

FCC 47 CFR PART 15 SUBPART C

Product Type : Wireless Mobile HotSpot
Applicant : Netgear Incorporated
Address : 350 East Plumeria Drive, San Jose, CA 95134
Trade Name : Netgear
Model Number : AirCard 781S
Test Specification : FCC 47 CFR PART 15 SUBPART C: Oct., 2012
ANSI C63.4-2009
Receive Date : Aug. 09, 2013
Test Period : Aug. 21 ~ Sep. 02, 2013
Issue Date : Oct. 01, 2013

Issue by

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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Sep. 16, 2013	Initial Issue	
01	Oct. 01, 2013	Revised report information.	Joyce Liao

Verification of Compliance

Issued Date: 10/01/2013

Product Type : Wireless Mobile HotSpot

Applicant : Netgear Incorporated

Address : 350 East Plumeria Drive, San Jose, CA 95134

Trade Name : Netgear

Model Number : AirCard 781S

FCC ID : PY3AC781S

Applicable Standard : FCC 47 CFR PART 15 SUBPART C: Oct., 2012
ANSI C63.4-2009

Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
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<http://www.atl-lab.com.tw/e-index.htm>



The above equipment was tested by A Test Lab Techno Corp. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247 .

The test results of this report relate only to the tested sample identified in this report.

Approved By : Cran Yang Reviewed By : Fly Lu
(Manager) (Cran Yang) (Testing Engineer) (Fly Lu)

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1 General Information

1.1 Summary of Test Result

Standard		Item	Result	Remark
15.247	RSS-GEN			
15.207	7.2.2	AC Power Conducted Emission	PASS	-----
Standard		Item	Result	Remark
15.247	RSS-210			
15.247(d)	A8.5	Transmitter Radiated Emissions	PASS	-----
15.247(b)(3)	A8.4	Max. Output Power	PASS	-----
15.247(a)(2)	A8.2 (a)	6dB RF Bandwidth	PASS	-----
15.247(e)	A8.2 (b)	Power Spectral Density	PASS	-----
15.247(c)	A8.5	Out of Band Conducted Spurious Emission	PASS	-----
15.247(d)	A8.5	Band Edge Measurement	PASS	-----
15.247(c)	A8.5	Occupied Bandwidth Measurement	PASS	-----
15.203	-	Antenna Requirement	PASS	-----

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2 Measurement Uncertainty

Item	Frequency Range		Uncertainty (dB)
AC Power Conducted Emission	9kHz ~ 30MHz		± 2.020
Radiated Emissions	30MHz ~ 230MHz	Horizontal	± 3.960
		Vertical	± 3.570
	230MHz ~ 1000MHz	Horizontal	± 3.960
		Vertical	± 3.570
	1000MHz ~ 18000MHz	Horizontal	± 3.072
		Vertical	± 3.028
	18000MHz ~ 40000MHz	Horizontal	± 3.622
		Vertical	± 3.506

2 EUT Description

Product Type	Wireless Mobile HotSpot
Trade Name	Netgear
Model No.	AirCard 781S
Applicant	Netgear Incorporated 350 East Plumeria Drive, San Jose, CA 95134
Manufacturer	Netgear Incorporated 350 East Plumeria Drive, San Jose, CA 95134
FCC ID	PY3AC781S
Frequency Range	IEEE 802.11b / 802.11g / 802.11n 2.4GHz 20MHz: 2412 ~ 2462 MHz IEEE 802.11a / IEEE 802.11n 5 GHz U-NII Band IV: 5745 ~ 5825 MHz
Modulation Type	IEEE 802.11b:DSSS IEEE 802.11g:DSSS + OFDM IEEE 802.11n 2.4GHz / IEEE 802.11a / IEEE 802.11n 5 GHz U-NII Band IV: OFDM
Antenna Type	Chip dielectric antennas
Antenna Gain	IEEE 802.11b / 802.11g / 802.11n 2.4GHz 20MHz:: 1 dBi IEEE 802.11a / IEEE 802.11n 5 GHz U-NII Band IV: 0 dBi
RF Output Power	IEEE 802.11b: 0.026 W / 14.10 dBm IEEE 802.11g: 0.144 W / 21.60 dBm IEEE 802.11n 2.4GHz 20MHz: 0.141 W / 21.50 dBm IEEE 802.11a U-NII Band IV: 0.061 W / 17.84 dBm IEEE 802.11n U-NII Band IV 20MHz: 0.063 W / 17.99 dBm IEEE 802.11n U-NII Band IV 40MHz: 0.059 W / 17.74 dBm
99 % Occupied Bandwidth	IEEE 802.11b: 12.43 MHz IEEE 802.11g: 16.51 MHz IEEE 802.11n 2.4GHz 20MHz: 17.75 MHz IEEE 802.11a U-NII Band IV: 16.54 MHz IEEE 802.11n U-NII Band IV 20MHz: 17.80 MHz IEEE 802.11n U-NII Band IV 40MHz: 36.06 MHz
Emission Designator	IEEE 802.11b: 12M4G7D IEEE 802.11g: 16M5G7D IEEE 802.11n 2.4GHz 20MHz: 17M8G7D IEEE 802.11a U-NII Band IV: 16M5G7D IEEE 802.11n U-NII Band IV 20MHz: 17M8G7D IEEE 802.11n U-NII Band IV 40MHz: 36M0G7D

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Normal Operation Mode
Mode 2: IEEE 802.11b Link Mode
Mode 3: IEEE 802.11g Link Mode
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode
Mode 5: IEEE 802.11a U-NII Band IV Link Mode
Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode
Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

IEEE 802.11b mode (ANT1+ANT2):

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode (ANT1+ANT2):

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n 2.4GHz 20MHz mode (ANT1+ANT2):

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11a mode / 5745 ~ 5825MHz (ANT1+ANT2):

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n U-NII Band IV 20MHz mode / 5745 ~ 5825MHz (ANT1+ANT2):

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6.5Mbps data rate were chosen for full testing.

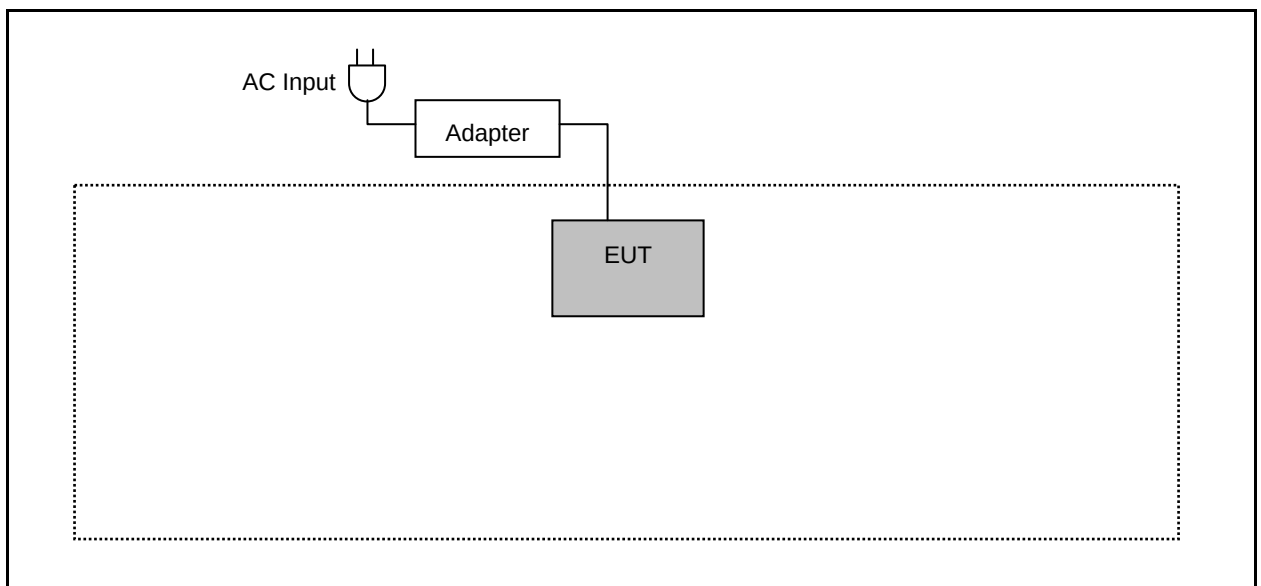
IEEE 802.11n U-NII Band IV 40MHz mode / 5755 ~ 5795MHz (ANT1+ANT2):

Channel Low (5755MHz) and Channel High (5795MHz) with 13.5Mbps data rate were chosen for full testing.

3.2. EUT Exercise Software

1.	Setup the EUT shown on 3.3.
2.	Turn on the power of all equipment.
3.	Turn on EUT Wi-Fi function and connect to the Notebook and data will communicate between Notebook through EUT.
4.	The EUT will start to operate function.

3.3. Configuration of Test System Details



3.4. Test Site Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Conducted Emission Measurement

4.1. Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

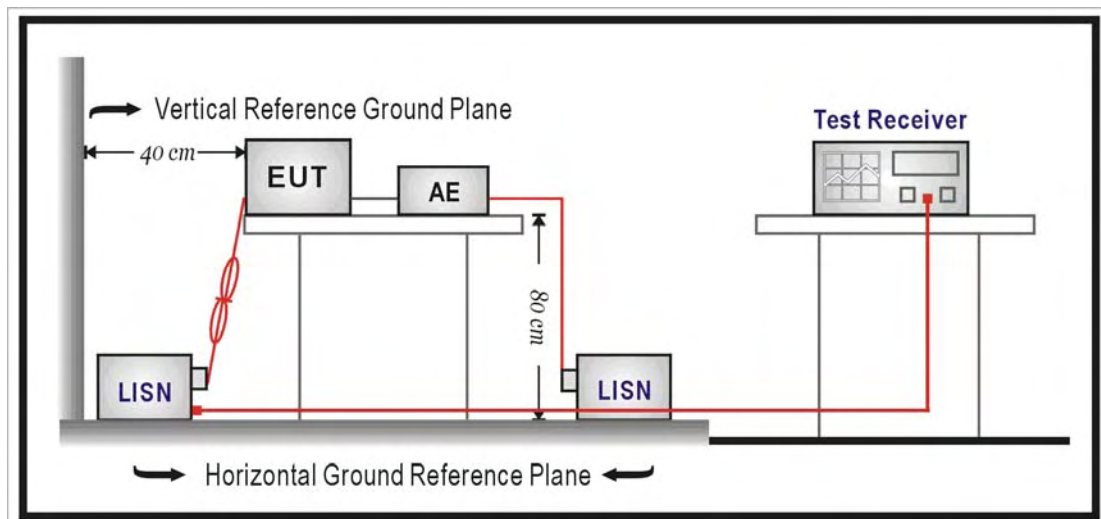
4.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/06/2013	(1)
LISN	R&S	ENV216	101040	03/04/2013	(1)
LISN	R&S	ENV216	101041	03/04/2013	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

4.3. Test Setup



4.4. Test Procedure

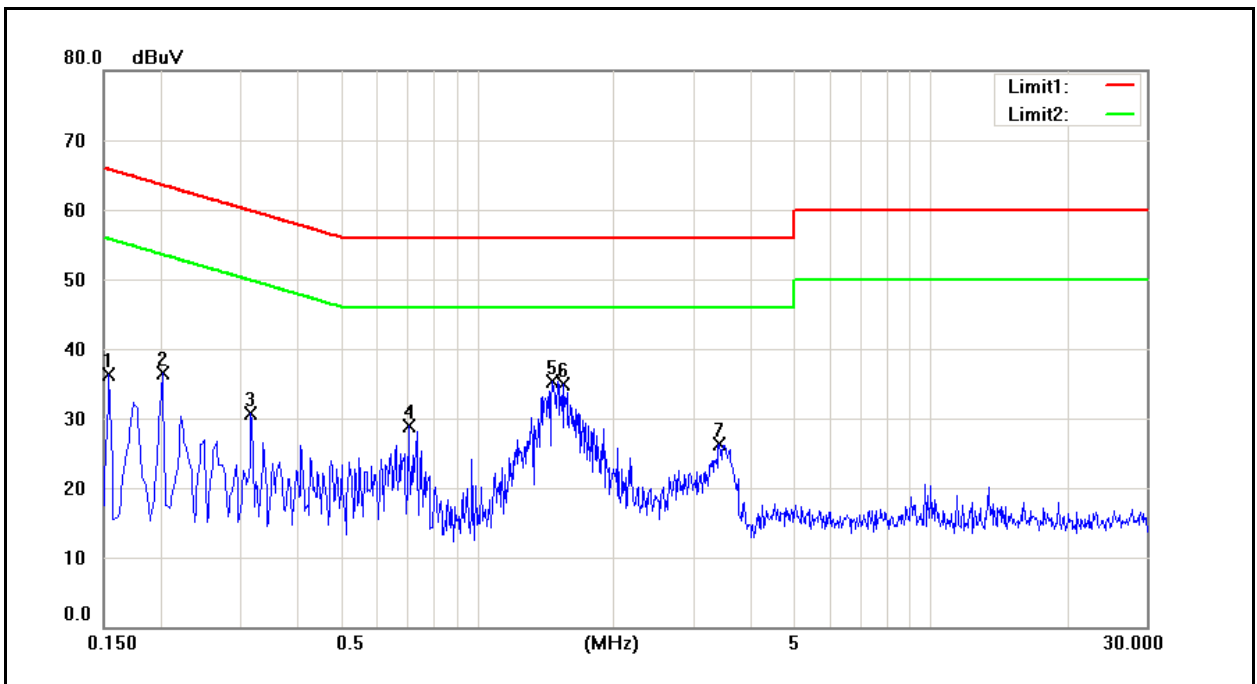
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and EMCO Model 3162/2 SH Line Impedance Stabilization Networks (LISN). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.1.

4.5. Test Result

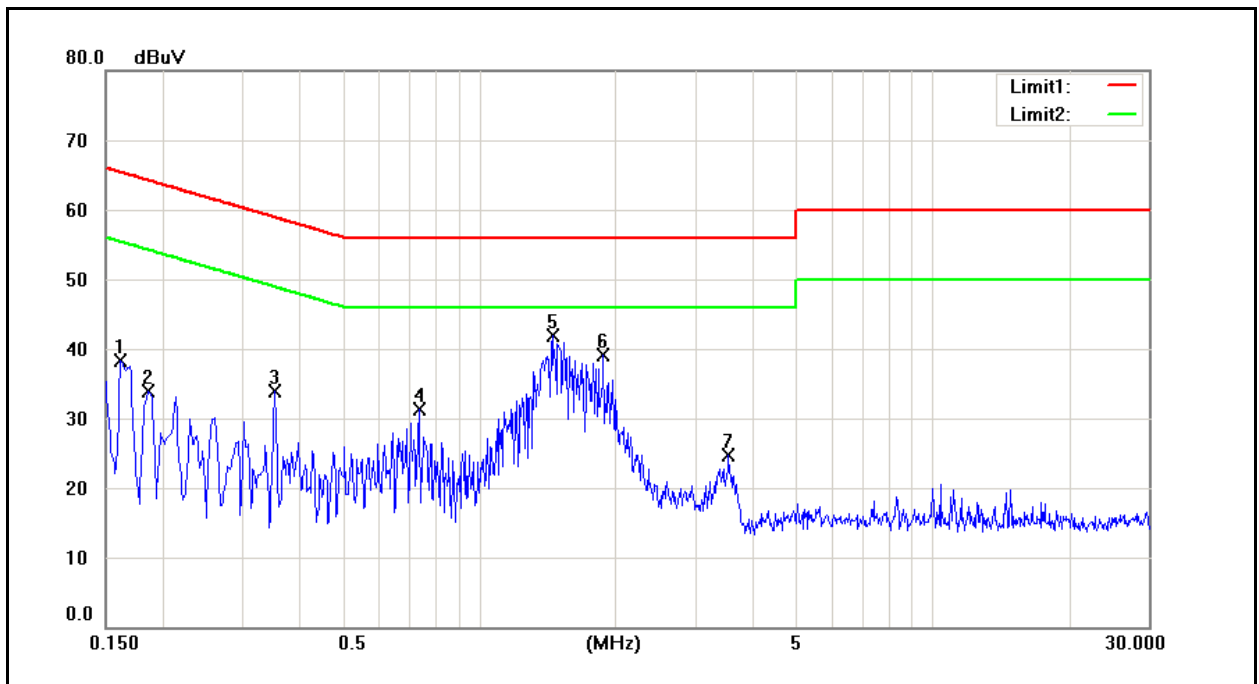
Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	08/21/2013
		Test By:	Fly Lu
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1540	20.92	8.23	9.62	30.54	17.85	65.78	55.78	-35.24	-37.93	Pass
2	0.2020	15.32	6.99	9.62	24.94	16.61	63.53	53.53	-38.59	-36.92	Pass
3	0.3180	8.50	1.24	9.62	18.12	10.86	59.76	49.76	-41.64	-38.90	Pass
4	0.7060	14.75	9.04	9.64	24.39	18.68	56.00	46.00	-31.61	-27.32	Pass
5	1.4660	19.17	10.66	9.68	28.85	20.34	56.00	46.00	-27.15	-25.66	Pass
6	1.5580	12.85	9.65	9.68	22.53	19.33	56.00	46.00	-33.47	-26.67	Pass
7	3.4180	13.04	6.63	9.72	22.76	16.35	56.00	46.00	-33.24	-29.65	Pass

Standard:	FCC Part 15C	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	1	Date:	08/21/2013
		Test By:	Fly Lu

Description:



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	20.42	3.42	9.63	30.05	13.05	65.36	55.36	-35.31	-42.31	Pass
2	0.1860	17.49	9.32	9.63	27.12	18.95	64.21	54.21	-37.09	-35.26	Pass
3	0.3540	13.29	7.87	9.63	22.92	17.50	58.87	48.87	-35.95	-31.37	Pass
4	0.7380	18.29	11.92	9.64	27.93	21.56	56.00	46.00	-28.07	-24.44	Pass
5	1.4500	21.13	16.05	9.67	30.80	25.72	56.00	46.00	-25.20	-20.28	Pass
6	1.8820	23.65	14.11	9.70	33.35	23.81	56.00	46.00	-22.65	-22.19	Pass
7	3.5620	7.73	2.12	9.73	17.46	11.85	56.00	46.00	-38.54	-34.15	Pass

5 Radiated Emission Measurement

5.1. Limit

According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at meter)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

5.2. Test Instruments

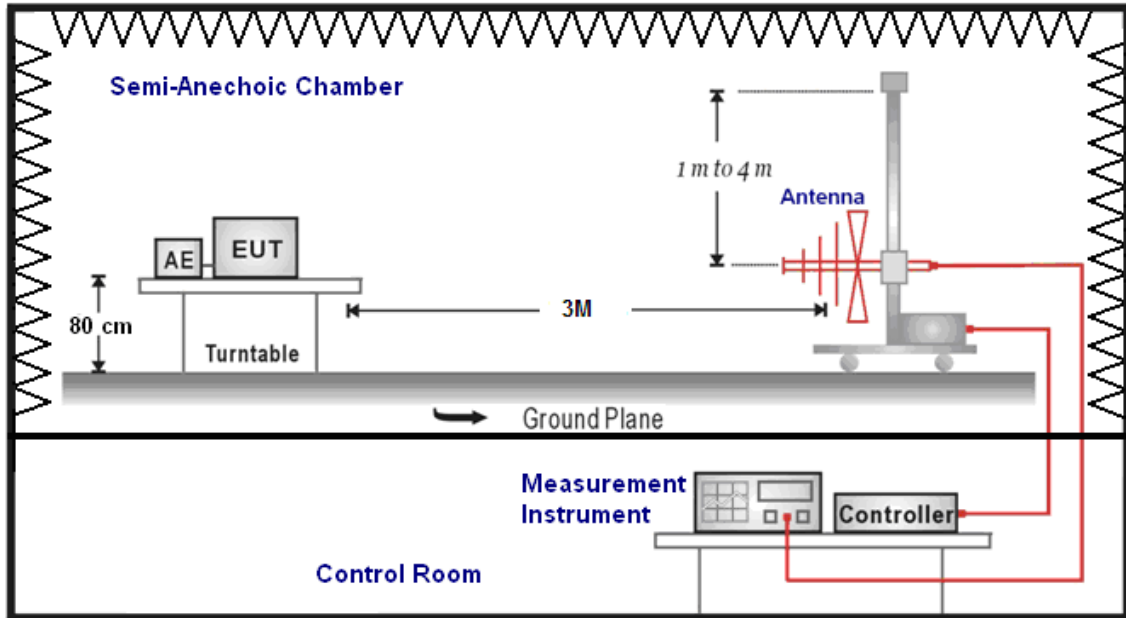
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/16/2012	(2)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2013	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2013	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/16/2013	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2013	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2013	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	08/14/2012	(3)
Test Site	ATL	TE01	888001	08/27/2013	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

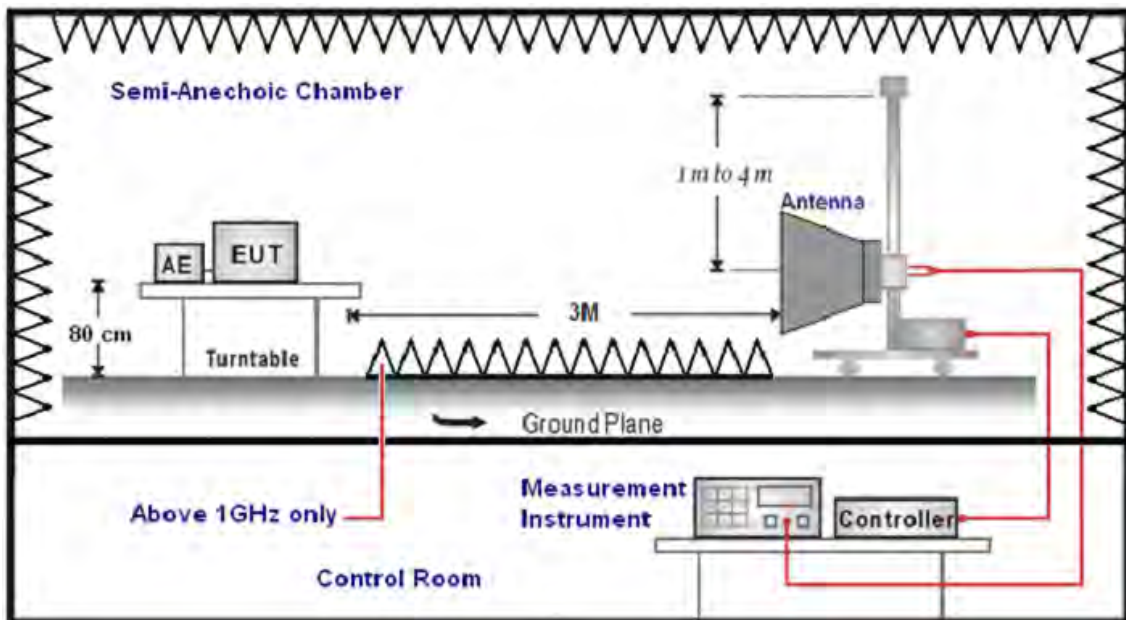
Note: N.C.R. = No Calibration Request.

5.3. Setup

Below 1GHz



Above 1GHz



5.4. Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna (model VULB9163) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 – 26.5 GHz at a distance of 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts per meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro volts per meter (dBuV/m).

The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) $\text{Amplitude (dBuV/m)} = \text{FI (dBuV)} + \text{AF (dBuV)} + \text{CL (dBuV)} - \text{Gain (dB)}$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

(2) $\text{Actual Amplitude (dBuV/m)} = \text{Amplitude (dBuV)} - \text{Dis(dB)}$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5.5. Test Result

Below 1GHz

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		AirCard 781S		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		1		Date:		08/31/2013	
				Test By:		Fly Lu	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
113.0000	28.23	-14.87	13.36	43.50	-30.14	QP	H
272.0000	31.61	-11.48	20.13	46.00	-25.87	QP	H
406.5000	26.45	-8.53	17.92	46.00	-28.08	QP	H
557.0000	27.22	-6.37	20.85	46.00	-25.15	QP	H
690.5000	27.10	-3.77	23.33	46.00	-22.67	QP	H
928.5000	26.60	0.80	27.40	46.00	-18.60	QP	H
93.0000	34.77	-15.38	19.39	43.50	-24.11	QP	V
230.0000	26.62	-12.66	13.96	46.00	-32.04	QP	V
393.5000	24.89	-8.61	16.28	46.00	-29.72	QP	V
551.5000	26.17	-6.52	19.65	46.00	-26.35	QP	V
700.0000	24.93	-3.69	21.24	46.00	-24.76	QP	V
898.0000	24.25	0.35	24.60	46.00	-21.40	QP	V

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

Above 1GHz

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	2			Date:	08/31/2013		
Frequency:	2412MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3051.000	36.81	6.02	42.83	74.00	-31.17	peak	H
4824.000	38.66	11.71	50.37	74.00	-23.63	peak	H
6397.000	33.01	17.10	50.11	74.00	-23.89	peak	H
2925.000	36.08	5.72	41.80	74.00	-32.20	peak	V
4824.000	40.17	11.71	51.88	74.00	-22.12	peak	V
6411.000	33.27	17.14	50.41	74.00	-23.59	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	2			Date:	08/31/2013		
Frequency:	2437MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2897.000	36.63	5.64	42.27	74.00	-31.73	peak	H
4874.000	37.38	11.84	49.22	74.00	-24.78	peak	H
6250.000	32.61	16.64	49.25	74.00	-24.75	peak	H
2918.000	36.87	5.70	42.57	74.00	-31.43	peak	V
4874.000	39.76	11.84	51.60	74.00	-22.40	peak	V
6390.000	32.98	17.08	50.06	74.00	-23.94	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	2			Date:	08/31/2013		
Frequency:	2462MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3065.000	37.18	6.06	43.24	74.00	-30.76	peak	H
4924.000	37.69	11.97	49.66	74.00	-24.34	peak	H
6334.000	32.76	16.90	49.66	74.00	-24.34	peak	H
3093.000	38.16	6.11	44.27	74.00	-29.73	peak	V
4924.000	43.42	11.97	55.39	74.00	-18.61	peak	V
4924.000	39.67	11.97	51.64	54.00	-2.36	AVG	V
6250.000	32.27	16.64	48.91	74.00	-25.09	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	3			Date:	08/31/2013		
Frequency:	2412MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2946.000	36.70	5.76	42.46	74.00	-31.54	peak	H
4577.000	35.27	11.07	46.34	74.00	-27.66	peak	H
6383.000	33.35	17.06	50.41	74.00	-23.59	peak	H
3030.000	37.29	5.97	43.26	74.00	-30.74	peak	V
4824.000	38.21	11.71	49.92	74.00	-24.08	peak	V
6390.000	32.02	17.08	49.10	74.00	-24.90	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	3			Date:	08/31/2013		
Frequency:	2437MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2862.000	37.91	5.55	43.46	74.00	-30.54	peak	H
4682.000	36.19	11.34	47.53	74.00	-26.47	peak	H
6215.000	34.09	16.54	50.63	74.00	-23.37	peak	H
2974.000	37.13	5.84	42.97	74.00	-31.03	peak	V
4874.000	39.16	11.84	51.00	74.00	-23.00	peak	V
6369.000	32.61	17.00	49.61	74.00	-24.39	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	3			Date:	08/31/2013		
Frequency:	2462MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2869.000	35.81	5.57	41.38	74.00	-32.62	peak	H
4591.000	34.62	11.11	45.73	74.00	-28.27	peak	H
6390.000	32.46	17.08	49.54	74.00	-24.46	peak	H
2897.000	36.90	5.64	42.54	74.00	-31.46	peak	V
4924.000	37.54	11.97	49.51	74.00	-24.49	peak	V
6369.000	32.99	17.00	49.99	74.00	-24.01	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	4			Date:	08/31/2013		
Frequency:	2412MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2918.000	36.06	5.70	41.76	74.00	-32.24	peak	H
4563.000	34.58	11.05	45.63	74.00	-28.37	peak	H
6369.000	33.34	17.00	50.34	74.00	-23.66	peak	H
2953.000	36.07	5.79	41.86	74.00	-32.14	peak	V
4824.000	38.30	11.71	50.01	74.00	-23.99	peak	V
6383.000	32.52	17.06	49.58	74.00	-24.42	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	4			Date:	08/31/2013		
Frequency:	2437MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3023.000	36.38	5.96	42.34	74.00	-31.66	peak	H
4874.000	37.71	11.84	49.55	74.00	-24.45	peak	H
6397.000	32.53	17.10	49.63	74.00	-24.37	peak	H
2974.000	36.40	5.84	42.24	74.00	-31.76	peak	V
4874.000	37.69	11.84	49.53	74.00	-24.47	peak	V
6355.000	32.87	16.97	49.84	74.00	-24.16	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	4			Date:	08/31/2013		
Frequency:	2462MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2869.000	35.93	5.57	41.50	74.00	-32.50	peak	H
4577.000	34.16	11.07	45.23	74.00	-28.77	peak	H
6369.000	32.39	17.00	49.39	74.00	-24.61	peak	H
2953.000	36.71	5.79	42.50	74.00	-31.50	peak	V
4924.000	37.47	11.97	49.44	74.00	-24.56	peak	V
6383.000	32.74	17.06	49.80	74.00	-24.20	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	5			Date:	08/31/2013		
Frequency:	5745MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2862.000	36.89	5.55	42.44	74.00	-31.56	peak	H
4549.000	34.48	11.01	45.49	74.00	-28.51	peak	H
6390.000	32.51	17.08	49.59	74.00	-24.41	peak	H
3002.000	37.89	5.91	43.80	74.00	-30.20	peak	V
4570.000	34.73	11.06	45.79	74.00	-28.21	peak	V
6390.000	32.71	17.08	49.79	74.00	-24.21	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	5			Date:	08/31/2013		
Frequency:	5785MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2715.000	37.93	5.17	43.10	74.00	-30.90	peak	H
4570.000	34.21	11.06	45.27	74.00	-28.73	peak	H
6383.000	33.88	17.06	50.94	74.00	-23.06	peak	H
2722.000	37.16	5.19	42.35	74.00	-31.65	peak	V
4591.000	35.74	11.11	46.85	74.00	-27.15	peak	V
6369.000	32.62	17.00	49.62	74.00	-24.38	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	5			Date:	08/31/2013		
Frequency:	5825MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2771.000	37.67	5.32	42.99	74.00	-31.01	peak	H
4591.000	34.67	11.11	45.78	74.00	-28.22	peak	H
6334.000	33.09	16.90	49.99	74.00	-24.01	peak	H
2939.000	35.89	5.75	41.64	74.00	-32.36	peak	V
4591.000	34.66	11.11	45.77	74.00	-28.23	peak	V
6439.000	33.46	17.22	50.68	74.00	-23.32	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	6			Date:	08/31/2013		
Frequency:	5745MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2813.000	36.51	5.42	41.93	74.00	-32.07	peak	H
4563.000	33.57	11.05	44.62	74.00	-29.38	peak	H
6467.000	32.75	17.31	50.06	74.00	-23.94	peak	H
2995.000	38.19	5.90	44.09	74.00	-29.91	peak	V
4591.000	34.37	11.11	45.48	74.00	-28.52	peak	V
6411.000	31.81	17.14	48.95	74.00	-25.05	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	6			Date:	08/31/2013		
Frequency:	5785MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2771.000	36.78	5.32	42.10	74.00	-31.90	peak	H
4570.000	34.73	11.06	45.79	74.00	-28.21	peak	H
6411.000	32.99	17.14	50.13	74.00	-23.87	peak	H
2834.000	37.54	5.48	43.02	74.00	-30.98	peak	V
4549.000	34.65	11.01	45.66	74.00	-28.34	peak	V
6271.000	33.22	16.71	49.93	74.00	-24.07	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	6			Date:	08/31/2013		
Frequency:	5825MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3051.000	36.49	6.02	42.51	74.00	-31.49	peak	H
4577.000	34.97	11.07	46.04	74.00	-27.96	peak	H
6439.000	33.29	17.22	50.51	74.00	-23.49	peak	H
3002.000	38.50	5.91	44.41	74.00	-29.59	peak	V
4577.000	34.56	11.07	45.63	74.00	-28.37	peak	V
6502.000	33.41	17.42	50.83	74.00	-23.17	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	7			Date:	08/31/2013		
Frequency:	5755MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2911.000	37.31	5.68	42.99	74.00	-31.01	peak	H
4619.000	35.23	11.19	46.42	74.00	-27.58	peak	H
6299.000	33.65	16.80	50.45	74.00	-23.55	peak	H
2883.000	37.03	5.61	42.64	74.00	-31.36	peak	V
4598.000	34.37	11.14	45.51	74.00	-28.49	peak	V
6411.000	33.36	17.14	50.50	74.00	-23.50	peak	V

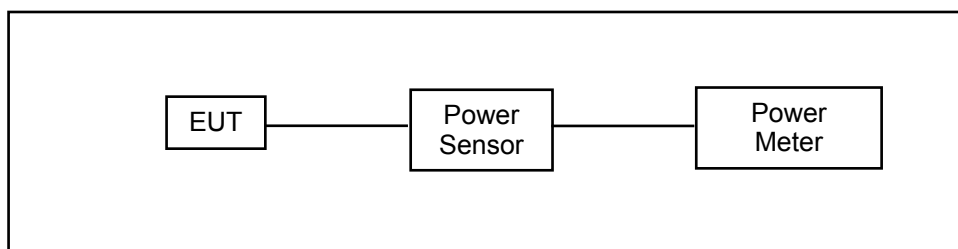
Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	AirCard 781S			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	7			Date:	08/31/2013		
Frequency:	5795MHz			Test By:	Fly Lu		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2981.000	36.74	5.86	42.60	74.00	-31.40	peak	H
4633.000	34.18	11.22	45.40	74.00	-28.60	peak	H
6390.000	32.07	17.08	49.15	74.00	-24.85	peak	H
2981.000	35.71	5.86	41.57	74.00	-32.43	peak	V
4598.000	34.89	11.14	46.03	74.00	-27.97	peak	V
6369.000	31.87	17.00	48.87	74.00	-25.13	peak	V

6 Maximum Conducted Output Power Measurement

6.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm.

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/19/2012	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/19/2012	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

6.4. Test Procedure

Measure and sum the conducted power levels measured at the various output ports as followed the section E)1 of KDB 662911 D01 Multiple Transmitter Output v02

The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor. The maximum peak output power shall not exceed 1 watt.

Use a direct connection between the antenna port of transmitter and the power sensor, for prevent the power sensor input attenuation 40-50 dB. Set the RBW Bandwidth of the emission or use a channel power meter mode.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm.

The antenna port of the EUT was connected to the input of a power sensor. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.



6.5. Test Result

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 2: IEEE 802.11b Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	1 M	7.58	0.006	4.95	0.003	9.47	0.009	11.92	0.016	10.07	0.010	14.10	0.026	< 30
2437		7.37	0.005	4.14	0.003	9.06	0.008	11.56	0.014	7.93	0.006	13.12	0.021	< 30
2462		7.93	0.006	3.39	0.002	9.24	0.008	11.78	0.015	6.35	0.004	12.87	0.019	< 30
2437	2 M	7.36	0.005	4.11	0.003	9.04	0.008	11.51	0.014	7.67	0.006	13.01	0.020	< 30
2437	5.5 M	7.35	0.005	4.08	0.003	9.03	0.008	11.48	0.014	7.54	0.006	12.95	0.020	< 30
2437	11 M	7.33	0.005	4.04	0.003	9.00	0.008	11.47	0.014	7.33	0.005	12.89	0.019	< 30

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 3: IEEE 802.11g Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	6 M	8.56	0.007	4.98	0.003	10.14	0.010	20.42	0.110	15.35	0.034	21.60	0.144	< 30
2437		8.22	0.007	4.55	0.003	9.77	0.009	18.69	0.074	14.81	0.030	20.18	0.104	< 30
2462		8.14	0.007	4.33	0.003	9.65	0.009	18.60	0.072	14.69	0.029	20.08	0.102	< 30
2437	9 M	8.19	0.007	4.53	0.003	9.74	0.009	18.43	0.070	14.76	0.030	19.98	0.100	< 30
2437	12 M	8.15	0.007	4.49	0.003	9.70	0.009	18.58	0.072	14.56	0.029	20.03	0.101	< 30
2437	18 M	8.13	0.007	4.47	0.003	9.68	0.009	18.52	0.071	14.64	0.029	20.01	0.100	< 30
2437	24 M	8.10	0.006	4.45	0.003	9.66	0.009	18.66	0.073	14.52	0.028	20.08	0.102	< 30
2437	36 M	8.08	0.006	4.42	0.003	9.63	0.009	18.61	0.073	14.40	0.028	20.01	0.100	< 30
2437	48 M	8.09	0.006	4.39	0.003	9.63	0.009	18.63	0.073	14.25	0.027	19.98	0.100	< 30
2437	54 M	8.05	0.006	4.37	0.003	9.60	0.009	18.42	0.070	14.11	0.026	19.79	0.095	< 30

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	6.5 M	8.33	0.007	4.85	0.003	9.94	0.010	20.06	0.101	14.72	0.030	21.17	0.131	< 30
2437		8.18	0.007	4.48	0.003	9.72	0.009	19.73	0.094	14.47	0.028	20.86	0.122	< 30
2462		8.28	0.007	4.93	0.003	9.93	0.010	20.43	0.110	14.87	0.031	21.50	0.141	< 30
2437	13 M	8.16	0.007	4.45	0.003	9.70	0.009	19.67	0.093	14.36	0.027	20.79	0.120	< 30
2437	19.5 M	8.13	0.007	4.40	0.003	9.66	0.009	19.45	0.088	14.15	0.026	20.57	0.114	< 30
2437	26 M	8.11	0.006	4.43	0.003	9.66	0.009	19.39	0.087	14.27	0.027	20.55	0.114	< 30
2437	39 M	8.09	0.006	4.37	0.003	9.63	0.009	19.21	0.083	13.83	0.024	20.32	0.108	< 30
2437	52 M	8.07	0.006	4.41	0.003	9.62	0.009	19.17	0.083	13.51	0.022	20.21	0.105	< 30
2437	58.5 M	8.05	0.006	4.38	0.003	9.60	0.009	19.11	0.081	13.63	0.023	20.19	0.105	< 30
2437	65 M	8.06	0.006	4.35	0.003	9.60	0.009	19.12	0.082	13.47	0.022	20.17	0.104	< 30

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 5: IEEE 802.11a U-NII Band IV Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5745	6 M	6.24	0.004	0.32	0.001	7.23	0.005	16.47	0.044	11.43	0.014	17.65	0.058	< 30
5765		6.38	0.004	-0.02	0.001	7.28	0.005	16.55	0.045	10.90	0.012	17.60	0.057	< 30
5785		6.15	0.004	0.59	0.001	7.22	0.005	16.42	0.044	11.31	0.014	17.59	0.057	< 30
5805		6.33	0.004	0.61	0.001	7.36	0.005	16.61	0.046	11.76	0.015	17.84	0.061	< 30
5825		6.47	0.004	0.19	0.001	7.39	0.005	16.62	0.046	11.28	0.013	17.73	0.059	< 30
5745	54 M	6.30	0.004	0.22	0.001	7.26	0.005	16.40	0.044	10.70	0.012	17.44	0.055	< 30
5765		6.41	0.004	0.38	0.001	7.38	0.005	16.53	0.045	11.15	0.013	17.64	0.058	< 30
5785		6.13	0.004	0.49	0.001	7.18	0.005	16.58	0.045	11.50	0.014	17.75	0.060	< 30
5805		6.29	0.004	0.51	0.001	7.31	0.005	16.60	0.046	11.59	0.014	17.79	0.060	< 30
5825		6.46	0.004	0.07	0.001	7.36	0.005	16.61	0.046	10.48	0.011	17.56	0.057	< 30

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5745	6.5 M	6.29	0.004	0.37	0.001	7.28	0.005	16.31	0.043	11.80	0.015	17.63	0.058	< 30
5765		6.38	0.004	0.48	0.001	7.37	0.005	16.65	0.046	11.52	0.014	17.81	0.060	< 30
5785		6.28	0.004	0.38	0.001	7.27	0.005	16.35	0.043	12.06	0.016	17.72	0.059	< 30
5805		6.29	0.004	0.58	0.001	7.32	0.005	16.38	0.043	11.42	0.014	17.58	0.057	< 30
5825		6.39	0.004	0.61	0.001	7.41	0.006	16.55	0.045	12.51	0.018	17.99	0.063	< 30
5745	65 M	6.18	0.004	0.15	0.001	7.15	0.005	16.38	0.043	12.11	0.016	17.76	0.060	< 30
5765		6.27	0.004	0.17	0.001	7.22	0.005	16.45	0.044	11.16	0.013	17.58	0.057	< 30
5785		6.01	0.004	0.12	0.001	7.01	0.005	16.11	0.041	11.09	0.013	17.30	0.054	< 30
5805		6.15	0.004	0.27	0.001	7.15	0.005	16.27	0.042	11.23	0.013	17.45	0.056	< 30
5825		6.31	0.004	0.22	0.001	7.27	0.005	16.59	0.046	11.35	0.014	17.73	0.059	< 30

Model Number	AirCard 781S													
Test Item	Maximum Conducted Output Power													
Test Mode	Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode													
Date of Test	08/21/2013										Test Site		TE05	
Frequency (MHz)	Data Rate	Average Power						Peak Power						Limit (dBm)
		ANT1		ANT2		ANT1+ANT2		ANT1		ANT2		ANT1+ANT2		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5755	13.5 M	6.17	0.004	0.31	0.001	7.17	0.005	16.54	0.045	11.35	0.014	17.69	0.059	< 30
5795		6.07	0.004	0.36	0.001	7.10	0.005	16.45	0.044	11.85	0.015	17.74	0.059	< 30
5755	135 M	6.13	0.004	0.25	0.001	7.13	0.005	16.51	0.045	10.79	0.012	17.54	0.057	< 30
5795		6.02	0.004	-0.01	0.001	6.99	0.005	16.42	0.044	10.36	0.011	17.38	0.055	< 30

7 6dB RF Bandwidth & 99 % Occupied Bandwidth Measurement

7.1. Limit

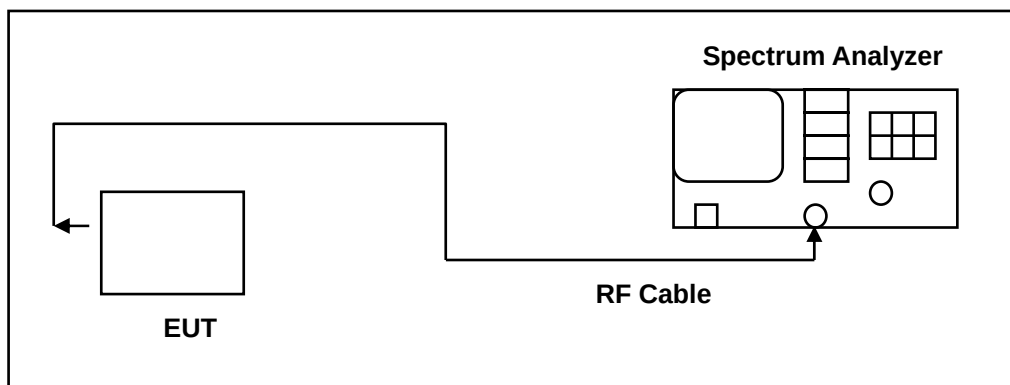
6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 2400–2483.5 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

99 % Occupied Bandwidth

N/A

7.2. Test Setup



7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2012	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

dRemark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

7.4. Test Procedure

6dB RF Bandwidth

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of KDB558074 D01 DTS Meas Guidance v03r01 for compliance to FCC 47CFR 15.247 requirements.

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels (Channel 1, 6, 11)

99 % Occupied Bandwidth

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%.

The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

7.5. Test Result

Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 2: IEEE 802.11b Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
2412	7.102	7.111	12.4255	11.9785	> 500
2437	8.027	7.101	12.2629	12.1792	> 500
2462	7.125	7.597	12.1148	12.1380	> 500

Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 3: IEEE 802.11g Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
2412	16.452	16.543	16.4211	16.5149	> 500
2437	16.569	16.514	16.4769	16.5000	> 500
2462	16.527	16.561	16.5198	16.5045	> 500

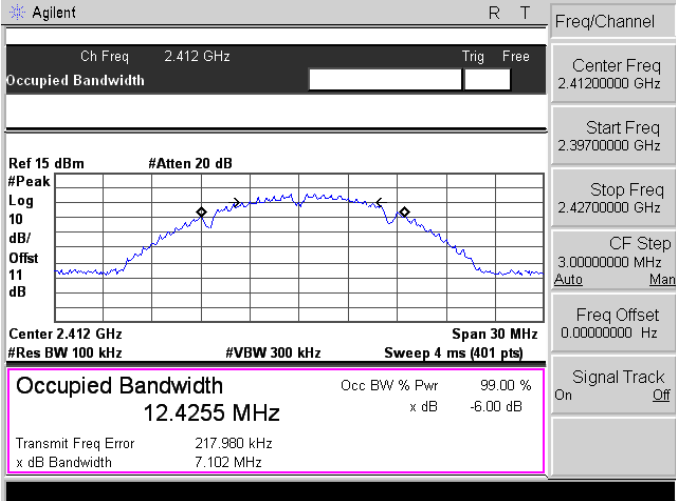
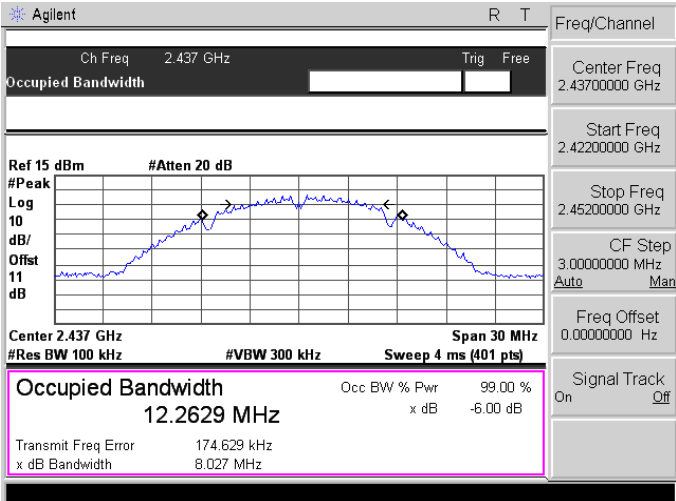
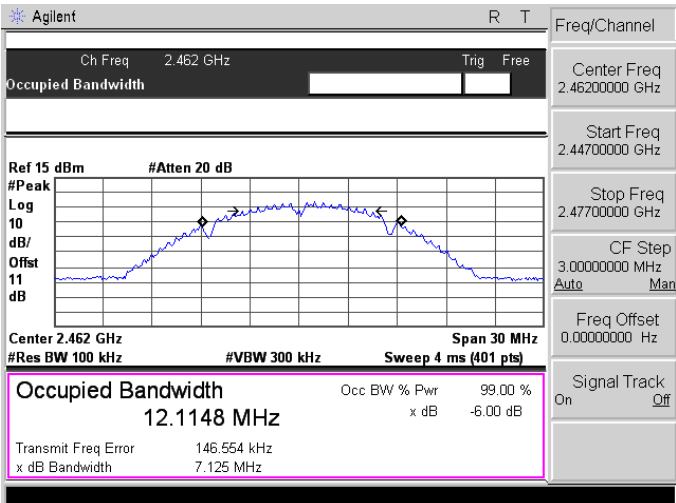
Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
2412	17.745	17.777	17.7500	17.6639	> 500
2437	17.767	17.769	17.6801	17.6274	> 500
2462	17.734	17.783	17.7313	17.7258	> 500

Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 5: IEEE 802.11a U-NII Band IV Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
5745	16.564	16.488	16.4346	16.5324	> 500
5785	16.496	16.504	16.3880	16.5390	> 500
5825	16.516	13.345	16.4197	16.1835	> 500

Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
5745	17.726	12.896	17.6070	15.9385	> 500
5785	17.684	17.769	17.5852	17.8093	> 500
5825	16.573	16.539	16.4234	16.5220	> 500

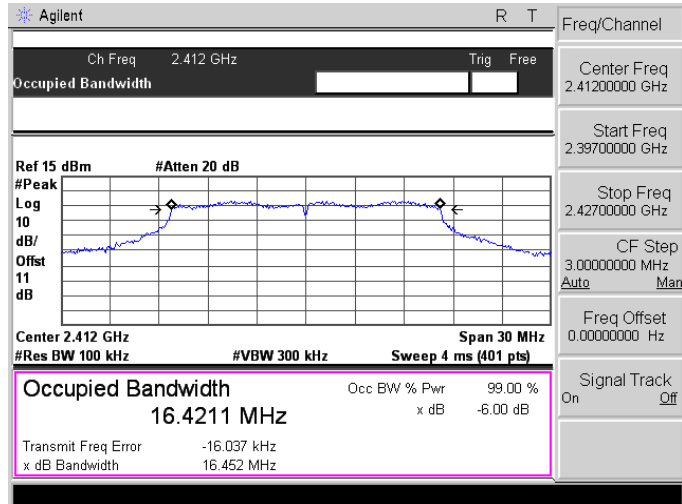
Model Number	AirCard 781S				
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth				
Test Mode	Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode				
Date of Test	09/02/2013			Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		6dB Bandwidth Limit (kHz)
	ANT1	ANT2	ANT1	ANT2	
5755	36.431	30.703	35.9538	34.0134	> 500
5795	36.514	31.957	36.0622	34.7359	> 500

7.6. Test Graphs

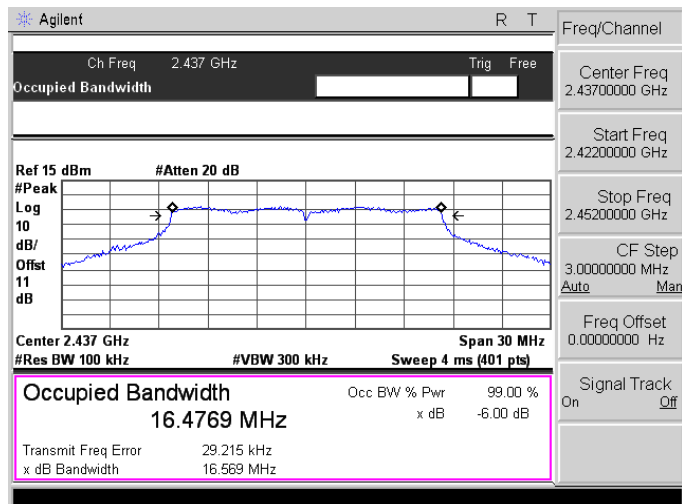
Mode 2: IEEE 802.11b Link Mode _ ANT1	
2412	 Agilent R T Ch Freq 2.412 GHz Trig Free Occupied Bandwidth Ref 15 dBm #Atten 20 dB #Peak Log 10 dB/Offset 11 dB Center 2.412 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 12.4255 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 217.980 kHz x dB Bandwidth 7.102 MHz Freq/Channel Center Freq 2.41200000 GHz Start Freq 2.39700000 GHz Stop Freq 2.42700000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2437	 Agilent R T Ch Freq 2.437 GHz Trig Free Occupied Bandwidth Ref 15 dBm #Atten 20 dB #Peak Log 10 dB/Offset 11 dB Center 2.437 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 12.2629 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 174.629 kHz x dB Bandwidth 8.027 MHz Freq/Channel Center Freq 2.43700000 GHz Start Freq 2.42200000 GHz Stop Freq 2.45200000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2462	 Agilent R T Ch Freq 2.462 GHz Trig Free Occupied Bandwidth Ref 15 dBm #Atten 20 dB #Peak Log 10 dB/Offset 11 dB Center 2.462 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 12.1148 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 146.554 kHz x dB Bandwidth 7.125 MHz Freq/Channel Center Freq 2.46200000 GHz Start Freq 2.44700000 GHz Stop Freq 2.47700000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

Mode 3: IEEE 802.11g Link Mode _ ANT1

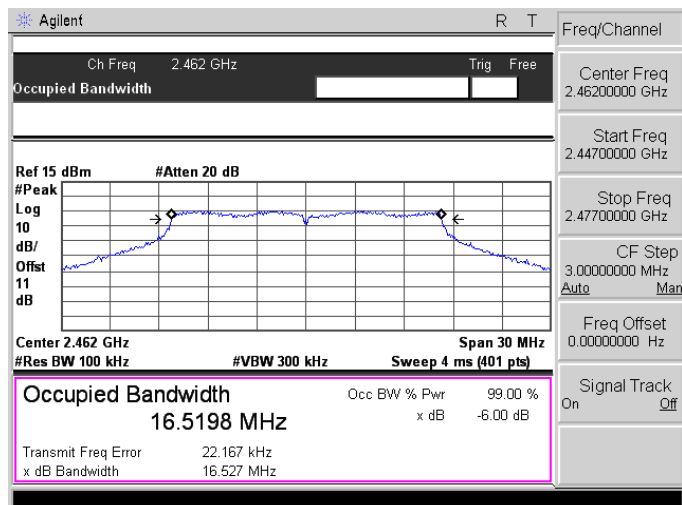
2412



2437

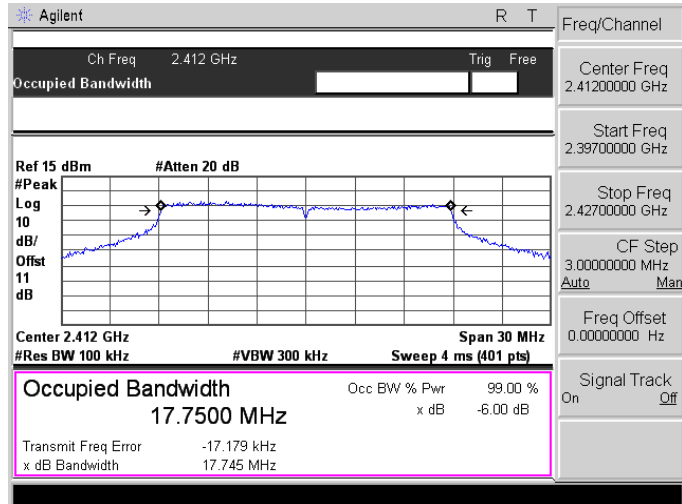


2462

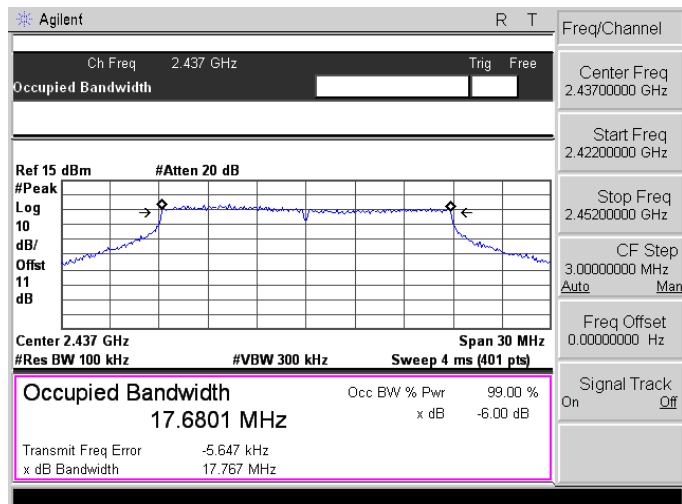


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ ANT1

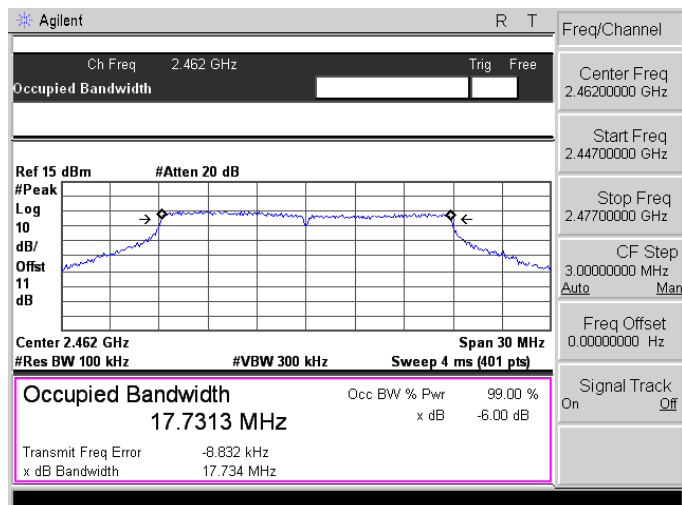
2412



2437

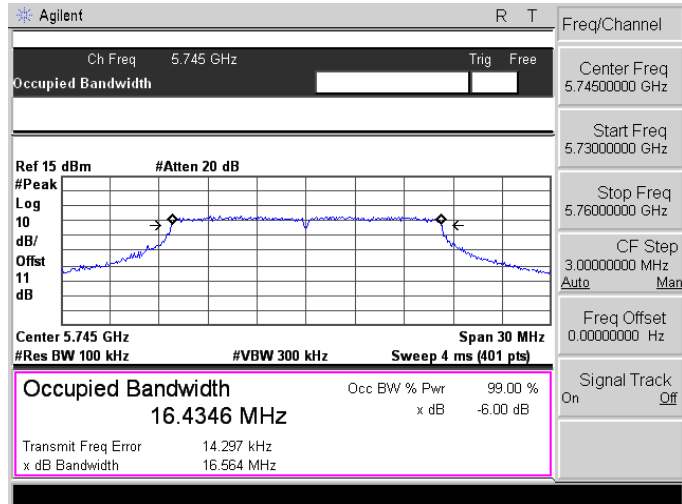


2462

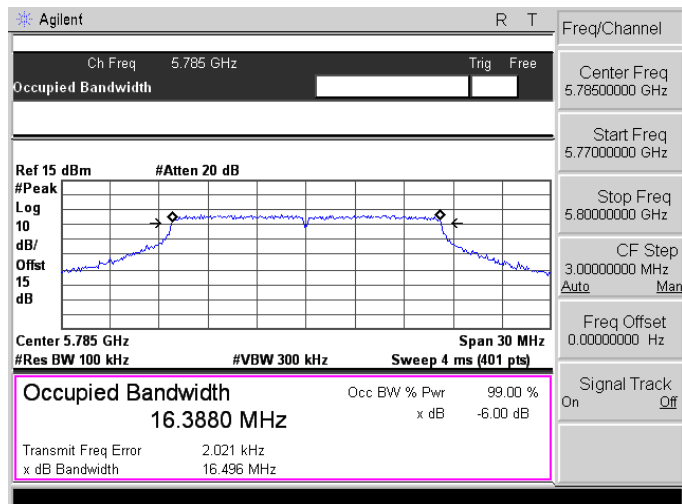


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT1

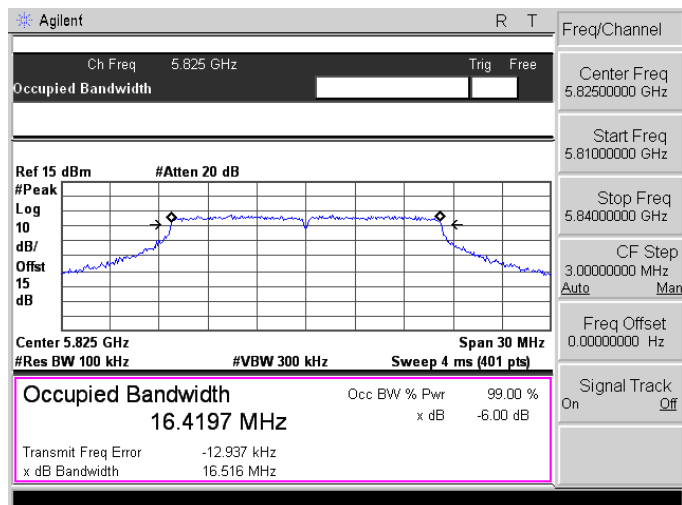
5745



5785

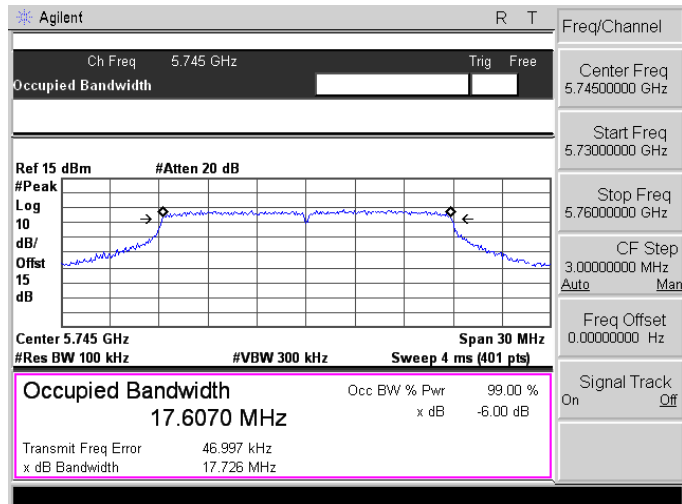


5825

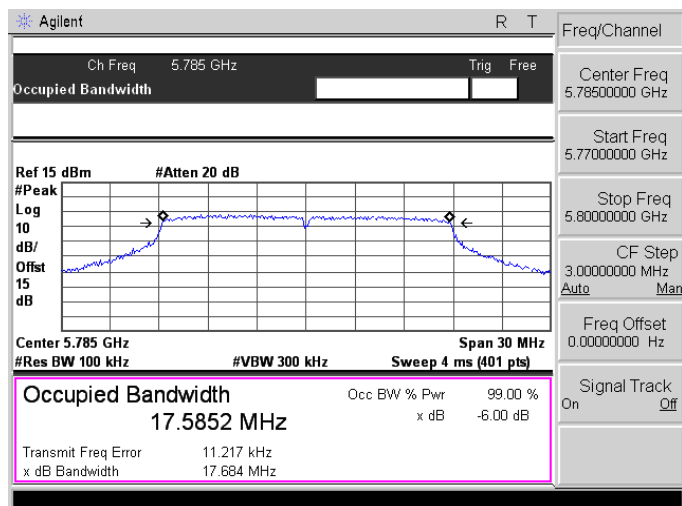


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT1

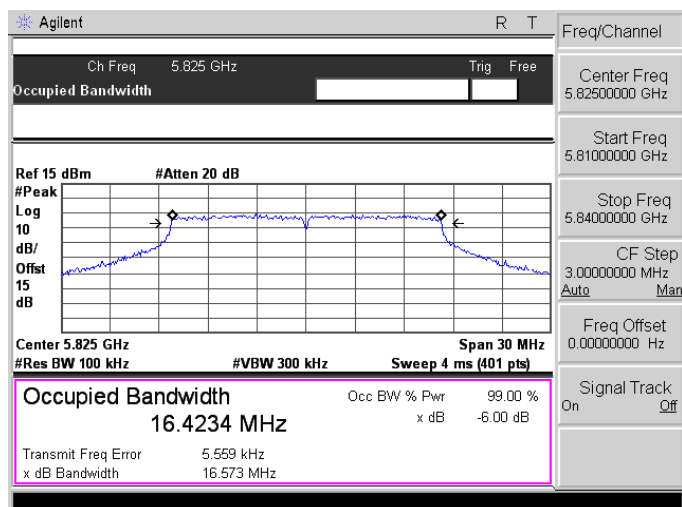
5745



5785

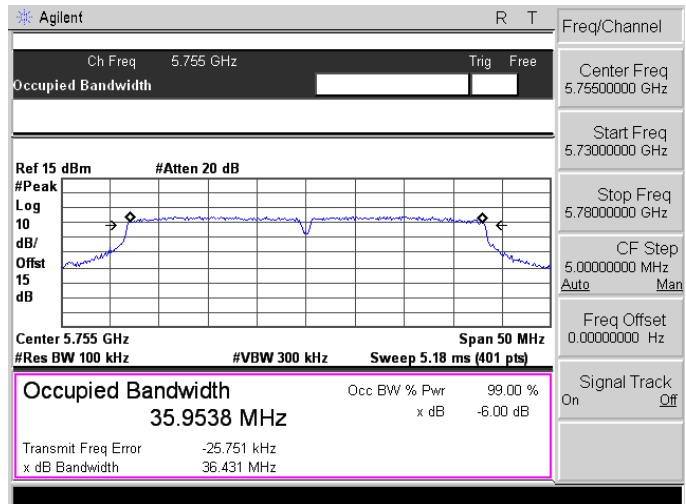


5825

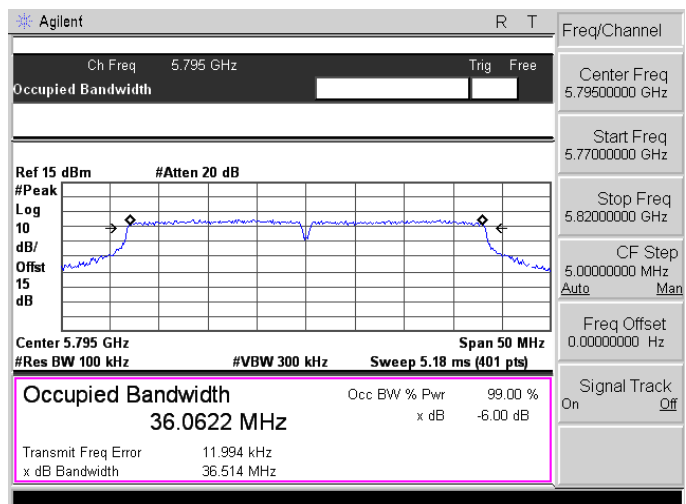


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT1

5755

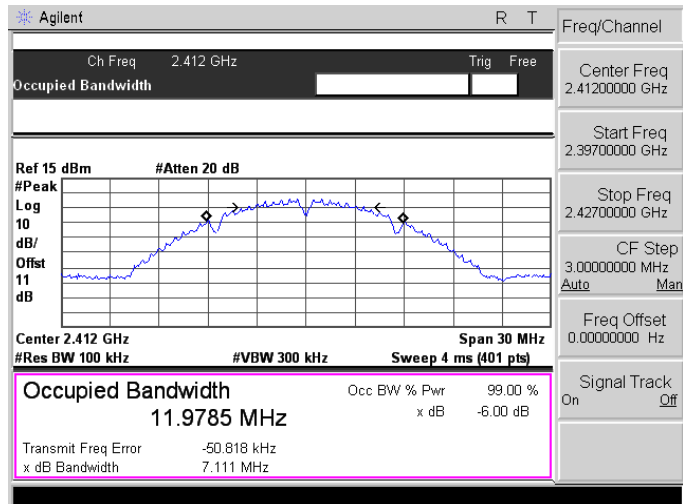


5795

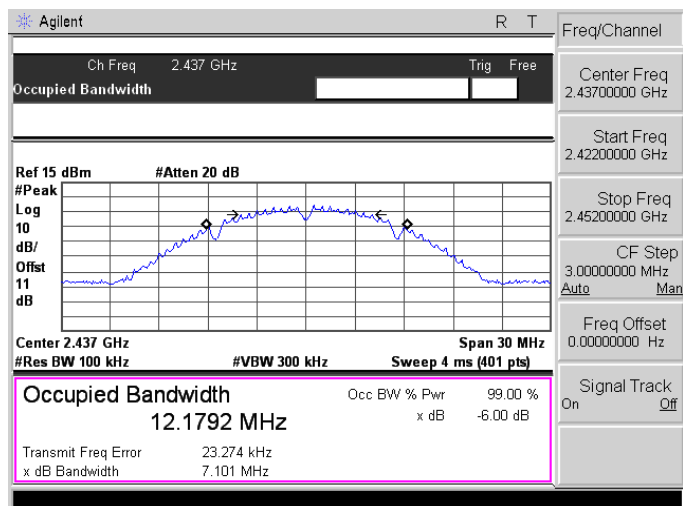


Mode 2: IEEE 802.11b Link Mode _ ANT2

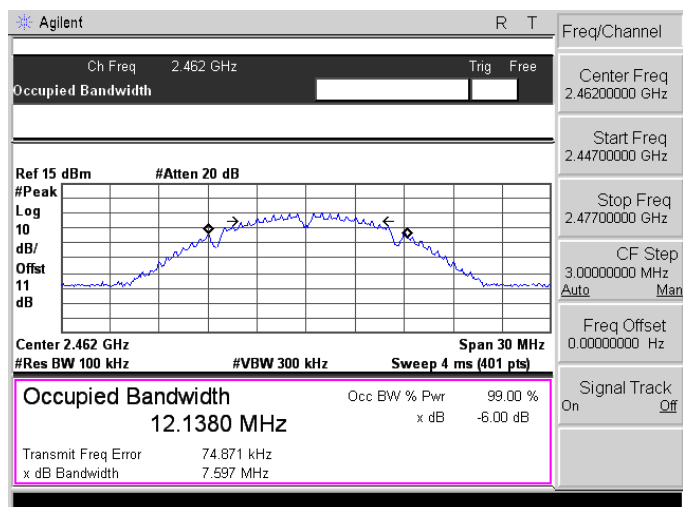
2412



2437

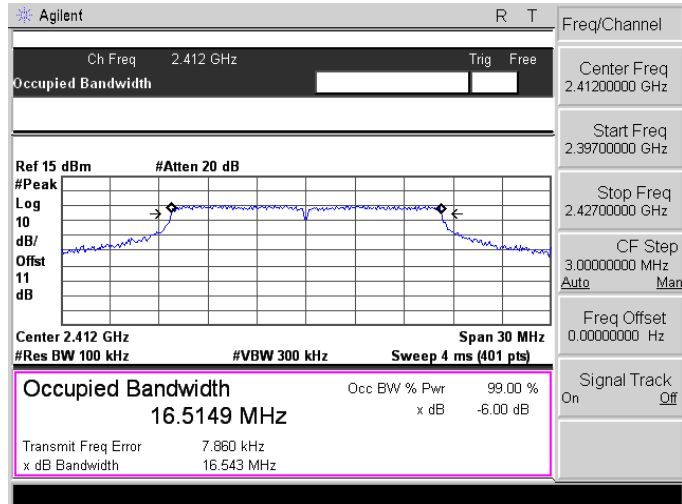


2462

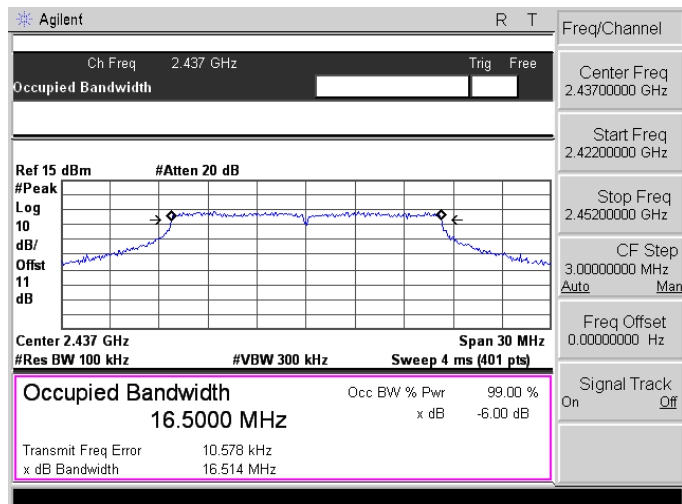


Mode 3: IEEE 802.11g Link Mode _ ANT2

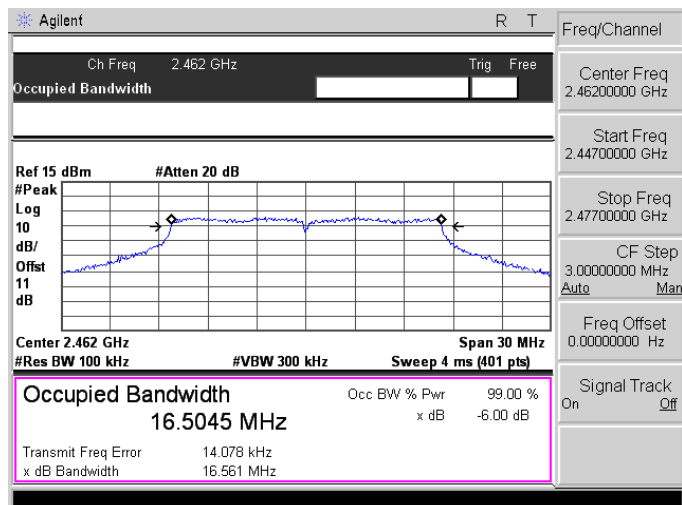
2412



2437

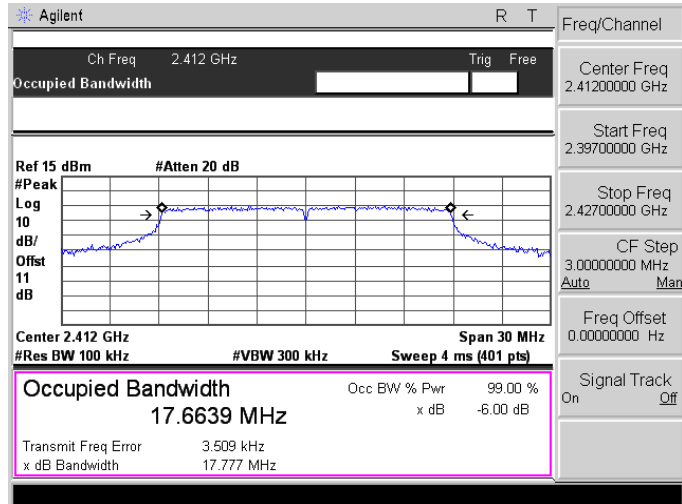


2462

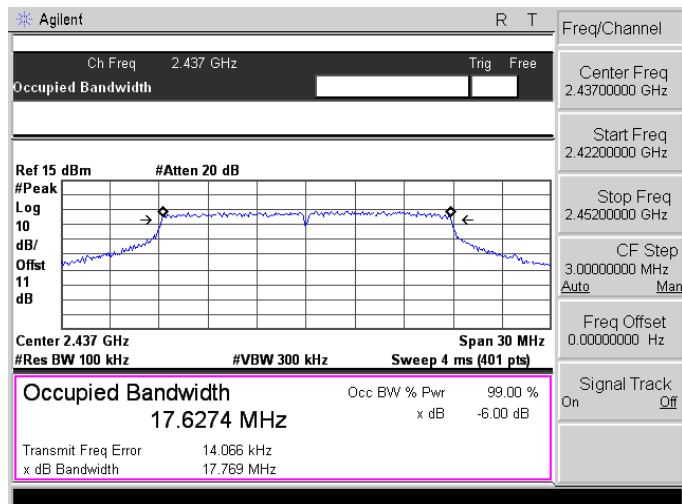


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ANT2

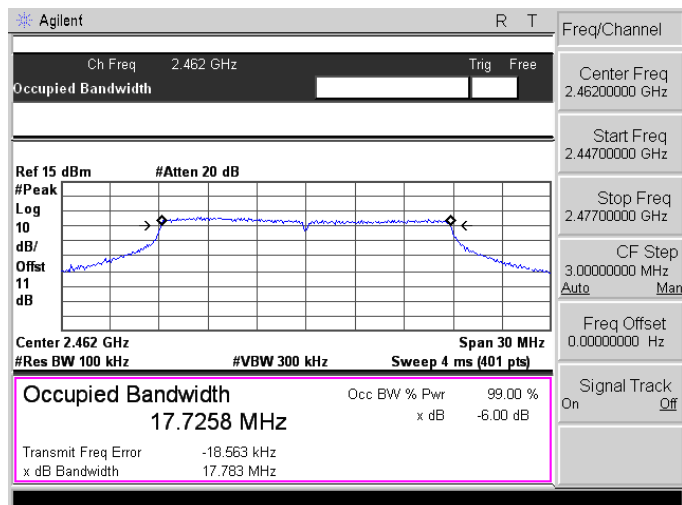
2412



2437

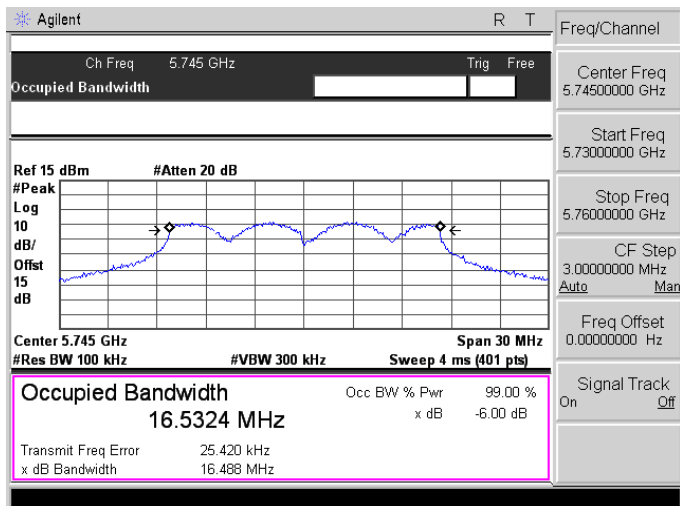


2462

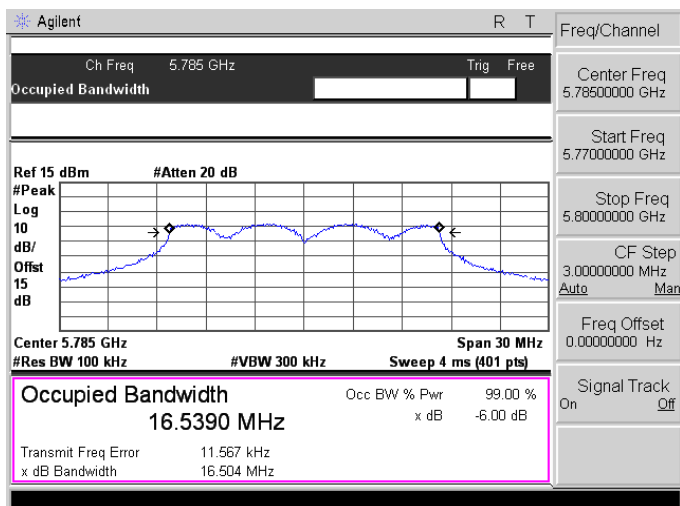


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT2

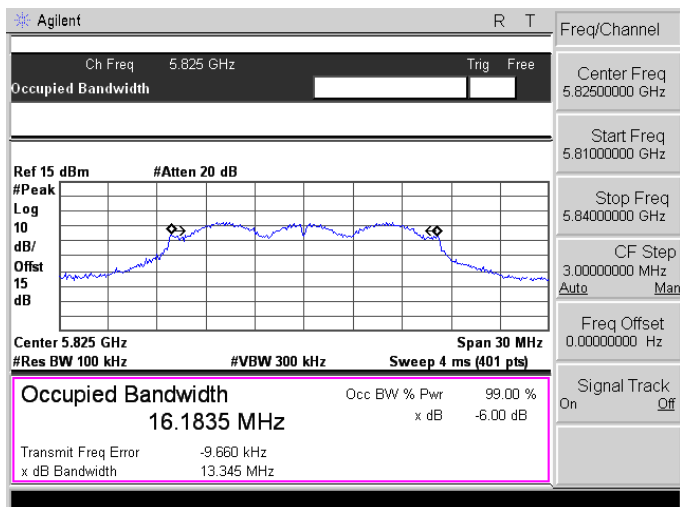
5745



5785

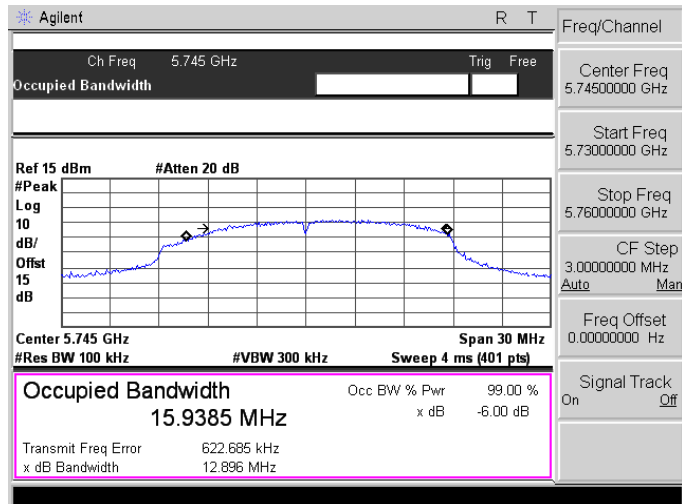


5825

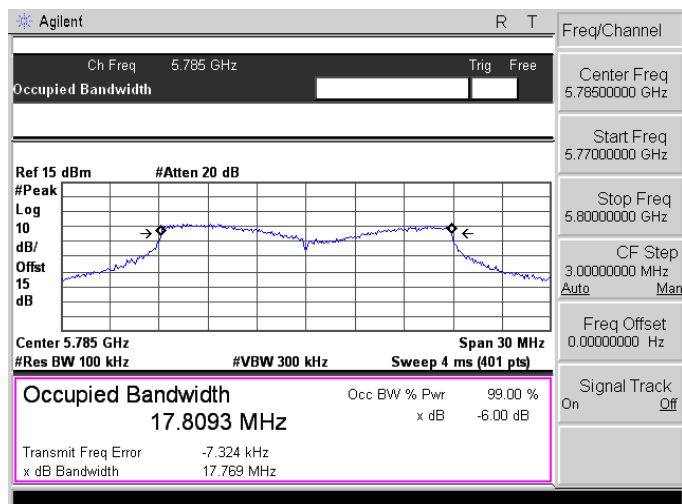


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ANT2

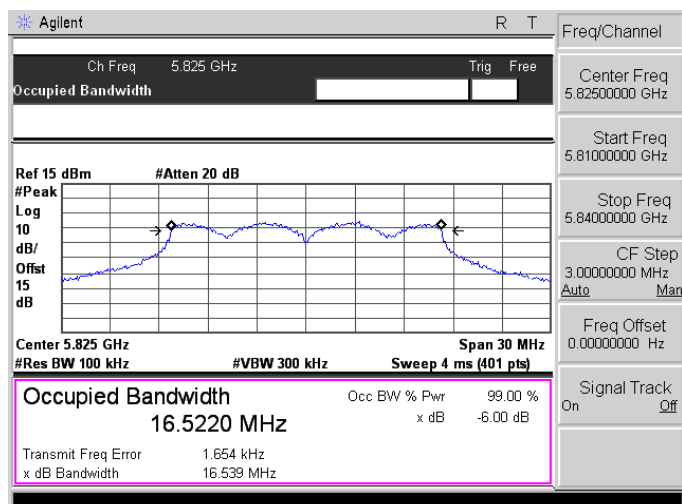
5745



5785

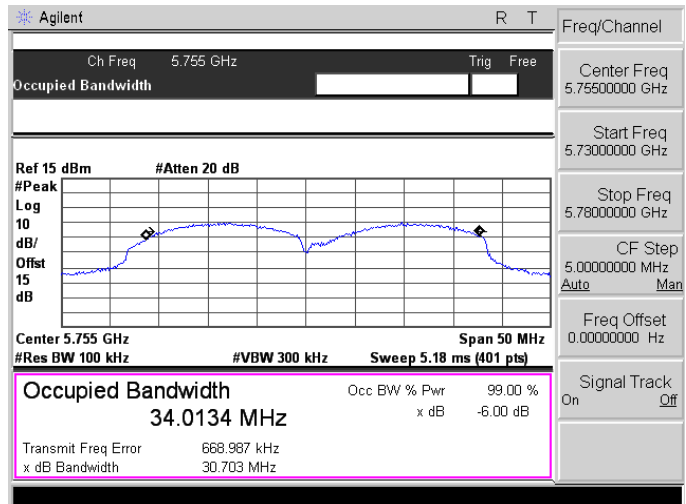


5825

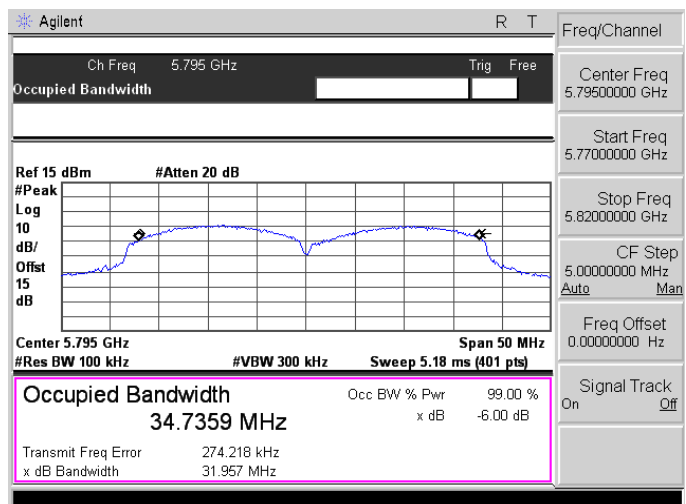


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ANT2

5755



5795

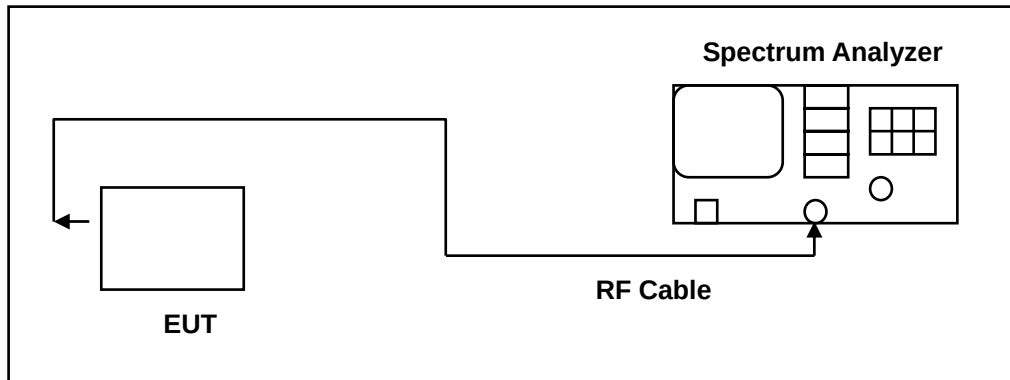


8 Maximum Power Density Measurement

8.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.2. Test Setup



8.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2012	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

8.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of KDB558074 D01 DTS Meas Guidance v03r01 for compliance to FCC 47CFR 15.247 requirements.

Measure and sum the spectrum across the outputs referring the section E)2)b of KDB 662911 D01 Multiple Transmitter Output v02

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

8.5. Test Result

Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 2: IEEE 802.11b Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
2412	-12.24	-12.79	-9.50	< 8
2437	-11.48	-14.44	-9.70	< 8
2462	-16.22	-20.48	-14.84	< 8

Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 3: IEEE 802.11g Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
2412	-15.04	-15.67	-12.33	< 8
2437	-13.06	-17.77	-11.80	< 8
2462	-16.41	-20.98	-15.11	< 8

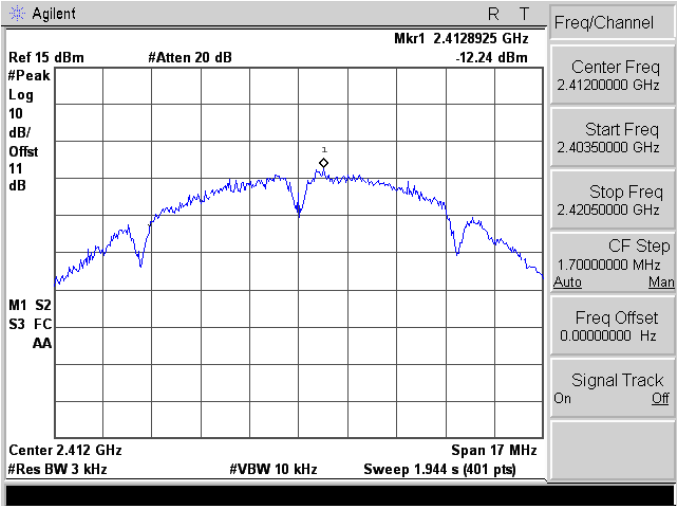
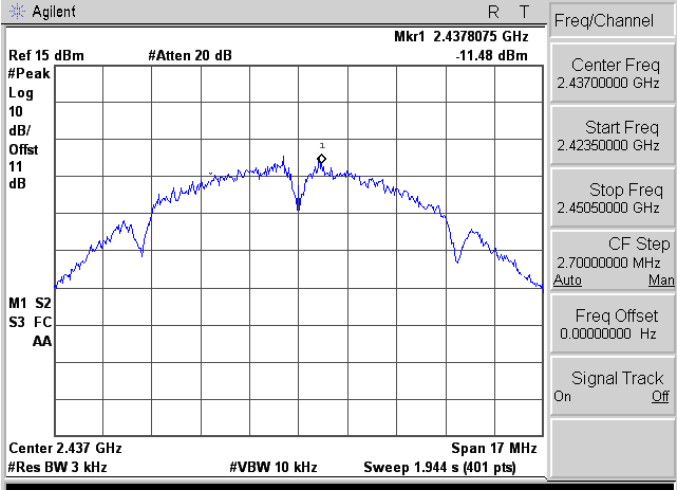
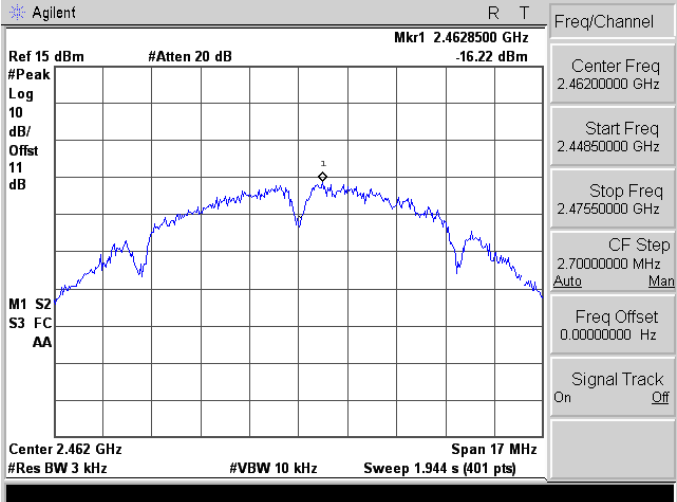
Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
2412	-12.79	-16.06	-11.11	< 8
2437	-12.97	-18.61	-11.92	< 8
2462	-17.84	-20.15	-15.83	< 8

Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 5: IEEE 802.11a U-NII Band IV Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
5745	-16.52	-25.89	-16.04	< 8
5785	-17.80	-24.07	-16.88	< 8
5825	-18.54	-24.03	-17.46	< 8

Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
5745	-18.63	-25.31	-17.79	< 8
5785	-18.78	-24.85	-17.82	< 8
5825	-18.38	-24.21	-17.37	< 8

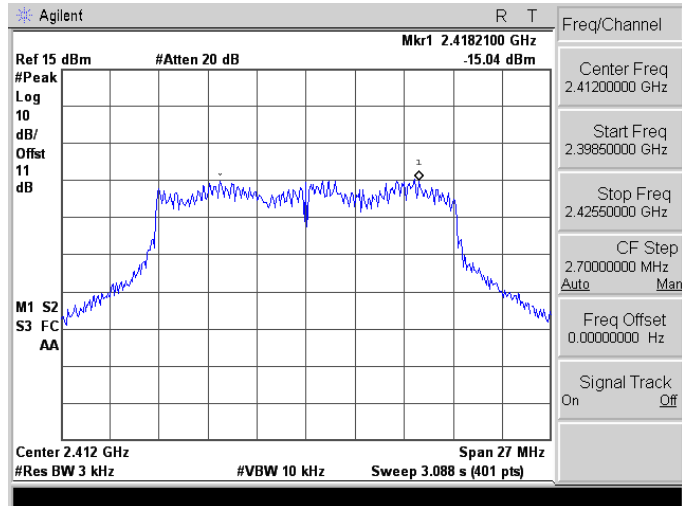
Model Number	AirCard 781S			
Test Item	Maximum Power Density			
Test Mode	Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode			
Date of Test	09/03/2013		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT1	ANT2	ANT1+ ANT2	
5755	-22.84	-29.03	-20.60	< 8
5795	-21.96	-26.31	-20.60	< 8

8.6. Test Graphs

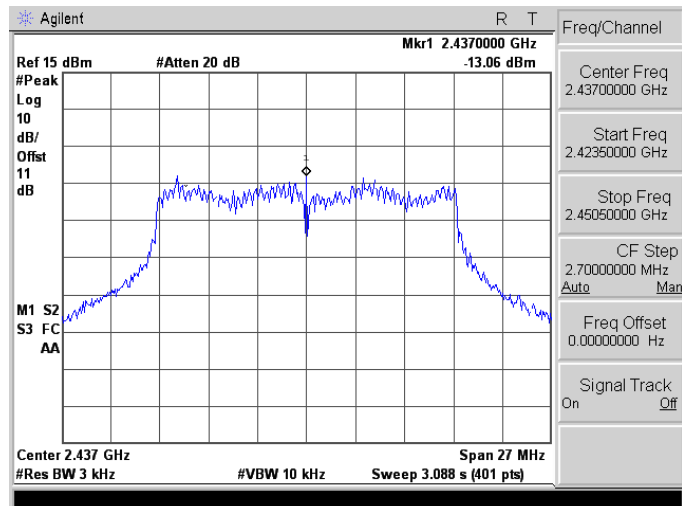
Mode 2: IEEE 802.11b Link Mode _ ANT1 2412	
2437	
2462	

Mode 3: IEEE 802.11g Link Mode _ ANT1

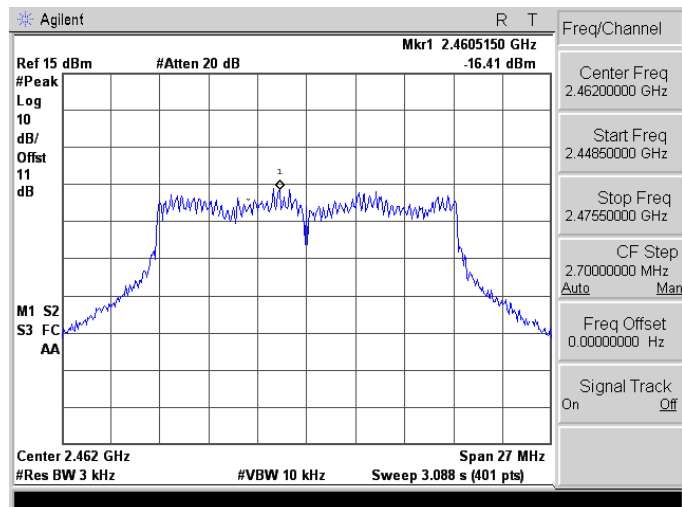
2412



2437

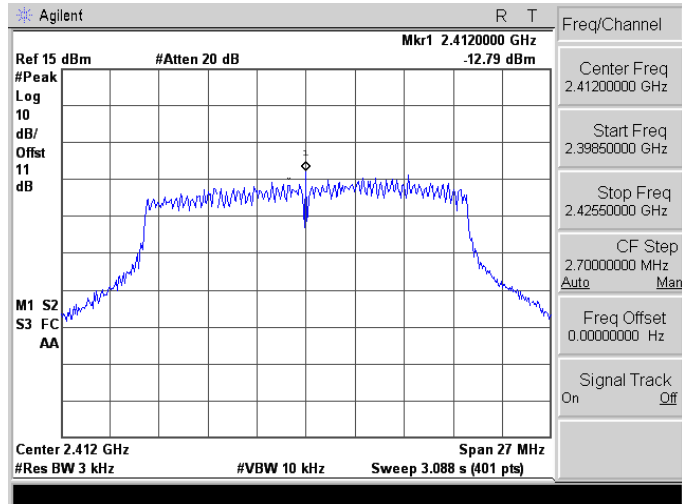


2462

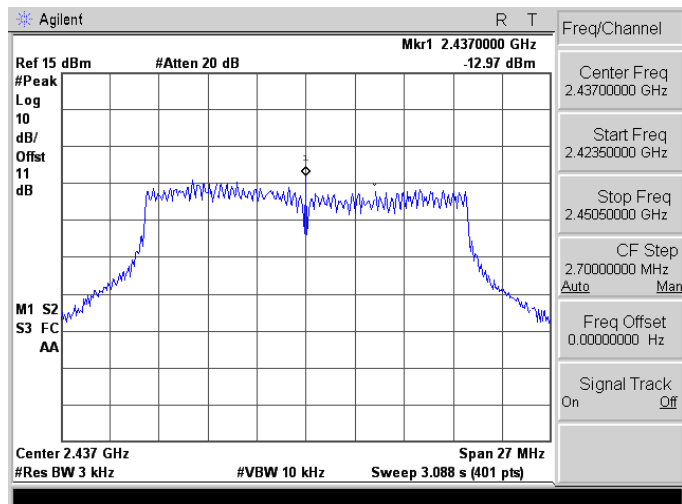


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ ANT1

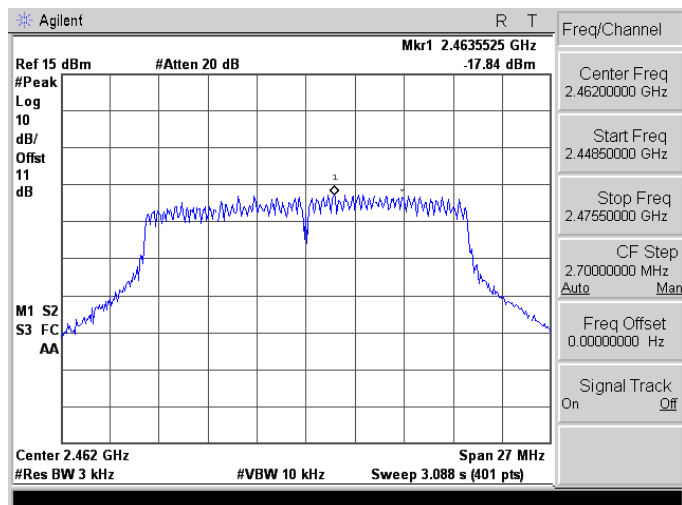
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2437

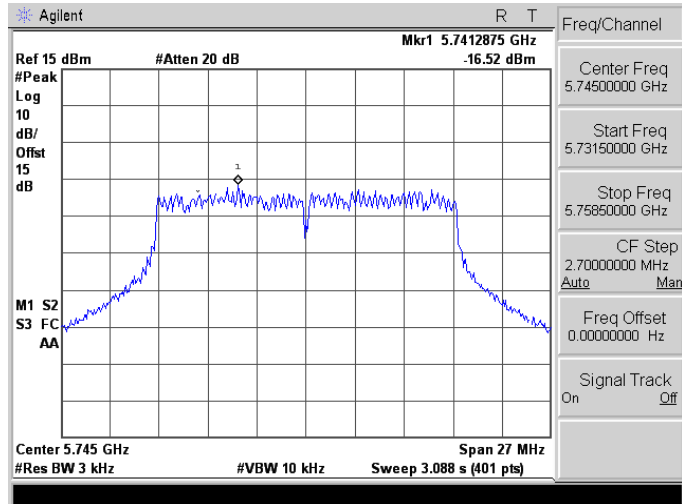


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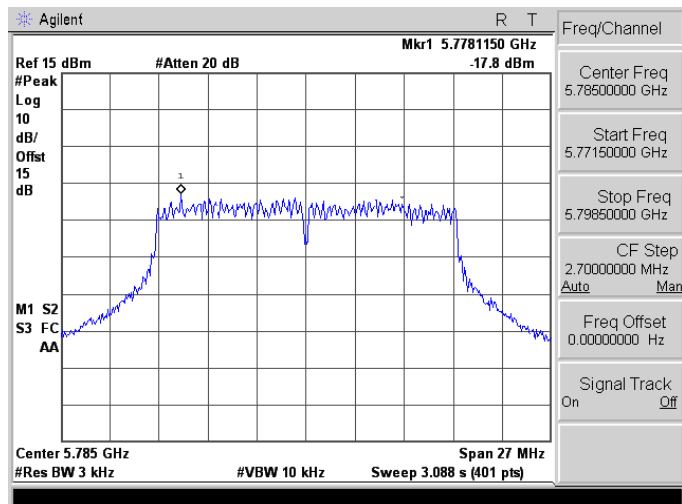


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT1

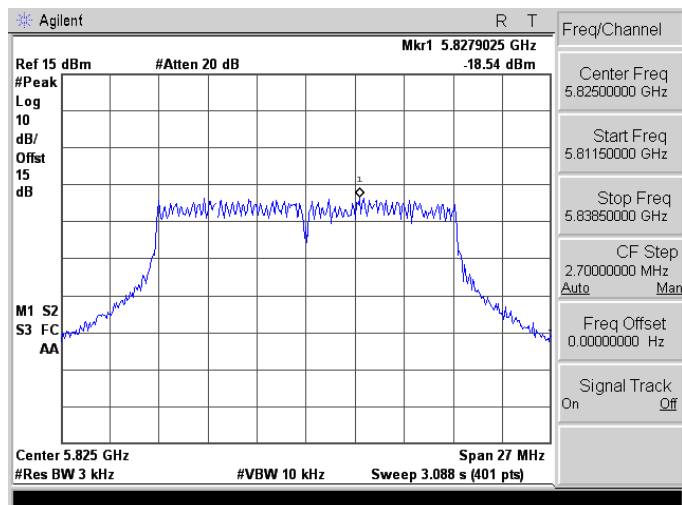
5745



5785

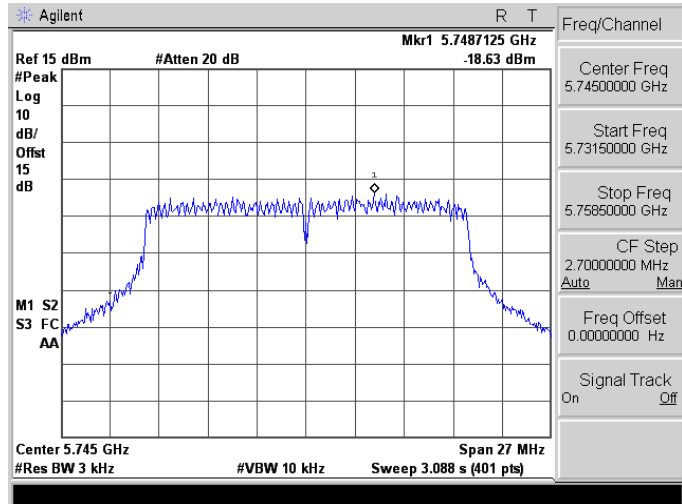


5825

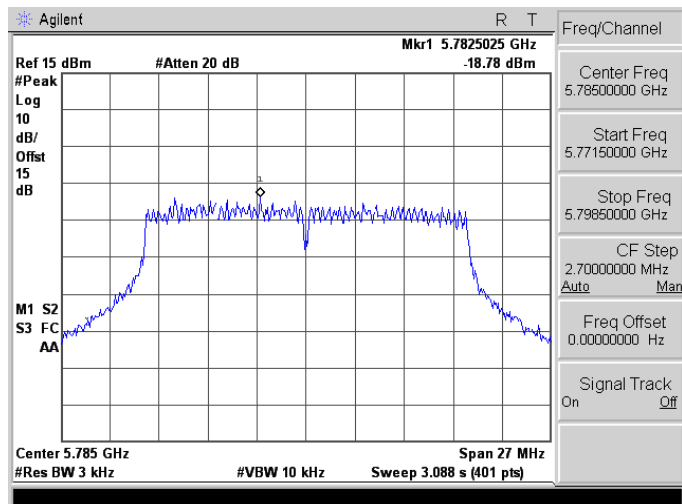


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT1

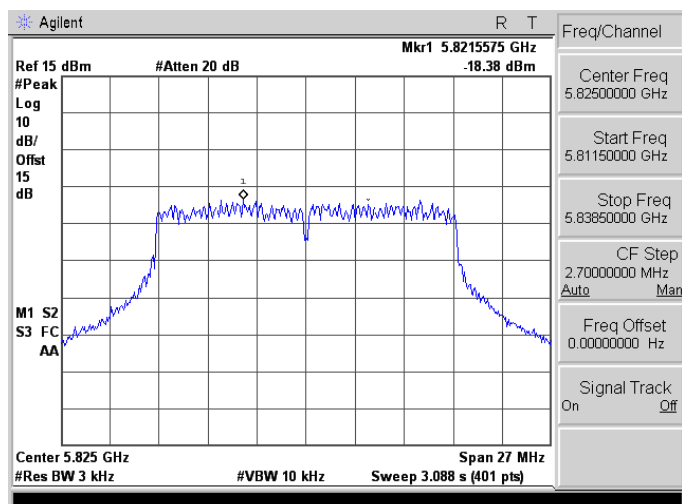
5745



5785

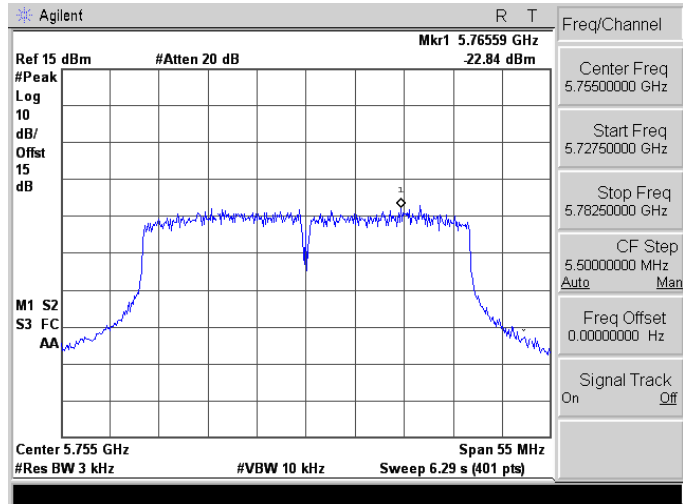


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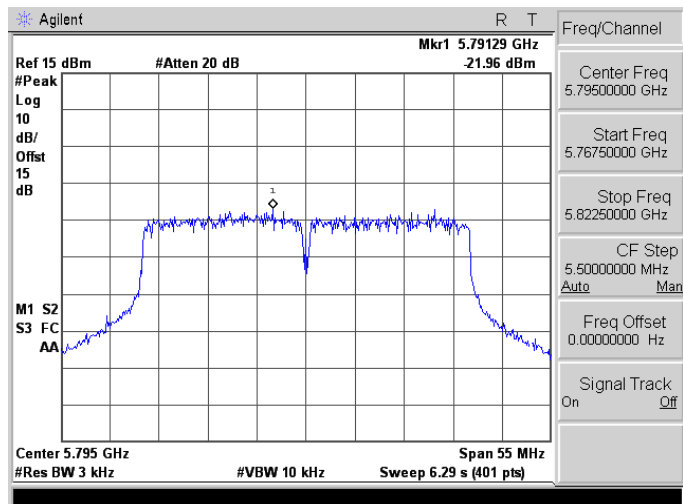


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT1

5755

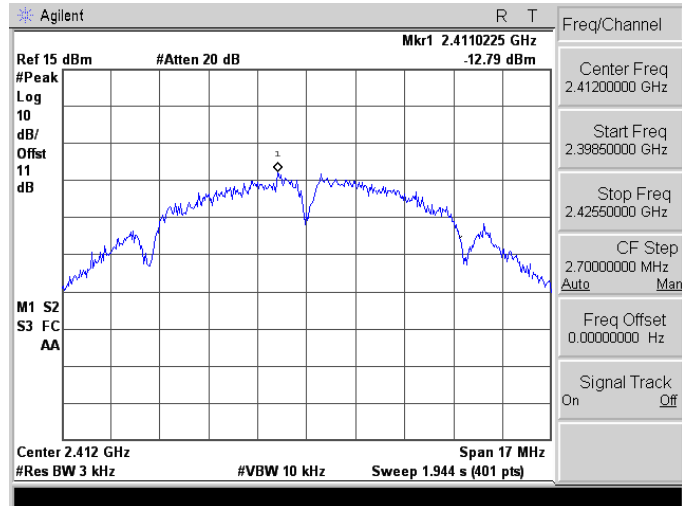


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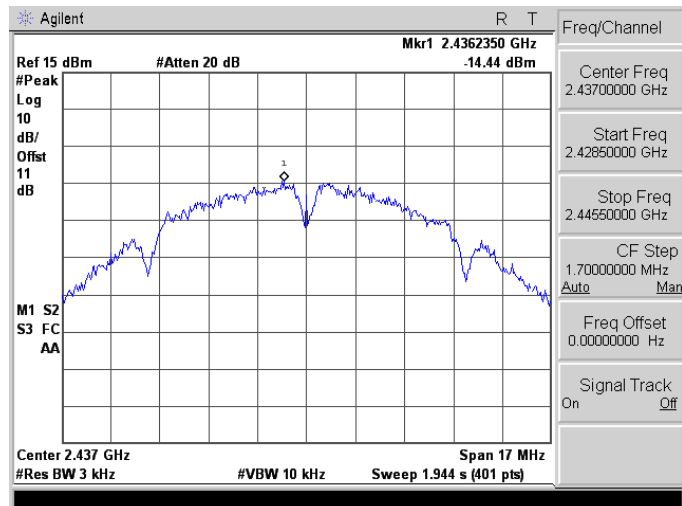


Mode 2: IEEE 802.11b Link Mode _ ANT2

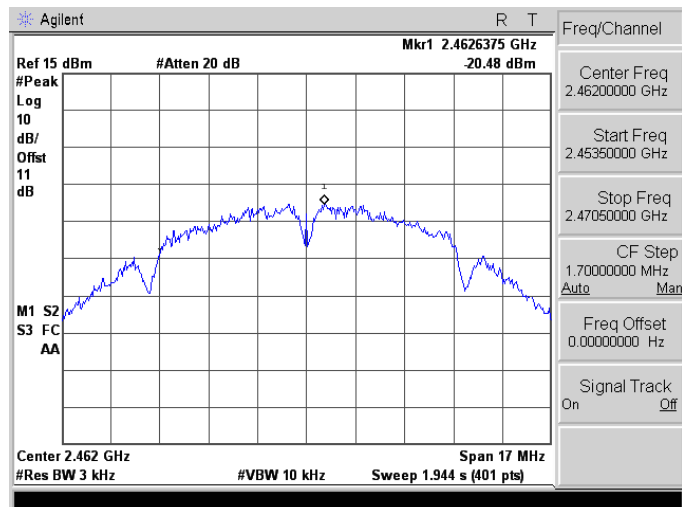
2412



2437

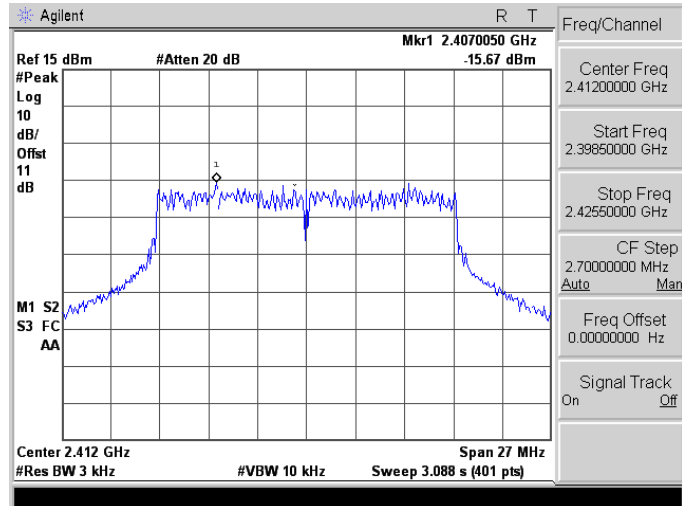


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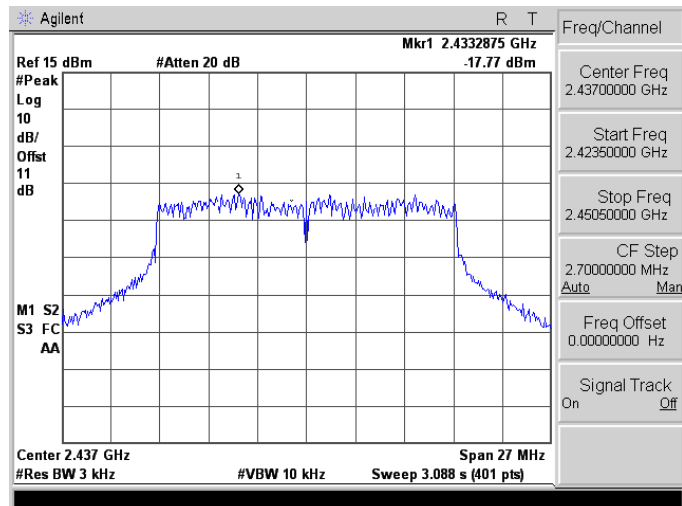


Mode 3: IEEE 802.11g Link Mode _ ANT2

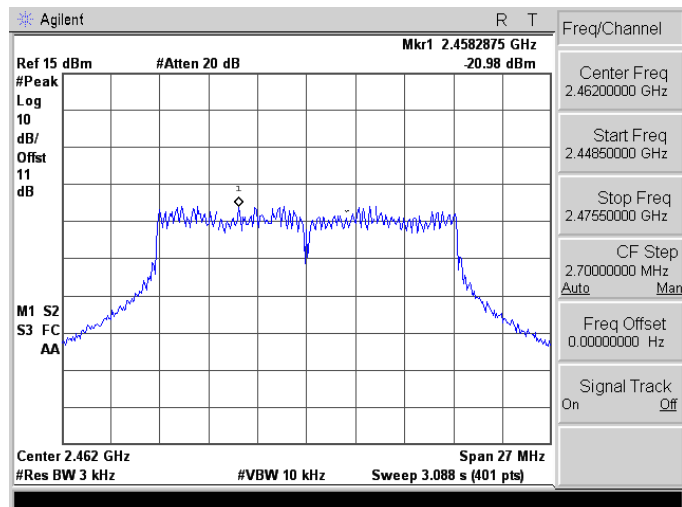
2412



2437

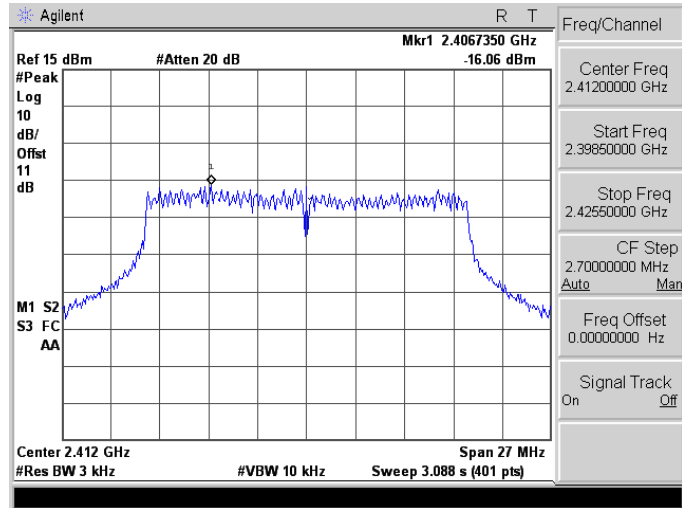


2462

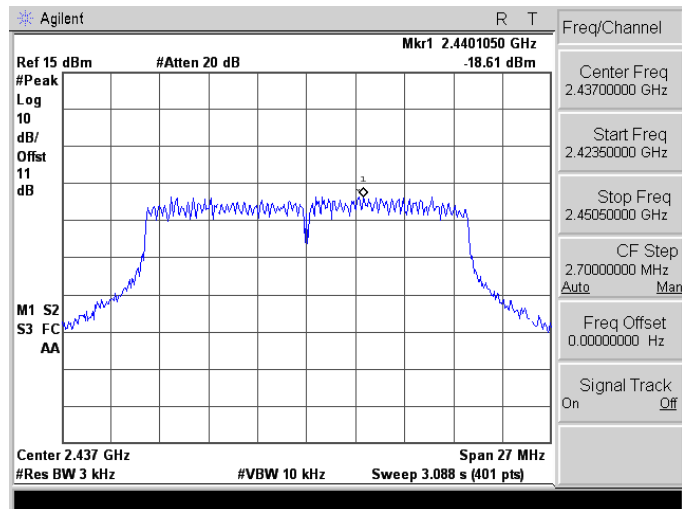


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ ANT2

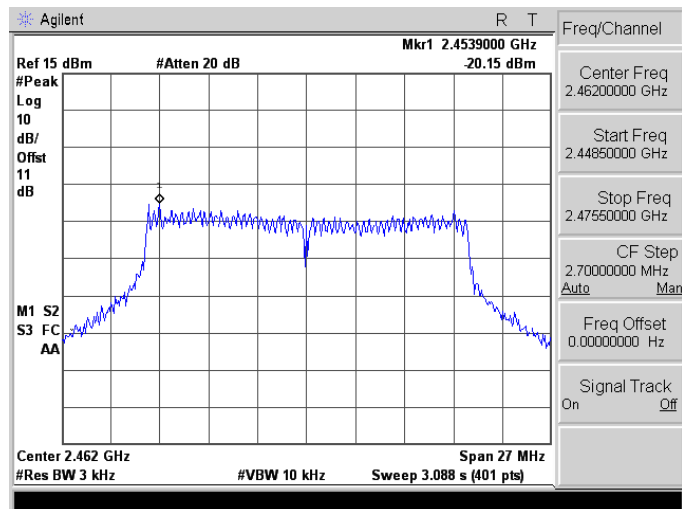
2412



2437

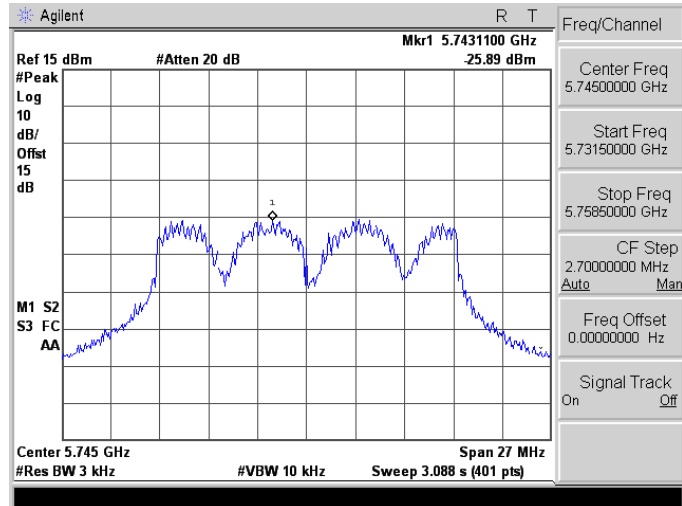


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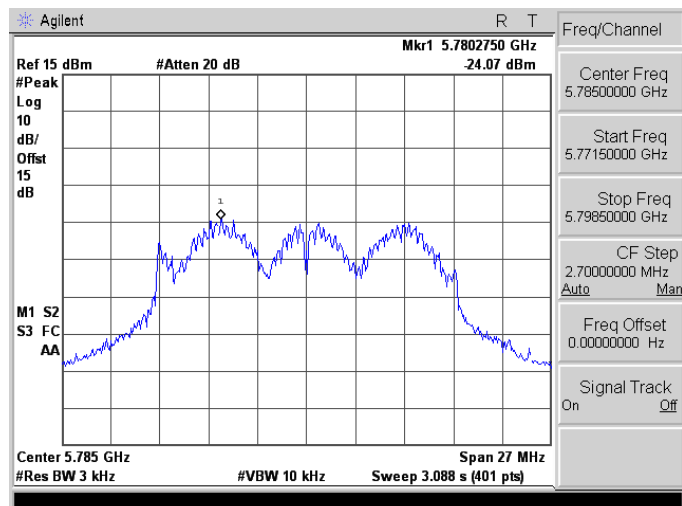


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT2

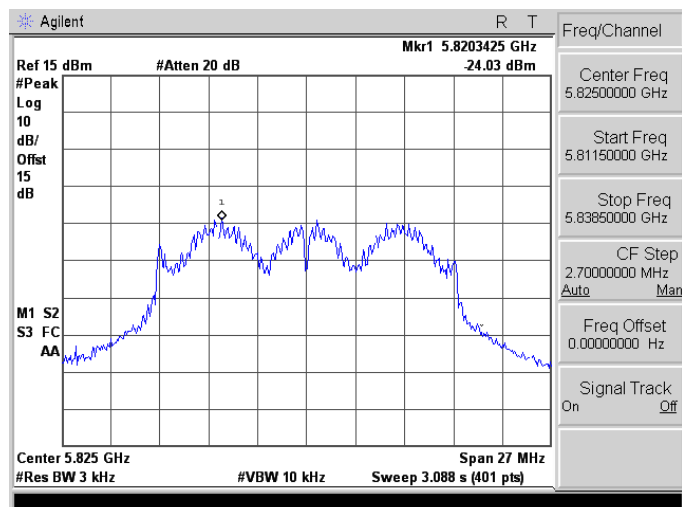
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5785

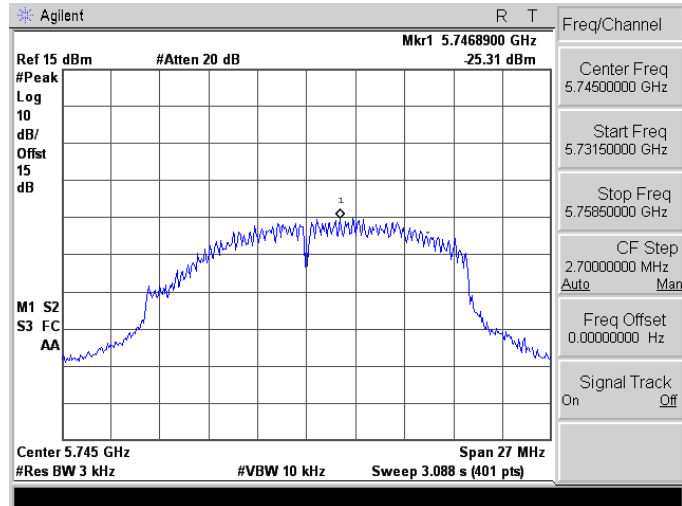


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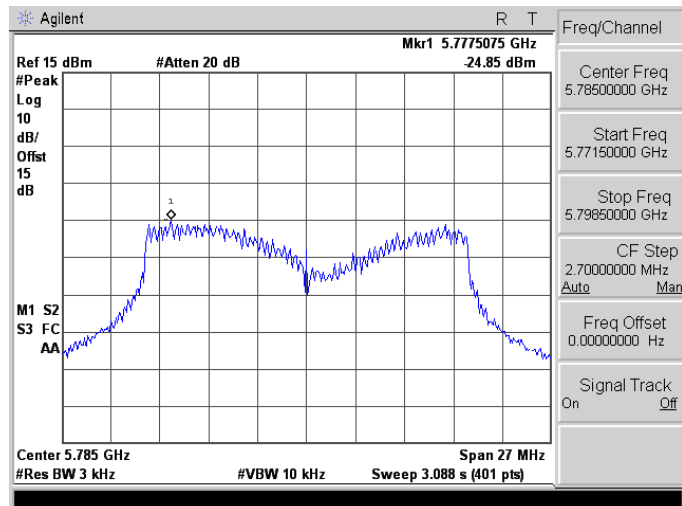


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT2

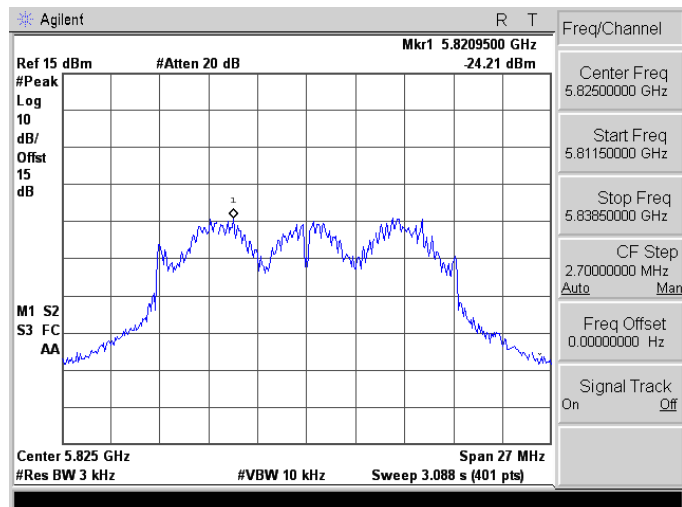
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5785

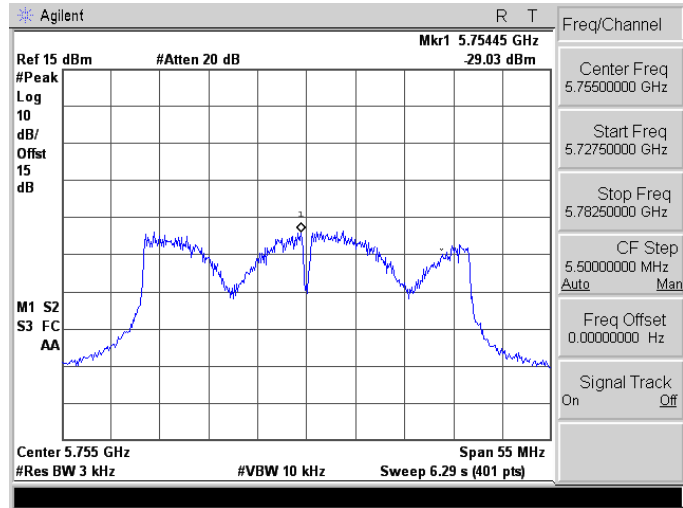


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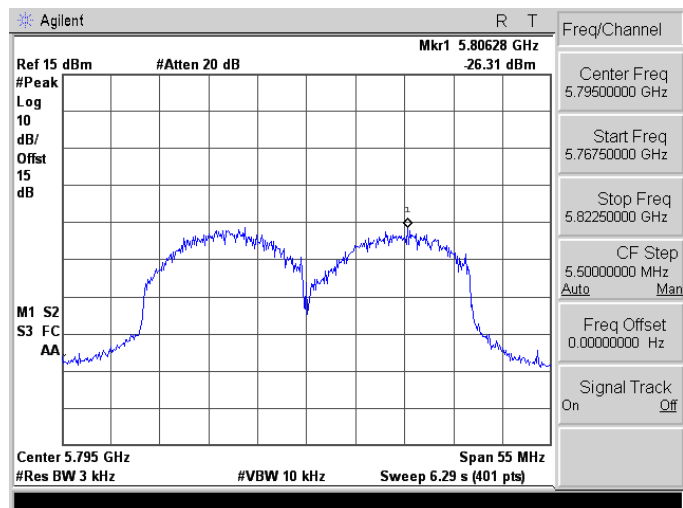


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT2

5755



5795

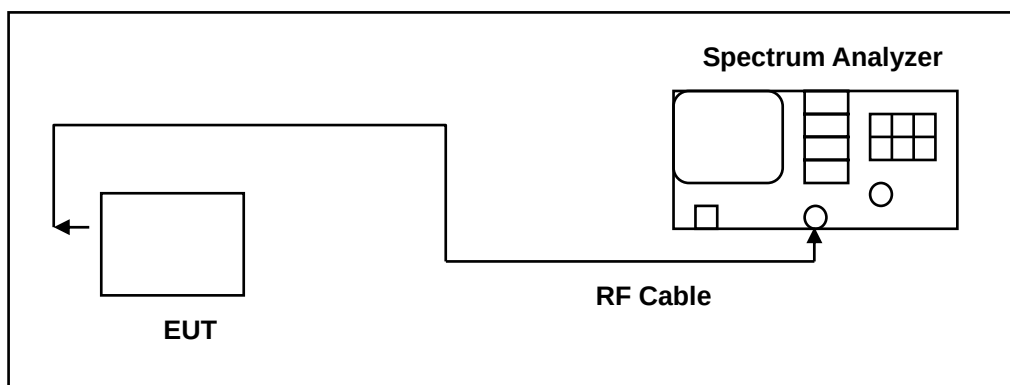


9 Out of Band Conducted Emissions Measurement

9.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

9.2. Test Setup



9.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2012	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/11/2013	(1)
Test Site	ATL	TE05	TE05	N.C.R.	----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

9.4. Test Procedure

The measurement as followed the section E)3)b of KDB 662911 D01 Multiple Transmitter Output v02 is performed by confirming that the maximum out-of-band emission on each individual output.

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

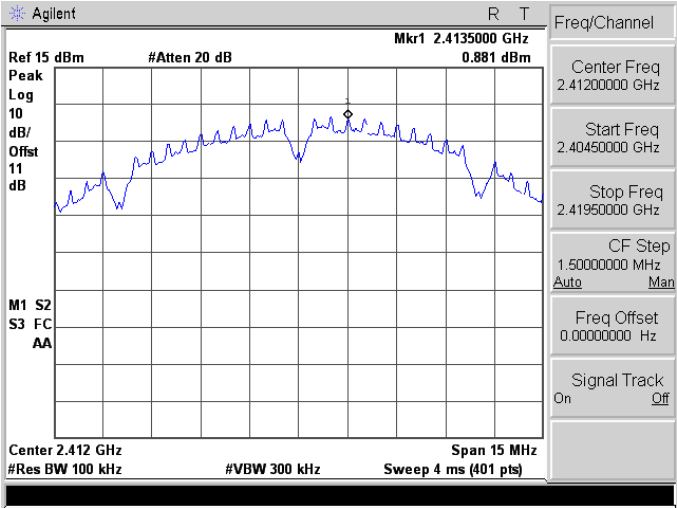
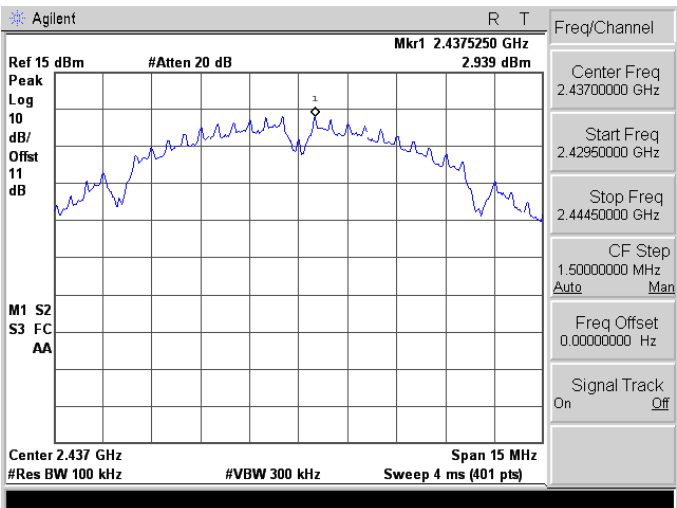
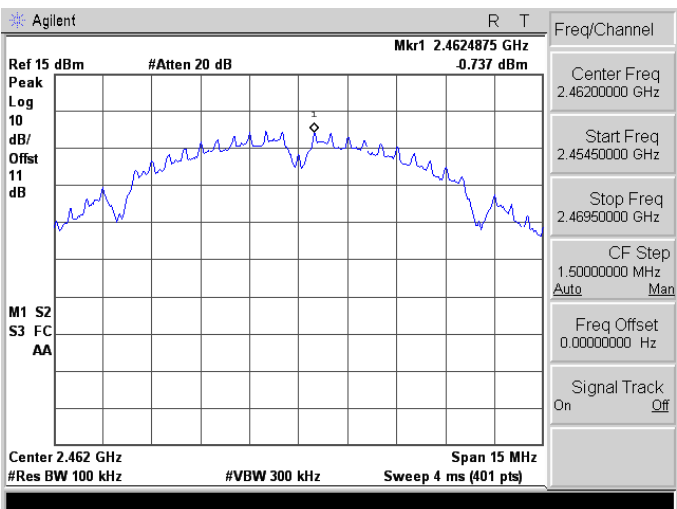
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band.

The test was performed at 3 channels (Channel 1, 6, 11)

9.5. Test Graphs

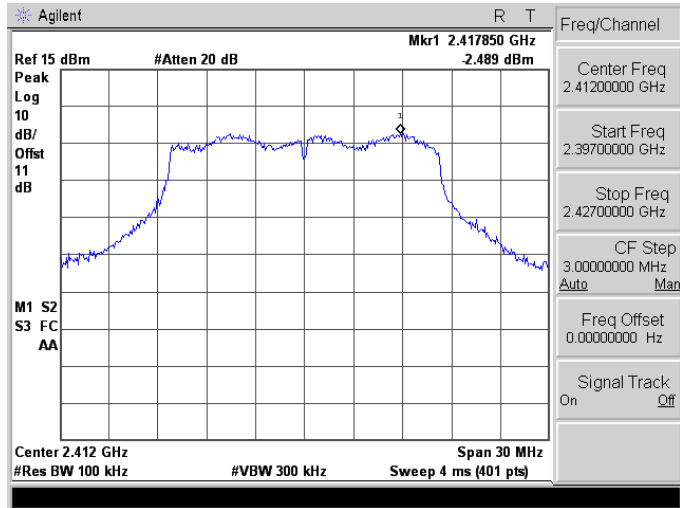
Reference level

Mode 2: IEEE 802.11b Link Mode _ ANT1

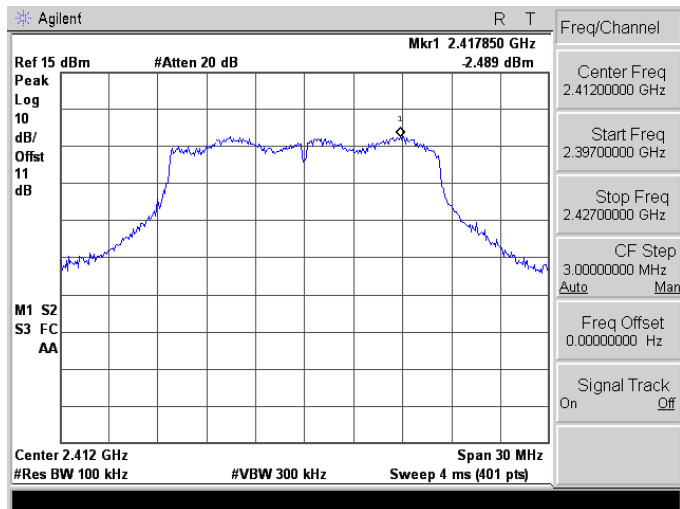
2412	
2437	
2462	

Mode 3: IEEE 802.11g Link Mode _ ANT1

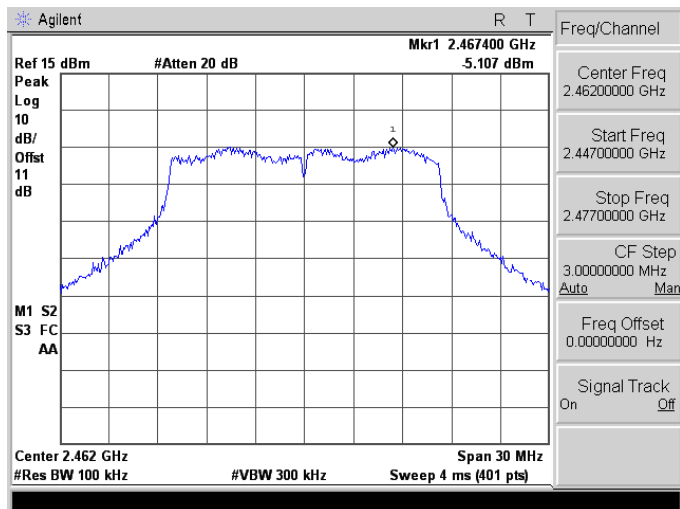
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2437

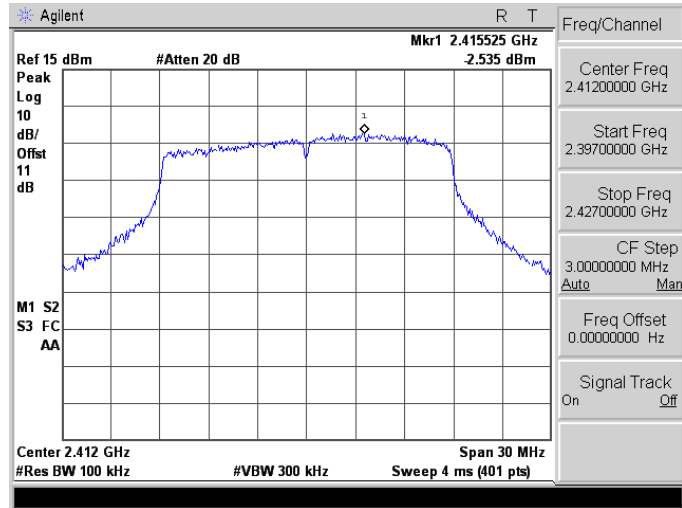


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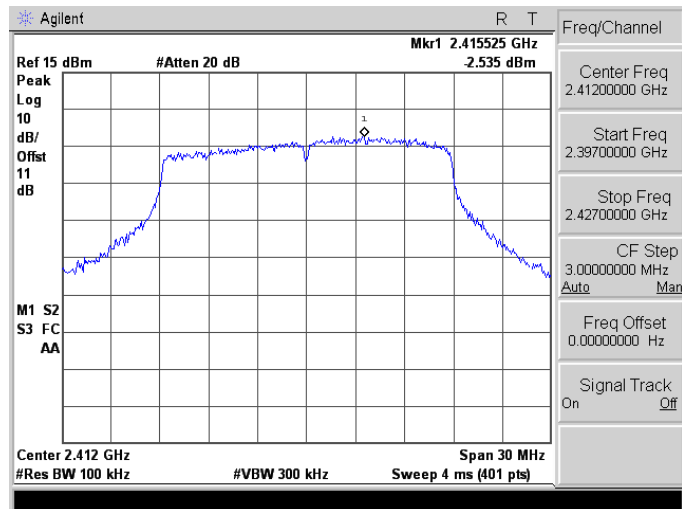


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ ANT1

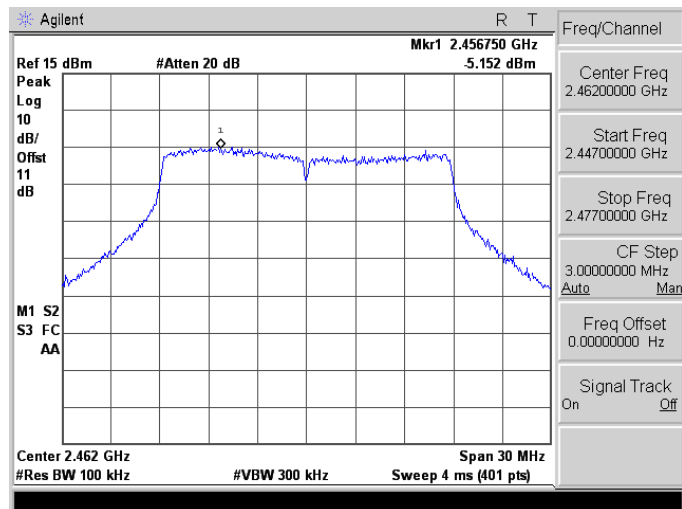
2412



2437



2462



Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT1

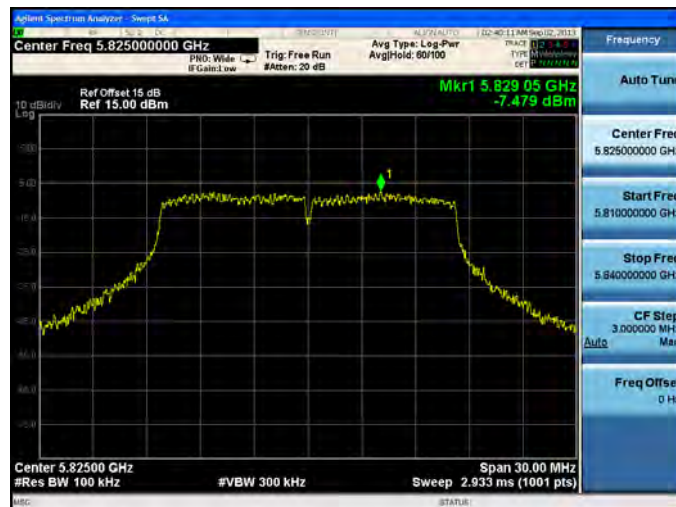
5745



5785



5825

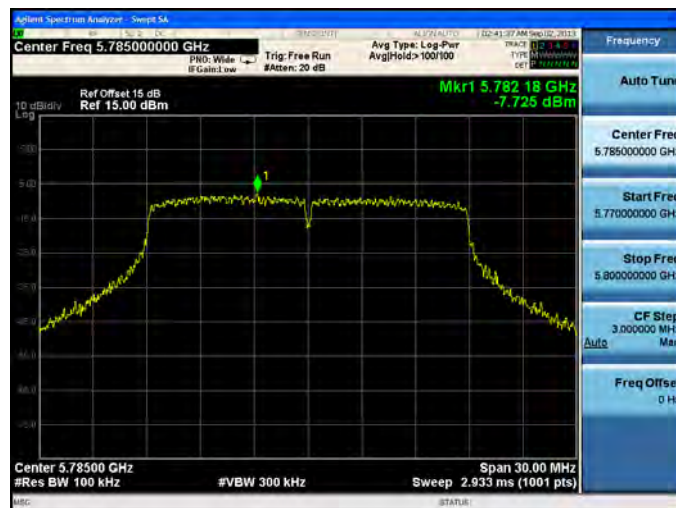


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT1

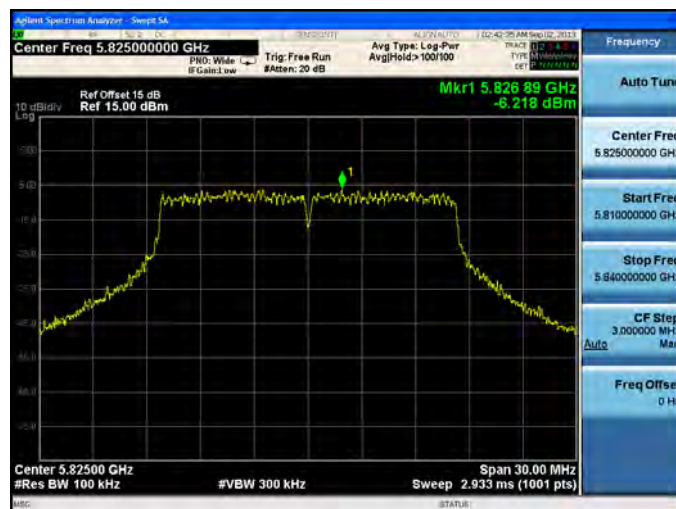
5745



5785



5825

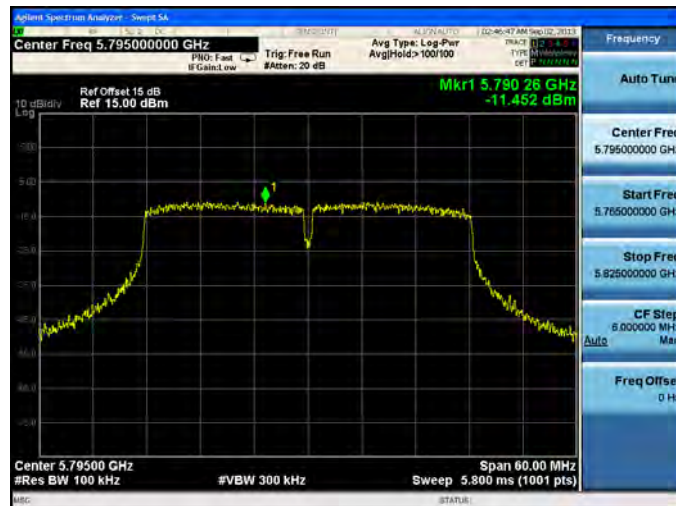


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT1

5755

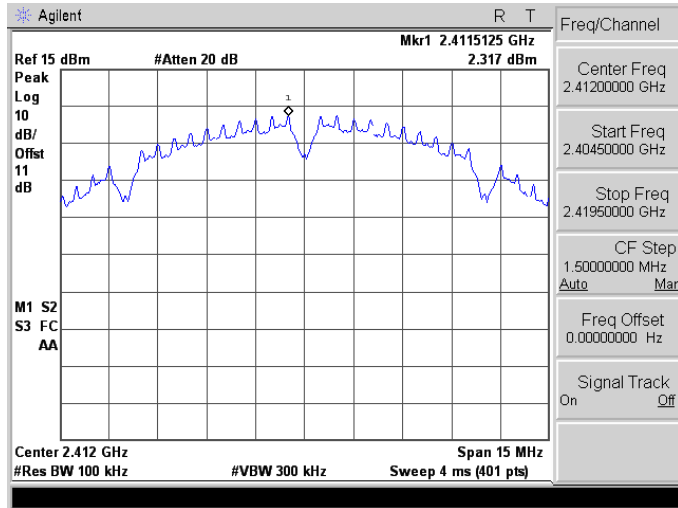


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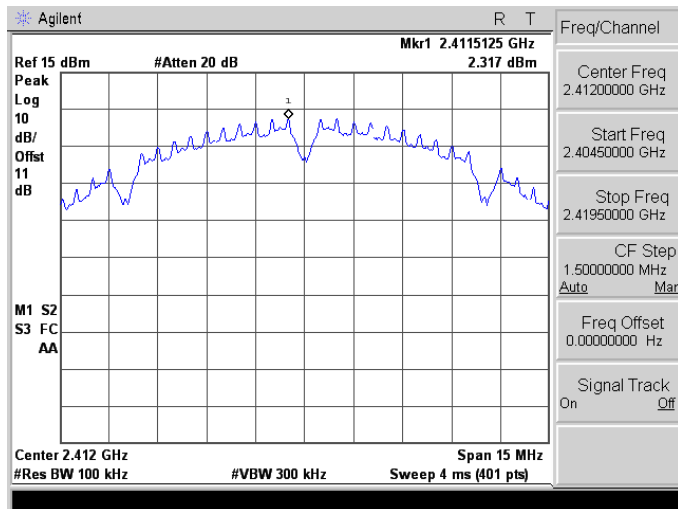


Mode 2: IEEE 802.11b Link Mode _ ANT2

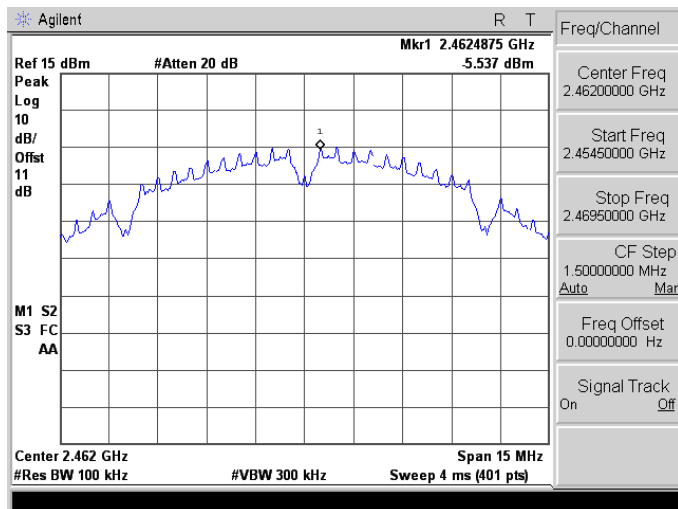
2412



2437

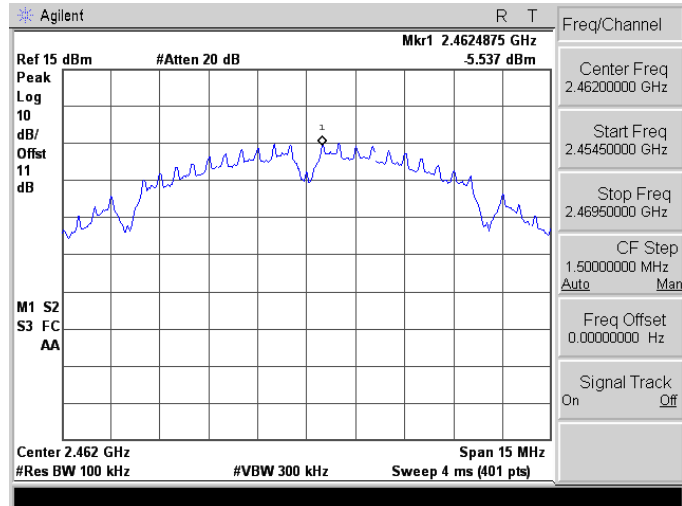


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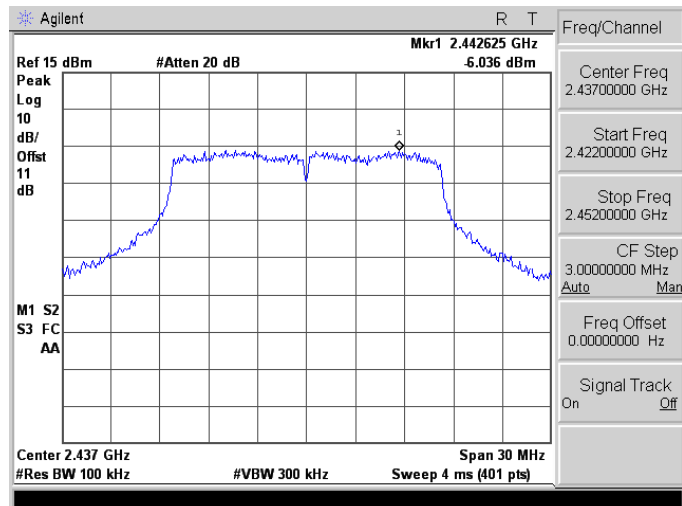


Mode 3: IEEE 802.11g Link Mode _ ANT2

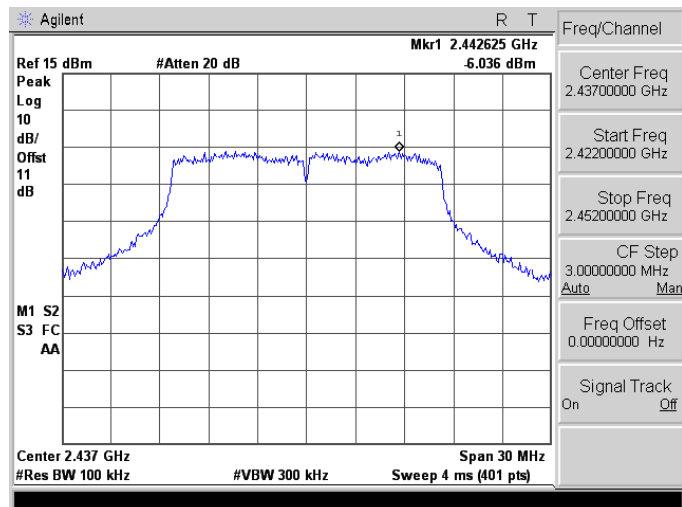
2412



2437

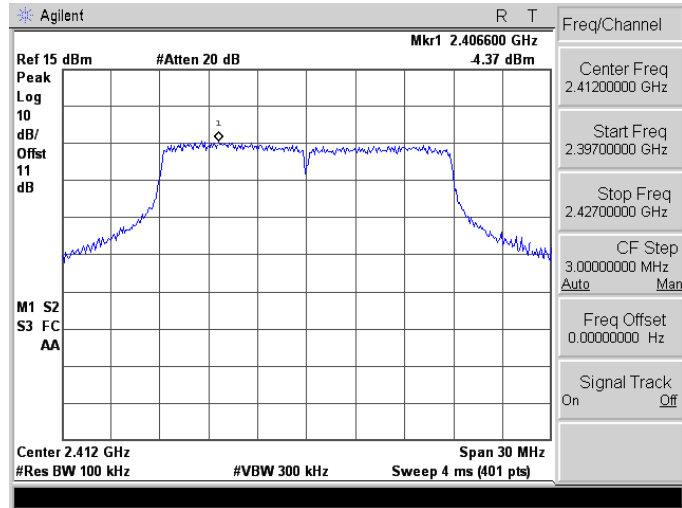


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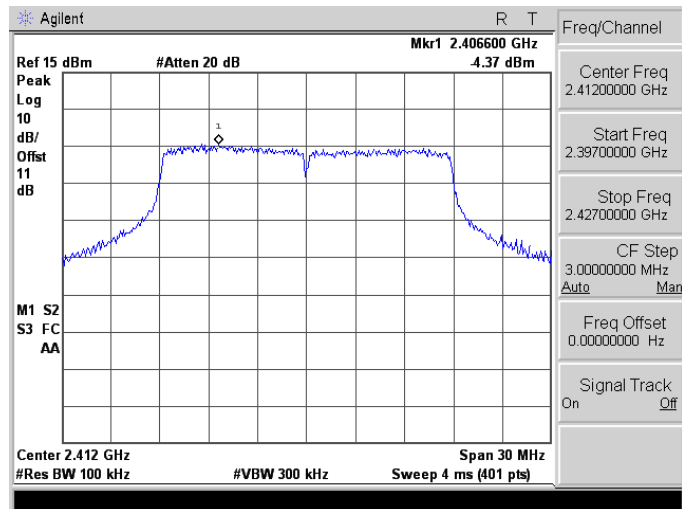


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ ANT2

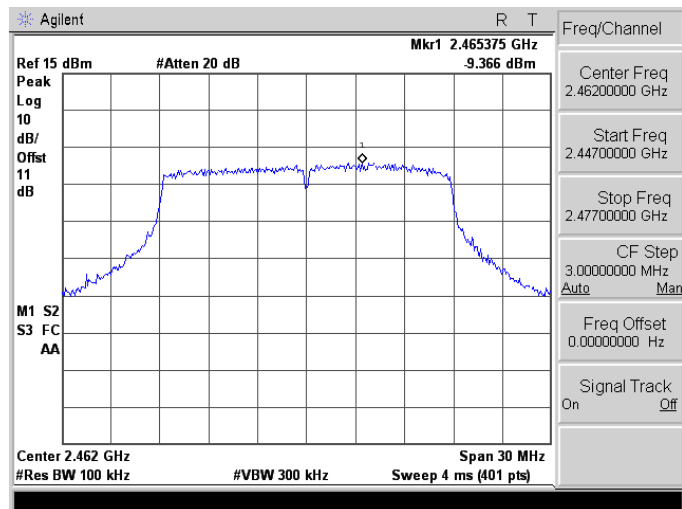
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2437

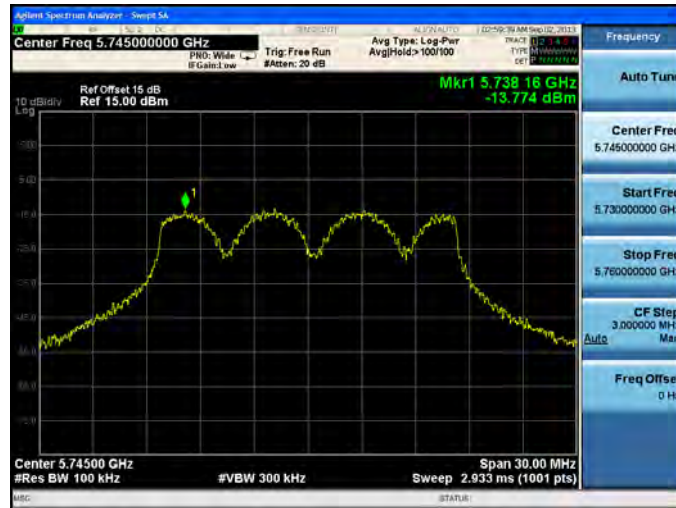


2462



Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT2

5745



5785

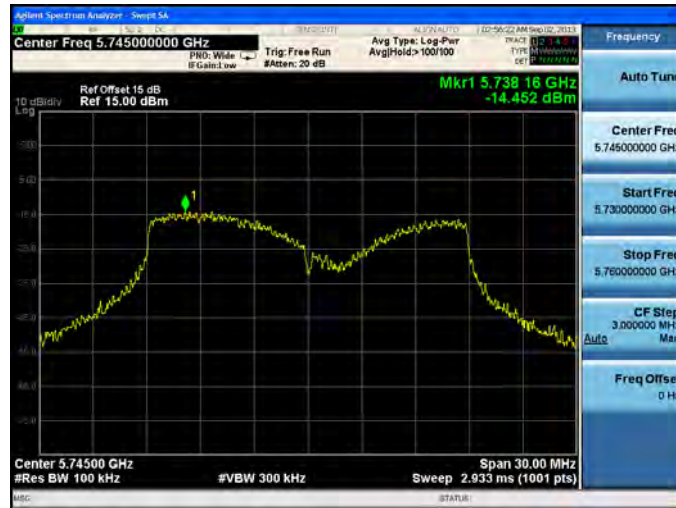


5825



Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT2

5745



5785

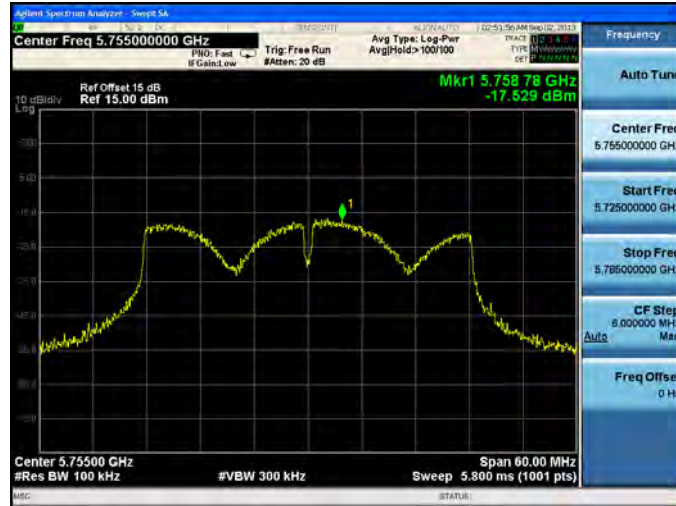


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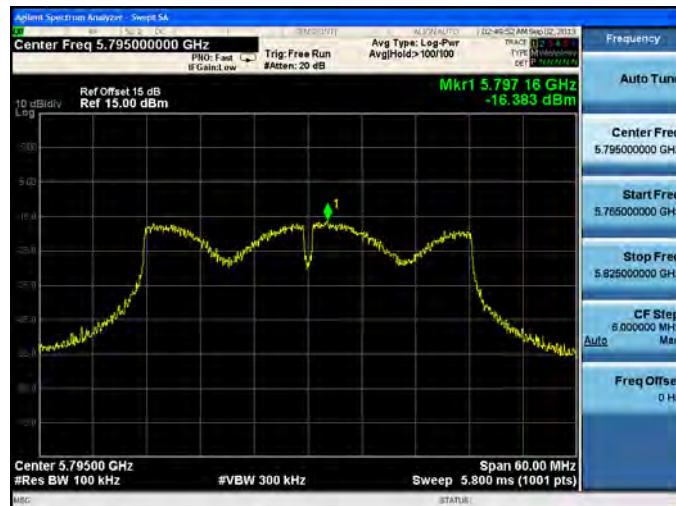


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ANT2

5755



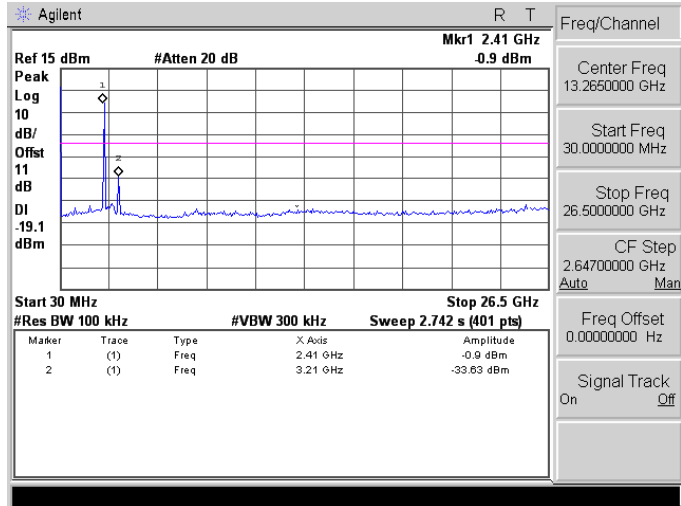
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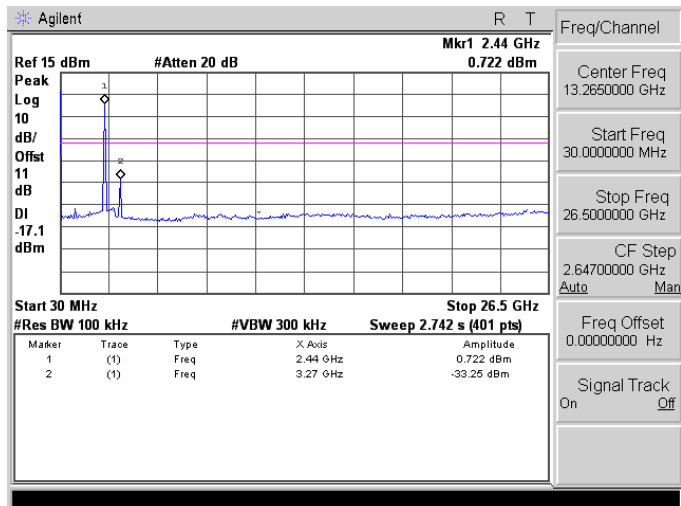
Out of Band Conducted Emissions

Mode 2: IEEE 802.11b Link Mode _ ANT1

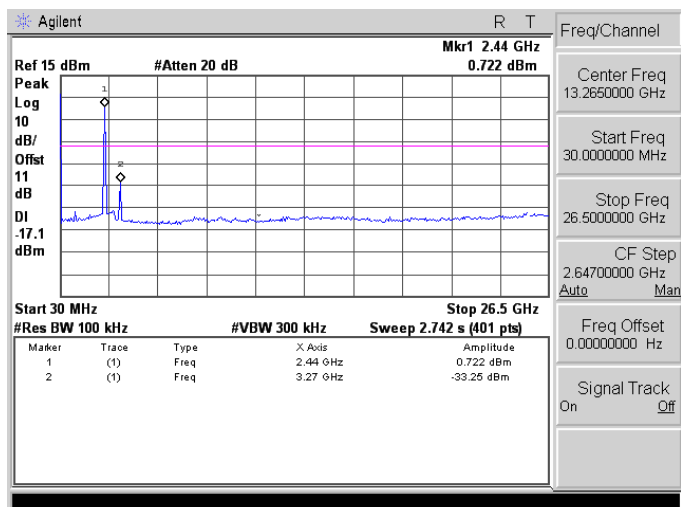
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2437

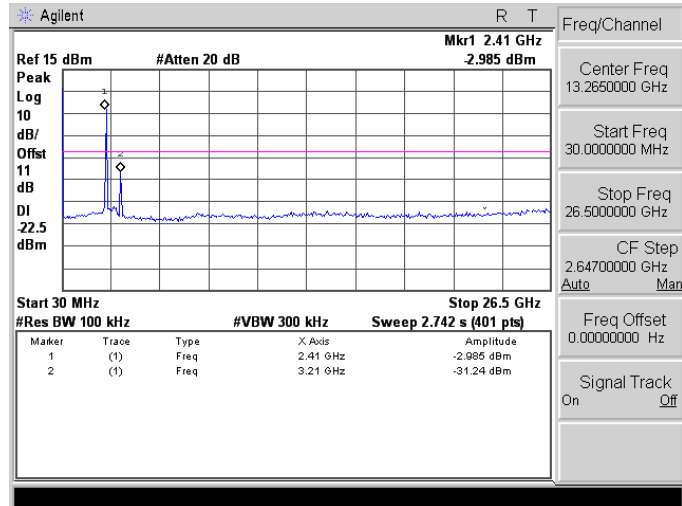


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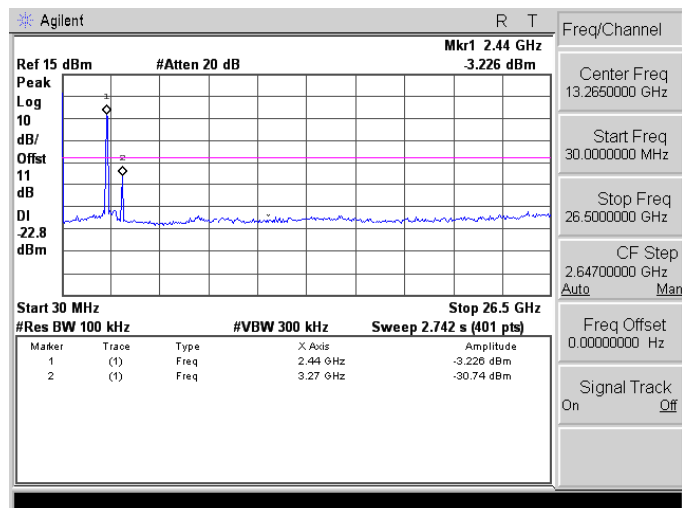


Mode 3: IEEE 802.11g Link Mode _ ANT1

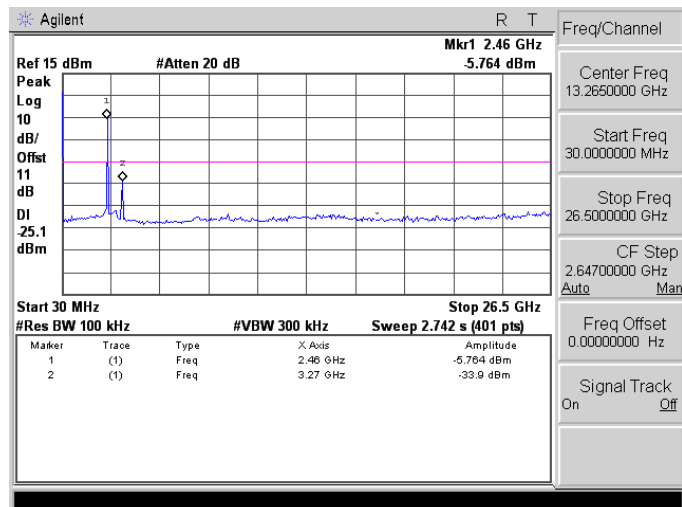
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2437

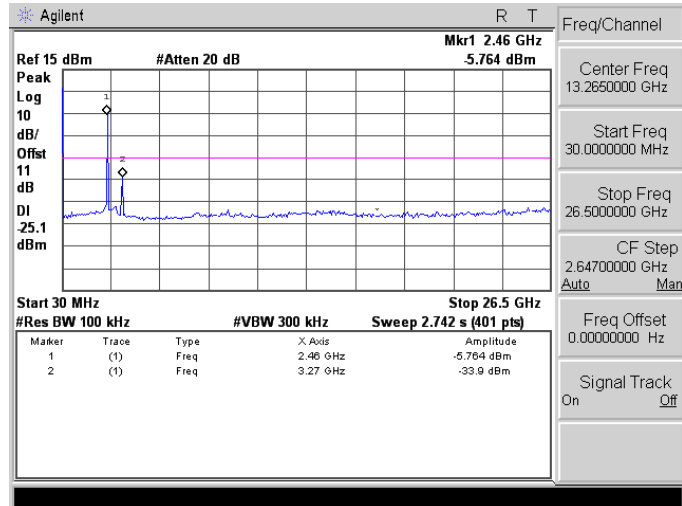


2462

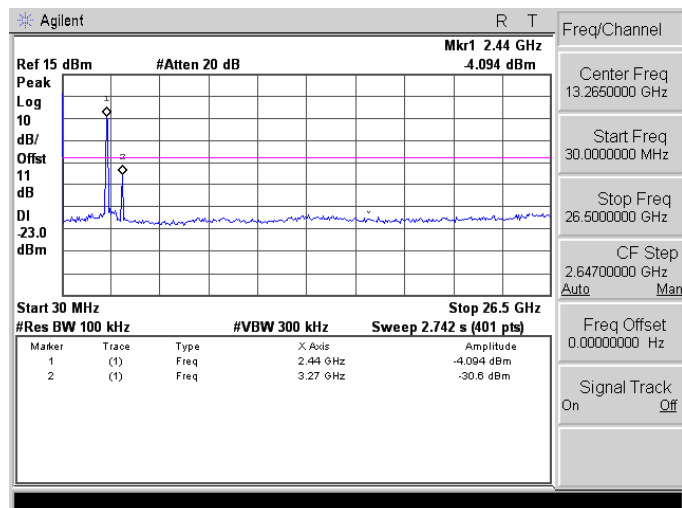


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ANT1

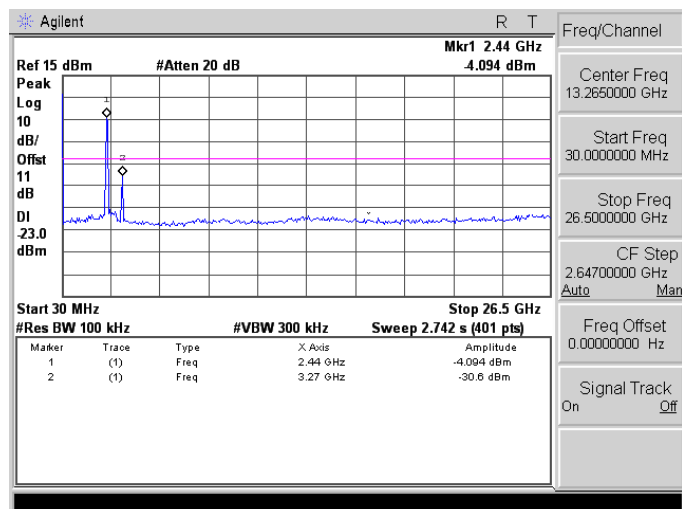
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2437

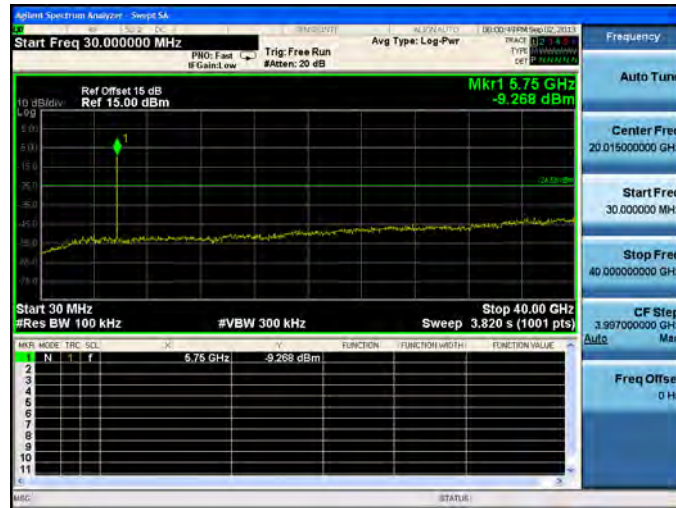


2462

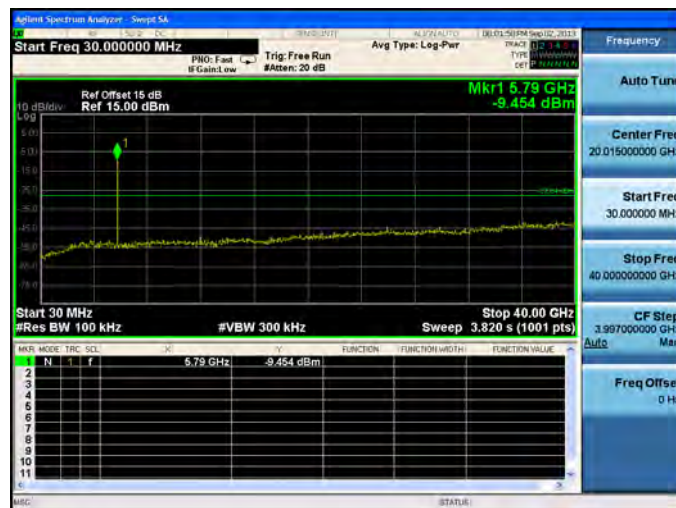


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT1

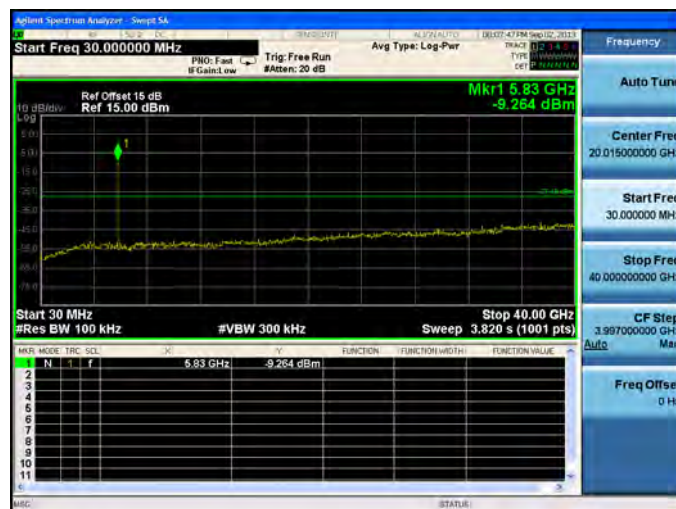
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5785

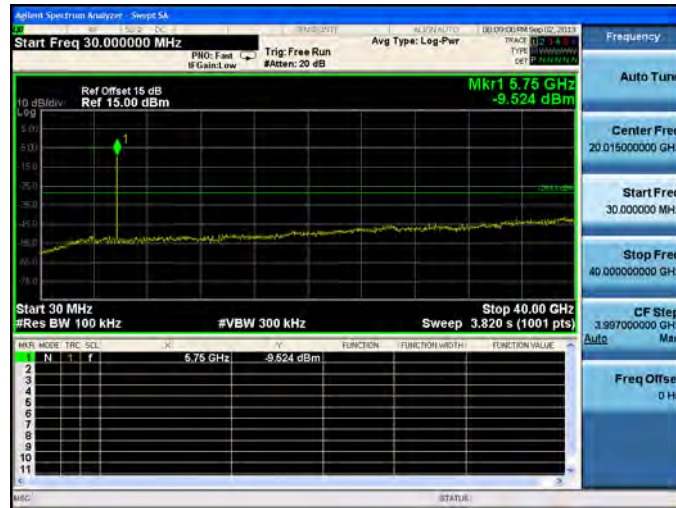


5825

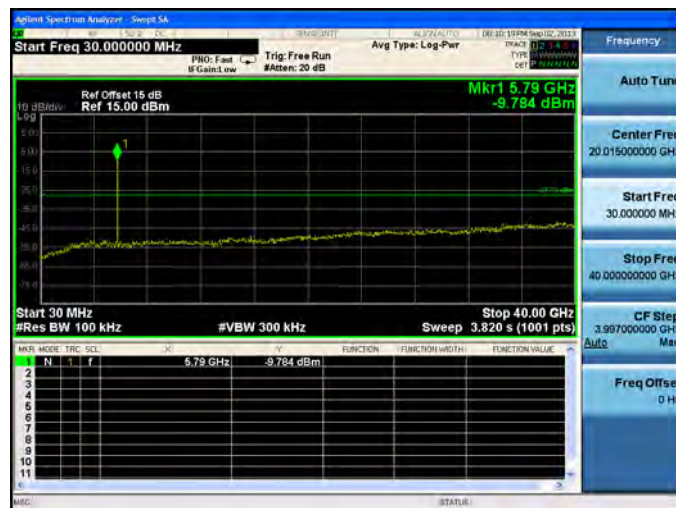


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT1

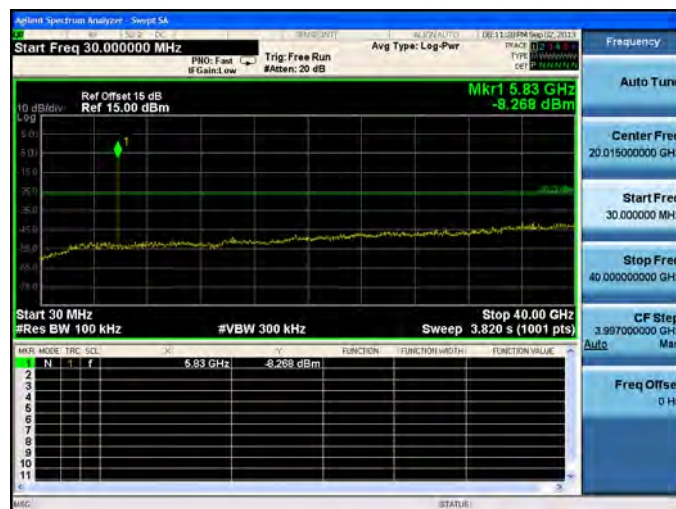
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5785

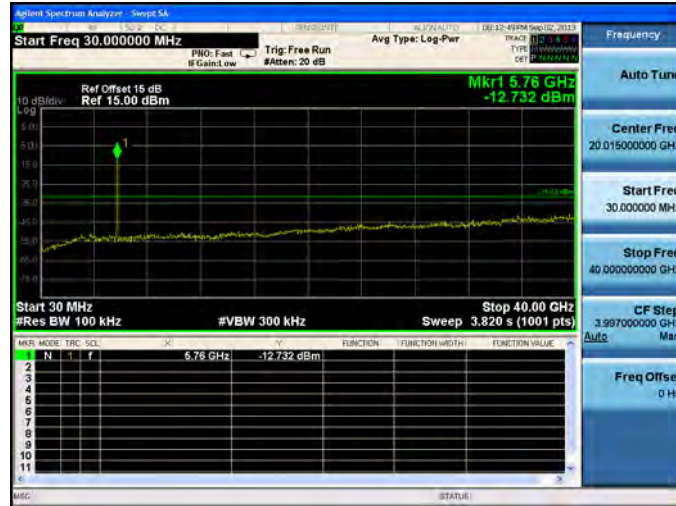


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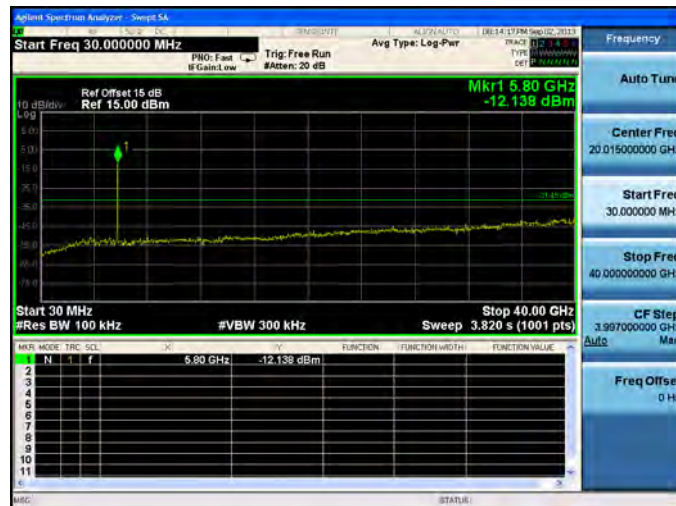


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT1

5755

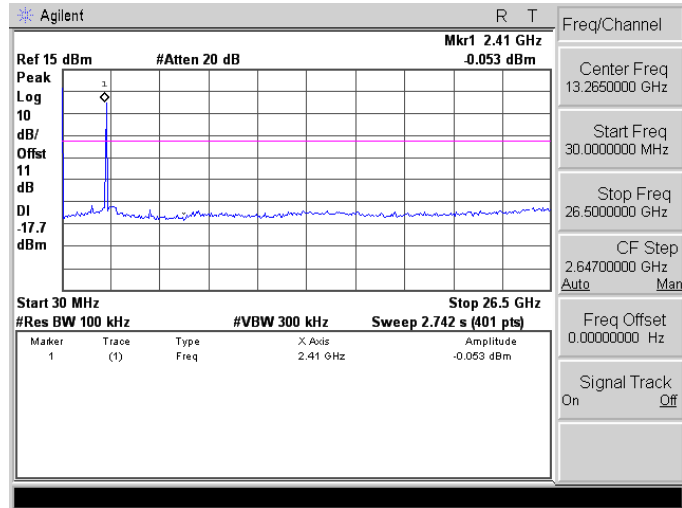


5795

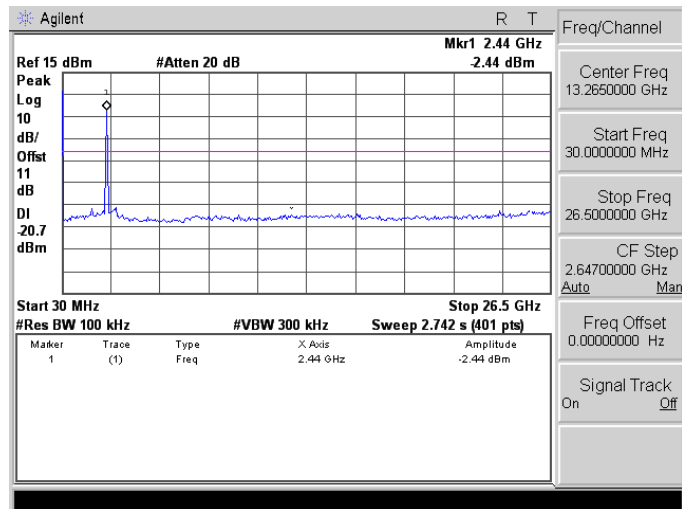


Mode 2: IEEE 802.11b Link Mode _ ANT2

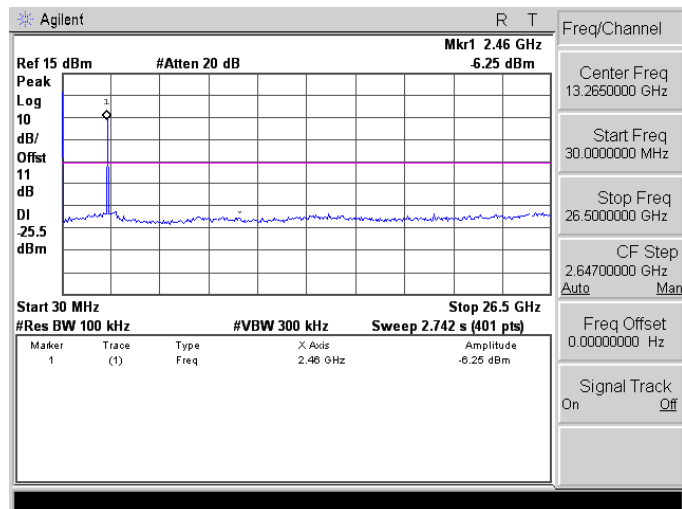
2412



2437

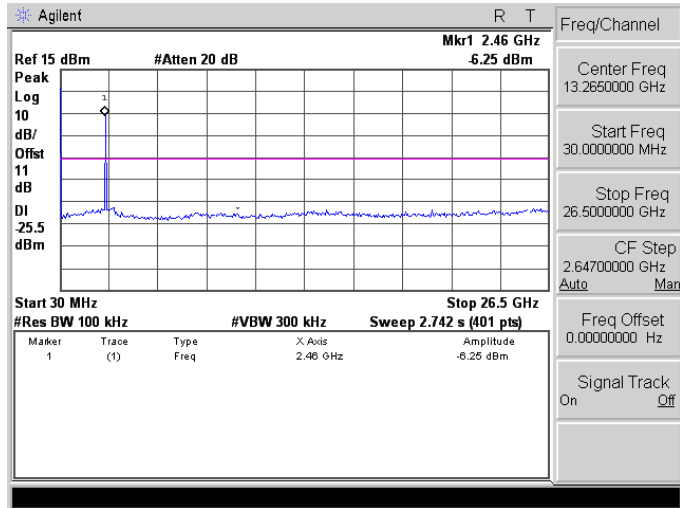


2462

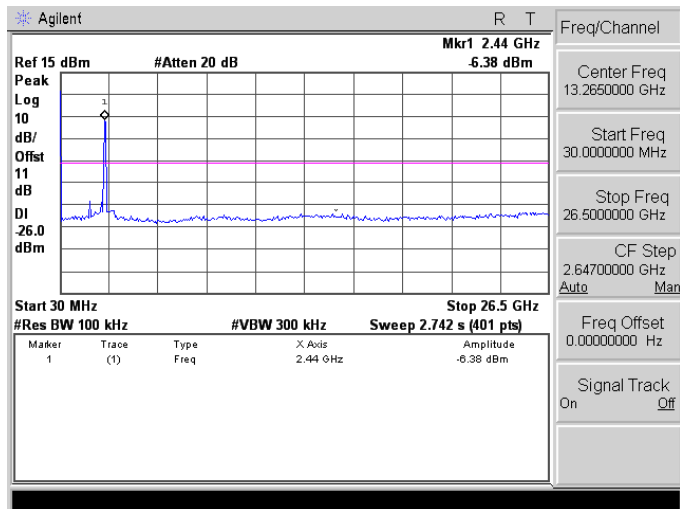


Mode 3: IEEE 802.11g Link Mode _ ANT2

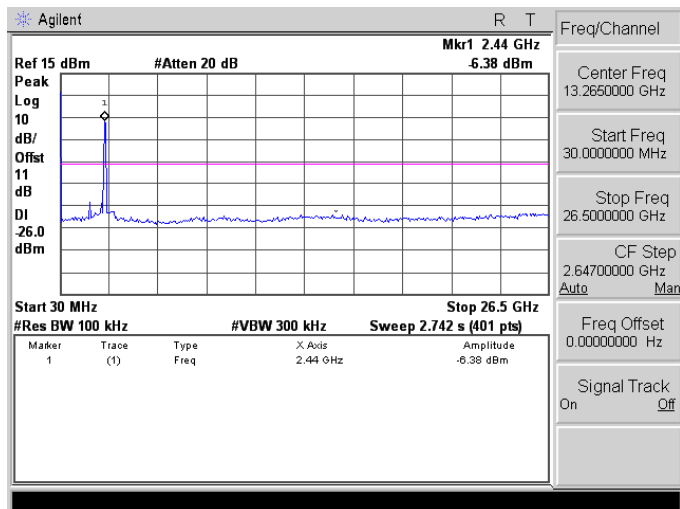
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2437

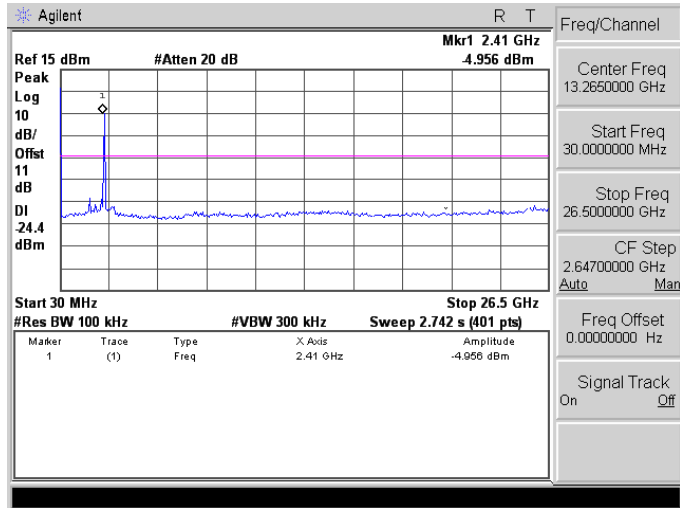


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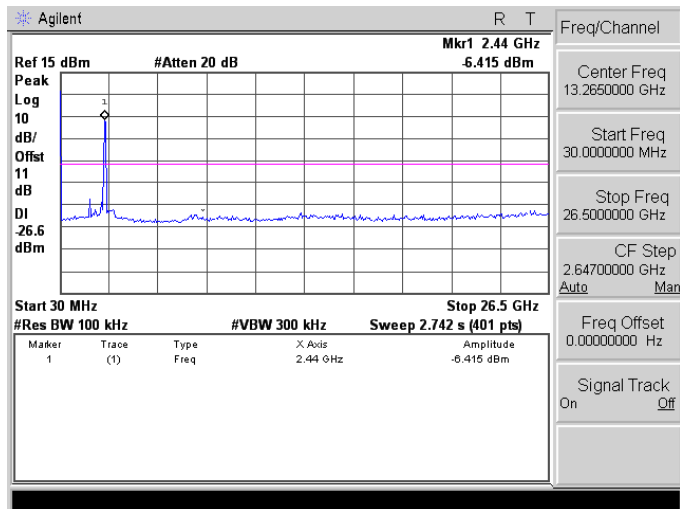


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ANT2

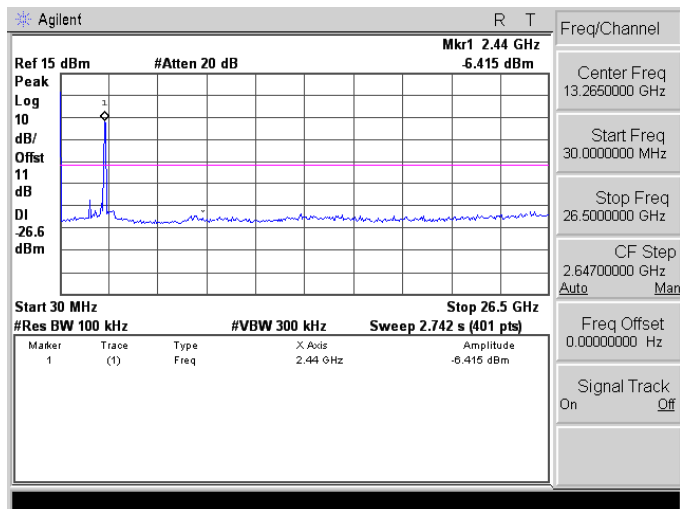
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2437

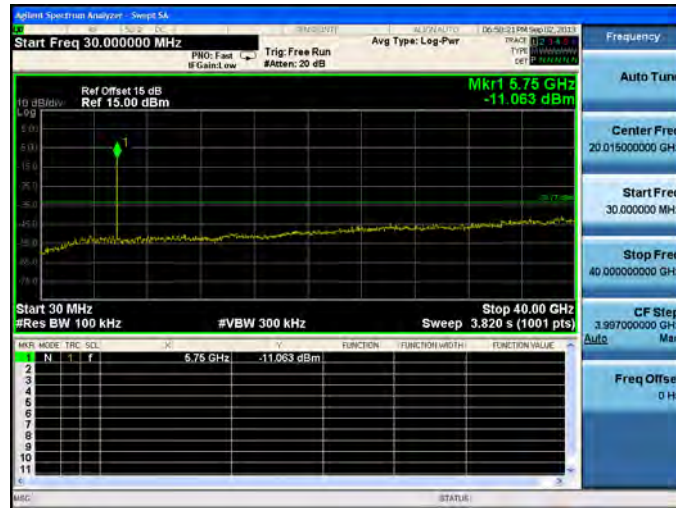


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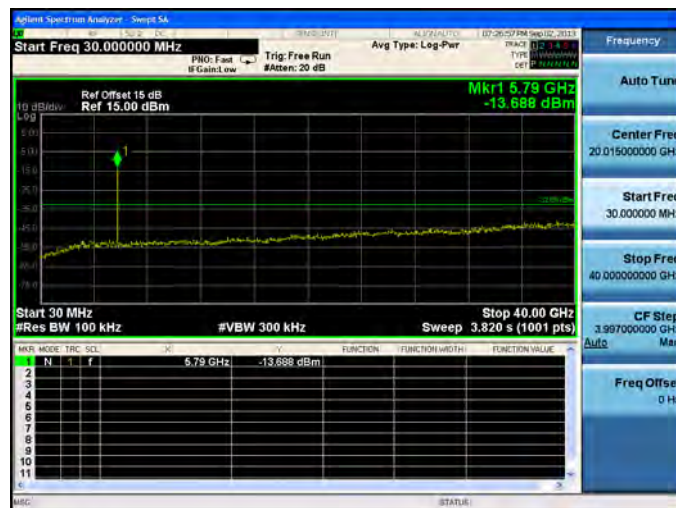


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT2

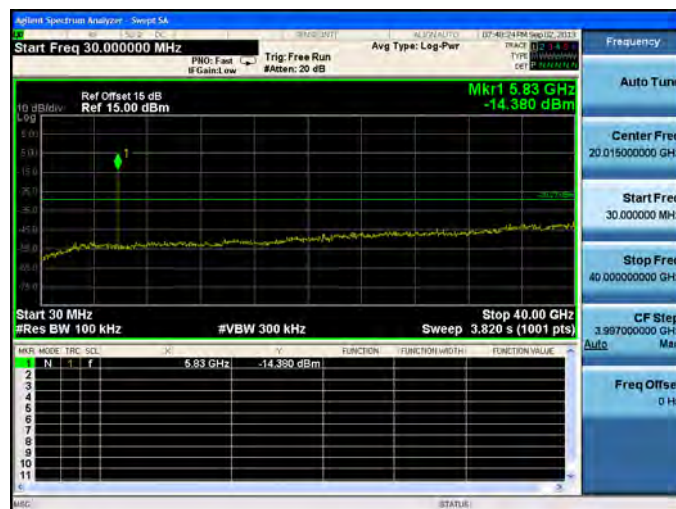
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5785

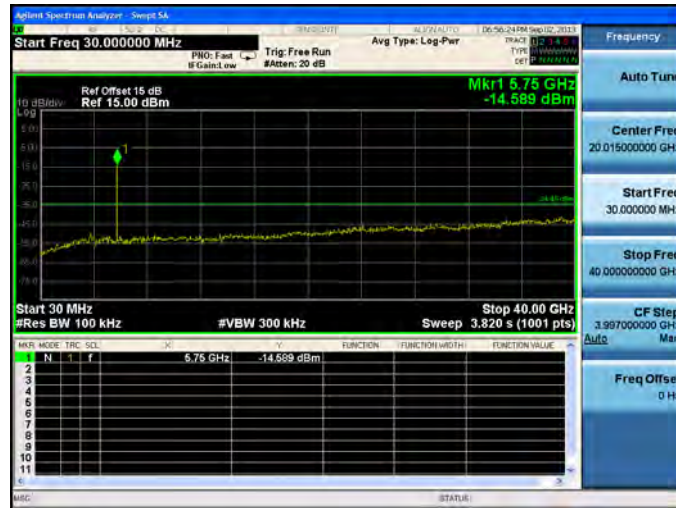


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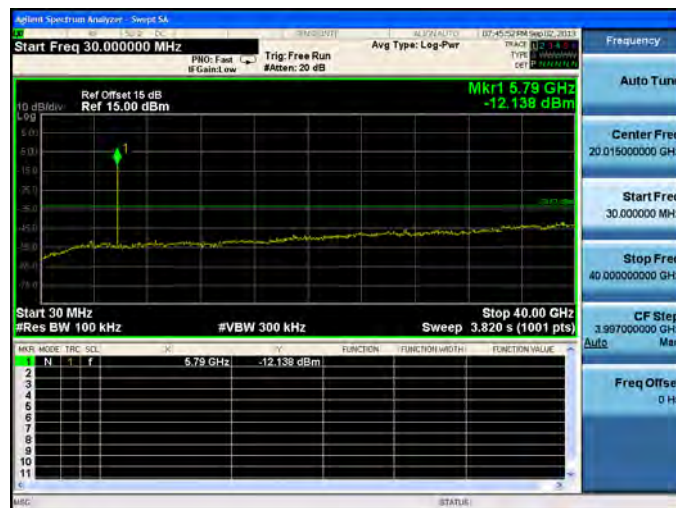


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT2

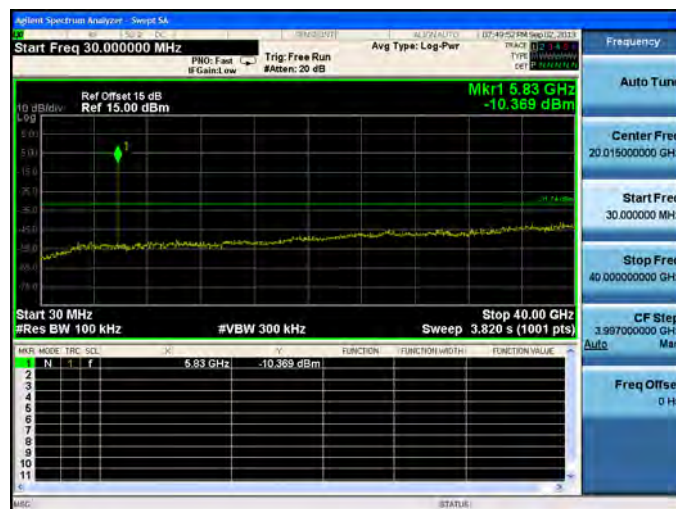
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5785

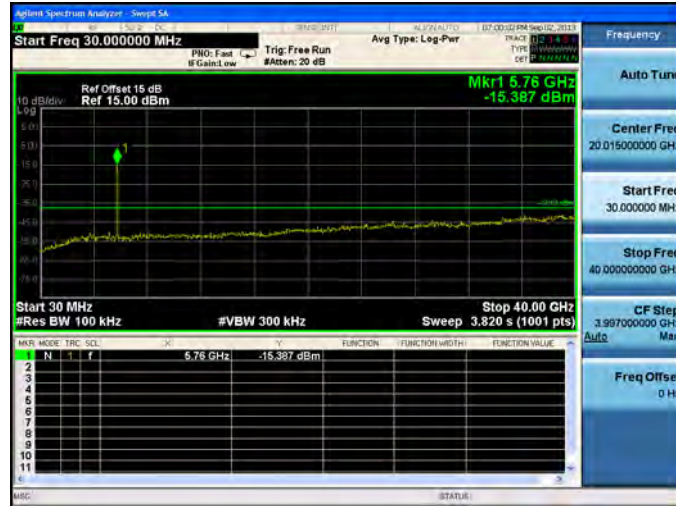


5825

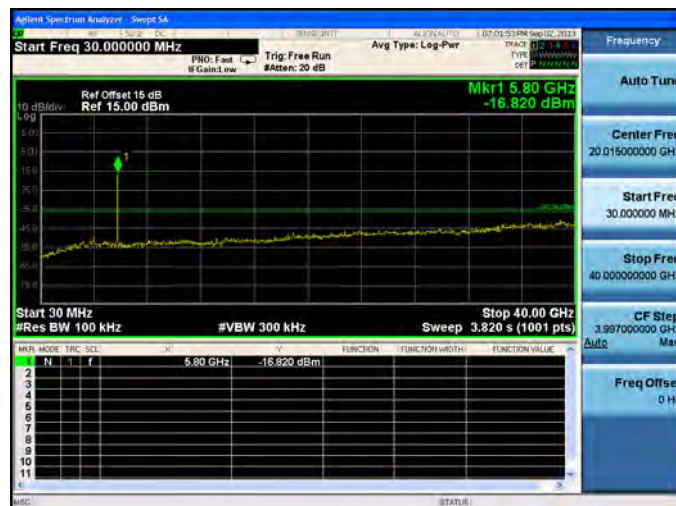


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT2

5755



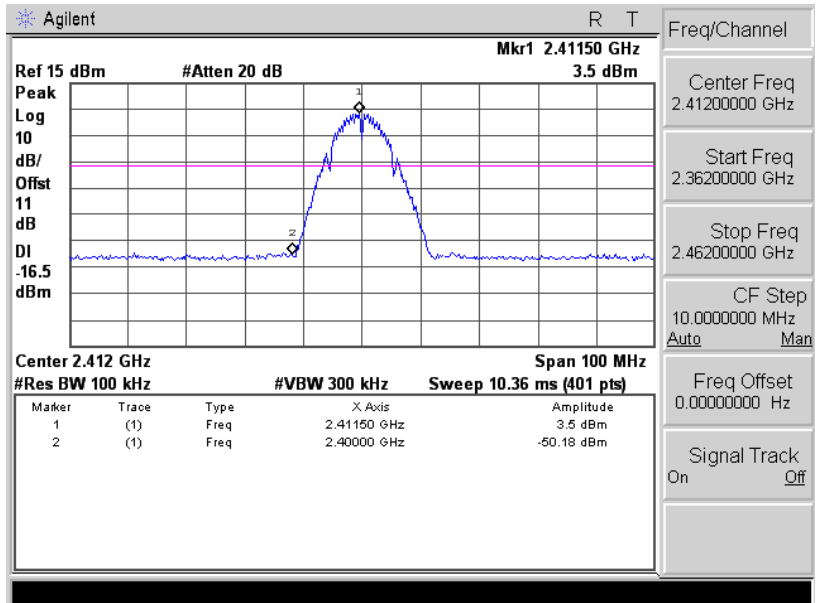
5795



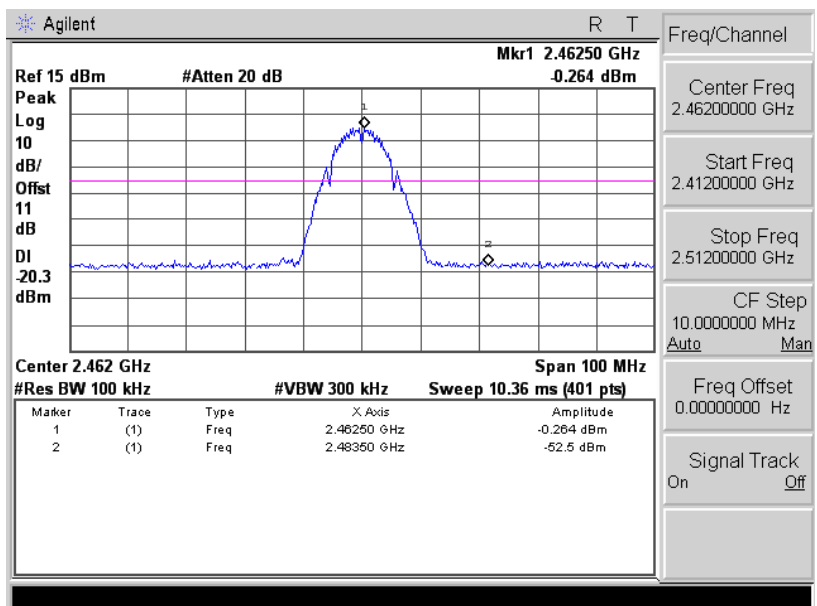
Conducted Band Edge

Mode 2: IEEE 802.11b Link Mode _ ANT1

2412

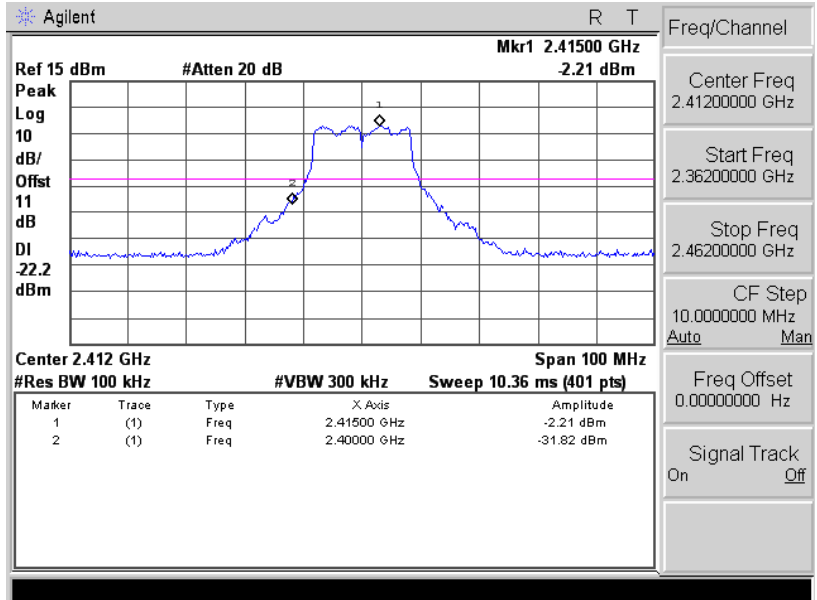


2462

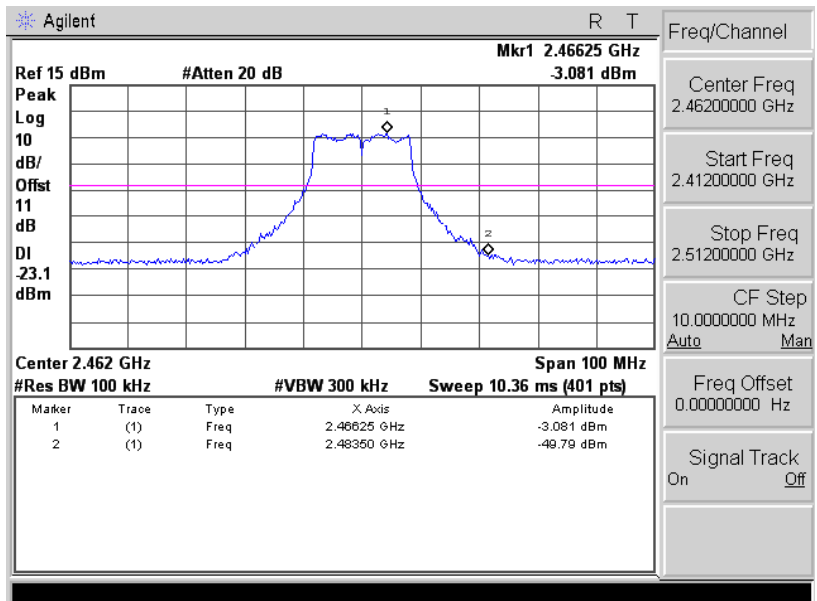


Mode 3: IEEE 802.11g Link Mode _ ANT1

2412

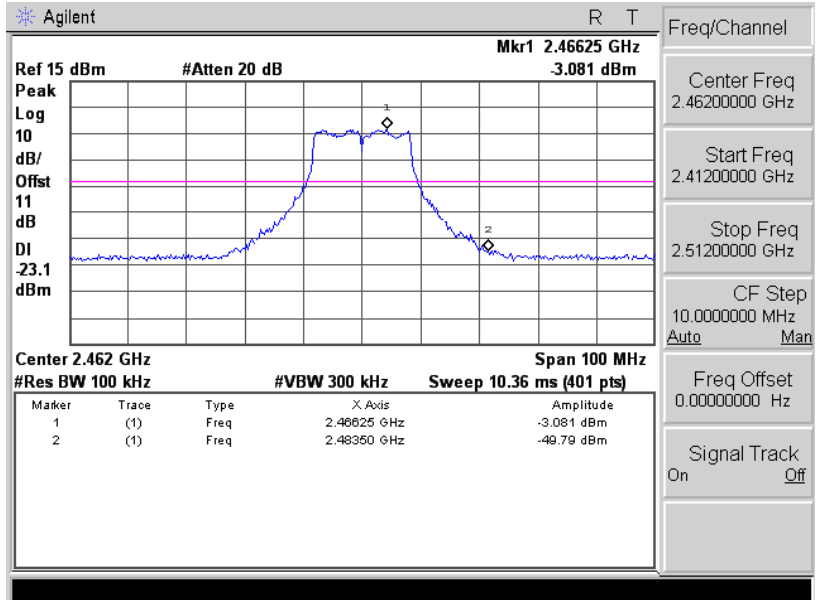


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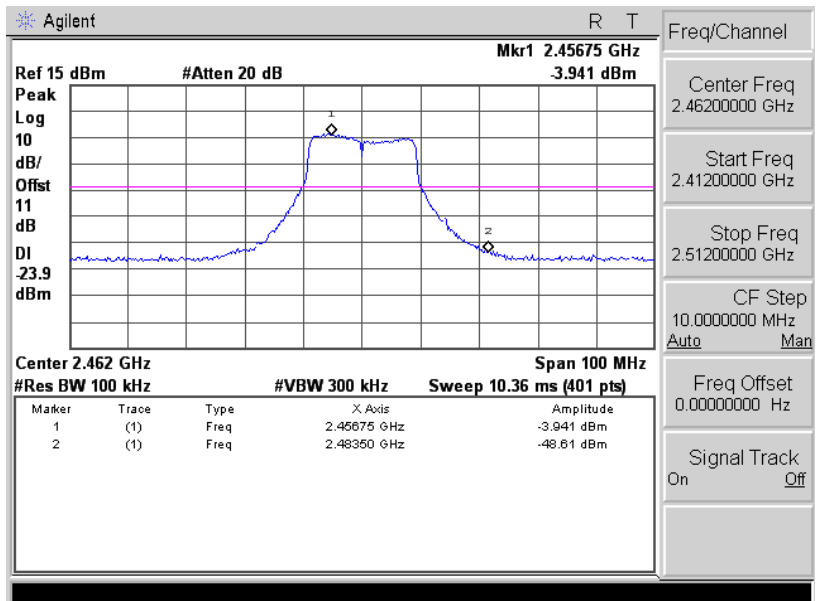


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ANT1

2412

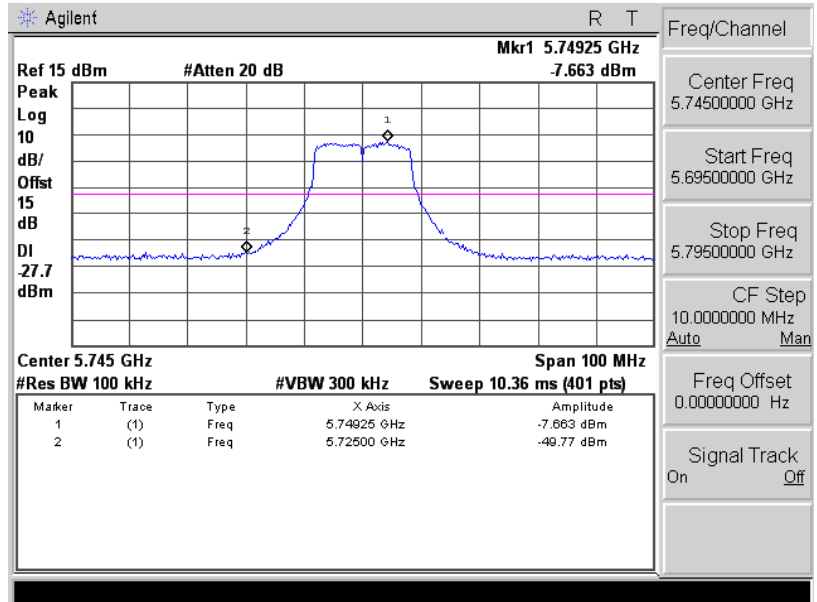


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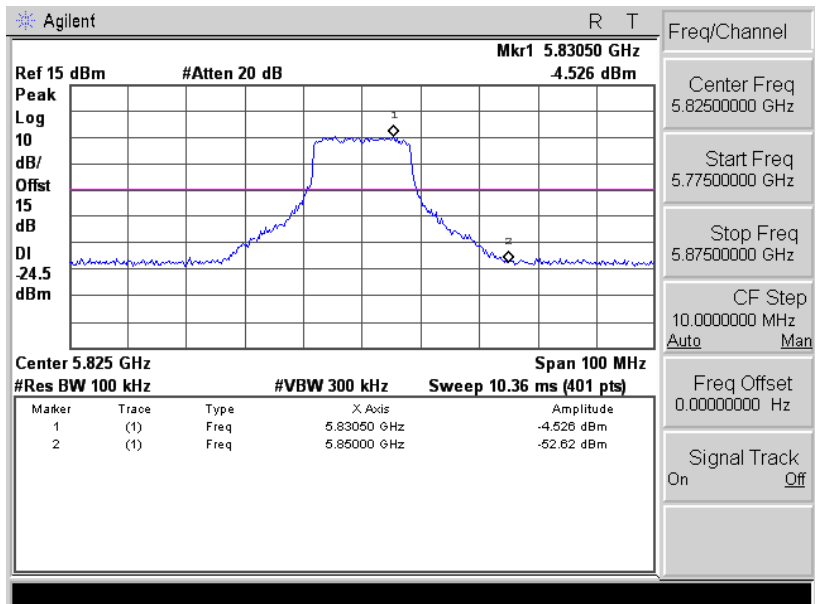


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT1

5745

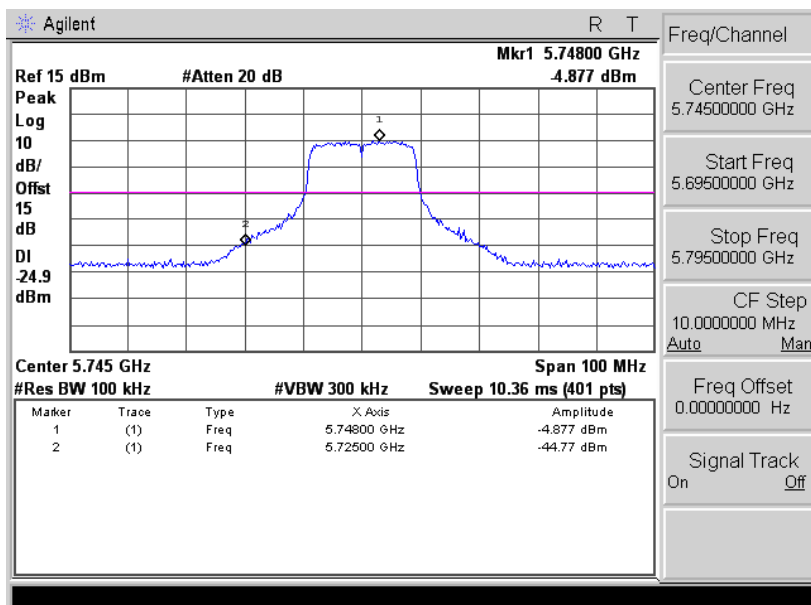


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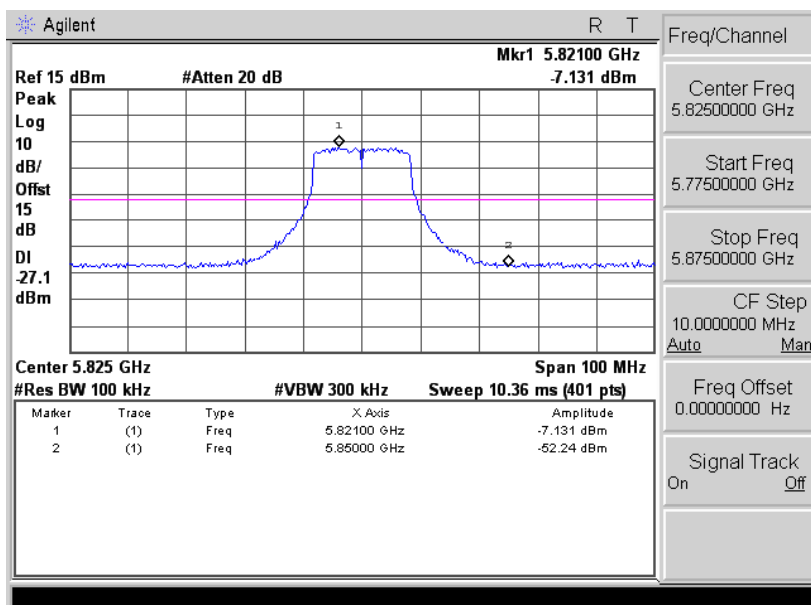


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT1

5745

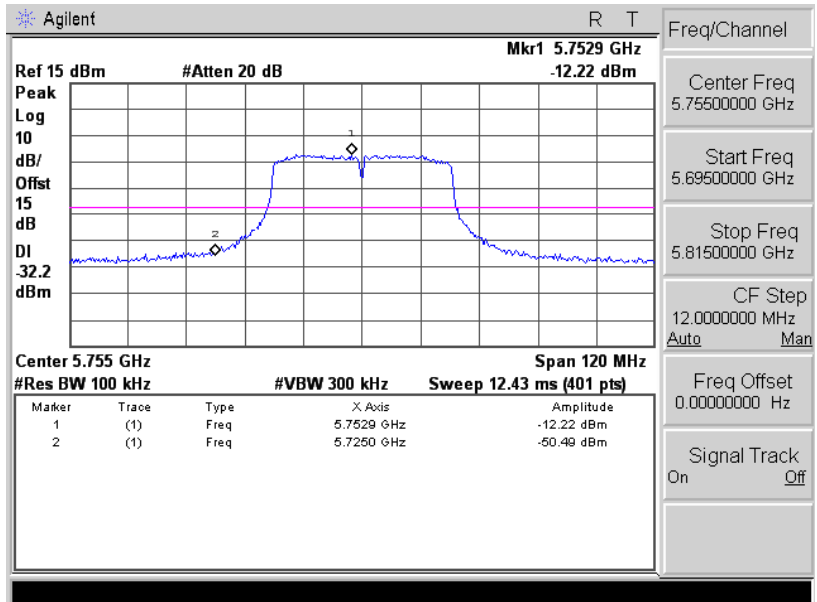


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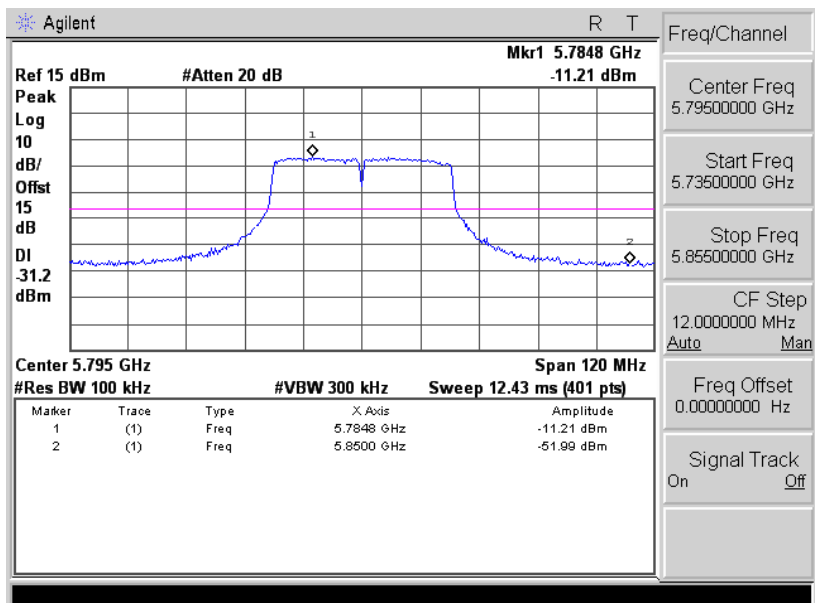


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT1

5755

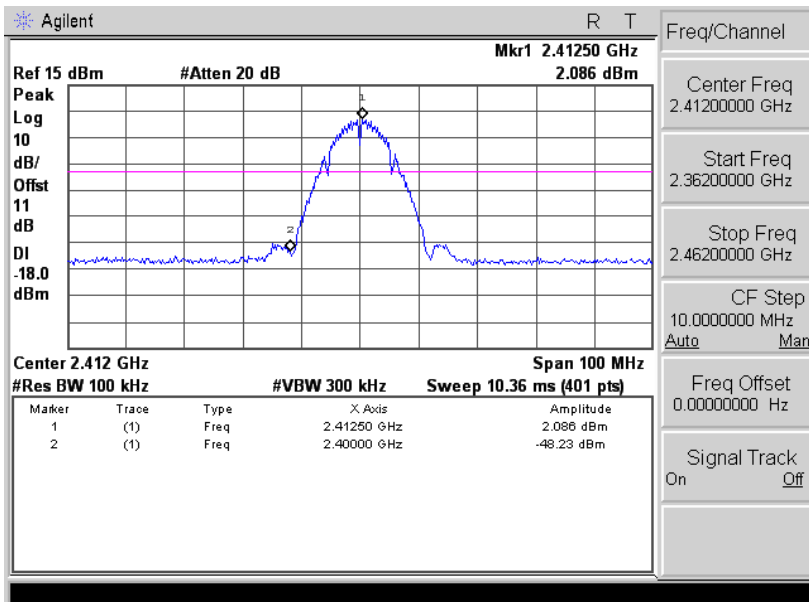


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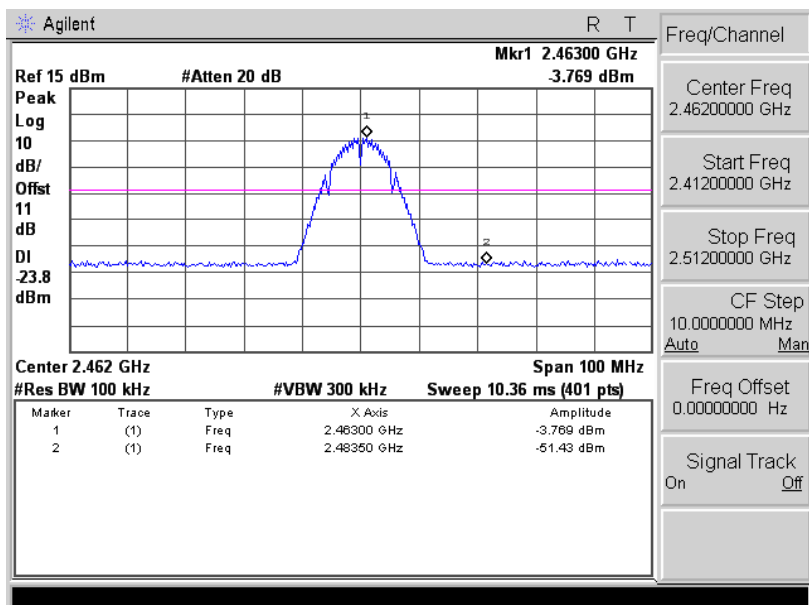


Mode 2: IEEE 802.11b Link Mode _ ANT2

2412

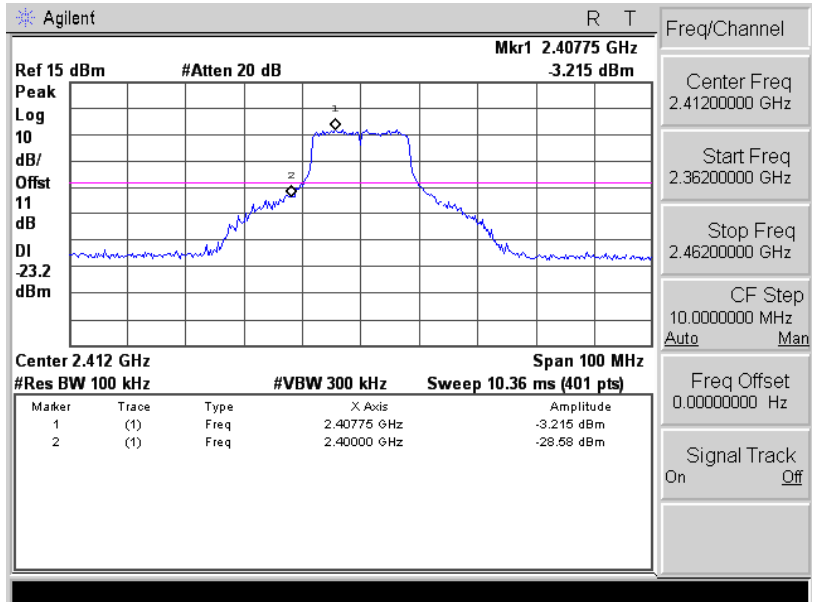


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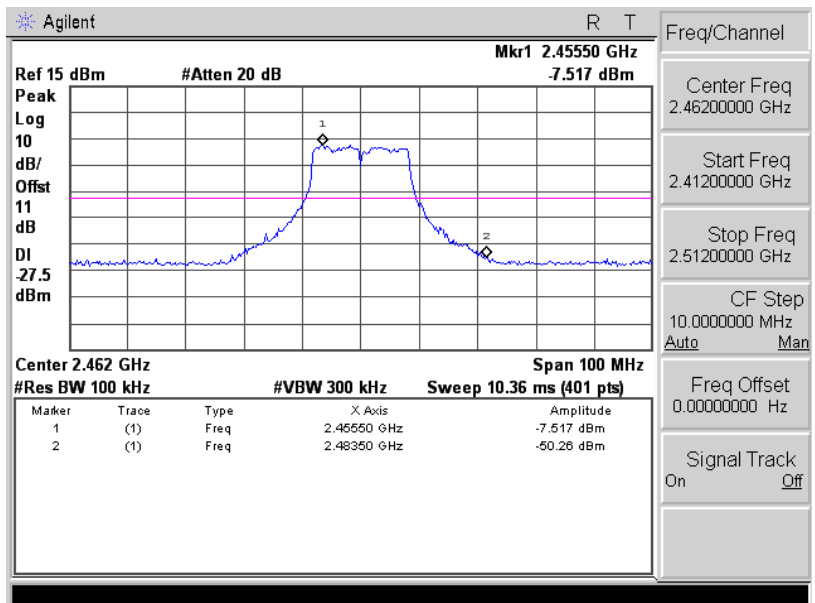


Mode 3: IEEE 802.11g Link Mode _ ANT2

2412

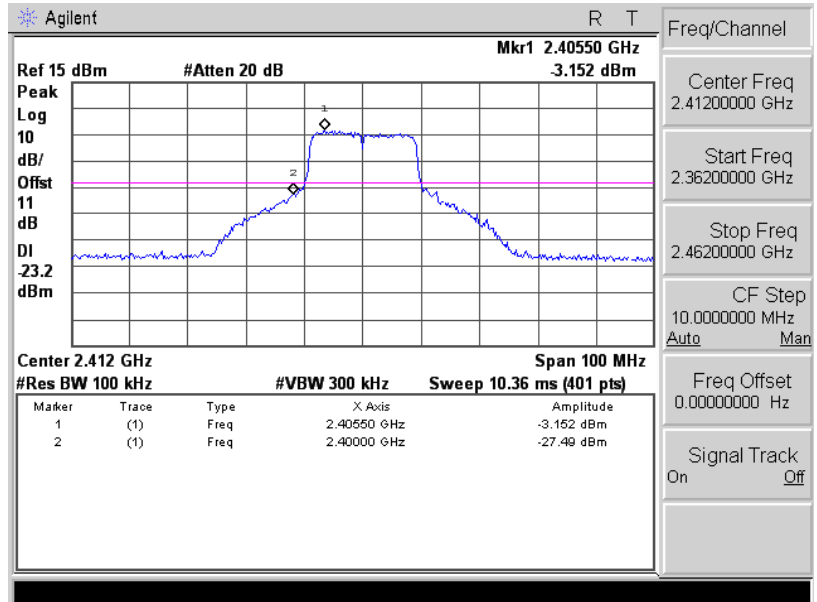


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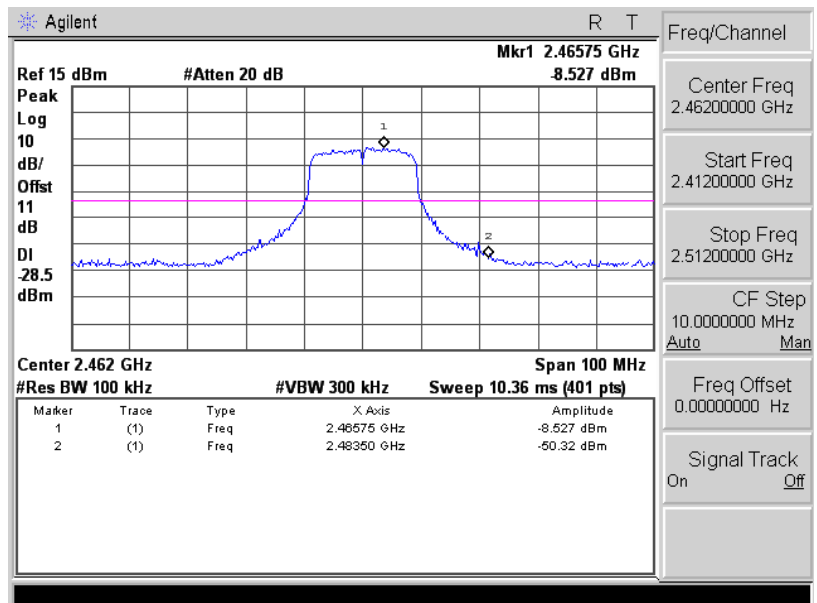


Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode _ANT2

2412

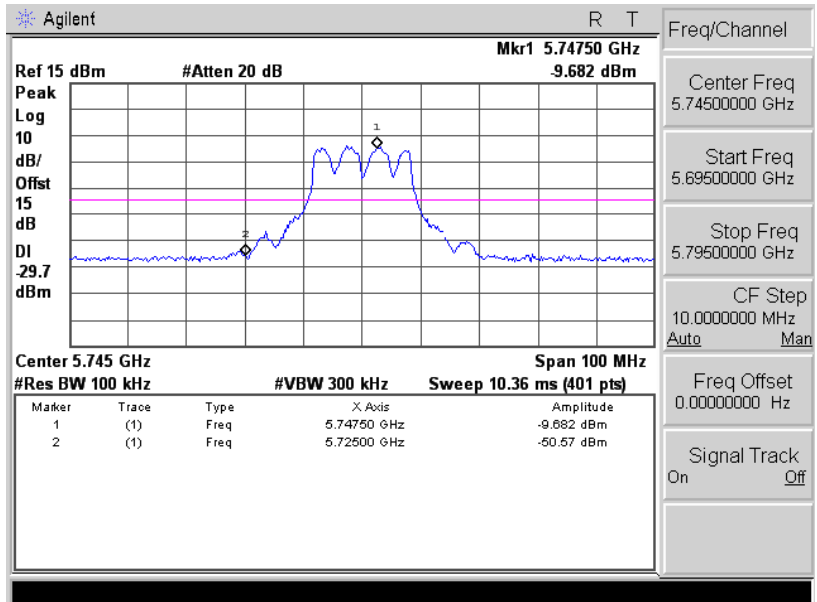


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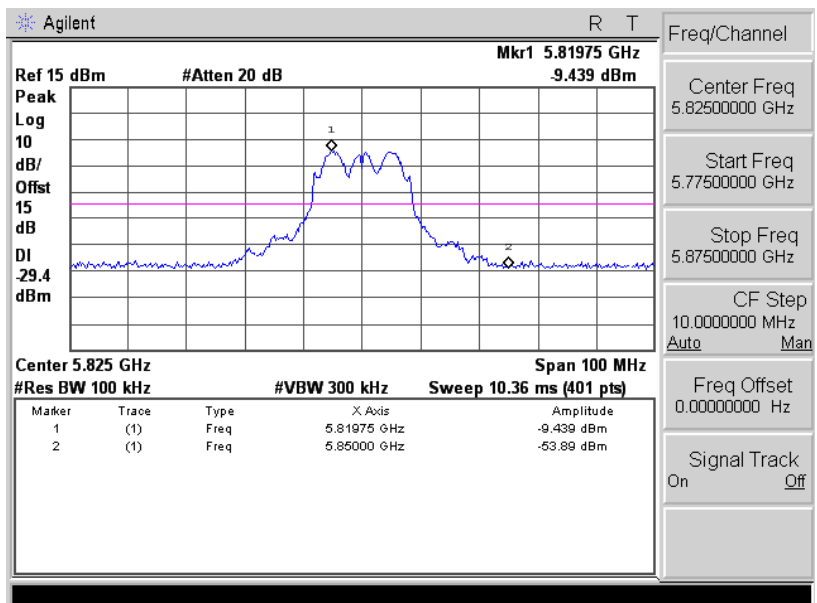


Mode 5: IEEE 802.11a U-NII Band IV Link Mode _ANT2

5745

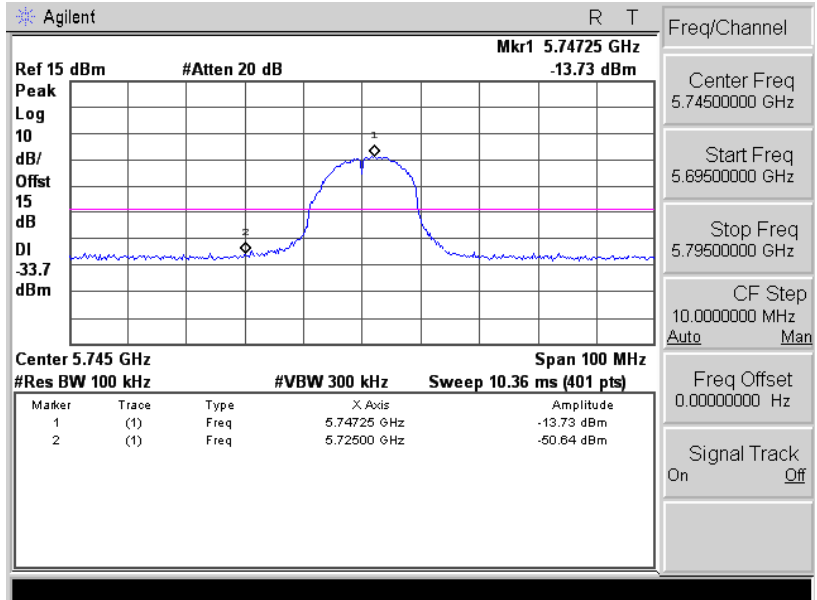


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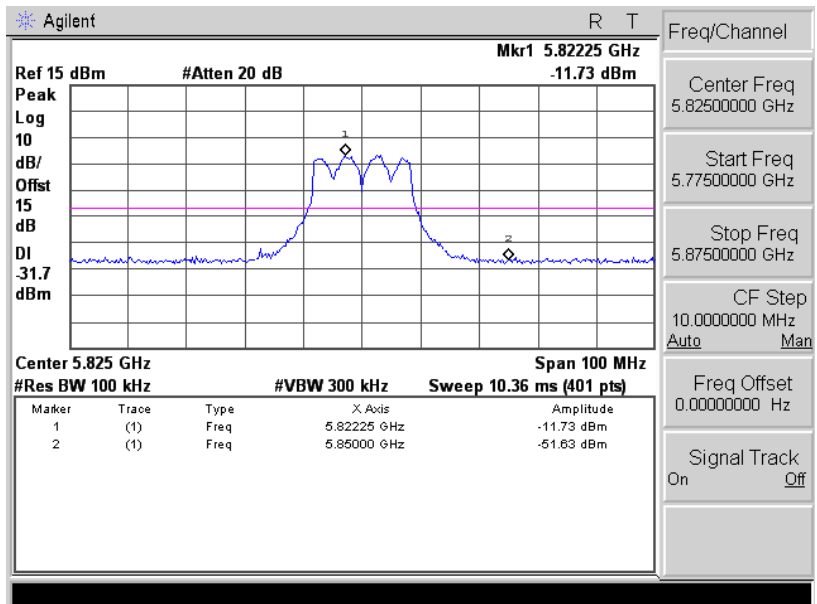


Mode 6: IEEE 802.11n U-NII Band IV 20MHz Link Mode _ ANT2

5745

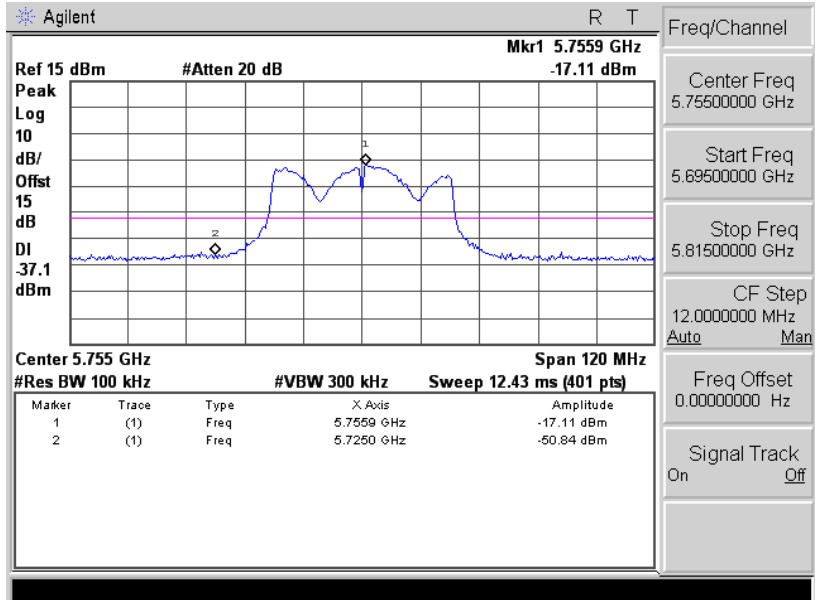


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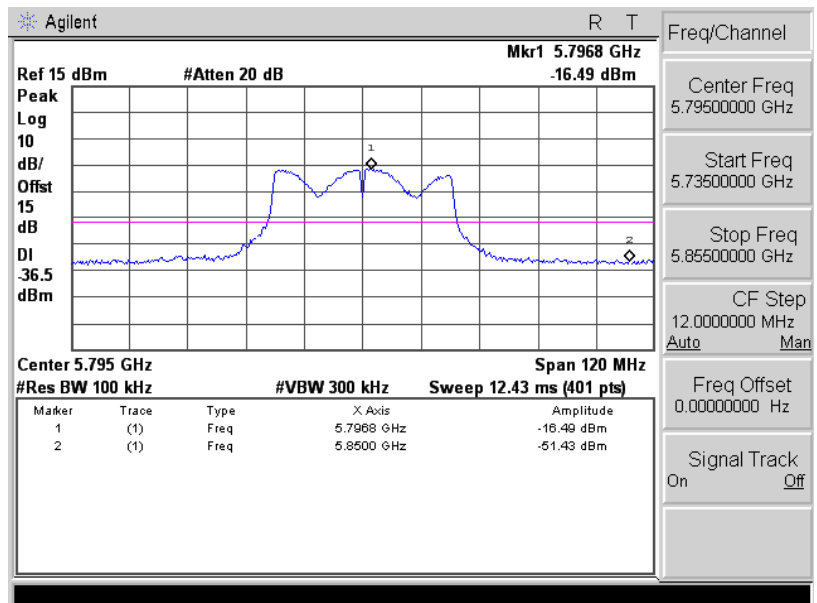


Mode 7: IEEE 802.11n U-NII Band IV 40MHz Link Mode _ ANT2

5755



5795

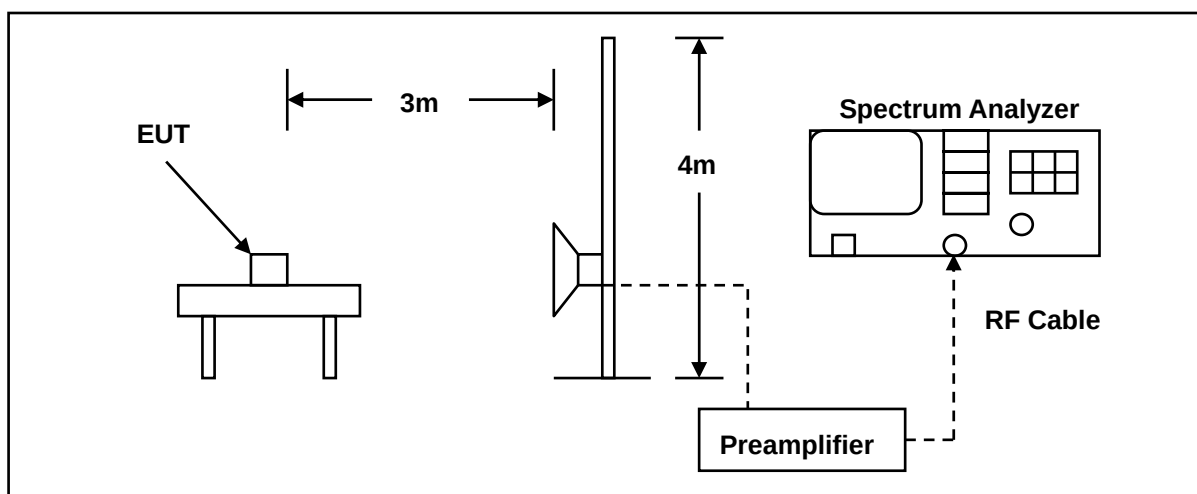


10 Band Edges Measurement

10.1.Limit

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

10.2.Test Setup



10.3.Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/16/2012	(2)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2013	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2013	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/16/2013	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2013	(1)
Test Site	ATL	TE01	888001	08/27/2013	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.

Note: N.C.R. = No Calibration Request.

10.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to DTS test procedure of KDB558074 D01 DTS Meas Guidance v03r01 for compliance to FCC 47CFR 15.247 requirements.

The emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter was in full radiated power. The additional test was performed to show compliance with the requirement at the band-edge frequency 2483.5 MHz and up to 2500 MHz and at 2390.0 MHz.

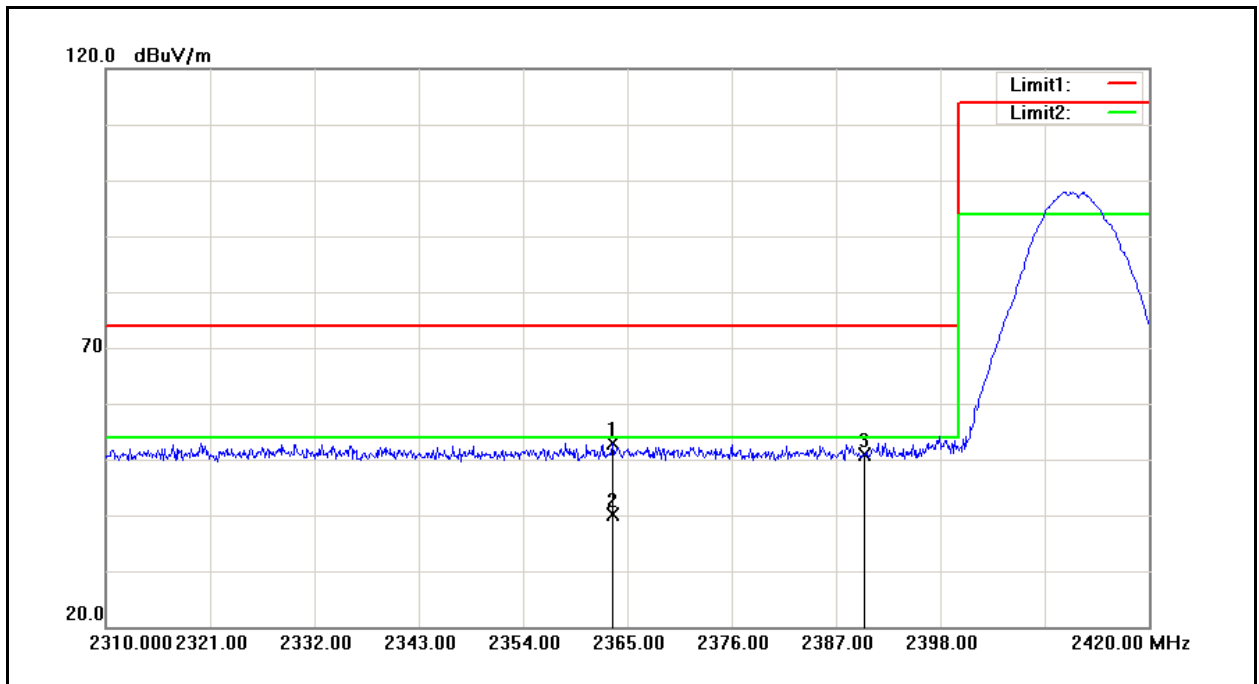
The transmitter was configured with the worst case antenna and setup to transmit at the highest channel. Then the field strength was measured at 2483.5 MHz.

The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel. Then the field strength was measured at 2390.0 MHz. These tests were performed at 4 different bit rates.

For measurements the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

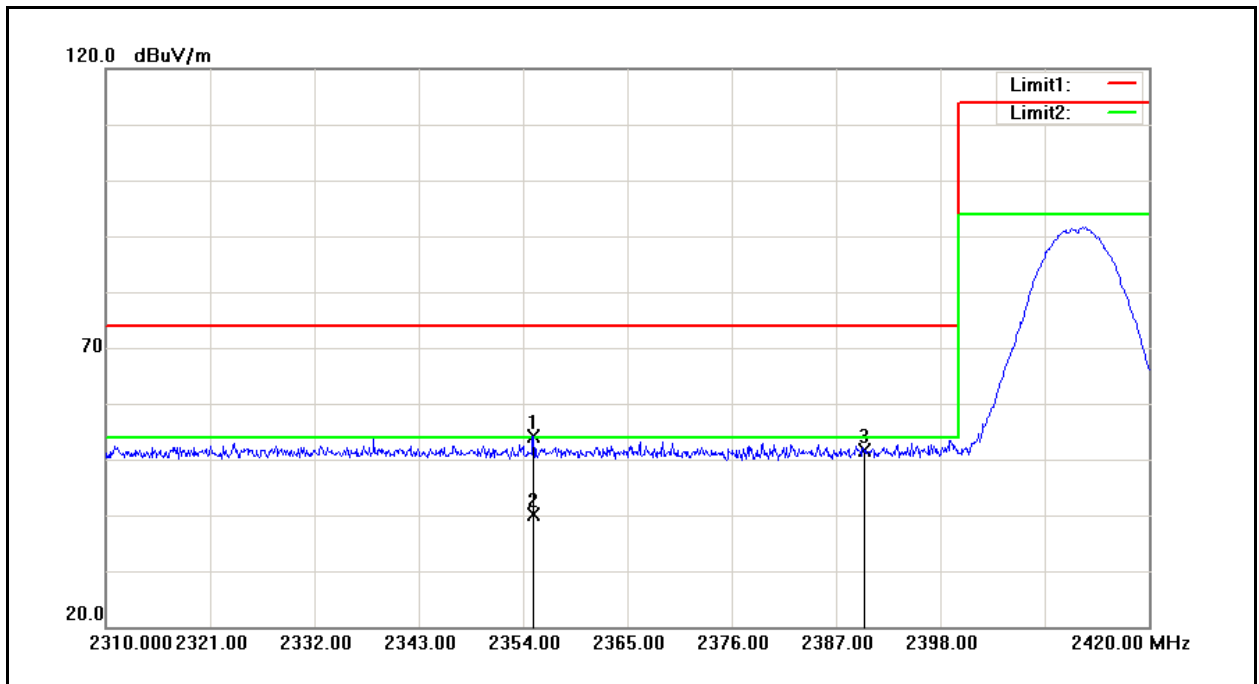
10.5. Test Result

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



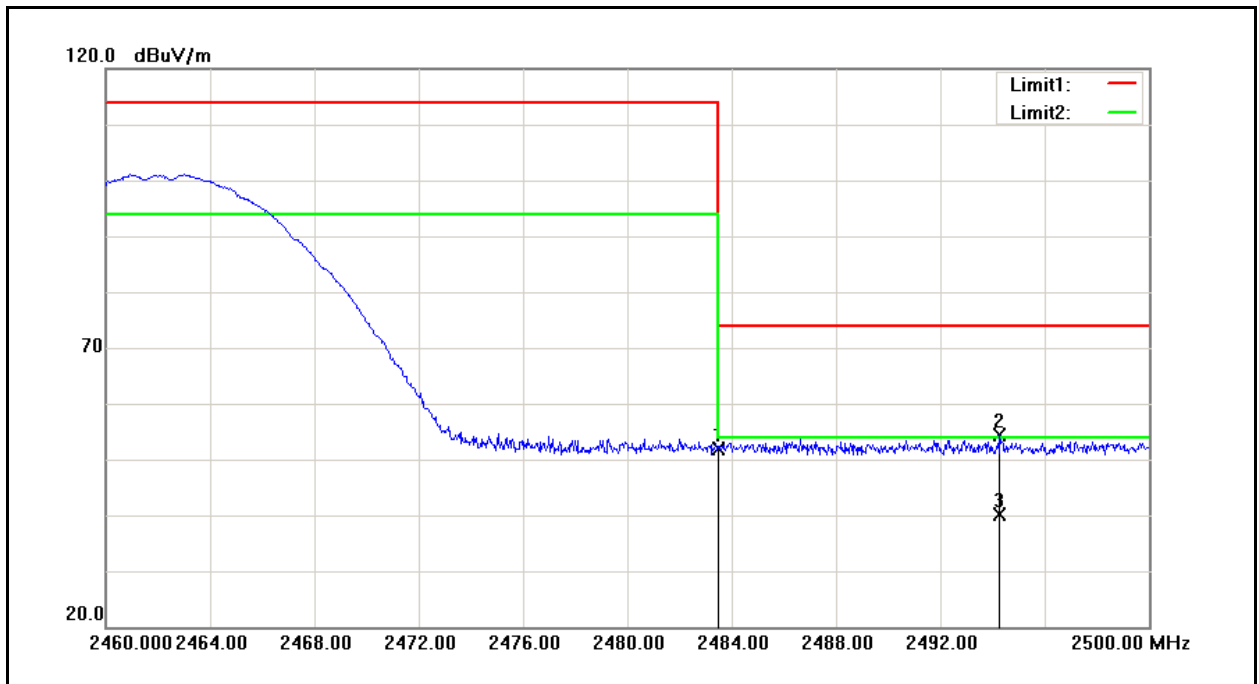
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2363.460	49.06	3.70	52.76	74.00	-21.24	peak
2	2363.460	36.52	3.70	40.22	54.00	-13.78	AVG
3	2390.000	46.89	3.88	50.77	74.00	-23.23	peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



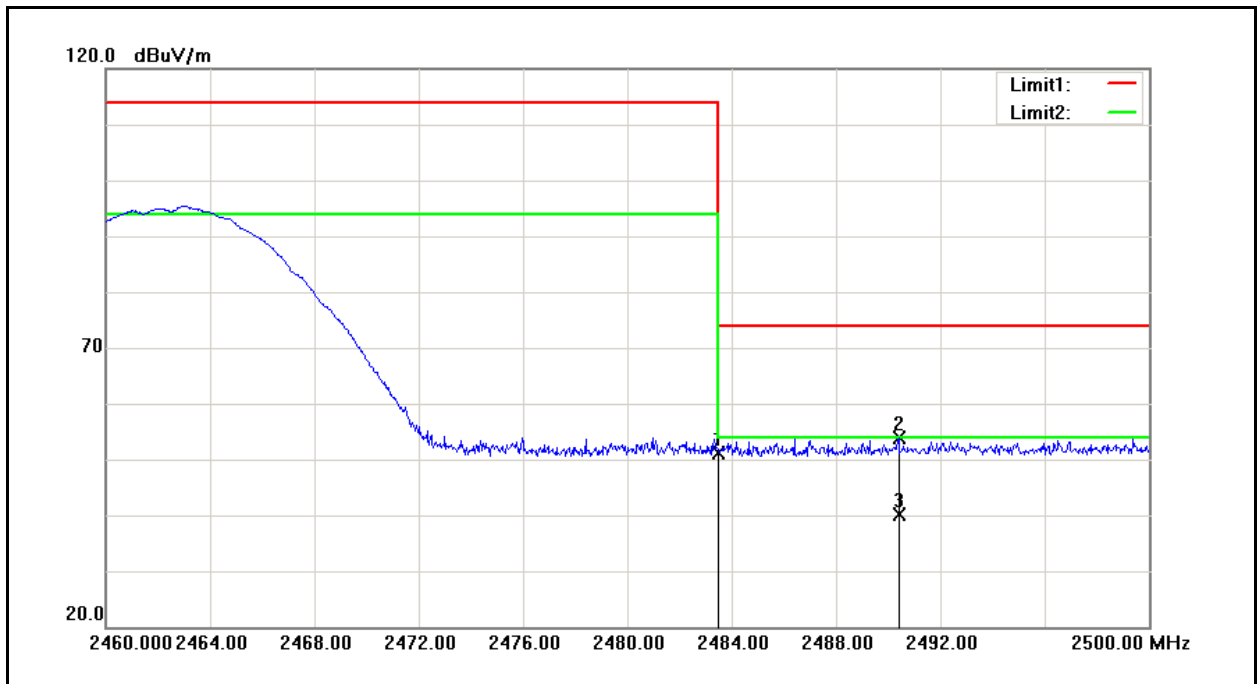
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2355.100	50.51	3.65	54.16	74.00	-19.84	peak
2	2355.100	36.43	3.65	40.08	54.00	-13.92	AVG
3	2390.000	47.71	3.88	51.59	74.00	-22.41	peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



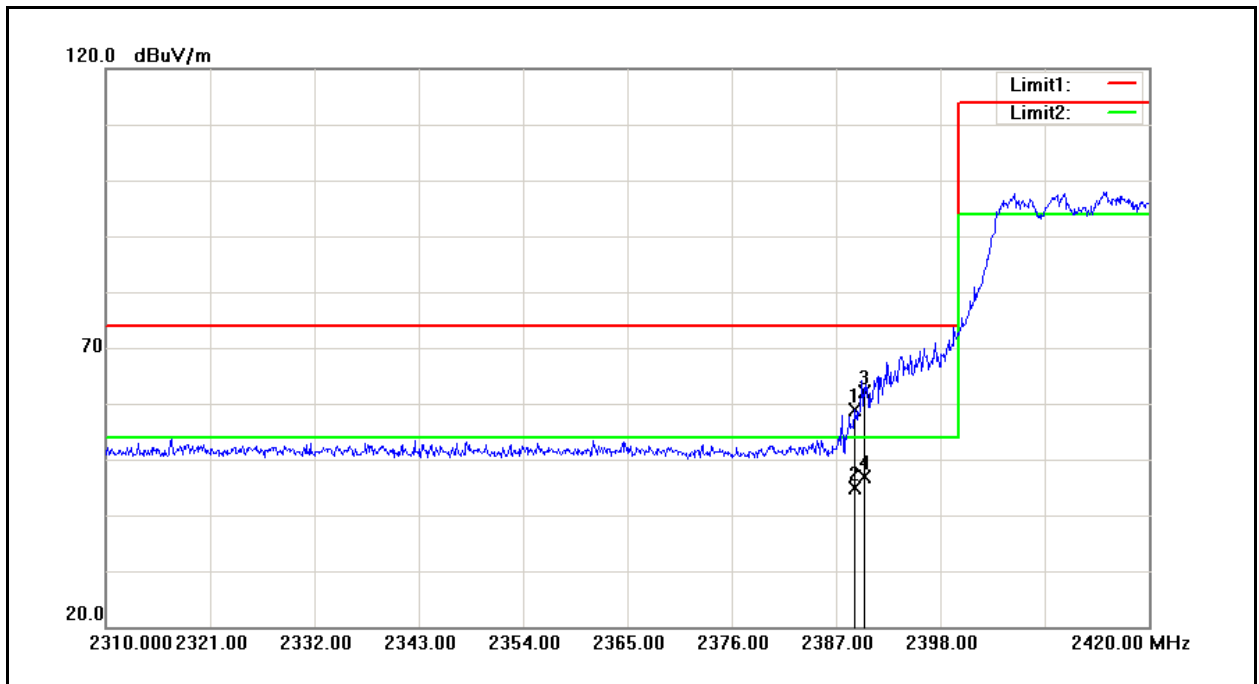
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	47.45	4.50	51.95	74.00	-22.05	peak
2	2494.280	49.92	4.58	54.50	74.00	-19.50	peak
3	2494.280	35.63	4.58	40.21	54.00	-13.79	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	2	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



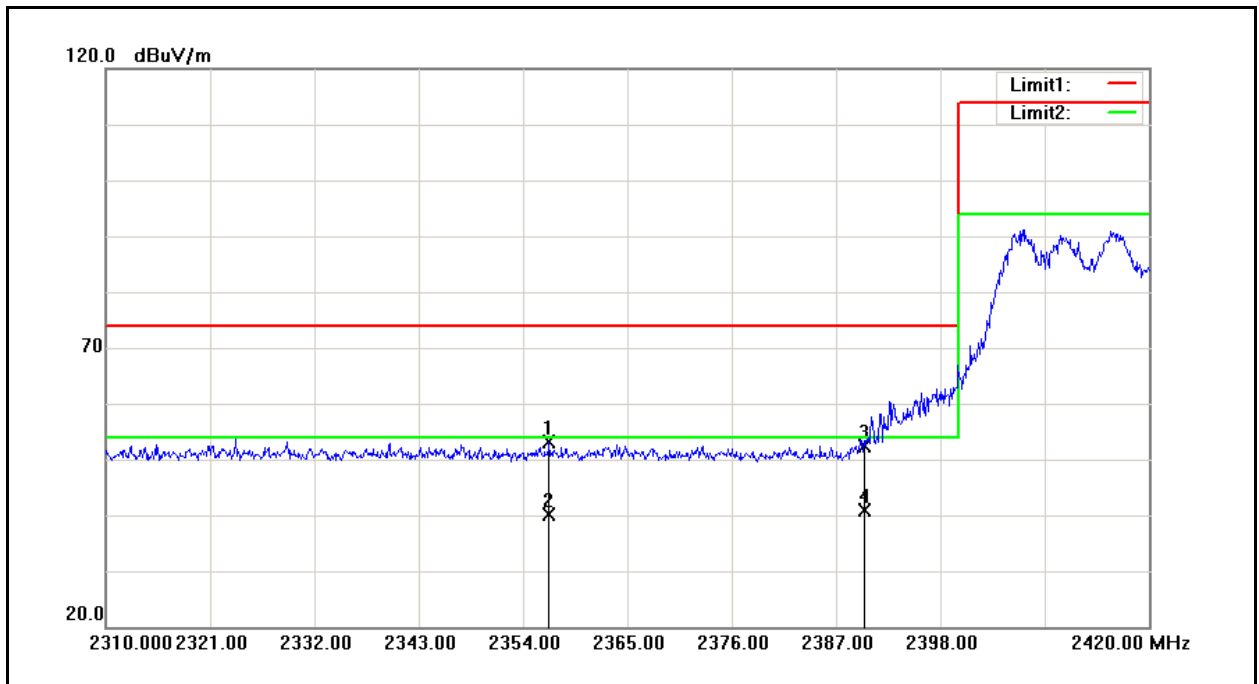
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	46.72	4.50	51.22	74.00	-22.78	peak
2	2490.400	49.22	4.55	53.77	74.00	-20.23	AVG
3	2490.400	35.61	4.55	40.16	54.00	-13.84	peak

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



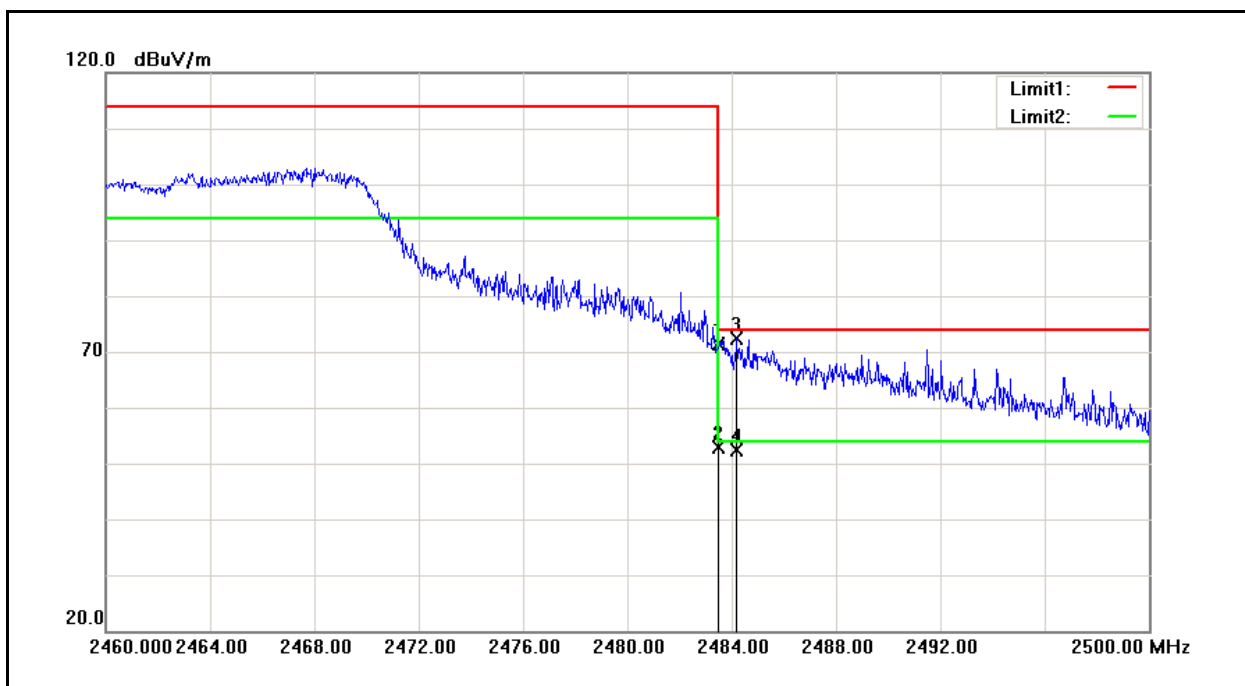
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.980	54.95	3.88	58.83	74.00	-15.17	peak
2	2388.980	40.93	3.88	44.81	54.00	-9.19	AVG
3	2390.000	58.37	3.88	62.25	74.00	-11.75	peak
4	2390.000	43.02	3.88	46.90	54.00	-7.10	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



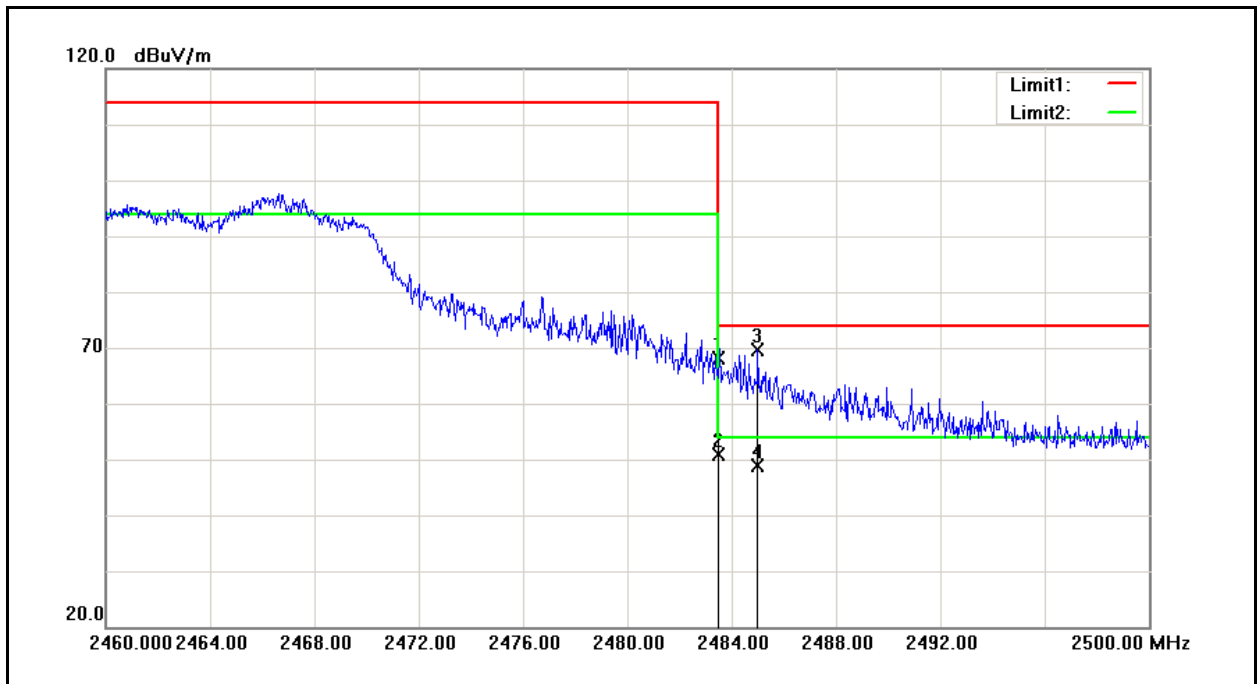
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2356.750	49.38	3.66	53.04	74.00	-20.96	peak
2	2356.750	36.40	3.66	40.06	54.00	-13.94	AVG
3	2390.000	48.62	3.88	52.50	74.00	-21.50	peak
4	2390.000	37.03	3.88	40.91	54.00	-13.09	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



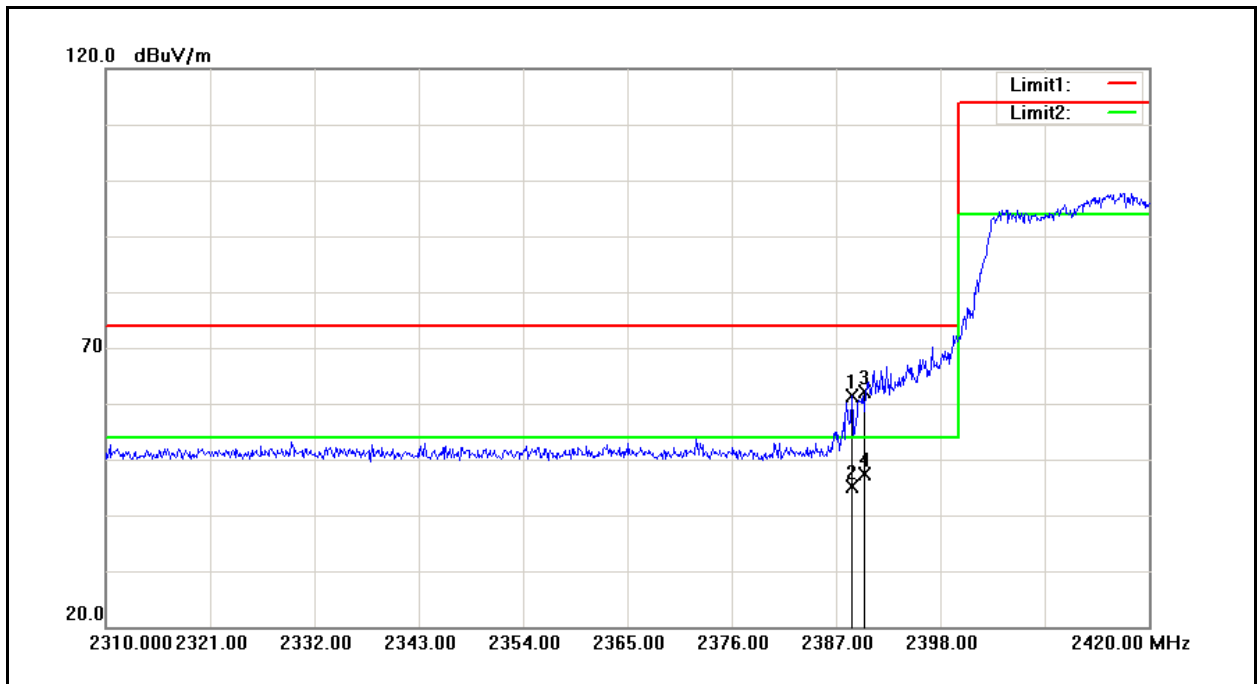
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	66.83	4.50	71.33	74.00	-2.67	peak
2	2483.500	48.41	4.50	52.91	54.00	-1.09	AVG
3	2484.200	67.78	4.51	72.29	74.00	-1.71	peak
4	2484.200	47.75	4.51	52.26	54.00	-1.74	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	3	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



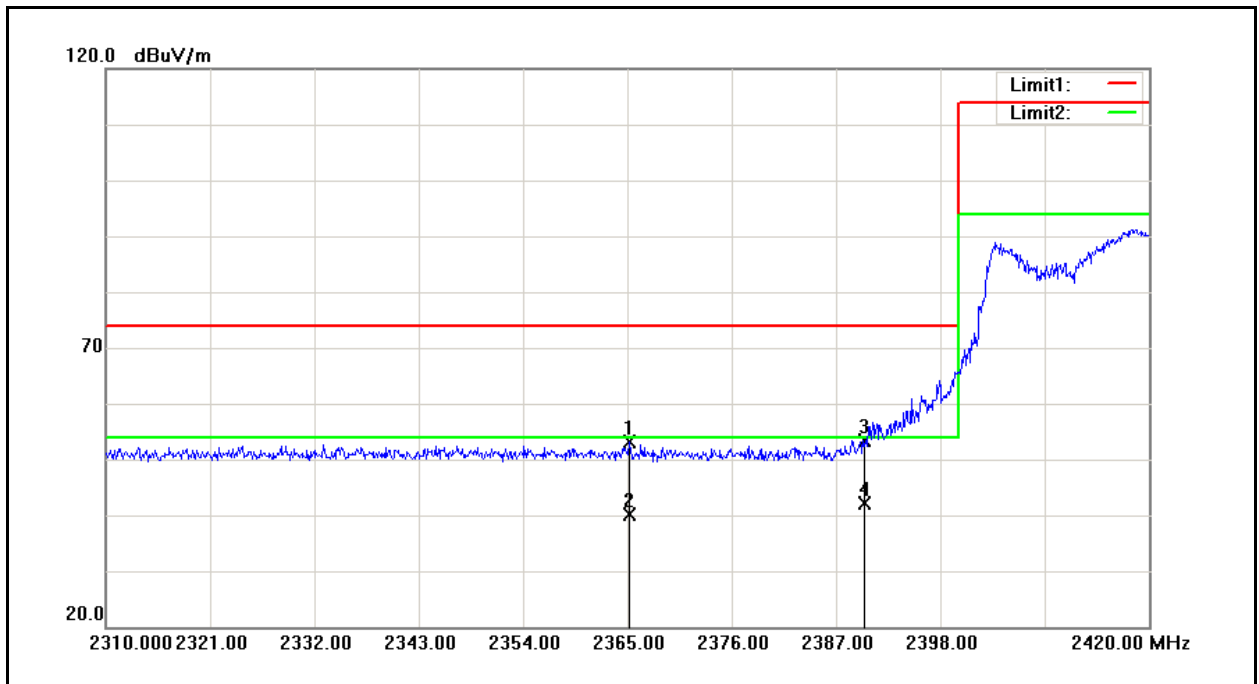
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	63.69	4.50	68.19	74.00	-5.81	peak
2	2483.500	46.41	4.50	50.91	54.00	-3.09	AVG
3	2485.000	65.06	4.51	69.57	74.00	-4.43	peak
4	2485.000	44.38	4.51	48.89	54.00	-5.11	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



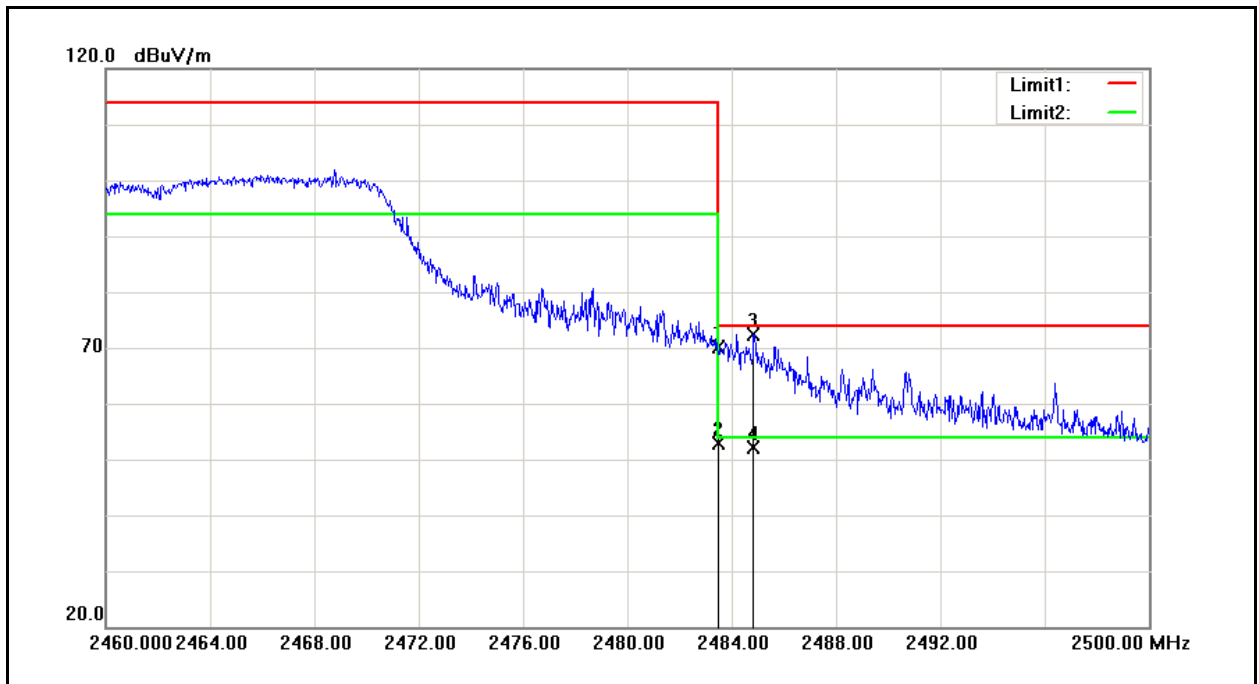
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.650	57.39	3.87	61.26	74.00	-12.74	peak
2	2388.650	41.33	3.87	45.20	54.00	-8.80	AVG
3	2390.000	58.17	3.88	62.05	74.00	-11.95	peak
4	2390.000	43.40	3.88	47.28	54.00	-6.72	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	08/31/2013
Frequency:	2412 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



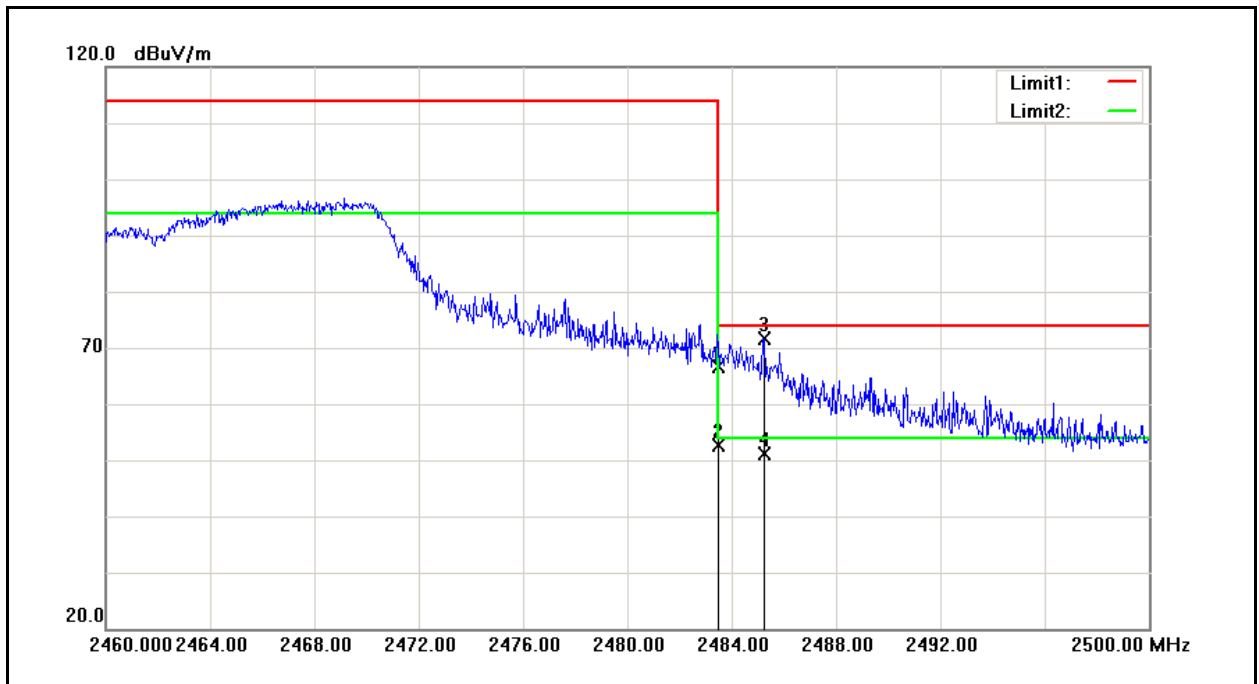
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2365.220	49.32	3.72	53.04	74.00	-20.96	peak
2	2365.220	36.34	3.72	40.06	54.00	-13.94	AVG
3	2390.000	49.38	3.88	53.26	74.00	-20.74	peak
4	2390.000	38.17	3.88	42.05	54.00	-11.95	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	65.61	4.50	70.11	74.00	-3.89	peak
2	2483.500	48.43	4.50	52.93	54.00	-1.07	AVG
3	2484.840	67.99	4.51	72.50	74.00	-1.50	peak
4	2484.840	47.52	4.51	52.03	54.00	-1.97	AVG

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AirCard 781S	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	4	Date:	08/31/2013
Frequency:	2462 MHz	Test By:	Fly Lu
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	62.10	4.50	66.60	74.00	-7.40	peak
2	2483.500	48.23	4.50	52.73	54.00	-1.27	AVG
3	2485.240	67.23	4.52	71.75	74.00	-2.25	peak
4	2485.240	46.58	4.52	51.10	54.00	-2.90	AVG

11 Antenna Measurement

11.1.Limit

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2.Antenna Connector Construction

The antenna used in this product is Chip dielectric antennas. And the maximum Gain of this antenna is 2.4GHz: 1 dBi, 5GHz: 0 dBi.