FCC 47 CFR PART 15 SUBPART C

RF Test Report

Applicant	:	TP-LINK TECHNOLOGIES CO., LTD.
Applicant Address	:	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China
Product Type	:	300Mbps Wireless N ADSL2+ Modem Router
Trade Name	:	TP-LINK
Model Number	:	TD-W8960N
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Receive Date	:	Oct. 21, 2015
Test Period	:	Nov. 05 ~ Nov. 29, 2015
Issue Date	:	Dec. 31, 2015

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	Dec. 11, 2015	Initial Issue	
01	Dec. 31, 2015	Revised antenna information.	Joyce Liao

Verification of Compliance

Issued Date: 12/31/2015

Applicant	:	TP-LINK TECHNOLOGIES CO., LTD.
Address Applicant	:	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China
Product Type	:	300Mbps Wireless N ADSL2+ Modem Router
Trade Name	:	TP-LINK
Model Number	:	TD-W8960N
FCC ID	:	TE7TDW8960NV7
EUT Rated Voltage	:	DC 9V, 0.85A
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. No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C) Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 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	Reviewed By	:	Eric Ou Yang
(Manager)		(Fly Lu)	(Testing Engineer)		(Eric Ou Yang)

TABLE OF CONTENTS

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	30MHz ~ 1000MHz	6.300
	1000MHz ~ 18000MHz	5.474
	18000MHz ~ 26500MHz	5.630
	26500MHz ~ 40000MHz	5.054

2 EUT Description

Applicant	TP-LINK TECHNOLOGIES CO., LTD.			
Applicant Address	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China			
Manufacturer	TP-LINK TECHNOLOGIES CO., LTD.			
Manufacturer Address	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China			
Product Type	300Mbps Wireless N ADSL2+ Modem Router			
Trade Name	TP-LINK			
Model Number	TD-W8960N			
FCC ID	TE7TDW8960NV7			
Operate Band	Frequency Range (MHz)	Modulation	Channel Bandwidth	Data Rate 400 / 800 GI (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 144.4Mbps
IEEE 802.11n 2.4GHz 40MHz	2422 ~ 2452	OFDM	40MHz	Up to 300Mbps
Antenna Delivery	2TX + 2RX (see the section 3.1)			
Antenna information	Type	Max. Gain (dBi)	Directional Gain (dBi)	
	Omni Directional Antenna	3.7	6.71	

Frequency Band	Max. RF Output Power (W)
IEEE 802.11b	0.070
IEEE 802.11g	0.152
IEEE 802.11n 2.4GHz 20MHz	0.151
IEEE 802.11n 2.4GHz 40MHz	0.156

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	ANT-0	ANT-1	ANT-0+1 (MIMO)
Mode 2: IEEE 802.11b link mode	V	V	---
Mode 3: IEEE 802.11g link mode	V	V	V
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	V	V	V
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	V	V	V

NOTE: The MIMO is CDD mode.

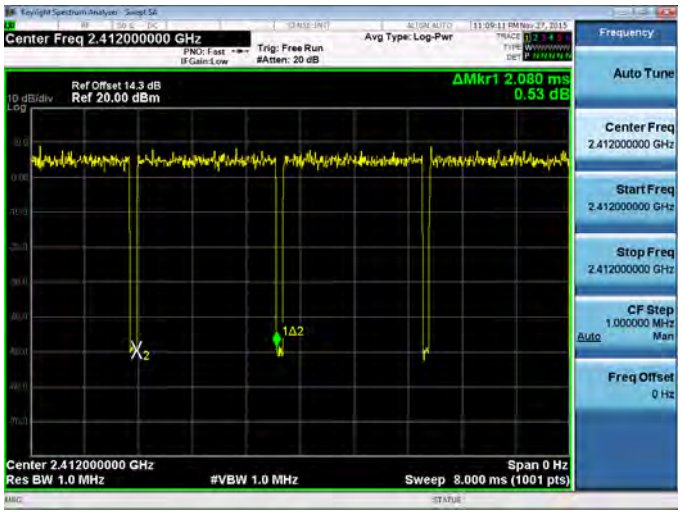
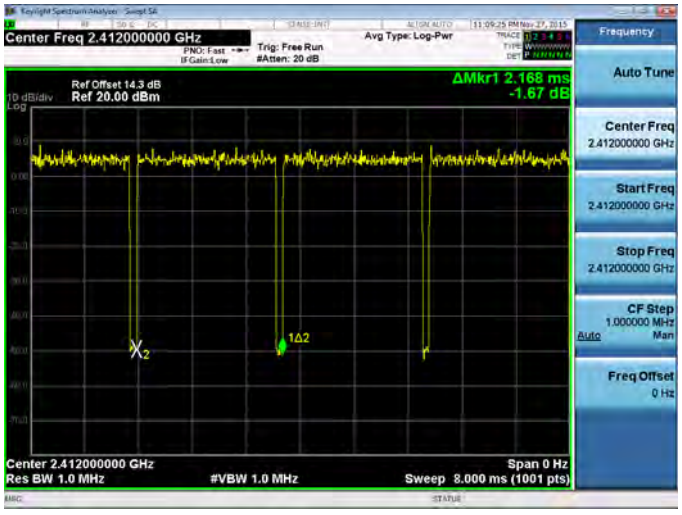
Test Mode	Antenna Delivery	Test Channel	Data Rate 800GI (ns)
Mode 2: IEEE 802.11b link mode	1TX / 1RX	1, 6, 11	1
Mode 3: IEEE 802.11g link mode	2TX / 2RX	1, 6, 11	6
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	2TX / 2RX	1, 6, 11	13
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	2TX / 2RX	3, 6, 9	27

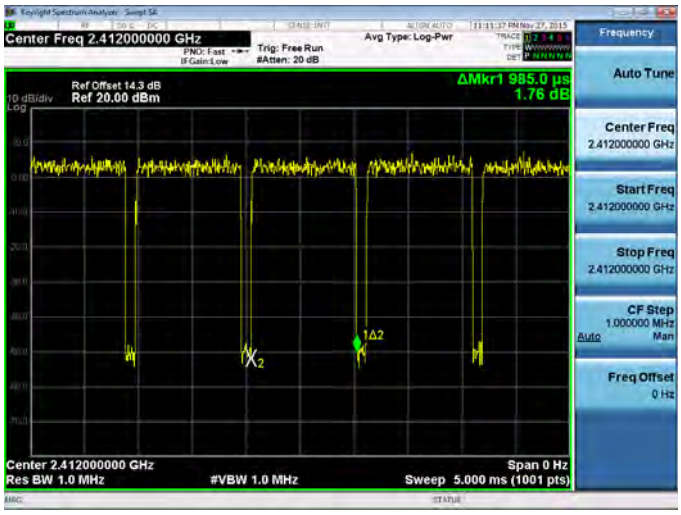
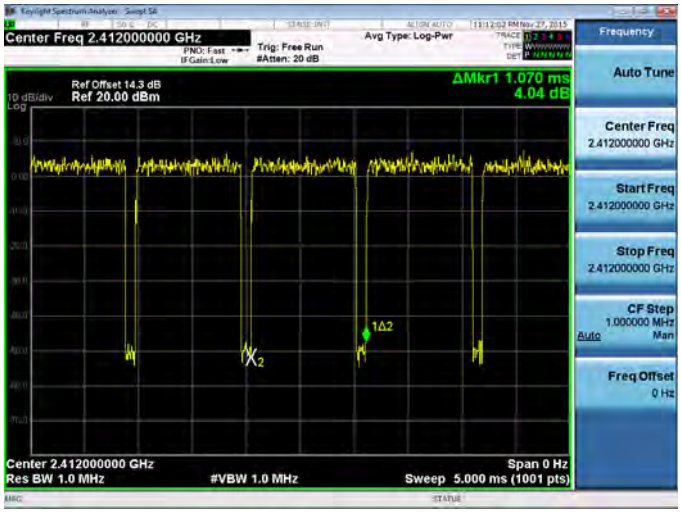
Duty cycle

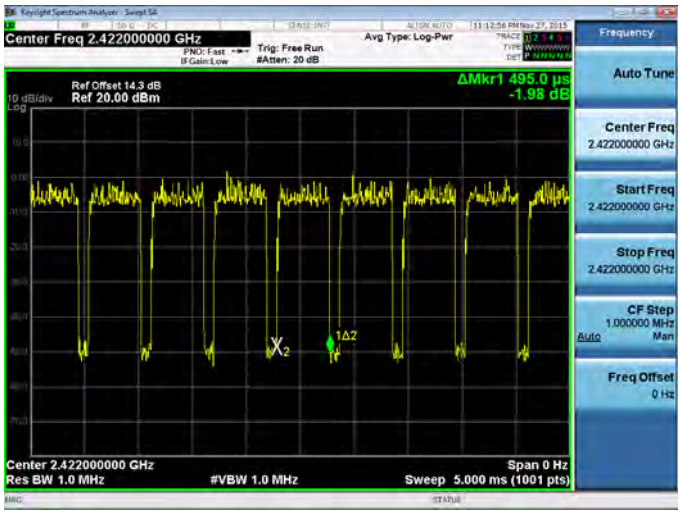
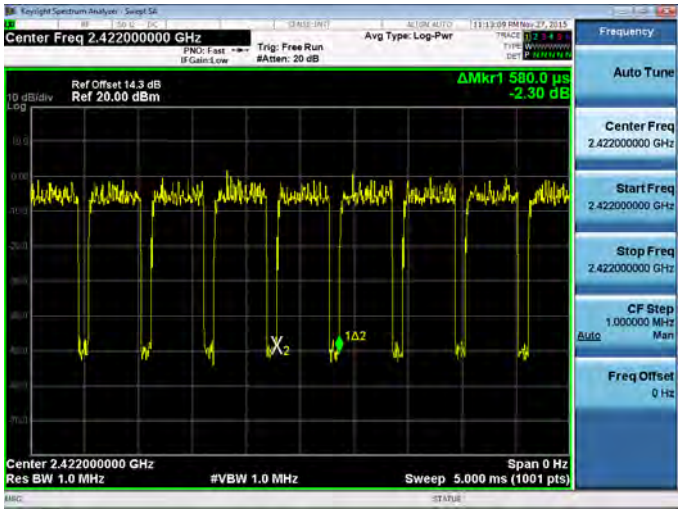
Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 2: IEEE 802.11b link mode	2412.0	12.480	13.080	0.954	0.204	0.080
Mode 3: IEEE 802.11g link mode	2412.0	2.080	2.168	0.959	0.180	0.481
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	2412.0	0.985	1.070	0.921	0.359	1.015
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	2422.0	0.495	0.580	0.853	0.688	2.020

Duty Cycle Graphs

Mode 2: IEEE 802.11b link mode	
On time	
On+off time	

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	

Mode 5: IEEE 802.11n 2.4GHz 40MHz Mode	
On time	
On+off time	

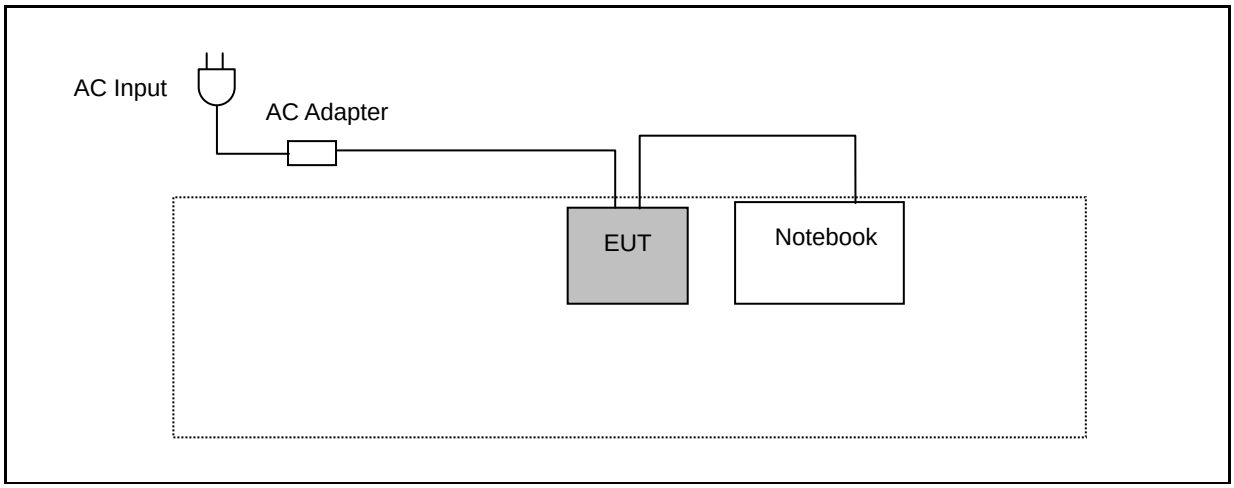
3.2. EUT Exercise Software

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.

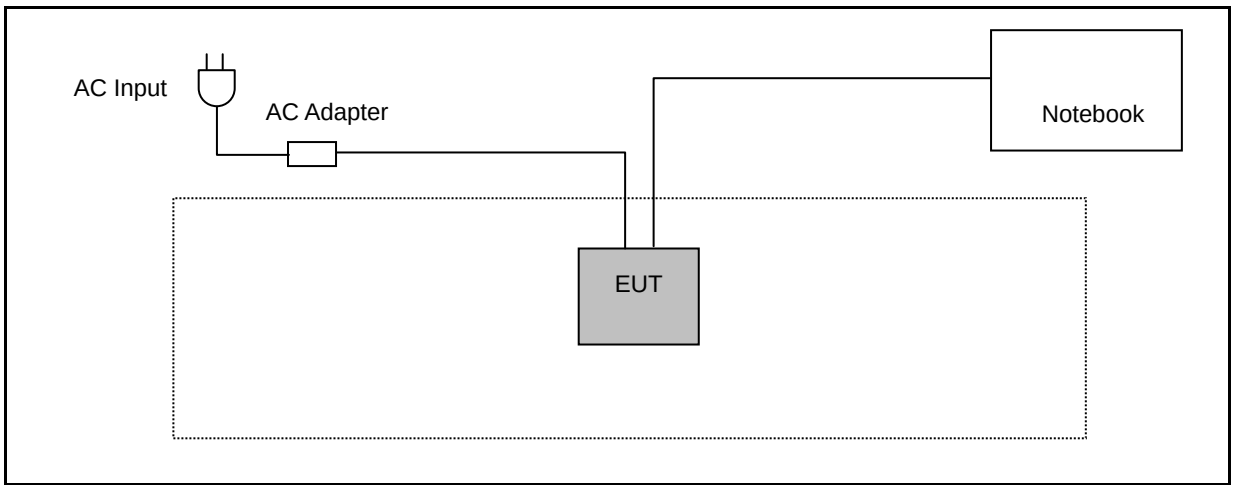
Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1
2	EZ-EMC Ver ATL-ITC-3A1-1

3.3. Configuration of Test System Details

3.4. Conducted Emissions



3.5. Radiated Emissions



3.6. 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

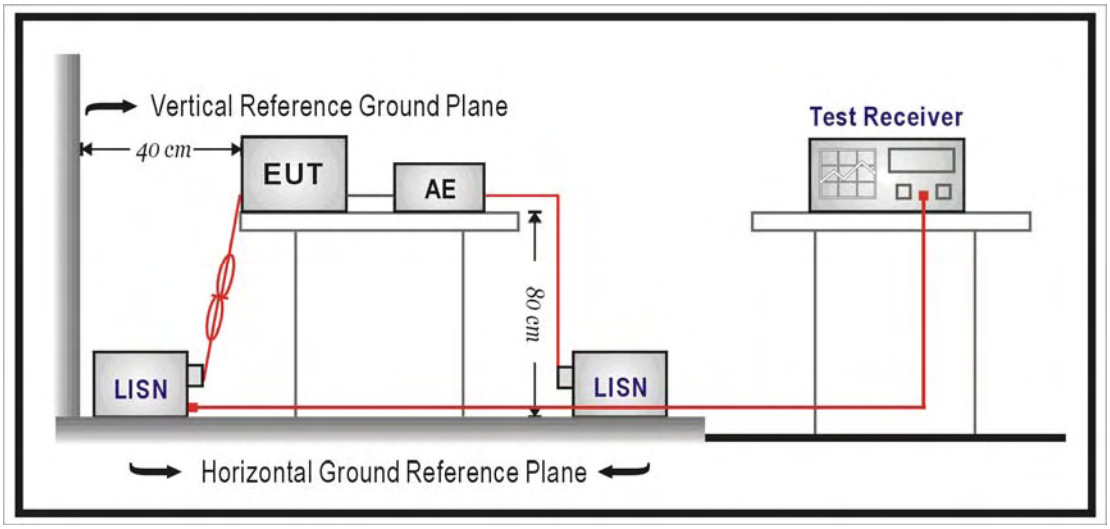
Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

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

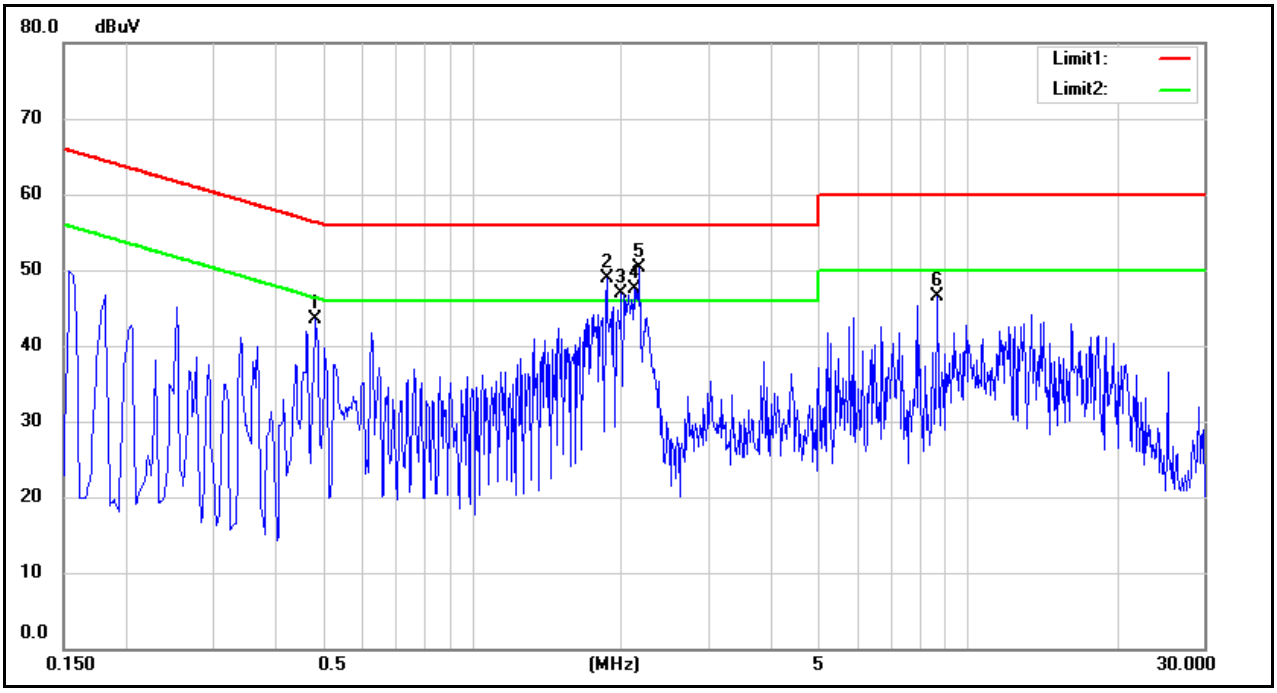
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

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

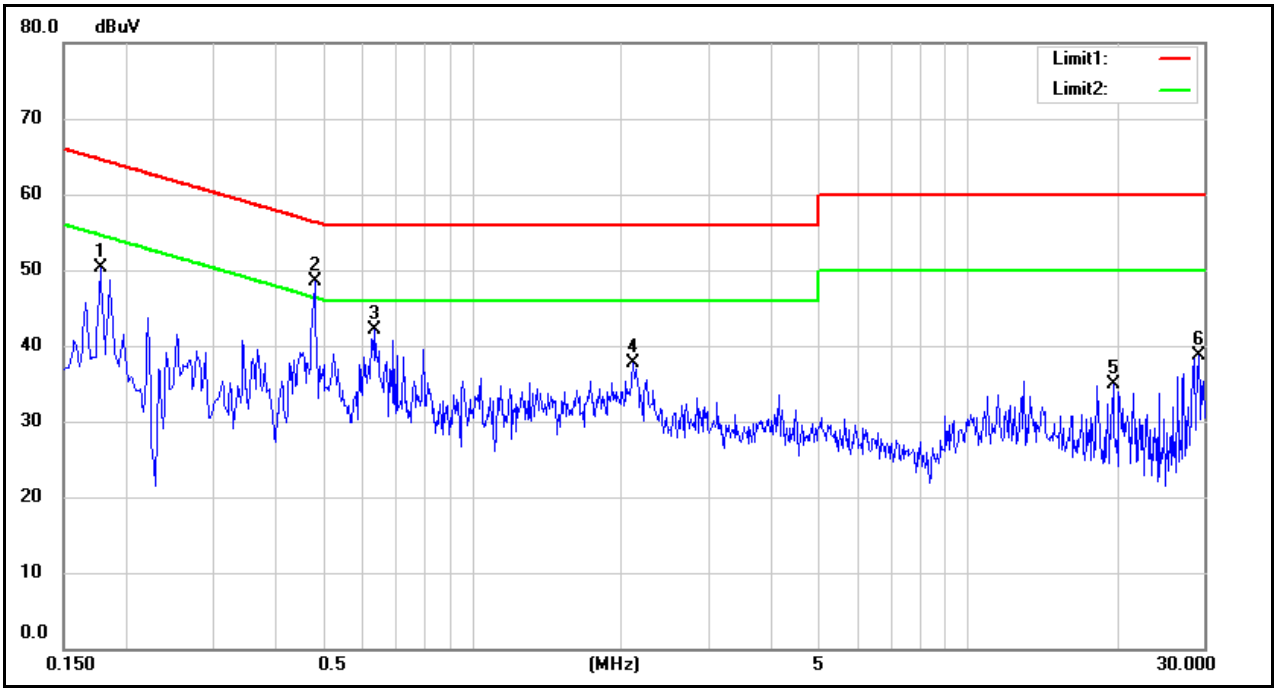
Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	11/05/2015
		Test By:	Eric Ou Yang
Description:			



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	0.4820	33.04	22.82	9.70	42.74	32.52	56.30	46.30	-13.56	-13.78	Pass
2	1.8700	32.67	21.75	9.76	42.43	31.51	56.00	46.00	-13.57	-14.49	Pass
3	2.0100	32.87	22.11	9.77	42.64	31.88	56.00	46.00	-13.36	-14.12	Pass
4	2.1220	33.87	22.92	9.77	43.64	32.69	56.00	46.00	-12.36	-13.31	Pass
5	2.1860	32.94	22.13	9.78	42.72	31.91	56.00	46.00	-13.28	-14.09	Pass
6	8.7180	34.62	27.27	9.95	44.57	37.22	60.00	50.00	-15.43	-12.78	Pass

Note: 1. Result (dBuV) = 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:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	11/05/2015
		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	0.1780	29.24	13.36	9.65	38.89	23.01	64.58	54.58	-25.69	-31.57	Pass
2	0.4820	36.25	27.95	9.67	45.92	37.62	56.30	46.30	-10.38	-8.68	Pass
3	0.6380	25.02	14.44	9.67	34.69	24.11	56.00	46.00	-21.31	-21.89	Pass
4	2.1180	21.95	12.43	9.74	31.69	22.17	56.00	46.00	-24.31	-23.83	Pass
5	19.7100	23.77	17.59	10.16	33.93	27.75	60.00	50.00	-26.07	-22.25	Pass
6	29.2340	29.17	22.63	10.23	39.40	32.86	60.00	50.00	-20.60	-17.14	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 (μV/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.

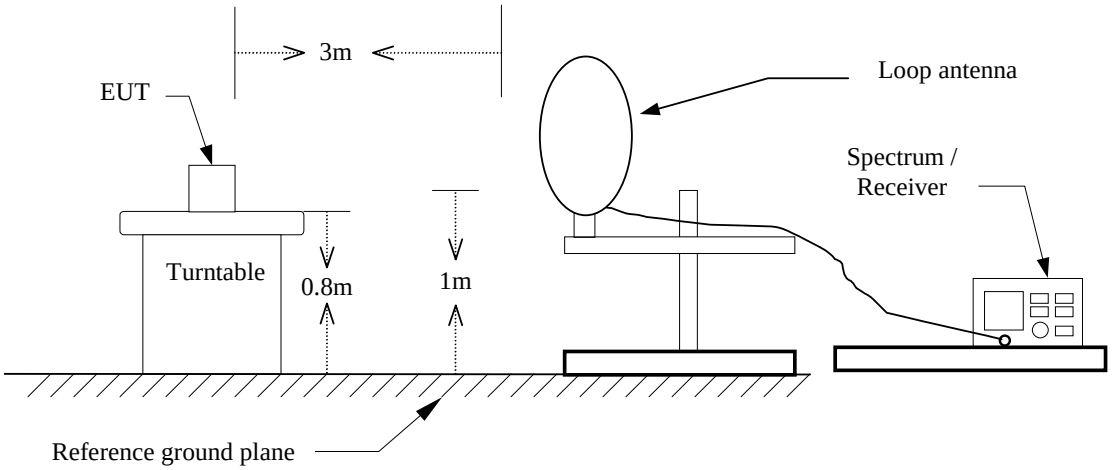
5.2. Test Instruments

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-SM-14000	140202	02/24/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	02/24/2015	(1)
Test Site	ATL	TE01	888001	08/26/2015	(1)

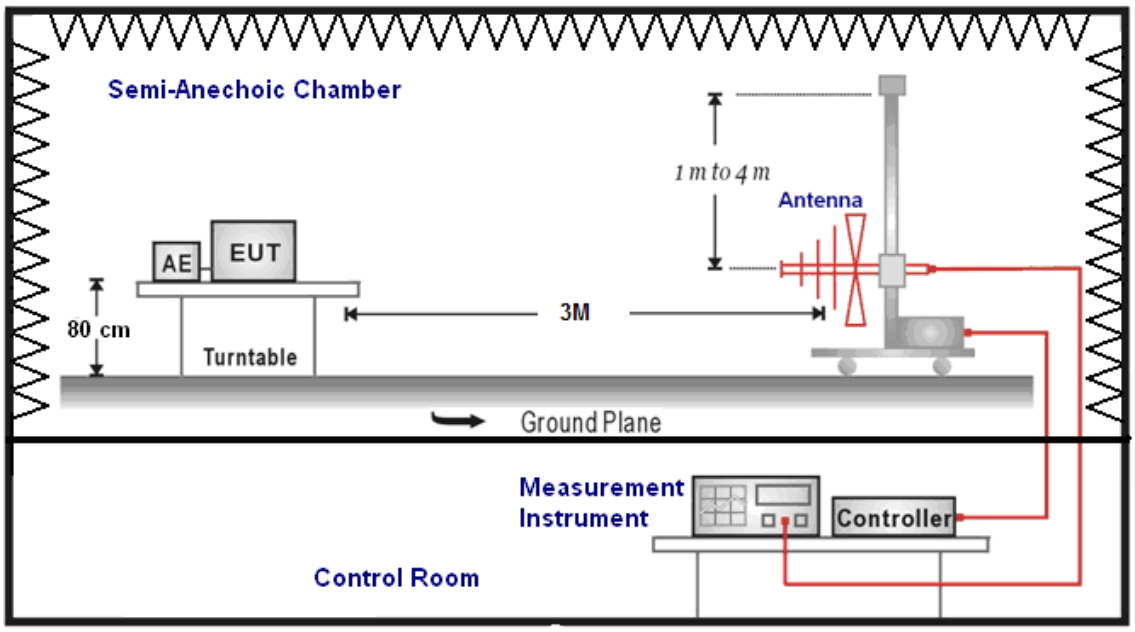
Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.
Note: N.C.R. = No Calibration Request.

5.3. Setup

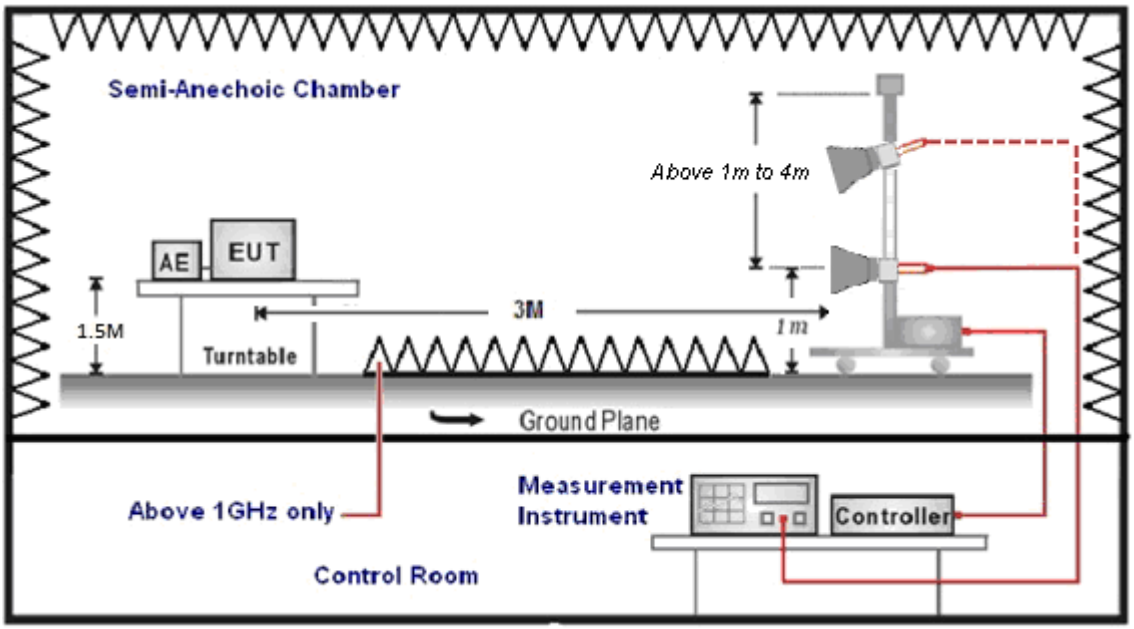
9kHz ~ 30MHz



Below 1GHz



Above 1GHz


Semi-Anechoic Chamber
Above 1m to 4m
AE
EUT
1.5M
3M
1m
Turntable
Ground Plane
Above 1GHz only
Measurement
Instrument
Controller
Control Room

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 tree 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 (mode 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 pre meter (uV/m).

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

The actual field is 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) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-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:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	11/29/2015
		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
278.5000	24.43	-9.81	14.62	46.00	-31.38	QP	H
403.5000	25.29	-7.29	18.00	46.00	-28.00	QP	H
493.5000	26.81	-5.56	21.25	46.00	-24.75	QP	H
644.5000	24.74	-2.95	21.79	46.00	-24.21	QP	H
751.0000	26.63	-0.96	25.67	46.00	-20.33	QP	H
901.5000	24.66	1.59	26.25	46.00	-19.75	QP	H
229.5000	23.02	-11.58	11.44	46.00	-34.56	QP	V
339.5000	23.40	-7.79	15.61	46.00	-30.39	QP	V
518.0000	27.72	-5.30	22.42	46.00	-23.58	QP	V
627.5000	25.14	-3.25	21.89	46.00	-24.11	QP	V
758.0000	25.60	-0.89	24.71	46.00	-21.29	QP	V
924.5000	24.05	1.74	25.79	46.00	-20.21	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:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/29/2015
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
2995.000	34.81	4.19	39.00	74.00	-35.00	peak	H
4556.000	30.16	9.52	39.68	74.00	-34.32	peak	H
6642.000	31.62	16.21	47.83	74.00	-26.17	peak	H
2995.000	38.72	4.19	42.91	74.00	-31.09	peak	V
4381.000	31.65	8.93	40.58	74.00	-33.42	peak	V
6684.000	31.02	16.32	47.34	74.00	-26.66	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/29/2015
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
3170.000	34.11	4.75	38.86	74.00	-35.14	peak	H
4542.000	30.91	9.46	40.37	74.00	-33.63	peak	H
6635.000	30.91	16.18	47.09	74.00	-26.91	peak	H
2995.000	38.71	4.19	42.90	74.00	-31.10	peak	V
4591.000	30.00	9.65	39.65	74.00	-34.35	peak	V
6726.000	30.59	16.44	47.03	74.00	-26.97	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/29/2015
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
3107.000	35.06	4.56	39.62	74.00	-34.38	peak	H
4556.000	30.65	9.52	40.17	74.00	-33.83	peak	H
6691.000	30.68	16.33	47.01	74.00	-26.99	peak	H
2995.000	37.62	4.19	41.81	74.00	-32.19	peak	V
4787.000	31.88	10.40	42.28	74.00	-31.72	peak	V
6754.000	30.28	16.51	46.79	74.00	-27.21	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/29/2015
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
2995.000	37.18	4.19	41.37	74.00	-32.63	peak	H
4402.000	30.38	9.00	39.38	74.00	-34.62	peak	H
6761.000	30.58	16.53	47.11	74.00	-26.89	peak	H
2995.000	39.36	4.19	43.55	74.00	-30.45	peak	V
4570.000	30.36	9.57	39.93	74.00	-34.07	peak	V
6649.000	30.52	16.22	46.74	74.00	-27.26	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/29/2015
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	35.48	4.33	39.81	74.00	-34.19	peak	H
4416.000	30.70	9.04	39.74	74.00	-34.26	peak	H
6698.000	30.34	16.36	46.70	74.00	-27.30	peak	H
2848.000	39.66	3.70	43.36	74.00	-30.64	peak	V
4395.000	33.66	8.98	42.64	74.00	-31.36	peak	V
6740.000	30.97	16.47	47.44	74.00	-26.56	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/29/2015
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
3093.000	34.18	4.50	38.68	74.00	-35.32	peak	H
4619.000	30.77	9.76	40.53	74.00	-33.47	peak	H
6733.000	31.73	16.46	48.19	74.00	-25.81	peak	H
2995.000	38.32	4.19	42.51	74.00	-31.49	peak	V
4591.000	30.65	9.65	40.30	74.00	-33.70	peak	V
6649.000	30.87	16.22	47.09	74.00	-26.91	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/29/2015
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
2995.000	35.02	4.19	39.21	74.00	-34.79	peak	H
4458.000	31.05	9.18	40.23	74.00	-33.77	peak	H
6656.000	30.63	16.24	46.87	74.00	-27.13	peak	H
2995.000	38.60	4.19	42.79	74.00	-31.21	peak	V
4626.000	30.56	9.79	40.35	74.00	-33.65	peak	V
6768.000	32.14	16.55	48.69	74.00	-25.31	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/29/2015
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
3086.000	35.34	4.48	39.82	74.00	-34.18	peak	H
4612.000	30.07	9.74	39.81	74.00	-34.19	peak	H
6761.000	30.44	16.53	46.97	74.00	-27.03	peak	H
2995.000	38.04	4.19	42.23	74.00	-31.77	peak	V
4598.000	30.41	9.68	40.09	74.00	-33.91	peak	V
6628.000	30.48	16.16	46.64	74.00	-27.36	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/29/2015
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
3051.000	33.25	4.37	37.62	74.00	-36.38	peak	H
4626.000	29.50	9.79	39.29	74.00	-34.71	peak	H
6677.000	29.76	16.30	46.06	74.00	-27.94	peak	H
2995.000	38.23	4.19	42.42	74.00	-31.58	peak	V
4521.000	31.18	9.39	40.57	74.00	-33.43	peak	V
6551.000	30.40	15.94	46.34	74.00	-27.66	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/29/2015
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
3009.000	33.42	4.24	37.66	74.00	-36.34	peak	H
4598.000	28.69	9.68	38.37	74.00	-35.63	peak	H
6733.000	29.38	16.46	45.84	74.00	-28.16	peak	H
3065.000	32.18	4.42	36.60	74.00	-37.40	peak	V
4570.000	28.45	9.57	38.02	74.00	-35.98	peak	V
6698.000	29.26	16.36	45.62	74.00	-28.38	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/29/2015
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	32.81	4.31	37.12	74.00	-36.88	peak	H
4605.000	28.77	9.70	38.47	74.00	-35.53	peak	H
6719.000	28.26	16.41	44.67	74.00	-29.33	peak	H
2995.000	31.70	4.19	35.89	74.00	-38.11	peak	V
4549.000	28.02	9.49	37.51	74.00	-36.49	peak	V
6705.000	27.89	16.38	44.27	74.00	-29.73	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/29/2015
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
3058.000	31.97	4.39	36.36	74.00	-37.64	peak	H
4654.000	27.23	9.89	37.12	74.00	-36.88	peak	H
6691.000	29.28	16.33	45.61	74.00	-28.39	peak	H
3023.000	32.75	4.29	37.04	74.00	-36.96	peak	V
4514.000	29.67	9.36	39.03	74.00	-34.97	peak	V
6691.000	29.74	16.33	46.07	74.00	-27.93	peak	V

Band Edge

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/17/2015
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
2359.940	49.56	1.82	51.38	74.00	-22.62	peak	H
2390.000	48.59	1.96	50.55	74.00	-23.45	peak	H
2388.540	53.63	1.96	55.59	74.00	-18.41	peak	V
2388.540	41.06	1.96	43.02	54.00	-10.98	AVG	V
2390.000	52.52	1.96	54.48	74.00	-19.52	peak	V
2390.000	42.12	1.96	44.08	54.00	-9.92	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/17/2015
Frequency:	2437 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
2376.880	50.04	1.90	51.94	74.00	-22.06	peak	H
2390.000	47.68	1.96	49.64	74.00	-24.36	peak	H
2483.500	47.86	2.42	50.28	74.00	-23.72	peak	H
2498.860	48.78	2.50	51.28	74.00	-22.72	peak	H
2384.480	51.07	1.94	53.01	74.00	-20.99	peak	V
2384.480	39.42	1.94	41.36	54.00	-12.64	AVG	V
2390.000	50.56	1.96	52.52	74.00	-21.48	peak	V
2390.000	39.82	1.96	41.78	54.00	-12.22	AVG	V
2483.500	50.45	2.42	52.87	74.00	-21.13	peak	V
2483.500	40.91	2.42	43.33	54.00	-10.67	AVG	V
2487.270	51.94	2.44	54.38	74.00	-19.62	peak	V
2487.270	40.88	2.44	43.32	54.00	-10.68	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 2	Date:	11/17/2015
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	46.80	2.42	49.22	74.00	-24.78	peak	H
2491.800	49.47	2.46	51.93	74.00	-22.07	peak	H
2483.500	62.76	2.42	65.18	74.00	-8.82	peak	V
2483.500	50.85	2.42	53.27	54.00	-0.73	AVG	V
2483.720	64.29	2.42	66.71	74.00	-7.29	peak	V
2483.720	50.29	2.42	52.71	54.00	-1.29	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/17/2015
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
2324.520	49.98	1.64	51.62	74.00	-22.38	peak	H
2390.000	48.68	1.96	50.64	74.00	-23.36	peak	H
2389.640	66.95	1.96	68.91	74.00	-5.09	peak	V
2389.640	50.40	1.96	52.36	54.00	-1.64	AVG	V
2390.000	64.57	1.96	66.53	74.00	-7.47	peak	V
2390.000	51.28	1.96	53.24	54.00	-0.76	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/17/2015
Frequency:	2437 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
2388.090	50.00	1.96	51.96	74.00	-22.04	peak	H
2390.000	49.47	1.96	51.43	74.00	-22.57	peak	H
2483.500	49.24	2.42	51.66	74.00	-22.34	peak	H
2494.490	54.11	2.48	56.59	74.00	-17.41	peak	H
2494.490	38.49	2.48	40.97	54.00	-13.03	AVG	H
2389.230	67.24	1.96	69.20	74.00	-4.80	peak	V
2389.230	47.91	1.96	49.87	54.00	-4.13	AVG	V
2390.000	66.03	1.96	67.99	74.00	-6.01	peak	V
2390.000	48.47	1.96	50.43	54.00	-3.57	AVG	V
2483.500	64.68	2.42	67.10	74.00	-6.90	peak	V
2483.500	50.89	2.42	53.31	54.00	-0.69	AVG	V
2491.450	67.89	2.46	70.35	74.00	-3.65	peak	V
2491.450	48.72	2.46	51.18	54.00	-2.82	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 3	Date:	11/17/2015
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	47.65	2.42	50.07	74.00	-23.93	peak	H
2486.760	48.92	2.44	51.36	74.00	-22.64	peak	H
2483.500	61.57	2.42	63.99	74.00	-10.01	peak	V
2483.500	50.87	2.42	53.29	54.00	-0.71	AVG	V
2483.800	60.00	2.42	62.42	74.00	-11.58	peak	V
2483.800	50.31	2.42	52.73	54.00	-1.27	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/17/2015
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
2382.270	50.00	1.92	51.92	74.00	-22.08	peak	H
2390.000	49.29	1.96	51.25	74.00	-22.75	peak	H
2389.090	63.43	1.96	65.39	74.00	-8.61	peak	V
2389.090	49.81	1.96	51.77	54.00	-2.23	AVG	V
2390.000	64.11	1.96	66.07	74.00	-7.93	peak	V
2390.000	51.49	1.96	53.45	54.00	-0.55	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/17/2015
Frequency:	2437 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
2387.520	52.06	1.96	54.02	74.00	-19.98	peak	H
2387.520	39.14	1.96	41.10	54.00	-12.90	AVG	H
2390.000	49.39	1.96	51.35	74.00	-22.65	peak	H
2483.500	50.93	2.42	53.35	74.00	-20.65	peak	H
2483.500	40.76	2.42	43.18	54.00	-10.82	AVG	H
2484.610	53.19	2.42	55.61	74.00	-18.39	peak	H
2484.610	40.72	2.42	43.14	54.00	-10.86	AVG	H
2385.430	62.67	1.94	64.61	74.00	-9.39	peak	V
2385.430	46.04	1.94	47.98	54.00	-6.02	AVG	V
2390.000	63.57	1.96	65.53	74.00	-8.47	peak	V
2390.000	47.90	1.96	49.86	54.00	-4.14	AVG	V
2483.500	62.45	2.42	64.87	74.00	-9.13	peak	V
2483.500	51.02	2.42	53.44	54.00	-0.56	AVG	V
2486.510	64.21	2.43	66.64	74.00	-7.36	peak	V
2486.510	48.56	2.43	50.99	54.00	-3.01	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	11/17/2015
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	50.49	2.42	52.91	74.00	-21.09	peak	H
2483.500	40.46	2.42	42.88	54.00	-11.12	AVG	H
2483.880	49.99	2.42	52.41	74.00	-21.59	peak	H
2483.880	40.53	2.42	42.95	54.00	-11.05	AVG	H
2483.500	60.06	2.42	62.48	74.00	-11.52	peak	V
2483.500	50.92	2.42	53.34	54.00	-0.66	AVG	V
2484.040	61.99	2.42	64.41	74.00	-9.59	peak	V
2484.040	50.24	2.42	52.66	54.00	-1.34	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/17/2015
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
2379.600	48.72	1.92	50.64	74.00	-23.36	peak	H
2390.000	46.90	1.96	48.86	74.00	-25.14	peak	H
2389.080	68.72	1.96	70.68	74.00	-3.32	peak	V
2389.080	50.66	1.96	52.62	54.00	-1.38	AVG	V
2390.000	65.49	1.96	67.45	74.00	-6.55	peak	V
2390.000	51.31	1.96	53.27	54.00	-0.73	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/17/2015
Frequency:	2437 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
2389.040	54.25	1.96	56.21	74.00	-17.79	peak	H
2389.040	46.87	1.96	48.83	54.00	-5.17	AVG	H
2390.000	54.77	1.96	56.73	74.00	-17.27	peak	H
2390.000	47.41	1.96	49.37	54.00	-4.63	AVG	H
2483.500	52.28	2.42	54.70	74.00	-19.30	peak	H
2483.500	46.94	2.42	49.36	54.00	-4.64	AVG	H
2484.610	53.56	2.42	55.98	74.00	-18.02	peak	H
2484.610	45.13	2.42	47.55	54.00	-6.45	AVG	H
2388.470	64.59	1.96	66.55	74.00	-7.45	peak	V
2388.470	49.81	1.96	51.77	54.00	-2.23	AVG	V
2390.000	65.28	1.96	67.24	74.00	-6.76	peak	V
2390.000	50.94	1.96	52.90	54.00	-1.10	AVG	V
2483.500	62.30	2.42	64.72	74.00	-9.28	peak	V
2483.500	50.82	2.42	53.24	54.00	-0.76	AVG	V
2485.750	61.80	2.43	64.23	74.00	-9.77	peak	V
2485.750	48.68	2.43	51.11	54.00	-2.89	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	TD-W8960N	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	11/17/2015
Frequency:	2452 MHz	Test By:	Eric Ou Yang

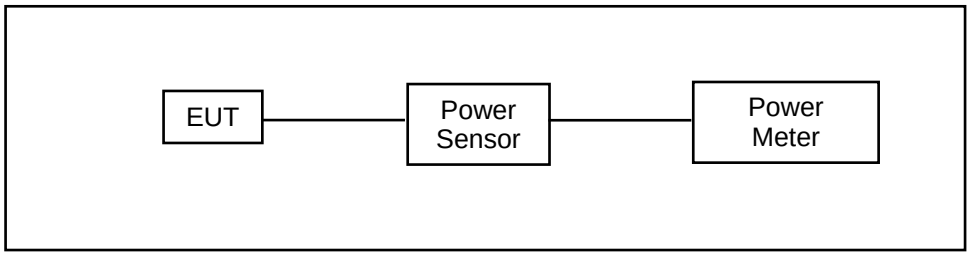
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	47.91	2.42	50.33	74.00	-23.67	peak	H
2484.950	48.94	2.42	51.36	74.00	-22.64	peak	H
2483.500	60.64	2.42	63.06	74.00	-10.94	peak	V
2483.500	50.90	2.42	53.32	54.00	-0.68	AVG	V
2484.400	62.98	2.42	65.40	74.00	-8.60	peak	V
2484.400	50.27	2.42	52.69	54.00	-1.31	AVG	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.
According to IEEE 802.11g/n antenna Directional Gain more than 6 dBi, the RF output power need to adjust limit.
For IEEE 802.11g/n MIMO mode Limit = 30dBm – 0.71 = 29.29 dBm

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Power Sensor	Anritsu	MA2411B	1126022	08/24/2015	(1)
Power Meter	Anritsu	ML2495A	1135009	08/24/2015	(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.

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	TD-W8960N					
Test Item	Maximum Conducted Output Power					
Test Mode	Mode 2: IEEE 802.11b link mode					
Date of Test	11/05/2015				Test Site	TE05
Frequency (MHz)	Data Rate	Average Power				Limit (dBm)
		ANT-0		ANT-1		
		(dBm)	(W)	(dBm)	(W)	
2412.0	1M	18.40	0.069	18.22	0.066	< 30
2437.0		**18.44**	**0.070**	18.28	0.067	< 30
2462.0		17.34	0.054	17.11	0.051	< 30
2437.0	2M	18.42	0.070	18.25	0.067	< 30
2437.0	5.5M	18.41	0.069	18.21	0.066	< 30
2437.0	11M	18.38	0.069	18.19	0.066	< 30

Model Number	TD-W8960N						
Test Item	Maximum Conducted Output Power						
Test Mode	Mode 3: IEEE 802.11g link mode						
Date of Test	11/05/2015					Test Site	TE05
Frequency (MHz)	Data Rate	Average Power					Limit (dBm)
		ANT-0		ANT-1		ANT-0+1	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412.0	6M	10.75	0.012	11.17	0.013	13.98	0.025	SISO < 30 MIMO < 29.29
2437.0		19.03	0.080	18.56	0.072	**21.81**	**0.152**	SISO < 30 MIMO < 29.29
2462.0		8.92	0.008	9.37	0.009	12.16	0.016	SISO < 30 MIMO < 29.29
2437.0	9M	18.97	0.079	18.49	0.071	21.75	0.150	SISO < 30 MIMO < 29.29
2437.0	12M	19.00	0.079	18.53	0.071	21.78	0.151	SISO < 30 MIMO < 29.29
2437.0	18M	19.02	0.080	18.47	0.070	21.76	0.150	SISO < 30 MIMO < 29.29
2437.0	24M	18.96	0.079	18.43	0.070	21.71	0.148	SISO < 30 MIMO < 29.29
2437.0	36M	18.88	0.077	18.51	0.071	21.71	0.148	SISO < 30 MIMO < 29.29
2437.0	48M	18.92	0.078	18.45	0.070	21.70	0.148	SISO < 30 MIMO < 29.29
2437.0	54M	18.99	0.079	18.48	0.070	21.75	0.150	SISO < 30 MIMO < 29.29

Model Number	TD-W8960N						
Test Item	Maximum Conducted Output Power						
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode						
Date of Test	11/05/2015				Test Site		TE05
Frequency (MHz)	Data Rate	Average Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412.0	13M	10.48	0.011	11.36	0.014	13.95	0.025	SISO < 30 MIMO < 29.29
2437.0		18.84	0.077	18.13	0.065	21.51	0.142	SISO < 30 MIMO < 29.29
2462.0		10.46	0.011	11.14	0.013	13.82	0.024	SISO < 30 MIMO < 29.29
2437.0	26M	18.79	0.076	18.10	0.065	21.47	0.140	SISO < 30 MIMO < 29.29
2437.0	39M	18.76	0.075	18.66	0.073	21.72	0.149	SISO < 30 MIMO < 29.29
2437.0	52M	18.75	0.075	18.71	0.074	21.74	0.149	SISO < 30 MIMO < 29.29
2437.0	78M	18.71	0.074	18.77	0.075	21.75	0.150	SISO < 30 MIMO < 29.29
2437.0	104M	18.69	0.074	18.75	0.075	21.73	0.149	SISO < 30 MIMO < 29.29
2437.0	117M	18.77	0.075	18.79	0.076	**21.79**	**0.151**	SISO < 30 MIMO < 29.29
2437.0	130M	18.65	0.073	18.72	0.074	21.70	0.148	SISO < 30 MIMO < 29.29

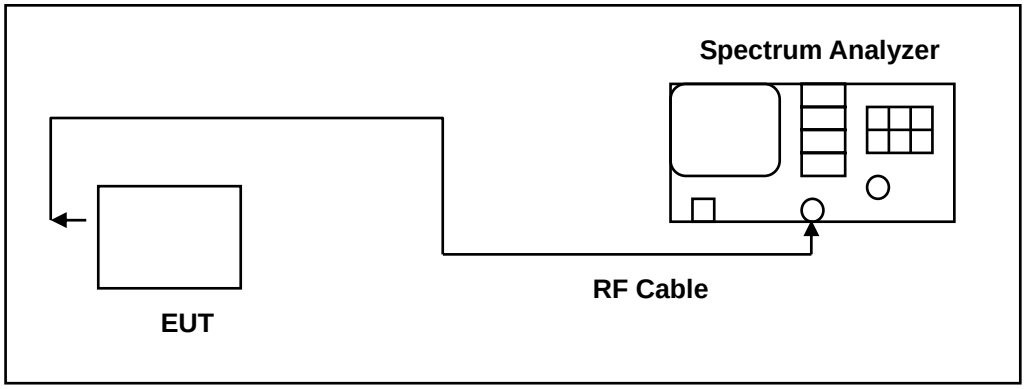
Model Number	TD-W8960N						
Test Item	Maximum Conducted Output Power						
Test Mode	Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode						
Date of Test	11/05/2015				Test Site		TE05
Frequency (MHz)	Data Rate	Average Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2422.0	27M	7.89	0.006	8.32	0.007	11.12	0.013	SISO < 30 MIMO < 29.29
2437.0		19.13	0.082	18.72	0.074	**21.94**	**0.156**	SISO < 30 MIMO < 29.29
2452.0		7.73	0.006	8.24	0.007	11.00	0.013	SISO < 30 MIMO < 29.29
2437.0	54M	18.95	0.079	18.66	0.073	21.82	0.152	SISO < 30 MIMO < 29.29
2437.0	81M	19.01	0.080	18.63	0.073	21.83	0.153	SISO < 30 MIMO < 29.29
2437.0	108M	19.04	0.080	18.55	0.072	21.81	0.152	SISO < 30 MIMO < 29.29
2437.0	162M	19.06	0.081	18.59	0.072	21.84	0.153	SISO < 30 MIMO < 29.29
2437.0	216M	19.03	0.080	18.62	0.073	21.84	0.153	SISO < 30 MIMO < 29.29
2437.0	243M	19.07	0.081	18.53	0.071	21.82	0.152	SISO < 30 MIMO < 29.29
2437.0	270M	19.00	0.079	18.70	0.074	21.86	0.154	SISO < 30 MIMO < 29.29

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	12/16/2014	(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)

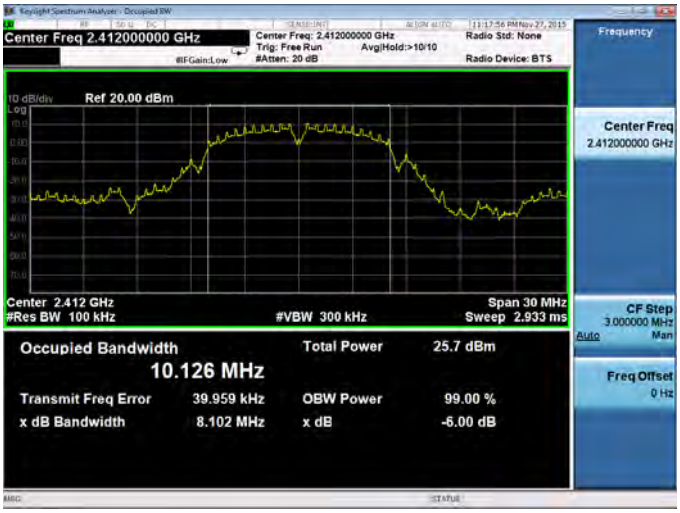
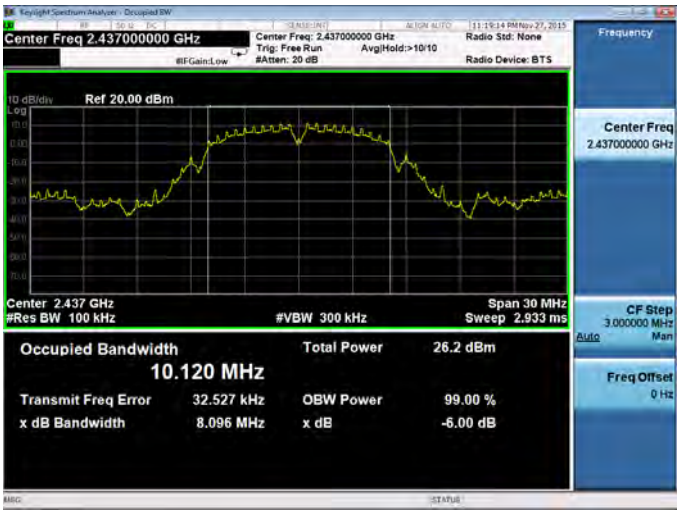
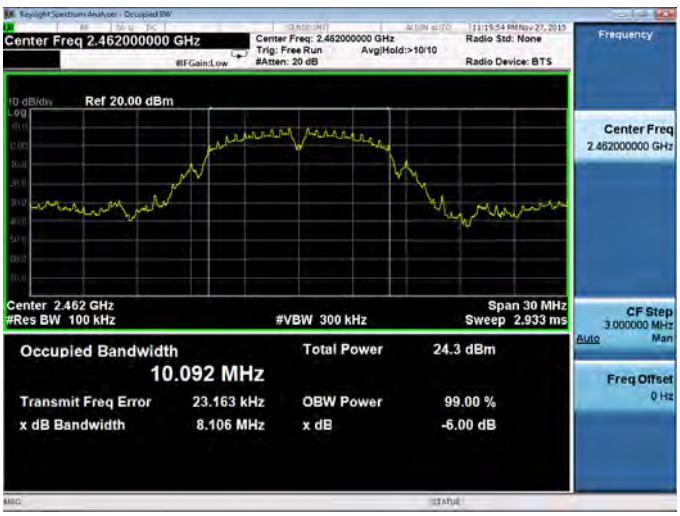
99 % Occupied Bandwidth: The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak 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

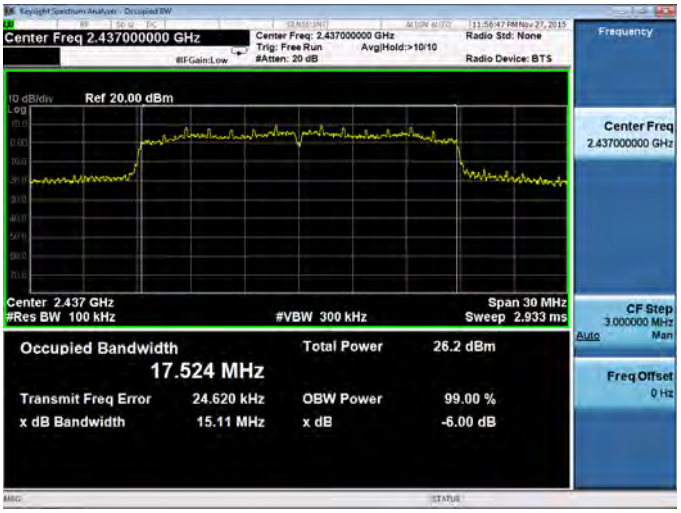
Model Number	TD-W8960N		
Test Item	6dB RF Bandwidth		
Test Mode	Mode 2: IEEE 802.11b link mode Mode 3: IEEE 802.11g link mode Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode		
Date of Test	11/27/2015, 11/28/2015	Test Site	TE05

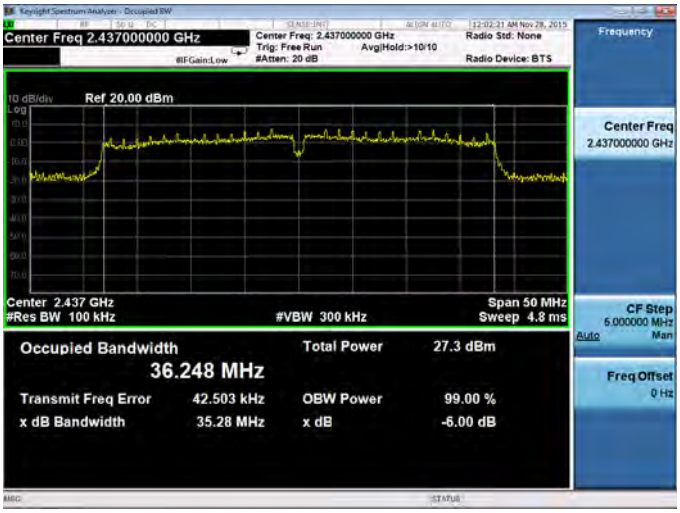
Test Mode	Frequency (MHz)	Measurement (kHz)		Limit (kHz)
		ANT-0	ANT-1	
Mode 2	2412	8102	---	> 500
	2437	8096	---	> 500
	2462	8106	---	> 500
Mode 3	2412	15110	15120	> 500
	2437	15120	15120	> 500
	2462	15120	15130	> 500
Mode 4	2412	15090	15120	> 500
	2437	15110	16100	> 500
	2462	15110	16620	> 500
Mode 5	2422	35130	35140	> 500
	2437	35280	35740	> 500
	2452	35140	35140	> 500

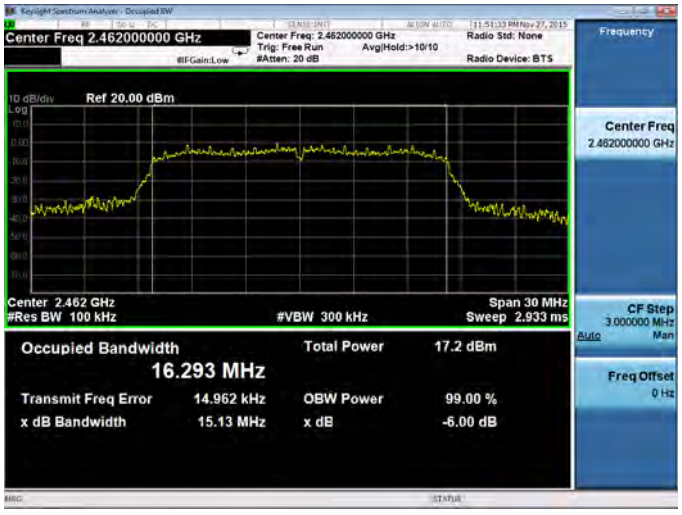
7.6. Test Graphs

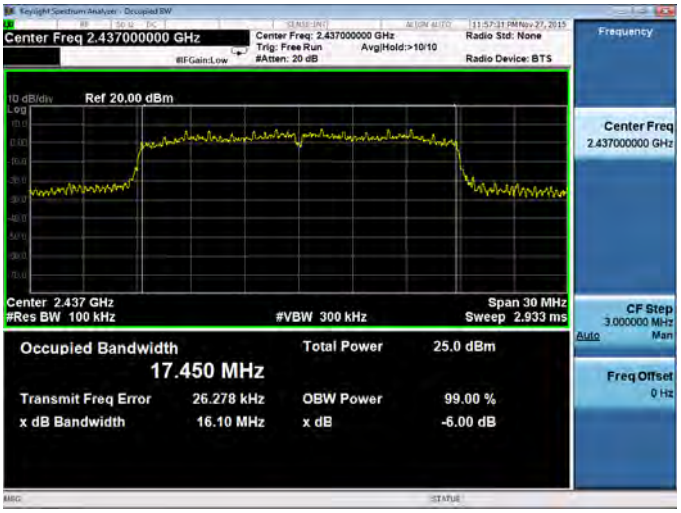
Mode 2: IEEE 802.11b link mode_ANT-0	
2412	
2437	
2462	

Mode 3: IEEE 802.11g link mode_ANT-0	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0	
2412	
2437	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0	
2422	
2437	
2452	

Mode 3: IEEE 802.11g link mode_ANT-1	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412	
2437	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
2422	
2437	
2452	

8 Maximum Power Density Measurement

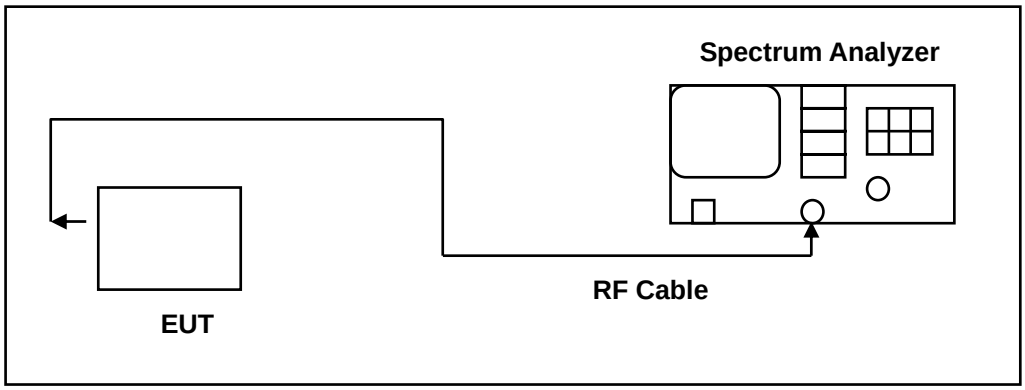
8.1. Limit

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.

According to IEEE 802.11g/n antenna Directional Gain more than 6 dBi, the power spectral density need to adjust limit.

For IEEE 802.11g/n MIMO mode Limit = 8dBm – 0.71 = 7.29 dBm

8.2. Test Setup



8.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/16/2014	(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.

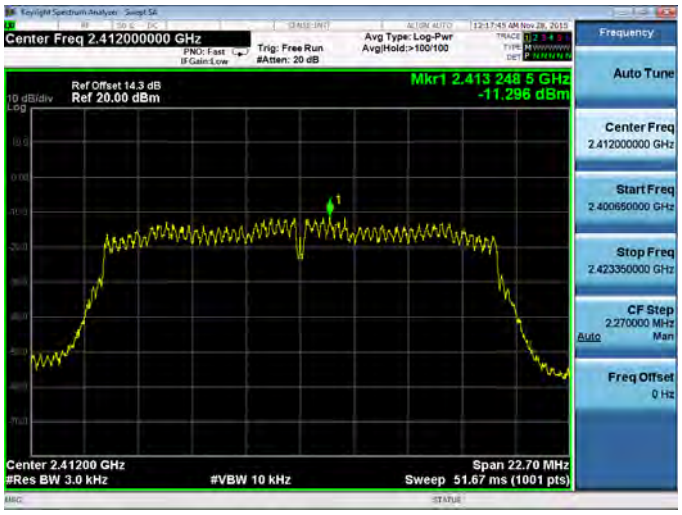
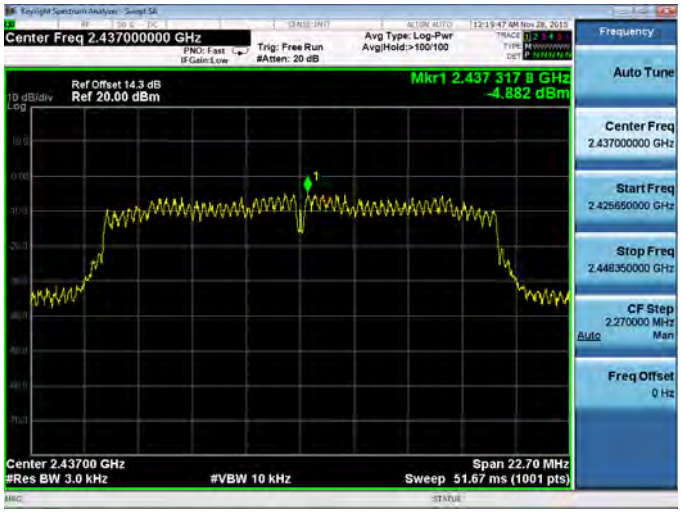
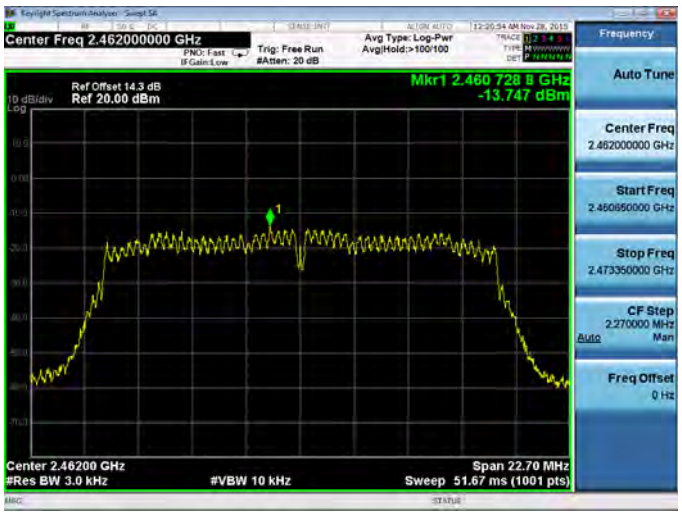
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 × RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the 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.

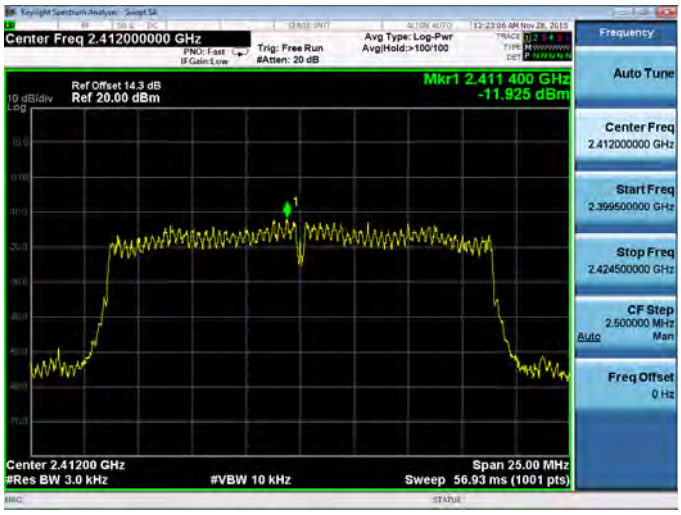
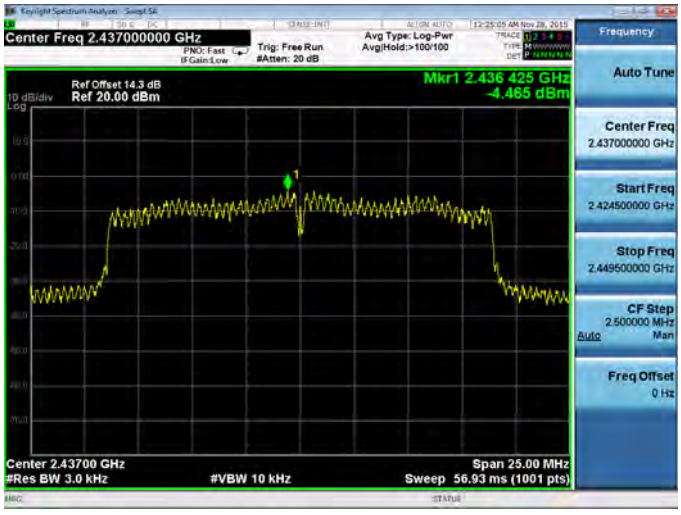
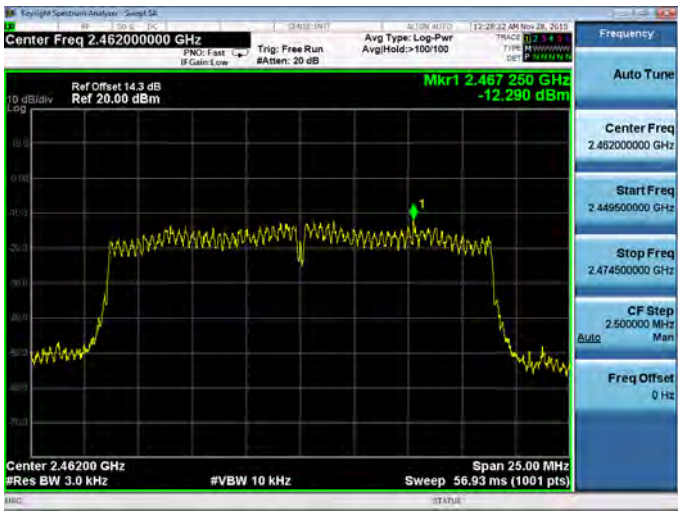
8.5. Test Result

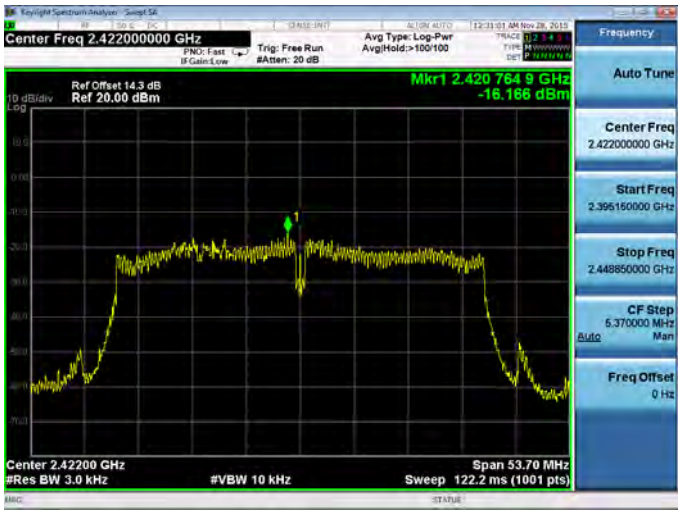
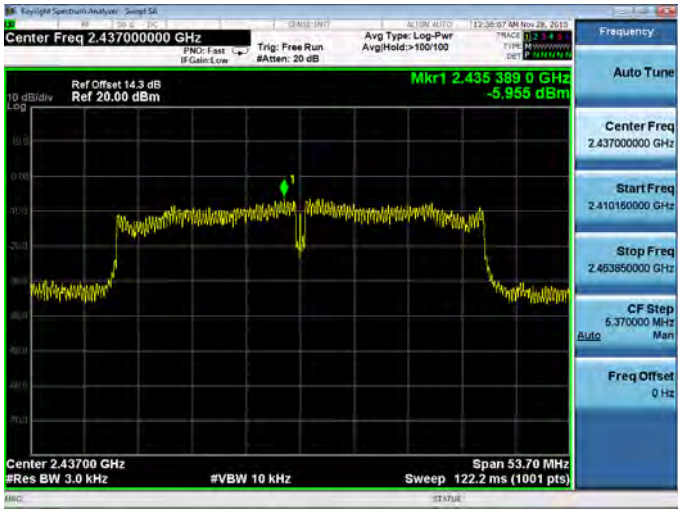
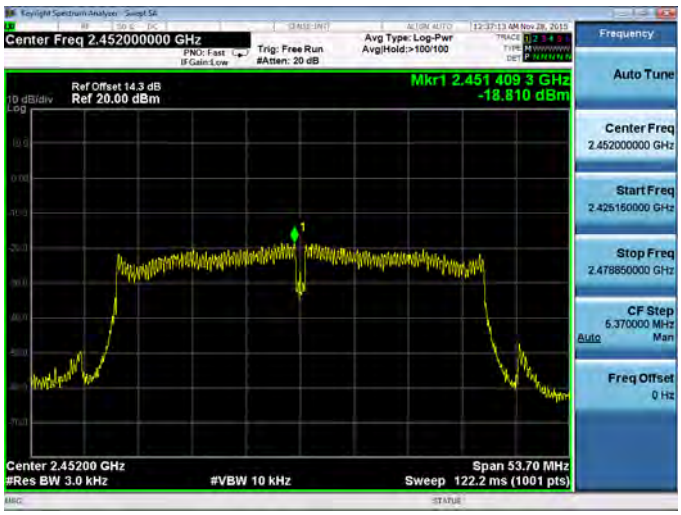
Model Number	TD-W8960N				
Test Item	Maximum Power Density				
Test Mode	Mode 2: IEEE 802.11b link mode Mode 3: IEEE 802.11g link mode Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode				
Date of Test	11/28/2015			Test Site	TE05
Test Mode	Frequency (MHz)	Measurement (dBm/3KHz)			Limit (dBm/3KHz)
		ANT-0	ANT-1	ANT-0+1	
Mode 2	2412	-1.402	---	---	< 8
	2437	-1.661	---	---	< 8
	2462	-4.276	---	---	< 8
Mode 3	2412	-11.296	-12.452	-8.825	SISO < 8 MOMO < 7.29
	2437	-4.882	-5.187	-2.022	SISO < 8 MOMO < 7.29
	2462	-13.747	-13.250	-10.481	SISO < 8 MOMO < 7.29
Mode 4	2412	-11.925	-12.769	-9.316	SISO < 8 MOMO < 7.29
	2437	-4.465	-5.924	-2.123	SISO < 8 MOMO < 7.29
	2462	-12.290	-12.086	-9.177	SISO < 8 MOMO < 7.29
Mode 5	2422	-16.166	-16.629	-13.381	SISO < 8 MOMO < 7.29
	2437	-5.955	-6.430	-3.176	SISO < 8 MOMO < 7.29
	2452	-18.810	-17.646	-15.179	SISO < 8 MOMO < 7.29

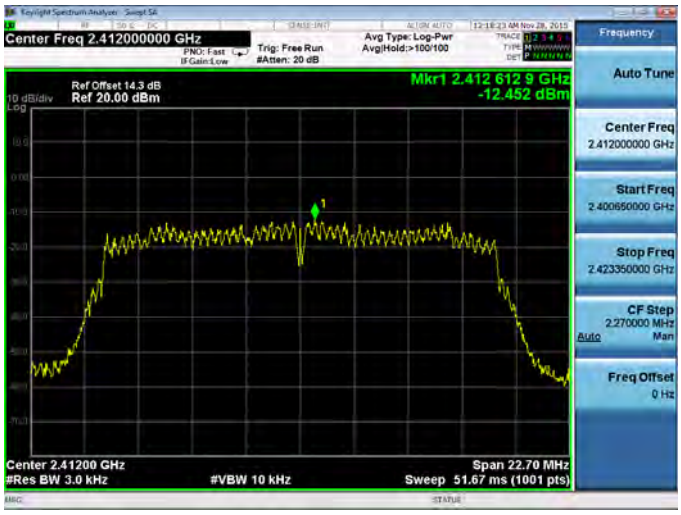
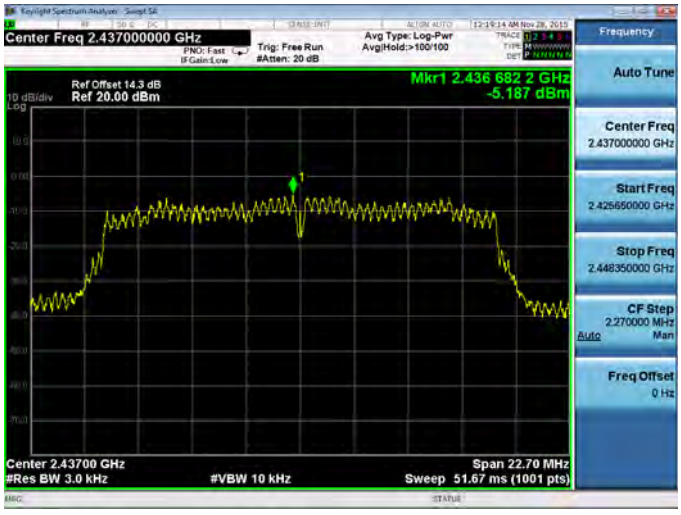
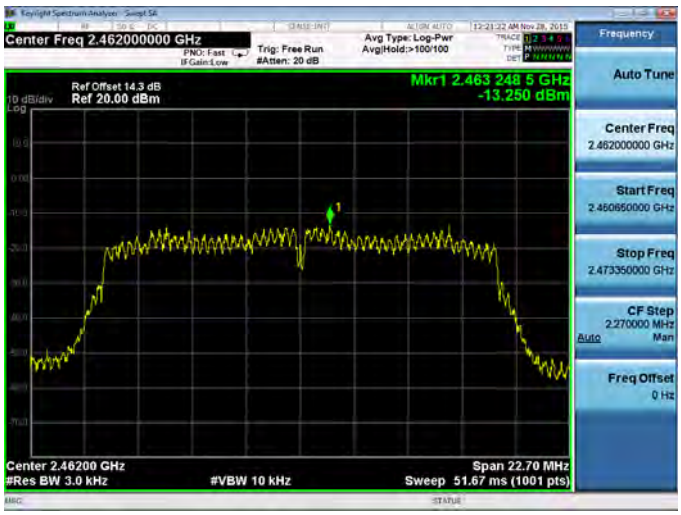
8.6. Test Graphs

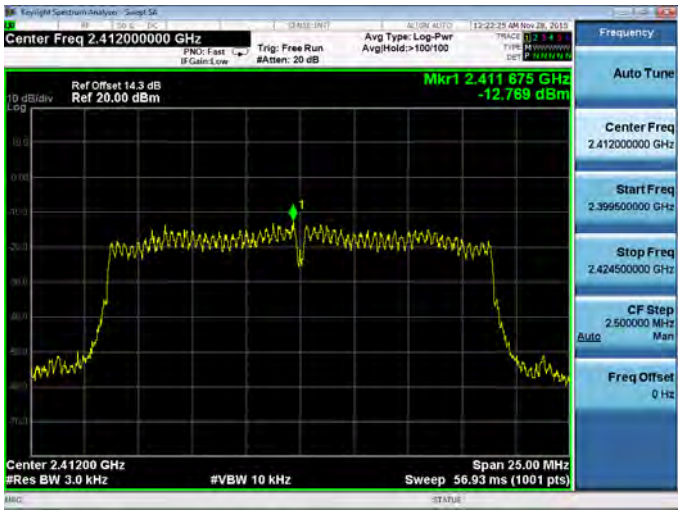
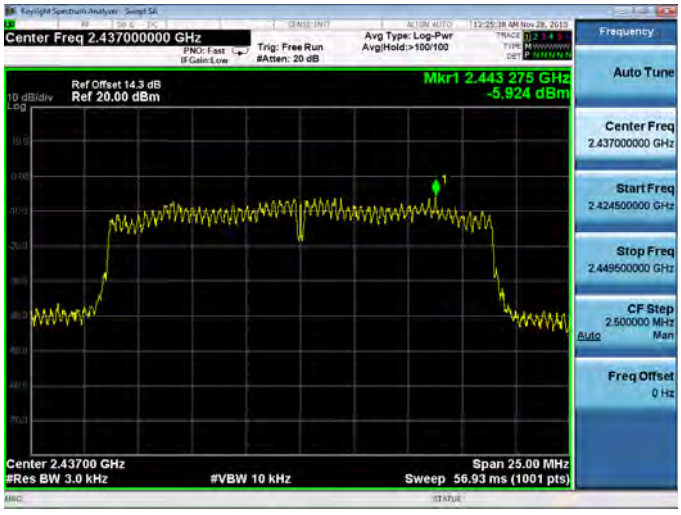
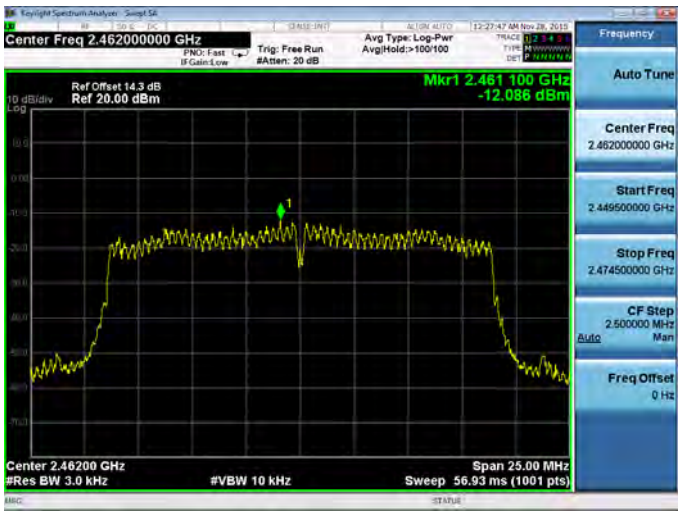
Mode 2: IEEE 802.11b link mode_ANT-0	
2412	
2437	
2462	

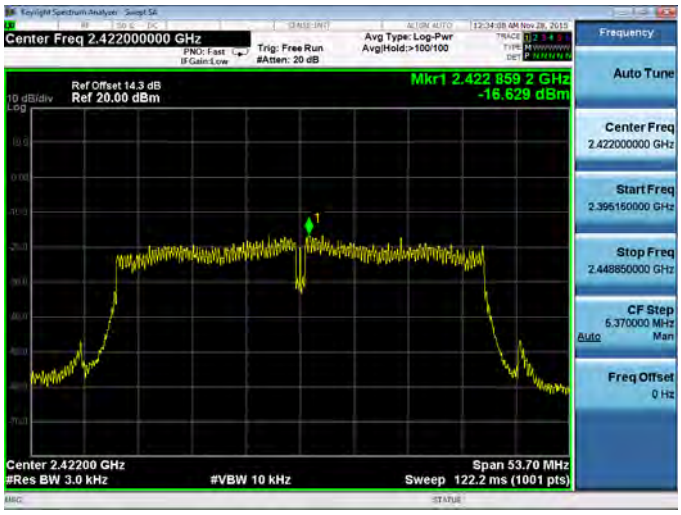
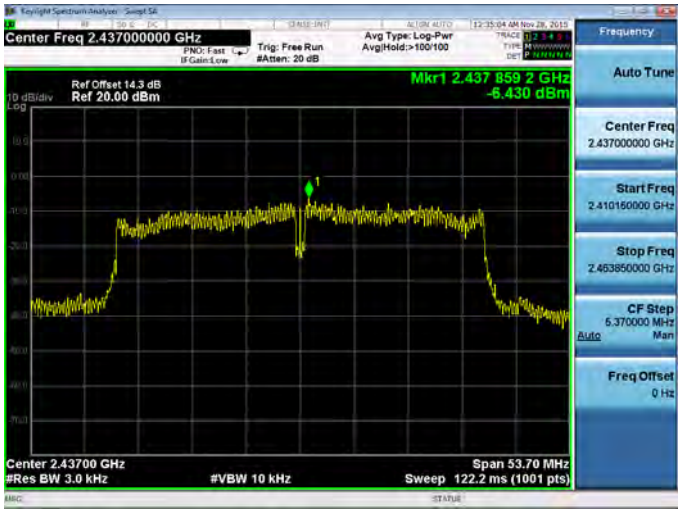
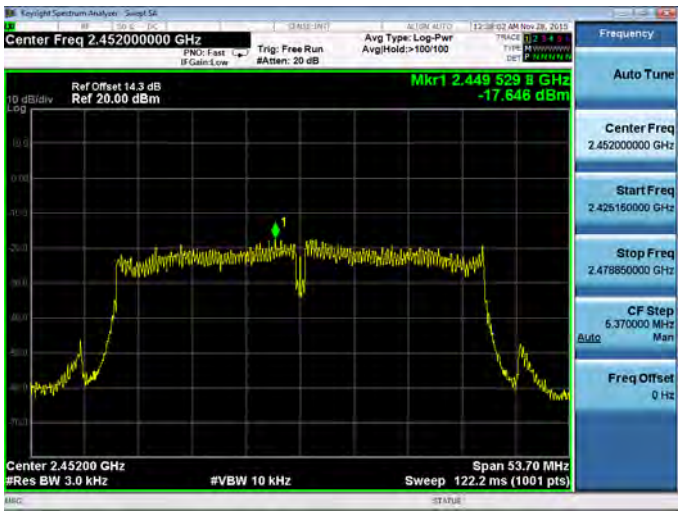
Mode 3: IEEE 802.11g link mode_ANT-0	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0	
2412	
2437	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0	
2422	
2437	
2452	

Mode 3: IEEE 802.11g link mode_ANT-1	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412	
2437	
2462	

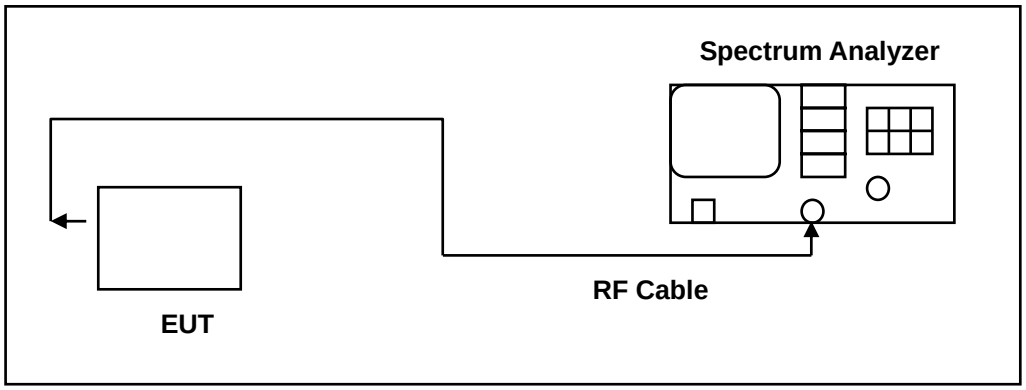
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
2422	
2437	
2452	

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 30 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	12/16/2014	(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.

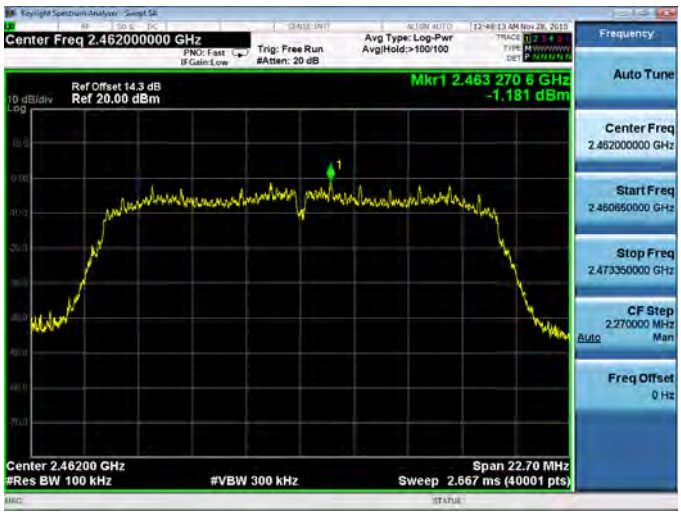
9.4. Test Procedure

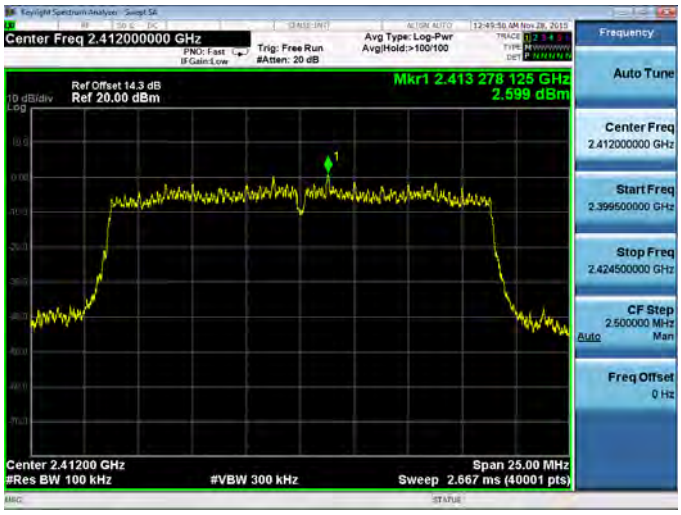
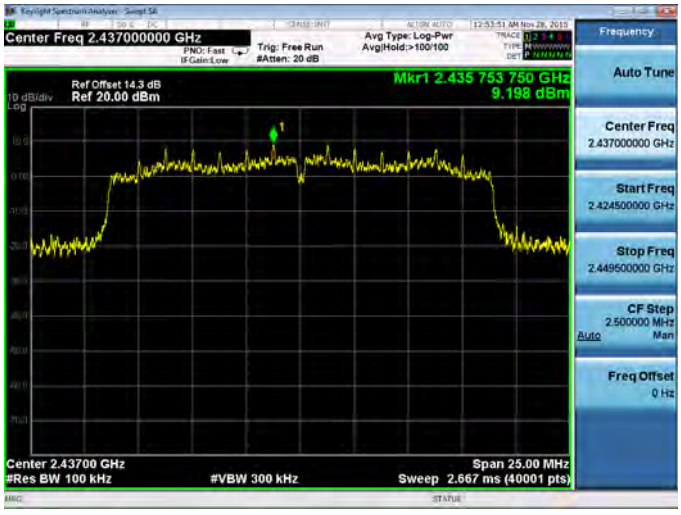
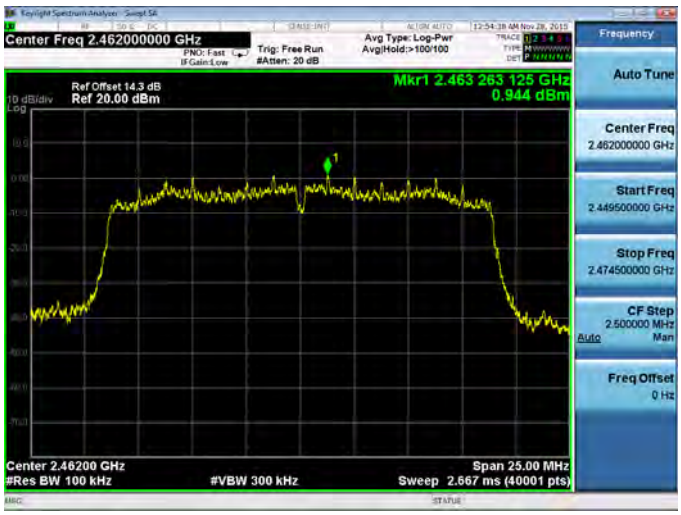
In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 30 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly 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.

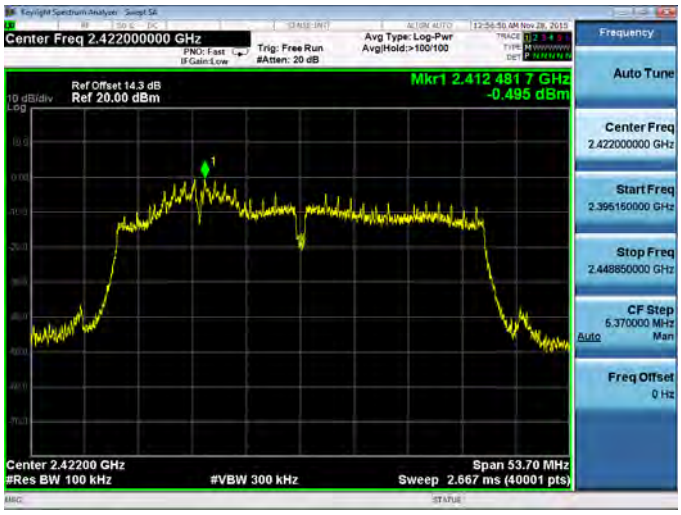
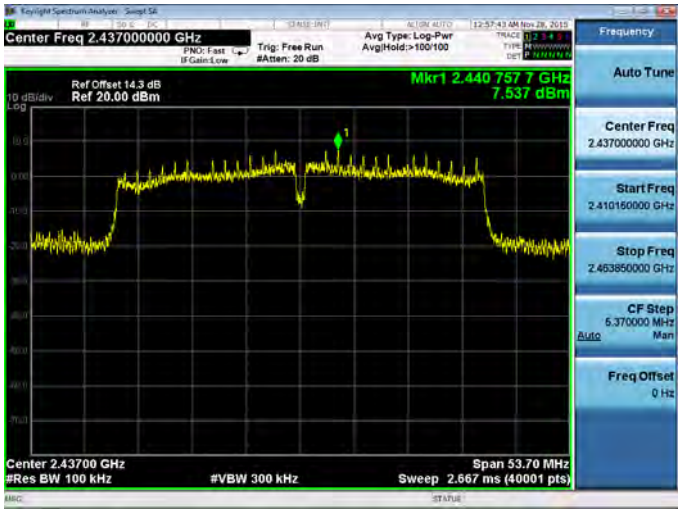
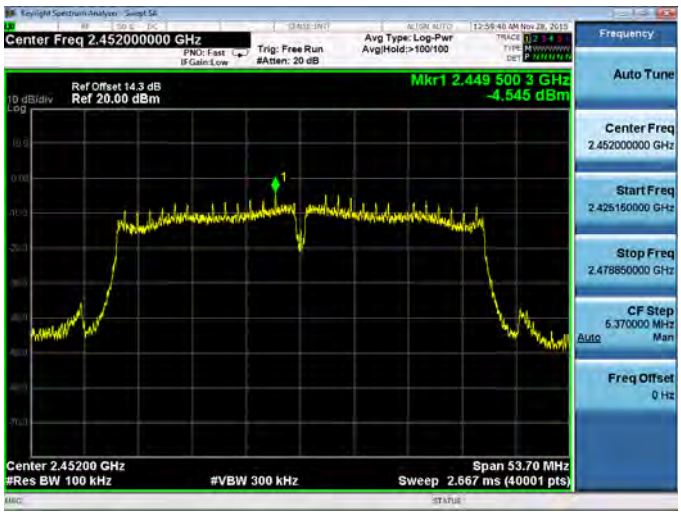
9.5. Test Graphs

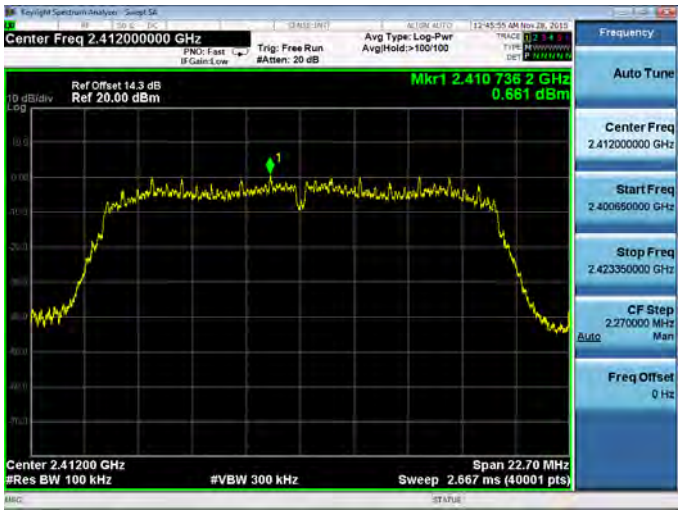
Reference level

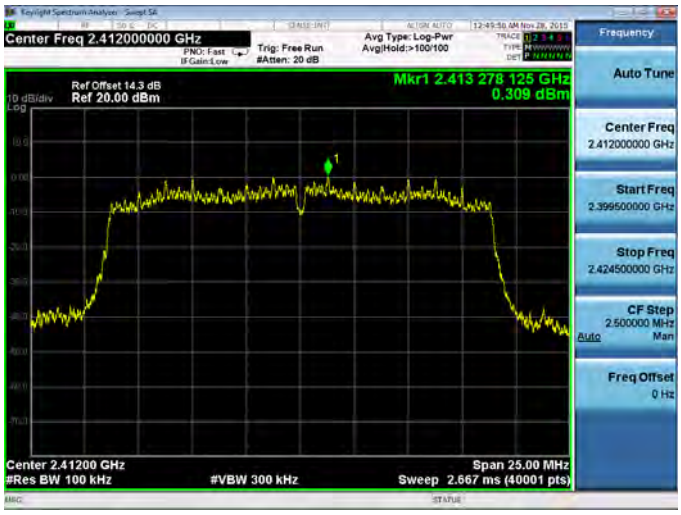
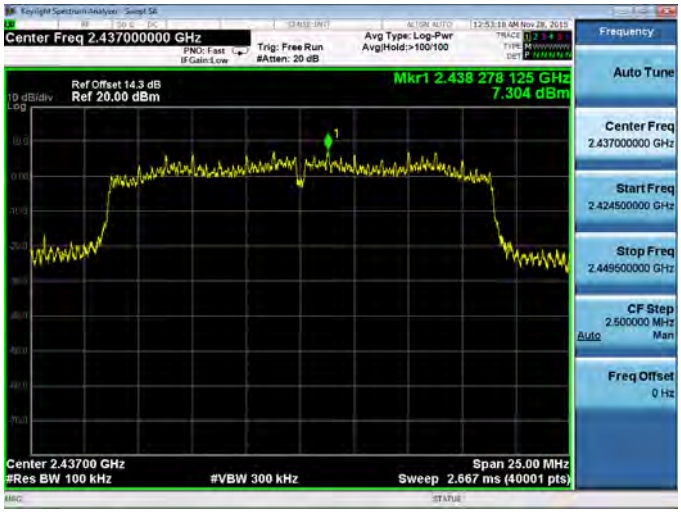
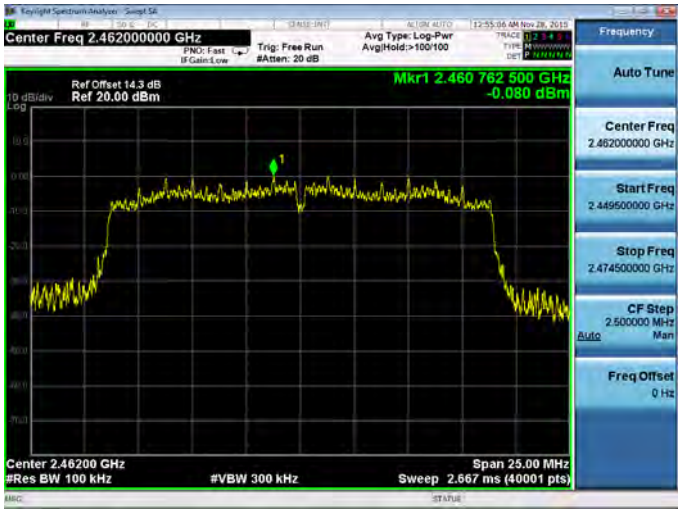
Mode 2: IEEE 802.11b link mode_ANT-0	
2412	
2437	
2462	

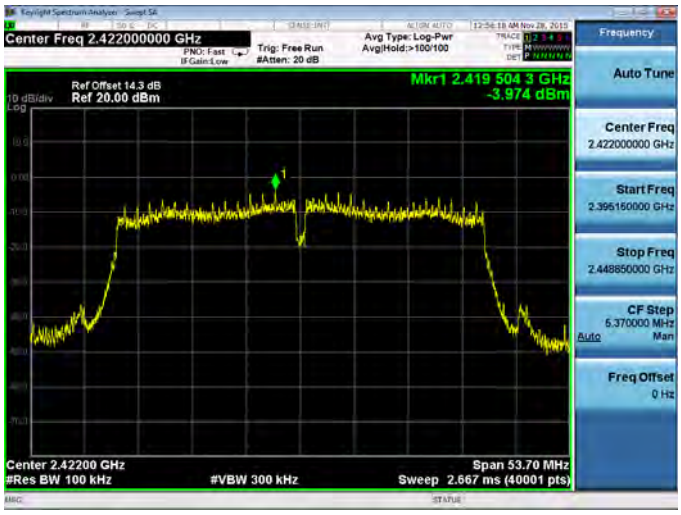
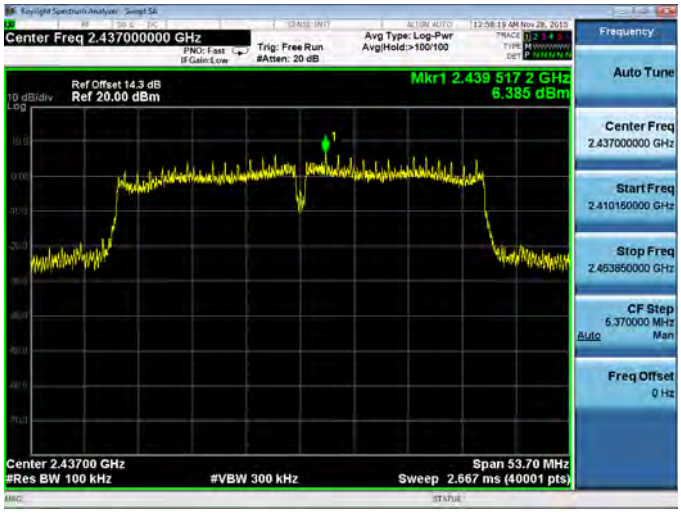
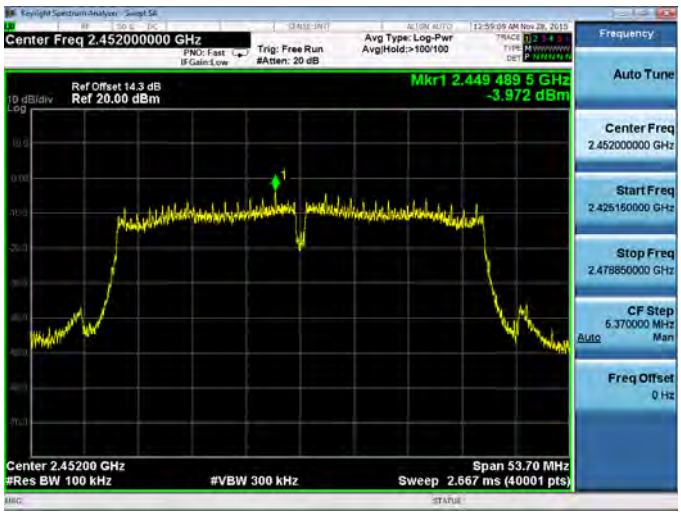
Mode 3: IEEE 802.11g link mode_ANT-0	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0	
2412	
2437	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0	
2422	
2437	
2452	

Mode 3: IEEE 802.11g link mode_ANT-1	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412	
2437	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
2422	
2437	
2452	

Out of Band Conducted Emissions

Mode 2: IEEE 802.11b link mode_ANT-0	
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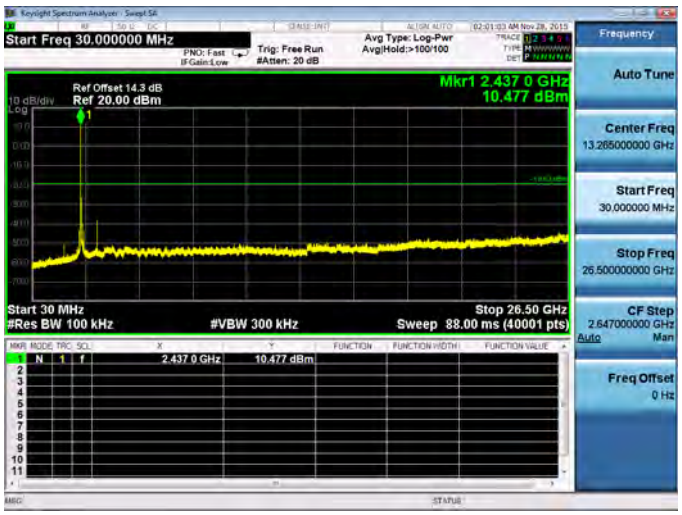
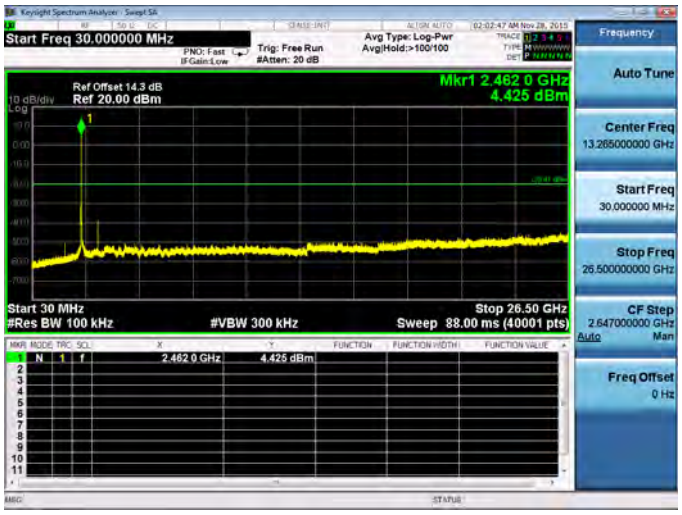
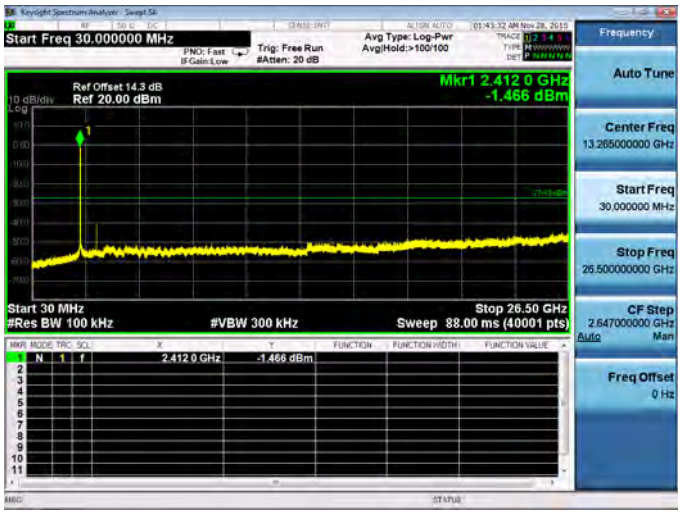
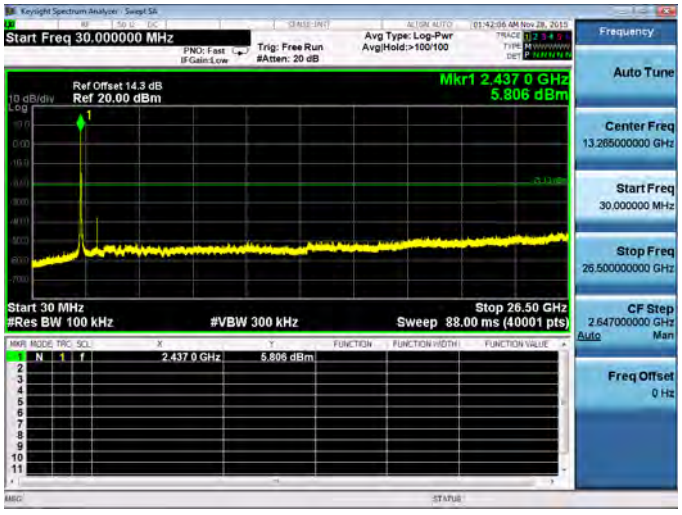
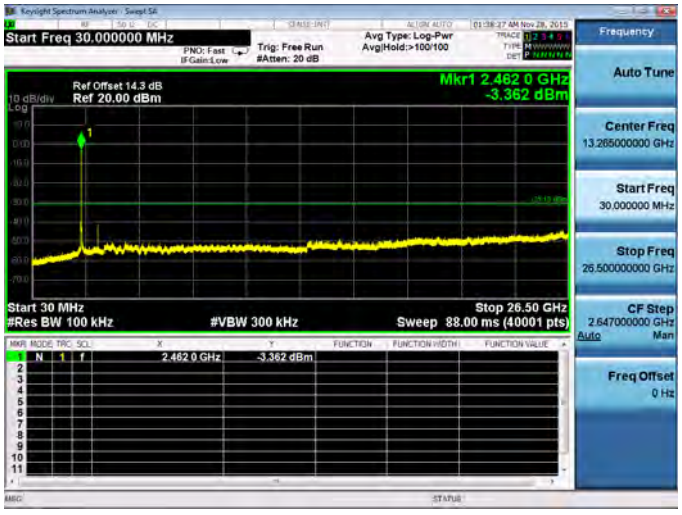
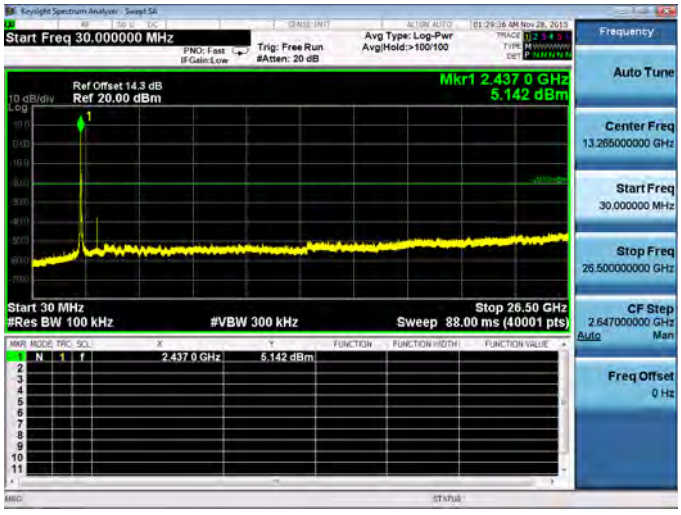
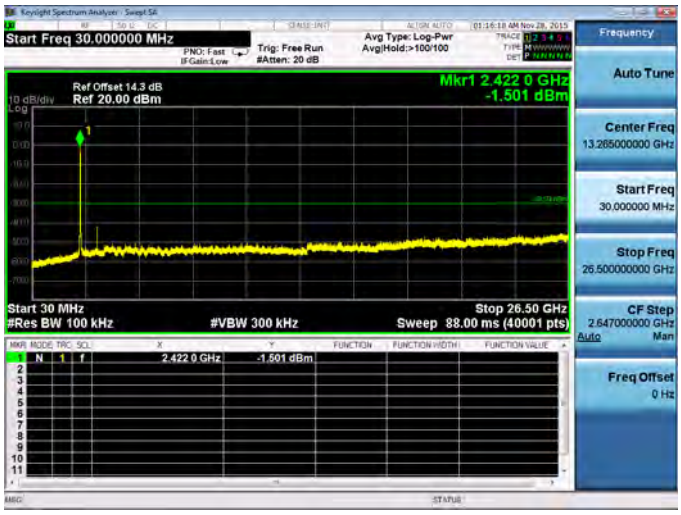
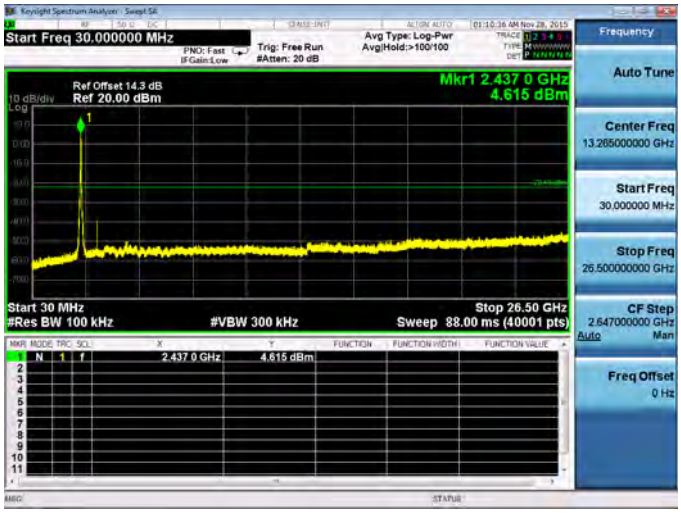
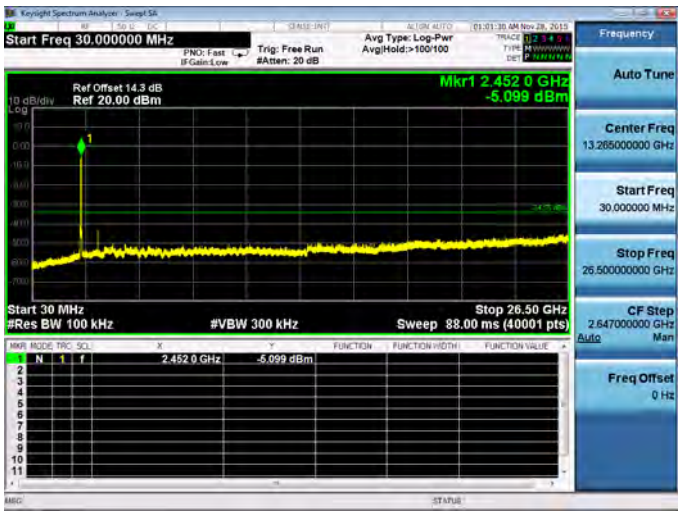
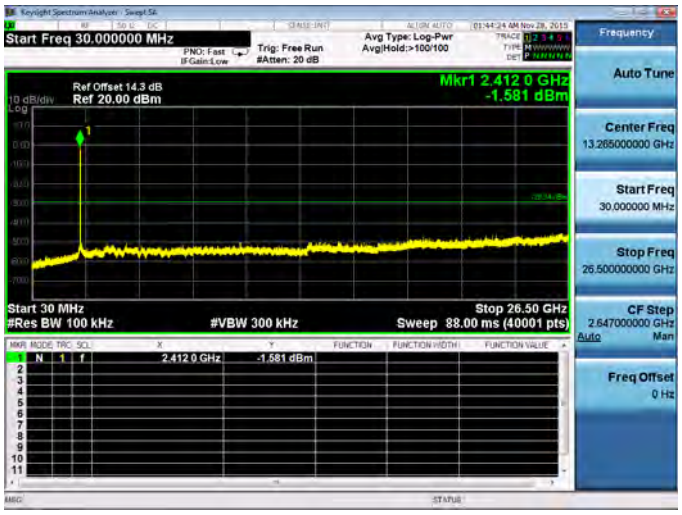
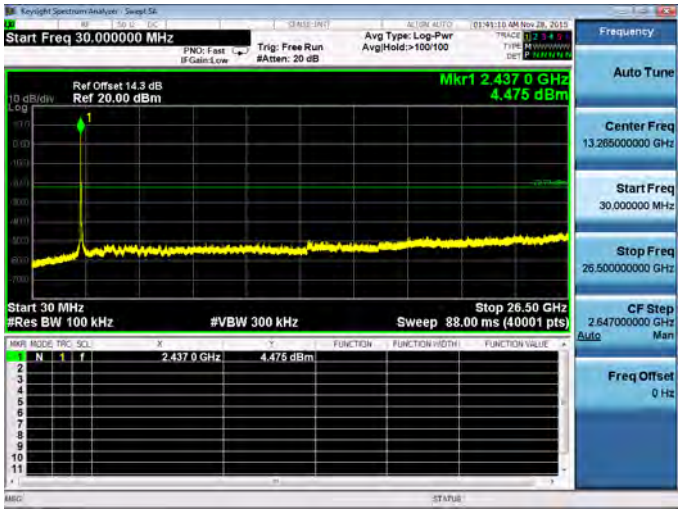
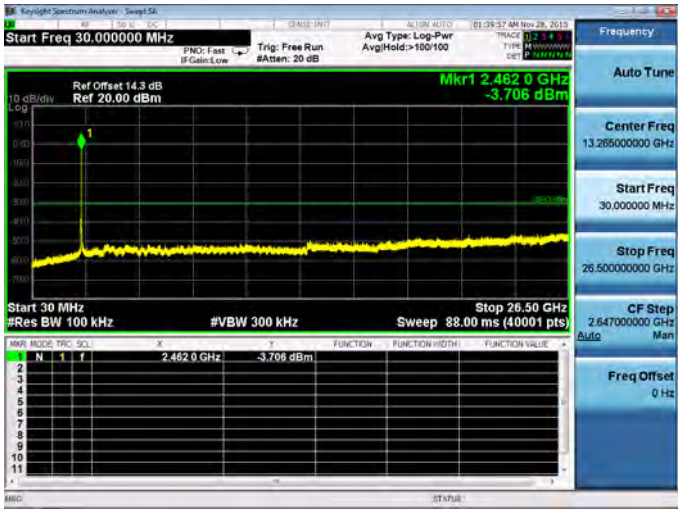
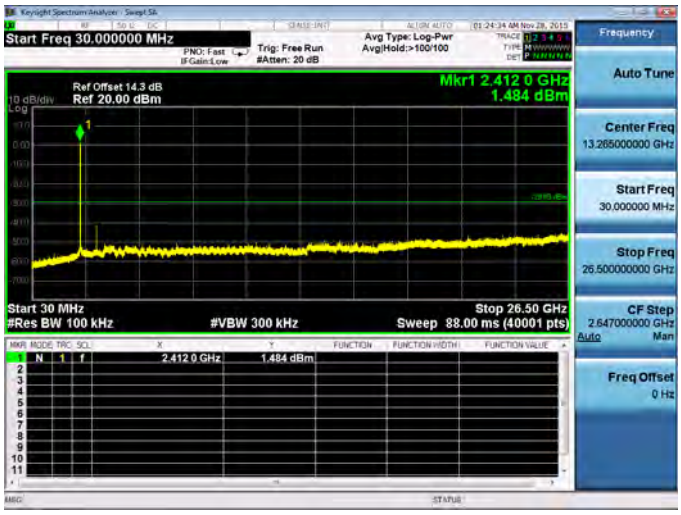
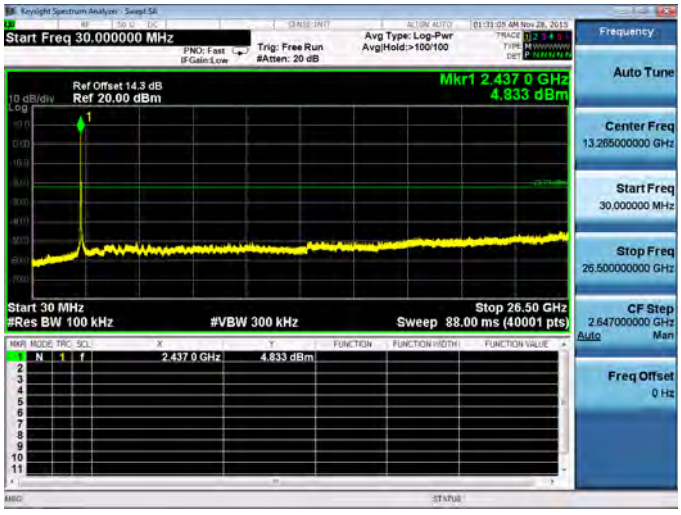
2437	
2462	

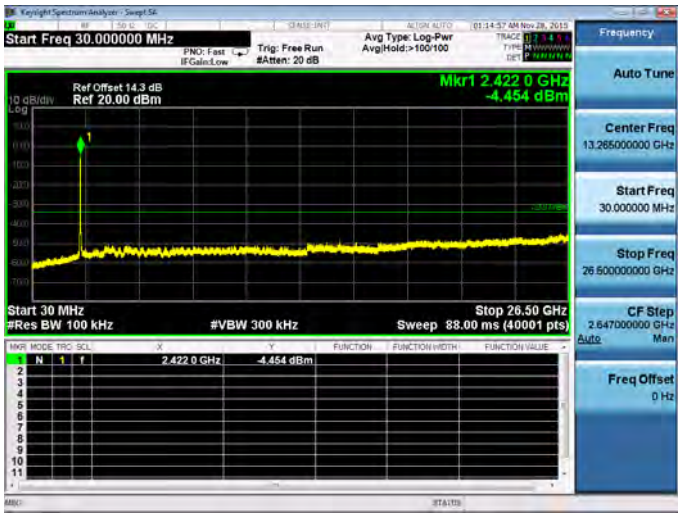
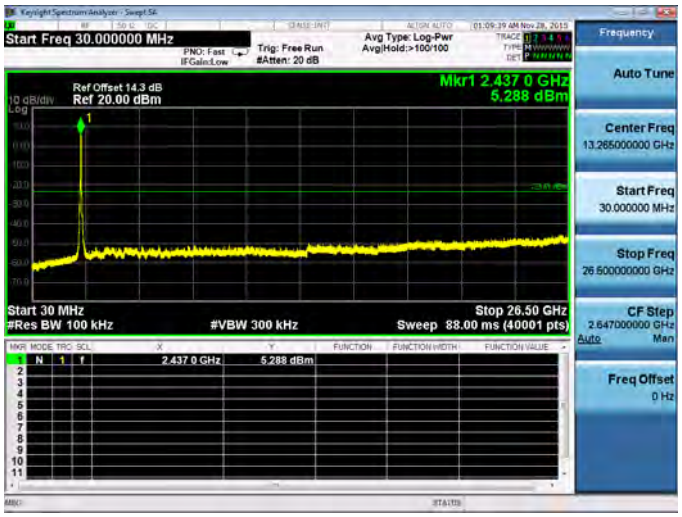
Mode 3: IEEE 802.11g link mode_ANT-0	
2412	
2437	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0	
2412	
2437	
2462	

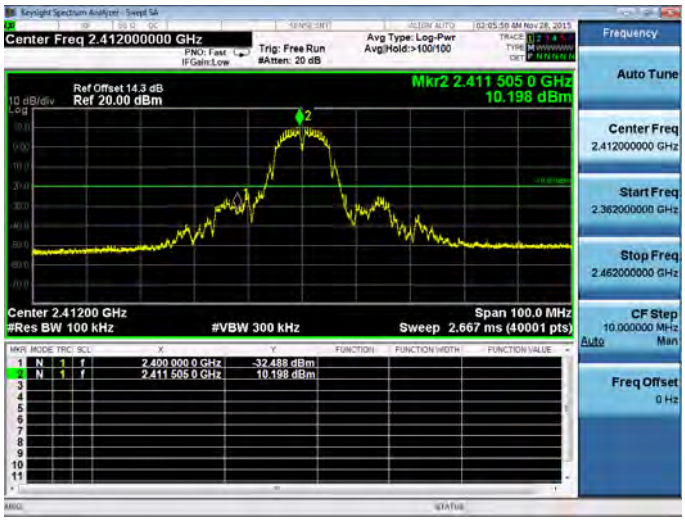
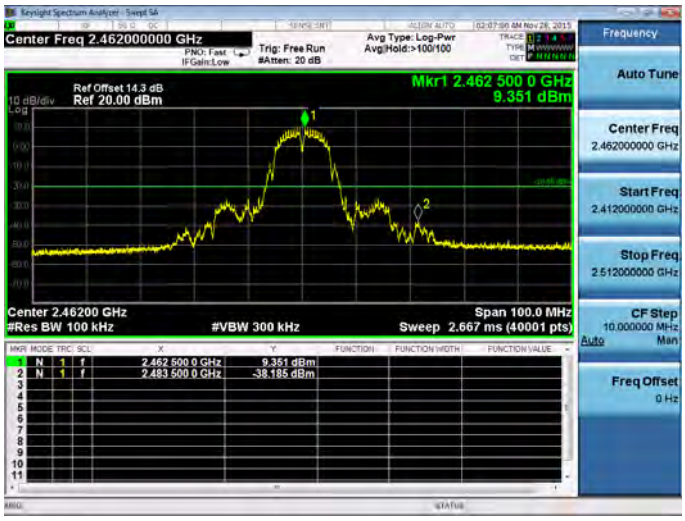
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0	
2422	
2437	
2452	

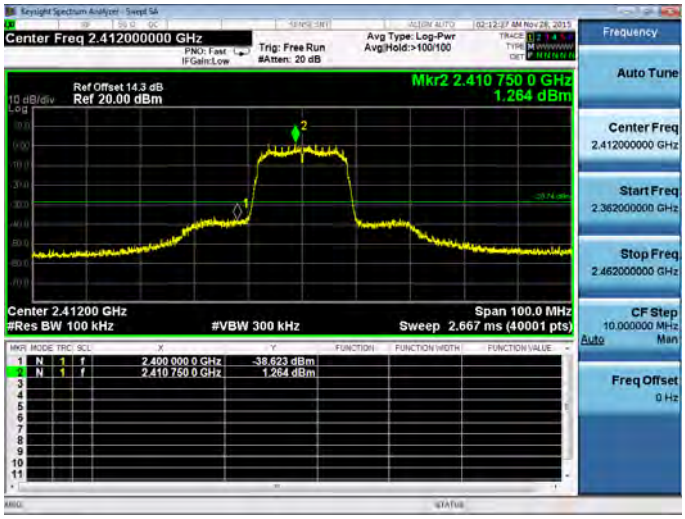
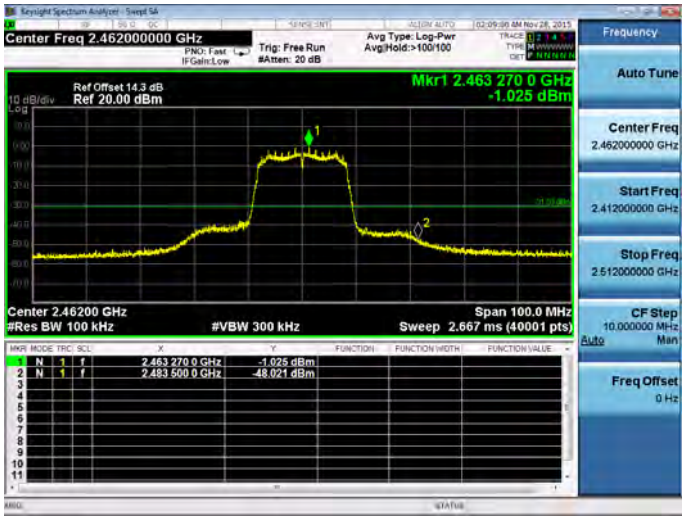
Mode 3: IEEE 802.11g link mode_ANT-1	
2412	
2437	
2462	

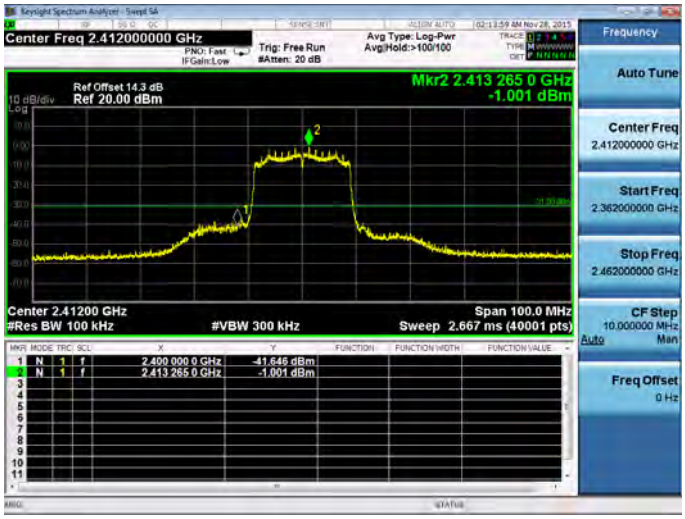
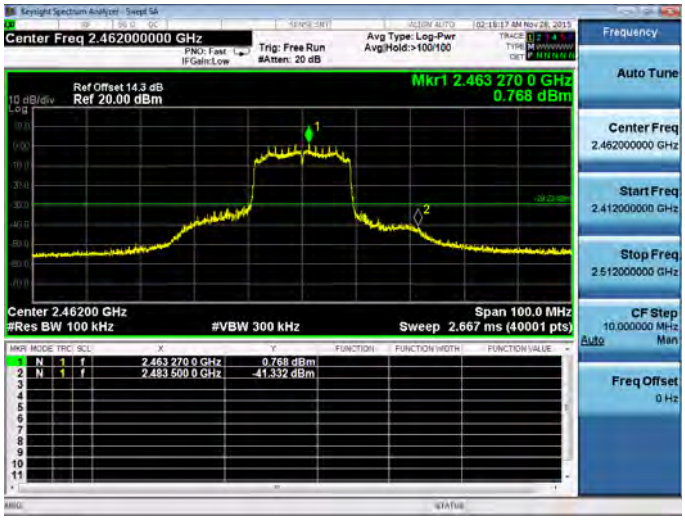
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412	
2437	
2462	

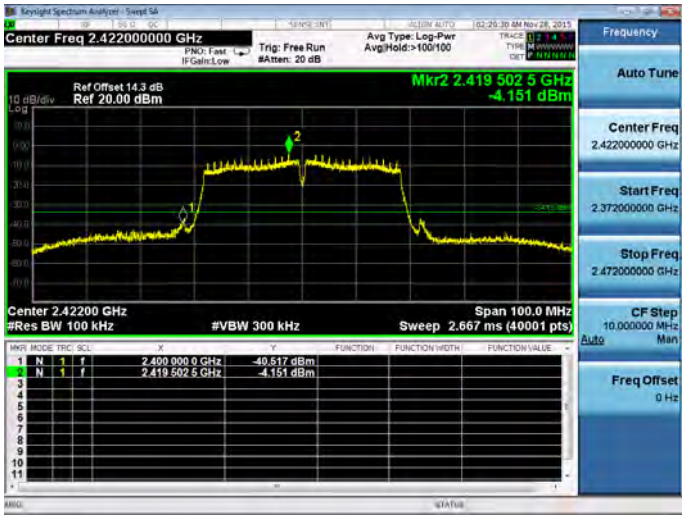
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
2422	
2437	
2452	

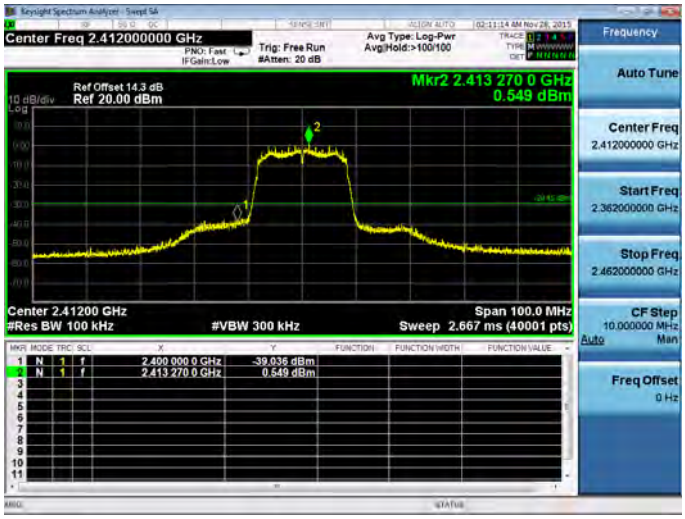
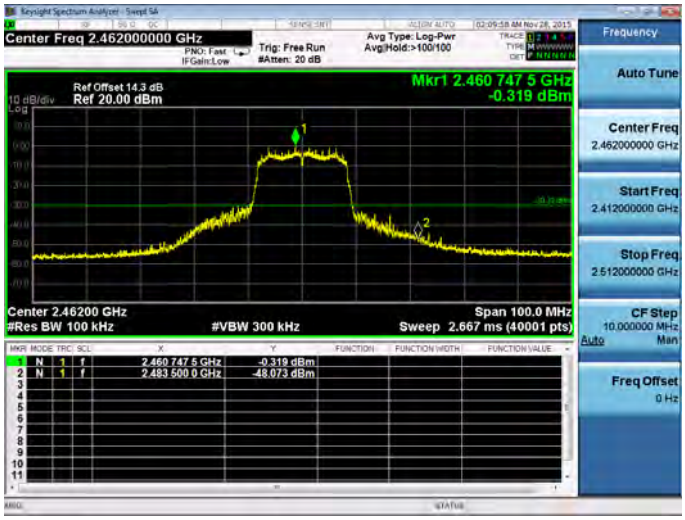
Conducted Band Edge

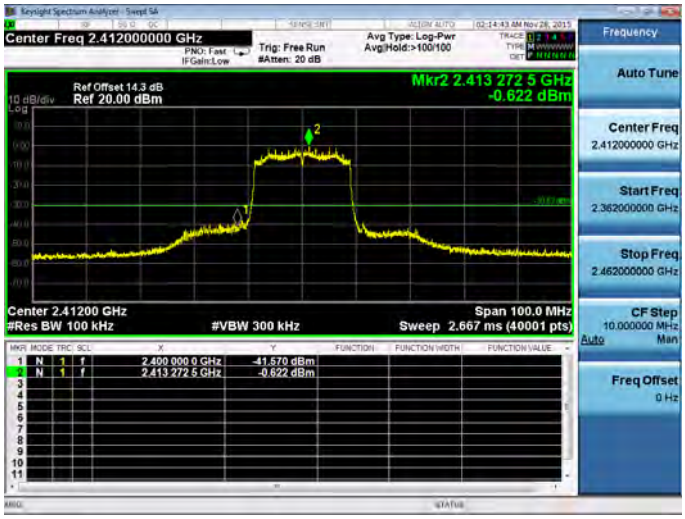
Mode 2: IEEE 802.11b link mode_ANT-0	
2412	
2462	

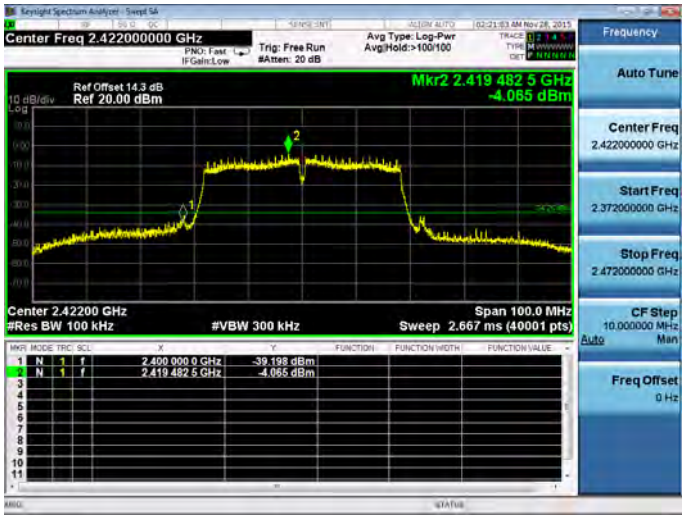
Mode 3: IEEE 802.11g link mode_ANT-0	
2412	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0	
2412	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0	
2422	
2452	

Mode 3: IEEE 802.11g link mode_ANT-1	
2412	
2462	

Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412	
2462	

Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
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

The antenna used in this product is Omni Directional Antenna. And the maximum Gain of this antenna is only 3.7 dBi.

10.3. Directional Gain Calculated

Directional Gain = GANT+10*log(NANT/NSS)

Operate Band	Directional Gain (dBi)
IEEE 802.11g	6.71
IEEE 802.11n 2.4GHz 20MHz	6.71
IEEE 802.11n 2.4GHz 40MHz	6.71