FCC Test Report (DFS Band)

Report No.:	RF200522E11A-1
FCC ID:	2AWHPR201
Test Model:	UTR-201
Received Date:	May 25, 2020
Test Date:	June 11 to July 01, 2020
Issued Date:	Aug. 21, 2020
Applicant:	Space Exploration Technologies Corp.
Address:	1 Rocket Rd., Hawthorne, CA 90250 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
RF200522E11A-1	Original release.	Aug. 21, 2020

1 Certificate of Conformity

Product:	Starlink Router
Brand:	SPACEX
Test Model:	UTR-201
Sample Status:	ENGINEERING SAMPLE
Applicant:	Space Exploration Technologies Corp.
Test Date:	June 11 to July 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 : _____ , **Date:** Aug. 21, 2020

Claire Kuan / Specialist

Approved by : _____ , **Date:** Aug. 21, 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 -18.16 dB at 0.23203 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 5350.00 MHz and 5725.00 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	No antenna connector is used.

Note:

1. For U-NII-2A, U-NII-2C band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	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 (DFS Band)

Product	Starlink Router
Brand	SPACEX
Test Model	UTR-201
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	56Vdc from PoE adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps
Operating Frequency	5.26 ~ 5.32 GHz, 5.50 ~ 5.72 GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 16 802.11n (HT40), 802.11ac (VHT40): 8 802.11ac (VHT80): 4
Output Power	**CDD Mode:** **5.26 ~ 5.32GHz:** 247.502 mW **5.50 ~ 5.72GHz:** 249.572 mW **Beamforming Mode:** **5.26 ~ 5.32GHz:** 247.222 mW **5.50 ~ 5.72GHz:** 249.572 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	PoE adapter x 1
Data Cable Supplied	RJ45 cable x1 (Shielded, 210cm)

Note:

1. This report is prepared for FCC class II change. The difference compared with the Report No.: RF200522E11-1 as the following:
   - ◆ Add DFS band <5.26GHz ~ 5.32GHz, 5.5 ~ 5.72GHz> by software.
2. According to above conditions, for DFS band all of test items need to be performed and all data was verified to meet the requirements.
3. The EUT has two radios as following table:

Radio 1	Radio 2
WLAN 2.4GHz	WLAN 5GHz

4. 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.		

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

No.	Brand	Model No.	Spec.
1	Acbel	UTP-201A	AC Input: 100-240Vac, 2.5A, 50-60Hz DC Output: 56V, 0.3A

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

Antenna NO.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
1	1.4	2.4~2.4835GHz	PCB	None	NA
	2.3	5.15~5.85GHz			
2	2.3	2.4~2.4835GHz	PCB	None	NA
	3.6	5.15~5.85GHz			

7. 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
VHT20	2TX	2RX
VHT40	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:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n mode power as same as 802.11ac mode and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

8. 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.
9. 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 5260 ~ 5320MHz

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

FOR 5500 ~ 5720MHz

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	138	5690 MHz
122	5610 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

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	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	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)	5260-5320, 5500-5720	54 to 62 102 to 142	110	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)	5260-5320, 5500-5720	54 to 62 102 to 142	110	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	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	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)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.5
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
802.11ac (VHT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	13.5
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	29.3

Test Condition:

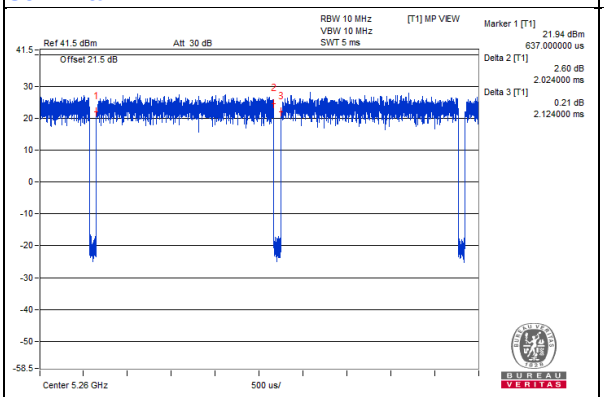
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 68%RH	120Vac, 60Hz	Tom Yang
RE<1G	23deg. C, 67%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 68%RH	120Vac, 60Hz	Nick Lo
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

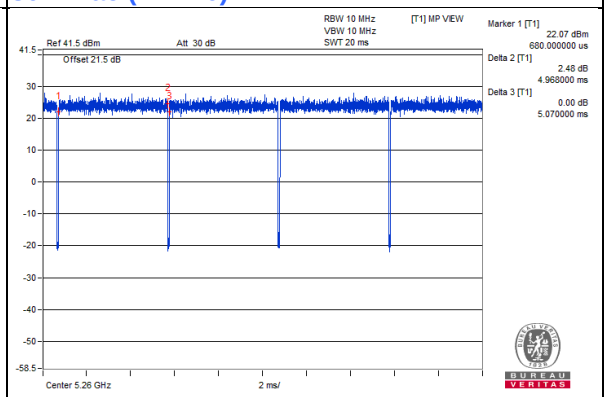
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.024 ms/2.124 ms = 0.953, Duty factor = 10 * log (1/Duty cycle) = 0.21 dB
802.11ac (VHT20): Duty cycle = 4.968 ms/5.07 ms = 0.98
802.11ac (VHT40): Duty cycle = 2.412 ms/2.504 ms = 0.963, Duty factor = 10 * log (1/Duty cycle) = 0.16 dB
802.11ac (VHT80): Duty cycle = 1.133 ms/1.214 ms = 0.933, Duty factor = 10 * log (1/Duty cycle) = 0.3 dB

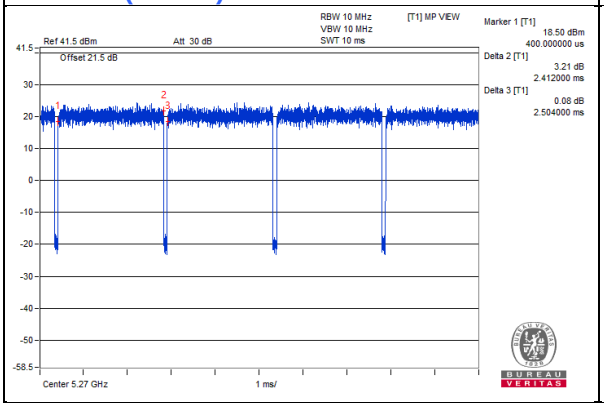
802.11a



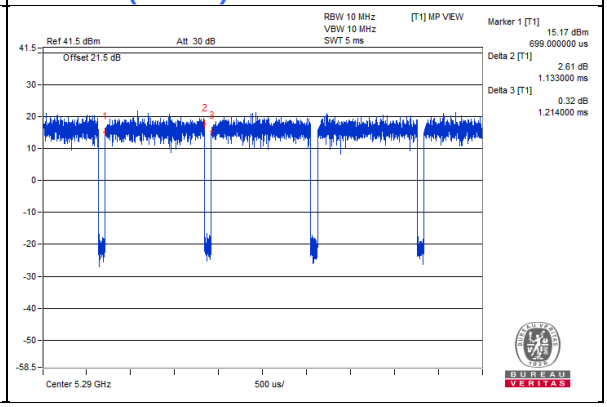
802.11ac (VHT20)



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.

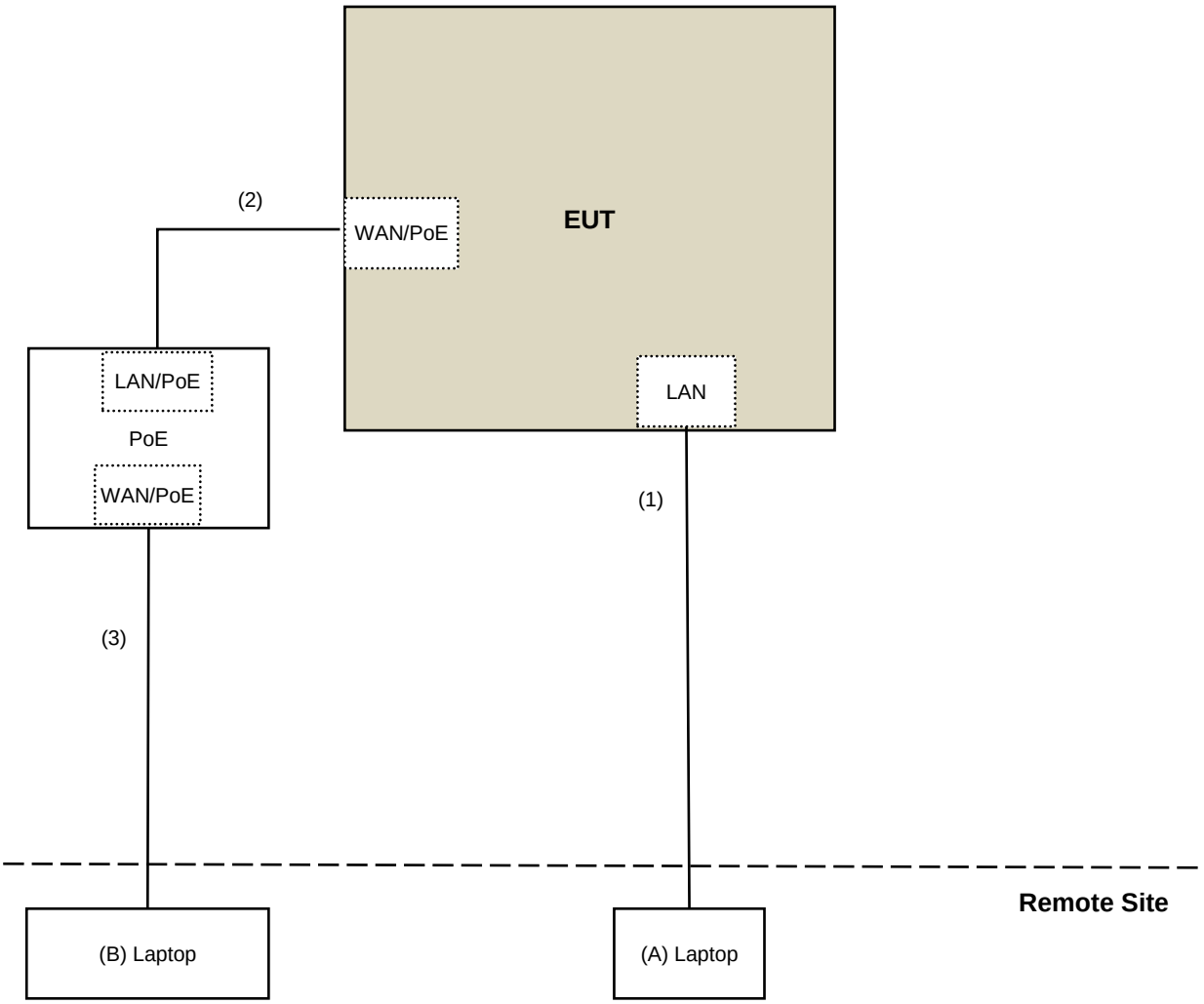
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

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	Yes	0	Provided by Lab
2.	RJ-45 Cable	1	2	Yes	0	Supplied by client
3.	RJ-45 Cable	1	10	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard and References

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

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

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

References Test Guidance:
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBµV/m)	AV:54 (dBµV/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(dBµV/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(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/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:

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

4.1.2 Test Instruments

For Radiated Emission & Bandedge & OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
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 17, 2019	July 16, 2020
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: June 11 to 25, 2020

For other test:

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 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
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
Voltage Meter FLUKE	179	89610322	Sep. 25, 2019	Sep. 24, 2020
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: July 01, 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:

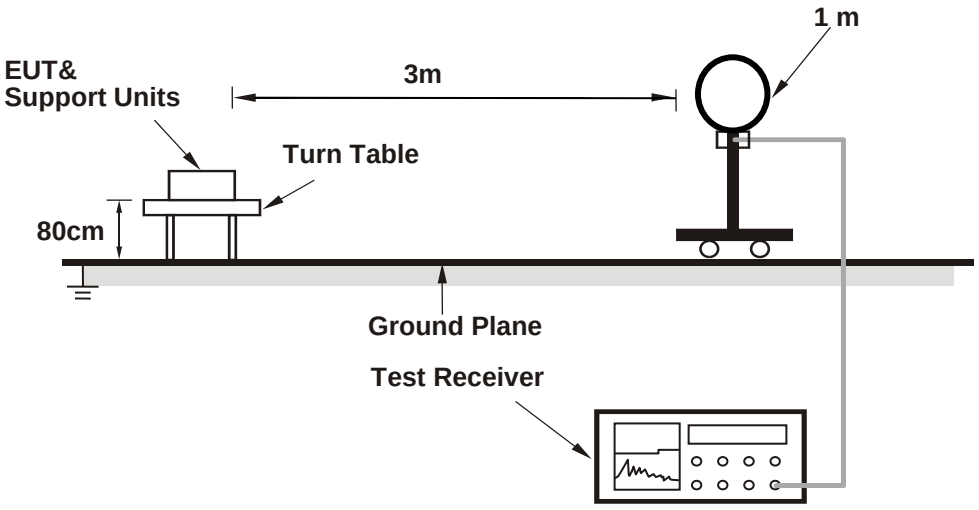
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

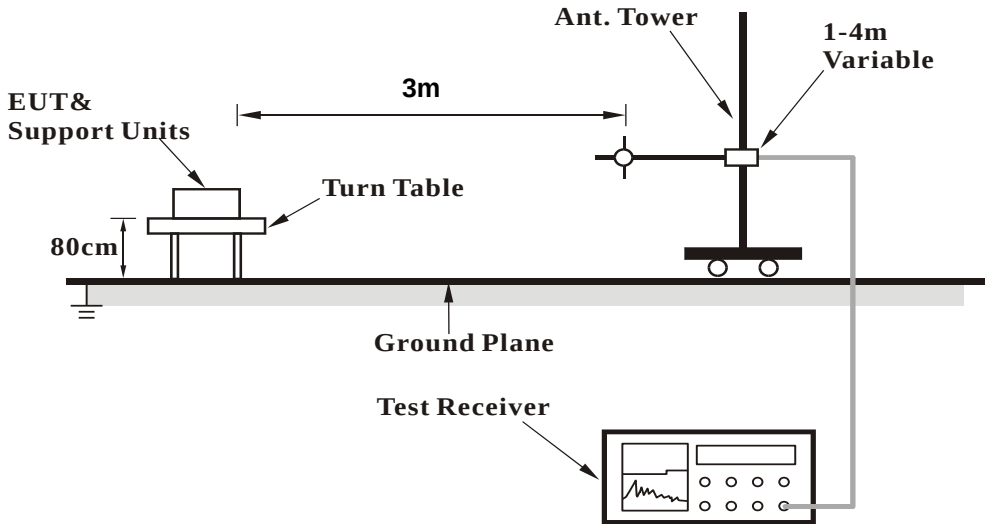
No deviation.

4.1.5 Test Setup

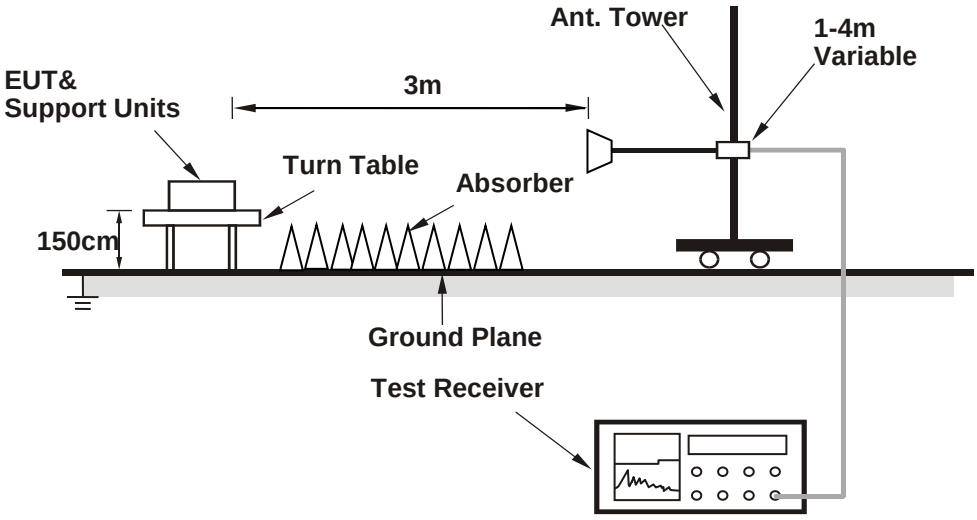
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QDART 4.8.00037) 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 52	**Detector Function**	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	51.0 PK	74.0	-23.0	1.92 H	305	47.3	3.7
2	5150.00	41.0 AV	54.0	-13.0	1.92 H	305	37.3	3.7
3	*5260.00	117.9 PK			1.92 H	305	114.5	3.4
4	*5260.00	107.5 AV			1.92 H	305	104.1	3.4
5	5350.00	51.5 PK	74.0	-22.5	1.92 H	305	48.1	3.4
6	5350.00	40.0 AV	54.0	-14.0	1.92 H	305	36.6	3.4
7	#10520.00	49.3 PK	68.2	-18.9	1.43 H	0	36.2	13.1
8	15780.00	45.5 PK	74.0	-28.5	1.59 H	36	32.0	13.5
9	15780.00	37.7 AV	54.0	-16.3	1.59 H	36	24.2	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	51.5 PK	74.0	-22.5	2.28 V	96	47.8	3.7
2	5150.00	40.8 AV	54.0	-13.2	2.28 V	96	37.1	3.7
3	*5260.00	116.3 PK			2.28 V	96	112.9	3.4
4	*5260.00	106.9 AV			2.28 V	96	103.5	3.4
5	5350.00	50.0 PK	74.0	-24.0	2.28 V	96	46.6	3.4
6	5350.00	39.6 AV	54.0	-14.4	2.28 V	96	36.2	3.4
7	#10520.00	48.1 PK	68.2	-20.1	1.45 V	12	35.0	13.1
8	15780.00	44.9 PK	74.0	-29.1	1.54 V	29	31.4	13.5
9	15780.00	34.8 AV	54.0	-19.2	1.54 V	29	21.3	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 60	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5300.00	117.6 PK			1.95 H	318	114.3	3.3
2	*5300.00	107.4 AV			1.95 H	318	104.1	3.3
3	10600.00	49.6 PK	74.0	-24.4	1.44 H	10	36.7	12.9
4	10600.00	43.7 AV	54.0	-10.3	1.44 H	10	30.8	12.9
5	15900.00	45.8 PK	74.0	-28.2	1.64 H	35	33.0	12.8
6	15900.00	38.1 AV	54.0	-15.9	1.64 H	35	25.3	12.8
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	*5300.00	116.6 PK			3.09 V	351	113.3	3.3
2	*5300.00	107.2 AV			3.09 V	351	103.9	3.3
3	10600.00	48.8 PK	74.0	-25.2	1.49 V	3	35.9	12.9
4	10600.00	42.1 AV	54.0	-11.9	1.49 V	3	29.2	12.9
5	15900.00	44.2 PK	74.0	-29.8	1.52 V	16	31.4	12.8
6	15900.00	34.3 AV	54.0	-19.7	1.52 V	16	21.5	12.8

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.

Channel	TX Channel 64	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5320.00	117.0 PK			1.85 H	302	113.6	3.4
2	*5320.00	107.6 AV			1.85 H	302	104.2	3.4
3	5350.00	65.8 PK	74.0	-8.2	1.85 H	302	62.4	3.4
4	5350.00	53.7 AV	54.0	-0.3	1.85 H	302	50.3	3.4
5	10640.00	48.1 PK	74.0	-25.9	1.49 H	11	35.2	12.9
6	10640.00	42.8 AV	54.0	-11.2	1.49 H	11	29.9	12.9
7	15960.00	46.6 PK	74.0	-27.4	1.66 H	27	33.8	12.8
8	15960.00	36.9 AV	54.0	-17.1	1.66 H	27	24.1	12.8
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	*5320.00	115.2 PK			3.05 V	355	111.8	3.4
2	*5320.00	106.6 AV			3.05 V	355	103.2	3.4
3	5350.00	65.2 PK	74.0	-8.8	3.05 V	355	61.8	3.4
4	5350.00	53.0 AV	54.0	-1.0	3.05 V	355	49.6	3.4
5	10640.00	47.8 PK	74.0	-26.2	1.49 V	12	34.9	12.9
6	10640.00	40.9 AV	54.0	-13.1	1.49 V	12	28.0	12.9
7	15960.00	44.1 PK	74.0	-29.9	1.48 V	7	31.3	12.8
8	15960.00	32.7 AV	54.0	-21.3	1.48 V	7	19.9	12.8

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.

Channel	TX Channel 100	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	5460.00	61.0 PK	74.0	-13.0	1.90 H	282	57.2	3.8
2	5460.00	46.1 AV	54.0	-7.9	1.90 H	282	42.3	3.8
3	#5470.00	67.6 PK	68.2	-0.6	1.90 H	282	63.7	3.9
4	*5500.00	116.7 PK			1.90 H	282	112.8	3.9
5	*5500.00	108.0 AV			1.90 H	282	104.1	3.9
6	11000.00	48.4 PK	74.0	-25.6	1.47 H	20	35.4	13.0
7	11000.00	42.8 AV	54.0	-11.2	1.47 H	20	29.8	13.0
8	#16500.00	46.7 PK	68.2	-21.5	1.70 H	42	32.1	14.6
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	5460.00	55.3 PK	74.0	-18.7	3.61 V	359	51.5	3.8
2	5460.00	42.9 AV	54.0	-11.1	3.61 V	359	39.1	3.8
3	#5470.00	61.0 PK	68.2	-7.2	3.61 V	359	57.1	3.9
4	*5500.00	115.1 PK			3.61 V	359	111.2	3.9
5	*5500.00	105.9 AV			3.61 V	359	102.0	3.9
6	11000.00	47.2 PK	74.0	-26.8	1.46 V	18	34.2	13.0
7	11000.00	40.5 AV	54.0	-13.5	1.46 V	18	27.5	13.0
8	#16500.00	44.0 PK	68.2	-24.2	1.47 V	7	29.4	14.6

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

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	*5580.00	117.9 PK			1.99 H	304	114.1	3.8
2	*5580.00	107.9 AV			1.99 H	304	104.1	3.8
3	11160.00	49.1 PK	74.0	-24.9	1.40 H	4	36.0	13.1
4	11160.00	43.4 AV	54.0	-10.6	1.40 H	4	30.3	13.1
5	#16740.00	46.5 PK	68.2	-21.7	1.69 H	33	30.3	16.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	116.9 PK			2.32 V	109	113.1	3.8
2	*5580.00	107.3 AV			2.32 V	109	103.5	3.8
3	11160.00	48.0 PK	74.0	-26.0	1.50 V	6	34.9	13.1
4	11160.00	41.7 AV	54.0	-12.3	1.50 V	6	28.6	13.1
5	#16740.00	44.9 PK	68.2	-23.3	1.54 V	44	28.7	16.2

Remarks:

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

Channel	TX Channel 140	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5700.00	115.1 PK			1.82 H	279	111.1	4.0
2	*5700.00	105.9 AV			1.82 H	279	101.9	4.0
3	#5725.00	67.8 PK	68.2	-0.4	1.82 H	279	63.8	4.0
4	11400.00	49.0 PK	74.0	-25.0	1.51 H	29	35.8	13.2
5	11400.00	43.2 AV	54.0	-10.8	1.51 H	29	30.0	13.2
6	#17100.00	46.5 PK	68.2	-21.7	1.76 H	56	29.3	17.2
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	*5700.00	114.2 PK			3.07 V	341	110.2	4.0
2	*5700.00	103.7 AV			3.07 V	341	99.7	4.0
3	#5725.00	64.3 PK	68.2	-3.9	3.07 V	341	60.3	4.0
4	11400.00	47.6 PK	74.0	-26.4	1.46 V	10	34.4	13.2
5	11400.00	40.8 AV	54.0	-13.2	1.46 V	10	27.6	13.2
6	#17100.00	44.1 PK	68.2	-24.1	1.43 V	5	26.9	17.2

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

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	5460.00	50.8 PK	74.0	-23.2	1.85 H	293	47.0	3.8
2	5460.00	38.6 AV	54.0	-15.4	1.85 H	293	34.8	3.8
3	#5470.00	50.4 PK	68.2	-17.8	1.85 H	293	46.5	3.9
4	*5720.00	118.3 PK			1.85 H	293	114.4	3.9
5	*5720.00	108.0 AV			1.85 H	293	104.1	3.9
6	#5850.00	53.6 PK	68.2	-14.6	1.85 H	293	49.2	4.4
7	11440.00	49.9 PK	74.0	-24.1	1.41 H	17	36.6	13.3
8	11440.00	43.8 AV	54.0	-10.2	1.41 H	17	30.5	13.3
9	#17160.00	45.8 PK	68.2	-22.4	1.65 H	40	28.4	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	5460.00	49.7 PK	74.0	-24.3	3.05 V	2	45.9	3.8
2	5460.00	37.4 AV	54.0	-16.6	3.05 V	2	33.6	3.8
3	#5470.00	50.9 PK	68.2	-17.3	3.05 V	2	47.0	3.9
4	*5720.00	116.5 PK			3.05 V	2	112.6	3.9
5	*5720.00	107.2 AV			3.05 V	2	103.3	3.9
6	#5850.00	53.4 PK	68.2	-14.8	3.05 V	2	49.0	4.4
7	11440.00	47.7 PK	74.0	-26.3	1.50 V	5	34.4	13.3
8	11440.00	41.3 AV	54.0	-12.7	1.50 V	5	28.0	13.3
9	#17160.00	44.9 PK	68.2	-23.3	1.59 V	51	27.5	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.

802.11ac (VHT20)

Channel	TX Channel 52	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	49.4 PK	74.0	-24.6	1.90 H	269	45.7	3.7
2	5150.00	40.4 AV	54.0	-13.6	1.90 H	269	36.7	3.7
3	*5260.00	116.2 PK			1.90 H	269	112.8	3.4
4	*5260.00	107.1 AV			1.90 H	269	103.7	3.4
5	#10520.00	49.6 PK	68.2	-18.6	1.42 H	5	36.5	13.1
6	15780.00	46.2 PK	74.0	-27.8	1.69 H	26	32.7	13.5
7	15780.00	38.5 AV	54.0	-15.5	1.69 H	26	25.0	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	5150.00	51.0 PK	74.0	-23.0	3.98 V	352	47.3	3.7
2	5150.00	40.1 AV	54.0	-13.9	3.98 V	352	36.4	3.7
3	*5260.00	116.6 PK			3.98 V	352	113.2	3.4
4	*5260.00	107.2 AV			3.98 V	352	103.8	3.4
5	#10520.00	47.9 PK	68.2	-20.3	1.50 V	21	34.8	13.1
6	15780.00	45.5 PK	74.0	-28.5	1.54 V	52	32.0	13.5
7	15780.00	34.6 AV	54.0	-19.4	1.54 V	52	21.1	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 60	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5300.00	115.8 PK			1.86 H	259	112.5	3.3
2	*5300.00	106.7 AV			1.86 H	259	103.4	3.3
3	10600.00	50.0 PK	74.0	-24.0	1.41 H	24	37.1	12.9
4	10600.00	44.1 AV	54.0	-9.9	1.41 H	24	31.2	12.9
5	15900.00	45.9 PK	74.0	-28.1	1.66 H	32	33.1	12.8
6	15900.00	38.4 AV	54.0	-15.6	1.66 H	32	25.6	12.8
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	*5300.00	116.6 PK			3.94 V	344	113.3	3.3
2	*5300.00	107.1 AV			3.94 V	344	103.8	3.3
3	10600.00	47.0 PK	74.0	-27.0	1.51 V	0	34.1	12.9
4	10600.00	40.9 AV	54.0	-13.1	1.51 V	0	28.0	12.9
5	15900.00	45.0 PK	74.0	-29.0	1.53 V	57	32.2	12.8
6	15900.00	34.3 AV	54.0	-19.7	1.53 V	57	21.5	12.8

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.

Channel	TX Channel 64	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5320.00	116.6 PK			1.88 H	290	113.2	3.4
2	*5320.00	106.4 AV			1.88 H	290	103.0	3.4
3	5350.00	66.0 PK	74.0	-8.0	1.88 H	290	62.6	3.4
4	5350.00	53.5 AV	54.0	-0.5	1.88 H	290	50.1	3.4
5	10640.00	48.1 PK	74.0	-25.9	1.51 H	8	35.2	12.9
6	10640.00	42.8 AV	54.0	-11.2	1.51 H	8	29.9	12.9
7	15960.00	46.7 PK	74.0	-27.3	1.70 H	37	33.9	12.8
8	15960.00	36.8 AV	54.0	-17.2	1.70 H	37	24.0	12.8
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	*5320.00	115.6 PK			3.96 V	353	112.2	3.4
2	*5320.00	105.7 AV			3.96 V	353	102.3	3.4
3	5350.00	65.8 PK	74.0	-8.2	3.96 V	353	62.4	3.4
4	5350.00	52.8 AV	54.0	-1.2	3.96 V	353	49.4	3.4
5	10640.00	48.2 PK	74.0	-25.8	1.49 V	19	35.3	12.9
6	10640.00	41.2 AV	54.0	-12.8	1.49 V	19	28.3	12.9
7	15960.00	44.4 PK	74.0	-29.6	1.44 V	11	31.6	12.8
8	15960.00	32.8 AV	54.0	-21.2	1.44 V	11	20.0	12.8

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.

Channel	TX Channel 100	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	5460.00	61.1 PK	74.0	-12.9	1.85 H	278	57.3	3.8
2	5460.00	44.6 AV	54.0	-9.4	1.85 H	278	40.8	3.8
3	#5470.00	67.7 PK	68.2	-0.5	1.85 H	278	63.8	3.9
4	*5500.00	117.5 PK			1.85 H	278	113.6	3.9
5	*5500.00	106.8 AV			1.85 H	278	102.9	3.9
6	11000.00	49.0 PK	74.0	-25.0	1.42 H	11	36.0	13.0
7	11000.00	43.3 AV	54.0	-10.7	1.42 H	11	30.3	13.0
8	#16500.00	46.6 PK	68.2	-21.6	1.70 H	36	32.0	14.6
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	5460.00	53.0 PK	74.0	-21.0	3.94 V	354	49.2	3.8
2	5460.00	40.9 AV	54.0	-13.1	3.94 V	354	37.1	3.8
3	#5470.00	66.1 PK	68.2	-2.1	3.94 V	354	62.2	3.9
4	*5500.00	114.5 PK			3.94 V	354	110.6	3.9
5	*5500.00	105.2 AV			3.94 V	354	101.3	3.9
6	11000.00	47.3 PK	74.0	-26.7	1.46 V	15	34.3	13.0
7	11000.00	40.6 AV	54.0	-13.4	1.46 V	15	27.6	13.0
8	#16500.00	44.4 PK	68.2	-23.8	1.53 V	3	29.8	14.6

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

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	*5580.00	115.6 PK			1.90 H	266	111.8	3.8
2	*5580.00	106.4 AV			1.90 H	266	102.6	3.8
3	11160.00	49.7 PK	74.0	-24.3	1.40 H	15	36.6	13.1
4	11160.00	43.6 AV	54.0	-10.4	1.40 H	15	30.5	13.1
5	#16740.00	46.8 PK	68.2	-21.4	1.72 H	33	30.6	16.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	116.8 PK			3.97 V	352	113.0	3.8
2	*5580.00	107.2 AV			3.97 V	352	103.4	3.8
3	11160.00	47.5 PK	74.0	-26.5	1.48 V	20	34.4	13.1
4	11160.00	41.3 AV	54.0	-12.7	1.48 V	20	28.2	13.1
5	#16740.00	44.8 PK	68.2	-23.4	1.57 V	51	28.6	16.2

Remarks:

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

Channel	TX Channel 140	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5700.00	116.2 PK			1.79 H	280	112.2	4.0
2	*5700.00	105.2 AV			1.79 H	280	101.2	4.0
3	#5725.00	67.5 PK	68.2	-0.7	1.79 H	280	63.5	4.0
4	11400.00	48.9 PK	74.0	-25.1	1.43 H	19	35.7	13.2
5	11400.00	43.2 AV	54.0	-10.8	1.43 H	19	30.0	13.2
6	#17100.00	46.8 PK	68.2	-21.4	1.67 H	40	29.6	17.2
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	*5700.00	114.1 PK			3.02 V	344	110.1	4.0
2	*5700.00	103.3 AV			3.02 V	344	99.3	4.0
3	#5725.00	65.1 PK	68.2	-3.1	3.02 V	344	61.1	4.0
4	11400.00	47.9 PK	74.0	-26.1	1.47 V	24	34.7	13.2
5	11400.00	40.8 AV	54.0	-13.2	1.47 V	24	27.6	13.2
6	#17100.00	45.0 PK	68.2	-23.2	1.46 V	6	27.8	17.2

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

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	5460.00	50.8 PK	74.0	-23.2	1.86 H	276	47.0	3.8
2	5460.00	38.5 AV	54.0	-15.5	1.86 H	276	34.7	3.8
3	#5470.00	50.7 PK	68.2	-17.5	1.86 H	276	46.8	3.9
4	*5720.00	115.4 PK			1.86 H	276	111.5	3.9
5	*5720.00	106.5 AV			1.86 H	276	102.6	3.9
6	#5850.00	53.6 PK	68.2	-14.6	1.86 H	276	49.2	4.4
7	11440.00	49.4 PK	74.0	-24.6	1.38 H	9	36.1	13.3
8	11440.00	43.6 AV	54.0	-10.4	1.38 H	9	30.3	13.3
9	#17160.00	46.4 PK	68.2	-21.8	1.68 H	34	29.0	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	5460.00	49.8 PK	74.0	-24.2	3.95 V	349	46.0	3.8
2	5460.00	37.7 AV	54.0	-16.3	3.95 V	349	33.9	3.8
3	#5470.00	50.6 PK	68.2	-17.6	3.95 V	349	46.7	3.9
4	*5720.00	116.7 PK			3.95 V	349	112.8	3.9
5	*5720.00	107.2 AV			3.95 V	349	103.3	3.9
6	#5850.00	53.4 PK	68.2	-14.8	3.95 V	349	49.0	4.4
7	11440.00	47.6 PK	74.0	-26.4	1.45 V	11	34.3	13.3
8	11440.00	41.0 AV	54.0	-13.0	1.45 V	11	27.7	13.3
9	#17160.00	45.6 PK	68.2	-22.6	1.61 V	40	28.2	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.

802.11ac (VHT40)

Channel	TX Channel 54	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	50.8 PK	74.0	-23.2	1.82 H	304	47.1	3.7
2	5150.00	43.4 AV	54.0	-10.6	1.82 H	304	39.7	3.7
3	*5270.00	114.1 PK			1.82 H	304	110.7	3.4
4	*5270.00	104.9 AV			1.82 H	304	101.5	3.4
5	5350.00	61.2 PK	74.0	-12.8	1.82 H	304	57.8	3.4
6	5350.00	46.4 AV	54.0	-7.6	1.82 H	304	43.0	3.4
7	#10540.00	49.2 PK	68.2	-19.0	1.45 H	12	36.2	13.0
8	15810.00	46.4 PK	74.0	-27.6	1.74 H	12	33.2	13.2
9	15810.00	38.5 AV	54.0	-15.5	1.74 H	12	25.3	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	52.3 PK	74.0	-21.7	3.97 V	352	48.6	3.7
2	5150.00	41.0 AV	54.0	-13.0	3.97 V	352	37.3	3.7
3	*5270.00	115.5 PK			3.97 V	352	112.1	3.4
4	*5270.00	105.5 AV			3.97 V	352	102.1	3.4
5	5350.00	64.0 PK	74.0	-10.0	3.97 V	352	60.6	3.4
6	5350.00	48.0 AV	54.0	-6.0	3.97 V	352	44.6	3.4
7	#10540.00	47.6 PK	68.2	-20.6	1.40 V	2	34.6	13.0
8	15810.00	45.8 PK	74.0	-28.2	1.60 V	30	32.6	13.2
9	15810.00	34.7 AV	54.0	-19.3	1.60 V	30	21.5	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 62	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	*5310.00	111.4 PK			1.92 H	296	108.1	3.3
2	*5310.00	102.3 AV			1.92 H	296	99.0	3.3
3	5350.00	65.3 PK	74.0	-8.7	1.92 H	296	61.9	3.4
4	5350.00	52.5 AV	54.0	-1.5	1.92 H	296	49.1	3.4
5	10620.00	47.4 PK	74.0	-26.6	1.44 H	32	34.5	12.9
6	10620.00	41.3 AV	54.0	-12.7	1.44 H	32	28.4	12.9
7	15930.00	45.6 PK	74.0	-28.4	1.74 H	32	32.8	12.8
8	15930.00	35.7 AV	54.0	-18.3	1.74 H	32	22.9	12.8
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	*5310.00	111.9 PK			3.94 V	350	108.6	3.3
2	*5310.00	101.9 AV			3.94 V	350	98.6	3.3
3	5350.00	67.2 PK	74.0	-6.8	3.94 V	350	63.8	3.4
4	5350.00	51.9 AV	54.0	-2.1	3.94 V	350	48.5	3.4
5	10620.00	48.3 PK	74.0	-25.7	1.53 V	6	35.4	12.9
6	10620.00	41.1 AV	54.0	-12.9	1.53 V	6	28.2	12.9
7	15930.00	43.9 PK	74.0	-30.1	1.40 V	8	31.1	12.8
8	15930.00	32.4 AV	54.0	-21.6	1.40 V	8	19.6	12.8

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.

Channel	TX Channel 102	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	5460.00	58.4 PK	74.0	-15.6	1.83 H	276	54.6	3.8
2	5460.00	45.0 AV	54.0	-9.0	1.83 H	276	41.2	3.8
3	#5470.00	68.0 PK	68.2	-0.2	1.83 H	276	64.1	3.9
4	*5510.00	112.5 PK			1.83 H	276	108.6	3.9
5	*5510.00	103.0 AV			1.83 H	276	99.1	3.9
6	11020.00	47.0 PK	74.0	-27.0	1.41 H	32	34.0	13.0
7	11020.00	41.2 AV	54.0	-12.8	1.41 H	32	28.2	13.0
8	#16530.00	45.3 PK	68.2	-22.9	1.77 H	17	30.6	14.7
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	5448.52	55.6 PK	74.0	-18.4	3.97 V	358	51.9	3.7
2	5448.52	42.0 AV	54.0	-12.0	3.97 V	358	38.3	3.7
3	#5462.96	61.7 PK	68.2	-6.5	3.97 V	358	57.9	3.8
4	*5510.00	110.5 PK			3.97 V	358	106.6	3.9
5	*5510.00	100.6 AV			3.97 V	358	96.7	3.9
6	11020.00	48.1 PK	74.0	-25.9	1.44 V	9	35.1	13.0
7	11020.00	40.9 AV	54.0	-13.1	1.44 V	9	27.9	13.0
8	#16530.00	43.8 PK	68.2	-24.4	1.49 V	3	29.1	14.7

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

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	*5550.00	113.9 PK			1.83 H	302	110.1	3.8
2	*5550.00	105.1 AV			1.83 H	302	101.3	3.8
3	11100.00	49.5 PK	74.0	-24.5	1.44 H	9	36.5	13.0
4	11100.00	43.8 AV	54.0	-10.2	1.44 H	9	30.8	13.0
5	#16650.00	45.8 PK	68.2	-22.4	1.72 H	32	30.1	15.7
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	*5550.00	115.1 PK			4.00 V	353	111.3	3.8
2	*5550.00	104.4 AV			4.00 V	353	100.6	3.8
3	11100.00	48.2 PK	74.0	-25.8	1.46 V	21	35.2	13.0
4	11100.00	41.5 AV	54.0	-12.5	1.46 V	21	28.5	13.0
5	#16650.00	45.6 PK	68.2	-22.6	1.56 V	39	29.9	15.7

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

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	*5670.00	113.4 PK			1.86 H	279	109.4	4.0
2	*5670.00	104.4 AV			1.86 H	279	100.4	4.0
3	#5725.00	67.6 PK	68.2	-0.6	1.86 H	279	63.6	4.0
4	11340.00	47.2 PK	74.0	-26.8	1.40 H	25	34.0	13.2
5	11340.00	41.0 AV	54.0	-13.0	1.40 H	25	27.8	13.2
6	#17010.00	45.5 PK	68.2	-22.7	1.78 H	39	28.5	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	*5670.00	112.8 PK			3.28 V	347	108.8	4.0
2	*5670.00	102.6 AV			3.28 V	347	98.6	4.0
3	#5725.00	62.5 PK	68.2	-5.7	3.28 V	347	58.5	4.0
4	11340.00	48.2 PK	74.0	-25.8	1.41 V	8	35.0	13.2
5	11340.00	40.7 AV	54.0	-13.3	1.41 V	8	27.5	13.2
6	#17010.00	43.6 PK	68.2	-24.6	1.52 V	19	26.6	17.0

Remarks:

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

Channel	TX Channel 142	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	5460.00	50.9 PK	74.0	-23.1	1.82 H	277	47.1	3.8
2	5460.00	40.3 AV	54.0	-13.7	1.82 H	277	36.5	3.8
3	#5470.00	52.4 PK	68.2	-15.8	1.82 H	277	48.5	3.9
4	*5710.00	114.2 PK			1.82 H	277	110.2	4.0
5	*5710.00	106.1 AV			1.82 H	277	102.1	4.0
6	#5850.00	55.0 PK	68.2	-13.2	1.82 H	277	50.6	4.4
7	11420.00	49.8 PK	74.0	-24.2	1.43 H	0	36.6	13.2
8	11420.00	44.0 AV	54.0	-10.0	1.43 H	0	30.8	13.2
9	#17130.00	46.2 PK	68.2	-22.0	1.63 H	32	29.0	17.2
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	5460.00	50.6 PK	74.0	-23.4	3.26 V	349	46.8	3.8
2	5460.00	39.4 AV	54.0	-14.6	3.26 V	349	35.6	3.8
3	#5470.00	51.9 PK	68.2	-16.3	3.26 V	349	48.0	3.9
4	*5710.00	113.8 PK			3.26 V	349	109.8	4.0
5	*5710.00	105.5 AV			3.26 V	349	101.5	4.0
6	#5850.00	54.8 PK	68.2	-13.4	3.26 V	349	50.4	4.4
7	11420.00	47.1 PK	74.0	-26.9	1.43 V	0	33.9	13.2
8	11420.00	40.8 AV	54.0	-13.2	1.43 V	0	27.6	13.2
9	#17130.00	45.5 PK	68.2	-22.7	1.64 V	47	28.3	17.2

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.

802.11ac (VHT80)

Channel	TX Channel 58	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	55.7 PK	74.0	-18.3	1.80 H	300	52.0	3.7
2	5150.00	44.7 AV	54.0	-9.3	1.80 H	300	41.0	3.7
3	*5290.00	108.0 PK			1.80 H	300	104.7	3.3
4	*5290.00	98.8 AV			1.80 H	300	95.5	3.3
5	5350.00	67.0 PK	74.0	-7.0	1.80 H	300	63.6	3.4
6	**5350.00**	**53.9 AV**	**54.0**	**-0.1**	**1.80 H**	**300**	**50.5**	**3.4**
7	#10580.00	47.6 PK	68.2	-20.6	1.41 H	23	34.7	12.9
8	15870.00	45.5 PK	74.0	-28.5	1.74 H	24	32.6	12.9
9	15870.00	35.5 AV	54.0	-18.5	1.74 H	24	22.6	12.9
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	55.6 PK	74.0	-18.4	3.98 V	359	51.9	3.7
2	5150.00	43.2 AV	54.0	-10.8	3.98 V	359	39.5	3.7
3	*5290.00	107.8 PK			3.98 V	359	104.5	3.3
4	*5290.00	98.6 AV			3.98 V	359	95.3	3.3
5	5350.00	68.2 PK	74.0	-5.8	3.98 V	359	64.8	3.4
6	5350.00	53.6 AV	54.0	-0.4	3.98 V	359	50.2	3.4
7	#10580.00	47.8 PK	68.2	-20.4	1.56 V	4	34.9	12.9
8	15870.00	43.7 PK	74.0	-30.3	1.39 V	12	30.8	12.9
9	15870.00	32.1 AV	54.0	-21.9	1.39 V	12	19.2	12.9

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

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	5460.00	64.5 PK	74.0	-9.5	1.78 H	277	60.7	3.8
2	5460.00	50.2 AV	54.0	-3.8	1.78 H	277	46.4	3.8
3	#5470.00	68.0 PK	68.2	-0.2	1.78 H	277	64.1	3.9
4	*5530.00	108.3 PK			1.78 H	277	104.5	3.8
5	*5530.00	99.0 AV			1.78 H	277	95.2	3.8
6	#5725.00	51.6 PK	68.2	-16.6	1.78 H	277	47.6	4.0
7	11060.00	47.8 PK	74.0	-26.2	1.42 H	45	34.9	12.9
8	11060.00	41.6 AV	54.0	-12.4	1.42 H	45	28.7	12.9
9	#16590.00	45.3 PK	68.2	-22.9	1.69 H	25	30.4	14.9
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	5460.00	58.9 PK	74.0	-15.1	3.79 V	360	55.1	3.8
2	5460.00	48.2 AV	54.0	-5.8	3.79 V	360	44.4	3.8
3	#5470.00	58.7 PK	68.2	-9.5	3.79 V	360	54.8	3.9
4	*5530.00	105.6 PK			3.79 V	360	101.8	3.8
5	*5530.00	97.1 AV			3.79 V	360	93.3	3.8
6	#5725.00	50.9 PK	68.2	-17.3	3.79 V	360	46.9	4.0
7	11060.00	48.2 PK	74.0	-25.8	1.57 V	8	35.3	12.9
8	11060.00	41.1 AV	54.0	-12.9	1.57 V	8	28.2	12.9
9	#16590.00	43.4 PK	68.2	-24.8	1.35 V	4	28.5	14.9

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

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	*5610.00	111.9 PK			1.73 H	281	108.2	3.7
2	*5610.00	102.5 AV			1.73 H	281	98.8	3.7
3	**#5725.00**	**68.1 PK**	**68.2**	**-0.1**	**1.73 H**	**281**	**64.1**	**4.0**
4	11220.00	47.9 PK	74.0	-26.1	1.49 H	36	34.7	13.2
5	11220.00	41.7 AV	54.0	-12.3	1.49 H	36	28.5	13.2
6	#16830.00	45.1 PK	68.2	-23.1	1.77 H	41	29.0	16.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5610.00	110.7 PK			3.87 V	360	107.0	3.7
2	*5610.00	100.9 AV			3.87 V	360	97.2	3.7
3	#5725.00	63.7 PK	68.2	-4.5	3.87 V	360	59.7	4.0
4	11220.00	47.7 PK	74.0	-26.3	1.46 V	16	34.5	13.2
5	11220.00	40.7 AV	54.0	-13.3	1.46 V	16	27.5	13.2
6	#16830.00	44.6 PK	68.2	-23.6	1.42 V	26	28.5	16.1

Remarks:

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

Channel	TX Channel 138	Detector Function	Peak (PK) Average (AV)
Frequency Range	1GHz ~ 40GHz		

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	5460.00	50.9 PK	74.0	-23.1	1.77 H	280	47.1	3.8
2	5460.00	39.8 AV	54.0	-14.2	1.77 H	280	36.0	3.8
3	#5470.00	54.5 PK	68.2	-13.7	1.77 H	280	50.6	3.9
4	*5690.00	110.7 PK			1.77 H	280	106.7	4.0
5	*5690.00	101.9 AV			1.77 H	280	97.9	4.0
6	#5850.00	67.6 PK	68.2	-0.6	1.77 H	280	63.2	4.4
7	11380.00	47.7 PK	74.0	-26.3	1.48 H	46	34.5	13.2
8	11380.00	41.5 AV	54.0	-12.5	1.48 H	46	28.3	13.2
9	#17070.00	45.8 PK	68.2	-22.4	1.75 H	27	28.8	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	5460.00	51.3 PK	74.0	-22.7	3.82 V	360	47.5	3.8
2	5460.00	40.2 AV	54.0	-13.8	3.82 V	360	36.4	3.8
3	#5470.00	53.9 PK	68.2	-14.3	3.82 V	360	50.0	3.9
4	*5690.00	110.7 PK			3.82 V	360	106.7	4.0
5	*5690.00	101.1 AV			3.82 V	360	97.1	4.0
6	#5850.00	63.8 PK	68.2	-4.4	3.82 V	360	59.4	4.4
7	11380.00	47.7 PK	74.0	-26.3	1.51 V	9	34.5	13.2
8	11380.00	40.7 AV	54.0	-13.3	1.51 V	9	27.5	13.2
9	#17070.00	44.2 PK	68.2	-24.0	1.46 V	23	27.2	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.

Below 1GHz Data:

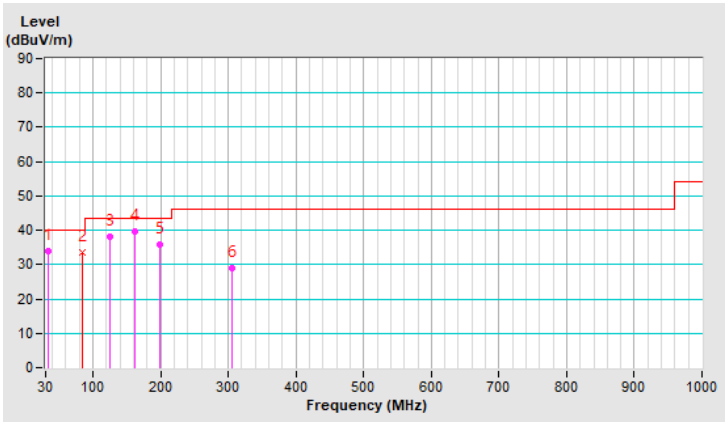
802.11ac (VHT40)

Channel	TX Channel 110	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	34.04	33.9 QP	40.0	-6.1	2.00 H	54	42.6	-8.7
2	85.15	33.5 QP	40.0	-6.5	1.50 H	250	46.6	-13.1
3	125.84	38.1 QP	43.5	-5.4	1.50 H	275	46.5	-8.4
4	161.99	39.8 QP	43.5	-3.7	2.00 H	196	46.7	-6.9
5	197.94	35.8 QP	43.5	-7.7	1.00 H	83	45.8	-10.0
6	304.60	29.1 QP	46.0	-16.9	1.00 H	135	34.8	-5.7

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.

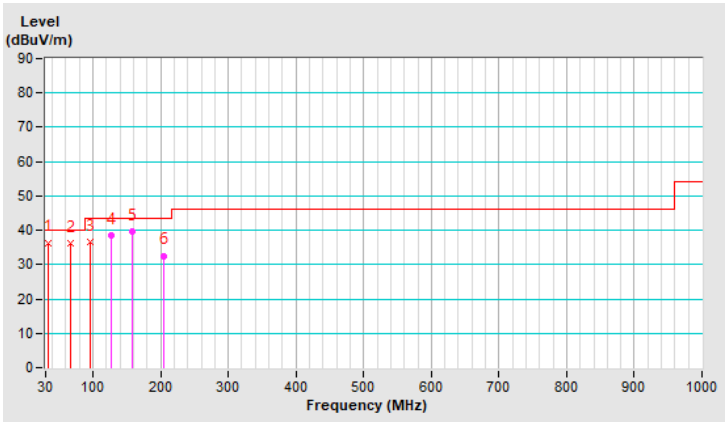


Channel	TX Channel 110	Detector Function	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	34.01	36.4 QP	40.0	-3.6	1.00 V	174	45.1	-8.7
2	67.54	36.1 QP	40.0	-3.9	1.00 V	243	45.5	-9.4
3	95.92	36.5 QP	43.5	-7.0	1.00 V	93	48.8	-12.3
4	126.90	38.4 QP	43.5	-5.1	1.00 V	331	46.9	-8.5
5	157.65	39.8 QP	43.5	-3.7	1.00 V	237	46.6	-6.8
6	205.53	32.6 QP	43.5	-10.9	1.00 V	43	42.5	-9.9

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

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. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: June 11, 2020

4.2.3 Test Procedure

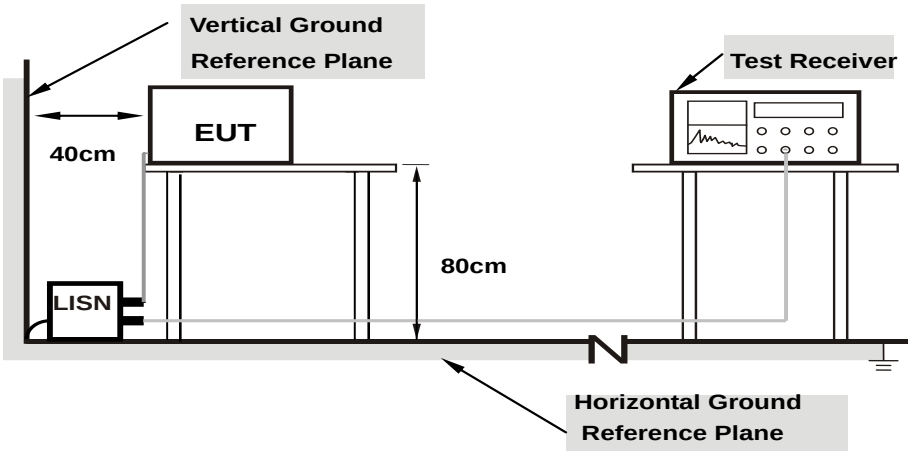
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

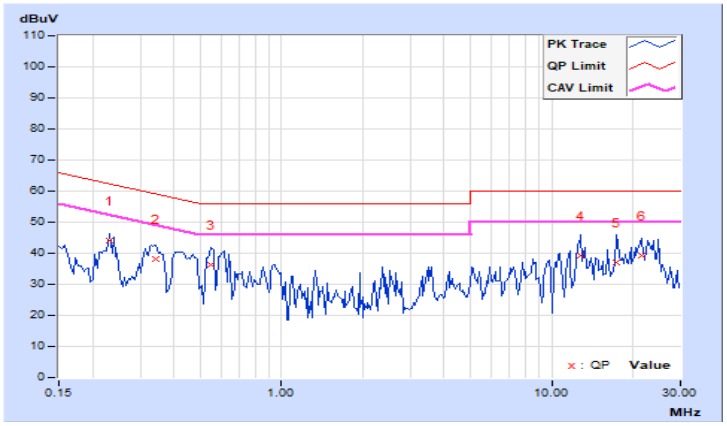
4.2.7 Test Results

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

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	**0.23203**	**10.02**	**34.20**	**20.95**	**44.22**	**30.97**	**62.38**	**52.38**	**-18.16**	**-21.41**
2	0.34141	10.03	28.23	11.97	38.26	22.00	59.17	49.17	-20.91	-27.17
3	0.54844	10.04	26.39	4.72	36.43	14.76	56.00	46.00	-19.57	-31.24
4	12.87500	10.75	28.46	15.93	39.21	26.68	60.00	50.00	-20.79	-23.32
5	17.33203	11.00	26.12	17.26	37.12	28.26	60.00	50.00	-22.88	-21.74
6	21.47266	11.20	27.97	18.43	39.17	29.63	60.00	50.00	-20.83	-20.37

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

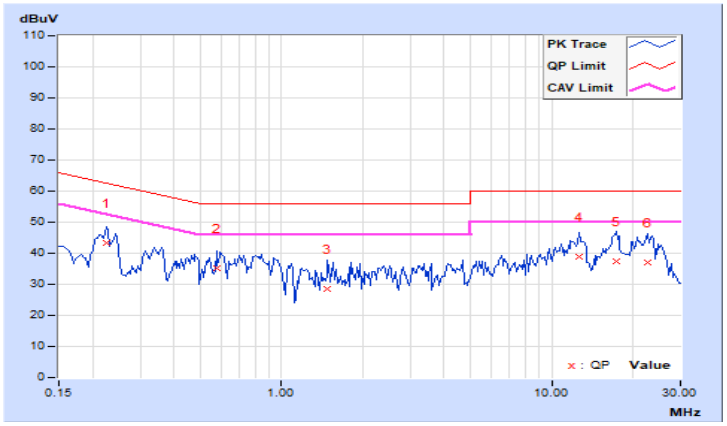


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.22422	10.01	33.37	19.24	43.38	29.25	62.66	52.66	-19.28	-23.41
2	0.57578	10.02	25.21	8.06	35.23	18.08	56.00	46.00	-20.77	-27.92
3	1.48438	10.08	18.37	3.66	28.45	13.74	56.00	46.00	-27.55	-32.26
4	12.63672	10.59	28.33	13.81	38.92	24.40	60.00	50.00	-21.08	-25.60
5	17.37500	10.78	26.56	16.56	37.34	27.34	60.00	50.00	-22.66	-22.66
6	22.61328	10.95	26.06	19.34	37.01	30.29	60.00	50.00	-22.99	-19.71

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

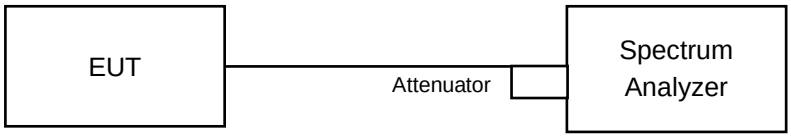
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

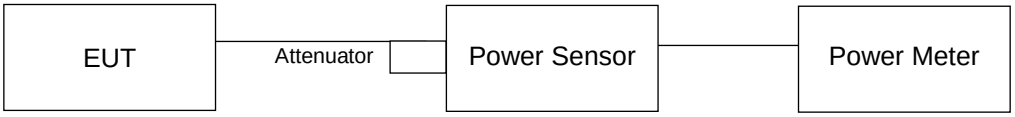
4.3.2 Test Setup

FOR POWER OUTPUT MEASUREMENT

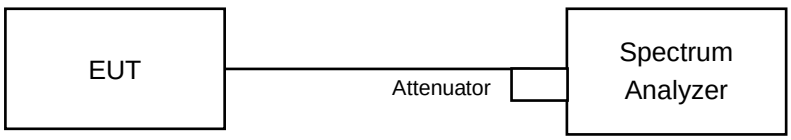
For channel straddling 5725MHz:



For other channels:



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

For other channels:

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 channel straddling 5725MHz:

Follow FCC KDB 789033 UNII test procedure:

802.11ac (VHT20)

Method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW ≥ 3 x RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle ≥ 98 percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

Other Modulation mode

Method SA-2

1. Set span to encompass the emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW ≥ 3 x RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Detector = RMS.
7. Trace average at least 100 traces in power averaging mode
8. Compute power by integrating the spectrum across the 26 dB EBW of the signal.
9. Duty factor need added to measured value (duty cycle < 98 percent).

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

POWER OUTPUT

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
52	5260	20.83	21.01	247.243	23.93	23.96	Pass
60	5300	20.85	20.98	246.933	23.93	23.96	Pass
64	5320	20.86	20.99	247.502	23.94	23.96	Pass
100	5500	20.91	21.01	249.493	23.97	23.98	Pass
116	5580	20.97	20.93	248.906	23.96	23.98	Pass
140	5700	20.97	20.94	249.191	23.97	23.98	Pass

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Duty Factor (dB)	Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1					
*144 (U-NII-2C Band)	5720	17.29	17.79	0.21	119.314	20.77	22.67	Pass
*144 (U-NII-3 Band)	5720	11.09	10.60	0.21	25.537	14.07	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test and refer to section 3.3 for duty cycle. spectrum plot

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
144	5720	138.031	21.40	21.03	20.89	249.509	23.97

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	19.78	23.96 < 24
60	5300	19.78	23.96 < 24
64	5320	19.78	23.96 < 24
100	5500	19.88	23.98 < 24
116	5580	19.88	23.98 < 24
140	5700	19.88	23.98 < 24
144 (U-NII-2C Band)	5720	14.72	22.67 < 24

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
52	5260	20.92	20.78	243.269	23.86	24.00	Pass
60	5300	20.85	20.99	247.222	23.93	24.00	Pass
64	5320	20.78	20.92	243.269	23.86	24.00	Pass
100	5500	20.87	21.03	248.945	23.96	24.00	Pass
116	5580	20.81	20.92	244.098	23.88	23.93	Pass
140	5700	21.03	20.78	246.439	23.92	24.00	Pass
*144 (U-NII-2C Band)	5720	18.39	18.69	142.985	21.55	22.82	Pass
*144 (U-NII-3 Band)	5720	13.67	11.12	36.223	15.59	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
144	5720	179.208	22.53	21.01	20.61	241.263	23.82

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.52	24.12 > 24
60	5300	20.64	24.14 > 24
64	5320	20.72	24.16 > 24
100	5500	20.35	24.08 > 24
116	5580	19.66	23.93 < 24
140	5700	20.35	24.08 > 24
144 (U-NII-2C Band)	5720	15.22	22.82 < 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
54	5270	20.53	20.98	238.294	23.77	24.00	Pass
62	5310	20.44	20.82	231.444	23.64	24.00	Pass
102	5510	20.83	20.92	244.655	23.89	24.00	Pass
110	5550	20.84	21.08	249.572	23.97	24.00	Pass
134	5670	20.77	21.03	246.164	23.91	24.00	Pass

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Duty Factor (dB)	Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1					
*142 (U-NII-2C Band)	5710	18.72	19.06	0.16	160.924	22.07	24.00	Pass
*142 (U-NII-3 Band)	5710	5.99	9.35	0.16	13.062	11.16	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test and refer to section 3.3 for duty cycle spectrum plot.

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
142	5710	167.593	22.24	20.79	20.78	239.624	23.80

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.23	27.04 > 24
62	5310	40.19	27.04 > 24
102	5510	40.55	27.07 > 24
110	5550	40.69	27.09 > 24
134	5670	39.99	27.01 > 24
142 (U-NII-2C Band)	5710	34.68	26.4 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
58	5290	20.79	20.95	244.401	23.88	24.00	Pass
106	5530	19.83	20.13	199.2	22.99	24.00	Pass
122	5610	20.56	20.81	234.266	23.70	24.00	Pass

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Duty Factor (dB)	Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1					
*138 (U-NII-2C Band)	5690	17.53	17.14	0.3	116.133	20.65	24.00	Pass
*138 (U-NII-3 Band)	5690	3.25	5.25	0.3	5.854	7.67	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test and refer to section 3.3 for duty cycle spectrum plot.

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
138	5690	113.848	20.56	20.61	20.73	233.384	23.68

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.26	30.2 > 24
106	5530	83.58	30.22 > 24
122	5610	83.65	30.22 > 24
138 (U-NII-2C Band)	5690	75.77	29.79 > 24

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
52	5260	20.92	20.78	243.269	23.86	24.00	Pass
60	5300	20.85	20.99	247.222	23.93	24.00	Pass
64	5320	20.78	20.92	243.269	23.86	24.00	Pass
100	5500	20.87	21.03	248.945	23.96	24.00	Pass
116	5580	20.81	20.92	244.098	23.88	23.93	Pass
140	5700	21.03	20.78	246.439	23.92	24.00	Pass
*144 (U-NII-2C Band)	5720	18.39	18.69	142.985	21.55	22.82	Pass
*144 (U-NII-3 Band)	5720	13.67	11.12	36.223	15.59	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.

1. For U-NII-2A: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi. , so the power limit shall not be reduced.
2. For U-NII-2C, U-NII-3: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi, so the power limit shall not be reduced..

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
144	5720	179.208	22.53	21.01	20.61	241.263	23.82

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.52	24.12 > 24
60	5300	20.64	24.14 > 24
64	5320	20.72	24.16 > 24
100	5500	20.35	24.08 > 24
116	5580	19.66	23.93 < 24
140	5700	20.35	24.08 > 24
144 (U-NII-2C Band)	5720	15.22	22.82 < 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
54	5270	20.53	20.98	238.294	23.77	24.00	Pass
62	5310	20.44	20.82	231.444	23.64	24.00	Pass
102	5510	20.83	20.92	244.655	23.89	24.00	Pass
110	5550	20.84	21.08	249.572	23.97	24.00	Pass
134	5670	20.77	21.03	246.164	23.91	24.00	Pass

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Duty Factor (dB)	Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1					
*142 (U-NII-2C Band)	5710	18.72	19.06	0.16	160.924	22.07	24.00	Pass
*142 (U-NII-3 Band)	5710	5.99	9.35	0.16	13.062	11.16	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test and refer to section 3.3 for duty cycle spectrum plot.

1. For U-NII-2A: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi, so the power limit shall not be reduced.
2. For U-NII-2C, U-NII-3: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi, so the power limit shall not be reduced..

The Total Power for the straddle channel and power meter value for reference only:

Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
142	5710	167.593	22.24	20.79	20.78	239.624	23.80

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	40.23	27.04 > 24
62	5310	40.19	27.04 > 24
102	5510	40.55	27.07 > 24
110	5550	40.69	27.09 > 24
134	5670	39.99	27.01 > 24
142 (U-NII-2C Band)	5710	34.68	26.4 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1				
58	5290	20.79	20.95	244.401	23.88	24.00	Pass
106	5530	19.83	20.13	199.2	22.99	24.00	Pass
122	5610	20.56	20.81	234.266	23.70	24.00	Pass

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Duty Factor (dB)	Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain0	Chain1					
*138 (U-NII-2C Band)	5690	17.53	17.14	0.3	116.133	20.65	24.00	Pass
*138 (U-NII-3 Band)	5690	3.25	5.25	0.3	5.854	7.67	30.00	Pass

Note: * Test was performed in accordance with Measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test and refer to section 3.3 for duty cycle spectrum plot.

1. For U-NII-2A: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi. , so the power limit shall not be reduced.
2. For U-NII-2C, U-NII-3: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi < 6dBi, so the power limit shall not be reduced..

The Total Power for the straddle channel and power meter value for reference only:

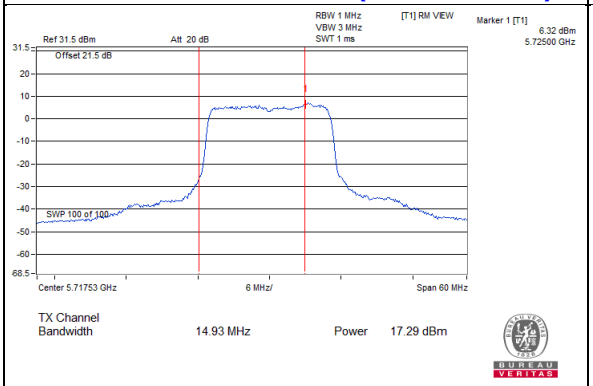
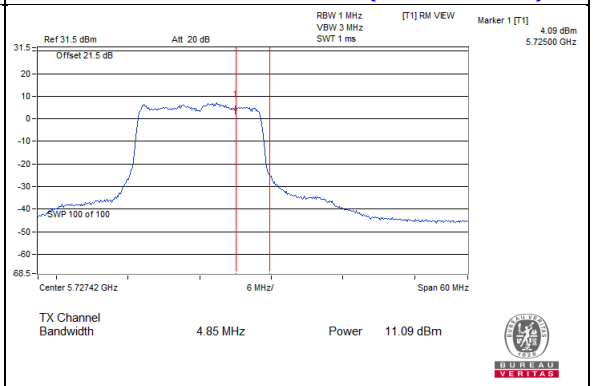
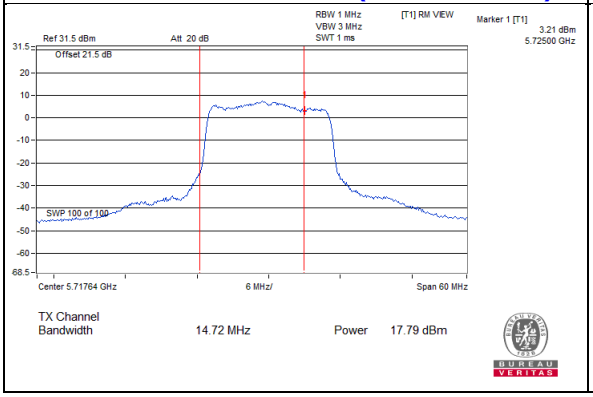
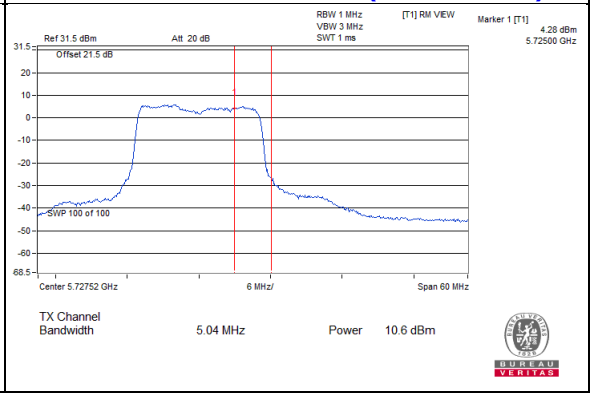
Chan.	Chan. Freq. (MHz)	Total Power (mW)	Total Power (dBm)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
				Chain0	Chain1		
138	5690	113.848	20.56	20.61	20.73	233.384	23.68

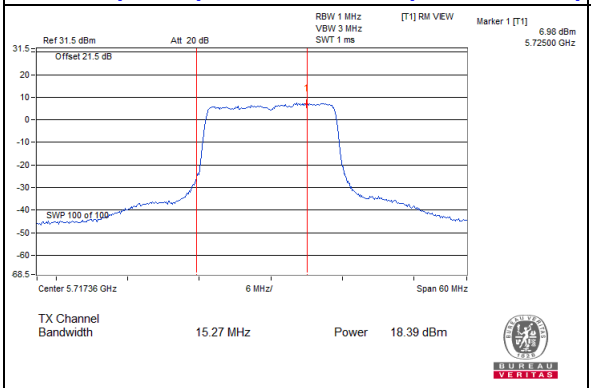
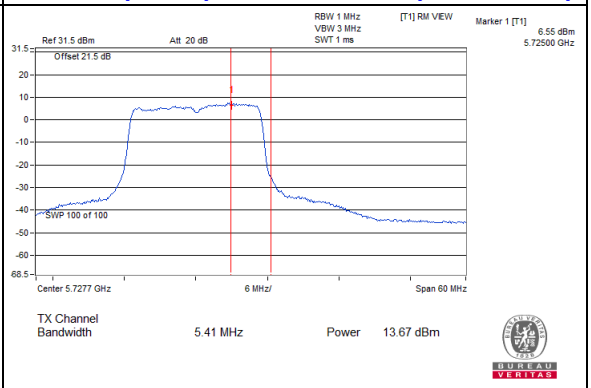
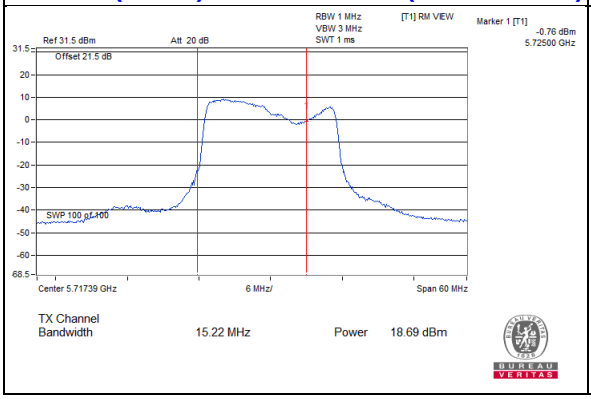
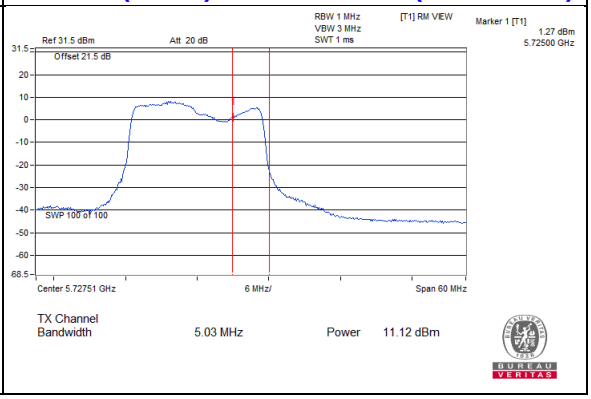
Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth

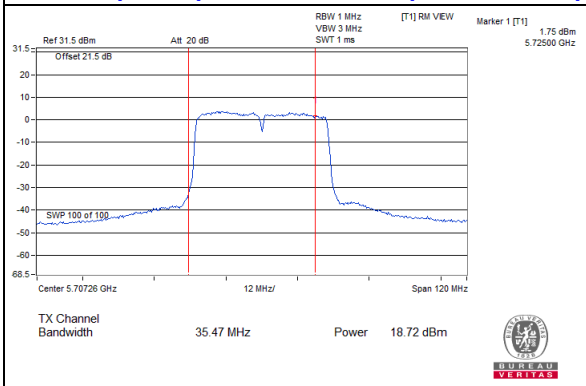
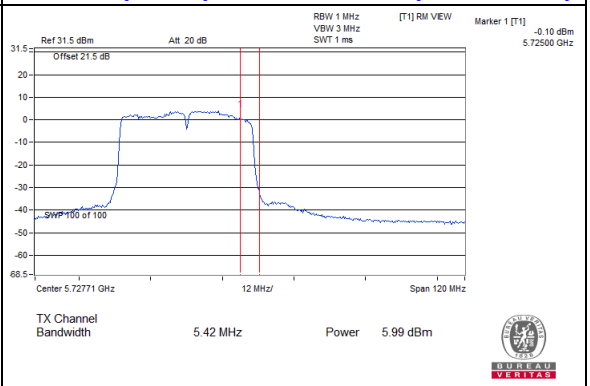
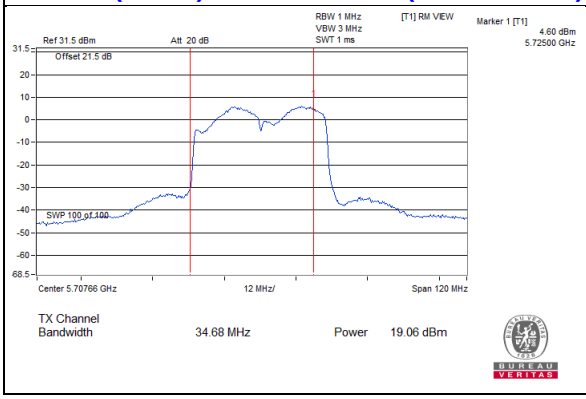
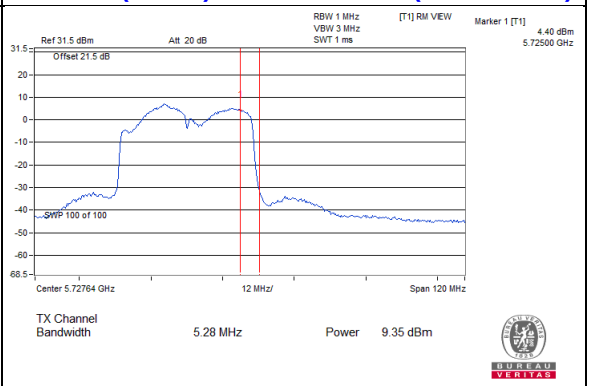
Power Limit = 11dBm + 10logB < U-NII-2A, U-NII-2C >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	83.26	30.2 > 24
106	5530	83.58	30.22 > 24
122	5610	83.65	30.22 > 24
138 (U-NII-2C Band)	5690	75.77	29.79 > 24

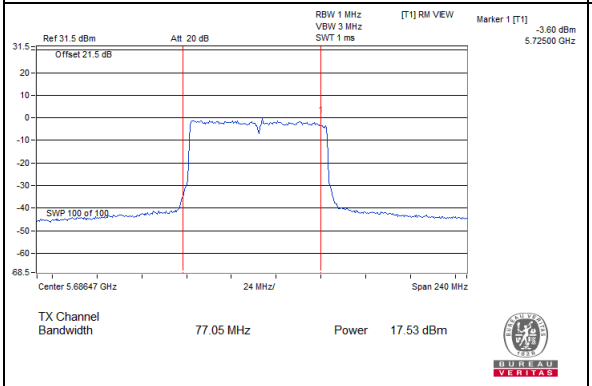
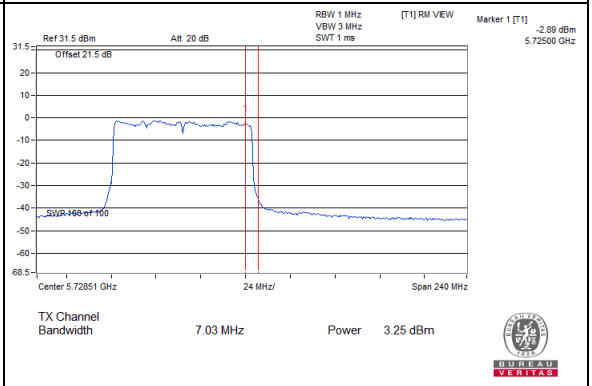
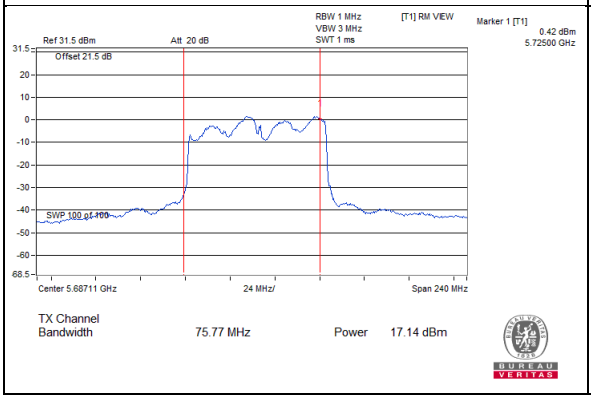
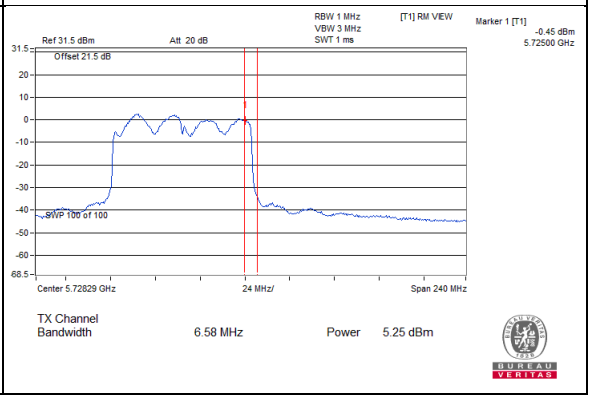
For channel straddling 5725MHz of Power

CDD Mode

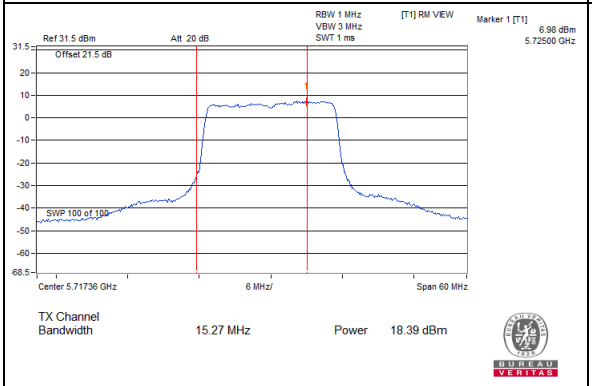
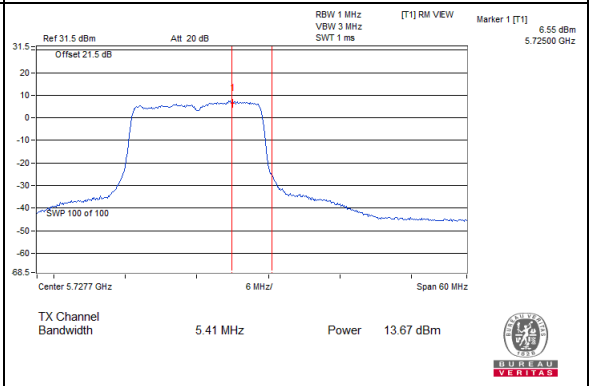
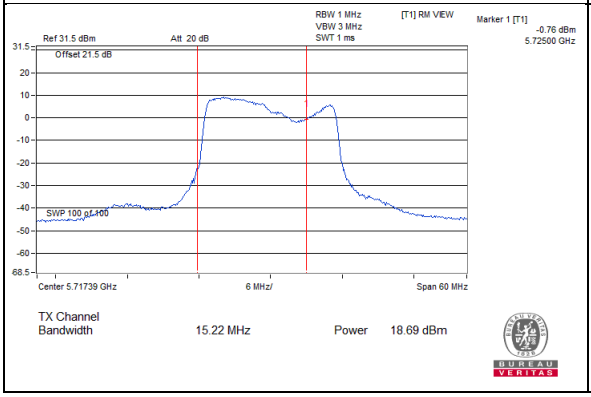
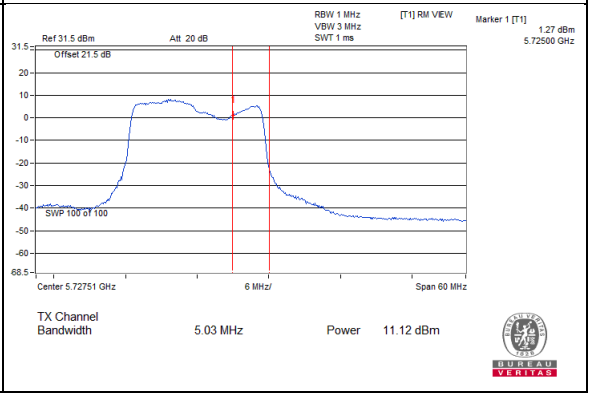
Spectrum Plot Value of Power	
802.11a_Chain 0 / CH144 (U-NII-2C Band)	**802.11a_Chain 0 / CH144 (U-NII-3 Band)**
 TX Channel Bandwidth 14.93 MHz Power 17.29 dBm	 TX Channel Bandwidth 4.85 MHz Power 11.09 dBm
802.11a_Chain 1 / CH144 (U-NII-2C Band)	**802.11a_Chain 1 / CH144 (U-NII-3 Band)**
 TX Channel Bandwidth 14.72 MHz Power 17.79 dBm	 TX Channel Bandwidth 5.04 MHz Power 10.6 dBm

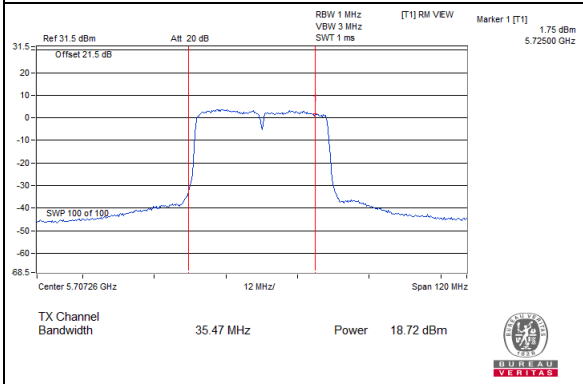
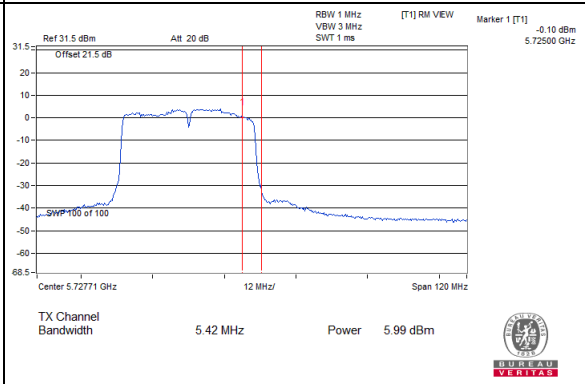
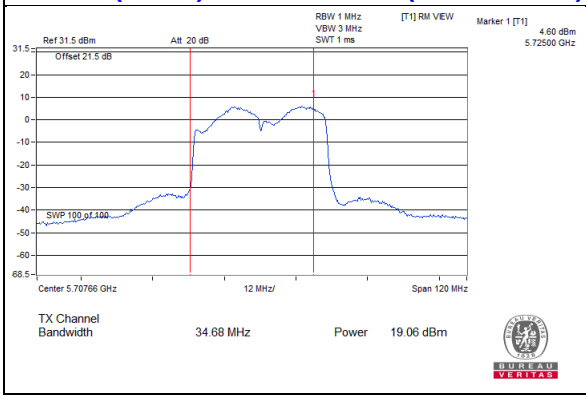
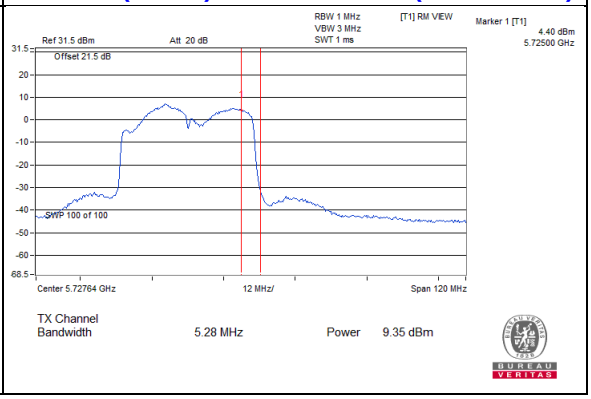
Spectrum Plot Value of Power	
802.11ac (VHT20)_Chain 0 / CH144 (U-NII-2C Band)	**802.11ac (VHT20)_Chain 0 / CH144 (U-NII-3 Band)**
	
802.11ac (VHT20)_Chain 1 / CH144 (U-NII-2C Band)	**802.11ac (VHT20)_Chain 1 / CH144 (U-NII-3 Band)**
	

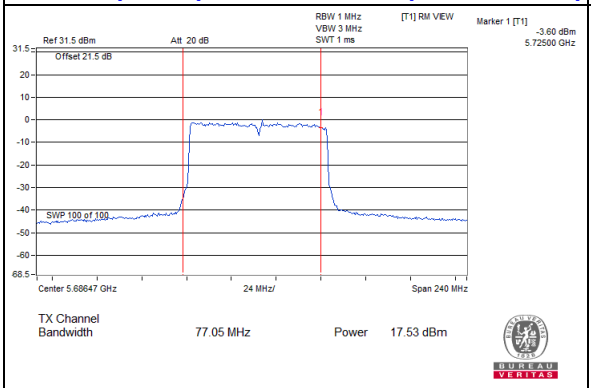
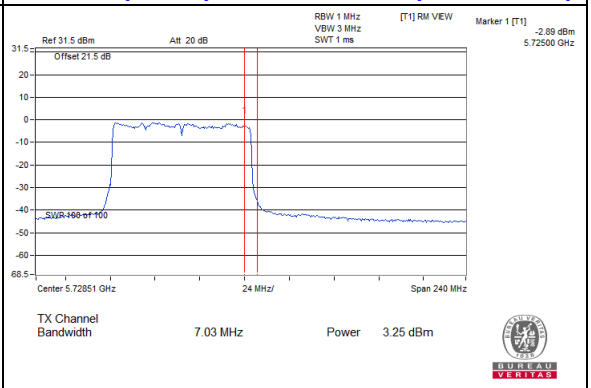
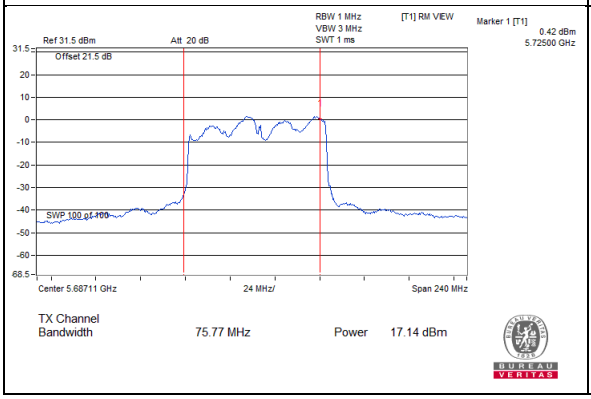
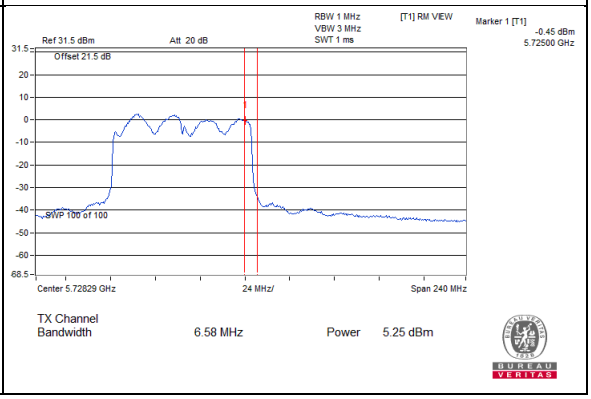
Spectrum Plot Value of Power	
802.11ac (VHT40)_Chain 0 / CH142 (U-NII-2C Band)	**802.11ac (VHT40)_Chain 0 / CH142 (U-NII-3 Band)**
	
802.11ac (VHT40)_Chain 1 / CH142 (U-NII-2C Band)	**802.11ac (VHT40)_Chain 1 / CH142 (U-NII-3 Band)**
	

Spectrum Plot Value of Power	
802.11ac (VHT80)_Chain 0 / CH138 (U-NII-2C Band)	**802.11ac (VHT80)_Chain 0 / CH138 (U-NII-3 Band)**
	
802.11ac (VHT80)_Chain 1 / CH138 (U-NII-2C Band)	**802.11ac (VHT80)_Chain 1 / CH138 (U-NII-3 Band)**
	

Beamforming Mode

Spectrum Plot Value of Power	
802.11ac (VHT20)_Chain 0 / CH144 (U-NII-2C Band)	**802.11ac (VHT20)_Chain 0 / CH144 (U-NII-3 Band)**
 TX Channel Bandwidth 15.27 MHz Power 18.39 dBm	 TX Channel Bandwidth 5.41 MHz Power 13.67 dBm
802.11ac (VHT20)_Chain 1 / CH144 (U-NII-2C Band)	**802.11ac (VHT20)_Chain 1 / CH144 (U-NII-3 Band)**
 TX Channel Bandwidth 15.22 MHz Power 18.69 dBm	 TX Channel Bandwidth 5.03 MHz Power 11.12 dBm

Spectrum Plot Value of Power	
802.11ac (VHT40)_Chain 0 / CH142 (U-NII-2C Band)	**802.11ac (VHT40)_Chain 0 / CH142 (U-NII-3 Band)**
	
802.11ac (VHT40)_Chain 1 / CH142 (U-NII-2C Band)	**802.11ac (VHT40)_Chain 1 / CH142 (U-NII-3 Band)**
	

Spectrum Plot Value of Power	
802.11ac (VHT80)_Chain 0 / CH138 (U-NII-2C Band)	**802.11ac (VHT80)_Chain 0 / CH138 (U-NII-3 Band)**
	
802.11ac (VHT80)_Chain 1 / CH138 (U-NII-2C Band)	**802.11ac (VHT80)_Chain 1 / CH138 (U-NII-3 Band)**
	

26dB OCCUPIED BANDWIDTH

CDD Mode

802.11a

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain0	Chain1
52	5260	19.81	19.78
60	5300	19.78	19.78
64	5320	19.78	19.78
100	5500	19.88	19.88
116	5580	19.88	19.88
140	5700	19.88	20.36
144 (U-NII-2C Band)	5720	14.93	14.72

802.11ac (VHT20)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain0	Chain1
52	5260	20.52	20.57
60	5300	20.65	20.64
64	5320	20.84	20.72
100	5500	20.35	20.48
116	5580	20.35	19.66
140	5700	20.52	20.35
144 (U-NII-2C Band)	5720	15.27	15.22

802.11ac (VHT40)

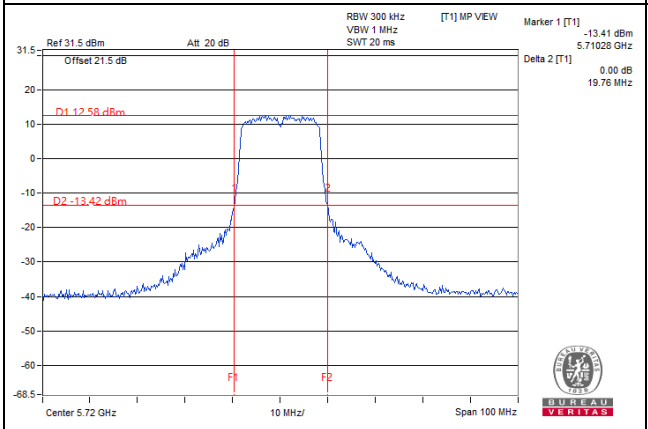
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain0	Chain1
54	5270	40.51	40.23
62	5310	40.79	40.19
102	5510	40.7	40.55
110	5550	40.69	40.71
134	5670	40.87	39.99
142 (U-NII-2C Band)	5710	35.47	34.68

802.11ac (VHT80)

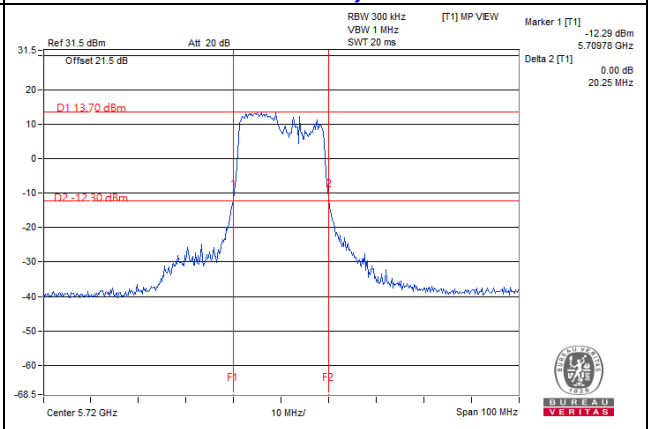
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain0	Chain1
58	5290	83.98	83.26
106	5530	84.47	83.58
122	5610	83.65	83.91
138 (U-NII-2C Band)	5690	77.05	75.77

Spectrum Plot of Worst Value

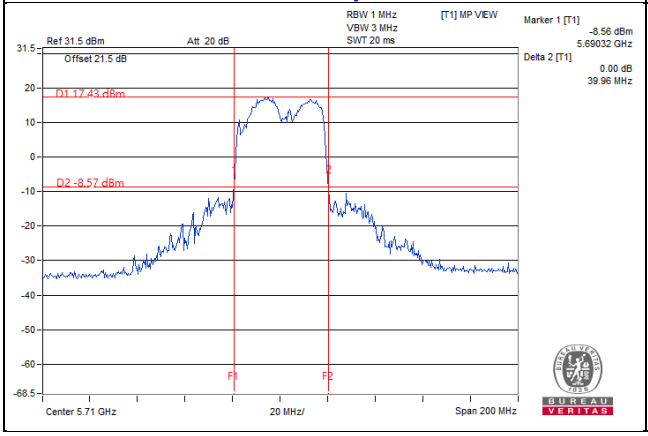
802.11a_Chain 1 / CH144 (U-NII-2C Band)



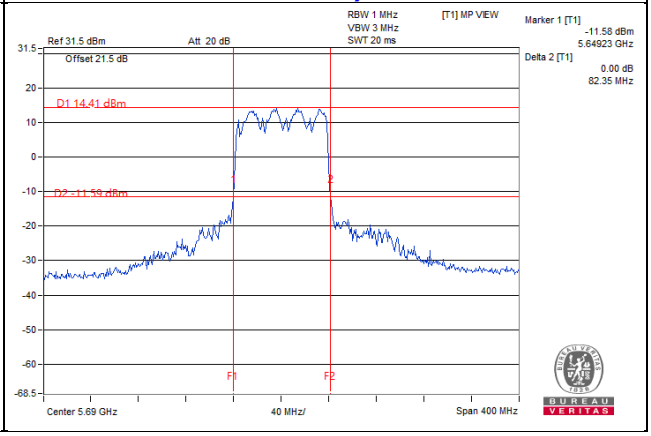
802.11ac (VHT20)_Chain 1 / CH144 (U-NII-2C Band)



802.11ac (VHT40)_Chain 1 / CH142 (U-NII-2C Band)



802.11ac (VHT80)_Chain 1 / CH138 (U-NII-2C Band)

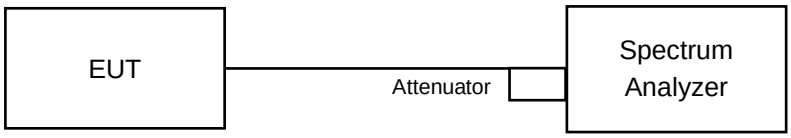


Note:

For CH144 (U-NII-2C) = 5725MHz - Marker 1
For CH142 (U-NII-2C) = 5725MHz - Marker 1
For CH138 (U-NII-2C) = 5725MHz - Marker 1

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)	
		Chain0	Chain1
52	5260	16.44	16.56
60	5300	16.56	16.56
64	5320	16.56	16.56
100	5500	16.44	16.32
116	5580	16.44	16.44
140	5700	16.44	16.44
144 (U-NII-2C Band)	5720	13.28	13.28
144 (U-NII-3 Band)	5720	3.16	3.28

802.11ac (VHT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain0	Chain1
52	5260	17.76	17.64
60	5300	17.76	17.76
64	5320	17.76	17.76
100	5500	17.64	17.64
116	5580	17.52	17.28
140	5700	17.64	17.64
144 (U-NII-2C Band)	5720	13.88	13.88
144 (U-NII-3 Band)	5720	3.76	3.76

802.11ac (VHT40)

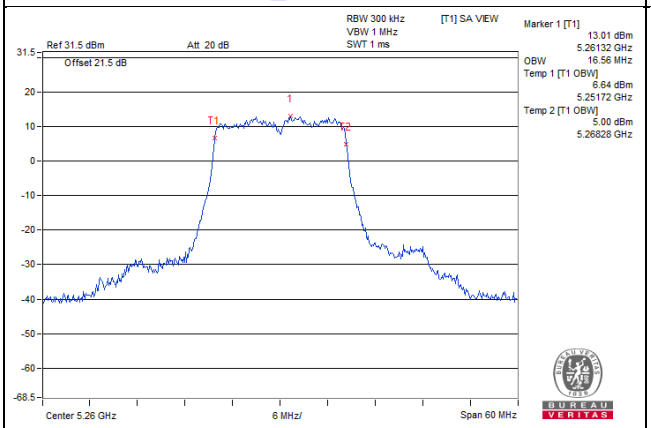
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain0	Chain1
54	5270	36	36
62	5310	36	36
102	5510	36	36.24
110	5550	36.24	36.48
134	5670	36.24	36
142 (U-NII-2C Band)	5710	33.24	32.76
142 (U-NII-2C Band)	5710	3	3.24

802.11ac (VHT80)

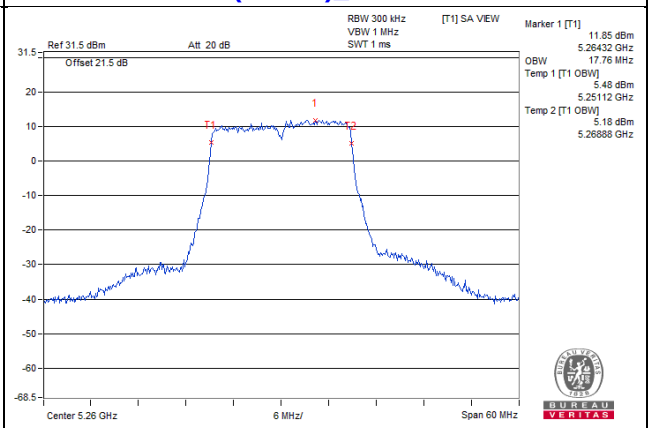
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain0	Chain1
58	5290	75.84	75.84
106	5530	75.84	76.8
122	5610	76.32	75.84
138 (U-NII-2C Band)	5690	72.92	72.44
138 (U-NII-3 Band)	5690	2.92	2.92

Spectrum Plot of Max. Value

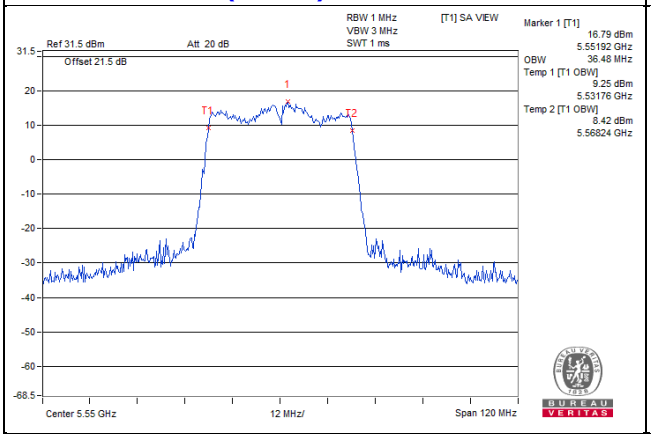
802.11a_Chain 0 / CH52



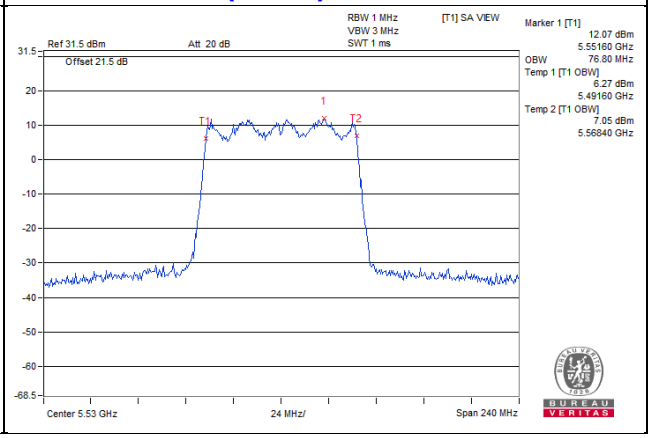
802.11ac (VHT20)_Chain 0 / CH52



802.11ac (VHT40)_Chain 1 / CH110



802.11ac (VHT80)_Chain 1 / CH106

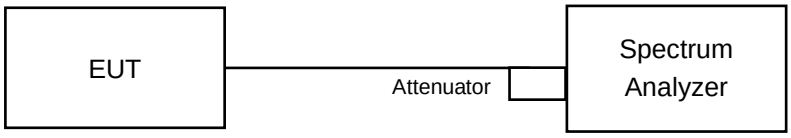


4.5 Peak Power Spectral Density Measurement

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-2A, U-NII-2C band:

For 802.11a, 802.11ac (VHT40), 802.11ac (VHT80)
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 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 U-NII-3 band:

For 802.11a, 802.11ac (VHT40), 802.11ac (VHT80)

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

For 802.11ac (VHT20)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

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
		Chain0	Chain1				
52	5260	7.02	7.49	0.21	10.48	11.00	Pass
60	5300	7.61	7.51	0.21	10.78	11.00	Pass
64	5320	7.55	7.17	0.21	10.58	11.00	Pass
100	5500	8.00	6.73	0.21	10.63	11.00	Pass
116	5580	8.42	6.73	0.21	10.88	11.00	Pass
140	5700	6.97	7.96	0.21	10.71	11.00	Pass
144 (U-NII-2C Band)	5720	7.94	6.77	0.21	10.61	11.00	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. For U-NII-2A: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. For U-NII-2C: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
4. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1			
52	5260	7.89	7.90	10.91	11.00	Pass
60	5300	8.01	7.06	10.57	11.00	Pass
64	5320	7.66	8.16	10.93	11.00	Pass
100	5500	7.63	8.00	10.83	11.00	Pass
116	5580	7.68	7.84	10.77	11.00	Pass
140	5700	6.99	8.59	10.87	11.00	Pass
144 (U-NII-2C Band)	5720	6.93	8.08	10.55	11.00	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. For U-NII-2A: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. For U-NII-2C: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.

802.11ac (VHT40)

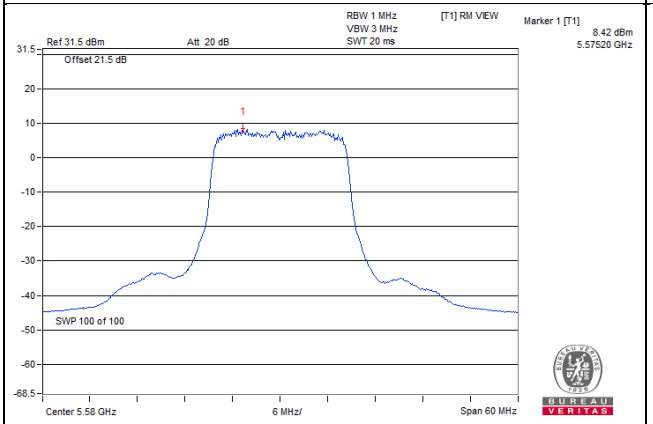
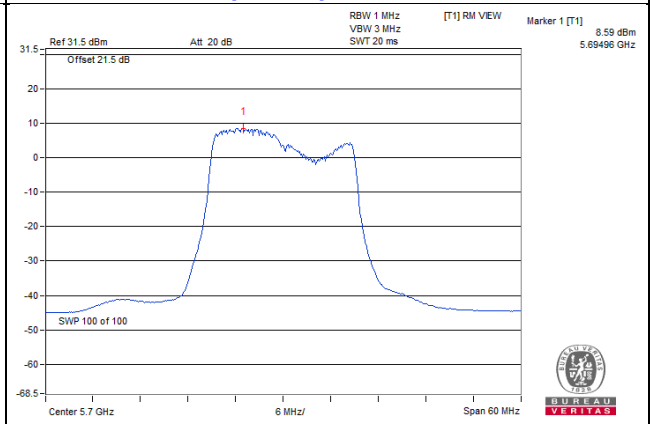
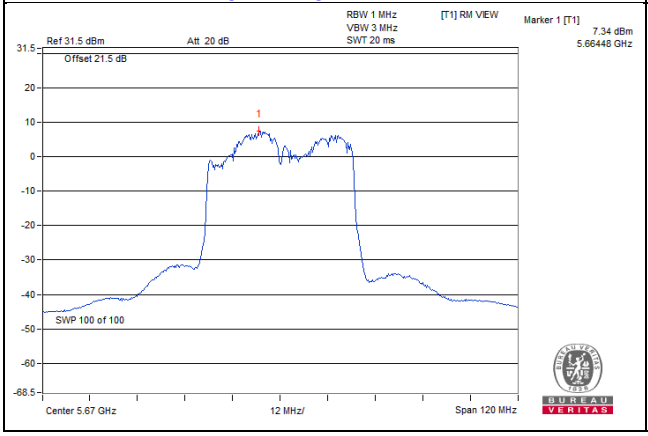
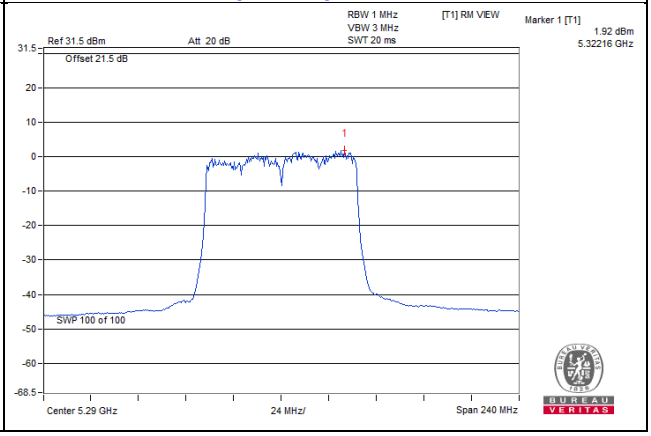
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Pass / Fail
		Chain0	Chain1				
54	5270	5.06	4.94	0.16	8.17	11.00	Pass
62	5310	4.10	5.75	0.16	8.17	11.00	Pass
102	5510	5.11	6.33	0.16	8.93	11.00	Pass
110	5550	5.61	6.47	0.16	9.23	11.00	Pass
134	5670	4.47	7.29	0.16	9.28	11.00	Pass
142 (U-NII-2C Band)	5710	3.88	6.96	0.16	8.86	11.00	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. For U-NII-2A: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. For U-NII-2C: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
4. 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
		Chain0	Chain1				
58	5290	1.84	1.78	0.30	5.12	11.00	Pass
106	5530	0.39	0.26	0.30	3.64	11.00	Pass
122	5610	0.75	1.79	0.30	4.61	11.00	Pass
138 (U-NII-2C Band)	5690	-0.88	2.88	0.30	4.71	11.00	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. For U-NII-2A: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. For U-NII-2C: The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
4. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH116	**802.11ac (VHT20)_Chain 1 / CH140**
	
802.11ac (VHT40)_Chain 1 / CH134	**802.11ac (VHT80)_Chain 0 / CH58**
	

For U-NII-3:

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
		Chain0	Chain1					
144 (U-NII-3 Band)	5720	-0.66	-2.50	0.21	1.74	3.96	30.00	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 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/300kHz)		Total PSD		Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass /Fail
		Chain 0	Chain 1	mW/ 300kHz	dBm/ 300kHz			
144 (U-NII-3 Band)	5720	-1.57	-3.22	1.1722	0.69	2.91	30.00	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 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

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
		Chain0	Chain1					
142 (U-NII-3 Band)	5710	-6.29	-3.77	0.16	-1.68	0.54	30.00	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 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

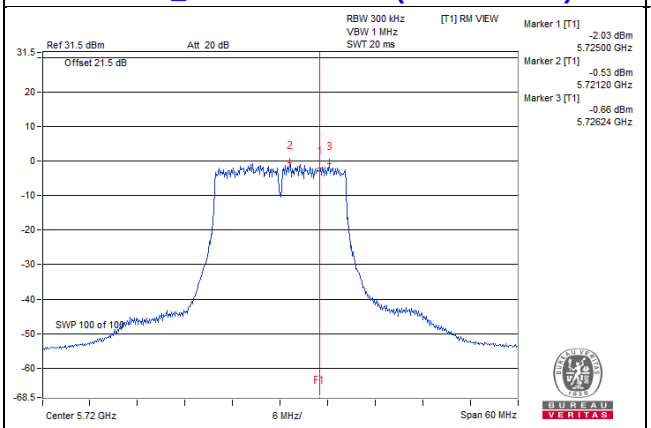
802.11ac (VHT80)

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
		Chain0	Chain1					
138 (U-NII-3 Band)	5690	-10.01	-7.05	0.30	-4.97	-2.75	30.00	Pass

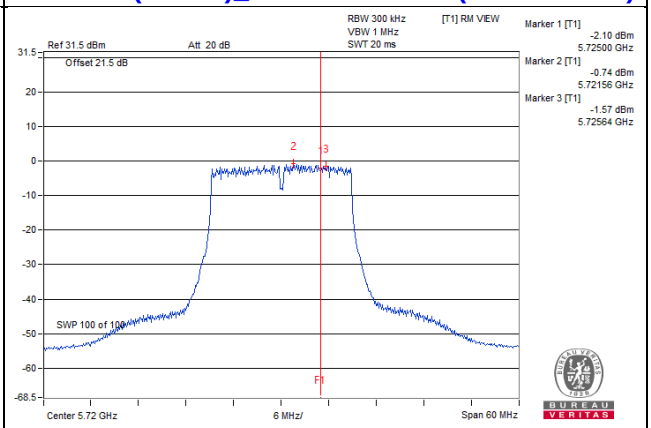
Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. The directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 5.98 dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

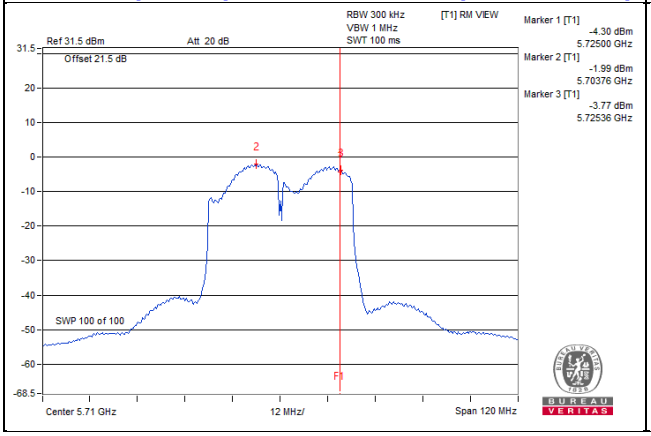
802.11a_Chain 0 / CH144 (U-NII-3 Band)



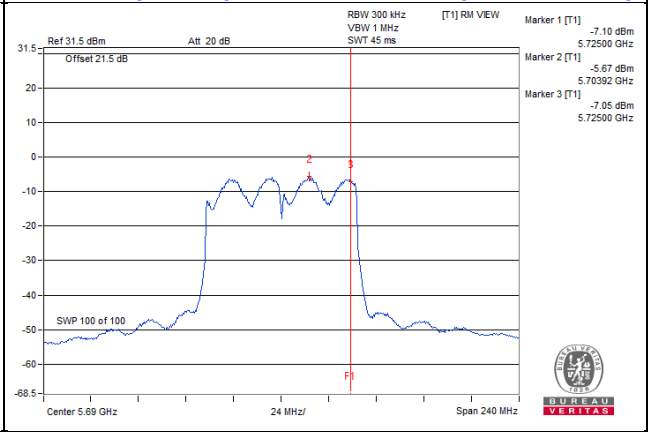
802.11ac (VHT20)_Chain 0 / CH144 (U-NII-3 Band)



802.11ac (VHT40)_Chain 1 / CH142 (U-NII-3 Band)



802.11ac (VHT80)_Chain 1 / CH138 (U-NII-3 Band)

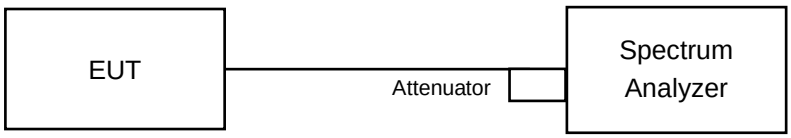


4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

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

MEASUREMENT PROCEDURE REF

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain0	Chain1		
144 (U-NII-3 Band)	5720	3.18	3.19	0.5	Pass

802.11ac (VHT20)

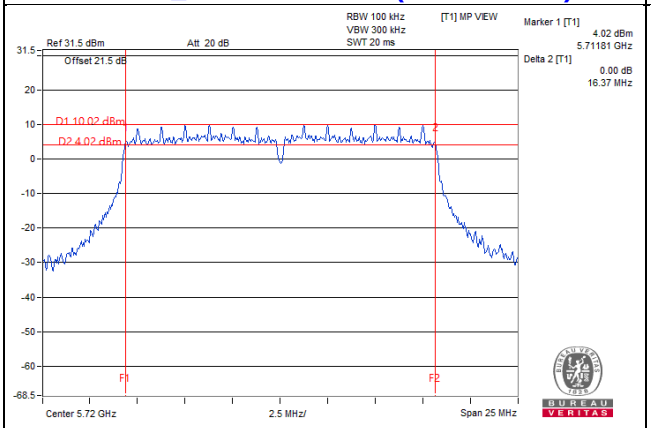
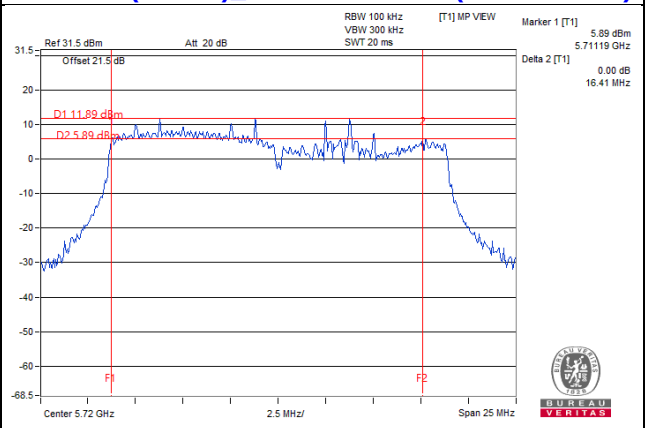
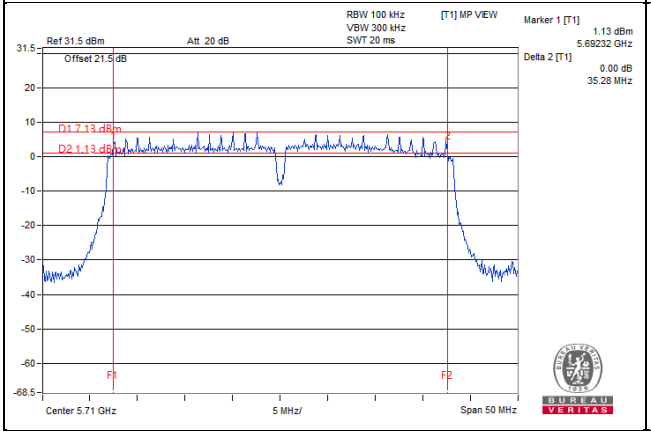
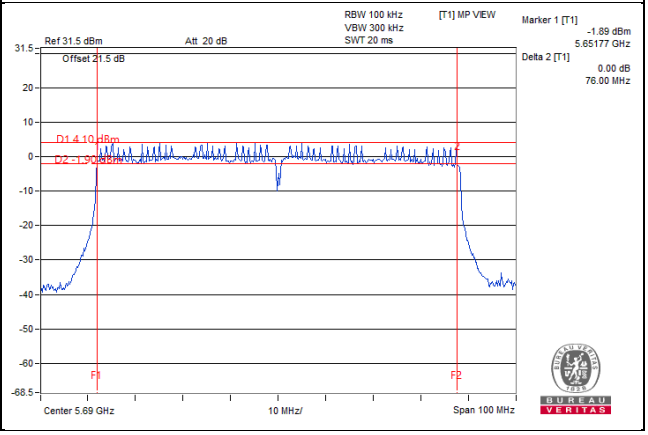
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain0	Chain1		
144 (U-NII-3 Band)	5720	3.81	2.6	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain0	Chain1		
142 (U-NII-3 Band)	5710	2.6	2.64	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain0	Chain1		
138 (U-NII-3 Band)	5690	2.77	2.77	0.5	Pass

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH144 (U-NII-3 Band)	**802.11ac (VHT20)_Chain 1 / CH144 (U-NII-3 Band)**
	
802.11ac (VHT40)_Chain 0 / CH142 (U-NII-3 Band)	**802.11ac (VHT80)_Chain 0 / CH138 (U-NII-3 Band)**
	

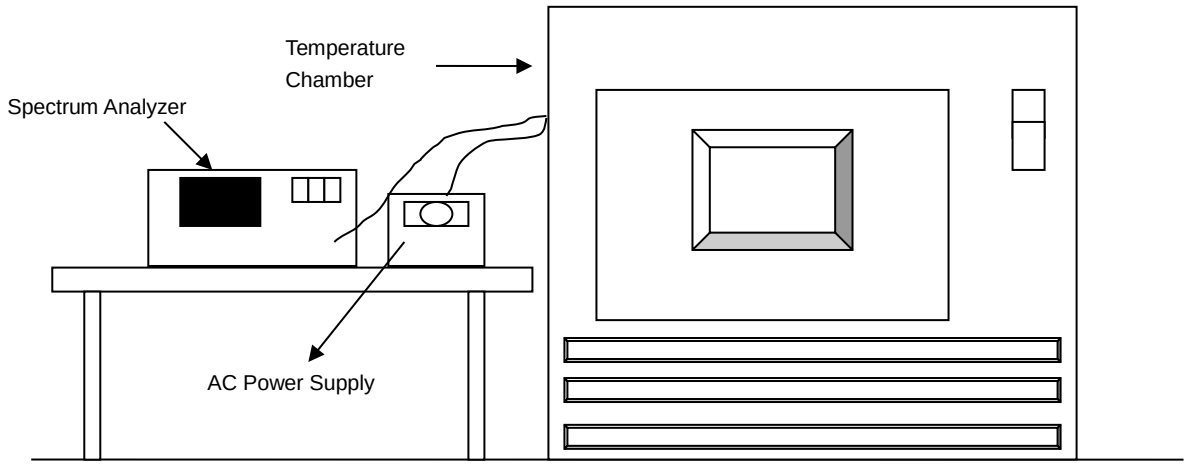
Note: The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

4.7 Frequency Stability Measurement

4.7.1 Limits of Frequency Stability Measurement

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

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

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

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

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

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

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

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5259.9761	Pass	5259.9744	Pass	5259.9762	Pass	5259.9734	Pass
30	120	5259.9849	Pass	5259.9854	Pass	5259.9871	Pass	5259.9878	Pass
20	120	5259.9865	Pass	5259.9861	Pass	5259.9837	Pass	5259.9866	Pass
10	120	5259.9796	Pass	5259.9809	Pass	5259.9783	Pass	5259.9791	Pass
0	120	5260.0012	Pass	5259.9988	Pass	5260.0005	Pass	5259.9996	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5259.9862	Pass	5259.9869	Pass	5259.983	Pass	5259.9856	Pass
	120	5259.9865	Pass	5259.9861	Pass	5259.9837	Pass	5259.9866	Pass
	102	5259.9872	Pass	5259.9866	Pass	5259.9833	Pass	5259.9875	Pass

5 Pictures of Test Arrangements

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

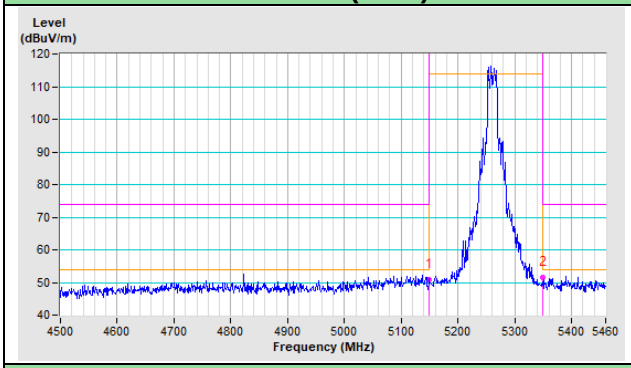
Annex A - Band-Edge Measurement (For U-NII-2A, U-NII-2C band)

CDD Mode

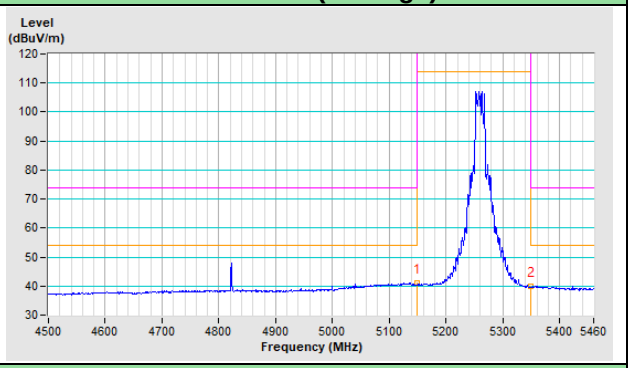
802.11a

Channel 52

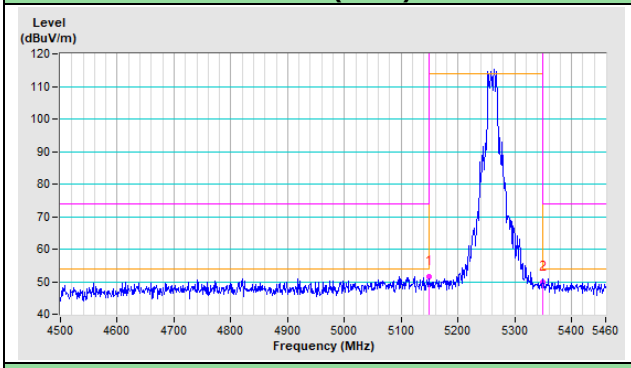
Horizontal (Peak)



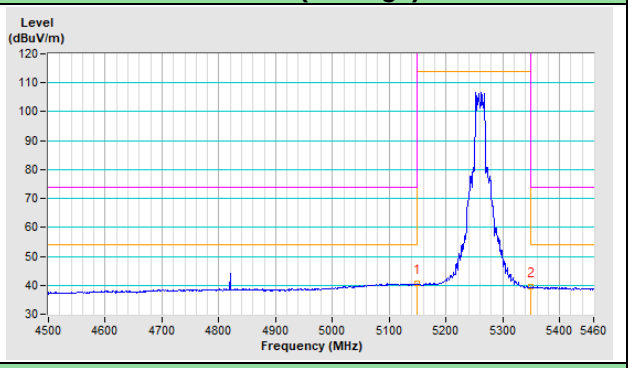
Horizontal (Average)



Vertical (Peak)

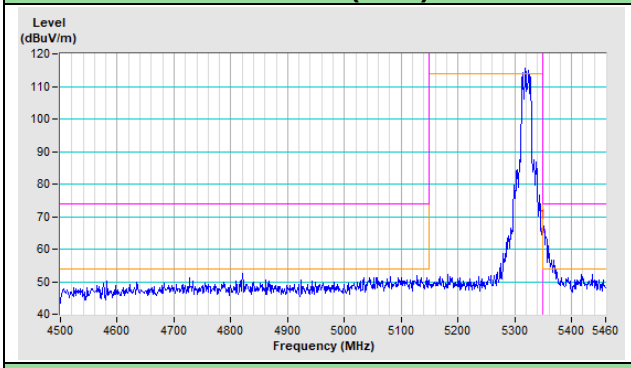


Vertical (Average)

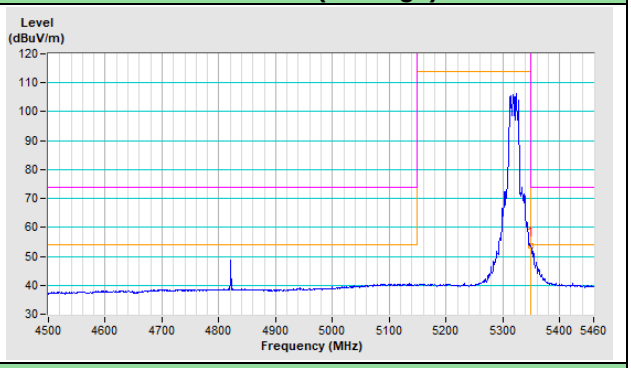


Channel 64

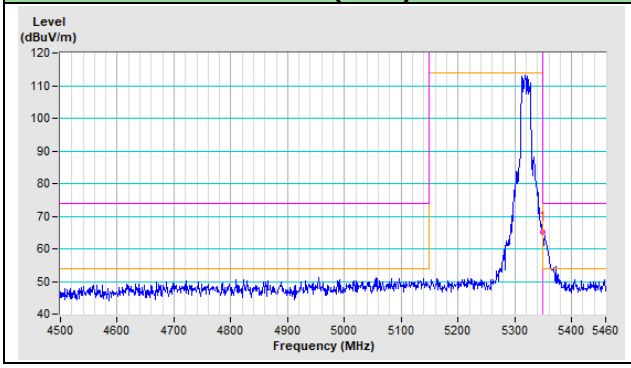
Horizontal (Peak)



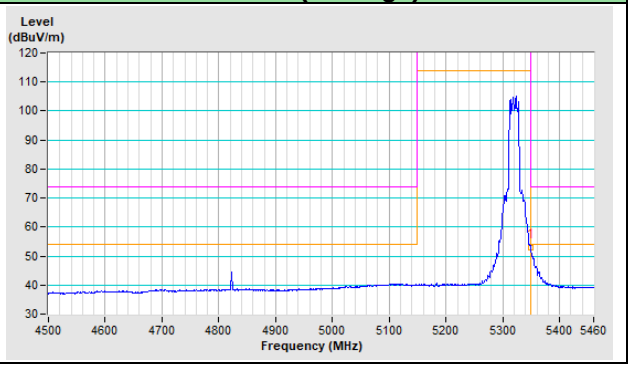
Horizontal (Average)

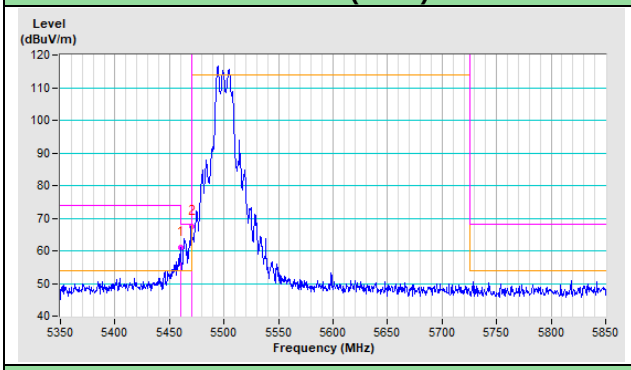
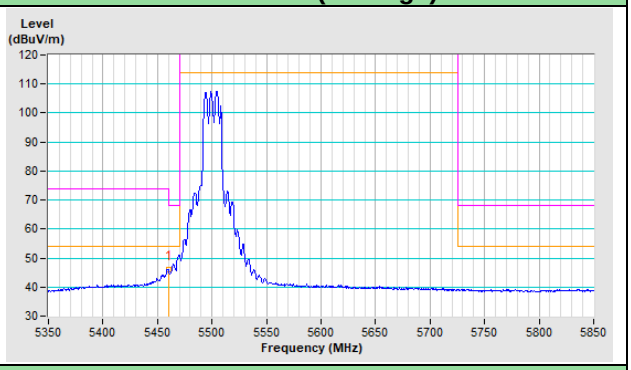
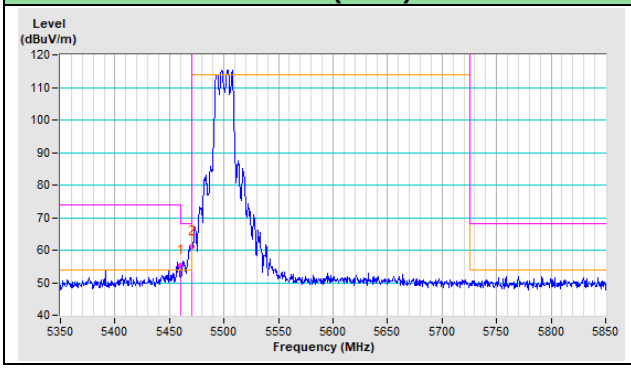
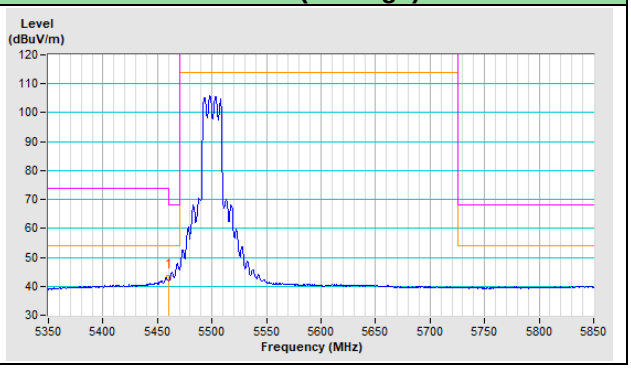


Vertical (Peak)



Vertical (Average)

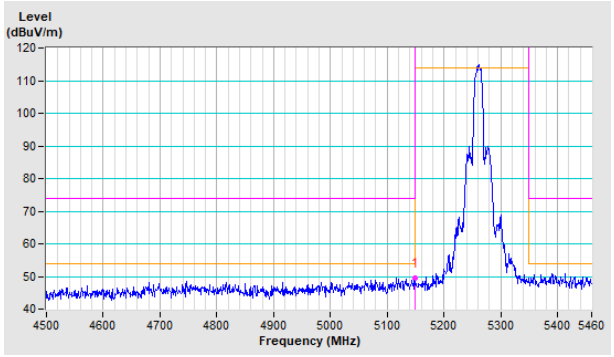


Channel 100	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

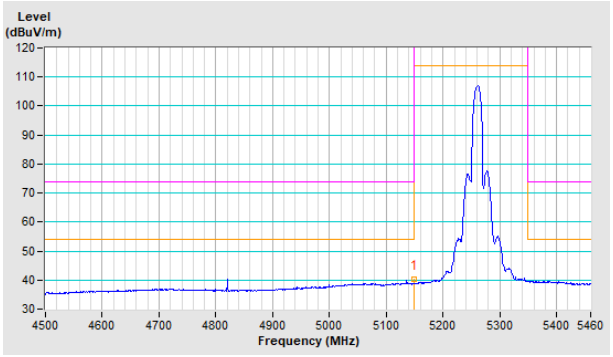
802.11ac (VHT20)

Channel 52

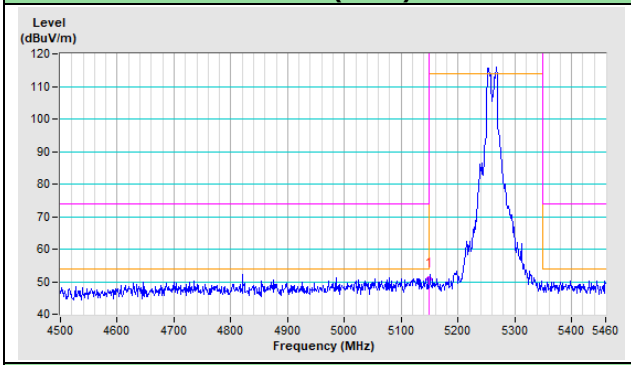
Horizontal (Peak)



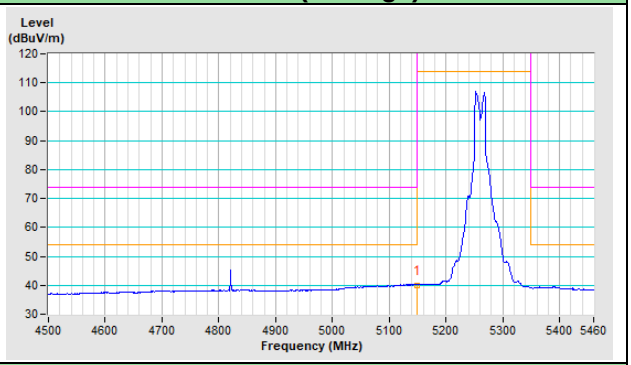
Horizontal (Average)



Vertical (Peak)

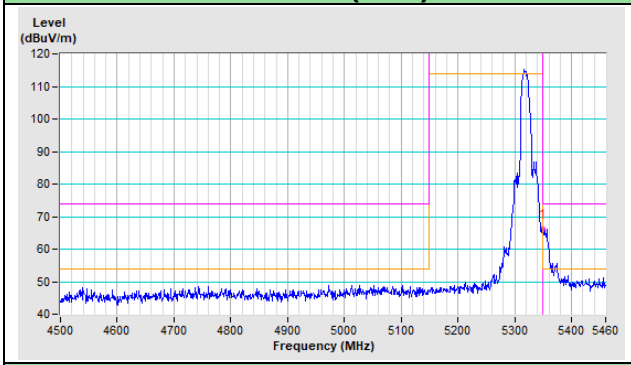


Vertical (Average)

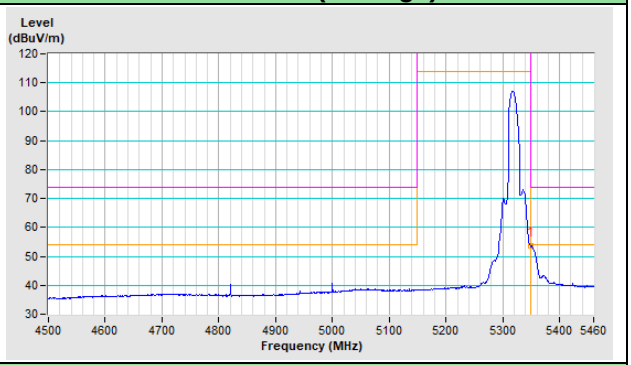


Channel 64

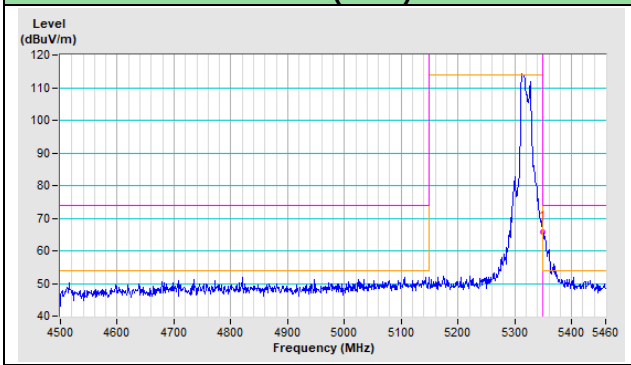
Horizontal (Peak)



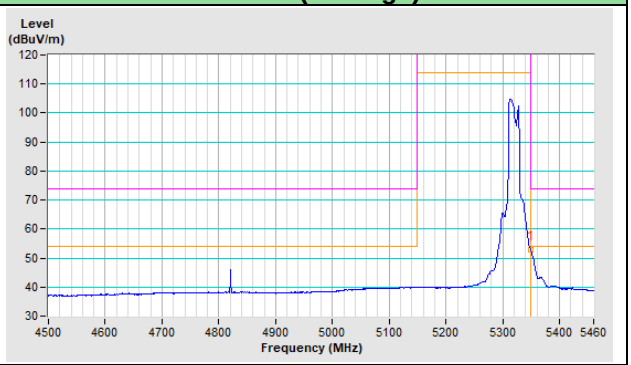
Horizontal (Average)

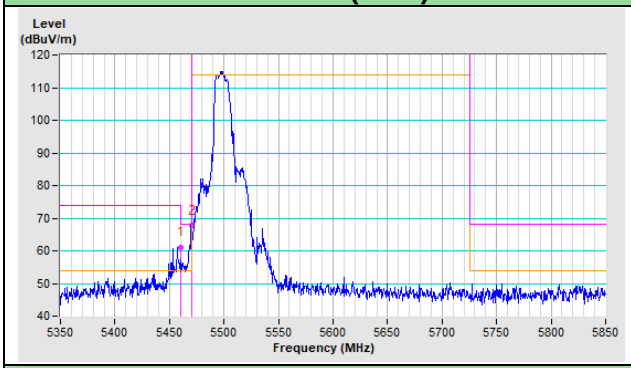
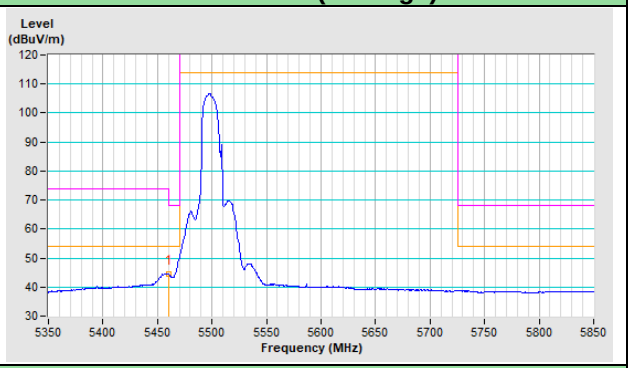
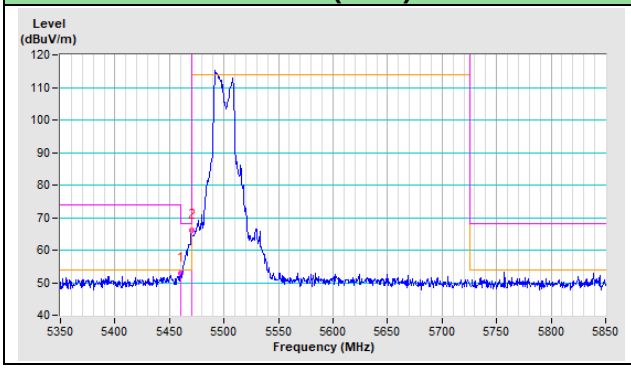
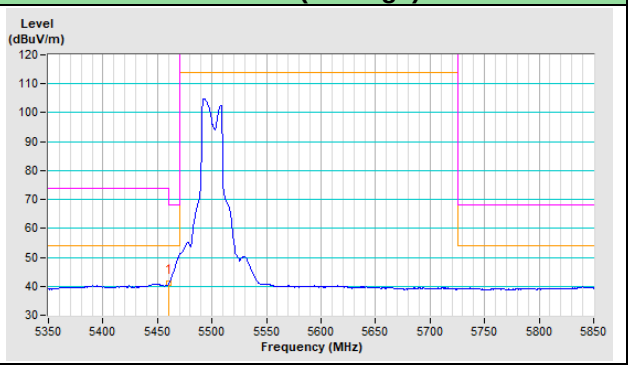


Vertical (Peak)



Vertical (Average)

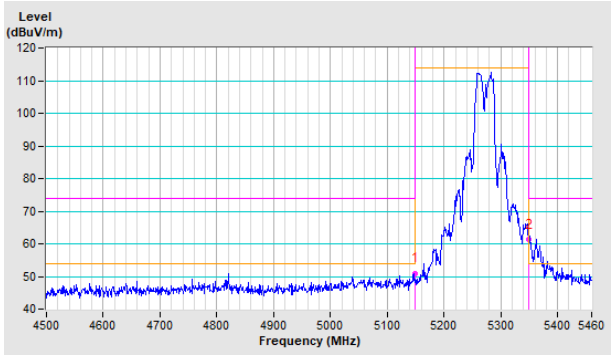


Channel 100	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

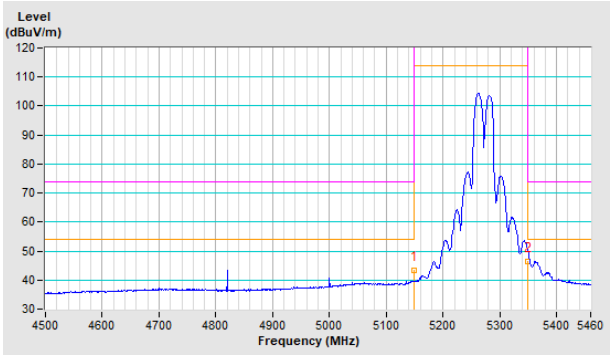
802.11ac (VHT40)

Channel 54

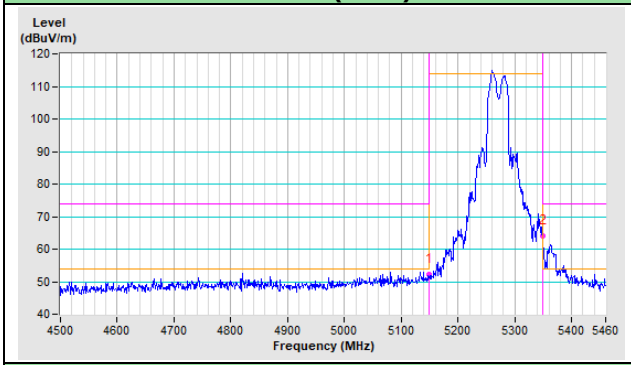
Horizontal (Peak)



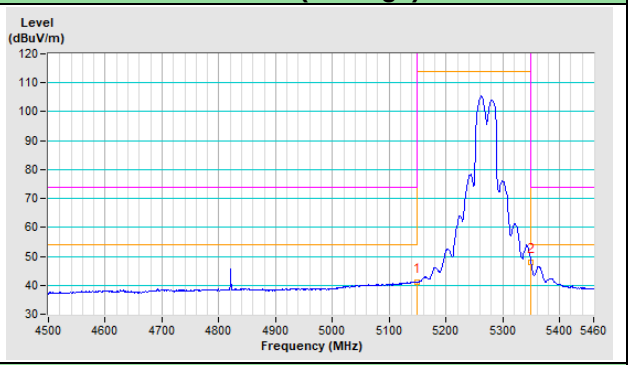
Horizontal (Average)



Vertical (Peak)

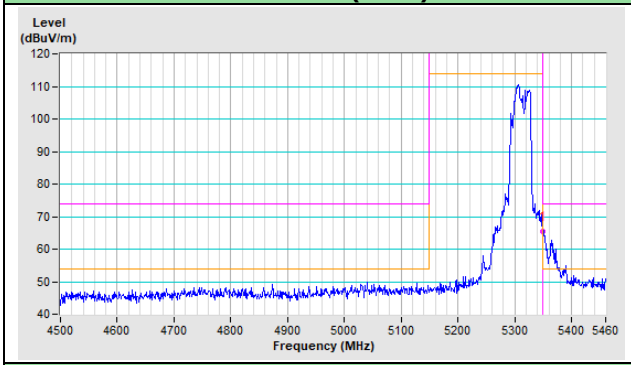


Vertical (Average)

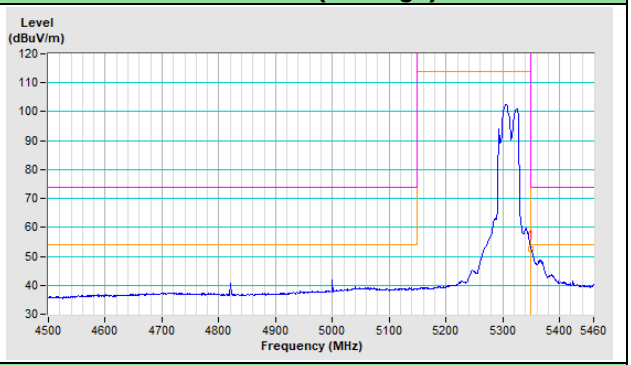


Channel 62

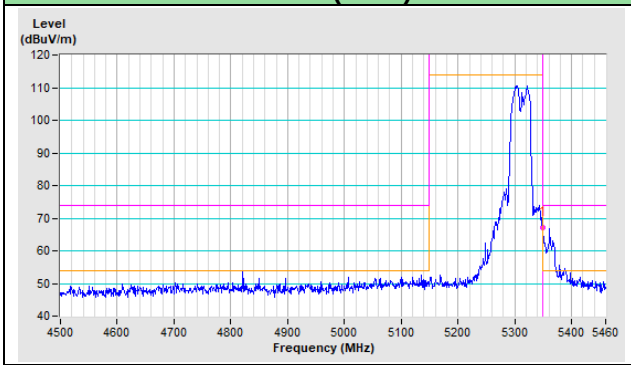
Horizontal (Peak)



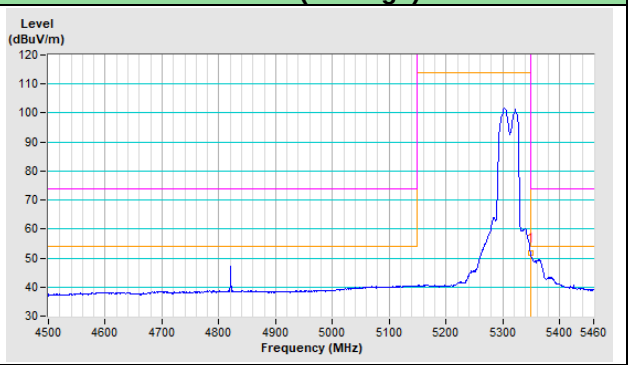
Horizontal (Average)

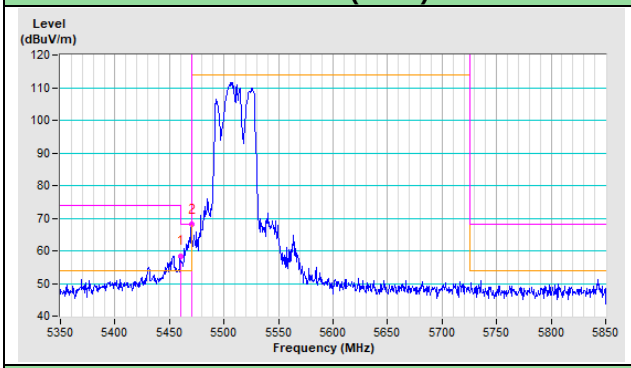
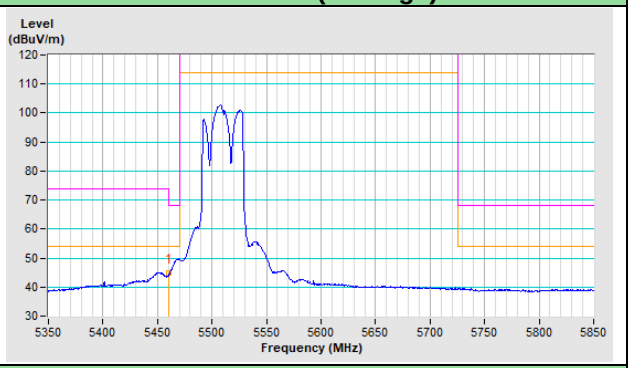
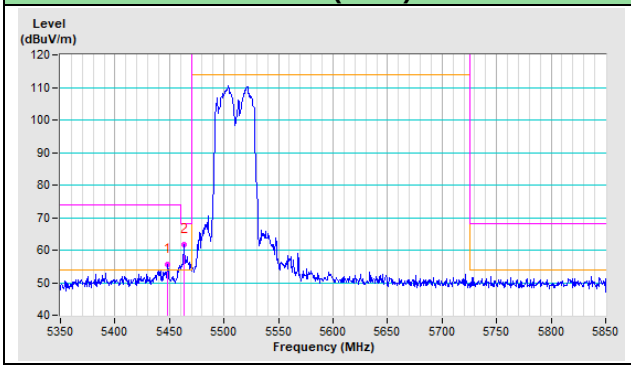
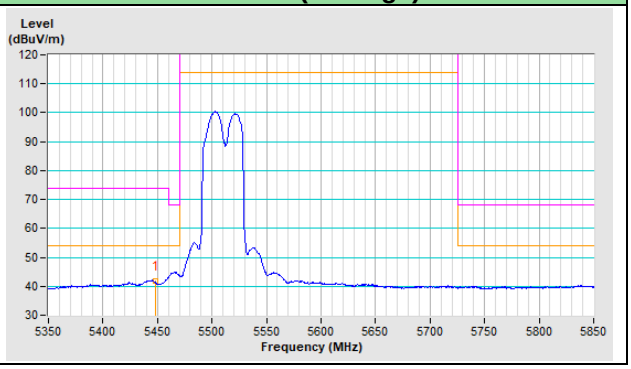


Vertical (Peak)



Vertical (Average)

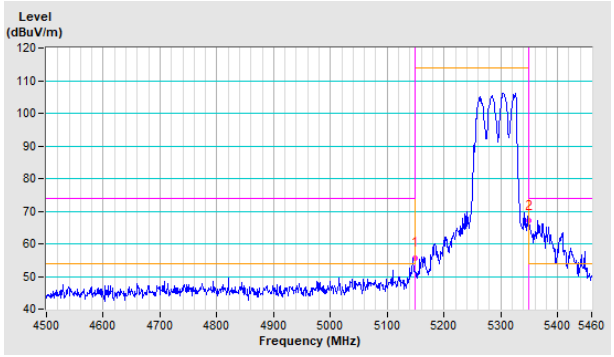


Channel 102	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

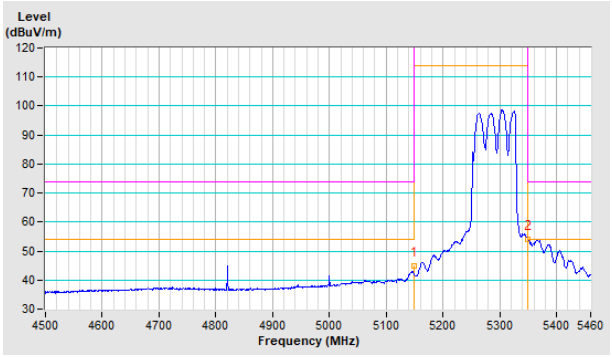
802.11ac (VHT80)

Channel 58

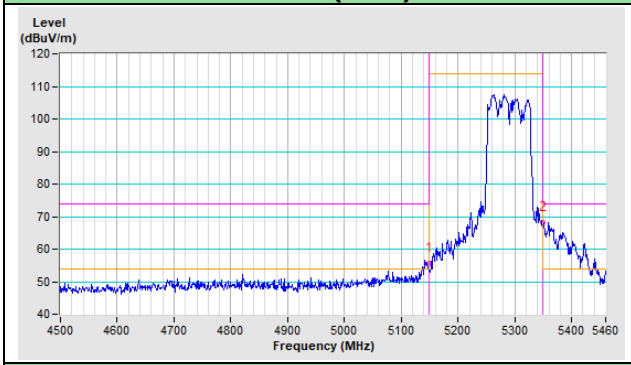
Horizontal (Peak)



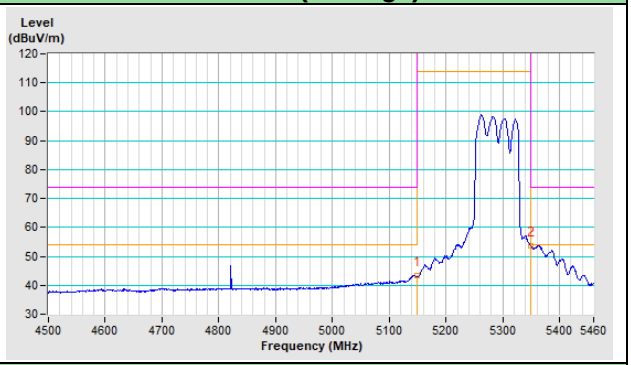
Horizontal (Average)



Vertical (Peak)

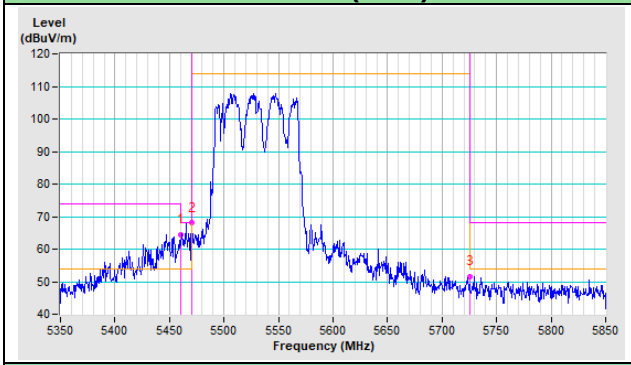


Vertical (Average)

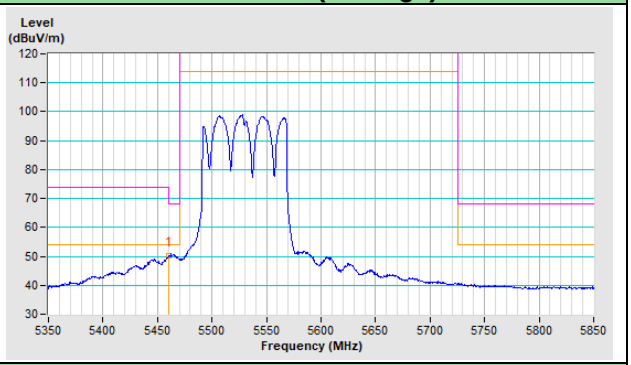


Channel 106

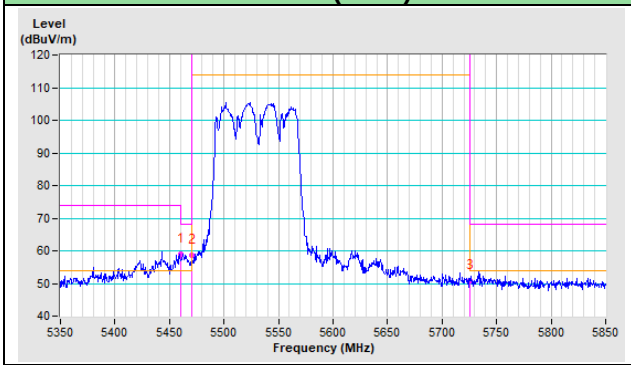
Horizontal (Peak)



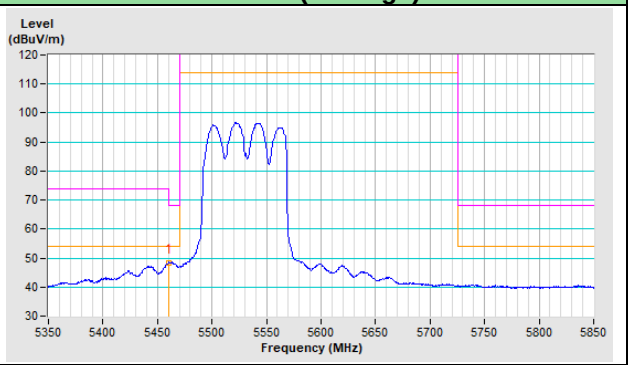
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Appendix – Information of the Testing Laboratories

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

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

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