

FCC Test Report

Report No.: RF180704E03H-1

FCC ID: UDX-60079010

Test Model: MR46-HW

Received Date: Sep. 24, 2019

Test Date: Oct. 08 to 16, 2019

Issued Date: Oct. 29, 2019

Applicant: Cisco Systems, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180704E03H-1	Original release.	Oct. 29, 2019

1 Certificate of Conformity

Product: 4x4 Wi-Fi 6 Access Point

Brand: Cisco

Test Model: MR46-HW

Sample Status: ENGINEERING SAMPLE

Applicant: Cisco Systems, Inc.

Test Date: Oct. 08 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:** Oct. 29, 2019
Claire Kuan / Specialist

Approved by :  , **Date:** Oct. 29, 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 -4.48dB at 0.38046MHz.
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 -0.1dB at 17355.00MHz
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 OOB 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) (\pm)
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	4x4 Wi-Fi 6 Access Point
Brand	Cisco
Test Model	MR46-HW
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter or 55Vdc from PoE or 56Vdc 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 1733.3Mbps 802.11ax: up to 2401.9Mbps
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: 868.186mW 5.18 ~ 5.24GHz: Non-Beamforming Mode: 4TX: 536.342mW 5.26GHz ~ 5.32GHz: Non-Beamforming Mode: 4TX: 243.567mW 5.50 ~ 5.72GHz: Non-Beamforming Mode: 4TX: 233.551mW 5.745 ~ 5.825GHz: Non-Beamforming Mode: 4TX: 919.988mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1 (option)
Data Cable Supplied	NA

Note:

- This is a supplementary report. The difference compared with the Report No.: RF180704E03-1 & RF180704E03D-1 as the following information:
 - ◆ Changed the product name to 4x4 Wi-Fi 6 Access Point.
 - ◆ Changed the model name to MR46-HW.
 - ◆ Gen 2 chip revise Gen 1 chip's bug.
 - ◆ Upgraded software version.
 - ◆ Added one new POE for test (Refer to POE No.3 as below table).
- 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.
- 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

- 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.

- 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:

- 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.
- 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 – 4TX				
Frequency range (GHz)	Directional Antenna Gain (dBi)		Antenna Type	Antenna Connector
2.4 ~ 2.4835	7.74		PIFA	i-pex(MHF)
5.15 ~ 5.25	8.40			
5.25 ~ 5.35	8.93			
5.47 ~ 5.725	8.51			
5.725 ~ 5.85	8.11			
WLAN Directional gain table – 2TX				
Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	2.4G Ant. 1+4	6.12	PIFA	i-pex(MHF)
5.15 ~ 5.25	5.15G Ant. 1+3	6.62		
5.25 ~ 5.35	5.35G Ant. 1+2	7.50		
5.47 ~ 5.725	5.55G Ant. 3+4	7.71		
5.725 ~ 5.85	5.85G Ant. 3+4	7.27		
Bluetooth antenna spec.				
Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type		Antenna Connector
4.24	2.4 ~ 2.4835	PIFA		i-pex(MHF)
Note: More detailed information, please refer to operating description.				

7. The EUT incorporates a MIMO function.

Radio 1 - 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

Radio 2 - 5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ac (VHT80+VHT80)	2TX+2TX	2RX+2RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX
802.11ax (HE80+HE80)	2TX+2TX	2RX+2RX

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.

Radio 3 - Scanning (only RX)		
2.4GHz		
MODULATION MODE	RX CONFIGURATION	
802.11b	1RX	
802.11g	1RX	
802.11n (HT20)	1RX	
802.11n (HT40)	1RX	
VHT20	1RX	
VHT40	1RX	
5GHz		
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 \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	4TX (PLC: POE mode; RE: adapter mode)

Where **RE \geq 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**.

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 (HE20)	5745-5825	149 to 165	149, 157, 165	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 5745-5825	36 to 48 149 to 165	149	OFDMA	BPSK	MCS0

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 5745-5825	36 to 48 149 to 165	149	OFDMA	BPSK	MCS0

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 (HE20)	5745-5825	149 to 165	149, 157, 165	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power (system)	Tested By
RE \geq 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 \geq 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	4TX (PLC: POE mode; RE: adapter mode)

Where **RE \geq 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**.

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 (HE40)	5260-5320	54 to 62	54, 62	OFDMA	BPSK	MCS0
802.11ax (HE40)	5500-5720	102 to 142	102, 110, 134, 142	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 (HE40)	5260-5320 5500-5720	54 to 62 102 to 142	54	OFDMA	BPSK	MCS0

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 (HE40)	5260-5320 5500-5720	54 to 62 102 to 142	54	OFDMA	BPSK	MCS0

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 (HE40)	5260-5320	54 to 62	54, 62	OFDMA	BPSK	MCS0
802.11ax (HE40)	5500-5720	102 to 142	102, 110, 134, 142	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power (system)	Tested By
RE \geq 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

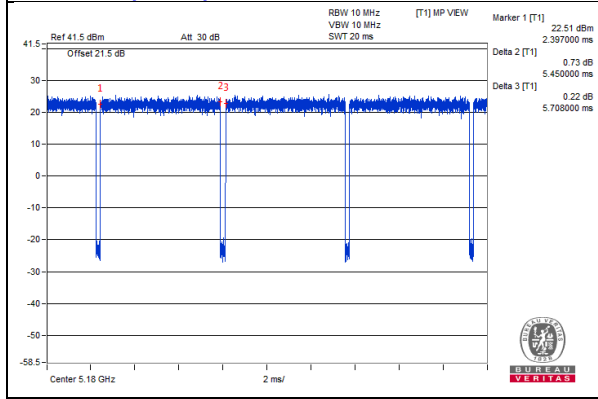
3.3 Duty Cycle of Test Signal

For UNII-1 & UNII-3

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

802.11ax (HE20): Duty cycle = 5.45 ms/5.708 ms = 0.955, Duty factor = $10 * \log(1/0.955) = 0.2$

802.11ax (HE20)

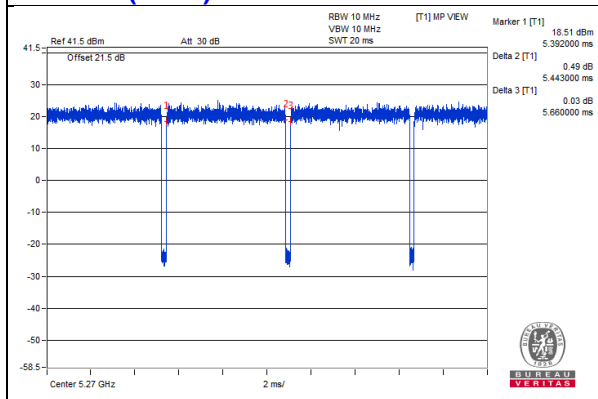


For UNII-2A & UNII-2C

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

802.11ax (HE40): Duty cycle = 5.443 ms/5.66 ms = 0.962, Duty factor = $10 * \log(1/0.962) = 0.17$

802.11ax (HE40)



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	CISCO	MA-INJ-5	NA	NA	Supplied by client

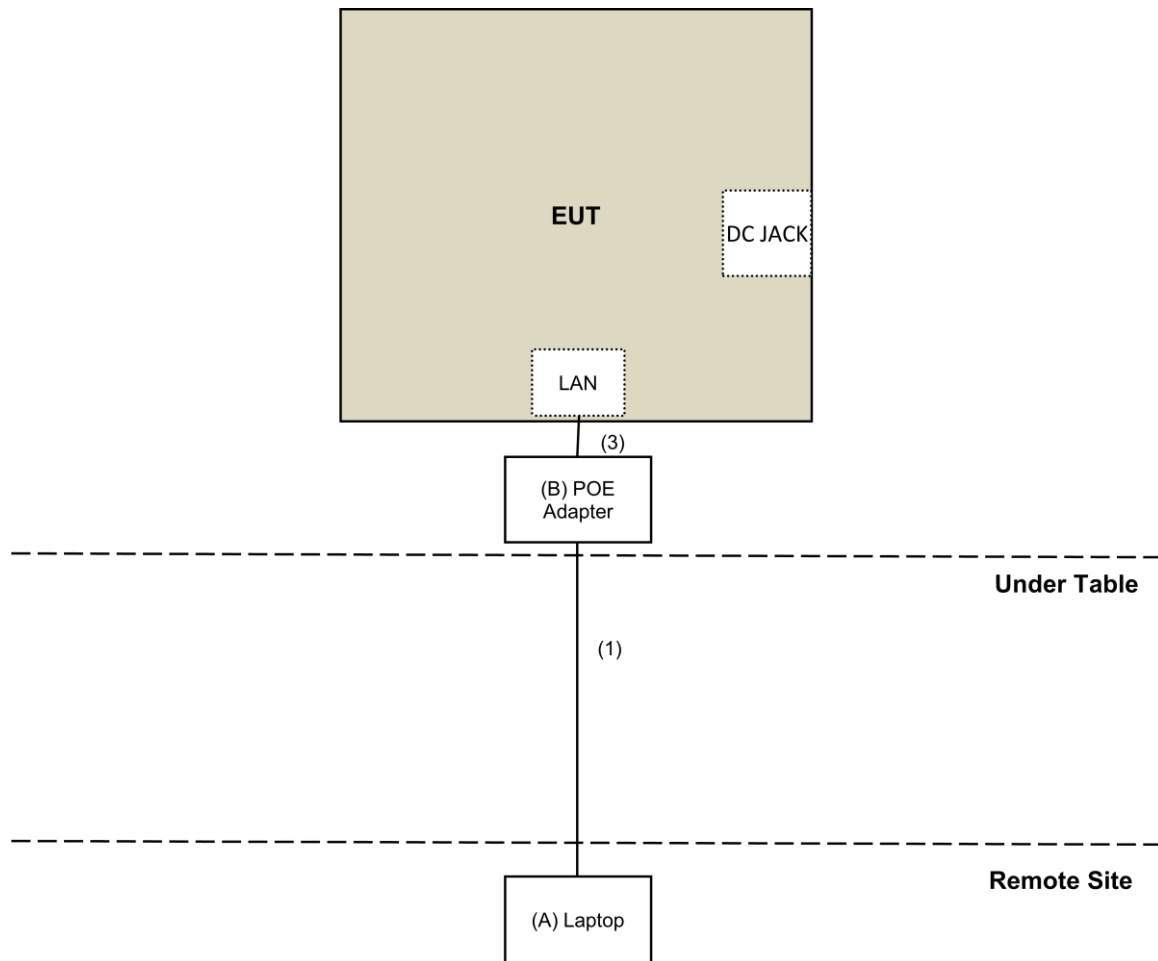
Note:

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

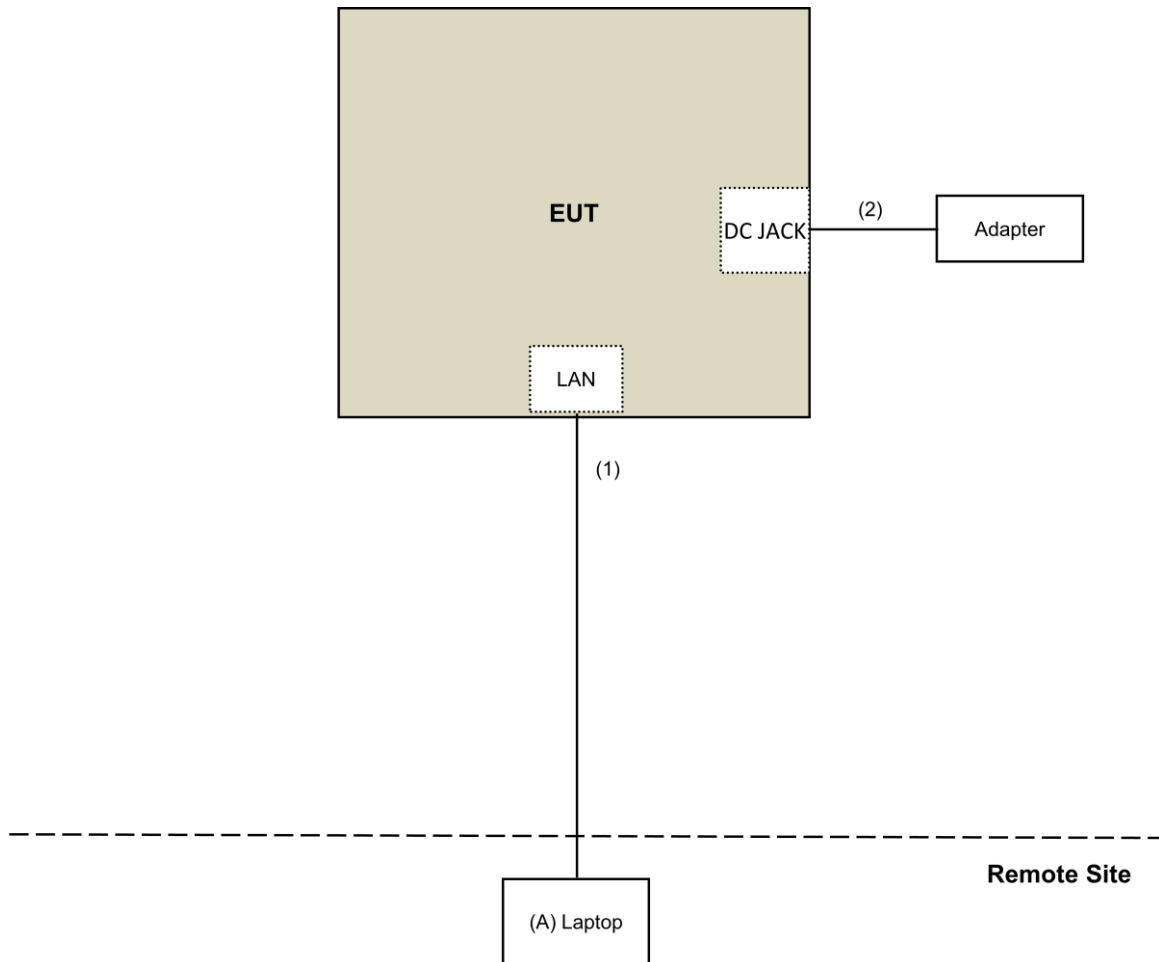
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	DC Cable	1	1.8	No	0	Supplied by client
3.	RJ-45 Cable	1	0.5	No	0	Provided by Lab

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

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/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(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 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(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

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

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

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. 08 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:

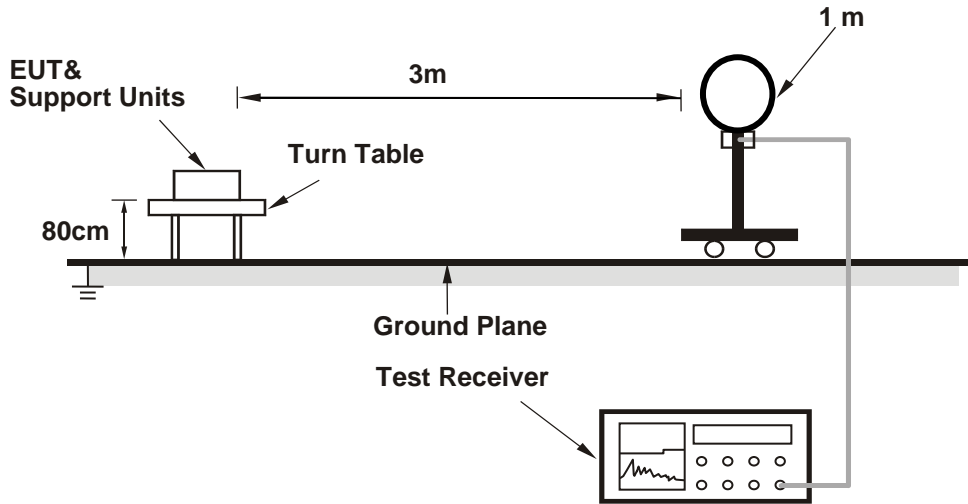
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) 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

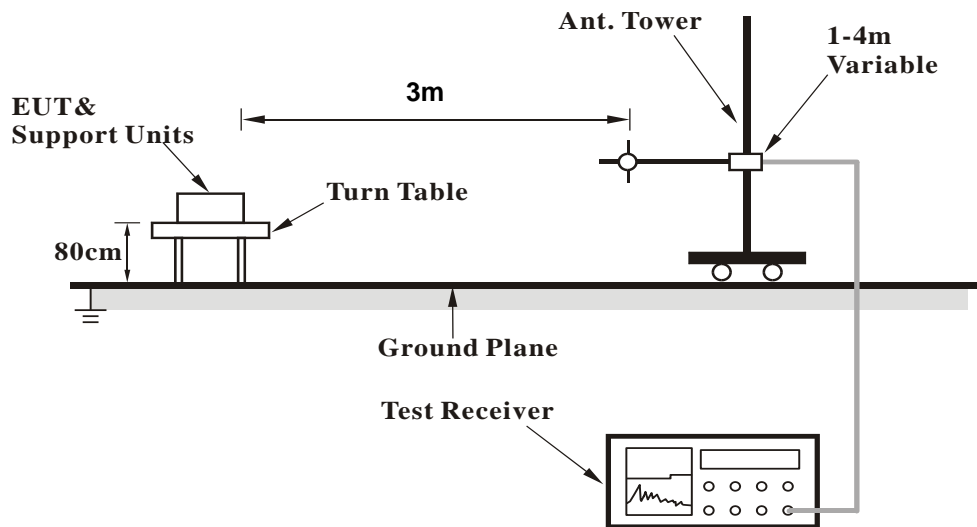
No deviation.

4.1.5 Test Setup

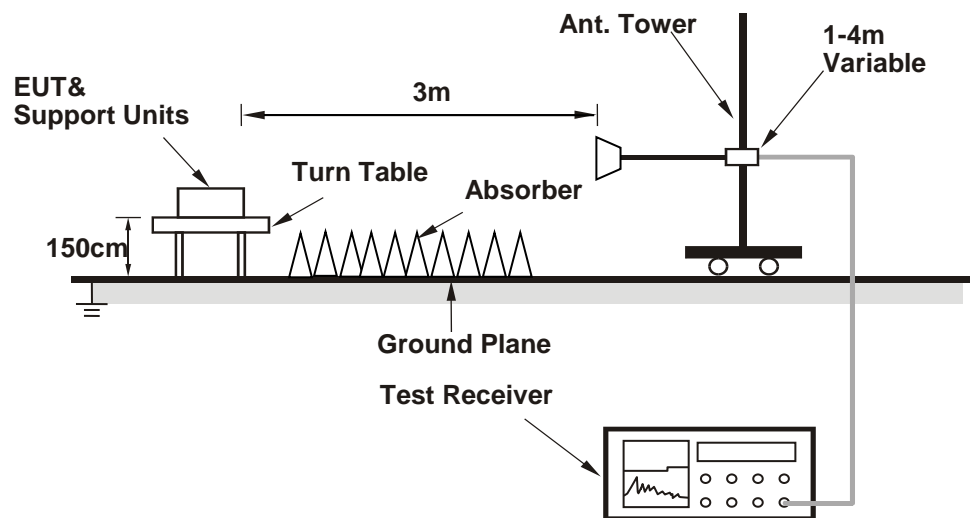
For Radiated emission below 30MHz



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 & UNII-3

Above 1GHz Data:

802.11ax (HE20)

CHANNEL	TX Channel 36	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	5150.00	60.7 PK	74.0	-13.3	1.19 H	37	57.4	3.3
2	5150.00	47.6 AV	54.0	-6.4	1.19 H	37	44.3	3.3
3	*5180.00	115.5 PK			1.19 H	37	112.2	3.3
4	*5180.00	103.7 AV			1.19 H	37	100.4	3.3
5	#10360.00	49.4 PK	68.2	-18.8	2.66 H	300	37.2	12.2
6	15540.00	53.0 PK	74.0	-21.0	2.00 H	21	39.8	13.2
7	15540.00	40.0 AV	54.0	-14.0	2.00 H	21	26.8	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	65.4 PK	74.0	-8.6	3.17 V	93	62.1	3.3
2	5150.00	53.6 AV	54.0	-0.4	3.17 V	93	50.3	3.3
3	*5180.00	124.2 PK			3.17 V	93	120.9	3.3
4	*5180.00	112.4 AV			3.17 V	93	109.1	3.3
5	#10360.00	51.0 PK	68.2	-17.2	1.89 V	295	38.8	12.2
6	15540.00	49.5 PK	74.0	-24.5	1.34 V	309	36.3	13.2
7	15540.00	38.4 AV	54.0	-15.6	1.34 V	309	25.2	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)
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	5150.00	61.0 PK	74.0	-13.0	1.10 H	15	57.7	3.3
2	5150.00	48.0 AV	54.0	-6.0	1.10 H	15	44.7	3.3
3	*5200.00	114.2 PK			1.10 H	15	111.1	3.1
4	*5200.00	102.3 AV			1.10 H	15	99.2	3.1
5	5350.00	54.8 PK	74.0	-19.2	1.10 H	15	51.8	3.0
6	5350.00	41.7 AV	54.0	-12.3	1.10 H	15	38.7	3.0
7	#10400.00	50.6 PK	68.2	-17.6	2.66 H	283	38.2	12.4
8	15600.00	53.6 PK	74.0	-20.4	1.98 H	33	40.4	13.2
9	15600.00	41.3 AV	54.0	-12.7	1.98 H	33	28.1	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	66.5 PK	74.0	-7.5	1.37 V	286	63.2	3.3
2	5150.00	52.9 AV	54.0	-1.1	1.37 V	286	49.6	3.3
3	*5200.00	123.4 PK			1.37 V	286	120.3	3.1
4	*5200.00	112.3 AV			1.37 V	286	109.2	3.1
5	5350.00	52.8 PK	74.0	-21.2	1.37 V	286	49.8	3.0
6	5350.00	41.4 AV	54.0	-12.6	1.37 V	286	38.4	3.0
7	#10400.00	51.1 PK	68.2	-17.1	1.37 V	286	38.7	12.4
8	15600.00	56.4 PK	74.0	-17.6	1.89 V	65	43.2	13.2
9	15600.00	44.8 AV	54.0	-9.2	1.89 V	65	31.6	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)
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	*5240.00	117.2 PK			3.51 H	190	114.4	2.8
2	*5240.00	105.1 AV			3.51 H	190	102.3	2.8
3	5350.00	49.8 PK	74.0	-24.2	3.51 H	190	46.8	3.0
4	5350.00	38.2 AV	54.0	-15.8	3.51 H	190	35.2	3.0
5	#10480.00	46.1 PK	68.2	-22.1	1.23 H	40	33.6	12.5
6	15720.00	53.0 PK	74.0	-21.0	1.23 H	360	40.7	12.3
7	15720.00	40.8 AV	54.0	-13.2	1.23 H	360	28.5	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	123.5 PK			1.00 V	100	120.7	2.8
2	*5240.00	110.3 AV			1.00 V	100	107.5	2.8
3	5350.00	54.3 PK	74.0	-19.7	1.00 V	100	51.3	3.0
4	5350.00	42.5 AV	54.0	-11.5	1.00 V	100	39.5	3.0
5	#10480.00	45.7 PK	68.2	-22.5	1.64 V	177	33.2	12.5
6	15720.00	58.3 PK	74.0	-15.7	1.88 V	63	46.0	12.3
7	15720.00	45.7 AV	54.0	-8.3	1.88 V	63	33.4	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.

CHANNEL	TX Channel 149	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	#5583.35	56.7 PK	68.2	-11.5	1.87 H	55	53.4	3.3
2	*5745.00	113.6 PK			1.87 H	55	110.0	3.6
3	*5745.00	104.4 AV			1.87 H	55	100.8	3.6
4	#5937.91	57.3 PK	68.2	-10.9	1.87 H	55	53.1	4.2
5	11490.00	48.5 PK	74.0	-25.5	1.60 H	200	35.4	13.1
6	11490.00	41.9 AV	54.0	-12.1	1.60 H	200	28.8	13.1
7	#17235.00	58.3 PK	68.2	-9.9	2.26 H	126	41.3	17.0

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	#5648.50	56.4 PK	68.2	-11.8	1.50 V	354	53.1	3.3
2	*5745.00	123.7 PK			1.50 V	32	120.1	3.6
3	*5745.00	112.4 AV			1.50 V	32	108.8	3.6
4	#5933.97	54.3 PK	68.2	-13.9	1.50 V	354	50.1	4.2
5	11490.00	46.7 PK	74.0	-27.3	1.22 V	45	33.6	13.1
6	11490.00	36.5 AV	54.0	-17.5	1.22 V	45	23.4	13.1
7	#17235.00	67.9 PK	68.2	-0.3	1.23 V	59	50.9	17.0

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 157	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	#5639.74	57.5 PK	68.2	-10.7	1.87 H	52	54.2	3.3
2	*5785.00	113.3 PK			1.87 H	52	109.5	3.8
3	*5785.00	104.2 AV			1.87 H	52	100.4	3.8
4	#5990.73	57.4 PK	68.2	-10.8	1.87 H	52	53.3	4.1
5	11570.00	48.0 PK	74.0	-26.0	1.59 H	208	35.3	12.7
6	11570.00	41.6 AV	54.0	-12.4	1.59 H	208	28.9	12.7
7	#17355.00	58.3 PK	68.2	-9.9	2.31 H	131	41.4	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	#5600.75	55.1 PK	68.2	-13.1	1.31 V	22	51.8	3.3
2	*5785.00	123.4 PK			1.31 V	22	119.6	3.8
3	*5785.00	111.9 AV			1.31 V	22	108.1	3.8
4	#5981.24	51.8 PK	68.2	-16.4	1.31 V	22	47.7	4.1
5	11570.00	46.8 PK	74.0	-27.2	1.24 V	47	34.1	12.7
6	11570.00	36.2 AV	54.0	-17.8	1.24 V	47	23.5	12.7
7	#17355.00	68.1 PK	68.2	-0.1	1.19 V	56	51.2	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 165	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	#5625.72	57.3 PK	68.2	-10.9	1.92 H	57	54.0	3.3
2	*5825.00	113.4 PK			1.92 H	57	109.5	3.9
3	*5825.00	104.1 AV			1.92 H	57	100.2	3.9
4	#5949.07	57.1 PK	68.2	-11.1	1.92 H	57	52.9	4.2
5	11650.00	48.8 PK	74.0	-25.2	1.63 H	208	36.0	12.8
6	11650.00	42.3 AV	54.0	-11.7	1.63 H	208	29.5	12.8
7	#17475.00	58.5 PK	68.2	-9.7	2.32 H	119	41.0	17.5

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	#5626.93	54.3 PK	68.2	-13.9	2.23 V	8	51.0	3.3
2	*5825.00	124.5 PK			2.23 V	8	120.6	3.9
3	*5825.00	112.4 AV			2.23 V	8	108.5	3.9
4	#5927.76	56.6 PK	68.2	-11.6	2.33 V	8	52.5	4.1
5	11650.00	46.7 PK	74.0	-27.3	1.24 V	43	33.9	12.8
6	11650.00	36.3 AV	54.0	-17.7	1.24 V	43	23.5	12.8
7	#17475.00	68.0 PK	68.2	-0.2	1.19 V	60	50.5	17.5

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11ax (HE20)

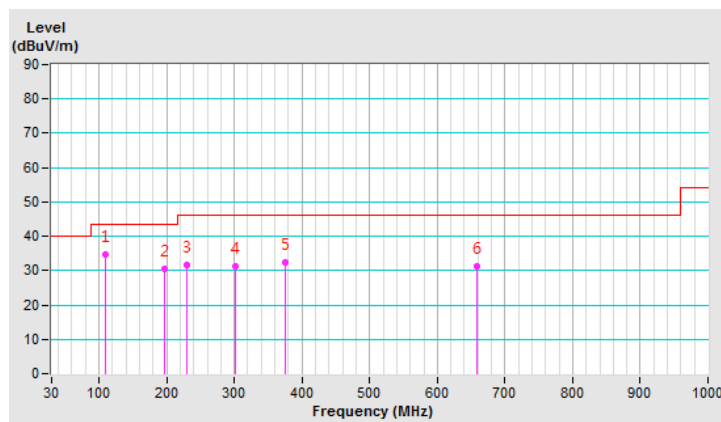
CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	109.20	34.7 QP	43.5	-8.8	1.43 H	221	45.5	-10.8
2	197.00	30.6 QP	43.5	-12.9	2.18 H	315	40.7	-10.1
3	230.24	31.8 QP	46.0	-14.2	1.69 H	257	41.2	-9.4
4	300.86	31.3 QP	46.0	-14.7	1.18 H	141	37.8	-6.5
5	374.98	32.4 QP	46.0	-13.6	1.16 H	295	37.1	-4.7
6	657.95	31.4 QP	46.0	-14.6	1.56 H	110	29.7	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.



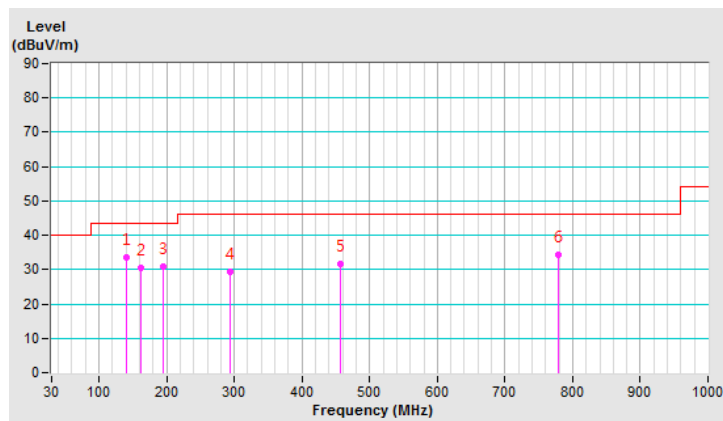
CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	141.18	33.4 QP	43.5	-10.1	1.56 V	272	41.5	-8.1
2	161.41	30.6 QP	43.5	-12.9	1.21 V	165	38.6	-8.0
3	195.80	30.8 QP	43.5	-12.7	1.28 V	113	40.9	-10.1
4	294.40	29.3 QP	46.0	-16.7	1.32 V	249	36.1	-6.8
5	456.55	31.8 QP	46.0	-14.2	1.34 V	193	34.5	-2.7
6	777.90	34.4 QP	46.0	-11.6	1.50 V	112	30.5	3.9

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 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:

802.11ax (HE40)

CHANNEL	TX Channel 54	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	5150.00	48.9 PK	74.0	-25.1	2.96 H	109	45.6	3.3
2	5150.00	38.4 AV	54.0	-15.6	2.96 H	109	35.1	3.3
3	*5270.00	109.8 PK			1.33 H	88	107.1	2.7
4	*5270.00	99.2 AV			1.33 H	88	96.5	2.7
5	5350.00	52.5 PK	74.0	-21.5	2.44 H	310	49.5	3.0
6	5350.00	41.1 AV	54.0	-12.9	2.44 H	310	38.1	3.0
7	#10540.00	50.5 PK	68.2	-17.7	1.33 H	88	37.9	12.6
8	15810.00	50.0 PK	74.0	-24.0	1.33 H	88	38.0	12.0
9	15810.00	39.6 AV	54.0	-14.4	1.33 H	88	27.6	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	52.9 PK	74.0	-21.1	2.73 V	98	49.6	3.3
2	5150.00	40.2 AV	54.0	-13.8	2.73 V	98	36.9	3.3
3	*5270.00	118.6 PK			2.73 V	98	115.9	2.7
4	*5270.00	107.0 AV			2.73 V	98	104.3	2.7
5	5350.00	56.3 PK	74.0	-17.7	2.73 V	98	53.3	3.0
6	5350.00	44.5 AV	54.0	-9.5	2.73 V	98	41.5	3.0
7	#10540.00	49.7 PK	68.2	-18.5	1.87 V	302	37.1	12.6
8	15810.00	60.0 PK	74.0	-14.0	2.84 V	182	48.0	12.0
9	15810.00	48.5 AV	54.0	-5.5	2.84 V	182	36.5	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 62	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	*5310.00	106.2 PK			1.37 H	77	103.4	2.8
2	*5310.00	95.5 AV			1.37 H	77	92.7	2.8
3	5350.00	55.8 PK	74.0	-18.2	1.37 H	77	52.8	3.0
4	5350.00	44.7 AV	54.0	-9.3	1.37 H	77	41.7	3.0
5	10620.00	50.4 PK	74.0	-23.6	2.95 H	106	37.9	12.5
6	10620.00	39.5 AV	54.0	-14.5	2.95 H	106	27.0	12.5
7	15930.00	53.0 PK	74.0	-21.0	2.37 H	323	40.6	12.4
8	15930.00	41.1 AV	54.0	-12.9	2.37 H	323	28.7	12.4

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	*5310.00	114.2 PK			1.27 V	80	111.4	2.8
2	*5310.00	103.2 AV			1.27 V	80	100.4	2.8
3	5350.00	62.7 PK	74.0	-11.3	1.27 V	80	59.7	3.0
4	5350.00	47.8 AV	54.0	-6.2	1.27 V	80	44.8	3.0
5	10620.00	49.6 PK	74.0	-24.4	1.97 V	312	37.1	12.5
6	10620.00	39.4 AV	54.0	-14.6	1.97 V	312	26.9	12.5
7	15930.00	59.7 PK	74.0	-14.3	2.85 V	206	47.3	12.4
8	15930.00	48.5 AV	54.0	-5.5	2.85 V	206	36.1	12.4

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.

CHANNEL	TX Channel 102	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	50.9 PK	74.0	-23.1	1.31 H	81	47.6	3.3
2	5460.00	40.0 AV	54.0	-14.0	1.31 H	81	36.7	3.3
3	#5470.00	61.9 PK	68.2	-6.3	1.31 H	81	58.6	3.3
4	*5510.00	108.1 PK			1.31 H	81	104.8	3.3
5	*5510.00	97.6 AV			1.31 H	81	94.3	3.3
6	11020.00	48.3 PK	74.0	-25.7	3.05 H	117	35.3	13.0
7	11020.00	38.1 AV	54.0	-15.9	3.05 H	117	25.1	13.0
8	#16530.00	53.5 PK	68.2	-14.7	2.49 H	329	38.9	14.6

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	62.3 PK	74.0	-11.7	2.44 V	166	59.0	3.3
2	5460.00	46.1 AV	54.0	-7.9	2.44 V	166	42.8	3.3
3	#5470.00	65.5 PK	68.2	-2.7	2.44 V	166	62.2	3.3
4	*5510.00	116.8 PK			2.44 V	166	113.5	3.3
5	*5510.00	104.5 AV			2.44 V	166	101.2	3.3
6	11020.00	49.9 PK	74.0	-24.1	1.91 V	323	36.9	13.0
7	11020.00	39.6 AV	54.0	-14.4	1.91 V	323	26.6	13.0
8	#16530.00	59.9 PK	68.2	-8.3	2.91 V	218	45.3	14.6

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 110	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	49.4 PK	74.0	-24.6	1.44 H	76	46.1	3.3
2	5460.00	37.7 AV	54.0	-16.3	1.44 H	76	34.4	3.3
3	#5470.00	51.3 PK	68.2	-16.9	1.44 H	76	48.0	3.3
4	*5550.00	107.8 PK			1.44 H	76	104.5	3.3
5	*5550.00	97.5 AV			1.44 H	76	94.2	3.3
6	11100.00	49.3 PK	74.0	-24.7	3.07 H	110	36.6	12.7
7	11100.00	38.9 AV	54.0	-15.1	3.07 H	110	26.2	12.7
8	#16650.00	52.3 PK	68.2	-15.9	2.41 H	317	37.1	15.2

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	5460.00	54.2 PK	74.0	-19.8	2.44 V	170	50.9	3.3
2	5460.00	42.8 AV	54.0	-11.2	2.44 V	170	39.5	3.3
3	#5470.00	56.3 PK	68.2	-11.9	2.44 V	170	53.0	3.3
4	*5550.00	118.7 PK			2.44 V	170	115.4	3.3
5	*5550.00	106.8 AV			2.44 V	170	103.5	3.3
6	11100.00	49.7 PK	74.0	-24.3	1.93 V	313	37.0	12.7
7	11100.00	39.6 AV	54.0	-14.4	1.93 V	313	26.9	12.7
8	#16650.00	60.5 PK	68.2	-7.7	2.74 V	203	45.3	15.2

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 134	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	*5670.00	107.8 PK			1.26 H	45	104.4	3.4
2	*5670.00	97.6 AV			1.26 H	45	94.2	3.4
3	#5725.00	62.6 PK	68.2	-5.6	1.26 H	45	59.1	3.5
4	11340.00	49.5 PK	74.0	-24.5	3.00 H	95	36.1	13.4
5	11340.00	39.0 AV	54.0	-15.0	3.00 H	95	25.6	13.4
6	#17010.00	52.7 PK	68.2	-15.5	2.38 H	314	36.5	16.2

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	*5670.00	117.6 PK			2.52 V	356	114.2	3.4
2	*5670.00	105.5 AV			2.52 V	356	102.1	3.4
3	#5725.00	68.0 PK	68.2	-0.2	2.52 V	356	64.5	3.5
4	11340.00	50.2 PK	74.0	-23.8	1.93 V	315	36.8	13.4
5	11340.00	39.8 AV	54.0	-14.2	1.93 V	315	26.4	13.4
6	#17010.00	59.5 PK	68.2	-8.7	2.83 V	209	43.3	16.2

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 142	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	49.6 PK	74.0	-24.4	1.34 H	75	46.3	3.3
2	5460.00	38.1 AV	54.0	-15.9	1.34 H	75	34.8	3.3
3	#5470.00	51.5 PK	68.2	-16.7	1.34 H	75	48.2	3.3
4	*5710.00	108.8 PK			1.34 H	75	105.3	3.5
5	*5710.00	98.6 AV			1.34 H	75	95.1	3.5
6	#5850.00	49.6 PK	68.2	-18.6	1.34 H	75	45.6	4.0
7	11420.00	49.8 PK	74.0	-24.2	3.06 H	129	36.6	13.2
8	11420.00	39.0 AV	54.0	-15.0	3.06 H	129	25.8	13.2
9	#17130.00	52.4 PK	68.2	-15.8	2.44 H	323	35.8	16.6

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	52.4 PK	74.0	-21.6	2.48 V	352	49.1	3.3
2	5460.00	40.0 AV	54.0	-14.0	2.48 V	352	36.7	3.3
3	#5470.00	52.7 PK	68.2	-15.5	2.48 V	352	49.4	3.3
4	*5710.00	118.2 PK			2.48 V	352	114.7	3.5
5	*5710.00	106.1 AV			2.48 V	352	102.6	3.5
6	#5850.00	53.6 PK	68.2	-14.6	2.48 V	352	49.6	4.0
7	11420.00	50.4 PK	74.0	-23.6	1.95 V	314	37.2	13.2
8	11420.00	40.3 AV	54.0	-13.7	1.95 V	314	27.1	13.2
9	#17130.00	59.5 PK	68.2	-8.7	2.92 V	199	42.9	16.6

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

802.11ax (HE40)

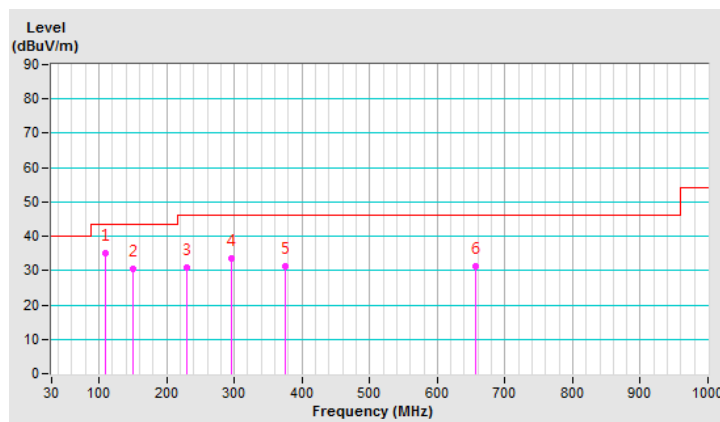
CHANNEL	TX Channel 54	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	109.21	35.2 QP	43.5	-8.3	1.56 H	249	46.0	-10.8
2	150.78	30.6 QP	43.5	-12.9	1.10 H	156	38.2	-7.6
3	230.22	30.9 QP	46.0	-15.1	1.69 H	303	40.3	-9.4
4	295.65	33.4 QP	46.0	-12.6	1.50 H	302	40.1	-6.7
5	375.03	31.4 QP	46.0	-14.6	1.65 H	298	36.1	-4.7
6	657.55	31.2 QP	46.0	-14.8	1.16 H	249	29.5	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.



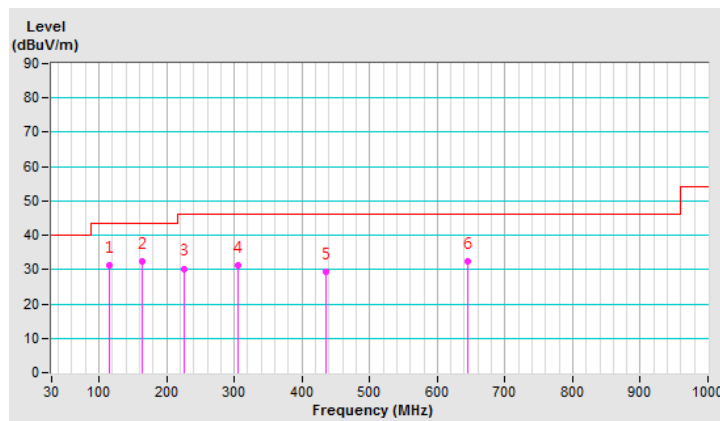
CHANNEL	TX Channel 54	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	116.32	31.4 QP	43.5	-12.1	1.56 V	219	41.5	-10.1
2	163.75	32.4 QP	43.5	-11.1	1.19 V	263	40.7	-8.3
3	226.65	30.3 QP	46.0	-15.7	1.09 V	241	39.9	-9.6
4	304.67	31.4 QP	46.0	-14.6	1.10 V	296	37.8	-6.4
5	434.65	29.3 QP	46.0	-16.7	1.45 V	298	32.4	-3.1
6	644.35	32.3 QP	46.0	-13.7	1.16 V	142	30.6	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.



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

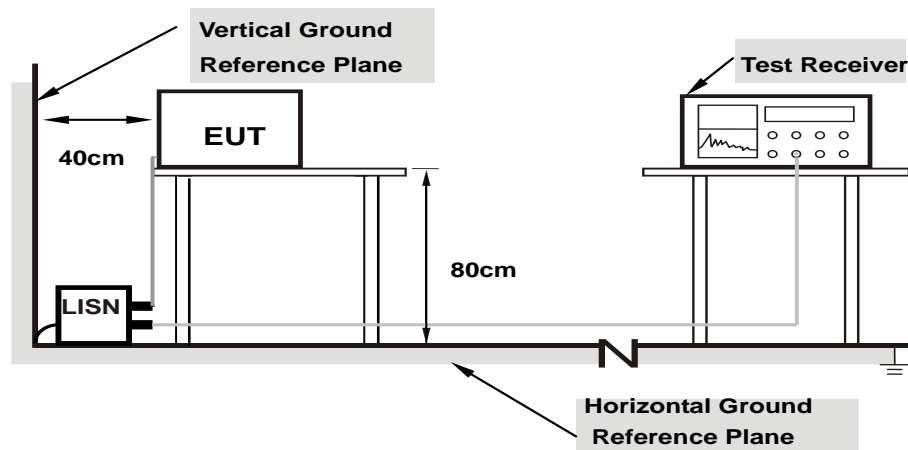
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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.

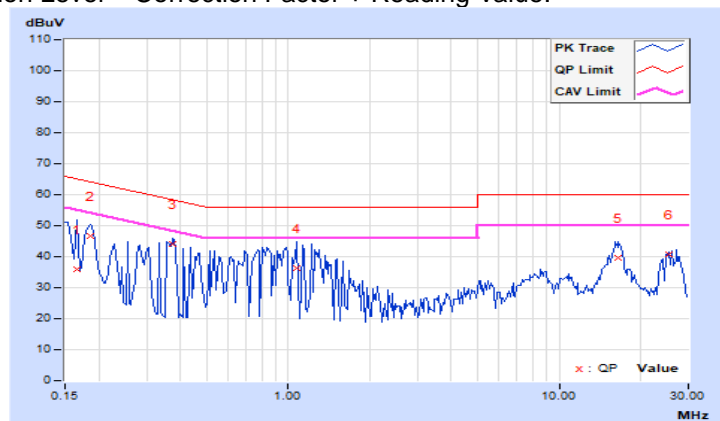
4.2.7 Test Results
For UNII-1 & UNII-3

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

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.16561	9.95	26.03	20.11	35.98	30.06	65.18	55.18	-29.20
2	0.18515	9.96	36.64	32.49	46.60	42.45	64.25	54.25	-17.65	-11.80
3	0.37657	9.97	34.13	33.31	44.10	43.28	58.35	48.35	-14.25	-5.07
4	1.07421	10.01	26.29	11.52	36.30	21.53	56.00	46.00	-19.70	-24.47
5	16.58593	10.86	28.65	22.65	39.51	33.51	60.00	50.00	-20.49	-16.49
6	25.46093	11.18	29.46	28.56	40.64	39.74	60.00	50.00	-19.36	-10.26

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.

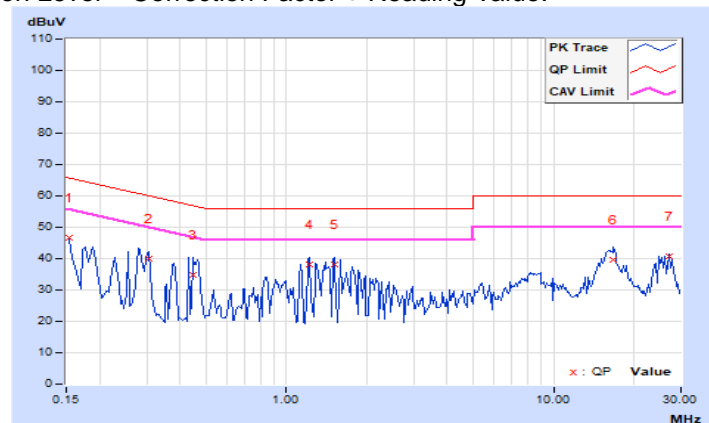


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15391	9.93	36.61	30.74	46.54	40.67	65.79	55.79	-19.25
2	0.30625	9.95	30.02	26.76	39.97	36.71	60.07	50.07	-20.10	-13.36
3	0.44688	9.95	24.98	13.02	34.93	22.97	56.93	46.93	-22.00	-23.96
4	1.22266	10.00	28.26	22.73	38.26	32.73	56.00	46.00	-17.74	-13.27
5	1.50781	10.02	28.11	23.19	38.13	33.21	56.00	46.00	-17.87	-12.79
6	16.76953	10.65	28.97	22.16	39.62	32.81	60.00	50.00	-20.38	-17.19
7	26.98438	10.88	29.75	29.15	40.63	40.03	60.00	50.00	-19.37	-9.97

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.



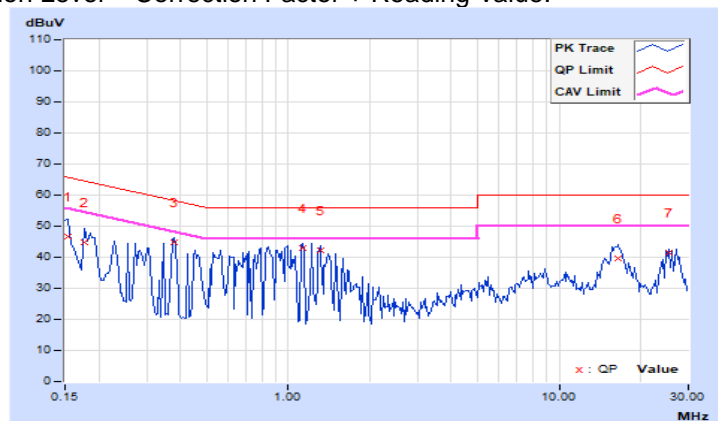
For UNII-2A & UNII-2C

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

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15391	9.95	36.55	29.65	46.50	39.60	65.79	55.79	-19.29
2	0.17735	9.96	34.96	22.33	44.92	32.29	64.61	54.61	-19.69	-22.32
3	0.38046	9.97	34.84	33.82	44.81	43.79	58.27	48.27	-13.46	-4.48
4	1.12500	10.02	32.89	22.57	42.91	32.59	56.00	46.00	-13.09	-13.41
5	1.31640	10.03	32.12	26.64	42.15	36.67	56.00	46.00	-13.85	-9.33
6	16.54689	10.85	28.63	22.52	39.48	33.37	60.00	50.00	-20.52	-16.63
7	25.45312	11.18	30.26	29.72	41.44	40.90	60.00	50.00	-18.56	-9.10

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.

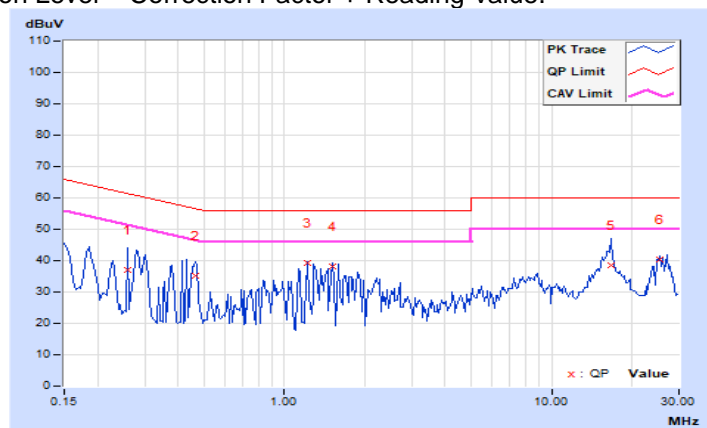


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.25937	9.94	27.25	7.49	37.19	17.43	61.45	51.45	-24.26
2	0.46249	9.95	25.24	21.72	35.19	31.67	56.65	46.65	-21.46	-14.98
3	1.21874	10.00	29.08	26.52	39.08	36.52	56.00	46.00	-16.92	-9.48
4	1.51173	10.02	28.26	24.03	38.28	34.05	56.00	46.00	-17.72	-11.95
5	16.70702	10.65	27.69	21.74	38.34	32.39	60.00	50.00	-21.66	-17.61
6	25.45310	10.86	29.46	27.88	40.32	38.74	60.00	50.00	-19.68	-11.26

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 \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Client device	250mW (24 dBm)
U-NII-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} ;

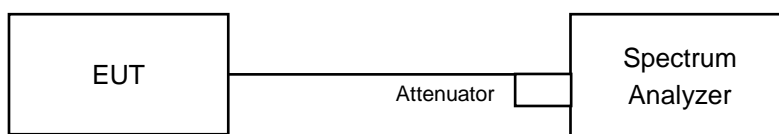
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

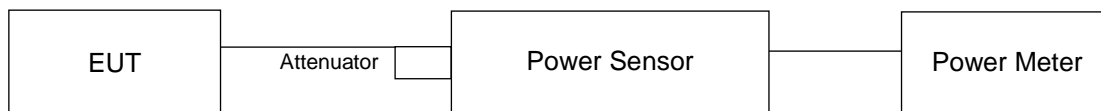
4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

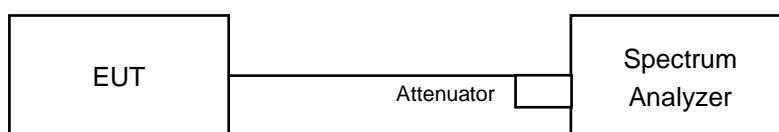
For channel straddling 5725MHz:



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 $\geq 3 \times$ 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 & UNII-3

802.11ax (HE20)

Chan.	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				
36	5180	20.35	20.27	20.06	20.44	426.86	26.30	30.00	Pass
40	5200	20.91	21.37	21.05	21.72	536.342	27.29	30.00	Pass
48	5240	20.88	21.24	20.50	21.54	510.27	27.08	30.00	Pass
149	5745	23.74	23.26	23.75	23.70	919.988	29.64	30.00	Pass
157	5785	23.65	23.36	23.60	23.61	907.211	29.58	30.00	Pass
165	5825	23.27	23.13	23.13	23.27	835.826	29.22	30.00	Pass

UNII-2A & UNII-2C

802.11ax (HE40)

Power Output:

Chan.	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				
54	5270	17.47	18.13	17.46	18.26	243.567	23.87	24.00	Pass
62	5310	16.01	16.48	16.04	16.51	169.315	22.29	24.00	Pass
102	5510	15.93	16.27	15.89	16.62	166.273	22.21	24.00	Pass
110	5550	17.42	17.64	17.13	17.99	227.877	23.58	24.00	Pass
134	5670	17.10	18.08	17.43	17.97	233.551	23.68	24.00	Pass
*142 (UNII-2C Band)	5710	13.53	13.53	13.57	13.74	95.142	19.78	24.00	Pass
*142 (UNII-3 Band)	5710	2.74	3.24	3.56	3.40	8.783	9.44	30.00	Pass

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

The Average Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	103.925	20.17

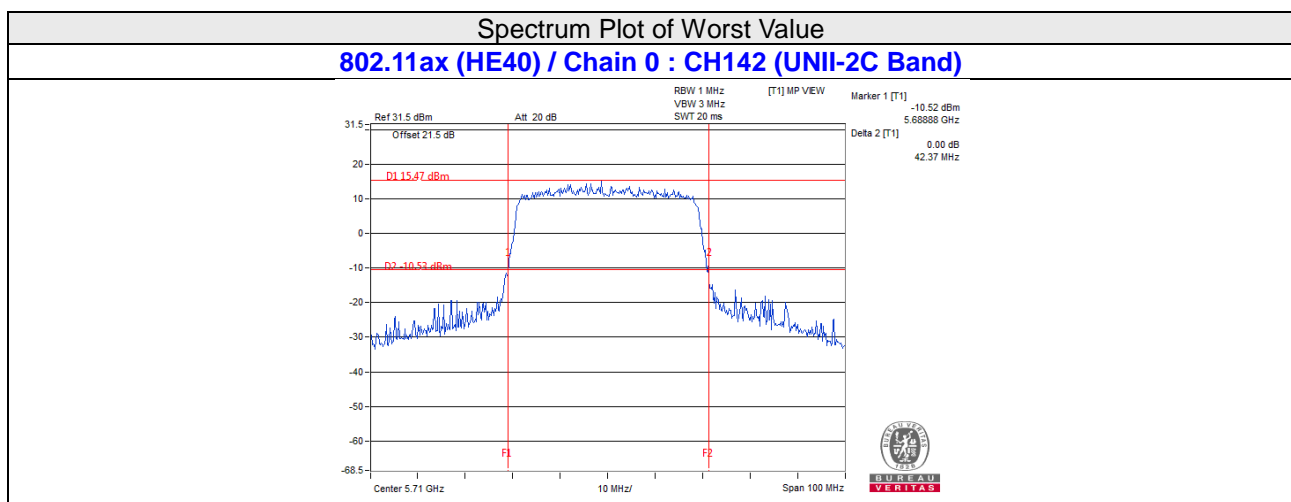
Note: The total power was calculated through formula and record the value for reference only.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	42.64	42.54	42.39	42.59
62	5310	42.21	42.10	42.73	42.51
102	5510	42.33	42.39	42.29	43.04
110	5550	42.86	42.23	42.58	42.62
134	5670	42.73	42.84	42.53	42.53
142 (UNII-2C Band)	5710	36.12	36.49	36.18	36.24

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)
54	5270	42.39	27.27 > 24
62	5310	42.10	27.24 > 24
102	5510	42.29	27.26 > 24
110	5550	42.23	27.25 > 24
134	5670	42.53	27.28 > 24
142 (UNII-2C Band)	5710	36.12	26.57 > 24



NOTE:

For CH142 (UNII-2C Band) = 5725MHz - Marker 1

5 Pictures of Test Arrangements

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

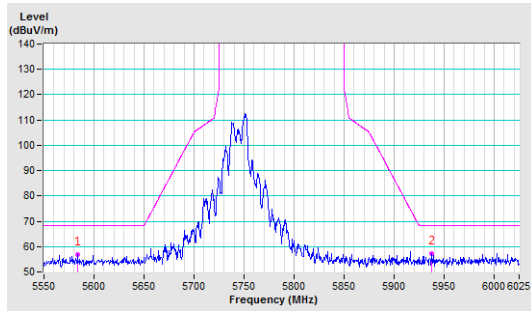
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

4TX:

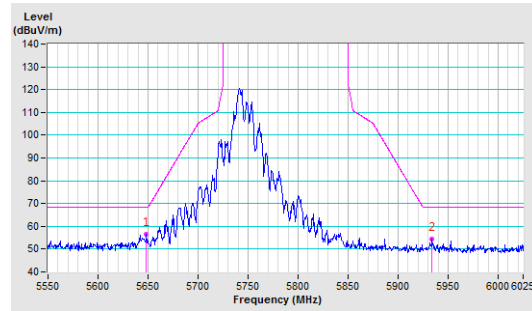
802.11ax (HE20)

CH 149 5745 MHz

Horizontal

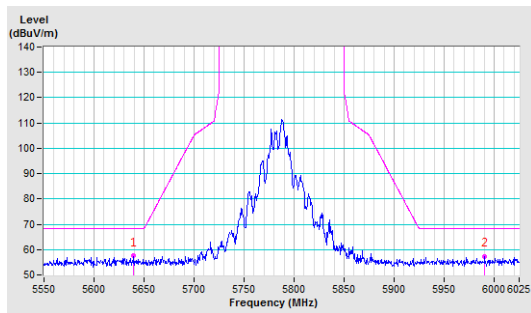


Vertical

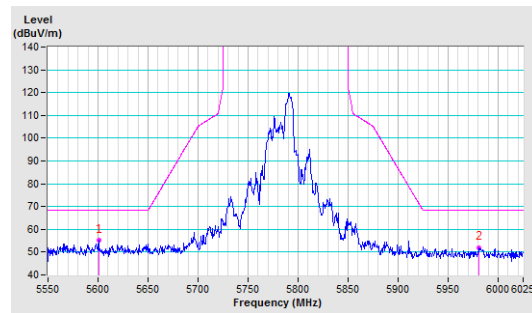


CH 157 5785 MHz

Horizontal

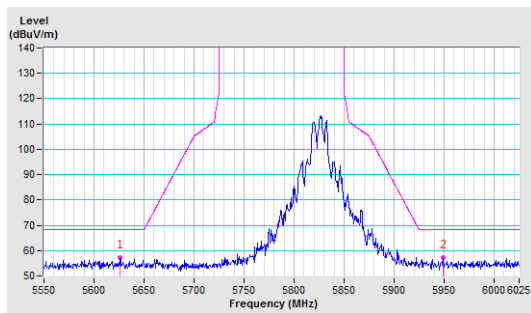


Vertical

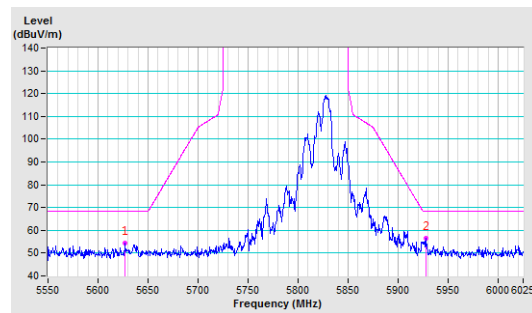


CH 165 5825 MHz

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:

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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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