



MEASUREMENT REPORT

FCC PART 15C / WLAN 802.11b/g/n/ax

FCC ID: 2AF5PMH7601

Applicant: MTRLC LLC

Application Type: Certification

Product: AX1800 Dual-band Mesh WiFi

Model No.: MH7601

Serial Model No.: MH760XY (Where X can be 0, 1, 2, 3, or 4, and Y can be A, B, C, D, or blank)

Brand Name: Motorola

FCC Classification: Digital Transmission System (DTS)

FCC Rule Part(s): Part 15 Subpart C (Section 15.247)

Test Procedure(s): ANSI C63.10-2013

Test Date: May 10 ~ July 16, 2021

Reviewed By:

Vincent Yu

Vincent Yu

Approved By:

Robin Wu

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Shenzhen) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2105RSZ007-U1	Rev. 01	Initial Report	08-04-2021	Valid

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1. GENERAL INFORMATION

1.1. Applicant

MTRLC LLC

275 Turnpike Street Suite 101 Canton, MA 02021

1.2. Manufacturer

MTRLC LLC

275 Turnpike Street Suite 101 Canton, MA 02021

1.3. Testing Facility

☐	Test Site – MRT Suzhou Laboratory	
	Laboratory Location (Suzhou – Wuzhong) D8 Building, No.2 Tian’edang Rd., Wuzhong Economic Development Zone, Suzhou, China	
	Laboratory Location (Suzhou – SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China	
	Laboratory Accreditations	
	A2LA: 3628.01 FCC: CN1166 VCCI: R-20025, G-20034, C-20020, T-20020	CNAS: L10551 ISED: CN0001
☒	Test Site – MRT Shenzhen Laboratory	
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China	
	Laboratory Accreditations	
	A2LA: 3628.02 FCC: CN1284	CNAS: L10551 ISED: CN0105
☐	Test Site – MRT Taiwan Laboratory	
	Laboratory Location (Taiwan) No. 38, Fuxing 2 nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)	
	Laboratory Accreditations	
	TAF: L3261-190725 FCC: 291082, TW3261	ISED: TW3261

1.4. Product Information

Product Name	AX1800 Dual-band Mesh WiFi
Model No.	MH7601
Serial Model No.	MH760XY (Where X can be 0, 1, 2, 3, or 4, and Y can be A, B, C, D, or blank)
Brand Name	Motorola
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Operating Temp.	0 ~ 40°C
Power Supply	AC/DC adapter
Accessories	
Adapter	Model No: S15B22-050A300-PK Input: 100 ~ 240V ~ 50/60Hz, max 0.7A Output: 5V=3A
Remark: The different models are only for marketing different clients, others are the same.	

1.5. Product Specification Subjective to this Report

Frequency Range	802.11b/g/n-HT20/ax-HE20: 2412 ~ 2462 MHz 802.11n-HT40/ax-HE40: 2422 ~ 2452 MHz
Channel Number	802.11b/g/n-HT20/ax-HE20: 11 802.11n-HT40/ax-HE40: 7
Modulation	802.11b: DSSS 802.11g/n: OFDM 802.11ax: OFDMA
Data Rate	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ax: up to 573.6Mbps
Maximum Output Power	802.11b: 29.78dBm 802.11g: 29.75dBm 802.11n-HT20: 29.46dBm 802.11n-HT40: 29.37dBm 802.11ax-HE20: 29.88dBm 802.11ax-HE40: 29.78dBm

Note: For other features of this EUT, test report will be issued separately.

1.6. Working Frequencies for this report

802.11b/g/n-HT20/ax-HE20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

802.11n-HT40/ax-HE40

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	--	--	--	--

1.7. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Antenna Gain (dBi)		Directional Gain (dBi)	
		Ant 1	Ant 2	For Power	For PSD
PIFA Antenna	2.412 ~ 2.462	3.00	3.00	3.00	6.01
	5.15 ~ 5.25	3.00	3.00	3.00	6.01
	5.725 ~ 5.85	3.00	3.00	3.00	6.01

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac mode.

Note 2: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

If all antennas have the same gain, G_{ANT} , Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,
Array Gain = $10 \log (N_{ANT} / N_{SS})$ dB;
- For power measurements on IEEE 802.11 devices,
Array Gain = 0 dB for $N_{ANT} \leq 4$;

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

Note 3: The antenna gain is declared by manufacture.

1.8. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)
	Mode 3: Transmit by 802.11n-HT20 (MCS0)
	Mode 4: Transmit by 802.11n-HT40 (MCS0)
	Mode 5: Transmit by 802.11ax-HE20 (MCS0)
	Mode 6: Transmit by 802.11ax-HE40 (MCS0)

Note: This device will match two kinds of Wi-Fi Front End Modules on the 2.4GHz Wi-Fi RF circuit according to market demand. The detailed information about the two kinds of Wi-Fi Front End Modules as below.

Mode No.	Description	Test Sample
QPF7219	The QPF7219 integrates a 2.4 GHz power amplifier (PA) with power detector, FCC bandedge BAW filter, regulator, transmitreceive switch (SP2T) and bypassable low noise amplifier (LNA) into a single device.	2021050701#(Radiated), 2021050702#(Conducted)
QPF4216B	The QPF4216B integrates a 2.4 GHz power amplifier (PA), regulator, single pole two throw switch (SP2T), bypassable low noise amplifier (LNA) into a single device.	2021071001# (Radiated/Conducted)

After evaluation, the power of sample of built-in QPF7219 module is higher than the power of built-in QPF4216B module compared to the limit required by regulations, so we choose the sample of built-in QPF7219 module to test all items, and for the sample of built-in QPF4216B module, Power (Full test), Radiated Restricted Band Edge (Full test) and Radiated Spurious Emission (Channel with highest power for each mode) have been evaluated.

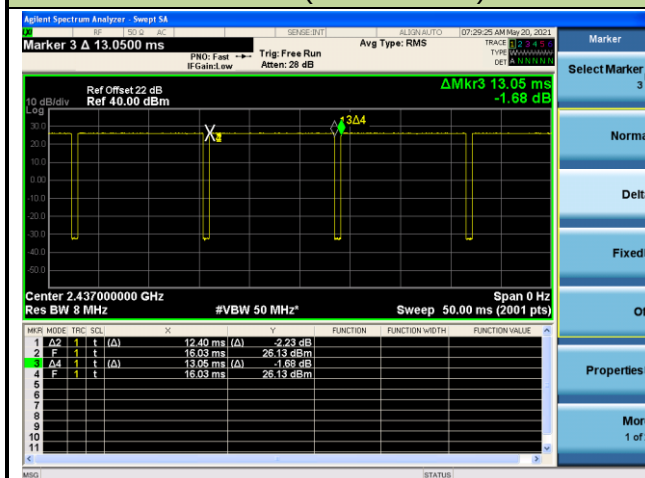
1.9. Duty Cycle

2.4GHz WLAN (DTS) operation is possible in 20MHz and 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

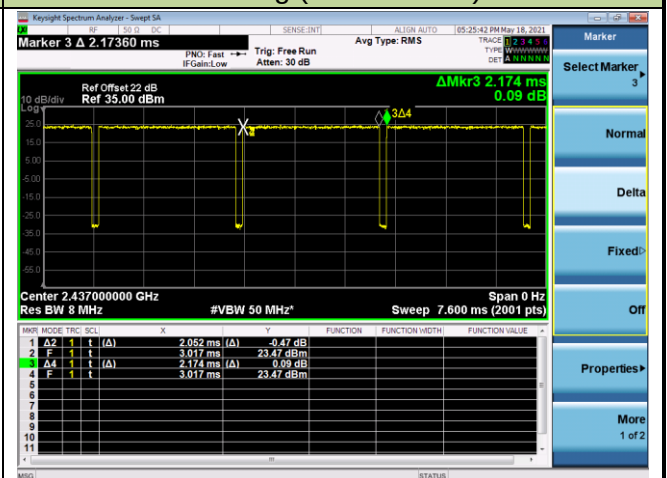
Test Mode	Duty Cycle
802.11b	95.02%
802.11g	94.39%
802.11n-HT20	94.18%
802.11n-HT40	90.33%
802.11ax-HE20	97.76%
802.11ax-HE40	95.81%

Duty Cycle (T = Transmission Duration)

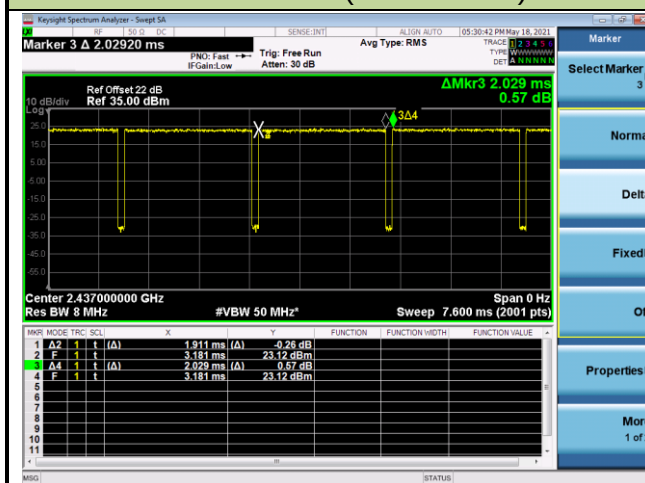
802.11b (T = 12.40ms)



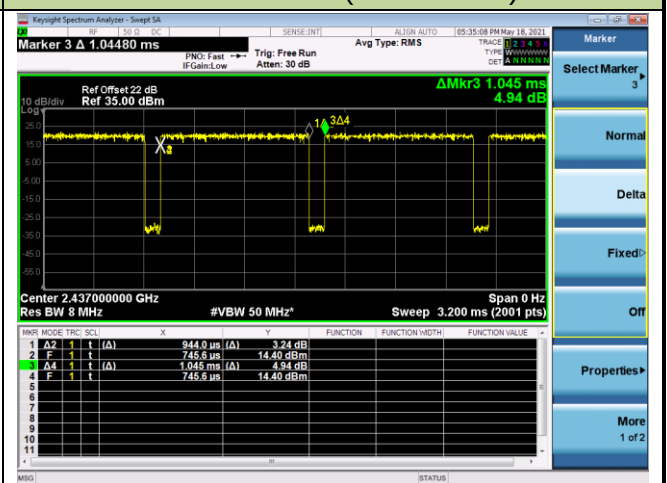
802.11g (T = 2.052ms)

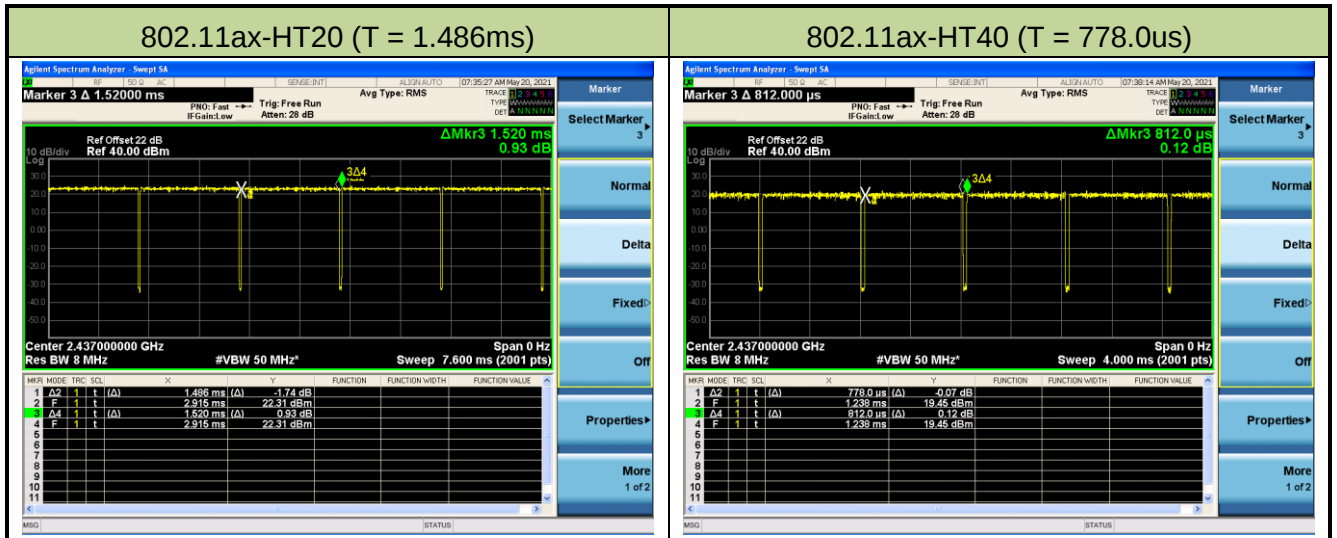


802.11n-HT20 (T = 1.911ms)



802.11n-HT40 (T = 944.0us)





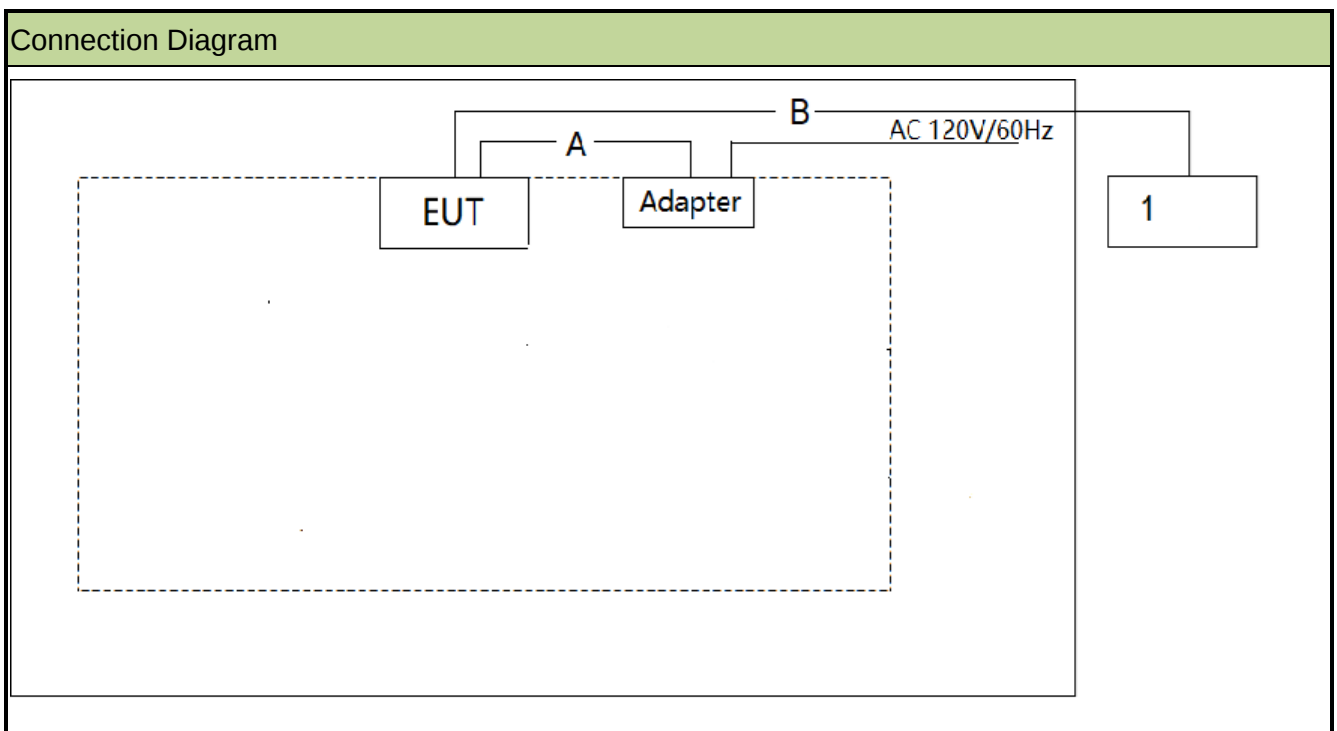
1.10. Description of Test Software

The test utility software used during testing was “accessMTool.exe”, and the version was v3.1.0.6. Power parameter value refers to operation description.

1.11. Test Environment Condition

Ambient Temperature	15°C ~ 35°C
Relative Humidity	20%RH ~ 75%RH

1.12. Description of Test Configuration



Cable Type		Cable Description
A	Power Cable	Non-Shielded, 1.5m
B	LAN Cable	Non-Shielded, >10m

1.13. Test System Details

Product		Manufacturer	Model No.	Power Cord
1	Notebook	Lenovo	E495	Non-Shielded, 1.8m

2. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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.”

- The antenna of the device is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

3. TEST EQUIPMENT CALIBRATION DATE

Conducted Emission (NS-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESL3	MRTSUE06576	1 year	2021/07/09
				1 year	2022/06/27
ENV216-LV-NETZNACHB	R&S	ENV216	MRTSUE06577	1 year	2021/07/09
				1 year	2022/07/04
ENV216-LV-NETZNACHB	R&S	ENV216	MRTSUE06578	1 year	2021/07/09
				1 year	2022/07/04
Temperature/Humidity Meter	deli	NO.8813	MRTSUE06587	1 year	2021/07/08
				1 year	2022/06/30
Shielding Anechoic Chamber	BOOMWAVE	SR2	MRTSUE06551	5 year	2024/06/04

Radiated Emission (NS-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06575	1 year	2021/07/09
				1 year	2022/06/27
EXA Signal Analyzer	Keysight	N9010A	MRTSUE06195	1 year	2022/03/17
Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2021/09/26
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06292	1 year	2021/10/24
Broad-Band Horn Antenna	Schwarzbeck	9120D	MRTSUE06572	1 year	2022/03/14
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06573	1 year	2021/07/03
				1 year	2022/06/30
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
				1 year	2022/06/09
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06574	1 year	2021/07/13
				1 year	2022/07/12
Anechoic Chamber	BOOMWAVE	AC1	MRTSUE06496	1 year	2021/07/25
				1 year	2022/07/24
Temperature/Humidity Meter	deli	NO.8813	MRTSUE06588	1 year	2021/07/08
				1 year	2022/06/30

Conducted Test Equipment (NS-TR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Thermal Hygrometer	DELI	No.8813	MRTSUE06783	1 year	2021/05/13
				1 year	2022/05/09
USB wideband power sensor	Keysight	U2021XA	MRTSUE06581	1 year	2021/08/20
10dB Attenuator	MVE	10dB	N/A	1 year	2021/08/20
EXA Signal Analyzer	Keysight	N9020A	MRTSUE10065	1 year	2021/06/16
				1 year	2022/06/17
EXA Signal Analyzer	Keysight	N9010A	MRTSUE06195	1 year	2022/03/17

Software	Version	Function
EMI Software	V3	EMI Test Software

4. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.78dB
Output Power
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.13dB
Power Spectrum Density
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.15dB
Occupied Bandwidth
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.28%

5. TEST RESULT

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	$\geq 500\text{kHz}$	Conducted	Pass	Section 5.2
15.247(b)(3)	Output Power	$\leq 1\text{Watt}$		Pass	Section 5.3
15.247(e)	Power Spectral Density	$\leq 8\text{dBm} / 3\text{kHz}$		Pass	Section 5.4
15.247(d)	Band Edge / Out-of-Band Emissions	$\geq 30\text{dBc}$ (Average)		Pass	Section 5.5
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 5.6 & 5.7
15.207	AC Conducted Emissions 150kHz - 30MHz	$< \text{FCC 15.207 limits}$	Line Conducted	Pass	Section 5.8

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) 802.11ax is the full RU mode, the test results shown in the following sections represent the worst-case emissions.
- 3) For the item of "6dB Bandwidth", we only evaluated the Ant 1 RF port due to the higher conducted average power than Ant 2 RF port.

5.2. 6dB Bandwidth Measurement

5.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

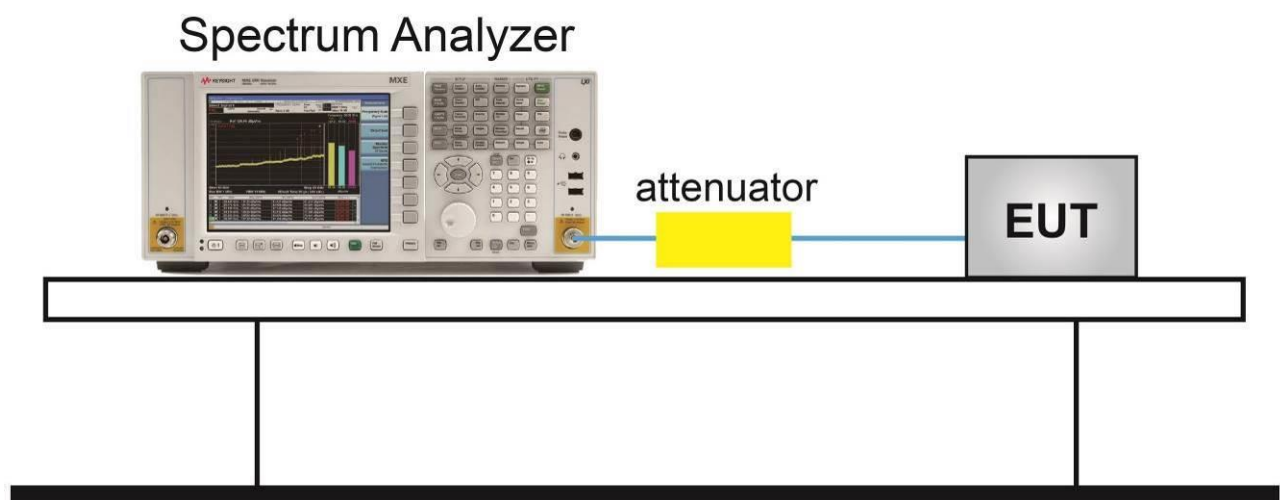
5.2.2. Test Procedure used

ANSI C63.10-2013 - Section 11.8.1

5.2.3. Test Setting

1. Set RBW = 100 kHz
2. VBW $\geq 3 \times$ RBW
3. Detector = Peak
4. Trace mode = Max hold
5. Sweep = Auto couple
6. Allow the trace was allowed to stabilize
7. 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

5.2.4. Test Setup



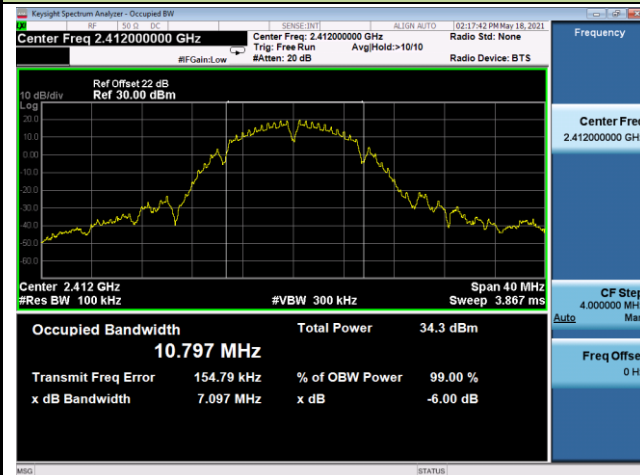
5.2.5. Test Result

Test Site	NS-SR2	Test Engineer	Flay Yang
Test Date	2021/05/18		

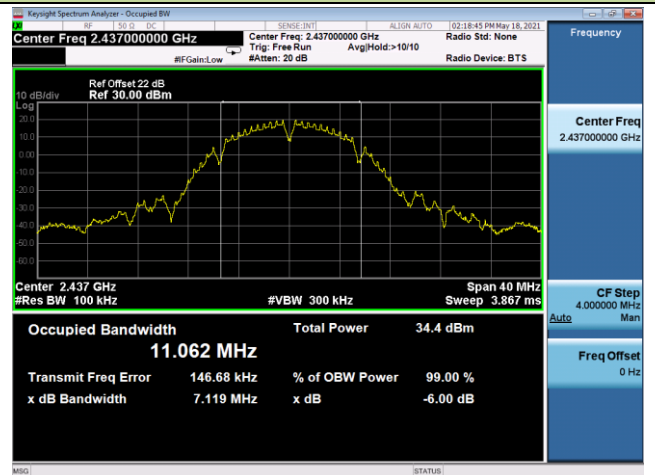
Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant 1 / Ant 1 + 2						
802.11b	1Mbps	01	2412	7.10	≥ 0.5	Pass
802.11b	1Mbps	06	2437	7.12	≥ 0.5	Pass
802.11b	1Mbps	11	2462	7.12	≥ 0.5	Pass
802.11g	6Mbps	01	2412	16.35	≥ 0.5	Pass
802.11g	6Mbps	06	2437	16.35	≥ 0.5	Pass
802.11g	6Mbps	11	2462	16.37	≥ 0.5	Pass
802.11n-HT20	MCS0	01	2412	17.63	≥ 0.5	Pass
802.11n-HT20	MCS0	06	2437	17.60	≥ 0.5	Pass
802.11n-HT20	MCS0	11	2462	17.63	≥ 0.5	Pass
802.11n-HT40	MCS0	03	2422	36.37	≥ 0.5	Pass
802.11n-HT40	MCS0	06	2437	35.74	≥ 0.5	Pass
802.11n-HT40	MCS0	09	2452	35.95	≥ 0.5	Pass
802.11ax-HE20	MCS0	01	2412	18.96	≥ 0.5	Pass
802.11ax-HE20	MCS0	06	2437	18.89	≥ 0.5	Pass
802.11ax-HE20	MCS0	11	2462	18.93	≥ 0.5	Pass
802.11ax-HE40	MCS0	03	2422	37.69	≥ 0.5	Pass
802.11ax-HE40	MCS0	06	2437	37.63	≥ 0.5	Pass
802.11ax-HE40	MCS0	09	2452	37.34	≥ 0.5	Pass

802.11b 6dB Bandwidth

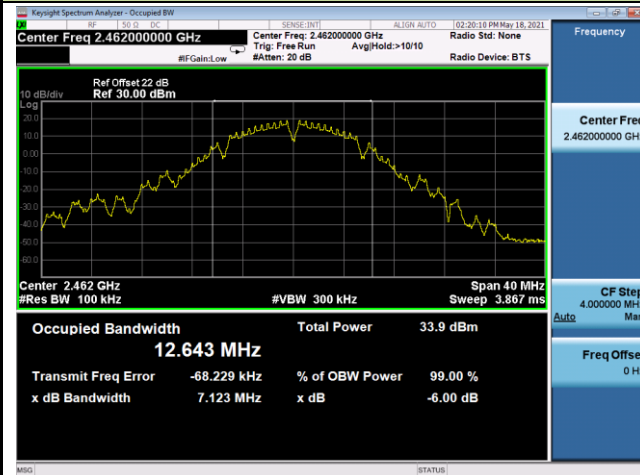
Channel 01 (2412MHz)



Channel 06 (2437MHz)

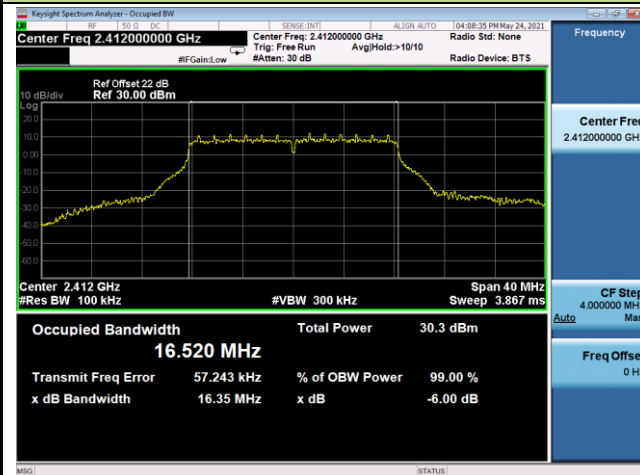


Channel 11 (2462MHz)

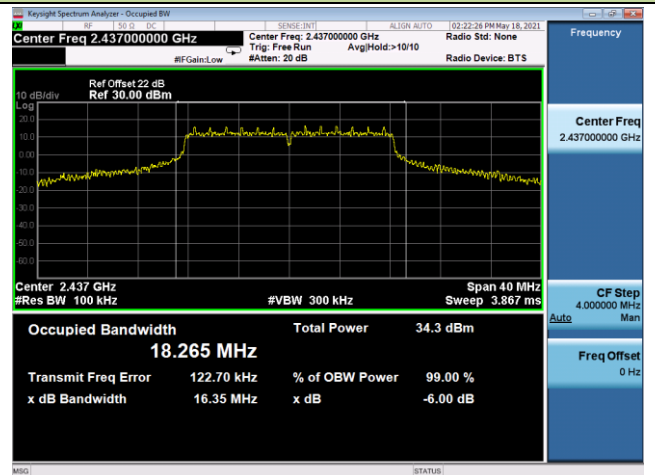


802.11g 6dB Bandwidth

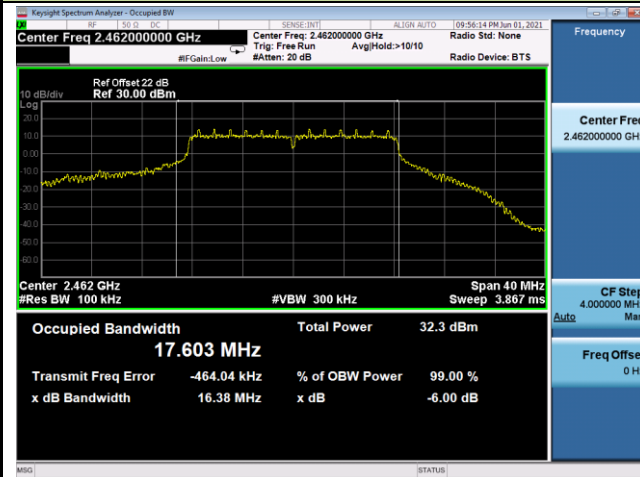
Channel 01 (2412MHz)



Channel 06 (2437MHz)

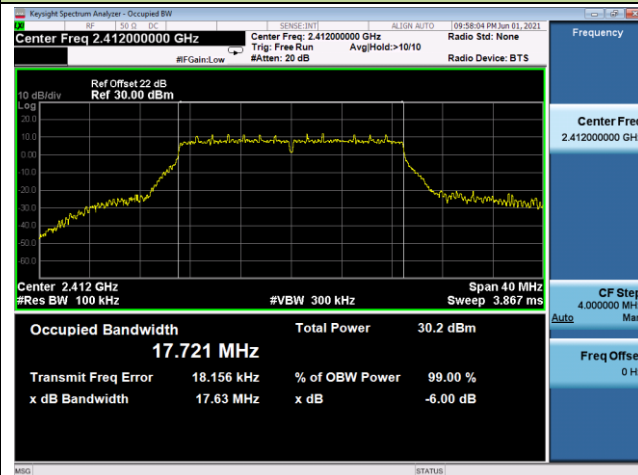


Channel 11 (2462MHz)

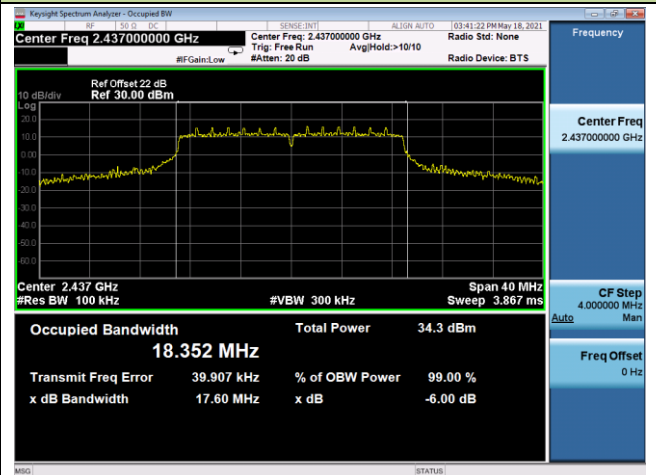


802.11n-HT20 6dB Bandwidth

Channel 01 (2412MHz)



Channel 06 (2437MHz)

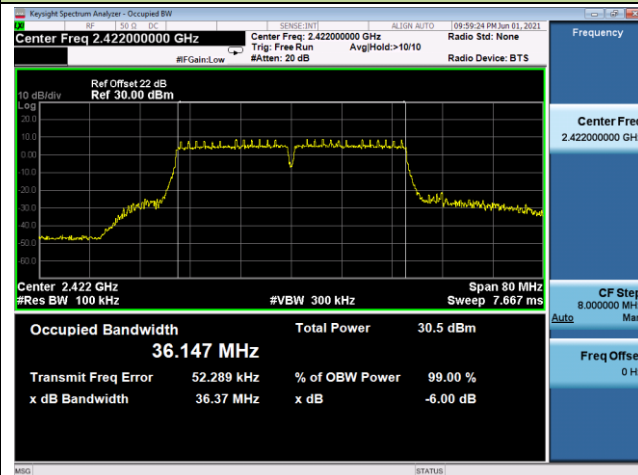


Channel 11 (2462MHz)

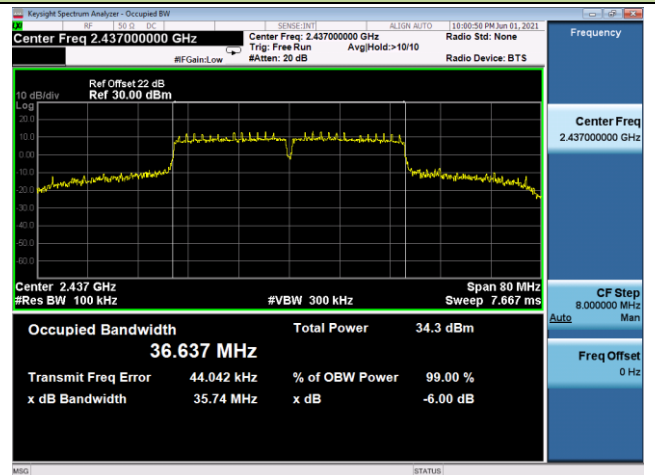


802.11n-HT40 6dB Bandwidth

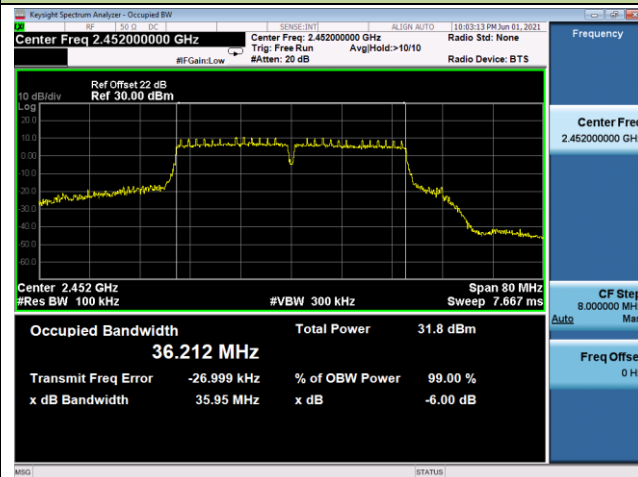
Channel 03 (2422MHz)



Channel 06 (2437MHz)

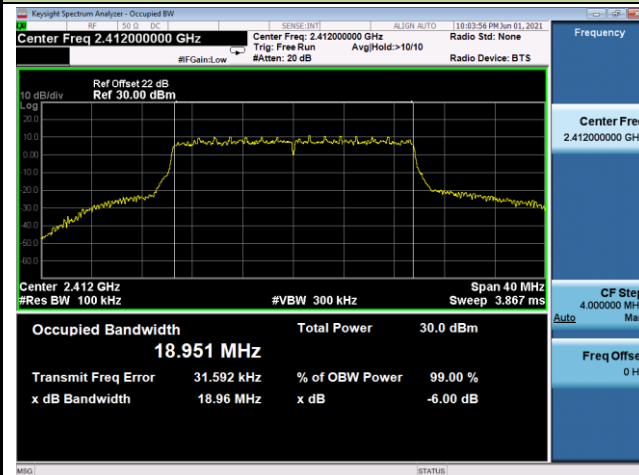


Channel 09 (2452MHz)

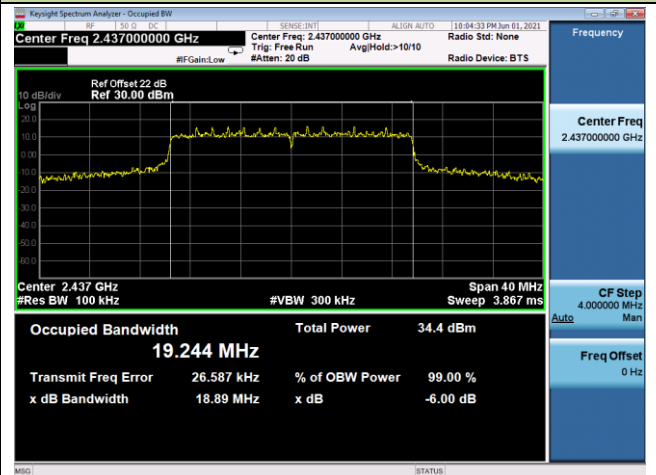


802.11ax-HE20 6dB Bandwidth

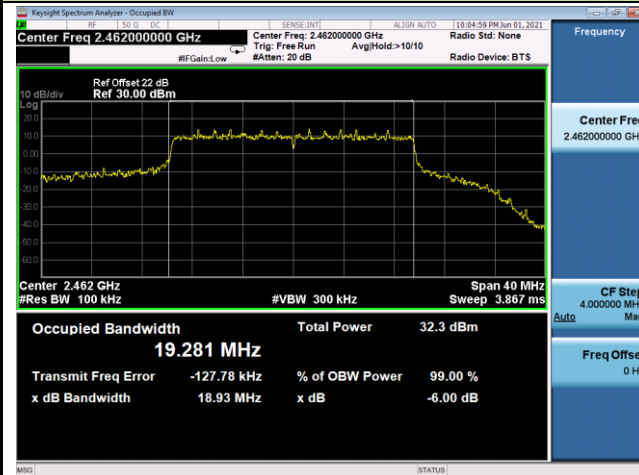
Channel 01 (2412MHz)



Channel 06 (2437MHz)

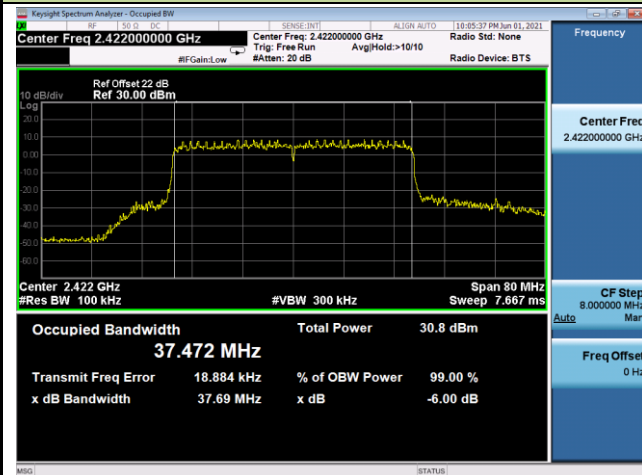


Channel 11 (2462MHz)

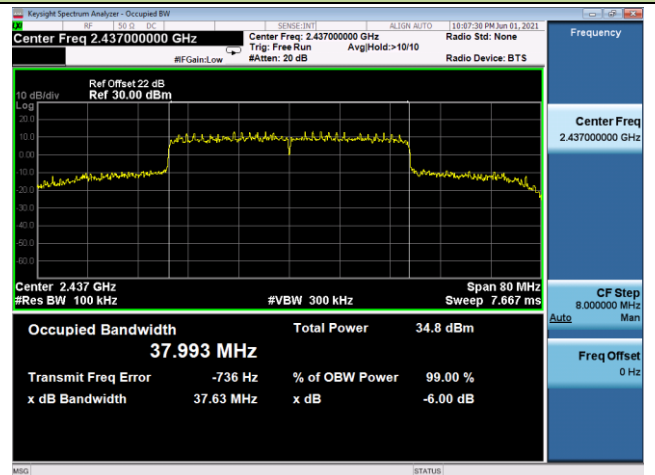


802.11ax-HE40 6dB Bandwidth

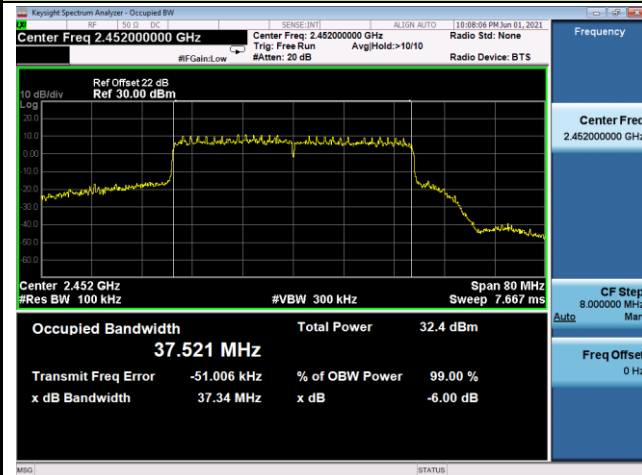
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



5.3. Output Power Measurement

5.3.1. Test Limit

The maximum conducted output power shall not exceed 1 Watt (30dBm).

5.3.2. Test Procedure Used

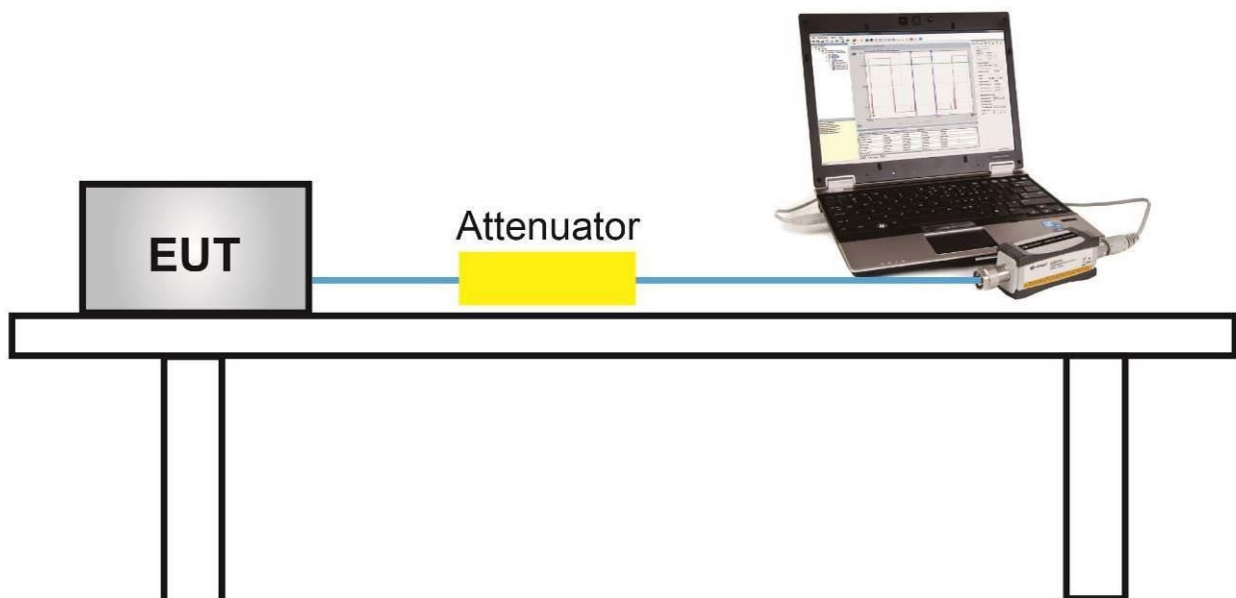
ANSI C63.10-2013 - Section 11.9.2.3.2

5.3.3. Test Setting

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

5.3.4. Test Setup



5.3.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (gray marker) for final test of each channel.

Output power at various data rates for Ant 1 / Ant 1+1 port:

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate / MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	26.97
				5.5Mbps	26.81
				11Mbps	26.65
802.11g	20	6	2437	6Mbps	26.85
				24Mbps	26.72
				54Mbps	26.56
802.11n	20	6	2437	MCS0	26.47
				MCS3	26.33
				MCS7	26.21
802.11n	40	6	2437	MCS0	26.50
				MCS3	26.35
				MCS7	26.24
802.11ax	20	6	2437	MCS0	26.87
				MCS3	26.74
				MCS7	26.61
802.11ax	40	6	2437	MCS0	26.83
				MCS3	26.68
				MCS7	26.52

Test Site	NS-SR2	Test Engineer	Flay Yang
Test Date	2021/05/18		
Test Sample	2021050702#		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Limit (dBm)	Result
				Ant 1	Ant 2			
11b	1Mbps	01	2412	26.75	26.39	29.58	≤ 30.00	Pass
11b	1Mbps	06	2437	26.97	26.56	29.78	≤ 30.00	Pass
11b	1Mbps	11	2462	26.28	25.97	29.14	≤ 30.00	Pass
11g	6Mbps	01	2412	23.14	22.92	26.04	≤ 30.00	Pass
11g	6Mbps	06	2437	26.85	26.62	29.75	≤ 30.00	Pass
11g	6Mbps	11	2462	24.72	24.68	27.71	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	21.96	21.84	24.91	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	26.47	26.42	29.46	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	24.66	24.74	27.71	≤ 30.00	Pass
11n-HT40	MCS0	03	2422	22.88	22.69	25.80	≤ 30.00	Pass
11n-HT40	MCS0	06	2437	26.50	26.22	29.37	≤ 30.00	Pass
11n-HT40	MCS0	09	2452	23.96	23.85	26.92	≤ 30.00	Pass
11ax-HE20	MCS0	01	2412	22.37	22.21	25.30	≤ 30.00	Pass
11ax-HE20	MCS0	06	2437	26.87	26.86	29.88	≤ 30.00	Pass
11ax-HE20	MCS0	11	2462	25.06	25.04	28.06	≤ 30.00	Pass
11ax-HE40	MCS0	03	2422	23.24	23.02	26.14	≤ 30.00	Pass
11ax-HE40	MCS0	06	2437	26.83	26.70	29.78	≤ 30.00	Pass
11ax-HE40	MCS0	09	2452	24.55	24.51	27.54	≤ 30.00	Pass

Note: Total Average Power (dBm) = $10 \cdot \log \{10^{(\text{ANT 1 Average Power} / 10)} + 10^{(\text{ANT 2 Average Power} / 10)}\}$ (dBm).

Test Site	NS-SR2	Test Engineer	Flay Yang
Test Date	2021/07/16		
Test Sample	2021071001#		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Limit (dBm)	Result
				Ant 1	Ant 2			
11b	1Mbps	01	2412	25.35	24.94	28.16	≤ 30.00	Pass
11b	1Mbps	06	2437	25.65	25.23	28.46	≤ 30.00	Pass
11b	1Mbps	11	2462	26.72	26.45	29.60	≤ 30.00	Pass
11g	6Mbps	01	2412	20.09	19.70	22.91	≤ 30.00	Pass
11g	6Mbps	06	2437	25.77	25.39	28.59	≤ 30.00	Pass
11g	6Mbps	11	2462	21.66	21.23	24.46	≤ 30.00	Pass
11n-HT20	MCS0	01	2412	19.12	18.87	22.01	≤ 30.00	Pass
11n-HT20	MCS0	06	2437	25.00	24.94	27.98	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	19.81	19.77	22.80	≤ 30.00	Pass
11n-HT40	MCS0	03	2422	17.35	17.09	20.23	≤ 30.00	Pass
11n-HT40	MCS0	06	2437	21.13	20.76	23.96	≤ 30.00	Pass
11n-HT40	MCS0	09	2452	18.25	17.81	21.05	≤ 30.00	Pass
11ax-HE20	MCS0	01	2412	19.08	18.64	21.88	≤ 30.00	Pass
11ax-HE20	MCS0	06	2437	24.99	24.69	27.85	≤ 30.00	Pass
11ax-HE20	MCS0	11	2462	18.58	18.17	21.39	≤ 30.00	Pass
11ax-HE40	MCS0	03	2422	16.58	16.75	19.68	≤ 30.00	Pass
11ax-HE40	MCS0	06	2437	20.81	20.39	23.62	≤ 30.00	Pass
11ax-HE40	MCS0	09	2452	18.35	18.04	21.21	≤ 30.00	Pass

Note: Total Average Power (dBm) = $10 \cdot \log \{10^{(\text{ANT 1 Average Power} / 10)} + 10^{(\text{ANT 2 Average Power} / 10)}\}$ (dBm).

5.4. Power Spectral Density Measurement

5.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

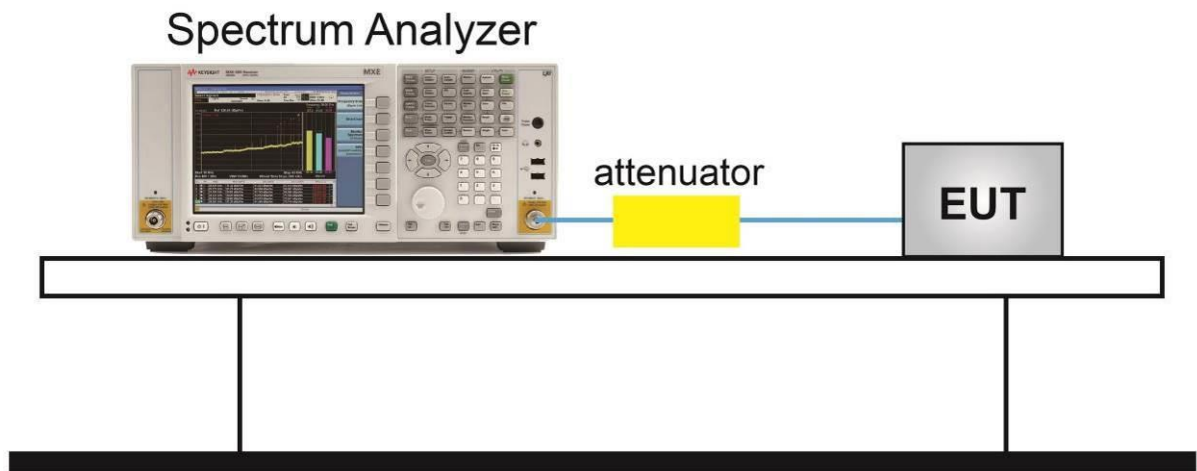
5.4.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.10.3 & 11.10.5

5.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the OBW
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = RMS
6. Employ trace averaging (rms) mode over a minimum of 100 traces.
7. Sweep time = auto couple
8. Use the peak marker function to determine the maximum amplitude level.
9. Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.
10. Trace was allowed to stabilize

5.4.4. Test Setup



5.4.5. Test Result

Test Site	NS-SR2	Test Engineer	Flay Yang
Test Date	2021/05/18		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	AVG PSD (dBm/10kHz)		Duty Cycle (%)	Final PSD (dBm/10kHz)	Limit (dBm/3kHz)	Result
				Ant 1	Ant 2				
11b	1Mbps	01	2412	0.74	0.48	95.02	3.84	≤ 7.99	Pass
11b	1Mbps	06	2437	1.48	0.78	95.02	4.37	≤ 7.99	Pass
11b	1Mbps	11	2462	0.36	0.26	95.02	3.54	≤ 7.99	Pass
11g	6Mbps	01	2412	-4.82	-4.90	94.39	-1.60	≤ 7.99	Pass
11g	6Mbps	06	2437	-1.58	-1.36	94.39	1.79	≤ 7.99	Pass
11g	6Mbps	11	2462	-3.86	-3.85	94.39	-0.59	≤ 7.99	Pass
11n-HT20	MCS0	01	2412	-6.44	-6.55	94.18	-3.22	≤ 7.99	Pass
11n-HT20	MCS0	06	2437	-2.02	-2.01	94.18	1.25	≤ 7.99	Pass
11n-HT20	MCS0	11	2462	-3.80	-3.67	94.18	-0.46	≤ 7.99	Pass
11n-HT40	MCS0	03	2422	-7.69	-8.10	90.33	-4.44	≤ 7.99	Pass
11n-HT40	MCS0	06	2437	-4.10	-4.09	90.33	-0.64	≤ 7.99	Pass
11n-HT40	MCS0	09	2452	-6.56	-7.07	90.33	-3.36	≤ 7.99	Pass
11ax-HE20	MCS0	01	2412	-7.19	-7.18	97.76	-4.08	≤ 7.99	Pass
11ax-HE20	MCS0	06	2437	-2.74	-3.33	97.76	0.08	≤ 7.99	Pass
11ax-HE20	MCS0	11	2462	-3.87	-4.03	97.76	-0.84	≤ 7.99	Pass
11ax-HE40	MCS0	03	2422	-8.52	-8.79	95.81	-5.46	≤ 7.99	Pass
11ax-HE40	MCS0	06	2437	-4.50	-4.61	95.81	-1.36	≤ 7.99	Pass
11ax-HE40	MCS0	09	2452	-6.72	-6.79	95.81	-3.56	≤ 7.99	Pass

Note 1: The total AVG PSD = $10 \cdot \log \{10^{(\text{Ant 1 AVG PSD}/10)} + 10^{(\text{Ant 2 AVG PSD}/10)}\} + 10 \cdot \log (1/\text{Duty cycle})$.

Note 2: PSD Limit = 8 - (6.01 - 6) = 7.99dBm/MHz;

Note 3: Total AVG PSD (dBm / 10kHz) << Limit (dBm / 3kHz), so there is no necessary to conversion unit.

802.11b AVGPDS - Ant 1

Channel 01 (2412MHz)



Channel 06 (2437MHz)

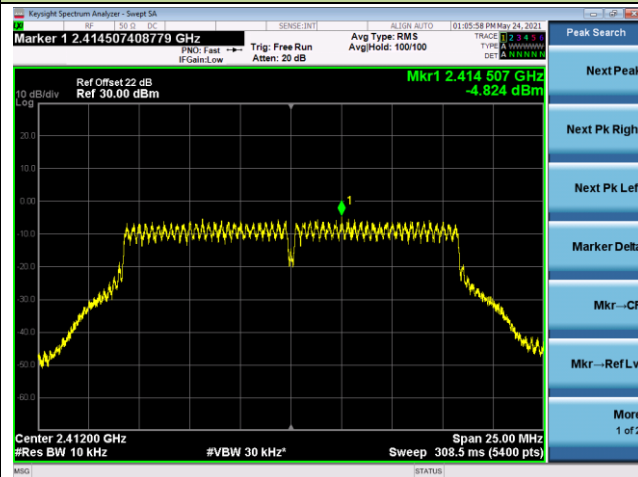


Channel 11 (2462MHz)

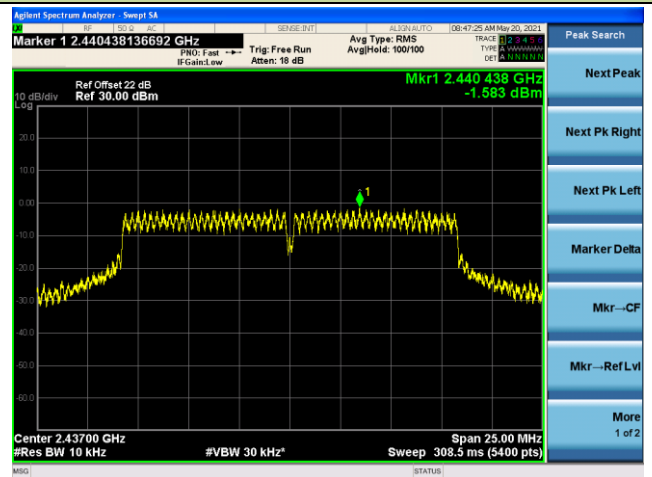


802.11g - AVGPDS - Ant 1

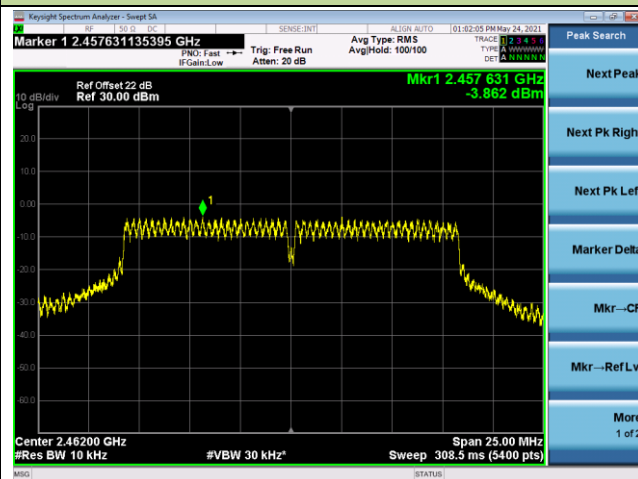
Channel 01 (2412MHz)



Channel 06 (2437MHz)

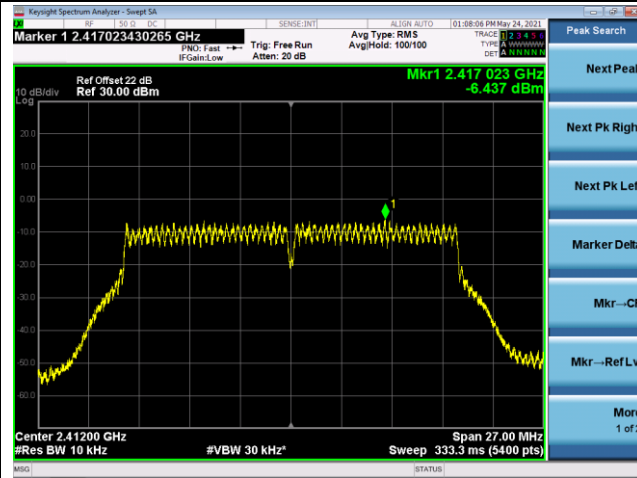


Channel 11 (2462MHz)

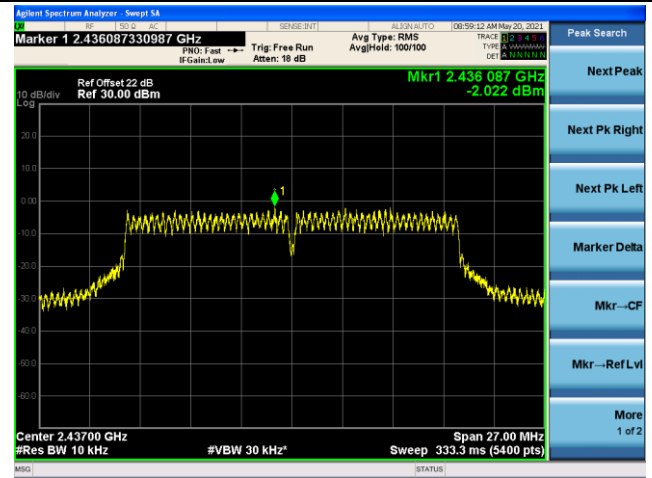


802.11n-HT20 - AVGPSD - Ant 1

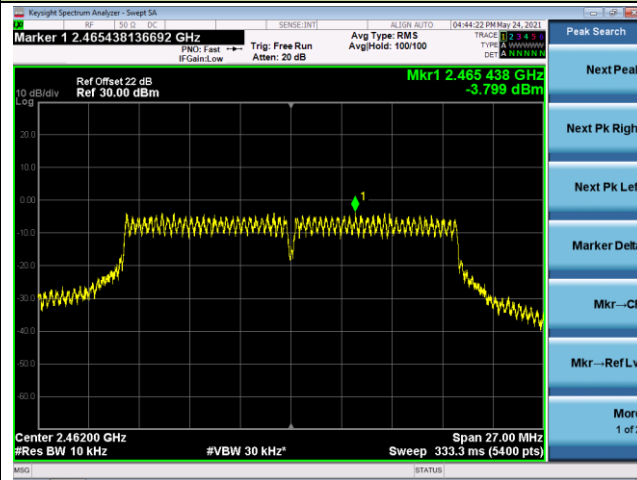
Channel 01 (2412MHz)



Channel 06 (2437MHz)

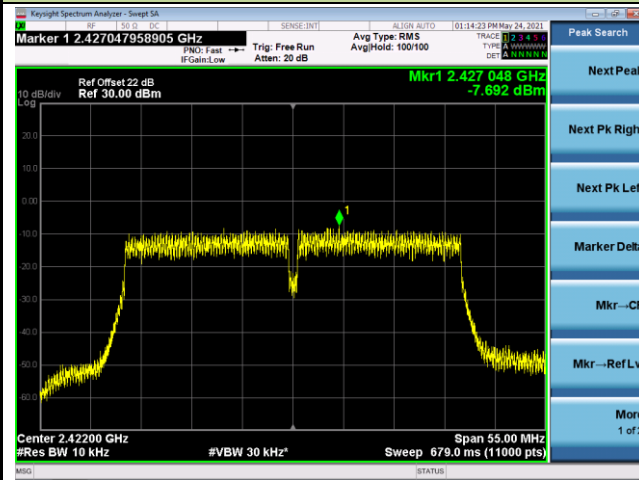


Channel 11 (2462MHz)

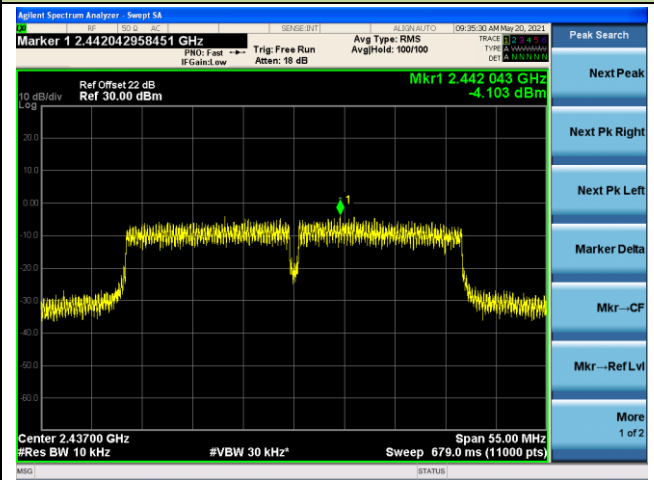


802.11n-HT40 - AVGPSD - Ant 1

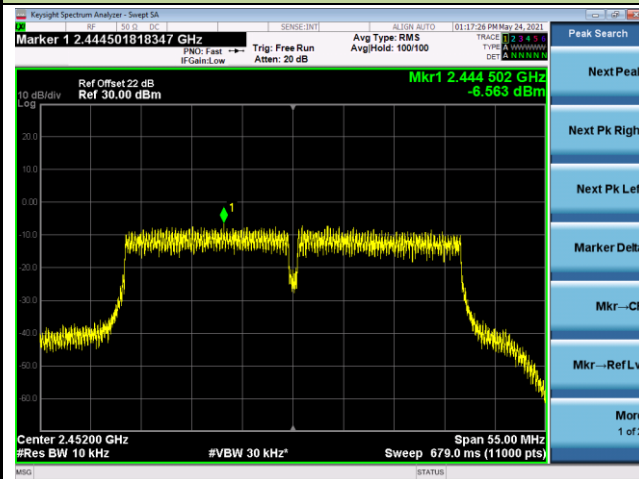
Channel 03 (2422MHz)



Channel 06 (2437MHz)

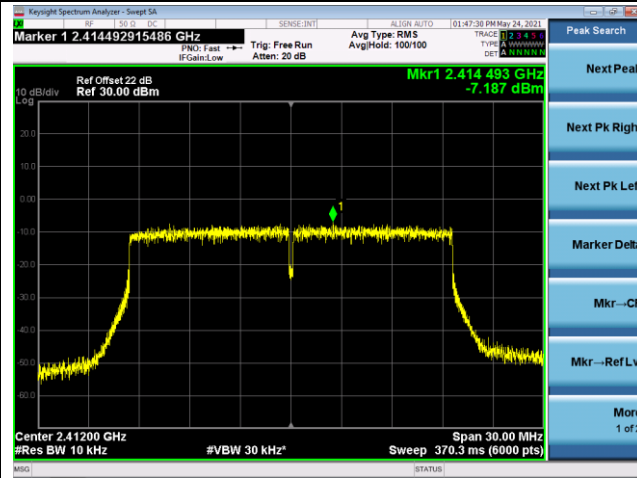


Channel 09 (2452MHz)

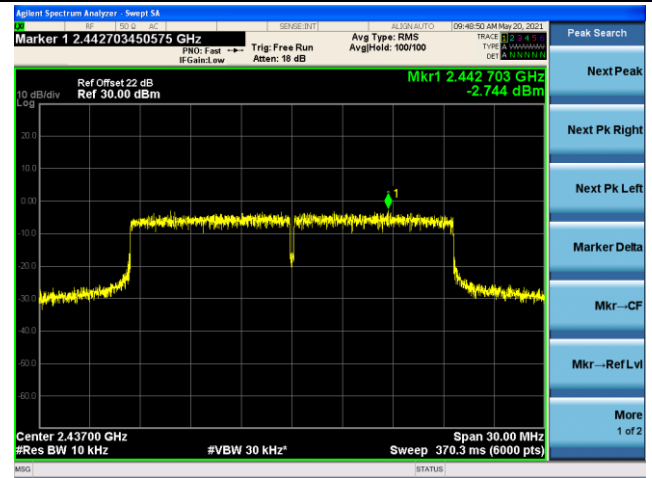


802.11ax-HE20 - AVGPSD - Ant 1

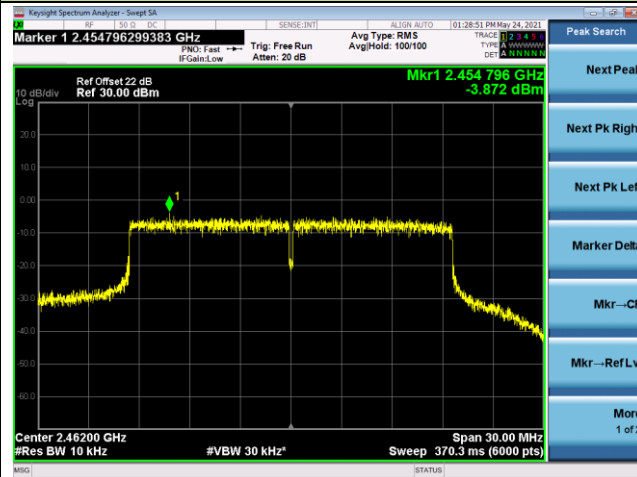
Channel 01 (2412MHz)



Channel 06 (2437MHz)

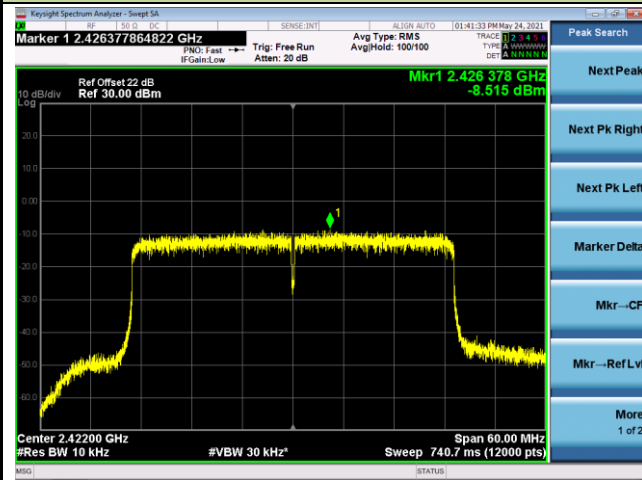


Channel 11 (2462MHz)

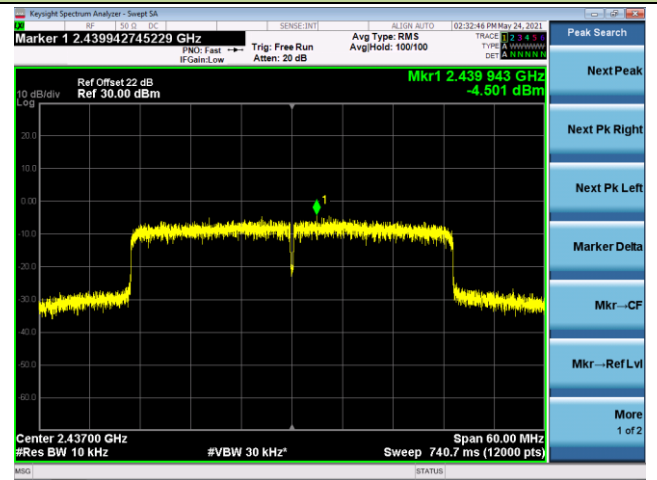


802.11ax-HE40 - AVGPSD - Ant 1

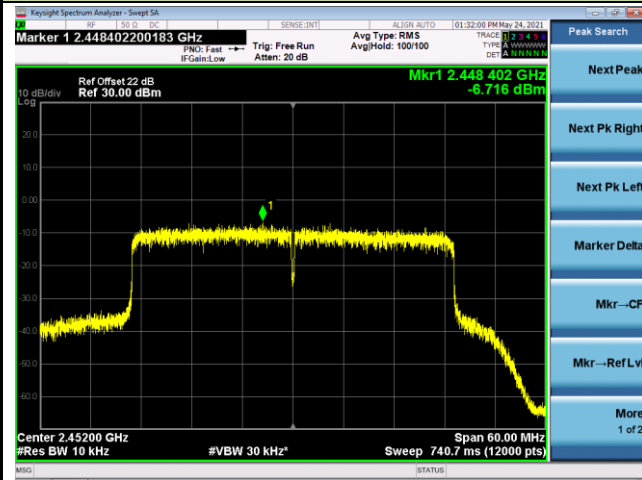
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



802.11b - AVGPDS - Ant 2

Channel 01 (2412MHz)



Channel 06 (2437MHz)

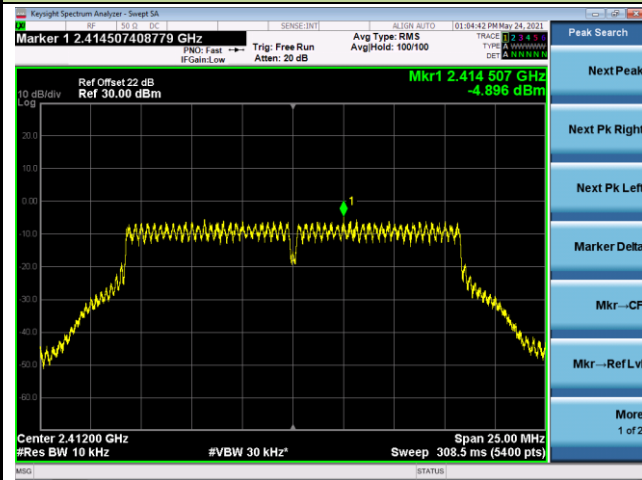


Channel 11 (2462MHz)

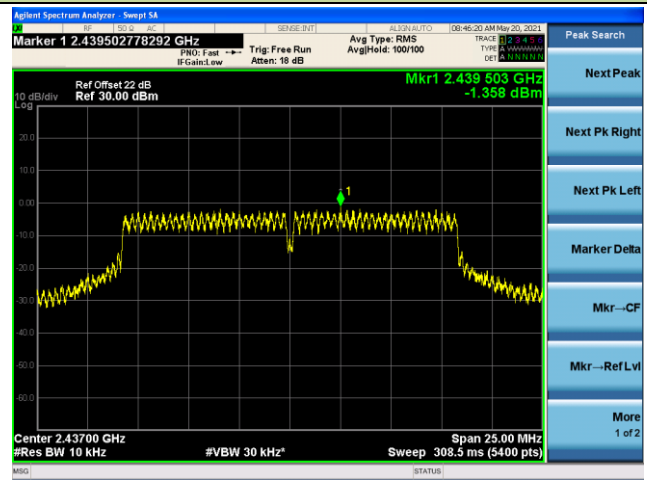


802.11g - AVGPDS - Ant 2

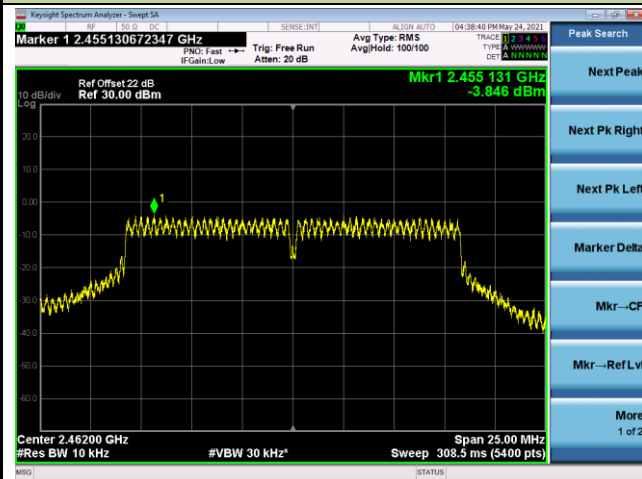
Channel 03 (2412MHz)



Channel 06 (2437MHz)

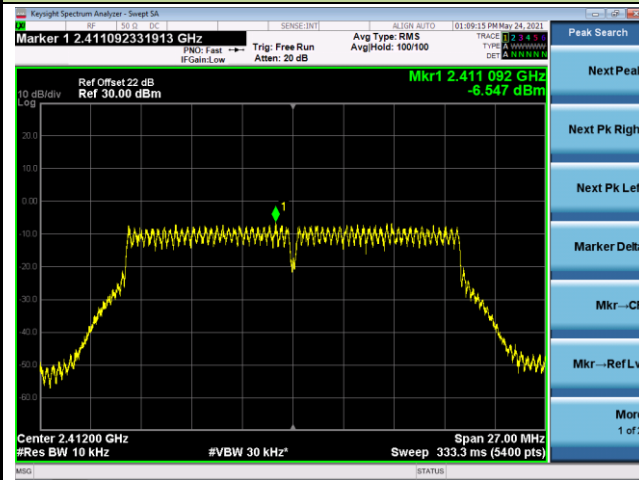


Channel 09 (2462MHz)

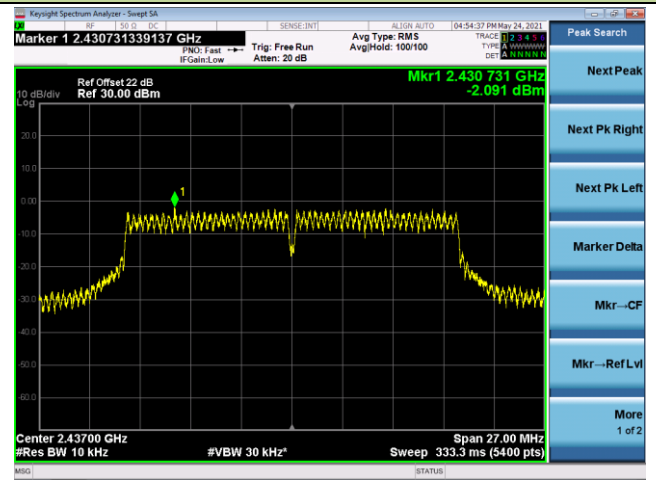


802.11n-HT20 - AVGPSD - Ant 2

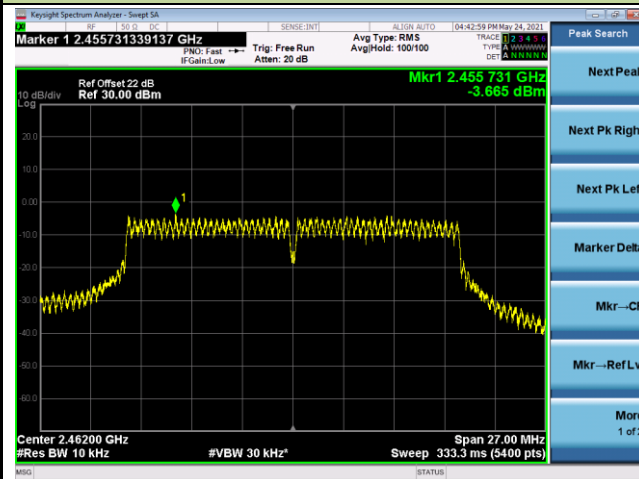
Channel 01 (2412MHz)



Channel 06 (2437MHz)

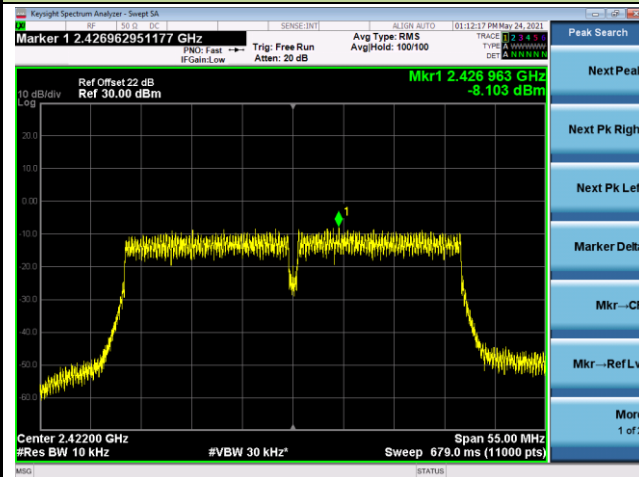


Channel 11 (2462MHz)

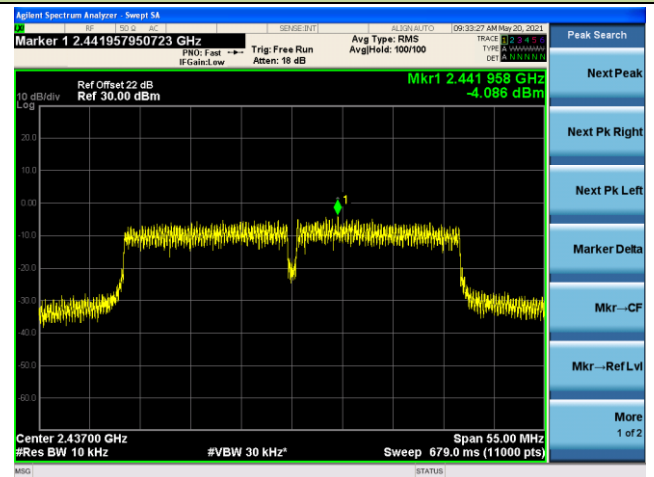


802.11n-HT40 - AVGPSD - Ant 2

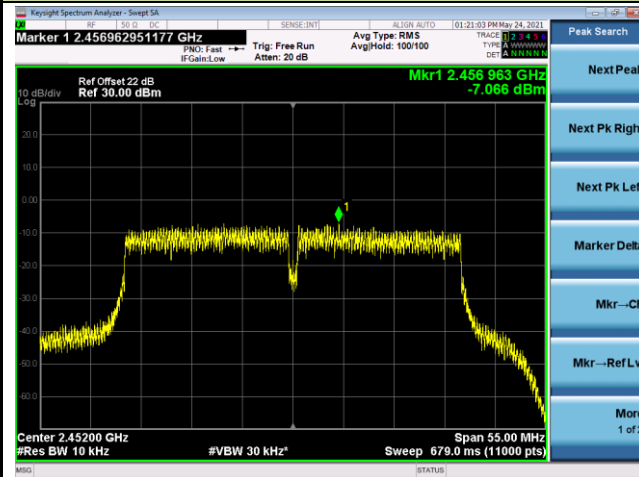
Channel 03 (2422MHz)



Channel 06 (2437MHz)

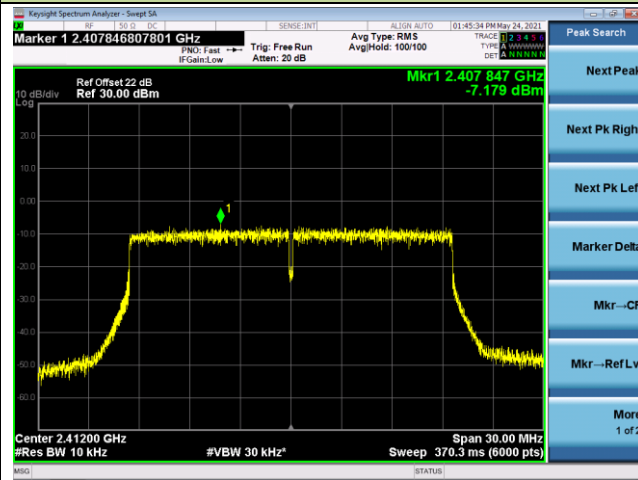


Channel 09 (2452MHz)

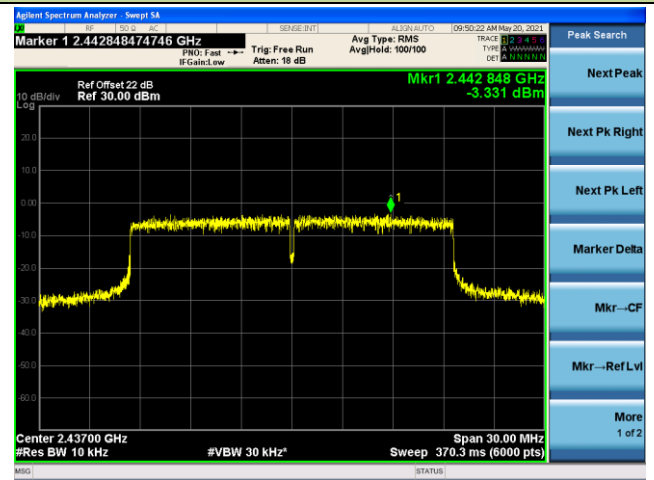


802.11ax-HE20 - AVGPSD - Ant 2

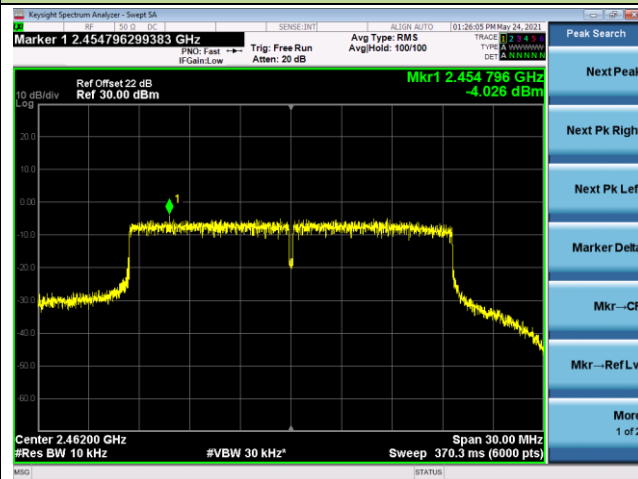
Channel 01 (2412MHz)



Channel 06 (2437MHz)

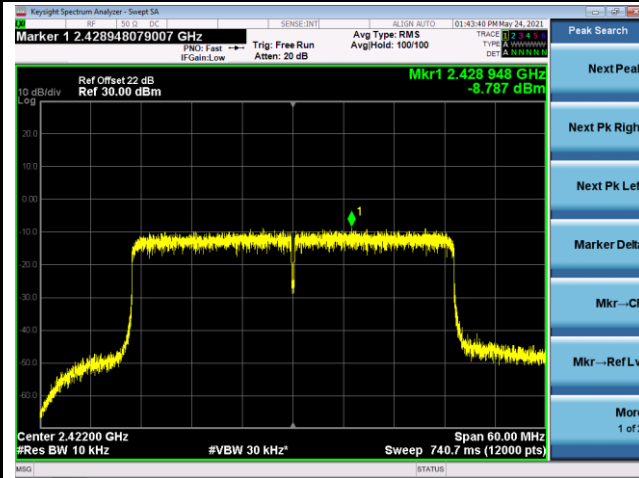


Channel 11 (2462MHz)

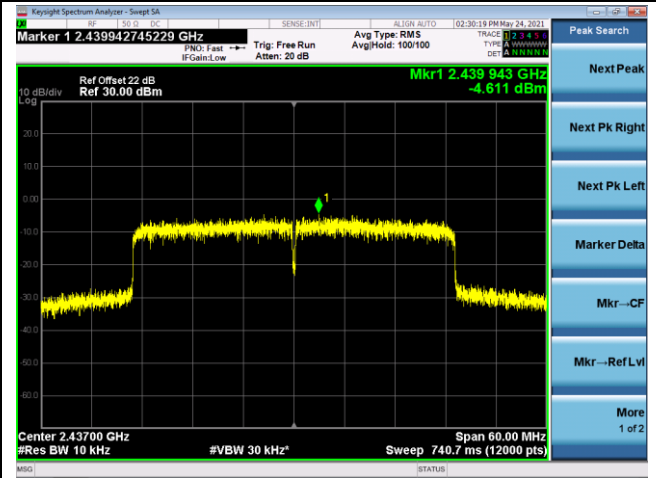


802.11ax-HE40 - AVGPSD - Ant 2

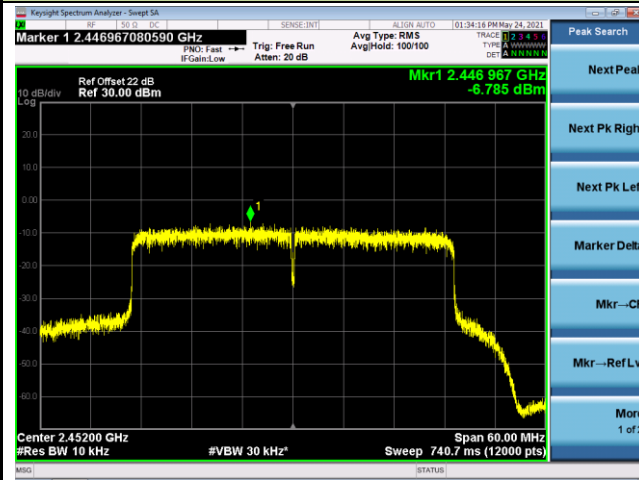
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



5.5. Conducted Band Edge and Out-of-Band Emissions

5.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

5.5.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.11

5.5.3. Test Setting

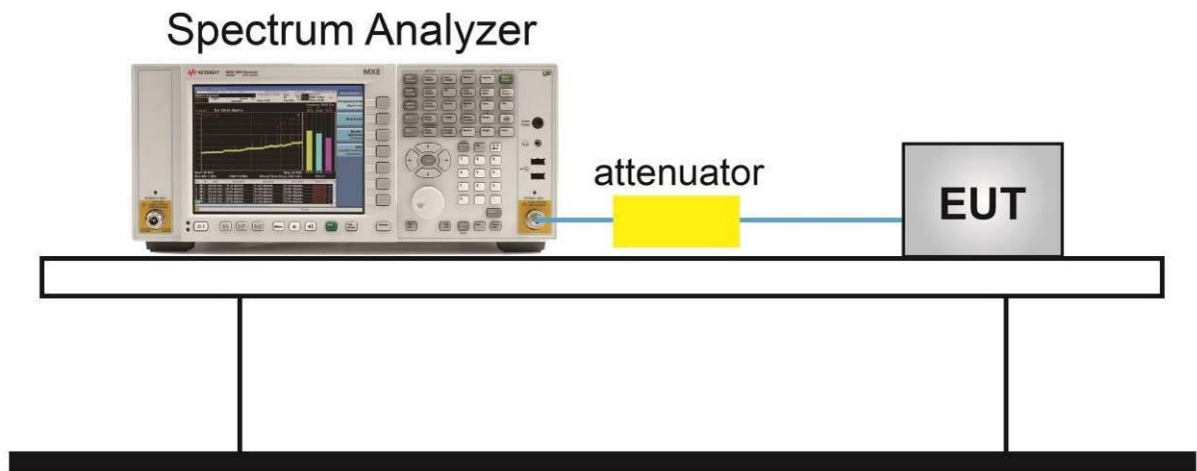
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

5.5.4.Test Setup



5.5.5.Test Result

Product	MESH AP Product	Test Engineer	Flay Yang
Test Site	NS-SR2	Test Date	2021/05/18 ~ 2021/05/24

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit	Result
802.11b	1Mbps	01	2412	30dBc	Pass
802.11b	1Mbps	06	2437	30dBc	Pass
802.11b	1Mbps	11	2462	30dBc	Pass
802.11g	6Mbps	01	2412	30dBc	Pass
802.11g	6Mbps	06	2437	30dBc	Pass
802.11g	6Mbps	11	2462	30dBc	Pass
802.11n-HT20	MCS0	01	2412	30dBc	Pass
802.11n-HT20	MCS0	06	2437	30dBc	Pass
802.11n-HT20	MCS0	11	2462	30dBc	Pass
802.11n-HT40	MCS0	03	2422	30dBc	Pass
802.11n-HT40	MCS0	06	2437	30dBc	Pass
802.11n-HT40	MCS0	09	2452	30dBc	Pass
802.11ax-HE20	MCS0	01	2412	30dBc	Pass
802.11ax-HE20	MCS0	06	2437	30dBc	Pass
802.11ax-HE20	MCS0	11	2462	30dBc	Pass
802.11ax-HE40	MCS0	03	2422	30dBc	Pass
802.11ax-HE40	MCS0	06	2437	30dBc	Pass
802.11ax-HE40	MCS0	09	2452	30dBc	Pass