FCC 47 CFR PART 15 SUBPART C

Product Type	:	Medical Station
Applicant	:	ONYX Healthcare Inc.
Address	:	2F,No.135,Lane235,Pao chiao Rd., HSIN-Tien City, Taipei, Taiwan 231
Trade Name	:	ONYX Healthcare
Model Number	:	ONYX-1521DTy-xxxxxxx (Where “y” T or blank, “x” in 0~9,A~Z or blank)
Test Specification	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2014 ANSI C63.10:2009
Receive Date	:	Dec. 30, 2014
Test Period	:	Jan. 31 ~ Feb. 11, 2015
Issue Date	:	Mar. 18, 2015

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Mar. 18, 2015	Initial Issue	

Verification of Compliance

Issued Date: 03/18/2015

Product Type	:	Medical Station
Applicant	:	ONYX Healthcare Inc.
Address	:	2F,No.135,Lane235,Pao chiao Rd., HSIN-Tien City, Taipei, Taiwan 231
Trade Name	:	ONYX Healthcare
Model Number	:	ONYX-1521DTy-xxxxxxx (Where “y” T or blank, “x” in 0~9,A~Z or blank)
FCC ID	:	RZ51521DTT-C1
EUT Rated Voltage	:	DC 24V, 2.91A
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2014 ANSI C63.10:2009
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan County 334, 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)

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1 General Information

1.1 Summary of Test Result

Standard 15.247	Item	Result	Remark
15.207	AC Power Conducted Emission	PASS	-----
Standard 15.247	Item	Result	Remark
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	-----
15.247(d)	Band Edge Measurement	PASS	-----
15.203	Antenna Requirement	PASS	-----

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

1.2 Measurement Uncertainty

Test Item	Frequency Range		Uncertainty (dB)
Conducted Emission	9kHz ~ 30MHz		± 2.02
Radiated Emission	30MHz ~ 1000MHz	Horizontal	± 3.98
		Vertical	± 3.62
	1000MHz ~ 18000MHz	Horizontal	± 3.11
		Vertical	± 3.07
	18000MHz ~ 40000MHz	Horizontal	± 3.66
		Vertical	± 3.54

2 EUT Description

Product Type	Medical Station		
Trade Name	ONYX Healthcare		
Model No.	ONYX-1521DTy-xxxxxxx (Where “y” T or blank, “x” in 0~9,A~Z or blank)		
Applicant	ONYX Healthcare Inc. 2F,No.135,Lane235,Pao chiao Rd., HSIN-Tien City, Taipei, Taiwan 231		
Manufacturer	ONYX Healthcare Inc. 2F,No.135,Lane235,Pao chiao Rd., HSIN-Tien City, Taipei, Taiwan 231		
FCC ID	RZ51521DTT-C1		
Frequency Range	IEEE 802.11b / 802.11g / 802.11n 2.4GHz 20MHz: 2412 ~ 2462 MHz IEEE 802.11n 2.4GHz 40MHz: 2422 ~ 2452 MHz Bluetooth v4.0 LE: 2402 ~ 2480 MHz		
Modulation Type	IEEE 802.11b:DSSS IEEE 802.11g:DSSS + OFDM IEEE 802.11n 2.4GHz 20MHz: OFDM IEEE 802.11n 2.4GHz 40MHz: OFDM Bluetooth v4.0 LE: GFSK		
Antenna Gain	Antenna Port	Antenna Type	Max. Gain
	ANT-0	Internal Antenna	WLAN 2.4G: 1.02 dBi Bluetooth v4.0: 1.02 dBi
	ANT-1	Internal Antenna	WLAN 2.4G: 2.05 dBi
Antenna Delivery	2TX + 2RX		
RF Output Power	IEEE 802.11b: 0.105 W / 20.22 dBm IEEE 802.11g: 0.204 W / 23.10 dBm IEEE 802.11n 2.4GHz 20MHz: 0.226 W / 23.54 dBm IEEE 802.11n 2.4GHz 40MHz: 0.115 W / 20.62 dBm Bluetooth v4.0 LE: 0.001 W / 1.40 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
Mode 6: Bluetooth v4.0 LE 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
Mode 2: IEEE 802.11b Mode	V	V	V
Mode 3: IEEE 802.11g Mode	V	V	V
Mode 4: IEEE 802.11n 2.4GHz 20MHz Mode	V	V	V
Mode 5: IEEE 802.11n 2.4GHz 40MHz Mode	V	V	V

Test Mode	TX/RX Function	Test Channel	Data Rate
Mode 2: IEEE 802.11b Mode	2TX / 2RX	1, 6, 11	1
Mode 3: IEEE 802.11g Mode	2TX / 2RX	1, 6, 11	6
Mode 4: IEEE 802.11n 2.4GHz 20MHz Mode	2TX / 2RX	1, 6, 11	13
Mode 5: IEEE 802.11n 2.4GHz 40MHz Mode	2TX / 2RX	3, 6, 9	27

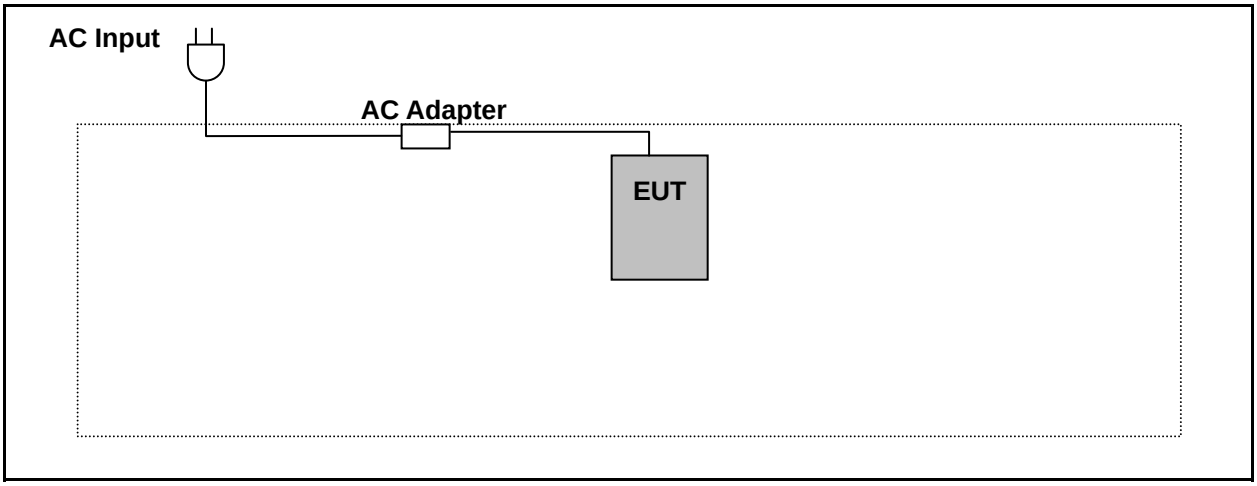
Note1: Duty cycle of test signal is >98%

3.2. EUT Exercise Software

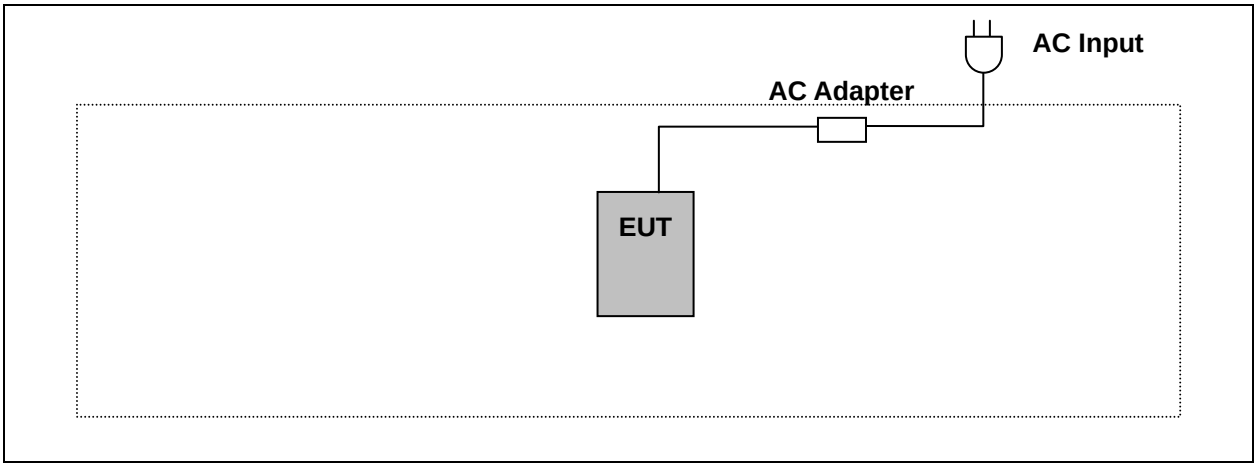
1. Setup the EUT shown on 3.3.
2. Turn on the power of all equipment.
3. Turn on Wi-Fi function link to AP.
4. EUT run test program.
5 Turn Bluetooth function link to CBT.

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

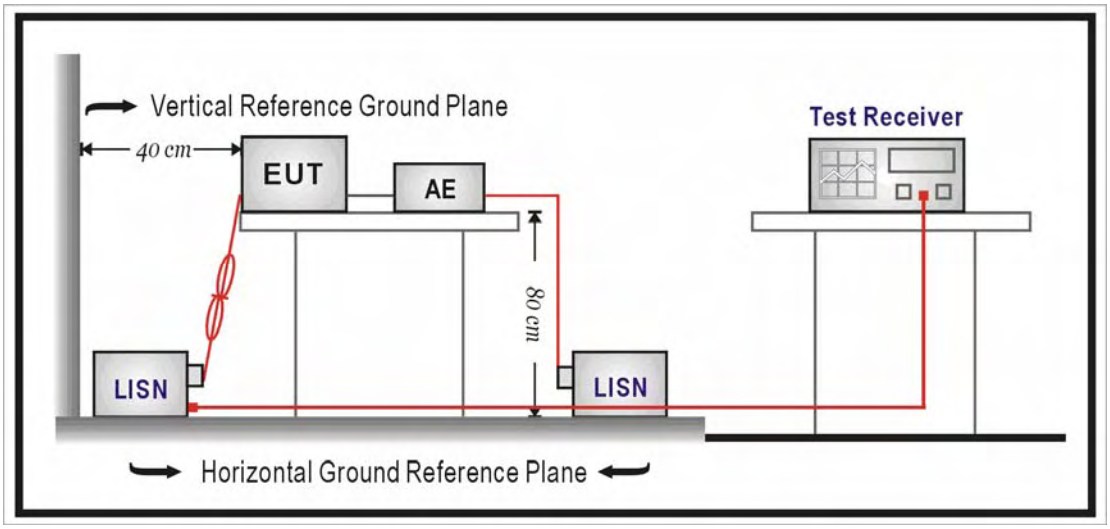
4.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/12/2014	(1)
LISN	R&S	ENV216	101040	03/07/2014	(1)
LISN	R&S	ENV216	101041	03/07/2014	(1)
RF Cable	EMCI	RG 214/U	TE-02	06/30/2014	(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

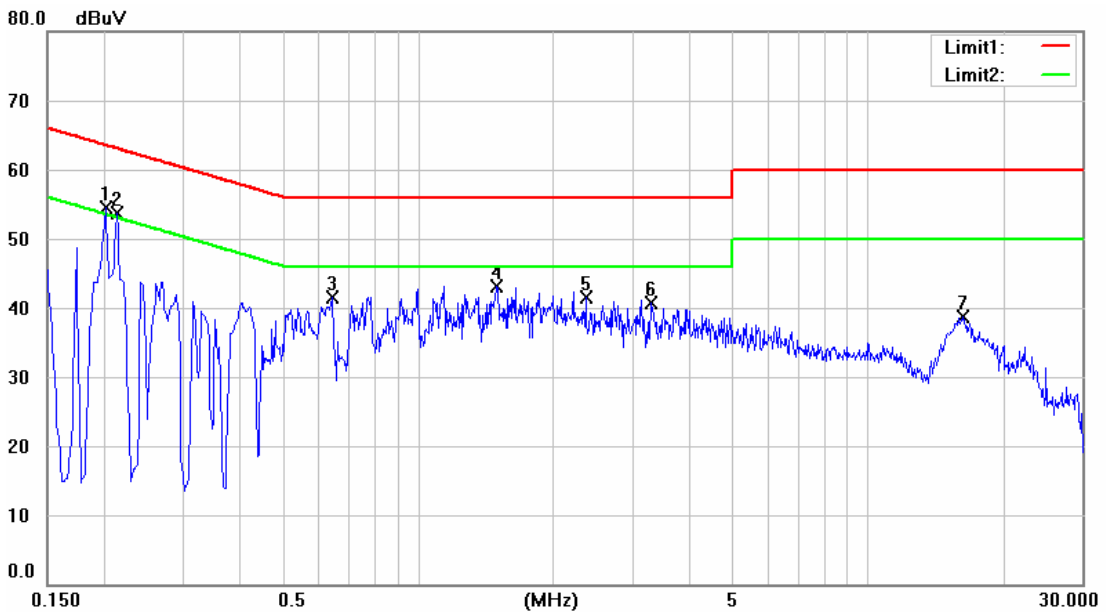
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

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

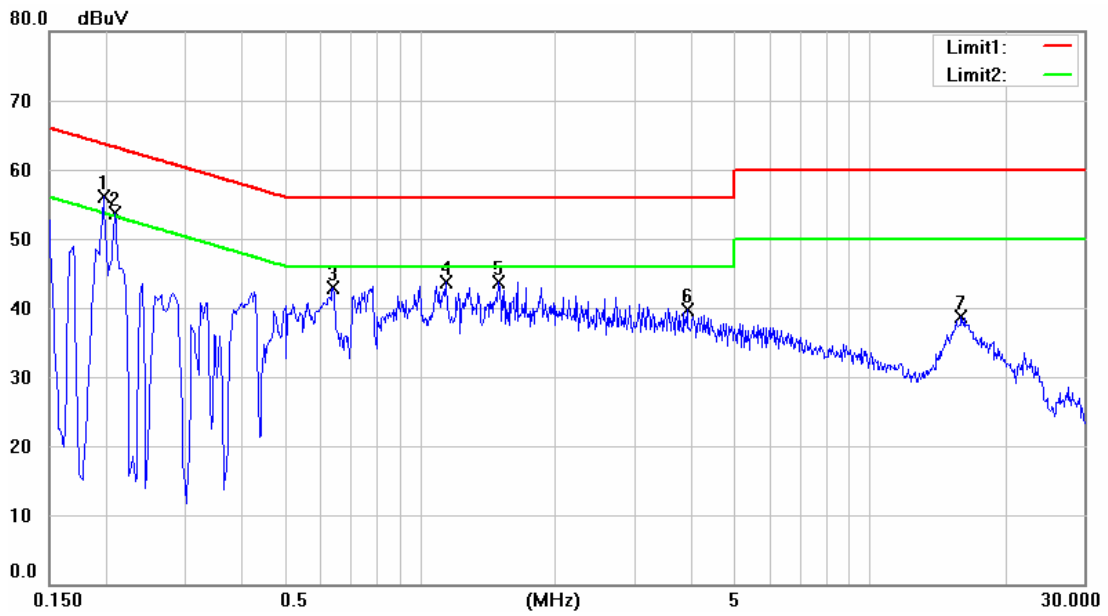
Standard:	FCC Part 15C	Line:	L1
Test item:	Conducted Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	02/04/2015
		Test By:	Eric Ou Yang
Description:			



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	0.2020	42.44	29.90	9.60	52.04	39.50	63.53	53.53	-11.49	-14.03	Pass
2	0.2140	40.51	24.08	9.60	50.11	33.68	63.05	53.05	-12.94	-19.37	Pass
3	0.6460	28.88	14.89	9.62	38.50	24.51	56.00	46.00	-17.50	-21.49	Pass
4	1.5020	31.44	18.71	9.67	41.11	28.38	56.00	46.00	-14.89	-17.62	Pass
5	2.3620	28.38	17.98	9.70	38.08	27.68	56.00	46.00	-17.92	-18.32	Pass
6	3.2940	26.25	19.05	9.75	36.00	28.80	56.00	46.00	-20.00	-17.20	Pass
7	16.2980	24.19	19.08	10.14	34.33	29.22	60.00	50.00	-25.67	-20.78	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:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	02/04/2015
		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	0.1980	42.52	29.37	9.60	52.12	38.97	63.69	53.69	-11.57	-14.72	Pass
2	0.2100	40.99	26.84	9.60	50.59	36.44	63.21	53.21	-12.62	-16.77	Pass
3	0.6420	31.99	18.26	9.62	41.61	27.88	56.00	46.00	-14.39	-18.12	Pass
4	1.1460	31.88	17.66	9.66	41.54	27.32	56.00	46.00	-14.46	-18.68	Pass
5	1.5020	31.69	19.09	9.68	41.37	28.77	56.00	46.00	-14.63	-17.23	Pass
6	3.9380	24.43	18.77	9.80	34.23	28.57	56.00	46.00	-21.77	-17.43	Pass
7	16.0500	24.42	19.25	10.13	34.55	29.38	60.00	50.00	-25.45	-20.62	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

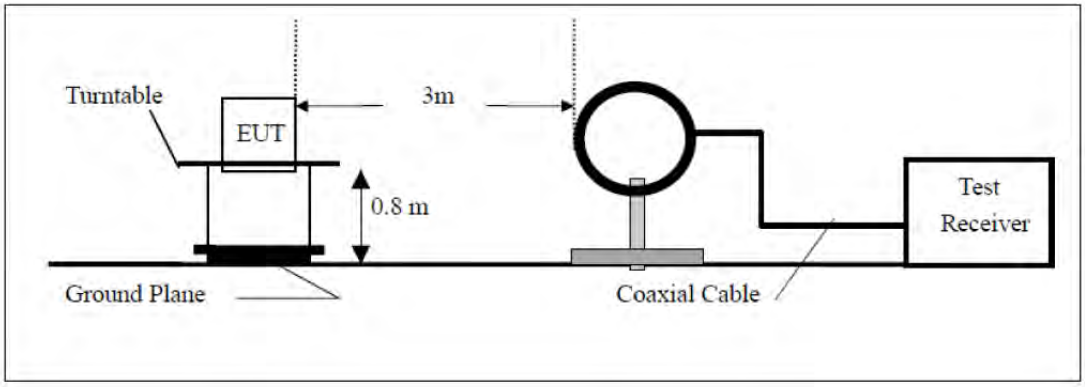
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

5.2. Test Instruments

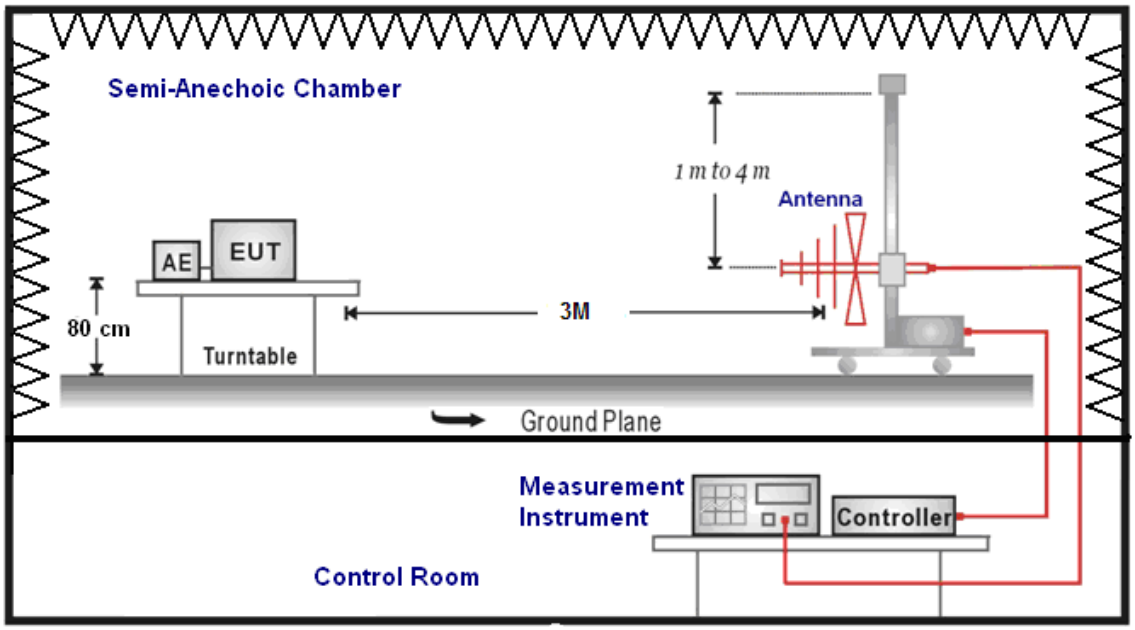
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2014	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2014	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/22/2014	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/11/2014	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/02/2014	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/02/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-SM-14000	140202	02/19/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	03/03/2014	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)

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

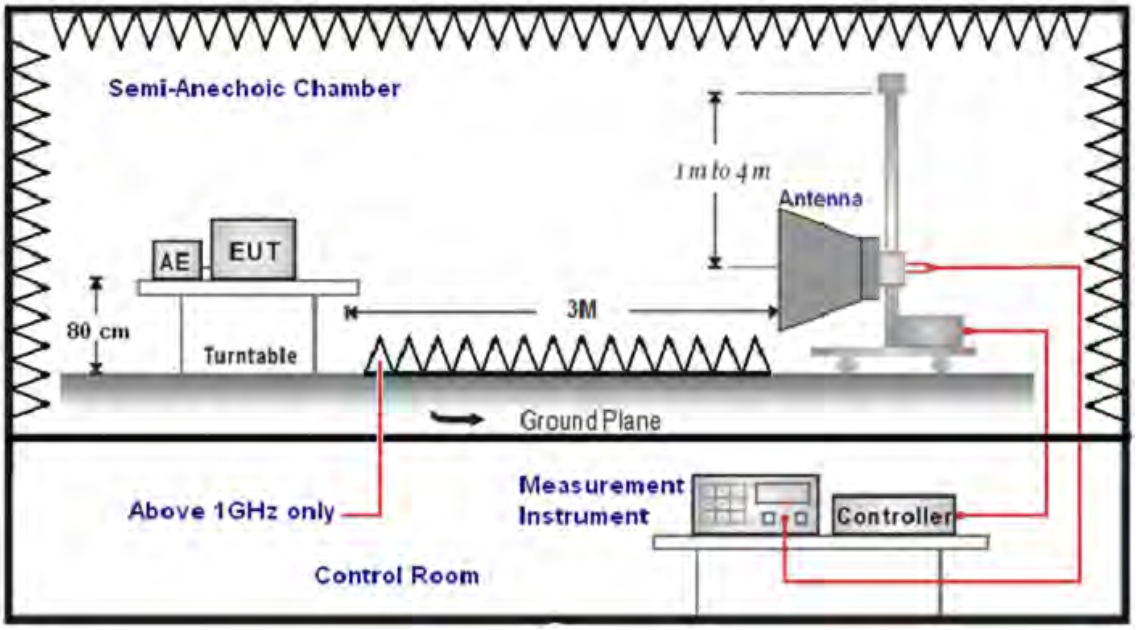
5.3. Setup



Below 1GHz



Above 1GHz


Semi-Anechoic Chamber
1 m to 4 m
Antenna
AE
EUT
80 cm
Turntable
3M
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 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

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

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

A nonconductive material surrounded the EUT to supporting the EUT for standing on 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 1 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

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

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

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

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts 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:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	1	Date:	01/31/2015
		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
111.5000	45.88	-15.38	30.50	43.50	-13.00	QP	H
247.5000	47.17	-12.46	34.71	46.00	-11.29	QP	H
333.0000	43.55	-9.91	33.64	46.00	-12.36	QP	H
630.0000	32.51	-3.80	28.71	46.00	-17.29	QP	H
720.0000	31.40	-2.13	29.27	46.00	-16.73	QP	H
864.0000	26.50	0.67	27.17	46.00	-18.83	QP	H
144.0000	41.27	-12.21	29.06	43.50	-14.44	QP	V
232.5000	43.74	-13.32	30.42	46.00	-15.58	QP	V
299.0000	44.88	-10.52	34.36	46.00	-11.64	QP	V
432.0000	40.85	-7.85	33.00	46.00	-13.00	QP	V
665.0000	41.83	-3.25	38.58	46.00	-7.42	QP	V
864.0000	35.19	0.67	35.86	46.00	-10.14	QP	V

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

Above 1GHz

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	2	Date:	01/31/2015
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
3023.000	37.91	-0.48	37.43	74.00	-36.57	peak	H
4598.000	34.66	4.04	38.70	74.00	-35.30	peak	H
6670.000	33.90	9.45	43.35	74.00	-30.65	peak	H
3023.000	37.10	-0.48	36.62	74.00	-37.38	peak	V
4577.000	34.96	3.98	38.94	74.00	-35.06	peak	V
6677.000	33.92	9.46	43.38	74.00	-30.62	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	2	Date:	01/31/2015
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	38.19	-0.44	37.75	74.00	-36.25	peak	H
4542.000	34.44	3.89	38.33	74.00	-35.67	peak	H
6705.000	33.58	9.54	43.12	74.00	-30.88	peak	H
3023.000	38.39	-0.48	37.91	74.00	-36.09	peak	V
4577.000	34.85	3.98	38.83	74.00	-35.17	peak	V
6698.000	34.02	9.53	43.55	74.00	-30.45	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	2	Date:	01/31/2015
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	38.25	-0.54	37.71	74.00	-36.29	peak	H
4570.000	34.83	3.97	38.80	74.00	-35.20	peak	H
6691.000	33.72	9.50	43.22	74.00	-30.78	peak	H
3009.000	39.05	-0.51	38.54	74.00	-35.46	peak	V
4563.000	35.45	3.95	39.40	74.00	-34.60	peak	V
6754.000	33.14	9.69	42.83	74.00	-31.17	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	3	Date:	01/31/2015
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
3030.000	39.56	-0.45	39.11	74.00	-34.89	peak	H
4549.000	36.01	3.92	39.93	74.00	-34.07	peak	H
6726.000	34.82	9.60	44.42	74.00	-29.58	peak	H
3037.000	39.28	-0.44	38.84	74.00	-35.16	peak	V
4598.000	36.31	4.04	40.35	74.00	-33.65	peak	V
6663.000	34.48	9.43	43.91	74.00	-30.09	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	3	Date:	01/31/2015
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	37.14	-0.44	36.70	74.00	-37.30	peak	H
4591.000	35.07	4.01	39.08	74.00	-34.92	peak	H
6691.000	33.85	9.50	43.35	74.00	-30.65	peak	H
3030.000	39.07	-0.45	38.62	74.00	-35.38	peak	V
4591.000	35.47	4.01	39.48	74.00	-34.52	peak	V
6677.000	33.18	9.46	42.64	74.00	-31.36	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	3	Date:	01/31/2015
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
2981.000	38.00	-0.59	37.41	74.00	-36.59	peak	H
4598.000	35.89	4.04	39.93	74.00	-34.07	peak	H
6649.000	33.89	9.39	43.28	74.00	-30.72	peak	H
3051.000	38.39	-0.40	37.99	74.00	-36.01	peak	V
4570.000	35.03	3.97	39.00	74.00	-35.00	peak	V
6670.000	33.60	9.45	43.05	74.00	-30.95	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	4	Date:	01/31/2015
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
2981.000	38.77	-0.59	38.18	74.00	-35.82	peak	H
4626.000	35.13	4.10	39.23	74.00	-34.77	peak	H
6677.000	33.63	9.46	43.09	74.00	-30.91	peak	H
3002.000	37.80	-0.54	37.26	74.00	-36.74	peak	V
4626.000	34.95	4.10	39.05	74.00	-34.95	peak	V
6677.000	34.57	9.46	44.03	74.00	-29.97	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	4	Date:	01/31/2015
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
3023.000	37.97	-0.48	37.49	74.00	-36.51	peak	H
4549.000	34.08	3.92	38.00	74.00	-36.00	peak	H
6642.000	33.87	9.37	43.24	74.00	-30.76	peak	H
3023.000	38.59	-0.48	38.11	74.00	-35.89	peak	V
4577.000	34.79	3.98	38.77	74.00	-35.23	peak	V
6726.000	33.91	9.60	43.51	74.00	-30.49	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	4	Date:	01/31/2015
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	37.98	-0.54	37.44	74.00	-36.56	peak	H
4591.000	35.95	4.01	39.96	74.00	-34.04	peak	H
6705.000	34.45	9.54	43.99	74.00	-30.01	peak	H
3009.000	39.24	-0.51	38.73	74.00	-35.27	peak	V
4570.000	35.37	3.97	39.34	74.00	-34.66	peak	V
6691.000	33.71	9.50	43.21	74.00	-30.79	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	5	Date:	01/31/2015
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	37.71	-0.51	37.20	74.00	-36.80	peak	H
4577.000	35.87	3.98	39.85	74.00	-34.15	peak	H
6670.000	34.06	9.45	43.51	74.00	-30.49	peak	H
3037.000	37.29	-0.44	36.85	74.00	-37.15	peak	V
4591.000	34.22	4.01	38.23	74.00	-35.77	peak	V
6670.000	33.85	9.45	43.30	74.00	-30.70	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	5	Date:	01/31/2015
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
3009.000	37.61	-0.51	37.10	74.00	-36.90	peak	H
4633.000	34.68	4.13	38.81	74.00	-35.19	peak	H
6698.000	34.08	9.53	43.61	74.00	-30.39	peak	H
3009.000	38.67	-0.51	38.16	74.00	-35.84	peak	V
4605.000	34.54	4.05	38.59	74.00	-35.41	peak	V
6642.000	33.76	9.37	43.13	74.00	-30.87	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	5	Date:	01/31/2015
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
3065.000	38.80	-0.36	38.44	74.00	-35.56	peak	H
4563.000	35.72	3.95	39.67	74.00	-34.33	peak	H
6691.000	33.82	9.50	43.32	74.00	-30.68	peak	H
2981.000	37.80	-0.59	37.21	74.00	-36.79	peak	V
4598.000	35.54	4.04	39.58	74.00	-34.42	peak	V
6663.000	34.26	9.43	43.69	74.00	-30.31	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	6	Date:	01/31/2015
Frequency:	2402MHz	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	37.33	-0.36	36.97	74.00	-37.03	peak	H
4626.000	33.93	4.10	38.03	74.00	-35.97	peak	H
6677.000	33.06	9.46	42.52	74.00	-31.48	peak	H
3037.000	37.38	-0.44	36.94	74.00	-37.06	peak	V
4577.000	34.68	3.98	38.66	74.00	-35.34	peak	V
6691.000	34.08	9.50	43.58	74.00	-30.42	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	6	Date:	01/31/2015
Frequency:	2440MHz	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	37.63	-0.40	37.23	74.00	-36.77	peak	H
4570.000	34.29	3.97	38.26	74.00	-35.74	peak	H
6663.000	34.18	9.43	43.61	74.00	-30.39	peak	H
3037.000	36.73	-0.44	36.29	74.00	-37.71	peak	V
4563.000	35.64	3.95	39.59	74.00	-34.41	peak	V
6621.000	33.77	9.31	43.08	74.00	-30.92	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	6	Date:	01/31/2015
Frequency:	2480MHz	Test By:	Eric Ou Yang

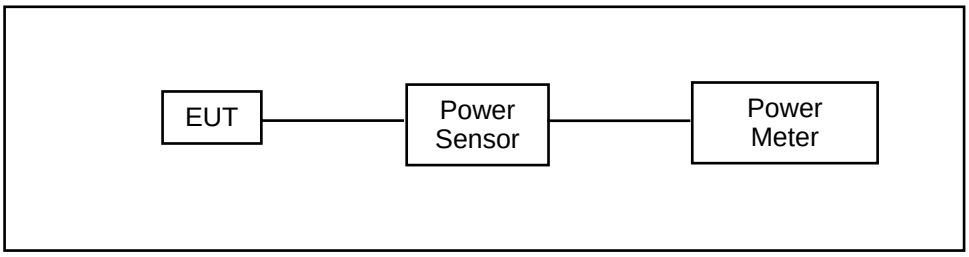
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
3037.000	36.07	-0.44	35.63	74.00	-38.37	peak	H
4570.000	34.68	3.97	38.65	74.00	-35.35	peak	H
6670.000	34.06	9.45	43.51	74.00	-30.49	peak	H
3009.000	37.56	-0.51	37.05	74.00	-36.95	peak	V
4577.000	34.90	3.98	38.88	74.00	-35.12	peak	V
6663.000	34.18	9.43	43.61	74.00	-30.39	peak	V

6 Maximum Conducted Output Power Measurement

6.1. Limit

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

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/15/2014	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/15/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	03/03/2014	(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.

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 peak output power shall not exceed 1 watt.

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

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

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

6.5. Test Result

Model Number	ONYX-1521DTT-C1-1010							
Test Item	Maximum Conducted Output Power							
Test Mode	Mode 2: IEEE 802.11b Link Mode							
Date of Test	01/31/2015				Test Site	TE05		
Frequency (MHz)	Data Rate	Peak Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	1M	17.39	0.055	17.03	0.050	**20.22**	**0.105**	< 30
2437		17.33	0.054	16.78	0.048	20.07	0.102	< 30
2462		16.88	0.049	16.39	0.044	19.65	0.092	< 30
2437	2M	17.19	0.052	16.74	0.047	19.98	0.100	< 30
2437	5.5M	17.00	0.050	16.54	0.045	19.79	0.095	< 30
2437	11M	16.95	0.050	16.41	0.044	19.70	0.093	< 30

Model Number	ONYX-1521DTT-C1-1010							
Test Item	Maximum Conducted Output Power							
Test Mode	Mode 3: IEEE 802.11g Link Mode							
Date of Test	01/31/2015				Test Site	TE05		
Frequency (MHz)	Data Rate	Peak Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	6M	20.93	0.124	19.04	0.080	**23.10**	**0.204**	< 30
2437		20.76	0.119	18.92	0.078	22.95	0.197	< 30
2462		20.31	0.107	18.82	0.076	22.64	0.184	< 30
2437	9M	20.41	0.110	18.57	0.072	22.60	0.182	< 30
2437	12M	20.59	0.115	18.75	0.075	22.78	0.190	< 30
2437	18M	20.48	0.112	18.64	0.073	22.67	0.185	< 30
2437	24M	20.39	0.109	18.55	0.072	22.58	0.181	< 30
2437	36M	20.61	0.115	18.77	0.075	22.80	0.190	< 30
2437	48M	20.46	0.111	18.62	0.073	22.65	0.184	< 30
2437	54M	20.55	0.114	18.71	0.074	22.74	0.188	< 30

Note: The relevant measured result has the offset with cable loss already.

Model Number	ONYX-1521DTT-C1-1010							
Test Item	Maximum Conducted Output Power							
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode							
Date of Test	01/31/2015				Test Site	TE05		
Frequency (MHz)	Data Rate	Peak Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2412	13M	21.45	0.140	19.35	0.086	**23.54**	**0.226**	< 30
2437		20.19	0.104	19.31	0.085	22.78	0.190	< 30
2462		20.00	0.100	18.67	0.074	22.40	0.174	< 30
2437	26M	19.89	0.097	18.81	0.076	22.39	0.174	< 30
2437	39M	19.80	0.095	18.72	0.074	22.30	0.170	< 30
2437	52M	19.66	0.092	18.58	0.072	22.16	0.165	< 30
2437	78M	19.65	0.092	18.57	0.072	22.15	0.164	< 30
2437	104M	19.76	0.095	18.68	0.074	22.26	0.168	< 30
2437	117M	19.94	0.099	18.86	0.077	22.44	0.176	< 30
2437	130M	19.91	0.098	18.83	0.076	22.41	0.174	< 30

Note: The relevant measured result has the offset with cable loss already.

Model Number	ONYX-1521DTT-C1-1010							
Test Item	Maximum Conducted Output Power							
Test Mode	Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode							
Date of Test	01/31/2015				Test Site	TE05		
Frequency (MHz)	Data Rate	Peak Power						Limit (dBm)
		ANT-0		ANT-1		ANT-0+1		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
2422	27M	17.62	0.058	17.59	0.057	**20.62**	**0.115**	< 30
2437		17.46	0.056	17.10	0.051	20.29	0.107	< 30
2452		16.69	0.047	16.65	0.046	19.68	0.093	< 30
2437	54M	16.72	0.047	16.36	0.043	19.55	0.090	< 30
2437	81M	16.87	0.049	16.51	0.045	19.70	0.093	< 30
2437	108M	16.94	0.049	16.58	0.045	19.77	0.095	< 30
2437	162M	16.82	0.048	16.46	0.044	19.65	0.092	< 30
2437	216M	16.89	0.049	16.53	0.045	19.72	0.094	< 30
2437	243M	16.76	0.047	16.40	0.044	19.59	0.091	< 30
2437	270M	16.80	0.048	16.44	0.044	19.63	0.092	< 30

Model Number	ONYX-1521DTT-C1-1010				
Test Item	Maximum Conducted Output Power				
Test Mode	Mode 6: Bluetooth v4.0 LE Link Mode				
Date of Test	01/31/2015		Test Site	TE05	
Frequency (MHz)	Data Rate	Peak Power			Limit (dBm)
		(dBm)	(W)		
2402	---	1.06	0.00128		< 30
2440	---	**1.40**	**0.00138**		< 30
2480	---	0.93	0.00124		< 30

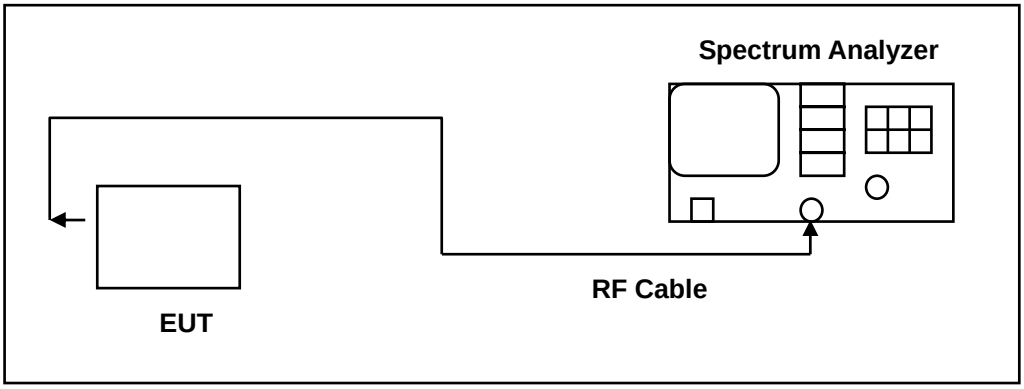
Note: The relevant measured result has the offset with cable loss already.

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)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	03/03/2014	(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 BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.
The test was performed at 3 channels (Channel low, middle, high)

7.5. Test Result

Model Number	ONYX-1521DTT-C1-1010			
Test Item	6dB RF Bandwidth and 99 % Occupied Bandwidth			
Test Mode	Mode 2: IEEE 802.11b Link Mode			
Date of Test	02/01/2015		Test Site	TE05
Frequency (MHz)	6dB RF Bandwidth (MHz)		6dB RF Bandwidth Limit (MHz)	
	ANT-0	ANT-1		
2412	10.115	10.105	> 0.500	
2437	10.142	10.104	> 0.500	
2462	10.051	10.134	> 0.500	

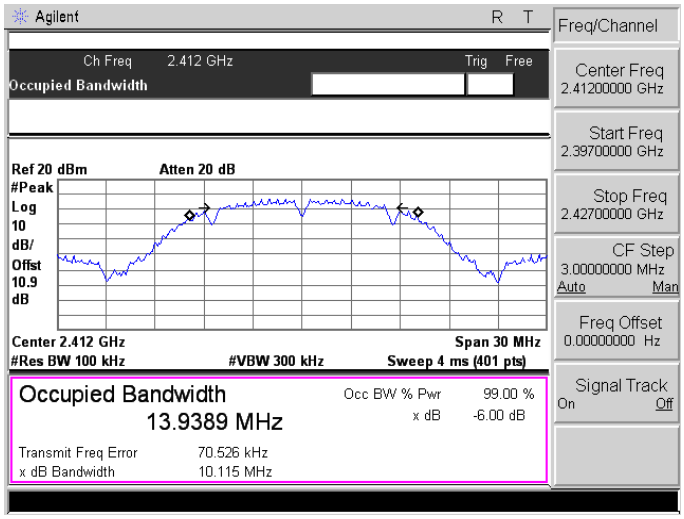
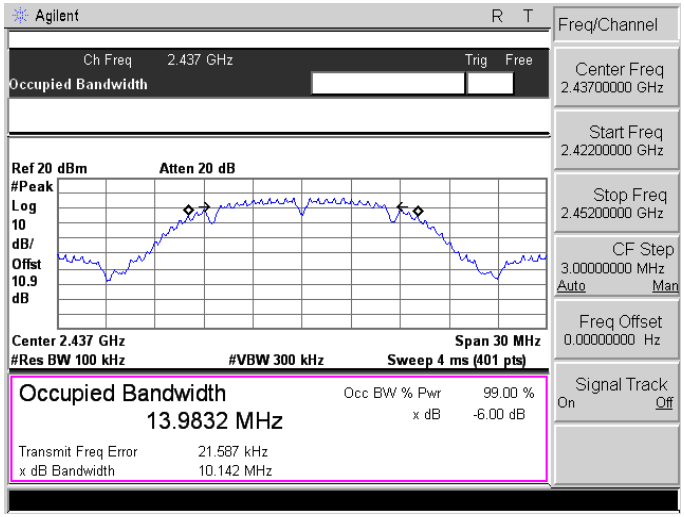
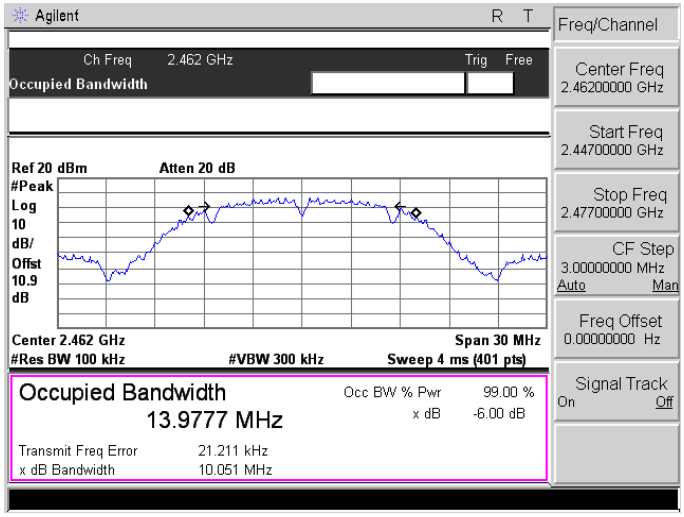
Model Number	ONYX-1521DTT-C1-1010			
Test Item	6dB RF Bandwidth and 99 % Occupied Bandwidth			
Test Mode	Mode 3: IEEE 802.11g Link Mode			
Date of Test	02/01/2015		Test Site	TE05
Frequency (MHz)	6dB RF Bandwidth (MHz)		6dB RF Bandwidth Limit (MHz)	
	ANT-0	ANT-1		
2412	16.560	16.503	> 0.500	
2437	16.573	16.525	> 0.500	
2462	16.515	16.525	> 0.500	

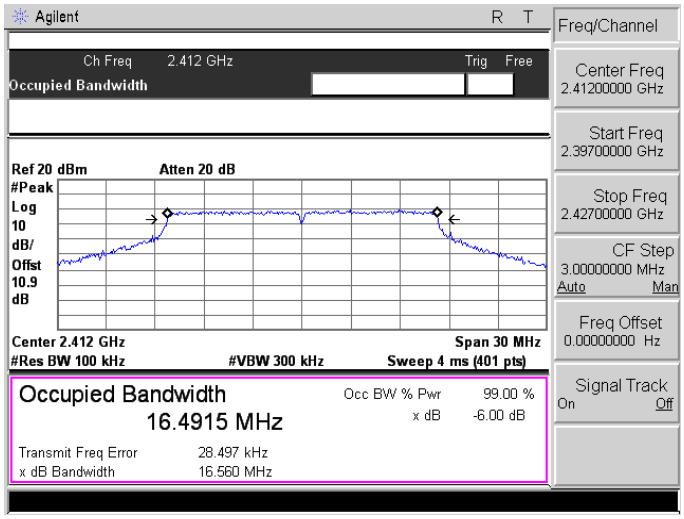
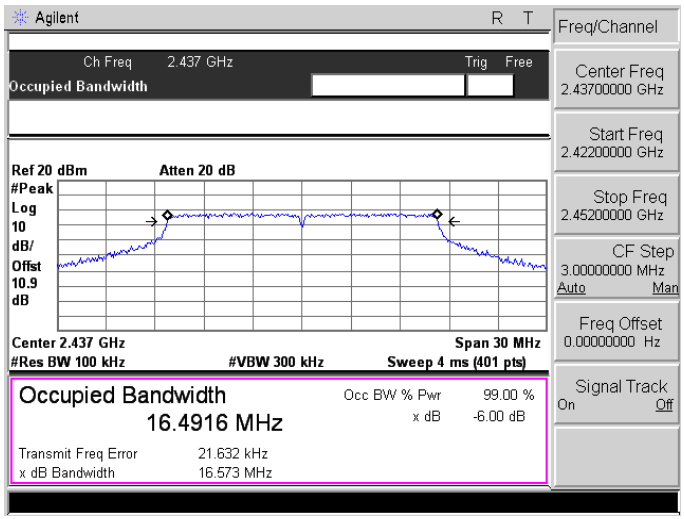
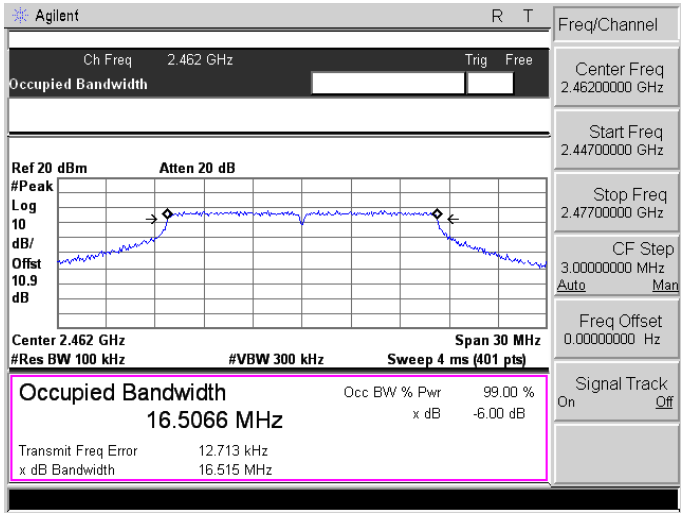
Model Number	ONYX-1521DTT-C1-1010			
Test Item	6dB RF Bandwidth and 99 % Occupied Bandwidth			
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode			
Date of Test	02/01/2015		Test Site	TE05
Frequency (MHz)	6dB RF Bandwidth (MHz)		6dB RF Bandwidth Limit (MHz)	
	ANT-0	ANT-1		
2412	17.794	17.807	> 0.500	
2437	17.797	17.793	> 0.500	
2462	17.818	17.819	> 0.500	

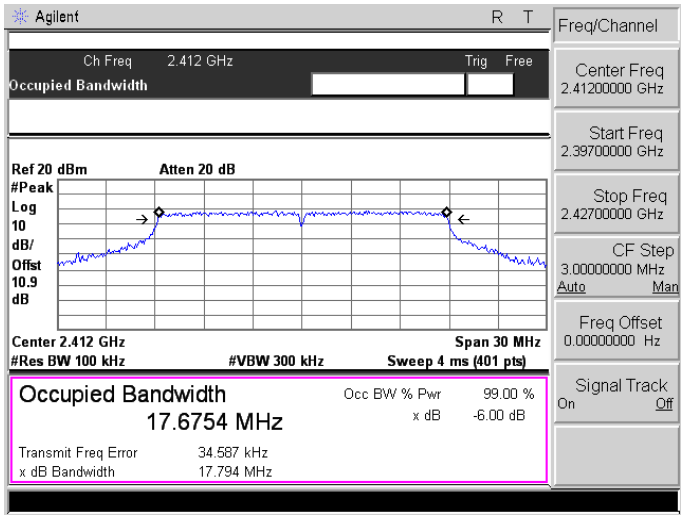
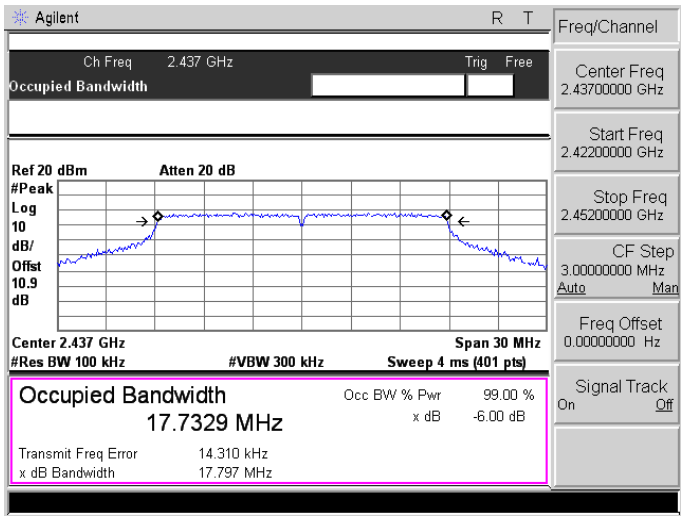
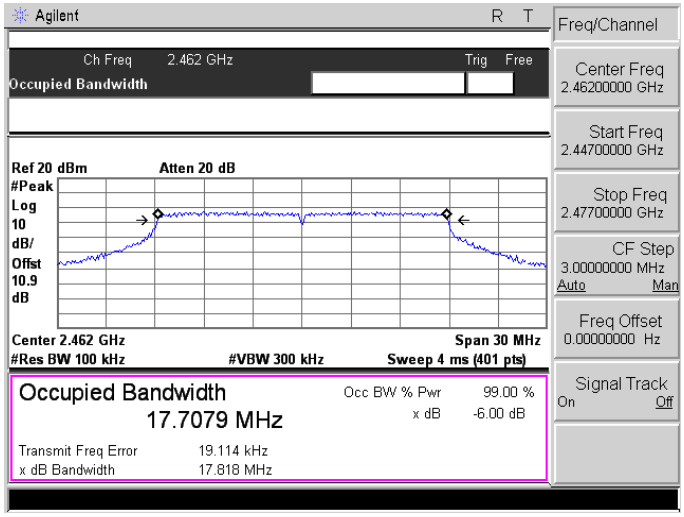
Model Number	ONYX-1521DTT-C1-1010			
Test Item	6dB RF Bandwidth and 99 % Occupied Bandwidth			
Test Mode	Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode			
Date of Test	02/01/2015		Test Site	TE05
Frequency (MHz)	6dB RF Bandwidth (MHz)		6dB RF Bandwidth Limit (MHz)	
	ANT-0	ANT-1		
2422	36.550	36.583	> 0.500	
2437	36.612	36.634	> 0.500	
2452	36.639	36.642	> 0.500	

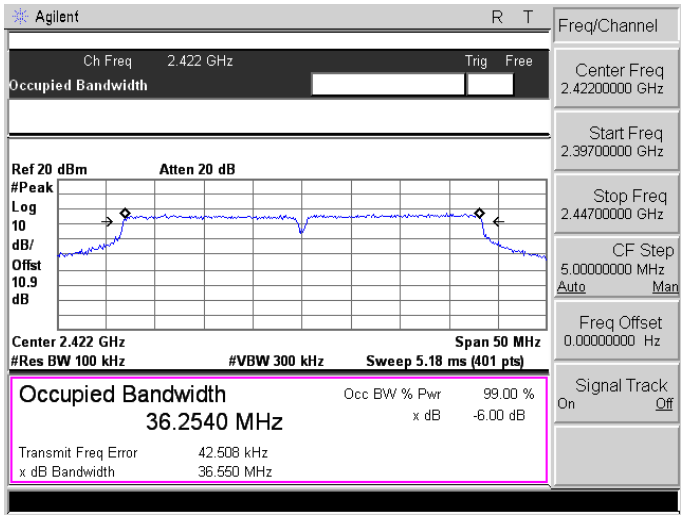
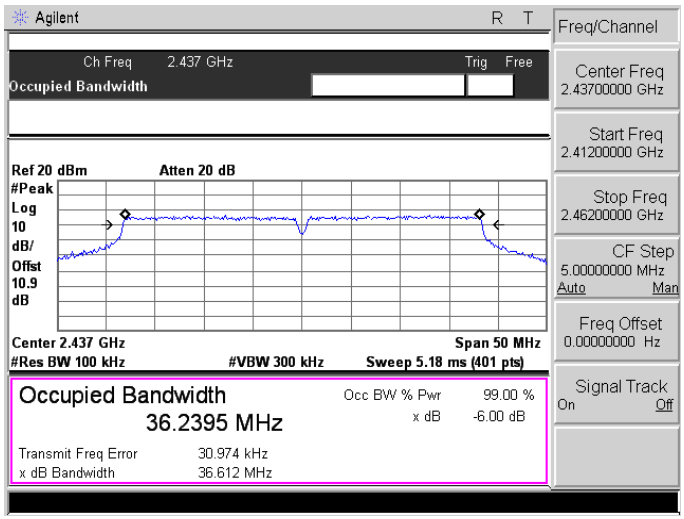
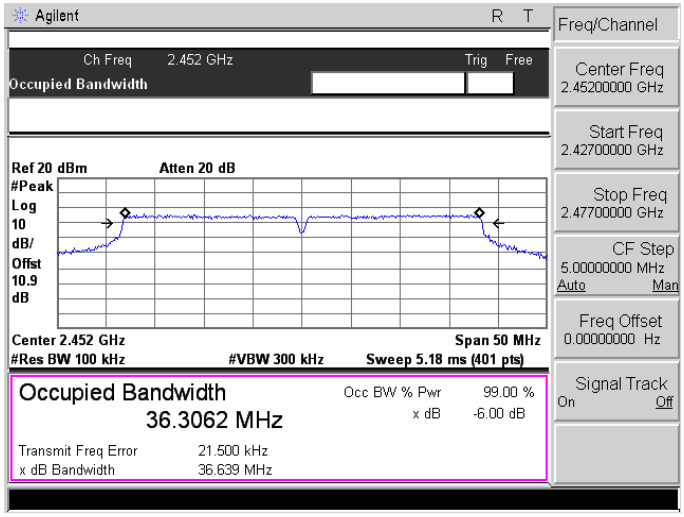
Model Number	ONYX-1521DTT-C1-1010		
Test Item	6dB RF Bandwidth & 99 % Occupied Bandwidth		
Test Mode	Mode 6: Bluetooth v4.0 LE Link Mode		
Date of Test	02/01/2015	Test Site	TE05
Frequency (MHz)	6dB Bandwidth (MHz)	6dB RF Bandwidth Limit (MHz)	
2402	0.704	> 0.500	
2440	0.708	> 0.500	
2480	0.709	> 0.500	

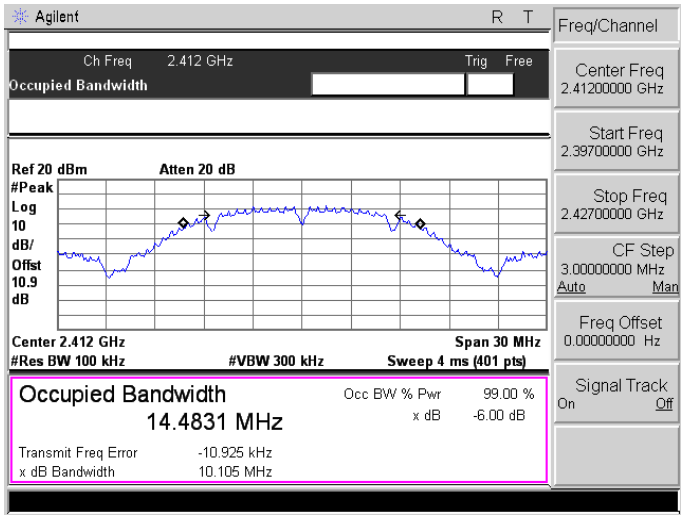
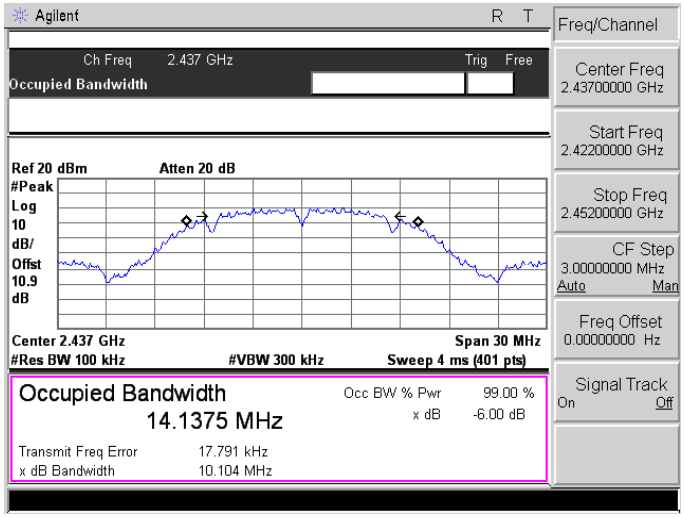
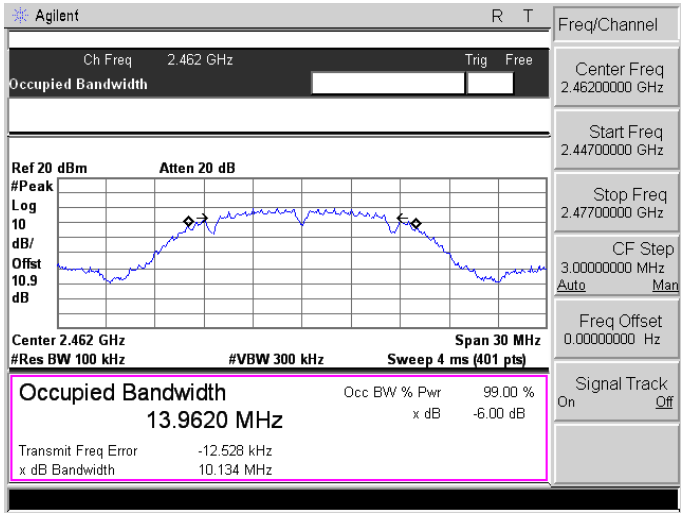
7.6. Test Graphs

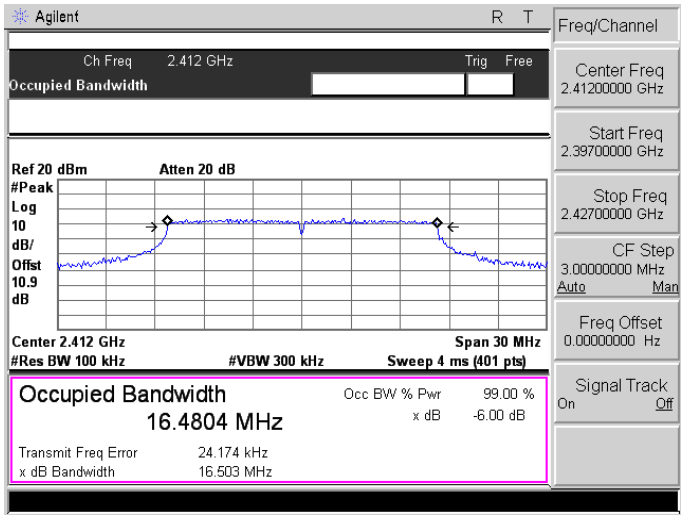
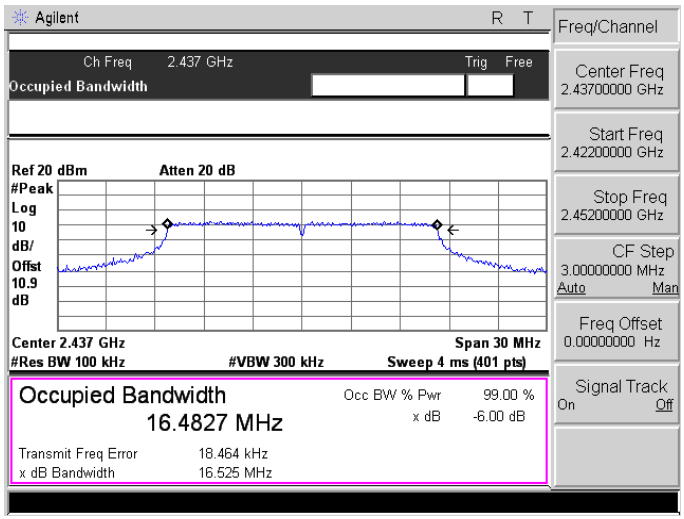
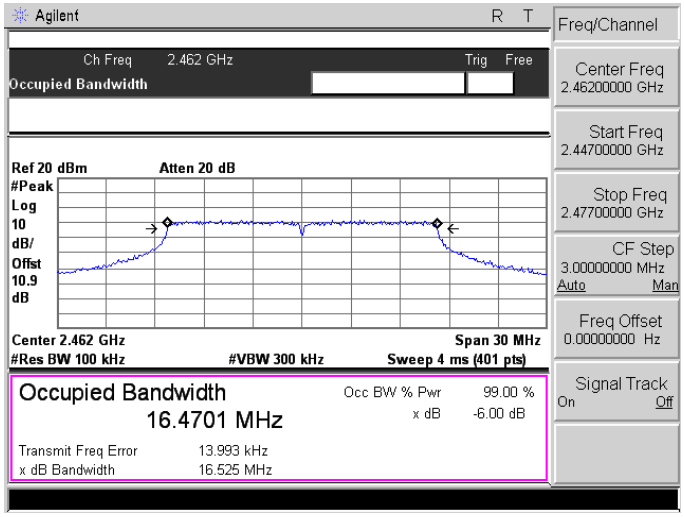
Mode 2: IEEE 802.11b Link Mode_ANT-0	
2412	
2437	
2462	

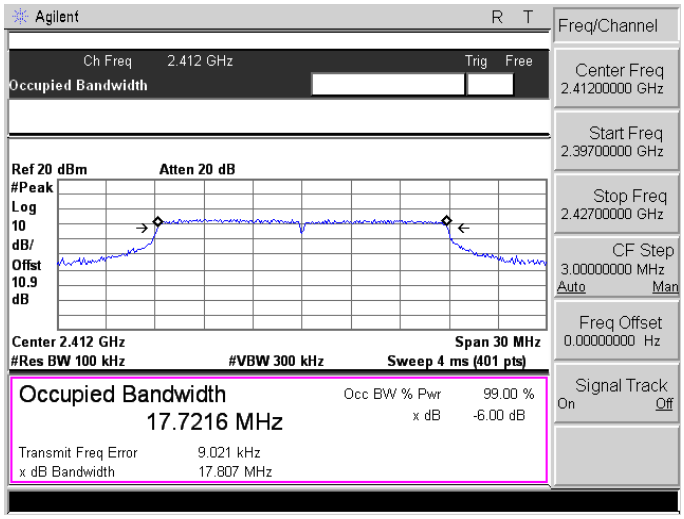
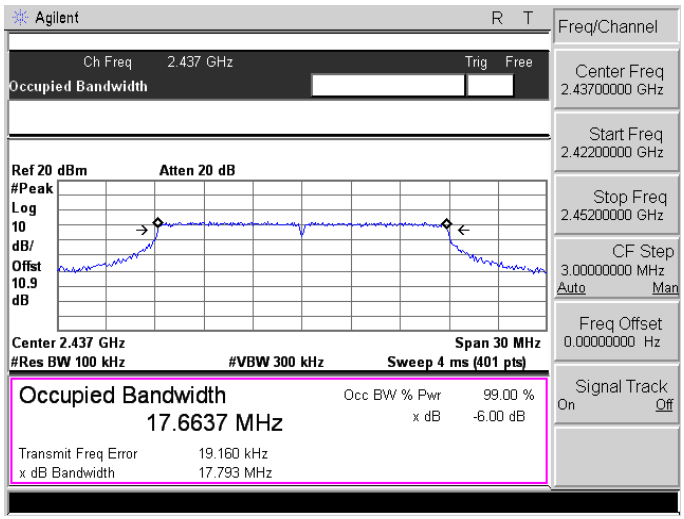
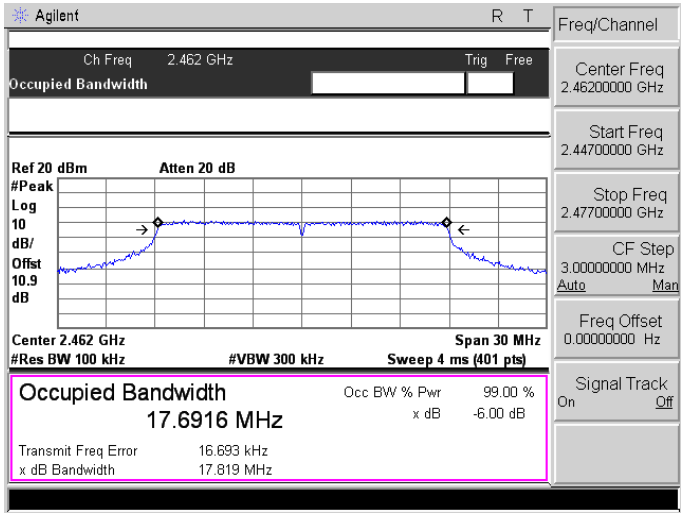
Mode 3: IEEE 802.11g Link Mode_ANT-0	
2412	
2437	
2462	

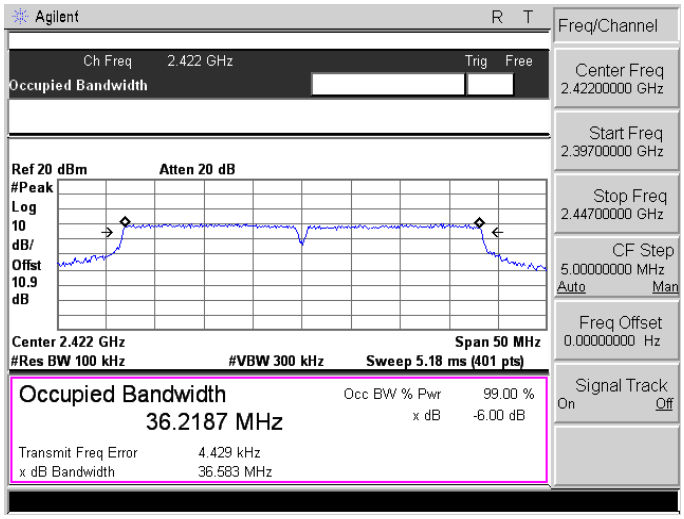
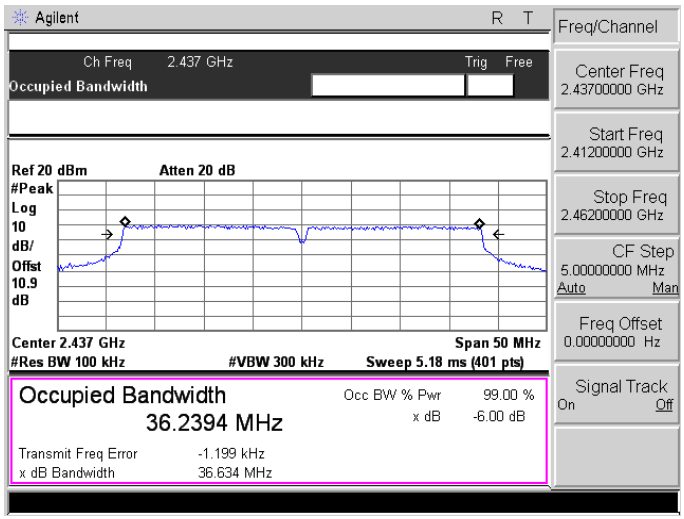
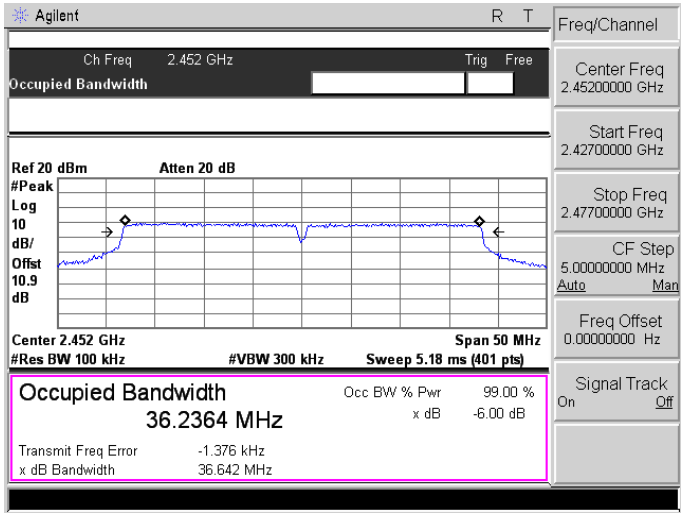
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-0	
2412	
2437	
2462	

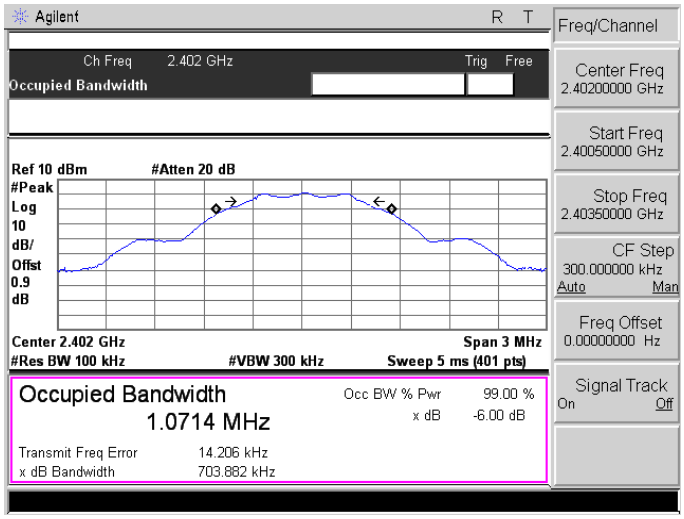
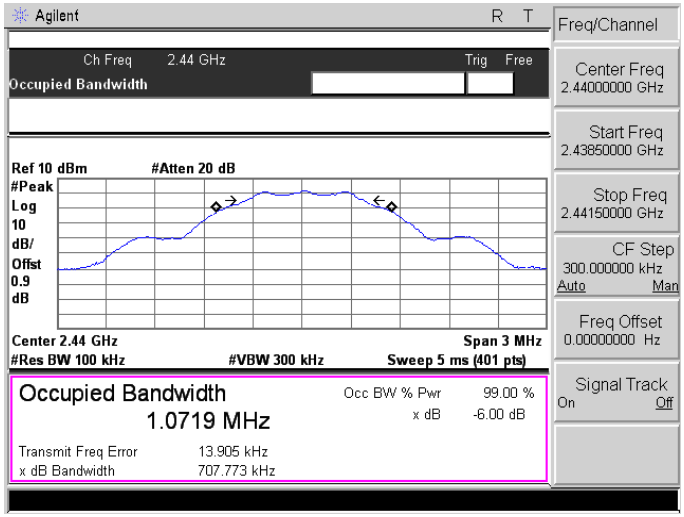
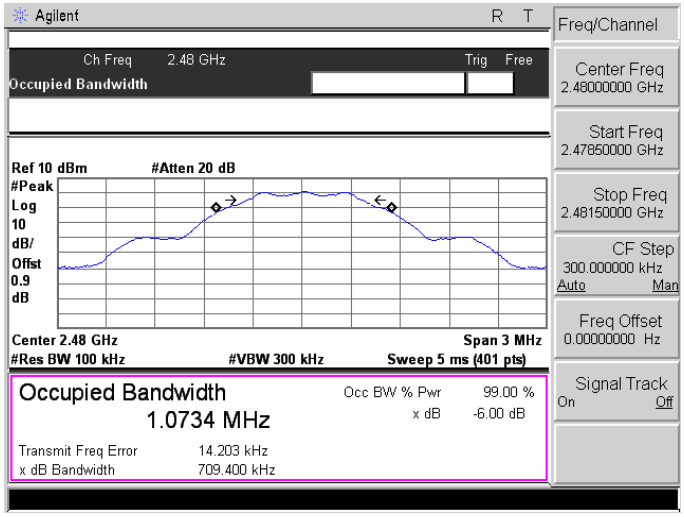
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-0	
2422	
2437	
2452	

Mode 2: IEEE 802.11b Link Mode_ANT-1	
2412	
2437	
2462	

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	

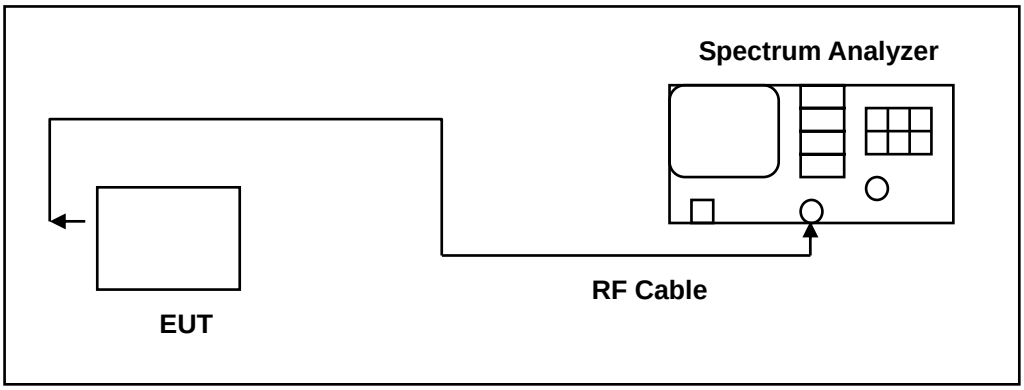
Mode 6: Bluetooth v4.0 LE Link Mode	
2402	
2440	
2480	

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	12/16/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	03/03/2014	(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	ONYX-1521DTT-C1-1010			
Test Item	Maximum Power Density			
Test Mode	Mode 2: IEEE 802.11b Link Mode			
Date of Test	02/11/2015		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT-0	ANT-1	ANT-0+1	
2412	-5.975	-7.114	-3.497	< 8
2437	-6.828	-7.810	-4.281	< 8
2462	-7.127	-8.283	-4.656	< 8

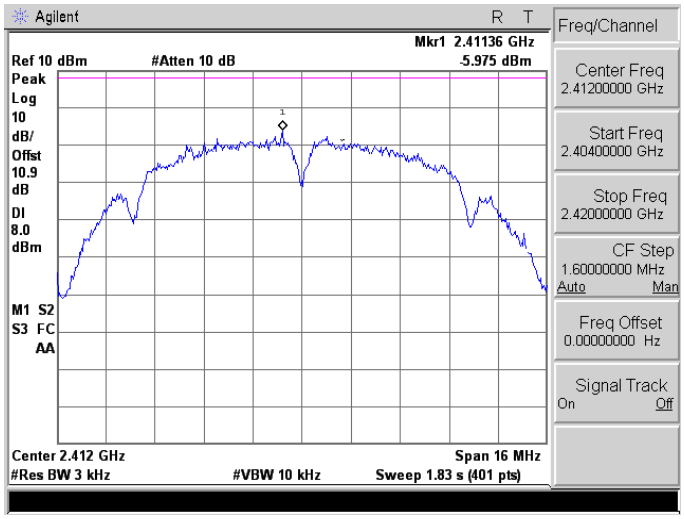
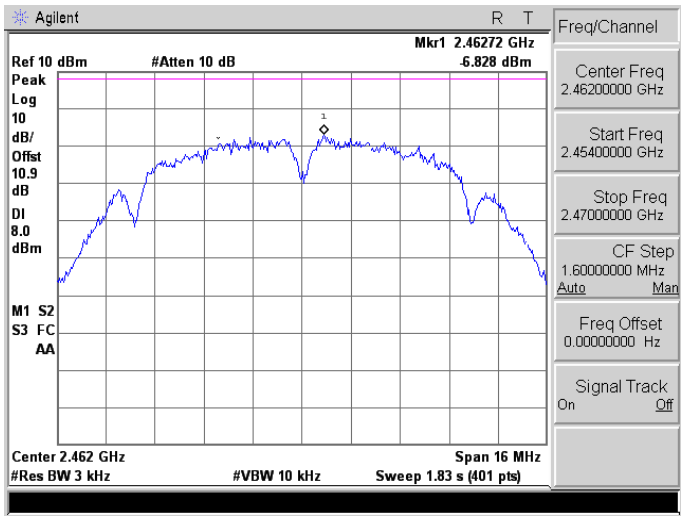
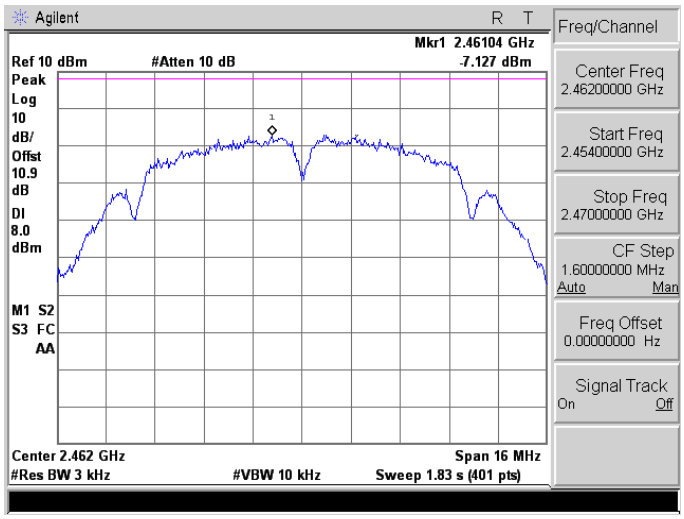
Model Number	ONYX-1521DTT-C1-1010			
Test Item	Maximum Power Density			
Test Mode	Mode 3: IEEE 802.11g Link Mode			
Date of Test	02/11/2015		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT-0	ANT-1	ANT-0+1	
2412	-10.780	-10.730	-7.745	< 8
2437	-11.190	-12.280	-8.691	< 8
2462	-11.410	-11.640	-8.513	< 8

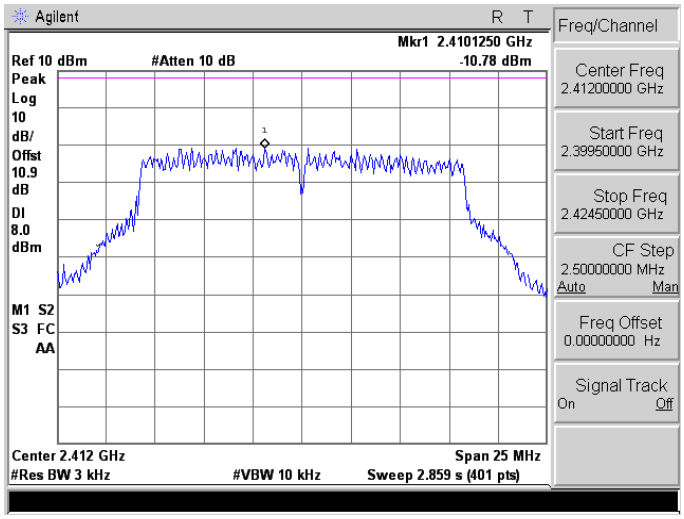
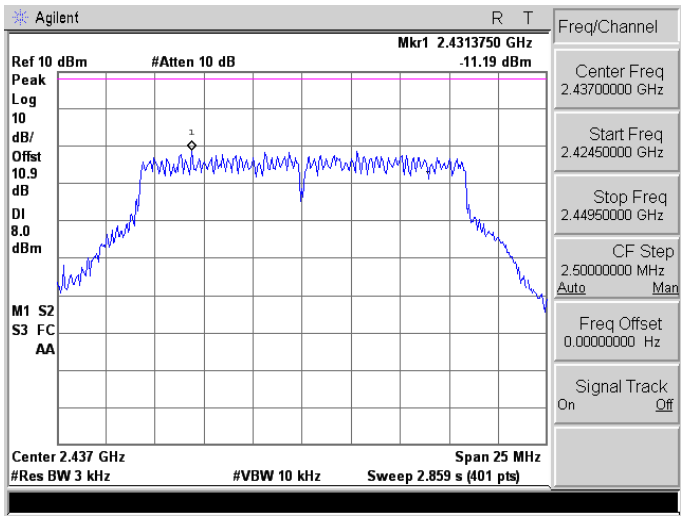
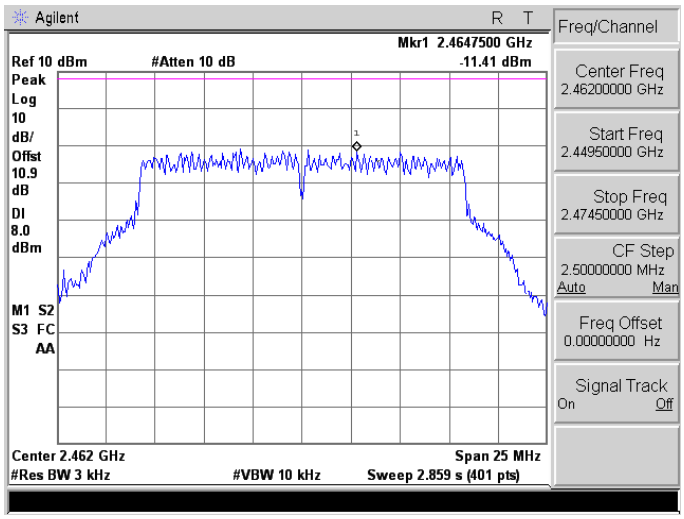
Model Number	ONYX-1521DTT-C1-1010			
Test Item	Maximum Power Density			
Test Mode	Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode			
Date of Test	02/11/2015		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT-0	ANT-1	ANT-0+1	
2412	-12.140	-12.480	-9.296	< 8
2437	-13.380	-13.380	-10.370	< 8
2462	-12.740	-13.620	-10.147	< 8

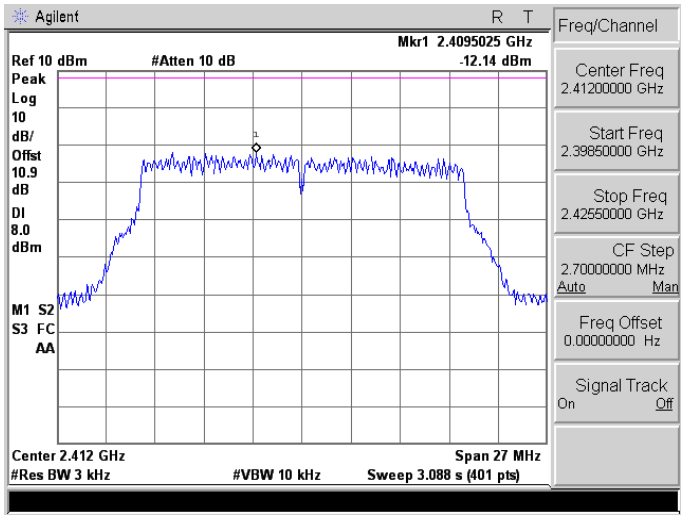
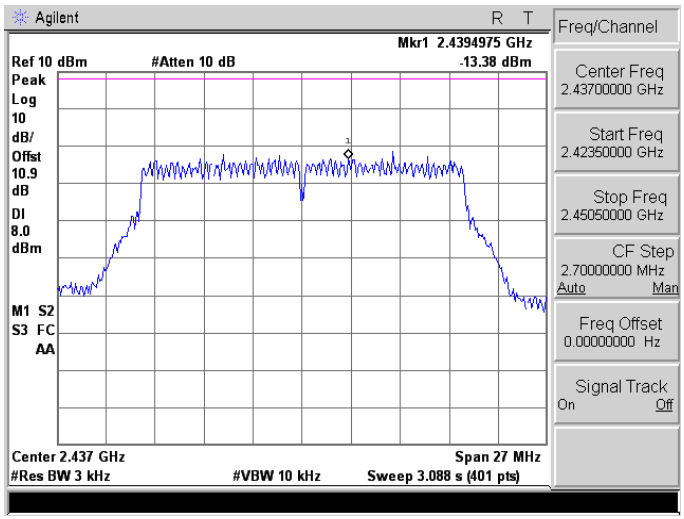
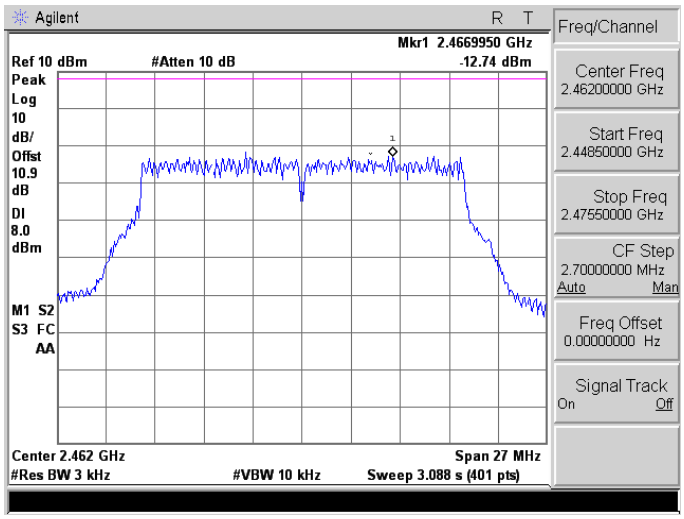
Model Number	ONYX-1521DTT-C1-1010			
Test Item	Maximum Power Density			
Test Mode	Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode			
Date of Test	02/11/2015		Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)			Limit (dBm)
	ANT-0	ANT-1	ANT-0+1	
2422	-17.760	-15.240	-13.309	< 8
2437	-18.870	-22.040	-17.162	< 8
2452	-19.070	-22.690	-17.503	< 8

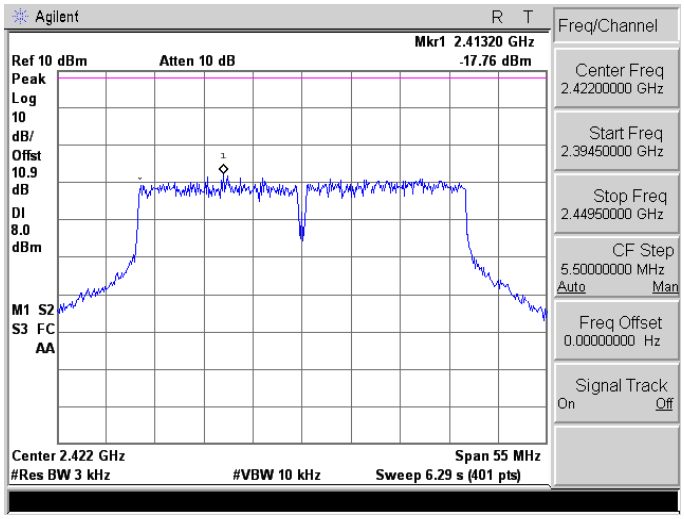
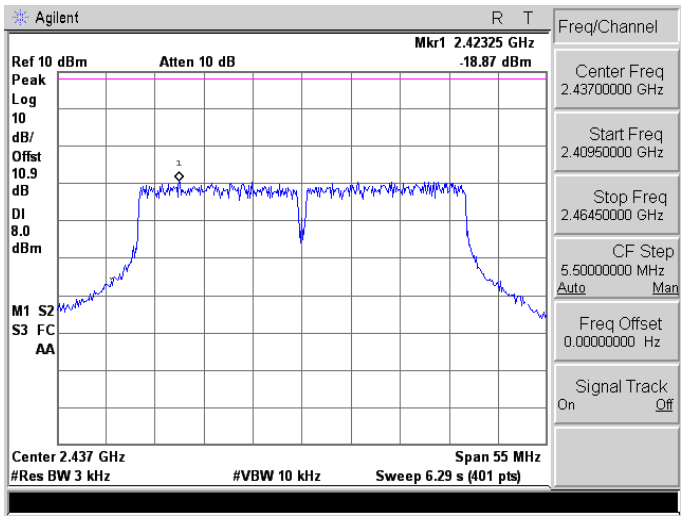
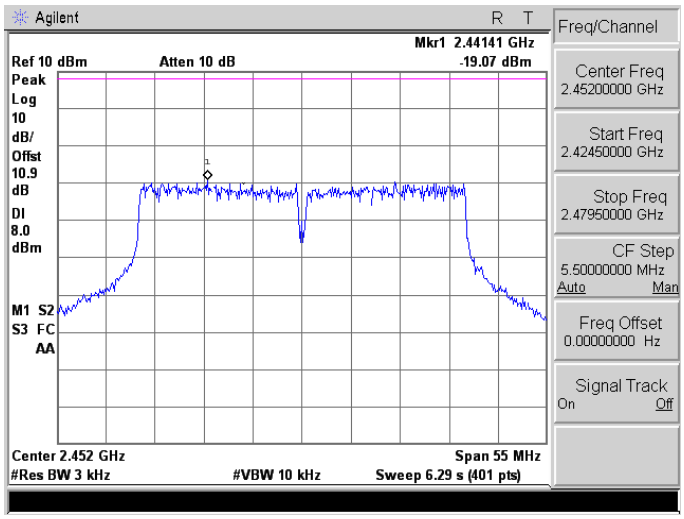
Model Number	ONYX-1521DTT-C1-1010		
Test Item	Maximum Power Density		
Test Mode	Mode 6: Bluetooth v4.0 LE Link Mode		
Date of Test	02/01/2015	Test Site	TE05
Frequency (MHz)	Reading (dBm/3KHz)		Limit (dBm)
2402	-8.838		< 8
2440	-8.274		< 8
2480	-8.900		< 8

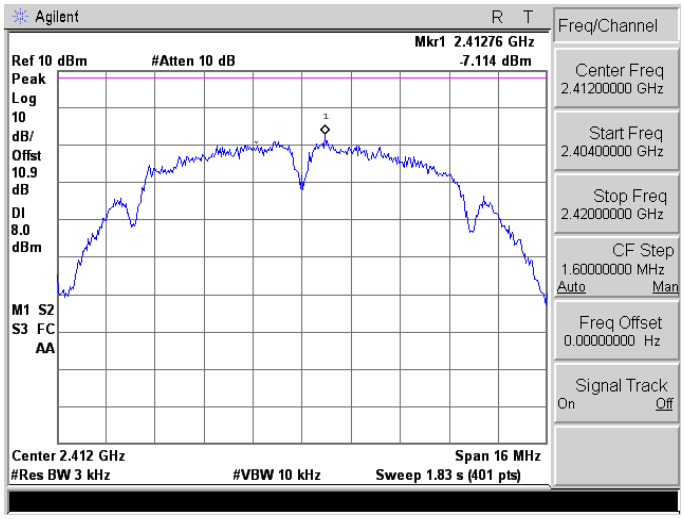
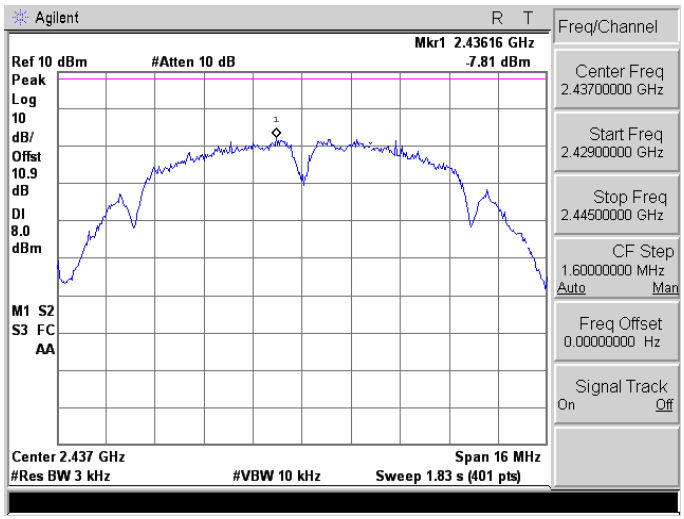
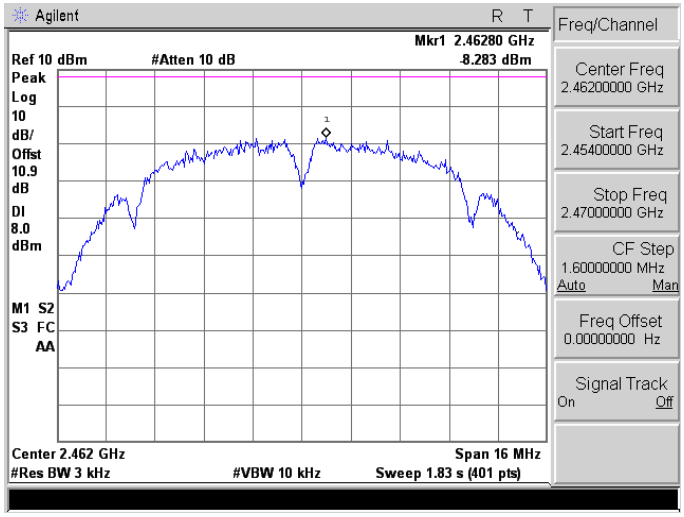
8.6. Test Graphs

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 2: IEEE 802.11b Link Mode_ANT-1	
2412	
2437	
2462	

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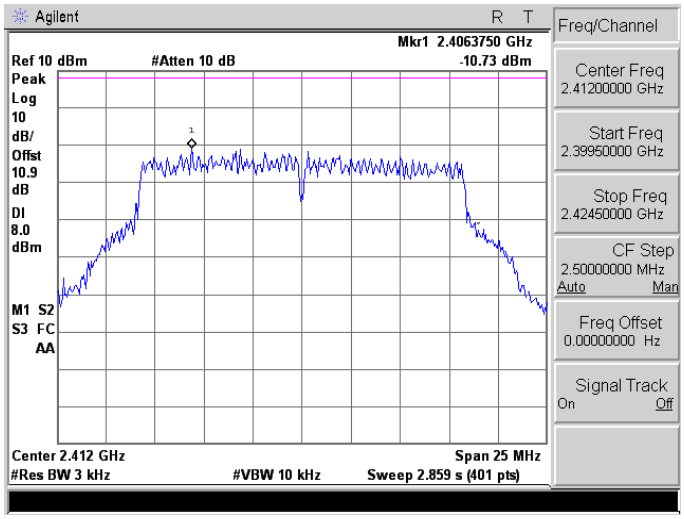
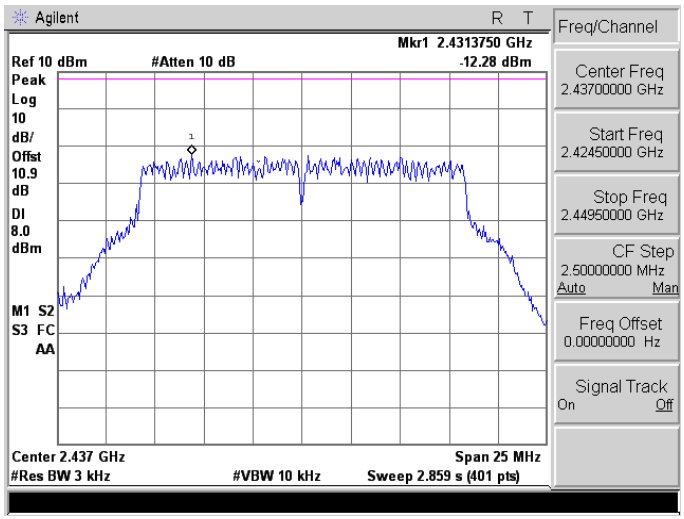
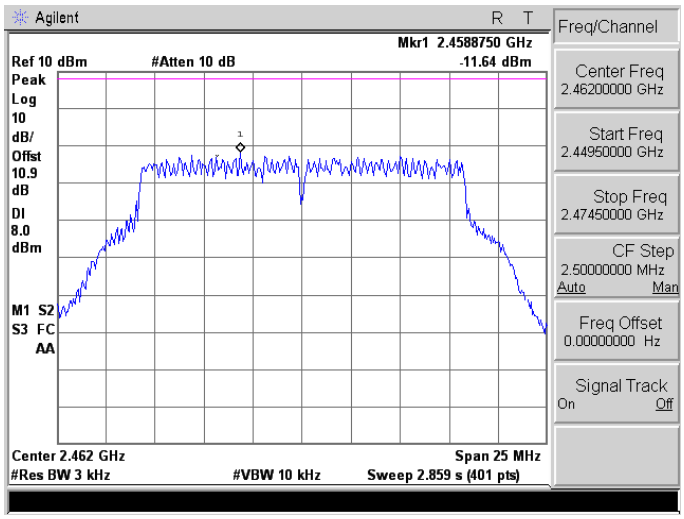
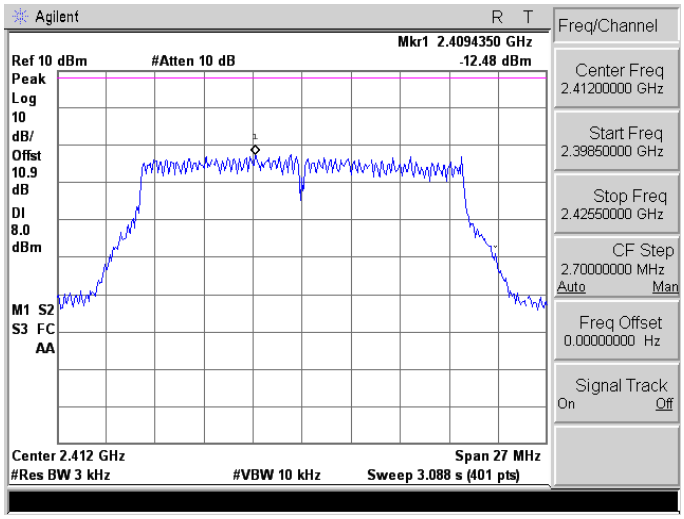
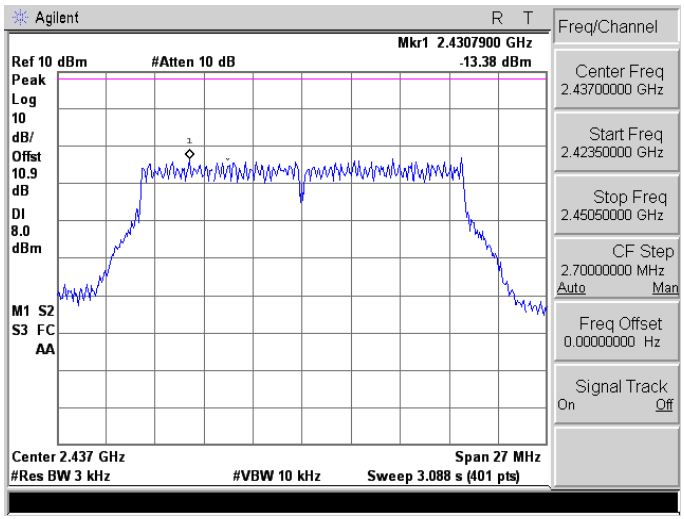
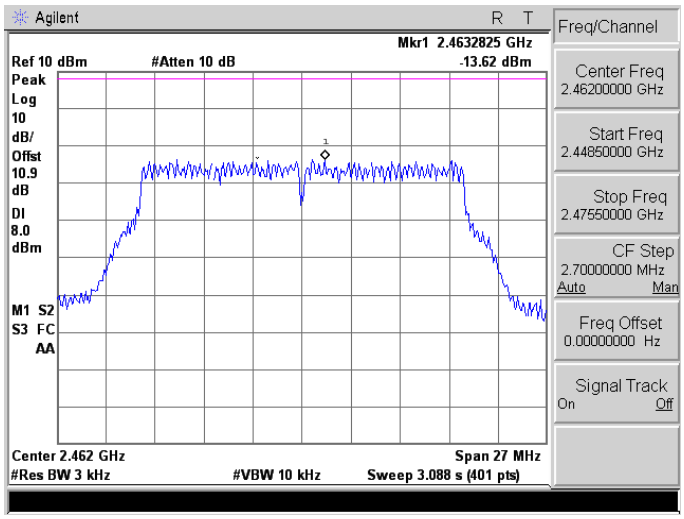
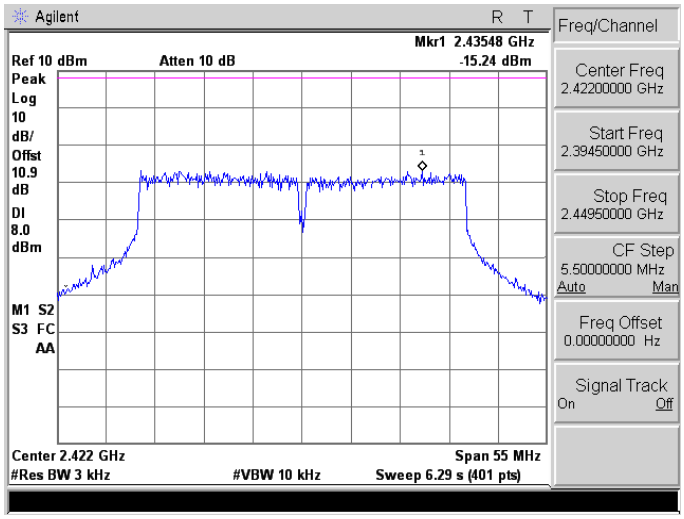
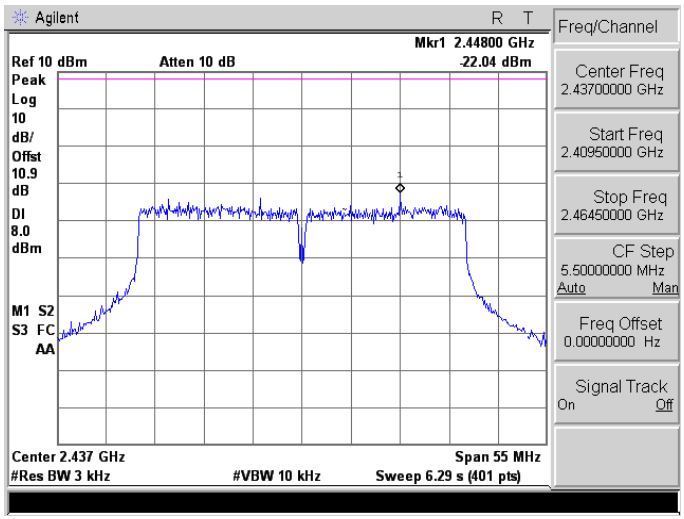
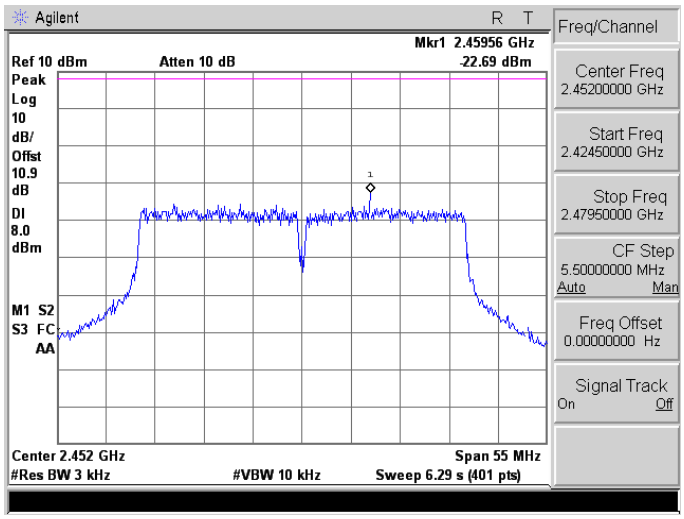
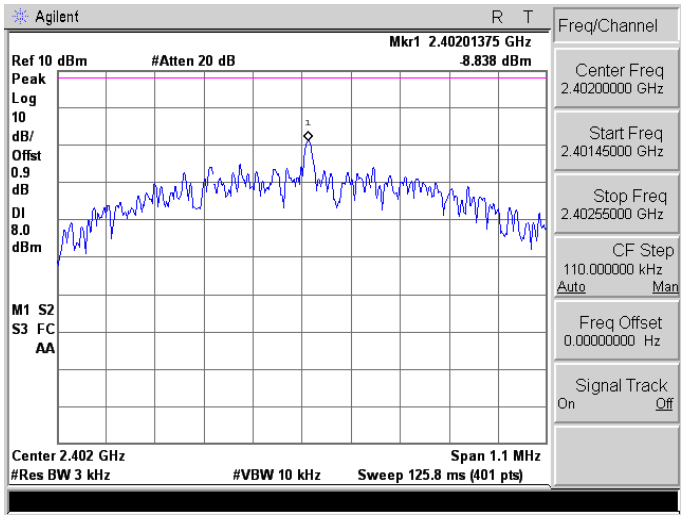
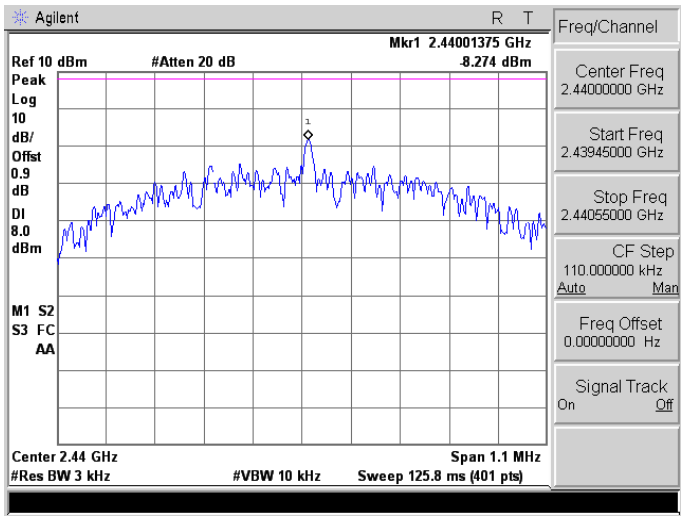
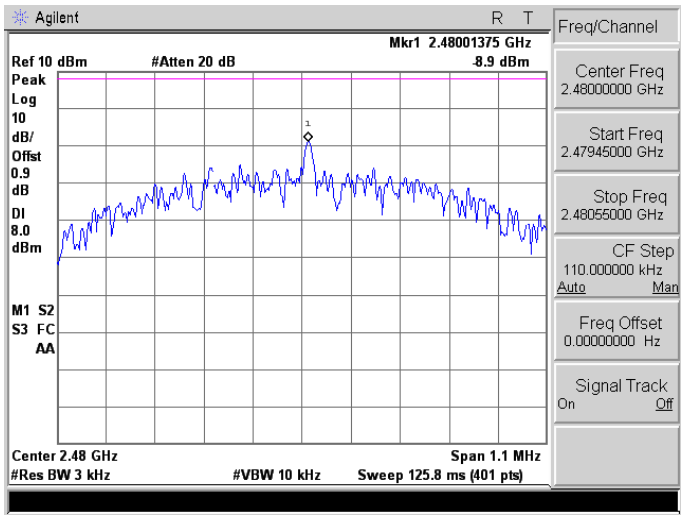
2412	
2437	
2462	

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	

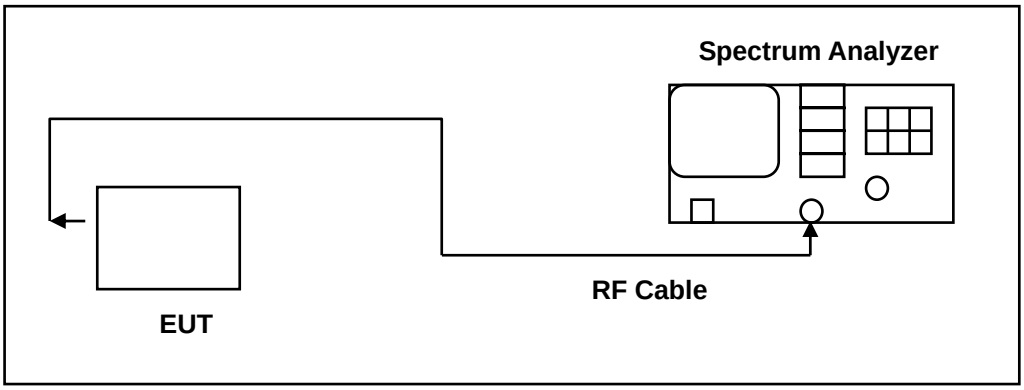
Mode 6: Bluetooth v4.0 LE Link Mode	
2402	
2440	
2480	

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	12/16/2014	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/24/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	03/03/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

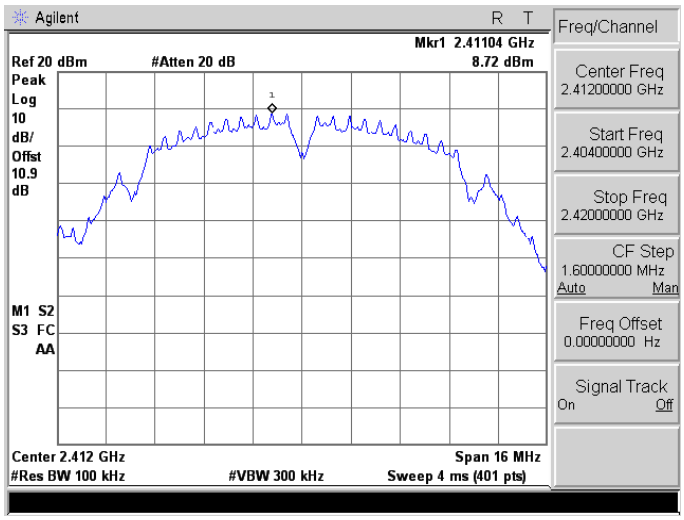
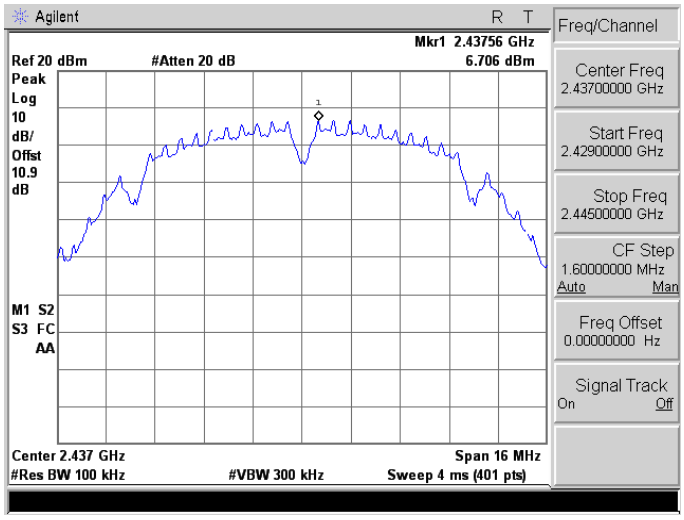
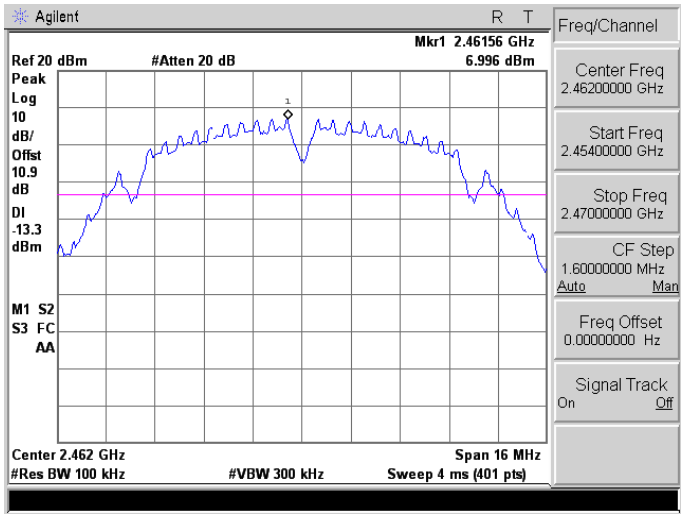
Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.
Note: N.C.R. = No Calibration Request.

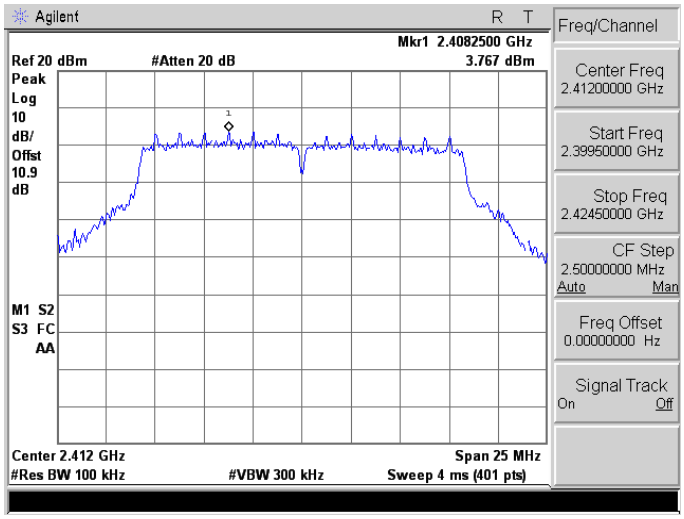
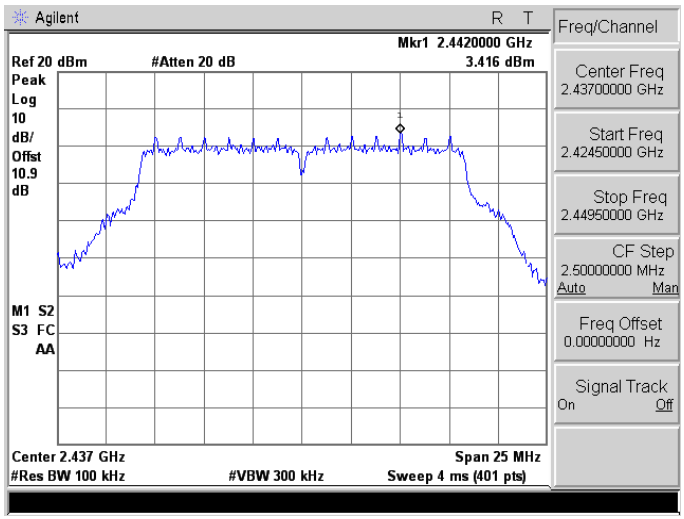
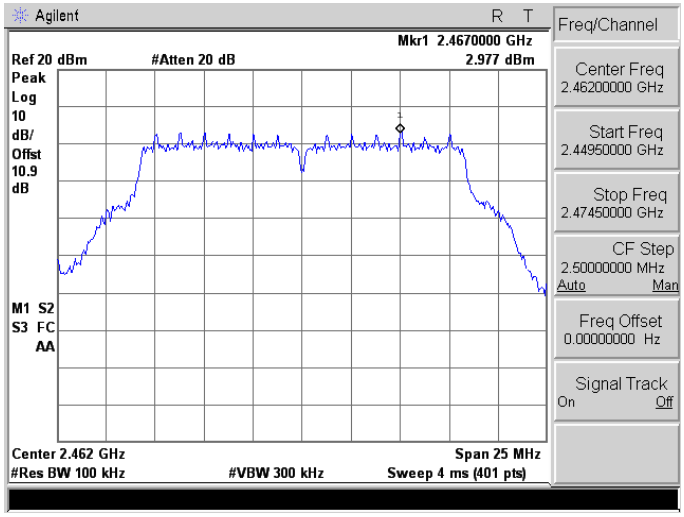
9.4. Test Procedure

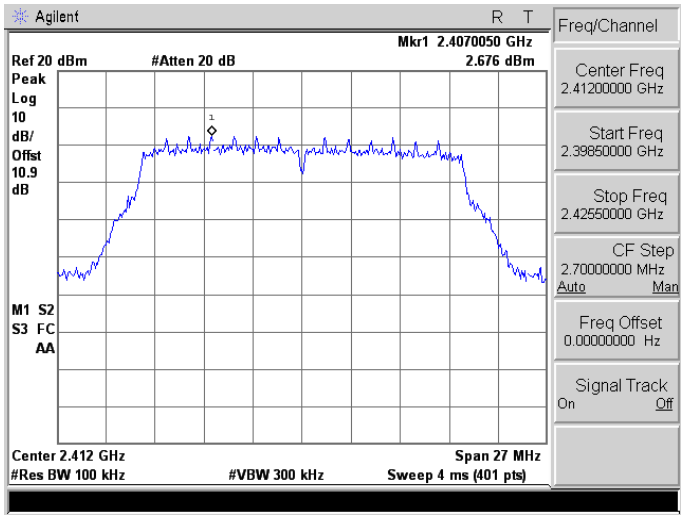
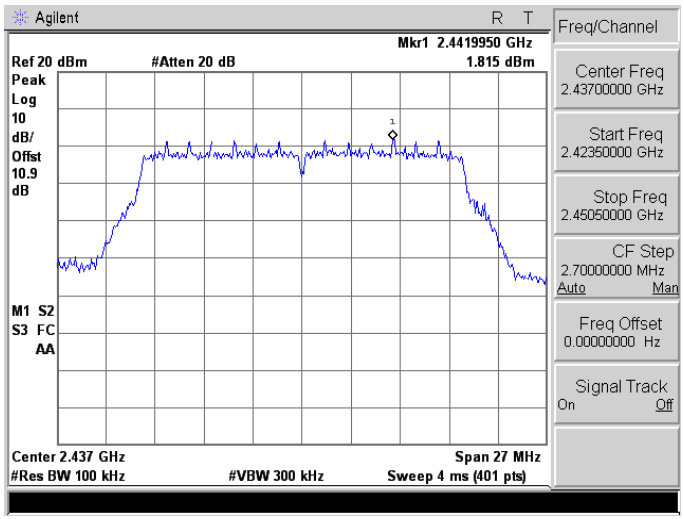
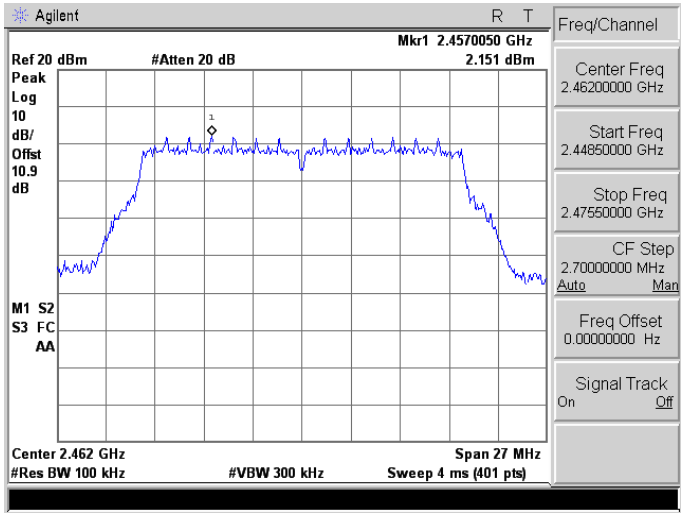
In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly 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.

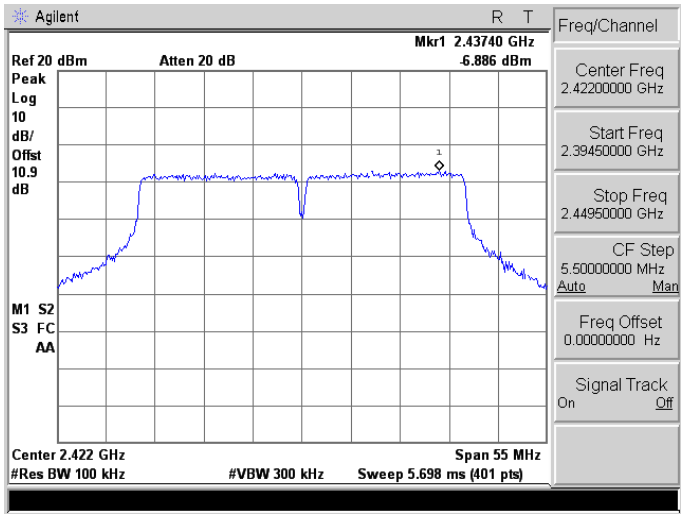
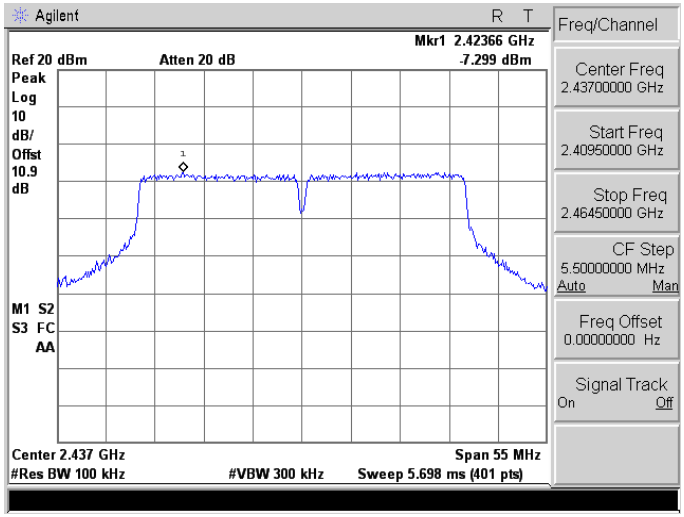
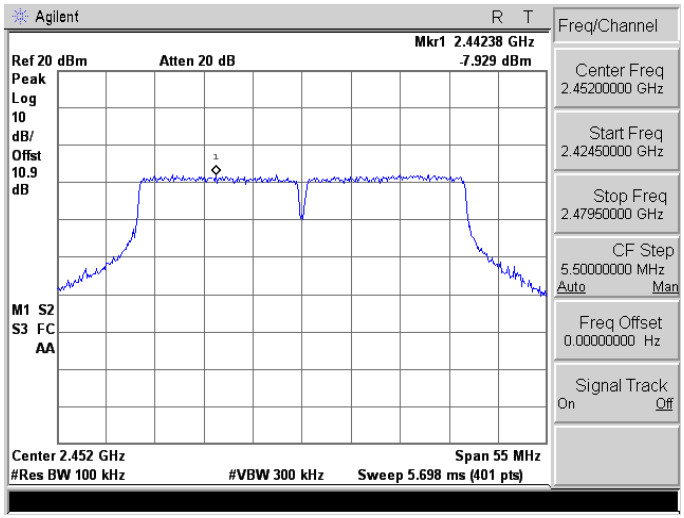
9.5. Test Graphs

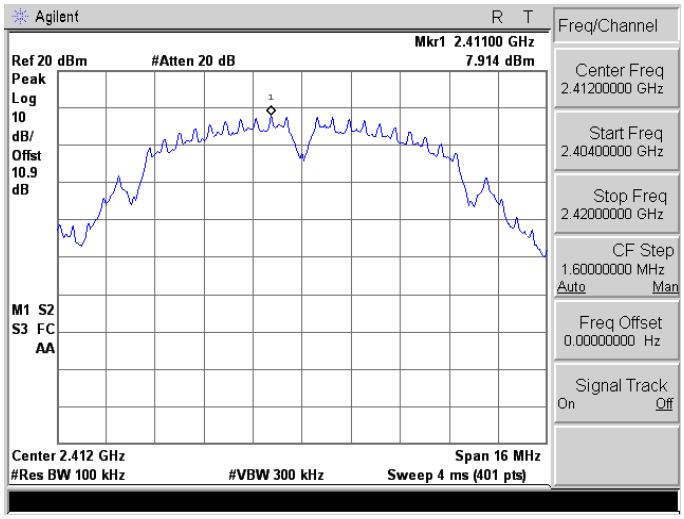
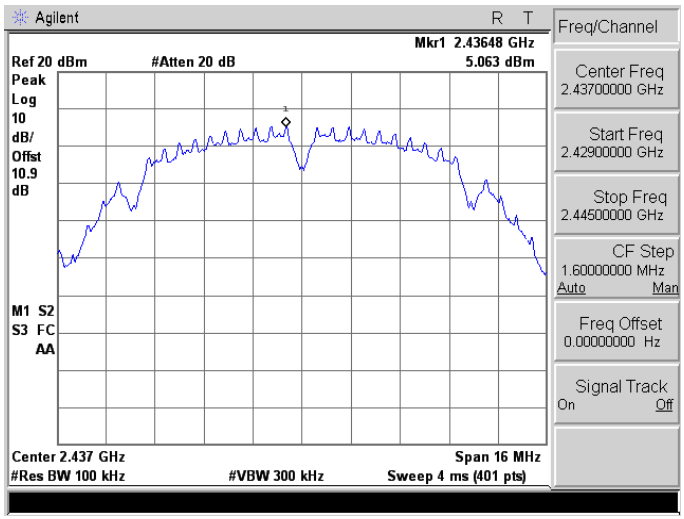
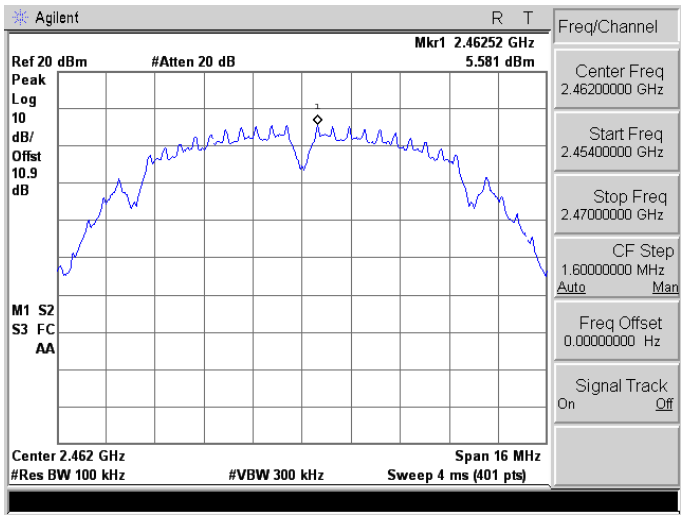
Reference level

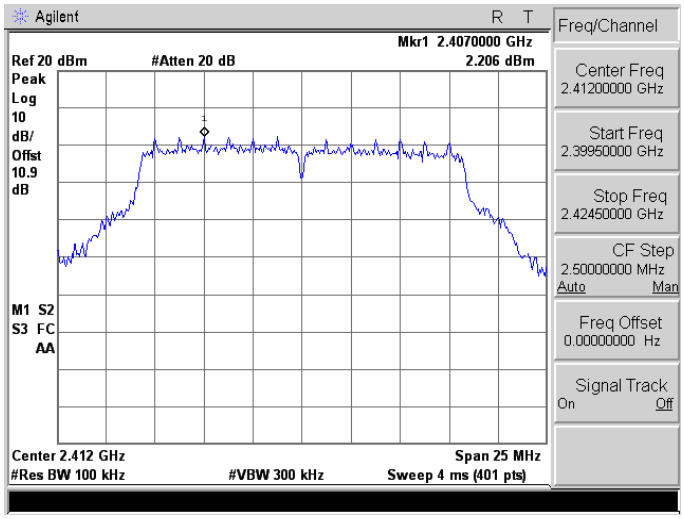
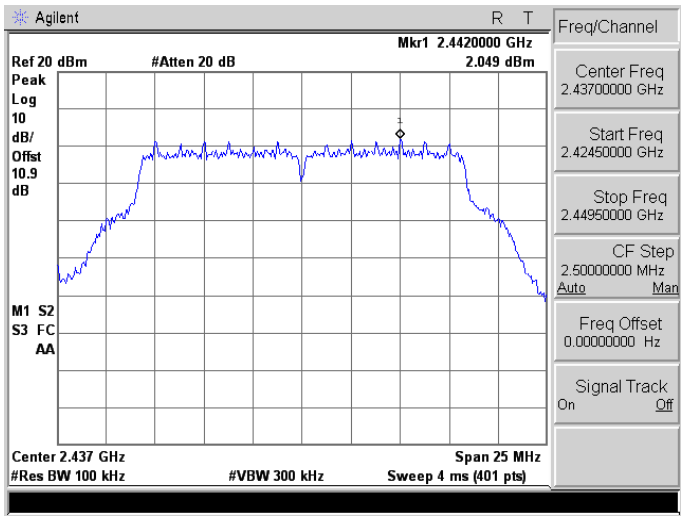
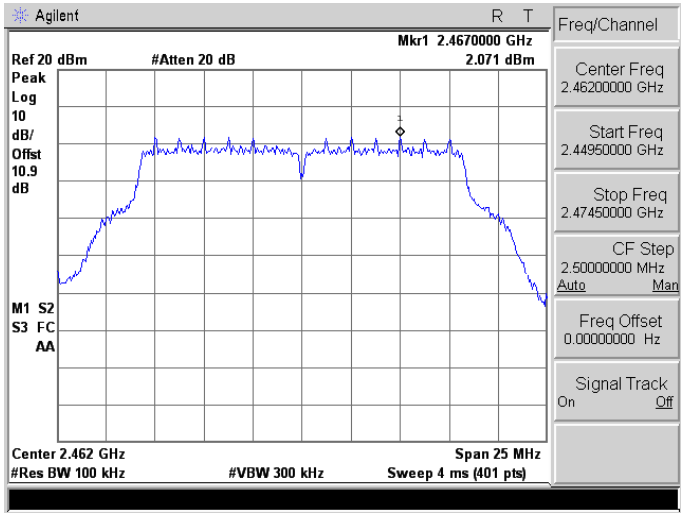
Mode 2: IEEE 802.11b Link Mode_ANT-0	
2412	
2437	
2462	

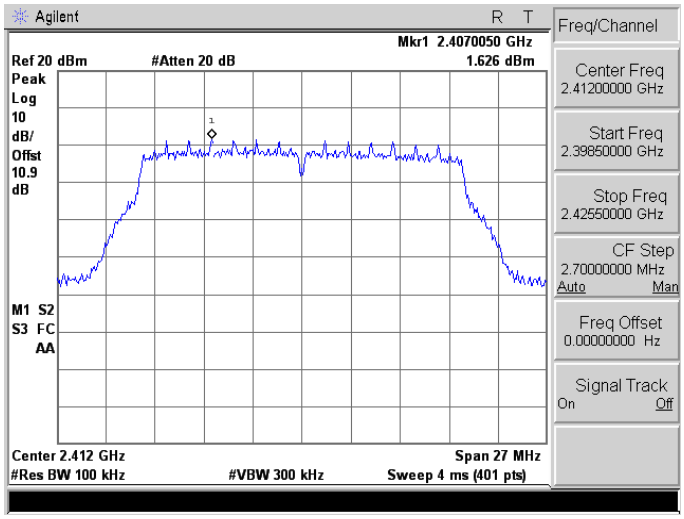
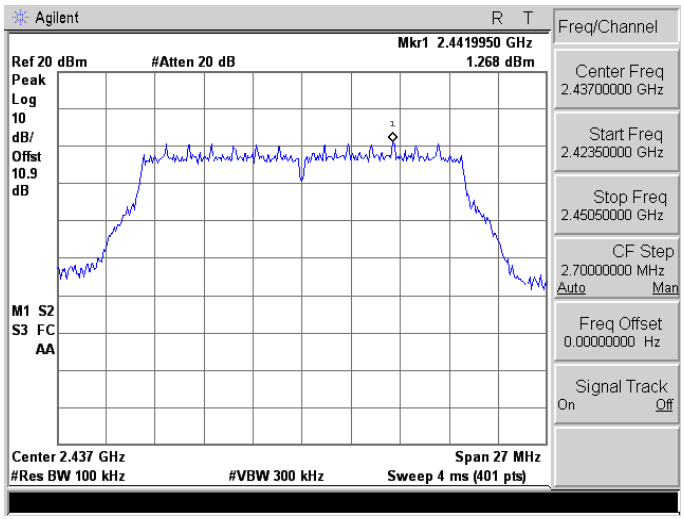
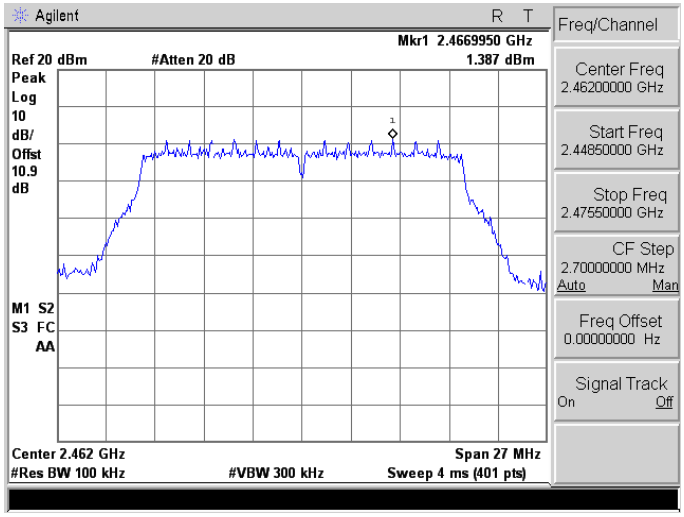
Mode 3: IEEE 802.11g Link Mode_ANT-0	
2412	
2437	
2462	

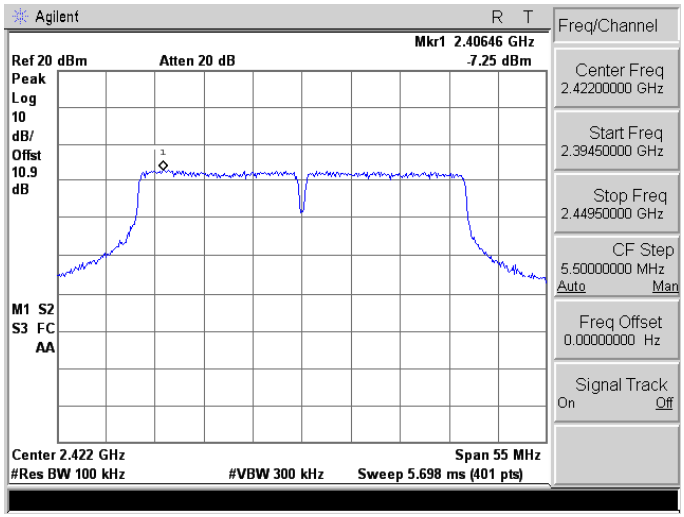
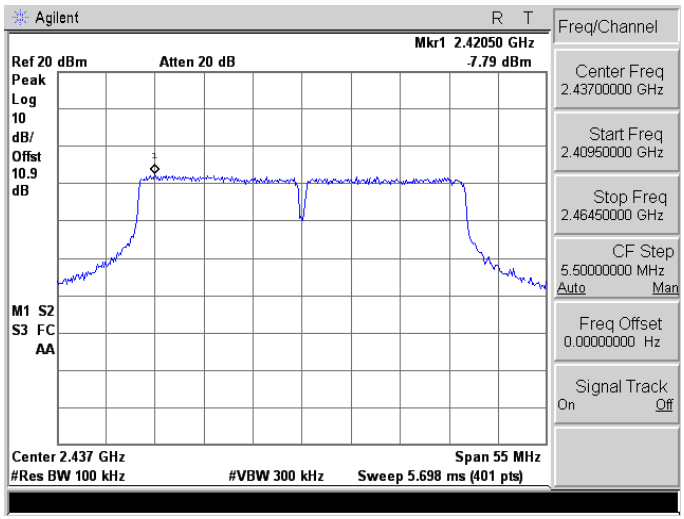
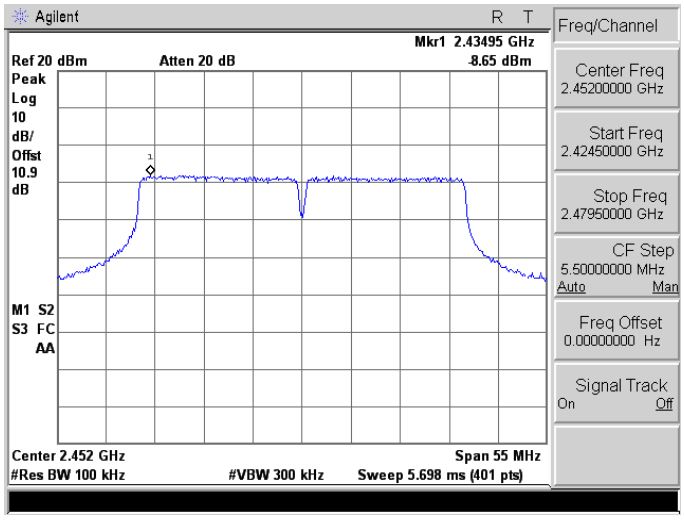
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-0	
2412	
2437	
2462	

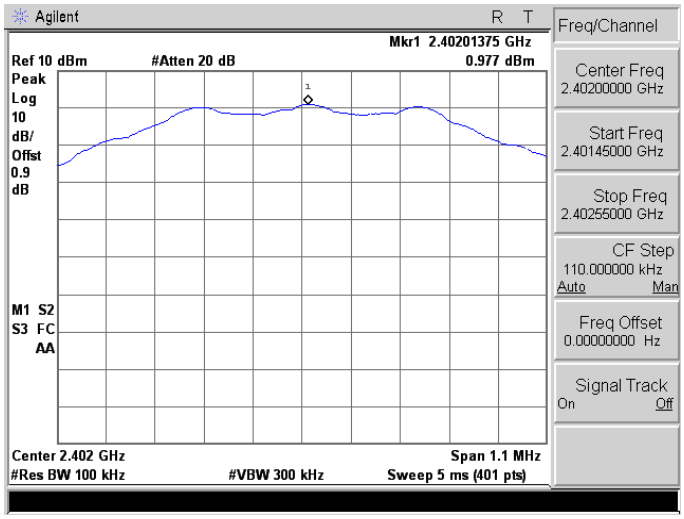
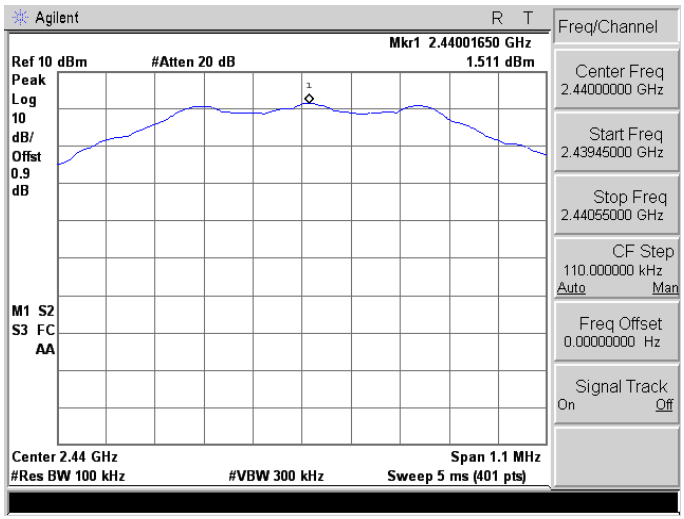
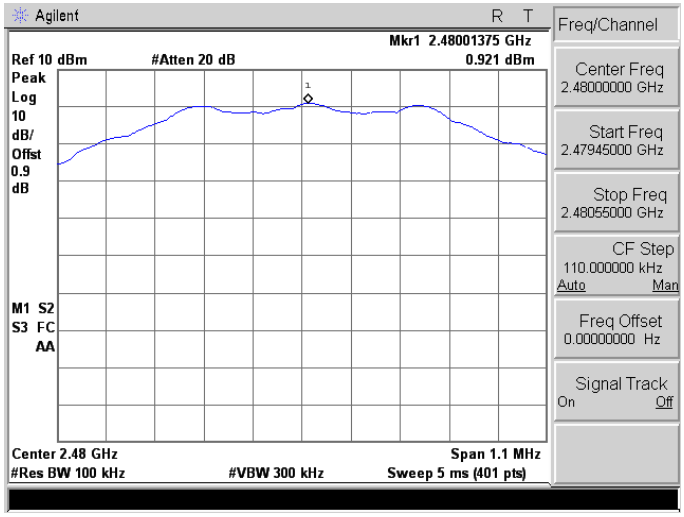
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-0	
2422	
2437	
2452	

Mode 2: IEEE 802.11b Link Mode_ANT-1	
2412	
2437	
2462	

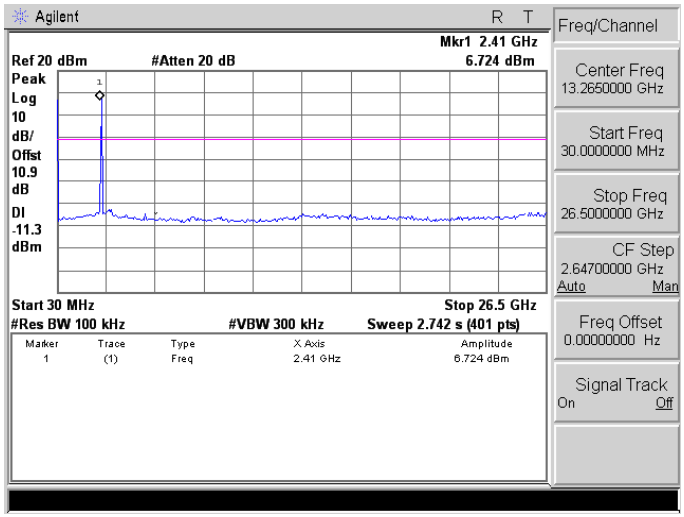
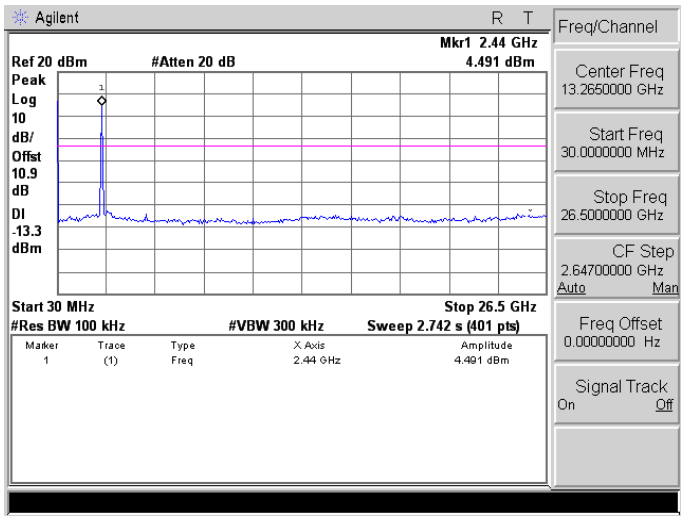
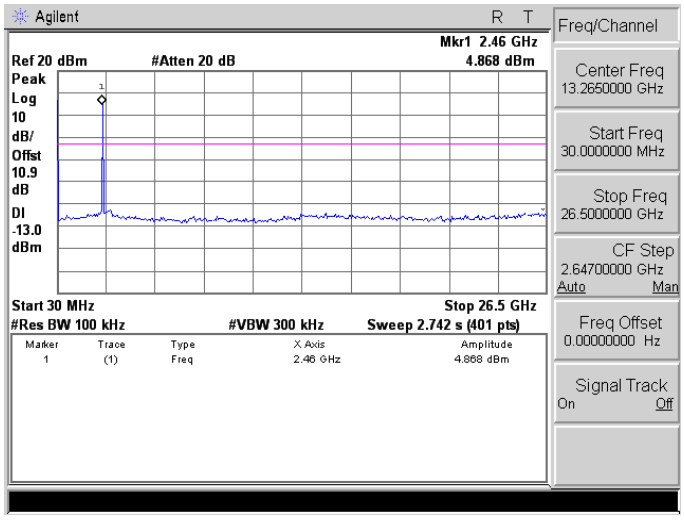
Mode 3: IEEE 802.11g Link Mode_ANT-1	
2412	
2437	
2462	

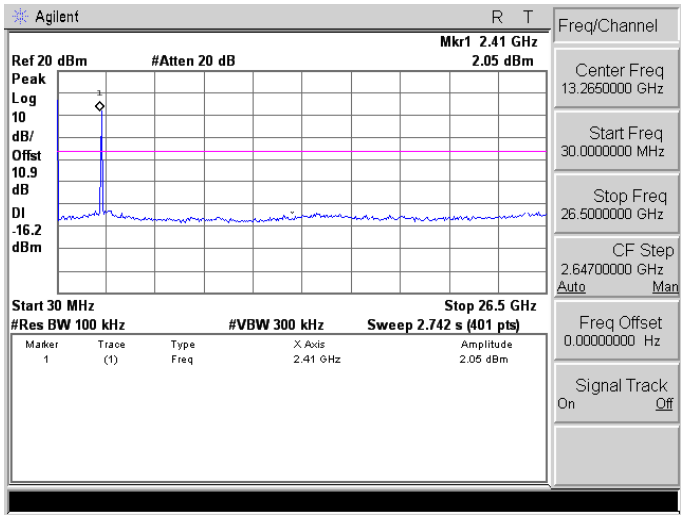
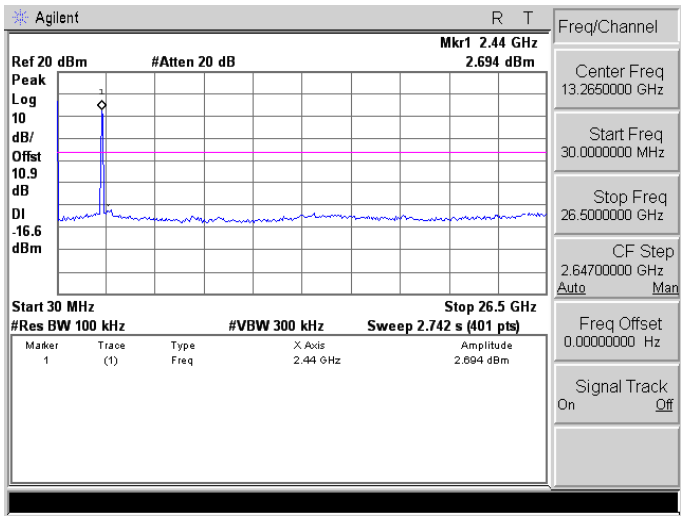
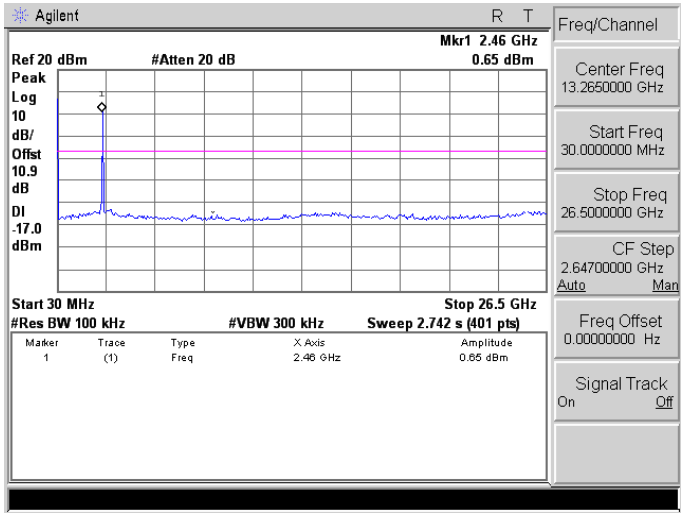
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-1	
2412	
2437	
2462	

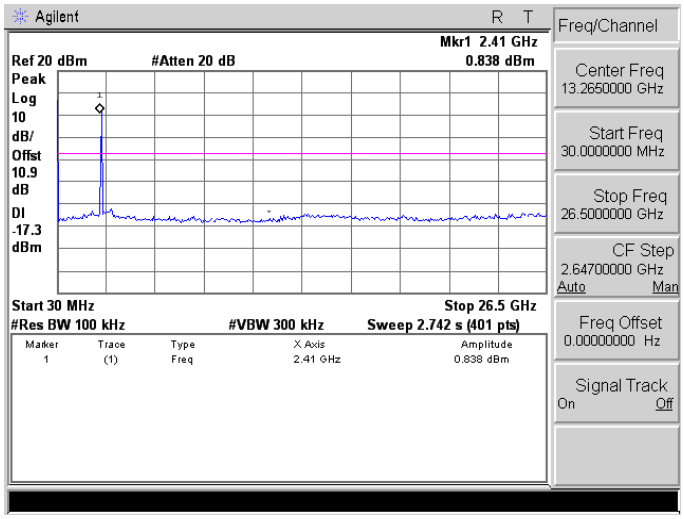
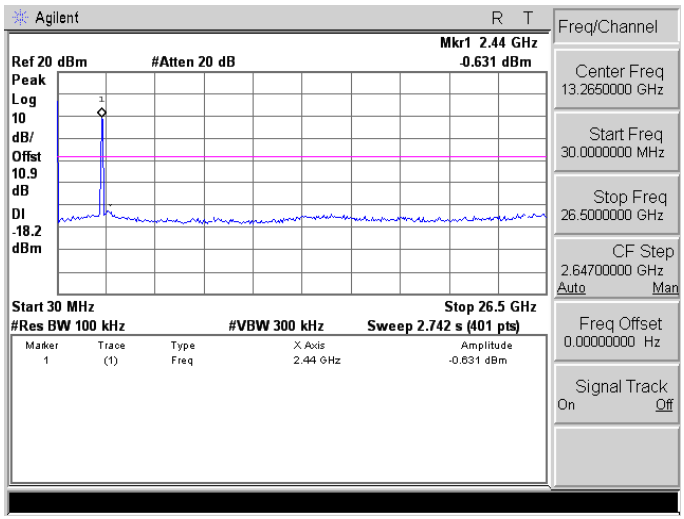
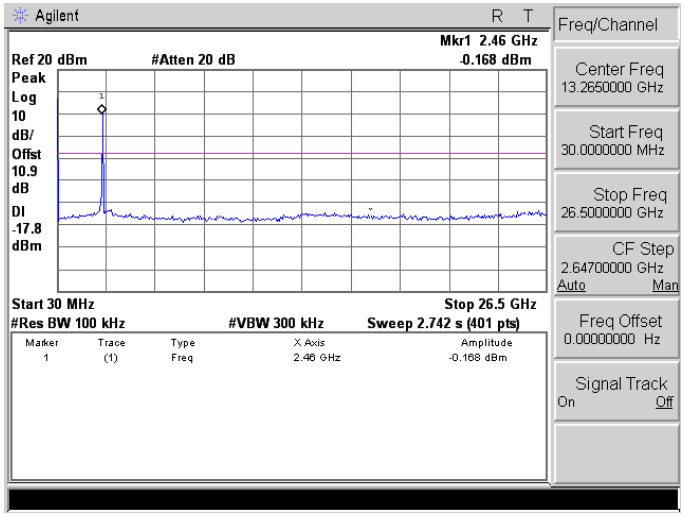
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-1	
2422	
2437	
2452	

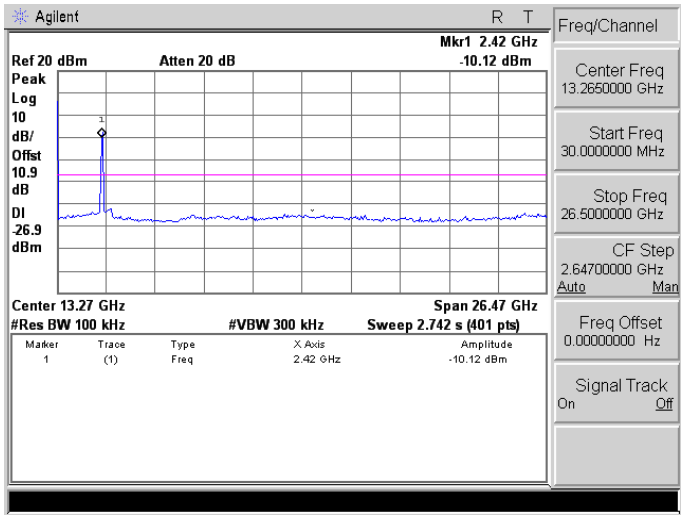
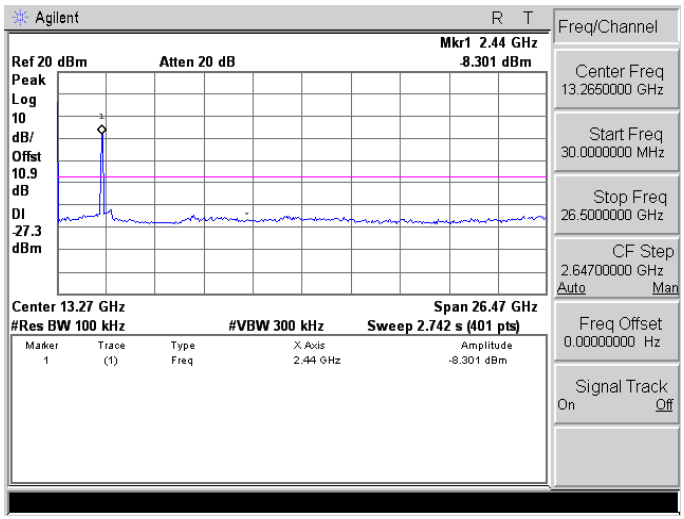
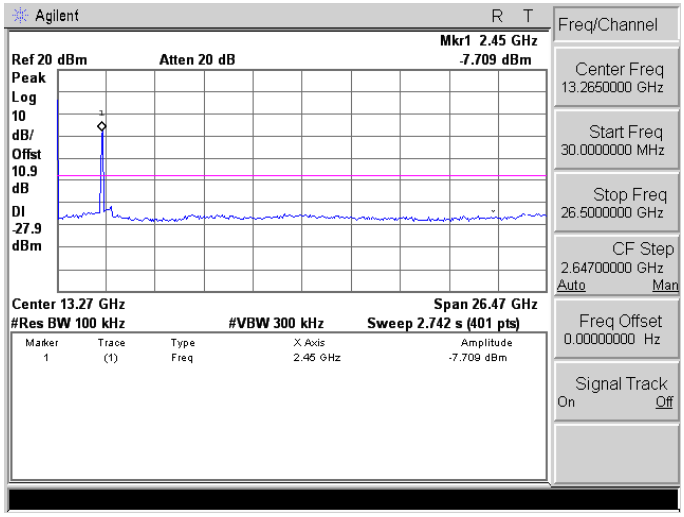
Mode 6: Bluetooth v4.0 LE Link Mode	
2402	
2440	
2480	

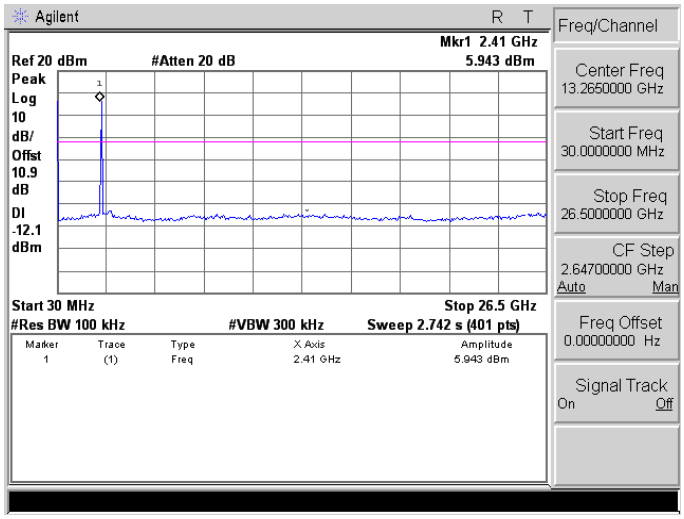
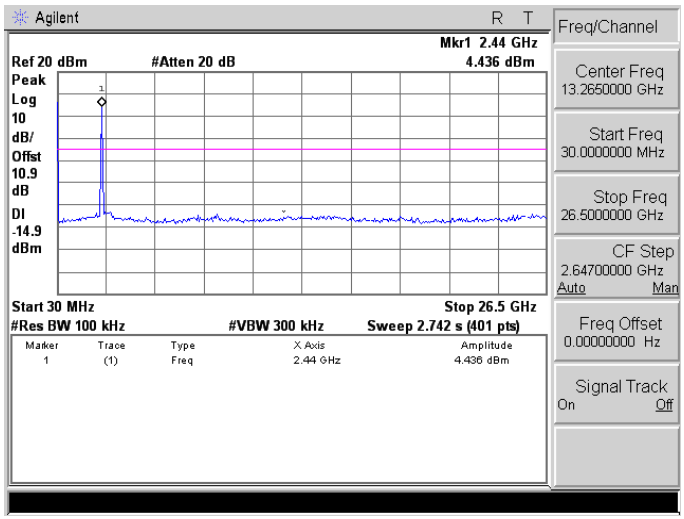
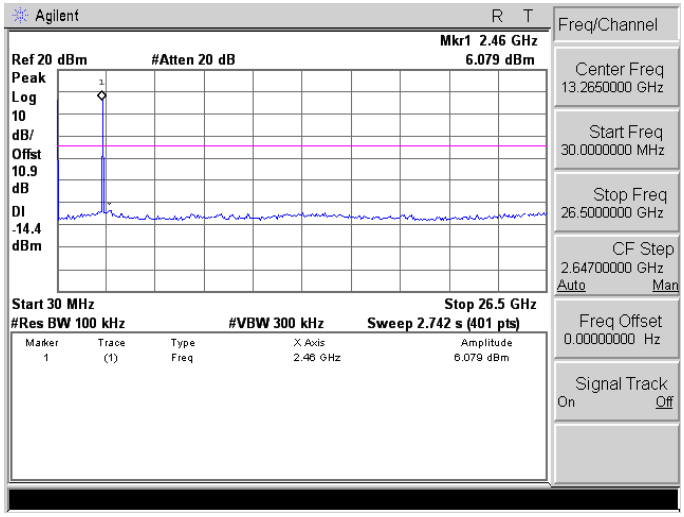
Out of Band Conducted Emissions

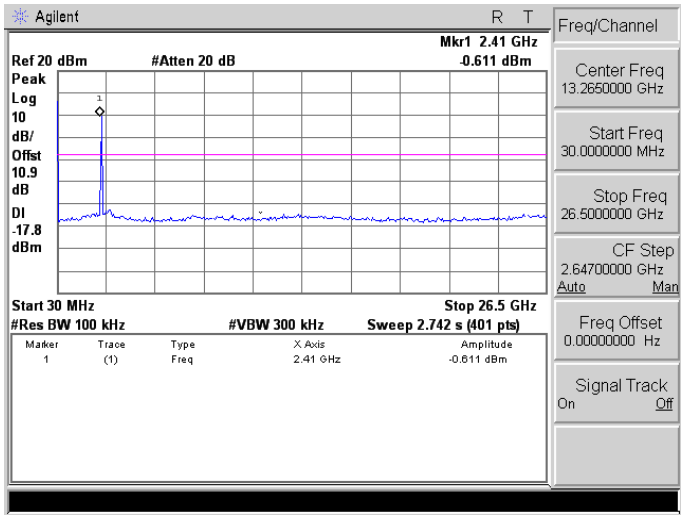
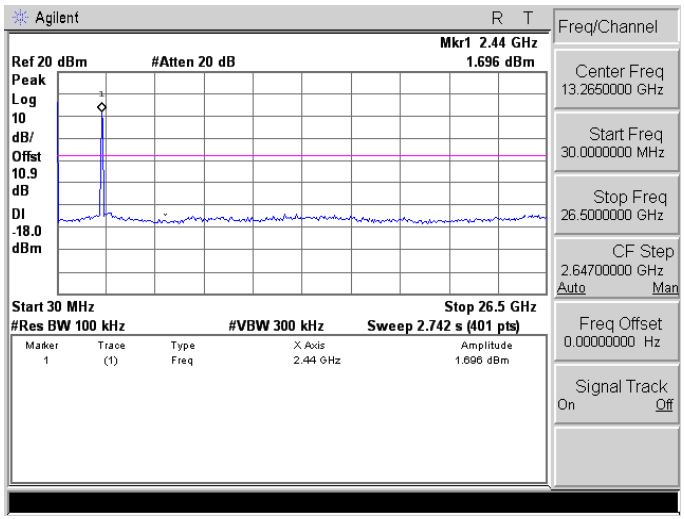
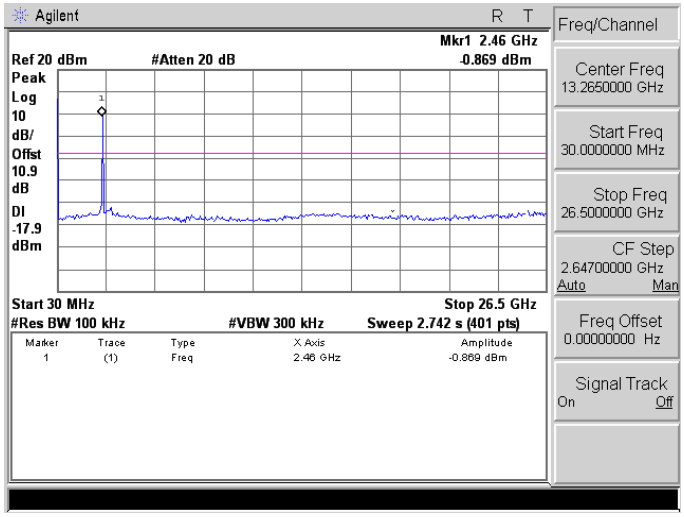
Mode 2: IEEE 802.11b Link Mode_ANT-0	
2412	
2437	
2462	

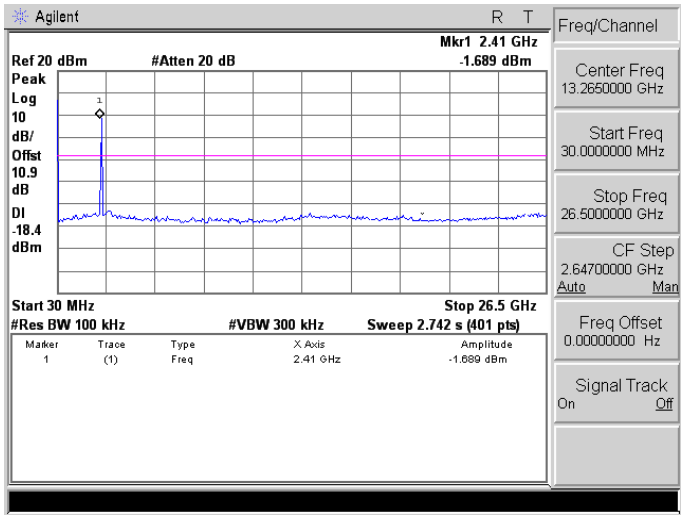
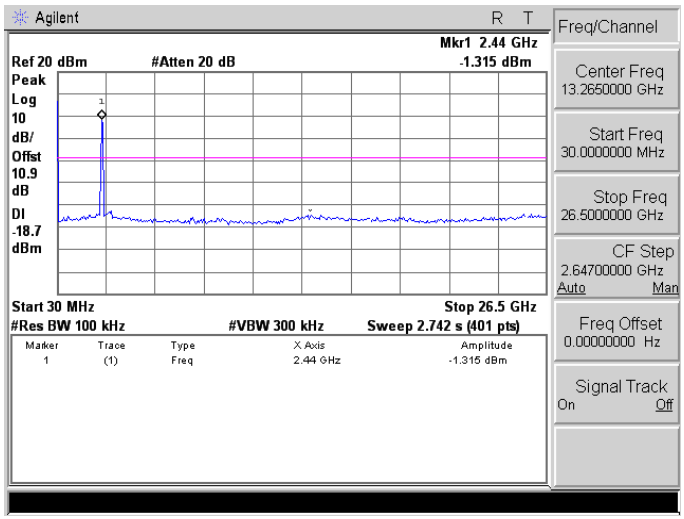
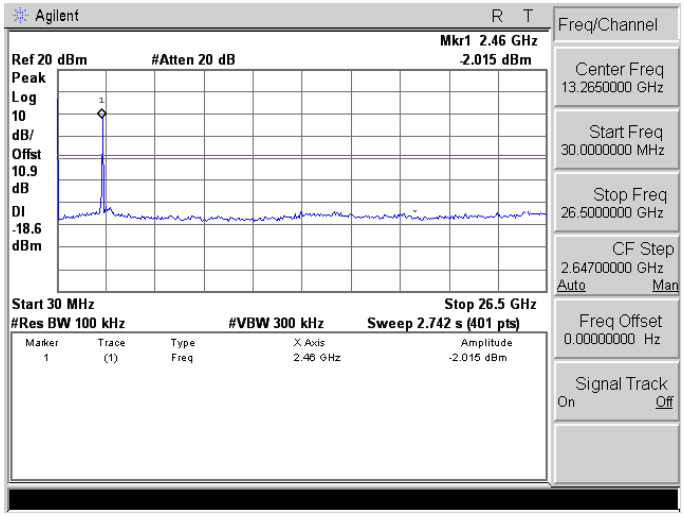
Mode 3: IEEE 802.11g Link Mode_ANT-0	
2412	
2437	
2462	

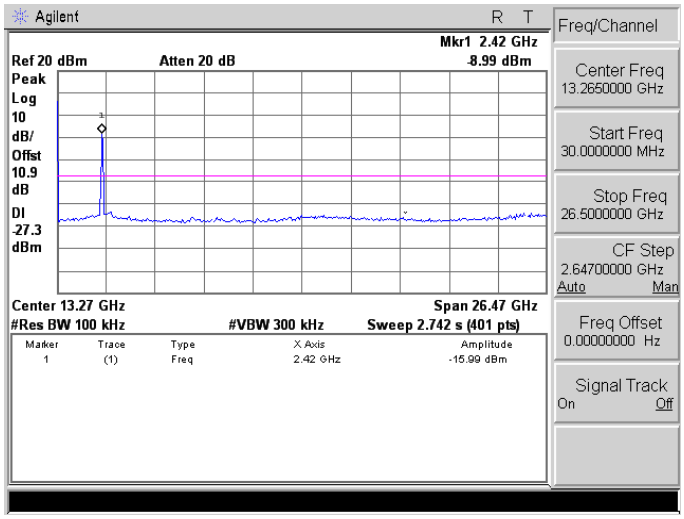
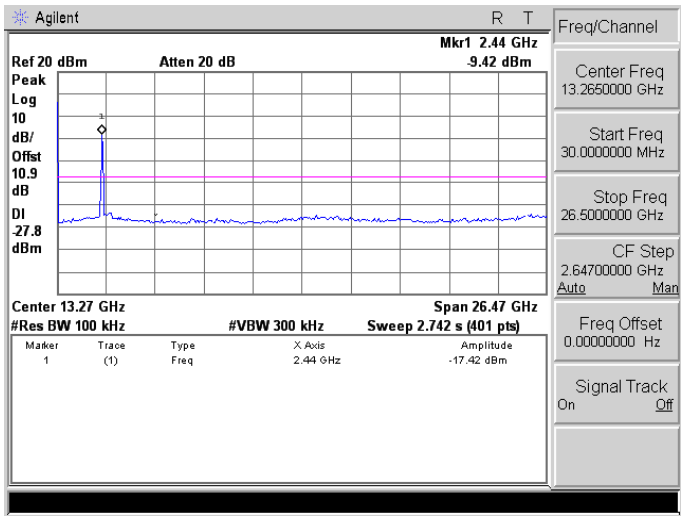
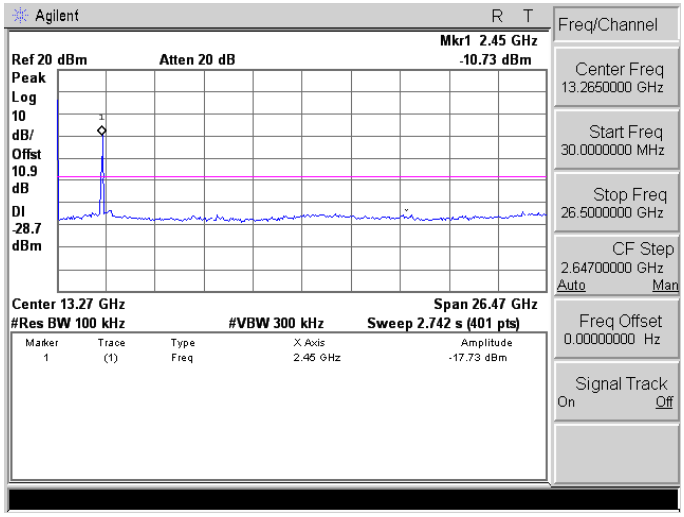
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-0	
2412	
2437	
2462	

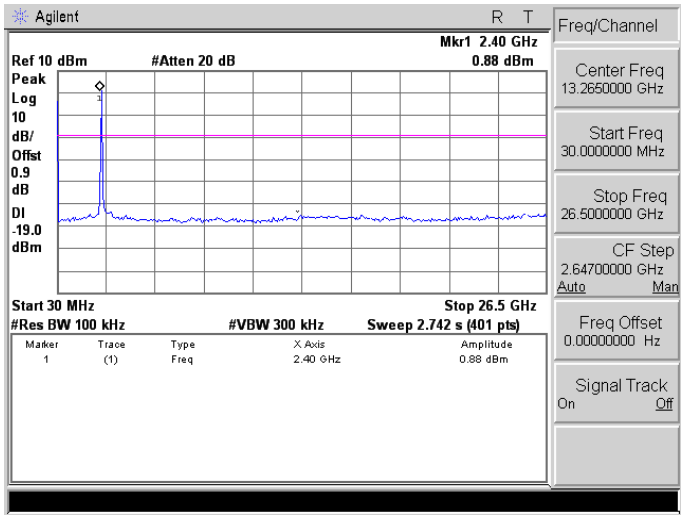
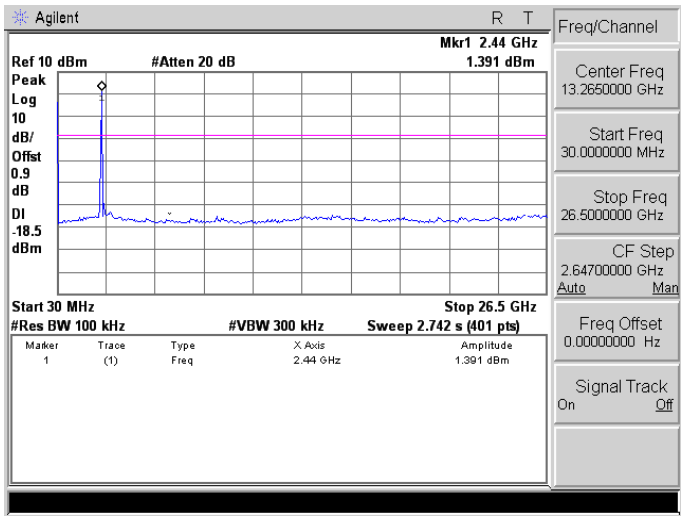
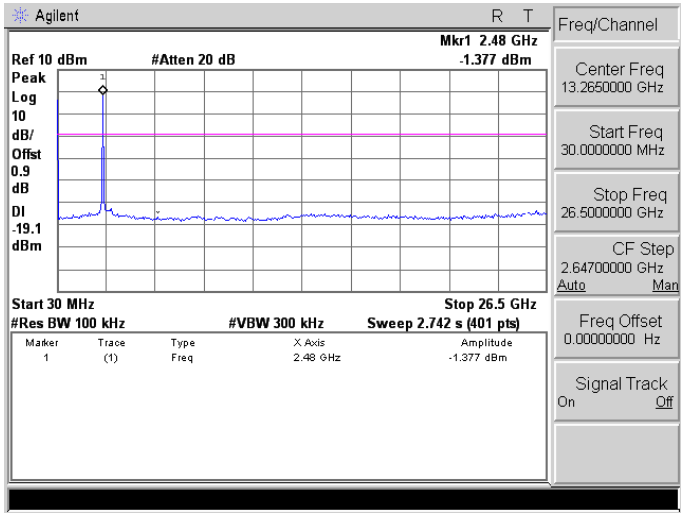
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-0	
2422	
2437	
2452	

Mode 2: IEEE 802.11b Link Mode_ANT-1	
2412	
2437	
2462	

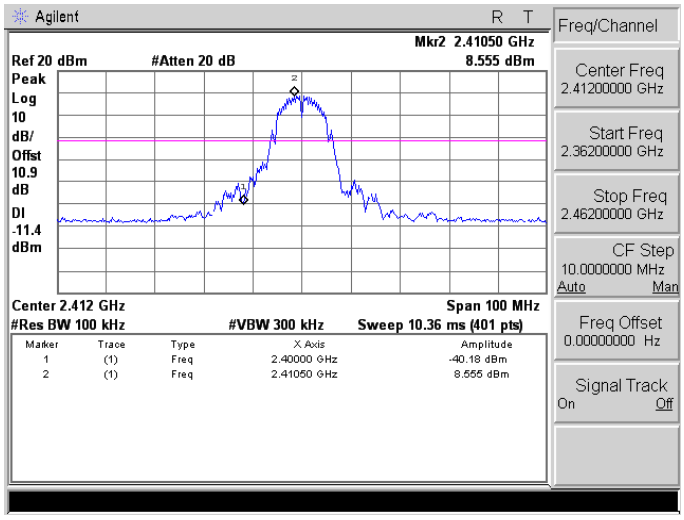
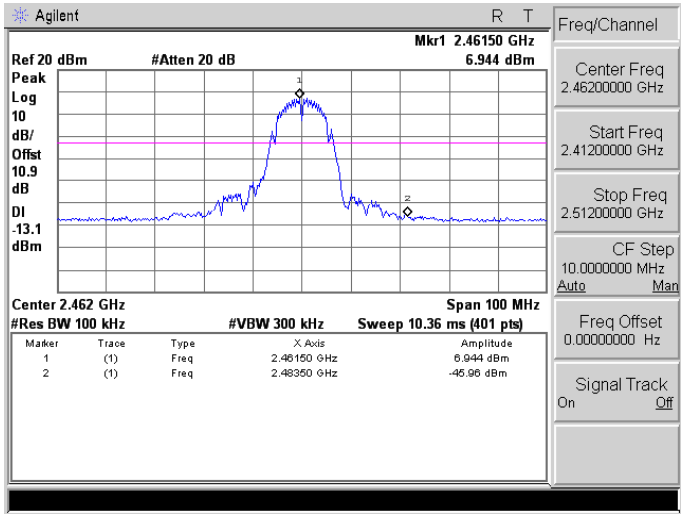
Mode 3: IEEE 802.11g Link Mode_ANT-1	
2412	
2437	
2462	

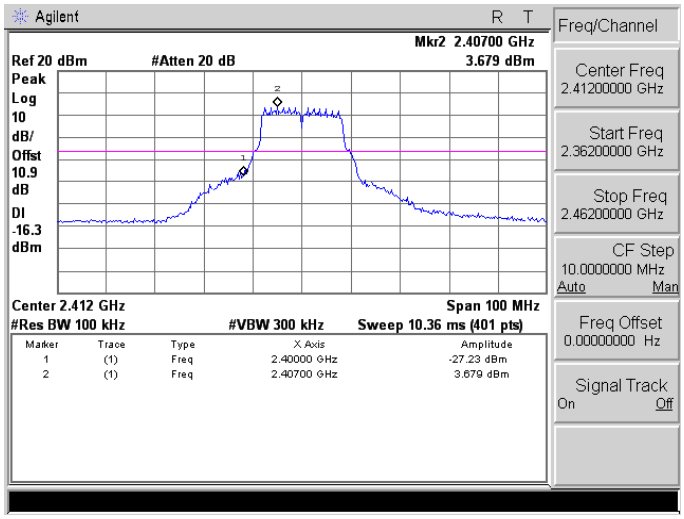
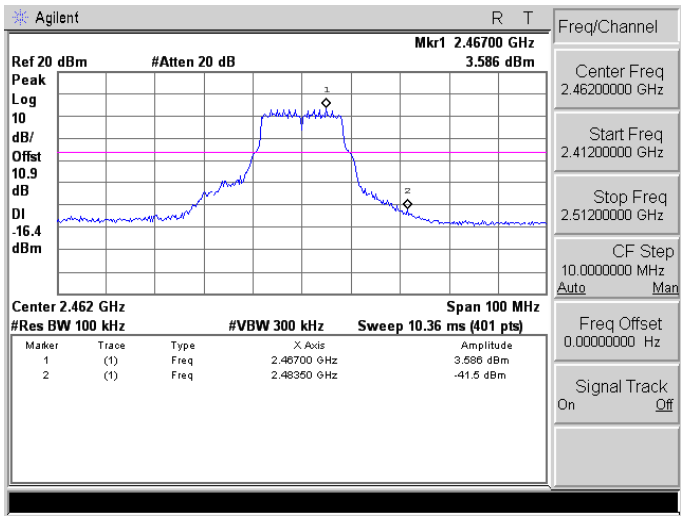
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-1	
2412	
2437	
2462	

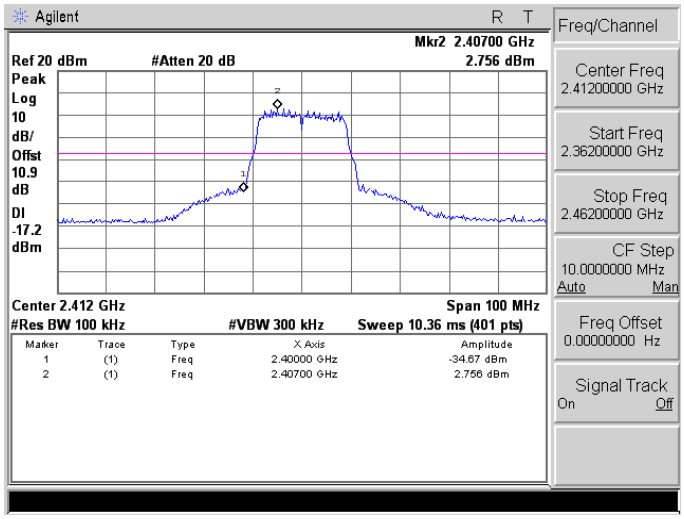
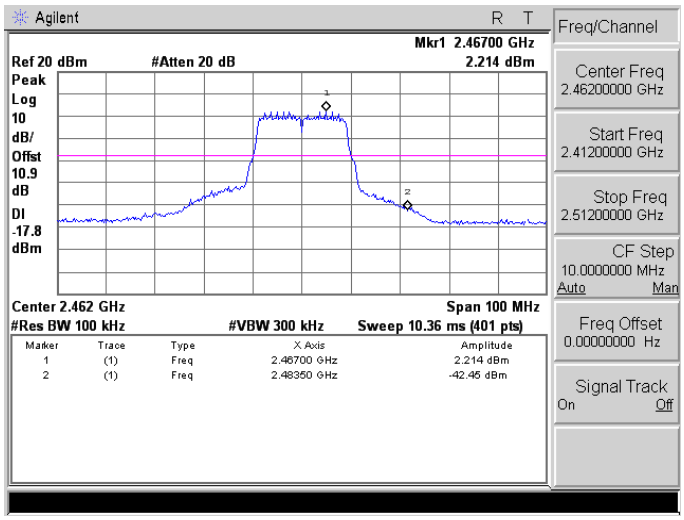
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-1	
2422	
2437	
2452	

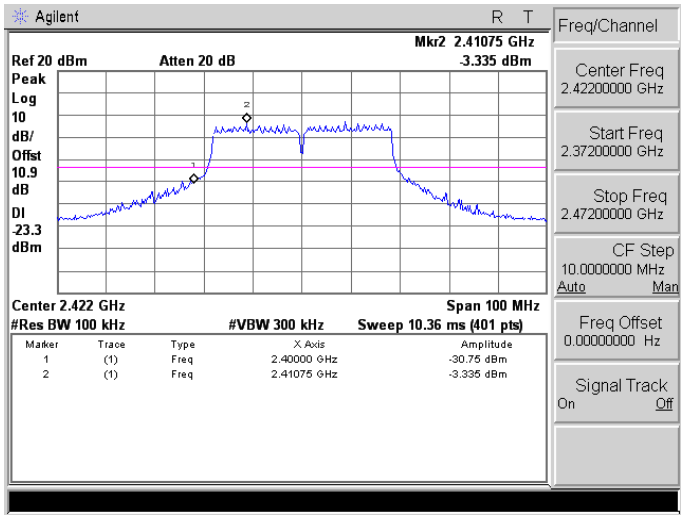
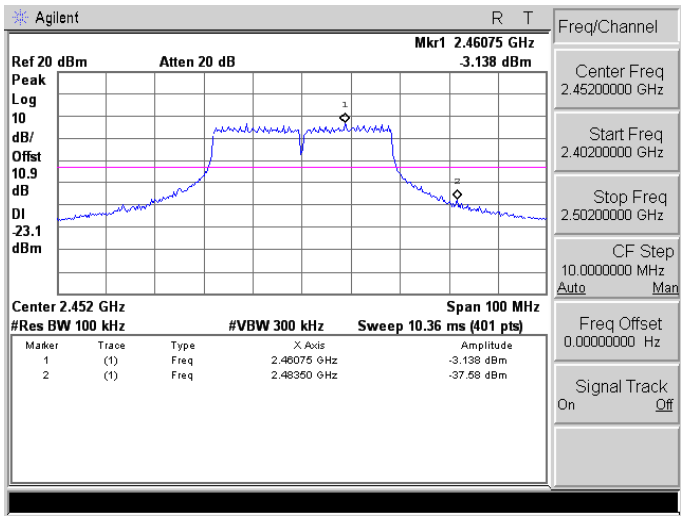
Mode 6: Bluetooth v4.0 LE Link Mode	
2402	
2440	
2480	

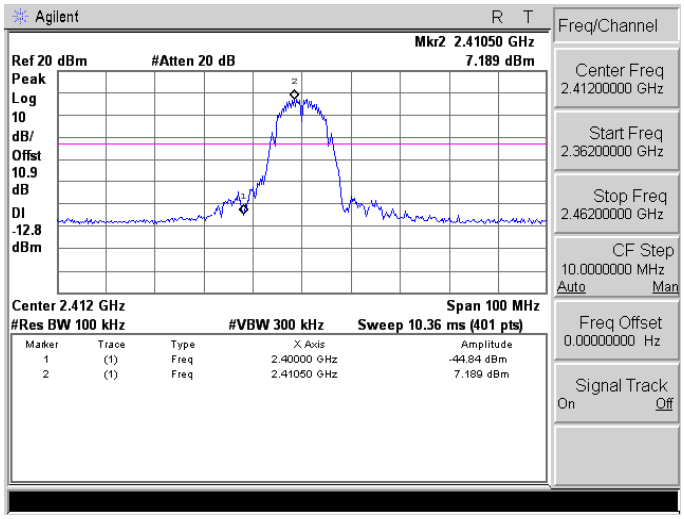
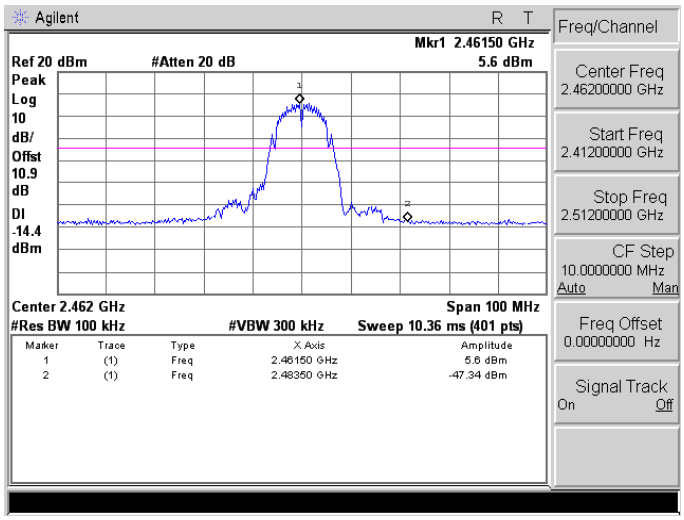
Conducted Band Edge

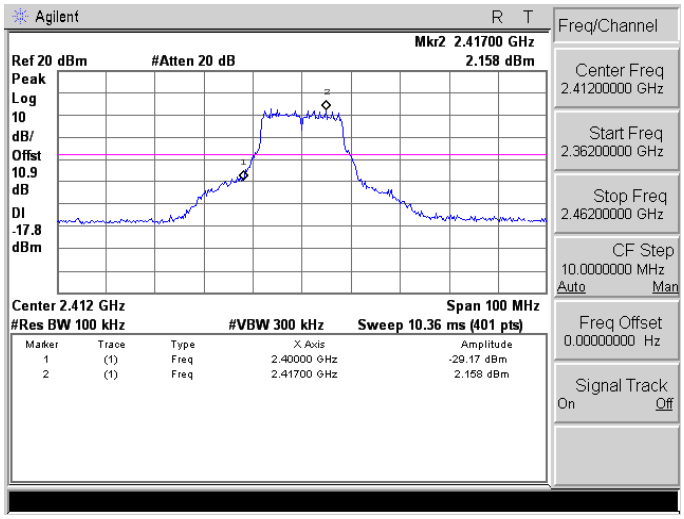
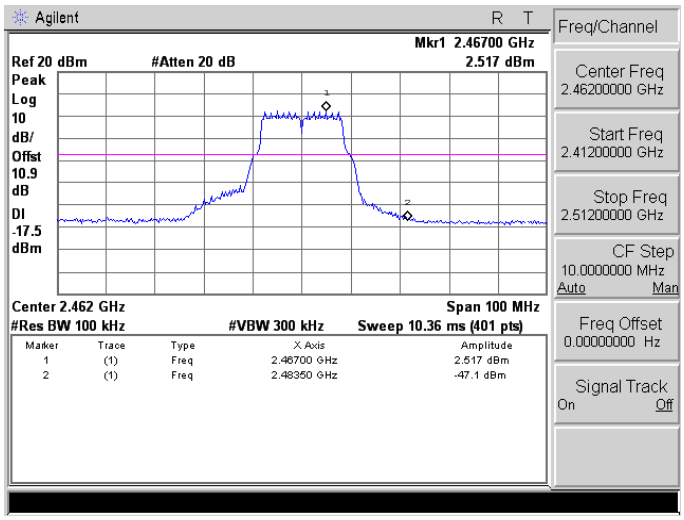
Mode 2: IEEE 802.11b Link Mode_ANT-0	
2412	
2462	

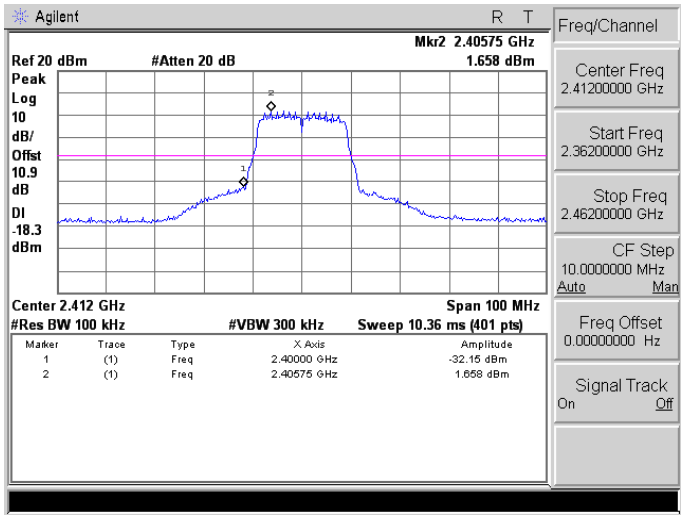
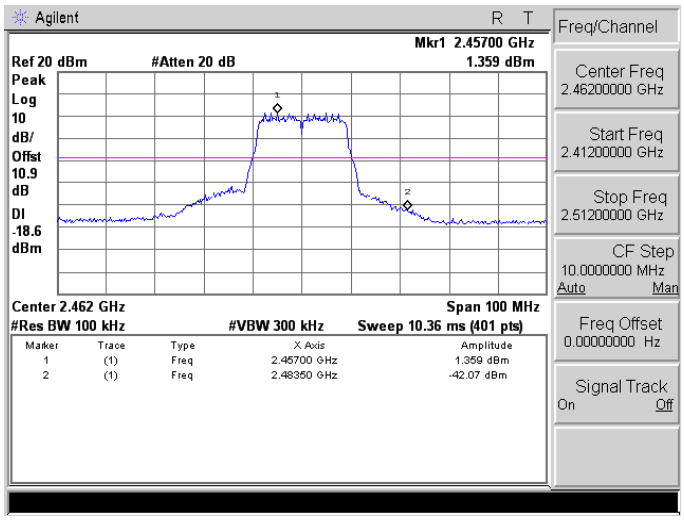
Mode 3: IEEE 802.11g Link Mode_ANT-0	
2412	
2462	

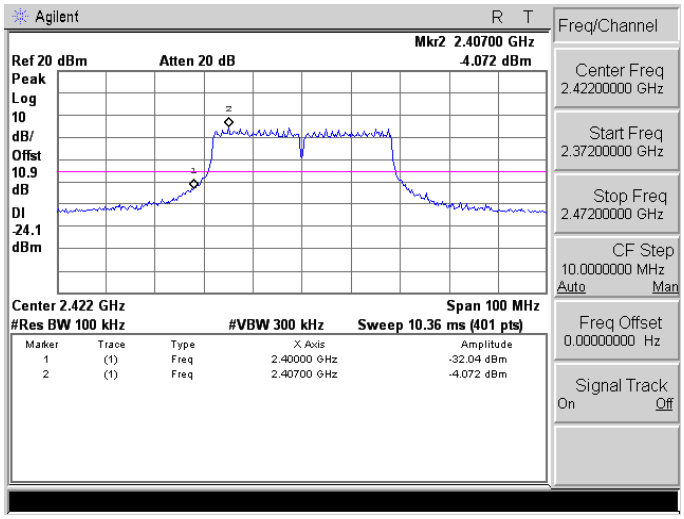
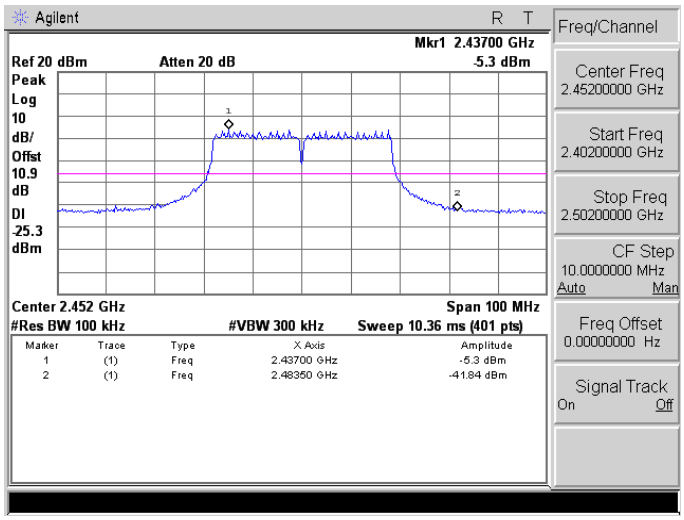
Mode 4: IEEE 802.11n 2.4GHz 20MHz Link Mode_ANT-0	
2412	
2462	

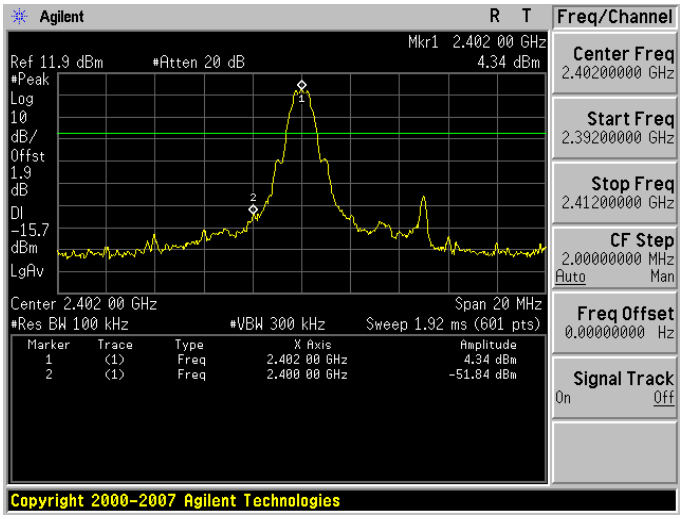
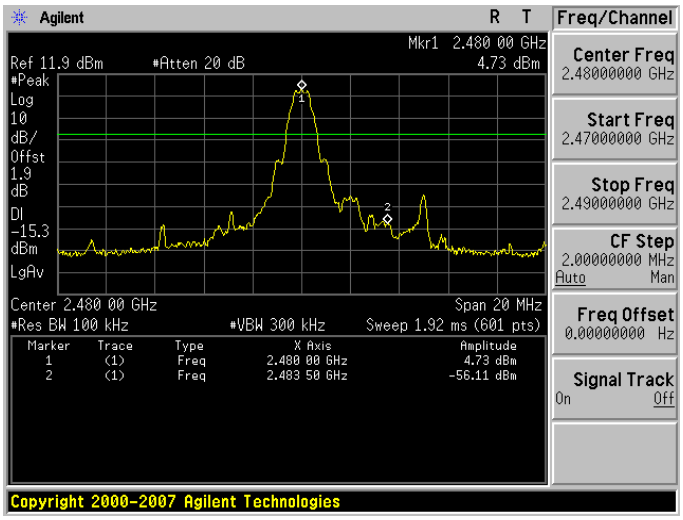
Mode 5: IEEE 802.11n 2.4GHz 40MHz Link Mode_ANT-0	
2422	
2452	

Mode 2: IEEE 802.11b Link Mode_ANT-1	
2412	
2462	

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	

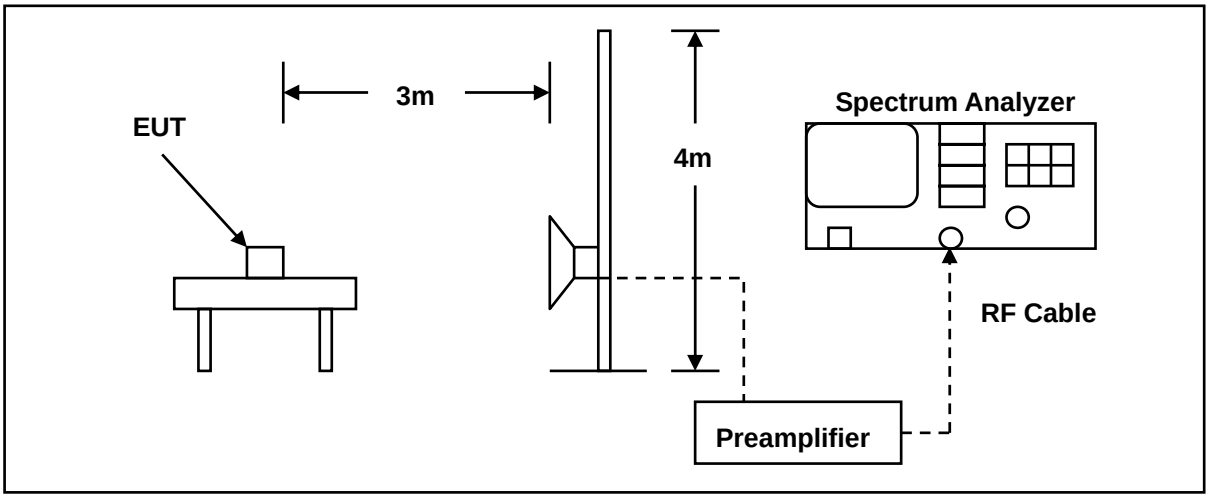
Mode 6: Bluetooth v4.0 LE Link Mode	
2402	
2480	

10 Band Edges Measurement

10.1.Limit

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

10.2.Test Setup



10.3.Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2014	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2014	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/11/2014	(1)
Microwave Cable	EMCI	EMC-104-SM-SM-14000	140202	02/19/2014	(1)
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	03/03/2014	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)

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

10.4. Test Procedure

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

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

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

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

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

10.5.Test Result

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	2	Date:	01/31/2015
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
2386.120	57.93	-2.27	55.66	74.00	-18.34	peak	H
2386.120	51.13	-2.27	48.86	54.00	-5.14	AVG	H
2390.000	55.79	-2.24	53.55	74.00	-20.45	peak	H
2390.000	45.88	-2.24	43.64	54.00	-10.36	AVG	H
2386.230	63.61	-2.27	61.34	74.00	-12.66	peak	V
2386.230	52.91	-2.27	50.64	54.00	-3.36	AVG	V
2390.000	61.33	-2.24	59.09	74.00	-14.91	peak	V
2390.000	49.87	-2.24	47.63	54.00	-6.37	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	2	Date:	01/31/2015
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	51.67	-1.83	49.84	74.00	-24.16	peak	H
2489.840	53.47	-1.79	51.68	74.00	-22.32	peak	H
2483.500	55.30	-1.83	53.47	74.00	-20.53	peak	V
2483.500	48.21	-1.83	46.38	54.00	-7.62	AVG	V
2487.320	56.22	-1.80	54.42	74.00	-19.58	peak	V
2487.320	47.43	-1.80	45.63	54.00	-8.37	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	3	Date:	01/31/2015
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
2389.640	65.47	-2.25	63.22	74.00	-10.78	peak	H
2389.640	49.79	-2.25	47.54	54.00	-6.46	AVG	H
2390.000	64.88	-2.24	62.64	74.00	-11.36	peak	H
2390.000	50.52	-2.24	48.28	54.00	-5.72	AVG	H
2388.100	70.34	-2.25	68.09	74.00	-5.91	peak	V
2388.100	52.09	-2.25	49.84	54.00	-4.16	AVG	V
2390.000	67.26	-2.24	65.02	74.00	-8.98	peak	V
2390.000	53.11	-2.24	50.87	54.00	-3.13	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	3	Date:	01/31/2015
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	62.00	-1.83	60.17	74.00	-13.83	peak	H
2483.500	47.54	-1.83	45.71	54.00	-8.29	AVG	H
2483.840	64.98	-1.82	63.16	74.00	-10.84	peak	H
2483.840	46.88	-1.82	45.06	54.00	-8.94	AVG	H
2483.500	66.64	-1.83	64.81	74.00	-9.19	peak	V
2483.500	52.85	-1.83	51.02	54.00	-2.98	AVG	V
2483.680	67.62	-1.83	65.79	74.00	-8.21	peak	V
2483.680	52.49	-1.83	50.66	54.00	-3.34	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	4	Date:	01/31/2015
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
2389.090	65.06	-2.25	62.81	74.00	-11.19	peak	H
2389.090	50.04	-2.25	47.79	54.00	-6.21	AVG	H
2390.000	66.30	-2.24	64.06	74.00	-9.94	peak	H
2390.000	50.97	-2.24	48.73	54.00	-5.27	AVG	H
2389.090	67.75	-2.25	65.50	74.00	-8.50	peak	V
2389.090	51.93	-2.25	49.68	54.00	-4.32	AVG	V
2390.000	65.52	-2.24	63.28	74.00	-10.72	peak	V
2390.000	53.59	-2.24	51.35	54.00	-2.65	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	4	Date:	01/31/2015
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	63.02	-1.83	61.19	74.00	-12.81	peak	H
2483.500	49.51	-1.83	47.68	54.00	-6.32	AVG	H
2484.000	66.04	-1.82	64.22	74.00	-9.78	peak	H
2484.000	48.81	-1.82	46.99	54.00	-7.01	AVG	H
2483.500	69.76	-1.83	67.93	74.00	-6.07	peak	V
2483.500	53.11	-1.83	51.28	54.00	-2.72	AVG	V
2484.520	70.37	-1.82	68.55	74.00	-5.45	peak	V
2484.520	52.07	-1.82	50.25	54.00	-3.75	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	5	Date:	01/31/2015
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
2388.720	65.88	-2.25	63.63	74.00	-10.37	peak	H
2388.720	51.04	-2.25	48.79	54.00	-5.21	AVG	H
2390.000	66.16	-2.24	63.92	74.00	-10.08	peak	H
2390.000	51.47	-2.24	49.23	54.00	-4.77	AVG	H
2389.560	73.69	-2.25	71.44	74.00	-2.56	peak	V
2389.560	53.94	-2.25	51.69	54.00	-2.31	AVG	V
2390.000	68.62	-2.24	66.38	74.00	-7.62	peak	V
2390.000	54.34	-2.24	52.10	54.00	-1.90	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	5	Date:	01/31/2015
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	62.86	-1.83	61.03	74.00	-12.97	peak	H
2483.500	45.88	-1.83	44.05	54.00	-9.95	AVG	H
2483.950	62.85	-1.82	61.03	74.00	-12.97	peak	H
2483.950	45.74	-1.82	43.92	54.00	-10.08	AVG	H
2483.500	67.17	-1.83	65.34	74.00	-8.66	peak	V
2483.500	50.19	-1.83	48.36	54.00	-5.64	AVG	V
2484.350	67.79	-1.82	65.97	74.00	-8.03	peak	V
2484.350	49.96	-1.82	48.14	54.00	-5.86	AVG	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	6	Date:	01/31/2015
Frequency:	2402 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
2389.750	42.57	-2.24	40.33	74.00	-33.67	peak	H
2390.000	40.72	-2.24	38.48	74.00	-35.52	peak	H
2389.200	42.35	-2.25	40.10	74.00	-33.90	peak	V
2390.000	42.37	-2.24	40.13	74.00	-33.87	peak	V

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	ONYX-1521DTT-C1-1010	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	6	Date:	01/31/2015
Frequency:	2480 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	37.03	-1.83	35.20	74.00	-38.80	peak	H
2487.780	40.92	-1.80	39.12	74.00	-34.88	peak	H
2483.500	36.78	-1.83	34.95	74.00	-39.05	peak	V
2493.120	40.83	-1.78	39.05	74.00	-34.95	peak	V

11 Antenna Measurement

11.1. Limit

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

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

11.2. Antenna Connector Construction

The antenna used in this product is liset as below:

Antenna Port	Antenna Type	Max. Gain
ANT-0	Internal Antenna	WLAN 2.4G: 1.02 dBi Bluetooth v4.0: 1.02 dBi
ANT-1	Internal Antenna	WLAN 2.4G: 2.05 dBi