

FCC Part 15C Measurement and Test Report

For

QBEX ELECTRONICS CORPORATION

1606NW 84th Ave, Miami, FL33126, U.S.A.

FCC ID: XFM-S843D

FCC Rules: FCC Part 15C

Product Description: MID

Tested Model: S843D

Report No.: STR13038272I-1

Tested Date: 2013-03-18 to 2013-03-27

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: QBEX ELECTRONICS CORPORATION
Address of applicant: 1606NW 84th Ave, Miami, FL33126, U.S.A.

Manufacturer: Shenzhen Switek Co., Ltd.
Address of manufacturer: 4/F, A5 BLDG, Fenghuang 1st Industrial Park,
Fuyong, Bao'an, Shenzhen, China

General Description of EUT	
Product Name:	MID
Trade Name:	/
Model No.:	S843D
Adding Model(s):	/
Rated Voltage:	DC 3.7V Li-ion Battery
Power Adapter Model:	XHY050200LUCH (Input: AC 100-240V 0.5A, Output: DC 5V 2.0A)
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b/g/n
Frequency Range:	2412-2462MHz
RF Output Power:	7.97dBm (Conducted)
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Modulation:	CCK, BPSK, QPSK, 16QAM, 64QAM
Quantity of Channels:	11
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	2 dBi
Lowest Internal Frequency of EUT:	32.768KHz
Device Category:	Portable Device

1.2 Test Standards

The following report is prepared on behalf of the QBEX ELECTRONICS CORPORATION in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The public notice KDB 558074 for digital transmission systems shall be performed also.

1.4 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Line	0.6	Shielded	Without Ferrite
DC Line	1.2	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
PC	Samsung	R20	/
TV	Samsung	ES4078T	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)(d)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant
§ 15.207	Conducted Emission	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to Part 15.247(i), 1.1307(b)(1), and 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

This product has a permanent antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), 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.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

5.3 Test Procedure

According to the KDB 558074, the test method of power spectral density as below:

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW ≥ 3 kHz.
5. Set the VBW $\geq 3 \times$ RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Environmental Conditions

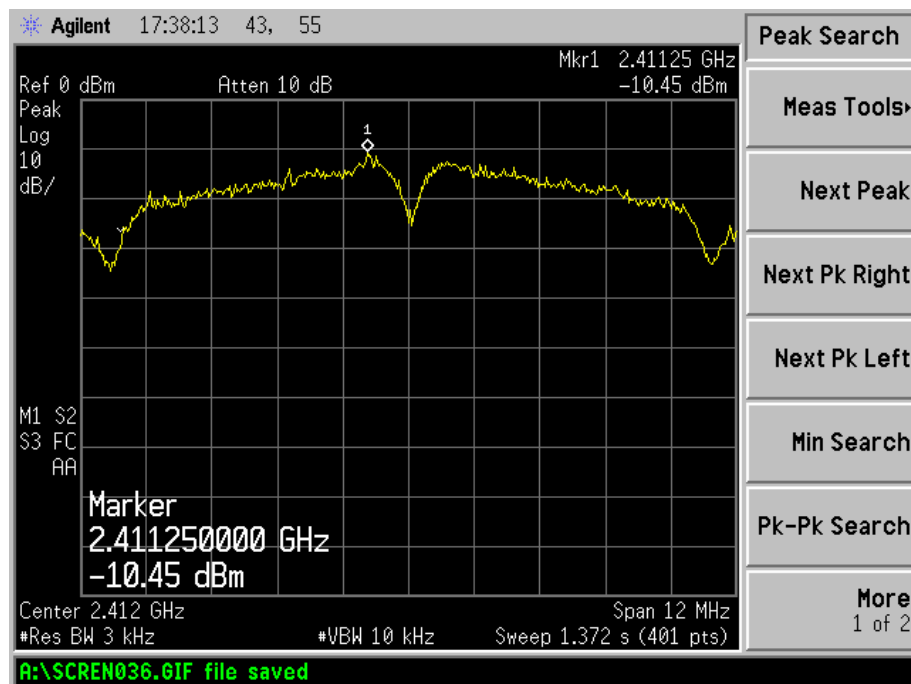
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

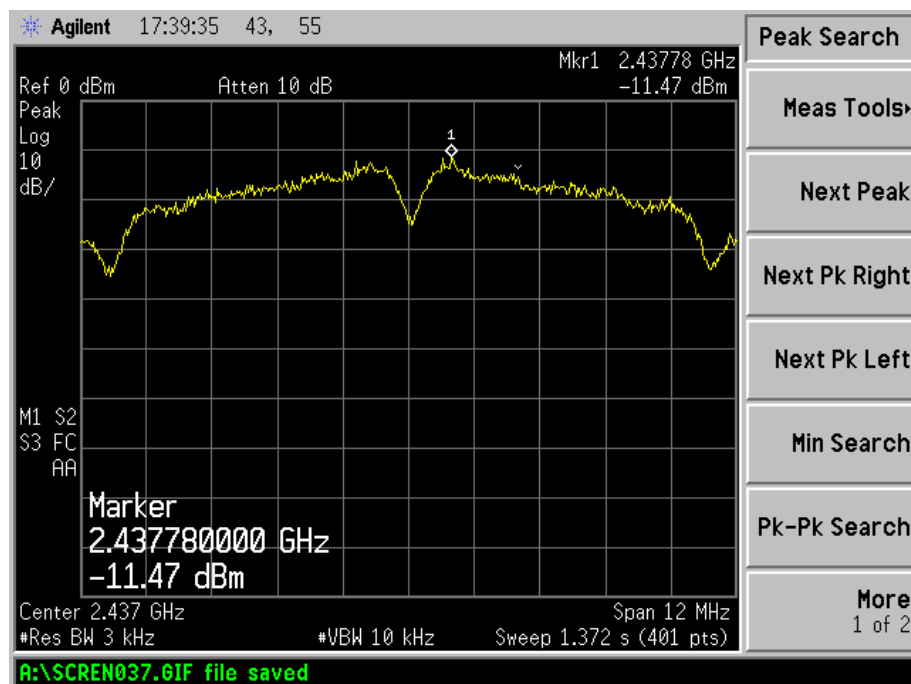
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-10.45	8
	2437	-11.47	8
	2462	-10.6	8
802.11g	2412	-16.87	8
	2437	-17.26	8
	2462	-18.11	8
802.11n HT20	2412	-17.41	8
	2437	-17.44	8
	2462	-18.26	8

Please refer to the following test plots:

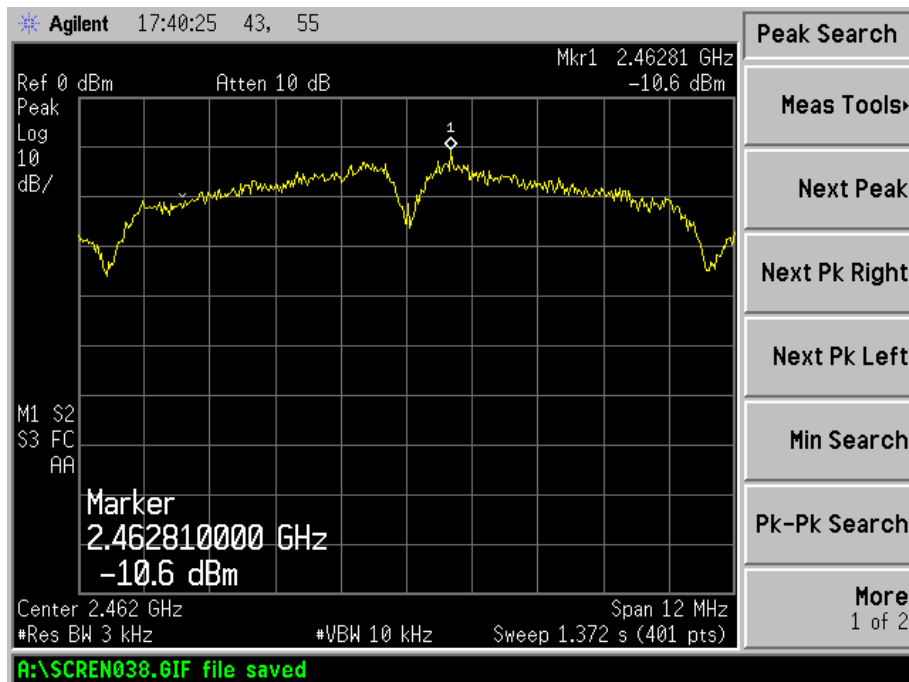
802.11b-Low Channel



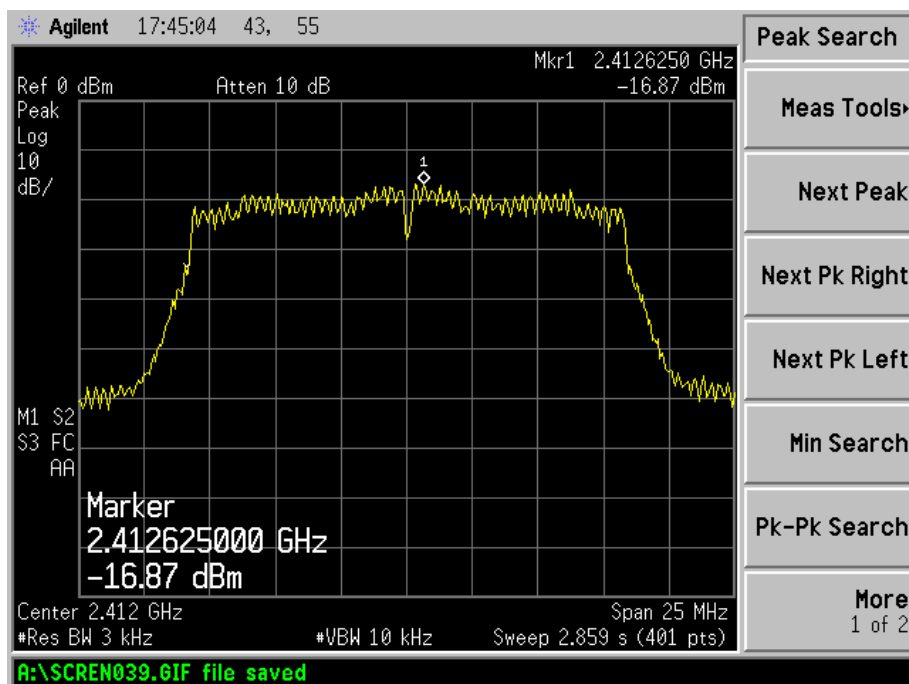
802.11b-Middle Channel



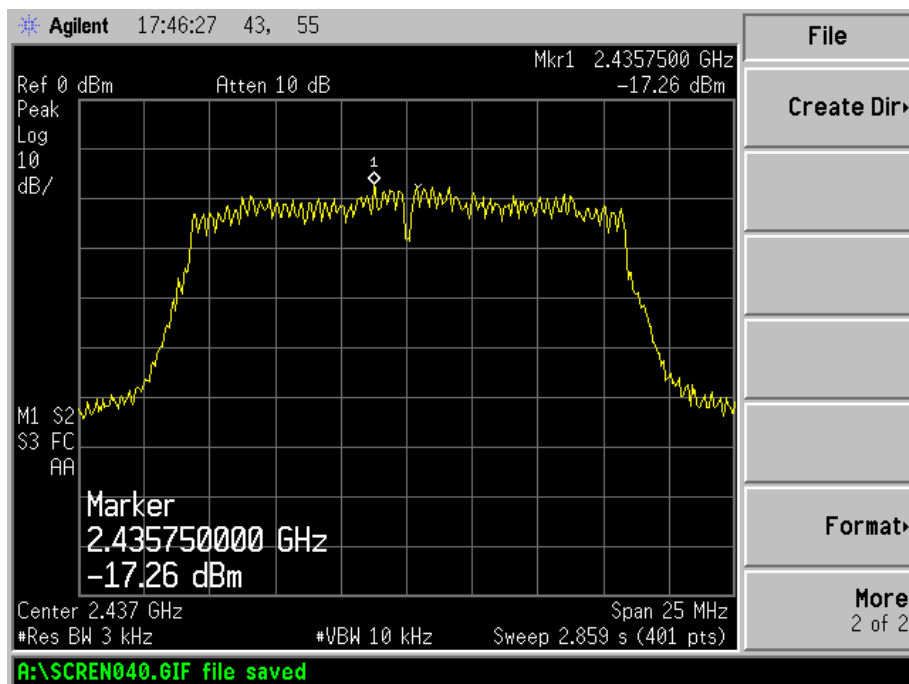
802.11b-High Channel



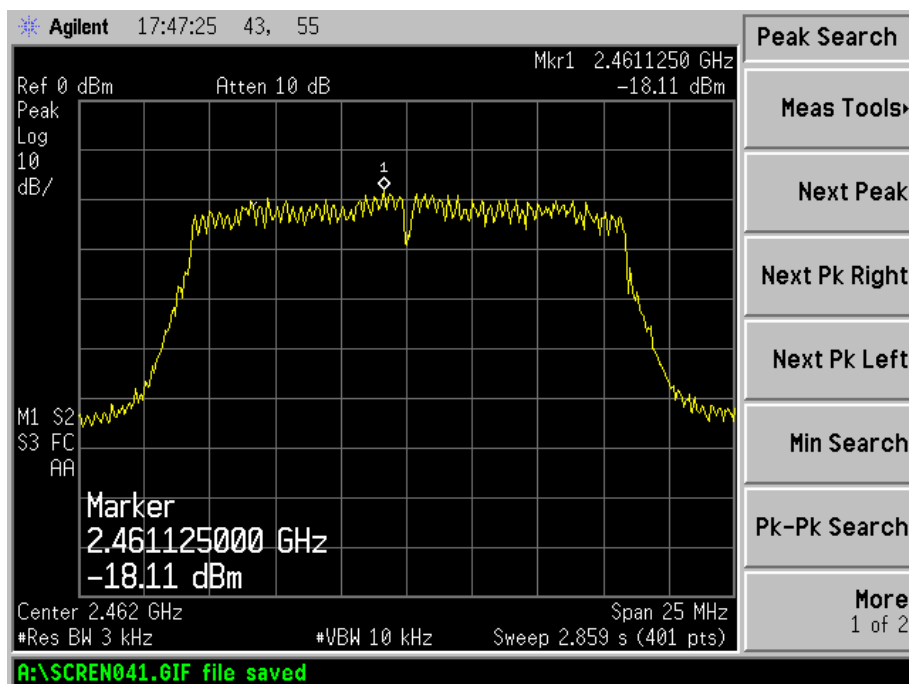
802.11g-Low Channel



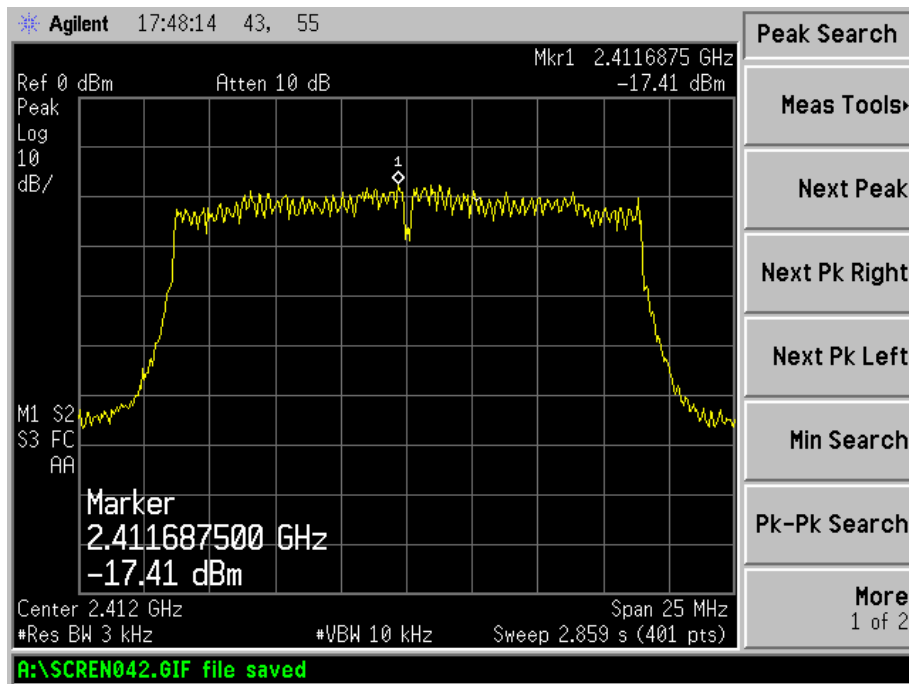
802.11g-Middle Channel



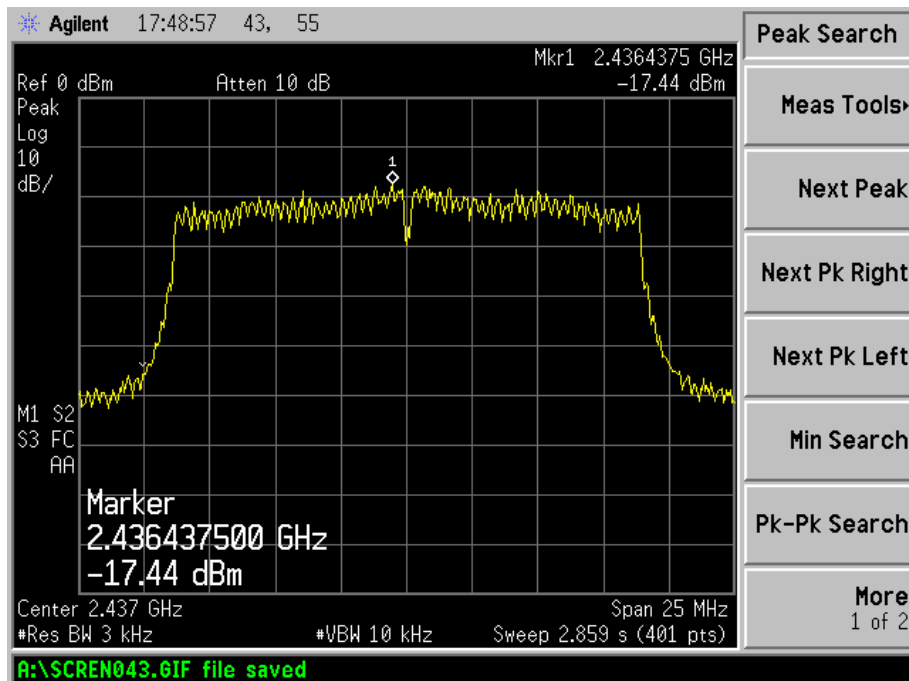
802.11g-High Channel



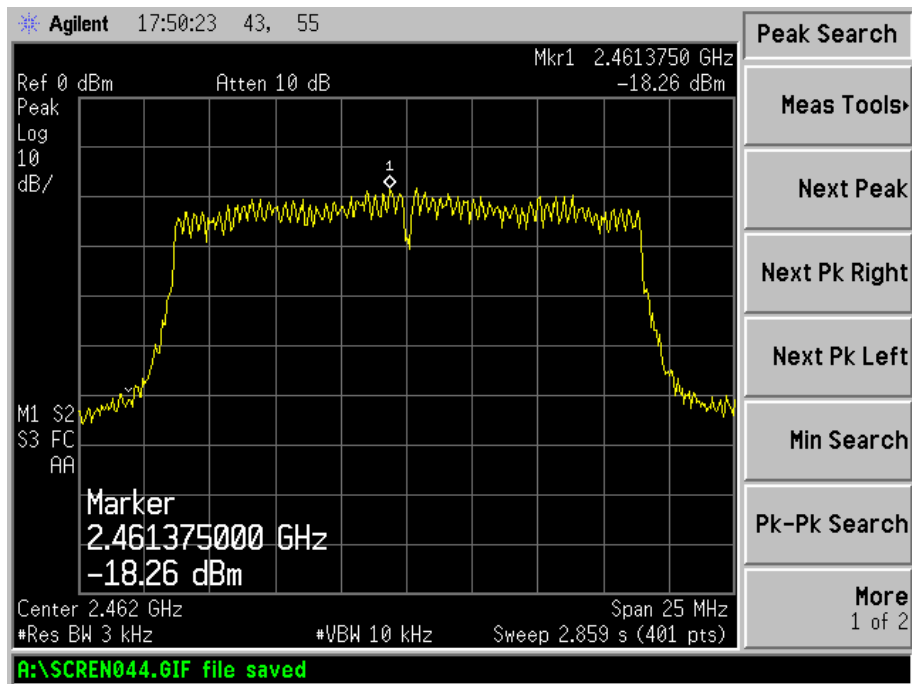
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



6. 6dB Bandwidth

6.1 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 500 kHz.

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission..

6.4 Environmental Conditions

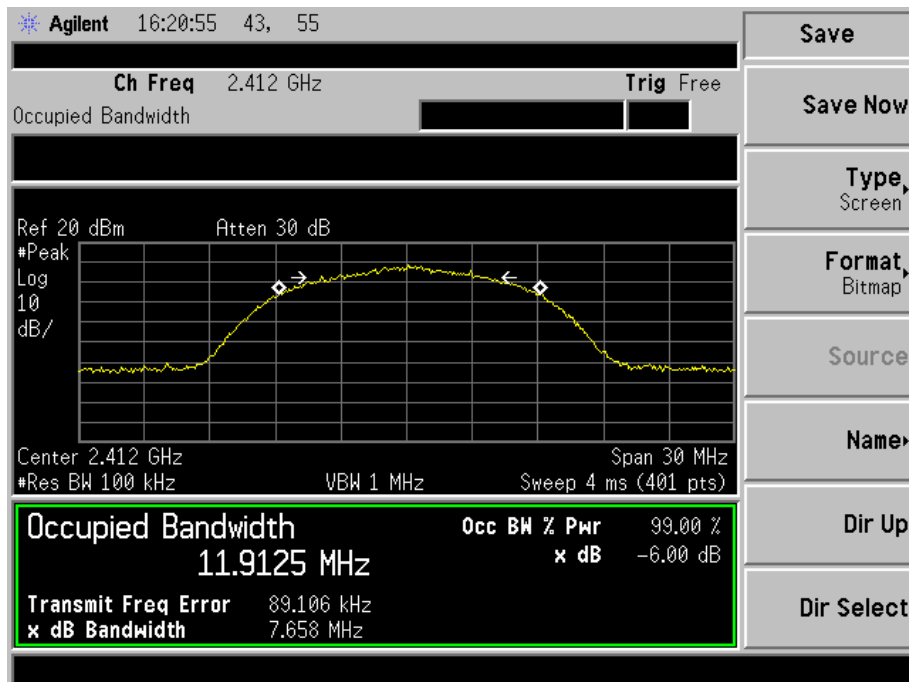
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

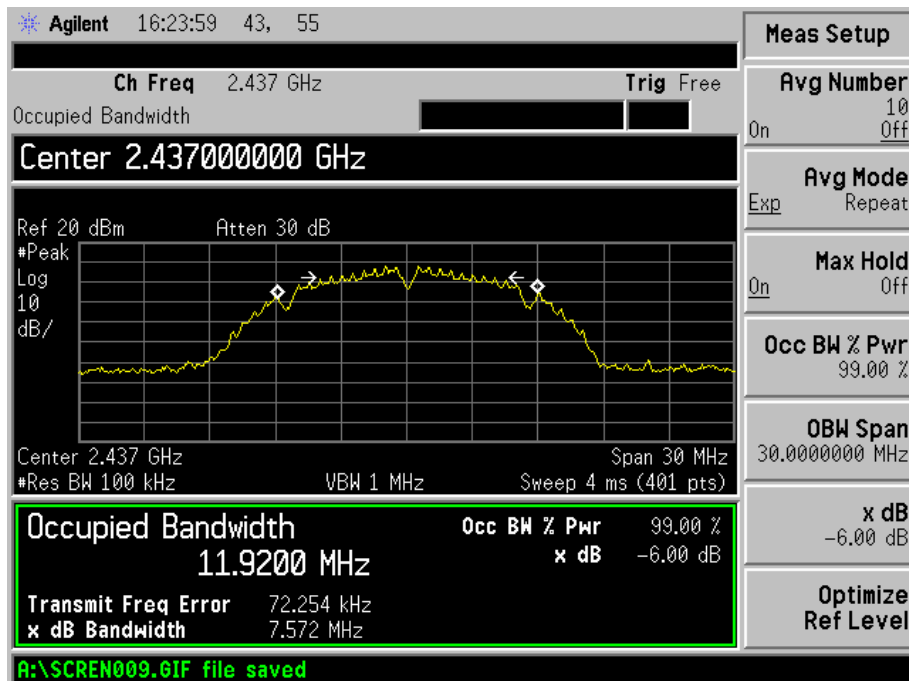
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	7658	500
	2437	7572	500
	2462	7586	500
802.11g	2422	15185	500
	2437	15071	500
	2452	15294	500
802.11n-HT20	2412	16098	500
	2437	16080	500
	2462	15950	500

Please refer to the following test plots:

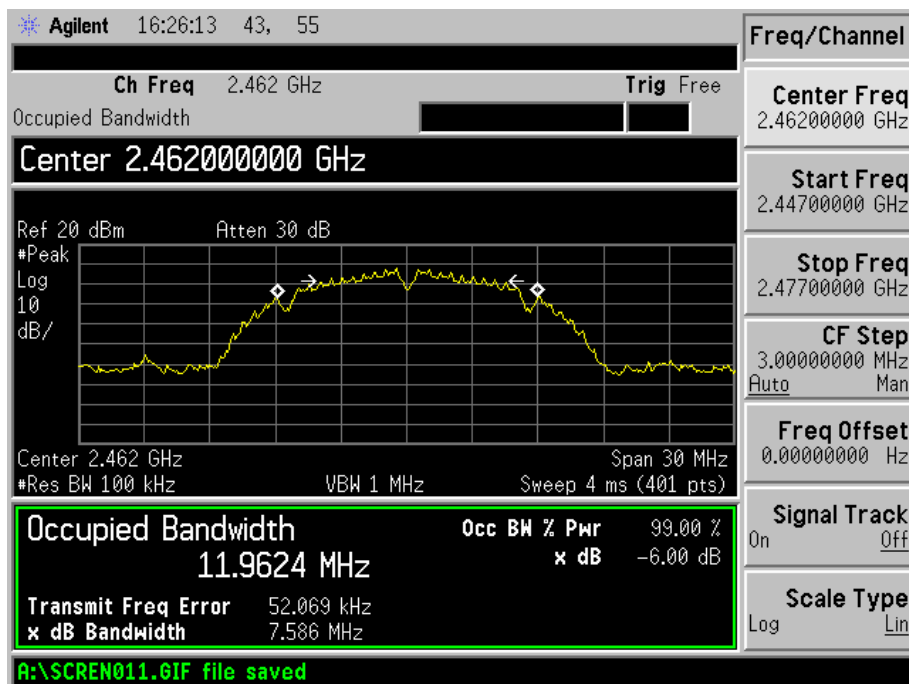
802.11b-Low Channel



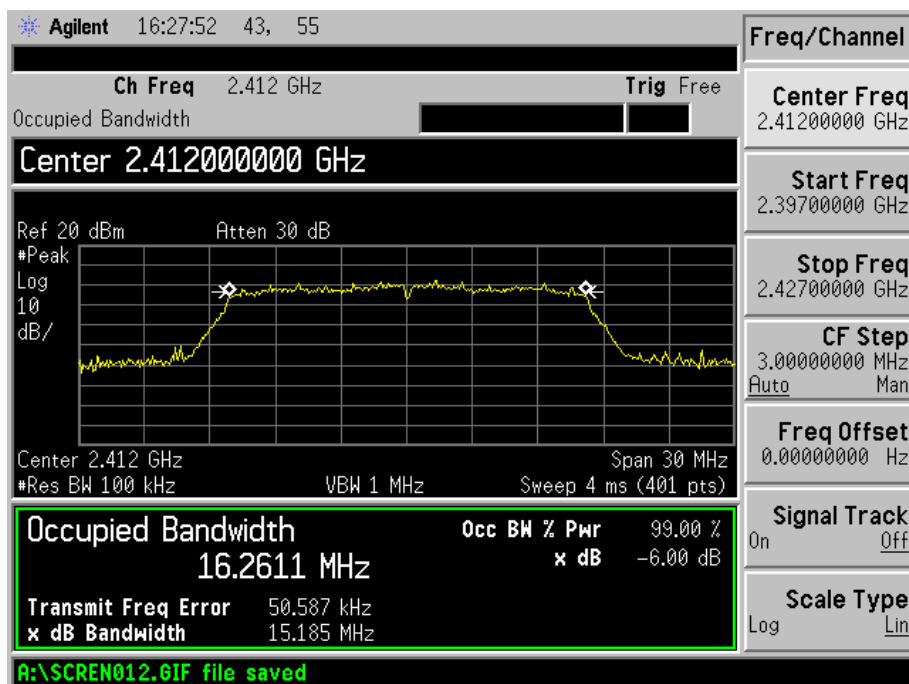
802.11b-Middle Channel



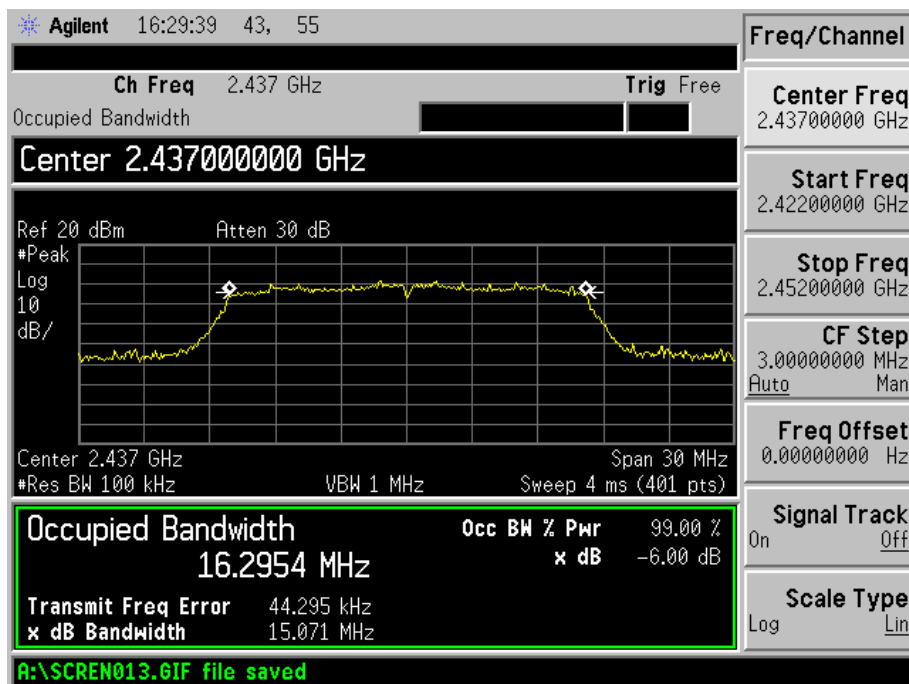
802.11b-High Channel



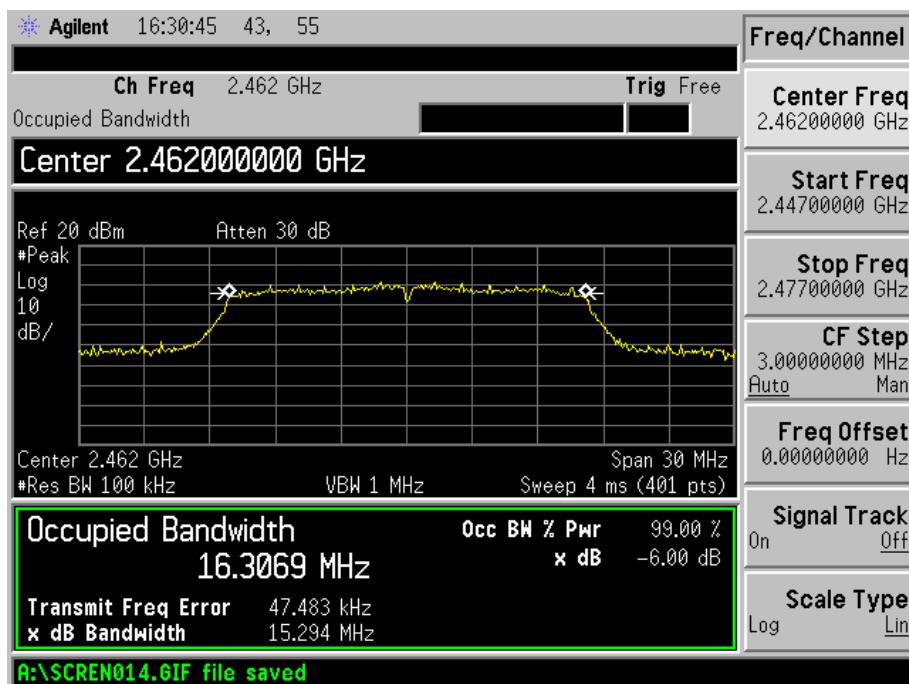
802.11g-Low Channel



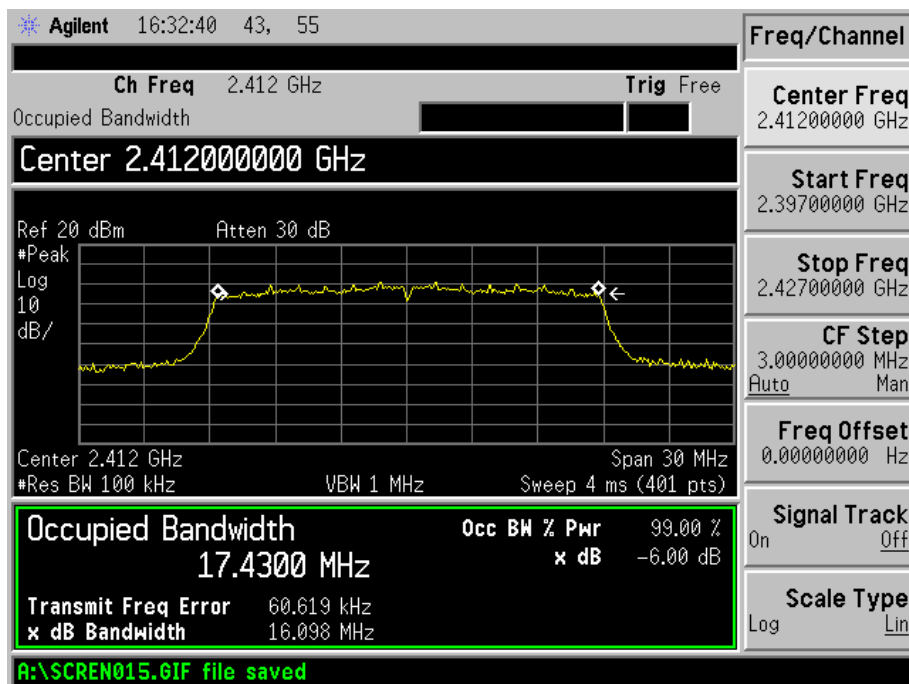
802.11g-Middle Channel



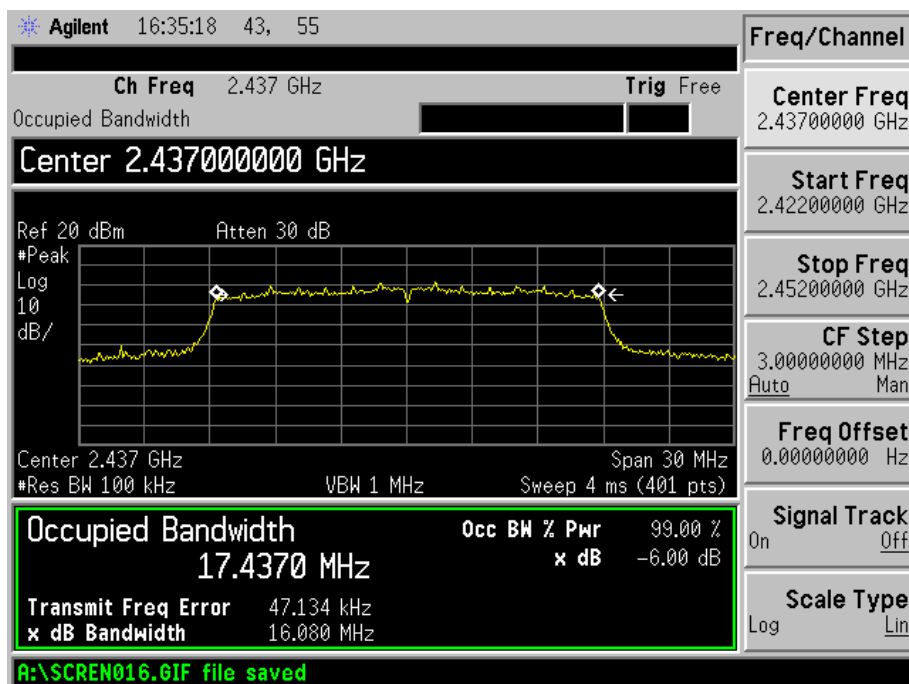
802.11g-High Channel



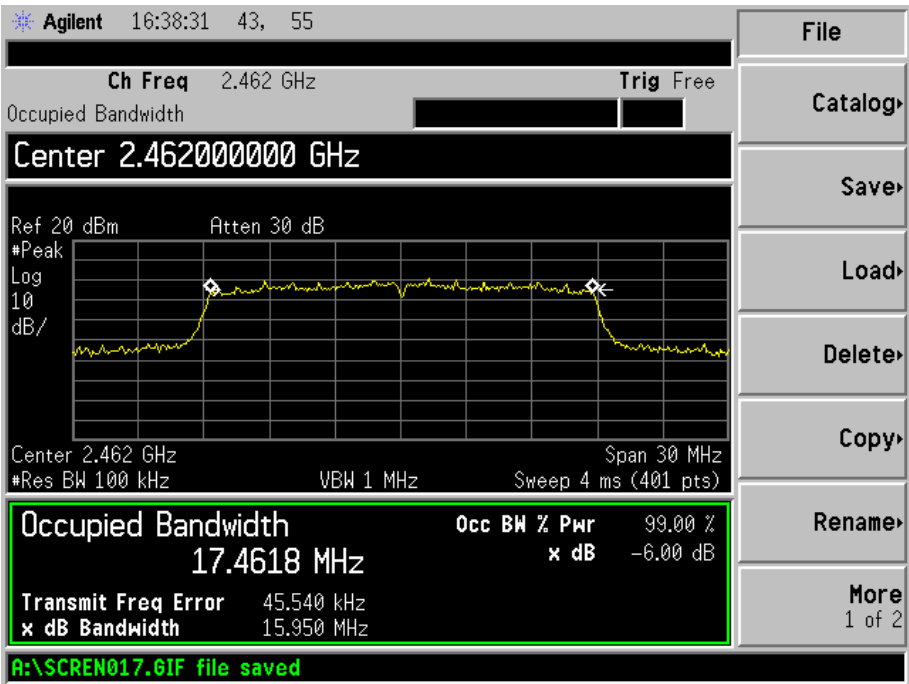
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



7. RF Output Power

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.

7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 (2012),

1. Set the RBW = maximum available (at least 1 MHz).
2. Set the VBW = 3 x RBW or maximum available setting (must be \geq RBW).
3. Set the span to fully encompass the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

7.4 Environmental Conditions

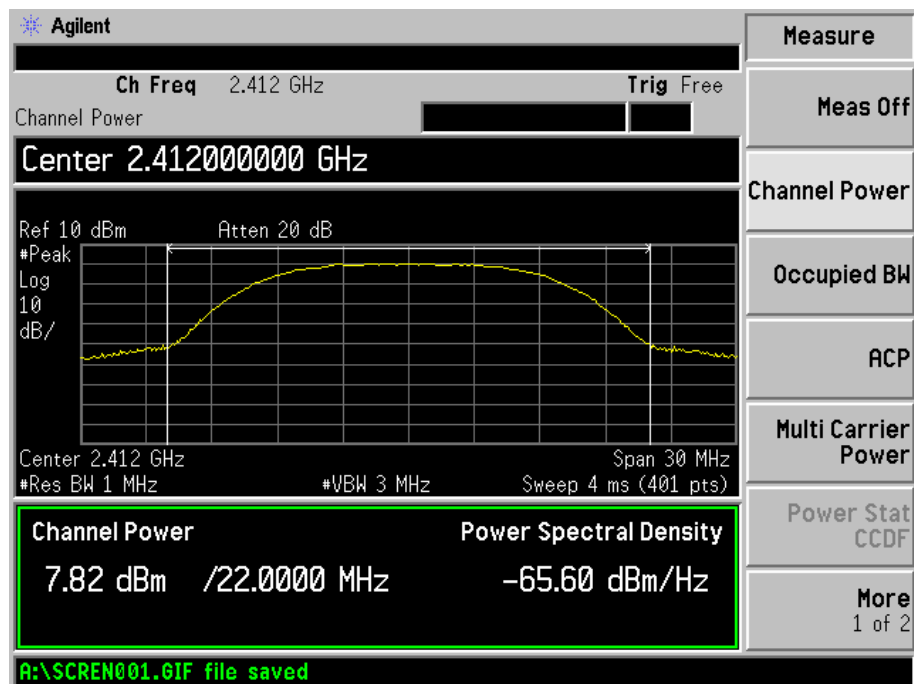
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

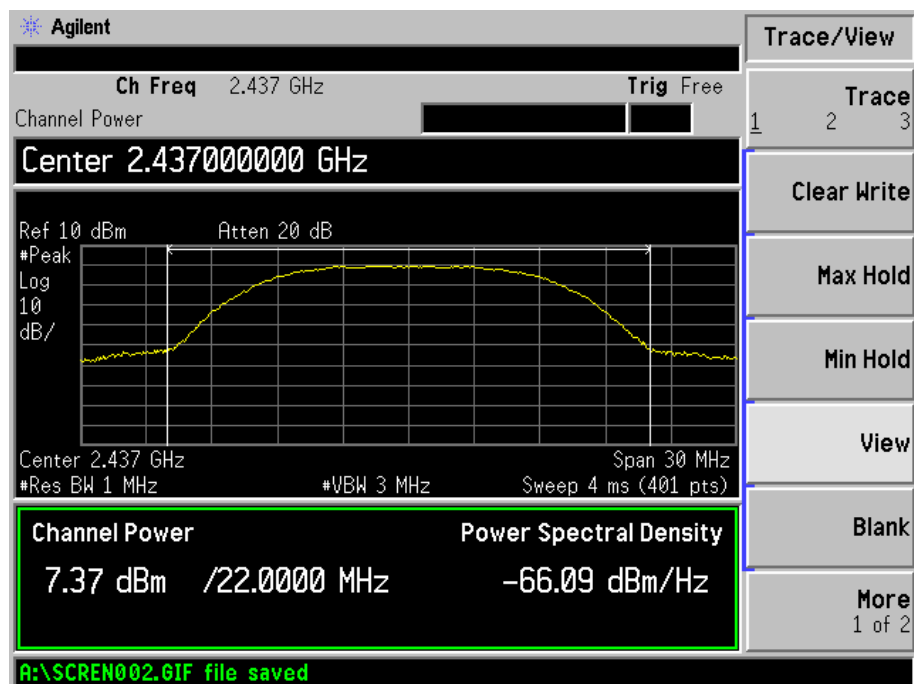
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_long_1Mbps	2412	7.82	6.0534	1000
	2437	7.37	5.4576	1000
	2462	7.20	5.2481	1000
802.11b_long_11Mbps	2412	7.97	6.2661	1000
	2437	7.30	5.3703	1000
	2462	6.66	4.6345	1000
802.11g_6Mbps	2412	6.05	4.0272	1000
	2437	6.15	4.1210	1000
	2462	6.06	4.0365	1000
802.11g_54Mbps	2412	6.56	4.5290	1000
	2437	6.60	4.5709	1000
	2462	6.60	4.5709	1000
802.11n HT20_MCS0	2412	5.64	3.6644	1000
	2437	5.55	3.5892	1000
	2462	5.56	3.5975	1000
802.11n HT20_MCS7	2412	5.80	3.8019	1000
	2437	5.22	3.3266	1000
	2462	5.35	3.4277	1000

Please refer to the following test plots:

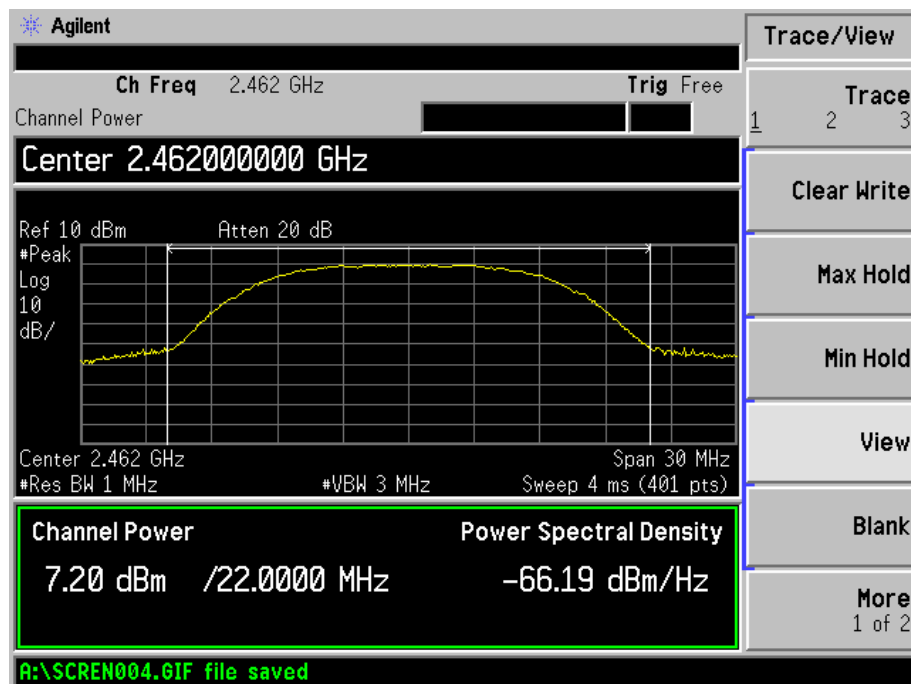
802.11b-long-1Mbps-Low Channel



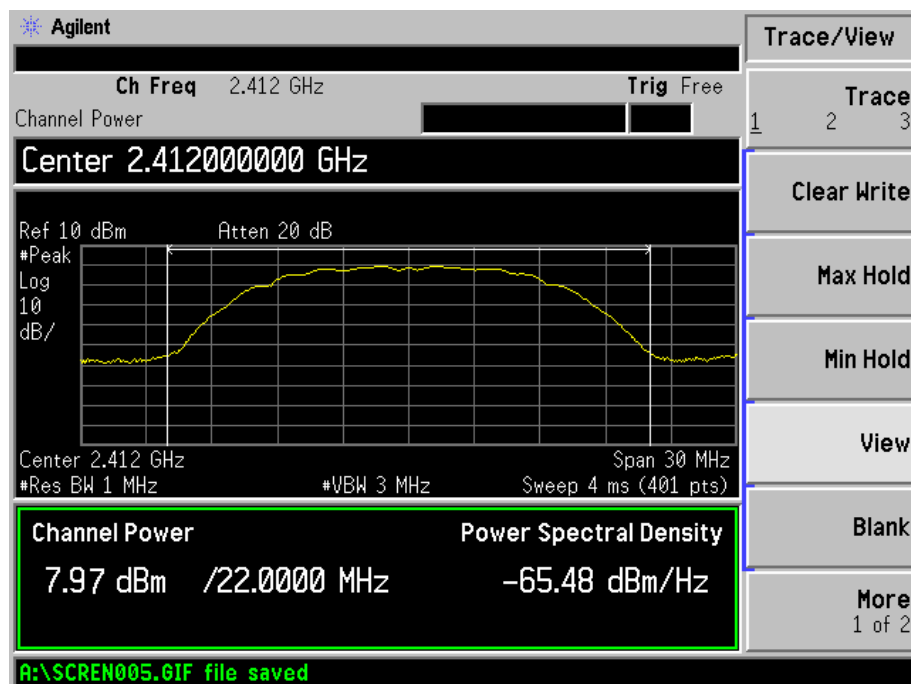
802.11b-long-1Mbps-Middle Channel



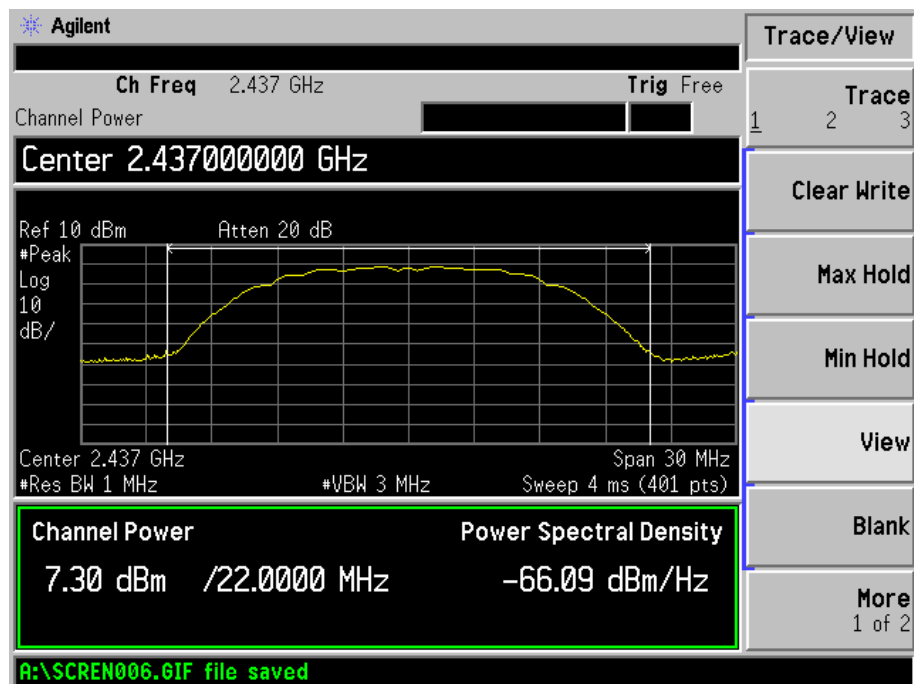
802.11b-long-1Mbps-High Channel



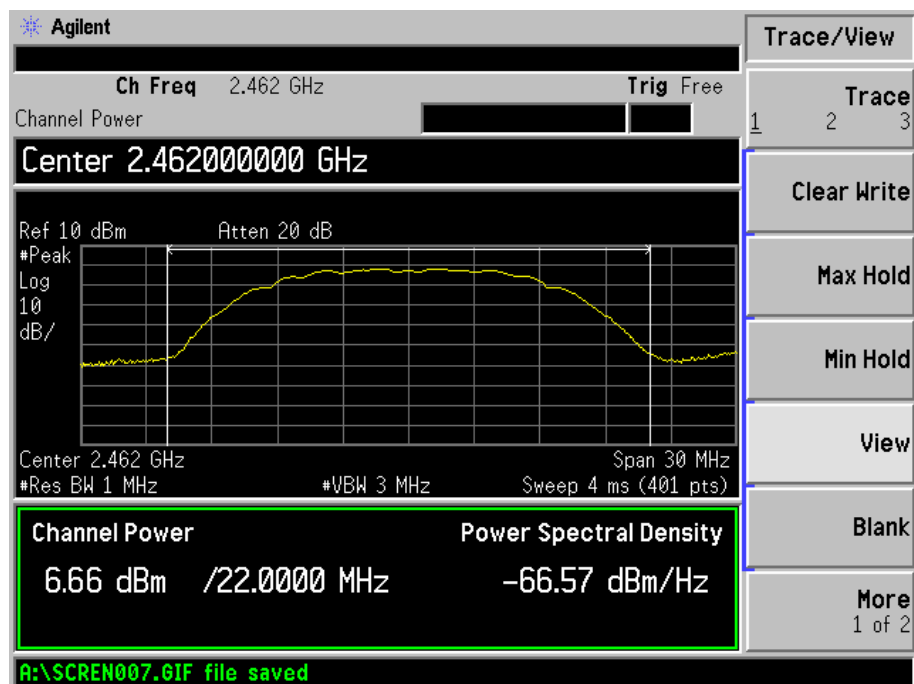
802.11b-long-11Mbps-Low Channel



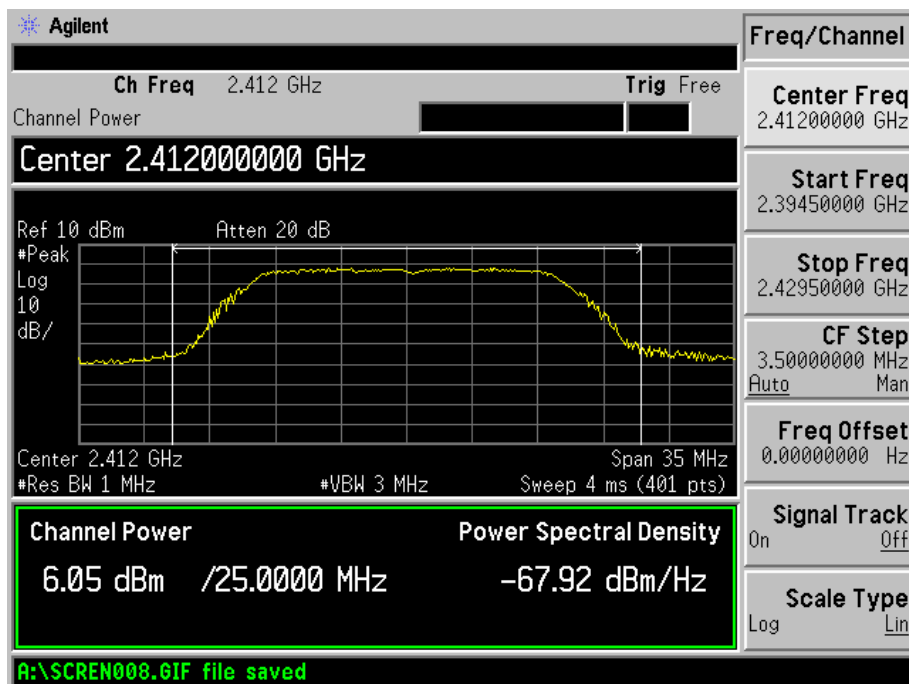
802.11b-long-11Mbps-Middle Channel



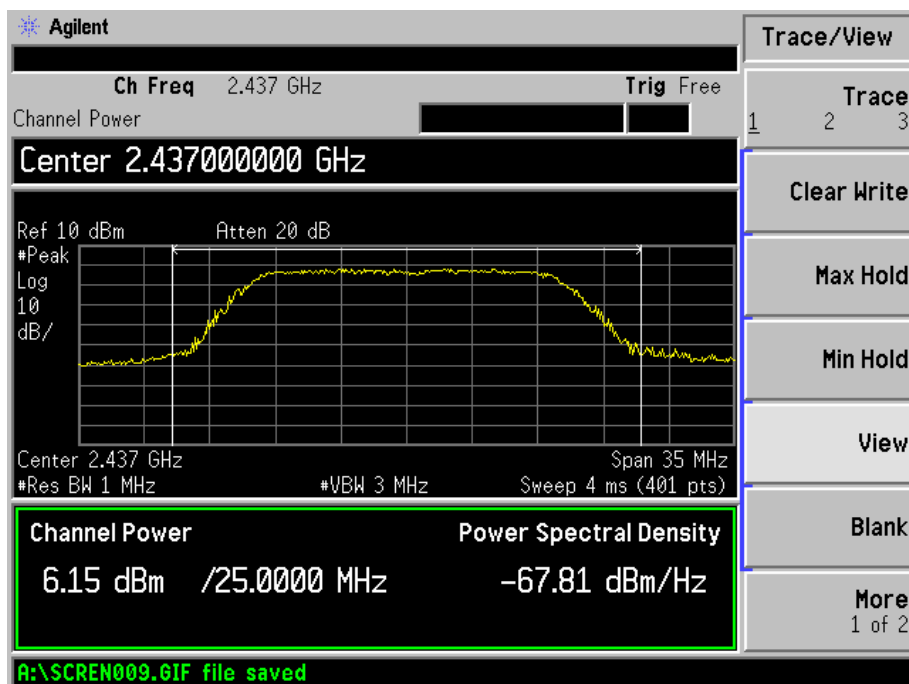
802.11b-long-11Mbps-High Channel



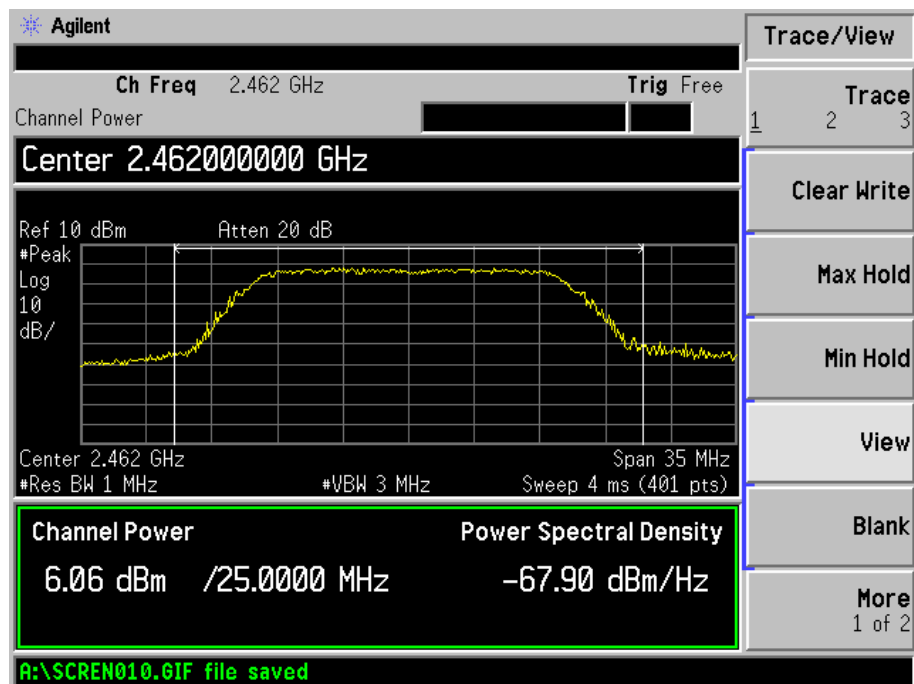
802.11g-6Mbps-Low Channel



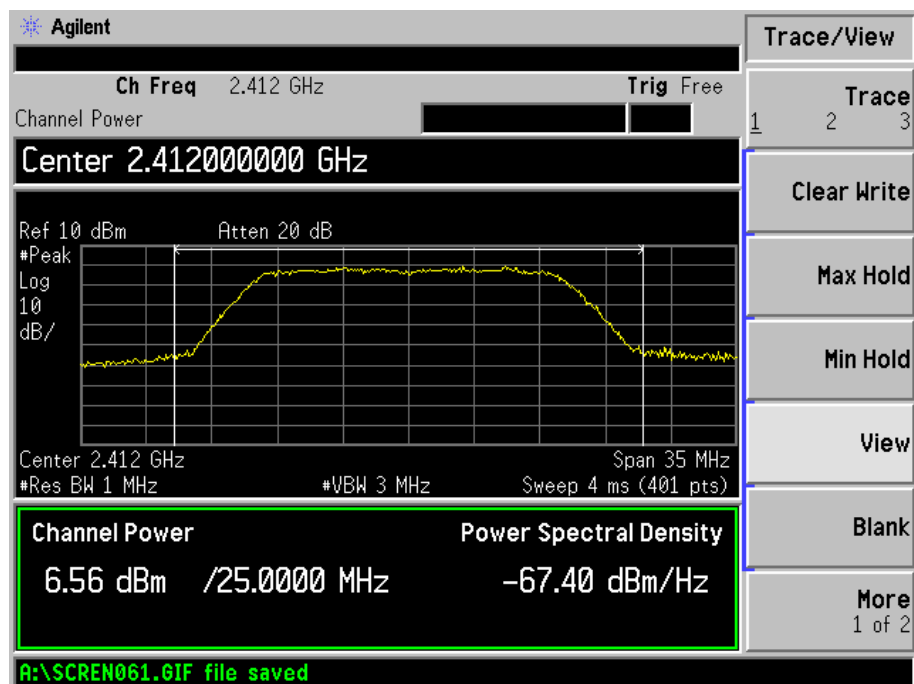
802.11g-6Mbps-Middle Channel



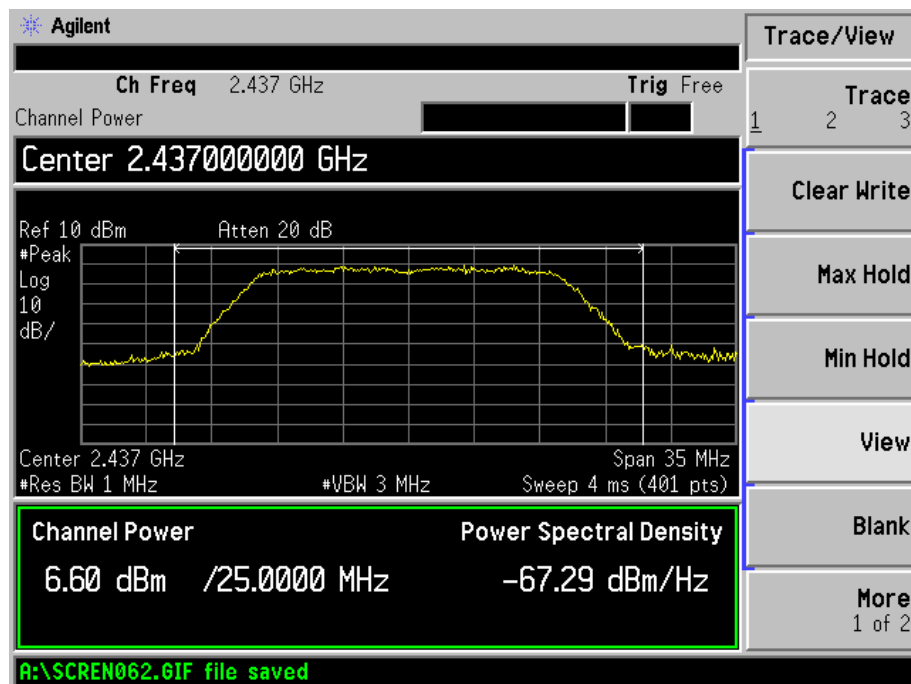
802.11g-6Mbps-High Channel



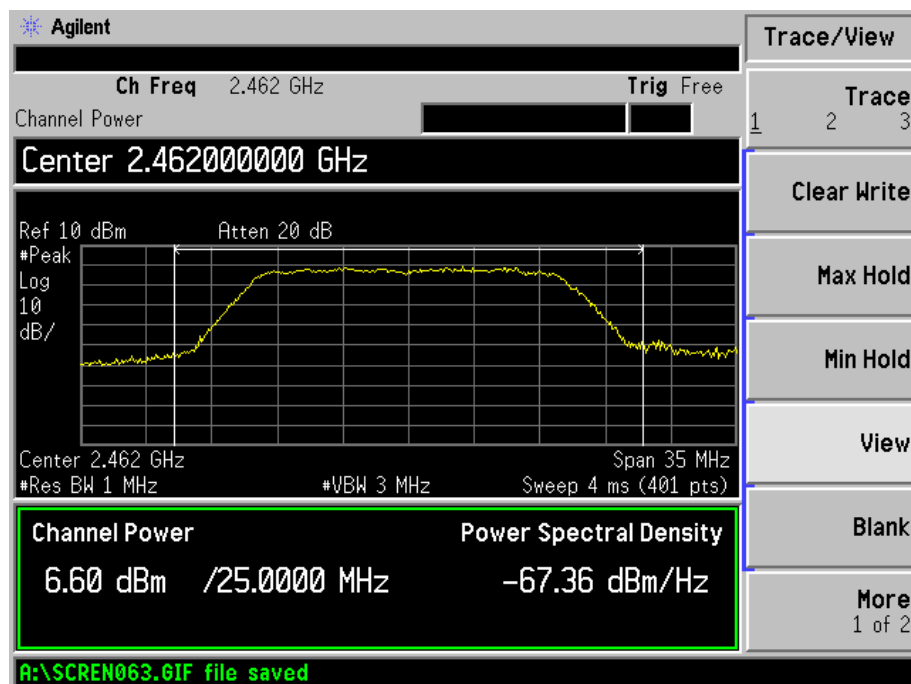
802.11g-54Mpb -Low Channel



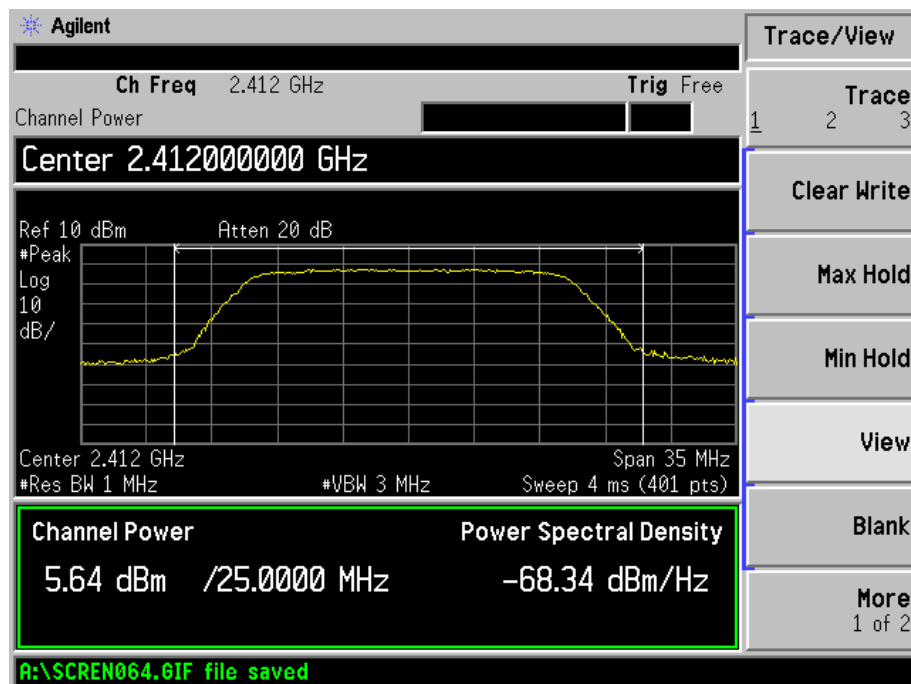
802.11g-54Mpb -Middle Channel



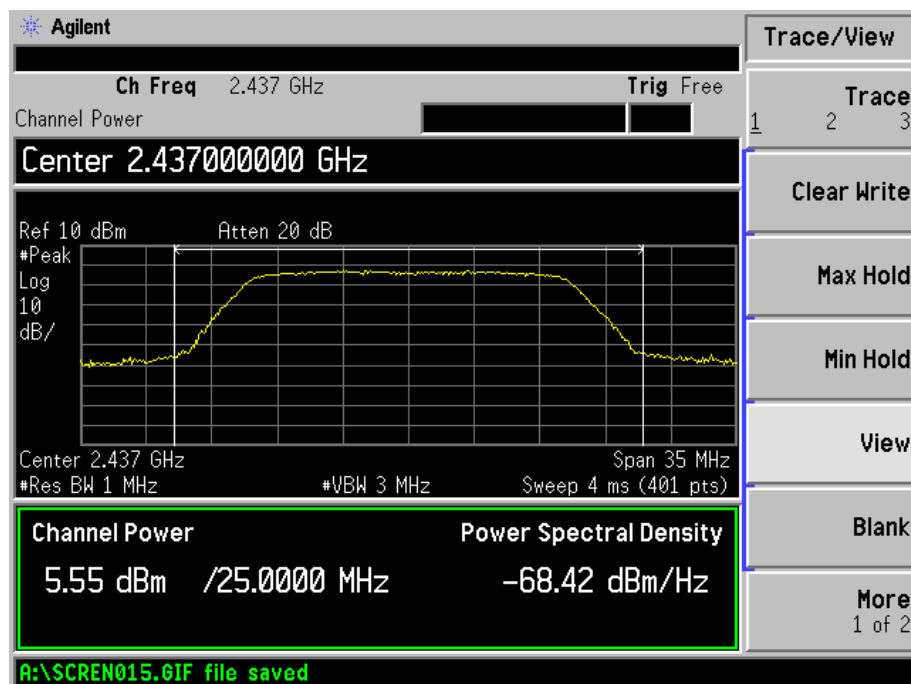
802.11g-54Mpb-High Channel



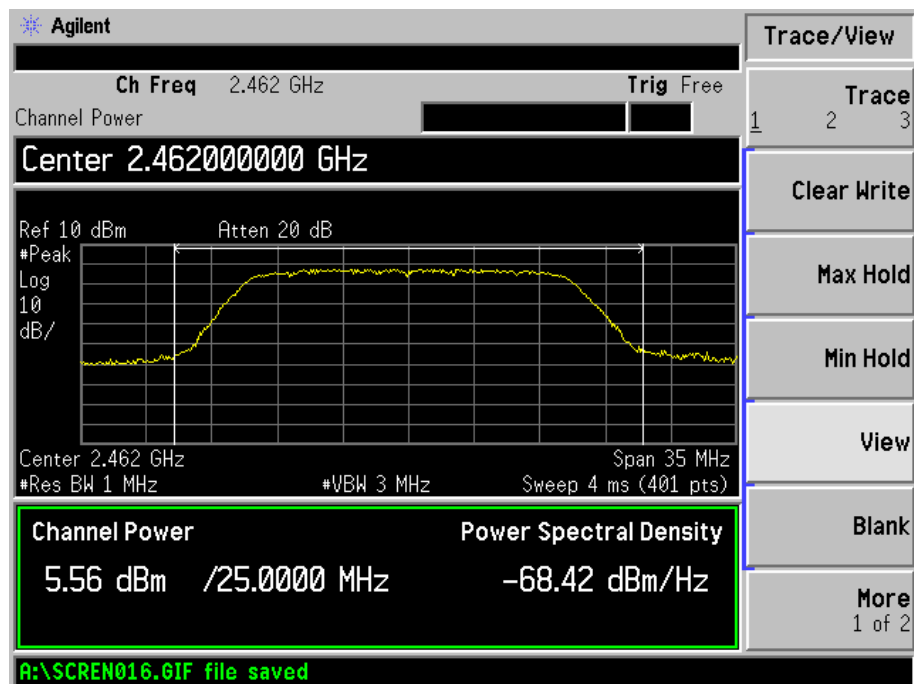
802.11n-HT20-MCS0-Low Channel



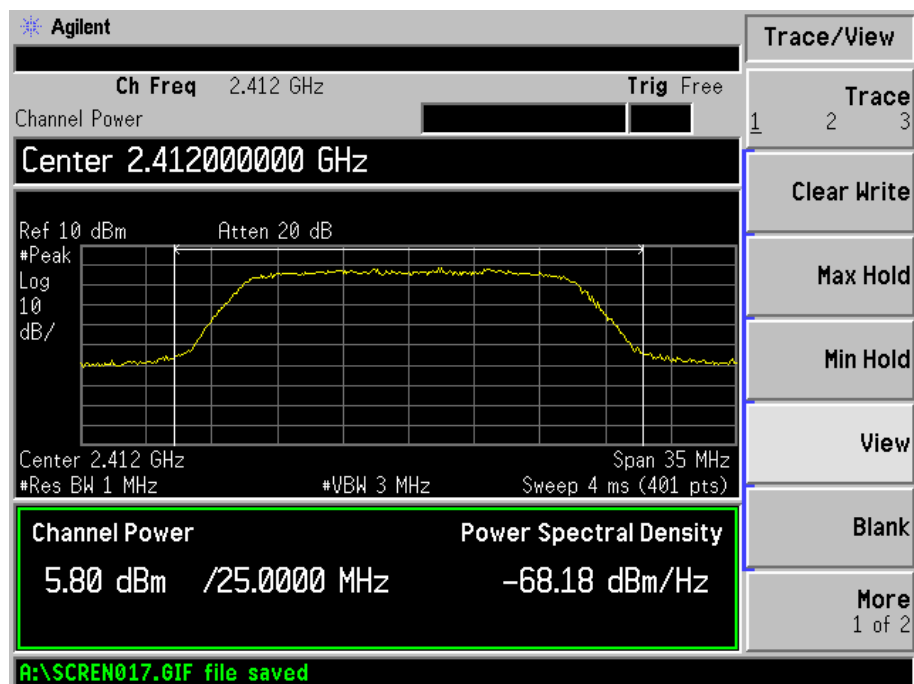
802.11n-HT20-MCS0-Middle Channel



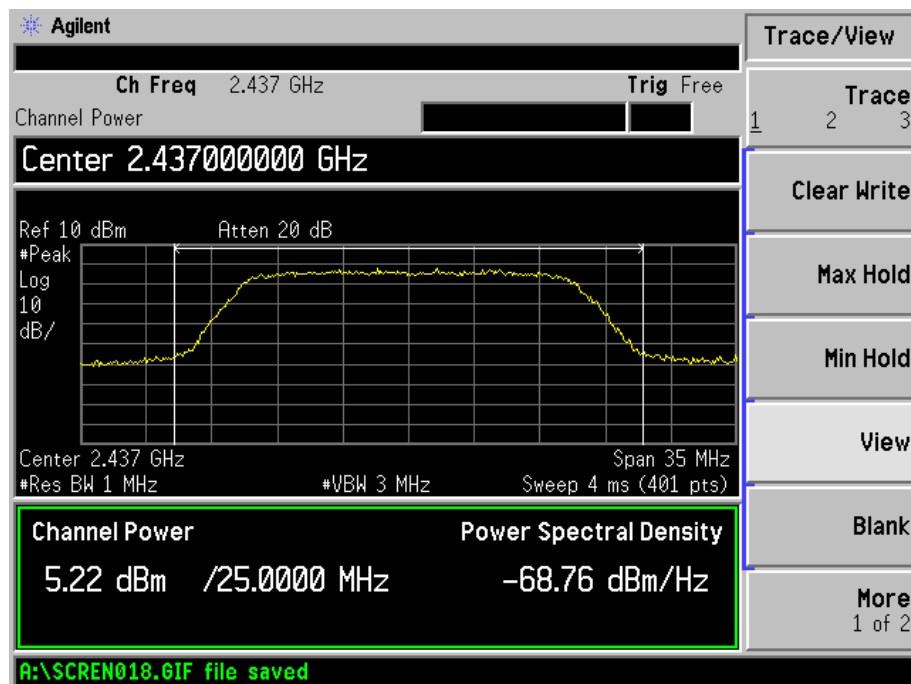
802.11n-HT20-MCS0-High Channel



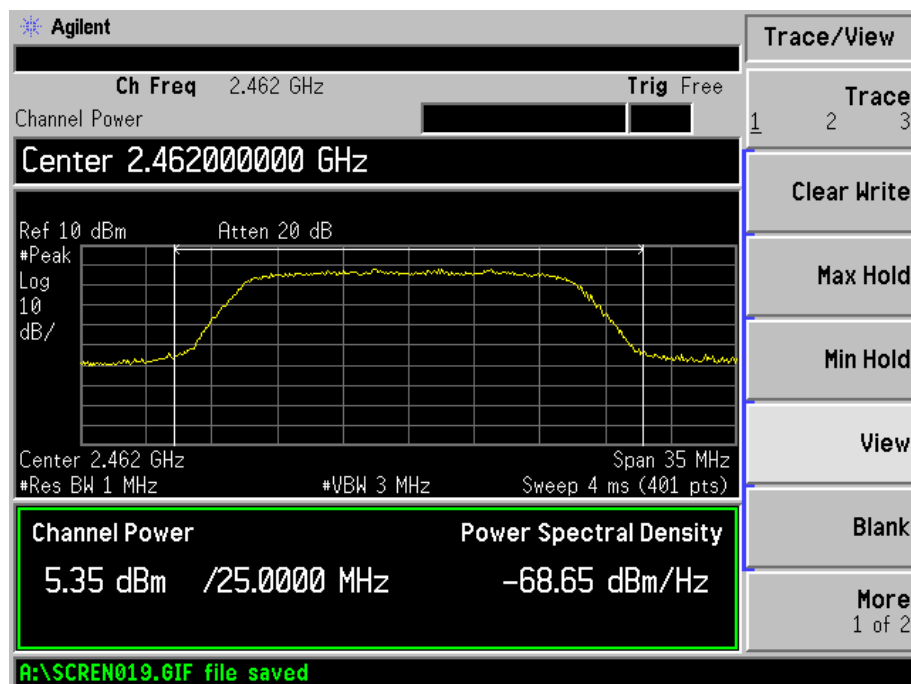
802.11n-HT20-MCS7-Low Channel



802.11n-HT20- MCS7-Middle Channel



802.11n-HT20- MCS7-High Channel



8. Field Strength of Spurious Emissions

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 5.10 dB.

8.2 Standard Applicable

According to §15.247(d), 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. 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).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Equipment List and Details

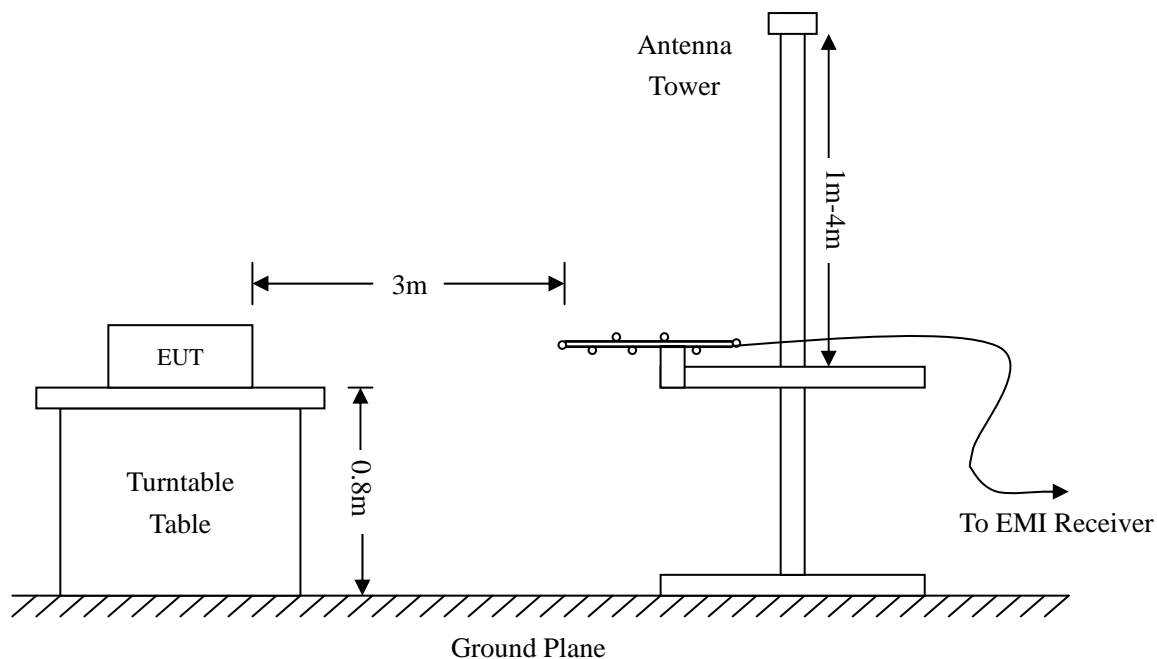
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-02-25	2014-02-24
Horn Antenna	ETS	3117	00086197	2013-02-25	2014-02-24
Horn Antenna	ETS	3116B	00088203	2013-02-25	2014-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2013-02-25	2014-02-24

8.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

8.6 Environmental Conditions

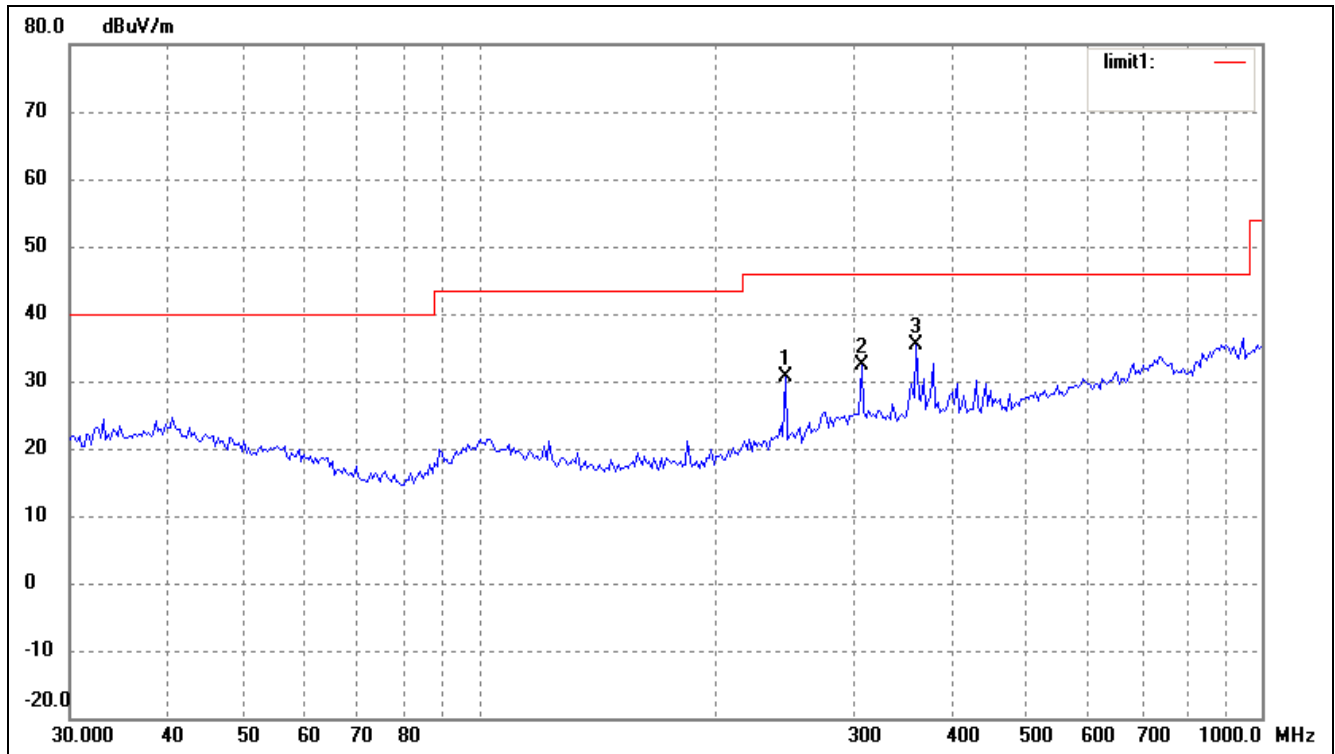
Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

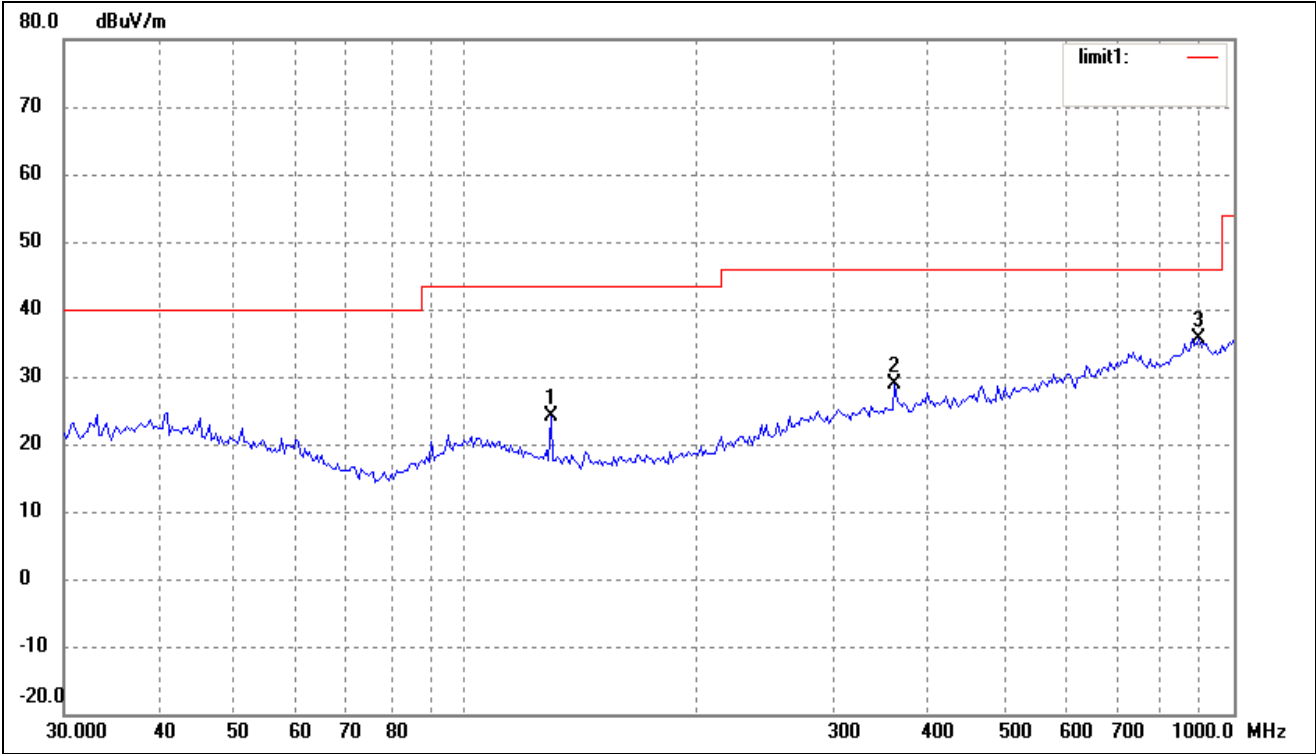
-7.16 dB at 4874 MHz in the Vertical polarization for 802.11n Middle Channel, 9kHz to 25 GHz, 3 Meters

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data (30MHz to 1GHz)*EUT: MID**Tested Model: S843D**Operating Condition: 802.11b Transmitting Low Channel-2412MHz**Comment:**Test Specification: Horizontal*

No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	23.54	7.17	30.71	46.00	-15.29	360	100	peak
2	307.8313	22.15	10.30	32.45	46.00	-13.55	360	200	peak
3	361.7139	24.74	10.69	35.43	46.00	-10.57	360	100	peak

Test Specification: Vertical

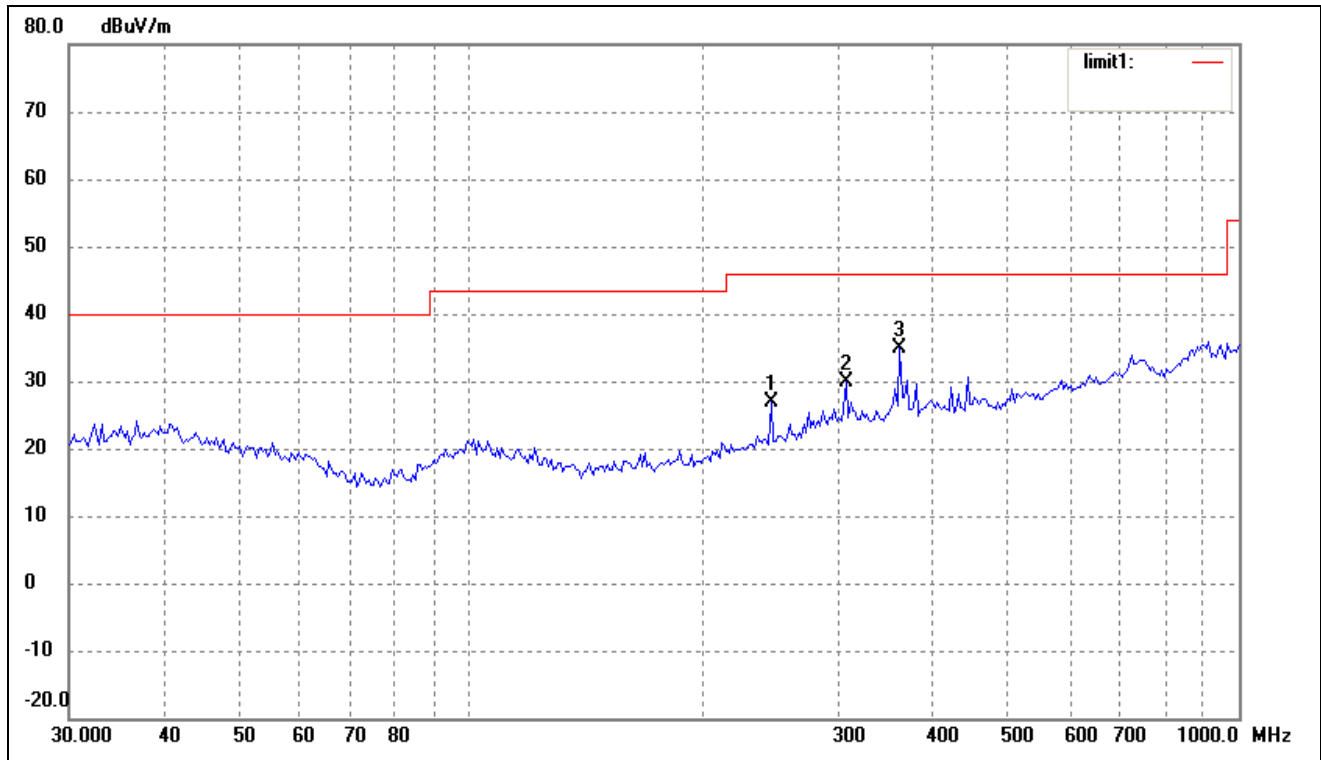


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	129.0146	20.02	4.20	24.22	43.50	-19.28	360	100	peak
2	361.7139	18.14	10.69	28.83	46.00	-17.17	360	100	peak
3	900.1474	16.32	19.38	35.70	46.00	-10.30	360	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

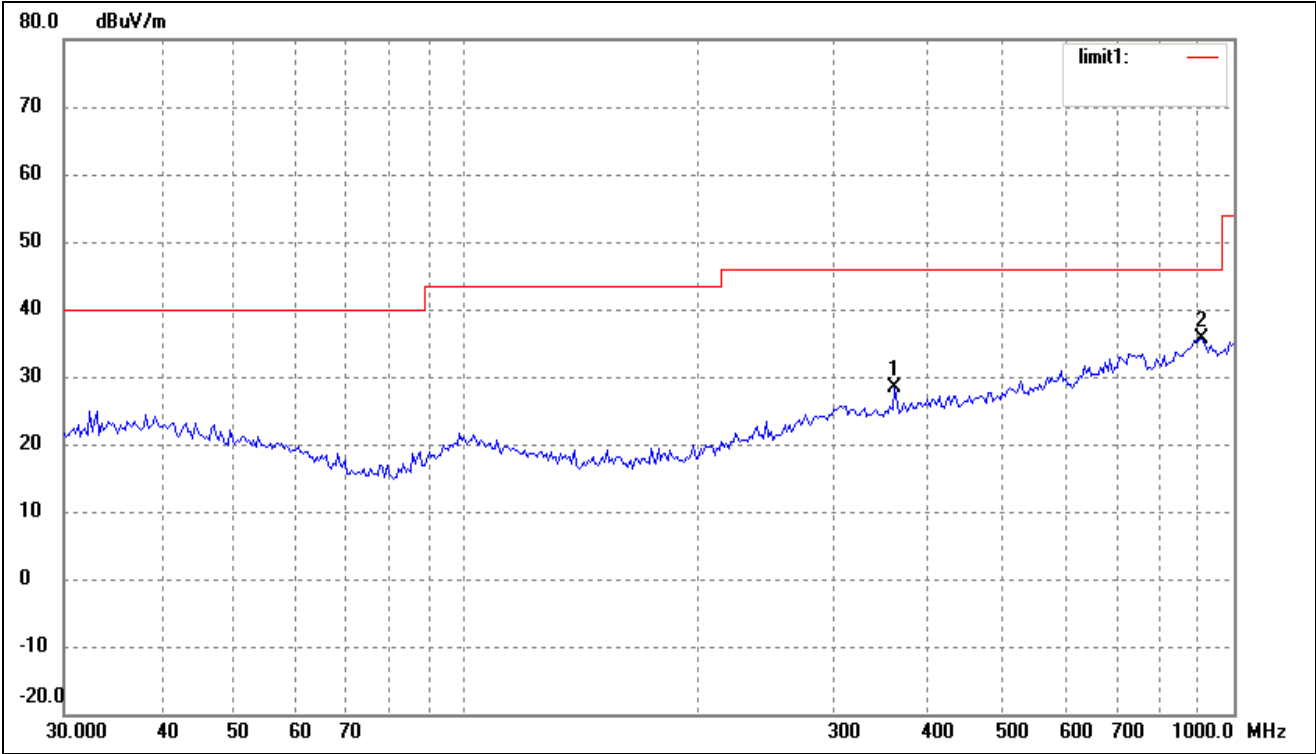
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	19.72	7.17	26.89	46.00	-19.11	360	100	peak
2	307.8313	19.68	10.30	29.98	46.00	-16.02	360	100	peak
3	361.7139	24.22	10.69	34.91	46.00	-11.09	360	100	peak

Test Specification: Vertical

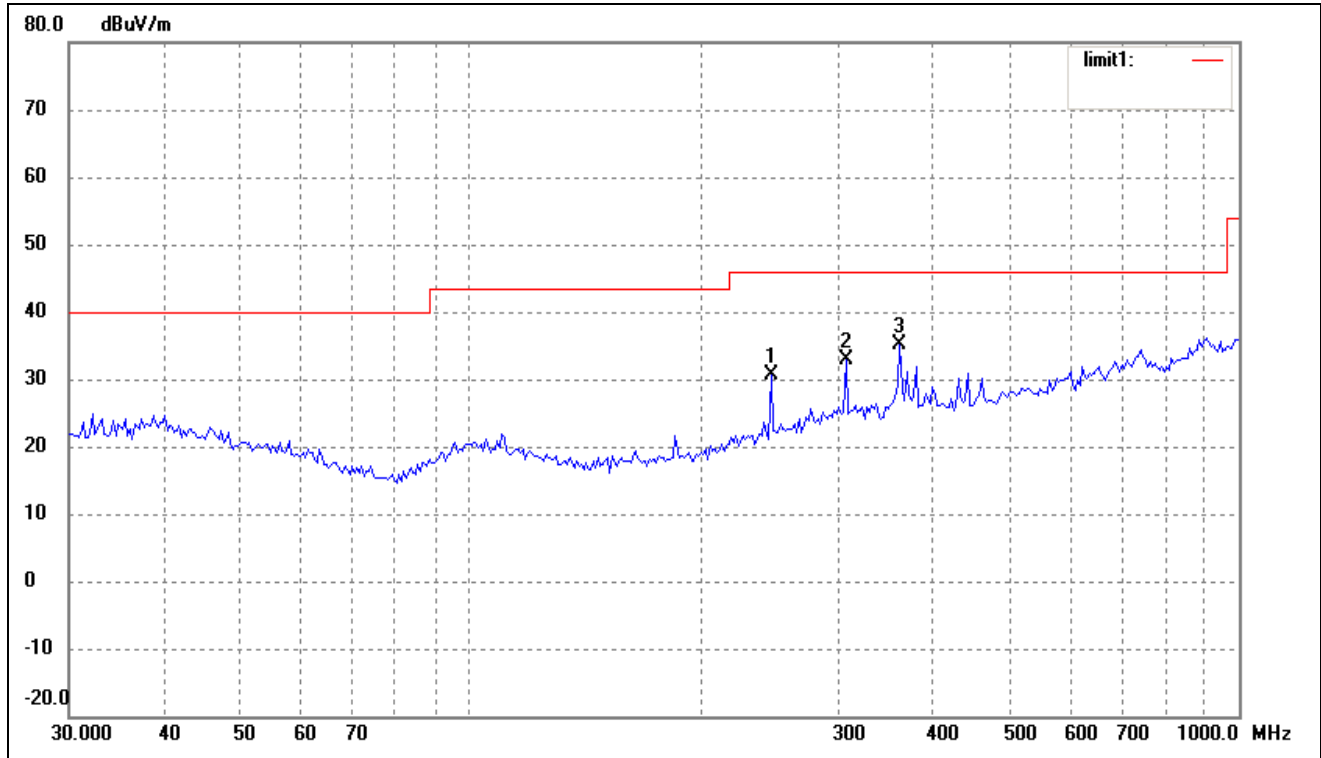


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	361.7139	17.66	10.69	28.35	46.00	-17.65	360	100	peak
2	906.4824	16.47	19.15	35.62	46.00	-10.38	360	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

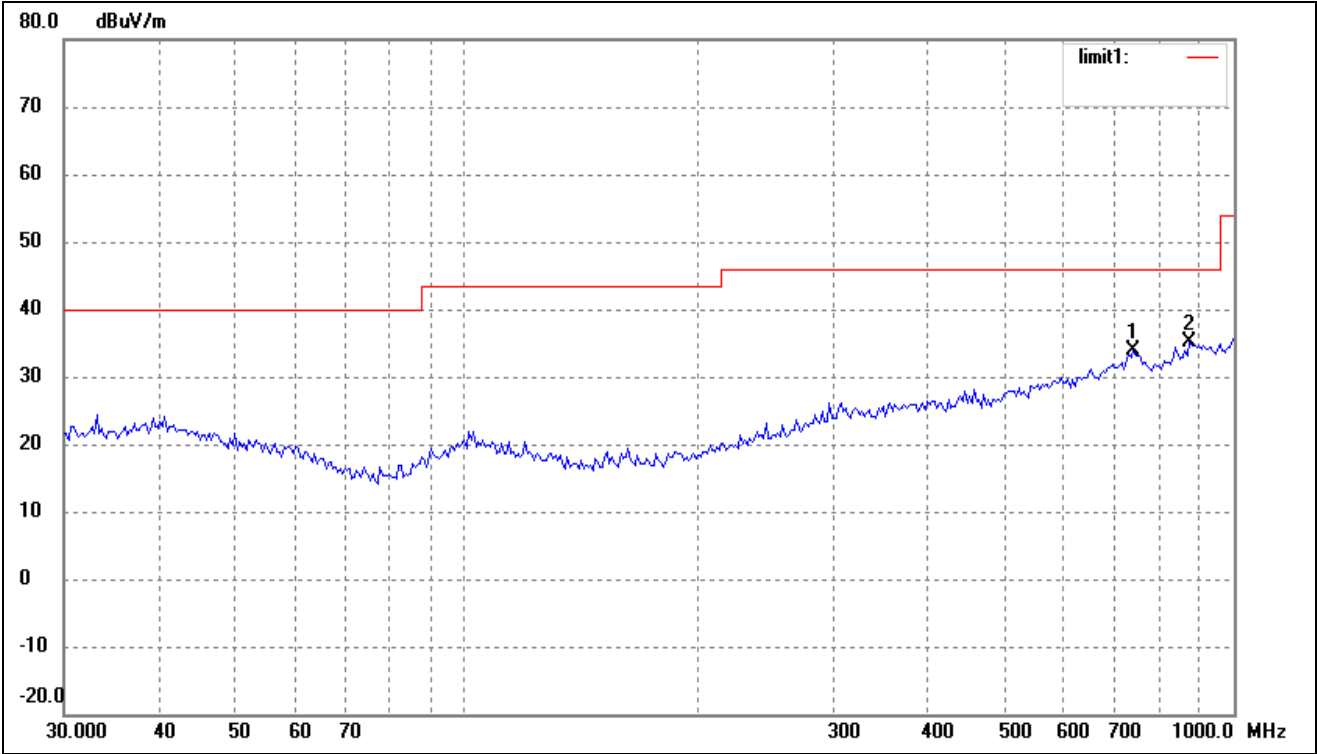
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	23.38	7.17	30.55	46.00	-15.45	360	100	peak
2	307.8313	22.59	10.30	32.89	46.00	-13.11	360	100	peak
3	361.7139	24.43	10.69	35.12	46.00	-10.88	360	100	peak

Test Specification: Vertical

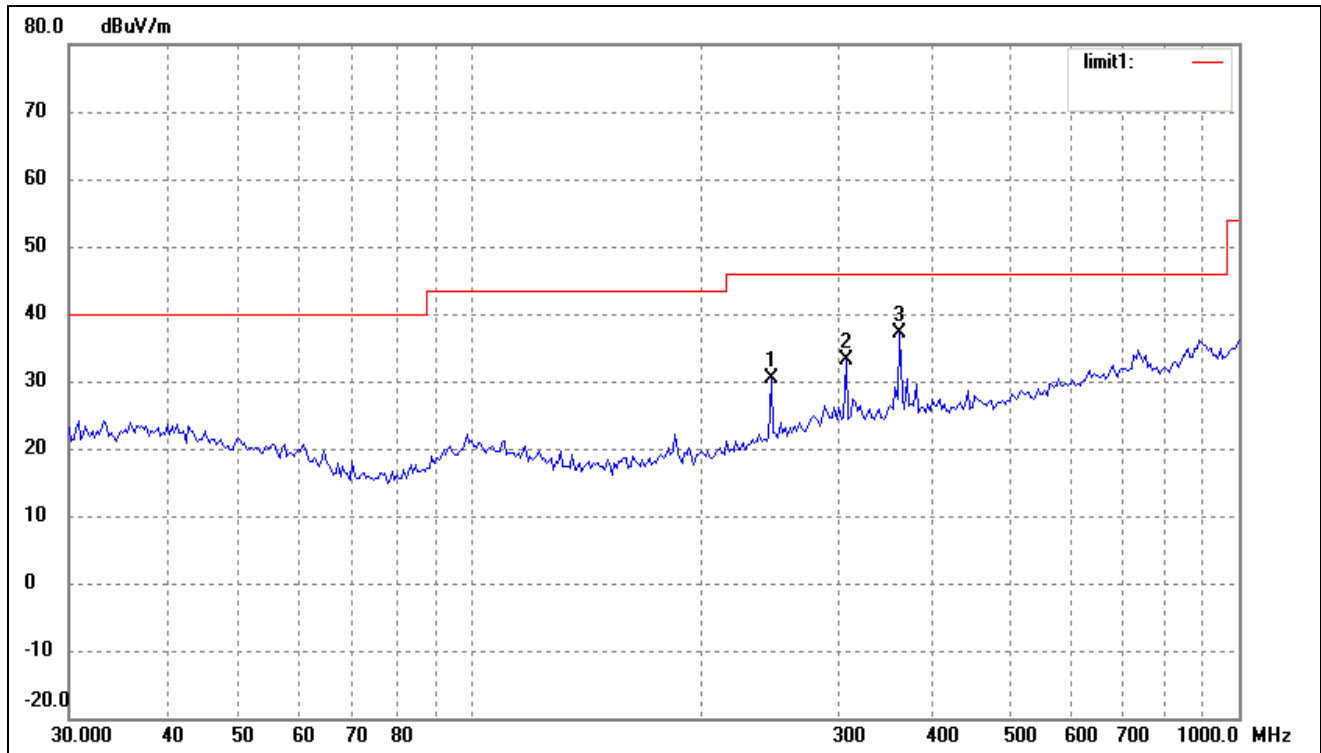


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	739.6605	15.69	18.07	33.76	46.00	-12.24	360	100	peak
2	875.2470	16.26	18.80	35.06	46.00	-10.94	360	100	peak

Operating Condition: 802.11g Transmitting Low Channel-2412MHz

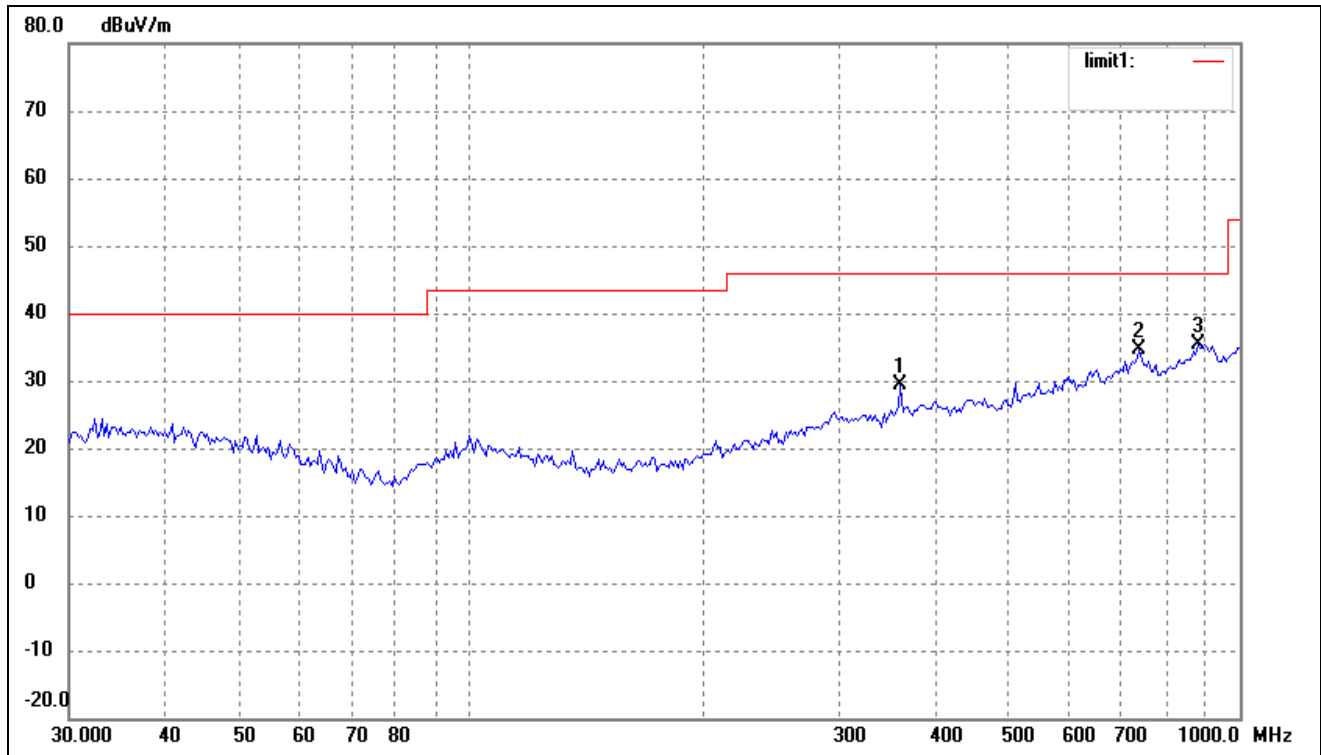
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	23.24	7.17	30.41	46.00	-15.59	360	100	peak
2	307.8313	22.84	10.30	33.14	46.00	-12.86	360	200	peak
3	361.7139	26.39	10.69	37.08	46.00	-8.92	360	100	peak

Test Specification: Vertical

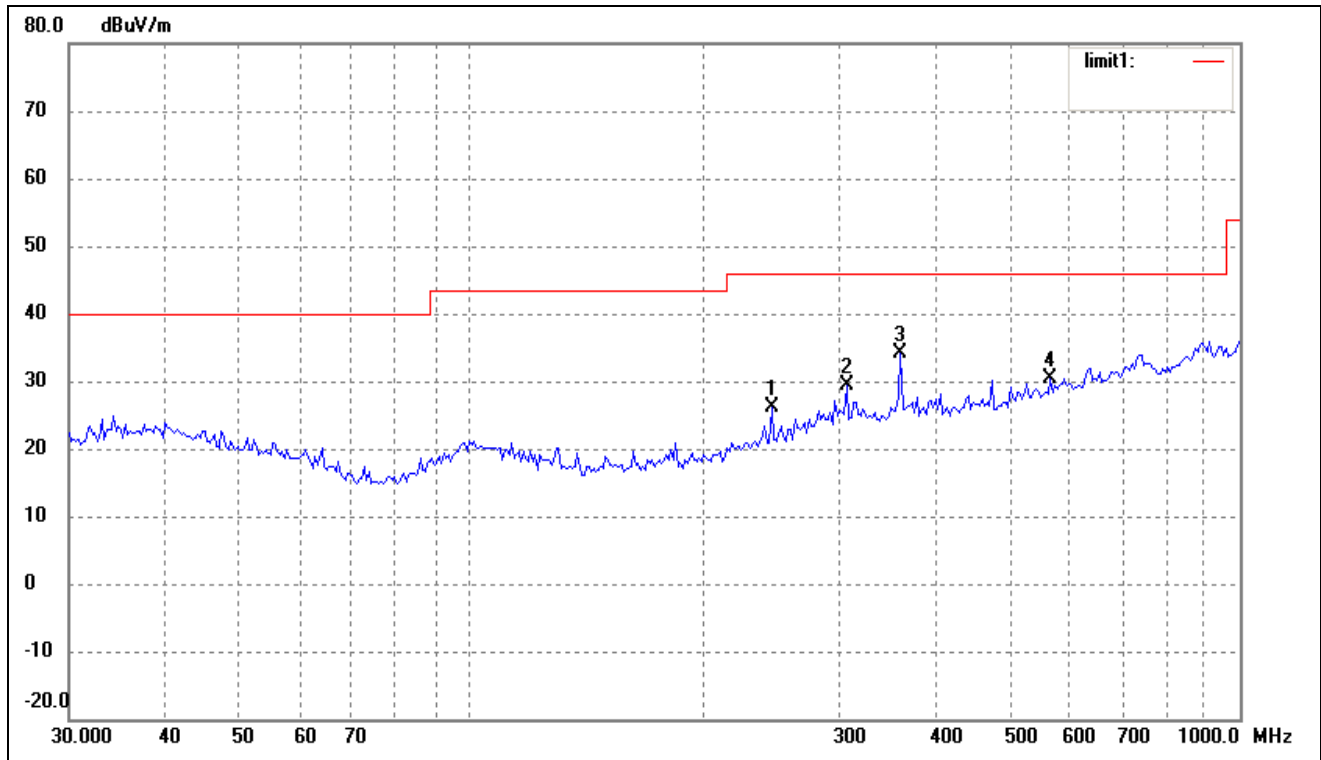


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	361.7139	18.76	10.69	29.45	46.00	-16.55	360	100	peak
2	739.6605	16.67	18.07	34.74	46.00	-11.26	360	100	peak
3	881.4067	16.39	19.03	35.42	46.00	-10.58	360	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

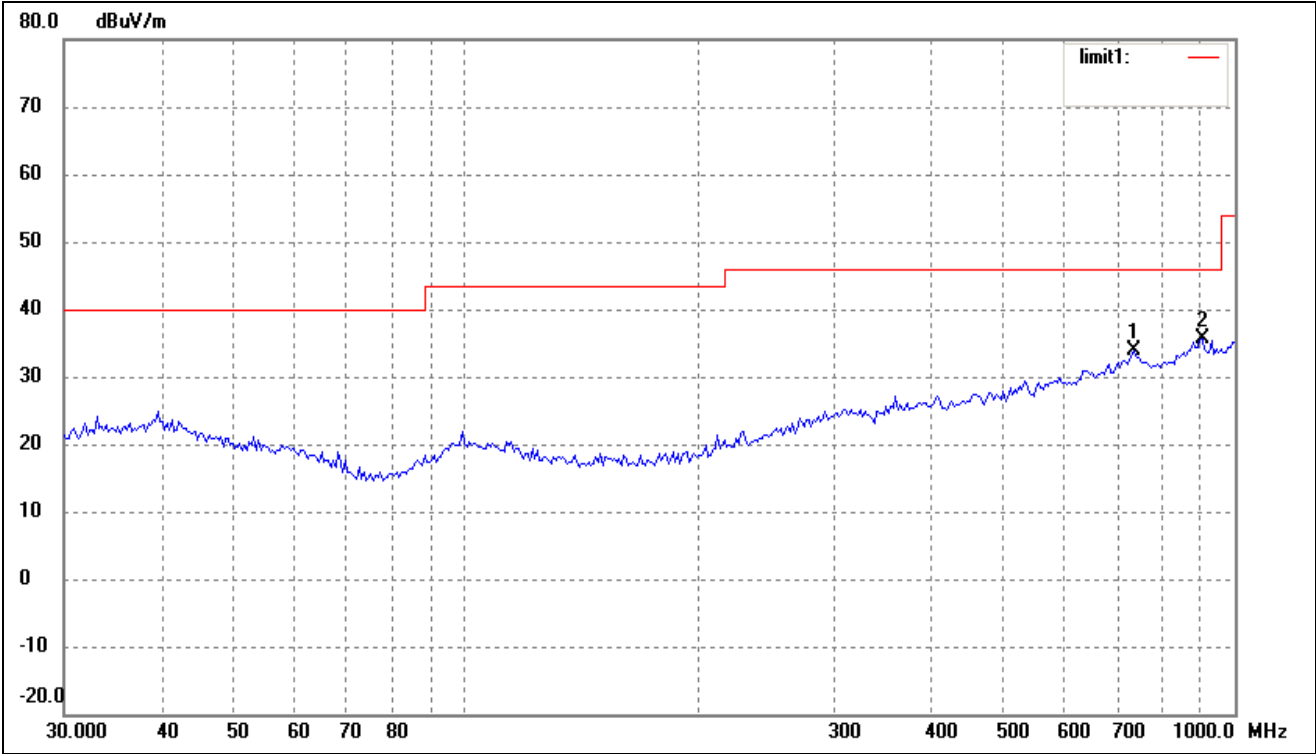
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	18.93	7.17	26.10	46.00	-19.90	360	100	peak
2	307.8313	19.20	10.30	29.50	46.00	-16.50	360	100	peak
3	361.7139	23.51	10.69	34.20	46.00	-11.80	360	100	peak
4	566.6223	16.86	13.58	30.44	46.00	-15.56	360	100	peak

Test Specification: Vertical

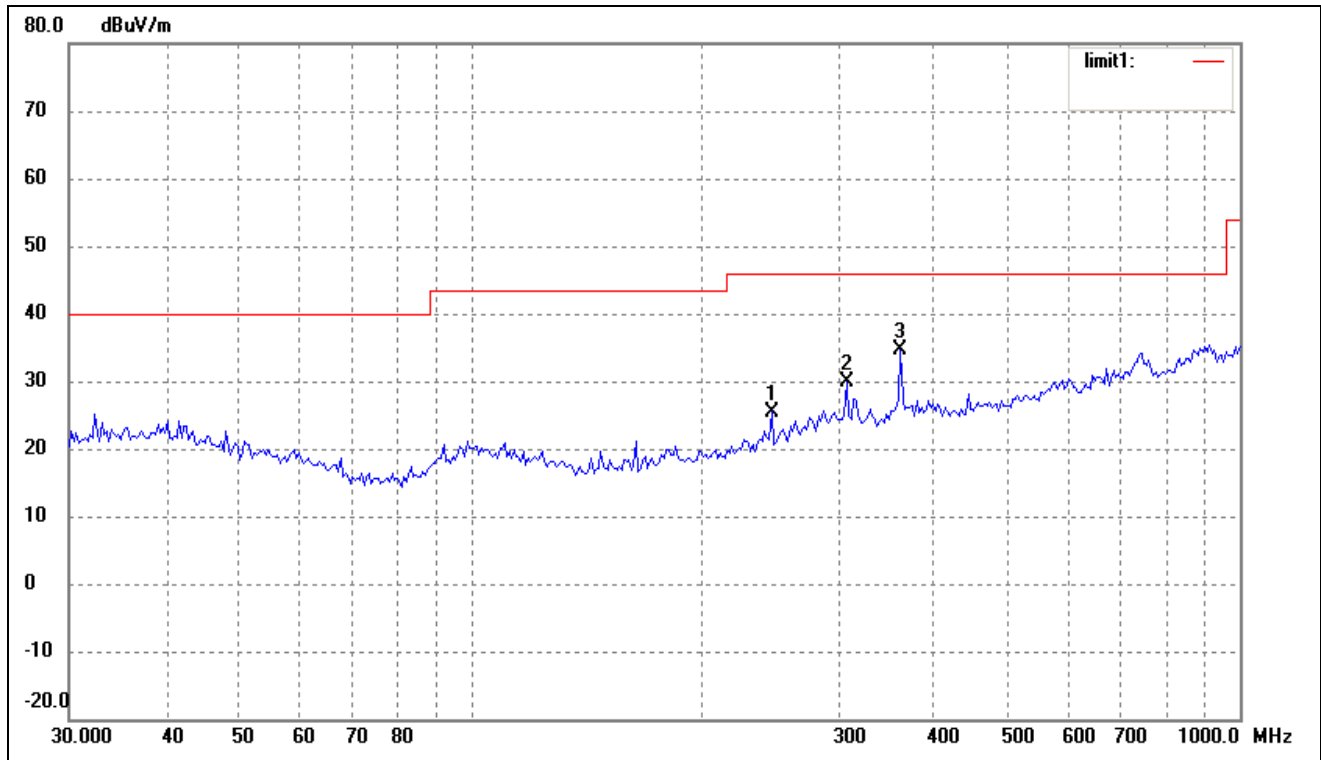


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	739.6605	15.80	18.07	33.87	46.00	-12.13	360	100	peak
2	906.4824	16.58	19.15	35.73	46.00	-10.27	360	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

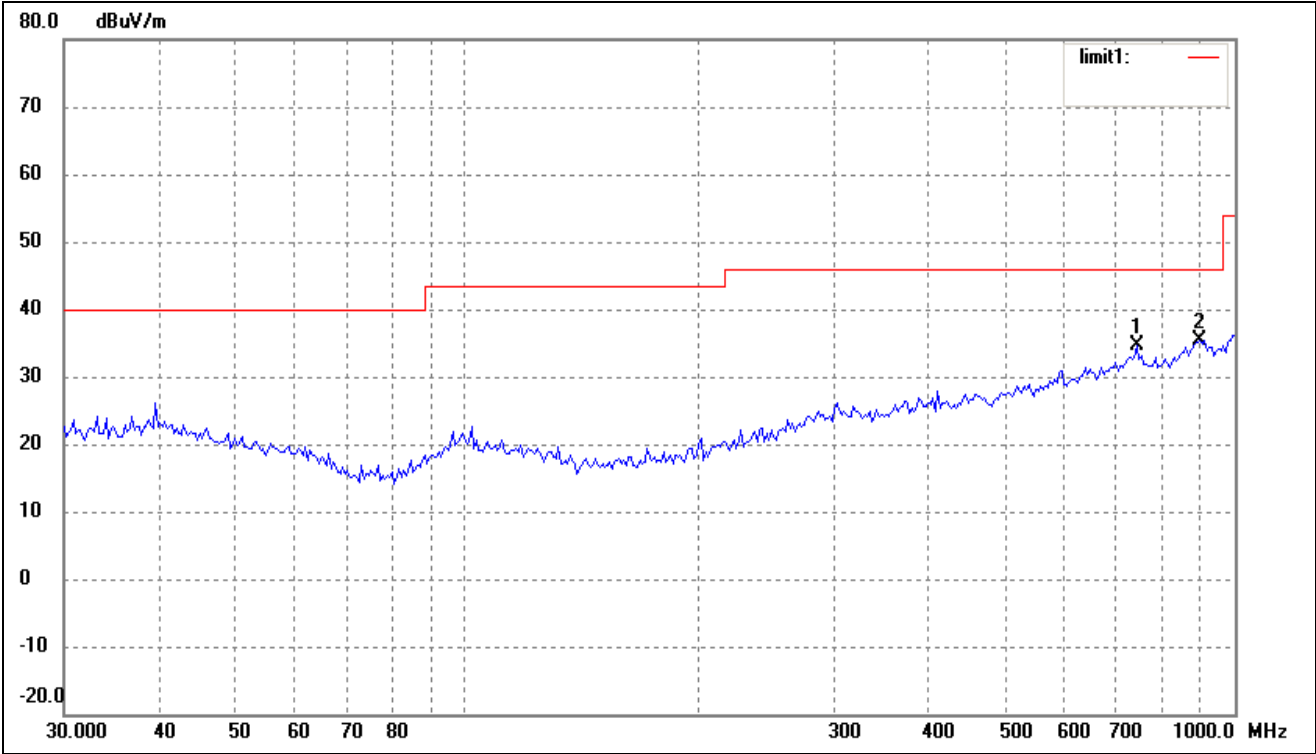
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	245.9509	18.33	7.17	25.50	46.00	-20.50	360	100	peak
2	307.8313	19.55	10.30	29.85	46.00	-16.15	360	100	peak
3	361.7139	24.01	10.69	34.70	46.00	-11.30	360	100	peak

Test Specification: Vertical

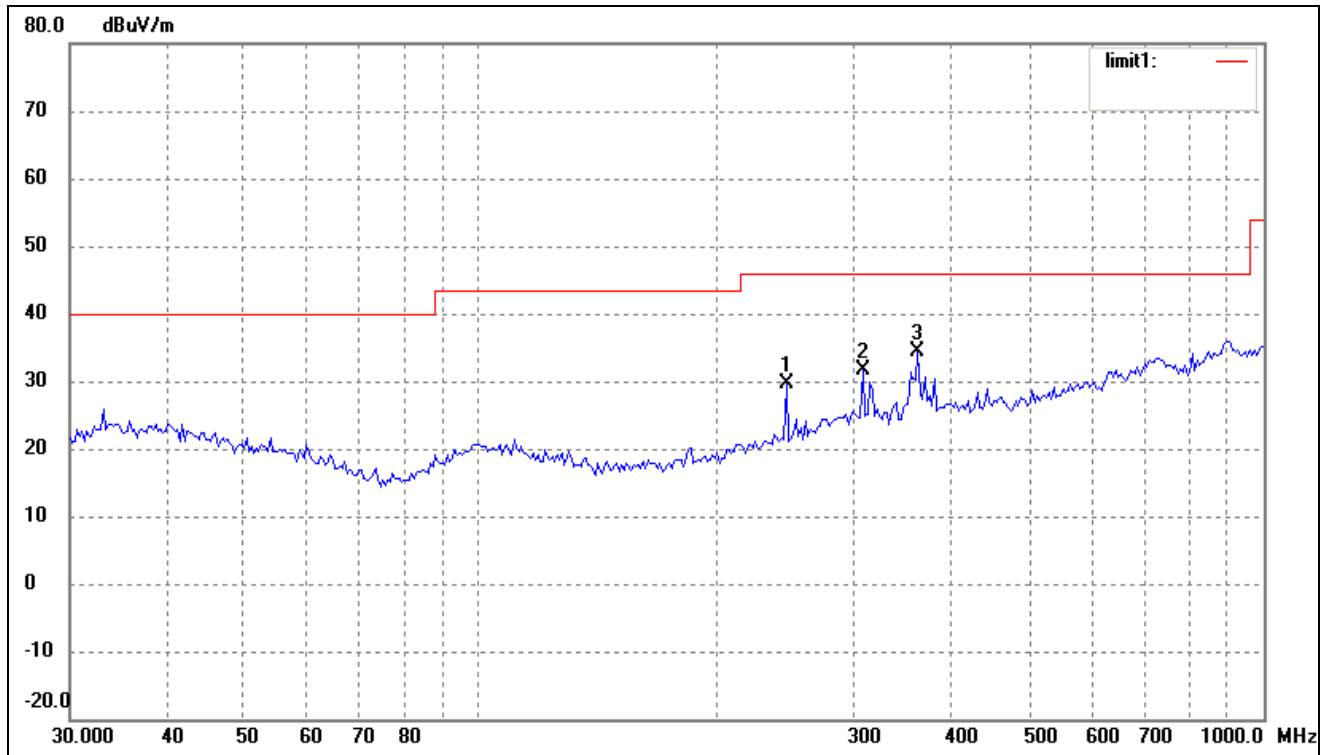


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	744.8661	16.63	17.95	34.58	46.00	-11.42	360	100	peak
2	900.1474	15.92	19.38	35.30	46.00	-10.70	360	100	peak

Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz

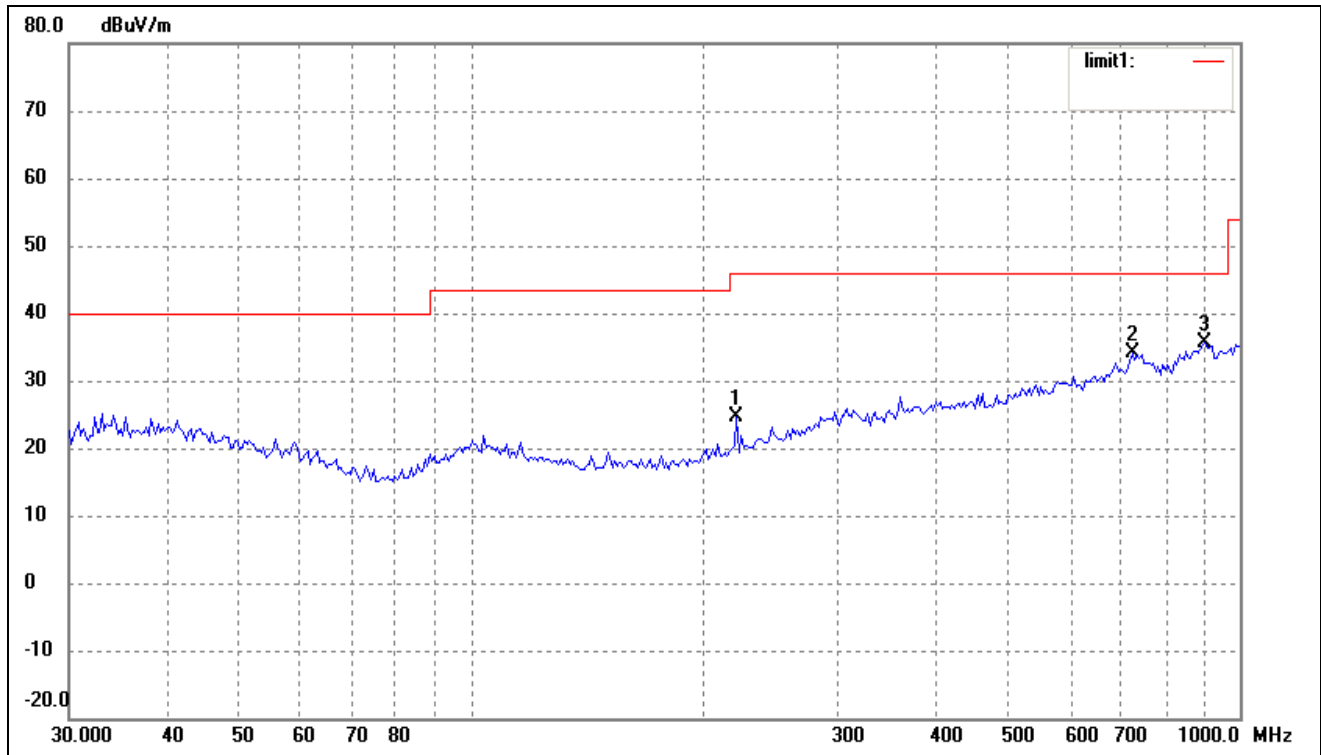
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	22.37	7.17	29.54	46.00	-16.46	360	100	peak
2	307.8313	21.29	10.30	31.59	46.00	-14.41	360	200	peak
3	361.7139	23.58	10.69	34.27	46.00	-11.73	360	100	peak

Test Specification: Vertical

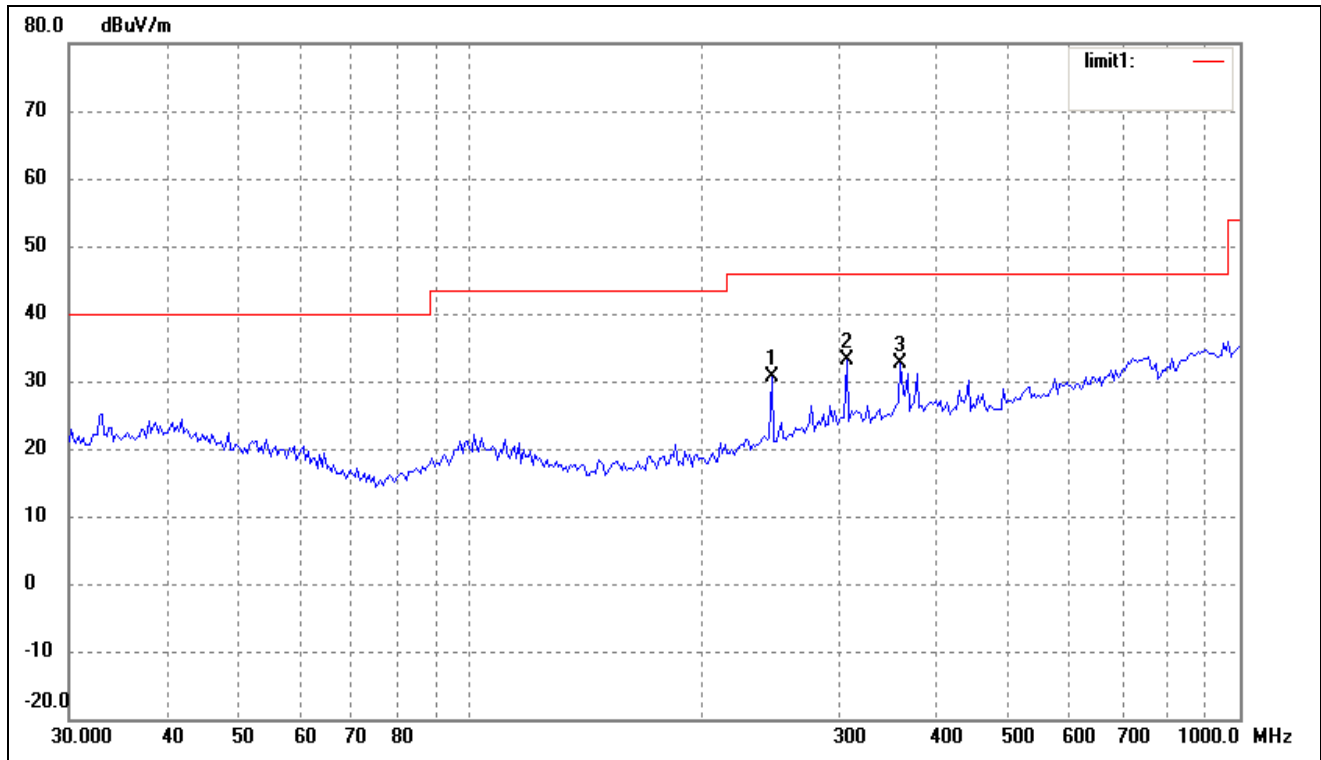


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	221.3921	18.65	6.00	24.65	46.00	-21.35	360	100	peak
2	724.2611	17.31	16.93	34.24	46.00	-11.76	360	100	peak
3	900.1474	16.13	19.38	35.51	46.00	-10.49	360	100	peak

Operating Condition: 802.11n-HT20 Transmitting Middle Channel-2437MHz

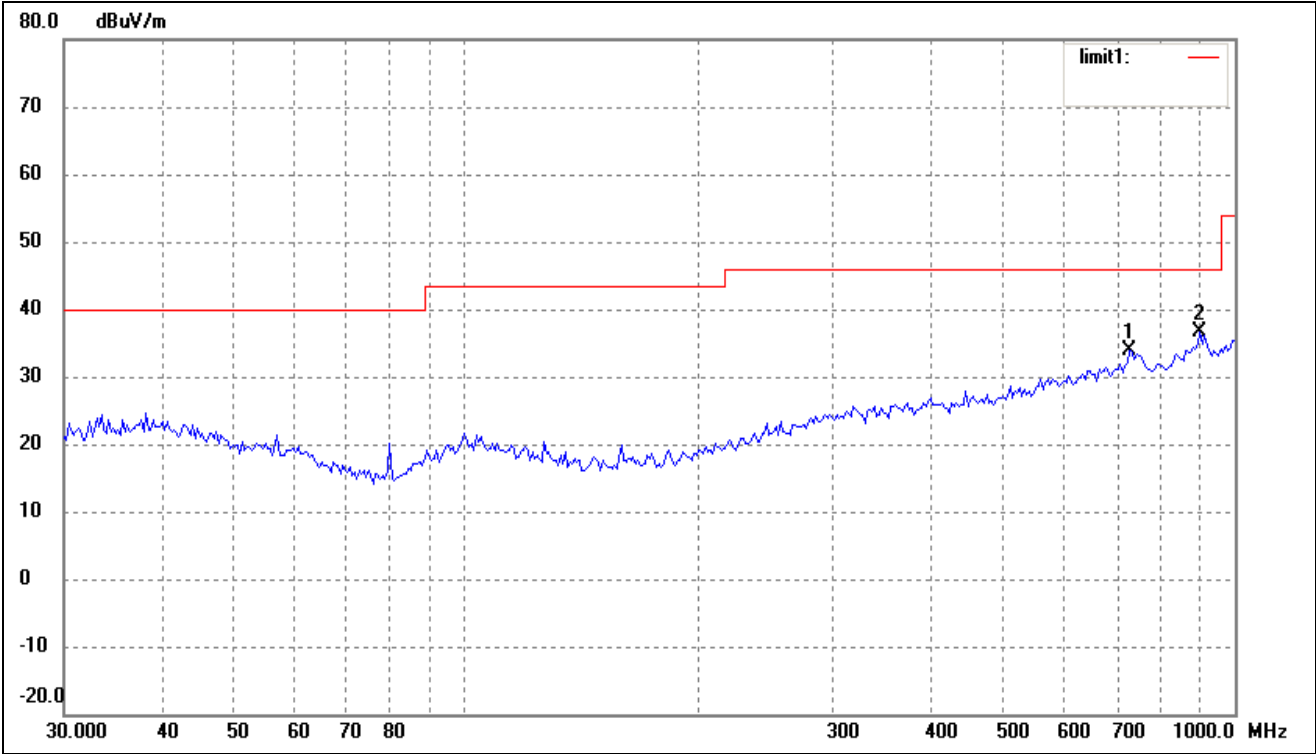
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	23.35	7.17	30.52	46.00	-15.48	360	100	peak
2	307.8313	22.74	10.30	33.04	46.00	-12.96	360	100	peak
3	361.7139	21.86	10.69	32.55	46.00	-13.45	360	100	peak

Test Specification: Vertical

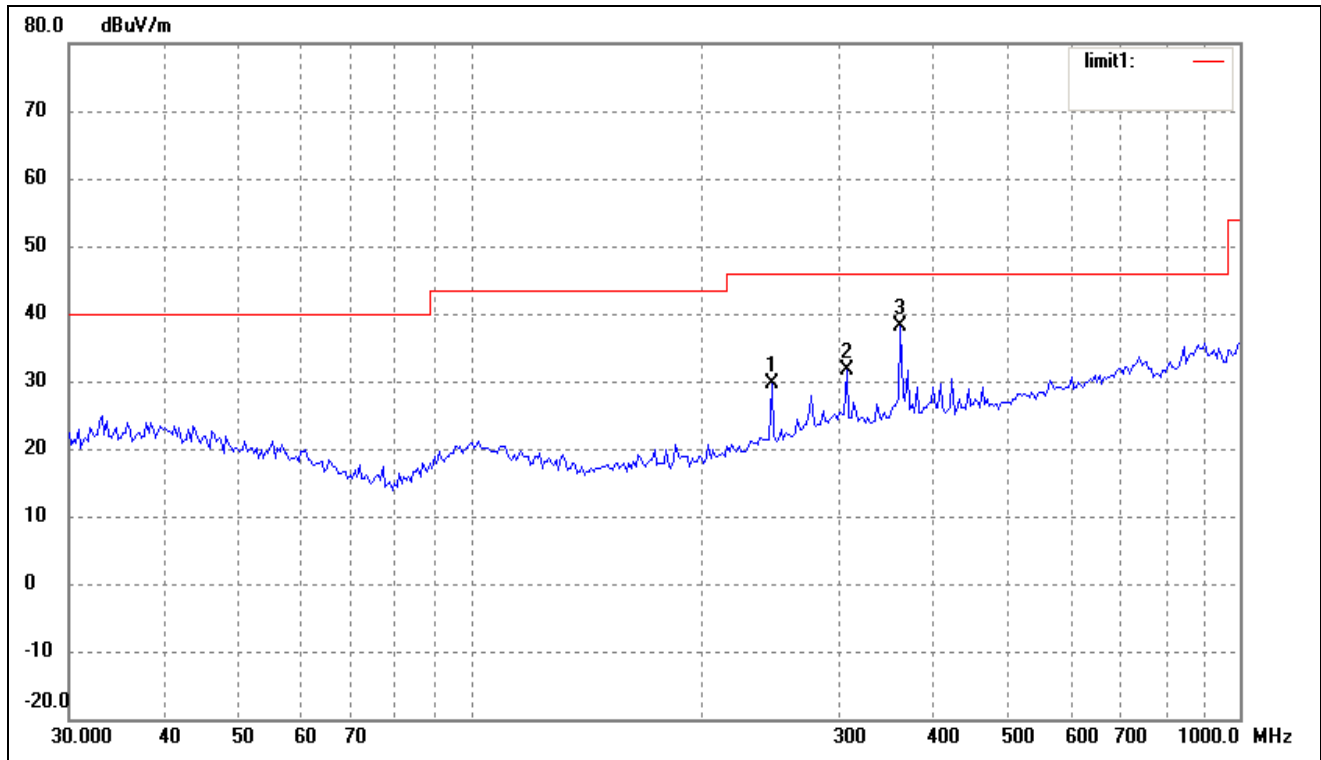


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	729.3583	16.52	17.31	33.83	46.00	-12.17	360	100	peak
2	900.1474	17.14	19.38	36.52	46.00	-9.48	360	100	peak

Operating Condition: 802.11n-HT20 Transmitting High Channel-2462MHz

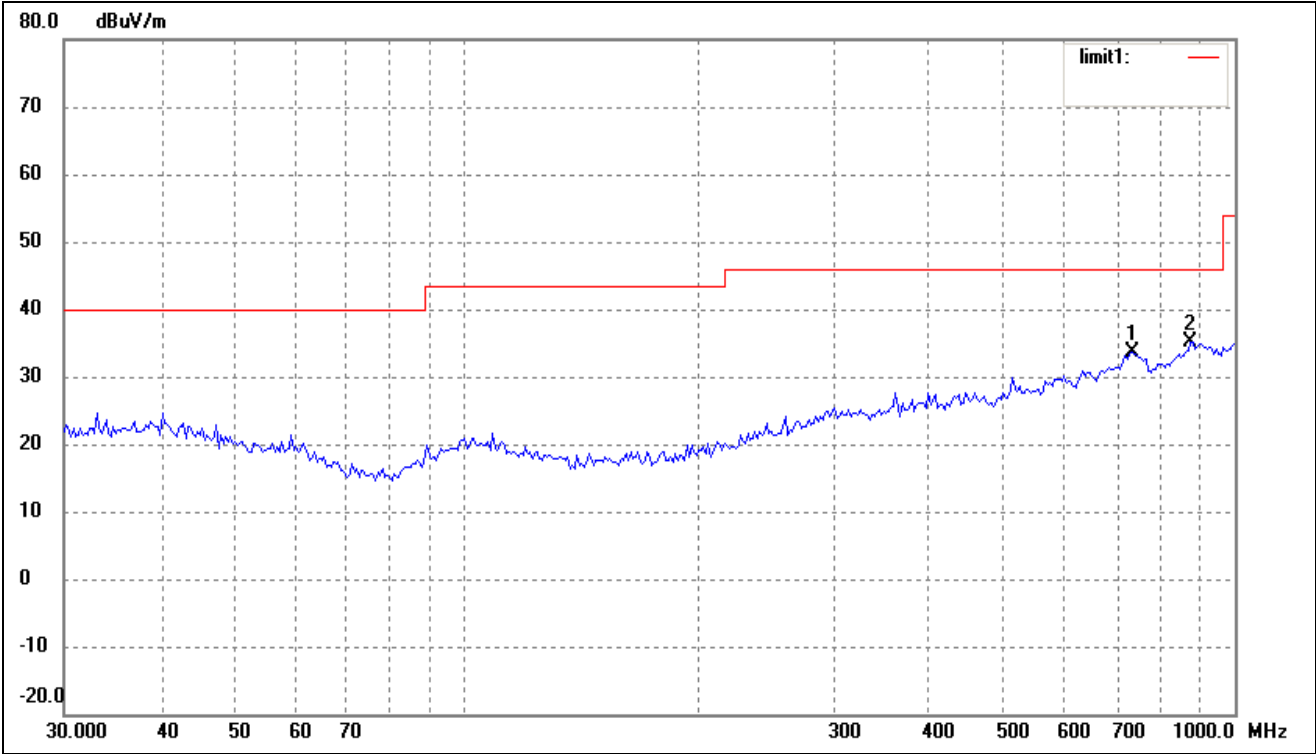
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	245.9509	22.51	7.17	29.68	46.00	-16.32	360	100	peak
2	307.8313	21.31	10.30	31.61	46.00	-14.39	360	100	peak
3	361.7139	27.52	10.69	38.21	46.00	-7.79	360	100	peak

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	734.4913	15.85	17.68	33.53	46.00	-12.47	360	100	peak
2	875.2470	16.36	18.80	35.16	46.00	-10.84	360	100	peak

*Spurious Emissions Above 1GHz**Test Mode: 802.11b*

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	56.62	-3.88	52.74	74.00	-21.26	H	PK
4824.000	39.97	-3.88	36.09	54.00	-17.91	H	AV
7236.000	43.33	1.14	44.47	74.00	-29.53	H	PK
7236.000	32.82	1.14	33.96	54.00	-20.04	H	AV
4824.000	63.09	-3.88	59.21	74.00	-14.79	V	PK
4824.000	44.34	-3.88	40.46	54.00	-13.54	V	AV
7236.000	44.18	1.14	45.32	74.00	-28.68	V	PK
7236.000	32.56	1.14	33.70	54.00	-20.30	V	AV
Middle Channel-2437MHz							
4874.000	58.13	-3.74	54.39	74.00	-19.61	H	PK
4874.000	41.64	-3.74	37.90	54.00	-16.10	H	AV
7311.000	45.94	1.47	47.41	74.00	-26.59	H	PK
7311.000	33.52	1.47	34.99	54.00	-19.01	H	AV
4874.000	65.69	-3.74	61.95	74.00	-12.05	V	PK
4874.000	48.91	-3.74	45.17	54.00	-8.83	V	AV
7311.000	48.32	1.47	49.79	74.00	-24.21	V	PK
7311.000	36.00	1.47	37.47	54.00	-16.53	V	AV
High Channel-2462MHz							
4924.000	54.36	-3.59	50.77	74.00	-23.23	H	PK
4924.000	38.68	-3.59	35.09	54.00	-18.91	H	AV
7368.000	31.91	1.72	33.63	54.00	-20.37	H	PK
7386.000	43.30	1.79	45.09	74.00	-28.91	H	AV
4924.000	66.11	-3.59	62.52	74.00	-11.48	V	PK
4924.000	49.09	-3.59	45.50	54.00	-8.50	V	AV
7386.000	48.77	1.79	50.56	74.00	-23.44	V	PK
7386.000	35.97	1.79	37.76	54.00	-16.24	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	54.52	-3.88	50.64	74.00	-23.36	H	PK
4824.000	38.72	-3.88	34.84	54.00	-19.16	H	AV
7236.000	43.27	1.14	44.41	74.00	-29.59	H	PK
7236.000	32.66	1.14	33.80	54.00	-20.20	H	AV
4824.000	64.19	-3.88	60.31	74.00	-13.69	V	PK
4824.000	45.08	-3.88	41.20	54.00	-12.80	V	AV
7236.000	44.30	1.14	45.44	74.00	-28.56	V	PK
7236.000	32.40	1.14	33.54	54.00	-20.46	V	AV
Middle Channel-2437MHz							
4874.000	57.16	-3.74	53.42	74.00	-20.58	H	PK
4874.000	41.22	-3.74	37.48	54.00	-16.52	H	AV
7311.000	45.17	1.47	46.64	74.00	-27.36	H	PK
7311.000	33.31	1.47	34.78	54.00	-19.22	H	AV
4874.000	65.21	-3.74	61.47	74.00	-12.53	V	PK
4874.000	48.37	-3.74	44.63	54.00	-9.37	V	AV
7311.000	48.69	1.47	50.16	74.00	-23.84	V	PK
7311.000	35.76	1.47	37.23	54.00	-16.77	V	AV
High Channel-2462MHz							
4924.000	56.33	-3.59	52.74	74.00	-21.26	H	PK
4924.000	40.40	-3.59	36.81	54.00	-17.19	H	AV
7386.000	43.10	1.79	44.89	74.00	-29.11	H	PK
7386.000	31.72	1.79	33.51	54.00	-20.49	H	AV
4924.000	64.71	-3.59	61.12	74.00	-12.88	V	PK
4924.000	47.84	-3.59	44.25	54.00	-9.75	V	AV
7386.000	49.33	1.79	51.12	74.00	-22.88	V	PK
7386.000	36.03	1.79	37.82	54.00	-16.18	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBUV/m)	dB/m	(dBUV/m)	(dBUV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	54.11	-3.88	50.23	74.00	-23.77	H	PK
4824.000	39.07	-3.88	35.19	54.00	-18.81	H	AV
7236.000	42.41	1.14	43.55	74.00	-30.45	H	PK
7236.000	31.32	1.14	32.46	54.00	-21.54	H	AV
4824.000	62.11	-3.88	58.23	74.00	-15.77	V	PK
4824.000	45.93	-3.88	42.05	54.00	-11.95	V	AV
7236.000	48.55	1.14	49.69	74.00	-24.31	V	PK
7321.500	33.22	1.52	34.74	54.00	-19.26	V	AV
Middle Channel-2437MHz							
4874.000	54.52	-3.74	50.78	74.00	-23.22	H	PK
4874.000	41.62	-3.74	37.88	54.00	-16.12	H	AV
7311.000	44.87	1.47	46.34	74.00	-27.66	H	PK
7311.000	33.30	1.47	34.77	54.00	-19.23	H	AV
4874.000	64.93	-3.74	61.19	74.00	-12.81	V	PK
4874.000	50.58	-3.74	46.84	54.00	-7.16	V	AV
7311.000	55.24	1.47	56.71	74.00	-17.29	V	PK
7311.000	38.05	1.47	39.52	54.00	-14.48	V	AV
High Channel-2462MHz							
4924.000	56.69	-3.59	53.10	74.00	-20.90	H	PK
4924.000	42.23	-3.59	38.64	54.00	-15.36	H	AV
7386.000	43.54	1.79	45.33	74.00	-28.67	H	PK
7386.000	31.83	1.79	33.62	54.00	-20.38	H	AV
4924.000	64.88	-3.59	61.29	74.00	-12.71	V	PK
4924.000	50.16	-3.59	46.57	54.00	-7.43	V	AV
7386.000	53.70	1.79	55.49	74.00	-18.51	V	PK
7386.000	37.23	1.79	39.02	54.00	-14.98	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz..

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) 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. 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).

9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-02-25	2014-02-24
Horn Antenna	ETS	3117	00086197	2013-02-25	2014-02-24

9.3 Test Procedure

According to the KDB 558074, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the DA 00-705, the band-edge conducted test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2380MHz to 2410MHz for low bandedge, 2470MHz to 2500MHz for the high bandedge)

RBW = 100kHz, VBW = 300kHz

Sweep = auto; Detector function = peak; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the limit specified in this section (at least 20dB attenuation).

9.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

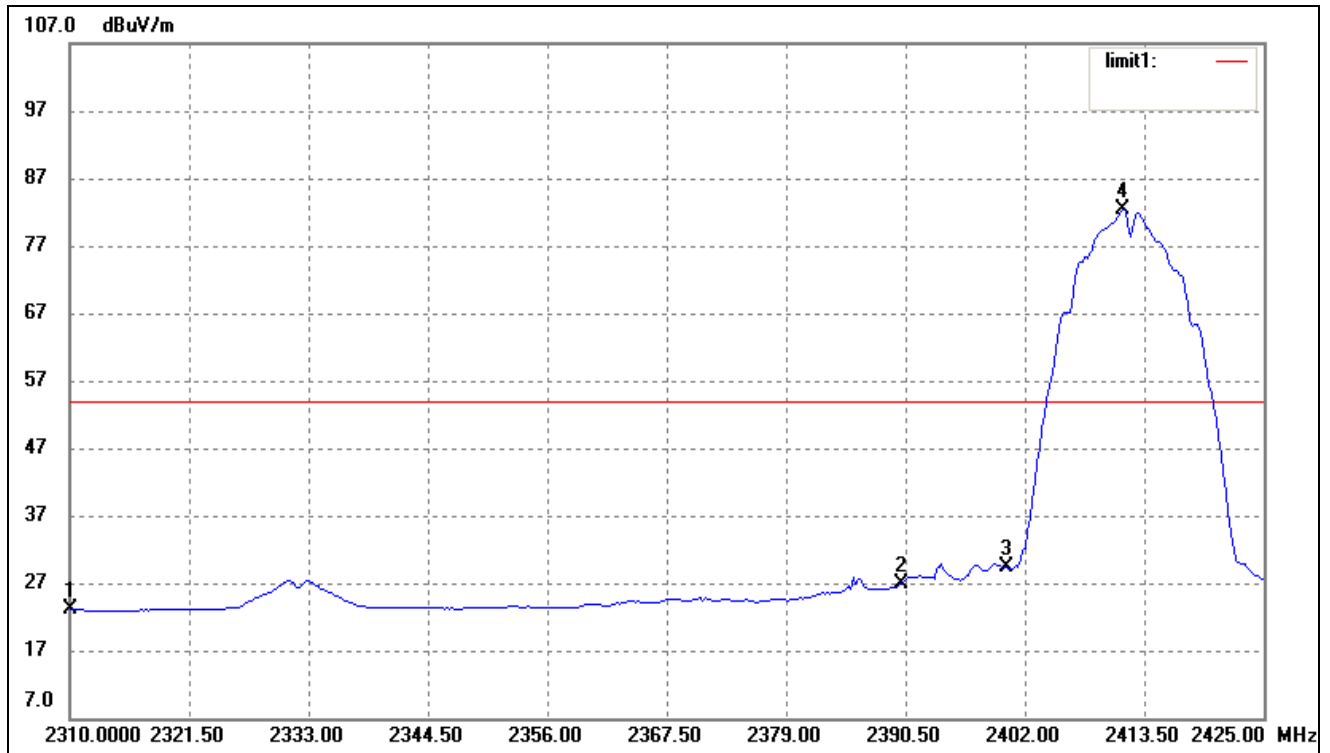
9.5 Summary of Test Results/Plots

Test Mode	Test Frequency MHz	Limit dBuV / dBc	Result
802.11b	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11g	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT20	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT40	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.247(d) requirements.

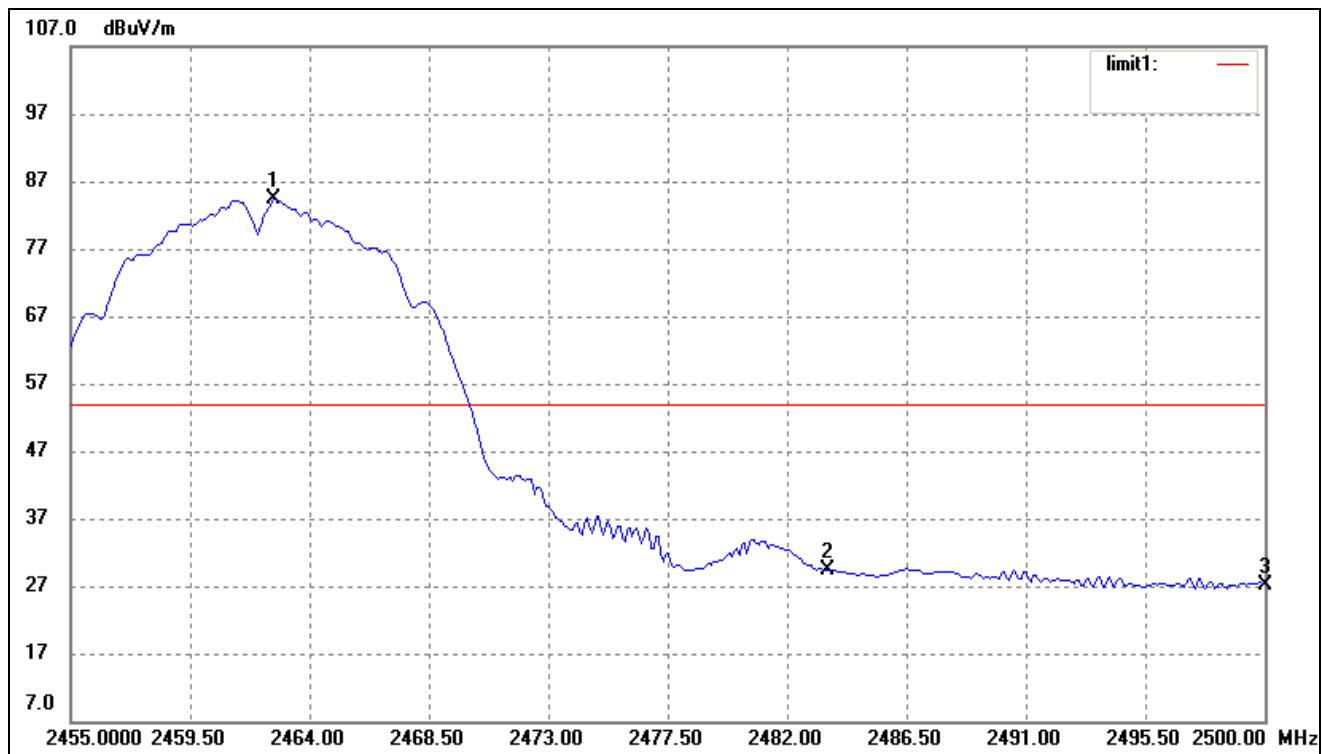
Please refer to the test plots as below.

802.11b-Lowest Bandedge



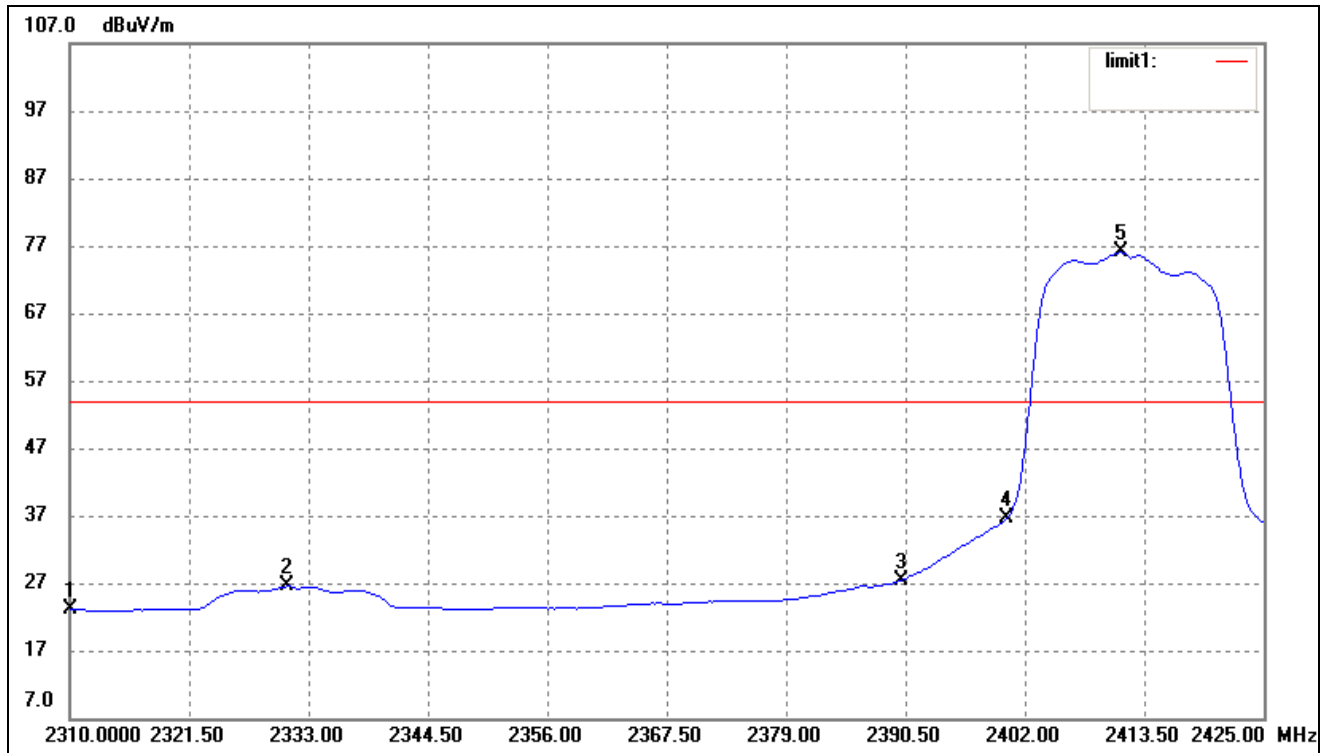
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.74	-11.72	23.02	54.00	-30.98	Average Detector
	2310.000	47.27	-11.72	35.55	74.00	-38.45	Peak Detector
2	2390.000	38.73	-11.75	26.98	54.00	-27.02	Average Detector
	2390.000	51.10	-11.75	39.35	74.00	-34.65	Peak Detector
3	2400.000	41.05	-11.75	29.30	Delta = 53.06 dBc		Average Detector
4	2411.430	94.11	-11.75	82.36			Average Detector

802.11b-Highest Bandedge



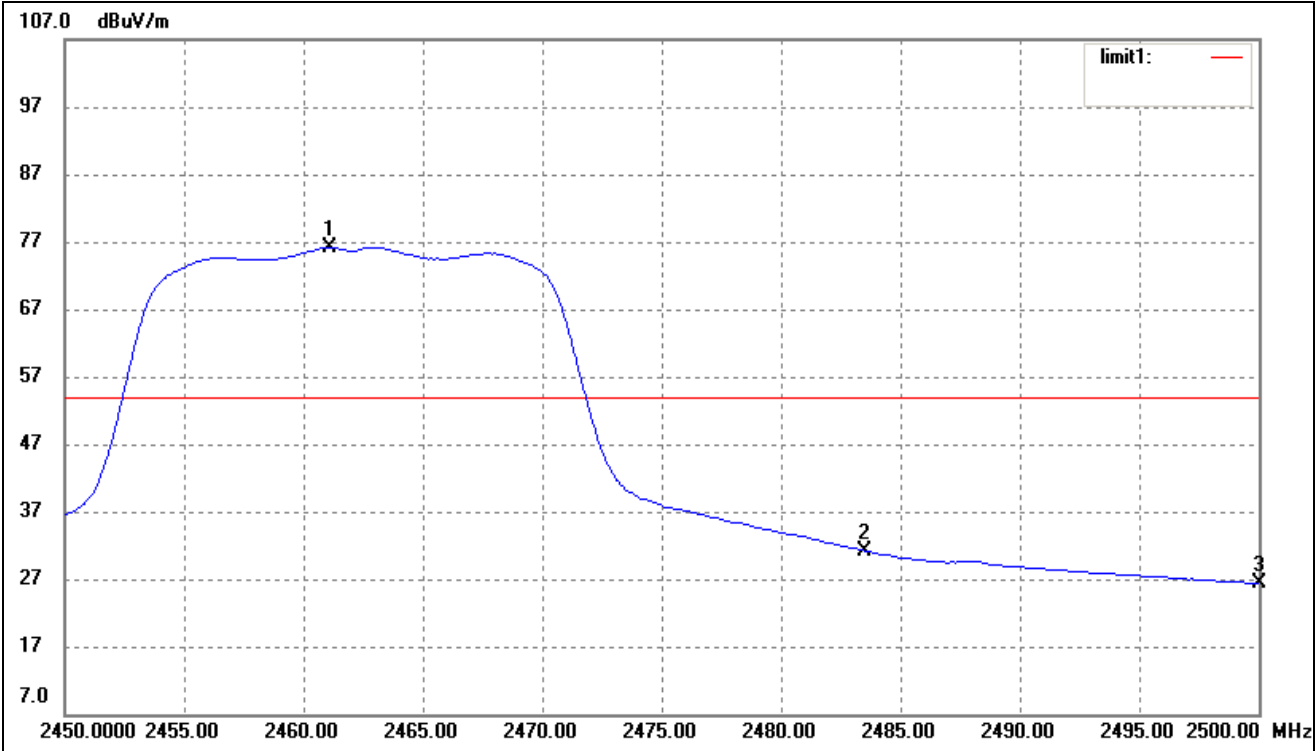
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2462.650	96.08	-11.78	84.30	/	/	Average Detector
	2460.940	101.27	-11.77	89.50	/	/	Peak Detector
1	2483.500	Delta = 47.3 dBc		37.00	54.00	-17.00	Average Detector
	2483.500			42.20	74.00	-31.80	Peak Detector
2	2500.000	38.80	-11.78	27.02	54.00	-26.98	Average Detector
	2500.000	52.01	-11.78	40.23	74.00	-33.77	Peak Detector

802.11g-Lowest Bandedge



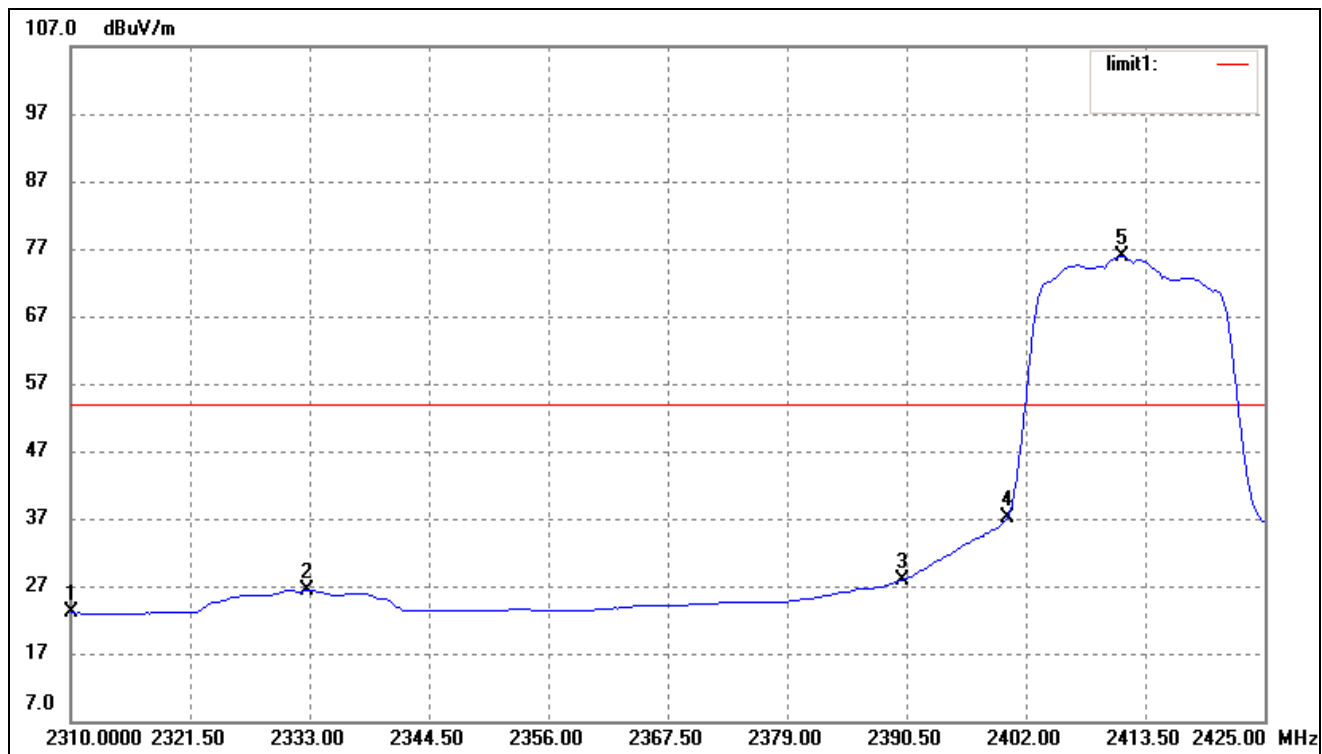
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.78	-11.72	23.06	54.00	-30.94	Average Detector
	2310.000	48.82	-11.72	37.10	74.00	-36.90	Peak Detector
2	2330.930	38.27	-11.72	26.55	54.00	-27.45	Average Detector
3	2390.000	39.21	-11.75	27.46	54.00	-26.54	Average Detector
	2390.000	62.89	-11.75	51.14	74.00	-22.86	Peak Detector
4	2400.000	48.27	-11.75	36.52	Delta = 39.51 dBc		Average Detector
5	2411.200	87.78	-11.75	76.03			Average Detector

802.11g-Highest Bandedge



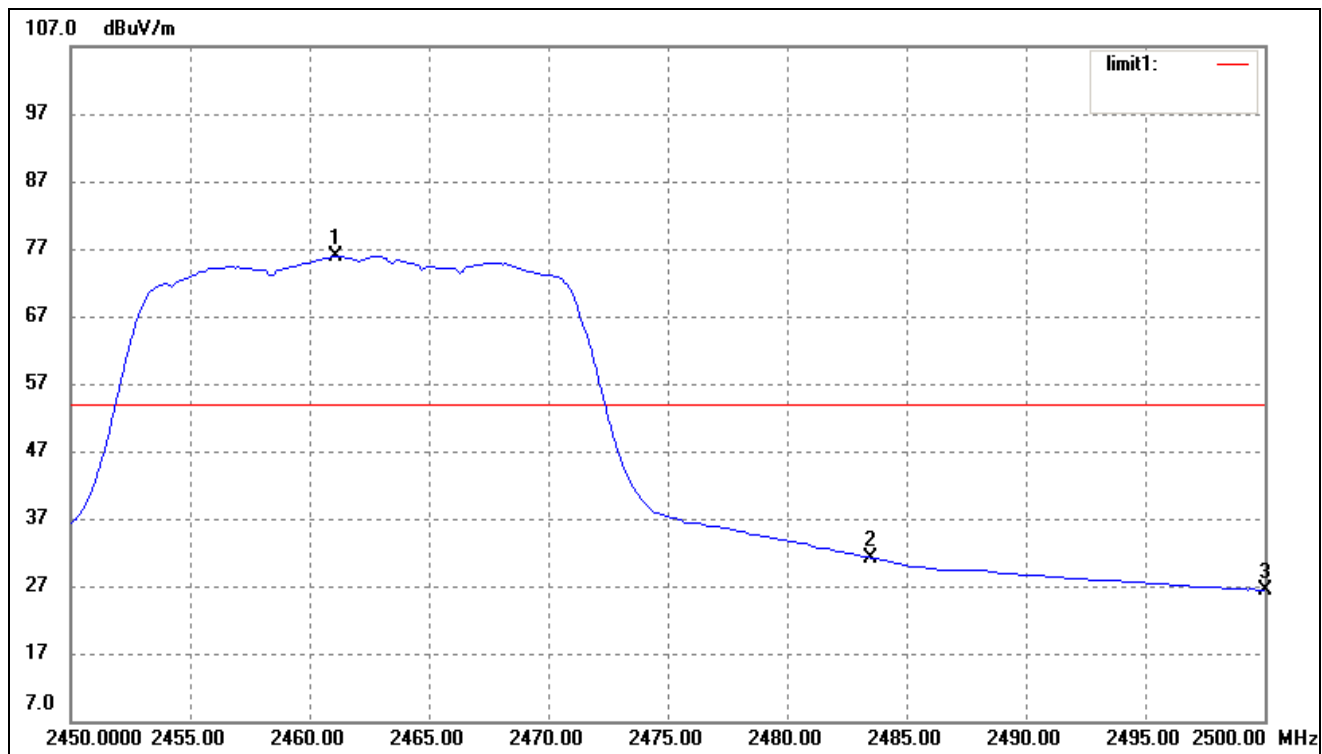
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.100	88.01	-11.77	76.24	/	/	Average Detector
	2461.800	102.69	-11.77	90.92	/	/	Peak Detector
1	2483.500	Delta = 45.01 dBc		31.23	54.00	-22.77	Average Detector
	2483.500			50.56	74.00	-23.44	Peak Detector
2	2500.000	38.19	-11.78	26.41	54.00	-27.59	Average Detector
	2500.000	52.46	-11.78	40.68	74.00	-33.32	Peak Detector

802.11n-HT20-Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.75	-11.72	23.03	54.00	-30.97	Average Detector
	2310.000	47.93	-11.72	36.21	74.00	-37.79	Peak Detector
2	2332.770	38.12	-11.73	26.39	54.00	-27.61	Average Detector
3	2390.000	39.70	-11.75	27.95	54.00	-26.05	Average Detector
	2390.000	56.25	-11.75	44.50	74.00	-29.50	Peak Detector
4	2400.000	48.99	-11.75	37.24	Delta = 38.7 dBc		Average Detector
5	2411.200	87.69	-11.75	75.94			Average Detector

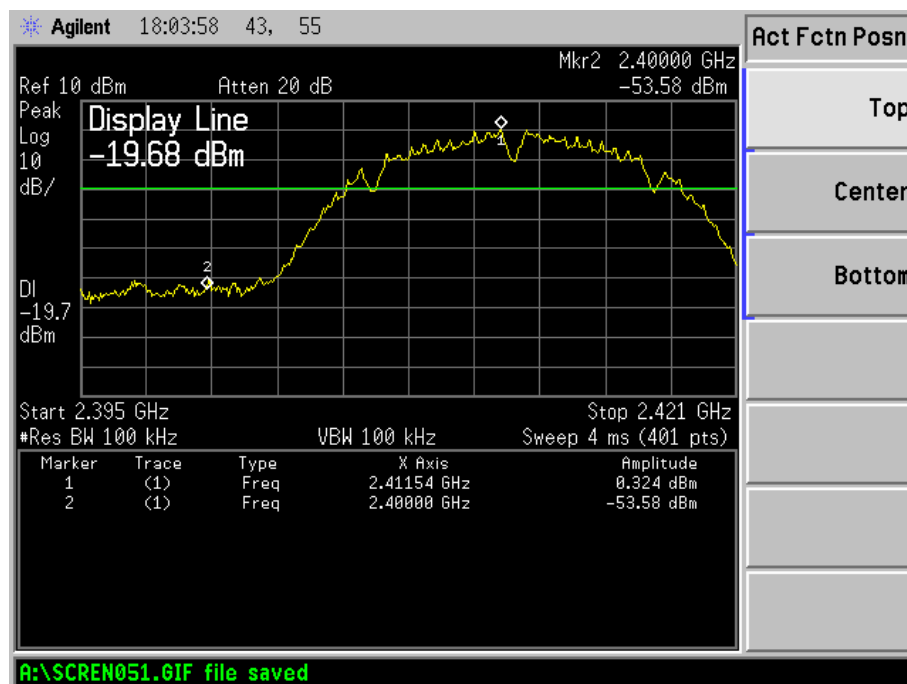
802.11n-HT20-Highest Bandedge



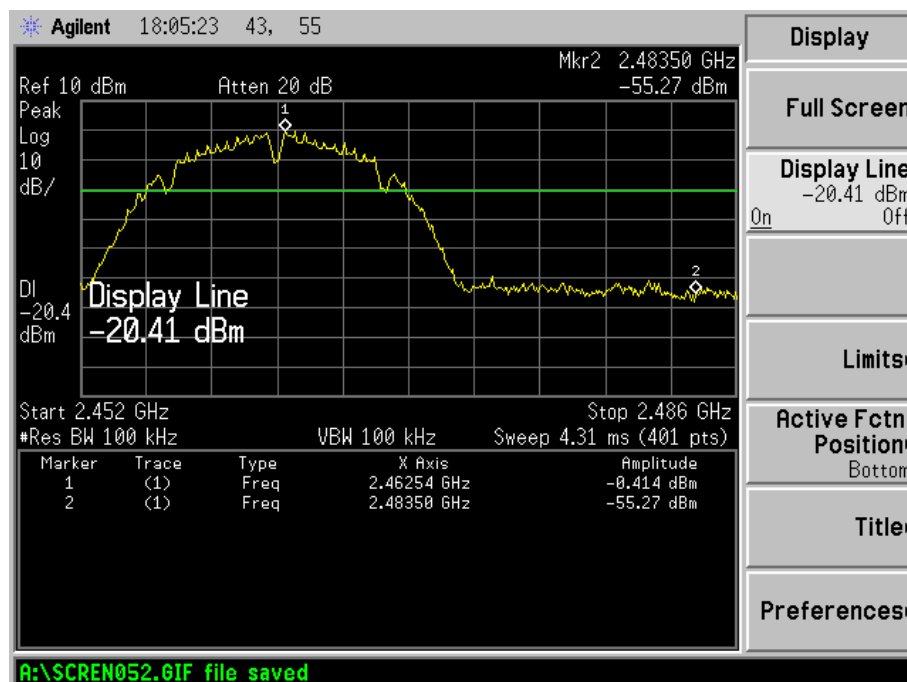
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.100	87.65	-11.77	75.88	/	/	Average Detector
	2462.000	102.16	-11.77	90.39	/	/	Peak Detector
1	2483.500	Delta = 38.62 dBc		37.26	54.00	-16.74	Average Detector
	2483.500			51.77	74.00	-22.23	Peak Detector
2	2500.000	38.26	-11.78	26.48	54.00	-27.52	Average Detector
	2500.000	52.14	-11.78	40.36	74.00	-33.64	Peak Detector

Bandedge (Conducted)

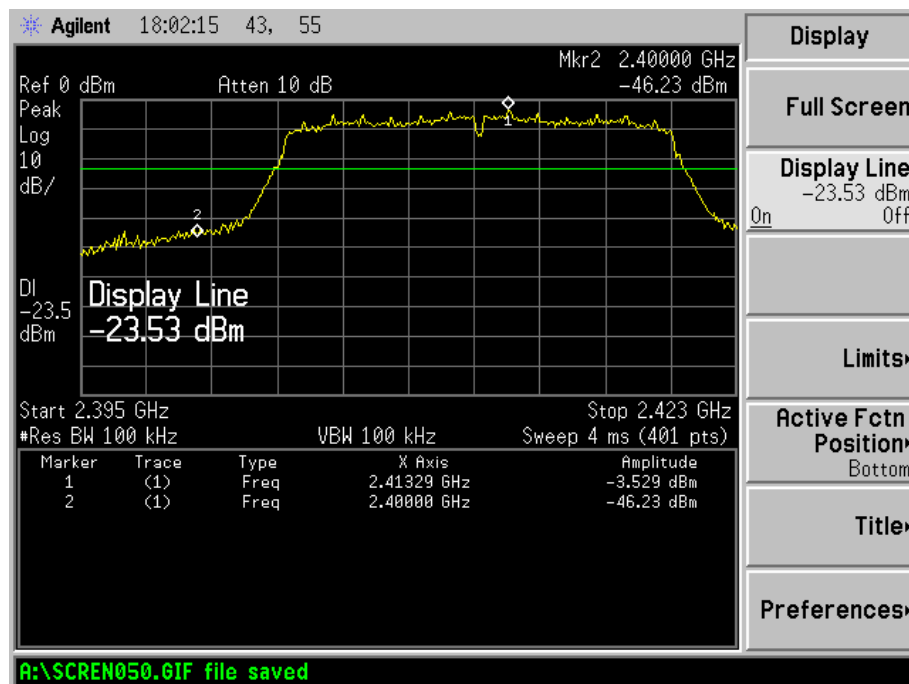
802.11b-Lowest Bandedge



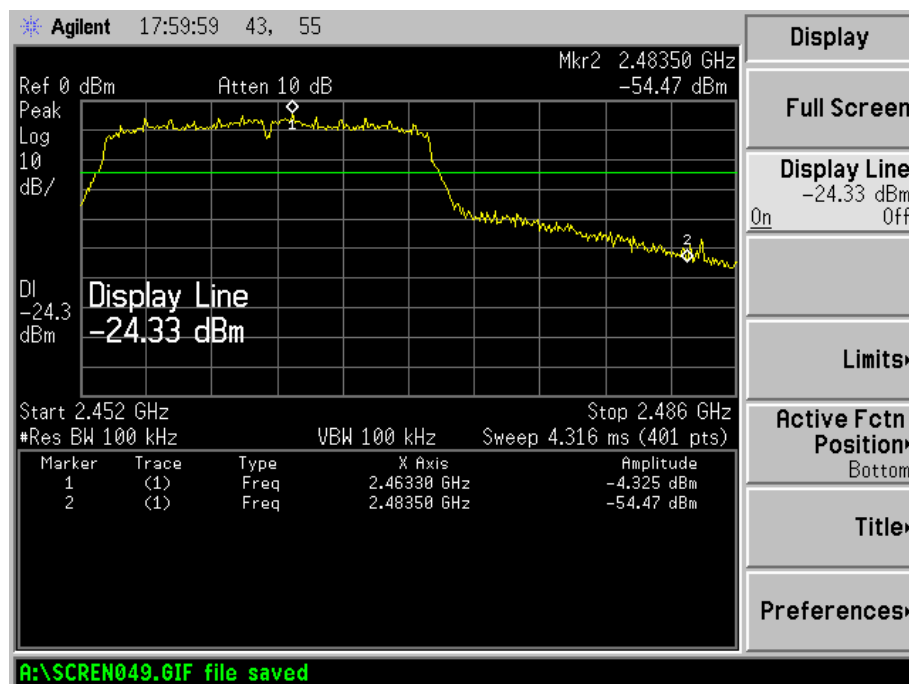
802.11b-Highest Bandedge



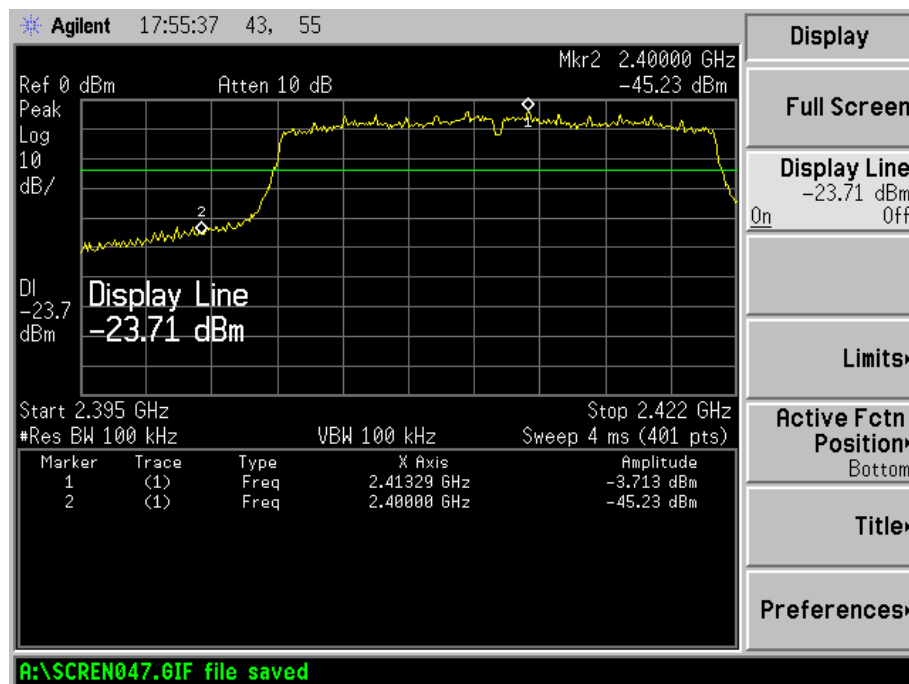
802.11g-Lowest Bandedge



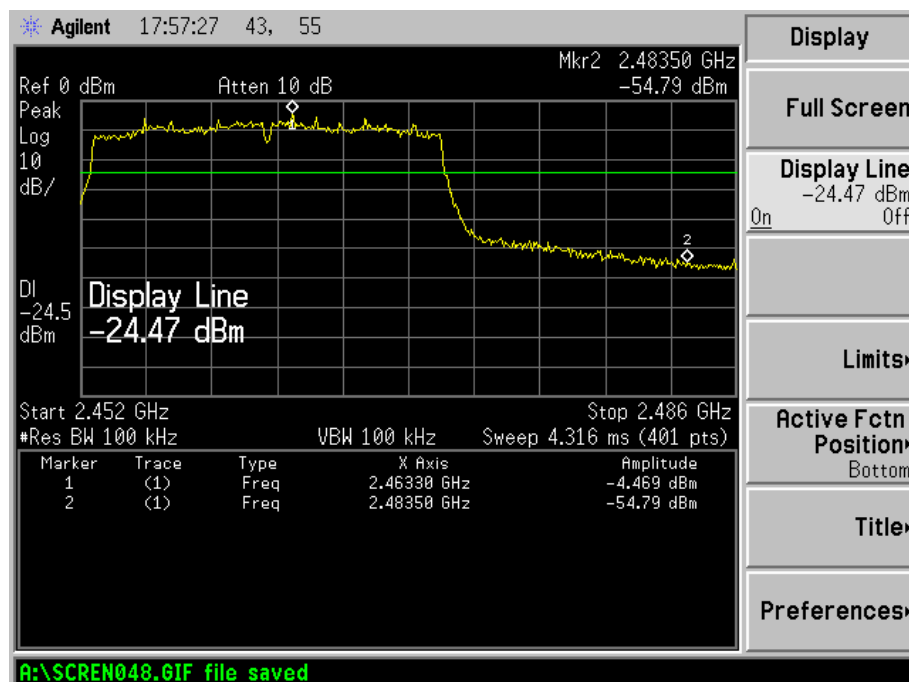
802.11g-Highest Bandedge

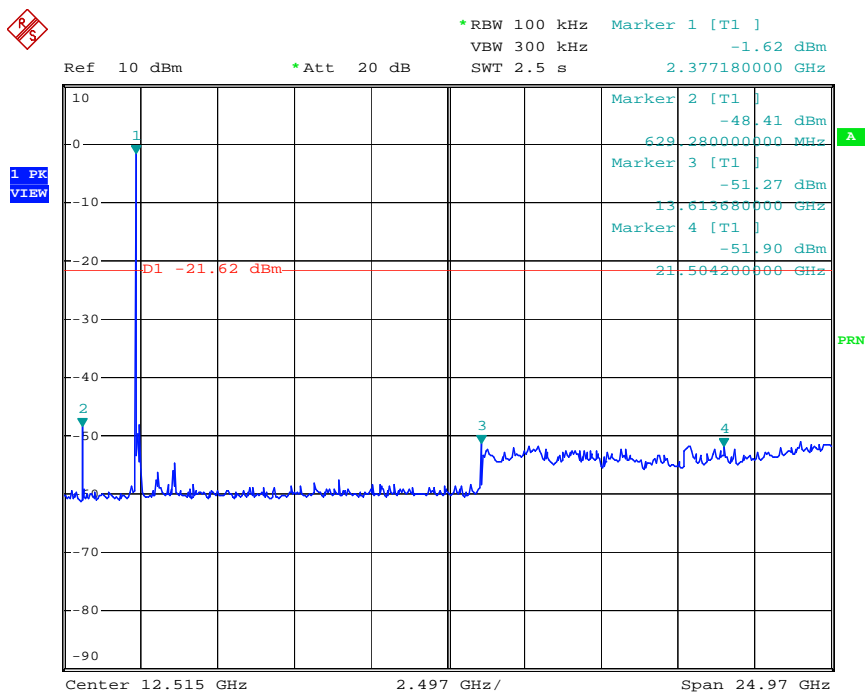


802.11n-HT20-Lowest Bandedge

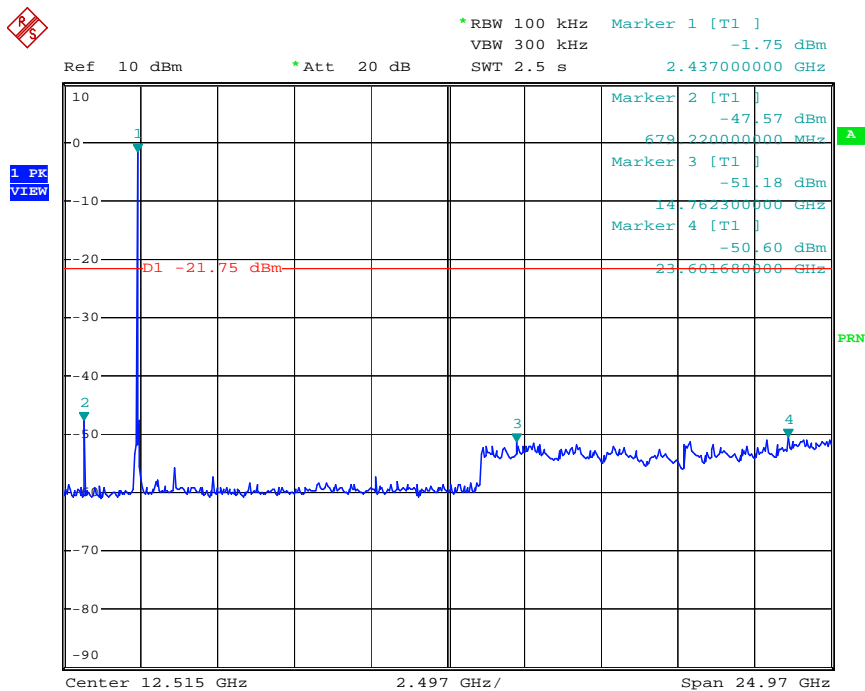


802.11n-HT20-Highest Bandedge



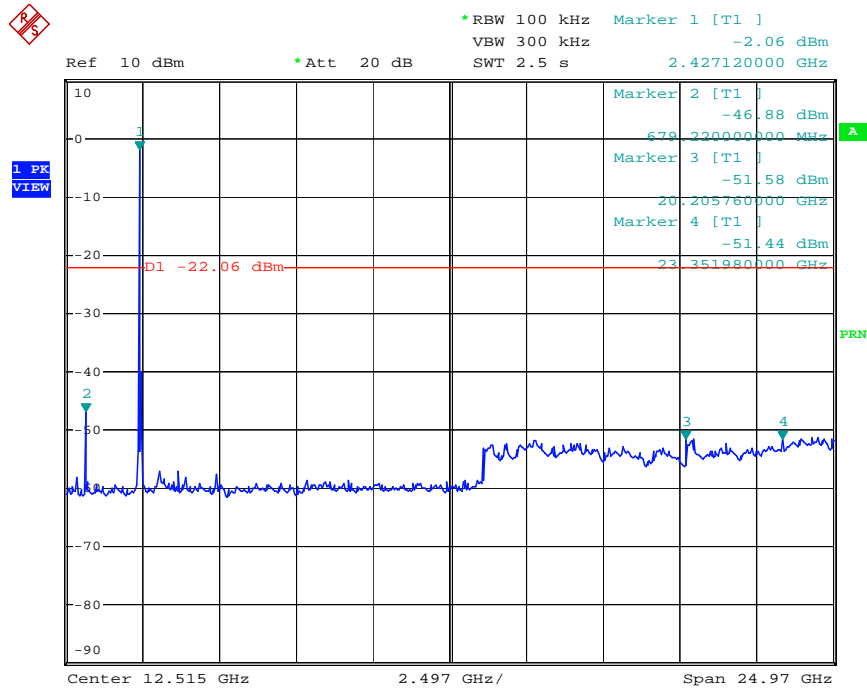
Conducted Spurious Emissions**802.11b Low Bandedge**

Date: 22.MAR.2013 17:10:40

802.11b Middle Bandedge

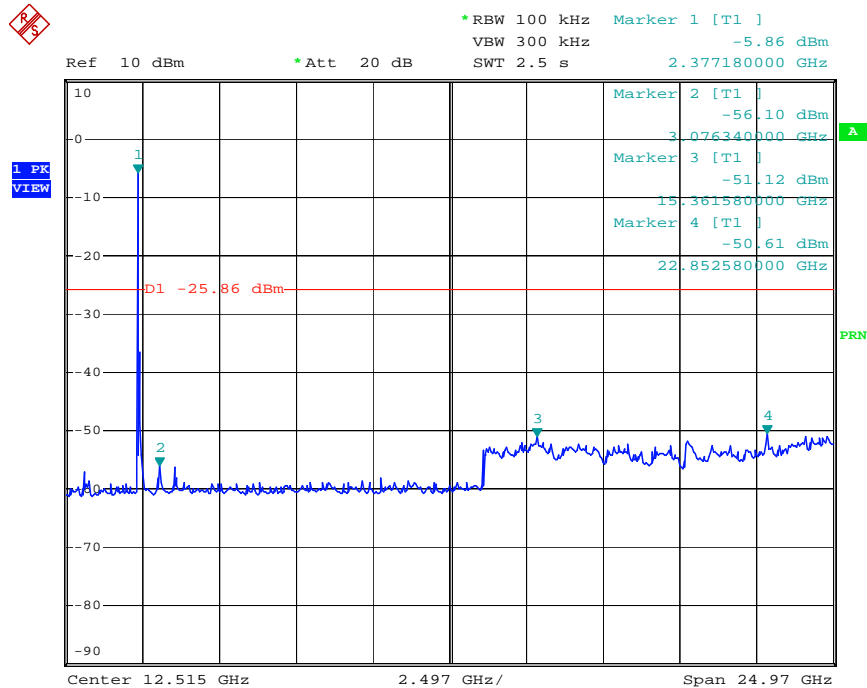
Date: 22.MAR.2013 17:13:19

802.11b High Bandedge



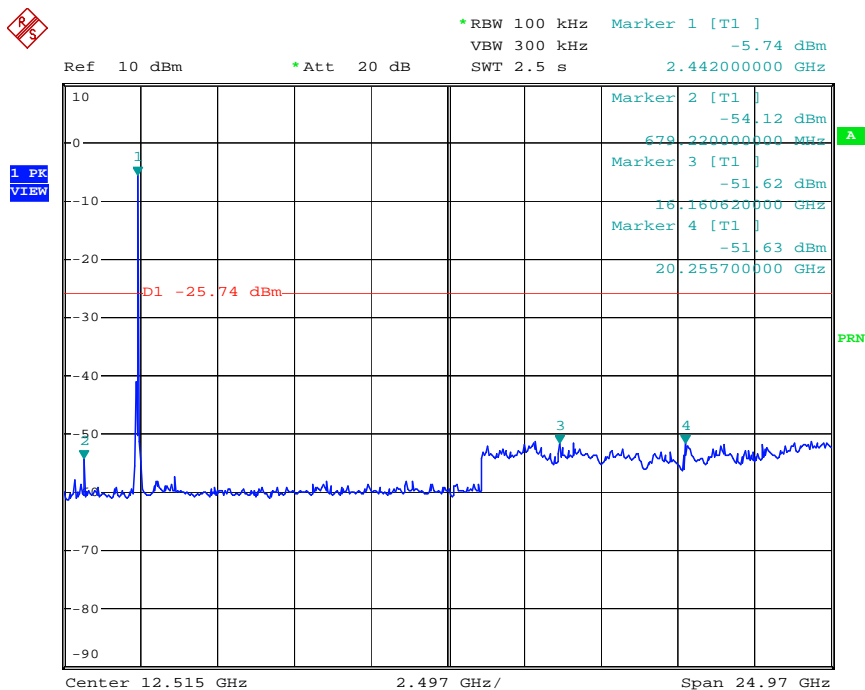
Date: 22.MAR.2013 17:17:17

802.11g Low Bandedge

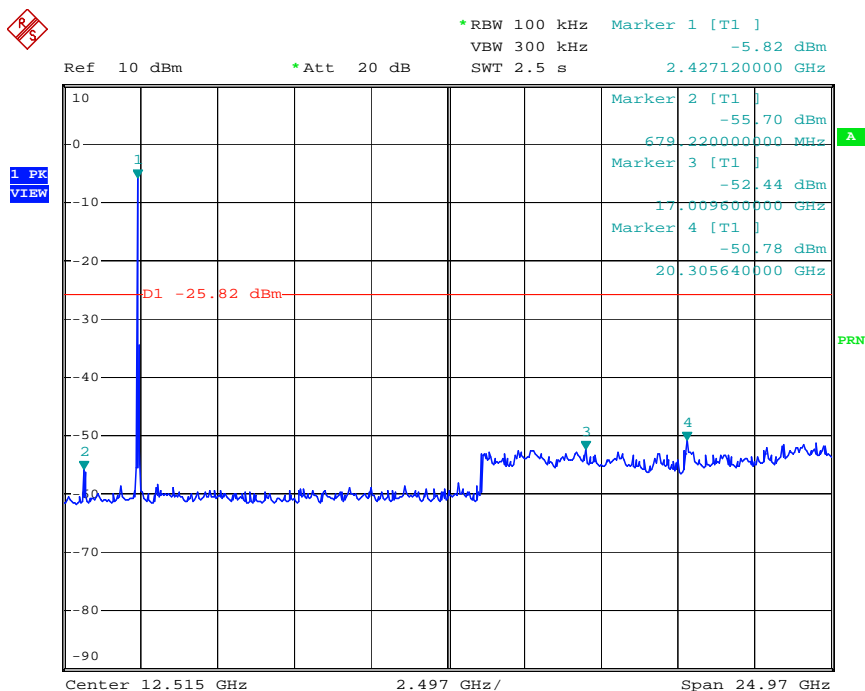


Date: 22.MAR.2013 17:22:36

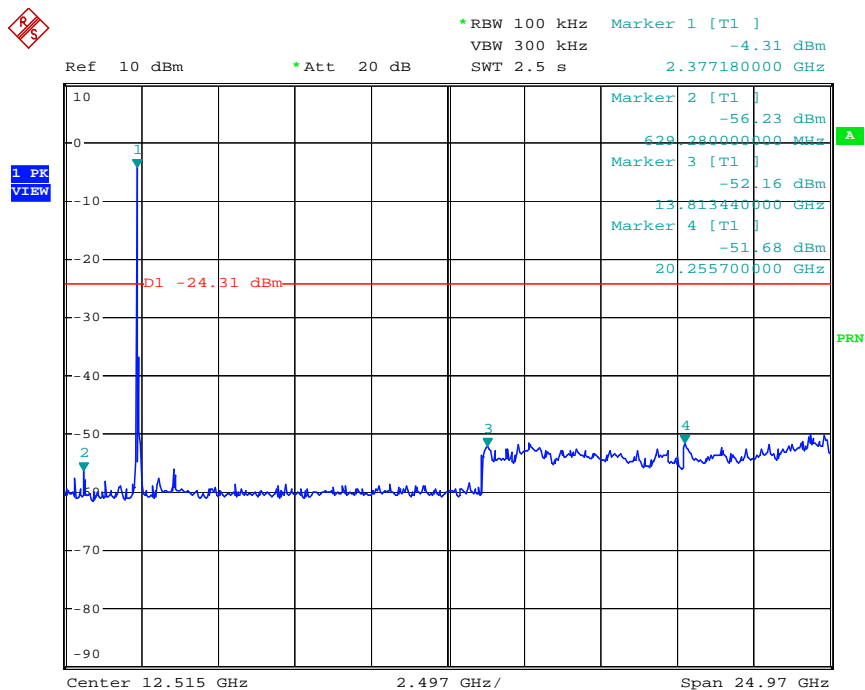
802.11g Middle Bandedge



802.11g High Bandedge

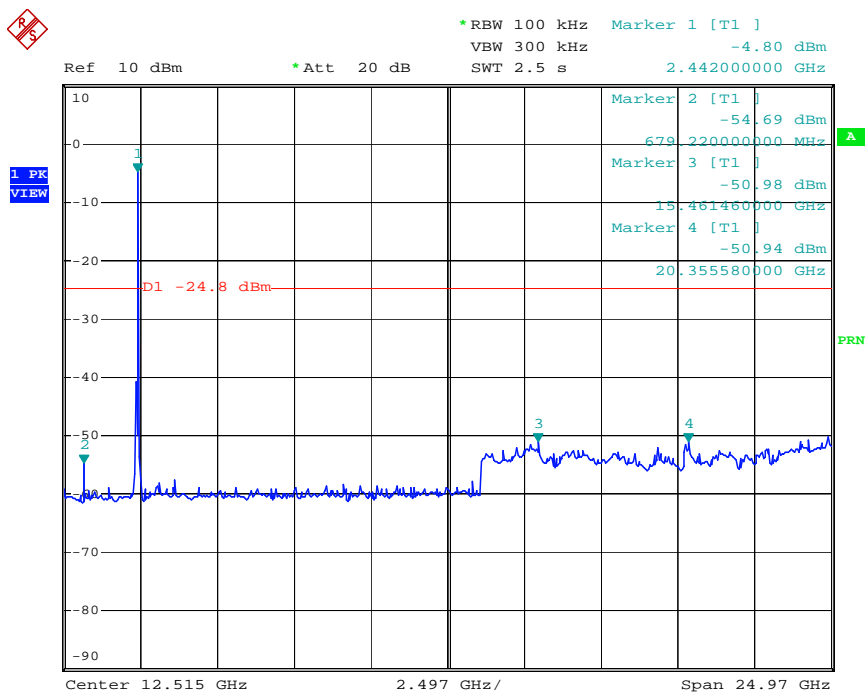


802.11n-HT20 Low Bandedge



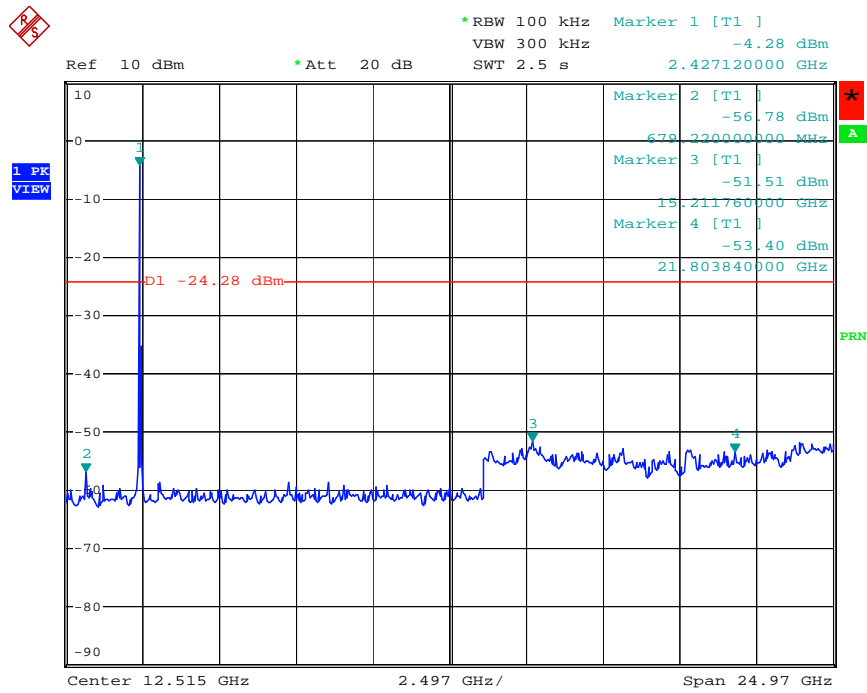
Date: 22.MAR.2013 17:27:54

802.11n-HT20 Middle Bandedge



Date: 22.MAR.2013 17:29:26

802.11n-HT20 High Bandedge



Date: 22.MAR.2013 17:31:35

10. Conducted Emissions

10.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

10.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2012-03-28	2013-03-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2012-03-28	2013-03-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2012-03-28	2013-03-27

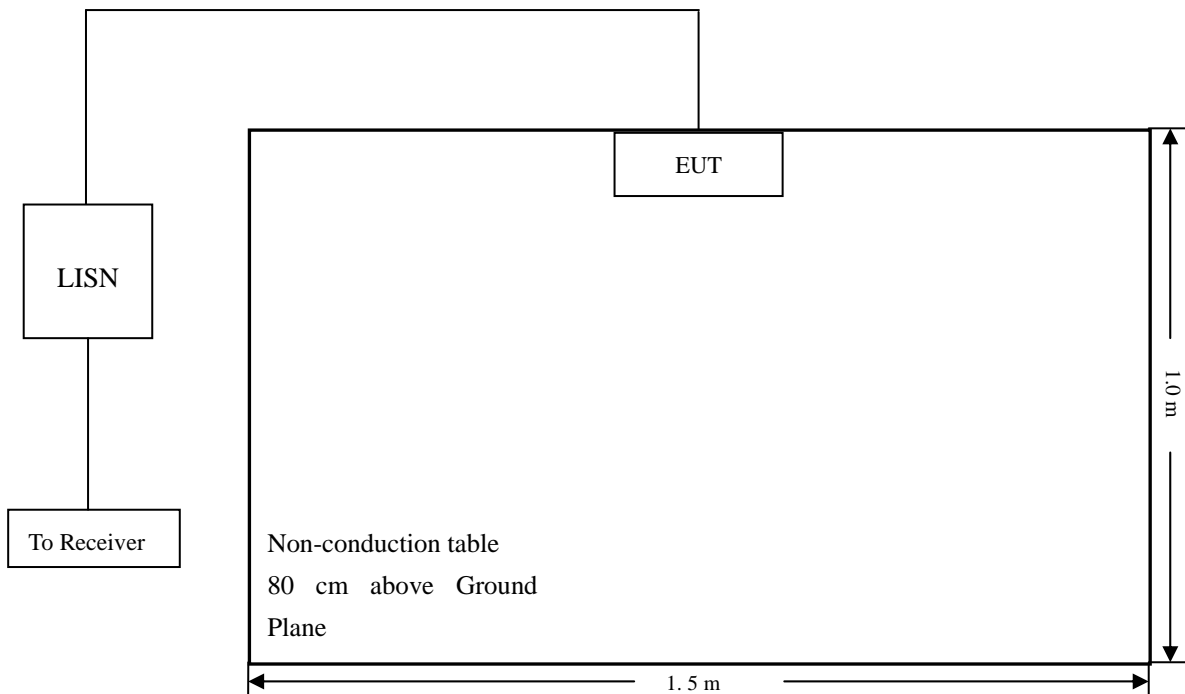
10.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

10.4 Basic Test Setup Block Diagram



10.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

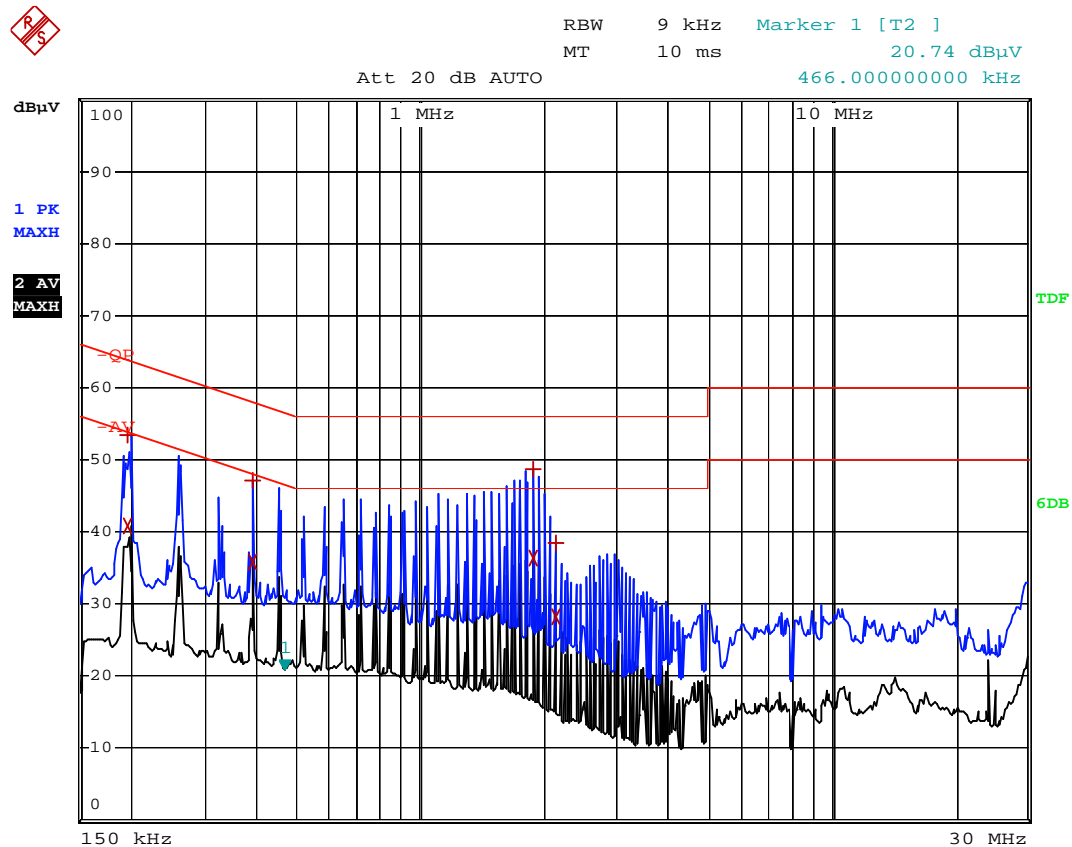
Start Frequency 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth 9 kHz
Quasi-Peak Adapter Mode Normal

10.7 Summary of Test Results/Plots

According to the data in section 11.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

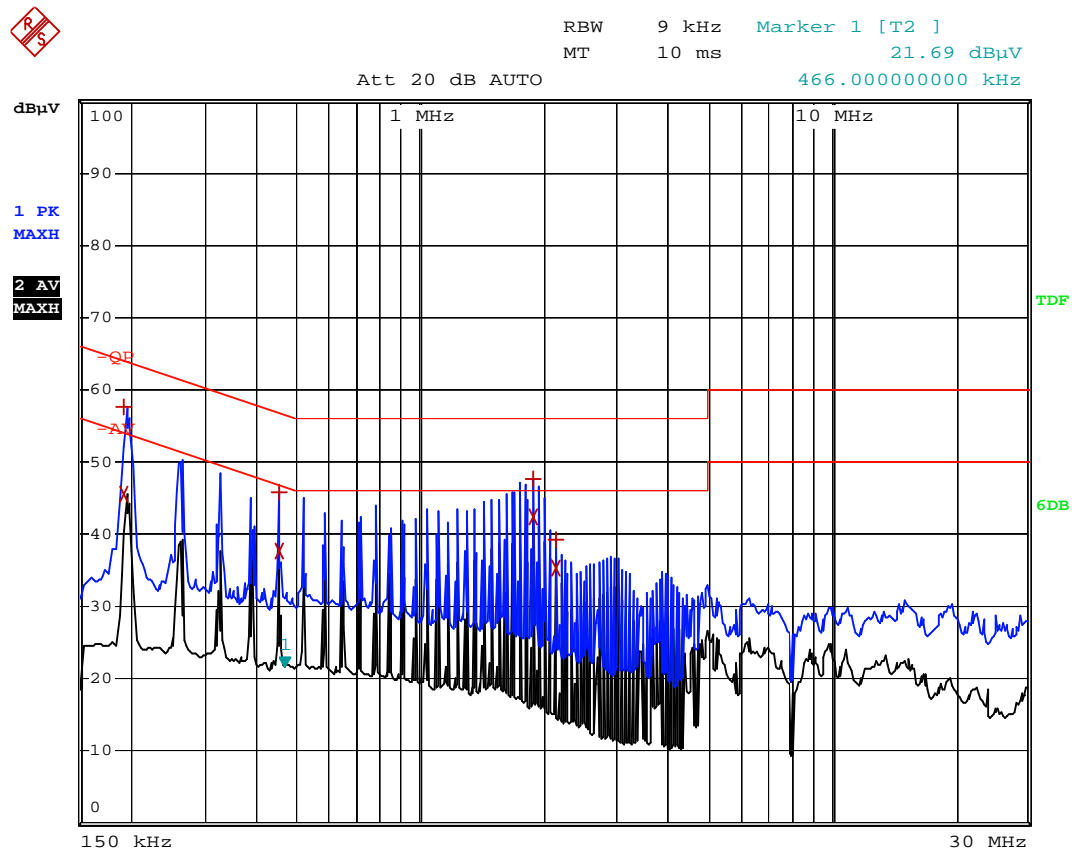
-3.56 dB at 1.878 MHz in the Line mode, Ave detector, 0.15-30MHz

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data*EUT: MID**Tested Model: S843D**Operating Condition: Transmitting**Comment:**Test Specification: Neutral*

EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	198 kHz	53.36	-10.32
2 Average	198 kHz	40.85	-12.83
1 Max Peak	390 kHz	47.23	-10.83
2 Average	390 kHz	35.78	-12.27
1 Max Peak	1.882 MHz	48.58	-7.41
2 Average	1.882 MHz	36.28	-9.71
1 Max Peak	2.138 MHz	38.47	-17.52
2 Average	2.138 MHz	28.14	-17.85

Test Specification: Line



EDIT PEAK LIST (Prescan Results)				
Trace1:	-QP			
Trace2:	-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB	
1 Max Peak	194 kHz	57.65	-6.20	
2 Average	194 kHz	45.66	-8.19	
1 Max Peak	454 kHz	45.81	-10.98	
2 Average	454 kHz	37.62	-9.17	
1 Max Peak	1.878 MHz	47.64	-8.35	
2 Average	1.878 MHz	42.43	-3.56	
1 Max Peak	2.138 MHz	39.26	-16.73	
2 Average	2.138 MHz	35.37	-10.62	

***** END OF REPORT *****