FCC Test Report

Report No.:	RF180704E02L-1
FCC ID:	UDX-60083010
Test Model:	MR56-HW
Received Date:	Sep. 24, 2019
Test Date:	Oct. 09 to 16, 2019
Issued Date:	Nov. 21, 2019
Applicant:	Cisco Systems, Inc.
Address:	170 West Tasman Drive, San Jose, CA 95134 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location :	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF180704E02L-1	Original release.	Nov. 21, 2019

1 Certificate of Conformity

Product:	8x8 Wi-Fi 6 Access Point
Brand:	Cisco
Test Model:	MR56-HW
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cisco Systems, Inc.
Test Date:	Oct. 09 to 16, 2019
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Nov. 21, 2019

Claire Kuan / Specialist

Approved by : _____ , **Date:** Nov. 21, 2019

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -5.30dB at 28.68360MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -3.2dB at 5470.00MHz
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
Note:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. This is a supplementary report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	8x8 Wi-Fi 6 Access Point
Brand	Cisco
Test Model	MR56-HW
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter or 55Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 3466.7Mbps 802.11ax: up to 4803.9Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18GHz ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz, 5.745GHz ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 12 802.11ac (VHT80), 802.11ax (HE80): 6 802.11ac (VHT80+80), 802.11ax (HE80+80): 1 set
Output Power	**2.4GHz:** **Non-Beamforming Mode:** **4TX:** 860.549mW **5.18 ~ 5.24GHz:** **Non-Beamforming Mode:** **8TX:** 399.767mW **5.26GHz ~ 5.32GHz:** **Non-Beamforming Mode:** **8TX:** 108.538mW **5.50 ~ 5.72GHz:** **Non-Beamforming Mode:** **8TX:** 124.83mW **5.745 ~ 5.825GHz:** **Non-Beamforming Mode:** **8TX:** 401.781mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1 (option)
Data Cable Supplied	NA

Note:

1. This is a supplementary report. The difference compared with the Report No.: RF180704E02-1& RF180704E02F-1 as the following infomatiion:
   - ◆ Changed the product name to 8x8 Wi-Fi 6 Access Point.
   - ◆ Changed the model name to MR56-HW.
   - ◆ Gen 2 chip revise Gen 1 chip's bug.
   - ◆ Upgrade software version.
   - ◆ Added one new POE for test (Refer to POE No.3 as below table).
2. According to above condition, only AC Power Conducted Emission / Radiated Emissions / Conducted power test items need to be performed. And all data were verified to meet the requirements.
3. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN (2.4GHz)	WLAN (5GHz)	2.4GHz / 5GHz Scanning (only RX)	Bluetooth

4. Simultaneously transmission condition.

Condition	Technology		
1	WLAN (2.4GHz)	WLAN (5GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

5. The EUT must be supplied with a power adapter or POE as following table:

Adapter (Option)			
No.	Brand	Model No.	Spec.
1	UMEC	MA-PWR-30W-US	Input: 100-240Vac, 0.8A, 50/60Hz Output: 12Vdc, 2.5A DC Output cable: Unshielded, 1.4m
2	Ktec	KSAS0361200250HU	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 2.5A DC Output cable: Unshielded, 1.8m
POE (Only for test not for sale)			
No.	Brand	Model No.	Spec.
1	CISCO	MA-INJ-5	Input: 100-240Vac, 1.5A, 50-60Hz Output: 55Vdc, 0.63A
2	CISCO	MA-INJ-4	Input: 100-240Vac, 0.67A, 50/60Hz Output: 55Vdc, 0.6A
3	PHIHONG	POEA30U-1ATE	Input: 100-240VAC, 50/60Hz, 0.8A Output: 56V, 0.536A

Note:
1. From the above conditions, the conducted emissions, **POE No. 3** was selected as representative POE for the test and its data was recorded in this report.
2. From the above conditions, the radiated emissions worse case was found in **Adapter No. 2**. Therefore only the test data of the mode was recorded in this report.

6. The antennas provided to the EUT, please refer to the following table:

WLAN Directional gain table – 8TX			
Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
5.15 ~ 5.25	9.29	PIFA	i-pex(MHF)
5.25 ~ 5.35	9.34		
5.47 ~ 5.725	8.88		
5.725 ~ 5.85	9.2		

WLAN Directional gain table – 4TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_2+Dual_3+Dual_4	5.43	PIFA	i-pex(MHF)
5.15 ~ 5.25	Single_1+Single_2+Single_3+Single_4	10.73		
5.25 ~ 5.35		10.71		
5.47 ~ 5.725		10.33		
5.725 ~ 5.85		10.68		

WLAN Directional gain table – 2TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_3	6.33	PIFA	i-pex(MHF)
5.15 ~ 5.25	Dual_2+Dual_3	8.47		
5.25 ~ 5.35		8.92		
5.47 ~ 5.725		8.16		
5.725 ~ 5.85		8.59		

Bluetooth antenna spec.			
Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector
3.61	2.4~2.4835	PIFA	i-pex(MHF)
Note: More detailed information, please refer to operating description.			

7. The EUT incorporates a MIMO function.

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	8TX	8RX
802.11n (HT20)	8TX	8RX
802.11n (HT40)	8TX	8RX
802.11ac (VHT20)	8TX	8RX
802.11ac (VHT40)	8TX	8RX
802.11ac (VHT80)	8TX	8RX
802.11ac (VHT80+VHT80)	4TX+4TX	4RX +4RX
802.11ax (HE20)	8TX	8RX
802.11ax (HE40)	8TX	8RX
802.11ax (HE80)	8TX	8RX
802.11ax (HE80+HE80)	4TX+4TX	4RX +4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and Non-Beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.

2.4GHz Scanning	
MODULATION MODE	**RX CONFIGURATION**
802.11b	1RX
802.11g	1RX
802.11n (HT20)	1RX
802.11n (HT40)	1RX
VHT20	1RX
VHT40	1RX
5GHz Scanning	
MODULATION MODE	**RX CONFIGURATION**
802.11a	1RX
802.11n (HT20)	1RX
802.11n (HT40)	1RX
802.11ac (VHT20)	1RX
802.11ac (VHT40)	1RX
802.11ac (VHT80)	1RX

8. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

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	5210 MHz

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	5290 MHz

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	5530 MHz	138	5690 MHz
122	5610 MHz		

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

For simultaneous transmission:

1 set is provided for 802.11ac (VHT80+80), 802.11ax (HE80+80):

Channel	Frequency
42+155	5210 MHz + 5775 MHz

Note: The transmission is for noncontiguous transmission using two nonadjacent 80MHz channels.

3.2.1 Test Mode Applicability and Tested Channel Detail

For UNII-1 & UNII-3

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	8TX (PLC: POE mode; RE: adapter mode)

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: 1. In the original test report, the EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (below 1GHz)** & **Z-plane (above 1GHz)**.

Radiated Emission Test (Above 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
802.11ax (HE40)	5745-5825	151 to 159	151, 159	OFDMA	BPSK	MCS0

Radiated Emission Test (Below 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240	36 to 48	151	OFDMA	BPSK	MCS0
802.11ax (HE40)	5745-5825	151 to 159				

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240	36 to 48	151	OFDMA	BPSK	MCS0
802.11ax (HE40)	5745-5825	151 to 159				

Antenna Port Conducted Measurement:

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	5180-5240	36 to 48	36, 40, 48	OFDMA	BPSK	MCS0
802.11ax (HE40)	5745-5825	151 to 159	151, 159	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power (system)	Tested By
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Tom Yang
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	24deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tom Yang

For UNII-2A & UNII-2C

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	8TX (PLC: POE mode; RE: adapter mode)

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: 1. In original report: the EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane (below 1GHz)** & **Z-plane (above 1GHz)**.

Radiated Emission Test (Above 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6Mb/s
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s

Radiated Emission Test (Below 1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320 5500-5720	52 to 64, 100 to 144	140	OFDM	BPSK	6Mb/s

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320 5500-5720	52 to 64, 100 to 144	140	OFDM	BPSK	6Mb/s

Antenna Port Conducted Measurement:

☒ Following channel(s) was (were) selected for the final test as listed below.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6Mb/s
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s

Test Condition:

Applicable To	Environmental Conditions	Input Power (system)	Tested By
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Tom Yang
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	24deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tom Yang

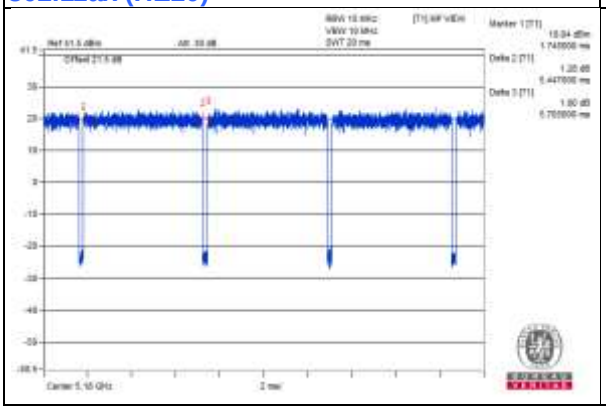
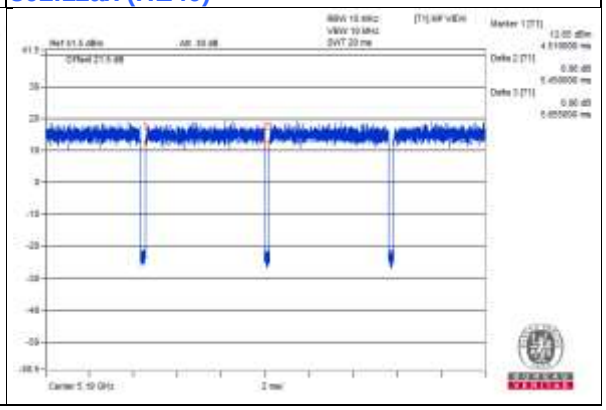
3.3 Duty Cycle of Test Signal

For UNII-1 & UNII-3

Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11ax (HE20): Duty cycle = 5.447 ms/5.705 ms = 0.955, Duty factor = 10 * log (1/Duty cycle) = 0.2

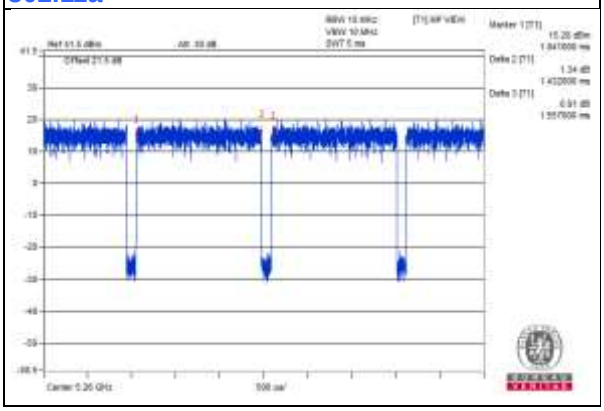
802.11ax (HE40): Duty cycle = 5.45 ms/5.655 ms = 0.964, Duty factor = 10 * log (1/Duty cycle) = 0.16

802.11ax (HE20)	802.11ax (HE40)
	

For UNII-2A & UNII-2C

Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 1.432 ms/1.557 ms = 0.92, Duty factor = 10 * log (1/Duty cycle) = 0.36

802.11a


3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	POE Adapter	PHIHONG	POEA30U-1ATE	NA	NA	Supplied by client

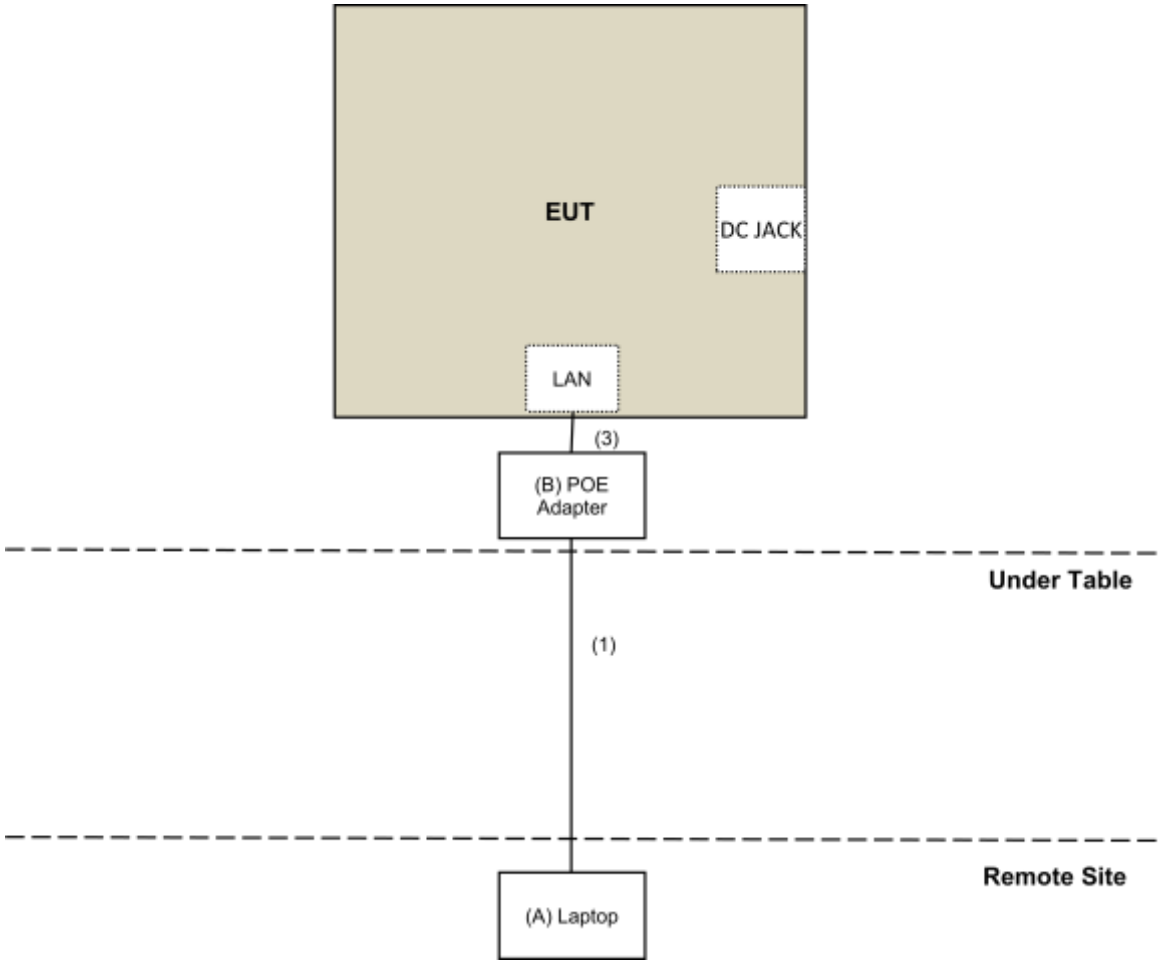
Note:

1. All power cords of the above support units are non-shielded (1.8m).

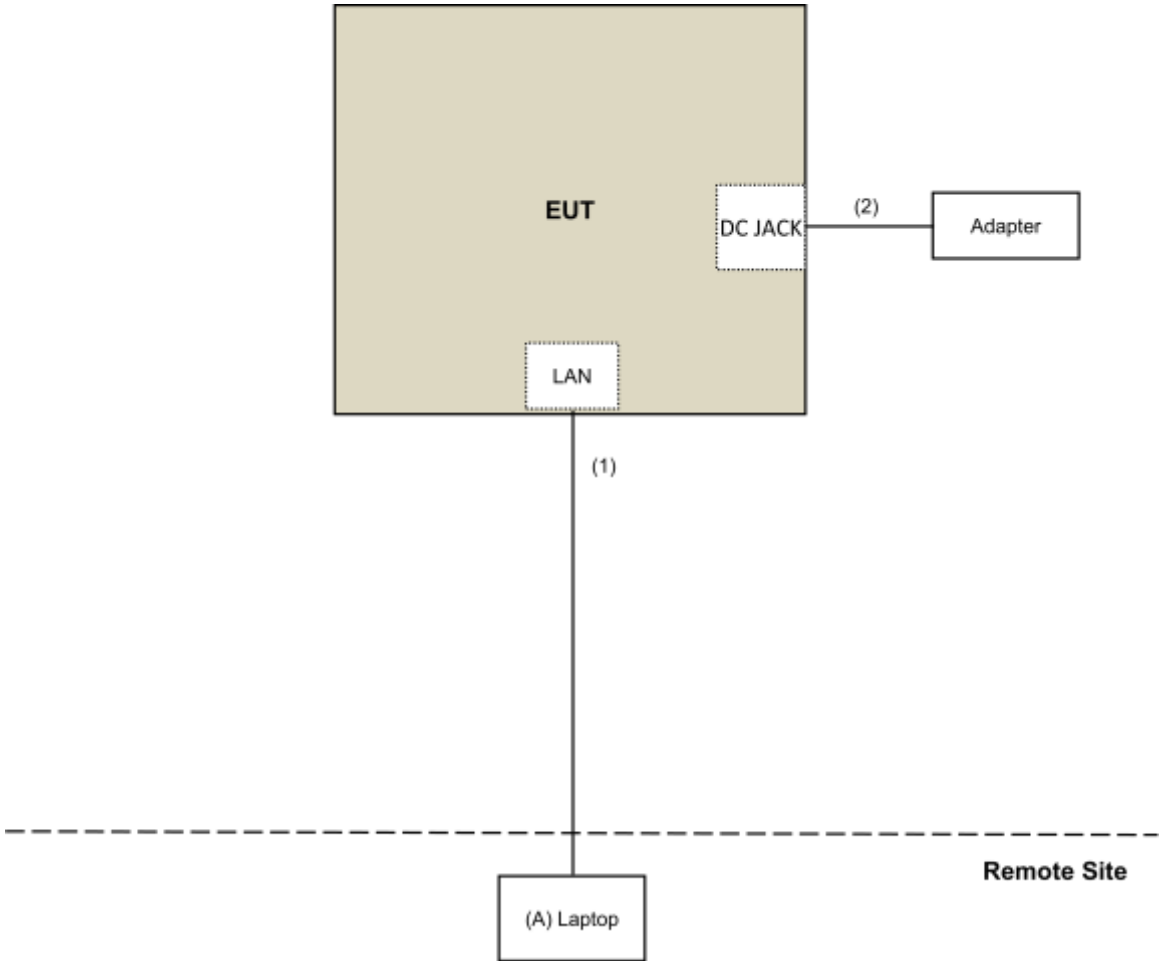
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	DC Cable	1	1.8	No	0	Supplied by client
3.	RJ-45 Cable	1	0.5	No	0	Provided by Lab

3.4.1 Configuration of System under Test

POE mode:



Adapter mode:



3.5 General Description of Applied Standard

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Frequencies (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.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*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.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Jan. 22, 2019	Jan. 21, 2020
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 30, 2019	Apr. 29, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 10, 2019	June 09, 2020
RF Cable	EMC104-SM-SM-6000	180602	June 10, 2019	June 09, 2020
Spectrum Analyzer Keysight	N9030A	MY54490679	July 17, 2019	July 16, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Oct. 09 to 16, 2019

4.1.3 Test Procedure

For Radiated emission below 30MHz

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. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

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. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

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.

Note:

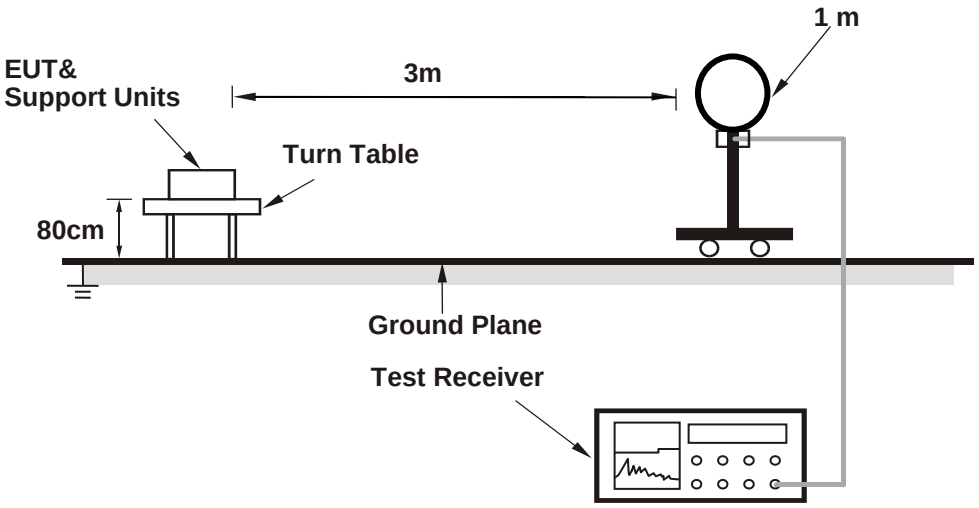
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

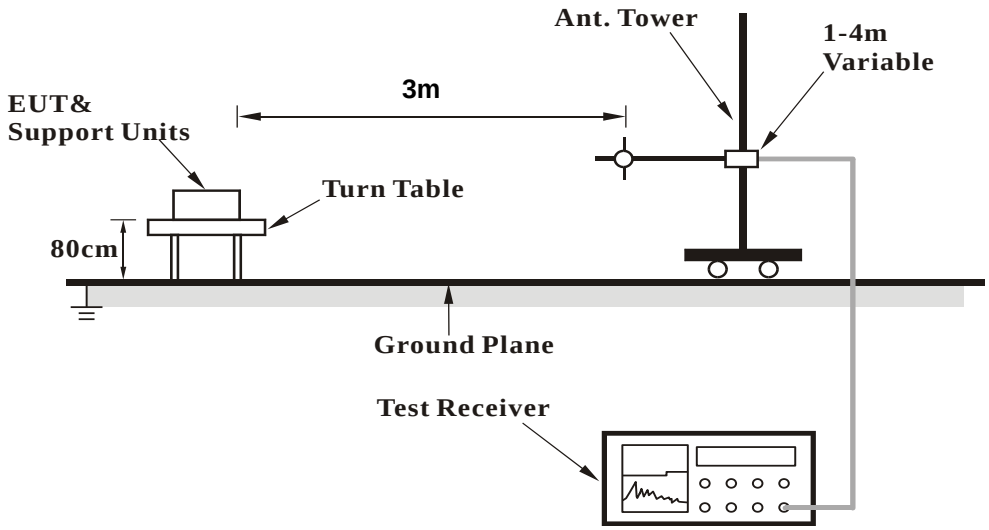
No deviation.

4.1.5 Test Setup

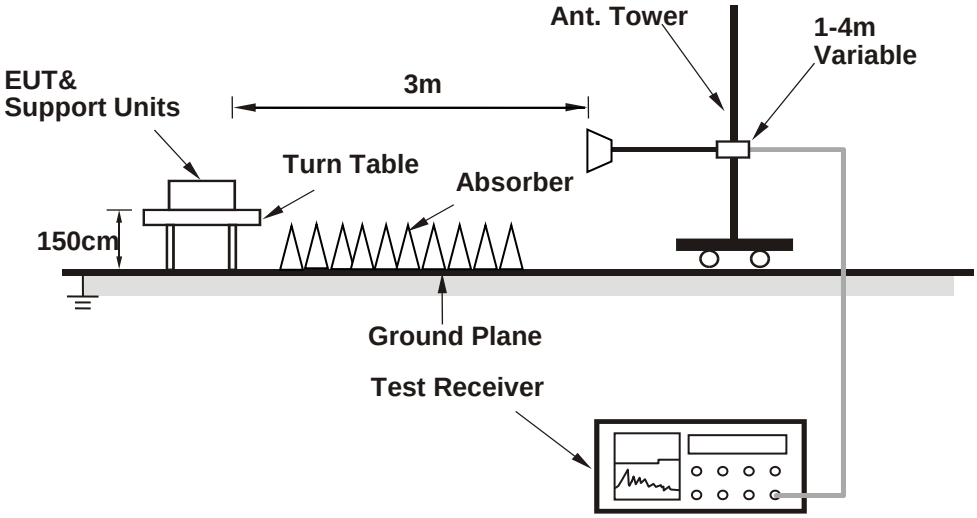
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QSPR (5.0-00161)) has been activated to set the EUT on specific status.

4.1.7 Test Results

For UNII-1

Above 1GHz Data:

802.11ax (HE20)

CHANNEL	TX Channel 36	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	62.1 PK	74.0	-11.9	1.96 H	114	58.8	3.3
2	5150.00	48.2 AV	54.0	-5.8	1.96 H	114	44.9	3.3
3	*5180.00	116.5 PK			1.45 H	5	113.2	3.3
4	*5180.00	107.4 AV			1.45 H	5	104.1	3.3
5	#10360.00	52.3 PK	68.2	-15.9	1.97 H	325	40.1	12.2
6	15540.00	53.0 PK	74.0	-21.0	2.26 H	43	39.8	13.2
7	15540.00	40.2 AV	54.0	-13.8	2.26 H	43	27.0	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	63.8 PK	74.0	-10.2	2.42 V	34	60.5	3.3
2	5150.00	49.6 AV	54.0	-4.4	2.42 V	34	46.3	3.3
3	*5180.00	119.1 PK			2.42 V	34	115.8	3.3
4	*5180.00	109.3 AV			2.42 V	34	106.0	3.3
5	#10360.00	51.8 PK	68.2	-16.4	2.48 V	303	39.6	12.2
6	15540.00	53.1 PK	74.0	-20.9	1.36 V	335	39.9	13.2
7	15540.00	40.4 AV	54.0	-13.6	1.36 V	335	27.2	13.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	119.5 PK			1.46 H	19	116.4	3.1
2	*5200.00	108.5 AV			1.46 H	19	105.4	3.1
3	#10400.00	52.4 PK	68.2	-15.8	1.94 H	337	40.0	12.4
4	15600.00	52.6 PK	74.0	-21.4	2.26 H	29	39.4	13.2
5	15600.00	39.8 AV	54.0	-14.2	2.26 H	29	26.6	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	122.6 PK			1.66 V	9	119.5	3.1
2	*5200.00	112.2 AV			1.66 V	9	109.1	3.1
3	#10400.00	52.3 PK	68.2	-15.9	2.48 V	312	39.9	12.4
4	15600.00	52.7 PK	74.0	-21.3	1.38 V	329	39.5	13.2
5	15600.00	39.9 AV	54.0	-14.1	1.38 V	329	26.7	13.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.5 PK			1.09 H	96	113.7	2.8
2	*5240.00	107.5 AV			1.09 H	96	104.7	2.8
3	5350.00	42.1 PK	74.0	-31.9	2.09 H	237	39.1	3.0
4	5350.00	31.0 AV	54.0	-23.0	2.09 H	237	28.0	3.0
5	#10480.00	52.6 PK	68.2	-15.6	1.97 H	317	40.1	12.5
6	15720.00	53.0 PK	74.0	-21.0	2.30 H	53	40.7	12.3
7	15720.00	40.0 AV	54.0	-14.0	2.30 H	53	27.7	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.9 PK			1.56 V	23	118.1	2.8
2	*5240.00	110.7 AV			1.56 V	23	107.9	2.8
3	5350.00	44.8 PK	74.0	-29.2	1.56 V	23	41.8	3.0
4	5350.00	31.3 AV	54.0	-22.7	1.56 V	23	28.3	3.0
5	#10480.00	51.7 PK	68.2	-16.5	2.51 V	319	39.2	12.5
6	15720.00	53.0 PK	74.0	-21.0	1.36 V	321	40.7	12.3
7	15720.00	40.1 AV	54.0	-13.9	1.36 V	321	27.8	12.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

For UNII-3

Above 1GHz Data:

802.11ax (HE40)

CHANNEL	TX Channel 151	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5612.01	59.0 PK	68.2	-9.2	1.10 H	5	55.7	3.3
2	*5755.00	115.2 PK			1.10 H	5	111.5	3.7
3	*5755.00	104.7 AV			1.10 H	5	101.0	3.7
4	#5985.92	58.6 PK	68.2	-9.6	1.10 H	5	54.5	4.1
5	11510.00	52.7 PK	74.0	-21.3	1.93 H	310	39.7	13.0
6	11510.00	45.7 AV	54.0	-8.3	1.93 H	310	32.7	13.0
7	#17265.00	52.0 PK	68.2	-16.2	2.29 H	41	35.1	16.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5642.98	53.9 PK	68.2	-14.3	1.71 V	360	50.6	3.3
2	*5755.00	119.4 PK			1.71 V	360	115.7	3.7
3	*5755.00	108.1 AV			1.71 V	360	104.4	3.7
4	#5932.85	51.3 PK	68.2	-16.9	1.71 V	360	47.2	4.1
5	11510.00	52.9 PK	74.0	-21.1	2.48 V	333	39.9	13.0
6	11510.00	46.4 AV	54.0	-7.6	2.48 V	333	33.4	13.0
7	#17265.00	52.1 PK	68.2	-16.1	1.36 V	320	35.2	16.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.83	59.2 PK	68.2	-9.0	1.42 H	68	55.9	3.3
2	*5795.00	114.9 PK			1.42 H	68	111.1	3.8
3	*5795.00	104.2 AV			1.42 H	68	100.4	3.8
4	#5964.55	58.5 PK	68.2	-9.7	1.42 H	68	54.3	4.2
5	11590.00	52.9 PK	74.0	-21.1	2.00 H	324	40.1	12.8
6	11590.00	46.0 AV	54.0	-8.0	2.00 H	324	33.2	12.8
7	#17385.00	51.4 PK	68.2	-16.8	2.32 H	49	34.6	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5652.60	54.9 PK	70.1	-15.2	1.38 V	8	51.6	3.3
2	*5795.00	118.9 PK			1.38 V	8	115.1	3.8
3	*5795.00	108.4 AV			1.38 V	8	104.6	3.8
4	#5929.76	52.7 PK	68.2	-15.5	1.38 V	8	48.6	4.1
5	11590.00	52.7 PK	74.0	-21.3	2.51 V	320	39.9	12.8
6	11590.00	46.0 AV	54.0	-8.0	2.51 V	320	33.2	12.8
7	#17385.00	51.8 PK	68.2	-16.4	1.42 V	335	35.0	16.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

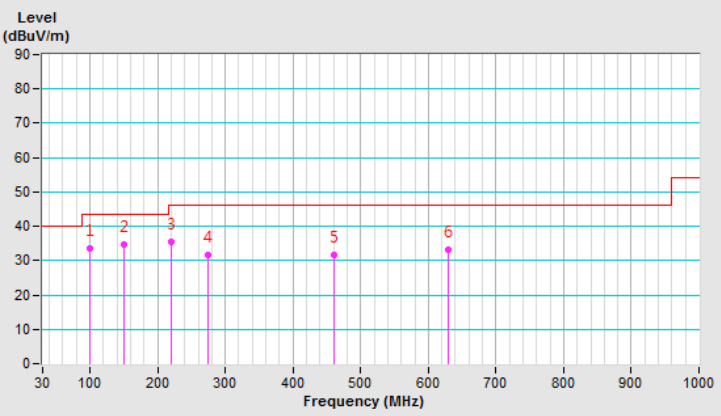
802.11ax (HE40)

CHANNEL	TX Channel 151	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	99.55	33.7 QP	43.5	-9.8	1.10 H	142	45.8	-12.1
2	149.66	34.6 QP	43.5	-8.9	1.65 H	281	42.2	-7.6
3	220.65	35.3 QP	46.0	-10.7	1.56 H	314	45.1	-9.8
4	274.23	31.6 QP	46.0	-14.4	2.00 H	114	39.0	-7.4
5	460.35	31.5 QP	46.0	-14.5	1.50 H	195	34.1	-2.6
6	629.15	33.1 QP	46.0	-12.9	1.45 H	334	31.6	1.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

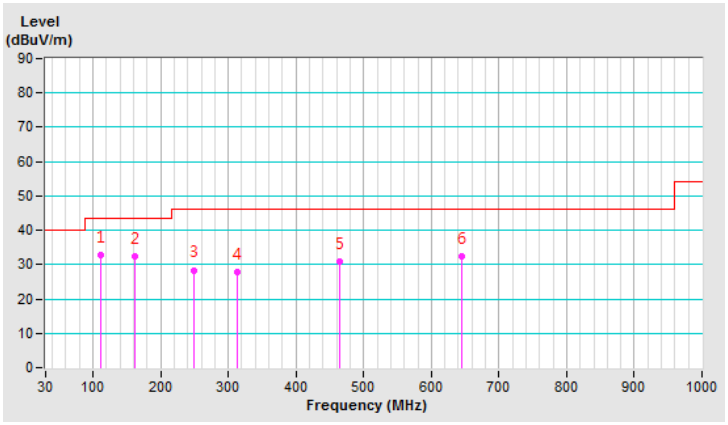


CHANNEL	TX Channel 151	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	111.49	32.8 QP	43.5	-10.7	1.56 V	298	43.4	-10.6
2	162.54	32.3 QP	43.5	-11.2	2.25 V	187	40.5	-8.2
3	249.93	28.4 QP	46.0	-17.6	1.53 V	264	36.8	-8.4
4	312.42	27.8 QP	46.0	-18.2	1.63 V	219	33.8	-6.0
5	464.89	30.9 QP	46.0	-15.1	1.00 V	152	33.4	-2.5
6	644.35	32.4 QP	46.0	-13.6	1.50 V	264	30.7	1.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



For UNII-2A & UNII-2C

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 52	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	49.8 PK	74.0	-24.2	1.45 H	341	46.5	3.3
2	5150.00	37.9 AV	54.0	-16.1	1.45 H	341	34.6	3.3
3	*5260.00	113.6 PK			1.45 H	341	110.9	2.7
4	*5260.00	106.0 AV			1.45 H	341	103.3	2.7
5	#10520.00	46.7 PK	68.2	-21.5	1.97 H	313	34.1	12.6
6	15780.00	46.2 PK	74.0	-27.8	2.18 H	45	34.2	12.0
7	15780.00	36.2 AV	54.0	-17.8	2.18 H	45	24.2	12.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	5150.00	50.3 PK	74.0	-23.7	1.48 V	348	47.0	3.3
2	5150.00	40.2 AV	54.0	-13.8	1.48 V	348	36.9	3.3
3	*5260.00	115.3 PK			1.48 V	348	112.6	2.7
4	*5260.00	106.9 AV			1.48 V	348	104.2	2.7
5	#10520.00	46.3 PK	68.2	-21.9	2.46 V	278	33.7	12.6
6	15780.00	46.6 PK	74.0	-27.4	1.47 V	332	34.6	12.0
7	15780.00	35.8 AV	54.0	-18.2	1.47 V	332	23.8	12.0

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	111.5 PK			1.96 H	234	108.7	2.8
2	*5300.00	102.4 AV			1.96 H	234	99.6	2.8
3	5350.00	49.5 PK	74.0	-24.5	1.40 H	232	46.5	3.0
4	5350.00	40.6 AV	54.0	-13.4	1.40 H	232	37.6	3.0
5	10600.00	49.5 PK	74.0	-24.5	1.98 H	329	37.0	12.5
6	10600.00	43.4 AV	54.0	-10.6	1.98 H	329	30.9	12.5
7	15900.00	52.1 PK	74.0	-21.9	2.17 H	46	39.8	12.3
8	15900.00	40.6 AV	54.0	-13.4	2.17 H	46	28.3	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	114.2 PK			1.46 V	354	111.4	2.8
2	*5300.00	105.9 AV			1.46 V	354	103.1	2.8
3	5350.00	50.4 PK	74.0	-23.6	1.46 V	354	47.4	3.0
4	5350.00	40.7 AV	54.0	-13.3	1.46 V	354	37.7	3.0
5	10600.00	49.8 PK	74.0	-24.2	2.43 V	293	37.3	12.5
6	10600.00	45.5 AV	54.0	-8.5	2.43 V	293	33.0	12.5
7	15900.00	57.6 PK	74.0	-16.4	1.53 V	320	45.3	12.3
8	15900.00	47.3 AV	54.0	-6.7	1.53 V	320	35.0	12.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	112.2 PK			1.34 H	336	109.4	2.8
2	*5320.00	104.5 AV			1.34 H	336	101.7	2.8
3	5350.00	50.9 PK	74.0	-23.1	1.59 H	277	47.9	3.0
4	5350.00	38.1 AV	54.0	-15.9	1.59 H	277	35.1	3.0
5	10640.00	49.0 PK	74.0	-25.0	1.92 H	315	36.5	12.5
6	10640.00	42.7 AV	54.0	-11.3	1.92 H	315	30.2	12.5
7	15960.00	52.3 PK	74.0	-21.7	2.15 H	36	39.6	12.7
8	15960.00	40.3 AV	54.0	-13.7	2.15 H	36	27.6	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	114.7 PK			1.43 V	345	111.9	2.8
2	*5320.00	106.2 AV			1.43 V	345	103.4	2.8
3	5350.00	51.4 PK	74.0	-22.6	1.43 V	345	48.4	3.0
4	5350.00	39.8 AV	54.0	-14.2	1.43 V	345	36.8	3.0
5	10640.00	49.2 PK	74.0	-24.8	2.46 V	303	36.7	12.5
6	10640.00	44.6 AV	54.0	-9.4	2.46 V	303	32.1	12.5
7	15960.00	57.5 PK	74.0	-16.5	1.51 V	331	44.8	12.7
8	15960.00	47.1 AV	54.0	-6.9	1.51 V	331	34.4	12.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	62.6 PK	74.0	-11.4	1.30 H	269	59.3	3.3
2	5460.00	44.1 AV	54.0	-9.9	1.30 H	269	40.8	3.3
3	**#5470.00**	**65.0 PK**	**68.2**	**-3.2**	**2.60 H**	**267**	**61.7**	**3.3**
4	*5500.00	111.1 PK			1.33 H	283	107.8	3.3
5	*5500.00	101.6 AV			1.33 H	283	98.3	3.3
6	11000.00	49.6 PK	74.0	-24.4	1.88 H	325	36.5	13.1
7	11000.00	43.1 AV	54.0	-10.9	1.88 H	325	30.0	13.1
8	#16500.00	51.3 PK	68.2	-16.9	2.11 H	29	37.0	14.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	53.1 PK	74.0	-20.9	1.34 V	14	49.8	3.3
2	5460.00	43.8 AV	54.0	-10.2	1.34 V	14	40.5	3.3
3	#5470.00	52.5 PK	68.2	-15.7	1.34 V	14	49.2	3.3
4	*5500.00	113.2 PK			1.34 V	14	109.9	3.3
5	*5500.00	104.8 AV			1.34 V	14	101.5	3.3
6	11000.00	49.1 PK	74.0	-24.9	2.41 V	296	36.0	13.1
7	11000.00	44.6 AV	54.0	-9.4	2.41 V	296	31.5	13.1
8	#16500.00	52.4 PK	68.2	-15.8	1.50 V	336	38.1	14.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 116	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	110.1 PK			1.19 H	163	106.8	3.3
2	*5580.00	100.4 AV			1.19 H	163	97.1	3.3
3	11160.00	49.2 PK	74.0	-24.8	1.98 H	321	36.3	12.9
4	11160.00	42.6 AV	54.0	-11.4	1.98 H	321	29.7	12.9
5	#16740.00	52.0 PK	68.2	-16.2	2.17 H	49	36.6	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	114.3 PK			1.43 V	336	111.0	3.3
2	*5580.00	106.3 AV			1.43 V	336	103.0	3.3
3	11160.00	48.6 PK	74.0	-25.4	2.42 V	309	35.7	12.9
4	11160.00	44.3 AV	54.0	-9.7	2.42 V	309	31.4	12.9
5	#16740.00	57.4 PK	68.2	-10.8	1.46 V	335	42.0	15.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	110.2 PK			1.07 H	297	106.8	3.4
2	*5700.00	101.5 AV			1.07 H	297	98.1	3.4
3	#5725.00	50.9 PK	68.2	-17.3	1.86 H	255	47.4	3.5
4	11400.00	48.7 PK	74.0	-25.3	1.99 H	312	35.4	13.3
5	11400.00	42.3 AV	54.0	-11.7	1.99 H	312	29.0	13.3
6	#17100.00	51.4 PK	68.2	-16.8	2.23 H	53	35.0	16.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	112.9 PK			1.50 V	333	109.5	3.4
2	*5700.00	104.5 AV			1.50 V	333	101.1	3.4
3	#5725.00	51.2 PK	68.2	-17.0	1.50 V	333	47.7	3.5
4	11400.00	49.4 PK	74.0	-24.6	2.44 V	318	36.1	13.3
5	11400.00	44.9 AV	54.0	-9.1	2.44 V	318	31.6	13.3
6	#17100.00	57.4 PK	68.2	-10.8	1.43 V	333	41.0	16.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	49.9 PK	74.0	-24.1	1.51 H	213	46.6	3.3
2	5460.00	38.1 AV	54.0	-15.9	1.51 H	213	34.8	3.3
3	#5470.00	48.7 PK	68.2	-19.5	1.44 H	4	45.4	3.3
4	*5720.00	112.6 PK			2.58 H	198	109.1	3.5
5	*5720.00	106.5 AV			2.58 H	198	103.0	3.5
6	#5850.00	50.4 PK	68.2	-17.8	1.33 H	122	46.4	4.0
7	11440.00	48.4 PK	74.0	-25.6	1.98 H	311	35.2	13.2
8	11440.00	42.4 AV	54.0	-11.6	1.98 H	311	29.2	13.2
9	#17160.00	52.1 PK	68.2	-16.1	2.23 H	36	35.3	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	51.0 PK	74.0	-23.0	1.70 V	354	47.7	3.3
2	5460.00	38.8 AV	54.0	-15.2	1.70 V	354	35.5	3.3
3	#5470.00	50.3 PK	68.2	-17.9	1.70 V	354	47.0	3.3
4	*5720.00	115.4 PK			1.70 V	354	111.9	3.5
5	*5720.00	107.2 AV			1.70 V	354	103.7	3.5
6	#5850.00	50.5 PK	68.2	-17.7	1.70 V	354	46.5	4.0
7	11440.00	49.3 PK	74.0	-24.7	2.44 V	300	36.1	13.2
8	11440.00	45.0 AV	54.0	-9.0	2.44 V	300	31.8	13.2
9	#17160.00	57.4 PK	68.2	-10.8	1.41 V	334	40.6	16.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

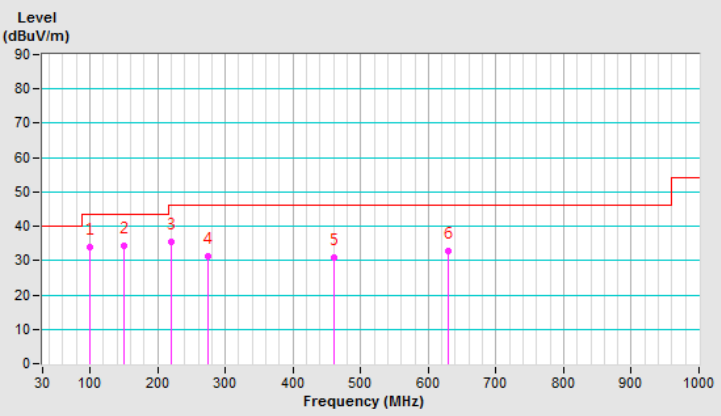
802.11a

CHANNEL	TX Channel 140	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	99.56	33.8 QP	43.5	-9.7	2.50 H	301	45.9	-12.1
2	149.89	34.2 QP	43.5	-9.3	1.64 H	332	41.8	-7.6
3	220.62	35.6 QP	46.0	-10.4	1.59 H	174	45.4	-9.8
4	274.20	31.3 QP	46.0	-14.7	1.56 H	291	38.7	-7.4
5	460.40	30.8 QP	46.0	-15.2	1.45 H	238	33.4	-2.6
6	629.25	32.9 QP	46.0	-13.1	1.50 H	241	31.4	1.5

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

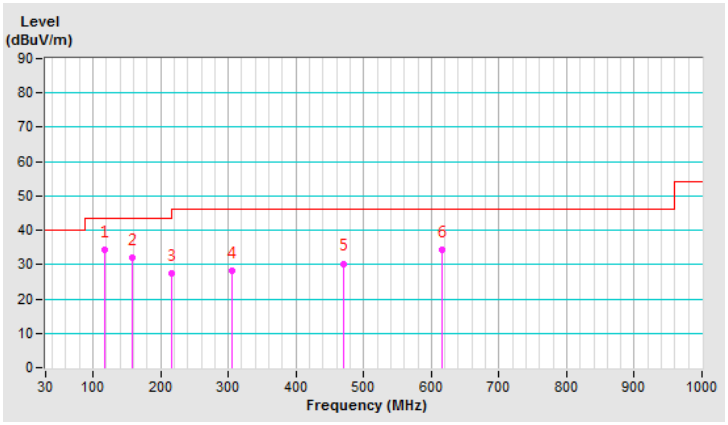


CHANNEL	TX Channel 140	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	116.35	34.3 QP	43.5	-9.2	1.43 V	265	44.4	-10.1
2	158.67	32.1 QP	43.5	-11.4	2.00 V	206	39.9	-7.8
3	215.90	27.3 QP	43.5	-16.2	1.61 V	314	37.2	-9.9
4	306.25	28.3 QP	46.0	-17.7	2.00 V	291	34.6	-6.3
5	470.36	30.3 QP	46.0	-15.7	1.54 V	302	32.6	-2.3
6	615.54	34.3 QP	46.0	-11.7	1.55 V	265	33.1	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	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.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: Oct. 16, 2019

4.2.3 Test Procedure

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.

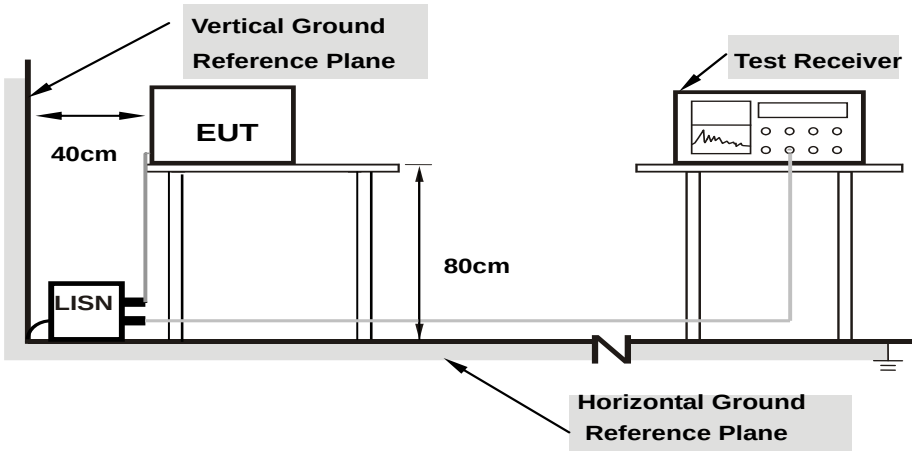
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

4.2.7 Test Results

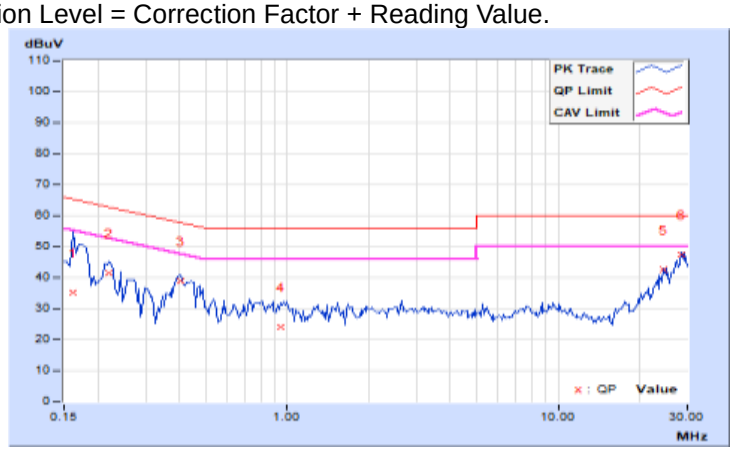
For UNII-1 & UNII-3

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16171	9.95	25.06	7.46	35.01	17.41	65.38	55.38	-30.37	-37.97
2	0.22030	9.96	31.58	22.13	41.54	32.09	62.81	52.81	-21.27	-20.72
3	0.40390	9.97	28.76	18.05	38.73	28.02	57.77	47.77	-19.04	-19.75
4	0.95076	10.01	14.15	4.45	24.16	14.46	56.00	46.00	-31.84	-31.54
5	24.45312	11.15	31.46	29.79	42.61	40.94	60.00	50.00	-17.39	-9.06
6	28.68749	11.26	36.13	33.38	47.39	44.64	60.00	50.00	-12.61	-5.36

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

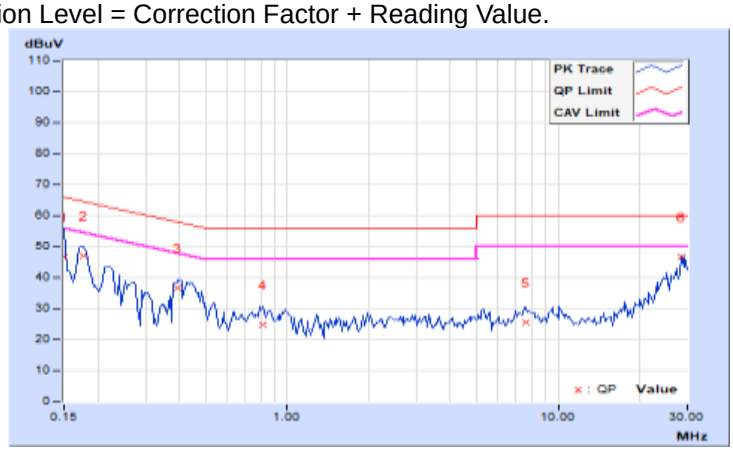


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.93	36.58	10.02	46.51	19.95	66.00	56.00	-19.49	-36.05
2	0.17732	9.94	37.19	26.76	47.13	36.70	64.61	54.61	-17.48	-17.91
3	0.39607	9.95	26.76	20.02	36.71	29.97	57.94	47.94	-21.23	-17.97
4	0.81795	9.98	15.02	5.13	25.00	15.11	56.00	46.00	-31.00	-30.89
5	7.65232	10.27	15.11	8.76	25.38	19.03	60.00	50.00	-34.62	-30.97
6	28.68749	10.91	35.79	33.02	46.70	43.93	60.00	50.00	-13.30	-6.07

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



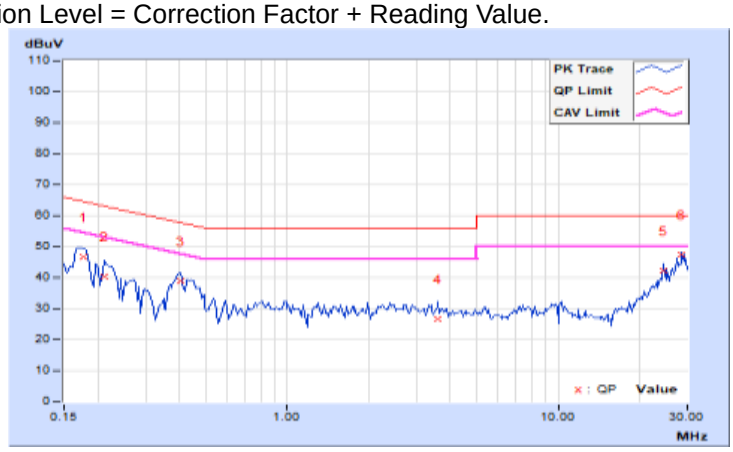
For UNII-2A & UNII-2C

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17733	9.96	36.82	27.19	46.78	37.15	64.61	54.61	-17.83	-17.46
2	0.21251	9.96	30.56	18.98	40.52	28.94	63.11	53.11	-22.59	-24.17
3	0.40390	9.97	28.87	19.79	38.84	29.76	57.77	47.77	-18.93	-18.01
4	3.61329	10.15	16.38	8.35	26.53	18.50	56.00	46.00	-29.47	-27.50
5	24.44921	11.15	31.02	28.68	42.17	39.83	60.00	50.00	-17.83	-10.17
6	**28.68360**	**11.26**	**36.26**	**33.44**	**47.52**	**44.70**	**60.00**	**50.00**	**-12.48**	**-5.30**

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

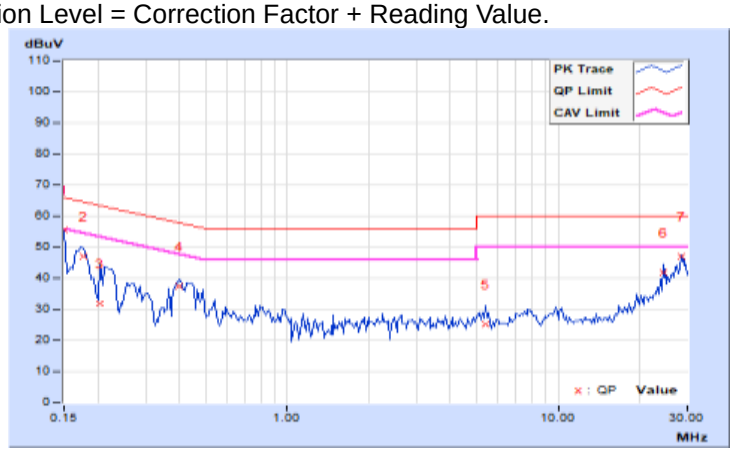


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.93	45.68	29.81	55.61	39.74	66.00	56.00	-10.39	-16.26
2	0.17733	9.94	37.04	26.69	46.98	36.63	64.61	54.61	-17.63	-17.98
3	0.20468	9.94	22.02	5.28	31.96	15.22	63.42	53.42	-31.46	-38.20
4	0.40001	9.95	27.46	20.03	37.41	29.98	57.85	47.85	-20.44	-17.87
5	5.42187	10.18	15.12	7.99	25.30	18.17	60.00	50.00	-34.70	-31.83
6	24.45312	10.85	30.86	29.32	41.71	40.17	60.00	50.00	-18.29	-9.83
7	28.68751	10.91	35.97	33.11	46.88	44.02	60.00	50.00	-13.12	-5.98

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Client device	250mW (24 dBm)
U-NII-2A	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

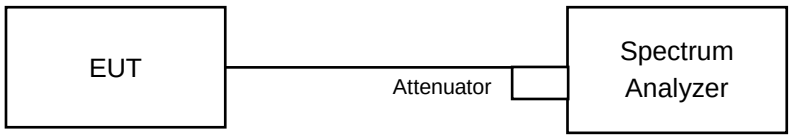
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

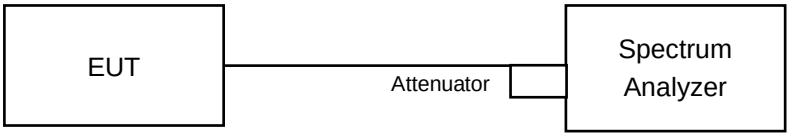
FOR POWER OUTPUT MEASUREMENT

For channel straddling 5725MHz:



For other channels:

FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For channel straddling 5725MHz:

Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW ≥ 3 x RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

For other channels:

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. Duty factor is not added to measured value.

FOR 26dB OCCUPIED BANDWIDTH

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Non-Beamforming Mode

UNII-1

802.11ax (HE20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)								Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5	Chain 6	Chain 7				
36	5180	17.19	16.85	17.06	16.92	17.22	16.48	17.34	16.74	399.39	26.01	26.71	Pass
40	5200	16.97	16.80	17.03	17.06	17.13	16.61	17.21	17.05	399.675	26.02	26.71	Pass
48	5240	17.24	16.71	16.80	16.93	17.38	16.88	17.13	16.78	399.767	26.02	26.71	Pass

Note: 1. The directional gain is 9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

UNII-3

802.11ax (HE40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)								Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5	Chain 6	Chain 7				
151	5755	16.99	16.87	17.24	17.24	17.18	17.01	16.55	16.95	401.781	26.04	26.80	Pass
159	5795	16.89	17.27	16.68	17.12	16.89	17.16	16.74	16.89	397.217	25.99	26.80	Pass

Note: 1. The directional gain is 9.2dBi > 6dBi, so the power limit shall be reduced to 30-(9.2-6) = 26.80dBm.

UNII-2A & UNII-2C

802.11a

POWER OUTPUT

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)								Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5	Chain 6	Chain 7				
52	5260	11.27	11.18	11.23	10.81	11.34	11.26	11.39	11.01	105.214	20.22	20.66	Pass
60	5300	11.22	11.18	11.36	10.90	11.41	11.19	11.45	11.83	108.538	20.36	20.66	Pass
64	5320	11.43	11.28	11.32	10.94	11.42	11.29	10.97	11.74	108.052	20.34	20.66	Pass
100	5500	11.77	11.82	12.04	11.51	11.74	11.48	11.47	11.45	117.371	20.70	21.12	Pass
116	5580	12.04	12.12	12.19	11.70	11.94	11.59	11.91	11.63	123.768	20.93	21.12	Pass
140	5700	12.08	11.92	11.65	11.69	12	11.81	12.41	11.85	124.83	20.96	21.12	Pass
*144 (U-NII-2C Band)	5720	6.51	6.34	6.71	7.13	6.88	6.98	6.82	7	41.664	16.20	19.93	Pass
*144 (U-NII-3 Band)	5720	0.66	0.48	0.96	1.34	1.2	1.41	0.83	1.18	10.997	10.41	26.80	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test.

1. For U-NII-2A: The directional gain is 9.34dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit -(9.34-6) ”.
2. For U-NII-2C: The directional gain is 8.88dBi > 6dBi, so the power limit shall be reduced to “Determined Conducted Limit -(8.88-6)”.
3. For U-NII-3: The directional gain is 9.2dBi > 6dBi, so the power limit shall be reduced to 30-(9.2-6) = 26.8dBm.

The Total Power for the straddle channel:

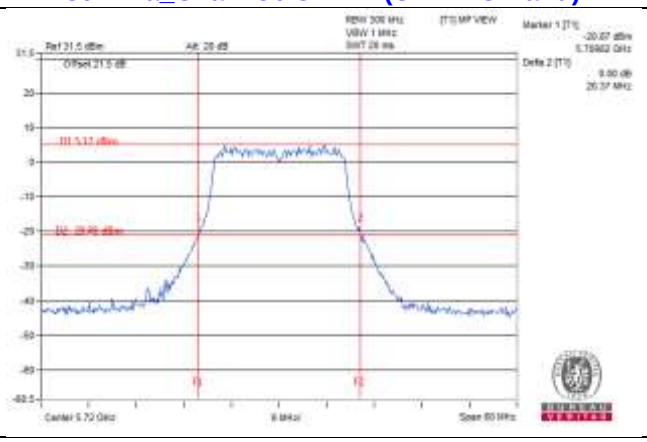
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	52.661	17.21
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)							
		Chain 0	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5	Chain 6	Chain 7
52	5260	21.26	22.57	21.78	22.84	20.47	20.73	20.56	21.99
60	5300	21.20	22.58	21.55	22.46	20.62	20.81	20.69	22.17
64	5320	21.27	22.38	21.33	22.64	20.82	20.86	20.61	21.78
100	5500	21.29	22.35	21.16	22.44	20.69	20.79	20.60	22.41
116	5580	21.38	22.45	21.30	22.41	20.84	20.79	20.65	21.94
140	5700	21.24	22.16	21.48	22.67	20.62	20.69	20.57	21.98
144 (U-NII-2C Band)	5720	15.97	16.41	15.95	16.63	15.21	15.18	15.33	15.90

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Power Limit = 11dBm + 10logB <U-NII-2A, U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.47	24.11 > 24
60	5300	20.62	24.14 > 24
64	5320	20.61	24.14 > 24
100	5500	20.60	24.13 > 24
116	5580	20.65	24.14 > 24
140	5700	20.57	24.13 > 24
144 (U-NII-2C Band)	5720	15.18	22.81 < 24

Spectrum Plot of Worst Value
802.11a_Chain 5 / CH144 (U-NII-2C Band)


Note:

For CH144 (U-NII-2C) = 5725MHz - Marker 1

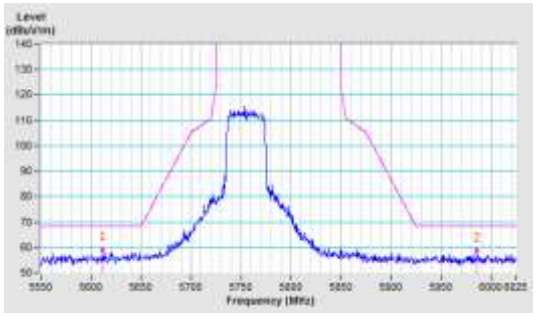
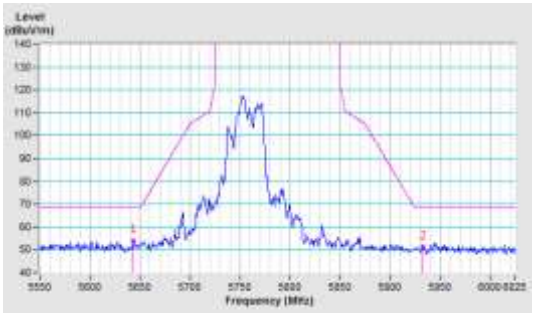
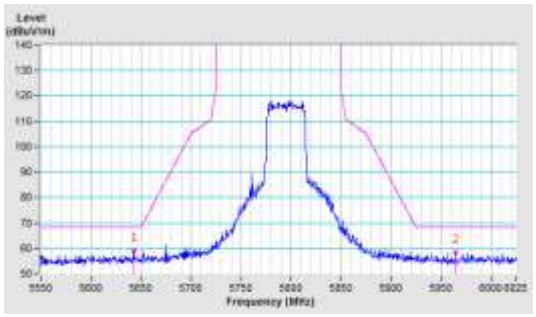
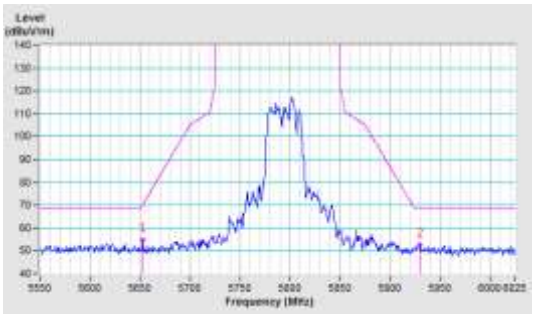
5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

8TX:

802.11ax (HE40)

CH 151 5755 MHz	
Horizontal	**Vertical**
	
CH 159 5795 MHz	
Horizontal	**Vertical**
	

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab
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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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