

FCC 47 CFR PART 15 SUBPART C

RF Test Report

Applicant : Comtrend Corporation
Product Type : Multi-DSL Wireless Router
Trade Name : COMTREND
Model Number : VR-3033u, VR-3033
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013
Receive Date : Jan. 08, 2016
Test Period : Jan. 08 ~ Feb. 17, 2016
Issue Date : Mar. 31, 2016

Issue by

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

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Mar. 31, 2016	Initial Issue	Snow Wang

Verification of Compliance

Issued Date: Mar. 31, 2016

Applicant : Comtrend Corporation
Product Type : Multi-DSL Wireless Router
Trade Name : COMTREND
Model Number : VR-3033u, VR-3033
FCC ID : L9VVR-3033U
EUT Rated Voltage : DC 12V, 1A
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013
Test Result : Complied
Performing Lab. : A Test Lab Techno Corp.

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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



(Manager)

Reviewed By



(Testing Engineer)

(Eric Ou Yang)

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1 General Information

1.1 Summary of Test Result

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

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

1.2 Measurement Uncertainty

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

2 EUT Description

Applicant	Comtrend Corporation 3F-1, No. 10, Lane 609, Chung Hsin Road, Section 5, San Chung Dist, New Taipei City 24159, Taiwan			
Manufacturer	Comtrend Corporation 3F-1, No. 10, Lane 609, Chung Hsin Road, Section 5, San Chung Dist, New Taipei City 24159, Taiwan			
Product Type	Multi-DSL Wireless Router			
Trade Name	COMTREND			
Model Number	VR-3033u, VR-3033			
Different Description	Those number models differ from each other in selling region			
FCC ID	L9VVR-3033U			
Operate Freq. Band	Frequency Range (MHz)	Modulation	Channel Bandwidth	Data Rate 400 GI (ns)
IEEE 802.11b	2412 ~ 2462	DSSS	20MHz	Up to 11Mbps
IEEE 802.11g	2412 ~ 2462	OFDM (16/64QAM)	20MHz	Up to 54Mbps
IEEE 802.11n 2.4GHz 20MHz	2412 ~ 2462	OFDM (16/64QAM)	20MHz	Up to 144.4Mbps
IEEE 802.11n 2.4GHz 40MHz	2422 ~ 2452	OFDM (16/64QAM)	40MHz	Up to 300Mbps
Antenna Delivery	See section 3.1			
Antenna information	ANT Port	Model Name	Type	Max. Gain (dBi)
	ANT-0	EDA-1313-2G4C1-B4	External Antenna	2.59 dBi
	ANT-1	EDA-1313-2G4C1-B3		2.63 dBi

Frequency Band	Max. RF Output Power (W)
IEEE 802.11b	0.136
IEEE 802.11g	0.415
IEEE 802.11n 2.4GHz 20MHz	0.782
IEEE 802.11n 2.4GHz 40MHz	0.632

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
Mode 2: IEEE 802.11b link mode	V	---	---
Mode 3: IEEE 802.11g link mode	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

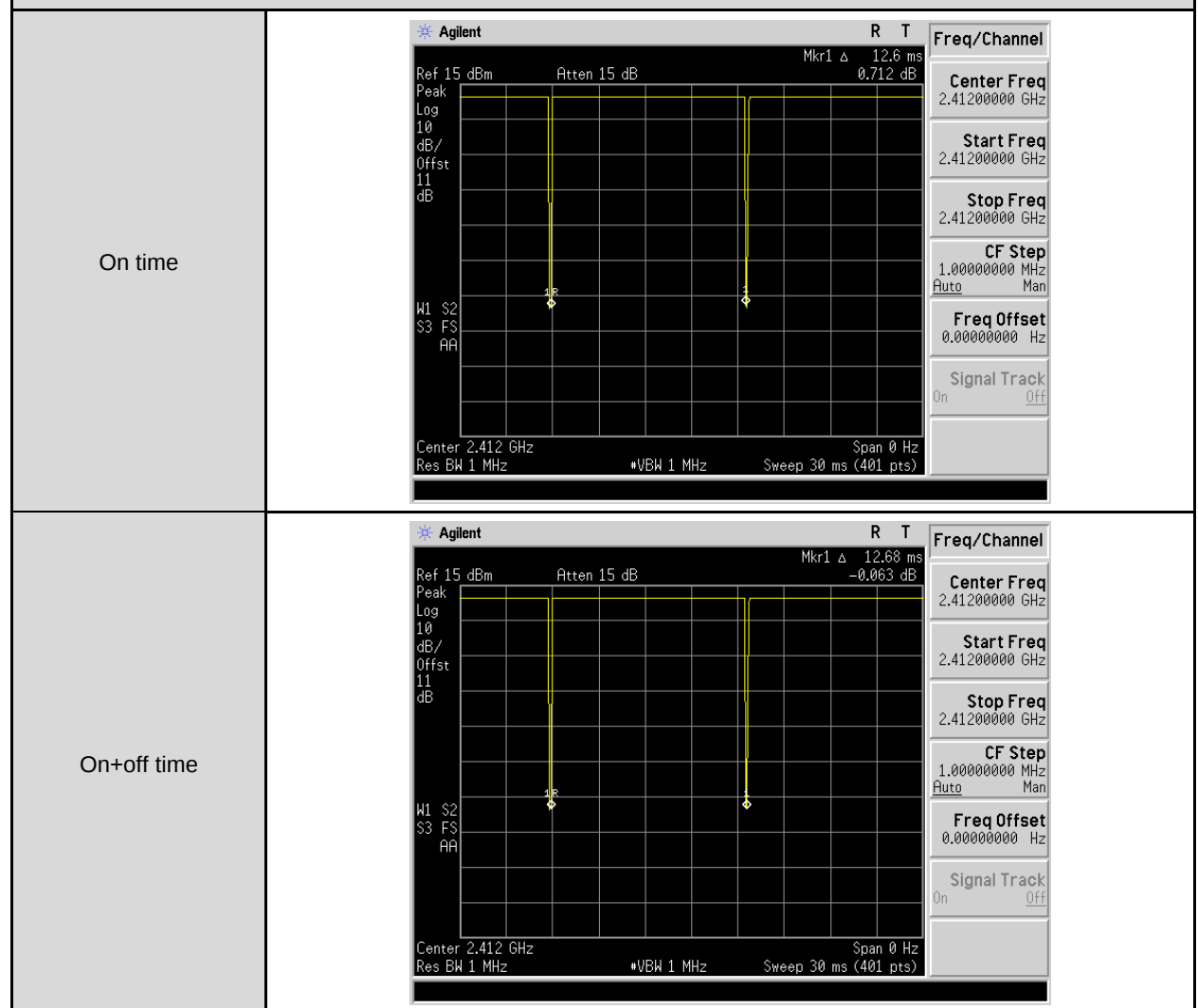
Test Mode	Antenna Delivery	Test Channel	Data Rate
Mode 2: IEEE 802.11b link mode	1TX / 1RX	1, 6, 11	1
Mode 3: IEEE 802.11g link mode	1TX / 1RX_Diversity	1, 6, 11	6
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	2TX / 2RX_MIMO	1, 6, 11	13
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	2TX / 2RX_MIMO	3, 6, 9	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	12.600	12.680	0.994	0.027	0.010
Mode 3: IEEE 802.11g link mode	2412.0	2.125	2.375	0.895	0.483	0.471
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode	2412.0	1.050	1.275	0.824	0.843	0.952
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode	2422.0	0.525	0.775	0.677	1.691	1.905

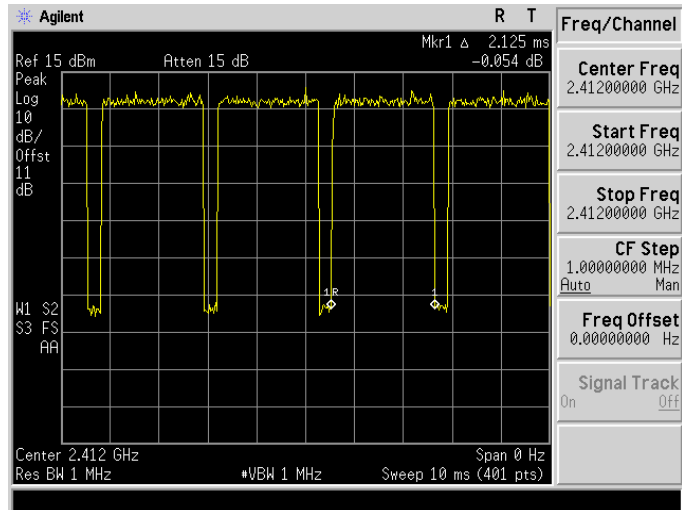
Duty Cycle Graphs

Mode 2: IEEE 802.11b link mode

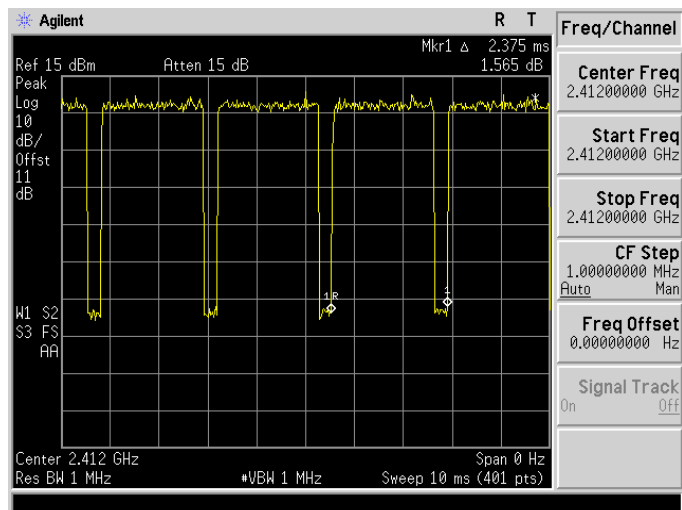


Mode 3: IEEE 802.11g Mode

On time

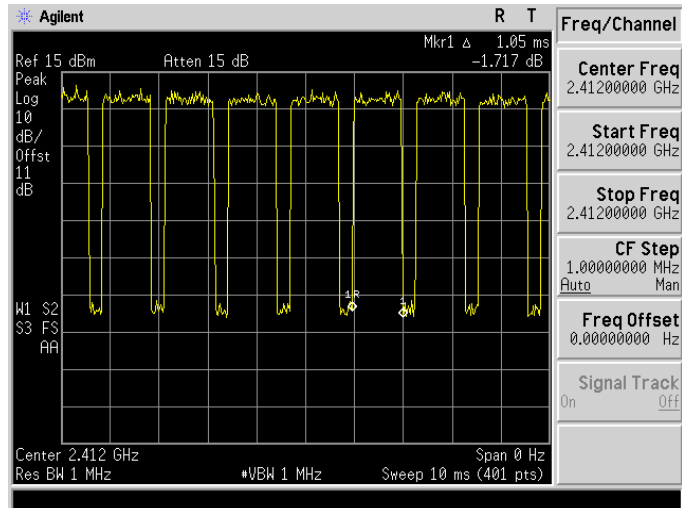


On+off time

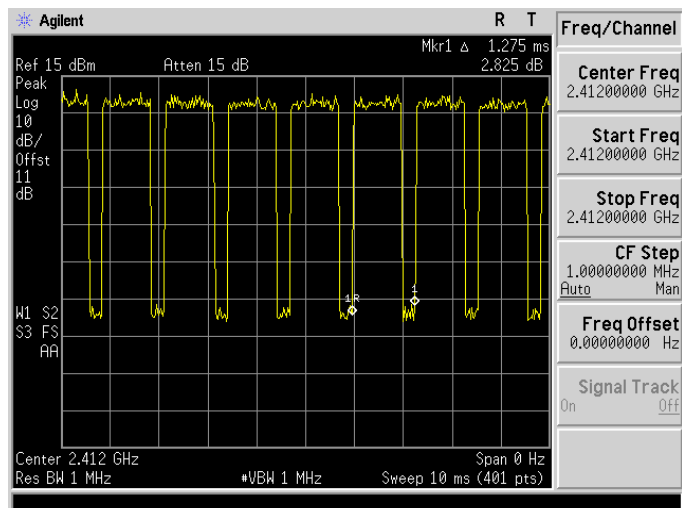


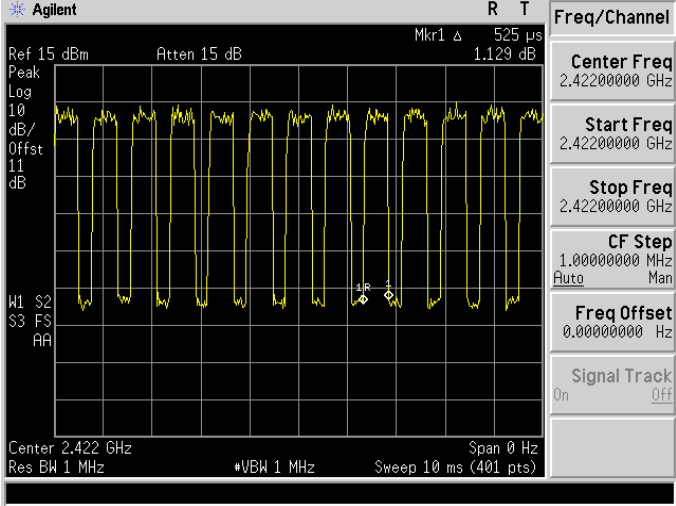
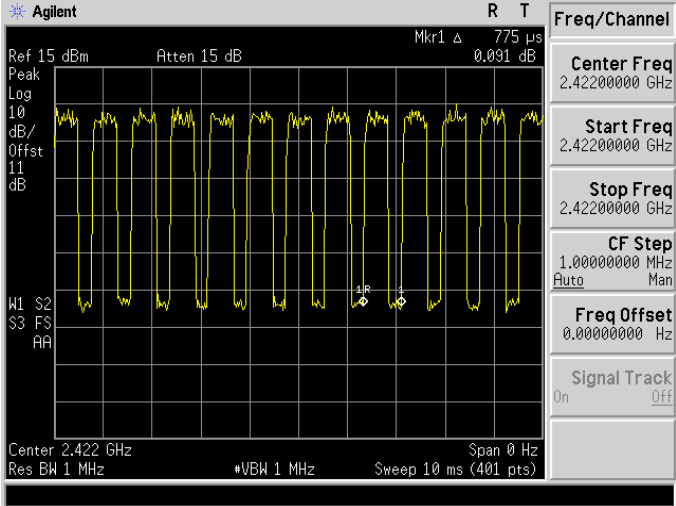
Mode 4: IEEE 802.11n 2.4GHz 20MHz Mode

On time



On+off time



Mode 5: IEEE 802.11n 2.4GHz 40MHz Mode	
On time	 The screenshot shows a spectrum analyzer interface with a yellow signal trace. The main display area shows a series of vertical pulses. The top status bar indicates 'Agilent' and 'R T'. The left side shows 'Ref 15 dBm', 'Atten 15 dB', and 'Mkr1 Δ 525 μs 1.129 dB'. The right side shows 'Freq/Channel' settings: 'Center Freq 2.42200000 GHz', 'Start Freq 2.42200000 GHz', 'Stop Freq 2.42200000 GHz', 'CF Step 1.00000000 MHz Auto Man', 'Freq Offset 0.00000000 Hz', and 'Signal Track On Off'. The bottom status bar shows 'Center 2.422 GHz', 'Res BW 1 MHz', '*VBW 1 MHz', and 'Sweep 10 ms (401 pts)'.
On+off time	 The screenshot shows a spectrum analyzer interface with a yellow signal trace. The main display area shows a series of vertical pulses. The top status bar indicates 'Agilent' and 'R T'. The left side shows 'Ref 15 dBm', 'Atten 15 dB', and 'Mkr1 Δ 775 μs 0.091 dB'. The right side shows 'Freq/Channel' settings: 'Center Freq 2.42200000 GHz', 'Start Freq 2.42200000 GHz', 'Stop Freq 2.42200000 GHz', 'CF Step 1.00000000 MHz Auto Man', 'Freq Offset 0.00000000 Hz', and 'Signal Track On Off'. The bottom status bar shows 'Center 2.422 GHz', 'Res BW 1 MHz', '*VBW 1 MHz', and 'Sweep 10 ms (401 pts)'.

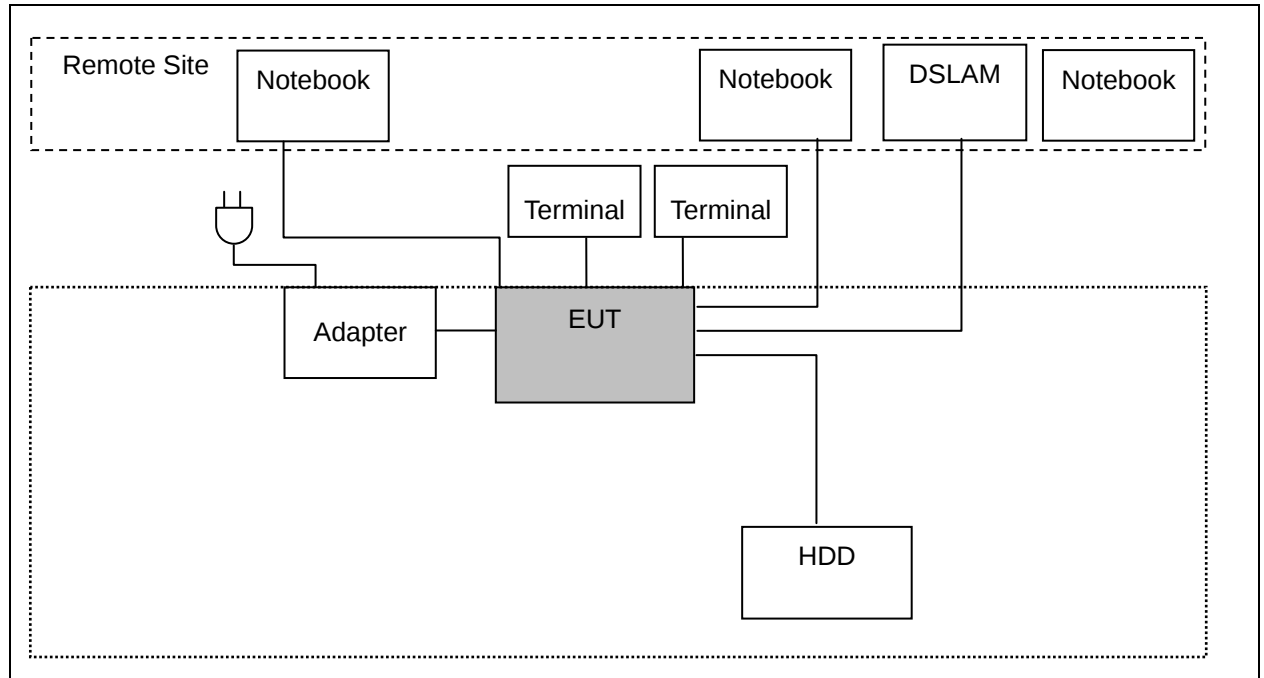
3.2. EUT Exercise Software

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

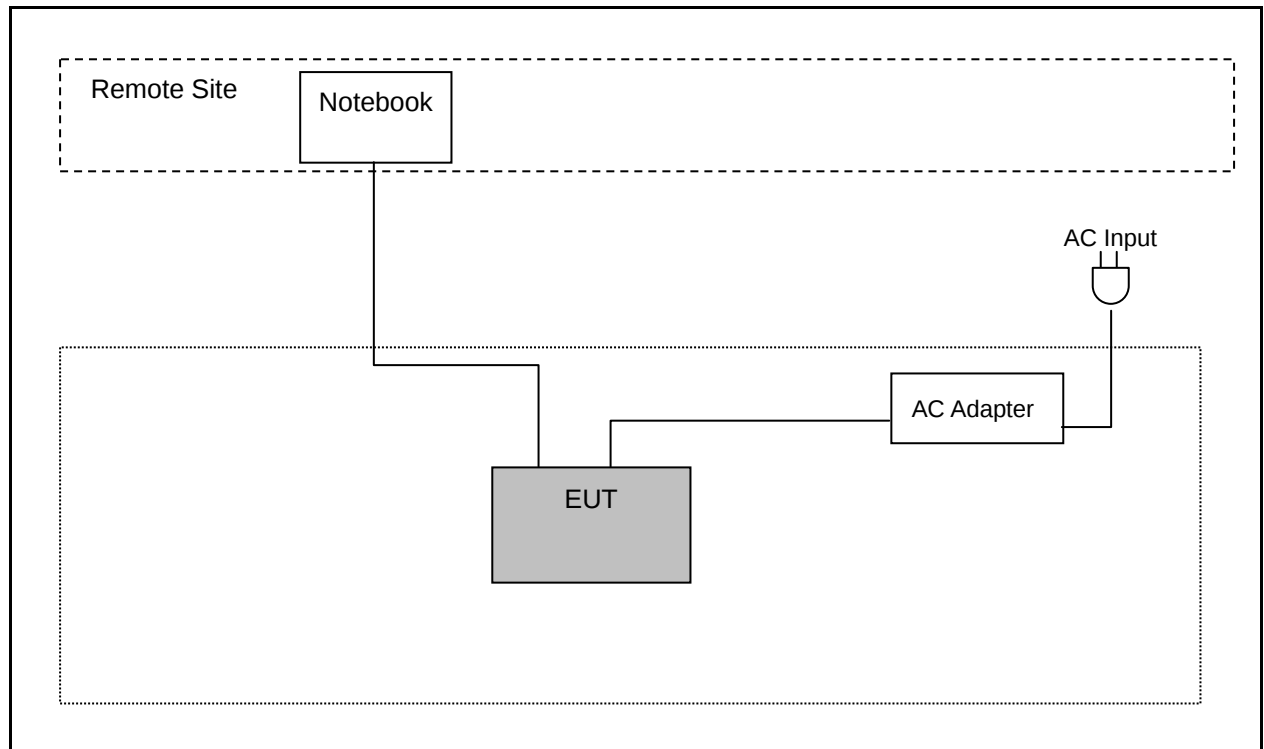
Measurement Software	
1	EZ-EMC Ver. ATL-03A1-1
2	EZ-EMC Ver ATL-ITC-3A1-1

3.3. Configuration of Test System Details

Conducted Emissions



Radiated Emissions



3.4. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Conducted Emission Measurement

4.1. Limit

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

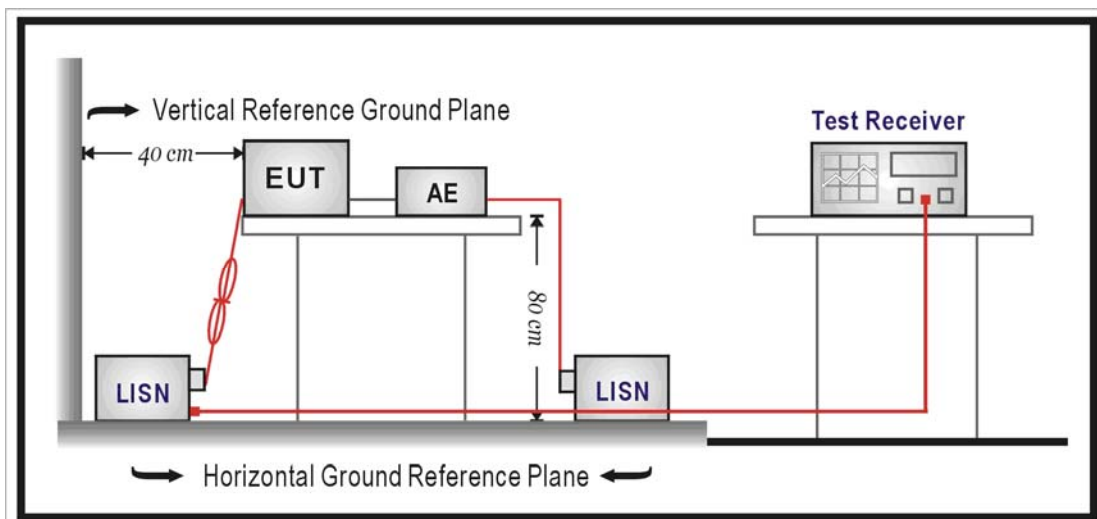
4.2. Test Instruments

Describe	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Test Receiver	R&S	ESCI	100367	06/25/2015	(1)
LISN	R&S	ENV216	101040	03/10/2015	(1)
LISN	R&S	ENV216	101041	03/06/2015	(1)
RF Cable	Woken	00100D1380194M	TE-02-02	06/26/2015	(1)
Test Site	ATL	TE02	TE02	N.C.R.	-----

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

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

4.3. Test Setup



4.4. Test Procedure

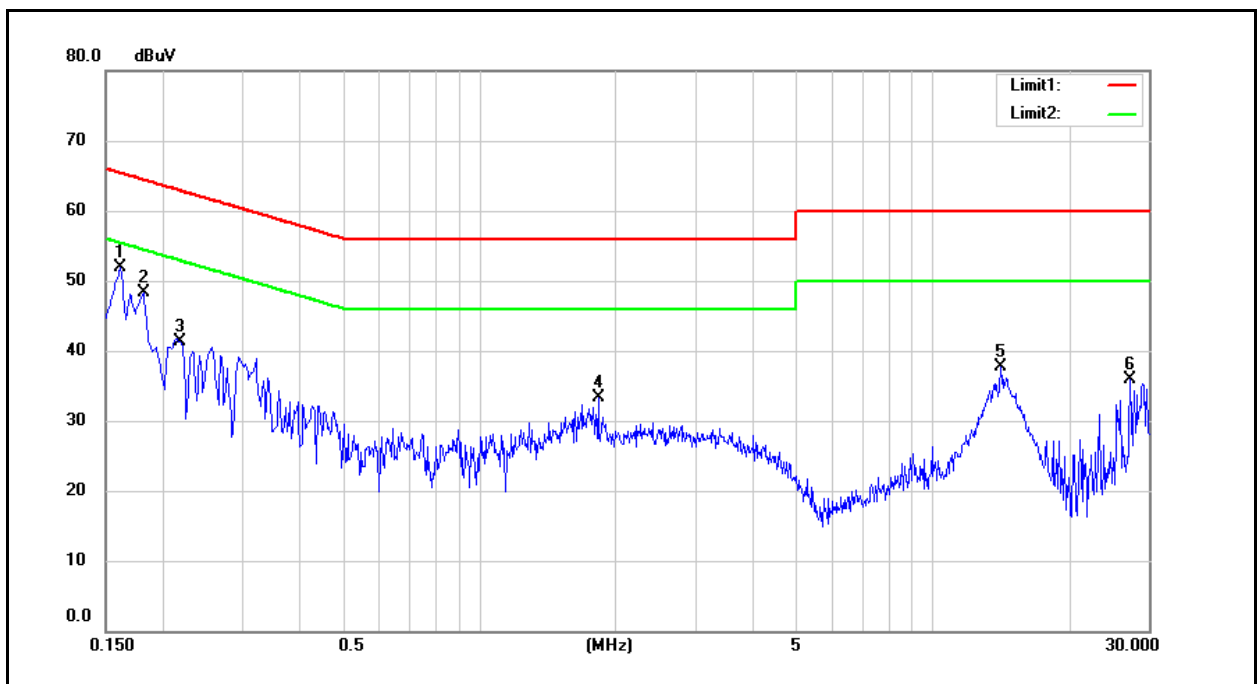
The power line conducted emission measurements were performed in a shielded enclosure. The EUT was assembled on a wooden table which is 80 centimeters high, was placed 40 centimeters from the back wall and at least 1 meter from the sidewall.

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:	VR-3033u	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	01/08/2016
		Test By:	Eric Ou Yang
Description:			

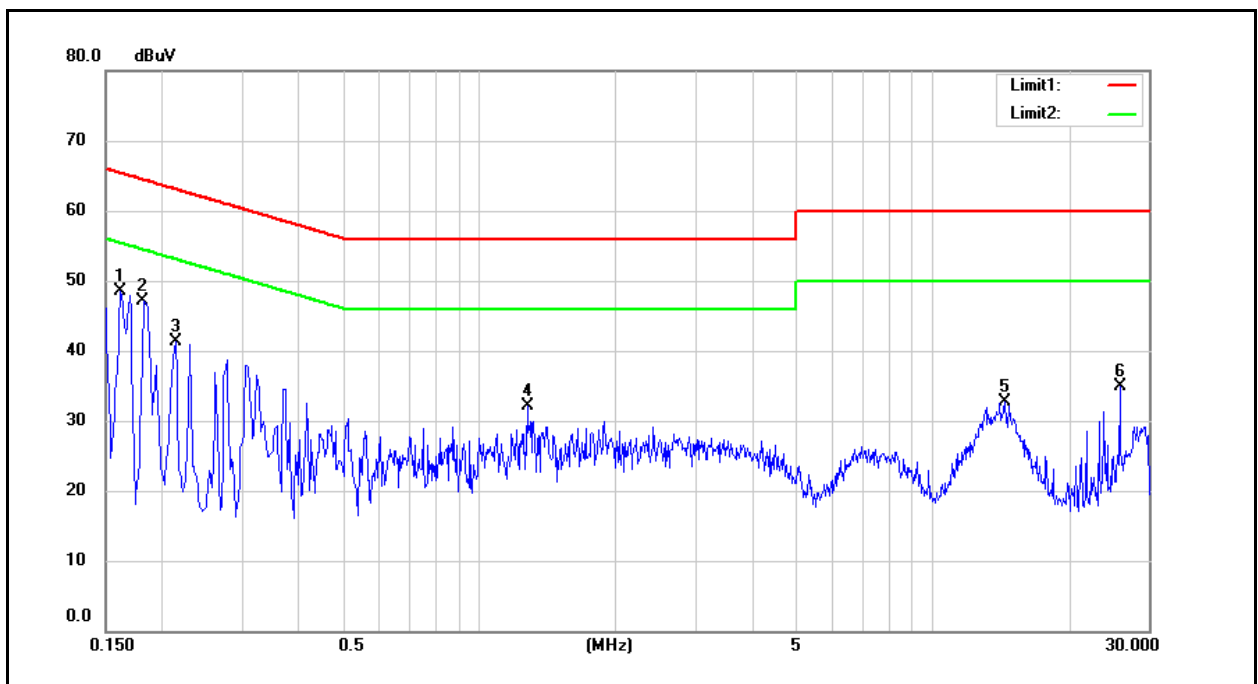


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	32.19	9.83	9.69	41.88	19.52	65.36	55.36	-23.48	-35.84	Pass
2	0.1820	35.32	17.17	9.68	45.00	26.85	64.39	54.39	-19.39	-27.54	Pass
3	0.2208	30.53	15.05	9.68	40.21	24.73	62.79	52.79	-22.58	-28.06	Pass
4	1.8340	17.42	9.58	9.76	27.18	19.34	56.00	46.00	-28.82	-26.66	Pass
5	14.2020	20.25	12.49	10.01	30.26	22.50	60.00	50.00	-29.74	-27.50	Pass
6	27.3580	17.84	3.85	10.06	27.90	13.91	60.00	50.00	-32.10	-36.09	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:	VR-3033u	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 1	Date:	01/08/2016
		Test By:	Eric Ou Yang
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	31.46	8.96	9.66	41.12	18.62	65.36	55.36	-24.24	-36.74	Pass
2	0.1820	34.76	16.77	9.65	44.41	26.42	64.39	54.39	-19.98	-27.97	Pass
3	0.2140	30.61	15.42	9.65	40.26	25.07	63.05	53.05	-22.79	-27.98	Pass
4	1.2780	17.72	10.46	9.70	27.42	20.16	56.00	46.00	-28.58	-25.84	Pass
5	14.4940	17.58	10.84	10.06	27.64	20.90	60.00	50.00	-32.36	-29.10	Pass
6	25.9540	18.78	2.99	10.21	28.99	13.20	60.00	50.00	-31.01	-36.80	Pass

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

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

5 Radiated Emission Measurement

5.1. Limit

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

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ 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

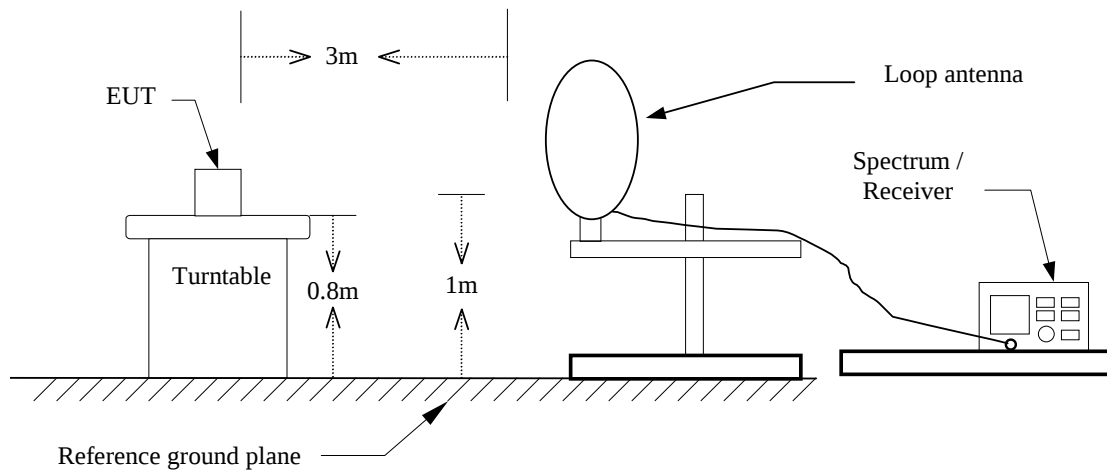
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/08/2016	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/08/2016	(1)
Pre Amplifier	Agilent	8449B	3008A02237	10/07/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(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)	ETS	3116	86467	09/01/2015	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/01/2016	(1)
Microwave Cable	EMCI	EMC102-KM-K M-14000	151001	10/15/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-S M-14000	140202	10/15/2015	(1)
Microwave Cable	EMCI	EMC104-SM-S M-600	140301	10/15/2015	(1)
Test Site	ATL	TE01	888001	08/27/2015	(1)

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

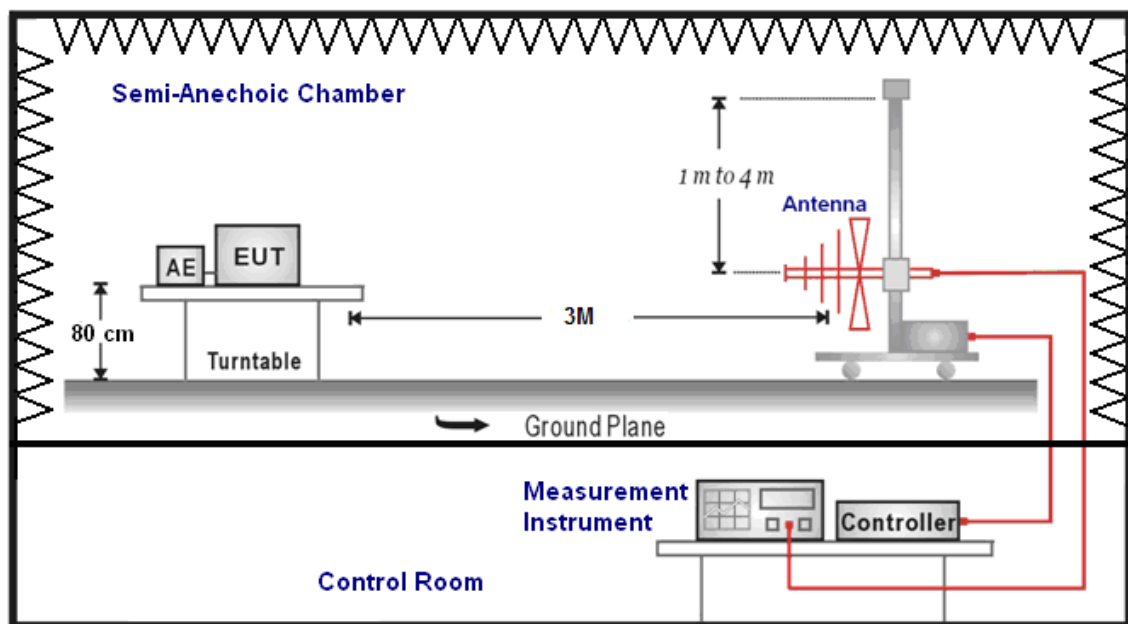
Note: N.C.R. = No Calibration Request.

5.3. Setup

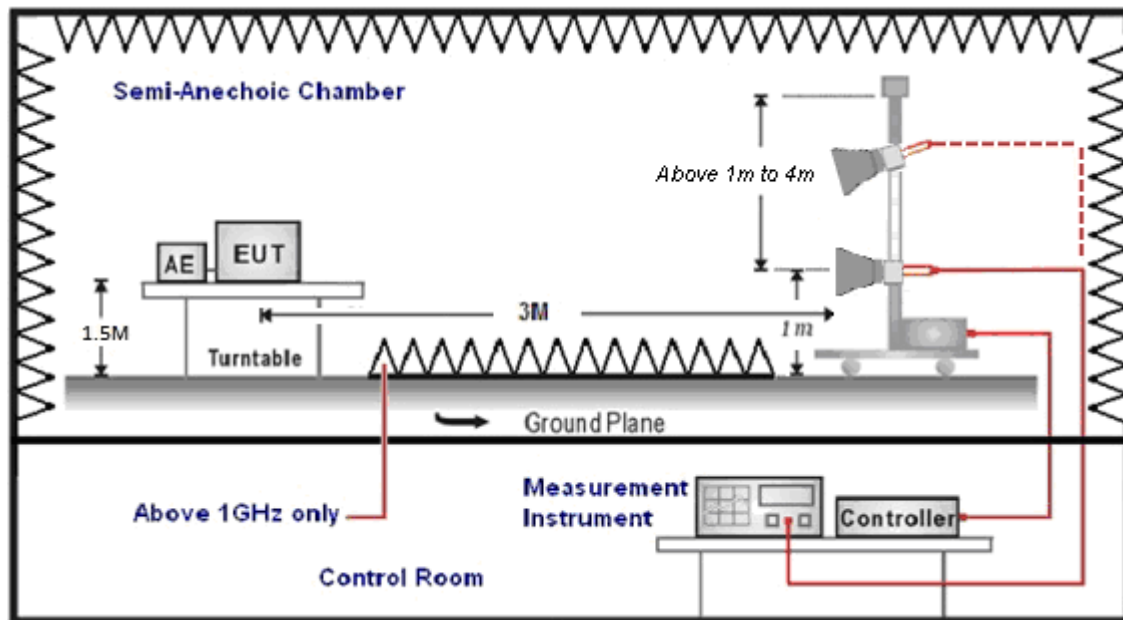
9kHz ~ 30MHz



Below 1GHz



Above 1GHz



5.4. Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height(below 1GHz use 0.8m turntable / above 1GHz use 1.5m turntable), top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

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

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >0.98 / 1/T for average measurements when Duty cycle <0.98. A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

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

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

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

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

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

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

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

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

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

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

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:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 1		Date:		02/15/2016	
				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
143.4900	40.47	-11.27	29.20	43.50	-14.30	QP	H
299.6600	41.23	-9.23	32.00	46.00	-14.00	QP	H
494.6300	40.68	-5.42	35.26	46.00	-10.74	QP	H
600.3600	38.38	-3.15	35.23	46.00	-10.77	QP	H
800.1800	33.94	0.54	34.48	46.00	-11.52	QP	H
948.5900	27.64	3.37	31.01	46.00	-14.99	QP	H
159.0100	47.46	-11.11	36.35	43.50	-7.15	QP	V
236.6100	43.55	-11.48	32.07	46.00	-13.93	QP	V
497.5400	46.65	-5.36	41.29	46.00	-4.71	QP	V
522.7600	47.95	-4.80	43.15	46.00	-2.85	QP	V
600.3600	46.27	-3.15	43.12	46.00	-2.88	QP	V
800.1800	31.19	0.54	31.73	46.00	-14.27	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:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	02/15/2016		
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
3149.000	54.24	-12.40	41.84	74.00	-32.16	peak	H
4822.000	56.99	-7.91	49.08	74.00	-24.92	peak	H
6698.000	50.76	-2.94	47.82	74.00	-26.18	peak	H
3051.000	54.81	-12.82	41.99	74.00	-32.01	peak	V
4824.000	60.87	-7.90	52.97	74.00	-21.03	peak	V
4824.000	57.88	-7.90	49.98	54.00	-4.02	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	02/15/2016		
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
3177.000	53.77	-12.29	41.48	74.00	-32.52	peak	H
4874.000	55.86	-7.75	48.11	74.00	-25.89	peak	H
6698.000	50.60	-2.94	47.66	74.00	-26.34	peak	H
3114.000	54.31	-12.56	41.75	74.00	-32.25	peak	V
4874.000	58.94	-7.75	51.19	74.00	-22.81	peak	V
6656.000	50.80	-3.07	47.73	74.00	-26.27	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	02/15/2016		
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
3100.000	54.00	-12.61	41.39	74.00	-32.61	peak	H
4668.000	53.54	-8.39	45.15	74.00	-28.85	peak	H
6600.000	51.48	-3.24	48.24	74.00	-25.76	peak	H
3282.000	55.00	-11.84	43.16	74.00	-30.84	peak	V
4924.000	57.06	-7.59	49.47	74.00	-24.53	peak	V
6726.000	51.68	-2.85	48.83	74.00	-25.17	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	02/15/2016		
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
3184.000	53.39	-12.26	41.13	74.00	-32.87	peak	H
4824.000	53.85	-7.90	45.95	74.00	-28.05	peak	H
6642.000	50.27	-3.11	47.16	74.00	-26.84	peak	H
3023.000	54.65	-12.95	41.70	74.00	-32.30	peak	V
4824.000	59.03	-7.90	51.13	74.00	-22.87	peak	V
6957.000	50.39	-2.14	48.25	74.00	-25.75	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	02/15/2016		
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
3198.000	54.29	-12.19	42.10	74.00	-31.90	peak	H
4668.000	52.47	-8.39	44.08	74.00	-29.92	peak	H
6698.000	50.83	-2.94	47.89	74.00	-26.11	peak	H
3107.000	54.15	-12.58	41.57	74.00	-32.43	peak	V
4874.000	56.09	-7.75	48.34	74.00	-25.66	peak	V
6537.000	51.13	-3.43	47.70	74.00	-26.30	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	02/15/2016		
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
3023.000	54.40	-12.95	41.45	74.00	-32.55	peak	H
4402.000	52.78	-9.09	43.69	74.00	-30.31	peak	H
6628.000	50.90	-3.15	47.75	74.00	-26.25	peak	H
3065.000	54.43	-12.76	41.67	74.00	-32.33	peak	V
4924.000	55.20	-7.59	47.61	74.00	-26.39	peak	V
6649.000	51.26	-3.09	48.17	74.00	-25.83	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	02/15/2016		
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
3128.000	54.07	-12.50	41.57	74.00	-32.43	peak	H
4824.000	53.74	-7.90	45.84	74.00	-28.16	peak	H
6677.000	51.30	-3.01	48.29	74.00	-25.71	peak	H
3037.000	54.56	-12.89	41.67	74.00	-32.33	peak	V
4824.000	55.85	-7.90	47.95	74.00	-26.05	peak	V
6691.000	50.60	-2.96	47.64	74.00	-26.36	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	02/15/2016		
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
2939.000	54.30	-13.19	41.11	74.00	-32.89	peak	H
4486.000	53.10	-8.94	44.16	74.00	-29.84	peak	H
6705.000	51.12	-2.91	48.21	74.00	-25.79	peak	H
2960.000	55.63	-13.14	42.49	74.00	-31.51	peak	V
4874.000	56.12	-7.75	48.37	74.00	-25.63	peak	V
6474.000	51.75	-3.66	48.09	74.00	-25.91	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	02/15/2016		
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
3100.000	54.94	-12.61	42.33	74.00	-31.67	peak	H
4472.000	53.33	-8.96	44.37	74.00	-29.63	peak	H
6789.000	51.65	-2.66	48.99	74.00	-25.01	peak	H
3282.000	54.02	-11.84	42.18	74.00	-31.82	peak	V
4924.000	54.23	-7.59	46.64	74.00	-27.36	peak	V
6691.000	50.85	-2.96	47.89	74.00	-26.11	peak	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 5			Date:	02/15/2016		
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
3121.000	54.18	-12.53	41.65	74.00	-32.35	peak	H
4844.000	53.03	-7.83	45.20	74.00	-28.80	peak	H
6628.000	50.99	-3.15	47.84	74.00	-26.16	peak	H
3044.000	55.14	-12.86	42.28	74.00	-31.72	peak	V
4844.000	54.39	-7.83	46.56	74.00	-27.44	peak	V
6698.000	51.44	-2.94	48.50	74.00	-25.50	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 5		Date:		02/15/2016	
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
2953.000	54.59	-13.17	41.42	74.00	-32.58	peak	H
4675.000	53.24	-8.37	44.87	74.00	-29.13	peak	H
6698.000	51.32	-2.94	48.38	74.00	-25.62	peak	H
3212.000	54.88	-12.15	42.73	74.00	-31.27	peak	V
4874.000	53.28	-7.75	45.53	74.00	-28.47	peak	V
6614.000	50.72	-3.19	47.53	74.00	-26.47	peak	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 5		Date:		02/15/2016	
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
3023.000	53.93	-12.95	40.98	74.00	-33.02	peak	H
4682.000	52.20	-8.34	43.86	74.00	-30.14	peak	H
6740.000	50.28	-2.82	47.46	74.00	-26.54	peak	H
3268.000	55.54	-11.91	43.63	74.00	-30.37	peak	V
4787.000	52.92	-8.01	44.91	74.00	-29.09	peak	V
6754.000	50.91	-2.77	48.14	74.00	-25.86	peak	V

Band Edge

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 2		Date:		02/15/2016	
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
2376.660	53.46	-0.38	53.08	74.00	-20.92	peak	H
2376.660	45.83	-0.38	45.45	54.00	-8.55	AVG	H
2390.000	51.46	-0.33	51.13	74.00	-22.87	peak	H
2387.770	58.27	-0.33	57.94	74.00	-16.06	peak	V
2387.770	46.90	-0.33	46.57	54.00	-7.43	AVG	V
2390.000	56.50	-0.33	56.17	74.00	-17.83	peak	V
2390.000	47.45	-0.33	47.12	54.00	-6.88	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 2			Date:	02/15/2016		
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	53.30	0.03	53.33	74.00	-20.67	peak	H
2483.500	45.64	0.03	45.67	54.00	-8.33	AVG	H
2490.440	55.45	0.06	55.51	74.00	-18.49	peak	H
2490.440	44.29	0.06	44.35	54.00	-9.65	AVG	H
2483.500	58.64	0.03	58.67	74.00	-15.33	peak	V
2483.500	48.10	0.03	48.13	54.00	-5.87	AVG	V
2489.440	60.12	0.05	60.17	74.00	-13.83	peak	V
2489.440	47.77	0.05	47.82	54.00	-6.18	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	02/15/2016		
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
2389.750	58.22	-0.33	57.89	74.00	-16.11	peak	H
2389.750	44.43	-0.33	44.10	54.00	-9.90	AVG	H
2390.000	59.21	-0.33	58.88	74.00	-15.12	peak	H
2390.000	44.59	-0.33	44.26	54.00	-9.74	AVG	H
2388.100	58.30	-0.33	57.97	74.00	-16.03	peak	V
2388.100	44.71	-0.33	44.38	54.00	-9.62	AVG	V
2390.000	58.23	-0.33	57.90	74.00	-16.10	peak	V
2390.000	45.23	-0.33	44.90	54.00	-9.10	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 3			Date:	02/15/2016		
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	53.35	0.03	53.38	74.00	-20.62	peak	H
2483.500	44.42	0.03	44.45	54.00	-9.55	AVG	H
2484.240	53.86	0.03	53.89	74.00	-20.11	peak	H
2484.240	44.23	0.03	44.26	54.00	-9.74	AVG	H
2483.500	56.32	0.03	56.35	74.00	-17.65	peak	V
2483.500	45.16	0.03	45.19	54.00	-8.81	AVG	V
2483.840	58.26	0.03	58.29	74.00	-15.71	peak	V
2483.840	45.05	0.03	45.08	54.00	-8.92	AVG	V

Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 4			Date:	02/15/2016		
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
2389.750	58.06	-0.33	57.73	74.00	-16.27	peak	H
2389.750	45.25	-0.33	44.92	54.00	-9.08	AVG	H
2390.000	55.47	-0.33	55.14	74.00	-18.86	peak	H
2390.000	45.39	-0.33	45.06	54.00	-8.94	AVG	H
2389.530	63.15	-0.33	62.82	74.00	-11.18	peak	V
2389.530	47.83	-0.33	47.50	54.00	-6.50	AVG	V
2390.000	61.77	-0.33	61.44	74.00	-12.56	peak	V
2390.000	47.91	-0.33	47.58	54.00	-6.42	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 4		Date:		02/15/2016	
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	52.35	0.03	52.38	74.00	-21.62	peak	H
2483.500	45.07	0.03	45.10	54.00	-8.90	AVG	H
2484.840	55.41	0.03	55.44	74.00	-18.56	peak	H
2484.840	44.82	0.03	44.85	54.00	-9.15	AVG	H
2483.500	57.55	0.03	57.58	74.00	-16.42	peak	V
2483.500	47.09	0.03	47.12	54.00	-6.88	AVG	V
2489.840	59.96	0.05	60.01	74.00	-13.99	peak	V
2489.840	46.92	0.05	46.97	54.00	-7.03	AVG	V

Standard:		FCC Part 15C		Test Distance:		3m	
Test item:		Radiated Emission		Power:		AC 120V/60Hz	
Model Number:		VR-3033u		Temp.(°C)/Hum.(%RH):		26(°C)/60%RH	
Mode:		Mode 5		Date:		02/15/2016	
Frequency:		2422 MHz		Test By:		Eric Ou Yang	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2386.680	61.12	-0.34	60.78	74.00	-13.22	peak	H
2386.680	45.97	-0.34	45.63	54.00	-8.37	AVG	H
2390.000	56.85	-0.33	56.52	74.00	-17.48	peak	H
2390.000	45.79	-0.33	45.46	54.00	-8.54	AVG	H
2386.560	65.17	-0.34	64.83	74.00	-9.17	peak	V
2386.560	47.76	-0.34	47.42	54.00	-6.58	AVG	V
2390.000	60.75	-0.33	60.42	74.00	-13.58	peak	V
2390.000	47.59	-0.33	47.26	54.00	-6.74	AVG	V

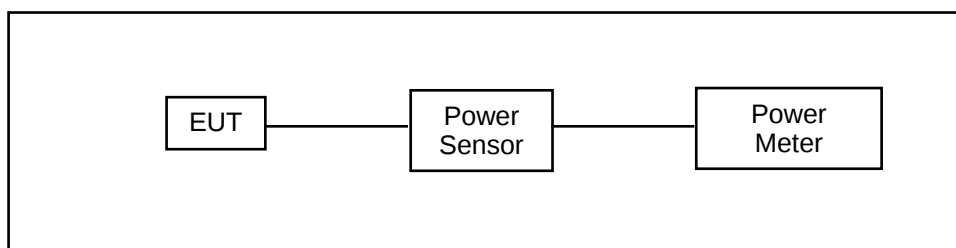
Standard:	FCC Part 15C			Test Distance:	3m		
Test item:	Radiated Emission			Power:	AC 120V/60Hz		
Model Number:	VR-3033u			Temp.(°C)/Hum.(%RH):	26(°C)/60%RH		
Mode:	Mode 5			Date:	02/15/2016		
Frequency:	2452 MHz			Test By:	Eric Ou Yang		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2483.500	53.72	0.03	53.75	74.00	-20.25	peak	H
2483.500	45.62	0.03	45.65	54.00	-8.35	AVG	H
2484.600	55.48	0.03	55.51	74.00	-18.49	peak	H
2484.600	45.38	0.03	45.41	54.00	-8.59	AVG	H
2483.500	61.07	0.03	61.10	74.00	-12.90	peak	V
2483.500	48.60	0.03	48.63	54.00	-5.37	AVG	V
2485.900	62.54	0.03	62.57	74.00	-11.43	peak	V
2485.900	47.51	0.03	47.54	54.00	-6.46	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.

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/11/2015	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/11/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

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

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

6.4. Test Procedure

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

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

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

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

6.5. Test Result

Model Number	VR-3033u						
Test Item	Maximum Conducted Output Power						
Date of Test	01/08/2016						
ANT-0							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 2	2412	1M	17.26	0.053	21.25	0.133	< 30
	2437		17.30	0.054	21.33	0.136	< 30
	2462		17.16	0.052	21.12	0.129	< 30
	2437	2M	17.25	0.053	21.23	0.133	< 30
	2437	5.5M	17.21	0.053	21.18	0.131	< 30
	2437	11M	17.14	0.052	21.08	0.128	< 30
Mode 3	2412	6M	16.15	0.041	26.18	0.415	< 30
	2437		15.98	0.040	26.00	0.398	< 30
	2462		15.86	0.039	25.90	0.389	< 30
	2437	9M	15.95	0.039	25.98	0.396	< 30
	2437	12M	15.93	0.039	25.97	0.395	< 30
	2437	18M	15.88	0.039	25.94	0.393	< 30
	2437	24M	15.80	0.038	25.86	0.385	< 30
	2437	36M	15.75	0.038	25.83	0.383	< 30
	2437	48M	15.72	0.037	25.81	0.381	< 30
	2437	54M	15.66	0.037	25.78	0.378	< 30

Model Number	VR-3033u						
Test Item	Maximum Conducted Output Power						
Date of Test	01/08/2016						
ANT-0							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 4	2412	13M	16.39	0.044	26.47	0.444	< 30
	2437		16.25	0.042	26.30	0.427	< 30
	2462		15.93	0.039	25.96	0.394	< 30
	2437	26M	16.21	0.042	26.25	0.422	< 30
	2437	39M	16.14	0.041	26.16	0.413	< 30
	2437	52M	16.10	0.041	26.14	0.411	< 30
	2437	78M	16.07	0.040	26.10	0.407	< 30
	2437	104M	16.02	0.040	26.08	0.406	< 30
	2437	117M	15.99	0.040	26.02	0.400	< 30
	2437	130M	15.95	0.039	25.98	0.396	< 30
Mode 5	2422	27M	15.14	0.033	25.28	0.337	< 30
	2437		14.91	0.031	25.10	0.324	< 30
	2452		15.05	0.032	25.17	0.329	< 30
	2437	54M	14.89	0.031	25.06	0.321	< 30
	2437	81M	14.82	0.030	25.01	0.317	< 30
	2437	108M	14.76	0.030	24.95	0.313	< 30
	2437	162M	14.74	0.030	24.90	0.309	< 30
	2437	216M	14.68	0.029	24.84	0.305	< 30
	2437	243M	14.62	0.029	24.75	0.299	< 30
	2437	135M	14.57	0.029	24.65	0.292	< 30

Model Number	VR-3033u						
Test Item	Maximum Conducted Output Power						
Date of Test	01/08/2016						
ANT-1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 3	2412	6M	15.27	0.034	25.45	0.351	< 30
	2437		15.07	0.032	25.20	0.331	< 30
	2462		14.84	0.030	25.04	0.319	< 30
	2437	9M	15.03	0.032	25.16	0.328	< 30
	2437	12M	15.00	0.032	25.15	0.327	< 30
	2437	18M	14.95	0.031	25.13	0.326	< 30
	2437	24M	14.93	0.031	25.11	0.324	< 30
	2437	36M	14.87	0.031	25.04	0.319	< 30
	2437	48M	14.85	0.031	25.02	0.318	< 30
	2437	54M	14.81	0.030	24.99	0.316	< 30
Mode 4	2412	13M	15.15	0.033	25.30	0.339	< 30
	2437		14.81	0.030	25.00	0.316	< 30
	2462		14.63	0.029	24.78	0.301	< 30
	2437	26M	14.79	0.030	24.97	0.314	< 30
	2437	39M	14.76	0.030	24.94	0.312	< 30
	2437	52M	14.71	0.030	24.88	0.308	< 30
	2437	78M	14.67	0.029	24.82	0.303	< 30
	2437	104M	14.63	0.029	24.77	0.300	< 30
	2437	117M	14.60	0.029	24.72	0.296	< 30
	2437	130M	14.55	0.029	24.61	0.289	< 30
Mode 5	2422	27M	14.59	0.029	24.69	0.294	< 30
	2437		14.25	0.027	24.33	0.271	< 30
	2452		14.28	0.027	24.38	0.274	< 30
	2437	54M	14.20	0.026	24.26	0.267	< 30
	2437	81M	14.17	0.026	24.21	0.264	< 30
	2437	108M	14.15	0.026	24.20	0.263	< 30
	2437	162M	14.11	0.026	24.15	0.260	< 30
	2437	216M	14.08	0.026	24.12	0.258	< 30
	2437	243M	14.02	0.025	24.08	0.256	< 30
	2437	135M	13.96	0.025	24.01	0.252	< 30

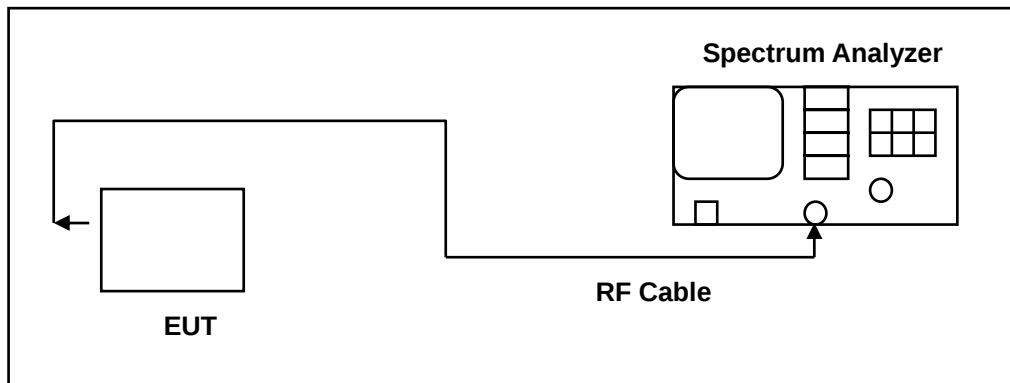
Model Number	VR-3033u						
Test Item	Maximum Conducted Output Power						
Date of Test	01/08/2016						
ANT-0+1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 4	2412	13M	18.82	0.076	28.93	0.782	< 30
	2437		18.60	0.072	28.71	0.743	< 30
	2462		18.34	0.068	28.42	0.695	< 30
	2437	26M	18.57	0.072	28.67	0.736	< 30
	2437	39M	18.51	0.071	28.60	0.725	< 30
	2437	52M	18.47	0.070	28.57	0.719	< 30
	2437	78M	18.44	0.070	28.52	0.711	< 30
	2437	104M	18.39	0.069	28.48	0.705	< 30
	2437	117M	18.36	0.069	28.43	0.696	< 30
	2437	130M	18.32	0.068	28.36	0.685	< 30
Mode 5	2422	27M	17.88	0.061	28.01	0.632	< 30
	2437		17.60	0.058	27.74	0.595	< 30
	2452		17.69	0.059	27.80	0.603	< 30
	2437	54M	17.57	0.057	27.69	0.587	< 30
	2437	81M	17.52	0.056	27.64	0.581	< 30
	2437	108M	17.48	0.056	27.60	0.576	< 30
	2437	162M	17.45	0.056	27.55	0.569	< 30
	2437	216M	17.40	0.055	27.51	0.563	< 30
	2437	243M	17.34	0.054	27.44	0.554	< 30
	2437	135M	17.29	0.054	27.35	0.544	< 30

7 6dB RF Bandwidth Measurement

7.1. Limit

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

7.2. Test Setup



7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

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

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

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 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.

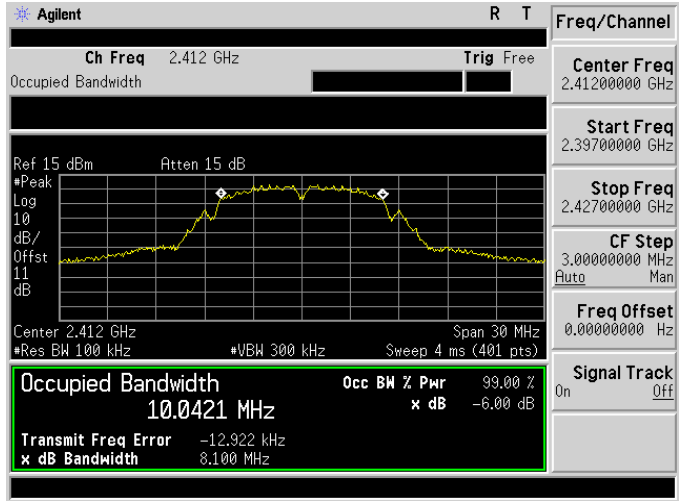
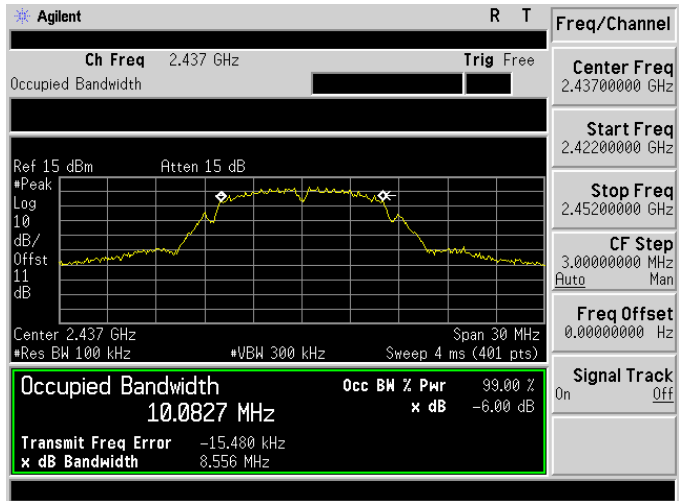
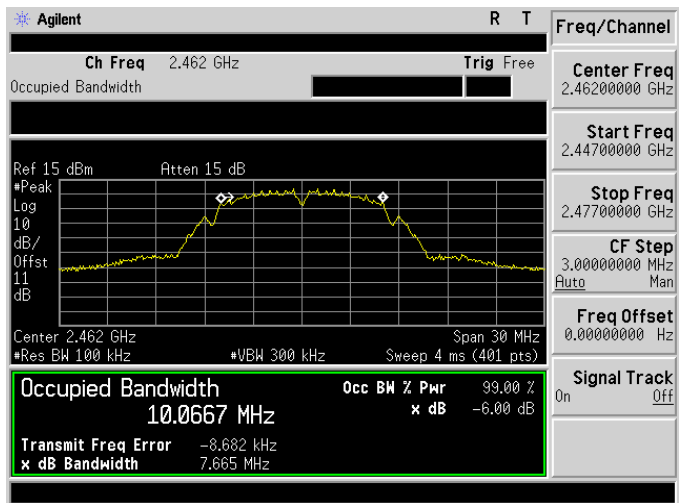
The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

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

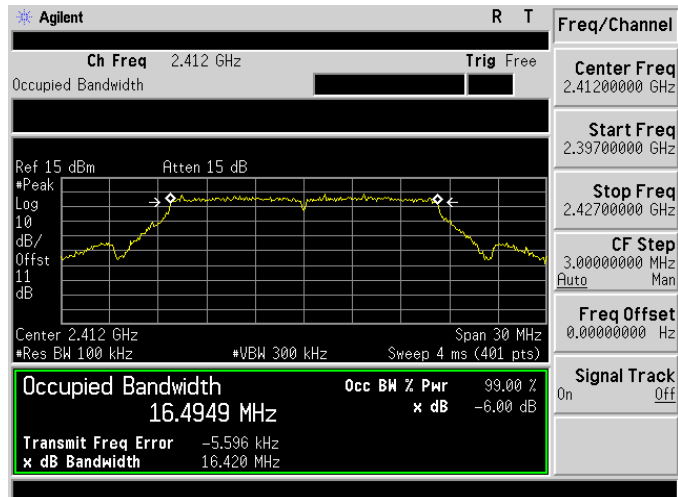
Model Number	VR-3033u		
Test Item	6dB RF Bandwidth		
Date of Test	02/17/2016		
ANT-0			
Test Mode	Frequency (MHz)	Measurement Results	Limit
		kHz	kHz
Mode 2	2412	8100	> 500
	2437	8556	> 500
	2462	7665	> 500
Mode 3	2412	16420	> 500
	2437	16468	> 500
	2462	16431	> 500
Mode 4	2412	17424	> 500
	2437	17590	> 500
	2462	17746	> 500
Mode 5	2422	35418	> 500
	2437	34015	> 500
	2452	35172	> 500
ANT-1			
Test Mode	Frequency (MHz)	Measurement Results	Limit
		kHz	kHz
Mode 4	2412	17654	> 500
	2437	17653	> 500
	2462	17621	> 500
Mode 5	2422	35869	> 500
	2437	35163	> 500
	2452	35236	> 500

7.6. Test Graphs

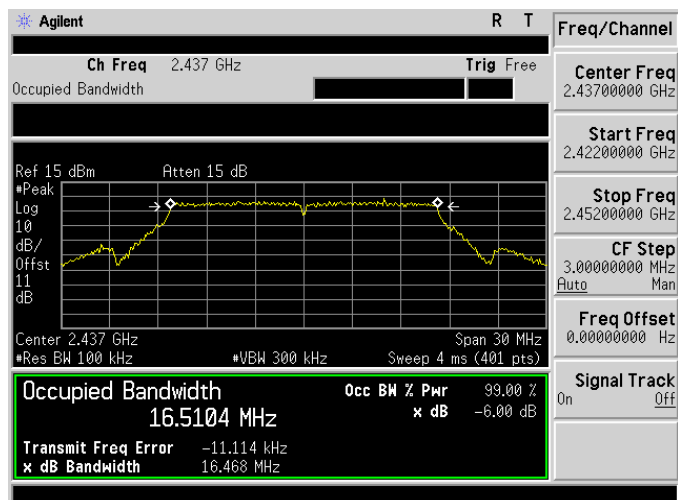
Mode 2: IEEE 802.11b link mode_ANT-0	
2412 MHz	 Agilent R T Ch Freq 2.412 GHz Trig Free Occupied Bandwidth Ref 15 dBm Atten 15 dB #Peak Log 10 dB/Offst 11 dB Center 2.412 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 10.0421 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -12.922 kHz x dB Bandwidth 8.100 MHz Freq/Channel Center Freq 2.41200000 GHz Start Freq 2.39700000 GHz Stop Freq 2.42700000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2437 MHz	 Agilent R T Ch Freq 2.437 GHz Trig Free Occupied Bandwidth Ref 15 dBm Atten 15 dB #Peak Log 10 dB/Offst 11 dB Center 2.437 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 10.0827 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -15.480 kHz x dB Bandwidth 8.556 MHz Freq/Channel Center Freq 2.43700000 GHz Start Freq 2.42200000 GHz Stop Freq 2.45200000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2462 MHz	 Agilent R T Ch Freq 2.462 GHz Trig Free Occupied Bandwidth Ref 15 dBm Atten 15 dB #Peak Log 10 dB/Offst 11 dB Center 2.462 GHz Span 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 4 ms (401 pts) Occupied Bandwidth 10.0667 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB Transmit Freq Error -8.602 kHz x dB Bandwidth 7.665 MHz Freq/Channel Center Freq 2.46200000 GHz Start Freq 2.44700000 GHz Stop Freq 2.47700000 GHz CF Step 3.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

Mode 3: IEEE 802.11g link mode_ANT-0

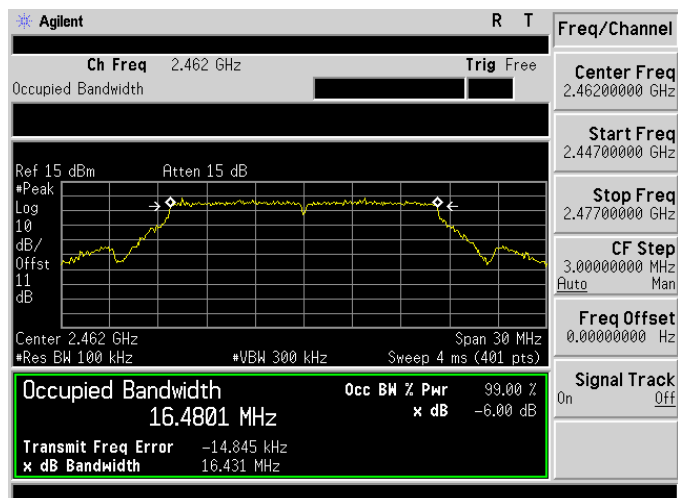
2412 MHz



2437 MHz

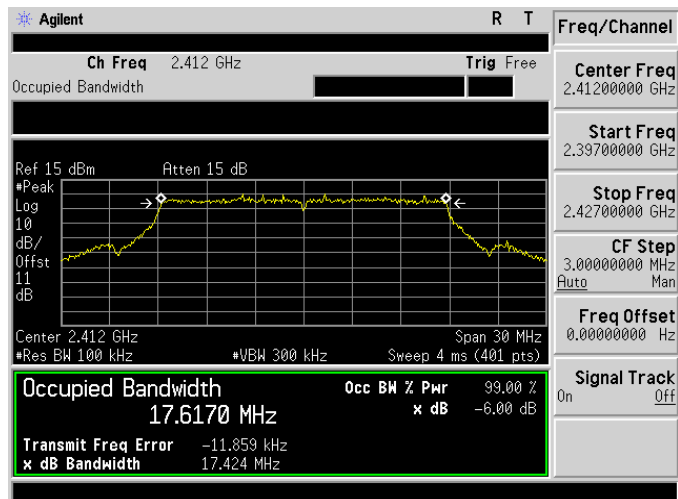


2462 MHz

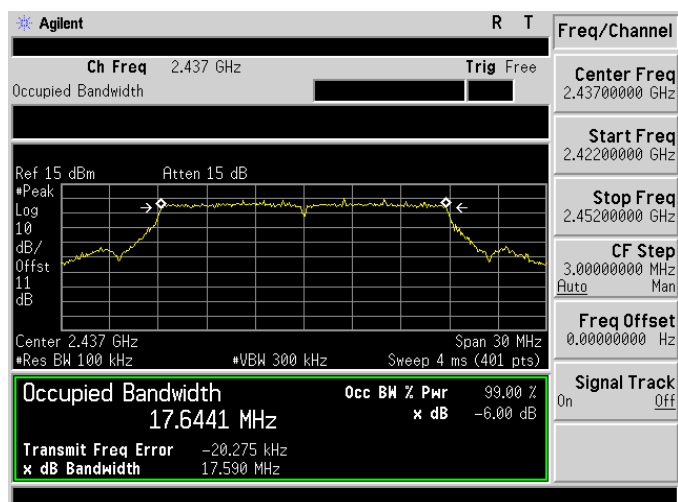


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0

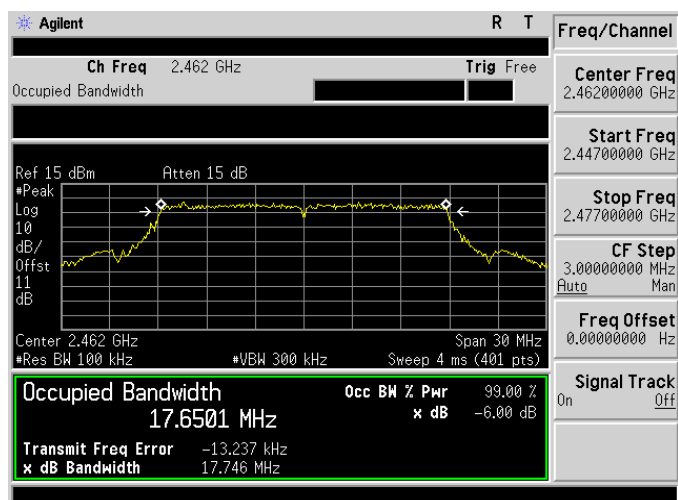
2412 MHz



2437 MHz

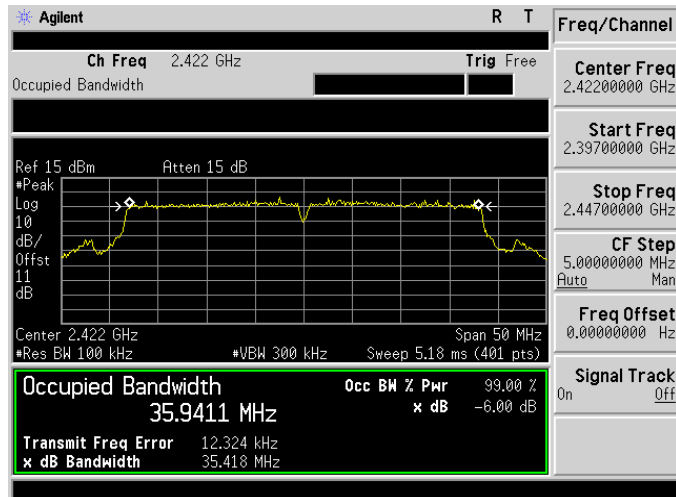


2462 MHz

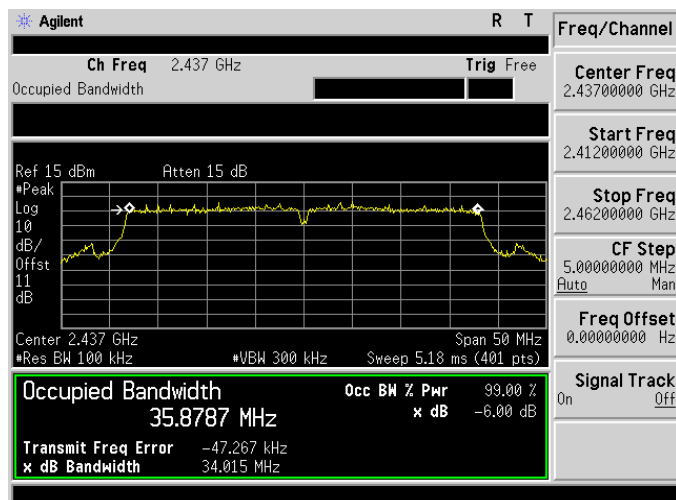


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0

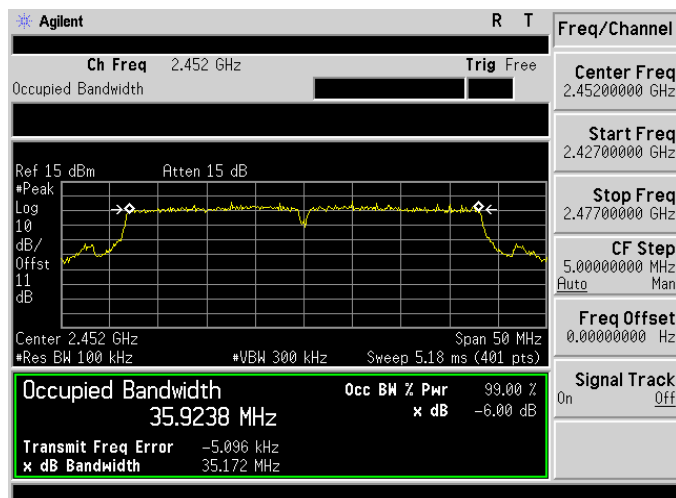
2422 MHz



2437 MHz

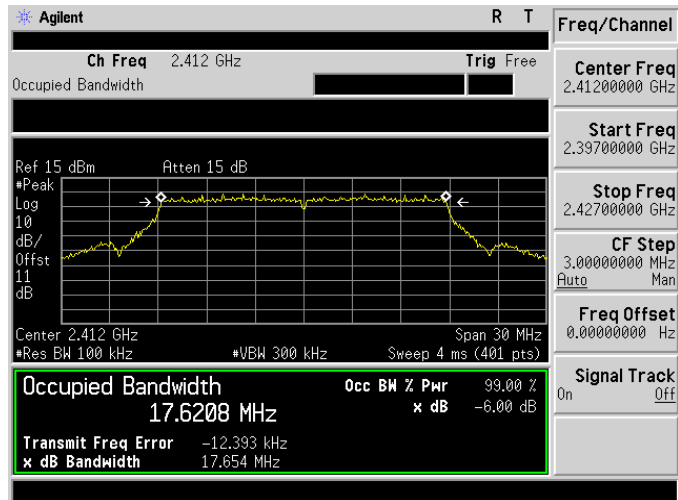


2452 MHz

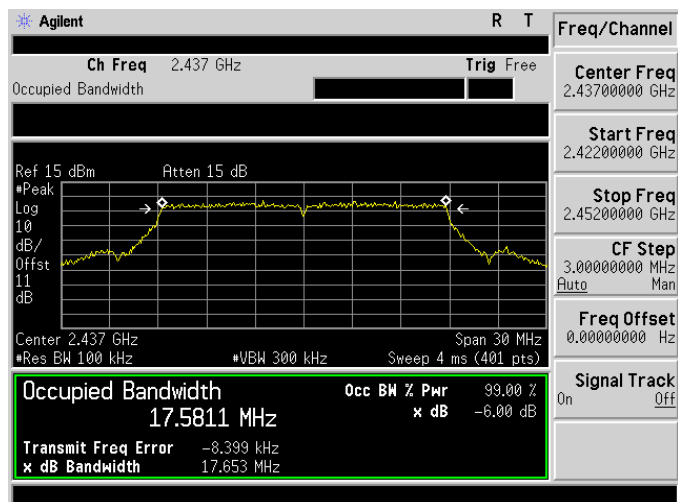


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1

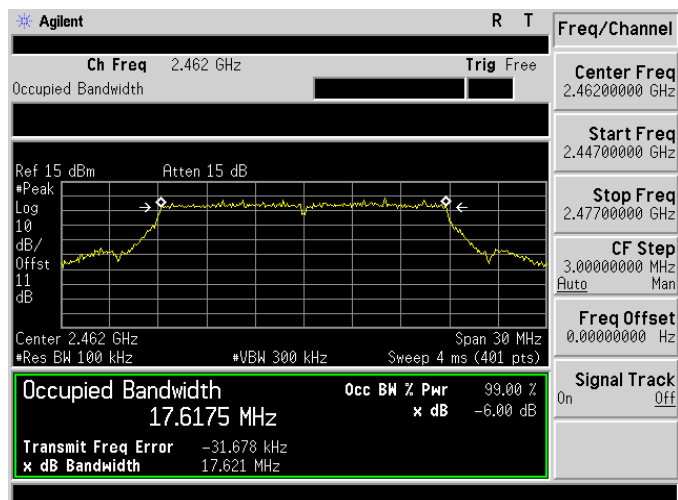
2412 MHz



2437 MHz

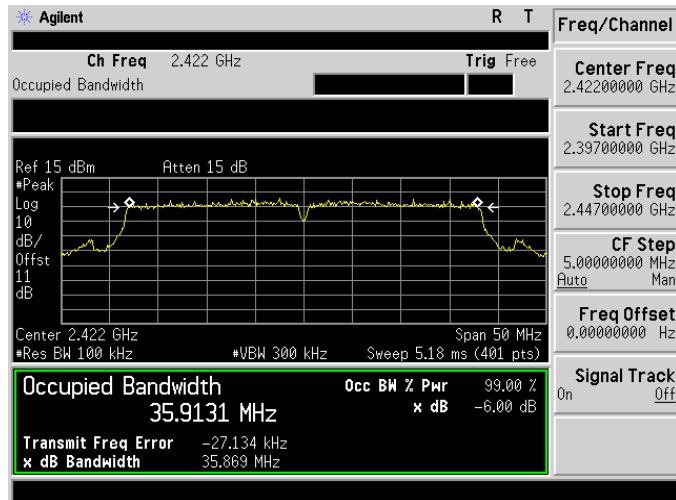


2462 MHz

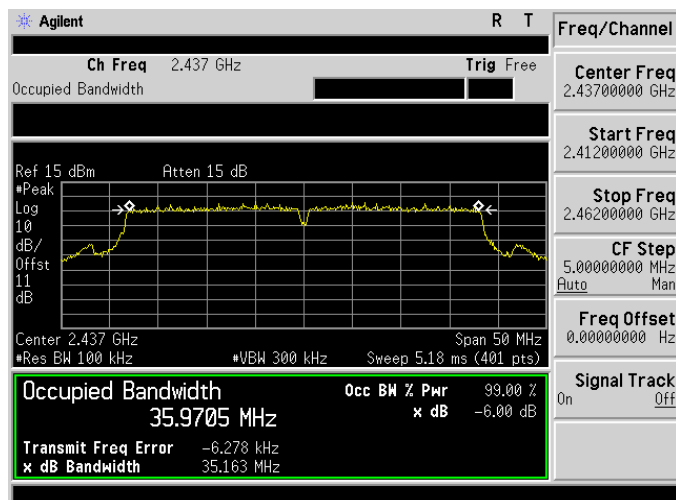


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1

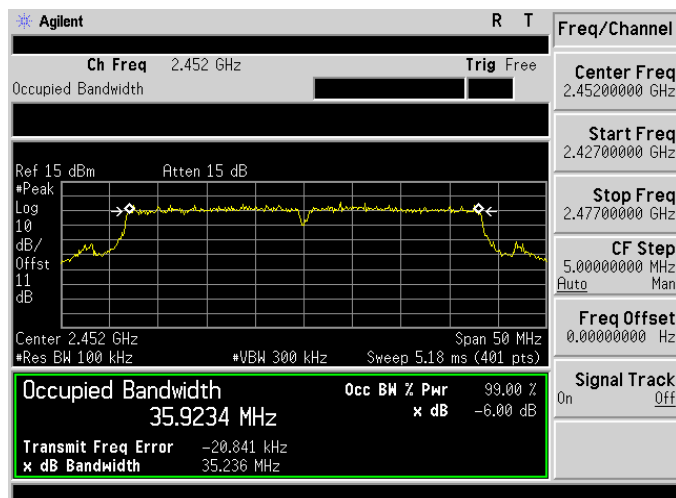
2422 MHz



2437 MHz



2452 MHz

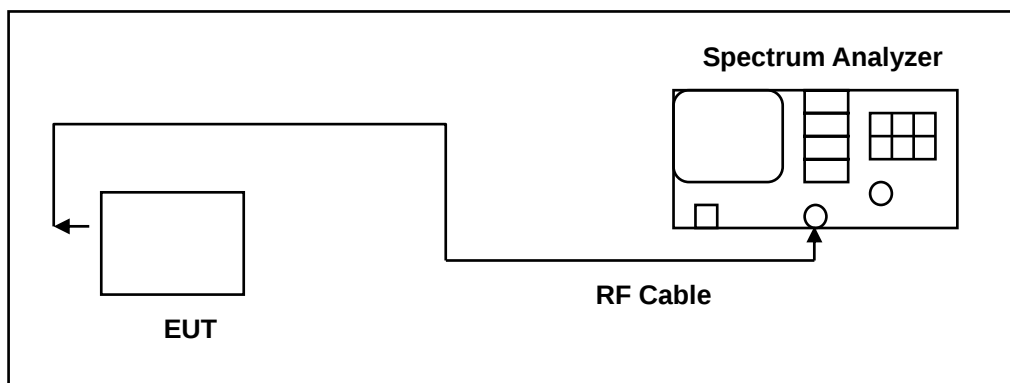


8 Maximum Power Density Measurement

8.1. Limit

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

8.2. Test Setup



8.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

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

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

8.4. Test Procedure

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

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

8.5. Test Result

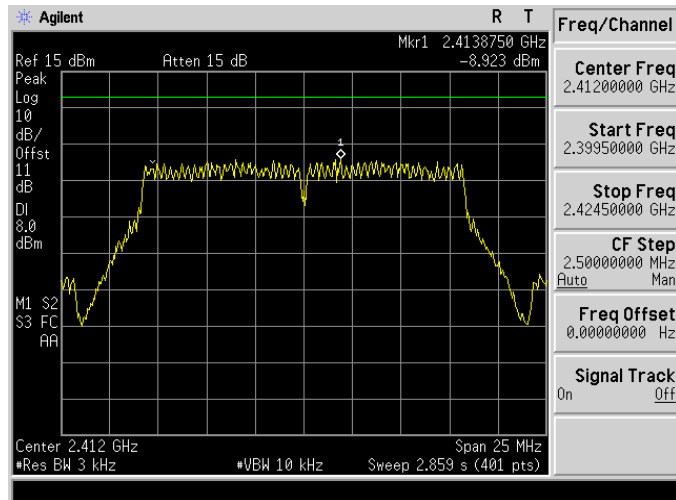
Model Number	VR-3033u		
Test Item	Maximum Power Density		
Date of Test	02/17/2016		
ANT-0			
Test Mode	Frequency (MHz)	Measurement Results (dBm/3KHz)	Limit (dBm/3KHz)
Mode 2	2412	-4.597	< 8
	2437	-3.016	< 8
	2462	-4.722	< 8
Mode 3	2412	-8.923	< 8
	2437	-8.824	< 8
	2462	-8.994	< 8
Mode 4	2412	-8.500	< 8
	2437	-8.415	< 8
	2462	-4.683	< 8
Mode 5	2422	-12.230	< 8
	2437	-11.240	< 8
	2452	-13.280	< 8
ANT-1			
Test Mode	Frequency (MHz)	Measurement Results (dBm/3KHz)	Limit (dBm/3KHz)
Mode 4	2412	-10.490	< 8
	2437	-10.690	< 8
	2462	-8.825	< 8
Mode 5	2422	-12.470	< 8
	2437	-13.790	< 8
	2452	-13.400	< 8

8.6. Test Graphs

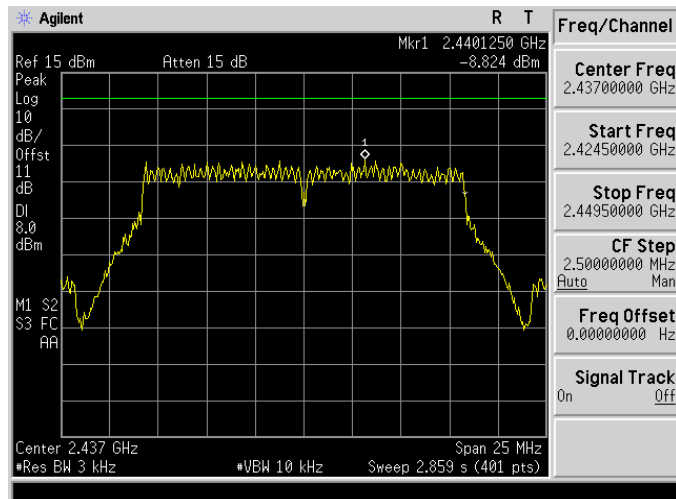
Mode 2: IEEE 802.11b link mode_ANT-0	
2412 MHz	Agilent R T Freq/Channel Ref 15 dBm Atten 15 dB Mkr1 2.4113175 GHz -4.597 dBm Center Freq 2.41200000 GHz Start Freq 2.40550000 GHz Stop Freq 2.41850000 GHz CF Step 1.30000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Center 2.412 GHz Span 13 MHz Res BW 3 kHz VBW 10 kHz Sweep 1.487 s (401 pts)
2437 MHz	Agilent R T Freq/Channel Ref 15 dBm Atten 15 dB Mkr1 2.4377150 GHz -3.016 dBm Center Freq 2.43700000 GHz Start Freq 2.43050000 GHz Stop Freq 2.44350000 GHz CF Step 1.30000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Center 2.437 GHz Span 13 MHz Res BW 3 kHz VBW 10 kHz Sweep 1.487 s (401 pts)
2462 MHz	Agilent R T Freq/Channel Ref 15 dBm Atten 15 dB Mkr1 2.4642100 GHz -4.722 dBm Center Freq 2.46200000 GHz Start Freq 2.45550000 GHz Stop Freq 2.46850000 GHz CF Step 1.30000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Center 2.462 GHz Span 13 MHz Res BW 3 kHz VBW 10 kHz Sweep 1.487 s (401 pts)

Mode 3: IEEE 802.11g link mode_ANT-0

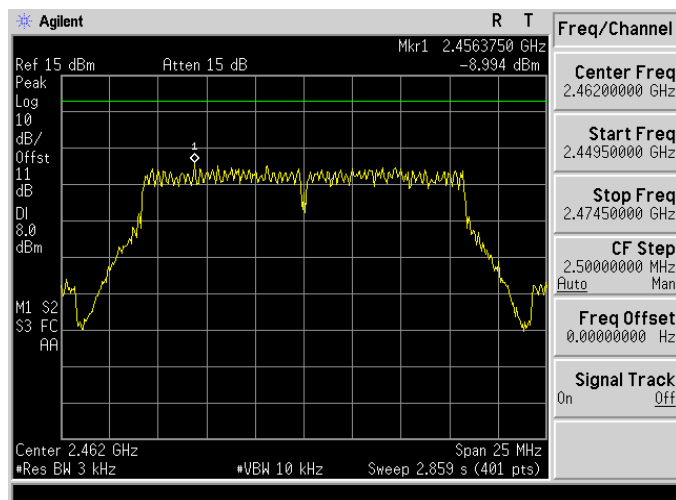
2412 MHz



2437 MHz

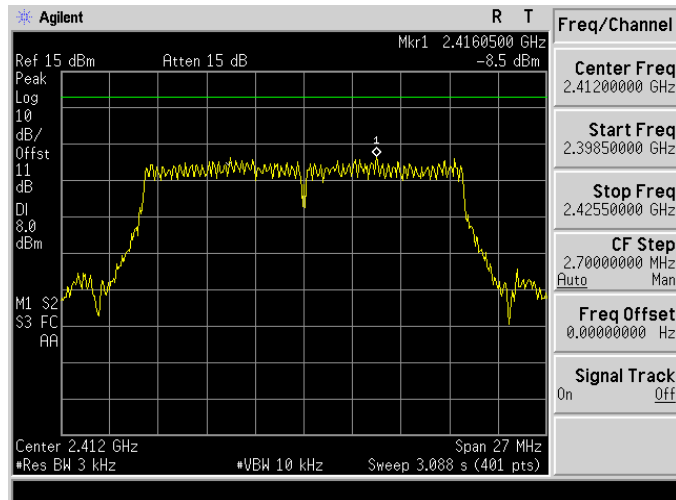


2462 MHz

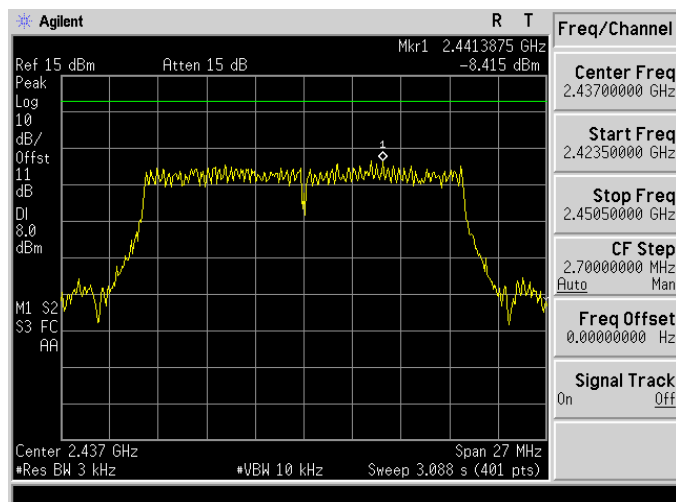


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-0

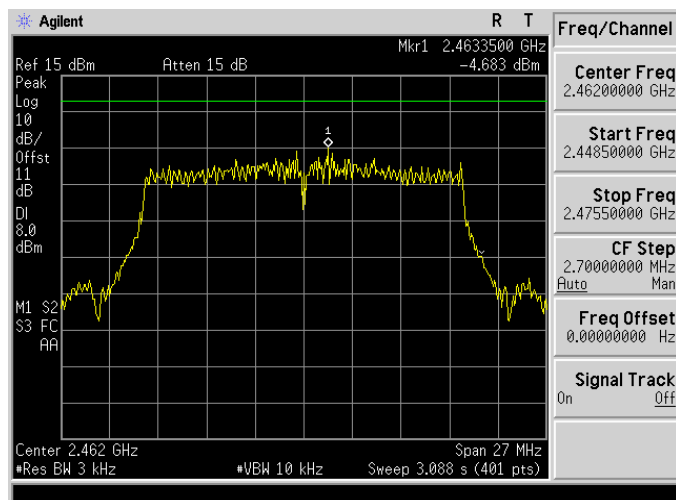
2412 MHz



2437 MHz

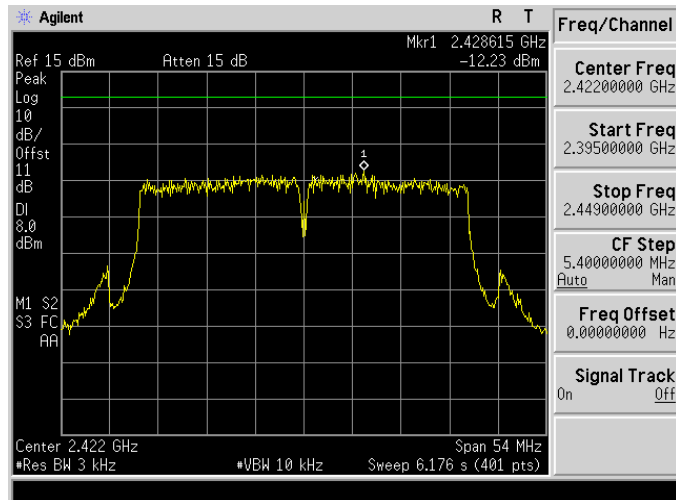


2462 MHz

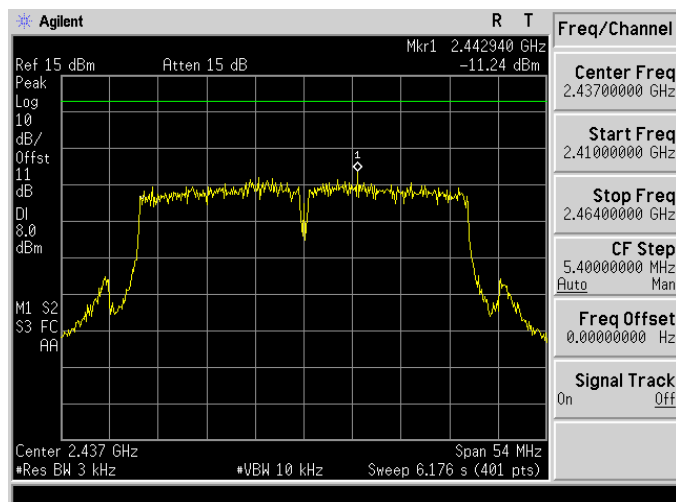


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-0

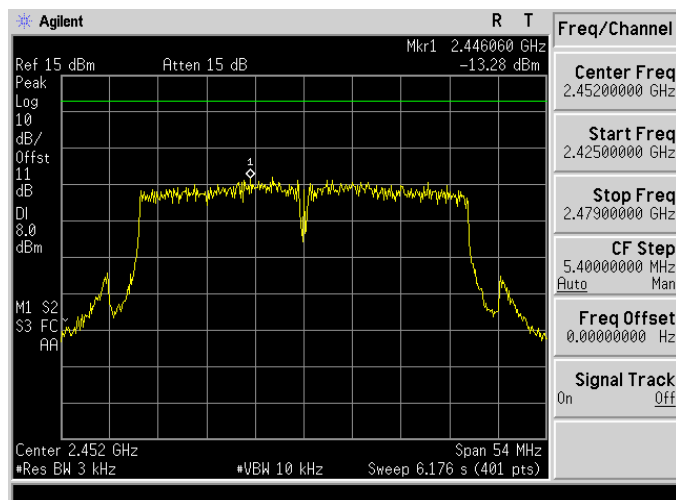
2422 MHz



2437 MHz

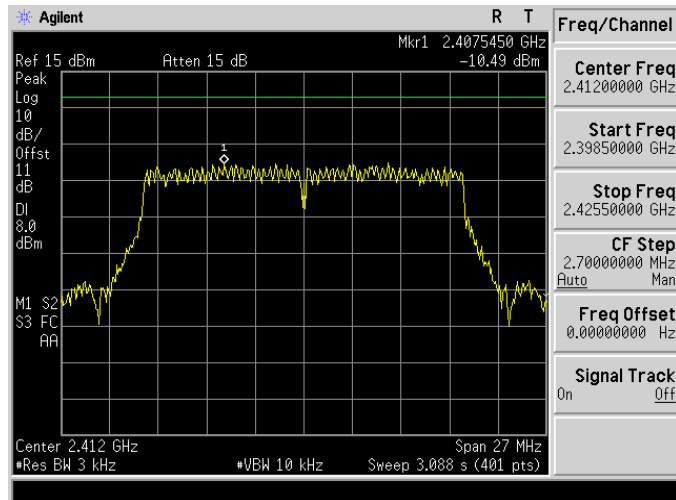


2452 MHz

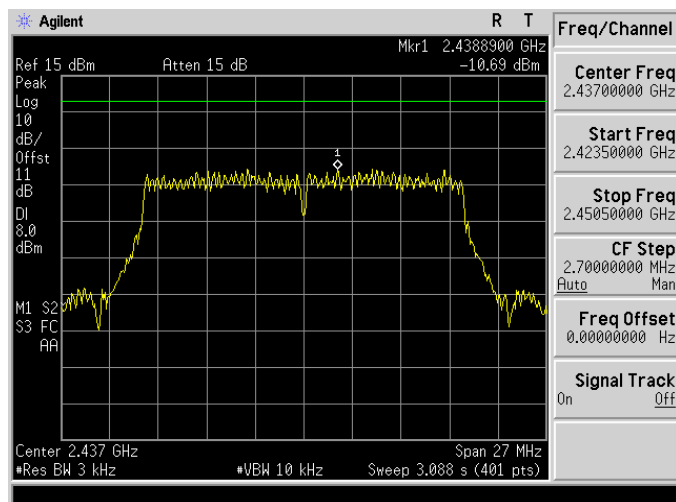


Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1

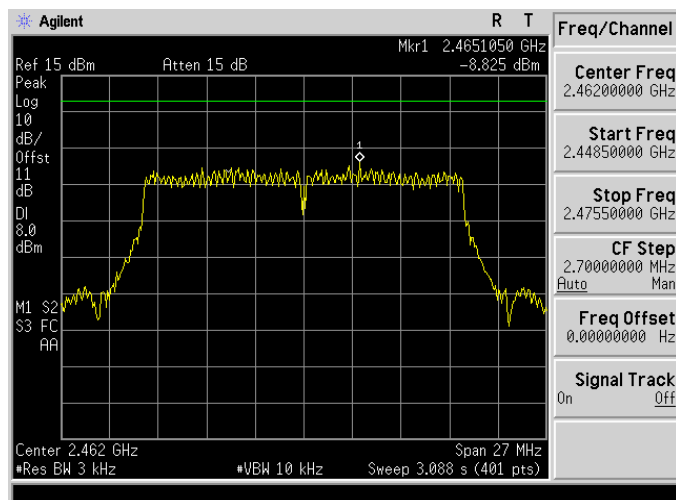
2412 MHz



2437 MHz

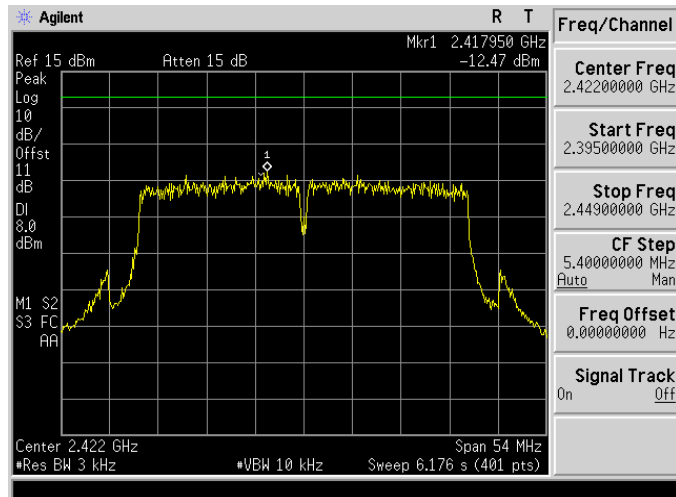


2462 MHz

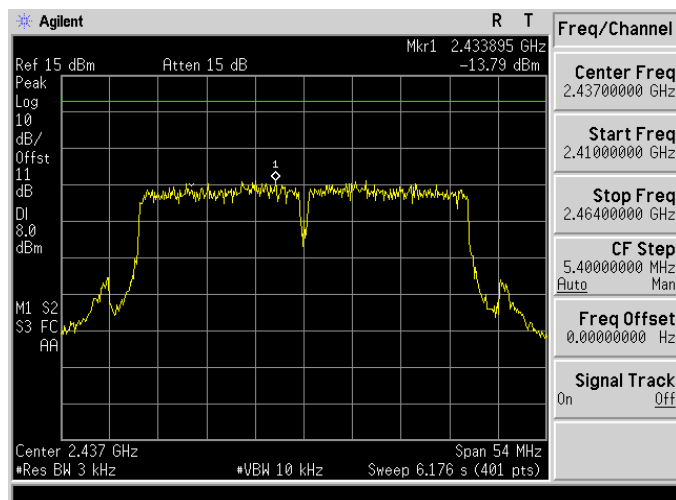


Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1

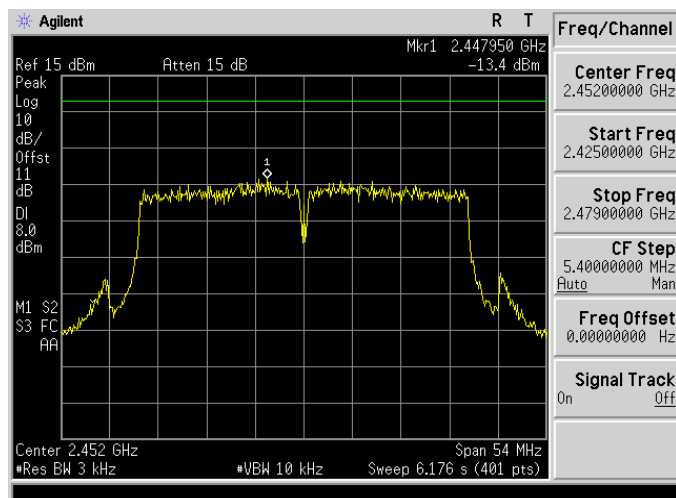
2422 MHz



2437 MHz



2452 MHz

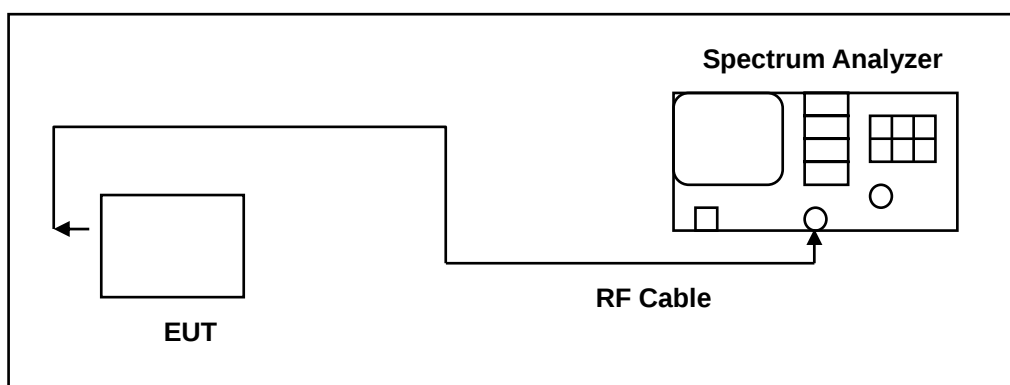


9 Out of Band Conducted Emissions Measurement

9.1. Limit

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

9.2. Test Setup



9.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/15/2015	(1)
Spectrum Analyzer	Agilent	E4408B	MY45107753	07/27/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/24/2015	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

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

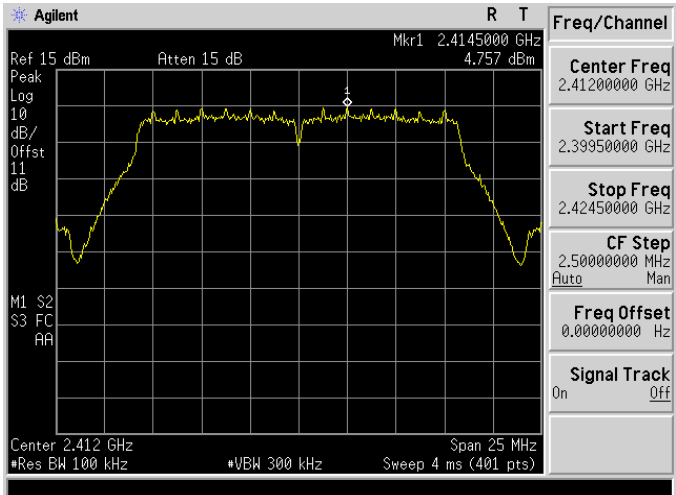
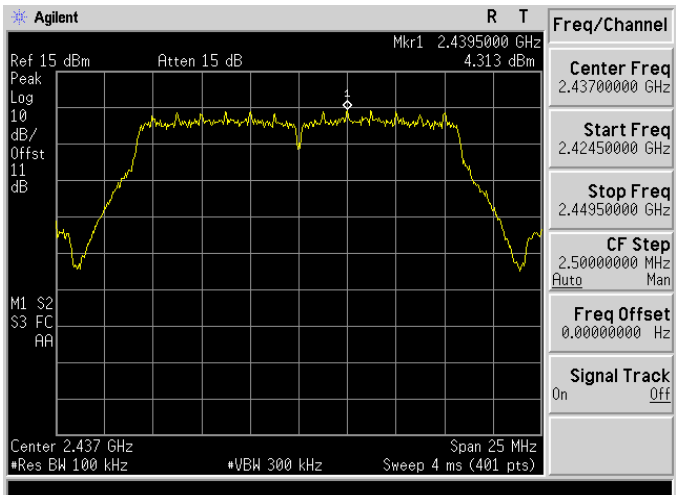
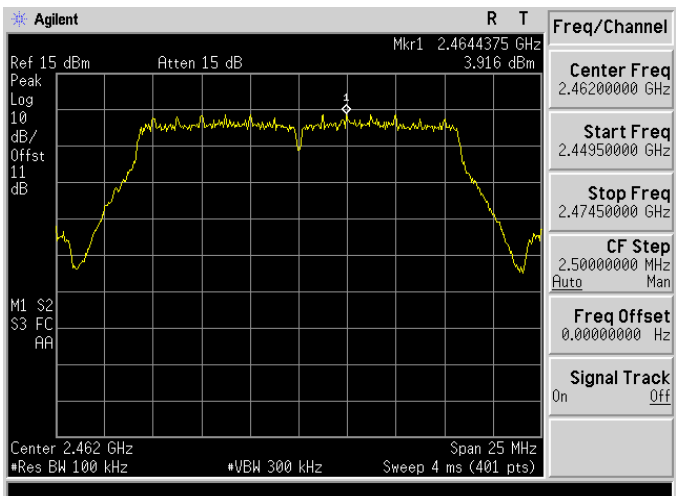
Note: N.C.R. = No Calibration Request.

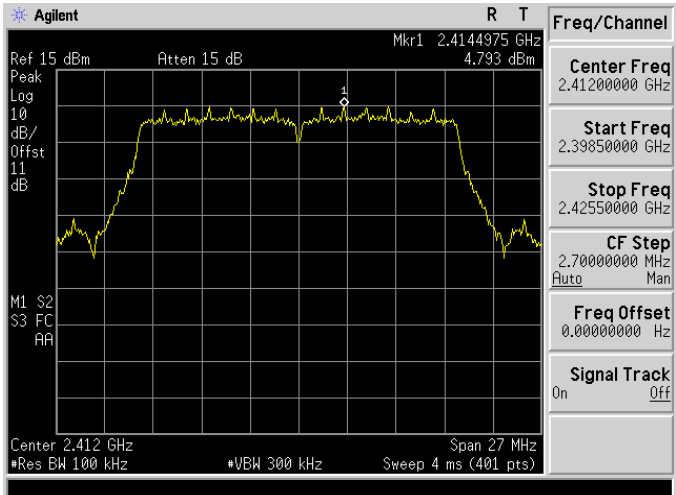
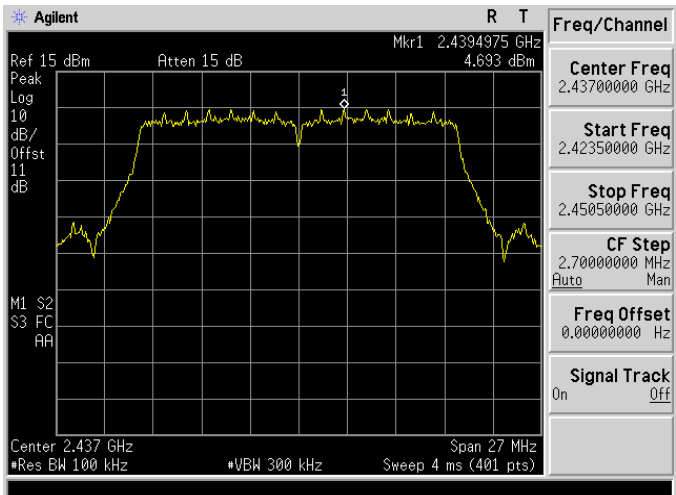
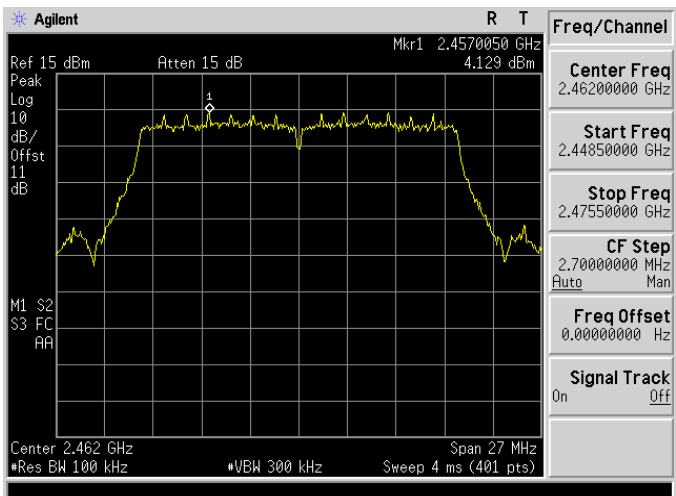
9.4. Test Procedure

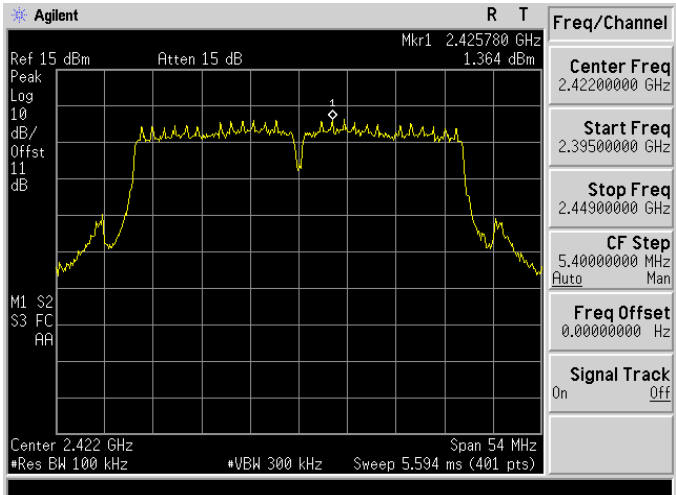
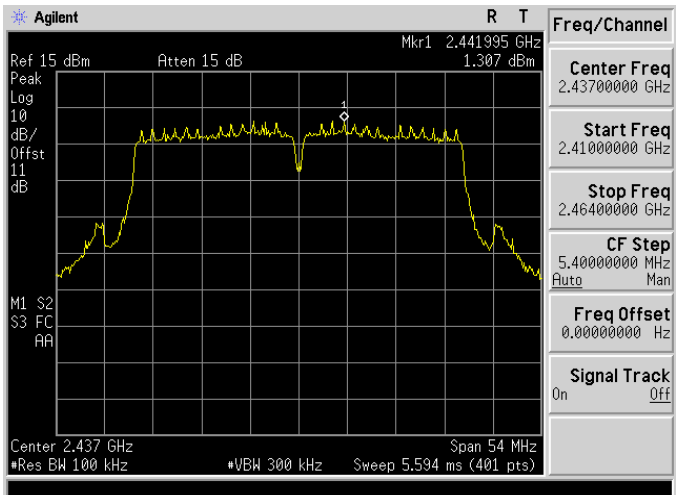
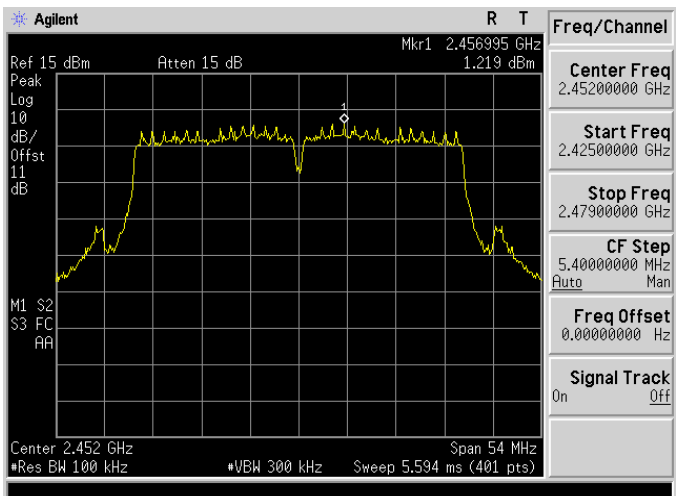
In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly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

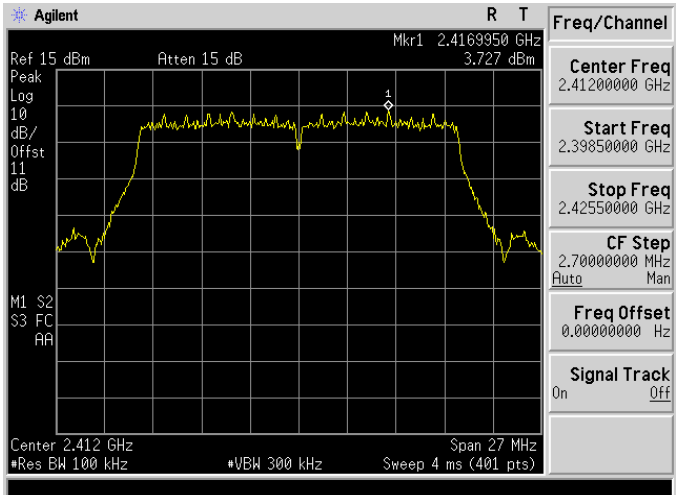
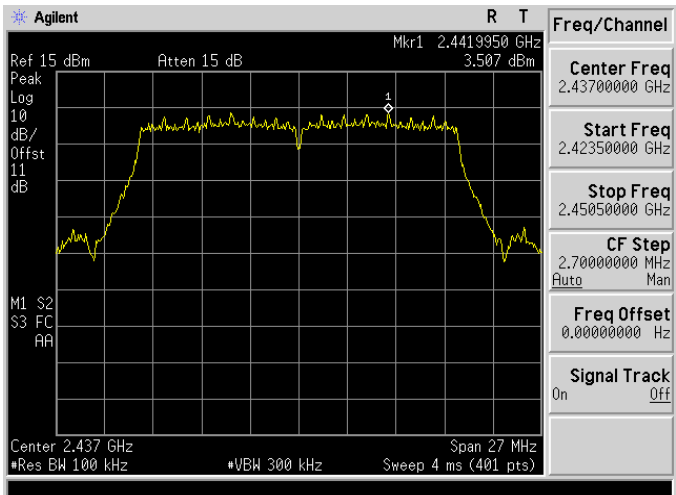
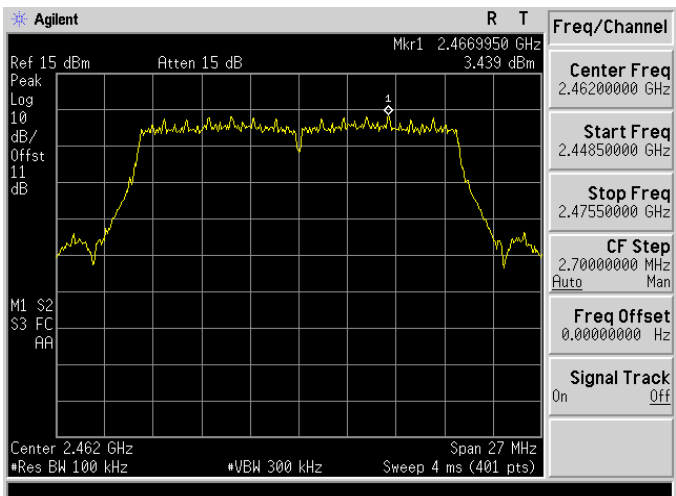
9.5. Test Graphs

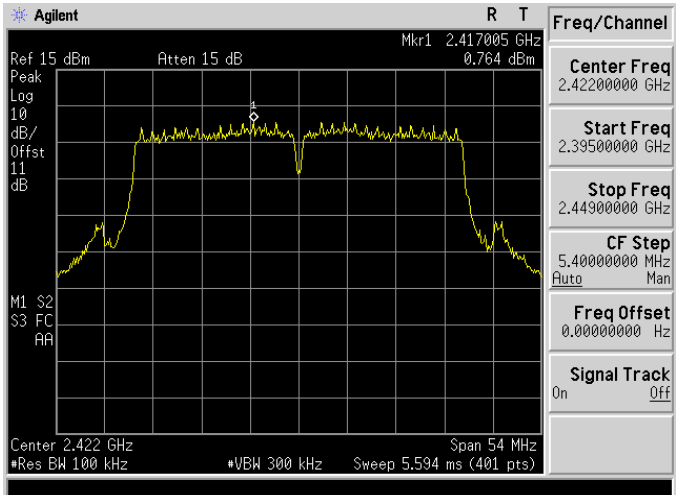
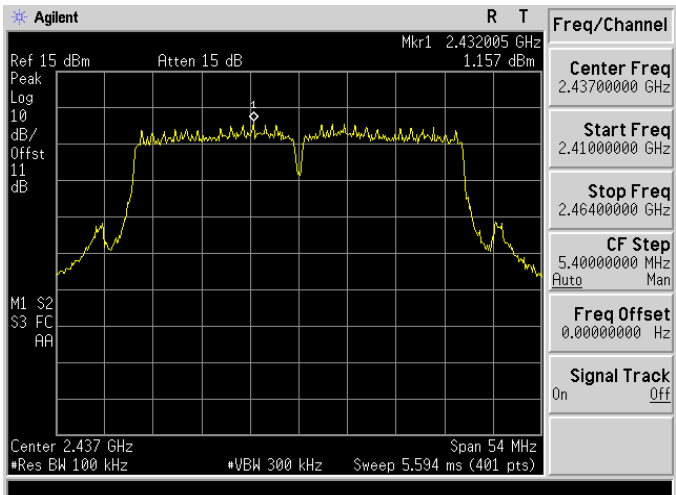
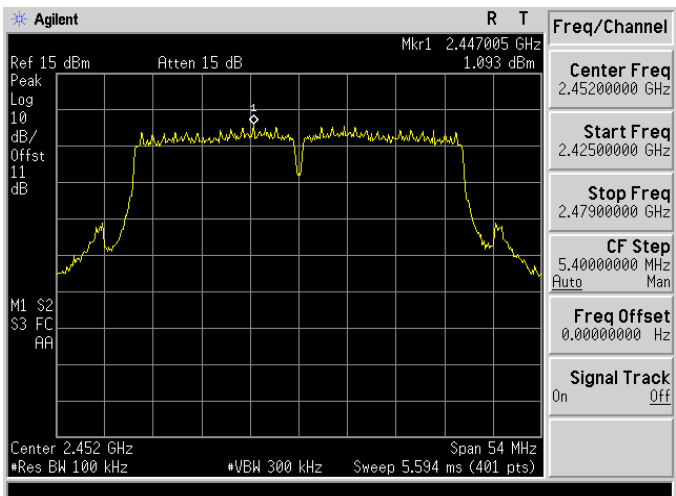
Reference level	
Mode 2: IEEE 802.11b link mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

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

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

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

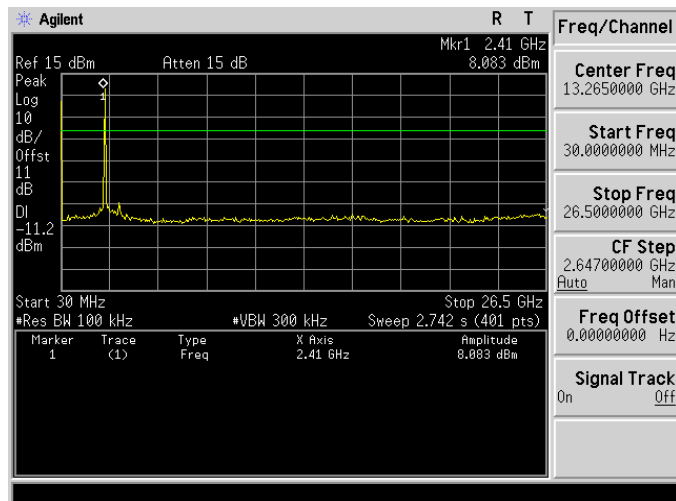
Reference level	
Mode 4: IEEE 802.11n 2.4GHz 20MHz link mode_ANT-1	
2412 MHz	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.4169950 GHz 3.727 dBm Center 2.412 GHz Span 27 MHz Res BW 100 kHz VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.41200000 GHz Start Freq 2.39850000 GHz Stop Freq 2.42550000 GHz CF Step 2.70000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2437 MHz	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.4419950 GHz 3.507 dBm Center 2.437 GHz Span 27 MHz Res BW 100 kHz VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.43700000 GHz Start Freq 2.42350000 GHz Stop Freq 2.45050000 GHz CF Step 2.70000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off
2462 MHz	 Agilent R T Ref 15 dBm Atten 15 dB Mkr1 2.4669950 GHz 3.439 dBm Center 2.462 GHz Span 27 MHz Res BW 100 kHz VBW 300 kHz Sweep 4 ms (401 pts) Freq/Channel Center Freq 2.46200000 GHz Start Freq 2.44850000 GHz Stop Freq 2.47550000 GHz CF Step 2.70000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off

Reference level	
Mode 5: IEEE 802.11n 2.4GHz 40MHz link mode_ANT-1	
2422 MHz	 Agilent Spectrum Analyzer Screenshot for 2422 MHz: - Ref: 15 dBm, Atten: 15 dB - Mkr1: 2.417005 GHz, 0.764 dBm - Center Freq: 2.42200000 GHz - Start Freq: 2.39500000 GHz - Stop Freq: 2.44900000 GHz - CF Step: 5.40000000 MHz (Auto) - Freq Offset: 0.00000000 Hz - Signal Track: On - Center: 2.422 GHz, Span: 54 MHz - Res BW: 100 kHz, VBW: 300 kHz, Sweep: 5.594 ms (401 pts)
2437 MHz	 Agilent Spectrum Analyzer Screenshot for 2437 MHz: - Ref: 15 dBm, Atten: 15 dB - Mkr1: 2.432005 GHz, 1.157 dBm - Center Freq: 2.43700000 GHz - Start Freq: 2.41000000 GHz - Stop Freq: 2.46400000 GHz - CF Step: 5.40000000 MHz (Auto) - Freq Offset: 0.00000000 Hz - Signal Track: On - Center: 2.437 GHz, Span: 54 MHz - Res BW: 100 kHz, VBW: 300 kHz, Sweep: 5.594 ms (401 pts)
2452 MHz	 Agilent Spectrum Analyzer Screenshot for 2452 MHz: - Ref: 15 dBm, Atten: 15 dB - Mkr1: 2.447005 GHz, 1.093 dBm - Center Freq: 2.45200000 GHz - Start Freq: 2.42500000 GHz - Stop Freq: 2.47900000 GHz - CF Step: 5.40000000 MHz (Auto) - Freq Offset: 0.00000000 Hz - Signal Track: On - Center: 2.452 GHz, Span: 54 MHz - Res BW: 100 kHz, VBW: 300 kHz, Sweep: 5.594 ms (401 pts)

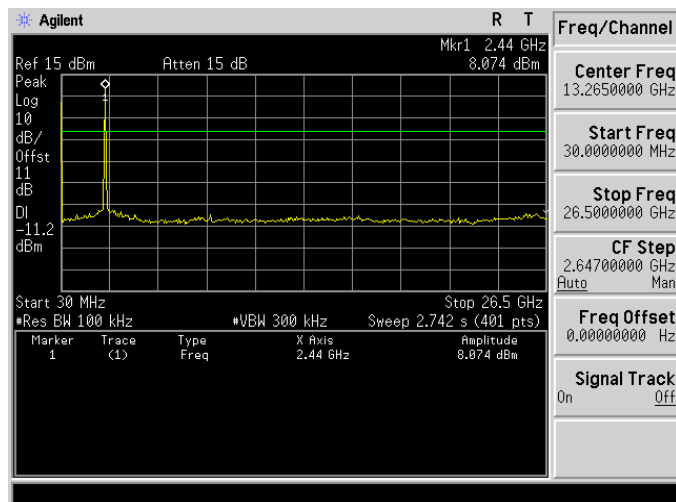
Out of Band Conducted Spurious Emission

Mode 2: IEEE 802.11b link mode_ANT-0

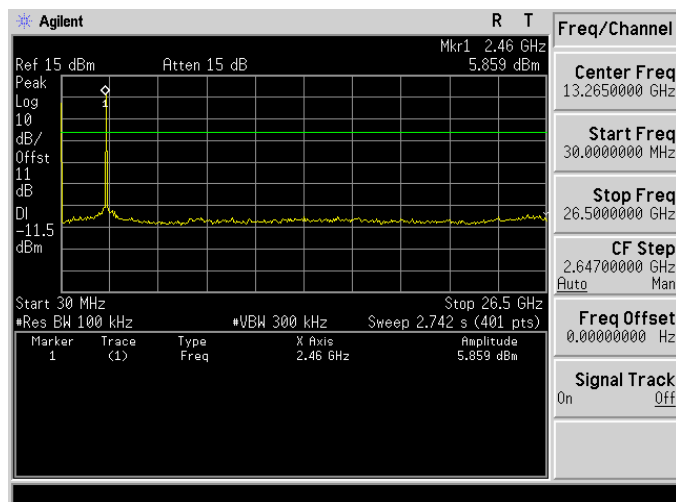
2412 MHz



2437 MHz



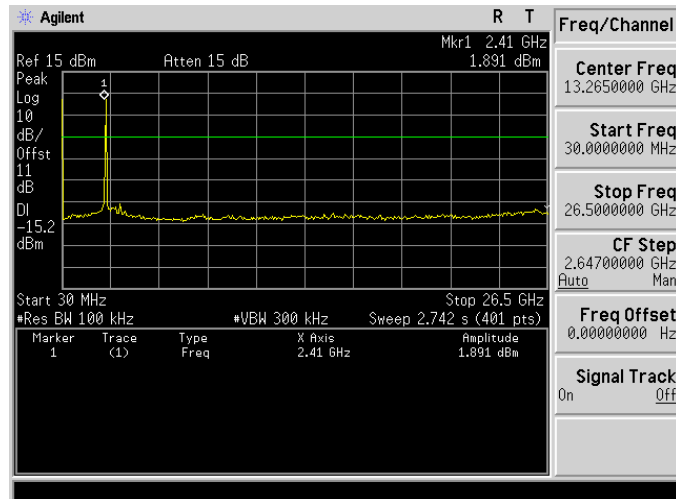
2462 MHz



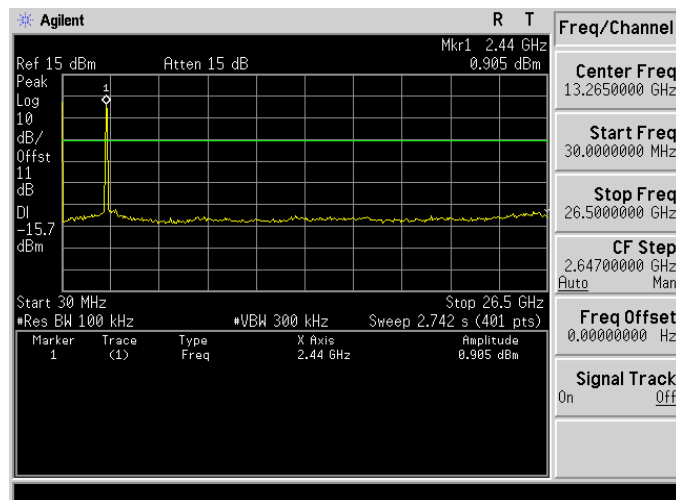
Out of Band Conducted Spurious Emission

Mode 3: IEEE 802.11g link mode_ANT-0

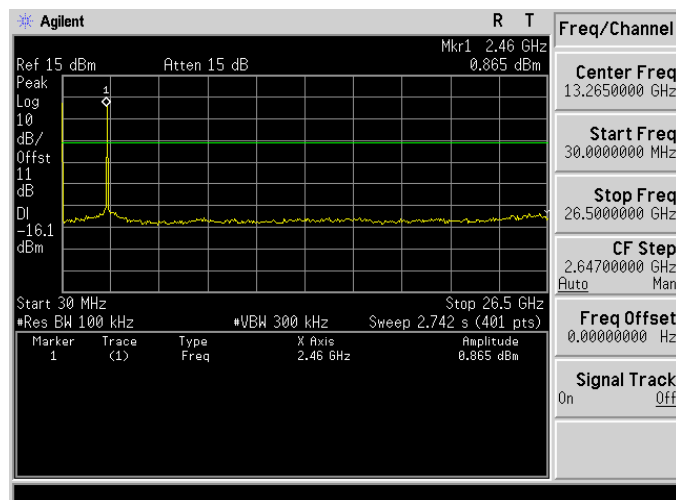
2412 MHz



2437 MHz



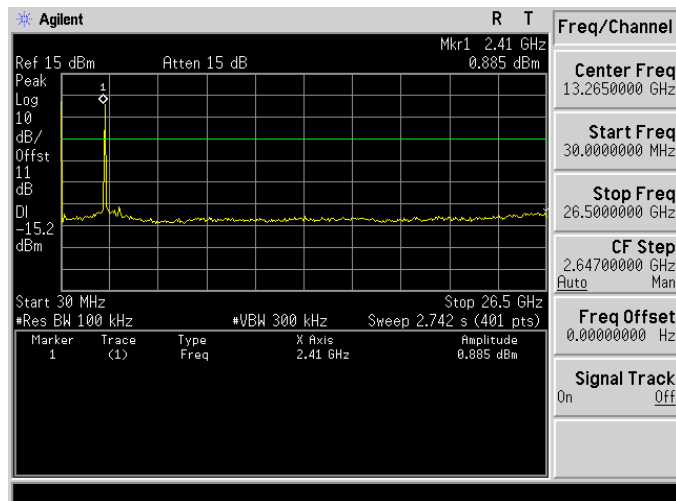
2462 MHz



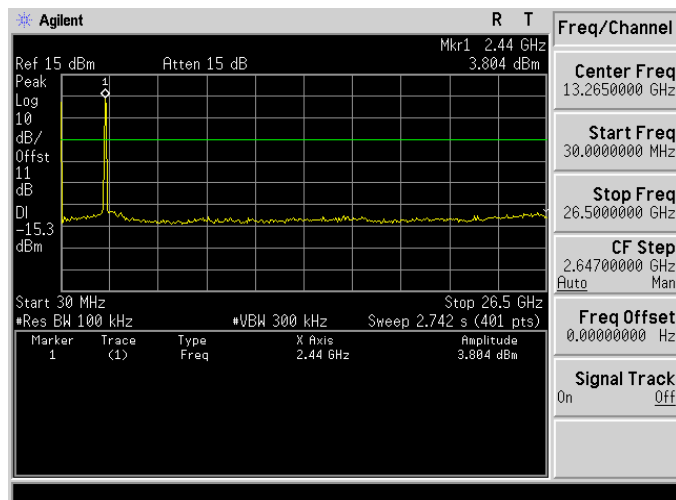
Out of Band Conducted Spurious Emission

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

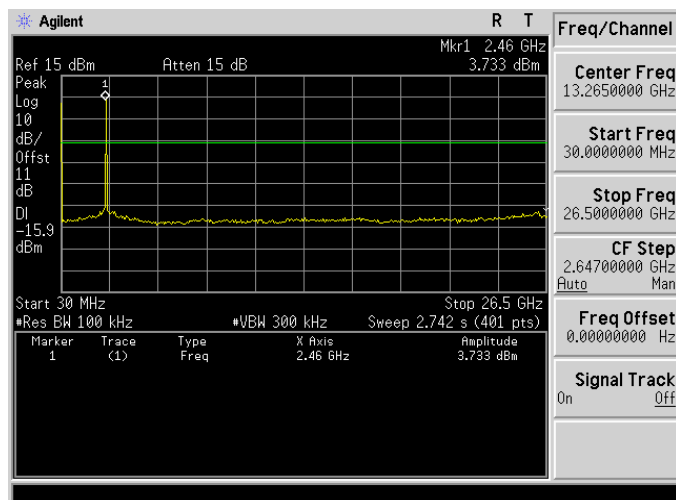
2412 MHz



2437 MHz



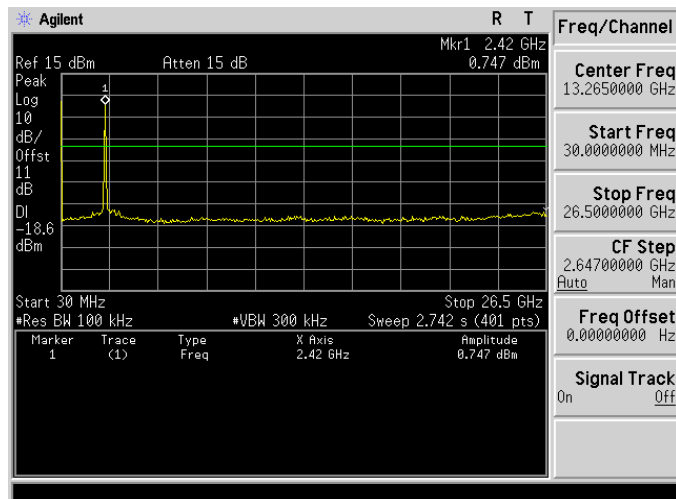
2462 MHz



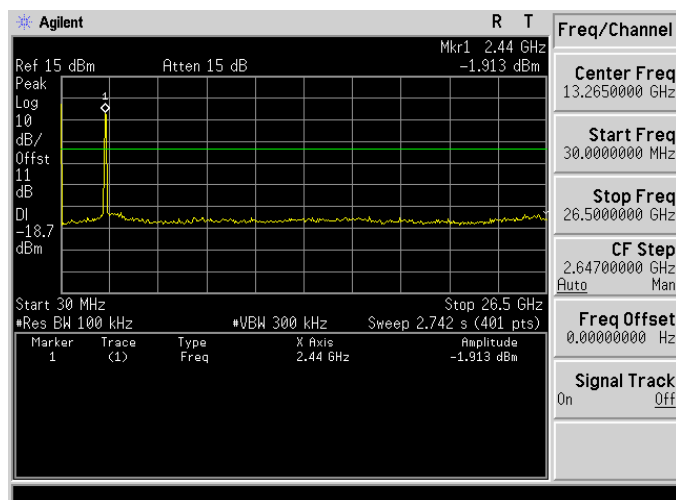
Out of Band Conducted Spurious Emission

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

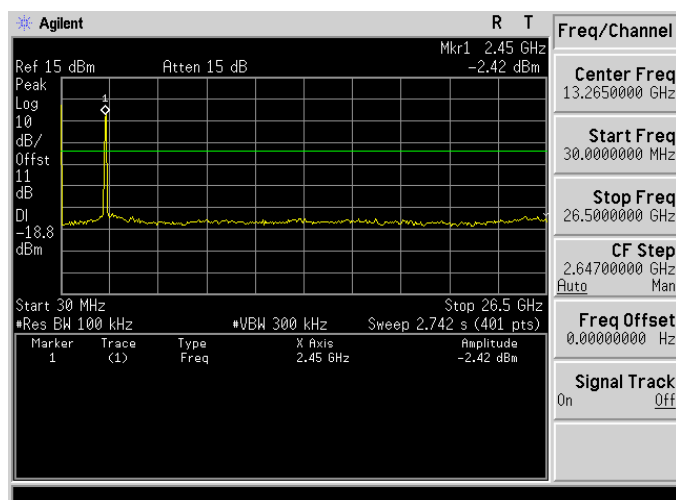
2422 MHz



2437 MHz



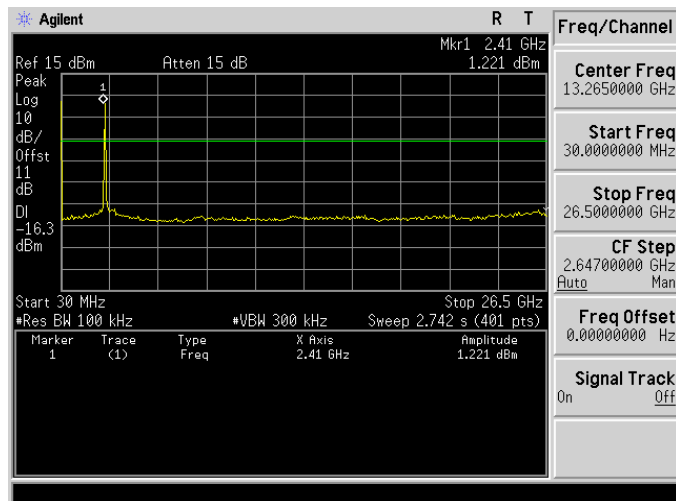
2452 MHz



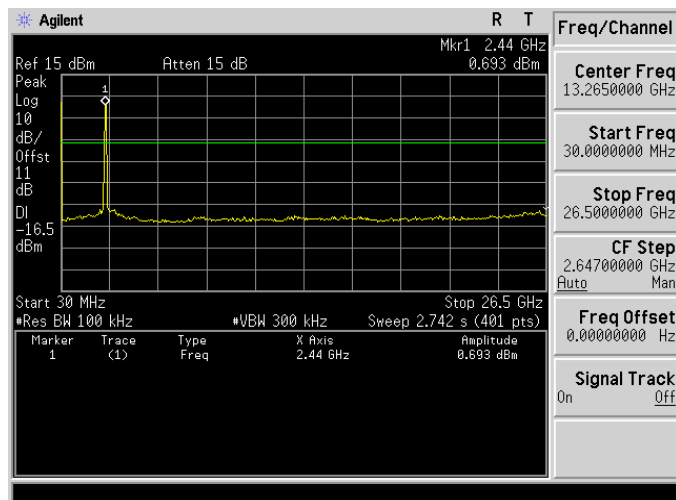
Out of Band Conducted Spurious Emission

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

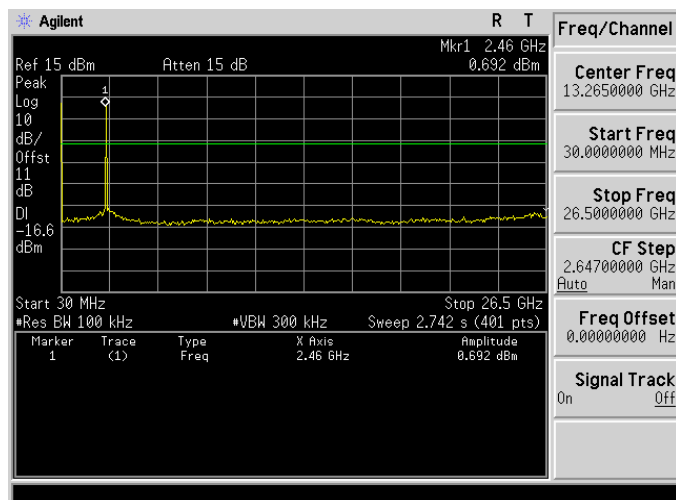
2412 MHz



2437 MHz



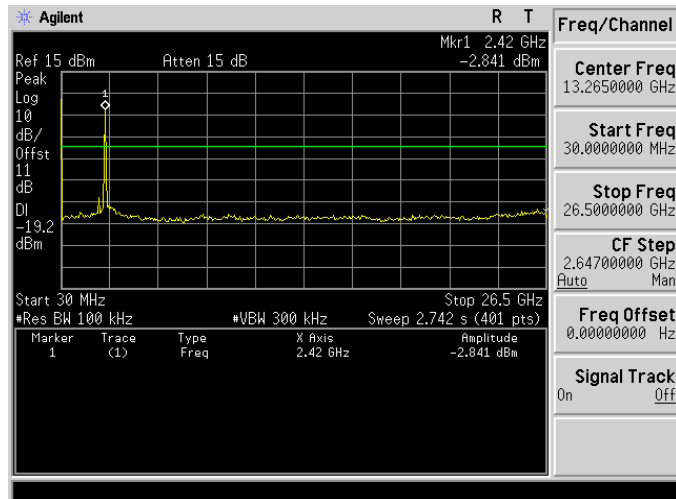
2462 MHz



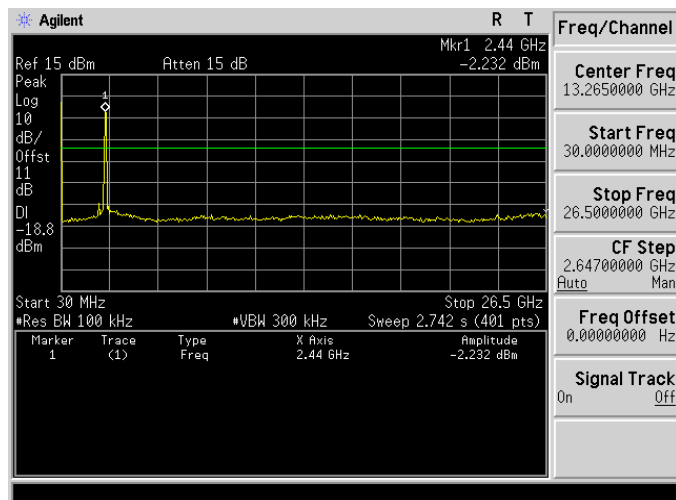
Out of Band Conducted Spurious Emission

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

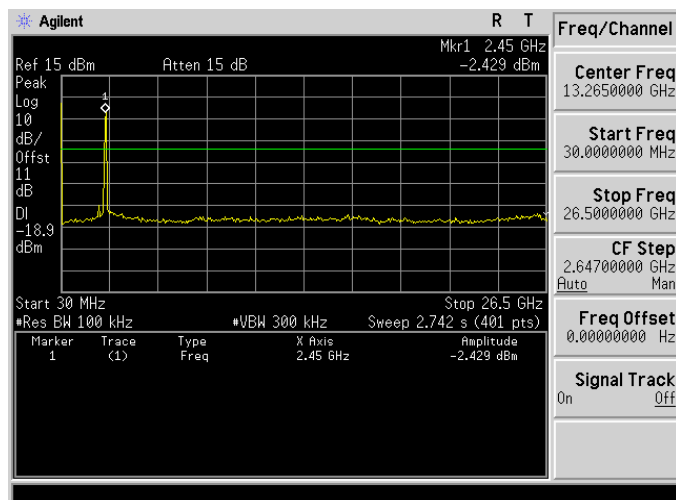
2422 MHz



2437 MHz



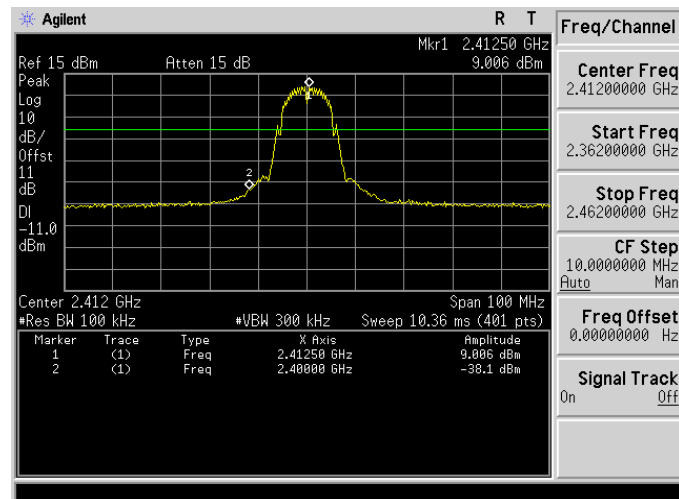
2452 MHz



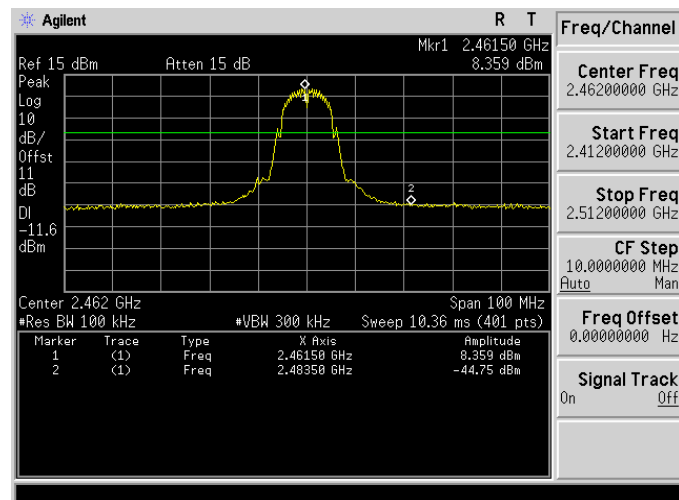
Conducted Band Edge

Mode 2: IEEE 802.11b link mode_ANT-0

2412 MHz



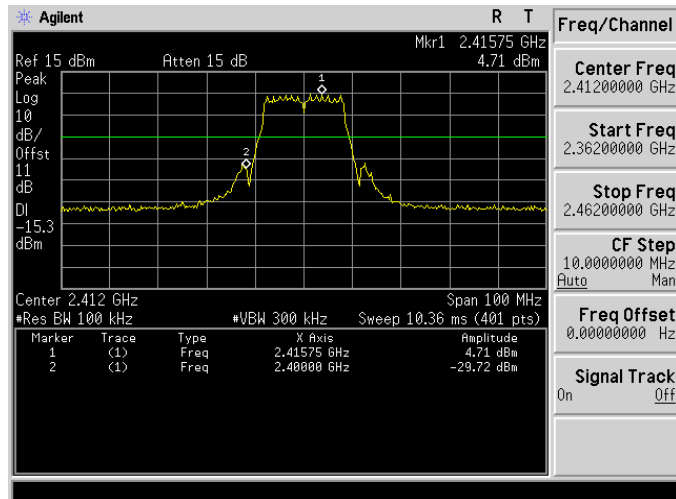
2462 MHz



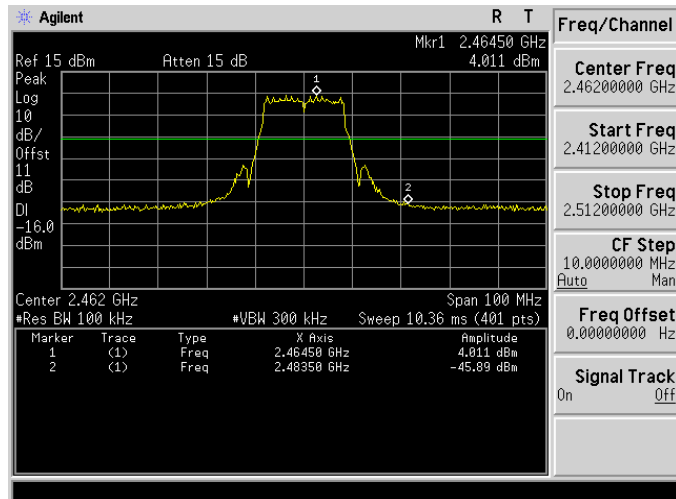
Conducted Band Edge

Mode 3: IEEE 802.11g link mode_ANT-0

2412 MHz



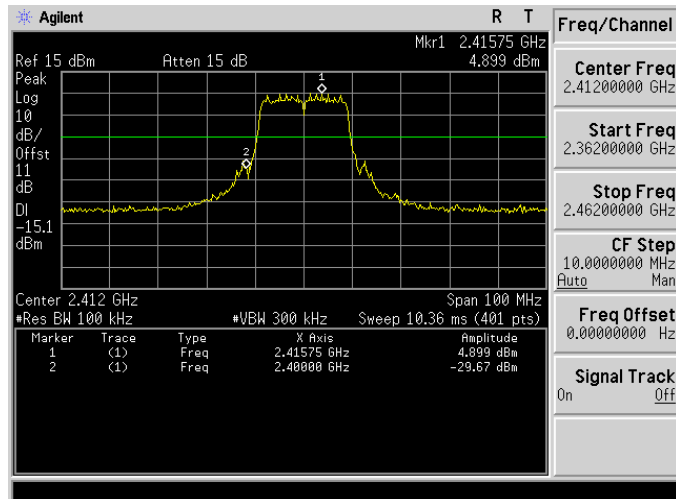
2462 MHz



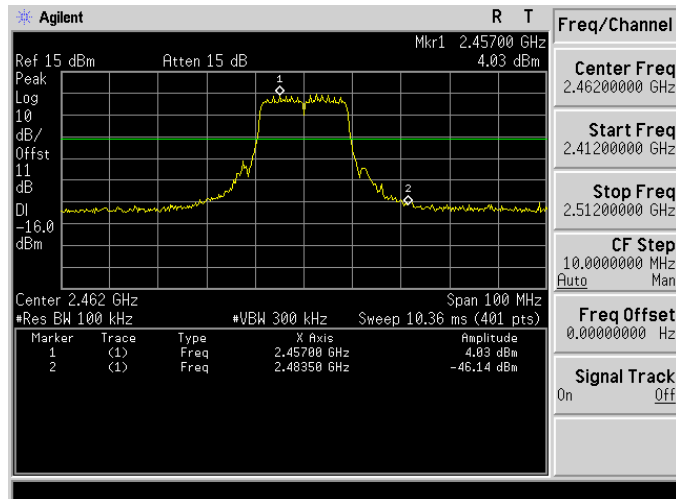
Conducted Band Edge

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

2412 MHz



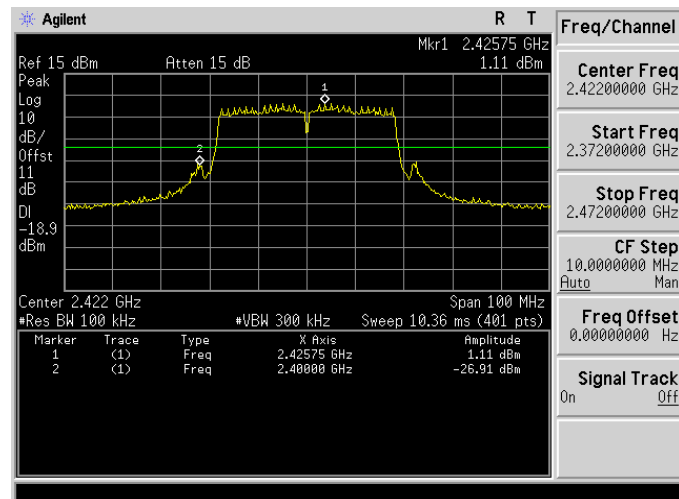
2462 MHz



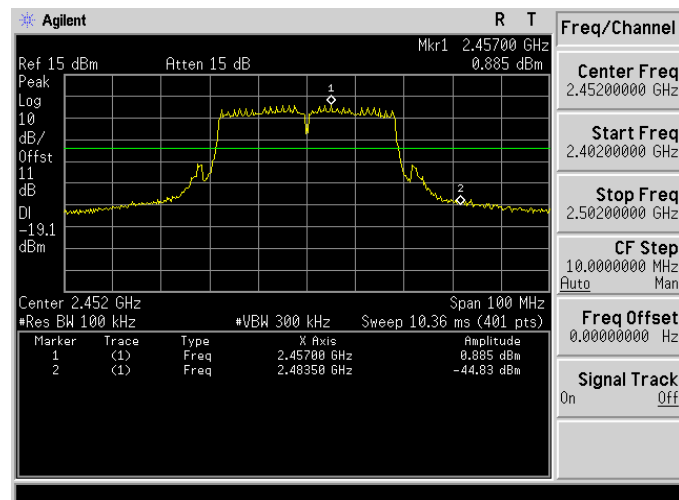
Conducted Band Edge

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

2422 MHz



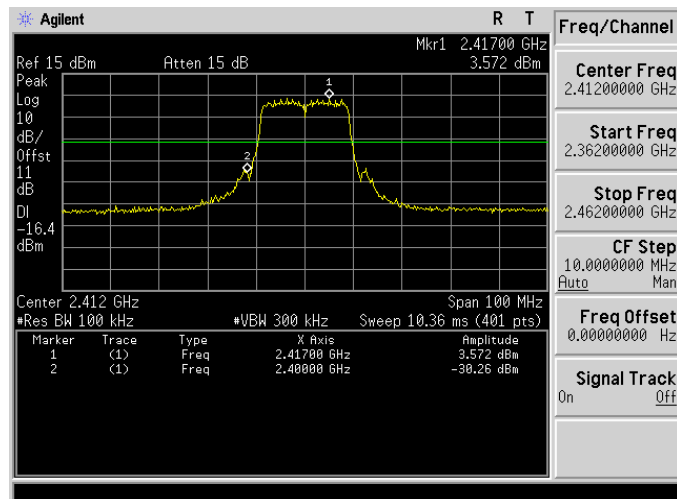
2452 MHz



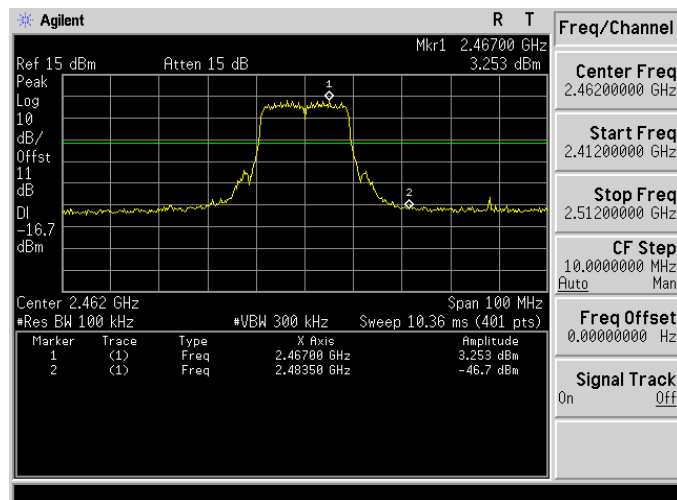
Conducted Band Edge

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

2412 MHz



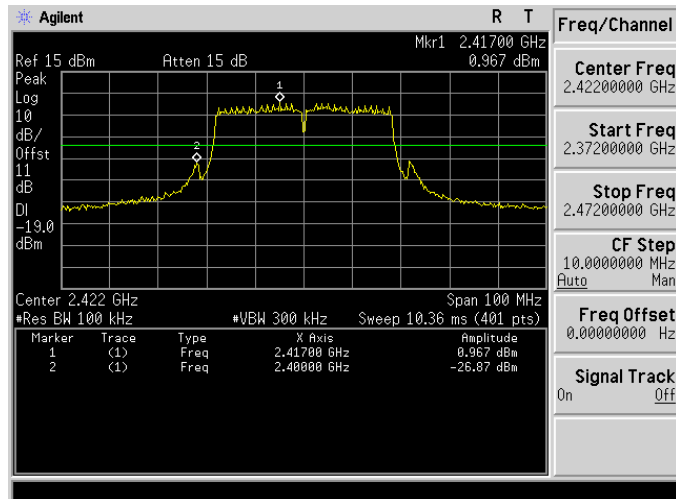
2462 MHz



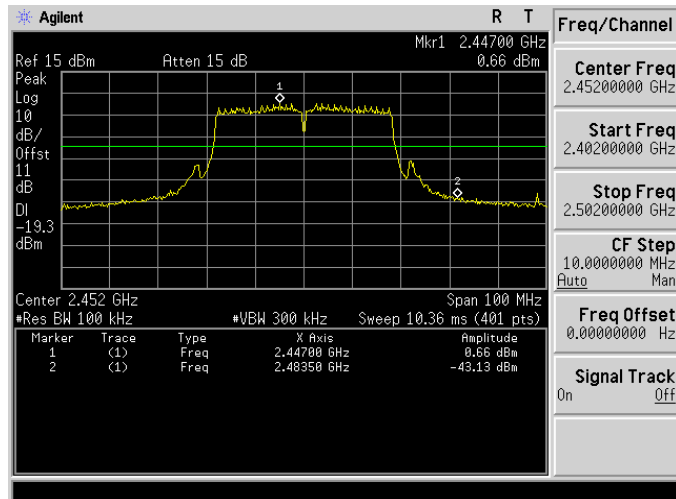
Conducted Band Edge

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

2422 MHz



2452 MHz



10 Antenna Measurement

10.1.Limit

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

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

10.2.Antenna Description

See section 2 – antenna information.

10.3.Directiona Gain Calculated

$$\text{Directional Gain} = 10 \cdot \log \left[\left(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20} \right)^2 / N_{\text{ANT}} \right]$$

Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11n 2.4GHz 20MHz	5.62
IEEE 802.11n 2.4GHz 40MHz	5.62