

# FCC Part 15C

## Measurement and Test Report

### For

### NEXXT SOLUTIONS

3505 N.W 107TH AVE. MIAMI, Florida 33178, United States

**FCC ID: X4YNX12AC**

<b>FCC Rule(s):</b>	<u>FCC Part 15C</u>
<b>Product Description:</b>	<u>Wireless Router</u>
<b>Tested Model:</b>	<u>ARNEL904U1</u>
<b>Report No.:</b>	<u>HCT17GR191E-1</u>
<b>Sample Receipt Date:</b>	<u>October 12, 2017</u>
<b>Tested Date:</b>	<u>October 12~ October 28, 2017</u>
<b>Issued Date:</b>	<u>October 29, 2017</u>
<b>Tested By:</b>	<u>Jason Su / Engineer</u>
<b>Reviewed By:</b>	<u>Silin Chen / EMC Manager</u>
<b>Approved &amp; Authorized By:</b>	<u>Jandy So / PSQ Manager</u>
<b>Prepared By:</b>	<p style="text-align: center;"><b>Shenzhen SEM Test Technology Co., Ltd</b> 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, 518101, China Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn</p>

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

## **TABLE OF CONTENTS**

<b>1. GENERAL INFORMATION .....</b>	<b>3</b>
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
1.2 TEST STANDARDS.....	5
1.3 TEST METHODOLOGY.....	5
1.4 TEST FACILITY .....	5
1.5 EUT SETUP AND TEST MODE .....	6
1.6 MEASUREMENT UNCERTAINTY .....	6
1.7 TEST EQUIPMENT LIST AND DETAILS .....	7
<b>2. SUMMARY OF TEST RESULTS .....</b>	<b>8</b>
<b>3. RF EXPOSURE .....</b>	<b>9</b>
3.1 STANDARD APPLICABLE.....	9
3.2 TEST RESULT.....	9
<b>4. ANTENNA REQUIREMENT .....</b>	<b>10</b>
4.1 STANDARD APPLICABLE.....	10
4.2 EVALUATION INFORMATION .....	10
<b>5. POWER SPECTRAL DENSITY .....</b>	<b>11</b>
5.1 STANDARD APPLICABLE.....	11
5.2 TEST PROCEDURE.....	11
5.3 ENVIRONMENTAL CONDITIONS .....	11
5.4 SUMMARY OF TEST RESULTS/PLOTS .....	12
<b>6. 6DB BANDWIDTH .....</b>	<b>25</b>
6.1 STANDARD APPLICABLE.....	25
6.2 TEST PROCEDURE.....	25
6.3 ENVIRONMENTAL CONDITIONS .....	25
6.4 SUMMARY OF TEST RESULTS/PLOTS .....	25
<b>7. RF OUTPUT POWER .....</b>	<b>39</b>
7.1 STANDARD APPLICABLE.....	39
7.2 TEST PROCEDURE.....	39
7.3 ENVIRONMENTAL CONDITIONS .....	39
7.4 SUMMARY OF TEST RESULTS/PLOTS .....	40
<b>8. FIELD STRENGTH OF SPURIOUS EMISSIONS .....</b>	<b>41</b>
8.1 MEASUREMENT UNCERTAINTY .....	41
8.2 STANDARD APPLICABLE.....	41
8.3 TEST PROCEDURE.....	41
8.4 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	43
8.5 ENVIRONMENTAL CONDITIONS .....	43
8.6 SUMMARY OF TEST RESULTS/PLOTS .....	43
<b>9. OUT OF BAND EMISSIONS.....</b>	<b>54</b>
9.1 STANDARD APPLICABLE.....	54
9.2 TEST PROCEDURE.....	54
9.3 ENVIRONMENTAL CONDITIONS .....	55
9.4 SUMMARY OF TEST RESULTS/PLOTS .....	55
<b>10. CONDUCTED EMISSIONS .....</b>	<b>83</b>
10.1 MEASUREMENT UNCERTAINTY .....	83
10.2 TEST PROCEDURE.....	83
10.3 BASIC TEST SETUP BLOCK DIAGRAM.....	83
10.4 ENVIRONMENTAL CONDITIONS .....	83
10.5 TEST RECEIVER SETUP .....	84
10.6 SUMMARY OF TEST RESULTS/PLOTS .....	84
10.7 CONDUCTED EMISSIONS TEST DATA.....	84

## 1. GENERAL INFORMATION

---

### 1.1 Product Description for Equipment Under Test (EUT)

<b>Client Information</b>	
Applicant:	<b>NEXXT SOLUTIONS</b>
Address of applicant:	3505 N.W 107TH AVE. MIAMI, Florida 33178, United States
Manufacturer:	<b>YICHEN (Shenzhen) Technology Co., Ltd.</b>
Address of manufacturer:	6th Building, Yasen Industrial Park, Chengxin Road 8, Baolong Industrial Estate, Longgang District, Shenzhen, China.

<b>General Description of EUT</b>	
Product Name:	Wireless Router
Trade Name:	NEXXT
Model No.:	ARNEL904U1
Adding Model(s):	N/A
Rated Voltage:	Input: AC 100-240V 50~60Hz 0.6Amax Output: DC 12V 1A
Power Adapter Model:	RD1201000-CSS-HMG
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

<b>Technical Characteristics of EUT</b>	
Frequency Range:	IEEE 802.11b: 2412MHz~2462MHz IEEE 802.11g: 2412MHz~2462MHz IEEE802.11nHT20: 2412MHz~2462MHz, 5180MHz~5240MHz, 5745MHz~5825MHz IEEE802.11nHT40: 2422MHz~2452MHz, IEEE 802.11a: 5180MHz~5240MHz, 5745MHz~5825MHz
RF Output Power:	21.09 dBm (Conducted)
Data Rate:	maximum of 150Mbps
Modulation:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)

Quantity of Channels:	11 for 802.11a/b/g/n(HT20); 7 for 802.11n(HT40)
Type of Antenna:	5dB Dual Frequency Welding Antenna
Antenna Gain:	5.5dBi

## 1.2 Test Standards

The following report is prepared on behalf of the **NEXXT SOLUTIONS** 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 C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, 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 measurement guide KDB 558074 D01 V04 for digital transmission systems and KDB 662911 D01 Multiple Transmitter Output v02r01 shall be performed also.

## 1.4 Test Facility

### FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

### Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

## 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:

<b>Test Mode List</b>		
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

Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.

<b>EUT Cable List and Details</b>			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Adapter Cable	1.45	Shielded	Without Core

<b>Special Cable List and Details</b>			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

<b>Auxiliary Equipment List and Details</b>			
Description	Manufacturer	Model	Serial Number
/	/	/	/

## 1.6 Measurement Uncertainty

<b>Measurement uncertainty</b>			
Parameter	Conditions	Uncertainty	
RF Output Power	Conducted	±0.42dB	
Occupied Bandwidth	Conducted	±1.5%	
Power Spectral Density	Conducted	±1.8dB	
Conducted Spurious Emission	Conducted	±2.17dB	
Conducted Emissions	Conducted	±2.88dB	
Transmitter Spurious Emissions	Radiated	±5.1dB	

## 1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11

## 2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.205	Restricted Band of Operation	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)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

## 3. RF Exposure

---

### 3.1 Standard Applicable

According to § 1.1307 and § 2.1091, the mobile transmitter must comply the RF exposure requirements.

### 3.2 Test Result

This product complied with the requirement of the RF Exposure, please see the MPE 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 two welding 5dB Dual Frequency Welding 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 Procedure

According to the KDB 558074 D01 V04, such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. The test method of power spectral density as below:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set VBW  $\geq 3 \times \text{RBW}$ .
- e) Detector = power averaging (RMS) or sample detector (when RMS not available).
- f) Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$ .
- g) Sweep time = auto couple.
- h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
- i) Use the peak marker function to determine the maximum amplitude level.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

### 5.3 Environmental Conditions

Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

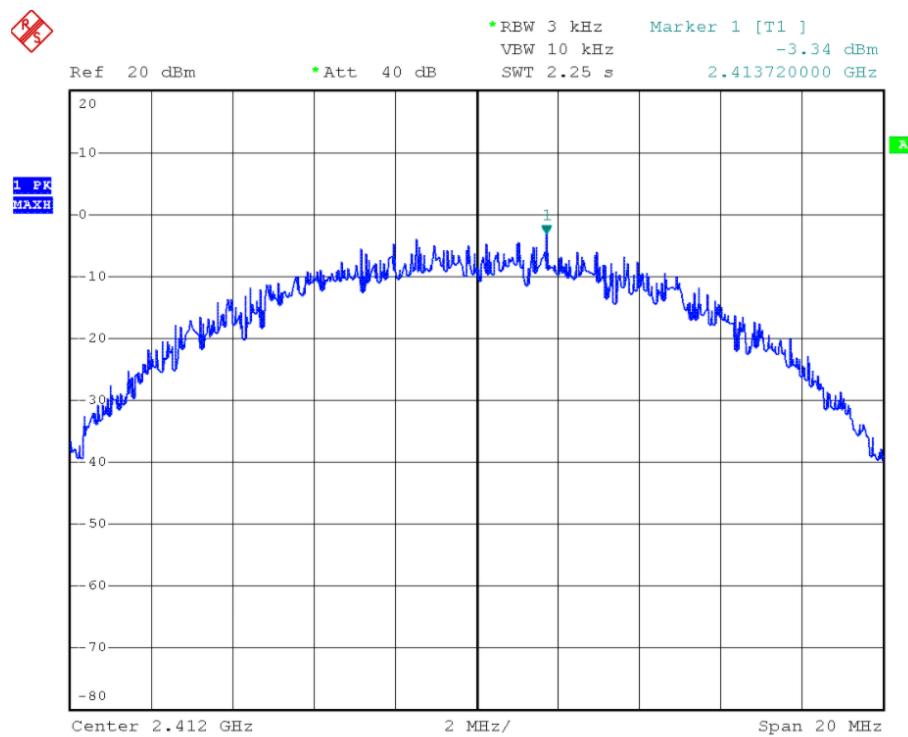
## 5.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	Power Spectral Density dBm/100kHz			Limit dBm/3kHz
		Chain 1	Chain 2	Total	
802.11b	2412	-3.34	-6.66	-1.68	5.49
	2437	-6.49	-7.26	-3.85	5.49
	2462	-3.92	-4.49	-1.19	5.49
802.11g	2412	-7.77	-11.53	-6.24	5.49
	2437	-11.18	-14.79	-10.03	5.49
	2462	-7.81	-12.28	-6.48	5.49
802.11n HT20	2412	-9.70	-13.78	-8.27	5.49
	2437	-8.84	-12.83	-7.38	5.49
	2462	-9.48	-11.73	-7.45	5.49
802.11n HT40	2422	-13.95	-12.61	-10.22	5.49
	2437	-14.71	-15.26	-11.97	5.49
	2452	-15.12	-15.84	-12.45	5.49

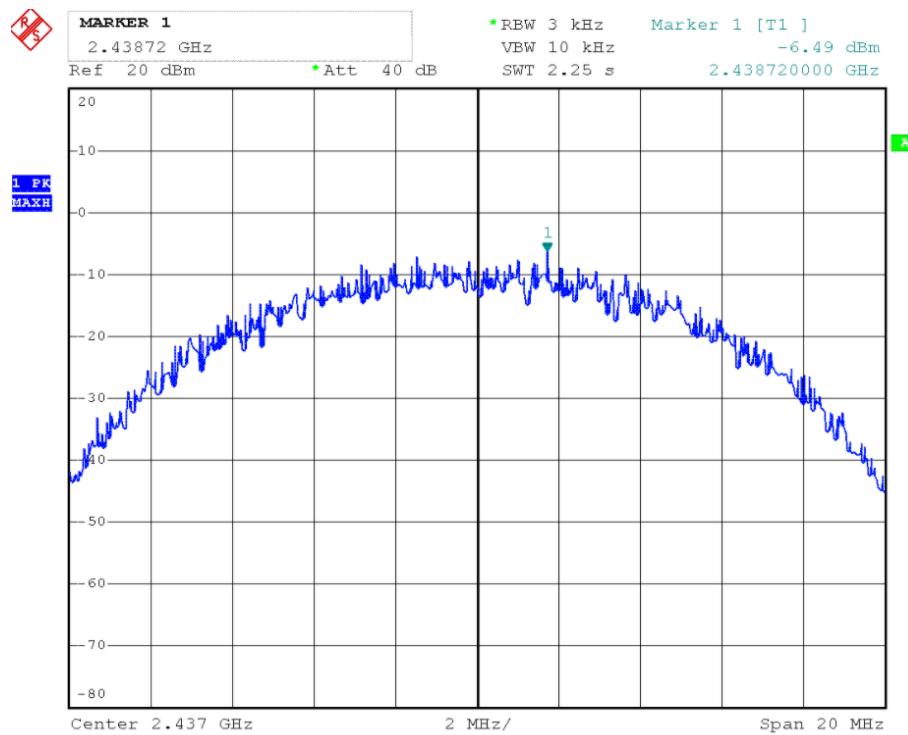
Please refer to the following test plots:

**Antenna 1**

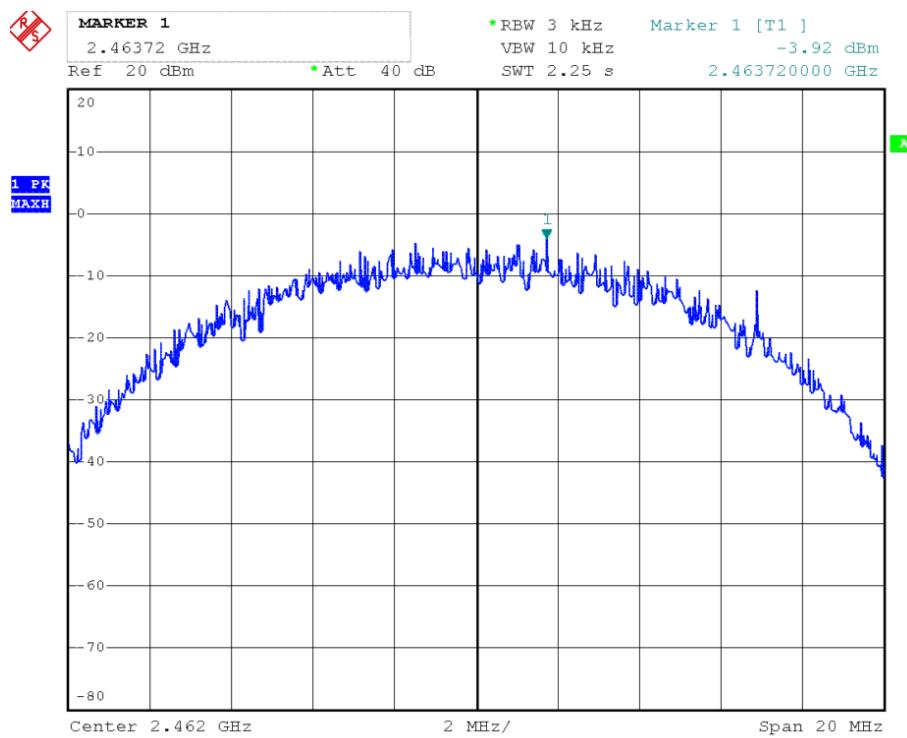
802.11b-Low Channel



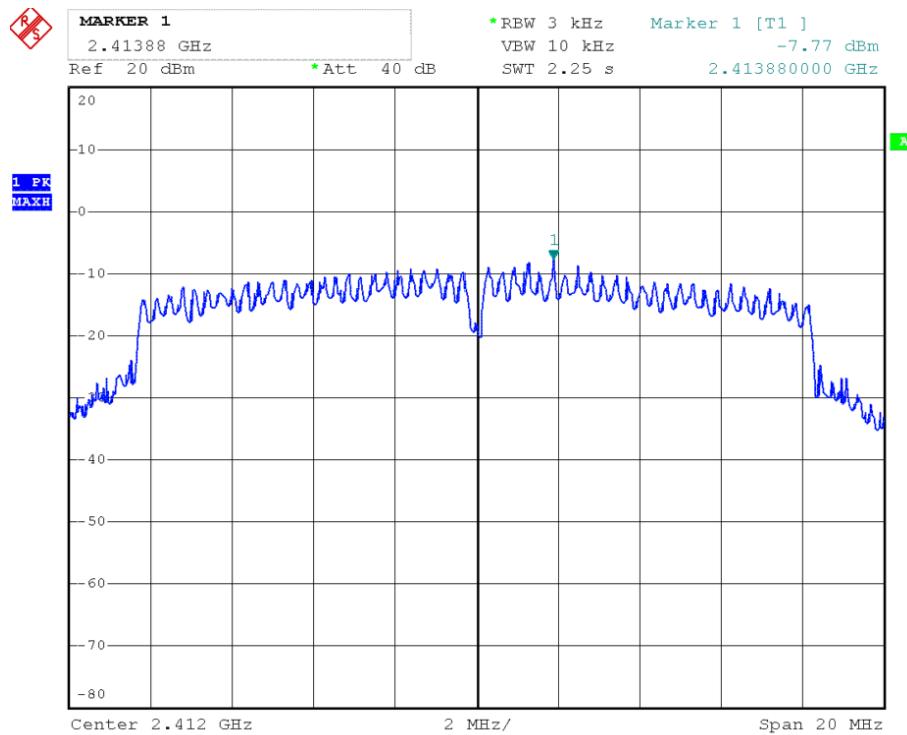
802.11b-Middle Channel



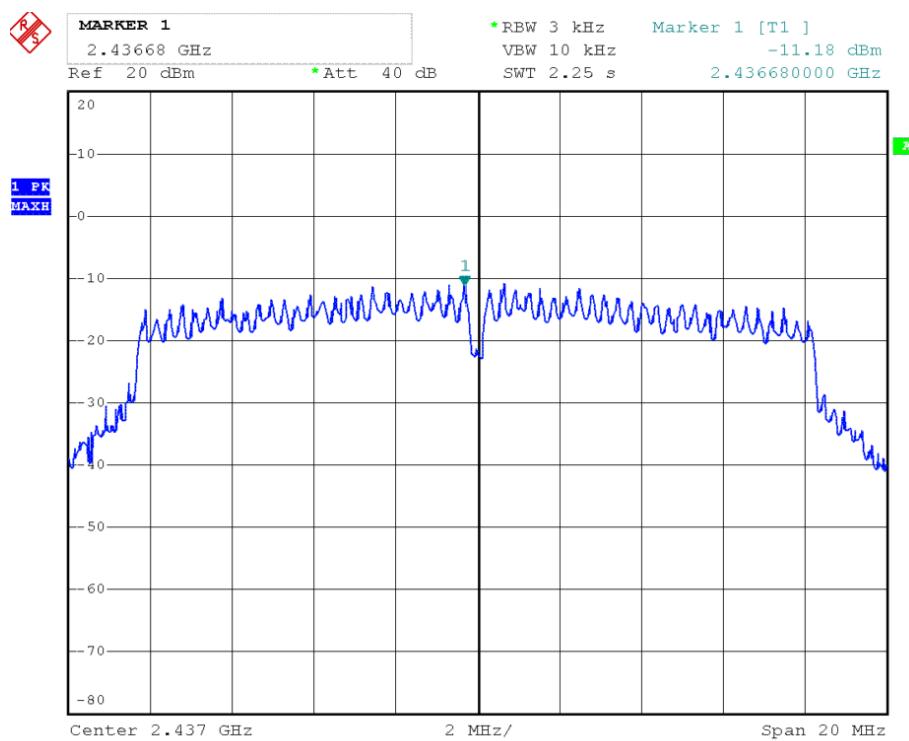
## 802.11b-High Channel



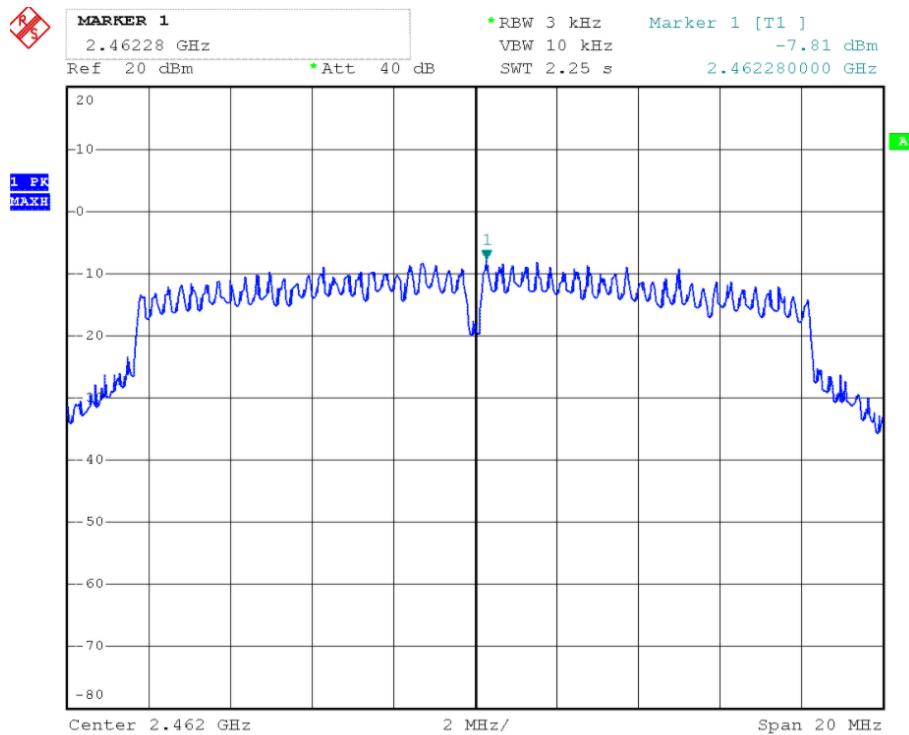
## 802.11g-Low Channel



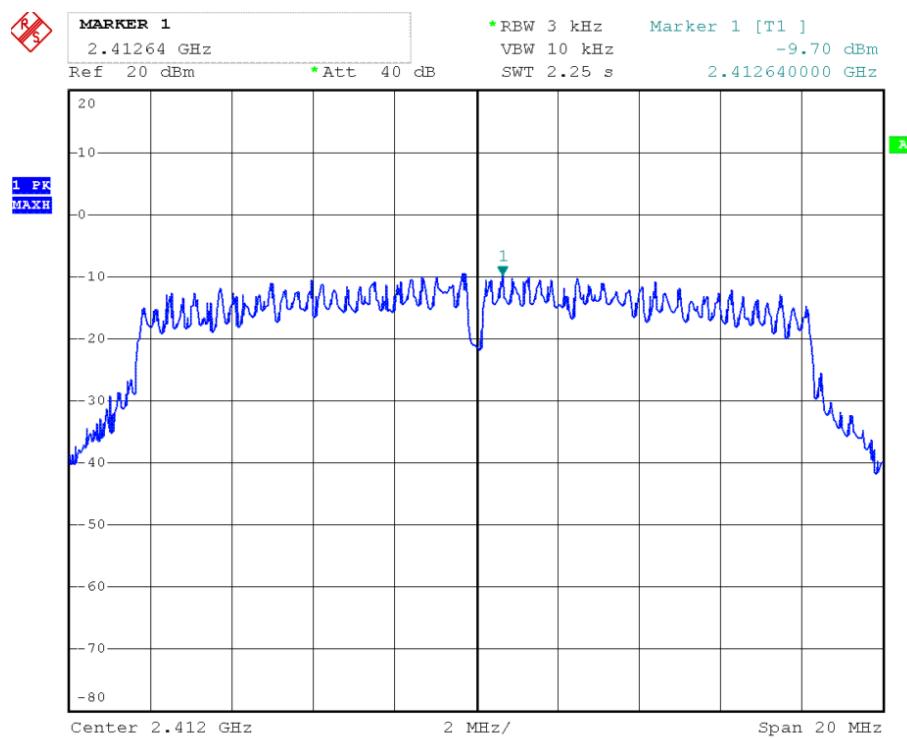
## 802.11g-Middle Channel



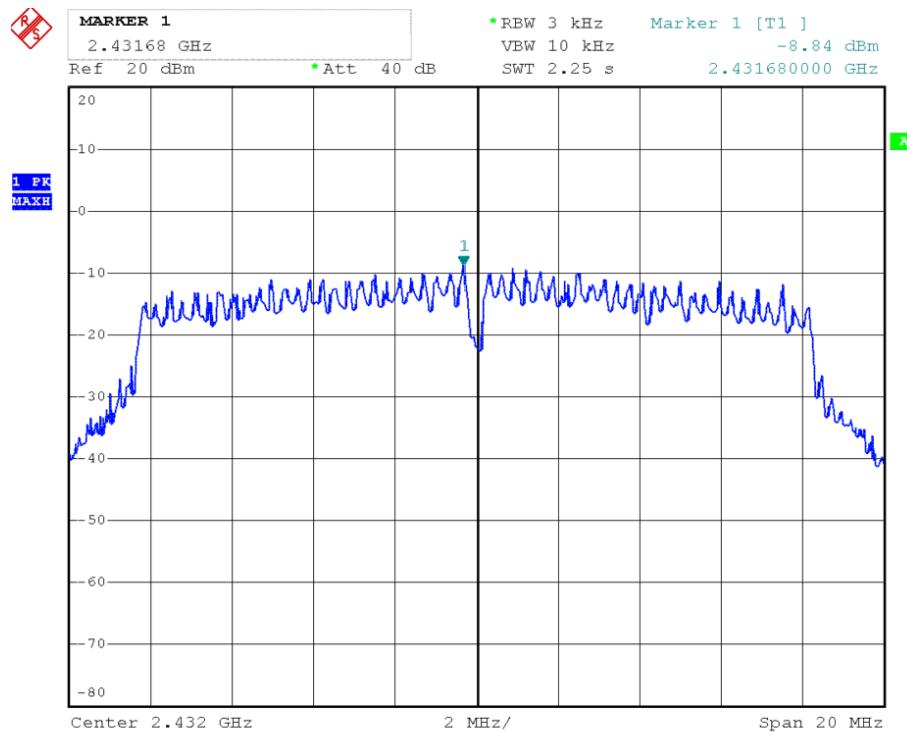
## 802.11g-High Channel



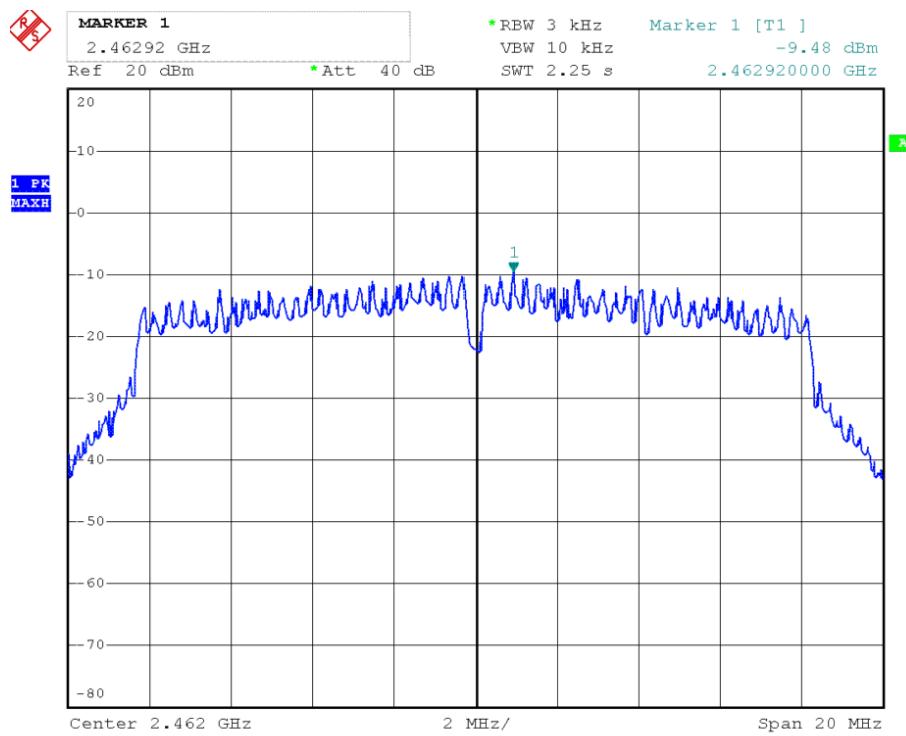
## 802.11n-HT20-Low Channel



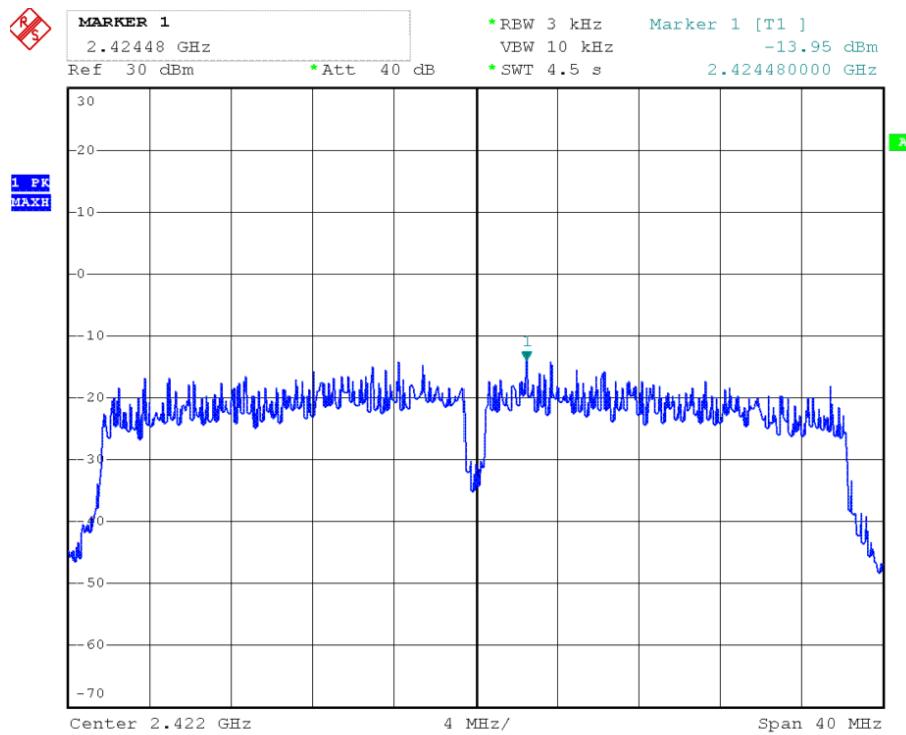
## 802.11n-HT20-Middle Channel



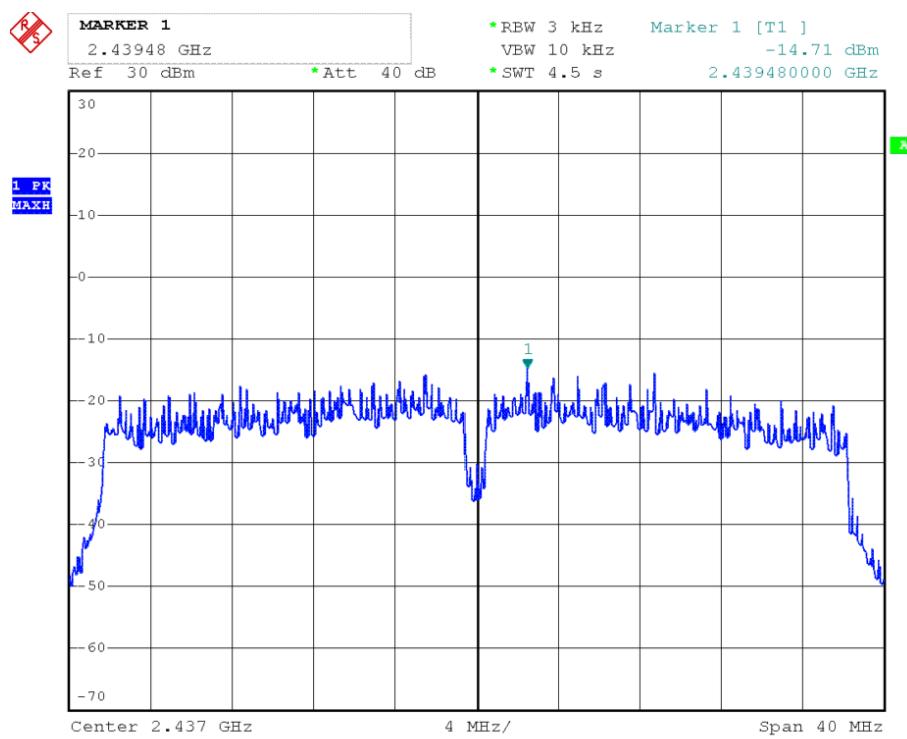
## 802.11n-HT20-High Channel



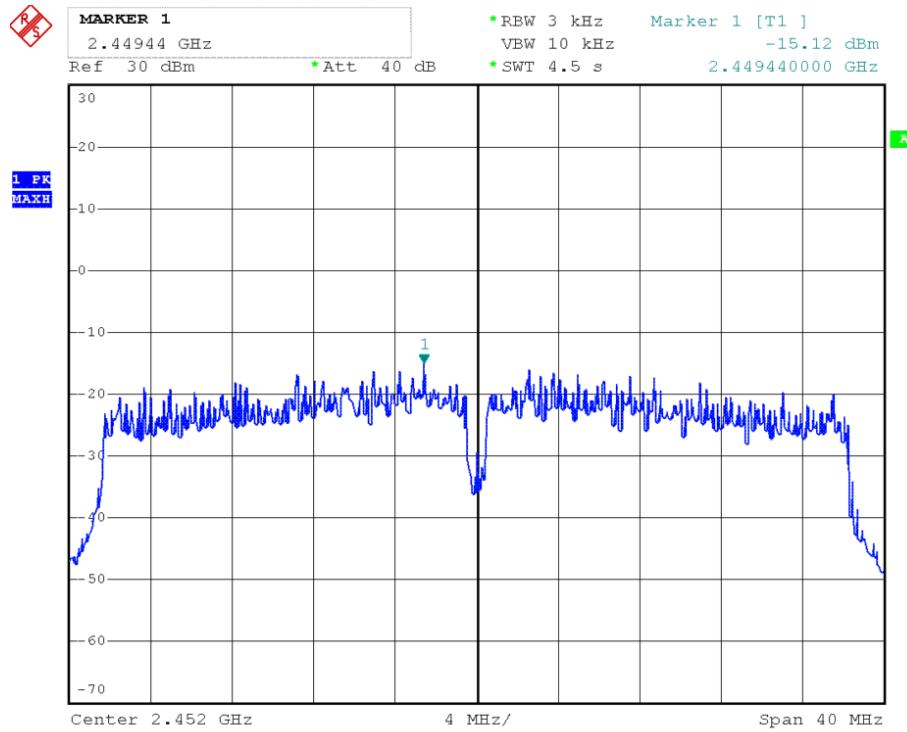
## 802.11n-HT40-Low Channel



## 802.11n-HT40-Middle Channel

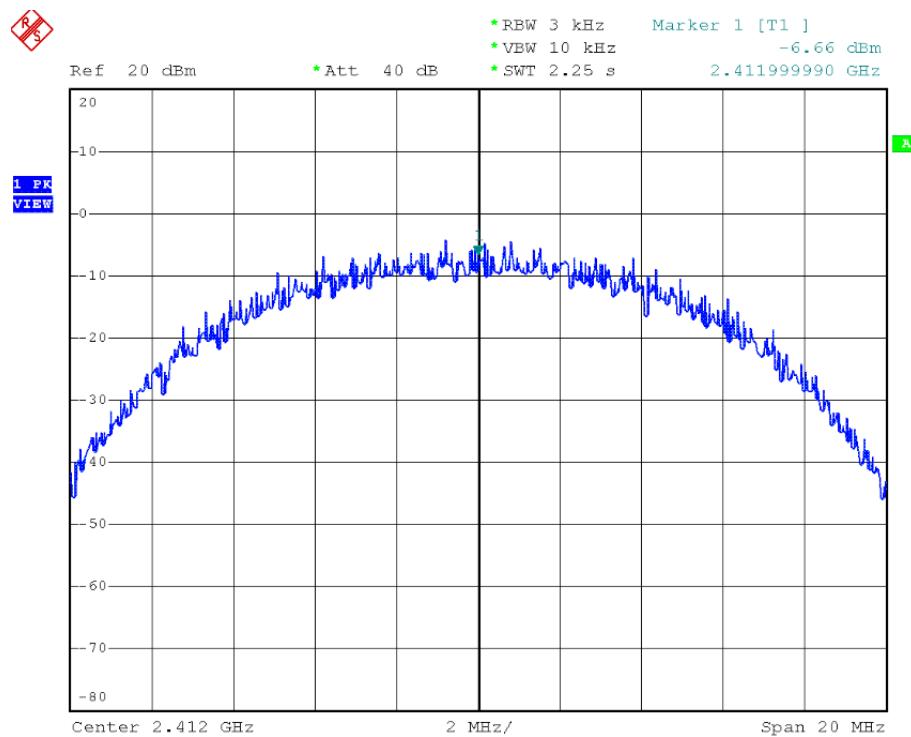


## 802.11n-HT40-High Channel

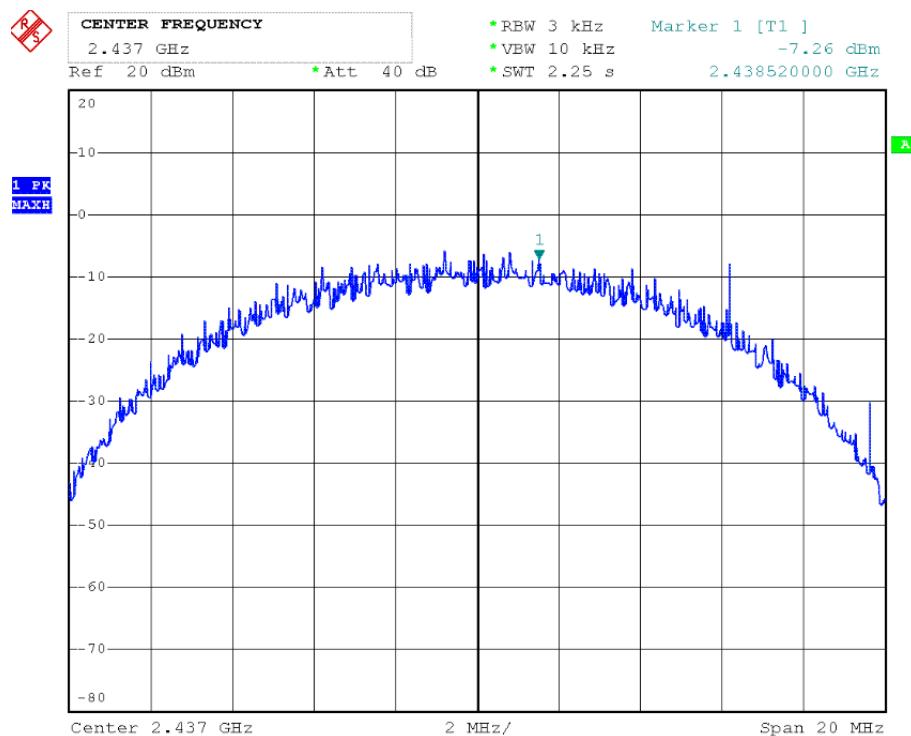


**Antenna 2**

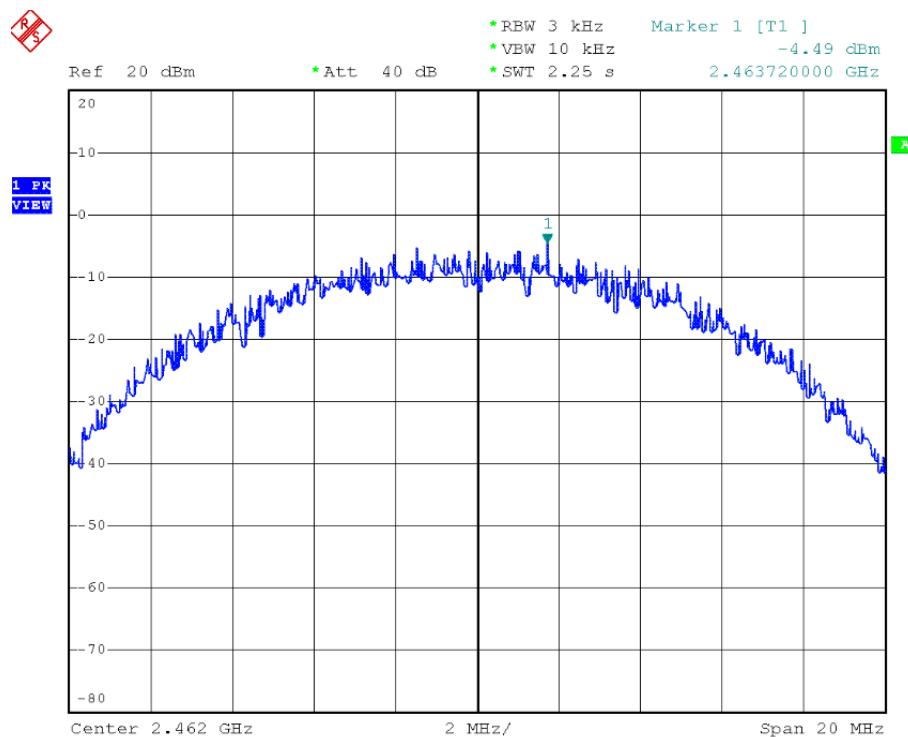
802.11b-Low Channel



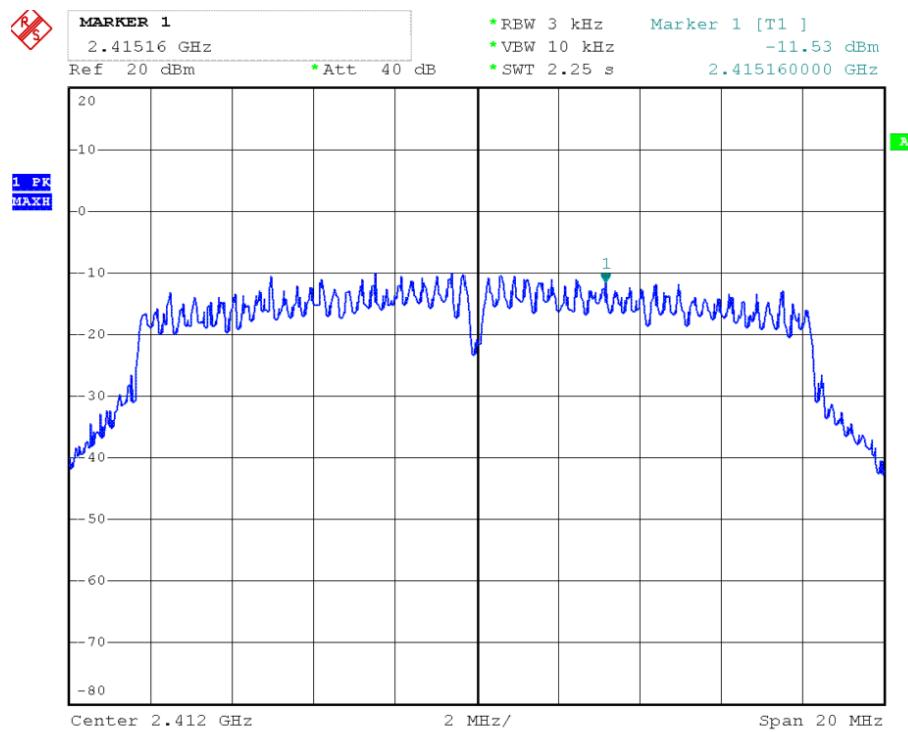
802.11b-Middle Channel



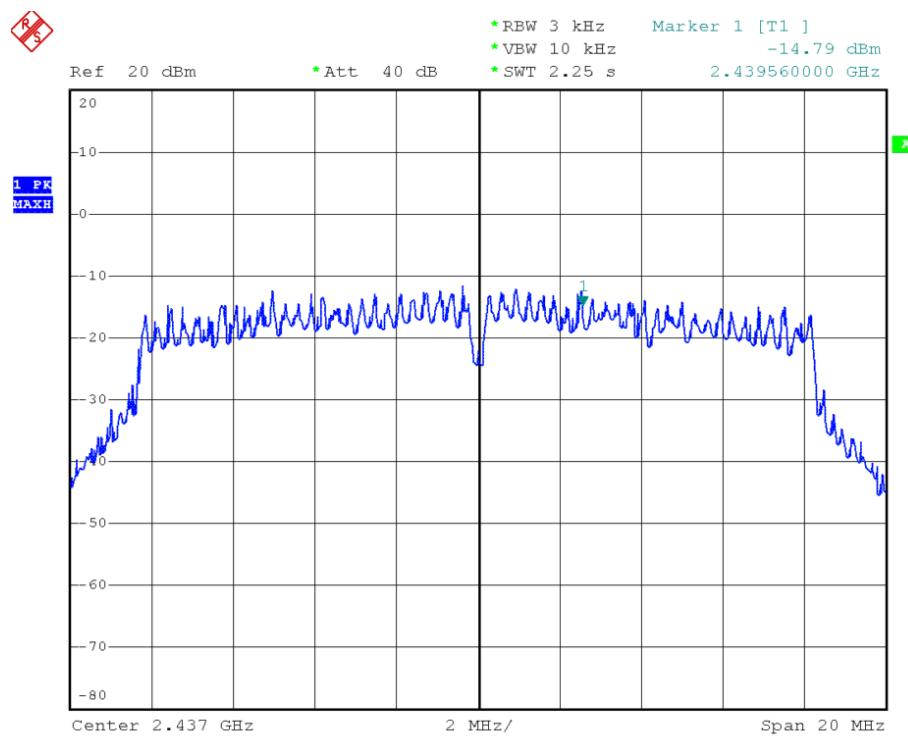
## 802.11b-High Channel



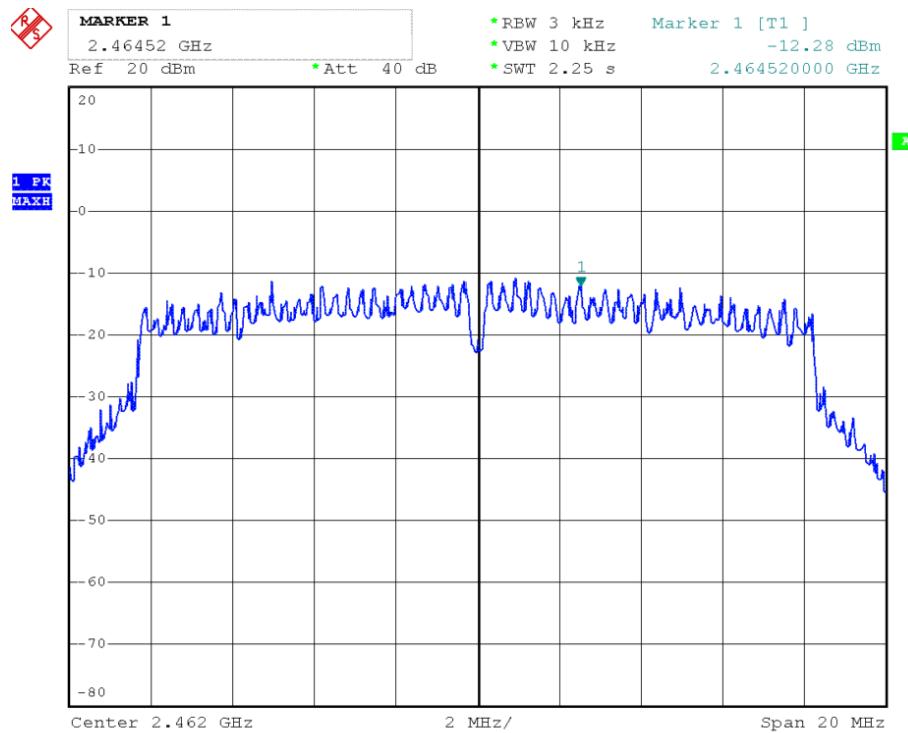
## 802.11g-Low Channel



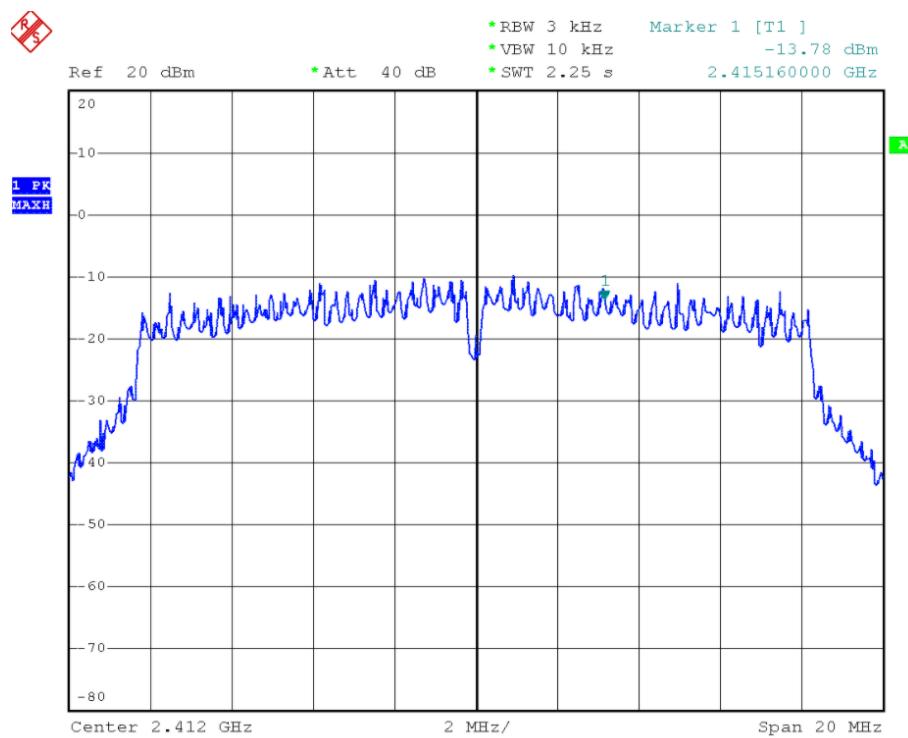
## 802.11g-Middle Channel



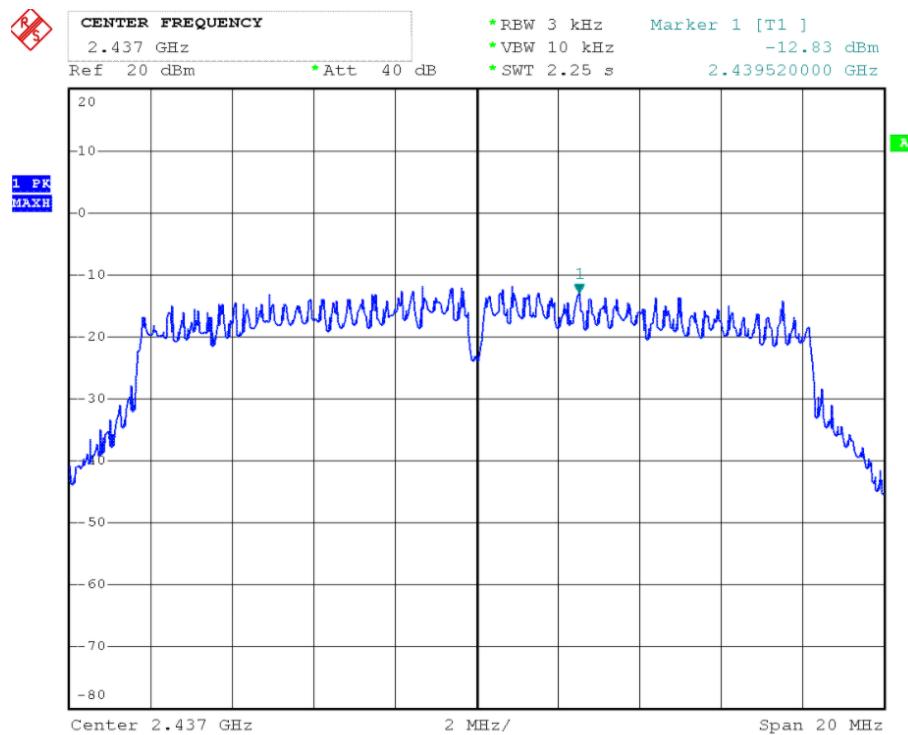
## 802.11g-High Channel



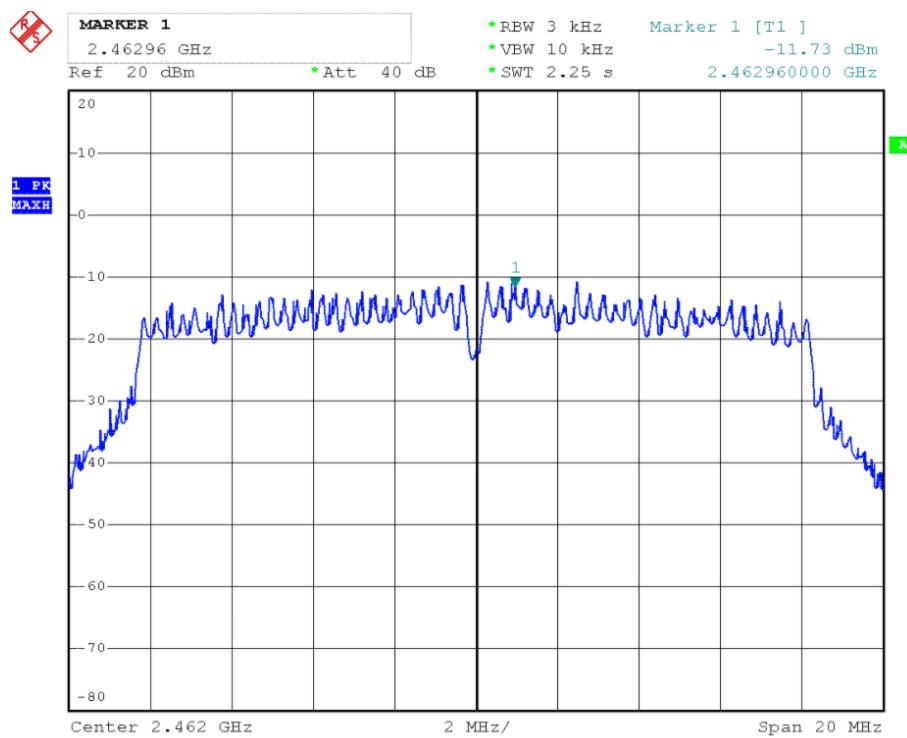
## 802.11n-HT20-Low Channel



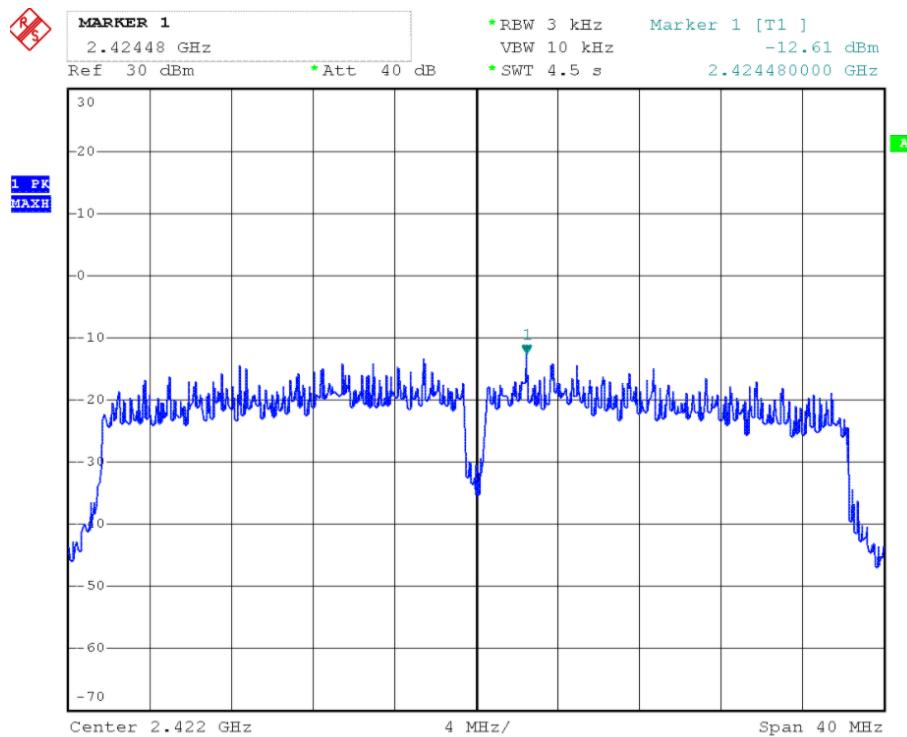
## 802.11n-HT20-Middle Channel



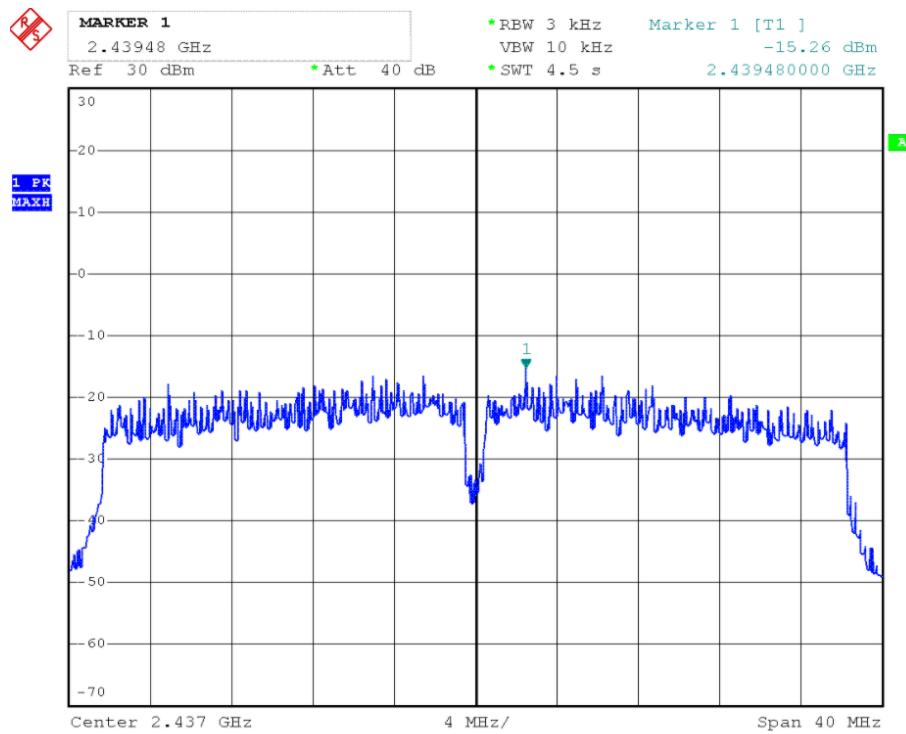
## 802.11n-HT20-High Channel



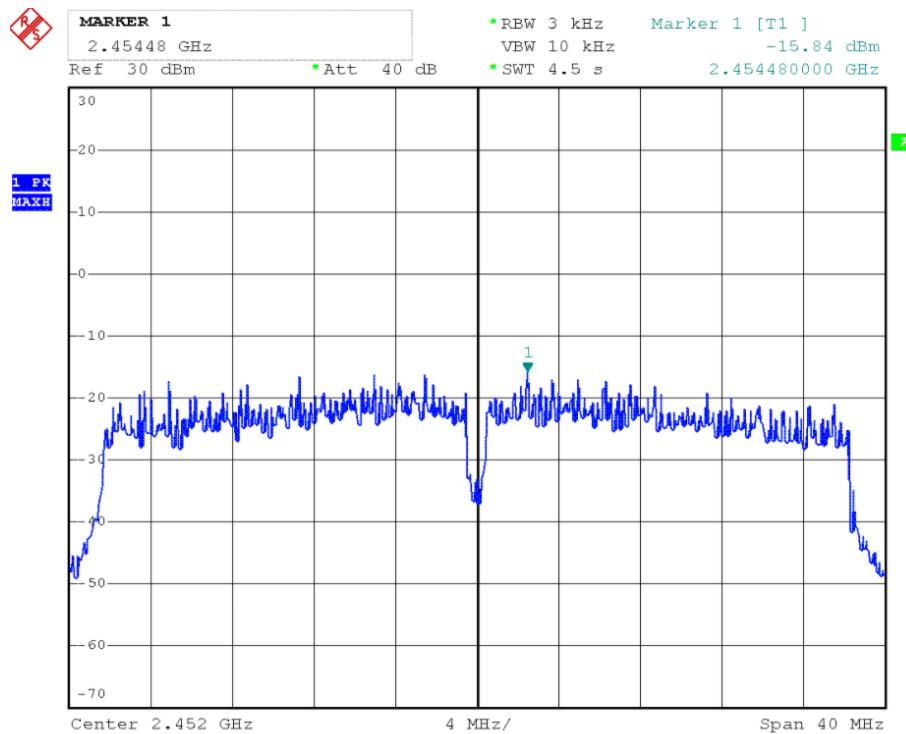
## 802.11n-HT40-Low Channel



## 802.11n-HT40-Middle Channel



## 802.11n-HT40-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 Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.3 Environmental Conditions

Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

### 6.4 Summary of Test Results/Plots

**Antenna 1**

<b>Test Mode</b>	<b>Test Channel MHz</b>	<b>6 dB Bandwidth MHz</b>	<b>Limit kHz</b>
802.11b	2412	9.32	≥500
	2437	9.28	≥500
	2462	9.28	≥500
802.11g	2412	16.28	≥500
	2437	16.24	≥500
	2462	16.28	≥500
802.11n-HT20	2412	16.28	≥500
	2437	16.24	≥500
	2462	16.28	≥500
802.11n-HT40	2422	34.96	≥500
	2437	34.76	≥500
	2452	35.12	≥500

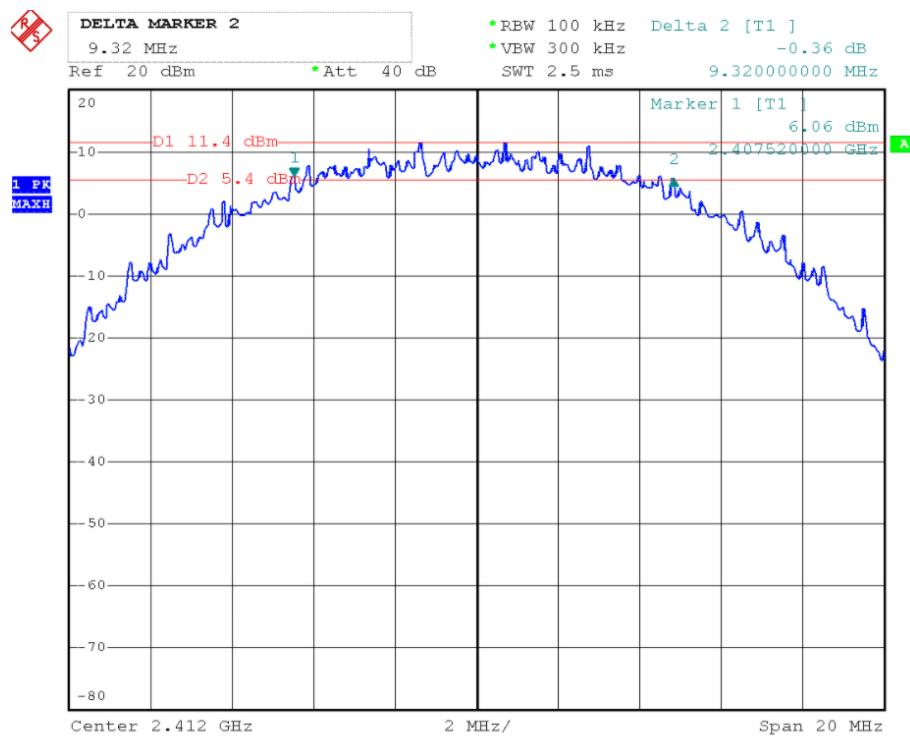
**Antenna 2**

<b>Test Mode</b>	<b>Test Channel MHz</b>	<b>6 dB Bandwidth MHz</b>	<b>Limit kHz</b>
802.11b	2412	9.00	≥500
	2437	9.08	≥500
	2462	9.08	≥500
802.11g	2412	16.28	≥500
	2437	15.68	≥500
	2462	15.16	≥500
802.11n-HT20	2412	16.32	≥500
	2437	16.28	≥500
	2462	15.16	≥500
802.11n-HT40	2422	34.96	≥500
	2437	35.00	≥500
	2452	35.12	≥500

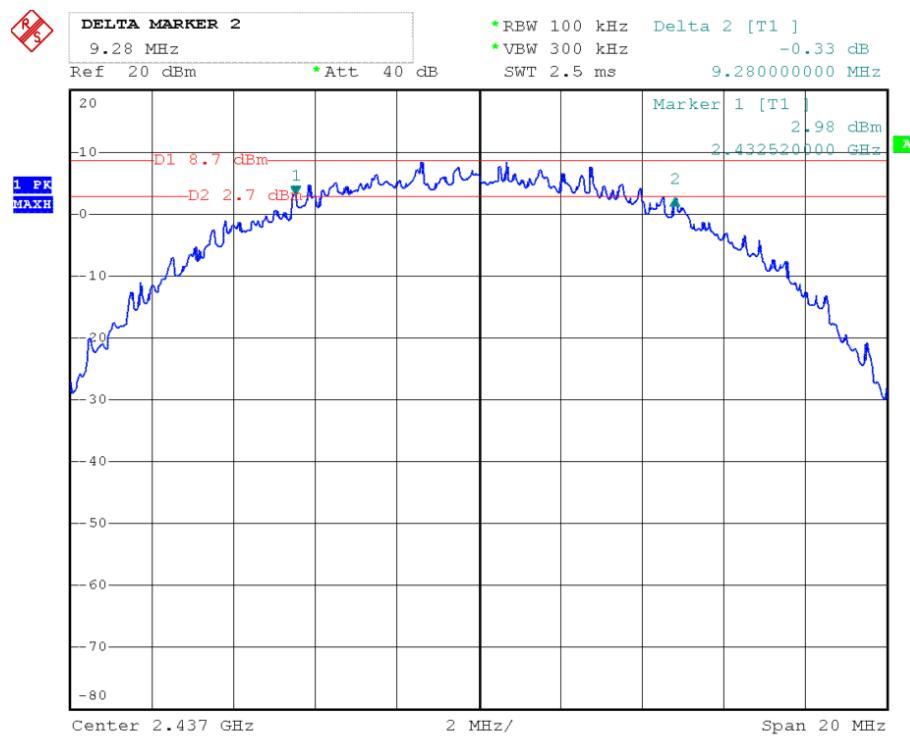
Please refer to the following test plots:

**Antenna 1**

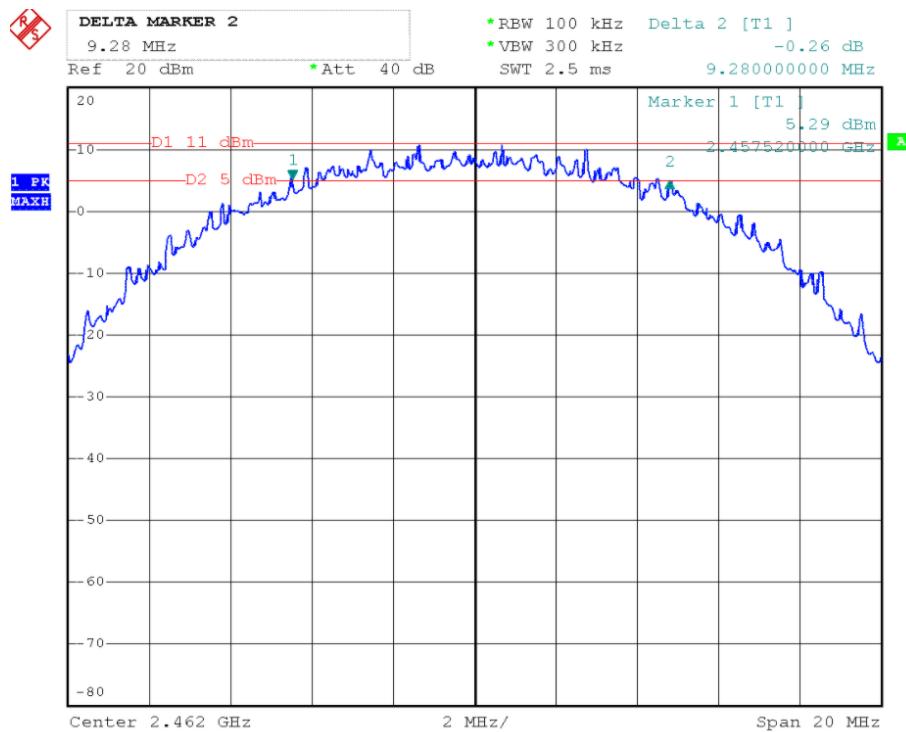
802.11b-Low Channel



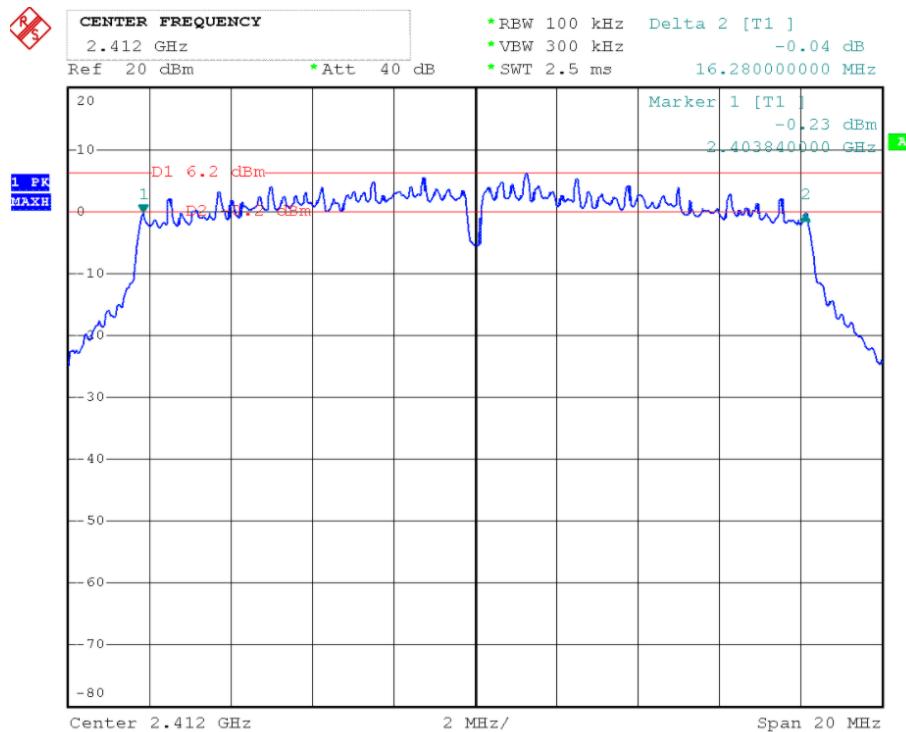
802.11b-Middle Channel



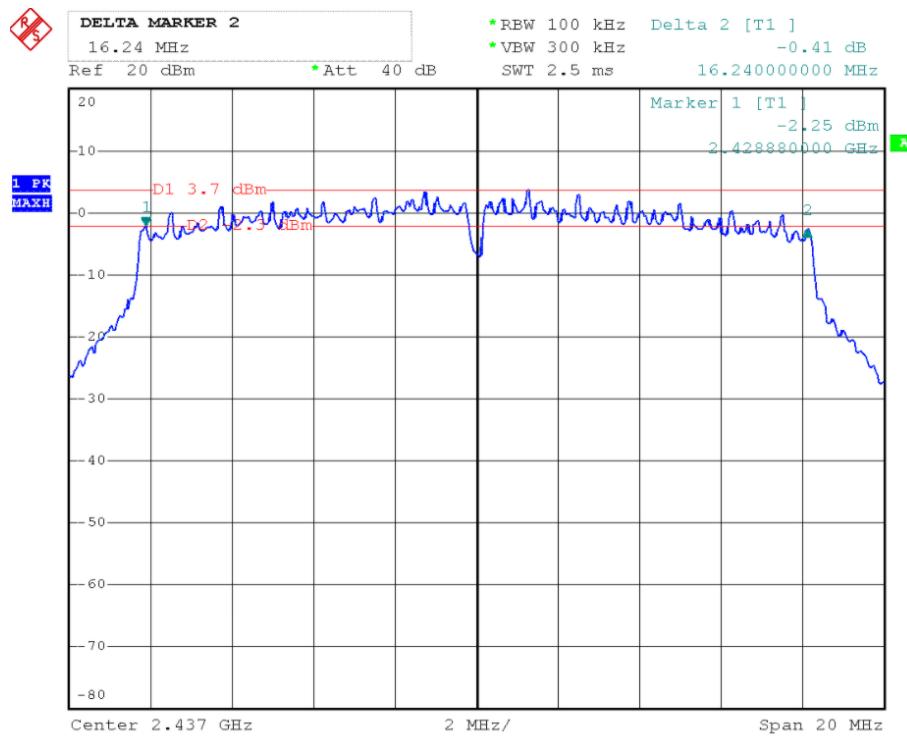
## 802.11b-High Channel



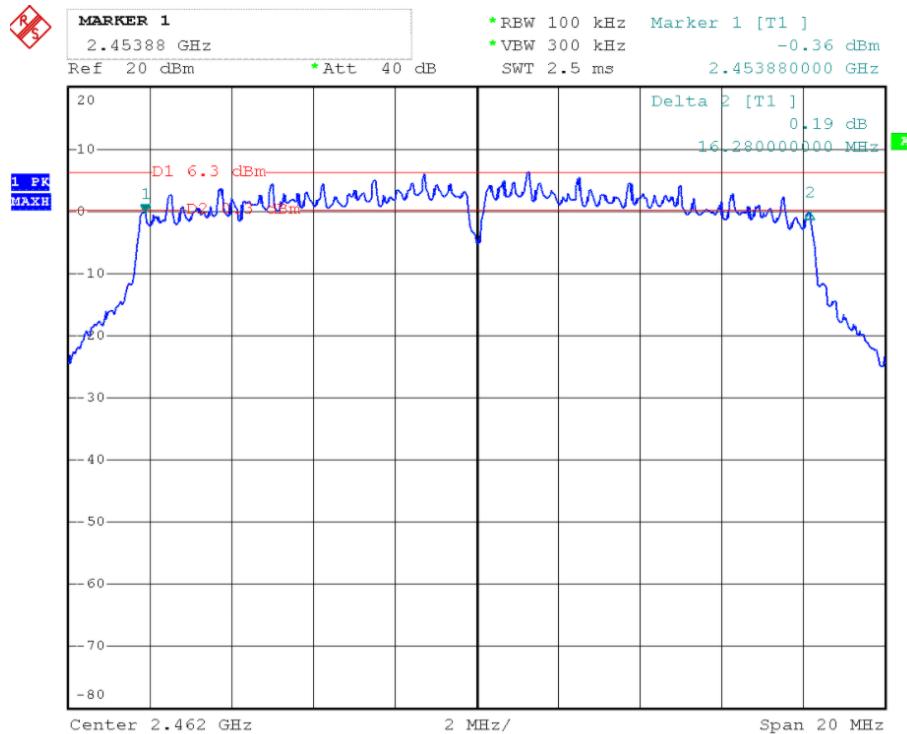
## 802.11g-Low Channel



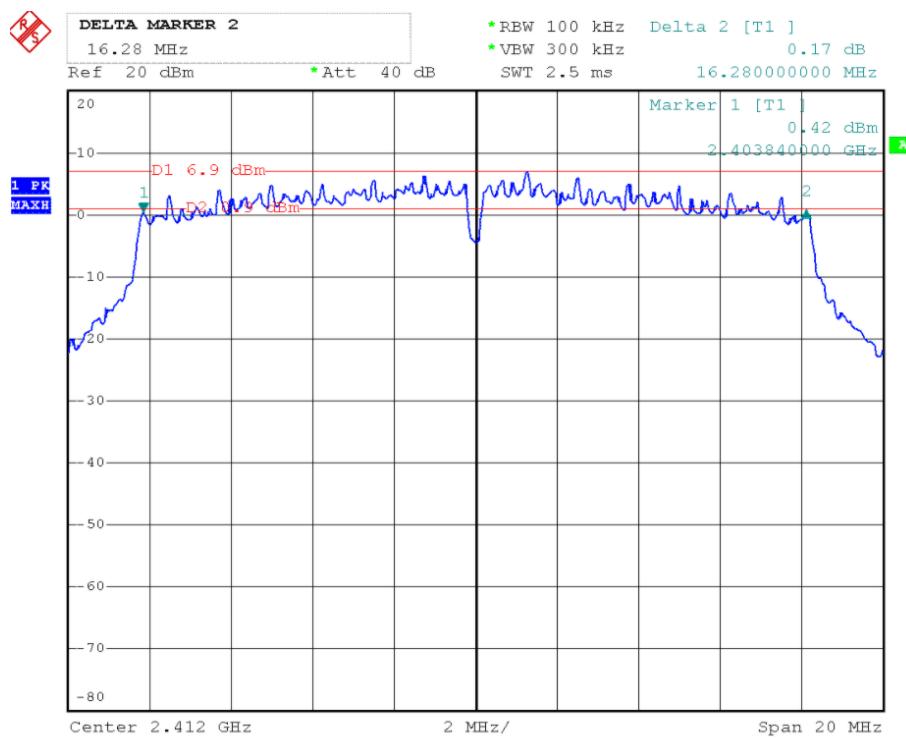
## 802.11g-Middle Channel



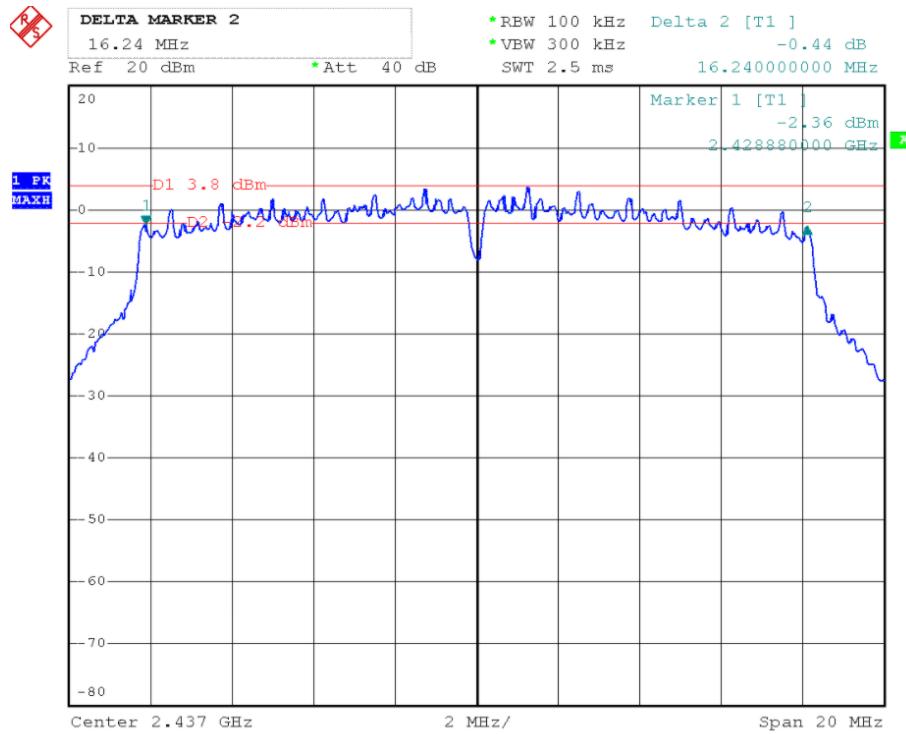
## 802.11g-High Channel



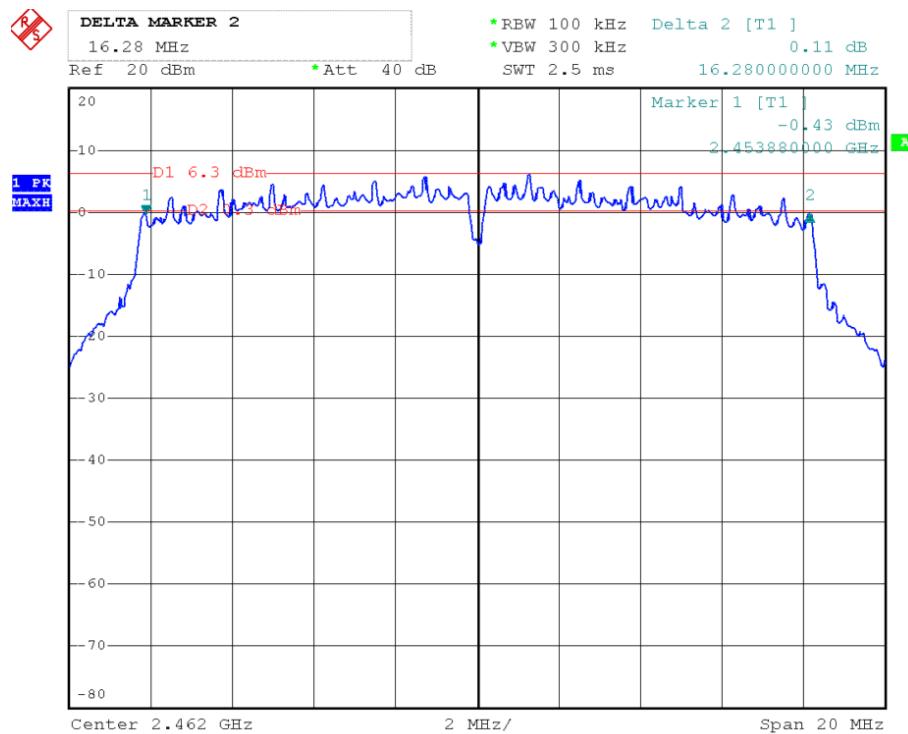
## 802.11n-HT20-Low Channel



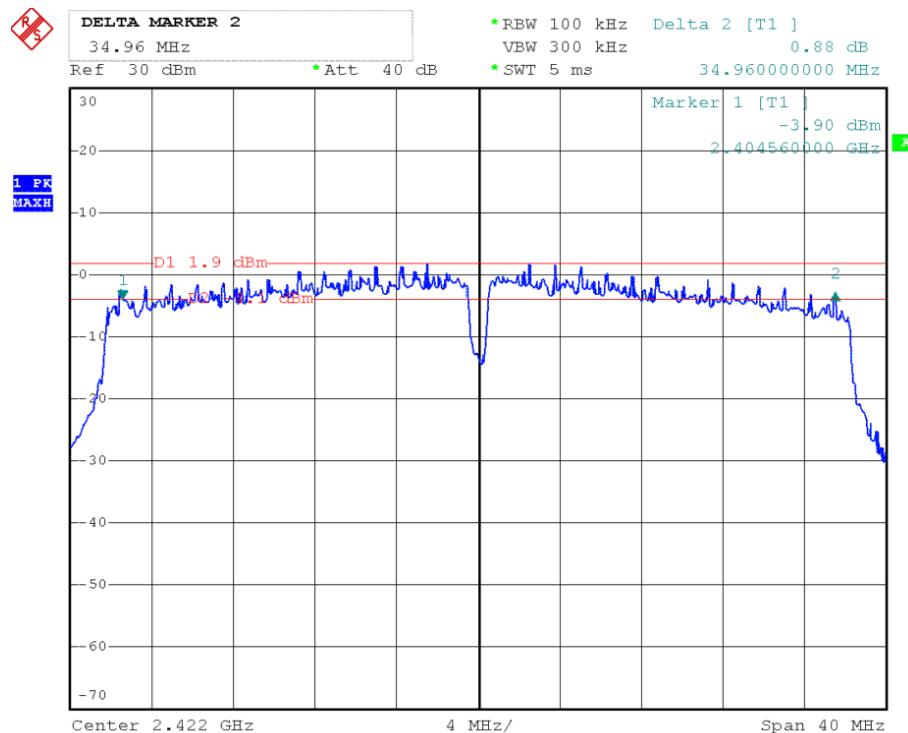
## 802.11n-HT20-Middle Channel



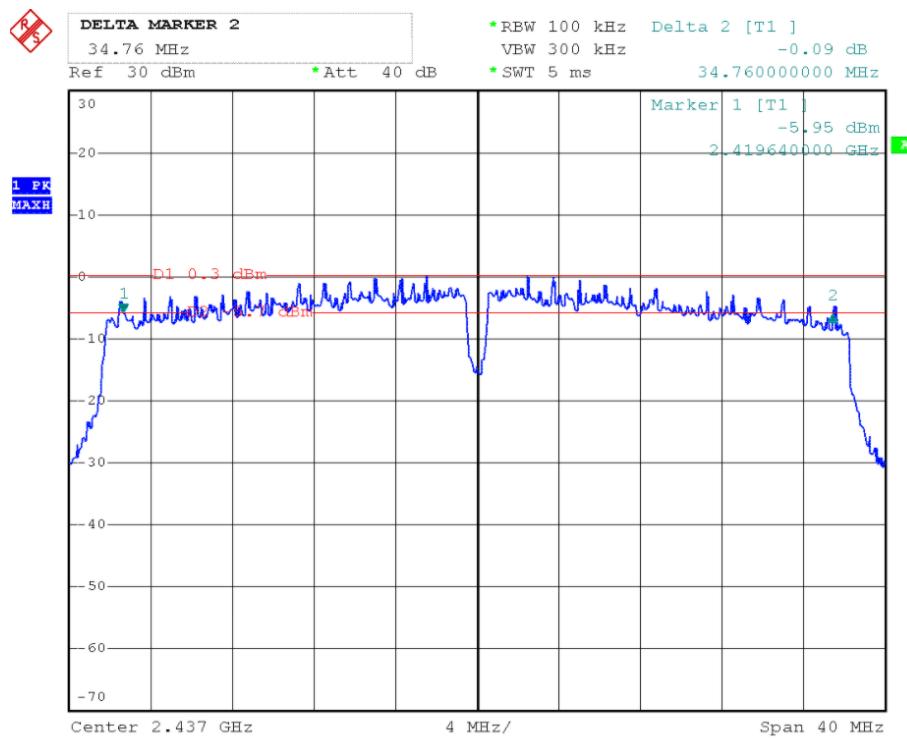
## 802.11n-HT20-High Channel



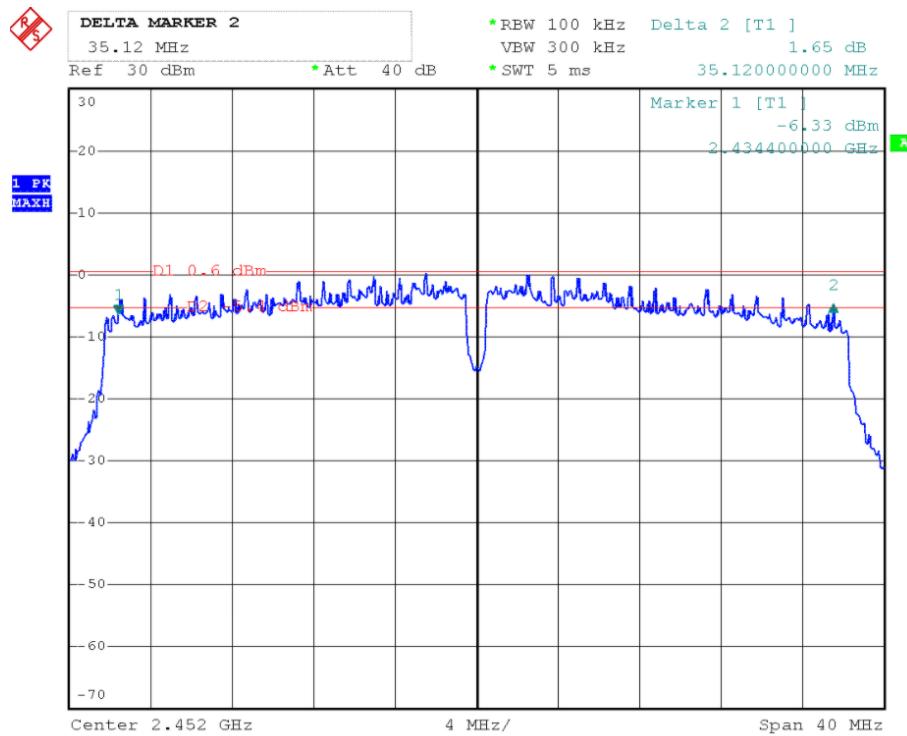
## 802.11n-HT40-Low Channel



## 802.11n-HT40-Middle Channel

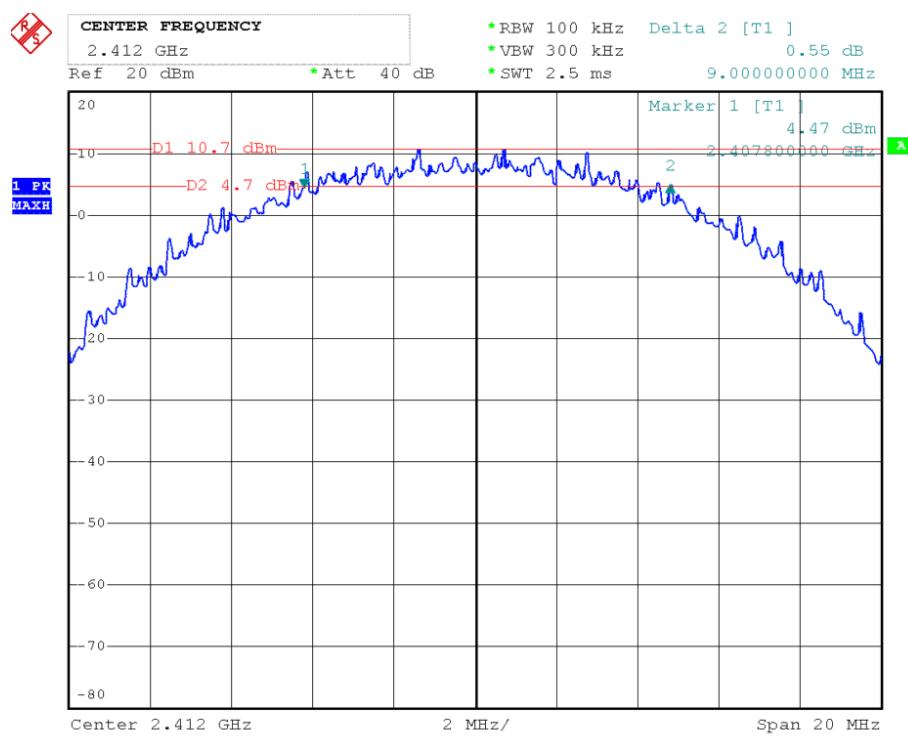


## 802.11n-HT40-High Channel

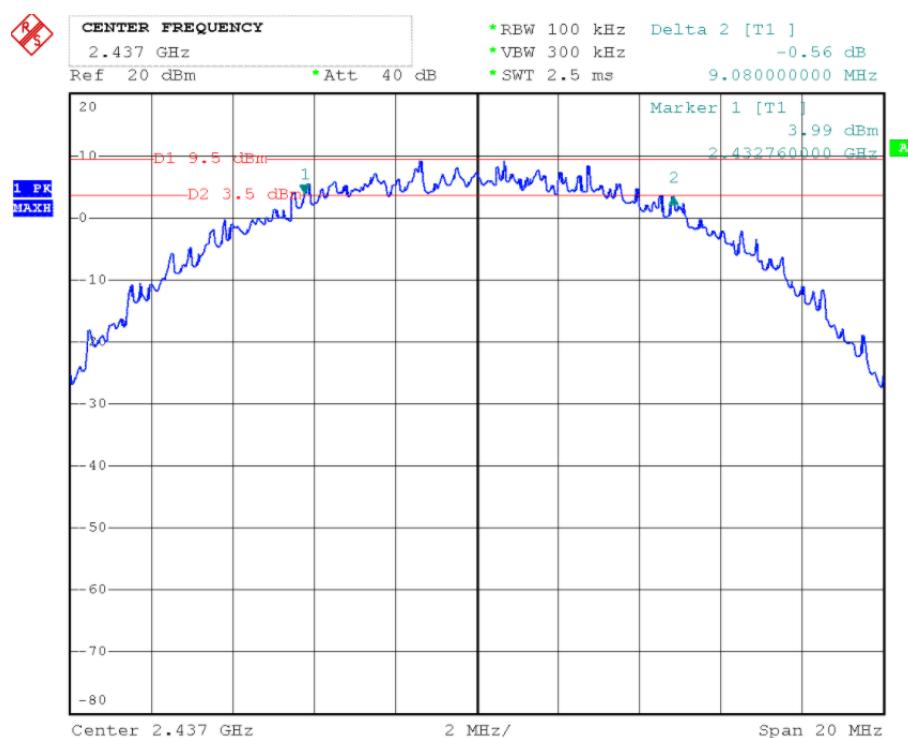


**Antenna 2**

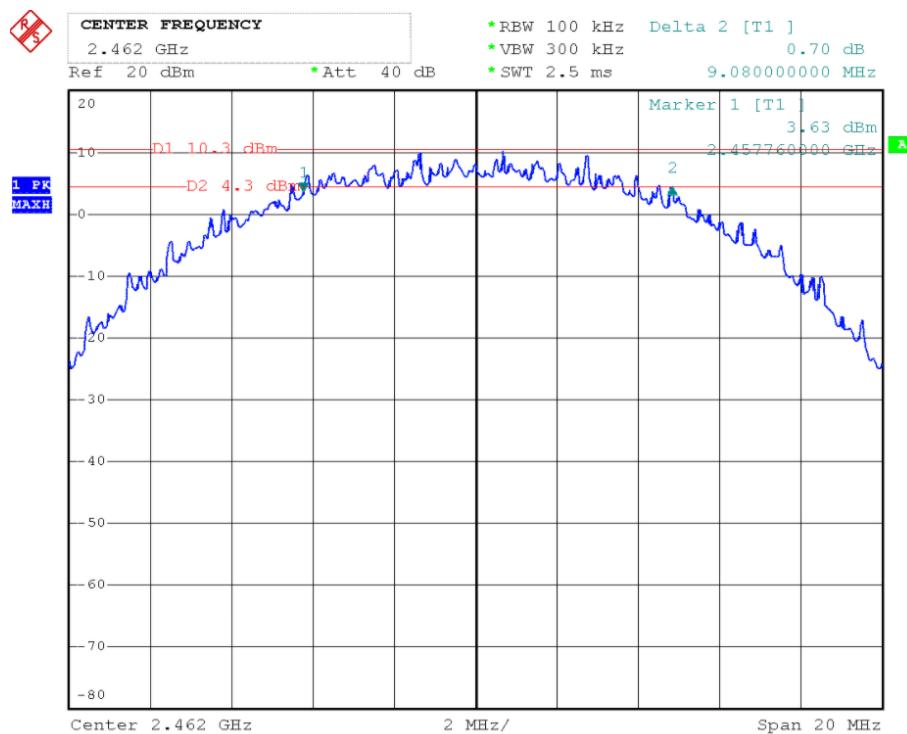
802.11b-Low Channel



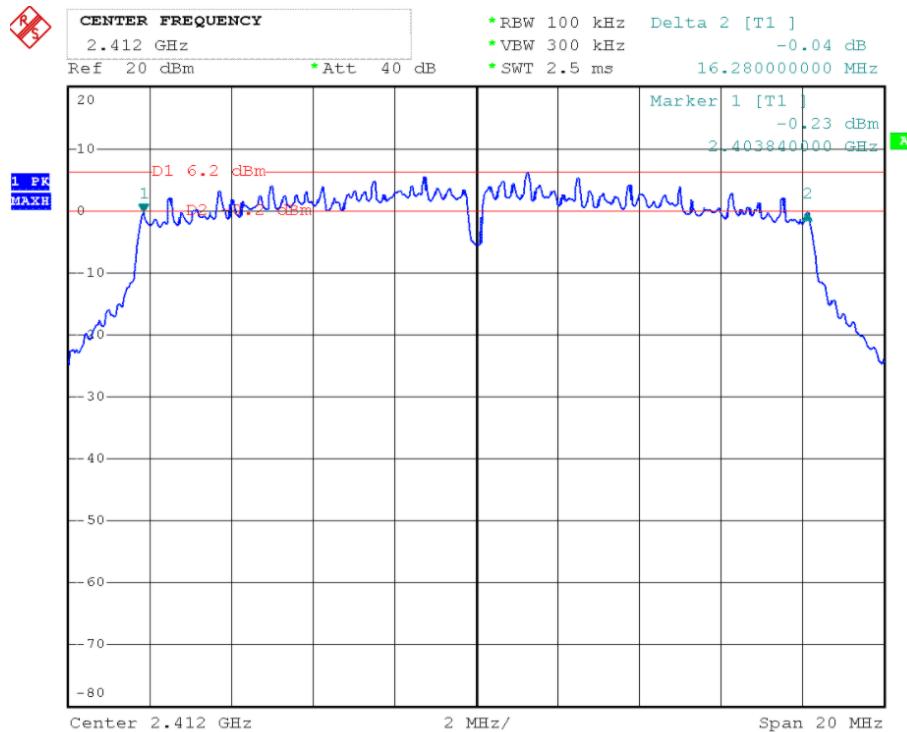
802.11b-Middle Channel



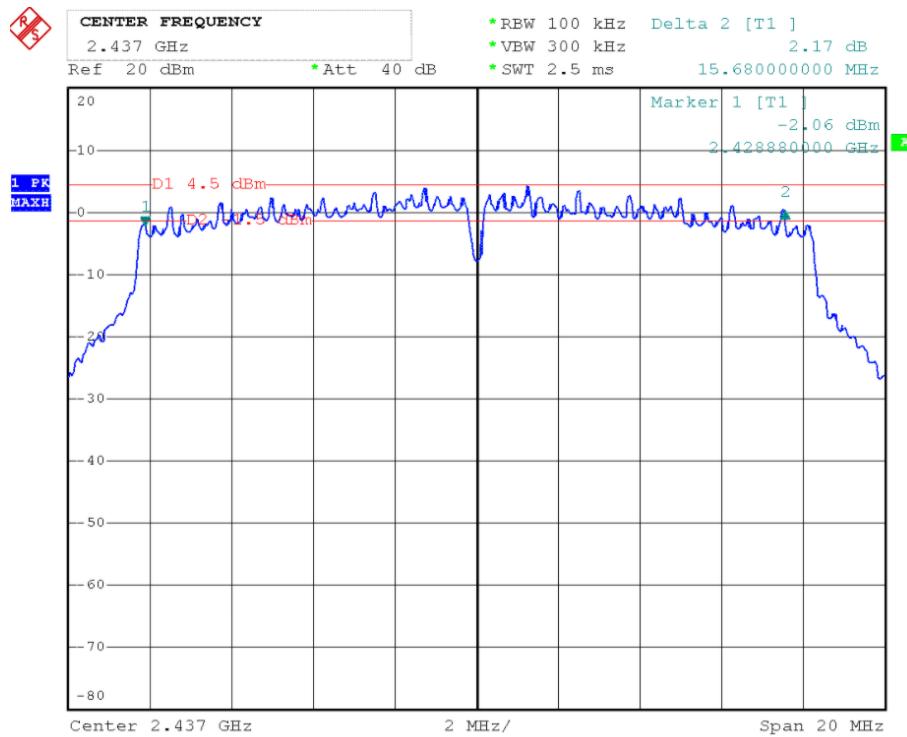
## 802.11b-High Channel



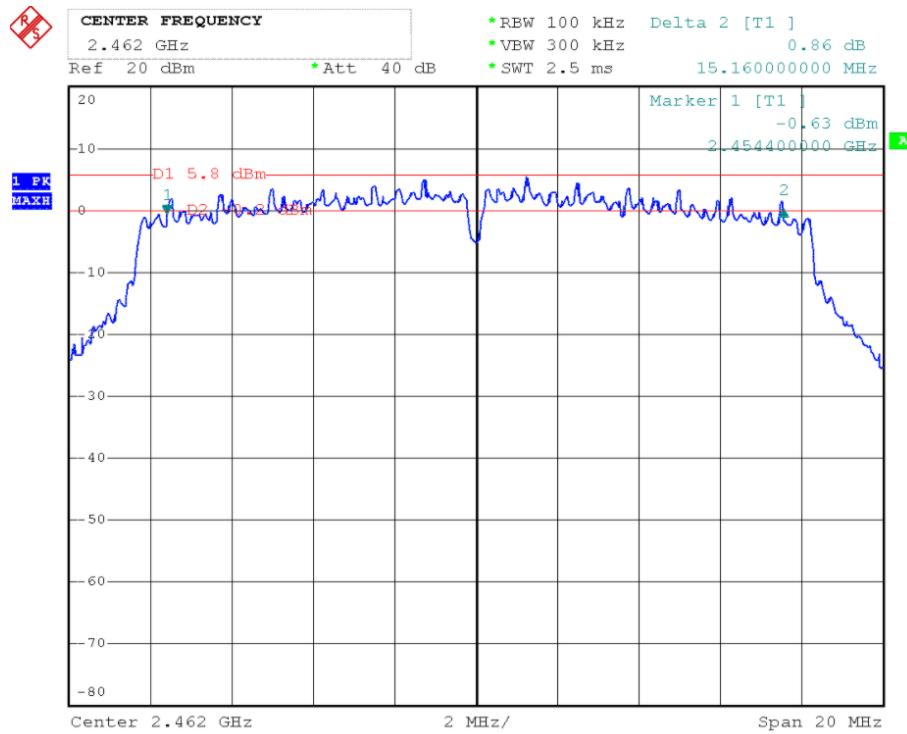
## 802.11g-Low Channel



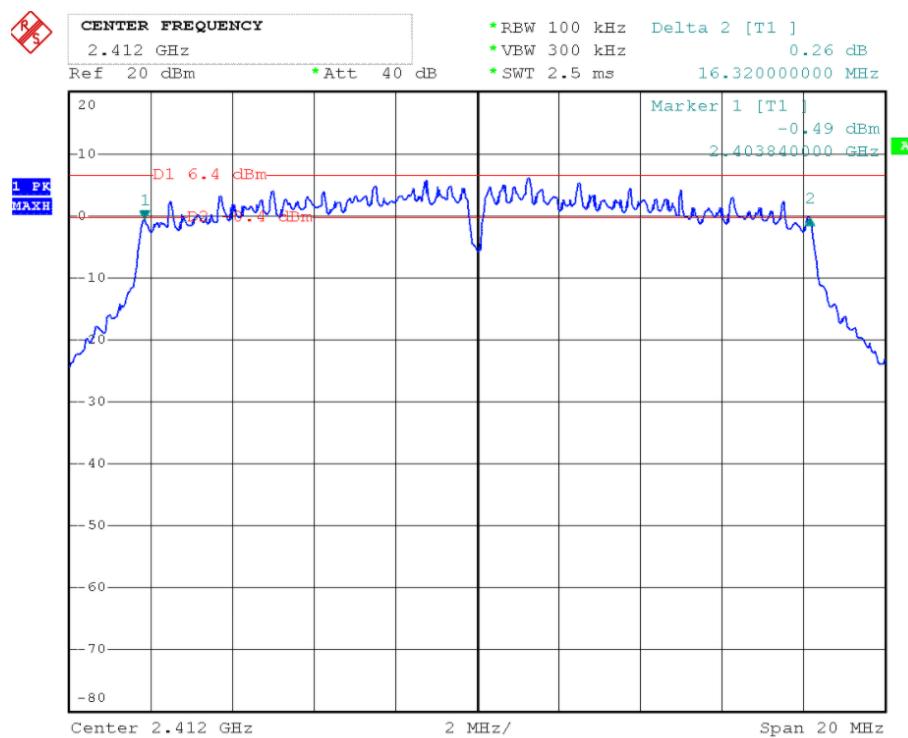
## 802.11g-Middle Channel



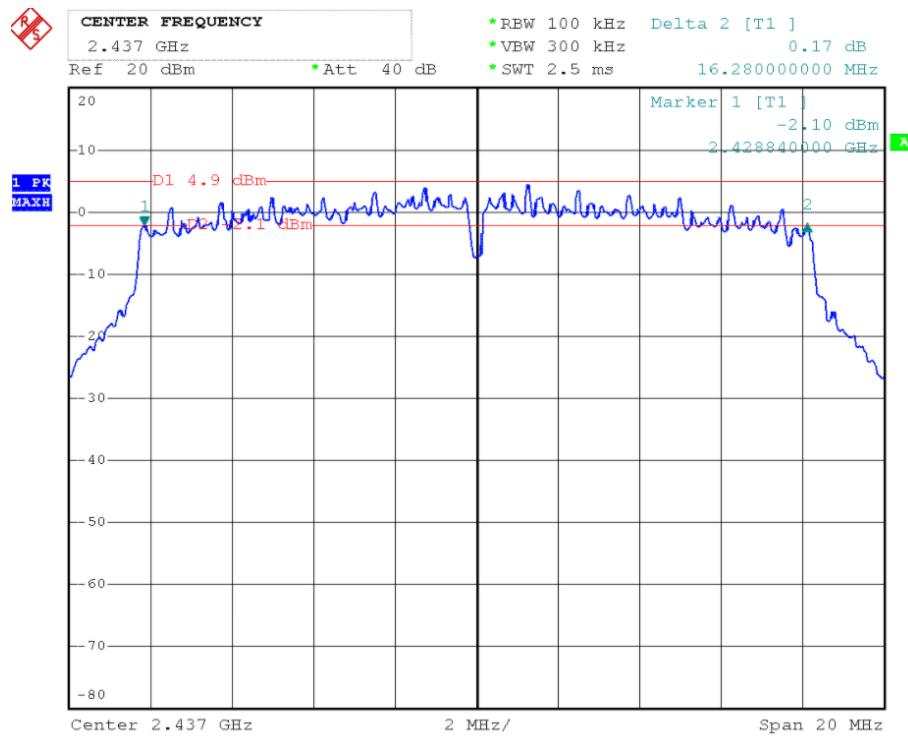
## 802.11g-High Channel



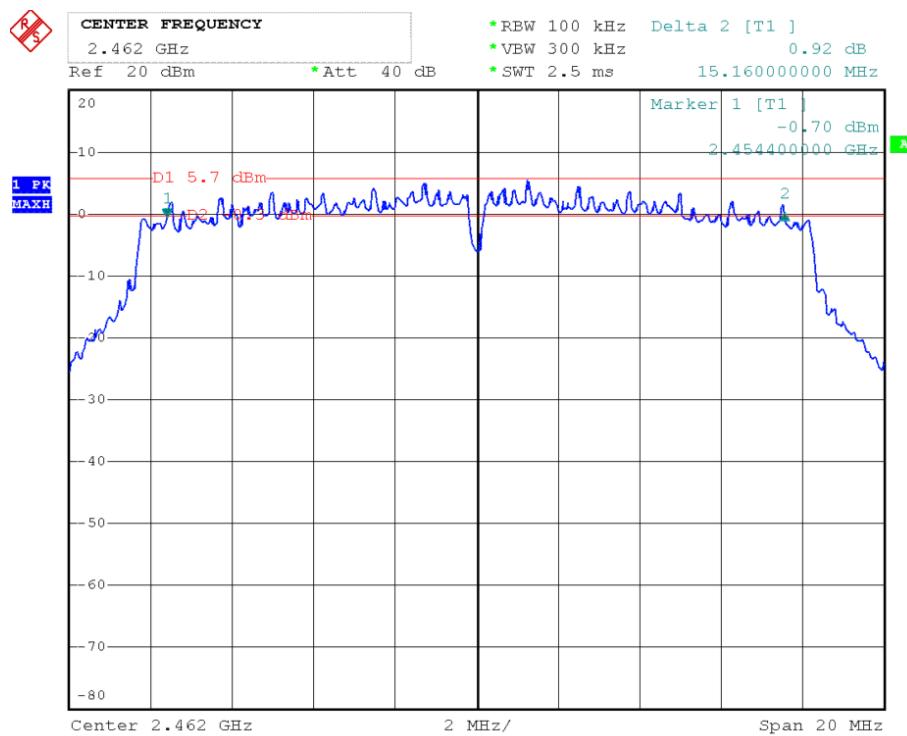
## 802.11n-HT20-Low Channel



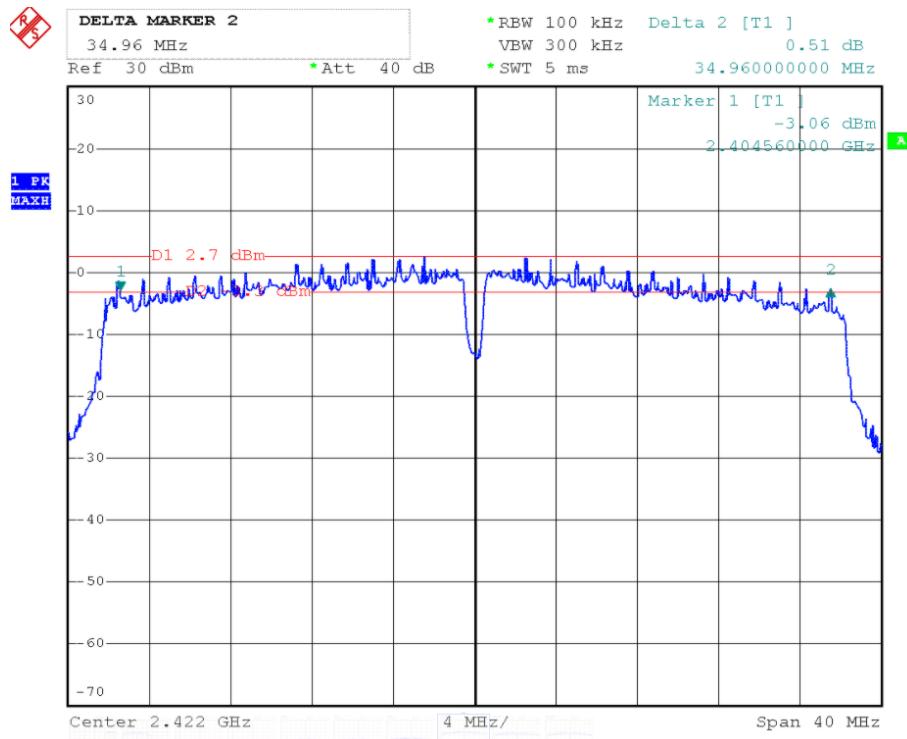
## 802.11n-HT20-Middle Channel



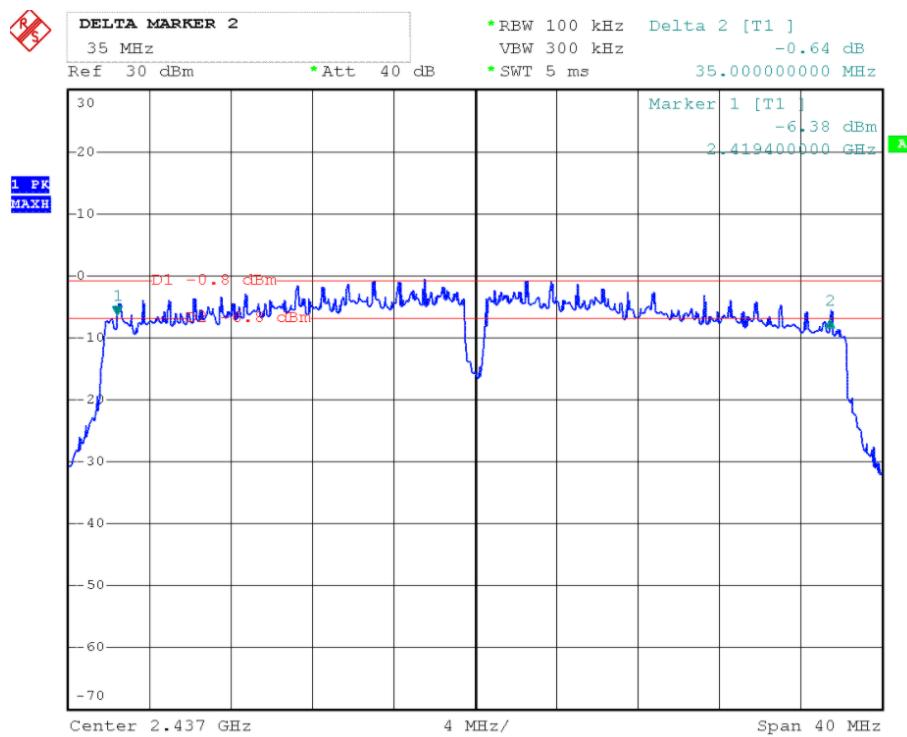
## 802.11n-HT20-High Channel



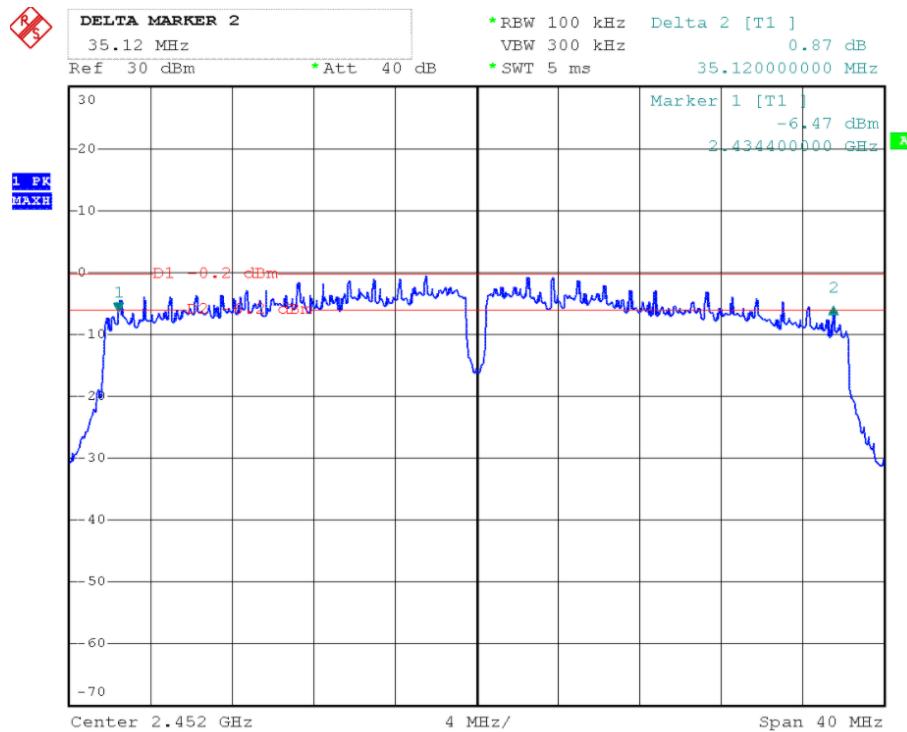
## 802.11n-HT40-Low Channel



## 802.11n-HT40-Middle Channel



## 802.11n-HT40-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 Procedure

According to KDB-558074 D01 V04, (channel integration method) When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth

- a) Set span to at least 1.5 times the OBW.
- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
- c) Set VBW  $\geq 3 \times$  RBW.
- d) Number of points in sweep  $\geq 2 \times$  span / RBW. (This gives bin-to-bin spacing  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)
- e) Sweep time = auto.
- f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle  $\geq 98 \%$ , and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run” .
- h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

### 7.3 Environmental Conditions

Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

## 7.4 Summary of Test Results/Plots

<b>Test Mode</b>	<b>Frequency MHz</b>	<b>Power 1 dBm</b>	<b>Power 2 dBm</b>	<b>Total Power dBm</b>	<b>Output Power mW</b>	<b>Limit mW</b>
802.11b_11Mbps	2412	18.15	18.01	21.09	128.5	561.05
	2437	18.10	17.93	21.03	126.8	561.05
	2462	17.55	17.63	20.57	114.0	561.05
802.11g_54Mbps	2412	15.88	15.33	18.62	72.8	561.05
	2437	15.33	15.22	15.73	37.4	561.05
	2462	15.13	14.77	17.96	62.5	561.05
802.11n HT20_MCS7	2412	15.77	15.46	18.63	72.9	561.05
	2437	15.50	15.21	18.87	77.1	561.05
	2462	15.45	15.23	18.35	68.4	561.05
802.11n HT40_MCS7	2422	15.55	14.49	18.44	69.8	561.05
	2437	15.43	15.42	18.43	69.7	561.05
	2452	15.40	14.87	18.15	65.3	561.05

## 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  $\pm 5.10$  dB.

### 8.2 Standard Applicable

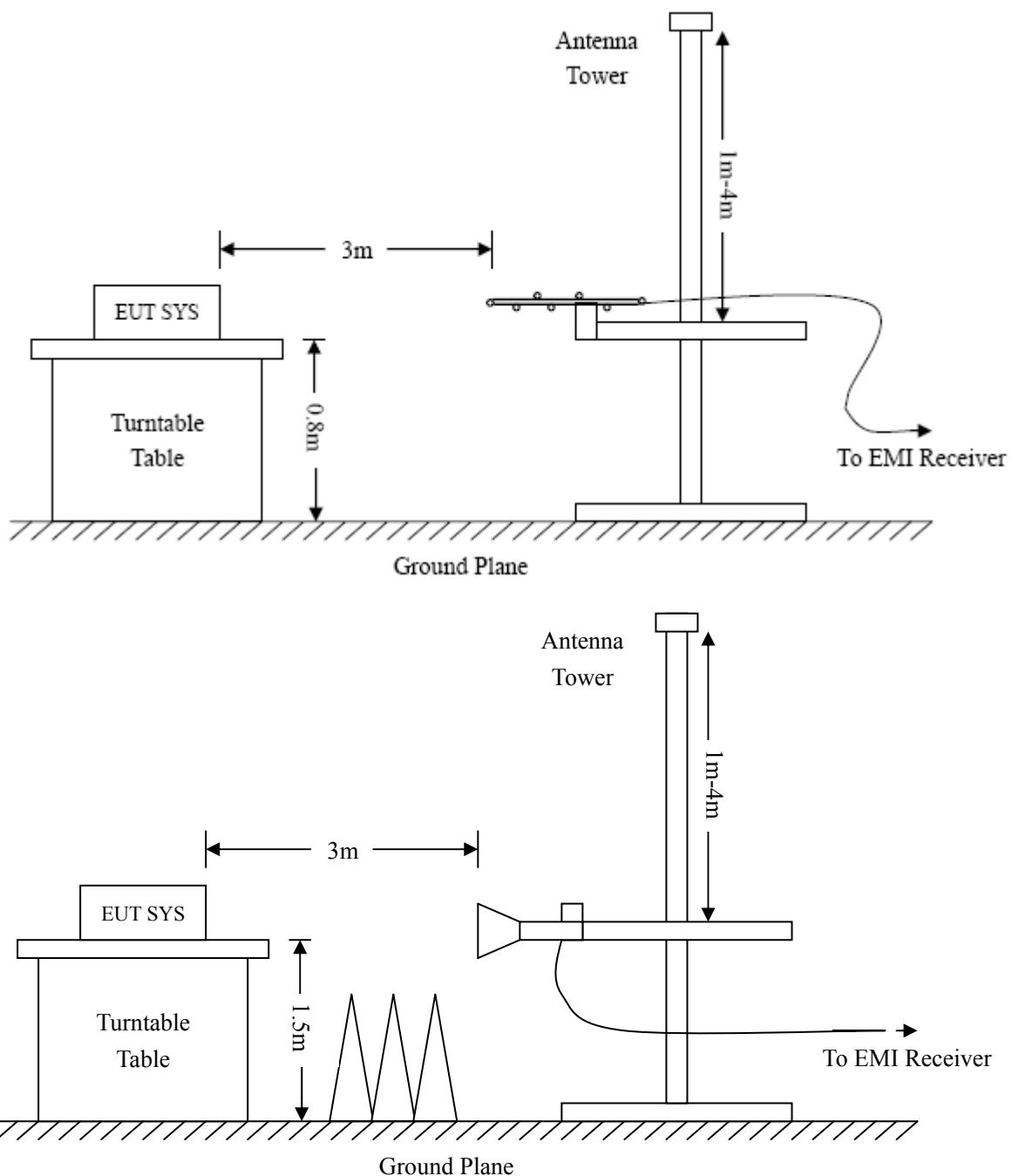
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within 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 Procedure

The setup of EUT is according with per ANSI C63.10-2013 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.



Frequency :9kHz-30MHz  
RBW=10KHz,  
VBW =30KHz  
Sweep time= Auto  
Trace = max hold  
Detector function = peak

Frequency :30MHz-1GHz  
RBW=120KHz,  
VBW=300KHz  
Sweep time= Auto  
Trace = max hold  
Detector function = peak, QP

Frequency :Above 1GHz  
RBW=1MHz,  
VBW=3MHz(Peak), 10Hz(AV)  
Sweep time= Auto  
Trace = max hold  
Detector function = peak, AV

## 8.4 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 $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit. The equation for margin calculation is as follows:

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

## 8.5 Environmental Conditions

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

## 8.6 Summary of Test Results/Plots

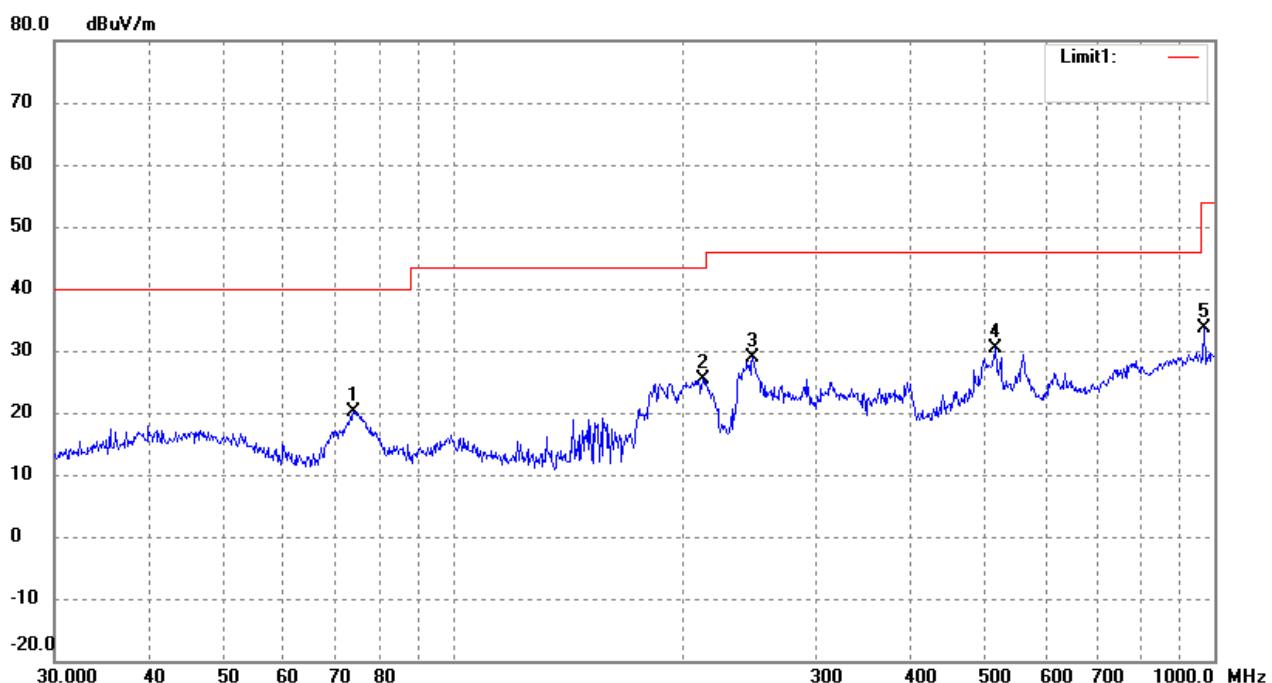
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

*Note: this EUT was tested in 3 orthogonal positions and the worst case position and the worst mode IEEE 802.11g (channel low, middle, high)) data was reported.*

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

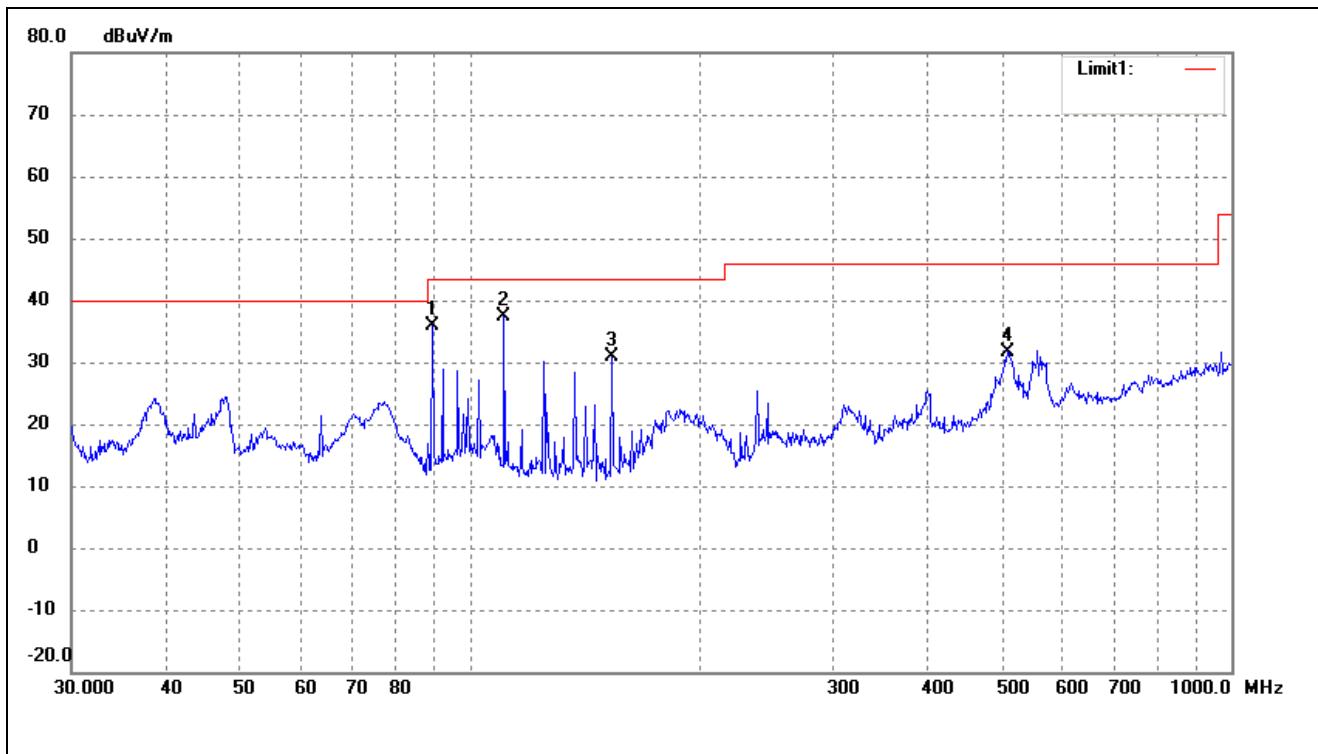
*EUT:* Wireless Router  
*Tested Model:* ARNEL904U1  
*Operating Condition:* 802.11b Transmitting Low Channel-2412MHz  
*Comment:* 120V/60Hz; Adapter DC 12V/1A

*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	74.1351	35.62	-15.49	20.13	40.00	-19.87	152	100	QP
2	213.0151	37.64	-12.17	25.47	43.50	-18.03	147	100	QP
3	247.6819	39.41	-10.60	28.81	46.00	-17.19	63	100	QP
4	515.4374	36.44	-6.07	30.37	46.00	-15.63	85	100	QP
5	968.9338	31.87	1.75	33.62	54.00	-20.38	287	100	QP

*Test Specification:* Vertical

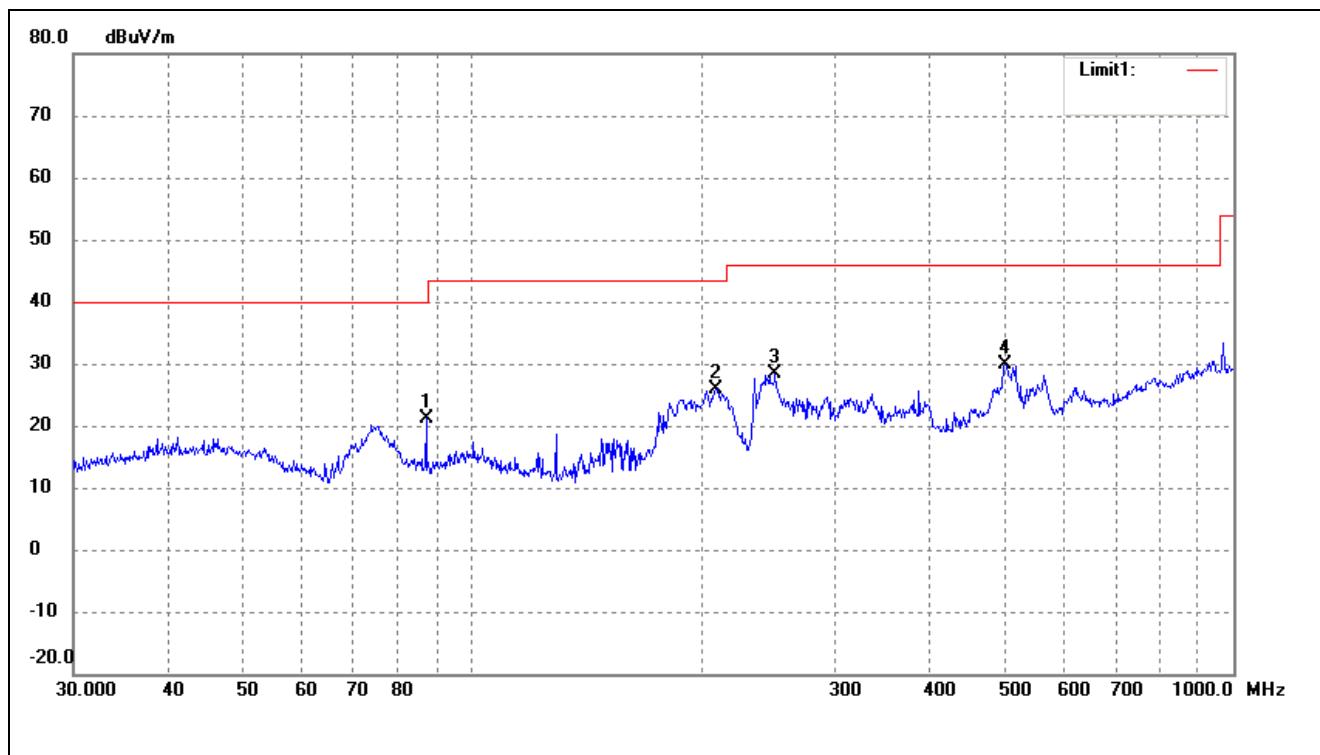


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	89.2764	49.76	-13.95	35.81	43.50	-7.69	256	100	QP
2	110.9571	49.99	-12.66	37.33	43.50	-6.17	187	100	QP
3	153.7385	45.94	-14.98	30.96	43.50	-12.54	63	100	QP
4	508.2582	37.87	-6.12	31.75	46.00	-14.25	185	100	QP

*Operating Condition:* 802.11b Transmitting Middle Channel-2437MHz

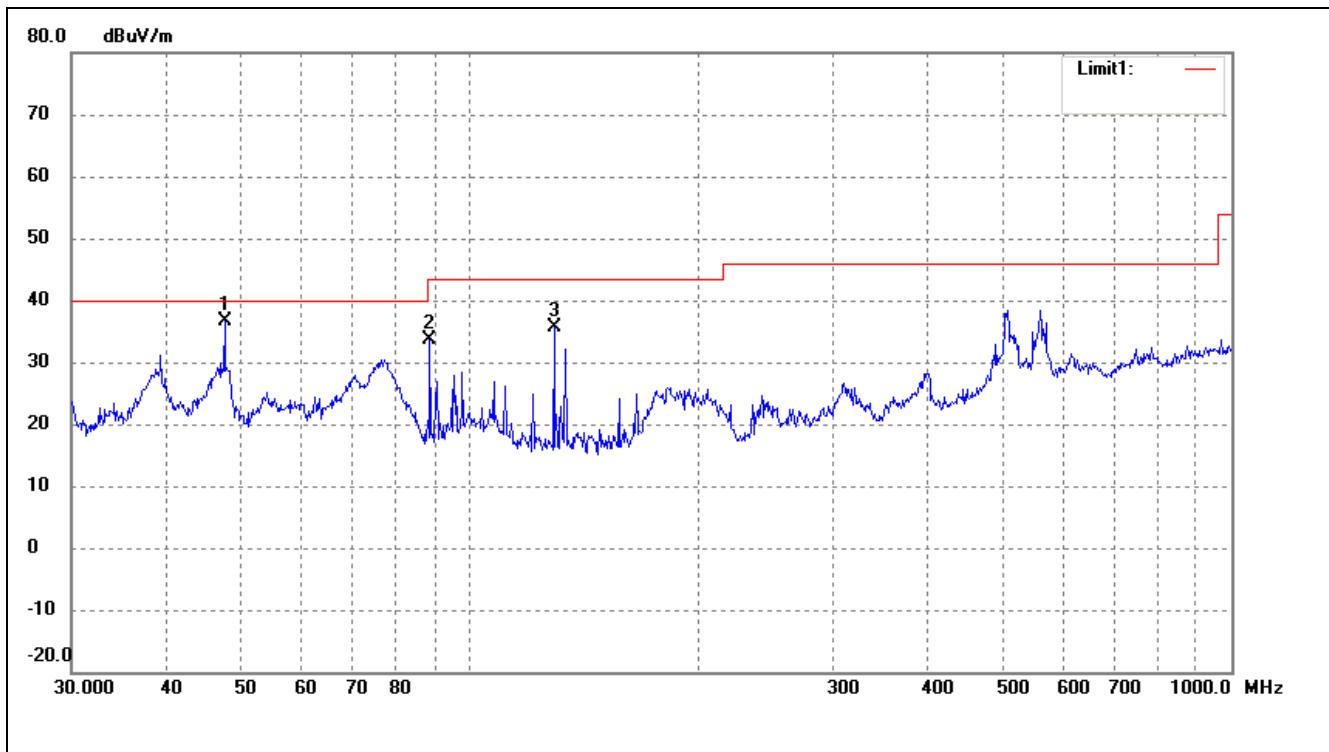
*Comment:* 120V/60Hz; Adapter DC 12V/1A

*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	87.11117	35.58	-14.47	21.11	40.00	-18.89	153	100	QP
2	209.3129	37.99	-12.01	25.98	43.50	-17.52	195	100	QP
3	250.3012	38.79	-10.49	28.30	46.00	-17.70	78	100	QP
4	501.1790	35.95	-6.19	29.76	46.00	-16.24	247	100	QP

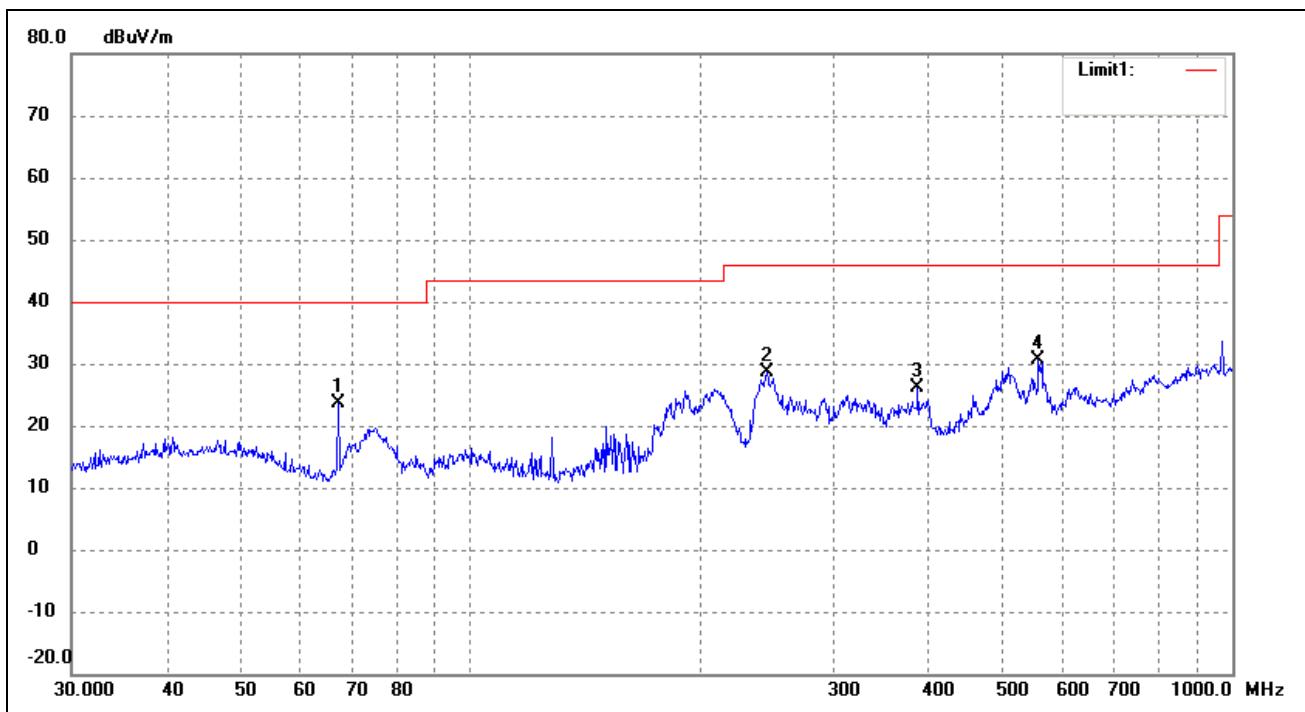
*Test Specification:* Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	47.6586	46.99	-10.43	36.56	40.00	-3.44	58	100	QP
2	88.6524	47.78	-14.23	33.55	43.50	-9.95	86	100	QP
3	129.0146	49.78	-14.20	35.58	43.50	-7.92	128	100	QP

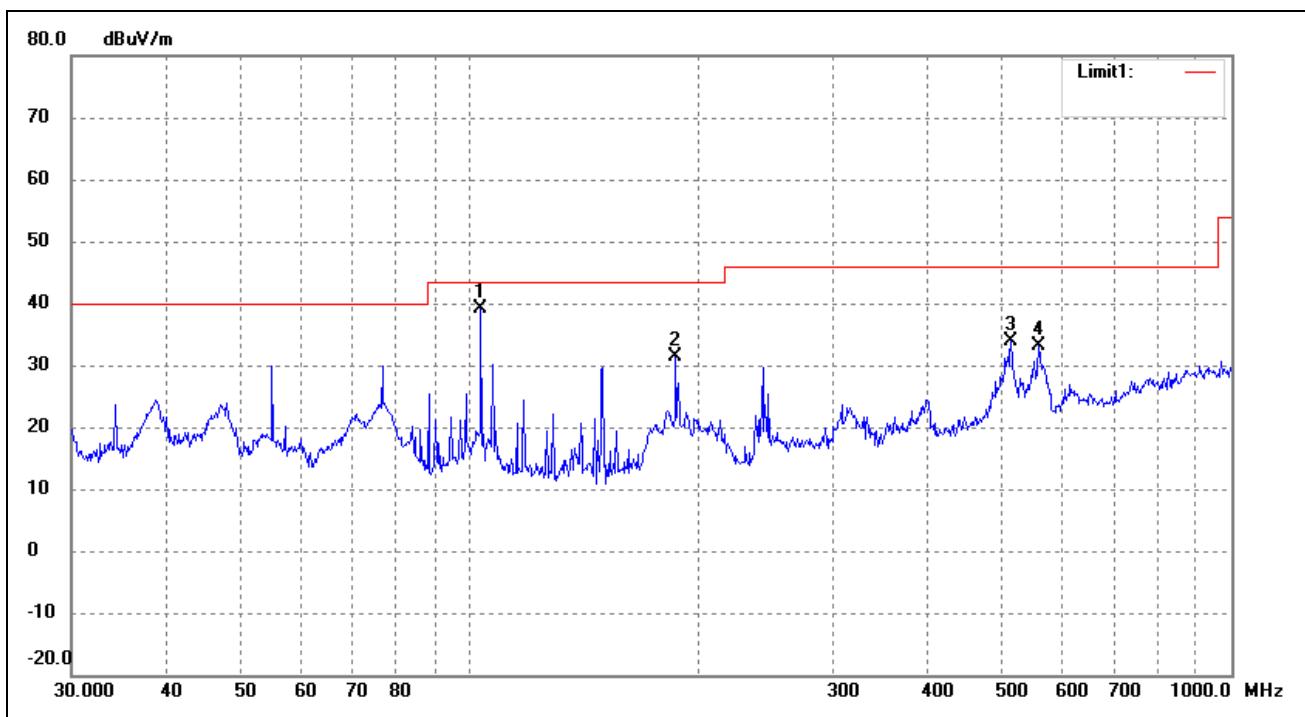
*Operating Condition:* 802.11b Transmitting High Channel-2462MHz  
*Comment:* 120V/60Hz; Adapter DC 12V/1A

*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	67.2022	37.67	-13.93	23.74	40.00	-16.26	255	100	QP
2	245.0900	39.45	-10.73	28.72	46.00	-17.28	47	100	QP
3	386.6338	33.21	-7.20	26.01	46.00	-19.99	69	100	QP
4	556.7744	36.29	-5.76	30.53	46.00	-15.47	185	100	QP

*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	103.4421	50.96	-11.80	39.16	43.50	-4.34	86	100	QP
2	186.4409	44.72	-13.38	31.34	43.50	-12.16	265	100	QP
3	513.6331	40.03	-6.07	33.96	46.00	-12.04	176	100	QP
4	558.7302	38.83	-5.76	33.07	46.00	-12.93	278	100	QP

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

<b>Frequency</b> <b>(MHz)</b>	<b>Reading</b> <b>(dBuV/m)</b>	<b>Correct</b> <b>dB/m</b>	<b>Result</b> <b>(dBuV/m)</b>	<b>Limit</b> <b>(dBuV/m)</b>	<b>Margin</b> <b>(dB)</b>	<b>Polar</b> <b>H/V</b>	<b>Detector</b>
Low Channel-2412MHz							
4824.000	51.74	-3.87	47.87	74.00	-26.13	H	PK
4824.000	36.49	-3.87	32.62	54.00	-21.38	H	AV
7236.000	43.95	1.14	45.09	74.00	-28.91	H	PK
7236.000	32.63	1.19	33.82	54.00	-20.18	H	AV
4824.000	54.96	-3.86	51.10	74.00	-22.90	V	PK
4824.000	38.15	-3.86	34.29	54.00	-19.71	V	AV
7236.000	46.76	1.10	47.86	74.00	-26.14	V	PK
7236.000	35.09	1.10	36.19	54.00	-17.81	V	AV
Middle Channel-2437MHz							
4874.000	54.74	-3.74	51.00	74.00	-23.00	H	PK
4874.000	39.99	-3.74	36.25	54.00	-17.75	H	AV
7311.000	47.77	1.47	49.24	74.00	-24.76	H	PK
7311.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4874.000	53.97	-3.74	50.23	74.00	-23.77	V	PK
4874.000	40.89	-3.74	37.15	54.00	-16.85	V	AV
7311.000	47.98	1.47	49.45	74.00	-24.55	V	PK
7311.000	34.08	1.47	35.55	54.00	-18.45	V	AV
High Channel-2462MHz							
4924.000	55.82	-3.59	49.88	74.00	-24.12	H	PK
4924.000	41.76	-3.59	35.82	54.00	-18.18	H	AV
7386.000	46.38	1.79	45.82	74.00	-28.18	H	PK
7386.000	34.83	1.79	34.27	54.00	-19.73	H	AV
4924.000	54.94	-3.59	49.00	74.00	-25.00	V	PK
4924.000	42.04	-3.59	36.10	54.00	-17.90	V	AV
7386.000	47.99	1.79	47.43	74.00	-26.57	V	PK
7386.000	35.18	1.79	34.62	54.00	-19.38	V	AV