



Test report No. : 4789813598-US-R1-V0  
Page : 1 of 157  
Issued date : 2021/8/16  
FCC ID : 2AAJXQS-IQWIFI6

## RADIO TEST REPORT

**Product** : IQ WiFi 6  
**Model Name** : IQ WiFi 6  
**FCC ID** : 2AAJXQS-IQWIFI6  
**Test Regulation** : FCC 47 CFR Part 15 Subpart E (Section 15.407)  
**Received Date** : 2021/3/8  
**Test Date** : 2021/3/23 ~ 2021/4/27  
**Issued Date** : 2021/8/16

**Applicant** : Qolsys Inc.  
1900 The Alameda, Suite 420, San Jose, CA 95126

**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-F0878 / 5.0





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## 1. Attestation of Test Results

**APPLICANT:** Qolsys Inc.  
 1900 The Alameda, Suite 420, San Jose, CA 95126

**MANUFACTURER:** Funing Precision Component Co, Ltd  
 Lot B, Que Vo Industrial Zone, Nam Son Ward, Bac Ninh  
 City, Bac Ninh Province, Vietnam.

**EUT DESCRIPTION:** IQ WiFi 6

**BRAND:** Qolsys

**MODEL:** IQ WiFi 6

**SAMPLE STAGE:** Mass-Production

**DATE of TESTED:** 2021/3/23 ~ 2021/4/27

<b>APPLICABLE STANDARDS</b>	
<b>STANDARD</b>	<b>Test Results</b>
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. 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:

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Sally Lu  
 Project Handler

Date : 2021/8/16

Approved and Authorized By:

*Mike Cai*

Mike Cai  
 Engineer Project Associate

Date : 2021/8/16

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## 2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.407(e)	6dB Bandwidth	PASS
15.403(i)	26dB Bandwidth	PASS
2.1049	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
15.203	Antenna Requirement	PASS
15.407(h)	Dynamic Frequency Selection	See Note3

Note:

1. For the Radiated Band Edge and OOB test plots were recorded in Appendix I, the Radiated Emissions test plots were recorded in Appendix II.
2. The Occupied Bandwidth was reference only.
3. The “Dynamic Frequency Selection measurement” was recorded in Report No.: 4789813598-US-R2-V0.

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### 3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013 and KDB 662911 D01 Multiple Transmitter Output v02r01.

### 4. Facilities and Accreditation

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

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## 5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

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

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	$\pm 3.1$ dB
RF Conducted	9 kHz - 40GHz	$\pm 1.9$ dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	$\pm 1.9$ dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	$\pm 5.4$ dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	$\pm 4.7$ dB

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## 6. Equipment under Test

### 6.1. Description of EUT

<b>Product</b>	IQ WiFi 6	
<b>Brand Name</b>	Qolsys	
<b>Model Name</b>	IQ WiFi 6	
<b>Operating Frequency</b>	5180 ~ 5240 MHz, 5260 ~ 5320 MHz, 5500 ~ 5720 MHz, 5745 ~ 5825 MHz	
<b>Modulation</b>	1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK	
<b>Transfer Rate</b>	802.11a: up to 54 Mbps 802.11n: up to MCS15 802.11ac: up to MCS9 802.11ax: up to HE11	
<b>Number of Channel</b>	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		1 for 802.11ac (VHT80), 802.11ax (HE80)
	5260 ~ 5320 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		1 for 802.11ac (VHT80), 802.11ax (HE80)
	5500 ~ 5720 MHz	12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		6 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		3 for 802.11ac (VHT80), 802.11ax (HE80),
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		1 for 802.11ac (VHT80), 802.11ax (HE80)

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<b>Maximum Output Power</b>	<b>Non-Beamforming mode:</b> 5180 ~ 5240 MHz: 26.33 dBm 5260 ~ 5320 MHz: 22.62 dBm 5500 ~ 5720 MHz: 23.46 dBm 5745 ~ 5825 MHz: 28.29 dBm <b>Beamforming mode:</b> 5180 ~ 5240 MHz: 26.33 dBm 5260 ~ 5320 MHz: 21.39 dBm 5500 ~ 5720 MHz: 21.39 dBm 5745 ~ 5825 MHz: 27.89 dBm
<b>Normal Voltage</b>	120Vac/ 60Hz
<b>S/N</b>	HHA3210500038
<b>Software Version</b>	N/A

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Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11a	2TX,2RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX
802.11ac (VHT20)	2TX,2RX
802.11ac (VHT40)	2TX,2RX
802.11ac (VHT80)	2TX,2RX
802.11ax (HE20)	2TX,2RX
802.11ax (HE40)	2TX,2RX
802.11ax (HE80)	2TX,2RX

\* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40 / VHT80 and 802.11ax mode for HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report.

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
AC adapter	Sure Power	SW81-120150-01	Input: 100-240V, 50-60 Hz, 0.68A Output: 12V, 1.5A Length: 1.8m
RJ-45 cable	Neiyi	NYS4681	Non-shielded Length: 1.5m
cradle	N/A	N/A	N/A

3. The device of WLAN 2.4G radio and WLAN 5G radio can transmit simultaneously, simultaneously transmission condition as following table:

Condition	Technology
1	WLAN (2.4GHz) + WLAN (5GHz)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found, worst case to representative condition in test report.

4. 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), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210MHz

### FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
58	5290MHz

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### FOR 5500 ~ 5720MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
106	5530MHz	138	5690MHz
122	5610MHz	-	-

### FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775MHz

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### 6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	23~27°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan
Radiated Spurious Emission	966-2	22~26°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan
AC power Line Conducted Emission	SR1	22~26°C/ 60~65%RH	120Vac/ 60Hz	2021/03/23~ 2021/04/27	WaterNil Guan

FCC Test Firm Registration Number: 498077

### 6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Frequency Band (GHz)	Maximum Gain (dBi)
1	Chain (0)	Passive System Alliance	WA-P-LB-02-849	PIFA	2.4~2.4835	3.74
					5.15~5.35	5.42
					5.47~5.725	5.77
					5.725~5.85	5.51
2	Chain (1)	Passive System Alliance	WA-P-LB-03-172	PIFA	2.4~2.4835	3.43
					5.15~5.35	5.17
					5.47~5.725	5.26
					5.725~5.85	5.26

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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## 6.5. Test Mode Applicability and Tested Channel Detail

- For AC power line conducted emissions, the pre-scan has been determined by AC power 120Vac/60Hz (worst case)
- The antenna No.1 has the highest gain, the following tests are all carried out using this antenna
- The fundamental of the EUT was investigated in three orthogonal axes X/Y/Z, it was determined that Z axis was worst-case. Therefore, all final radiated testing was performed with the EUT in Z axis.
- The EUT was investigated in Beamforming mode and non-Beamforming mode, it was determined that non-Beamforming mode was worst-case for bandedge test result. Therefore, all final radiated testing was performed with the EUT in Beamforming mode (Except for legacy mode modulation).
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- 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).

### Non-Beamforming mode

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	6Mbps
	802.11ax20		OFDMA	36 to 48	36, 44, 48	HE0
	802.11ax40			38 to 46	38, 46	HE0
	802.11ax80			42	42	HE0
	802.11a	5260-5320	OFDM	52 to 64	52, 60, 64	6Mbps
	802.11ax20		OFDMA	52 to 64	52, 60, 64	HE0
	802.11ax40			54 to 62	54, 62	HE0
	802.11ax80			58	58	HE0
	802.11a	5500-5720	OFDM	100 to 144	100,116,140,144	6Mbps
	802.11ax20		OFDMA	100 to 144	100,116,140,144	HE0
	802.11ax40			102 to 142	102, 110, 134,142	HE0
	802.11ax80			106, 122,138	106, 122,138	HE0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6Mbps
	802.11ax20		OFDMA	149 to 165	149, 157, 165	HE0
	802.11ax40			151 to 159	151, 159	HE0
	802.11ax80			155	155	HE0
Radiated Emissions (Below 1GHz)	802.11a	5745-5825	OFDM	149 to 165	149	6Mbps
AC Power Line Conducted Emission	802.11a	5745-5825	OFDM	149 to 165	149	6Mbps

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Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
*Antenna Port Conducted Measurement	802.11a	5180-5240	OFDM	36 to 48	36, 44, 48	6Mbps
	802.11ax20		OFDMA	36 to 48	36, 44, 48	HE0
	802.11ax40			38 to 46	38, 46	HE0
	802.11ax80			42	42	HE0
	802.11a	5260-5320	OFDM	52 to 64	52, 60, 64	6Mbps
	802.11ax20		OFDMA	52 to 64	52, 60, 64	HE0
	802.11ax40			54 to 62	54, 62	HE0
	802.11ax80			58	58	HE0
	802.11a	5500-5720	OFDM	100 to 144	100,116,140,144	6Mbps
	802.11ax20		OFDMA	100 to 144	100,116,140,144	HE0
	802.11ax40			102 to 142	102, 110, 134,142	HE0
	802.11ax80			106, 122,138	106, 122,138	HE0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6Mbps
	802.11ax20		OFDMA	149 to 165	149, 157, 165	HE0
	802.11ax40			151 to 159	151, 159	HE0
	802.11ax80			155	155	HE0

\*Note: The worse spurious emissions test and maximum output power was found in Non-Beamforming mode. Therefore Beamforming mode only the test data of the RF output power were recorded in this report.

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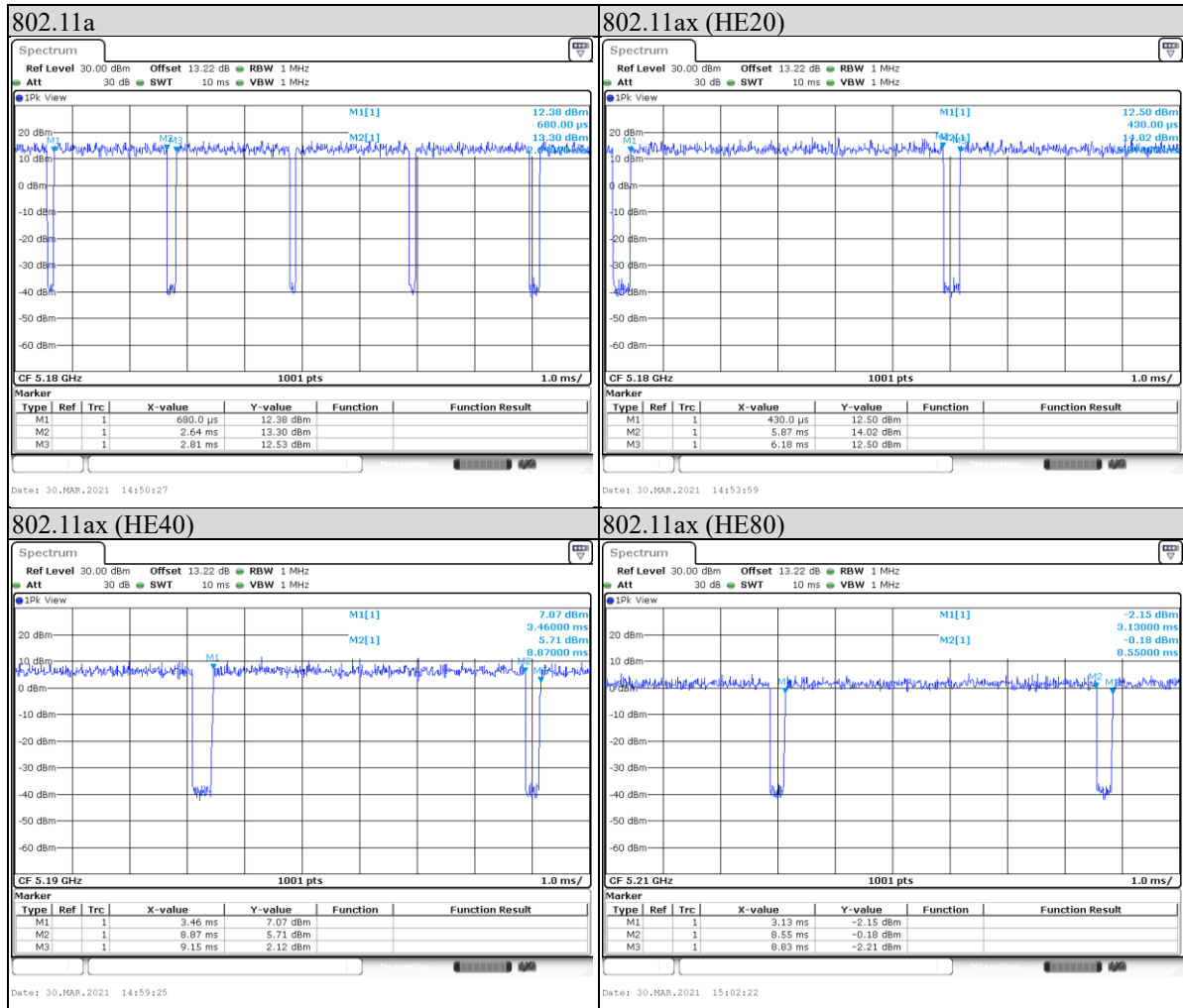
## 6.6. Duty cycle

802.11a: Duty cycle =  $1.96/2.13 = 0.92$ , Duty factor(dB) =  $10 * \log(1/0.92) = 0.37$

802.11ax (HE20): Duty cycle =  $5.44/5.75 = 0.946$ , Duty factor(dB) =  $10 * \log(1/0.946) = 0.25$

802.11ax (HE40): Duty cycle =  $5.41/5.69 = 0.951$ , Duty factor(dB) =  $10 * \log(1/0.951) = 0.22$

802.11ax (HE80): Duty cycle =  $5.42/5.7 = 0.951$ , Duty factor(dB) =  $10 * \log(1/0.951) = 0.22$







## 7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
<b>Radiated Spurious Emission</b>					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2020/11/11	2021/11/10
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2020/12/11	2021/12/10
Loop Antenna	ETS lindgren	6502	00213440	2020/12/25	2021/12/24
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2021/1/13	2022/1/12
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2020/12/30	2021/12/29
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2020/12/30	2021/12/29
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2020/6/9	2021/6/8
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2021/2/3	2022/2/2
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2020/5/19	2021/5/18
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2021/1/22	2022/1/21
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2021/1/22	2022/1/21

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	2020/11/6	2021/11/5
Pulse Power Sensor	Anritsu	MA2411B	1531202	2020/12/21	2021/12/20
Power Meter	Anritsu	ML2495A	1645002	2020/12/21	2021/12/20
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA1701-010	2021/3/22	2022/3/21
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2020/11/17	2021/11/16
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2020/8/19	2021/8/18
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2020/8/12	2021/8/11
Cables	TITAN	CFD200	T0732ACFD20 020A300-1	2021/3/2	2022/3/1

UL Software		
Description	Name	Version
Radiated measurement	EZ_EMCC	1.1.4.2
Conducted measurement	Keysight.TestSystem	1.0.0.0
AC power Line Conducted Emission	EZ_EMCC	1.1.4.2

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## 8. Description of Test Setup

### Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Laptop	DELL	Latitude E5470	CXSKWF2	N/A
B	Adapter	Sure Power	SW81-120150-01	N/A	N/A

### I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	RJ-45 Cable	Fastlink	FL-61STU-04	10	N/A
2	DC cable	Sure Power	SW81-120150-01	N/A	N/A
3	RJ-45 Cable	Neiyi	NYS4681	1.5	N/A

### Test Setup

Controlled using a bespoke application (QSPR (5.0-00197)) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

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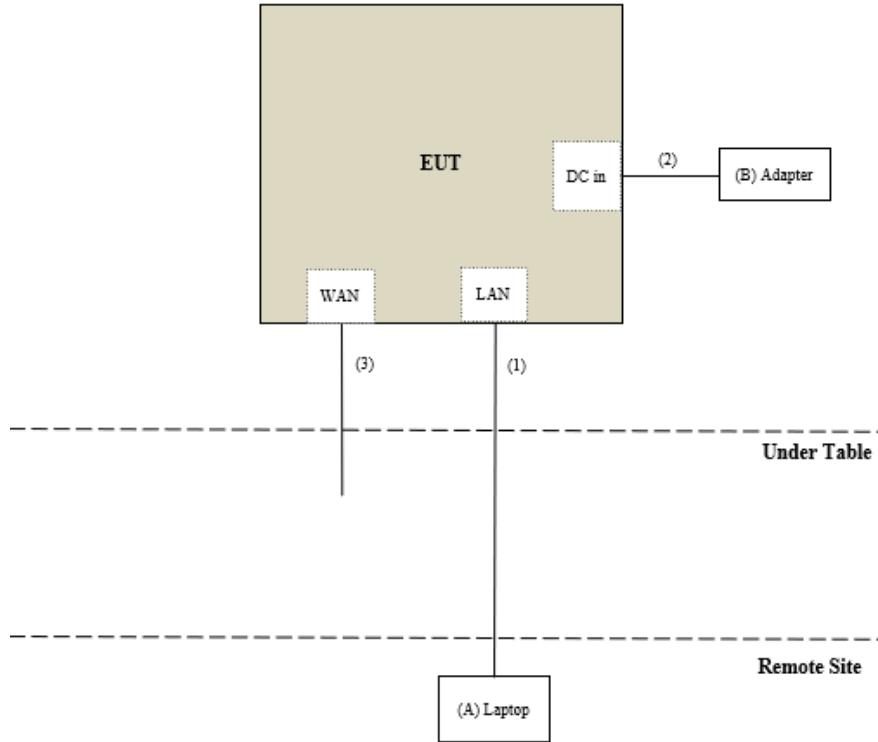
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**Setup Diagram for Test**



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## 9. Test Results

### 9.1. 6dB Bandwidth

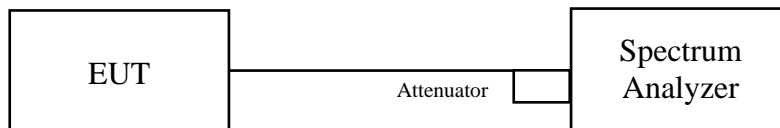
#### Requirements

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



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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## Test Data

### 802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (U-NII-3 Band)	5720	3.07	2.79	0.5	PASS
149	5745	15.50	15.30	0.5	PASS
157	5785	15.30	15.90	0.5	PASS
165	5825	15.34	15.34	0.5	PASS

### 802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (U-NII-3 Band)	5720	3.39	4.19	0.5	PASS
149	5745	16.78	17.54	0.5	PASS
157	5785	16.30	16.66	0.5	PASS
165	5825	17.58	18.30	0.5	PASS

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### 802.11ax (HE40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142 (U-NII-3 Band)	5710	3.78	3.62	0.5	PASS
151	5755	37.64	37.64	0.5	PASS
159	5795	37.64	37.72	0.5	PASS

### 802.11ax (HE80)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138 (U-NII-3 Band)	5690	5.92	5.60	0.5	PASS
155	5775	80.40	78.96	0.5	PASS

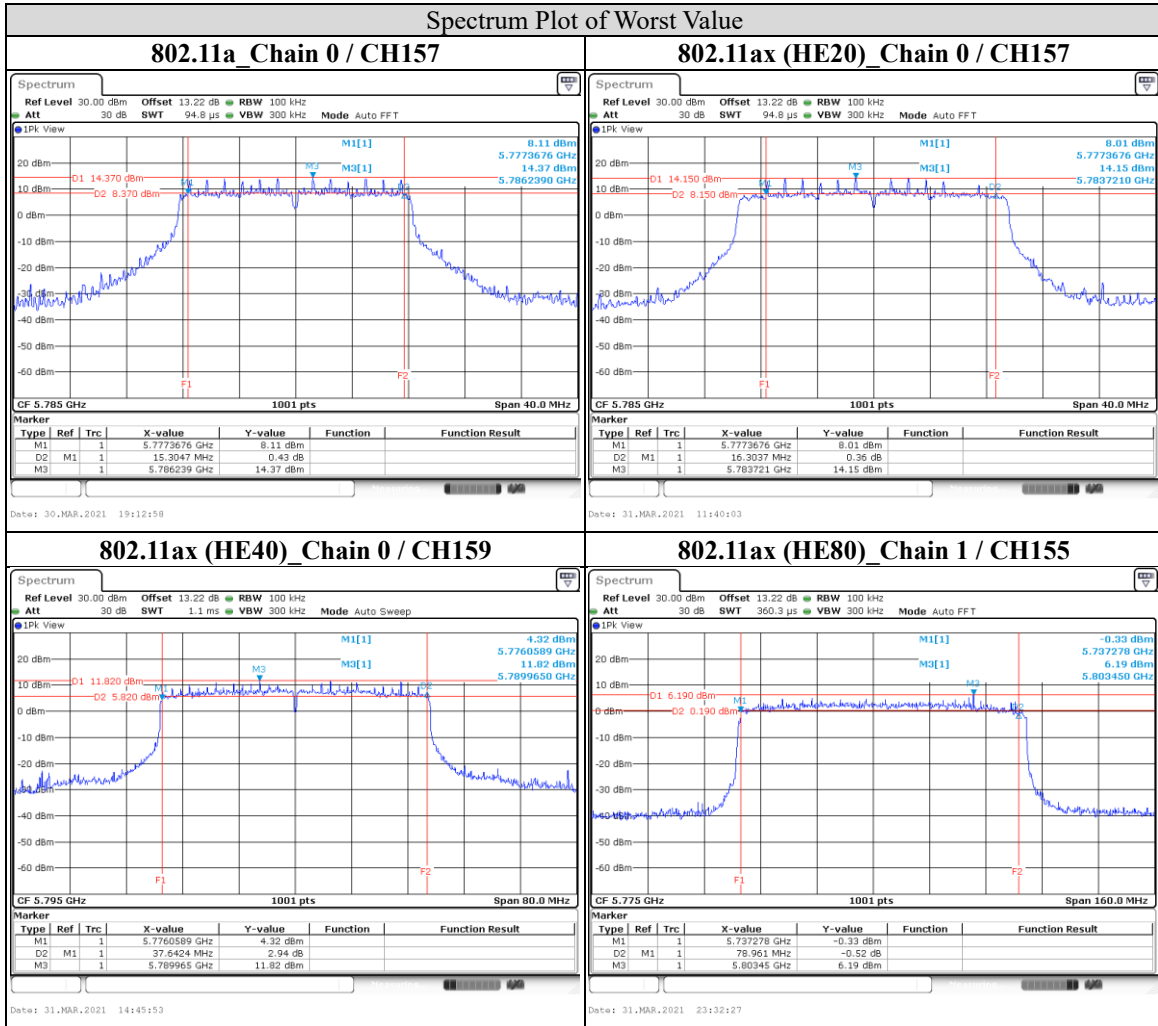
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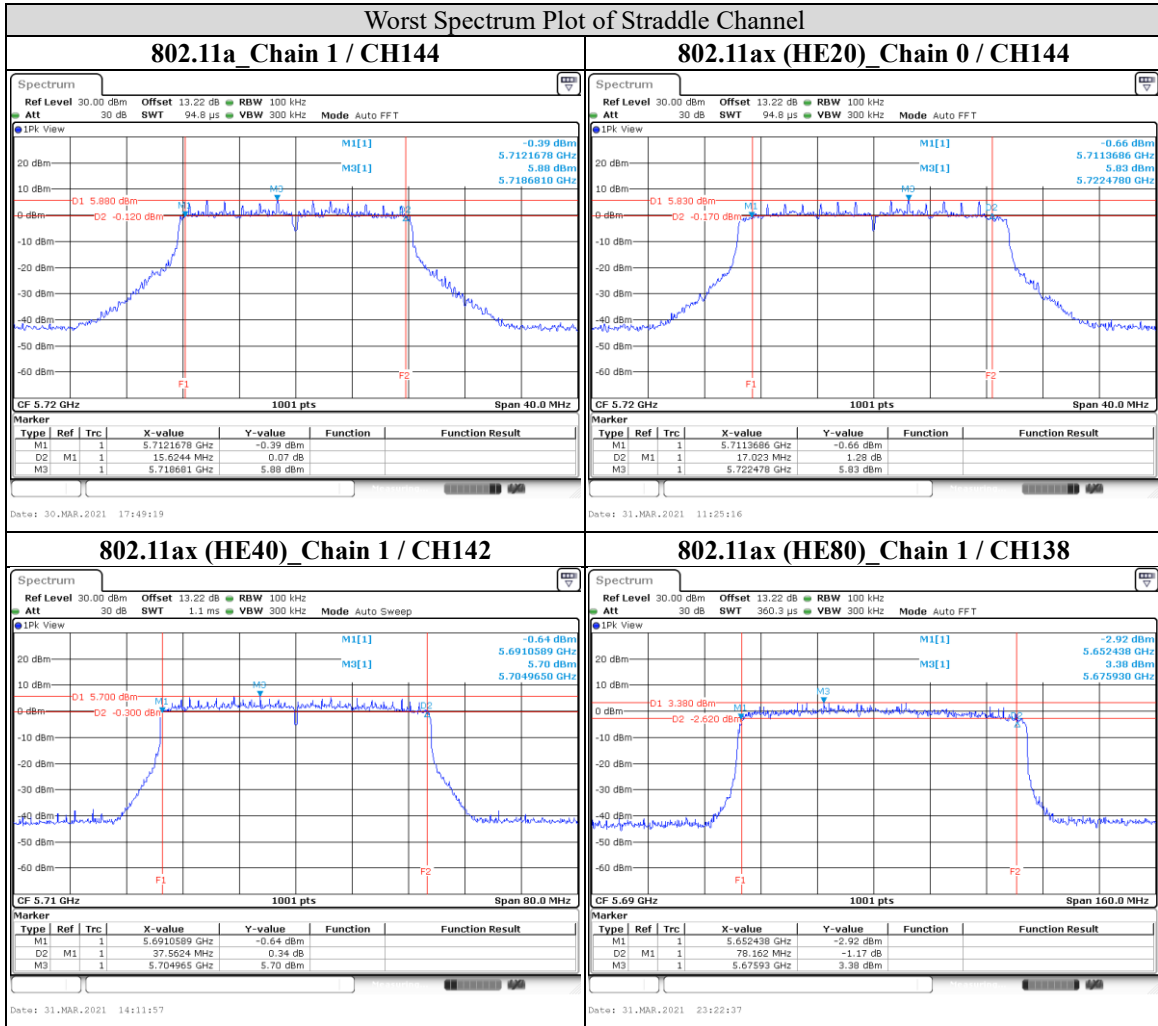
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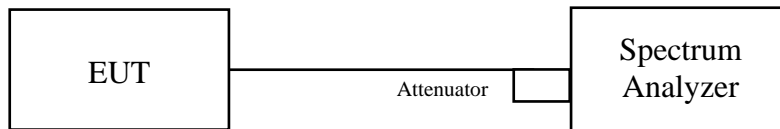


## 9.2. 26dB Bandwidth

### Test procedure

- a. Set RBW = approximately 1% of the emission bandwidth.
- b. Set the VBW > RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. 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



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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## Test Data

### 802.11a

Channel	Channel Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.46	20.42
60	5300	20.50	20.70
64	5320	20.54	20.14
100	5500	20.74	20.70
116	5580	20.46	20.58
140	5700	20.38	20.10
144	5720	20.22	20.54
144 (U-NII-2c Band)	5720	15.07	15.31

### 802.11ax (HE20)

Channel	Channel Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.46	20.90
60	5300	21.61	21.50
64	5320	21.42	21.14
100	5500	21.58	21.34
116	5580	21.34	21.22
140	5700	21.30	21.78
144	5720	21.30	21.38
144 (U-NII-2c Band)	5720	15.71	15.71

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### 802.11ax (HE40)

Channel	Channel Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	41.00	41.48
62	5310	41.08	41.32
102	5510	40.76	40.76
110	5550	41.08	41.08
134	5670	41.00	41.24
142	5710	41.16	41.16
142 (U-NII-2c Band)	5710	35.78	35.78

### 802.11ax (HE80)

Channel	Channel Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	82.16	82.32
106	5530	82.48	82.80
122	5610	85.83	85.83
138	5690	85.67	85.51
138 (U-NII-2c Band)	5690	75.92	75.60

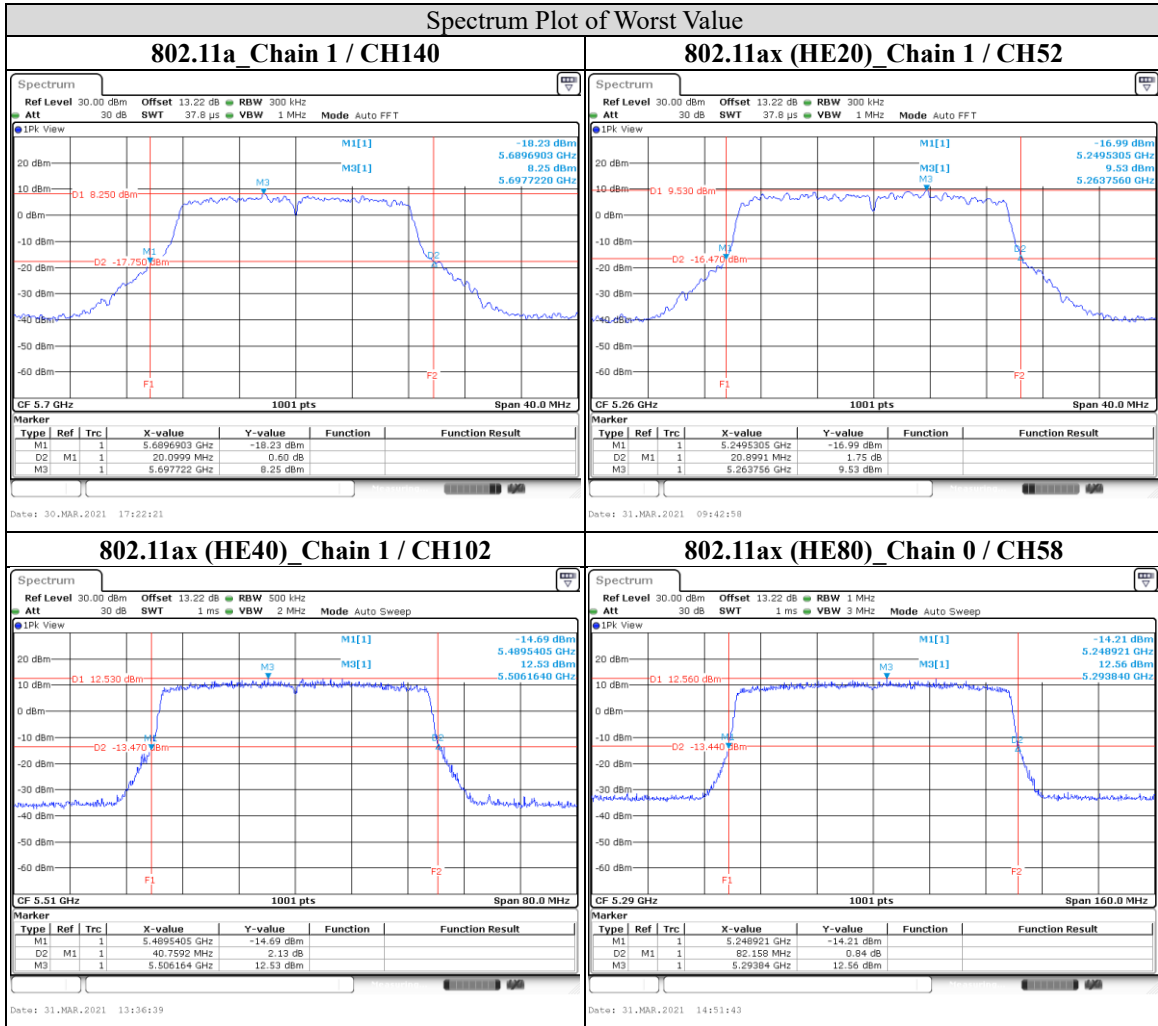
### Underwriters Laboratories Taiwan Co., Ltd.

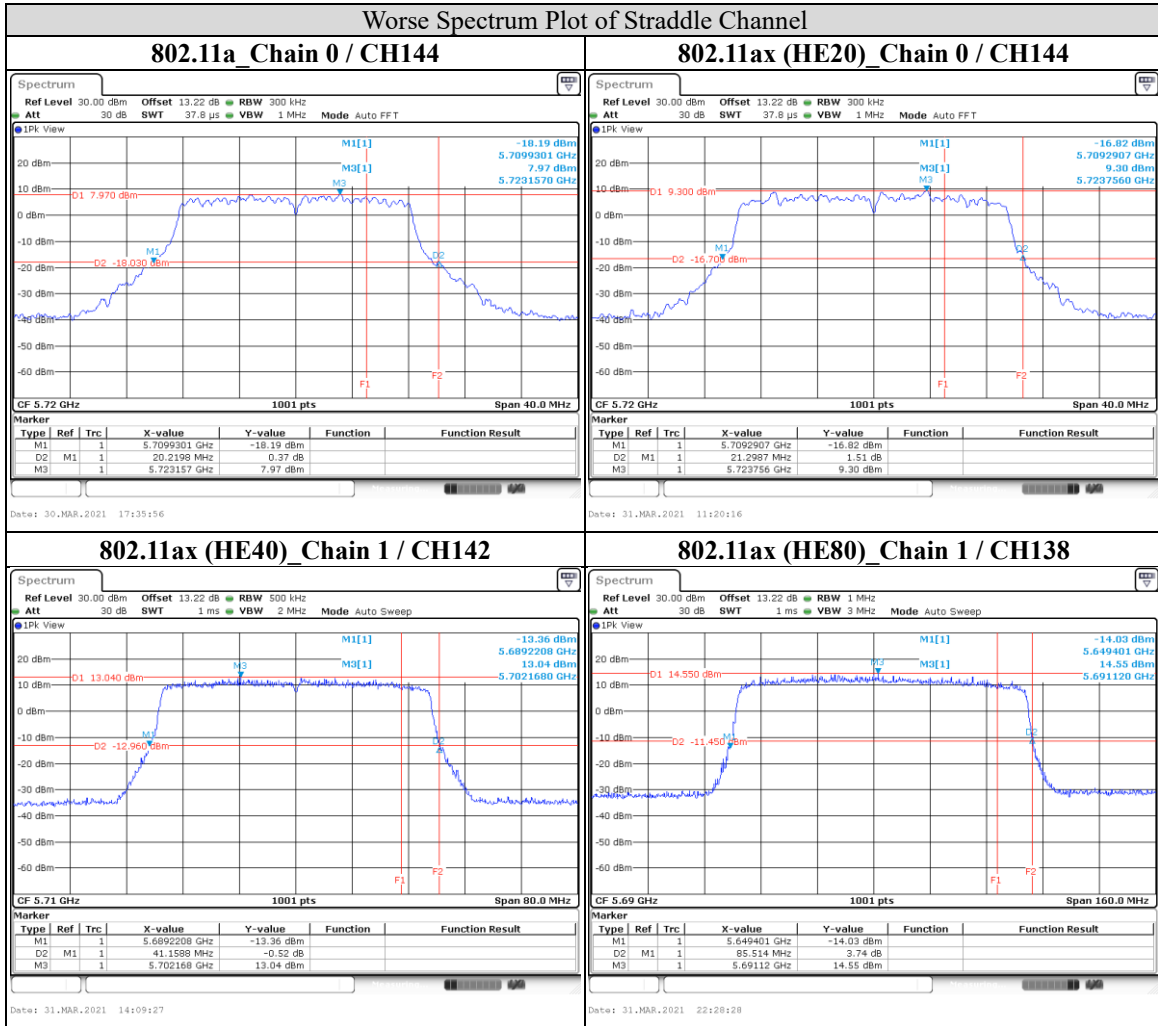
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Note: The bandwidth below 5725MHz = Delta 2 – (Marker 1 + Delta 2 – 5725MHz)

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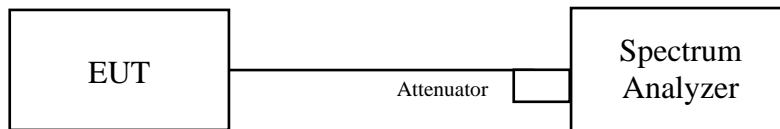


### 9.3. Occupied Bandwidth

#### Test procedure

- a. Set center frequency to the nominal EUT channel center frequency.
- b. Set span = 1.5 times to 5.0 times the OBW.
- c. Set RBW = 1% to 5% of the OBW
- d. Set VBW  $\geq 3 \times$  RBW
- e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f. Use the 99% power bandwidth function of the instrument (if available).
- g. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

#### Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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## Test Data

### 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.46	16.42
44	5220	16.46	16.42
48	5240	16.42	16.42
52	5260	16.42	16.46
60	5300	16.42	16.42
64	5320	16.46	16.46
100	5500	16.42	16.42
116	5580	16.42	16.42
140	5700	16.42	16.42
144	5720	16.50	16.46
149	5745	16.46	16.46
157	5785	16.42	16.42
165	5825	16.42	16.46

### 802.11ax (HE20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.98	18.98
44	5220	18.90	18.94
48	5240	18.94	18.94
52	5260	18.94	18.94
60	5300	18.86	18.94
64	5320	18.94	18.94
100	5500	18.90	19.02
116	5580	18.94	18.90
140	5700	19.02	18.90
144	5720	18.90	18.94
149	5745	18.98	18.98
157	5785	18.94	18.98
165	5825	18.94	19.02

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### 802.11ax (HE40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.64	37.80
46	5230	37.72	37.72
54	5270	37.72	37.72
62	5310	37.72	37.72
102	5510	37.72	37.80
110	5550	37.80	37.80
134	5670	37.80	37.72
142	5710	37.72	37.72
151	5755	37.72	37.88
159	5795	37.80	37.80

### 802.11ax (HE80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	77.04	77.20
58	5290	76.88	77.20
106	5530	77.04	77.20
122	5610	80.40	80.72
138	5690	80.40	80.40
155	5775	80.72	80.56

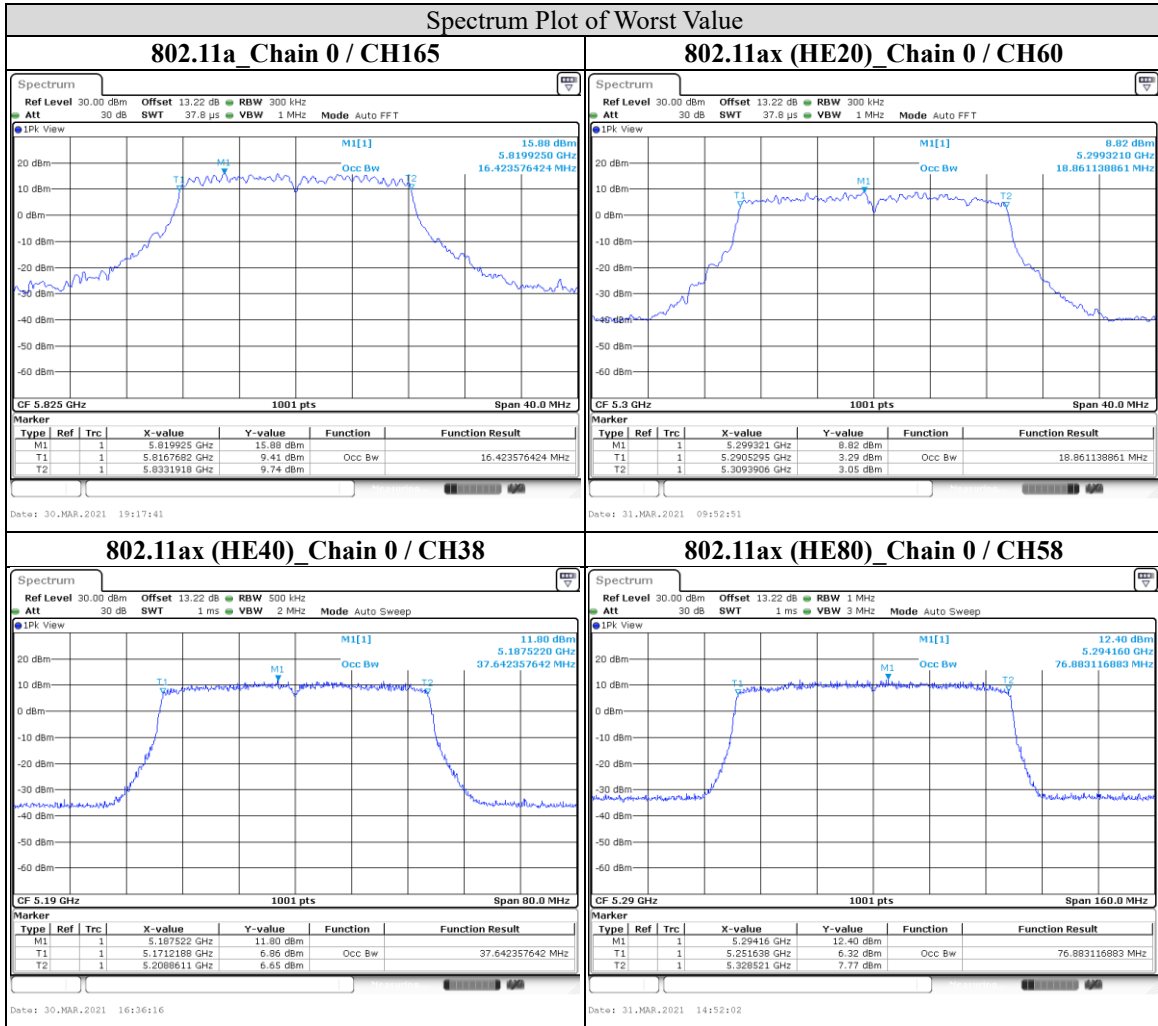
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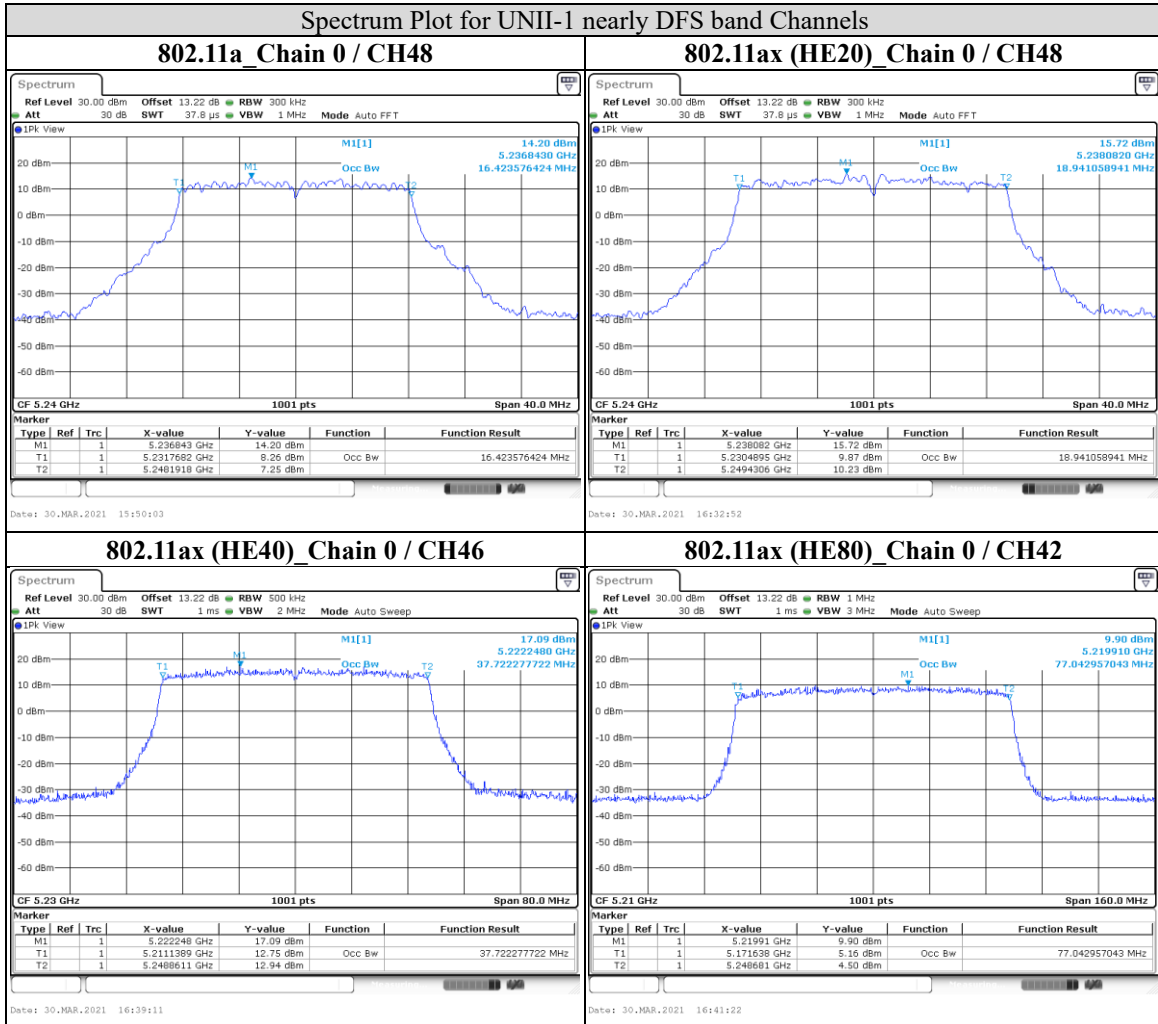
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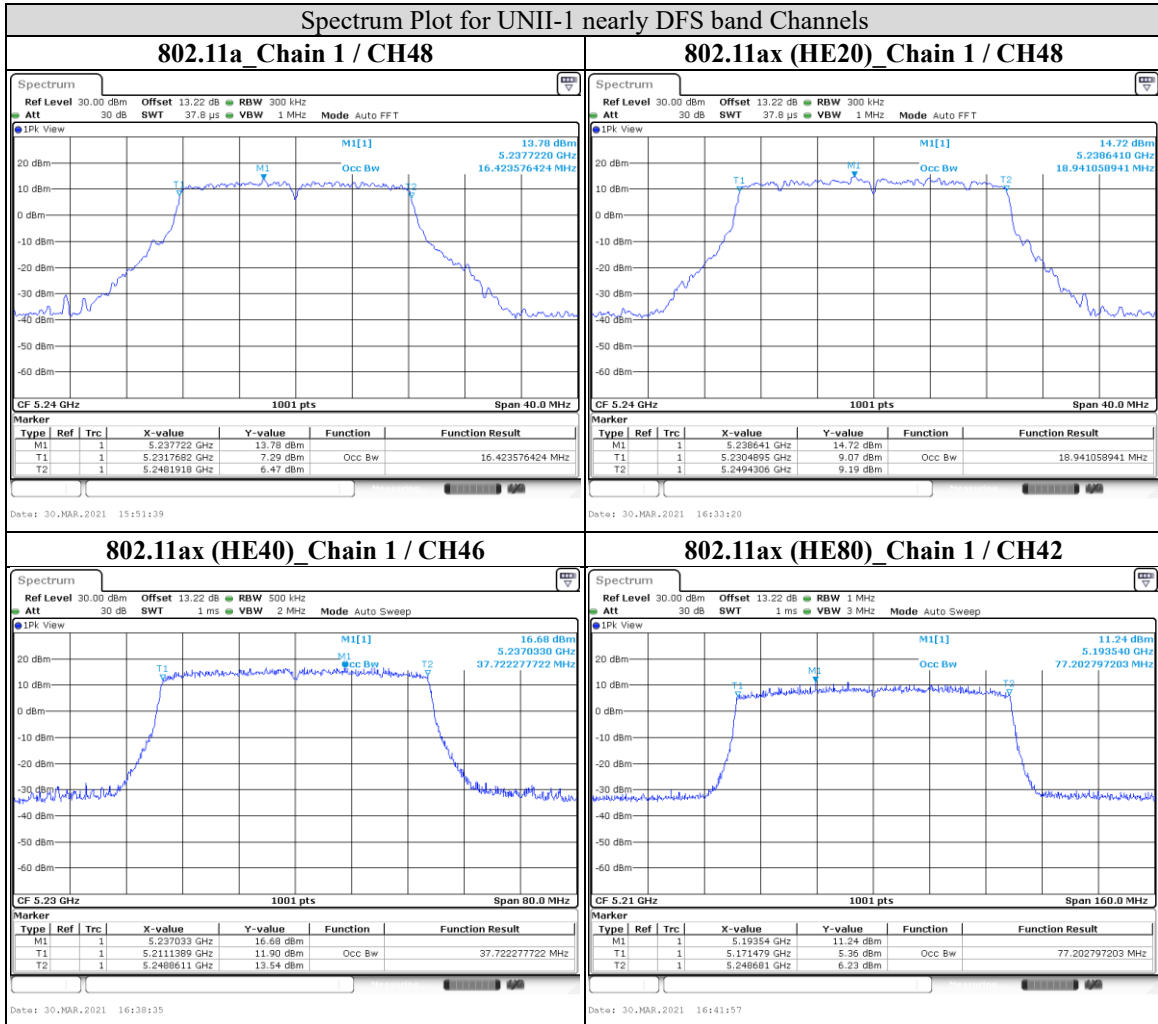
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Note: The observed T2 is all <5250 MHz, so UNII-1 band channels which in nearly DFS band no need for DFS function.



Note: The observed T2 is all <5250 MHz, so UNII-1 band channels which in nearly DFS band no need for DFS function.



## 9.4. Conducted output power

### Requirements

Operation Band	EUT Category		Limit
U-NII-1	√	Outdoor Access Point	1 Watt (30 dBm) Max. e.i.r.p ≤ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	1 Watt (30 dBm) If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$
		Indoor Access Point	1 Watt (30 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
		Client device	250mW (23.98 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-2A	√		250mW (23.98 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-2C	√		250mW (23.98 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-3	√		For Point-to-multipoint systems (P2M): 1 Watt (30 dBm). If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 1 Watt (30 dBm)

Note:

- $P_{Out}$  = maximum conducted output power in dBm,
- $G_{TX}$  = the maximum transmitting antenna directional gain in dBi.
- Directional Gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / N_{ant}]$  dBi.

$N_{ant}$ : Number of Transmit Antennas

$G1, G2, \dots, Gn$ : Gain of Individual Antennas

- B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

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## Test Procedure

### For Average Power Measurement

#### Test method PM-G

##### For 802.11a, 802.11ax (HE20), 802.11ax (HE40)

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

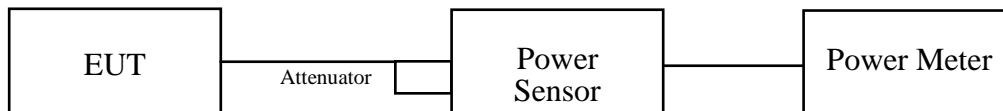
##### For 802.11ax (HE80)

- Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- Set sweep trigger\*.
- Set RBW = 1 MHz.
- Set VBW  $\geq$  3 MHz
- Number of points in sweep  $\geq$  2 Span / RBW.
- Sweep time  $\leq$  (number of points in sweep) \* T
- Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- Detector = RMS.
- Trace mode = max hold.
- 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.”

## Test Setup

### For Average Power Measurement



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

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## Test Data

### Non-Beamforming mode

#### 802.11a

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
36	5180	21.85	21.99	311.172	24.93	30	PASS
44	5220	21.86	21.62	298.538	24.75	30	PASS
48	5240	21.87	21.77	304.089	24.83	30	PASS
52	5260	16.20	16.22	83.56	19.22	23.98	PASS
60	5300	15.85	15.89	77.268	18.88	23.98	PASS
64	5320	15.89	15.59	74.989	18.75	23.98	PASS
100	5500	16.10	15.83	79.068	18.98	23.98	PASS
116	5580	16.29	16.10	83.368	19.21	23.98	PASS
140	5700	16.16	16.32	84.14	19.25	23.98	PASS
144*	5720	16.12	16.18	82.414	19.16	-	-
144 (U-NII-2c Band)	5720	14.84	14.90	61.376	17.88	22.78	PASS
144 (U-NII-3 Band)	5720	10.18	10.24	20.989	13.22	30	PASS
149	5745	24.51	25.22	615.177	27.89	30	PASS
157	5785	24.44	24.92	588.844	27.70	30	PASS
165	5825	24.32	24.69	564.937	27.52	30	PASS

Note:

1. Record the total power CH144\* value for reference only.

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**802.11ax (HE20)**

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
36	5180	22.29	22.02	328.852	25.17	30	PASS
44	5220	22.30	22.01	328.852	25.17	30	PASS
48	5240	22.28	22.18	334.195	25.24	30	PASS
52	5260	16.49	16.59	90.157	19.55	23.98	PASS
60	5300	16.61	16.17	87.297	19.41	23.98	PASS
64	5320	16.85	16.55	93.541	19.71	23.98	PASS
100	5500	16.54	16.13	86.099	19.35	23.98	PASS
116	5580	16.20	16.05	82.035	19.14	23.98	PASS
140	5700	16.15	16.29	83.753	19.23	23.98	PASS
144*	5720	16.21	16.26	84.14	19.25	-	-
144 (U-NII-2c Band)	5720	14.89	14.92	61.944	17.92	22.96	PASS
144 (U-NII-3 Band)	5720	10.40	10.50	22.182	13.46	30	PASS
149	5745	23.78	24.71	534.564	27.28	30	PASS
157	5785	23.71	24.46	514.044	27.11	30	PASS
165	5825	23.62	24.06	485.289	26.86	30	PASS

Note:

1. Record the total power CH144\* value for reference only.

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**802.11ax (HE40)**

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
38	5190	18.17	18.37	134.276	21.28	30	PASS
46	5230	23.28	23.36	429.536	26.33	30	PASS
54	5270	19.53	19.69	182.81	22.62	23.98	PASS
62	5310	18.91	18.66	151.356	21.80	23.98	PASS
102	5510	19.49	19.21	172.187	22.36	23.98	PASS
110	5550	19.46	19.57	179.061	22.53	23.98	PASS
134	5670	19.38	19.29	171.791	22.35	23.98	PASS
142*	5710	19.14	19.42	169.434	22.29	-	-
142 (U-NII-2c Band)	5710	18.53	18.81	147.231	21.68	23.98	PASS
142 (U-NII-3 Band)	5710	10.30	10.58	22.182	13.46	30	PASS
151	5755	25.04	25.50	674.528	28.29	30	PASS
159	5795	25.05	25.33	660.693	28.20	30	PASS

Note:

1. Record the total power CH142\* value for reference only.

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**802.11ax (HE80)**

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
42	5210	16.97	16.92	99.083	19.96	30	PASS
58	5290	18.48	18.28	137.721	21.39	23.98	PASS
106	5530	18.37	18.38	137.721	21.39	23.98	PASS
122	5610	20.18	20.14	207.491	23.17	23.98	PASS
138*	5690	20.34	20.56	221.82	23.46	-	-
138 (U-NII-2c Band)	5690	19.81	20.02	196.336	22.93	23.98	PASS
138 (U-NII-3 Band)	5690	10.90	11.20	25.527	14.07	30	PASS
155	5775	22.80	23.03	391.742	25.93	30	PASS

Note:

1. Record the total power CH138\* value for reference only.

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## Beamforming mode

### 802.11ax (HE20)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
36	5180	22.29	22.02	328.852	25.17	27.69	PASS
44	5220	22.30	22.01	328.852	25.17	27.69	PASS
48	5240	22.28	22.18	334.195	25.24	27.69	PASS
52	5260	16.49	16.59	90.157	19.55	21.67	PASS
60	5300	16.61	16.17	87.297	19.41	21.67	PASS
64	5320	16.85	16.55	93.541	19.71	21.67	PASS
100	5500	16.54	16.13	86.099	19.35	21.45	PASS
116	5580	16.20	16.05	82.035	19.14	21.45	PASS
140	5700	16.15	16.29	83.753	19.23	21.45	PASS
144*	5720	16.21	16.26	84.14	19.25	-	-
144 (U-NII-2c Band)	5720	14.89	14.92	61.944	17.92	20.43	PASS
144 (U-NII-3 Band)	5720	10.40	10.50	22.182	13.46	27.6	PASS
149	5745	23.78	24.71	534.564	27.28	27.6	PASS
157	5785	23.71	24.46	514.044	27.11	27.6	PASS
165	5825	23.62	24.06	485.289	26.86	27.6	PASS

Note:

1. Record the total power CH144\* value for reference only.

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**802.11ax (HE40)**

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
38	5190	18.17	18.37	134.276	21.28	27.69	PASS
46	5230	23.28	23.36	429.536	26.33	27.69	PASS
54	5270	18.00	18.13	128.233	21.08	21.67	PASS
62	5310	18.37	18.27	135.831	21.33	21.67	PASS
102	5510	18.05	17.75	123.31	20.91	21.45	PASS
110	5550	18.05	18.22	130.317	21.15	21.45	PASS
134	5670	18.10	17.87	125.893	21.00	21.45	PASS
142*	5710	17.80	17.94	122.462	20.88	-	-
142 (U-NII-2c Band)	5710	17.16	17.33	106.17	20.26	21.45	PASS
142 (U-NII-3 Band)	5710	9.18	9.11	16.444	12.16	27.6	PASS
151	5755	24.07	24.48	535.797	27.29	27.6	PASS
159	5795	24.12	24.22	522.396	27.18	27.6	PASS

Note:

1. Record the total power CH142\* value for reference only.

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**802.11ax (HE80)**

Channel	Channel Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		Chain 0	Chain 1				
42	5210	16.97	16.92	99.083	19.96	27.69	PASS
58	5290	18.48	18.28	137.721	21.39	21.67	PASS
106	5530	18.37	18.38	137.721	21.39	21.45	PASS
122	5610	17.96	17.77	122.462	20.88	21.45	PASS
138*	5690	18.05	18.18	129.718	21.13	-	-
138 (U-NII-2c Band)	5690	17.73	17.86	120.504	20.81	21.45	PASS
138 (U-NII-3 Band)	5690	6.52	6.63	9.078	9.58	27.6	PASS
155	5775	22.80	23.03	391.742	25.93	27.6	PASS

Note:

1. Record the total power CH138\* value for reference only.

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## 9.5. Power Spectral Density

### Requirements

Operation Band	EUT Category		Limit
U-NII-1	√	Outdoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	17dBm/ MHz If $G_{TX} > 23$ dBi, then $PSD = 17 - (G_{TX} - 23)$
		Indoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
		Client device	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2A		√	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2C		√	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-3		√	For Point-to-multipoint systems (P2M): 30dBm/ 500kHz. If $G_{TX} > 6$ dBi, then $PSD = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 30dBm/ 500kHz

Note:

- PSD = power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz
- $G_{TX}$  = the maximum transmitting antenna directional gain in dBi.
- Directional Gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / Nant]$  dBi.

Nant: Number of Transmit Antennas

G1, G2, ..., Gn: Gain of Individual Antennas

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## Test procedure

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

#### **Using method SA-2\_with Duty cycle <98 %**

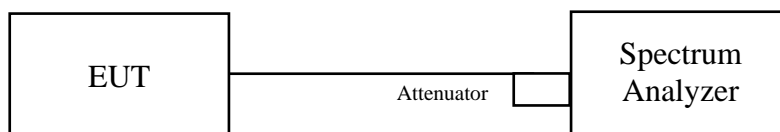
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW  $\geq$  3 RBW, Detector = RMS
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

### **For U-NII-3 band:**

#### **with Duty cycle <98 %**

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW  $\geq$  1 MHz, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 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  $BWCF = 10\log(500\text{ kHz}/300\text{ kHz})$
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

## Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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## Test Data

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

#### 802.11a

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/MHz)		Total PSD with duty factor (dBm/MHz)	PSD Maximum Limit (dBm/MHz)	Pass/Fail
		Chain 0	Chain 1			
36	5180	11.00	10.89	14.33	14.69	PASS
44	5220	10.87	10.64	14.14	14.69	PASS
48	5240	10.53	10.49	13.89	14.69	PASS
52	5260	5.12	4.99	8.44	8.69	PASS
60	5300	4.84	4.83	8.22	8.69	PASS
64	5320	4.78	4.49	8.02	8.69	PASS
100	5500	4.82	4.41	8	8.47	PASS
116	5580	4.98	4.97	8.36	8.47	PASS
140	5700	4.81	4.78	8.18	8.47	PASS
144 (U-NII-2c Band)	5720	4.90	4.87	8.27	8.47	PASS

#### Note:

##### 2. For U-NII-1, U-NII-2A, Band:

Directional gain = 8.31 dBi > 6 dBi , so the limit shall be reduced.

##### For U-NII-2C Band:

Directional gain = 8.53 dBi > 6 dBi , so the limit shall be reduced.

##### 3. Refer to section 6.6 for duty cycle spectrum plot.

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### 802.11ax (HE20)

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/MHz)		Total PSD with duty factor (dBm/MHz)	PSD Maximum Limit (dBm/MHz)	Pass/Fail
		Chain 0	Chain 1			
36	5180	10.82	10.67	14.01	14.69	PASS
44	5220	10.72	10.72	13.98	14.69	PASS
48	5240	10.82	10.73	14.04	14.69	PASS
52	5260	4.87	5.13	8.26	8.69	PASS
60	5300	4.71	4.64	7.94	8.69	PASS
64	5320	4.93	4.45	7.96	8.69	PASS
100	5500	4.74	4.58	7.92	8.47	PASS
116	5580	4.71	4.57	7.9	8.47	PASS
140	5700	4.65	4.66	7.92	8.47	PASS
144 (U-NII-2c Band)	5720	4.71	4.48	7.86	8.47	PASS

**Note:**

**2. For U-NII-1 Band:**

Directional gain = 8.31 dBi > 6 dBi , so the limit shall be reduced.

**For U-NII-2A, U-NII-2C Band:**

Directional gain = 8.53 dBi > 6 dBi , so the limit shall be reduced.

3. Refer to section 6.6 for duty cycle spectrum plot.

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**802.11ax (HE40)**

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/MHz)		Total PSD with duty factor (dBm/MHz)	PSD Maximum Limit (dBm/MHz)	Pass/Fail
		Chain 0	Chain 1			
38	5190	3.89	3.71	7.03	14.69	PASS
46	5230	8.94	8.65	12.03	14.69	PASS
54	5270	5.03	4.92	8.21	8.69	PASS
62	5310	4.40	3.99	7.43	8.69	PASS
102	5510	4.99	4.92	8.19	8.47	PASS
110	5550	4.93	4.79	8.09	8.47	PASS
134	5670	4.93	4.66	8.03	8.47	PASS
142 (U-NII-2c Band)	5710	4.64	4.74	7.92	8.47	PASS

**Note:**

**2. For U-NII-1 Band:**

Directional gain = 8.31 dBi > 6 dBi , so the limit shall be reduced.

**For U-NII-2A, U-NII-2C Band:**

Directional gain = 8.53 dBi > 6 dBi , so the limit shall be reduced.

**3. Refer to section 6.6 for duty cycle spectrum plot.**

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### 802.11ax (HE80)

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/MHz)		Total PSD with duty factor (dBm/MHz)	PSD Maximum Limit (dBm/MHz)	Pass/Fail
		Chain 0	Chain 1			
42	5210	-0.42	-0.56	2.74	14.69	PASS
58	5290	0.78	0.70	3.97	8.69	PASS
106	5530	0.76	0.73	3.98	8.47	PASS
122	5610	2.90	2.72	6.04	8.47	PASS
138 (U-NII-2c Band)	5690	2.93	3.08	6.24	8.47	PASS

**Note:**

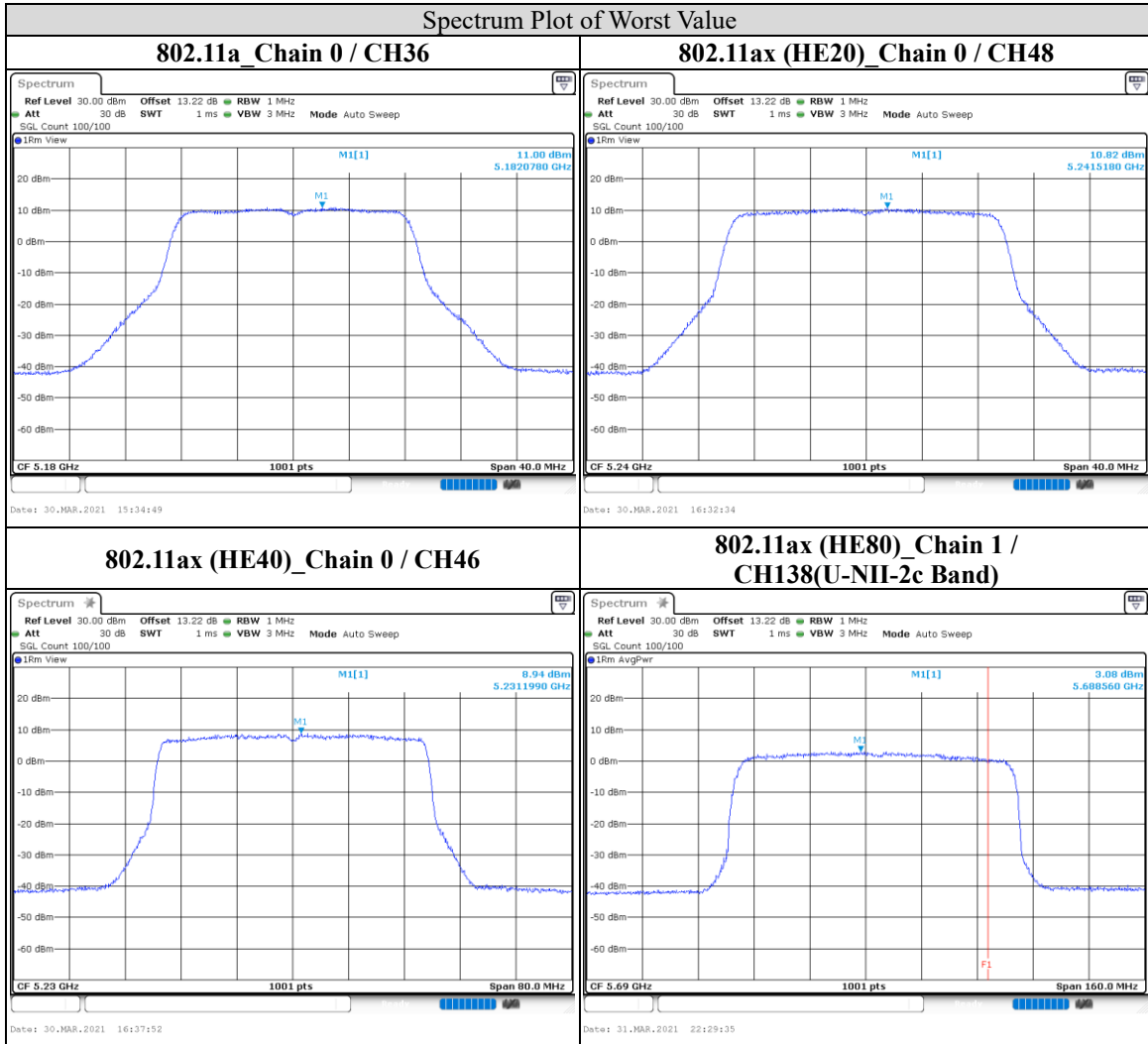
**2. For U-NII-1 Band:**

Directional gain = 8.31 dBi > 6 dBi , so the limit shall be reduced.

**For U-NII-2A, U-NII-2C Band:**

Directional gain = 8.53 dBi > 6 dBi , so the limit shall be reduced.

**3. 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)		Total PSD w/o BWCF (dBm/300 kHz)	Total PSD with BWCF (dBm/500 kHz)	Total PSD with duty factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
144 (U-NII-3 Band)	5720	-1.31	-1.55	1.58	3.80	4.17	27.60	PASS
149	5745	7.88	8.86	11.41	13.63	14	27.60	PASS
157	5785	7.46	8.24	10.88	13.10	13.47	27.60	PASS
165	5825	7.96	8.05	11.02	13.24	13.61	27.60	PASS

**Note:**

1. Directional gain = 8.4 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.
3. 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  $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$ .

**802.11ax (HE20)**

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/300 kHz)		Total PSD w/o BWCF (dBm/300 kHz)	Total PSD with BWCF (dBm/500 kHz)	Total PSD with duty factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
144 (U-NII-3 Band)	5720	-1.89	-1.58	1.28	3.50	3.75	27.60	PASS
149	5745	6.59	6.91	9.76	11.98	12.23	27.60	PASS
157	5785	6.84	6.91	9.89	12.11	12.36	27.60	PASS
165	5825	6.62	6.90	9.77	11.99	12.24	27.60	PASS

**Note:**

1. Directional gain = 8.4 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.
3. 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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### 802.11ax (HE40)

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/300 kHz)		Total PSD w/o BWCF (dBm/300 kHz)	Total PSD with BWCF (dBm/500 kHz)	Total PSD with duty factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
142 (U-NII-3 Band)	5710	-2.32	-2.36	0.67	2.89	3.11	27.60	PASS
151	5755	5.33	5.72	8.54	10.76	10.98	27.60	PASS
159	5795	5.19	5.09	8.15	10.37	10.59	27.60	PASS

**Note:**

1. Directional gain = 8.4 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.
3. 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  $BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$ .

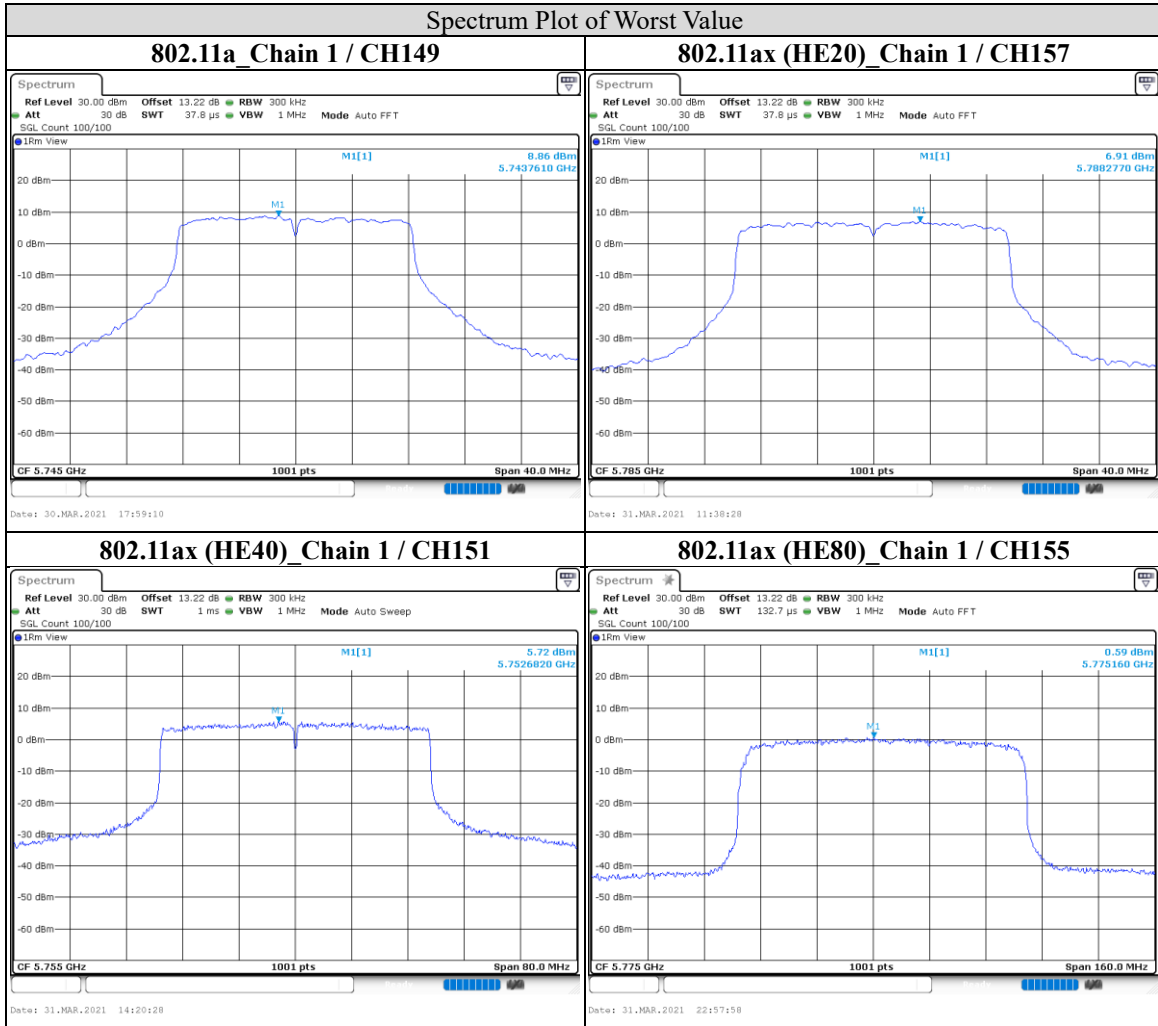
### 802.11ax (HE80)

Channel	Frequency (MHz)	PSD w/o duty factor (dBm/300 kHz)		Total PSD w/o BWCF (dBm/300 kHz)	Total PSD with BWCF (dBm/500 kHz)	Total PSD with duty factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
138 (U-NII-3 Band)	5690	-4.68	-4.65	-1.65	0.57	0.79	27.60	PASS
155	5775	0.12	0.59	3.37	5.59	5.81	27.60	PASS

**Note:**

1. Directional gain = 8.4 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.
3. 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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## 9.6. Frequency Stability

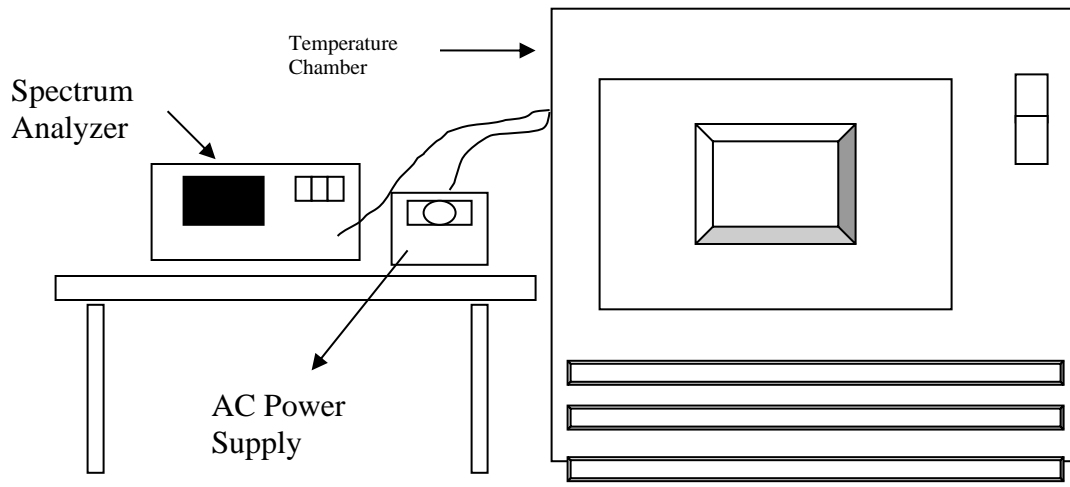
### Requirements

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







**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	5179.9956	-0.85	5179.9931	-1.33	5179.9931	-1.33	5179.9934	-1.27
40	120	5180.0065	1.25	5180.0093	1.80	5180.0073	1.41	5180.0094	1.81
30	120	5179.9736	-5.10	5179.9773	-4.38	5179.974	-5.02	5179.9724	-5.33
20	120	5180.0265	5.12	5180.0255	4.92	5180.0228	4.40	5180.0246	4.75
10	120	5180.0102	1.97	5180.0071	1.37	5180.0118	2.28	5180.0103	1.99
0	120	5179.9874	-2.43	5179.9845	-2.99	5179.9862	-2.66	5179.9865	-2.61
-10	120	5180.0065	1.25	5180.0079	1.53	5180.0082	1.58	5180.005	0.97
-20	120	5180.0133	2.57	5180.0161	3.11	5180.0157	3.03	5180.0156	3.01
-30	120	5179.9808	-3.71	5179.9826	-3.36	5179.9827	-3.34	5179.98	-3.86
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)
20	138	5180.0262	5.06	5180.0251	4.85	5180.0237	4.58	5180.0252	4.86
20	120	5180.0265	5.12	5180.0255	4.92	5180.0228	4.40	5180.0246	4.75
20	102	5180.0267	5.15	5180.0259	5.00	5180.0223	4.31	5180.0241	4.65

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## 9.7. 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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Doc No: 17-EM-F0878 / 5.0



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)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
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 effective 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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Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. 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.
- c. 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.

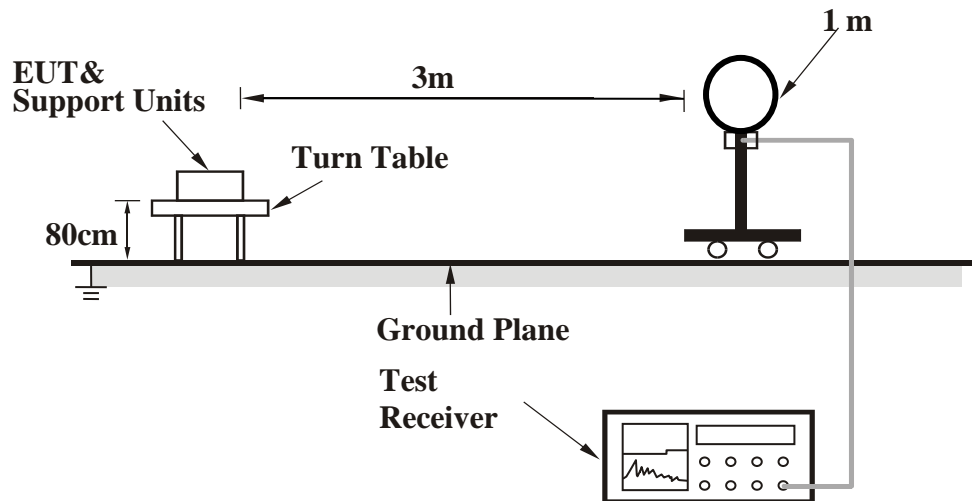
Configuration	Average	
	RBW	VBW
802.11a	1MHz	1kHz
802.11ax (HE20)		200Hz
802.11ax (HE40)		200Hz
802.11ax (HE80)		200Hz

Note: Refer to section 6.6 for duty cycle.

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported.

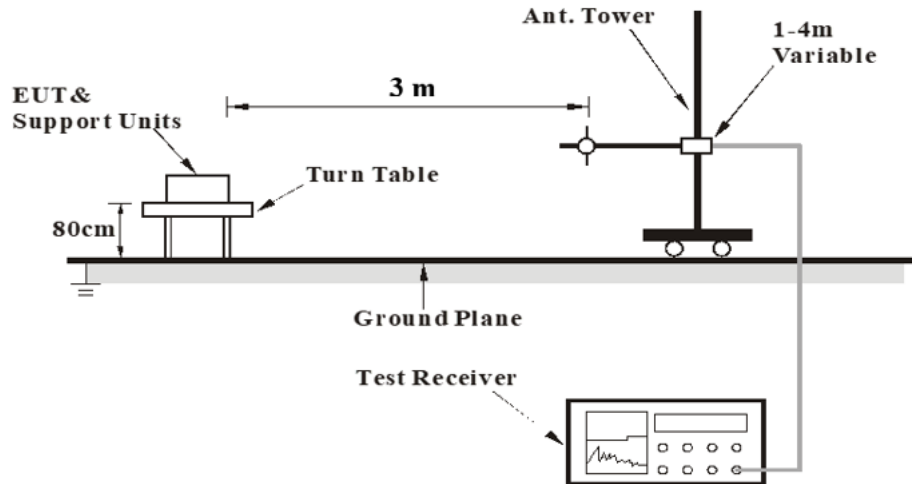
**Test Setup**

<Frequency Range 9 kHz ~ 30 MHz>

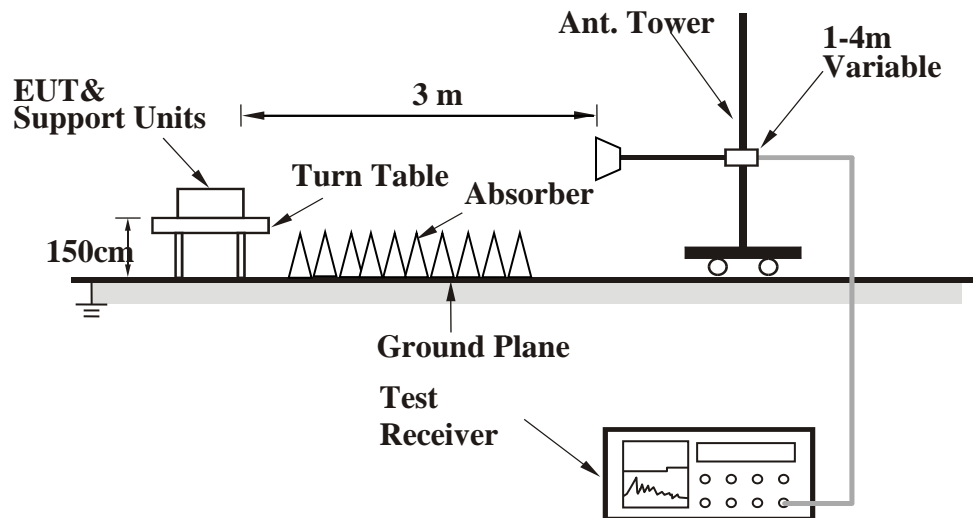


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<Frequency Range 30 MHz ~ 1 GHz >



<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.



## Test Data

### Above 1GHz Data

#### Non-Beamforming mode

#### 802.11a

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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10360	32.17	17.39	49.56	68.2	-18.64	Peak
-	5069.3	32.35	19.37	51.72	54	-2.28	Average
@	5180	89.15	19.4	108.55	-	-	Average
-	5141	43.43	19.43	62.86	74	-11.14	Peak
@	5180	97.86	19.4	117.26	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10360	32.61	17.39	50	68.2	-18.2	Peak
-	5149.4	33.29	19.43	52.72	54	-1.28	Average
@	5180	92.47	19.4	111.87	-	-	Average
-	5148.2	43.17	19.42	62.59	74	-11.41	Peak
@	5180	100.8	19.4	120.2	-	-	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 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10440	31.94	17.63	49.57	68.2	-18.63	Peak
-	5147.6	32.34	19.42	51.76	54	-2.24	Average
@	5220	92.13	19.33	111.46	-	-	Average
-	5122.7	43.46	19.45	62.91	74	-11.09	Peak
@	5220	100.39	19.33	119.72	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10440	31.98	17.63	49.61	68.2	-18.59	Peak
-	5131.4	32.77	19.44	52.21	54	-1.79	Average
@	5220	95.87	19.33	115.2	-	-	Average
-	5058.5	43.72	19.33	63.05	74	-10.95	Peak
@	5220	103.55	19.33	122.88	-	-	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 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10480	32.5	17.69	50.19	68.2	-18.01	Peak
-	5051.3	32.47	19.31	51.78	54	-2.22	Average
@	5240	92.25	19.27	111.52	-	-	Average
-	5142.8	43.13	19.43	62.56	74	-11.44	Peak
@	5240	102.37	19.27	121.64	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10480	32.84	17.69	50.53	68.2	-17.67	Peak
-	5119.4	32.94	19.45	52.39	54	-1.61	Average
@	5240	95.72	19.27	114.99	-	-	Average
-	5143.1	44.05	19.43	63.48	74	-10.52	Peak
@	5240	103.83	19.27	123.1	-	-	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 other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10520	32.62	17.73	50.35	68.2	-17.85	Peak
@	5260	92.32	19.24	111.56	-	-	Average
-	5376	31.51	19.34	50.85	54	-3.15	Average
@	5260	99.41	19.24	118.65	-	-	Peak
-	5422.2	39.88	19.53	59.41	74	-14.59	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10520	31.7	17.73	49.43	68.2	-18.77	Peak
@	5260	94.73	19.24	113.97	-	-	Average
-	5375.7	32.43	19.33	51.76	54	-2.24	Average
@	5260	102.26	19.24	121.5	-	-	Peak
-	5391.9	40.7	19.39	60.09	74	-13.91	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 other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10600	32.38	17.73	50.11	68.2	-18.09	Peak
@	5300	91.87	19.21	111.08	-	-	Average
-	5375.7	31.82	19.33	51.15	54	-2.85	Average
@	5300	102.41	19.21	121.62	-	-	Peak
-	5446.2	40.51	19.65	60.16	74	-13.84	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10600	32.91	17.73	50.64	68.2	-17.56	Peak
@	5300	94.36	19.21	113.57	-	-	Average
-	5352.9	32.02	19.27	51.29	54	-2.71	Average
@	5300	103.15	19.21	122.36	-	-	Peak
-	5457.6	40.83	19.7	60.53	74	-13.47	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 other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10640	32.33	17.82	50.15	74	-23.85	Peak
@	5320	89.38	19.23	108.61	-	-	Average
-	5376	31.44	19.34	50.78	54	-3.22	Average
@	5320	96.32	19.23	115.55	-	-	Peak
-	5378.7	40.63	19.35	59.98	74	-14.02	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10640	32.45	17.82	50.27	74	-23.73	Peak
@	5320	92.16	19.23	111.39	-	-	Average
-	5352.3	33.68	19.26	52.94	54	-1.06	Average
@	5320	100.05	19.23	119.28	-	-	Peak
-	5352.3	42.67	19.26	61.93	74	-12.07	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11000	31.78	18.28	50.06	74	-23.94	Peak
-	5449.35	31.18	19.67	50.85	54	-3.15	Average
-	5449.35	41.22	19.67	60.89	74	-13.11	Peak
-	5469.65	40.74	19.74	60.48	68.2	-7.72	Peak
@	5500	90.1	19.83	109.93	-	-	Average
@	5500	98.04	19.83	117.87	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11000	31.97	18.28	50.25	74	-23.75	Peak
-	5454.6	32.14	19.69	51.83	54	-2.17	Average
-	5454.6	40.99	19.69	60.68	74	-13.32	Peak
-	5470	46.41	19.74	66.15	68.2	-2.05	Peak
@	5500	92.83	19.83	112.66	-	-	Average
@	5500	101.06	19.83	120.89	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11160	31.62	18.32	49.94	74	-24.06	Peak
-	5445.15	30.87	19.65	50.52	54	-3.48	Average
-	5445.15	41.39	19.65	61.04	74	-12.96	Peak
-	5461.95	40.51	19.71	60.22	68.2	-7.98	Peak
@	5580	91.61	19.98	111.59	-	-	Average
@	5580	102.3	19.98	122.28	-	-	Peak
-	5745.8	41.6	20.28	61.88	68.2	-6.32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11160	32.31	18.32	50.63	74	-23.37	Peak
-	5439.9	31.25	19.63	50.88	54	-3.12	Average
-	5439.9	40.78	19.63	60.41	74	-13.59	Peak
-	5466.15	41.06	19.72	60.78	68.2	-7.42	Peak
@	5580	95.3	19.98	115.28	-	-	Average
@	5580	104.3	19.98	124.28	-	-	Peak
-	5747.2	40.75	20.29	61.04	68.2	-7.16	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11400	31.61	18.74	50.35	74	-23.65	Peak
@	5700	89.49	20.05	109.54	-	-	Average
@	5700	97.4	20.05	117.45	-	-	Peak
-	5728.3	44.12	20.19	64.31	68.2	-3.89	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11400	32.71	18.74	51.45	54	-2.55	Average
-	11400	39.8	18.74	58.54	74	-15.46	Peak
@	5700	93.6	20.05	113.65	-	-	Average
@	5700	100.6	20.05	120.65	-	-	Peak
-	5726.2	46.75	20.18	66.93	68.2	-1.27	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 144	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11440	28.25	18.86	47.11	54	-6.89	Average
-	11440	34.76	18.86	53.62	74	-20.38	Peak

Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11440	33.59	18.86	52.45	54	-1.55	Average
-	11440	36.95	18.86	55.81	74	-18.19	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. 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11490	32.3	19.02	51.32	74	-22.68	Peak
-	5585	41.93	20	61.93	68.2	-6.27	Peak
-	5725	55.17	20.18	75.35	122.2	-46.85	Peak
@	5745	97.39	20.28	117.67	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11490	33.45	19.02	52.47	54	-1.53	Average
-	11490	36.93	19.02	55.95	74	-18.05	Peak
-	5620	41.83	20.02	61.85	68.2	-6.35	Peak
-	5717	56.39	20.15	76.54	109.96	-33.42	Peak
@	5745	101.58	20.28	121.86	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11570	31.9	18.88	50.78	74	-23.22	Peak
-	5623.5	40.71	20.02	60.73	68.2	-7.47	Peak
-	5701.5	42.17	20.07	62.24	105.62	-43.38	Peak
@	5785	98.81	20.48	119.29	-	-	Peak
-	5898	41.05	20.97	62.02	88.14	-26.12	Peak
-	5929.5	40.88	21	61.88	68.2	-6.32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11570	30.02	18.88	48.9	54	-5.1	Average
-	11570	34.17	18.88	53.05	74	-20.95	Peak
-	5618	41.35	20.02	61.37	68.2	-6.83	Peak
-	5691.5	42.12	20.04	62.16	98.93	-36.77	Peak
@	5785	101.33	20.48	121.81	-	-	Peak
-	5883	40.96	20.92	61.88	99.26	-37.38	Peak
-	5946.5	40.95	21.02	61.97	68.2	-6.23	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11650	32.07	18.63	50.7	74	-23.3	Peak
@	5825	97.98	20.69	118.67	-	-	Peak
-	5851	51.64	20.81	72.45	119.92	-47.47	Peak
-	5972	41.82	21.08	62.9	68.2	-5.3	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11650	29.88	18.63	48.51	54	-5.49	Average
-	11650	34.39	18.63	53.02	74	-20.98	Peak
@	5825	101.83	20.69	122.52	-	-	Peak
-	5850	55.69	20.81	76.5	122.2	-45.7	Peak
-	6000.5	41.4	21.17	62.57	68.2	-5.63	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



**802.11ax (HE20)**

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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10360	32	17.39	49.39	68.2	-18.81	Peak
-	5148.8	33.01	19.42	52.43	54	-1.57	Average
@	5180	89.06	19.4	108.46	-	-	Average
-	5145.8	43	19.43	62.43	74	-11.57	Peak
@	5180	97.84	19.4	117.24	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10360	32.31	17.39	49.7	68.2	-18.5	Peak
-	5147	33.71	19.43	53.14	54	-0.86	Average
@	5180	92.3	19.4	111.7	-	-	Average
-	5150	43.97	19.43	63.4	74	-10.6	Peak
@	5180	102.06	19.4	121.46	-	-	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 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10440	31.68	17.63	49.31	68.2	-18.89	Peak
-	5104.1	32.3	19.46	51.76	54	-2.24	Average
@	5220	91.94	19.33	111.27	-	-	Average
-	5055.2	42.79	19.31	62.1	74	-11.9	Peak
@	5220	100.25	19.33	119.58	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10440	31.95	17.63	49.58	68.2	-18.62	Peak
-	5131.4	32.76	19.44	52.2	54	-1.8	Average
@	5220	95.12	19.33	114.45	-	-	Average
-	5128.4	43.26	19.43	62.69	74	-11.31	Peak
@	5220	102.53	19.33	121.86	-	-	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 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10480	32.23	17.69	49.92	68.2	-18.28	Peak
-	5143.1	32.21	19.43	51.64	54	-2.36	Average
@	5240	91.74	19.27	111.01	-	-	Average
-	5090.3	42.66	19.43	62.09	74	-11.91	Peak
@	5240	100.08	19.27	119.35	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10480	31.53	17.69	49.22	68.2	-18.98	Peak
-	5130.5	32.75	19.44	52.19	54	-1.81	Average
@	5240	95.05	19.27	114.32	-	-	Average
-	5071.1	43.07	19.37	62.44	74	-11.56	Peak
@	5240	103.78	19.27	123.05	-	-	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10520	32.37	17.73	50.1	68.2	-18.1	Peak
@	5260	91.95	19.24	111.19	-	-	Average
-	5376	31.54	19.34	50.88	54	-3.12	Average
@	5260	101.72	19.24	120.96	-	-	Peak
-	5378.1	41.41	19.35	60.76	74	-13.24	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10520	32.89	17.73	50.62	68.2	-17.58	Peak
@	5260	93.47	19.24	112.71	-	-	Average
-	5375.7	32.8	19.33	52.13	54	-1.87	Average
@	5260	101.53	19.24	120.77	-	-	Peak
-	5364.3	40.71	19.31	60.02	74	-13.98	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10600	32.01	17.73	49.74	68.2	-18.46	Peak
@	5300	90.88	19.21	110.09	-	-	Average
-	5375.7	31.72	19.33	51.05	54	-2.95	Average
@	5300	97.49	19.21	116.7	-	-	Peak
-	5360.7	39.94	19.29	59.23	74	-14.77	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10600	32.99	17.73	50.72	68.2	-17.48	Peak
@	5300	93.12	19.21	112.33	-	-	Average
-	5376	32.69	19.34	52.03	54	-1.97	Average
@	5300	101.42	19.21	120.63	-	-	Peak
-	5350.8	41.1	19.26	60.36	74	-13.64	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 other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10640	31.98	17.82	49.8	74	-24.2	Peak
@	5320	88.89	19.23	108.12	-	-	Average
-	5376	30.79	19.34	50.13	54	-3.87	Average
@	5320	97.23	19.23	116.46	-	-	Peak
-	5413.2	40.07	19.48	59.55	74	-14.45	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10640	31.68	17.82	49.5	74	-24.5	Peak
@	5320	91.58	19.23	110.81	-	-	Average
-	5350.2	33.73	19.26	52.99	54	-1.01	Average
@	5320	100.61	19.23	119.84	-	-	Peak
-	5350.5	41.68	19.26	60.94	74	-13.06	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11000	31.46	18.28	49.74	74	-24.26	Peak
-	5437.8	31.46	19.61	51.07	54	-2.93	Average
-	5437.8	41.75	19.61	61.36	74	-12.64	Peak
-	5467.55	42	19.73	61.73	68.2	-6.47	Peak
@	5500	89.26	19.83	109.09	-	-	Average
@	5500	97.36	19.83	117.19	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11000	33.49	18.28	51.77	74	-22.23	Peak
-	5427.65	31.74	19.56	51.3	54	-2.7	Average
-	5427.65	41.34	19.56	60.9	74	-13.1	Peak
-	5470	45.69	19.74	65.43	68.2	-2.77	Peak
@	5500	93.18	19.83	113.01	-	-	Average
@	5500	103.59	19.83	123.42	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11160	31.73	18.32	50.05	74	-23.95	Peak
-	5432.2	30.87	19.58	50.45	54	-3.55	Average
-	5432.2	40.22	19.58	59.8	74	-14.2	Peak
-	5465.1	39.9	19.72	59.62	68.2	-8.58	Peak
@	5580	89.94	19.98	109.92	-	-	Average
@	5580	99.39	19.98	119.37	-	-	Peak
-	5735.3	40.89	20.23	61.12	68.2	-7.08	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11160	32.4	18.32	50.72	74	-23.28	Peak
-	5436.05	31.42	19.6	51.02	54	-2.98	Average
-	5436.05	41.11	19.6	60.71	74	-13.29	Peak
-	5461.6	40.39	19.71	60.1	68.2	-8.1	Peak
@	5580	93.66	19.98	113.64	-	-	Average
@	5580	102.7	19.98	122.68	-	-	Peak
-	5747.9	40.73	20.29	61.02	68.2	-7.18	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11400	31.53	18.74	50.27	74	-23.73	Peak
@	5700	87.43	20.05	107.48	-	-	Average
@	5700	96.11	20.05	116.16	-	-	Peak
-	5725	42	20.18	62.18	68.2	-6.02	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11400	30.05	18.74	48.79	54	-5.21	Average
-	11400	36.2	18.74	54.94	74	-19.06	Peak
@	5700	90.8	20.05	110.85	-	-	Average
@	5700	99.82	20.05	119.87	-	-	Peak
-	5725.15	46.88	20.18	67.06	68.2	-1.14	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 144	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11440	26.21	18.86	45.07	54	-8.93	Average
-	11440	34.42	18.86	53.28	74	-20.72	Peak

Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11440	32.44	18.86	51.3	54	-2.7	Average
-	11440	36.66	18.86	55.52	74	-18.48	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. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11490	32.06	19.02	51.08	74	-22.92	Peak
-	5642.5	40.92	20	60.92	68.2	-7.28	Peak
-	5699.5	41.17	20.05	61.22	104.83	-43.61	Peak
@	5745	99.56	20.28	119.84	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11490	32.4	19.02	51.42	54	-2.58	Average
-	11490	35.88	19.02	54.9	74	-19.1	Peak
-	5604	41.58	20.03	61.61	68.2	-6.59	Peak
-	5684	42.08	20.03	62.11	93.4	-31.29	Peak
@	5745	100.42	20.28	120.7	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11570	32.28	18.88	51.16	74	-22.84	Peak
-	5601	40.97	20.04	61.01	68.2	-7.19	Peak
-	5692	41.71	20.04	61.75	99.3	-37.55	Peak
@	5785	97.08	20.48	117.56	-	-	Peak
-	5904.5	41.35	20.98	62.33	83.33	-21	Peak
-	5977.5	40.9	21.1	62	68.2	-6.2	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11570	29.23	18.88	48.11	54	-5.89	Average
-	11570	34.19	18.88	53.07	74	-20.93	Peak
-	5636	41.35	20.01	61.36	68.2	-6.84	Peak
-	5691.5	42.15	20.04	62.19	98.93	-36.74	Peak
@	5785	100.63	20.48	121.11	-	-	Peak
-	5902.5	40.83	20.97	61.8	84.81	-23.01	Peak
-	5962	40.73	21.05	61.78	68.2	-6.42	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11650	31.89	18.63	50.52	74	-23.48	Peak
@	5825	97.24	20.69	117.93	-	-	Peak
-	5898.5	40.47	20.97	61.44	87.77	-26.33	Peak
-	6020.5	41.63	21.2	62.83	68.2	-5.37	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11650	27.16	18.63	45.79	54	-8.21	Average
-	11650	33.44	18.63	52.07	74	-21.93	Peak
@	5825	100.38	20.69	121.07	-	-	Peak
-	5923.5	42.09	20.99	63.08	69.31	-6.23	Peak
-	5952.5	40.99	21.03	62.02	68.2	-6.18	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0





**802.11ax (HE40)**

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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10380	33.34	17.49	50.83	68.2	-17.37	Peak
-	5149.7	32.24	19.43	51.67	54	-2.33	Average
@	5190	82.44	19.4	101.84	-	-	Average
-	5056.1	42.99	19.32	62.31	74	-11.69	Peak
@	5190	89.6	19.4	109	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10380	32.44	17.49	49.93	68.2	-18.27	Peak
-	5150	33.8	19.43	53.23	54	-0.77	Average
@	5190	86.34	19.4	105.74	-	-	Average
-	5144	44.52	19.43	63.95	74	-10.05	Peak
@	5190	94.4	19.4	113.8	-	-	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10460	32.37	17.66	50.03	68.2	-18.17	Peak
-	5066	32.5	19.35	51.85	54	-2.15	Average
@	5230	87.79	19.3	107.09	-	-	Average
-	5073.8	42.37	19.38	61.75	74	-12.25	Peak
@	5230	96.1	19.3	115.4	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10460	32.5	17.66	50.16	68.2	-18.04	Peak
-	5149.7	33.09	19.43	52.52	54	-1.48	Average
@	5230	91.09	19.3	110.39	-	-	Average
-	5144.6	44.24	19.43	63.67	74	-10.33	Peak
@	5230	98.13	19.3	117.43	-	-	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 54	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10540	32.23	17.72	49.95	68.2	-18.25	Peak
@	5270	88.81	19.22	108.03	-	-	Average
-	5376	32.24	19.34	51.58	54	-2.42	Average
@	5270	95.68	19.22	114.9	-	-	Peak
-	5401.2	40.44	19.42	59.86	74	-14.14	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10540	32.07	17.72	49.79	68.2	-18.41	Peak
@	5270	90.48	19.22	109.7	-	-	Average
-	5355.6	33.91	19.28	53.19	54	-0.81	Average
@	5270	98.98	19.22	118.2	-	-	Peak
-	5357.7	43.27	19.29	62.56	74	-11.44	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 62	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10620	32.58	17.78	50.36	74	-23.64	Peak
@	5310	82.37	19.21	101.58	-	-	Average
-	5376	30.98	19.34	50.32	54	-3.68	Average
@	5310	93.6	19.21	112.81	-	-	Peak
-	5364.9	40.93	19.31	60.24	74	-13.76	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	10620	32.18	17.78	49.96	74	-24.04	Peak
@	5310	84.91	19.21	104.12	-	-	Average
-	5350.2	33.4	19.26	52.66	54	-1.34	Average
@	5310	95.52	19.21	114.73	-	-	Peak
-	5358.3	40.9	19.29	60.19	74	-13.81	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 102	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11020	31.75	18.32	50.07	74	-23.93	Peak
-	5449.7	29.86	19.67	49.53	54	-4.47	Average
-	5449.7	40.51	19.67	60.18	74	-13.82	Peak
-	5468.25	40.92	19.74	60.66	68.2	-7.54	Peak
@	5510	83.14	19.84	102.98	-	-	Average
@	5510	92.43	19.84	112.27	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11020	32.02	18.32	50.34	74	-23.66	Peak
-	5455.3	32.17	19.69	51.86	54	-2.14	Average
-	5455.3	40.46	19.69	60.15	74	-13.85	Peak
-	5468.25	46.4	19.74	66.14	68.2	-2.06	Peak
@	5510	87.15	19.84	106.99	-	-	Average
@	5510	96.74	19.84	116.58	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 110	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11100	32.21	18.49	50.7	74	-23.3	Peak
-	5458.45	31.49	19.7	51.19	54	-2.81	Average
-	5458.45	41.04	19.7	60.74	74	-13.26	Peak
-	5467.55	45.61	19.73	65.34	68.2	-2.86	Peak
@	5550	88.76	19.88	108.64	-	-	Average
@	5550	97.75	19.88	117.63	-	-	Peak
-	5727.6	40.64	20.19	60.83	68.2	-7.37	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11100	32.17	18.49	50.66	74	-23.34	Peak
-	5459.85	33.15	19.7	52.85	54	-1.15	Average
-	5459.85	42.74	19.7	62.44	74	-11.56	Peak
-	5467.9	46.98	19.74	66.72	68.2	-1.48	Peak
@	5550	91.41	19.88	111.29	-	-	Average
@	5550	100.91	19.88	120.79	-	-	Peak
-	5736.7	41.57	20.24	61.81	68.2	-6.39	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 134	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11340	31.53	18.55	50.08	74	-23.92	Peak
@	5670	87.31	20.02	107.33	-	-	Average
@	5670	94.44	20.02	114.46	-	-	Peak
-	5726.55	41.54	20.19	61.73	68.2	-6.47	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11340	33.79	18.55	52.34	74	-21.66	Peak
@	5670	89.66	20.02	109.68	-	-	Average
@	5670	98.2	20.02	118.22	-	-	Peak
-	5725.85	45.98	20.18	66.16	68.2	-2.04	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 142	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11420	32.27	18.8	51.07	74	-22.93	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11420	32.46	18.8	51.26	54	-2.74	Average
-	11420	37.59	18.8	56.39	74	-17.61	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. 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11510	31.87	19.03	50.9	74	-23.1	Peak
-	5592	41.75	20.02	61.77	68.2	-6.43	Peak
-	5698	52.75	20.05	72.8	103.73	-30.93	Peak
@	5755	96.04	20.33	116.37	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11510	33.53	19.03	52.56	74	-21.44	Peak
-	5559.5	42.52	19.92	62.44	68.2	-5.76	Peak
-	5700	55.87	20.05	75.92	105.2	-29.28	Peak
@	5755	100.15	20.33	120.48	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11590	31.06	18.84	49.9	74	-24.1	Peak
@	5795	95.3	20.53	115.83	-	-	Peak
-	5882.5	41.93	20.92	62.85	99.63	-36.78	Peak
-	5937	40.85	21	61.85	68.2	-6.35	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11590	32.24	18.84	51.08	74	-22.92	Peak
@	5795	97.99	20.53	118.52	-	-	Peak
-	5875.5	48.85	20.89	69.74	104.83	-35.09	Peak
-	5935.5	41.57	21	62.57	68.2	-5.63	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



**802.11ax (HE80)**

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

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10420	32.44	17.6	50.04	68.2	-18.16	Peak
-	5111.6	32.17	19.46	51.63	54	-2.37	Average
@	5210	78.18	19.36	97.54	-	-	Average
-	5087.6	43.6	19.43	63.03	74	-10.97	Peak
@	5210	85.26	19.36	104.62	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10420	32.79	17.6	50.39	68.2	-17.81	Peak
-	5145.5	33.8	19.43	53.23	54	-0.77	Average
@	5210	82.61	19.36	101.97	-	-	Average
-	5084	43.11	19.42	62.53	74	-11.47	Peak
@	5210	91.32	19.36	110.68	-	-	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 other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 58	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10580	31.65	17.73	49.38	68.2	-18.82	Peak
@	5290	79.13	19.21	98.34	-	-	Average
-	5350.2	30.97	19.26	50.23	54	-3.77	Average
@	5290	89.38	19.21	108.59	-	-	Peak
-	5354.1	43.94	19.27	63.21	74	-10.79	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	10580	32.16	17.73	49.89	68.2	-18.31	Peak
@	5290	81.35	19.21	100.56	-	-	Average
-	5355.6	33.06	19.28	52.34	54	-1.66	Average
@	5290	89.65	19.21	108.86	-	-	Peak
-	5356.5	43.3	19.28	62.58	74	-11.42	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 other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 106	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11060	32.09	18.41	50.5	74	-23.5	Peak
-	5457.05	30.47	19.69	50.16	54	-3.84	Average
-	5457.05	39.84	19.69	59.53	74	-14.47	Peak
-	5465.1	39.84	19.72	59.56	68.2	-8.64	Peak
@	5530	77.7	19.87	97.57	-	-	Average
@	5530	90	19.87	109.87	-	-	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11060	32.31	18.41	50.72	74	-23.28	Peak
-	5447.6	32.59	19.66	52.25	54	-1.75	Average
-	5447.6	40.9	19.66	60.56	74	-13.44	Peak
-	5466.5	41.29	19.72	61.01	68.2	-7.19	Peak
@	5530	81.83	19.87	101.7	-	-	Average
@	5530	91.51	19.87	111.38	-	-	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



EUT Test Condition		Measurement Detail	
Channel	Channel 122	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11220	32.4	18.25	50.65	74	-23.35	Peak
-	5411.2	31.42	19.47	50.89	54	-3.11	Average
-	5411.2	40.61	19.47	60.08	74	-13.92	Peak
-	5469.65	40.84	19.74	60.58	68.2	-7.62	Peak
@	5610	84.27	20.03	104.3	-	-	Average
@	5610	92.36	20.03	112.39	-	-	Peak
-	5729.35	45.21	20.2	65.41	68.2	-2.79	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11220	31.92	18.25	50.17	74	-23.83	Peak
-	5455.3	32.58	19.69	52.27	54	-1.73	Average
-	5455.3	42.19	19.69	61.88	74	-12.12	Peak
-	5468.25	43.05	19.74	62.79	68.2	-5.41	Peak
@	5610	86.62	20.03	106.65	-	-	Average
@	5610	96.3	20.03	116.33	-	-	Peak
-	5725	45.36	20.18	65.54	68.2	-2.66	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 138	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11380	32.01	18.67	50.68	74	-23.32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	11380	27.23	18.67	45.9	54	-8.1	Average
-	11380	34.31	18.67	52.98	74	-21.02	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. 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							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11550	31.84	18.93	50.77	74	-23.23	Peak
-	5649.5	44.25	20	64.25	68.2	-3.95	Peak
-	5690.5	48.19	20.04	68.23	98.2	-29.97	Peak
@	5775	91.59	20.44	112.03	-	-	Peak
-	5882.5	45.64	20.92	66.56	99.63	-33.07	Peak
-	5991	41.32	21.14	62.46	68.2	-5.74	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11550	31.59	18.93	50.52	74	-23.48	Peak
-	5649.5	47.25	20	67.25	68.2	-0.95	Peak
-	5700	54.42	20.05	74.47	105.2	-30.73	Peak
@	5775	94.75	20.44	115.19	-	-	Peak
-	5882	50.98	20.91	71.89	100	-28.11	Peak
-	5929.5	42.65	21	63.65	68.2	-4.55	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 peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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**Co-location mode**

**802.11b + 802.11a**

EUT Test Condition		Measurement Detail	
Channel	Channel 11 + Channel 149	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4961	41.15	2.62	43.77	74	-30.23	Peak
*	11489	31.82	19.02	50.84	74	-23.16	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	4960	42.86	2.62	45.48	74	-28.52	Peak
-	11490	33.21	19.02	52.23	54	-1.77	Average
-	11490	36.03	19.02	55.05	74	-18.95	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. " \* ": The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

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### 9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

### **KDB 414788 D01 OATS and Chamber Correlation Justification**

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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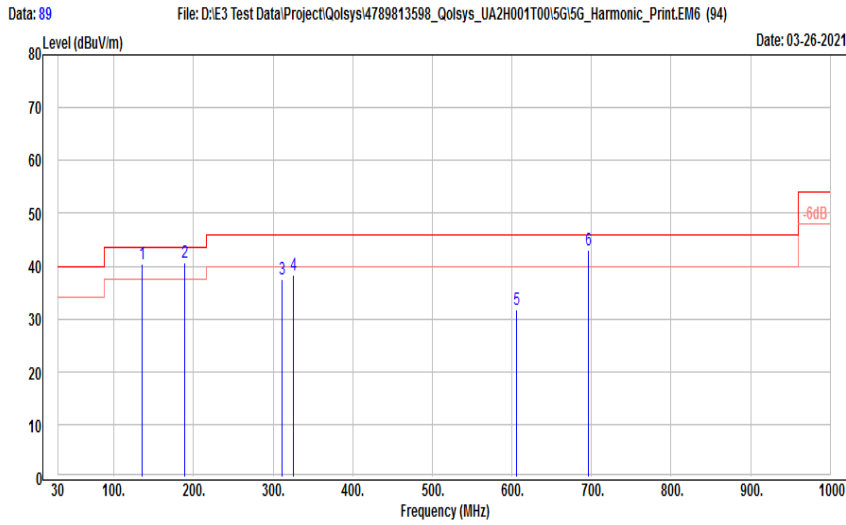
### 30 MHz ~ 1 GHz Data

### Non-Beamforming mode

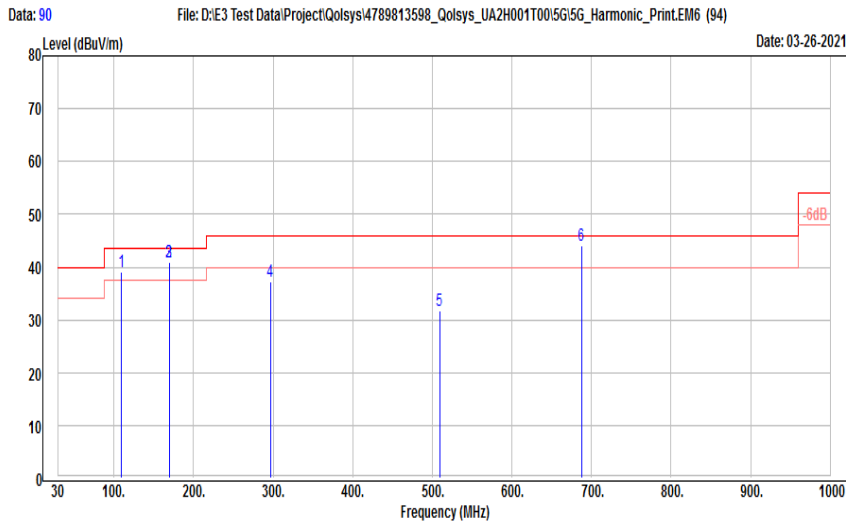
### 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 1 GHz

### Horizontal



### Vertical



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Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	135.73	53.09	-12.63	40.46	43.5	-3.04	QP
*	189.08	54.73	-14.2	40.53	43.5	-2.97	Peak
*	311.3	47.86	-10.29	37.57	46	-8.43	Peak
*	325.85	48.1	-9.72	38.38	46	-7.62	Peak
*	606.18	34.02	-2.24	31.78	46	-14.22	Peak
-	696.39	43.99	-1.01	42.98	46	-3.02	QP
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	109.54	54.33	-15.29	39.04	43.5	-4.46	Peak
*	169.68	52.86	-11.98	40.88	43.5	-2.62	Peak
*	169.68	52.86	-11.98	40.88	43.5	-2.62	Peak
*	296.75	48.05	-10.74	37.31	46	-8.69	Peak
*	509.18	36.56	-4.83	31.73	46	-14.27	Peak
*	687.66	45.3	-1.16	44.14	46	-1.86	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. " \* ": The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

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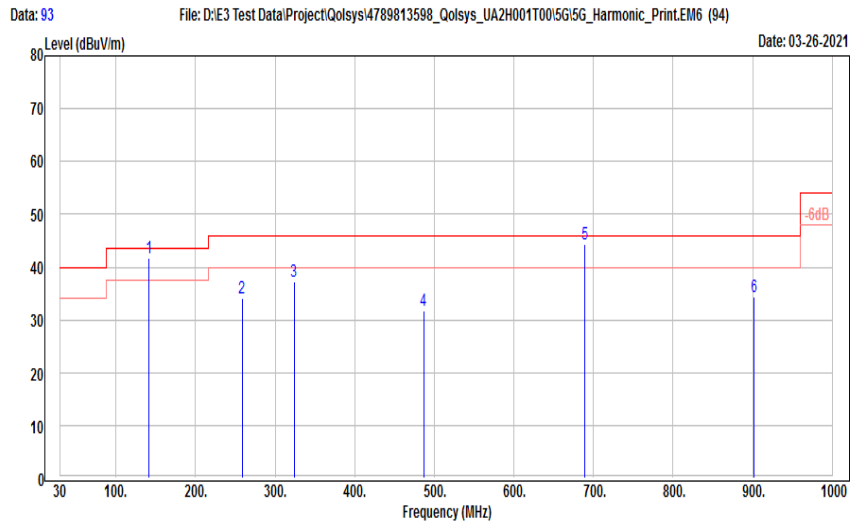


Co-location mode

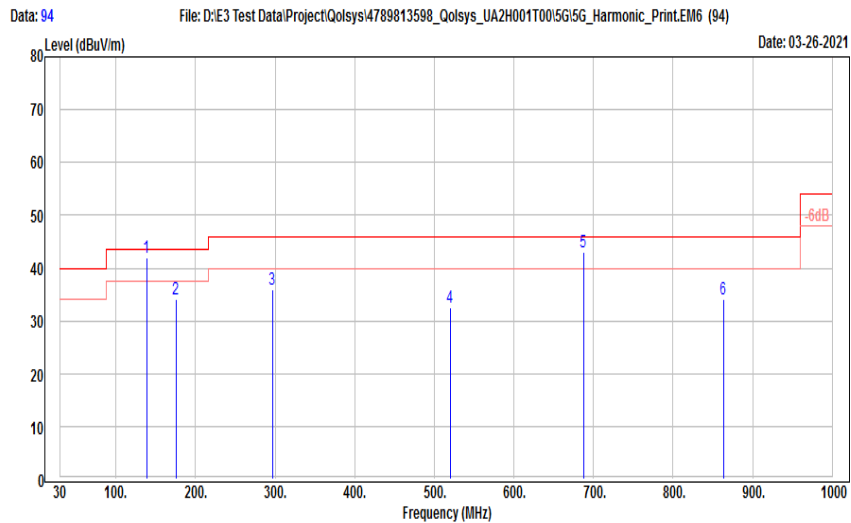
802.11b + 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 11 + Channel 149	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



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Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	141.55	54	-12.21	41.79	43.5	-1.71	QP
*	258.92	46.67	-12.48	34.19	46	-11.81	Peak
*	323.91	47.06	-9.8	37.26	46	-8.74	Peak
*	486.87	36.98	-5.33	31.65	46	-14.35	Peak
*	689.6	45.51	-1.11	44.4	46	-1.6	Peak
*	902.03	32.13	2.32	34.45	46	-11.55	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	138.64	54.22	-12.38	41.84	43.5	-1.66	Peak
*	175.5	46.7	-12.48	34.22	43.5	-9.28	Peak
*	296.75	46.55	-10.74	35.81	46	-10.19	Peak
*	519.85	36.96	-4.55	32.41	46	-13.59	Peak
*	687.66	44.07	-1.16	42.91	46	-3.09	Peak
*	863.23	32.33	1.69	34.02	46	-11.98	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. " \* ": The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

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## 9.8. AC Power Line Conducted Emission

### Requirements

Frequency (MHz)	Conducted limit (dB $\mu$ 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.

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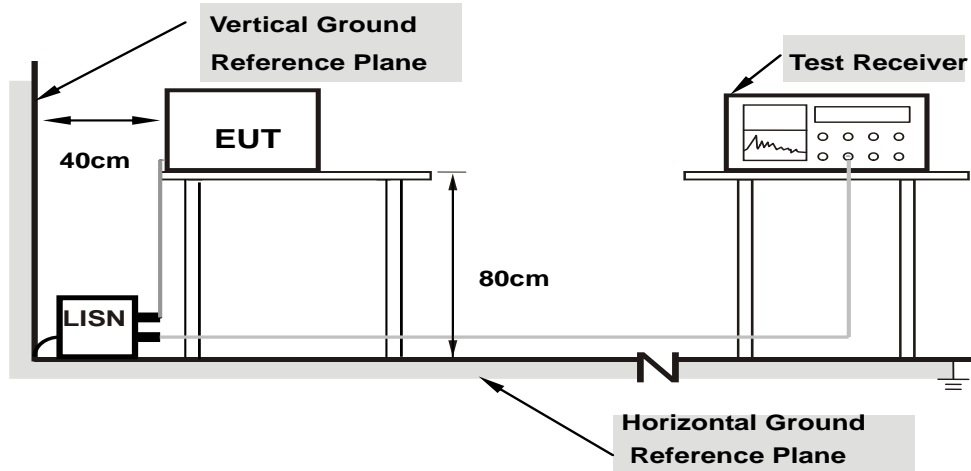
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## Test Setup



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

For the actual test configuration, please refer to the Setup Configurations.

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