



Test report No. : 4788408771-US-R4
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Issued date : October 1, 2018
FCC ID : 2AQJEGC01

RADIO TEST REPORT

Product : Smart Gateway
Model Name : SHC301
FCC ID : 2AQJEGC01
Test Regulation : FCC 47 CFR Part 15 Subpart E (Section 15.407)
Received Date : May 28, 2018
Test Date : May 29, 2018 ~ July 12, 2018
Issued Date : October 1, 2018

Applicant : GalaThings Technology Inc.
9F.-6, NO.65, Gaotie 7th Rd., Zhubei City, Hsinchu
County 302, Taiwan (R.O.C.)

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing
Rd., Zhudong Township, Hsinchu County, Taiwan



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Doc No: 17-EM-F0876 / 1.0



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REVISION HISTORY

Original Test Report No.: 4788408771-US-R4

[illegible]

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1. Attestation of Test Results

APPLICANT: GalaThings Technology Inc.
9F.-6, NO.65, Gaotie 7th Rd., Zhubei City, Hsinchu County 302,
Taiwan (R.O.C.)

MANUFACTURER WHA YU INDUSTRIAL CO., LTD
No.326, Sec 2, Kung Tao 5 Road, Hsin Chu City, Taiwan

EUT DESCRIPTION: Smart Gateway

BRAND: Mercu

MODEL: SHC301

SAMPLE STAGE: Identical Prototype

DATE of TESTED: May 29, 2018 ~ July 12, 2018

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart E (Section 15.407)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Evelyn Lee Date : October 1, 2018
Project Handler

Approve By:

John Cheng Date : October 1, 2018
Project Engineer

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.407(e)	6dB Bandwidth	PASS
-	Occupied Bandwidth	See Note2
15.407(a)(1/2/3)	Conducted Output Power	PASS
15.407(a)(1/2/3)	Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS
15.407(b)(6)	AC Power Conducted Emission	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203	Antenna Requirement	PASS

Note:

1. For FCC Clause 15.407(b), the Radiated Band Edge and OOB test plots were recorded in Appendix I.
2. The Occupied Bandwidth was reference only

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3. Test Methodology

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB414788 D01 Radiated Test Site v01, ANSI C63.10-2013.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

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5. Measurement Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor k=2.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	2.6
RF Conducted	9 kHz - 40GHz	2	1.0
Radiated disturbance below 30MHz	9 kHz - 30 MHz	2	2.4
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	2	5.5
Radiated disturbance above 1GHz	1GHz ~ 40GHz	2	5.0

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6. Equipment under Test

6.1. Description of EUT

Product	Smart Gateway	
Brand Name	Mercu	
Model Name	SHC301	
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz	
Modulation	256QAM, 64QAM, 16QAM, QPSK, BPSK	
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to MCS7 802.11ac: up to MCS9	
Number of Channel	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11ac (VHT40)
		1 for 802.11ac (VHT80)
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11ac (VHT40)
		1 for 802.11ac (VHT80)
Maximum Output Power	5180 ~ 5240 MHz: 15.16 dBm 5745 ~ 5825 MHz: 14.09 dBm	
Normal Voltage	5Vdc (adapter or host equipment)	
Hardware Version	N/A	
Software Version	N/A	

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Note:

1. The EUT provides one completed transmitters and one receivers.

Modulation Mode	Tx,Rx Function
802.11a	1TX,1RX
802.11n (HT20)	1TX,1RX
802.11n (HT40)	1TX,1RX
802.11ac (VHT80)	1TX,1RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report.

2. The EUT contains following accessory devices Product Brand Model Description USB Cable

Product	Brand	Model	Description
AC Adapter	PHIHONG	PSAF10A-050Q	I/P: 100-240Vac, 280mA, O/P: 5Vdc, 2000mA
AC Adapter	FLYPOWER	PS10I050K2000UU	I/P: 100-240Vac, 350mA, 50/60Hz O/P: 5Vdc, 2000mA
USB Cable	N/A	N/A	3 meter, non-shielded cable

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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6.2. Channel List

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Tested by
Antenna Port Conducted Measurement	SR4	25°C / 64%RH	120 Vac / 60 Hz	Wayne Chen
Radiated Spurious Emission	966-2	26°C / 60%RH	120 Vac / 60 Hz	Wayne Chen
AC power Line Conducted Emission	SR1	26°C / 54%RH	120 Vac / 60 Hz	Wayne Chen

FCC Test Firm Registration Number: 498077

6.4. Description Of Available Antennas

Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
Chain(0)	M.gear	C1920-510002-A(SRF2017850)	PCB	4.3

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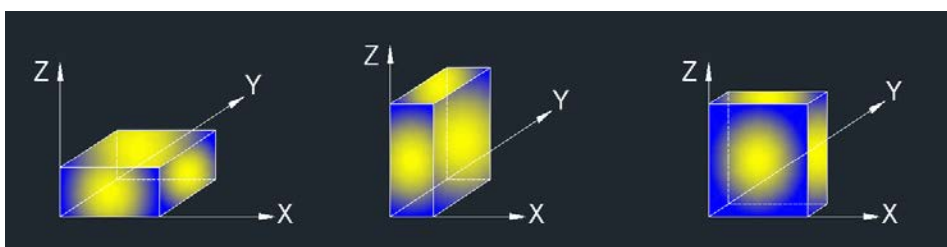


6.5. Operating Mode and Worst Case of EUT

Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
Radiated Emissions (Above 1GHz)	802.11a	5180-5240	OFDM	36 to 48	36, 44, 48	6.0
	802.11n(HT20)		OFDM	36 to 48	36, 44, 48	MCS0
	802.11n(HT40)		OFDM	38 to 46	38, 46	MCS0
	802.11ac (VHT80)		OFDM	42	42	MCS0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6.0
	802.11n(HT20)		OFDM	149 to 165	149, 157, 165	MCS0
	802.11n(HT40)		OFDM	151 to 159	151, 159	MCS0
	802.11ac (VHT80)		OFDM	155	155	MCS0
Radiated Emissions (Below 1GHz)	802.11ac (VHT80)	5180-5240	OFDM	42	42	MCS0
AC Power Line Conducted Emission	802.11ac (VHT80)	5180-5240	OFDM	42	42	MCS0
Antenna Port Conducted Measurement	802.11a	5180-5240	OFDM	36 to 48	36, 44, 48	6.0
	802.11n(HT20)		OFDM	36 to 48	36, 44, 48	MCS0
	802.11n(HT40)		OFDM	38 to 46	38, 46	MCS0
	802.11ac (VHT80)		OFDM	42	42	MCS0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6.0
	802.11n(HT20)		OFDM	149 to 165	149, 157, 165	MCS0
	802.11n(HT40)		OFDM	151 to 159	151, 159	MCS0
	802.11ac (VHT80)		OFDM	155	155	MCS0

Note:

1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
2. For below 1 GHz radiated emission and AC power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case.
3. X axis, Y axis, Z axis positions:



The fundamental of the EUT was investigated in three orthogonal axes X/Y/Z, it was determined that X axis was worst-case . Therefore, all final radiated testing was performed with the EUT in X axis.

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6.6. Duty cycle

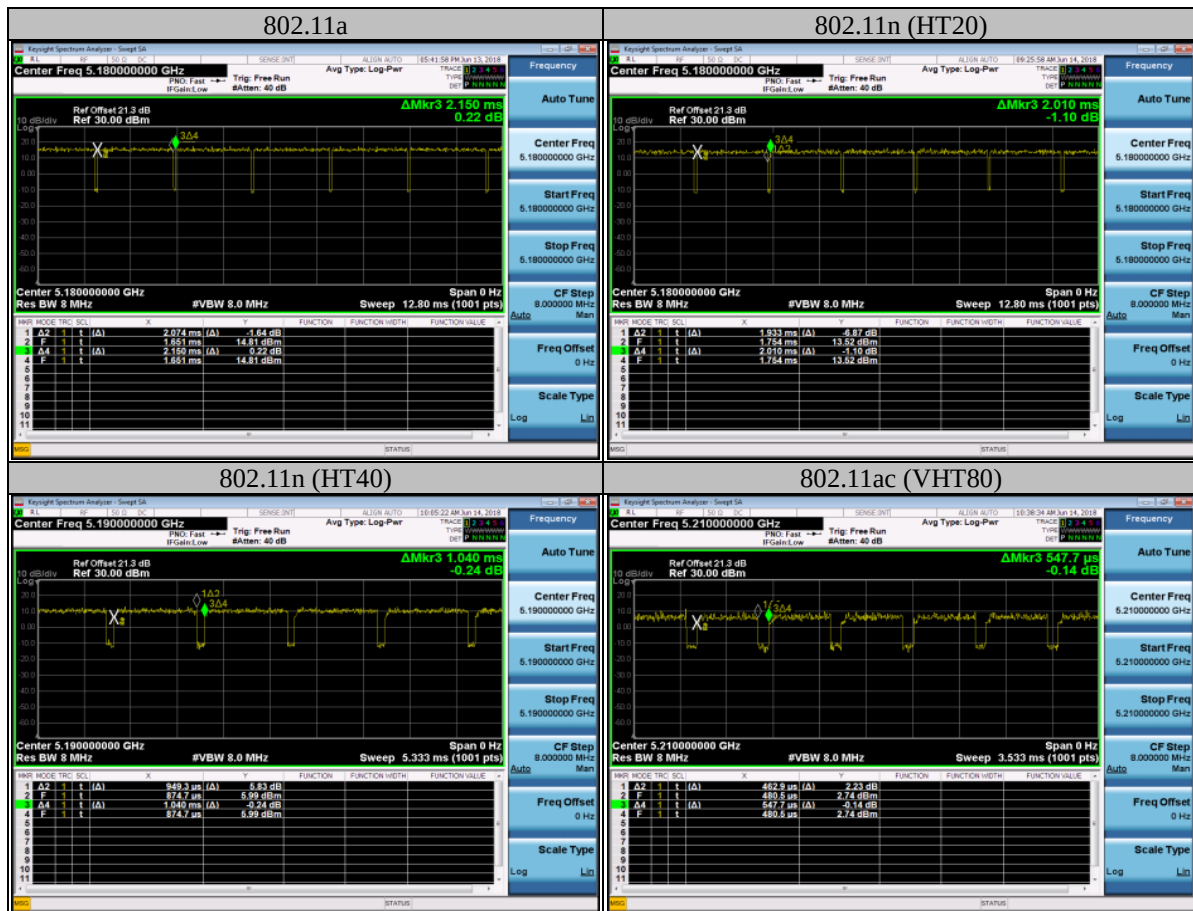
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $2.074/2.15 = 0.965$, Duty factor = $10 * \log(1/0.965) = 0.16$

802.11n (HT20): Duty cycle = $1.933/2.01 = 0.962$, Duty factor = $10 * \log(1/0.962) = 0.17$

802.11n (HT40): Duty cycle = $0.9493/1.04 = 0.913$, Duty factor = $10 * \log(1/0.913) = 0.40$

802.11ac (VHT80): Duty cycle = $0.4529/0.5477 = 0.827$, Duty factor = $10 * \log(1/0.827) = 0.83$



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7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070821	Nov. 28, 2017	1 year
Loop Antenna	ETS lindgren	6502	00213440	Dec. 7, 2017	1 year
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	VULB 9168-773 & AT-N0539	Feb. 12, 2018	1 year
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	BBHA 9120D-01686	Jan. 23, 2018	1 year
Horn Antenna(18-40 GHz)	Schwarzbeck	BBHA 9170	BBHA9170750	Jan.12, 2018	1 year
Preamplifier (30-1000 MHz)	EMCI	RMC330E	980404	Jan. 9, 2018	1 year
Preamplifier (1-18 GHz)	EMCI	EMC051835B E	980407	Jan. 10, 2018	1 year
Preamplifier (18-40GHz)	EMCI	EMC184040S EE	980408	Mar. 13, 2018	1 year
RF Cable (9 KHz~18 GHz)	UltraPhase & EMC Instrument	A1K50-UP0358-A1K50-1500&EMC106-NM-SM-2500/8000	170111-3&170104/170223	Feb. 1, 2018	1 year
RF Cable (18 GHz~40 GHz)	UltraPhase	K1K50-UP0264-K1K50-500/2500/4000	170214-3/170214-3/170214-1	Feb. 1, 2018	1 year

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	Nov. 20, 2017	1 year
Power meter	Anrisu	MA2411B	1531202	Dec. 14, 2017	1 year
Power sensor	Anrisu	ML2495A	1645002	Dec. 14, 2017	1 year
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA1701-010	Mar.20,2018	1 year
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	Nov. 28, 2017	1 year
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	Aug. 2, 2017	1 year
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	July 31, 2017	1 year
Cables	Huber+Suhner	RG 214/U	FCC-BCICF-4_RF	Feb. 1, 2018	1 year

UL Software		
Description	Name	Version
Radiated measurement	EMC-RI	1.0.0.0
Conducted measurement	Keysight.TestSystem	1.0.0.0
AC power Line Conducted Emission	EZ_EMC	1.1.4.2

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8. Description of Test Setup

Support Equipment

Item	Equipment	Brand Name	Model Name	P/N
N/A	N/A	N/A	N/A	N/A

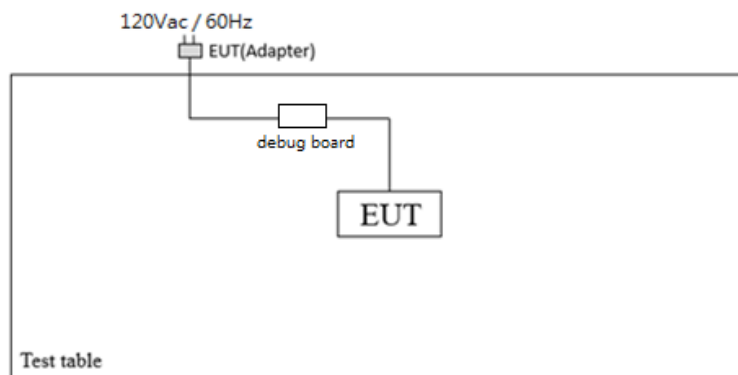
Accessory

Item	Accessory	Brand Name	Model Name	Description
N/A	N/A	N/A	N/A	N/A

Test Setup

The EUT was worked in engineering mode to transmit signal.

Setup Diagram for Test



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9. Test Results

9.1. 6 dB Bandwidth

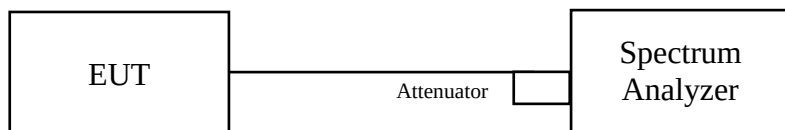
Requirements

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

Test procedure

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

Test Setup



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Test Data

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.05	0.5	Pass
157	5785	14.7	0.5	Pass
165	5825	15.03	0.5	Pass

802.11n (HT-20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15	0.5	Pass
157	5785	15	0.5	Pass
165	5825	15.39	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.04	0.5	Pass
159	5795	33.84	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	73.92	0.5	Pass

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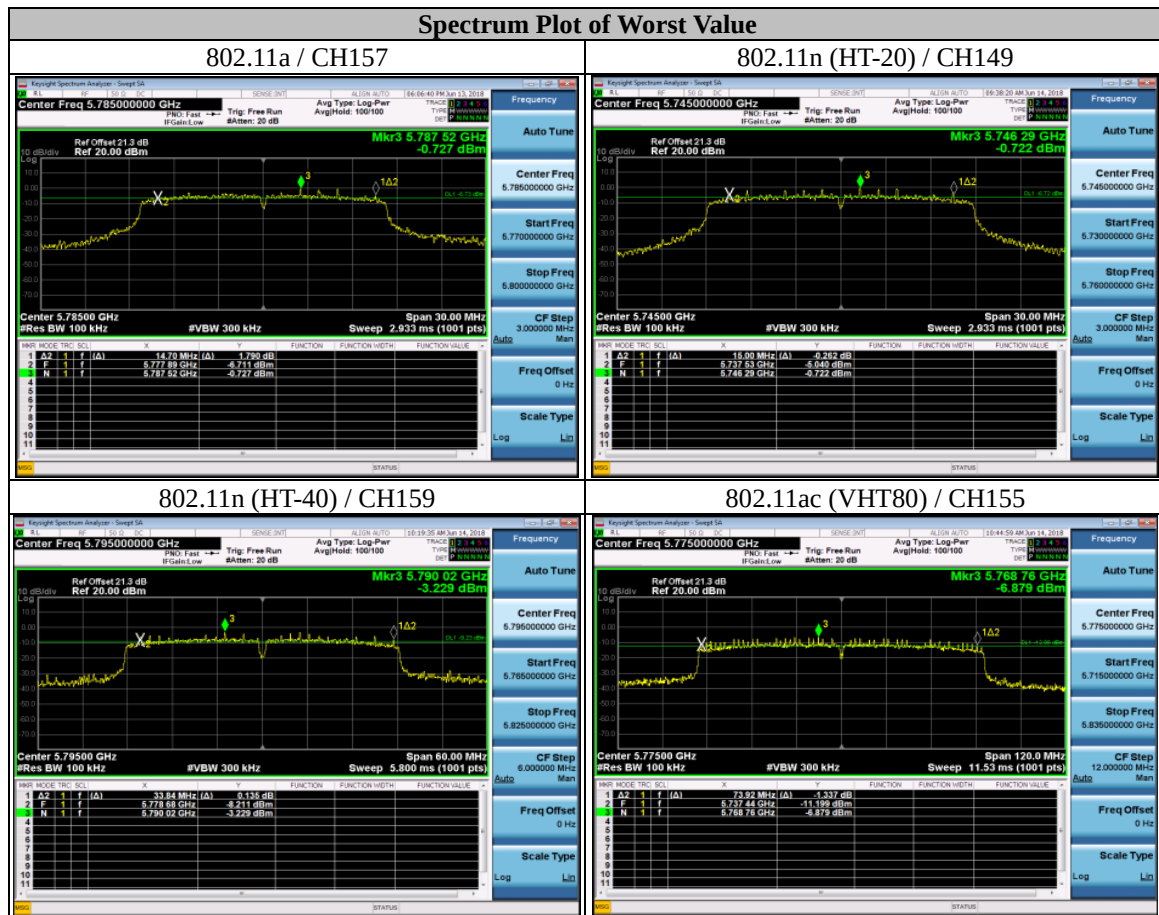
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9.2. Conducted output power

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Client device	250mW (24 dBm)
U-NII-3	---		1 Watt (30 dBm)

Test Procedure

For Average Power Measurement

Test method PM-G

For 802.11a, 802.11n (HT20), 802.11n (HT40)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value.

Test method SA-1

For 802.11ac (VHT80)

- 1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- 2) Set sweep trigger*.
- 3) Set RBW = 1 MHz.
- 4) Set VBW $\geq$ 3 MHz
- 5) Number of points in sweep $\geq$ 2 Span / RBW.
- 6) Sweep time $\leq$ (number of points in sweep) * T
- 7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- 8) Detector = RMS.
- 9) Trace mode = max hold.
- 10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

* If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq$ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

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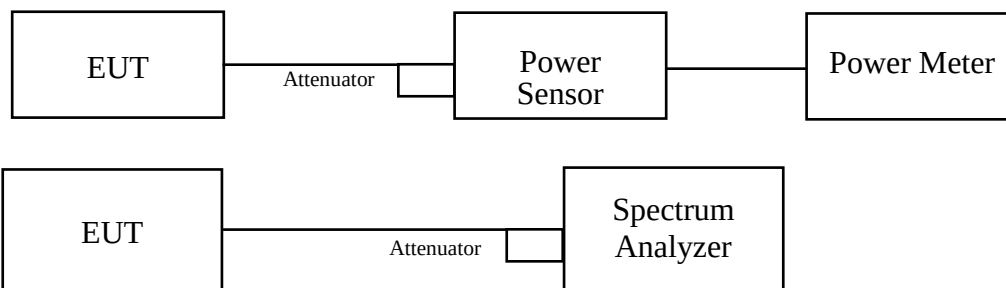


FOR 26dB Occupied Bandwidth

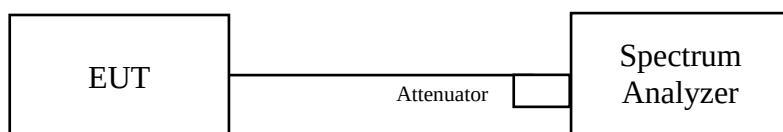
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Setup

For Average Power Measurement



FOR 26dB Occupied Bandwidth



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Test Data

Average Power: 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	32.43	15.11	24	PASS
44	5220	32.66	15.14	24	PASS
48	5240	32.58	15.13	24	PASS
149	5745	23.50	13.71	30	PASS
157	5785	23.82	13.77	30	PASS
165	5825	21.68	13.36	30	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	31.84	15.03	24	PASS
44	5220	31.92	15.04	24	PASS
48	5240	31.70	15.01	24	PASS
149	5745	22.70	13.56	30	PASS
157	5785	22.96	13.61	30	PASS
165	5825	20.99	13.22	30	PASS

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802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
38	5190	32.81	15.16	24	PASS
46	5230	32.14	15.07	24	PASS
151	5755	25.64	14.09	30	PASS
159	5795	23.55	13.72	30	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (mW)	MAXIMUM CONDUCTED POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
42	5210	29.92	14.76	24	PASS
155	5775	23.88	13.78	30	PASS

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26dB Bandwidth:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	20.48	PASS
44	5220	20.98	PASS
48	5240	19.82	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	19.98	PASS
40	5200	19.95	PASS
48	5240	20.14	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
38	5190	41.42	PASS
46	5230	40.53	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
42	5210	82.86	PASS

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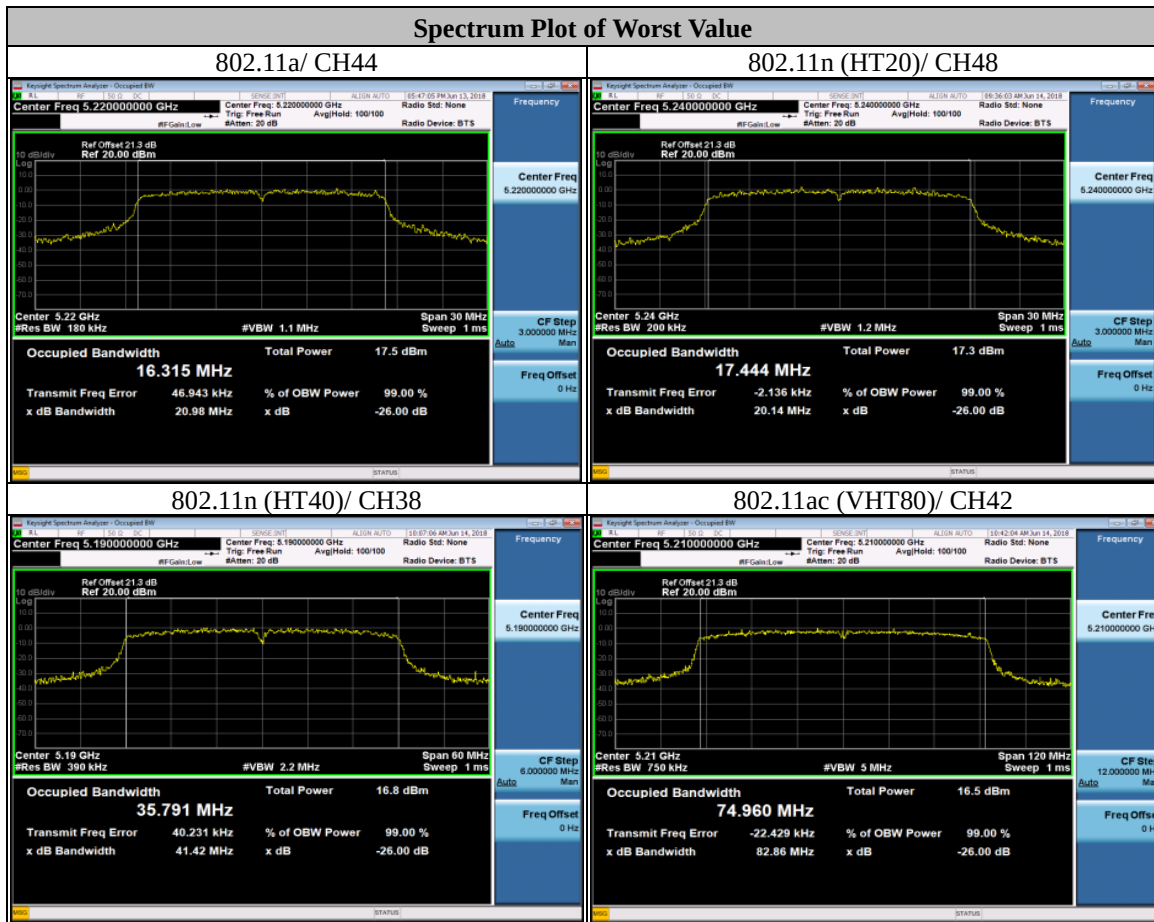
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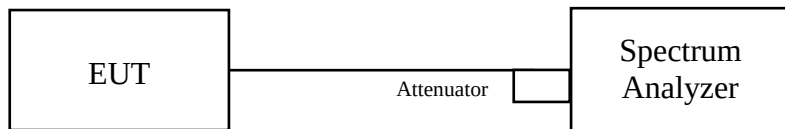


9.3. Occupied Bandwidth

Test procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

Test Setup



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Test Data

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.336
44	5220	16.364
48	5240	16.341
149	5745	16.347
157	5785	16.347
165	5825	16.487

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.474
44	5220	17.464
48	5240	17.471
149	5745	17.475
157	5785	17.473
165	5825	17.516

802.11n (HT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	35.877
46	5230	35.91
151	5755	35.957
159	5795	36.009

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	74.974
155	5775	75.354

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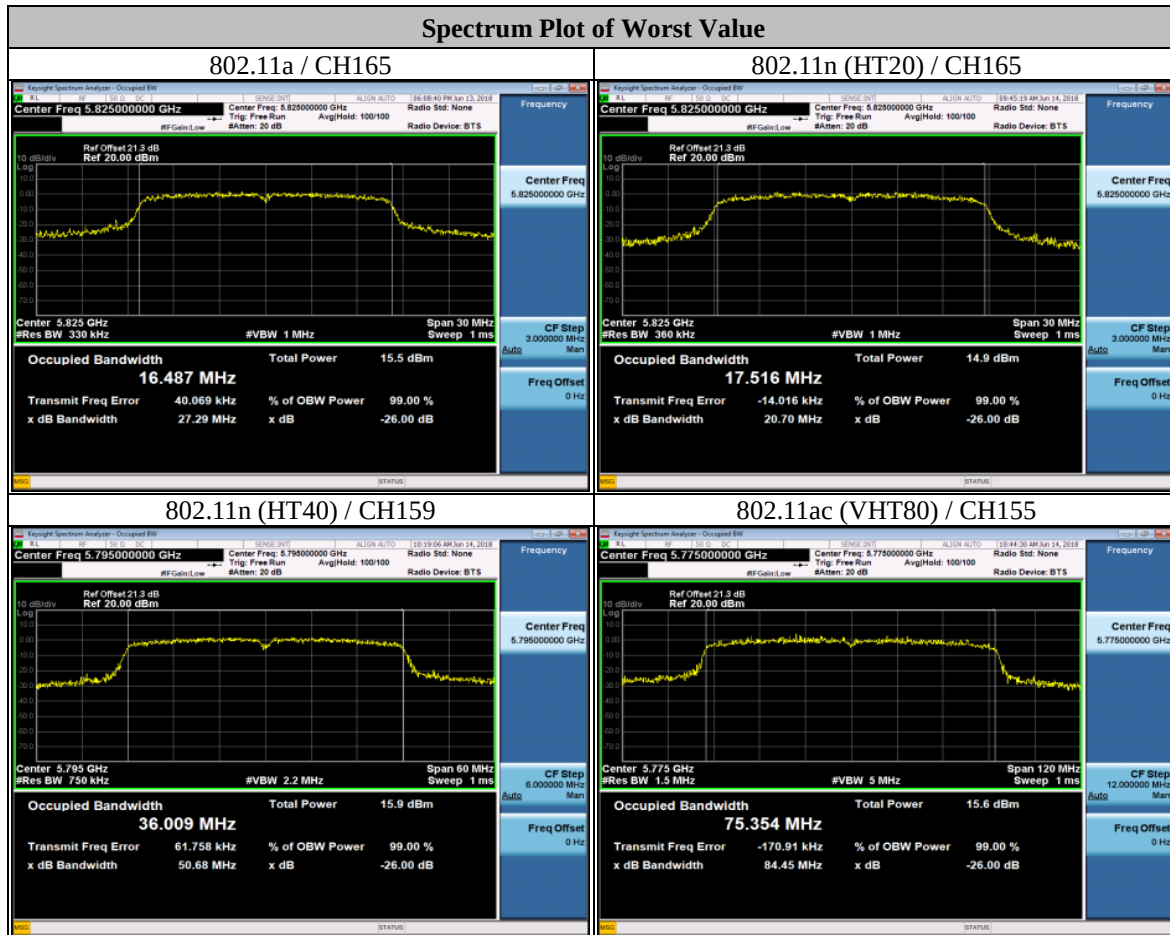
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9.4. Power Spectral Density

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client device	11dBm/ MHz
U-NII-3	---		30dBm/ 500kHz

Test procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2_with Duty cycle and Duty cycle <98 %

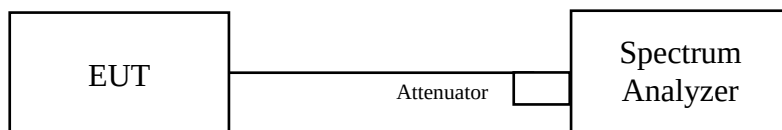
1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW $\geq$ 3 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

For U-NII-3:

Using method SA-2_with Duty cycle and Duty cycle <98 %

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

Test Setup



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Test Data

802.11a

CHANNEL	FREQUENCY (MHz)	PSD w/o duty factor (dBm)	Duty Factor (dB)	PSD with duty factor (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	0.176	0.16	0.332	11	PASS
44	5220	0.188	0.16	0.344	11	PASS
48	5240	0.117	0.16	0.273	11	PASS

NOTE: Refer to section 6.6 for duty cycle spectrum plot.

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o duty factor (dBm)	Duty Factor (dB)	PSD with duty factor (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	-0.913	0.17	-0.743	11	PASS
44	5220	-0.243	0.17	-0.073	11	PASS
48	5240	-0.31	0.17	-0.140	11	PASS

NOTE: Refer to section 6.6 for duty cycle spectrum plot.

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o duty factor (dBm)	Duty Factor (dB)	PSD with duty factor (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
38	5190	-4.618	0.40	-4.222	11	PASS
46	5230	-4.451	0.40	-4.055	11	PASS

NOTE: Refer to section 6.6 for duty cycle spectrum plot.

802.11ac (80MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o duty factor (dBm)	Duty Factor (dB)	PSD with duty factor (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
42	5210	-8.966	0.83	-8.141	11	PASS

NOTE: Refer to section 6.6 for duty cycle spectrum plot.

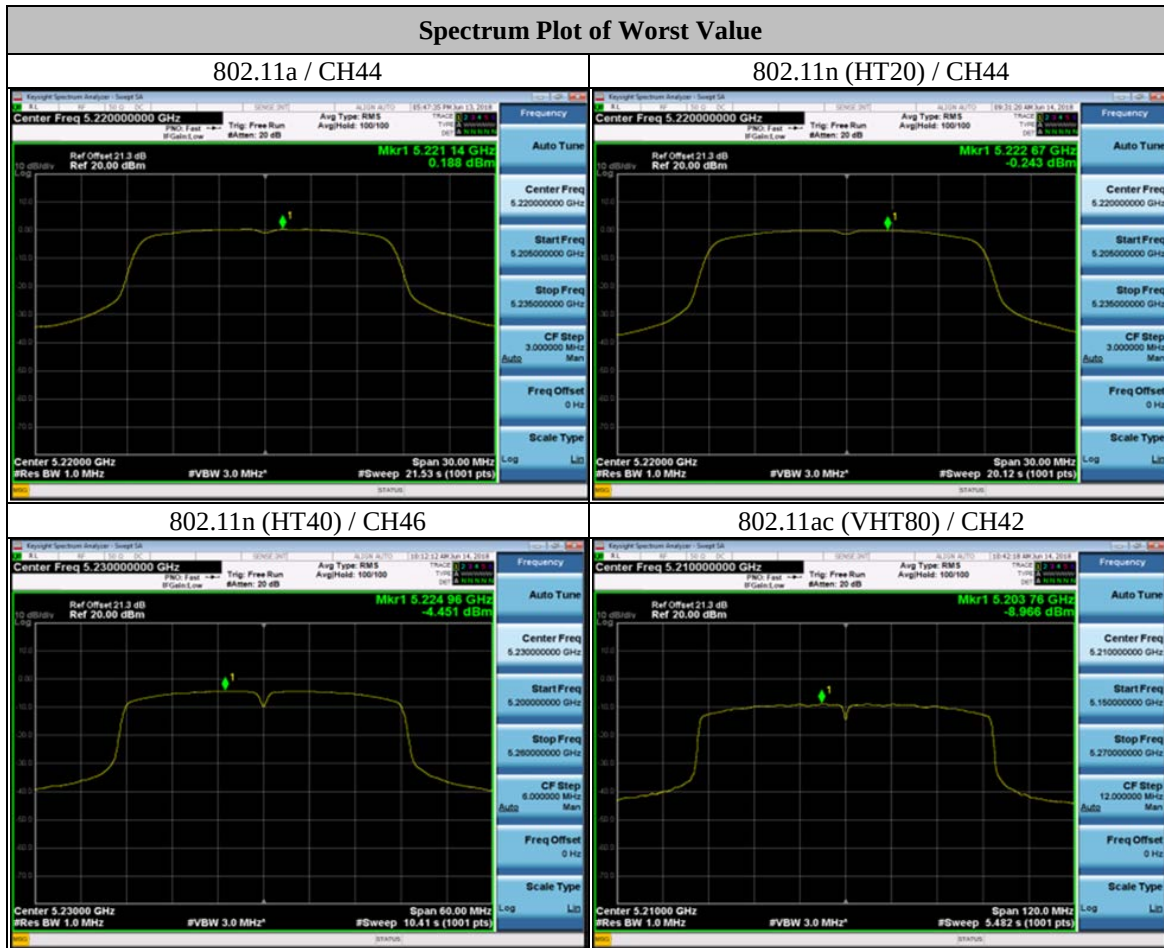
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For U-NII-3 Band

802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/300 kHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-5.944	-3.726	0.16	-3.57	30	Pass
157	5785	-6.594	-4.376	0.16	-4.22	30	Pass
165	5825	-5.741	-3.523	0.16	-3.37	30	Pass

Note:

1. Refer to section 6.6 for duty cycle spectrum plot.
2. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$.

802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/300 kHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-6.088	-3.870	0.17	-3.70	30	Pass
157	5785	-6.892	-4.674	0.17	-4.50	30	Pass
165	5825	-6.2	-3.982	0.17	-3.81	30	Pass

Note:

1. Refer to section 6.6 for duty cycle spectrum plot.
2. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$.

802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/300 kHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-8.447	-6.229	0.40	-5.83	30	Pass
157	5785	-9.364	-7.146	0.40	-6.75	30	Pass

Note:

1. Refer to section 6.6 for duty cycle spectrum plot.
2. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$.

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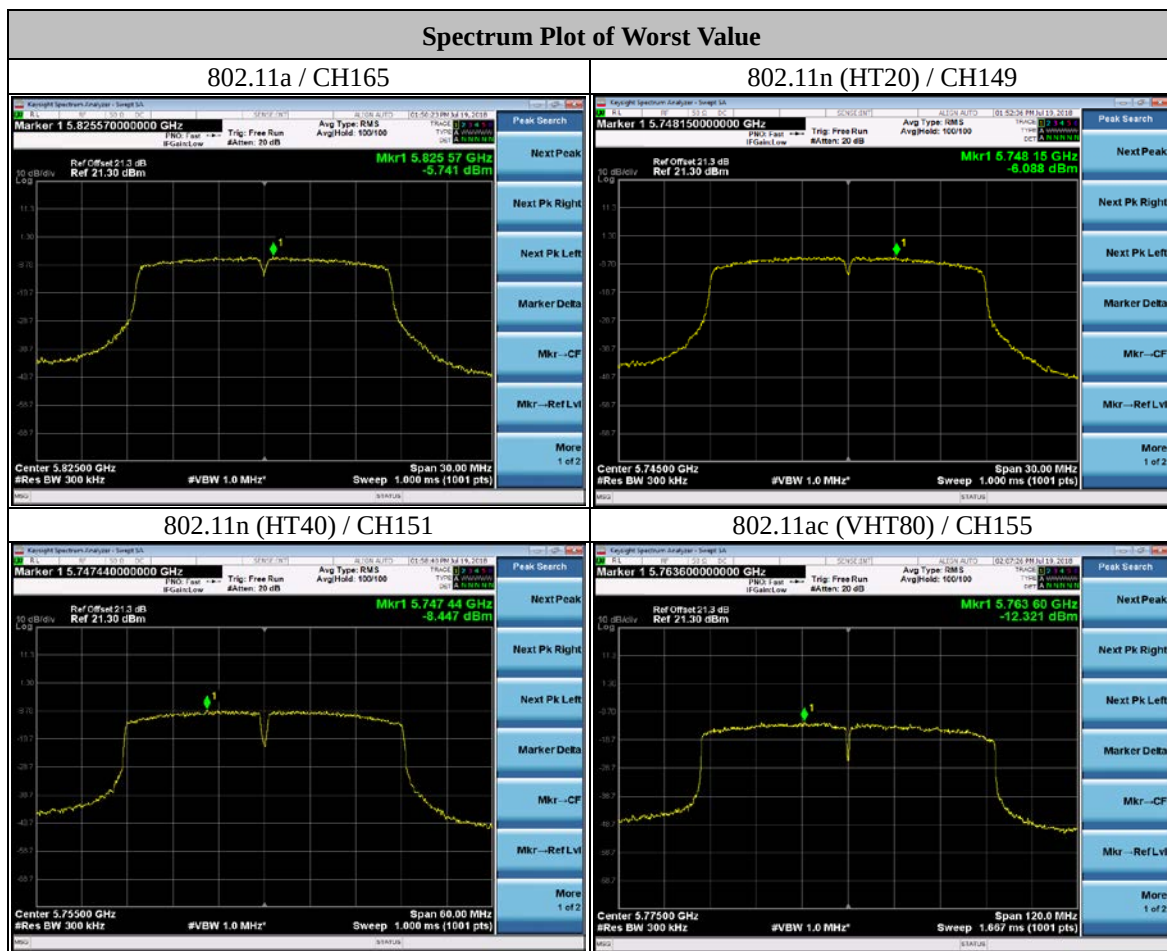


802.11ac (VHT80)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/300 kHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
155	5775	-12.321	-10.103	0.83	-9.28	30	Pass

Note:

1. Refer to section 6.6 for duty cycle spectrum plot.
2. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$.



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9.5. Frequency Stability

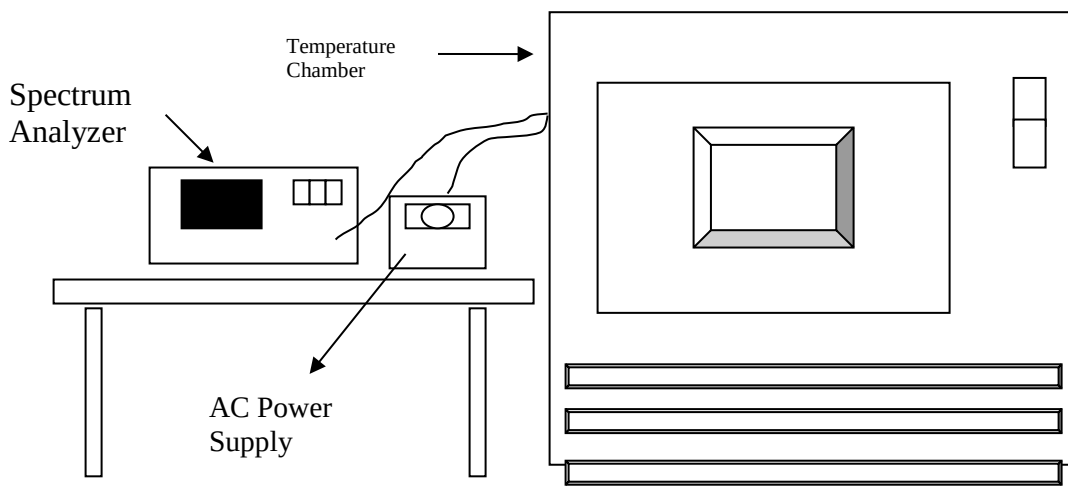
Requirements

The frequency of the carrier signal shall be maintained within band of operation.

Test procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Test Setup



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Test Data

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)
50	120	5179.985	-2.90	5179.985	-2.90	5179.985	-2.90	5179.986	-2.70
40	120	5179.985	-2.90	5179.986	-2.70	5179.983	-3.28	5179.988	-2.32
30	120	5180.017	3.28	5180.021	4.05	5180.023	4.44	5180.023	4.44
20	120	5179.976	-4.63	5179.972	-5.41	5179.973	-5.21	5179.973	-5.21
10	120	5180.004	0.77	5179.997	-0.58	5180.003	0.58	5180.006	1.16
0	120	5179.979	-4.05	5179.988	-2.32	5179.984	-3.09	5179.985	-2.90
-10	120	5179.983	-3.28	5179.983	-3.28	5179.982	-3.47	5179.979	-4.05
-20	120	5179.988	-2.32	5179.986	-2.70	5179.983	-3.28	5179.986	-2.70
-30	120	5180.008	1.54	5179.989	-2.12	5179.984	-3.09	5179.982	-3.47
20	102	5179.976	-4.63	5180.002	0.39	5180.003	0.58	5179.999	-0.19
20	138	5179.95	-9.65	5179.973	-5.21	5179.977	-4.44	5179.974	-5.02

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9.6. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) * ¹ PK:10 (dBm/MHz) * ² PK:15.6 (dBm/MHz) * ³ PK:27 (dBm/MHz) * ⁴	PK: 68.2(dBμV/m) * ¹ PK:105.2 (dBμV/m) * ² PK: 110.8(dBμV/m) * ³ PK:122.2 (dBμV/m) * ⁴
*1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

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Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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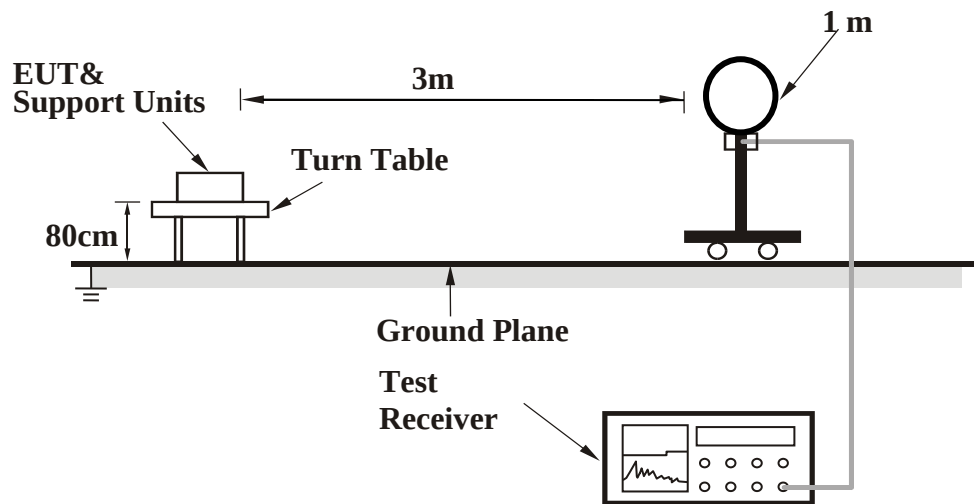
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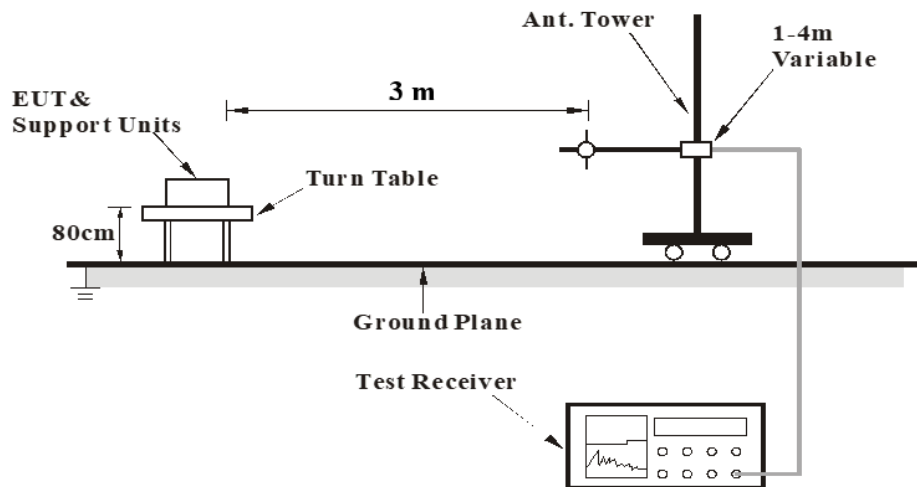
- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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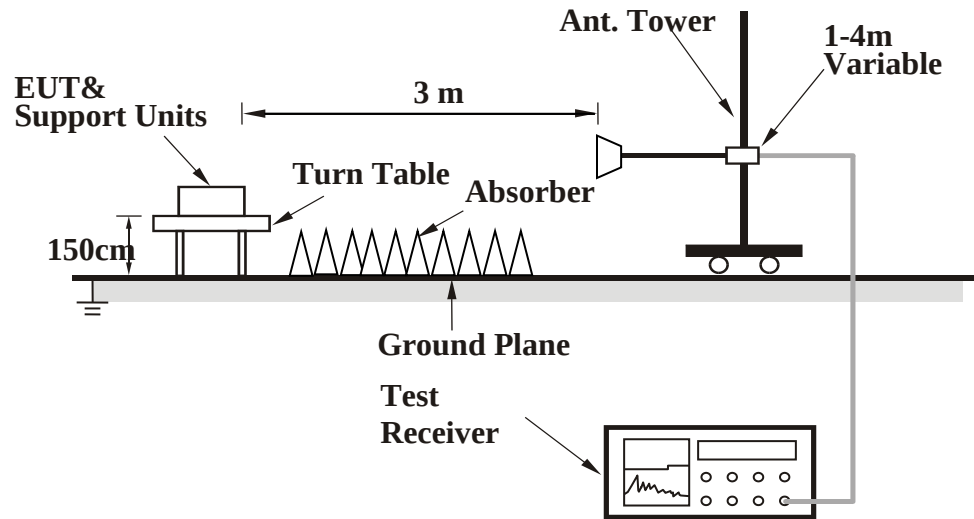
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<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

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Test Data

Above 1GHz Data :

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5147.540	61.00	-3.81	57.19	74.00	-16.81	peak
2	5150.000	49.86	-3.81	46.05	74.00	-27.95	peak
@3	5177.550	100.07	-3.78	96.29	-	-	peak
4	5150.000	39.48	-3.81	35.67	54.00	-18.33	AVG
@5	5177.000	91.73	-3.78	87.95	-	-	AVG
#6	10360.000	40.34	6.99	47.33	68.20	-20.87	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5148.310	56.45	-3.81	52.64	74.00	-21.36	peak
2	5150.000	53.55	-3.81	49.74	74.00	-24.26	peak
@3	5179.120	96.28	-3.78	92.50	-	-	peak
4	5150.000	37.67	-3.81	33.86	54.00	-20.14	AVG
@5	5182.850	88.25	-3.78	84.47	-	-	AVG
#6	10360.000	40.26	6.99	47.25	68.20	-20.95	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 44	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	44.28	-3.81	40.47	74.00	-33.53	peak
@2	5217.390	99.74	-3.74	96.00	-	-	peak
3	5150.000	34.71	-3.81	30.90	54.00	-23.10	AVG
@4	5217.340	91.55	-3.74	87.81	-	-	AVG
#5	10440.000	39.95	7.18	47.13	68.20	-21.07	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	44.04	-3.81	40.23	74.00	-33.77	peak
@2	5221.160	96.43	-3.74	92.69	-	-	peak
3	5150.000	34.83	-3.81	31.02	54.00	-22.98	AVG
@4	5218.610	89.79	-3.74	86.05	-	-	AVG
#5	10440.000	43.23	7.18	50.41	68.20	-17.79	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	44.48	-3.81	40.67	74.00	-33.33	peak
@2	5242.810	99.23	-3.71	95.52	-	-	peak
3	5150.000	35.23	-3.81	31.42	54.00	-22.58	AVG
@4	5237.180	91.59	-3.73	87.86	-	-	AVG
#5	10480.000	40.48	7.27	47.75	68.20	-20.45	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	43.79	-3.81	39.98	74.00	-34.02	peak
@2	5238.610	95.88	-3.73	92.15	-	-	peak
3	5150.000	35.16	-3.81	31.35	54.00	-22.65	AVG
@4	5237.180	87.72	-3.73	83.99	-	-	AVG
#5	10480.000	42.33	7.27	49.60	68.20	-18.60	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5553.733	45.56	-3.39	42.17	68.20	-26.03	peak
2	5693.017	46.64	-3.15	43.49	100.03	-56.54	peak
3	5716.017	55.77	-3.11	52.66	109.68	-57.02	peak
4	5721.617	56.58	-3.10	53.48	114.49	-61.01	peak
@5	5742.900	94.88	-3.07	91.81	-	-	peak
6	11490.000	42.10	8.55	50.65	74.00	-23.35	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5607.383	45.64	-3.29	42.35	68.20	-25.85	peak
2	5695.733	46.28	-3.15	43.13	102.04	-58.91	peak
3	5716.933	60.01	-3.11	56.90	109.94	-53.04	peak
4	5721.500	60.14	-3.10	57.04	114.22	-57.18	peak
@5	5742.583	97.24	-3.07	94.17	-	-	peak
6	11490.000	40.04	8.55	48.59	74.00	-25.41	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5609.650	45.91	-3.29	42.62	68.20	-25.58	peak
2	5680.433	46.09	-3.18	42.91	90.72	-47.81	peak
3	5708.417	44.62	-3.12	41.50	107.56	-66.06	peak
4	5723.133	44.40	-3.10	41.30	117.94	-76.64	peak
@5	5787.783	93.69	-3.00	90.69	-	-	peak
6	5850.567	44.27	-2.89	41.38	120.91	-79.53	peak
7	5868.783	44.77	-2.85	41.92	106.94	-65.02	peak
8	5912.650	44.65	-2.78	41.87	77.34	-35.47	peak
#9	5957.333	45.40	-2.71	42.69	68.20	-25.51	peak
10	11570.000	42.42	8.53	50.95	74.00	-23.05	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5567.833	46.03	-3.36	42.67	68.20	-25.53	peak
2	5682.900	45.05	-3.17	41.88	92.55	-50.67	peak
3	5714.400	45.10	-3.11	41.99	109.23	-67.24	peak
4	5723.700	44.61	-3.10	41.51	119.24	-77.73	peak
@5	5786.900	96.56	-3.00	93.56	-	-	peak
6	5851.267	44.08	-2.89	41.19	119.31	-78.12	peak
7	5863.217	45.39	-2.86	42.53	108.50	-65.97	peak
8	5889.867	45.15	-2.82	42.33	94.20	-51.87	peak
#9	5959.167	44.71	-2.71	42.00	68.20	-26.20	peak
10	11570.000	41.32	8.53	49.85	74.00	-24.15	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@1	5827.450	94.12	-2.93	91.19	-	-	peak
2	5850.750	55.30	-2.89	52.41	120.49	-68.08	peak
3	5855.933	54.75	-2.88	51.87	110.54	-58.67	peak
4	5877.683	45.86	-2.85	43.01	103.21	-60.20	peak
#5	6002.117	44.88	-2.63	42.25	68.20	-25.95	peak
6	11650.000	41.01	8.52	49.53	74.00	-24.47	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@1	5821.633	96.63	-2.93	93.70	-	-	peak
2	5852.783	59.17	-2.89	56.28	115.85	-59.57	peak
3	5862.933	51.67	-2.86	48.81	108.58	-59.77	peak
4	5913.600	45.65	-2.78	42.87	76.64	-33.77	peak
#5	6001.050	45.57	-2.64	42.93	68.20	-25.27	peak
6	11650.000	39.80	8.52	48.32	74.00	-25.68	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5144.220	58.81	-3.81	55.00	74.00	-19.00	peak
2	5150.000	48.04	-3.81	44.23	74.00	-29.77	peak
@3	5181.460	99.28	-3.78	95.50	-	-	peak
4	5150.000	38.77	-3.81	34.96	54.00	-19.04	AVG
@5	5178.750	91.25	-3.78	87.47	-	-	AVG
#6	10360.000	41.77	6.99	48.76	68.20	-19.44	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5140.410	50.18	-3.81	46.37	74.00	-27.63	peak
2	5150.000	45.23	-3.81	41.42	74.00	-32.58	peak
@3	5175.800	96.59	-3.78	92.81	-	-	peak
4	5150.000	38.04	-3.81	34.23	54.00	-19.77	AVG
@5	5183.410	89.10	-3.78	85.32	-	-	AVG
#6	10360.000	42.60	6.99	49.59	68.20	-18.61	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
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EUT Test Condition		Measurement Detail	
Channel	Channel 44	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	44.60	-3.81	40.79	74.00	-33.21	peak
@2	5218.730	98.59	-3.74	94.85	-	-	peak
3	5150.000	35.15	-3.81	31.34	54.00	-22.66	AVG
@4	5217.930	90.30	-3.74	86.56	-	-	AVG
#5	10440.000	40.08	7.18	47.26	68.20	-20.94	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	43.78	-3.81	39.97	74.00	-34.03	peak
@2	5221.200	96.08	-3.74	92.34	-	-	peak
3	5150.000	35.22	-3.81	31.41	54.00	-22.59	AVG
@4	5218.590	89.05	-3.74	85.31	-	-	AVG
#5	10440.000	43.26	7.18	50.44	68.20	-17.76	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	44.04	-3.81	40.23	74.00	-33.77	peak
@2	5238.570	98.72	-3.73	94.99	-	-	peak
3	5150.000	35.11	-3.81	31.30	54.00	-22.70	AVG
@4	5242.050	91.04	-3.72	87.32	-	-	AVG
#5	10480.000	41.04	7.27	48.31	68.20	-19.89	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	43.78	-3.81	39.97	74.00	-34.03	peak
@2	5241.490	94.98	-3.73	91.25	-	-	peak
3	5150.000	34.57	-3.81	30.76	54.00	-23.24	AVG
@4	5238.480	87.92	-3.73	84.19	-	-	AVG
#5	10480.000	43.93	7.27	51.20	68.20	-17.00	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
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EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5629.633	46.54	-3.26	43.28	68.20	-24.92	peak
2	5695.083	49.84	-3.15	46.69	101.56	-54.87	peak
3	5714.783	58.31	-3.11	55.20	109.34	-54.14	peak
4	5724.817	62.41	-3.10	59.31	121.78	-62.47	peak
@5	5746.350	94.80	-3.07	91.73	-	-	peak
6	11490.000	42.24	8.55	50.79	74.00	-23.21	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5602.617	47.46	-3.30	44.16	68.20	-24.04	peak
2	5694.867	48.94	-3.15	45.79	101.40	-55.61	peak
3	5716.050	59.74	-3.11	56.63	109.69	-53.06	peak
4	5723.650	62.85	-3.10	59.75	119.12	-59.37	peak
@5	5743.766	96.97	-3.07	93.90	-	-	peak
6	11490.000	42.82	8.55	51.37	74.00	-22.63	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0876 / 1.0



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EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5600.350	46.28	-3.30	42.98	68.20	-25.22	peak
2	5677.983	45.65	-3.18	42.47	88.91	-46.44	peak
3	5709.750	46.06	-3.12	42.94	107.93	-64.99	peak
4	5723.017	46.25	-3.10	43.15	117.68	-74.53	peak
@5	5783.967	94.16	-3.00	91.16	-	-	peak
6	5852.200	45.98	-2.89	43.09	117.18	-74.09	peak
7	5873.800	46.90	-2.85	44.05	105.54	-61.49	peak
8	5917.700	46.23	-2.78	43.45	73.60	-30.15	peak
#9	6027.900	46.22	-2.53	43.69	68.20	-24.51	peak
10	11570.000	42.26	8.53	50.79	74.00	-23.21	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5637.283	45.88	-3.25	42.63	68.20	-25.57	peak
2	5669.017	45.75	-3.18	42.57	82.27	-39.70	peak
3	5710.050	45.65	-3.12	42.53	108.01	-65.48	peak
4	5721.717	45.13	-3.10	42.03	114.71	-72.68	peak
@5	5783.133	96.91	-3.00	93.91	-	-	peak
6	5850.633	45.08	-2.89	42.19	120.76	-78.57	peak
7	5867.117	45.15	-2.86	42.29	107.41	-65.12	peak
8	5918.500	46.29	-2.77	43.52	73.01	-29.49	peak
#9	5970.733	45.92	-2.68	43.24	68.20	-24.96	peak
10	11570.000	42.09	8.53	50.62	74.00	-23.38	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@1	5823.567	94.43	-2.93	91.50	-	-	peak
2	5854.450	57.23	-2.88	54.35	112.05	-57.70	peak
3	5860.617	54.70	-2.87	51.83	109.23	-57.40	peak
4	5909.567	45.74	-2.79	42.95	79.62	-36.67	peak
#5	5975.000	47.09	-2.68	44.41	68.20	-23.79	peak
#6	6032.267	46.62	-2.52	44.10	68.20	-24.10	peak
7	11650.000	40.85	8.52	49.37	74.00	-24.63	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@1	5823.667	97.01	-2.93	94.08	-	-	peak
2	5850.033	60.49	-2.89	57.60	122.12	-64.52	peak
3	5856.600	58.79	-2.88	55.91	110.35	-54.44	peak
4	5877.850	47.97	-2.85	45.12	103.09	-57.97	peak
#5	5966.300	46.06	-2.70	43.36	68.20	-24.84	peak
6	11650.000	41.41	8.52	49.93	74.00	-24.07	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5143.460	60.97	-3.81	57.16	74.00	-16.84	peak
2	5150.000	57.03	-3.81	53.22	74.00	-20.78	peak
@3	5191.960	95.19	-3.76	91.43	-	-	peak
4	5150.000	47.58	-3.81	43.77	54.00	-10.23	AVG
@5	5194.420	86.69	-3.76	82.93	-	-	AVG
#6	10380.000	42.71	7.04	49.75	68.20	-18.45	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5143.720	58.45	-3.81	54.64	74.00	-19.36	peak
2	5150.000	51.88	-3.81	48.07	74.00	-25.93	peak
@3	5200.140	92.43	-3.75	88.68	-	-	peak
4	5150.000	46.71	-3.81	42.90	54.00	-11.10	AVG
@5	5183.040	85.12	-3.78	81.34	-	-	AVG
#6	10380.000	42.22	7.04	49.26	68.20	-18.94	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 46	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5145.500	52.88	-3.81	49.07	74.00	-24.93	peak
2	5150.000	51.98	-3.81	48.17	74.00	-25.83	peak
@3	5237.700	95.31	-3.73	91.58	-	-	peak
4	5150.000	34.88	-3.81	31.07	54.00	-22.93	AVG
@5	5231.880	85.11	-3.72	81.39	-	-	AVG
#6	10460.000	39.63	7.23	46.86	68.20	-21.34	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	45.00	-3.81	41.19	74.00	-32.81	peak
@2	5227.700	92.90	-3.73	89.17	-	-	peak
3	5150.000	34.93	-3.81	31.12	54.00	-22.88	AVG
@4	5227.520	84.15	-3.73	80.42	-	-	AVG
#5	10460.000	41.42	7.23	48.65	68.20	-19.55	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 151	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5643.500	48.68	-3.23	45.45	68.20	-22.75	peak
2	5695.750	55.25	-3.15	52.10	102.06	-49.96	peak
3	5715.067	60.87	-3.11	57.76	109.42	-51.66	peak
4	5722.483	62.81	-3.10	59.71	116.46	-56.75	peak
@5	5759.000	92.59	-3.04	89.55	-	-	peak
6	11510.000	41.48	8.56	50.04	74.00	-23.96	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5621.767	48.73	-3.26	45.47	68.20	-22.73	peak
2	5694.700	57.25	-3.15	54.10	101.28	-47.18	peak
3	5715.083	61.55	-3.11	58.44	109.42	-50.98	peak
4	5723.467	64.92	-3.10	61.82	118.70	-56.88	peak
@5	5751.633	93.88	-3.05	90.83	-	-	peak
6	11510.000	42.31	8.56	50.87	74.00	-23.13	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 159	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5606.917	47.48	-3.29	44.19	68.20	-24.01	peak
2	5696.450	48.32	-3.15	45.17	102.57	-57.40	peak
3	5717.050	52.29	-3.11	49.18	109.97	-60.79	peak
4	5722.033	51.29	-3.10	48.19	115.44	-67.25	peak
@5	5796.600	92.10	-2.97	89.13	-	-	peak
6	5853.183	53.84	-2.89	50.95	114.94	-63.99	peak
7	5857.950	52.55	-2.88	49.67	109.97	-60.30	peak
8	5875.600	49.75	-2.85	46.90	104.76	-57.86	peak
#9	5927.483	47.80	-2.76	45.04	68.20	-23.16	peak
10	11590.000	39.93	8.53	48.46	74.00	-25.54	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5622.767	46.96	-3.26	43.70	68.20	-24.50	peak
2	5696.983	50.44	-3.14	47.30	102.97	-55.67	peak
3	5712.800	52.63	-3.11	49.52	108.78	-59.26	peak
4	5722.517	52.55	-3.10	49.45	116.54	-67.09	peak
@5	5787.950	94.32	-3.00	91.32	-	-	peak
6	5851.783	56.74	-2.89	53.85	118.13	-64.28	peak
7	5861.117	53.02	-2.86	50.16	109.09	-58.93	peak
8	5883.183	50.90	-2.83	48.07	99.14	-51.07	peak
#9	5930.350	46.42	-2.76	43.66	68.20	-24.54	peak
10	11590.000	39.71	8.53	48.24	74.00	-25.76	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	59.06	-3.81	55.25	74.00	-18.75	peak
@2	5210.450	92.05	-3.75	88.30	-	-	peak
3	5150.000	48.29	-3.81	44.48	54.00	-9.52	AVG
@4	5203.480	82.55	-3.76	78.79	-	-	AVG
#5	10420.000	40.81	7.13	47.94	68.20	-20.26	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	52.97	-3.81	49.16	74.00	-24.84	peak
@2	5215.400	88.91	-3.74	85.17	-	-	peak
3	5150.000	47.25	-3.81	43.44	54.00	-10.56	AVG
@4	5215.830	81.09	-3.74	77.35	-	-	AVG
#5	10420.000	41.12	7.13	48.25	68.20	-19.95	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 155	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5627.017	49.27	-3.26	46.01	68.20	-22.19	peak
2	5695.583	61.78	-3.15	58.63	101.93	-43.30	peak
3	5715.533	62.76	-3.11	59.65	109.55	-49.90	peak
4	5723.717	62.74	-3.10	59.64	119.27	-59.63	peak
@5	5774.917	89.68	-3.01	86.67	-	-	peak
6	5849.483	59.45	-2.89	56.56	130.00	-73.44	peak
7	5856.433	56.41	-2.88	53.53	110.40	-56.87	peak
8	5883.567	50.46	-2.83	47.63	98.86	-51.23	peak
#9	5944.900	46.41	-2.74	43.67	68.20	-24.53	peak
10	11550.000	39.61	8.54	48.15	74.00	-25.85	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#1	5629.633	48.75	-3.26	45.49	68.20	-22.71	peak
2	5695.717	61.97	-3.15	58.82	102.03	-43.21	peak
3	5713.850	62.75	-3.11	59.64	109.08	-49.44	peak
4	5723.267	64.33	-3.10	61.23	118.25	-57.02	peak
@5	5773.933	91.98	-3.01	88.97	-	-	peak
6	5852.533	59.47	-2.89	56.58	116.42	-59.84	peak
7	5857.117	57.58	-2.88	54.70	110.21	-55.51	peak
8	5877.300	52.01	-2.85	49.16	103.50	-54.34	peak
#9	5955.283	46.62	-2.71	43.91	68.20	-24.29	peak
10	11550.000	41.28	8.54	49.82	74.00	-24.18	peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " # ": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Below 1GHz Data :

9 kHz ~ 30 MHz Data:

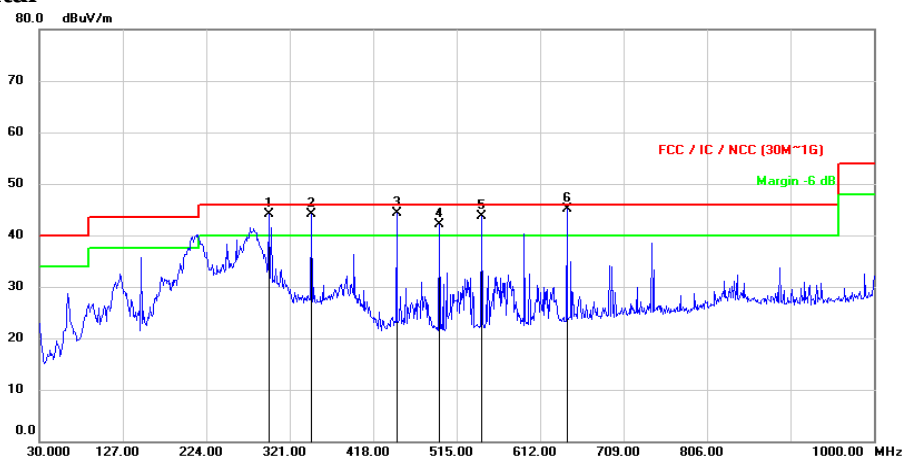
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

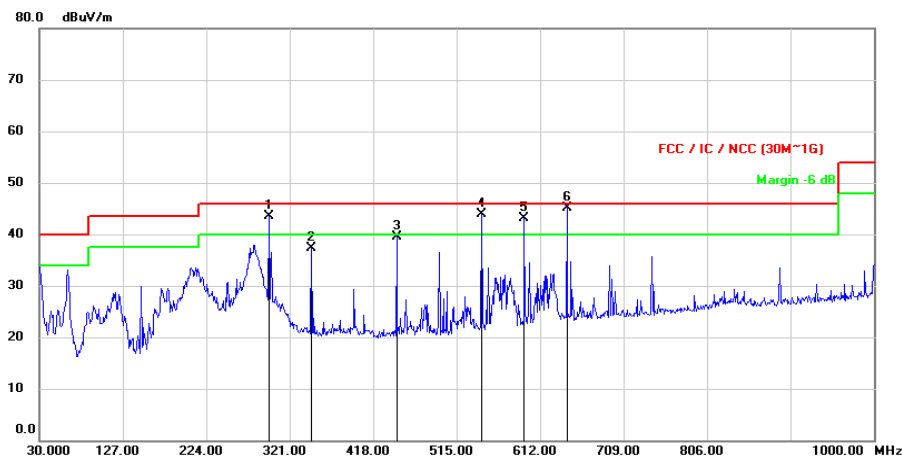
802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



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Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	297.0087	58.58	-14.53	44.05	46.00	-1.95	peak
2	346.4786	57.58	-13.46	44.12	46.00	-1.88	peak
3	445.4833	55.05	-10.74	44.31	46.00	-1.69	peak
4	494.9857	52.05	-9.92	42.13	46.00	-3.87	peak
5	544.4880	52.65	-8.94	43.71	46.00	-2.29	peak
6	643.4927	51.99	-6.86	45.13	46.00	-0.87	peak
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	296.9763	58.04	-14.53	43.51	46.00	-2.49	peak
2	346.4786	50.77	-13.46	37.31	46.00	-8.69	peak
3	445.4833	50.33	-10.74	39.59	46.00	-6.41	peak
4	544.4880	52.80	-8.94	43.86	46.00	-2.14	peak
5	593.9903	50.71	-7.60	43.11	46.00	-2.89	peak
6	643.4927	52.06	-6.86	45.20	46.00	-0.80	QP

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. The other emission levels were very low against the limit.

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9.7. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated and the worst-case emissions are reported

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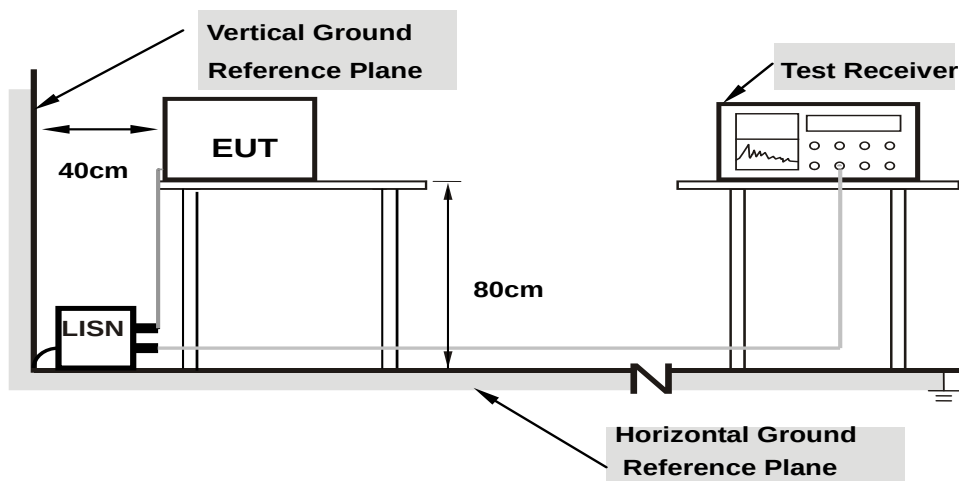
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Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

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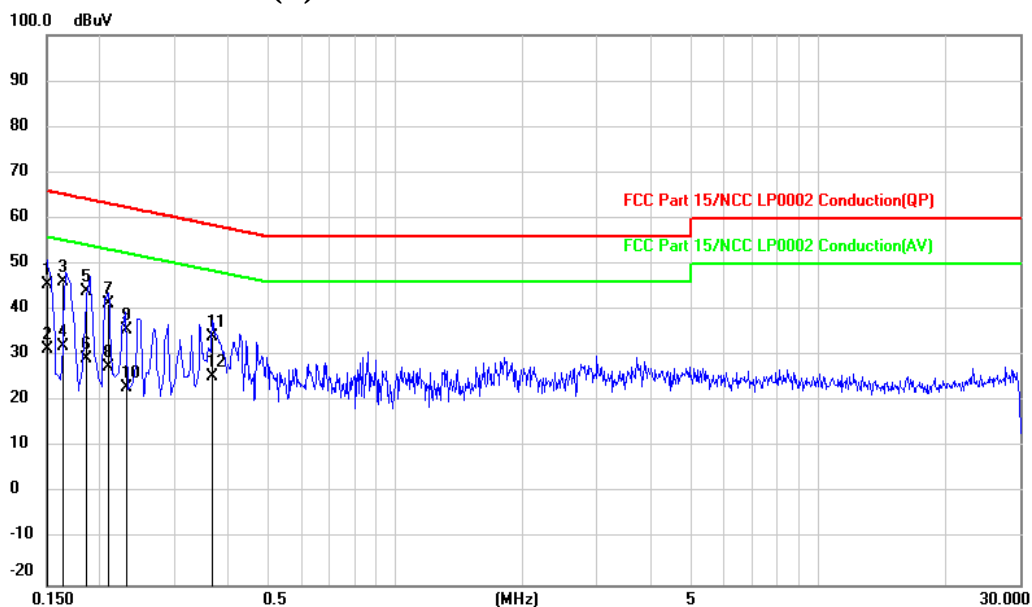


Test Data

802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	150 kHz ~ 30 MHz

Phase of Power : Line (L)



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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1511	25.91	19.57	45.48	65.94	-20.46	QP
2	0.1511	11.84	19.57	31.41	55.94	-24.53	AVG
3	0.1623	26.51	19.57	46.08	65.35	-19.27	QP
4	0.1623	12.55	19.57	32.12	55.35	-23.23	AVG
5	0.1853	24.47	19.58	44.05	64.24	-20.19	QP
6	0.1853	9.73	19.58	29.31	54.24	-24.93	AVG
7	0.2102	21.63	19.58	41.21	63.20	-21.99	QP
8	0.2102	8.05	19.58	27.63	53.20	-25.57	AVG
9	0.2329	15.99	19.59	35.58	62.35	-26.77	QP
10	0.2329	3.59	19.59	23.18	52.35	-29.17	AVG
11	0.3704	14.59	19.60	34.19	58.49	-24.30	QP
12	0.3704	5.97	19.60	25.57	48.49	-22.92	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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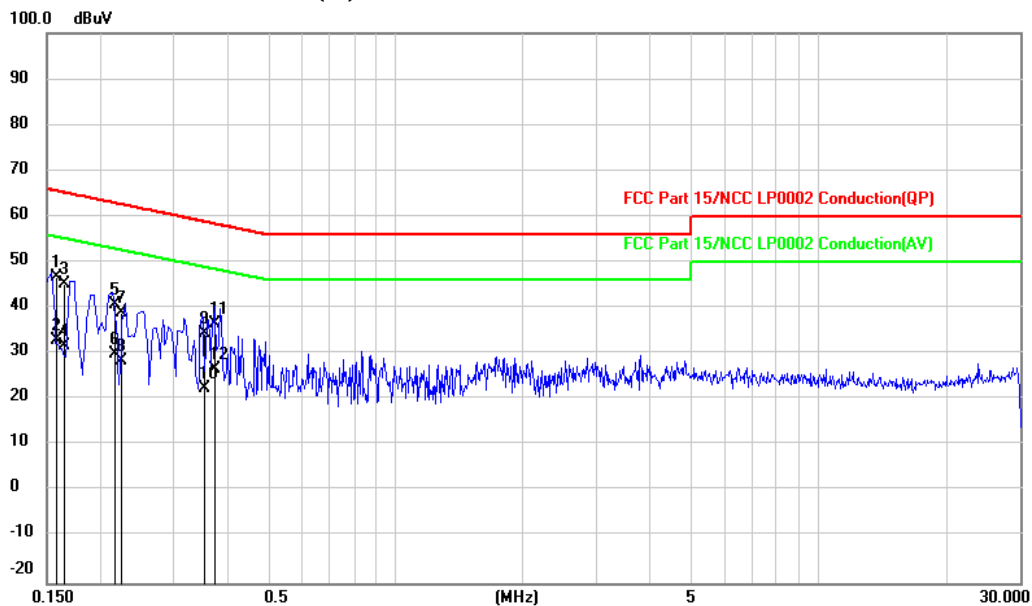
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Phase of Power : Neutral (N)



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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1586	27.31	19.59	46.90	65.54	-18.64	QP
2	0.1586	13.38	19.59	32.97	55.54	-22.57	AVG
3	0.1658	25.68	19.59	45.27	65.17	-19.90	QP
4	0.1658	12.31	19.59	31.90	55.17	-23.27	AVG
5	0.2181	21.28	19.60	40.88	62.89	-22.01	QP
6	0.2181	10.29	19.60	29.89	52.89	-23.00	AVG
7	0.2252	19.26	19.60	38.86	62.62	-23.76	QP
8	0.2252	8.89	19.60	28.49	52.62	-24.13	AVG
9	0.3539	14.78	19.62	34.40	58.87	-24.47	QP
10	0.3539	2.77	19.62	22.39	48.87	-26.48	AVG
11	0.3717	16.88	19.62	36.50	58.46	-21.96	QP
12	0.3717	7.01	19.62	26.63	48.46	-21.83	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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9.8. Automatically Discontinue Transmission

Requirements

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

Test Result

Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinue transmission in case of either absence of information to transmit or operational failure.

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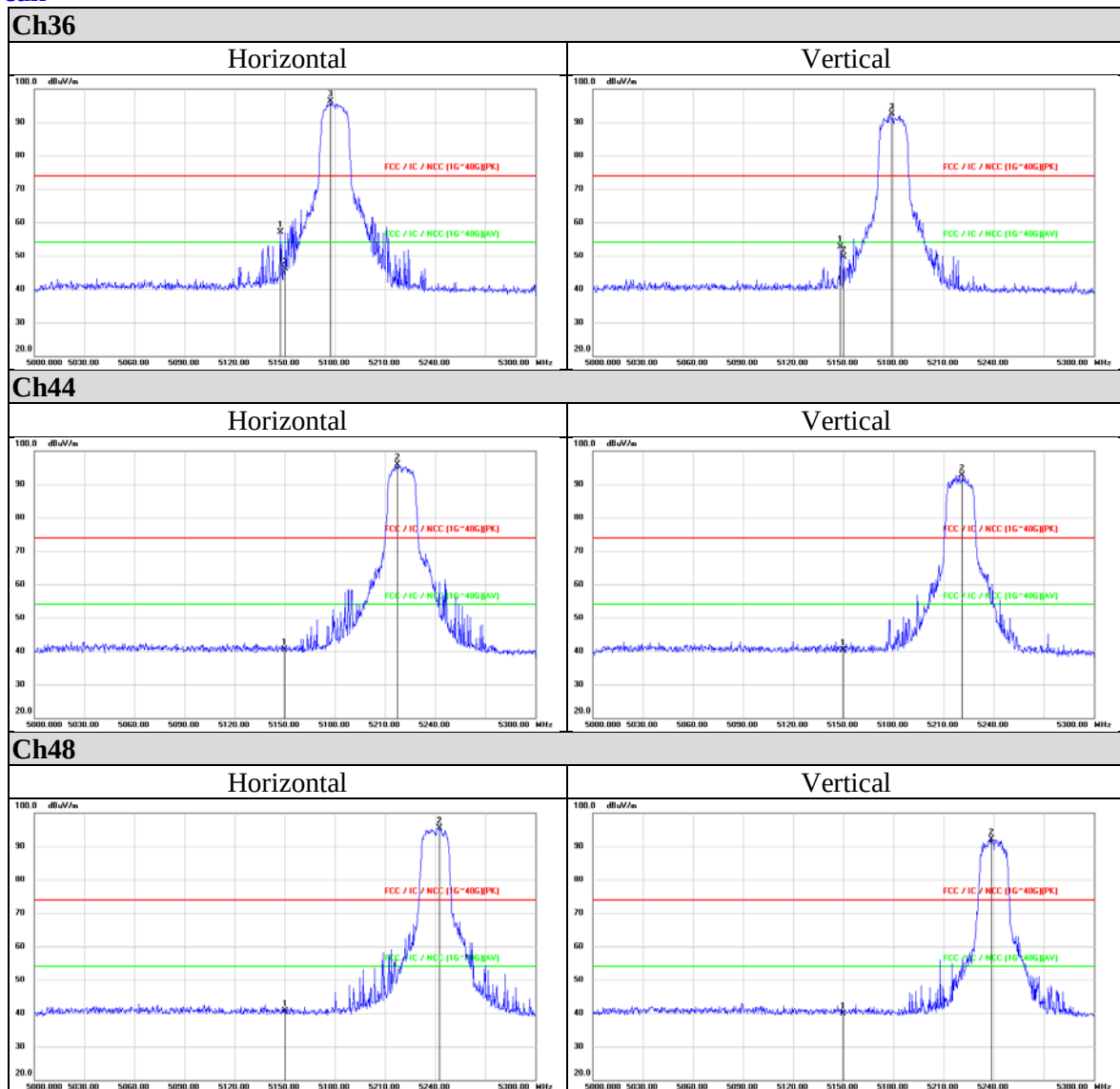
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Appendix I Radiated Band Edge and OOB Measurement

802.11a Peak



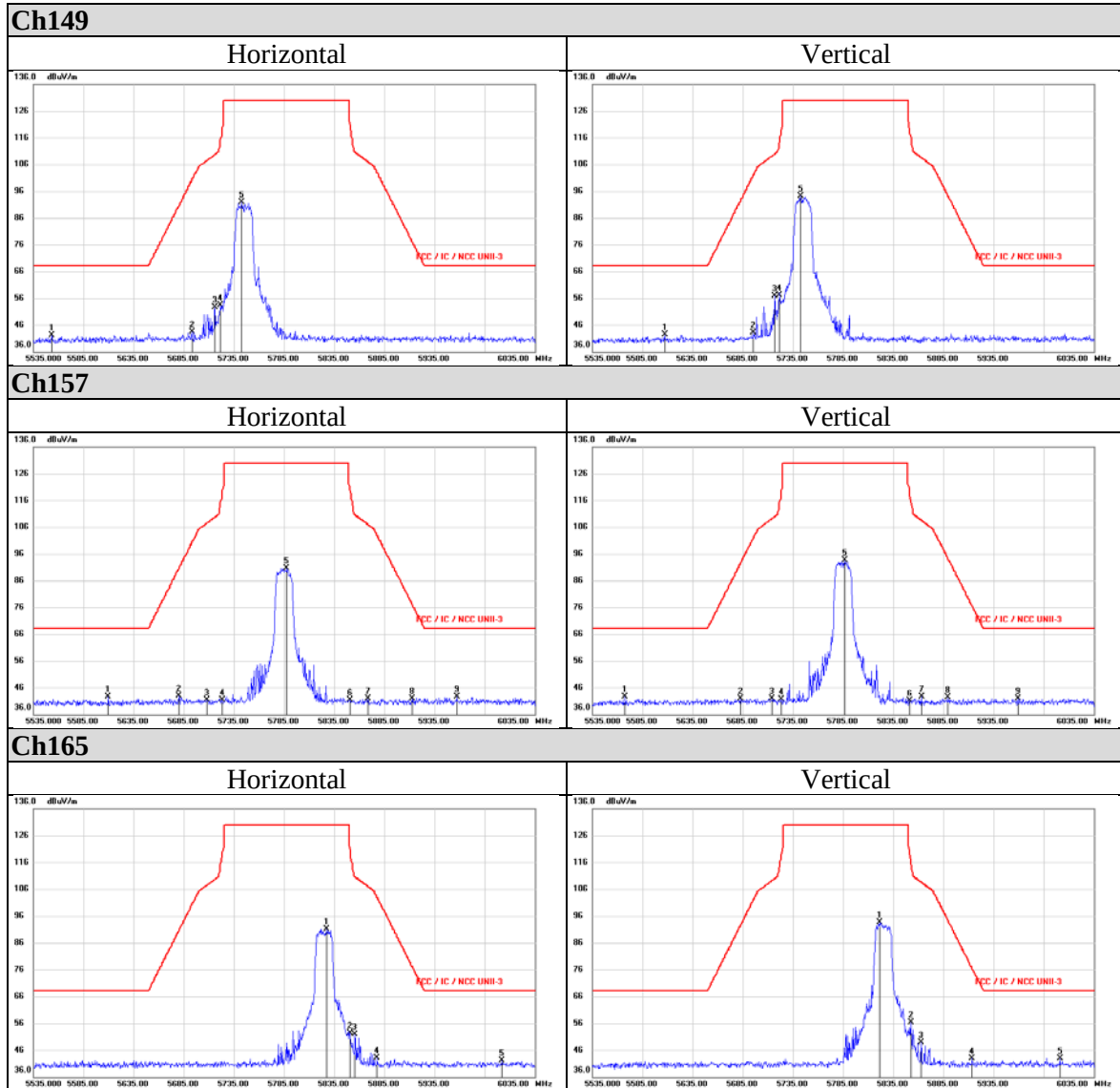
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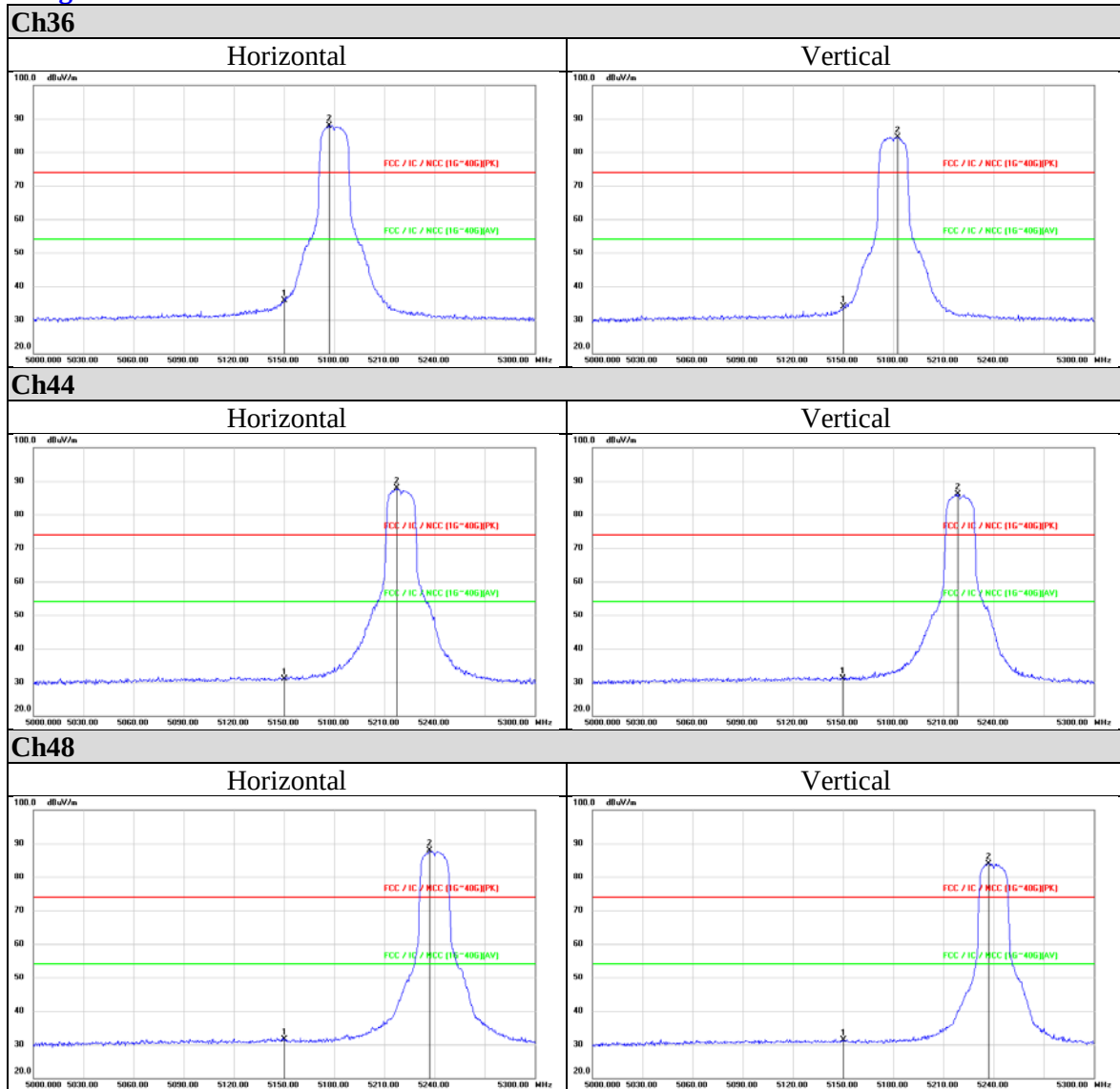
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Average



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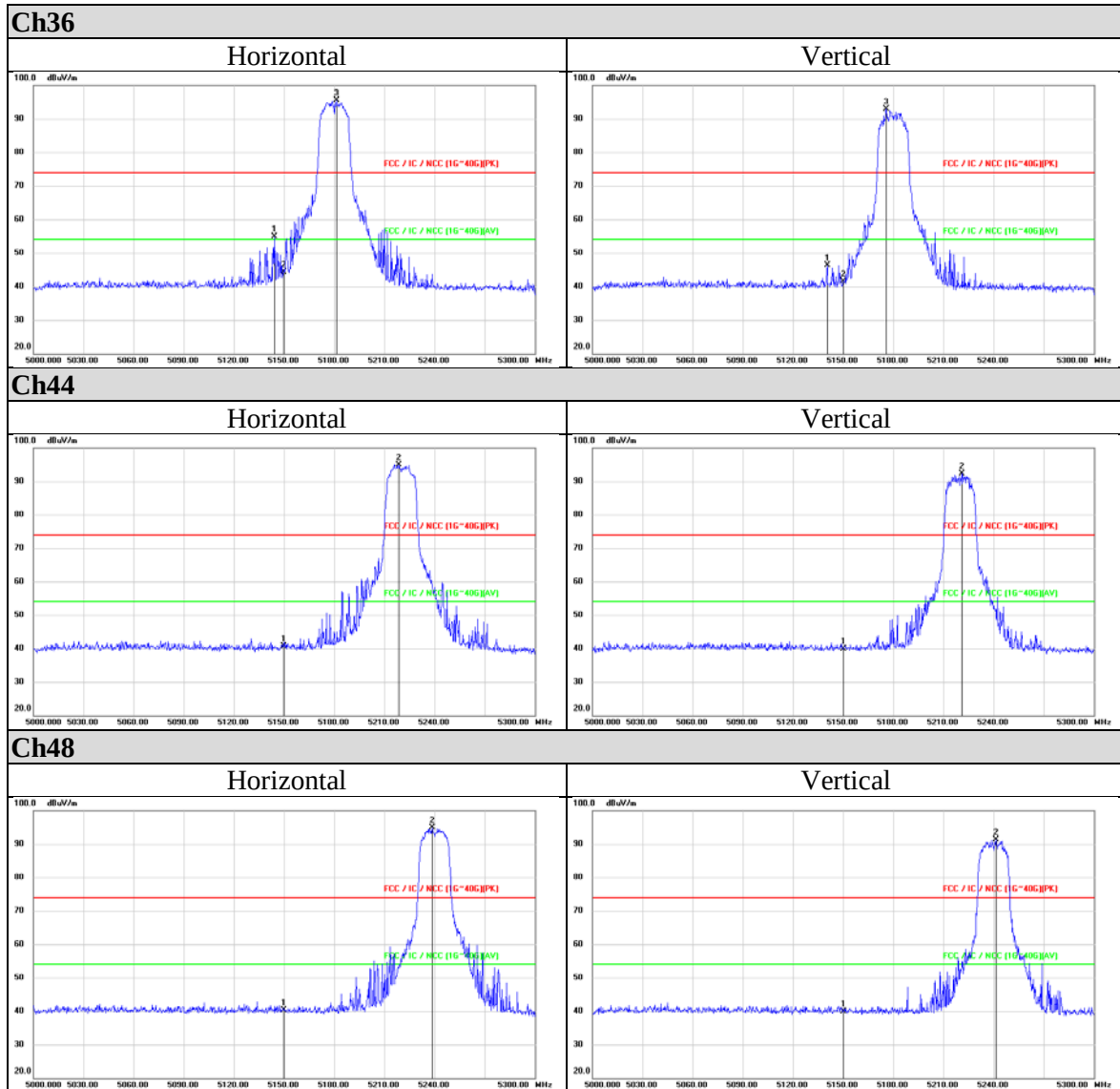
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802.11n (HT20)
Peak



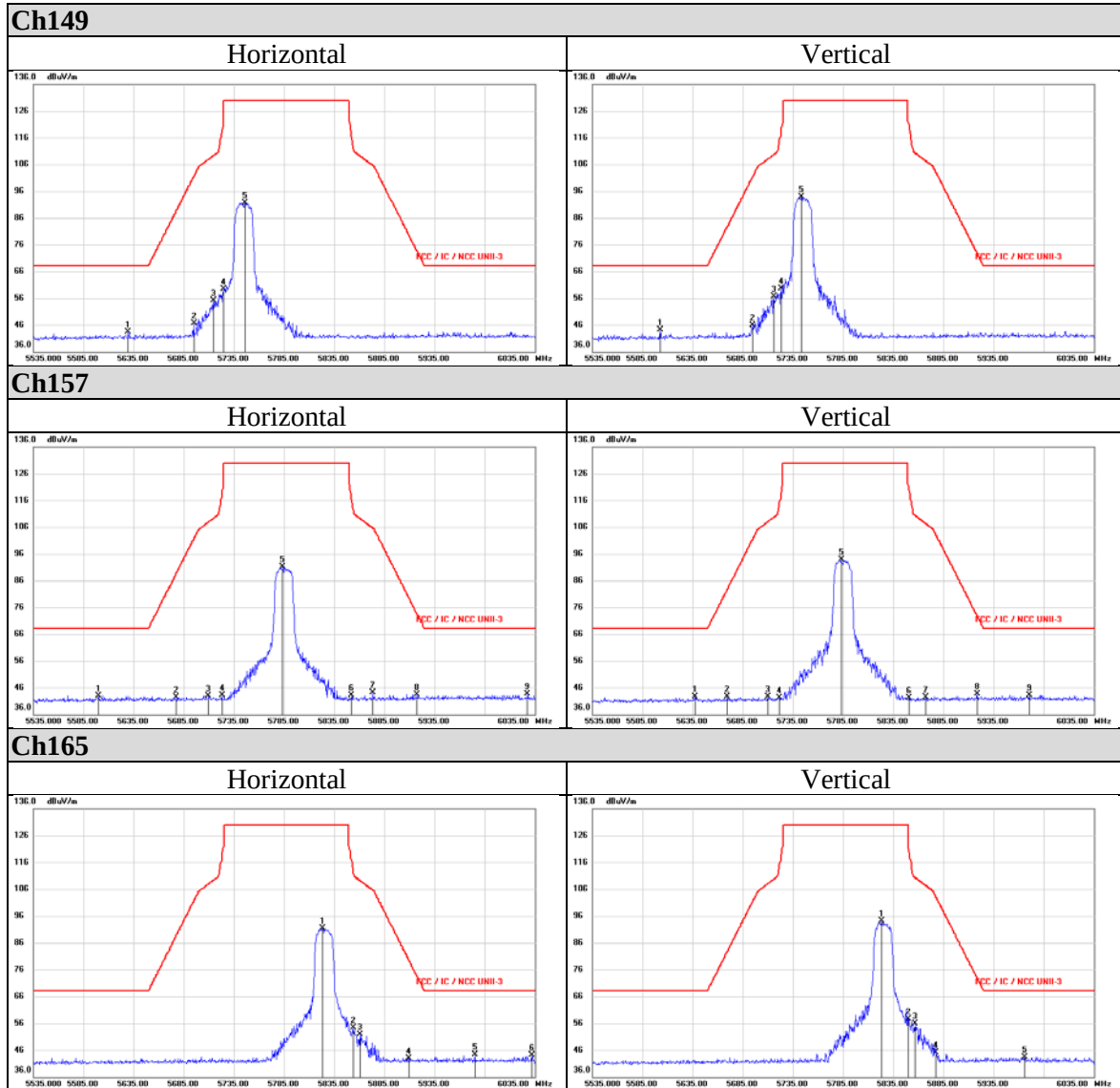
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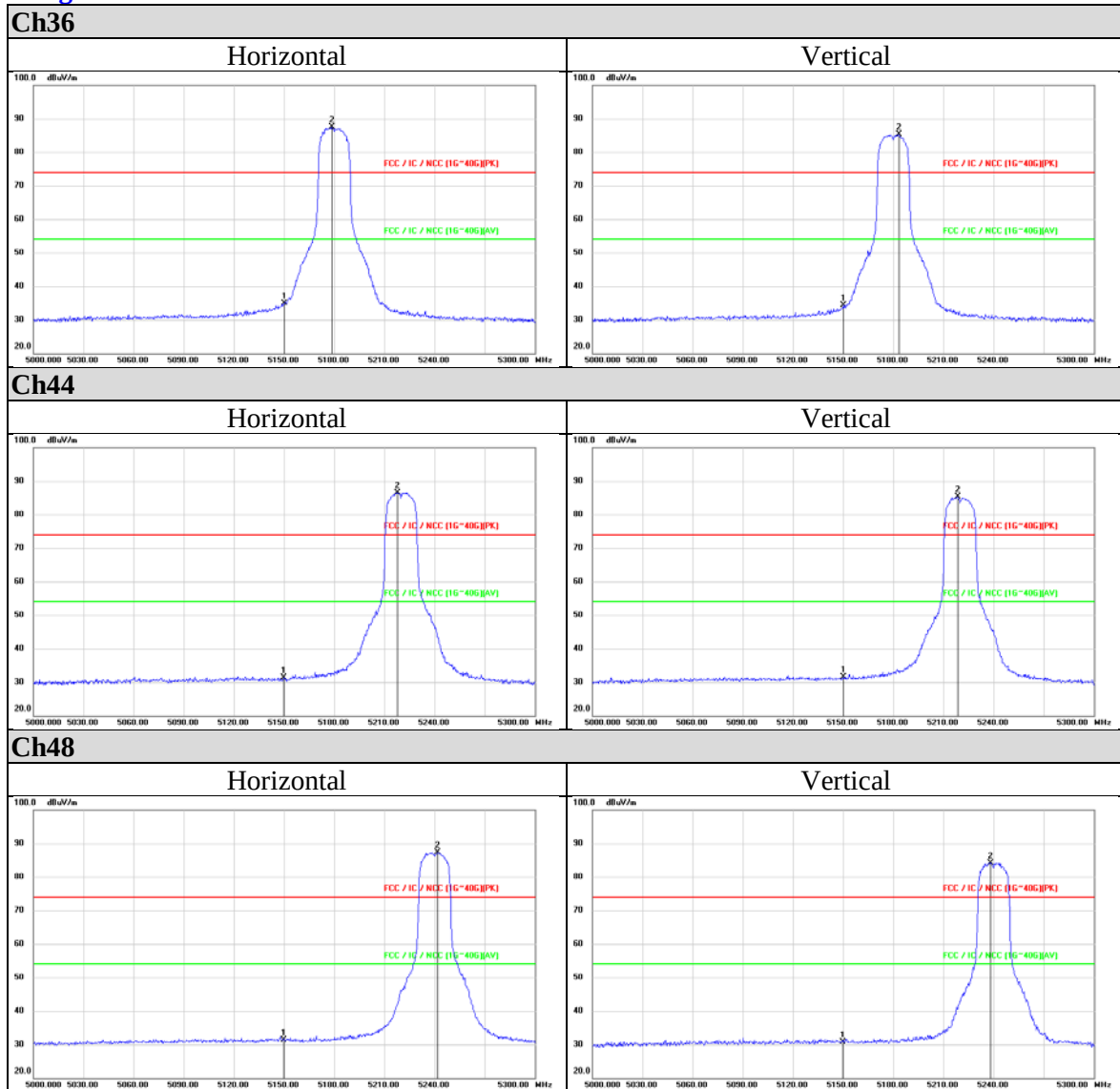
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Average



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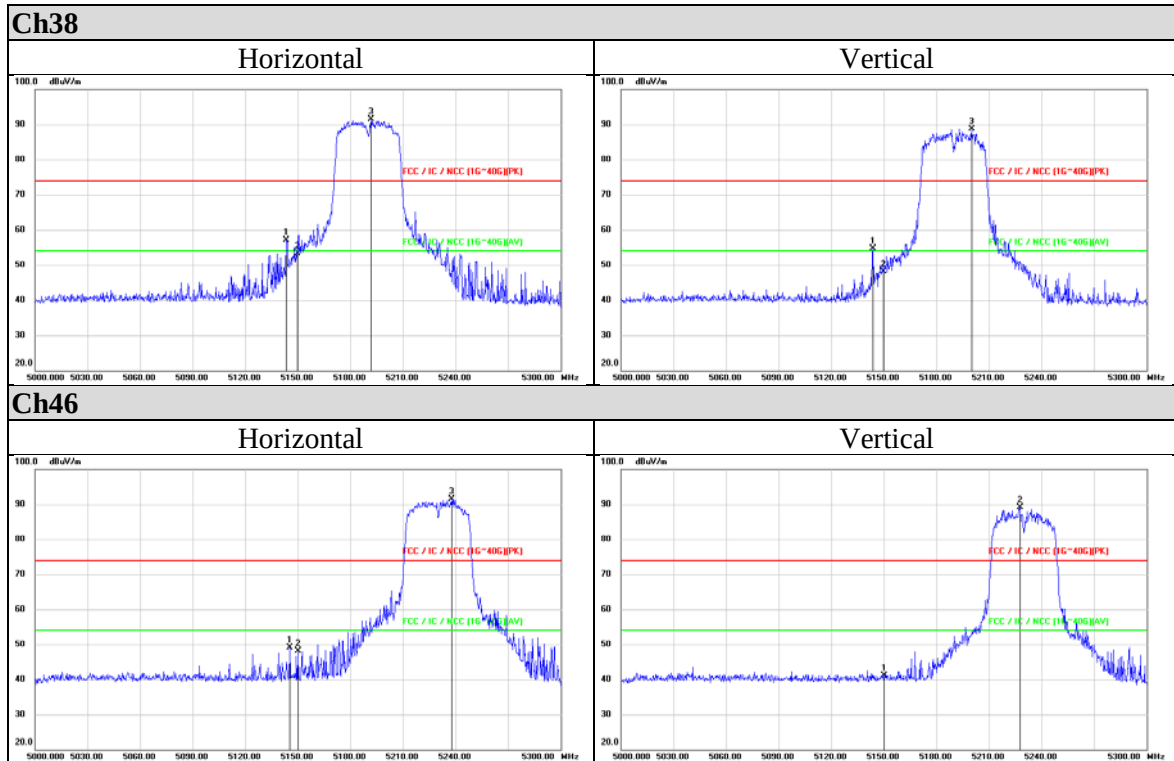
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802.11n (HT40)
Peak



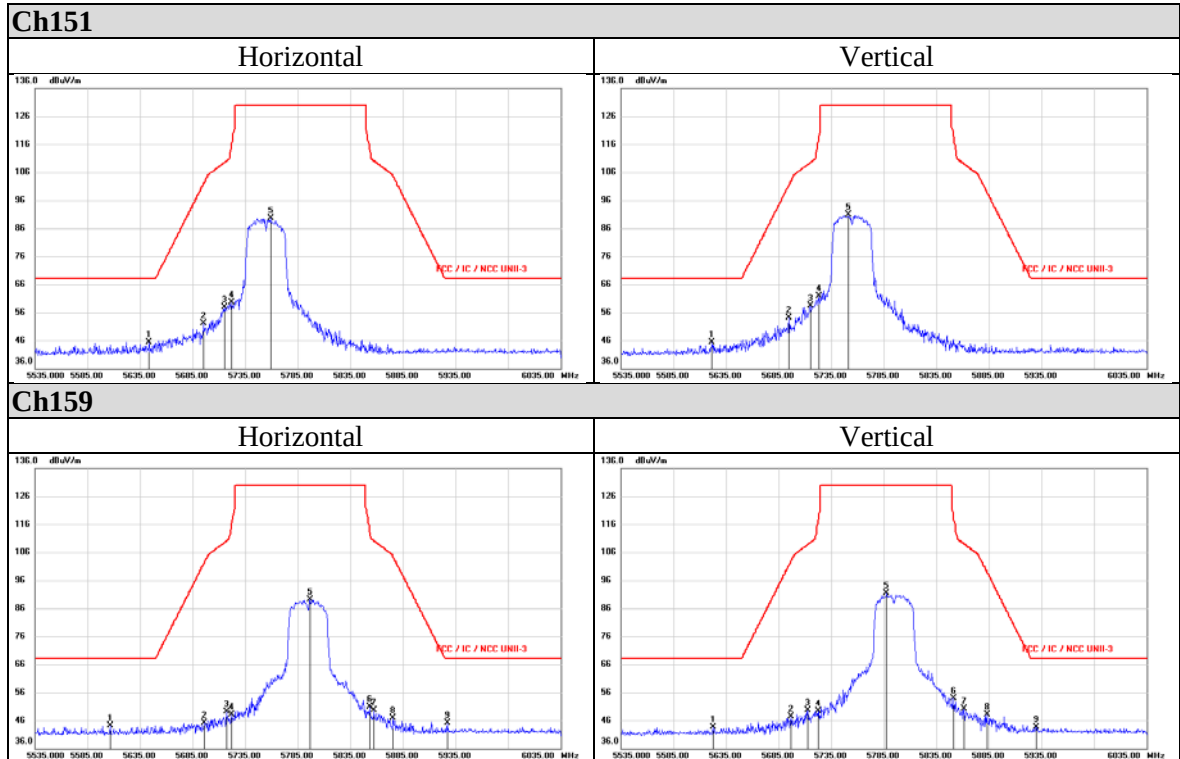
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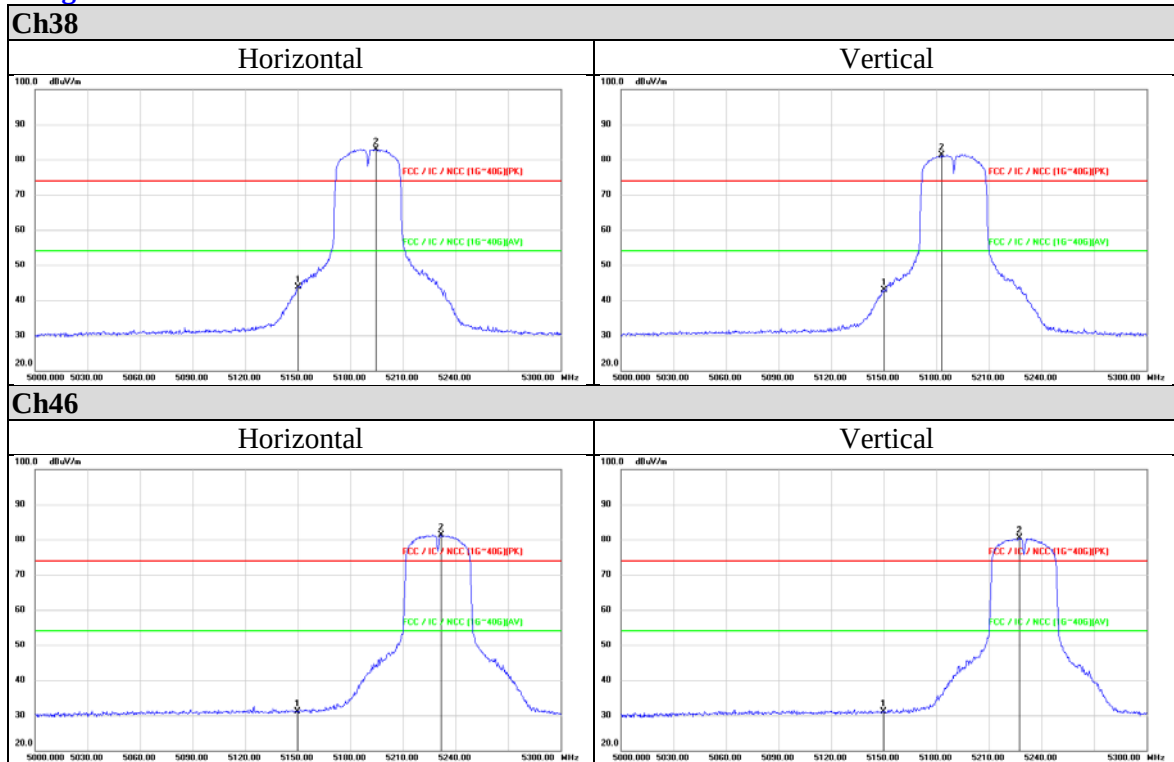
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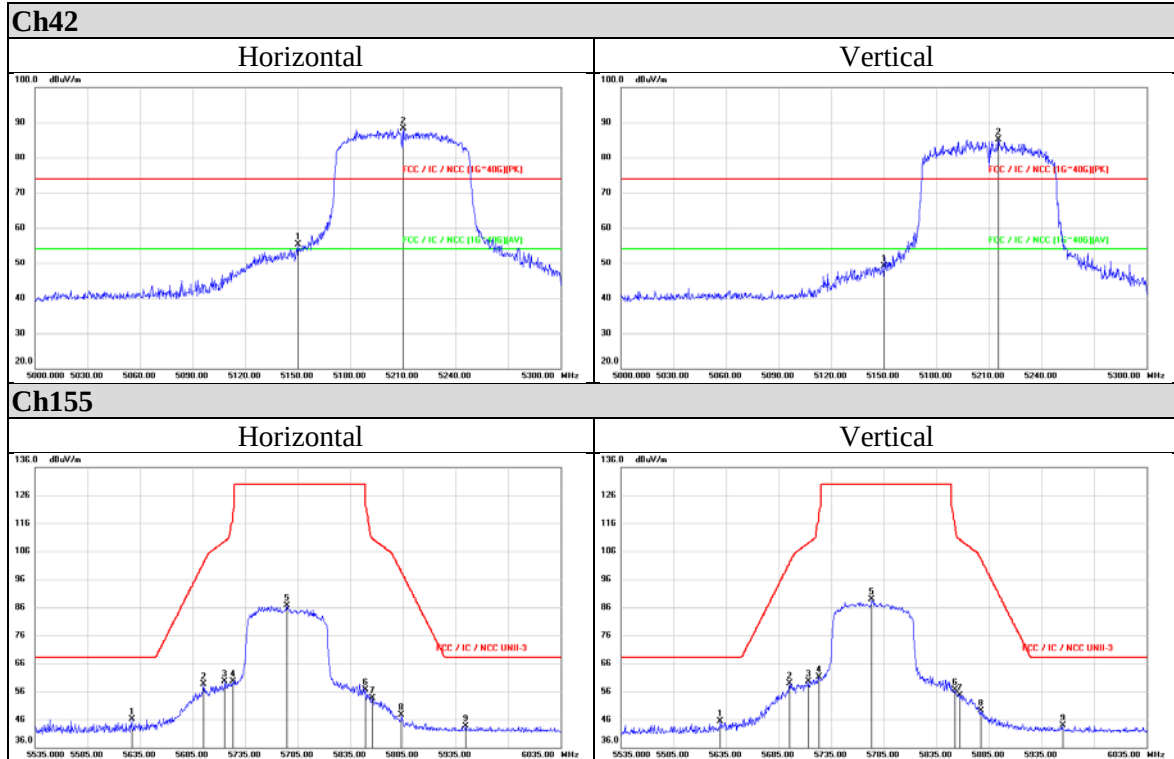
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802.11ac (VHT80)
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