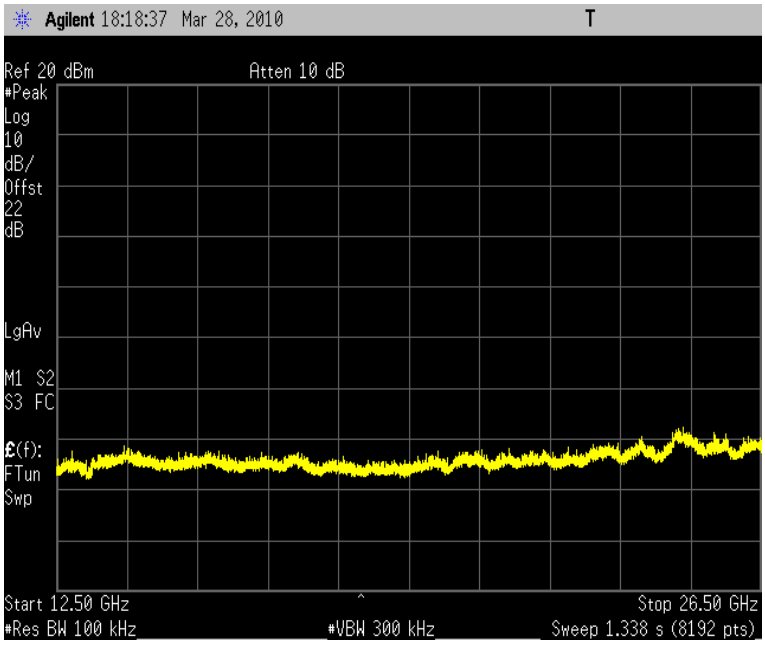
802.11(n), 5GHz 20MHz, High Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



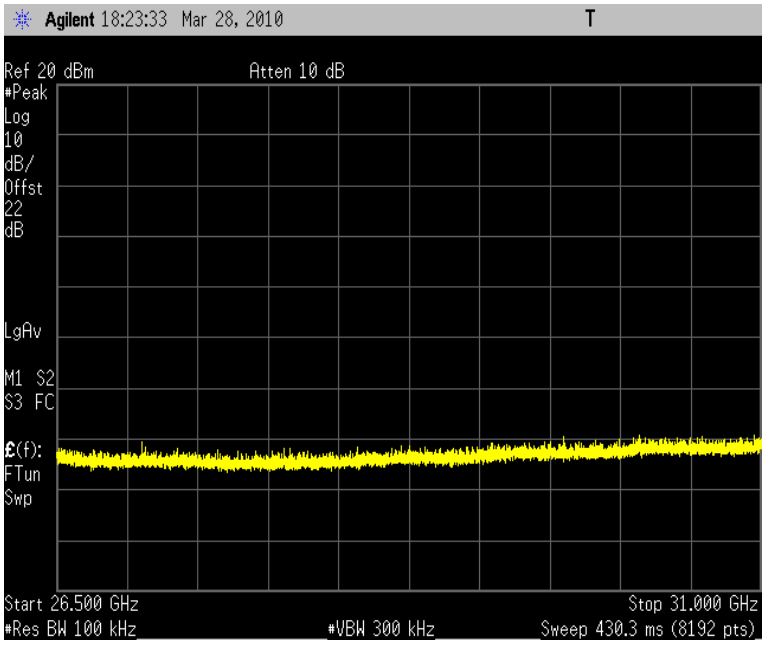
802.11(n), 5GHz 20MHz, High Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



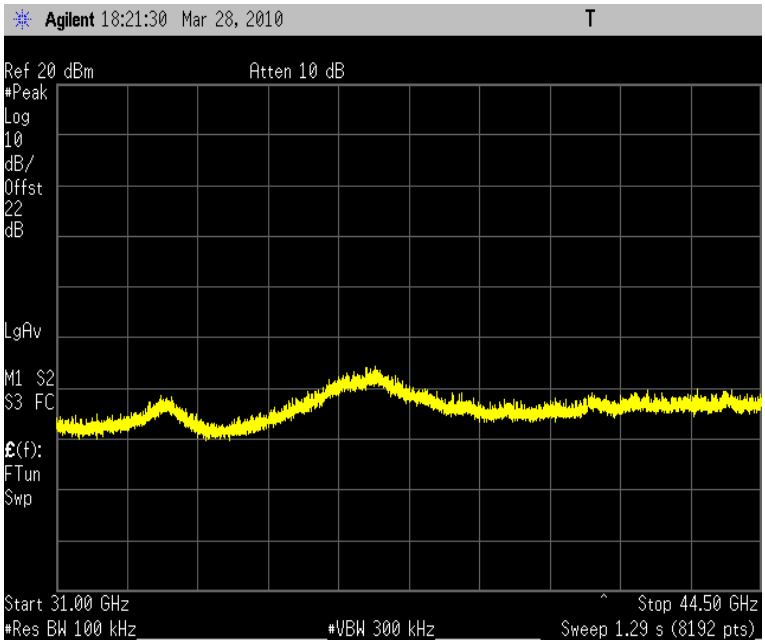
802.11(n), 5GHz 40MHz, Low Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



802.11(n), 5GHz 40MHz, Low Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc

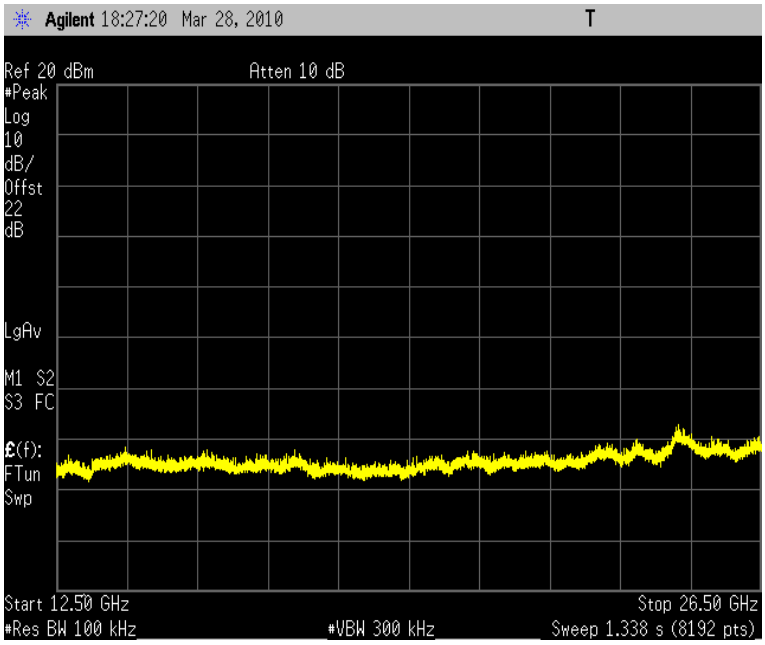


802.11(n), 5GHz 40MHz, Low Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc

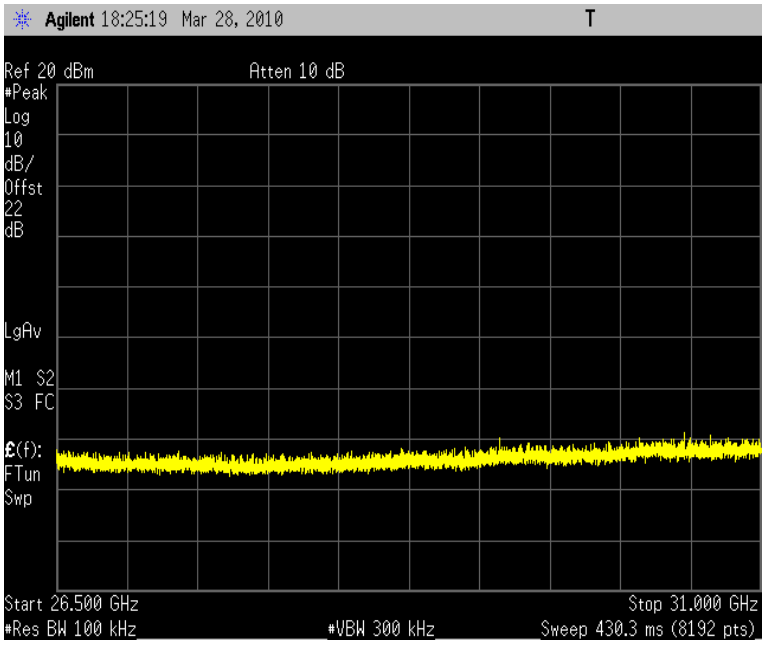


SPURIOUS CONDUCTED EMISSIONS

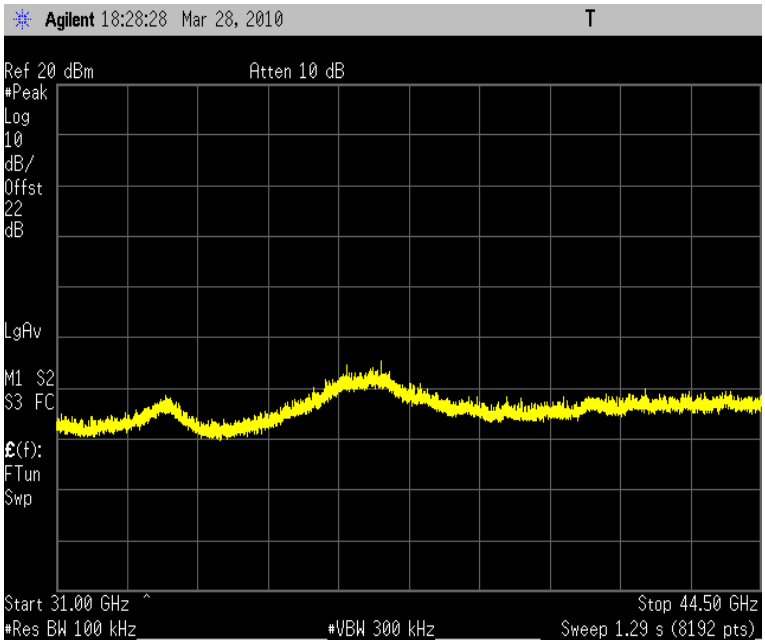
802.11(n), 5GHz 40MHz, Mid Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



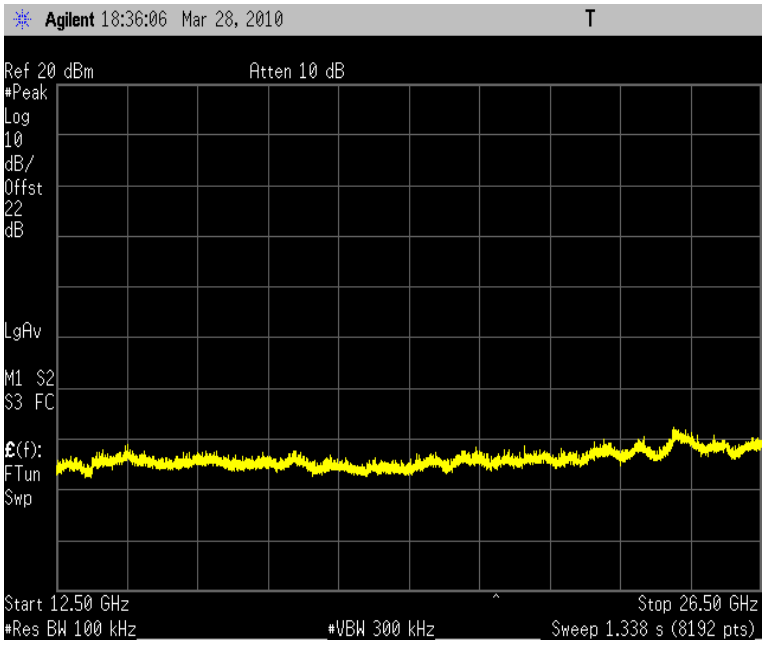
802.11(n), 5GHz 40MHz, Mid Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



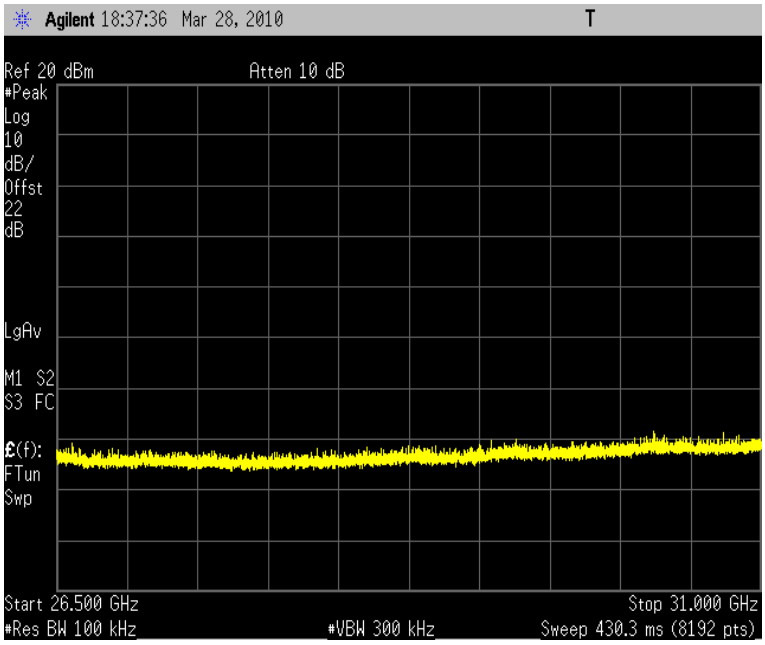
802.11(n), 5GHz 40MHz, Mid Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



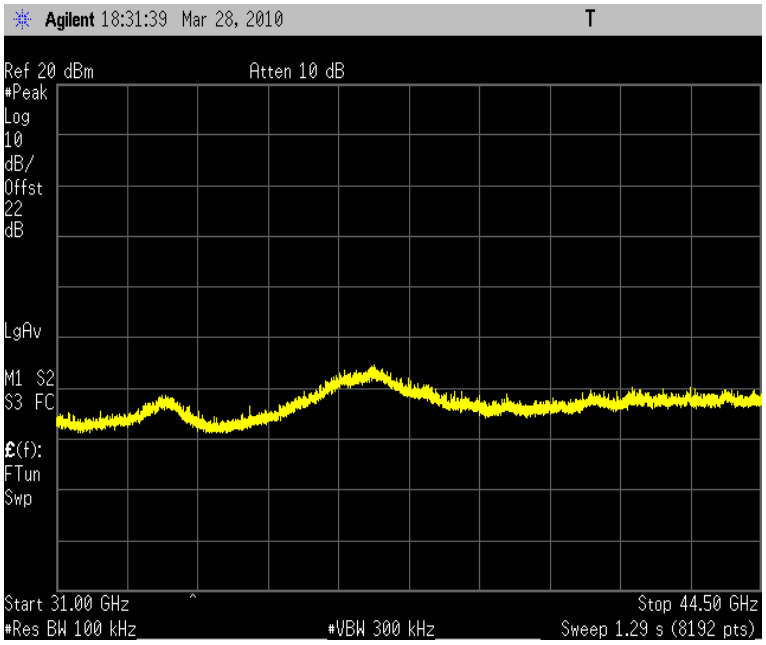
802.11(n), 5GHz 40MHz, High Channel, 12.5 GHz - 26.5 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



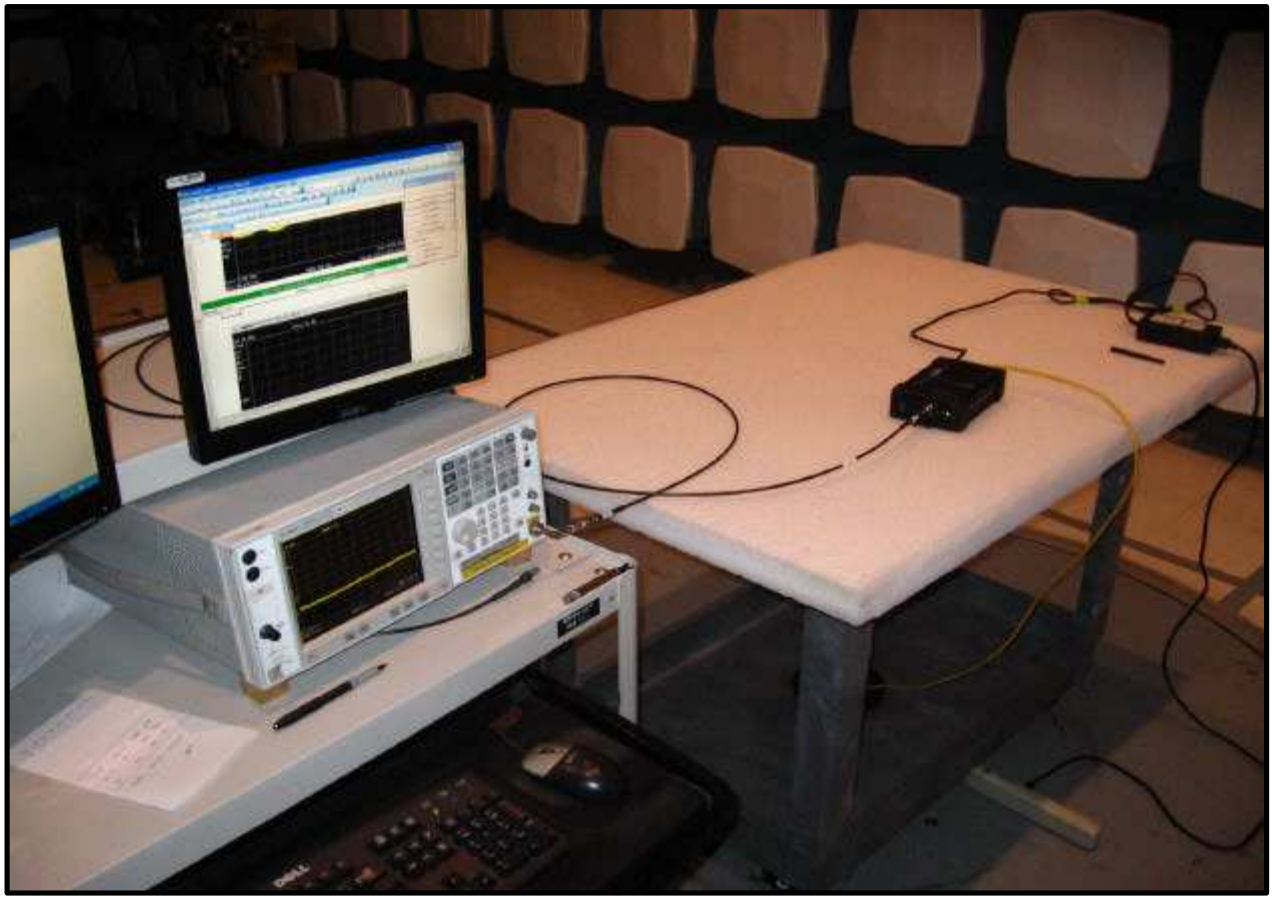
802.11(n), 5GHz 40MHz, High Channel, 26.5 GHz - 31 GHz		
Result: Pass	**Value:** < -30 dBc	**Limit:** = -20 dBc



802.11(n), 5GHz 40MHz, High Channel, 31 GHz - 40 GHz		
Result: Pass	**Value:** < -40 dBc	**Limit:** = -20 dBc



SPURIOUS CONDUCTED EMISSIONS



RADIATED SPURIOUS EMISSIONS

MODES OF OPERATION
Transmitting 802.11(b/g), 2.4 GHz, 17 dBm
Transmitting 802.11(n), 2.4 GHz, 20MHz, 14 dBm
Transmitting 802.11(n), 2.4 GHz, 40MHz, 15 dBm
Transmitting 802.11(a), 5150 - 5250 MHz Band, 16 dBm
Transmitting 802.11(a), 5250 - 5350 MHz Band, 17 dBm
Transmitting 802.11(a), 5470 - 5725 MHz Band, 17 dBm
Transmitting 802.11(n), 20 MHz, 5150 - 5250 MHz Band, 16 dBm
Transmitting 802.11(n), 20 MHz, 5250 - 5350 MHz Band, 17 dBm
Transmitting 802.11(n), 20 MHz, 5470 - 5725 MHz Band, 17 dBm
Transmitting 802.11(n), 40 MHz, 5150 - 5250 MHz Band, 16 dBm
Transmitting 802.11(n), 40 MHz, 5250 - 5350 MHz Band, 17 dBm
Transmitting 802.11(n), 40 MHz, 5470 - 5725 MHz Band, 17 dBm

POWER SETTINGS INVESTIGATED
120VAC/60Hz

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	25 GHz

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAQ	1/6/2010	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	7/10/2009	13
Antenna, Biconilog	EMCO	3141	AXE	1/14/2010	13
EV01 Cables		Bilog Cables	EVA	7/10/2009	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/10/2009	13
Antenna, Horn	EMCO	3115	AHC	8/12/2008	24
EV01 Cables		Double Ridge Horn Cables	EVB	7/10/2009	13
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	7/10/2009	13
Antenna, Horn	ETS	3160-07	AHU	NCR	0
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	7/10/2009	13
Antenna, Horn	ETS	3160-08	AHV	NCR	0
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	4/2/2010	13
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	5/19/2009	13
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	13
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFD	7/10/2009	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	7/10/2009	13
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVQ	4/15/2009	13

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2008.1.9

EUT:	WF1101	Work Order:	VERW0039
Serial Number:	M33142-001-0007	Date:	04/08/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	None	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antennas (See notes as to different antenna Samples used)

EUT OPERATING MODES

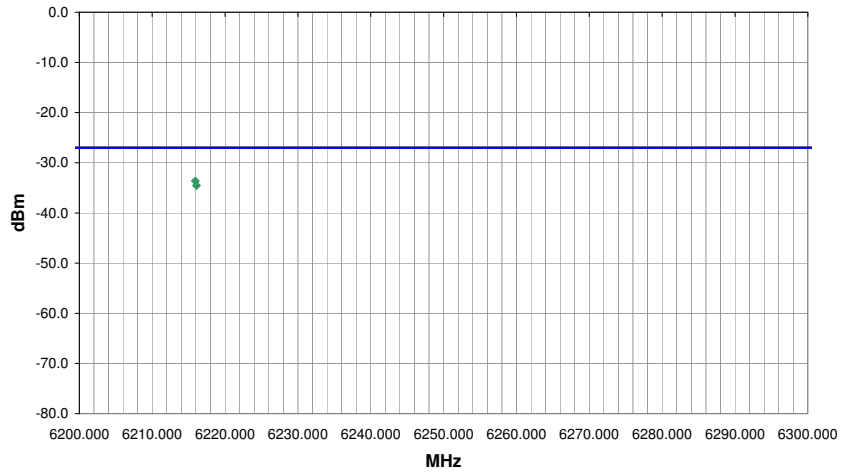
Transmitting 802.11(a), Channel 36

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	4
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
6215.930			288.0	1.1			V-Horn	PK	4.34E-07	-33.6	-27.0	-6.6	Antenna 2, 6 Mbps, 16 dBm EUT on side, antenna vertical
6216.080			288.0	1.1			V-Horn	PK	3.52E-07	-34.5	-27.0	-7.5	Antenna 1, 6 Mbps, 16 dBm EUT on side, antenna vertical

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2008.1.9

EUT:	WF1101	**Work Order:**	VERW0039
Serial Number:	M33142-001-0007	**Date:**	04/08/10
Customer:	Veriwave, Inc.	**Temperature:**	22
Attendees:	None	**Humidity:**	38%
Project:	None	**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:** 120VAC/60Hz	**Job Site:** EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antennas (See notes as to different antenna Samples used)

EUT OPERATING MODES

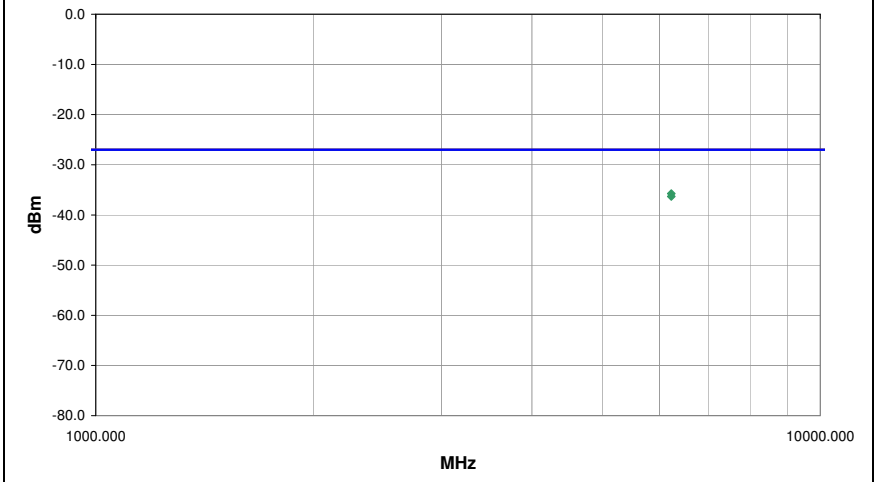
Transmitting 802.11(n), 20 MHz, Channel 36

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
6227.870			293.0	1.0			V-Horn	PK	2.67E-07	-35.7	-27.0	-8.7	Antenna 2, MCSO, 16 dBm EUT on side, antenna vertical
6228.120			292.0	1.2			V-Horn	PK	2.33E-07	-36.3	-27.0	-9.3	Antenna 1, MCSO, 16 dBm EUT on side, antenna vertical

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2008.1.9

EUT:	WF1101	Work Order:	VERW0039
Serial Number:	0019E3	Date:	04/08/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	Brian Denheyer	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS | Test Method

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antenna

EUT OPERATING MODES

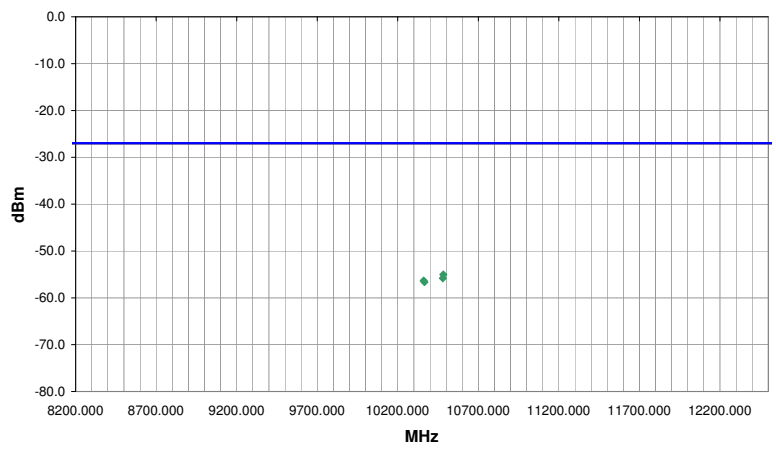
Transmitting 802.11(a), 6 Mbps, 16 dBm

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	6
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10482.370			180.0	1.2			H-Horn	PK	3.14E-09	-55.0	-27.0	-28.0	Antenna 2, Ch 48, 6Mbps, 16 dBm EUT horizontal, antenna horizontal-90
10479.220			164.0	1.0			H-Horn	PK	2.61E-09	-55.8	-27.0	-28.8	Antenna 1, Ch 48, 6Mbps, 16 dBm EUT horizontal, antenna horizontal-90
10360.210			133.0	1.1			H-Horn	PK	2.33E-09	-56.3	-27.0	-29.3	Antenna 2, Ch 36, 6Mbps, 16 dBm EUT horizontal, antenna horizontal-90
10365.310			133.0	1.0			H-Horn	PK	2.17E-09	-56.6	-27.0	-29.6	Antenna 1, Ch 36, 6Mbps, 16 dBm EUT horizontal, antenna horizontal-90

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2008.1.9

EUT:	WF1101	Work Order:	VERW0037
Serial Number:	M33142-001-007	Date:	04/14/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	Brian Denheyer	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antenna (unknown)

EUT OPERATING MODES

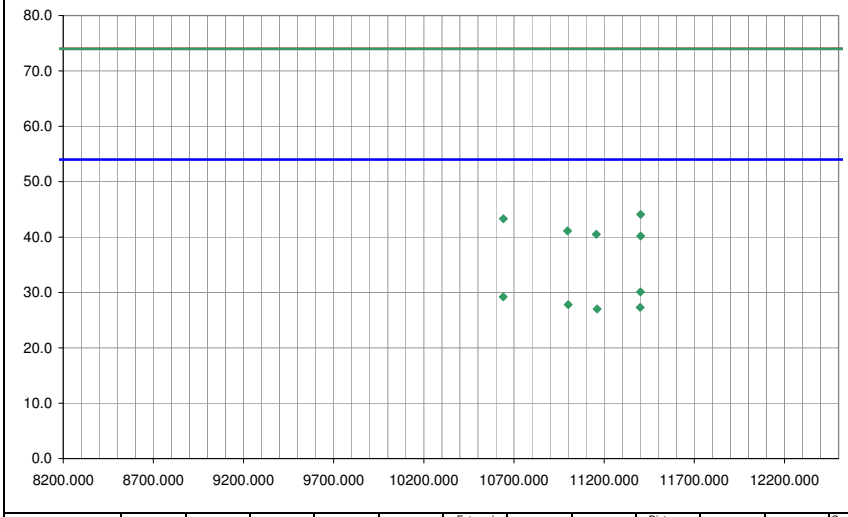
Transmitting 802.11(n), 20 MHz, MCS0, 17 dBm

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
11401.250	37.4	-7.3	75.0	1.3	3.0	0.0	V-Horn	AV	0.0	30.1	54.0	-23.9	Ch. 140, EUT on side, Antenna vertical
10640.300	40.7	-11.5	288.0	1.0	3.0	0.0	V-Horn	AV	0.0	29.2	54.0	-24.8	Ch. 64, EUT on side, Antenna vertical, 17 dBm
11000.850	37.8	-10.0	279.0	1.0	3.0	0.0	V-Horn	AV	0.0	27.8	54.0	-26.2	Ch. 100, EUT on side, Antenna vertical
11400.150	34.6	-7.3	354.0	1.0	3.0	0.0	H-Horn	AV	0.0	27.3	54.0	-26.7	Ch. 140, EUT horizontal, Antenna horizontal-90
11160.800	35.9	-8.9	274.0	1.0	3.0	0.0	V-Horn	AV	0.0	27.0	54.0	-27.0	Ch. 116, EUT on side, Antenna vertical
11402.200	51.4	-7.3	75.0	1.3	3.0	0.0	V-Horn	PK	0.0	44.1	74.0	-29.9	Ch. 140, EUT on side, Antenna vertical
10641.100	54.8	-11.5	288.0	1.0	3.0	0.0	V-Horn	PK	0.0	43.3	74.0	-30.7	Ch. 64, EUT on side, Antenna vertical, 17 dBm
10997.250	51.1	-10.0	279.0	1.0	3.0	0.0	V-Horn	PK	0.0	41.1	74.0	-32.9	Ch. 100, EUT on side, Antenna vertical
11156.500	49.4	-8.9	274.0	1.0	3.0	0.0	V-Horn	PK	0.0	40.5	74.0	-33.5	Ch. 116, EUT on side, Antenna vertical
11402.450	47.5	-7.3	354.0	1.0	3.0	0.0	H-Horn	PK	0.0	40.2	74.0	-33.8	Ch. 140, EUT horizontal, Antenna horizontal-90

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2008.1.9

EUT:	WF1101	Work Order:	VERW0037
Serial Number:	M33142-001-007	Date:	04/14/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	Brian Denheyer	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antenna (unknown)

EUT OPERATING MODES

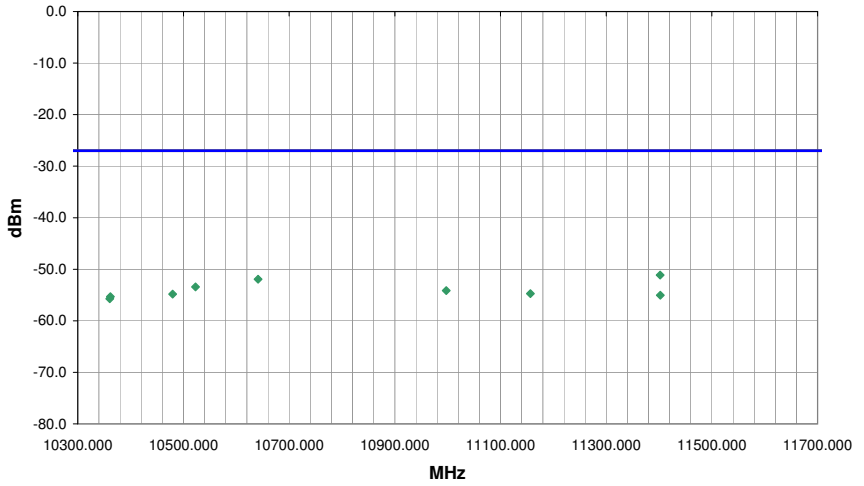
Transmitting 802.11(n), 20 MHz, MCS0, 17 dBm

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
11402.200			75.0	1.3			V-Horn	PK	7.71E-09	-51.1	-27.0	-24.1	Ch. 140, EUT on side, Antenna vertical
10641.100			288.0	1.0			V-Horn	PK	6.41E-09	-51.9	-27.0	-24.9	Ch. 64, EUT on side, Antenna vertical, 17 dBm
10522.750			287.0	1.0			V-Horn	PK	4.54E-09	-53.4	-27.0	-26.4	Ch. 52, EUT on side, Antenna vertical, 17 dBm
10997.250			279.0	1.0			V-Horn	PK	3.86E-09	-54.1	-27.0	-27.1	Ch. 100, EUT on side, Antenna vertical
11156.500			274.0	1.0			V-Horn	PK	3.37E-09	-54.7	-27.0	-27.7	Ch. 116, EUT on side, Antenna vertical
10479.500			181.0	1.2			H-Horn	PK	3.29E-09	-54.8	-27.0	-27.8	Ch. 48, EUT horizontal, Antenna horizontal-90, 16 dBm
11402.450			354.0	1.0			H-Horn	PK	3.14E-09	-55.0	-27.0	-28.0	Ch. 140, EUT horizontal, Antenna horizontal-90
10361.850			286.0	1.0			V-Horn	PK	2.93E-09	-55.3	-27.0	-28.3	Ch. 36, EUT on side, Antenna vertical, 16 dBm
10360.450			173.0	1.3			H-Horn	PK	2.67E-09	-55.7	-27.0	-28.7	Ch. 36, EUT horizontal, Antenna horizontal-90, 16 dBm

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.8.29

EUT:	WF1101			**Work Order:**	VERW0035
Serial Number:	0019E3			**Date:**	03/18/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Ethan Schoonover	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	**Test Distance (m)**	3

COMMENTS

Ethernet to remote PC, standard antenna.

EUT OPERATING MODES

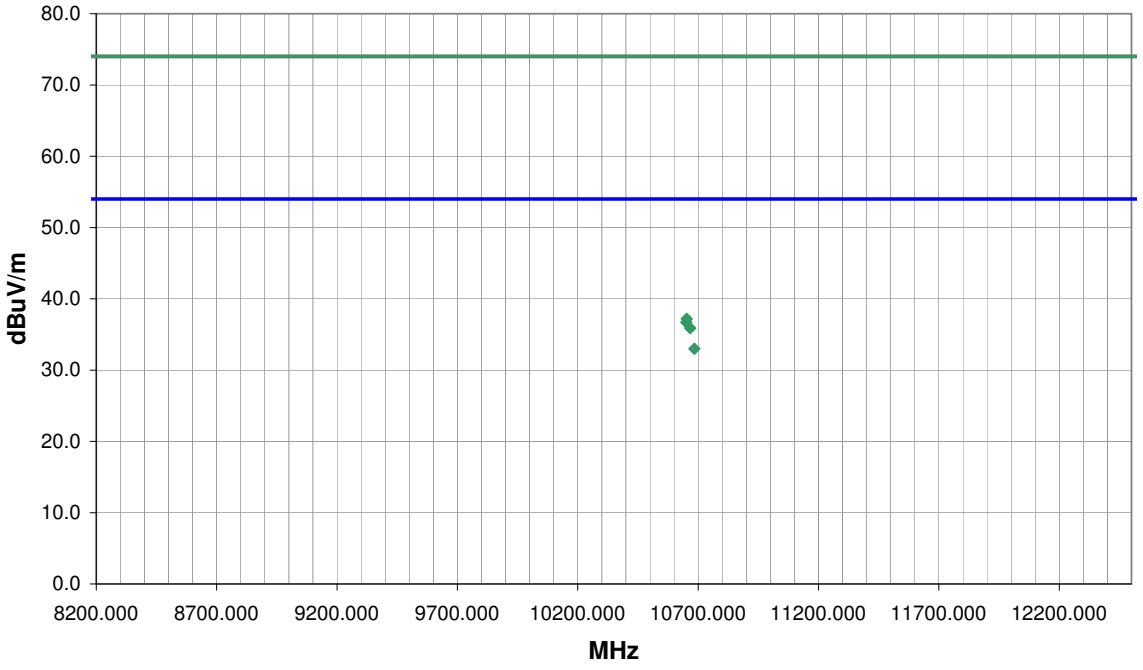
Transmitting 802.11(n), 40 MHz msc=0, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	7
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
10667.000	47.3	-11.4	22.0	1.0	3.0	0.0	H-Horn	AV	0.0	35.9	54.0	-18.1
10684.600	44.4	-11.4	226.0	1.0	3.0	0.0	V-Horn	AV	0.0	33.0	54.0	-21.0
10652.400	48.7	-11.5	226.0	1.0	3.0	0.0	V-Horn	PK	0.0	37.2	74.0	-36.8
10651.300	48.2	-11.5	22.0	1.0	3.0	0.0	H-Horn	PK	0.0	36.7	74.0	-37.3

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.8.29

EUT:	WF1101	**Work Order:**	VERW0035
Serial Number:	0019E3	**Date:**	03/18/10
Customer:	Veriwave, Inc.	**Temperature:**	22
Attendees:	Brian Denheyer	**Humidity:**	38%
Project:	None	**Barometric Pres.:**	30.15 in
Tested by:	Ethan Schoonover	**Power:** 120VAC/60Hz	**Job Site:** EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	**Test Distance (m)**	3

COMMENTS

Ethernet to remote PC, standard antenna.

EUT OPERATING MODES

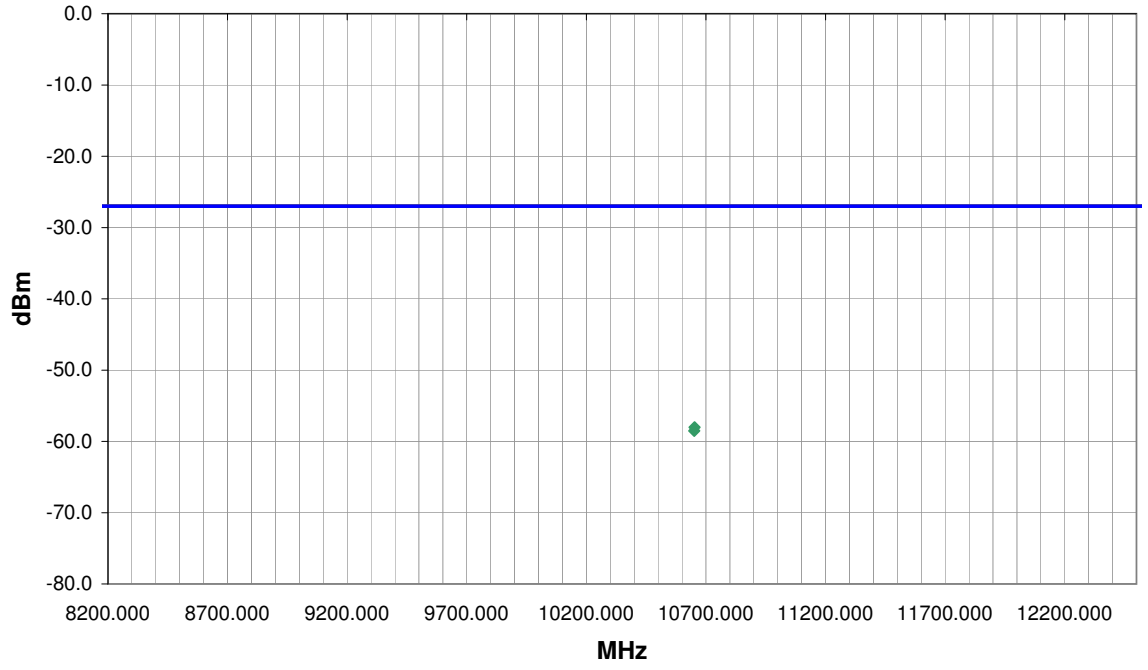
Transmitting 802.11(n), 40 MHz msc=0, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	7
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
10652.400			226.0	1.0			V-Horn	PK	1.57E-09	-58.0	-27.0	-31.0
10651.300			22.0	1.0			H-Horn	PK	1.40E-09	-58.5	-27.0	-31.5

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi	Work Order:	VERW0034
Serial Number:	M33142-001-0007	Date:	03/01/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	Brian Denheyer	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.205:2010	#N/A

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

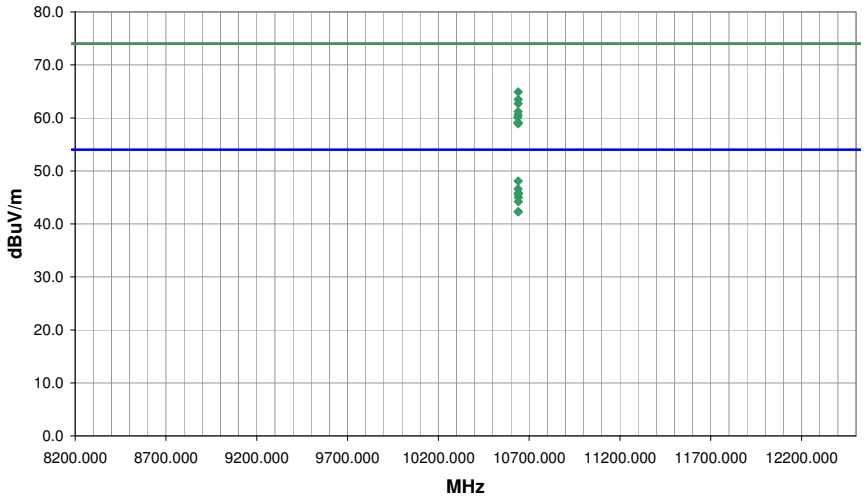
Transmitting 802.11(a), 6 Mbps, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
10639.490	59.6	-11.5	326.0	1.1	3.0	0.0	H-Horn	AV	0.0	48.1	54.0	-5.9	6 Mbps, EUT on side, antenna horizontal
10639.450	58.1	-11.5	268.0	1.0	3.0	0.0	V-Horn	AV	0.0	46.6	54.0	-7.4	6 Mbps, EUT on side, antenna vertical
10640.910	57.3	-11.5	268.0	1.0	3.0	0.0	V-Horn	AV	0.0	45.8	54.0	-8.2	36 Mbps, EUT on side, antenna vertical
10641.000	57.3	-11.5	266.0	1.2	3.0	0.0	V-Horn	AV	0.0	45.8	54.0	-8.2	6 Mbps, EUT on horizontal, antenna vertical
10639.280	57.1	-11.5	310.0	1.1	3.0	0.0	H-Horn	AV	0.0	45.6	54.0	-8.4	36 Mbps, EUT on side, antenna horizontal
10641.150	56.5	-11.5	309.0	1.1	3.0	0.0	H-Horn	AV	0.0	45.0	54.0	-9.0	54 Mbps, EUT on side, antenna horizontal
10639.860	76.4	-11.5	326.0	1.1	3.0	0.0	H-Horn	PK	0.0	64.9	74.0	-9.1	6 Mbps, EUT on side, antenna horizontal
10641.200	55.7	-11.5	277.0	1.0	3.0	0.0	V-Horn	AV	0.0	44.2	54.0	-9.8	54 Mbps, EUT on side, antenna vertical
10639.790	75.0	-11.5	268.0	1.0	3.0	0.0	V-Horn	PK	0.0	63.5	74.0	-10.5	6 Mbps, EUT on side, antenna vertical
10639.870	74.2	-11.5	266.0	1.2	3.0	0.0	V-Horn	PK	0.0	62.7	74.0	-11.3	6 Mbps, EUT on horizontal, antenna vertical
10639.490	53.8	-11.5	193.0	1.0	3.0	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7	6 Mbps, EUT vertical, antenna vertical
10639.610	53.8	-11.5	321.0	1.0	3.0	0.0	H-Horn	AV	0.0	42.3	54.0	-11.7	6 Mbps, EUT on horizontal, antenna horizontal
10638.660	72.7	-11.5	268.0	1.0	3.0	0.0	V-Horn	PK	0.0	61.2	74.0	-12.8	36 Mbps, EUT on side, antenna vertical
10638.650	72.1	-11.5	310.0	1.1	3.0	0.0	H-Horn	PK	0.0	60.6	74.0	-13.4	36 Mbps, EUT on side, antenna horizontal
10637.610	71.6	-11.5	309.0	1.1	3.0	0.0	H-Horn	PK	0.0	60.1	74.0	-13.9	54 Mbps, EUT on side, antenna horizontal
10637.740	70.6	-11.5	277.0	1.0	3.0	0.0	V-Horn	PK	0.0	59.1	74.0	-14.9	54 Mbps, EUT on side, antenna vertical
10639.830	70.6	-11.5	193.0	1.0	3.0	0.0	V-Horn	PK	0.0	59.1	74.0	-14.9	6 Mbps, EUT vertical, antenna vertical
10639.900	70.4	-11.5	321.0	1.0	3.0	0.0	H-Horn	PK	0.0	58.9	74.0	-15.1	6 Mbps, EUT on horizontal, antenna horizontal

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi	Work Order:	VERW0034
Serial Number:	M33142-001-0007	Date:	03/01/10
Customer:	Veriwave, Inc.	Temperature:	22
Attendees:	Brian Denheyer	Humidity:	38%
Project:	None	Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

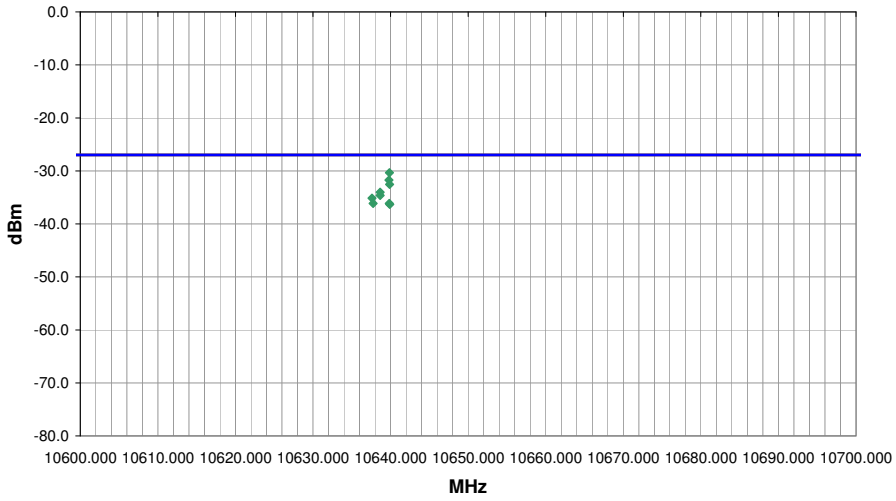
Transmitting 802.11(a), 6 Mbps, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10639.860			326.0	1.1			H-Horn	PK	9.27E-07	-30.3	-27.0	-3.3	6 Mbps, EUT on side, antenna horizontal
10639.790			268.0	1.0			V-Horn	PK	6.72E-07	-31.7	-27.0	-4.7	6 Mbps, EUT on side, antenna vertical
10639.870			266.0	1.2			V-Horn	PK	5.59E-07	-32.5	-27.0	-5.5	6 Mbps, EUT on horizontal, antenna vertical
10638.660			268.0	1.0			V-Horn	PK	3.95E-07	-34.0	-27.0	-7.0	36 Mbps, EUT on side, antenna vertical
10638.650			310.0	1.1			H-Horn	PK	3.44E-07	-34.6	-27.0	-7.6	36 Mbps, EUT on side, antenna horizontal
10637.610			309.0	1.1			H-Horn	PK	3.07E-07	-35.1	-27.0	-8.1	54 Mbps, EUT on side, antenna horizontal
10637.740			277.0	1.0			V-Horn	PK	2.44E-07	-36.1	-27.0	-9.1	54 Mbps, EUT on side, antenna vertical
10639.830			193.0	1.0			V-Horn	PK	2.44E-07	-36.1	-27.0	-9.1	6 Mbps, EUT vertical, antenna vertical
10639.900			321.0	1.0			H-Horn	PK	2.33E-07	-36.3	-27.0	-9.3	6 Mbps, EUT on horizontal, antenna horizontal

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			Work Order:	VERW0034
Serial Number:	M33142-001-0007			Date:	03/01/10
Customer:	Veriwave, Inc.			Temperature:	22
Attendees:	Brian Denheyer			Humidity:	38%
Project:	None			Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

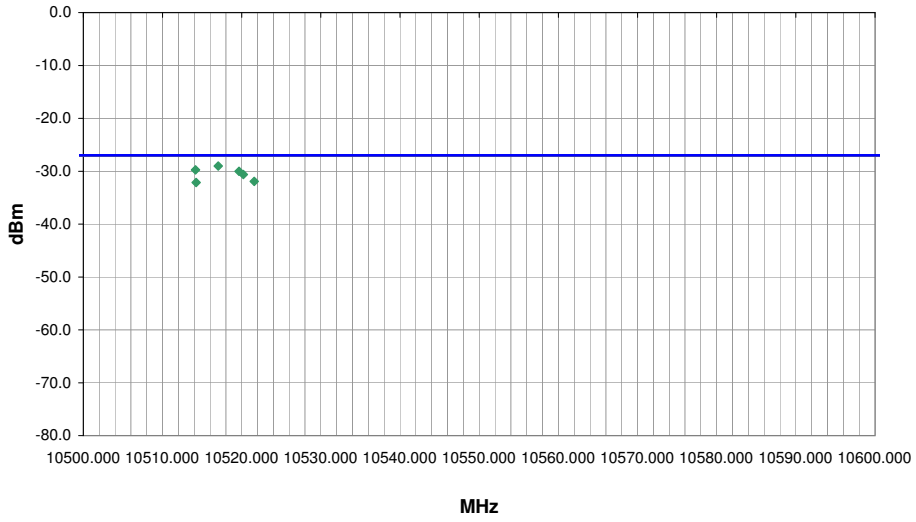
Transmitting 802.11(a), 17 dBm, Channel 52

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	8
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10517.040			309.0	1.1			H-Horn	PK	1.25E-06	-29.0	-27.0	-2.0	6 Mbps, EUT on side, antenna horizontal
10514.170			309.0	1.1			H-Horn	PK	1.06E-06	-29.7	-27.0	-2.7	54 Mbps, EUT on side, antenna horizontal
10519.670			259.0	1.1			V-Horn	PK	9.93E-07	-30.0	-27.0	-3.0	6 Mbps, EUT on side, antenna vertical
10520.210			309.0	1.1			H-Horn	PK	8.65E-07	-30.6	-27.0	-3.6	36 Mbps, EUT on side, antenna horizontal
10521.580			259.0	1.1			V-Horn	PK	6.41E-07	-31.9	-27.0	-4.9	36 Mbps, EUT on side, antenna vertical
10514.250			259.0	1.1			V-Horn	PK	6.13E-07	-32.1	-27.0	-5.1	54 Mbps, EUT on side, antenna vertical

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			**Work Order:**	VERW0034
Serial Number:	M33142-001-0007			**Date:**	03/02/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

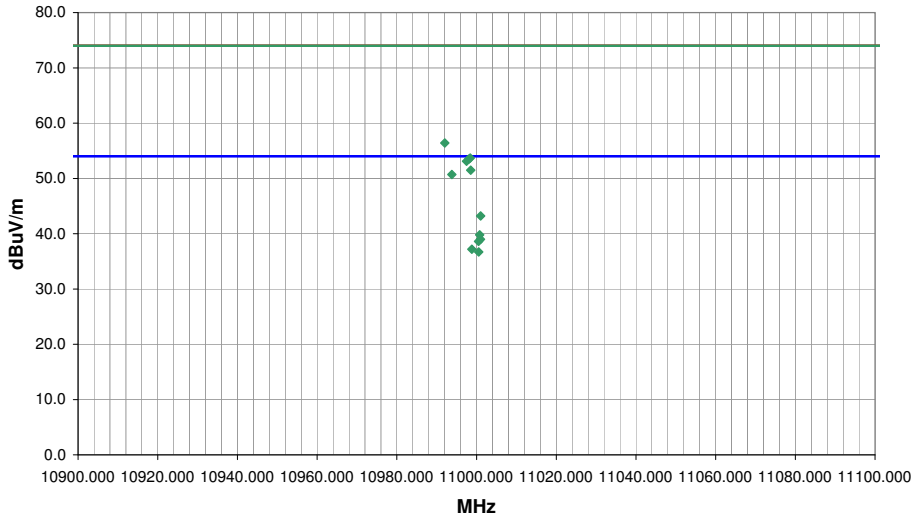
Transmitting 802.11(a), 17 dBm, Channel 100

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	9
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
11001.040	53.2	-10.0	306.0	1.0	3.0	0.0	H-Horn	AV	0.0	43.2	54.0	-10.8	6 Mbps, EUT on side, antenna horizontal
11000.790	49.8	-10.0	309.0	1.0	3.0	0.0	H-Horn	AV	0.0	39.8	54.0	-14.2	36 Mbps, EUT on side, antenna horizontal
11001.000	49.0	-10.0	253.0	1.0	3.0	0.0	V-Horn	AV	0.0	39.0	54.0	-15.0	6 Mbps, EUT on side, antenna vertcal
11000.500	48.6	-10.0	309.0	1.0	3.0	0.0	H-Horn	AV	0.0	38.6	54.0	-15.4	54 Mbps, EUT on side, antenna horizontal
10998.830	47.2	-10.0	263.0	1.0	3.0	0.0	V-Horn	AV	0.0	37.2	54.0	-16.8	36 Mbps, EUT on side, antenna vertcal
11000.540	46.7	-10.0	255.0	1.0	3.0	0.0	V-Horn	AV	0.0	36.7	54.0	-17.3	54 Mbps, EUT on side, antenna vertcal
10992.040	66.4	-10.0	306.0	1.0	3.0	0.0	H-Horn	PK	0.0	56.4	74.0	-17.6	6 Mbps, EUT on side, antenna horizontal
10998.420	63.7	-10.0	309.0	1.0	3.0	0.0	H-Horn	PK	0.0	53.7	74.0	-20.3	54 Mbps, EUT on side, antenna horizontal
10998.040	63.5	-10.0	309.0	1.0	3.0	0.0	H-Horn	PK	0.0	53.5	74.0	-20.5	36 Mbps, EUT on side, antenna horizontal
10997.500	63.1	-10.0	253.0	1.0	3.0	0.0	V-Horn	PK	0.0	53.1	74.0	-20.9	6 Mbps, EUT on side, antenna vertcal
10998.540	61.5	-10.0	255.0	1.0	3.0	0.0	V-Horn	PK	0.0	51.5	74.0	-22.5	54 Mbps, EUT on side, antenna vertcal
10993.790	60.7	-10.0	263.0	1.0	3.0	0.0	V-Horn	PK	0.0	50.7	74.0	-23.3	36 Mbps, EUT on side, antenna vertcal

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			Work Order:	VERW0034
Serial Number:	M33142-001-0007			Date:	03/02/10
Customer:	Veriwave, Inc.			Temperature:	22
Attendees:	Brian Denheyer			Humidity:	38%
Project:	None			Barometric Pres.:	30.15 in
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

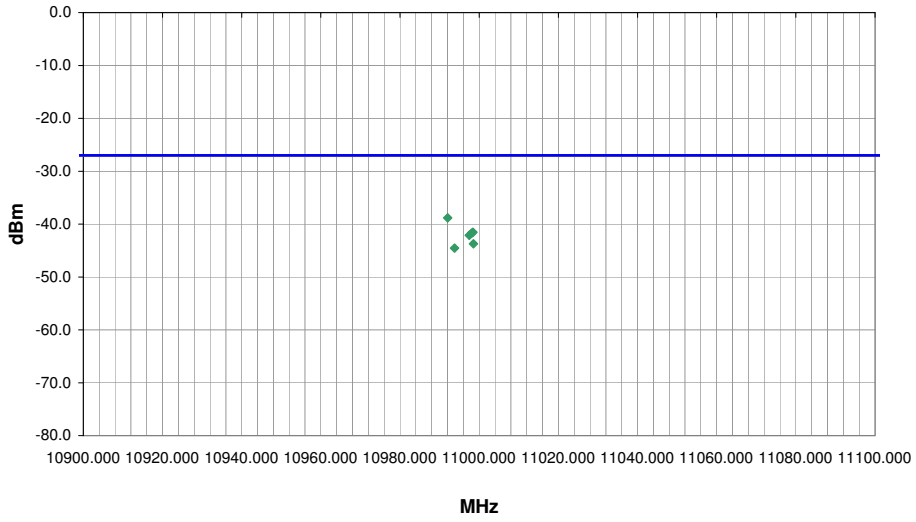
Transmitting 802.11(a), 17 dBm, Channel 100

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	9
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10992.040			306.0	1.0			H-Horn	PK	1.31E-07	-38.8	-27.0	-11.8	6 Mbps, EUT on side, antenna horizontal
10998.420			309.0	1.0			H-Horn	PK	7.03E-08	-41.5	-27.0	-14.5	54 Mbps, EUT on side, antenna horizontal
10998.040			309.0	1.0			H-Horn	PK	6.72E-08	-41.7	-27.0	-14.7	36 Mbps, EUT on side, antenna horizontal
10997.500			253.0	1.0			V-Horn	PK	6.13E-08	-42.1	-27.0	-15.1	6 Mbps, EUT on side, antenna vertcal
10998.540			255.0	1.0			V-Horn	PK	4.24E-08	-43.7	-27.0	-16.7	54 Mbps, EUT on side, antenna vertcal
10993.790			263.0	1.0			V-Horn	PK	3.52E-08	-44.5	-27.0	-17.5	36 Mbps, EUT on side, antenna vertcal

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			**Work Order:**	VERW0034
Serial Number:	M33142-001-0007			**Date:**	03/02/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

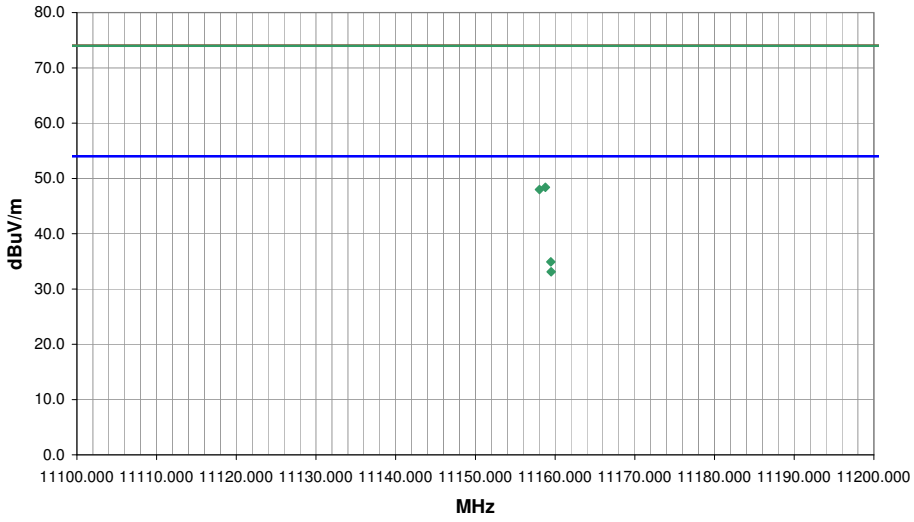
Transmitting 802.11(a), 17 dBm, Channel 116

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	10
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
11159.460	43.8	-8.9	49.0	1.0	3.0	0.0	H-Horn	AV	0.0	34.9	54.0	-19.1	6 Mbps, EUT on side, antenna horizontal
11159.500	42.0	-8.9	269.0	1.0	3.0	0.0	V-Horn	AV	0.0	33.1	54.0	-20.9	6 Mbps, EUT on side, antenna vertical
11158.790	57.3	-8.9	49.0	1.0	3.0	0.0	H-Horn	PK	0.0	48.4	74.0	-25.6	6 Mbps, EUT on side, antenna horizontal
11158.040	56.9	-8.9	269.0	1.0	3.0	0.0	V-Horn	PK	0.0	48.0	74.0	-26.0	6 Mbps, EUT on side, antenna vertical

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			**Work Order:**	VERW0034
Serial Number:	M33142-001-0007			**Date:**	03/02/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

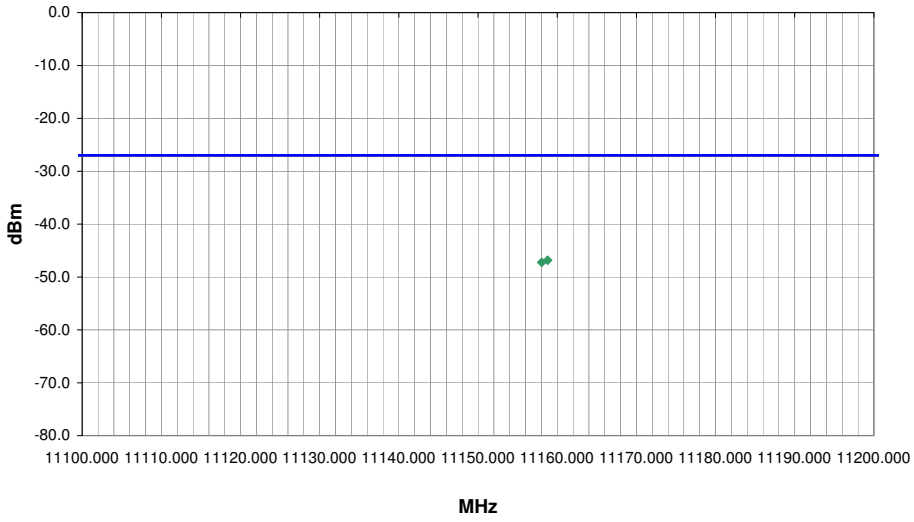
Transmitting 802.11(a), 17 dBm, Channel 116

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	10
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
11158.790			49.0	1.0			H-Horn	PK	2.08E-08	-46.8	-27.0	-19.8	6 Mbps, EUT on side, antenna horizontal
11158.040			269.0	1.0			V-Horn	PK	1.89E-08	-47.2	-27.0	-20.2	6 Mbps, EUT on side, antenna vertical

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			**Work Order:**	VERW0034
Serial Number:	M33142-001-0007			**Date:**	03/02/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

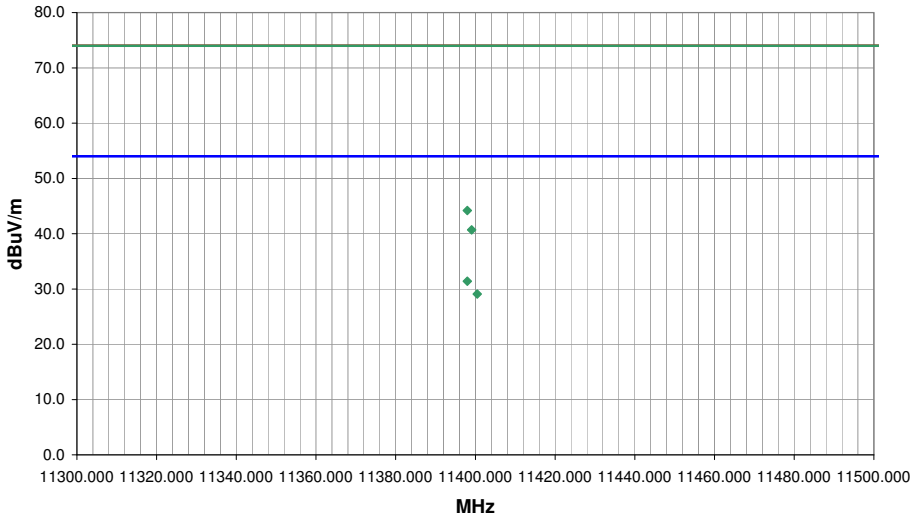
Transmitting 802.11(a), 17 dBm, Channel 116

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
11397.960	38.7	-7.3	56.0	1.0	3.0	0.0	H-Horn	AV	0.0	31.4	54.0	-22.6	6 Mbps, EUT on side, antenna horizontal
11400.460	36.4	-7.3	248.0	1.0	3.0	0.0	V-Horn	AV	0.0	29.1	54.0	-24.9	6 Mbps, EUT on side, antenna vertical
11397.960	51.5	-7.3	56.0	1.0	3.0	0.0	H-Horn	PK	0.0	44.2	74.0	-29.8	6 Mbps, EUT on side, antenna horizontal
11399.040	48.0	-7.3	248.0	1.0	3.0	0.0	V-Horn	PK	0.0	40.7	74.0	-33.3	6 Mbps, EUT on side, antenna vertical

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.4.13

EUT:	WaveDeploy WiFi			**Work Order:**	VERW0034
Serial Number:	M33142-001-0007			**Date:**	03/02/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, Standard antenna

EUT OPERATING MODES

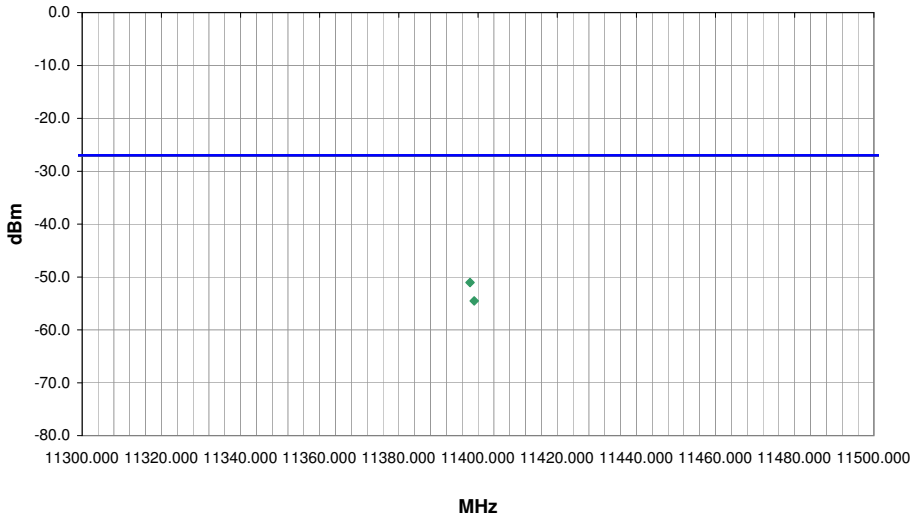
Transmitting 802.11(a), 17 dBm, Channel 116

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11
Results	Pass

Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
11397.960			56.0	1.0			H-Horn	PK	7.89E-09	-51.0	-27.0	-24.0	6 Mbps, EUT on side, antenna horizontal
11399.040			248.0	1.0			V-Horn	PK	3.52E-09	-54.5	-27.0	-27.5	6 Mbps, EUT on side, antenna vertical

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.8.29

EUT:	WF1101			**Work Order:**	VERW0035
Serial Number:	0019E3			**Date:**	03/18/10
Customer:	Veriwave, Inc.			**Temperature:**	22
Attendees:	Brian Denheyer			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	30.15 in
Tested by:	Ethan Schoonover	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.209:2010	ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	**Test Distance (m)**	3

COMMENTS

Ethernet to remote PC, standard antenna.

EUT OPERATING MODES

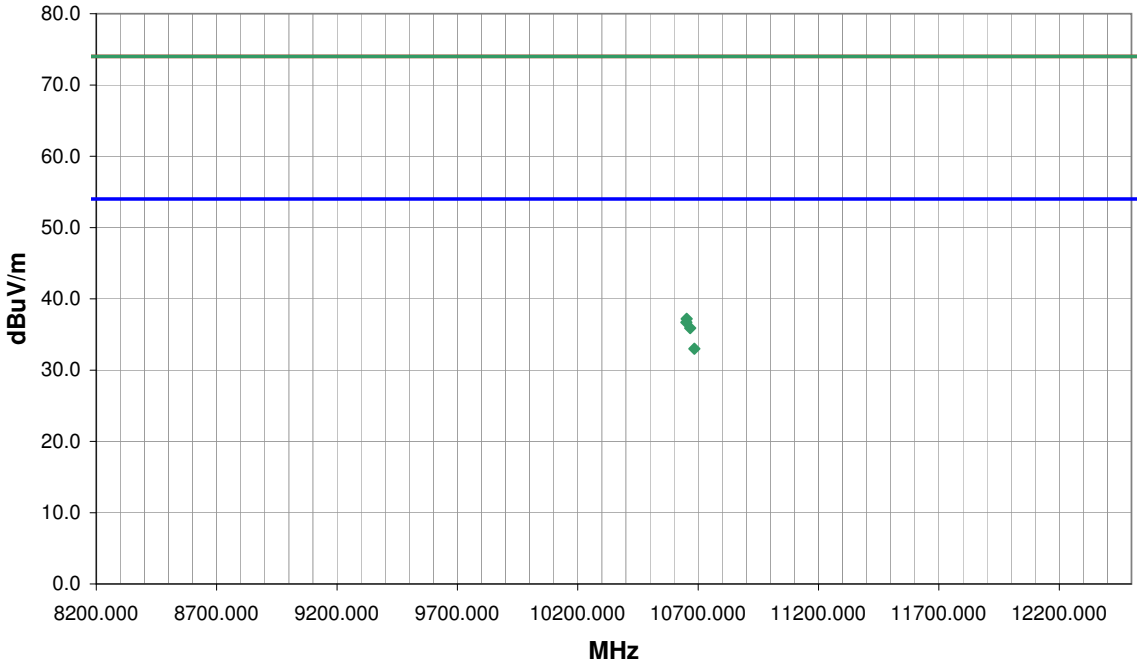
Transmitting 802.11(n), 40 MHz msc=0, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	7
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
10667.000	47.3	-11.4	22.0	1.0	3.0	0.0	H-Horn	AV	0.0	35.9	54.0	-18.1
10684.600	44.4	-11.4	226.0	1.0	3.0	0.0	V-Horn	AV	0.0	33.0	54.0	-21.0
10652.400	48.7	-11.5	226.0	1.0	3.0	0.0	V-Horn	PK	0.0	37.2	74.0	-36.8
10651.300	48.2	-11.5	22.0	1.0	3.0	0.0	H-Horn	PK	0.0	36.7	74.0	-37.3

NORTHWEST EMC

RADIATED EMISSIONS DATA SHEET

PSA 2008.07.21
EMI 2009.8.29

EUT:	WF1101			Work Order:	VERW0035
Serial Number:	0019E3			Date:	03/18/10
Customer:	Veriwave, Inc.			Temperature:	22
Attendees:	Brian Denheyer			Humidity:	38%
Project:	None			Barometric Pres.:	30.15 in
Tested by:	Ethan Schoonover	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2010	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Ethernet to remote PC, standard antenna.

EUT OPERATING MODES

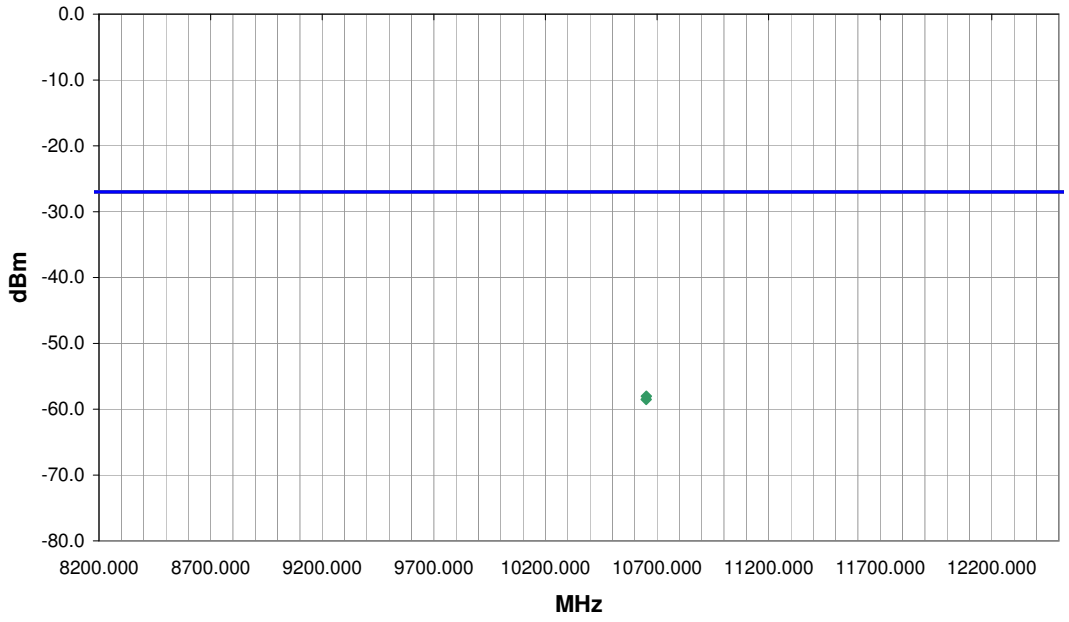
Transmitting 802.11(n), 40 MHz msc=0, 17 dBm, Channel 64

DEVIATIONS FROM TEST STANDARD

No deviations.

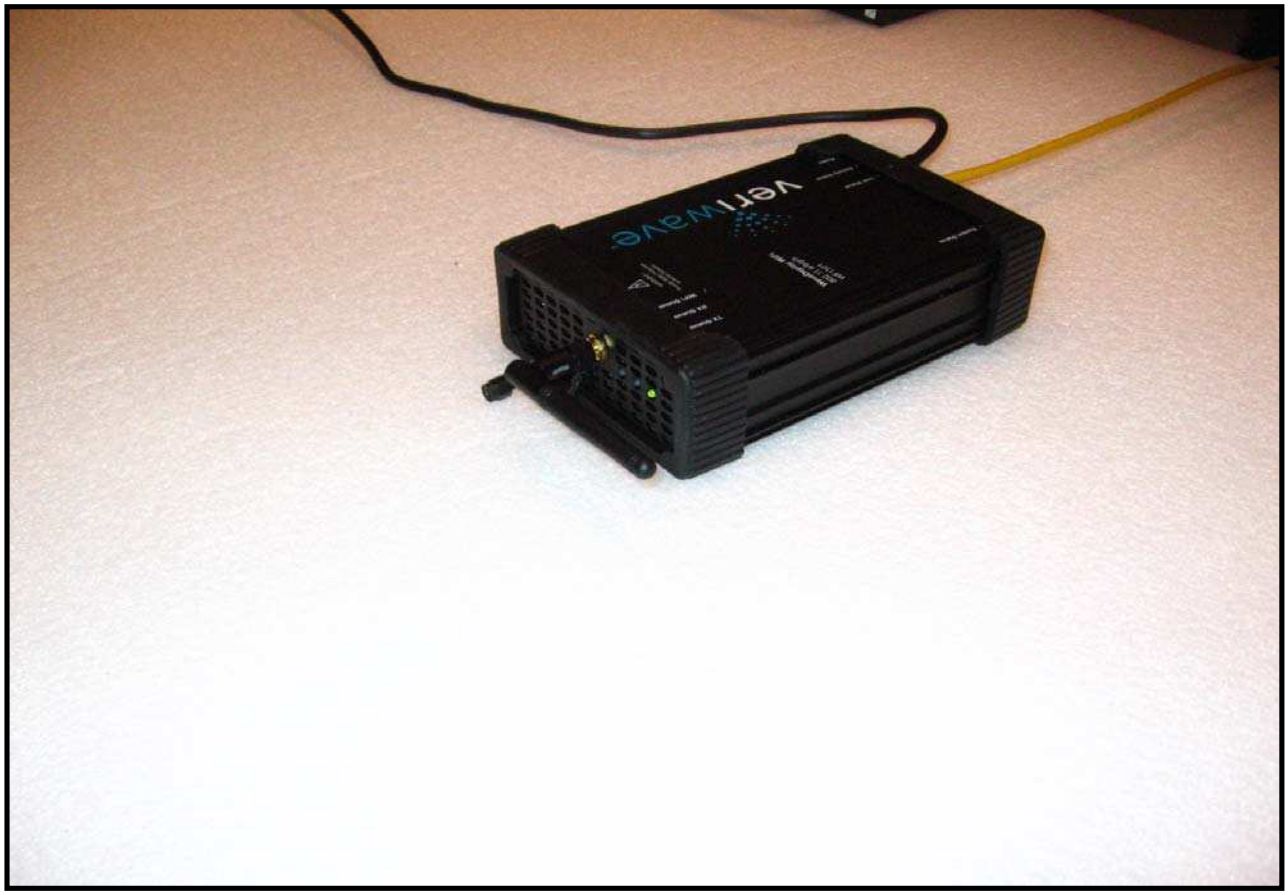
Run #	7
Results	Pass

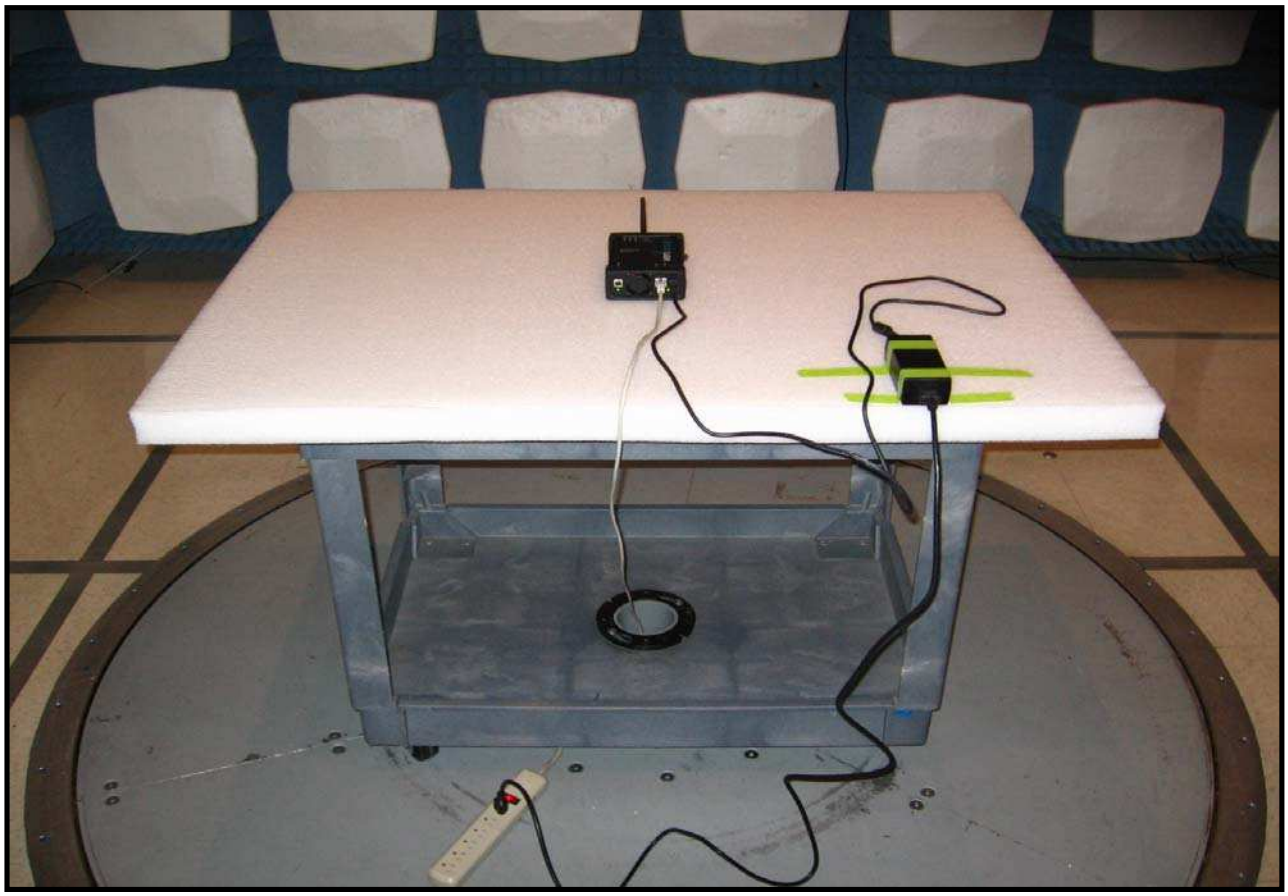
Signature



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10652.400			226.0	1.0			V-Horn	PK	1.57E-09	-58.0	-27.0	-31.0	
10651.300			22.0	1.0			H-Horn	PK	1.40E-09	-58.5	-27.0	-31.5	

NORTHWEST
EMC


VeriWave



NORTHWEST
EMC

RADIATED SPURIOUS EMISSIONS