

FCC Test Report

Report No.: RFBCWK-WTW-P20120330-1

FCC ID: MSQ-RTAC2K00

Test Model: RT-AC68U V4

Received Date: Dec. 19, 2020

Test Date: Dec. 30, 2020 to Jan. 05, 2021

Issued Date: Feb. 18, 2021

Applicant: ASUSTeK COMPUTER INC.

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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBCWK-WTW-P20120330-1	Original release.	Feb. 18, 2021

1 Certificate of Conformity

Product: Wireless-AC1900 Dual Band Gigabit Router

Brand: ASUS

Test Model: RT-AC68U V4

Sample Status: Engineering sample

Applicant: ASUSTeK COMPUTER INC.

Test Date: Dec. 30, 2020 to Jan. 05, 2021

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

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

Prepared by : Vivian Huang , **Date:** Feb. 18, 2021
Vivian Huang / Specialist

Approved by : Clark Lin , **Date:** Feb. 18, 2021
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -11.56dB at 18.98047MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5395.85MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is R-SMA not a standard connector.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OBE test plots were recorded in Annex A.
2. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
3. 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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.5 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless-AC1900 Dual Band Gigabit Router
Brand	ASUS
Test Model	RT-AC68U V4
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 450 Mbps 802.11ac: up to 1300 Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	CDD Mode: 2.412 ~ 2.462 GHz: 764.699 mW 5.18 ~ 5.24 GHz: 136.034 mW 5.745 ~ 5.825 GHz: 820.372 mW Beamforming Mode: 2.412 ~ 2.462 GHz: 659.338 mW 5.18 ~ 5.24 GHz: 136.034 mW 5.745 ~ 5.825 GHz: 820.372 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Cable Supplied	RJ45 Cable x1 (1.4m, unshielded)

Note:

1. The EUT has below radios as following table:

Radio 1	Radio 2
WLAN 2.4GHz	WLAN 5GHz

2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	WLAN 5GHz

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type
1	Chain0/1/2	Walsin	RFDPA141000SBLB827	1.33	2.4~2.4835	Dipole	R-SMA
				1.57	5.15~5.25		
				1.6	5.25~5.35		
				1.78	5.47~5.725		
				1.85	5.725~5.85		
2	Chain0/1/2	Whayu	C660-510509-A	1.22	2.4~2.4835	Dipole	R-SMA
				1.08	5.15~5.25		
				1.33	5.25~5.35		
				1.38	5.47~5.725		
				1.49	5.725~5.85		

Note: Antenna Set 1 was selected for the final test.

4. The EUT power needs to be supplied from power adapter, the information is as below table:

No.	Brand	Model No.	Spec.
1	APD	WA-30P12FU	Input: 100-240Vac, 0.9A, 50-60Hz Output: 12V, 2.5A DC cable: 1.8m, unshielded
2	I.T.E	MU30B1120250-A1	Input: 100-240Vac, 0.8A, 50-60Hz Output: 12V, 2.5A DC cable: 1.5m, unshielded

Note:

- From the above models, the worst radiated emission and conducted emission test was found in **Adapter 1**. Therefore only the test data of the modes were recorded in this report.
- We had pre-tested all modes at 240V/60Hz and 120V/60Hz, test mode at 120V/60Hz was the worst case and only this mode was presented in the report.

5. The EUT incorporates a MIMO function.

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	3TX	3RX
802.11g	3TX	3RX
802.11n (HT20)	3TX	3RX
802.11n (HT40)	3TX	3RX
VHT20	3TX	3RX
VHT40	3TX	3RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	3TX	3RX
802.11n (HT20)	3TX	3RX
802.11n (HT40)	3TX	3RX
802.11ac (VHT20)	3TX	3RX
802.11ac (VHT40)	3TX	3RX
802.11ac (VHT80)	3TX	3RX

Note:

- All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
- The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
- The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz, 80MHz), therefore the manufacturer will control the power for 802.11n mode is the same as the 802.11ac or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.
7. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 44, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240 5745-5825	36 to 48 149 to 165	165	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240 5745-5825	36 to 48 149 to 165	165	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 44, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (output power only)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE \geq 1G	25deg. C, 75%RH	120Vac, 60Hz	Sampson Chen
RE $<$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Carter Lin
PLC	25deg. C, 67%RH	120Vac, 60Hz	Sampson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

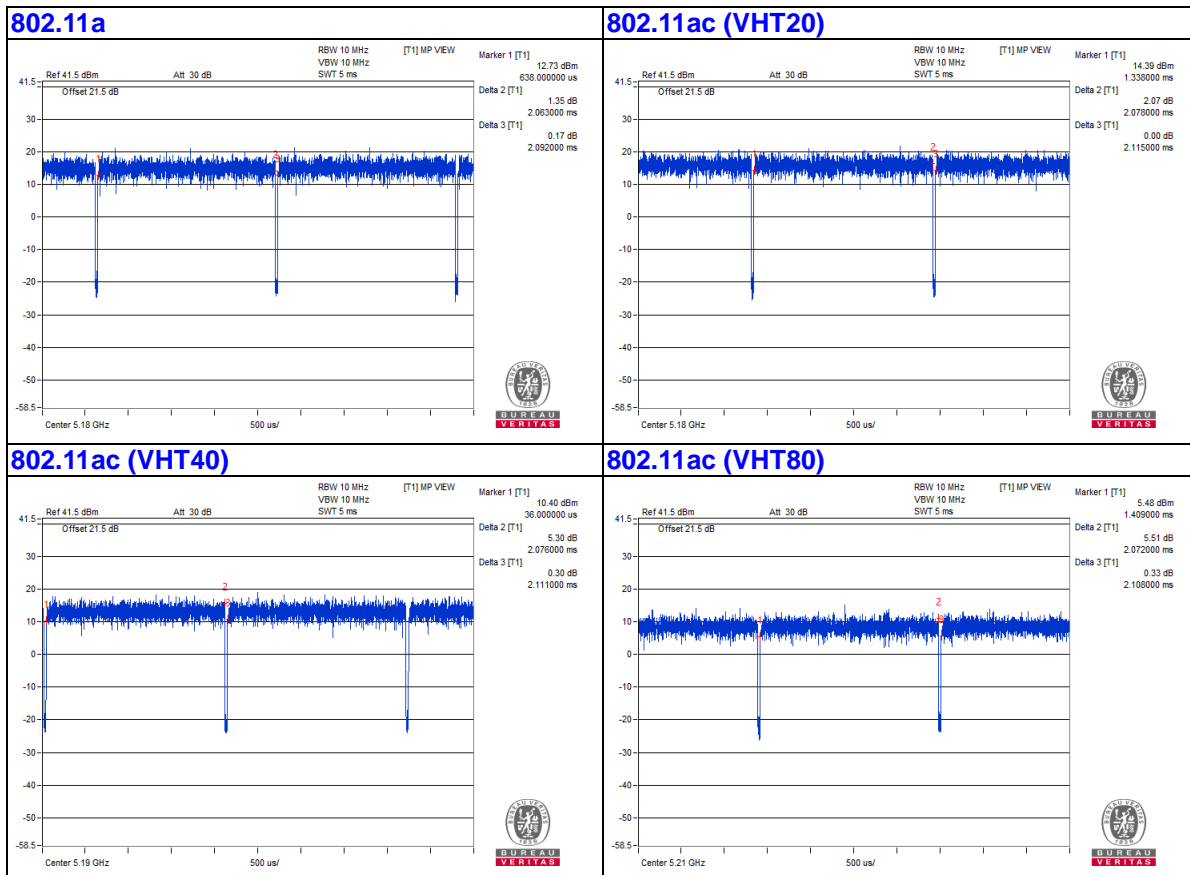
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11a: Duty cycle = 2.063 ms/2.092 ms = 0.986

802.11ac (VHT20): Duty cycle = 2.078 ms/2.115 ms = 0.983

802.11ac (VHT40): Duty cycle = 2.076 ms/2.111 ms = 0.983

802.11ac (VHT80): Duty cycle = 2.072 ms/2.108 ms = 0.983



3.4 Description of Support Units

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

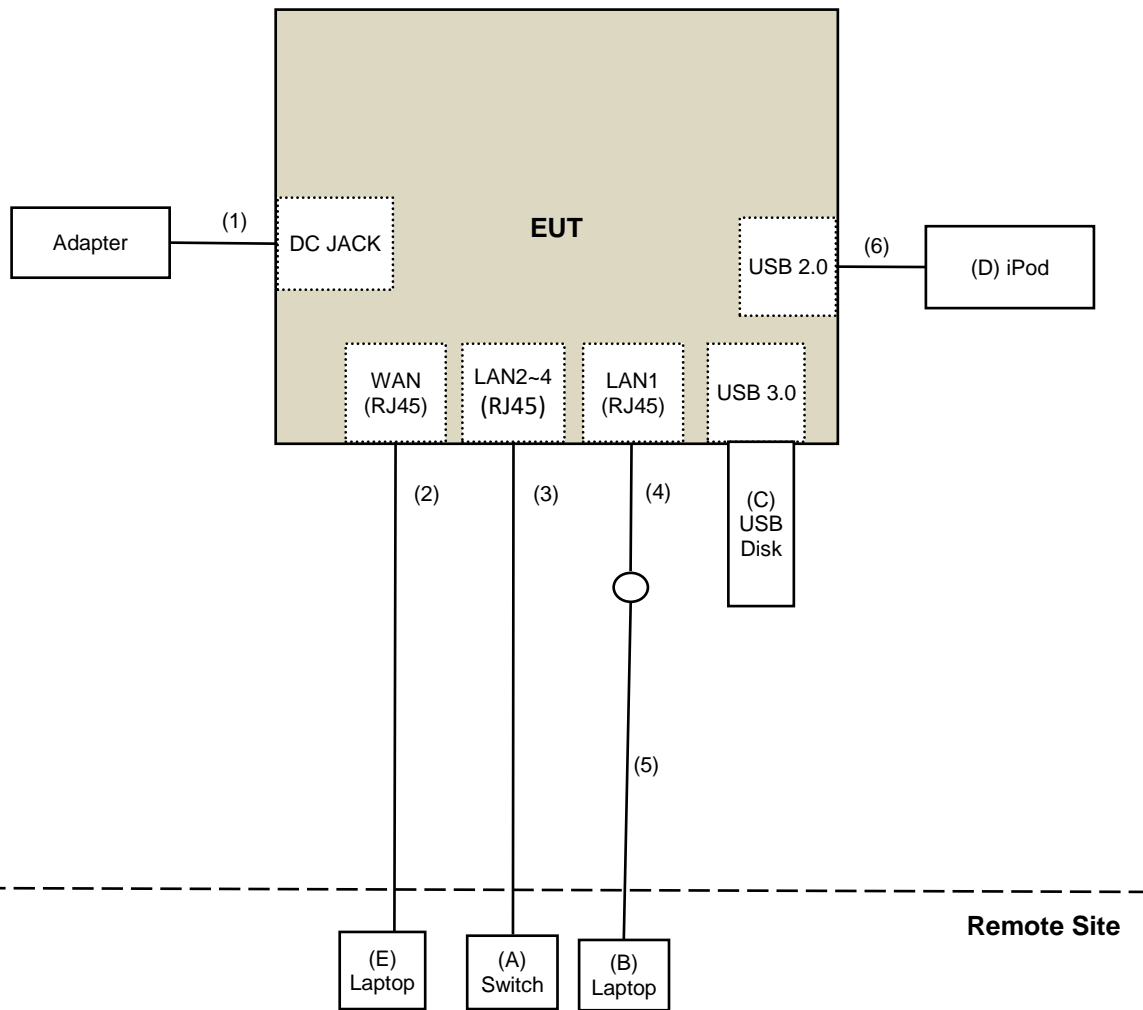
ID	Product	Brand	Model No.	Serial No	FCC ID	Remarks
A.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	USB Disk	SanDisk	USB 3.0 Flash Drive	NA	NA	Provided by Lab
D.	iPod	Apple	MC749TA/A	CC4DMFJUDFDM	NA	Provided by Lab
E.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.5m).

ID	Descriptions (Cables)	Qty	Length (m)	Shielding (Yes/No)	Cores (Number)	Remarks
1	DC Cable	1	1.8	No	0	Supplied by client
2	RJ-45 Cable	1	10	No	0	Provided by Lab
3	RJ-45 Cable	3	10	No	0	Provided by Lab
4	RJ-45 Cable	1	1.4	No	0	Supplied by client
5	RJ-45 Cable	1	10	No	0	Provided by Lab
6	USB Cable	1	0.1	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard 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 Procedure 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 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

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

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

4.1.2 Test Instruments

For Radiated emission & BandEdge &OBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 01, 2020	Nov. 30, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 06, 2020	Nov. 05, 2021
RF Cable	8D	966-6-1	Apr. 04, 2020	Apr. 03, 2021
RF Cable	8D	966-4-2	Mar. 18, 2020	Mar. 17, 2021
RF Cable	8D	966-4-3	Mar. 18, 2020	Mar. 17, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	Jan. 14, 2020	Jan. 13, 2021
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC 12630 SE	980638	Apr. 08, 2020	Apr. 07, 2021
RF Cable	EMC104-SM-SM-1200	160922	Dec. 25, 2020	Dec. 24, 2021
RF Cable	EMC104-SM-SM-2000	180502	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-6000	180418	Apr. 29, 2020	Apr. 28, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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 966 Chamber No. 4.
3. Tested Date: Dec. 30, 2020 to Jan. 05, 2021

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	May 29, 2020	May 28, 2021
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
AC Power Source Extech Electronics	6905S	1991551	NA	NA
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
True RMS Clamp Meter FLUKE	325	31130711WS	June 06, 2020	June 05, 2021
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Jan. 03, 2021

4.1.3 Test Procedure

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

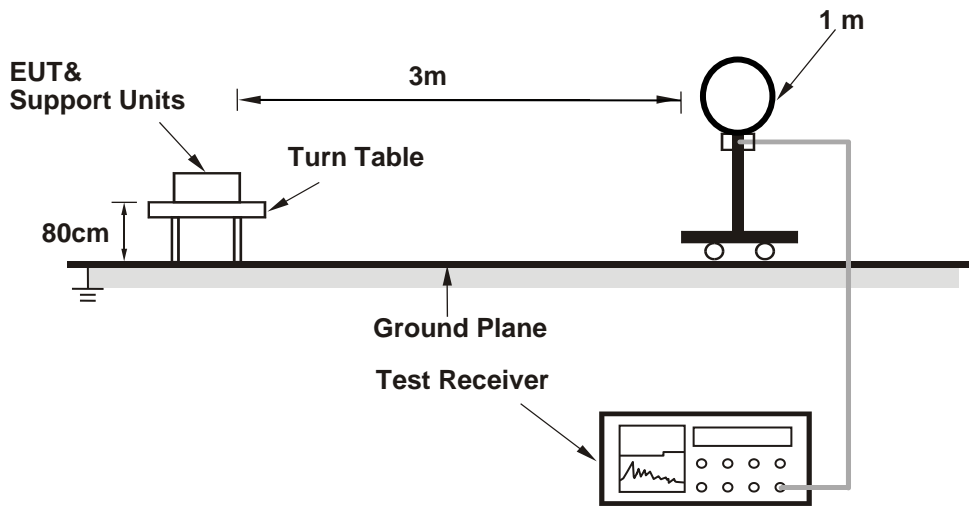
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

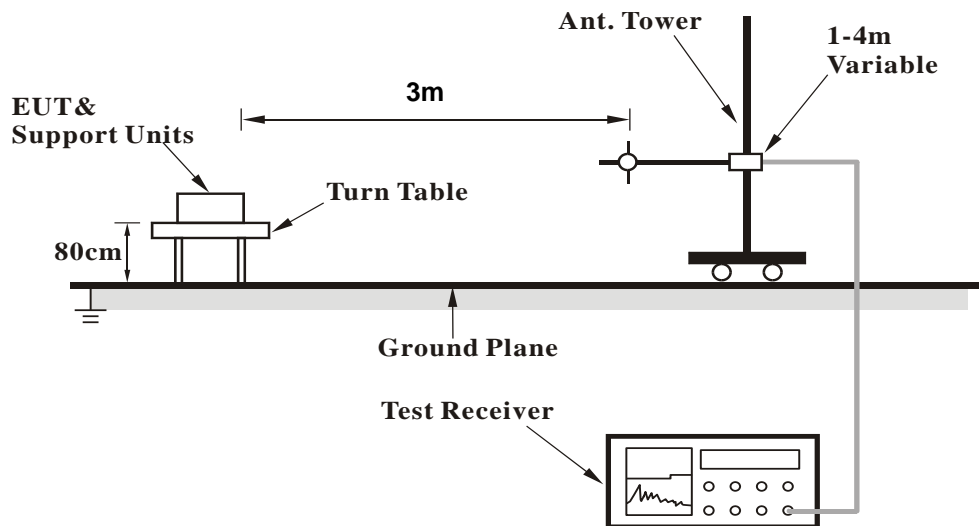
No deviation.

4.1.5 Test Setup

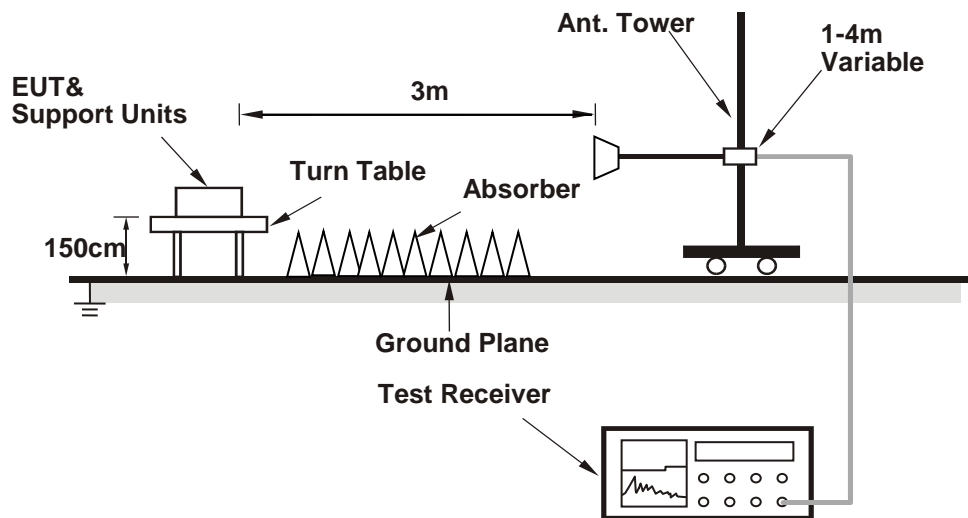
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

- a. Connected the EUT with the Laptop Computer which is placed on remote site.
- b. Controlling software (accessMTool_REL_3_2_1_1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

RF Mode	TX 802.11a	Channel	CH 36 : 5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	47.9 PK	74.0	-26.1	1.32 H	81	46.8	1.1
2	5150.00	36.9 AV	54.0	-17.1	1.32 H	81	35.8	1.1
3	*5180.00	101.9 PK			1.32 H	81	100.9	1.0
4	*5180.00	92.1 AV			1.32 H	81	91.1	1.0
5	5394.90	48.8 PK	74.0	-25.2	1.32 H	81	47.8	1.0
6	5394.90	38.0 AV	54.0	-16.0	1.32 H	81	37.0	1.0
7	#10360.00	45.9 PK	68.2	-22.3	1.77 H	160	35.6	10.3
8	15540.00	45.8 PK	74.0	-28.2	1.66 H	354	33.8	12.0
9	15540.00	33.3 AV	54.0	-20.7	1.66 H	354	21.3	12.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4964.20	52.8 PK	74.0	-21.2	2.27 V	6	52.2	0.6
2	4964.20	46.6 AV	54.0	-7.4	2.27 V	6	46.0	0.6
3	5149.44	56.3 PK	74.0	-17.7	2.27 V	6	55.2	1.1
4	5149.44	43.9 AV	54.0	-10.1	2.27 V	6	42.8	1.1
5	*5180.00	113.5 PK			2.27 V	6	112.5	1.0
6	*5180.00	104.1 AV			2.27 V	6	103.1	1.0
7	5395.85	60.1 PK	74.0	-13.9	2.27 V	6	59.1	1.0
8	5395.85	53.9 AV	54.0	-0.1	2.27 V	6	52.9	1.0
9	#10360.00	45.8 PK	68.2	-22.4	1.74 V	166	35.5	10.3
10	15540.00	46.6 PK	74.0	-27.4	1.75 V	142	34.6	12.0
11	15540.00	34.7 AV	54.0	-19.3	1.75 V	142	22.7	12.0

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 44 : 5220 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5220.00	100.9 PK			1.25 H	74	99.9	1.0
2	*5220.00	90.8 AV			1.25 H	74	89.8	1.0
3	5350.00	48.3 PK	74.0	-25.7	1.25 H	74	47.5	0.8
4	5350.00	37.3 AV	54.0	-16.7	1.25 H	74	36.5	0.8
5	#10440.00	46.1 PK	68.2	-22.1	1.81 H	161	35.7	10.4
6	15660.00	45.8 PK	74.0	-28.2	1.70 H	8	34.2	11.6
7	15660.00	33.4 AV	54.0	-20.6	1.70 H	8	21.8	11.6

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5220.00	112.3 PK			2.30 V	16	111.3	1.0
2	*5220.00	102.6 AV			2.30 V	16	101.6	1.0
3	5350.00	47.8 PK	74.0	-26.2	2.30 V	16	47.0	0.8
4	5350.00	37.1 AV	54.0	-16.9	2.30 V	16	36.3	0.8
5	#10440.00	45.8 PK	68.2	-22.4	1.79 V	171	35.4	10.4
6	15660.00	46.5 PK	74.0	-27.5	1.72 V	130	34.9	11.6
7	15660.00	34.4 AV	54.0	-19.6	1.72 V	130	22.8	11.6

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.

RF Mode	TX 802.11a	Channel	CH 48 : 5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5019.81	48.1 PK	74.0	-25.9	1.27 H	80	47.1	1.0
2	5019.81	37.3 AV	54.0	-16.7	1.27 H	80	36.3	1.0
3	*5240.00	101.4 PK			1.27 H	80	100.6	0.8
4	*5240.00	91.3 AV			1.27 H	80	90.5	0.8
5	5394.12	50.7 PK	74.0	-23.3	1.27 H	80	49.7	1.0
6	5394.12	39.7 AV	54.0	-14.3	1.27 H	80	38.7	1.0
7	#10480.00	45.7 PK	68.2	-22.5	1.78 H	144	35.4	10.3
8	15720.00	45.6 PK	74.0	-28.4	1.63 H	342	34.4	11.2
9	15720.00	33.1 AV	54.0	-20.9	1.63 H	342	21.9	11.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5021.64	55.0 PK	74.0	-19.0	2.30 V	7	54.0	1.0
2	5021.64	45.6 AV	54.0	-8.4	2.30 V	7	44.6	1.0
3	*5240.00	113.1 PK			2.30 V	7	112.3	0.8
4	*5240.00	103.6 AV			2.30 V	7	102.8	0.8
5	5458.40	61.9 PK	74.0	-12.1	2.30 V	7	60.8	1.1
6	5458.40	52.4 AV	54.0	-1.6	2.30 V	7	51.3	1.1
7	#10480.00	46.0 PK	68.2	-22.2	1.80 V	177	35.7	10.3
8	15720.00	46.6 PK	74.0	-27.4	1.79 V	129	35.4	11.2
9	15720.00	34.6 AV	54.0	-19.4	1.79 V	129	23.4	11.2

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5623.51	52.3 PK	68.2	-15.9	1.29 H	84	50.9	1.4
2	*5745.00	113.1 PK			1.29 H	84	111.4	1.7
3	*5745.00	103.5 AV			1.29 H	84	101.8	1.7
4	#5979.92	51.2 PK	68.2	-17.0	1.29 H	84	49.4	1.8
5	11490.00	48.8 PK	74.0	-25.2	1.67 H	316	36.7	12.1
6	11490.00	36.4 AV	54.0	-17.6	1.67 H	316	24.3	12.1
7	#17235.00	52.0 PK	68.2	-16.2	1.71 H	27	35.8	16.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5625.22	60.2 PK	68.2	-8.0	2.00 V	322	58.8	1.4
2	*5745.00	124.7 PK			2.00 V	322	123.0	1.7
3	*5745.00	115.3 AV			2.00 V	322	113.6	1.7
4	#5983.30	60.1 PK	68.2	-8.1	2.00 V	322	58.3	1.8
5	11490.00	49.6 PK	74.0	-24.4	1.75 V	151	37.5	12.1
6	11490.00	37.3 AV	54.0	-16.7	1.75 V	151	25.2	12.1
7	#17235.00	49.0 PK	68.2	-19.2	1.78 V	146	32.8	16.2

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 157 : 5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5622.72	54.0 PK	68.2	-14.2	1.30 H	69	52.6	1.4
2	*5785.00	112.6 PK			1.30 H	69	110.8	1.8
3	*5785.00	103.1 AV			1.30 H	69	101.3	1.8
4	#5942.81	51.1 PK	68.2	-17.1	1.30 H	69	49.3	1.8
5	11570.00	49.2 PK	74.0	-24.8	1.66 H	322	37.2	12.0
6	11570.00	36.6 AV	54.0	-17.4	1.66 H	322	24.6	12.0
7	#17355.00	51.9 PK	68.2	-16.3	1.76 H	29	34.9	17.0

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5621.99	62.1 PK	68.2	-6.1	1.98 V	321	60.7	1.4
2	*5785.00	124.3 PK			1.98 V	321	122.5	1.8
3	*5785.00	115.0 AV			1.98 V	321	113.2	1.8
4	#5943.73	62.8 PK	68.2	-5.4	1.98 V	321	61.0	1.8
5	11570.00	49.4 PK	74.0	-24.6	1.81 V	164	37.4	12.0
6	11570.00	37.1 AV	54.0	-16.9	1.81 V	164	25.1	12.0
7	#17355.00	49.5 PK	68.2	-18.7	1.73 V	147	32.5	17.0

Remarks:

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

RF Mode	TX 802.11a	Channel	CH 165 : 5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5577.42	54.2 PK	68.2	-14.0	1.28 H	65	52.9	1.3
2	*5825.00	113.6 PK			1.28 H	65	111.8	1.8
3	*5825.00	104.0 AV			1.28 H	65	102.2	1.8
4	#5977.31	52.0 PK	68.2	-16.2	1.28 H	65	50.2	1.8
5	11650.00	49.3 PK	74.0	-24.7	1.66 H	309	37.6	11.7
6	11650.00	36.8 AV	54.0	-17.2	1.66 H	309	25.1	11.7
7	#17475.00	52.1 PK	68.2	-16.1	1.71 H	21	33.2	18.9

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5578.75	64.9 PK	68.2	-3.3	2.05 V	327	63.6	1.3
2	*5825.00	125.0 PK			2.05 V	327	123.2	1.8
3	*5825.00	115.8 AV			2.05 V	327	114.0	1.8
4	#5983.15	60.3 PK	68.2	-7.9	2.05 V	327	58.5	1.8
5	11650.00	49.7 PK	74.0	-24.3	1.80 V	140	38.0	11.7
6	11650.00	37.5 AV	54.0	-16.5	1.80 V	140	25.8	11.7
7	#17475.00	49.6 PK	68.2	-18.6	1.77 V	139	30.7	18.9

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.

RF Mode	TX 802.11ac (VHT20)	Channel	CH 36 : 5180 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5098.62	50.0 PK	74.0	-24.0	1.24 H	82	48.8	1.2
2	5098.62	39.0 AV	54.0	-15.0	1.24 H	82	37.8	1.2
3	*5180.00	101.7 PK			1.24 H	82	100.7	1.0
4	*5180.00	91.4 AV			1.24 H	82	90.4	1.0
5	5395.50	50.9 PK	74.0	-23.1	1.24 H	82	49.9	1.0
6	5395.50	40.7 AV	54.0	-13.3	1.24 H	82	39.7	1.0
7	#10360.00	45.2 PK	68.2	-23.0	1.83 H	161	34.9	10.3
8	15540.00	45.8 PK	74.0	-28.2	1.66 H	352	33.8	12.0
9	15540.00	33.1 AV	54.0	-20.9	1.66 H	352	21.1	12.0

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4964.18	55.4 PK	74.0	-18.6	1.58 V	179	54.8	0.6
2	4964.18	47.8 AV	54.0	-6.2	1.58 V	179	47.2	0.6
3	5150.00	58.2 PK	74.0	-15.8	1.58 V	179	57.1	1.1
4	5150.00	47.8 AV	54.0	-6.2	1.58 V	179	46.7	1.1
5	*5180.00	113.2 PK			1.58 V	179	112.2	1.0
6	*5180.00	103.4 AV			1.58 V	179	102.4	1.0
7	5395.88	60.1 PK	74.0	-13.9	1.58 V	179	59.1	1.0
8	5395.88	51.6 AV	54.0	-2.4	1.58 V	179	50.6	1.0
9	#10360.00	45.2 PK	68.2	-23.0	1.73 V	167	34.9	10.3
10	15540.00	46.7 PK	74.0	-27.3	1.70 V	158	34.7	12.0
11	15540.00	35.0 AV	54.0	-19.0	1.70 V	158	23.0	12.0

Remarks:

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

RF Mode	TX 802.11ac (VHT20)	Channel	CH 44 : 5220 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5220.00	100.9 PK			1.18 H	68	99.9	1.0
2	*5220.00	90.4 AV			1.18 H	68	89.4	1.0
3	5350.00	48.6 PK	74.0	-25.4	1.18 H	68	47.8	0.8
4	5350.00	38.0 AV	54.0	-16.0	1.18 H	68	37.2	0.8
5	#10440.00	45.6 PK	68.2	-22.6	1.81 H	166	35.2	10.4
6	15660.00	45.7 PK	74.0	-28.3	1.65 H	350	34.1	11.6
7	15660.00	33.0 AV	54.0	-21.0	1.65 H	350	21.4	11.6

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5220.00	112.5 PK			1.59 V	172	111.5	1.0
2	*5220.00	102.6 AV			1.59 V	172	101.6	1.0
3	5350.00	48.6 PK	74.0	-25.4	1.59 V	172	47.8	0.8
4	5350.00	38.1 AV	54.0	-15.9	1.59 V	172	37.3	0.8
5	#10440.00	46.0 PK	68.2	-22.2	1.73 V	178	35.6	10.4
6	15660.00	47.0 PK	74.0	-27.0	1.75 V	126	35.4	11.6
7	15660.00	35.1 AV	54.0	-18.9	1.75 V	126	23.5	11.6

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.

RF Mode	TX 802.11ac (VHT20)	Channel	CH 48 : 5240 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5021.66	49.1 PK	74.0	-24.9	1.22 H	78	48.1	1.0
2	5021.66	38.3 AV	54.0	-15.7	1.22 H	78	37.3	1.0
3	*5240.00	101.2 PK			1.22 H	78	100.4	0.8
4	*5240.00	91.2 AV			1.22 H	78	90.4	0.8
5	5398.91	50.5 PK	74.0	-23.5	1.22 H	78	49.5	1.0
6	5398.91	40.0 AV	54.0	-14.0	1.22 H	78	39.0	1.0
7	#10480.00	45.9 PK	68.2	-22.3	1.73 H	158	35.6	10.3
8	15720.00	45.9 PK	74.0	-28.1	1.64 H	352	34.7	11.2
9	15720.00	33.3 AV	54.0	-20.7	1.64 H	352	22.1	11.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5021.72	54.3 PK	74.0	-19.7	1.59 V	182	53.3	1.0
2	5021.72	46.0 AV	54.0	-8.0	1.59 V	182	45.0	1.0
3	*5240.00	113.8 PK			1.59 V	182	113.0	0.8
4	*5240.00	104.5 AV			1.59 V	182	103.7	0.8
5	5458.24	58.8 PK	74.0	-15.2	1.59 V	182	57.7	1.1
6	5458.24	51.0 AV	54.0	-3.0	1.59 V	182	49.9	1.1
7	#10480.00	45.4 PK	68.2	-22.8	1.74 V	158	35.1	10.3
8	15720.00	46.5 PK	74.0	-27.5	1.75 V	132	35.3	11.2
9	15720.00	34.8 AV	54.0	-19.2	1.75 V	132	23.6	11.2

Remarks:

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

RF Mode	TX 802.11ac (VHT20)	Channel	CH 149 : 5745 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5581.87	52.1 PK	68.2	-16.1	1.26 H	90	50.8	1.3
2	*5745.00	112.7 PK			1.26 H	90	111.0	1.7
3	*5745.00	103.2 AV			1.26 H	90	101.5	1.7
4	#5954.56	50.1 PK	68.2	-18.1	1.26 H	90	48.3	1.8
5	11490.00	48.8 PK	74.0	-25.2	1.73 H	330	36.7	12.1
6	11490.00	36.7 AV	54.0	-17.3	1.73 H	330	24.6	12.1
7	#17235.00	51.9 PK	68.2	-16.3	1.70 H	33	35.7	16.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5586.02	60.7 PK	68.2	-7.5	1.82 V	2	59.4	1.3
2	*5745.00	124.2 PK			1.82 V	2	122.5	1.7
3	*5745.00	114.6 AV			1.82 V	2	112.9	1.7
4	#5979.85	59.8 PK	68.2	-8.4	1.82 V	2	58.0	1.8
5	11490.00	48.9 PK	74.0	-25.1	1.79 V	147	36.8	12.1
6	11490.00	36.8 AV	54.0	-17.2	1.79 V	147	24.7	12.1
7	#17235.00	49.3 PK	68.2	-18.9	1.78 V	147	33.1	16.2

Remarks:

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

RF Mode	TX 802.11ac (VHT20)	Channel	CH 157 : 5785 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5627.83	53.7 PK	68.2	-14.5	1.36 H	68	52.3	1.4
2	*5785.00	113.9 PK			1.36 H	68	112.1	1.8
3	*5785.00	104.4 AV			1.36 H	68	102.6	1.8
4	#5937.91	51.5 PK	68.2	-16.7	1.36 H	68	49.7	1.8
5	11570.00	49.1 PK	74.0	-24.9	1.66 H	325	37.1	12.0
6	11570.00	36.6 AV	54.0	-17.4	1.66 H	325	24.6	12.0
7	#17355.00	52.2 PK	68.2	-16.0	1.70 H	15	35.2	17.0

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5626.21	58.7 PK	68.2	-9.5	1.86 V	5	57.3	1.4
2	*5785.00	126.3 PK			1.86 V	5	124.5	1.8
3	*5785.00	115.7 AV			1.86 V	5	113.9	1.8
4	#5946.36	58.5 PK	68.2	-9.7	1.86 V	5	56.7	1.8
5	11570.00	49.7 PK	74.0	-24.3	1.73 V	158	37.7	12.0
6	11570.00	37.6 AV	54.0	-16.4	1.73 V	158	25.6	12.0
7	#17355.00	49.6 PK	68.2	-18.6	1.81 V	151	32.6	17.0

Remarks:

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

RF Mode	TX 802.11ac (VHT20)	Channel	CH 165 : 5825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5578.60	52.9 PK	68.2	-15.3	1.26 H	69	51.6	1.3
2	*5825.00	114.4 PK			1.26 H	69	112.6	1.8
3	*5825.00	104.6 AV			1.26 H	69	102.8	1.8
4	#5988.32	51.3 PK	68.2	-16.9	1.26 H	69	49.5	1.8
5	11650.00	49.0 PK	74.0	-25.0	1.70 H	325	37.3	11.7
6	11650.00	36.3 AV	54.0	-17.7	1.70 H	325	24.6	11.7
7	#17475.00	51.9 PK	68.2	-16.3	1.73 H	20	33.0	18.9

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5582.09	60.3 PK	68.2	-7.9	1.76 V	5	59.0	1.3
2	*5825.00	126.6 PK			1.76 V	5	124.8	1.8
3	*5825.00	116.0 AV			1.76 V	5	114.2	1.8
4	#5981.66	61.4 PK	68.2	-6.8	1.76 V	5	59.6	1.8
5	11650.00	50.0 PK	74.0	-24.0	1.80 V	154	38.3	11.7
6	11650.00	37.7 AV	54.0	-16.3	1.80 V	154	26.0	11.7
7	#17475.00	48.7 PK	68.2	-19.5	1.77 V	147	29.8	18.9

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.

RF Mode	TX 802.11ac (VHT40)	Channel	CH 38 : 5190 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5148.20	53.7 PK	74.0	-20.3	1.22 H	65	52.6	1.1
2	5148.20	41.8 AV	54.0	-12.2	1.22 H	65	40.7	1.1
3	*5190.00	99.7 PK			1.22 H	65	98.7	1.0
4	*5190.00	90.1 AV			1.22 H	65	89.1	1.0
5	#10380.00	45.6 PK	68.2	-22.6	1.73 H	173	35.3	10.3
6	15570.00	45.5 PK	74.0	-28.5	1.64 H	352	33.4	12.1
7	15570.00	32.8 AV	54.0	-21.2	1.64 H	352	20.7	12.1

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.7 PK	74.0	-9.3	1.57 V	170	63.6	1.1
2	5150.00	53.3 AV	54.0	-0.7	1.57 V	170	52.2	1.1
3	*5190.00	110.8 PK			1.57 V	170	109.8	1.0
4	*5190.00	102.3 AV			1.57 V	170	101.3	1.0
5	#10380.00	45.4 PK	68.2	-22.8	1.71 V	160	35.1	10.3
6	15570.00	46.4 PK	74.0	-27.6	1.77 V	129	34.3	12.1
7	15570.00	34.7 AV	54.0	-19.3	1.77 V	129	22.6	12.1

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.

RF Mode	TX 802.11ac (VHT40)	Channel	CH 46 : 5230 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5230.00	101.9 PK			1.24 H	70	101.0	0.9
2	*5230.00	92.4 AV			1.24 H	70	91.5	0.9
3	5393.69	49.3 PK	74.0	-24.7	1.24 H	70	48.3	1.0
4	5393.69	37.6 AV	54.0	-16.4	1.24 H	70	36.6	1.0
5	#10460.00	46.1 PK	68.2	-22.1	1.78 H	167	35.7	10.4
6	15690.00	45.2 PK	74.0	-28.8	1.64 H	9	33.9	11.3
7	15690.00	33.0 AV	54.0	-21.0	1.64 H	9	21.7	11.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5230.00	114.5 PK			1.59 V	166	113.6	0.9
2	*5230.00	104.4 AV			1.59 V	166	103.5	0.9
3	5385.29	55.3 PK	74.0	-18.7	1.59 V	166	54.3	1.0
4	5385.29	44.3 AV	54.0	-9.7	1.59 V	166	43.3	1.0
5	#10460.00	46.4 PK	68.2	-21.8	1.69 V	163	36.0	10.4
6	15690.00	47.2 PK	74.0	-26.8	1.72 V	157	35.9	11.3
7	15690.00	35.1 AV	54.0	-18.9	1.72 V	157	23.8	11.3

Remarks:

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

RF Mode	TX 802.11ac (VHT40)	Channel	CH 151 : 5755 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5606.94	51.5 PK	68.2	-16.7	1.33 H	72	50.1	1.4
2	*5755.00	107.7 PK			1.33 H	72	106.0	1.7
3	*5755.00	99.1 AV			1.33 H	72	97.4	1.7
4	#6007.05	51.1 PK	68.2	-17.1	1.33 H	72	49.3	1.8
5	11510.00	48.9 PK	74.0	-25.1	1.68 H	325	36.8	12.1
6	11510.00	36.8 AV	54.0	-17.2	1.68 H	325	24.7	12.1
7	#17265.00	52.4 PK	68.2	-15.8	1.69 H	32	36.4	16.0

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5640.87	58.7 PK	68.2	-9.5	1.72 V	8	57.3	1.4
2	*5755.00	119.6 PK			1.72 V	8	117.9	1.7
3	*5755.00	110.7 AV			1.72 V	8	109.0	1.7
4	#5934.19	54.6 PK	68.2	-13.6	1.72 V	8	52.8	1.8
5	11510.00	49.5 PK	74.0	-24.5	1.74 V	148	37.4	12.1
6	11510.00	36.9 AV	54.0	-17.1	1.74 V	148	24.8	12.1
7	#17265.00	48.9 PK	68.2	-19.3	1.83 V	145	32.9	16.0

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.

RF Mode	TX 802.11ac (VHT40)	Channel	CH 159 : 5795 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5641.71	51.1 PK	68.2	-17.1	1.36 H	97	49.7	1.4
2	*5795.00	109.5 PK			1.36 H	97	107.6	1.9
3	*5795.00	101.3 AV			1.36 H	97	99.4	1.9
4	#5956.86	51.7 PK	68.2	-16.5	1.36 H	97	49.9	1.8
5	11590.00	48.3 PK	74.0	-25.7	1.66 H	318	36.3	12.0
6	11590.00	35.9 AV	54.0	-18.1	1.66 H	318	23.9	12.0
7	#17385.00	51.9 PK	68.2	-16.3	1.71 H	39	34.1	17.8

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5645.97	59.9 PK	68.2	-8.3	1.77 V	10	58.5	1.4
2	*5795.00	122.3 PK			1.77 V	10	120.4	1.9
3	*5795.00	112.9 AV			1.77 V	10	111.0	1.9
4	#5951.49	59.3 PK	68.2	-8.9	1.77 V	10	57.5	1.8
5	11590.00	49.3 PK	74.0	-24.7	1.77 V	142	37.3	12.0
6	11590.00	37.2 AV	54.0	-16.8	1.77 V	142	25.2	12.0
7	#17385.00	48.7 PK	68.2	-19.5	1.80 V	152	30.9	17.8

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.

RF Mode	TX 802.11ac (VHT80)	Channel	CH 42 : 5210 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5148.40	53.5 PK	74.0	-20.5	1.31 H	82	52.4	1.1
2	5148.40	41.9 AV	54.0	-12.1	1.31 H	82	40.8	1.1
3	*5210.00	96.1 PK			1.31 H	82	95.1	1.0
4	*5210.00	86.2 AV			1.31 H	82	85.2	1.0
5	5418.24	50.4 PK	74.0	-23.6	1.31 H	82	49.4	1.0
6	5418.24	37.1 AV	54.0	-16.9	1.31 H	82	36.1	1.0
7	#10420.00	45.7 PK	68.2	-22.5	1.80 H	149	35.3	10.4
8	15630.00	45.9 PK	74.0	-28.1	1.63 H	357	34.1	11.8
9	15630.00	33.3 AV	54.0	-20.7	1.63 H	357	21.5	11.8

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.0 PK	74.0	-10.0	1.52 V	170	62.9	1.1
2	5150.00	53.4 AV	54.0	-0.6	1.52 V	170	52.3	1.1
3	*5210.00	106.7 PK			1.52 V	170	105.7	1.0
4	*5210.00	97.1 AV			1.52 V	170	96.1	1.0
5	5350.00	53.2 PK	74.0	-20.8	1.52 V	170	52.4	0.8
6	5350.00	41.7 AV	54.0	-12.3	1.52 V	170	40.9	0.8
7	#10420.00	45.6 PK	68.2	-22.6	1.75 V	163	35.2	10.4
8	15630.00	46.4 PK	74.0	-27.6	1.72 V	137	34.6	11.8
9	15630.00	34.7 AV	54.0	-19.3	1.72 V	137	22.9	11.8

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.

RF Mode	TX 802.11ac (VHT80)	Channel	CH 155 : 5775 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5643.08	52.2 PK	68.2	-16.0	1.33 H	75	50.8	1.4
2	*5775.00	105.4 PK			1.33 H	75	103.6	1.8
3	*5775.00	94.2 AV			1.33 H	75	92.4	1.8
4	#5942.24	51.0 PK	68.2	-17.2	1.33 H	75	49.2	1.8
5	11550.00	48.6 PK	74.0	-25.4	1.64 H	323	36.5	12.1
6	11550.00	35.9 AV	54.0	-18.1	1.64 H	323	23.8	12.1
7	#17325.00	52.2 PK	68.2	-16.0	1.75 H	25	35.8	16.4

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5636.85	60.1 PK	68.2	-8.1	1.75 V	13	58.7	1.4
2	*5775.00	117.2 PK			1.75 V	13	115.4	1.8
3	*5775.00	106.1 AV			1.75 V	13	104.3	1.8
4	#5936.83	57.7 PK	68.2	-10.5	1.75 V	13	55.9	1.8
5	11550.00	49.5 PK	74.0	-24.5	1.75 V	163	37.4	12.1
6	11550.00	37.0 AV	54.0	-17.0	1.75 V	163	24.9	12.1
7	#17325.00	48.9 PK	68.2	-19.3	1.79 V	145	32.5	16.4

Remarks:

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

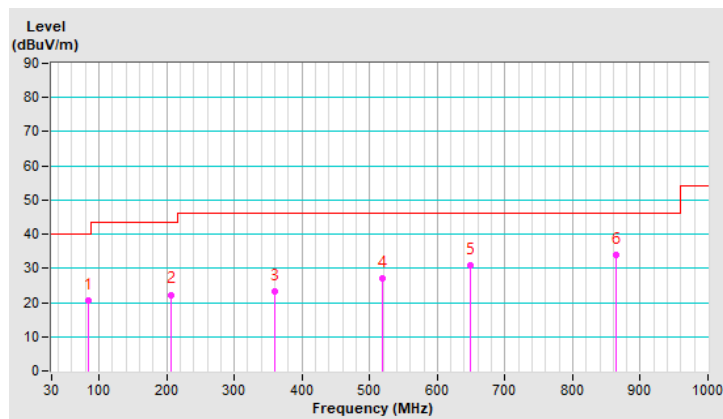
Below 1GHz Data:

RF Mode	TX 802.11ac (VHT20)	Channel	CH 165 : 5825 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	84.54	20.7 QP	40.0	-19.3	1.00 H	93	35.0	-14.3
2	206.98	22.3 QP	43.5	-21.2	1.50 H	3	33.9	-11.6
3	360.33	23.3 QP	46.0	-22.7	1.00 H	342	29.0	-5.7
4	519.12	27.1 QP	46.0	-18.9	1.50 H	254	28.7	-1.6
5	649.22	30.8 QP	46.0	-15.2	1.00 H	18	29.4	1.4
6	864.18	33.8 QP	46.0	-12.2	1.50 H	277	28.8	5.0

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 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.



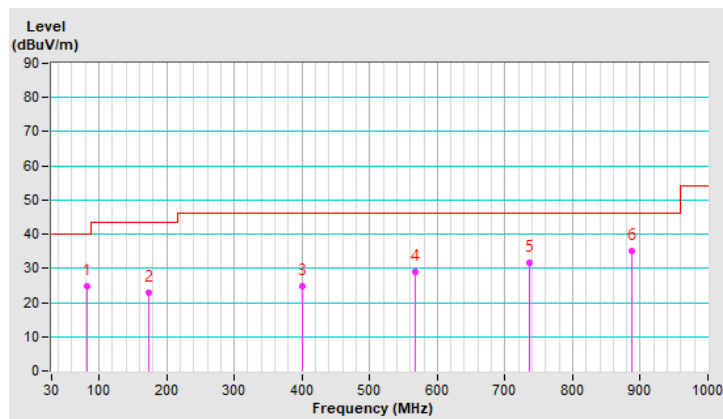
RF Mode	TX 802.11ac (VHT20)	Channel	CH 165 : 5825 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	81.82	24.7 QP	40.0	-15.3	1.50 V	360	38.6	-13.9
2	174.48	23.0 QP	43.5	-20.5	1.50 V	360	32.2	-9.2
3	399.64	24.8 QP	46.0	-21.2	1.00 V	104	29.5	-4.7
4	567.02	29.0 QP	46.0	-17.0	1.00 V	310	29.7	-0.7
5	736.43	31.6 QP	46.0	-14.4	1.00 V	146	28.5	3.1
6	887.24	34.9 QP	46.0	-11.1	2.00 V	289	29.3	5.6

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 of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Jan. 04, 2021

4.2.3 Test Procedure

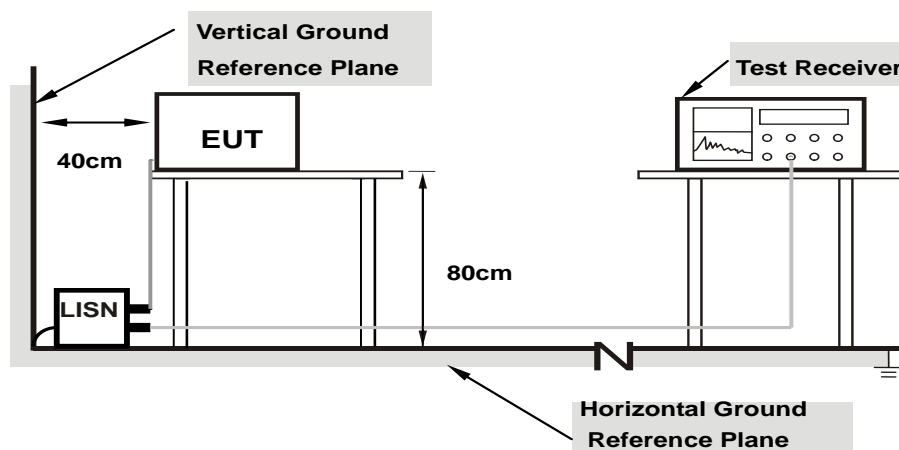
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

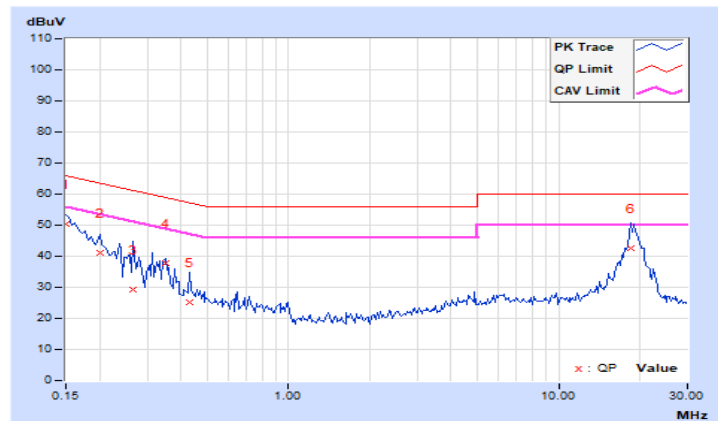
4.2.7 Test Results

RF Mode	TX 802.11ac (VHT20)	Channel	CH 165 : 5825 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15000	9.96	40.24	24.99	50.20	34.95	66.00	56.00	-15.80	-21.05
2	0.20078	9.99	31.20	18.33	41.19	28.32	63.58	53.58	-22.39	-25.26
3	0.26719	10.00	19.30	6.15	29.30	16.15	61.20	51.20	-31.90	-35.05
4	0.34922	10.01	27.63	22.05	37.64	32.06	58.98	48.98	-21.34	-16.92
5	0.43125	10.02	15.15	4.55	25.17	14.57	57.23	47.23	-32.06	-32.66
6	18.46484	11.35	31.20	24.35	42.55	35.70	60.00	50.00	-17.45	-14.30

Remarks:

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

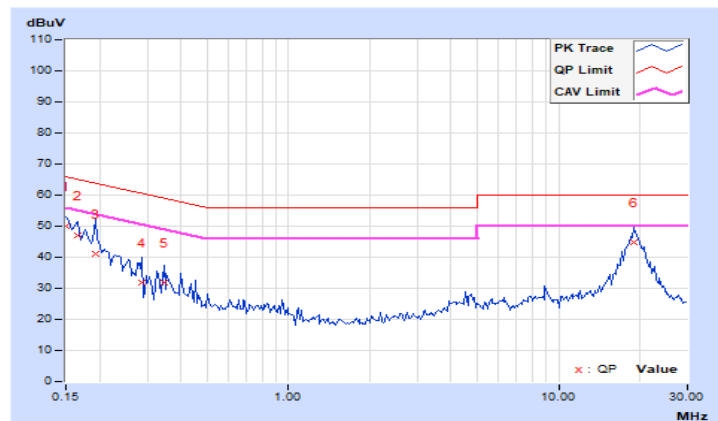


RF Mode	TX 802.11ac (VHT20)	Channel	CH 165 : 5825 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15000	9.94	40.22	24.63	50.16	34.57	66.00	56.00	-15.84	-21.43
2	0.16562	9.95	37.13	20.76	47.08	30.71	65.18	55.18	-18.10	-24.47
3	0.19297	9.97	31.32	15.69	41.29	25.66	63.91	53.91	-22.62	-28.25
4	0.28672	9.99	21.82	6.62	31.81	16.61	60.62	50.62	-28.81	-34.01
5	0.34531	10.00	21.87	10.39	31.87	20.39	59.07	49.07	-27.20	-28.68
6	18.98047	11.12	33.52	27.32	44.64	38.44	60.00	50.00	-15.36	-11.56

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3		√	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

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

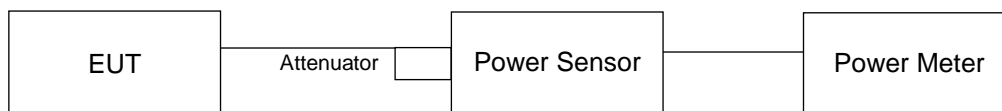
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

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

Note: This device can support different category application which switched by access point mode and client mode by software.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	12.35	12.13	12.73	52.26	17.18	30.00	Pass
44	5220	12.02	12.36	12.43	50.639	17.04	30.00	Pass
48	5240	11.61	12.17	12.26	47.796	16.79	30.00	Pass
149	5745	24.29	23.32	24.08	739.176	28.69	30.00	Pass
157	5785	24.21	23.34	24.05	733.505	28.65	30.00	Pass
165	5825	24.20	23.44	24.01	735.595	28.67	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	12.92	12.84	13.60	61.728	17.90	30.00	Pass
44	5220	12.85	12.91	13.41	60.747	17.84	30.00	Pass
48	5240	13.07	13.22	13.56	63.965	18.06	30.00	Pass
149	5745	24.00	23.10	23.79	694.694	28.42	30.00	Pass
157	5785	24.61	23.60	24.20	781.182	28.93	30.00	Pass
165	5825	24.81	23.91	24.34	820.372	29.14	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	12.51	12.49	13.35	57.193	17.57	30.00	Pass
46	5230	16.45	16.29	16.93	136.034	21.34	30.00	Pass
151	5755	21.67	21.09	21.60	419.965	26.23	30.00	Pass
159	5795	23.14	22.66	23.04	591.937	27.72	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	11.77	12.28	12.69	50.514	17.03	30.00	Pass
155	5775	18.75	19.06	19.11	236.998	23.75	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	12.92	12.84	13.60	61.728	17.90	29.66	Pass
44	5220	12.85	12.91	13.41	60.747	17.84	29.66	Pass
48	5240	13.07	13.22	13.56	63.965	18.06	29.66	Pass
149	5745	24.00	23.10	23.79	694.694	28.42	29.38	Pass
157	5785	24.61	23.60	24.20	781.182	28.93	29.38	Pass
165	5825	24.81	23.91	24.34	820.372	29.14	29.38	Pass

Note: 1. For U-NII-1: Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.34 - 6) = 29.66\text{dBm}$.

2. For U-NII-3: Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.62 - 6) = 29.38\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	12.51	12.49	13.35	57.193	17.57	29.66	Pass
46	5230	16.45	16.29	16.93	136.034	21.34	29.66	Pass
151	5755	21.67	21.09	21.60	419.965	26.23	29.38	Pass
159	5795	23.14	22.66	23.04	591.937	27.72	29.38	Pass

Note: 1. For U-NII-1: Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.34 - 6) = 29.66\text{dBm}$.

2. For U-NII-3: Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.62 - 6) = 29.38\text{dBm}$.

802.11ac (VHT80)

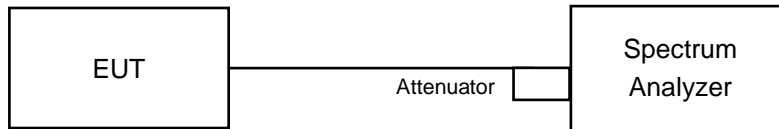
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	11.77	12.28	12.69	50.514	17.03	29.66	Pass
155	5775	18.75	19.06	19.11	236.998	23.75	29.38	Pass

Note: 1. For U-NII-1: Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.34 - 6) = 29.66\text{dBm}$.

2. For U-NII-3: Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.62 - 6) = 29.38\text{dBm}$.

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	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	16.92	16.8	16.92
44	5220	16.92	16.92	16.8
48	5240	16.8	16.8	16.8
149	5745	21.96	17.28	17.65
157	5785	21	17.52	18.24
165	5825	23.4	17.64	18

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	18	17.76	18
44	5220	17.88	17.76	17.88
48	5240	18	17.76	18
149	5745	21.48	18.12	18.36
157	5785	25.56	18.48	18.72
165	5825	24.24	18.6	18.84

802.11ac (VHT40)

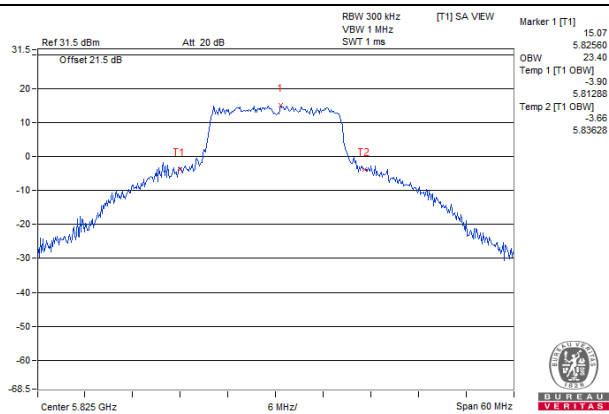
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
38	5190	36.96	36.48	36.48
46	5230	36.48	36.48	36.48
151	5755	37.44	36.96	37.2
159	5795	39.6	37.2	37.2

802.11ac (VHT80)

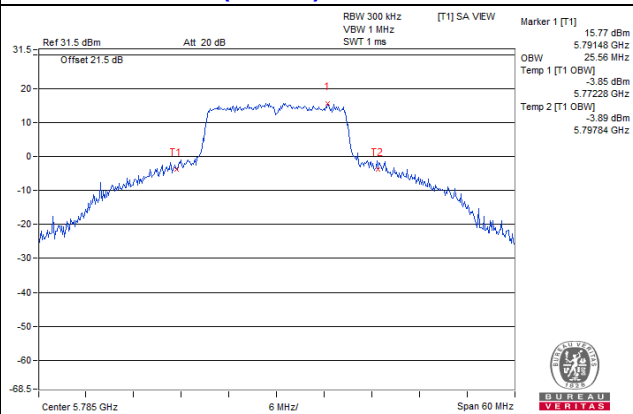
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
42	5210	75.84	75.84	75.84
155	5775	75.84	75.84	75.84

Spectrum Plot of Max. Value

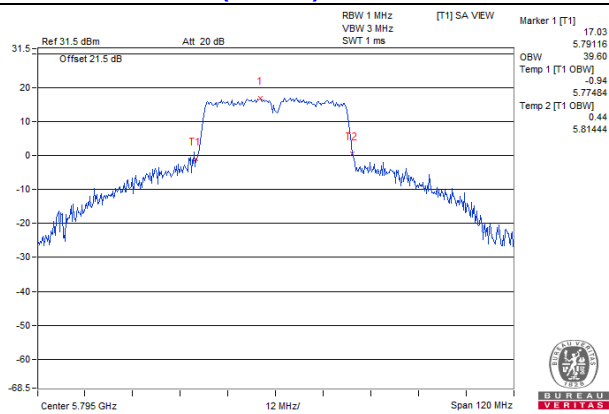
802.11a_Chain 0 / CH165



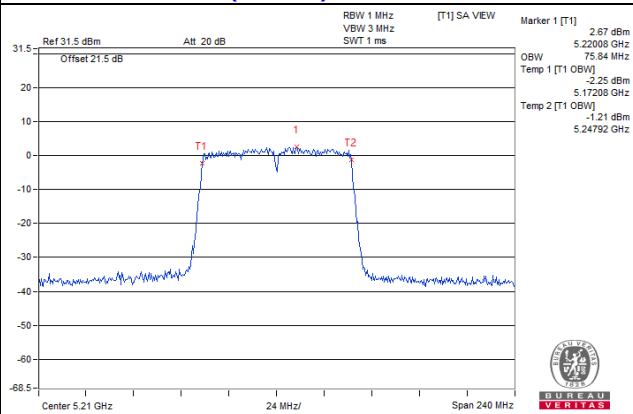
802.11ac (VHT20)_Chain 0 / CH157



802.11ac (VHT40)_Chain 0 / CH159

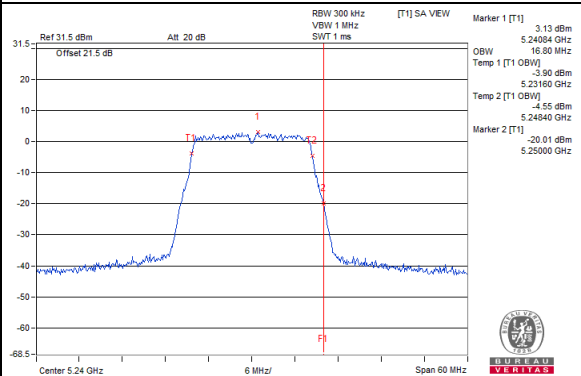


802.11ac (VHT80)_Chain 0 / CH42

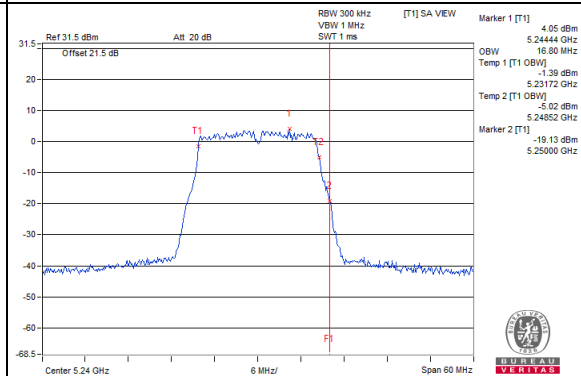


**Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)**

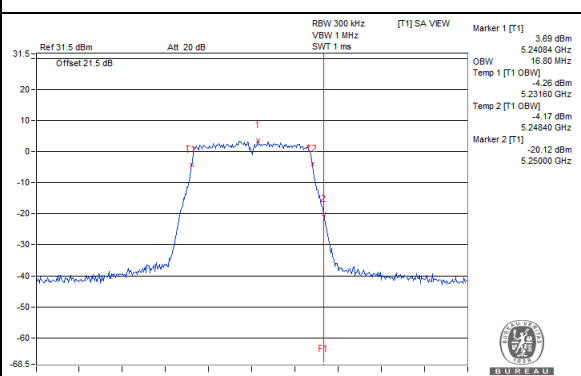
802.11a_Chain 0 / CH48



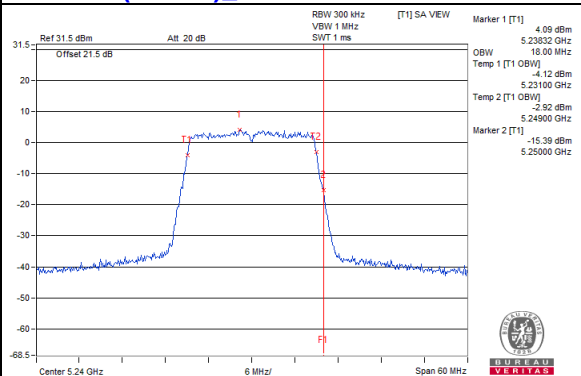
802.11a_Chain 1 / CH48



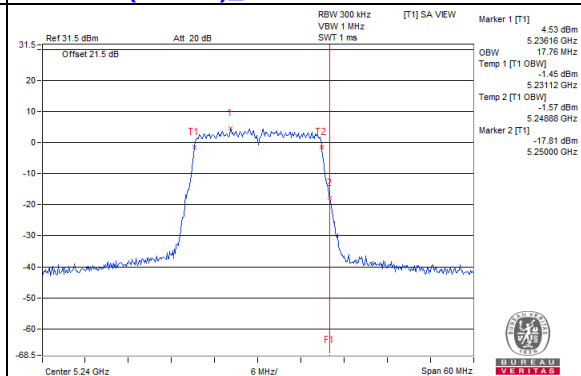
802.11a_Chain 2 / CH48



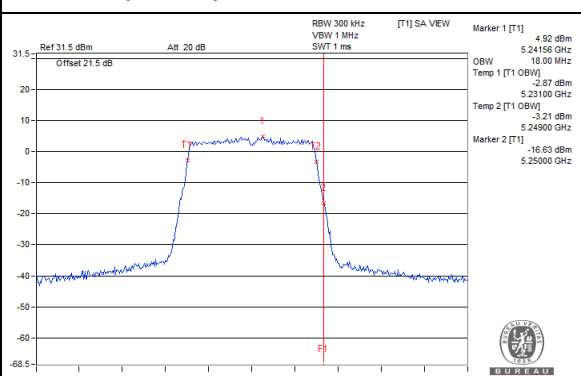
802.11ac (VHT20)_Chain 0 / CH48



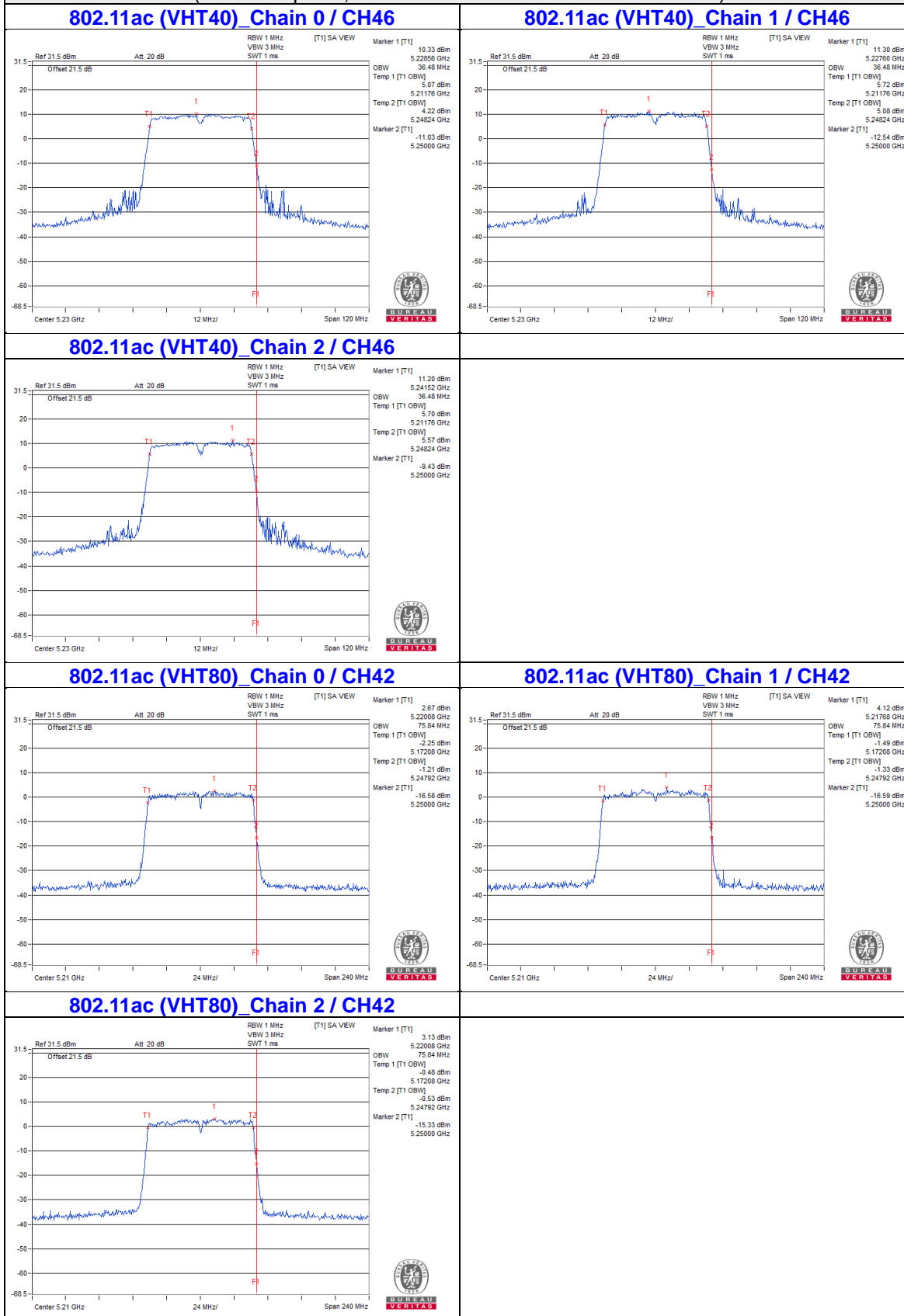
802.11ac (VHT20)_Chain 1 / CH48



802.11ac (VHT20)_Chain 2 / CH48

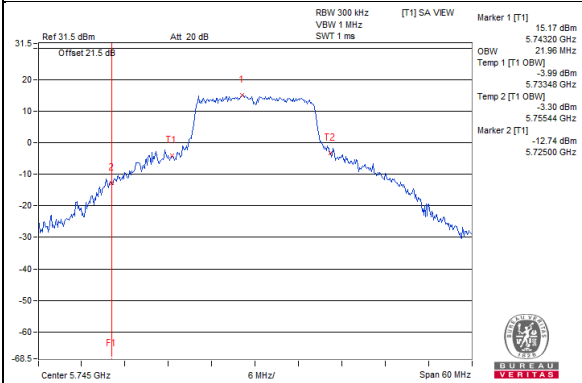


**Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)**

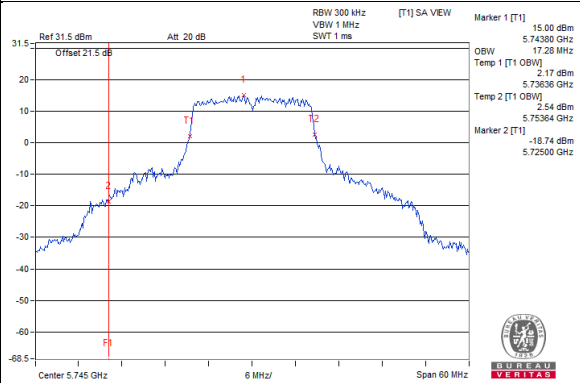


**Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)**

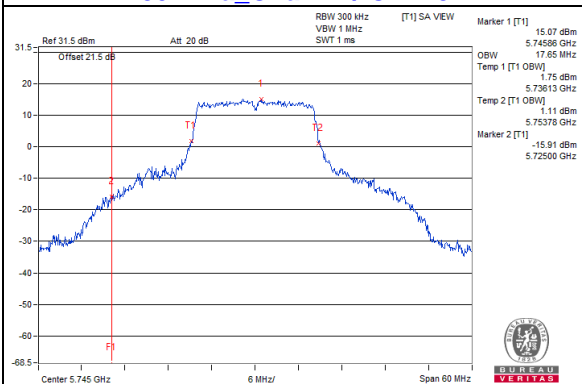
802.11a_Chain 0 / CH149



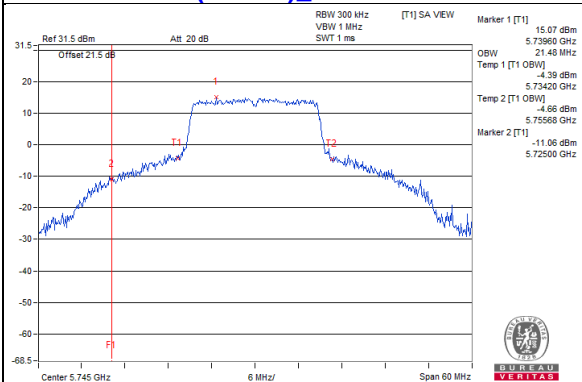
802.11a_Chain 1 / CH149



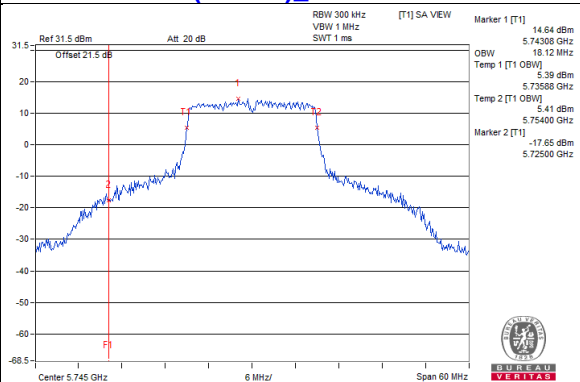
802.11a_Chain 2 / CH149



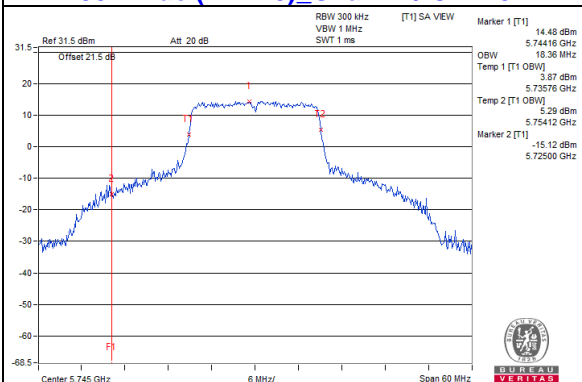
802.11ac (VHT20)_Chain 0 / CH149



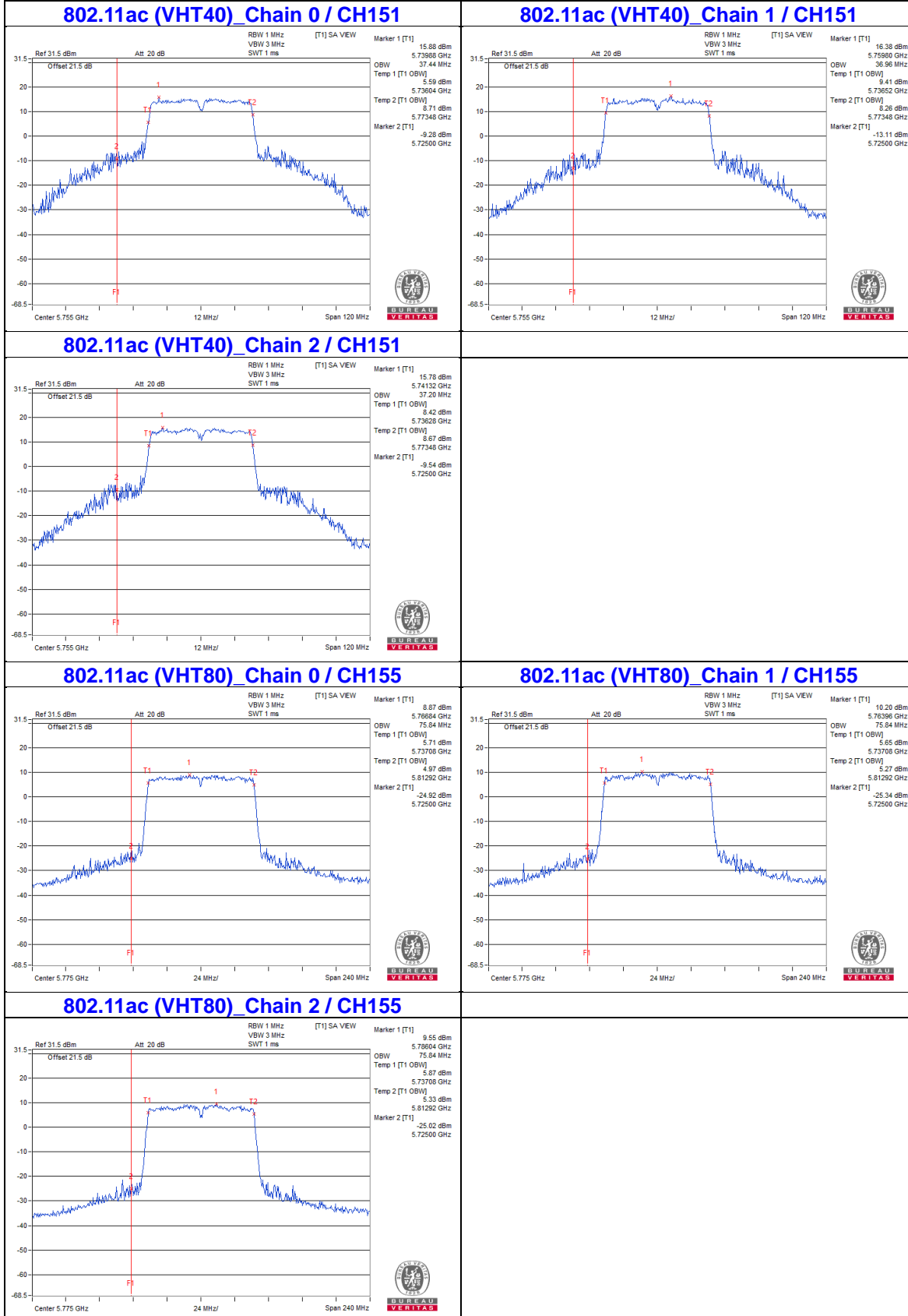
802.11ac (VHT20)_Chain 1 / CH149



802.11ac (VHT20)_Chain 2 / CH149



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

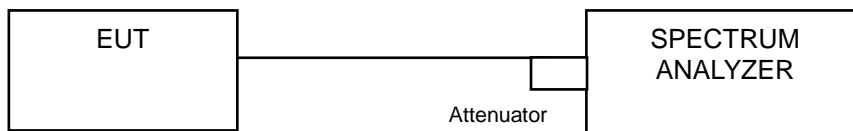


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1:

Using method SA-1

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

For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/300\text{ kHz})$
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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1	Chain2			
36	5180	-0.30	-0.28	0.09	4.61	16.66	PASS
44	5220	-0.58	-0.06	-0.30	4.46	16.66	PASS
48	5240	-0.85	-0.35	-0.34	4.26	16.66	PASS

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(6.34-6) = 16.66\text{dBm}$.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1	Chain2			
36	5180	0.20	0.04	0.71	5.10	16.66	PASS
44	5220	-0.01	0.03	0.50	4.95	16.66	PASS
48	5240	0.10	0.13	0.83	5.14	16.66	PASS

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(6.34-6) = 16.66\text{dBm}$.

802.11ac (VHT40)

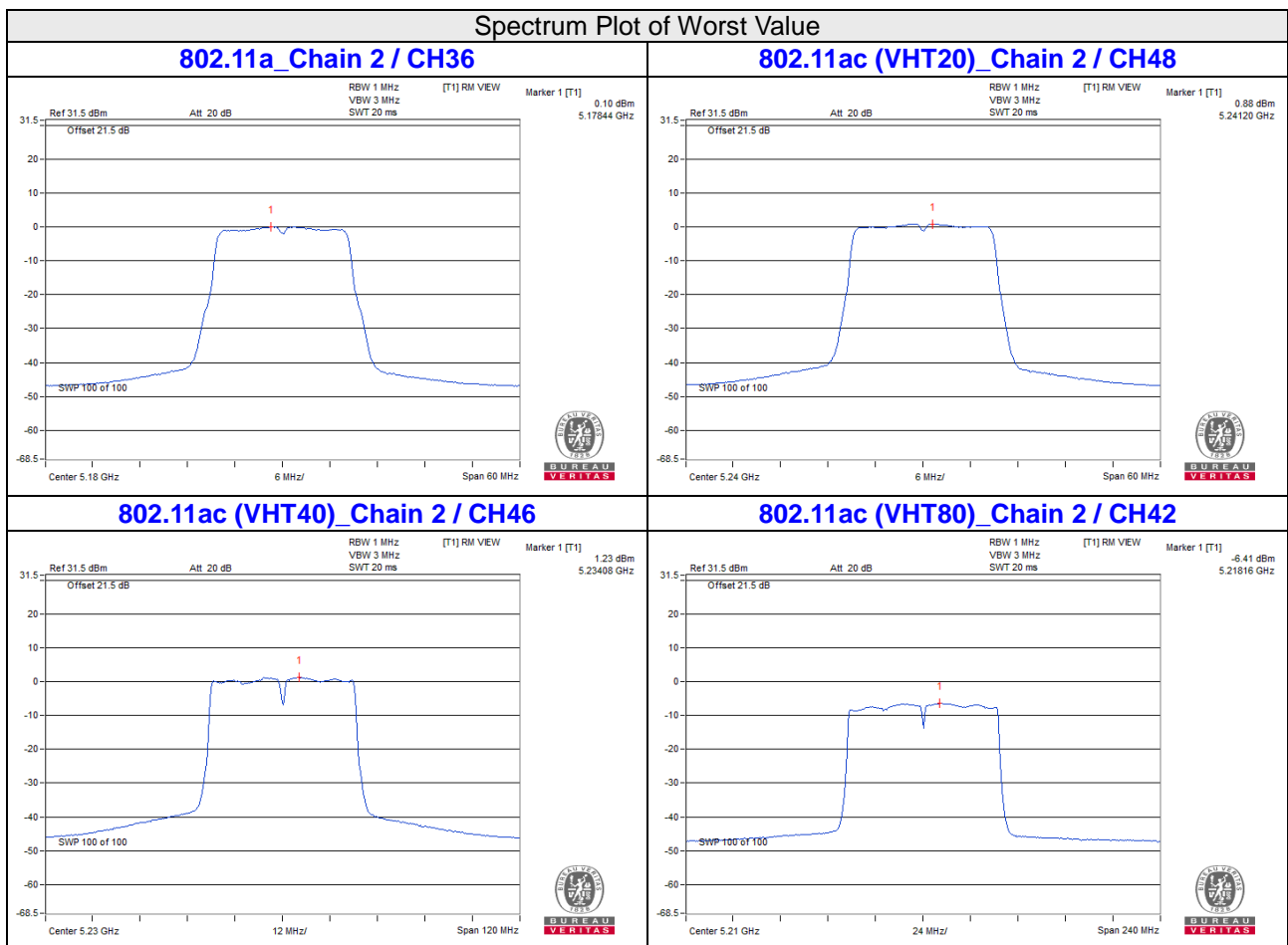
Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1	Chain2			
38	5190	-3.45	-3.53	-2.47	1.65	16.66	PASS
46	5230	0.44	0.66	1.21	5.55	16.66	PASS

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(6.34-6) = 16.66\text{dBm}$.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1	Chain2			
42	5210	-7.39	-6.74	-6.42	-2.06	16.66	PASS

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $1.57\text{dBi} + 10\log(3) = 6.34\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (6.34 - 6) = 16.66\text{dBm}$.



For U-NII-3:
802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)			Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1	Chain2					
149	5745	2.83	2.06	3.11	5.572	7.46	9.68	29.38	PASS
157	5785	2.93	2.25	3.15	5.708	7.56	9.78	29.38	PASS
165	5825	3.47	2.30	3.02	5.926	7.73	9.95	29.38	PASS

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2. Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(6.62-6) = 29.38\text{dBm}$.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)			Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1	Chain2					
149	5745	2.20	1.51	2.06	4.682	6.70	8.92	29.38	PASS
157	5785	3.37	2.17	2.68	5.674	7.54	9.76	29.38	PASS
165	5825	3.32	2.21	2.71	5.678	7.54	9.76	29.38	PASS

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2. Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(6.62-6) = 29.38\text{dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)			Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1	Chain2					
151	5755	-3.37	-3.86	-3.49	1.3191	1.20	3.42	29.38	PASS
159	5795	-1.62	-2.55	-2.31	1.832	2.63	4.85	29.38	PASS

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2. Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30-(6.62-6) = 29.38\text{dBm}$.

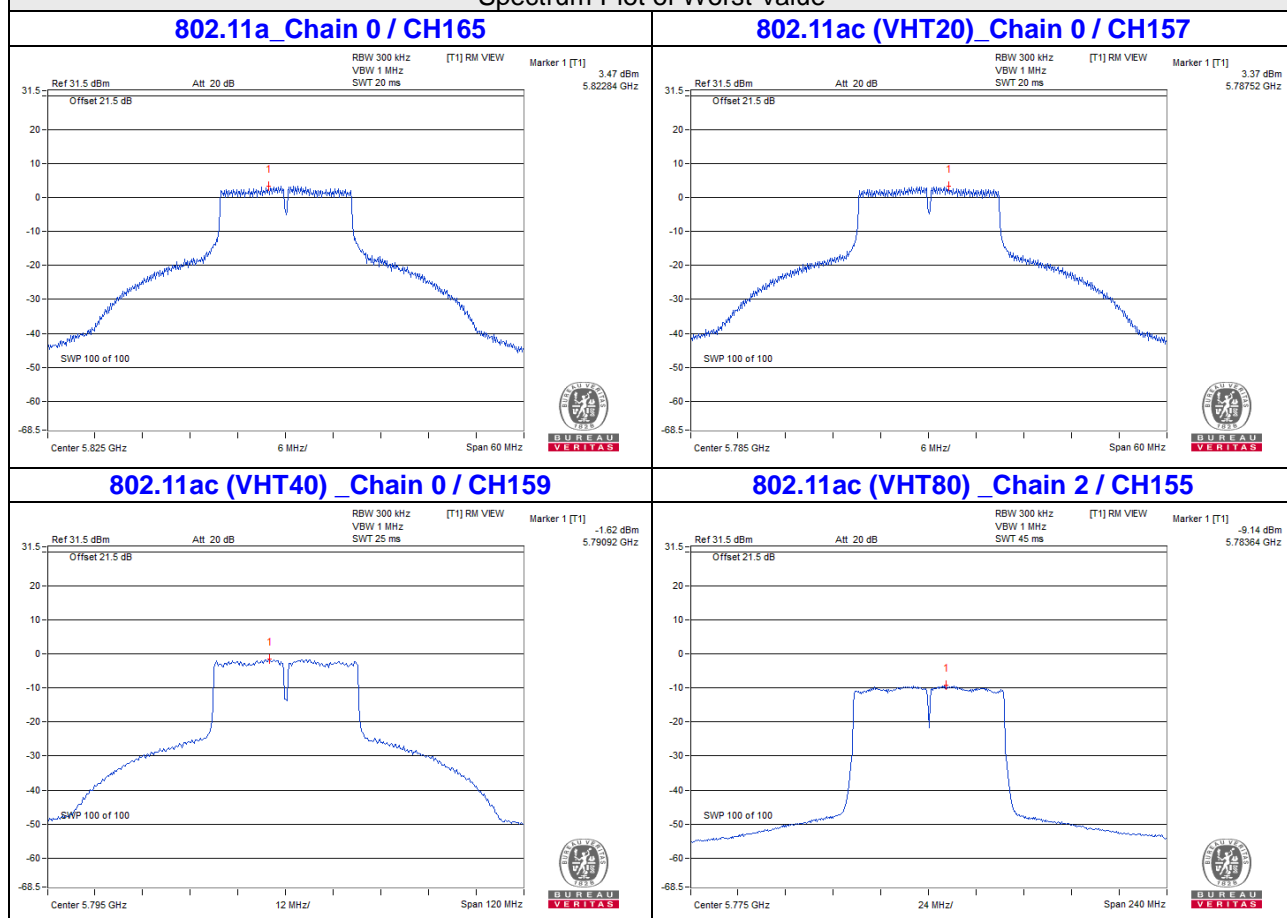
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)			Total PSD (mW/300kHz)	Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain0	Chain1	Chain2					
155	5775	-9.54	-9.32	-9.14	0.35	-4.56	-2.34	29.38	PASS

Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2. Directional gain = $1.85\text{dBi} + 10\log(3) = 6.62\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (6.62 - 6) = 29.38\text{dBm}$.

Spectrum Plot of Worst Value

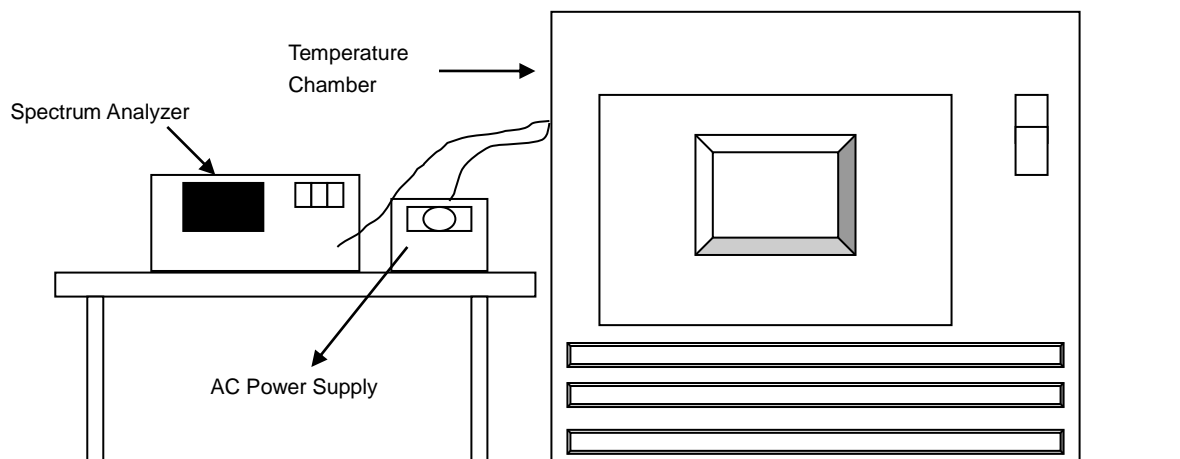


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- 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. (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5179.977	PASS	5179.9789	PASS	5179.9742	PASS	5179.9788	PASS
30	120	5180.009	PASS	5180.0049	PASS	5180.0089	PASS	5180.0066	PASS
20	120	5179.9862	PASS	5179.9892	PASS	5179.9857	PASS	5179.9855	PASS
10	120	5180.0213	PASS	5180.0205	PASS	5180.0231	PASS	5180.0224	PASS
0	120	5179.9895	PASS	5179.9888	PASS	5179.9893	PASS	5179.9906	PASS

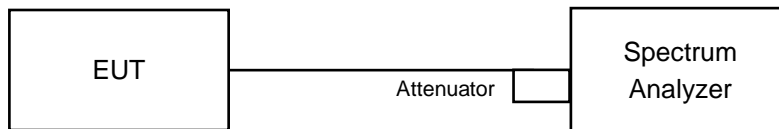
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9872	PASS	5179.9895	PASS	5179.9864	PASS	5179.9855	PASS
	120	5179.9862	PASS	5179.9892	PASS	5179.9857	PASS	5179.9855	PASS
	102	5179.9868	PASS	5179.9899	PASS	5179.9847	PASS	5179.9864	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

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)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	16.38	16.43	16.39	0.5	Pass
157	5785	16.4	16.42	16.4	0.5	Pass
165	5825	16.41	16.42	16.4	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.64	17.68	17.65	0.5	Pass
157	5785	17.65	17.65	17.64	0.5	Pass
165	5825	17.63	17.65	17.64	0.5	Pass

802.11ac (VHT40)

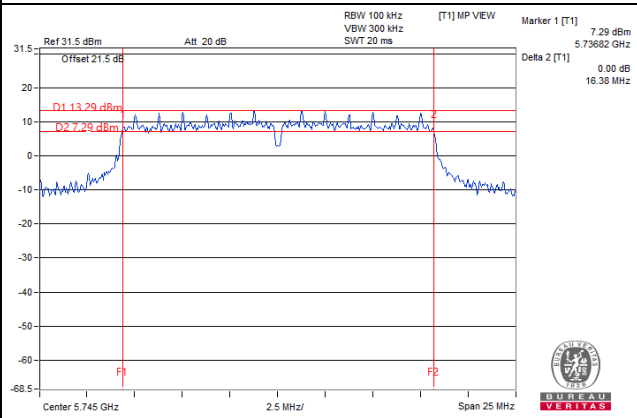
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.46	36.44	36.47	0.5	Pass
159	5795	36.47	36.45	36.46	0.5	Pass

802.11ac (VHT80)

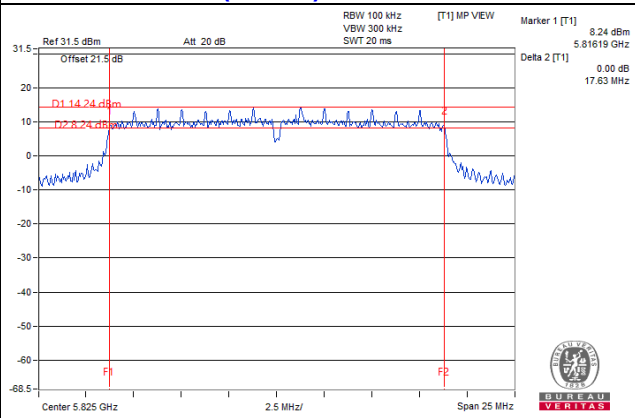
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.42	76.41	76.41	0.5	Pass

Spectrum Plot of Worst Value

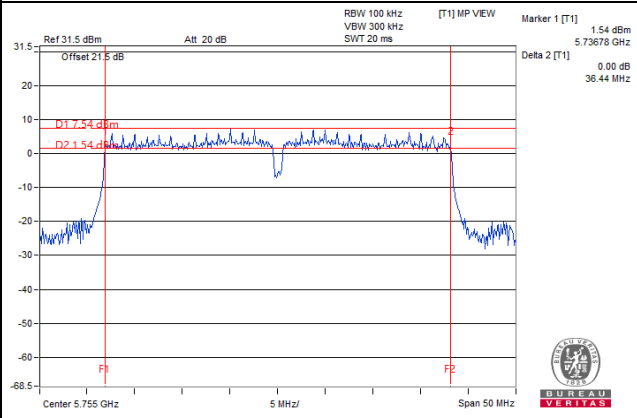
802.11a_Chain 0 / CH149



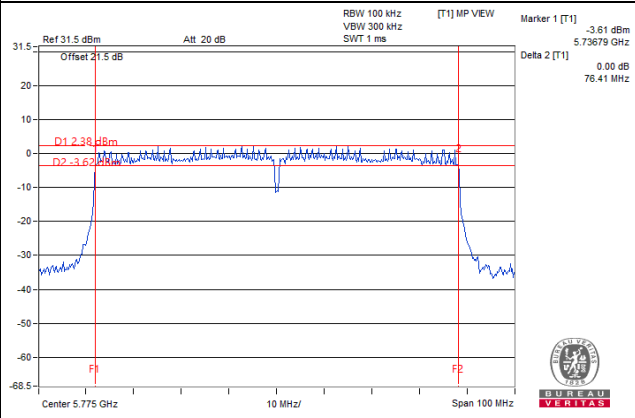
802.11ac (VHT20)_Chain 0 / CH165



802.11ac (VHT40)_Chain 1 / CH151



802.11ac (VHT80)_Chain 1 / CH155



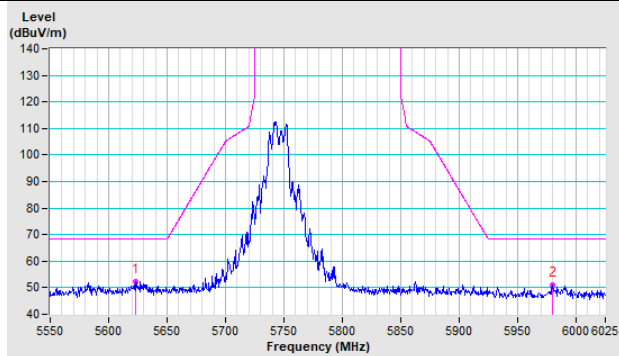
5 Pictures of Test Arrangements

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

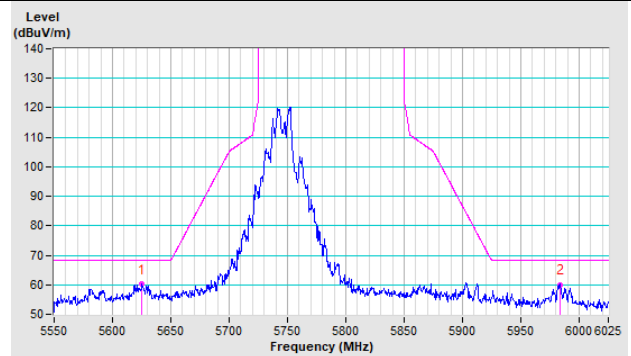
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a CH 149 : 5745 MHz

Horizontal

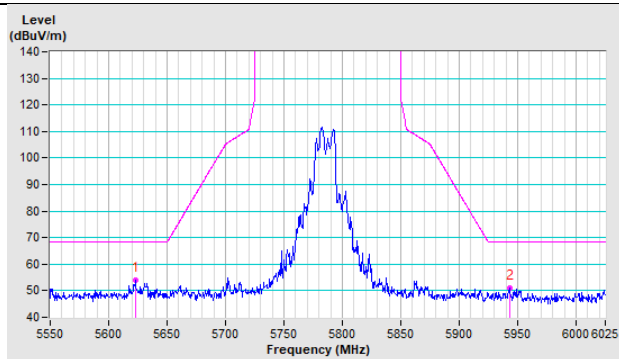


Vertical

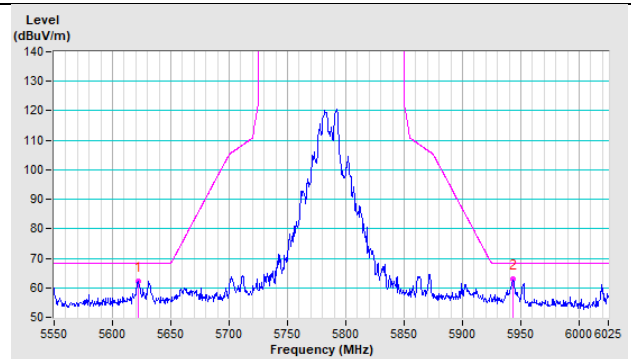


802.11a CH 157 : 5785 MHz

Horizontal

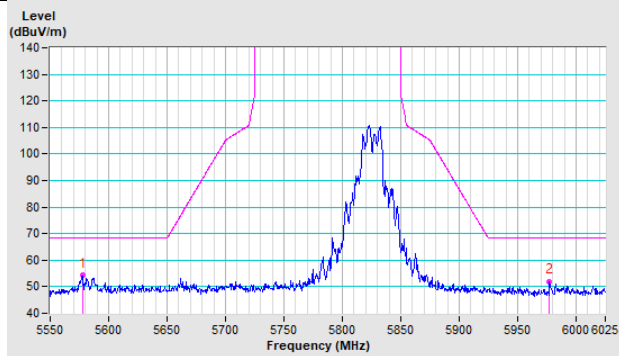


Vertical

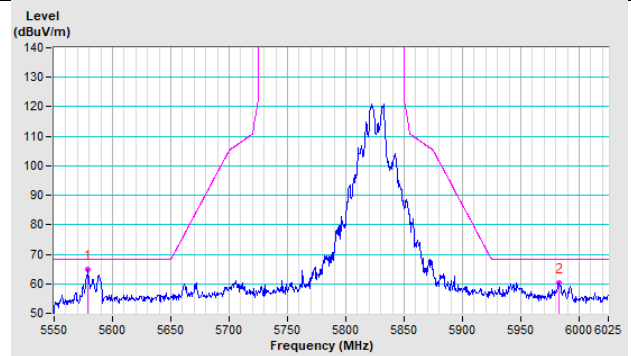


802.11a CH 165 : 5825 MHz

Horizontal

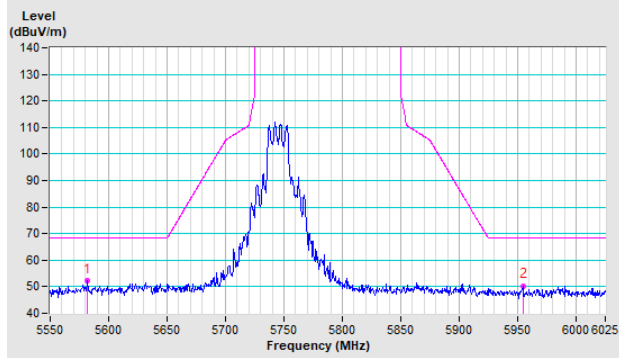


Vertical

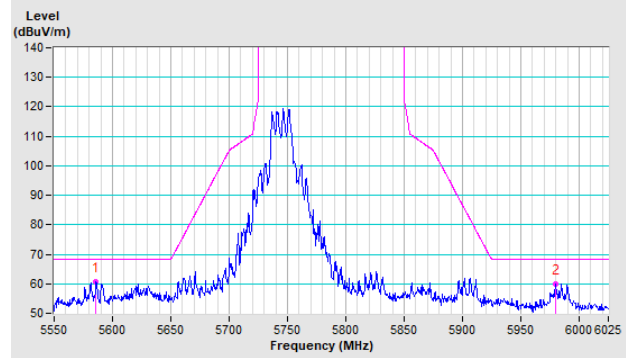


802.11ac (VHT20) CH 149 : 5745 MHz

Horizontal

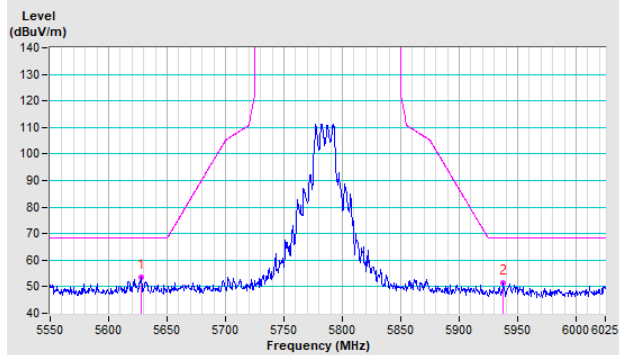


Vertical

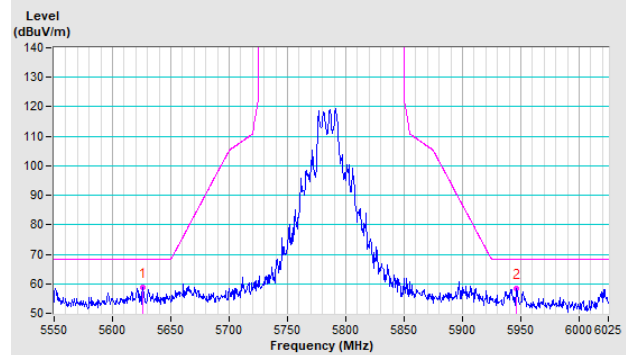


802.11ac (VHT20) CH 157 : 5785 MHz

Horizontal

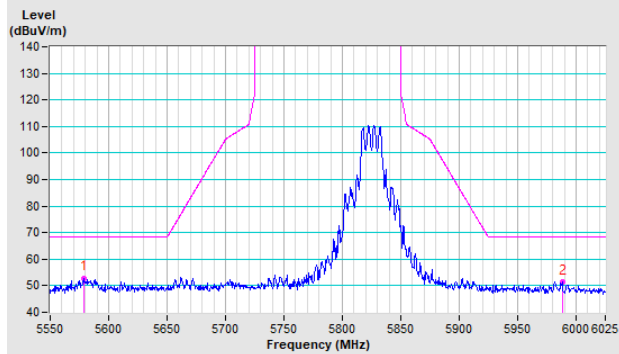


Vertical

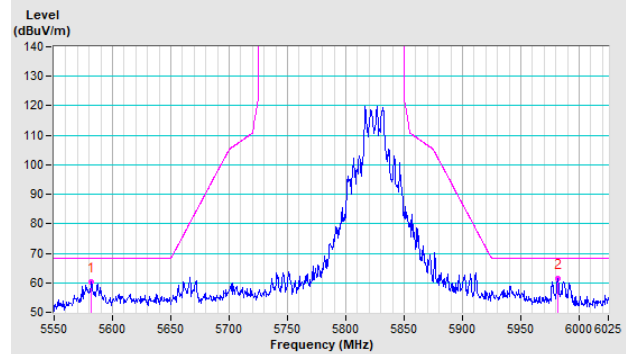


802.11ac (VHT20) CH 165 : 5825 MHz

Horizontal

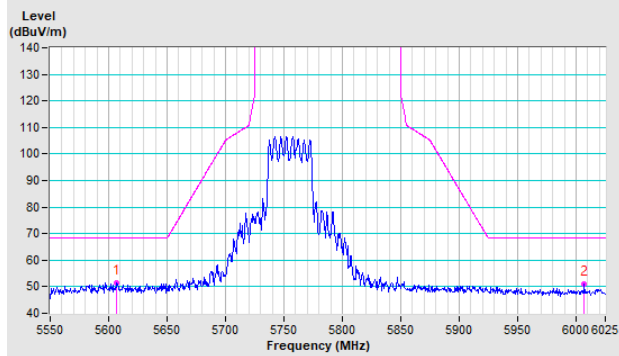


Vertical

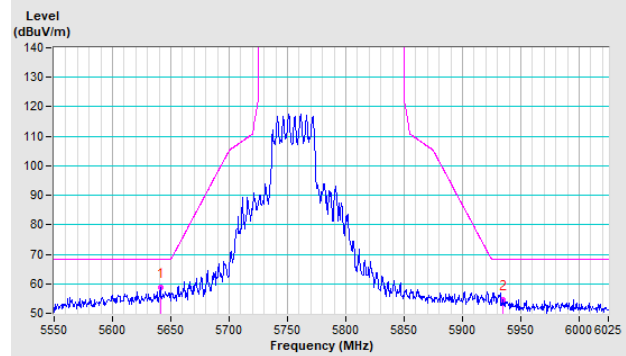


802.11ac (VHT40) CH 151 : 5755 MHz

Horizontal

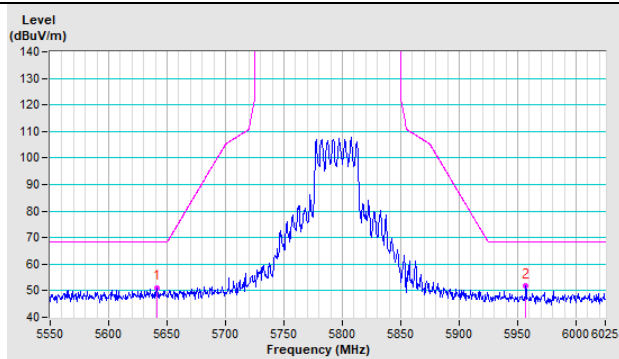


Vertical

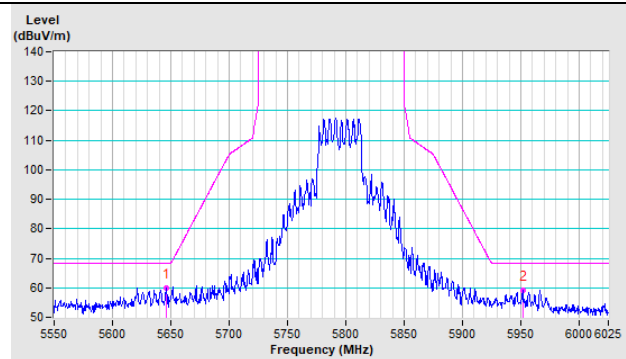


802.11ac (VHT40) CH 159 : 5795 MHz

Horizontal

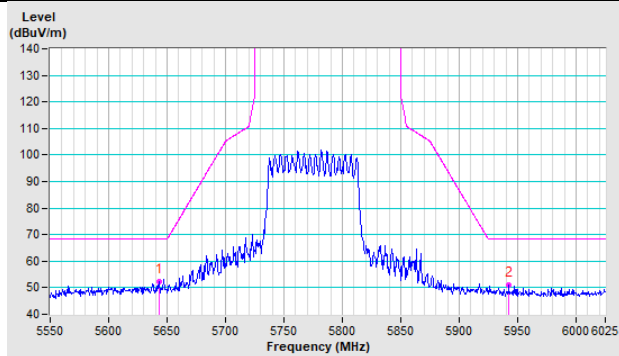


Vertical

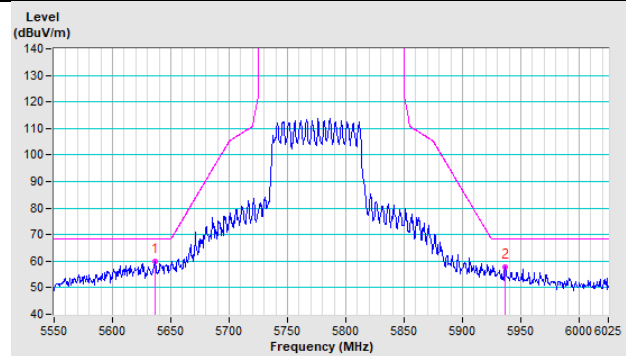


802.11ac (VHT80) CH 155 : 5775 MHz

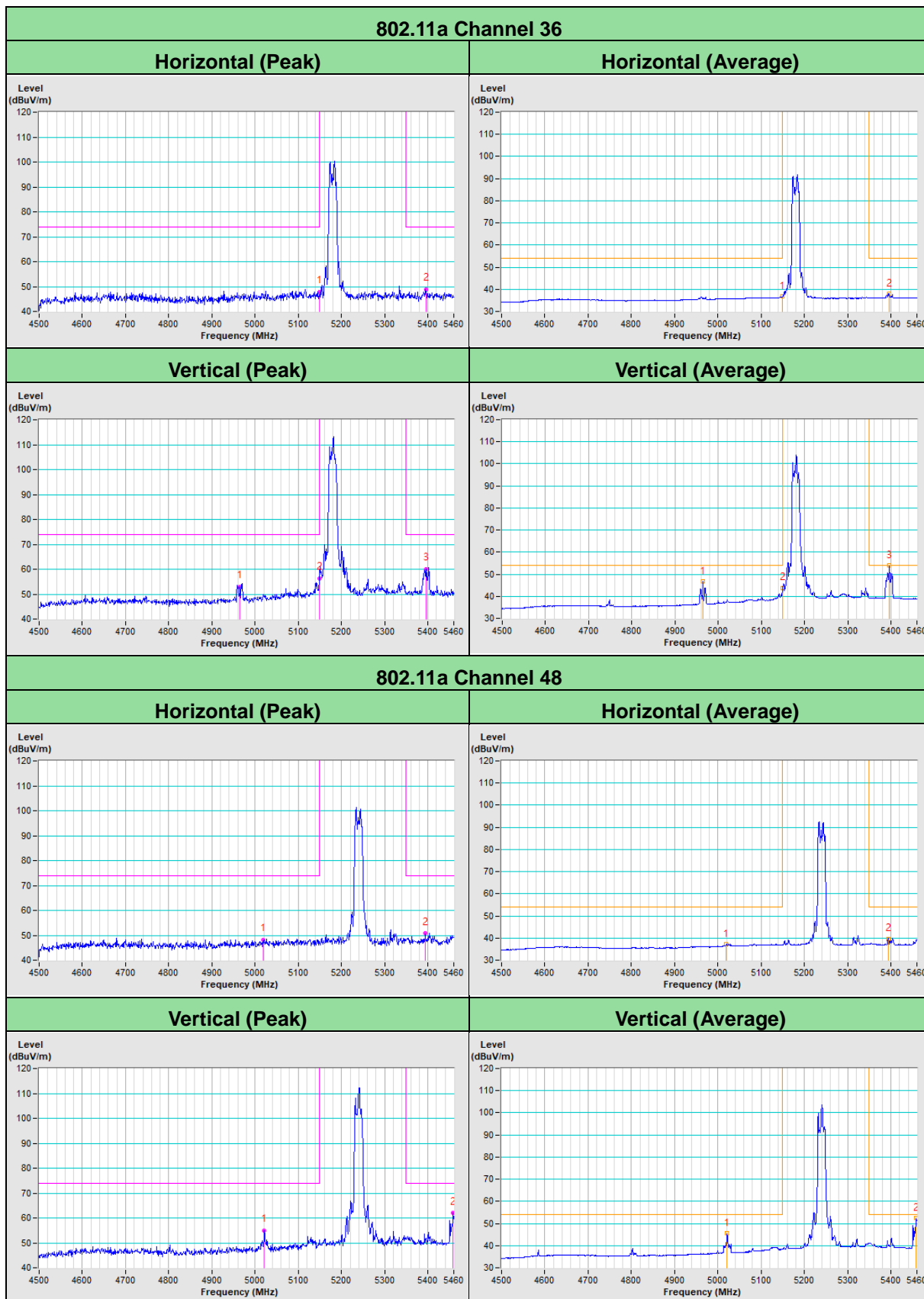
Horizontal



Vertical

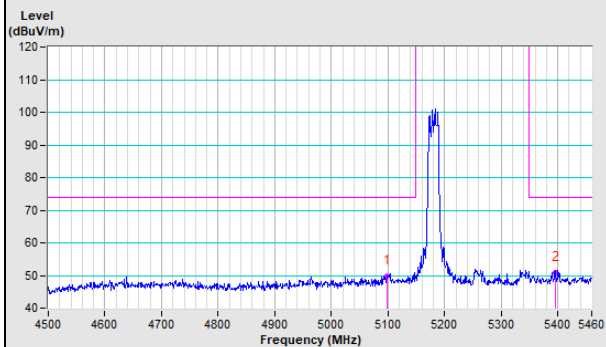


Annex B- Band-edge measurement (For U-NII-1 band)

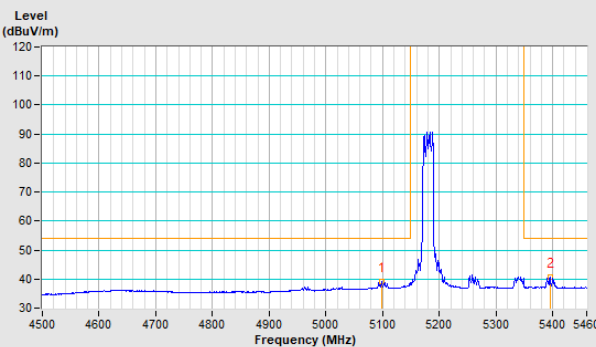


802.11ac (VHT20) Channel 36

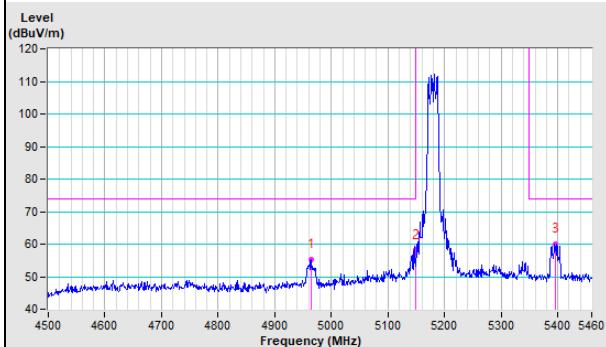
Horizontal (Peak)



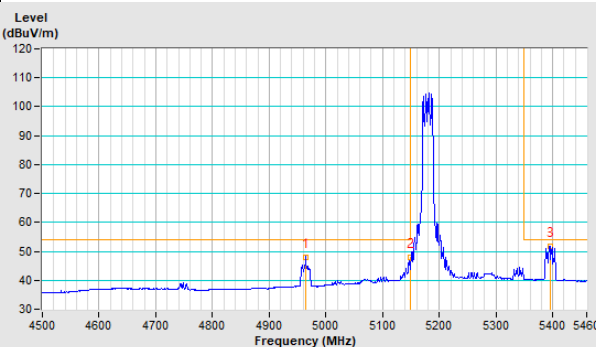
Horizontal (Average)



Vertical (Peak)

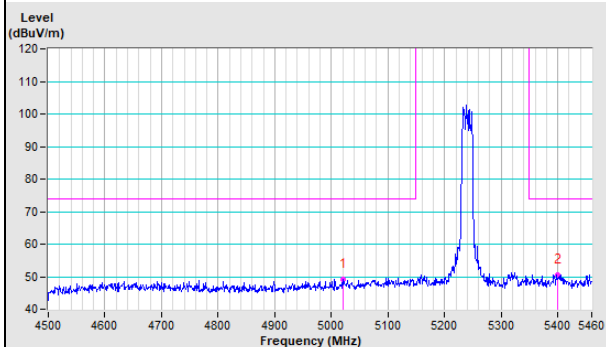


Vertical (Average)

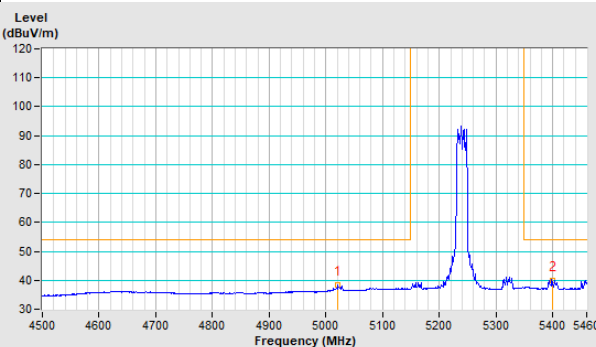


802.11ac (VHT20) Channel 48

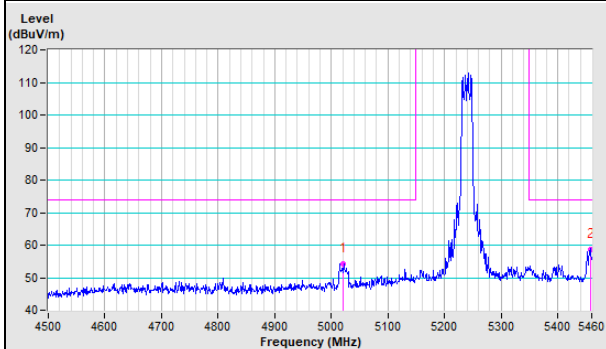
Horizontal (Peak)



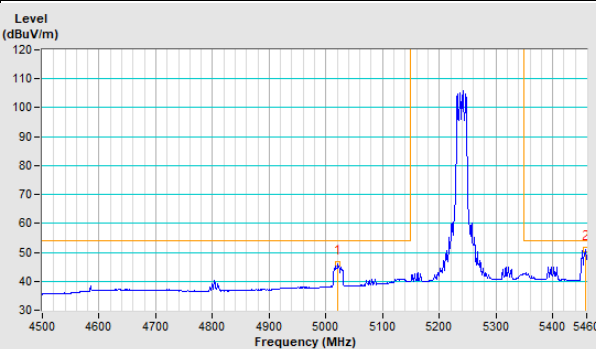
Horizontal (Average)



Vertical (Peak)

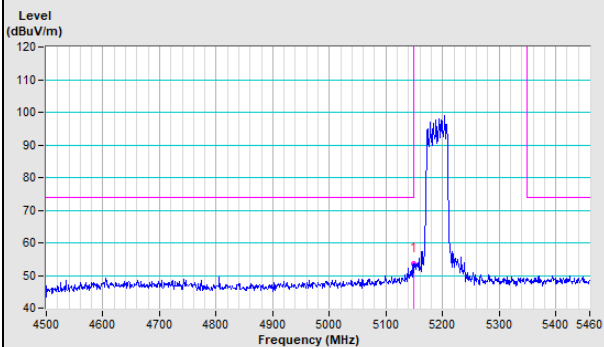


Vertical (Average)

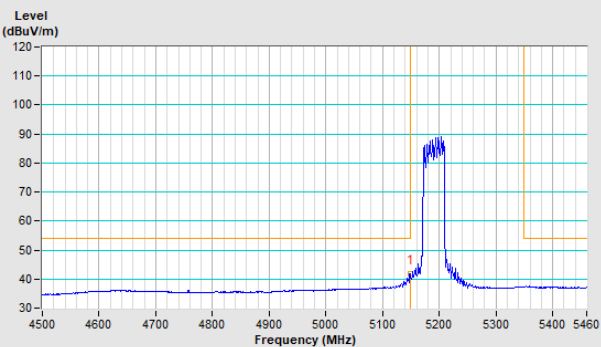


802.11ac (VHT40) Channel 38

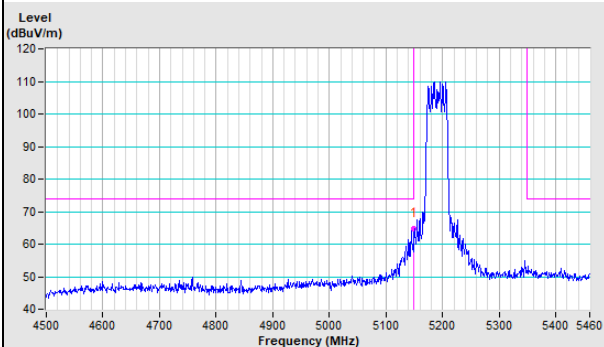
Horizontal (Peak)



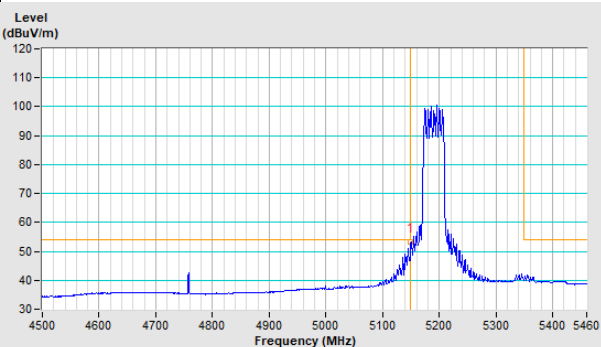
Horizontal (Average)



Vertical (Peak)

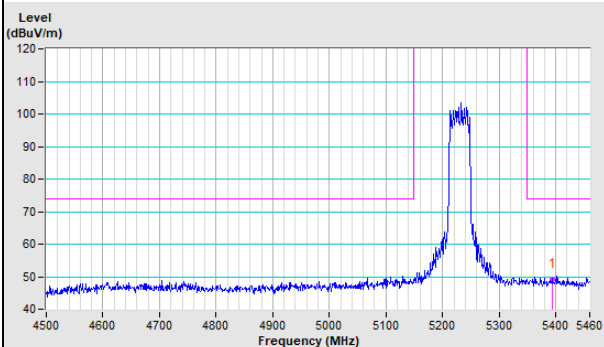


Vertical (Average)

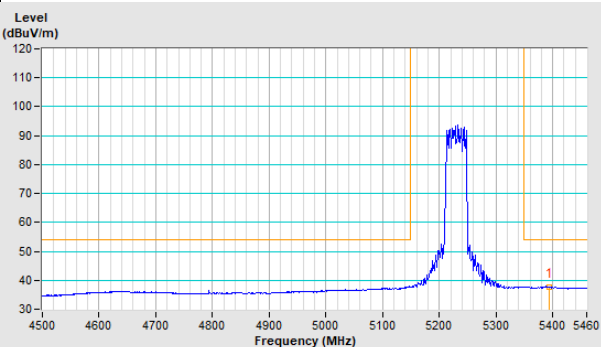


802.11ac (VHT40) Channel 46

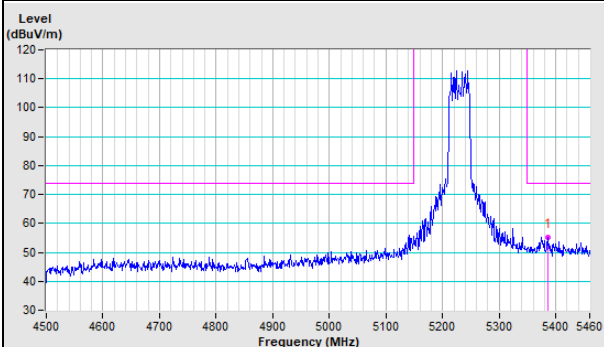
Horizontal (Peak)



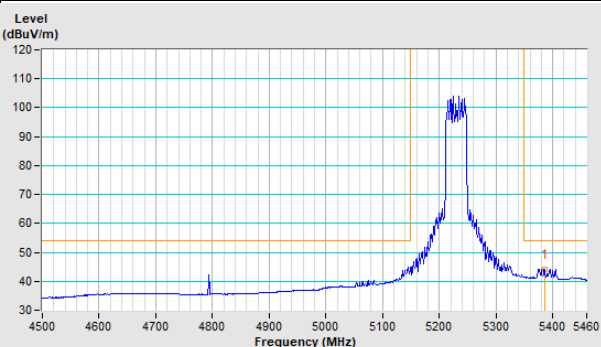
Horizontal (Average)



Vertical (Peak)

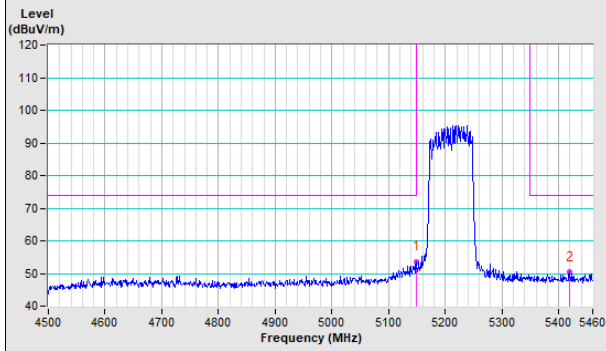


Vertical (Average)

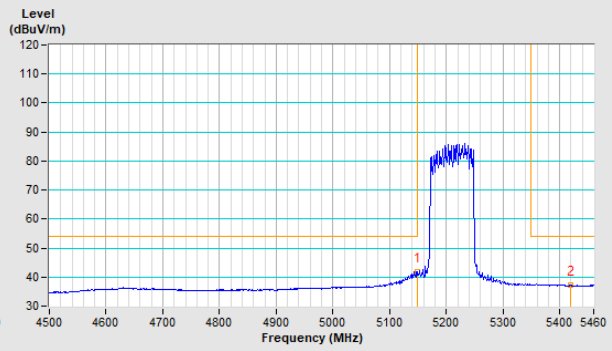


802.11ac (VHT80) Channel 42

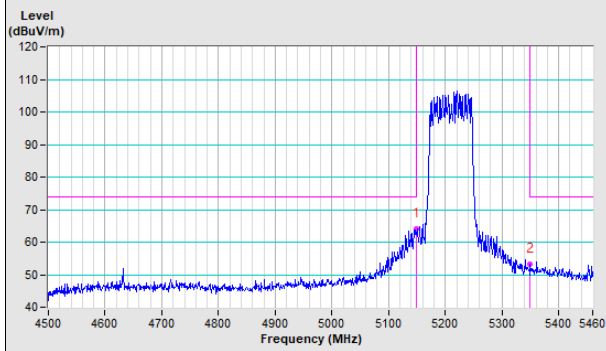
Horizontal (Peak)



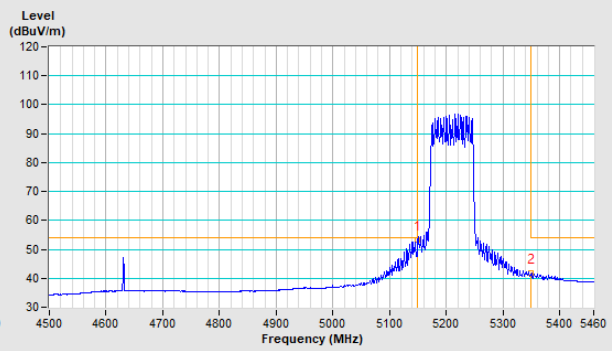
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



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.

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Web Site: www.bureauveritas-adt.com

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

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