

FCC Part 15C Measurement and Test Report

For

Huaheng Electronic Technology Co., Ltd.

11th Floor, Building A4, National Animation Industry Base, No. 800

Wangjiang West Road, Hefei, Anhui Province, China

FCC ID: REX00100

FCC Rules:	<u>FCC Part 15.247</u>
Product Description:	<u>Projection Tablet PC</u>
Tested Model:	<u>U7</u>
Report No.:	<u>STR12128009I-1</u>
Tested Date:	<u>2012-12-03 to 2012-12-19</u>
Issued Date:	<u>2012-12-20</u>
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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: Huaheng Electronic Technology Co., Ltd
Address of applicant: 11th Floor, Building A4, National Animation Industry Base, No.800 Wangjiang West Road, Hefei, Anhui Province, China

Manufacturer: Huaheng Electronic Technology Co., Ltd
Address of manufacturer: 11th Floor, Building A4, National Animation Industry Base, No.800 Wangjiang West Road, Hefei, Anhui Province, China

General Description of EUT	
Product Name:	Projection Tablet PC
Trade Name:	Smart Devices
Model No.:	U7
Adding Model(s):	/
Rated Voltage:	DC 3.7V Li-ion Battery
Power Adapter Model:	HSA050200B
	Input: AC 100-240V, Output: DC 5V
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11b/g/n
Frequency Range:	2412-2462MHz
RF Output Power:	11.87dBm (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:	1.0dBi
Lowest Internal Frequency of EUT:	32.768KHz
Device Category:	Portable Device

1.2 Test Standards

The following report is prepared on behalf of the Huaheng Electronic Technology Co., Ltd 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
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Power Cable	1.15	Unshielded	With Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	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

N/A: not applicable

3. Antenna Requirement

3.1 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.

3.2 Evaluation Information

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

4. Power Spectral Density

4.1 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.

4.2 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

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 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 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.

4.4 Environmental Conditions

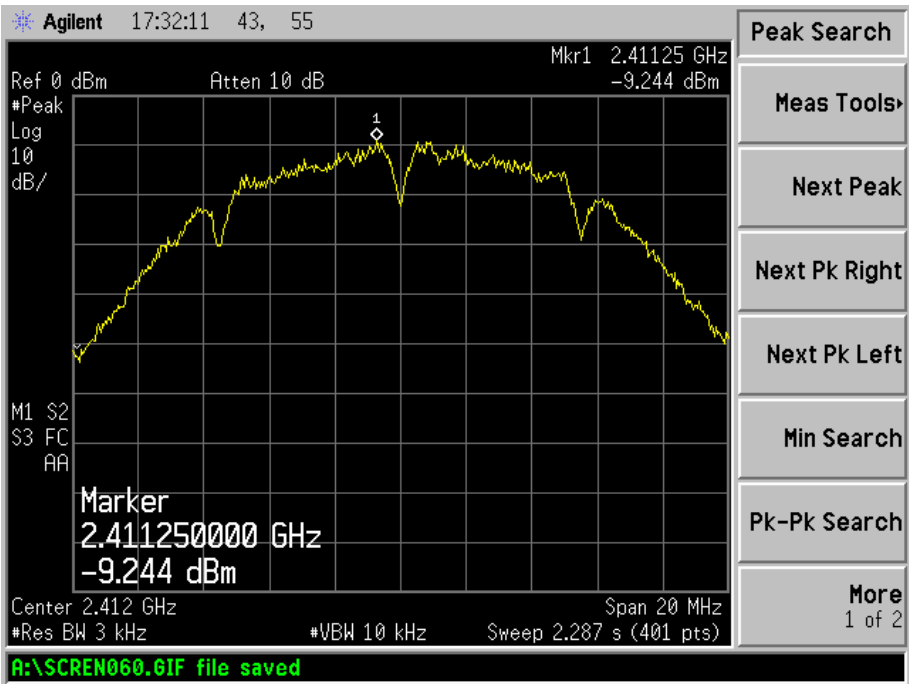
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

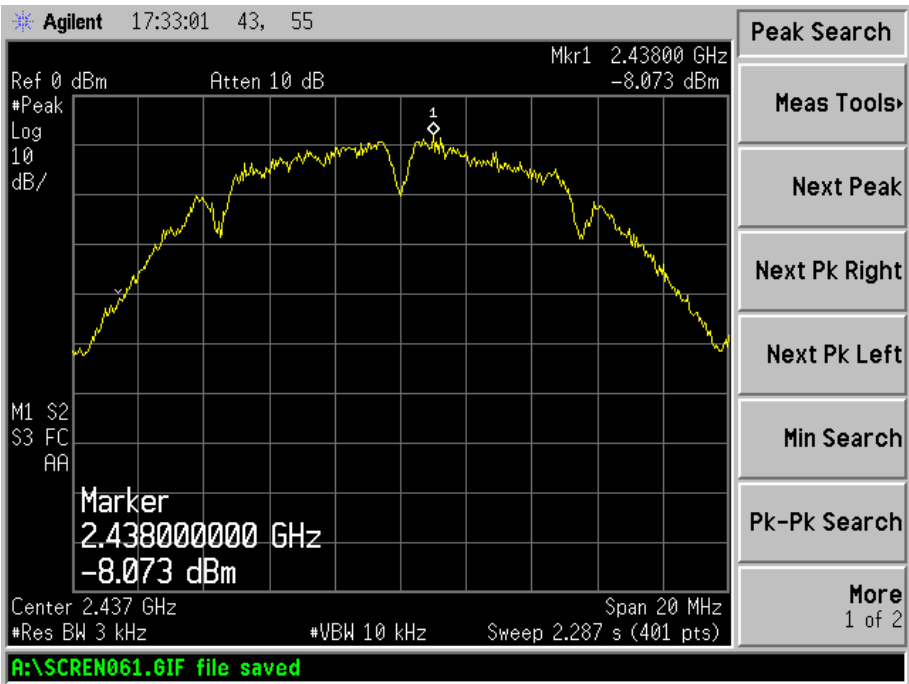
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-9.422	8
	2437	-8.073	8
	2462	-9.031	8
802.11g	2412	-11.24	8
	2437	-10.11	8
	2462	-11.11	8
802.11n-HT20	2412	-11.58	8
	2437	-10.05	8
	2462	-11.57	8

Please refer to the following test plots:

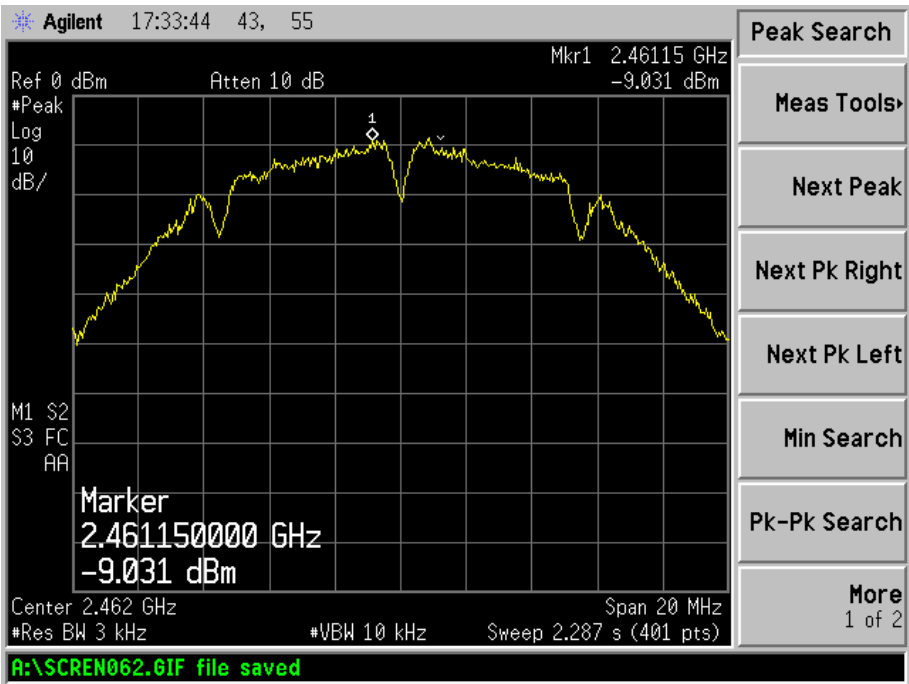
802.11b-Low Channel



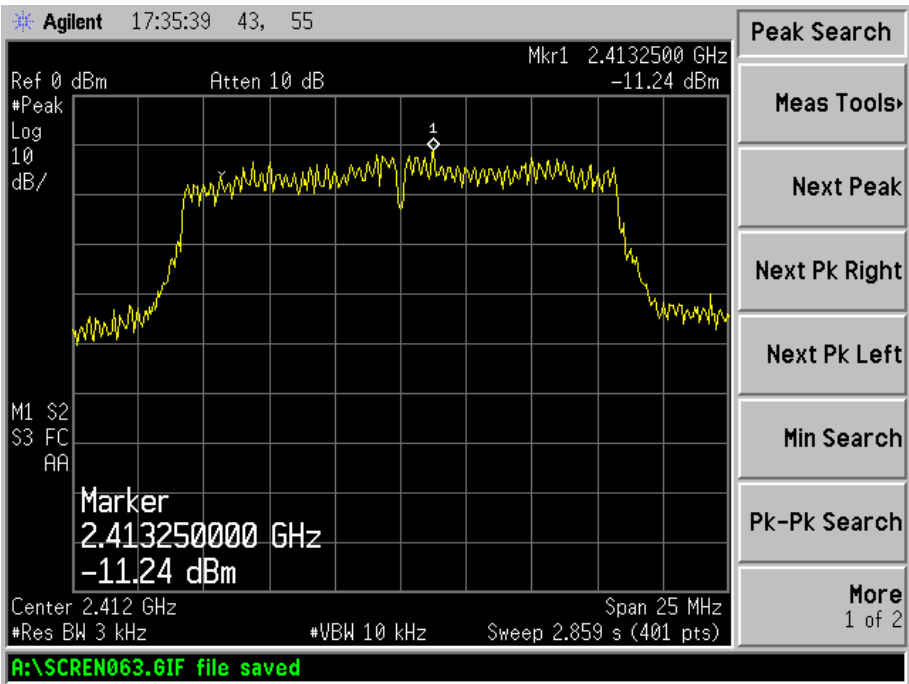
802.11b-Middle Channel



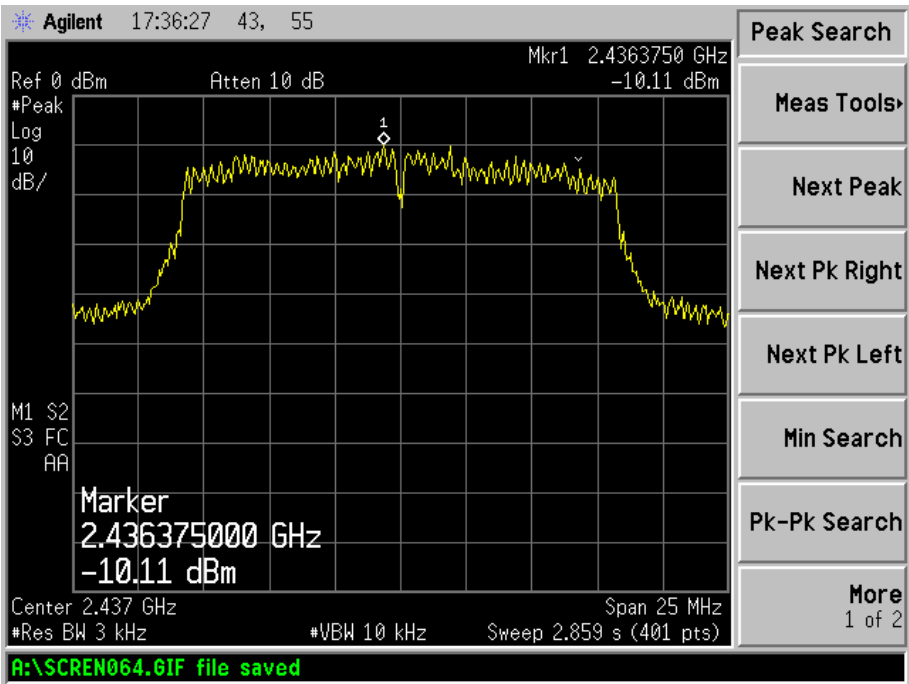
802.11b-High Channel



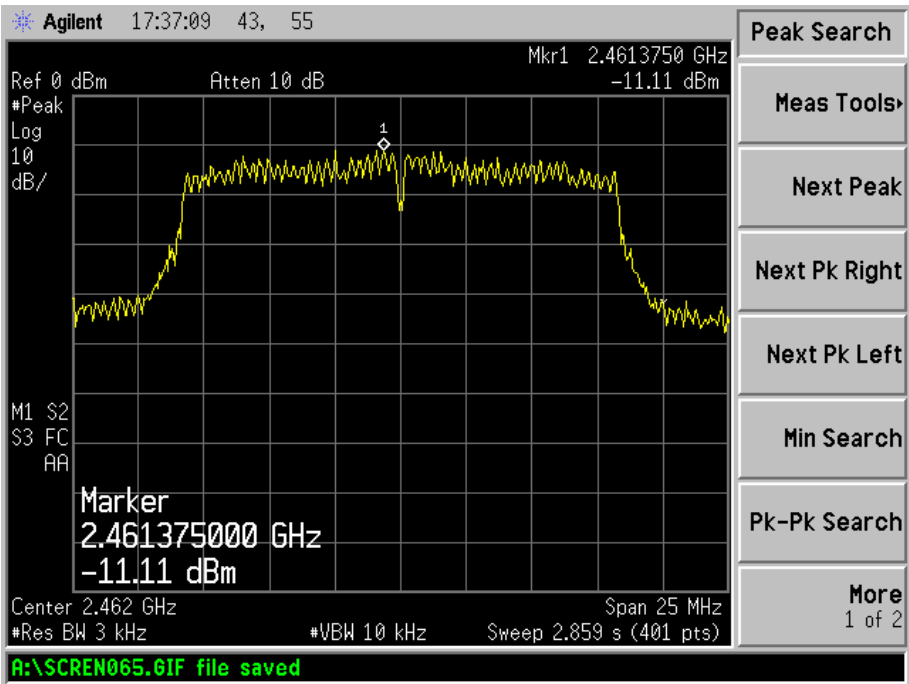
802.11g-Low Channel



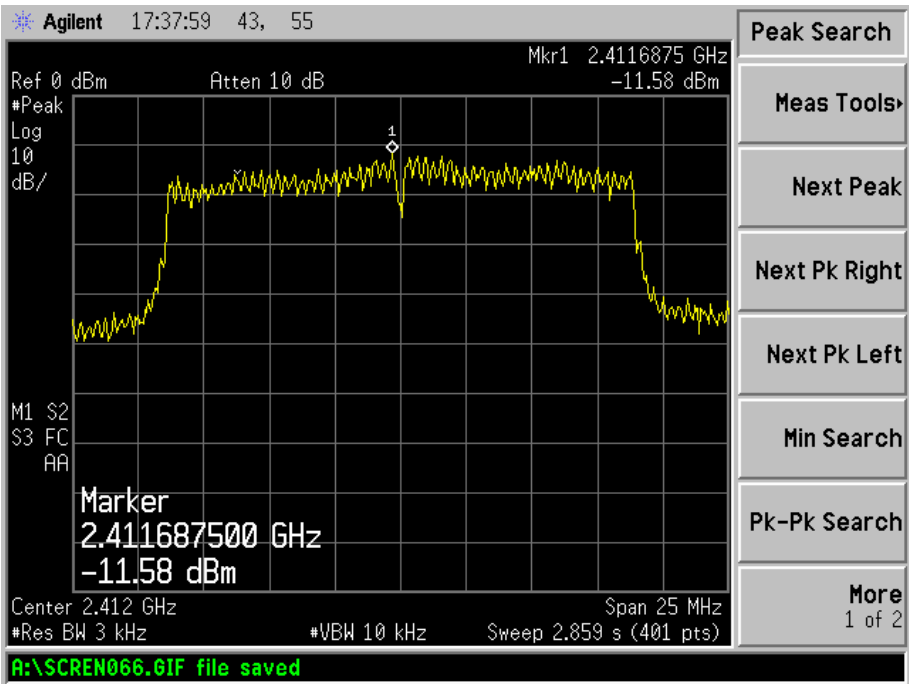
802.11g-Middle Channel



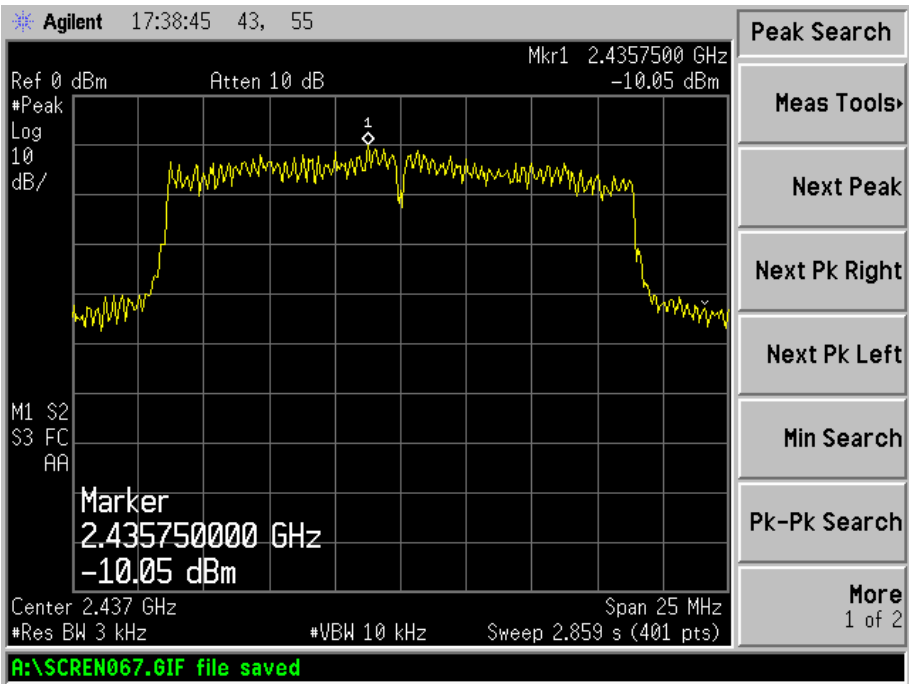
802.11g-High Channel



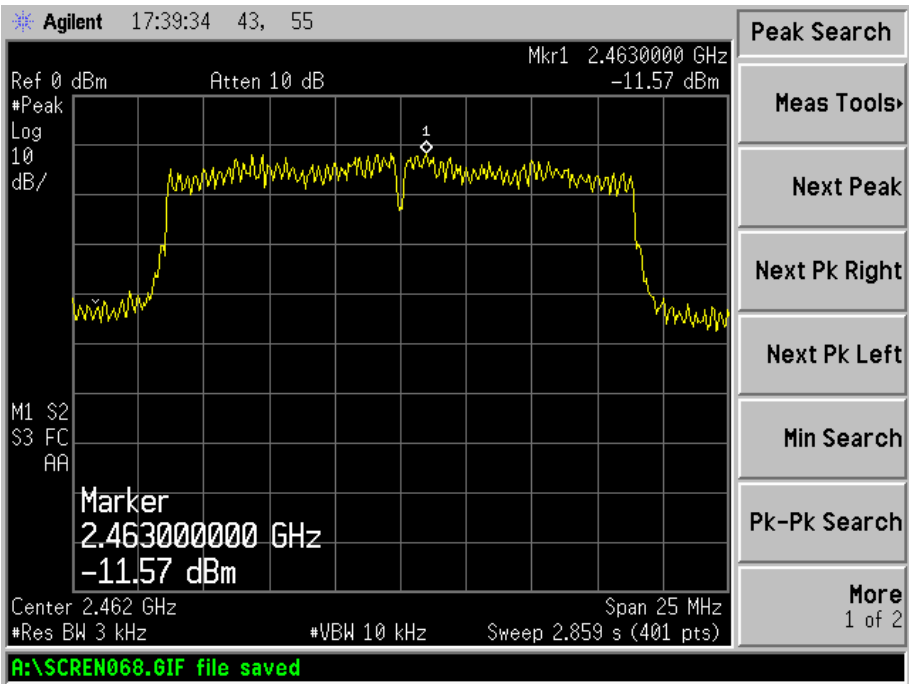
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



5. 6dB Bandwidth

5.1 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.

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

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 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..

5.4 Environmental Conditions

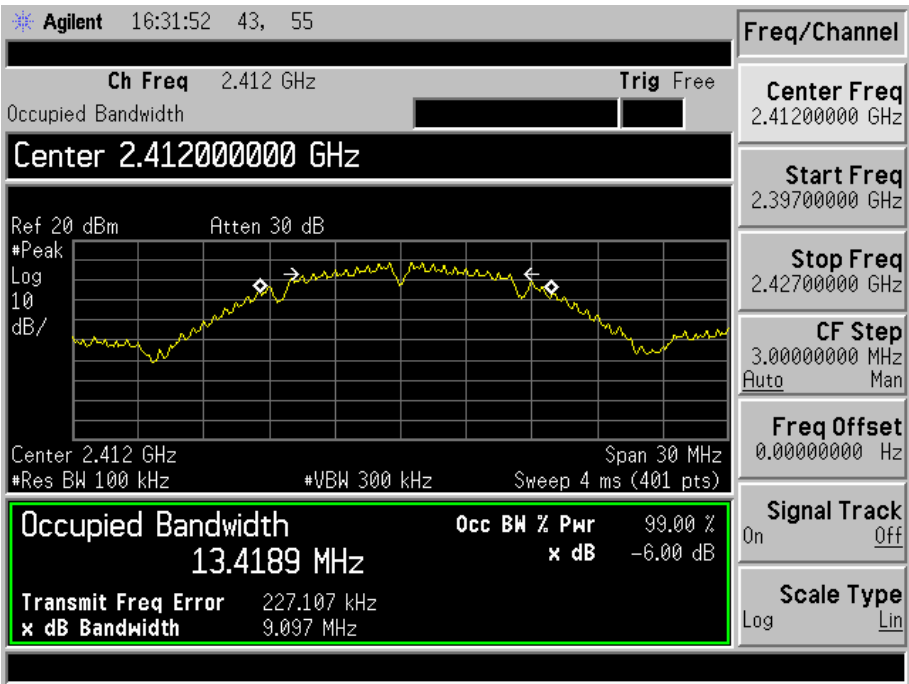
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

5.5 Summary of Test Results/Plots

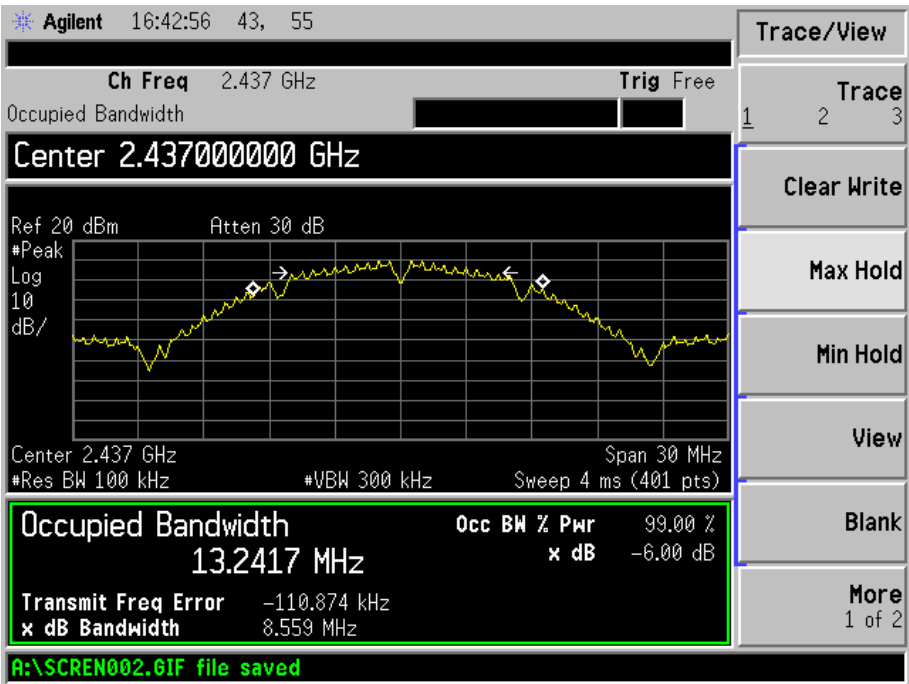
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	9097	500
	2437	8559	500
	2462	8608	500
802.11g	2422	14203	500
	2437	14870	500
	2452	14725	500
802.11n-HT20	2412	16390	500
	2437	15870	500
	2462	16893	500

Please refer to the following test plots:

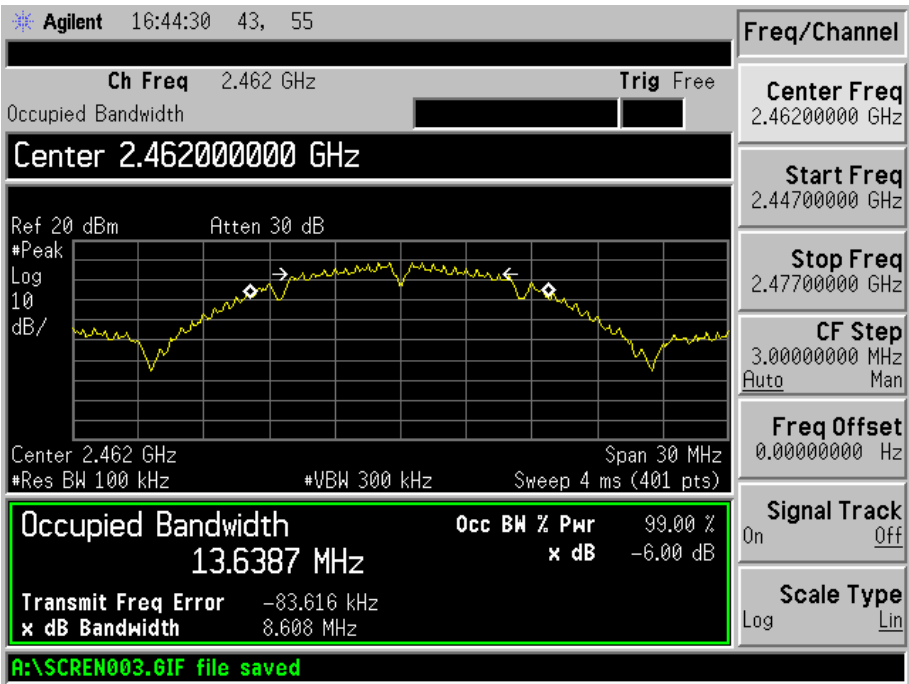
802.11b-Low Channel



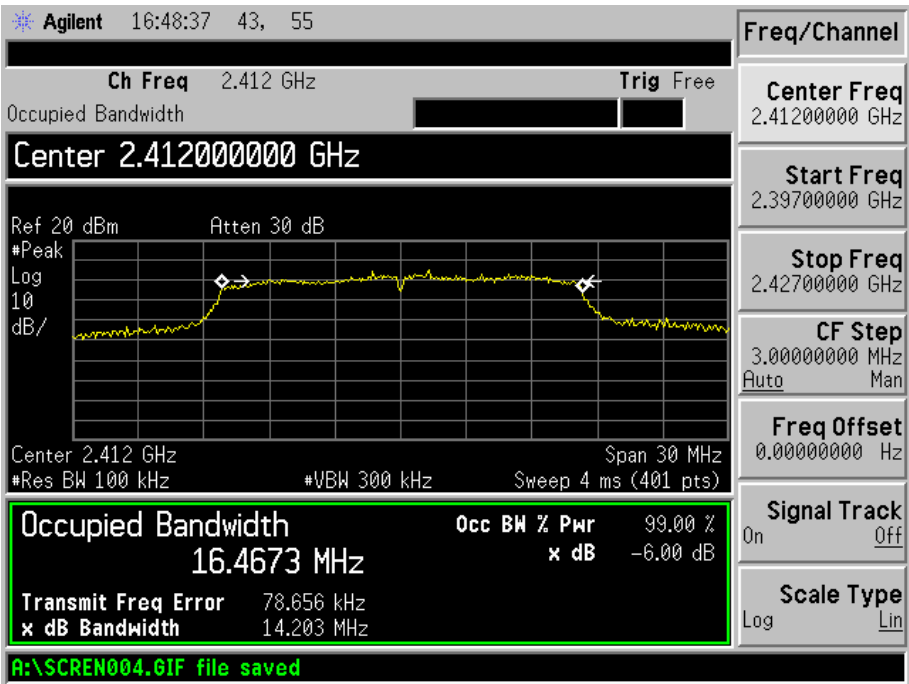
802.11b-Middle Channel



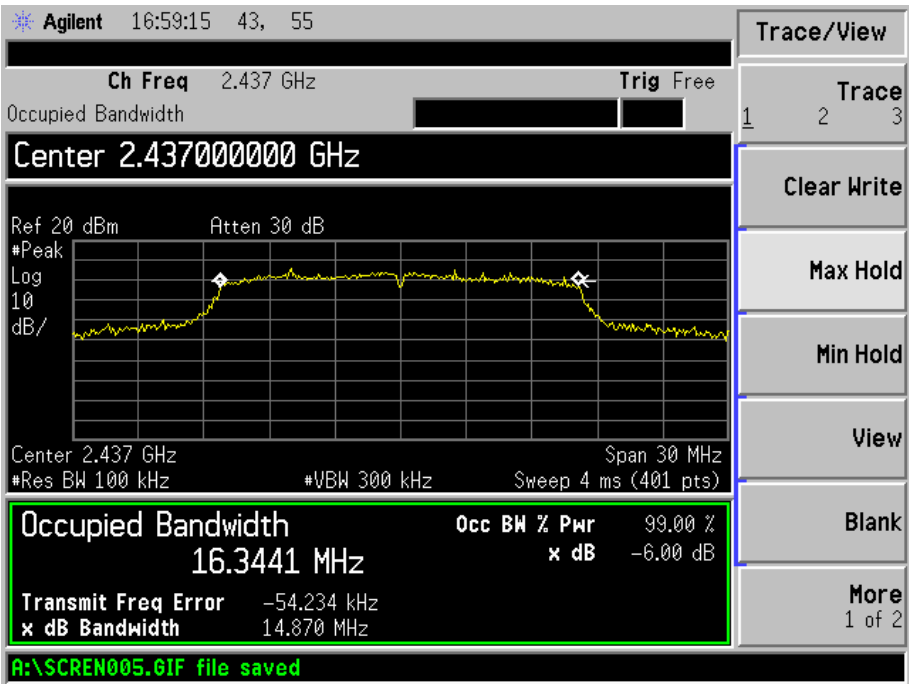
802.11b-High Channel



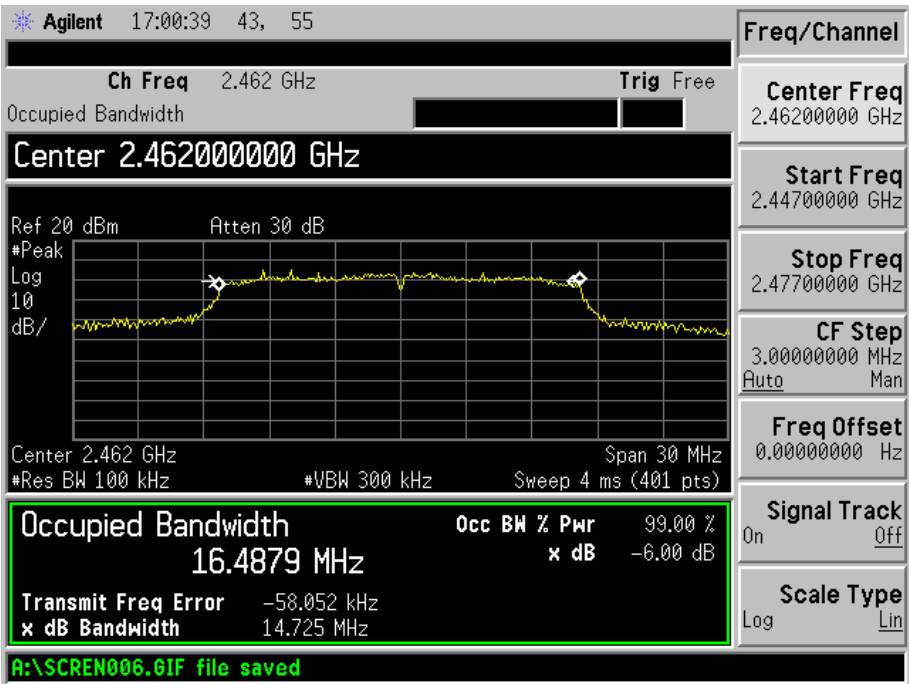
802.11g-Low Channel



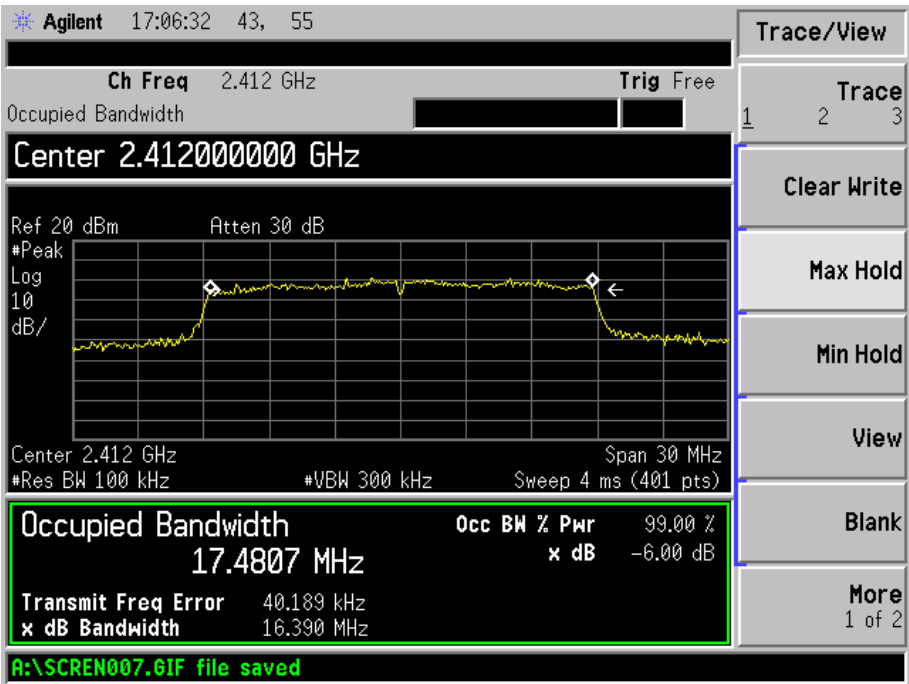
802.11g-Middle Channel



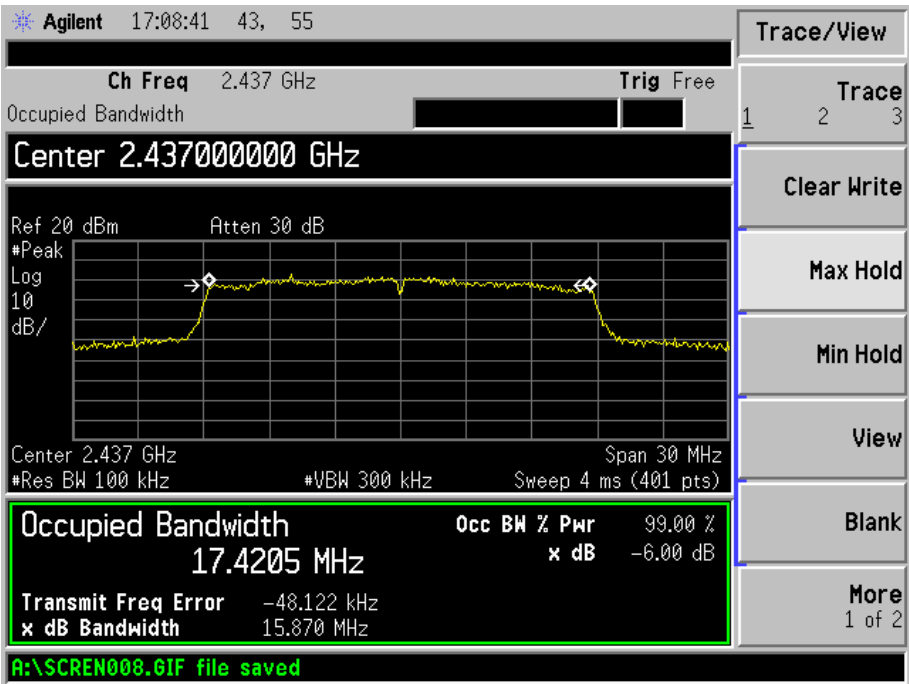
802.11g-High Channel



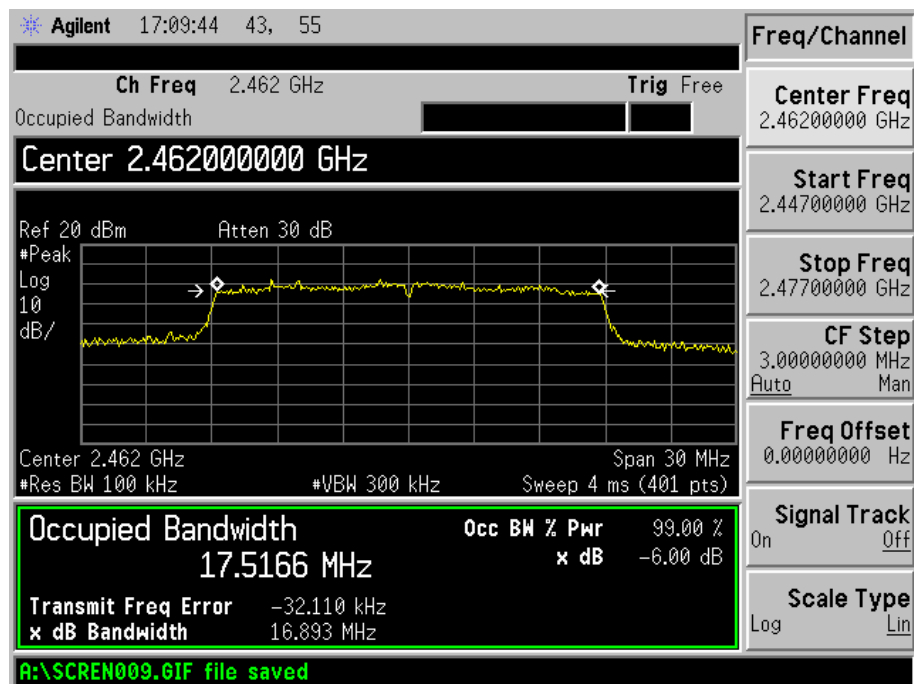
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



6. RF Output Power

6.1 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.

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

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 (2005), the method #1 of the power output option2 was used, the following is the measurement procedure.

1. Set the analyzer span to a minimum of 1.5 times the EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW $\geq$ 3 MHz.
4. Detector = power average (RMS) detector.
5. Ensure that the number of measurement points in the sweep $\geq$ 2 x span/RBW.
6. Manually set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
7. Perform the measurement over a single sweep.
8. Use the spectrum analyzer' s band power measurement function with band limits set equal to the EBW band edges.

6.4 Environmental Conditions

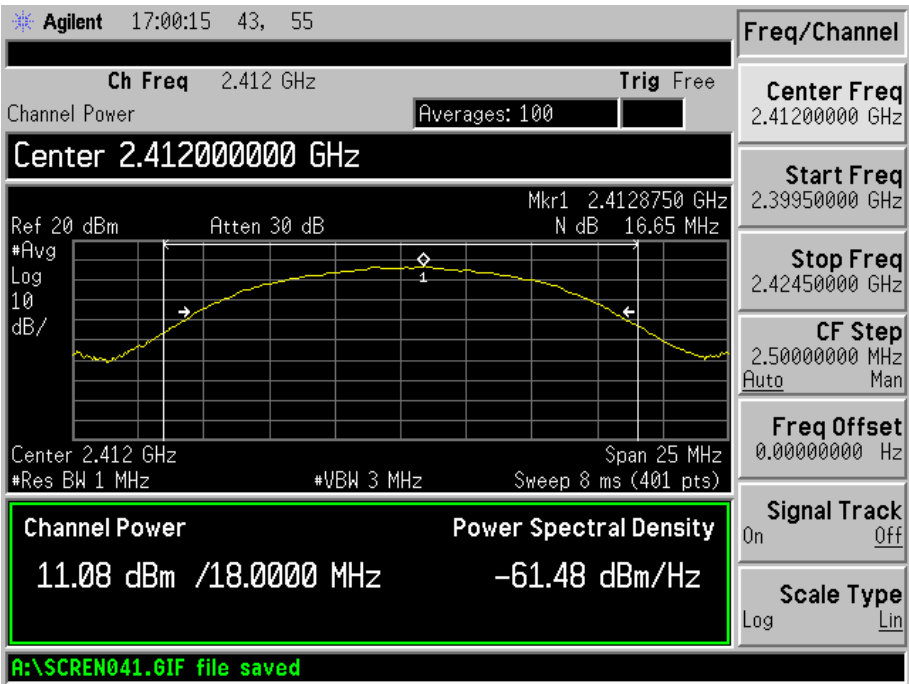
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

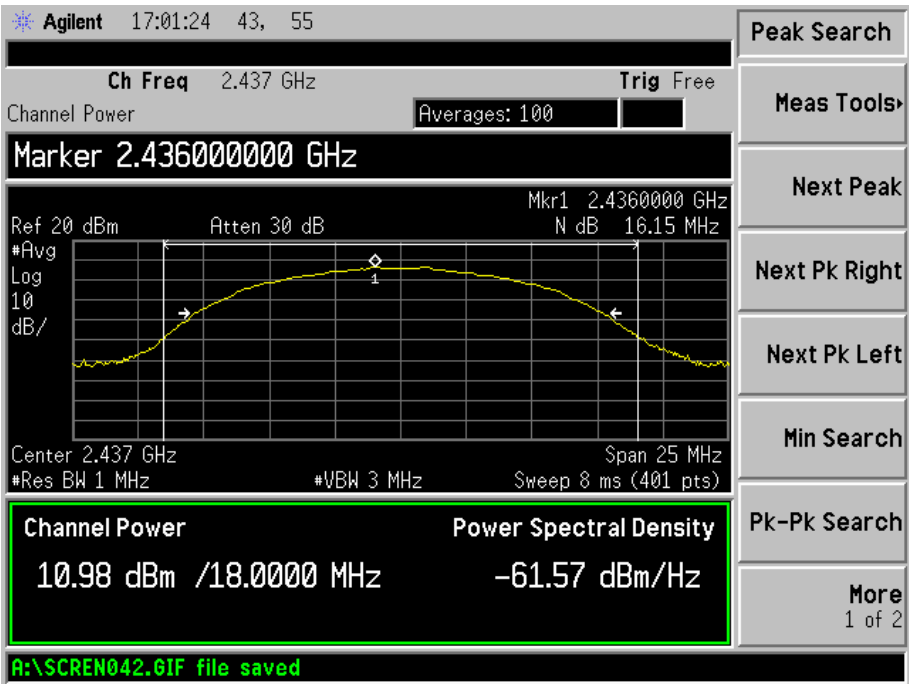
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_1Mbps	2412	11.08	12.82	1000
	2437	10.98	12.53	1000
	2462	11.87	15.38	1000
802.11b_11Mbps	2412	11.09	12.85	1000
	2437	10.70	11.75	1000
	2462	10.38	10.91	1000
802.11g_6Mbps	2412	11.21	13.21	1000
	2437	11.22	13.24	1000
	2462	10.75	11.89	1000
802.11g_54Mbps	2412	9.97	9.93	1000
	2437	9.74	9.42	1000
	2462	9.41	8.73	1000
802.11n HT20_MCS0	2412	9.91	9.79	1000
	2437	10.86	12.19	1000
	2462	10.42	11.02	1000
802.11n HT20_MCS7	2412	8.52	7.11	1000
	2437	9.57	9.06	1000
	2462	9.36	8.63	1000

Please refer to the following test plots:

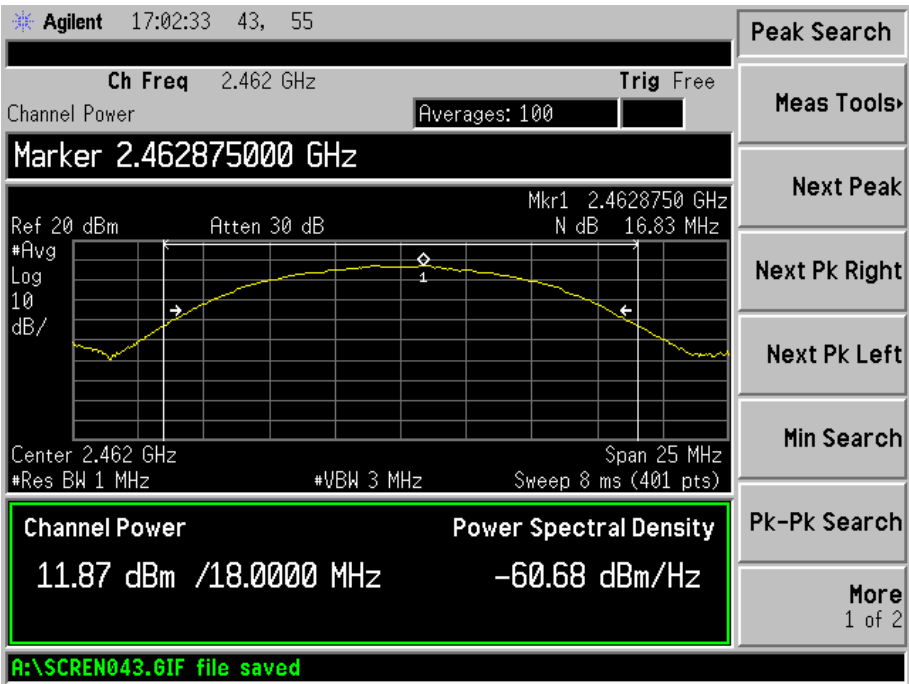
802.11b-1Mbps-Low Channel



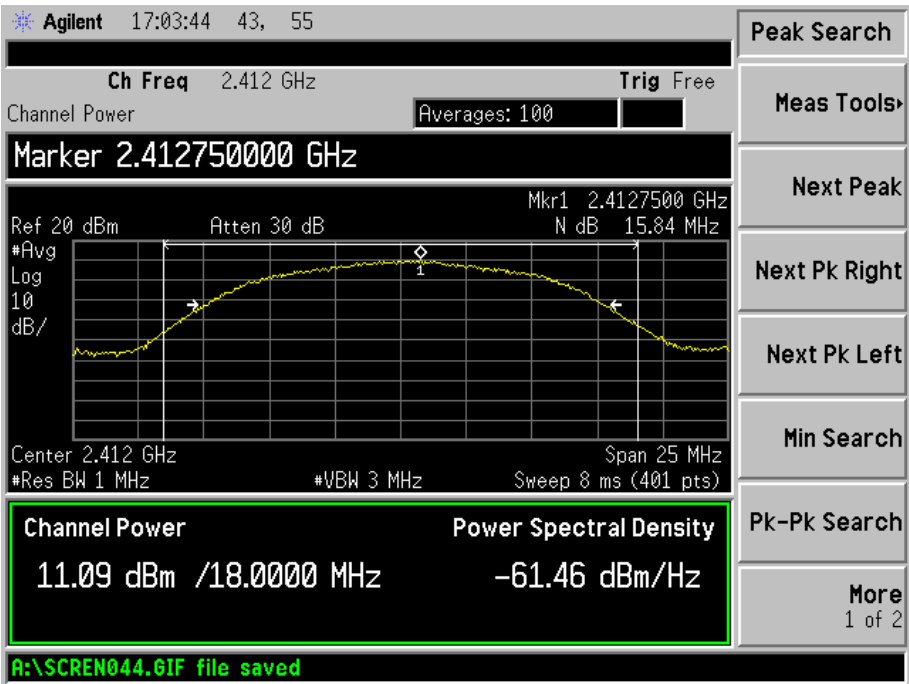
802.11b-1Mbps-Middle Channel



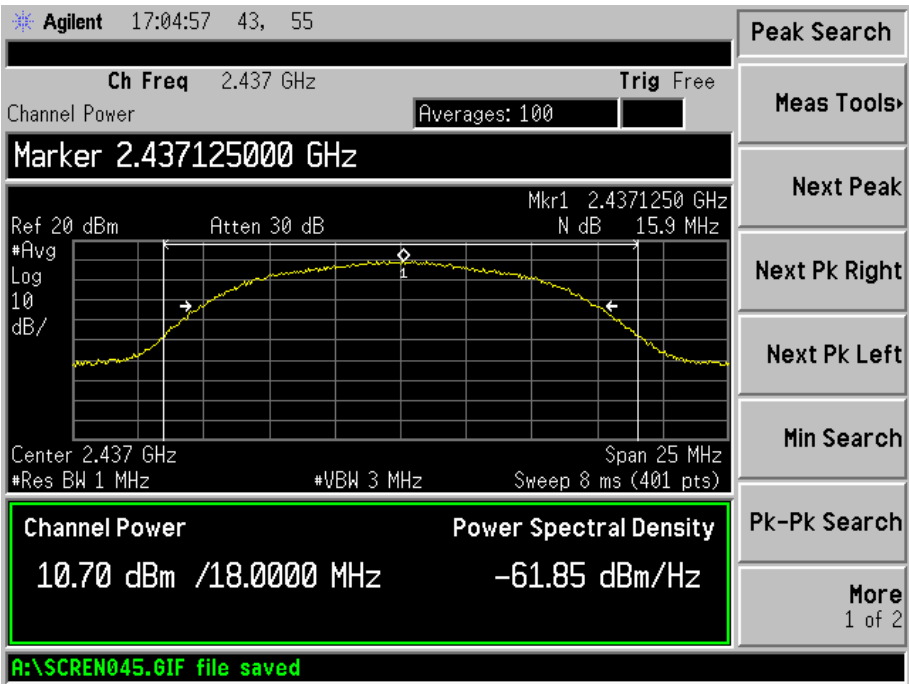
802.11b-1Mbps-High Channel



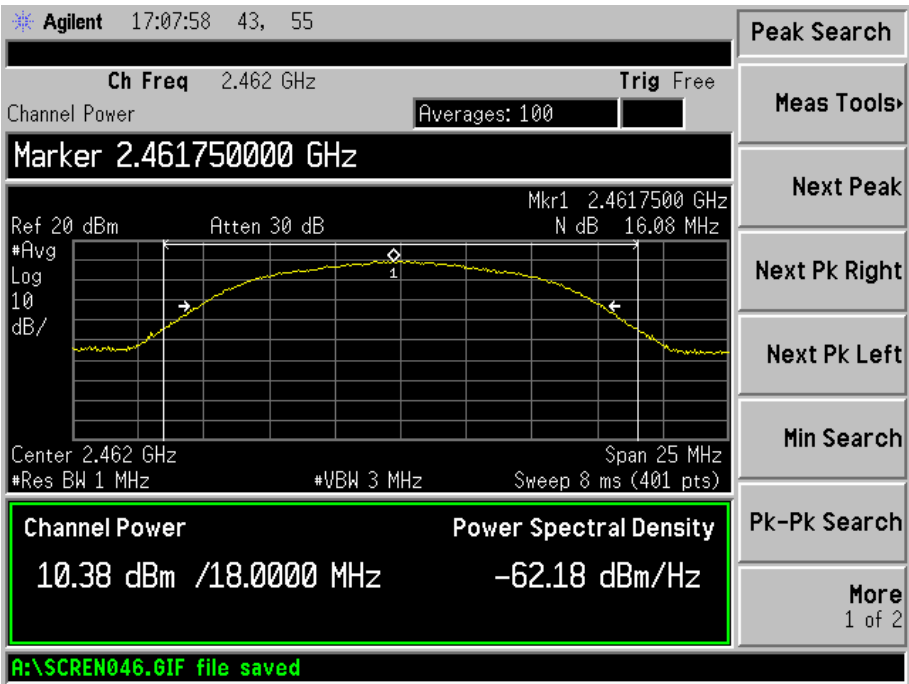
802.11b-11Mbps-Low Channel



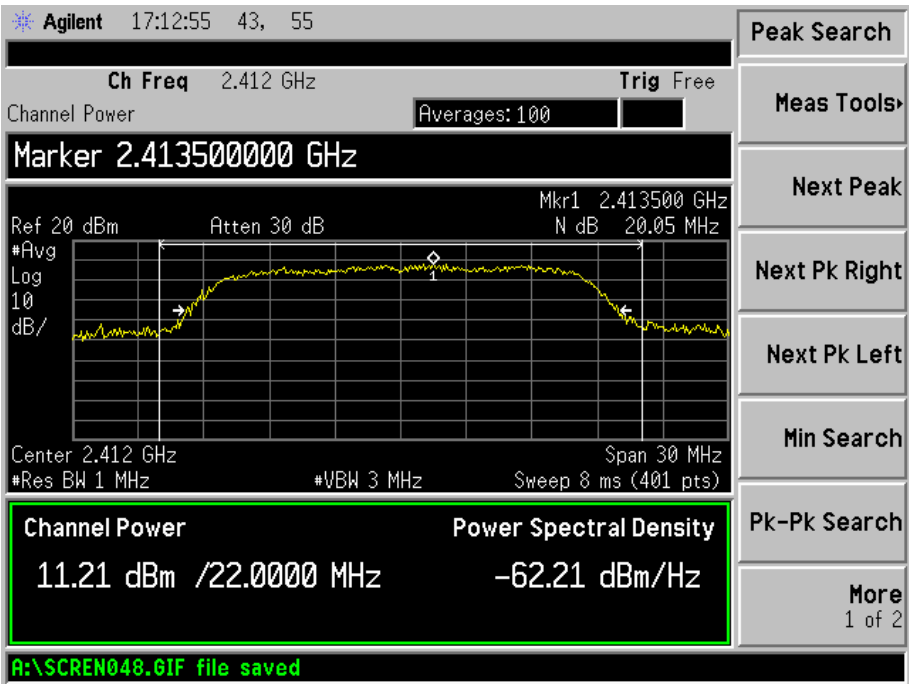
802.11b-11Mbps-Middle Channel



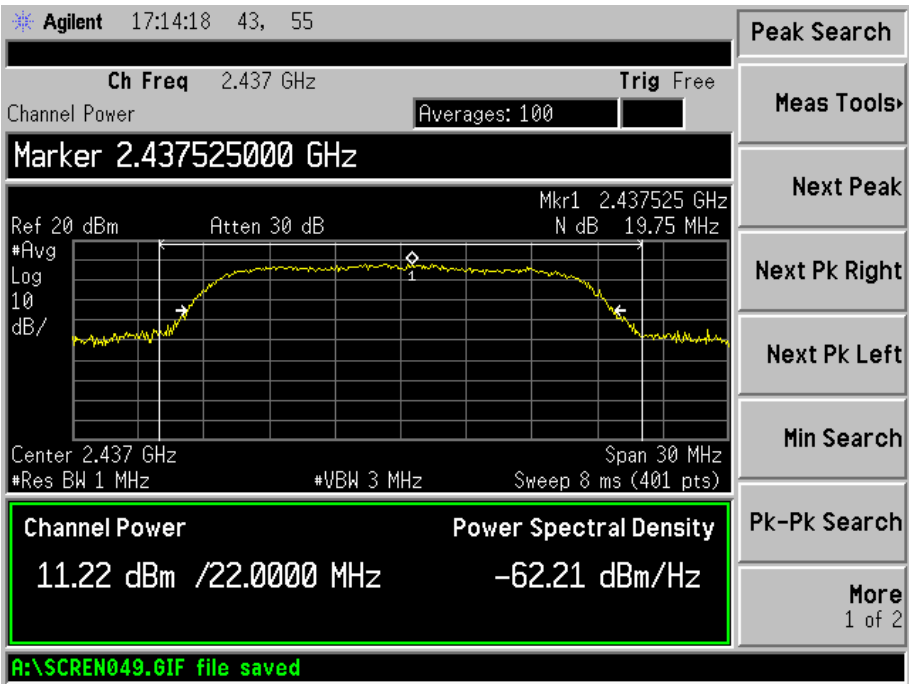
802.11b-11Mbps-High Channel



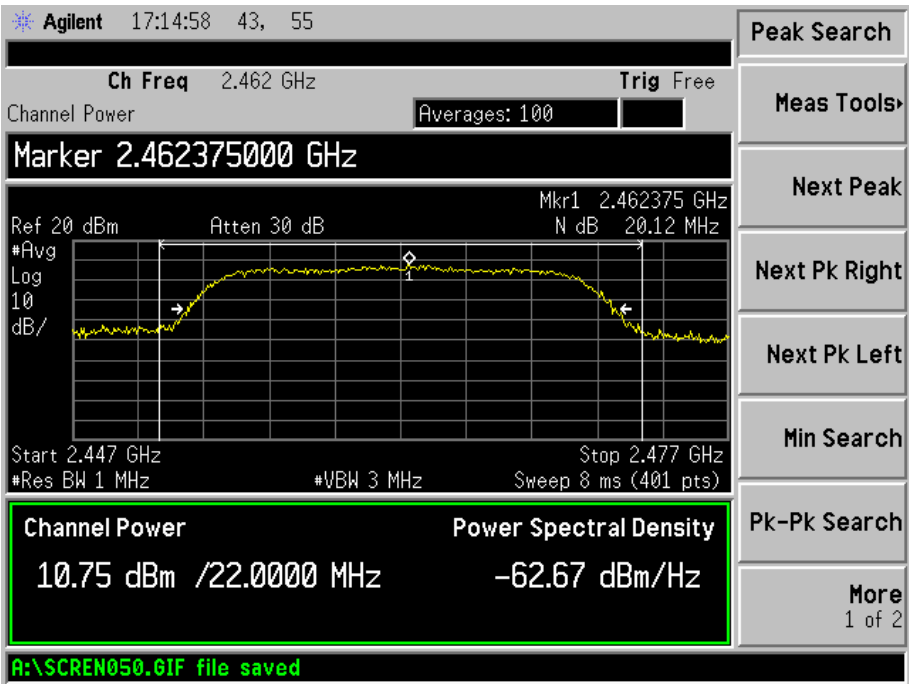
802.11g-6Mbps-Low Channel



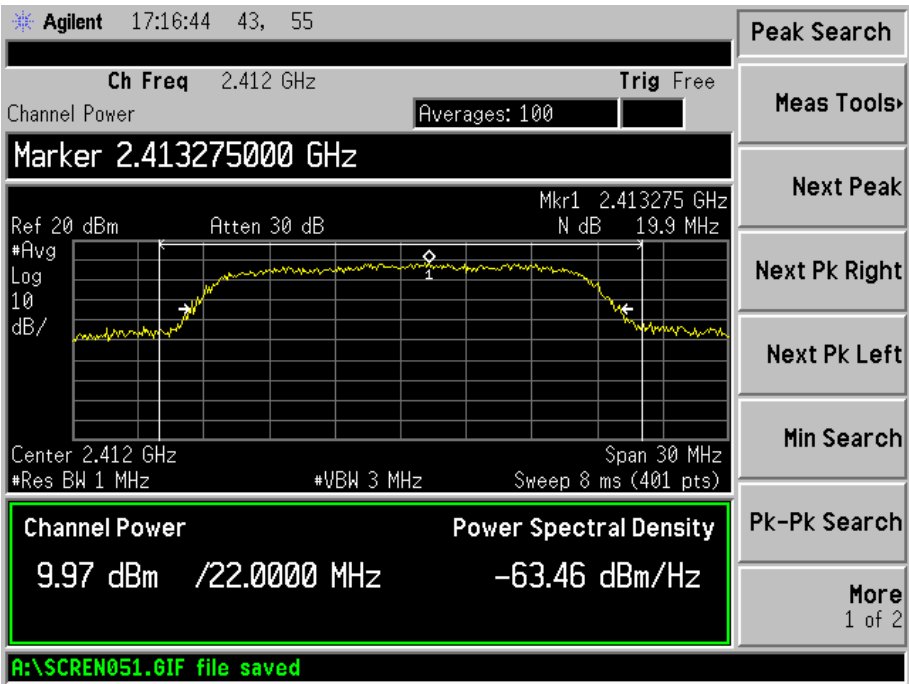
802.11g-6Mbps-Middle Channel



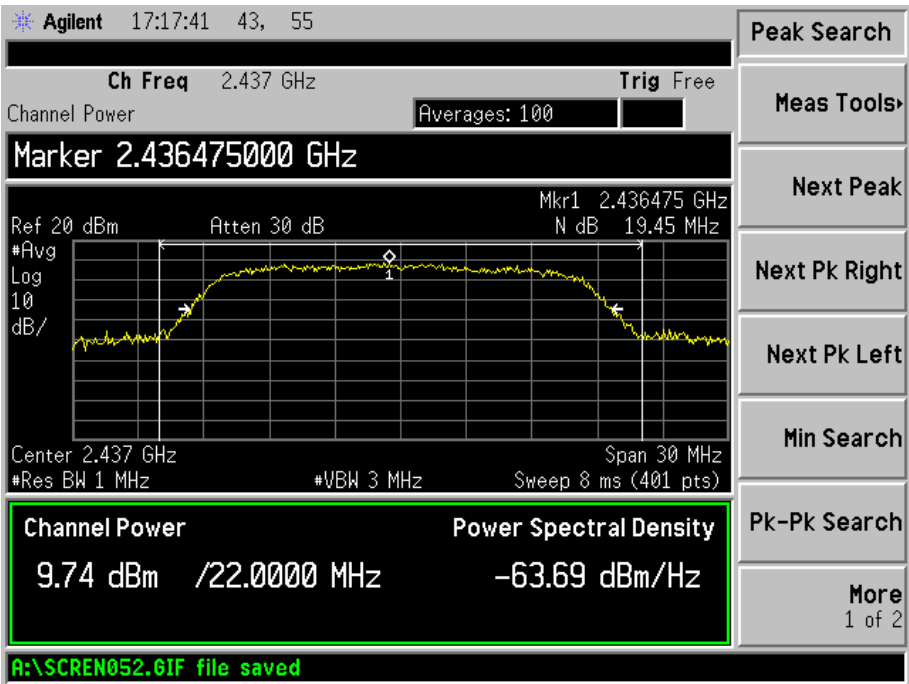
802.11g-6Mbps-High Channel



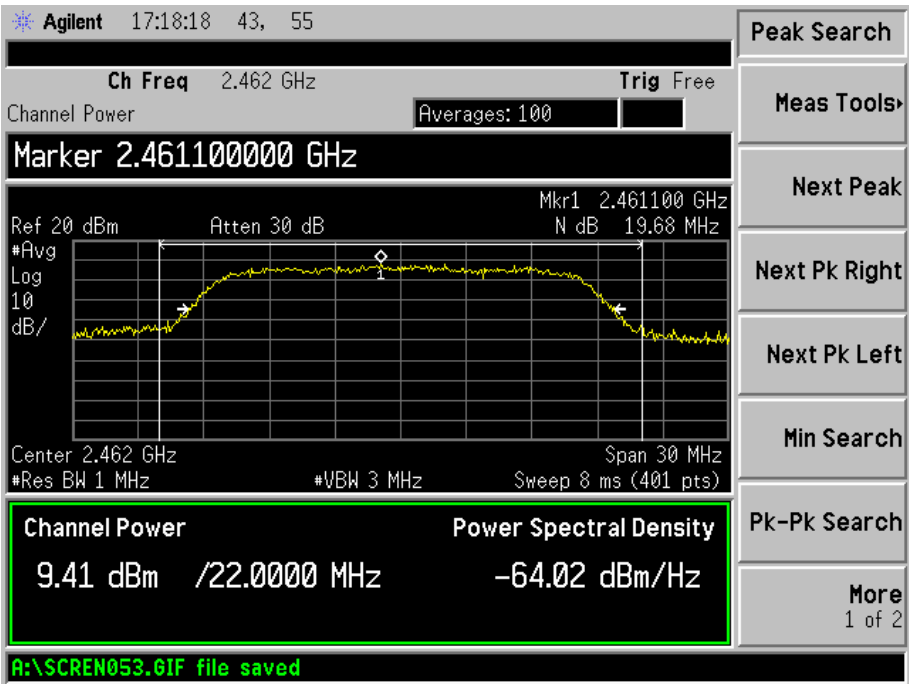
802.11g-54Mbps-Low Channel



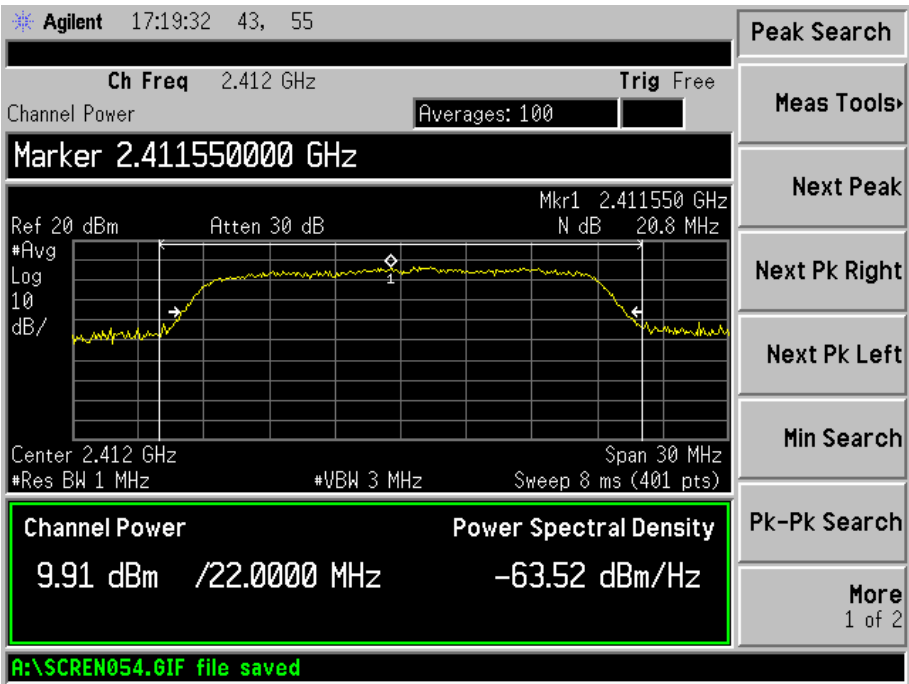
802.11g-54Mbps-Low Channel



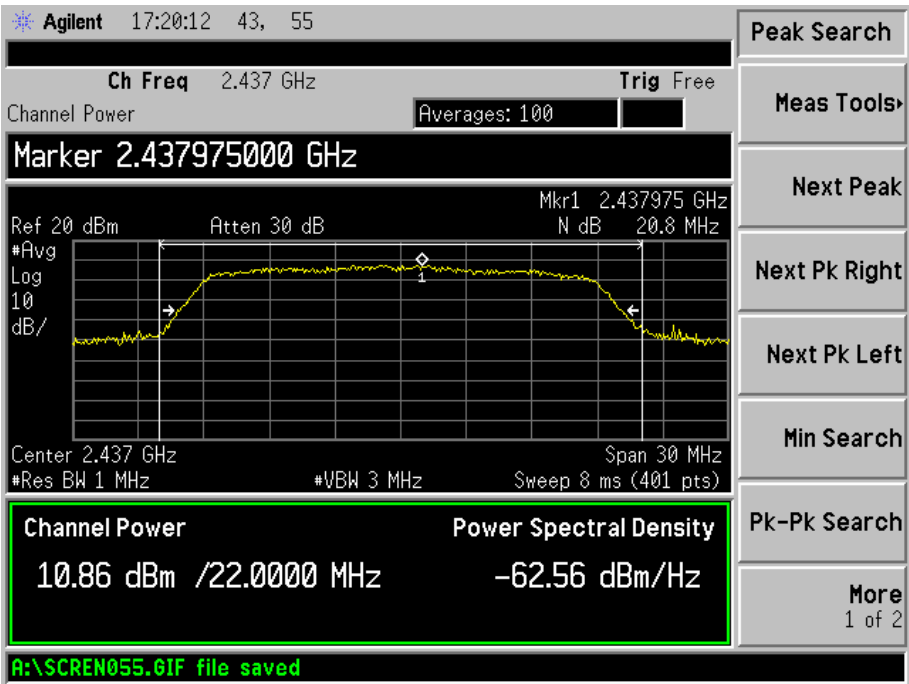
802.11g-54Mbps-Low Channel



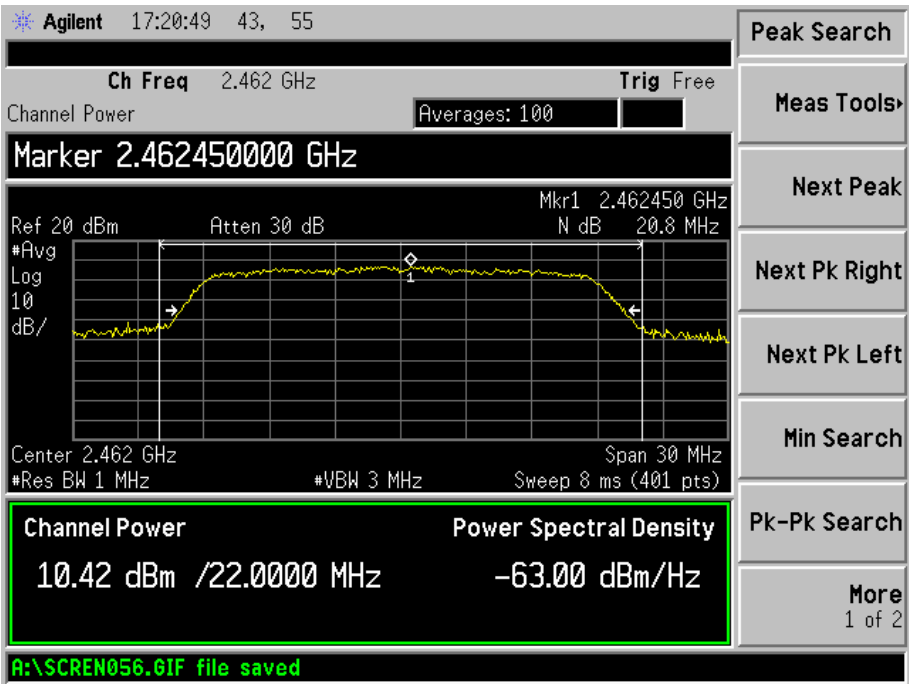
802.11n-HT20-MCS0_Low Channel



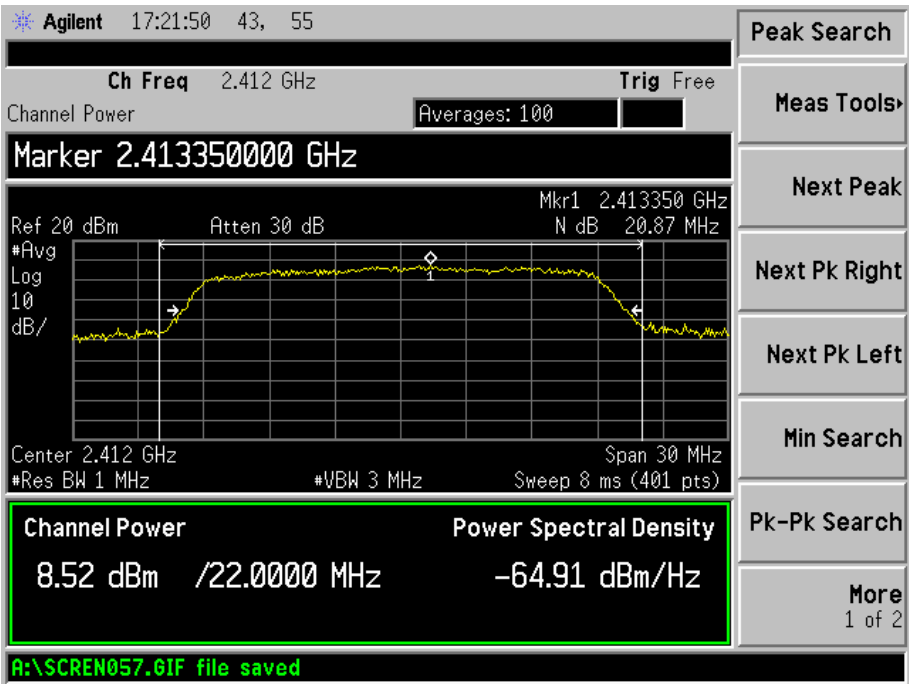
802.11n-HT20- MCS0_Middle Channel



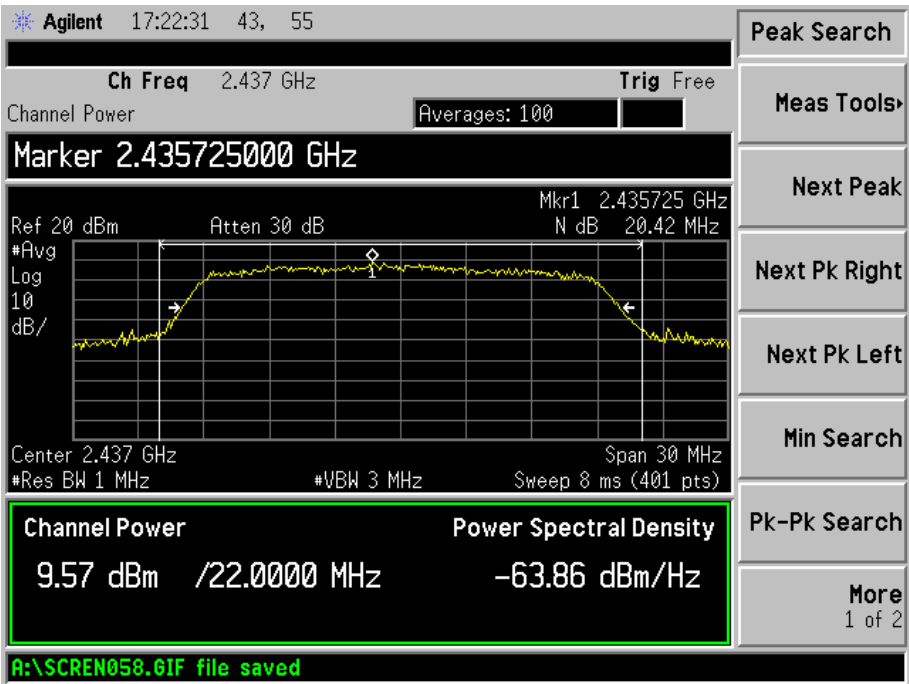
802.11n-HT20- MCS0_High Channel



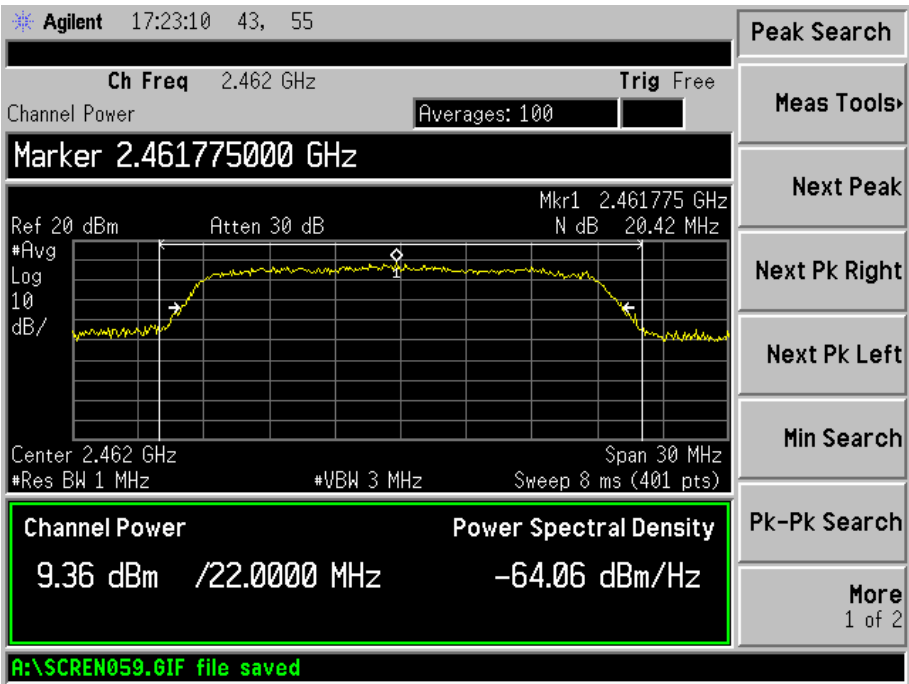
802.11n-HT20- MCS7_Low Channel



802.11n-HT20- MCS -Middle Channel



802.11n-HT20- MCS -High Channel



7. Field Strength of Spurious Emissions

7.1 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.

7.2 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.

7.3 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	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24
Horn Antenna	ETS	3116B	00088203	2012-02-25	2013-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2012-02-25	2013-02-24

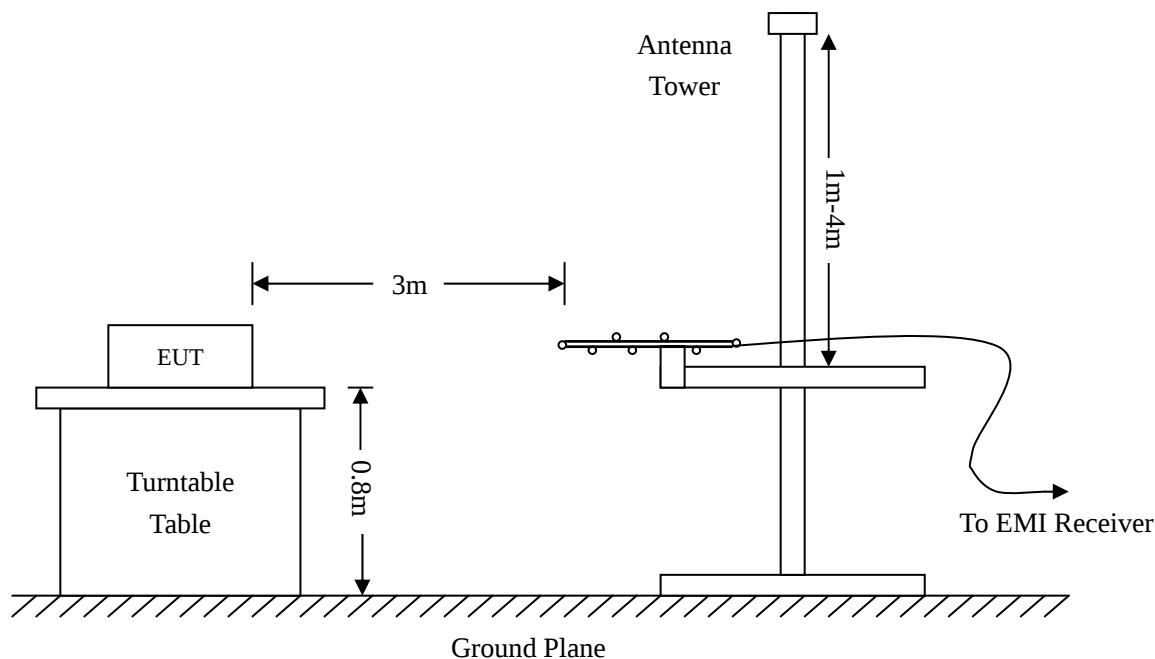
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.4 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.



7.5 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 -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

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

7.6 Environmental Conditions

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

7.7 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:

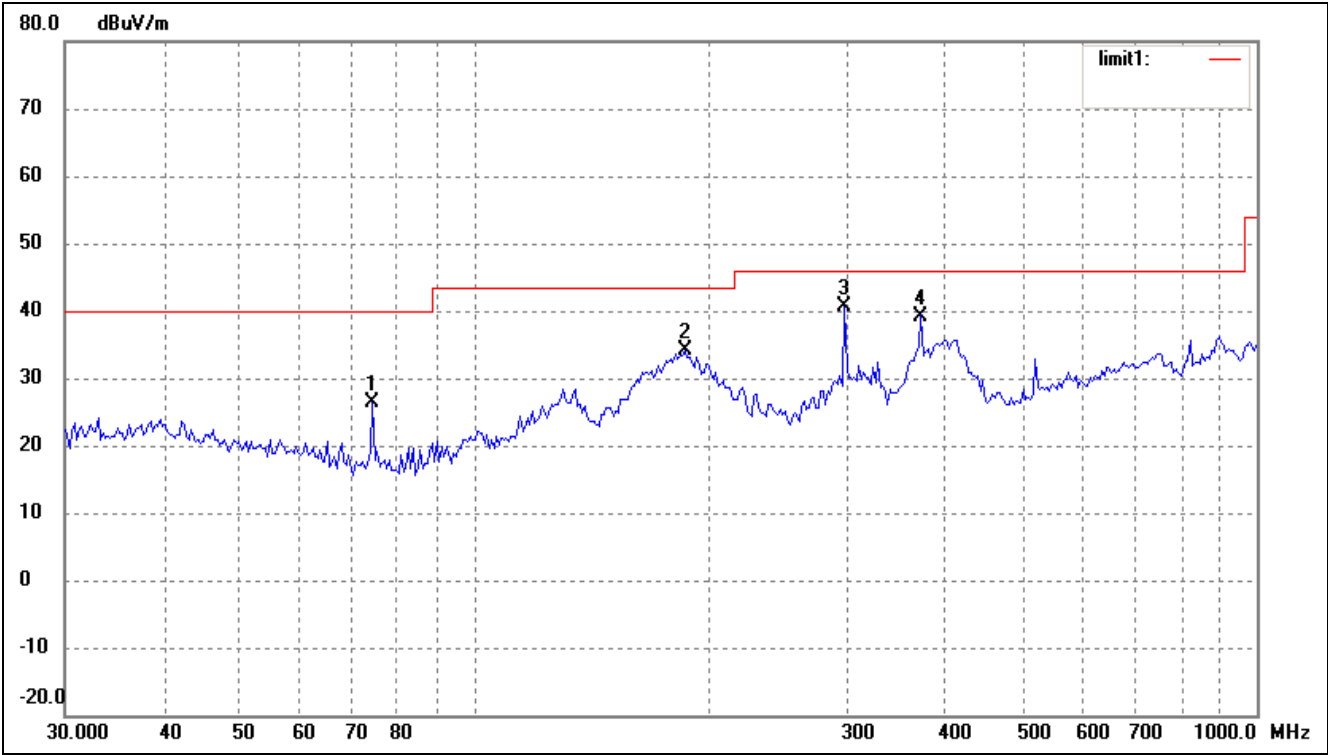
**-4.95 dB at 372.0045MHz in the Horizontal polarization for 802.11n-HT20-Low Channel, 9kHz to 25 GHz,
3 Meters**

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)

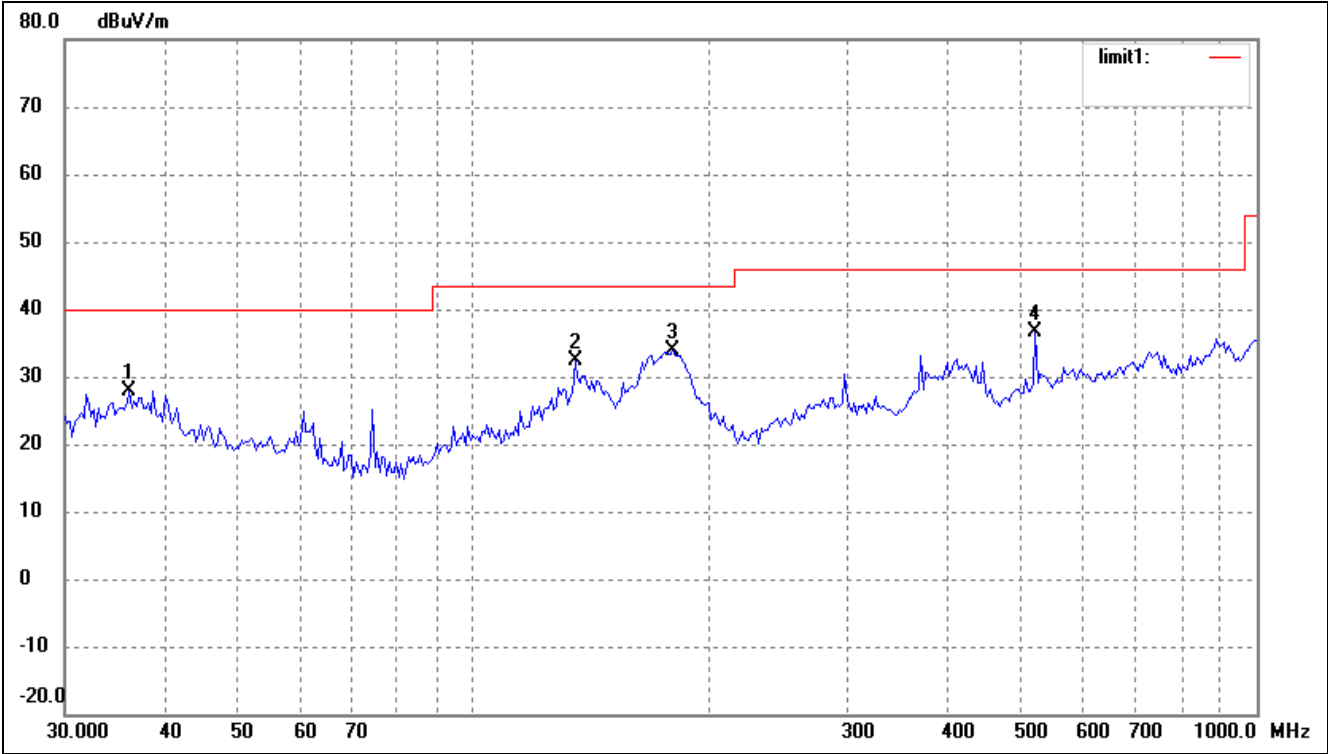
EUT: Projection Tablet PC
Tested Model: U7
Operating Condition: 802.11b Transmitting Low Channel-2412MHz
Comment: DC 3.7V Li-ion Battery

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	74.1351	24.24	2.05	26.29	40.00	-13.71	264	100	peak
2	185.7882	30.18	4.01	34.19	43.50	-9.31	113	200	peak
3	297.2241	30.62	10.04	40.66	46.00	-5.34	287	100	peak
4	372.0045	28.60	10.65	39.25	46.00	-6.75	185	200	peak

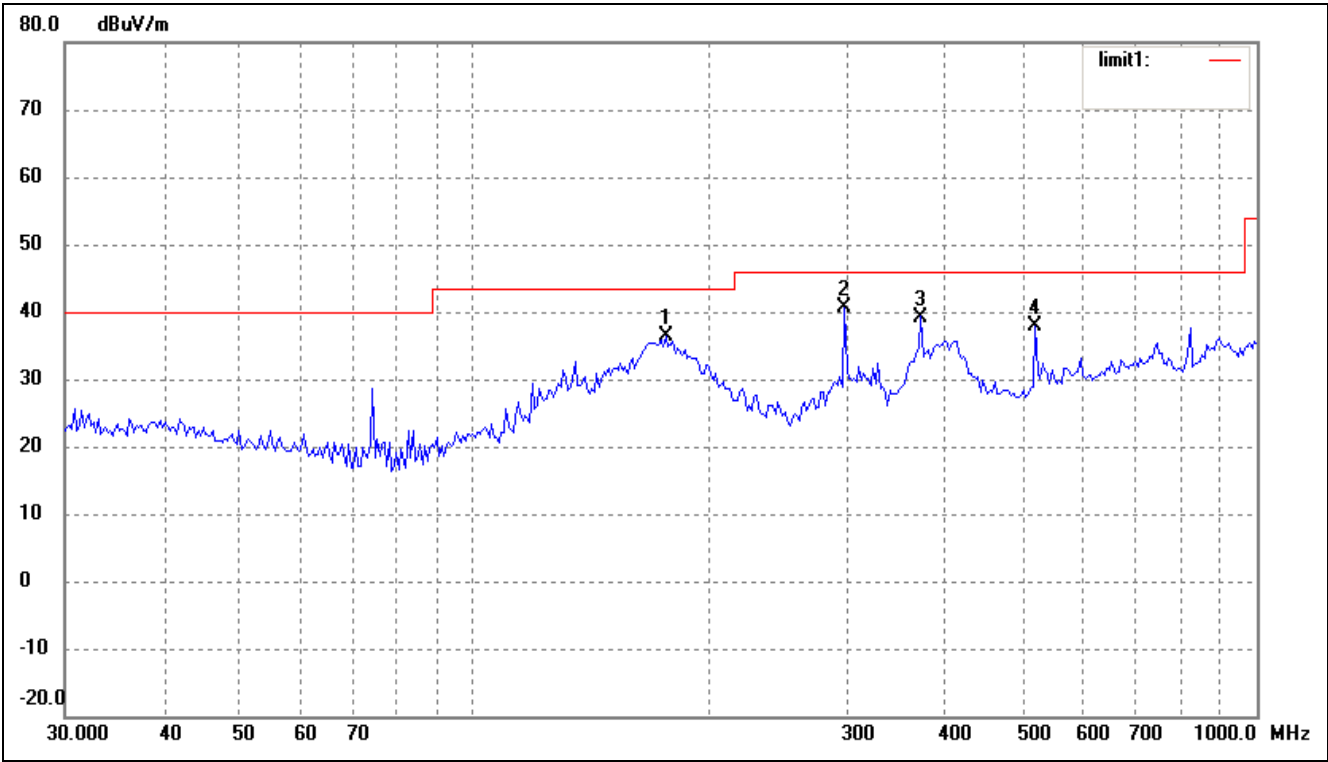
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.2541	18.84	9.09	27.93	40.00	-12.07	240	100	peak
2	134.5592	28.56	3.78	32.34	43.50	-11.16	187	100	peak
3	179.3864	30.16	3.74	33.90	43.50	-9.60	220	100	peak
4	520.8882	23.61	12.93	36.54	46.00	-9.46	359	100	peak

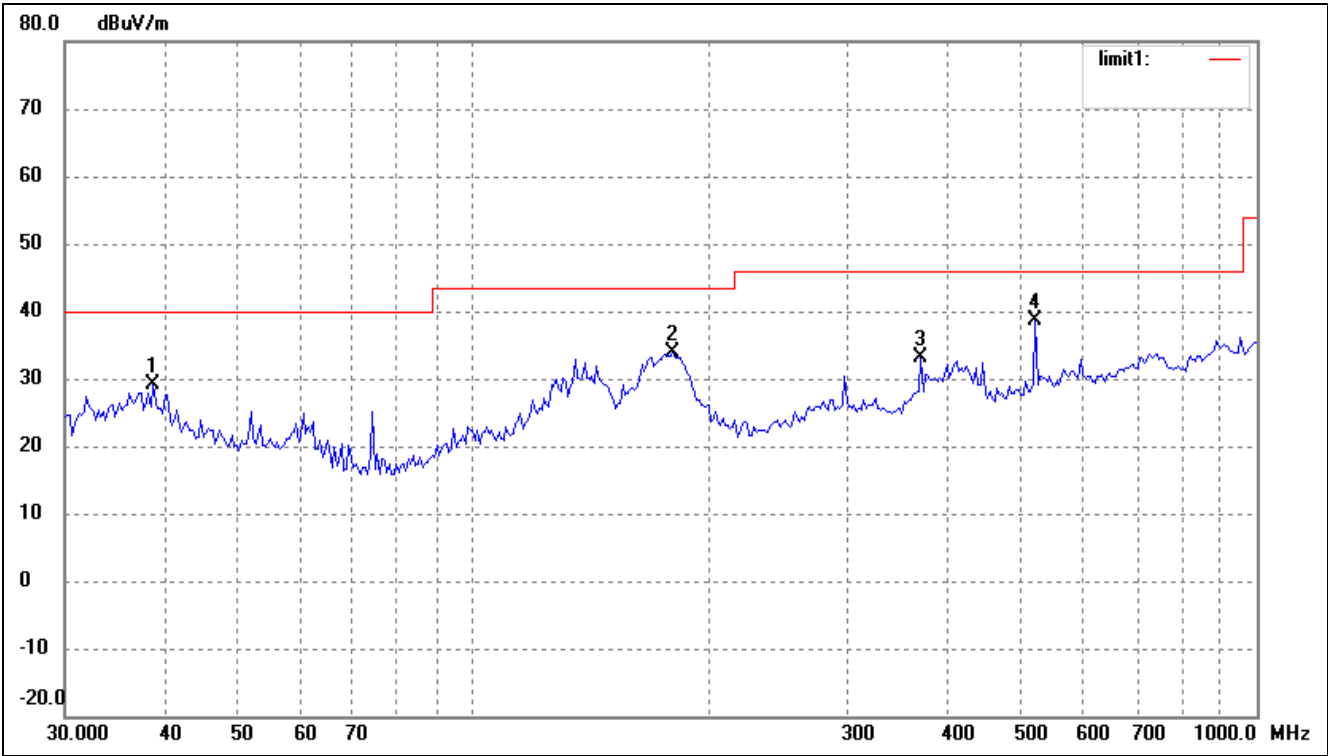
Operating Condition: 802.11b Transmitting Middle Channel-2437MHz
Comment: DC 3.7V Li-ion Battery

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	175.6516	32.71	3.73	36.44	43.50	-7.06	162	100	peak
2	297.2241	30.62	10.04	40.66	46.00	-5.34	200	100	peak
3	372.0045	28.60	10.65	39.25	46.00	-6.75	359	200	peak
4	520.8882	24.83	12.93	37.76	46.00	-8.24	359	200	peak

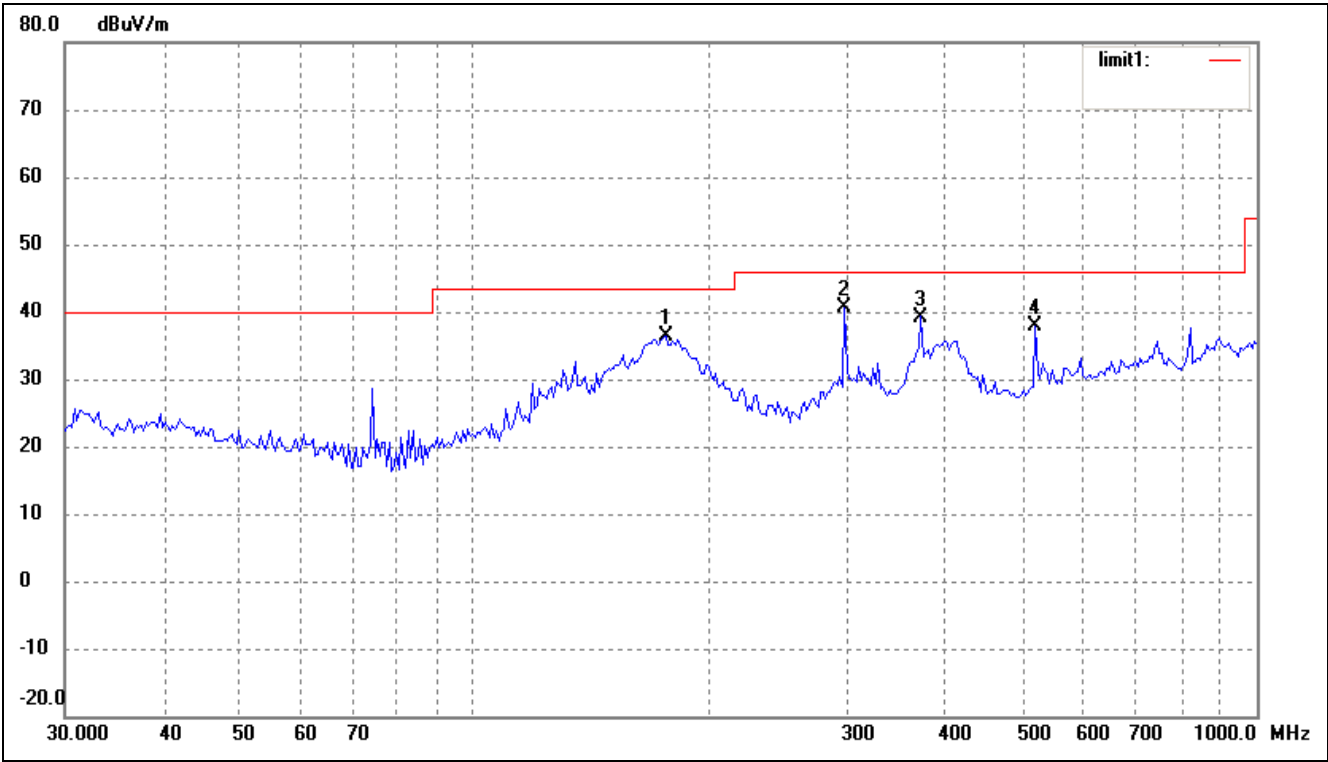
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	38.8879	19.68	9.50	29.18	40.00	-10.82	240	100	peak
2	179.3864	30.16	3.74	33.90	43.50	-9.60	187	100	peak
3	372.0045	22.55	10.65	33.20	46.00	-12.80	220	100	peak
4	520.8882	25.65	12.93	38.58	46.00	-7.42	359	100	peak

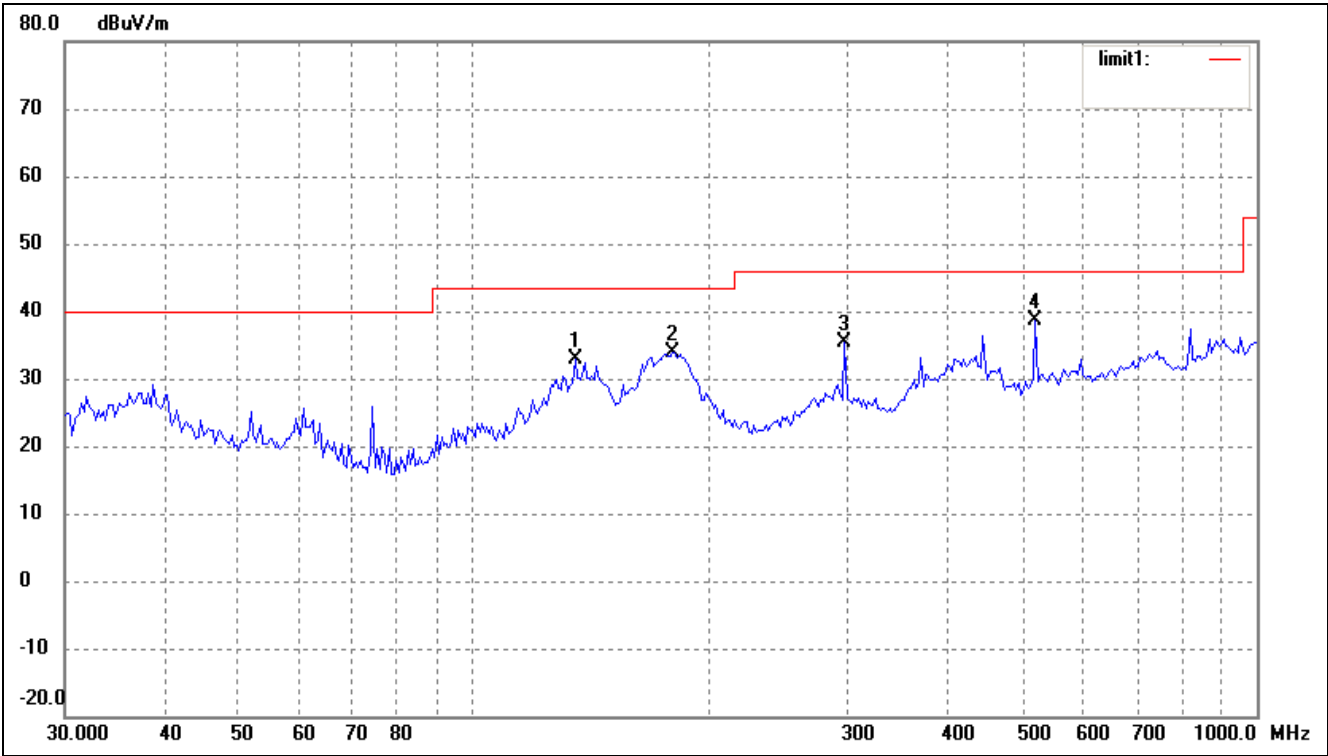
Operating Condition: 802.11b Transmitting High Channel-2462MHz
Comment: DC 3.7V Li-ion Battery

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	175.6516	32.71	3.73	36.44	43.50	-7.06	162	100	peak
2	297.2241	30.62	10.04	40.66	46.00	-5.34	200	100	peak
3	372.0045	28.60	10.65	39.25	46.00	-6.75	359	200	Peak
4	520.8882	24.83	12.93	37.76	46.00	-8.24	359	200	peak

Test Specification: Vertical

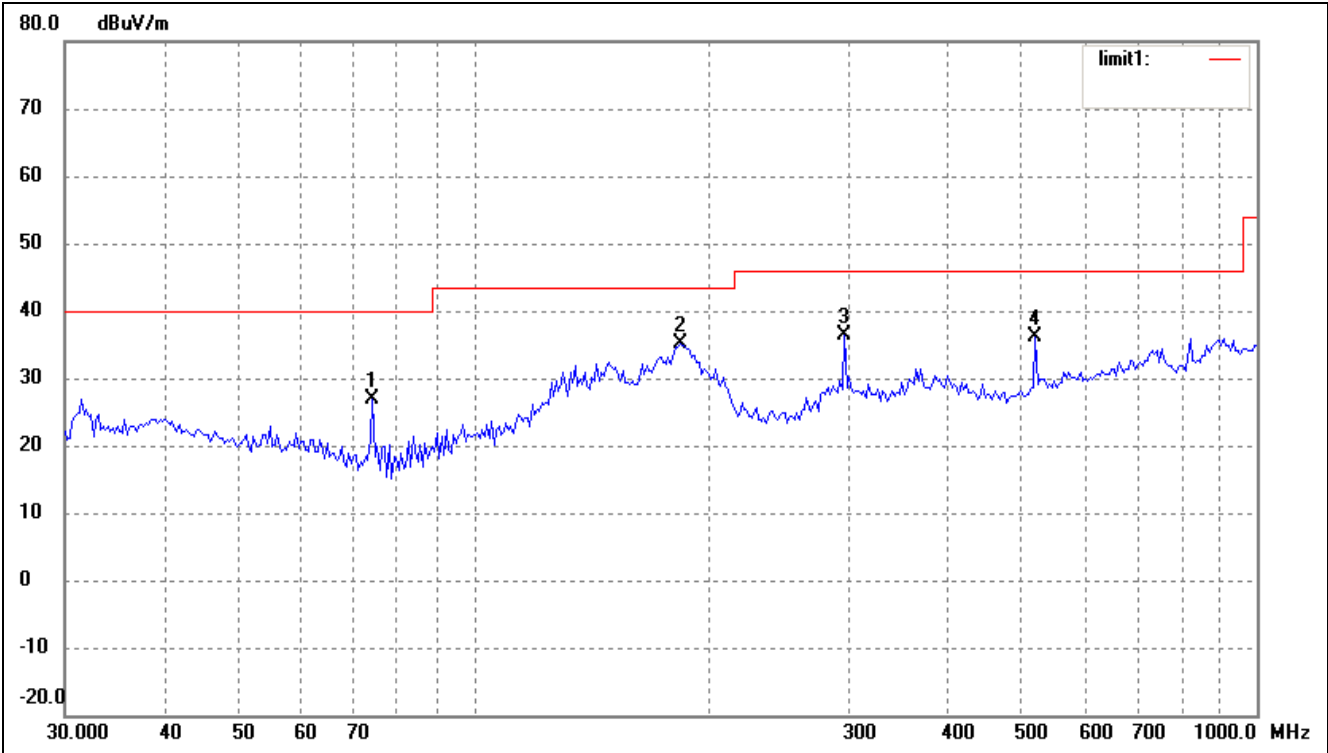


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	134.5592	29.03	3.78	32.81	43.50	-10.69	240	100	peak
2	179.3864	30.16	3.74	33.90	43.50	-9.60	187	100	peak
3	297.2241	25.41	10.04	35.45	46.00	-10.55	220	100	peak
4	520.8882	25.65	12.93	38.58	46.00	-7.42	359	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

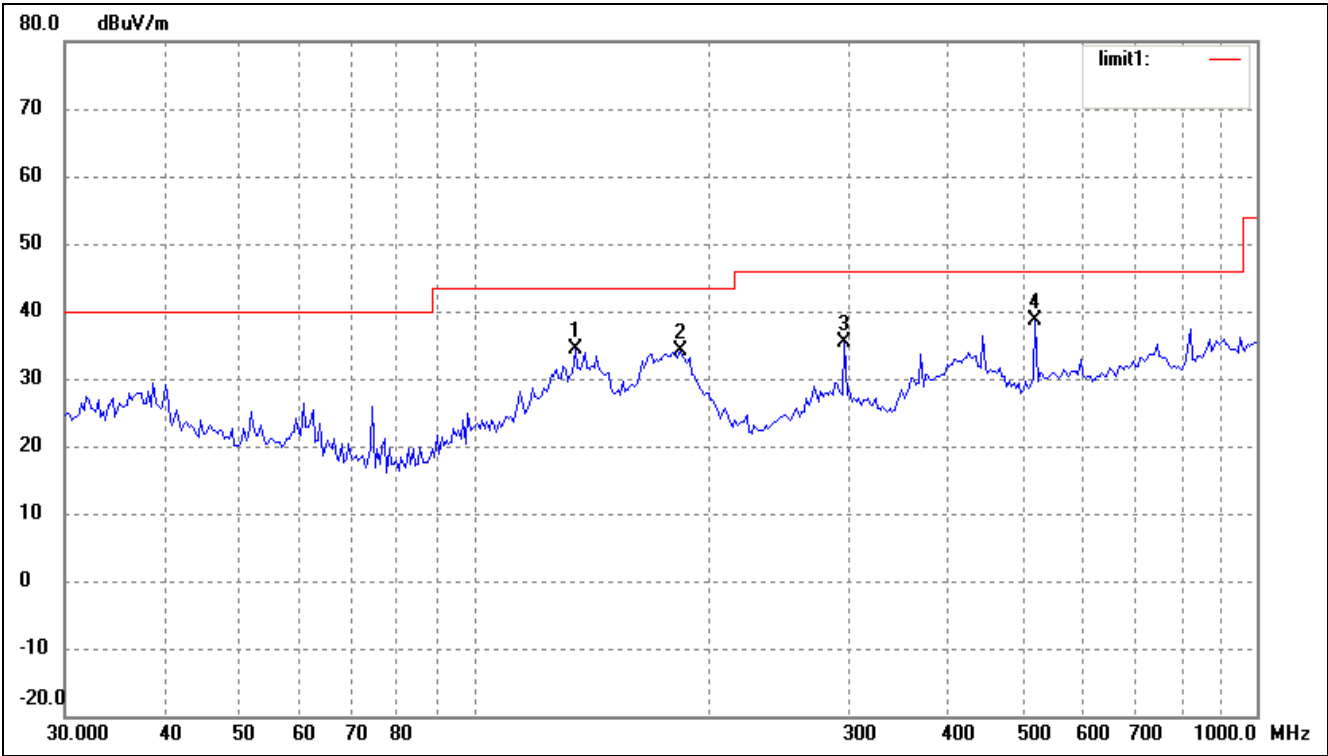
EUT: Projection Tablet PC
Tested Model: U7
Operating Condition: 802.11g Transmitting Low Channel-2412MHz
Comment: DC 3.7V Li-ion Battery

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	74.1351	24.93	2.05	26.98	40.00	-13.02	264	100	peak
2	183.2005	31.20	3.89	35.09	43.50	-8.41	113	200	peak
3	297.2241	26.30	10.04	36.34	46.00	-9.66	287	100	peak
4	520.8882	23.08	12.93	36.01	46.00	-9.99	185	200	peak

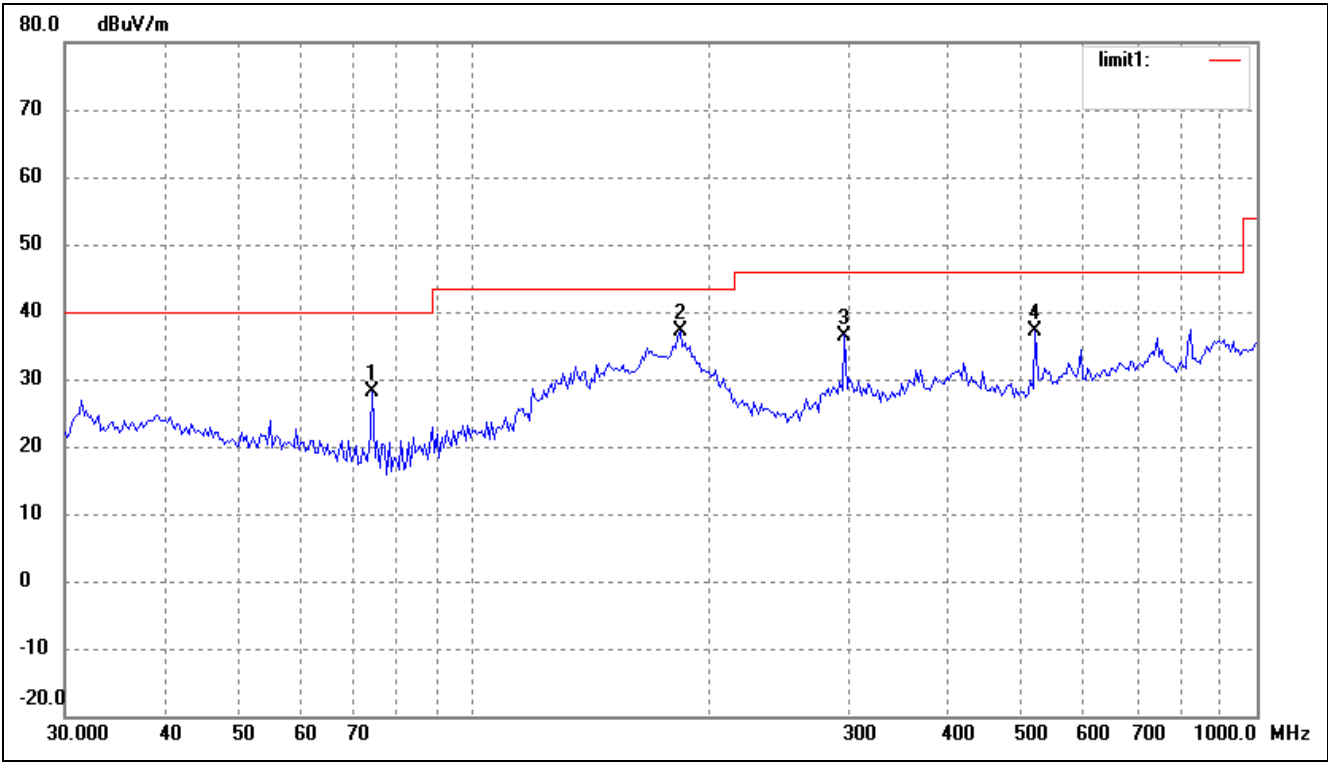
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	134.5592	30.53	3.78	34.31	43.50	-9.19	240	100	peak
2	183.2005	30.16	3.89	34.05	43.50	-9.45	187	100	peak
3	297.2241	25.45	10.04	35.49	46.00	-10.51	220	100	peak
4	520.8882	25.74	12.93	38.67	46.00	-7.33	359	100	peak

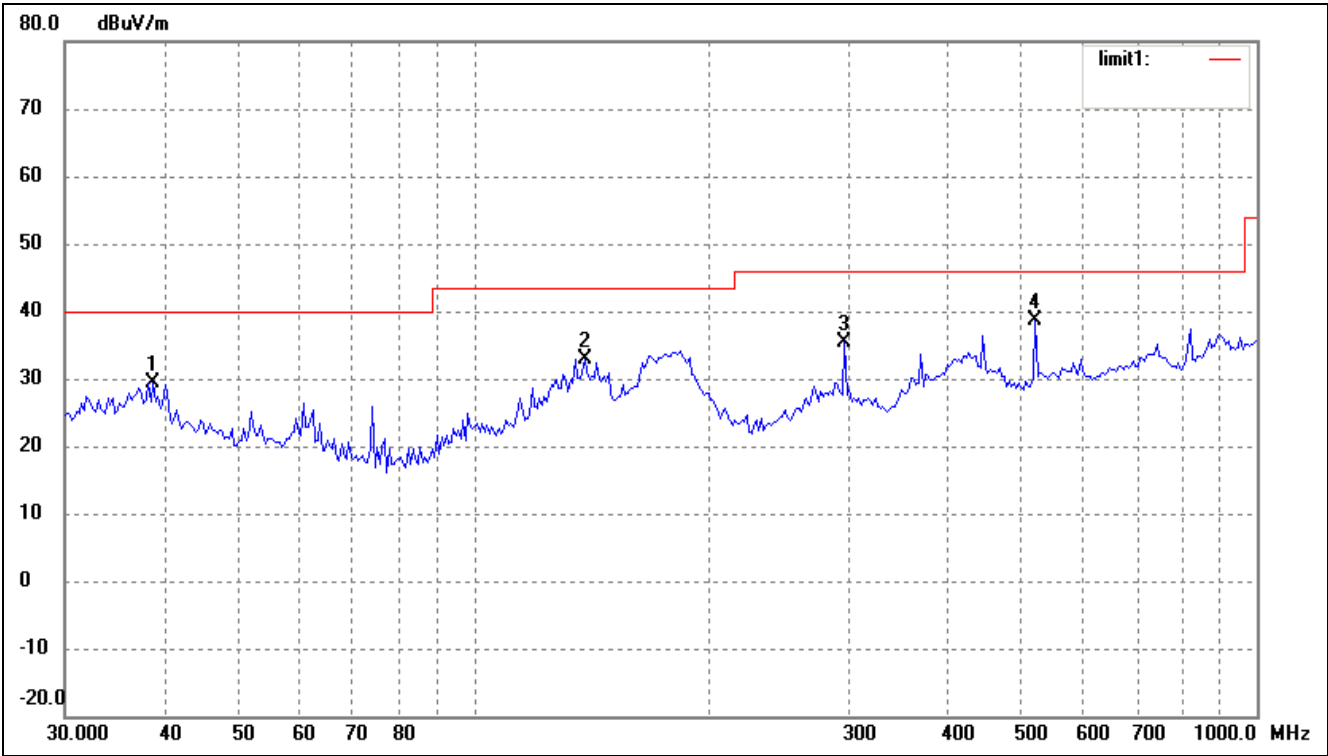
Operating Condition: 802.11g Transmitting Middle Channel-2437MHz
Comment: DC 3.7V Li-ion Battery

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	74.1351	26.05	2.05	28.10	40.00	-11.90	162	100	peak
2	183.2005	33.24	3.89	37.13	43.50	-6.37	200	100	peak
3	297.2241	26.46	10.04	36.50	46.00	-9.50	359	200	peak
4	520.8882	24.30	12.93	37.23	46.00	-8.77	359	200	peak

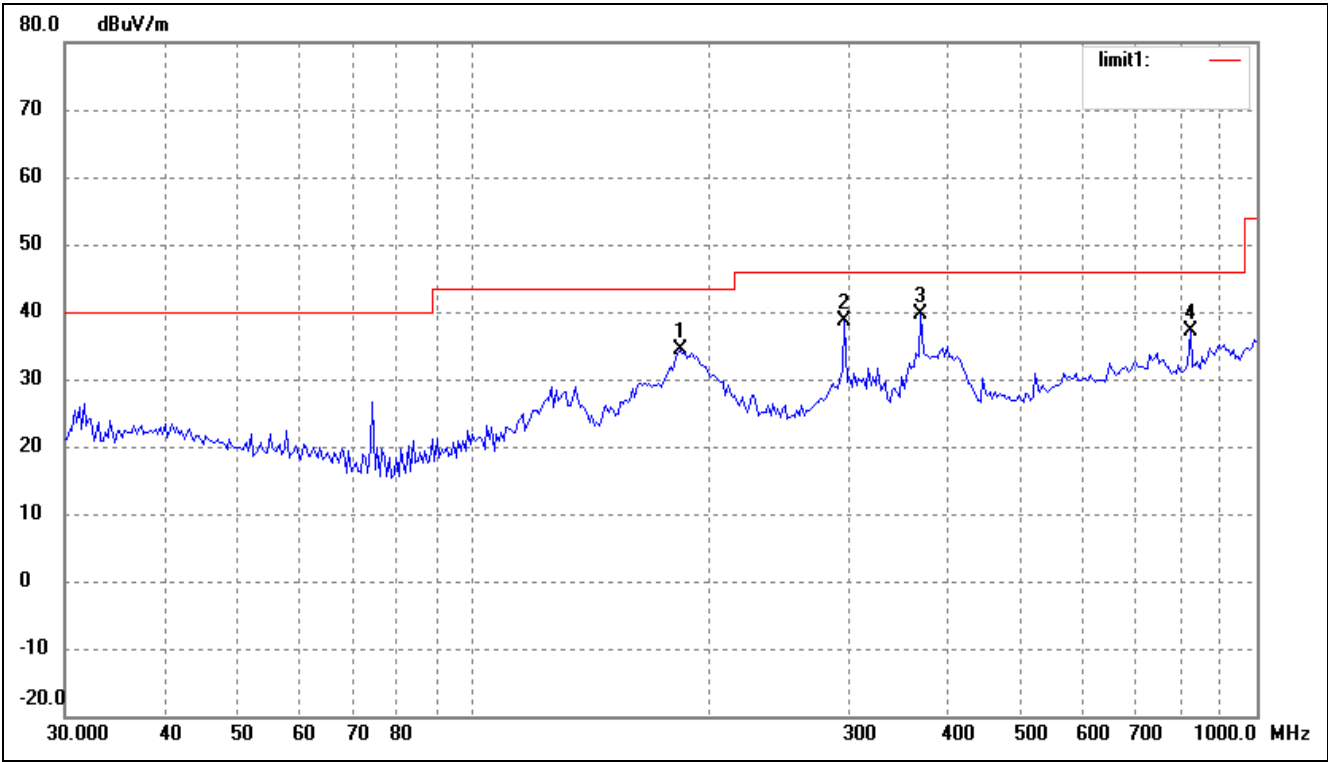
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	38.8879	19.96	9.50	29.46	40.00	-10.54	240	100	peak
2	138.3873	29.35	3.51	32.86	43.50	-10.64	187	100	peak
3	297.2241	25.45	10.04	35.49	46.00	-10.51	220	100	peak
4	520.8882	25.74	12.93	38.67	46.00	-7.33	359	100	peak

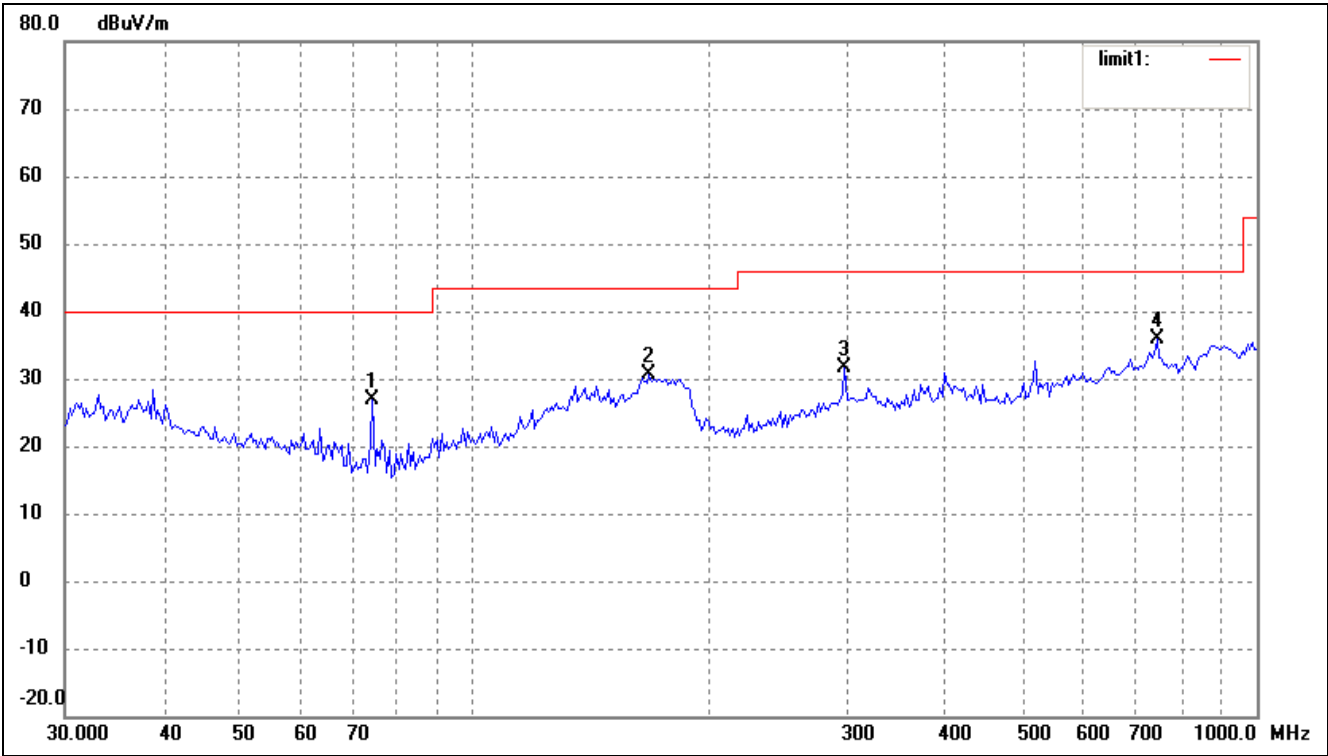
Operating Condition: 802.11g Transmitting High Channel-2462MHz
Comment: DC 3.7V Li-ion Battery

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	183.2005	30.37	3.89	34.26	43.50	-9.24	162	100	peak
2	297.2241	28.58	10.04	38.62	46.00	-7.38	200	100	peak
3	372.0045	28.97	10.65	39.62	46.00	-6.38	359	200	Peak
4	821.7104	20.34	16.84	37.18	46.00	-8.82	359	200	peak

Test Specification: Vertical

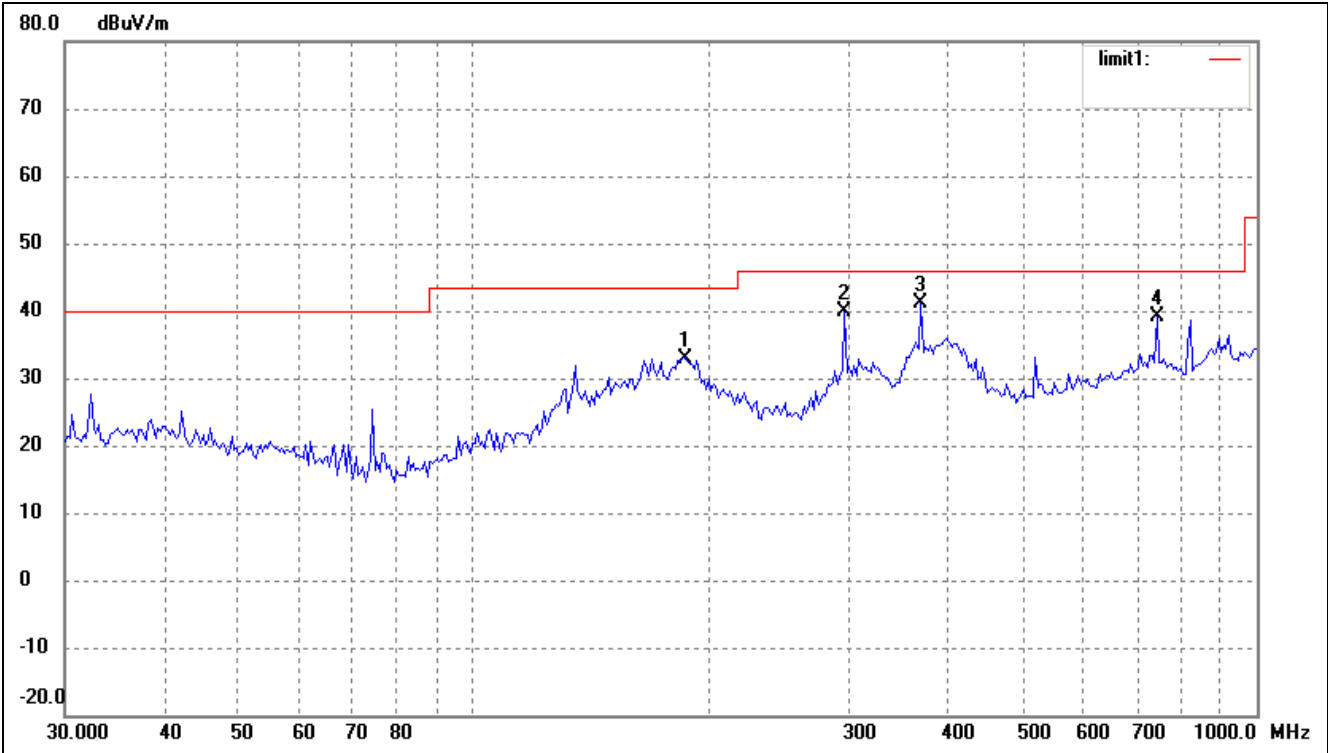


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	74.1351	24.77	2.05	26.82	40.00	-13.18	240	100	peak
2	167.2368	26.91	3.68	30.59	43.50	-12.91	187	100	peak
3	297.2241	21.68	10.04	31.72	46.00	-14.28	220	100	peak
4	744.8661	17.87	17.95	35.82	46.00	-10.18	359	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

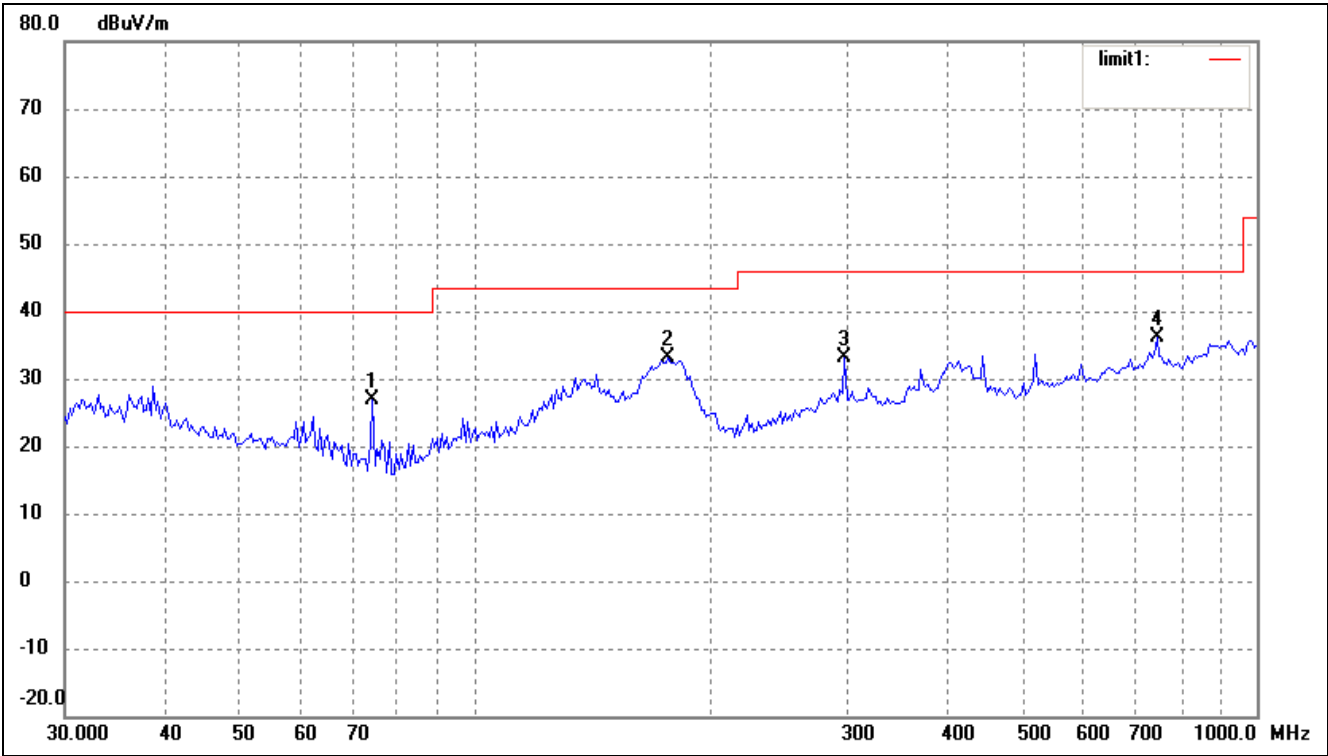
EUT: Projection Tablet PC
Tested Model: U7
Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz
Comment: DC 3.7V Li-ion Battery

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	185.7882	28.99	4.01	33.00	43.50	-10.50	264	100	peak
2	297.2241	29.91	10.04	39.95	46.00	-6.05	113	200	peak
3	372.0045	30.40	10.65	41.05	46.00	-4.95	287	100	peak
4	744.8661	21.14	17.95	39.09	46.00	-6.91	185	200	peak

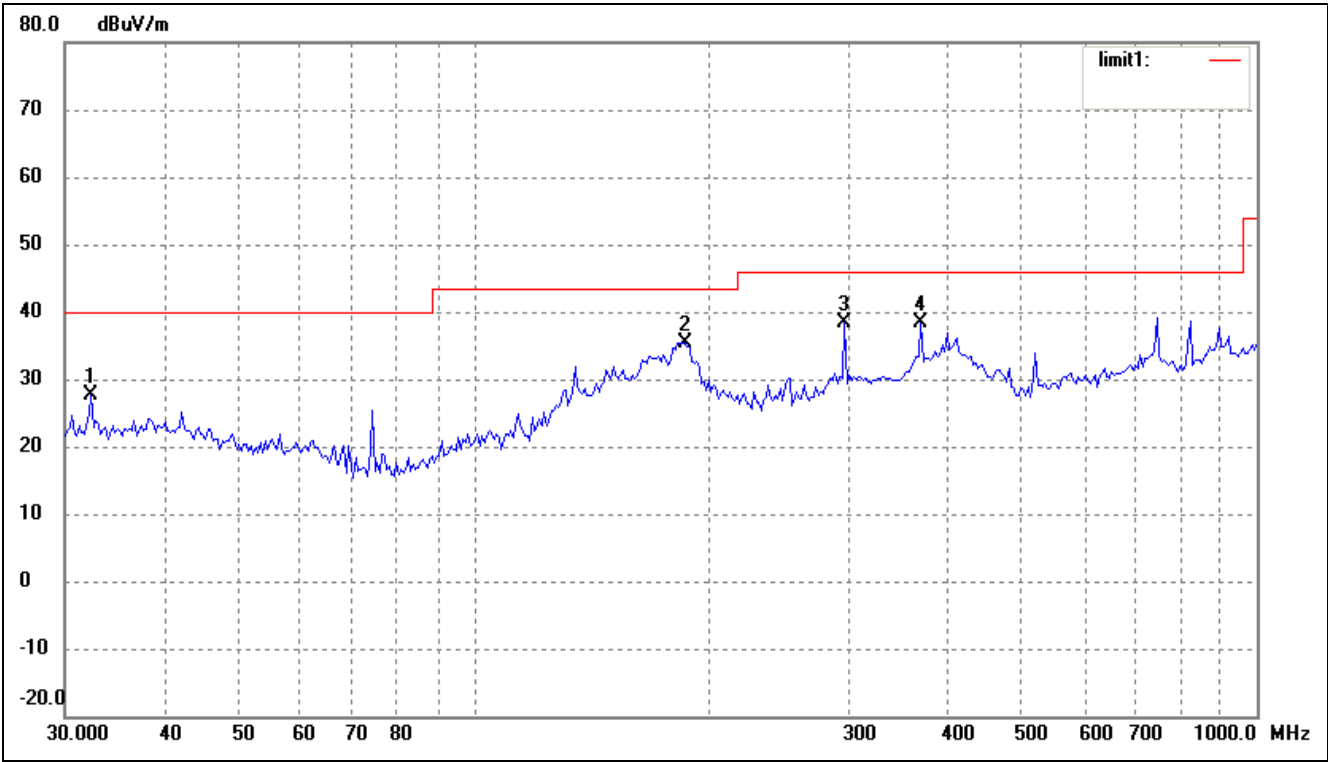
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	74.1351	24.77	2.05	26.82	40.00	-13.18	240	100	peak
2	176.8878	29.43	3.73	33.16	43.50	-10.34	187	100	peak
3	297.2241	23.08	10.04	33.12	46.00	-12.88	220	100	peak
4	744.8661	18.20	17.95	36.15	46.00	-9.85	359	100	peak

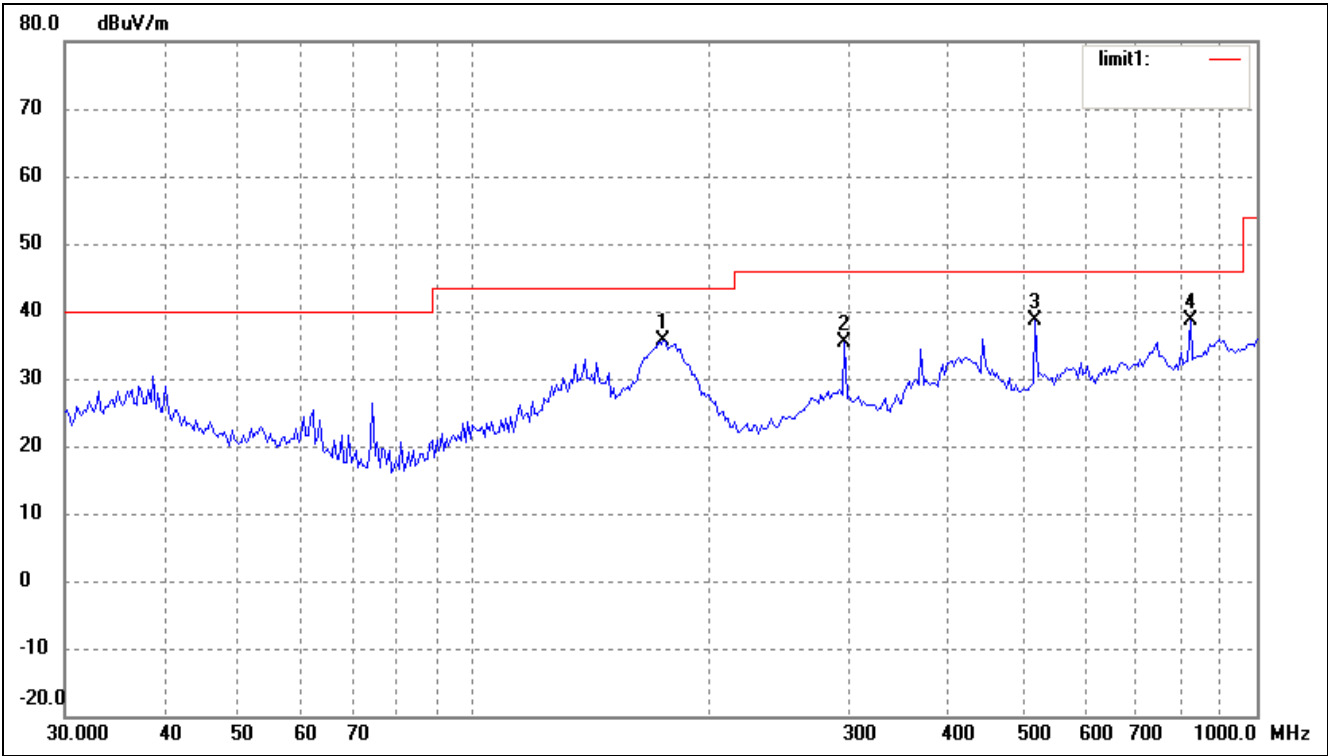
Operating Condition: 802.11n-HT20 Transmitting Middle Channel-2437MHz
Comment: DC 3.7V Li-ion Battery

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	32.4059	19.23	8.44	27.67	40.00	-12.33	162	100	peak
2	185.7882	31.45	4.01	35.46	43.50	-8.04	200	100	peak
3	297.2241	28.41	10.04	38.45	46.00	-7.55	359	200	peak
4	372.0045	27.78	10.65	38.43	46.00	-7.57	359	200	peak

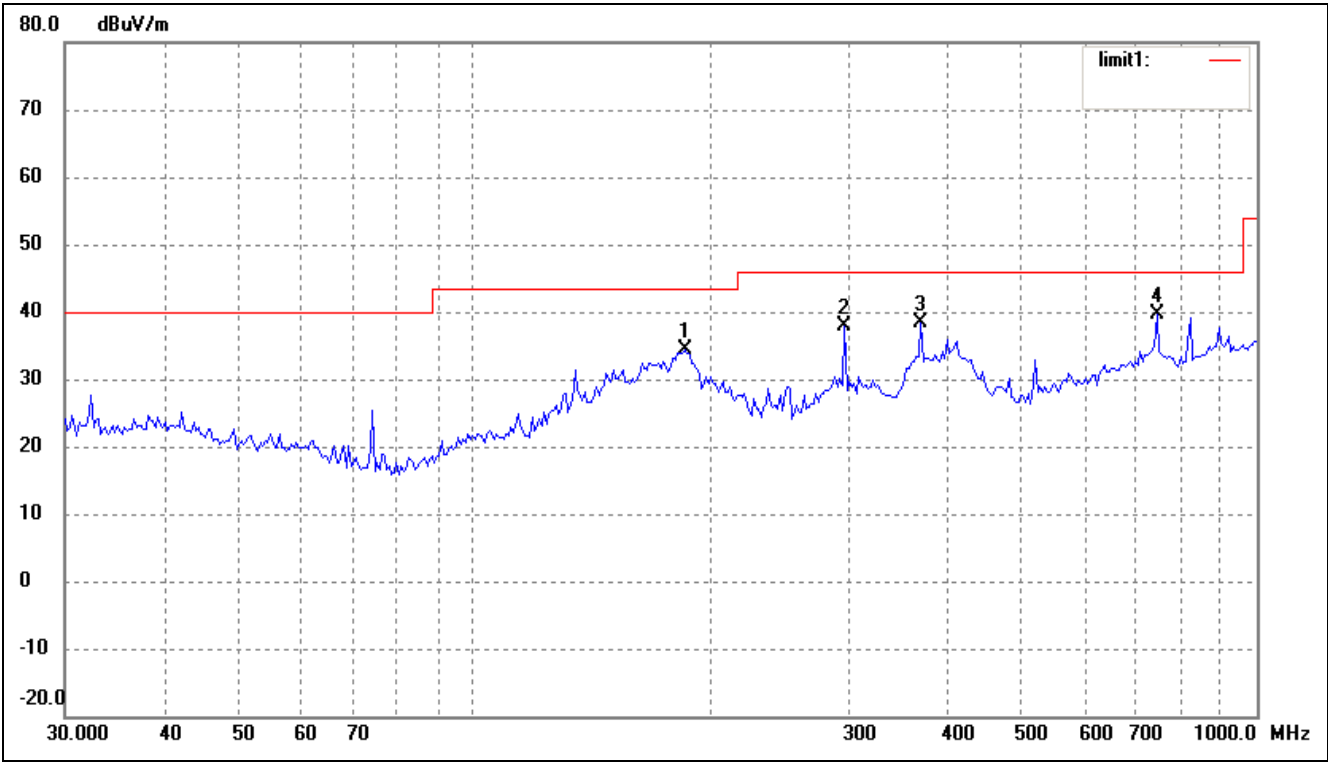
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	174.4241	31.91	3.72	35.63	43.50	-7.87	240	100	peak
2	297.2241	25.41	10.04	35.45	46.00	-10.55	187	100	peak
3	520.8882	25.75	12.93	38.68	46.00	-7.32	220	100	peak
4	821.7104	21.78	16.84	38.62	46.00	-7.38	359	100	peak

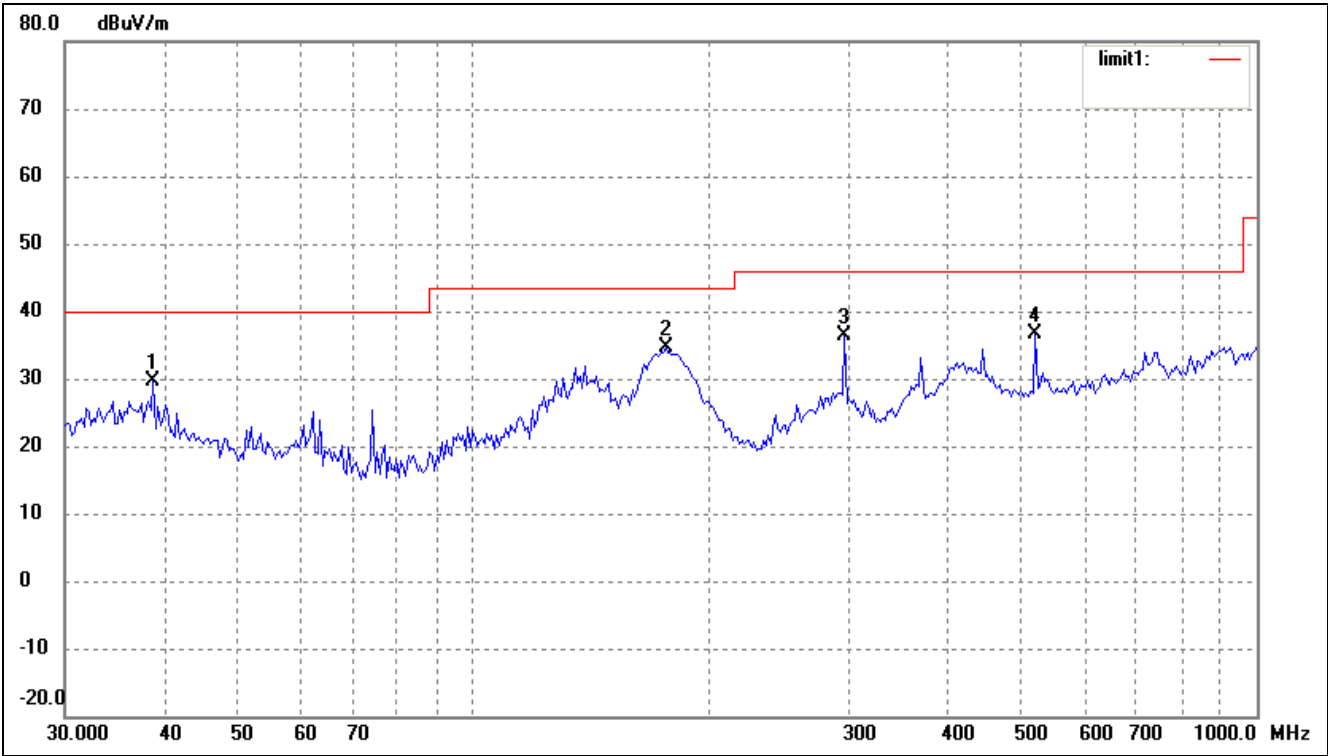
Operating Condition: 802.11n-HT20 Transmitting Low Channel-2462MHz
Comment: DC 3.7V Li-ion Battery

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	185.7882	30.45	4.01	34.46	43.50	-9.04	162	100	peak
2	297.2241	27.91	10.04	37.95	46.00	-8.05	200	100	peak
3	372.0045	27.78	10.65	38.43	46.00	-7.57	359	200	Peak
4	744.8661	21.64	17.95	39.59	46.00	-6.41	359	200	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	38.8879	20.13	9.50	29.63	40.00	-10.37	240	100	peak
2	175.6516	30.84	3.73	34.57	43.50	-8.93	187	100	peak
3	297.2241	26.26	10.04	36.30	46.00	-9.70	220	100	peak
4	520.8882	23.63	12.93	36.56	46.00	-9.44	359	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	57.09	-3.85	53.24	74.00	-20.76	H	PK
4824	40.65	-3.85	36.80	54.00	-17.20	H	AV
7236	46.93	1.26	48.19	74.00	-25.81	H	PK
7236	34.64	1.26	35.90	54.00	-18.10	H	AV
4824	58.07	-3.85	54.22	74.00	-19.78	V	PK
4824	41.93	-3.85	37.98	54.00	-16.02	V	AV
7236	47.94	1.26	49.20	74.00	-24.80	V	PK
7236	34.82	1.26	36.08	54.00	-17.92	V	AV
Middle Channel-2437MHz							
4874	58.21	-3.71	54.50	74.00	-19.50	H	PK
4874	42.16	-3.71	38.45	54.00	-15.55	H	AV
7311	46.79	1.59	48.38	74.00	-25.62	H	PK
7311	35.13	1.59	36.72	54.00	-17.28	H	AV
4874	67.46	-3.71	63.75	74.00	-10.25	V	PK
4874	50.36	-3.71	46.65	54.00	-7.35	V	AV
7311	54.82	1.59	56.41	74.00	-17.59	V	PK
7311	39.18	1.59	40.77	54.00	-13.23	V	AV
High Channel-2462MHz							
4924	57.25	-3.57	53.68	74.00	-20.32	H	PK
4924	40.92	-3.57	37.35	54.00	-16.65	H	AV
7386	46.74	1.91	48.65	74.00	-25.35	H	PK
7386	34.73	1.91	36.64	54.00	-17.36	H	AV
4924	63.25	-3.57	59.68	74.00	-14.32	V	PK
4924	45.99	-3.57	42.42	54.00	-11.58	V	AV
7386	49.09	1.91	51.00	74.00	-23.00	V	PK
7386	35.91	1.91	37.82	54.00	-16.18	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	53.66	-3.85	49.81	74.00	-24.19	H	PK
4824	39.53	-3.85	35.68	54.00	-18.32	H	AV
7236	45.33	1.26	46.59	74.00	-27.41	H	PK
7236	34.49	1.26	35.75	54.00	-18.25	H	AV
4824	62.19	-3.85	58.34	74.00	-15.66	V	PK
4824	47.70	-3.85	43.85	54.00	-10.15	V	AV
7236	54.24	1.26	55.50	74.00	-18.50	V	PK
7236	36.49	1.26	37.75	54.00	-16.25	V	AV
Middle Channel-2437MHz							
4874	59.08	-3.71	55.37	74.00	-18.63	H	PK
4874	43.41	-3.71	39.70	54.00	-14.30	H	AV
7311	46.95	1.59	48.54	74.00	-25.46	H	PK
7311	35.14	1.59	36.73	54.00	-17.27	H	AV
4874	65.95	-3.71	62.24	74.00	-11.76	V	PK
4874	52.35	-3.71	48.64	54.00	-5.36	V	AV
7311	58.89	1.59	60.48	74.00	-13.52	V	PK
7311	39.97	1.59	41.56	54.00	-12.44	V	AV
High Channel-2462MHz							
4924	56.91	-3.57	53.34	74.00	-20.66	H	PK
4924	43.15	-3.57	39.58	54.00	-14.42	H	AV
7386	47.45	1.91	49.36	74.00	-24.64	H	PK
7386	35.37	1.91	37.28	54.00	-16.72	H	AV
4924	62.30	-3.57	58.73	74.00	-15.27	V	PK
4924	48.25	-3.57	44.68	54.00	-9.32	V	AV
7386	52.06	1.91	53.97	74.00	-20.03	V	PK
7386	36.55	1.91	38.46	54.00	-15.54	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	55.30	-3.85	51.45	74.00	-22.55	H	PK
4824	42.76	-3.85	38.91	54.00	-15.09	H	AV
7236	46.08	1.26	47.34	74.00	-26.66	H	PK
7236	34.49	1.26	35.75	54.00	-18.25	H	AV
4824	58.58	-3.85	54.73	74.00	-19.27	V	PK
4824	46.91	-3.85	43.06	54.00	-10.94	V	AV
7236	48.36	1.26	49.50	74.00	-24.50	V	PK
7236	36.39	1.26	37.65	54.00	-16.35	V	AV
Middle Channel-2437MHz							
4874	60.69	-3.71	56.98	74.00	-17.02	H	PK
4874	46.15	-3.71	42.44	54.00	-11.56	H	AV
7311	50.54	1.59	52.13	74.00	-21.87	H	PK
7311	35.71	1.59	37.30	54.00	-16.70	H	AV
4874	67.46	-3.71	63.75	74.00	-10.25	V	PK
4874	52.01	-3.71	48.30	54.00	-5.70	V	AV
7311	57.83	1.59	59.42	74.00	-14.58	V	PK
7311	40.19	1.59	41.78	54.00	-12.22	V	AV
High Channel-2462MHz							
4924	58.34	-3.57	54.77	74.00	-19.23	H	PK
4924	43.94	-3.57	40.37	54.00	-13.63	H	AV
7386	47.18	1.91	49.09	74.00	-24.91	H	PK
7386	35.19	1.91	37.10	54.00	-16.90	H	AV
4924	64.67	-3.57	61.10	74.00	-12.90	V	PK
4924	49.49	-3.57	45.92	54.00	-8.08	V	AV
7386	52.40	1.91	54.31	74.00	-19.69	V	PK
7386	37.35	1.91	39.26	54.00	-14.74	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..

8. Out of Band Emissions

8.1 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).

8.2 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	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24

8.3 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).

8.4 Environmental Conditions

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

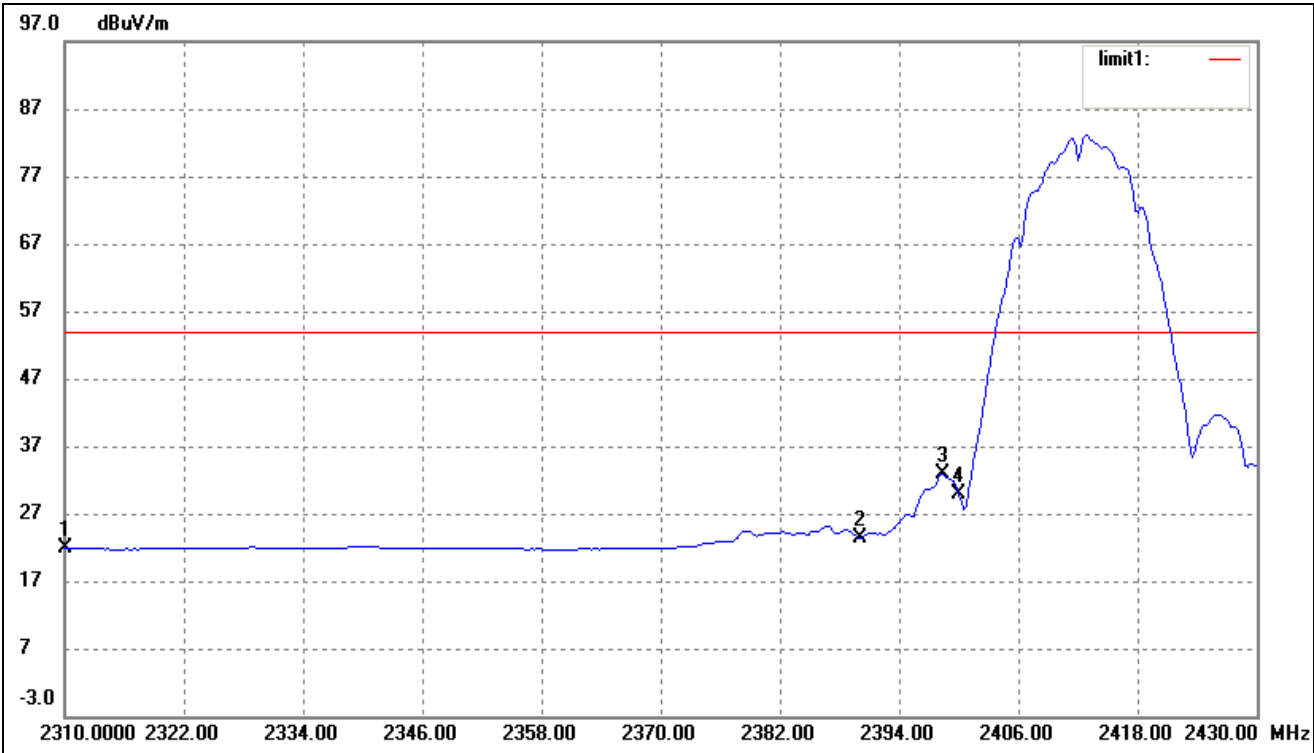
8.5 Summary of Test Results/Plots

Test Mode	Test Frequency MHz	Limit dBuV / dBc	Result
802.11b	2390.00	<54 dBuV	Pass
	2398.320	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass
802.11g	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT20	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
	2483.50	<54 dBuV	Pass

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

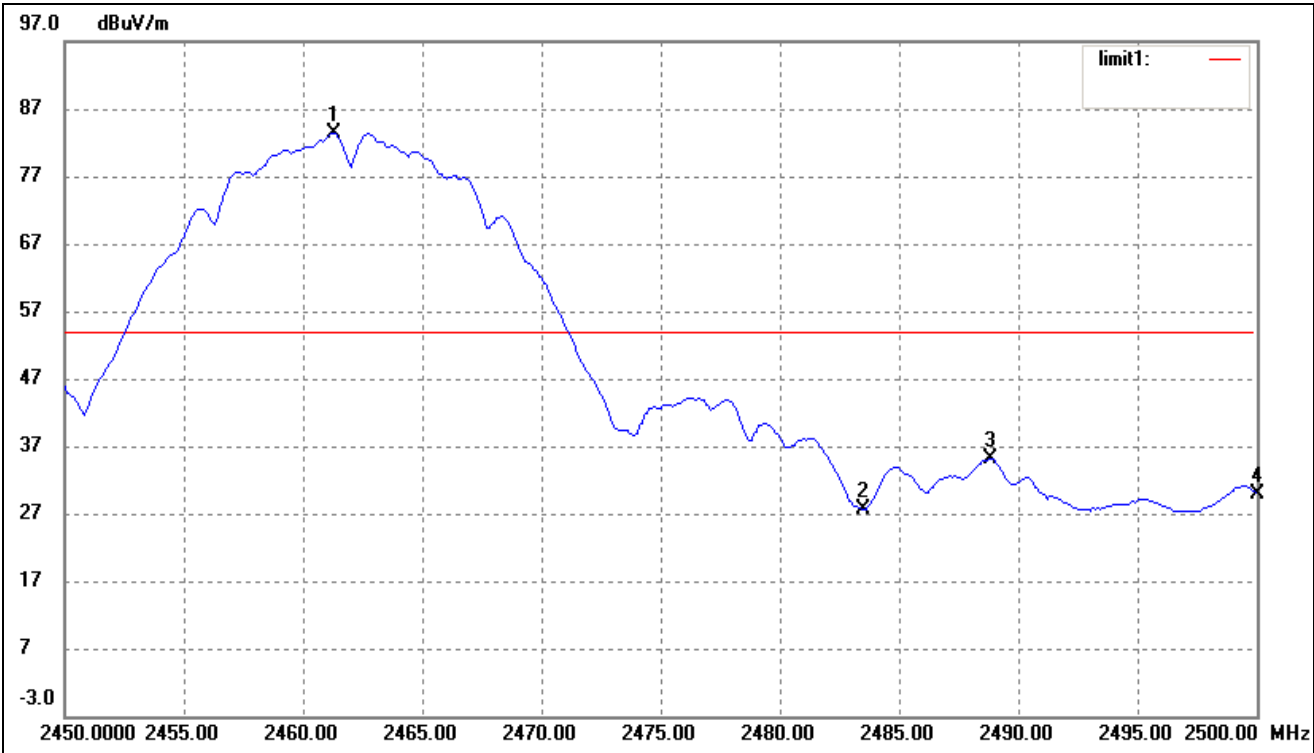
Please refer to the test plots as below.

802.11b-Lowest Bandedge



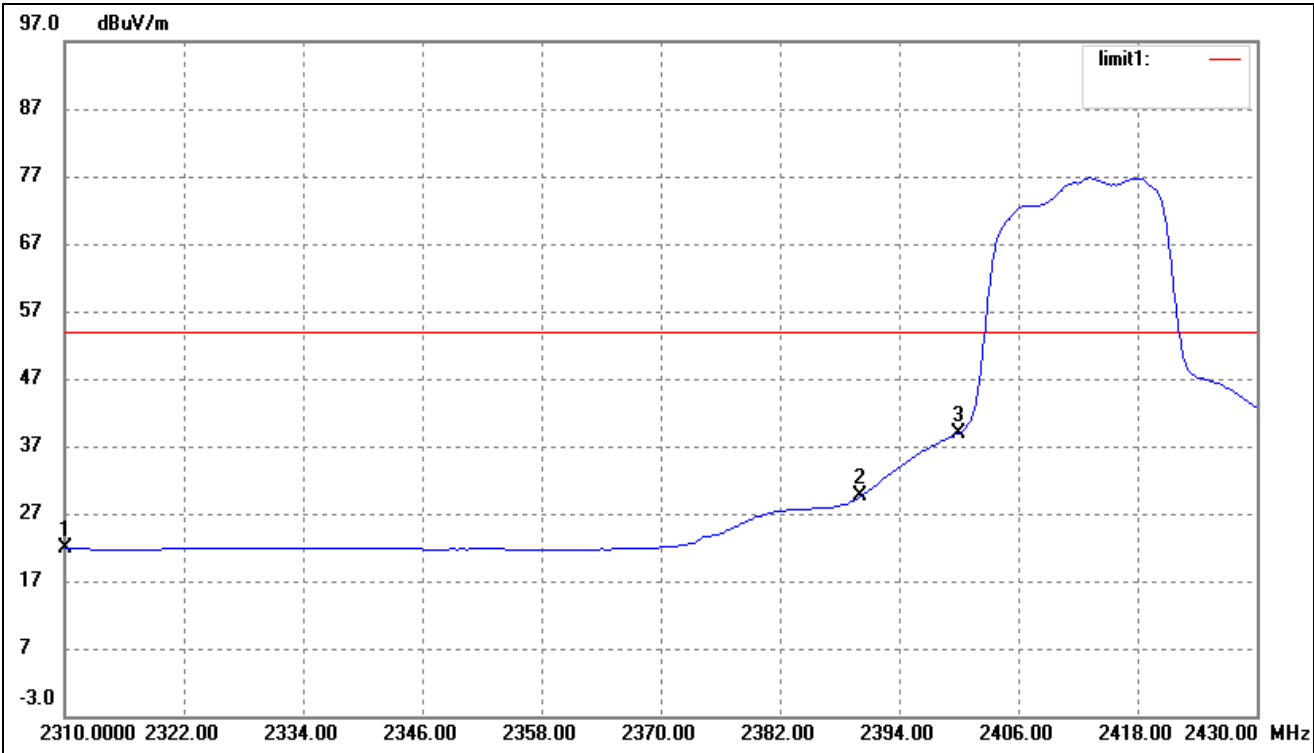
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.62	-11.72	21.90	54.00	-32.10	Average Detector
	2310.000	46.46	-11.72	34.74	74.00	-39.26	Peak Detector
2	2390.000	35.20	-11.75	23.45	54.00	-30.55	Average Detector
	2390.000	47.66	-11.75	35.91	74.00	-38.09	Peak Detector
3	2398.320	44.68	-11.75	32.93	54.00	-21.07	Average Detector
	2398.320	52.67	-11.75	40.92	74.00	-33.08	Peak Detector
4	2400.000	41.62	-11.75	29.87	54.00	-24.13	Average Detector
	2400.000	50.96	-11.75	39.21	74.00	-34.79	Peak Detector

802.11b-Highest Bandedge



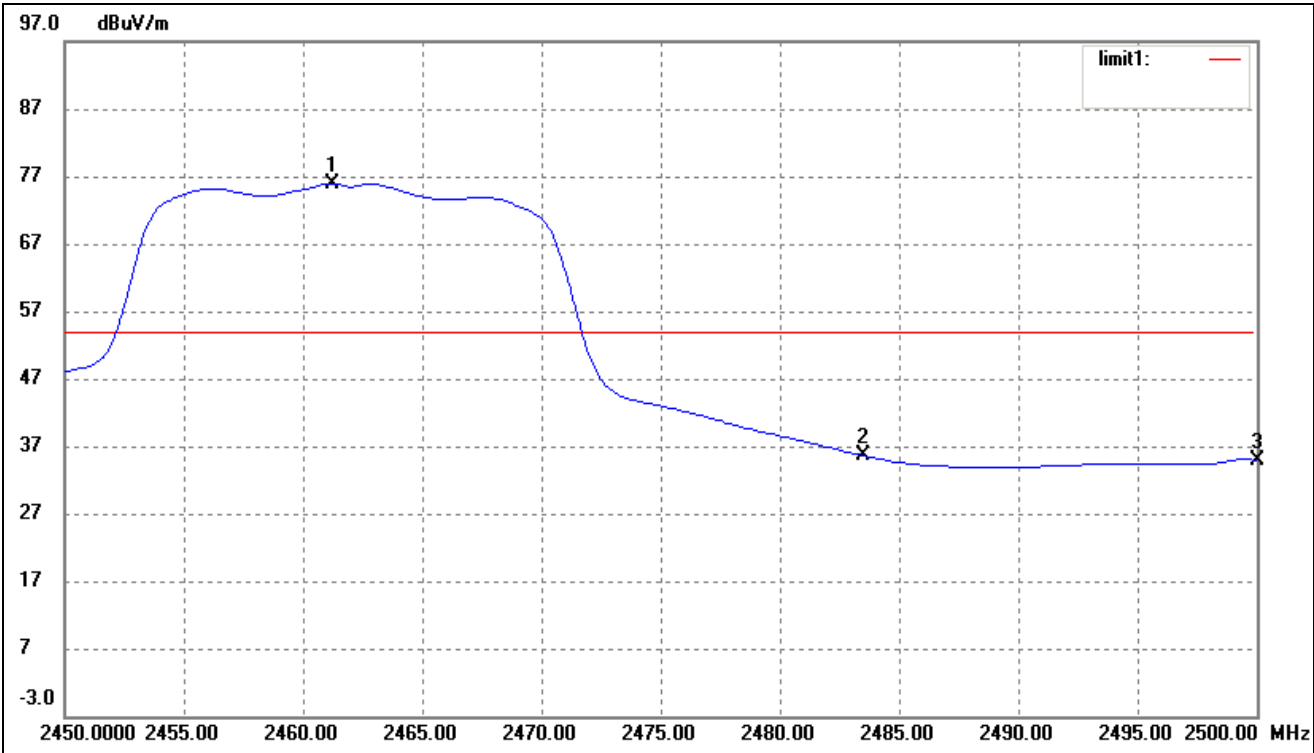
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2462.000	95.07	-11.77	83.30	/	/	Average Detector
	2462.000	99.59	-11.78	87.81	/	/	Peak Detector
2	2483.500	Delta = 52.91 dBc		30.39	54.00	-23.61	Average Detector
	2483.500			34.90	74.00	-39.10	Peak Detector
3	2488.800	46.93	-11.78	35.15	54.00	-18.85	Average Detector
	2488.800	55.54	-11.78	43.76	74.00	-30.24	Peak Detector
4	2500.000	41.66	-11.78	29.88	54.00	-24.12	Average Detector
	2500.000	53.93	-11.78	42.15	74.00	-28.91	Peak Detector

802.11g-Lowest Bandedge

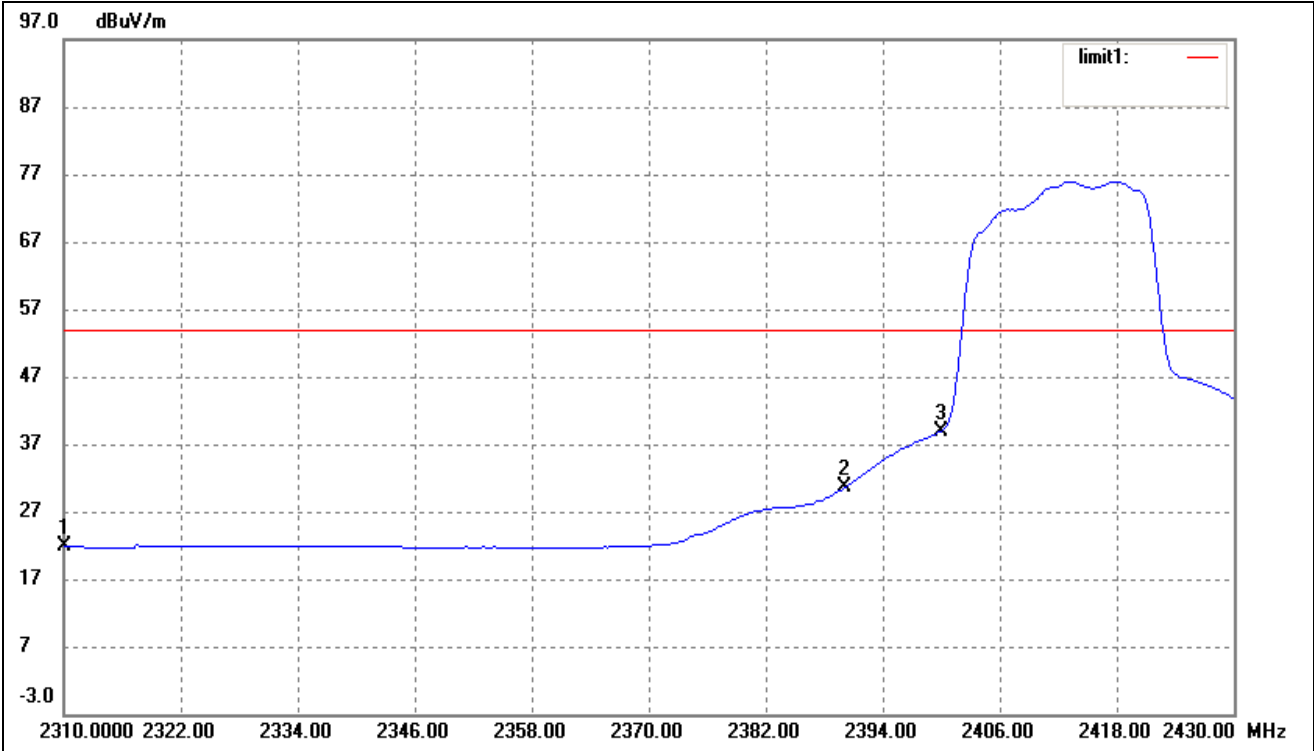


No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.52	-11.72	21.80	54.00	-32.20	Average Detector
	2310.000	47.91	-11.72	36.19	74.00	-37.81	Peak Detector
2	2390.000	41.28	-11.75	29.53	54.00	-24.47	Average Detector
	2390.000	59.98	-11.75	48.23	74.00	-25.77	Peak Detector
3	2400.000	50.69	-11.75	38.94	54.00	-15.06	Average Detector
	2400.000	68.88	-11.75	57.13	74.00	-16.87	Peak Detector

802.11g-Highest Bandedge

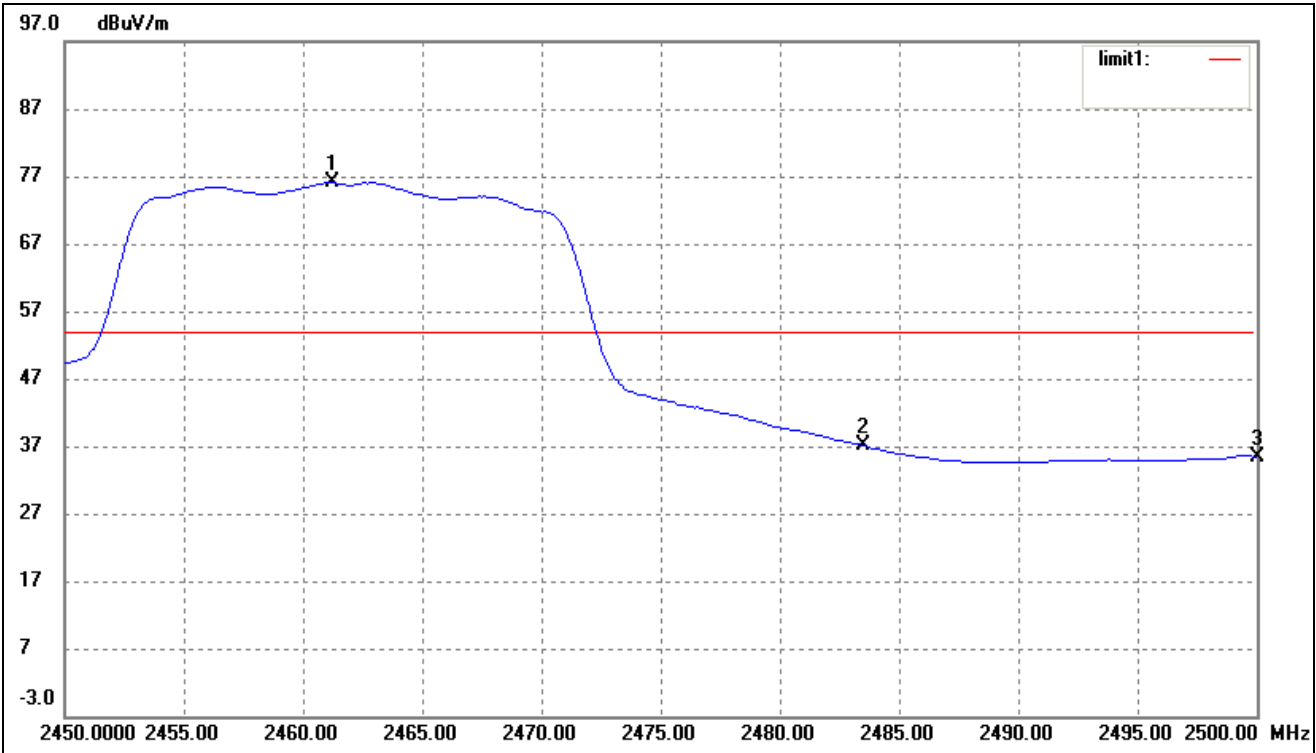


802.11n-HT20-Lowest Bandedge



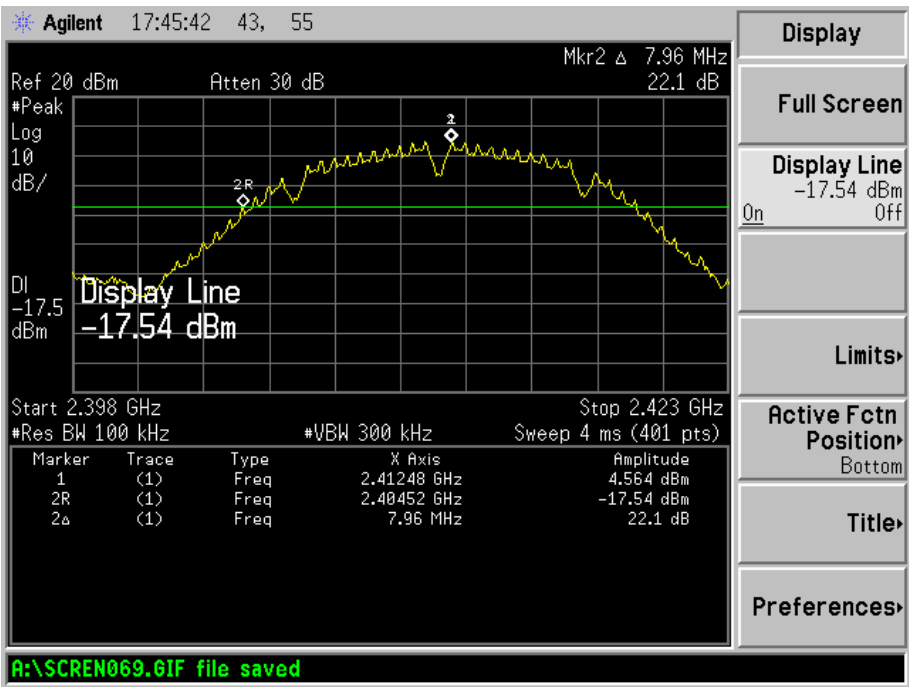
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.51	-11.72	21.79	54.00	-32.21	Average Detector
	2310.000	46.45	-11.72	34.73	74.00	-39.27	Peak Detector
2	2390.000	42.48	-11.75	30.73	54.00	-23.27	Average Detector
	2390.000	63.01	-11.75	51.26	74.00	-22.74	Peak Detector
3	2400.000	50.66	-11.75	38.91	54.00	-15.09	Average Detector
	2400.000	69.04	-11.75	57.29	74.00	-16.71	Peak Detector

802.11n-HT20-Highest Bandedge

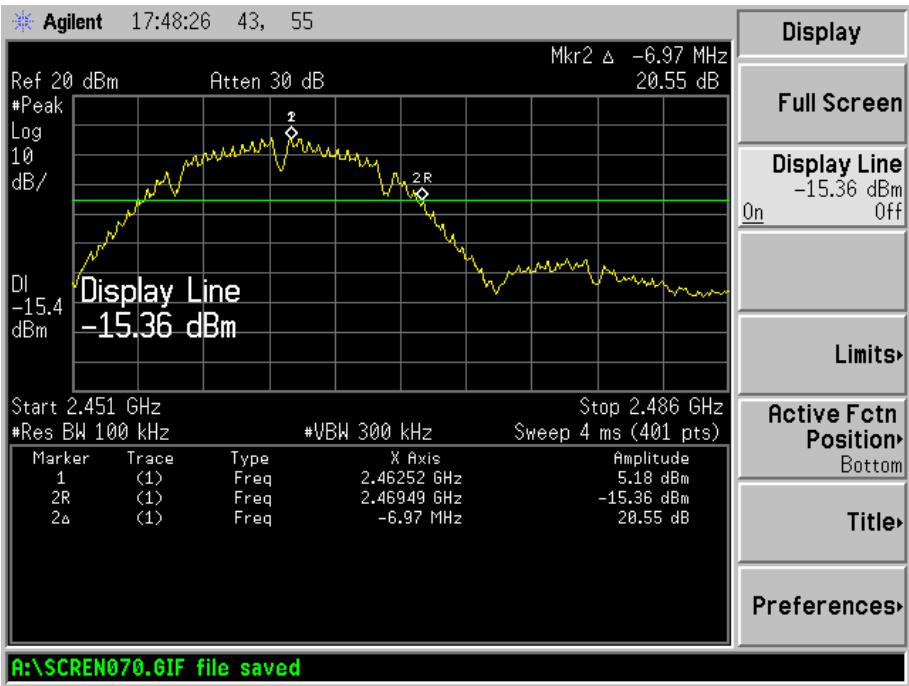


Bandedge (Conducted)

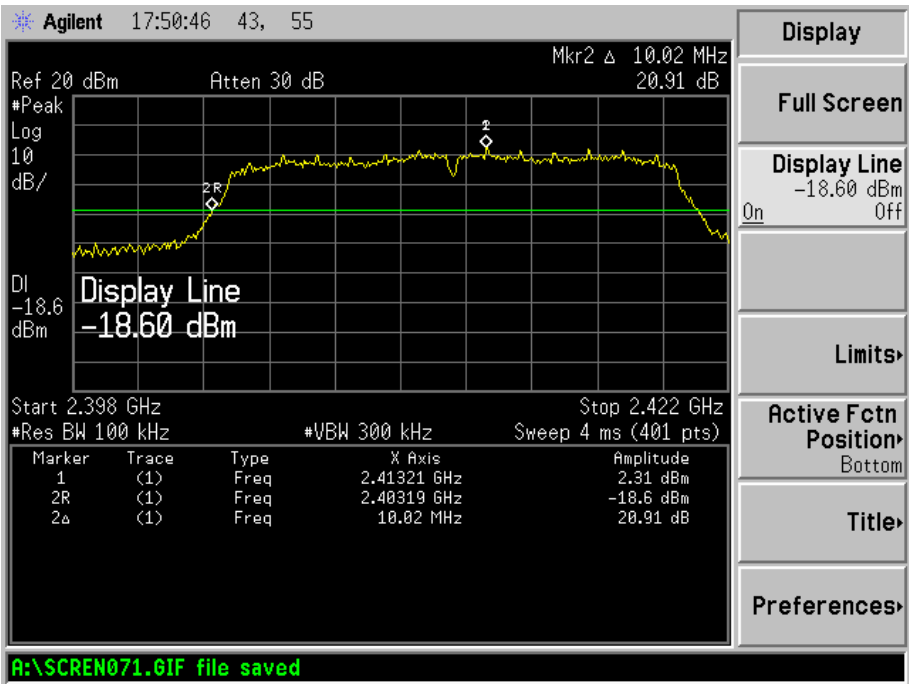
802.11b-Lowest Bandedge



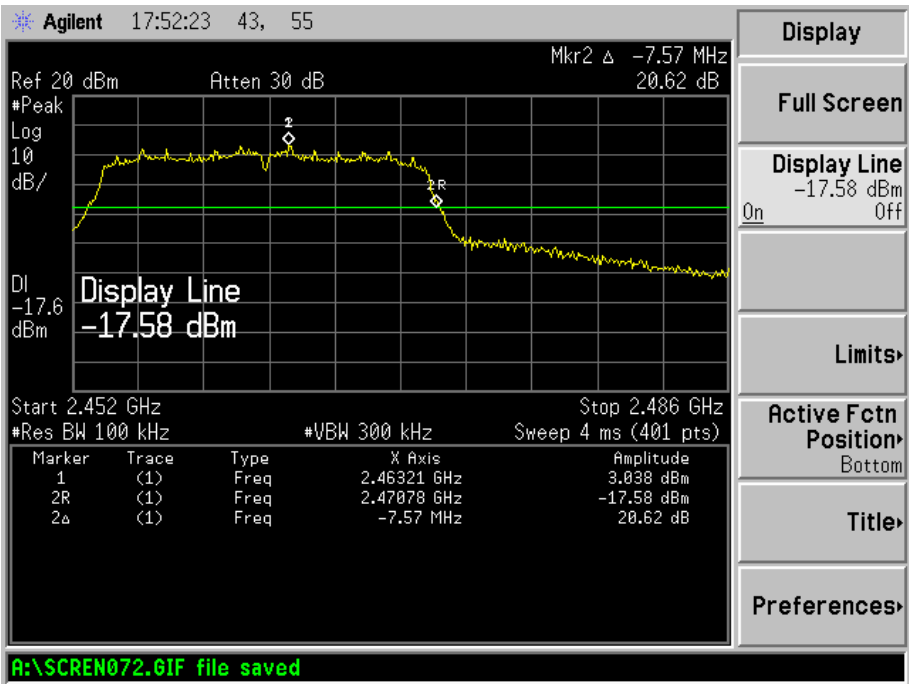
802.11b-Highest Bandedge



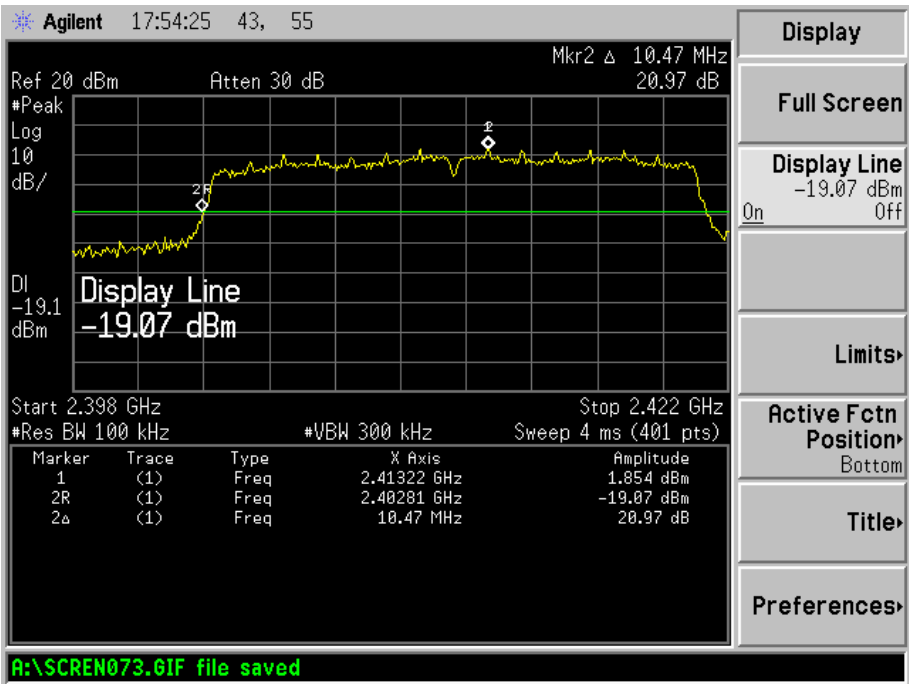
802.11g-Lowest Bandedge



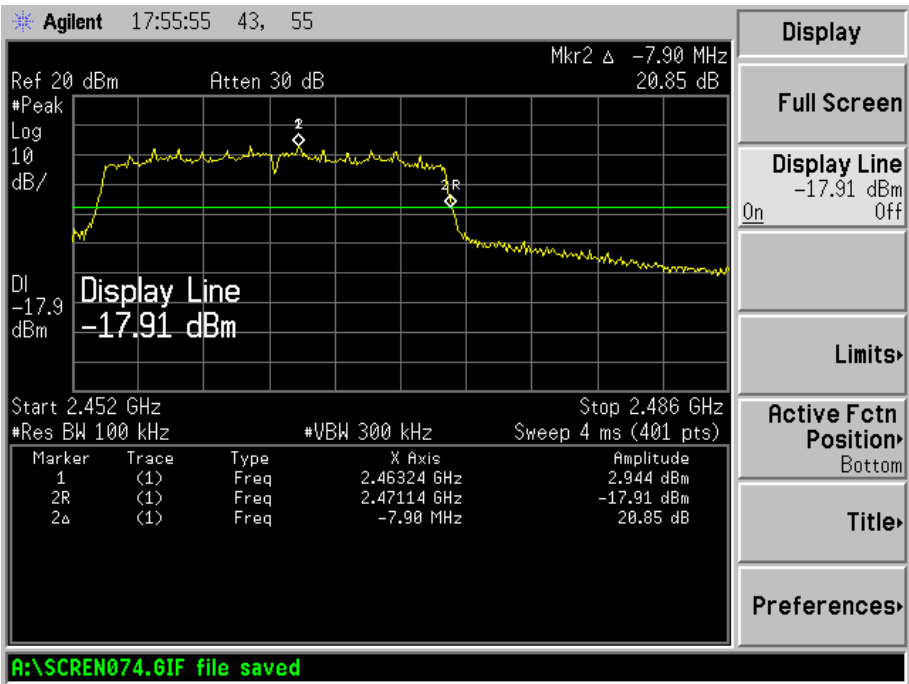
802.11g-Highest Bandedge



802.11n-HT20-Lowest Bandedge

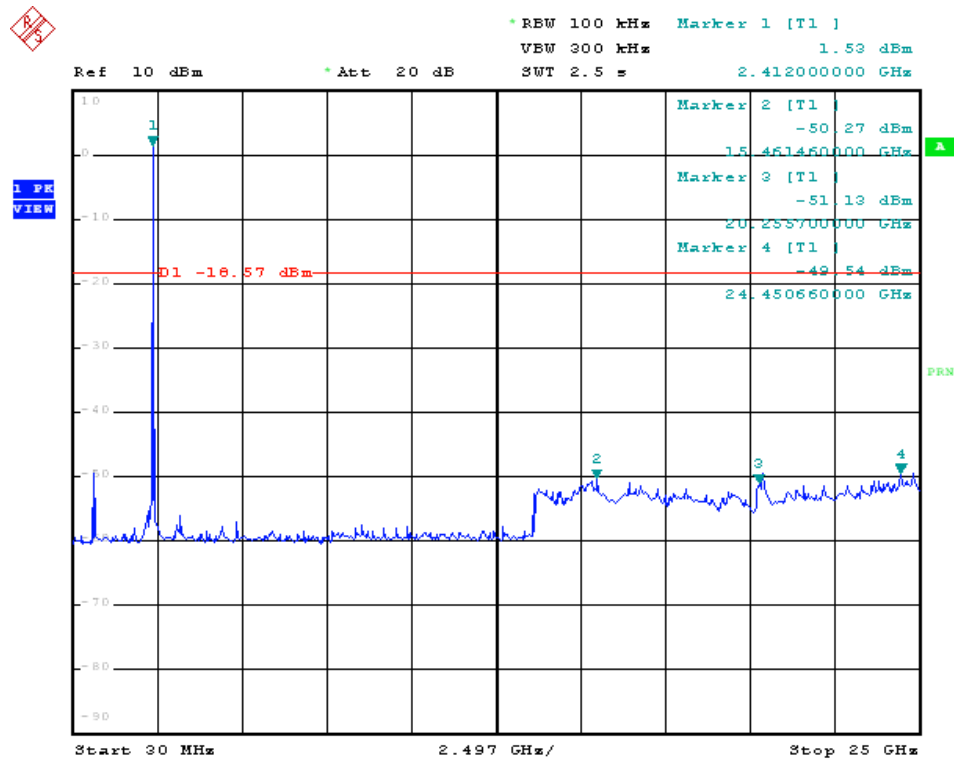


802.11n-HT20-Highest Bandedge

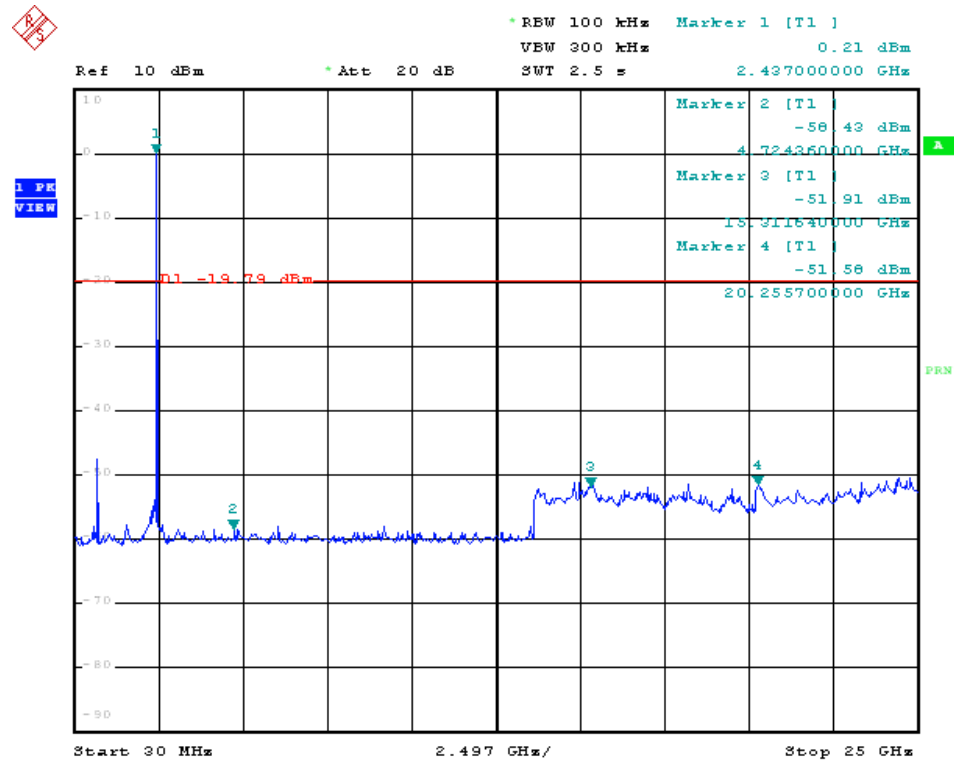


Conducted Spurious Emissions

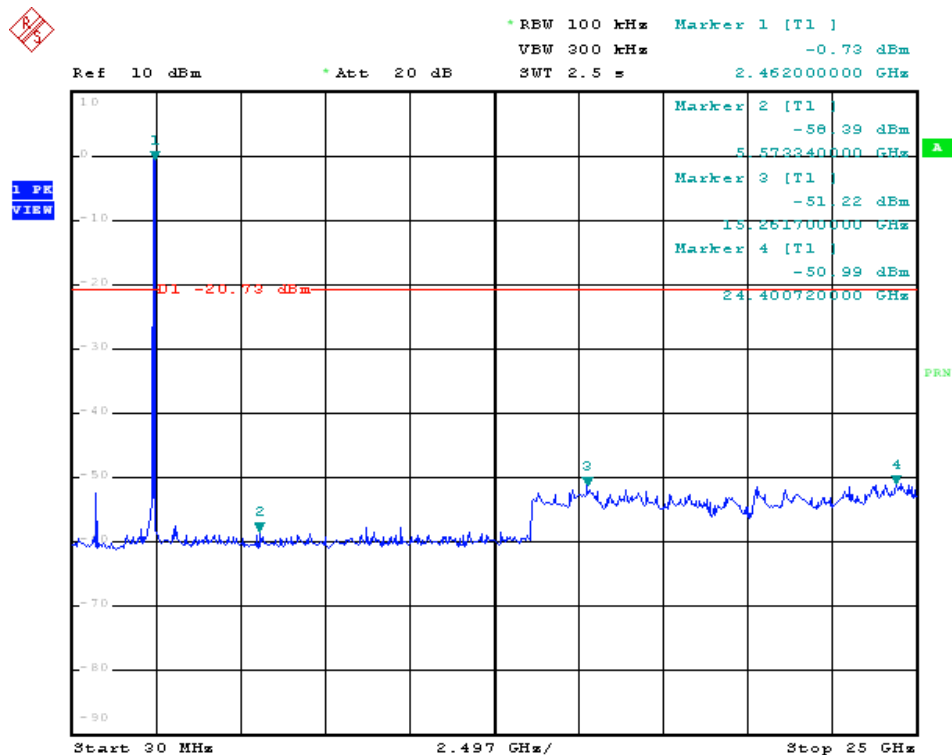
802.11b Low Bandedge



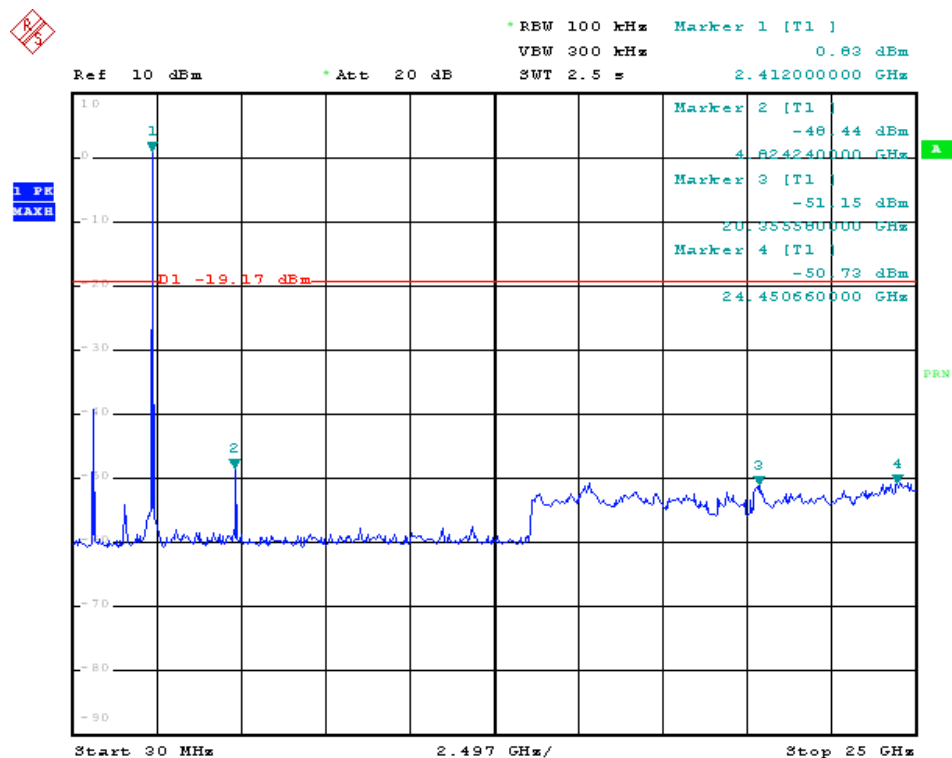
802.11b Middle Bandedge



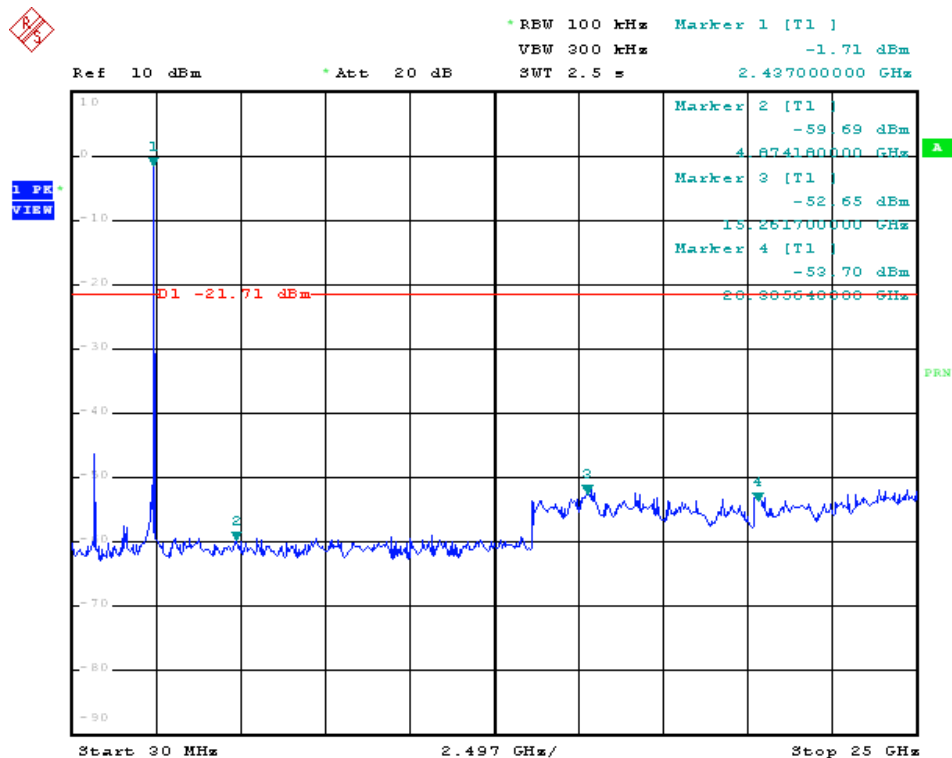
802.11b High Bandedge



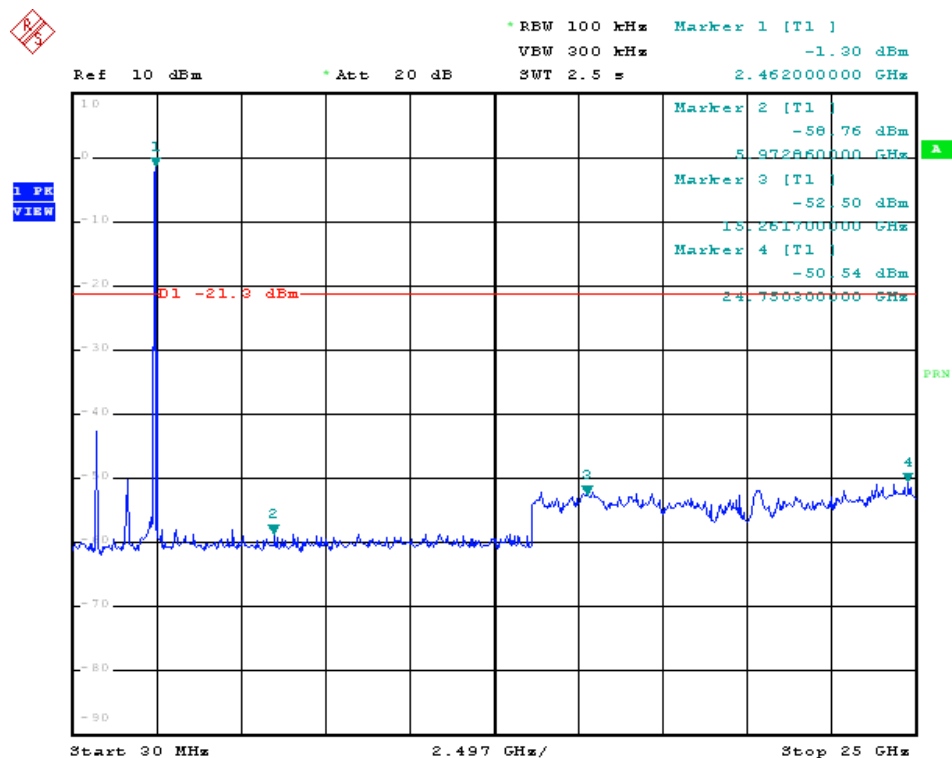
802.11g Low Bandedge



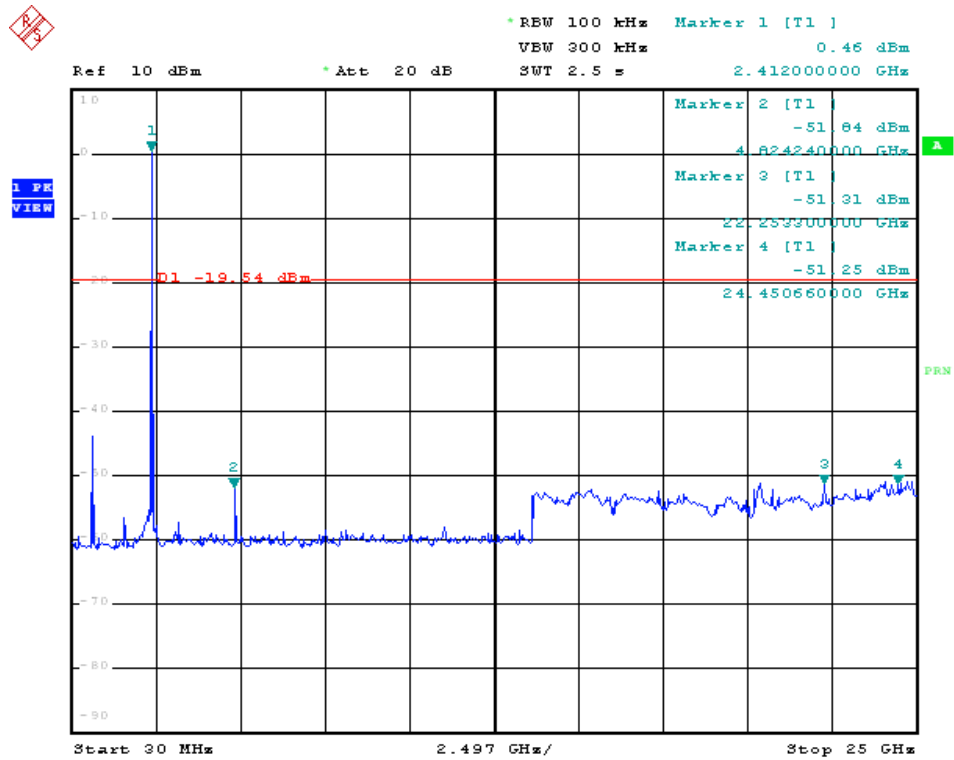
802.11g Middle Bandedge



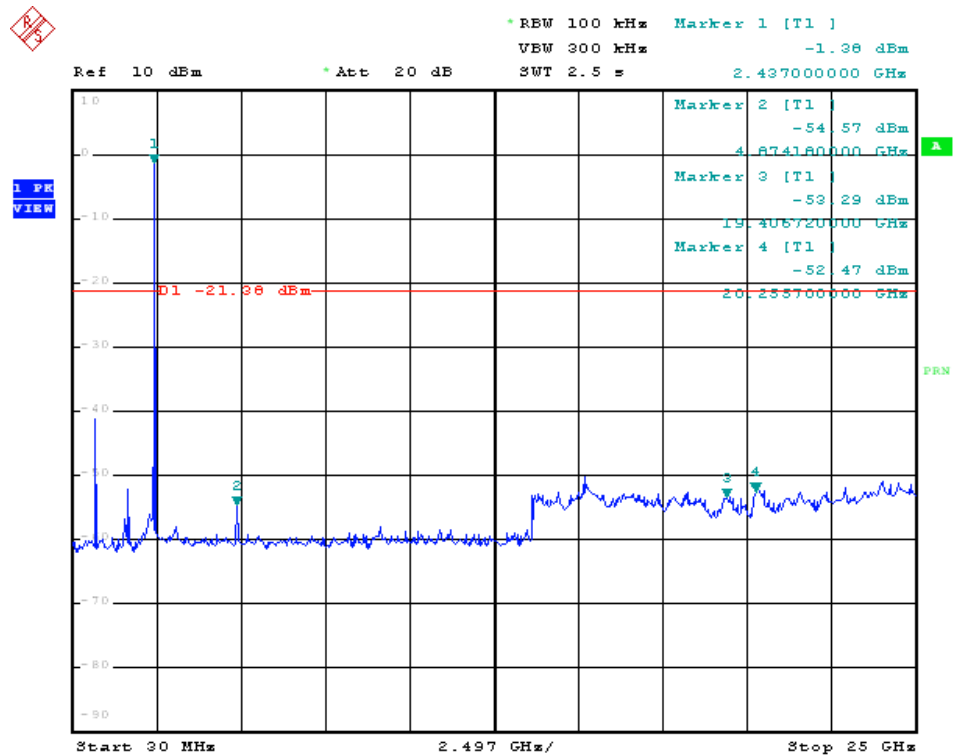
802.11g High Bandedge



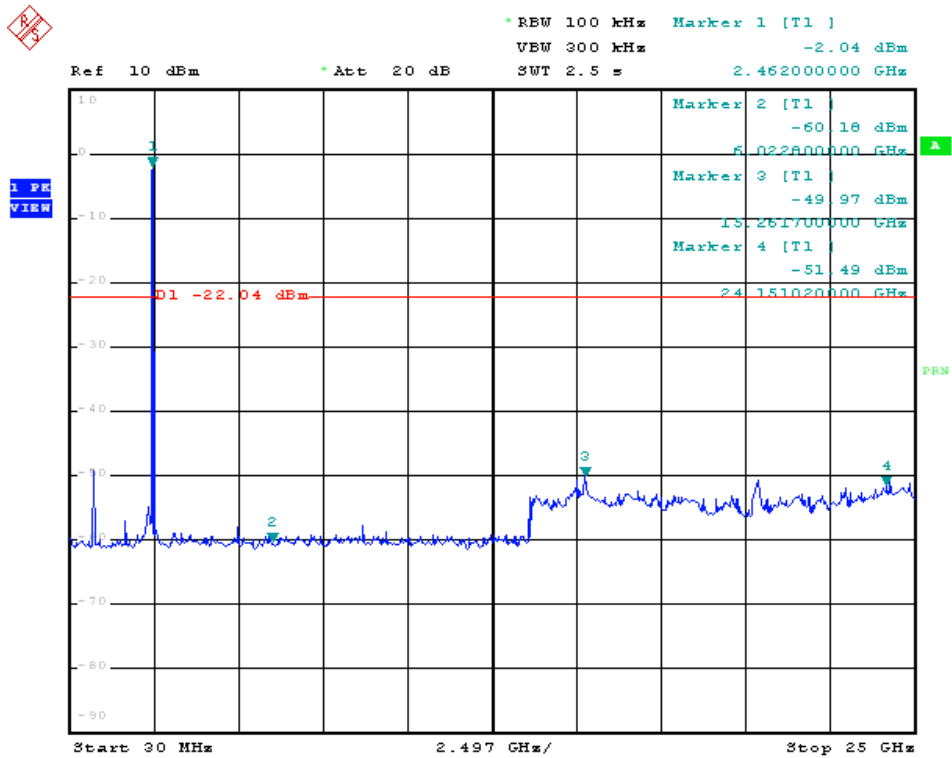
802.11n-HT20 Low Bandedge



802.11n-HT20 Middle Bandedge



802.11n-HT20 High Bandedge



9. Conducted Emissions

9.1 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.

9.2 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

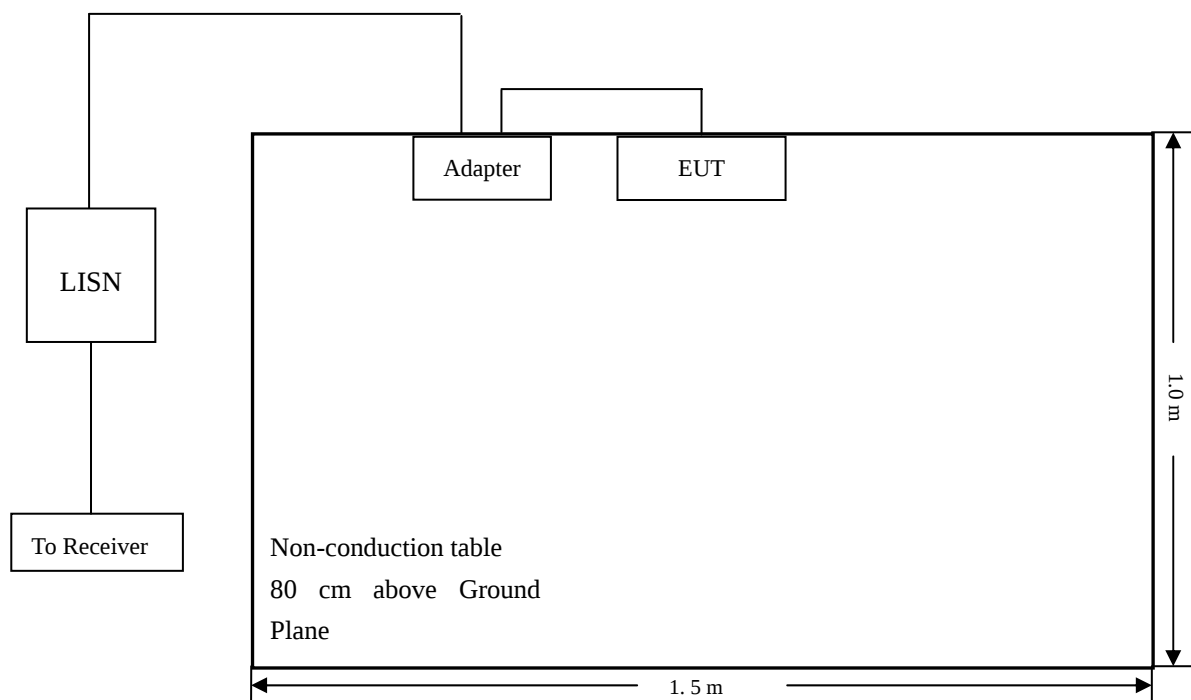
9.3 Test Procedure

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.

9.4 Basic Test Setup Block Diagram



9.5 Environmental Conditions

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

9.6 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

9.7 Summary of Test Results/Plots

According to the data in section 3.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

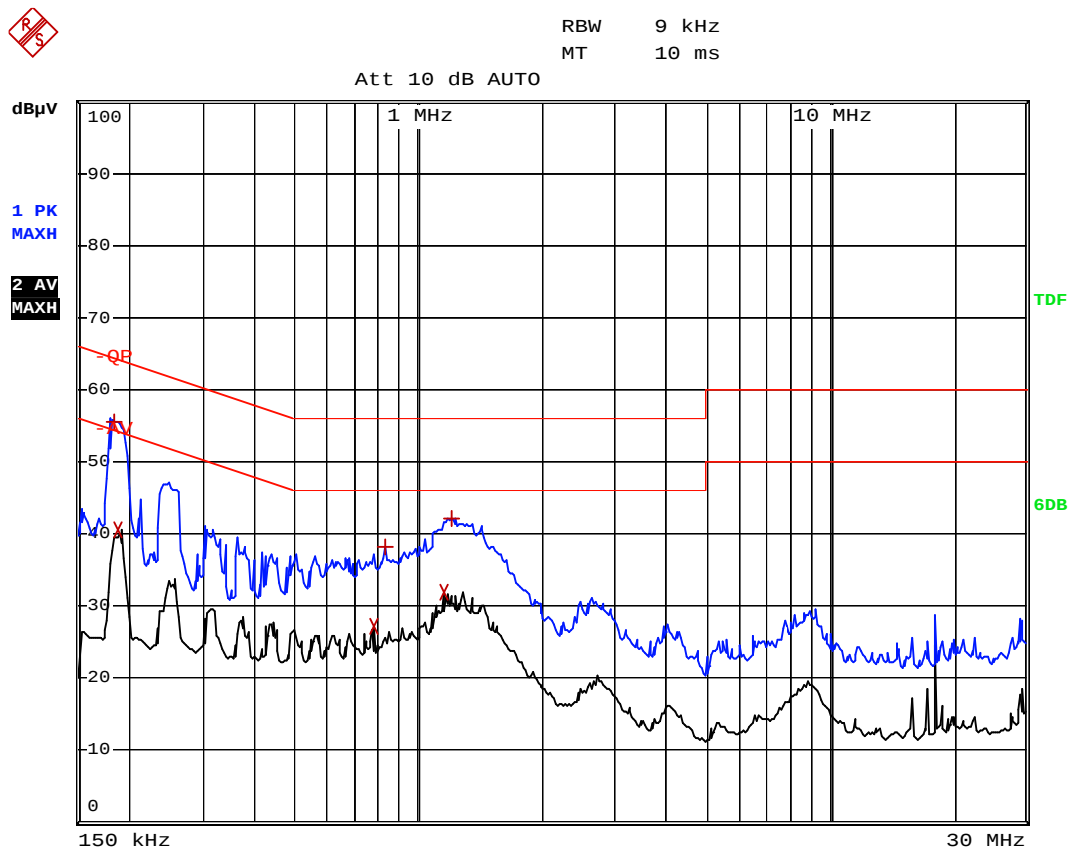
-8.56 dBμV at 0.186 MHz in the Line mode, Peak detector, 0.15-30MHz

9.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

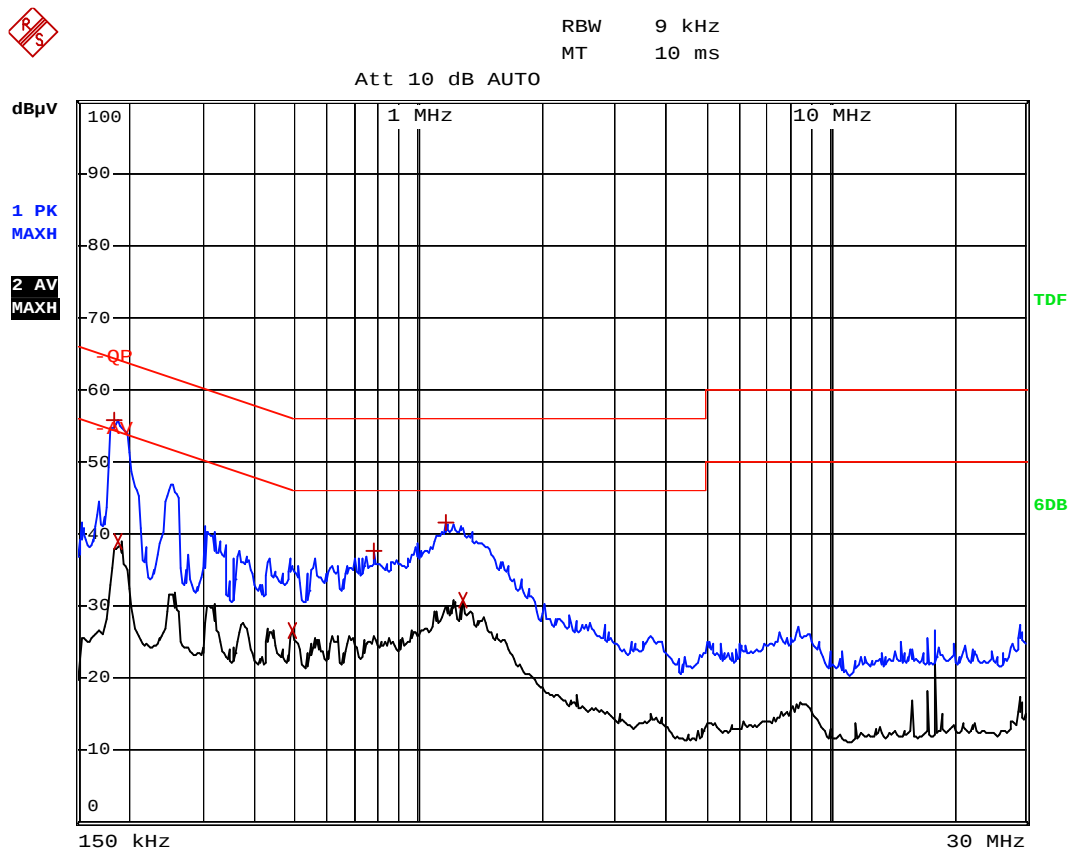
EUT: Projection Tablet PC
Tested Model: U7
Operating Condition: Transmitting
Comment: AC 120V/60Hz, adapter 5V

Test Specification: Neutral



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	186 kHz	55.63	-8.57
2 Average	190 kHz	40.49	-13.54
2 Average	778 kHz	27.24	-18.75
1 Max Peak	834 kHz	38.23	-17.76
2 Average	1.154 MHz	31.84	-14.15
1 Max Peak	1.202 MHz	42.19	-13.80

Test Specification: Line



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	186 kHz	55.64	-8.56
2 Average	190 kHz	38.87	-15.16
2 Average	494 kHz	26.65	-19.44
1 Max Peak	778 kHz	37.66	-18.33
1 Max Peak	1.17 MHz	41.52	-14.47
2 Average	1.29 MHz	30.93	-15.07

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