

FCC Part 15C Measurement and Test Report

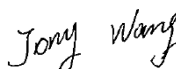
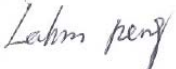

For

ShenZhen HaiLingKe Electronic co.,Ltd.

3F, 5# Buliding, Minxing Industrial Park, MinKang Rd .Minzhi,

Longhua District, Shenzhen, China

FCC ID: 2AD56HLK-M35

FCC Rule(s):	<u>FCC Part 15C</u>
Product Description:	<u>WIFI module</u>
Tested Model:	<u>HLK-M35</u>
Report No.:	<u>STR15018194I</u>
Tested Date:	<u>2015-01-21 to 2015-01-31</u>
Issued Date:	<u>2015-01-31</u>
Tested By:	<u>Jong Wang / Engineer</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 Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: ShenZhen HaiLingKe Electronic co.,Ltd.
 Address of applicant: 3F, 5# Buliding, Minxing Industrial Park, MinKang Rd .Minzhi, Longhua District, Shenzhen, China
 Manufacturer: ShenZhen HaiLingKe Electronic co.,Ltd.
 Address of manufacturer: 3F, 5# Buliding, Minxing Industrial Park, MinKang Rd .Minzhi, Longhua District, Shenzhen, China

General Description of EUT	
Product Name:	WIFI module
Trade Name:	HI-LINK
Model No.:	HLK-M35
Adding Model(s):	/
Rated Voltage:	DC 3.3V
Power Adapter Model:	/
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2472MHz for 802.11b/g/n(HT20) 2422-2462MHz for 802.11n(HT40)
RF Output Power:	16.33 dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	13 for 802.11b/g/n(HT20); 9 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	1.5dBi
Lowest Internal Frequency	40MHz

1.2 Test Standards

The following report is prepared on behalf of the ShenZhen HaiLingKe Electronic 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 C63.4-2014, 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 V03r02 for digital transmission systems shall be performed also.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology 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 934118.

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.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology 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 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd 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, 2442MHz, 2462MHz, 2467MHz, 2472MHz
TM2	802.11g	2412MHz, 2442MHz, 2462MHz, 2467MHz, 2472MHz
TM3	802.11n-HT20	2412MHz, 2442MHz, 2462MHz, 2467MHz, 2472MHz
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz, 2457MHz, 2462MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

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

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
computer	Lenovo	A4600t-10	

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
§ 15.207(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 § 2.1093, 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 an integral 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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

5.3 Test Procedure

According to the KDB 558074 D01 V03r02, 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 $\geq 2 \times \text{span}/\text{RBW}$.
- 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).

5.4 Environmental Conditions

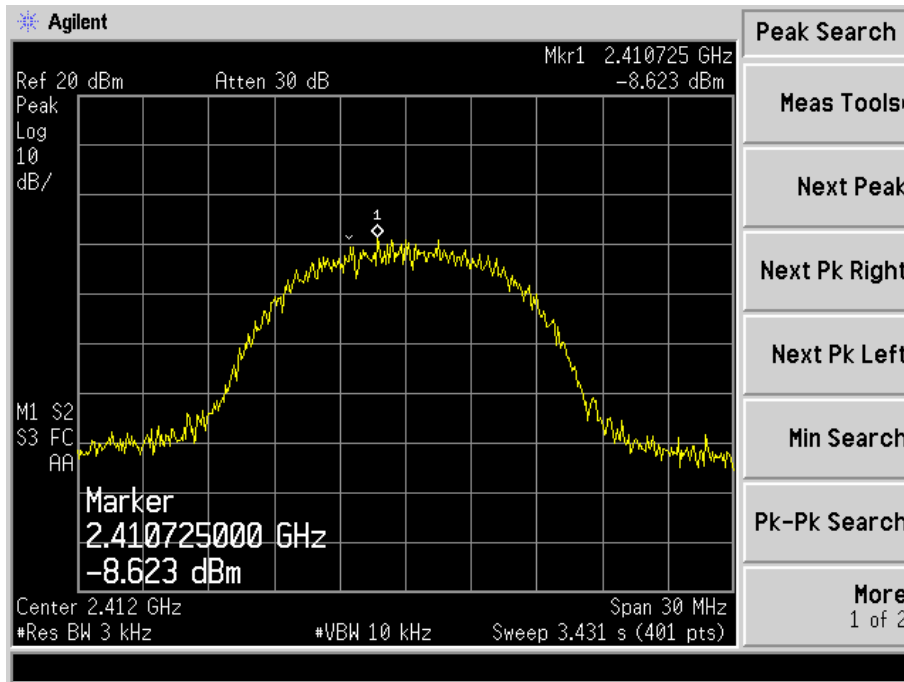
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

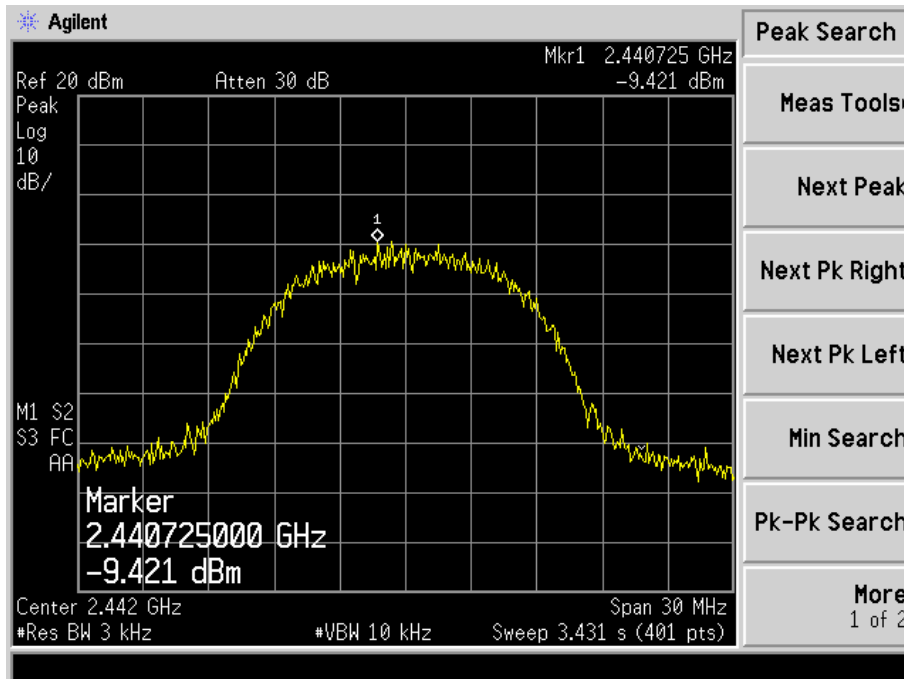
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-8.623	8
	2442	-9.421	8
	2462	-9.808	8
	2467	-10.02	8
	2472	-10.16	8
802.11g	2412	-13.66	8
	2442	-15.17	8
	2462	-16.14	8
	2467	-16.06	8
	2472	-15.89	8
802.11n HT20	2412	-15.21	8
	2442	-16.05	8
	2462	-17.04	8
	2467	-16.95	8
	2472	-15.94	8
802.11n HT40	2422	-18.00	8
	2442	-18.83	8
	2452	-18.85	8
	2457	-18.87	8
	2462	-19.02	8

Please refer to the following test plots:

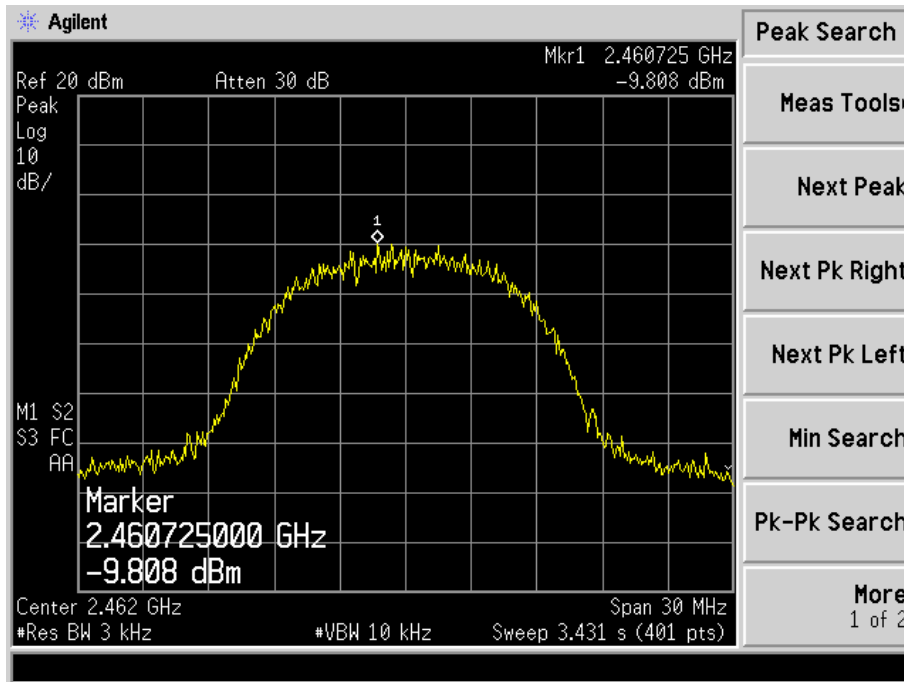
802.11b-2412MHz



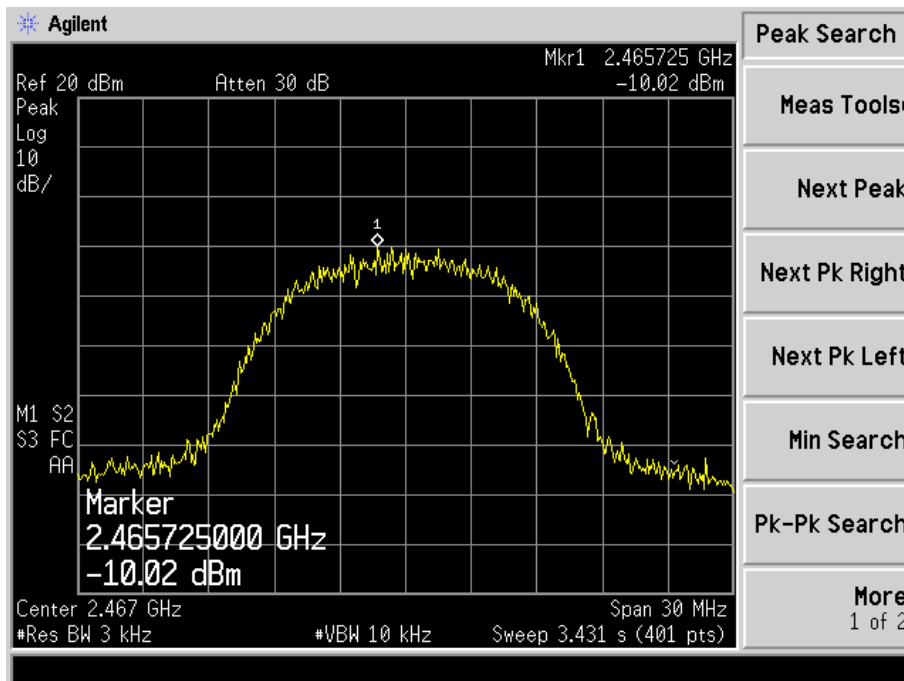
802.11b-2442MHz



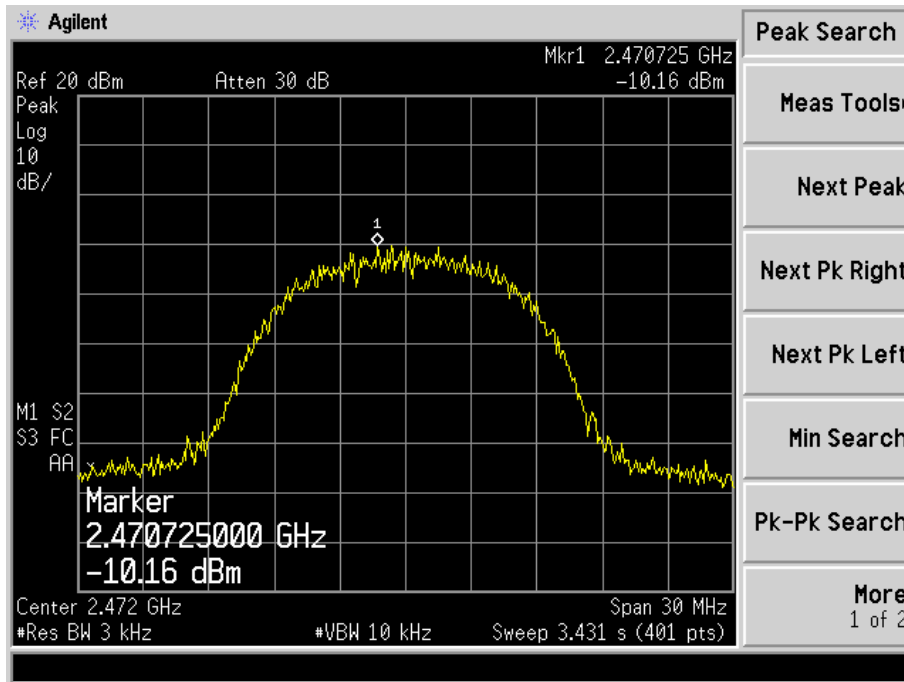
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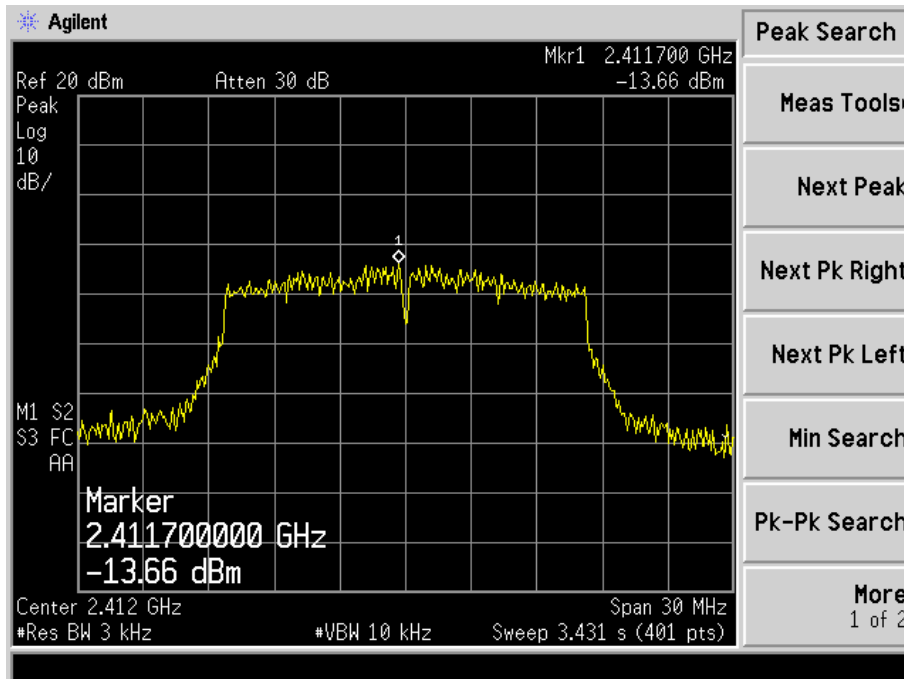
802.11b-2467MHz



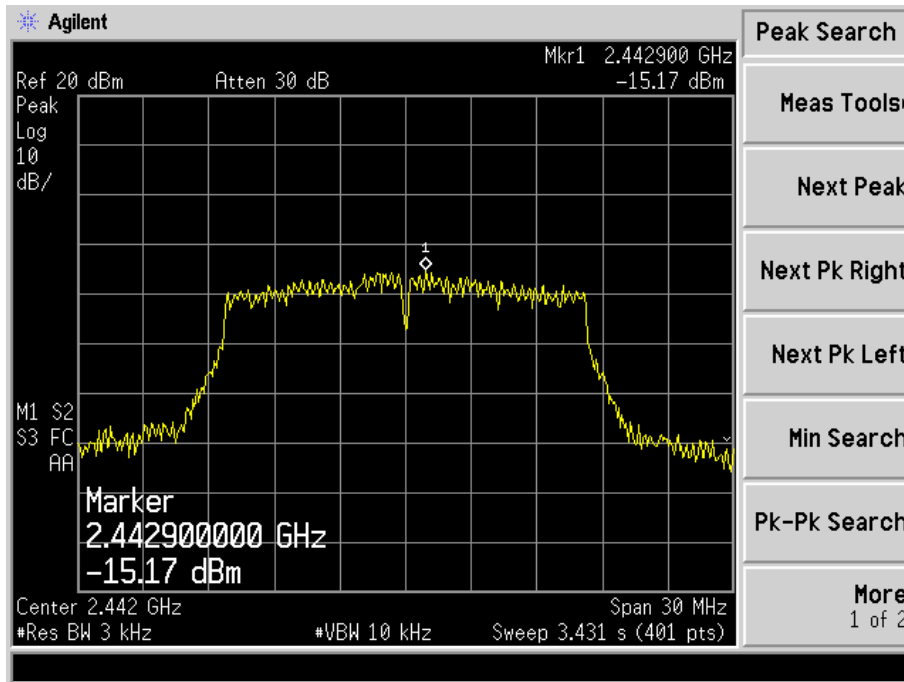
802.11b-2472MHz



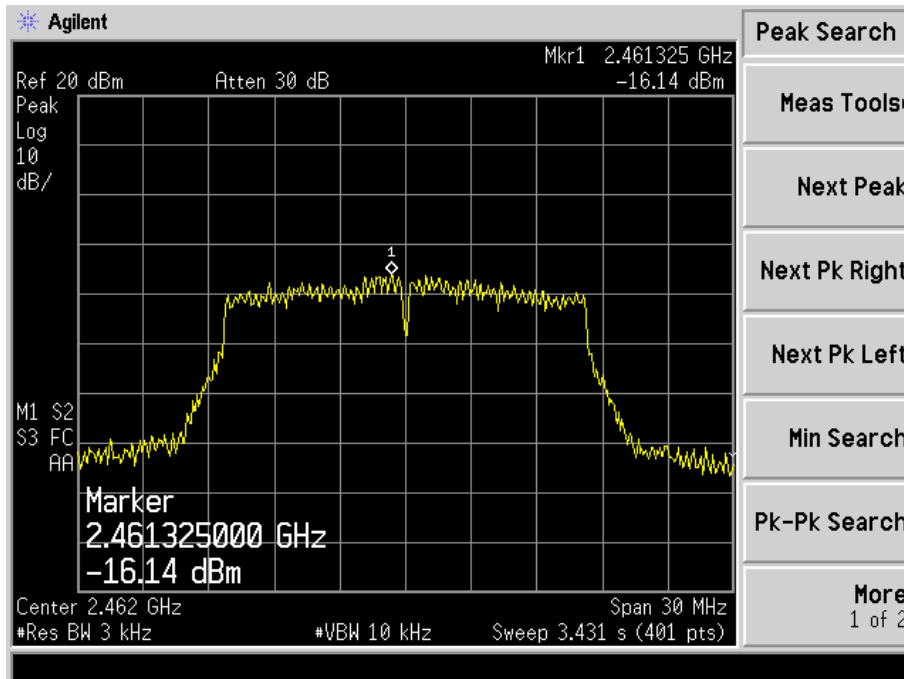
802.11g-2412MHz



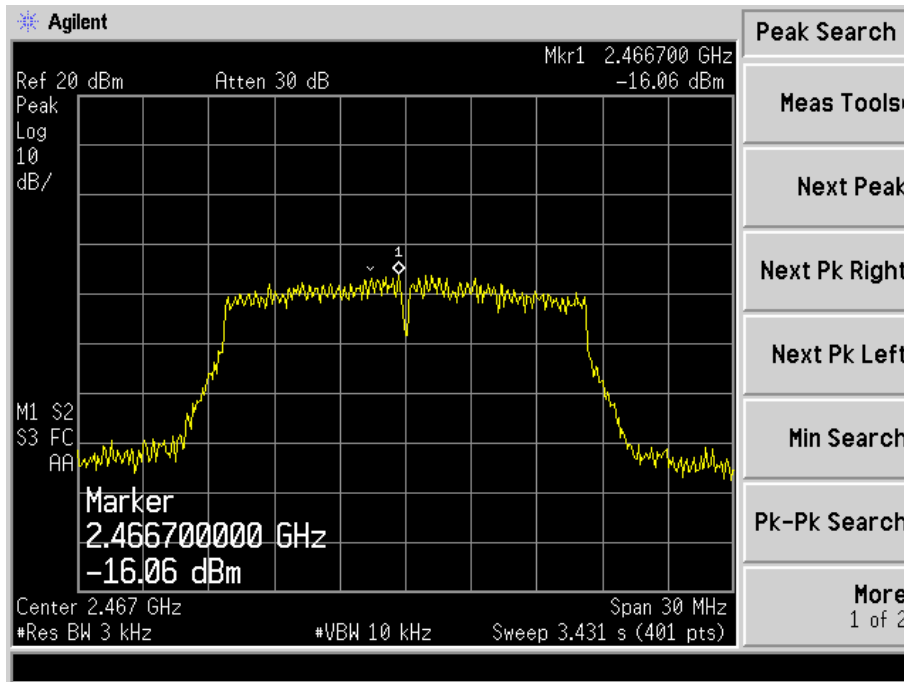
802.11g-2442MHz



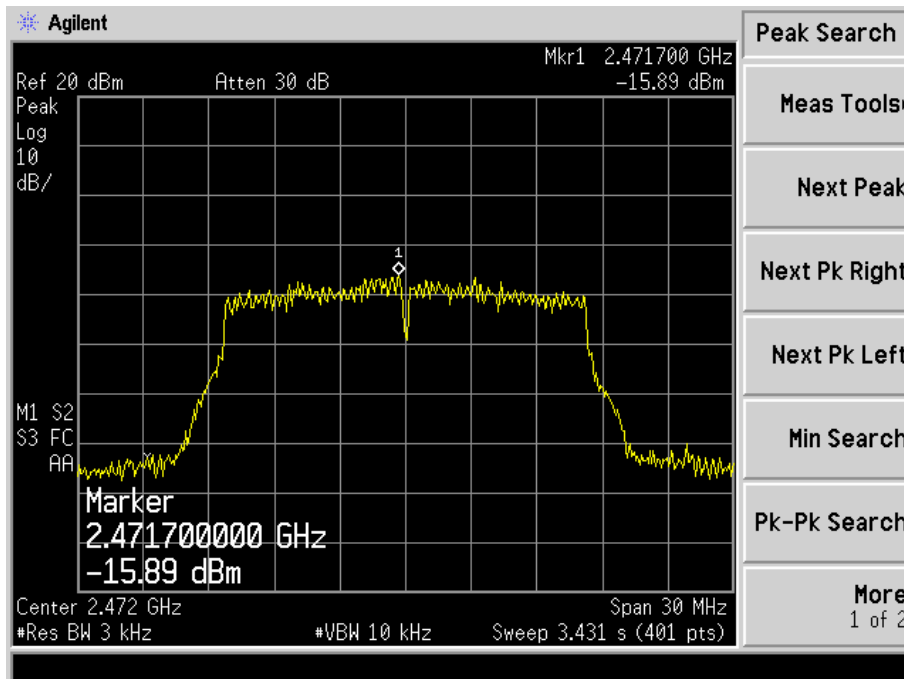
802.11g-2462MHz



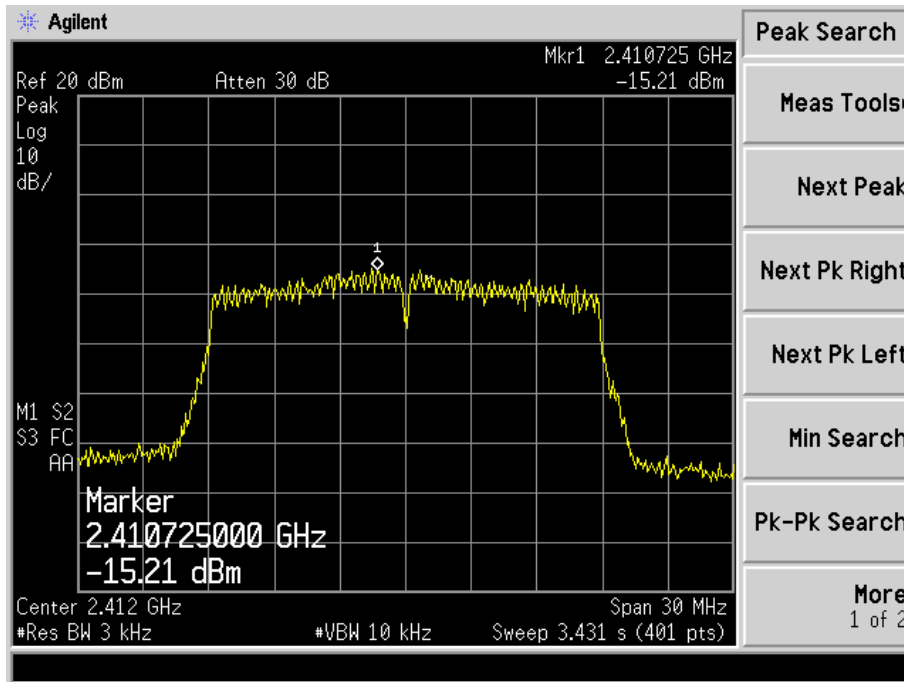
802.11g-2467MHz



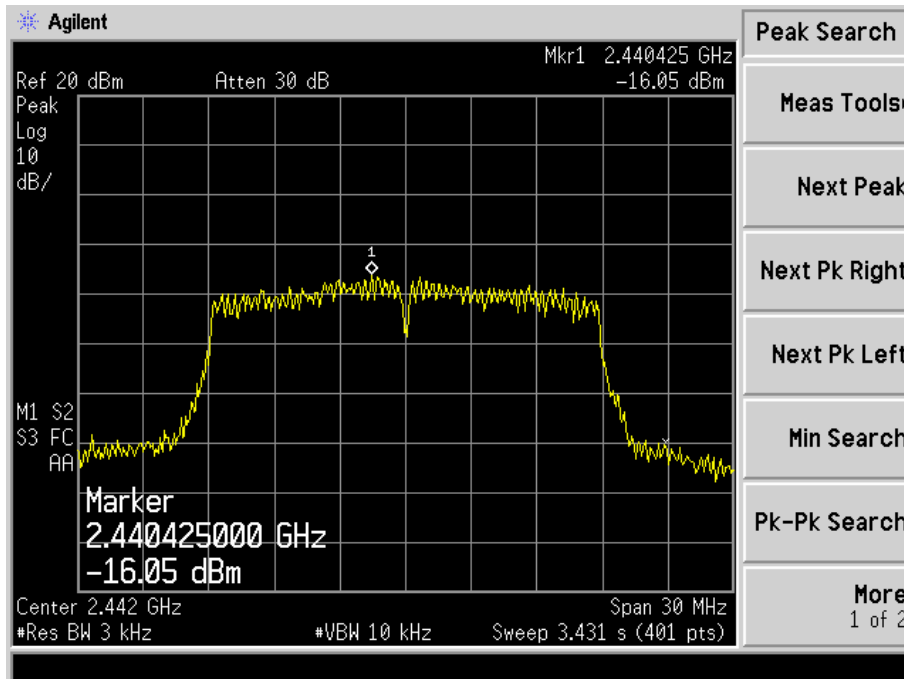
802.11g-2472MHz



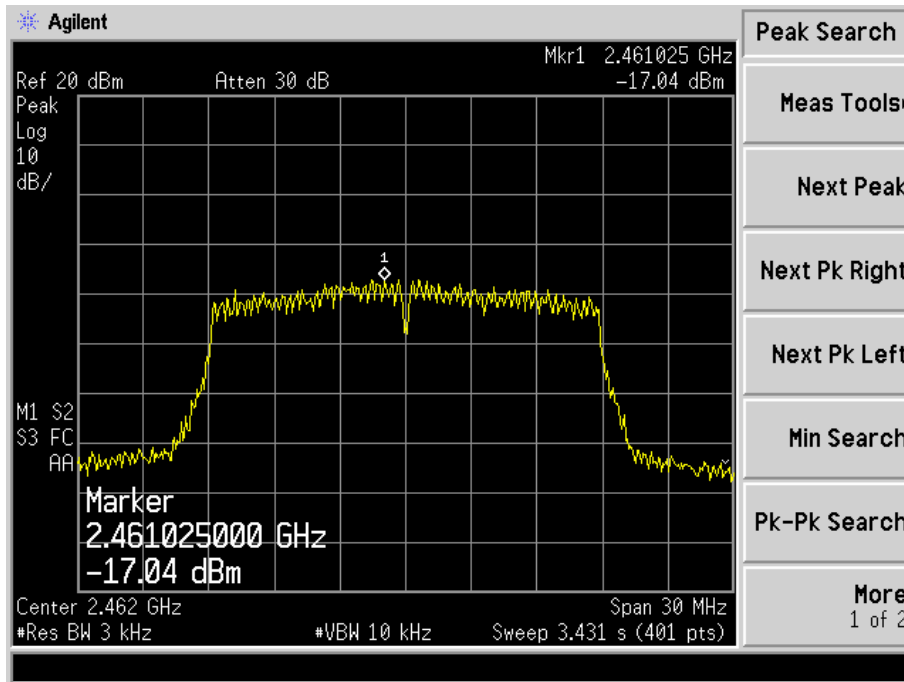
802.11n-HT20-2412MHz



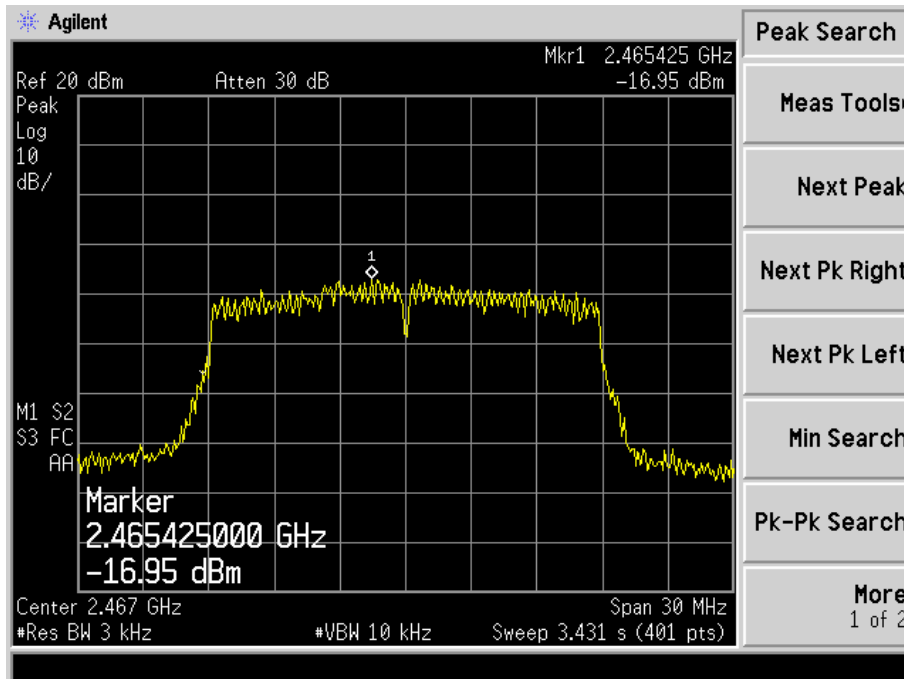
802.11n-HT20-2442MHz



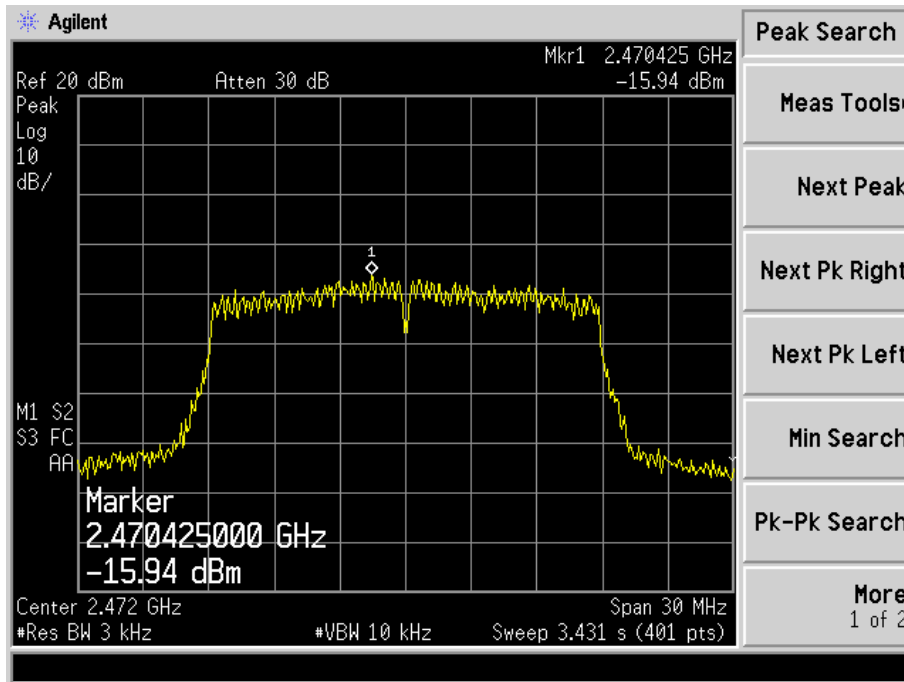
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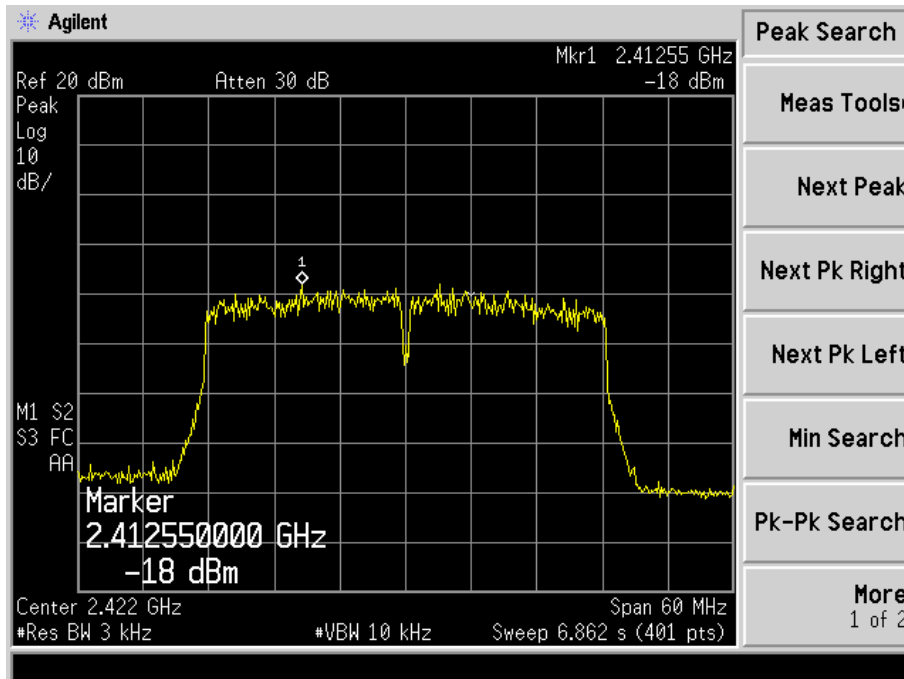
802.11n-HT20-2467MHz



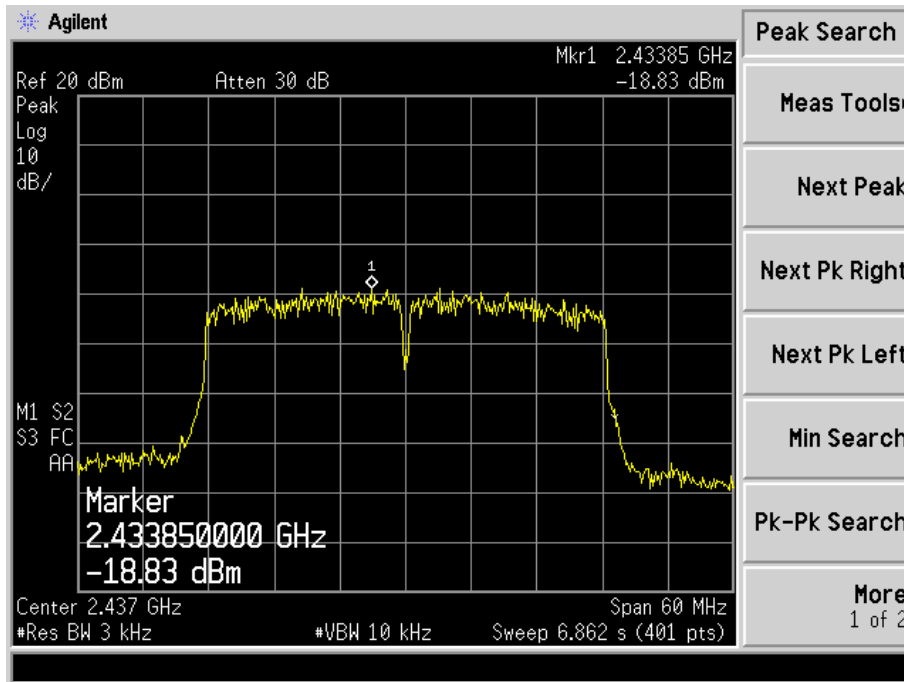
802.11n-HT20-2472MHz



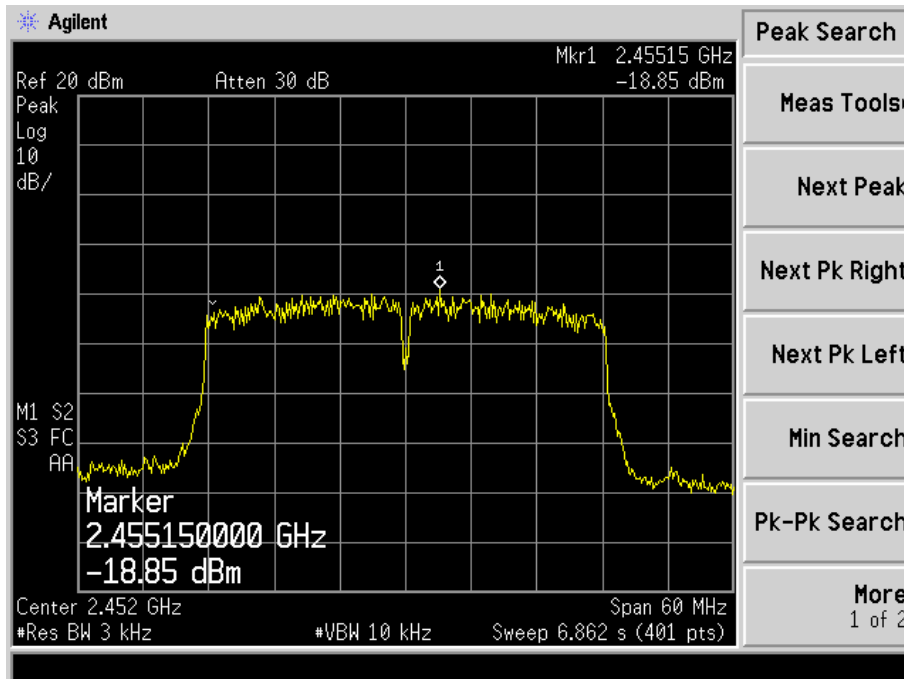
802.11n-HT40-2422MHz



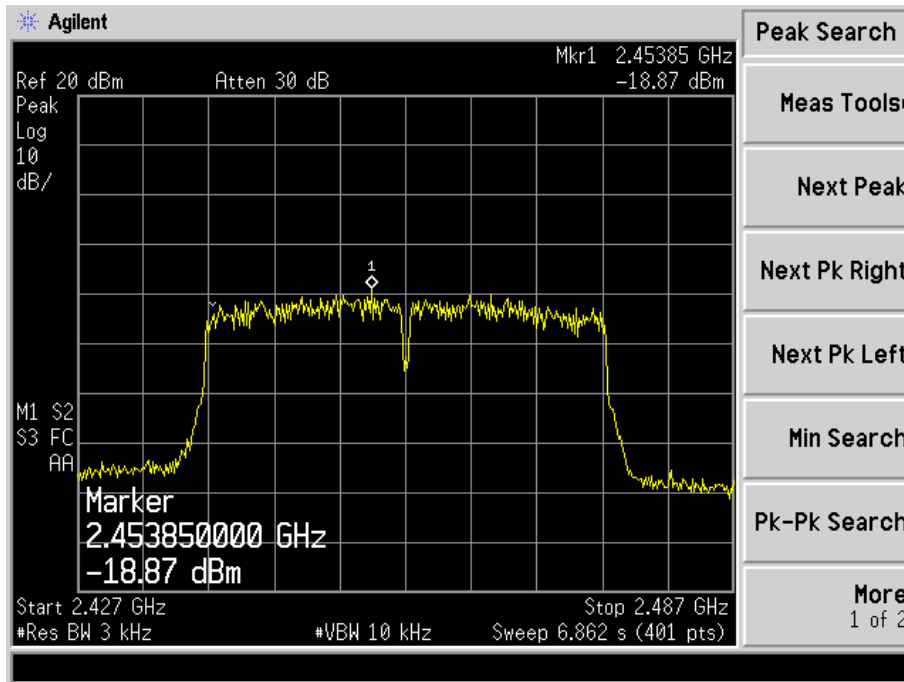
802.11n-HT40-2437MHz



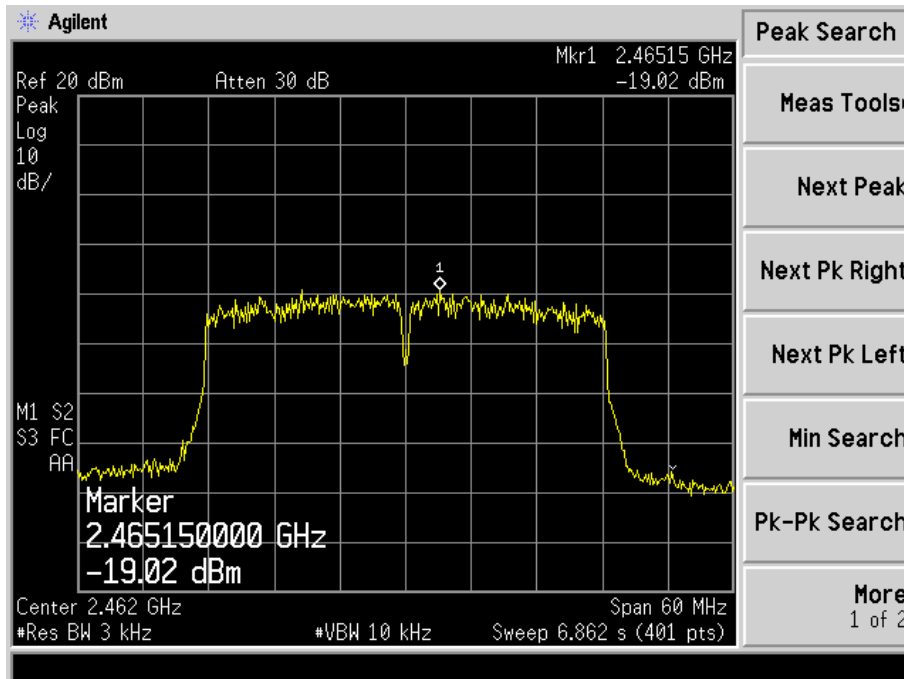
802.11n-HT40-2452MHz



802.11n-HT40-2457MHz



802.11n-HT40-2462MHz



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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

6.3 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.

6.4 Environmental Conditions

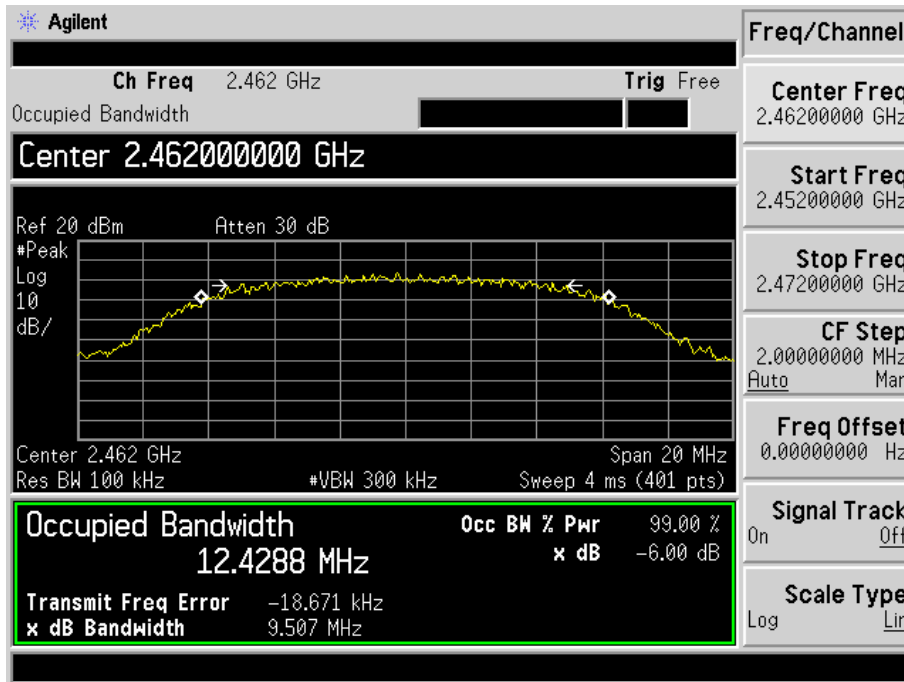
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

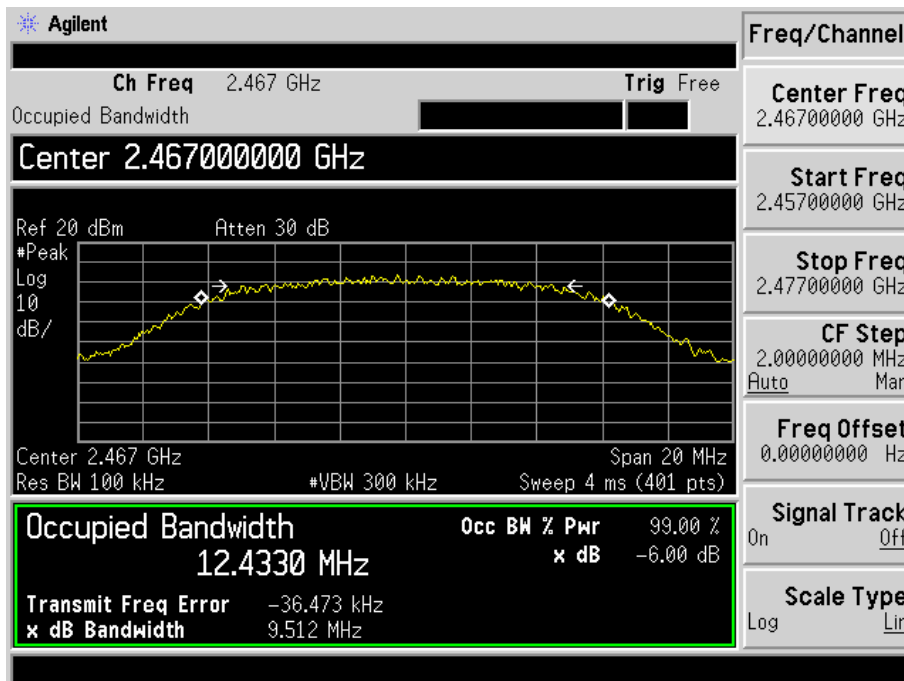
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	9528	12567.6	500
	2442	9417	12435.1	500
	2462	9507	12428.8	500
	2467	9512	12433.0	500
	2472	9950	12408.8	500
802.11g	2412	16469	16401.6	500
	2442	16427	16366.8	500
	2462	16474	16367.5	500
	2467	16407	16331.1	500
	2472	16478	16369.8	500
802.11n-HT20	2412	17551	17515.1	500
	2442	17665	17532.1	500
	2462	17622	17526.9	500
	2467	17476	17508.5	500
	2472	17680	17540.7	500
802.11n-HT40	2422	35876	35872.3	500
	2437	35814	35838.7	500
	2452	36168	35.9060	500
	2457	35838	35875.1	500
	2462	35698	35853.7	500

Please refer to the following test plots:

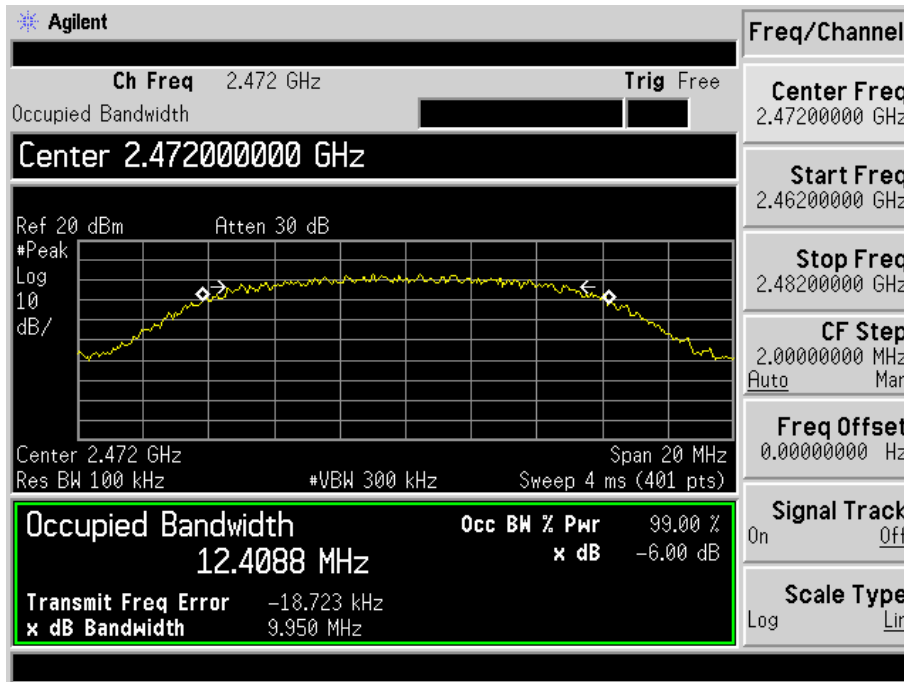
802.11b-2462MHz



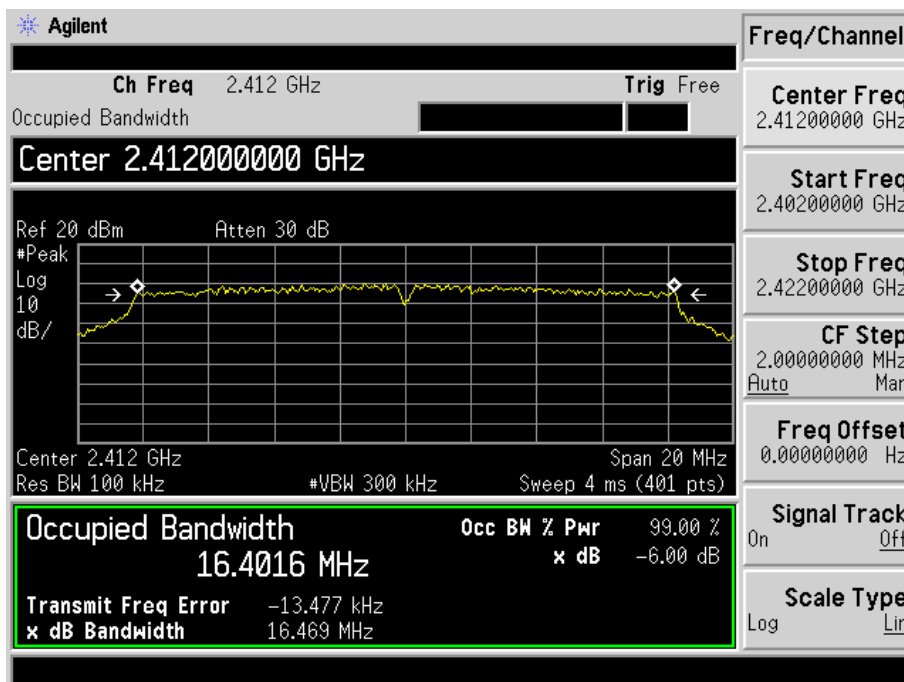
802.11b-2467MHz



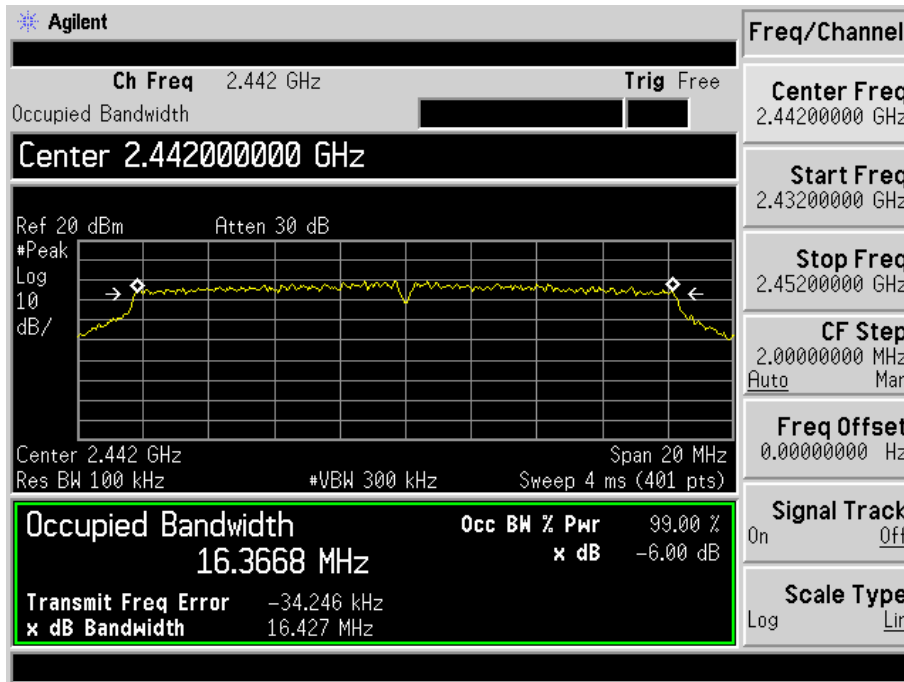
802.11b-2472MHz



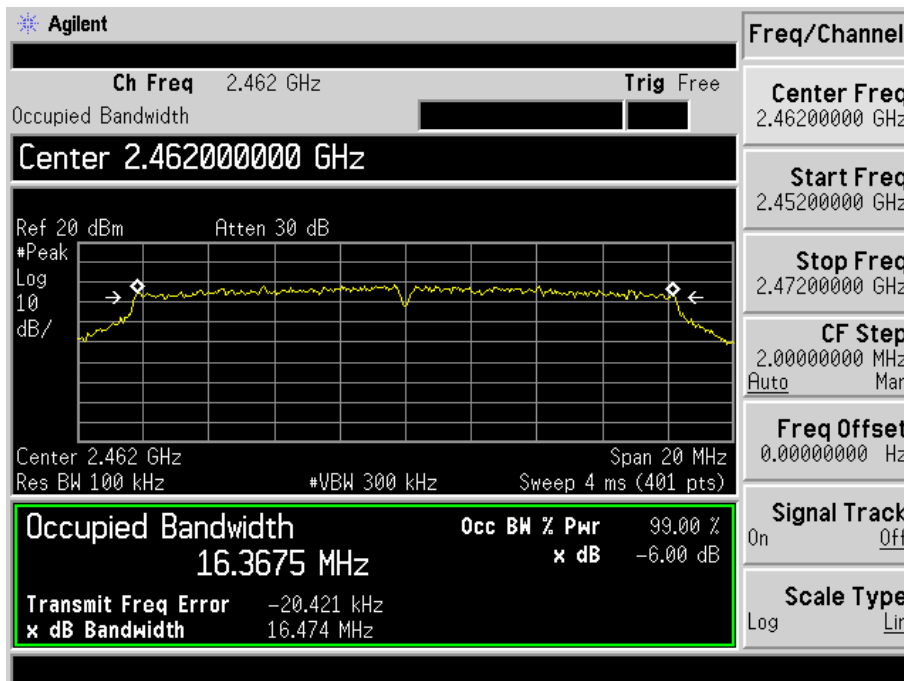
802.11g-2412MHz



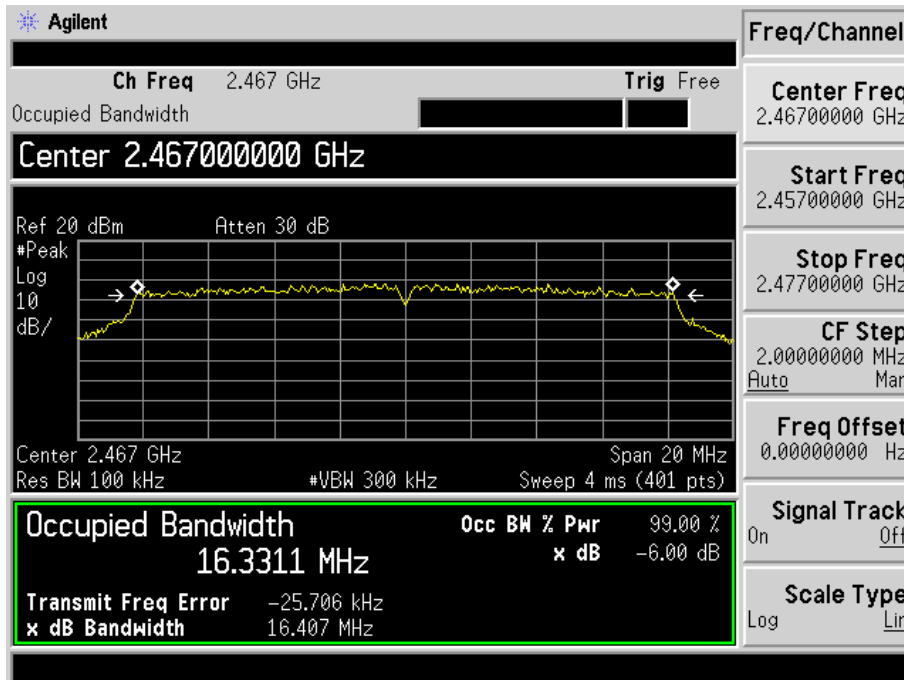
802.11g-2442MHz



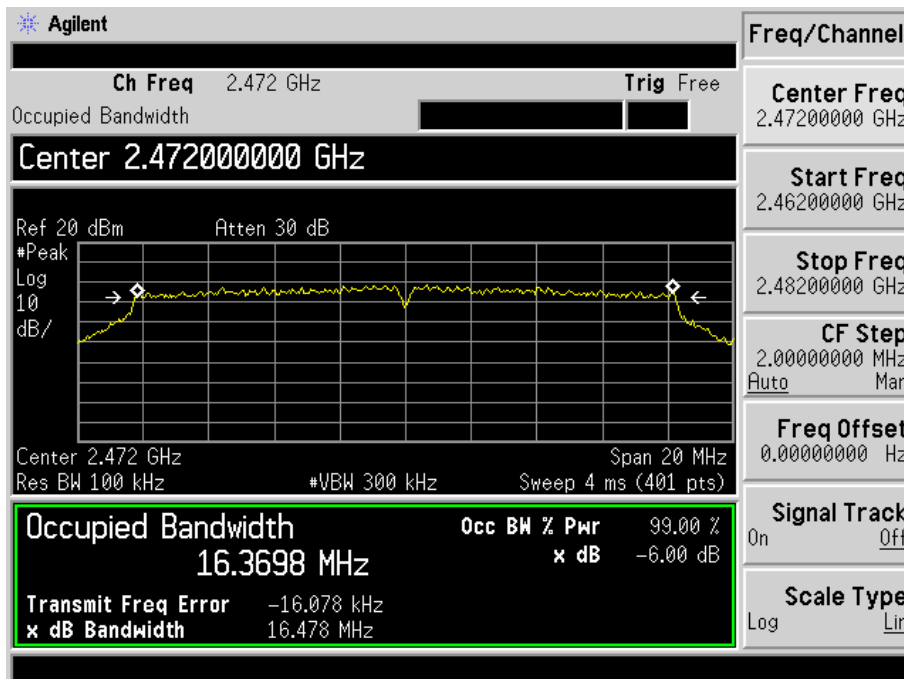
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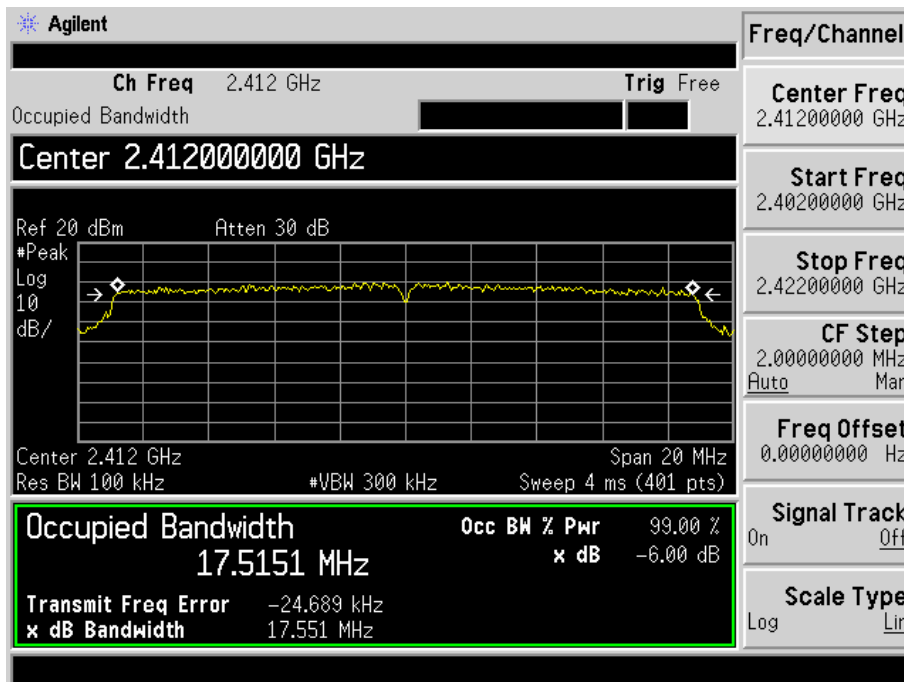
802.11g-2467MHz



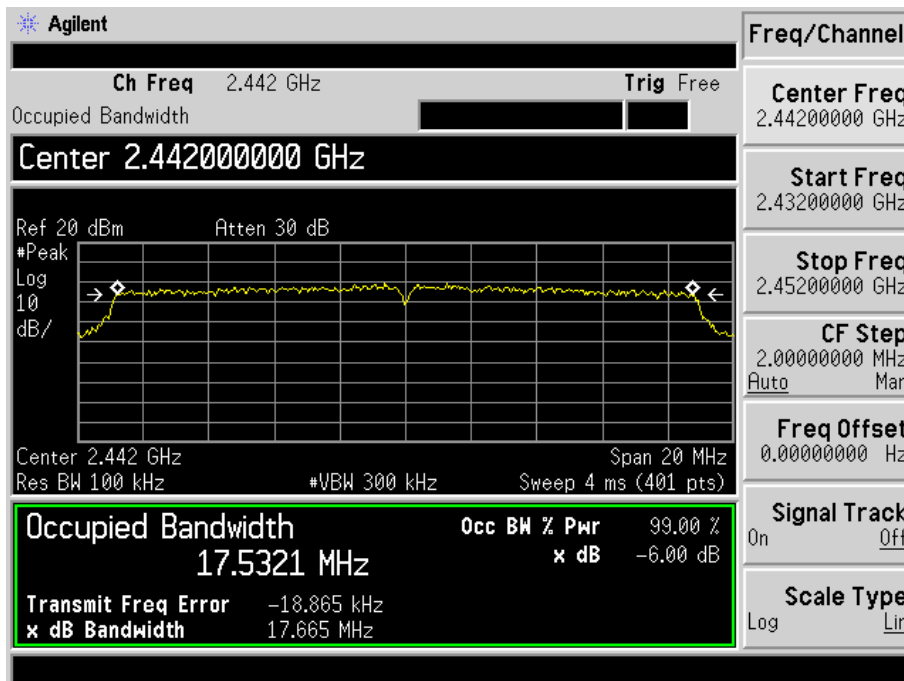
802.11g-2472MHz



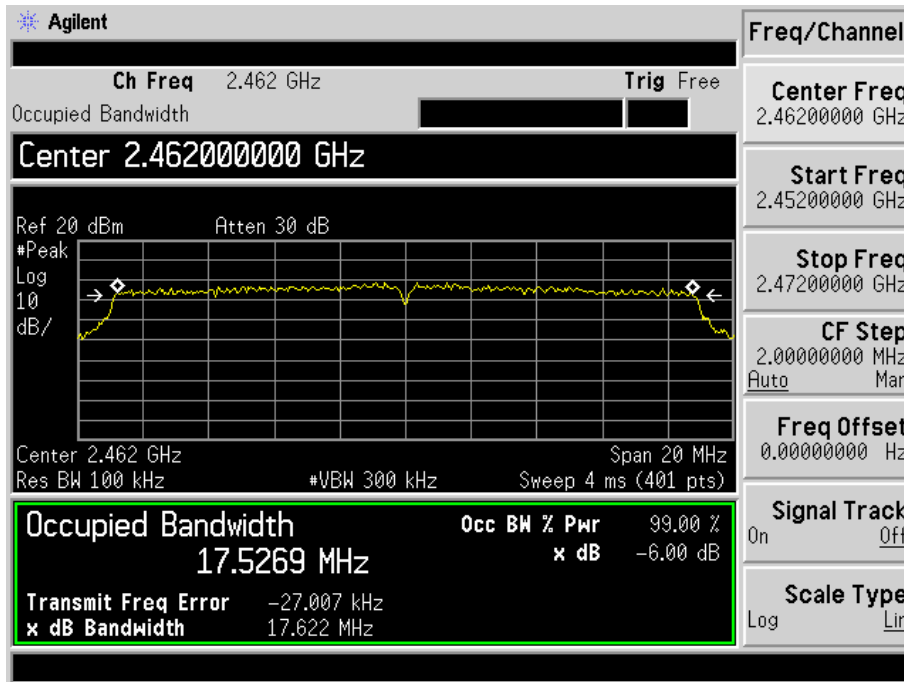
802.11n-HT20-2412MHz



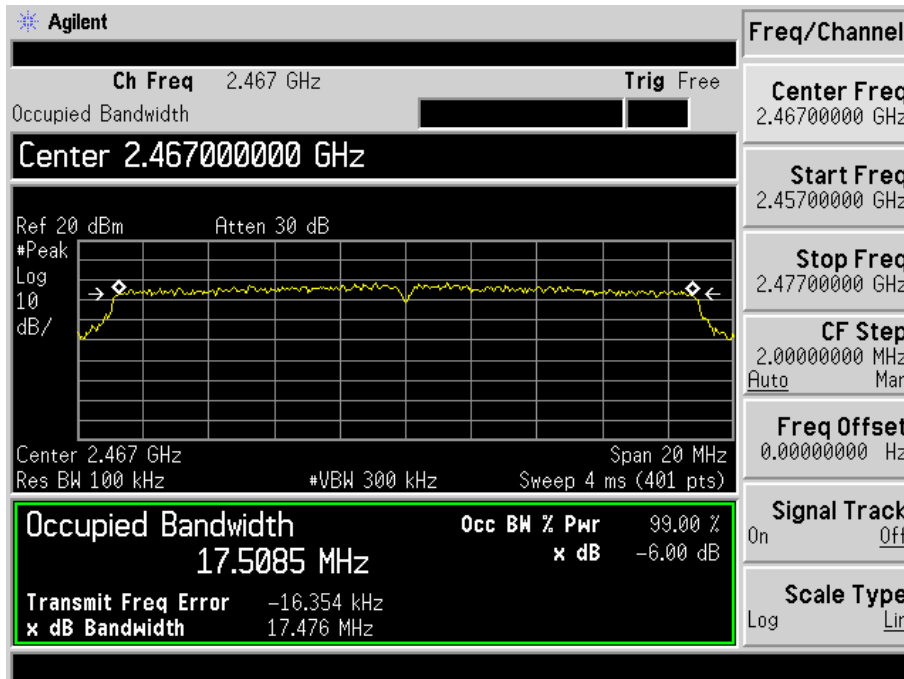
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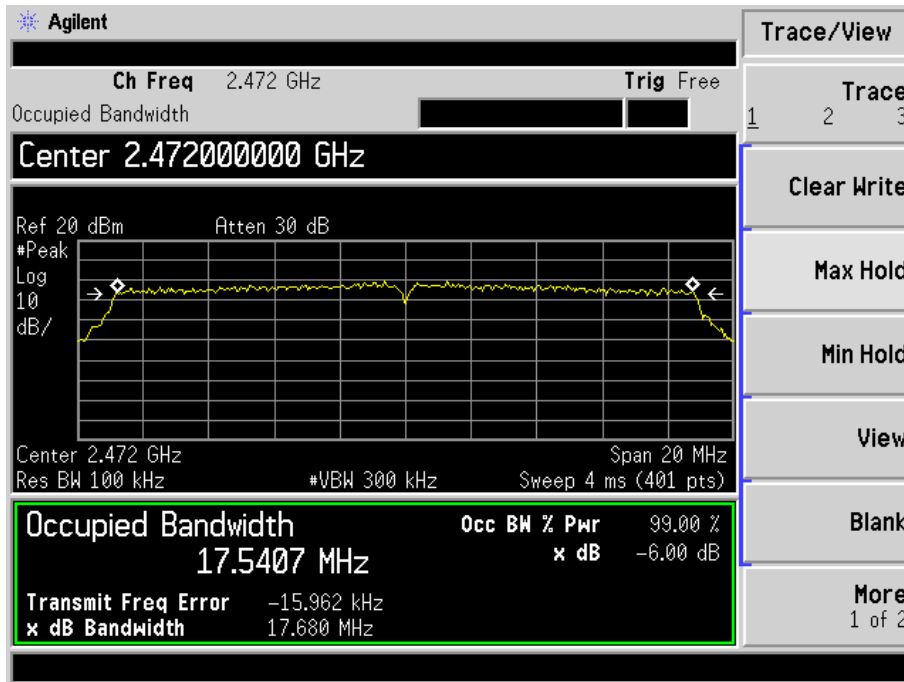
802.11n-HT20-2462MHz



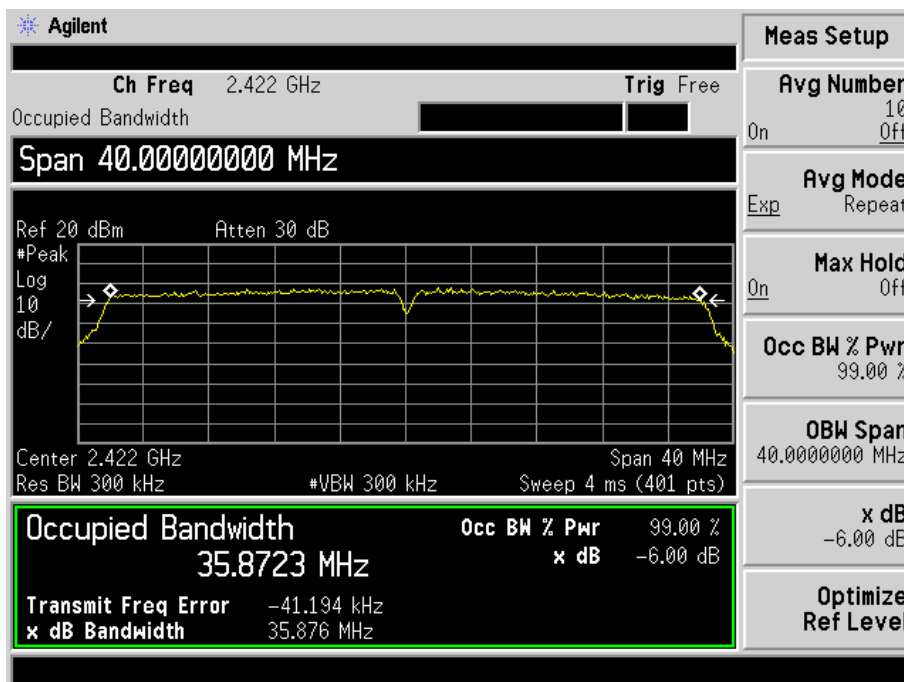
802.11n-HT20-2467MHz



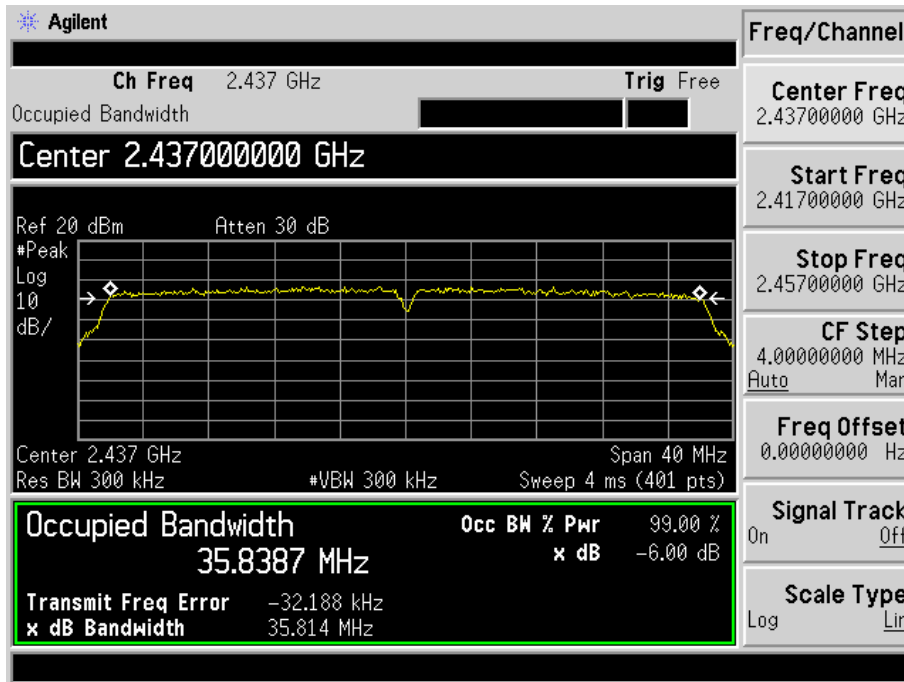
802.11n-HT20-2472MHz



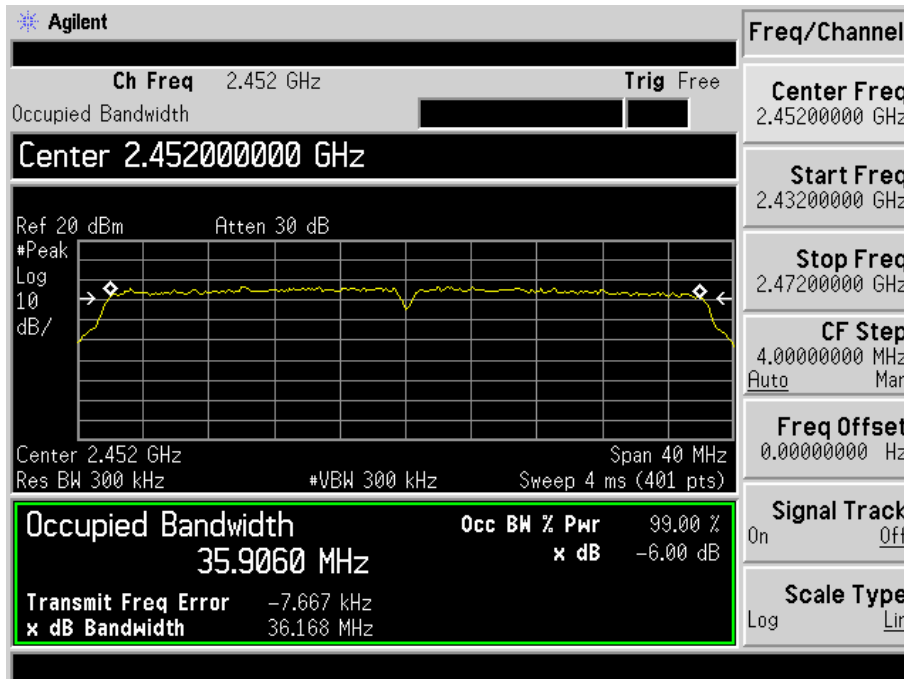
802.11n-HT40-2422MHz



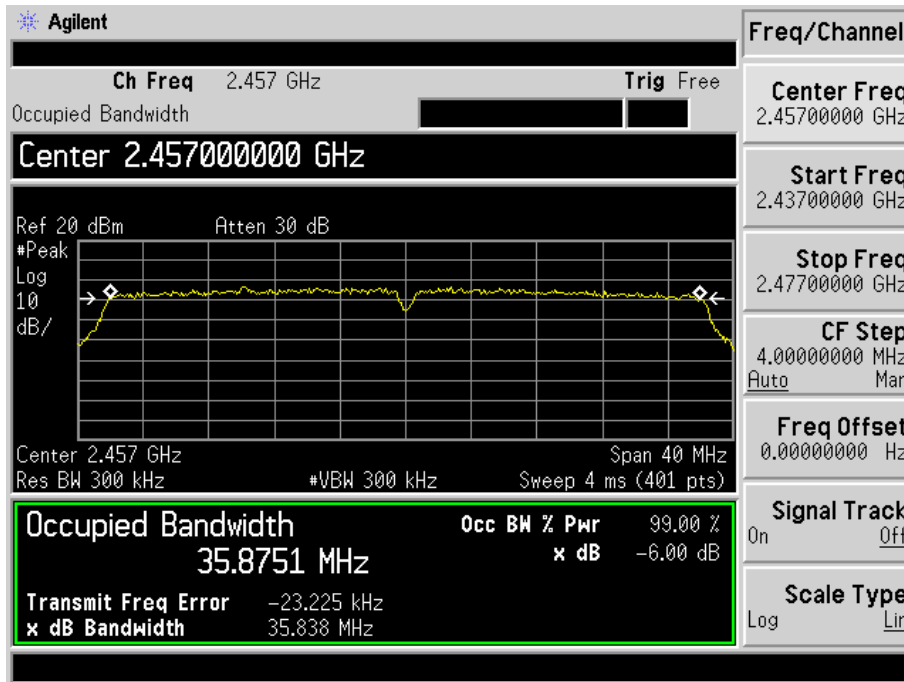
802.11n-HT40-2437MHz



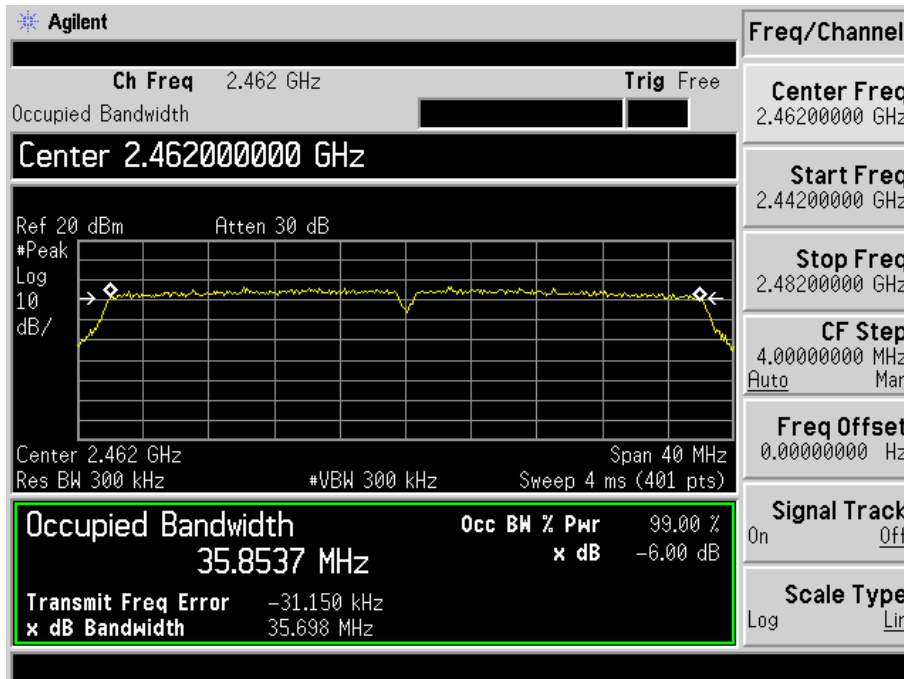
802.11n-HT40-2452MHz



802.11n-HT40-2457MHz



802.11n-HT40-2462MHz



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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 D01 V03r02, 9.2.2.2 (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 ≥ 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.

7.4 Environmental Conditions

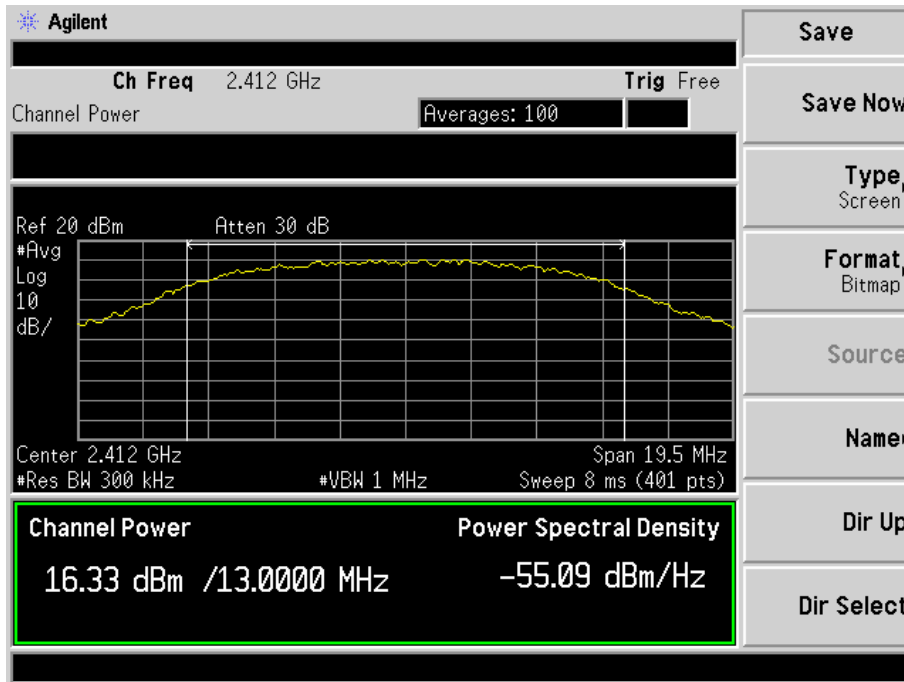
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

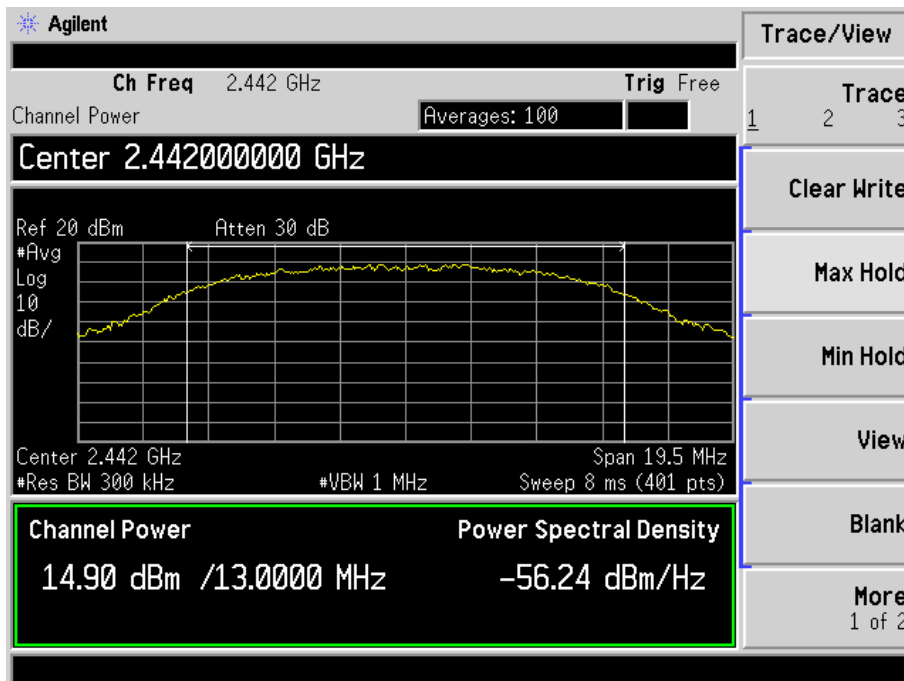
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b _ 11Mbps	2412	16.33	42.95	1000
	2442	14.90	30.90	1000
	2462	14.59	28.77	1000
	2467	14.45	27.86	1000
	2472	14.57	28.64	1000
802.11g_54Mbps	2412	12.78	18.97	1000
	2442	11.85	15.31	1000
	2462	11.38	13.74	1000
	2467	11.37	13.71	1000
	2472	11.67	14.69	1000
802.11n HT20_MCS7	2412	13.13	20.56	1000
	2442	11.88	15.42	1000
	2462	11.37	13.71	1000
	2467	11.27	13.40	1000
	2472	11.18	13.12	1000
802.11n HT40_MCS7	2422	10.23	10.54	1000
	2437	9.77	9.48	1000
	2452	9.34	8.59	1000
	2457	9.49	8.89	1000
	2462	9.43	8.77	1000

Please refer to the following test plots:

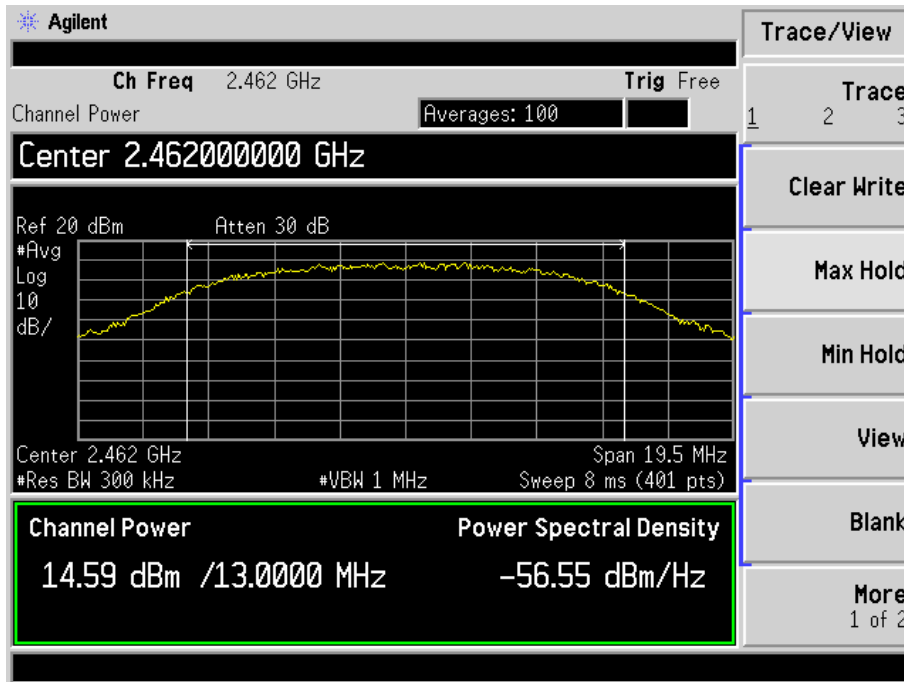
802.11b-11Mbps-2412MHz



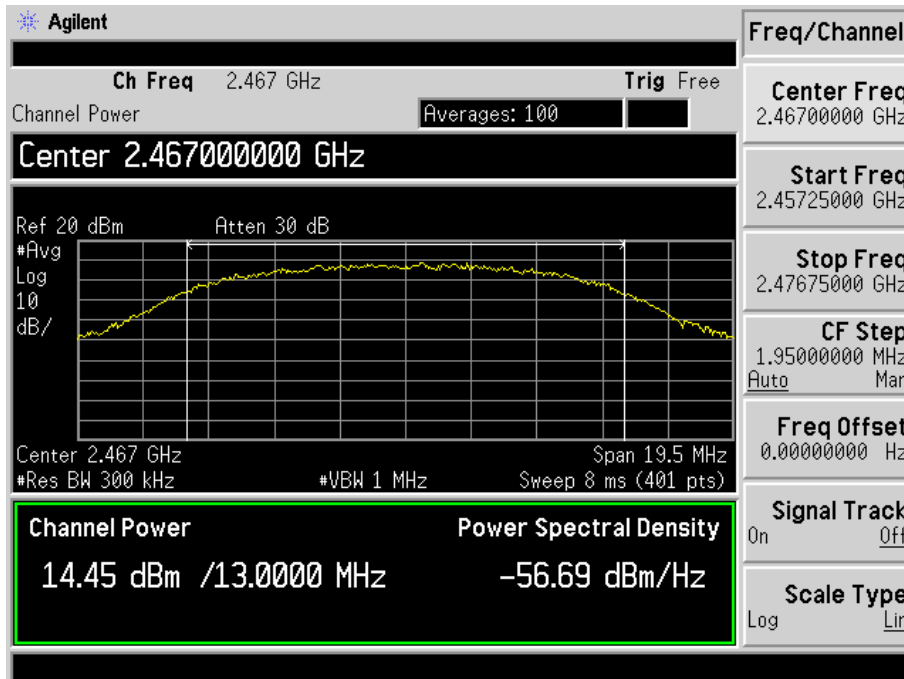
802.11b-11Mbps-2442MHz



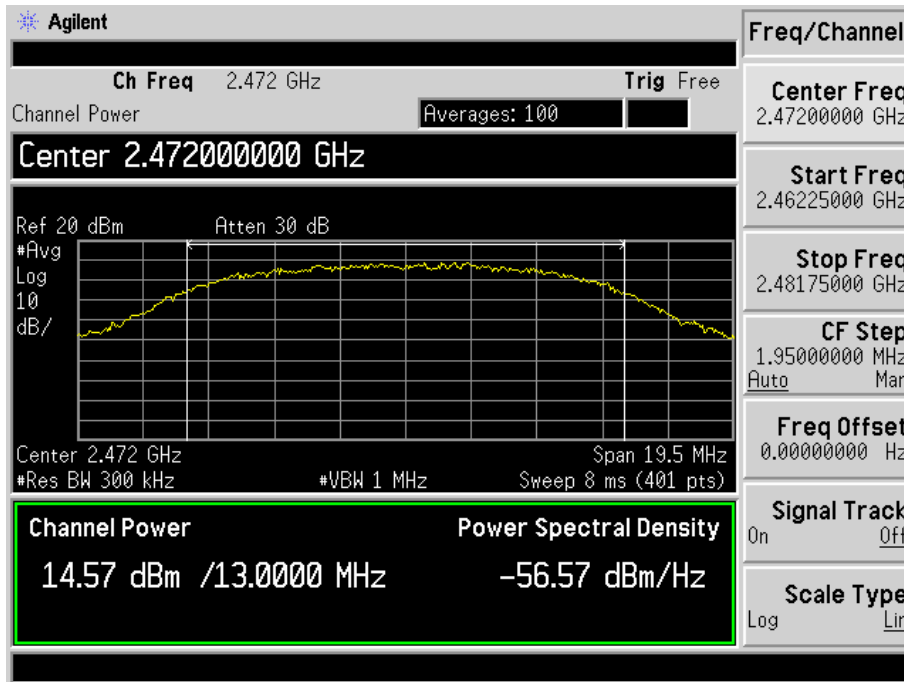
802.11b-11Mbps-2462MHz



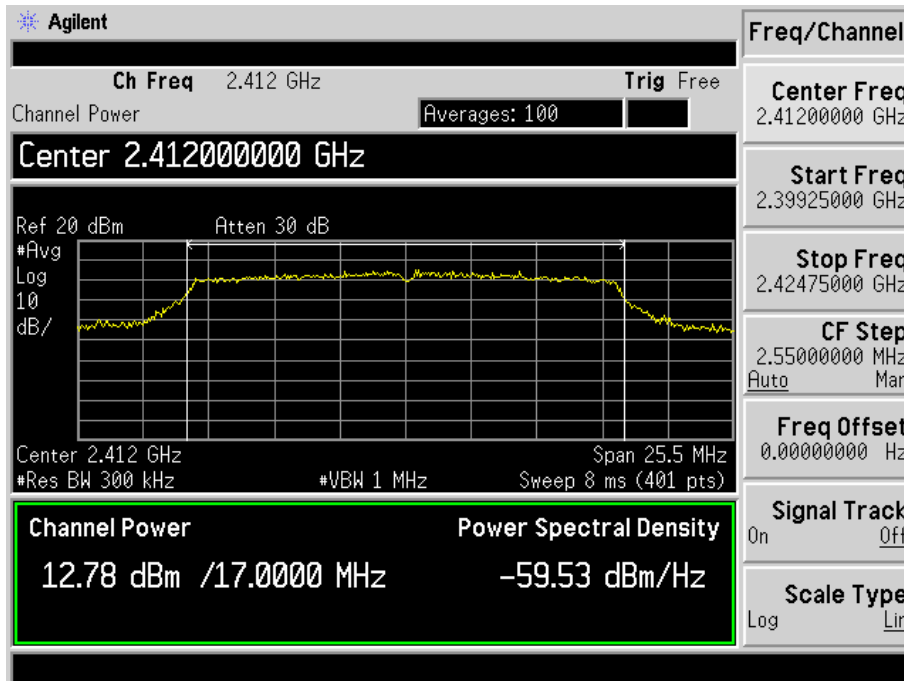
802.11b-11Mbps-2467MHz



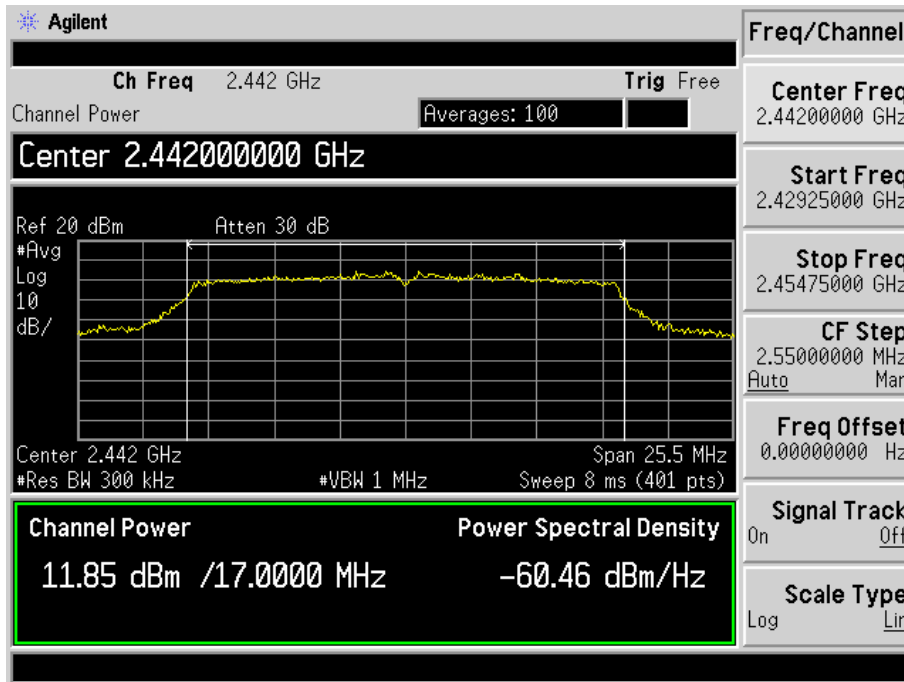
802.11b-11Mbps-2472MHz



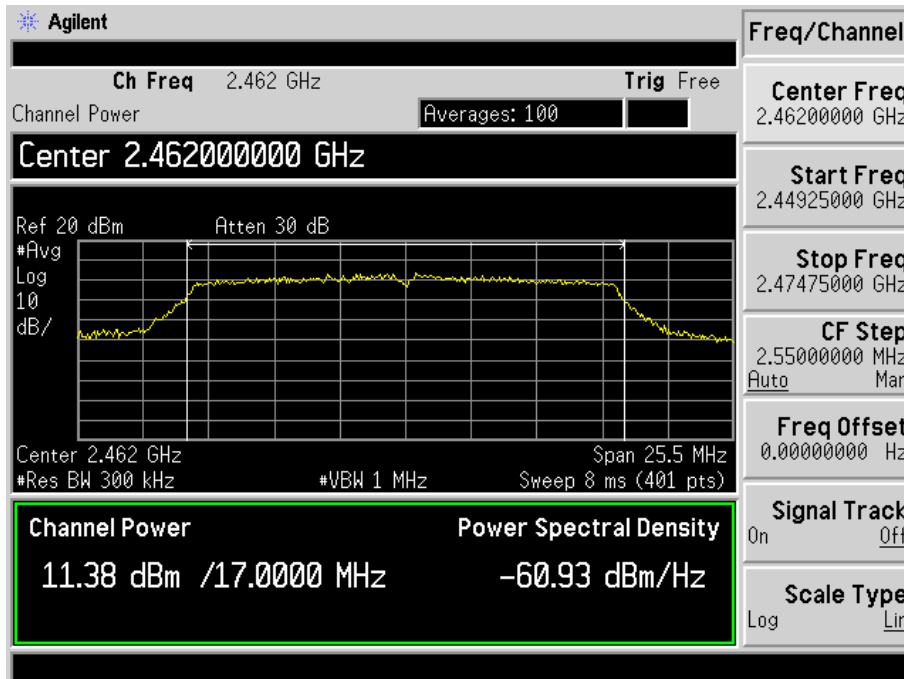
802.11g-54Mbps-2412MHz



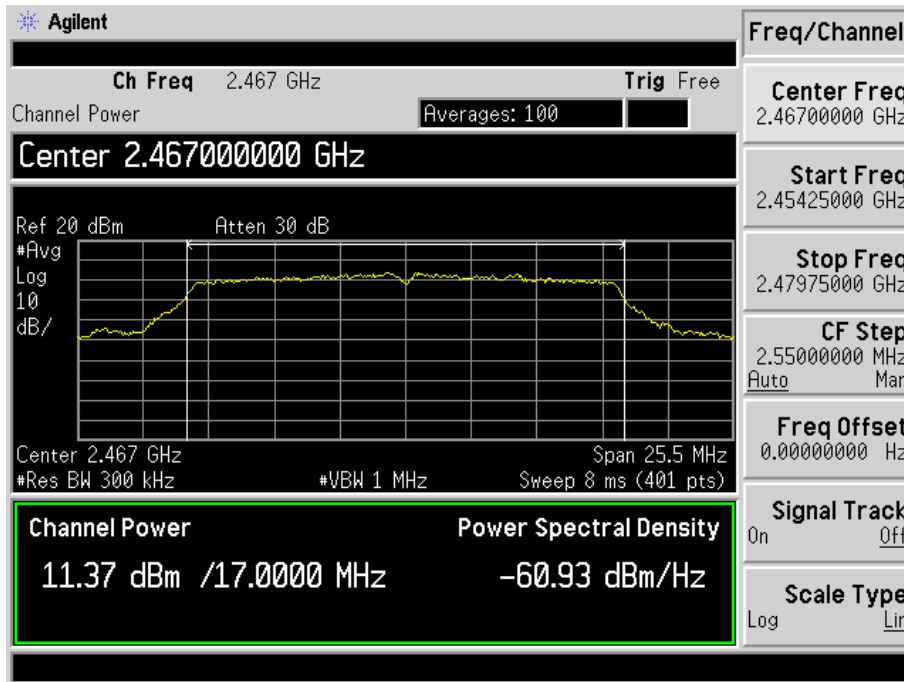
802.11g -54Mbps-2442MHz



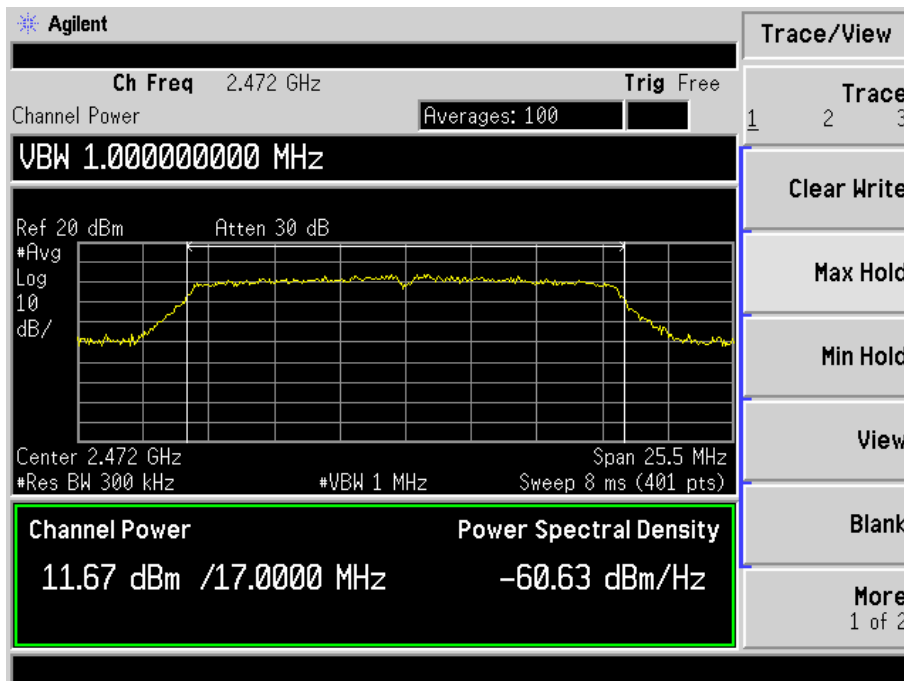
802.11g -54Mbps-2462MHz



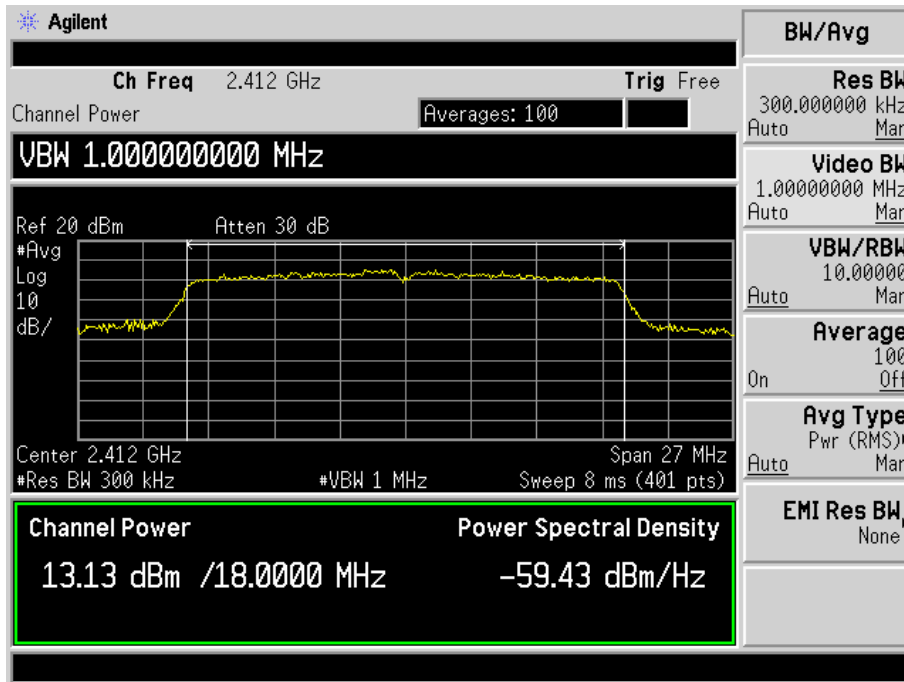
802.11g -54Mbps-2467MHz



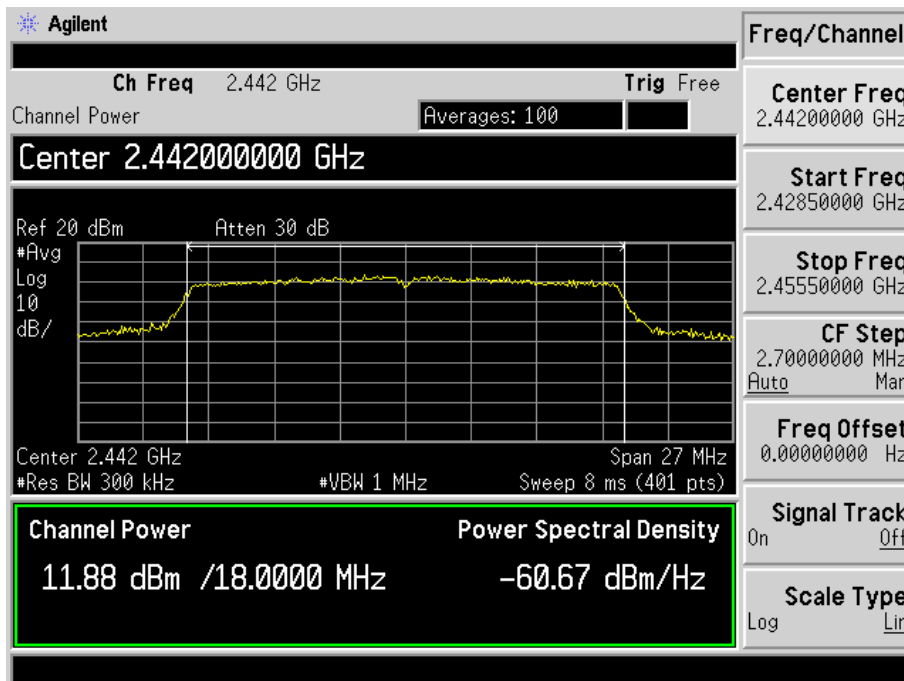
802.11g -54Mbps-2472MHz



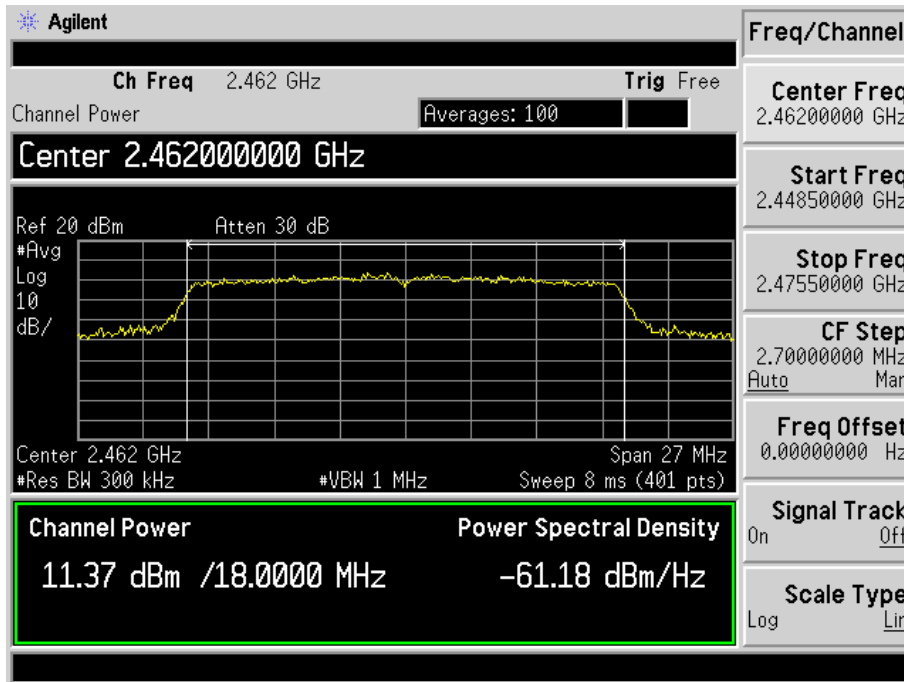
802.11n-HT20-MCS7-2412MHz



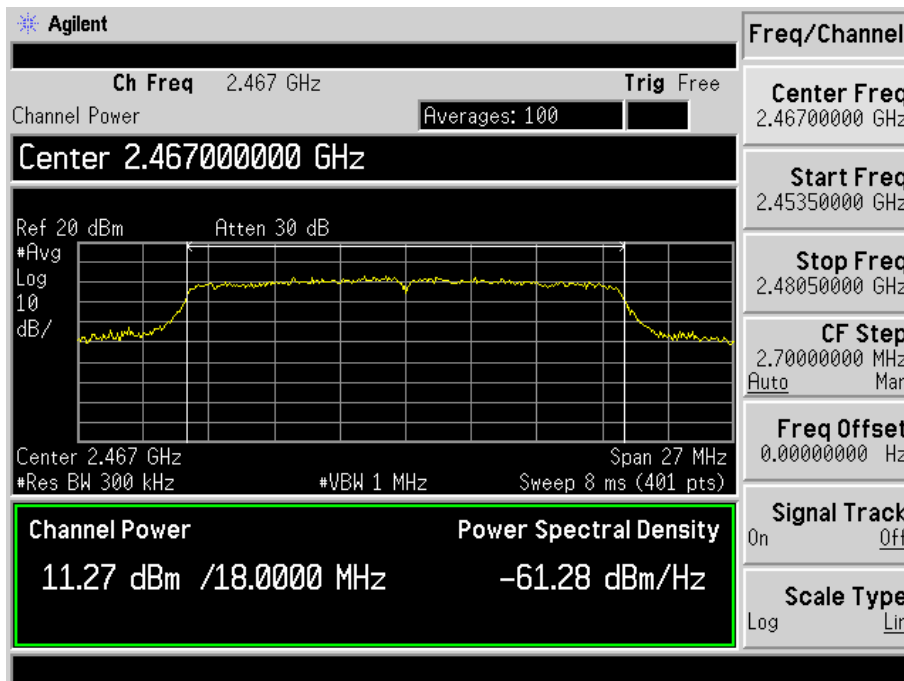
802.11n-HT20-MCS7-2442MHz



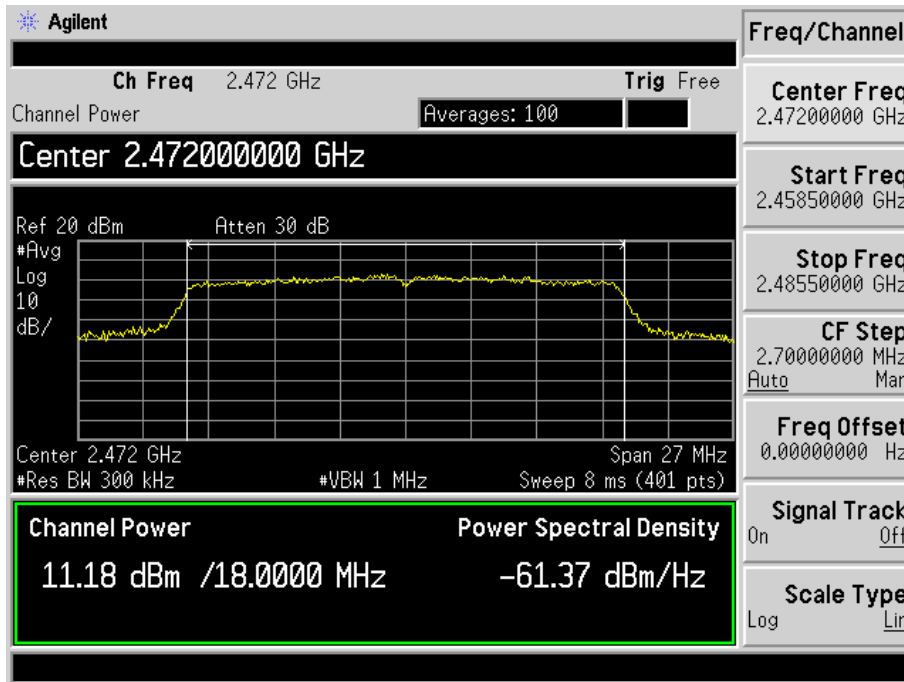
802.11n-HT20-MCS7-2462MHz



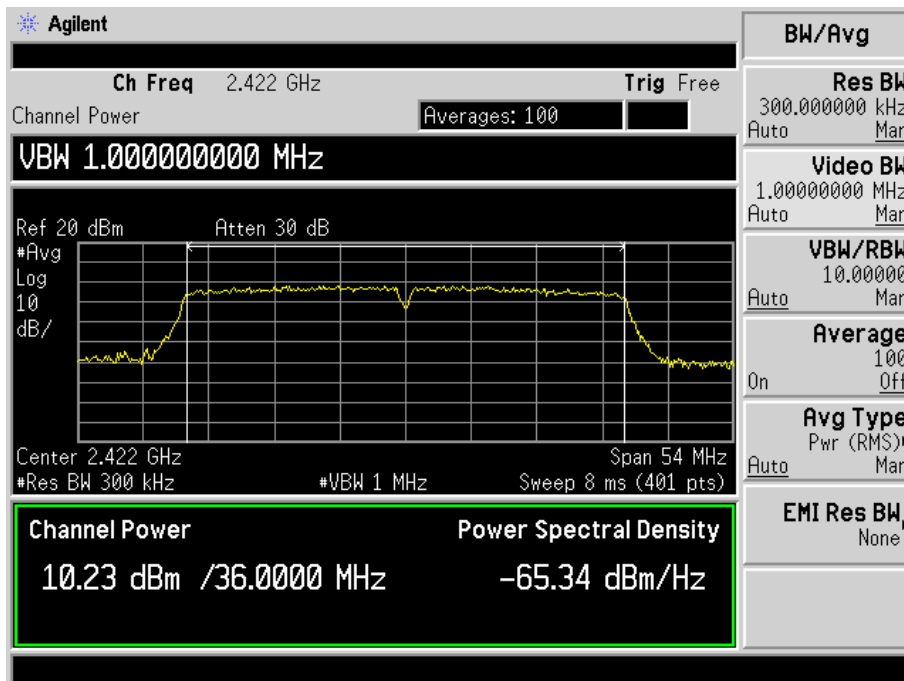
802.11n-HT20-MCS7-2467MHz



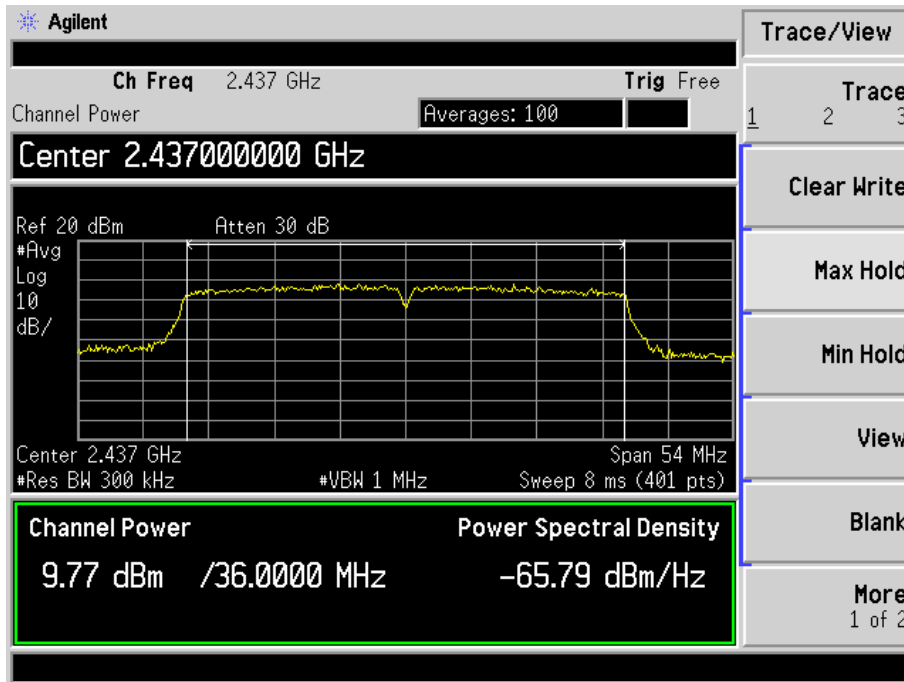
802.11n-HT20-MCS7-2472MHz



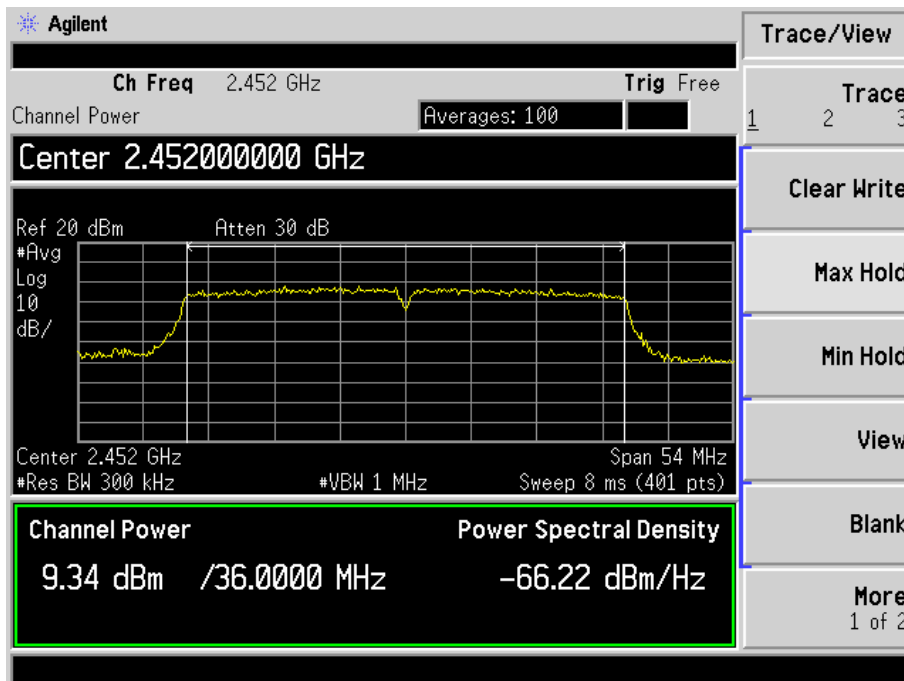
802.11n-HT40-MCS7-2422MHz



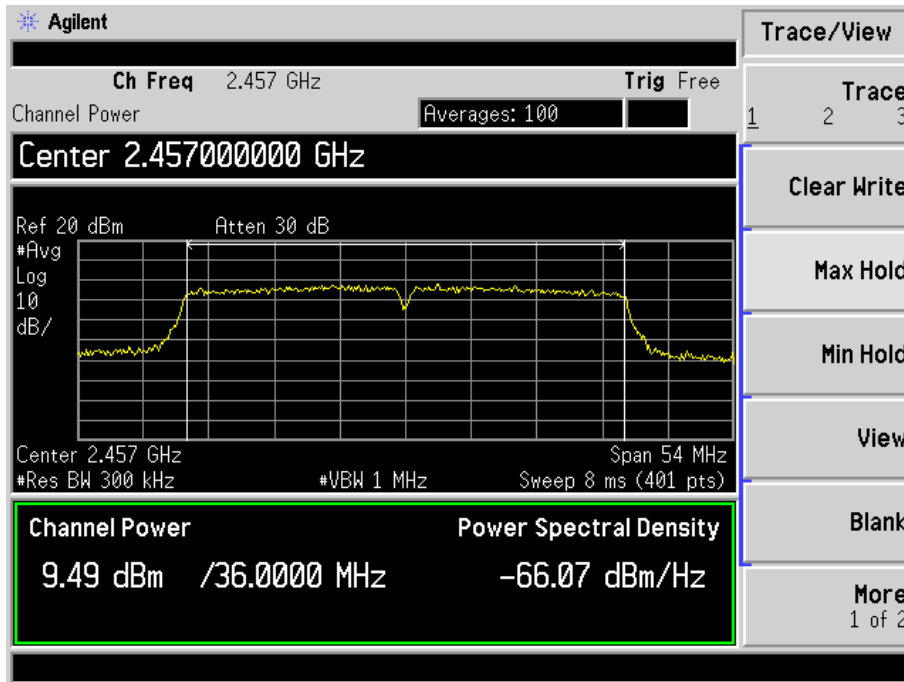
802.11n-HT40-MCS7-2437MHz



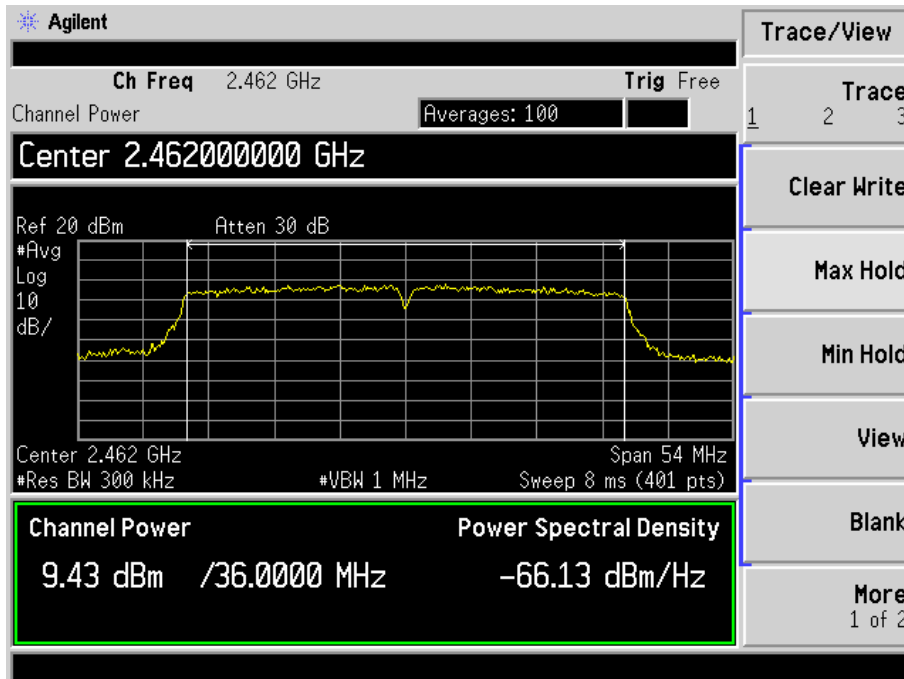
802.11n-HT40-MCS7-2452MHz



802.11n-HT40-MCS7-2457MHz



802.11n-HT40-MCS7-2462MHz



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

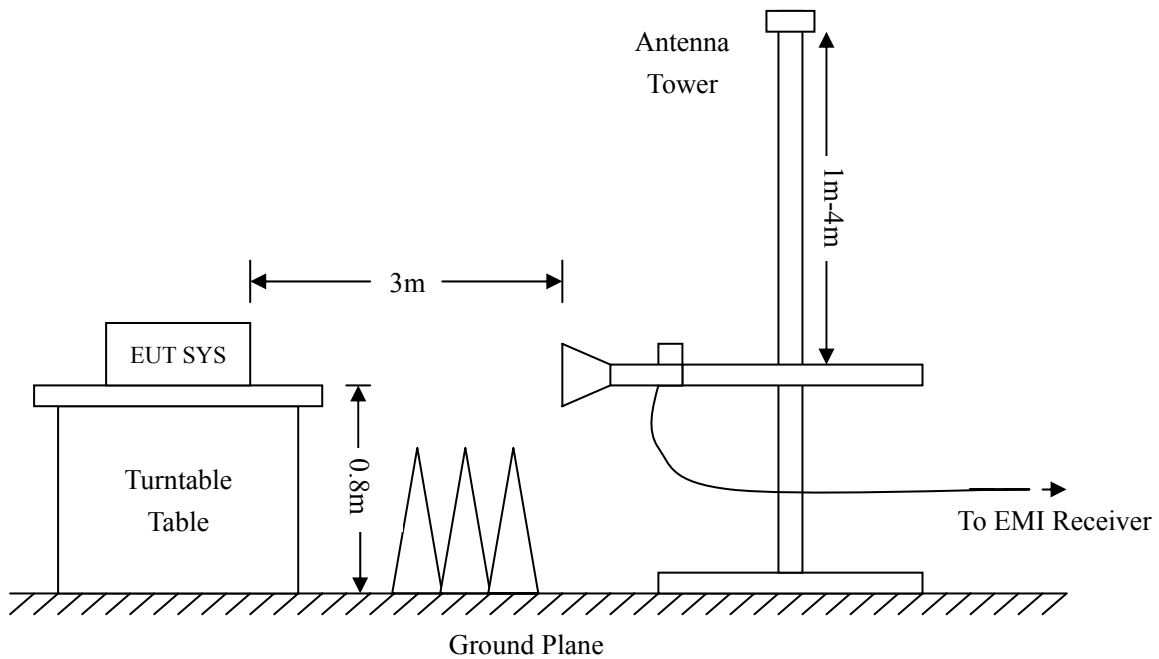
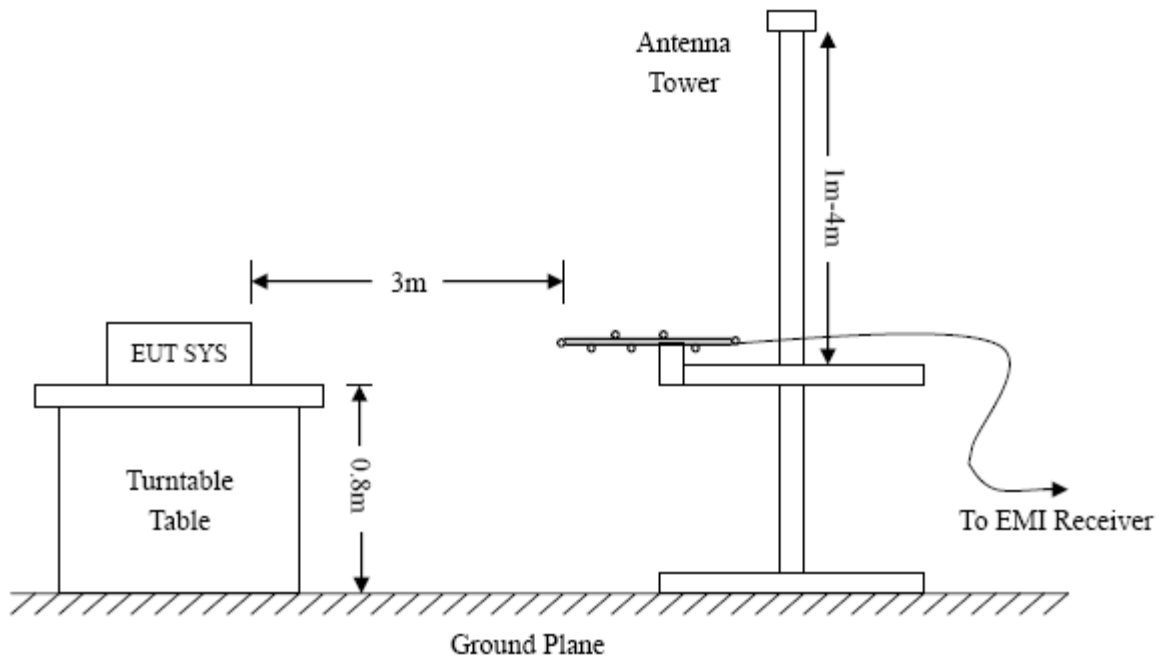
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	ETS	3116B	00088203	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

8.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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

8.5 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

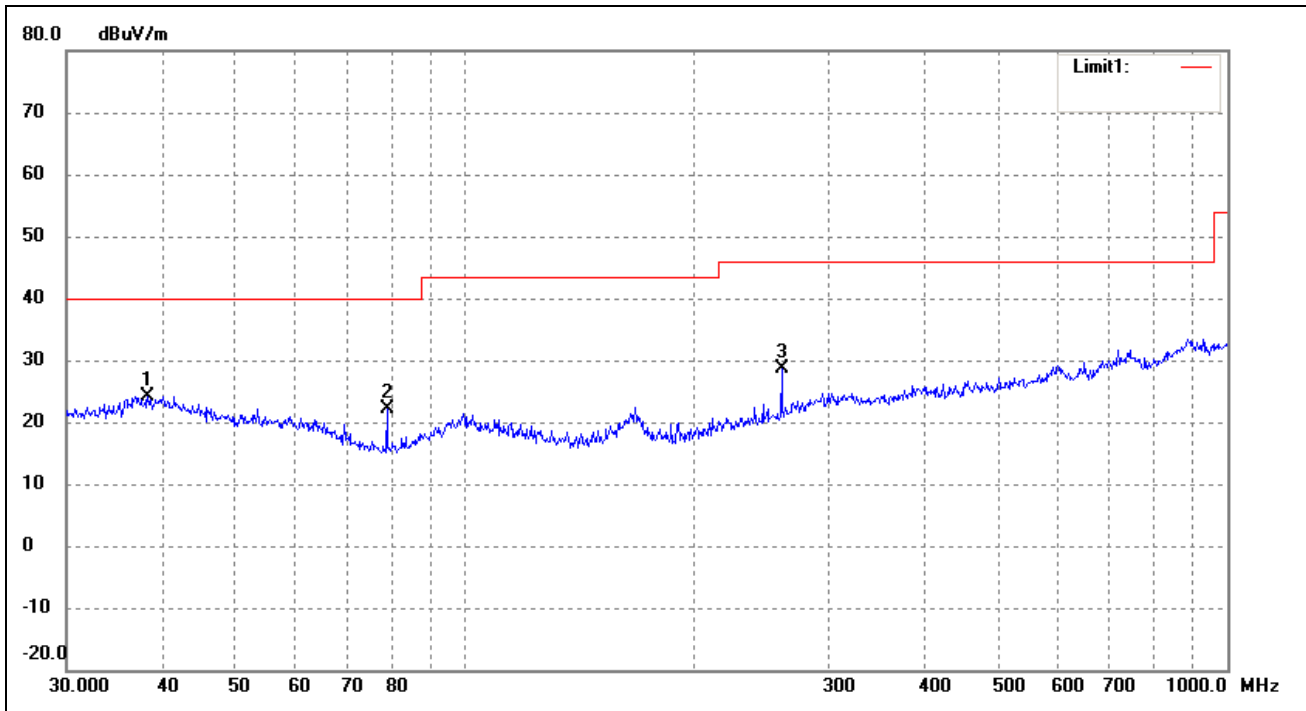
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

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)

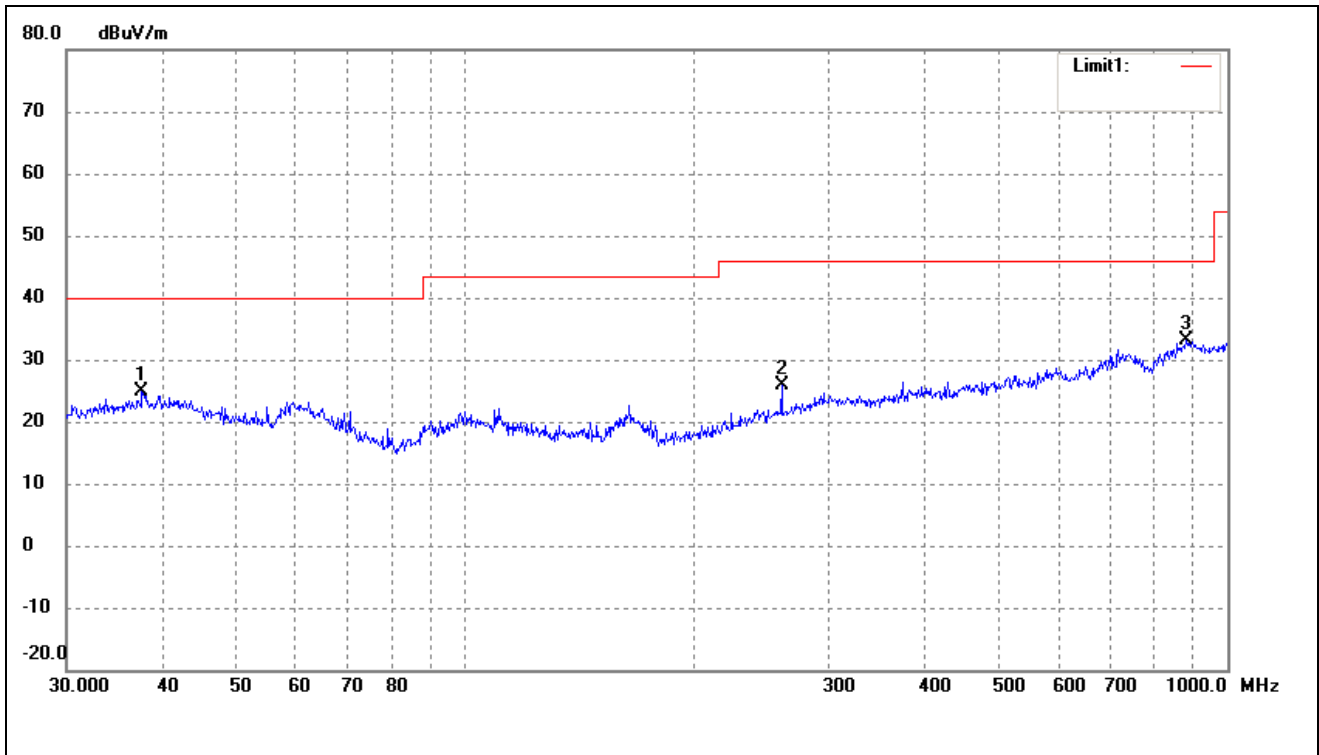
EUT: *WIFI module*
 Tested Model: *HLK-M35*
 Operating Condition: *802.11b Transmitting Low Channel-2412MHz*
 Comment: *DC 3.3V*

 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	38.3462	17.43	6.81	24.24	40.00	-15.76	56	100	peak
2	78.9652	21.11	1.12	22.23	40.00	-17.77	97	100	peak
3	260.1444	21.56	7.04	28.60	46.00	-17.40	166	100	peak

Test Specification: Vertical

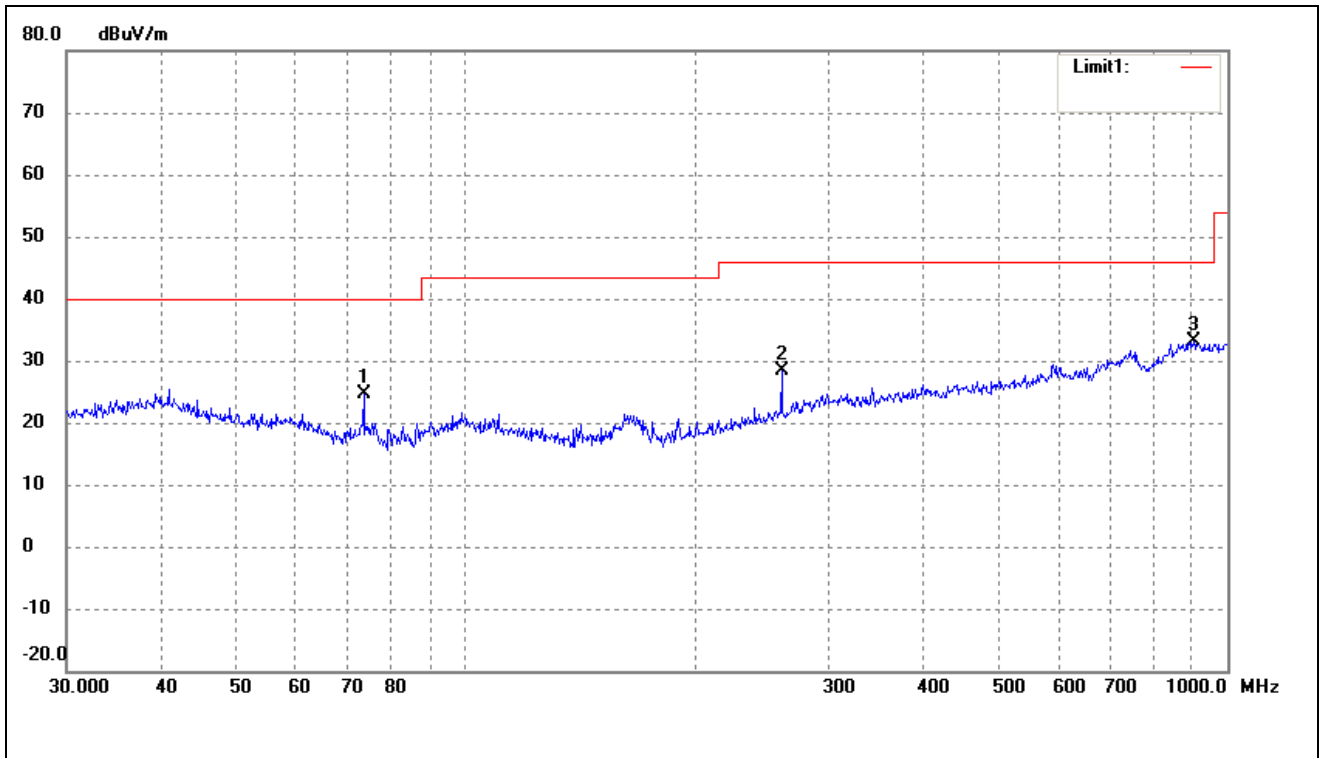


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.6798	15.95	8.85	24.80	40.00	-15.20	47	100	peak
2	260.1444	18.85	7.04	25.89	46.00	-20.11	134	100	peak
3	884.5029	16.28	16.83	33.11	46.00	-12.89	212	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2442MHz

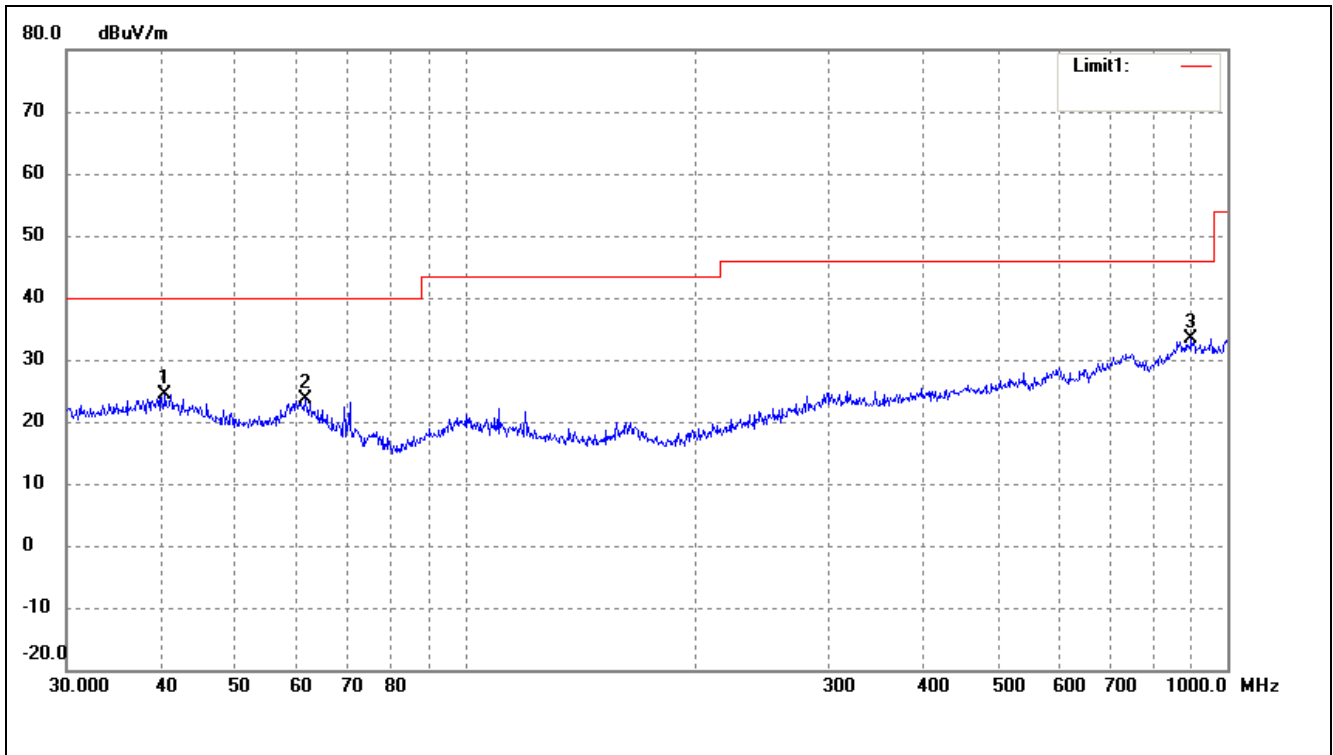
Comment: DC 3.3V

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	73.6170	22.80	1.76	24.56	40.00	-15.44	83	100	peak
2	260.1444	21.32	7.04	28.36	46.00	-17.64	171	100	peak
3	903.3094	16.34	16.79	33.13	46.00	-12.87	241	100	peak

Test Specification: Vertical

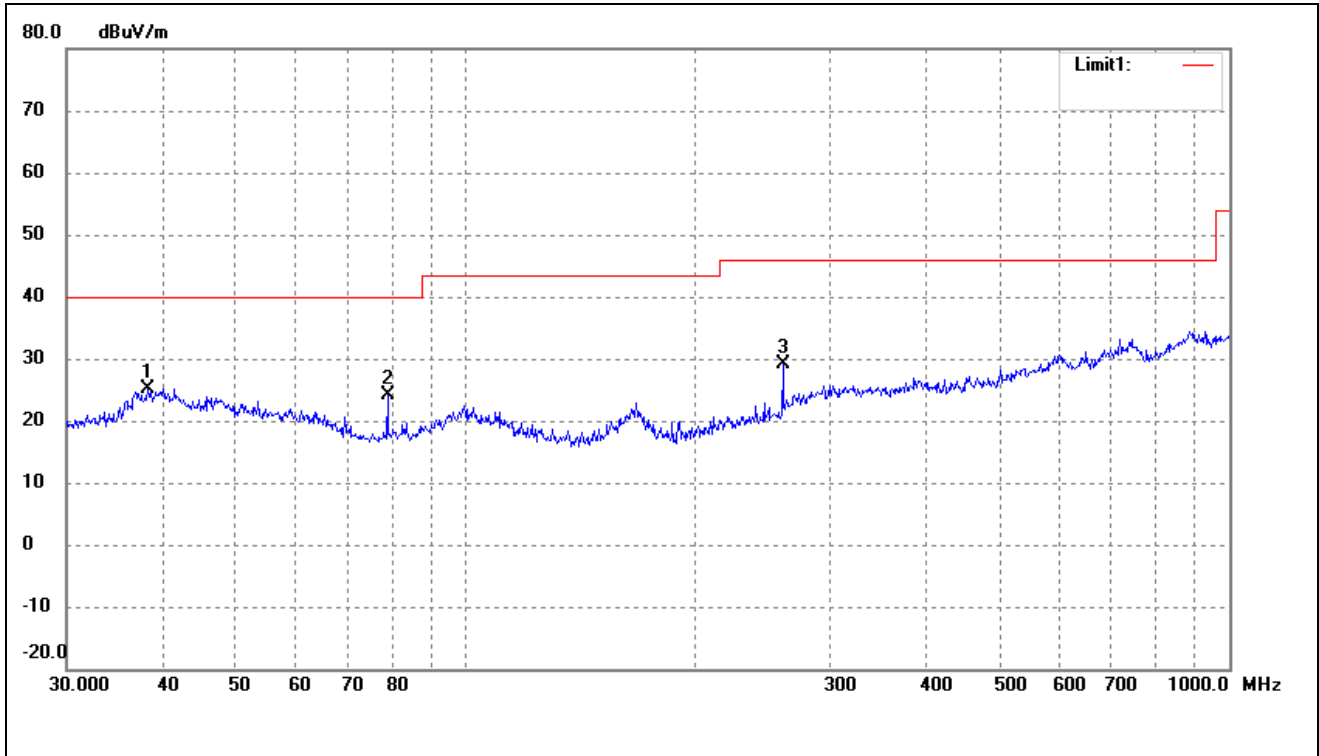


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.4172	15.23	9.12	24.35	40.00	-15.65	52	100	peak
2	61.7781	18.89	4.81	23.70	40.00	-16.30	99	100	peak
3	896.9965	16.41	16.85	33.26	46.00	-12.74	243	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2462MHz

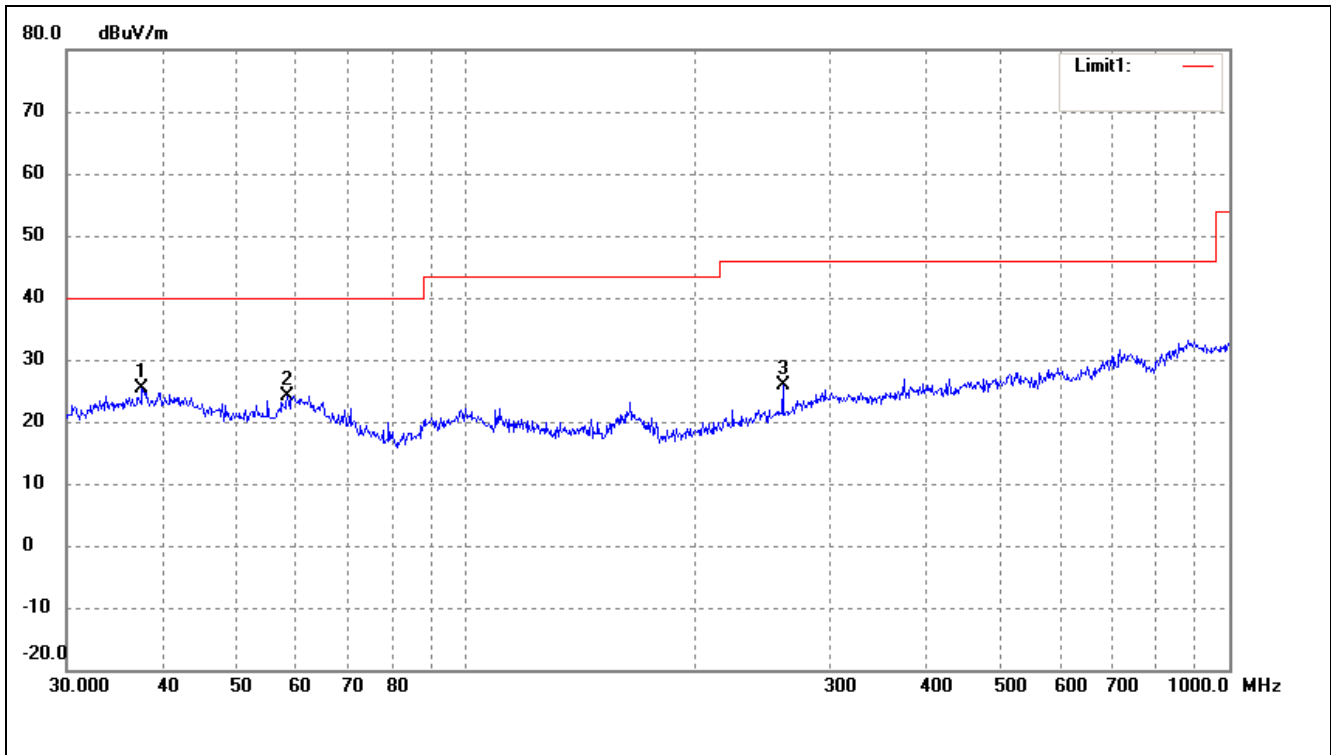
Comment: DC 3.3V

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	38.3462	18.43	6.81	25.24	40.00	-14.76	62	100	peak
2	78.9651	23.11	1.12	24.23	40.00	-15.77	135	100	peak
3	260.1444	22.06	7.04	29.10	46.00	-16.90	253	100	peak

Test Specification: Vertical

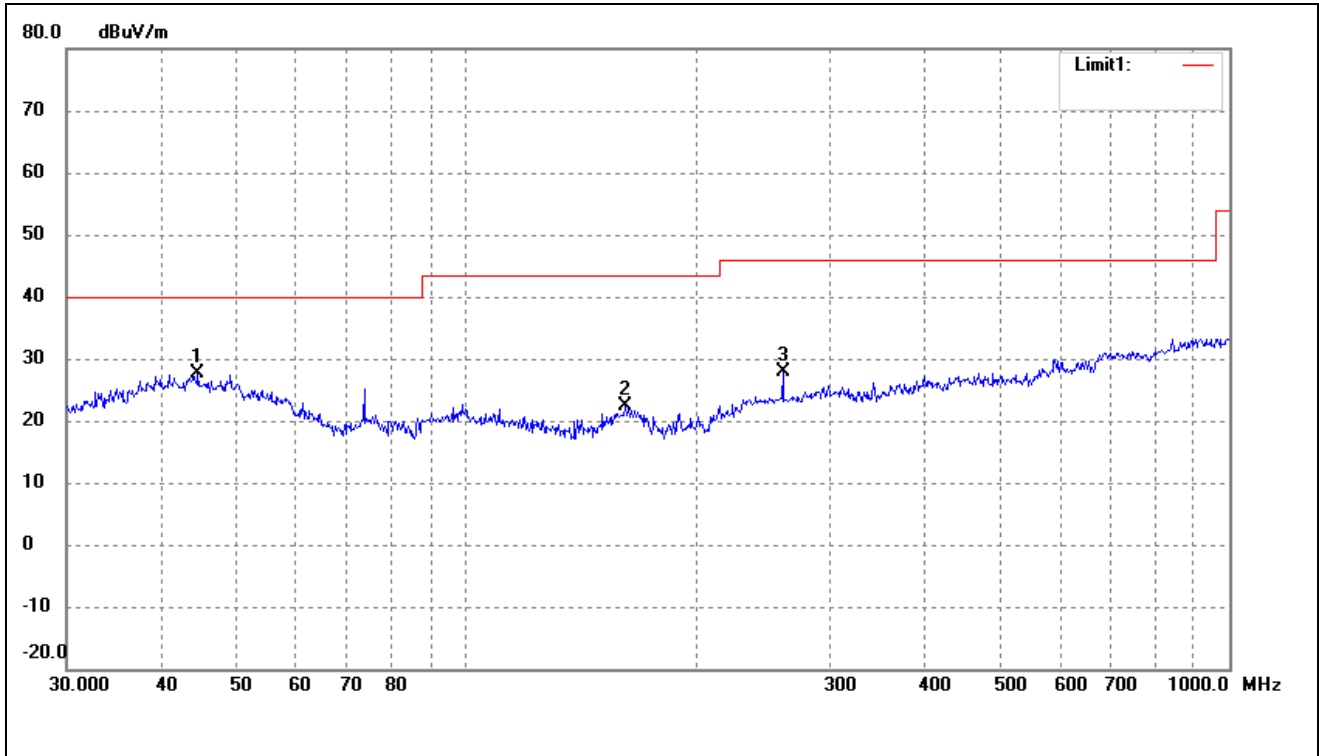


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.6798	16.45	8.85	25.30	40.00	-14.70	469	100	peak
2	58.4074	18.58	5.51	24.09	40.00	-15.91	123	100	peak
3	260.1444	18.85	7.04	25.89	46.00	-20.11	215	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2467MHz

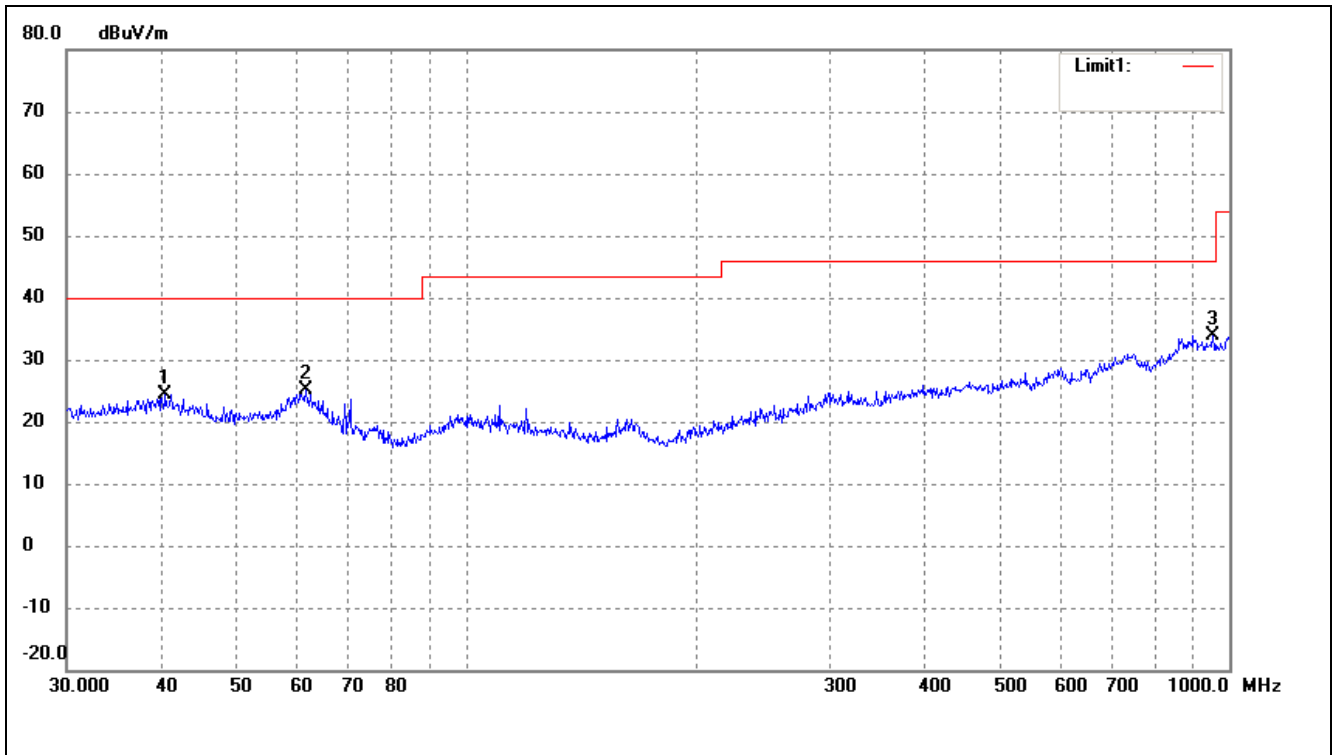
Comment: DC 3.3V

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	44.5867	20.84	6.80	27.64	40.00	-12.36	65	100	peak
2	162.0414	19.64	2.63	22.27	43.50	-21.23	184	100	peak
3	260.1444	20.82	7.04	27.86	46.00	-18.14	265	100	peak

Test Specification: Vertical

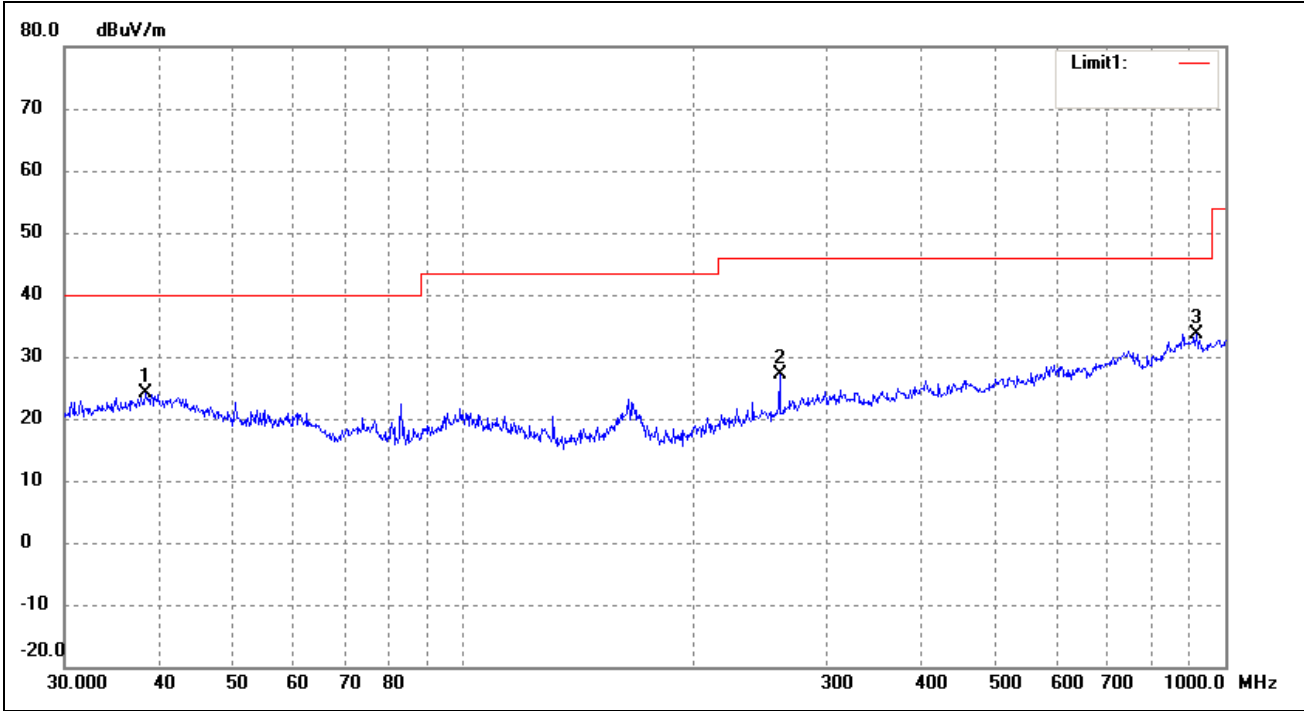


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.4172	15.23	9.12	24.35	40.00	-15.65	46	100	peak
2	61.7781	20.39	4.81	25.20	40.00	-14.80	89	100	peak
3	952.0937	17.69	16.29	33.98	46.00	-12.02	236	100	peak

Operating Condition: 802.11b Transmitting High Channel-2472MHz

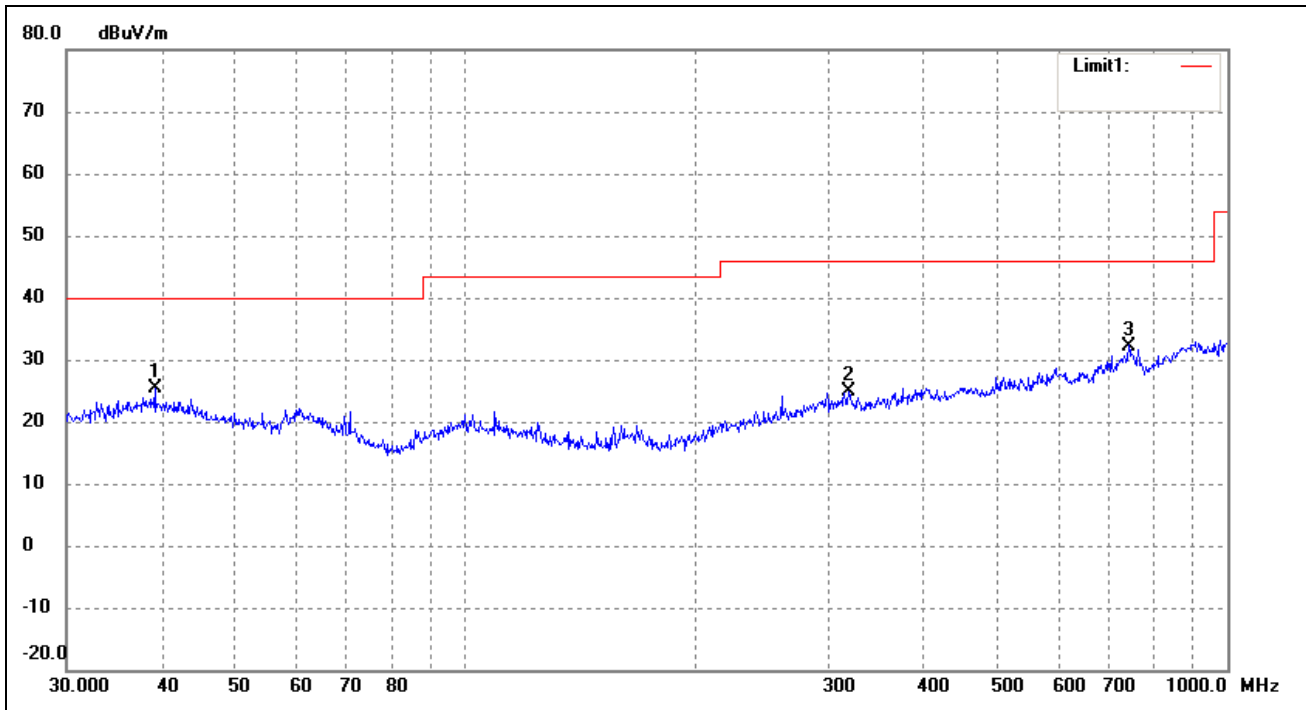
Comment: DC 3.3V

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	38.3462	17.38	6.81	24.19	40.00	-15.81	39	100	peak
2	260.1444	19.97	7.04	27.01	46.00	-18.99	167	100	peak
3	916.0687	17.16	16.56	33.72	46.00	-12.28	256	100	peak

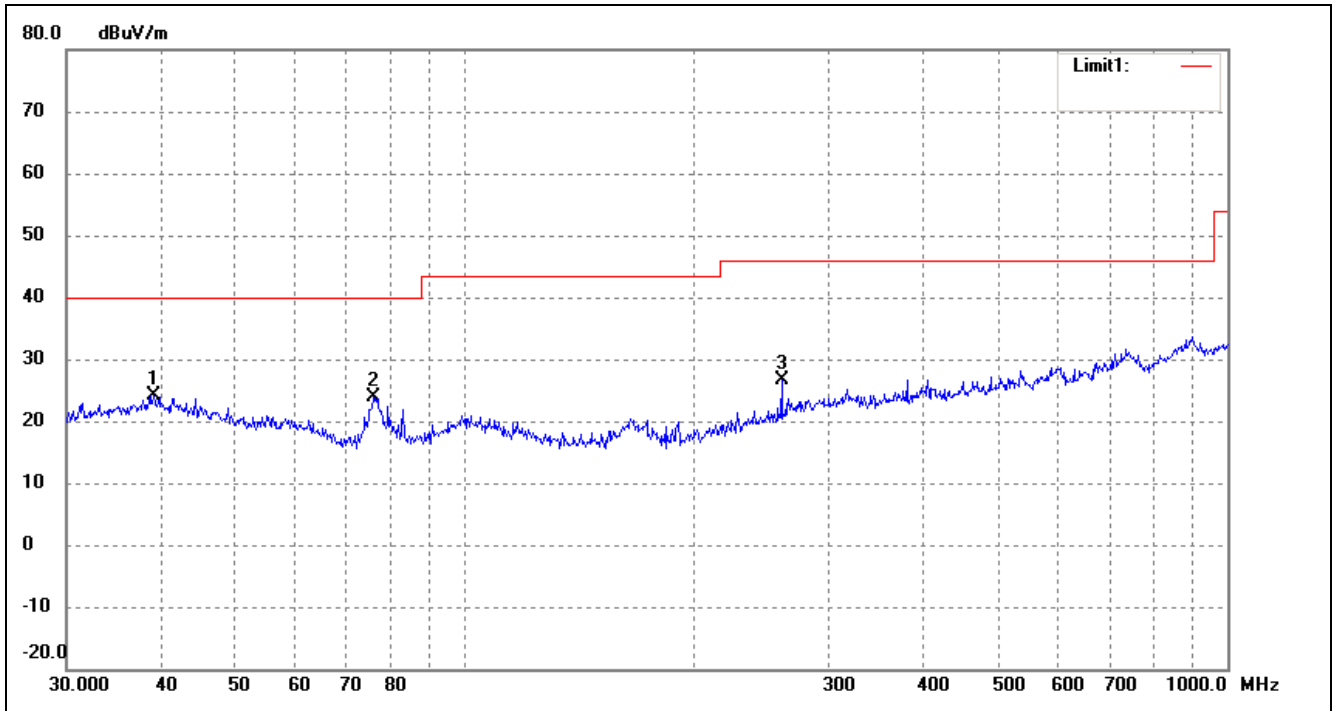
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.1616	16.27	9.10	25.37	40.00	-14.63	61	100	peak
2	318.8170	15.52	9.28	24.80	46.00	-21.20	203	100	peak
3	742.2587	16.80	15.45	32.25	46.00	-13.75	277	100	peak

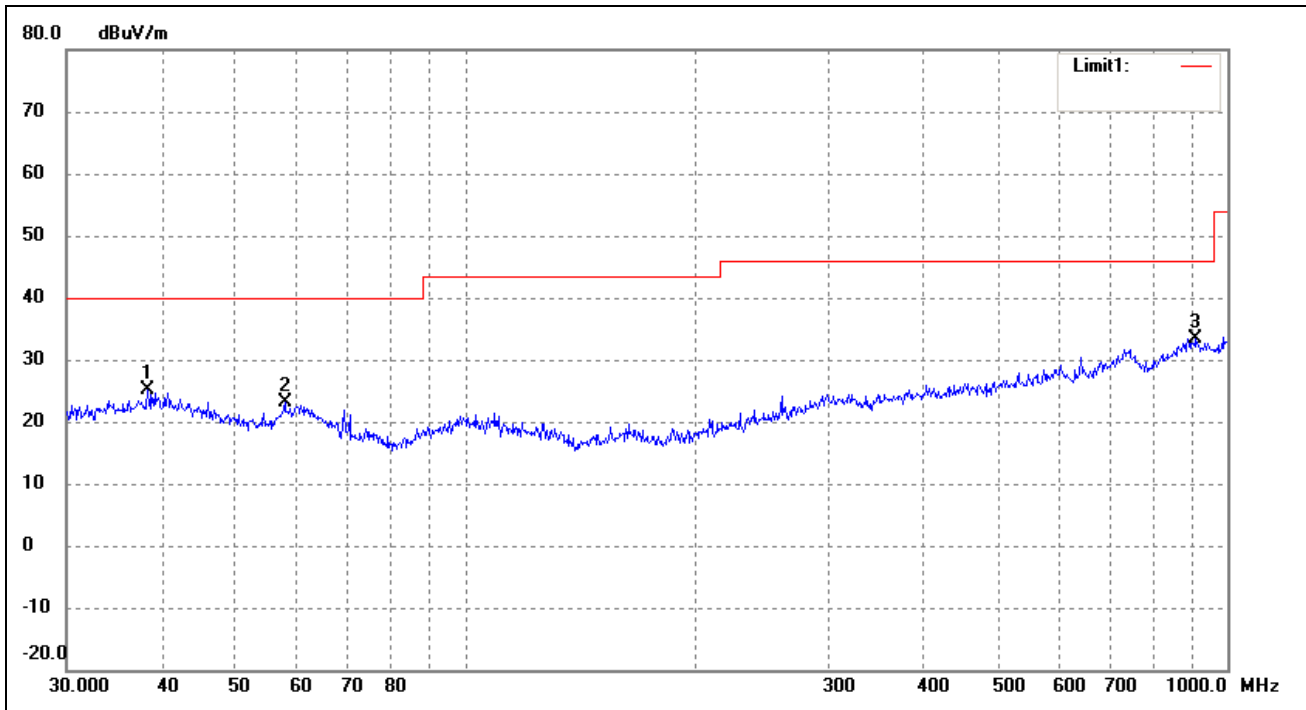
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: *WIFI module*
 Tested Model: *HLK-M35*
 Operating Condition: *802.11g Transmitting Low Channel-2412MHz*
 Comment: *DC 3.3V*
 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	39.0245	17.18	6.99	24.17	40.00	-15.83	43	100	peak
2	75.7114	22.37	1.51	23.88	40.00	-16.12	87	100	peak
3	260.1444	19.69	7.04	26.73	46.00	-19.27	169	100	peak

Test Specification: Vertical

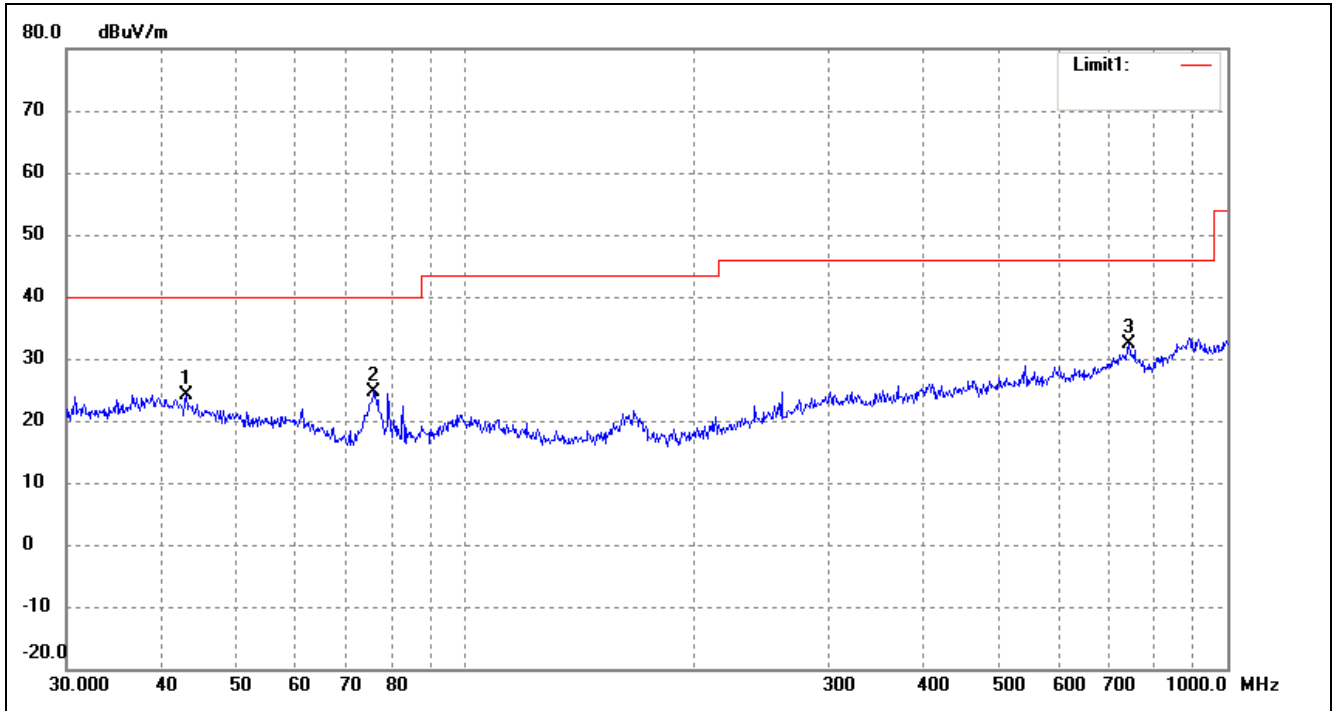


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.3462	16.05	8.97	25.02	40.00	-14.98	63	100	peak
2	57.9993	17.47	5.55	23.02	40.00	-16.98	105	100	peak
3	909.6667	16.73	16.68	33.41	46.00	-12.59	249	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2442MHz

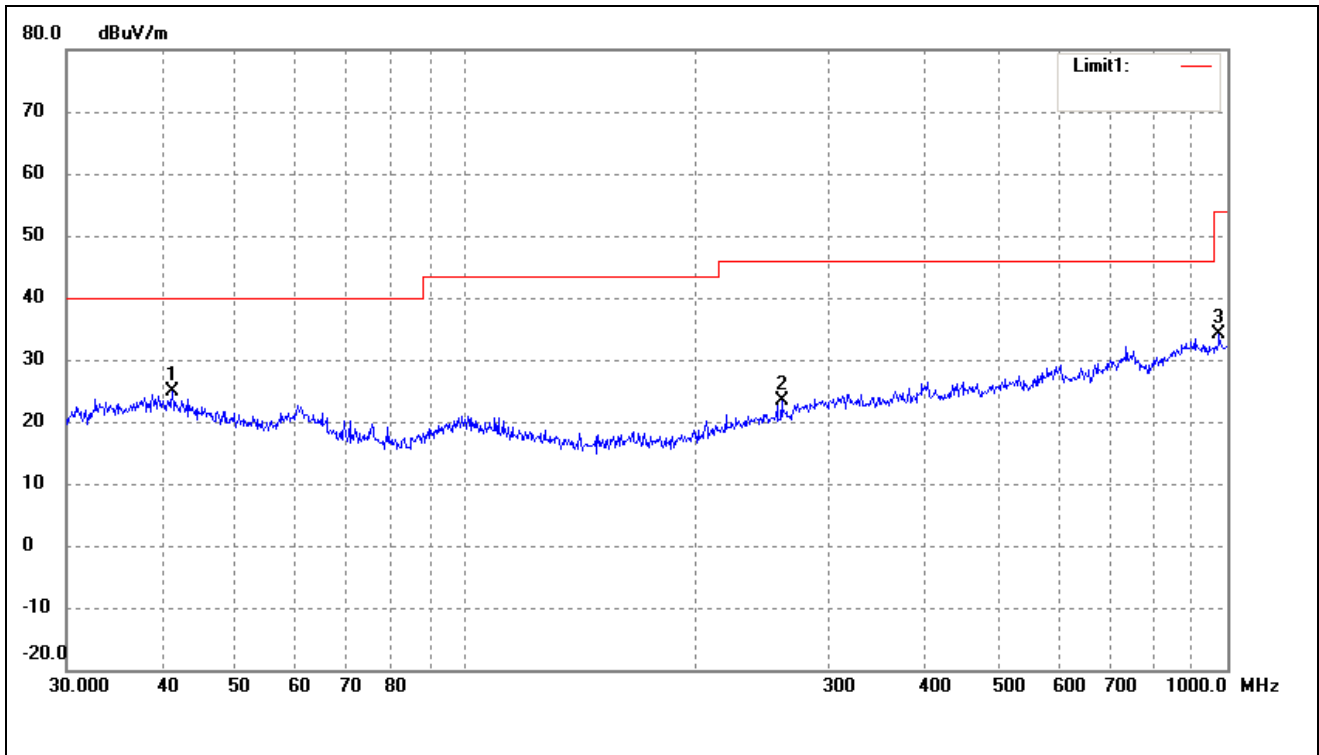
Comment: DC 3.3V

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	43.0504	17.24	6.94	24.18	40.00	-15.82	66	100	peak
2	75.9772	23.27	1.48	24.75	40.00	-15.25	111	100	peak
3	742.2586	18.75	13.67	32.42	46.00	-13.58	272	100	peak

Test Specification: Vertical

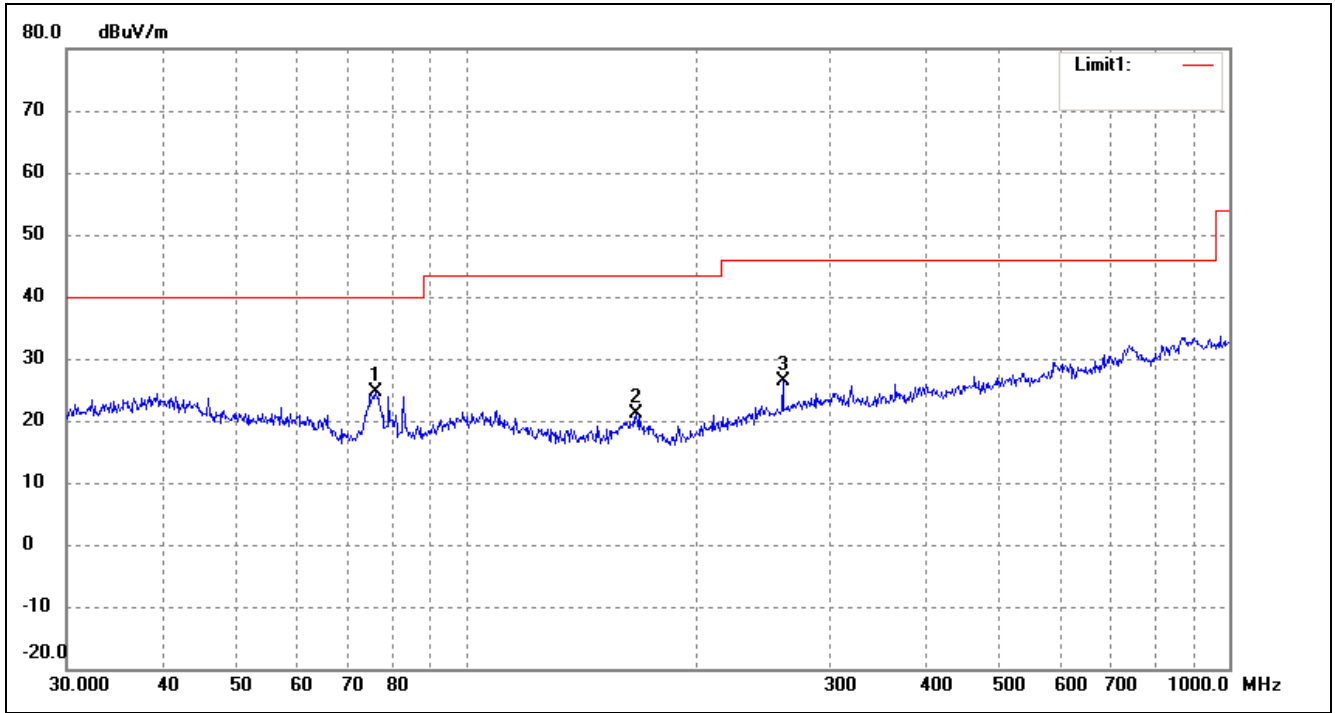


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	41.2765	15.92	8.87	24.79	40.00	-15.21	39	100	peak
2	260.1444	16.40	7.04	23.44	46.00	-22.56	177	100	peak
3	975.7529	17.44	16.61	34.05	54.00	-19.95	261	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2462MHz

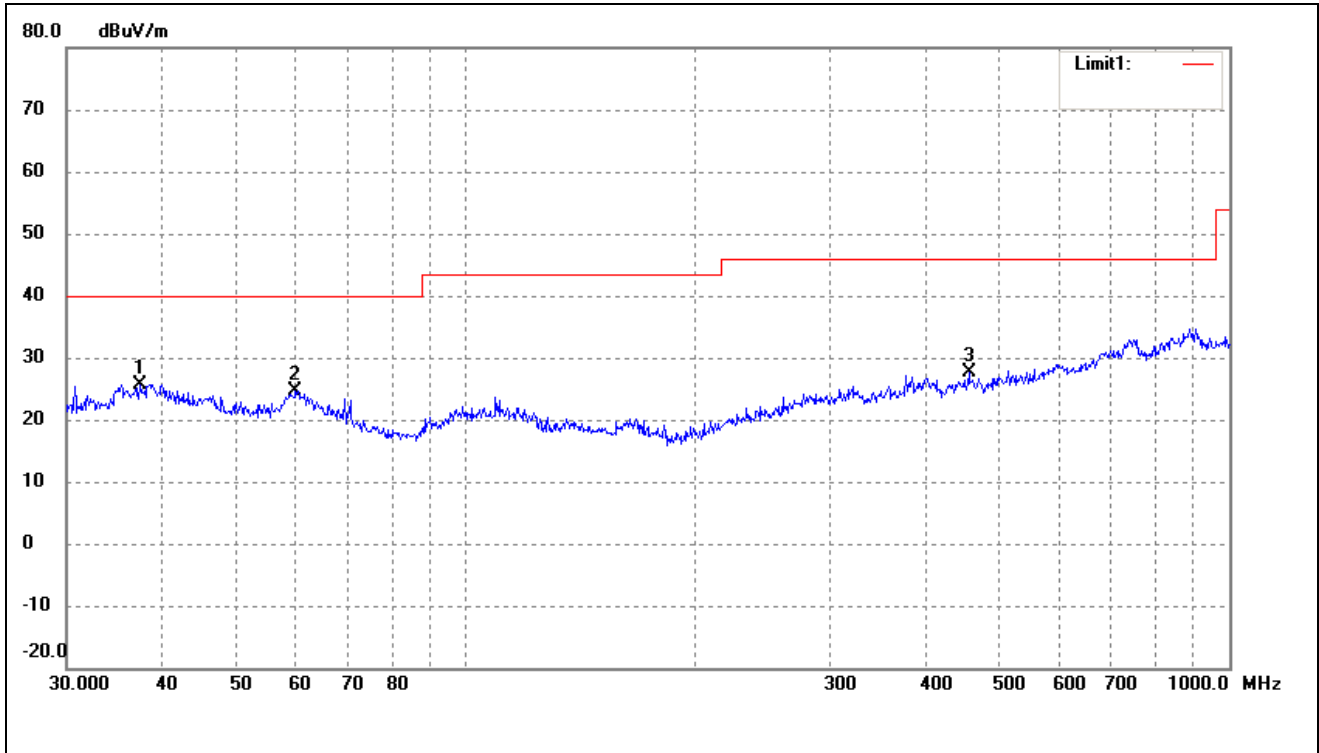
Comment: DC 3.3V

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	76.2442	23.23	1.45	24.68	40.00	-15.32	75	100	peak
2	167.2367	18.59	2.66	21.25	43.50	-22.25	139	100	peak
3	260.1444	19.46	7.04	26.50	46.00	-19.50	257	100	peak

Test Specification: Vertical

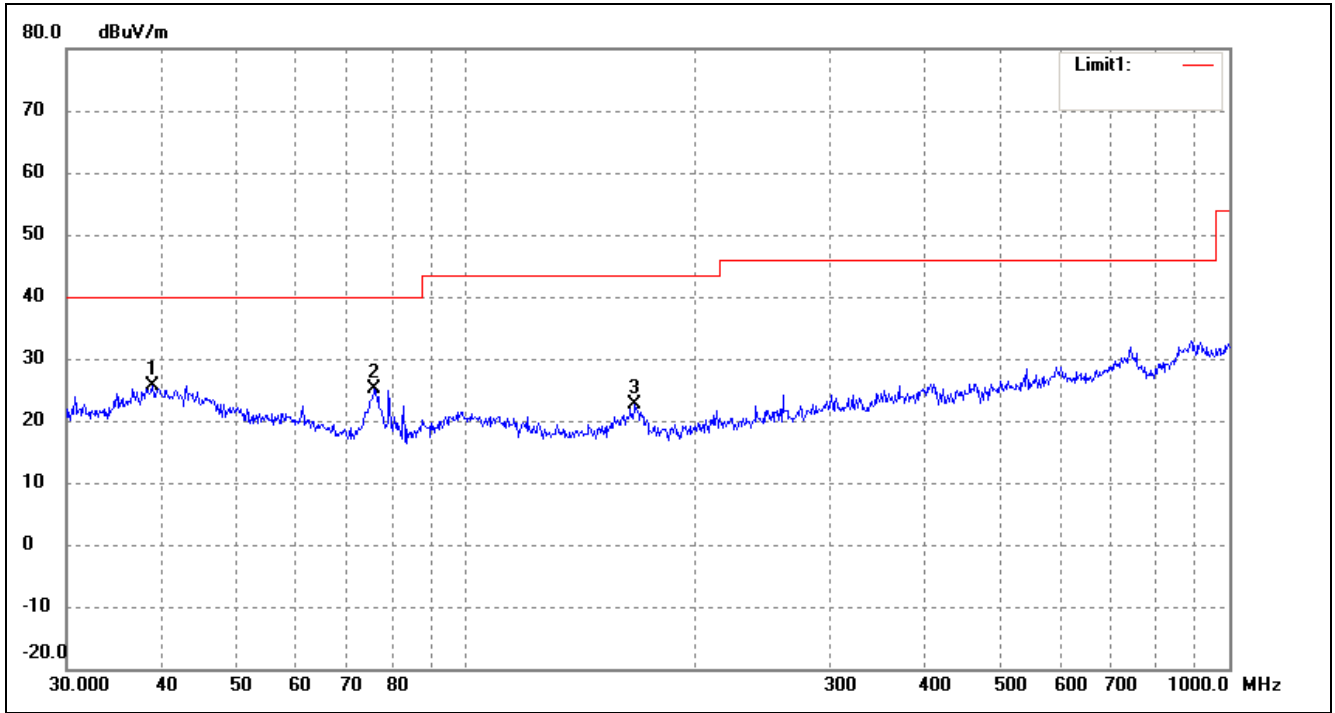


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.4164	16.89	8.81	25.70	40.00	-14.30	43	100	peak
2	59.8588	19.28	5.39	24.67	40.00	-15.33	154	100	peak
3	455.9057	17.15	10.45	27.60	46.00	-18.40	264	100	peak

Operating Condition: 802.11g Transmitting High Channel-2467MHz

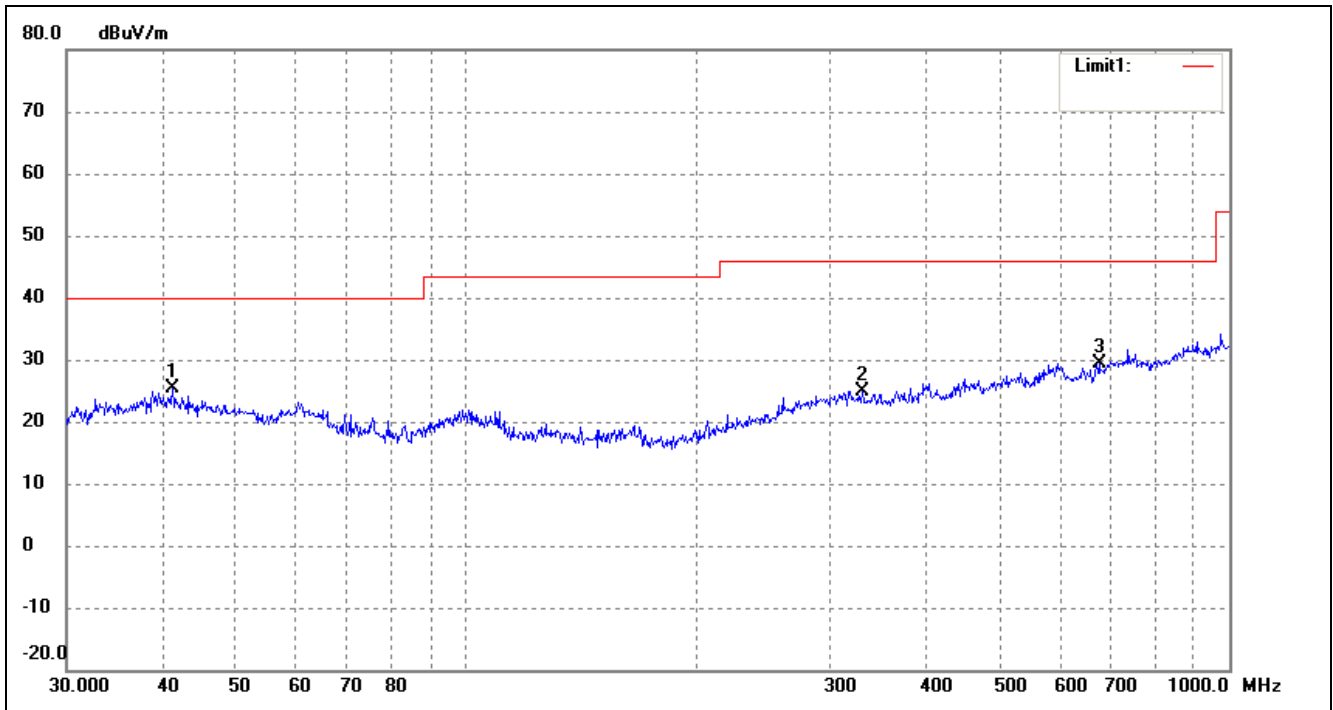
Comment: DC 3.3V

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	38.8879	18.69	6.95	25.64	40.00	-14.36	43	100	peak
2	75.9771	23.77	1.48	25.25	40.00	-14.75	103	200	peak
3	166.6512	19.95	2.66	22.61	43.50	-20.89	198	200	peak

Test Specification: Vertical

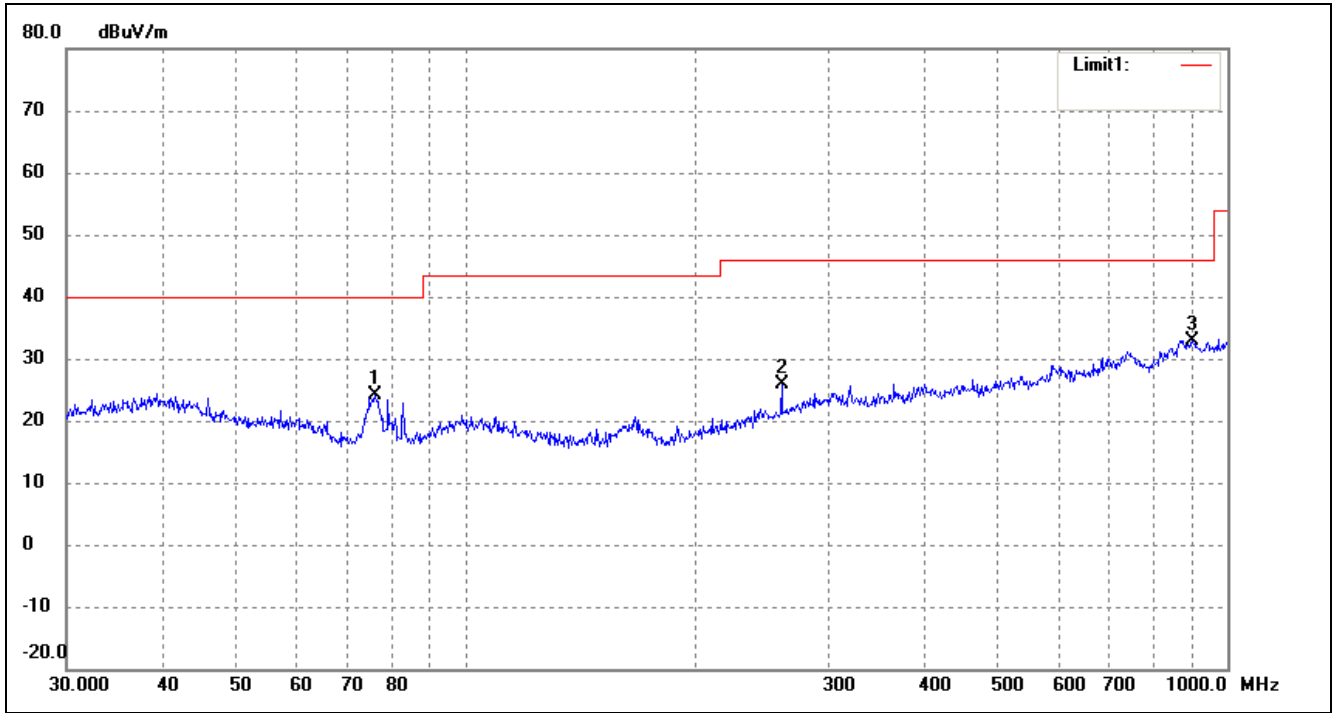


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	41.2764	16.42	8.87	25.29	40.00	-14.71	56	100	peak
2	331.3546	15.94	8.96	24.90	46.00	-21.10	129	100	peak
3	675.2079	16.38	12.99	29.37	46.00	-16.63	258	100	peak

Operating Condition: 802.11g Transmitting High Channel-2472MHz

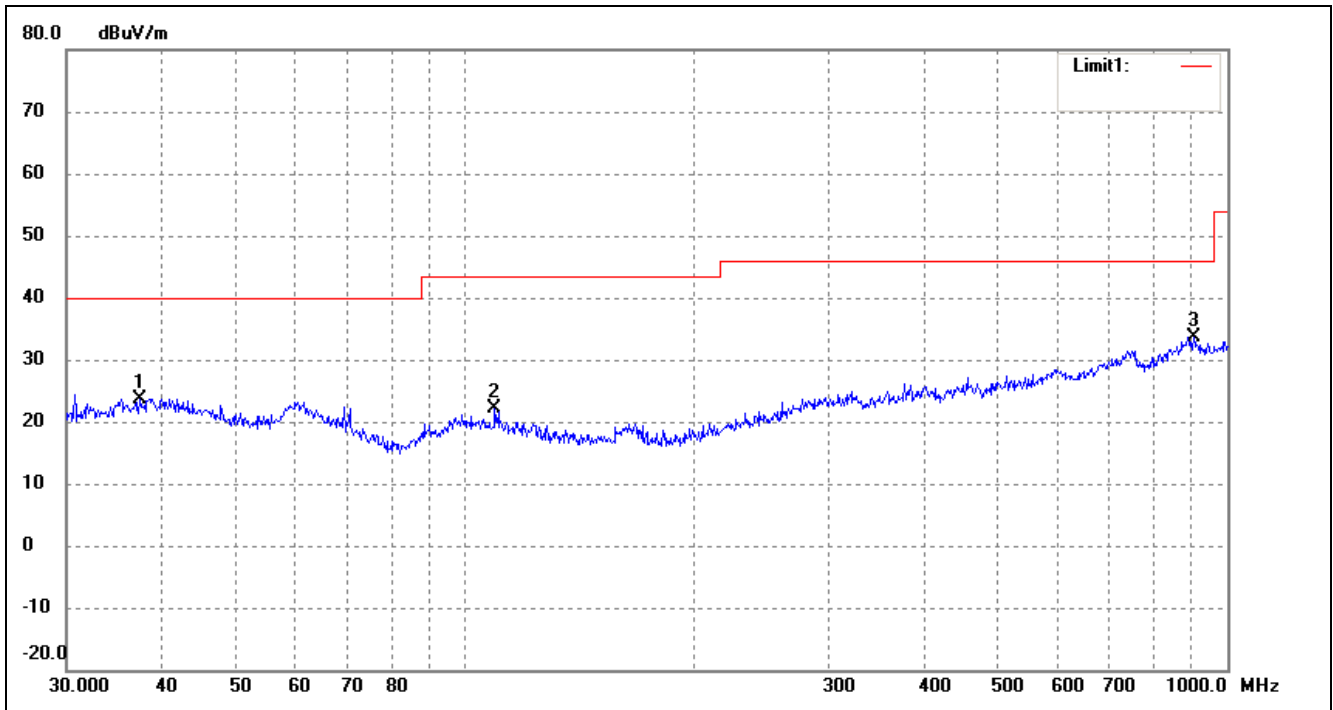
Comment: DC 3.3V

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	76.2442	22.73	1.45	24.18	40.00	-15.82	97	100	peak
2	260.1444	18.96	7.04	26.00	46.00	-20.00	163	200	peak
3	900.1474	16.14	16.85	32.99	46.00	-13.01	249	200	peak

Test Specification: Vertical

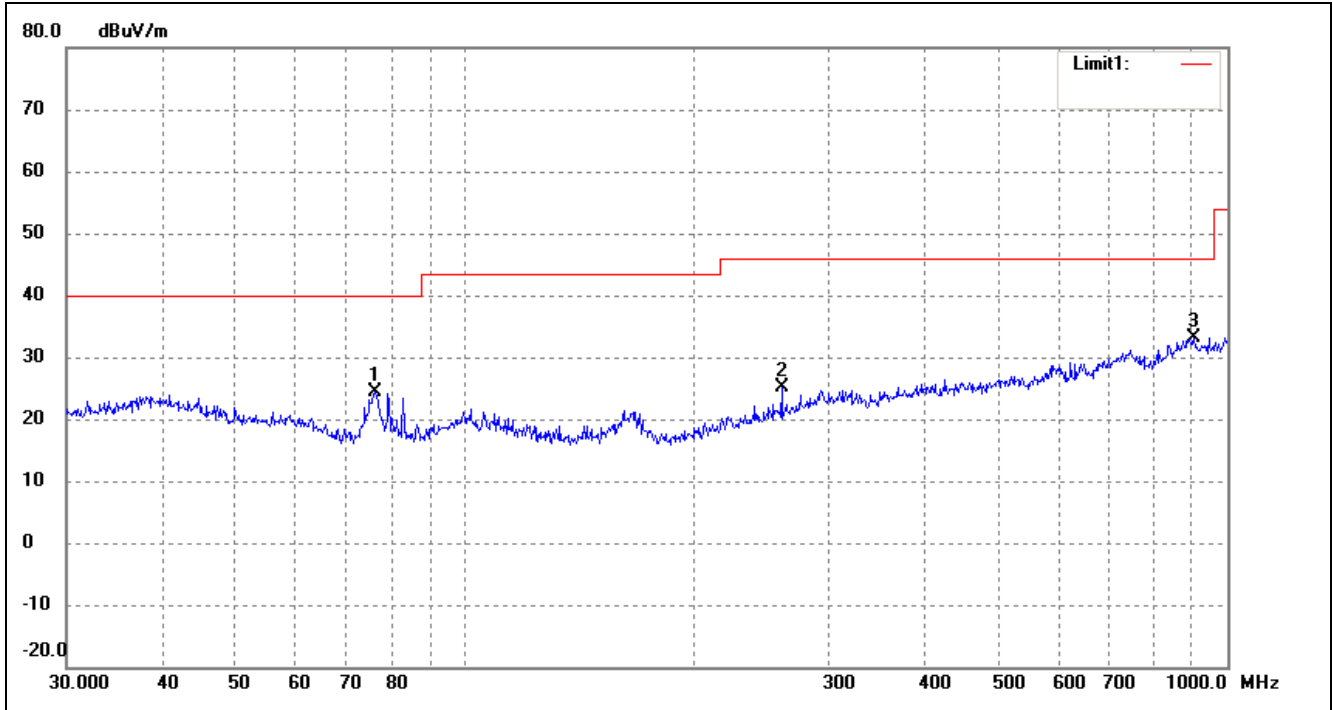


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.4165	14.89	8.81	23.70	40.00	-16.30	46	100	peak
2	109.4116	16.94	5.13	22.07	43.50	-21.43	123	100	peak
3	903.3094	16.79	16.79	33.58	46.00	-12.42	279	100	peak

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

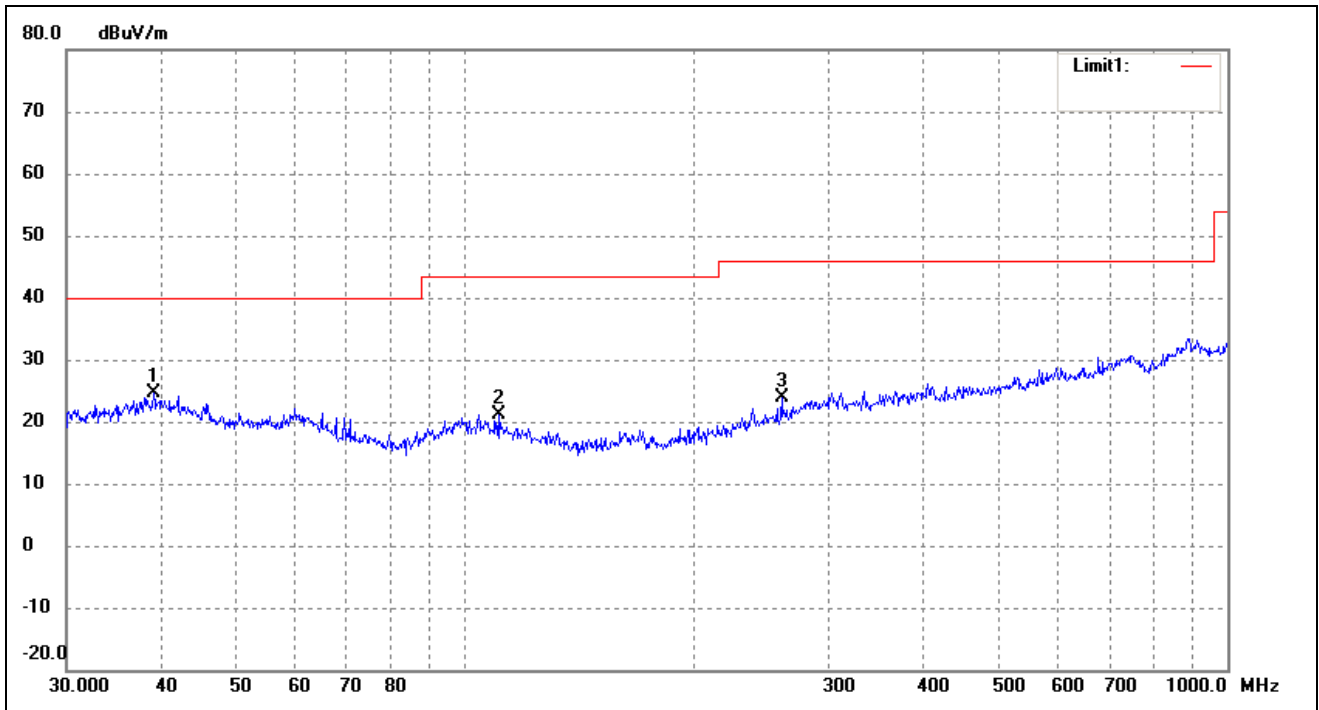
EUT: *WIFI module*
 Tested Model: *HLK-M35*
 Operating Condition: *802.11n-HT20 Transmitting Low Channel-2412MHz*
 Comment: *DC 3.3V*

 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	76.2442	23.05	1.45	24.50	40.00	-15.50	136	100	peak
2	260.1444	18.10	7.04	25.14	46.00	-20.86	202	200	peak
3	903.3094	16.38	16.79	33.17	46.00	-12.83	287	200	peak

Test Specification: Vertical

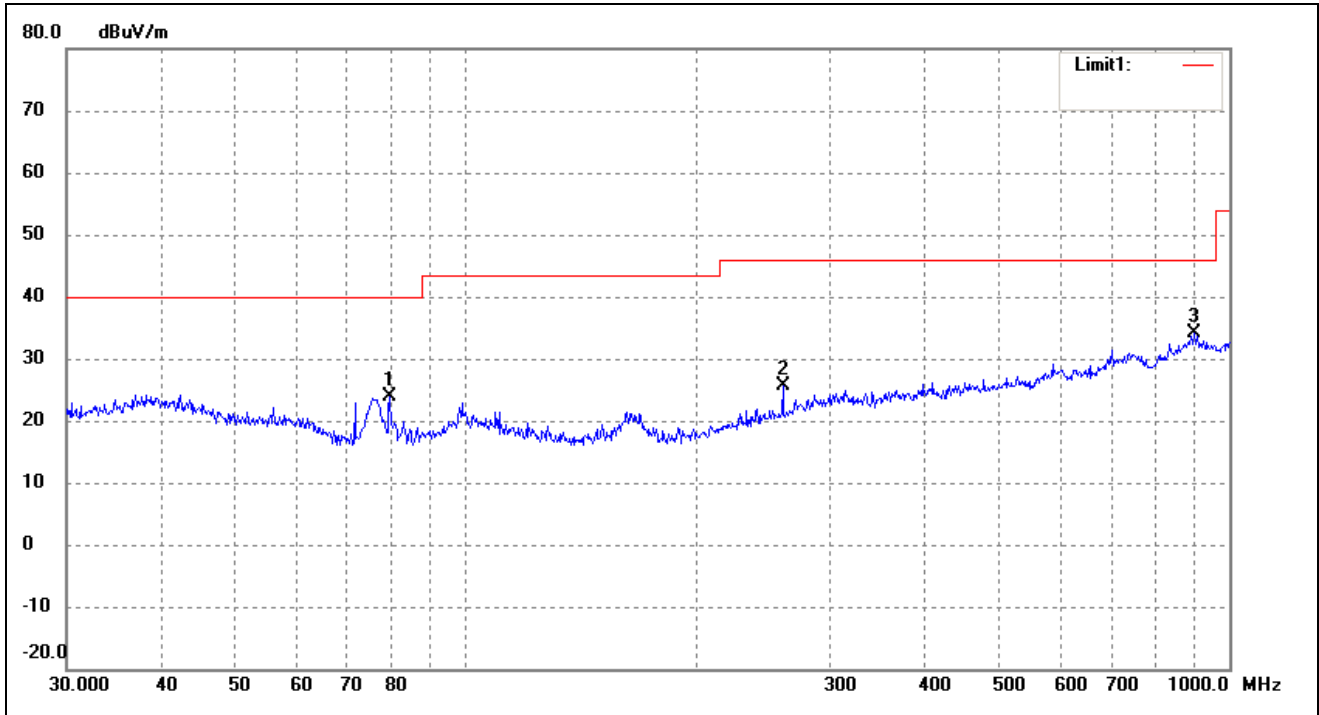


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.0245	15.47	9.08	24.55	40.00	-15.45	44	100	peak
2	110.5687	16.04	5.02	21.06	43.50	-22.44	87	100	peak
3	260.1444	16.92	7.04	23.96	46.00	-22.04	169	100	peak

Operating Condition: 802.11n-HT20 Transmitting Middle Channel-2442MHz

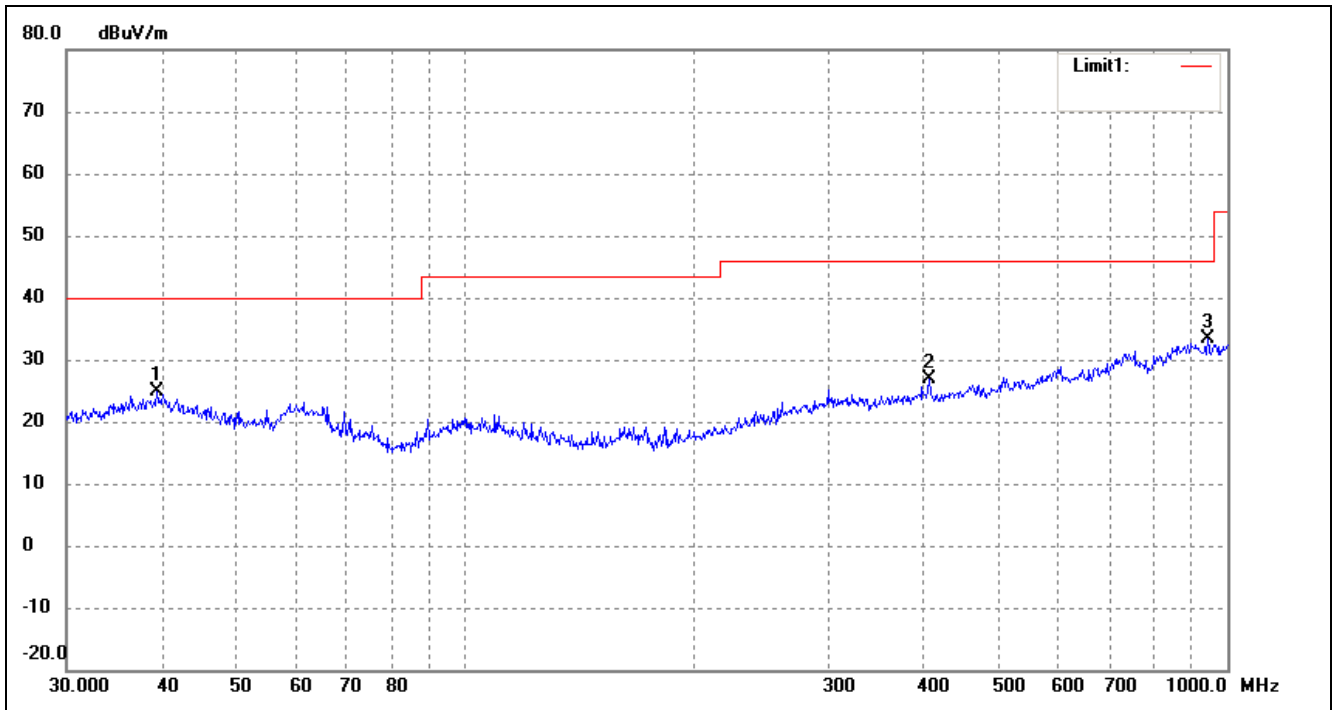
Comment: DC 3.3V

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	79.5209	22.88	1.06	23.94	40.00	-16.06	76	100	peak
2	260.1444	18.52	7.04	25.56	46.00	-20.44	187	100	peak
3	900.1474	17.36	16.85	34.21	46.00	-11.79	292	100	peak

Test Specification: Vertical

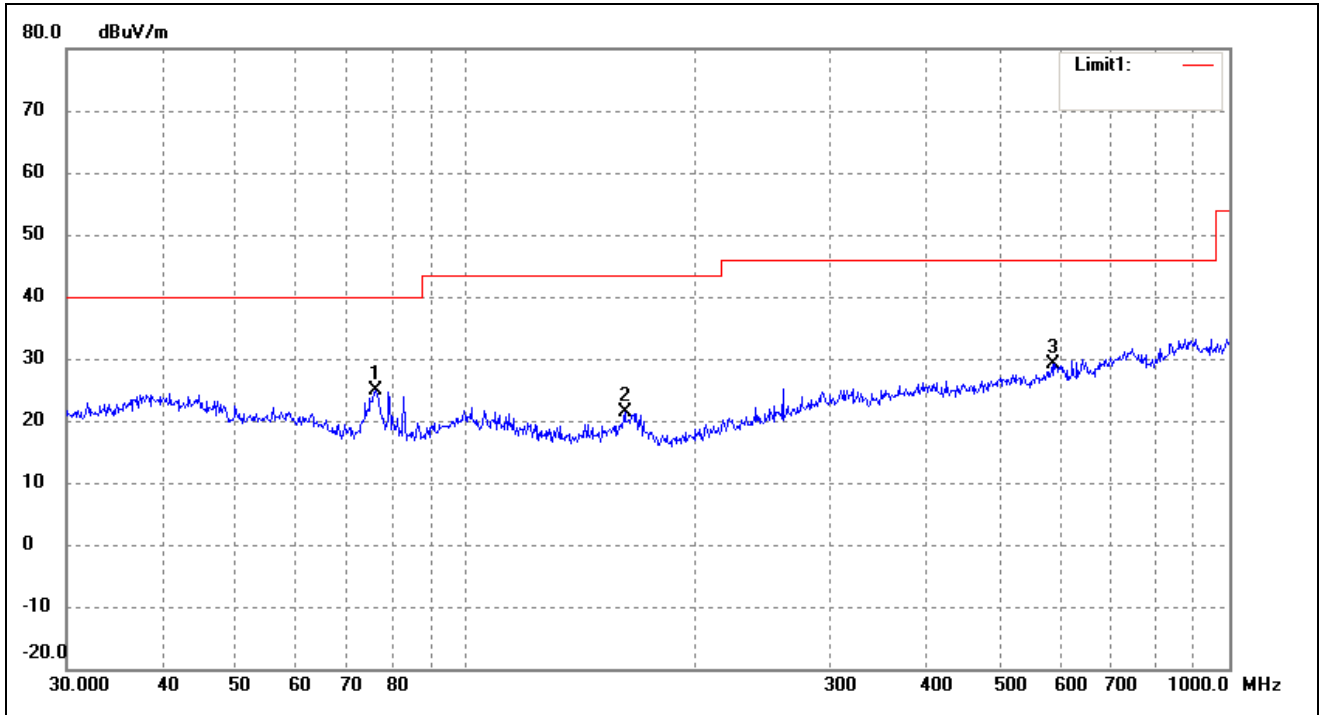


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.4371	15.62	9.16	24.78	40.00	-15.22	53	100	peak
2	406.0880	16.94	9.91	26.85	46.00	-19.15	196	100	peak
3	942.1305	17.12	16.23	33.35	46.00	-12.65	275	100	peak

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

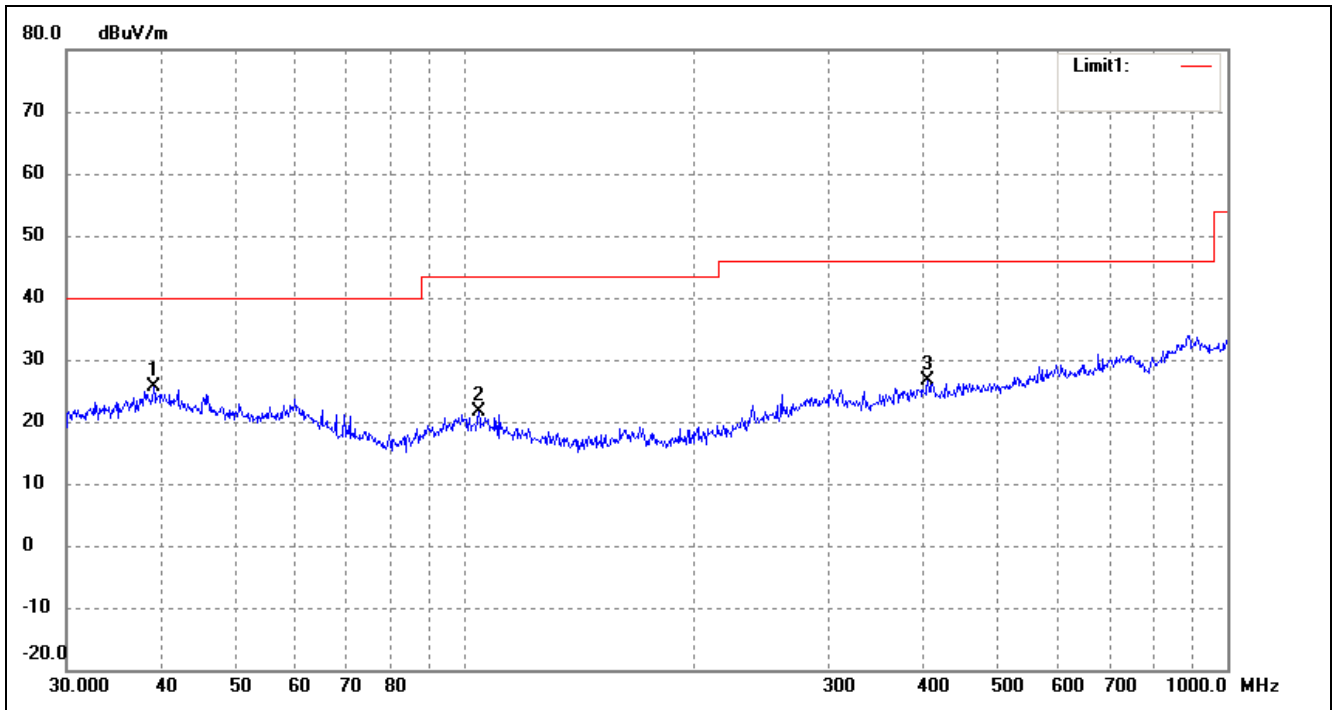
Comment: DC 3.3V

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	76.2442	23.55	1.45	25.00	40.00	-15.00	77	100	peak
2	161.4741	18.67	2.63	21.30	43.50	-22.20	159	100	peak
3	586.8437	16.39	12.83	29.22	46.00	-16.78	283	100	peak

Test Specification: Vertical

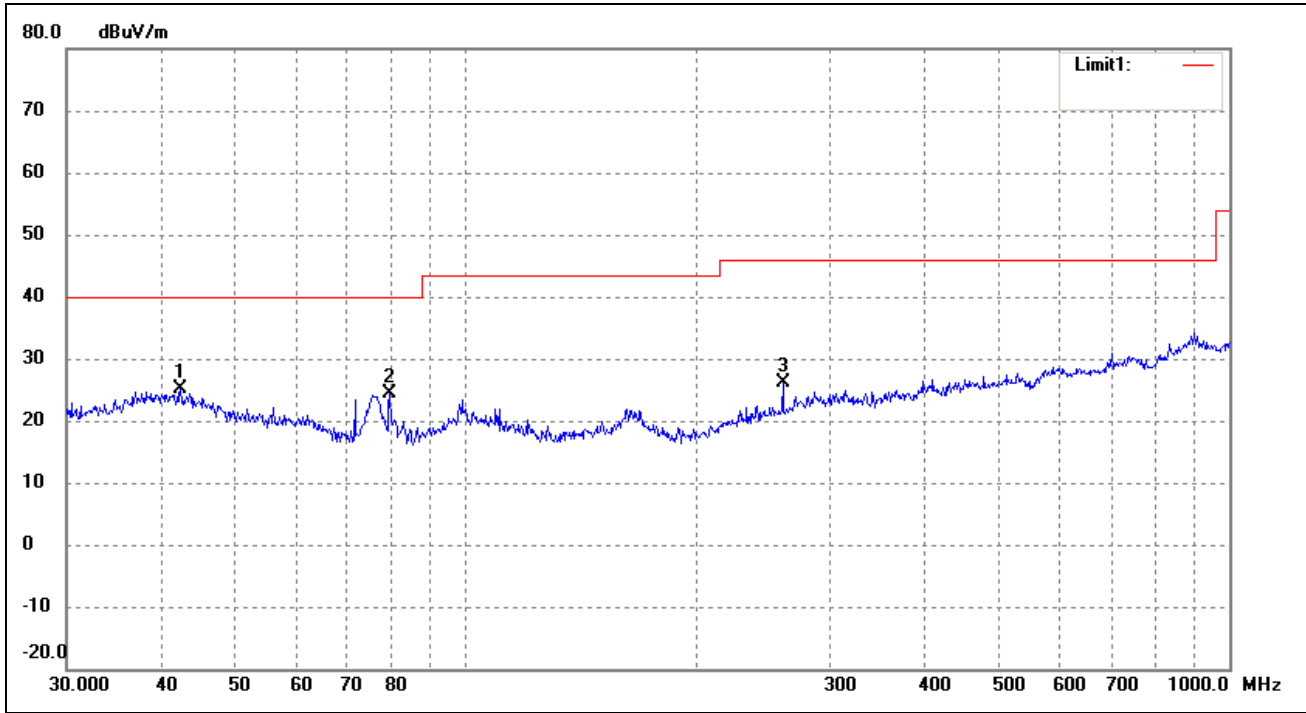


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.0245	16.47	9.08	25.55	40.00	-14.45	33	100	peak
2	104.1701	15.82	5.69	21.51	43.50	-21.99	174	100	peak
3	404.6664	16.68	9.96	26.64	46.00	-19.36	299	100	peak

Operating Condition: 802.11n-HT20 Transmitting High Channel-2467MHz

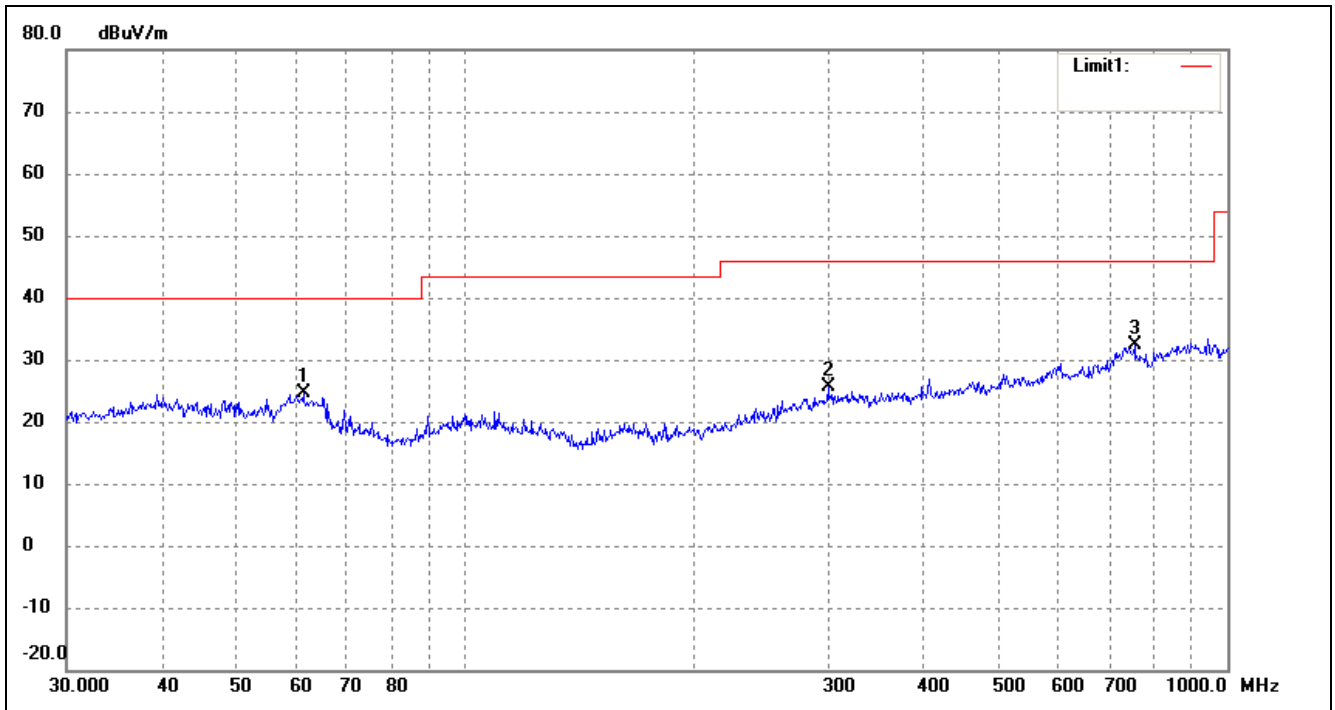
Comment: DC 3.3V

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	42.3021	18.16	7.02	25.18	40.00	-14.82	46	100	peak
2	79.5208	23.38	1.06	24.44	40.00	-15.56	155	100	peak
3	260.1444	19.02	7.04	26.06	46.00	-19.94	247	200	peak

Test Specification: Vertical

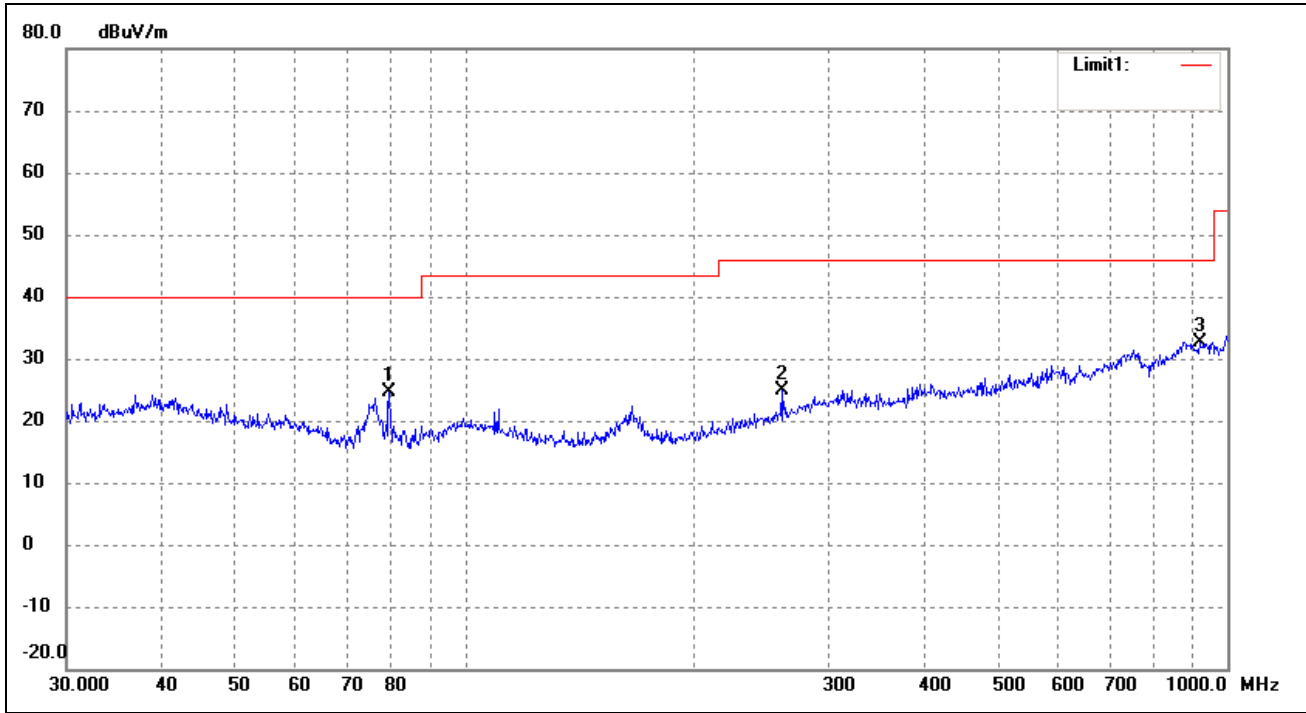


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	61.3462	19.59	4.95	24.54	40.00	-15.46	68	100	peak
2	299.3158	16.51	9.15	25.66	46.00	-20.34	179	100	peak
3	755.3872	17.63	14.86	32.49	46.00	-13.51	267	100	peak

Operating Condition: 802.11n-HT20 Transmitting High Channel-2472MHz

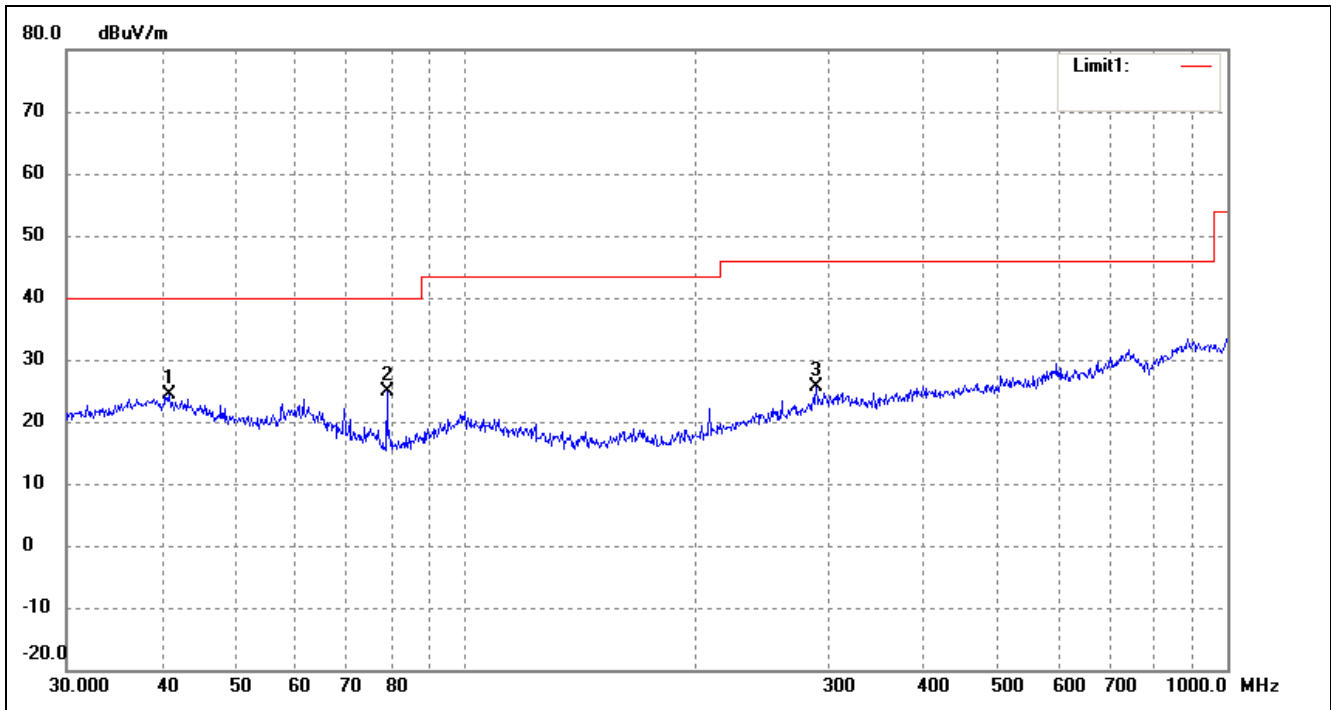
Comment: DC 3.3V

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	79.5208	23.61	1.06	24.67	40.00	-15.33	88	100	peak
2	260.1444	17.77	7.04	24.81	46.00	-21.19	158	100	peak
3	919.2866	16.16	16.50	32.66	46.00	-13.34	199	200	peak

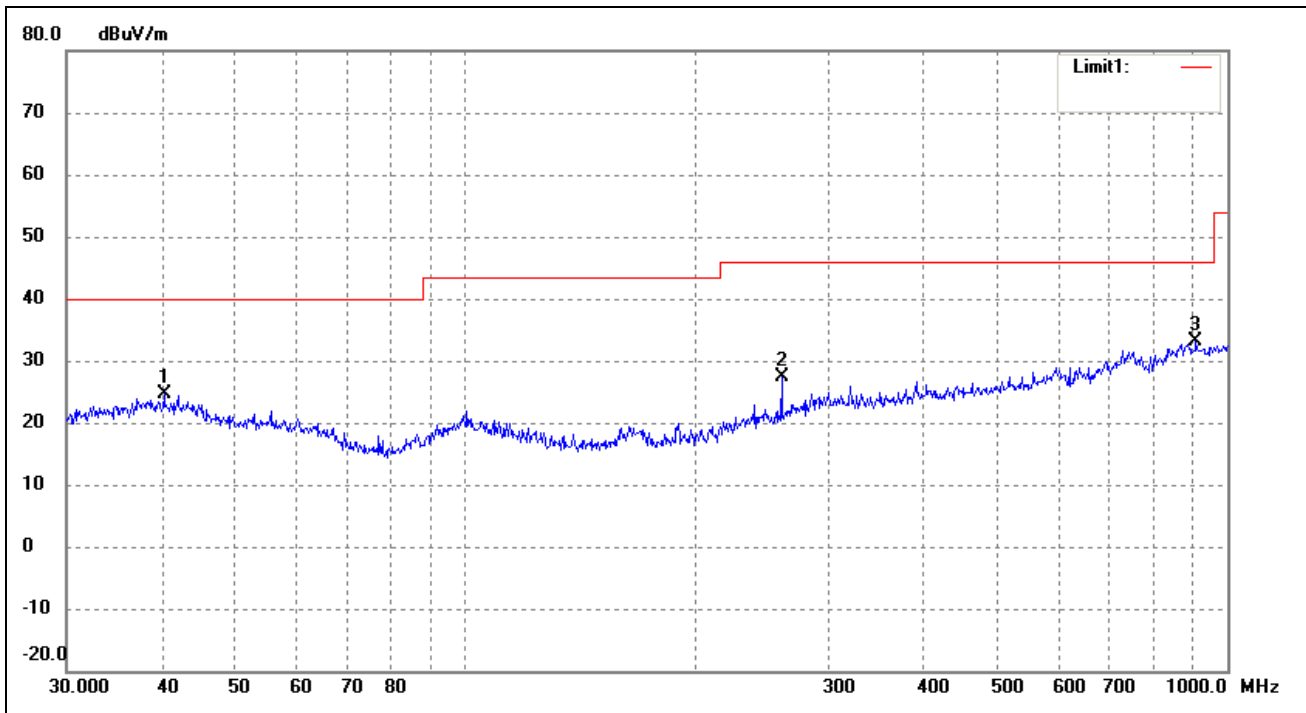
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.8446	15.42	9.00	24.42	40.00	-15.58	37	100	peak
2	78.9652	23.86	1.12	24.98	40.00	-15.02	94	100	peak
3	289.0021	16.81	8.75	25.56	46.00	-20.44	182	100	peak

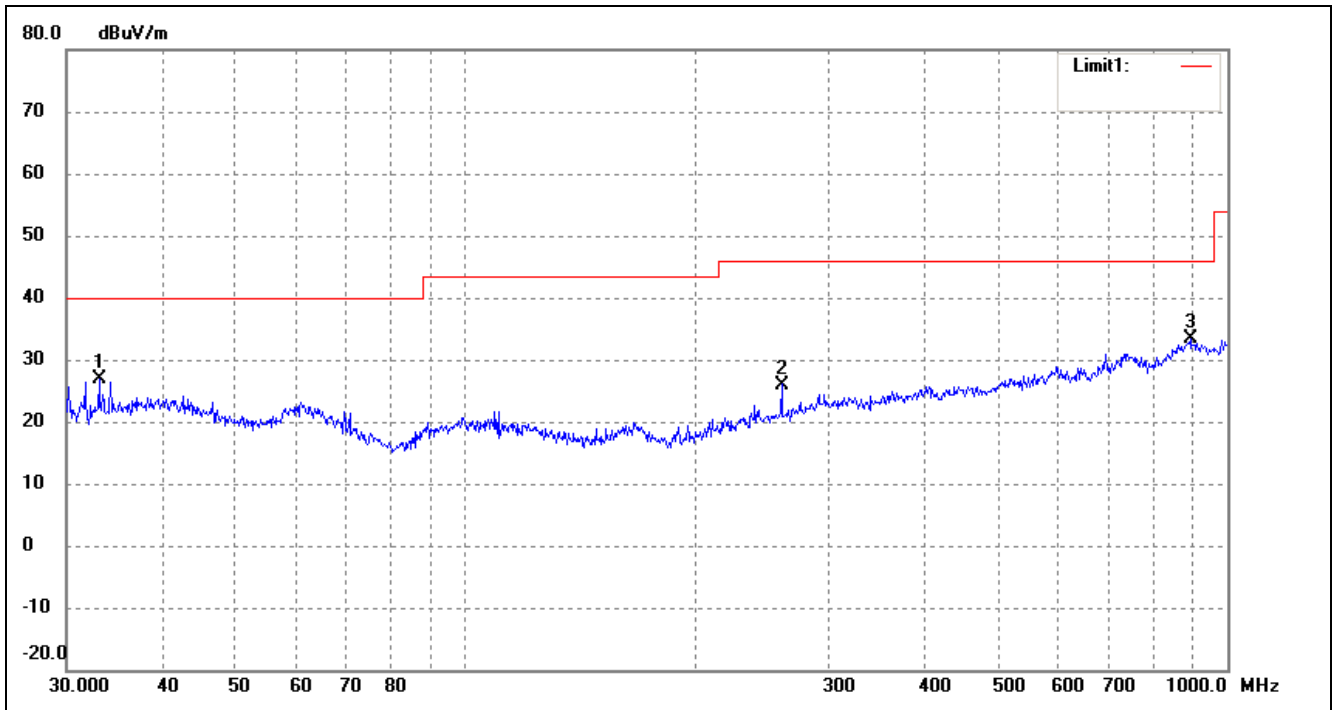
EUT: *WIFI module*
 Tested Model: *HLK-M35*
 Operating Condition: *802.11n-HT40 Transmitting Low Channel-2422MHz*
 Comment: *DC 3.3V*

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	40.2757	17.33	7.22	24.55	40.00	-15.45	41	100	peak
2	260.1444	20.25	7.04	27.29	46.00	-18.71	178	200	peak
3	909.6667	16.43	16.68	33.11	46.00	-12.89	239	200	peak

Test Specification: Vertical

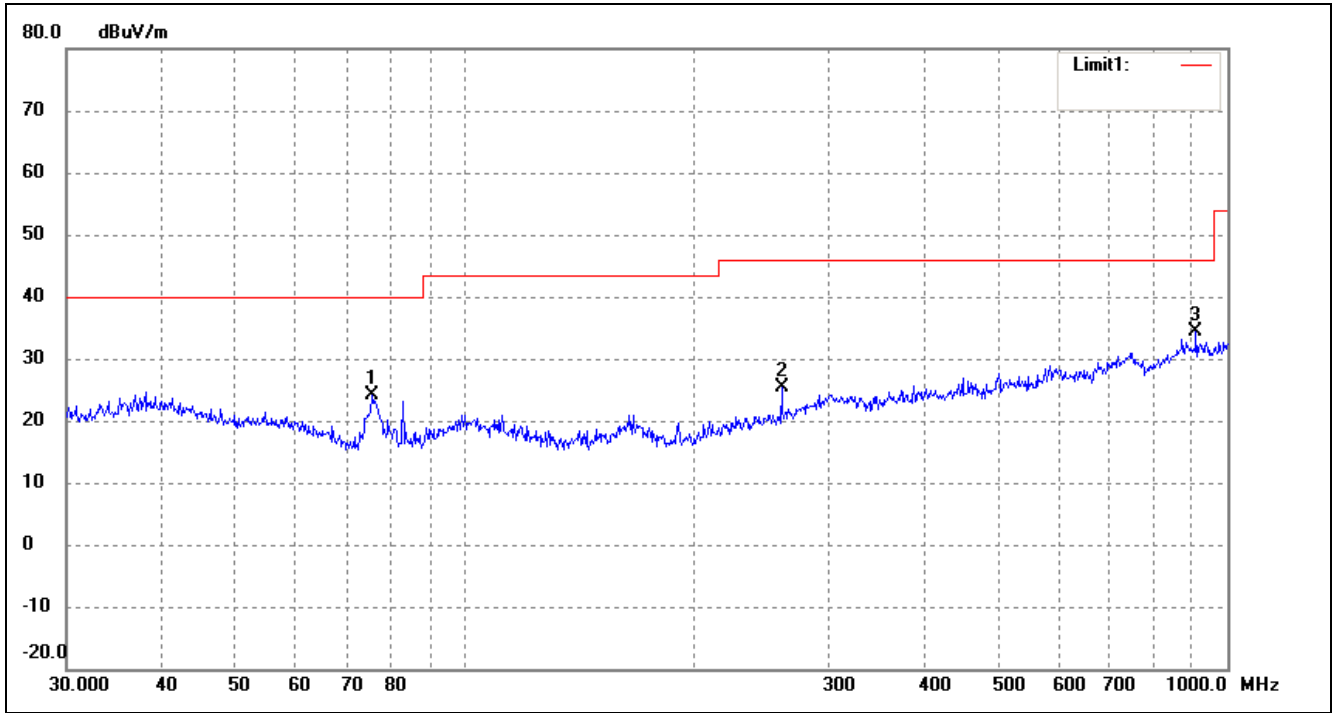


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	18.74	8.10	26.84	40.00	-13.16	68	100	peak
2	260.1444	18.96	7.04	26.00	46.00	-20.00	146	100	peak
3	893.8567	16.62	16.85	33.47	46.00	-12.53	235	100	peak

Operating Condition: 802.11n-HT40 Transmitting Middle Channel-2437MHz

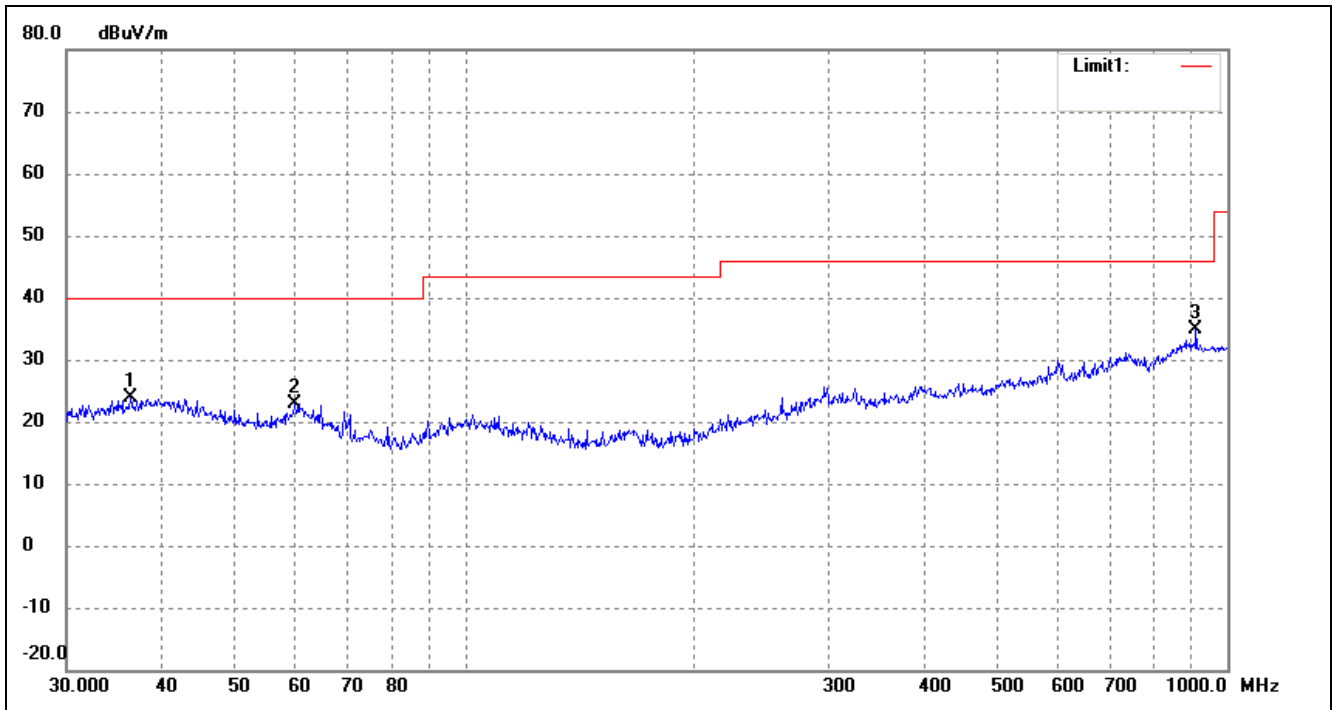
Comment: DC 3.3V

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	75.4464	22.52	1.55	24.07	40.00	-15.93	74	100	peak
2	260.1444	18.30	7.04	25.34	46.00	-20.66	146	100	peak
3	909.6667	17.59	16.68	34.27	46.00	-11.73	238	100	peak

Test Specification: Vertical

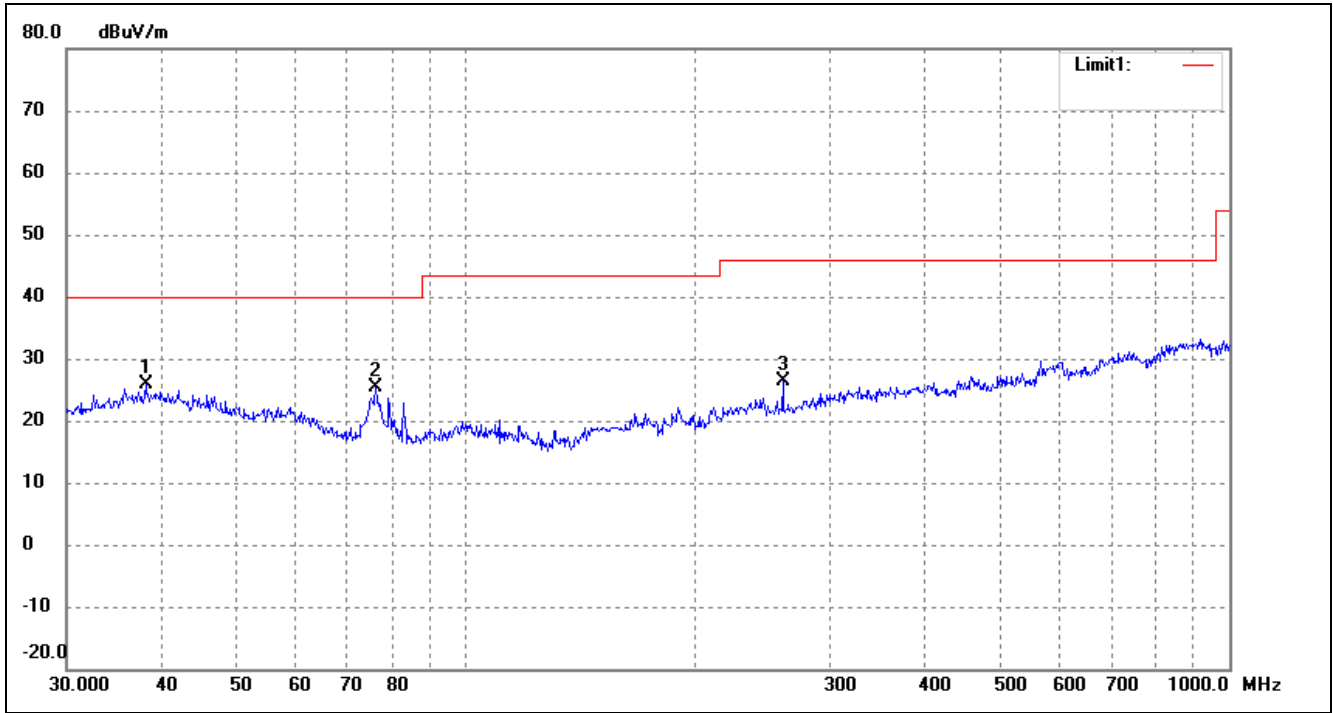


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	36.3814	15.18	8.64	23.82	40.00	-16.18	43	100	peak
2	59.8588	17.49	5.39	22.88	40.00	-17.12	68	100	peak
3	909.6667	18.12	16.68	34.80	46.00	-11.20	164	100	peak

Operating Condition: 802.11n-HT40 Transmitting Middle Channel-2452MHz

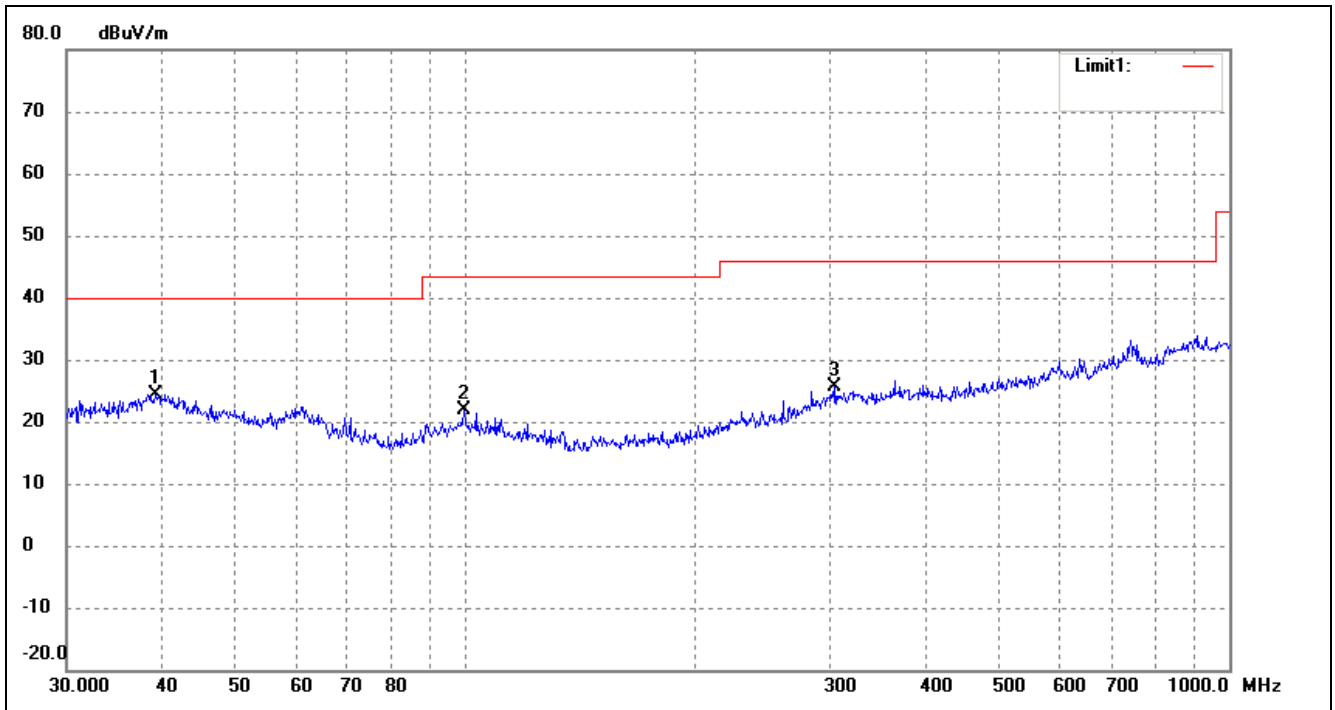
Comment: DC 3.3V

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	38.0782	19.04	6.73	25.77	40.00	-14.23	42	100	peak
2	76.2442	23.92	1.45	25.37	40.00	-14.63	99	100	peak
3	260.1444	19.23	7.04	26.27	46.00	-19.73	138	100	peak

Test Specification: Vertical

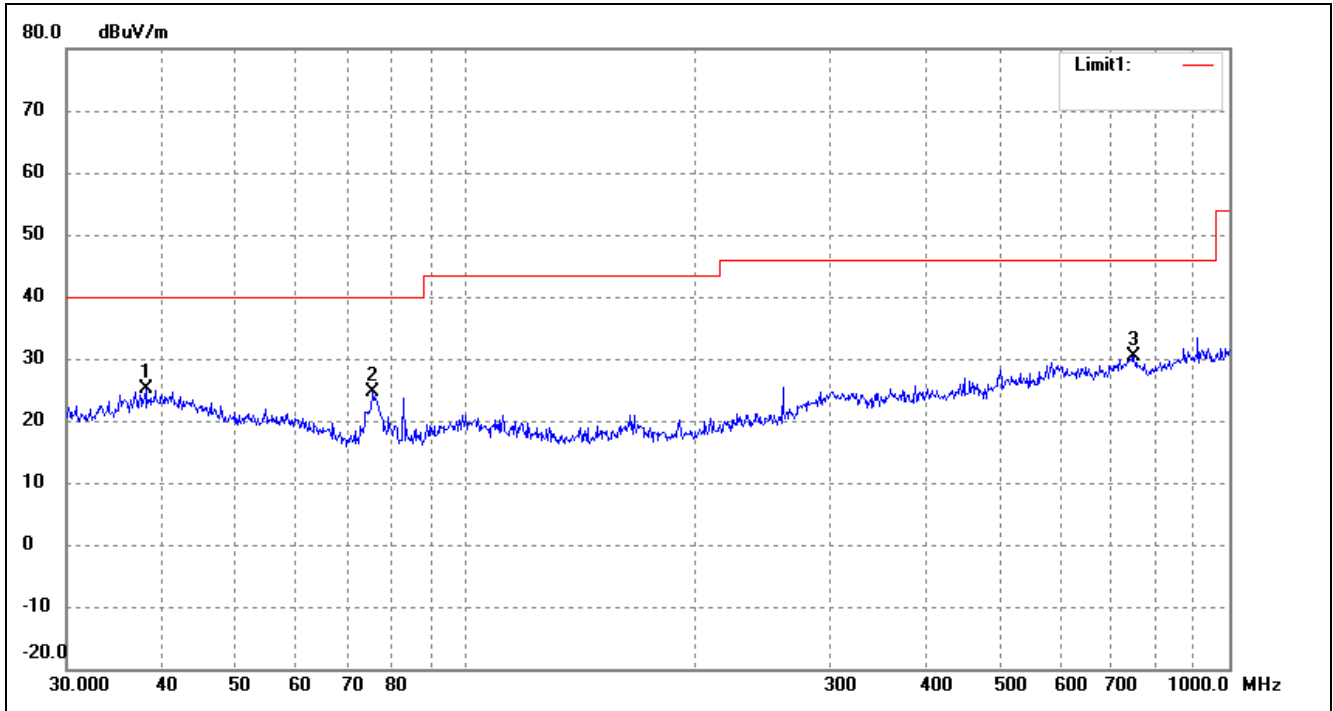


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.1615	15.32	9.10	24.42	40.00	-15.58	46	100	peak
2	99.5280	15.80	6.01	21.81	43.50	-21.69	59	100	peak
3	304.6100	16.45	9.19	25.64	46.00	-20.36	164	100	peak

Operating Condition: 802.11n-HT40 Transmitting High Channel-2457MHz

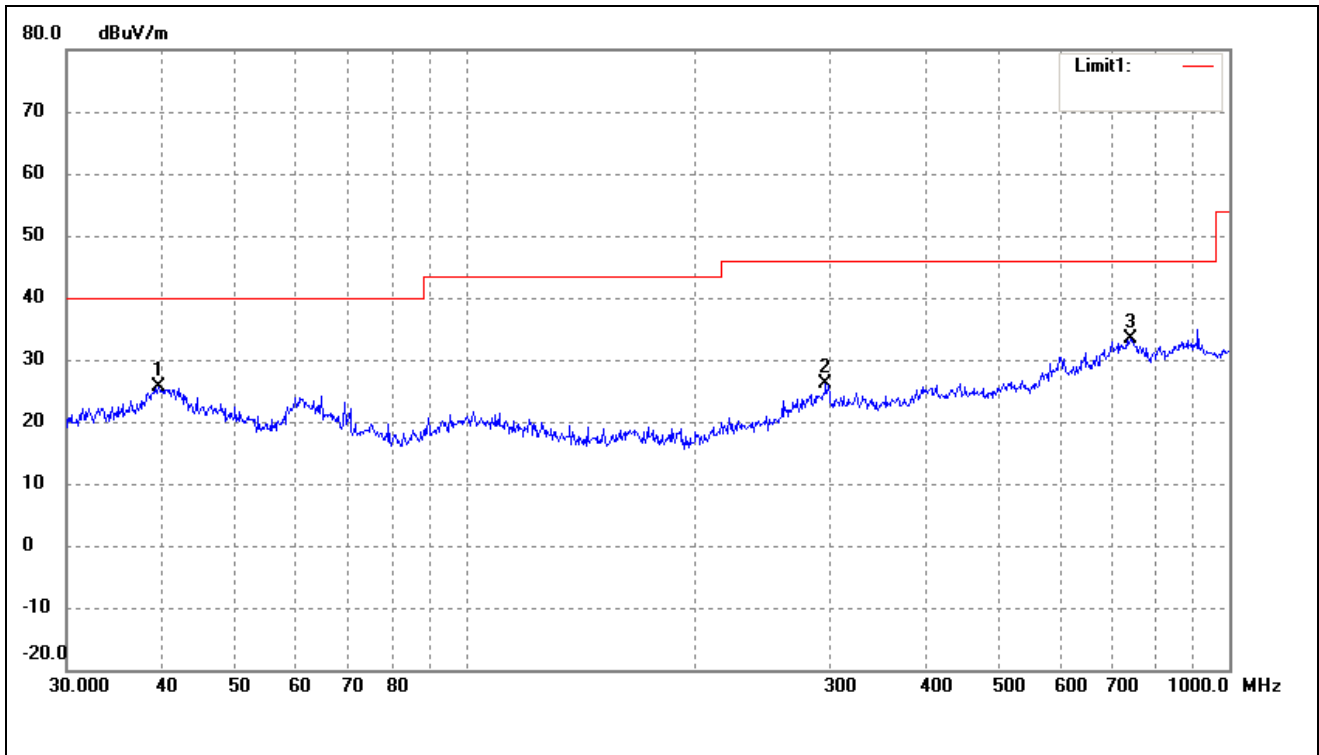
Comment: DC 3.3V

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	38.0782	18.33	6.73	25.06	40.00	-14.94	59	100	peak
2	75.4463	23.02	1.55	24.57	40.00	-15.43	163	100	peak
3	750.1082	16.23	14.10	30.33	46.00	-15.67	236	100	peak

Test Specification: Vertical

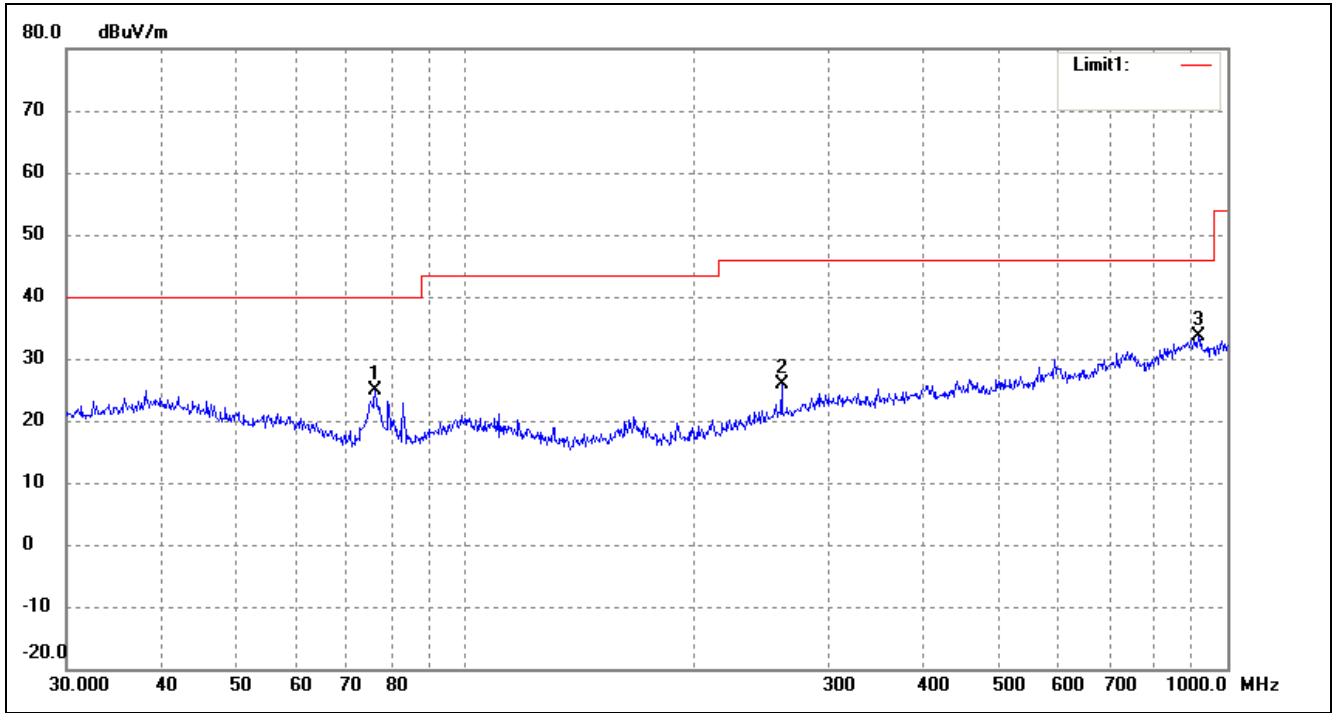


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.5756	16.36	9.18	25.54	40.00	-14.46	64	100	peak
2	296.1836	16.99	9.03	26.02	46.00	-19.98	129	100	peak
3	742.2586	17.85	15.45	33.30	46.00	-12.70	203	100	peak

Operating Condition: 802.11n-HT40 Transmitting High Channel-2462MHz

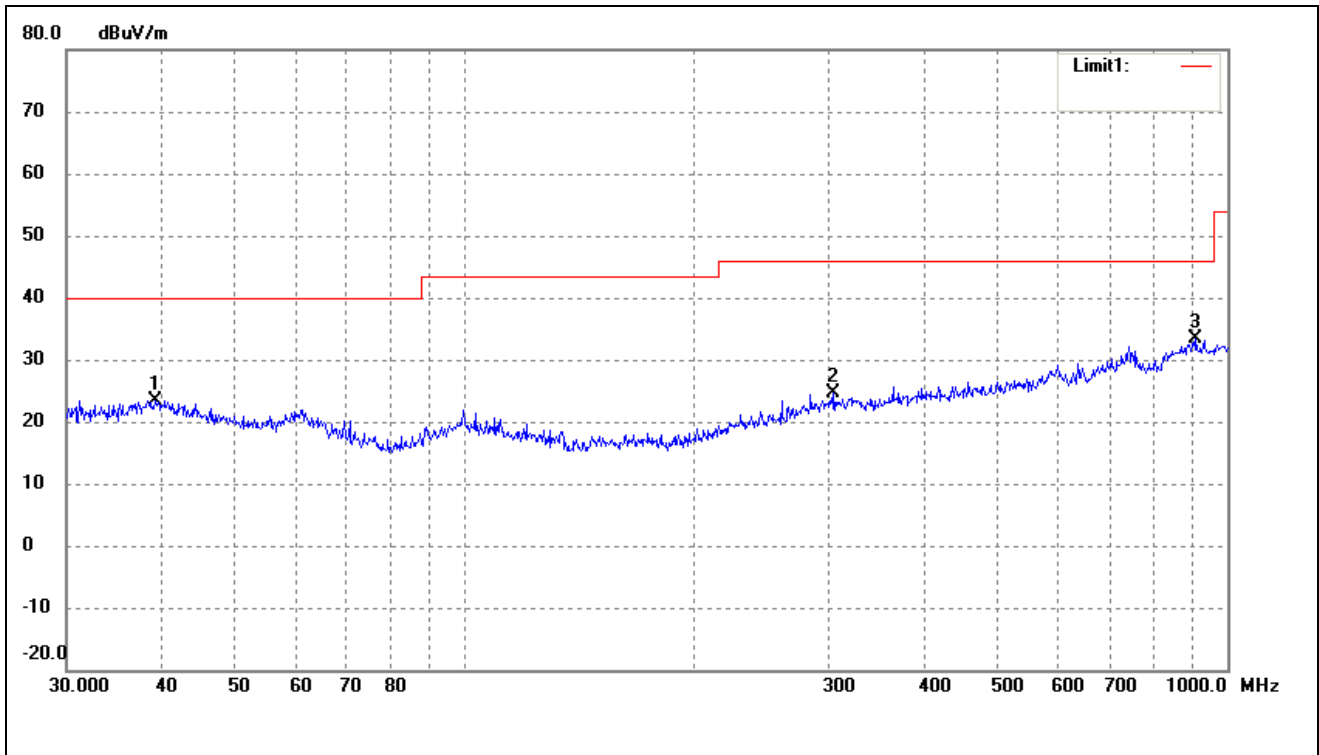
Comment: DC 3.3V

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	76.2442	23.42	1.45	24.87	40.00	-15.13	65	100	peak
2	260.1444	18.73	7.04	25.77	46.00	-20.23	105	100	peak
3	916.0687	17.13	16.56	33.69	46.00	-12.31	197	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	39.1616	14.32	9.10	23.42	40.00	-16.58	54	100	peak
2	304.6100	15.45	9.19	24.64	46.00	-21.36	138	100	peak
3	909.6667	16.64	16.68	33.32	46.00	-12.68	180	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	
2412MHz							
4824	54.09	0.57	54.66	74.00	-19.34	H	PK
4824	38.84	0.57	39.41	54.00	-14.59	H	AV
7236	46.30	3.69	49.99	74.00	-24.01	H	PK
7236	34.98	3.69	38.67	54.00	-15.33	H	AV
4824	57.31	0.57	57.88	74.00	-16.12	V	PK
4824	40.50	0.57	41.07	54.00	-12.93	V	AV
7236	49.11	3.69	52.80	74.00	-21.20	V	PK
7236	37.44	3.69	41.13	54.00	-12.87	V	AV
2442MHz							
4884	54.74	0.66	55.40	74.00	-18.60	H	PK
4884	39.99	0.66	40.65	54.00	-13.35	H	AV
7326	47.77	3.76	51.53	74.00	-22.47	H	PK
7326	33.10	3.76	36.86	54.00	-17.14	H	AV
4884	53.97	0.66	54.63	74.00	-19.37	V	PK
4884	40.89	0.66	41.55	54.00	-12.45	V	AV
7326	47.98	3.76	51.74	74.00	-22.26	V	PK
7326	34.08	3.76	37.84	54.00	-16.16	V	AV
2462MHz							
4924	55.82	0.74	56.56	74.00	-17.44	H	PK
4924	41.76	0.74	42.50	54.00	-11.50	H	AV
7386	46.38	3.83	50.21	74.00	-23.79	H	PK
7386	34.83	3.83	38.66	54.00	-15.34	H	AV
4924	54.94	0.74	55.68	74.00	-18.32	V	PK
4924	42.04	0.74	42.78	54.00	-11.22	V	AV
7386	47.99	3.83	51.82	74.00	-22.18	V	PK
7386	35.18	3.83	39.01	54.00	-14.99	V	AV

2467MHz							
4934.000	54.16	-3.74	50.42	74.00	-23.58	H	PK
4934.000	42.48	-3.74	38.74	54.00	-15.26	H	AV
7401.000	48.74	1.47	50.21	74.00	-23.79	H	PK
7401.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4934.000	54.92	-3.74	51.18	74.00	-22.82	V	PK
4934.000	42.62	-3.74	38.88	54.00	-15.12	V	AV
7401.000	48.49	1.47	49.96	74.00	-24.04	V	PK
7401.000	35.20	1.47	36.67	54.00	-17.33	V	AV
2472MHz							
4944.000	53.90	-3.59	50.31	74.00	-23.69	H	PK
4924.000	43.23	-3.59	39.64	54.00	-14.36	H	AV
7416.000	48.31	1.79	50.10	74.00	-23.90	H	PK
7416.000	36.10	1.79	37.89	54.00	-16.11	H	AV
4944.000	55.70	-3.59	52.11	74.00	-21.89	V	PK
4924.000	41.48	-3.59	37.89	54.00	-16.11	V	AV
7416.000	48.55	1.79	50.34	74.00	-23.66	V	PK
7416.000	35.36	1.79	37.15	54.00	-16.85	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	
2412MHz							
4824	55.50	0.57	56.07	74.00	-17.93	H	PK
4824	42.23	0.57	42.80	54.00	-11.20	H	AV
7236	48.42	3.69	52.11	74.00	-21.89	H	PK
7236	34.40	3.69	38.09	54.00	-15.91	H	AV
4824	55.99	0.57	56.56	74.00	-17.44	V	PK
4824	42.65	0.57	43.22	54.00	-10.78	V	AV
7236	49.22	3.69	52.91	74.00	-21.09	V	PK
7236	35.54	3.69	39.23	54.00	-14.77	V	AV
2442MHz							
4884	55.10	0.66	55.76	74.00	-18.24	H	PK
4884	43.28	0.66	43.94	54.00	-10.06	H	AV
7326	47.38	3.76	51.14	74.00	-22.86	H	PK
7326	35.27	3.76	39.03	54.00	-14.97	H	AV
4884	57.07	0.66	57.73	74.00	-16.27	V	PK
4884	43.86	0.66	44.52	54.00	-9.48	V	AV
7326	48.40	3.76	52.16	74.00	-21.84	V	PK
7326	35.33	3.76	39.09	54.00	-14.91	V	AV
2462MHz							
4924	54.00	0.74	54.74	74.00	-19.26	H	PK
4924	40.75	0.74	41.49	54.00	-12.51	H	AV
7386	47.18	3.83	51.01	74.00	-22.99	H	PK
7386	34.73	3.83	38.56	54.00	-15.44	H	AV
4924	56.11	0.74	56.85	74.00	-17.15	V	PK
4924	42.69	0.74	43.43	54.00	-10.57	V	AV
7386	48.58	3.83	52.41	74.00	-21.59	V	PK
7386	35.95	3.83	39.78	54.00	-14.22	V	AV

2467MHz							
4934.000	54.74	-3.74	51.00	74.00	-23.00	H	PK
4934.000	39.99	-3.74	36.25	54.00	-17.75	H	AV
7401.000	47.77	1.47	49.24	74.00	-24.76	H	PK
7401.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4934.000	53.97	-3.74	50.23	74.00	-23.77	V	PK
4934.000	40.89	-3.74	37.15	54.00	-16.85	V	AV
7401.000	47.98	1.47	49.45	74.00	-24.55	V	PK
7401.000	34.08	1.47	35.55	54.00	-18.45	V	AV
2472MHz							
4944.000	55.82	-3.59	52.23	74.00	-21.77	H	PK
4924.000	41.76	-3.59	38.17	54.00	-15.83	H	AV
7416.000	46.38	1.79	48.17	74.00	-25.83	H	PK
7416.000	34.83	1.79	36.62	54.00	-17.38	H	AV
4944.000	54.94	-3.59	51.35	74.00	-22.65	V	PK
4924.000	42.04	-3.59	38.45	54.00	-15.55	V	AV
7416.000	47.99	1.79	49.78	74.00	-24.22	V	PK
7416.000	35.18	1.79	36.97	54.00	-17.03	V	AV

Test Mode: 802.11n-HT20

Frequency (MHz)	Reading (dBUV/m)	Correct dB/m	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Polar H/V	Detector
2412MHz							
4824	55.60	0.57	56.17	74.00	-17.83	H	PK
4824	40.54	0.57	41.11	54.00	-12.89	H	AV
7236	47.26	3.69	50.95	74.00	-23.05	H	PK
7236	34.44	3.69	38.13	54.00	-15.87	H	AV
4824	56.71	0.57	57.28	74.00	-16.72	V	PK
4824	43.18	0.57	43.75	54.00	-10.25	V	AV
7236	49.21	3.69	52.90	74.00	-21.10	V	PK
7236	35.77	3.69	39.46	54.00	-14.54	V	AV
2442MHz							
4884	54.16	0.66	54.82	74.00	-19.18	H	PK
4884	42.48	0.66	43.14	54.00	-10.86	H	AV
7326	48.74	3.76	52.50	74.00	-21.50	H	PK
7326	33.10	3.76	36.86	54.00	-17.14	H	AV
4884	54.92	0.66	55.58	74.00	-18.42	V	PK
4884	42.62	0.66	43.28	54.00	-10.72	V	AV
7326	48.49	3.76	52.25	74.00	-21.75	V	PK
7326	35.20	3.76	38.96	54.00	-15.04	V	AV
2462MHz							
4924	53.90	0.74	54.64	74.00	-19.36	H	PK
4924	43.23	0.74	43.97	54.00	-10.03	H	AV
7386	48.31	3.83	52.14	74.00	-21.86	H	PK
7386	36.10	3.83	39.93	54.00	-14.07	H	AV
4924	55.70	0.74	56.44	74.00	-17.56	V	PK
4924	41.48	0.74	42.22	54.00	-11.78	V	AV
7386	48.55	3.83	52.38	74.00	-21.62	V	PK
7386	35.36	3.83	39.19	54.00	-14.81	V	AV

2467MHz							
4934.000	55.10	-3.74	51.36	74.00	-22.64	H	PK
4934.000	43.28	-3.74	39.54	54.00	-14.46	H	AV
7401.000	47.38	1.47	48.85	74.00	-25.15	H	PK
7401.000	35.27	1.47	36.74	54.00	-17.26	H	AV
4934.000	57.07	-3.74	53.33	74.00	-20.67	V	PK
4934.000	43.86	-3.74	40.12	54.00	-13.88	V	AV
7401.000	48.40	1.47	49.87	74.00	-24.13	V	PK
7401.000	35.33	1.47	36.80	54.00	-17.20	V	AV
2472MHz							
4944.000	54.00	-3.59	50.41	74.00	-23.59	H	PK
4924.000	40.75	-3.59	37.16	54.00	-16.84	H	AV
7416.000	47.18	1.79	48.97	74.00	-25.03	H	PK
7416.000	34.73	1.79	36.52	54.00	-17.48	H	AV
4944.000	56.11	-3.59	52.52	74.00	-21.48	V	PK
4924.000	42.69	-3.59	39.10	54.00	-14.90	V	AV
7416.000	48.58	1.79	50.37	74.00	-23.63	V	PK
7416.000	35.95	1.79	37.74	54.00	-16.26	V	AV

Test Mode: 802.11n-HT40

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
2422MHz							
4844	53.25	0.60	53.85	74.00	-20.15	H	PK
4844	38.25	0.60	38.85	54.00	-15.15	H	AV
7266	46.48	3.72	50.20	74.00	-23.80	H	PK
7266	32.56	3.72	36.28	54.00	-17.72	H	AV
4844	54.22	0.60	54.82	74.00	-19.18	V	PK
4844	39.42	0.60	40.02	54.00	-13.98	V	AV
7266	48.81	3.72	52.53	74.00	-21.47	V	PK
7266	34.78	3.72	38.50	54.00	-15.50	V	AV
2437MHz							
4884	52.53	0.66	53.19	74.00	-20.81	H	PK
4884	37.88	0.66	38.54	54.00	-15.46	H	AV
7326	44.88	3.76	48.64	74.00	-25.36	H	PK
7326	32.03	3.76	35.79	54.00	-18.21	H	AV
4884	53.74	0.66	54.40	74.00	-19.60	V	PK
4884	39.95	0.66	40.61	54.00	-13.39	V	AV
7326	45.78	3.76	49.54	74.00	-24.46	V	PK
7326	34.00	3.76	37.76	54.00	-16.24	V	AV
2452MHz							
4904	52.65	0.72	53.37	74.00	-20.63	H	PK
4904	39.37	0.72	40.09	54.00	-13.91	H	AV
7356	45.63	3.81	49.44	74.00	-24.56	H	PK
7356	30.73	3.81	34.54	54.00	-19.46	H	AV
4904	54.84	0.72	55.56	74.00	-18.44	V	PK
4904	40.83	0.72	41.55	54.00	-12.45	V	AV
7356	48.18	3.81	51.99	74.00	-22.01	V	PK
7356	35.12	3.81	38.93	54.00	-15.07	V	AV

2457MHz							
4914.000	52.53	-3.74	48.79	74.00	-25.21	H	PK
4914.000	37.88	-3.74	34.14	54.00	-19.86	H	AV
7371.000	44.88	1.47	46.35	74.00	-27.65	H	PK
7371.000	32.03	1.47	33.50	54.00	-20.50	H	AV
4914.000	53.74	-3.74	50.00	74.00	-24.00	V	PK
4914.000	39.95	-3.74	36.21	54.00	-17.79	V	AV
7371.000	45.78	1.47	47.25	74.00	-26.75	V	PK
7371.000	34.00	1.47	35.47	54.00	-18.53	V	AV
2462MHz							
4924.000	52.65	-3.63	49.02	74.00	-24.98	H	PK
4924.000	39.37	-3.63	35.74	54.00	-18.26	H	AV
7386.000	45.63	1.62	47.25	74.00	-26.75	H	PK
7386.000	30.73	1.62	32.35	54.00	-21.65	H	AV
4924.000	54.84	-3.63	51.21	74.00	-22.79	V	PK
4924.000	40.83	-3.63	37.20	54.00	-16.80	V	AV
7386.000	48.18	1.62	49.80	74.00	-24.20	V	PK
7386.000	35.12	1.62	36.74	54.00	-17.26	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th 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	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23

9.3 Test Procedure

According to the KDB 558074D01 v03r02, 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 KDB 558074 D01 V03r02, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW \geq 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.4 Environmental Conditions

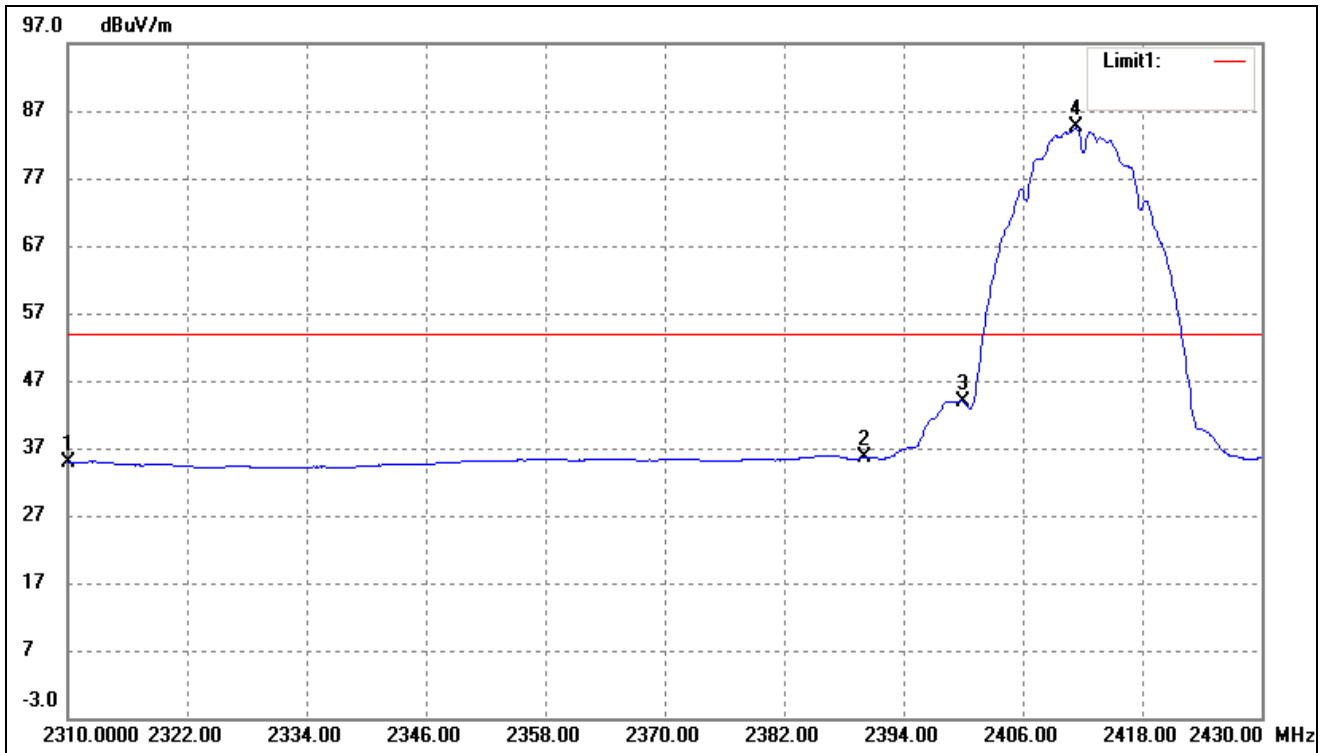
Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

Please refer to the test plots as below.

802.11b-Lowest Bandedge

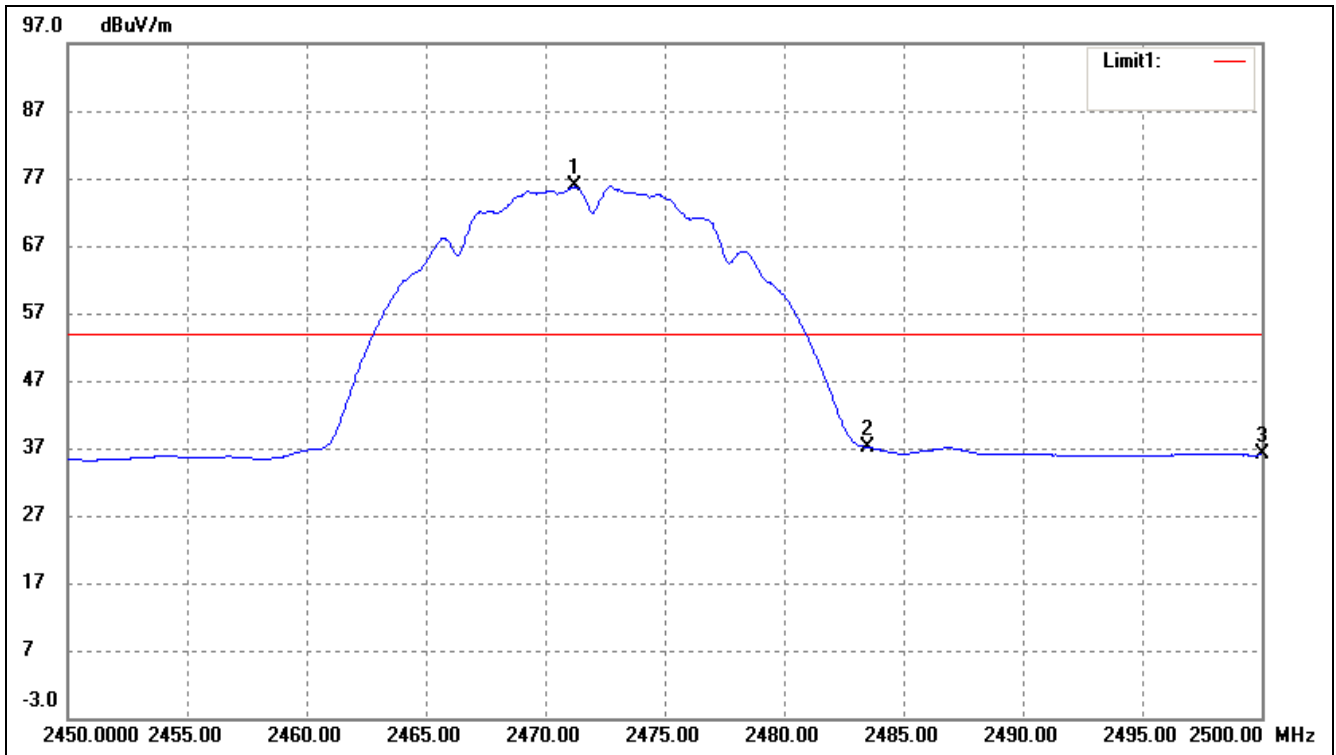
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	18.59	16.34	34.93	54.00	-19.07	Average Detector
	2310.000	31.16	16.34	47.50	74.00	-26.50	Peak Detector
2	2390.000	18.55	17.03	35.58	54.00	-18.42	Average Detector
	2390.000	30.92	17.03	47.95	74.00	-26.05	Peak Detector
3	2400.000	26.76	17.11	43.87	Delta=40.64dBc		Average Detector
4	2411.280	67.32	17.19	84.51			Average Detector

802.11b-Highest Bandedge

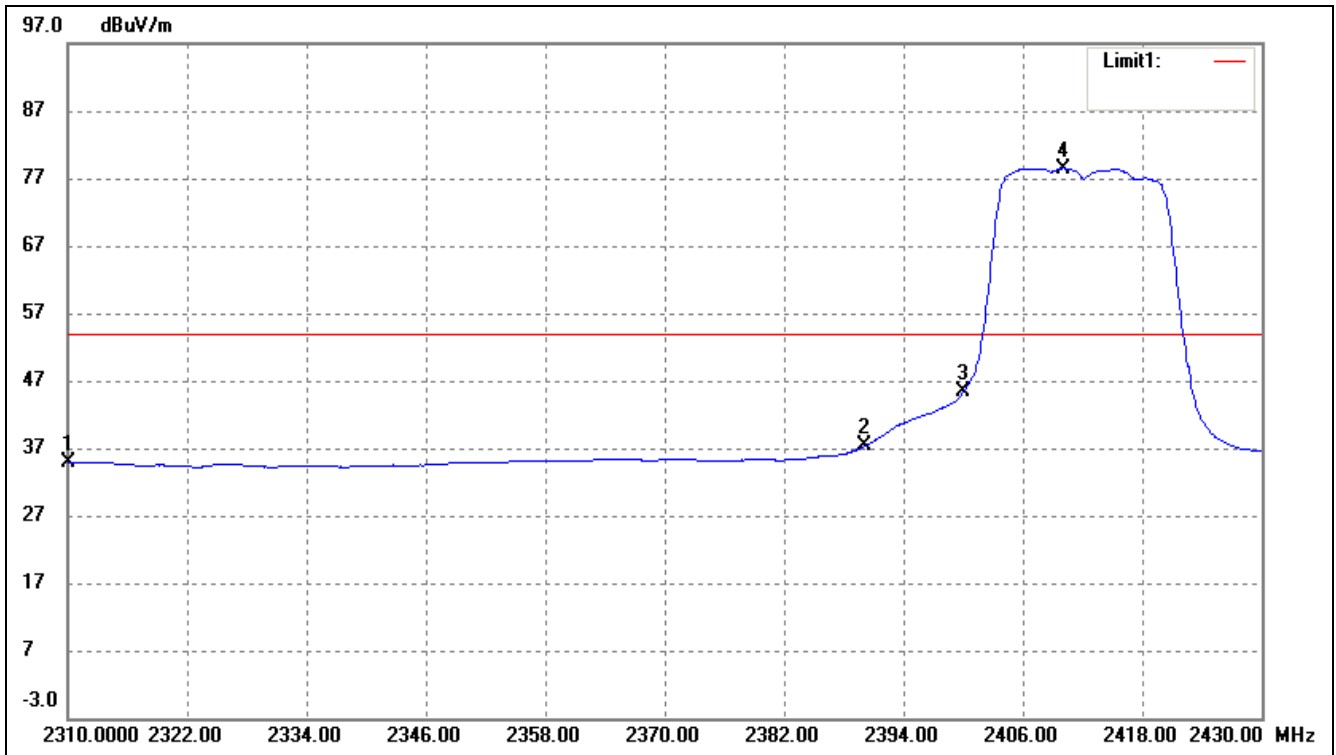
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2471.200	58.14	17.65	75.79	/	/	Average Detector
	2471.200	67.23	17.65	84.88	/	/	Peak Detector
2	2483.500	Delta = 45.59dBc		30.20	54.00	-23.80	Average Detector
	2483.500			39.29	74.00	-34.71	Peak Detector
3	2500.000	18.16	17.86	36.02	54.00	-17.98	Average Detector
	2500.000	30.95	17.86	48.81	74.00	-25.19	Peak Detector

802.11g-Lowest Bandedge

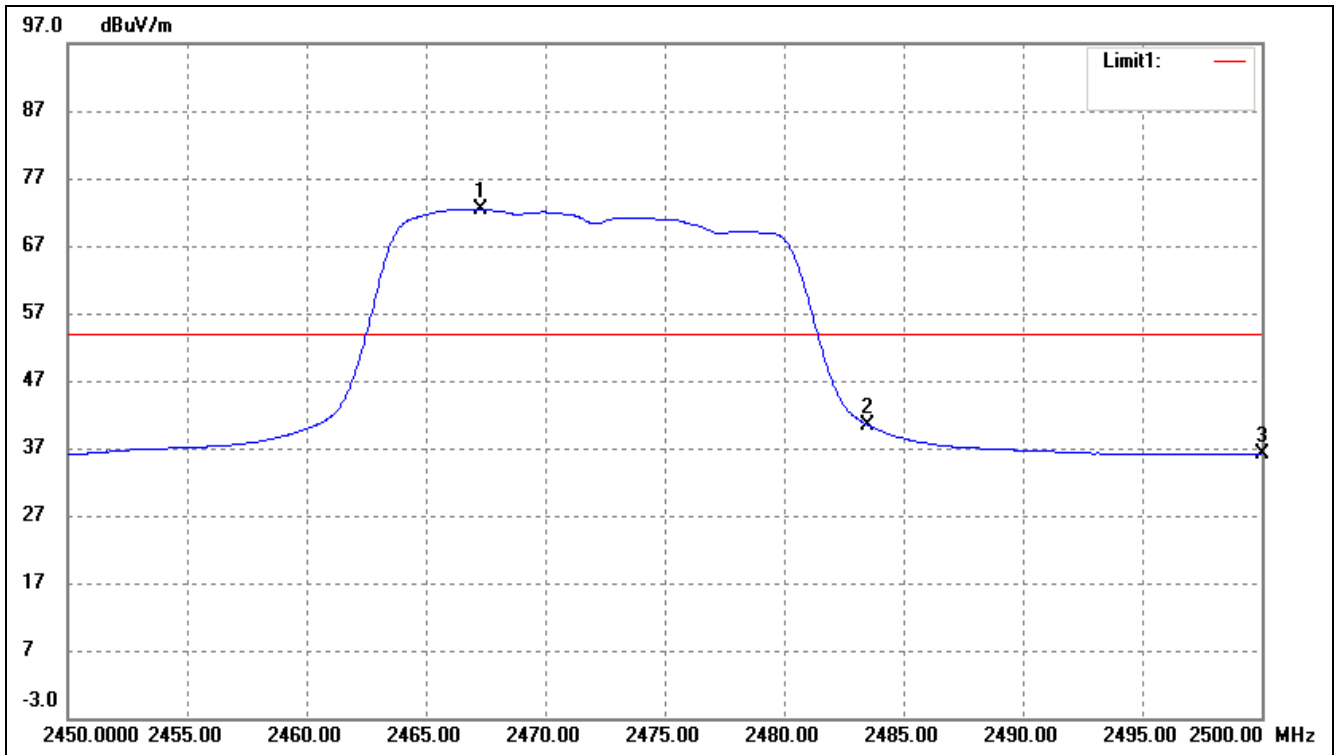
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	18.52	16.34	34.86	54.00	-19.14	Average Detector
	2310.000	30.35	16.34	46.69	74.00	-27.31	Peak Detector
2	2390.000	20.24	17.03	37.27	54.00	-16.73	Average Detector
	2390.000	35.23	17.03	52.26	74.00	-21.74	Peak Detector
3	2400.000	28.24	17.11	45.35	Delta=33.15dBc		Average Detector
4	2410.080	61.31	17.19	78.50			Average Detector

802.11g-Highest Bandedge

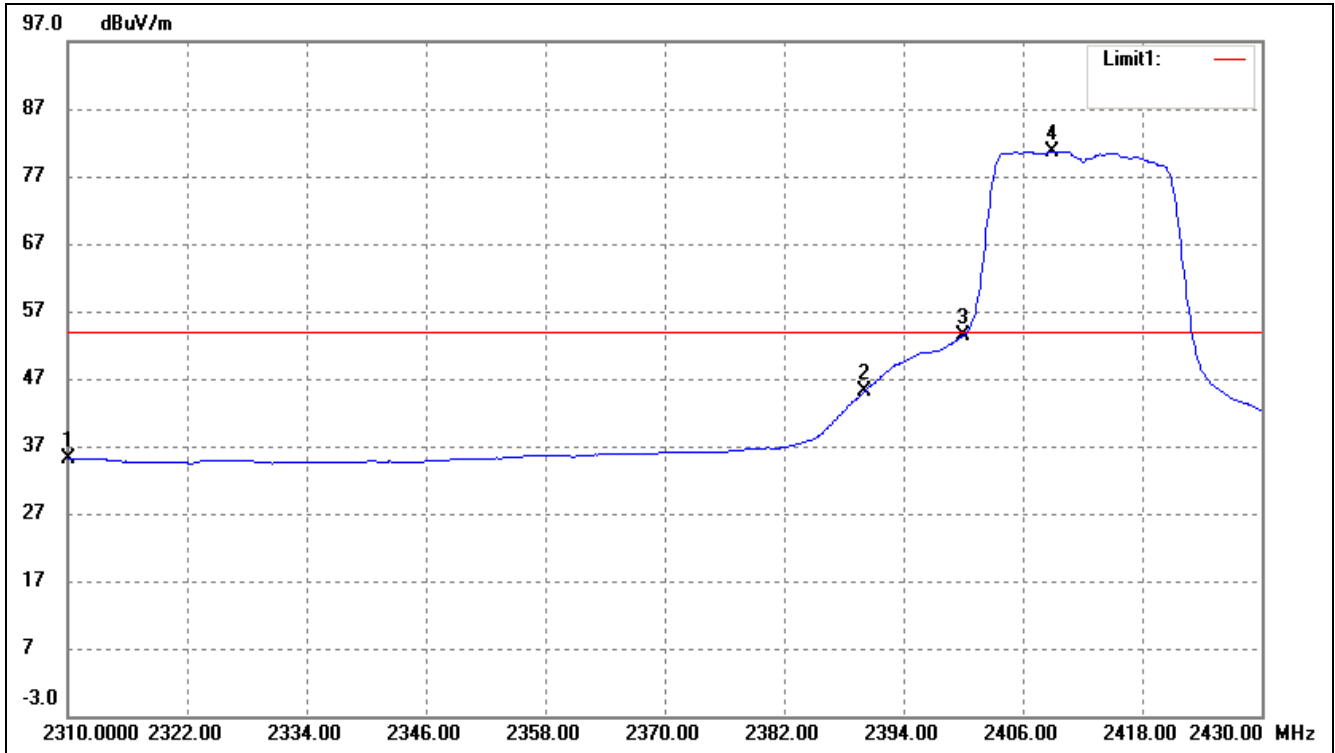
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2467.300	54.80	17.60	72.40	/	/	Average Detector
	2467.300	67.46	17.60	85.06	/	/	Peak Detector
1	2483.500	Delta = 44.48dBc		27.92	54.00	-26.08	Average Detector
	2483.500	Delta = 44.48dBc		40.58	74.00	-33.42	Peak Detector
3	2500.000	18.19	17.86	36.05	54.00	-17.95	Average Detector
	2500.000	43.83	-3.28	40.55	74.00	-33.45	Peak Detector

802.11n-HT20-Lowest Bandedge

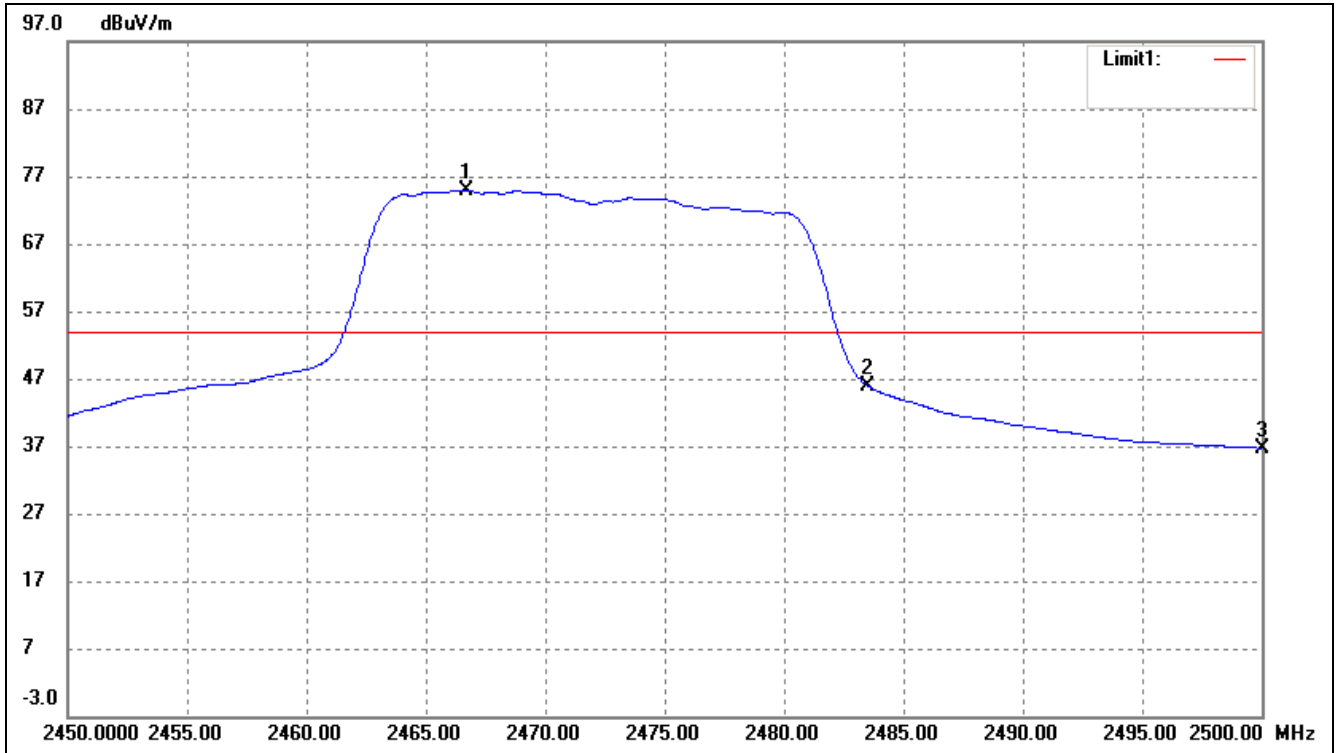
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	18.67	16.34	35.01	54.00	-18.99	Average Detector
		30.12	16.34	46.46	74.00	-27.54	Peak Detector
2	2390.000	28.06	17.03	45.09	54.00	-8.91	Average Detector
		51.71	17.03	68.74	74.00	-5.26	Peak Detector
3	2400.000	36.32	17.11	53.43	Delta=27.31dBc		Average Detector
4	2408.880	63.57	17.17	80.74			Average Detector

802.11n-HT20-Highest Bandedge

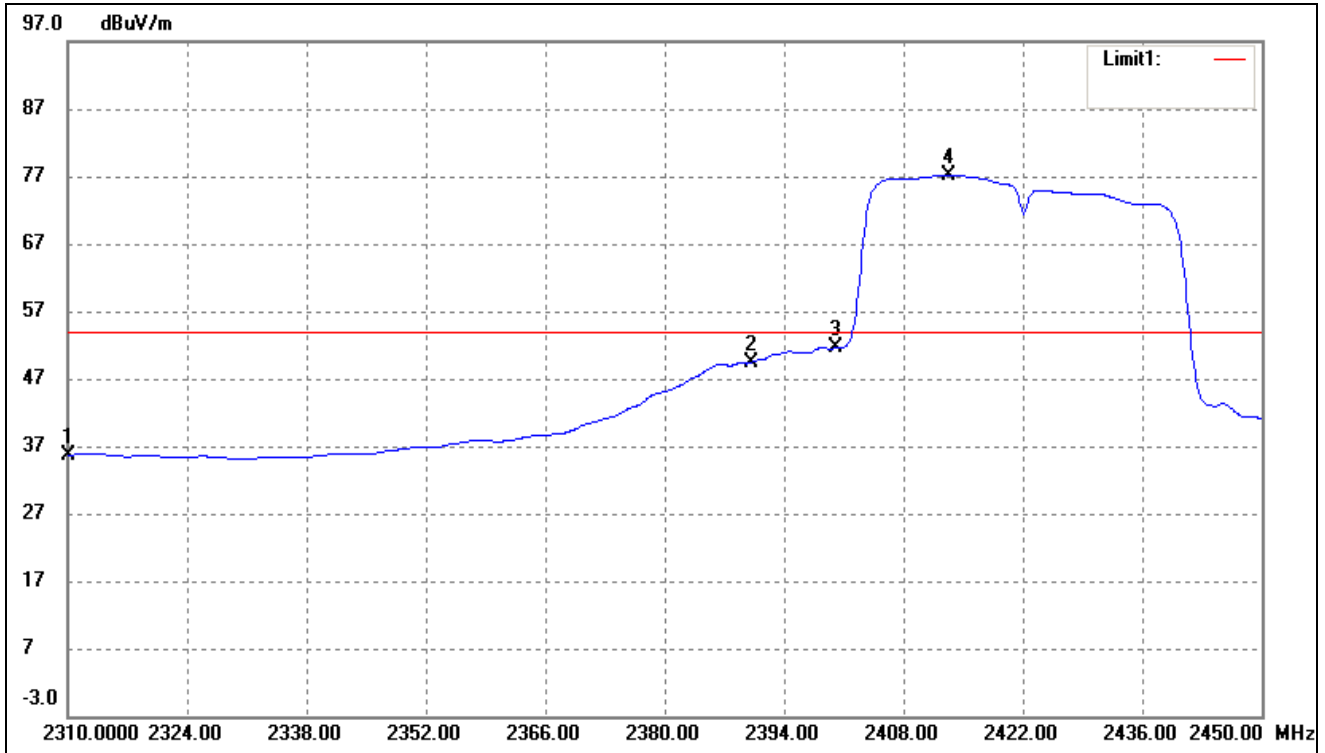
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2466.700	57.32	17.60	74.92	/	/	Average Detector
	2466.250	68.36	17.60	85.96	/	/	Peak Detector
2	2483.500	Delta = 45.09dBc		29.83	54.00	-24.17	Average Detector
	2483.500			40.87	74.00	-33.13	Peak Detector
3	2500.000	18.81	17.86	36.67	54.00	-17.33	Average Detector
	2500.000	30.86	17.86	48.72	74.00	-25.28	Peak Detector

802.11n-HT40-Lowest Bandedge

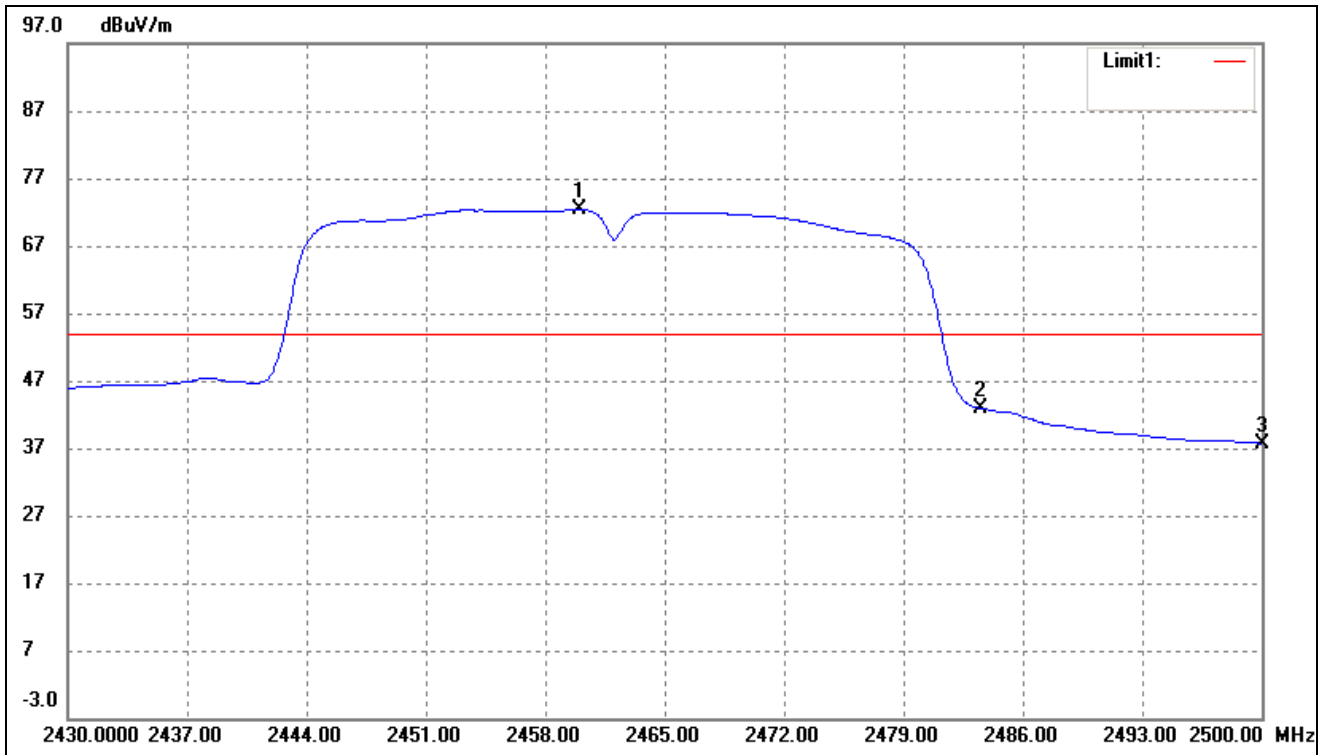
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	19.39	16.34	35.73	54.00	-18.27	Average Detector
		31.78	16.34	48.12	74.00	-25.88	Peak Detector
2	2390.000	32.35	17.03	49.38	54.00	-4.62	Average Detector
		47.86	17.03	64.89	74.00	-9.11	Peak Detector
3	2400.000	34.47	17.11	51.58	Delta=25.55dBc	Average Detector	
4	2413.320	59.92	17.21	77.13		Average Detector	

802.11n-HT40-Highest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.030	54.79	17.56	72.35	/	/	Average Detector
	2459.610	65.70	17.55	83.25	/	/	Peak Detector
2	2483.500	Delta = 46.21dBc		26.14	54.00	-27.86	Average Detector
	2483.500			37.04	74.00	-36.96	Peak Detector
3	2500.000	19.80	17.86	37.66	54.00	-16.34	Average Detector
	2500.000	33.96	17.86	51.82	74.00	-22.18	Peak Detector

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	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

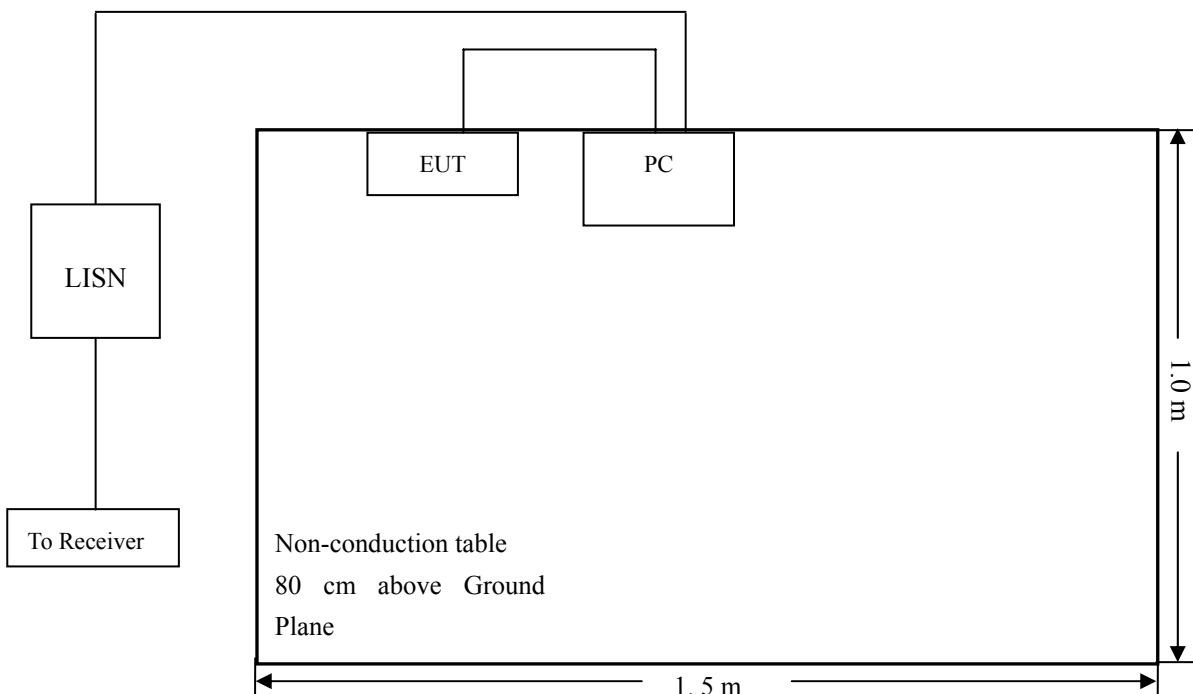
10.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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 9.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

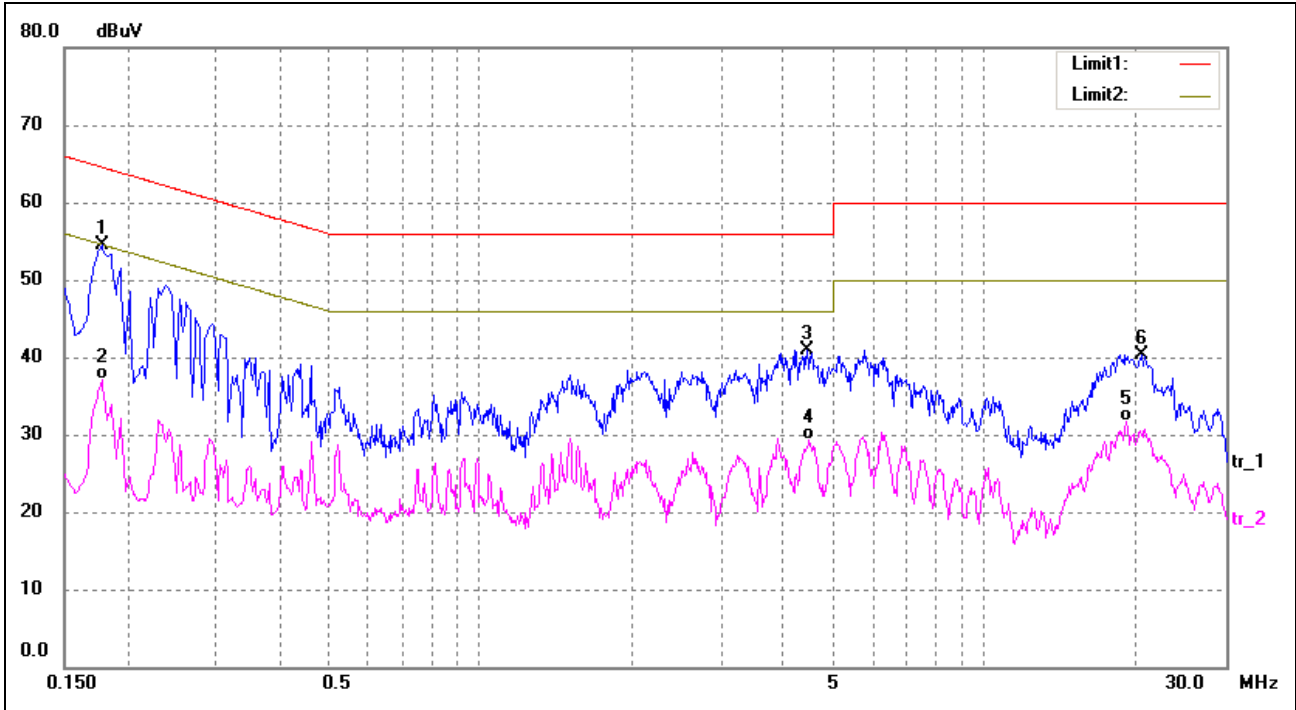
-9.85 dB at 0.1620 MHz in the Line mode, Peak detector, 0.15-30MHz

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

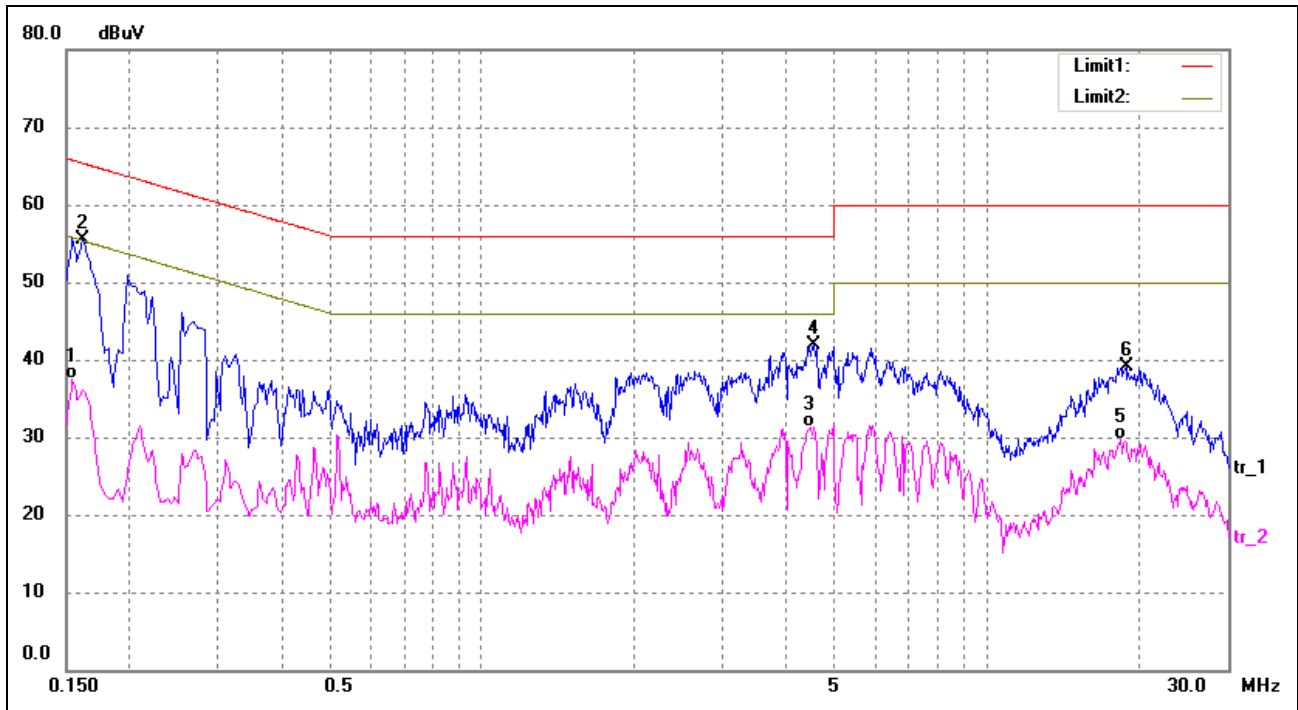
EUT: *WIFI module*
 Tested Model: *HLK-M35*
 Operating Condition: *Transmitting(Wi-Fi)*
 Comment: *DC 3.3V*

 Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1780	44.97	9.50	54.47	64.58	-10.11	peak
2	0.1780	27.65	9.50	37.15	54.58	-17.43	AVG
3	4.4500	30.81	10.00	40.81	56.00	-15.19	peak
4	4.4980	19.23	10.00	29.23	46.00	-16.77	AVG
5	19.0980	19.91	11.82	31.73	50.00	-18.27	AVG
6	20.4500	28.40	12.00	40.40	60.00	-19.60	peak

Test Specification: Live



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	28.03	9.50	37.53	55.78	-18.25	AVG
2*	0.1620	46.01	9.50	55.51	65.36	-9.85	peak
3	4.4700	21.40	10.00	31.40	46.00	-14.60	AVG
4	4.5460	31.92	10.00	41.92	56.00	-14.08	peak
5	18.3700	17.99	11.67	29.66	50.00	-20.34	AVG
6	18.8340	27.36	11.77	39.13	60.00	-20.87	peak

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