

FCC Test Report

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Test Model: DAP-2622

Received Date: July 13, 2020

Test Date: July 31 to Sep. 14, 2020

Issued Date: Dec. 04, 2020

Applicant: D-Link Corporation

Address: 17595 Mt. Herrmann Street Fountain Valley, CA92708 USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

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



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Release Control Record

Issue No.	Description	Date Issued
RF200713E04-1	Original release.	Dec. 04, 2020

1 Certificate of Conformity

Product: Nuclias Connect AC1200 Wave 2 Wall-Plated Access Point

Brand: D-Link

Test Model: DAP-2622

Sample Status: ENGINEERING SAMPLE

Applicant: D-Link Corporation

Test Date: July 31 to Sep. 14, 2020

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 : Phoenix Huang, **Date:** Dec. 04, 2020
Phoenix Huang / Specialist

Approved by : Clark Lin, **Date:** Dec. 04, 2020
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 -10.53dB at 0.20859 MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1 dB at 5139.07 MHz and 5150.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 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	Nuclias Connect AC1200 Wave 2 Wall-Plated Access Point
Brand	D-Link
Test Model	DAP-2622
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	54Vdc from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462 GHz 5GHz: 5.18~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	CDD Mode: 2.412 ~ 2.462 GHz: 781.654 mW 5.18 ~ 5.24 GHz: 503.477 mW 5.745 ~ 5.825 GHz: 545.899 mW Beamforming Mode: 5.18 ~ 5.24 GHz: 488.629 mW 5.745 ~ 5.825 GHz: 545.899 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

Condition	Technology
1	WLAN (2.4GHz) + WLAN (5GHz)

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

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

Antenna No.	RF Chain No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	0	3	2.4~2.4835	PCB	i-pex(MHF)	55
		4.5	5.15~5.85			
2	1	2.8	2.4~2.4835	PCB	i-pex(MHF)	35
		4.1	5.15~5.85			

3. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX

Note:

- All of modulation mode support beamforming function except 2.4GHz band and 802.11a modulation mode.
- The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
- The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), 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)

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

5. 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≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240, 5745-5825	38 to 46, 151 to 159	159	OFDM	BPSK	13.5

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240, 5745-5825	38 to 46, 151 to 159	159	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

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

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

Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE _≥ 1G	23deg. C, 66%RH	120Vac, 60Hz	Aubrey Chang, Tom Yang
RE _{<} 1G	23deg. C, 66%RH	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 75%RH	120Vac, 60Hz	Spempson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Kevin Ko

3.3 Duty Cycle of Test Signal

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

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

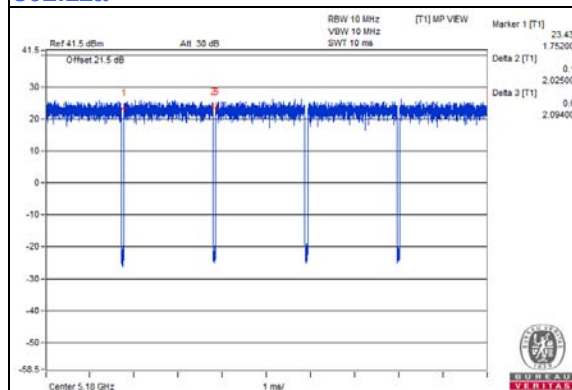
802.11a: Duty cycle = $2.025 \text{ ms} / 2.094 \text{ ms} = 0.967$, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.15 \text{ dB}$

802.11ac (VHT20): Duty cycle = $4.962 \text{ ms} / 5.035 \text{ ms} = 0.986$

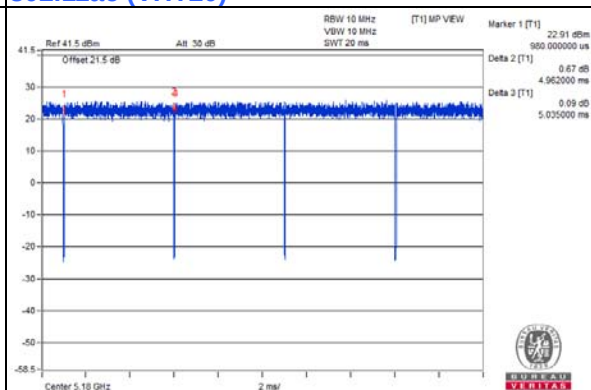
802.11ac (VHT40): Duty cycle = $2.413 \text{ ms} / 2.498 \text{ ms} = 0.966$, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.15 \text{ dB}$

802.11ac (VHT80): Duty cycle = $1.135 \text{ ms} / 1.2 \text{ ms} = 0.946$, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.24 \text{ dB}$

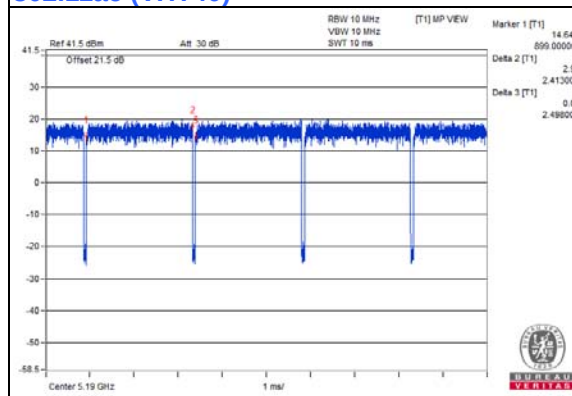
802.11a



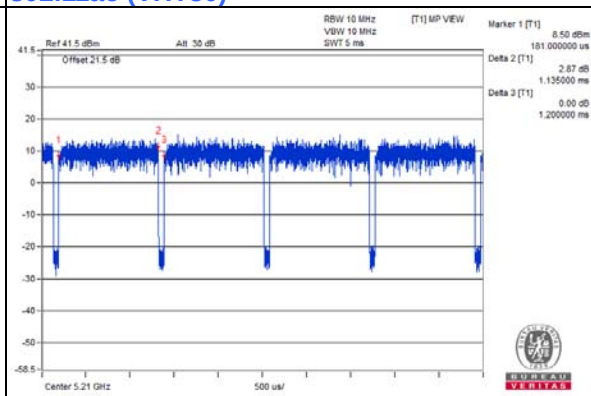
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	POE	Bullet	BPI100-GH	D814C A00 APCC	NA	Supplied by client
B.	Laptop	DELL	P88G	G1WJL42	PD93165NG	Provided by Lab
C.	HUB	ZyXEL	GS1100-16	S150H44000046	FCC DoC	Provided by Lab

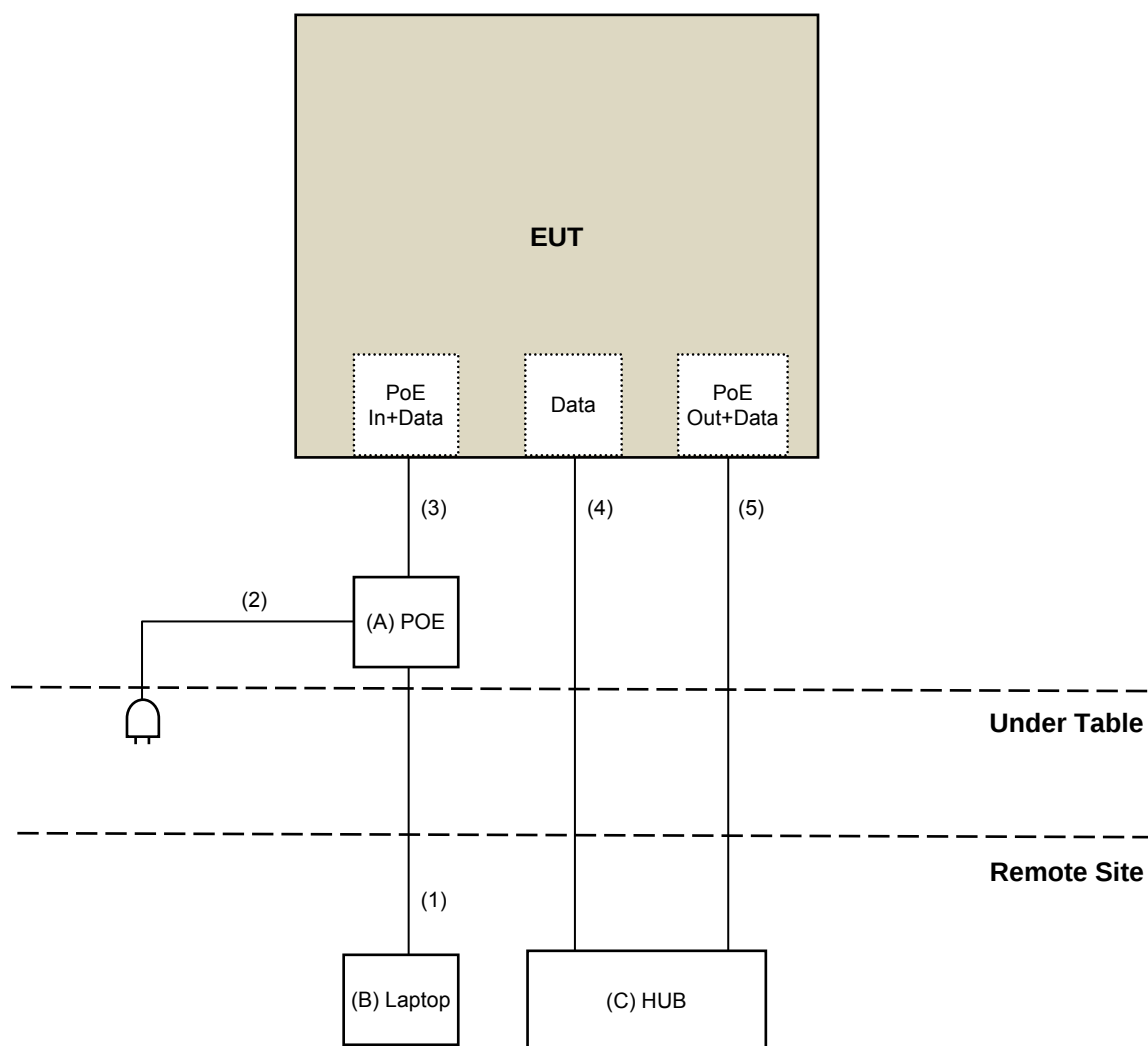
Note:

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

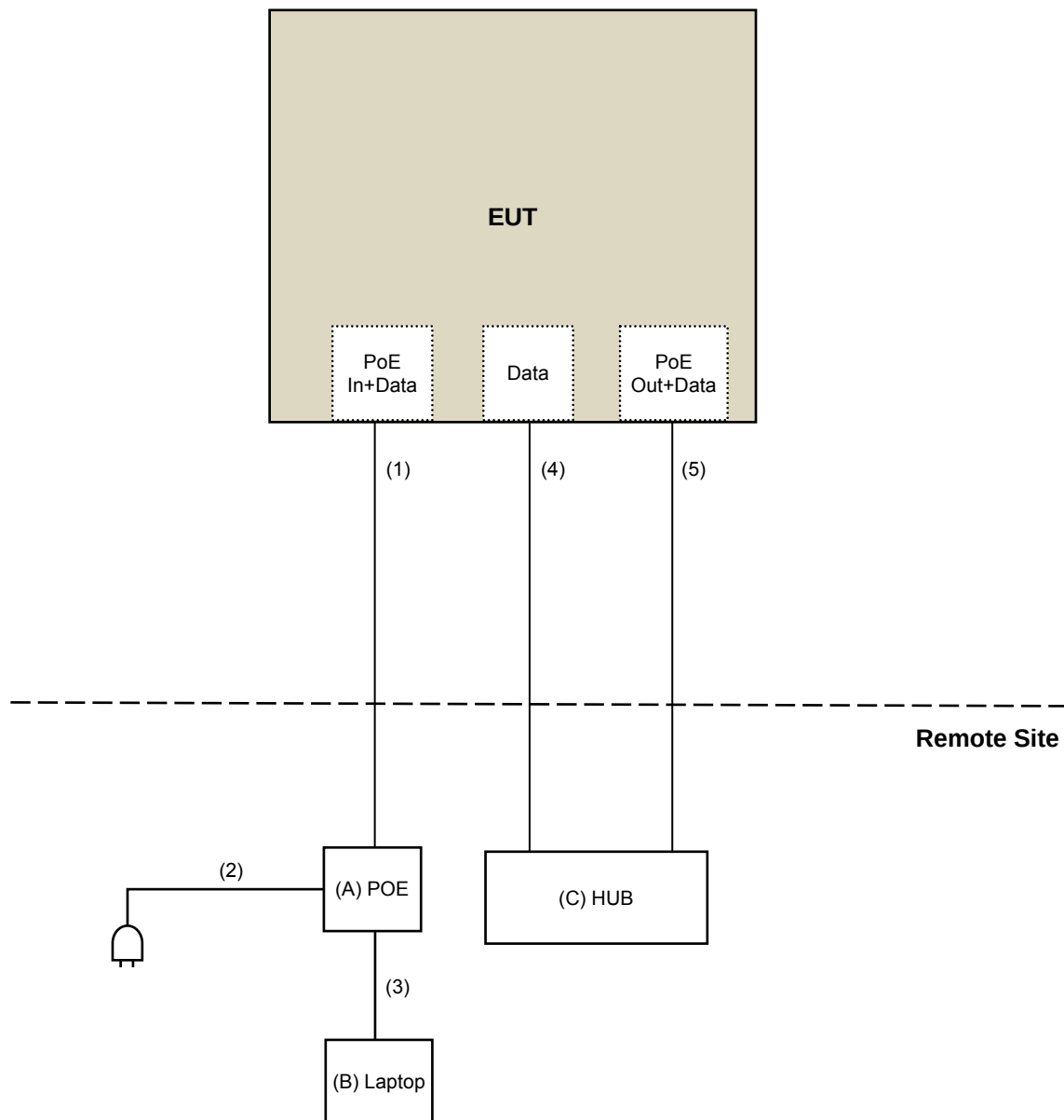
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	AC Cable	1	1.7	No	0	Provided by Lab
3.	RJ-45 Cable	1	1.8	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For AC Power Conducted Emission test



For Radiated Emission 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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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}
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. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

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

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

4.1.2 Test Instruments

For Radiated Emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 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	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1200	160922	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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. 3.
3. Tested Date: July 31 to Sep. 10, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	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
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: Sep. 08, 2020

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:

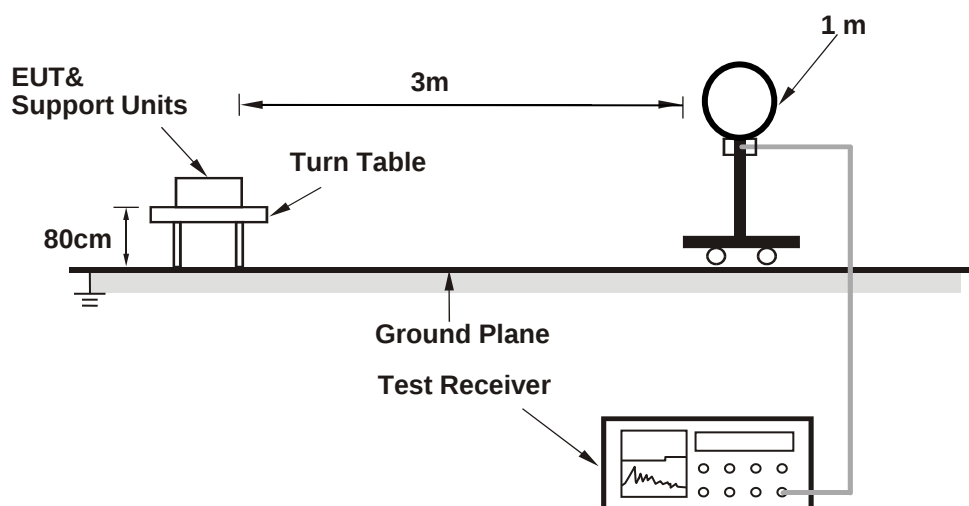
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

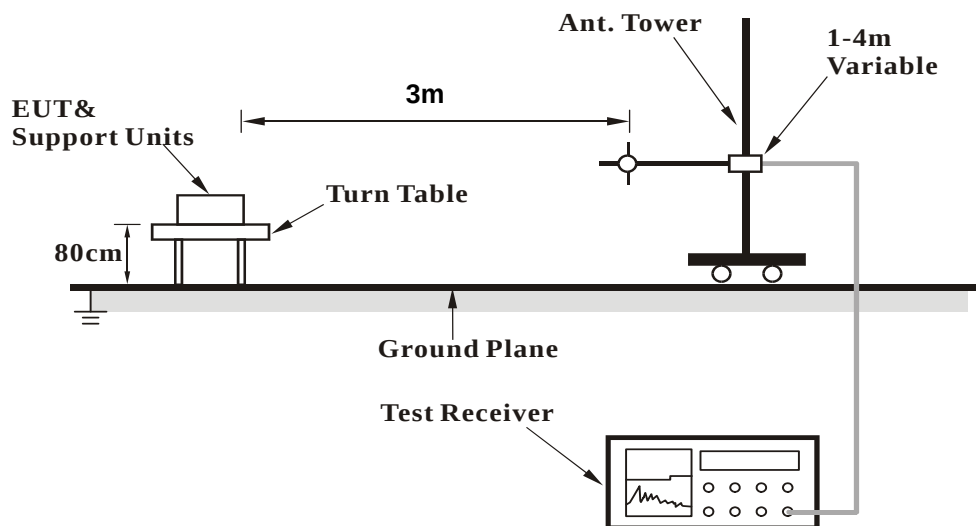
No deviation.

4.1.5 Test Setup

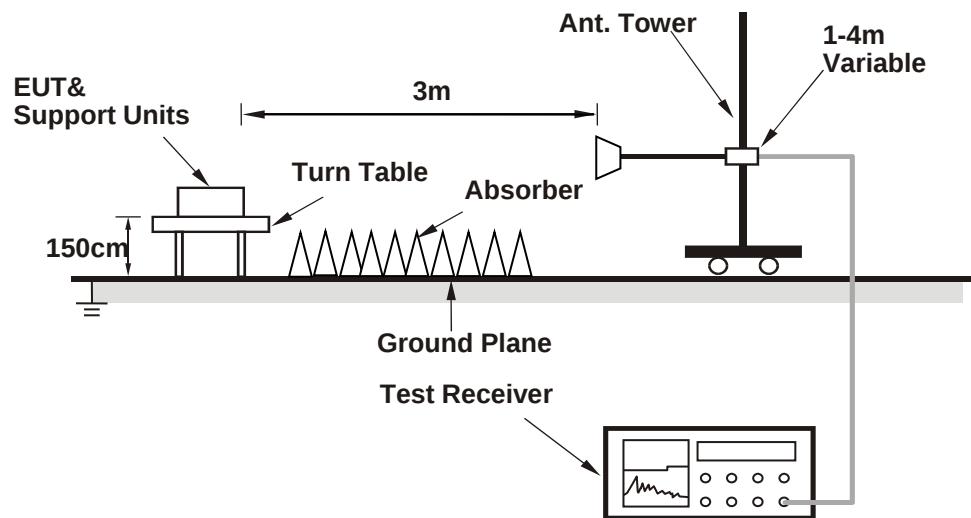
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Controlling software (vcredist_x64) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

CDD Mode

Above 1GHz Data:

802.11a

Channel	TX Channel 36	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	63.9 PK	74.0	-10.1	1.75 H	336	60.2	3.7
2	5150.00	53.6 AV	54.0	-0.4	1.75 H	336	49.9	3.7
3	*5180.00	118.9 PK			1.75 H	336	115.3	3.6
4	*5180.00	107.9 AV			1.75 H	336	104.3	3.6
5	#10360.00	52.5 PK	68.2	-15.7	1.45 H	360	39.8	12.7
6	15540.00	56.5 PK	74.0	-17.5	2.04 H	302	43.3	13.2
7	15540.00	44.1 AV	54.0	-9.9	2.04 H	302	30.9	13.2
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	5150.00	58.8 PK	74.0	-15.2	1.55 V	182	55.1	3.7
2	5150.00	46.6 AV	54.0	-7.4	1.55 V	182	42.9	3.7
3	*5180.00	110.3 PK			1.55 V	182	106.7	3.6
4	*5180.00	100.5 AV			1.55 V	182	96.9	3.6
5	#10360.00	60.6 PK	68.2	-7.6	1.52 V	332	47.9	12.7
6	15540.00	54.3 PK	74.0	-19.7	3.96 V	346	41.1	13.2
7	15540.00	43.7 AV	54.0	-10.3	3.96 V	346	30.5	13.2

Remarks:

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

Channel	TX Channel 40	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	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	66.5 PK	74.0	-7.5	1.81 H	339	62.8	3.7
2	5150.00	53.8 AV	54.0	-0.2	1.81 H	339	50.1	3.7
3	*5200.00	121.3 PK			1.81 H	339	117.8	3.5
4	*5200.00	111.2 AV			1.81 H	339	107.7	3.5
5	5350.00	54.5 PK	74.0	-19.5	1.81 H	339	51.1	3.4
6	5350.00	43.0 AV	54.0	-11.0	1.81 H	339	39.6	3.4
7	#10400.00	53.0 PK	68.2	-15.2	1.43 H	339	40.2	12.8
8	15600.00	55.3 PK	74.0	-18.7	2.09 H	307	41.8	13.5
9	15600.00	43.2 AV	54.0	-10.8	2.09 H	307	29.7	13.5
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	58.9 PK	74.0	-15.1	1.54 V	190	55.2	3.7
2	5150.00	46.6 AV	54.0	-7.4	1.54 V	190	42.9	3.7
3	*5200.00	113.4 PK			1.54 V	190	109.9	3.5
4	*5200.00	103.5 AV			1.54 V	190	100.0	3.5
5	5350.00	49.7 PK	74.0	-24.3	1.54 V	190	46.3	3.4
6	5350.00	38.1 AV	54.0	-15.9	1.54 V	190	34.7	3.4
7	#10400.00	60.8 PK	68.2	-7.4	1.50 V	344	48.0	12.8
8	15600.00	54.6 PK	74.0	-19.4	4.00 V	345	41.1	13.5
9	15600.00	43.7 AV	54.0	-10.3	4.00 V	345	30.2	13.5

Remarks:

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

Channel	TX Channel 48	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	*5240.00	120.8 PK			1.74 H	339	117.3	3.5
2	*5240.00	110.9 AV			1.74 H	339	107.4	3.5
3	5401.56	55.1 PK	74.0	-18.9	1.74 H	339	51.5	3.6
4	5401.56	43.4 AV	54.0	-10.6	1.74 H	339	39.8	3.6
5	#10480.00	52.5 PK	68.2	-15.7	1.41 H	354	39.4	13.1
6	15720.00	55.9 PK	74.0	-18.1	2.09 H	295	42.1	13.8
7	15720.00	43.7 AV	54.0	-10.3	2.09 H	295	29.9	13.8

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	*5240.00	113.7 PK			1.45 V	179	110.2	3.5
2	*5240.00	104.0 AV			1.45 V	179	100.5	3.5
3	5393.33	49.4 PK	74.0	-24.6	1.45 V	179	45.8	3.6
4	5393.33	38.1 AV	54.0	-15.9	1.45 V	179	34.5	3.6
5	#10480.00	60.6 PK	68.2	-7.6	1.46 V	335	47.5	13.1
6	15720.00	54.5 PK	74.0	-19.5	3.99 V	354	40.7	13.8
7	15720.00	43.4 AV	54.0	-10.6	3.99 V	354	29.6	13.8

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.

Channel	TX Channel 149	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5647.40	56.8 PK	68.2	-11.4	1.90 H	335	52.4	4.4
2	*5745.00	118.2 PK			1.90 H	335	114.2	4.0
3	*5745.00	108.8 AV			1.90 H	335	104.8	4.0
4	#5999.90	52.3 PK	68.2	-15.9	1.90 H	335	47.2	5.1
5	11490.00	58.2 PK	74.0	-15.8	1.97 H	303	44.9	13.3
6	11490.00	48.6 AV	54.0	-5.4	1.97 H	303	35.3	13.3
7	#17235.00	58.7 PK	68.2	-9.5	1.50 H	300	41.1	17.6

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	#5623.95	50.4 PK	68.2	-17.8	1.85 V	180	46.1	4.3
2	*5745.00	113.2 PK			1.85 V	180	109.2	4.0
3	*5745.00	104.7 AV			1.85 V	180	100.7	4.0
4	#5950.15	49.5 PK	68.2	-18.7	1.85 V	180	44.6	4.9
5	11490.00	66.3 PK	74.0	-7.7	1.84 V	337	53.0	13.3
6	11490.00	53.8 AV	54.0	-0.2	1.84 V	337	40.5	13.3
7	#17235.00	63.1 PK	68.2	-5.1	1.50 V	6	45.5	17.6

Remarks:

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

Channel	TX Channel 157	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5627.56	57.5 PK	68.2	-10.7	1.81 H	336	53.2	4.3
2	*5785.00	119.1 PK			1.81 H	336	115.0	4.1
3	*5785.00	109.6 AV			1.81 H	336	105.5	4.1
4	#5941.46	53.1 PK	68.2	-15.1	1.81 H	336	48.1	5.0
5	11570.00	58.6 PK	74.0	-15.4	1.95 H	288	45.4	13.2
6	11570.00	48.8 AV	54.0	-5.2	1.95 H	288	35.6	13.2
7	#17355.00	58.1 PK	68.2	-10.1	1.51 H	310	40.5	17.6

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	#5648.11	50.7 PK	68.2	-17.5	1.91 V	175	46.3	4.4
2	*5785.00	114.7 PK			1.91 V	175	110.6	4.1
3	*5785.00	105.4 AV			1.91 V	175	101.3	4.1
4	#5931.82	50.3 PK	68.2	-17.9	1.91 V	175	45.4	4.9
5	11570.00	65.8 PK	74.0	-8.2	1.80 V	324	52.6	13.2
6	11570.00	53.3 AV	54.0	-0.7	1.80 V	324	40.1	13.2
7	#17355.00	63.0 PK	68.2	-5.2	1.46 V	14	45.4	17.6

Remarks:

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

Channel	TX Channel 165	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5593.39	56.9 PK	68.2	-11.3	1.84 H	335	52.6	4.3
2	*5825.00	119.0 PK			1.84 H	335	114.7	4.3
3	*5825.00	108.9 AV			1.84 H	335	104.6	4.3
4	#5956.53	54.2 PK	68.2	-14.0	1.84 H	335	49.3	4.9
5	11650.00	59.3 PK	74.0	-14.7	1.98 H	296	46.0	13.3
6	11650.00	49.3 AV	54.0	-4.7	1.98 H	296	36.0	13.3
7	#17475.00	58.1 PK	68.2	-10.1	1.53 H	319	40.2	17.9
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	#5610.74	51.1 PK	68.2	-17.1	1.88 V	183	46.9	4.2
2	*5825.00	113.9 PK			1.88 V	183	109.6	4.3
3	*5825.00	105.1 AV			1.88 V	183	100.8	4.3
4	#5939.71	49.0 PK	68.2	-19.2	1.88 V	183	44.0	5.0
5	11650.00	65.5 PK	74.0	-8.5	1.83 V	320	52.2	13.3
6	11650.00	52.8 AV	54.0	-1.2	1.83 V	320	39.5	13.3
7	#17475.00	63.3 PK	68.2	-4.9	1.49 V	30	45.4	17.9

Remarks:

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

802.11ac (VHT20)

Channel	TX Channel 36	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	63.4 PK	74.0	-10.6	1.75 H	341	59.7	3.7
2	5150.00	53.5 AV	54.0	-0.5	1.75 H	341	49.8	3.7
3	*5180.00	117.2 PK			1.75 H	341	113.6	3.6
4	*5180.00	106.3 AV			1.75 H	341	102.7	3.6
5	#10360.00	52.8 PK	68.2	-15.4	1.45 H	360	40.1	12.7
6	15540.00	56.4 PK	74.0	-17.6	1.99 H	287	43.2	13.2
7	15540.00	43.8 AV	54.0	-10.2	1.99 H	287	30.6	13.2

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	5150.00	58.2 PK	74.0	-15.8	1.55 V	179	54.5	3.7
2	5150.00	45.6 AV	54.0	-8.4	1.55 V	179	41.9	3.7
3	*5180.00	110.6 PK			1.55 V	179	107.0	3.6
4	*5180.00	100.5 AV			1.55 V	179	96.9	3.6
5	#10360.00	60.9 PK	68.2	-7.3	1.49 V	338	48.2	12.7
6	15540.00	54.6 PK	74.0	-19.4	3.94 V	347	41.4	13.2
7	15540.00	43.8 AV	54.0	-10.2	3.94 V	347	30.6	13.2

Remarks:

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

Channel	TX Channel 40	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	66.7 PK	74.0	-7.3	1.89 H	337	63.0	3.7
2	5150.00	53.5 AV	54.0	-0.5	1.89 H	337	49.8	3.7
3	*5200.00	120.6 PK			1.89 H	337	117.1	3.5
4	*5200.00	110.2 AV			1.89 H	337	106.7	3.5
5	#10400.00	52.5 PK	68.2	-15.7	1.37 H	337	39.7	12.8
6	15600.00	55.2 PK	74.0	-18.8	2.08 H	307	41.7	13.5
7	15600.00	43.1 AV	54.0	-10.9	2.08 H	307	29.6	13.5
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	59.0 PK	74.0	-15.0	1.56 V	171	55.3	3.7
2	5150.00	46.6 AV	54.0	-7.4	1.56 V	171	42.9	3.7
3	*5200.00	113.5 PK			1.56 V	171	110.0	3.5
4	*5200.00	103.7 AV			1.56 V	171	100.2	3.5
5	#10400.00	60.5 PK	68.2	-7.7	1.56 V	338	47.7	12.8
6	15600.00	54.6 PK	74.0	-19.4	3.99 V	359	41.1	13.5
7	15600.00	43.6 AV	54.0	-10.4	3.99 V	359	30.1	13.5

Remarks:

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

Channel	TX Channel 48	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	*5240.00	120.2 PK			1.65 H	342	116.7	3.5
2	*5240.00	109.9 AV			1.65 H	342	106.4	3.5
3	5406.26	53.5 PK	74.0	-20.5	1.65 H	342	49.9	3.6
4	5406.26	43.0 AV	54.0	-11.0	1.65 H	342	39.4	3.6
5	#10480.00	52.3 PK	68.2	-15.9	1.34 H	335	39.2	13.1
6	15720.00	55.1 PK	74.0	-18.9	2.03 H	304	41.3	13.8
7	15720.00	43.3 AV	54.0	-10.7	2.03 H	304	29.5	13.8

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	4920.07	48.2 PK	74.0	-25.8	1.45 V	180	45.5	2.7
2	4920.07	38.3 AV	54.0	-15.7	1.45 V	180	35.6	2.7
3	*5240.00	113.8 PK			1.45 V	180	110.3	3.5
4	*5240.00	103.4 AV			1.45 V	180	99.9	3.5
5	#10480.00	60.6 PK	68.2	-7.6	1.61 V	340	47.5	13.1
6	15720.00	54.8 PK	74.0	-19.2	3.96 V	358	41.0	13.8
7	15720.00	43.6 AV	54.0	-10.4	3.96 V	358	29.8	13.8

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.

Channel	TX Channel 149	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5608.25	56.4 PK	68.2	-11.8	2.06 H	335	52.2	4.2
2	*5745.00	119.8 PK			2.06 H	335	115.8	4.0
3	*5745.00	108.8 AV			2.06 H	335	104.8	4.0
4	#6008.08	52.1 PK	68.2	-16.1	2.06 H	335	47.0	5.1
5	11490.00	59.4 PK	74.0	-14.6	2.03 H	306	46.1	13.3
6	11490.00	49.7 AV	54.0	-4.3	2.03 H	306	36.4	13.3
7	#17235.00	58.8 PK	68.2	-9.4	1.53 H	333	41.2	17.6

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	#5648.63	49.7 PK	68.2	-18.5	1.83 V	180	45.3	4.4
2	*5745.00	113.9 PK			1.83 V	180	109.9	4.0
3	*5745.00	105.0 AV			1.83 V	180	101.0	4.0
4	#5932.04	49.0 PK	68.2	-19.2	1.83 V	180	44.1	4.9
5	11490.00	66.1 PK	74.0	-7.9	1.85 V	340	52.8	13.3
6	11490.00	53.5 AV	54.0	-0.5	1.85 V	340	40.2	13.3
7	#17235.00	63.8 PK	68.2	-4.4	1.53 V	8	46.2	17.6

Remarks:

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

Channel	TX Channel 157	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5621.10	56.6 PK	68.2	-11.6	1.95 H	335	52.3	4.3
2	*5785.00	120.1 PK			1.95 H	335	116.0	4.1
3	*5785.00	109.0 AV			1.95 H	335	104.9	4.1
4	#5938.94	53.4 PK	68.2	-14.8	1.95 H	335	48.4	5.0
5	11570.00	59.5 PK	74.0	-14.5	2.03 H	295	46.3	13.2
6	11570.00	49.6 AV	54.0	-4.4	2.03 H	295	36.4	13.2
7	#17355.00	58.6 PK	68.2	-9.6	1.51 H	333	41.0	17.6

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	#5624.36	50.5 PK	68.2	-17.7	2.03 V	176	46.2	4.3
2	*5785.00	115.0 PK			2.03 V	176	110.9	4.1
3	*5785.00	105.6 AV			2.03 V	176	101.5	4.1
4	#5941.72	49.7 PK	68.2	-18.5	2.03 V	176	44.7	5.0
5	11570.00	65.9 PK	74.0	-8.1	1.90 V	326	52.7	13.2
6	11570.00	53.4 AV	54.0	-0.6	1.90 V	326	40.2	13.2
7	#17355.00	63.3 PK	68.2	-4.9	1.57 V	4	45.7	17.6

Remarks:

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

Channel	TX Channel 165	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5643.43	56.0 PK	68.2	-12.2	1.94 H	337	51.7	4.3
2	*5825.00	118.6 PK			1.94 H	337	114.3	4.3
3	*5825.00	108.6 AV			1.94 H	337	104.3	4.3
4	#5927.46	53.9 PK	68.2	-14.3	1.94 H	337	49.0	4.9
5	11650.00	59.3 PK	74.0	-14.7	2.04 H	285	46.0	13.3
6	11650.00	49.4 AV	54.0	-4.6	2.04 H	285	36.1	13.3
7	#17475.00	58.9 PK	68.2	-9.3	1.51 H	328	41.0	17.9

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	#5556.00	50.2 PK	68.2	-18.0	1.92 V	176	46.0	4.2
2	*5825.00	113.8 PK			1.92 V	176	109.5	4.3
3	*5825.00	105.0 AV			1.92 V	176	100.7	4.3
4	#5962.48	49.9 PK	68.2	-18.3	1.92 V	176	45.0	4.9
5	11650.00	65.7 PK	74.0	-8.3	1.92 V	317	52.4	13.3
6	11650.00	53.4 AV	54.0	-0.6	1.92 V	317	40.1	13.3
7	#17475.00	63.8 PK	68.2	-4.4	1.57 V	6	45.9	17.9

Remarks:

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

802.11ac (VHT40)

Channel	TX Channel 38	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	66.0 PK	74.0	-8.0	1.50 H	336	62.3	3.7
2	5150.00	53.8 AV	54.0	-0.2	1.50 H	336	50.1	3.7
3	*5190.00	109.9 PK			1.50 H	336	106.3	3.6
4	*5190.00	100.6 AV			1.50 H	336	97.0	3.6
5	#10380.00	52.4 PK	68.2	-15.8	1.40 H	360	39.7	12.7
6	15570.00	56.2 PK	74.0	-17.8	2.04 H	307	42.8	13.4
7	15570.00	43.9 AV	54.0	-10.1	2.04 H	307	30.5	13.4

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	5150.00	59.9 PK	74.0	-14.1	1.38 V	179	56.2	3.7
2	5150.00	48.8 AV	54.0	-5.2	1.38 V	179	45.1	3.7
3	*5190.00	103.9 PK			1.38 V	179	100.3	3.6
4	*5190.00	94.2 AV			1.38 V	179	90.6	3.6
5	#10380.00	60.1 PK	68.2	-8.1	1.47 V	345	47.4	12.7
6	15570.00	54.1 PK	74.0	-19.9	3.91 V	351	40.7	13.4
7	15570.00	43.3 AV	54.0	-10.7	3.91 V	351	29.9	13.4

Remarks:

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

Channel	TX Channel 46	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	5139.07	67.3 PK	74.0	-6.7	1.72 H	341	63.6	3.7
2	5139.07	53.9 AV	54.0	-0.1	1.72 H	341	50.2	3.7
3	*5230.00	116.4 PK			1.72 H	341	112.9	3.5
4	*5230.00	106.6 AV			1.72 H	341	103.1	3.5
5	#10460.00	52.7 PK	68.2	-15.5	1.41 H	358	39.7	13.0
6	15690.00	56.5 PK	74.0	-17.5	2.01 H	317	42.6	13.9
7	15690.00	44.0 AV	54.0	-10.0	2.01 H	317	30.1	13.9

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	5139.07	60.0 PK	74.0	-14.0	1.61 V	178	56.3	3.7
2	5139.07	49.4 AV	54.0	-4.6	1.61 V	178	45.7	3.7
3	*5230.00	111.3 PK			1.61 V	178	107.8	3.5
4	*5230.00	102.0 AV			1.61 V	178	98.5	3.5
5	#10460.00	60.2 PK	68.2	-8.0	1.50 V	329	47.2	13.0
6	15690.00	54.5 PK	74.0	-19.5	4.00 V	356	40.6	13.9
7	15690.00	43.1 AV	54.0	-10.9	4.00 V	356	29.2	13.9

Remarks:

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

Channel	TX Channel 151	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5642.66	61.7 PK	68.2	-6.5	1.74 H	337	57.4	4.3
2	*5755.00	115.9 PK			1.74 H	337	111.9	4.0
3	*5755.00	106.5 AV			1.74 H	337	102.5	4.0
4	#5990.49	53.4 PK	68.2	-14.8	1.74 H	337	48.3	5.1
5	11510.00	59.3 PK	74.0	-14.7	2.09 H	285	46.0	13.3
6	11510.00	49.1 AV	54.0	-4.9	2.09 H	285	35.8	13.3
7	#17265.00	59.3 PK	68.2	-8.9	1.50 H	327	41.8	17.5

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	#5648.70	55.9 PK	68.2	-12.3	2.06 V	174	51.5	4.4
2	*5755.00	110.8 PK			2.06 V	174	106.8	4.0
3	*5755.00	102.5 AV			2.06 V	174	98.5	4.0
4	#6007.65	50.0 PK	68.2	-18.2	2.06 V	174	44.9	5.1
5	11510.00	65.6 PK	74.0	-8.4	1.90 V	310	52.3	13.3
6	11510.00	53.3 AV	54.0	-0.7	1.90 V	310	40.0	13.3
7	#17265.00	64.0 PK	68.2	-4.2	1.59 V	10	46.5	17.5

Remarks:

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

Channel	TX Channel 159	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5646.09	59.8 PK	68.2	-8.4	1.84 H	335	55.5	4.3
2	*5795.00	117.3 PK			1.84 H	335	113.1	4.2
3	*5795.00	107.6 AV			1.84 H	335	103.4	4.2
4	#5926.60	63.3 PK	68.2	-4.9	1.84 H	335	58.4	4.9
5	11590.00	59.7 PK	74.0	-14.3	2.12 H	287	46.4	13.3
6	11590.00	49.3 AV	54.0	-4.7	2.12 H	287	36.0	13.3
7	#17385.00	58.8 PK	68.2	-9.4	1.52 H	333	41.1	17.7

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	#5647.55	54.0 PK	68.2	-14.2	2.01 V	175	49.6	4.4
2	*5795.00	111.4 PK			2.01 V	175	107.2	4.2
3	*5795.00	102.9 AV			2.01 V	175	98.7	4.2
4	#5928.71	58.8 PK	68.2	-9.4	2.01 V	175	53.9	4.9
5	11590.00	64.3 PK	74.0	-9.7	1.72 V	332	51.0	13.3
6	11590.00	53.7 AV	54.0	-0.3	1.72 V	332	40.4	13.3
7	#17385.00	59.8 PK	68.2	-8.4	1.43 V	356	42.1	17.7

Remarks:

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

802.11ac (VHT80)

Channel	TX Channel 42	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	62.4 PK	74.0	-11.6	1.72 H	338	58.7	3.7
2	5150.00	53.9 AV	54.0	-0.1	1.72 H	338	50.2	3.7
3	*5210.00	104.0 PK			1.72 H	338	100.4	3.6
4	*5210.00	94.4 AV			1.72 H	338	90.8	3.6
5	#10420.00	53.0 PK	68.2	-15.2	1.37 H	344	40.2	12.8
6	15630.00	56.7 PK	74.0	-17.3	2.03 H	325	43.0	13.7
7	15630.00	44.3 AV	54.0	-9.7	2.03 H	325	30.6	13.7

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	56.6 PK	74.0	-17.4	1.35 V	181	52.9	3.7
2	5150.00	46.1 AV	54.0	-7.9	1.35 V	181	42.4	3.7
3	*5210.00	97.0 PK			1.35 V	181	93.4	3.6
4	*5210.00	89.5 AV			1.35 V	181	85.9	3.6
5	#10420.00	59.8 PK	68.2	-8.4	1.53 V	322	47.0	12.8
6	15630.00	54.7 PK	74.0	-19.3	4.00 V	340	41.0	13.7
7	15630.00	43.3 AV	54.0	-10.7	4.00 V	340	29.6	13.7

Remarks:

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

Channel	TX Channel 155	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 40GHz		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	#5645.76	67.1 PK	68.2	-1.1	2.01 H	334	62.8	4.3
2	*5775.00	110.1 PK			2.01 H	334	106.0	4.1
3	*5775.00	100.2 AV			2.01 H	334	96.1	4.1
4	#5944.77	62.1 PK	68.2	-6.1	2.01 H	334	57.2	4.9
5	11550.00	60.3 PK	74.0	-13.7	2.15 H	295	47.1	13.2
6	11550.00	49.7 AV	54.0	-4.3	2.15 H	295	36.5	13.2
7	#17325.00	58.5 PK	68.2	-9.7	1.52 H	331	40.9	17.6

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	#5642.95	60.1 PK	68.2	-8.1	2.06 V	174	55.8	4.3
2	*5775.00	104.6 PK			2.06 V	174	100.5	4.1
3	*5775.00	96.4 AV			2.06 V	174	92.3	4.1
4	#5928.97	55.0 PK	68.2	-13.2	2.06 V	174	50.1	4.9
5	11550.00	62.6 PK	74.0	-11.4	1.77 V	319	49.4	13.2
6	11550.00	51.9 AV	54.0	-2.1	1.77 V	319	38.7	13.2
7	#17325.00	60.3 PK	68.2	-7.9	1.48 V	346	42.7	17.6

Remarks:

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

Below 1GHz Data:

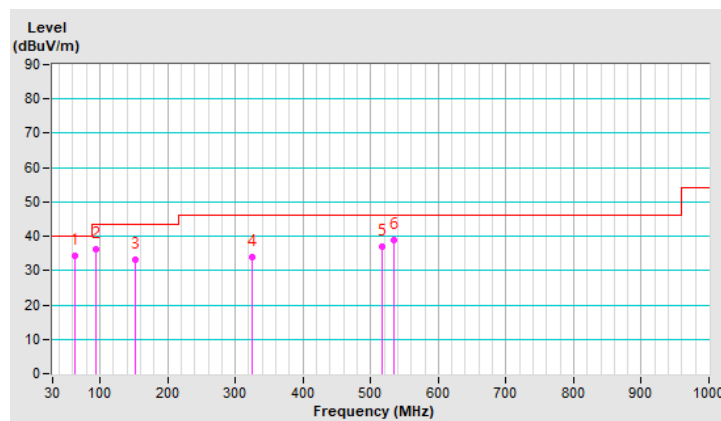
802.11ac (VHT40)

Channel	TX Channel 159	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

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	63.64	34.3 QP	40.0	-5.7	1.00 H	77	42.9	-8.6
2	94.75	36.2 QP	43.5	-7.3	1.50 H	245	48.9	-12.7
3	151.74	33.0 QP	43.5	-10.5	1.00 H	248	39.9	-6.9
4	325.03	34.0 QP	46.0	-12.0	1.50 H	325	38.9	-4.9
5	516.73	37.0 QP	46.0	-9.0	2.00 H	351	37.0	0.0
6	535.15	39.0 QP	46.0	-7.0	1.50 H	214	38.8	0.2

Remarks:

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

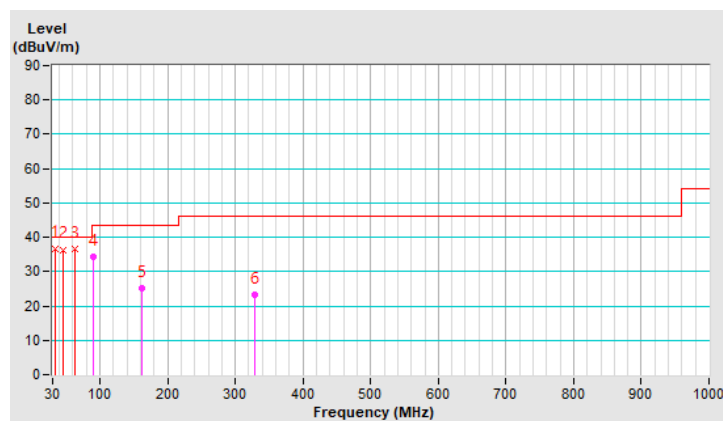


Channel	TX Channel 159	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

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	33.79	36.8 QP	40.0	-3.2	1.34 V	298	45.5	-8.7
2	45.75	36.4 QP	40.0	-3.6	1.47 V	324	44.0	-7.6
3	62.93	36.7 QP	40.0	-3.3	1.43 V	177	45.3	-8.6
4	89.74	34.3 QP	43.5	-9.2	1.00 V	226	47.5	-13.2
5	161.47	25.1 QP	43.5	-18.4	1.00 V	187	32.0	-6.9
6	329.70	23.2 QP	46.0	-22.8	1.50 V	53	27.9	-4.7

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
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: Sep. 14, 2020

4.2.3 Test Procedure

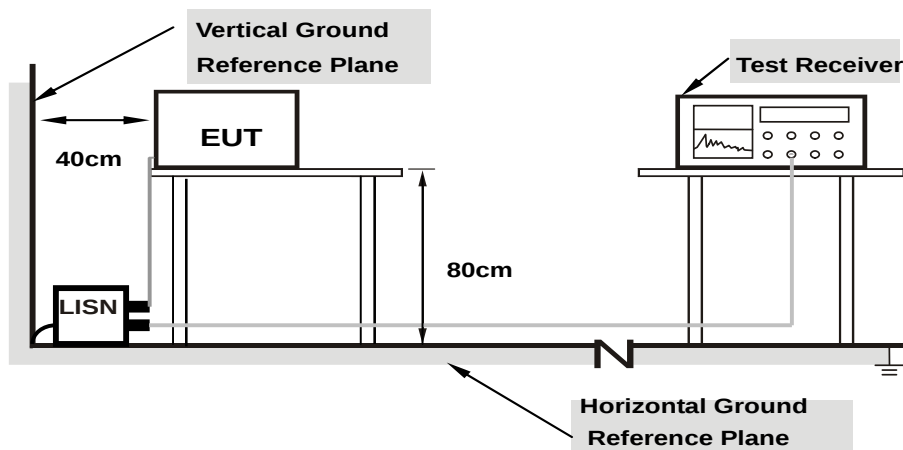
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

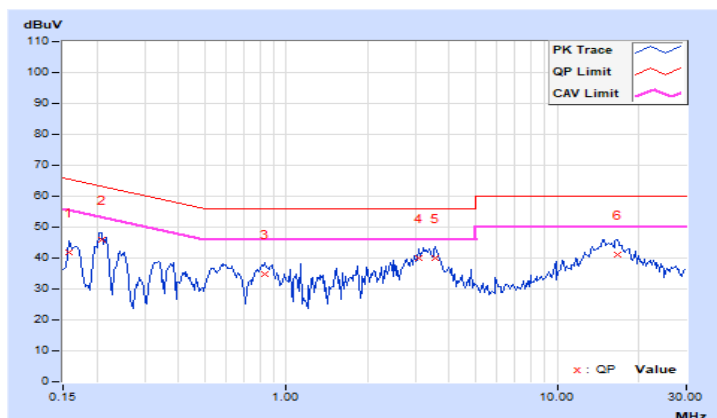
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.15781	9.91	32.00	17.28	41.91	27.19	65.58	55.58	-23.67	-28.39
2	0.20859	9.93	36.02	29.63	45.95	39.56	63.26	53.26	-17.31	-13.70
3	0.83359	9.98	24.85	16.44	34.83	26.42	56.00	46.00	-21.17	-19.58
4	3.07422	10.08	29.79	21.20	39.87	31.28	56.00	46.00	-16.13	-14.72
5	3.56641	10.10	29.97	21.88	40.07	31.98	56.00	46.00	-15.93	-14.02
6	16.69531	10.82	30.25	24.38	41.07	35.20	60.00	50.00	-18.93	-14.80

Remarks:

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

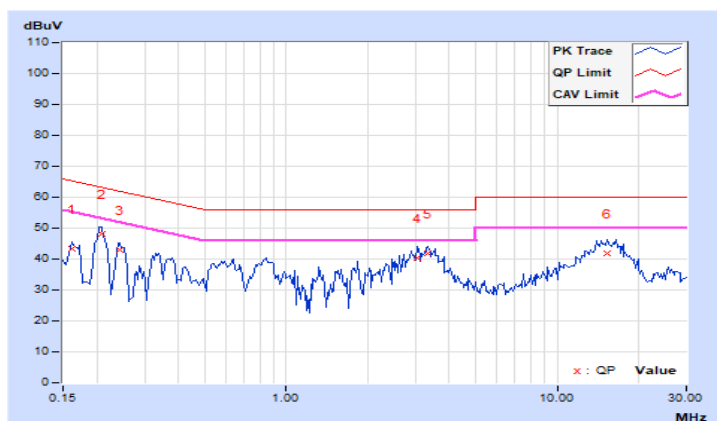


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.91	33.24	21.33	43.15	31.24	65.38	55.38	-22.23	-24.14
2	0.20859	9.93	38.28	32.80	48.21	42.73	63.26	53.26	-15.05	-10.53
3	0.24375	9.93	33.13	27.72	43.06	37.65	61.97	51.97	-18.91	-14.32
4	3.03516	10.06	30.14	21.51	40.20	31.57	56.00	46.00	-15.80	-14.43
5	3.34766	10.07	31.92	23.83	41.99	33.90	56.00	46.00	-14.01	-12.10
6	15.21875	10.57	31.45	25.95	42.02	36.52	60.00	50.00	-17.98	-13.48

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

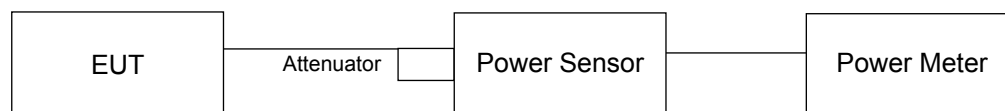
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

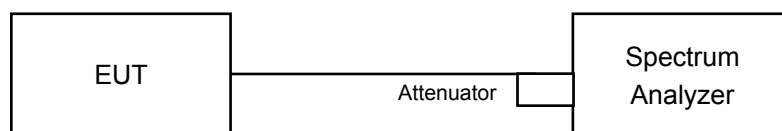
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT



FOR 26dB OCCUPIED BANDWIDTH



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR POWER OUTPUT MEASUREMENT

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

FOR 26dB OCCUPIED BANDWIDTH

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.55	19.86	210.329	23.23	30.00	Pass
40	5200	24.35	23.64	503.477	27.02	30.00	Pass
48	5240	23.66	23.52	457.179	26.60	30.00	Pass
149	5745	23.98	23.02	450.482	26.54	30.00	Pass
157	5785	23.74	22.81	427.577	26.31	30.00	Pass
165	5825	22.73	22.80	378.046	25.78	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.26	19.62	197.792	22.96	30.00	Pass
40	5200	24.22	23.51	488.629	26.89	30.00	Pass
48	5240	23.42	23.31	434.075	26.38	30.00	Pass
149	5745	24.57	23.33	501.696	27.00	30.00	Pass
157	5785	24.48	23.08	483.779	26.85	30.00	Pass
165	5825	23.16	23.02	407.461	26.10	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.49	16.76	103.529	20.15	30.00	Pass
46	5230	22.92	22.46	372.082	25.71	30.00	Pass
151	5755	23.47	22.69	408.111	26.11	30.00	Pass
159	5795	24.58	24.13	545.899	27.37	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.23	13.77	50.308	17.02	30.00	Pass
155	5775	20.22	19.75	199.602	23.00	30.00	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.26	19.62	197.792	22.96	28.69	Pass
40	5200	24.22	23.51	488.629	26.89	28.69	Pass
48	5240	23.42	23.31	434.075	26.38	28.69	Pass
149	5745	24.57	23.33	501.696	27.00	28.69	Pass
157	5785	24.48	23.08	483.779	26.85	28.69	Pass
165	5825	23.16	23.02	407.461	26.10	28.69	Pass

Note: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.49	16.76	103.529	20.15	28.69	Pass
46	5230	22.92	22.46	372.082	25.71	28.69	Pass
151	5755	23.47	22.69	408.111	26.11	28.69	Pass
159	5795	24.58	24.13	545.899	27.37	28.69	Pass

Note: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm}$.

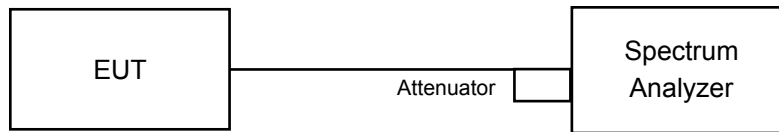
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.23	13.77	50.308	17.02	28.69	Pass
155	5775	20.22	19.75	199.602	23.00	28.69	Pass

Note: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm}$.

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

CDD Mode

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.56
40	5200	21.96	16.8
48	5240	16.92	16.68
149	5745	28.92	17.04
157	5785	26.28	17.04
165	5825	18	16.92

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.76
40	5200	20.64	18.00
48	5240	18.12	17.88
149	5745	38.20	17.88
157	5785	33.00	18.00
165	5825	21.24	18.00

802.11ac (VHT40)

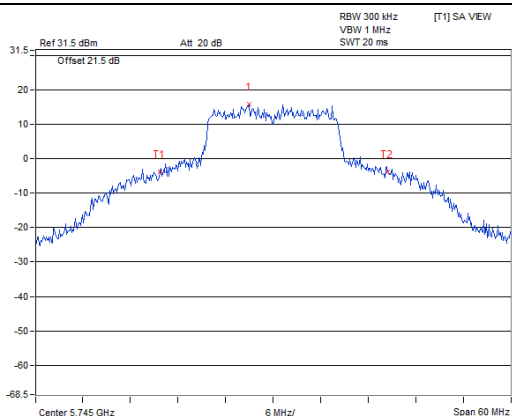
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.48
46	5230	36.48	36.24
151	5755	51.84	36.72
159	5795	75.20	43.68

802.11ac (VHT80)

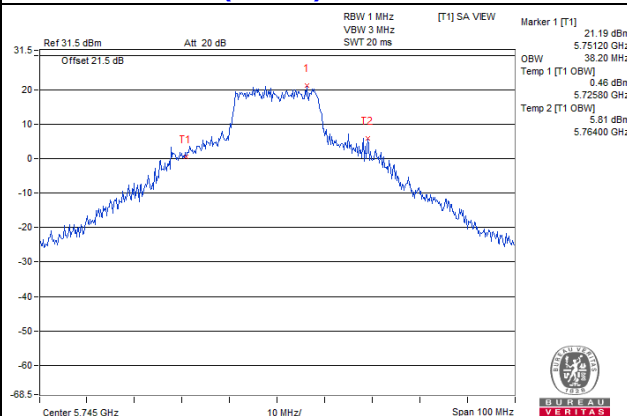
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.32	75.84
155	5775	76.32	76.32

Spectrum Plot of Max. Value

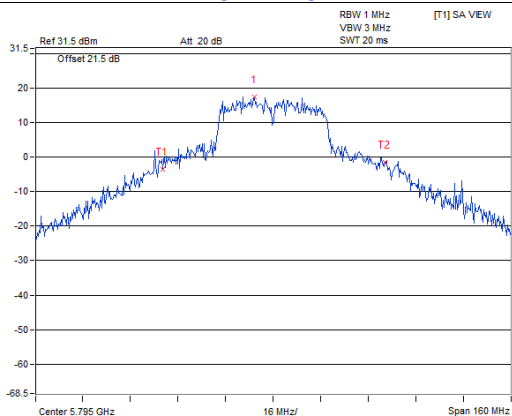
802.11a_Chain 0 / CH149



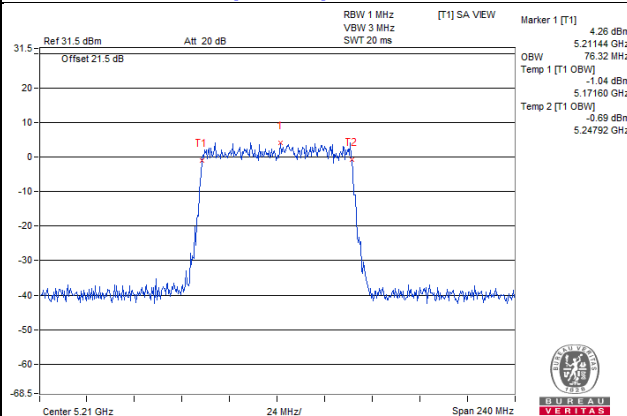
802.11ac (VHT20)_Chain 0 / CH149



802.11ac (VHT40)_Chain 0 / CH159

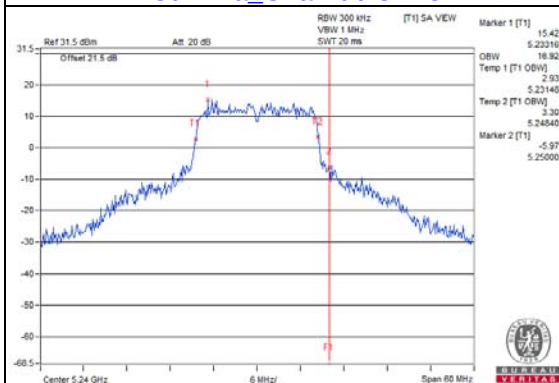


802.11ac (VHT80)_Chain 0 / CH42

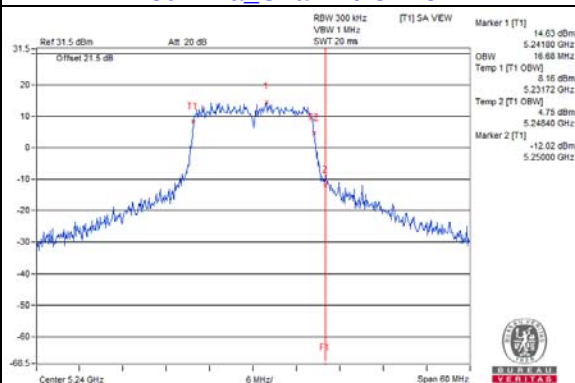


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

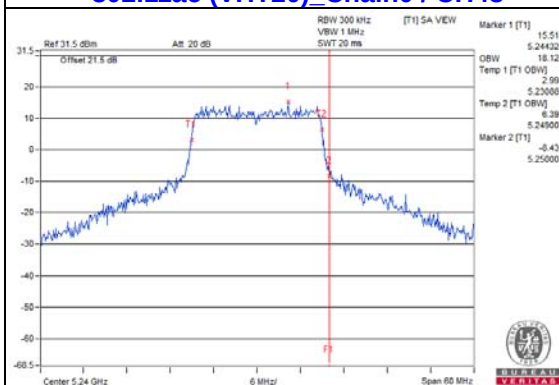
802.11a Chain0 / CH48



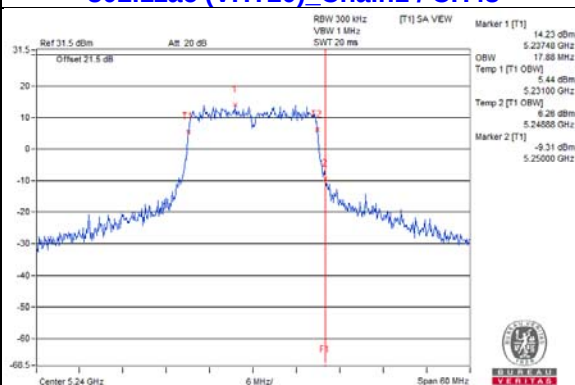
802.11a Chain1 / CH48



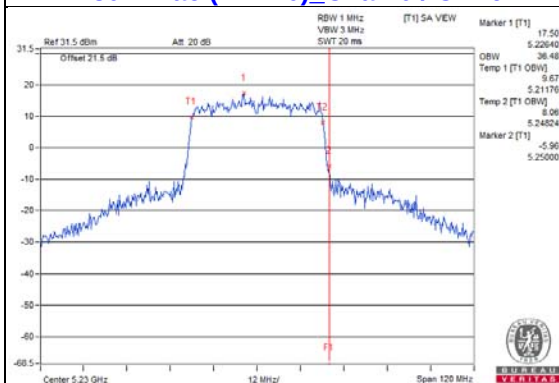
802.11ac (VHT20) Chain0 / CH48



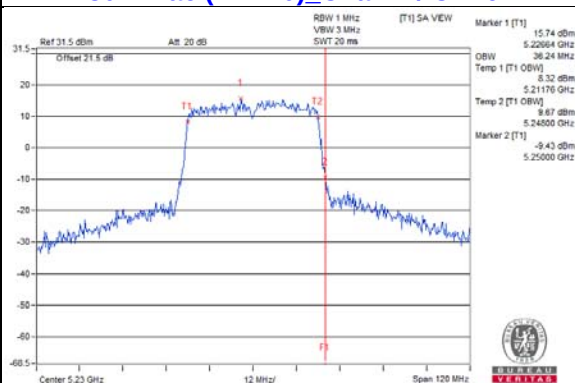
802.11ac (VHT20) Chain1 / CH48



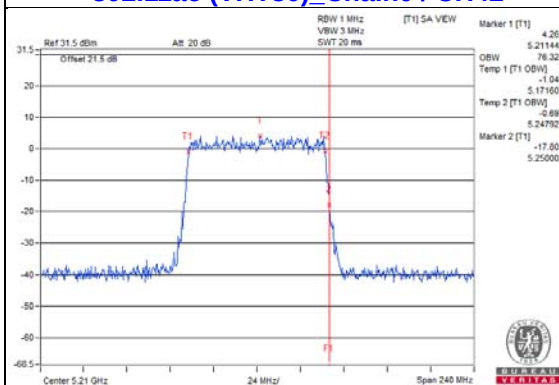
802.11ac (VHT40) Chain0 / CH46



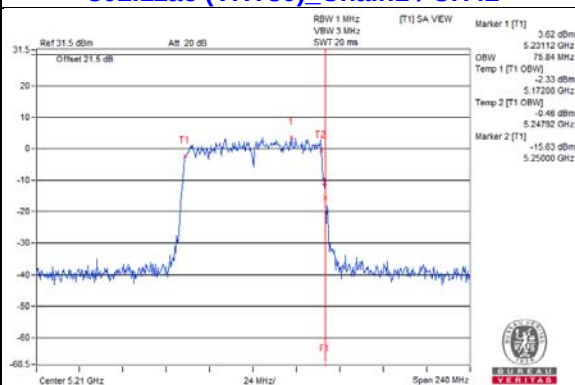
802.11ac (VHT40) Chain1 / CH46



802.11ac (VHT80) Chain0 / CH42

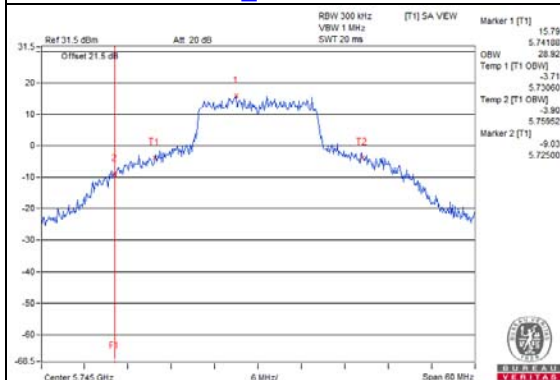


802.11ac (VHT80) Chain1 / CH42

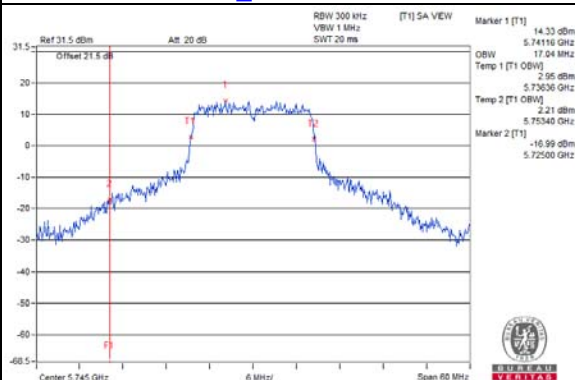


**Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)**

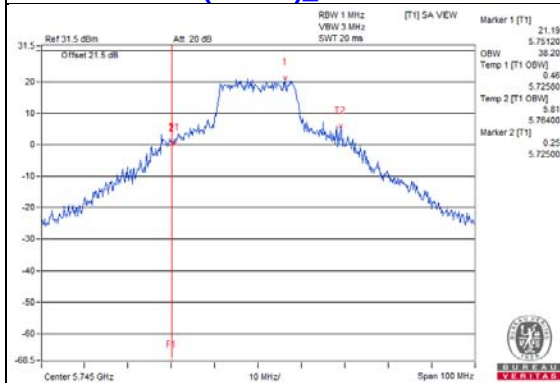
802.11a_Chain0 / CH149



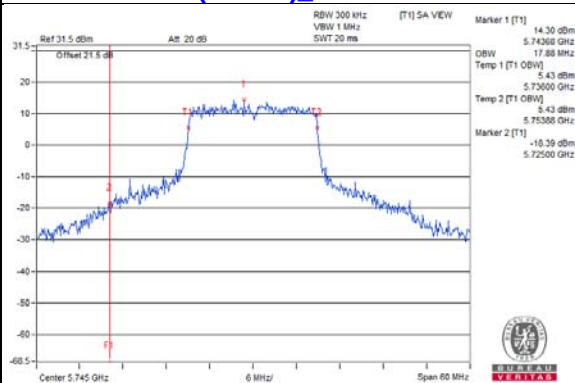
802.11a_Chain1 / CH149



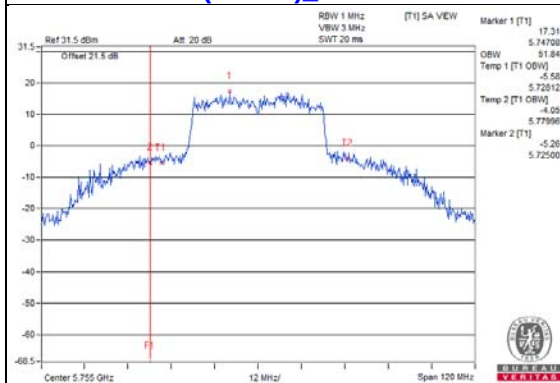
802.11ac (VHT20)_Chain0 / CH149



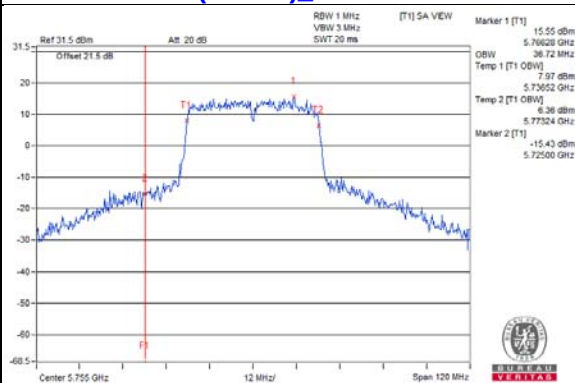
802.11ac (VHT20)_Chain1 / CH149



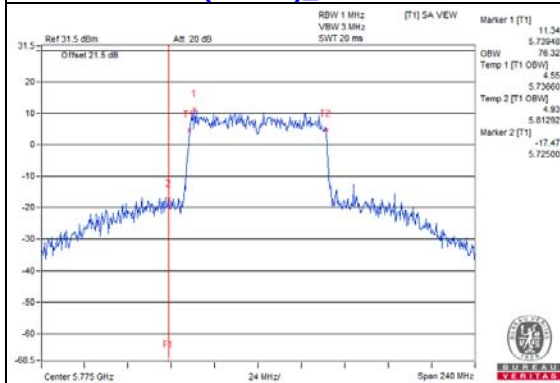
802.11ac (VHT40)_Chain0 / CH151



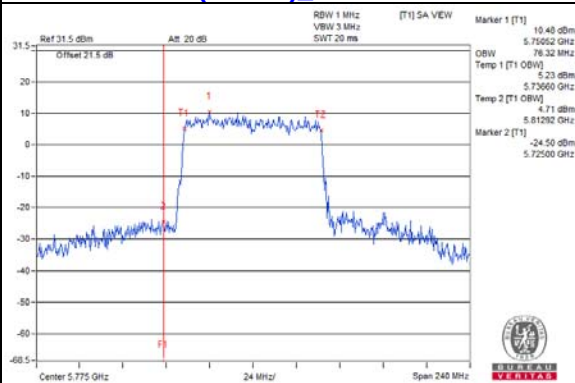
802.11ac (VHT40)_Chain1 / CH151



802.11ac (VHT80)_Chain0 / CH155



802.11ac (VHT80)_Chain1 / CH155

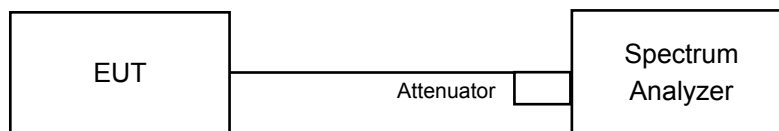


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

802.11ac (VHT20)

Using method SA-1

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

For other modulation mode

Using method SA-2

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

For U-NII-3 band:

802.11ac (VHT20)

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 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

For other modulation mode

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW $\geq$ 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 and add $10 \log (1/\text{duty cycle})$

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	7.26	5.95	0.15	9.81	15.69	Pass
40	5200	10.69	9.95	0.15	13.49	15.69	Pass
48	5240	10.43	9.72	0.15	13.25	15.69	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.31 - 6) = 15.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	6.81	5.43	9.19	15.69	Pass
40	5200	9.90	9.90	12.91	15.69	Pass
48	5240	9.82	9.10	12.49	15.69	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.31 - 6) = 15.69 \text{ dBm/MHz}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	0.51	0.45	0.15	3.64	15.69	Pass
46	5230	6.53	5.71	0.15	9.30	15.69	Pass

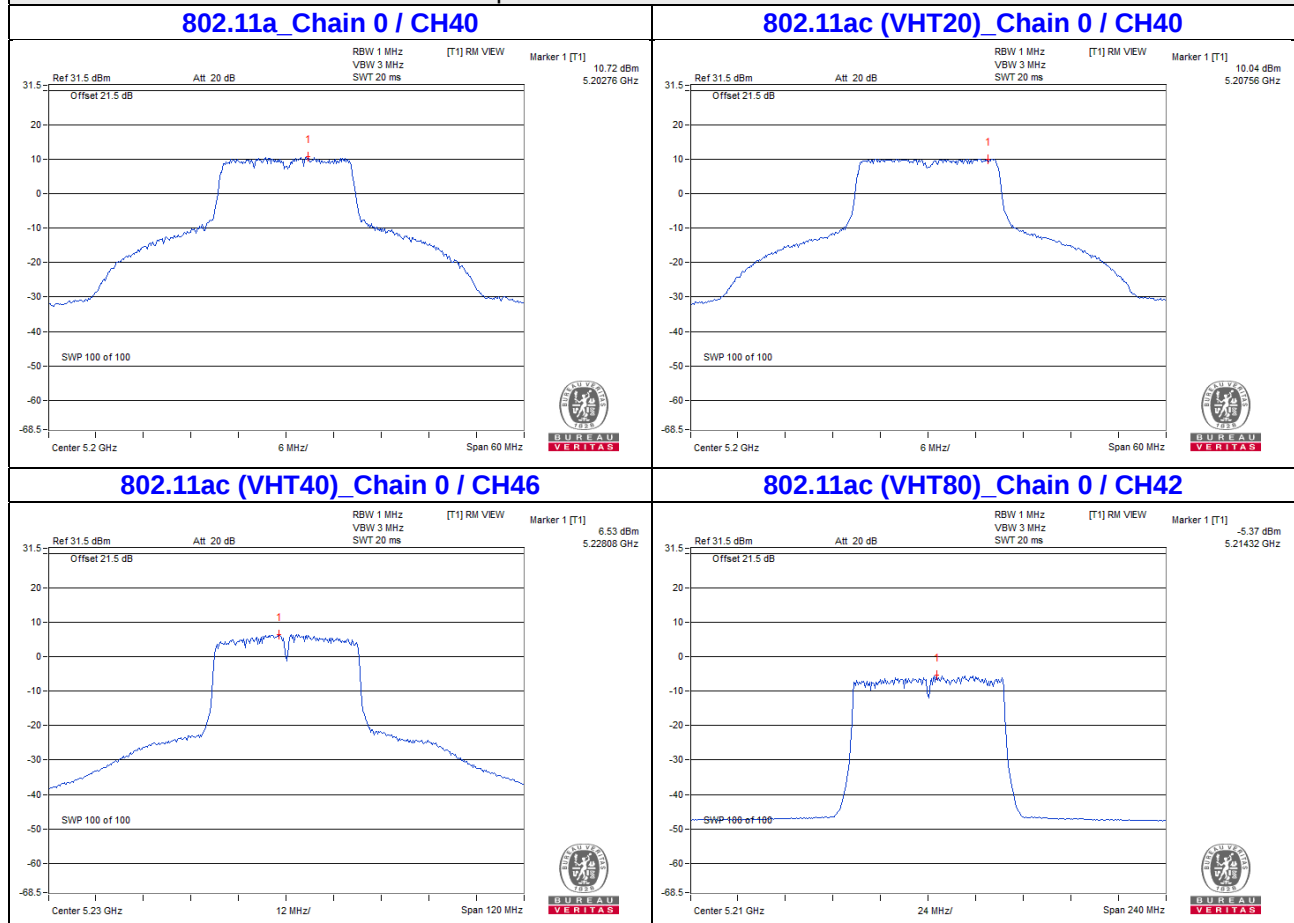
- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (7.31 - 6) = 15.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-5.37	-6.24	0.24	-2.53	15.69	Pass

- Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (7.31 - 6) = 15.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value



For U-NII-3 band:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300 kHz)	Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
149	5745	1.62	1.23	0.15	4.58	6.80	28.69	Pass
157	5785	1.16	0.79	0.15	4.13	6.35	28.69	Pass
165	5825	0.45	0.63	0.15	3.70	5.92	28.69	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)		Total PSD (dBm/300kHz)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Pass / Fail
		Chain 0	Chain 1				
149	5745	1.75	0.77	4.30	6.52	28.69	Pass
157	5785	1.89	0.84	4.41	6.63	28.69	Pass
165	5825	0.75	0.30	3.54	5.76	28.69	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm/MHz}$.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300 kHz)	Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
151	5755	-2.27	-2.98	0.15	0.55	2.77	28.69	Pass
159	5795	-0.96	-1.54	0.15	1.92	4.14	28.69	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

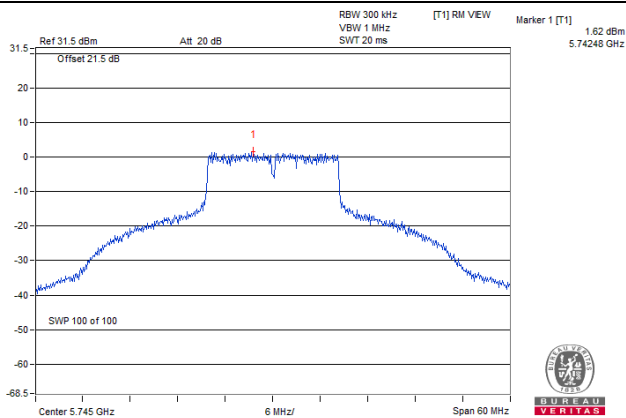
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Duty Factor (dB)	Total PSD (dBm/300 kHz)	Total PSD (dBm/500 kHz)	PSD Limit (dBm/500 kHz)	Pass / Fail
		Chain 0	Chain 1					
155	5775	-8.71	-8.86	0.24	-5.53	-3.31	28.69	Pass

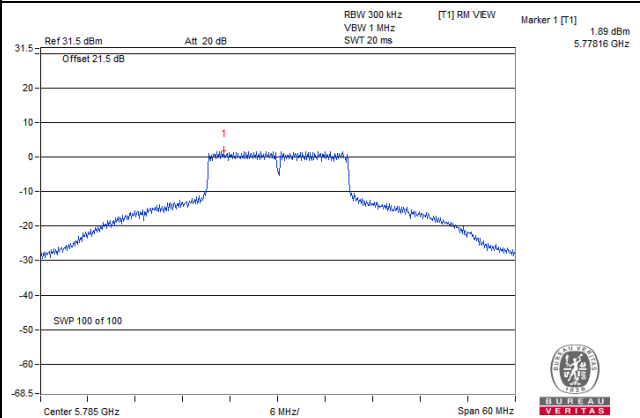
- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20}) / 2] = 7.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (7.31 - 6) = 28.69 \text{ dBm/MHz}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

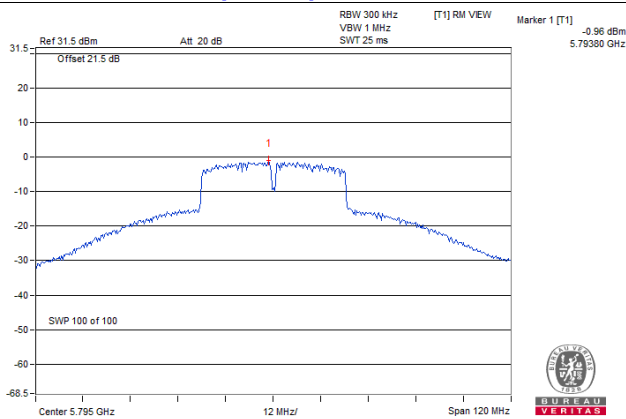
802.11a_Chain 0 / CH149



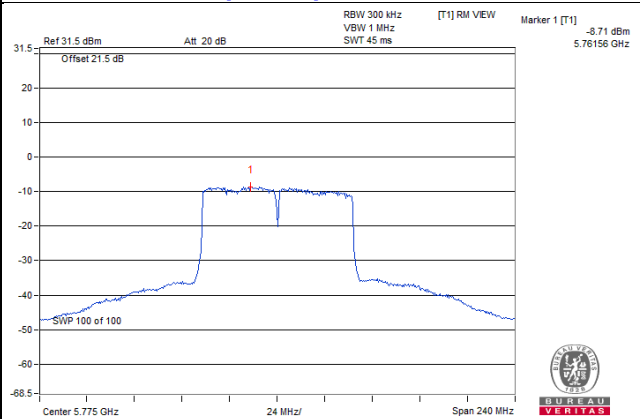
802.11ac (VHT20)_Chain 0 / CH157



802.11ac (VHT40)_Chain 0 / CH159



802.11ac (VHT80)_Chain 0 / CH155

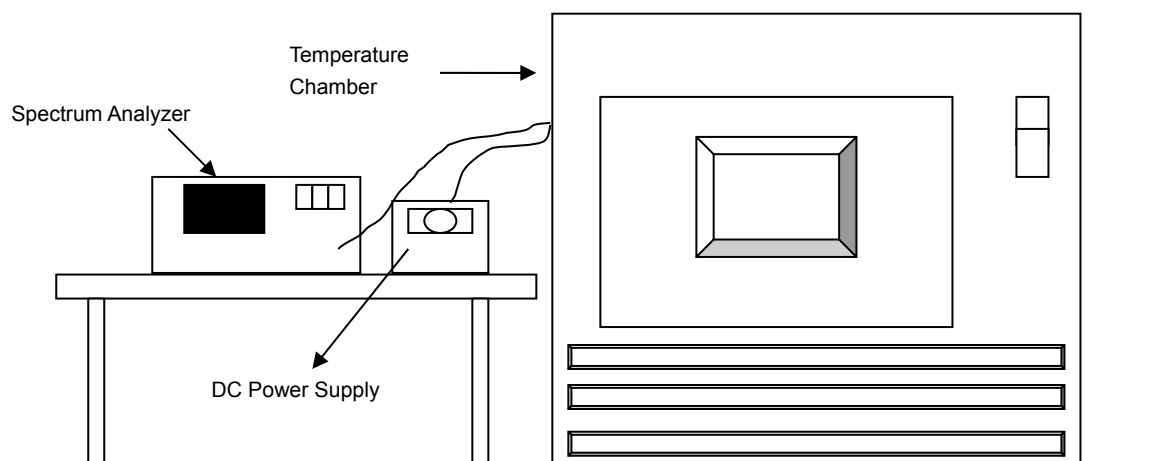


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC 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 (Vdc)	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	54	5179.9936	Pass	5179.9937	Pass	5179.9917	Pass	5179.991	Pass
30	54	5180.0046	Pass	5180.0045	Pass	5180.0041	Pass	5180.0018	Pass
20	54	5180.0029	Pass	5180.0045	Pass	5180.0027	Pass	5180.0051	Pass
10	54	5180.0101	Pass	5180.0068	Pass	5180.0089	Pass	5180.0074	Pass
0	54	5180.0232	Pass	5180.0257	Pass	5180.0243	Pass	5180.0237	Pass

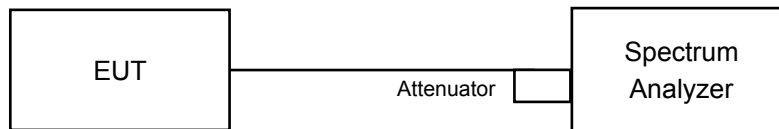
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	62.1	5180.0033	Pass	5180.0042	Pass	5180.0031	Pass	5180.0048	Pass
	54	5180.0029	Pass	5180.0045	Pass	5180.0027	Pass	5180.0051	Pass
	45.9	5180.0024	Pass	5180.0041	Pass	5180.0019	Pass	5180.006	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

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.43	16.40	0.5	Pass
157	5785	16.37	16.38	0.5	Pass
165	5825	16.40	16.37	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.65	17.31	0.5	Pass
157	5785	17.69	17.62	0.5	Pass
165	5825	16.81	17.59	0.5	Pass

802.11ac (VHT40)

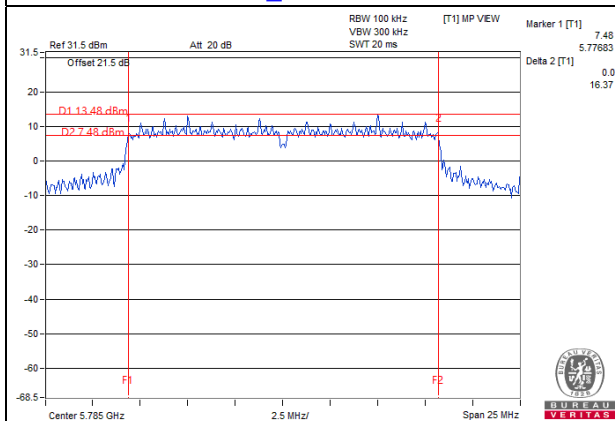
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.2	35.23	0.5	Pass
159	5795	33.25	35.21	0.5	Pass

802.11ac (VHT80)

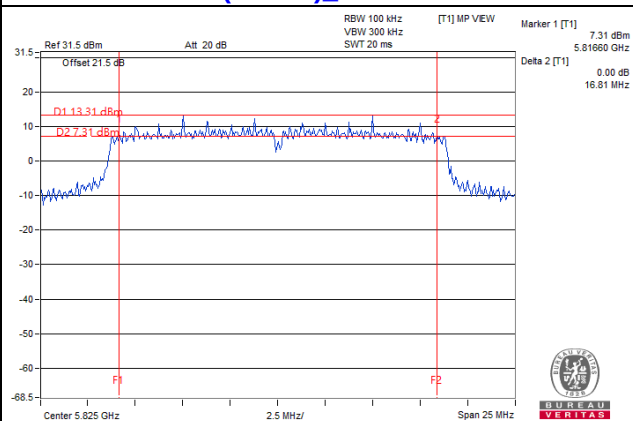
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.58	76.13	0.5	Pass

Spectrum Plot of Worst Value

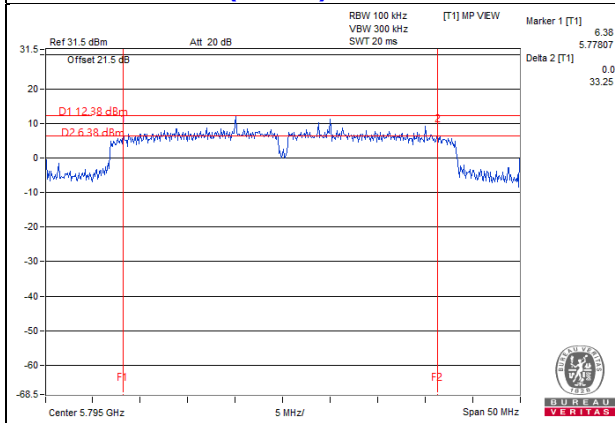
802.11a_Chain 0 / CH157



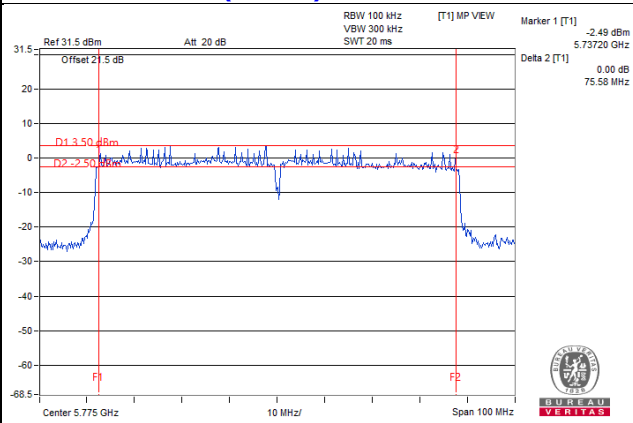
802.11ac (VHT20)_Chain 0 / CH165



802.11ac (VHT40)_Chain 0 / CH159



802.11ac (VHT80)_Chain 0 / CH155



5 Pictures of Test Arrangements

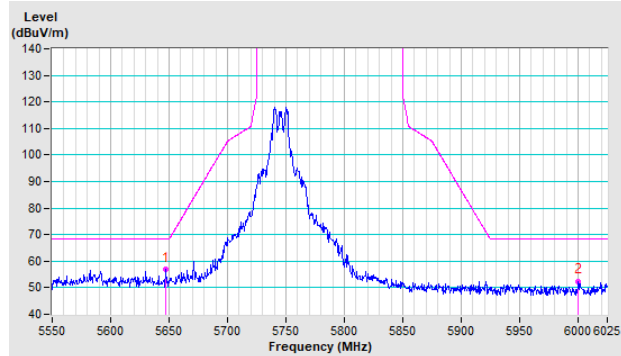
Please refer to the attached file (Test Setup Photo).

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

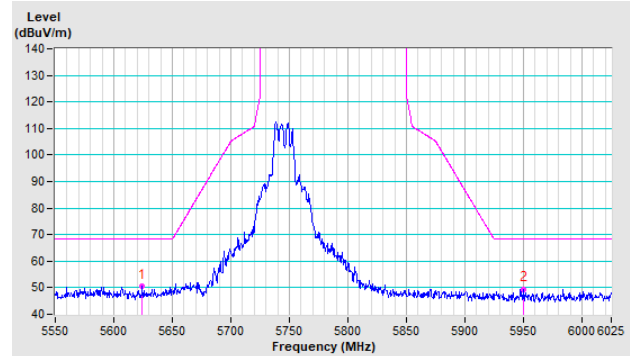
802.11a

CH 149 5745 MHz

Horizontal

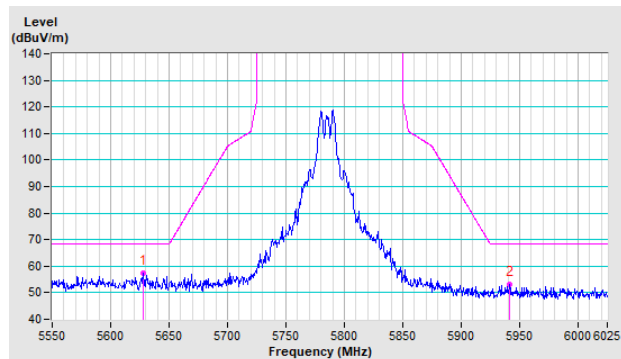


Vertical

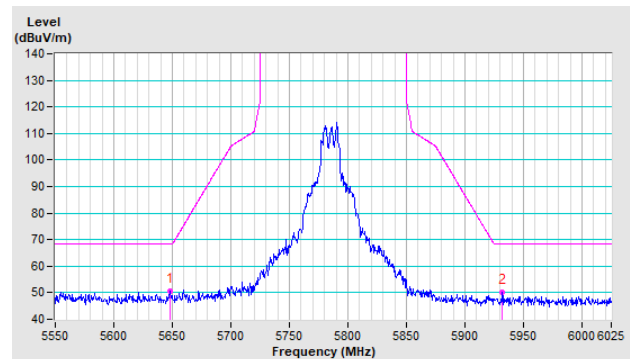


CH 157 5785 MHz

Horizontal

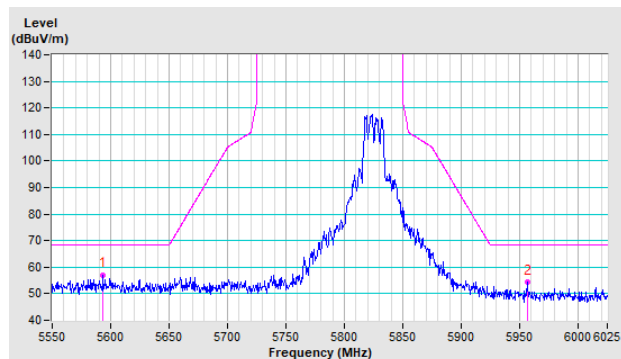


Vertical

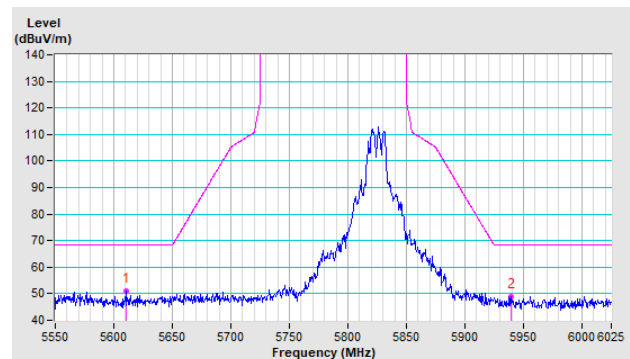


CH 165 5825 MHz

Horizontal



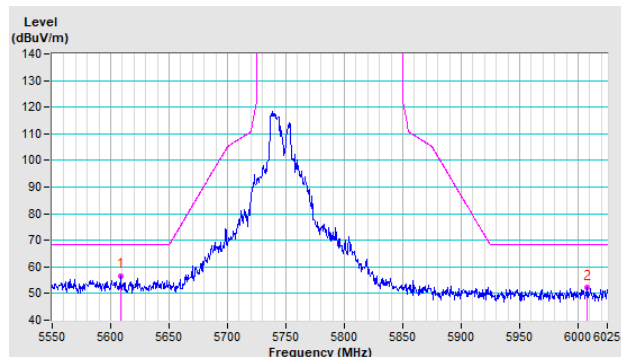
Vertical



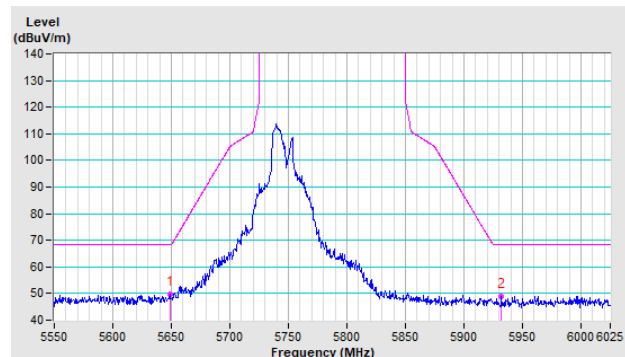
802.11ac (VHT20)

CH 149 5745 MHz

Horizontal

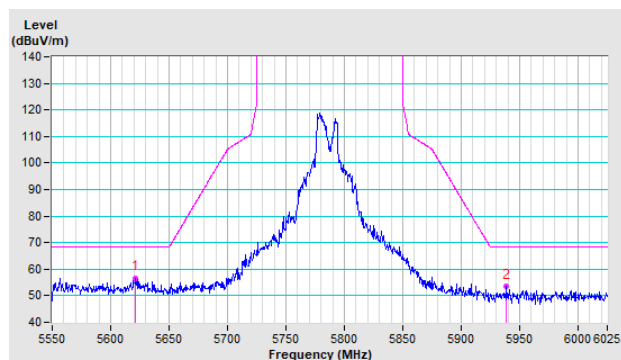


Vertical

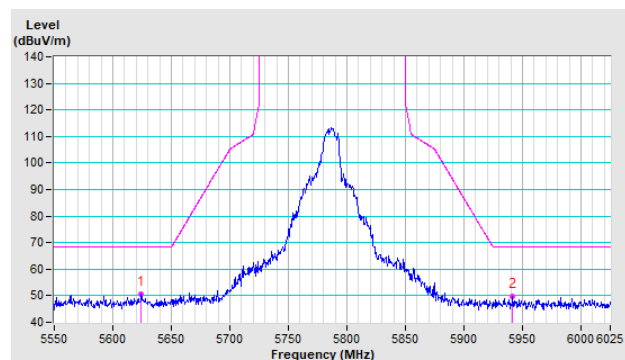


CH 157 5785 MHz

Horizontal

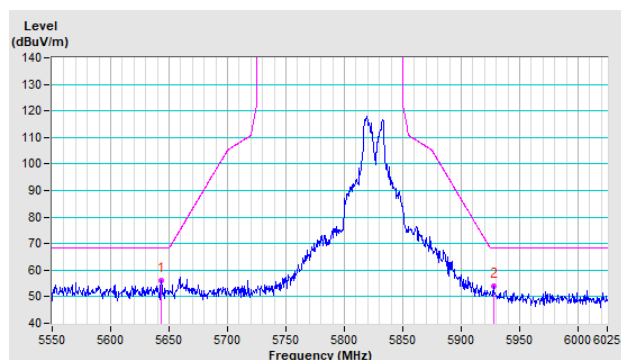


Vertical

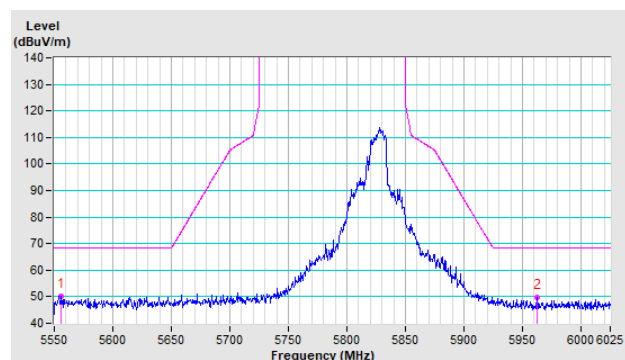


CH 165 5825 MHz

Horizontal



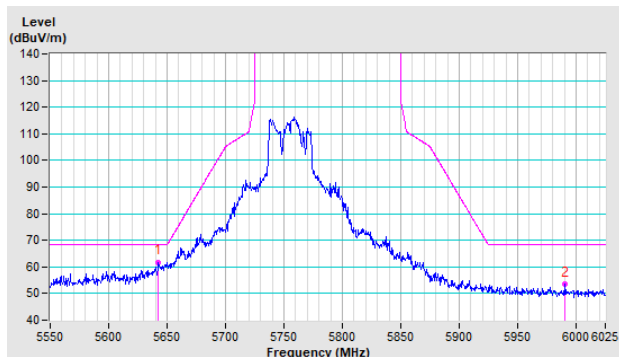
Vertical



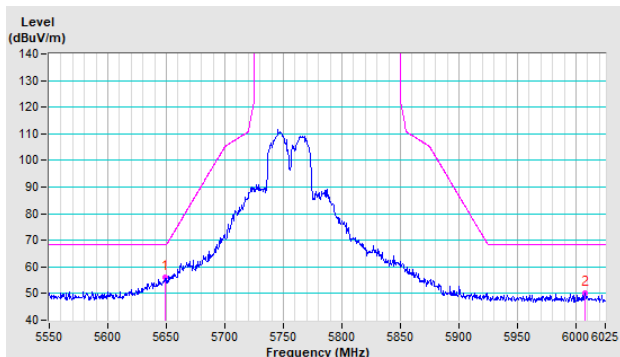
802.11ac (VHT40)

CH 151 5755 MHz

Horizontal

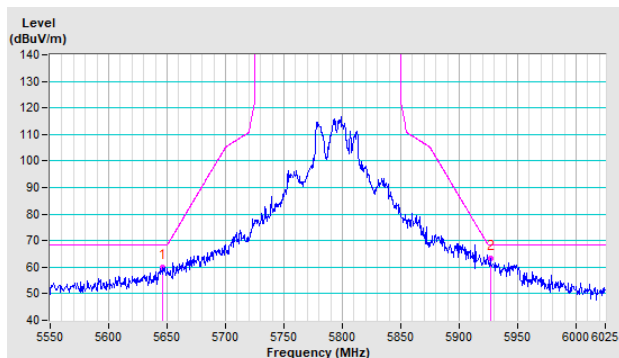


Vertical

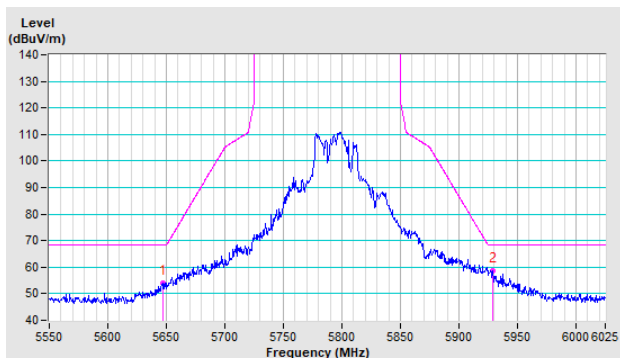


CH 159 5795 MHz

Horizontal



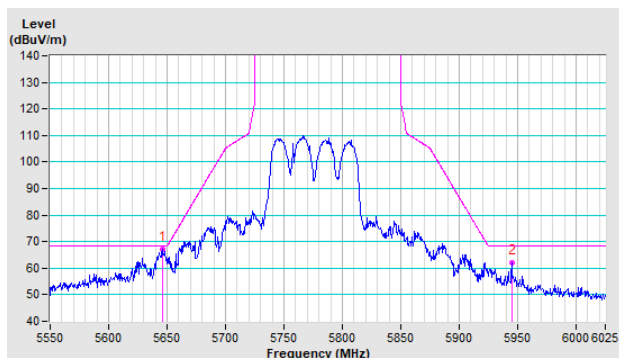
Vertical



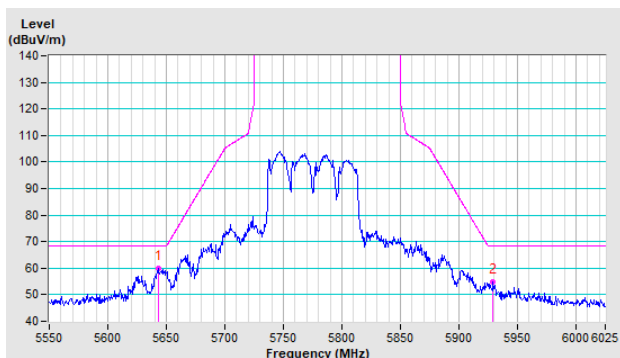
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal

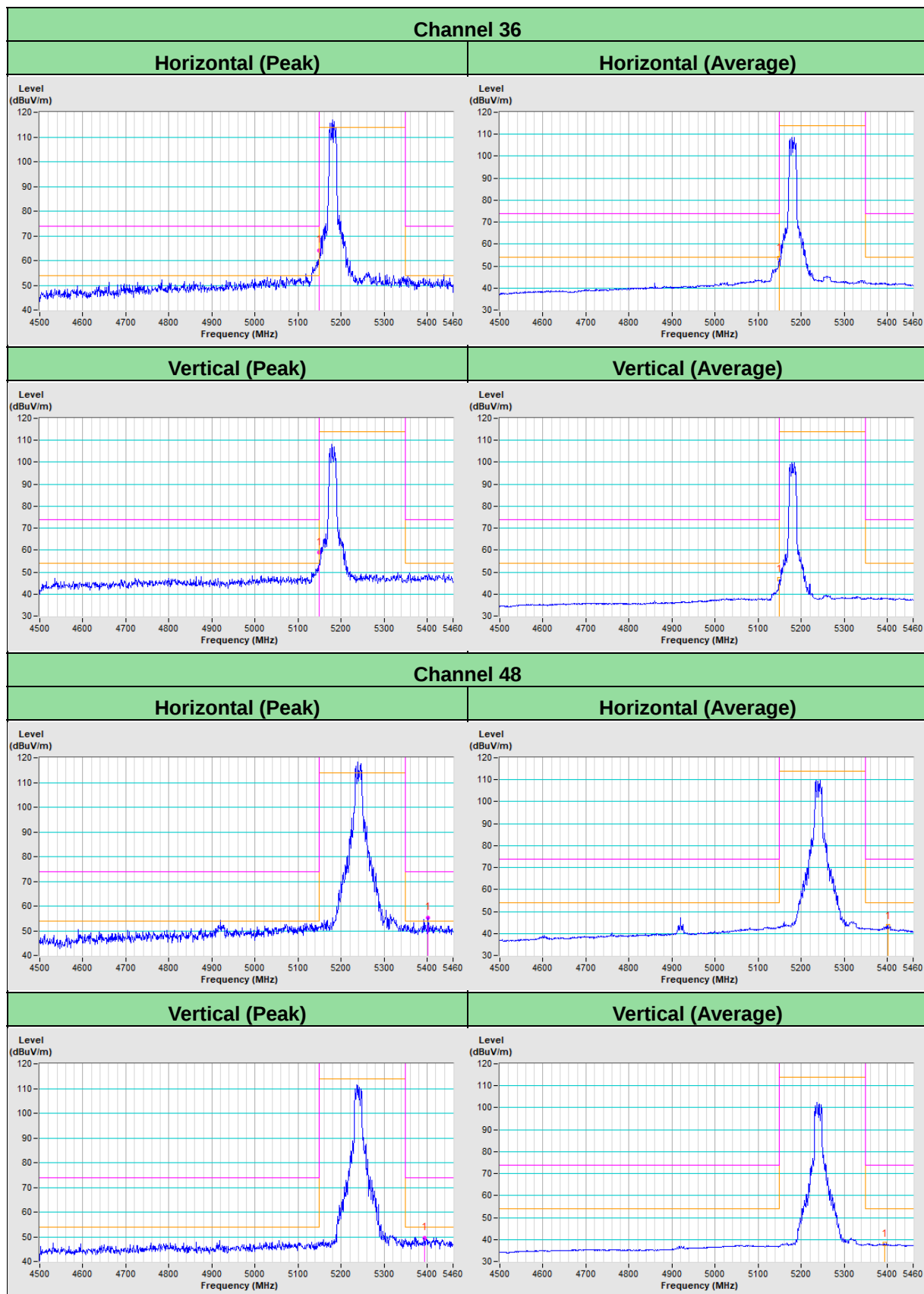


Vertical

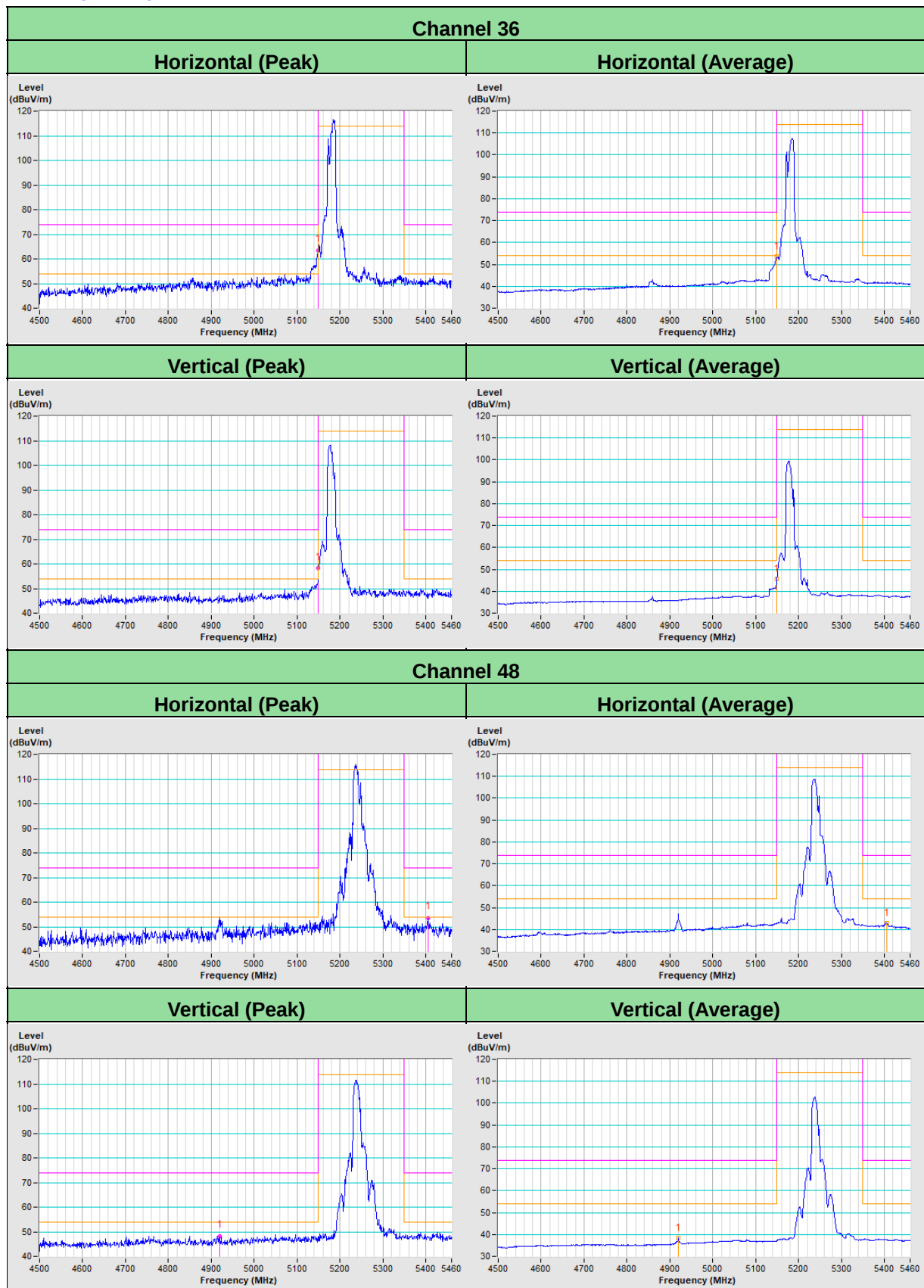


Annex B - Band-Edge Measurement (For U-NII-1 band)

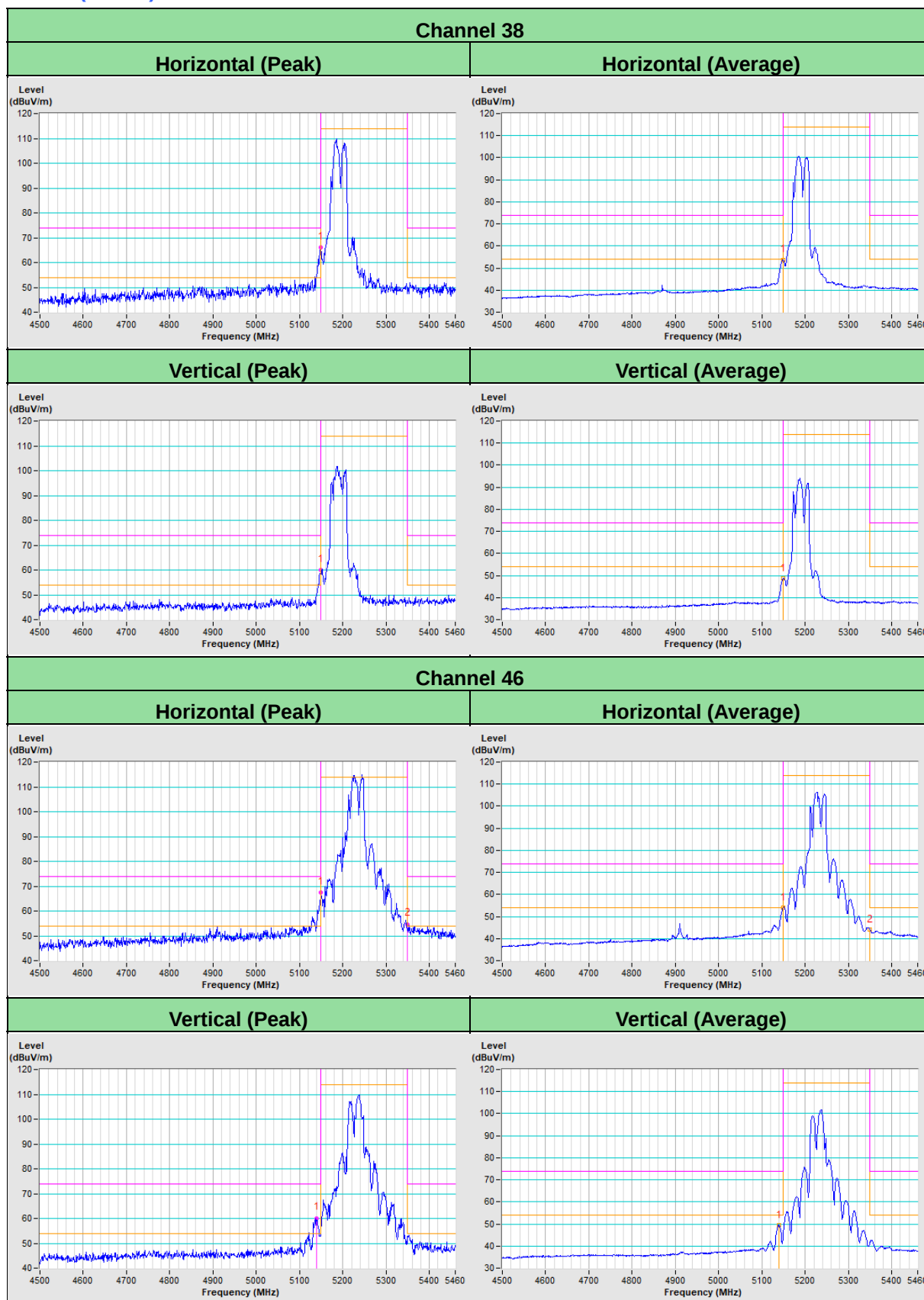
802.11a



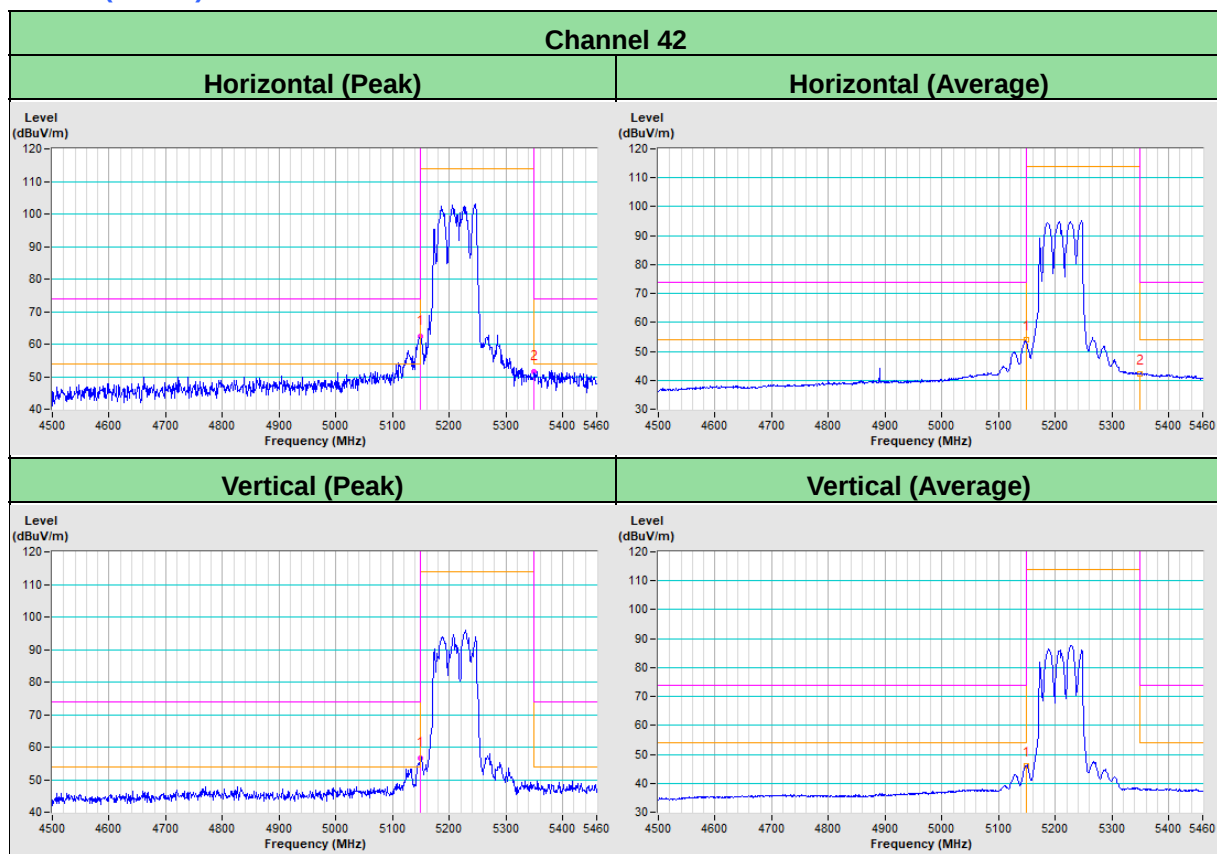
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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