FCC Test Report (DFS Band)

Report No.:	RF190515E04A-1
FCC ID:	Q87-03448
Test Model:	MX5300
Received Date:	May 15, 2019
Test Date:	June 17 to July 03, 2019
Issued Date:	Apr. 15, 2020
Applicant:	Linksys LLC
Address:	121 Theory Drive, Irvine, CA 92617, 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

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF190515E04A-1	Original release.	Apr. 15, 2020

1 Certificate of Conformity

Product:	Velop
Brand:	Linksys
Test Model:	MX5300
Sample Status:	ENGINEERING SAMPLE
Applicant:	Linksys LLC
Test Date:	June 17 to July 03, 2019
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Phoenix Huang , **Date:** Apr. 15, 2020

Phoenix Huang / Specialist

Approved by : , **Date:** Apr. 15, 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 -9.80dB at 0.15000MHz.
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 -0.2dB at 5350.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(mhf) not a standard connector.

Note:
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	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (DFS Band)

Product	Velop
Brand	Linksys
Test Model	MX5300
Status of EUT	ENGINEERING SAMPLE
Driver Version (FVIN)	1.1.7.198969
Power Supply Rating	12Vdc from power adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps 802.11ax: up to 2401.9Mbps
Operating Frequency	5.26 ~ 5.32GHz, 5.5 ~ 5.72GHz
Number of Channel	**5GHz (U-NII-2A):** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 **5GHz (U-NII-2C):** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 6 802.11ac (VHT80): 3
Output Power	**Non-Beamforming Mode:** **5.26 ~ 5.32GHz:** 249.702mW **5.5 ~ 5.72GHz:** 249.392mW **Beamforming Mode:** **5.26 ~ 5.32GHz:** 249.702mW **5.5 ~ 5.72GHz:** 249.392mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF190515E04-1 as the following:
   - ◆ Add DFS band <5.26 ~ 5.32GHz, 5.5 ~ 5.72GHz>
2. According to above condition, all test items need to be performed. And all data weres verified to meet the requirements.
3. Simultaneously transmission condition.

Condition	Technology				
1	WLAN 2.4GHz	WLAN 5GHz (low band)	WLAN 5GHz (high band)	Bluetooth	Zigbee
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.					

4. The EUT must be supplied power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	Spec.
1	Ktec	KSAS0501200400HU	Input: 100-240Vac, 1.2A, 50/60Hz Output: 12V, 4.0A DC Output cable: Unshielded, 1.6m
2	Frecom	F48L-120400SPAU	Input: 100-240Vac, 1.4A, 50/60Hz Output: 12V, 4.0A DC Output cable: Unshielded, 1.5m
3	APD	WA-48B12FU	Input: 100-240Vac, 1.5A, 50/60Hz Output: 12V, 4.0A DC Output cable: Unshielded, 1.5m
4	APD	DA-48T12	Input: 100-240Vac, 1.4A, 50/60Hz AC Input cable: Unshielded, 1m Output: 12V, 4.0A DC Output cable: Unshielded, 1.5m
Note: From the above adapters, the worst Radiated Emissions was found in **Adapter 2;** the worst Conducted Emission was found in **Adapter 3.** Therefore only the test data of the mode was recorded in this report.			

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

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4~2.4835 (Bluetooth+Zigbee)	1.97	Dipole	i-pex(MHF)
2.4~2.4835 (WLAN)	3.98		
5.15~5.25	5.18		
5.25~5.35	5.98		
5.47~5.725	4.72		
5.725~5.85	5.73		
Note: More detailed information, please refer to operating description.			

6. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz, 80MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

3.2 Description of Test Modes

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

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	
1	√	√	√	√	WALN 5GHz Low band
2	√	√	√	√	WALN 5GHz High band

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.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6Mb/s
802.11ax (HE20)		52 to 64	52, 60, 64	OFDMA	BPSK	MCS0
802.11ax (HE40)		54 to 62	54, 62	OFDMA	BPSK	MCS0
802.11ax (HE80)		58	58	OFDMA	BPSK	MCS0
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0

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.

Non-Beamforming Mode (low band)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE40)	5260-5320	54 to 62	62	OFDMA	BPSK	MCS0
Non-Beamforming Mode (high band)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ac (VHT80)	5500-5720	106 to 138	106	OFDM	BPSK	MCS0

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.

Non-Beamforming Mode (low band)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE40)	5260-5320	54 to 62	62	OFDMA	BPSK	MCS0
Non-Beamforming Mode (high band)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ac (VHT80)	5500-5720	106 to 138	106	OFDM	BPSK	MCS0

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.

Non-Beamforming Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6Mb/s
802.11ac (VHT20) (Output power only)		52 to 64	52, 60, 64	OFDM	BPSK	MCS0
802.11ac (VHT40) (Output power only)		54 to 62	54, 62	OFDM	BPSK	MCS0
802.11ac (VHT80) (Output power only)		58	58	OFDM	BPSK	MCS0
802.11ax (HE20)		52 to 64	52, 60, 64	OFDMA	BPSK	MCS0
802.11ax (HE40)		54 to 62	54, 62	OFDMA	BPSK	MCS0
802.11ax (HE80)		58	58	OFDMA	BPSK	MCS0
802.11a	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	6Mb/s
802.11ac (VHT20)		100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0
Beamforming Mode (output power only)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ac (VHT20)	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	MCS0
802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	MCS0
802.11ac (VHT80)		58	58	OFDM	BPSK	MCS0
802.11ax (HE20)		52 to 64	52, 60, 64	OFDMA	BPSK	MCS0
802.11ax (HE40)		54 to 62	54, 62	OFDMA	BPSK	MCS0
802.11ax (HE80)		58	58	OFDMA	BPSK	MCS0
802.11ac (VHT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	BPSK	MCS0
802.11ac (VHT40)		102 to 142	102, 110, 134, 142	OFDM	BPSK	MCS0
802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	21deg. C, 67%RH	120Vac, 60Hz	Robert Cheng
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

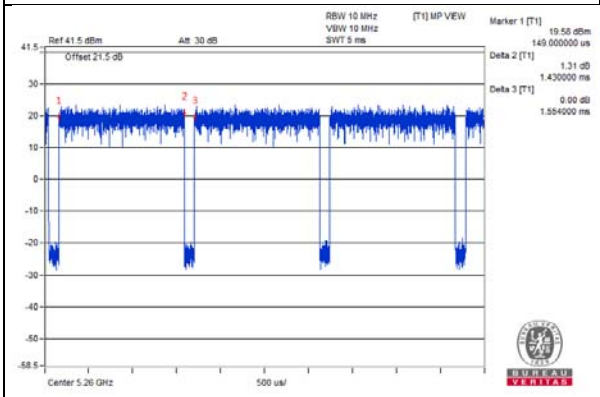
3.3 Duty Cycle of Test Signal

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.

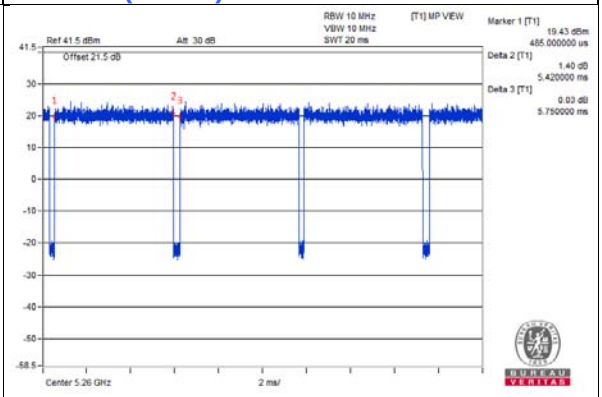
For low band:

802.11a: Duty cycle = 1.43 ms/1.554 ms = 0.92, Duty factor = 10 * log (1/Duty cycle) = 0.36
802.11ac (VHT20): Duty cycle = 5.42 ms/5.75 ms = 0.943, Duty factor = 10 * log (1/Duty cycle) = 0.26
802.11ac (VHT40): Duty cycle = 5.427 ms/5.662 ms = 0.958, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11ac (VHT80): Duty cycle = 5.426 ms/5.666 ms = 0.958, Duty factor = 10 * log (1/Duty cycle) = 0.19
802.11ax (HE20): Duty cycle = 5.443 ms/5.73 ms = 0.95, Duty factor = 10 * log (1/Duty cycle) = 0.22
802.11ax (HE40): Duty cycle = 5.438 ms/5.665 ms = 0.96, Duty factor = 10 * log (1/Duty cycle) = 0.18
802.11ax (HE80): Duty cycle = 5.443 ms/5.733 ms = 0.949, Duty factor = 10 * log (1/Duty cycle) = 0.23

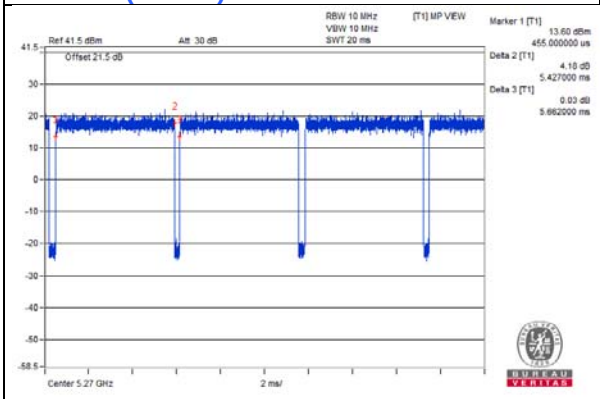
802.11a



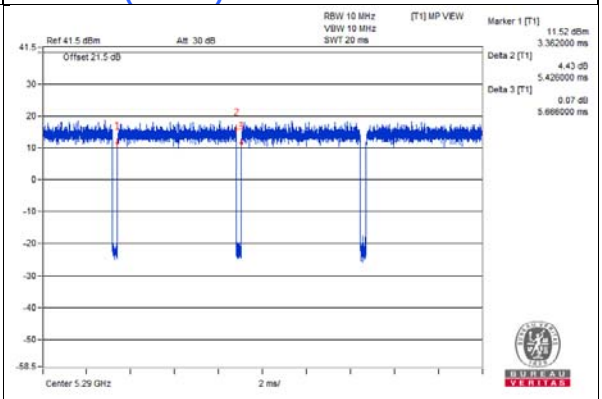
802.11ac (VHT20)



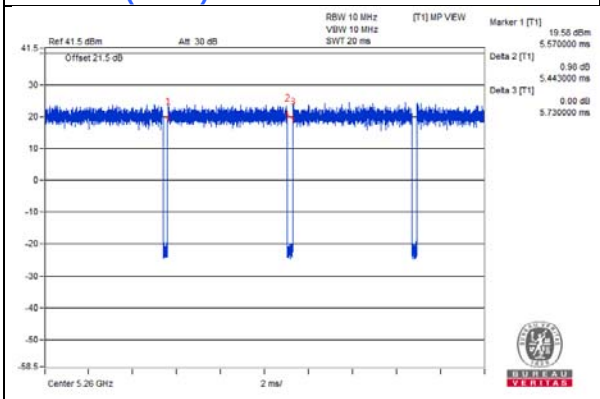
802.11ac (VHT40)



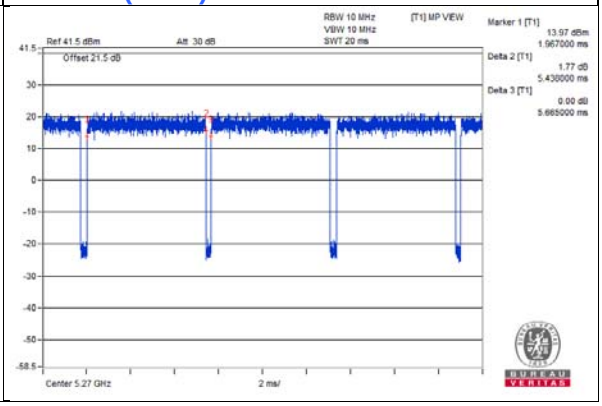
802.11ac (VHT80)



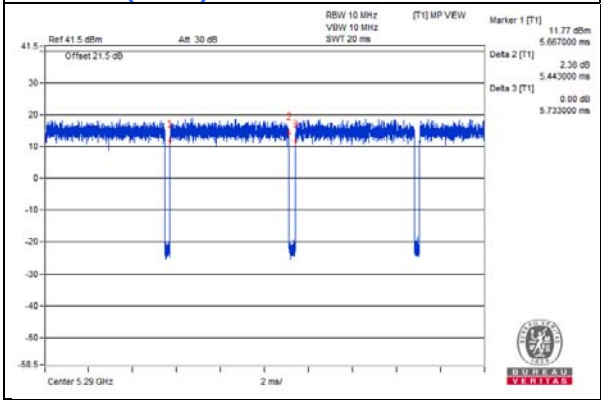
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



For high band:

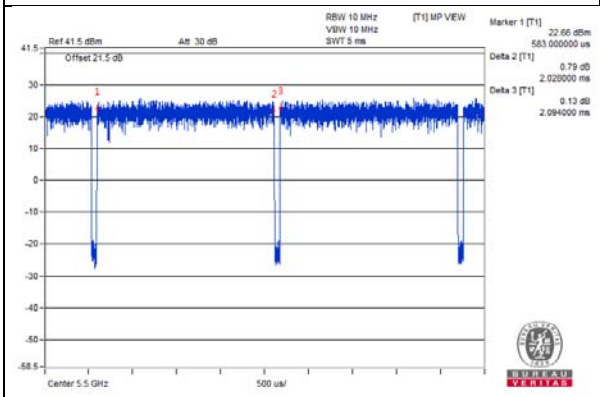
802.11a: Duty cycle = 2.028 ms/2.094 ms = 0.968, Duty factor = 10 * log (1/Duty cycle) = 0.14

802.11ac (VHT20): Duty cycle = 4.965 ms/5.055 ms = 0.982

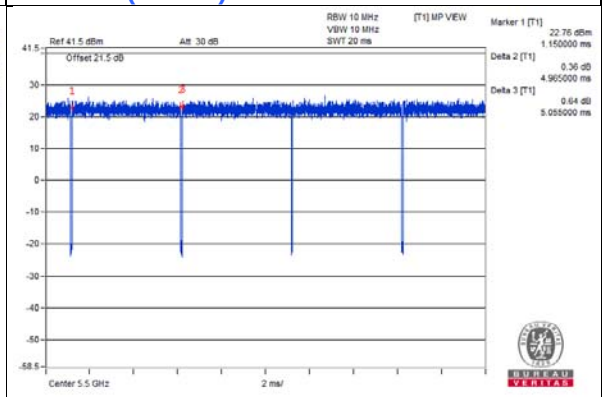
802.11ac (VHT40): Duty cycle = 2.415 ms/2.481 ms = 0.973, Duty factor = 10 * log (1/Duty cycle) = 0.12

802.11ac (VHT80): Duty cycle = 1.134 ms/1.202 ms = 0.943, Duty factor = 10 * log (1/Duty cycle) = 0.25

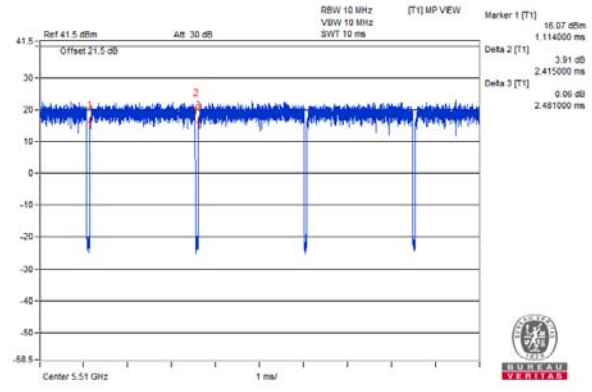
802.11a



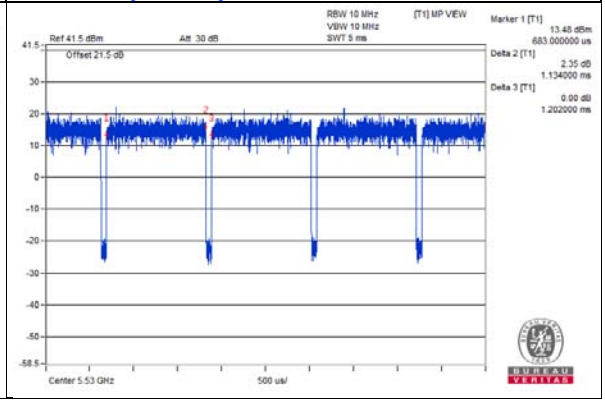
802.11ac (VHT20)



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.

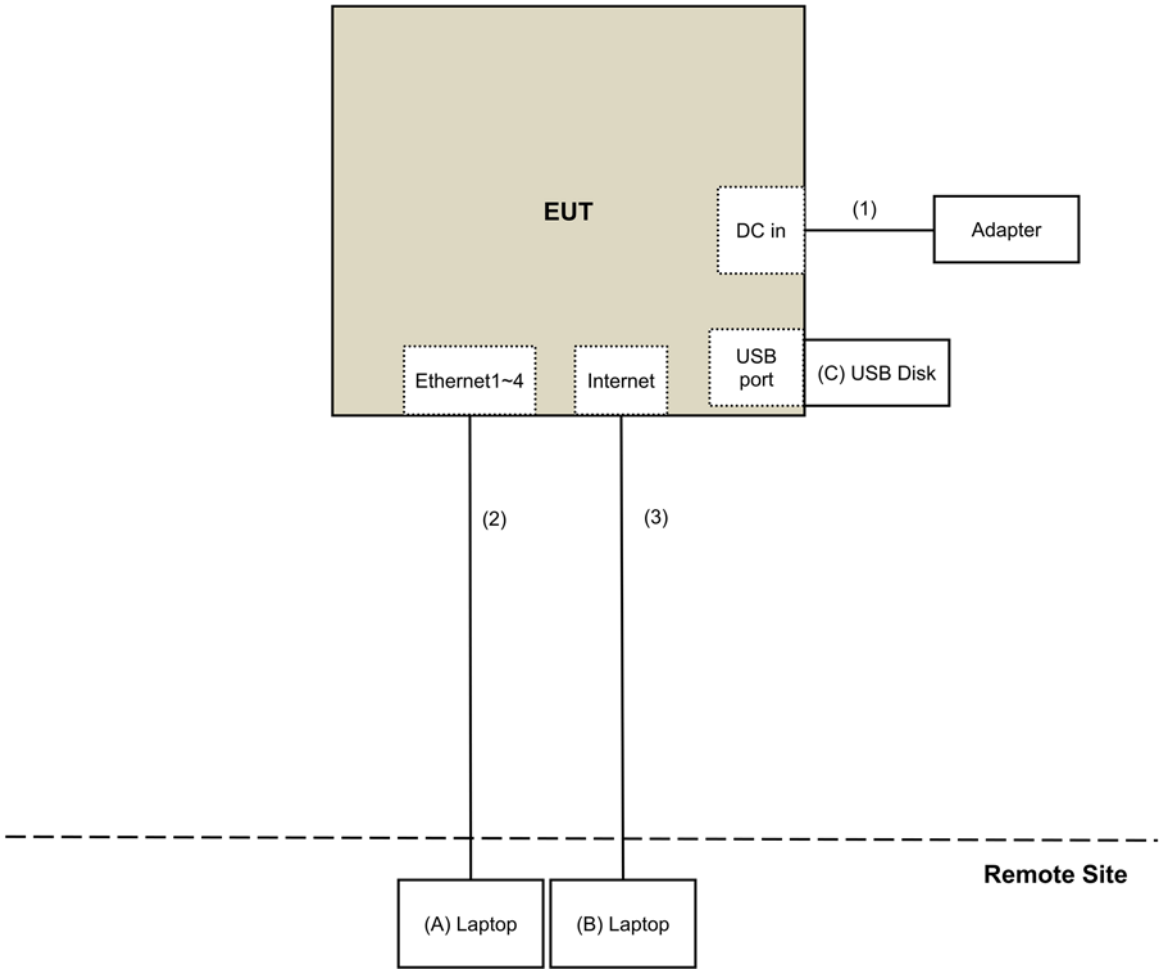
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B.	Laptop	Lenovo	81A4	YD02YN2A	PD93165NGU	Provided by Lab
C.	USB Disk	SanDisk	Ultra Flair USB 3.0(32GB)	NA	NA	Provided by Lab

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.	DC Cable	1.5	10	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

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

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

References Test Guidance:
KDB 789033 D02 General UNII Test 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
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: June 27 to July 03, 2019

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:

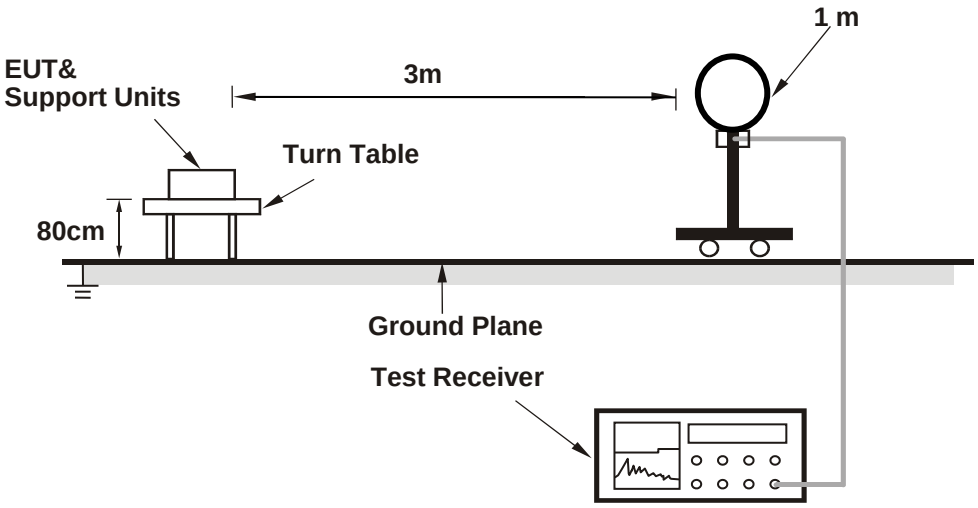
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

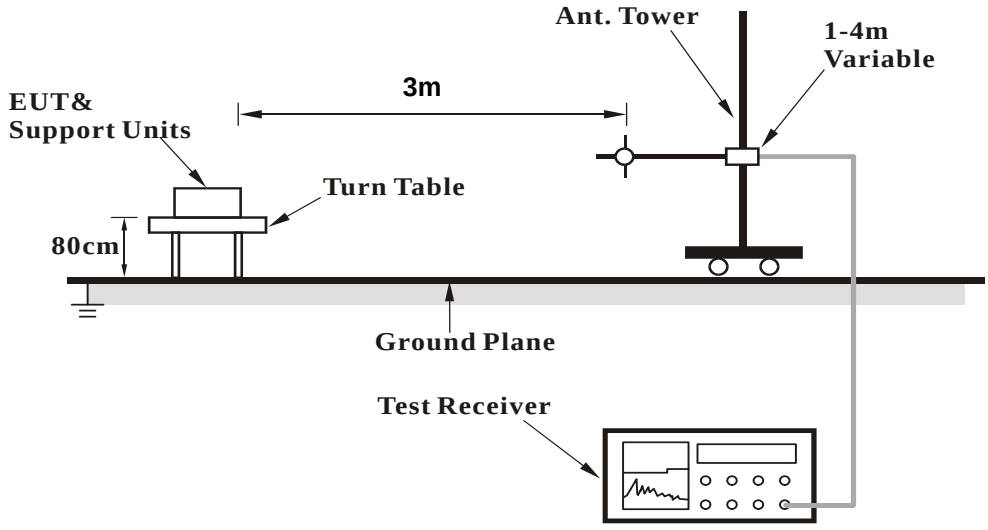
No deviation.

4.1.5 Test Setup

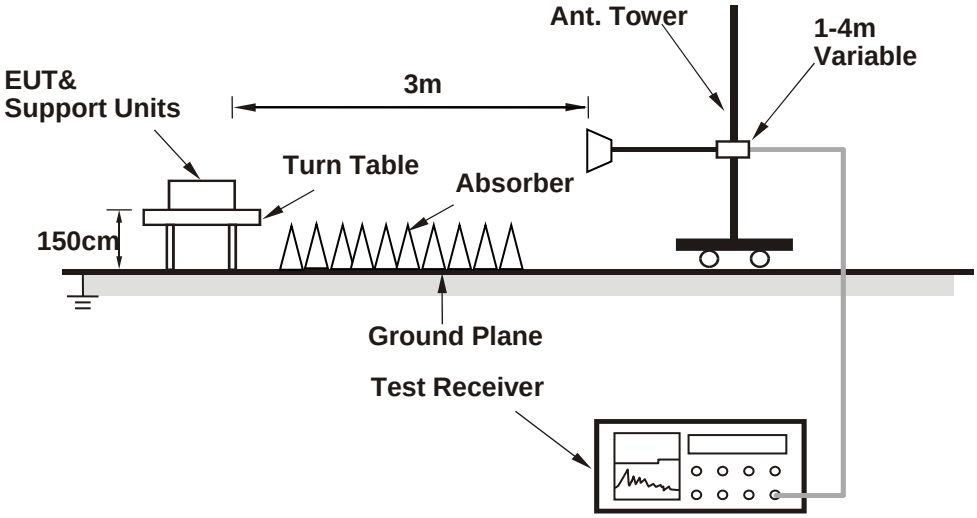
For Radiated emission below 30MHz



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 (QSPR (5.0-00160) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

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.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.5 PK	74.0	-23.5	2.07 H	308	47.2	3.3
2	5150.00	39.1 AV	54.0	-14.9	2.07 H	308	35.8	3.3
3	*5260.00	115.2 PK			2.07 H	308	112.5	2.7
4	*5260.00	106.0 AV			2.07 H	308	103.3	2.7
5	#10520.00	48.7 PK	68.2	-19.5	1.90 H	278	36.1	12.6
6	15780.00	47.0 PK	74.0	-27.0	1.75 H	360	35.0	12.0
7	15780.00	34.6 AV	54.0	-19.4	1.75 H	360	22.6	12.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.8 PK	74.0	-23.2	1.35 V	309	47.5	3.3
2	5150.00	39.5 AV	54.0	-14.5	1.35 V	309	36.2	3.3
3	*5260.00	115.9 PK			1.35 V	309	113.2	2.7
4	*5260.00	106.4 AV			1.35 V	309	103.7	2.7
5	#10520.00	45.1 PK	68.2	-23.1	3.90 V	178	32.5	12.6
6	15780.00	47.8 PK	74.0	-26.2	1.78 V	180	35.8	12.0
7	15780.00	34.1 AV	54.0	-19.9	1.78 V	180	22.1	12.0

REMARKS:

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

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	115.4 PK			2.05 H	314	112.6	2.8
2	*5300.00	106.1 AV			2.05 H	314	103.3	2.8
3	10600.00	48.7 PK	74.0	-25.3	1.84 H	278	36.2	12.5
4	10600.00	34.9 AV	54.0	-19.1	1.84 H	278	22.4	12.5
5	15900.00	46.9 PK	74.0	-27.1	1.73 H	339	34.6	12.3
6	15900.00	33.7 AV	54.0	-20.3	1.73 H	339	21.4	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	116.3 PK			1.40 V	293	113.5	2.8
2	*5300.00	106.8 AV			1.40 V	293	104.0	2.8
3	10600.00	44.7 PK	74.0	-29.3	3.90 V	201	32.2	12.5
4	10600.00	31.0 AV	54.0	-23.0	3.90 V	201	18.5	12.5
5	15900.00	48.0 PK	74.0	-26.0	1.85 V	191	35.7	12.3
6	15900.00	34.2 AV	54.0	-19.8	1.85 V	191	21.9	12.3

REMARKS:

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

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	115.2 PK			2.10 H	321	112.4	2.8
2	*5320.00	105.8 AV			2.10 H	321	103.0	2.8
3	5350.00	63.6 PK	74.0	-10.4	2.10 H	321	60.6	3.0
4	5350.00	48.1 AV	54.0	-5.9	2.10 H	321	45.1	3.0
5	10640.00	49.1 PK	74.0	-24.9	1.83 H	256	36.6	12.5
6	10640.00	35.1 AV	54.0	-18.9	1.83 H	256	22.6	12.5
7	15960.00	46.5 PK	74.0	-27.5	1.77 H	359	33.8	12.7
8	15960.00	33.1 AV	54.0	-20.9	1.77 H	359	20.4	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	116.2 PK			1.37 V	295	113.4	2.8
2	*5320.00	106.6 AV			1.37 V	295	103.8	2.8
3	5350.00	61.3 PK	74.0	-12.7	1.37 V	295	58.3	3.0
4	5350.00	46.2 AV	54.0	-7.8	1.37 V	295	43.2	3.0
5	10640.00	44.8 PK	74.0	-29.2	3.90 V	192	32.3	12.5
6	10640.00	30.8 AV	54.0	-23.2	3.90 V	192	18.3	12.5
7	15960.00	47.6 PK	74.0	-26.4	1.82 V	190	34.9	12.7
8	15960.00	33.9 AV	54.0	-20.1	1.82 V	190	21.2	12.7

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.

802.11ax (HE20)

CHANNEL	TX Channel 52	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.6 PK	74.0	-23.4	2.05 H	302	47.3	3.3
2	5150.00	38.9 AV	54.0	-15.1	2.05 H	302	35.6	3.3
3	*5260.00	114.9 PK			2.05 H	302	112.2	2.7
4	*5260.00	105.7 AV			2.05 H	302	103.0	2.7
5	#10520.00	48.7 PK	68.2	-19.5	1.97 H	254	36.1	12.6
6	15780.00	47.8 PK	74.0	-26.2	1.82 H	357	35.8	12.0
7	15780.00	35.3 AV	54.0	-18.7	1.82 H	357	23.3	12.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	50.7 PK	74.0	-23.3	1.49 V	296	47.4	3.3
2	5150.00	39.1 AV	54.0	-14.9	1.49 V	296	35.8	3.3
3	*5260.00	116.1 PK			1.49 V	296	113.4	2.7
4	*5260.00	106.7 AV			1.49 V	296	104.0	2.7
5	#10520.00	45.2 PK	68.2	-23.0	3.92 V	190	32.6	12.6
6	15780.00	48.1 PK	74.0	-25.9	1.80 V	203	36.1	12.0
7	15780.00	34.3 AV	54.0	-19.7	1.80 V	203	22.3	12.0

REMARKS:

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

CHANNEL	TX Channel 60	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	115.7 PK			2.09 H	316	112.9	2.8
2	*5300.00	106.4 AV			2.09 H	316	103.6	2.8
3	10600.00	49.2 PK	74.0	-24.8	1.84 H	254	36.7	12.5
4	10600.00	35.2 AV	54.0	-18.8	1.84 H	254	22.7	12.5
5	15900.00	47.4 PK	74.0	-26.6	1.78 H	344	35.1	12.3
6	15900.00	33.9 AV	54.0	-20.1	1.78 H	344	21.6	12.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5300.00	117.0 PK			1.47 V	299	114.2	2.8
2	*5300.00	107.2 AV			1.47 V	299	104.4	2.8
3	10600.00	45.7 PK	74.0	-28.3	3.87 V	175	33.2	12.5
4	10600.00	31.4 AV	54.0	-22.6	3.87 V	175	18.9	12.5
5	15900.00	47.6 PK	74.0	-26.4	1.85 V	174	35.3	12.3
6	15900.00	34.1 AV	54.0	-19.9	1.85 V	174	21.8	12.3

REMARKS:

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

CHANNEL	TX Channel 64	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	115.1 PK			2.11 H	309	112.3	2.8
2	*5320.00	105.8 AV			2.11 H	309	103.0	2.8
3	5350.00	63.6 PK	74.0	-10.4	2.11 H	309	60.6	3.0
4	5350.00	47.8 AV	54.0	-6.2	2.11 H	309	44.8	3.0
5	10640.00	48.8 PK	74.0	-25.2	1.88 H	271	36.3	12.5
6	10640.00	35.0 AV	54.0	-19.0	1.88 H	271	22.5	12.5
7	15960.00	46.8 PK	74.0	-27.2	1.70 H	360	34.1	12.7
8	15960.00	33.1 AV	54.0	-20.9	1.70 H	360	20.4	12.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5320.00	116.3 PK			1.49 V	305	113.5	2.8
2	*5320.00	106.9 AV			1.49 V	305	104.1	2.8
3	5350.00	59.8 PK	74.0	-14.2	1.49 V	305	56.8	3.0
4	5350.00	43.3 AV	54.0	-10.7	1.49 V	305	40.3	3.0
5	10640.00	45.9 PK	74.0	-28.1	3.90 V	181	33.4	12.5
6	10640.00	31.7 AV	54.0	-22.3	3.90 V	181	19.2	12.5
7	15960.00	48.1 PK	74.0	-25.9	1.92 V	195	35.4	12.7
8	15960.00	34.2 AV	54.0	-19.8	1.92 V	195	21.5	12.7

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.

802.11ax (HE40)

CHANNEL	TX Channel 54	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.1 PK	74.0	-20.9	1.74 H	328	49.8	3.3
2	5150.00	39.6 AV	54.0	-14.4	1.74 H	328	36.3	3.3
3	*5270.00	114.9 PK			1.74 H	328	112.2	2.7
4	*5270.00	102.1 AV			1.74 H	328	99.4	2.7
5	5350.00	57.3 PK	74.0	-16.7	1.74 H	328	54.3	3.0
6	5350.00	47.6 AV	54.0	-6.4	1.74 H	328	44.6	3.0
7	#10540.00	45.1 PK	68.2	-23.1	1.90 H	249	32.5	12.6
8	15810.00	46.5 PK	74.0	-27.5	1.81 H	344	34.5	12.0
9	15810.00	34.4 AV	54.0	-19.6	1.81 H	344	22.4	12.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	52.8 PK	74.0	-21.2	1.46 V	232	49.5	3.3
2	5150.00	39.2 AV	54.0	-14.8	1.46 V	232	35.9	3.3
3	*5270.00	115.3 PK			1.46 V	232	112.6	2.7
4	*5270.00	102.3 AV			1.46 V	232	99.6	2.7
5	5350.00	55.3 PK	74.0	-18.7	1.46 V	232	52.3	3.0
6	5350.00	42.3 AV	54.0	-11.7	1.46 V	232	39.3	3.0
7	#10540.00	45.1 PK	68.2	-23.1	3.90 V	181	32.5	12.6
8	15810.00	48.3 PK	74.0	-25.7	1.80 V	181	36.3	12.0
9	15810.00	34.5 AV	54.0	-19.5	1.80 V	181	22.5	12.0

REMARKS:

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

CHANNEL	TX Channel 62	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	115.1 PK			2.21 H	329	112.3	2.8
2	*5310.00	102.2 AV			2.21 H	329	99.4	2.8
3	5350.00	63.8 PK	74.0	-10.2	2.21 H	329	60.8	3.0
4	5350.00	52.8 AV	54.0	-1.2	2.21 H	329	49.8	3.0
5	10620.00	45.3 PK	74.0	-28.7	1.88 H	263	32.8	12.5
6	10620.00	31.4 AV	54.0	-22.6	1.88 H	263	18.9	12.5
7	15930.00	47.1 PK	74.0	-26.9	1.73 H	350	34.7	12.4
8	15930.00	33.6 AV	54.0	-20.4	1.73 H	350	21.2	12.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	115.5 PK			1.44 V	307	112.7	2.8
2	*5310.00	102.3 AV			1.44 V	307	99.5	2.8
3	5350.00	62.9 PK	74.0	-11.1	1.44 V	307	59.9	3.0
4	5350.00	52.1 AV	54.0	-1.9	1.44 V	307	49.1	3.0
5	10620.00	45.8 PK	74.0	-28.2	3.88 V	177	33.3	12.5
6	10620.00	31.5 AV	54.0	-22.5	3.88 V	177	19.0	12.5
7	15930.00	47.7 PK	74.0	-26.3	1.86 V	189	35.3	12.4
8	15930.00	34.0 AV	54.0	-20.0	1.86 V	189	21.6	12.4

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.

802.11ax (HE80)

CHANNEL	TX Channel 58	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.3 PK	74.0	-20.7	1.32 H	314	50.0	3.3
2	5150.00	41.2 AV	54.0	-12.8	1.32 H	314	37.9	3.3
3	*5290.00	111.9 PK			1.32 H	314	109.2	2.7
4	*5290.00	100.2 AV			1.32 H	314	97.5	2.7
5	5350.00	66.8 PK	74.0	-7.2	1.32 H	314	63.8	3.0
6	**5350.00**	**53.8 AV**	**54.0**	**-0.2**	**1.32 H**	**314**	**50.8**	**3.0**
7	#10580.00	45.4 PK	68.2	-22.8	1.89 H	258	32.8	12.6
8	15870.00	45.7 PK	74.0	-28.3	1.71 H	333	33.6	12.1
9	15870.00	33.7 AV	54.0	-20.3	1.71 H	333	21.6	12.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.3 PK	74.0	-20.7	1.60 V	228	50.0	3.3
2	5150.00	43.1 AV	54.0	-10.9	1.60 V	228	39.8	3.3
3	*5290.00	111.9 PK			1.60 V	228	109.2	2.7
4	*5290.00	100.3 AV			1.60 V	228	97.6	2.7
5	5350.00	61.3 PK	74.0	-12.7	1.60 V	228	58.3	3.0
6	5350.00	48.8 AV	54.0	-5.2	1.60 V	228	45.8	3.0
7	#10580.00	45.7 PK	68.2	-22.5	3.28 V	57	33.1	12.6
8	15870.00	46.8 PK	74.0	-27.2	1.69 V	154	34.7	12.1
9	15870.00	34.3 AV	54.0	-19.7	1.69 V	154	22.2	12.1

REMARKS:

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

Below 1GHz Data:

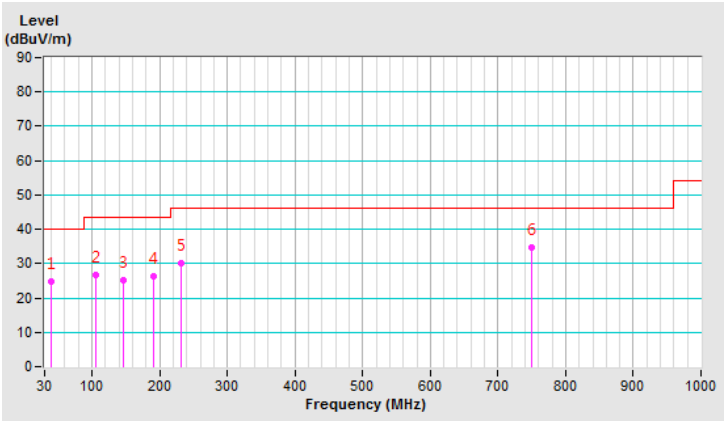
802.11ax (HE40)

CHANNEL	TX Channel 62	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	39.17	24.9 QP	40.0	-15.1	1.34 H	301	33.5	-8.6
2	106.14	26.8 QP	43.5	-16.7	1.24 H	99	37.9	-11.1
3	146.88	25.1 QP	43.5	-18.4	1.71 H	275	32.9	-7.8
4	191.53	26.3 QP	43.5	-17.2	1.65 H	267	36.5	-10.2
5	231.74	30.0 QP	46.0	-16.0	1.98 H	81	39.5	-9.5
6	750.03	34.7 QP	46.0	-11.3	1.74 H	31	31.0	3.7

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.

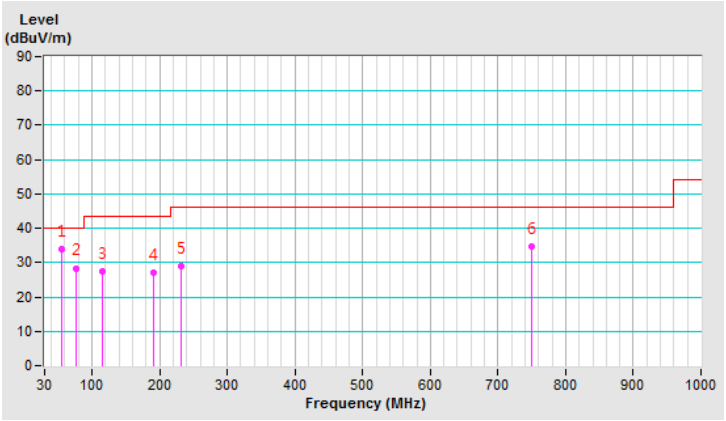


CHANNEL	TX Channel 62	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.15	33.8 QP	40.0	-6.2	1.41 V	118	42.0	-8.2
2	76.46	28.4 QP	40.0	-11.6	1.34 V	255	40.4	-12.0
3	115.53	27.5 QP	43.5	-16.0	1.65 V	313	37.7	-10.2
4	191.07	27.2 QP	43.5	-16.3	1.47 V	252	37.4	-10.2
5	231.78	28.9 QP	46.0	-17.1	1.65 V	105	38.4	-9.5
6	750.01	34.6 QP	46.0	-11.4	1.34 V	84	30.9	3.7

REMARKS:

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



4.1.8 Test Results (Mode 2)

Above 1GHz Data:

802.11a

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	49.2 PK	74.0	-24.8	2.41 H	133	45.9	3.3
2	5460.00	38.8 AV	54.0	-15.2	2.41 H	133	35.5	3.3
3	#5470.00	55.1 PK	68.2	-13.1	2.41 H	133	51.8	3.3
4	*5500.00	115.2 PK			2.41 H	133	111.9	3.3
5	*5500.00	105.0 AV			2.41 H	133	101.7	3.3
6	11000.00	49.0 PK	74.0	-25.0	1.90 H	288	35.9	13.1
7	11000.00	34.9 AV	54.0	-19.1	1.90 H	288	21.8	13.1
8	#16500.00	47.4 PK	68.2	-20.8	2.69 H	356	33.1	14.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	50.3 PK	74.0	-23.7	1.53 V	51	47.0	3.3
2	5460.00	40.2 AV	54.0	-13.8	1.53 V	51	36.9	3.3
3	#5470.00	56.2 PK	68.2	-12.0	1.53 V	51	52.9	3.3
4	*5500.00	116.7 PK			1.53 V	51	113.4	3.3
5	*5500.00	107.2 AV			1.53 V	51	103.9	3.3
6	11000.00	44.9 PK	74.0	-29.1	1.55 V	63	31.8	13.1
7	11000.00	31.0 AV	54.0	-23.0	1.55 V	63	17.9	13.1
8	#16500.00	58.3 PK	68.2	-9.9	2.42 V	0	44.0	14.3

REMARKS:

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

CHANNEL	TX Channel 116	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	115.5 PK			2.66 H	150	112.2	3.3
2	*5580.00	105.2 AV			2.66 H	150	101.9	3.3
3	11160.00	49.6 PK	74.0	-24.4	1.69 H	263	36.7	12.9
4	11160.00	35.6 AV	54.0	-18.4	1.69 H	263	22.7	12.9
5	#16740.00	47.6 PK	68.2	-20.6	2.67 H	321	32.2	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	116.7 PK			1.51 V	63	113.4	3.3
2	*5580.00	107.0 AV			1.51 V	63	103.7	3.3
3	11160.00	45.5 PK	74.0	-28.5	1.60 V	73	32.6	12.9
4	11160.00	31.5 AV	54.0	-22.5	1.60 V	73	18.6	12.9
5	#16740.00	48.0 PK	68.2	-20.2	2.36 V	14	32.6	15.4

REMARKS:

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

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	115.1 PK			2.55 H	138	111.7	3.4
2	*5700.00	105.0 AV			2.55 H	138	101.6	3.4
3	#5725.00	54.3 PK	68.2	-13.9	2.55 H	138	50.8	3.5
4	11400.00	49.7 PK	74.0	-24.3	2.66 H	273	36.4	13.3
5	11400.00	35.6 AV	54.0	-18.4	2.66 H	273	22.3	13.3
6	#17100.00	47.3 PK	68.2	-20.9	2.27 H	310	30.9	16.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	117.2 PK			1.51 V	45	113.8	3.4
2	*5700.00	107.7 AV			1.51 V	45	104.3	3.4
3	#5725.00	56.4 PK	68.2	-11.8	1.51 V	45	52.9	3.5
4	11400.00	45.3 PK	74.0	-28.7	1.54 V	71	32.0	13.3
5	11400.00	31.2 AV	54.0	-22.8	1.54 V	71	17.9	13.3
6	#17100.00	47.7 PK	68.2	-20.5	2.47 V	21	31.3	16.4

REMARKS:

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

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	114.5 PK			2.50 H	131	111.0	3.5
2	*5720.00	104.7 AV			2.50 H	131	101.2	3.5
3	#5850.00	50.2 PK	68.2	-18.0	2.50 H	131	46.2	4.0
4	11440.00	49.4 PK	74.0	-24.6	1.71 H	267	36.2	13.2
5	11440.00	35.6 AV	54.0	-18.4	1.71 H	267	22.4	13.2
6	#17160.00	47.6 PK	68.2	-20.6	2.62 H	335	30.8	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	117.2 PK			1.54 V	42	113.7	3.5
2	*5720.00	107.6 AV			1.54 V	42	104.1	3.5
3	#5850.00	51.4 PK	68.2	-16.8	1.54 V	42	47.4	4.0
4	11440.00	45.5 PK	74.0	-28.5	1.56 V	87	32.3	13.2
5	11440.00	31.3 AV	54.0	-22.7	1.56 V	87	18.1	13.2
6	#17160.00	47.9 PK	68.2	-20.3	2.50 V	28	31.1	16.8

REMARKS:

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

802.11ac (VHT20)

CHANNEL	TX Channel 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	48.8 PK	74.0	-25.2	2.59 H	139	45.5	3.3
2	5460.00	38.6 AV	54.0	-15.4	2.59 H	139	35.3	3.3
3	#5470.00	60.9 PK	68.2	-7.3	2.59 H	139	57.6	3.3
4	*5500.00	115.2 PK			2.59 H	139	111.9	3.3
5	*5500.00	105.2 AV			2.59 H	139	101.9	3.3
6	11000.00	49.9 PK	74.0	-24.1	1.64 H	270	36.8	13.1
7	11000.00	35.8 AV	54.0	-18.2	1.64 H	270	22.7	13.1
8	#16500.00	48.3 PK	68.2	-19.9	2.70 H	336	34.0	14.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	50.3 PK	74.0	-23.7	1.54 V	53	47.0	3.3
2	5460.00	40.0 AV	54.0	-14.0	1.54 V	53	36.7	3.3
3	#5470.00	61.3 PK	68.2	-6.9	1.41 V	55	58.0	3.3
4	*5500.00	117.7 PK			1.54 V	53	114.4	3.3
5	*5500.00	107.9 AV			1.54 V	53	104.6	3.3
6	11000.00	45.2 PK	74.0	-28.8	1.43 V	57	32.1	13.1
7	11000.00	31.5 AV	54.0	-22.5	1.43 V	57	18.4	13.1
8	#16500.00	48.1 PK	68.2	-20.1	2.39 V	359	33.8	14.3

REMARKS:

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

CHANNEL	TX Channel 116	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	115.0 PK			2.61 H	141	111.7	3.3
2	*5580.00	105.1 AV			2.61 H	141	101.8	3.3
3	11160.00	49.6 PK	74.0	-24.4	1.63 H	253	36.7	12.9
4	11160.00	35.4 AV	54.0	-18.6	1.63 H	253	22.5	12.9
5	#16740.00	47.6 PK	68.2	-20.6	2.65 H	311	32.2	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5580.00	116.9 PK			1.56 V	37	113.6	3.3
2	*5580.00	107.6 AV			1.56 V	37	104.3	3.3
3	11160.00	45.5 PK	74.0	-28.5	1.43 V	53	32.6	12.9
4	11160.00	31.9 AV	54.0	-22.1	1.43 V	53	19.0	12.9
5	#16740.00	48.4 PK	68.2	-19.8	2.39 V	357	33.0	15.4

REMARKS:

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

CHANNEL	TX Channel 140	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	115.5 PK			2.58 H	137	112.1	3.4
2	*5700.00	105.3 AV			2.58 H	137	101.9	3.4
3	#5725.00	58.3 PK	68.2	-9.9	2.58 H	137	54.8	3.5
4	11400.00	49.8 PK	74.0	-24.2	1.65 H	270	36.5	13.3
5	11400.00	35.9 AV	54.0	-18.1	1.65 H	270	22.6	13.3
6	#17100.00	47.6 PK	68.2	-20.6	2.70 H	327	31.2	16.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5700.00	116.7 PK			1.46 V	44	113.3	3.4
2	*5700.00	107.5 AV			1.46 V	44	104.1	3.4
3	#5725.00	56.9 PK	68.2	-11.3	1.46 V	44	53.4	3.5
4	11400.00	45.0 PK	74.0	-29.0	1.49 V	44	31.7	13.3
5	11400.00	31.3 AV	54.0	-22.7	1.49 V	44	18.0	13.3
6	#17100.00	48.1 PK	68.2	-20.1	2.34 V	360	31.7	16.4

REMARKS:

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

CHANNEL	TX Channel 144	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	115.5 PK			2.58 H	151	112.0	3.5
2	*5720.00	105.5 AV			2.58 H	151	102.0	3.5
3	#5850.00	50.3 PK	68.2	-17.9	2.58 H	151	46.3	4.0
4	11440.00	49.7 PK	74.0	-24.3	1.71 H	256	36.5	13.2
5	11440.00	35.8 AV	54.0	-18.2	1.71 H	256	22.6	13.2
6	#17160.00	47.7 PK	68.2	-20.5	2.66 H	307	30.9	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5720.00	117.3 PK			1.51 V	33	113.8	3.5
2	*5720.00	107.9 AV			1.51 V	33	104.4	3.5
3	#5850.00	51.6 PK	68.2	-16.6	1.51 V	33	47.6	4.0
4	11440.00	45.6 PK	74.0	-28.4	1.55 V	65	32.4	13.2
5	11440.00	31.2 AV	54.0	-22.8	1.55 V	65	18.0	13.2
6	#17160.00	47.8 PK	68.2	-20.4	2.42 V	29	31.0	16.8

REMARKS:

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

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CHANNEL	TX Channel 102	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	48.7 PK	74.0	-25.3	2.99 H	144	45.4	3.3
2	5460.00	38.8 AV	54.0	-15.2	2.99 H	144	35.5	3.3
3	#5470.00	59.3 PK	68.2	-8.9	2.99 H	144	56.0	3.3
4	*5510.00	111.2 PK			2.99 H	144	107.9	3.3
5	*5510.00	102.6 AV			2.99 H	144	99.3	3.3
6	11020.00	45.2 PK	74.0	-28.8	1.63 H	263	32.2	13.0
7	11020.00	31.2 AV	54.0	-22.8	1.63 H	263	18.2	13.0
8	#16530.00	48.0 PK	68.2	-20.2	2.71 H	333	33.4	14.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5460.00	53.3 PK	74.0	-20.7	1.46 V	52	50.0	3.3
2	5460.00	43.2 AV	54.0	-10.8	1.46 V	52	39.9	3.3
3	#5470.00	62.5 PK	68.2	-5.7	1.46 V	52	59.2	3.3
4	*5510.00	113.5 PK			1.46 V	52	110.2	3.3
5	*5510.00	103.3 AV			1.46 V	52	100.0	3.3
6	11020.00	44.9 PK	74.0	-29.1	1.48 V	63	31.9	13.0
7	11020.00	31.1 AV	54.0	-22.9	1.48 V	63	18.1	13.0
8	#16530.00	48.1 PK	68.2	-20.1	2.44 V	354	33.5	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 110	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	110.9 PK			2.85 H	150	107.6	3.3
2	*5550.00	102.2 AV			2.85 H	150	98.9	3.3
3	11100.00	45.8 PK	74.0	-28.2	1.58 H	253	33.1	12.7
4	11100.00	31.6 AV	54.0	-22.4	1.58 H	253	18.9	12.7
5	#16650.00	47.9 PK	68.2	-20.3	2.69 H	331	32.7	15.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	113.5 PK			1.48 V	53	110.2	3.3
2	*5550.00	103.1 AV			1.48 V	53	99.8	3.3
3	11100.00	45.4 PK	74.0	-28.6	1.41 V	67	32.7	12.7
4	11100.00	31.6 AV	54.0	-22.4	1.41 V	67	18.9	12.7
5	#16650.00	48.2 PK	68.2	-20.0	2.37 V	360	33.0	15.2

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 134	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	110.5 PK			3.01 H	149	107.1	3.4
2	*5670.00	102.1 AV			3.01 H	149	98.7	3.4
3	#5725.00	59.2 PK	68.2	-9.0	3.01 H	149	55.7	3.5
4	11340.00	45.3 PK	74.0	-28.7	1.67 H	271	31.9	13.4
5	11340.00	31.6 AV	54.0	-22.4	1.67 H	271	18.2	13.4
6	#17010.00	48.4 PK	68.2	-19.8	2.66 H	342	32.2	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5670.00	114.0 PK			1.56 V	51	110.6	3.4
2	*5670.00	103.6 AV			1.56 V	51	100.2	3.4
3	#5725.00	63.8 PK	68.2	-4.4	1.56 V	51	60.3	3.5
4	11340.00	45.1 PK	74.0	-28.9	1.46 V	52	31.7	13.4
5	11340.00	31.1 AV	54.0	-22.9	1.46 V	52	17.7	13.4
6	#17010.00	48.0 PK	68.2	-20.2	2.42 V	360	31.8	16.2

REMARKS:

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

CHANNEL	TX Channel 142	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5710.00	110.4 PK			3.03 H	160	106.9	3.5
2	*5710.00	101.8 AV			3.03 H	160	98.3	3.5
3	#5850.00	50.4 PK	68.2	-17.8	3.03 H	160	46.4	4.0
4	11420.00	45.6 PK	74.0	-28.4	1.62 H	251	32.4	13.2
5	11420.00	31.5 AV	54.0	-22.5	1.62 H	251	18.3	13.2
6	#17130.00	47.5 PK	68.2	-20.7	2.66 H	336	30.9	16.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5710.00	113.9 PK			1.51 V	61	110.4	3.5
2	*5710.00	103.7 AV			1.51 V	61	100.2	3.5
3	#5850.00	51.3 PK	68.2	-16.9	1.51 V	61	47.3	4.0
4	11420.00	45.4 PK	74.0	-28.6	1.55 V	57	32.2	13.2
5	11420.00	31.0 AV	54.0	-23.0	1.55 V	57	17.8	13.2
6	#17130.00	48.0 PK	68.2	-20.2	2.43 V	28	31.4	16.6

REMARKS:

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

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CHANNEL	TX Channel 106	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5448.00	56.5 PK	74.0	-17.5	2.97 H	145	53.2	3.3
2	5448.00	45.7 AV	54.0	-8.3	2.97 H	145	42.4	3.3
3	#5470.00	62.5 PK	68.2	-5.7	2.97 H	145	59.2	3.3
4	*5530.00	108.5 PK			2.97 H	145	105.2	3.3
5	*5530.00	98.9 AV			2.97 H	145	95.6	3.3
6	11060.00	45.8 PK	74.0	-28.2	1.67 H	264	32.9	12.9
7	11060.00	31.5 AV	54.0	-22.5	1.67 H	264	18.6	12.9
8	#16590.00	48.1 PK	68.2	-20.1	2.76 H	342	33.2	14.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5448.00	59.4 PK	74.0	-14.6	1.46 V	54	56.1	3.3
2	5448.00	48.3 AV	54.0	-5.7	1.46 V	54	45.0	3.3
3	#5470.00	64.3 PK	68.2	-3.9	1.46 V	54	61.0	3.3
4	*5530.00	110.2 PK			1.46 V	54	106.9	3.3
5	*5530.00	100.7 AV			1.46 V	54	97.4	3.3
6	11060.00	45.6 PK	74.0	-28.4	1.46 V	67	32.7	12.9
7	11060.00	31.7 AV	54.0	-22.3	1.46 V	67	18.8	12.9
8	#16590.00	48.4 PK	68.2	-19.8	2.43 V	358	33.5	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.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5610.00	107.9 PK			2.96 H	138	104.6	3.3
2	*5610.00	98.5 AV			2.96 H	138	95.2	3.3
3	#5725.00	61.4 PK	68.2	-6.8	2.96 H	138	57.9	3.5
4	11220.00	45.3 PK	74.0	-28.7	1.57 H	276	32.3	13.0
5	11220.00	31.4 AV	54.0	-22.6	1.57 H	276	18.4	13.0
6	#16830.00	48.0 PK	68.2	-20.2	2.70 H	343	32.7	15.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5610.00	110.2 PK			1.48 V	51	106.9	3.3
2	*5610.00	101.2 AV			1.48 V	51	97.9	3.3
3	#5725.00	64.3 PK	68.2	-3.9	1.48 V	51	60.8	3.5
4	11220.00	44.7 PK	74.0	-29.3	1.47 V	42	31.7	13.0
5	11220.00	31.2 AV	54.0	-22.8	1.47 V	42	18.2	13.0
6	#16830.00	48.4 PK	68.2	-19.8	2.44 V	351	33.1	15.3

REMARKS:

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

CHANNEL	TX Channel 138	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5690.00	108.5 PK			2.92 H	160	105.1	3.4
2	*5690.00	99.0 AV			2.92 H	160	95.6	3.4
3	#5850.00	59.3 PK	68.2	-8.9	2.92 H	160	55.3	4.0
4	11380.00	46.1 PK	74.0	-27.9	1.63 H	254	32.8	13.3
5	11380.00	31.8 AV	54.0	-22.2	1.63 H	254	18.5	13.3
6	#17070.00	47.8 PK	68.2	-20.4	2.72 H	335	31.5	16.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5690.00	110.7 PK			1.42 V	46	107.3	3.4
2	*5690.00	101.6 AV			1.42 V	46	98.2	3.4
3	#5850.00	51.9 PK	68.2	-16.3	1.42 V	46	47.9	4.0
4	11380.00	45.2 PK	74.0	-28.8	1.60 V	59	31.9	13.3
5	11380.00	31.2 AV	54.0	-22.8	1.60 V	59	17.9	13.3
6	#17070.00	47.8 PK	68.2	-20.4	2.50 V	34	31.5	16.3

REMARKS:

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

Below 1GHz Data:

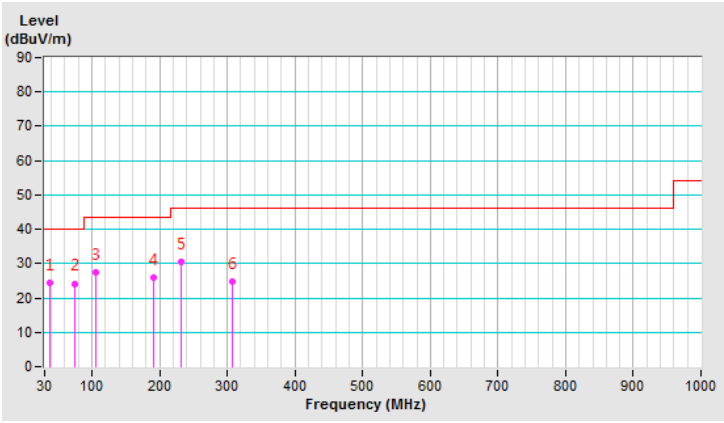
802.11ac (VHT80)

CHANNEL	TX Channel 106	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.46	24.4 QP	40.0	-15.6	1.24 H	278	33.1	-8.7
2	73.84	24.2 QP	40.0	-15.8	1.37 H	57	35.5	-11.3
3	105.30	27.3 QP	43.5	-16.2	1.44 H	78	38.5	-11.2
4	190.49	25.8 QP	43.5	-17.7	1.68 H	248	36.0	-10.2
5	231.61	30.5 QP	46.0	-15.5	1.78 H	78	40.0	-9.5
6	307.20	24.8 QP	46.0	-21.2	1.99 H	47	31.5	-6.7

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.

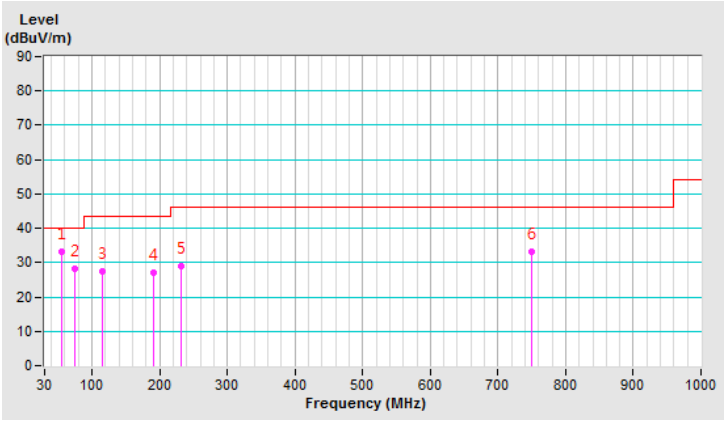


CHANNEL	TX Channel 106	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.83	33.1 QP	40.0	-6.9	1.31 V	211	41.4	-8.3
2	75.44	28.1 QP	40.0	-11.9	1.24 V	19	39.8	-11.7
3	115.24	27.4 QP	43.5	-16.1	1.34 V	360	37.6	-10.2
4	190.24	27.2 QP	43.5	-16.3	1.45 V	310	37.3	-10.1
5	231.76	28.8 QP	46.0	-17.2	1.68 V	100	38.3	-9.5
6	750.01	33.3 QP	46.0	-12.7	1.85 V	88	29.6	3.7

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 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: July 02, 2019

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.

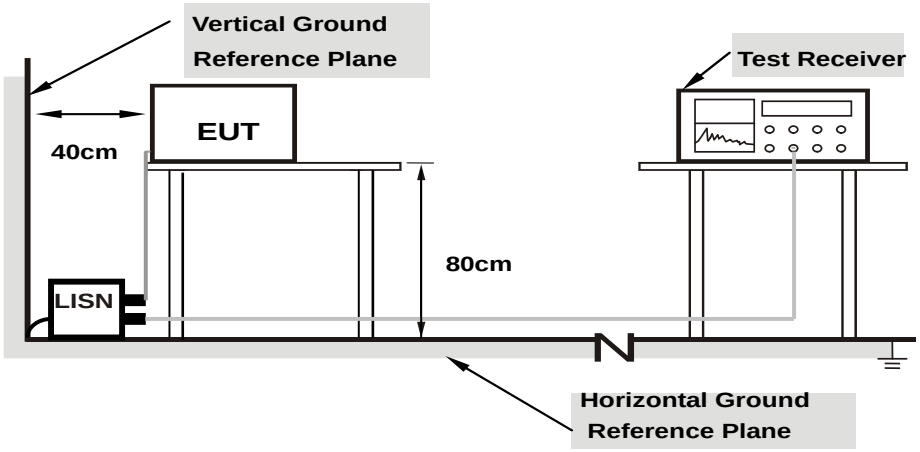
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

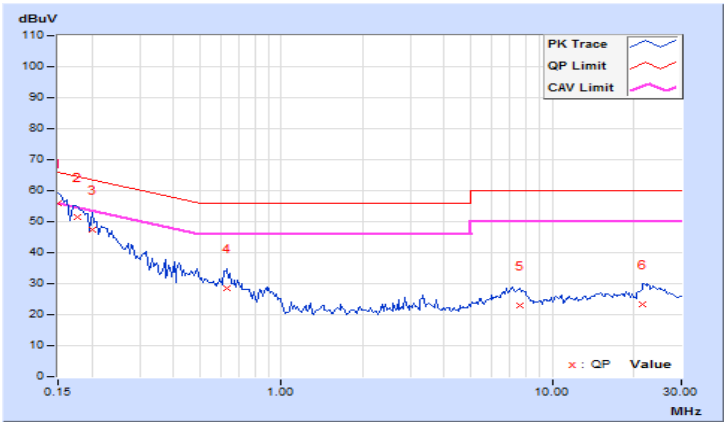
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	45.96	29.94	55.99	39.97	66.00	56.00	-10.01	-16.03
2	0.17734	10.04	41.61	24.54	51.65	34.58	64.61	54.61	-12.96	-20.03
3	0.20078	10.05	37.33	19.13	47.38	29.18	63.58	53.58	-16.20	-24.40
4	0.63438	10.10	18.47	12.99	28.57	23.09	56.00	46.00	-27.43	-22.91
5	7.58594	10.55	12.36	6.50	22.91	17.05	60.00	50.00	-37.09	-32.95
6	21.57031	11.40	11.98	5.65	23.38	17.05	60.00	50.00	-36.62	-32.95

REMARKS:

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

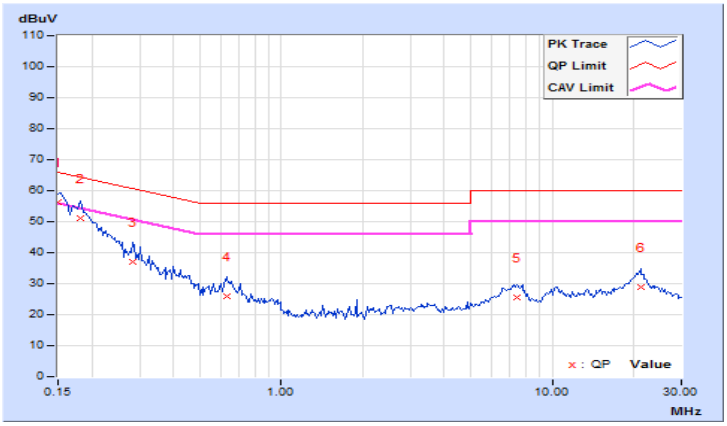


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**9.94**	**46.26**	**29.32**	**56.20**	**39.26**	**66.00**	**56.00**	**-9.80**	**-16.74**
2	0.18125	9.95	41.07	23.28	51.02	33.23	64.43	54.43	-13.41	-21.20
3	0.28281	9.96	27.04	12.26	37.00	22.22	60.73	50.73	-23.73	-28.51
4	0.62656	9.99	15.99	10.98	25.98	20.97	56.00	46.00	-30.02	-25.03
5	7.43359	10.38	15.01	9.55	25.39	19.93	60.00	50.00	-34.61	-30.07
6	21.24219	11.16	17.82	12.56	28.98	23.72	60.00	50.00	-31.02	-26.28

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.



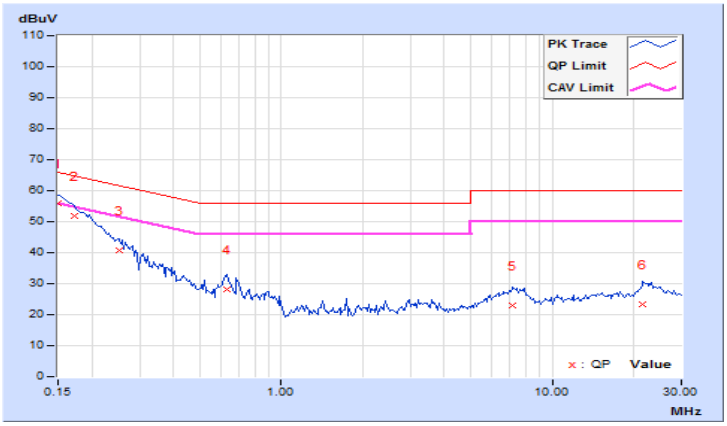
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	46.08	28.10	56.11	38.13	66.00	56.00	-9.89	-17.87
2	0.17344	10.04	41.77	23.63	51.81	33.67	64.79	54.79	-12.98	-21.12
3	0.25156	10.06	30.68	13.86	40.74	23.92	61.71	51.71	-20.97	-27.79
4	0.63438	10.10	18.06	12.93	28.16	23.03	56.00	46.00	-27.84	-22.97
5	7.17969	10.52	12.57	6.67	23.09	17.19	60.00	50.00	-36.91	-32.81
6	21.65234	11.40	12.11	5.88	23.51	17.28	60.00	50.00	-36.49	-32.72

REMARKS:

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

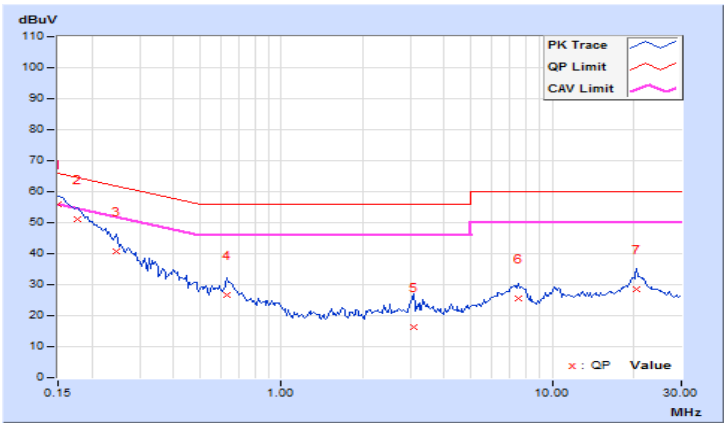


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	45.84	29.18	55.78	39.12	66.00	56.00	-10.22	-16.88
2	0.17734	9.95	41.23	23.81	51.18	33.76	64.61	54.61	-13.43	-20.85
3	0.24766	9.96	30.65	15.08	40.61	25.04	61.84	51.84	-21.23	-26.80
4	0.63047	9.99	16.64	11.28	26.63	21.27	56.00	46.00	-29.37	-24.73
5	3.07031	10.12	6.16	-3.65	16.28	6.47	56.00	46.00	-39.72	-39.53
6	7.49609	10.38	15.03	9.33	25.41	19.71	60.00	50.00	-34.59	-30.29
7	20.60156	11.15	17.35	12.34	28.50	23.49	60.00	50.00	-31.50	-26.51

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,

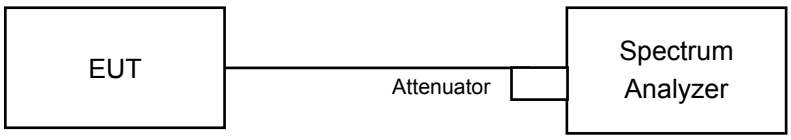
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup

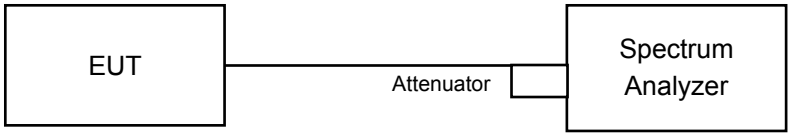
FOR POWER OUTPUT MEASUREMENT

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 channel straddling 5725MHz:

Follow FCC KDB 789033 UNII test procedure:
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 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 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 Result (Mode 1)

Non-Beamforming Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	17.64	17.72	17.51	17.93	235.683	23.72	23.91	Pass
60	5300	17.98	17.39	17.54	17.83	235.062	23.71	23.95	Pass
64	5320	17.82	17.37	17.47	17.86	232.051	23.66	23.94	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	19.57	19.98	19.70	19.74
60	5300	19.80	19.76	19.77	19.79
64	5320	19.72	19.68	19.77	19.91

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	19.57	23.91 < 24
60	5300	19.76	23.95 < 24
64	5320	19.68	23.94 < 24

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	17.92	17.52	17.11	17.52	226.336	23.55	24.00	Pass
60	5300	17.97	17.98	17.56	17.66	240.828	23.82	24.00	Pass
64	5320	17.99	17.35	17.50	17.67	231.989	23.65	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.11	20.85	20.93	21.05
60	5300	20.86	21.02	20.85	21.27
64	5320	21.17	20.86	21.16	21.15

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.85	24.19 > 24
60	5300	20.85	24.19 > 24
64	5320	20.86	24.19 > 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	18.32	17.49	17.11	17.70	234.313	23.70	24.00	Pass
62	5310	18.11	18.17	17.50	17.77	246.404	23.92	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	42.52	42.17	42.18	41.97
62	5310	41.98	42.12	42.34	42.24

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.97	27.22 > 24
62	5310	41.98	27.23 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	17.69	17.25	17.38	17.72	225.695	23.54	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	82.61	82.76	82.55	82.57

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.55	30.16 > 24

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	17.97	17.56	17.18	17.59	229.329	23.60	24.00	Pass
60	5300	18.01	18.03	17.63	17.72	243.873	23.87	24.00	Pass
64	5320	18.04	17.42	17.57	17.73	235.329	23.72	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.62	21.62	21.48	21.72
60	5300	21.71	21.50	21.57	21.46
64	5320	21.63	21.74	21.46	21.60

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.48	24.32 > 24
60	5300	21.46	24.31 > 24
64	5320	21.46	24.31 > 24

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	18.38	17.54	17.18	17.76	237.563	23.76	24.00	Pass
62	5310	18.19	18.22	17.56	17.81	249.702	23.97	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	42.67	42.82	42.80	42.62
62	5310	42.34	42.74	42.74	42.59

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	42.62	27.29 > 24
62	5310	42.34	27.26 > 24

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	17.75	17.31	17.43	17.78	228.707	23.59	24.00	Pass

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.01	82.80	82.95	83.07

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.80	30.18 > 24

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	17.92	17.52	17.11	17.52	226.336	23.55	24.00	Pass
60	5300	17.97	17.98	17.56	17.66	240.828	23.82	24.00	Pass
64	5320	17.99	17.35	17.50	17.67	231.989	23.65	24.00	Pass

Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.11	20.85	20.93	21.05
60	5300	20.86	21.02	20.85	21.27
64	5320	21.17	20.86	21.16	21.15

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	20.85	24.19 > 24
60	5300	20.85	24.19 > 24
64	5320	20.86	24.19 > 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	18.32	17.49	17.11	17.70	234.313	23.70	24.00	Pass
62	5310	18.11	18.17	17.50	17.77	246.404	23.92	24.00	Pass

Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	42.52	42.17	42.18	41.97
62	5310	41.98	42.12	42.34	42.24

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	41.97	27.22 > 24
62	5310	41.98	27.23 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	17.69	17.25	17.38	17.72	225.695	23.54	24.00	Pass

Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	82.61	82.76	82.55	82.57

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.55	30.16 > 24

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	17.97	17.56	17.18	17.59	229.329	23.60	24.00	Pass
60	5300	18.01	18.03	17.63	17.72	243.873	23.87	24.00	Pass
64	5320	18.04	17.42	17.57	17.73	235.329	23.72	24.00	Pass

Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	21.62	21.62	21.48	21.72
60	5300	21.71	21.50	21.57	21.46
64	5320	21.63	21.74	21.46	21.60

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

Power Limit = 11dBm + 10logB <U-NII-2A>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
52	5260	21.48	24.32 > 24
60	5300	21.46	24.31 > 24
64	5320	21.46	24.31 > 24

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	18.38	17.54	17.18	17.76	237.563	23.76	24.00	Pass
62	5310	18.19	18.22	17.56	17.81	249.702	23.97	24.00	Pass

Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	42.67	42.82	42.80	42.62
62	5310	42.34	42.74	42.74	42.59

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
54	5270	42.62	27.29 > 24
62	5310	42.34	27.26 > 24

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	17.75	17.31	17.43	17.78	228.707	23.59	24.00	Pass

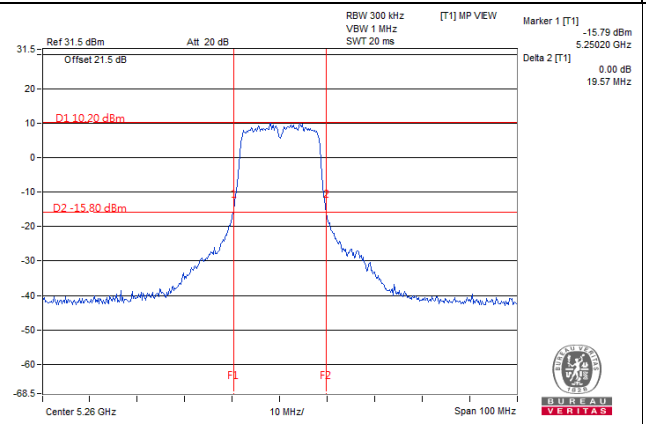
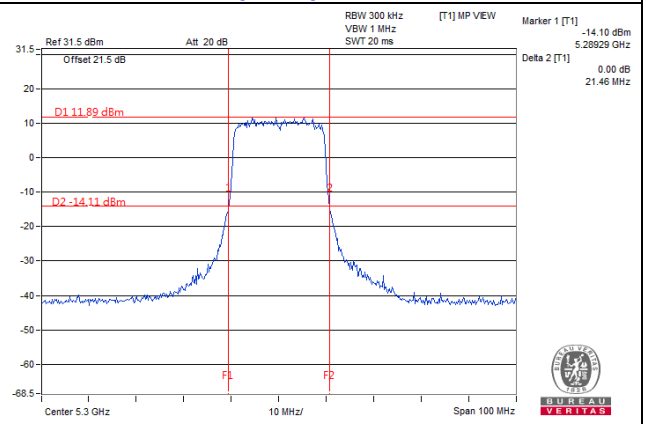
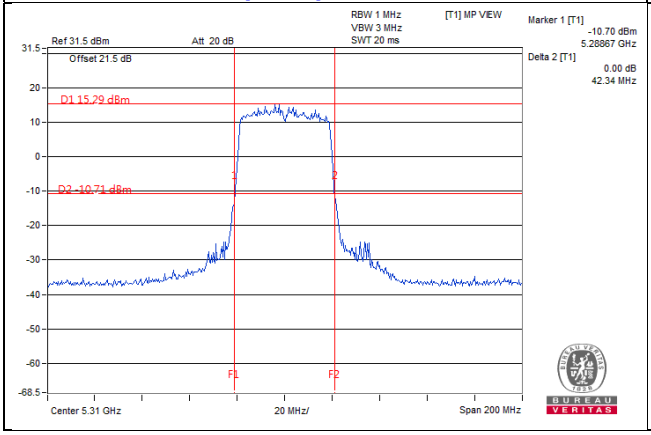
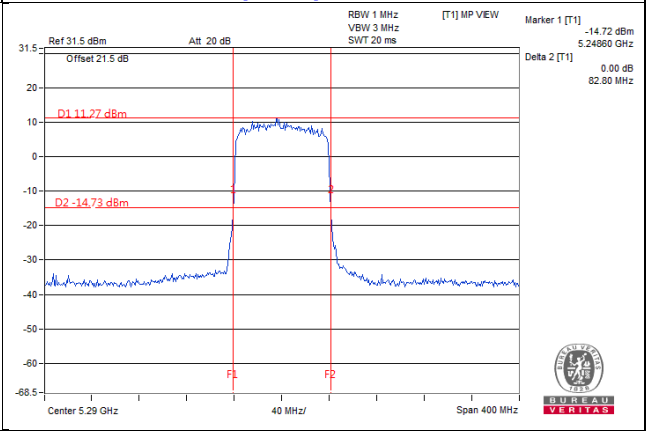
Note: 1. The directional gain = 5.98dBi < 6dBi, so the power limit shall not be reduced.

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	83.01	82.80	82.95	83.07

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

Power Limit = 11dBm + 10logB <U-NII-2A >			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
58	5290	82.80	30.18 > 24

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH52	**802.11ax (HE20)_Chain 3 / CH60**
	
802.11ax (HE40)_Chain 0 / CH62	**802.11ax (HE80)_Chain 1 / CH58**
	

4.3.8 Test Result (Mode 2)

Non-Beamforming Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
100	5500	17.48	17.39	17.52	17.89	228.816	23.59	24.00	Pass
116	5580	17.68	17.41	17.78	17.88	235.05	23.71	24.00	Pass
140	5700	18.18	17.66	17.81	18.09	248.923	23.96	24.00	Pass
*144 (U-NII-2C Band)	5720	14.33	13.47	13.71	14.18	107.599	20.32	22.69	Pass
*144 (U-NII-3 Band)	5720	8.34	7.49	7.66	8.04	26.771	14.28	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.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	134.37	21.28
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
100	5500	19.97	20.32	20.30	19.99
116	5580	21.60	21.19	21.24	21.24
140	5700	20.23	20.13	20.10	20.51
144 (U-NII-2C Band)	5720	14.91	14.97	14.77	14.89

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
100	5500	19.97	24 > 24
116	5580	21.19	24.26 > 24
140	5700	20.10	24.03 > 24
144 (U-NII-2C Band)	5720	14.77	22.69 < 24

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
100	5500	17.68	17.62	17.51	17.99	235.739	23.72	24.00	Pass
116	5580	17.01	17.63	18.14	18.23	239.867	23.80	24.00	Pass
140	5700	17.79	17.51	17.59	17.81	234.288	23.70	24.00	Pass
*144 (U-NII-2C Band)	5720	13.74	13.75	14.10	14.08	104.67	20.20	22.81	Pass
*144 (U-NII-3 Band)	5720	8.18	8.26	8.62	8.52	29.35	14.68	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.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	134.02	21.27
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
100	5500	20.71	20.77	20.71	20.91
116	5580	22.17	22.28	22.33	22.30
140	5700	21.04	20.93	20.95	21.14
144 (U-NII-2C Band)	5720	15.34	15.37	15.21	15.20

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
100	5500	20.71	24.16 > 24
116	5580	22.17	24.45 > 24
140	5700	20.93	24.2 > 24
144 (U-NII-2C Band)	5720	15.20	22.81 < 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
102	5510	17.59	17.39	17.54	17.83	229.668	23.61	24.00	Pass
110	5550	17.85	17.12	17.84	17.71	232.311	23.66	24.00	Pass
134	5670	17.64	17.19	17.64	17.77	228.353	23.59	24.00	Pass
*142 (U-NII-2C Band)	5710	14.24	13.84	14.64	14.35	111.727	20.48	24.00	Pass
*142 (U-NII-3 Band)	5710	3.65	2.81	3.59	3.35	9.052	9.57	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.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	120.779	20.82
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
102	5510	41.03	40.97	41.11	41.16
110	5550	40.95	40.96	40.89	41.36
134	5670	41.07	41.07	41.19	41.19
142 (U-NII-2C Band)	5710	35.53	35.52	35.81	35.58

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
102	5510	40.97	27.12 > 24
110	5550	40.89	27.11 > 24
134	5670	41.07	27.13 > 24
142 (U-NII-2C Band)	5710	35.52	26.5 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
106	5530	17.92	17.63	17.96	18.26	249.392	23.97	24.00	Pass
122	5610	17.94	17.56	17.94	17.95	243.849	23.87	24.00	Pass
*138 (U-NII-2C Band)	5690	13.94	14.24	13.95	14.21	107.048	20.30	24.00	Pass
*138 (U-NII-3 Band)	5690	0.21	0.36	1.06	1.00	4.878	6.88	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.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	111.926	20.49
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
106	5530	83.39	83.81	84.92	84.98
122	5610	84.03	84.14	84.77	84.08
138 (U-NII-2C Band)	5690	76.62	77.57	76.89	76.77

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)
106	5530	83.39	30.21 > 24
122	5610	84.03	30.24 > 24
138 (U-NII-2C Band)	5690	76.62	29.84 > 24

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
100	5500	17.68	17.62	17.51	17.99	235.739	23.72	24.00	Pass
116	5580	17.01	17.63	18.14	18.23	239.867	23.80	24.00	Pass
140	5700	17.79	17.51	17.59	17.81	234.288	23.70	24.00	Pass
*144 (U-NII-2C Band)	5720	13.74	13.75	14.10	14.08	104.67	20.20	22.81	Pass
*144 (U-NII-3 Band)	5720	8.18	8.26	8.62	8.52	29.35	14.68	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.
1. For U-NII-2C: The directional gain = 4.72dBi < 6dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 5.73dBi < 6dBi, so the power limit shall not be reduced.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
144	5720	134.02	21.27
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
100	5500	20.71	20.77	20.71	20.91
116	5580	22.17	22.28	22.33	22.30
140	5700	21.04	20.93	20.95	21.14
144 (U-NII-2C Band)	5720	15.34	15.37	15.21	15.20

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
100	5500	20.71	24.16 > 24
116	5580	22.17	24.45 > 24
140	5700	20.93	24.2 > 24
144 (U-NII-2C Band)	5720	15.20	22.81 < 24

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
102	5510	17.59	17.39	17.54	17.83	229.668	23.61	24.00	Pass
110	5550	17.85	17.12	17.84	17.71	232.311	23.66	24.00	Pass
134	5670	17.64	17.19	17.64	17.77	228.353	23.59	24.00	Pass
*142 (U-NII-2C Band)	5710	14.24	13.84	14.64	14.35	111.727	20.48	24.00	Pass
*142 (U-NII-3 Band)	5710	3.65	2.81	3.59	3.35	9.052	9.57	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.
1. For U-NII-2C: The directional gain = 4.72dBi < 6dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 5.73dBi < 6dBi, so the power limit shall not be reduced.

The Total Power for the straddle channel:

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
142	5710	120.779	20.82
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
102	5510	41.03	40.97	41.11	41.16
110	5550	40.95	40.96	40.89	41.36
134	5670	41.07	41.07	41.19	41.19
142 (U-NII-2C Band)	5710	35.53	35.52	35.81	35.58

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
102	5510	40.97	27.12 > 24
110	5550	40.89	27.11 > 24
134	5670	41.07	27.13 > 24
142 (U-NII-2C Band)	5710	35.52	26.5 > 24

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
106	5530	17.92	17.63	17.96	18.26	249.392	23.97	24.00	Pass
122	5610	17.94	17.56	17.94	17.95	243.849	23.87	24.00	Pass
*138 (U-NII-2C Band)	5690	13.94	14.24	13.95	14.21	107.048	20.30	24.00	Pass
*138 (U-NII-3 Band)	5690	0.21	0.36	1.06	1.00	4.878	6.88	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.
1. For U-NII-2C: The directional gain = 4.72dBi < 6dBi, so the power limit shall not be reduced.
2. For U-NII-3: The directional gain = 5.73dBi < 6dBi, so the power limit shall not be reduced.

The Total Power for the straddle channel:

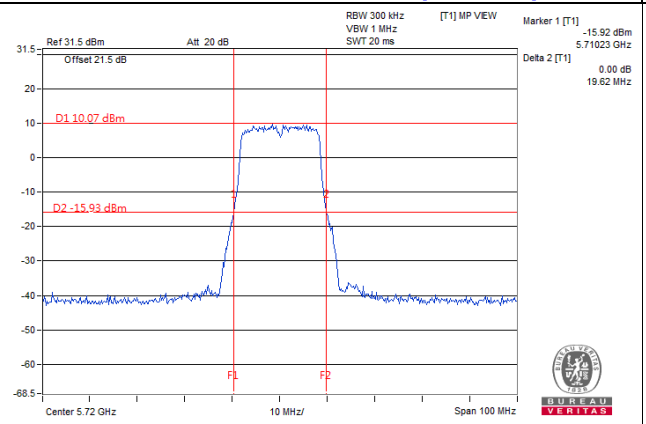
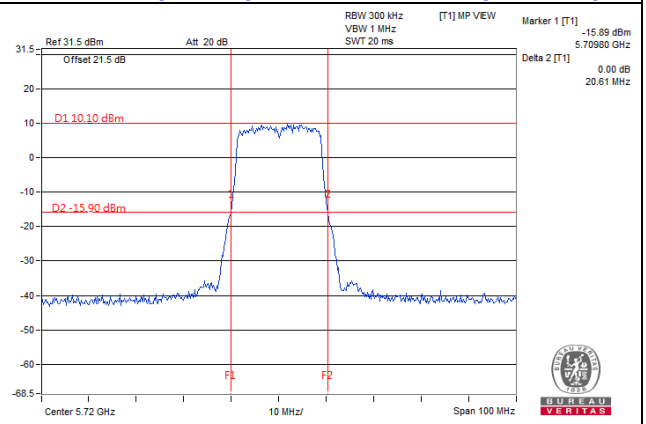
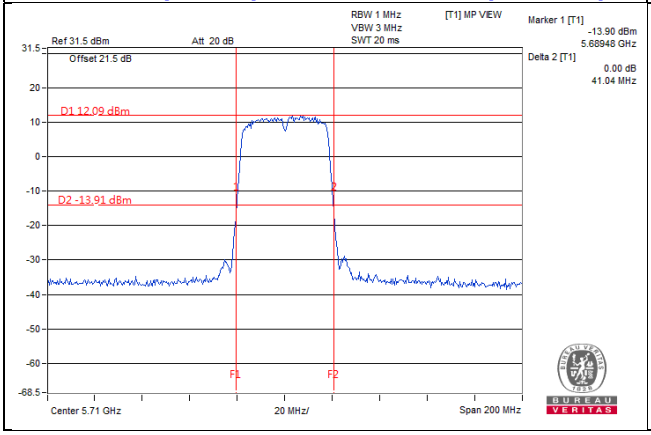
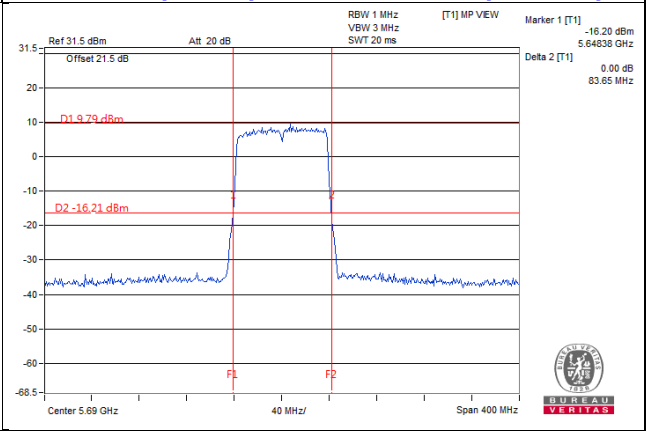
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
138	5690	111.926	20.49
Note: The total power was calculated through formula and record the value for reference only.			

26dB OCCUPIED BANDWIDTH

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
106	5530	83.39	83.81	84.92	84.98
122	5610	84.03	84.14	84.77	84.08
138 (U-NII-2C Band)	5690	76.62	77.57	76.89	76.77

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

Power Limit = 11dBm + 10logB < U-NII-2C>			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Limit (dBm)
106	5530	83.39	30.21 > 24
122	5610	84.03	30.24 > 24
138 (U-NII-2C Band)	5690	76.62	29.84 > 24

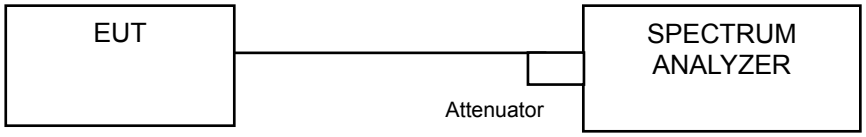
Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH144 (U-NII-2C)	**802.11ac (VHT20)_Chain 3 / CH144 (U-NII-2C)**
	
802.11ac (VHT40)_Chain 1 / CH142 (U-NII-2C)	**802.11ac (VHT80)_Chain 0 / CH138 (U-NII-2C)**
	

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 (Mode 1)

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	16.44	16.44	16.44	16.44
60	5300	16.44	16.44	16.44	16.44
64	5320	16.44	16.44	16.44	16.44

802.11ax (HE20)

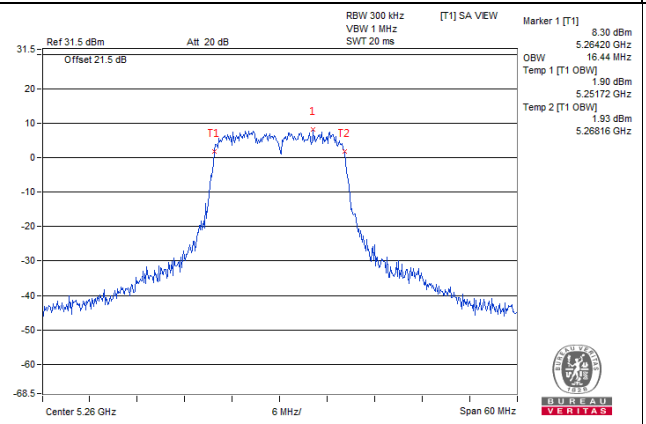
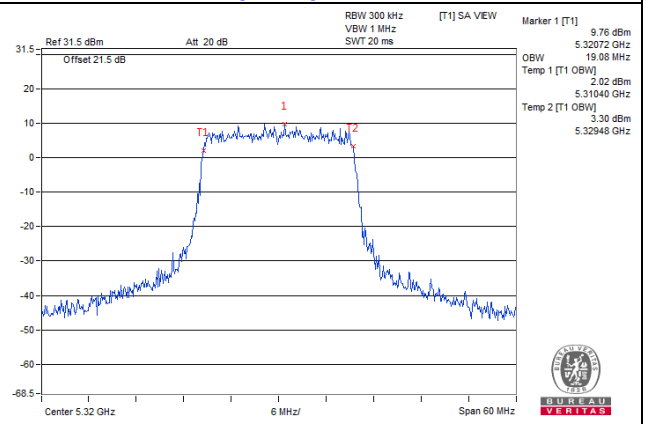
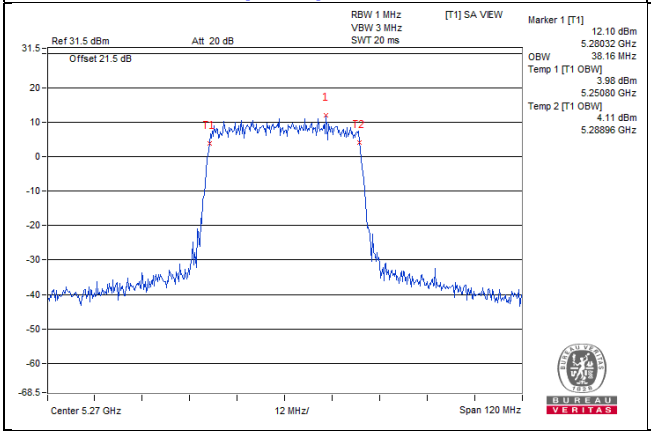
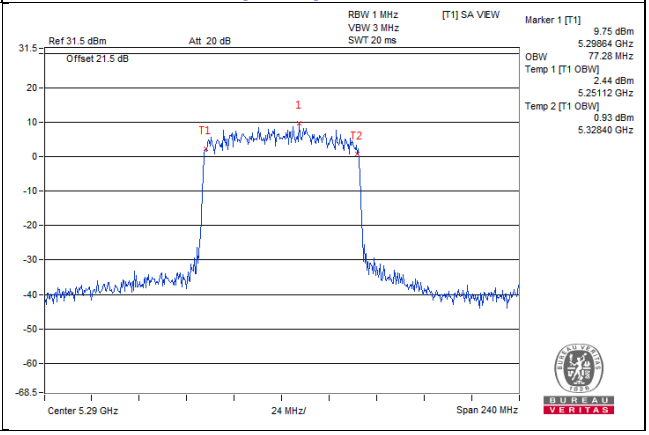
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
52	5260	18.96	18.96	18.96	18.84
60	5300	18.96	18.96	18.96	18.96
64	5320	19.08	19.08	18.96	19.08

802.11ax (HE40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
54	5270	37.92	38.16	37.92	37.92
62	5310	37.92	38.16	38.16	38.16

802.11ax (HE80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
58	5290	77.28	76.80	77.28	77.28

Spectrum Plot of Max. Value	
802.11a_Chain 2 / CH52	**802.11ax (HE20)_Chain 0 / CH64**
	
802.11ax (HE40)_Chain 1 / CH54	**802.11ax (HE80)_Chain 0 / CH58**
	

4.4.5 Test Results (Mode 2)

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
100	5500	16.56	16.56	16.56	16.56
116	5580	16.56	16.56	16.56	16.56
140	5700	16.56	16.56	16.56	16.56
144 (U-NII-2C Band)	5720	13.28	13.28	13.28	13.28
144 (U-NII-3 Band)	5720	3.28	3.28	3.16	3.28

802.11ac (VHT20)

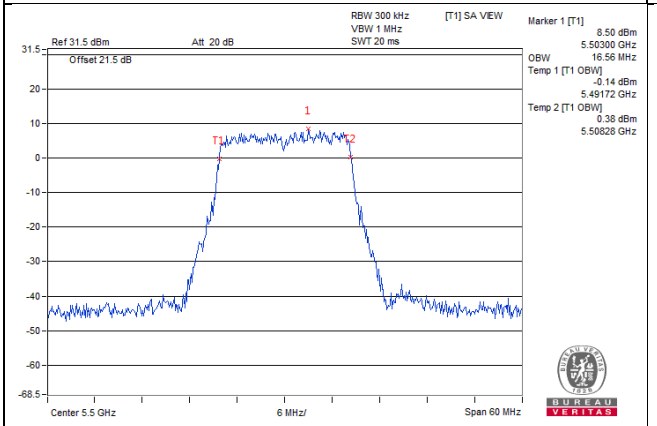
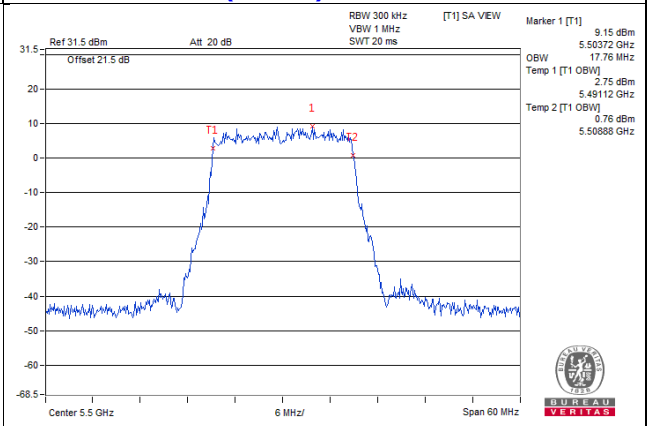
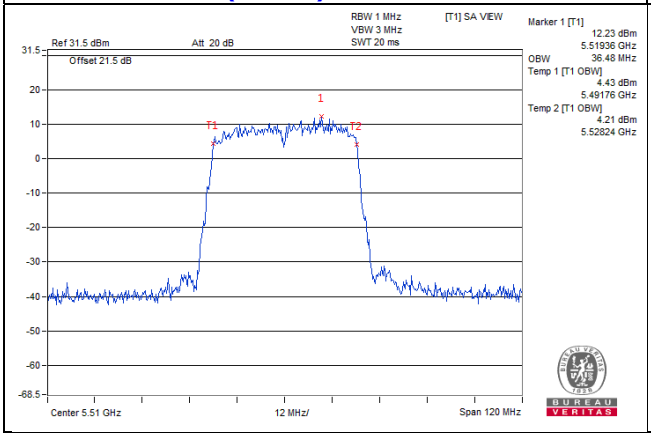
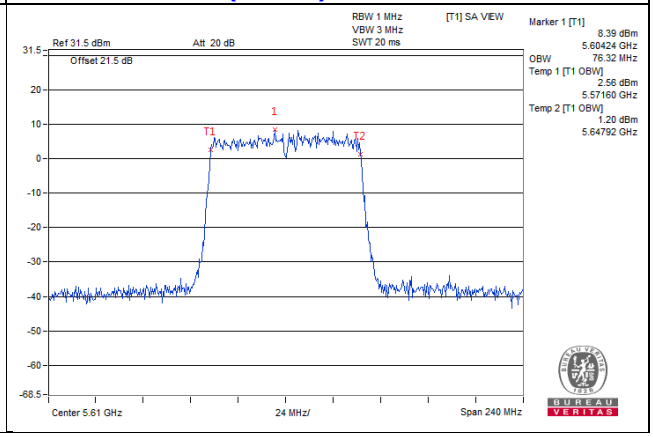
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
100	5500	17.76	17.76	17.76	17.76
116	5580	17.76	17.76	17.64	17.76
140	5700	17.64	17.64	17.64	17.64
144 (U-NII-2C Band)	5720	13.88	13.88	13.88	13.88
144 (U-NII-3 Band)	5720	3.88	3.88	3.88	3.76

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
102	5510	36.48	36.00	36.00	36.24
110	5550	36.24	36.00	36.24	36.00
134	5670	36.24	36.24	36.24	36.24
142 (U-NII-2C Band)	5710	33.24	33.00	33.24	33.24
142 (U-NII-3 Band)	5710	3.00	3.00	3.00	3.24

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
106	5530	75.84	75.84	75.84	75.84
122	5610	75.84	75.84	75.84	76.32
138 (U-NII-2C Band)	5690	72.92	72.92	72.92	72.92
138 (U-NII-3 Band)	5690	2.92	2.44	2.92	2.92

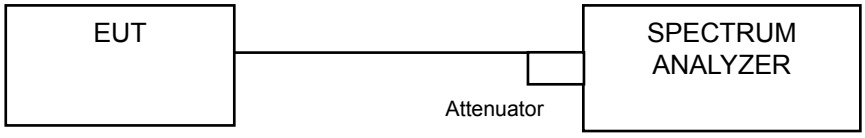
Spectrum Plot of Max. Value	
802.11a_Chain 0 / CH100	**802.11ac (VHT20)_Chain 0 / CH100**
	
802.11ac (VHT40)_Chain 0 / CH102	**802.11ac (VHT80)_Chain 3 / CH122**
	

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:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results (Mode 1)

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	2.99	3.60	3.16	3.74	0.36	9.76	11.00	Pass
60	5300	3.42	3.02	3.06	3.21	0.36	9.56	11.00	Pass
64	5320	1.62	1.69	2.71	3.37	0.36	8.79	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. The directional gain = 5.98dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
52	5260	3.44	3.29	2.27	3.61	0.22	9.42	11.00	Pass
60	5300	3.50	1.40	2.37	3.63	0.22	9.06	11.00	Pass
64	5320	2.81	2.75	1.95	2.97	0.22	8.88	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. The directional gain = 5.98dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

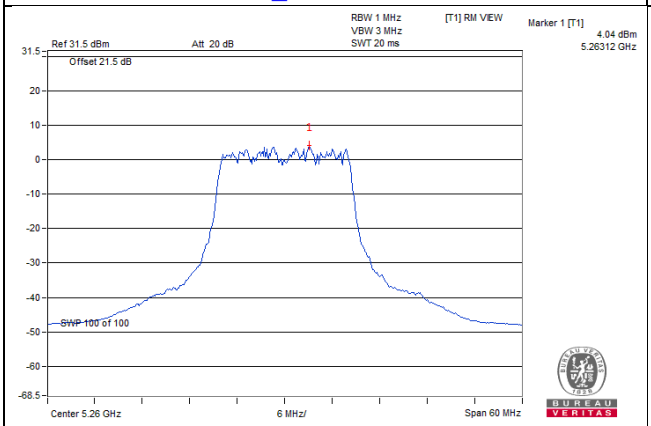
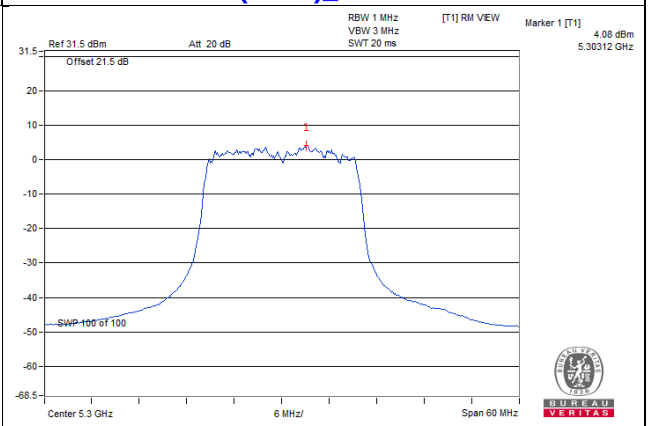
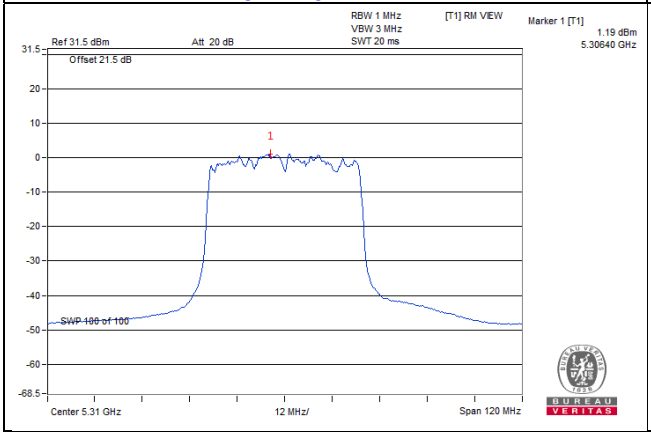
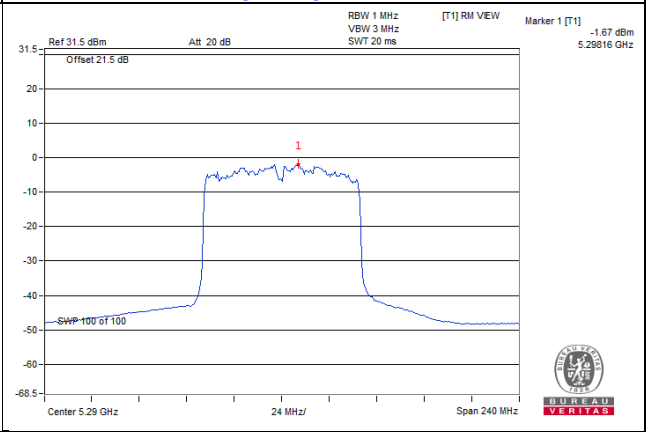
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
54	5270	0.23	-0.50	-0.84	-0.08	0.18	5.92	11.00	Pass
62	5310	0.91	1.30	0.40	1.19	0.18	7.16	11.00	Pass

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. The directional gain = 5.98dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
58	5290	-1.67	-3.78	-2.41	-2.95	0.23	3.62	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. The directional gain = 5.98dBi < 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 3 / CH52	**802.11ax (HE20)_Chain 3 / CH60**
	
802.11ax (HE40)_Chain 3 / CH62	**802.11ax (HE80)_Chain 0 / CH58**
	

4.5.8 Test Results (Mode 2)

For U-NII-2C:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
100	5500	3.04	4.03	4.11	4.61	0.14	10.14	11.00	Pass
116	5580	4.21	3.99	4.05	4.82	0.14	10.44	11.00	Pass
140	5700	4.53	3.66	3.29	4.34	0.14	10.14	11.00	Pass
144 (U-NII-2C Band)	5720	4.39	3.49	4.15	4.59	0.14	10.33	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. The directional gain = 4.72dBi < 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.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
100	5500	4.27	4.12	4.10	4.51	10.27	11.00	Pass
116	5580	3.63	4.03	4.72	4.81	10.35	11.00	Pass
140	5700	3.47	3.66	3.97	4.05	9.81	11.00	Pass
144 (U-NII-2C Band)	5720	3.56	3.65	4.09	3.99	9.85	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. The directional gain = 4.72dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

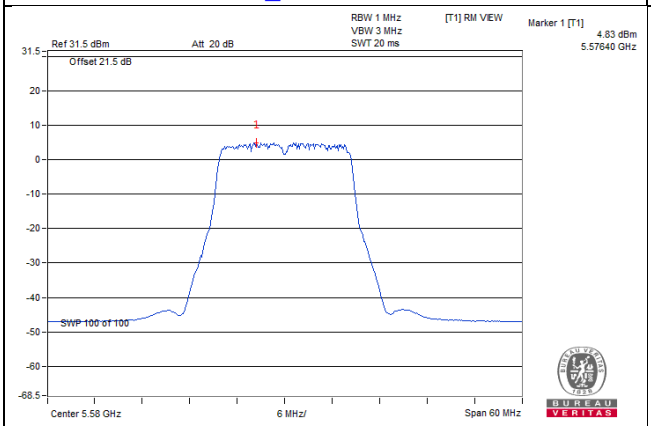
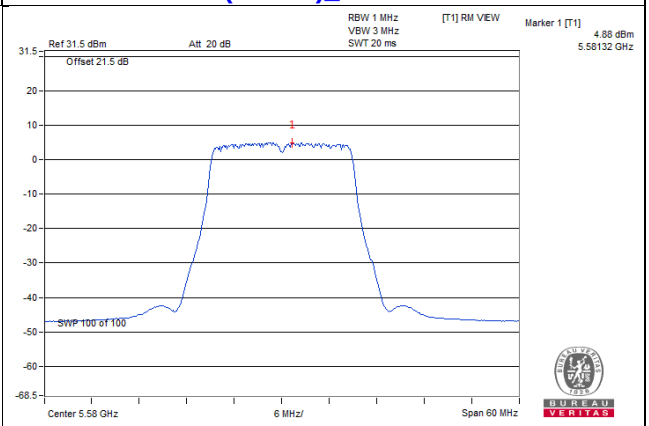
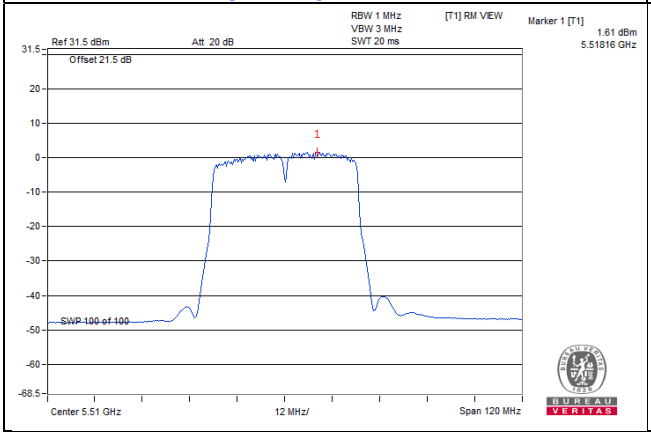
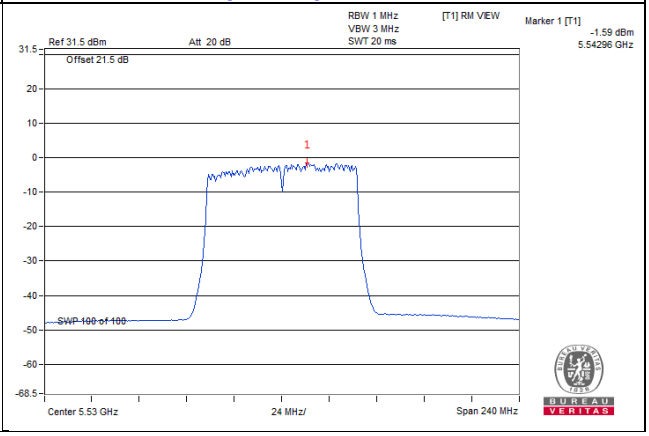
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
102	5510	1.61	0.15	1.05	1.55	0.12	7.27	11.00	Pass
110	5550	1.60	-0.03	1.42	1.23	0.12	7.24	11.00	Pass
134	5670	0.27	0.37	1.27	1.11	0.12	6.92	11.00	Pass
142 (U-NII-2C Band)	5710	0.99	0.53	1.28	1.13	0.12	7.13	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. The directional gain = 4.72dBi < 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/MHz)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
106	5530	-1.61	-2.42	-2.04	-2.02	0.25	4.26	11.00	Pass
122	5610	-1.96	-2.09	-1.87	-2.30	0.25	4.22	11.00	Pass
138 (U-NII-2C Band)	5690	-2.60	-2.32	-2.62	-2.38	0.25	3.79	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. The directional gain = 4.72dBi < 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 3 / CH116	**802.11ac (VHT20)_Chain 3 / CH116**
	
802.11ac (VHT40)_Chain 0 / CH102	**802.11ac (VHT80)_Chain 0 / CH106**
	

For U-NII-3:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
144 (U-NII-3 Band)	5720	-3.72	-4.69	-4.67	-4.11	0.14	1.5422	1.88	4.10	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 = 5.73dBi < 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	Chain 2	Chain 3	mW/ 300kHz	dBm/ 300kHz			
144 (U-NII-3 Band)	5720	-4.96	-4.63	-4.71	-4.54	1.3531	1.31	3.53	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 = 5.73dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
142 (U-NII-3 Band)	5710	-8.48	-8.90	-8.18	-8.27	0.12	0.5873	-2.31	-0.09	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 = 5.73dBi < 6dBi, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

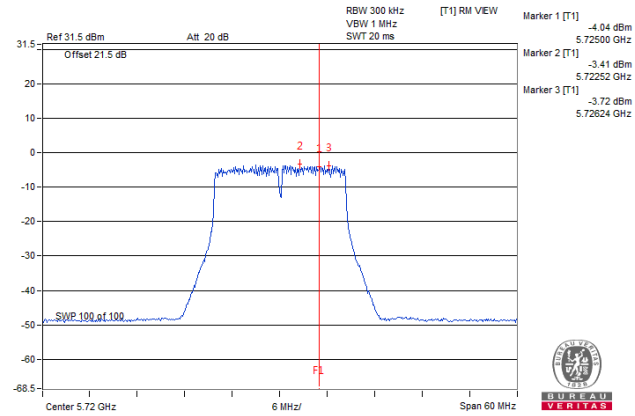
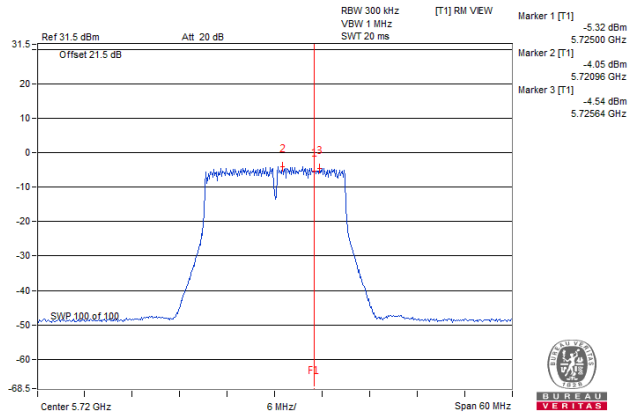
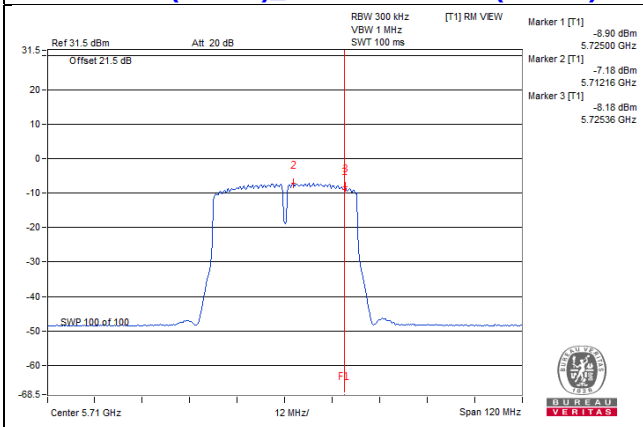
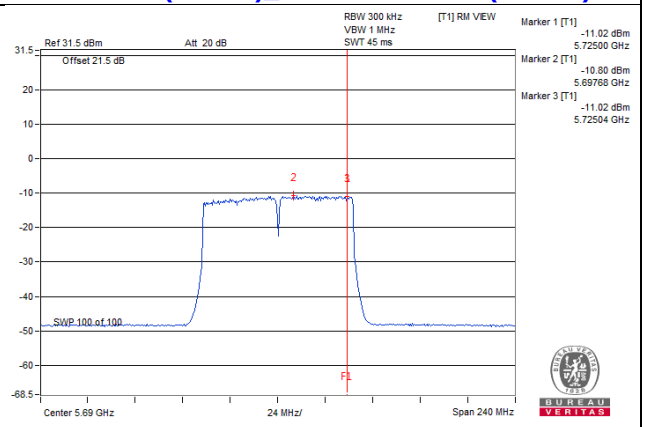
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/300kHz)				Duty Factor (dB)	Total PSD With Duty Factor		Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
		Chain 0	Chain 1	Chain 2	Chain 3		mW/300 kHz	dBm/300kHz			
138 (U-NII-3 Band)	5690	-11.57	-11.40	-11.04	-11.02	0.25	0.31786	-4.98	-2.76	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 = 5.73dBi < 6dBi, so the power density limit shall not be reduced.

3. Refer to section 3.3 for duty cycle spectrum plot.

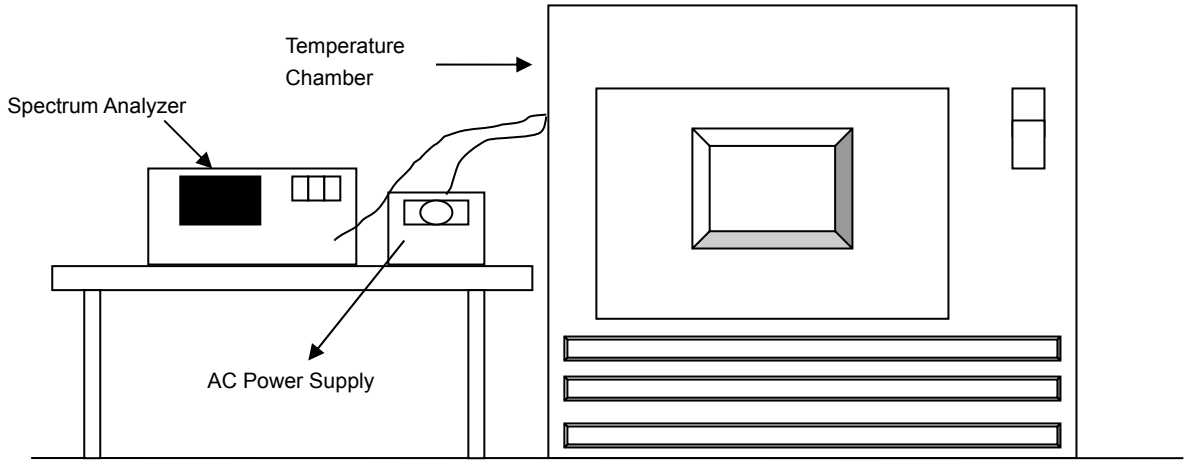
Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH144 (U-NII-3)	**802.11ac (VHT20)_Chain 3 / CH144 (U-NII-3)**
	
802.11ac (VHT40)_Chain 2 / CH142 (U-NII-3)	**802.11ac (VHT80)_Chain 3 / CH138 (U-NII-3)**
	

4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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.
.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results (Mode 1)

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
50	120	5260.0219	PASS	5260.0238	PASS	5260.0216	PASS	5260.0213	PASS
40	120	5259.9815	PASS	5259.985	PASS	5259.9841	PASS	5259.9836	PASS
30	120	5260.0193	PASS	5260.0179	PASS	5260.0146	PASS	5260.0162	PASS
20	120	5260.0019	PASS	5260.003	PASS	5260.0026	PASS	5260.0032	PASS
10	120	5259.9775	PASS	5259.9798	PASS	5259.9791	PASS	5259.9763	PASS
0	120	5259.9965	PASS	5260.0004	PASS	5260.0006	PASS	5259.9957	PASS
-10	120	5259.9978	PASS	5259.9977	PASS	5259.9981	PASS	5259.9978	PASS
-20	120	5260.0073	PASS	5260.0072	PASS	5260.0083	PASS	5260.0097	PASS
-30	120	5259.9731	PASS	5259.9765	PASS	5259.9726	PASS	5259.9745	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	5260.0029	PASS	5260.0038	PASS	5260.0029	PASS	5260.0028	PASS
	120	5260.0019	PASS	5260.003	PASS	5260.0026	PASS	5260.0032	PASS
	102	5260.0014	PASS	5260.0025	PASS	5260.0018	PASS	5260.0031	PASS

4.6.8 Test Results (Mode 2)

Frequency Stability Versus Temp.									
Operating Frequency: 5500 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
50	120	5500.0132	PASS	5500.0115	PASS	5500.0138	PASS	5500.014	PASS
40	120	5500.021	PASS	5500.0213	PASS	5500.0227	PASS	5500.0221	PASS
30	120	5499.9873	PASS	5499.9874	PASS	5499.9867	PASS	5499.9858	PASS
20	120	5500.0256	PASS	5500.0263	PASS	5500.0272	PASS	5500.0284	PASS
10	120	5500.0188	PASS	5500.0187	PASS	5500.0191	PASS	5500.0158	PASS
0	120	5500.0192	PASS	5500.0223	PASS	5500.023	PASS	5500.0182	PASS
-10	120	5499.9935	PASS	5499.993	PASS	5499.991	PASS	5499.9928	PASS
-20	120	5499.9883	PASS	5499.9893	PASS	5499.9878	PASS	5499.9853	PASS
-30	120	5499.9734	PASS	5499.9739	PASS	5499.9724	PASS	5499.9752	PASS

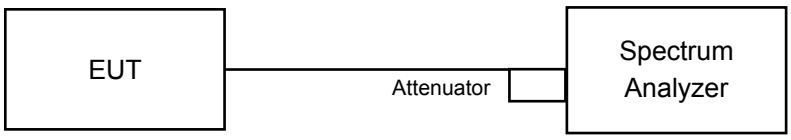
Frequency Stability Versus Voltage									
Operating Frequency: 5500 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5500.0248	PASS	5500.0272	PASS	5500.0269	PASS	5500.0279	PASS
	120	5500.0256	PASS	5500.0263	PASS	5500.0272	PASS	5500.0284	PASS
	102	5500.0265	PASS	5500.0265	PASS	5500.0276	PASS	5500.029	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (U-NII-3 Band)	5720	3.18	3.18	3.18	3.17	0.5	Pass

802.11ac (VHT20)

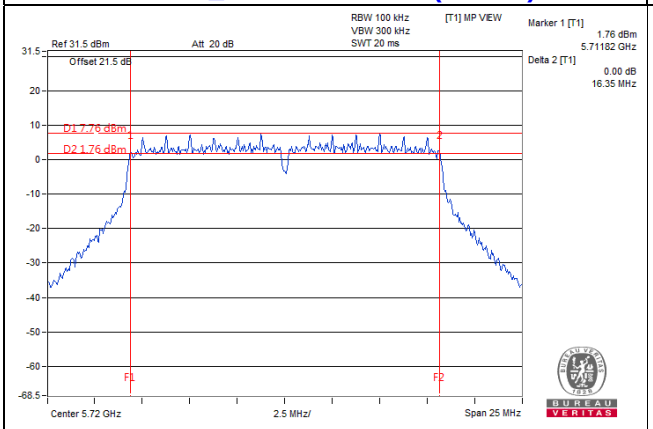
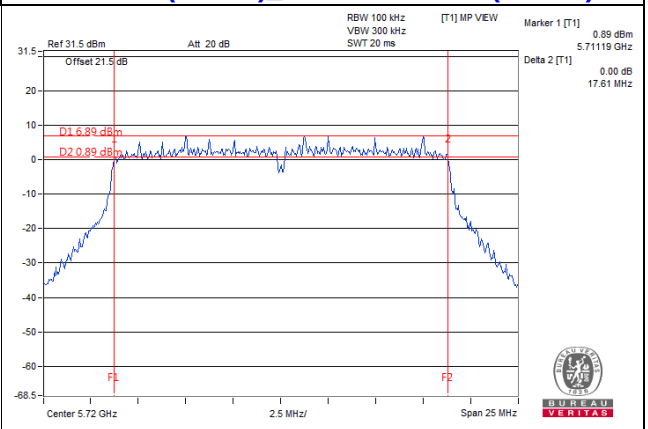
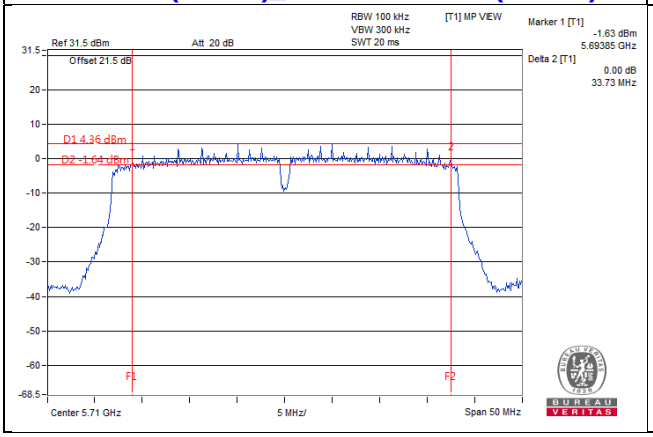
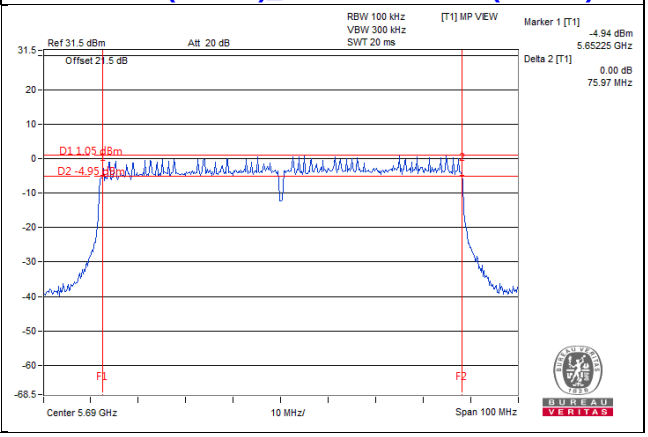
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
144 (U-NII-3 Band)	5720	3.80	3.80	3.80	3.80	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
142 (U-NII-3 Band)	5710	2.67	2.63	2.80	2.58	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
138 (U-NII-3 Band)	5690	3.34	3.22	3.27	3.22	0.5	Pass

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

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

5 Pictures of Test Arrangements

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

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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