FCC Test Report

Report No.:	RF200107C19-1
FCC ID:	Q87-03530
Test Model:	RE7000 V2
Series Model:	RE6900, RE7100 (Refer to Section 3.1 for more details)
Received Date:	Jan. 07, 2020
Test Date:	Jan. 14, 2020 ~ Jan. 17, 2020
Issued Date:	Feb. 04, 2020
Applicant:	LINKSYS LLC
Address:	121 Theory Drive Irvine California 92617 United State
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location :	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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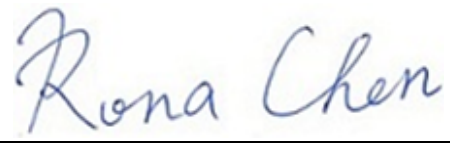
Release Control Record

Issue No.	Description	Date Issued
RF200107C19-1	Original Release	Feb. 04, 2020

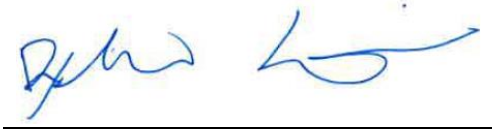
1 Certificate of Conformity

Product:	Linksys MAX-STREAM AC1900+ WiFi Range Extender
Brand:	LINKSYS
Test Model:	RE7000 V2
Series Model:	RE6900, RE7100 (Refer to Section 3.1 for more details)
Sample Status:	Engineering Sample
Applicant:	LINKSYS LLC
Test Date:	Jan. 14, 2020 ~ Jan. 17, 2020
Standards:	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 RF characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Feb. 04, 2020

Rona Chen / Specialist

Approved by :  , **Date:** Feb. 04, 2020

Dylan Chiou / Senior Project Engineer

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 -19.75 dB at 0.15400 MHz.
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 -1.1 dB at 5150.00 MHz. & 5638.04 MHz
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)	6 dB 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	No antenna connector is used.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
2. 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	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	3.59 dB
	200 MHz ~ 1000 MHz	3.60 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Linksys MAX-STREAM AC1900+ WiFi Range Extender
Brand	LINKSYS
Test Model	RE7000 V2
Series Model	RE6900, RE7100
Status of EUT	Engineering Sample
Power Supply Rating	120 Vac (AC Main)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 600.0 Mbps 802.11ac: up to 1733.3 Mbps
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	484.307 mW for 5180 ~ 5240 MHz 694.904 mW for 5745 ~ 5825 MHz
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The models are listed as below.

Brand Name	Model Name	Difference
LINKSYS	RE7000 V2	Belkin sell the same product to different marketing segment basing on the same platform.
	RE6900	
	RE7100	

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

Modulation Mode	Tx Function	Beamforming
802.11a	4TX	Not Support
802.11n (HT20)	4TX	Support
802.11n (HT40)	4TX	Support
802.11ac (VHT20)	4TX	Support
802.11ac (VHT40)	4TX	Support
802.11ac (VHT80)	4TX	Support

* Except for 802.11a, the worst case of above modulation modes is beamforming on mode for the final test.

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

3. The antenna information of EUT are listed as below.

No.	Antenna Band	Antenna Type	2.4 GHz Gain (peak)	5 GHz Gain (peak)	Antenna Connector	Command
1	5G single Band	METAL	-	5150 MHz：3.06 5550 MHz：3.19 5850 MHz：2.44	Switch connector (J6)	5G：Chain0
2	2.4G & 5G Dual Band	PCB	2400 MHz：3.28 2450 MHz：3.06 2500 MHz：2.77	5150 MHz：3.09 5550 MHz：3.26 5850 MHz：3.38	I-Pex connector (J26)	5G：Chain1 2G：Chain1
3	2.4G & 5G Dual Band	PCB	2400 MHz：2.81 2450 MHz：2.89 2500 MHz：3.31	5150 MHz：3.22 5550 MHz：2.93 5850 MHz：3.16	I-Pex connector (J27)	5G：Chain2 2G：Chain0
4	5G single Band	METAL	-	5150 MHz：2.29 5550 MHz：3.05 5850 MHz：3.16	Switch connector (J36)	5G：Chain3
* The antenna connector of 5G single Band METAL type antenna is only for conduct debug use						

4. 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 ~ 5240 MHz

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

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

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

For 5745 ~ 5825 MHz:

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

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

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5775

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

NOTE: 1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-"means no effect.

Radiated Emission Test (Above 1 GHz):

☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		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
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		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 1 GHz):

☒ 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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5745-5825	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5745-5825	802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		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
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jones Chang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Noah Chang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jones Chang
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Ivan Tseng

3.3 Duty Cycle of Test Signal

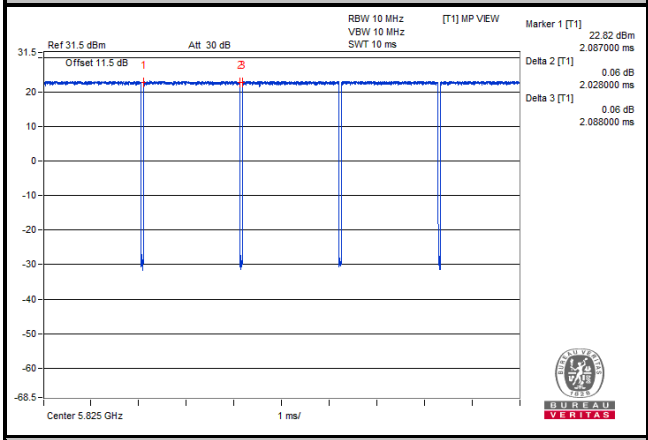
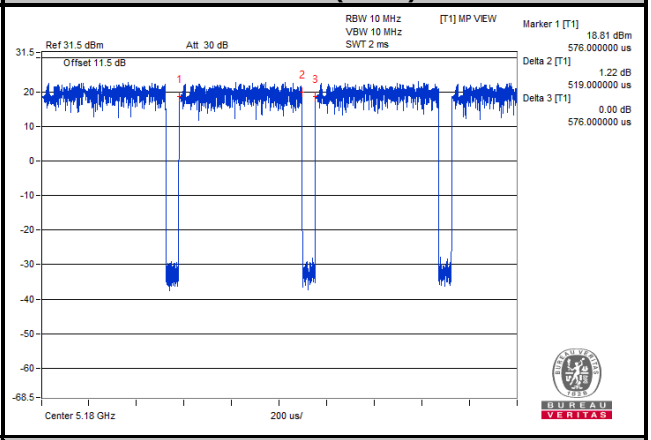
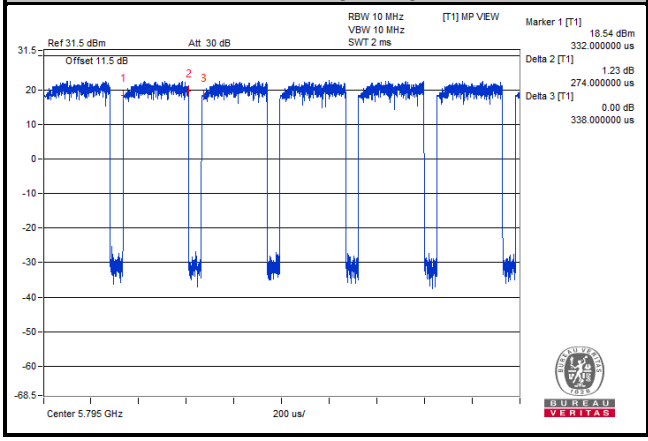
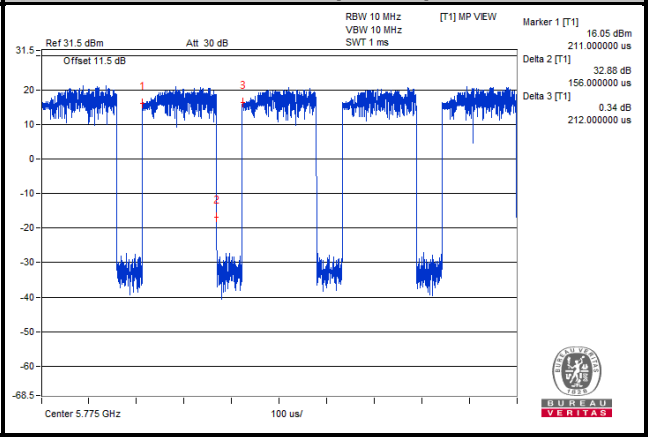
MODULATION TYPE: BPSK

802.11a: Duty cycle = 2.028/2.088 = 0.971, Duty factor = 10 * log(1/0.971) = 0.13

802.11n (HT20): Duty cycle = 0.519/0.575 = 0.903, Duty factor = 10 * log(1/0.903) = 0.45

802.11n (HT40): Duty cycle = 0.274/0.338 = 0.811, Duty factor = 10 * log(1/0.811) = 0.91

802.11ac (VHT80): Duty cycle = 0.156/0.212 = 0.736, Duty factor = 10 * log(1/0.736) = 1.33

802.11a	802.11n (HT20)
	
802.11n (HT40)	**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.

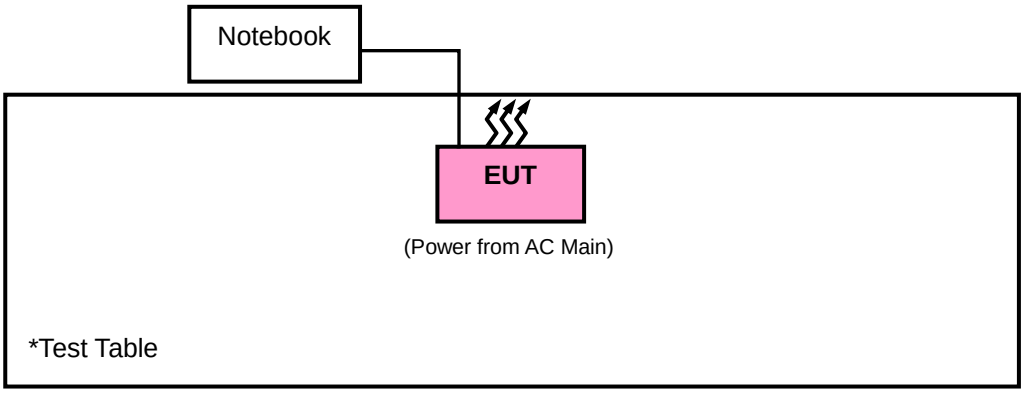
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	DELL	E5410	1HC2XM1	N/A

No.	Signal Cable Description of The Above Support Units
1.	6m non-shielded LAN cable

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1 acted as communication partners to transfer data.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Limits of Unwanted Emission Out of the Restricted Bands

<table>
<tr><th colspan="3">Applicable To</th><th colspan="2">Limit</th></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedures New Rules v02r01</td><td colspan="2">Field Strength at 3 m</td></tr>
<tr><td>PK: 74 (dBµV/m)</td><td>AV: 54 (dBµV/m)</td></tr>
<tr><th>Frequency Band</th><th colspan="2">Applicable To</th><th>EIRP Limit</th><th>Equivalent Field Strength at 3 m</th></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).

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 04, 2019	Jun. 03, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 05, 2019	Sep. 04, 2020
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 15, 2019	Jul. 14, 2020
Digital Multimeter Fluke	87-III	70360742	Jun. 27, 2019	Jun. 26, 2020
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2019	Sep. 09, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

4.1.4 Test Procedures

For Radiated Emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

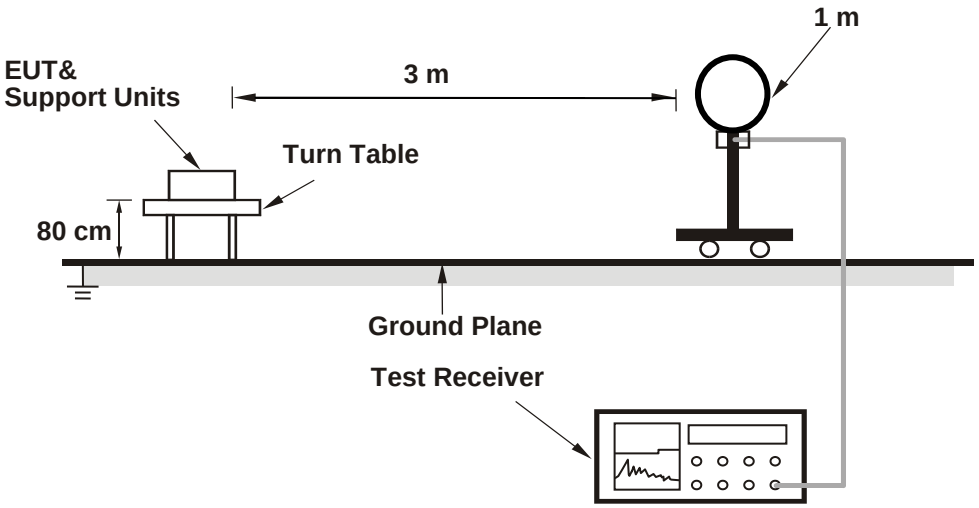
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (11a: RBW = 1 MHz, VBW = 1 kHz ; 11ac (VHT20): RBW = 1 MHz, VBW = 3 kHz ; 11ac (VHT40): RBW = 1 MHz, VBW = 10 kHz ; 11ac (VHT80): RBW = 1 MHz, VBW = 10 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

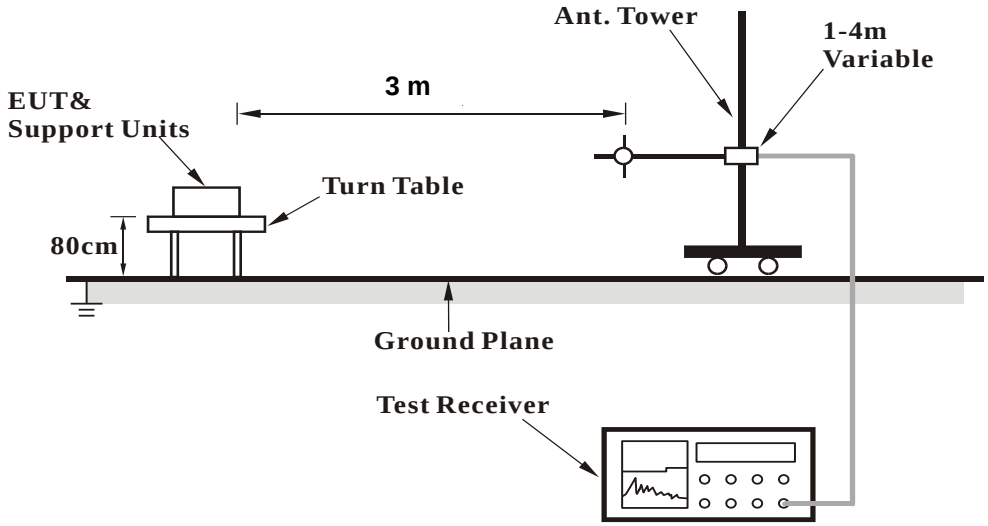
No deviation.

4.1.6 Test Setup

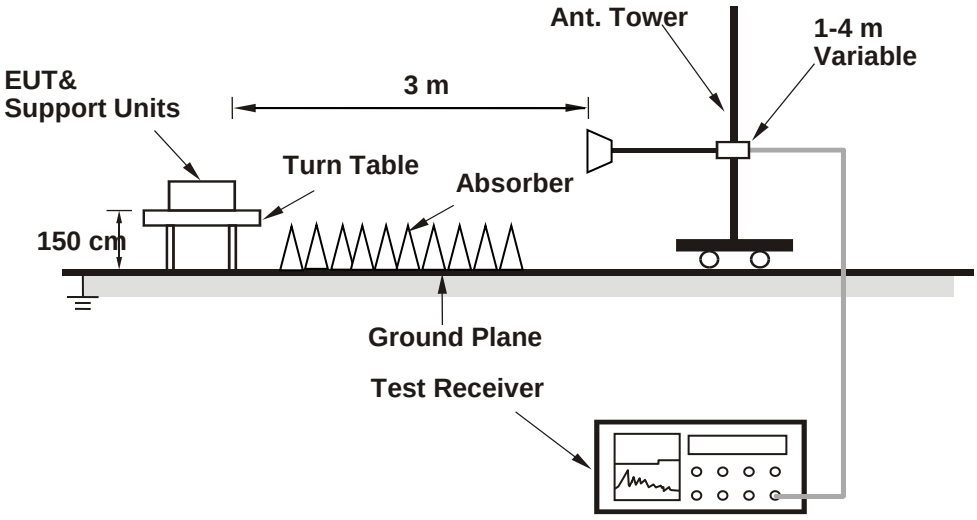
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.7 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.8 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	67.2 PK	74.0	-6.8	2.66 H	181	58.2	9.0
2	5150.00	50.7 AV	54.0	-3.3	2.66 H	181	41.7	9.0
3	*5180.00	112.3 PK			2.66 H	181	103.4	8.9
4	*5180.00	102.8 AV			2.66 H	181	93.9	8.9
5	#10360.00	54.4 PK	68.2	-13.8	1.53 H	27	36.0	18.4
6	15540.00	54.8 PK	74.0	-19.2	1.68 H	151	31.7	23.1
7	15540.00	43.0 AV	54.0	-11.0	1.68 H	151	19.9	23.1
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	5150.00	70.5 PK	74.0	-3.5	1.75 V	322	61.5	9.0
2	**5150.00**	**52.9 AV**	**54.0**	**-1.1**	**1.75 V**	**322**	**43.9**	**9.0**
3	*5180.00	113.8 PK			1.75 V	322	104.9	8.9
4	*5180.00	104.6 AV			1.75 V	322	95.7	8.9
5	#10360.00	55.6 PK	68.2	-12.6	1.84 V	190	37.2	18.4
6	15540.00	55.2 PK	74.0	-18.8	1.58 V	313	32.1	23.1
7	15540.00	43.0 AV	54.0	-11.0	1.58 V	313	19.9	23.1

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 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	66.6 PK	74.0	-7.4	1.48 H	174	57.6	9.0
2	5150.00	52.8 AV	54.0	-1.2	1.48 H	174	43.8	9.0
3	*5200.00	115.8 PK			1.48 H	174	107.0	8.8
4	*5200.00	106.6 AV			1.48 H	174	97.8	8.8
5	#10400.00	55.9 PK	68.2	-12.3	1.44 H	43	37.4	18.5
6	15600.00	56.1 PK	74.0	-17.9	1.62 H	135	33.1	23.0
7	15600.00	43.0 AV	54.0	-11.0	1.62 H	135	20.0	23.0
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	69.2 PK	74.0	-4.8	1.82 V	310	60.2	9.0
2	**5150.00**	**52.9 AV**	**54.0**	**-1.1**	**1.82 V**	**310**	**43.9**	**9.0**
3	*5200.00	119.7 PK			1.82 V	310	110.9	8.8
4	*5200.00	110.6 AV			1.82 V	310	101.8	8.8
5	#10400.00	56.9 PK	68.2	-11.3	1.77 V	176	38.4	18.5
6	15600.00	56.6 PK	74.0	-17.4	1.50 V	319	33.6	23.0
7	15600.00	43.4 AV	54.0	-10.6	1.50 V	319	20.4	23.0

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 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	5150.00	56.2 PK	74.0	-17.8	1.50 H	163	47.2	9.0
2	5150.00	44.3 AV	54.0	-9.7	1.50 H	163	35.3	9.0
3	*5240.00	117.0 PK			1.47 H	158	108.6	8.4
4	*5240.00	106.9 AV			1.47 H	158	98.5	8.4
5	5350.00	52.2 PK	74.0	-21.8	1.45 H	163	43.4	8.8
6	5350.00	40.3 AV	54.0	-13.7	1.45 H	163	31.5	8.8
7	#10480.00	57.5 PK	68.2	-10.7	1.61 H	127	38.7	18.8
8	15720.00	55.3 PK	74.0	-18.7	1.53 H	52	32.4	22.9
9	15720.00	44.7 AV	54.0	-9.3	1.53 H	52	21.8	22.9
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	5150.00	62.4 PK	74.0	-11.6	1.76 V	245	53.4	9.0
2	5150.00	46.1 AV	54.0	-7.9	1.76 V	245	37.1	9.0
3	*5240.00	121.5 PK			1.76 V	245	113.1	8.4
4	*5240.00	112.1 AV			1.76 V	245	103.7	8.4
5	5350.00	55.2 PK	74.0	-18.8	1.76 V	245	46.4	8.8
6	5350.00	42.8 AV	54.0	-11.2	1.76 V	245	34.0	8.8
7	#10480.00	57.8 PK	68.2	-10.4	1.62 V	117	39.0	18.8
8	15720.00	55.1 PK	74.0	-18.9	1.80 V	162	32.2	22.9
9	15720.00	43.6 AV	54.0	-10.4	1.80 V	162	20.7	22.9

REMARKS:

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

CHANNEL	TX Channel 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	#5644.39	58.7 PK	68.2	-9.5	3.77 H	301	50.2	8.5
2	*5745.00	117.0 PK			3.77 H	301	107.2	9.8
3	*5745.00	108.2 AV			3.77 H	301	98.4	9.8
4	#5931.68	59.3 PK	68.2	-8.9	3.77 H	301	49.9	9.4
5	11490.00	55.4 PK	74.0	-18.6	1.48 H	41	34.9	20.5
6	11490.00	45.2 AV	54.0	-8.8	1.48 H	41	24.7	20.5
7	#17235.00	55.0 PK	68.2	-13.2	1.65 H	135	27.0	28.0
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	#5627.63	58.5 PK	68.2	-9.7	1.42 V	225	50.1	8.4
2	*5745.00	118.4 PK			1.42 V	224	108.6	9.8
3	*5745.00	109.3 AV			1.42 V	224	99.5	9.8
4	#5934.49	58.7 PK	68.2	-9.5	1.42 V	225	49.3	9.4
5	11490.00	54.9 PK	74.0	-19.1	1.83 V	165	34.4	20.5
6	11490.00	43.2 AV	54.0	-10.8	1.83 V	165	22.7	20.5
7	#17235.00	55.1 PK	68.2	-13.1	1.59 V	303	27.1	28.0

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) 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	#5618.99	58.2 PK	68.2	-10.0	3.75 H	290	49.8	8.4
2	*5785.00	117.1 PK			3.75 H	290	107.1	10.0
3	*5785.00	108.1 AV			3.75 H	290	98.1	10.0
4	#5977.55	60.2 PK	68.2	-8.0	3.75 H	290	50.6	9.6
5	11570.00	55.5 PK	74.0	-18.5	1.46 H	50	34.8	20.7
6	11570.00	45.5 AV	54.0	-8.5	1.46 H	50	24.8	20.7
7	#17355.00	54.9 PK	68.2	-13.3	1.63 H	133	26.2	28.7
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	#5640.21	57.8 PK	68.2	-10.4	1.36 V	225	49.3	8.5
2	*5785.00	118.5 PK			1.36 V	225	108.5	10.0
3	*5785.00	109.5 AV			1.36 V	225	99.5	10.0
4	#5981.77	58.9 PK	68.2	-9.3	1.36 V	225	49.3	9.6
5	11570.00	54.6 PK	74.0	-19.4	1.82 V	180	33.9	20.7
6	11570.00	43.2 AV	54.0	-10.8	1.82 V	180	22.5	20.7
7	#17355.00	54.8 PK	68.2	-13.4	1.55 V	317	26.1	28.7

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	#5603.20	58.3 PK	68.2	-9.9	3.70 H	288	50.0	8.3
2	*5825.00	116.8 PK			3.70 H	288	106.6	10.2
3	*5825.00	108.2 AV			3.70 H	288	98.0	10.2
4	#5931.09	59.5 PK	68.2	-8.7	3.70 H	288	50.1	9.4
5	11650.00	55.7 PK	74.0	-18.3	1.43 H	51	35.1	20.6
6	11650.00	45.5 AV	54.0	-8.5	1.43 H	51	24.9	20.6
7	#17475.00	54.6 PK	68.2	-13.6	1.70 H	122	25.2	29.4
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	#5641.20	57.7 PK	68.2	-10.5	1.43 V	224	49.2	8.5
2	*5825.00	118.1 PK			1.43 V	224	107.9	10.2
3	*5825.00	109.1 AV			1.43 V	224	98.9	10.2
4	#5978.91	59.0 PK	68.2	-9.2	1.43 V	224	49.4	9.6
5	11650.00	55.0 PK	74.0	-19.0	1.82 V	160	34.4	20.6
6	11650.00	43.3 AV	54.0	-10.7	1.82 V	160	22.7	20.6
7	#17475.00	55.2 PK	68.2	-13.0	1.57 V	317	25.8	29.4

REMARKS:

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

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	71.5 PK	74.0	-2.5	1.50 H	154	62.5	9.0
2	5150.00	52.4 AV	54.0	-1.6	1.50 H	154	43.4	9.0
3	*5180.00	112.7 PK			1.50 H	154	103.8	8.9
4	*5180.00	103.2 AV			1.50 H	154	94.3	8.9
5	#10360.00	55.0 PK	68.2	-13.2	1.55 H	128	36.6	18.4
6	15540.00	53.4 PK	74.0	-20.6	1.59 H	133	30.3	23.1
7	15540.00	42.1 AV	54.0	-11.9	1.59 H	133	19.0	23.1
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	5150.00	66.3 PK	74.0	-7.7	1.75 V	304	57.3	9.0
2	5150.00	52.8 AV	54.0	-1.2	1.75 V	304	43.8	9.0
3	*5180.00	108.4 PK			1.75 V	304	99.5	8.9
4	*5180.00	101.5 AV			1.75 V	304	92.6	8.9
5	#10360.00	56.2 PK	68.2	-12.0	1.92 V	345	37.8	18.4
6	15540.00	54.3 PK	74.0	-19.7	1.90 V	347	31.2	23.1
7	15540.00	42.5 AV	54.0	-11.5	1.90 V	347	19.4	23.1

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 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	68.7 PK	74.0	-5.3	1.49 H	160	59.7	9.0
2	5150.00	51.1 AV	54.0	-2.9	1.49 H	160	42.1	9.0
3	*5200.00	116.3 PK			1.49 H	160	107.5	8.8
4	*5200.00	107.0 AV			1.49 H	160	98.2	8.8
5	#10400.00	55.4 PK	68.2	-12.8	1.52 H	123	36.9	18.5
6	15600.00	53.8 PK	74.0	-20.2	1.66 H	145	30.8	23.0
7	15600.00	42.2 AV	54.0	-11.8	1.66 H	145	19.2	23.0
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	69.8 PK	74.0	-4.2	2.26 V	257	60.8	9.0
2	**5150.00**	**52.9 AV**	**54.0**	**-1.1**	**2.26 V**	**257**	**43.9**	**9.0**
3	*5200.00	119.8 PK			2.26 V	257	111.0	8.8
4	*5200.00	110.0 AV			2.26 V	257	101.2	8.8
5	#10400.00	56.4 PK	68.2	-11.8	1.90 V	344	37.9	18.5
6	15600.00	55.3 PK	74.0	-18.7	1.88 V	359	32.3	23.0
7	15600.00	42.6 AV	54.0	-11.4	1.88 V	359	19.6	23.0

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 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	5150.00	57.0 PK	74.0	-17.0	1.60 H	189	48.0	9.0
2	5150.00	45.2 AV	54.0	-8.8	1.60 H	189	36.2	9.0
3	*5240.00	117.2 PK			1.51 H	172	108.8	8.4
4	*5240.00	106.8 AV			1.51 H	172	98.4	8.4
5	5350.00	58.6 PK	74.0	-15.4	1.55 H	179	49.8	8.8
6	5350.00	46.7 AV	54.0	-7.3	1.55 H	179	37.9	8.8
7	#10480.00	57.5 PK	68.2	-10.7	1.69 H	133	38.7	18.8
8	15720.00	56.9 PK	74.0	-17.1	1.68 H	130	34.0	22.9
9	15720.00	42.9 AV	54.0	-11.1	1.68 H	130	20.0	22.9
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	5150.00	65.2 PK	74.0	-8.8	1.97 V	249	56.2	9.0
2	5150.00	49.8 AV	54.0	-4.2	1.97 V	249	40.8	9.0
3	*5240.00	122.5 PK			1.97 V	249	114.1	8.4
4	*5240.00	112.9 AV			1.97 V	249	104.5	8.4
5	5350.00	62.0 PK	74.0	-12.0	1.97 V	249	53.2	8.8
6	5350.00	44.6 AV	54.0	-9.4	1.97 V	249	35.8	8.8
7	#10480.00	58.6 PK	68.2	-9.6	1.77 V	350	39.8	18.8
8	15720.00	57.8 PK	74.0	-16.2	1.80 V	355	34.9	22.9
9	15720.00	43.6 AV	54.0	-10.4	1.80 V	355	20.7	22.9

REMARKS:

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

CHANNEL	TX Channel 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	#5643.52	58.1 PK	68.2	-10.1	3.73 H	300	49.6	8.5
2	*5745.00	117.7 PK			3.73 H	300	107.9	9.8
3	*5745.00	108.9 AV			3.73 H	300	99.1	9.8
4	#5972.37	58.6 PK	68.2	-9.6	3.73 H	300	49.0	9.6
5	11490.00	55.6 PK	74.0	-18.4	1.73 H	132	35.1	20.5
6	11490.00	42.5 AV	54.0	-11.5	1.73 H	132	22.0	20.5
7	#17235.00	54.2 PK	68.2	-14.0	1.65 H	146	26.2	28.0
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	#5642.78	58.6 PK	68.2	-9.6	2.89 V	170	50.1	8.5
2	*5745.00	118.4 PK			2.89 V	170	108.6	9.8
3	*5745.00	109.2 AV			2.89 V	170	99.4	9.8
4	#5927.91	59.5 PK	68.2	-8.7	2.89 V	170	50.1	9.4
5	11490.00	57.7 PK	74.0	-16.3	1.64 V	348	37.2	20.5
6	11490.00	45.8 AV	54.0	-8.2	1.64 V	348	25.3	20.5
7	#17235.00	55.3 PK	68.2	-12.9	1.61 V	282	27.3	28.0

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) 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	#5633.17	57.8 PK	68.2	-10.4	3.86 H	275	49.4	8.4
2	*5785.00	117.8 PK			3.86 H	275	107.8	10.0
3	*5785.00	108.8 AV			3.86 H	275	98.8	10.0
4	#5950.98	60.5 PK	68.2	-7.7	3.86 H	275	50.9	9.6
5	11570.00	55.6 PK	74.0	-18.4	1.76 H	127	34.9	20.7
6	11570.00	42.4 AV	54.0	-11.6	1.76 H	127	21.7	20.7
7	#17355.00	53.8 PK	68.2	-14.4	1.63 H	138	25.1	28.7
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	#5623.80	58.0 PK	68.2	-10.2	2.00 V	224	49.6	8.4
2	*5785.00	119.7 PK			2.00 V	224	109.7	10.0
3	*5785.00	109.9 AV			2.00 V	224	99.9	10.0
4	#5970.91	60.2 PK	68.2	-8.0	2.00 V	224	50.6	9.6
5	11570.00	57.3 PK	74.0	-16.7	1.63 V	352	36.6	20.7
6	11570.00	45.2 AV	54.0	-8.8	1.63 V	352	24.5	20.7
7	#17355.00	55.1 PK	68.2	-13.1	1.62 V	291	26.4	28.7

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	#5613.42	56.7 PK	68.2	-11.5	3.89 H	291	48.3	8.4
2	*5825.00	117.4 PK			3.89 H	291	107.2	10.2
3	*5825.00	108.4 AV			3.89 H	291	98.2	10.2
4	#5952.17	58.5 PK	68.2	-9.7	3.89 H	291	48.9	9.6
5	11650.00	55.9 PK	74.0	-18.1	1.76 H	127	35.3	20.6
6	11650.00	42.8 AV	54.0	-11.2	1.76 H	127	22.2	20.6
7	#17475.00	54.5 PK	68.2	-13.7	1.68 H	146	25.1	29.4
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	#5634.53	58.7 PK	68.2	-9.5	1.24 V	215	50.3	8.4
2	*5825.00	118.9 PK			1.24 V	215	108.7	10.2
3	*5825.00	109.3 AV			1.24 V	215	99.1	10.2
4	#5930.60	59.7 PK	68.2	-8.5	1.24 V	215	50.3	9.4
5	11650.00	57.6 PK	74.0	-16.4	1.65 V	360	37.0	20.6
6	11650.00	45.5 AV	54.0	-8.5	1.65 V	360	24.9	20.6
7	#17475.00	55.3 PK	68.2	-12.9	1.59 V	296	25.9	29.4

REMARKS:

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

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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	65.7 PK	74.0	-8.3	1.56 H	159	56.7	9.0
2	5150.00	48.6 AV	54.0	-5.4	1.56 H	159	39.6	9.0
3	*5190.00	108.4 PK			1.56 H	159	99.5	8.9
4	*5190.00	98.7 AV			1.56 H	159	89.8	8.9
5	#10380.00	53.9 PK	68.2	-14.3	1.47 H	138	35.4	18.5
6	15570.00	55.1 PK	74.0	-18.9	1.65 H	155	32.0	23.1
7	15570.00	43.0 AV	54.0	-11.0	1.65 H	155	19.9	23.1
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	5150.00	66.6 PK	74.0	-7.4	2.26 V	300	57.6	9.0
2	5150.00	52.8 AV	54.0	-1.2	2.26 V	300	43.8	9.0
3	*5190.00	106.9 PK			2.26 V	300	98.0	8.9
4	*5190.00	100.1 AV			2.26 V	300	91.2	8.9
5	#10380.00	54.5 PK	68.2	-13.7	1.96 V	359	36.0	18.5
6	15570.00	55.5 PK	74.0	-18.5	1.91 V	351	32.4	23.1
7	15570.00	43.5 AV	54.0	-10.5	1.91 V	351	20.4	23.1

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 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	63.8 PK	74.0	-10.2	2.30 H	177	54.8	9.0
2	5150.00	50.7 AV	54.0	-3.3	2.30 H	177	41.7	9.0
3	*5230.00	113.0 PK			2.30 H	177	104.5	8.5
4	*5230.00	104.0 AV			2.30 H	177	95.5	8.5
5	5350.00	53.2 PK	74.0	-20.8	2.30 H	177	44.4	8.8
6	5350.00	41.1 AV	54.0	-12.9	2.30 H	177	32.3	8.8
7	#10460.00	53.8 PK	68.2	-14.4	1.45 H	130	35.1	18.7
8	15690.00	54.9 PK	74.0	-19.1	1.66 H	149	32.0	22.9
9	15690.00	42.7 AV	54.0	-11.3	1.66 H	149	19.8	22.9
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	5150.00	70.3 PK	74.0	-3.7	2.13 V	256	61.3	9.0
2	5150.00	52.6 AV	54.0	-1.4	2.13 V	256	43.6	9.0
3	*5230.00	115.0 PK			2.13 V	256	106.5	8.5
4	*5230.00	105.6 AV			2.13 V	256	97.1	8.5
5	5350.00	55.2 PK	74.0	-18.8	2.13 V	256	46.4	8.8
6	5350.00	43.9 AV	54.0	-10.1	2.13 V	256	35.1	8.8
7	#10460.00	54.8 PK	68.2	-13.4	2.02 V	345	36.1	18.7
8	15690.00	56.2 PK	74.0	-17.8	1.88 V	355	33.3	22.9
9	15690.00	43.9 AV	54.0	-10.1	1.88 V	355	21.0	22.9

REMARKS:

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

CHANNEL	TX Channel 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	#5640.69	59.2 PK	68.2	-9.0	3.60 H	144	50.7	8.5
2	*5755.00	112.5 PK			3.60 H	144	102.7	9.8
3	*5755.00	102.1 AV			3.60 H	144	92.3	9.8
4	#5967.07	60.1 PK	68.2	-8.1	3.60 H	144	50.5	9.6
5	11510.00	55.4 PK	74.0	-18.6	1.72 H	132	34.9	20.5
6	11510.00	42.5 AV	54.0	-11.5	1.72 H	132	22.0	20.5
7	#17265.00	54.4 PK	68.2	-13.8	1.73 H	133	26.3	28.1
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	#5646.90	63.1 PK	68.2	-5.1	1.50 V	170	54.6	8.5
2	*5755.00	115.6 PK			1.50 V	170	105.8	9.8
3	*5755.00	106.6 AV			1.50 V	170	96.8	9.8
4	#5988.16	59.8 PK	68.2	-8.4	1.50 V	170	50.2	9.6
5	11510.00	57.0 PK	74.0	-17.0	1.68 V	347	36.5	20.5
6	11510.00	45.2 AV	54.0	-8.8	1.68 V	347	24.7	20.5
7	#17265.00	54.9 PK	68.2	-13.3	1.60 V	298	26.8	28.1

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	#5647.10	57.6 PK	68.2	-10.6	3.54 H	297	49.1	8.5
2	*5795.00	115.2 PK			3.54 H	297	105.1	10.1
3	*5795.00	105.9 AV			3.54 H	297	95.8	10.1
4	#5963.84	59.3 PK	68.2	-8.9	3.54 H	297	49.7	9.6
5	11590.00	55.6 PK	74.0	-18.4	1.79 H	125	34.9	20.7
6	11590.00	42.8 AV	54.0	-11.2	1.79 H	125	22.1	20.7
7	#17385.00	54.1 PK	68.2	-14.1	1.66 H	140	25.3	28.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5611.60	59.7 PK	68.2	-8.5	2.35 V	234	51.4	8.3
2	*5795.00	117.6 PK			2.35 V	234	107.5	10.1
3	*5795.00	107.8 AV			2.35 V	234	97.7	10.1
4	#5948.41	60.2 PK	68.2	-8.0	2.35 V	234	50.8	9.4
5	11590.00	56.9 PK	74.0	-17.1	1.60 V	360	36.2	20.7
6	11590.00	45.1 AV	54.0	-8.9	1.60 V	360	24.4	20.7
7	#17385.00	54.2 PK	68.2	-14.0	1.65 V	287	25.4	28.8

REMARKS:

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

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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	63.3 PK	74.0	-10.7	1.59 H	166	54.3	9.0
2	5150.00	50.6 AV	54.0	-3.4	1.59 H	166	41.6	9.0
3	*5210.00	104.6 PK			1.61 H	167	95.9	8.7
4	*5210.00	94.6 AV			1.61 H	167	85.9	8.7
5	5350.00	52.5 PK	74.0	-21.5	1.59 H	166	43.7	8.8
6	5350.00	41.2 AV	54.0	-12.8	1.59 H	166	32.4	8.8
7	#10420.00	54.2 PK	68.2	-14.0	1.40 H	132	35.6	18.6
8	15630.00	54.7 PK	74.0	-19.3	1.67 H	140	31.7	23.0
9	15630.00	42.3 AV	54.0	-11.7	1.67 H	140	19.3	23.0
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	66.5 PK	74.0	-7.5	1.56 V	305	57.5	9.0
2	**5150.00**	**52.9 AV**	**54.0**	**-1.1**	**1.56 V**	**305**	**43.9**	**9.0**
3	*5210.00	102.8 PK			1.56 V	305	94.1	8.7
4	*5210.00	95.6 AV			1.56 V	305	86.9	8.7
5	5350.00	54.7 PK	74.0	-19.3	1.56 V	305	45.9	8.8
6	5350.00	40.3 AV	54.0	-13.7	1.56 V	305	31.5	8.8
7	#10420.00	55.3 PK	68.2	-12.9	2.05 V	350	36.7	18.6
8	15630.00	56.1 PK	74.0	-17.9	1.84 V	349	33.1	23.0
9	15630.00	43.6 AV	54.0	-10.4	1.84 V	349	20.6	23.0

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 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	#5641.62	65.9 PK	68.2	-2.3	2.22 H	188	57.4	8.5
2	*5775.00	104.3 PK			2.22 H	188	94.4	9.9
3	*5775.00	96.7 AV			2.22 H	188	86.8	9.9
4	#5947.39	61.7 PK	68.2	-6.5	2.22 H	188	52.3	9.4
5	11550.00	54.2 PK	74.0	-19.8	1.82 H	126	33.5	20.7
6	11550.00	42.9 AV	54.0	-11.1	1.82 H	126	22.2	20.7
7	#17325.00	53.3 PK	68.2	-14.9	1.71 H	131	24.7	28.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	**#5638.04**	**67.1 PK**	**68.2**	**-1.1**	**1.55 V**	**220**	**57.6**	**9.5**
2	*5775.00	108.7 PK			1.55 V	220	98.8	9.9
3	*5775.00	100.3 AV			1.55 V	220	90.4	9.9
4	#5946.77	60.0 PK	68.2	-8.2	1.55 V	220	49.8	10.2
5	11550.00	55.7 PK	74.0	-18.3	1.56 V	357	35.0	20.7
6	11550.00	43.3 AV	54.0	-10.7	1.56 V	357	22.6	20.7
7	#17325.00	53.9 PK	68.2	-14.3	1.65 V	279	25.3	28.6

REMARKS:

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

Below 1GHz Worst-case Data

802.11ac (VHT80)

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	322.90	41.9 QP	46.0	-4.1	1.00 H	5	48.6	-6.7
2	379.17	38.7 QP	46.0	-7.3	1.00 H	323	44.0	-5.3
3	429.62	39.2 QP	46.0	-6.8	1.00 H	323	43.2	-4.0
4	503.36	36.5 QP	46.0	-9.5	1.49 H	100	39.0	-2.5
5	600.38	41.4 QP	46.0	-4.6	1.99 H	352	41.3	0.1
6	633.36	36.8 QP	46.0	-9.2	1.49 H	94	36.1	0.7
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	249.17	32.8 QP	46.0	-13.2	1.01 V	307	42.0	-9.2
2	289.91	35.3 QP	46.0	-10.7	2.00 V	99	42.9	-7.6
3	452.91	39.5 QP	46.0	-6.5	1.01 V	294	42.8	-3.3
4	627.54	35.7 QP	46.0	-10.3	1.01 V	97	35.0	0.7
5	784.72	42.1 QP	46.0	-3.9	1.01 V	307	37.4	4.7
6	936.07	38.6 QP	46.0	-7.4	1.01 V	316	30.7	7.9

REMARKS:

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

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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

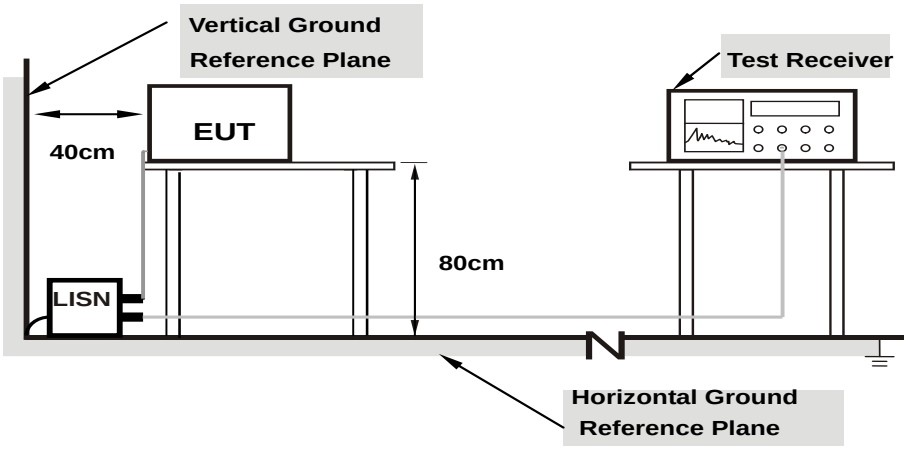
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) 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.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

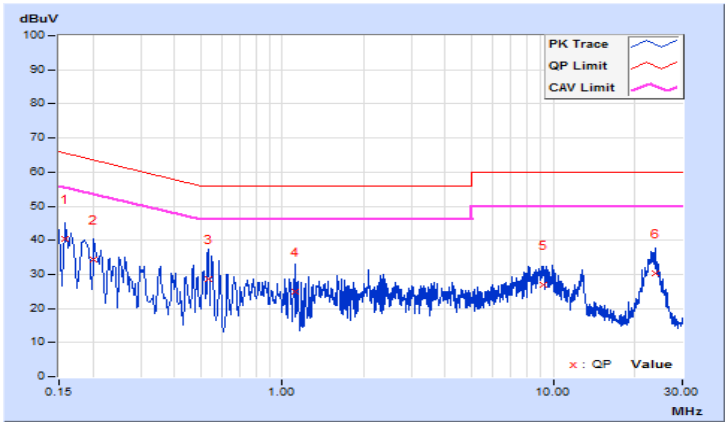
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Jones Chang	Test Date	2020/1/17

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.71	30.83	18.29	40.54	28.00	65.57	55.57	-25.03	-27.57
2	0.20200	9.78	24.63	11.76	34.41	21.54	63.53	53.53	-29.12	-31.99
3	0.53400	9.93	18.75	2.64	28.68	12.57	56.00	46.00	-27.32	-33.43
4	1.11400	10.03	14.82	2.30	24.85	12.33	56.00	46.00	-31.15	-33.67
5	9.20600	10.30	16.62	5.07	26.92	15.37	60.00	50.00	-33.08	-34.63
6	23.75400	10.44	19.99	11.24	30.43	21.68	60.00	50.00	-29.57	-28.32

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

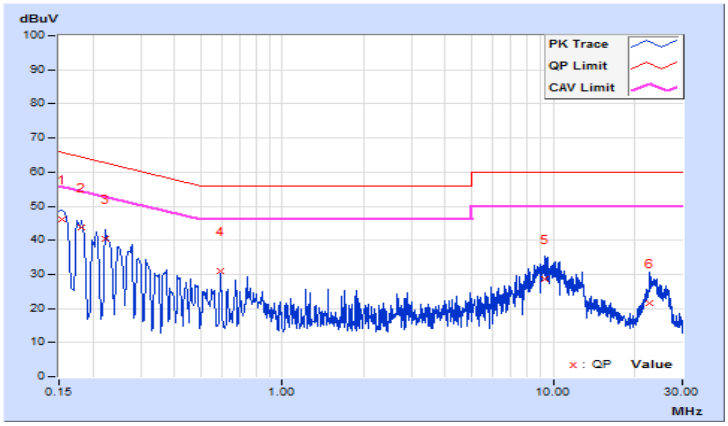


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Jones Chang	Test Date	2020/1/17

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15400**	**9.69**	**36.34**	**22.04**	**46.03**	**31.73**	**65.78**	**55.78**	**-19.75**	**-24.05**
2	0.18180	9.76	34.07	20.10	43.83	29.86	64.40	54.40	-20.57	-24.54
3	0.22200	9.81	30.49	15.97	40.30	25.78	62.74	52.74	-22.44	-26.96
4	0.59000	9.89	21.13	15.58	31.02	25.47	56.00	46.00	-24.98	-20.53
5	9.33000	10.24	18.24	4.91	28.48	15.15	60.00	50.00	-31.52	-34.85
6	22.66200	10.51	11.16	4.88	21.67	15.39	60.00	50.00	-38.33	-34.61

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 ≦ 125 mW (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)
		Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A	--		250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C	--		250 mW (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 $N_{ANT} \leq 4$;

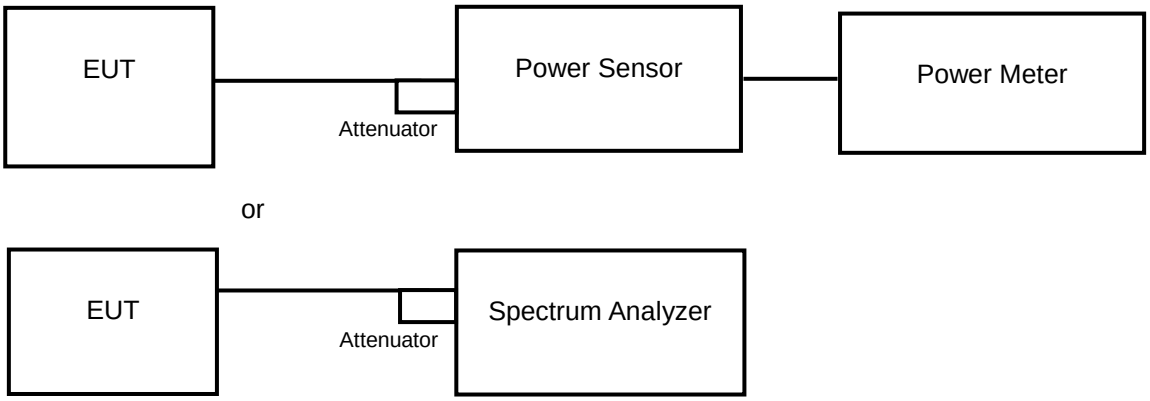
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

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

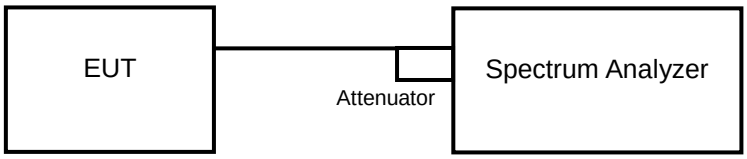
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<802.11a, 802.11ac (VHT20), 802.11ac (VHT40)>

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.

<802.11ac (VHT80)>

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99 % occupied bandwidth) of the signal.
b. Set sweep trigger to “free run”.
c. Set RBW = 1 MHz.
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ 2 Span / RBW.
f. Sweep time ≤ (number of points in sweep) * T
g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
h. Detector = RMS.
i. Trace mode = max hold.
j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum

26 dB Bandwidth

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

Power Output:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	15.52	14.89	15.55	15.80	140.388	21.47	30	Pass
40	5200	19.42	19.60	19.80	19.56	364.563	25.62	30	Pass
48	5240	19.57	21.01	20.83	20.96	462.554	26.65	30	Pass
149	5745	22.07	22.91	22.15	21.18	651.778	28.14	30	Pass
157	5785	22.43	23.20	22.23	21.58	694.904	28.42	30	Pass
165	5825	22.49	23.19	22.17	21.37	687.772	28.37	30	Pass

Note:

U-NII-1 Band: Directional gain is the maximum gain of antennas = 3.22 < 6 dBi, so the limit dose not need to be reduced.

U-NII-3 Band: Directional gain is the maximum gain of antennas = 3.38 < 6 dBi, so the limit dose not need to be reduced.

802.11ac (VHT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	16.87	17.28	16.93	17.88	212.79	23.28	27.06	Pass
40	5200	18.17	18.76	18.94	18.83	295.504	24.71	27.06	Pass
48	5240	20.30	20.94	21.10	20.94	484.307	26.85	27.06	Pass
149	5745	20.95	20.88	20.74	20.57	479.515	26.81	26.94	Pass
157	5785	21.12	20.68	20.35	20.78	474.437	26.76	26.94	Pass
165	5825	20.27	20.84	20.07	21.41	467.735	26.70	26.94	Pass

Note:

U-NII-1 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the limit shall be reduced to 30-(8.94-6) = 27.06 dBm.

U-NII-3 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the limit shall be reduced to 30-(9.06-6) = 26.94 dBm.

802.11ac (VHT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	13.72	13.42	13.40	15.40	102.081	20.09	27.06	Pass
46	5230	17.60	17.39	17.38	18.81	243.107	23.86	27.06	Pass
151	5755	21.07	21.03	20.79	20.70	492.143	26.92	26.94	Pass
159	5795	21.28	20.82	19.60	20.83	467.318	26.70	26.94	Pass

Note:

U-NII-1 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the limit shall be reduced to 30-(8.94-6) = 27.06 dBm.

U-NII-3 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the limit shall be reduced to 30-(9.06-6) = 26.94 dBm.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	11.79	11.84	12.33	13.29	68.807	18.38	27.06	Pass
155	5775	20.13	19.88	19.82	20.44	406.916	26.10	26.94	Pass

Note:

U-NII-1 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the limit shall be reduced to 30-(8.94-6) = 27.06 dBm.

U-NII-3 Band: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the limit shall be reduced to 30-(9.06-6) = 26.94 dBm.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	37.50	36.25	41.08	24.81
40	5200	33.49	26.96	29.12	35.35
48	5240	33.59	33.73	32.85	35.97

802.11ac (VHT20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	24.79	21.28	20.48	32.18
40	5200	32.94	28.19	22.64	37.62
48	5240	36.98	38.50	32.05	40.12

802.11ac (VHT40)

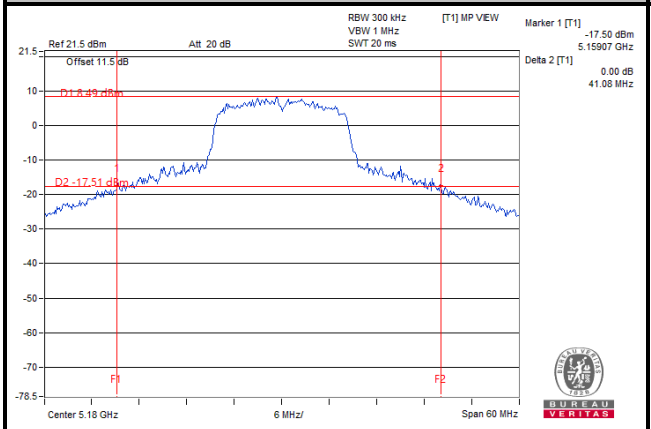
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	42.23	41.64	41.58	42.10
46	5230	55.69	44.79	42.61	68.89

802.11ac (VHT80)

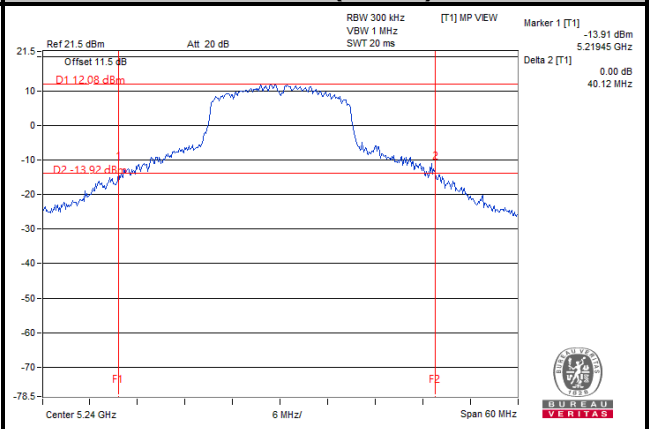
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	81.05	81.05	80.78	80.83

Spectrum Plot of Worst Value

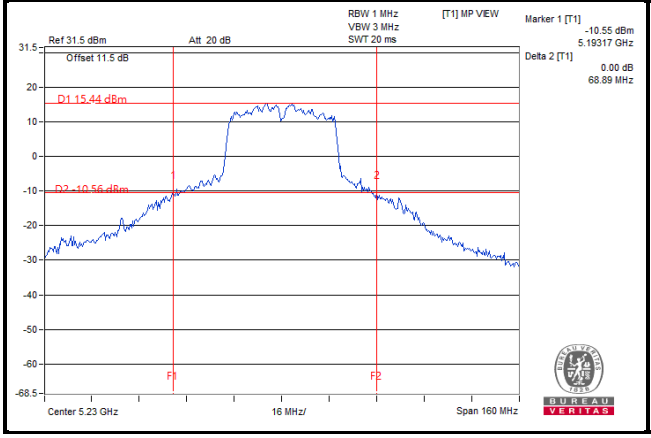
802.11a



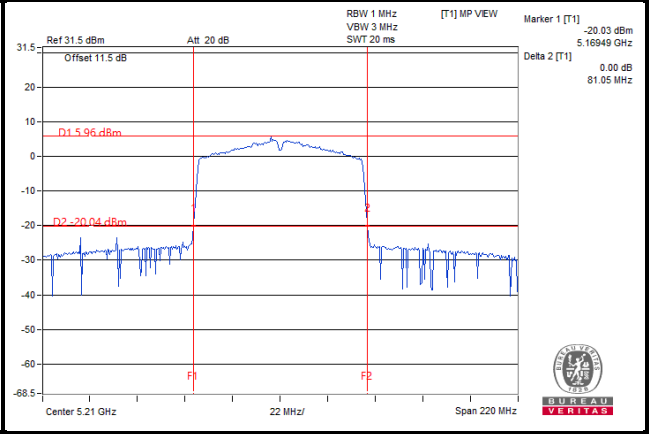
802.11ac (VHT20)



802.11ac (VHT40)

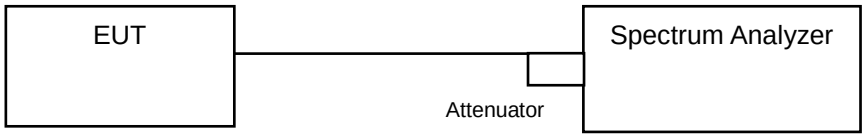


802.11ac (VHT80)



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

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	20.64	18.96	16.80	16.80
40	5200	17.88	17.16	17.16	19.20
48	5240	18.00	18.48	17.88	19.92
149	5745	28.80	29.28	27.74	28.32
157	5785	28.08	28.56	27.24	27.72
165	5825	28.56	18.12	25.56	27.84

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.88	17.76	17.76	18.12
40	5200	18.12	17.88	17.88	20.76
48	5240	18.35	18.26	19.91	18.26
149	5745	27.72	22.17	25.20	29.40
157	5785	29.28	21.24	26.28	28.80
165	5825	25.80	22.20	24.48	29.16

802.11ac (VHT40)

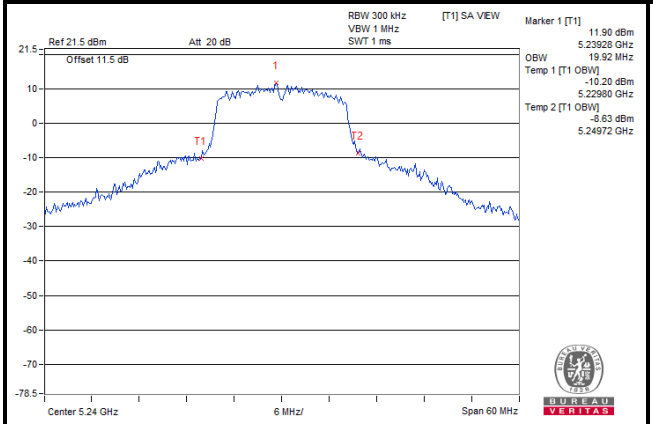
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.24	36.12	36.12	36.24
46	5230	36.72	36.24	36.36	36.96
151	5755	44.76	39.21	43.32	43.68
159	5795	43.20	37.39	42.36	42.60

802.11ac (VHT80)

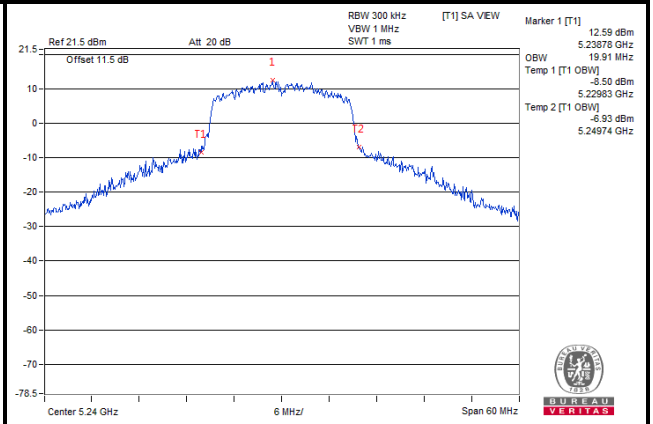
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.36	75.36	75.12	75.12
155	5775	86.64	78.96	77.76	91.68

Spectrum Plot of Worst Value

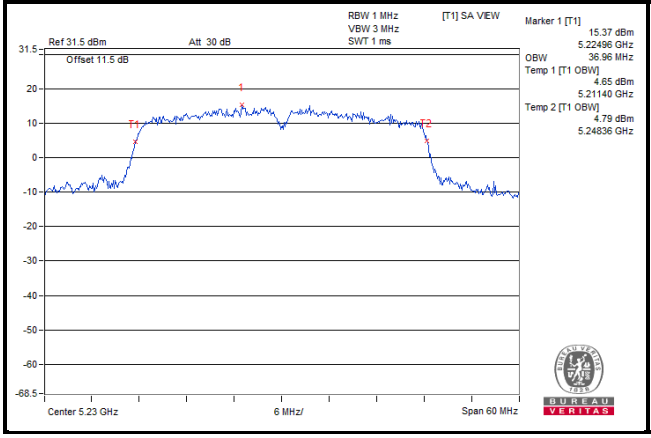
802.11a



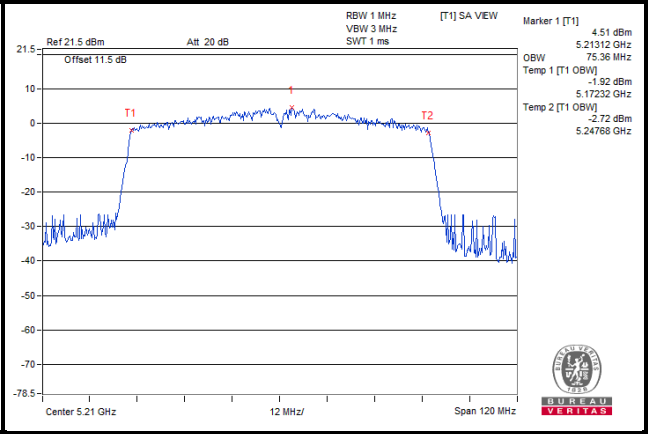
802.11ac (VHT20)

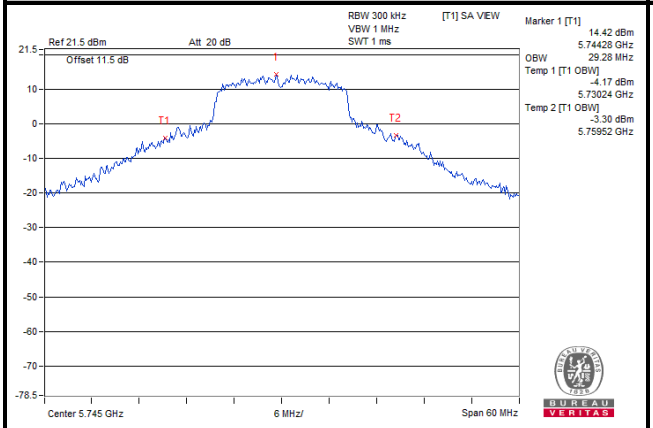
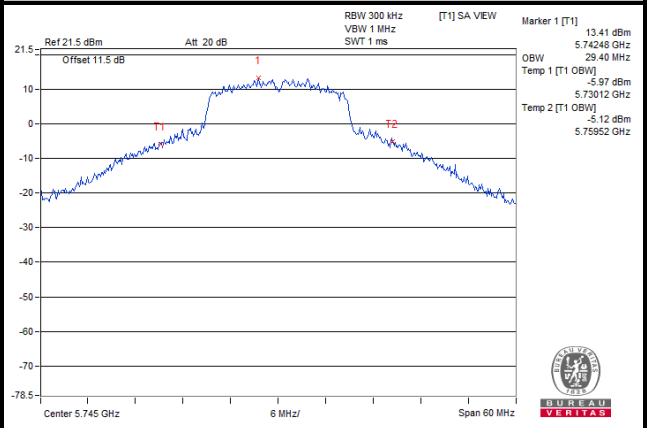
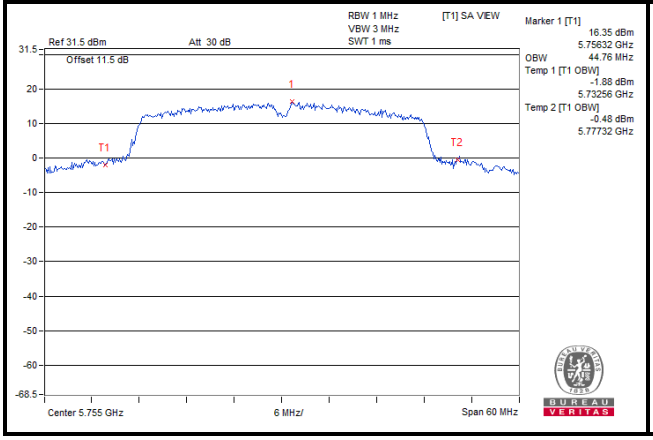
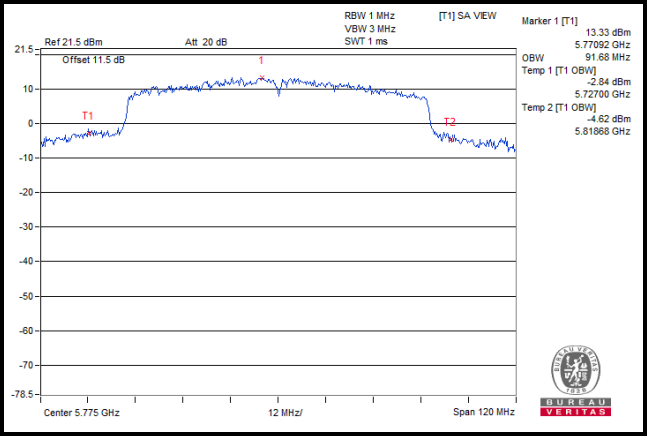


802.11ac (VHT40)



802.11ac (VHT80)



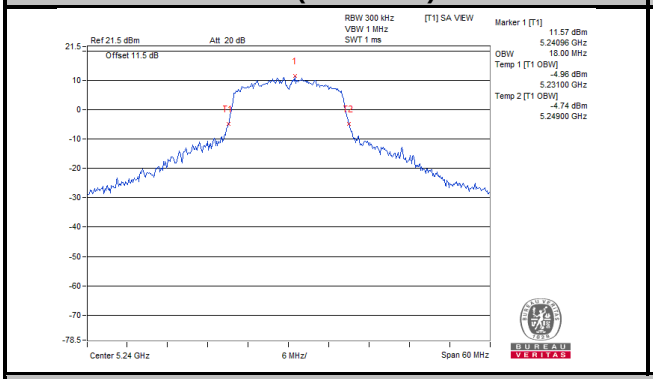
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

Chain 0

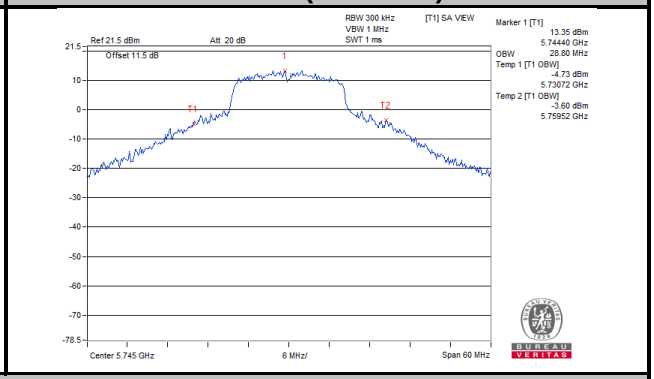
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

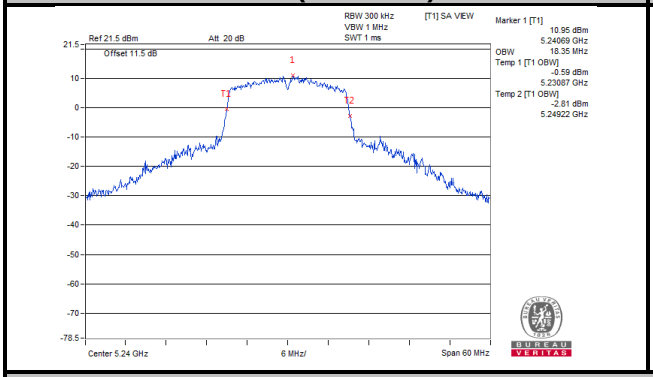


Ch 149 (5745 MHz)

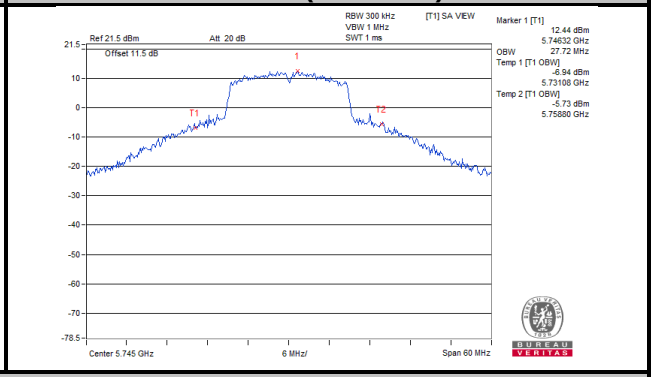


802.11ac (VHT20)

Ch 48 (5240 MHz)

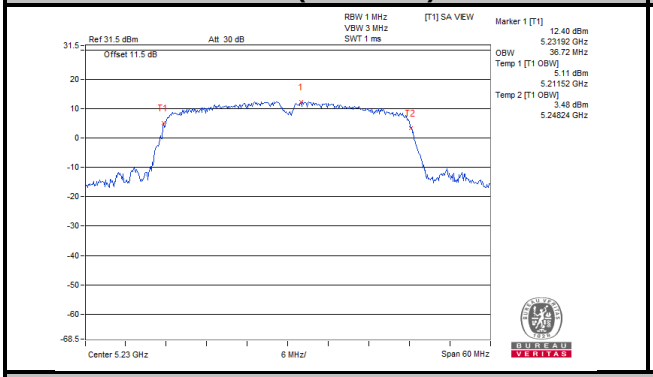


Ch 149 (5745 MHz)

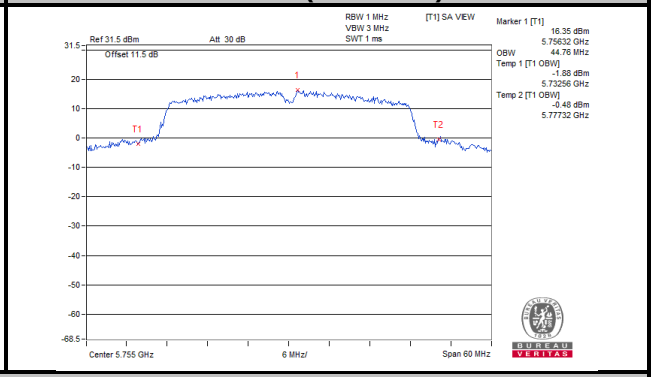


802.11ac (VHT40)

Ch 46 (5230 MHz)

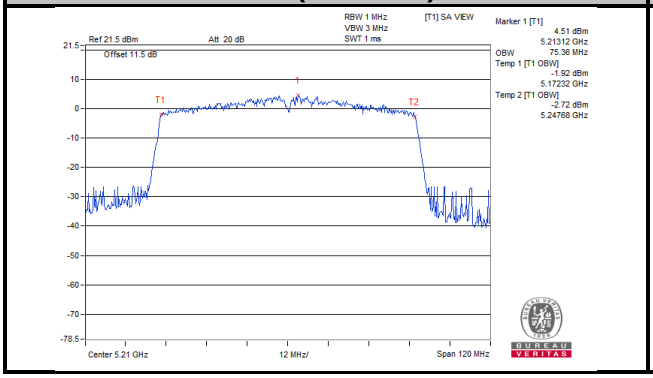


Ch 151 (5755 MHz)

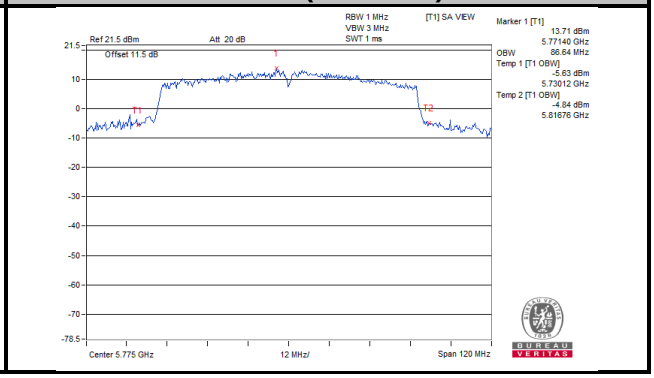


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

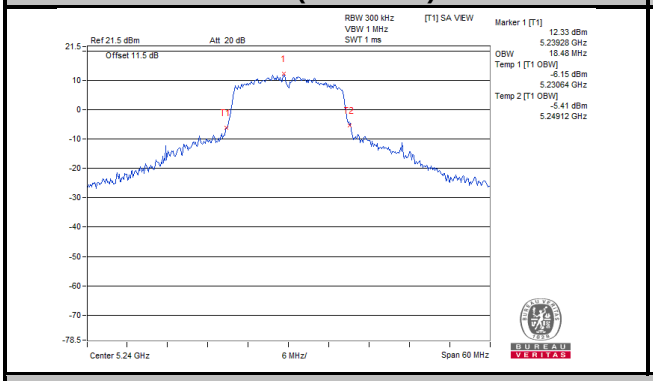


Chain 1

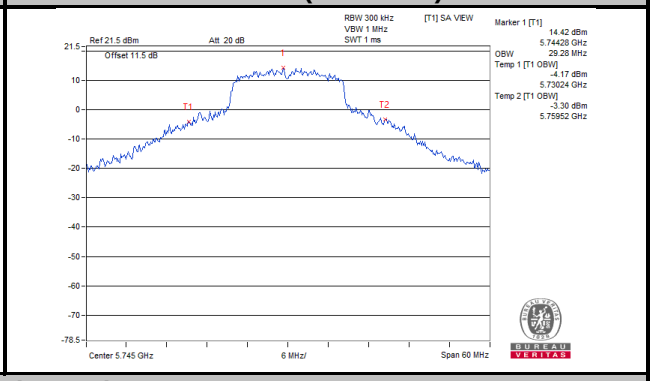
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

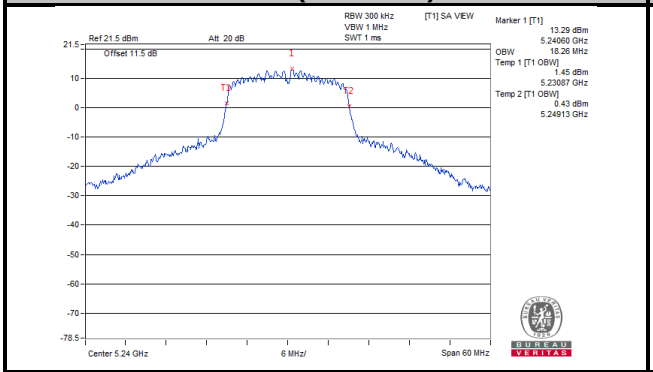


Ch 149 (5745 MHz)

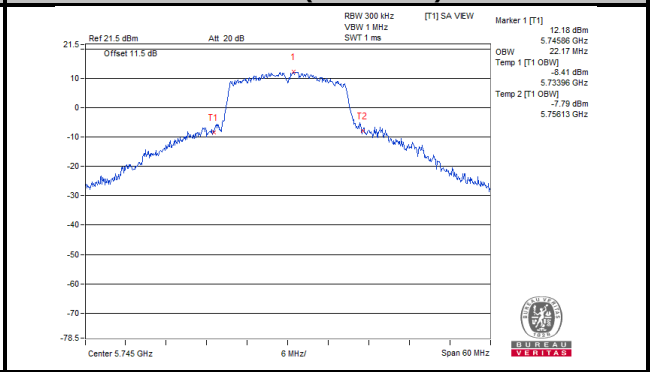


802.11ac (VHT20)

Ch 48 (5240 MHz)

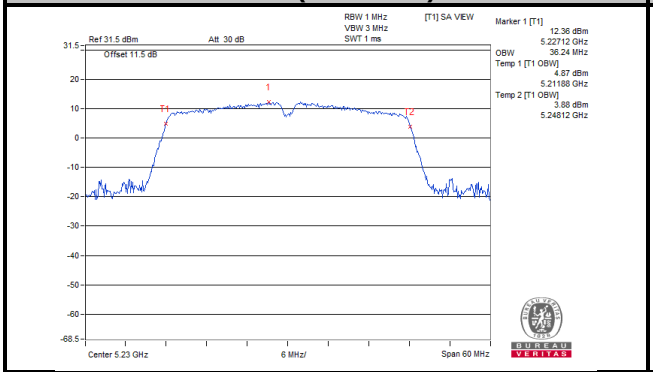


Ch 149 (5745 MHz)

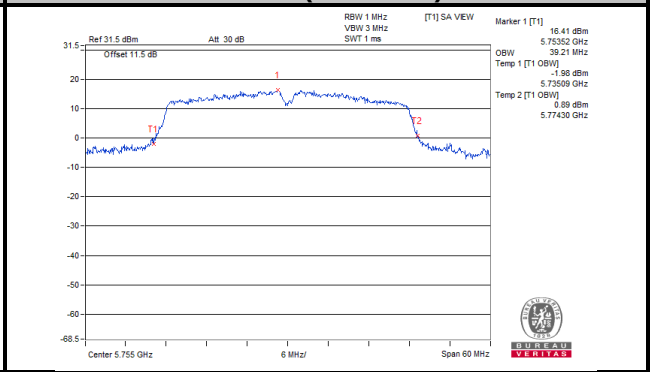


802.11ac (VHT40)

Ch 46 (5230 MHz)

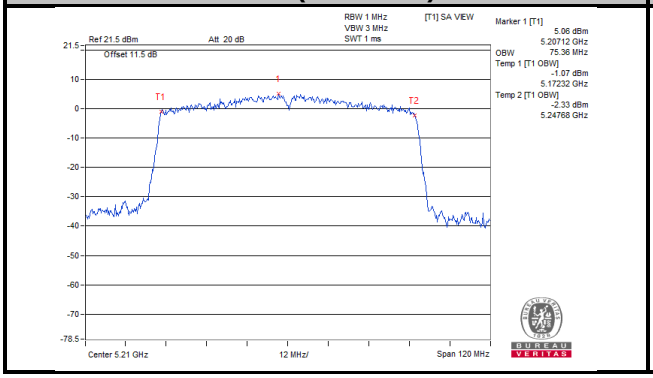


Ch 151 (5755 MHz)

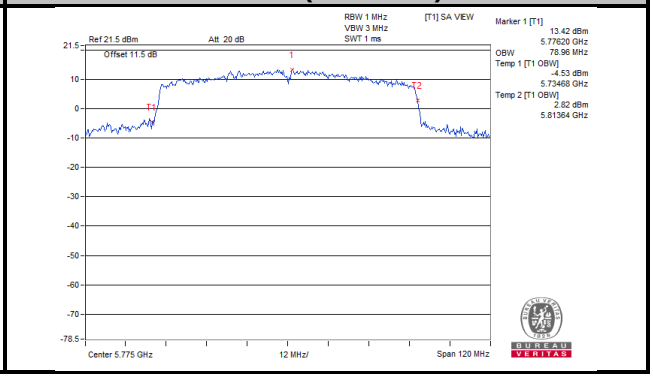


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

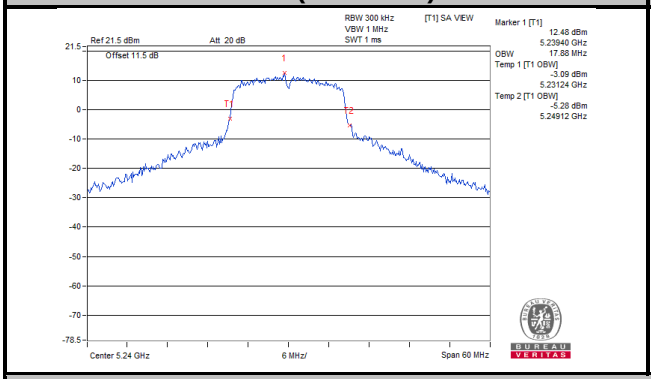


Chain 2

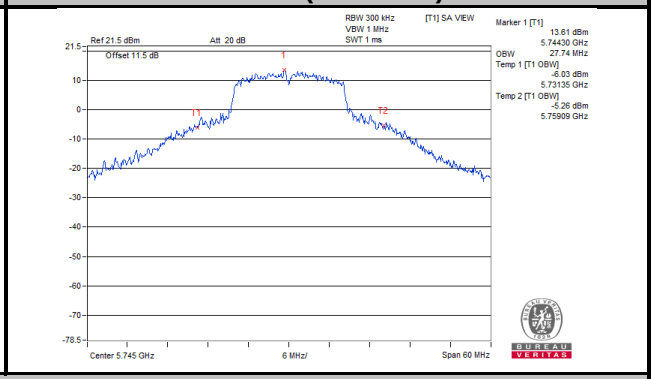
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

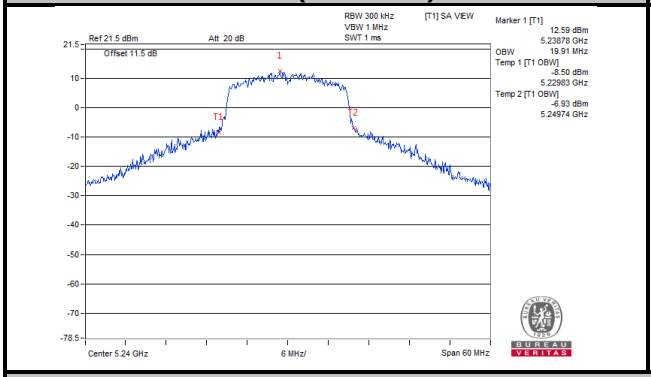


Ch 149 (5745 MHz)

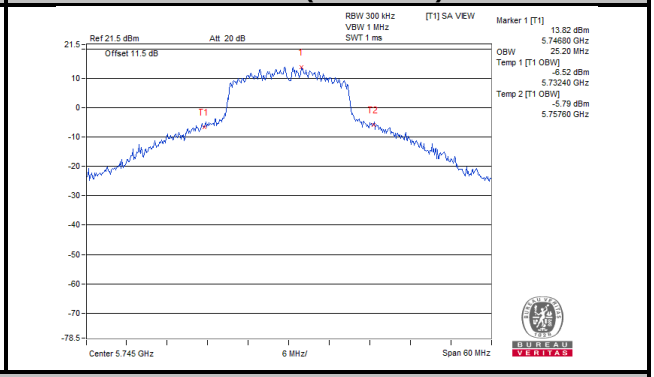


802.11ac (VHT20)

Ch 48 (5240 MHz)

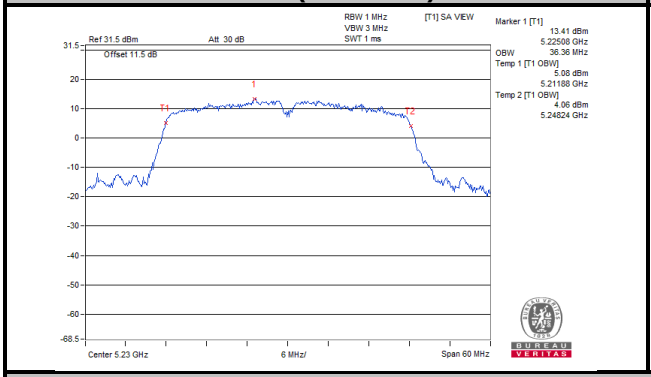


Ch 149 (5745 MHz)

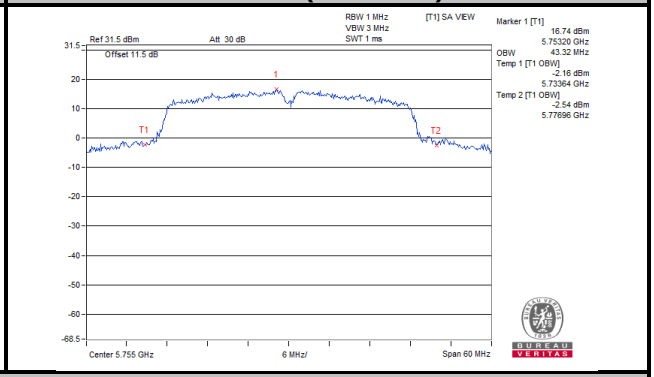


802.11ac (VHT40)

Ch 46 (5230 MHz)

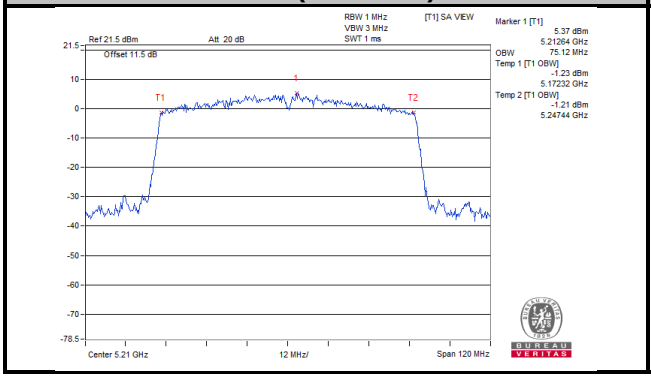


Ch 151 (5755 MHz)

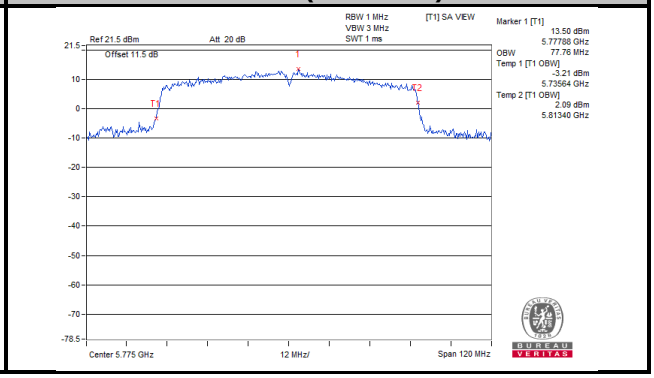


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

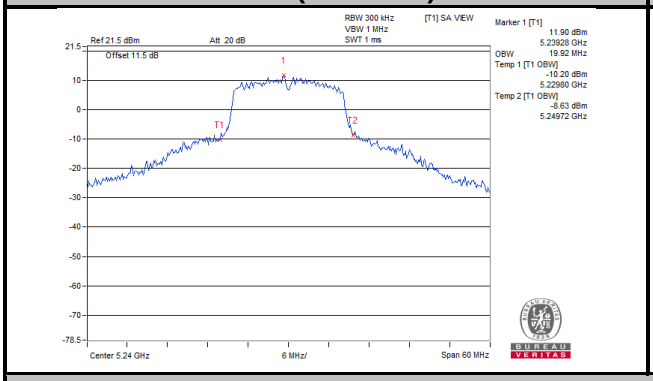


Chain 3

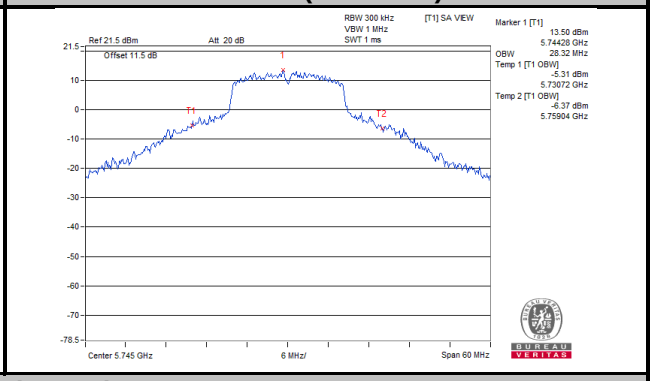
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

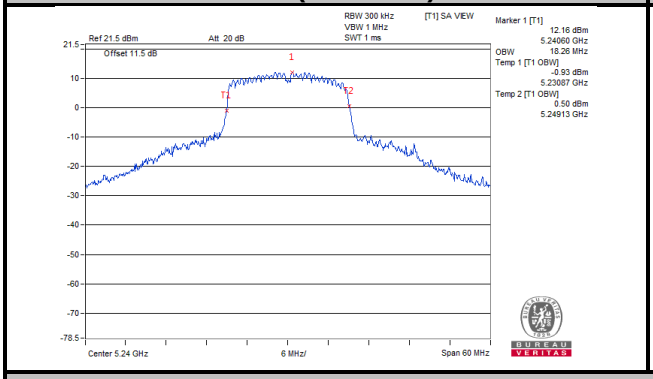


Ch 149 (5745 MHz)

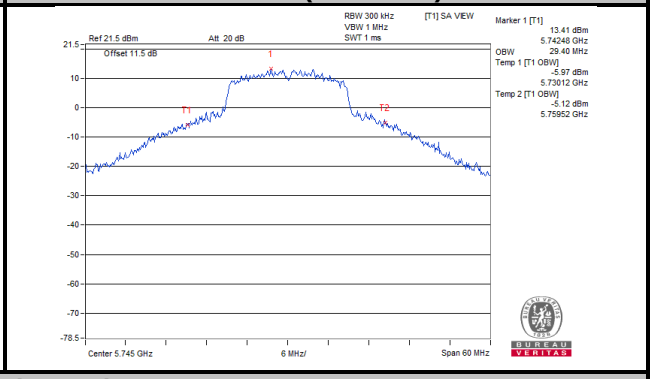


802.11ac (VHT20)

Ch 48 (5240 MHz)

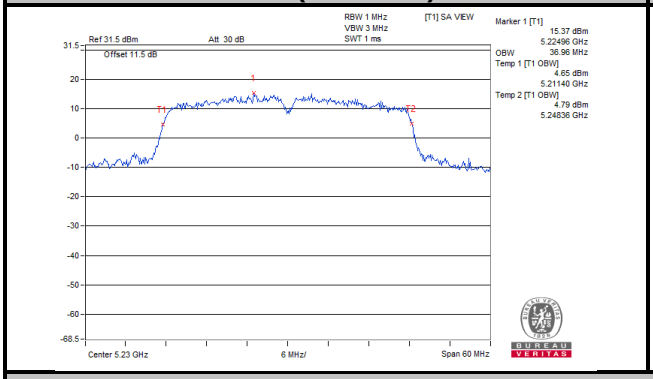


Ch 149 (5745 MHz)

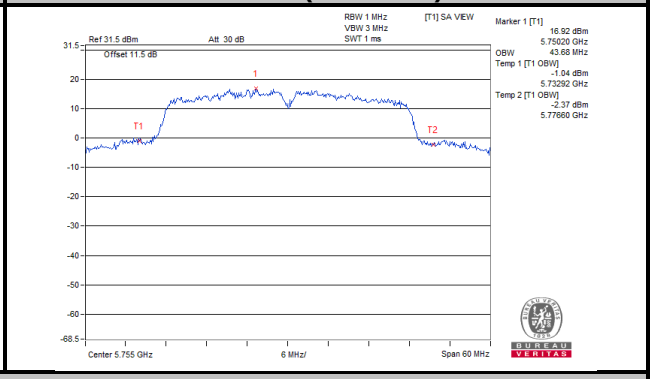


802.11ac (VHT40)

Ch 46 (5230 MHz)

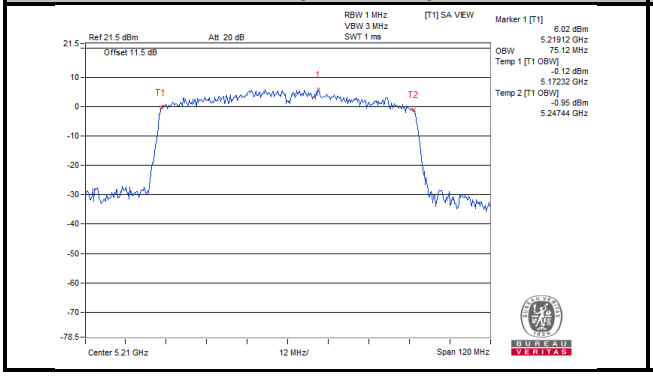


Ch 151 (5755 MHz)

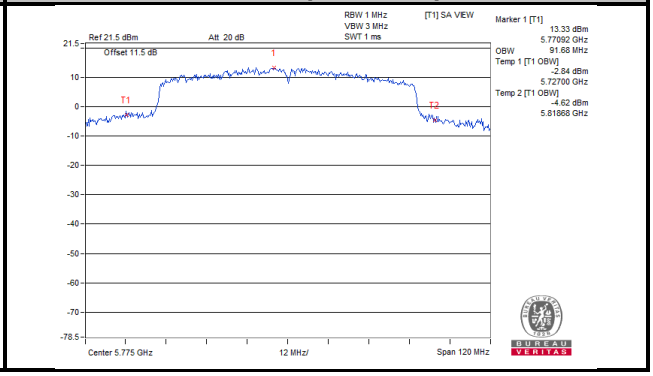


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

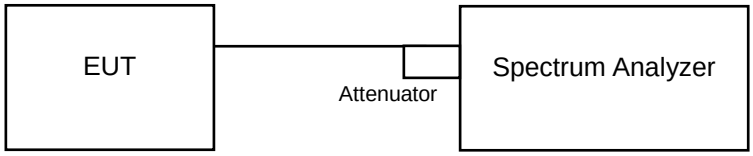


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

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 RBW, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 RBW, 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(500 kHz / 300 kHz).
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

For U-NII-1 Band

802.11a

Channel	Frequency (MHz)	PSD (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	3.50	2.56	3.24	4.13	0.13	9.54	14.06	Pass
40	5200	6.95	6.62	7.18	7.26	0.13	13.16	14.06	Pass
48	5240	7.11	7.97	7.89	7.78	0.13	13.85	14.06	Pass

Note:

1. Method E) 2) 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. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the power density limit shall be reduced to 17-(8.94-6) = 14.06 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Channel	Frequency (MHz)	PSD (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	4.88	5.11	4.84	5.70	0.45	11.62	14.06	Pass
40	5200	6.14	6.47	6.33	6.83	0.45	12.92	14.06	Pass
48	5240	7.61	7.38	7.81	7.49	0.45	14.05	14.06	Pass

Note:

1. Method E) 2) 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. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the power density limit shall be reduced to 17-(8.94-6) = 14.06 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

Channel	Frequency (MHz)	PSD (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	-1.46	-1.73	-1.34	0.23	0.91	5.93	14.06	Pass
46	5230	2.30	2.42	2.25	3.60	0.91	9.61	14.06	Pass

Note:

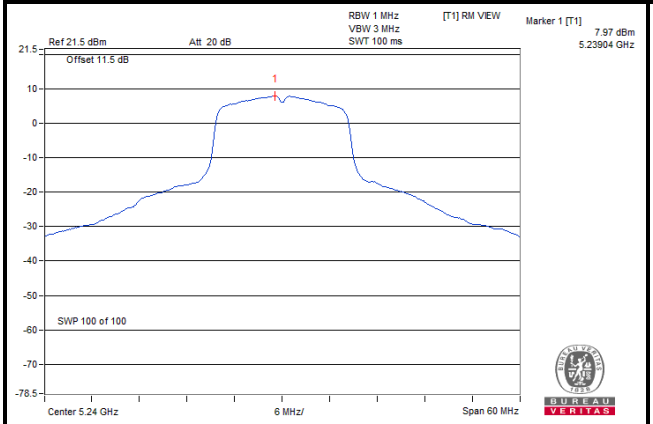
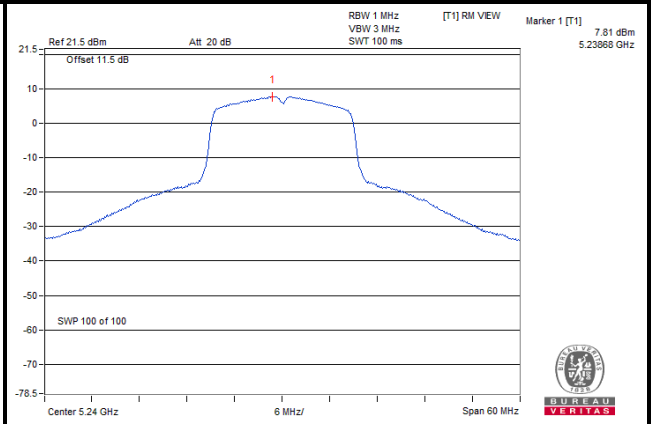
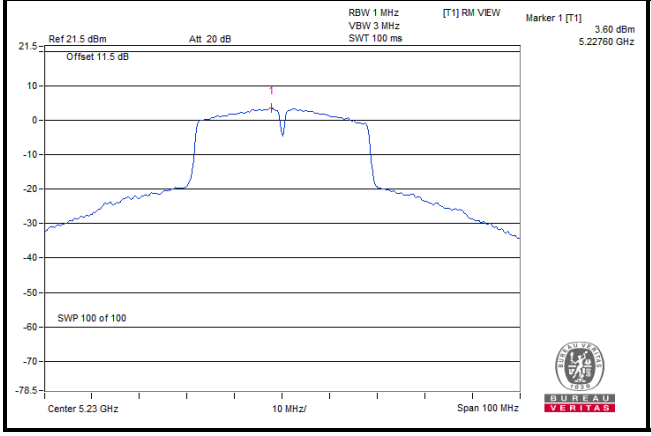
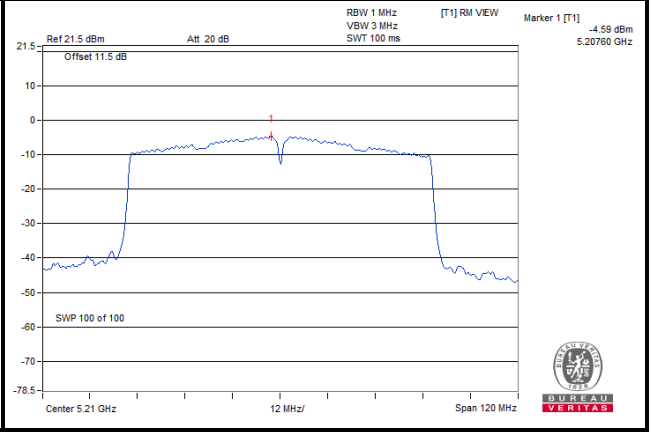
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the power density limit shall be reduced to 17-(8.94-6) = 14.06 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Channel	Frequency (MHz)	PSD (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	-6.03	-5.57	-5.67	-4.59	1.33	1.92	14.06	Pass

Note:

1. Method E) 2) 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. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 8.94$ dBi > 6 dBi , so the power density limit shall be reduced to 17-(8.94-6) = 14.06 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

For U-NII-3 Band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	1.20	3.42	6.02	0.13	9.57	26.94	Pass
	157	5785	0.89	3.11	6.02	0.13	9.26	26.94	Pass
	165	5825	1.12	3.34	6.02	0.13	9.49	26.94	Pass
1	149	5745	1.56	3.78	6.02	0.13	9.93	26.94	Pass
	157	5785	1.31	3.53	6.02	0.13	9.68	26.94	Pass
	165	5825	-1.05	1.17	6.02	0.13	7.32	26.94	Pass
2	149	5745	0.96	3.18	6.02	0.13	9.33	26.94	Pass
	157	5785	0.92	3.14	6.02	0.13	9.29	26.94	Pass
	165	5825	0.48	2.70	6.02	0.13	8.85	26.94	Pass
3	149	5745	0.78	3.00	6.02	0.13	9.15	26.94	Pass
	157	5785	0.48	2.70	6.02	0.13	8.85	26.94	Pass
	165	5825	0.27	2.49	6.02	0.13	8.64	26.94	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the power density limit shall be reduced to 30-(9.06-6) = 26.94 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	0.10	2.32	6.02	0.45	8.79	26.94	Pass
	157	5785	0.45	2.67	6.02	0.45	9.14	26.94	Pass
	165	5825	-0.25	1.97	6.02	0.45	8.44	26.94	Pass
1	149	5745	0.19	2.41	6.02	0.45	8.88	26.94	Pass
	157	5785	0.02	2.24	6.02	0.45	8.71	26.94	Pass
	165	5825	0.18	2.40	6.02	0.45	8.87	26.94	Pass
2	149	5745	0.25	2.47	6.02	0.45	8.94	26.94	Pass
	157	5785	0.40	2.62	6.02	0.45	9.09	26.94	Pass
	165	5825	-0.05	2.17	6.02	0.45	8.64	26.94	Pass
3	149	5745	0.17	2.39	6.02	0.45	8.86	26.94	Pass
	157	5785	-0.08	2.14	6.02	0.45	8.61	26.94	Pass
	165	5825	0.00	2.22	6.02	0.45	8.69	26.94	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the power density limit shall be reduced to 30-(9.06-6) = 26.94 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=4) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	151	5755	-2.55	-0.33	6.02	0.91	6.60	26.94	Pass
	159	5795	-3.16	-0.94	6.02	0.91	5.99	26.94	Pass
1	151	5755	-2.42	-0.20	6.02	0.91	6.73	26.94	Pass
	159	5795	-3.16	-0.94	6.02	0.91	5.99	26.94	Pass
2	151	5755	-2.82	-0.60	6.02	0.91	6.33	26.94	Pass
	159	5795	-2.80	-0.58	6.02	0.91	6.35	26.94	Pass
3	151	5755	-3.09	-0.87	6.02	0.91	6.06	26.94	Pass
	159	5795	-3.23	-1.01	6.02	0.91	5.92	26.94	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the power density limit shall be reduced to 30-(9.06-6) = 26.94 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

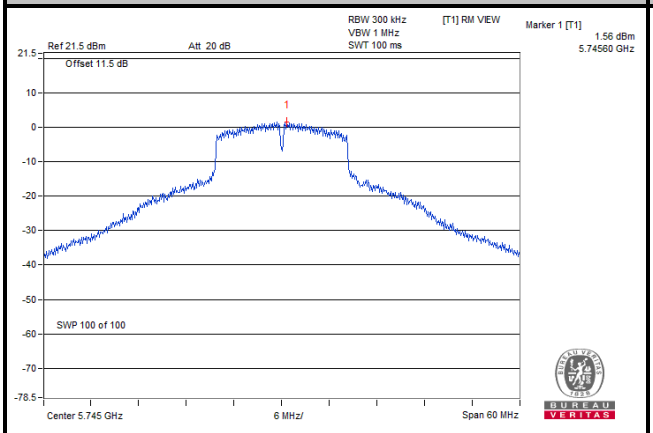
TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=4) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	155	5775	-5.20	-2.98	6.02	1.33	4.37	26.94	Pass
1	155	5775	-5.30	-3.08	6.02	1.33	4.27	26.94	Pass
2	155	5775	-6.07	-3.85	6.02	1.33	3.50	26.94	Pass
3	155	5775	-5.25	-3.03	6.02	1.33	4.32	26.94	Pass

Note:

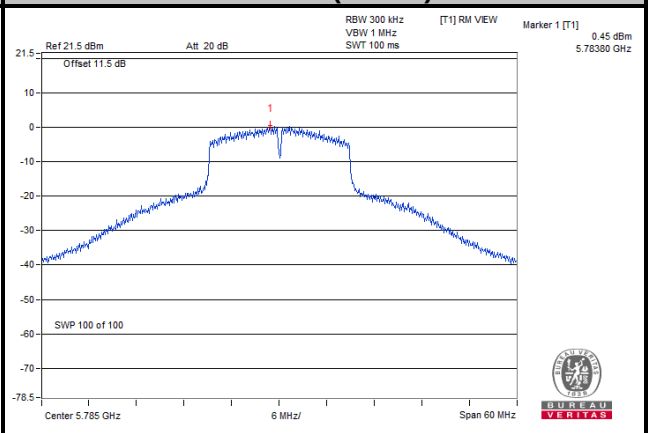
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 9.06$ dBi > 6 dBi , so the power density limit shall be reduced to 30-(9.06-6) = 26.94 dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

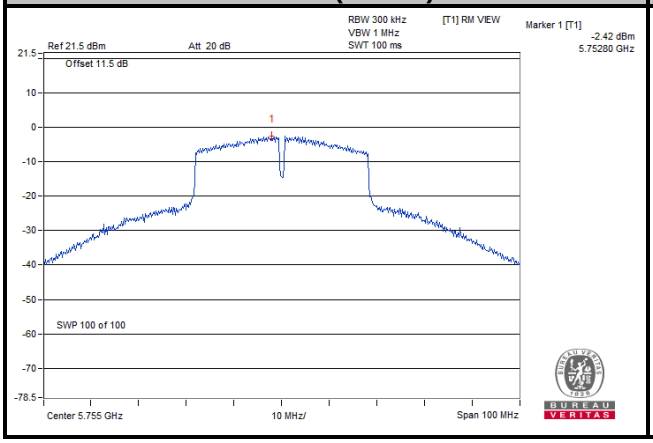
802.11a



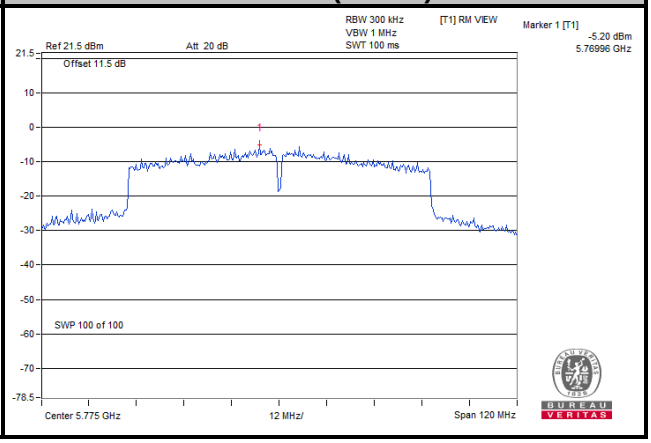
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

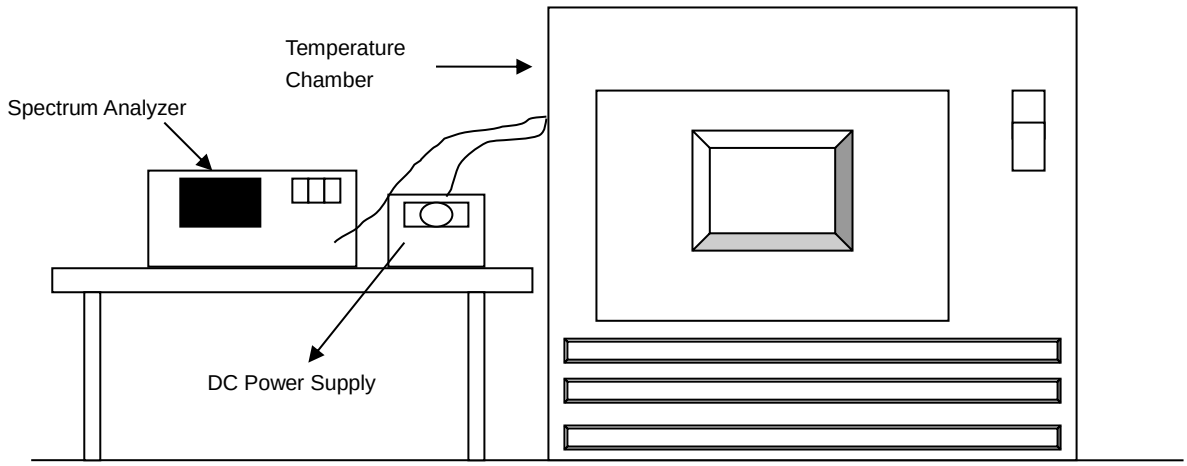


4.6 Frequency Stability

4.6.1 Limit 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 4.1.3 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 DC 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 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5179.9797	PASS	5179.9804	PASS	5179.9826	PASS	5179.982	PASS
40	120	5180.0034	PASS	5180.0035	PASS	5180.0048	PASS	5180.0013	PASS
30	120	5179.9918	PASS	5179.9916	PASS	5179.9937	PASS	5179.9891	PASS
20	120	5179.9757	PASS	5179.9743	PASS	5179.9756	PASS	5179.9723	PASS
10	120	5179.9919	PASS	5179.9942	PASS	5179.9945	PASS	5179.991	PASS
0	120	5180.0046	PASS	5180.0052	PASS	5180.0019	PASS	5180.0006	PASS
-10	120	5179.9935	PASS	5179.9978	PASS	5179.9937	PASS	5179.9964	PASS
-20	120	5179.9834	PASS	5179.979	PASS	5179.9825	PASS	5179.9828	PASS
-30	120	5179.9829	PASS	5179.9824	PASS	5179.9807	PASS	5179.9784	PASS

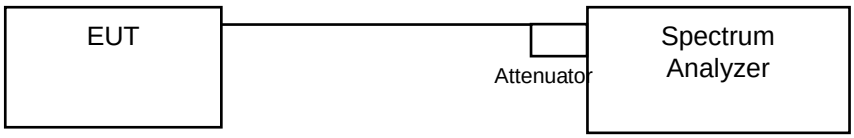
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	5179.9759	PASS	5179.9737	PASS	5179.9763	PASS	5179.9722	PASS	5179.9759
	5179.9757	PASS	5179.9743	PASS	5179.9756	PASS	5179.9723	PASS	5179.9757
	5179.976	PASS	5179.9733	PASS	5179.9765	PASS	5179.9713	PASS	5179.976

4.7 6 dB Bandwidth Measurement

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100 kHz
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

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.19	15.39	15.18	15.94	0.5	Pass
157	5785	15.71	15.17	15.20	15.96	0.5	Pass
165	5825	15.18	15.20	15.19	15.92	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.20	15.16	16.38	15.79	0.5	Pass
157	5785	15.38	15.18	16.39	15.78	0.5	Pass
165	5825	15.38	15.20	16.28	15.79	0.5	Pass

802.11ac (VHT40)

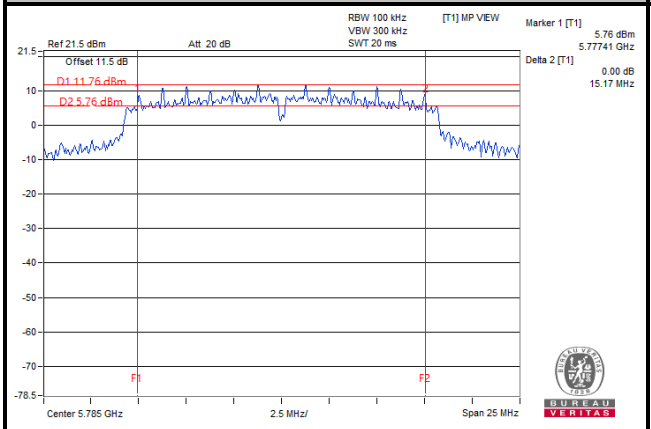
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.11	35.14	35.15	35.11	0.5	Pass
159	5795	35.13	35.16	35.16	35.13	0.5	Pass

802.11ac (VHT80)

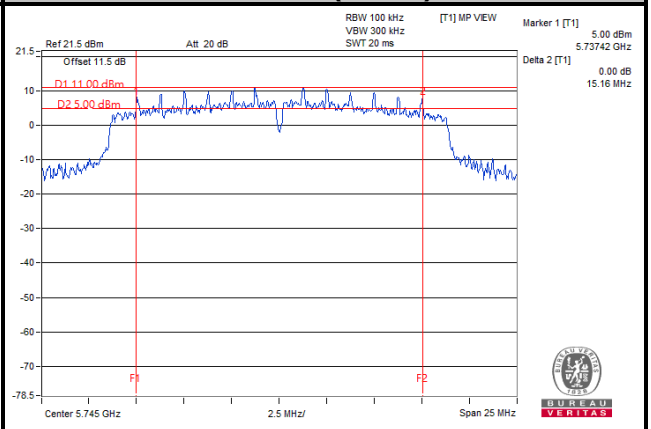
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	71.49	72.70	72.82	61.66	0.5	Pass

Spectrum Plot of Worst Value

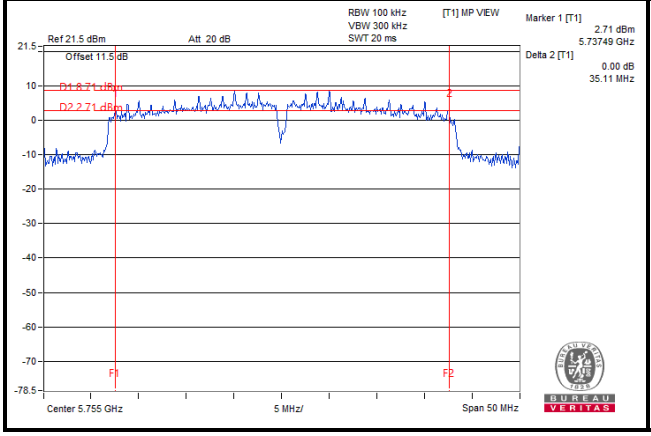
802.11a



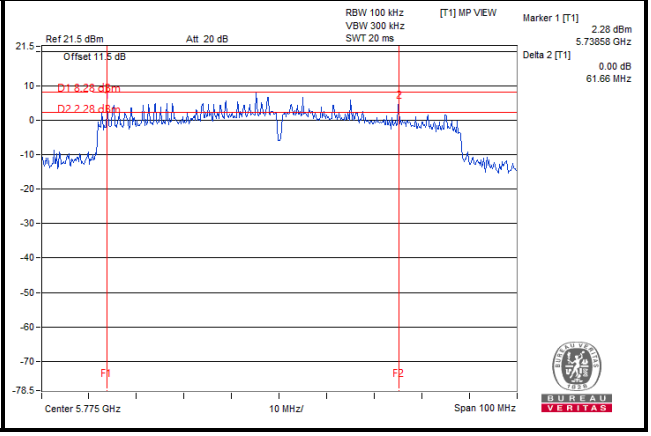
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)

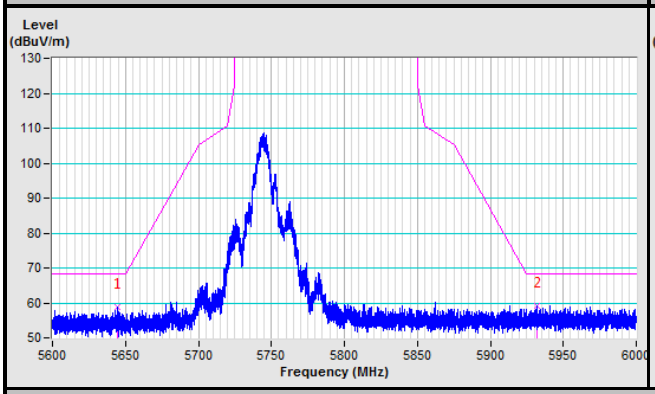
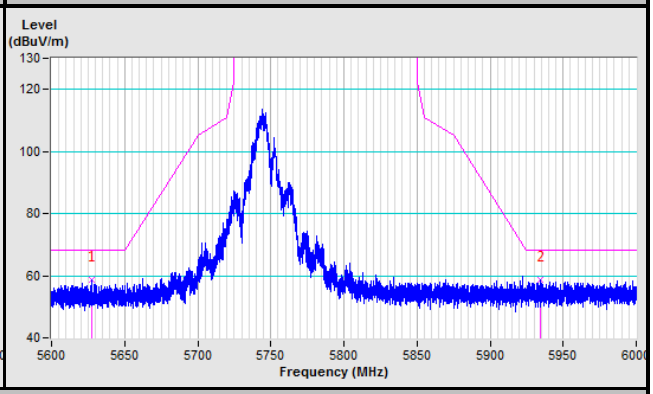
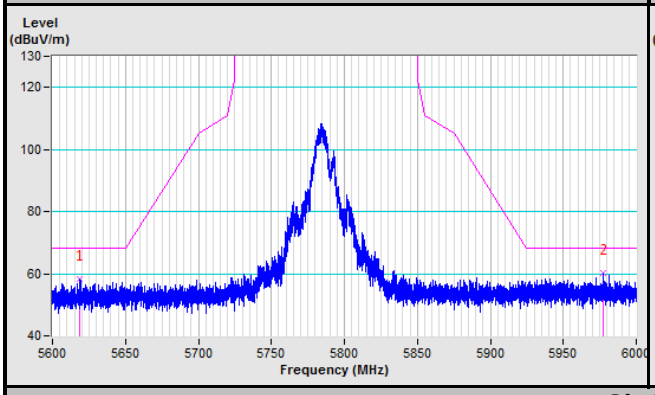
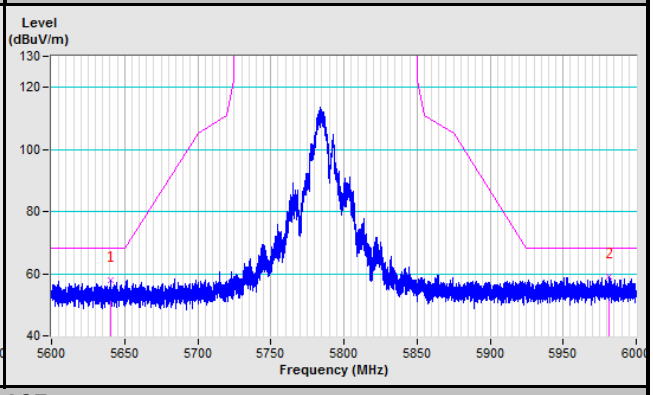


5 Pictures of Test Arrangements

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	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
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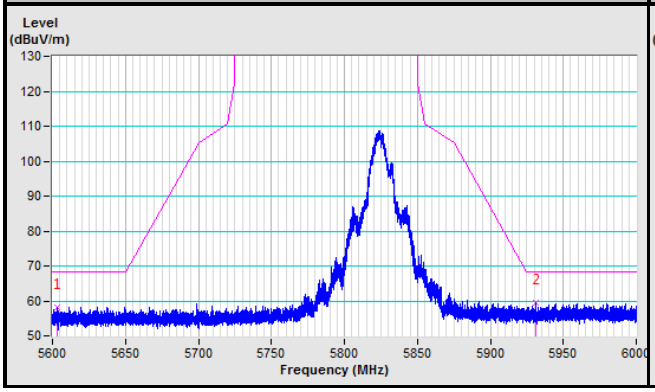
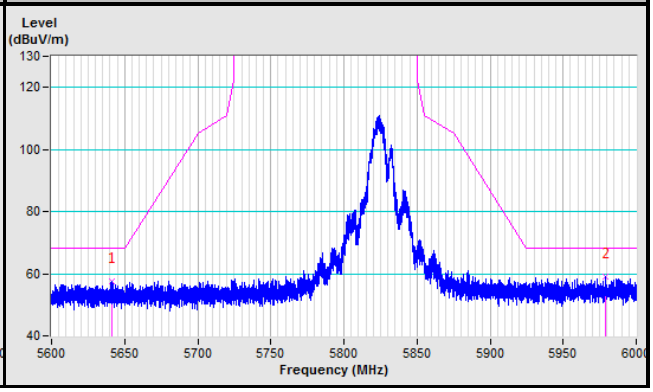
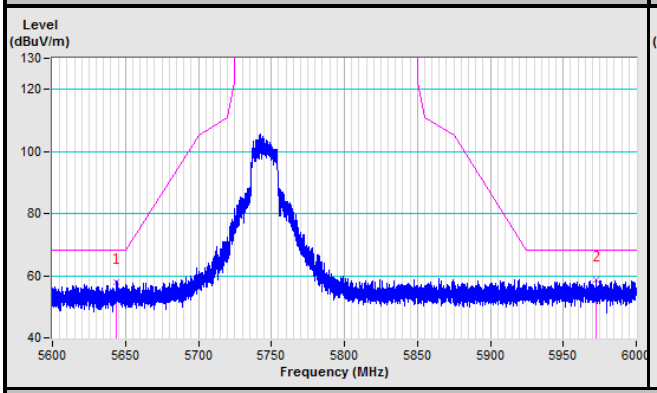
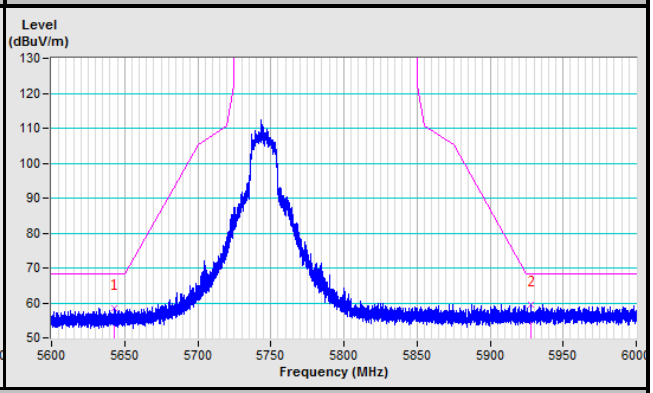
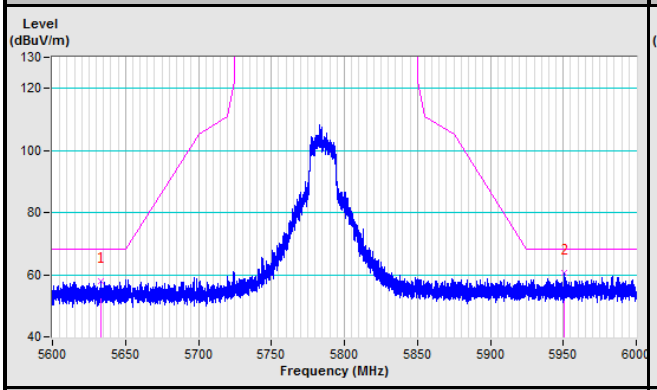
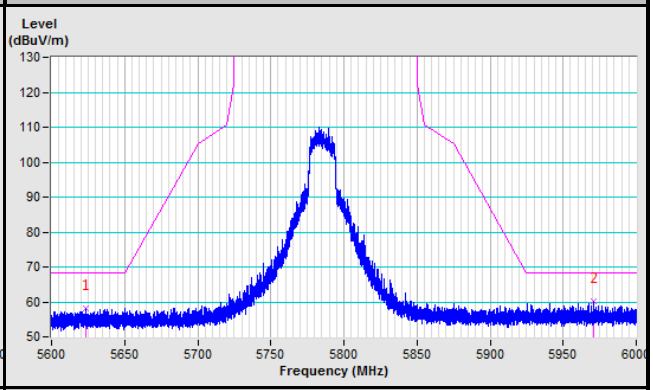
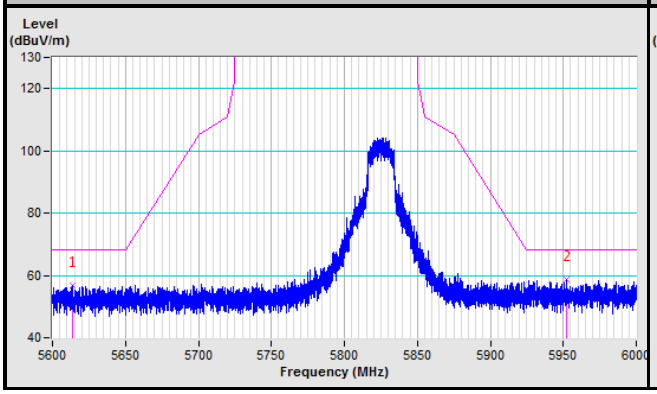
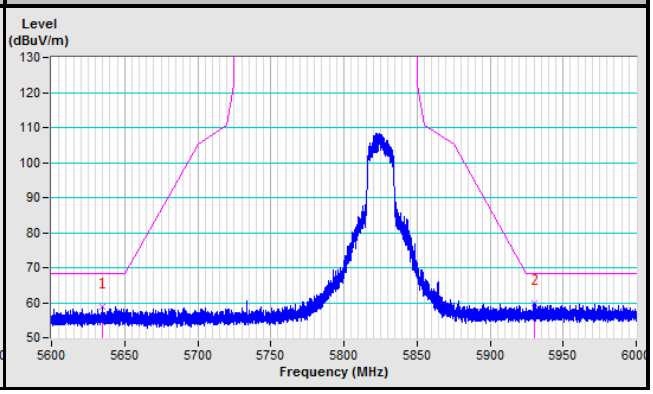
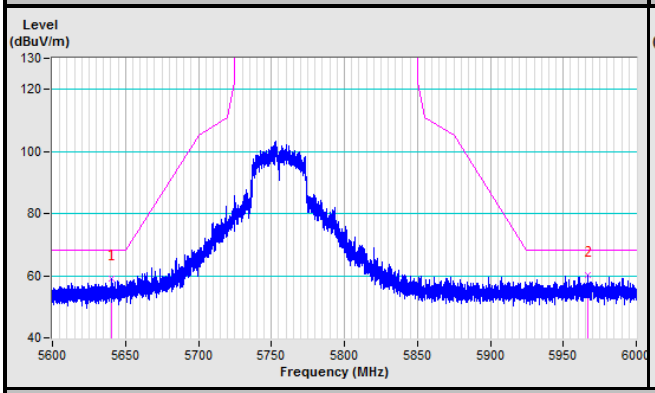
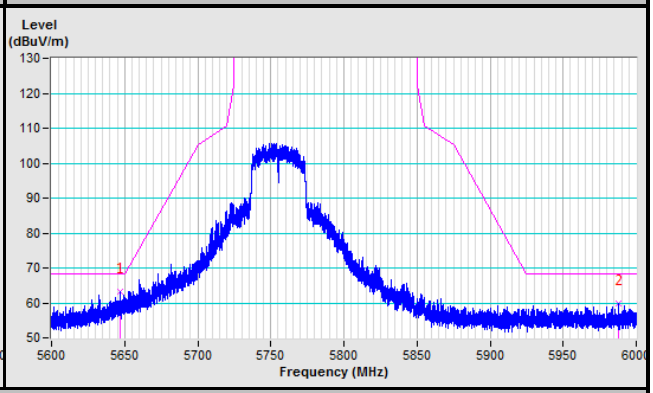
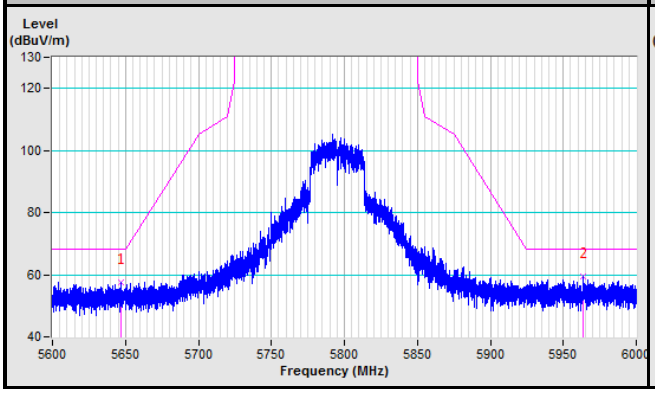
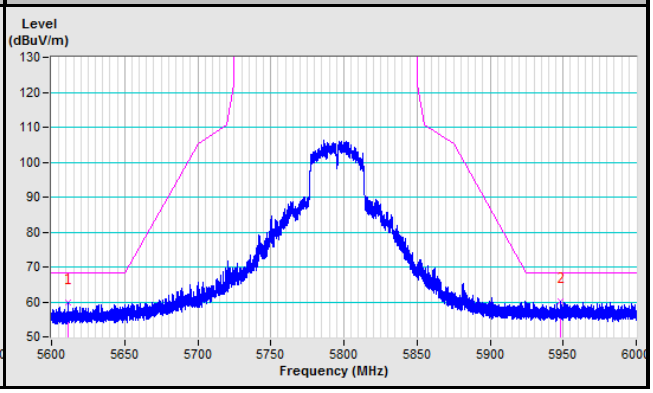
Horizontal	Vertical
	

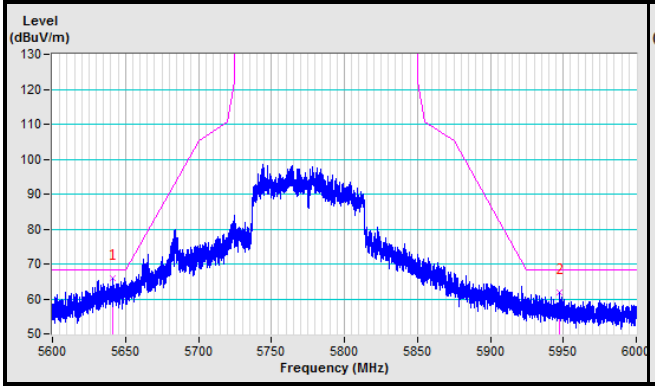
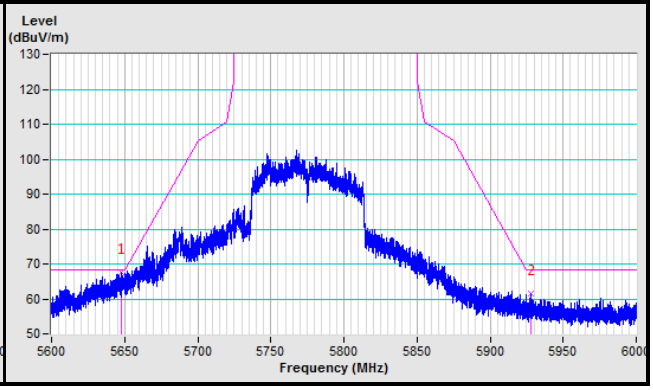
802.11ac (VHT20)

Ch 149	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
Ch 165	
Horizontal	Vertical
	

802.11ac (VHT40)

Ch 151	
Horizontal	Vertical
	
Ch 159	
Horizontal	Vertical
	

802.11ac (VHT80)

Ch 155	
Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
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.

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