

FCC Test Report

Report No.: RF190430E06B-1

FCC ID: PY320200500

Test Model: MC315

Received Date: Apr. 22, 2020

Test Date: May 04 to June 01, 2020

Issued Date: June 05, 2020

Applicant: NETGEAR, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF190430E06B-1	Original release.	June 05, 2020

1 Certificate of Conformity

Product: Meural Canvas

Brand: NETGEAR

Test Model: MC315

Sample Status: ENGINEERING SAMPLE

Applicant: NETGEAR, Inc.

Test Date: May 04 to June 01, 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 : Joyce Kuo , **Date:** June 05, 2020
Joyce Kuo / Specialist

Approved by : Clark Lin , **Date:** June 05, 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 -20.89 dB at 0.16172 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 -2.0 dB at 5643.98 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	5.1 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	Meural Canvas
Brand	NETGEAR
Test Model	MC315
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from power adapter
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 150 Mbps 802.11ac: up to 433.3 Mbps
Operating Frequency	2.4GHz: 2.412GHz ~ 2.462GHz 5GHz: 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.412 ~ 2.462GHz: 243.781 mW 5.18 ~ 5.24GHz: 229.615mW 5.745 ~ 5.825GHz: 224.388 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The device of WLAN 2.4GHz and 5GHz technology cannot transmit simultaneously.
2. The ETU must be supplied power adapter as following table:

Brand	Model No.	P/N	Spec.
NETGEAR	AD2076F10	332-11554-01	Input: 100-120Vac, 0.56A, 50/60Hz Output: 12Vdc, 1.5A DC output cable: 1.8 m, unshielded

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

Ant. No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
1	2.7	2.4~2.4835	Dipole	I-PEX
	3.77	5.15~5.25		
	3.81	5.725~5.85		

4. The EUT incorporates a SISO function.

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz, 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)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 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

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.

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)
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	48	OFDM	BPSK	6

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5180-5240, 5745-5825	36 to 48, 149 to 165	48	OFDM	BPSK	6

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.

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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 75%RH	120Vac, 60Hz	Ryan Du
RE $<$ 1G	22deg. C, 68%RH	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 70%RH	120Vac, 60Hz	Duncan Wang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

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

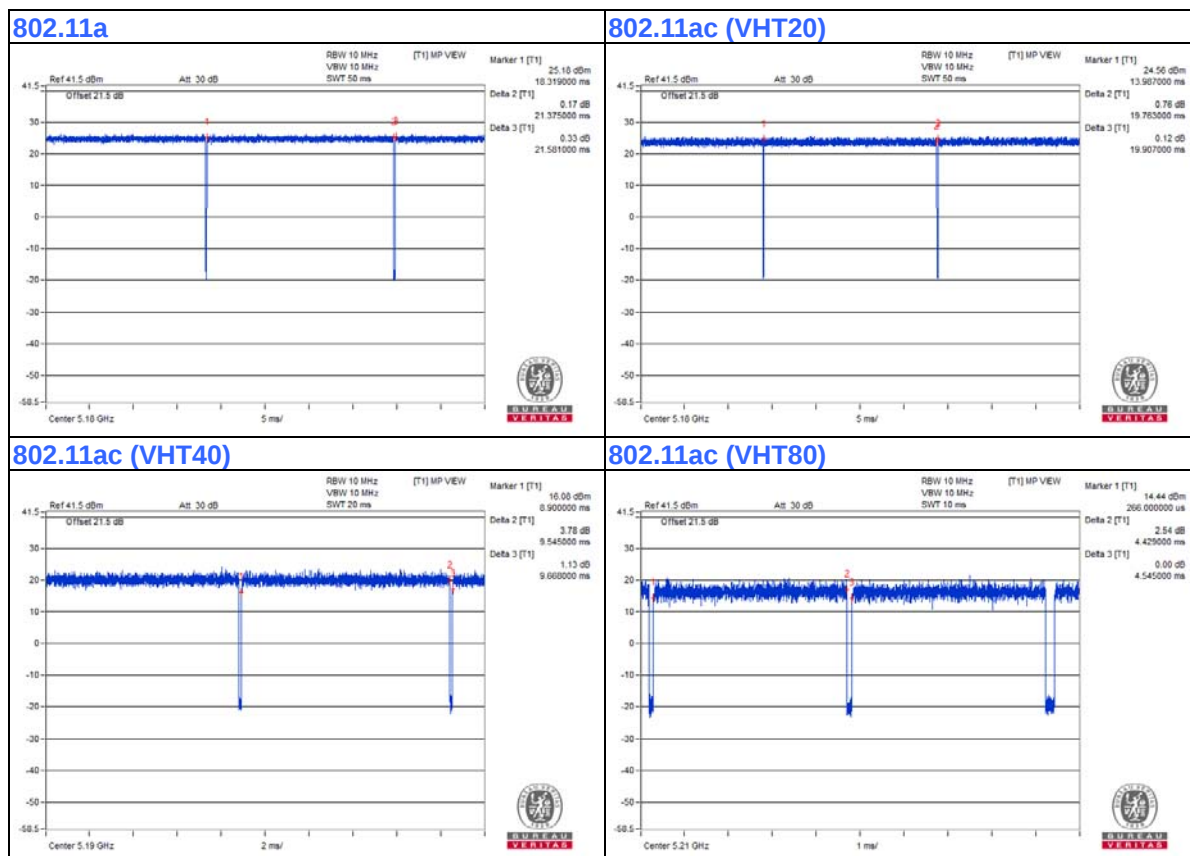
If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11a: Duty cycle = 21.375 ms / 21.581 ms = 0.99

802.11ac (VHT20): Duty cycle = 19.763 ms / 19.907 ms = 0.993

802.11ac (VHT40): Duty cycle = 9.545 ms / 9.668 ms = 0.987

802.11ac (VHT80): Duty cycle = 4.429 ms / 4.545 ms = 0.974, Duty factor = $10 \cdot \log(1/\text{Duty cycle}) = 0.11 \text{ dB}$

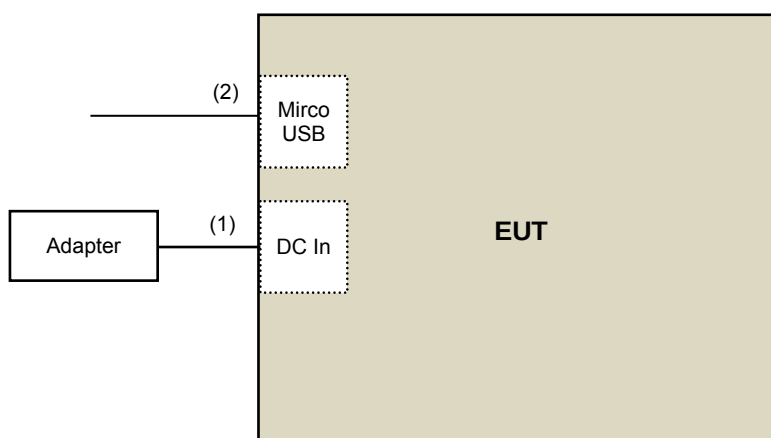


3.4 Description of Support Units

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	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	0	Supplied by client
2.	Micro USB Cable	1	1	No	0	Provided by Lab (For console use)

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

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:

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

4.1.2 Test Instruments

For Radiated Emission test: (802.11a)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 30, 2019	May 29, 2020
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-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 18, 2020	Mar. 17, 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-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 15, 2020	Jan. 14, 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. 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
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: May 04 to 12, 2020

For Radiated Emission test: (other modulation mode)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 15, 2020	Jan. 14, 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. 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
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: May 30 to June 01, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1529002	July 26, 2019	July 25, 2020
Power sensor Anritsu	MA2411B	1339443	July 26, 2019	July 25, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 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: May 29, 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:

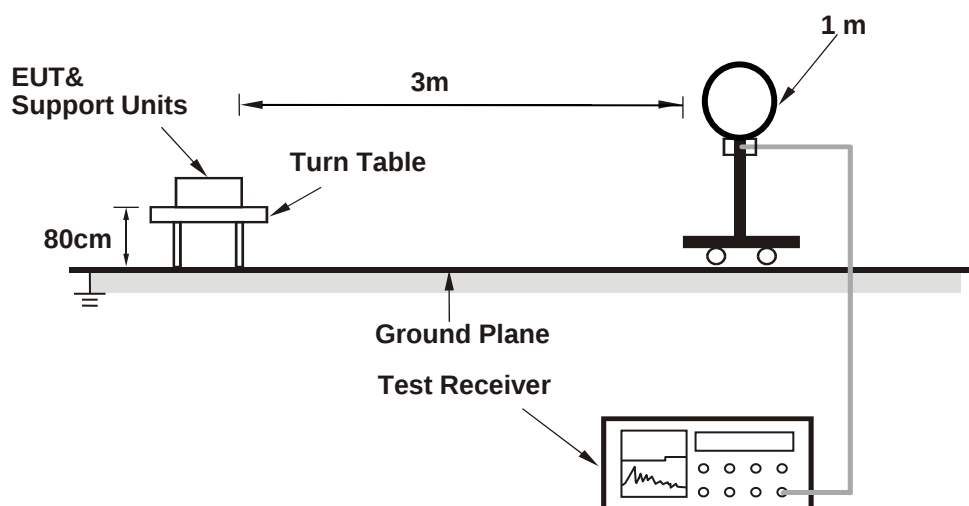
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

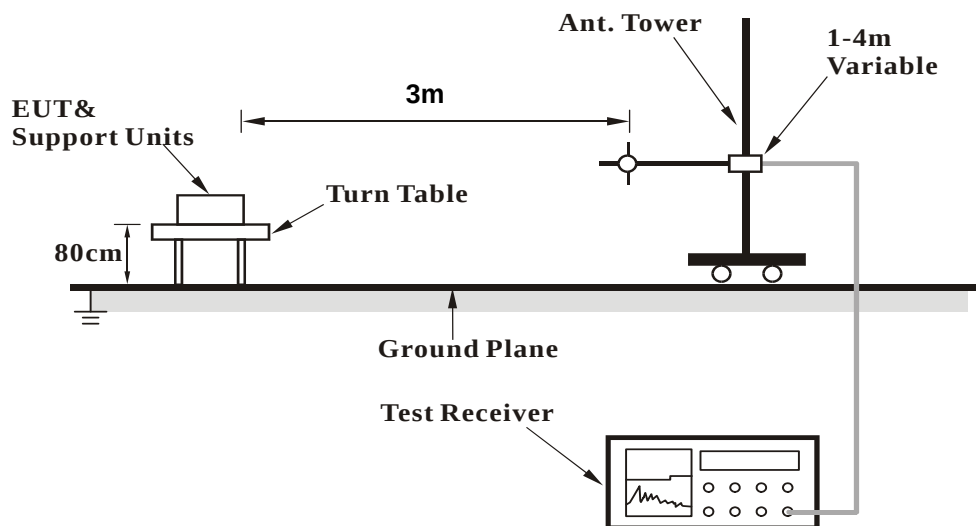
No deviation.

4.1.5 Test Setup

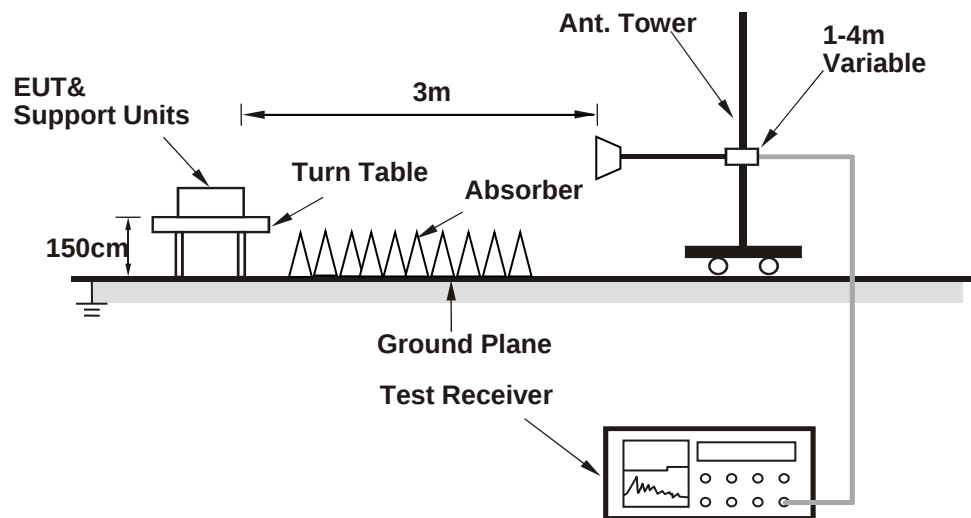
For Radiated emission below 30MHz



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

- Connected the EUT with the Laptop Computer which is placed on remote site.
- Controlling software (qdart_conn.win.1.0_installer_00056.1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

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	57.8 PK	74.0	-16.2	1.94 H	324	54.8	3.0
2	5150.00	48.2 AV	54.0	-5.8	1.94 H	324	45.2	3.0
3	*5180.00	110.8 PK			1.94 H	324	107.8	3.0
4	*5180.00	101.3 AV			1.94 H	324	98.3	3.0
5	#10360.00	47.3 PK	68.2	-20.9	1.59 H	105	34.1	13.2
6	15540.00	57.6 PK	74.0	-16.4	1.87 H	134	44.0	13.6
7	15540.00	45.5 AV	54.0	-8.5	1.87 H	134	31.9	13.6
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	5150.00	52.9 PK	74.0	-21.1	3.76 V	254	49.9	3.0
2	5150.00	43.8 AV	54.0	-10.2	3.76 V	254	40.8	3.0
3	*5180.00	107.2 PK			3.76 V	254	104.2	3.0
4	*5180.00	98.2 AV			3.76 V	254	95.2	3.0
5	#10360.00	49.8 PK	68.2	-18.4	2.04 V	52	36.6	13.2
6	15540.00	50.2 PK	74.0	-23.8	2.45 V	170	36.6	13.6
7	15540.00	48.1 AV	54.0	-5.9	2.45 V	170	34.5	13.6

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 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	52.6 PK	74.0	-21.4	2.23 H	331	49.6	3.0
2	5150.00	44.3 AV	54.0	-9.7	2.23 H	331	41.3	3.0
3	*5200.00	113.6 PK			2.23 H	331	110.7	2.9
4	*5200.00	103.6 AV			2.23 H	331	100.7	2.9
5	#10400.00	47.0 PK	68.2	-21.2	1.64 H	89	33.7	13.3
6	15600.00	58.0 PK	74.0	-16.0	1.86 H	146	44.1	13.9
7	15600.00	46.2 AV	54.0	-7.8	1.86 H	146	32.3	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	5150.00	52.6 PK	74.0	-21.4	3.80 V	258	49.6	3.0
2	5150.00	41.5 AV	54.0	-12.5	3.80 V	258	38.5	3.0
3	*5200.00	109.4 PK			3.80 V	258	106.5	2.9
4	*5200.00	100.3 AV			3.80 V	258	97.4	2.9
5	#10400.00	50.5 PK	68.2	-17.7	2.00 V	63	37.2	13.3
6	15600.00	60.2 PK	74.0	-13.8	2.52 V	184	46.3	13.9
7	15600.00	48.9 AV	54.0	-5.1	2.52 V	184	35.0	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 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	5150.00	50.1 PK	74.0	-23.9	2.54 H	328	47.1	3.0
2	5150.00	39.8 AV	54.0	-14.2	2.54 H	328	36.8	3.0
3	*5240.00	114.0 PK			2.54 H	328	111.1	2.9
4	*5240.00	103.9 AV			2.54 H	328	101.0	2.9
5	5350.00	50.7 PK	74.0	-23.3	2.54 H	328	47.7	3.0
6	5350.00	38.7 AV	54.0	-15.3	2.54 H	328	35.7	3.0
7	#10480.00	47.9 PK	68.2	-20.3	1.55 H	109	34.4	13.5
8	15720.00	57.7 PK	74.0	-16.3	1.91 H	137	44.3	13.4
9	15720.00	45.7 AV	54.0	-8.3	1.91 H	137	32.3	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	50.7 PK	74.0	-23.3	3.82 V	266	47.7	3.0
2	5150.00	39.7 AV	54.0	-14.3	3.82 V	266	36.7	3.0
3	*5240.00	109.7 PK			3.82 V	266	106.8	2.9
4	*5240.00	100.5 AV			3.82 V	266	97.6	2.9
5	5350.00	49.7 PK	74.0	-24.3	3.82 V	266	46.7	3.0
6	5350.00	38.9 AV	54.0	-15.1	3.82 V	266	35.9	3.0
7	#10480.00	50.4 PK	68.2	-17.8	2.01 V	47	36.9	13.5
8	15720.00	59.8 PK	74.0	-14.2	2.51 V	190	46.4	13.4
9	15720.00	48.5 AV	54.0	-5.5	2.51 V	190	35.1	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 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	#5598.95	52.2 PK	68.2	-16.0	1.88 H	331	48.8	3.4
2	*5745.00	116.2 PK			1.88 H	331	112.4	3.8
3	*5745.00	106.1 AV			1.88 H	331	102.3	3.8
4	#5937.72	51.5 PK	68.2	-16.7	1.88 H	331	47.5	4.0
5	11490.00	50.7 PK	74.0	-23.3	1.50 H	174	36.7	14.0
6	11490.00	38.4 AV	54.0	-15.6	1.50 H	174	24.4	14.0
7	#17235.00	59.5 PK	68.2	-8.7	1.47 H	207	43.0	16.5

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	#5613.27	50.7 PK	68.2	-17.5	4.00 V	266	47.3	3.4
2	*5745.00	111.8 PK			4.00 V	266	108.0	3.8
3	*5745.00	102.3 AV			4.00 V	266	98.5	3.8
4	#5984.21	51.3 PK	68.2	-16.9	4.00 V	266	47.2	4.1
5	11490.00	50.2 PK	74.0	-23.8	2.23 V	46	36.2	14.0
6	11490.00	39.0 AV	54.0	-15.0	2.23 V	46	25.0	14.0
7	#17235.00	63.5 PK	68.2	-4.7	2.49 V	180	47.0	16.5

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 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	#5581.42	52.0 PK	68.2	-16.2	2.48 H	324	48.7	3.3
2	*5785.00	115.7 PK			2.48 H	324	111.8	3.9
3	*5785.00	106.7 AV			2.48 H	324	102.8	3.9
4	#5929.54	52.7 PK	68.2	-15.5	2.48 H	324	48.7	4.0
5	11570.00	51.2 PK	74.0	-22.8	1.53 H	189	37.6	13.6
6	11570.00	38.7 AV	54.0	-15.3	1.53 H	189	25.1	13.6
7	#17355.00	59.6 PK	68.2	-8.6	1.44 H	222	42.6	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	#5603.76	50.4 PK	68.2	-17.8	4.00 V	266	47.0	3.4
2	*5785.00	111.7 PK			4.00 V	266	107.8	3.9
3	*5785.00	102.0 AV			4.00 V	266	98.1	3.9
4	#5978.93	50.0 PK	68.2	-18.2	4.00 V	266	45.9	4.1
5	11570.00	49.5 PK	74.0	-24.5	2.23 V	37	35.9	13.6
6	11570.00	38.5 AV	54.0	-15.5	2.23 V	37	24.9	13.6
7	#17355.00	63.9 PK	68.2	-4.3	2.52 V	191	46.9	17.0

Remarks:

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

Channel	TX Channel 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	#5629.57	51.8 PK	68.2	-16.4	2.31 H	326	48.4	3.4
2	*5825.00	115.9 PK			2.31 H	326	111.8	4.1
3	*5825.00	107.3 AV			2.31 H	326	103.2	4.1
4	#5974.79	51.5 PK	68.2	-16.7	2.31 H	326	47.4	4.1
5	11650.00	51.0 PK	74.0	-23.0	1.54 H	173	37.5	13.5
6	11650.00	38.7 AV	54.0	-15.3	1.54 H	173	25.2	13.5
7	#17475.00	59.2 PK	68.2	-9.0	1.52 H	197	40.6	18.6

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	#5559.05	50.3 PK	68.2	-17.9	3.61 V	268	47.0	3.3
2	*5825.00	110.9 PK			3.61 V	268	106.8	4.1
3	*5825.00	101.5 AV			3.61 V	268	97.4	4.1
4	#6024.52	51.8 PK	68.2	-16.4	3.61 V	268	47.7	4.1
5	11650.00	50.6 PK	74.0	-23.4	2.20 V	51	37.1	13.5
6	11650.00	39.5 AV	54.0	-14.5	2.20 V	51	26.0	13.5
7	#17475.00	63.7 PK	68.2	-4.5	2.47 V	187	45.1	18.6

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.

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	55.3 PK	74.0	-18.7	1.92 H	330	52.3	3.0
2	5150.00	46.2 AV	54.0	-7.8	1.92 H	330	43.2	3.0
3	*5180.00	109.9 PK			1.92 H	330	106.9	3.0
4	*5180.00	100.7 AV			1.92 H	330	97.7	3.0
5	#10360.00	45.5 PK	68.2	-22.7	1.64 H	112	32.3	13.2
6	15540.00	49.7 PK	74.0	-24.3	1.77 H	115	36.1	13.6
7	15540.00	40.3 AV	54.0	-13.7	1.77 H	115	26.7	13.6
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	5150.00	53.2 PK	74.0	-20.8	3.72 V	269	50.2	3.0
2	5150.00	43.6 AV	54.0	-10.4	3.72 V	269	40.6	3.0
3	*5180.00	104.8 PK			3.72 V	269	101.8	3.0
4	*5180.00	96.6 AV			3.72 V	269	93.6	3.0
5	#10360.00	46.2 PK	68.2	-22.0	2.00 V	41	33.0	13.2
6	15540.00	49.5 PK	74.0	-24.5	2.48 V	164	35.9	13.6
7	15540.00	39.8 AV	54.0	-14.2	2.48 V	164	26.2	13.6

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 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	52.7 PK	74.0	-21.3	2.24 H	344	49.7	3.0
2	5150.00	44.5 AV	54.0	-9.5	2.24 H	344	41.5	3.0
3	*5200.00	113.6 PK			2.24 H	344	110.7	2.9
4	*5200.00	105.0 AV			2.24 H	344	102.1	2.9
5	#10400.00	45.9 PK	68.2	-22.3	1.65 H	111	32.6	13.3
6	15600.00	50.2 PK	74.0	-23.8	1.74 H	122	36.3	13.9
7	15600.00	40.6 AV	54.0	-13.4	1.74 H	122	26.7	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	5150.00	52.8 PK	74.0	-21.2	3.81 V	273	49.8	3.0
2	5150.00	41.6 AV	54.0	-12.4	3.81 V	273	38.6	3.0
3	*5200.00	109.7 PK			3.81 V	273	106.8	2.9
4	*5200.00	100.9 AV			3.81 V	273	98.0	2.9
5	#10400.00	46.3 PK	68.2	-21.9	1.97 V	50	33.0	13.3
6	15600.00	49.4 PK	74.0	-24.6	2.49 V	168	35.5	13.9
7	15600.00	39.7 AV	54.0	-14.3	2.49 V	168	25.8	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 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	5150.00	49.8 PK	74.0	-24.2	1.89 H	332	46.8	3.0
2	5150.00	39.8 AV	54.0	-14.2	1.89 H	332	36.8	3.0
3	*5240.00	113.8 PK			1.89 H	332	110.9	2.9
4	*5240.00	105.3 AV			1.89 H	332	102.4	2.9
5	5350.00	50.4 PK	74.0	-23.6	1.89 H	332	47.4	3.0
6	5350.00	40.0 AV	54.0	-14.0	1.89 H	332	37.0	3.0
7	#10480.00	45.2 PK	68.2	-23.0	1.70 H	110	31.7	13.5
8	15720.00	49.5 PK	74.0	-24.5	1.81 H	126	36.1	13.4
9	15720.00	40.1 AV	54.0	-13.9	1.81 H	126	26.7	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	49.9 PK	74.0	-24.1	3.82 V	280	46.9	3.0
2	5150.00	39.9 AV	54.0	-14.1	3.82 V	280	36.9	3.0
3	*5240.00	109.4 PK			3.82 V	280	106.5	2.9
4	*5240.00	100.3 AV			3.82 V	280	97.4	2.9
5	5350.00	50.8 PK	74.0	-23.2	3.82 V	280	47.8	3.0
6	5350.00	39.4 AV	54.0	-14.6	3.82 V	280	36.4	3.0
7	#10480.00	46.4 PK	68.2	-21.8	2.02 V	37	32.9	13.5
8	15720.00	49.8 PK	74.0	-24.2	2.46 V	165	36.4	13.4
9	15720.00	40.0 AV	54.0	-14.0	2.46 V	165	26.6	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 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	#5599.29	52.4 PK	68.2	-15.8	2.26 H	327	49.0	3.4
2	*5745.00	115.1 PK			2.26 H	327	111.3	3.8
3	*5745.00	106.3 AV			2.26 H	327	102.5	3.8
4	#5938.93	51.3 PK	68.2	-16.9	2.26 H	327	47.3	4.0
5	11490.00	45.4 PK	74.0	-28.6	1.60 H	119	31.4	14.0
6	11490.00	35.1 AV	54.0	-18.9	1.60 H	119	21.1	14.0
7	#17235.00	49.3 PK	68.2	-18.9	1.79 H	124	32.8	16.5

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	#5608.96	49.4 PK	68.2	-18.8	4.00 V	268	46.0	3.4
2	*5745.00	109.5 PK			4.00 V	268	105.7	3.8
3	*5745.00	99.9 AV			4.00 V	268	96.1	3.8
4	#5971.54	50.7 PK	68.2	-17.5	4.00 V	268	46.6	4.1
5	11490.00	46.5 PK	74.0	-27.5	2.02 V	44	32.5	14.0
6	11490.00	35.8 AV	54.0	-18.2	2.02 V	44	21.8	14.0
7	#17235.00	49.7 PK	68.2	-18.5	2.42 V	163	33.2	16.5

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 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	#5641.07	52.2 PK	68.2	-16.0	1.87 H	331	48.8	3.4
2	*5785.00	115.7 PK			1.87 H	331	111.8	3.9
3	*5785.00	106.1 AV			1.87 H	331	102.2	3.9
4	#5980.29	51.7 PK	68.2	-16.5	1.87 H	331	47.6	4.1
5	11570.00	45.1 PK	74.0	-28.9	1.68 H	119	31.5	13.6
6	11570.00	34.7 AV	54.0	-19.3	1.68 H	119	21.1	13.6
7	#17355.00	49.7 PK	68.2	-18.5	1.75 H	124	32.7	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	#5580.65	50.6 PK	68.2	-17.6	3.72 V	272	47.3	3.3
2	*5785.00	109.3 PK			3.72 V	272	105.4	3.9
3	*5785.00	100.1 AV			3.72 V	272	96.2	3.9
4	#5931.60	50.9 PK	68.2	-17.3	3.72 V	272	46.9	4.0
5	11570.00	46.7 PK	74.0	-27.3	1.98 V	52	33.1	13.6
6	11570.00	36.3 AV	54.0	-17.7	1.98 V	52	22.7	13.6
7	#17355.00	49.9 PK	68.2	-18.3	2.48 V	151	32.9	17.0

Remarks:

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

Channel	TX Channel 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	#5629.24	51.6 PK	68.2	-16.6	2.24 H	330	48.2	3.4
2	*5825.00	115.8 PK			2.24 H	330	111.7	4.1
3	*5825.00	106.3 AV			2.24 H	330	102.2	4.1
4	#5964.77	51.8 PK	68.2	-16.4	2.24 H	330	47.7	4.1
5	11650.00	45.3 PK	74.0	-28.7	1.63 H	112	31.8	13.5
6	11650.00	35.0 AV	54.0	-19.0	1.63 H	112	21.5	13.5
7	#17475.00	49.9 PK	68.2	-18.3	1.77 H	103	31.3	18.6

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	#5604.83	50.1 PK	68.2	-18.1	3.33 V	271	46.7	3.4
2	*5825.00	109.4 PK			3.33 V	271	105.3	4.1
3	*5825.00	99.9 AV			3.33 V	271	95.8	4.1
4	#5964.32	50.3 PK	68.2	-17.9	3.33 V	271	46.2	4.1
5	11650.00	45.9 PK	74.0	-28.1	1.95 V	43	32.4	13.5
6	11650.00	35.4 AV	54.0	-18.6	1.95 V	43	21.9	13.5
7	#17475.00	49.6 PK	68.2	-18.6	2.48 V	165	31.0	18.6

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.

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	57.5 PK	74.0	-16.5	1.92 H	331	54.5	3.0
2	5150.00	49.0 AV	54.0	-5.0	1.92 H	331	46.0	3.0
3	*5190.00	106.1 PK			1.92 H	331	103.1	3.0
4	*5190.00	97.4 AV			1.92 H	331	94.4	3.0
5	#10380.00	45.5 PK	68.2	-22.7	1.69 H	117	32.3	13.2
6	15570.00	49.4 PK	74.0	-24.6	1.80 H	128	35.6	13.8
7	15570.00	39.9 AV	54.0	-14.1	1.80 H	128	26.1	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	5150.00	53.8 PK	74.0	-20.2	3.56 V	267	50.8	3.0
2	5150.00	45.1 AV	54.0	-8.9	3.56 V	267	42.1	3.0
3	*5190.00	102.0 PK			3.56 V	267	99.0	3.0
4	*5190.00	93.6 AV			3.56 V	267	90.6	3.0
5	#10380.00	46.5 PK	68.2	-21.7	1.97 V	51	33.3	13.2
6	15570.00	49.1 PK	74.0	-24.9	2.52 V	164	35.3	13.8
7	15570.00	39.6 AV	54.0	-14.4	2.52 V	164	25.8	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 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	*5230.00	109.0 PK			1.97 H	328	106.1	2.9
2	*5230.00	100.9 AV			1.97 H	328	98.0	2.9
3	5350.00	59.4 PK	74.0	-14.6	1.97 H	328	56.4	3.0
4	5350.00	43.7 AV	54.0	-10.3	1.97 H	328	40.7	3.0
5	#10460.00	45.9 PK	68.2	-22.3	1.61 H	101	32.4	13.5
6	15690.00	50.0 PK	74.0	-24.0	1.73 H	109	36.5	13.5
7	15690.00	40.5 AV	54.0	-13.5	1.73 H	109	27.0	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	*5230.00	104.1 PK			3.60 V	282	101.2	2.9
2	*5230.00	95.8 AV			3.60 V	282	92.9	2.9
3	5350.00	54.3 PK	74.0	-19.7	3.60 V	282	51.3	3.0
4	5350.00	40.8 AV	54.0	-13.2	3.60 V	282	37.8	3.0
5	#10460.00	46.3 PK	68.2	-21.9	2.00 V	30	32.8	13.5
6	15690.00	49.3 PK	74.0	-24.7	2.48 V	180	35.8	13.5
7	15690.00	39.3 AV	54.0	-14.7	2.48 V	180	25.8	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 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	#5635.70	60.7 PK	68.2	-7.5	2.24 H	331	57.3	3.4
2	*5755.00	112.3 PK			2.24 H	331	108.5	3.8
3	*5755.00	103.7 AV			2.24 H	331	99.9	3.8
4	#5956.73	57.1 PK	68.2	-11.1	2.24 H	331	53.0	4.1
5	11510.00	45.5 PK	74.0	-28.5	1.59 H	125	31.7	13.8
6	11510.00	35.0 AV	54.0	-19.0	1.59 H	125	21.2	13.8
7	#17265.00	49.1 PK	68.2	-19.1	1.76 H	120	32.5	16.6

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	#5582.41	51.8 PK	68.2	-16.4	3.76 V	271	48.5	3.3
2	*5755.00	107.2 PK			3.76 V	271	103.4	3.8
3	*5755.00	97.9 AV			3.76 V	271	94.1	3.8
4	#5977.00	52.1 PK	68.2	-16.1	3.76 V	271	48.0	4.1
5	11510.00	45.8 PK	74.0	-28.2	1.99 V	56	32.0	13.8
6	11510.00	35.4 AV	54.0	-18.6	1.99 V	56	21.6	13.8
7	#17265.00	49.3 PK	68.2	-18.9	2.49 V	168	32.7	16.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5639.41	56.7 PK	68.2	-11.5	1.86 H	330	53.3	3.4
2	*5795.00	111.9 PK			1.86 H	330	108.0	3.9
3	*5795.00	103.1 AV			1.86 H	330	99.2	3.9
4	#5934.31	61.1 PK	68.2	-7.1	1.86 H	330	57.1	4.0
5	11590.00	45.2 PK	74.0	-28.8	1.59 H	116	31.6	13.6
6	11590.00	34.8 AV	54.0	-19.2	1.59 H	116	21.2	13.6
7	#17385.00	49.5 PK	68.2	-18.7	1.71 H	111	32.1	17.4

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	#5622.78	52.1 PK	68.2	-16.1	3.86 V	269	48.7	3.4
2	*5795.00	105.8 PK			3.86 V	269	101.9	3.9
3	*5795.00	96.8 AV			3.86 V	269	92.9	3.9
4	#5931.85	52.0 PK	68.2	-16.2	3.86 V	269	48.0	4.0
5	11590.00	46.0 PK	74.0	-28.0	2.00 V	27	32.4	13.6
6	11590.00	35.4 AV	54.0	-18.6	2.00 V	27	21.8	13.6
7	#17385.00	50.0 PK	68.2	-18.2	2.48 V	149	32.6	17.4

Remarks:

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

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Channel	TX Channel 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	59.6 PK	74.0	-14.4	1.82 H	329	56.6	3.0
2	5150.00	49.6 AV	54.0	-4.4	1.82 H	329	46.6	3.0
3	*5210.00	103.6 PK			1.82 H	329	100.6	3.0
4	*5210.00	94.3 AV			1.82 H	329	91.3	3.0
5	5350.00	52.4 PK	74.0	-21.6	1.82 H	329	49.4	3.0
6	5350.00	42.3 AV	54.0	-11.7	1.82 H	329	39.3	3.0
7	#10420.00	45.9 PK	68.2	-22.3	1.67 H	115	32.6	13.3
8	15630.00	50.0 PK	74.0	-24.0	1.78 H	124	36.3	13.7
9	15630.00	40.6 AV	54.0	-13.4	1.78 H	124	26.9	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	54.3 PK	74.0	-19.7	3.63 V	286	51.3	3.0
2	5150.00	45.8 AV	54.0	-8.2	3.63 V	286	42.8	3.0
3	*5210.00	99.3 PK			3.63 V	286	96.3	3.0
4	*5210.00	89.8 AV			3.63 V	286	86.8	3.0
5	5350.00	51.3 PK	74.0	-22.7	3.63 V	286	48.3	3.0
6	5350.00	41.9 AV	54.0	-12.1	3.63 V	286	38.9	3.0
7	#10420.00	45.9 PK	68.2	-22.3	1.99 V	44	32.6	13.3
8	15630.00	49.5 PK	74.0	-24.5	2.48 V	150	35.8	13.7
9	15630.00	39.9 AV	54.0	-14.1	2.48 V	150	26.2	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	#5643.98	66.2 PK	68.2	-2.0	1.98 H	331	62.7	3.5
2	*5775.00	108.9 PK			1.98 H	331	105.0	3.9
3	*5775.00	99.7 AV			1.98 H	331	95.8	3.9
4	#5926.51	64.4 PK	68.2	-3.8	1.98 H	331	60.5	3.9
5	11550.00	45.6 PK	74.0	-28.4	1.66 H	97	31.9	13.7
6	11550.00	35.2 AV	54.0	-18.8	1.66 H	97	21.5	13.7
7	#17325.00	50.0 PK	68.2	-18.2	1.76 H	131	33.2	16.8
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	#5645.66	56.8 PK	68.2	-11.4	4.00 V	260	53.3	3.5
2	*5775.00	101.9 PK			4.00 V	260	98.0	3.9
3	*5775.00	92.8 AV			4.00 V	260	88.9	3.9
4	#5931.52	55.7 PK	68.2	-12.5	4.00 V	260	51.7	4.0
5	11550.00	46.1 PK	74.0	-27.9	2.03 V	42	32.4	13.7
6	11550.00	35.9 AV	54.0	-18.1	2.03 V	42	22.2	13.7
7	#17325.00	49.5 PK	68.2	-18.7	2.52 V	179	32.7	16.8

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.

Below 1GHz Data:

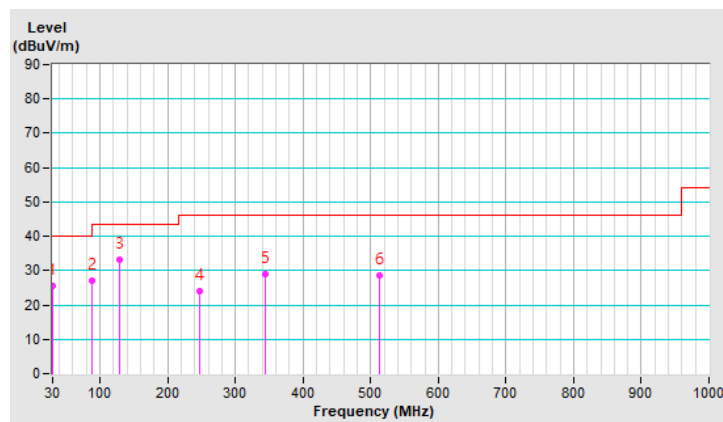
802.11a

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.69	25.6 QP	40.0	-14.4	1.00 H	89	34.8	-9.2
2	88.82	26.9 QP	43.5	-16.6	2.00 H	254	40.6	-13.7
3	128.41	33.2 QP	43.5	-10.3	2.00 H	246	42.1	-8.9
4	246.60	23.9 QP	46.0	-22.1	1.50 H	254	32.5	-8.6
5	343.44	28.9 QP	46.0	-17.1	1.00 H	223	34.4	-5.5
6	512.62	28.7 QP	46.0	-17.3	1.50 H	336	29.7	-1.0

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.

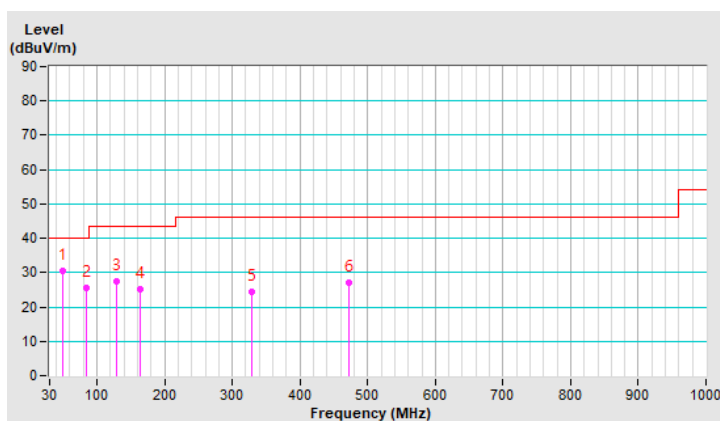


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.60	30.5 QP	40.0	-9.5	1.00 V	284	38.3	-7.8
2	83.86	25.5 QP	40.0	-14.5	1.50 V	241	38.9	-13.4
3	128.04	27.4 QP	43.5	-16.1	1.50 V	67	36.3	-8.9
4	163.56	25.2 QP	43.5	-18.3	1.50 V	146	32.8	-7.6
5	328.75	24.5 QP	46.0	-21.5	1.00 V	49	30.1	-5.6
6	471.97	27.1 QP	46.0	-18.9	1.50 V	152	28.8	-1.7

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	100287	Apr. 16, 2020	Apr. 15, 2021
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-523	Oct. 17, 2019	Oct. 16, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100071	Oct. 30, 2019	Oct. 29, 2020
RF Cable	5D-FB	COACAB-002	Sep. 09, 2019	Sep. 08, 2020
10 dB PAD EMEC	STI02-2200-10	002	Mar. 13, 2020	Mar. 12, 2021
50 ohms Terminator	N/A	EMC-04	Oct. 29, 2019	Oct. 28, 2020
50 ohms Terminator	N/A	EMC-01	Sep. 27, 2019	Sep. 26, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conducted Room D
3. Tested Date: May 12, 2020

4.2.3 Test Procedure

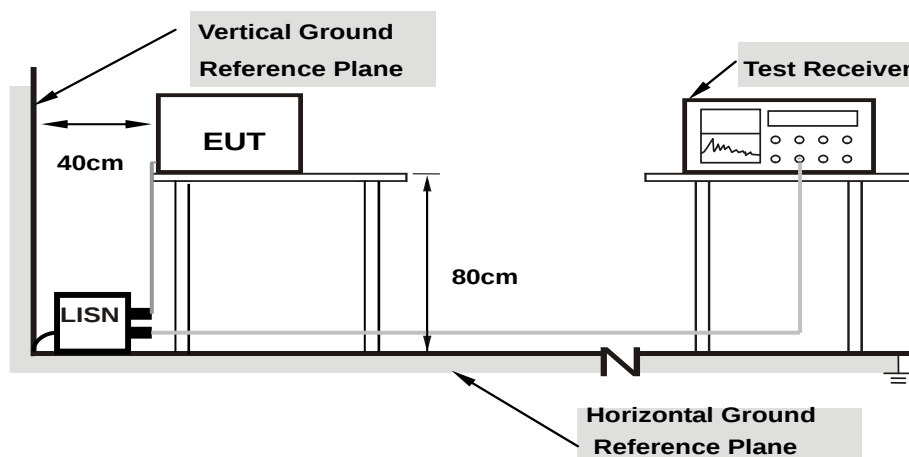
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

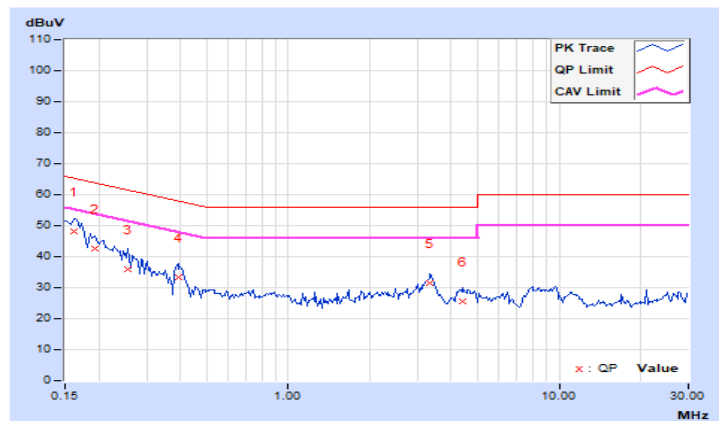
4.2.7 Test Results

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

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.02	38.29	24.47	48.31	34.49	65.38	55.38	-17.07	-20.89
2	0.19297	10.02	32.46	20.60	42.48	30.62	63.91	53.91	-21.43	-23.29
3	0.25547	10.03	26.07	13.93	36.10	23.96	61.58	51.58	-25.48	-27.62
4	0.39219	10.05	23.36	17.87	33.41	27.92	58.02	48.02	-24.61	-20.10
5	3.33594	10.28	21.09	16.14	31.37	26.42	56.00	46.00	-24.63	-19.58
6	4.42578	10.37	15.21	9.14	25.58	19.51	56.00	46.00	-30.42	-26.49

Remarks:

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

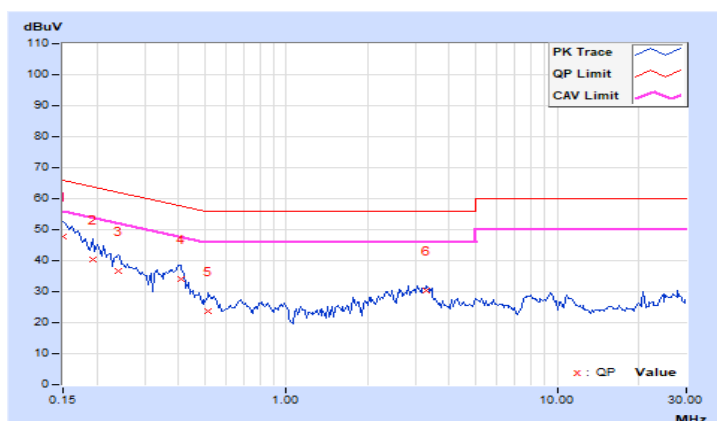


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.10	37.51	22.86	47.61	32.96	66.00	56.00	-18.39	-23.04
2	0.19297	10.08	30.14	20.03	40.22	30.11	63.91	53.91	-23.69	-23.80
3	0.23984	10.09	26.56	14.86	36.65	24.95	62.10	52.10	-25.45	-27.15
4	0.40781	10.12	23.83	19.36	33.95	29.48	57.69	47.69	-23.74	-18.21
5	0.51719	10.13	13.49	8.07	23.62	18.20	56.00	46.00	-32.38	-27.80
6	3.30859	10.30	19.96	15.00	30.26	25.30	56.00	46.00	-25.74	-20.70

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



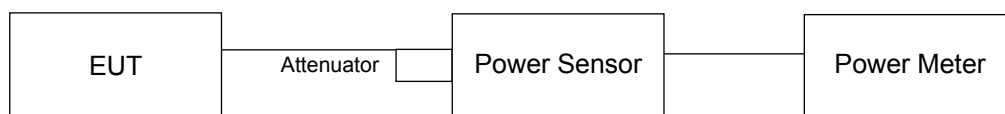
4.3 Transmit Power Measurement

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

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

802.11a

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
36	5180	138.995	21.43	24.00	Pass
40	5200	226.986	23.56	24.00	Pass
48	5240	229.615	23.61	24.00	Pass
149	5745	224.388	23.51	30.00	Pass
157	5785	216.272	23.35	30.00	Pass
165	5825	209.411	23.21	30.00	Pass

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
36	5180	107.399	20.31	24.00	Pass
40	5200	216.77	23.36	24.00	Pass
48	5240	226.464	23.55	24.00	Pass
149	5745	210.863	23.24	30.00	Pass
157	5785	207.491	23.17	30.00	Pass
165	5825	202.768	23.07	30.00	Pass

802.11ac (VHT40)

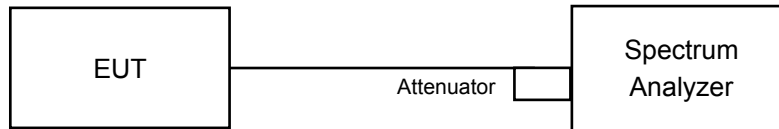
Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
38	5190	77.625	18.90	24.00	Pass
46	5230	167.494	22.24	24.00	Pass
151	5755	220.293	23.43	30.00	Pass
159	5795	206.063	23.14	30.00	Pass

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
42	5210	83.946	19.24	24.00	Pass
155	5775	204.644	23.11	30.00	Pass

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)
36	5180	16.44
40	5200	16.68
48	5240	16.92
149	5745	22.43
157	5785	21.36
165	5825	19.44

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.4
40	5200	17.64
48	5240	17.64
149	5745	24
157	5785	23.76
165	5825	22.08

802.11ac (VHT40)

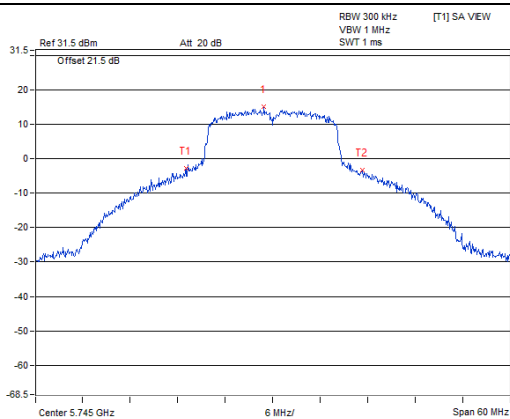
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	36.24
46	5230	36.24
151	5755	46.8
159	5795	46.32

802.11ac (VHT80)

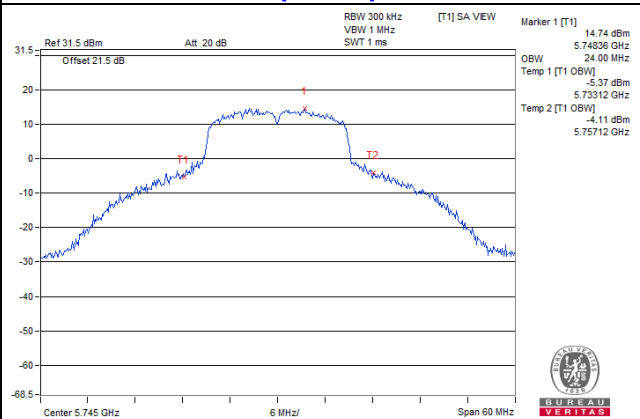
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	75.36
155	5775	91.2

Spectrum Plot of Max. Value

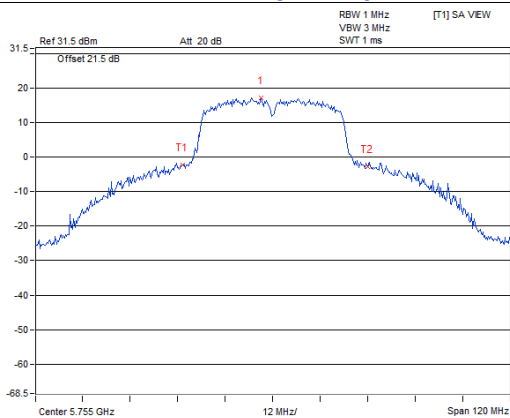
802.11a / CH149



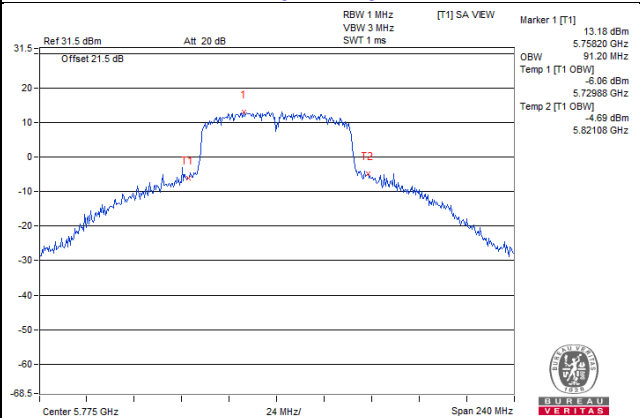
802.11ac (VHT20)_CH149



802.11ac (VHT40)_CH151

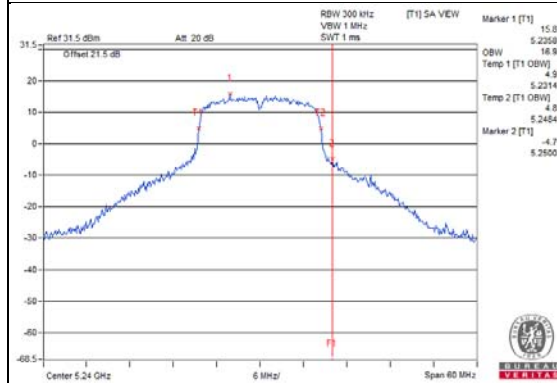


802.11ac (VHT80)_CH155

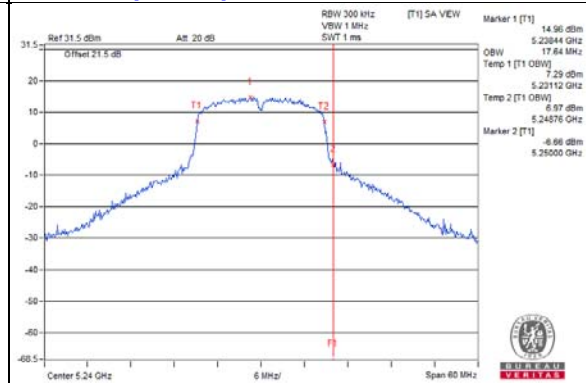


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

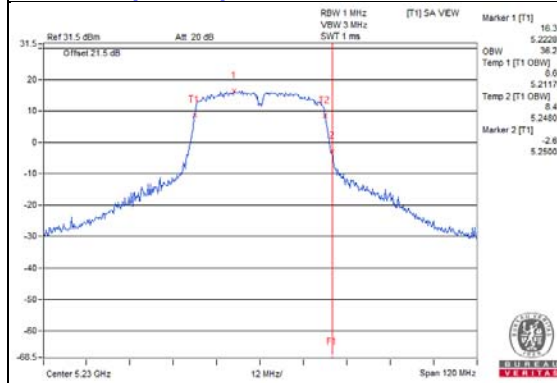
802.11a_CH48



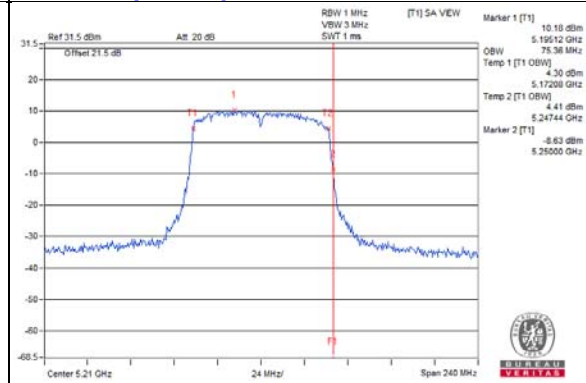
802.11ac (VHT20)_CH48



802.11ac (VHT40)_CH46

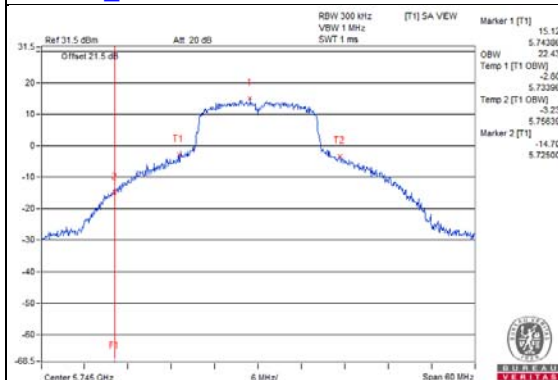


802.11ac (VHT80)_CH42

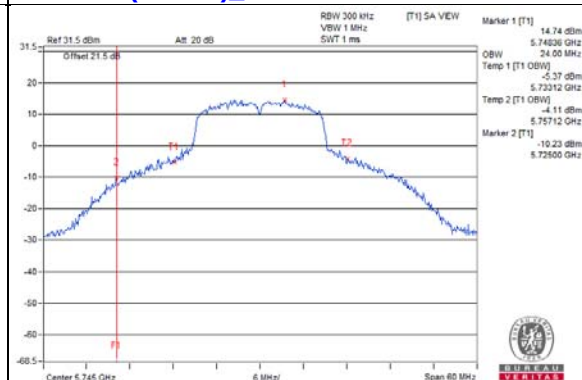


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

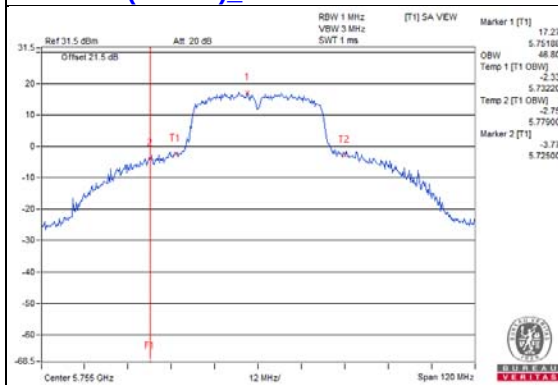
802.11a_CH149



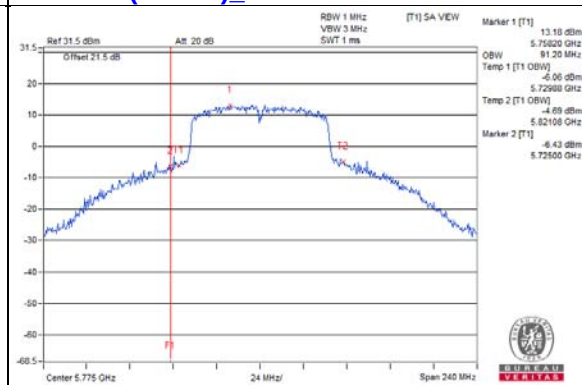
802.11ac (VHT20)_CH149



802.11ac (VHT40)_CH151



802.11ac (VHT80)_CH155

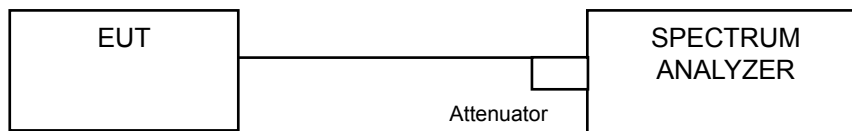


4.5 Peak Power Spectral Density Measurement

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

802.11a, 802.11ac (VHT20), 802.11ac (VHT40):

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 (reducing) 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

802.11ac (VHT80):

For U-NII-1:

Using method SA-2

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

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 (reducing) 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/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:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	8.80	11.00	Pass
40	5200	10.89	11.00	Pass
48	5240	10.81	11.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	7.50	11.00	Pass
40	5200	10.61	11.00	Pass
48	5240	10.62	11.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
38	5190	3.21	11.00	Pass
46	5230	6.43	11.00	Pass

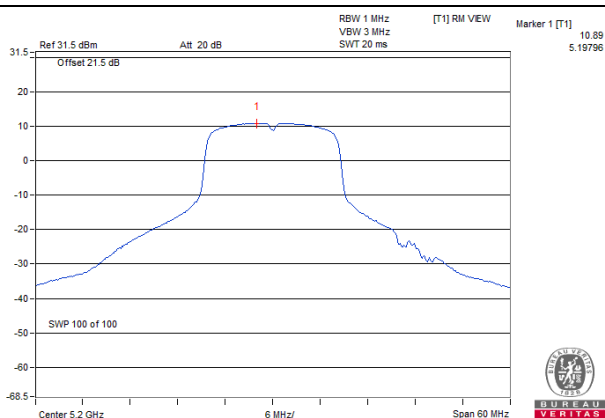
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Duty Factor (dB)	Total PSD (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
42	5210	0.51	0.11	0.62	11.00	Pass

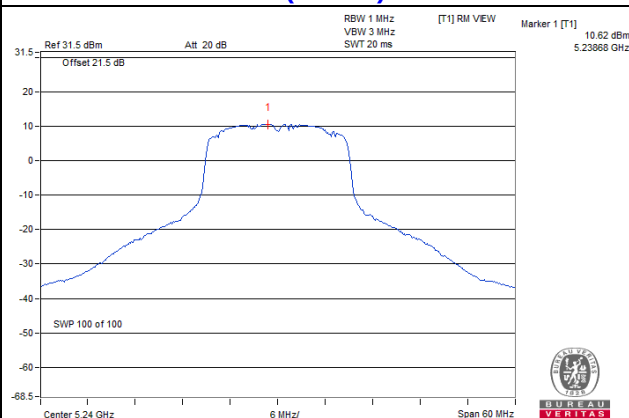
Note: 1. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

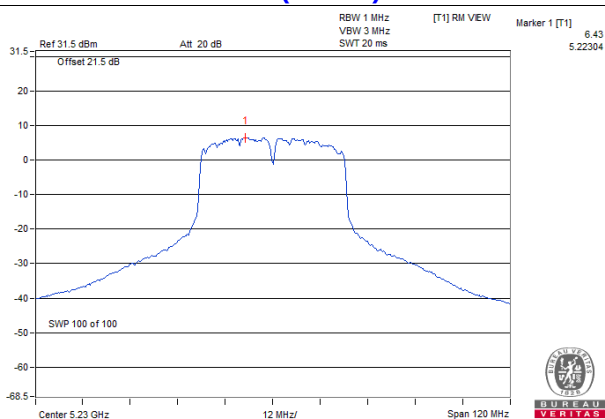
802.11a / CH40



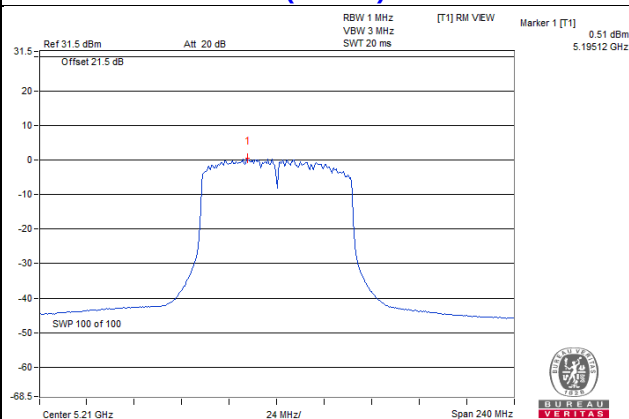
802.11ac (VHT20) / CH48



802.11ac (VHT40) / CH46



802.11ac (VHT80) / CH42



For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
149	5745	1.66	3.88	30.00	Pass
157	5785	1.15	3.37	30.00	Pass
165	5825	0.87	3.09	30.00	Pass

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
149	5745	1.71	3.93	30.00	Pass
157	5785	1.50	3.72	30.00	Pass
165	5825	0.97	3.19	30.00	Pass

802.11ac (VHT40)

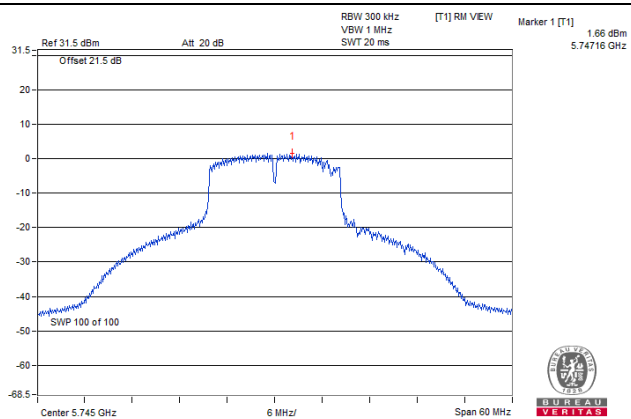
Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
151	5755	-2.39	-0.17	30.00	Pass
159	5795	-2.42	-0.20	30.00	Pass

802.11ac (VHT80)

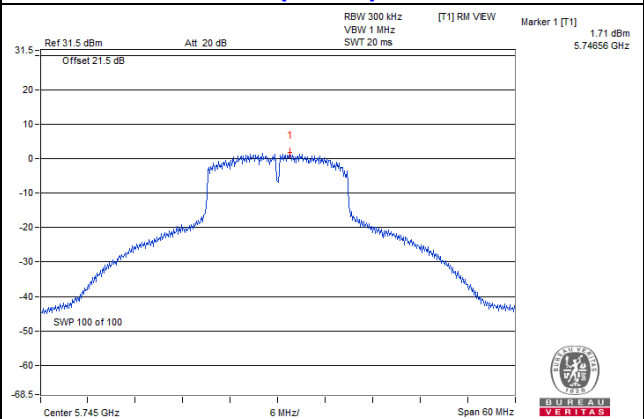
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
155	5775	-6.00	0.11	-5.89	-3.67	30.00	Pass

Spectrum Plot of Worst Value

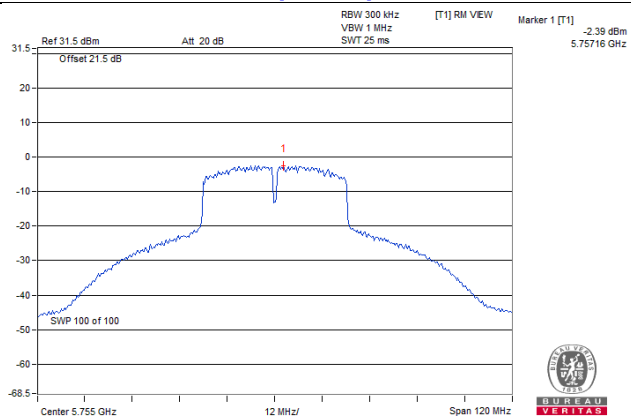
802.11a / CH149



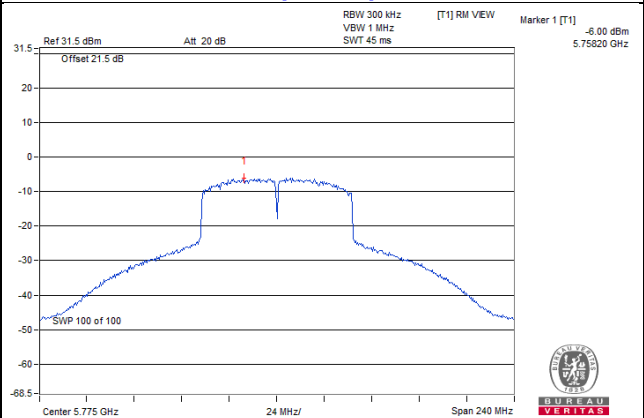
802.11ac (VHT20) / CH149



802.11ac (VHT40) / CH151



802.11ac (VHT80) / CH155

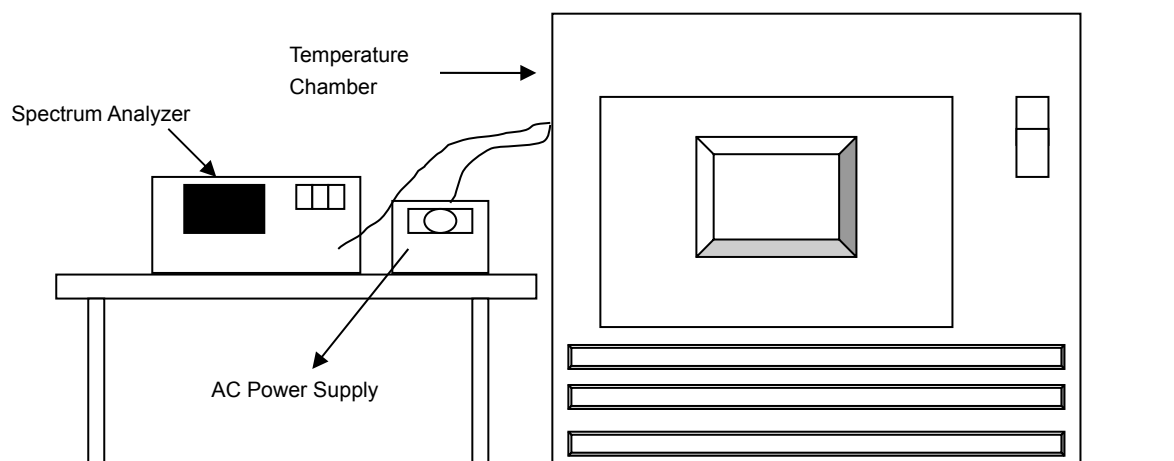


4.6 Frequency Stability Measurement

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 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	5180.0254	Pass	5180.0246	Pass	5180.0238	Pass	5180.0249	Pass
30	120	5179.9769	Pass	5179.9807	Pass	5179.9774	Pass	5179.9798	Pass
20	120	5180.0211	Pass	5180.02	Pass	5180.0231	Pass	5180.0219	Pass
10	120	5179.9748	Pass	5179.9752	Pass	5179.9735	Pass	5179.9778	Pass
0	120	5180.0182	Pass	5180.0141	Pass	5180.0154	Pass	5180.0134	Pass

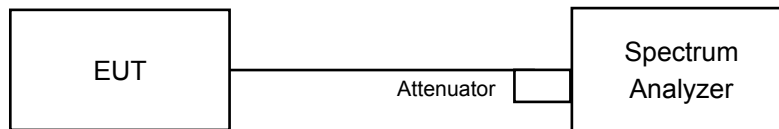
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0205	Pass	5180.0196	Pass	5180.023	Pass	5180.0225	Pass
	120	5180.0211	Pass	5180.02	Pass	5180.0231	Pass	5180.0219	Pass
	102	5180.0221	Pass	5180.0193	Pass	5180.0229	Pass	5180.0228	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
149	5745	16.06	0.5	PASS
157	5785	15.91	0.5	PASS
165	5825	15.72	0.5	PASS

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.73	0.5	PASS
157	5785	16.03	0.5	PASS
165	5825	16.23	0.5	PASS

802.11ac (VHT40)

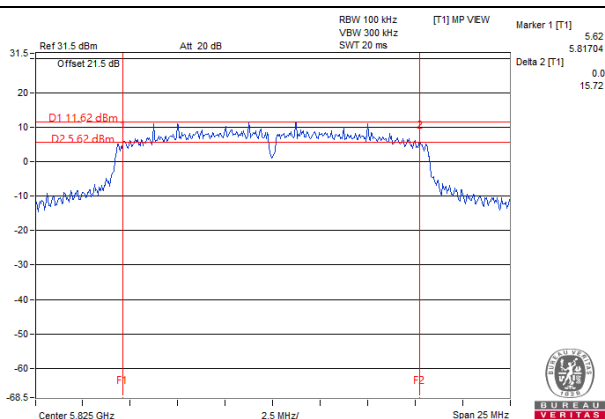
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	31.46	0.5	PASS
159	5795	33.23	0.5	PASS

802.11ac (VHT80)

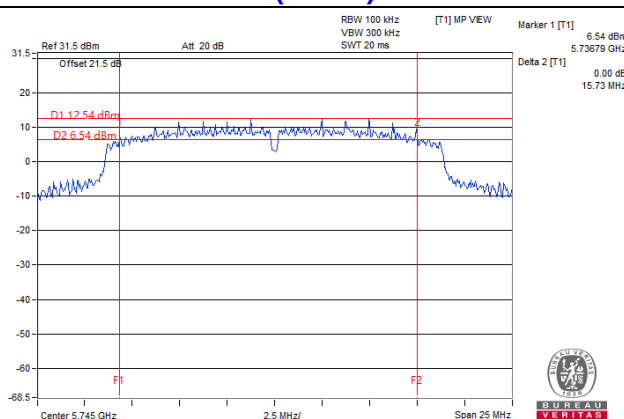
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	72.72	0.5	PASS

Spectrum Plot of Worst Value

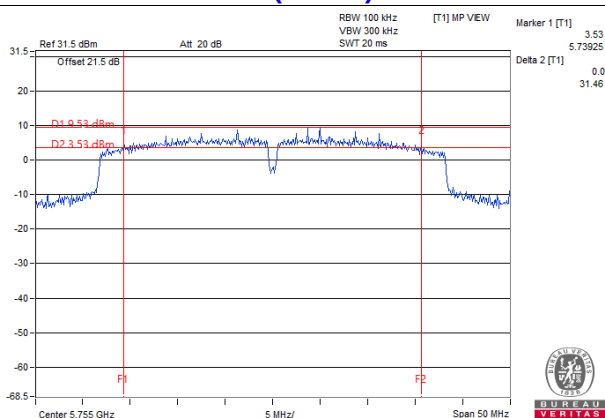
802.11a / CH165



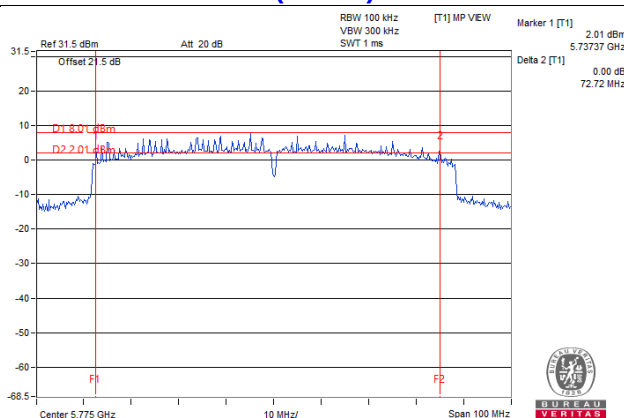
802.11ac (VHT20) / CH149



802.11ac (VHT40) / CH151



802.11ac (VHT80) / CH155



5 Pictures of Test Arrangements

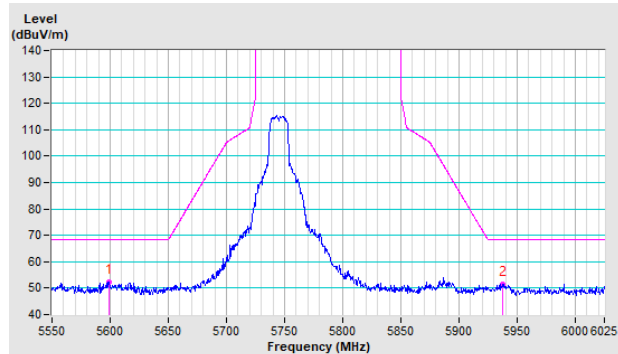
Please refer to the attached file (Test Setup Photo).

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

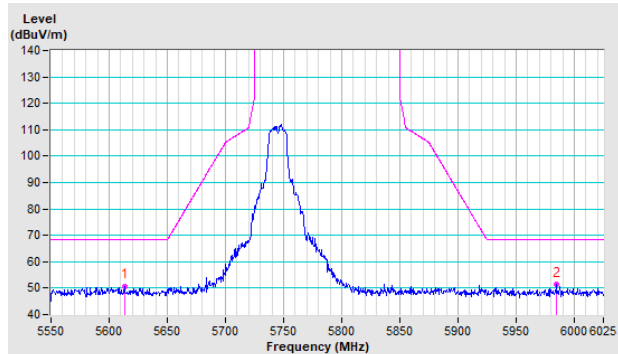
802.11a

CH 149 5745 MHz

Horizontal

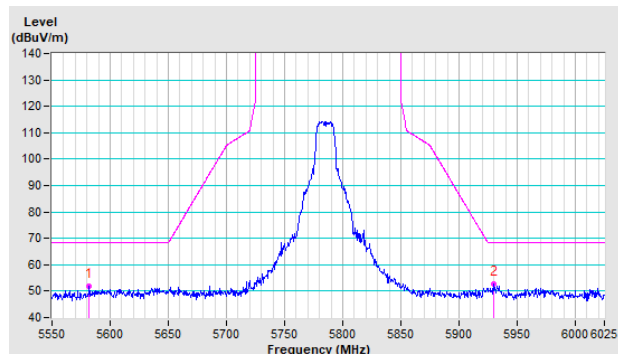


Vertical

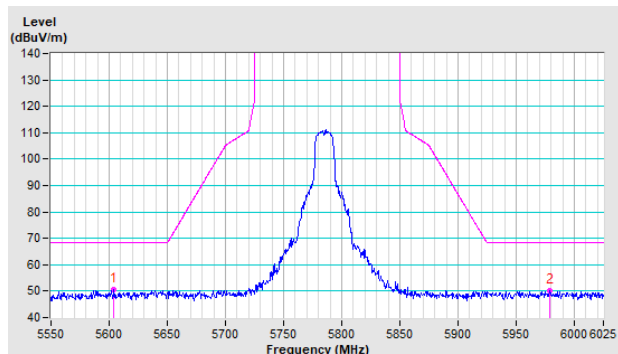


CH 157 5785 MHz

Horizontal

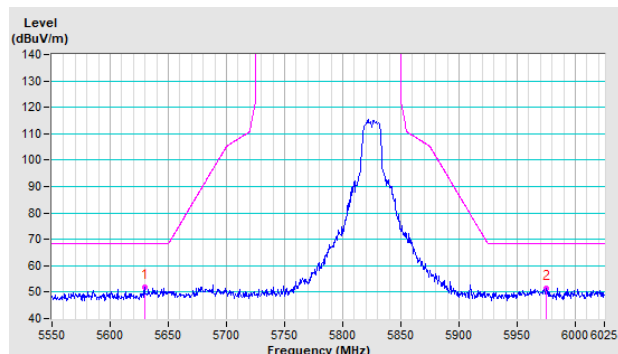


Vertical

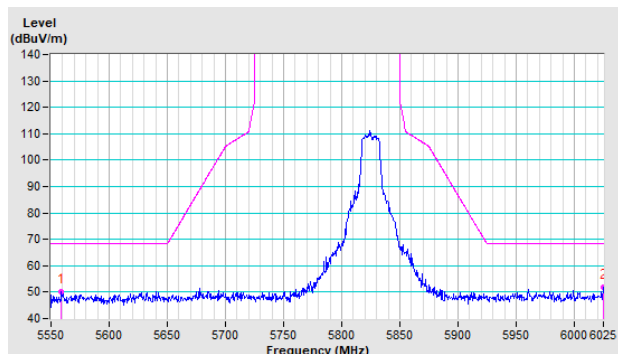


CH 165 5825 MHz

Horizontal



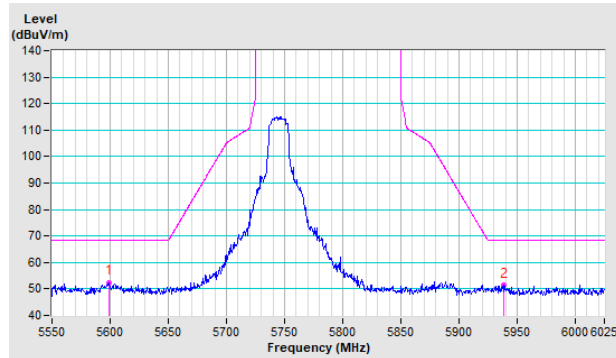
Vertical



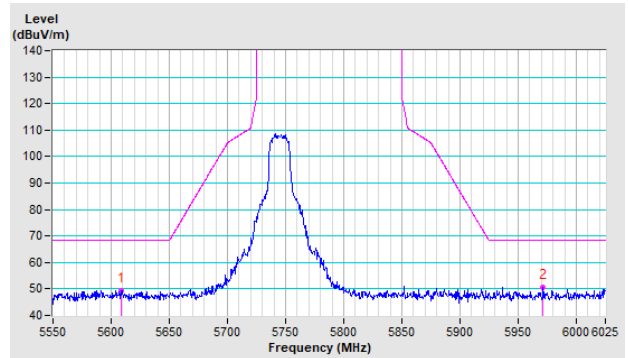
802.11ac (VHT20)

CH 149 5745 MHz

Horizontal

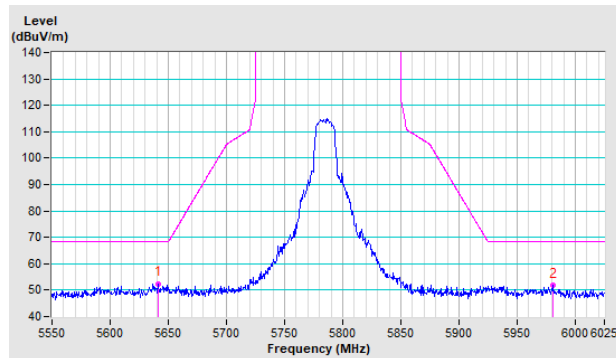


Vertical

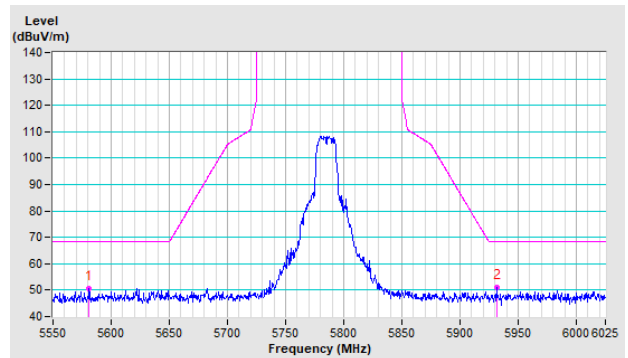


CH 157 5785 MHz

Horizontal

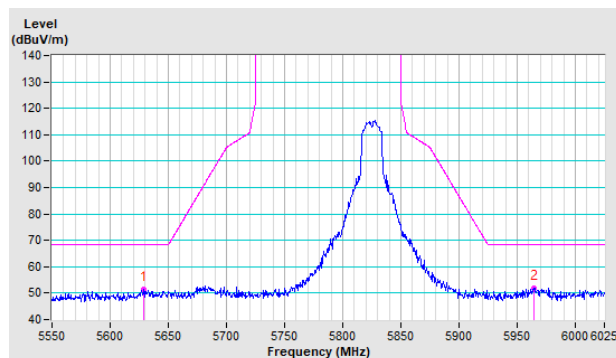


Vertical

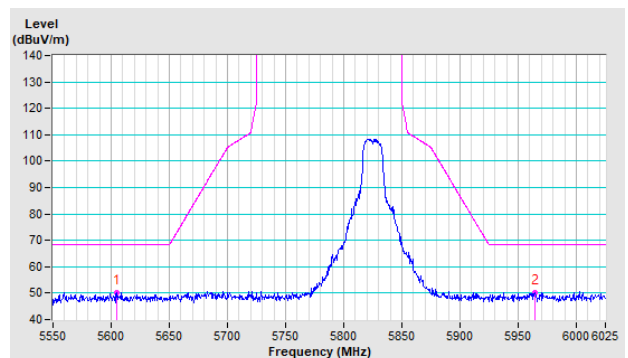


CH 165 5825 MHz

Horizontal



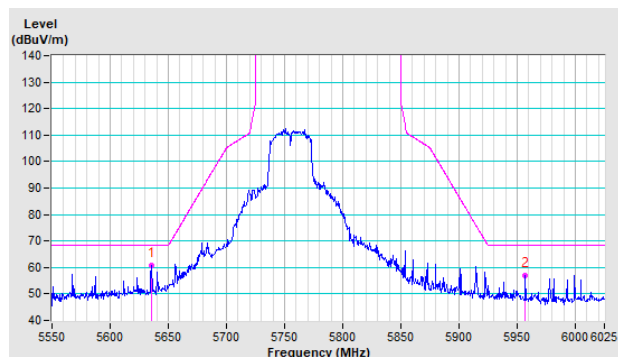
Vertical



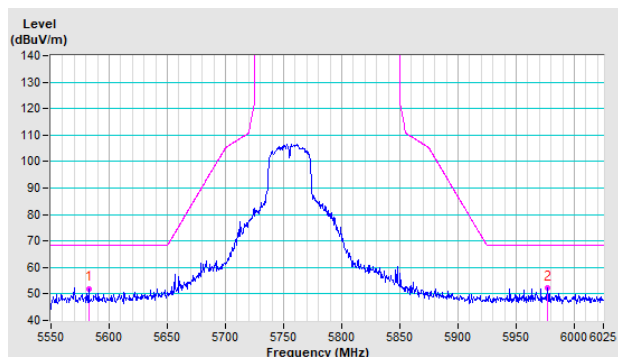
802.11ac (VHT40)

CH 151 5755 MHz

Horizontal

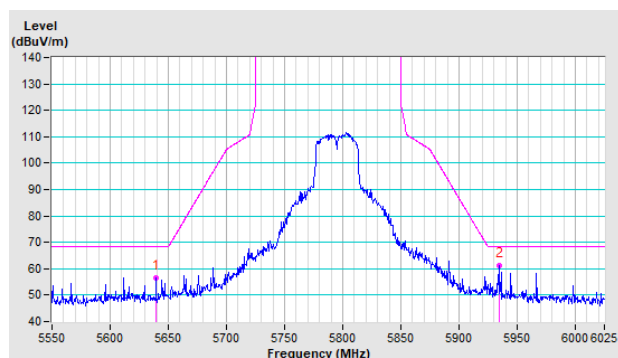


Vertical

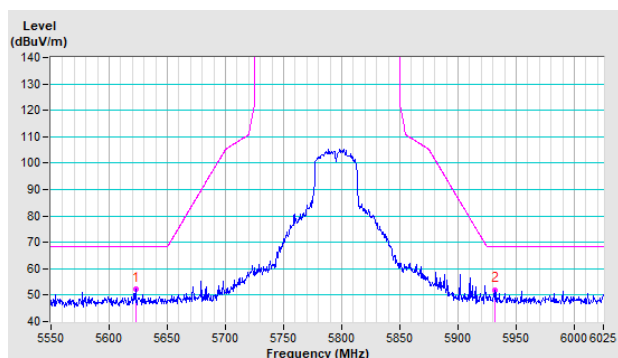


CH 159 5795 MHz

Horizontal



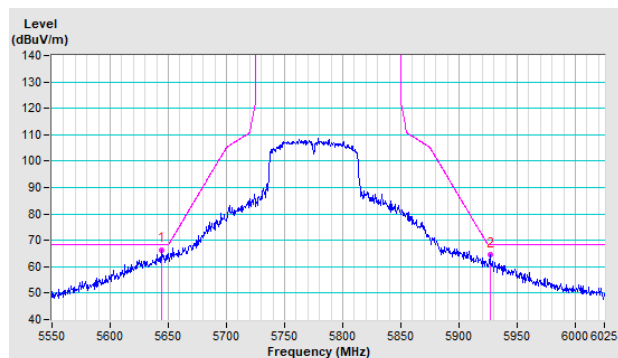
Vertical



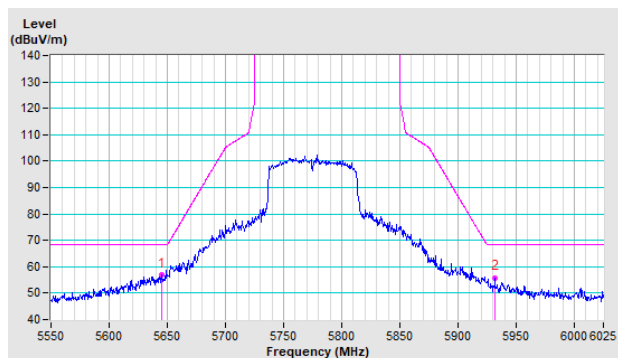
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal

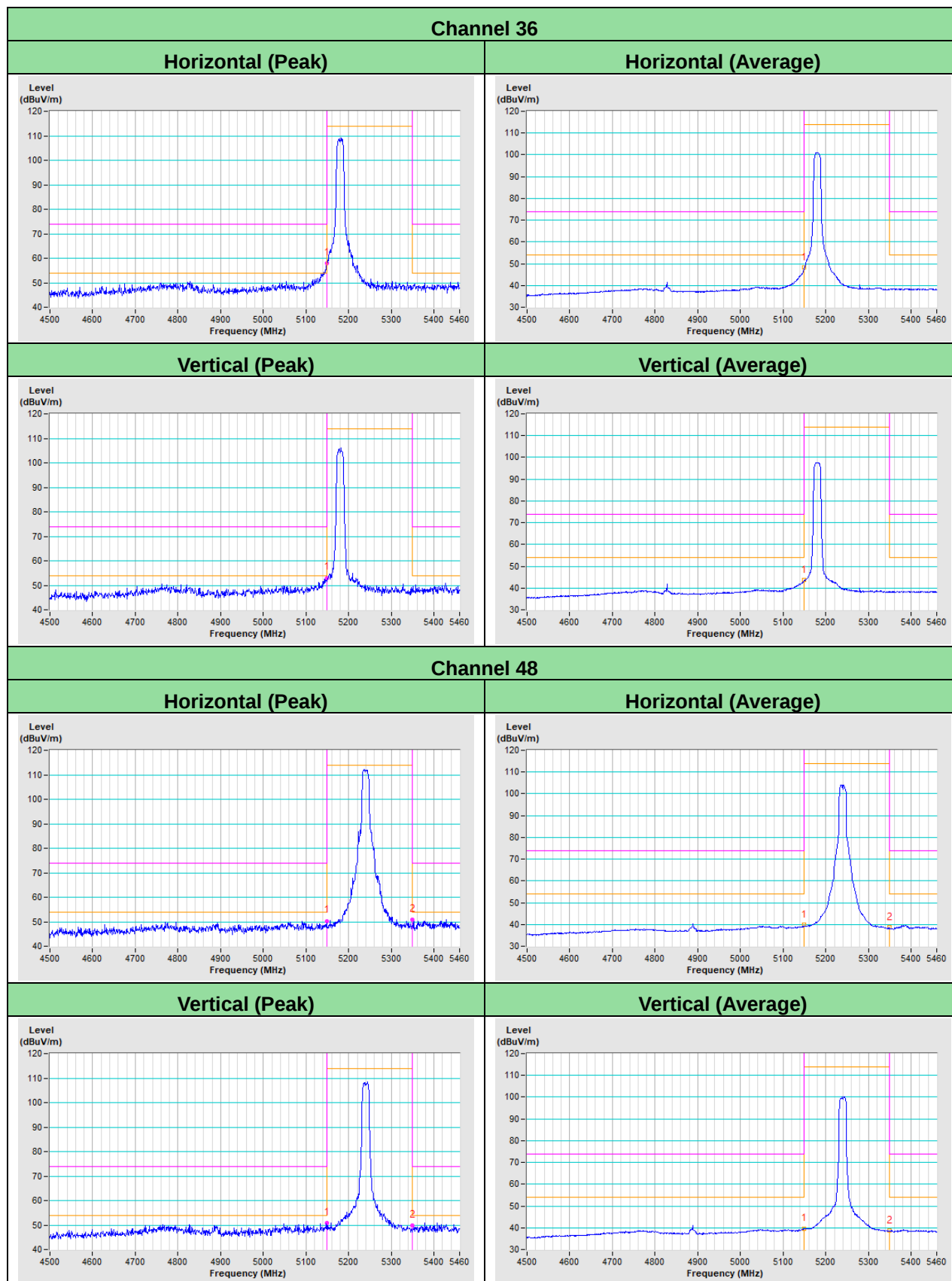


Vertical

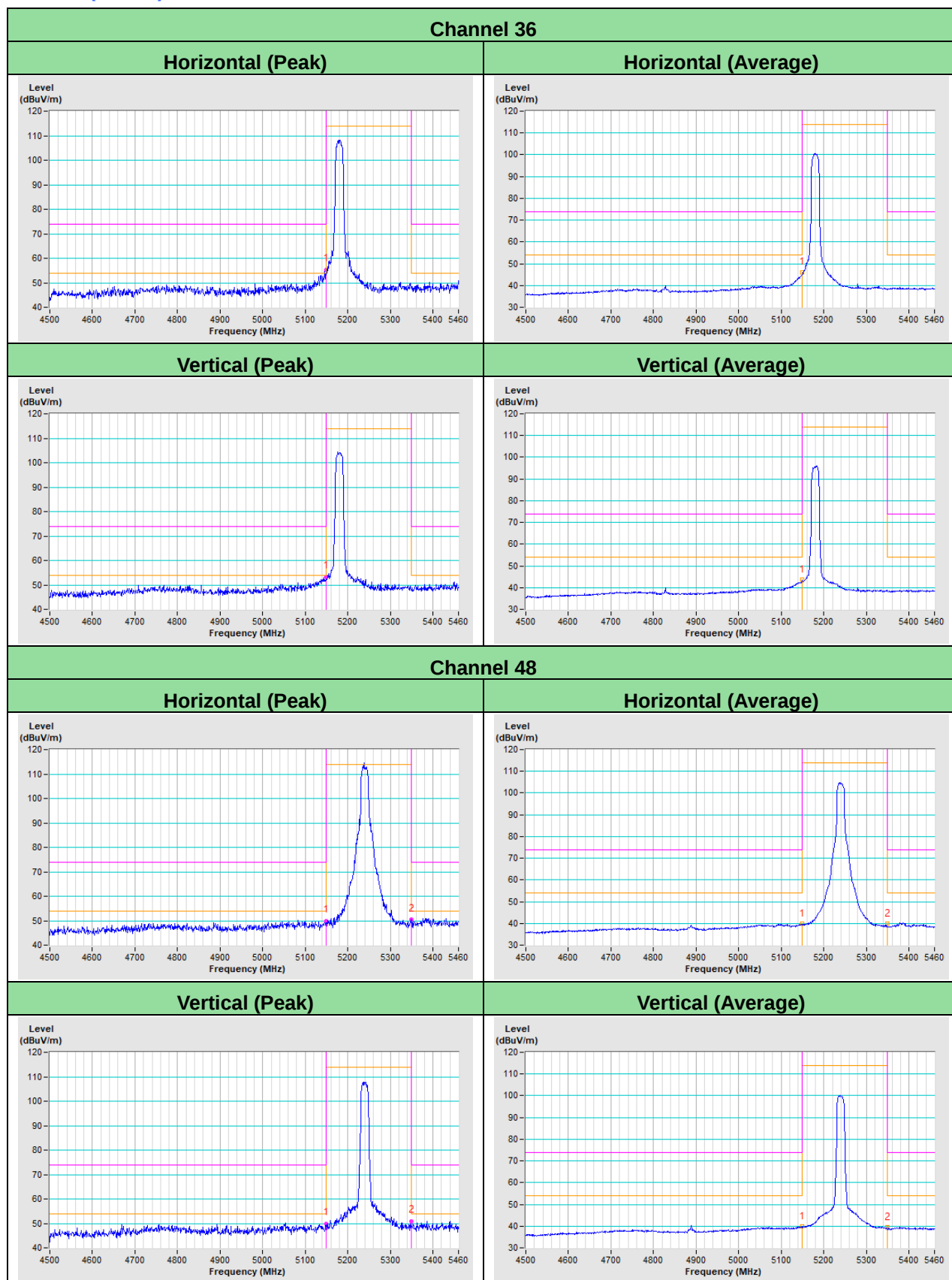


Annex B- Band-edge measurement (For U-NII-1 band)

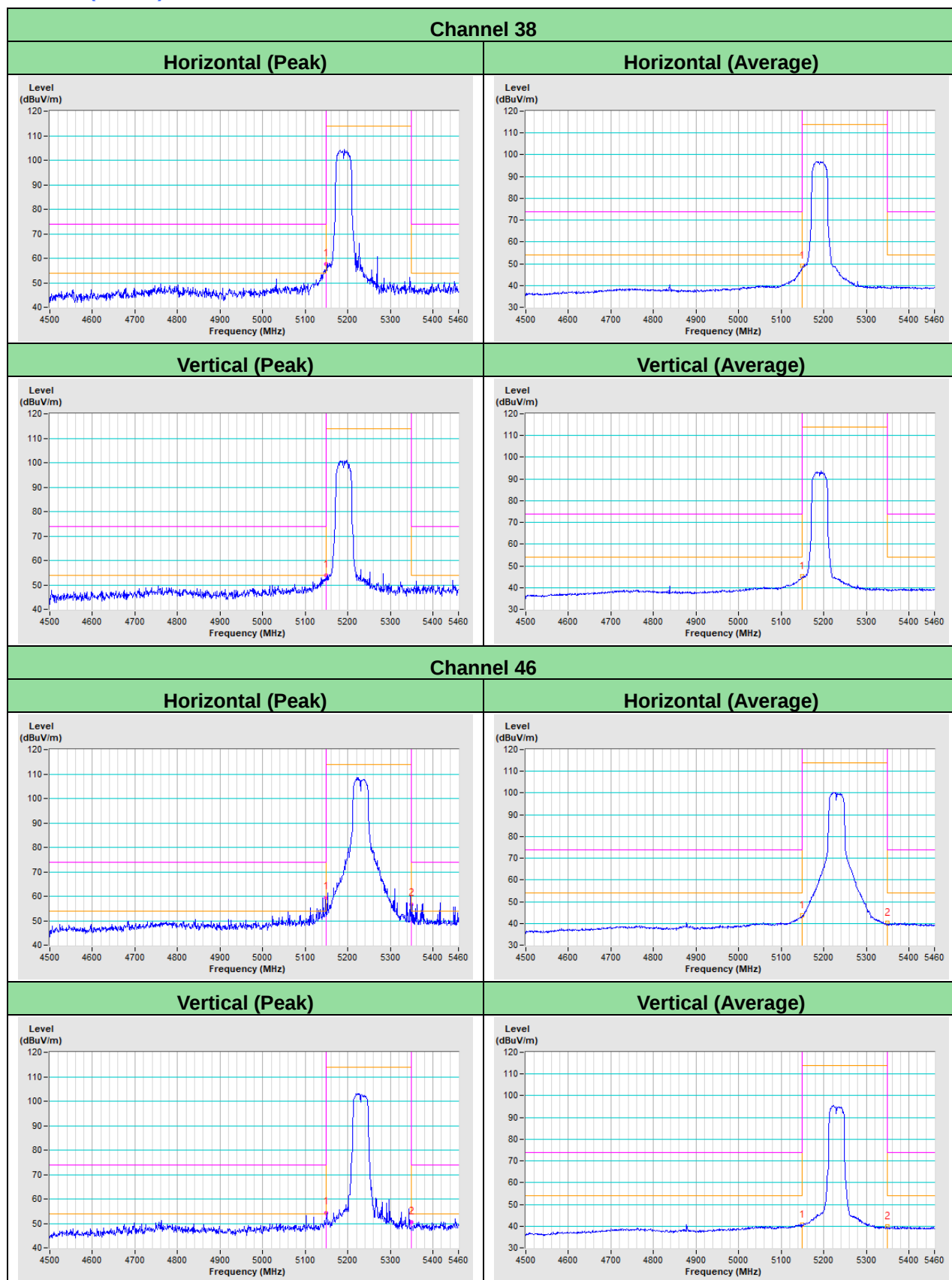
802.11a



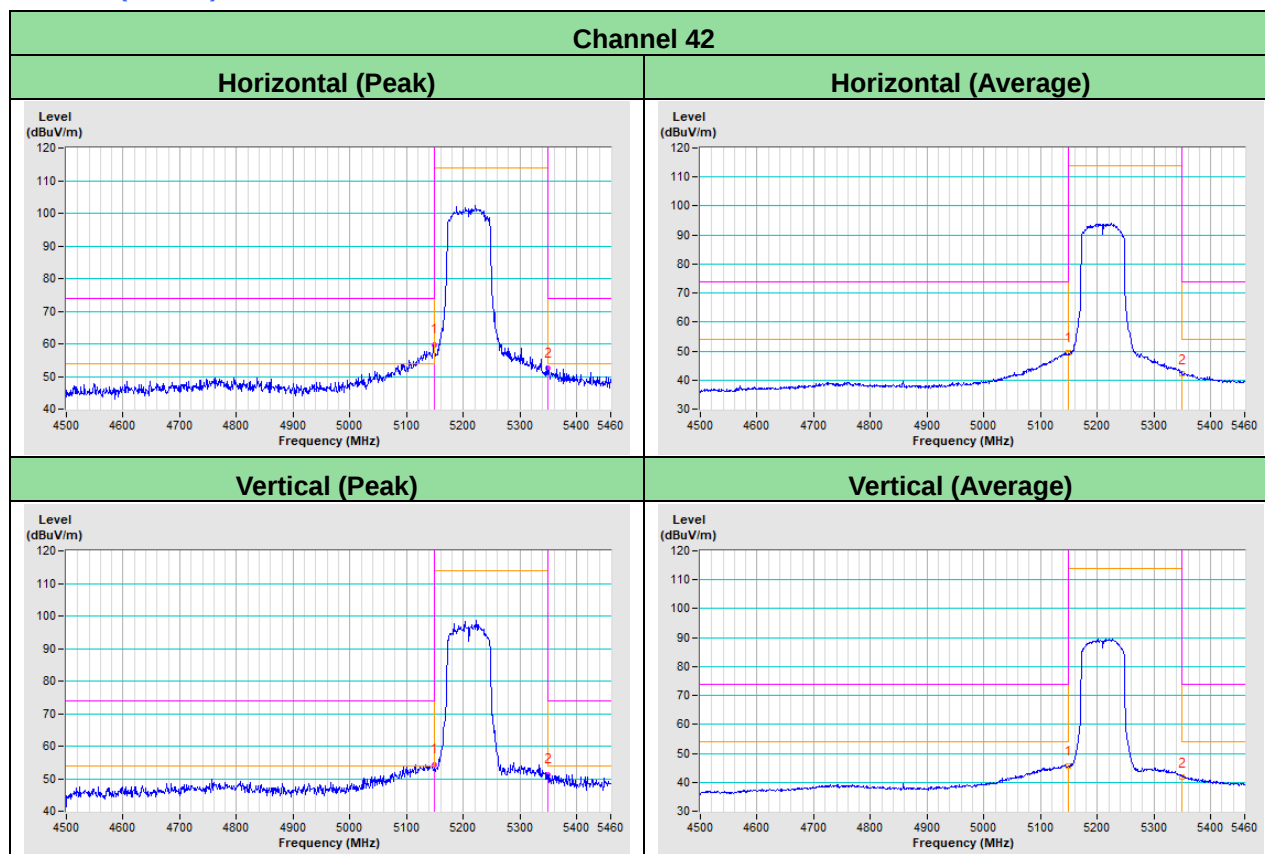
802.11ac (VHT20)



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.

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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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