ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 210

OF

Equipment Under Test:	**Tablet**
Brand Name:	**HP**
Model No.:	**HSTNH-I410Y**
Model Different:	**N/A**
FCC ID:	**B94HHI410Y**
IC:	**3905A-HHI410Y**
Report No.:	**ER/2014/50057**
Issue Date:	**Jun. 10, 2014**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-210 issue 8 :2010, Annex 8**
Prepared for:	**Hewlett-Packard Company 3000 Hanover Street, Palo Alto, California 94304, USA**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803**

Testing Laboratory
0513

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VERIFICATION OF COMPLIANCE

Applicant:	Hewlett-Packard Company 3000 Hanover Street, Palo Alto, California 94304, USA
Equipment Under Test:	Tablet
Brand Name:	HP
Model No. for:	HSTNH-I410Y
Model Difference:	N/A
FCC ID:	B94HHI410Y
IC:	3905A-HHI410Y
File Number:	ER/2014/50057
Date of test:	May 21, 2014 ~ Jun. 03, 2014
Date of EUT Received:	May 21, 2014

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2009 and RSS-Gen. issue 3 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247 and IC RSS 210 issue 8: 2010 Annex 8.
The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Tseng	***Date***	Jun. 10, 2014
	Marcus Tseng / Engineer		
Prepared By:	Violetta Tang	***Date***	Jun. 10, 2014
	Violetta Tang / Clerk		
Approved By:	Jim Chang	***Date***	Jun. 10, 2014
	Jim Chang / Supervisor		

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Version

Version No.	Date	Description
00	Jun. 10, 2014	Initial creation of document

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1 GENERAL INFORMATION

General:

Equipment Under Test:	Tablet	
Brand Name:	HP	
Model No.:	HSTNH-I410Y	
Model difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Data Cable (USB):	Model No.: KF-13031412-2, Supplier: Elinke	
Power Supply:	3.7Vdc Rechargeable Li-Polymer Battery or 5V from AC/DC Adapter	
	Battery:	Model No.: PR-3159167, Supplier: TCL
	Adapter :	Model No.: W12-010N3A, Supplier: Chicony

WLAN:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b: 17.18dBm g: 22.96dBm	DSSS, OFDM	b: 12M1G1D g: 16M4D1D
11n	HT20 2412-2462	11	n: 22.12dBm	OFDM	n: 17M5D1D
Antenna Designation:			PIFA Antenna, 1.68dBi		
Modulation type:			CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM		
Transition Rate:			802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps		

This report applies for WLAN, and complies with FCC rule part 15C.

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1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: B94HHI410Y** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. And **IC: 3905A-HHI410Y** filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.2 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2009 and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Jan 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009. FCC Registration Number is: 990257, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County,Taiwan which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. FCC Registration Number: 455997. The address of SGS Taiwan Ltd. Electronics & Communication Laboratory 1F, No.134, Wukung Road New Taipei City TAIWAN 24803, IC Registration Number: 4620A-6.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7.3.1 of ANSI C63.4-2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 of ANSI C63.4-2009.

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2.4 Configuration of Tested System

Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration

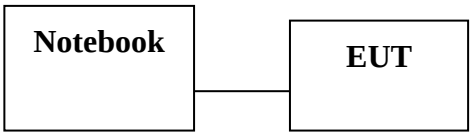

Fig. 2-2 AC Power Line Conducted Emission

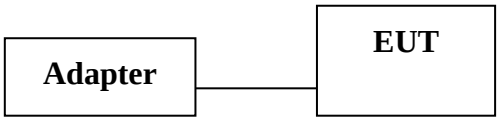

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L412	LR-957X7	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC/IC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §7.2.4	AC Power Line Conducted Emission	Compliant
§15.247(b) (3) RSS-210 §A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2) RSS-210 §A8.2(a)	6dB Bandwidth	Compliant
§15.247(d) RSS-210 §A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d) RSS-210 §A8.5	Spurious Emission	Compliant
§15.247(e) RSS-210 §A8.2(b)	Peak Power Density	Compliant
§15.203 RSS-GEN §7.1.2,	Antenna Requirement	Compliant
RSS-Gen §4.6.1	99% Power Bandwidth	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n_HT20 mode: Channel low (2412MHz)、mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

The worst case is determined by the output power that generates the highest emission. As examined in the section of output power measurement, the section 7.5, the lowest data rate at b/g/n_HT20 resulted the highest level of fundamental emission, and therefore, the lowest data rate is chosen as the worst-case to conduct the remaining of other mandatory test cases.

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.42 dB
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
99% Power Bandwidth	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable:

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note
1.The lower limit shall apply at the transition frequencies
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/19/2014	03/18/2015
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2013	11/25/2014

6.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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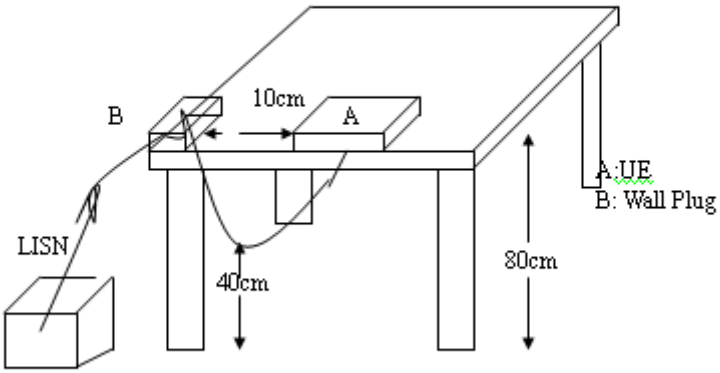
6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

6.6 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit.

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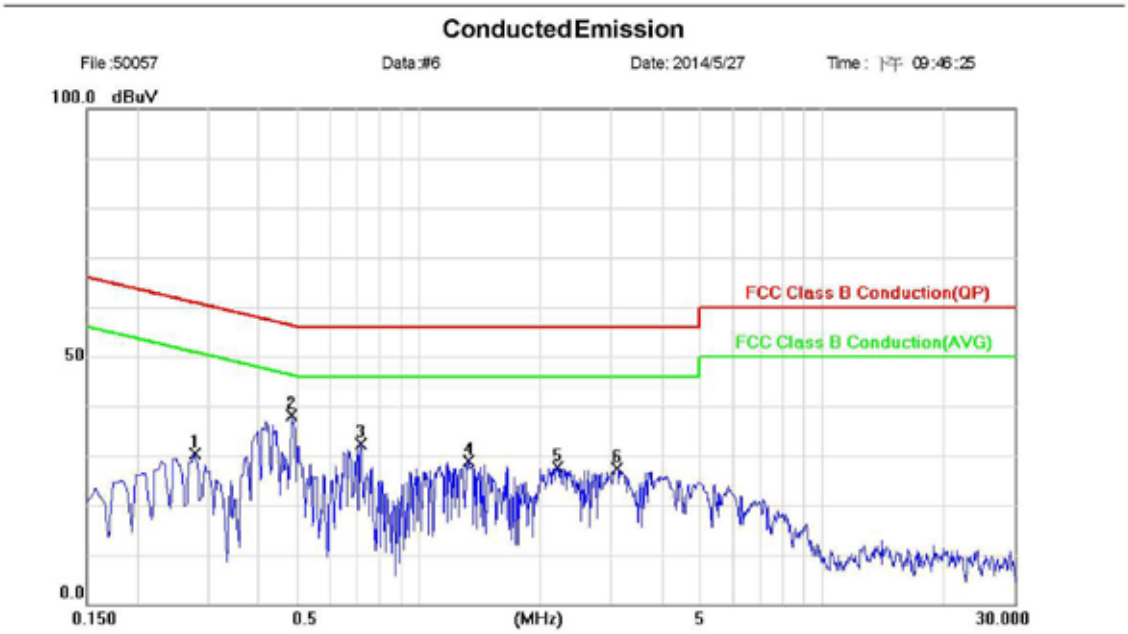
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	May 27, 2014
Temperature:	26 ℃	Humidity:	60 %	Test By:	Marcus

Site ConductionRoom
Limit: FCC Class B Conduction(QP)
Mode: Operation
Note:

Phase: L1
Power: AC 120V/60Hz

Temperature: 26 ℃
Humidity: 60%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2780	30.20	0.06	30.26	60.88	-30.62	peak	
2	*	0.4820	38.06	0.07	38.13	56.30	-18.17	peak	
3		0.7180	32.40	0.09	32.49	56.00	-23.51	peak	
4		1.3260	28.86	0.11	28.97	56.00	-27.03	peak	
5		2.2020	27.45	0.13	27.58	56.00	-28.42	peak	
6		3.1060	27.14	0.16	27.30	56.00	-28.70	peak	

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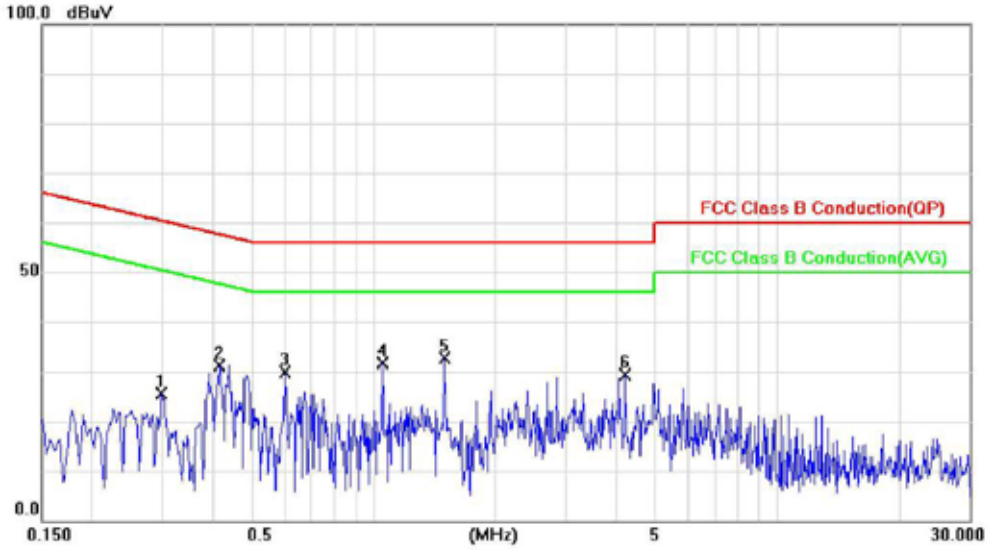
Site ConductionRoom
Limit: FCC Class B Conduction(QP)
Mode: Operation
Note:

Phase: N
Power: AC 120V/60Hz

Temperature: 25 ℃
Humidity: 60%

ConductedEmission

File :50057 Data:#5 Date: 2014/5/27 Time : 下午 09:44:06



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2980	25.51	0.06	25.57	60.30	-34.73	peak	
2		0.4140	31.14	0.07	31.21	57.57	-26.36	peak	
3		0.6020	29.81	0.08	29.89	56.00	-26.11	peak	
4		1.0500	31.62	0.10	31.72	56.00	-24.28	peak	
5	*	1.5020	32.57	0.12	32.69	56.00	-23.31	peak	
6		4.2020	29.17	0.17	29.34	56.00	-26.66	peak	

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7 PEAK OUTPUT POWER MEASUREMENT

7.1 Standard Applicable:

According to §15.247 (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to RSS-210 issue 8,§A8.4(4), for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

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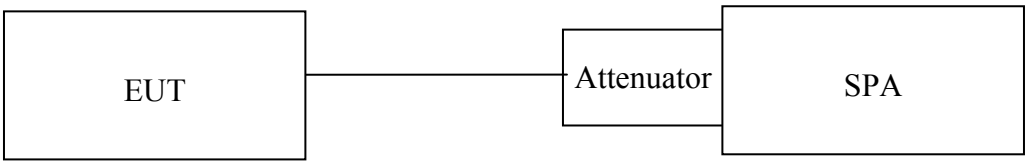
7.2 Measurement Equipment Used:

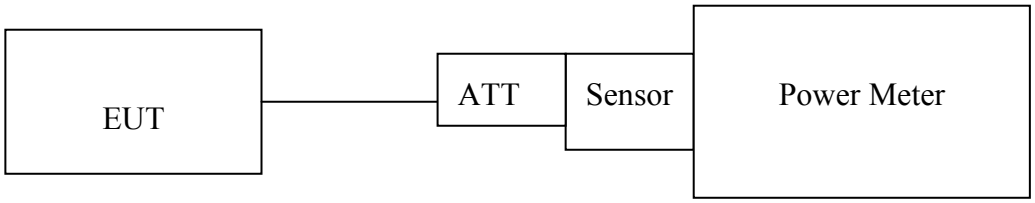
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	01/13/2014	01/12/2015
Power Sensor	Anritsu	MA2411B	917032	01/13/2014	01/12/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/08/2014	03/07/2015
DC Block	Mini-Circuits	BLK-18-S+	1	02/27/2014	02/26/2015
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/03/2014	01/02/2015
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015
Splitter	Agilent	11636B	N/A	02/27/2014	02/26/2015

7.3 Test Set-up:

Spectrum:



Power Meter:



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7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (**Peak power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =peak, Sweep = Auto. Setting on spectrum is adjusted based on the mandatory procedure in 9.1.2 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.1.3 in KDB558074 is followed.
   (**Avg. power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =Avg., Trace avg =100, Sweep = Auto, Setting on spectrum is adjusted based on the mandatory procedure in 9.2.2.4 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.2.3, option 3 in KDB558074 is followed.
3. Record the max. Reading as observed from Spectrum or Power Meter.
4. Repeat above procedures until all frequency of interest measured was complete.

Pre-anaysis Check: While conducting average power measurement, duty cycle of each mode (b/g/n_ht20) shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones b = 99.48%, g = 96.88%, and n_ht_20 = 96.32%, where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Test Procedure:

Set span = 0, RBW = 8MHz, VBW = 8MHz, Detector = Peak

Duty Cycle:

	Duty Cycle	Duty Fator (dB)
802.11b	0.9948	0.02
802.11g	0.9688	0.14
802.11n_20	0.9632	0.16

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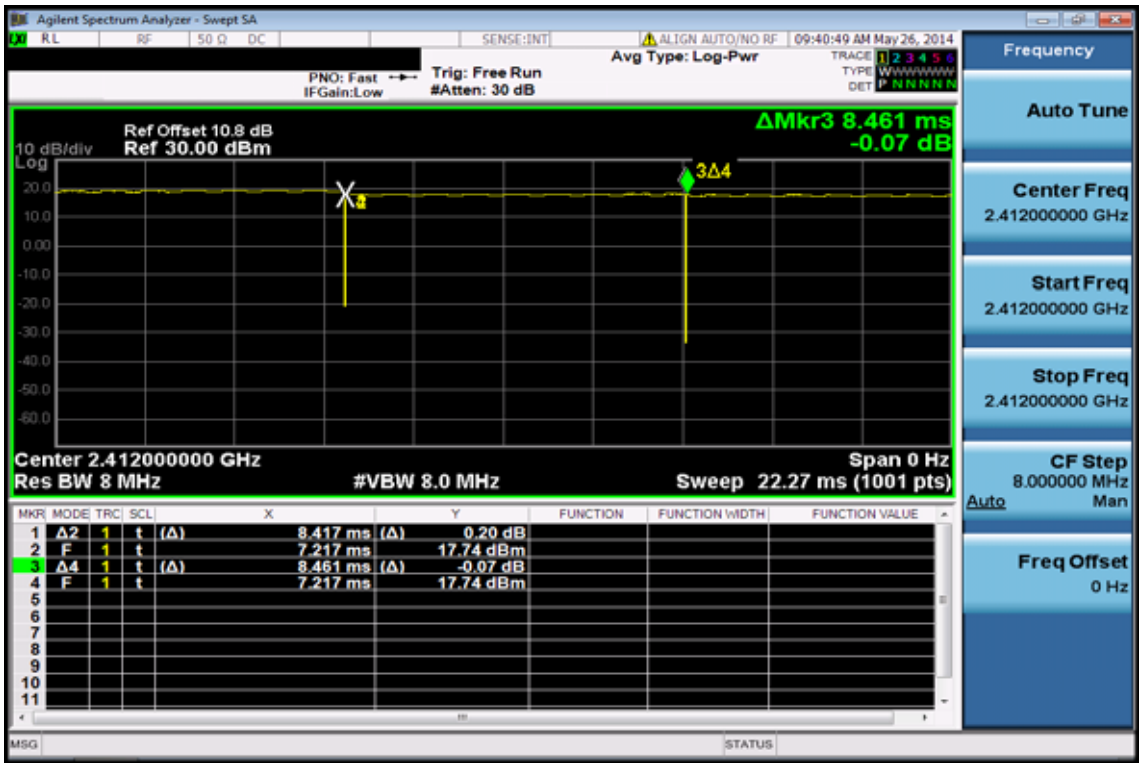
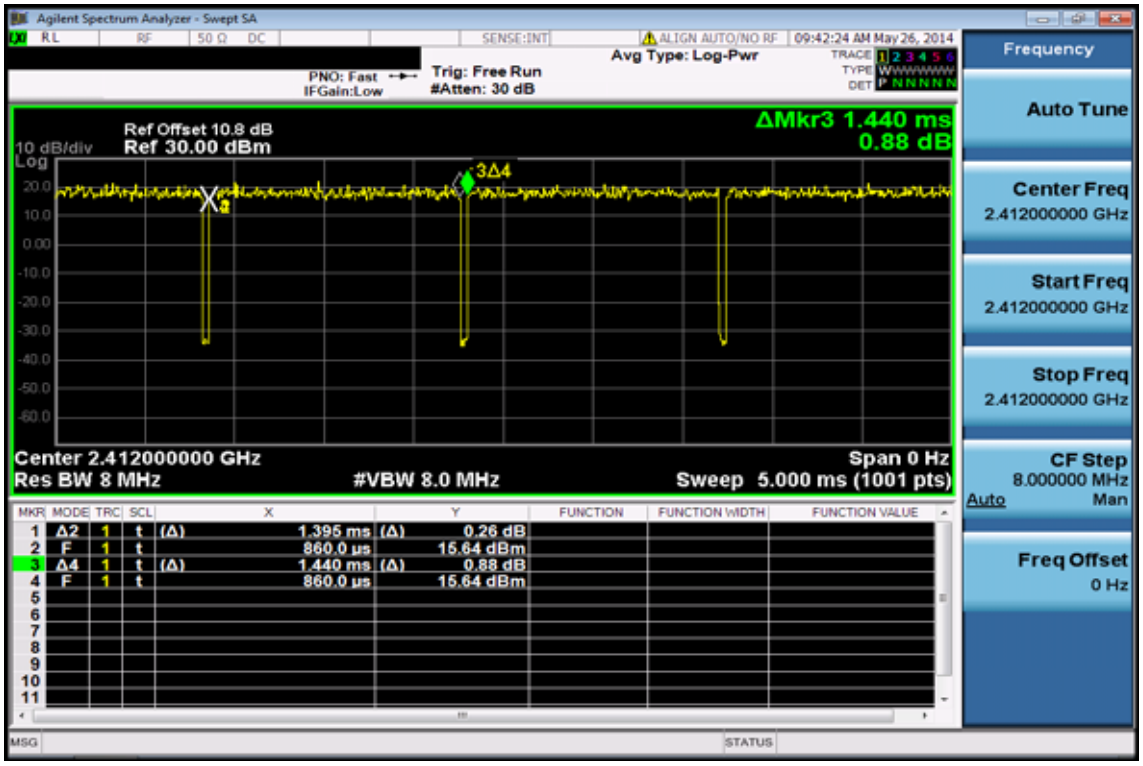
Duty Factor:

802.11 b



802.11 g



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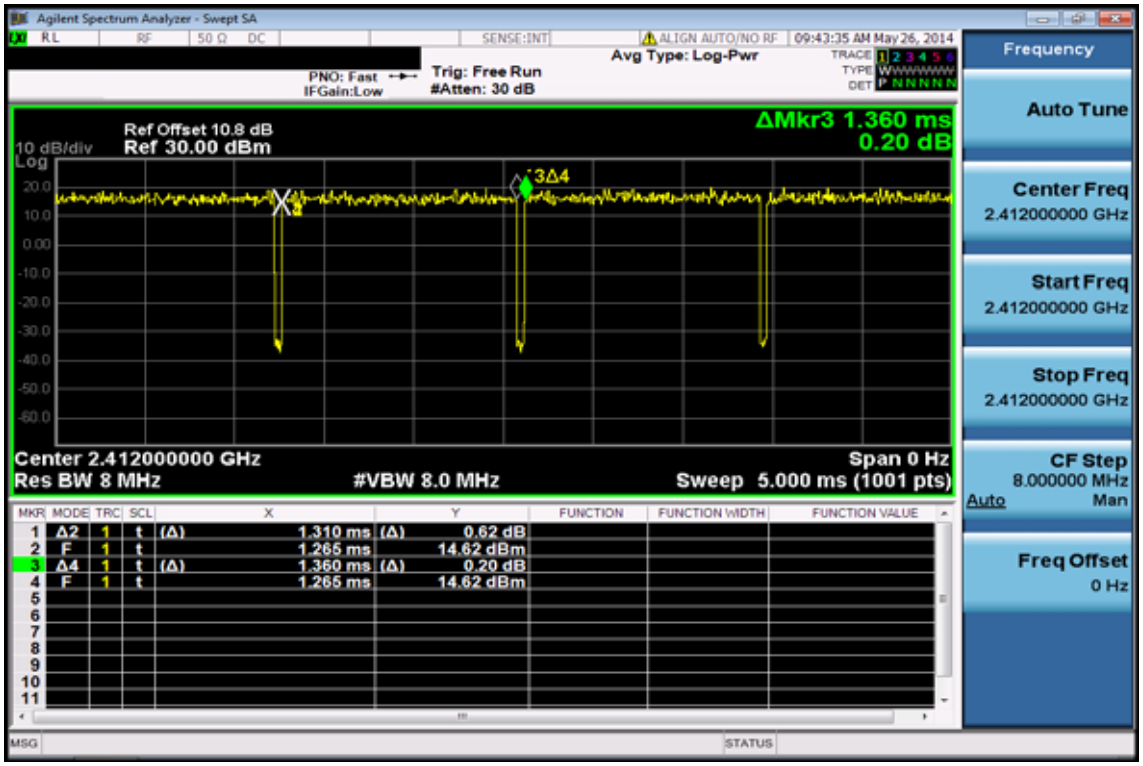
802.11 n_20 MHz



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7.5 Measurement Result:

802.11b

		Peak Power Output (dBm)				
CH	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412	16.87	16.81	16.74	16.62	1 Watt = 30 dBm
6	2437	17.08	16.95	16.87	16.75	1 Watt = 30 dBm
11	2462	**17.18**	17.05	17.04	16.91	1 Watt = 30 dBm

		Average Power Output (dBm)				
CH	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412	13.22	13.09	13.02	12.89	1 Watt = 30 dBm
6	2437	13.42	13.31	13.24	13.17	1 Watt = 30 dBm
11	2462	13.54	13.45	13.33	13.20	1 Watt = 30 dBm

802.11g

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412	22.82	22.69	22.69	22.55	22.42	22.30	22.29	22.26	1 Watt = 30 dBm
6	2437	**22.96**	22.82	22.73	22.67	22.63	22.57	22.50	22.37	1 Watt = 30 dBm
11	2462	22.76	22.72	22.69	22.69	22.58	22.50	22.39	22.38	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412	12.00	11.89	11.83	11.70	11.59	11.57	11.47	11.47	1 Watt = 30 dBm
6	2437	11.96	11.86	11.83	11.71	11.68	11.65	11.59	11.50	1 Watt = 30 dBm
11	2462	12.16	12.10	12.10	12.08	11.97	11.83	11.83	11.69	1 Watt = 30 dBm

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802.11n_20M

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
1	2412	**22.12**	22.04	22.04	22.00	21.89	21.77	21.68	21.61	1 Watt = 30 dBm
6	2437	22.10	22.07	22.02	21.97	21.87	21.79	21.76	21.69	1 Watt = 30 dBm
11	2462	21.95	21.83	21.73	21.60	21.50	21.50	21.39	21.31	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
1	2412	11.46	11.46	11.41	11.39	11.38	11.36	11.28	11.25	1 Watt = 30 dBm
6	2437	11.53	11.45	11.39	11.28	11.14	11.09	10.99	10.91	1 Watt = 30 dBm
11	2462	11.52	11.39	11.28	11.19	11.05	11.05	10.93	10.87	1 Watt = 30 dBm

**** Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.***

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802.11b

		EIRP (dBm)				
CH	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412	14.90	14.77	14.70	14.57	4 Watts = 36 dBm
6	2437	15.10	14.99	14.92	14.85	4 Watts = 36 dBm
11	2462	15.22	15.13	15.01	14.88	4 Watts = 36 dBm

802.11g

		EIRP (dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412	13.68	13.57	13.51	13.38	13.27	13.25	13.15	13.15	4 Watts = 36 dBm
6	2437	13.64	13.54	13.51	13.39	13.36	13.33	13.27	13.18	4 Watts = 36 dBm
11	2462	13.84	13.78	13.78	13.74	13.65	13.51	13.51	13.37	4 Watts = 36 dBm

802.11n_20M

		EIRP (dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
1	2412	13.14	13.14	13.09	13.06	13.05	13.03	12.94	12.93	4 Watts = 36 dBm
6	2437	13.21	13.13	13.07	12.96	12.82	12.77	12.67	12.59	4 Watts = 36 dBm
11	2462	13.20	13.07	12.96	12.87	12.73	12.73	12.61	12.55	4 Watts = 36 dBm

* Note: EIRP = Average Power + Gain, where the nominal gain of the antenna (1.68dBi for 2.4GHz)

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8 6dB BANDWIDTH

8.1 Standard Applicable:

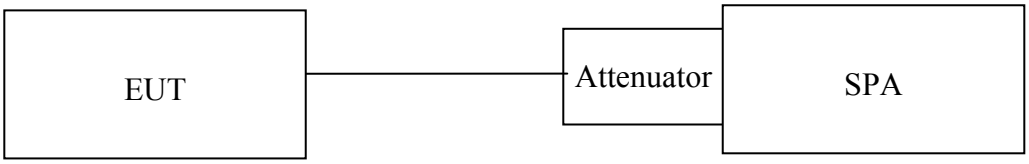
According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 8: 2010Annex 8.2. Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Measurement Equipment Used:

Refer to section 7.2 for details.

8.3 Test Set-up:



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto, the setting on spectrum is adjusted based on the procedure as guide in 8.1 option 1 of KDB558074.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency of interest measured was complete.

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8.5 Measurement Result:

802.11b

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	7.585	> 500	PASS
2437	7.572	> 500	PASS
2462	7.558	> 500	PASS

802.11g

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	15.14	> 500	PASS
2437	15.14	> 500	PASS
2462	15.34	> 500	PASS

802.11n_20M

Frequency (MHz)	Bandwidth (MHz)	Bandwidth (KHz)	Result
2412	15.14	> 500	PASS
2437	15.05	> 500	PASS
2462	15.14	> 500	PASS

Offset 10.8dB

Note: Refer to next page for plots.

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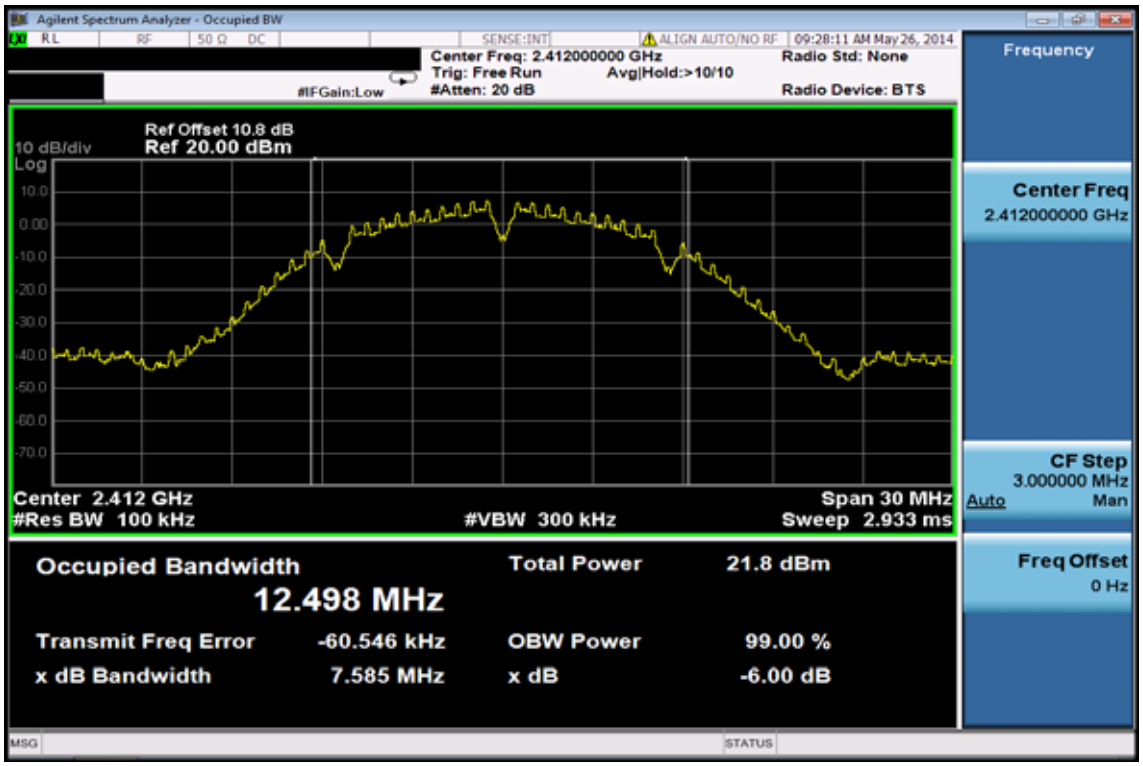
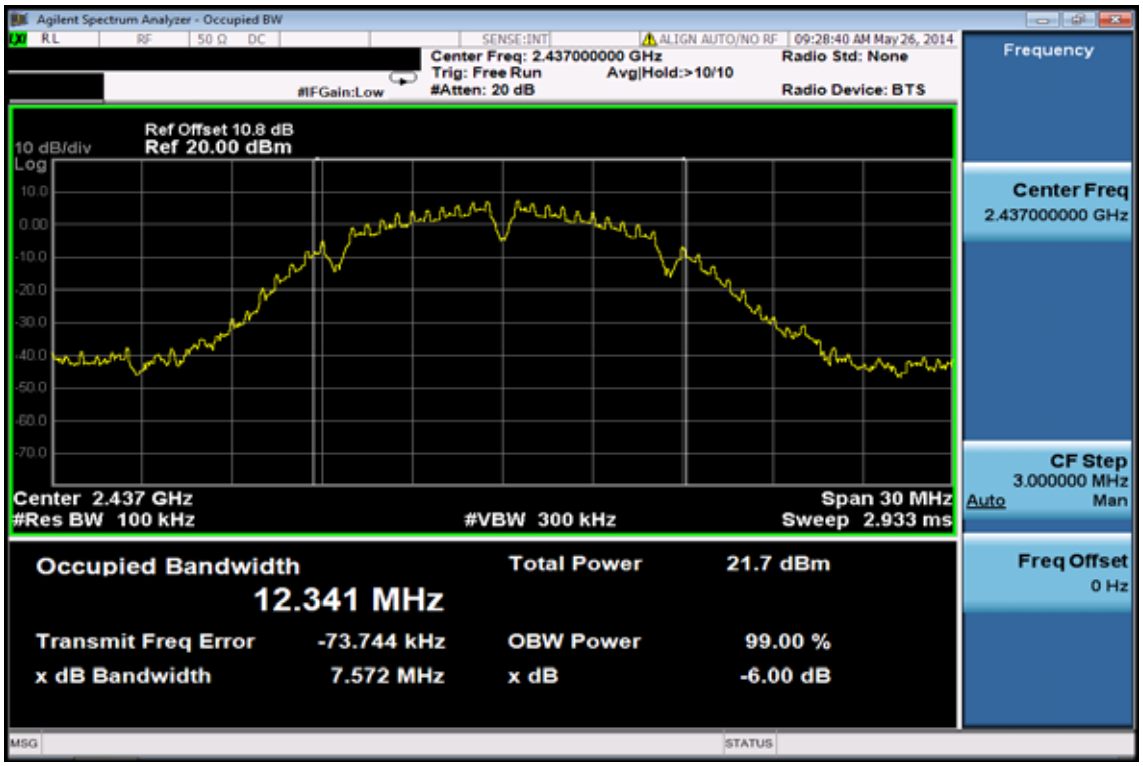
802.11b

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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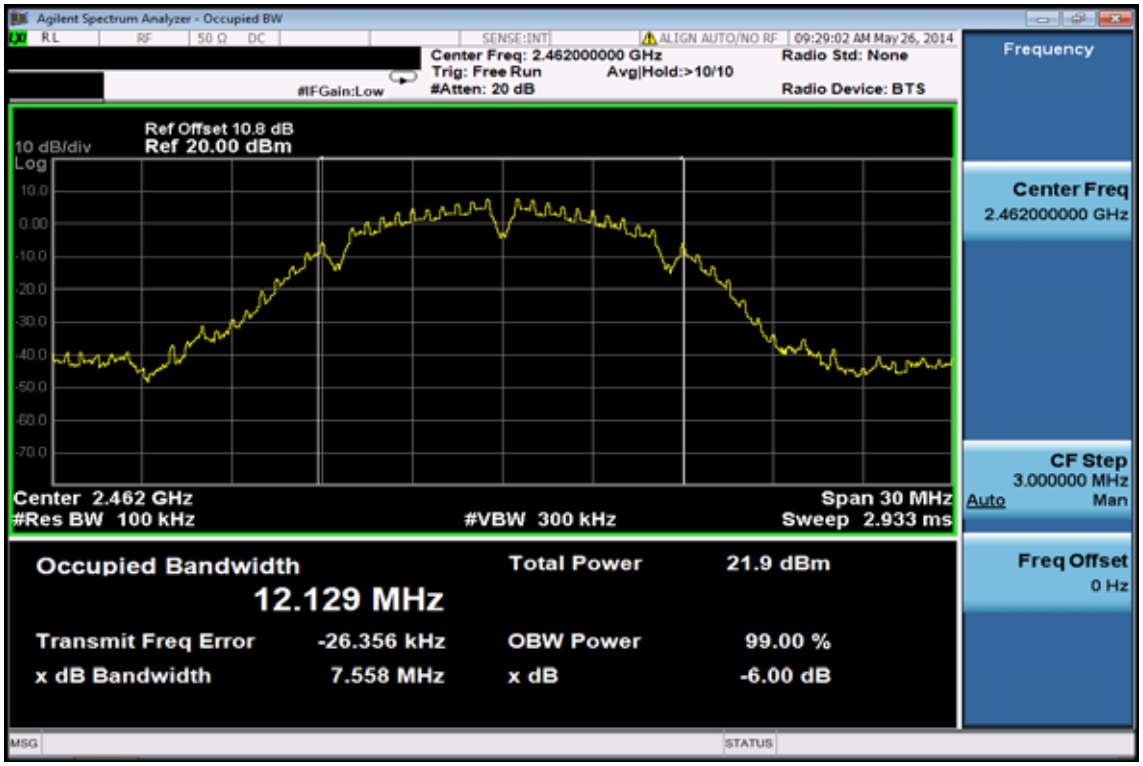
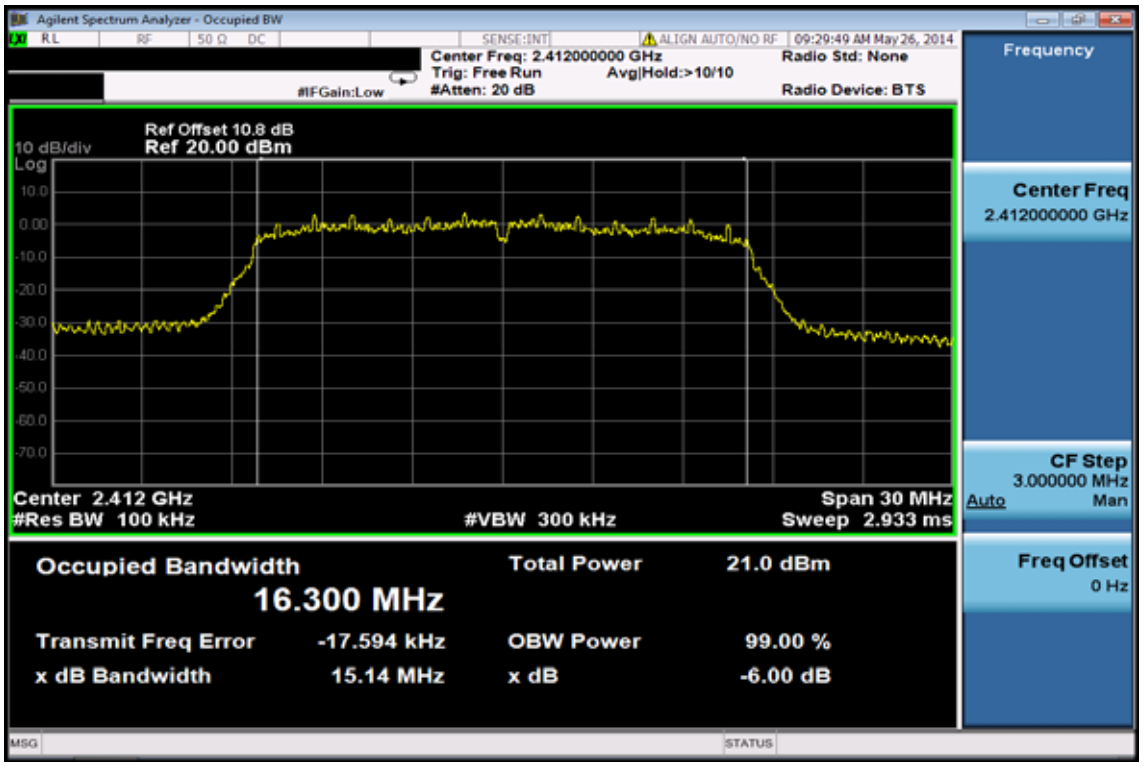
6dB Band Width Test Data CH-High



802.11g

6dB Band Width Test Data CH-Low



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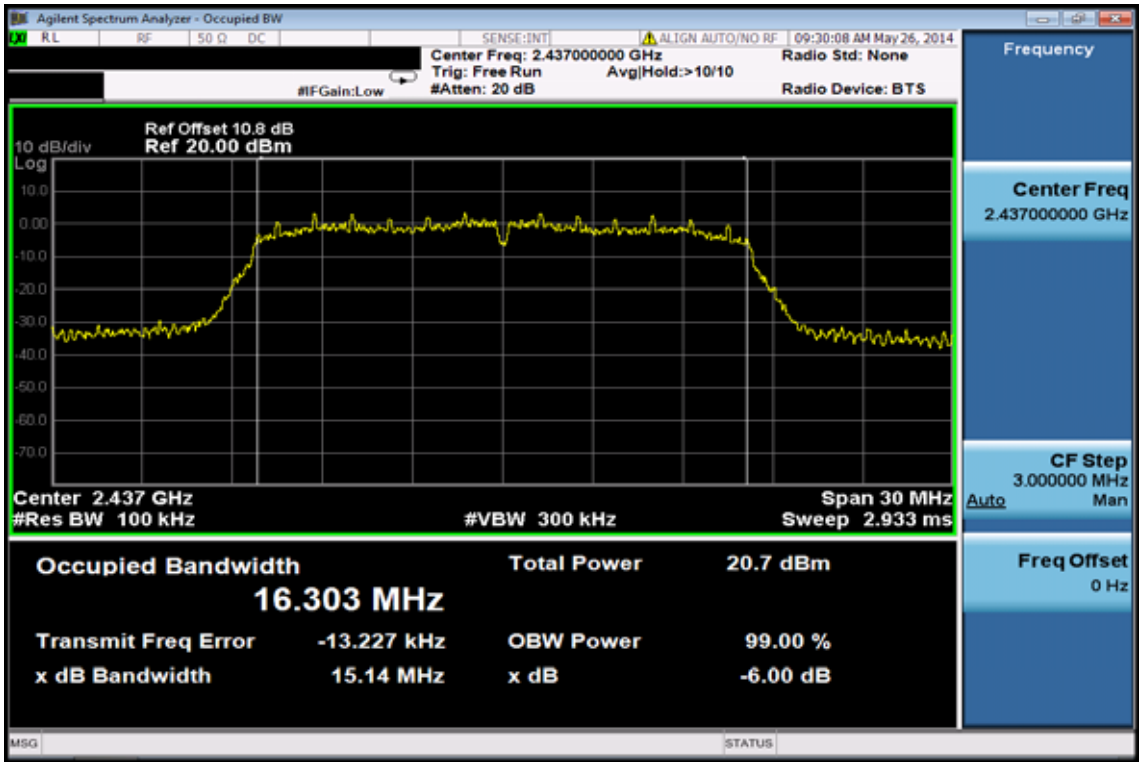
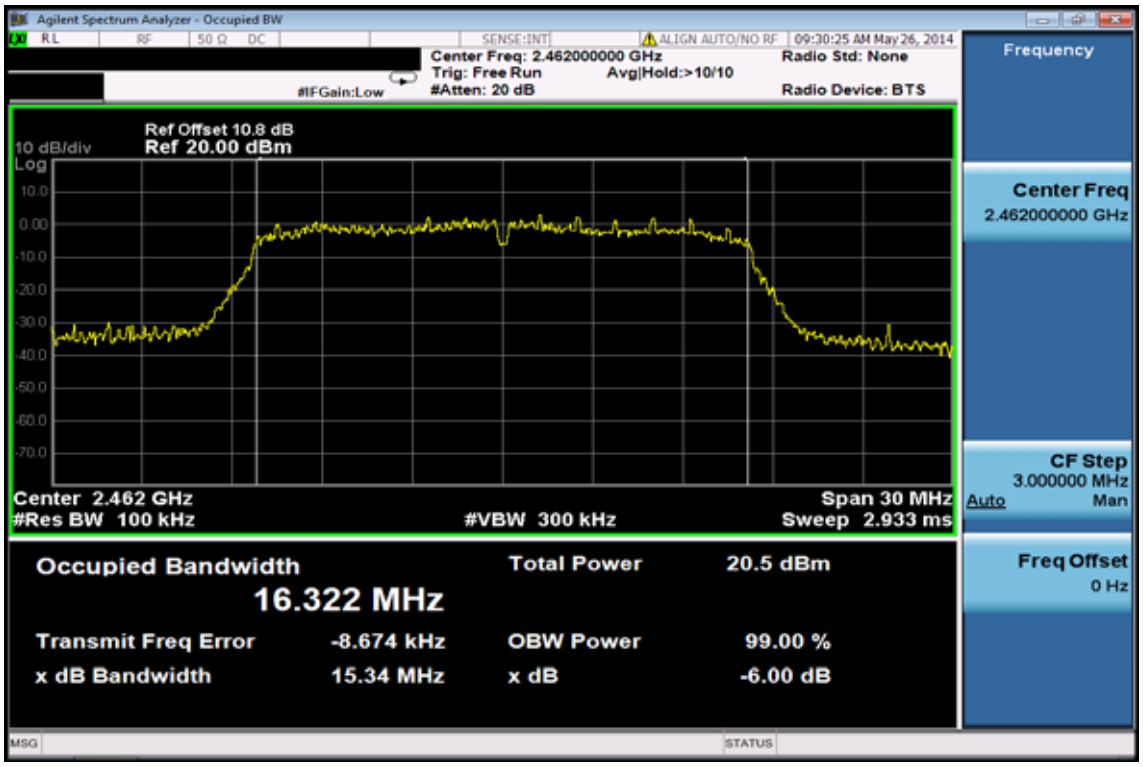
6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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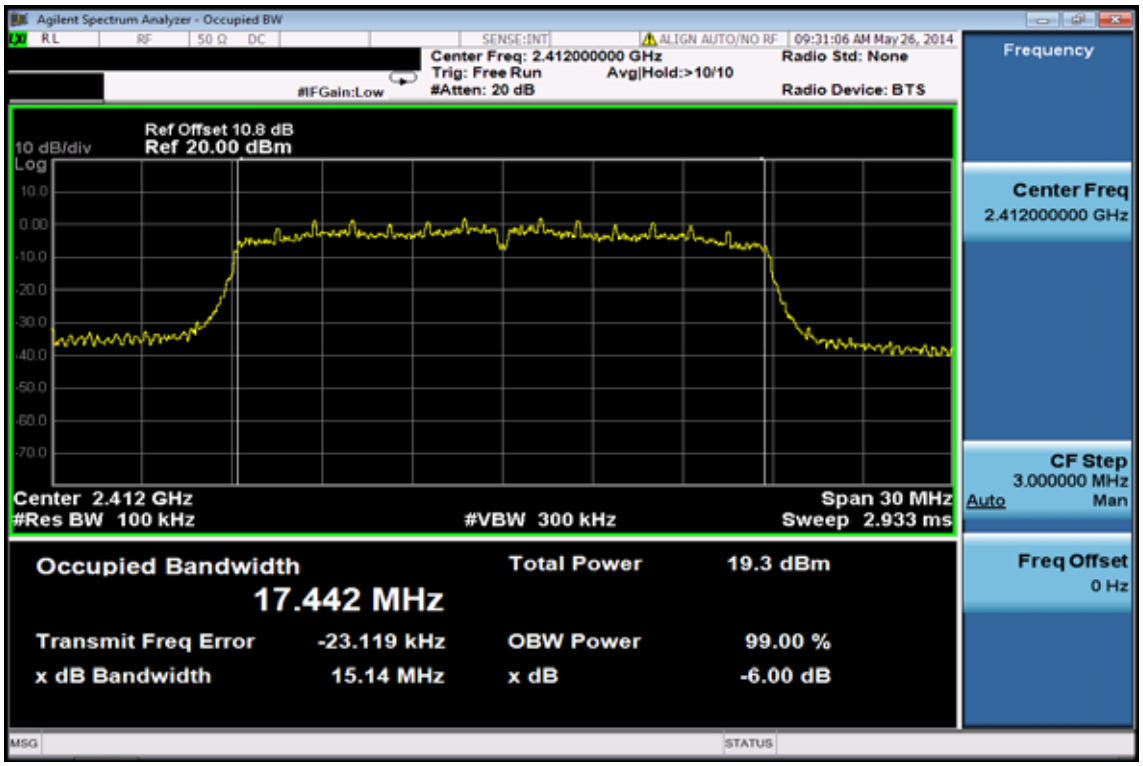
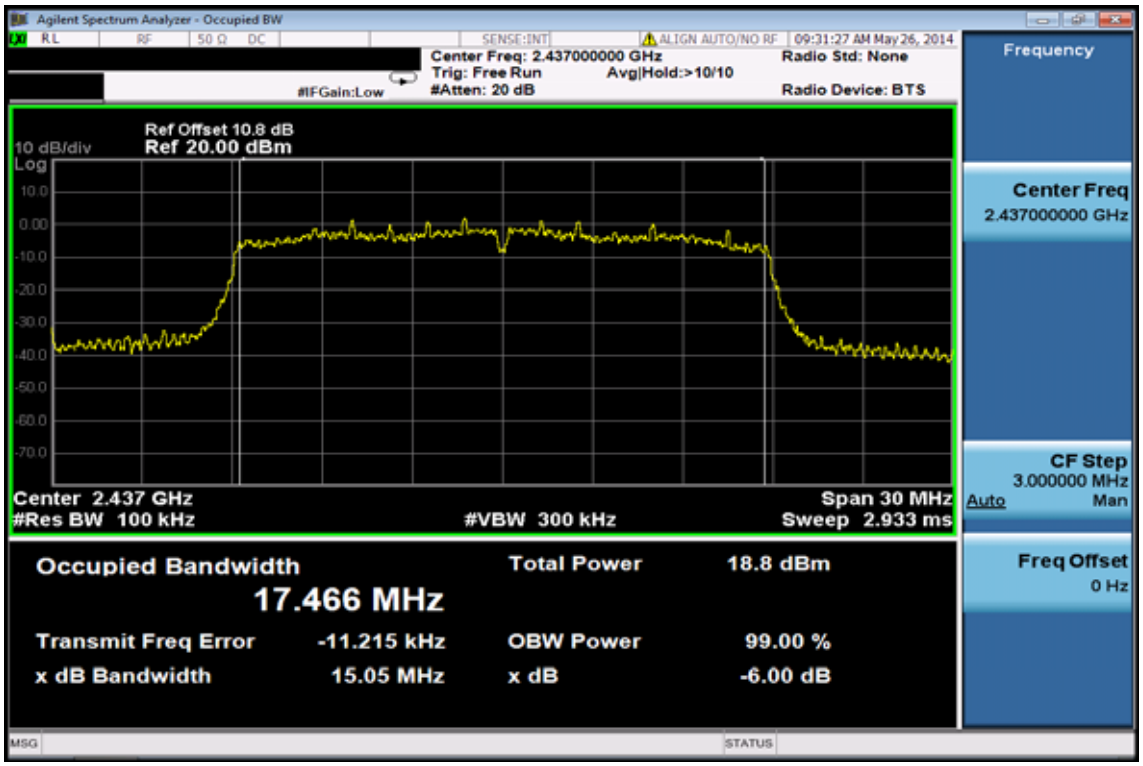
802.11n_20M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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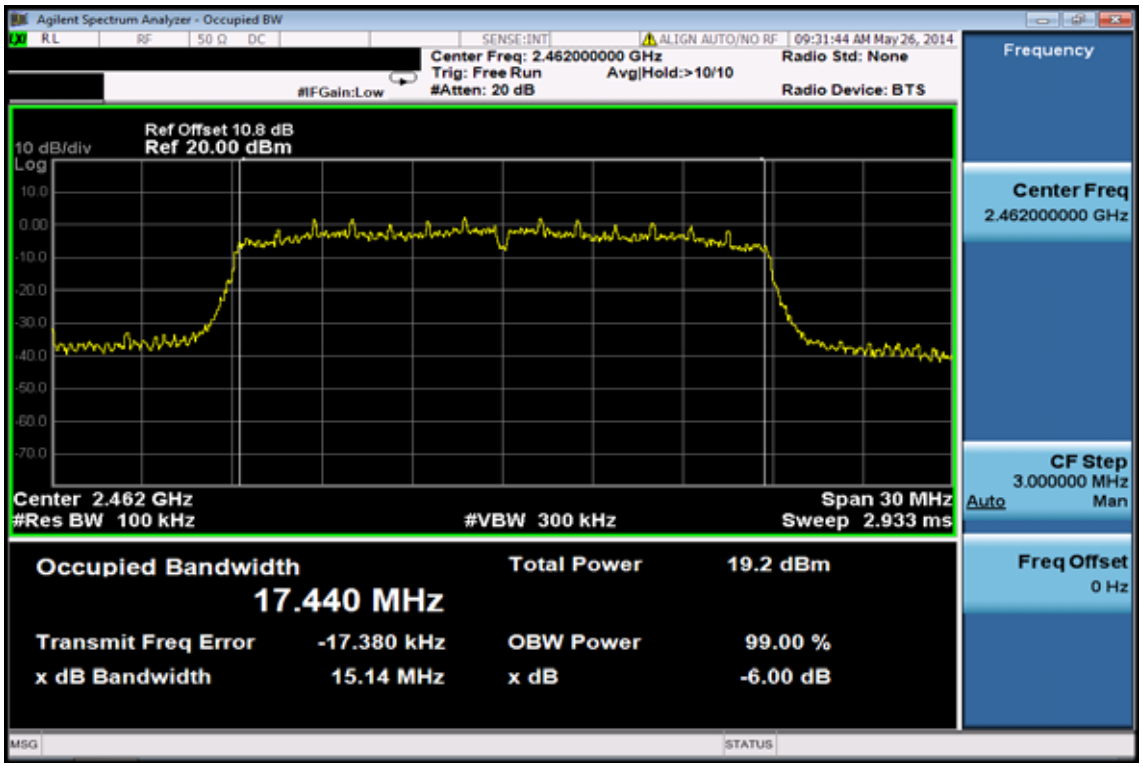
6dB Band Width Test Data CH-High



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9 BAND EDGES MEASUREMENT

9.1 Standard Applicable:

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to RSS-Gen §7.2.5 and RSS-210 issue 8,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 5 and 6 is not required. In addition, radiated emissions which fall in the restricted bands of Table 3 must also comply with the radiated emission limits specified in Tables 5 and 6.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

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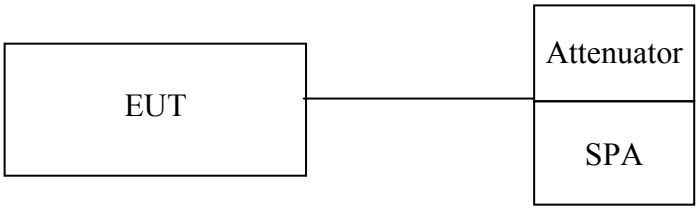
9.2.2 Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	01/20/2014	01/19/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/22/2013	10/21/2014
Loop Antenna	ETS.LINDGREN	6502	00148045	07/05/2013	07/04/2014
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/02/2014	01/01/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	01/23/2014	01/22/2015
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2014	01/02/2015
Pre-Amplifier	Agilent	8449B	3008A00578	01/03/2014	01/02/2015
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/24/2014	01/23/2015
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/27/2014	02/26/2015
Attenuator	Mini-Circuit	BW-S10W2+	004	02/27/2014	02/26/2015
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/03/2014	01/02/2015
3m Site NSA	SGS	966 chamber	N/A	07/15/2013	07/14/2014

Note: N.C.R refers to Not Calibrated Required.

9.3 Test SET-UP:

9.3.1 Conducted Emission at antenna port:



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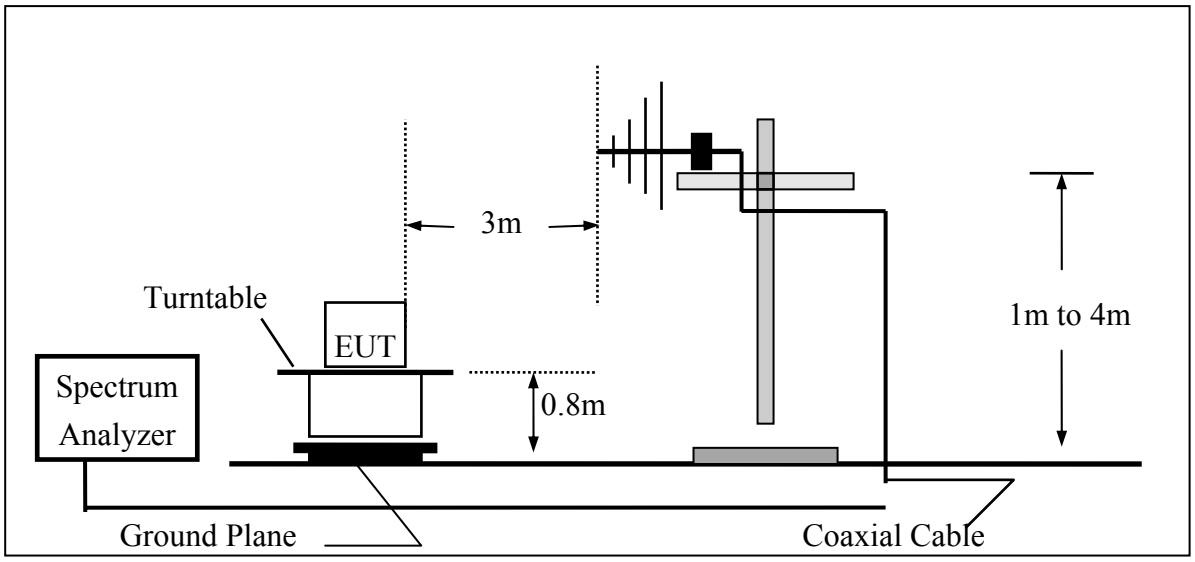
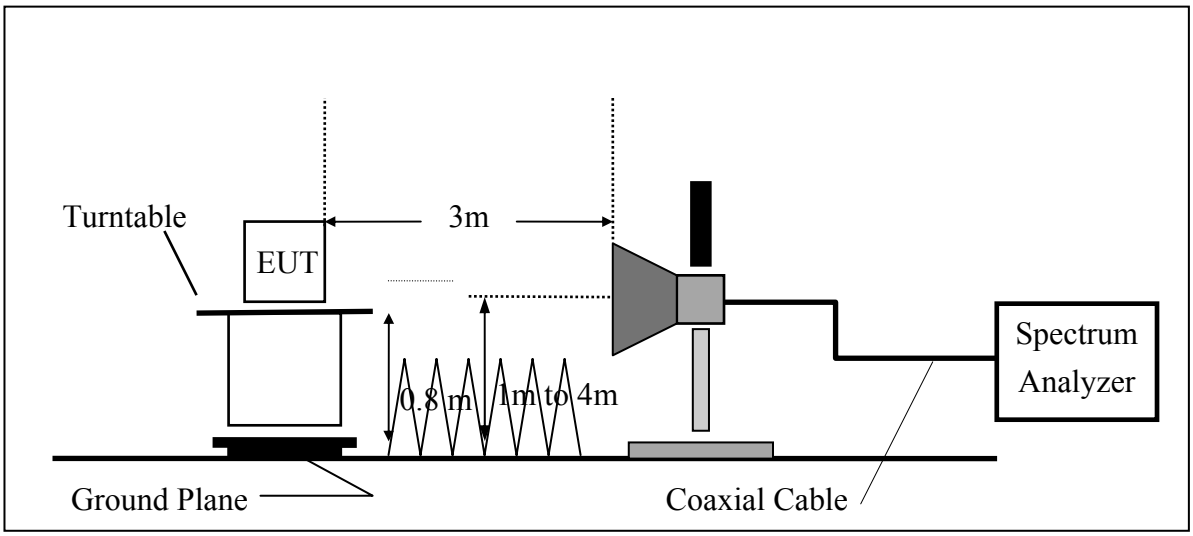
9.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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9.4 Measurement Procedure:

Unwanted Emissions into Non-Restricted Frequency Bands, Measurement Procedure followed by 11.1 of KDB558074 D01

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
4. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
5. Mark the highest reading of the emission as the reference level measurement.
6. Set DL as the limit = reading on marker 1 – 20dBm
7. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 KHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Unwanted Emission falling into Restricted Frequency Bands, Measurement Procedure followed by 12.1 of KDB558074:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. On spectrum, following 8.1.2, and RBW = 1MHz, VBW = 3MHz, & Marker 2390MHz, and 2483.5MHz (Peak Measurement). Average Measurement: following 8.2 with the modification span to 1MHz, &RBW = 1MHz, VBW = 3MHz and peak marker function to obtain the highest reading on 2390, and 2483.5MHz.

   Repeat above procedures until all default test channel (low, middle, and high) was complete

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9.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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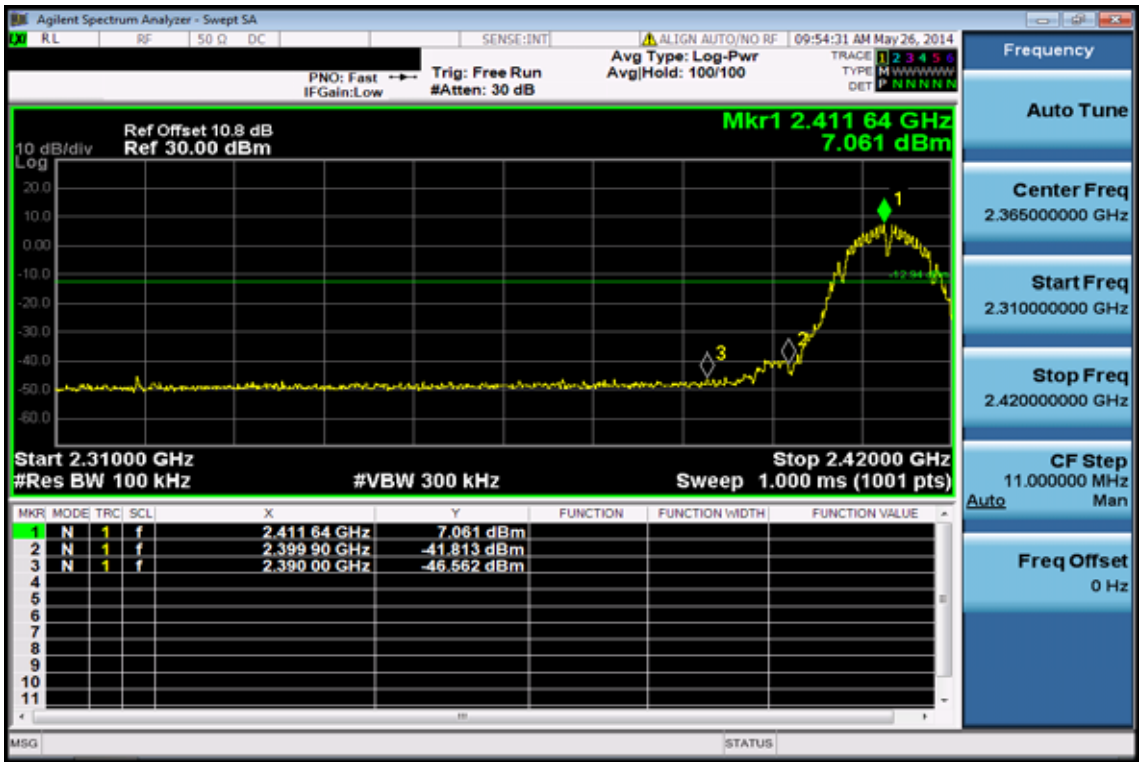
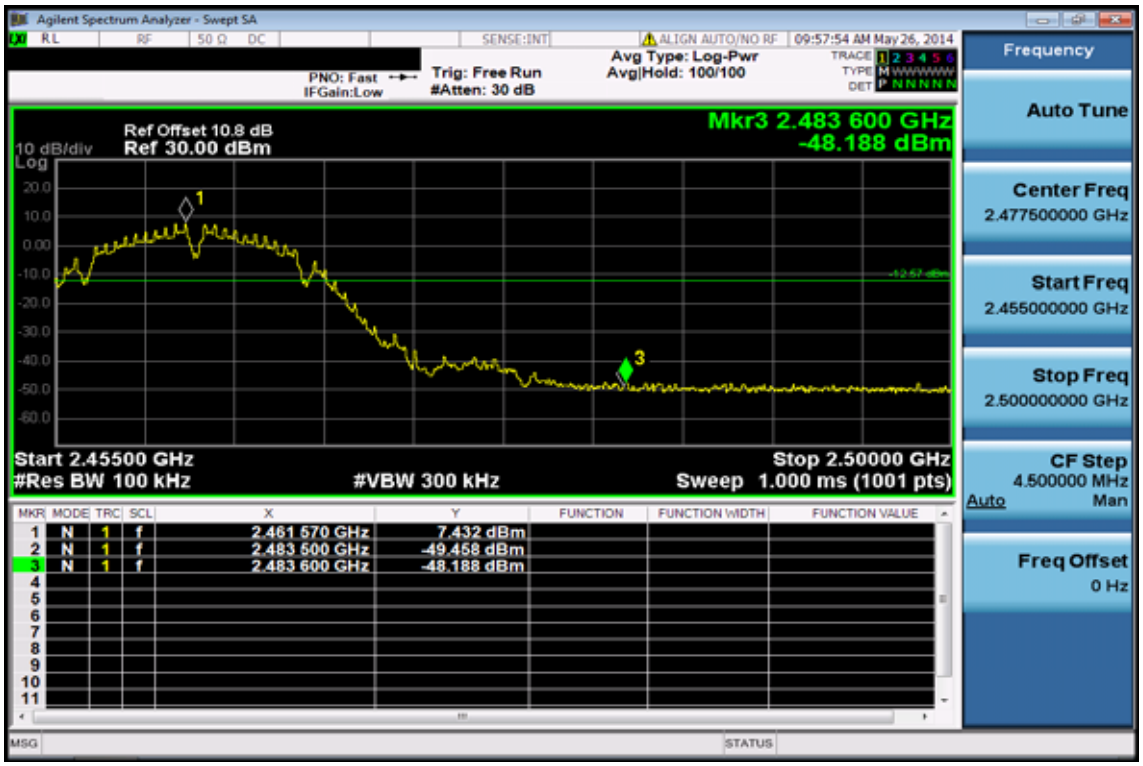
802.11b - Unwanted Emissions into Non-Restricted Frequency Bands

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 b mode

Operation Band	:802.11 b	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	39.77	2.42	42.19	54.00	-11.81
2390.00	E	Peak	52.79	2.42	55.21	74.00	-18.79

Operation Band	:802.11 b	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	40.53	2.42	42.95	54.00	-11.05
2390.00	E	Peak	52.26	2.42	54.68	74.00	-19.32

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Operation Band	:802.11 b	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	37.01	2.74	39.75	54.00	-14.25
2483.50	E	Peak	49.92	2.74	52.66	74.00	-21.34

Operation Band	:802.11 b	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	39.54	2.74	42.28	54.00	-11.72
2483.50	E	Peak	51.94	2.74	54.68	74.00	-19.32

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802.11g - Unwanted Emissions into Non-Restricted Frequency Bands

Band Edges Test Data CH-Low

Band Edges Test Data CH-High

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Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 g mode

Operation Band	:802.11 g	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	46.83	2.42	49.25	54.00	-4.75
2390.00	E	Peak	63.76	2.42	66.18	74.00	-7.82

Operation Band	:802.11 g	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	50.11	2.42	52.53	54.00	-1.47
2390.00	E	Peak	65.42	2.42	67.84	74.00	-6.16

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Operation Band	:802.11 g	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	45.02	2.74	47.76	54.00	-6.24
2483.50	E	Peak	62.43	2.74	65.17	74.00	-8.83

Operation Band	:802.11 g	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	48.75	2.74	51.49	54.00	-2.51
2483.50	E	Peak	66.56	2.74	69.30	74.00	-4.70

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802.11n_20M- Unwanted Emissions into Non-Restricted Frequency Bands

Band Edges Test Data CH-Low

Band Edges Test Data CH-High

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Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n_20M mode

Operation Band	:802.11 n20M	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	46.85	2.42	49.27	54.00	-4.73
2390.00	E	Peak	65.53	2.42	67.95	74.00	-6.05

Operation Band	:802.11 n20M	Test Date	:2014-05-29
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge LOW	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2390.00	E	Average	50.05	2.42	52.47	54.00	-1.53
2390.00	E	Peak	68.48	2.42	70.90	74.00	-3.10

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Operation Band	:802.11 n20M	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	45.17	2.74	47.91	54.00	-6.09
2483.50	E	Peak	64.09	2.74	66.83	74.00	-7.17

Operation Band	:802.11 n20M	Test Date	:2014-05-29
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:Band Edge HIGH	Engineer	:Curry
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
2483.50	E	Average	49.36	2.74	52.10	54.00	-1.90
2483.50	E	Peak	69.73	2.74	72.47	74.00	-1.53

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10 SPURIOUS RADIATED EMISSION TEST

10.1 Standard Applicable

According to §15.247(d),

Emission at antenna port:

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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-Gen §7.2.5 and RSS-210 issue 8,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 5 and 6 is not required. In addition, radiated emissions which fall in the restricted bands of Table 3 must also comply with the radiated emission limits specified in Tables 5 and 6 of RSS-GEN.

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10.2 Measurement Equipment Used:

10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

10.3 Test SET-UP:

10.3.1 Conducted Emission at antenna port:

Refer to section 8 .3 for details.

10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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10.4 Measurement Procedure:

Radiated Emission:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Conducted Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 100K & VBW = 300K on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz, 18G to 40GHz (applicable if operation mode is 5GHz)
4. Via Software, combine 5 spans of frequency range into one plot
5. Repeat above procedures until all default test channel measured were complete.

10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

10.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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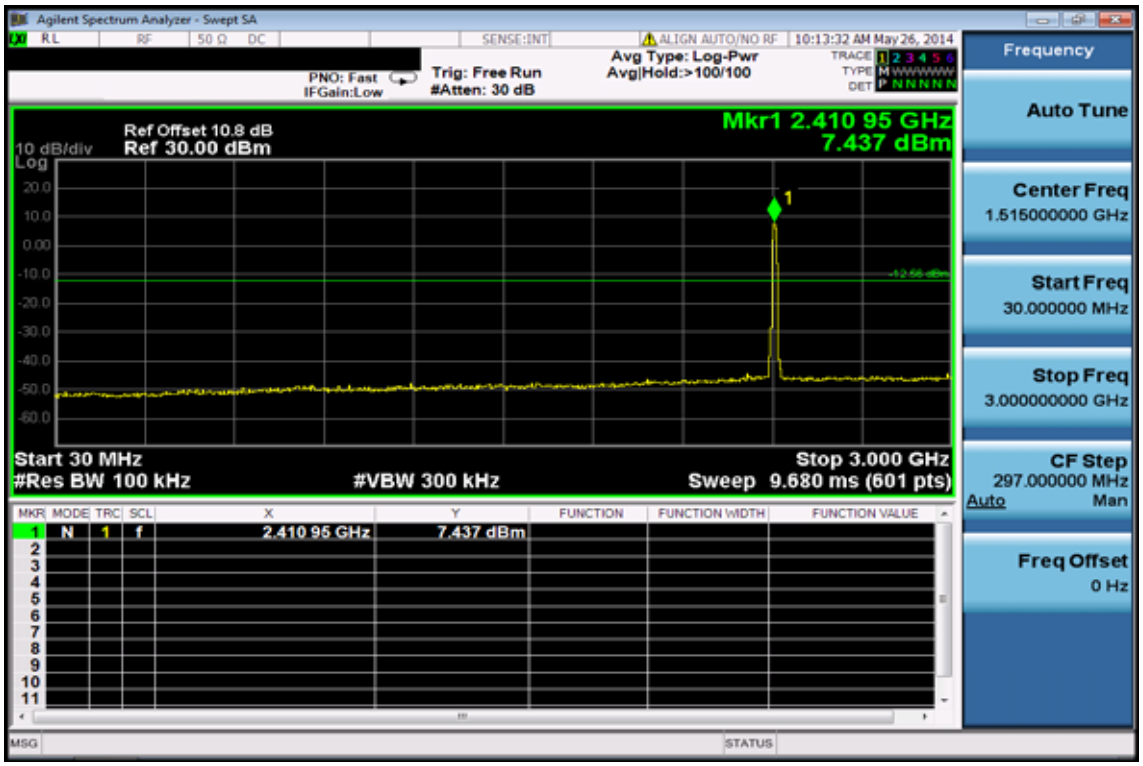
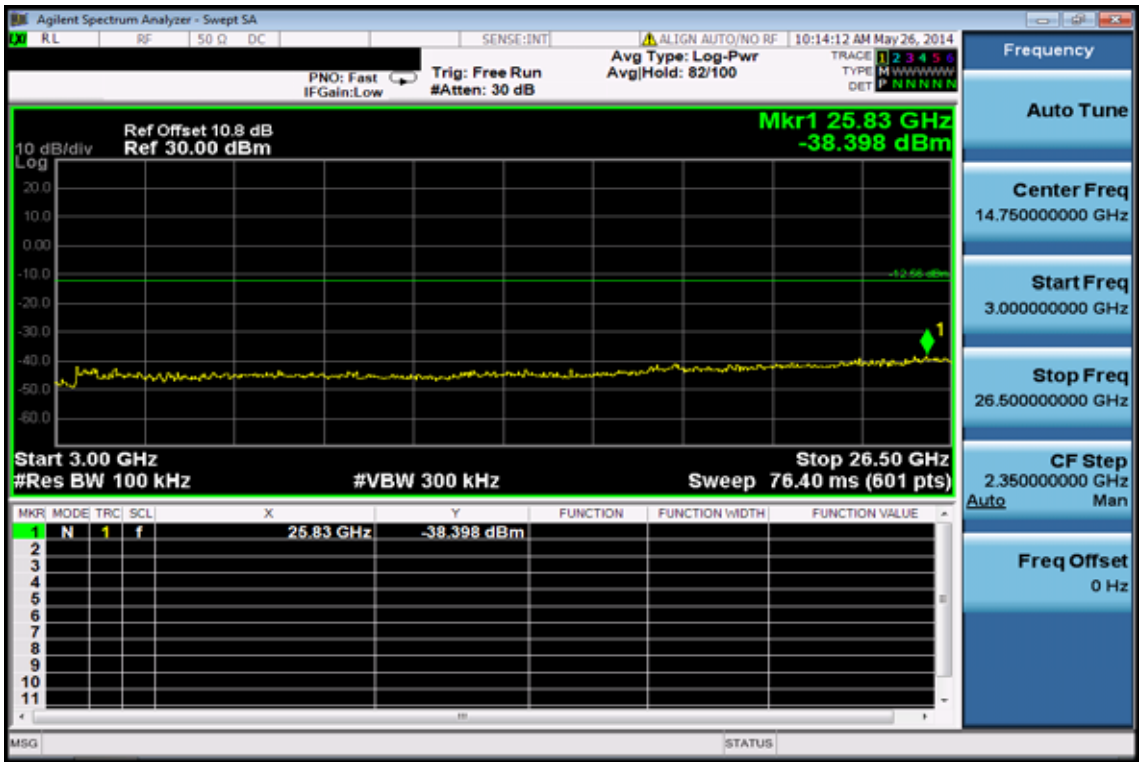
Conducted Spurious Emission Measurement Result (802.11b)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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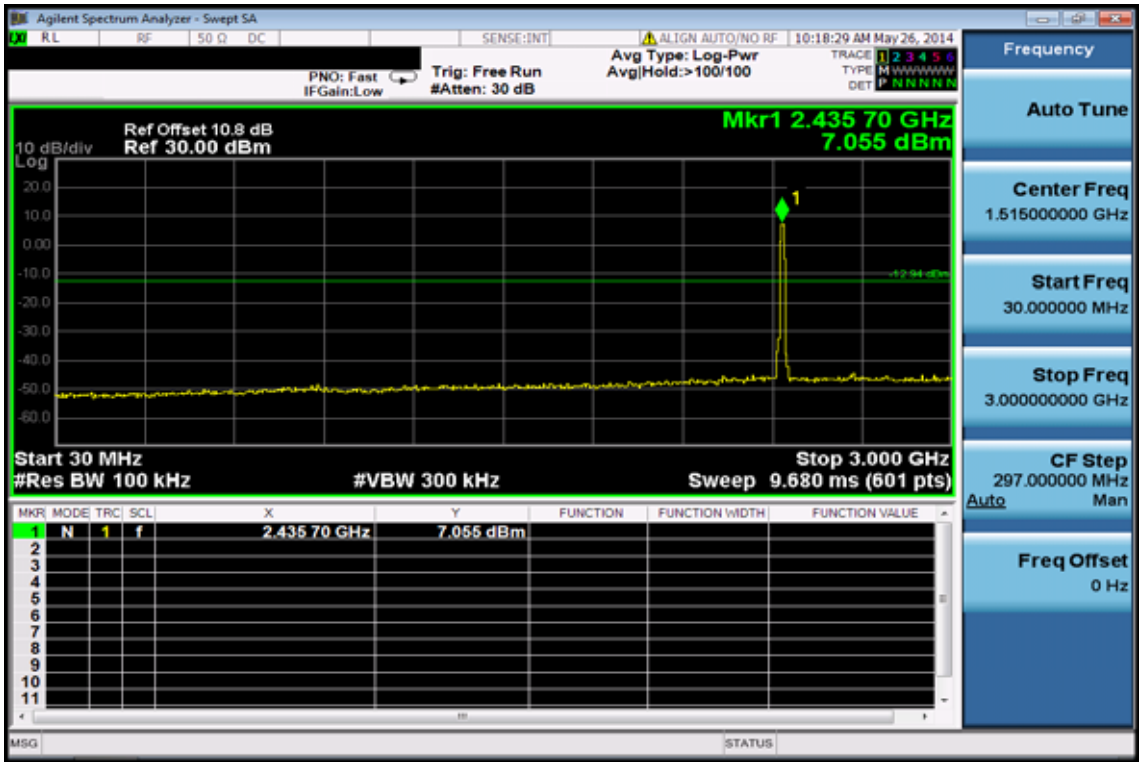
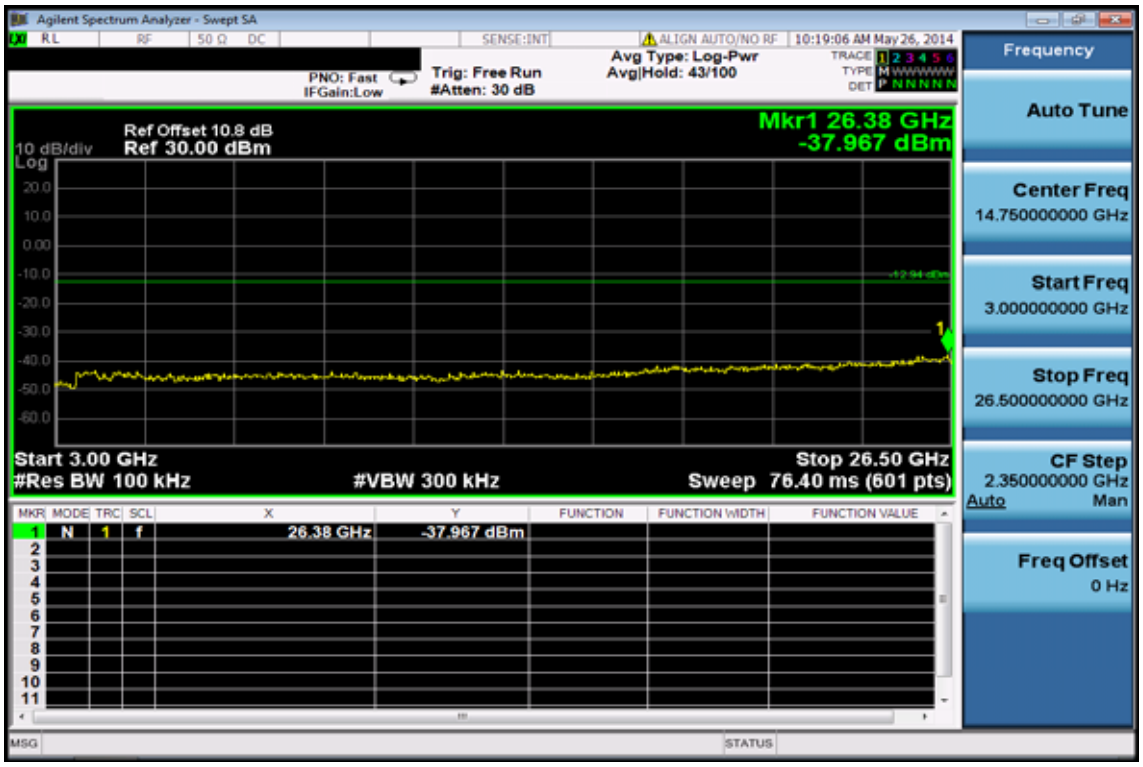
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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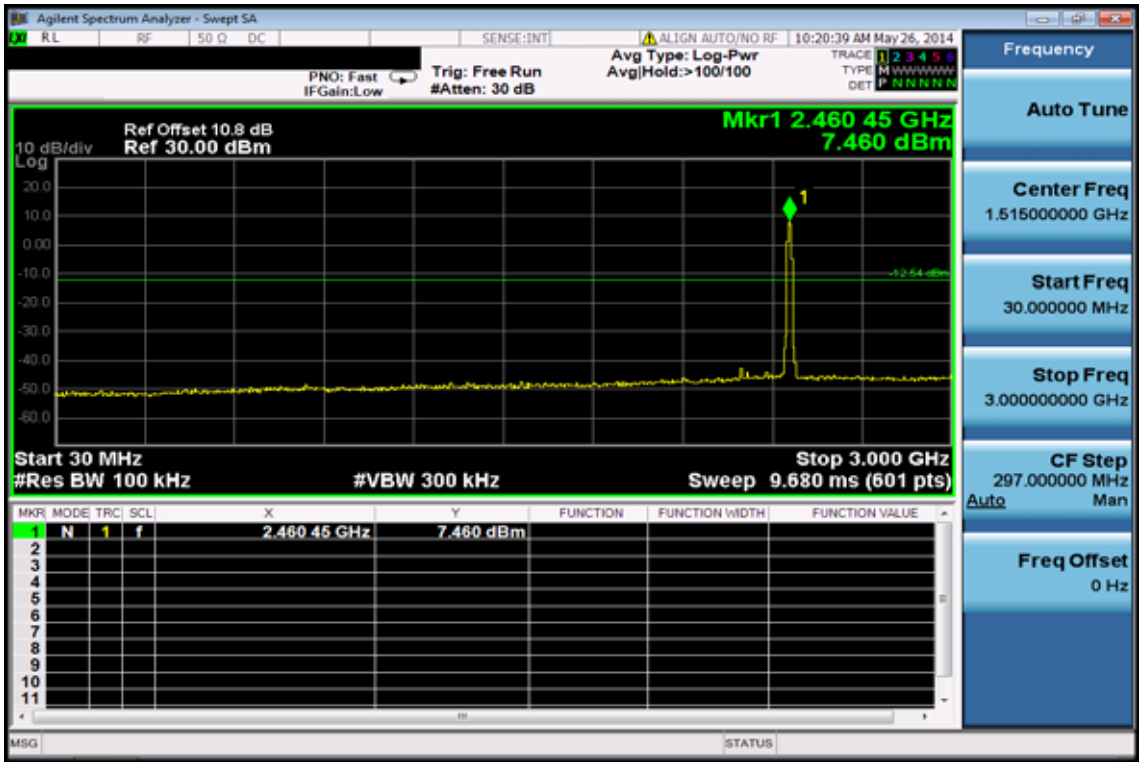
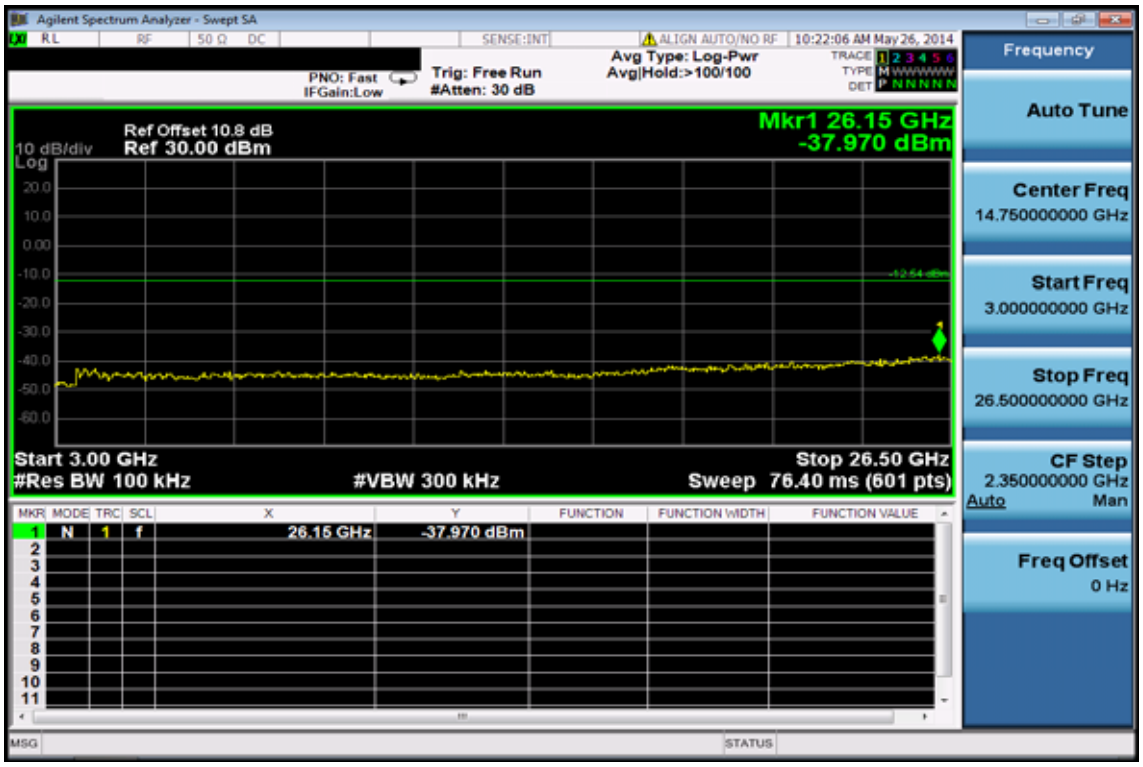
Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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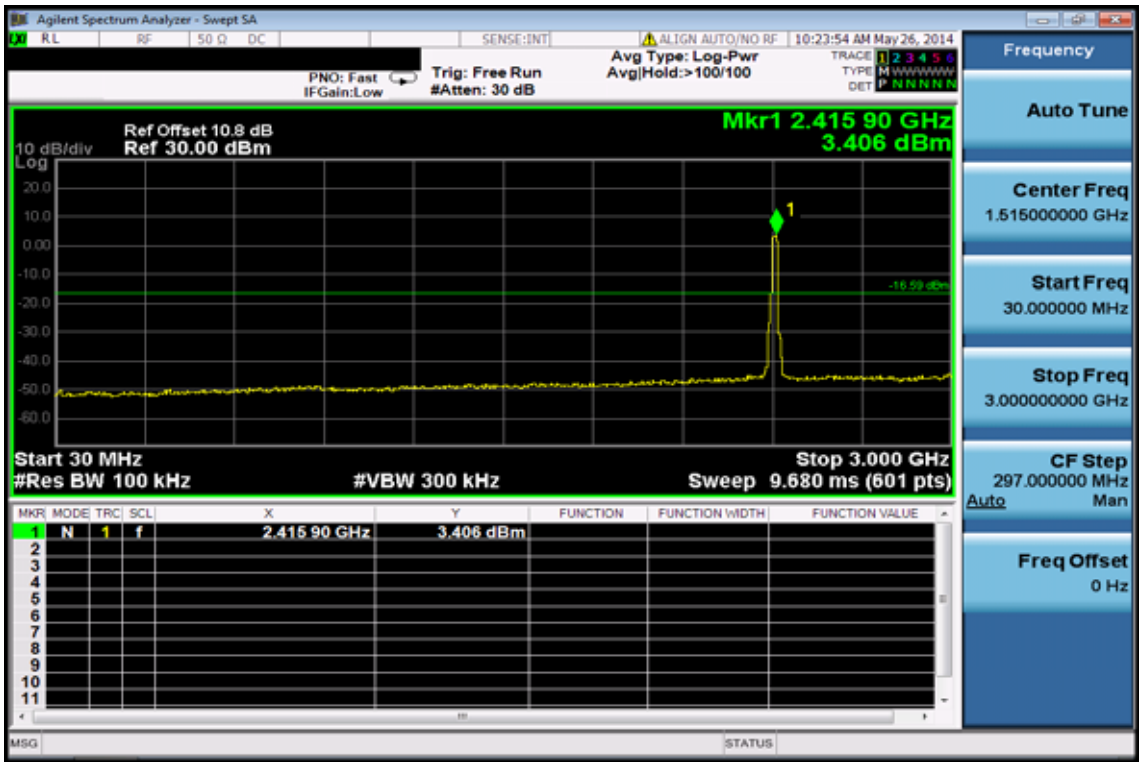
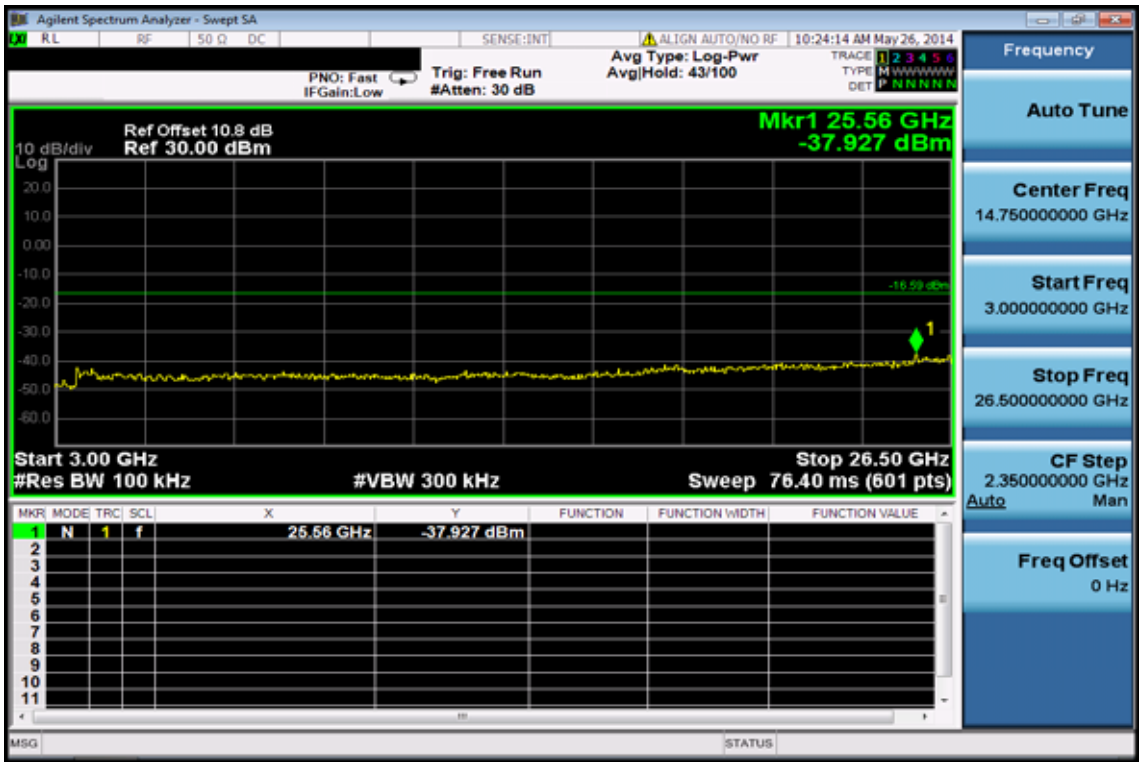
Conducted Spurious Emission Measurement Result (802.11g)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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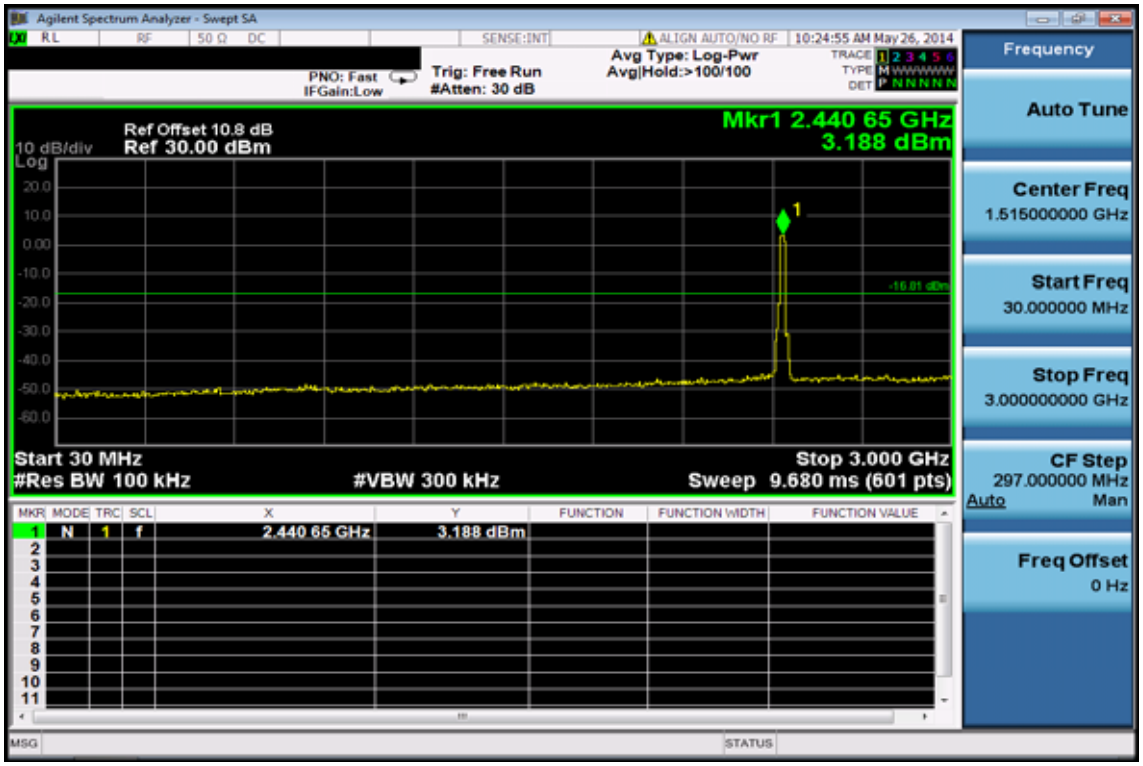
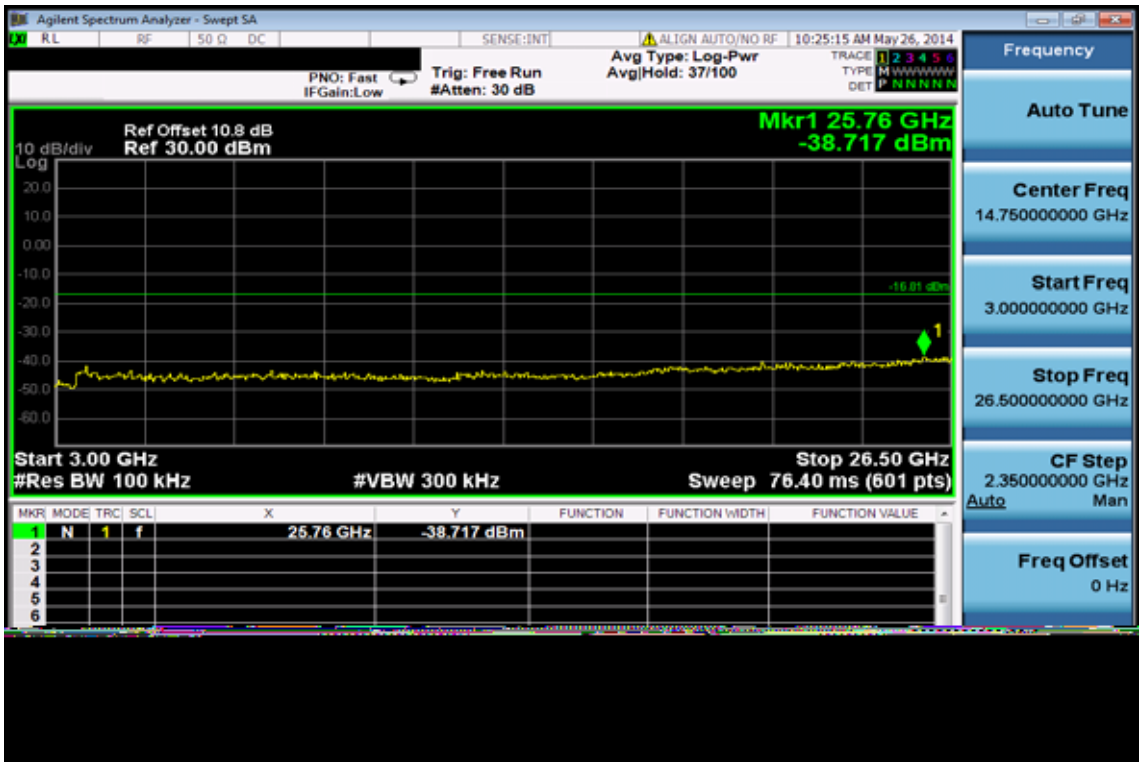
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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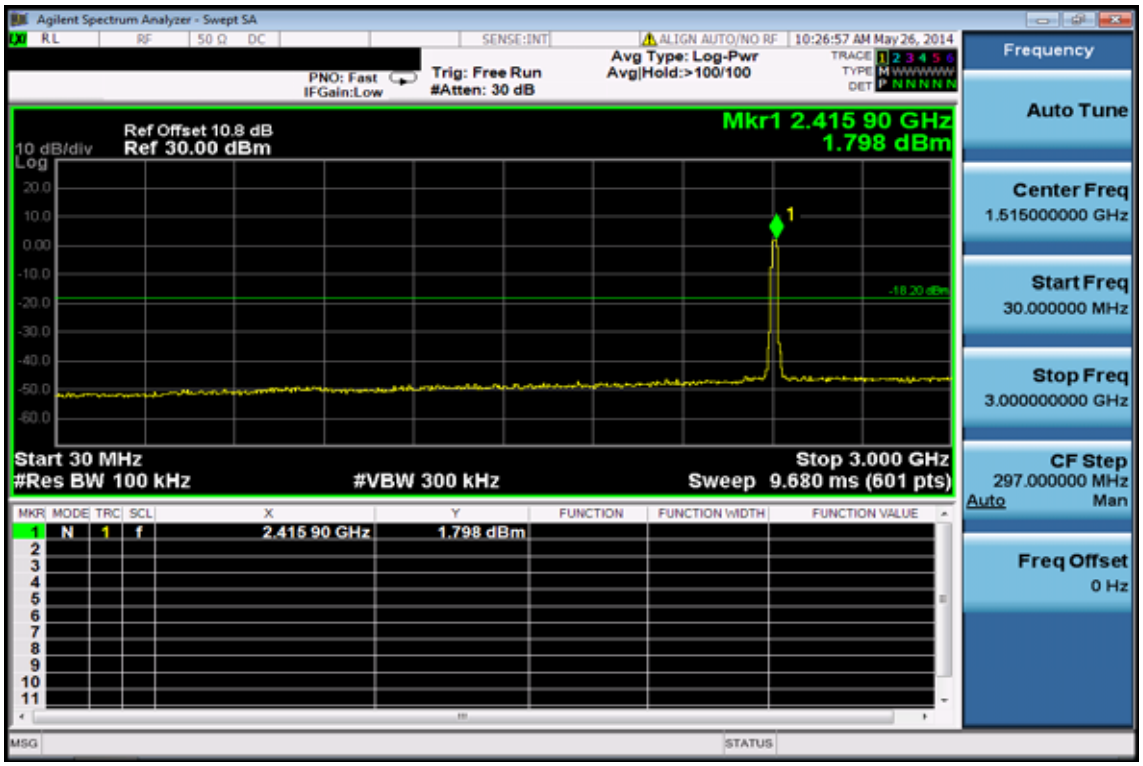
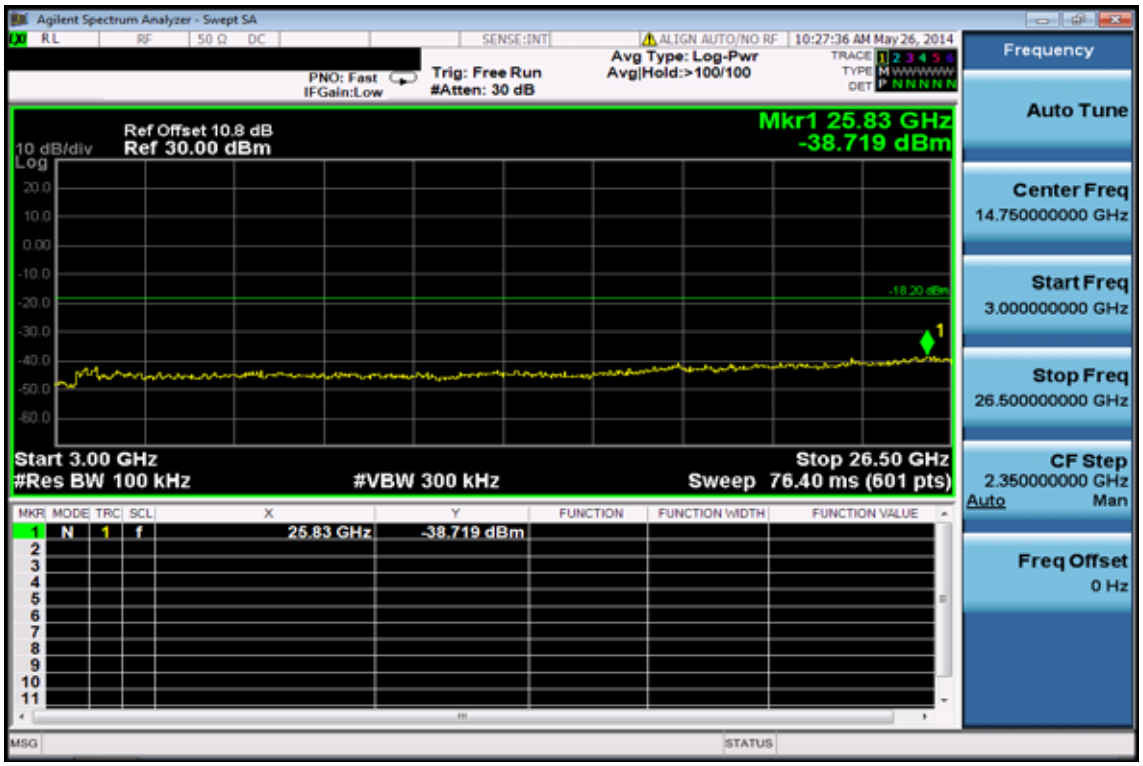
Conducted Spurious Emission Measurement Result (802.11n_20M)

Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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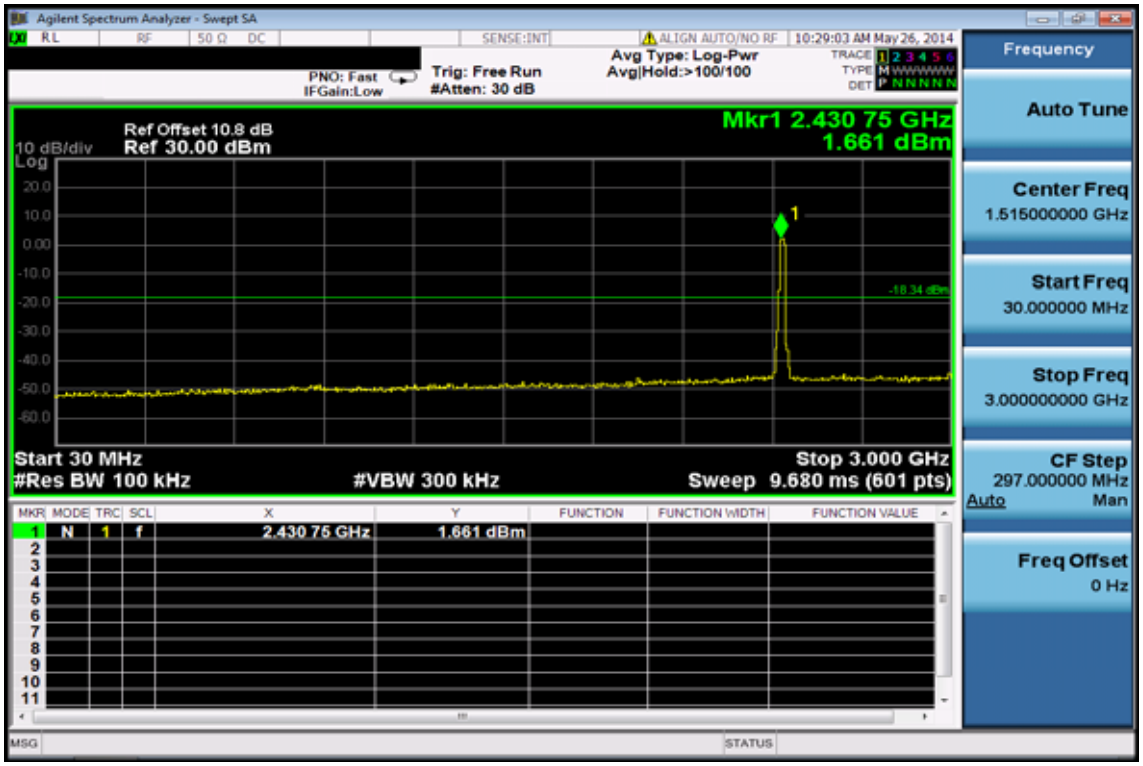
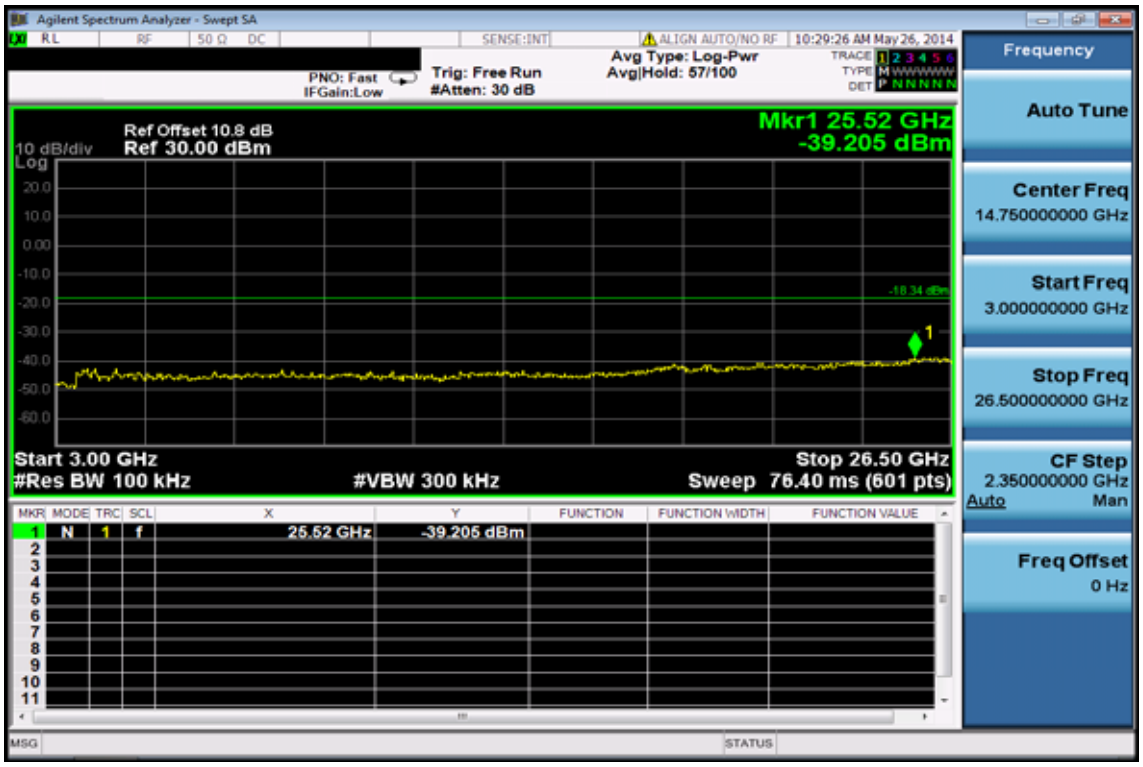
Ch Mid 30MHz – 3GHz



Ch Mid 3GHz – 26.5GHz



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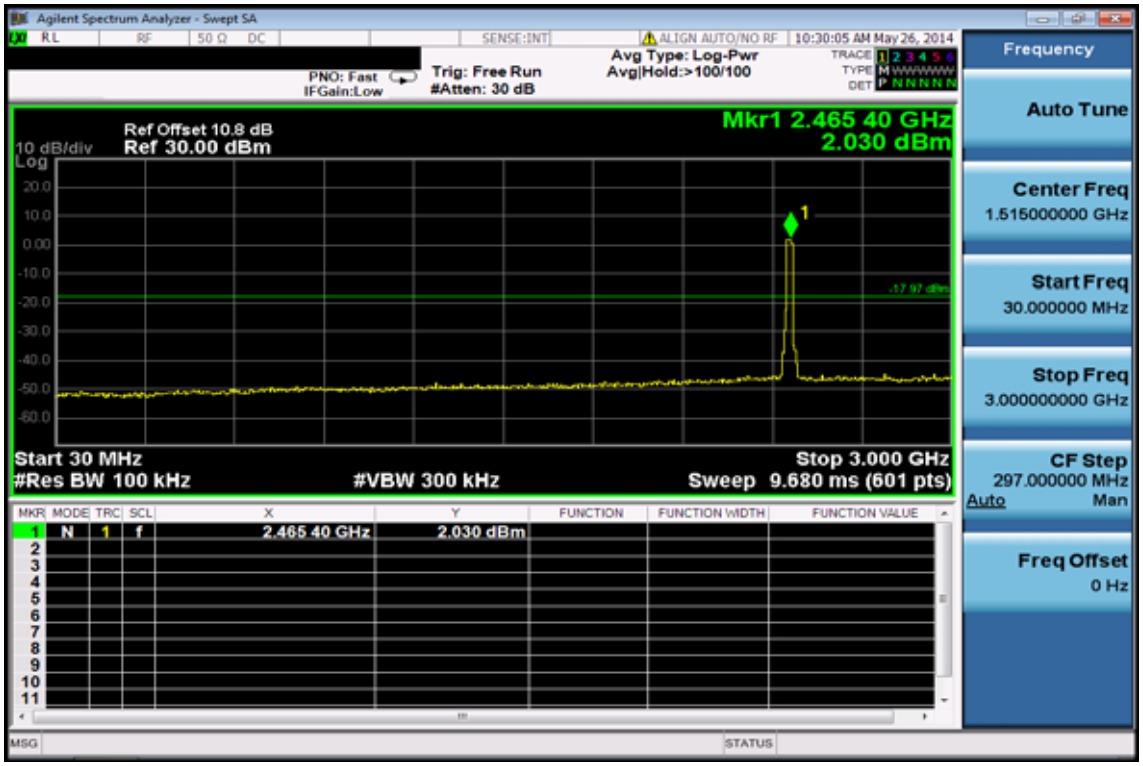
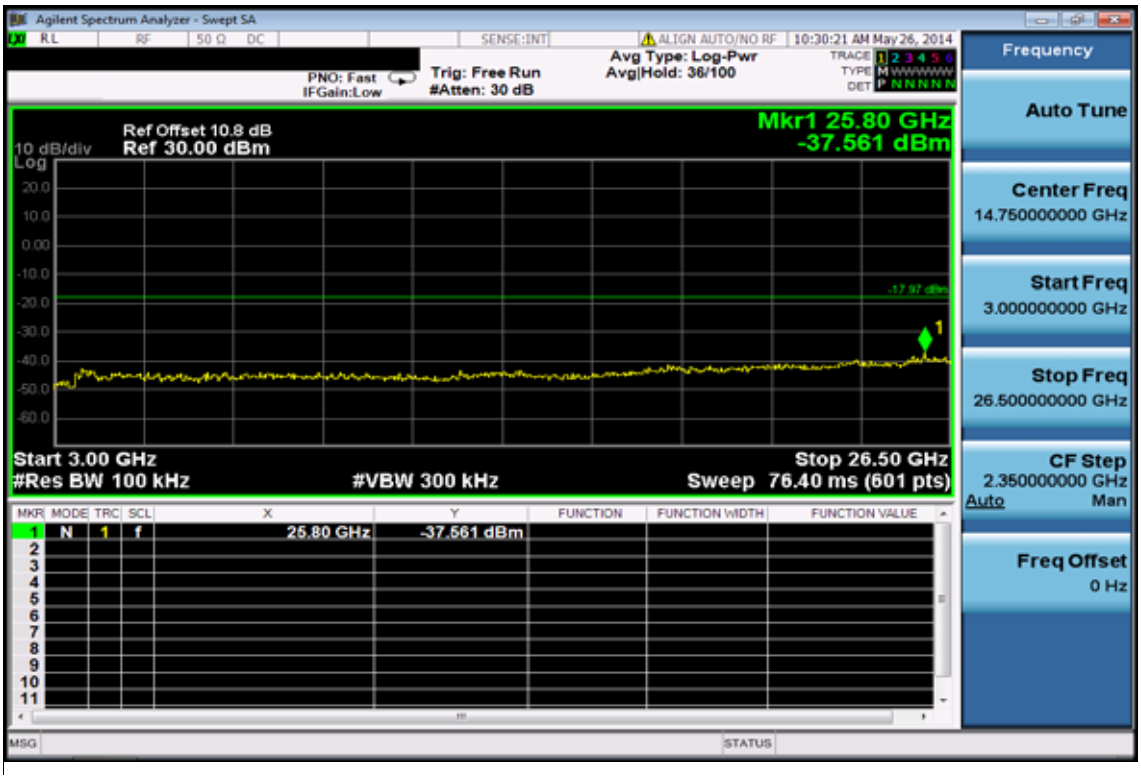
Ch High 30MHz – 3GHz



Ch High 3GHz – 26.5GHz



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Radiated Spurious Emission Measurement Result (802.11b)

Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
34.85	S	Peak	38.67	-13.77	24.90	40.00	-15.10
240.49	S	Peak	40.72	-13.24	27.48	46.00	-18.52
312.27	S	Peak	36.48	-10.99	25.49	46.00	-20.51
539.25	S	Peak	34.07	-7.62	26.45	46.00	-19.55
682.81	S	Peak	28.08	-3.67	24.41	46.00	-21.59
937.92	S	Peak	27.88	0.01	27.89	46.00	-18.11
2372.00	S	Average	38.15	2.33	40.48	54.00	-13.52
2372.00	S	Peak	48.02	2.33	50.35	74.00	-23.65
4824.00	H	Average	39.93	6.89	46.82	54.00	-7.18
4824.00	H	Peak	43.77	6.89	50.66	74.00	-23.34
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
35.82	S	Peak	30.57	-13.71	16.86	40.00	-23.14
240.49	S	Peak	43.23	-13.24	29.99	46.00	-16.01
312.27	S	Peak	41.12	-10.99	30.13	46.00	-15.87
500.45	S	Peak	43.65	-7.52	36.13	46.00	-9.87
683.78	S	Peak	28.36	-3.67	24.69	46.00	-21.31
952.47	S	Peak	28.15	0.18	28.33	46.00	-17.67
2351.00	S	Average	39.38	2.24	41.62	54.00	-12.38
2351.00	S	Peak	47.34	2.24	49.58	74.00	-24.42
4824.00	H	Average	41.08	6.89	47.97	54.00	-6.03
4824.00	H	Peak	44.68	6.89	51.57	74.00	-22.43
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
34.85	S	Peak	38.92	-13.77	25.15	40.00	-14.85
240.49	S	Peak	40.88	-13.24	27.64	46.00	-18.36
312.27	S	Peak	36.09	-10.99	25.10	46.00	-20.90
527.61	S	Peak	32.86	-7.51	25.35	46.00	-20.65
677.96	S	Peak	28.36	-3.73	24.63	46.00	-21.37
913.67	S	Peak	28.78	-0.42	28.36	46.00	-17.64
2358.00	S	Average	40.38	2.28	42.66	54.00	-11.34
2358.00	S	Peak	48.65	2.28	50.93	74.00	-23.07
4874.00	H	Average	42.01	6.96	48.97	54.00	-5.03
4874.00	H	Peak	46.38	6.96	53.34	74.00	-20.66
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
34.85	S	Peak	30.90	-13.77	17.13	40.00	-22.87
240.49	S	Peak	43.52	-13.24	30.28	46.00	-15.72
312.27	S	Peak	41.03	-10.99	30.04	46.00	-15.96
539.25	S	Peak	43.98	-7.62	36.36	46.00	-9.64
672.14	S	Peak	28.30	-3.95	24.35	46.00	-21.65
906.88	S	Peak	28.66	-0.60	28.06	46.00	-17.94
2365.00	S	Average	39.60	2.29	41.89	54.00	-12.11
2365.00	S	Peak	49.00	2.29	51.29	74.00	-22.71
4874.00	H	Average	43.24	6.96	50.20	54.00	-3.80
4874.00	H	Peak	46.75	6.96	53.71	74.00	-20.29
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
34.85	S	Peak	38.84	-13.77	25.07	40.00	-14.93
239.52	S	Peak	41.16	-13.30	27.86	46.00	-18.14
312.27	S	Peak	35.80	-10.99	24.81	46.00	-21.19
539.25	S	Peak	33.80	-7.62	26.18	46.00	-19.82
696.39	S	Peak	28.34	-3.94	24.40	46.00	-21.60
943.74	S	Peak	27.59	0.10	27.69	46.00	-18.31
2365.00	S	Average	38.90	2.29	41.19	54.00	-12.81
2365.00	S	Peak	49.90	2.29	52.19	74.00	-21.81
4924.00	H	Average	41.55	7.01	48.56	54.00	-5.44
4924.00	H	Peak	46.35	7.01	53.36	74.00	-20.64
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11 b	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
35.82	S	Peak	31.25	-13.71	17.54	40.00	-22.46
240.49	S	Peak	43.70	-13.24	30.46	46.00	-15.54
312.27	S	Peak	41.18	-10.99	30.19	46.00	-15.81
539.25	S	Peak	44.57	-7.62	36.95	46.00	-9.05
678.93	S	Peak	28.02	-3.70	24.32	46.00	-21.68
950.53	S	Peak	27.44	0.17	27.61	46.00	-18.39
2365.00	S	Average	39.76	2.29	42.05	54.00	-11.95
2365.00	S	Peak	49.35	2.29	51.64	74.00	-22.36
4924.00	H	Average	45.35	7.01	52.36	54.00	-1.64
4924.00	H	Peak	48.93	7.01	55.94	74.00	-18.06
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11g)

Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
46.49	S	Peak	35.51	-13.04	22.47	40.00	-17.53
114.39	S	Peak	39.38	-15.60	23.78	43.50	-19.72
216.24	S	Peak	40.55	-14.72	25.83	46.00	-20.17
263.77	S	Peak	36.90	-12.33	24.57	46.00	-21.43
480.08	S	Peak	31.14	-7.75	23.39	46.00	-22.61
719.67	S	Peak	35.81	-4.26	31.55	46.00	-14.45
2365.00	S	Average	31.30	2.29	33.59	54.00	-20.41
2365.00	S	Peak	43.16	2.29	45.45	74.00	-28.55
4824.00	H	Average	28.78	6.89	35.67	54.00	-18.33
4824.00	H	Peak	41.53	6.89	48.42	74.00	-25.58
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
191.99	S	Peak	42.55	-14.82	27.73	43.50	-15.77
263.77	S	Peak	40.44	-12.33	28.11	46.00	-17.89
359.80	S	Peak	39.34	-10.01	29.33	46.00	-16.67
539.25	S	Peak	42.18	-7.62	34.56	46.00	-11.44
719.67	S	Peak	32.95	-4.26	28.69	46.00	-17.31
861.29	S	Peak	29.00	-1.60	27.40	46.00	-18.60
4824.00	H	Average	28.16	6.89	35.05	54.00	-18.95
4824.00	H	Peak	41.40	6.89	48.29	74.00	-25.71
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
114.39	S	Peak	39.06	-15.60	23.46	43.50	-20.04
191.99	S	Peak	40.25	-14.82	25.43	43.50	-18.07
263.77	S	Peak	37.64	-12.33	25.31	46.00	-20.69
359.80	S	Peak	32.04	-10.01	22.03	46.00	-23.97
576.11	S	Peak	30.60	-5.49	25.11	46.00	-20.89
719.67	S	Peak	36.00	-4.26	31.74	46.00	-14.26
4874.00	H	Average	27.27	6.96	34.23	54.00	-19.77
4874.00	H	Peak	39.50	6.96	46.46	74.00	-27.54
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
191.99	S	Peak	43.11	-14.82	28.29	43.50	-15.21
263.77	S	Peak	40.55	-12.33	28.22	46.00	-17.78
385.02	S	Peak	38.56	-9.47	29.09	46.00	-16.91
423.82	S	Peak	34.56	-8.96	25.60	46.00	-20.40
500.45	S	Peak	42.51	-7.52	34.99	46.00	-11.01
719.67	S	Peak	32.36	-4.26	28.10	46.00	-17.90
4874.00	H	Average	29.24	6.96	36.20	54.00	-17.80
4874.00	H	Peak	42.56	6.96	49.52	74.00	-24.48
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
114.39	S	Peak	38.85	-15.60	23.25	43.50	-20.25
191.99	S	Peak	40.31	-14.82	25.49	43.50	-18.01
263.77	S	Peak	36.96	-12.33	24.63	46.00	-21.37
359.80	S	Peak	32.47	-10.01	22.46	46.00	-23.54
600.36	S	Peak	29.86	-5.51	24.35	46.00	-21.65
719.67	S	Peak	35.79	-4.26	31.53	46.00	-14.47
4924.00	H	Average	29.96	7.01	36.97	54.00	-17.03
4924.00	H	Peak	43.06	7.01	50.07	74.00	-23.93
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11 g	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
154.16	S	Peak	31.96	-12.73	19.23	43.50	-24.27
216.24	S	Peak	44.09	-14.72	29.37	46.00	-16.63
359.80	S	Peak	40.04	-10.01	30.03	46.00	-15.97
423.82	S	Peak	34.38	-8.96	25.42	46.00	-20.58
500.45	S	Peak	40.56	-7.52	33.04	46.00	-12.96
858.38	S	Peak	27.94	-1.64	26.30	46.00	-19.70
2365.00	H	Average	38.45	2.29	40.74	54.00	-13.26
2365.00	H	Peak	52.17	2.29	54.46	74.00	-19.54
4924.00	H	Average	27.31	7.01	34.32	54.00	-19.68
4924.00	H	Peak	39.93	7.01	46.94	74.00	-27.06
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Radiated Spurious Emission Measurement Result (802.11n_20M)

Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
34.85	S	Peak	36.67	-13.77	22.90	40.00	-17.10
114.39	S	Peak	38.38	-15.60	22.78	43.50	-20.72
216.24	S	Peak	39.55	-14.72	24.83	46.00	-21.17
240.49	S	Peak	39.72	-13.24	26.48	46.00	-19.52
527.61	S	Peak	32.25	-7.51	24.74	46.00	-21.26
719.67	S	Peak	33.81	-4.26	29.55	46.00	-16.45
4824.00	H	Average	27.87	6.89	34.76	54.00	-19.24
4824.00	H	Peak	40.57	6.89	47.46	74.00	-26.54
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
216.24	S	Peak	45.18	-14.72	30.46	46.00	-15.54
240.49	S	Peak	42.23	-13.24	28.99	46.00	-17.01
312.27	S	Peak	42.12	-10.99	31.13	46.00	-14.87
359.80	S	Peak	37.34	-10.01	27.33	46.00	-18.67
500.45	S	Peak	42.65	-7.52	35.13	46.00	-10.87
539.25	S	Peak	41.18	-7.62	33.56	46.00	-12.44
2358.00	S	Average	29.02	2.28	31.30	54.00	-22.70
2358.00	S	Peak	43.28	2.28	45.56	74.00	-28.44
4824.00	H	Average	29.34	6.89	36.23	54.00	-17.77
4824.00	H	Peak	42.25	6.89	49.14	74.00	-24.86
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
47.46	S	Peak	36.48	-13.00	23.48	40.00	-16.52
114.39	S	Peak	40.06	-15.60	24.46	43.50	-19.04
160.95	S	Peak	34.85	-12.66	22.19	43.50	-21.31
240.49	S	Peak	38.88	-13.24	25.64	46.00	-20.36
312.27	S	Peak	35.09	-10.99	24.10	46.00	-21.90
527.61	S	Peak	34.86	-7.51	27.35	46.00	-18.65
4874.00	H	Average	32.34	6.96	39.30	54.00	-14.70
4874.00	H	Peak	44.60	6.96	51.56	74.00	-22.44
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
191.99	S	Peak	41.11	-14.82	26.29	43.50	-17.21
240.49	S	Peak	43.52	-13.24	30.28	46.00	-15.72
312.27	S	Peak	41.03	-10.99	30.04	46.00	-15.96
385.02	S	Peak	39.56	-9.47	30.09	46.00	-15.91
500.45	S	Peak	43.51	-7.52	35.99	46.00	-10.01
539.25	S	Peak	45.98	-7.62	38.36	46.00	-7.64
4874.00	H	Average	33.40	6.96	40.36	54.00	-13.64
4874.00	H	Peak	46.29	6.96	53.25	74.00	-20.75
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
91.11	S	Peak	42.09	-18.87	23.22	43.50	-20.28
164.83	S	Peak	35.04	-12.78	22.26	43.50	-21.24
216.24	S	Peak	43.36	-14.72	28.64	46.00	-17.36
239.52	S	Peak	43.16	-13.30	29.86	46.00	-16.14
312.27	S	Peak	37.80	-10.99	26.81	46.00	-19.19
719.67	S	Peak	37.79	-4.26	33.53	46.00	-12.47
2659.00	S	Average	27.40	3.08	30.48	54.00	-23.52
2659.00	S	Peak	44.24	3.08	47.32	74.00	-26.68
4924.00	H	Average	28.89	7.01	35.90	54.00	-18.10
4924.00	H	Peak	43.58	7.01	50.59	74.00	-23.41
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2014-05-27
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C/52 RH
Operation Mode	:TX HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.
"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.
"---" : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV / m	Limit @3m dBμV / m	Margin dB
191.99	S	Peak	41.61	-14.82	26.79	43.50	-16.71
240.49	S	Peak	44.70	-13.24	31.46	46.00	-14.54
312.27	S	Peak	43.18	-10.99	32.19	46.00	-13.81
500.45	S	Peak	42.56	-7.52	35.04	46.00	-10.96
539.25	S	Peak	41.57	-7.62	33.95	46.00	-12.05
719.67	S	Peak	34.09	-4.26	29.83	46.00	-16.17
4924.00	H	Average	31.05	7.01	38.06	54.00	-15.94
4924.00	H	Peak	44.44	7.01	51.45	74.00	-22.55
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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11 PEAK POWER SPECTRAL DENSITY

11.1 Standard Applicable:

According to §15.247(e) 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 8, §A8.2(b) The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

11.2 Measurement Equipment Used:

Refer to section 7.2 for details.

11.3 Test Set-up:

Refer to section 7.3 for details.

11.4 Measurement Procedure (following the measurement procedure 9.1 option1 of KDB558074):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x 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.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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11.5 Measurement Result:

802.11b

Frequency MHz	RF Power Density Reading (dBm)	Maximum Limit (dBm)
2412	-4.410	8
2437	-4.770	8
2462	-4.867	8

802.11g

Frequency MHz	RF Power Density Reading (dBm)	Maximum Limit (dBm)
2412	-10.291	8
2437	-9.894	8
2462	-9.572	8

802.11n_20M

Frequency MHz	RF Power Density Reading (dBm)	Maximum Limit (dBm)
2412	-11.237	8
2437	-11.222	8
2462	-11.180	8

Offset 10.8dB

Note: Refer to next page for plots.

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802.11b

Power Spectral Density Test Plot (CH-Low)

Power Spectral Density Test Plot (CH-Mid)

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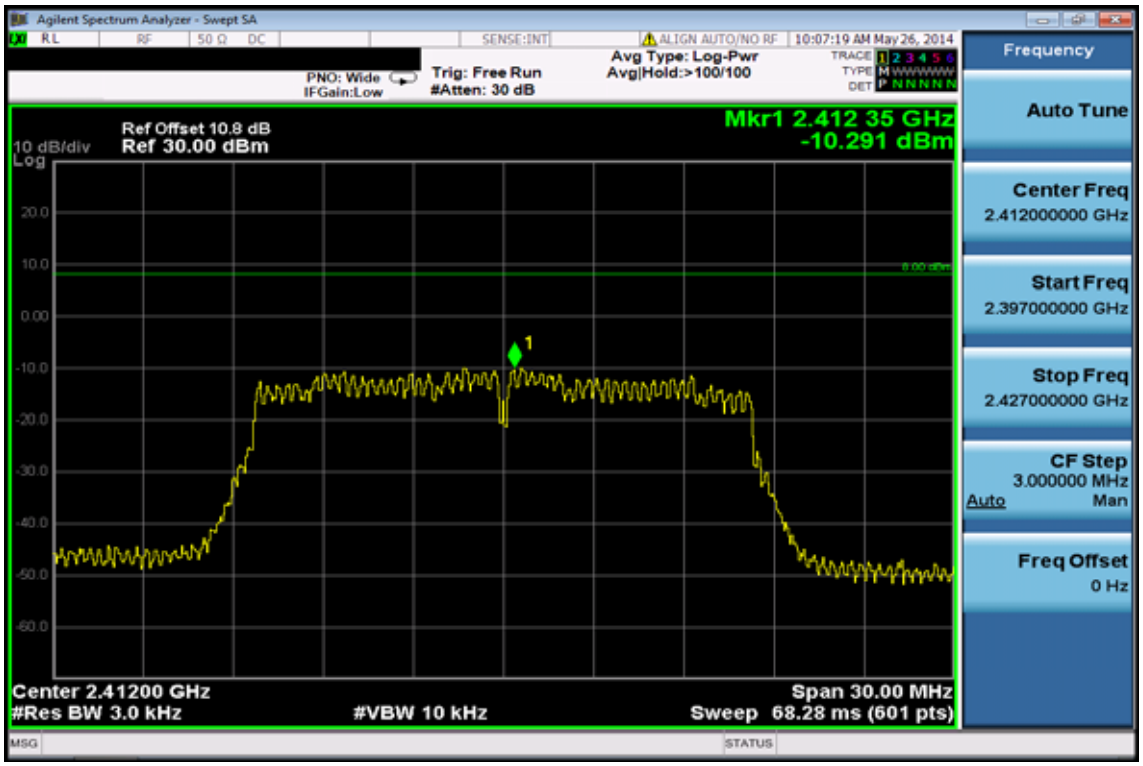
Power Spectral Density Test Plot (CH-High)

802.11g

Power Spectral Density Test Plot (CH-Low)



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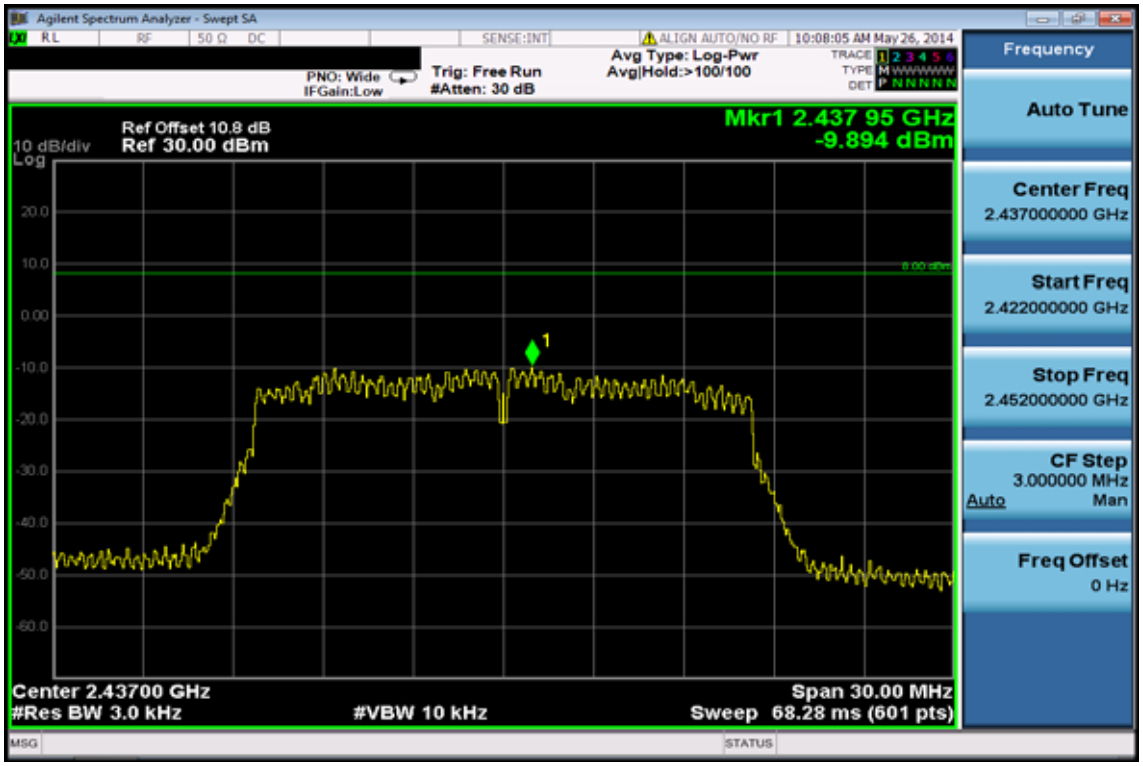
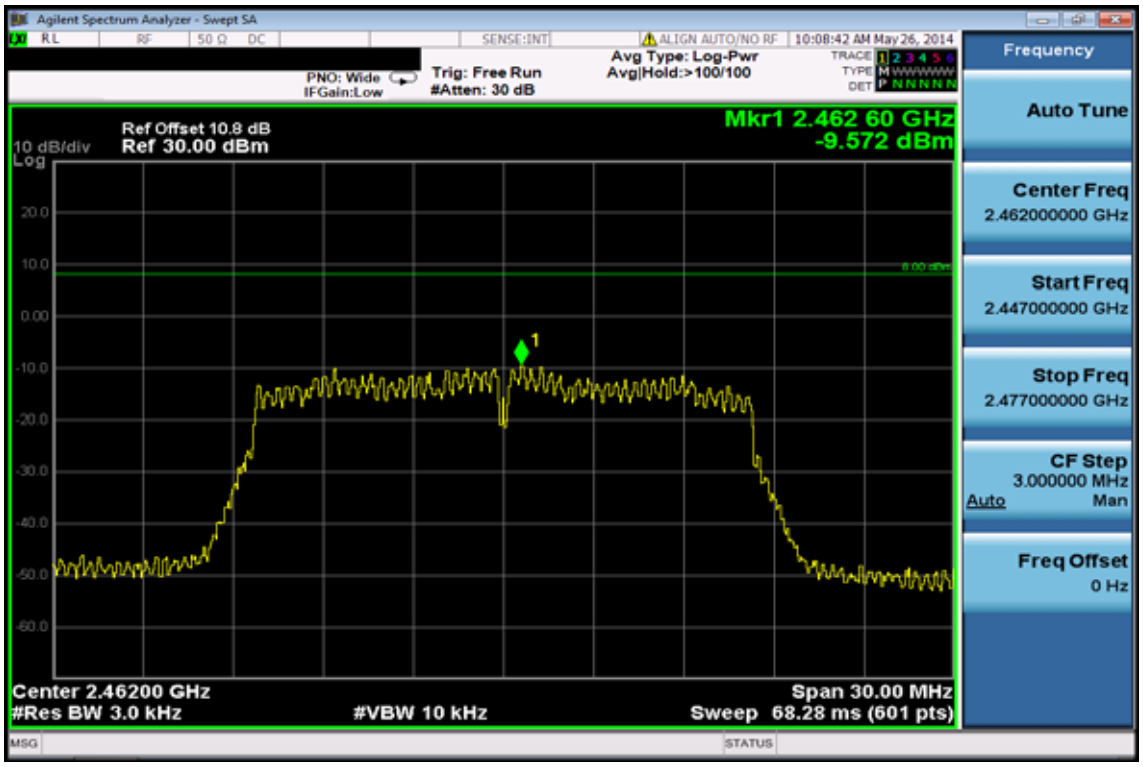
Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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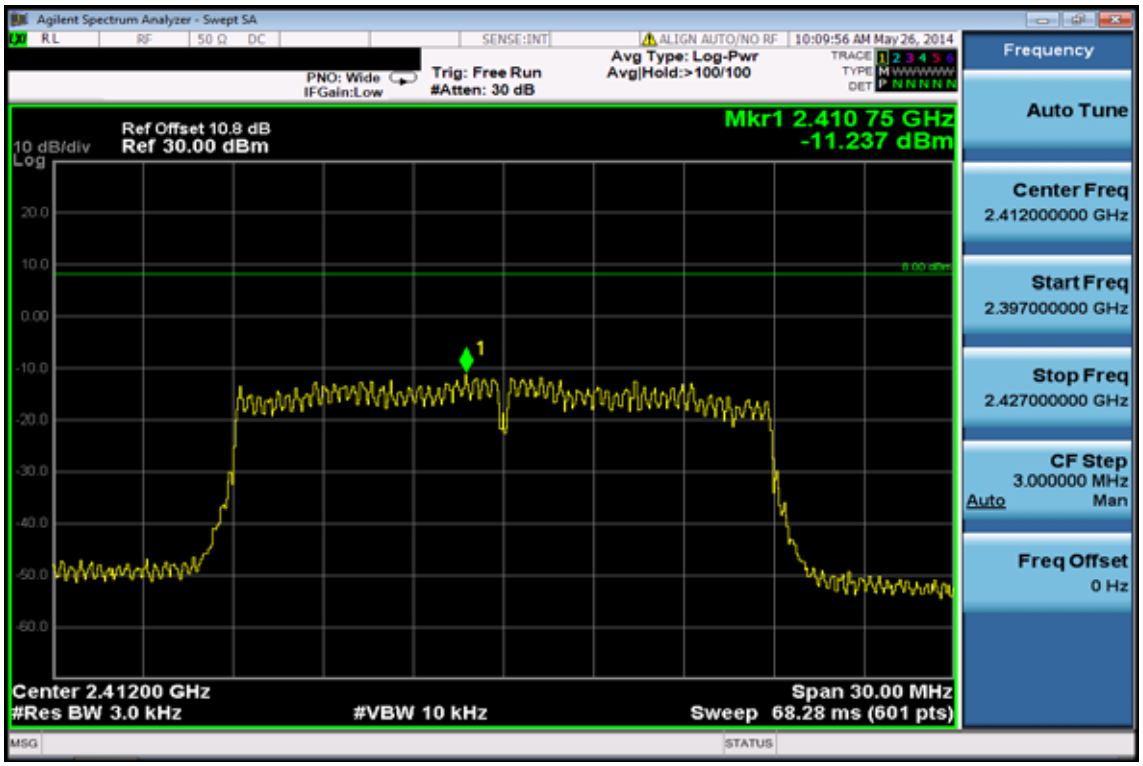
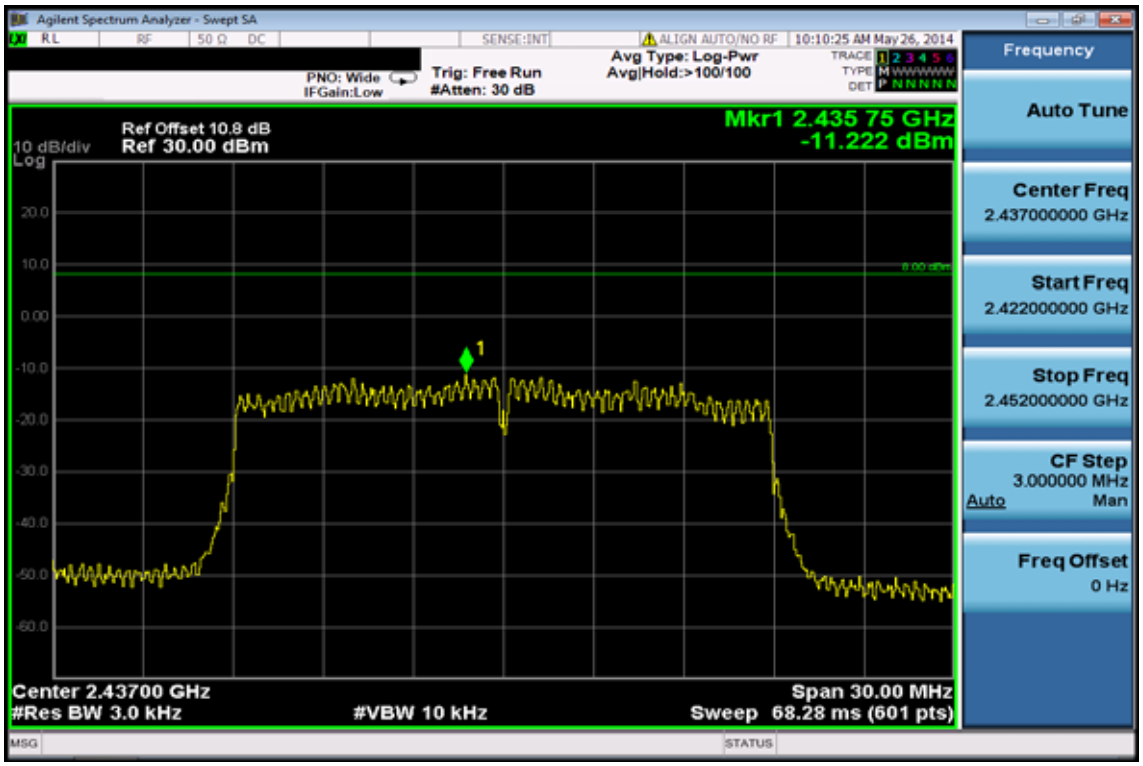
802.11n_20M

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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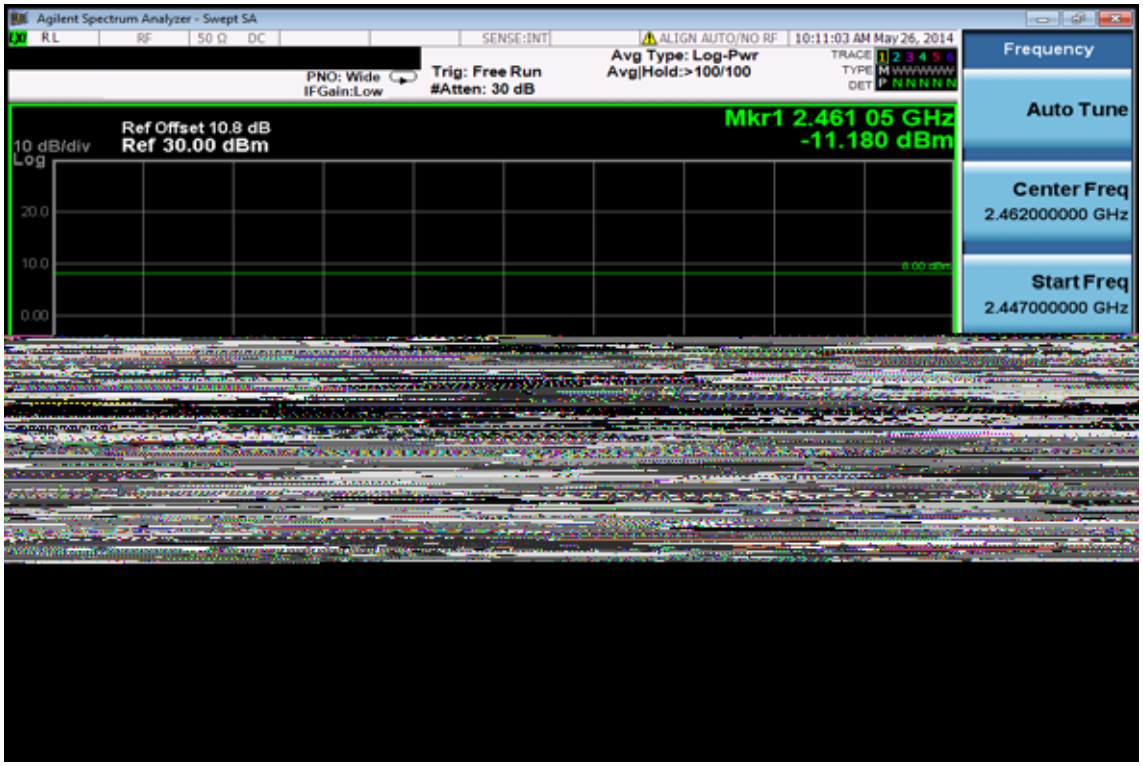
Power Spectral Density Test Plot (CH-High)



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12 ANTENNA REQUIREMENT

12.1 Standard Applicable:

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

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 1.68dBi, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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13 99% BANDWIDTH MEASUREMENT

13.1 Standard Applicable:

RSS-Gen §4.6.1, the transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

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

The span between the two recorded frequencies is the occupied bandwidth.

13.2 Measurement Equipment Used:

Refer to section 7.2 for details.

13.3 Test Set-up:

Refer to section 7.3 for details.

13.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=1% of the Span, VBW = 3 times RBW, Span= 30MHz.
4. Turn on the 99% bandwidth function, max reading..
5. Repeat above procedures until all frequency measured were complete.

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13.5 Measurement Result:

802.11b

Frequency MHz	99%Bandwidth (MHz)
2412	12.134
2437	**12.331**
2462	12.240

802.11g

Frequency MHz	99%Bandwidth (MHz)
2412	16.245
2437	**16.431**
2462	16.304

802.11n_20M

Frequency MHz	99%Bandwidth (MHz)
2412	17.490
2437	**17.536**
2462	17.485

Offset 10.8dB

Note: Refer to next page for plots.

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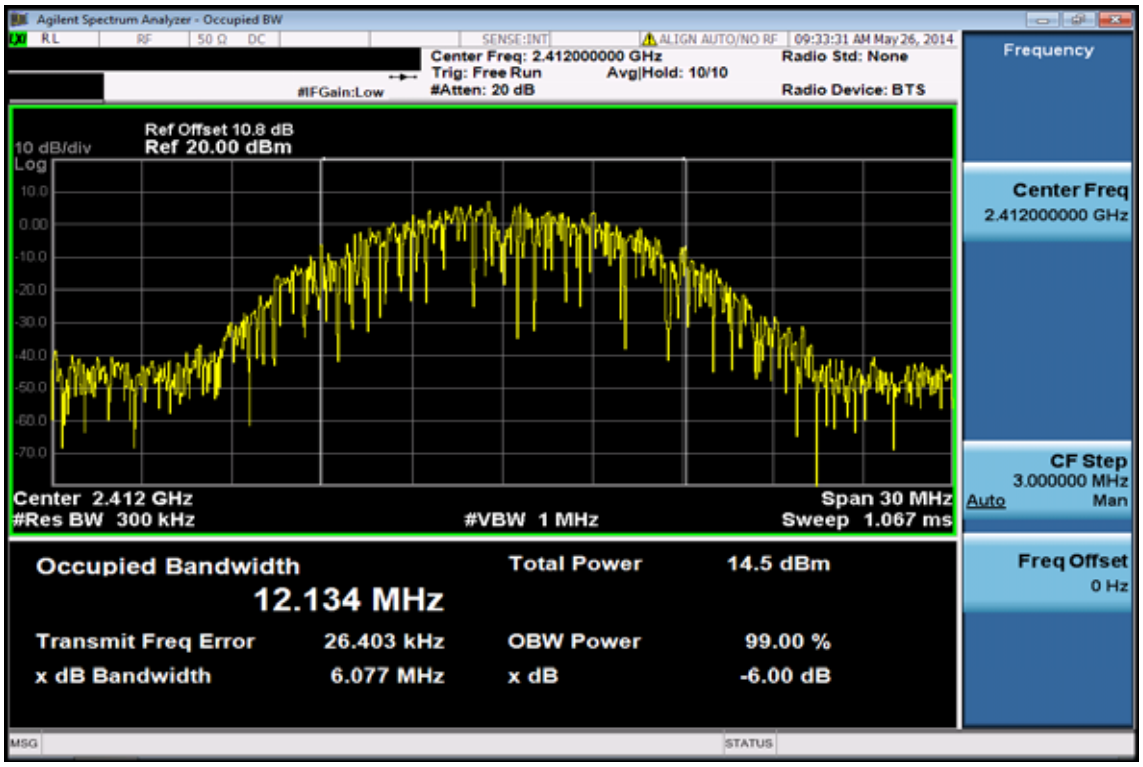
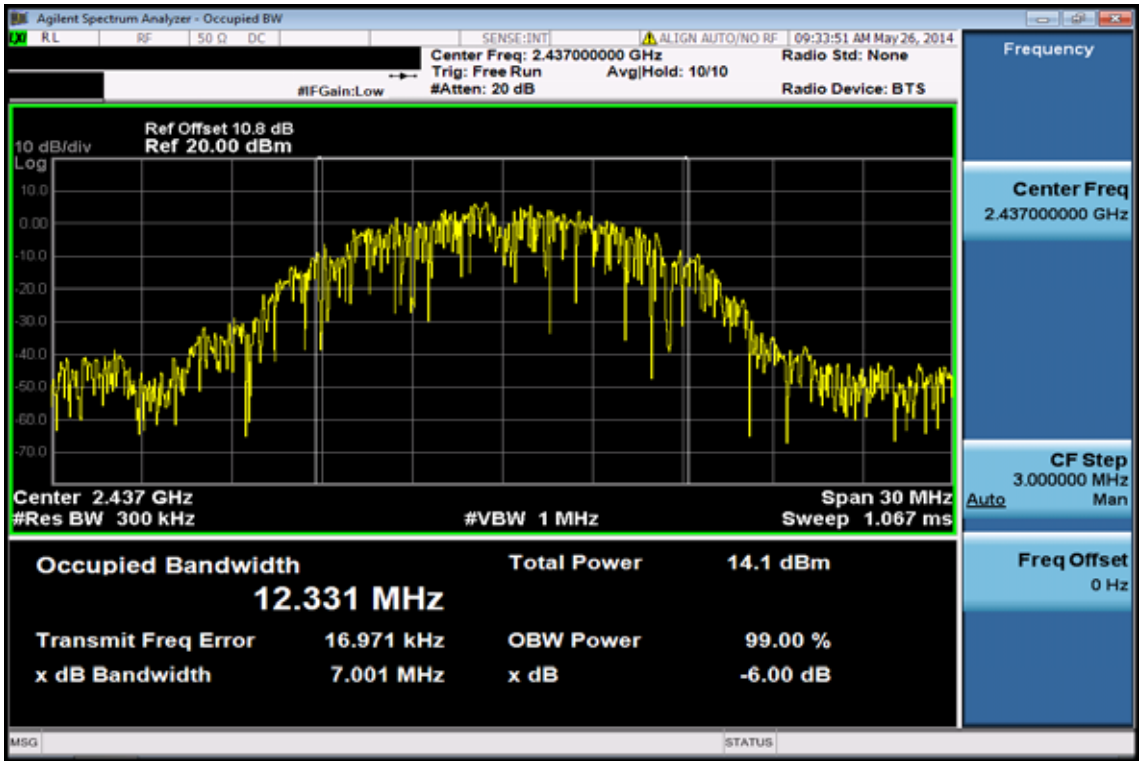
802.11b

99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid



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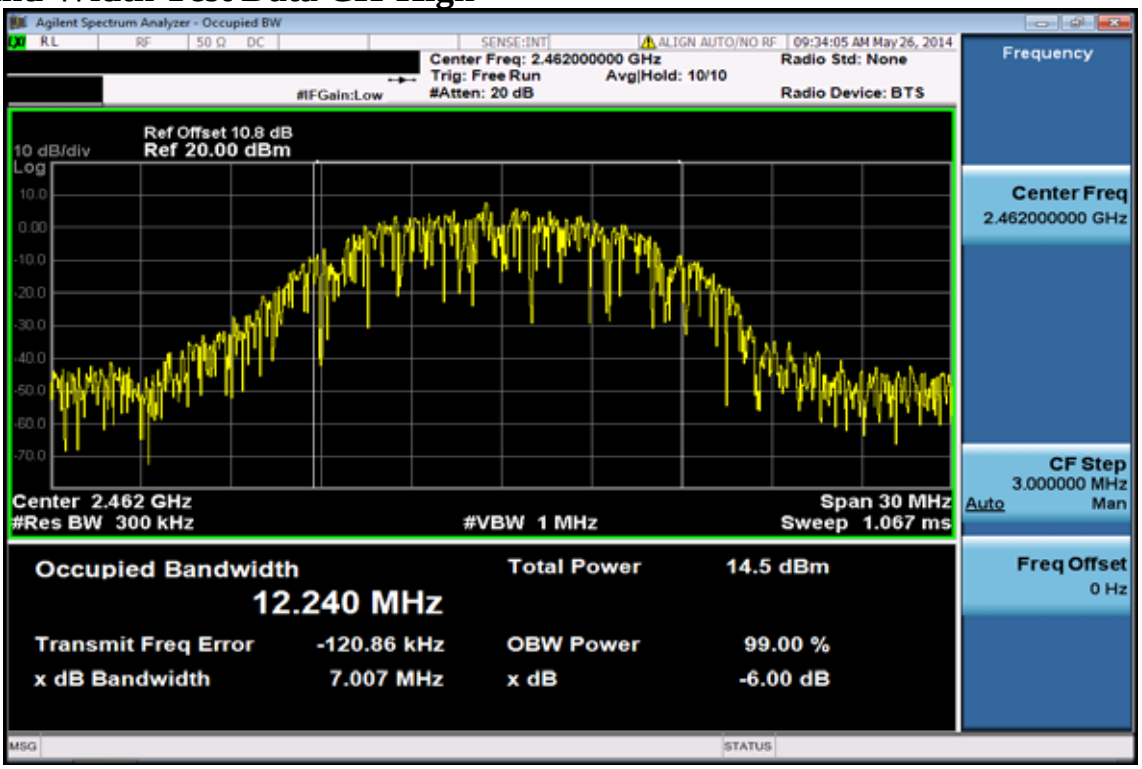
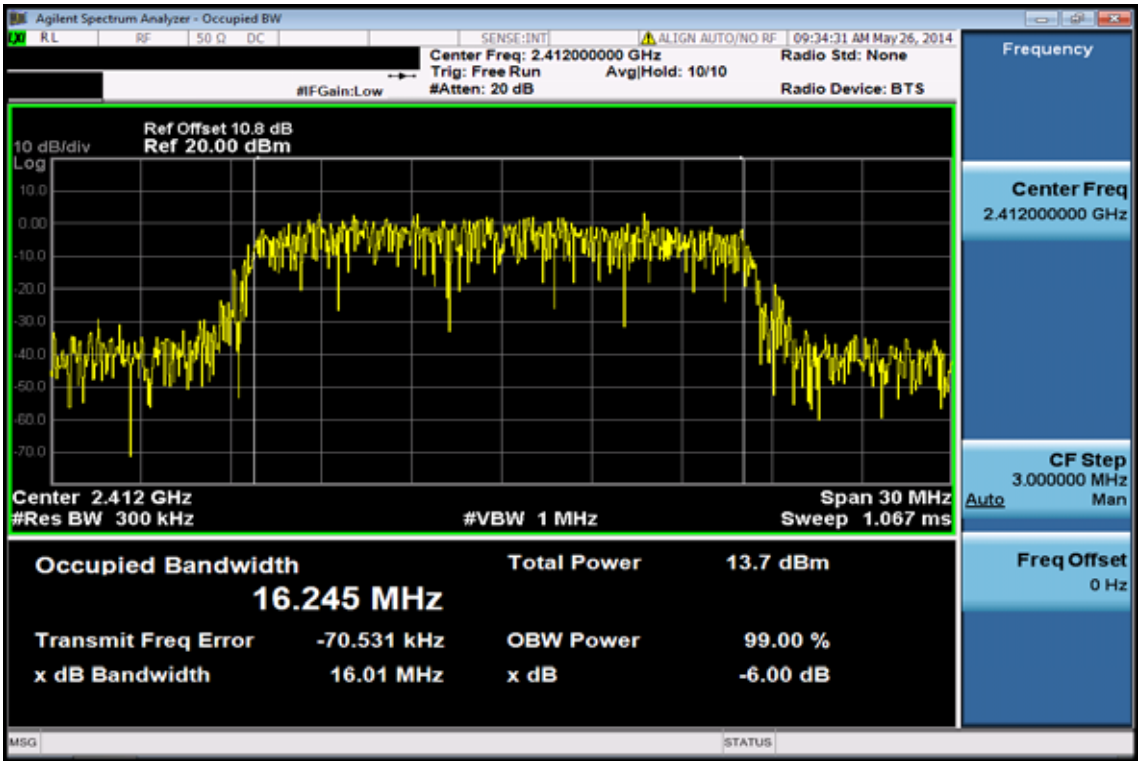
99% Band Width Test Data CH-High



802.11g

99% Band Width Test Data CH-Low



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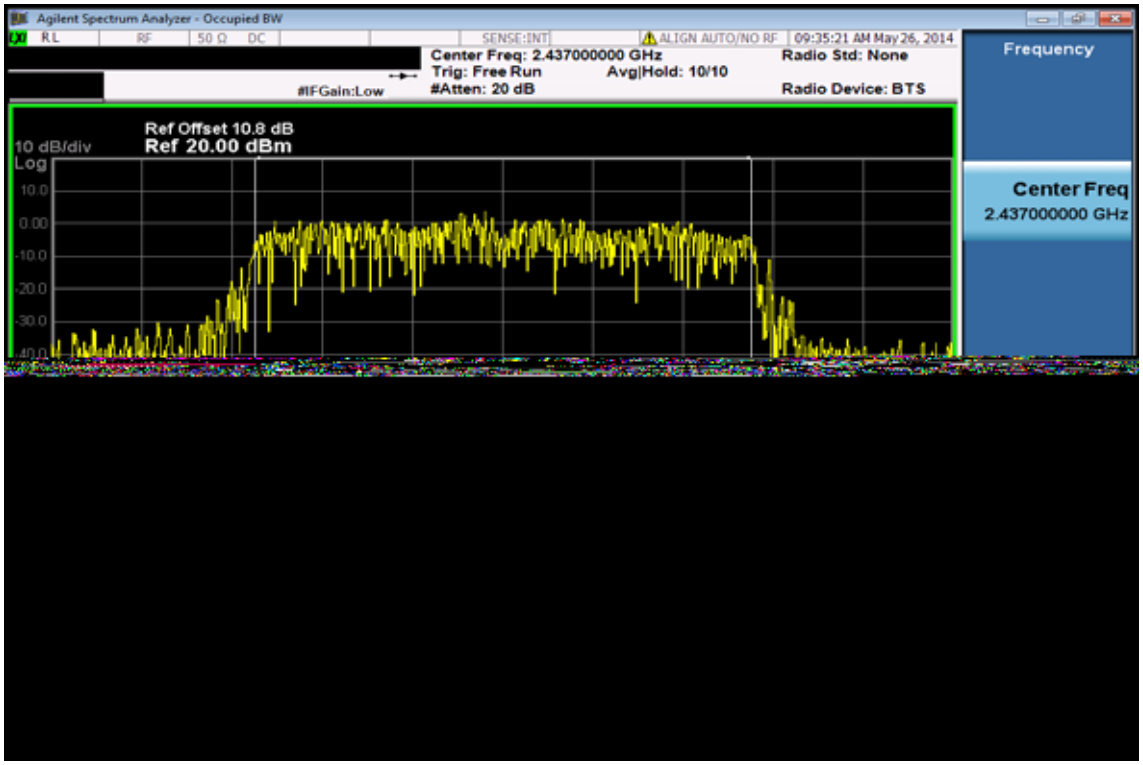
99% Band Width Test Data CH-Mid



99% Band Width Test Data CH-High

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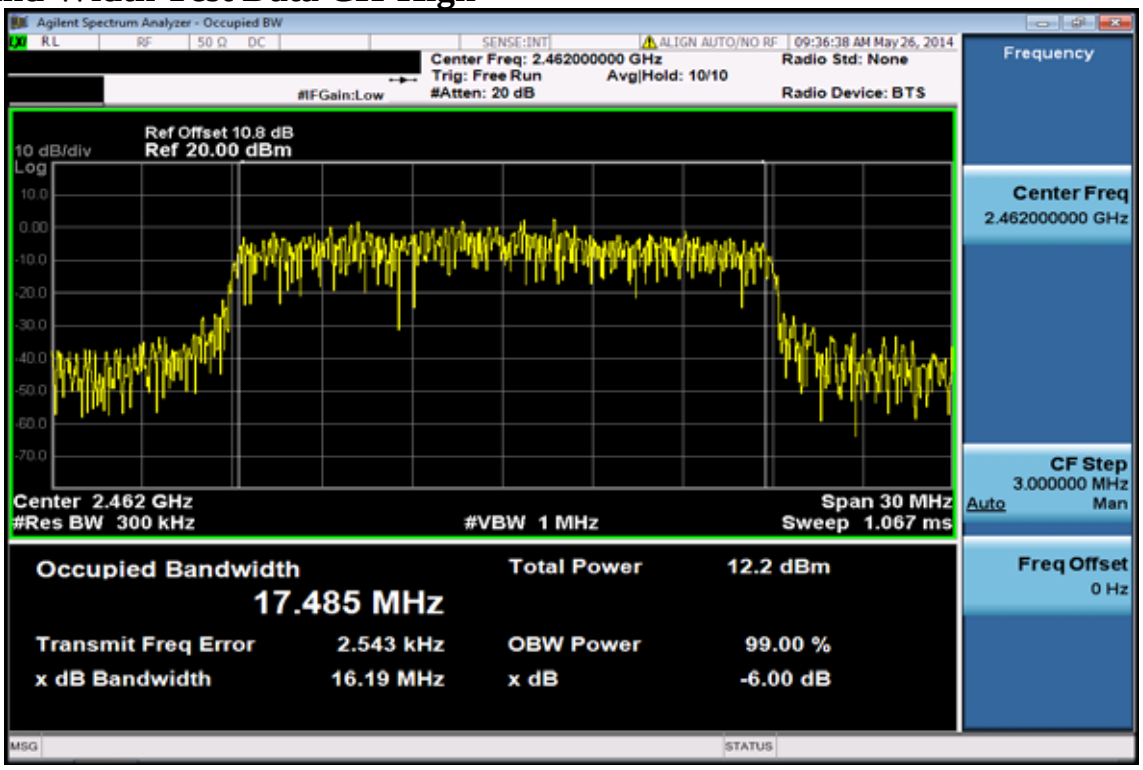
99% Band Width Test Data CH-High



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