Report No.:	RF190213E02-1
FCC ID:	KA2AP2682A1
Test Model:	DAP-2682
Received Date:	Feb. 13 2019
Test Date:	Apr. 29 to May 05, 2019
Issued Date:	July 26, 2019
Applicant:	D-Link Corporation
Address:	No.289, Xinhu 3rd Rd., Neihu District, Tapei City 11494, Taiwan
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 R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF190213E02-1	Original release.	July 26, 2019

1 Certificate of Conformity

Product:	Nuclias Connect AC2300 Wave2 Access Point
Brand:	D-Link
Test Model:	DAP-2682
Sample Status:	ENGINEERING SAMPLE
Applicant:	D-Link Corporation
Test Date:	Apr. 29 to May 05, 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:** July 26, 2019

Claire Kuan / Specialist

Approved by : _____ , **Date:** July 26, 2019

May Chen / 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 -4.79dB at 20.85156MHz.
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 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	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 (WLAN)

Product	Nuclias Connect AC2300 Wave2 Access Point
Brand	D-Link
Test Model	DAP-2682
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter or POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462GHz** 867.929mW **5.18 ~ 5.24GHz** **CDD Mode:** 505.494mW **Beamforming Mode:** 342.608mW **5.745 ~ 5.825GHz** **CDD Mode:** 680.795mW **Beamforming Mode:** 323.067mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

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

2. The EUT must be supplied with a adapter as following table:

Brand	Model No.	Spec.
Asian Power Devices Inc.	WA-30P12R	Input: 100-240Vac, 50-60Hz, 0.9A Max Output: 12V/2.5A (1.2m, unshielded)

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

Ant. No.	Model	Antenna Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
1	290-20382	3.86	2.4~2.4835	PIFA	i-pex(MHF)
		4.62	5.15~5.25		
		4.68	5.25~5.35		
		4.88	5.47~5.725		
		4.88	5.725~5.85		
2	290-20383	3.96	2.4~2.4835	PIFA	i-pex(MHF)
		4.51	5.15~5.25		
		4.59	5.25~5.35		
		4.74	5.47~5.725		
		4.93	5.725~5.85		
3	290-20384	3.73	2.4~2.4835	PIFA	i-pex(MHF)
		4.25	5.15~5.25		
		4.77	5.25~5.35		
		4.66	5.47~5.725		
		4.88	5.725~5.85		
4	290-20385	3.7	2.4~2.4835	PIFA	i-pex(MHF)
		4.93	5.15~5.25		
		4.65	5.25~5.35		
		4.74	5.47~5.725		
		4.74	5.725~5.85		

4. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Power from adapter
Mode B	Power from PoE adapter

Note: From the above modes, the conducted emission worst case was found in **Mode B** and the radiated emission worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.

5. 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
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

Note:
1. All of modulation mode support beamforming function except 2.4GHz & 802.11a modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. 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):

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

Note: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane for below 1GHz and Y-plane for above 1GHz**

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240, 5745-5825	36 to 48, 149 to 165	151	OFDM	BPSK	13.5

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240, 5745-5825	36 to 48, 149 to 165	151	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (output power only)						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

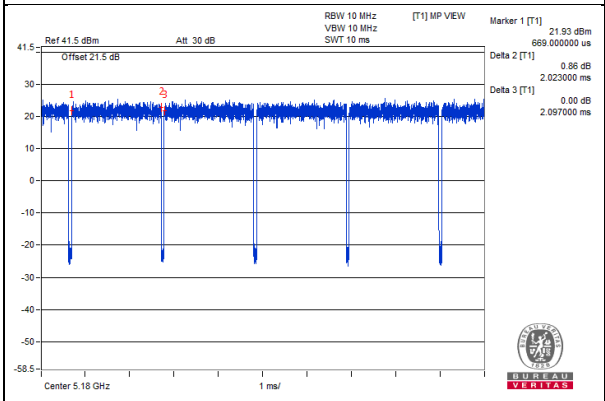
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Ryan Du
RE<1G	22deg. C, 67%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

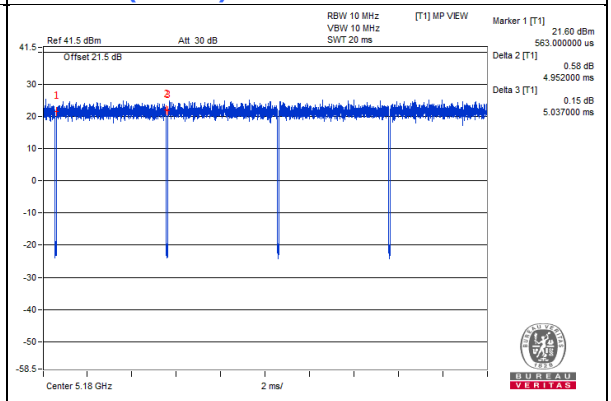
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.023 ms/2.097 ms = 0.965, Duty factor = 10 * log (1/Duty cycle) = 0.16
802.11ac (VHT20): Duty cycle = 4.952 ms/5.037 ms = 0.983
802.11ac (VHT40): Duty cycle = 2.4 ms/2.485 ms = 0.966, Duty factor = 10 * log (1/Duty cycle) = 0.15
802.11ac (VHT80): Duty cycle = 1.133 ms/1.202 ms = 0.943, Duty factor = 10 * log (1/Duty cycle) = 0.26

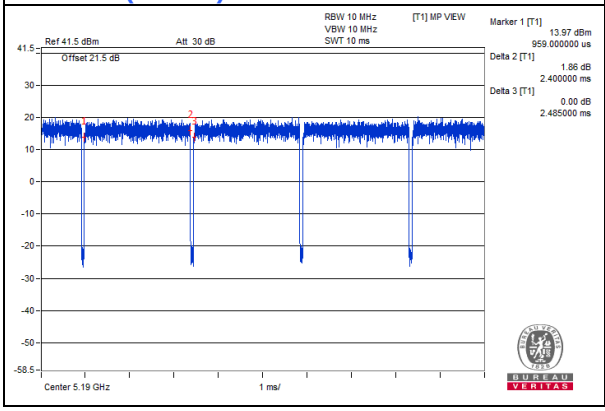
802.11a



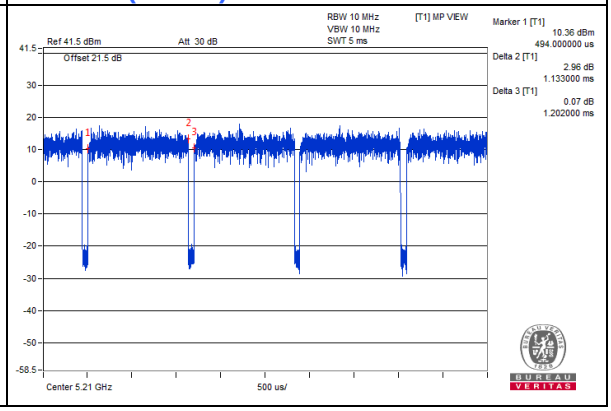
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C.	PoE Adapter	NA	740-64214-001	NA	NA	Provided by Lab

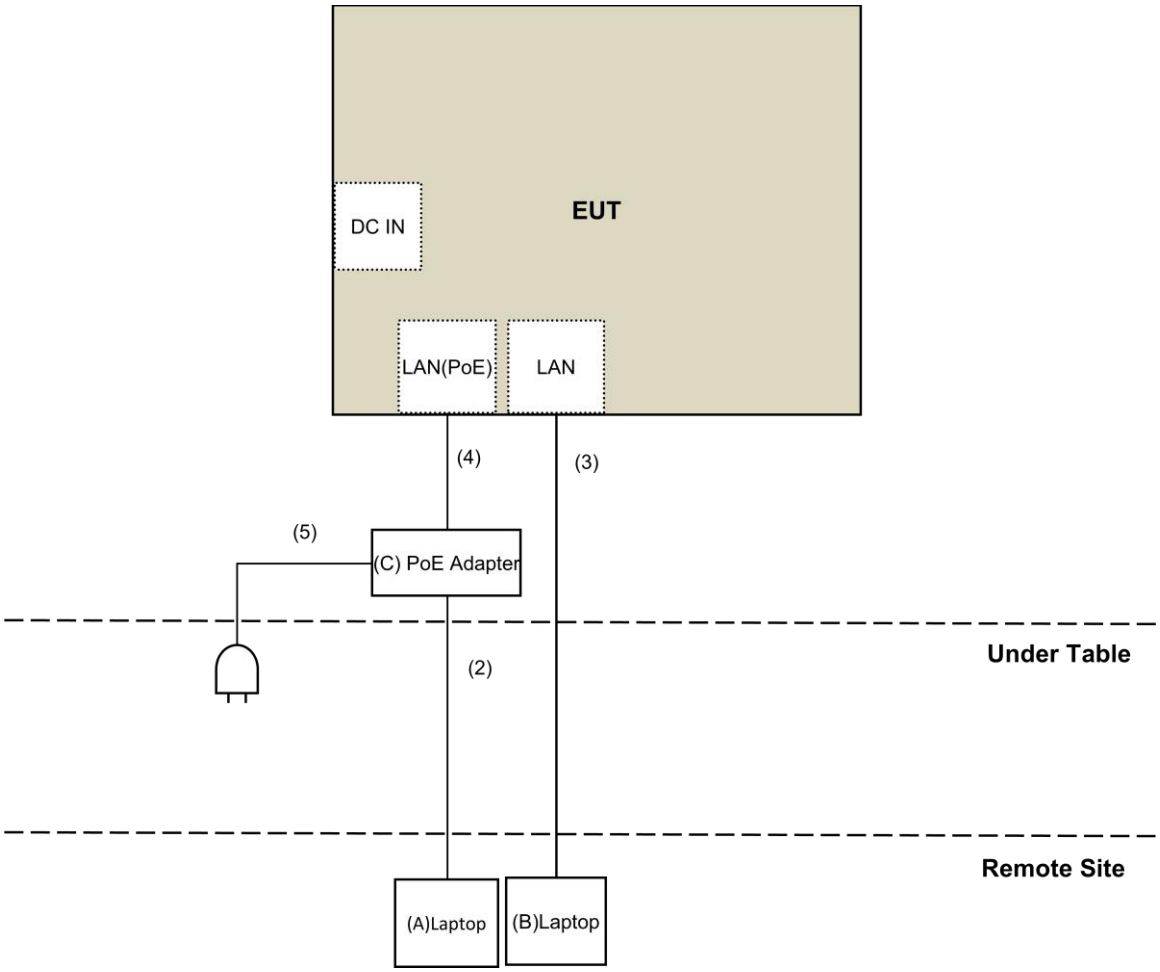
Note:

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

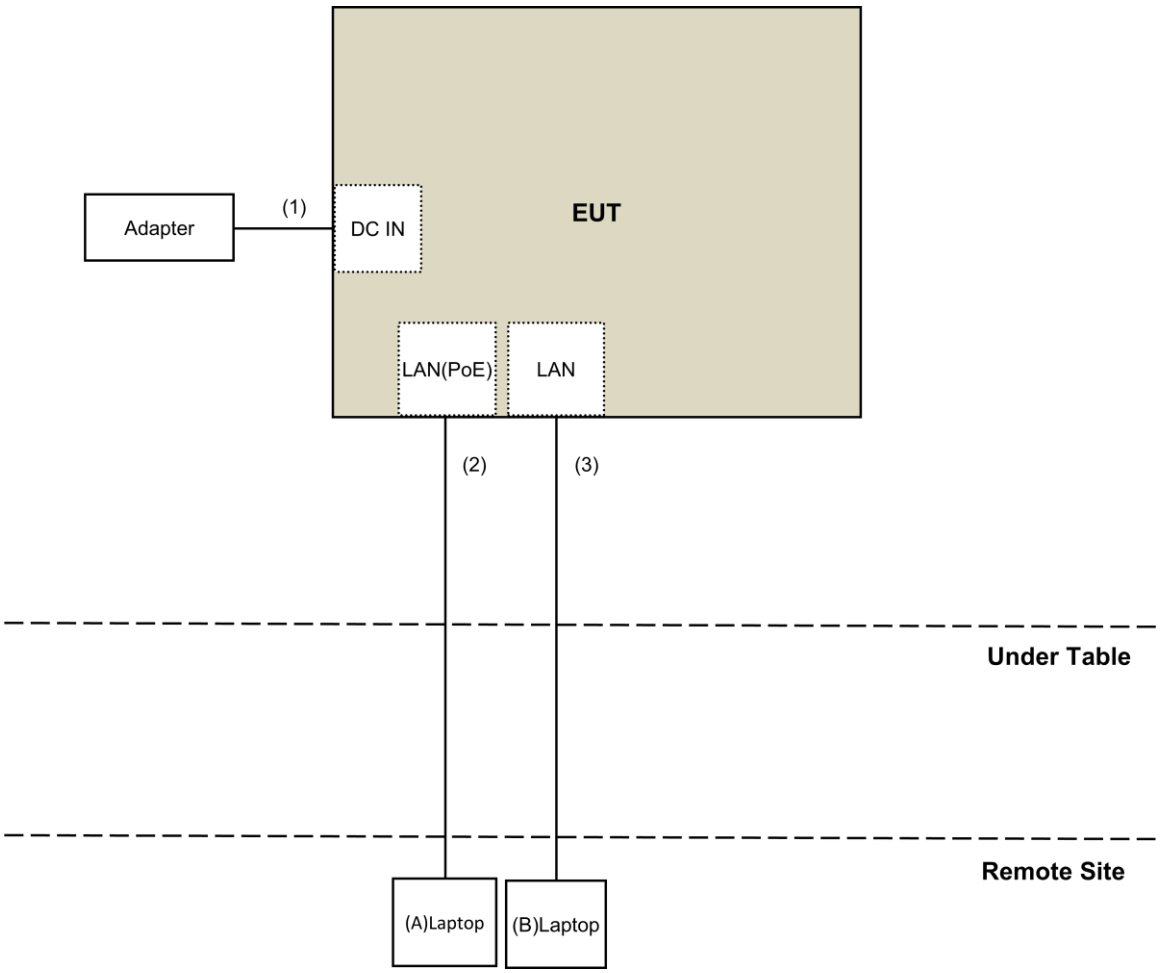
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.2	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	AC Cable	1	1.8	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For Power Line Conducted Emission test:



For other test:



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="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" 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 12, 2018	July 11, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
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. 27, 2018	Sep. 26, 2019
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 12, 2018	June 11, 2019
RF Cable	EMC104-SM-SM-6000	180602	June 12, 2018	June 11, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
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
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 09, 2019	Jan. 08, 2020
True RMS Clamp Meter FLUKE	325	31130711WS	May 22, 2018	May 21, 2019

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. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Apr. 29 to May. 05, 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:

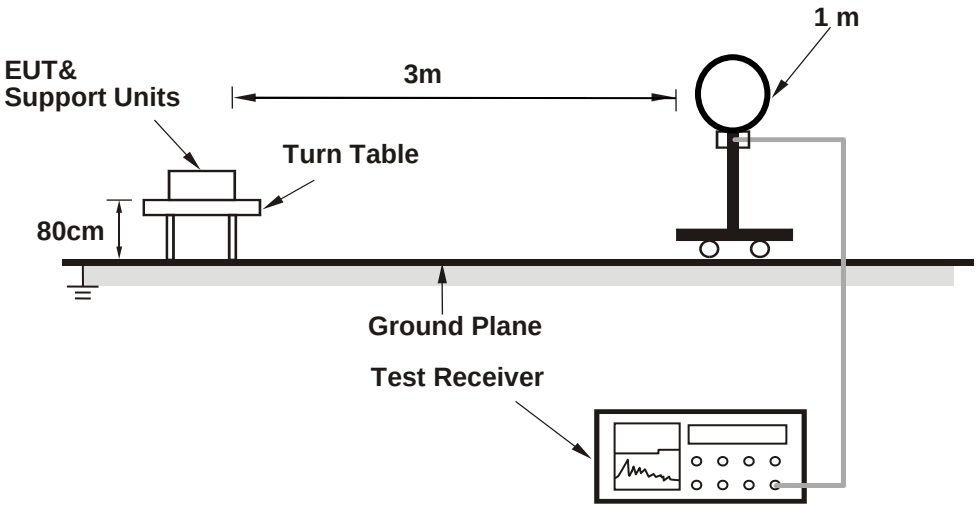
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

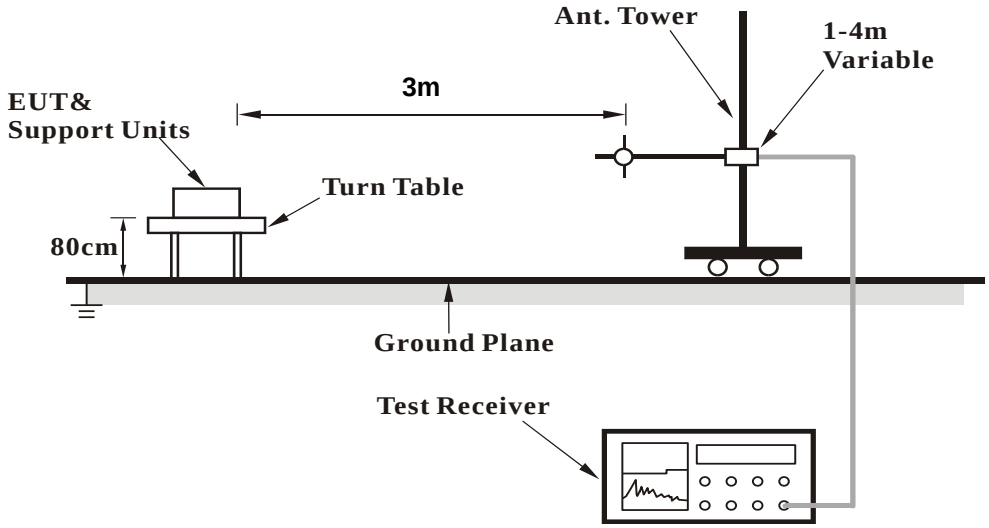
No deviation.

4.1.5 Test Setup

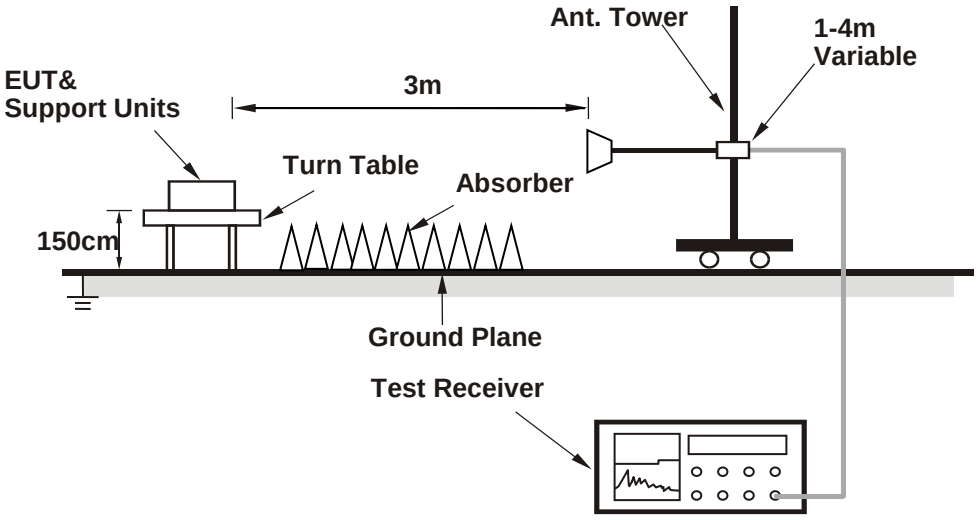
For Radiated emission below 30MHz



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 (QDART-Connectivity (1.0.00058)) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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	61.6 PK	74.0	-12.4	1.78 H	12	58.5	3.1
2	5150.00	48.9 AV	54.0	-5.1	1.78 H	12	45.8	3.1
3	*5180.00	117.3 PK			1.78 H	12	114.2	3.1
4	*5180.00	106.4 AV			1.78 H	12	103.3	3.1
5	#10360.00	65.3 PK	68.2	-2.9	1.17 H	360	53.0	12.3
6	15540.00	67.1 PK	74.0	-6.9	1.75 H	299	54.1	13.0
7	15540.00	50.5 AV	54.0	-3.5	1.75 H	299	37.5	13.0
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	67.7 PK	74.0	-6.3	1.62 V	22	64.6	3.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.62 V**	**22**	**50.8**	**3.1**
3	*5180.00	119.2 PK			1.62 V	22	116.1	3.1
4	*5180.00	109.3 AV			1.62 V	22	106.2	3.1
5	#10360.00	63.6 PK	68.2	-4.6	1.48 V	188	51.3	12.3
6	15540.00	61.1 PK	74.0	-12.9	1.65 V	32	48.1	13.0
7	15540.00	46.2 AV	54.0	-7.8	1.65 V	32	33.2	13.0

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 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	116.3 PK			1.73 H	19	113.3	3.0
2	*5200.00	105.7 AV			1.73 H	19	102.7	3.0
3	#10400.00	66.7 PK	68.2	-1.5	1.03 H	360	54.0	12.7
4	15600.00	67.3 PK	74.0	-6.7	1.64 H	300	53.8	13.5
5	15600.00	50.8 AV	54.0	-3.2	1.64 H	300	37.3	13.5
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	5150.00	54.4 PK	74.0	-19.6	1.74 V	22	51.3	3.1
2	5150.00	44.2 AV	54.0	-9.8	1.74 V	22	41.1	3.1
3	*5200.00	119.7 PK			1.74 V	22	116.7	3.0
4	*5200.00	108.9 AV			1.74 V	22	105.9	3.0
5	5350.00	52.0 PK	74.0	-22.0	1.74 V	22	49.1	2.9
6	5350.00	39.9 AV	54.0	-14.1	1.74 V	22	37.0	2.9
7	#6933.33	57.3 PK	68.2	-10.9	1.74 V	25	50.5	6.8
8	#10400.00	64.0 PK	68.2	-4.2	1.46 V	183	51.3	12.7
9	15600.00	61.2 PK	74.0	-12.8	1.69 V	24	47.7	13.5
10	15600.00	46.4 AV	54.0	-7.6	1.69 V	24	32.9	13.5

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.
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	116.9 PK			1.77 H	15	114.2	2.7
2	*5240.00	106.1 AV			1.77 H	15	103.4	2.7
3	5350.00	53.4 PK	74.0	-20.6	1.77 H	15	50.5	2.9
4	5350.00	40.9 AV	54.0	-13.1	1.77 H	15	38.0	2.9
5	#10480.00	66.7 PK	68.2	-1.5	1.01 H	360	54.2	12.5
6	15720.00	67.5 PK	74.0	-6.5	1.67 H	295	55.0	12.5
7	15720.00	50.6 AV	54.0	-3.4	1.67 H	295	38.1	12.5
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	*5240.00	119.1 PK			1.62 V	25	116.4	2.7
2	*5240.00	109.0 AV			1.62 V	25	106.3	2.7
3	5350.00	53.7 PK	74.0	-20.3	1.62 V	25	50.8	2.9
4	5350.00	41.3 AV	54.0	-12.7	1.62 V	25	38.4	2.9
5	#10480.00	63.9 PK	68.2	-4.3	1.47 V	192	51.4	12.5
6	15720.00	60.6 PK	74.0	-13.4	1.65 V	30	48.1	12.5
7	15720.00	45.9 AV	54.0	-8.1	1.65 V	30	33.4	12.5

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	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	#5636.18	53.8 PK	68.2	-14.4	1.83 H	23	50.6	3.2
2	*5745.00	119.8 PK			1.83 H	23	116.3	3.5
3	*5745.00	108.9 AV			1.83 H	23	105.4	3.5
4	#5992.66	52.6 PK	68.2	-15.6	1.83 H	23	48.7	3.9
5	11490.00	67.5 PK	74.0	-6.5	1.50 H	331	54.5	13.0
6	11490.00	53.6 AV	54.0	-0.4	1.50 H	331	40.6	13.0
7	#17235.00	65.3 PK	68.2	-2.9	2.31 H	301	49.1	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	#5606.99	56.2 PK	68.2	-12.0	2.34 V	16	53.0	3.2
2	*5745.00	119.5 PK			2.34 V	16	116.0	3.5
3	*5745.00	109.8 AV			2.34 V	16	106.3	3.5
4	#6005.95	56.8 PK	68.2	-11.4	2.34 V	16	52.9	3.9
5	11490.00	63.5 PK	74.0	-10.5	1.88 V	348	50.5	13.0
6	11490.00	49.8 AV	54.0	-4.2	1.88 V	348	36.8	13.0
7	#17235.00	58.5 PK	68.2	-9.7	1.57 V	356	42.3	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 157	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	#5635.29	53.7 PK	68.2	-14.5	1.78 H	9	50.5	3.2
2	*5785.00	118.9 PK			1.78 H	9	115.2	3.7
3	*5785.00	108.2 AV			1.78 H	9	104.5	3.7
4	#5949.22	52.6 PK	68.2	-15.6	1.78 H	9	48.6	4.0
5	11570.00	67.5 PK	74.0	-6.5	1.50 H	342	54.8	12.7
6	11570.00	53.7 AV	54.0	-0.3	1.50 H	342	41.0	12.7
7	#17355.00	65.1 PK	68.2	-3.1	2.34 H	296	48.4	16.7
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	#5571.93	55.8 PK	68.2	-12.4	2.24 V	21	52.6	3.2
2	*5785.00	119.5 PK			2.24 V	21	115.8	3.7
3	*5785.00	109.5 AV			2.24 V	21	105.8	3.7
4	#5934.41	56.0 PK	68.2	-12.2	2.24 V	21	52.0	4.0
5	11570.00	63.4 PK	74.0	-10.6	1.89 V	356	50.7	12.7
6	11570.00	49.8 AV	54.0	-4.2	1.89 V	356	37.1	12.7
7	#17355.00	59.0 PK	68.2	-9.2	1.61 V	360	42.3	16.7

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	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	#5579.93	53.5 PK	68.2	-14.7	1.73 H	17	50.3	3.2
2	*5825.00	119.4 PK			1.73 H	17	115.7	3.7
3	*5825.00	108.7 AV			1.73 H	17	105.0	3.7
4	#5946.99	54.8 PK	68.2	-13.4	1.73 H	17	50.8	4.0
5	11650.00	67.2 PK	74.0	-6.8	1.50 H	317	54.5	12.7
6	11650.00	53.6 AV	54.0	-0.4	1.50 H	317	40.9	12.7
7	#17475.00	65.4 PK	68.2	-2.8	2.36 H	294	47.4	18.0
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	#5636.49	55.6 PK	68.2	-12.6	2.19 V	21	52.4	3.2
2	*5825.00	120.4 PK			2.19 V	21	116.7	3.7
3	*5825.00	109.7 AV			2.19 V	21	106.0	3.7
4	#5966.06	56.7 PK	68.2	-11.5	2.19 V	21	52.7	4.0
5	11650.00	63.9 PK	74.0	-10.1	1.87 V	356	51.2	12.7
6	11650.00	50.0 AV	54.0	-4.0	1.87 V	356	37.3	12.7
7	#17475.00	58.0 PK	68.2	-10.2	1.52 V	360	40.0	18.0

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.

802.11ac (VHT20)

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	61.6 PK	74.0	-12.4	1.48 H	343	58.5	3.1
2	5150.00	50.1 AV	54.0	-3.9	1.48 H	343	47.0	3.1
3	*5180.00	115.5 PK			1.48 H	343	112.4	3.1
4	*5180.00	104.8 AV			1.48 H	343	101.7	3.1
5	#10360.00	64.8 PK	68.2	-3.4	1.15 H	354	52.5	12.3
6	15540.00	66.4 PK	74.0	-7.6	1.76 H	284	53.4	13.0
7	15540.00	50.1 AV	54.0	-3.9	1.76 H	284	37.1	13.0
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	65.0 PK	74.0	-9.0	1.62 V	22	61.9	3.1
2	5150.00	53.7 AV	54.0	-0.3	1.62 V	22	50.6	3.1
3	*5180.00	119.3 PK			1.62 V	22	116.2	3.1
4	*5180.00	108.8 AV			1.62 V	22	105.7	3.1
5	#10360.00	63.6 PK	68.2	-4.6	1.42 V	200	51.3	12.3
6	15540.00	61.2 PK	74.0	-12.8	1.63 V	27	48.2	13.0
7	15540.00	46.5 AV	54.0	-7.5	1.63 V	27	33.5	13.0

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 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	5150.00	56.5 PK	74.0	-17.5	1.48 H	350	53.4	3.1
2	5150.00	44.5 AV	54.0	-9.5	1.48 H	350	41.4	3.1
3	*5200.00	116.7 PK			1.48 H	350	113.7	3.0
4	*5200.00	106.1 AV			1.48 H	350	103.1	3.0
5	5350.00	51.5 PK	74.0	-22.5	1.48 H	350	48.6	2.9
6	5350.00	39.6 AV	54.0	-14.4	1.48 H	350	36.7	2.9
7	#10400.00	66.5 PK	68.2	-1.7	1.00 H	360	53.8	12.7
8	15600.00	66.0 PK	74.0	-8.0	1.59 H	312	52.5	13.5
9	15600.00	49.7 AV	54.0	-4.3	1.59 H	312	36.2	13.5
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	5150.00	56.2 PK	74.0	-17.8	1.52 V	20	53.1	3.1
2	5150.00	44.2 AV	54.0	-9.8	1.52 V	20	41.1	3.1
3	*5200.00	119.3 PK			1.52 V	20	116.3	3.0
4	*5200.00	109.1 AV			1.52 V	20	106.1	3.0
5	5350.00	51.7 PK	74.0	-22.3	1.52 V	20	48.8	2.9
6	5350.00	39.8 AV	54.0	-14.2	1.52 V	20	36.9	2.9
7	#10400.00	63.8 PK	68.2	-4.4	1.46 V	200	51.1	12.7
8	15600.00	61.4 PK	74.0	-12.6	1.65 V	37	47.9	13.5
9	15600.00	46.6 AV	54.0	-7.4	1.65 V	37	33.1	13.5

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.
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	117.1 PK			1.54 H	339	114.4	2.7
2	*5240.00	106.5 AV			1.54 H	339	103.8	2.7
3	5350.00	53.0 PK	74.0	-21.0	1.54 H	339	50.1	2.9
4	5350.00	41.6 AV	54.0	-12.4	1.54 H	339	38.7	2.9
5	#10480.00	66.5 PK	68.2	-1.7	1.00 H	360	54.0	12.5
6	15720.00	66.4 PK	74.0	-7.6	1.66 H	279	53.9	12.5
7	15720.00	50.3 AV	54.0	-3.7	1.66 H	279	37.8	12.5
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	*5240.00	119.6 PK			1.64 V	21	116.9	2.7
2	*5240.00	109.3 AV			1.64 V	21	106.6	2.7
3	5350.00	53.3 PK	74.0	-20.7	1.64 V	21	50.4	2.9
4	5350.00	41.8 AV	54.0	-12.2	1.64 V	21	38.9	2.9
5	#10480.00	64.2 PK	68.2	-4.0	1.42 V	191	51.7	12.5
6	15720.00	61.7 PK	74.0	-12.3	1.58 V	13	49.2	12.5
7	15720.00	46.9 AV	54.0	-7.1	1.58 V	13	34.4	12.5

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	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	#5607.79	55.7 PK	68.2	-12.5	1.57 H	333	52.5	3.2
2	*5745.00	116.9 PK			1.57 H	333	113.4	3.5
3	*5745.00	106.1 AV			1.57 H	333	102.6	3.5
4	#6000.73	53.2 PK	68.2	-15.0	1.57 H	333	49.3	3.9
5	11490.00	67.6 PK	74.0	-6.4	1.49 H	332	54.6	13.0
6	11490.00	53.7 AV	54.0	-0.3	1.49 H	332	40.7	13.0
7	#17235.00	65.4 PK	68.2	-2.8	2.25 H	298	49.2	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	#5643.14	56.2 PK	68.2	-12.0	1.42 V	35	53.0	3.2
2	*5745.00	118.3 PK			1.42 V	35	114.8	3.5
3	*5745.00	108.0 AV			1.42 V	35	104.5	3.5
4	#5987.48	56.7 PK	68.2	-11.5	1.42 V	35	52.8	3.9
5	11490.00	62.9 PK	74.0	-11.1	1.88 V	360	49.9	13.0
6	11490.00	49.3 AV	54.0	-4.7	1.88 V	360	36.3	13.0
7	#17235.00	58.6 PK	68.2	-9.6	1.58 V	356	42.4	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 157	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	#5638.93	53.5 PK	68.2	-14.7	1.56 H	348	50.3	3.2
2	*5785.00	117.1 PK			1.56 H	348	113.4	3.7
3	*5785.00	106.5 AV			1.56 H	348	102.8	3.7
4	#5946.44	52.4 PK	68.2	-15.8	1.56 H	348	48.4	4.0
5	11570.00	67.5 PK	74.0	-6.5	1.48 H	323	54.8	12.7
6	11570.00	53.6 AV	54.0	-0.4	1.48 H	323	40.9	12.7
7	#17355.00	65.3 PK	68.2	-2.9	2.27 H	299	48.6	16.7
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	#5594.22	55.0 PK	68.2	-13.2	1.43 V	36	51.8	3.2
2	*5785.00	118.8 PK			1.43 V	36	115.1	3.7
3	*5785.00	108.3 AV			1.43 V	36	104.6	3.7
4	#5972.77	56.5 PK	68.2	-11.7	1.43 V	36	52.6	3.9
5	11570.00	63.0 PK	74.0	-11.0	1.86 V	360	50.3	12.7
6	11570.00	49.7 AV	54.0	-4.3	1.86 V	360	37.0	12.7
7	#17355.00	58.4 PK	68.2	-9.8	1.56 V	360	41.7	16.7

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.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	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	#5602.00	54.0 PK	68.2	-14.2	1.59 H	349	50.8	3.2
2	*5825.00	117.4 PK			1.59 H	349	113.7	3.7
3	*5825.00	106.5 AV			1.59 H	349	102.8	3.7
4	#5957.03	55.4 PK	68.2	-12.8	1.59 H	349	51.4	4.0
5	11650.00	67.8 PK	74.0	-6.2	1.55 H	340	55.1	12.7
6	11650.00	53.8 AV	54.0	-0.2	1.55 H	340	41.1	12.7
7	#17475.00	64.8 PK	68.2	-3.4	2.25 H	303	46.8	18.0
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	#5636.55	55.8 PK	68.2	-12.4	1.42 V	10	52.6	3.2
2	*5825.00	117.7 PK			1.42 V	10	114.0	3.7
3	*5825.00	108.0 AV			1.42 V	10	104.3	3.7
4	#5966.10	57.0 PK	68.2	-11.2	1.42 V	10	53.0	4.0
5	11650.00	62.5 PK	74.0	-11.5	1.85 V	358	49.8	12.7
6	11650.00	49.1 AV	54.0	-4.9	1.85 V	358	36.4	12.7
7	#17475.00	58.9 PK	68.2	-9.3	1.61 V	355	40.9	18.0

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.

802.11ac (VHT40)

CHANNEL	TX Channel 38	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	61.3 PK	74.0	-12.7	1.51 H	342	58.2	3.1
2	5150.00	50.5 AV	54.0	-3.5	1.51 H	342	47.4	3.1
3	*5190.00	111.3 PK			1.51 H	342	108.3	3.0
4	*5190.00	101.2 AV			1.51 H	342	98.2	3.0
5	5350.00	50.7 PK	74.0	-23.3	1.51 H	342	47.8	2.9
6	5350.00	39.4 AV	54.0	-14.6	1.51 H	342	36.5	2.9
7	#10380.00	61.1 PK	68.2	-7.1	1.52 H	332	48.6	12.5
8	15570.00	57.4 PK	74.0	-16.6	2.26 H	287	44.1	13.3
9	15570.00	42.8 AV	54.0	-11.2	2.26 H	287	29.5	13.3
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	5150.00	64.9 PK	74.0	-9.1	1.61 V	24	61.8	3.1
2	5150.00	53.8 AV	54.0	-0.2	1.61 V	24	50.7	3.1
3	*5190.00	114.6 PK			1.61 V	24	111.6	3.0
4	*5190.00	104.6 AV			1.61 V	24	101.6	3.0
5	5350.00	50.4 PK	74.0	-23.6	1.61 V	24	47.5	2.9
6	5350.00	39.2 AV	54.0	-14.8	1.61 V	24	36.3	2.9
7	#10380.00	61.4 PK	68.2	-6.8	1.43 V	211	48.9	12.5
8	15570.00	58.3 PK	74.0	-15.7	1.62 V	18	45.0	13.3
9	15570.00	43.6 AV	54.0	-10.4	1.62 V	18	30.3	13.3

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 46	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	63.5 PK	74.0	-10.5	1.46 H	331	60.4	3.1
2	5150.00	49.9 AV	54.0	-4.1	1.46 H	331	46.8	3.1
3	*5230.00	113.4 PK			1.46 H	331	110.6	2.8
4	*5230.00	104.7 AV			1.46 H	331	101.9	2.8
5	5350.00	52.6 PK	74.0	-21.4	1.46 H	331	49.7	2.9
6	5350.00	41.1 AV	54.0	-12.9	1.46 H	331	38.2	2.9
7	#10460.00	61.5 PK	68.2	-6.7	1.47 H	331	49.0	12.5
8	15690.00	58.4 PK	74.0	-15.6	2.28 H	290	45.7	12.7
9	15690.00	44.1 AV	54.0	-9.9	2.28 H	290	31.4	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	5150.00	67.5 PK	74.0	-6.5	1.61 V	17	64.4	3.1
2	5150.00	53.7 AV	54.0	-0.3	1.61 V	17	50.6	3.1
3	*5230.00	116.8 PK			1.61 V	17	114.0	2.8
4	*5230.00	107.9 AV			1.61 V	17	105.1	2.8
5	5350.00	52.7 PK	74.0	-21.3	1.61 V	17	49.8	2.9
6	5350.00	41.1 AV	54.0	-12.9	1.61 V	17	38.2	2.9
7	#10460.00	61.8 PK	68.2	-6.4	1.45 V	216	49.3	12.5
8	15690.00	58.3 PK	74.0	-15.7	1.66 V	22	45.6	12.7
9	15690.00	43.8 AV	54.0	-10.2	1.66 V	22	31.1	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.
6. " # ": The radiated frequency is out of the restricted band.

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	#5640.76	54.9 PK	68.2	-13.3	1.68 H	17	51.7	3.2
2	*5755.00	112.7 PK			1.68 H	17	109.1	3.6
3	*5755.00	104.7 AV			1.68 H	17	101.1	3.6
4	#5970.27	53.0 PK	68.2	-15.2	1.68 H	17	49.1	3.9
5	11510.00	60.1 PK	74.0	-13.9	1.83 H	352	47.2	12.9
6	11510.00	46.6 AV	54.0	-7.4	1.83 H	352	33.7	12.9
7	#17265.00	58.7 PK	68.2	-9.5	1.56 H	360	42.6	16.1
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	#5651.01	67.9 PK	69.0	-1.1	1.74 V	4	64.7	3.2
2	*5755.00	116.1 PK			1.74 V	4	112.5	3.6
3	*5755.00	108.1 AV			1.74 V	4	104.5	3.6
4	#5926.72	53.9 PK	68.2	-14.3	1.74 V	4	50.0	3.9
5	11510.00	60.6 PK	74.0	-13.4	1.86 V	351	47.7	12.9
6	11510.00	47.1 AV	54.0	-6.9	1.86 V	351	34.2	12.9
7	#17265.00	58.7 PK	68.2	-9.5	1.61 V	360	42.6	16.1

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	#5645.66	55.5 PK	68.2	-12.7	1.83 H	110	52.3	3.2
2	*5795.00	117.4 PK			1.83 H	110	113.8	3.6
3	*5795.00	108.1 AV			1.83 H	110	104.5	3.6
4	#5947.18	53.5 PK	68.2	-14.7	1.83 H	110	49.5	4.0
5	11590.00	60.5 PK	74.0	-13.5	1.78 H	339	47.7	12.8
6	11590.00	47.0 AV	54.0	-7.0	1.78 H	339	34.2	12.8
7	#17385.00	58.6 PK	68.2	-9.6	1.54 H	360	41.7	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	#5647.35	68.0 PK	68.2	-0.2	2.32 V	173	64.8	3.2
2	*5795.00	117.7 PK			2.32 V	173	114.1	3.6
3	*5795.00	108.2 AV			2.32 V	173	104.6	3.6
4	#5927.60	66.2 PK	68.2	-2.0	2.32 V	173	62.3	3.9
5	11590.00	61.1 PK	74.0	-12.9	1.78 V	149	48.3	12.8
6	11590.00	47.5 AV	54.0	-6.5	1.78 V	149	34.7	12.8
7	#17385.00	58.5 PK	68.2	-9.7	1.57 V	354	41.6	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.

802.11ac (VHT80)

CHANNEL	TX Channel 42	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	63.2 PK	74.0	-10.8	1.78 H	107	60.1	3.1
2	5150.00	50.1 AV	54.0	-3.9	1.78 H	107	47.0	3.1
3	*5210.00	107.1 PK			1.78 H	107	104.2	2.9
4	*5210.00	96.9 AV			1.78 H	107	94.0	2.9
5	5350.00	51.0 PK	74.0	-23.0	1.78 H	107	48.1	2.9
6	5350.00	40.4 AV	54.0	-13.6	1.78 H	107	37.5	2.9
7	#10420.00	61.0 PK	68.2	-7.2	1.80 H	350	48.4	12.6
8	15630.00	58.4 PK	74.0	-15.6	1.49 H	360	45.2	13.2
9	15630.00	41.2 AV	54.0	-12.8	1.49 H	360	28.0	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	67.0 PK	74.0	-7.0	1.60 V	24	63.9	3.1
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.60 V**	**24**	**50.8**	**3.1**
3	*5210.00	110.1 PK			1.60 V	24	107.2	2.9
4	*5210.00	100.2 AV			1.60 V	24	97.3	2.9
5	5350.00	52.4 PK	74.0	-21.6	1.60 V	24	49.5	2.9
6	5350.00	41.7 AV	54.0	-12.3	1.60 V	24	38.8	2.9
7	#10420.00	60.6 PK	68.2	-7.6	1.86 V	339	48.0	12.6
8	15630.00	58.7 PK	74.0	-15.3	1.65 V	360	45.5	13.2
9	15630.00	41.5 AV	54.0	-12.5	1.65 V	360	28.3	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 155	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	#5638.33	64.0 PK	68.2	-4.2	1.76 H	102	60.8	3.2
2	*5775.00	109.3 PK			1.76 H	102	105.7	3.6
3	*5775.00	99.1 AV			1.76 H	102	95.5	3.6
4	#5931.70	57.0 PK	68.2	-11.2	1.76 H	102	53.1	3.9
5	11550.00	61.1 PK	74.0	-12.9	1.76 H	348	48.2	12.9
6	11550.00	47.4 AV	54.0	-6.6	1.76 H	348	34.5	12.9
7	#17325.00	58.0 PK	68.2	-10.2	1.49 H	360	41.6	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	#5645.57	67.9 PK	68.2	-0.3	1.72 V	4	64.7	3.2
2	*5775.00	111.5 PK			1.72 V	4	107.9	3.6
3	*5775.00	102.6 AV			1.72 V	4	99.0	3.6
4	#5929.17	65.4 PK	68.2	-2.8	1.72 V	4	61.5	3.9
5	11550.00	61.3 PK	74.0	-12.7	1.75 V	164	48.4	12.9
6	11550.00	47.9 AV	54.0	-6.1	1.75 V	164	35.0	12.9
7	#17325.00	58.1 PK	68.2	-10.1	1.53 V	343	41.7	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. 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:

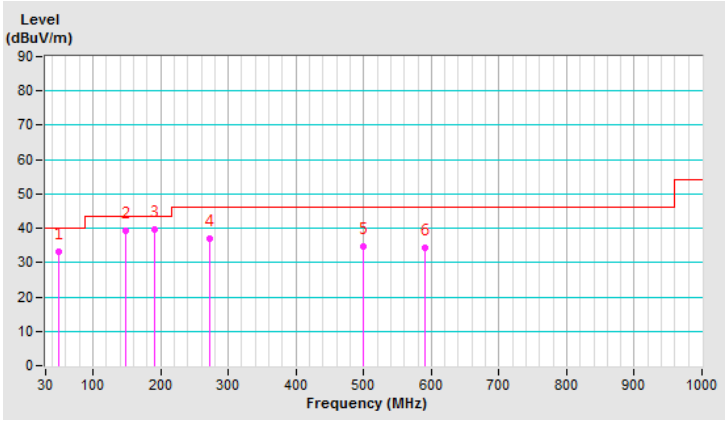
802.11ac (VHT40)

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	49.70	33.3 QP	40.0	-6.7	3.50 H	169	41.9	-8.6
2	147.60	39.1 QP	43.5	-4.4	2.00 H	149	46.9	-7.8
3	191.07	39.8 QP	43.5	-3.7	1.50 H	265	49.8	-10.0
4	272.09	37.1 QP	46.0	-8.9	1.00 H	165	44.8	-7.7
5	499.99	34.8 QP	46.0	-11.2	1.50 H	165	36.4	-1.6
6	590.32	34.4 QP	46.0	-11.6	1.50 H	264	34.1	0.3

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 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.

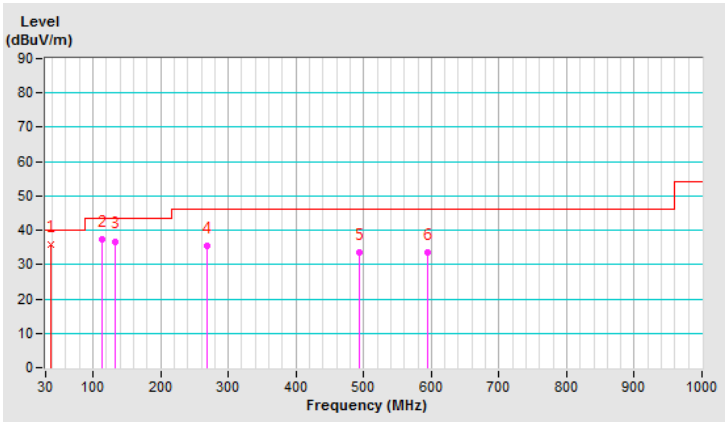


CHANNEL	TX Channel 151	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	38.35	35.9 QP	40.0	-4.1	1.00 V	165	45.3	-9.4
2	112.98	37.4 QP	43.5	-6.1	1.00 V	163	47.8	-10.4
3	133.45	36.8 QP	43.5	-6.7	1.50 V	145	45.8	-9.0
4	268.96	35.3 QP	46.0	-10.7	2.00 V	169	43.1	-7.8
5	494.12	33.5 QP	46.0	-12.5	1.00 V	143	35.4	-1.9
6	594.73	33.4 QP	46.0	-12.6	1.00 V	163	33.0	0.4

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 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. 28, 2018	Sep. 27, 2019
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: May 03, 2019

4.2.3 Test Procedure

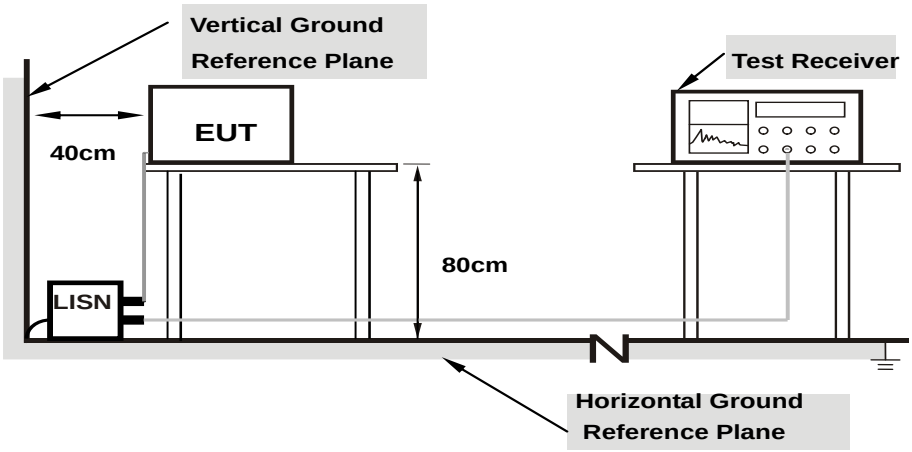
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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	0.15781	10.02	40.02	32.32	50.04	42.34	65.58	55.58	-15.54	-13.24
2	0.29063	10.05	38.18	29.83	48.23	39.88	60.51	50.51	-12.28	-10.63
3	0.34922	10.06	42.99	33.34	53.05	43.40	58.98	48.98	-5.93	-5.58
4	0.41172	10.07	34.16	15.64	44.23	25.71	57.61	47.61	-13.38	-21.90
5	0.45469	10.07	31.55	23.24	41.62	33.31	56.79	46.79	-15.17	-13.48
6	0.68516	10.09	30.34	16.88	40.43	26.97	56.00	46.00	-15.57	-19.03
7	0.75938	10.09	27.22	14.96	37.31	25.05	56.00	46.00	-18.69	-20.95
8	0.84531	10.10	28.94	21.09	39.04	31.19	56.00	46.00	-16.96	-14.81
9	0.96641	10.11	28.68	21.27	38.79	31.38	56.00	46.00	-17.21	-14.62
10	1.06641	10.11	24.29	13.42	34.40	23.53	56.00	46.00	-21.60	-22.47
11	1.38281	10.13	23.47	13.51	33.60	23.64	56.00	46.00	-22.40	-22.36
12	20.84375	11.08	37.64	32.56	48.72	43.64	60.00	50.00	-11.28	-6.36

Remarks:

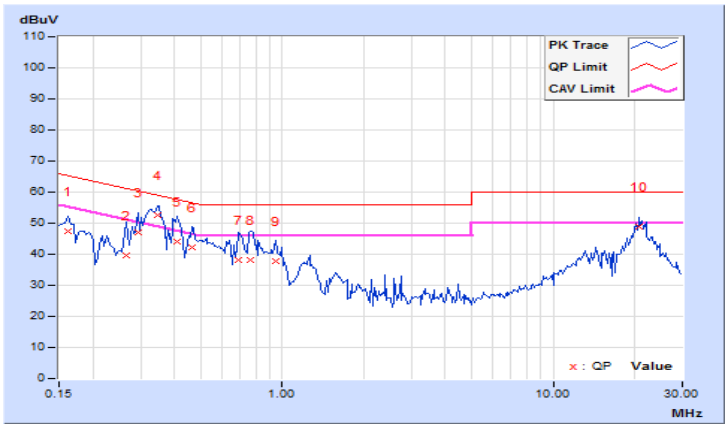
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

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	0.16172	9.93	37.51	31.38	47.44	41.31	65.38	55.38	-17.94	-14.07
2	0.26719	9.95	29.54	13.69	39.49	23.64	61.20	51.20	-21.71	-27.56
3	0.29453	9.95	37.11	26.53	47.06	36.48	60.40	50.40	-13.34	-13.92
4	0.34531	9.95	42.73	33.50	52.68	43.45	59.07	49.07	-6.39	-5.62
5	0.40781	9.96	34.16	12.17	44.12	22.13	57.69	47.69	-13.57	-25.56
6	0.46250	9.96	32.15	19.48	42.11	29.44	56.65	46.65	-14.54	-17.21
7	0.68906	9.97	28.00	13.56	37.97	23.53	56.00	46.00	-18.03	-22.47
8	0.76719	9.98	27.99	16.95	37.97	26.93	56.00	46.00	-18.03	-19.07
9	0.94297	9.99	27.92	20.17	37.91	30.16	56.00	46.00	-18.09	-15.84
10	**20.85156**	**10.88**	**38.08**	**34.33**	**48.96**	**45.21**	**60.00**	**50.00**	**-11.04**	**-4.79**

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)

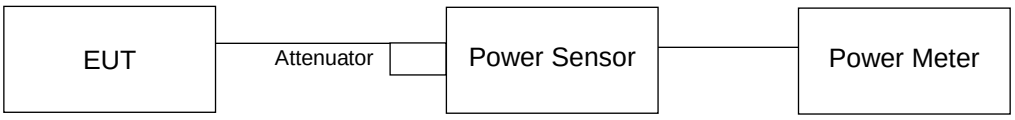
*B is the 26 dB emission bandwidth in megahertz

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



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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.

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 Results

CDD Mode

802.11a

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	18.85	18.67	19.56	19.77	335.564	25.26	30.00	Pass
40	5200	19.11	18.71	19.51	19.86	341.931	25.34	30.00	Pass
48	5240	18.99	18.72	19.52	19.63	335.092	25.25	30.00	Pass
149	5745	22.29	21.52	21.73	22.13	623.581	27.95	30.00	Pass
157	5785	22.01	21.65	21.54	22.31	617.85	27.91	30.00	Pass
165	5825	21.87	21.62	21.21	22.25	599.036	27.77	30.00	Pass

802.11ac (VHT20)

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	18.63	18.72	19.61	19.65	331.087	25.20	30.00	Pass
40	5200	18.59	18.81	19.62	19.69	333.043	25.23	30.00	Pass
48	5240	18.61	18.94	19.58	19.67	334.419	25.24	30.00	Pass
149	5745	22.01	21.31	21.47	21.98	592.104	27.72	30.00	Pass
157	5785	21.76	21.38	21.29	22.01	580.813	27.64	30.00	Pass
165	5825	21.61	21.30	20.95	21.94	560.539	27.49	30.00	Pass

802.11ac (VHT40)

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				
38	5190	17.52	17.58	18.23	18.22	246.675	23.92	30.00	Pass
46	5230	20.87	20.77	20.91	21.48	505.494	27.04	30.00	Pass
151	5755	22.54	22.07	22.15	22.46	680.795	28.33	30.00	Pass
159	5795	22.11	20.91	21.79	21.92	592.47	27.73	30.00	Pass

802.11ac (VHT80)

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				
42	5210	16.85	16.80	17.41	17.35	205.686	23.13	30.00	Pass
155	5775	19.43	19.01	19.16	19.61	341.141	25.33	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

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	18.63	18.72	19.61	19.65	331.087	25.20	25.40	Pass
40	5200	18.59	18.81	19.62	19.69	333.043	25.23	25.40	Pass
48	5240	18.61	18.94	19.58	19.67	334.419	25.24	25.40	Pass
149	5745	19.02	18.71	18.66	18.87	304.642	24.84	25.12	Pass
157	5785	19.26	18.89	18.68	19.42	323.067	25.09	25.12	Pass
165	5825	19.12	18.92	18.54	19.53	320.834	25.06	25.12	Pass

Note: For UNII-1: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.60dBi > 6dBi , so the power limit shall be reduced to 30-(10.60-6) = 25.40Bm.
For UNII-3: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.88dBi > 6dBi , so the power limit shall be reduced to 30-(10.88-6) = 25.120Bm.

802.11ac (VHT40)

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				
38	5190	17.52	17.58	18.23	18.22	246.675	23.92	25.40	Pass
46	5230	19.21	19.08	19.37	19.63	342.608	25.35	25.40	Pass
151	5755	19.28	18.79	18.91	19.20	321.386	25.07	25.12	Pass
159	5795	19.46	18.26	19.14	19.23	321.084	25.07	25.12	Pass

Note: For UNII-1: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.60dBi > 6dBi , so the power limit shall be reduced to 30-(10.60-6) = 25.40Bm.
For UNII-3: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.88dBi > 6dBi , so the power limit shall be reduced to 30-(10.88-6) = 25.120Bm.

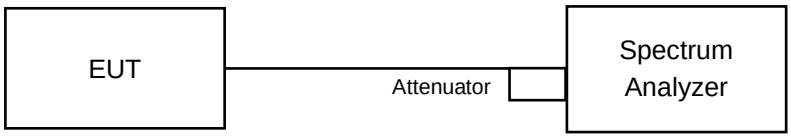
802.11ac (VHT80)

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				
42	5210	16.85	16.80	17.41	17.35	205.686	23.13	25.40	Pass
155	5775	19.09	18.72	18.81	19.28	316.325	25.00	25.12	Pass

Note: For UNII-1: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.60dBi > 6dBi , so the power limit shall be reduced to 30-(10.60-6) = 25.40Bm.
For UNII-3: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/2}$)^2 / 4] = 10.88dBi > 6dBi , so the power limit shall be reduced to 30-(10.88-6) = 25.120Bm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.56	16.44	16.56	16.44
40	5200	16.56	16.44	16.56	16.56
48	5240	16.56	16.56	16.56	16.56
149	5745	20.28	16.44	16.56	16.56
157	5785	22.68	16.44	16.56	16.68
165	5825	29.04	16.44	16.56	16.80

802.11ac (VHT20)

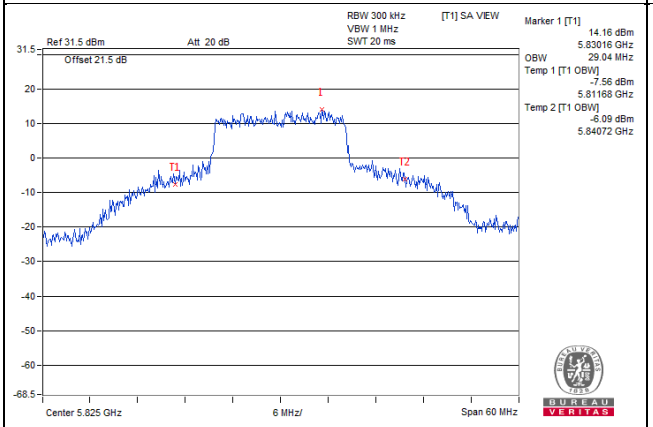
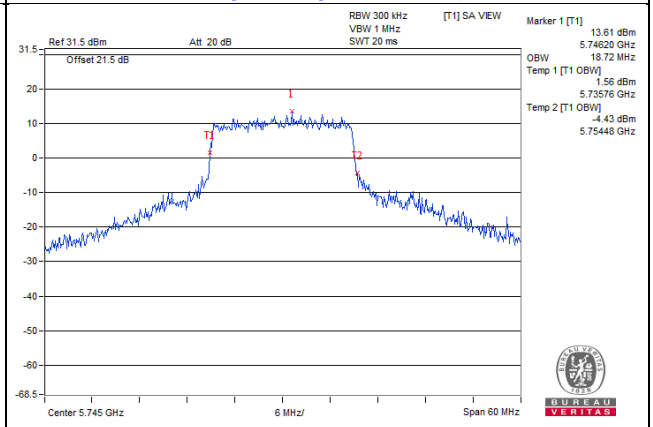
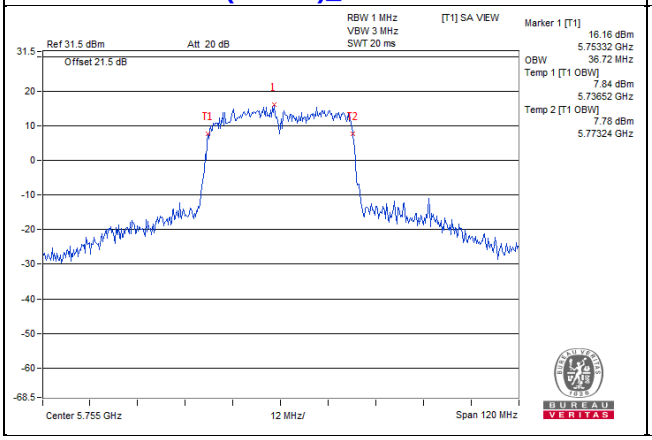
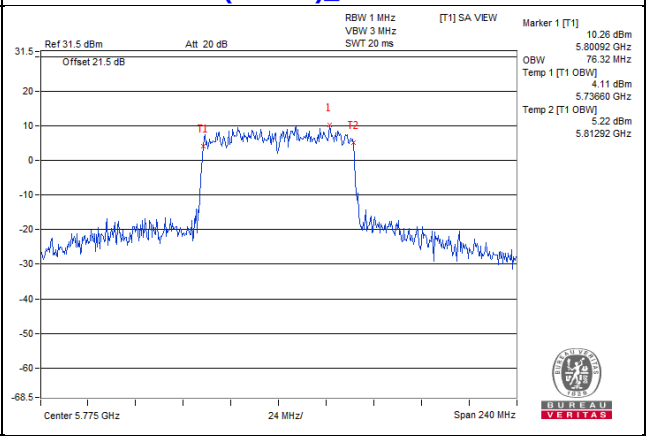
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.64	17.64	16.56	17.64
40	5200	17.64	17.64	16.56	17.76
48	5240	17.64	17.76	16.56	17.64
149	5745	18.72	17.76	17.64	17.76
157	5785	18.12	17.76	17.76	17.76
165	5825	18.36	17.64	17.76	17.76

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.24	36.24	36.24	36.24
46	5230	36.24	36.24	36.24	36.24
151	5755	36.72	36.24	36.24	36.72
159	5795	62.16	36.48	36.48	36.24

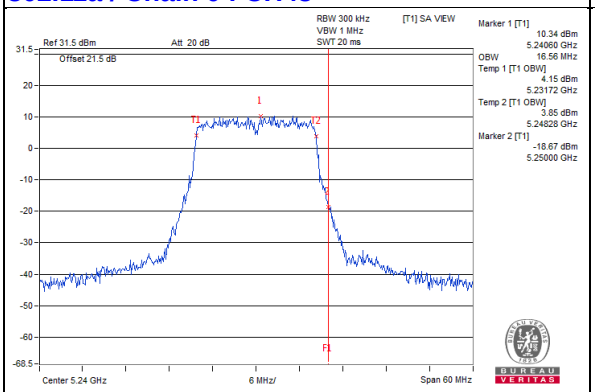
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.84	75.84	76.32	75.84
155	5775	76.32	76.32	75.84	75.36

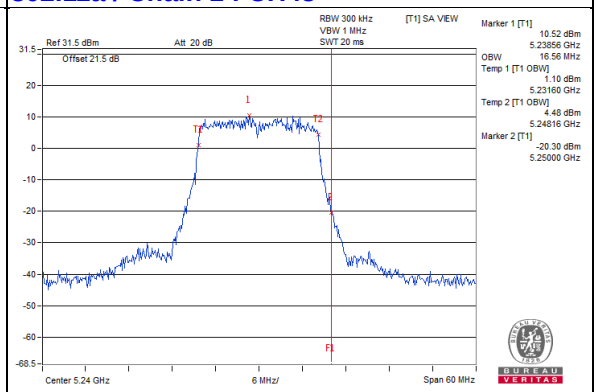
Spectrum Plot of Max. Value	
802.11a_Chain 0 / CH165	**802.11ac (VHT20)_Chain 0 / CH149**
	
802.11ac (VHT40)_Chain 0 / CH159	**802.11ac (VHT80)_Chain 0 / CH155**
	

Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

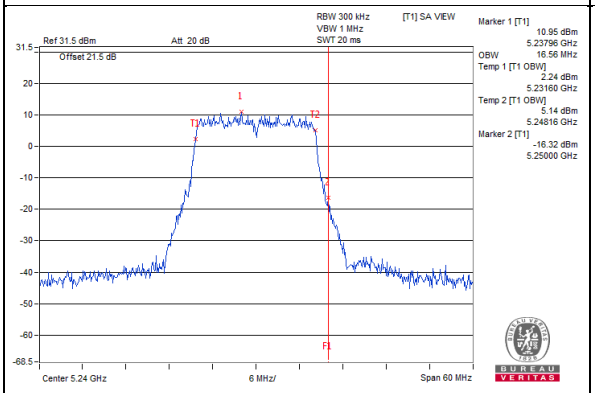
802.11a / Chain 0 : CH48



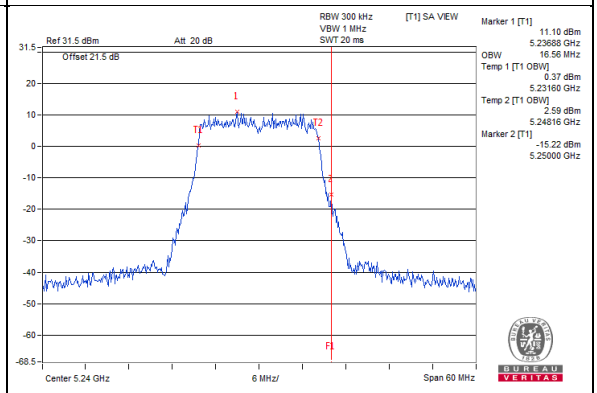
802.11a / Chain 1 : CH48



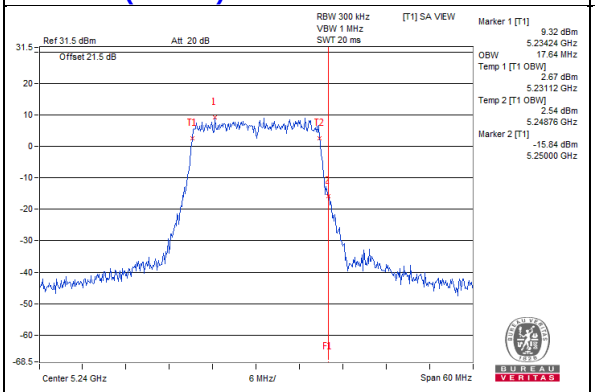
802.11a / Chain 2 : CH48



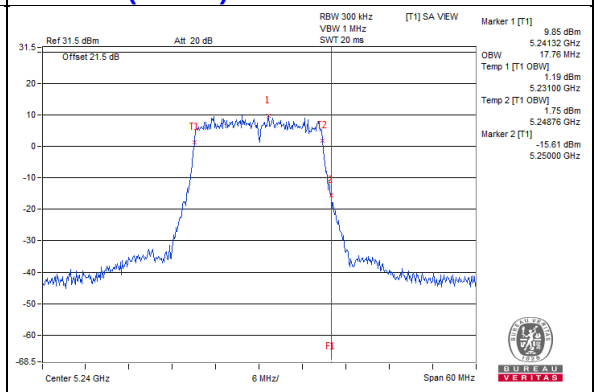
802.11a / Chain 3 : CH48



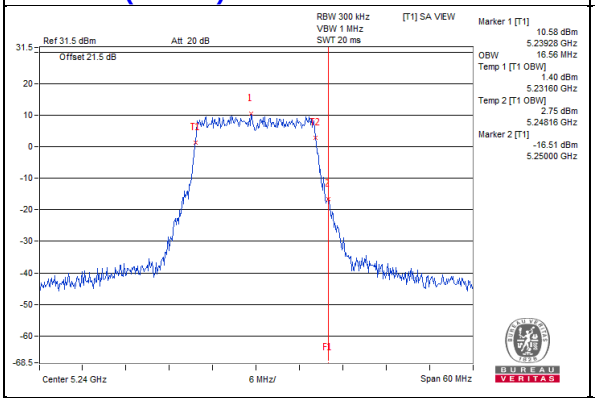
802.11ac (VHT20) / Chain 0 : CH48



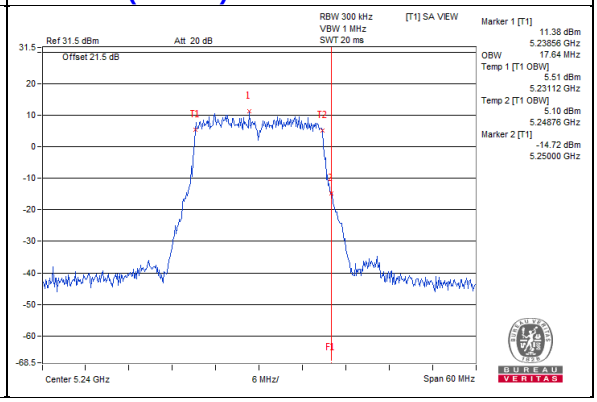
802.11ac (VHT20) / Chain 1 : CH48



802.11ac (VHT20) / Chain 2 : CH48

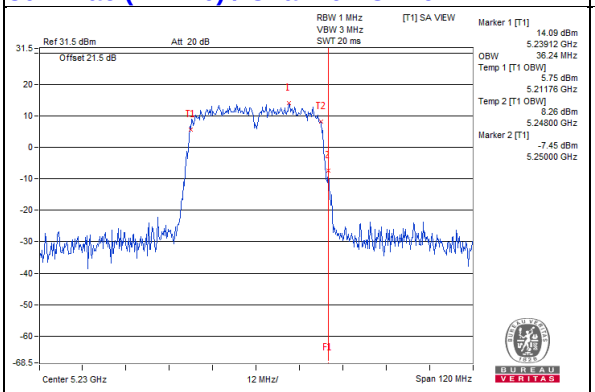


802.11ac (VHT20) / Chain 3 : CH48

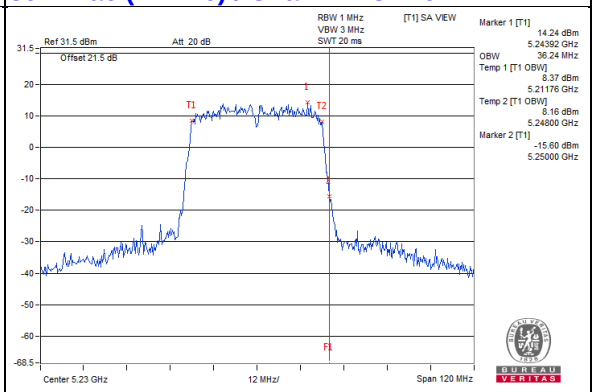


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

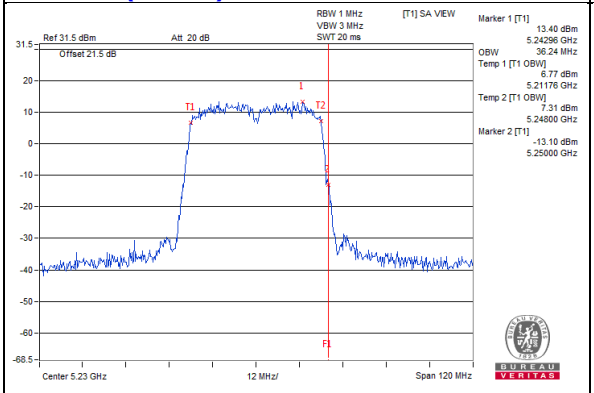
802.11ac (VHT40) / Chain 0 : CH46



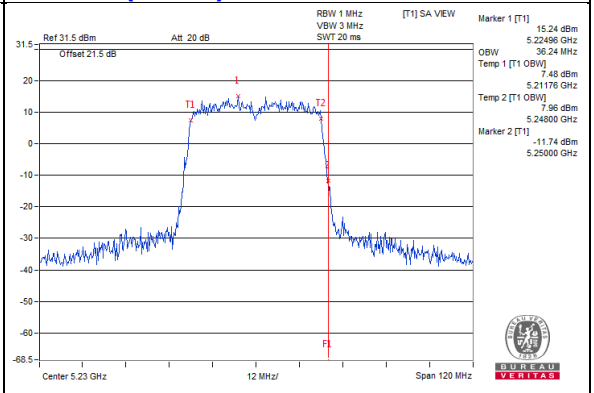
802.11ac (VHT40) / Chain 1 : CH46



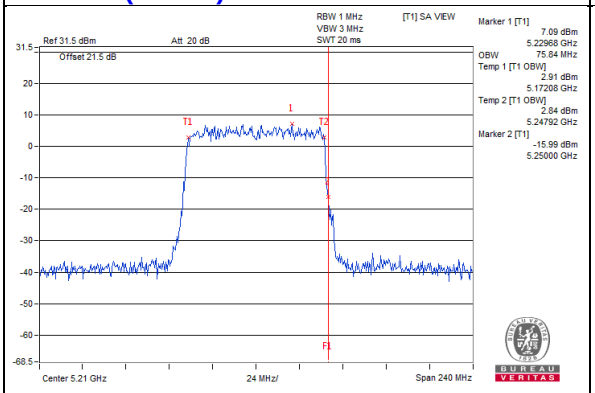
802.11ac (VHT40) / Chain 2 : CH46



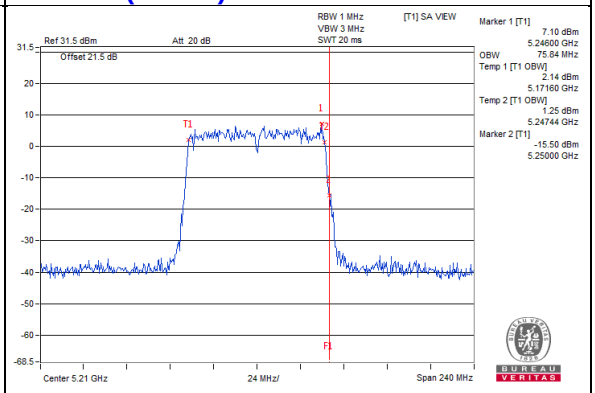
802.11ac (VHT40) / Chain 3 : CH46



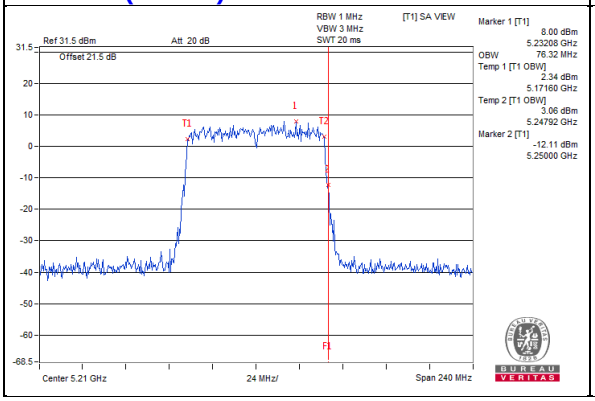
802.11ac (VHT80) / Chain 0 : CH42



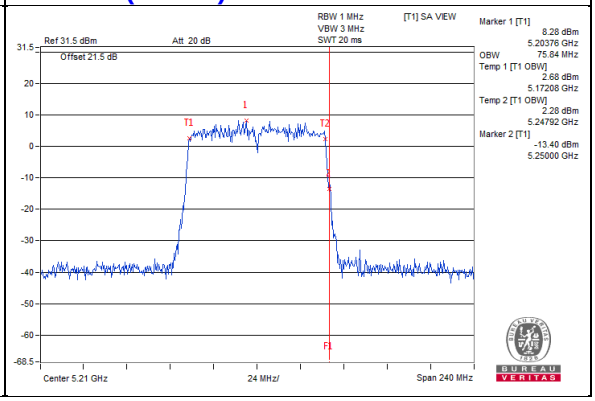
802.11ac (VHT80) / Chain 1 : CH42



802.11ac (VHT80) / Chain 2 : CH42

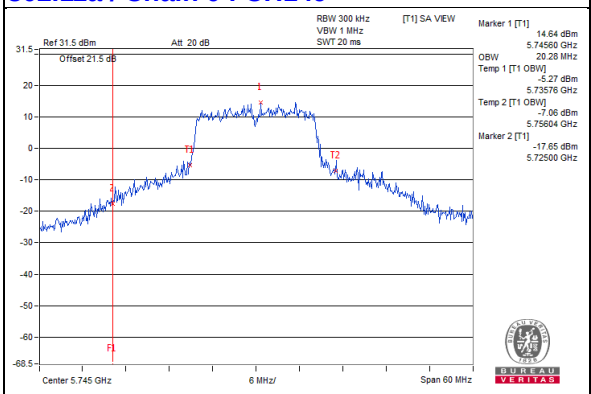


802.11ac (VHT80) / Chain 3 : CH42

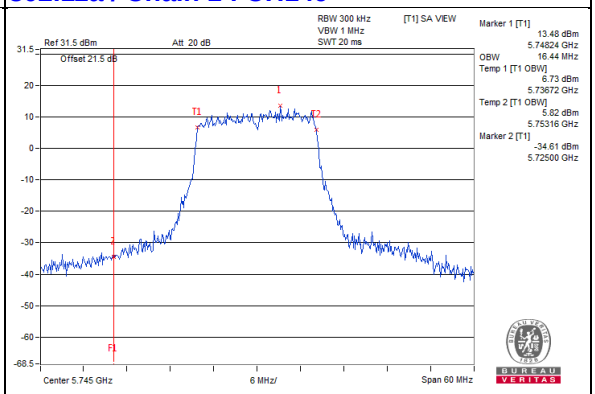


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

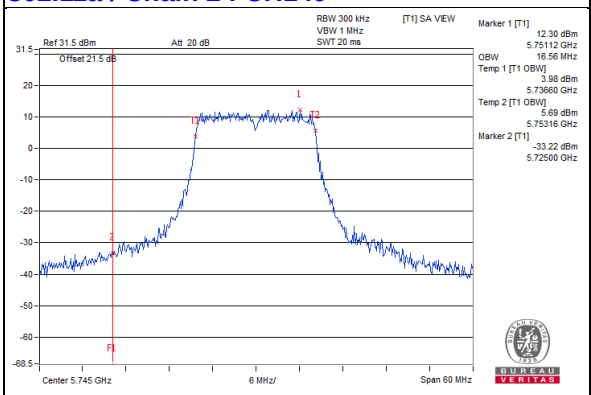
802.11a / Chain 0 : CH149



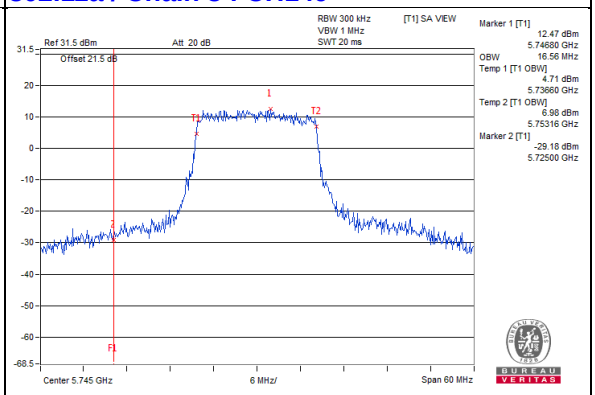
802.11a / Chain 1 : CH149



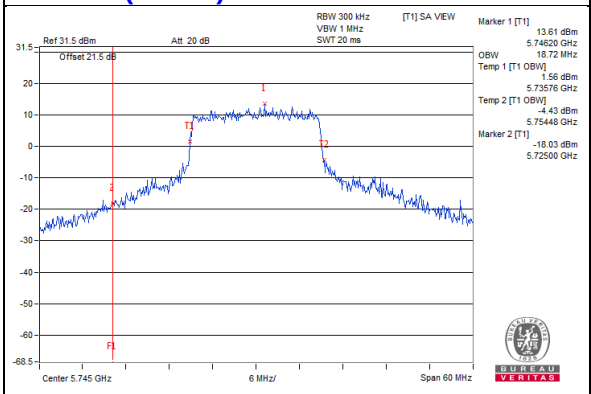
802.11a / Chain 2 : CH149



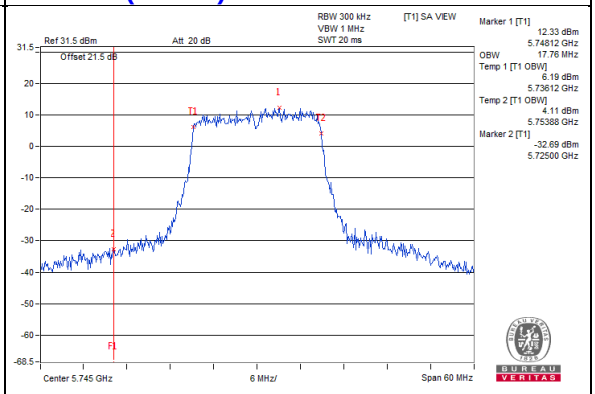
802.11a / Chain 3 : CH149



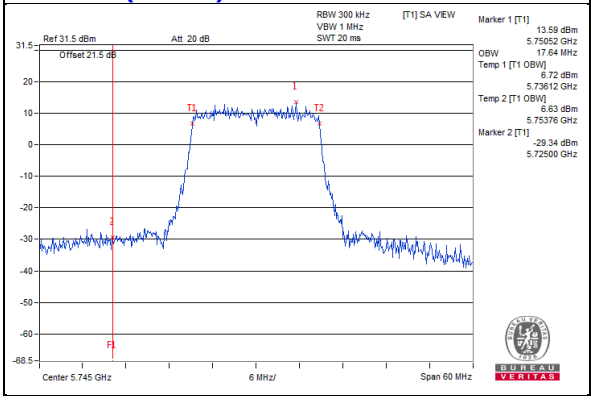
802.11ac (VHT20) / Chain 0 : CH149



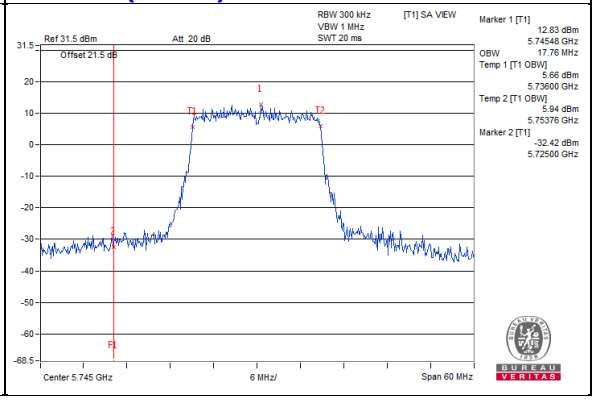
802.11ac (VHT20) / Chain 1 : CH149



802.11ac (VHT20) / Chain 2 : CH149

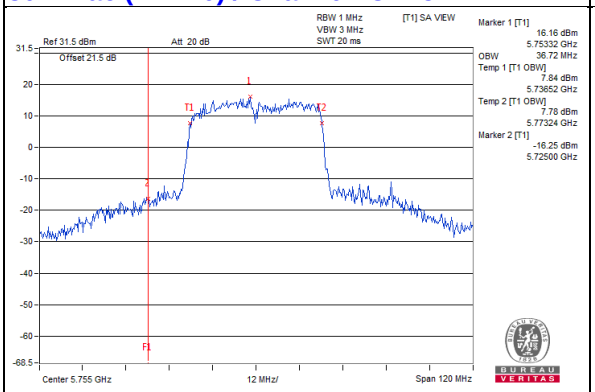


802.11ac (VHT20) / Chain 3 : CH149

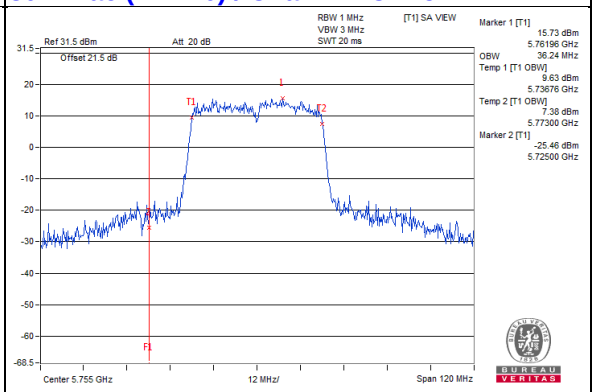


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

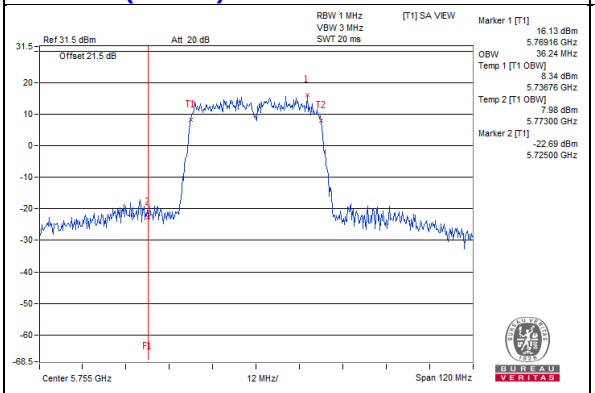
802.11ac (VHT40) / Chain 0 : CH151



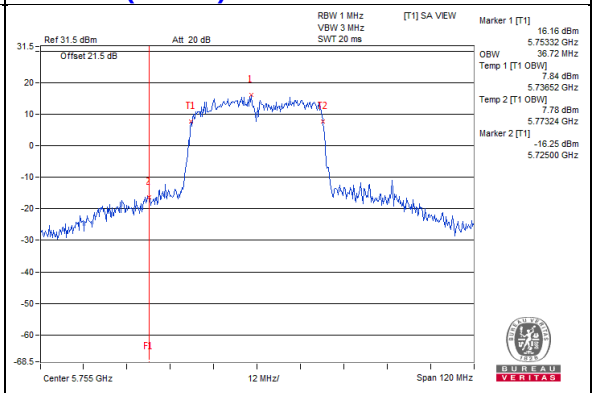
802.11ac (VHT40) / Chain 1 : CH151



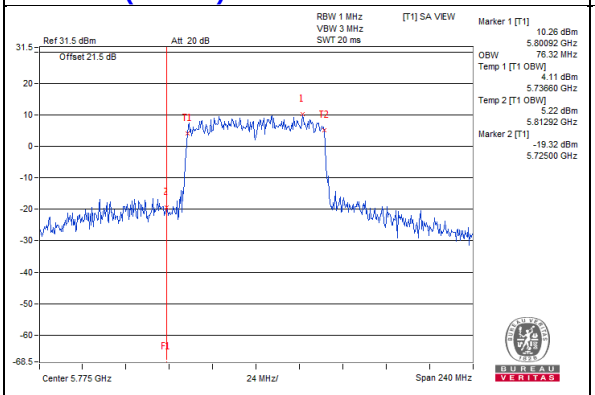
802.11ac (VHT40) / Chain 2 : CH151



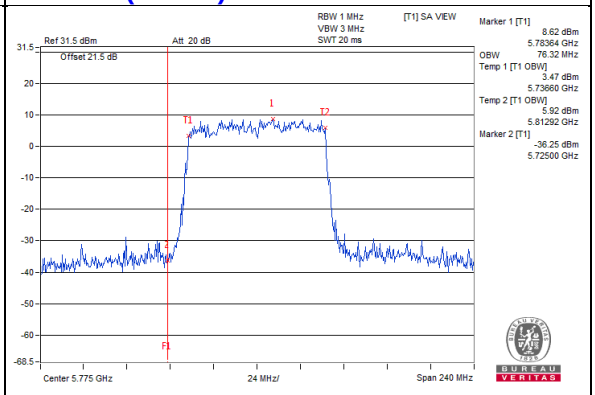
802.11ac (VHT40) / Chain 3 : CH151



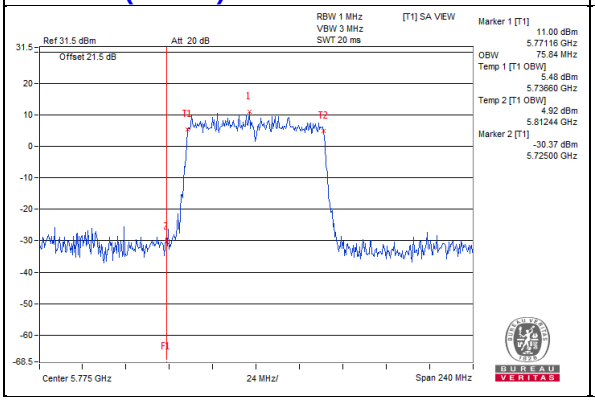
802.11ac (VHT80) / Chain 0 : CH155



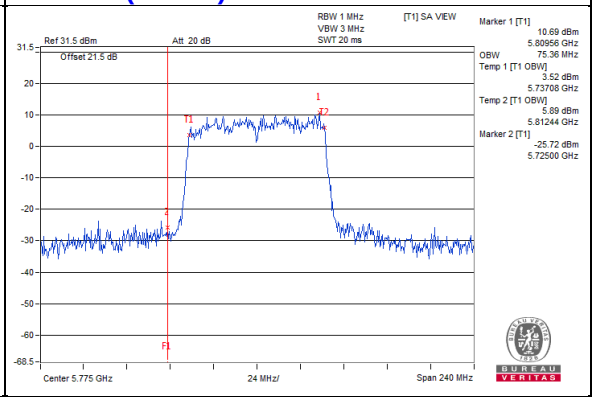
802.11ac (VHT80) / Chain 1 : CH155



802.11ac (VHT80) / Chain 2 : CH155



802.11ac (VHT80) / Chain 3 : CH155

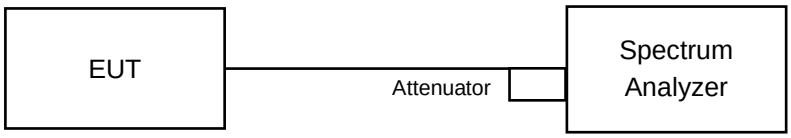


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:
For 802.11ac (VHT20)
Using method SA-1

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

For other modulation mode
Using method SA-2

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

For U-NII-3:

For 802.11ac (VHT20)

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

For other modulation mode

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.91	5.01	6.30	5.90	0.16	11.99	12.40	Pass
40	5200	5.97	5.51	5.12	5.81	0.16	11.80	12.40	Pass
48	5240	5.82	5.75	5.96	5.30	0.16	11.90	12.40	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.60dBi > 6dBi , so the power density limit shall be reduced to 17-(10.60-6) = 12.40dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.89	4.80	5.73	5.66	11.31	12.40	Pass
40	5200	4.35	4.44	5.88	5.67	11.16	12.40	Pass
48	5240	4.52	5.13	5.88	5.36	11.27	12.40	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.60dBi > 6dBi , so the power density limit shall be reduced to 17-(10.60-6) = 12.40dBm.

802.11ac (VHT40)

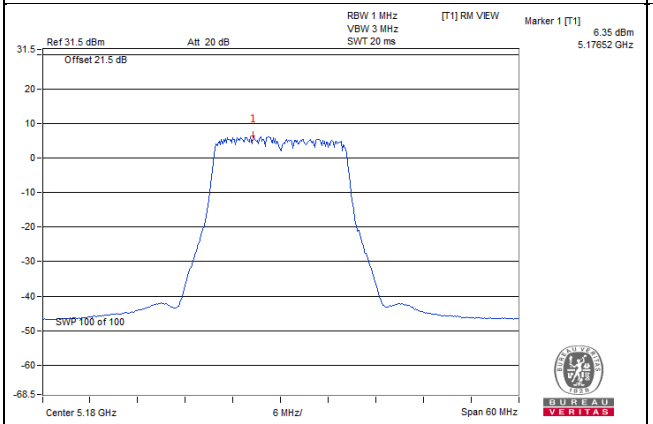
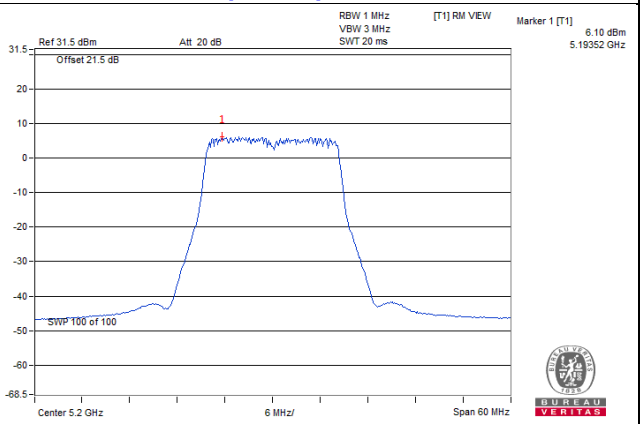
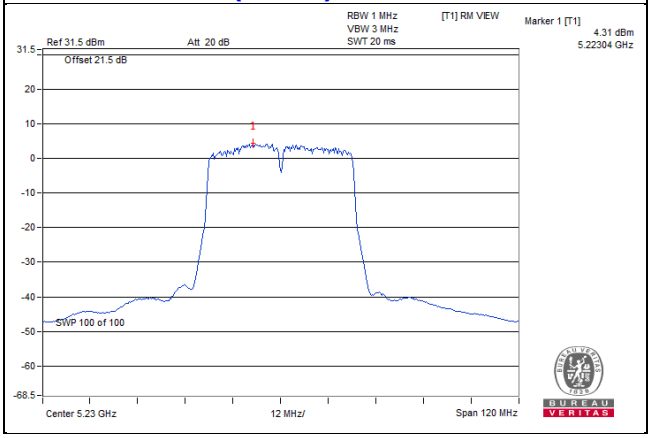
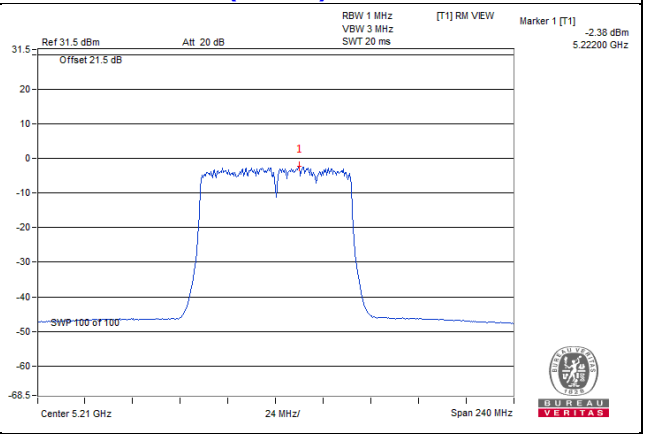
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	0.15	1.11	1.50	1.97	0.15	7.40	12.40	Pass
46	5230	4.05	4.31	3.86	4.24	0.15	10.29	12.40	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.60dBi > 6dBi , so the power density limit shall be reduced to 17-(10.60-6) = 12.40dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-4.07	-3.17	-2.78	-2.38	0.26	3.22	12.40	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 10.60dBi > 6dBi , so the power density limit shall be reduced to 17-(10.60-6) = 12.40dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH36	**802.11ac (VHT20)_Chain 2 / CH40**
	
802.11ac (VHT40)_Chain 1 / CH46	**802.11ac (VHT80)_Chain 3 / CH42**
	

CDD Mode

For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300kHz	dBm/300kHz			
149	5745	0.91	0.24	-0.06	0.85	0.16	4.6567	6.68	8.90	25.12	Pass
157	5785	0.78	0.64	-0.23	0.46	0.16	4.5772	6.61	8.83	25.12	Pass
165	5825	0.95	-0.03	-0.51	0.68	0.16	4.4535	6.49	8.71	25.12	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 4] = 10.88dBi > 6dBi , so the power density limit shall be reduced to 30-(10.88-6) = 25.12dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)				Total PSD		Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3	mW/300kHz	dBm/300kHz		
149	5745	0.35	-0.12	-0.18	-0.32	3.945	5.96	25.12	Pass
157	5785	-0.39	-0.41	-0.57	0.25	3.7603	5.75	25.12	Pass
165	5825	-0.50	-0.42	-0.26	-0.50	3.6322	5.60	25.12	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 4] = 10.88dBi > 6dBi , so the power density limit shall be reduced to 30-(10.88-6) = 25.12dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300kHz	dBm/300kHz			
151	5755	-2.11	-2.68	-2.98	-2.11	0.15	2.3539	3.72	5.94	25.12	Pass
159	5795	-2.89	-4.32	-3.81	-3.53	0.15	1.8051	2.57	4.79	25.12	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 4] = 10.88dBi > 6dBi , so the power density limit shall be reduced to 30-(10.88-6) = 25.12dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

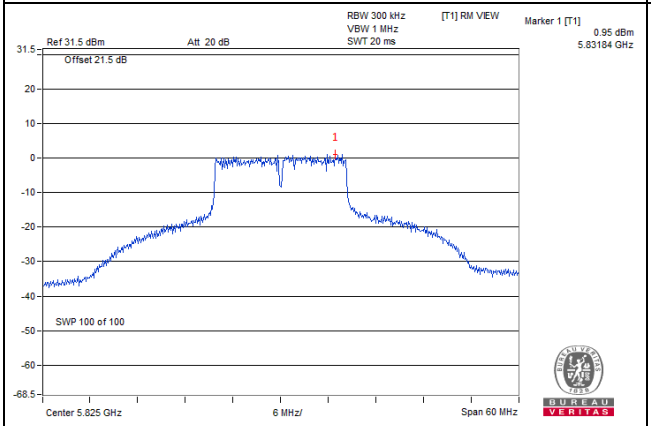
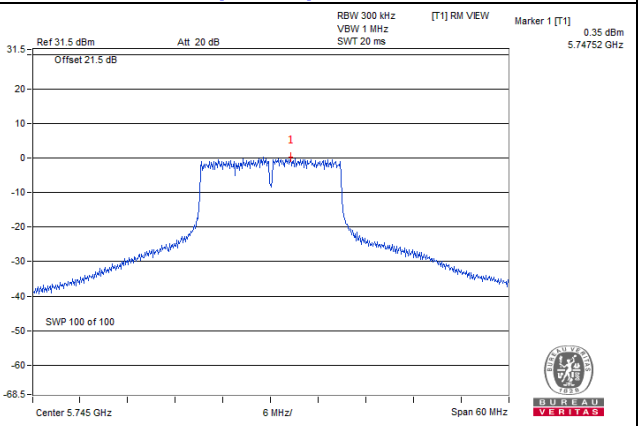
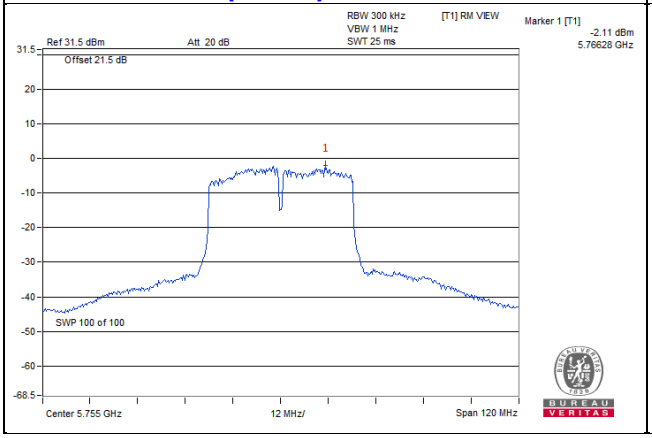
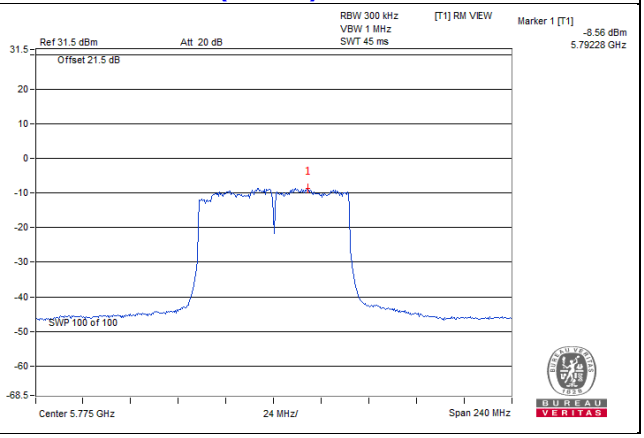
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300kHz	dBm/300kHz			
155	5775	-8.90	-9.09	-9.09	-8.56	0.16	0.5461	-2.63	-0.41	25.12	Pass

Note: 1. Method b) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. The Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 4] = 10.88dBi > 6dBi , so the power density limit shall be reduced to 30-(10.88-6) = 25.12dBm.

3. Refer to section 3.3 for duty cycle spectrum plot.

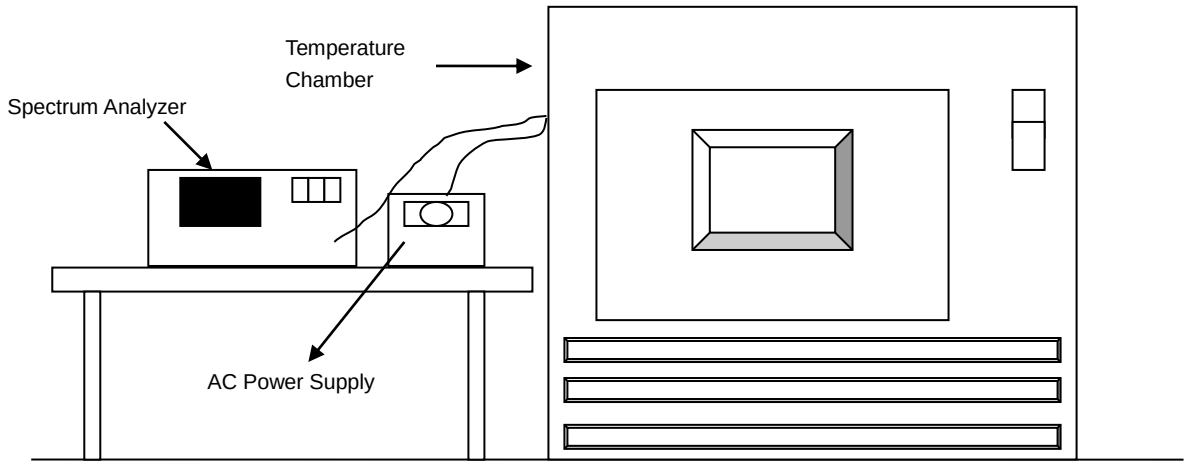
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH165	**802.11ac (VHT20)_Chain 0 / CH149**
	
802.11ac (VHT40)_Chain 0 / CH151	**802.11ac (VHT80)_Chain 3 / CH155**
	

4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.

e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5179.9967	PASS	5179.9953	PASS	5179.9935	PASS	5179.9945	Pass
40	120	5179.9998	PASS	5180.0006	PASS	5179.9997	PASS	5180.0028	Pass
30	120	5179.9797	PASS	5179.9761	PASS	5179.9779	PASS	5179.9795	Pass
20	120	5179.9861	PASS	5179.9853	PASS	5179.985	PASS	5179.9862	Pass
10	120	5179.9923	PASS	5179.9881	PASS	5179.9923	PASS	5179.9924	Pass
0	120	5179.995	PASS	5179.9913	PASS	5179.9905	PASS	5179.9922	Pass
-10	120	5179.9766	PASS	5179.9744	PASS	5179.974	PASS	5179.9759	Pass
-20	120	5180.0038	PASS	5180.0065	PASS	5180.0041	PASS	5180.0065	Pass
-30	120	5180.0084	PASS	5180.0048	PASS	5180.0072	PASS	5180.0081	Pass

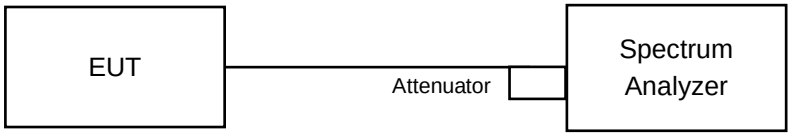
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9863	PASS	5179.985	PASS	5179.9844	PASS	5179.9871	Pass
	120	5179.9861	PASS	5179.9853	PASS	5179.985	PASS	5179.9862	Pass
	102	5179.9852	PASS	5179.9844	PASS	5179.9845	PASS	5179.9855	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.39	15.98	16.38	16.37	0.5	Pass
157	5785	16.40	16.33	16.40	16.38	0.5	Pass
165	5825	16.38	16.35	16.39	16.40	0.5	Pass

802.11ac (VHT20)

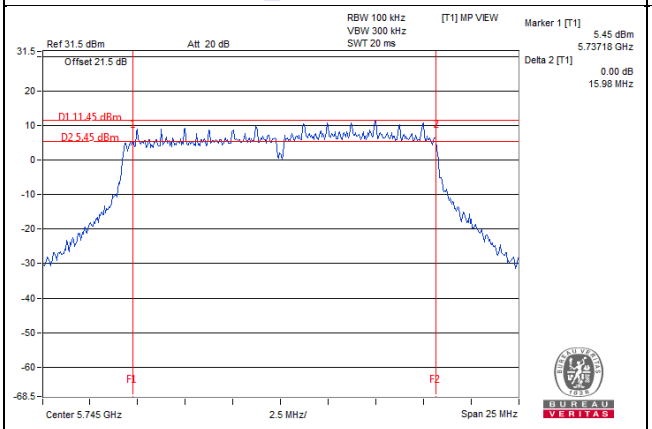
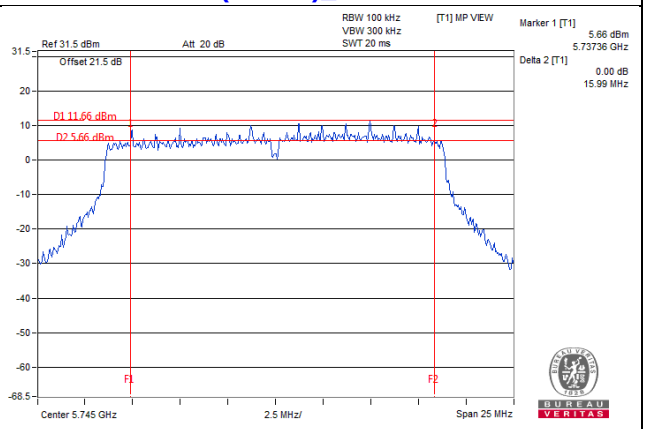
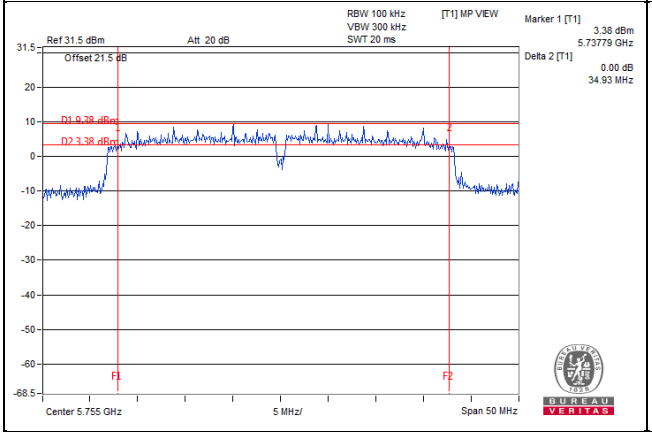
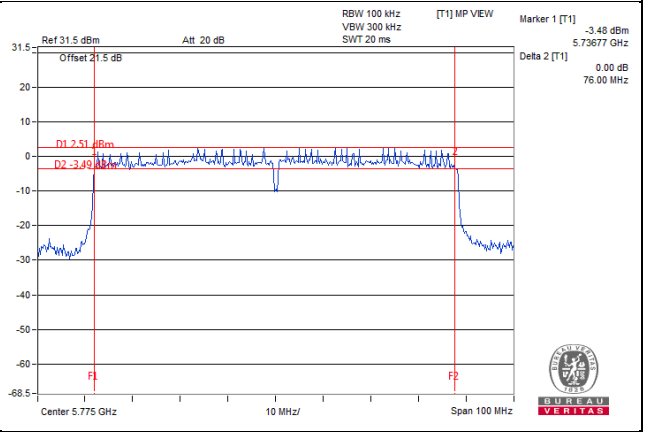
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.59	15.99	17.61	17.63	0.5	Pass
157	5785	17.63	16.74	17.61	17.64	0.5	Pass
165	5825	17.33	17.22	17.62	17.63	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	34.93	35.23	35.17	35.15	0.5	Pass
159	5795	35.14	35.18	35.19	35.18	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.00	76.36	76.46	76.01	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 1 / CH149**
	
802.11ac (VHT40)_Chain 0 / CH151	**802.11ac (VHT80)_Chain 0 / CH155**
	

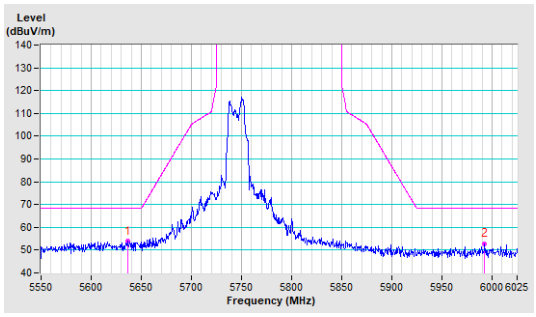
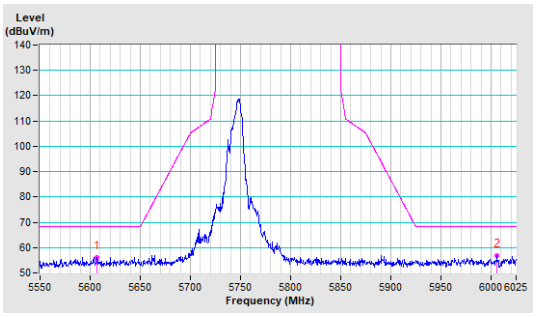
5 Pictures of Test Arrangements

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

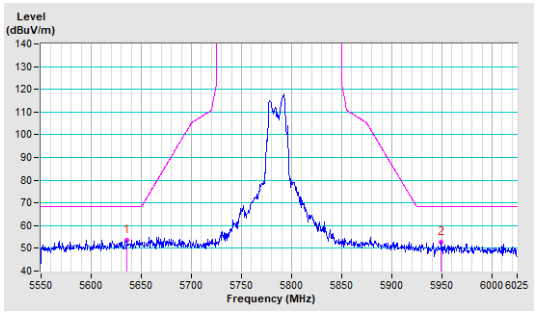
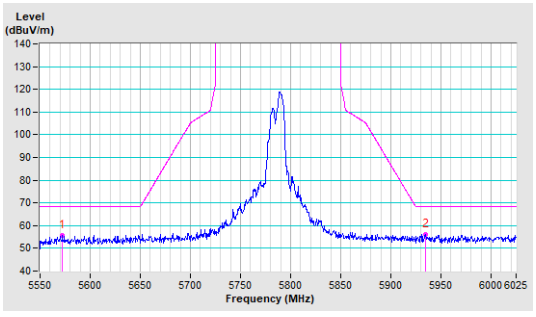
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

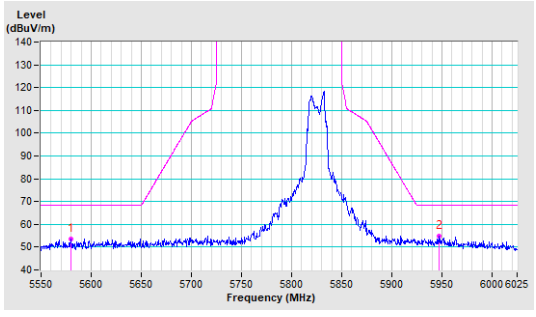
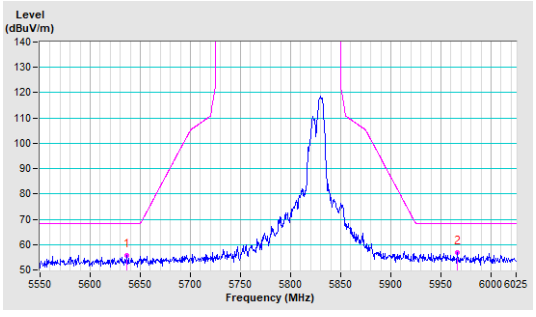
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

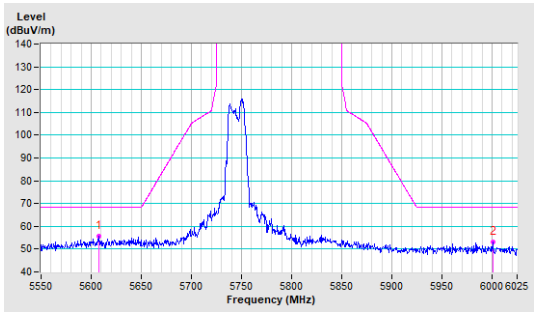
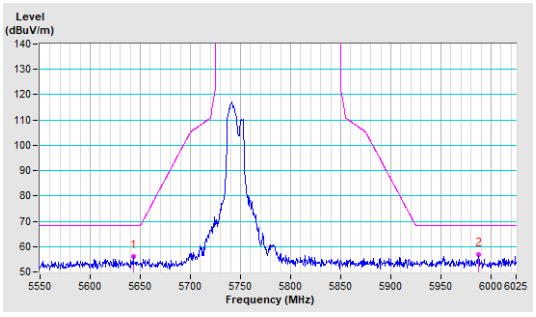
Horizontal	Vertical
	

CH 165 5825 MHz

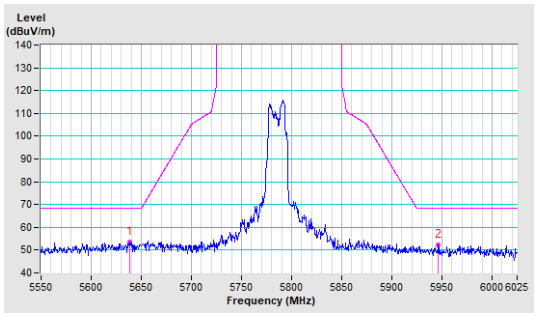
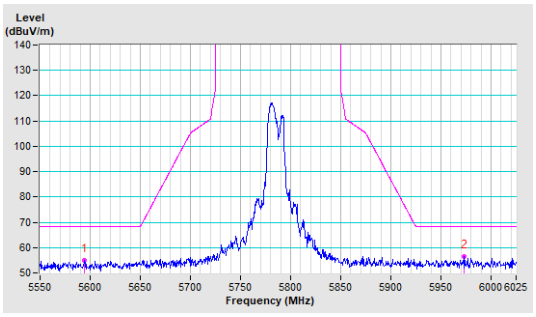
Horizontal	Vertical
	

802.11ac (VHT20)

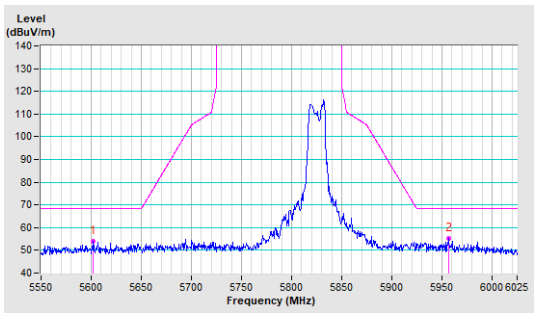
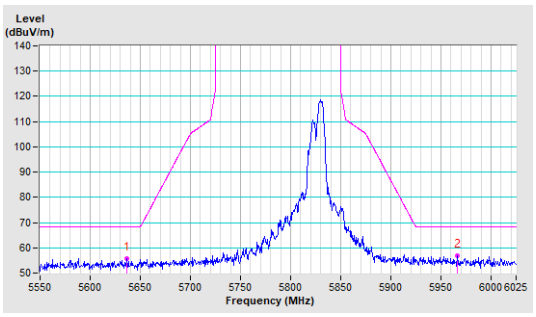
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

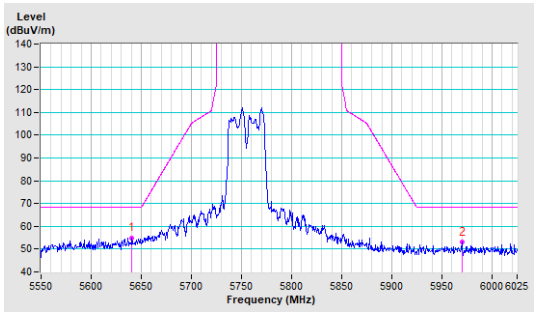
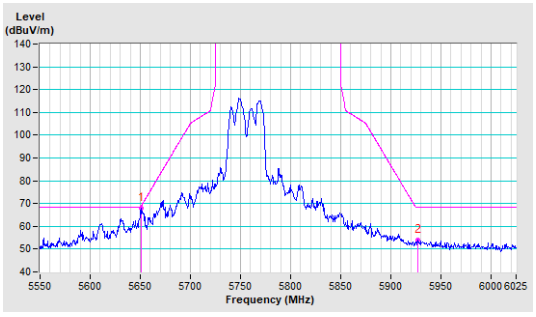
Horizontal	Vertical
	

CH 165 5825 MHz

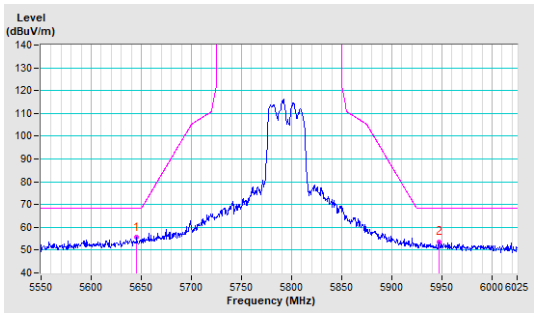
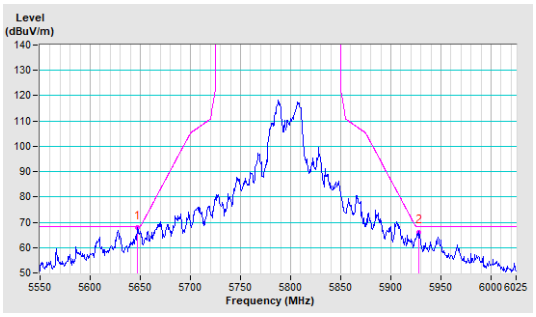
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

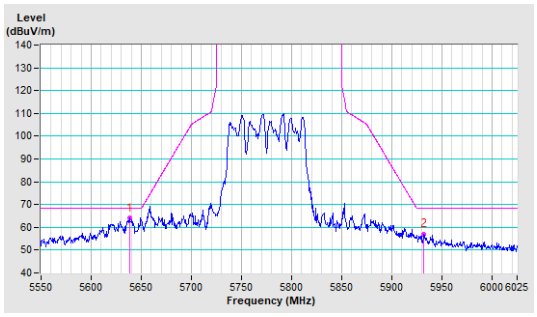
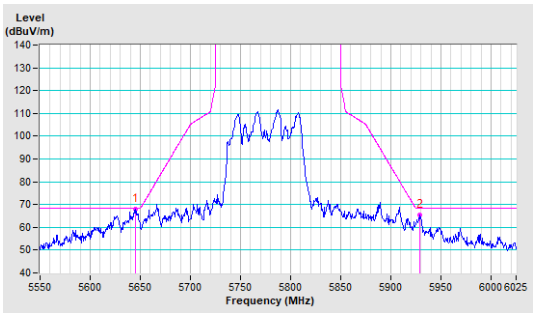
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 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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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---