

FCC 47 CFR PART 15 SUBPART C

RF Test Report

Applicant : Uniform Industrial Corp.
Product Type : POS System
Trade Name : Uniform
Model Number : nPOS15
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013
Receive Date : Dec. 23, 2015
Test Period : Dec. 23, 2015 ~ Jan. 04, 2016
Issue Date : Jan. 12, 2016

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Jan. 12, 2016	Initial Issue	

Verification of Compliance

Issued Date: 01/12/2016

Applicant : Uniform Industrial Corp.
Product Type : POS System

Trade Name : Uniform
Model Number : nPOS15
FCC ID : TFJ-NPOS15
EUT Rated Voltage : DC 12V, 5A
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013

Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.

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Taoyuan City 33465, Taiwan (R.O.C)
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<http://www.atl-lab.com.tw/e-index.htm>

A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By

: Fly Lu

(Manager)

(Fly Lu)

Reviewed By

: Eric Ou Yang

(Testing Engineer)

(Eric Ou Yang)

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1 General Information

1.1 Summary of Test Result

Standard	Item	Result	Remark
15.247			
15.207	AC Power Conducted Emission	PASS	-----
Standard	Item	Result	Remark
15.247			
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(b)(3)	Max. Output Power	PASS	-----
15.247(a)(2)	6dB RF Bandwidth	PASS	-----
15.247(e)	Power Spectral Density	PASS	-----
15.247(d)	Out of Band Conducted Spurious Emission	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

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9kHz ~ 150KHz	2.7
	150kHz ~ 30MHz	2.8
Radiated Emission	9kHz ~ 30MHz	1.457
	30MHz ~ 1000MHz	6.300
	1000MHz ~ 18000MHz	5.474
	18000MHz ~ 26500MHz	5.630
	26500MHz ~ 40000MHz	5.054

2 EUT Description

Applicant	Uniform Industrial Corp. 47341 Bayside Parkway, Fremont, California 94538, United States			
Manufacturer	Uniform Industrial Corp. 47341 Bayside Parkway, Fremont, California 94538, United States			
Product Type	POS System			
Trade Name	Uniform			
Model Number	nPOS15			
FCC ID	TFJ-NPOS15			
Operate Freq. Band	Frequency Range (MHz)	Modulation	Channel Bandwidth	Data Rate 400 / 800G (ns)
IEEE 802.11b	2412 ~ 2462	DSSS	20MHz	Up to 11Mbps
IEEE 802.11g	2412 ~ 2462	DSSS+OFDM	20MHz	Up to 54Mbps
IEEE 802.11n 2.4GHz 20MHz	2412 ~ 2462	OFDM	20MHz	Up to 72.2Mbps
IEEE 802.11n 2.4GHz 40MHz	2422 ~ 2452	OFDM	40MHz	Up to 150Mbps
Antenna Delivery	1TX + 1RX			
Antenna information	Model Number		Type	Max. Gain (dBi)
	98M75MIPF000		PIFA Antenna	3.5
RF Output Power	IEEE 802.11b: 0.036 W / 15.62 dBm IEEE 802.11g: 0.064 W / 18.03 dBm IEEE 802.11n 2.4GHz 20MHz: 0.075 W / 18.76 dBm IEEE 802.11n 2.4GHz 40MHz: 0.055 W / 17.37 dBm			

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 802.11n 2.4GHz 40MHz link mode

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

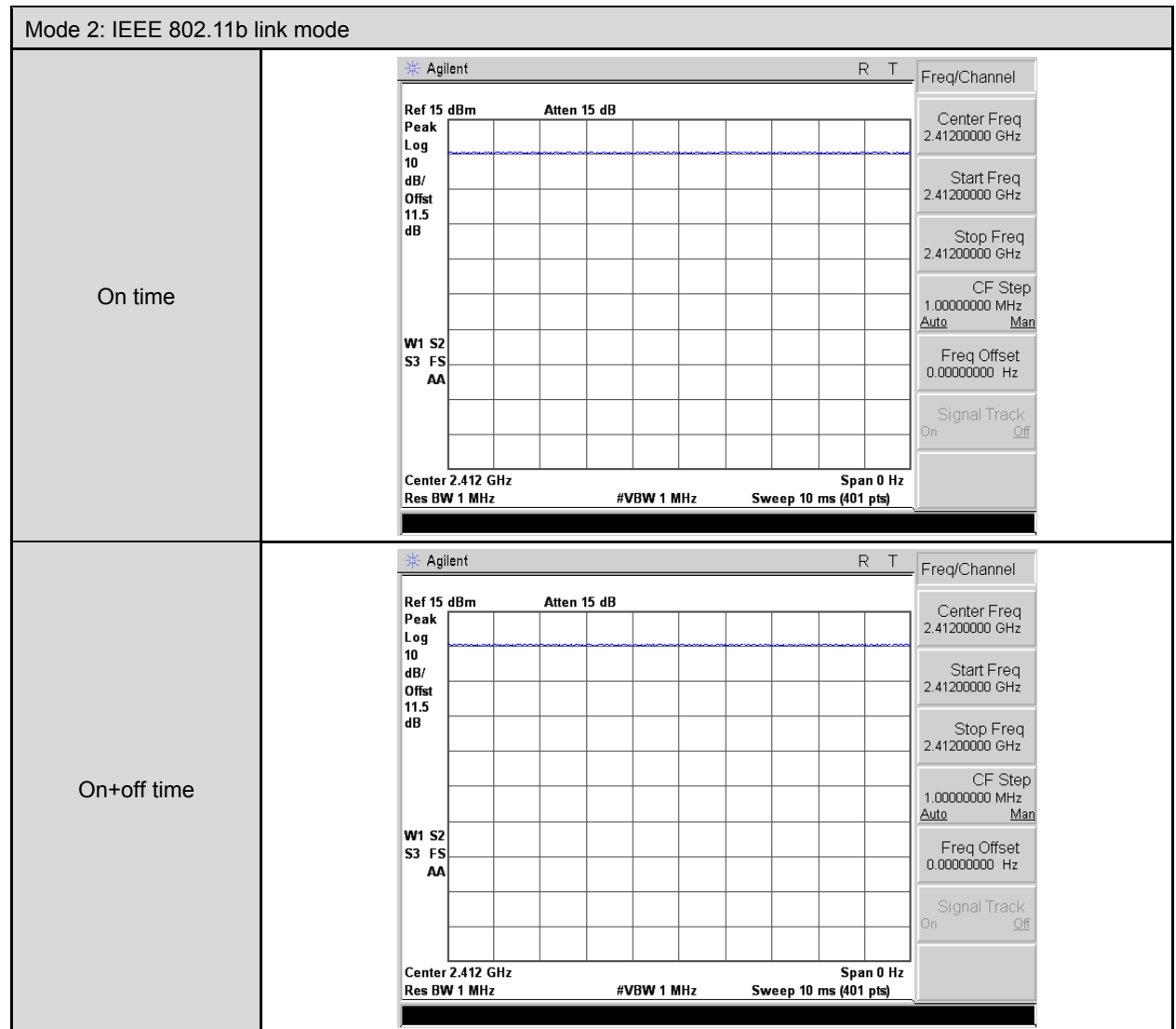
After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

Test Mode	Antenna Delivery	Test Channel	Data Rate 400 / 800 GI (ns)
Mode 2: IEEE 802.11b link mode	1TX / 1RX	1, 6, 11	1
Mode 3: IEEE 802.11g link mode	1TX / 1RX	1, 6, 11	6
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	1TX / 1RX	1, 6, 11	6.5
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	1TX / 1RX	3, 6, 9	13.5

Duty cycle

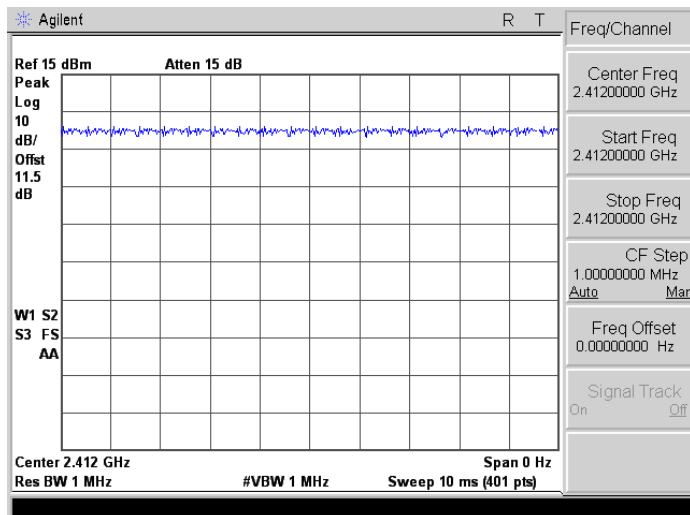
Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 2: IEEE 802.11b link mode	2412.0	1.000	1.000	1.000	0.000	0.010
Mode 3: IEEE 802.11g link mode	2412.0	1.000	1.000	1.000	0.000	0.010
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	2412.0	1.000	1.000	1.000	0.000	0.010
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	2422.0	1.000	1.000	1.000	0.000	0.010

Duty Cycle Graphs

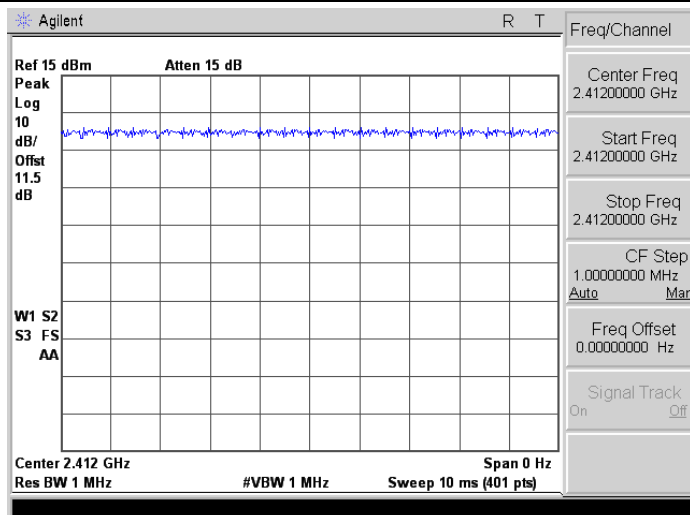


Mode 3: IEEE 802.11g Mode

On time

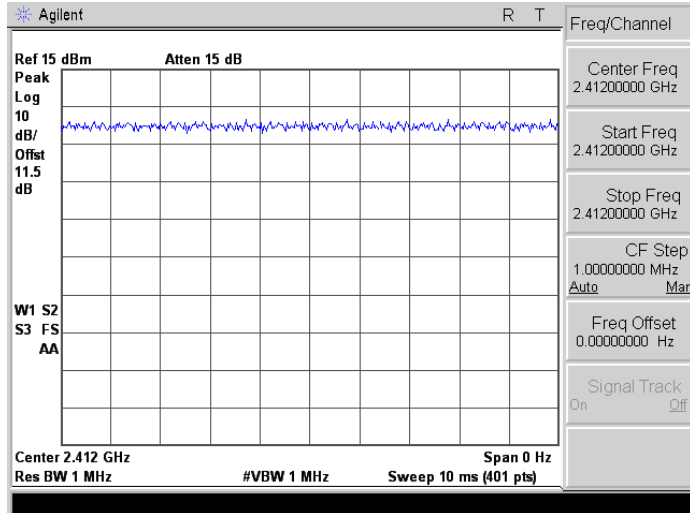


On+off time

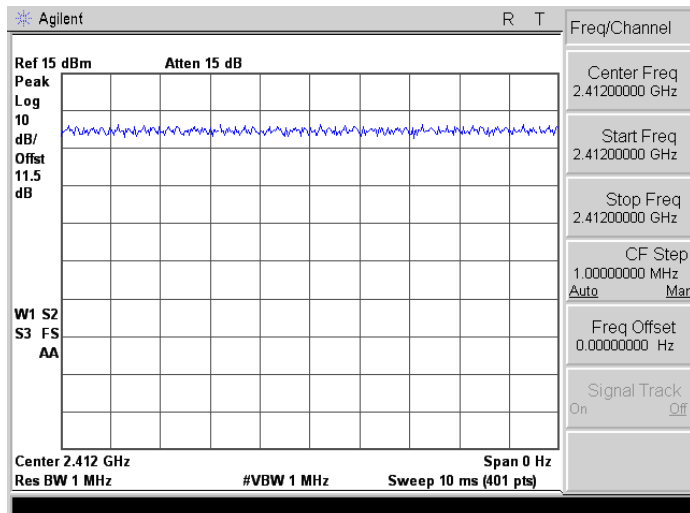


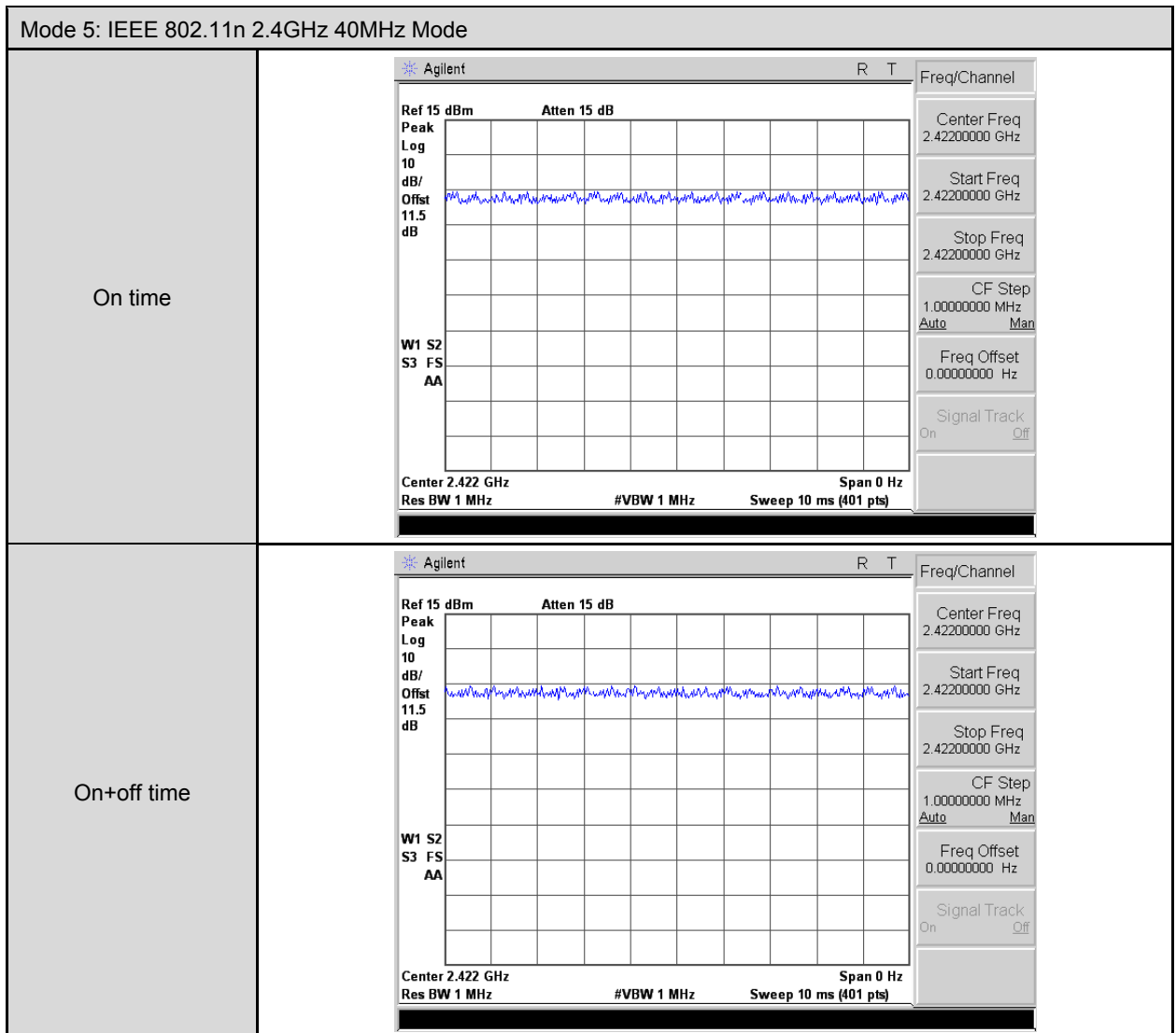
Mode 4: IEEE 802.11n 2.4GHz 20MHz Mode

On time



On+off time





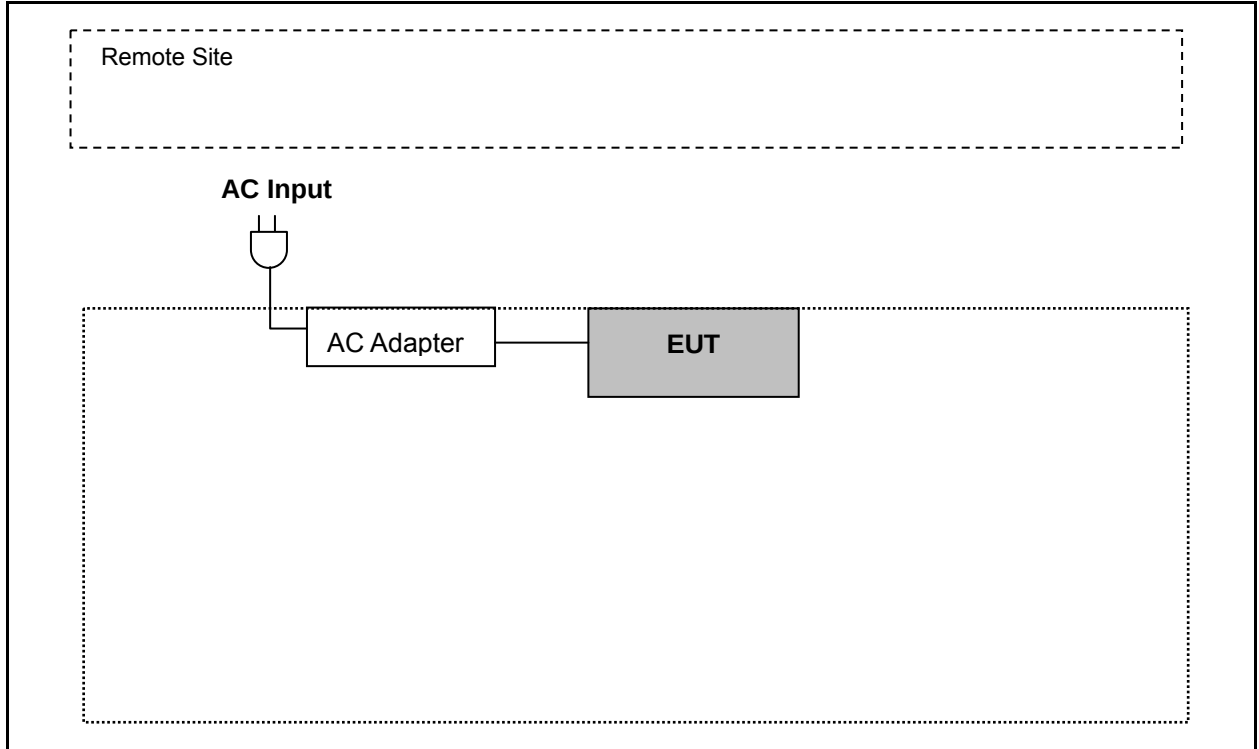
3.2. EUT Exercise Software

1	Setup the EUT shown on 3.3.
2	Turn on the power of all equipment.
3	Turn on Wi-Fi function.
4	EUT run test program.

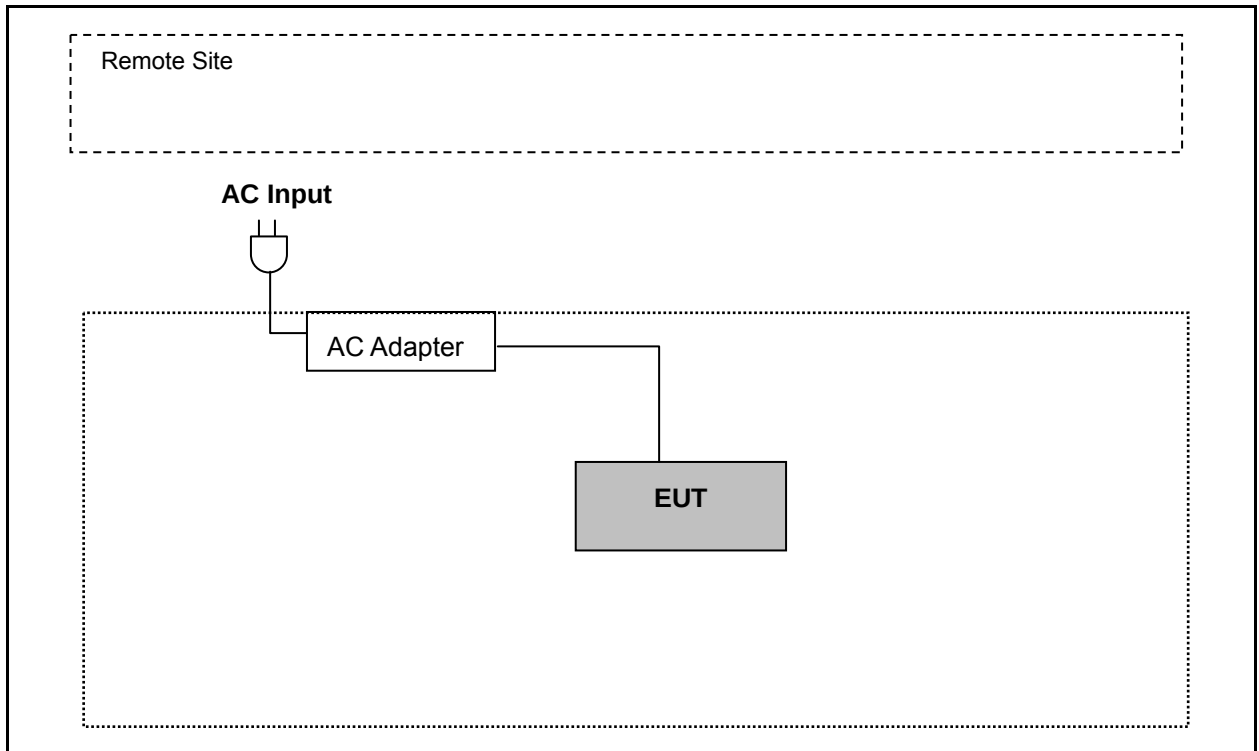
Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1
2	EZ-EMC Ver ATL-ITC-3A1-1

3.3. Configuration of Test System Details

Conducted Emissions



Radiated Emissions



3.4. Test Site Environment

Items	Required (IEC 60068-1)	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

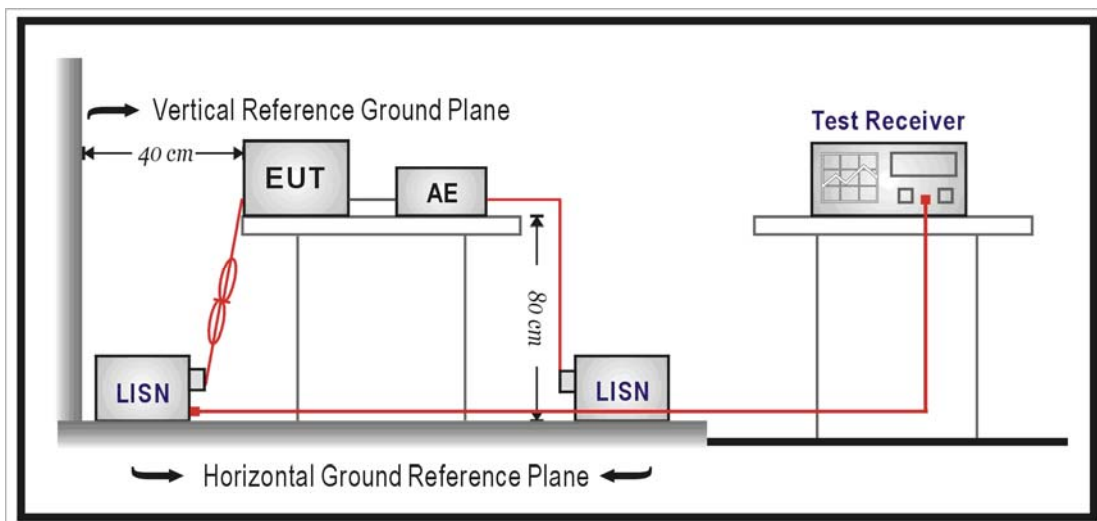
4.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/25/2015	(1)
LISN	R&S	ENV216	101040	03/10/2015	(1)
LISN	R&S	ENV216	101041	03/06/2015	(1)
RF Cable	Woken	00100D1380194M	TE-02-02	06/26/2015	(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 EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

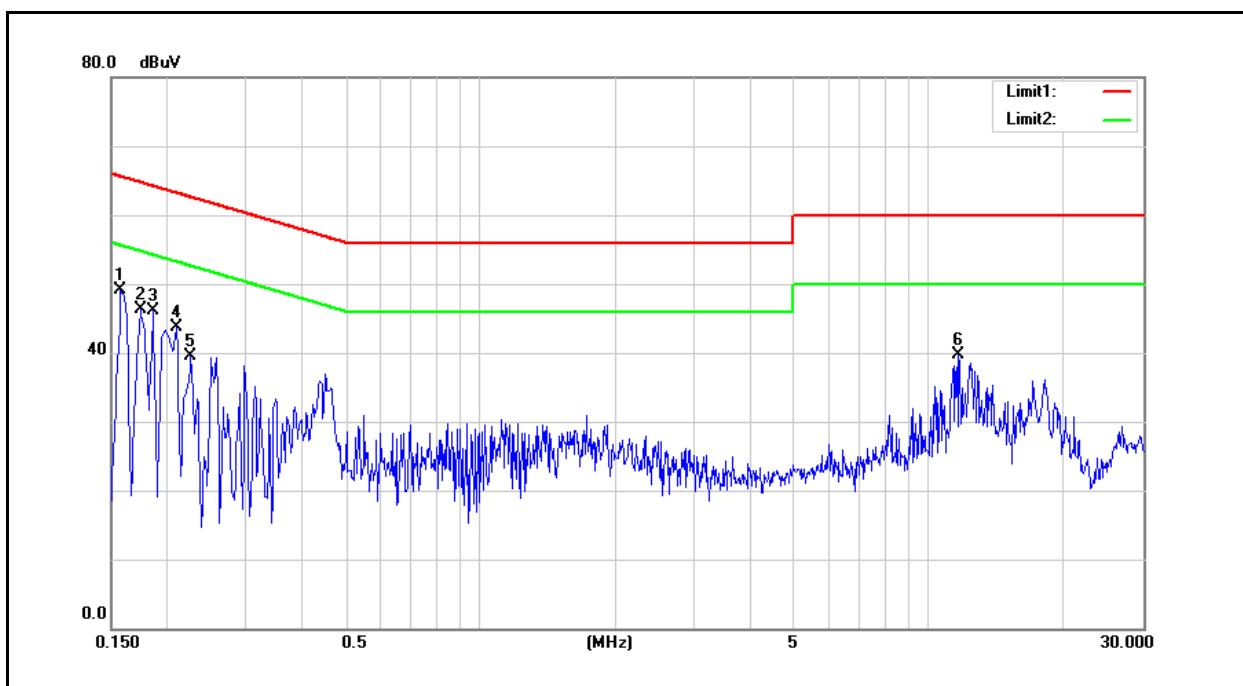
For A.C. mains conducted interference, measured both sides of A.C. lines and carried out using quasi-peak and average detector receivers of maximum conducted interference.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz. The equipment under test (EUT) shall meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. The voltage limits shall be met. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.5. Test Result

Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	nPOS15	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	01/04/2016
		Test By:	Eric Ou Yang
Description:			



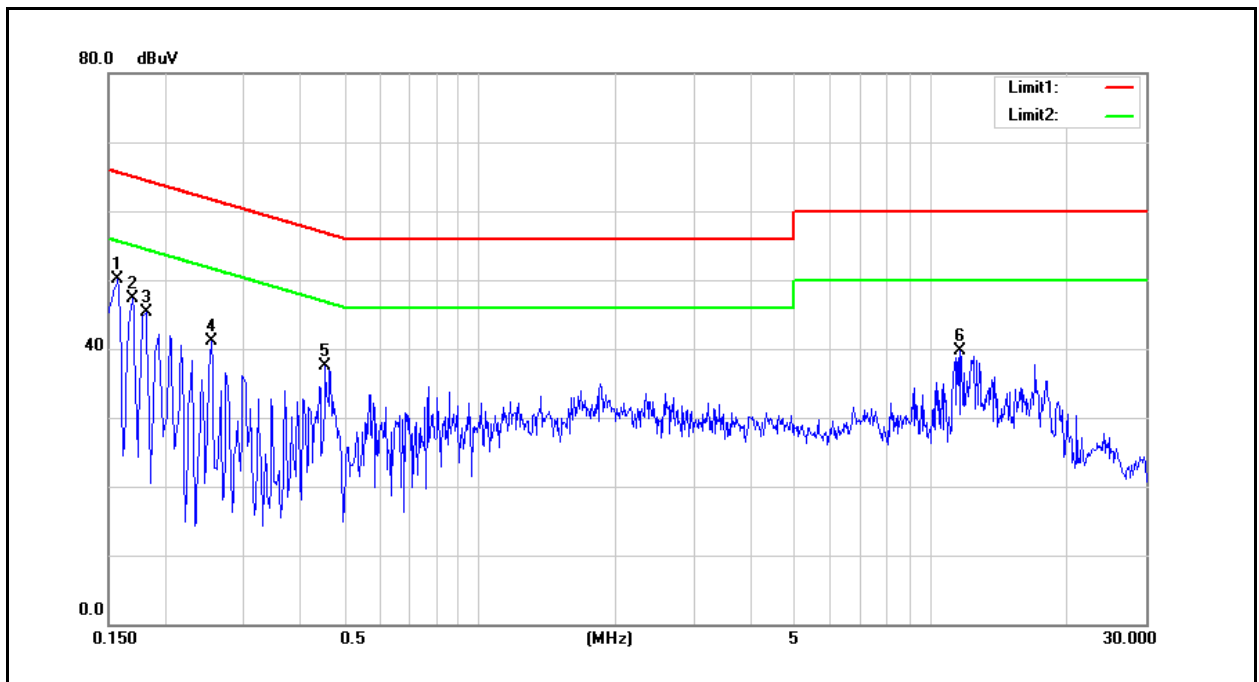
No.	Frequency (MHz)	QP reading (dBμV)	AVG reading (dBμV)	Correction factor (dB)	QP result (dBμV)	AVG result (dBμV)	QP limit (dBμV)	AVG limit (dBμV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1580	34.38	14.33	9.69	44.07	24.02	65.57	55.57	-21.50	-31.55	Pass
2	0.1740	34.68	15.97	9.69	44.37	25.66	64.77	54.77	-20.40	-29.11	Pass
3	0.1860	32.07	12.59	9.68	41.75	22.27	64.21	54.21	-22.46	-31.94	Pass
4	0.2100	28.53	10.79	9.68	38.21	20.47	63.21	53.21	-25.00	-32.74	Pass
5	0.2260	26.71	10.29	9.68	36.39	19.97	62.60	52.60	-26.21	-32.63	Pass
6	11.6420	28.65	27.66	9.99	38.64	37.65	60.00	50.00	-21.36	-12.35	Pass

Note: 1. Result (dBμV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15C	Line:	N
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	nPOS15	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	01/04/2016
		Test By:	Eric Ou Yang

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	0.1580	34.29	14.96	9.66	43.95	24.62	65.57	55.57	-21.62	-30.95	Pass
2	0.1700	35.09	17.79	9.66	44.75	27.45	64.96	54.96	-20.21	-27.51	Pass
3	0.1820	32.49	15.03	9.65	42.14	24.68	64.39	54.39	-22.25	-29.71	Pass
4	0.2540	24.17	10.48	9.66	33.83	20.14	61.63	51.63	-27.80	-31.49	Pass
5	0.4540	26.79	18.91	9.67	36.46	28.58	56.80	46.80	-20.34	-18.22	Pass
6	11.6420	28.92	27.98	10.01	38.93	37.99	60.00	50.00	-21.07	-12.01	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

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 ($\mu\text{V}/\text{m}$ 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

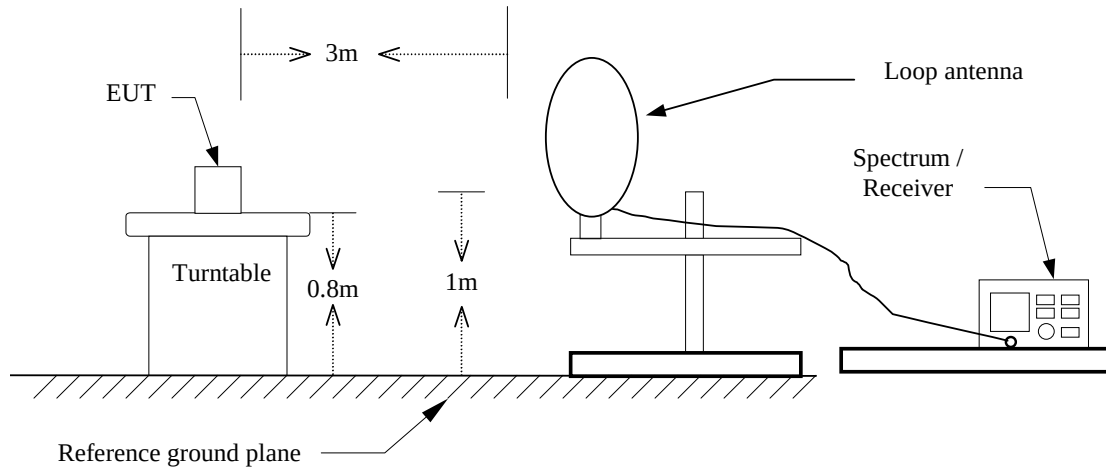
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	08/11/2015	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/12/2015	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/02/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-S M-14000	140202	02/24/2015	(1)
Microwave Cable	EMCI	EMC104-SM-S M-600	140301	02/24/2015	(1)
Test Site	ATL	TE01	888001	08/27/2015	(1)

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

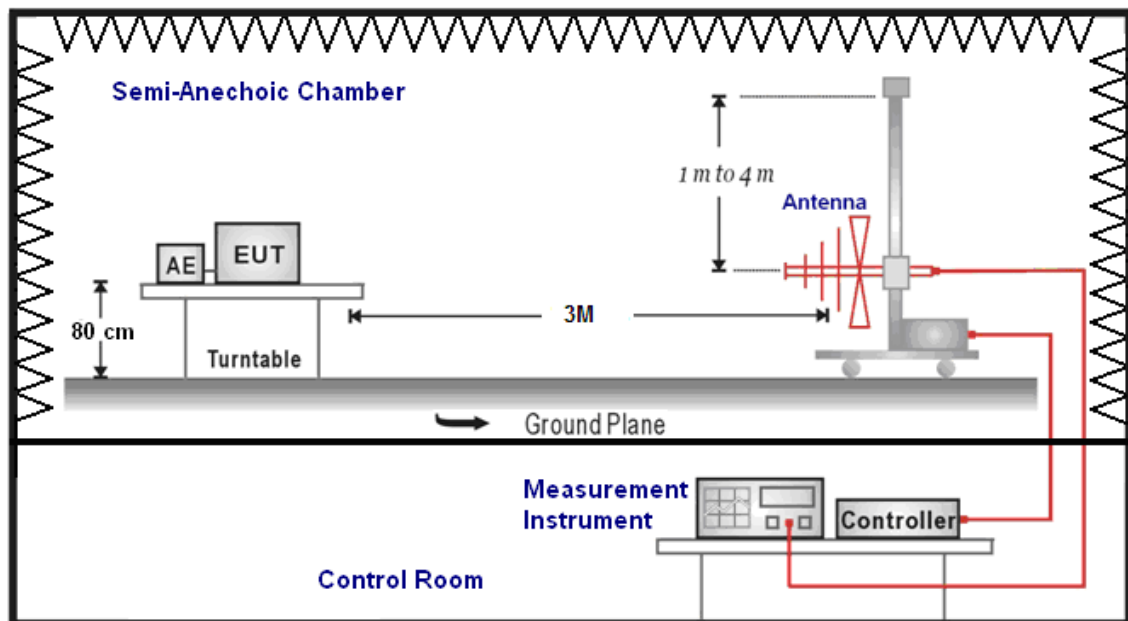
Note: N.C.R. = No Calibration Request.

5.3. Setup

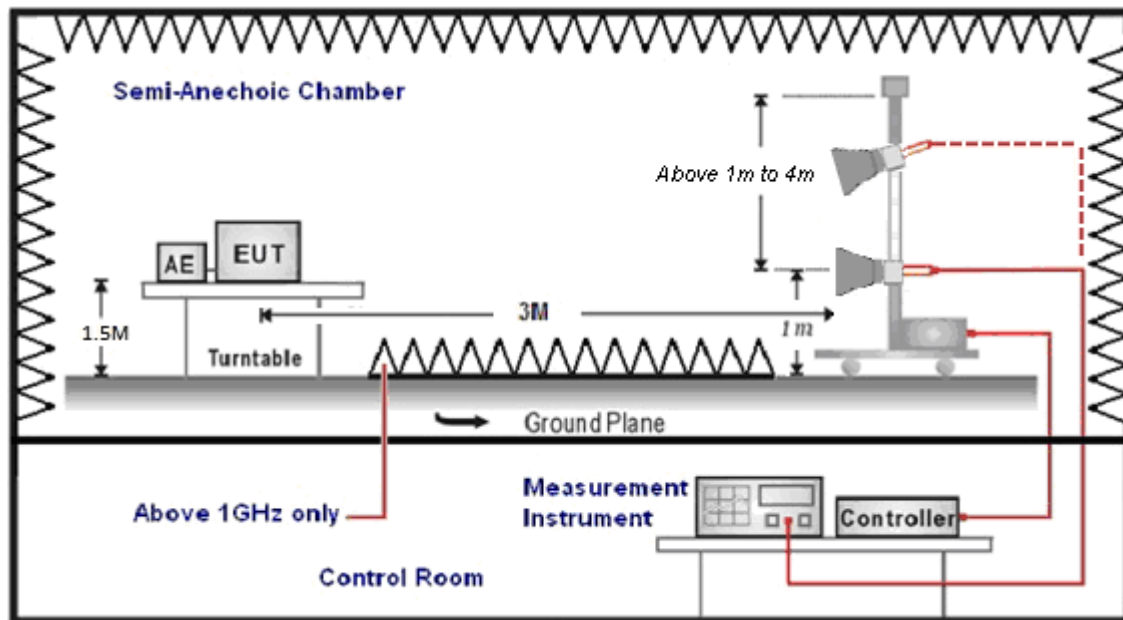
9kHz ~ 30MHz



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 or 1.5 meters height (below 1GHz use 0.8m turntable / above 1GHz use 1.5m turntable), 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 when Duty cycle >0.98 / $1/T$ for average measurements when Duty cycle <0.98 . 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 3 meter. The antenna at an angle toward the source of the emission. 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:		nPOS15		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 1		Date:		12/25/2015	
				Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
191.5000	50.80	-16.05	34.75	43.50	-8.75	QP	H
204.0000	50.02	-16.11	33.91	43.50	-9.59	QP	H
377.0000	47.63	-11.46	36.17	46.00	-9.83	QP	H
650.0000	40.35	-7.29	33.06	46.00	-12.94	QP	H
711.0000	40.50	-6.23	34.27	46.00	-11.73	QP	H
776.0000	39.21	-5.22	33.99	46.00	-12.01	QP	H
179.5000	51.39	-14.81	36.58	43.50	-6.92	QP	V
192.0000	50.60	-16.07	34.53	43.50	-8.97	QP	V
379.5000	51.59	-11.43	40.16	46.00	-5.84	QP	V
550.0000	43.35	-8.76	34.59	46.00	-11.41	QP	V
650.0000	41.38	-7.29	34.09	46.00	-11.91	QP	V
776.0000	40.11	-5.22	34.89	46.00	-11.11	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:		nPOS15		Temp.(℃)/Hum.(%RH):		26(℃)/60%RH	
Mode:		Mode 2		Date:		12/23/2015	
Frequency:		2412MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3009.000	37.02	1.35	38.37	74.00	-35.63	peak	H
4612.000	32.85	6.72	39.57	74.00	-34.43	peak	H
6677.000	33.52	11.97	45.49	74.00	-28.51	peak	H
3079.000	35.05	1.68	36.73	74.00	-37.27	peak	V
4824.000	35.36	7.46	42.82	74.00	-31.18	peak	V
6726.000	32.10	12.09	44.19	74.00	-29.81	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		nPOS15		Temp.(℃)/Hum.(%RH):		26(℃)/60%RH	
Mode:		Mode 2		Date:		12/23/2015	
Frequency:		2437MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3030.000	36.65	1.46	38.11	74.00	-35.89	peak	H
4874.000	37.93	7.63	45.56	74.00	-28.44	peak	H
6719.000	32.54	12.07	44.61	74.00	-29.39	peak	H
3044.000	37.41	1.51	38.92	74.00	-35.08	peak	V
4874.000	39.44	7.63	47.07	74.00	-26.93	peak	V
6719.000	32.77	12.07	44.84	74.00	-29.16	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	12/23/2015		
Frequency:	2462MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3002.000	37.02	1.32	38.34	74.00	-35.66	peak	H
4924.000	35.43	7.81	43.24	74.00	-30.76	peak	H
6698.000	32.19	12.02	44.21	74.00	-29.79	peak	H
3065.000	35.93	1.62	37.55	74.00	-36.45	peak	V
4924.000	37.21	7.81	45.02	74.00	-28.98	peak	V
6677.000	32.71	11.97	44.68	74.00	-29.32	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	12/25/2015		
Frequency:	2412MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3065.000	33.07	4.42	37.49	74.00	-36.51	peak	H
4549.000	28.57	9.49	38.06	74.00	-35.94	peak	H
6635.000	30.02	16.18	46.20	74.00	-27.80	peak	H
3030.000	33.17	4.31	37.48	74.00	-36.52	peak	V
4563.000	30.44	9.55	39.99	74.00	-34.01	peak	V
6705.000	28.26	16.38	44.64	74.00	-29.36	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		nPOS15		Temp.(℃)/Hum.(%RH):		26(℃)/60%RH	
Mode:		Mode 3		Date:		12/25/2015	
Frequency:		2437MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3051.000	30.98	4.37	35.35	74.00	-38.65	peak	H
4563.000	28.86	9.55	38.41	74.00	-35.59	peak	H
6649.000	27.94	16.22	44.16	74.00	-29.84	peak	H
3030.000	32.99	4.31	37.30	74.00	-36.70	peak	V
4563.000	29.76	9.55	39.31	74.00	-34.69	peak	V
6649.000	27.40	16.22	43.62	74.00	-30.38	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		nPOS15		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 3		Date:		12/25/2015	
Frequency:		2462MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3121.000	32.48	4.60	37.08	74.00	-36.92	peak	H
4591.000	29.18	9.65	38.83	74.00	-35.17	peak	H
6691.000	28.01	16.33	44.34	74.00	-29.66	peak	H
3065.000	33.86	4.42	38.28	74.00	-35.72	peak	V
4577.000	28.24	9.60	37.84	74.00	-36.16	peak	V
6649.000	28.66	16.22	44.88	74.00	-29.12	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	Mode 4			Date:	12/25/2015		
Frequency:	2412MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3037.000	33.23	4.33	37.56	74.00	-36.44	peak	H
4626.000	27.91	9.79	37.70	74.00	-36.30	peak	H
6719.000	28.21	16.41	44.62	74.00	-29.38	peak	H
2974.000	32.69	4.12	36.81	74.00	-37.19	peak	V
4563.000	28.81	9.55	38.36	74.00	-35.64	peak	V
6586.000	25.55	16.04	41.59	74.00	-32.41	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	12/25/2015		
Frequency:	2437MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3058.000	32.51	4.39	36.90	74.00	-37.10	peak	H
4563.000	27.22	9.55	36.77	74.00	-37.23	peak	H
6677.000	28.80	16.30	45.10	74.00	-28.90	peak	H
3086.000	33.68	4.48	38.16	74.00	-35.84	peak	V
4479.000	28.72	9.24	37.96	74.00	-36.04	peak	V
6663.000	28.73	16.26	44.99	74.00	-29.01	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	12/25/2015		
Frequency:	2462MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3065.000	31.21	4.42	35.63	74.00	-38.37	peak	H
4563.000	28.30	9.55	37.85	74.00	-36.15	peak	H
6642.000	28.34	16.21	44.55	74.00	-29.45	peak	H
3058.000	30.93	4.39	35.32	74.00	-38.68	peak	V
4542.000	26.60	9.46	36.06	74.00	-37.94	peak	V
6649.000	27.54	16.22	43.76	74.00	-30.24	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 5			Date:	12/25/2015		
Frequency:	2422MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2974.000	36.90	1.83	38.73	74.00	-35.27	peak	H
4633.000	31.96	7.00	38.96	74.00	-35.04	peak	H
6719.000	33.11	12.09	45.20	74.00	-28.80	peak	H
3037.000	36.14	2.07	38.21	74.00	-35.79	peak	V
4591.000	31.23	6.86	38.09	74.00	-35.91	peak	V
6677.000	32.11	12.00	44.11	74.00	-29.89	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	Mode 5			Date:	12/25/2015		
Frequency:	2437MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3037.000	36.87	2.07	38.94	74.00	-35.06	peak	H
4521.000	32.63	6.63	39.26	74.00	-34.74	peak	H
6684.000	33.98	12.02	46.00	74.00	-28.00	peak	H
2953.000	38.14	1.75	39.89	74.00	-34.11	peak	V
4465.000	31.75	6.48	38.23	74.00	-35.77	peak	V
6831.000	31.33	12.32	43.65	74.00	-30.35	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 5			Date:	12/25/2015		
Frequency:	2452MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3030.000	37.11	2.05	39.16	74.00	-34.84	peak	H
4584.000	33.38	6.83	40.21	74.00	-33.79	peak	H
6656.000	35.03	11.97	47.00	74.00	-27.00	peak	H
3037.000	37.46	2.07	39.53	74.00	-34.47	peak	V
4549.000	33.16	6.72	39.88	74.00	-34.12	peak	V
6649.000	33.94	11.95	45.89	74.00	-28.11	peak	V

Band Edge

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	12/23/2015		
Frequency:	2412 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2384.250	52.96	-0.35	52.61	74.00	-21.39	peak	H
2384.250	43.98	-0.35	43.63	54.00	-10.37	AVG	H
2390.000	49.65	-0.33	49.32	74.00	-24.68	peak	H
2386.450	51.03	-0.35	50.68	74.00	-23.32	peak	V
2390.000	47.95	-0.33	47.62	74.00	-26.38	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(℃)/Hum.(%RH):	26(℃)/60%RH		
Mode:	Mode 2			Date:	12/23/2015		
Frequency:	2462 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	49.65	0.03	49.68	74.00	-24.32	peak	H
2487.840	52.55	0.04	52.59	74.00	-21.41	peak	H
2487.840	43.89	0.04	43.93	54.00	-10.07	AVG	H
2483.500	48.09	0.03	48.12	74.00	-25.88	peak	V
2491.760	50.29	0.06	50.35	74.00	-23.65	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	12/23/2015		
Frequency:	2412 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2389.310	53.29	-0.33	52.96	74.00	-21.04	peak	H
2389.310	41.59	-0.33	41.26	54.00	-12.74	AVG	H
2390.000	53.92	-0.33	53.59	74.00	-20.41	peak	H
2390.000	41.68	-0.33	41.35	54.00	-12.65	AVG	H
2388.870	52.42	-0.33	52.09	74.00	-21.91	peak	V
2388.870	39.43	-0.33	39.10	54.00	-14.90	AVG	V
2390.000	52.51	-0.33	52.18	74.00	-21.82	peak	V
2390.000	39.56	-0.33	39.23	54.00	-14.77	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	12/23/2015		
Frequency:	2462 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	49.71	0.03	49.74	74.00	-24.26	peak	H
2484.120	52.43	0.03	52.46	74.00	-21.54	AVG	H
2484.120	40.30	0.03	40.33	54.00	-13.67	peak	H
2483.500	48.83	0.03	48.86	74.00	-25.14	peak	V
2493.560	49.24	0.06	49.30	74.00	-24.70	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	12/23/2015		
Frequency:	2412 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2389.420	57.94	-0.33	57.61	74.00	-16.39	peak	H
2389.420	42.42	-0.33	42.09	54.00	-11.91	AVG	H
2390.000	56.69	-0.33	56.36	74.00	-17.64	peak	H
2390.000	42.92	-0.33	42.59	54.00	-11.41	AVG	H
2389.530	54.64	-0.33	54.31	74.00	-19.69	peak	V
2389.530	39.95	-0.33	39.62	54.00	-14.38	AVG	V
2390.000	56.75	-0.33	56.42	74.00	-17.58	peak	V
2390.000	40.32	-0.33	39.99	54.00	-14.01	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		nPOS15		Temp.(℃)/Hum.(%RH):		26(℃)/60%RH	
Mode:		Mode 4		Date:		12/23/2015	
Frequency:		2462 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	54.22	0.03	54.25	74.00	-19.75	peak	H
2483.500	40.46	0.03	40.49	54.00	-13.51	AVG	H
2483.800	59.25	0.03	59.28	74.00	-14.72	peak	H
2483.800	40.28	0.03	40.31	54.00	-13.69	AVG	H
2483.500	50.41	0.03	50.44	74.00	-23.56	peak	V
2483.600	53.45	0.03	53.48	74.00	-20.52	peak	V
2483.600	37.42	0.03	37.45	54.00	-16.55	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	nPOS15			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 5			Date:	12/23/2015		
Frequency:	2422 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2386.320	62.53	-0.35	62.18	74.00	-11.82	peak	H
2386.320	44.31	-0.35	43.96	54.00	-10.04	AVG	H
2390.000	58.44	-0.33	58.11	74.00	-15.89	peak	H
2390.000	45.45	-0.33	45.12	54.00	-8.88	AVG	H
2383.800	58.55	-0.35	58.20	74.00	-15.80	peak	V
2383.800	40.76	-0.35	40.41	54.00	-13.59	AVG	V
2386.800	57.01	-0.33	56.68	74.00	-17.32	peak	V
2386.800	41.32	-0.33	40.99	54.00	-13.01	AVG	V
2390.000	55.23	-0.33	54.90	74.00	-19.10	peak	V
2390.000	42.25	-0.33	41.92	54.00	-12.08	AVG	V

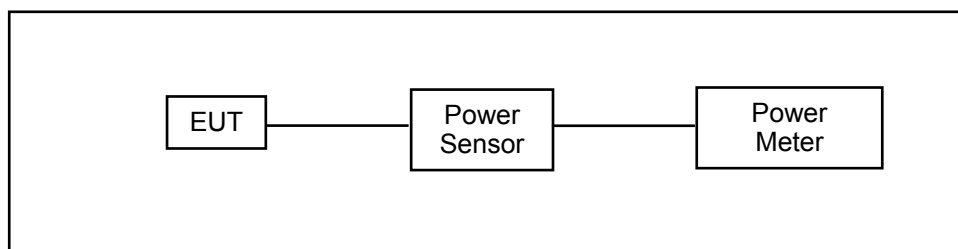
Standard:	FCC Part 15C		Test Distance:	3m			
Test item:	Radiated Emission		Power:	AC 120V/60Hz			
Model Number:	nPOS15		Temp.(°C)/Hum.(%RH):	26(°C)/60%RH			
Mode:	Mode 5		Date:	12/23/2015			
Frequency:	2452 MHz		Test By:	Eric Ou Yang			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	51.61	0.03	51.64	74.00	-22.36	peak	H
2485.600	52.96	0.03	52.99	74.00	-21.01	peak	H
2485.600	40.30	0.03	40.33	54.00	-13.67	AVG	H
2483.500	47.73	0.03	47.76	74.00	-26.24	peak	V
2485.000	50.11	0.03	50.14	74.00	-23.86	peak	V

6 Maximum Conducted Output Power Measurement

6.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for maximum 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	12/11/2015	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/11/2015	(1)
Microwave Cable	EMCI	EMC104-SM-S M-1500	140303	02/24/2015	(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

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 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	nPOS15					
Test Item	Maximum Conducted Output Power					
Test Mode	Mode 2: IEEE 802.11b link mode					
Date of Test	12/23/2015				Test Site	TE05
Frequency (MHz)	Data Rate	Average Power		Peak Power		Limit (dBm)
		(dBm)	(W)	(dBm)	(W)	
2412	1M	13.33	0.022	15.37	0.034	< 30
2437		13.49	0.022	15.51	0.036	< 30
2462		13.56	0.023	15.62	0.036	< 30
2437	2M	13.43	0.022	15.45	0.035	< 30
2437	5.5M	13.40	0.022	15.43	0.035	< 30
2437	11M	13.26	0.021	15.31	0.034	< 30

Model Number	nPOS15					
Test Item	Maximum Conducted Output Power					
Test Mode	Mode 3: IEEE 802.11g link mode					
Date of Test	12/23/2015				Test Site	TE05
Frequency (MHz)	Data Rate	Average Power		Peak Power		Limit (dBm)
		(dBm)	(W)	(dBm)	(W)	
2412	6M	8.91	0.008	17.80	0.060	< 30
2437		9.08	0.008	17.98	0.063	< 30
2462		9.15	0.008	18.03	0.064	< 30
2437	9M	9.06	0.008	17.95	0.062	< 30
2437	12M	9.01	0.008	17.92	0.062	< 30
2437	18M	8.97	0.008	17.87	0.061	< 30
2437	24M	8.90	0.008	17.78	0.060	< 30
2437	36M	8.93	0.008	17.84	0.061	< 30
2437	48M	8.79	0.008	17.68	0.059	< 30
2437	54M	8.84	0.008	17.73	0.059	< 30

Model Number	nPOS15					
Test Item	Maximum Conducted Output Power					
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode					
Date of Test	12/23/2015				Test Site	TE05
Frequency (MHz)	Data Rate	Average Power		Peak Power		Limit (dBm)
		(dBm)	(W)	(dBm)	(W)	
2412	6.5M	9.01	0.008	17.93	0.062	< 30
2437		9.97	0.010	18.76	0.075	< 30
2462		9.90	0.010	18.69	0.074	< 30
2437	13M	9.91	0.010	18.71	0.074	< 30
2437	19.5M	9.88	0.010	18.65	0.073	< 30
2437	26M	9.72	0.009	18.50	0.071	< 30
2437	39M	9.80	0.010	18.58	0.072	< 30
2437	52M	9.75	0.009	18.54	0.071	< 30
2437	58.5M	9.67	0.009	18.43	0.070	< 30
2437	65M	9.71	0.009	18.48	0.070	< 30

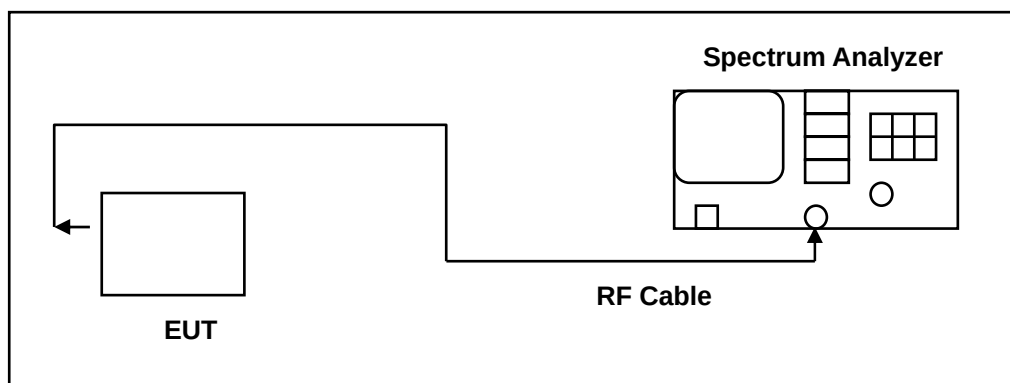
Model Number	nPOS15					
Test Item	Maximum Conducted Output Power					
Test Mode	Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode					
Date of Test	12/23/2015				Test Site	TE05
Frequency (MHz)	Data Rate	Average Power		Peak Power		Limit (dBm)
		(dBm)	(W)	(dBm)	(W)	
2422	13.5M	8.19	0.007	16.93	0.049	< 30
2437		8.57	0.007	17.37	0.055	< 30
2452		8.31	0.007	17.07	0.051	< 30
2437	27M	8.55	0.007	17.33	0.054	< 30
2437	40.5M	8.50	0.007	17.29	0.054	< 30
2437	54M	8.42	0.007	17.19	0.052	< 30
2437	81M	8.38	0.007	17.12	0.052	< 30
2437	108M	8.41	0.007	17.17	0.052	< 30
2437	121.5M	8.48	0.007	17.24	0.053	< 30
2437	135M	8.32	0.007	17.08	0.051	< 30

7 6dB RF 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.

7.2. Test Setup



7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	(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

The EUT tested to DTS test procedure of KDB558074D01 for compliance to FCC 47CFR 15.247 requirements.

6dB RF Bandwidth: The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES RBW 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 low, middle, high)

99 % Occupied Bandwidth: The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

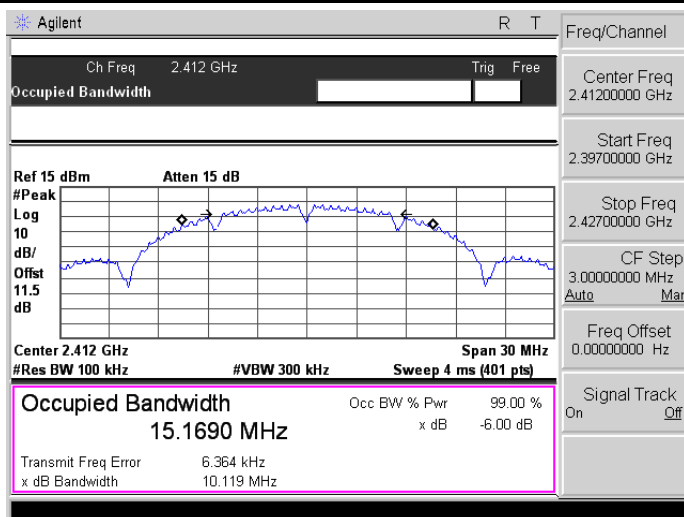
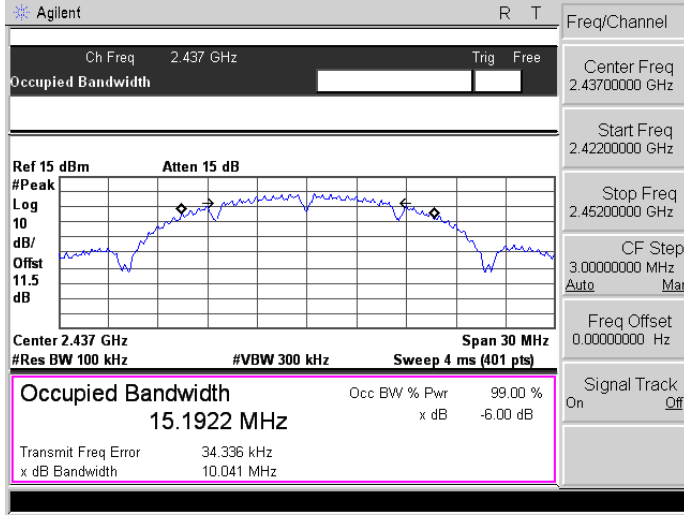
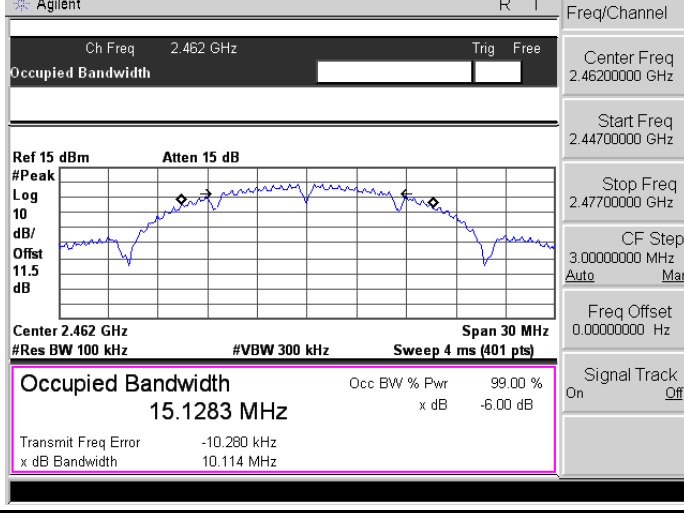
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

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**

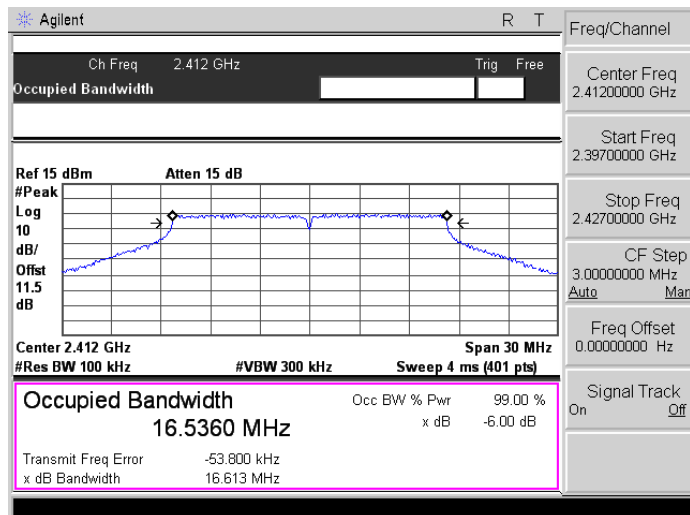
Model Number	nPOS15		
Test Item	6dB RF Bandwidth		
Test Mode	Mode 2: IEEE 802.11b link mode Mode 3: IEEE 802.11g link mode Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode		
Date of Test	12/23/2015	Test Site	TE05
Test Mode	Frequency (MHz)	Measurement (MHz)	Limit (MHz)
Mode 2	2412	10.119	> 0.500
	2437	10.041	> 0.500
	2462	10.114	> 0.500
Mode 3	2412	16.613	> 0.500
	2437	16.598	> 0.500
	2462	16.580	> 0.500
Mode 4	2412	17.827	> 0.500
	2437	17.861	> 0.500
	2462	17.836	> 0.500
Mode 5	2422	36.498	> 0.500
	2437	36.498	> 0.500
	2452	36.476	> 0.500

7.6. Test Graphs

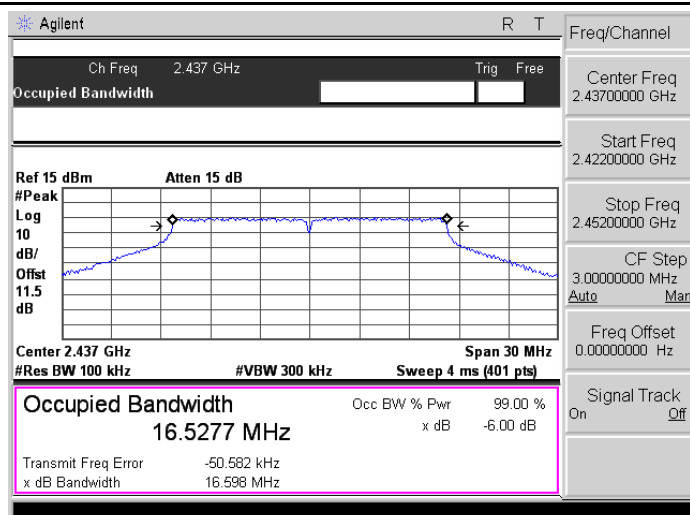
Mode 2: IEEE 802.11b link mode	
2412	 Agilent R T Ch Freq 2.412 GHz Trig Free Occupied Bandwidth Ref 15 dBm Atten 15 dB #Peak Log 10 dB/Offset 11.5 dB Center 2.412 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 15.1690 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 6.364 kHz x dB Bandwidth 10.119 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 15 dB #Peak Log 10 dB/Offset 11.5 dB Center 2.437 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 15.1922 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error 34.336 kHz x dB Bandwidth 10.041 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 15 dB #Peak Log 10 dB/Offset 11.5 dB Center 2.462 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 15.1283 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -10.280 kHz x dB Bandwidth 10.114 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

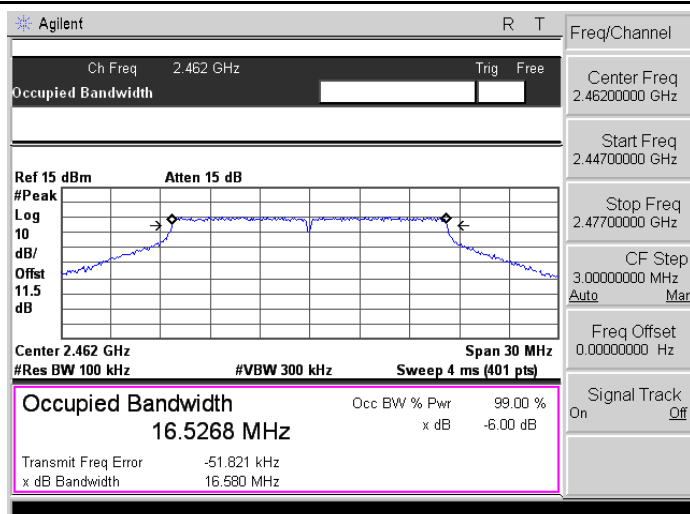
2412



2437

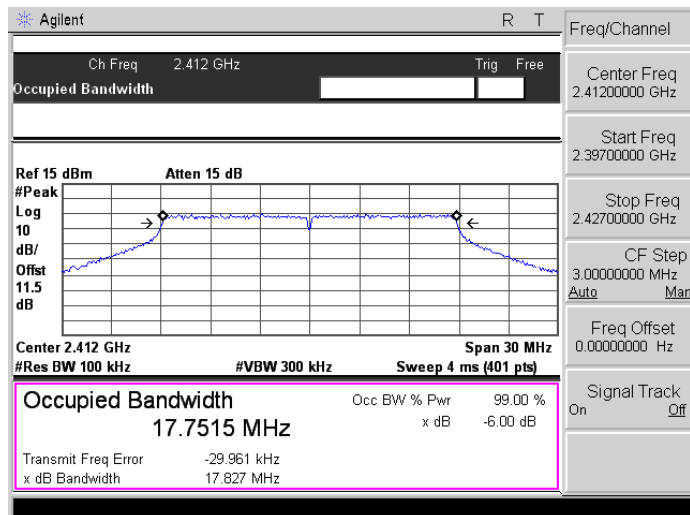


2462

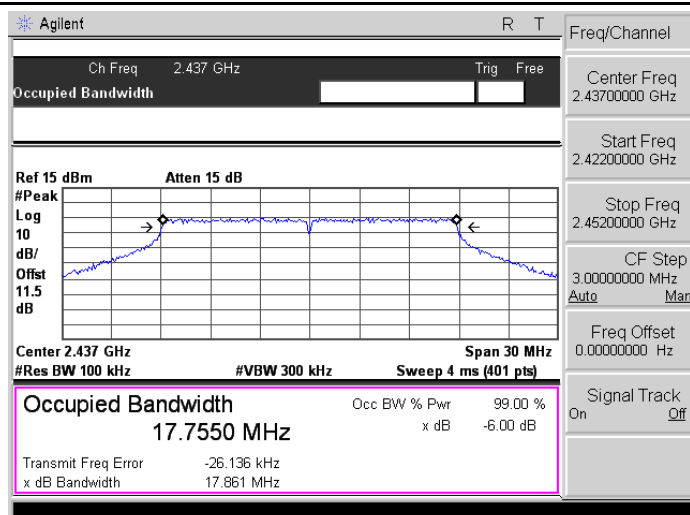


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode

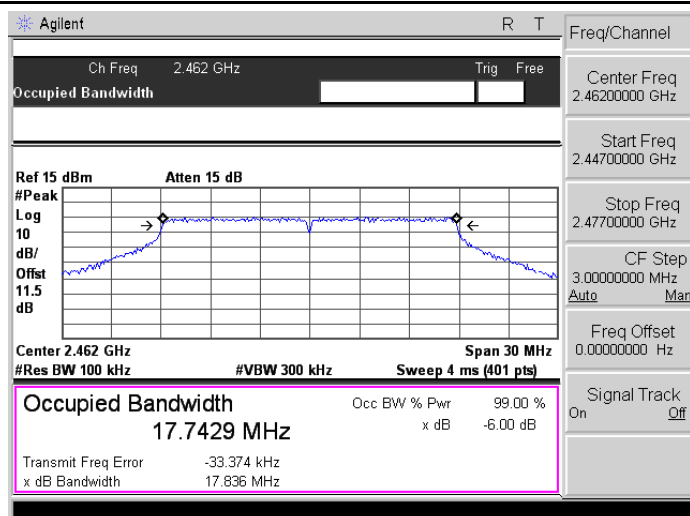
2412



2437

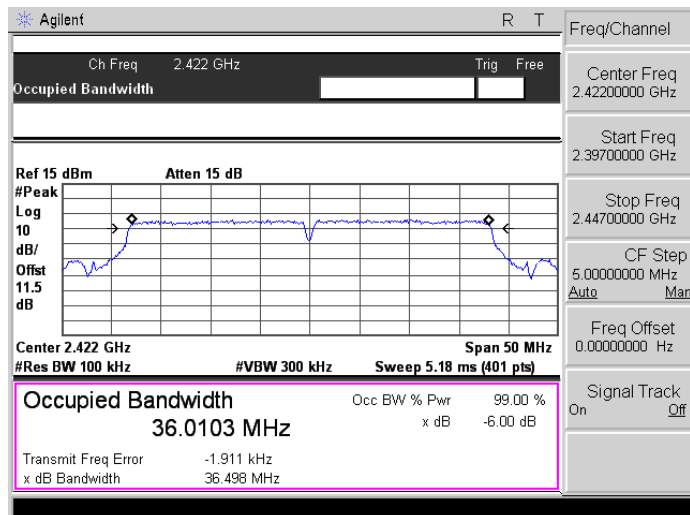


2462

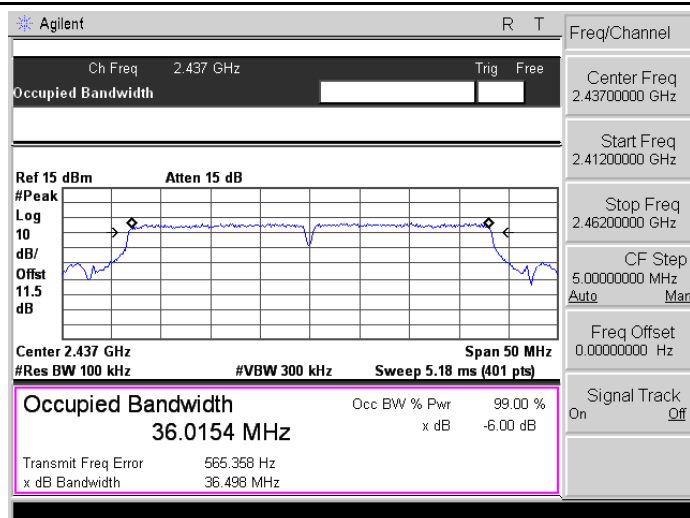


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode

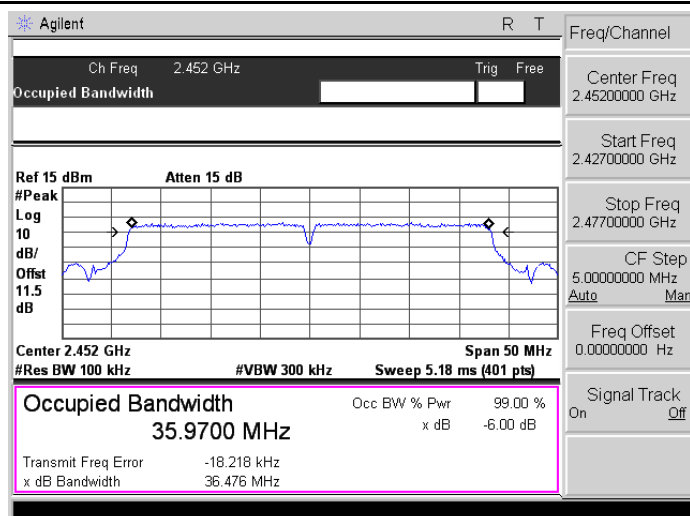
2422



2437



2452

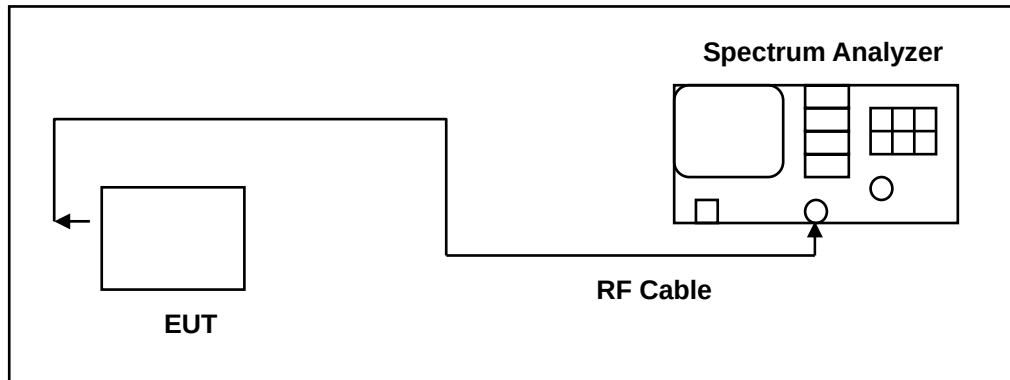


8 Maximum Power Density Measurement

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	12/15/2015	(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 tested to DTS test procedure of KDB558074D01 for compliance to FCC 47CFR 15.247 requirements.

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.

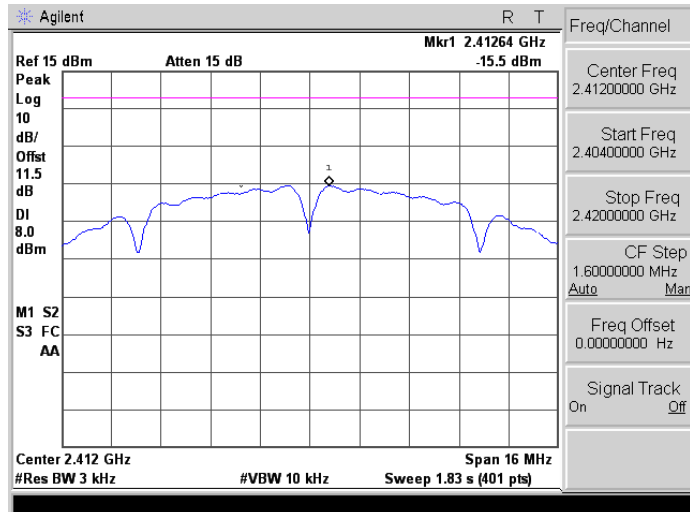
8.5. Test Result

Model Number	nPOS15		
Test Item	Maximum Power Density		
Test 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 802.11n 2.4GHz 40MHz link mode		
Date of Test	12/23/2015	Test Site	TE05
Test Mode	Frequency (MHz)	Measurement (dBm/3KHz)	Limit (dBm/3KHz)
Mode 2	2412	-15.500	< 8
	2437	-15.090	< 8
	2462	-18.210	< 8
Mode 3	2412	-18.550	< 8
	2437	-18.460	< 8
	2462	-18.420	< 8
Mode 4	2412	-18.890	< 8
	2437	-18.130	< 8
	2462	-18.220	< 8
Mode 5	2422	-21.320	< 8
	2437	-19.070	< 8
	2452	-20.580	< 8

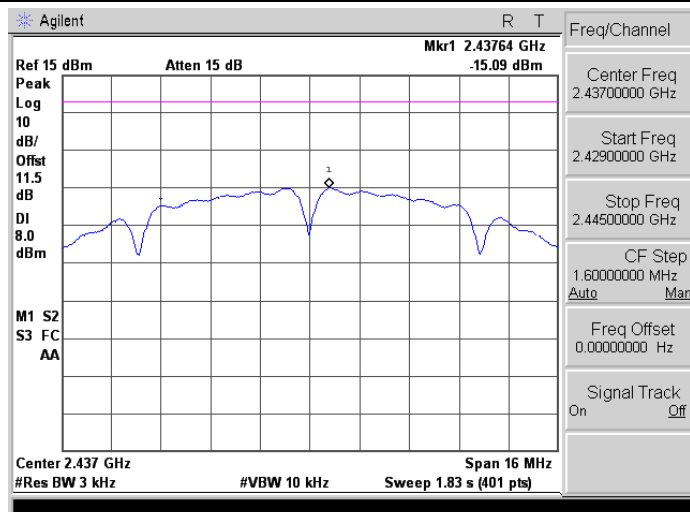
8.6. Test Graphs

Mode 2: IEEE 802.11b link mode

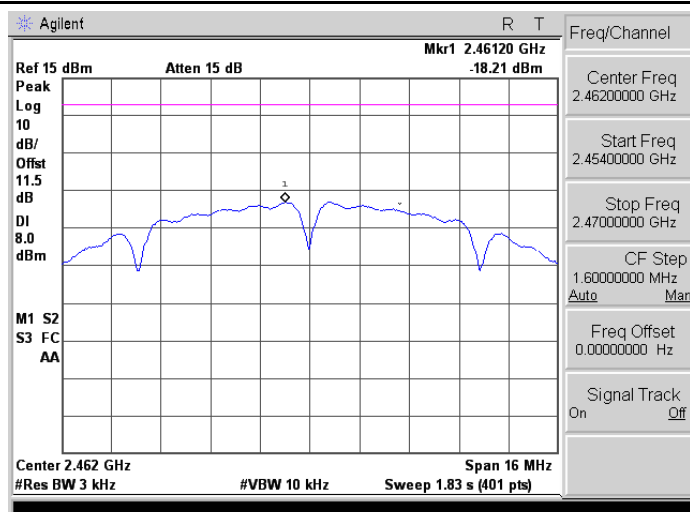
2412



2437

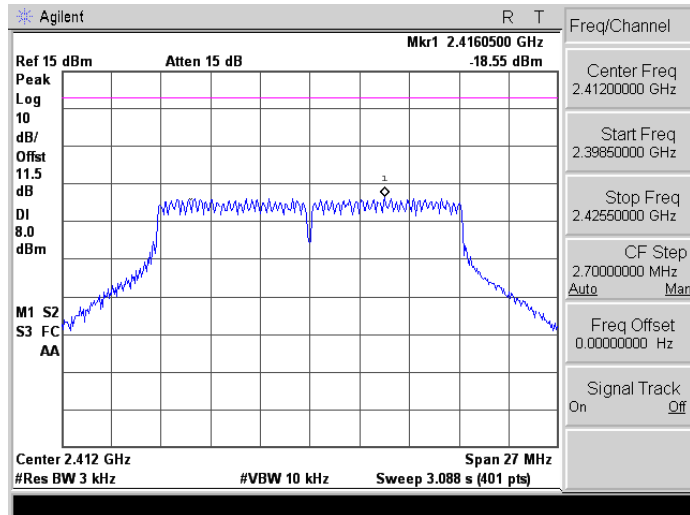


2462

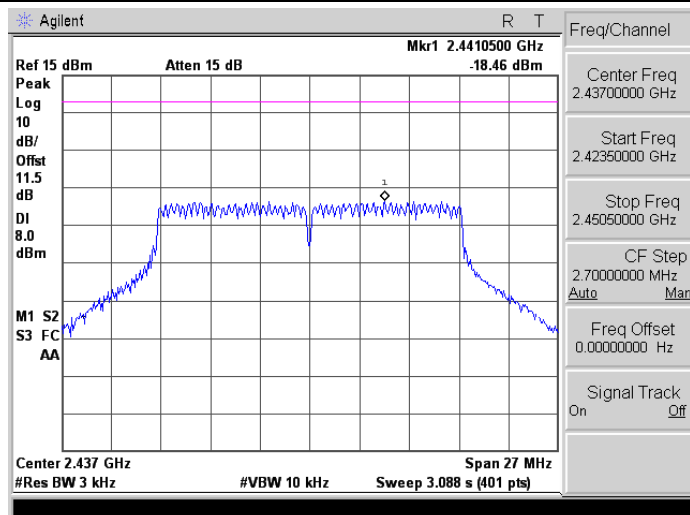


Mode 3: IEEE 802.11g link mode

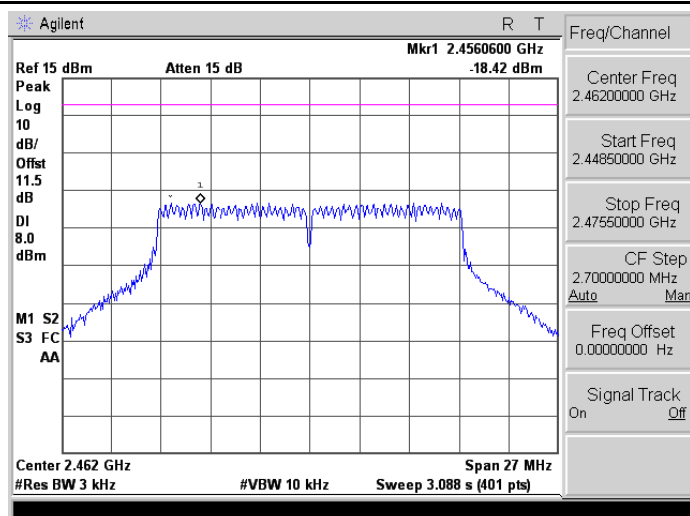
2412



2437

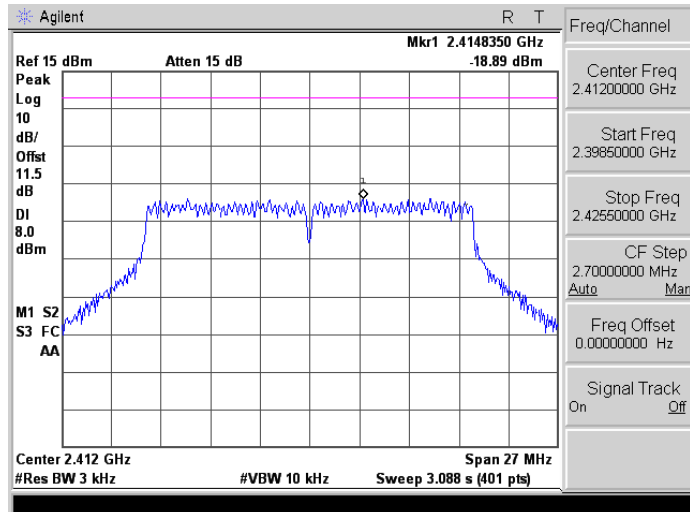


2462

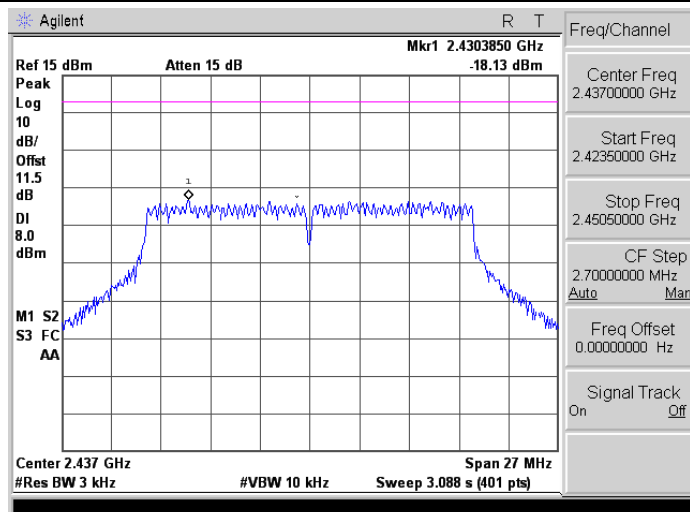


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode

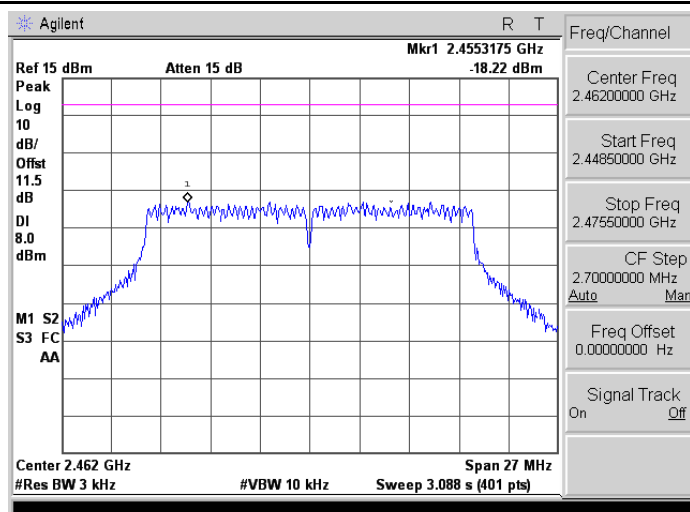
2412



2437

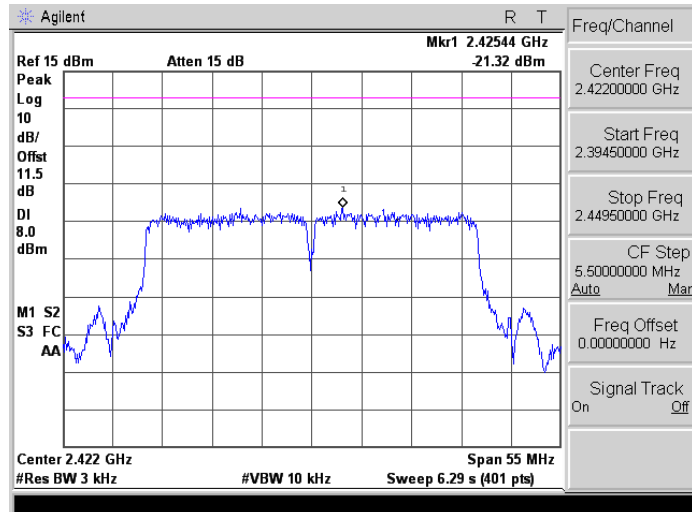


2462

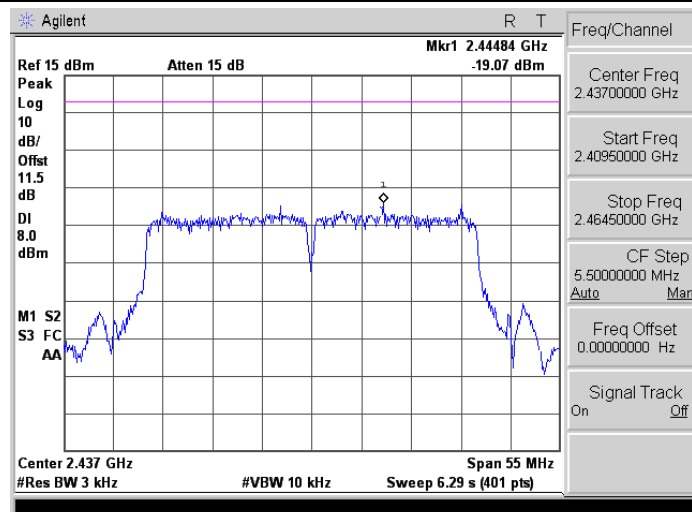


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode

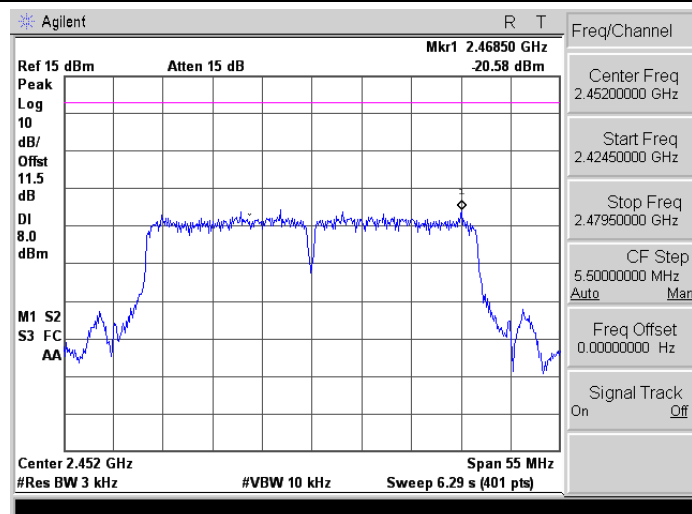
2422



2437



2452

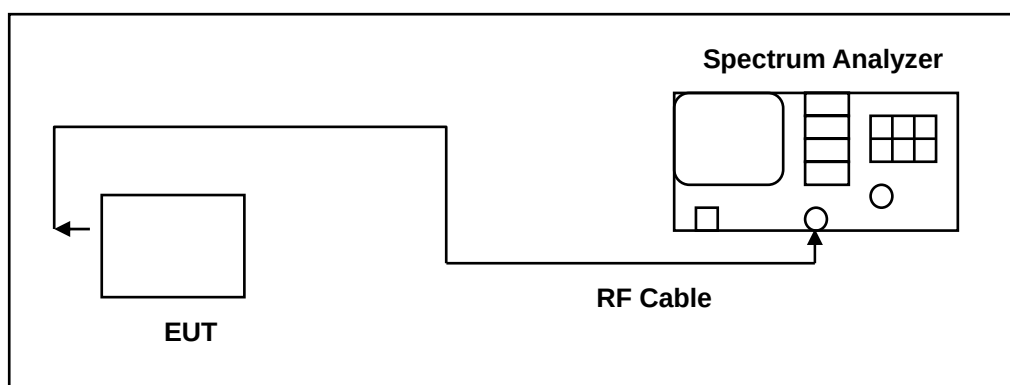


9 Out of Band Conducted Emissions Measurement

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	12/15/2015	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/27/2015	(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.

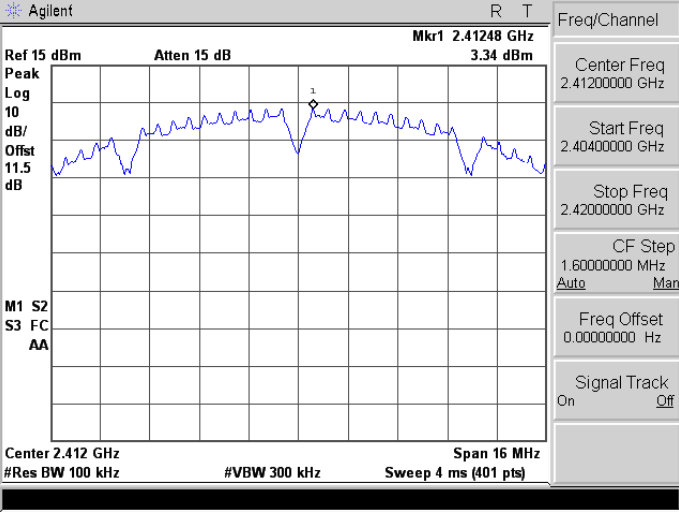
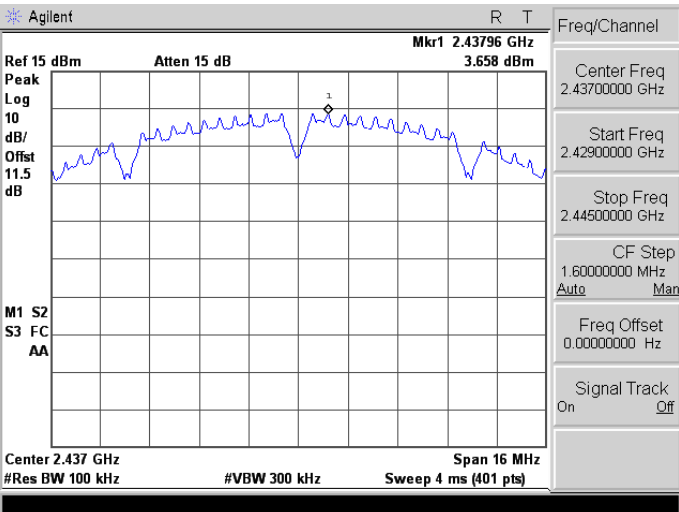
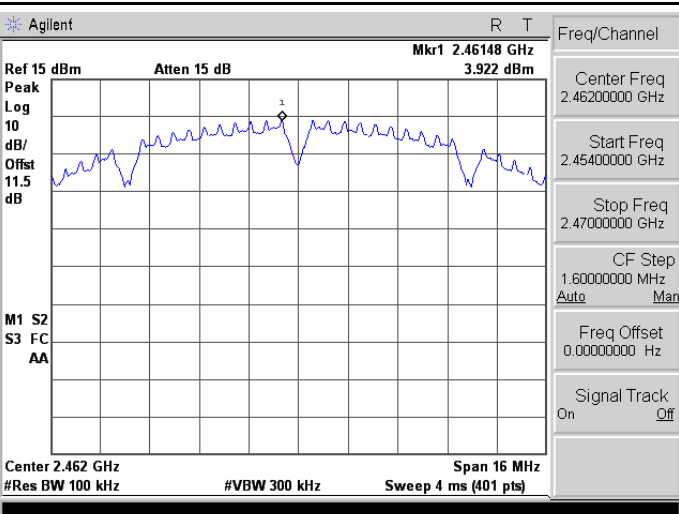
9.4. Test Procedure

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.

9.5. Test Graphs

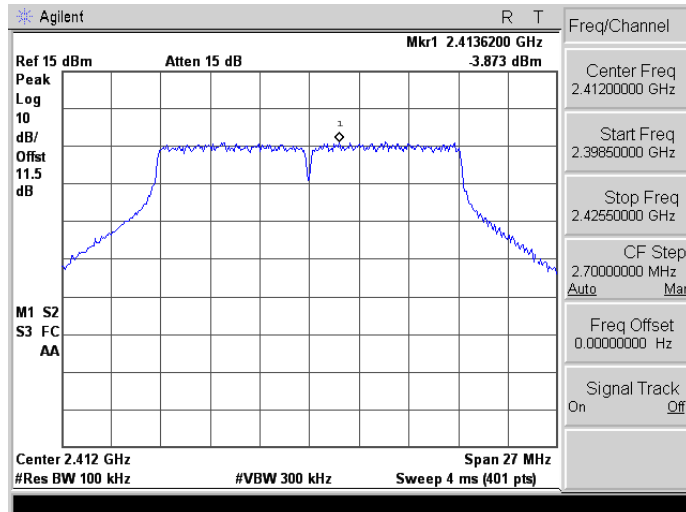
Reference level

Mode 2: IEEE 802.11b link mode

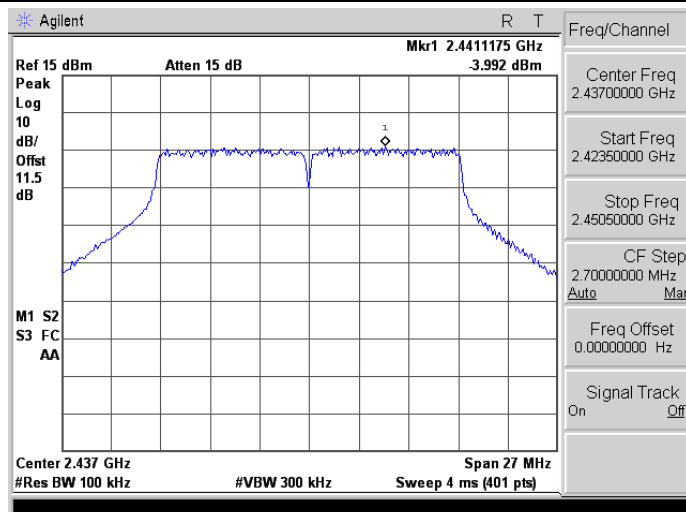
2412	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.41248 GHz 3.34 dBm Center 2.412 GHz Span 16 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.41200000 GHz Start Freq 2.40400000 GHz Stop Freq 2.42000000 GHz CF Step 1.60000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2437	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.43796 GHz 3.658 dBm Center 2.437 GHz Span 16 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.43700000 GHz Start Freq 2.42900000 GHz Stop Freq 2.44500000 GHz CF Step 1.60000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2462	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.46148 GHz 3.922 dBm Center 2.462 GHz Span 16 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.46200000 GHz Start Freq 2.45400000 GHz Stop Freq 2.47000000 GHz CF Step 1.60000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

Mode 3: IEEE 802.11g link mode

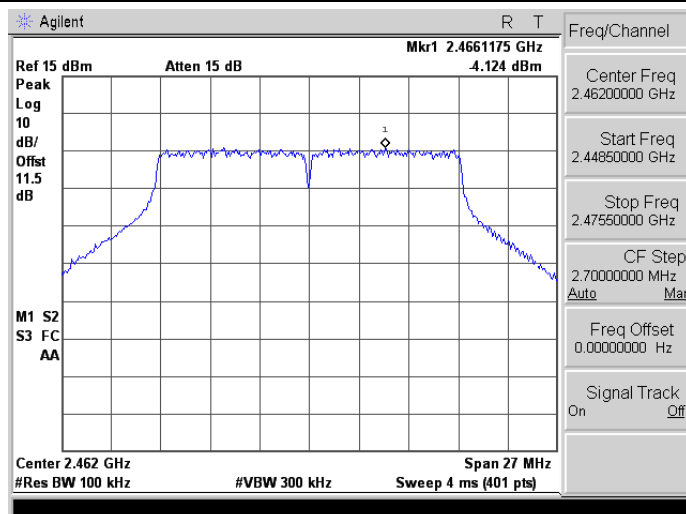
2412



2437

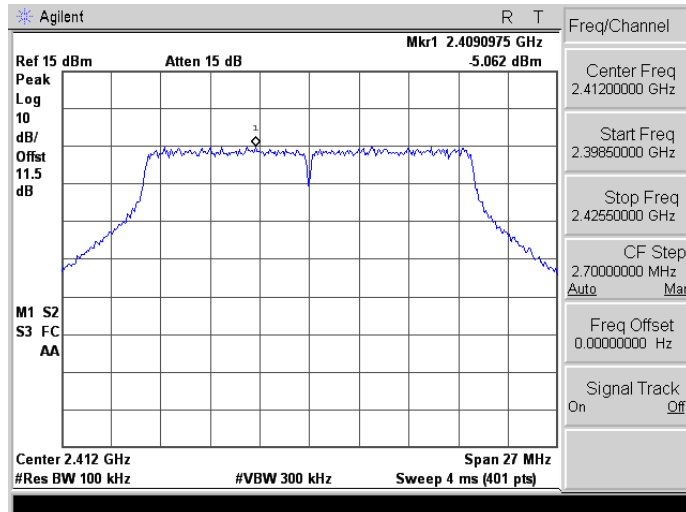


2462

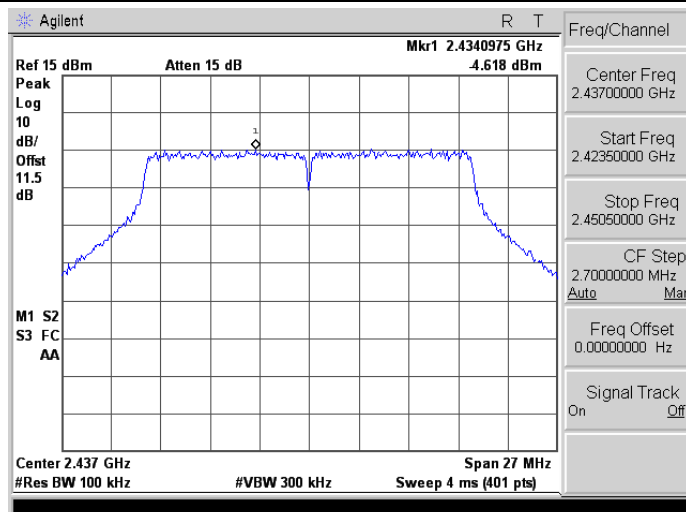


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode

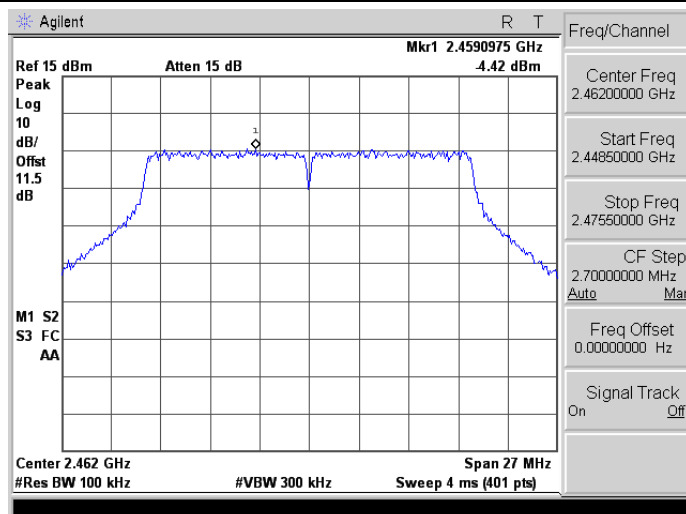
2412



2437

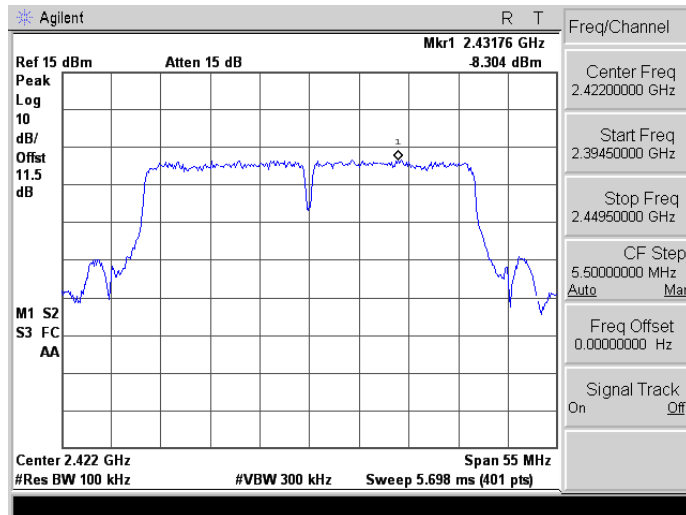


2462

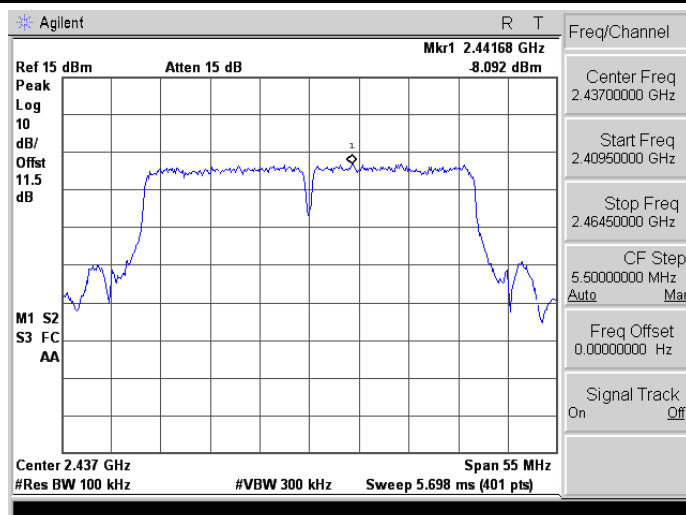


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode

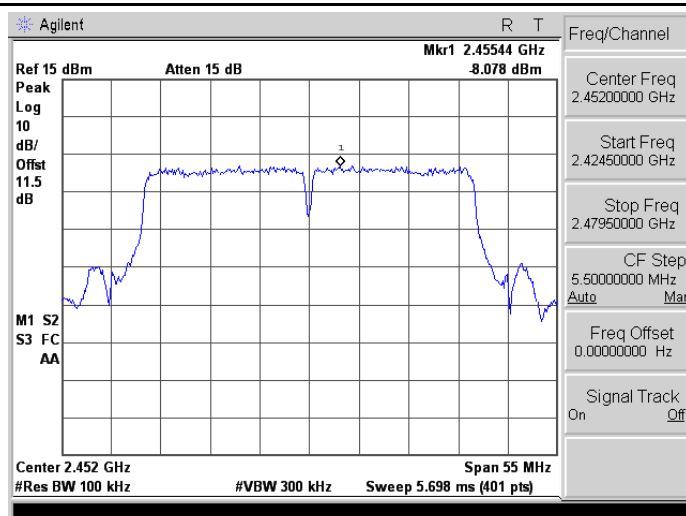
2422



2437



2452



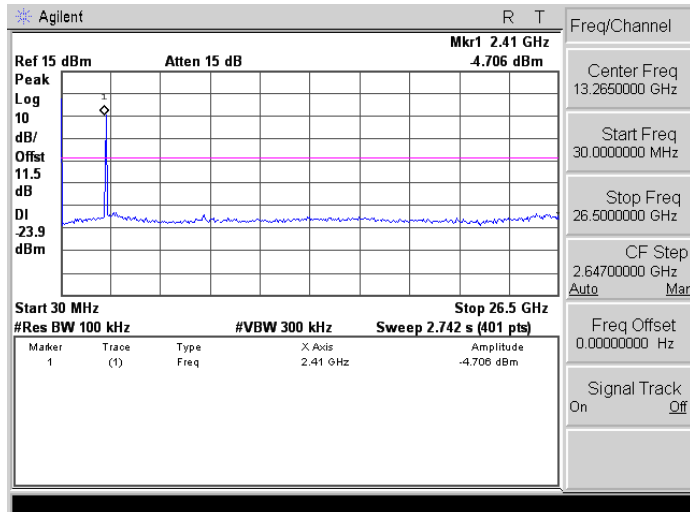
Out of Band Conducted Emissions

Mode 2: IEEE 802.11b link mode

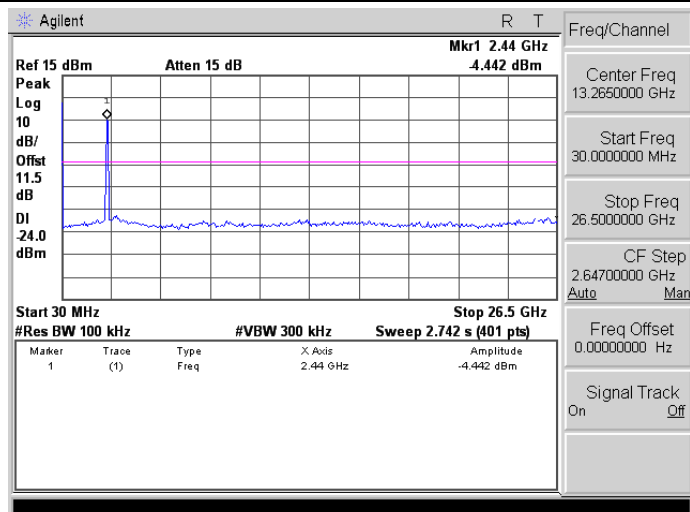
2412	Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.41 GHz 3.079 dBm Peak Log 10 dB/ Offst 11.5 dB DI -16.7 dBm Start 30 MHz Stop 26.5 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.742 s (401 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.41 GHz</td><td>3.079 dBm</td></tr></table> Freq/Channel Center Freq 13.2650000 GHz Start Freq 30.0000000 MHz Stop Freq 26.5000000 GHz CF Step 2.64700000 GHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.41 GHz	3.079 dBm
Marker	Trace	Type	X Axis	Amplitude							
1	(1)	Freq	2.41 GHz	3.079 dBm							
2437	Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.44 GHz 3.032 dBm Peak Log 10 dB/ Offst 11.5 dB DI -16.3 dBm Start 30 MHz Stop 26.5 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.742 s (401 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.44 GHz</td><td>3.032 dBm</td></tr></table> Freq/Channel Center Freq 13.2650000 GHz Start Freq 30.0000000 MHz Stop Freq 26.5000000 GHz CF Step 2.64700000 GHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.44 GHz	3.032 dBm
Marker	Trace	Type	X Axis	Amplitude							
1	(1)	Freq	2.44 GHz	3.032 dBm							
2462	Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.46 GHz 2.834 dBm Peak Log 10 dB/ Offst 11.5 dB DI -16.1 dBm Start 30 MHz Stop 26.5 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.742 s (401 pts) <table><tr><th>Marker</th><th>Trace</th><th>Type</th><th>X Axis</th><th>Amplitude</th></tr><tr><td>1</td><td>(1)</td><td>Freq</td><td>2.46 GHz</td><td>2.834 dBm</td></tr></table> Freq/Channel Center Freq 13.2650000 GHz Start Freq 30.0000000 MHz Stop Freq 26.5000000 GHz CF Step 2.64700000 GHz Auto Man Freq Offset 0.0000000 Hz Signal Track On Off	Marker	Trace	Type	X Axis	Amplitude	1	(1)	Freq	2.46 GHz	2.834 dBm
Marker	Trace	Type	X Axis	Amplitude							
1	(1)	Freq	2.46 GHz	2.834 dBm							

Mode 3: IEEE 802.11g link mode

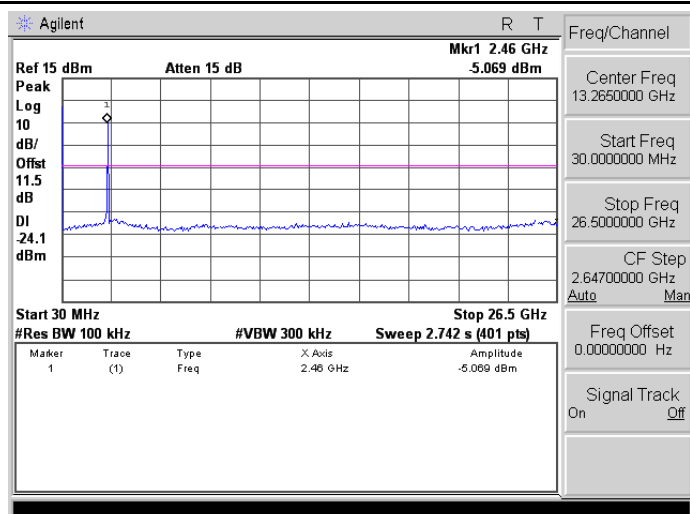
2412



2437

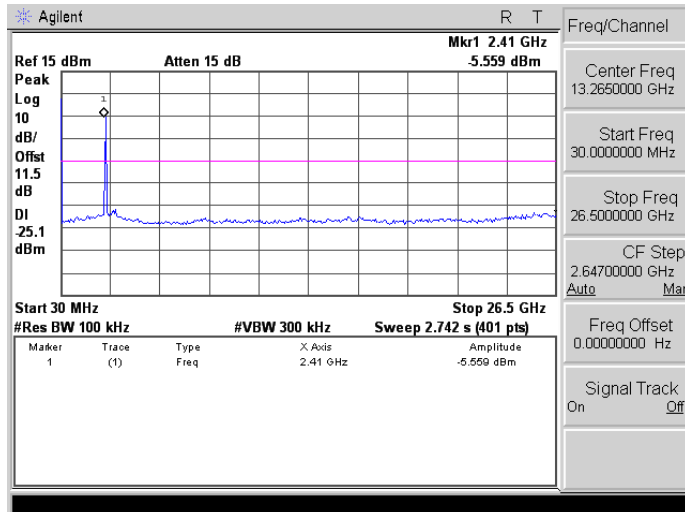


2462

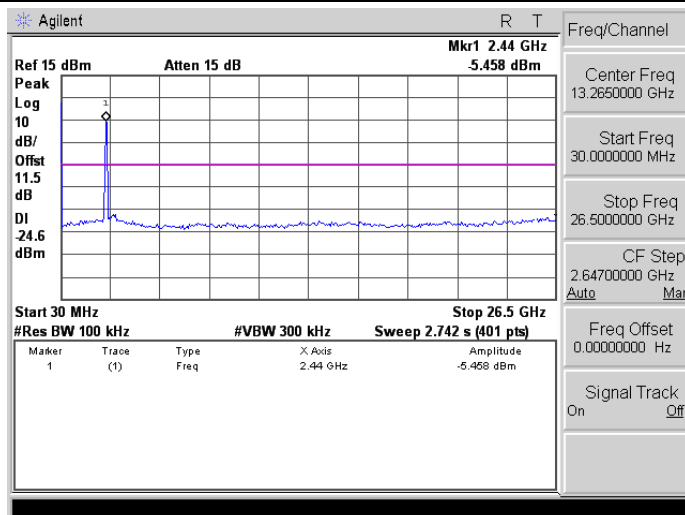


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode

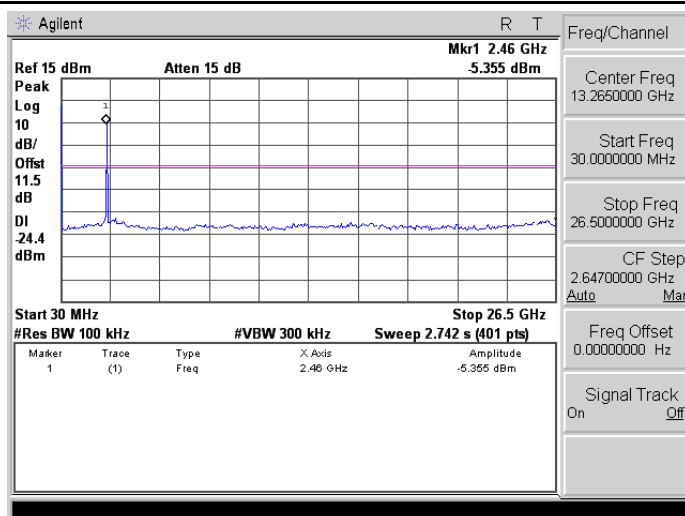
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2437

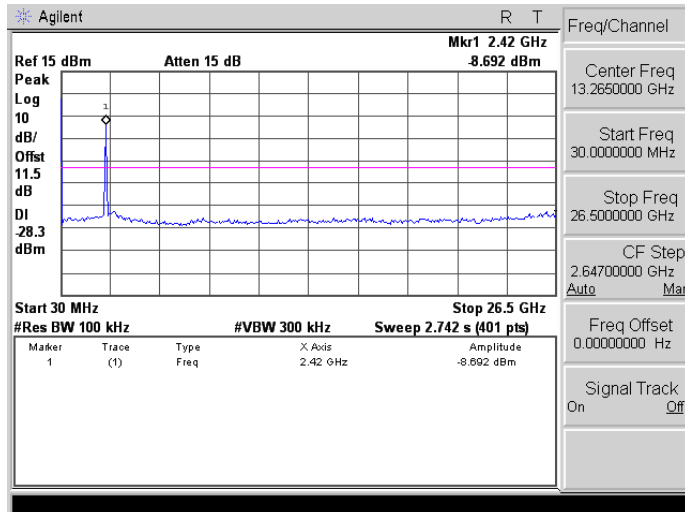


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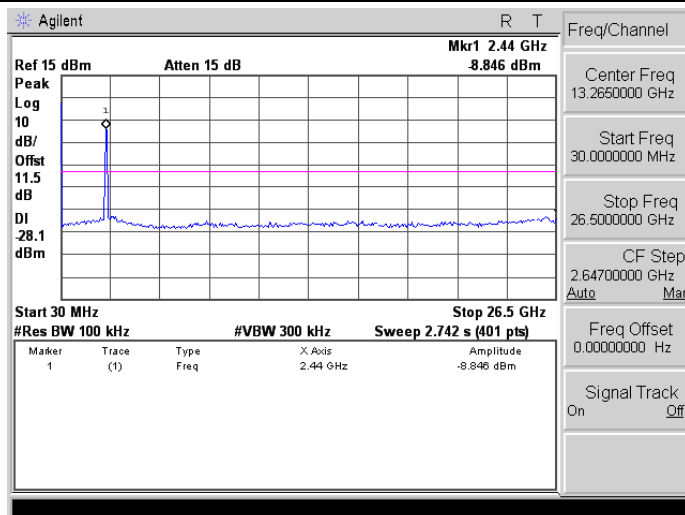


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode

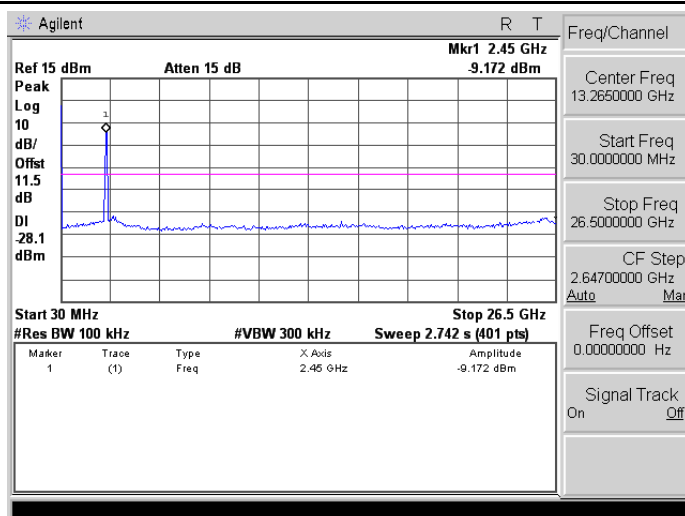
2422



2437



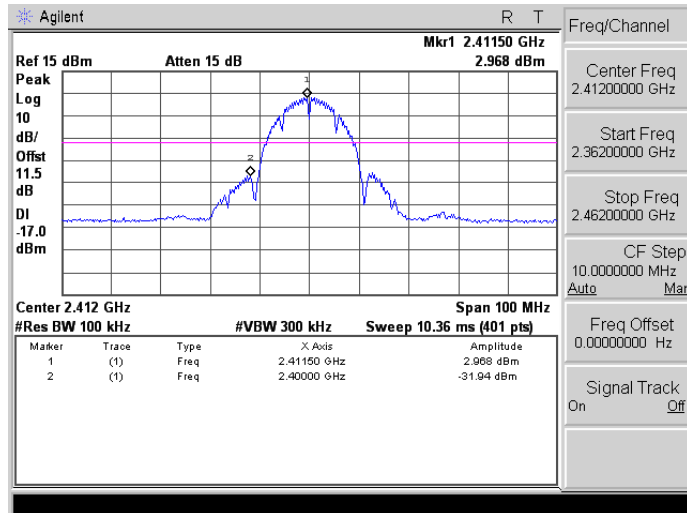
2452



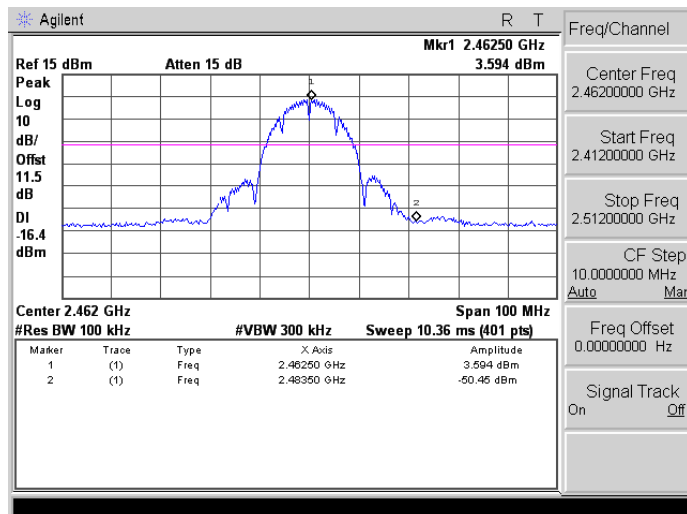
Conducted Band Edge

Mode 2: IEEE 802.11b link mode

2412

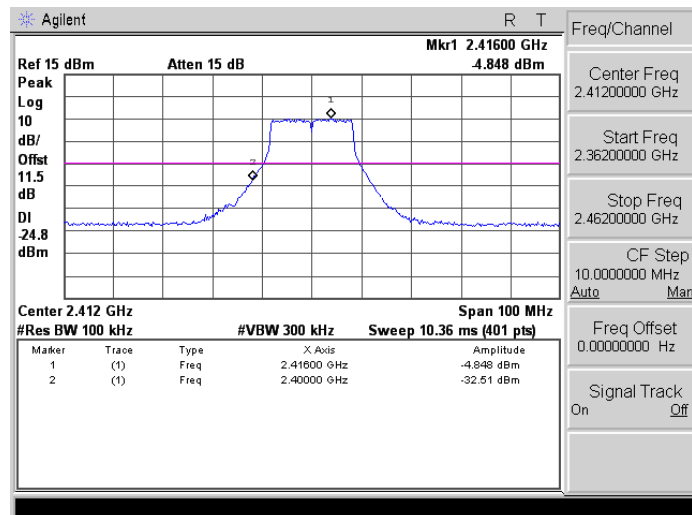


2462

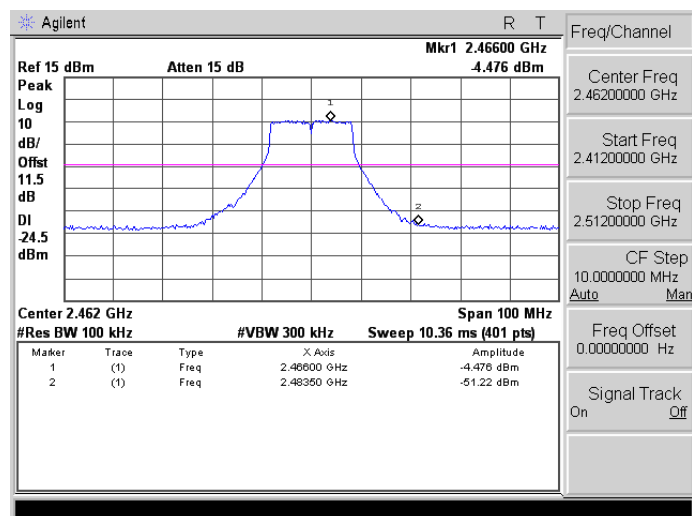


Mode 3: IEEE 802.11g link mode

2412

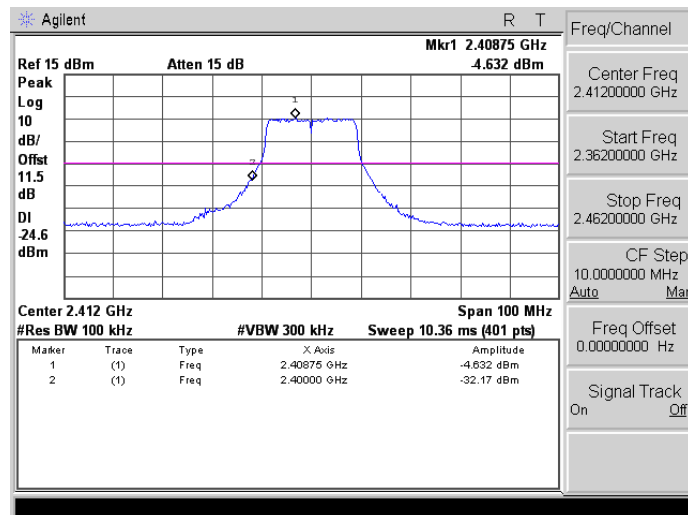


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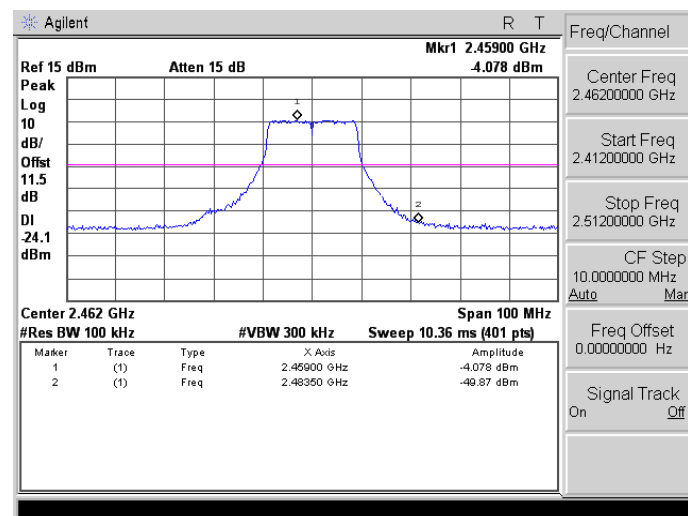


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode

2412

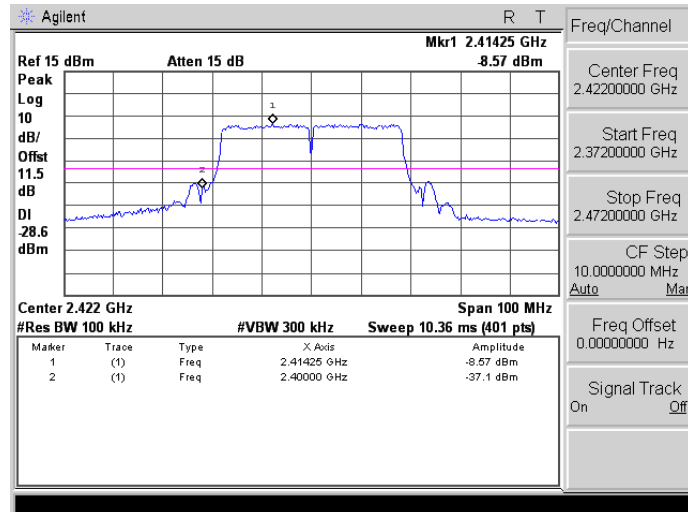


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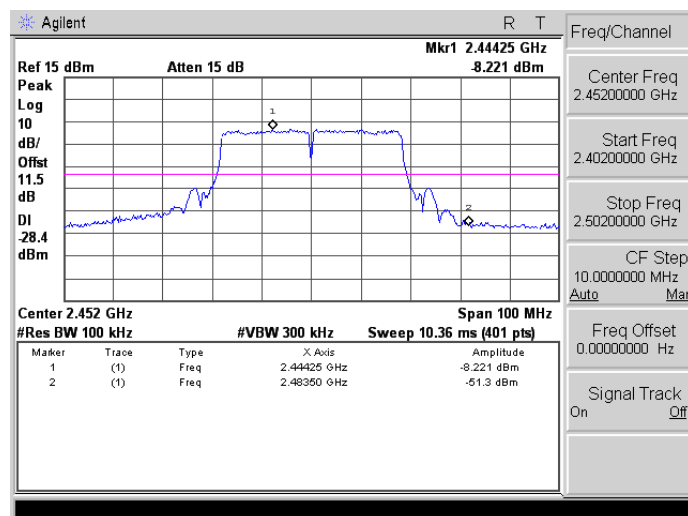


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode

2422



2452



10 Antenna Measurement

10.1.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.

10.2.Antenna Description

See section 2 – antenna information.