FCC Test Report

Report No.:	RF170706C25-1
FCC ID:	PY317100376
Test Model:	C7500
Received Date:	July 06, 2017
Test Date:	Aug. 08 to 15, 2017
Issued Date:	Sep. 06, 2017
Applicant:	NETGEAR INC.
Address:	350 East Plumeria Drive San Jose, CA 95134
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 R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF170706C25-1	Original release.	Sep. 06, 2017

1 Certificate of Conformity

Product:	AC3200 WiFi Cable Modem Router
Brand:	NETGEAR
Test Model:	C7500
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR INC.
Test Date:	Aug. 08 to 15, 2017
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Sep. 06, 2017

Wendy Wu / Specialist

Approved by : _____ , **Date:** Sep. 06, 2017

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -10.13dB at 29.23498MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5145.00MHz, 5150.00MHz, 11490.00MHz, 11570.00MHz, 11650.00MHz.
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.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC3200 WiFi Cable Modem Router
Brand	NETGEAR
Test Model	C7500
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 19V from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** **CDD Mode:** 984.906mW **Beamforming Mode (Nss=1):** 558.355mW **Beamforming Mode (Nss=2):** 799.826mW **5GHz:** **CDD Mode:** **5.18 ~ 5.24GHz:** 836.579mW **5.745 ~ 5.825GHz:** 992.311mW **Beamforming Mode (Nss=1):** **5.18 ~ 5.24GHz:** 608.681mW **5.745 ~ 5.825GHz:** 755.931mW **Beamforming Mode (Nss=2):** **5.18 ~ 5.24GHz:** 990.45mW **5.745 ~ 5.825GHz:** 991.062mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	Ethernet Cable x 1

Note:

1. 2.4GHz & 5GHz technology can not transmit at same time.
2. The EUT must be supplied with a power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	AD2003F10	PN:332-10631-01	AC Input: 100-120Vac, 1.5A, 50/60Hz DC Output: 19V, 3.16A DC Output cable: Unshielded, 1.8m
2	NETGEAR	2ABS060K 1 NA	PN:332-10788-01	AC Input: 100-120Vac, 1.7A, 50/60Hz DC Output: 19V, 3.16A DC Output cable: Unshielded, 1.8m
Note: 1. From the above adapters, the worse case was found in Adapter 2. Therefore only the test data of the mode was recorded in this report.				

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

2.4GHz					
Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connecter Type
1	Chain (0)	2.47	2.4~2.4835	Dipole	i-pex(MHF)
2	Chain (1)	2.47			
3	Chain (2)	2.47			
4	Chain (3)	2.47			
5GHz					
Antenna No.	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connecter Type
1	Chain (0)	2.13	5.15~5.25	Dipole	i-pex(MHF)
		1.19	5.725~5.85		
2	Chain (1)	2.13	5.15~5.25	Dipole	i-pex(MHF)
		1.19	5.725~5.85		
3	Chain (2)	2.13	5.15~5.25	Dipole	i-pex(MHF)
		1.19	5.725~5.85		
4	Chain (3)	2.13	5.15~5.25	Dipole	i-pex(MHF)
		1.19	5.725~5.85		

4. The EUT incorporates a MIMO function:

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	4TX	4RX
802.11g	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
VHT20	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~8, Nss=4	4TX	4RX
VHT40	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS 0~8, Nss=1	4TX	4RX
	MCS 0~8, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~8, Nss=4	4TX	4RX
802.11ac (VHT40)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX
802.11ac (VHT80)	MCS 0~9, Nss=1	4TX	4RX
	MCS 0~9, Nss=2	4TX	4RX
	MCS 0~9, Nss=3	4TX	4RX
	MCS 0~9, Nss=4	4TX	4RX

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

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With adapter 2
2	-	-	√	-	With adapter 1

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

NOTE:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (Nss=2)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	13

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	157	OFDM	BPSK	6

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (Nss=1) (Output power only)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3
Beamforming Mode (Nss=2)						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	13
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	27
802.11ac (VHT80)		42	42	OFDM	BPSK	58.5
802.11ac (VHT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	13
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	27
802.11ac (VHT80)		155	155	OFDM	BPSK	58.5

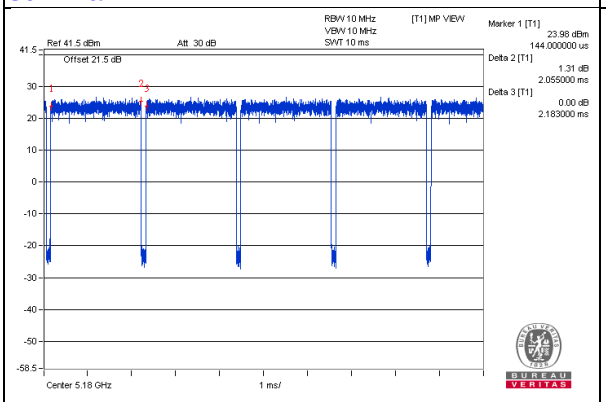
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	23deg. C, 64%RH	120Vac, 60Hz	Jyunchun Lin
PLC	25deg. C, 75%RH 25deg. C, 75%RH	120Vac, 60Hz	Andy Ho Jyunchun Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

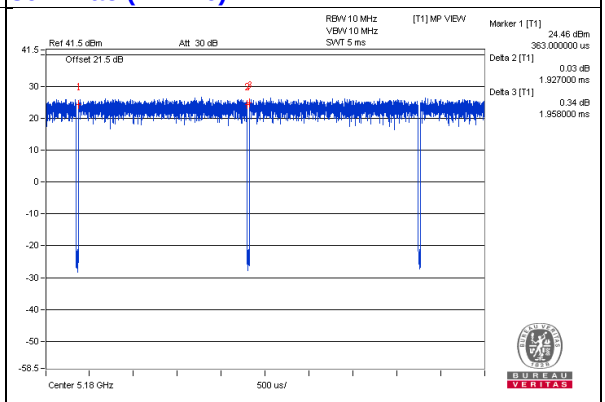
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.055 ms/2.183 ms = 0.941, Duty factor = 10 * log(1/0.941) = 0.26
802.11ac (VHT20): Duty cycle = 1.927 ms/1.958 ms = 0.984
802.11ac (VHT40): Duty cycle = 0.948 ms/0.981 ms = 0.966, Duty factor = 10 * log(1/0.966) = 0.15
802.11ac (VHT80): Duty cycle = 0.46 ms/0.489 ms = 0.941, Duty factor = 10 * log(1/0.941) = 0.27

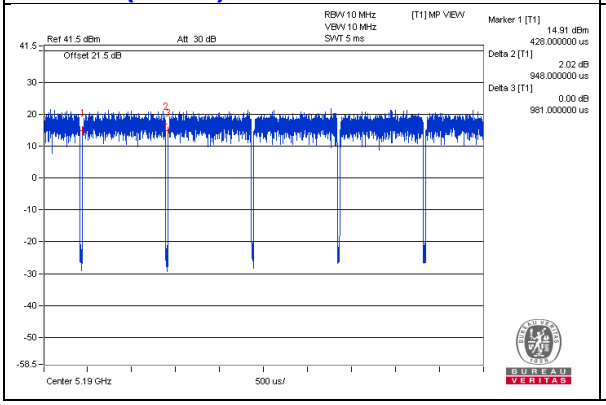
802.11a



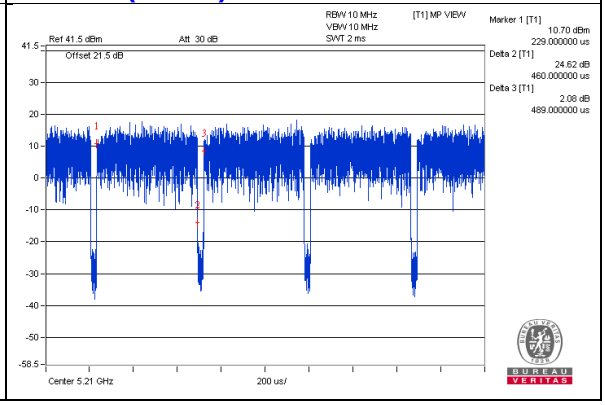
802.11ac (VHT20)



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.

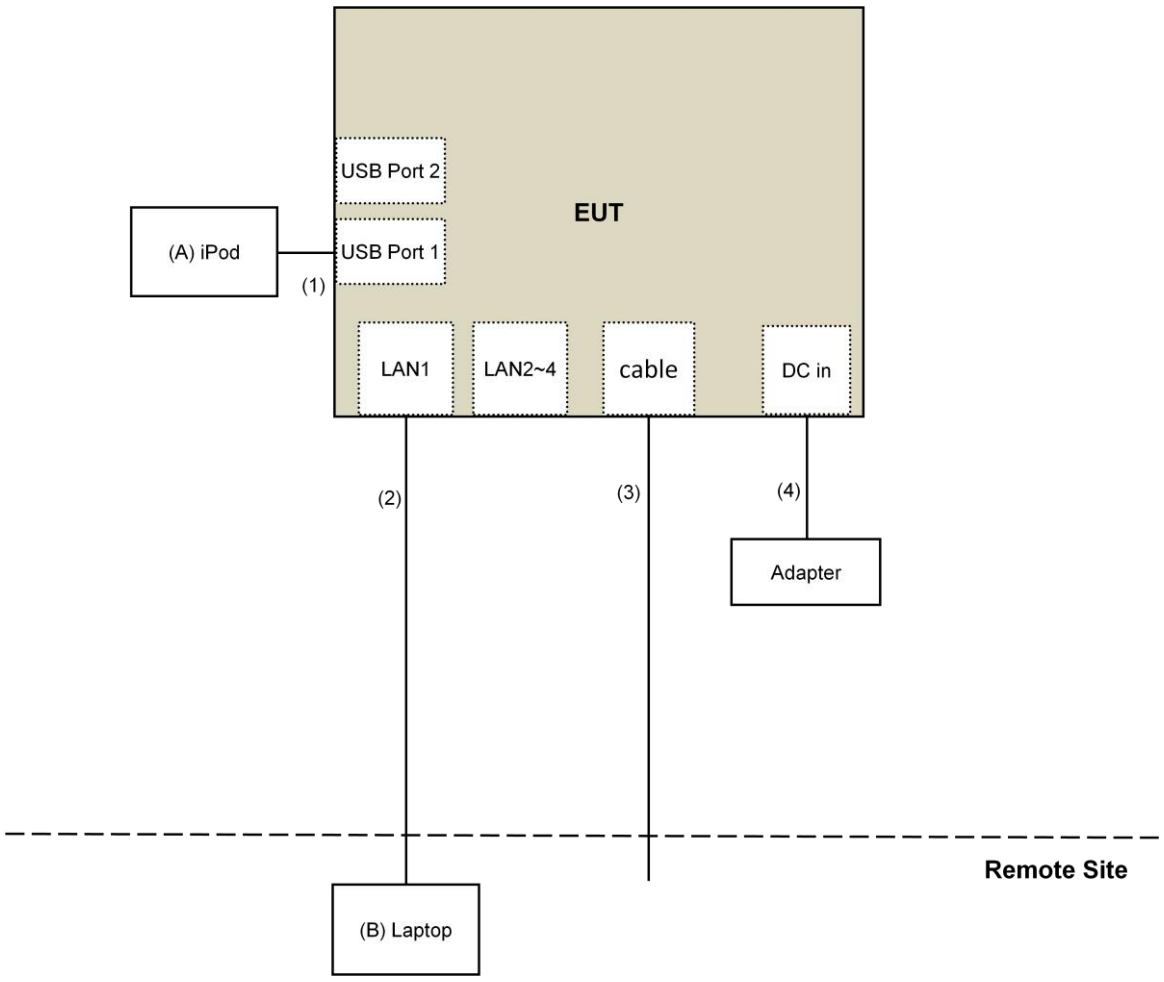
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	iPod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
B.	Laptop	HP	Pavilion 14-ab023TU	5CD5340WXZ	NA	Provided by Lab

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.	USB Cable	1	0.1	Yes	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	Coaxial Cable	1	10	Yes	0	Provided by Lab
4.	DC Cable	1	1.8	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v01r04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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

<table>
<tr><td colspan="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r03</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="4">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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 08, 2017	July 07, 2018
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 10, 2016	Nov. 09, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2016	Nov. 09, 2017

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5 Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Aug. 08 to 11, 2017

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. Both X and Y axes 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 detect 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:

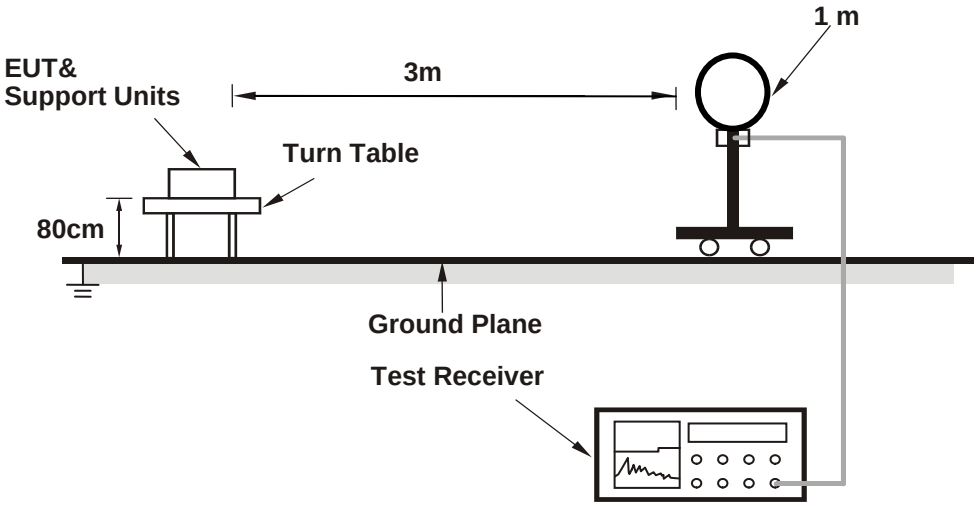
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

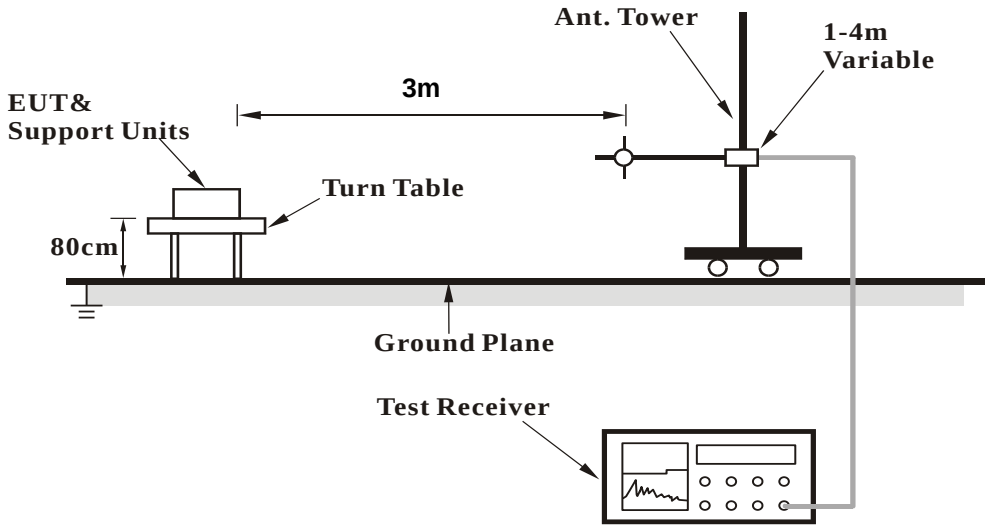
No deviation.

4.1.5 Test Setup

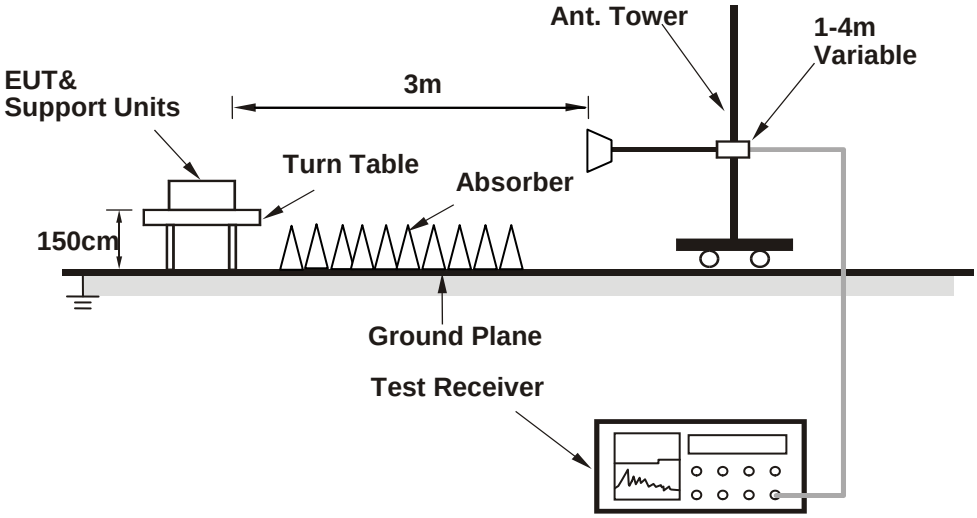
For Radiated emission below 30MHz



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 (MTool [V2.0.2.7]) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

CDD Mode

802.11a

CHANNEL	TX Channel 36	**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	66.6 PK	74.0	-7.4	1.50 H	319	62.6	4.0
2	5150.00	51.3 AV	54.0	-2.7	1.50 H	319	47.3	4.0
3	*5180.00	105.4 PK			1.45 H	322	101.4	4.0
4	*5180.00	95.7 AV			1.45 H	322	91.7	4.0
5	#10360.00	65.1 PK	74.0	-8.9	1.53 H	132	51.5	13.6
6	#10360.00	35.2 AV	54.0	-18.8	1.53 H	132	21.6	13.6
7	15540.00	47.8 PK	74.0	-26.2	1.56 H	350	34.6	13.2
8	15540.00	33.9 AV	54.0	-20.1	1.56 H	350	20.7	13.2
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	5150.00	69.0 PK	74.0	-5.0	1.39 V	310	65.0	4.0
2	5150.00	53.7 AV	54.0	-0.3	1.39 V	310	49.7	4.0
3	*5180.00	111.3 PK			1.39 V	310	107.3	4.0
4	*5180.00	101.6 AV			1.39 V	310	97.6	4.0
5	#10360.00	68.5 PK	74.0	-5.5	1.90 V	33	54.9	13.6
6	#10360.00	35.7 AV	54.0	-18.3	1.90 V	33	22.1	13.6
7	15540.00	47.1 PK	74.0	-26.9	1.43 V	358	33.9	13.2
8	15540.00	33.8 AV	54.0	-20.2	1.43 V	358	20.6	13.2

REMARKS:

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

CHANNEL	TX Channel 40	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	*5200.00	106.5 PK			1.55 H	331	102.5	4.0
2	*5200.00	96.3 AV			1.55 H	331	92.3	4.0
3	#10400.00	64.9 PK	74.0	-9.1	1.50 H	139	51.3	13.6
4	#10400.00	34.8 AV	54.0	-19.2	1.50 H	139	21.2	13.6
5	15600.00	47.3 PK	74.0	-26.7	1.56 H	344	33.9	13.4
6	15600.00	33.7 AV	54.0	-20.3	1.56 H	344	20.3	13.4
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	*5200.00	112.4 PK			1.35 V	309	108.4	4.0
2	*5200.00	102.8 AV			1.35 V	309	98.8	4.0
3	#10400.00	68.5 PK	74.0	-5.5	1.85 V	22	54.9	13.6
4	#10400.00	35.7 AV	54.0	-18.3	1.85 V	22	22.1	13.6
5	15600.00	47.5 PK	74.0	-26.5	1.48 V	360	34.1	13.4
6	15600.00	33.9 AV	54.0	-20.1	1.48 V	360	20.5	13.4

REMARKS:

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

CHANNEL	TX Channel 48	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	*5240.00	107.0 PK			1.50 H	338	102.8	4.2
2	*5240.00	96.5 AV			1.50 H	338	92.3	4.2
3	5350.00	51.0 PK	74.0	-23.0	1.50 H	338	46.6	4.4
4	5350.00	38.2 AV	54.0	-15.8	1.50 H	338	33.8	4.4
5	#10480.00	64.9 PK	74.0	-9.1	1.45 H	123	51.2	13.7
6	#10480.00	34.6 AV	54.0	-19.4	1.45 H	123	20.9	13.7
7	15720.00	47.4 PK	74.0	-26.6	1.51 H	329	33.4	14.0
8	15720.00	33.5 AV	54.0	-20.5	1.51 H	329	19.5	14.0
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	*5240.00	113.0 PK			1.41 V	309	108.8	4.2
2	*5240.00	103.1 AV			1.41 V	309	98.9	4.2
3	5350.00	51.8 PK	74.0	-22.2	1.41 V	309	47.4	4.4
4	5350.00	38.7 AV	54.0	-15.3	1.41 V	309	34.3	4.4
5	#10480.00	68.4 PK	74.0	-5.6	1.86 V	30	54.7	13.7
6	#10480.00	35.5 AV	54.0	-18.5	1.86 V	30	21.8	13.7
7	15720.00	47.6 PK	74.0	-26.4	1.44 V	360	33.6	14.0
8	15720.00	33.9 AV	54.0	-20.1	1.44 V	360	19.9	14.0

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	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	#5626.28	50.7 PK	68.2	-17.5	1.03 H	41	46.0	4.7
2	*5745.00	104.5 PK			1.03 H	41	99.5	5.0
3	*5745.00	94.7 AV			1.03 H	41	89.7	5.0
4	#6005.44	51.0 PK	68.2	-17.2	1.03 H	41	45.3	5.7
5	11490.00	65.5 PK	74.0	-8.5	3.70 H	167	51.4	14.1
6	11490.00	52.8 AV	54.0	-1.2	3.70 H	167	38.7	14.1
7	#17235.00	61.3 PK	74.0	-12.7	1.50 H	338	43.0	18.3
8	#17235.00	49.8 AV	54.0	-4.2	1.50 H	338	31.5	18.3
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	#5650.33	52.3 PK	68.4	-16.1	1.50 V	152	47.6	4.7
2	*5745.00	112.6 PK			1.50 V	152	107.6	5.0
3	*5745.00	102.0 AV			1.50 V	152	97.0	5.0
4	#5990.86	51.5 PK	68.2	-16.7	1.50 V	152	45.9	5.6
5	11490.00	68.2 PK	74.0	-5.8	2.60 V	184	54.1	14.1
6	**11490.00**	**53.9 AV**	**54.0**	**-0.1**	**2.60 V**	**184**	**39.8**	**14.1**
7	#17235.00	56.4 PK	74.0	-17.6	1.50 V	0	38.1	18.3
8	#17235.00	44.2 AV	54.0	-9.8	1.50 V	0	25.9	18.3

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	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	#5636.31	51.1 PK	68.2	-17.1	1.03 H	41	46.3	4.8
2	*5785.00	105.7 PK			1.03 H	41	100.7	5.0
3	*5785.00	95.7 AV			1.03 H	41	90.7	5.0
4	#5999.47	51.4 PK	68.2	-16.8	1.03 H	41	45.8	5.6
5	11570.00	65.9 PK	74.0	-8.1	3.75 H	170	51.9	14.0
6	11570.00	53.2 AV	54.0	-0.8	3.75 H	170	39.2	14.0
7	#17355.00	61.8 PK	74.0	-12.2	1.53 H	327	42.9	18.9
8	#17355.00	50.0 AV	54.0	-4.0	1.53 H	327	31.1	18.9
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	#5627.22	52.7 PK	68.2	-15.5	1.50 V	151	48.0	4.7
2	*5785.00	113.5 PK			1.50 V	151	108.5	5.0
3	*5785.00	102.8 AV			1.50 V	151	97.8	5.0
4	#5942.21	51.9 PK	68.2	-16.3	1.50 V	151	46.5	5.4
5	11570.00	68.8 PK	74.0	-5.2	2.82 V	184	54.8	14.0
6	**11570.00**	**53.9 AV**	**54.0**	**-0.1**	**2.82 V**	**184**	**39.9**	**14.0**
7	#17355.00	56.0 PK	74.0	-18.0	1.44 V	8	37.1	18.9
8	#17355.00	43.7 AV	54.0	-10.3	1.44 V	8	24.8	18.9

REMARKS:

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

CHANNEL	TX Channel 165	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	#5613.65	51.3 PK	68.2	-16.9	1.03 H	41	46.6	4.7
2	*5825.00	105.2 PK			1.03 H	41	100.0	5.2
3	*5825.00	95.0 AV			1.03 H	41	89.8	5.2
4	#5985.48	52.0 PK	68.2	-16.2	1.03 H	41	46.4	5.6
5	11650.00	65.4 PK	74.0	-8.6	3.71 H	166	51.3	14.1
6	11650.00	52.6 AV	54.0	-1.4	3.71 H	166	38.5	14.1
7	#17475.00	61.4 PK	74.0	-12.6	1.44 H	338	41.7	19.7
8	#17475.00	49.6 AV	54.0	-4.4	1.44 H	338	29.9	19.7
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	#5588.18	51.9 PK	68.2	-16.3	1.50 V	150	47.3	4.6
2	*5825.00	113.0 PK			1.50 V	150	107.8	5.2
3	*5825.00	102.3 AV			1.50 V	150	97.1	5.2
4	#5990.09	52.6 PK	68.2	-15.6	1.50 V	150	47.0	5.6
5	11650.00	68.8 PK	74.0	-5.2	2.82 V	184	54.7	14.1
6	**11650.00**	**53.9 AV**	**54.0**	**-0.1**	**2.82 V**	**184**	**39.8**	**14.1**
7	#17475.00	56.5 PK	74.0	-17.5	1.47 V	15	36.8	19.7
8	#17475.00	44.0 AV	54.0	-10.0	1.47 V	15	24.3	19.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT20)

CHANNEL	TX Channel 149	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	#5646.23	51.2 PK	68.2	-17.0	1.06 H	60	46.4	4.8
2	*5745.00	105.3 PK			1.06 H	60	100.3	5.0
3	*5745.00	95.2 AV			1.06 H	60	90.2	5.0
4	#5968.33	51.0 PK	68.2	-17.2	1.06 H	60	45.5	5.5
5	11490.00	65.8 PK	74.0	-8.2	3.74 H	158	51.7	14.1
6	11490.00	52.9 AV	54.0	-1.1	3.74 H	158	38.8	14.1
7	#17235.00	61.3 PK	74.0	-12.7	1.48 H	331	43.0	18.3
8	#17235.00	49.8 AV	54.0	-4.2	1.48 H	331	31.5	18.3
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	#5636.30	52.3 PK	68.2	-15.9	1.50 V	153	47.5	4.8
2	*5745.00	111.5 PK			1.50 V	153	106.5	5.0
3	*5745.00	101.0 AV			1.50 V	153	96.0	5.0
4	#5992.66	51.8 PK	68.2	-16.4	1.50 V	153	46.2	5.6
5	11490.00	68.7 PK	74.0	-5.3	2.77 V	86	54.6	14.1
6	**11490.00**	**53.9 AV**	**54.0**	**-0.1**	**2.77 V**	**86**	**39.8**	**14.1**
7	#17235.00	56.0 PK	74.0	-18.0	1.48 V	18	37.7	18.3
8	#17235.00	43.7 AV	54.0	-10.3	1.48 V	18	25.4	18.3

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	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	#5639.89	50.3 PK	68.2	-17.9	1.32 H	60	45.5	4.8
2	*5785.00	105.8 PK			1.32 H	60	100.8	5.0
3	*5785.00	95.5 AV			1.32 H	60	90.5	5.0
4	#5934.89	51.1 PK	68.2	-17.1	1.32 H	60	45.7	5.4
5	11570.00	65.8 PK	74.0	-8.2	3.73 H	159	51.8	14.0
6	11570.00	53.0 AV	54.0	-1.0	3.73 H	159	39.0	14.0
7	#17355.00	61.9 PK	74.0	-12.1	1.48 H	325	43.0	18.9
8	#17355.00	50.2 AV	54.0	-3.8	1.48 H	325	31.3	18.9
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	#5632.52	51.7 PK	68.2	-16.5	1.50 V	151	46.9	4.8
2	*5785.00	112.9 PK			1.50 V	151	107.9	5.0
3	*5785.00	101.3 AV			1.50 V	151	96.3	5.0
4	#6017.90	51.5 PK	68.2	-16.7	1.50 V	151	45.8	5.7
5	11570.00	67.0 PK	74.0	-7.0	2.77 V	186	53.0	14.0
6	**11570.00**	**53.9 AV**	**54.0**	**-0.1**	**2.77 V**	**186**	**39.9**	**14.0**
7	#17355.00	56.3 PK	74.0	-17.7	1.44 V	5	37.4	18.9
8	#17355.00	43.8 AV	54.0	-10.2	1.44 V	5	24.9	18.9

REMARKS:

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

CHANNEL	TX Channel 165	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	#5644.90	50.8 PK	68.2	-17.4	1.50 H	60	46.0	4.8
2	*5825.00	104.4 PK			1.50 H	60	99.2	5.2
3	*5825.00	94.2 AV			1.50 H	60	89.0	5.2
4	#5997.57	51.8 PK	68.2	-16.4	1.50 H	60	46.2	5.6
5	11650.00	65.8 PK	74.0	-8.2	3.76 H	157	51.7	14.1
6	11650.00	53.2 AV	54.0	-0.8	3.76 H	157	39.1	14.1
7	#17475.00	62.4 PK	74.0	-11.6	1.52 H	335	42.7	19.7
8	#17475.00	50.3 AV	54.0	-3.7	1.52 H	335	30.6	19.7
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	#5590.98	51.9 PK	68.2	-16.3	1.50 V	152	47.3	4.6
2	*5825.00	112.2 PK			1.50 V	152	107.0	5.2
3	*5825.00	101.0 AV			1.50 V	152	95.8	5.2
4	#5923.55	55.3 PK	69.3	-14.0	1.50 V	152	49.9	5.4
5	11650.00	68.0 PK	74.0	-6.0	2.80 V	185	53.9	14.1
6	**11650.00**	**53.9 AV**	**54.0**	**-0.1**	**2.80 V**	**185**	**39.8**	**14.1**
7	#17475.00	56.1 PK	74.0	-17.9	1.39 V	10	36.4	19.7
8	#17475.00	43.8 AV	54.0	-10.2	1.39 V	10	24.1	19.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT40)

CHANNEL	TX Channel 38	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	64.6 PK	74.0	-9.4	1.61 H	338	60.6	4.0
2	5150.00	51.3 AV	54.0	-2.7	1.61 H	338	47.3	4.0
3	*5190.00	99.3 PK			1.61 H	338	95.3	4.0
4	*5190.00	89.2 AV			1.61 H	338	85.2	4.0
5	5350.00	51.0 PK	74.0	-23.0	1.61 H	338	46.6	4.4
6	5350.00	40.1 AV	54.0	-13.9	1.61 H	338	35.7	4.4
7	#10380.00	58.7 PK	74.0	-15.3	1.40 H	126	45.1	13.6
8	#10380.00	34.0 AV	54.0	-20.0	1.40 H	126	20.4	13.6
9	15570.00	46.9 PK	74.0	-27.1	1.47 H	333	33.6	13.3
10	15570.00	33.3 AV	54.0	-20.7	1.47 H	333	20.0	13.3
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	5150.00	67.0 PK	74.0	-7.0	1.50 V	321	63.0	4.0
2	5150.00	53.7 AV	54.0	-0.3	1.50 V	321	49.7	4.0
3	*5190.00	105.7 PK			1.50 V	321	101.7	4.0
4	*5190.00	95.6 AV			1.50 V	321	91.6	4.0
5	5350.00	53.0 PK	74.0	-21.0	1.50 V	321	48.6	4.4
6	5350.00	42.6 AV	54.0	-11.4	1.50 V	321	38.2	4.4
7	#10380.00	60.6 PK	74.0	-13.4	1.16 V	174	47.0	13.6
8	#10380.00	35.1 AV	54.0	-18.9	1.16 V	174	21.5	13.6
9	15570.00	47.5 PK	74.0	-26.5	1.56 V	360	34.2	13.3
10	15570.00	33.7 AV	54.0	-20.3	1.56 V	360	20.4	13.3

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 46	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	5145.00	61.2 PK	74.0	-12.8	1.66 H	347	57.2	4.0
2	5145.00	46.8 AV	54.0	-7.2	1.66 H	347	42.8	4.0
3	*5230.00	102.9 PK			1.66 H	347	98.7	4.2
4	*5230.00	92.8 AV			1.66 H	347	88.6	4.2
5	5372.90	58.8 PK	74.0	-15.2	1.66 H	347	54.4	4.4
6	5372.90	41.1 AV	54.0	-12.9	1.66 H	347	36.7	4.4
7	#10460.00	61.9 PK	74.0	-12.1	1.37 H	124	48.2	13.7
8	#10460.00	36.2 AV	54.0	-17.8	1.37 H	124	22.5	13.7
9	15690.00	47.3 PK	74.0	-26.7	1.43 H	331	33.3	14.0
10	15690.00	33.4 AV	54.0	-20.6	1.43 H	331	19.4	14.0
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	5145.00	63.7 PK	74.0	-10.3	1.50 V	321	59.7	4.0
2	5145.00	49.1 AV	54.0	-4.9	1.50 V	321	45.1	4.0
3	*5230.00	109.4 PK			1.50 V	321	105.2	4.2
4	*5230.00	99.1 AV			1.50 V	321	94.9	4.2
5	5372.90	61.0 PK	74.0	-13.0	1.50 V	321	56.6	4.4
6	5372.90	43.6 AV	54.0	-10.4	1.50 V	321	39.2	4.4
7	#10460.00	63.1 PK	74.0	-10.9	1.20 V	175	49.4	13.7
8	#10460.00	37.4 AV	54.0	-16.6	1.20 V	175	23.7	13.7
9	15690.00	47.7 PK	74.0	-26.3	1.54 V	356	33.7	14.0
10	15690.00	33.9 AV	54.0	-20.1	1.54 V	356	19.9	14.0

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 151	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	#5645.95	55.2 PK	68.2	-13.0	1.27 H	317	50.4	4.8
2	*5755.00	103.1 PK			1.27 H	317	98.1	5.0
3	*5755.00	93.2 AV			1.27 H	317	88.2	5.0
4	#5923.82	53.9 PK	69.1	-15.2	1.27 H	317	48.5	5.4
5	11510.00	65.2 PK	74.0	-8.8	3.77 H	148	51.2	14.0
6	11510.00	52.5 AV	54.0	-1.5	3.77 H	148	38.5	14.0
7	#17265.00	61.4 PK	74.0	-12.6	1.52 H	346	42.9	18.5
8	#17265.00	49.8 AV	54.0	-4.2	1.52 H	346	31.3	18.5
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	#5649.38	66.9 PK	68.2	-1.3	1.50 V	204	62.1	4.8
2	*5755.00	111.0 PK			1.50 V	204	106.0	5.0
3	*5755.00	100.3 AV			1.50 V	204	95.3	5.0
4	#5921.39	62.9 PK	70.9	-8.0	1.50 V	204	57.5	5.4
5	11510.00	67.3 PK	74.0	-6.7	2.85 V	198	53.3	14.0
6	11510.00	53.5 AV	54.0	-0.5	2.85 V	198	39.5	14.0
7	#17265.00	56.3 PK	74.0	-17.7	1.36 V	24	37.8	18.5
8	#17265.00	44.1 AV	54.0	-9.9	1.36 V	24	25.6	18.5

REMARKS:

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

CHANNEL	TX Channel 159	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	#5621.25	52.2 PK	68.2	-16.0	1.27 H	316	47.5	4.7
2	*5795.00	103.3 PK			1.27 H	316	98.2	5.1
3	*5795.00	93.3 AV			1.27 H	316	88.2	5.1
4	#5934.27	56.3 PK	68.2	-11.9	1.27 H	316	50.9	5.4
5	11590.00	65.1 PK	74.0	-8.9	3.72 H	173	51.1	14.0
6	11590.00	52.4 AV	54.0	-1.6	3.72 H	173	38.4	14.0
7	#17385.00	61.6 PK	74.0	-12.4	1.53 H	316	42.5	19.1
8	#17385.00	50.0 AV	54.0	-4.0	1.53 H	316	30.9	19.1
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	#5618.08	63.9 PK	68.2	-4.3	1.50 V	191	59.2	4.7
2	*5795.00	110.9 PK			1.50 V	191	105.8	5.1
3	*5795.00	99.8 AV			1.50 V	191	94.7	5.1
4	#5949.21	66.5 PK	68.2	-1.7	1.50 V	191	61.1	5.4
5	11590.00	67.5 PK	74.0	-6.5	2.80 V	177	53.5	14.0
6	11590.00	53.6 AV	54.0	-0.4	2.80 V	177	39.6	14.0
7	#17385.00	55.9 PK	74.0	-18.1	1.36 V	8	36.8	19.1
8	#17385.00	43.5 AV	54.0	-10.5	1.36 V	8	24.4	19.1

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 42	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	5145.00	62.1 PK	74.0	-11.9	1.71 H	333	58.1	4.0
2	5145.00	51.3 AV	54.0	-2.7	1.71 H	333	47.3	4.0
3	*5210.00	97.4 PK			1.71 H	333	93.3	4.1
4	*5210.00	88.3 AV			1.71 H	333	84.2	4.1
5	5350.00	51.8 PK	74.0	-22.2	1.71 H	333	47.4	4.4
6	5350.00	41.2 AV	54.0	-12.8	1.71 H	333	36.8	4.4
7	#10420.00	57.7 PK	74.0	-16.3	1.32 H	118	44.1	13.6
8	#10420.00	33.1 AV	54.0	-20.9	1.32 H	118	19.5	13.6
9	15630.00	47.0 PK	74.0	-27.0	1.39 H	342	33.4	13.6
10	15630.00	33.2 AV	54.0	-20.8	1.39 H	342	19.6	13.6
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	5145.00	65.2 PK	74.0	-8.8	1.50 V	322	61.2	4.0
2	**5145.00**	**53.9 AV**	**54.0**	**-0.1**	**1.50 V**	**322**	**49.9**	**4.0**
3	*5210.00	104.0 PK			1.50 V	322	99.9	4.1
4	*5210.00	94.7 AV			1.50 V	322	90.6	4.1
5	5350.00	53.6 PK	74.0	-20.4	1.50 V	322	49.2	4.4
6	5350.00	43.5 AV	54.0	-10.5	1.50 V	322	39.1	4.4
7	#10420.00	58.8 PK	74.0	-15.2	1.14 V	170	45.2	13.6
8	#10420.00	34.1 AV	54.0	-19.9	1.14 V	170	20.5	13.6
9	15630.00	47.4 PK	74.0	-26.6	1.54 V	360	33.8	13.6
10	15630.00	33.5 AV	54.0	-20.5	1.54 V	360	19.9	13.6

REMARKS:

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

CHANNEL	TX Channel 155	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	#5626.95	61.0 PK	68.2	-7.2	1.27 H	316	56.3	4.7
2	*5775.00	100.2 PK			1.27 H	316	95.2	5.0
3	*5775.00	90.4 AV			1.27 H	316	85.4	5.0
4	#5926.20	62.8 PK	68.2	-5.4	1.27 H	316	57.4	5.4
5	11550.00	52.2 PK	74.0	-21.8	3.77 H	184	38.2	14.0
6	11550.00	47.5 AV	54.0	-6.5	3.77 H	184	33.5	14.0
7	#17325.00	56.4 PK	74.0	-17.6	1.50 H	324	37.8	18.6
8	#17325.00	45.2 AV	54.0	-8.8	1.50 H	324	26.6	18.6
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	#5643.01	67.3 PK	68.2	-0.9	1.50 V	191	62.5	4.8
2	*5775.00	104.3 PK			1.50 V	191	99.3	5.0
3	*5775.00	96.0 AV			1.50 V	191	91.0	5.0
4	#5923.54	67.3 PK	69.3	-2.0	1.50 V	191	61.9	5.4
5	11550.00	53.9 PK	74.0	-20.1	2.79 V	166	39.9	14.0
6	11550.00	48.7 AV	54.0	-5.3	2.79 V	166	34.7	14.0
7	#17325.00	54.2 PK	74.0	-19.8	1.41 V	2	35.6	18.6
8	#17325.00	41.0 AV	54.0	-13.0	1.41 V	2	22.4	18.6

REMARKS:

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

Beamforming Mode (Nss=2)

802.11ac (VHT20)

CHANNEL	TX Channel 36	**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	68.2 PK	74.0	-5.8	1.55 H	325	64.2	4.0
2	5150.00	51.5 AV	54.0	-2.5	1.55 H	325	47.5	4.0
3	*5180.00	103.8 PK			1.55 H	325	99.8	4.0
4	*5180.00	93.8 AV			1.55 H	325	89.8	4.0
5	#10360.00	62.7 PK	74.0	-11.3	1.41 H	110	49.1	13.6
6	#10360.00	36.6 AV	54.0	-17.4	1.41 H	110	23.0	13.6
7	15540.00	46.6 PK	74.0	-27.4	1.56 H	339	33.4	13.2
8	15540.00	33.0 AV	54.0	-21.0	1.56 H	339	19.8	13.2
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	5150.00	70.6 PK	74.0	-3.4	1.57 V	311	66.6	4.0
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.57 V**	**311**	**49.9**	**4.0**
3	*5180.00	110.3 PK			1.57 V	311	106.3	4.0
4	*5180.00	100.3 AV			1.57 V	311	96.3	4.0
5	#10360.00	63.2 PK	74.0	-10.8	1.20 V	187	49.6	13.6
6	#10360.00	37.5 AV	54.0	-16.5	1.20 V	187	23.9	13.6
7	15540.00	47.5 PK	74.0	-26.5	1.55 V	360	34.3	13.2
8	15540.00	33.9 AV	54.0	-20.1	1.55 V	360	20.7	13.2

REMARKS:

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

CHANNEL	TX Channel 40	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	*5200.00	107.1 PK			1.56 H	351	103.1	4.0
2	*5200.00	96.5 AV			1.56 H	351	92.5	4.0
3	#10400.00	64.2 PK	74.0	-9.8	1.45 H	105	50.6	13.6
4	#10400.00	38.7 AV	54.0	-15.3	1.45 H	105	25.1	13.6
5	15600.00	46.7 PK	74.0	-27.3	1.57 H	333	33.3	13.4
6	15600.00	33.2 AV	54.0	-20.8	1.57 H	333	19.8	13.4
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	*5200.00	113.5 PK			1.44 V	310	109.5	4.0
2	*5200.00	102.9 AV			1.44 V	310	98.9	4.0
3	#10400.00	65.5 PK	74.0	-8.5	1.26 V	180	51.9	13.6
4	#10400.00	39.9 AV	54.0	-14.1	1.26 V	180	26.3	13.6
5	15600.00	47.1 PK	74.0	-26.9	1.50 V	358	33.7	13.4
6	15600.00	33.7 AV	54.0	-20.3	1.50 V	358	20.3	13.4

REMARKS:

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

CHANNEL	TX Channel 48	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	*5240.00	108.1 PK			1.54 H	353	103.9	4.2
2	*5240.00	96.9 AV			1.54 H	353	92.7	4.2
3	5350.00	53.8 PK	74.0	-20.2	1.54 H	353	49.4	4.4
4	5350.00	38.9 AV	54.0	-15.1	1.54 H	353	34.5	4.4
5	#10480.00	64.5 PK	74.0	-9.5	1.37 H	115	50.8	13.7
6	#10480.00	38.9 AV	54.0	-15.1	1.37 H	115	25.2	13.7
7	15720.00	46.6 PK	74.0	-27.4	1.53 H	333	32.6	14.0
8	15720.00	33.2 AV	54.0	-20.8	1.53 H	333	19.2	14.0
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	*5240.00	114.6 PK			1.62 V	306	110.4	4.2
2	*5240.00	103.5 AV			1.62 V	306	99.3	4.2
3	5350.00	55.9 PK	74.0	-18.1	1.62 V	306	51.5	4.4
4	5350.00	41.1 AV	54.0	-12.9	1.62 V	306	36.7	4.4
5	#10480.00	65.8 PK	74.0	-8.2	1.29 V	176	52.1	13.7
6	#10480.00	40.2 AV	54.0	-13.8	1.29 V	176	26.5	13.7
7	15720.00	46.6 PK	74.0	-27.4	1.45 V	360	32.6	14.0
8	15720.00	33.4 AV	54.0	-20.6	1.45 V	360	19.4	14.0

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

CDD Mode

802.11a

CHANNEL	TX Channel 157	**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	104.67	36.2 QP	43.5	-7.3	3.00 H	74	48.1	-11.9
2	199.97	31.9 QP	43.5	-11.6	1.00 H	173	43.3	-11.4
3	244.15	35.7 QP	46.0	-10.3	1.00 H	232	45.4	-9.7
4	320.01	38.7 QP	46.0	-7.3	1.00 H	273	45.8	-7.1
5	419.19	36.3 QP	46.0	-9.7	1.00 H	9	40.9	-4.6
6	451.88	37.0 QP	46.0	-9.0	2.50 H	351	40.6	-3.6
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	91.57	33.4 QP	43.5	-10.1	2.00 V	53	47.4	-14.0
2	245.22	33.6 QP	46.0	-12.4	1.50 V	26	43.3	-9.7
3	320.03	34.3 QP	46.0	-11.7	1.50 V	186	41.4	-7.1
4	454.96	35.2 QP	46.0	-10.8	2.00 V	94	38.7	-3.5
5	480.01	37.3 QP	46.0	-8.7	1.00 V	153	40.3	-3.0
6	674.98	31.9 QP	46.0	-14.1	1.50 V	123	31.4	0.5

REMARKS:

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

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, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
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 Shielded Room No. 1.
3 Tested Date: Aug. 11 to 15, 2017

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.

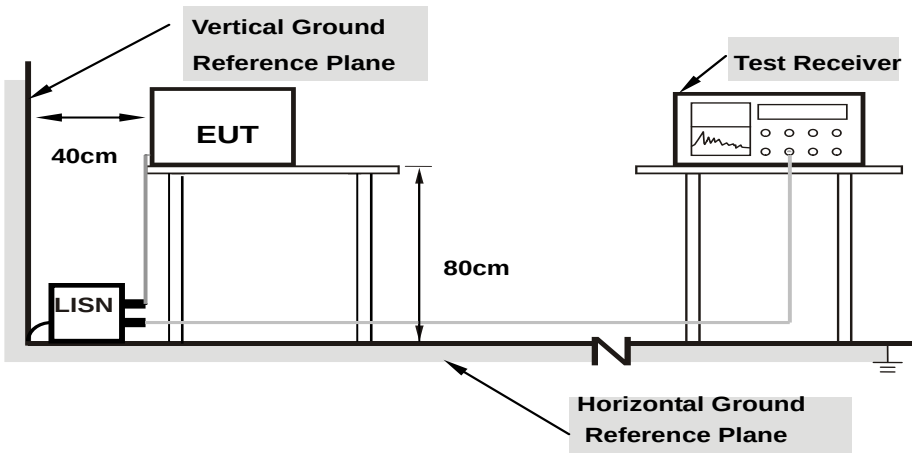
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

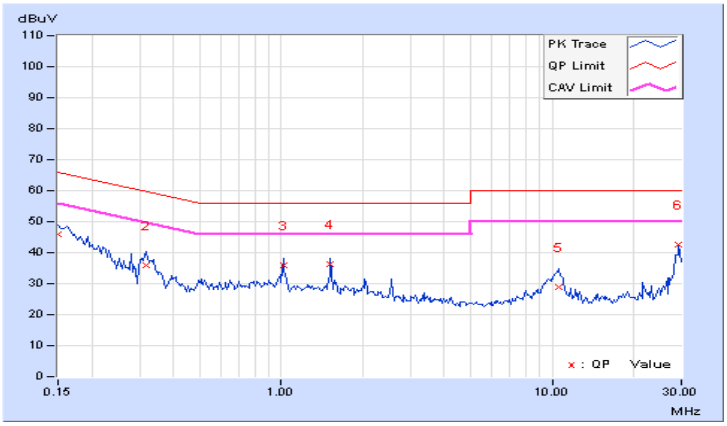
4.2.7 Test Results (Mode 1)

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	10.08	35.68	22.83	45.76	32.91	66.00	56.00	-20.24	-23.09
2	0.31797	10.10	25.95	18.13	36.05	28.23	59.76	49.76	-23.71	-21.53
3	1.02344	10.16	25.80	20.65	35.96	30.81	56.00	46.00	-20.04	-15.19
4	1.52344	10.17	25.96	22.45	36.13	32.62	56.00	46.00	-19.87	-13.38
5	10.53906	10.82	18.00	9.78	28.82	20.60	60.00	50.00	-31.18	-29.40
6	**29.23438**	**11.74**	**30.76**	**28.13**	**42.50**	**39.87**	**60.00**	**50.00**	**-17.50**	**-10.13**

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.

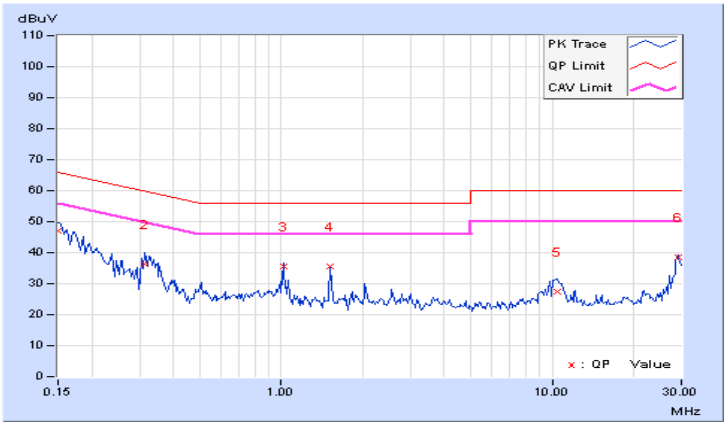


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	10.07	36.79	23.07	46.86	33.14	66.00	56.00	-19.14	-22.86
2	0.31406	10.09	26.29	18.31	36.38	28.40	59.86	49.86	-23.48	-21.46
3	1.01953	10.12	25.27	23.59	35.39	33.71	56.00	46.00	-20.61	-12.29
4	1.52344	10.17	25.21	22.21	35.38	32.38	56.00	46.00	-20.62	-13.62
5	10.39063	10.72	16.64	8.00	27.36	18.72	60.00	50.00	-32.64	-31.28
6	29.11328	11.29	27.38	24.80	38.67	36.09	60.00	50.00	-21.33	-13.91

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.



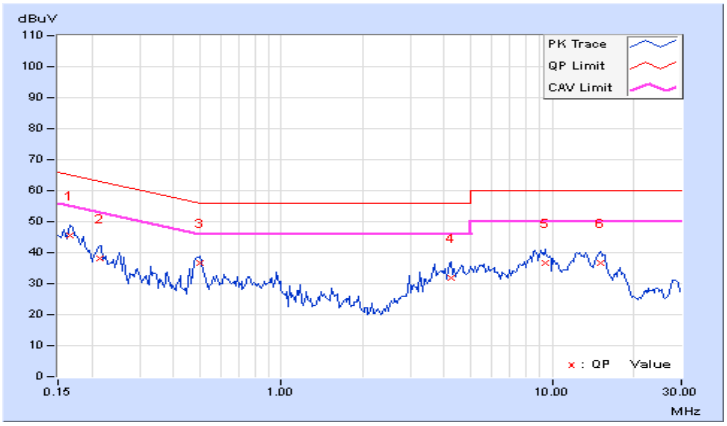
4.2.8 Test Results (Mode 2)

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	0.16562	10.07	35.33	25.97	45.40	36.04	65.18	55.18	-19.78	-19.14
2	0.21441	10.06	28.03	20.72	38.09	30.78	63.03	53.03	-24.94	-22.25
3	0.50156	10.12	26.59	23.09	36.71	33.21	56.00	46.00	-19.29	-12.79
4	4.24219	10.31	21.59	14.67	31.90	24.98	56.00	46.00	-24.10	-21.02
5	9.39453	10.58	25.93	20.45	36.51	31.03	60.00	50.00	-23.49	-18.97
6	15.02734	10.96	25.74	19.74	36.70	30.70	60.00	50.00	-23.30	-19.30

REMARKS:

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

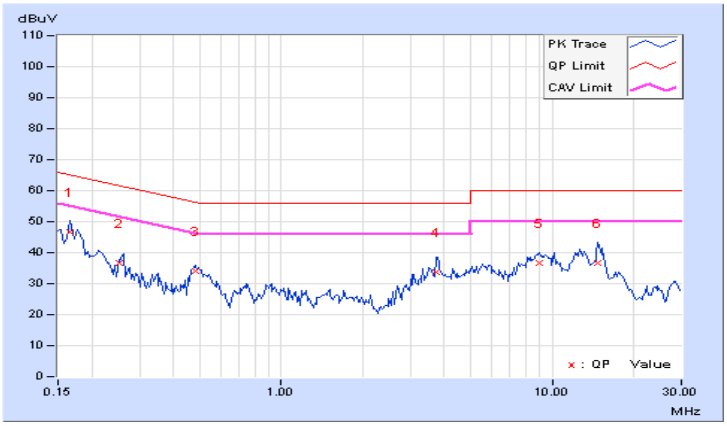


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16562	10.05	36.54	25.62	46.59	35.67	65.18	55.18	-18.59	-19.51
2	0.25241	10.05	26.56	19.65	36.61	29.70	61.68	51.68	-25.07	-21.98
3	0.48203	10.10	23.96	20.22	34.06	30.32	56.30	46.30	-22.24	-15.98
4	3.73047	10.21	23.36	13.80	33.57	24.01	56.00	46.00	-22.43	-21.99
5	8.95313	10.49	26.09	20.47	36.58	30.96	60.00	50.00	-23.42	-19.04
6	14.78906	10.78	26.01	19.87	36.79	30.65	60.00	50.00	-23.21	-19.35

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 Measurment

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)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.81	21.50	21.78	21.58	587.5	27.69	30.00	Pass
40	5200	21.54	22.39	21.28	21.63	595.763	27.75	30.00	Pass
48	5240	21.52	21.85	21.67	21.69	589.479	27.70	30.00	Pass
149	5745	23.32	22.20	22.73	23.93	815.413	29.11	30.00	Pass
157	5785	24.03	22.85	24.12	24.60	992.311	29.97	30.00	Pass
165	5825	23.16	22.37	22.91	23.92	821.636	29.15	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.96	21.45	22.16	21.69	608.681	27.84	30.00	Pass
40	5200	21.54	22.83	21.15	21.58	608.625	27.84	30.00	Pass
48	5240	21.85	21.96	21.75	21.68	607	27.83	30.00	Pass
149	5745	24.15	23.19	23.63	24.22	963.381	29.84	30.00	Pass
157	5785	24.21	23.21	23.61	24.60	991.062	29.96	30.00	Pass
165	5825	24.02	23.33	23.49	24.49	972.173	29.88	30.00	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	19.76	18.72	18.55	20.10	343.04	25.35	30.00	Pass
46	5230	23.90	22.60	22.45	23.68	836.579	29.23	30.00	Pass
151	5755	24.13	22.40	23.31	25.36	990.448	29.96	30.00	Pass
159	5795	24.03	22.31	22.91	25.27	955.092	29.80	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	19.31	18.84	18.12	20.08	328.592	25.17	30.00	Pass
155	5775	21.79	20.72	22.19	23.38	652.388	28.15	30.00	Pass

Beamforming Mode (Nss=1)

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				
36	5180	21.96	21.45	22.16	21.69	608.681	27.84	27.85	Pass
40	5200	21.54	22.83	21.15	21.58	608.625	27.84	27.85	Pass
48	5240	21.85	21.96	21.75	21.68	607	27.83	27.85	Pass
149	5745	23.16	22.18	22.54	23.08	754.919	28.78	28.79	Pass
157	5785	23.08	22.12	22.34	23.38	755.333	28.78	28.79	Pass
165	5825	23.08	22.30	22.24	23.23	750.932	28.76	28.79	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi , so the power limit shall be reduced to 30-(8.15-6) = 27.85dBm.
2. For UNII-3: Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi , so the power limit shall be reduced to 30-(7.21-6) = 28.79dBm.

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				
38	5190	19.76	18.72	18.55	20.10	343.04	25.35	27.85	Pass
46	5230	22.45	20.80	20.85	22.16	582.074	27.65	27.85	Pass
151	5755	22.98	21.38	22.15	24.08	755.931	28.78	28.79	Pass
159	5795	23.04	21.39	21.96	24.07	751.399	28.76	28.79	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi , so the power limit shall be reduced to 30-(8.15-6) = 27.85dBm.
2. For UNII-3: Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi , so the power limit shall be reduced to 30-(7.21-6) = 28.79dBm.

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				
42	5210	19.31	18.84	18.12	20.08	328.592	25.17	27.85	Pass
155	5775	21.79	20.72	22.19	23.38	652.388	28.15	28.79	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi , so the power limit shall be reduced to 30-(8.15-6) = 27.85dBm.
2. For UNII-3: Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi , so the power limit shall be reduced to 30-(7.21-6) = 28.79dBm.

Beamforming Mode (Nss=2)

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				
36	5180	22.93	22.43	22.19	22.61	719.288	28.57	30.00	Pass
40	5200	23.53	24.81	23.10	23.68	965.635	29.85	30.00	Pass
48	5240	24.01	23.89	23.93	23.92	990.45	29.96	30.00	Pass
149	5745	24.15	23.19	23.63	24.22	963.381	29.84	30.00	Pass
157	5785	24.21	23.21	23.61	24.60	991.062	29.96	30.00	Pass
165	5825	24.02	23.33	23.49	24.49	972.173	29.88	30.00	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 6dBi , so the power limit shall not be reduced.
2. For UNII-3: Directional gain = 1.19dBi + 10log(2) = 4.20dBi < 6dBi , so the power limit shall not be reduced.

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				
38	5190	19.76	18.72	18.55	20.10	343.04	25.35	30.00	Pass
46	5230	23.90	22.60	22.45	23.68	836.579	29.23	30.00	Pass
151	5755	24.13	22.40	23.31	25.36	990.448	29.96	30.00	Pass
159	5795	24.03	22.31	22.91	25.27	955.092	29.80	30.00	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 6dBi , so the power limit shall not be reduced.
2. For UNII-3: Directional gain = 1.19dBi + 10log(2) = 4.20dBi < 6dBi , so the power limit shall not be reduced.

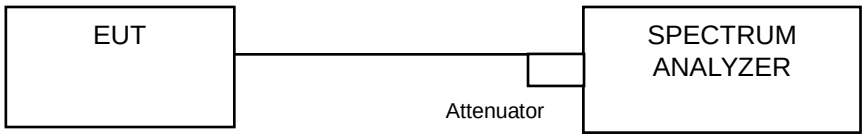
802.11ac (VHT80)

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				
42	5210	19.31	18.84	18.12	20.08	328.592	25.17	30.00	Pass
155	5775	21.79	20.72	22.19	23.38	652.388	28.15	30.00	Pass

Note: 1. For UNII-1: Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 6dBi , so the power limit shall not be reduced.
2. For UNII-3: Directional gain = 1.19dBi + 10log(2) = 4.20dBi < 6dBi , so the power limit shall not be reduced.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.08	18.48	17.52	19.56
40	5200	19.44	18.48	17.64	18.72
48	5240	18.00	17.28	17.52	19.08
149	5745	19.44	17.52	20.16	21.84
157	5785	22.80	19.68	24.24	24.84
165	5825	25.08	22.08	22.68	24.96

Beamforming Mode (Nss=2)

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	23.64	23.88	18.84	21.84
40	5200	29.40	27.60	20.88	27.96
48	5240	20.28	18.60	18.48	19.56
149	5745	23.88	20.04	24.72	25.68
157	5785	29.16	24.48	26.52	25.52
165	5825	29.64	28.32	26.52	30.12

802.11ac (VHT40)

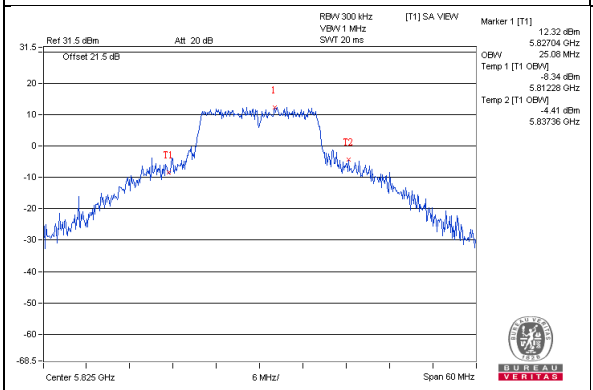
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.96	36.96	36.72	36.72
46	5230	38.40	37.44	37.20	38.64
151	5755	53.28	38.16	50.88	54.72
159	5795	57.12	42.72	49.20	59.76

802.11ac (VHT80)

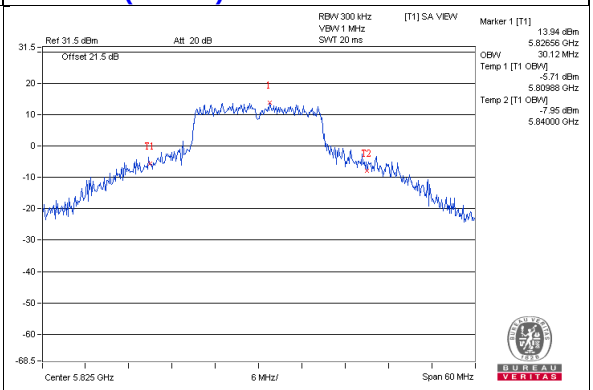
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.36	75.36	75.36	75.84
155	5775	76.80	76.32	78.24	77.28

Spectrum Plot of Worst Value

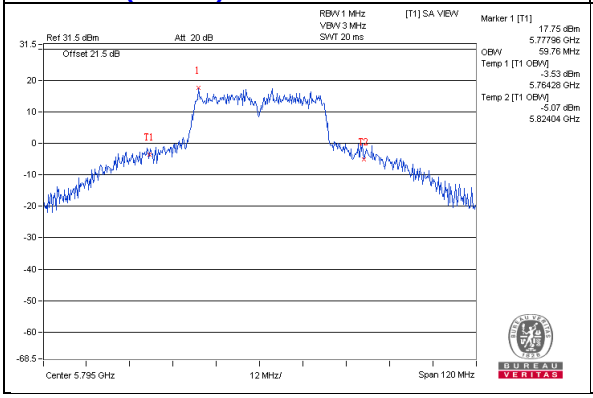
802.11a / Chain 0 : CH165



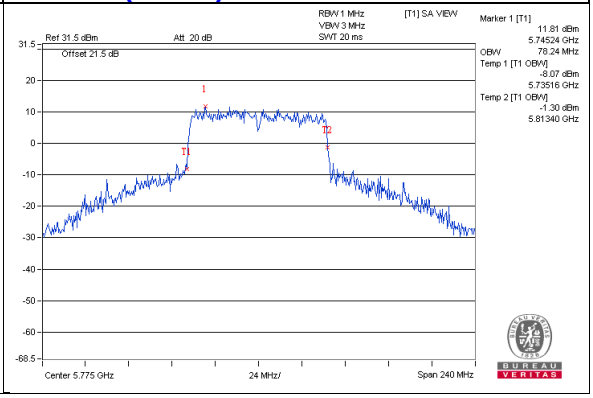
802.11ac (VHT20) / Chain 3 : CH165



802.11ac (VHT40) / Chain 3: CH159

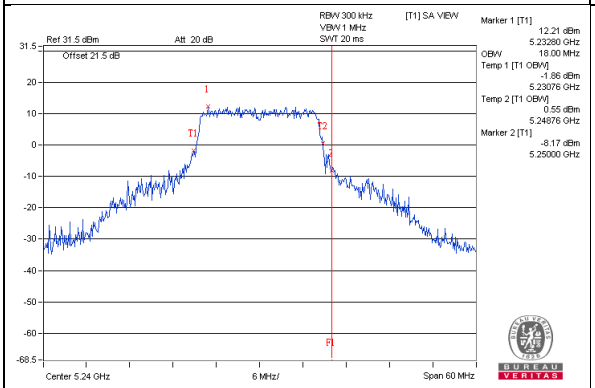


802.11ac (VHT80) / Chain 2 : CH155

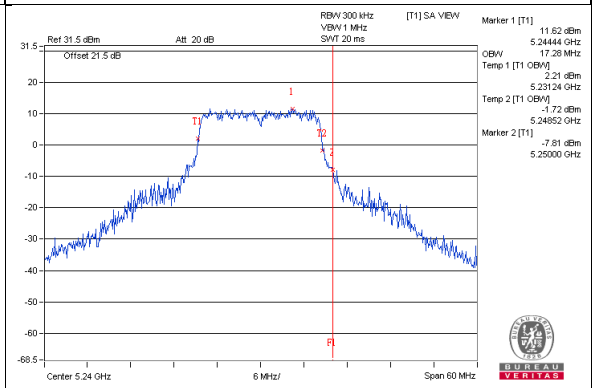


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

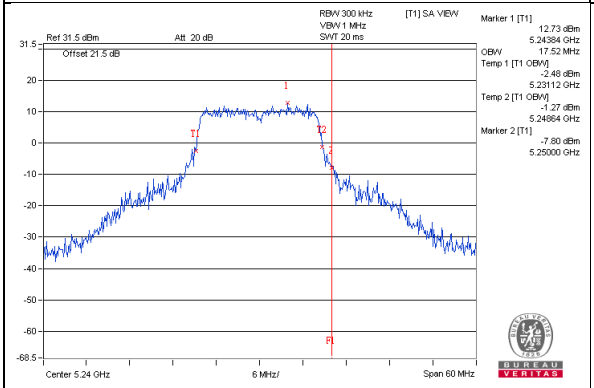
802.11a / Chain 0 : CH48



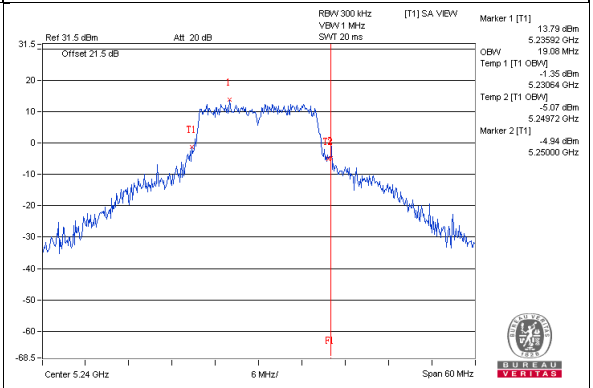
802.11a / Chain 1 : CH48



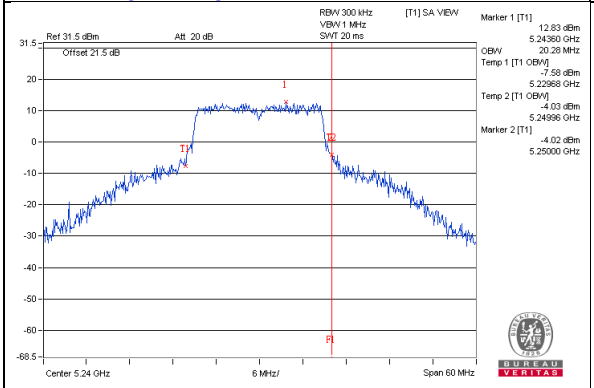
802.11a / Chain 2 : CH48



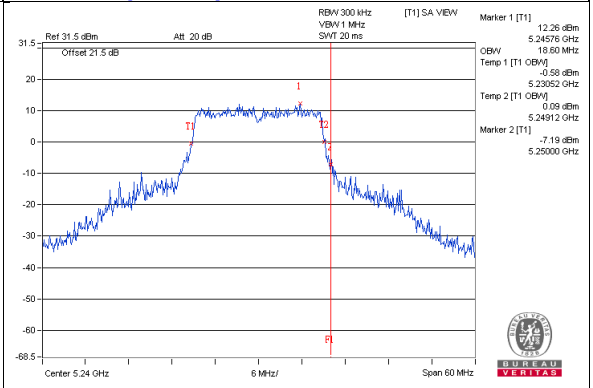
802.11a / Chain 3 : CH48



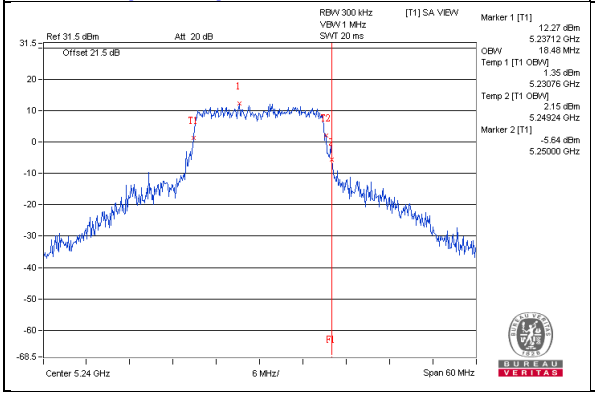
802.11ac (VHT20) / Chain 0 : CH48



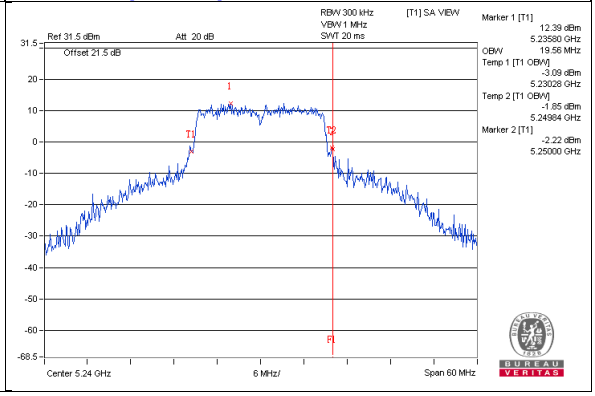
802.11ac (VHT20) / Chain 1 : CH48



802.11ac (VHT20) / Chain 2 : CH48

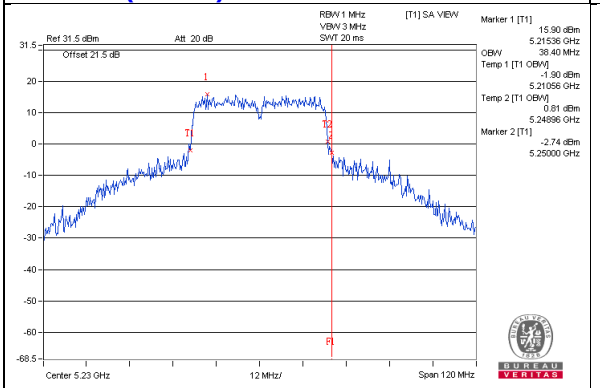


802.11ac (VHT20) / Chain 3 : CH48

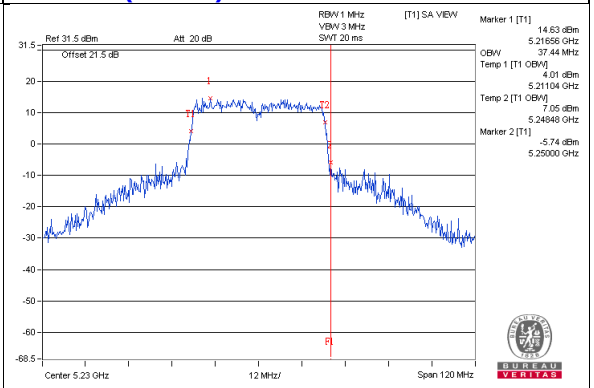


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

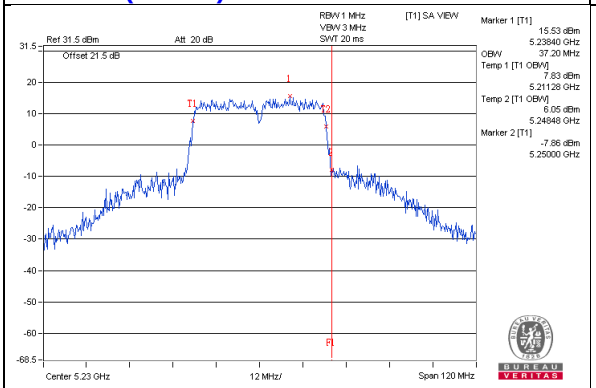
802.11ac (VHT40) / Chain 0 : CH46



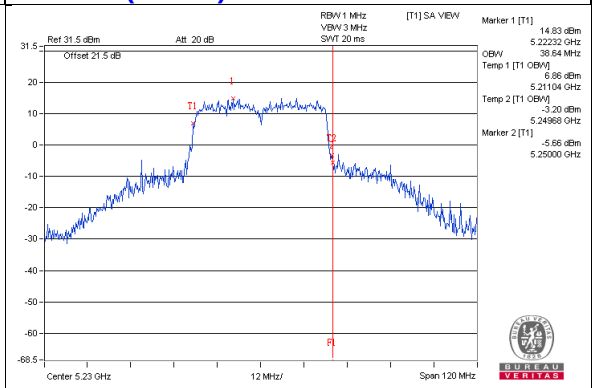
802.11ac (VHT40) / Chain 1 : CH46



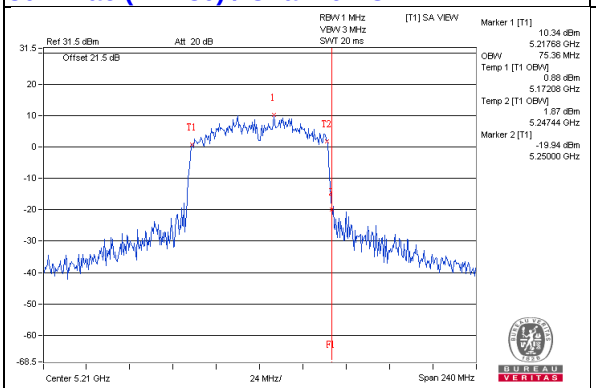
802.11ac (VHT40) / Chain 2 : CH46



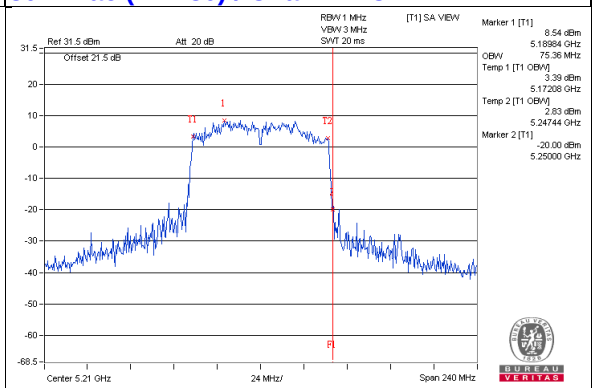
802.11ac (VHT40) / Chain 3 : CH46



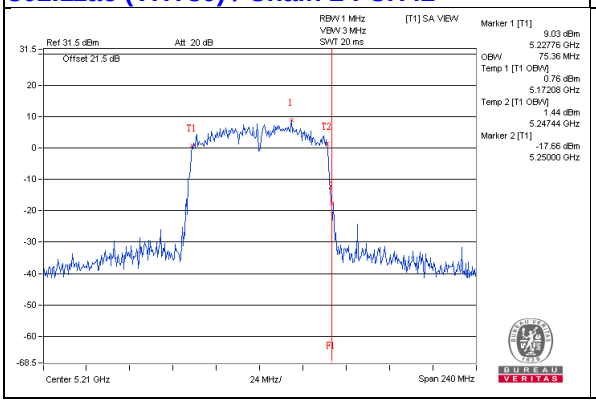
802.11ac (VHT80) / Chain 0 : CH42



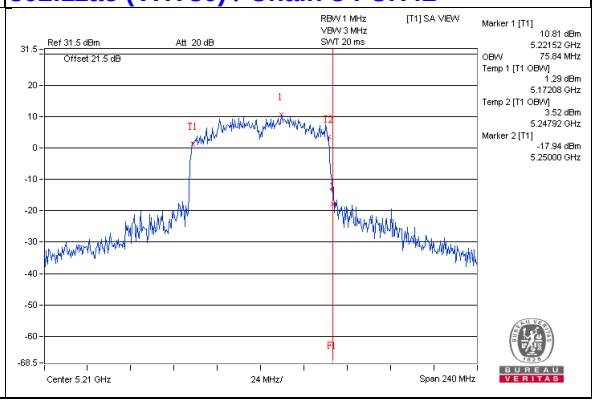
802.11ac (VHT80) / Chain 1 : CH42



802.11ac (VHT80) / Chain 2 : CH42

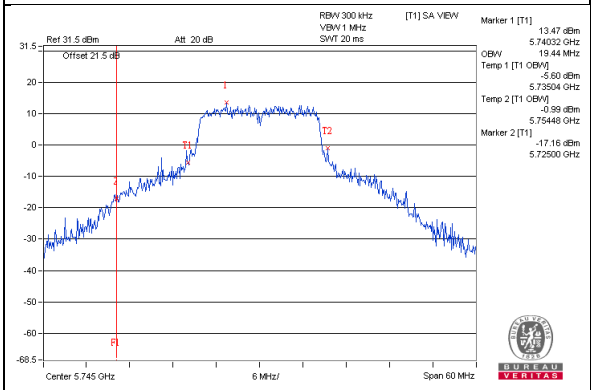


802.11ac (VHT80) / Chain 3 : CH42

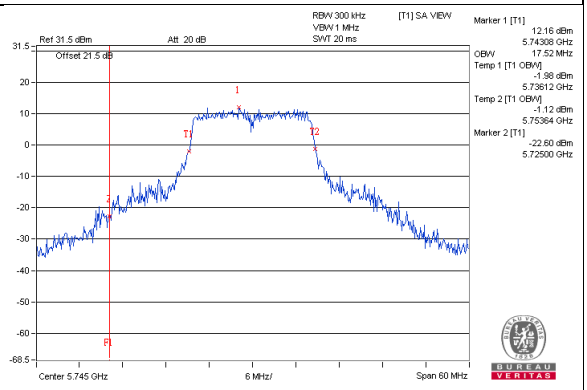


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

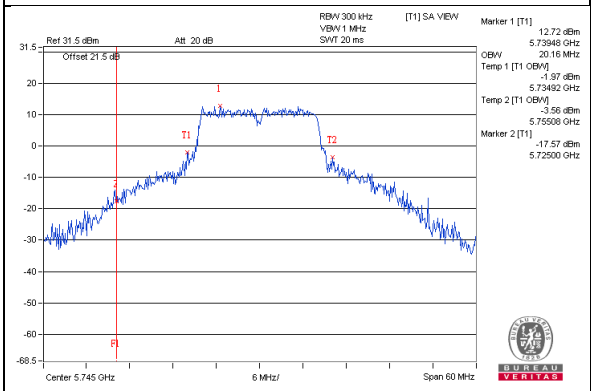
802.11a / Chain 0 : CH149



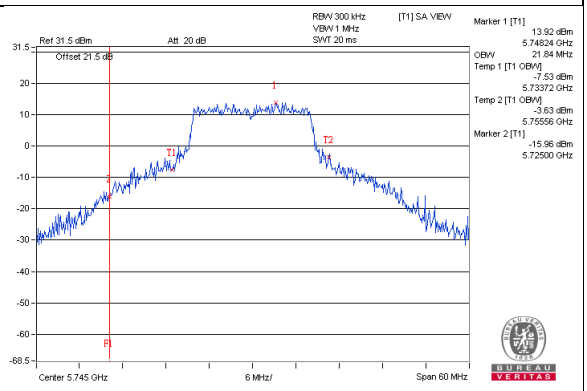
802.11a / Chain 1 : CH149



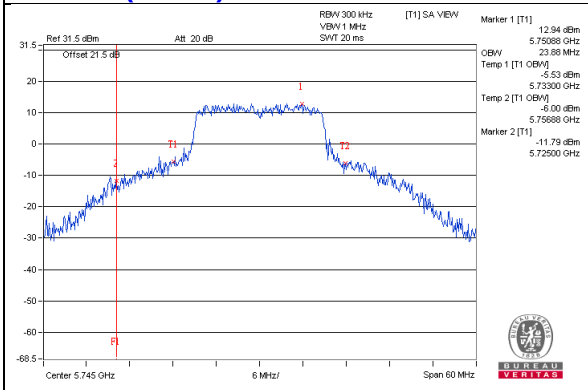
802.11a / Chain 2 : CH149



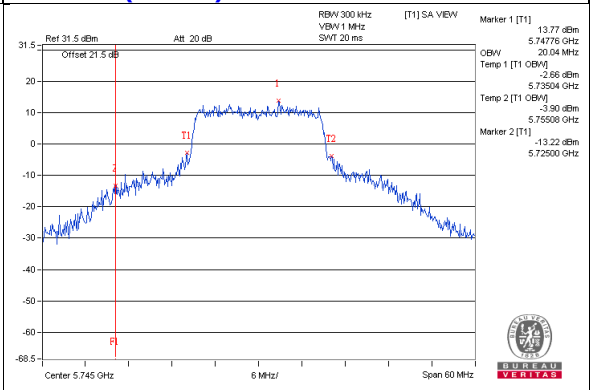
802.11a / Chain 3 : CH149



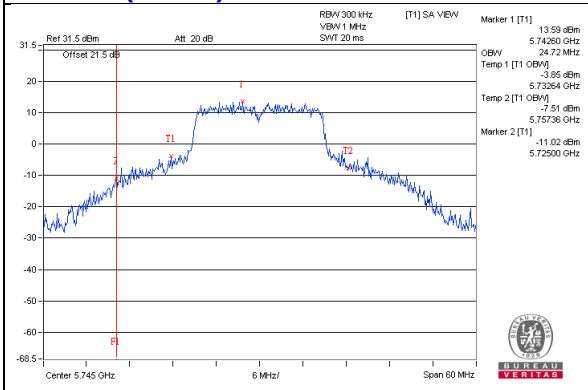
802.11ac (VHT20) / Chain 0 : CH149



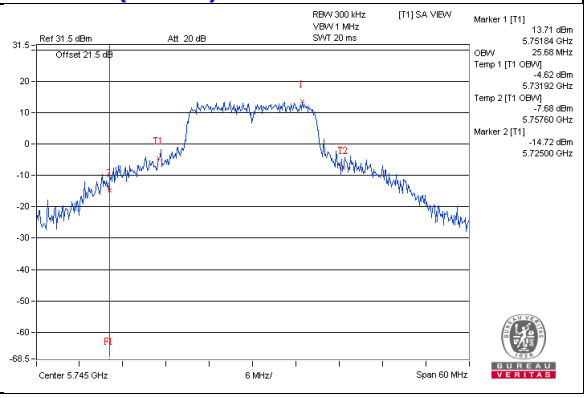
802.11ac (VHT20) / Chain 1 : CH149



802.11ac (VHT20) / Chain 2 : CH149

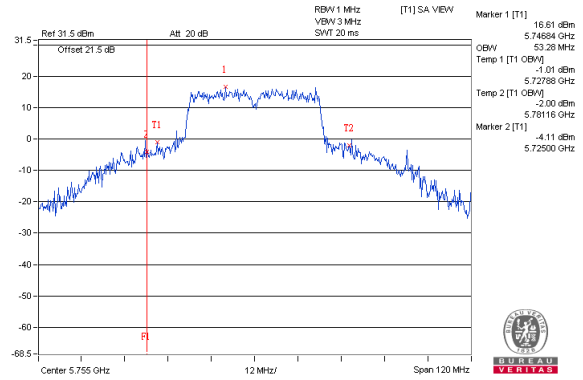


802.11ac (VHT20) / Chain 3 : CH149

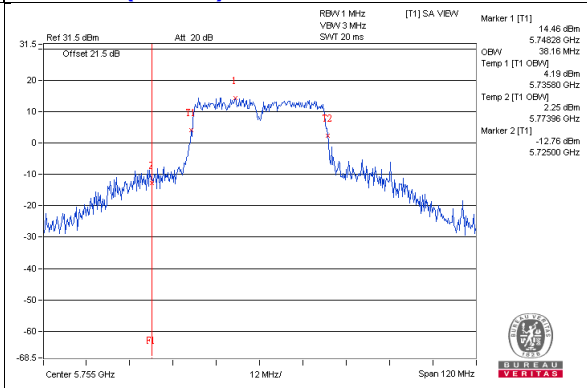


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

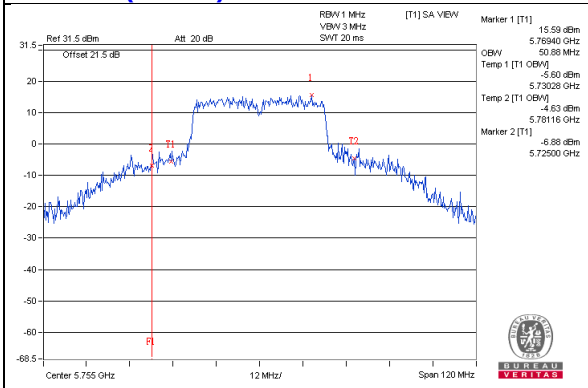
802.11ac (VHT40) / Chain 0 : CH151



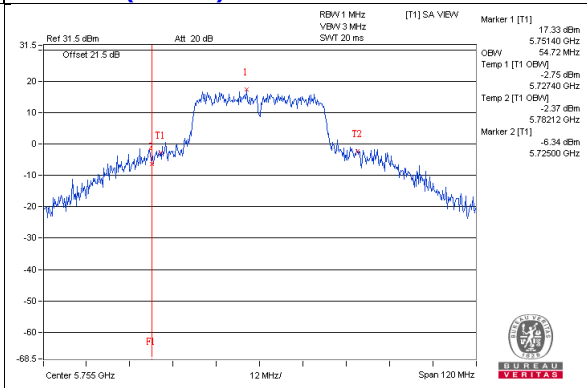
802.11ac (VHT40) / Chain 1 : CH151



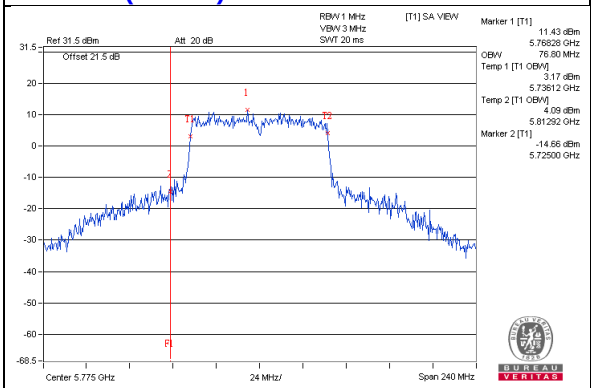
802.11ac (VHT40) / Chain 2 : CH151



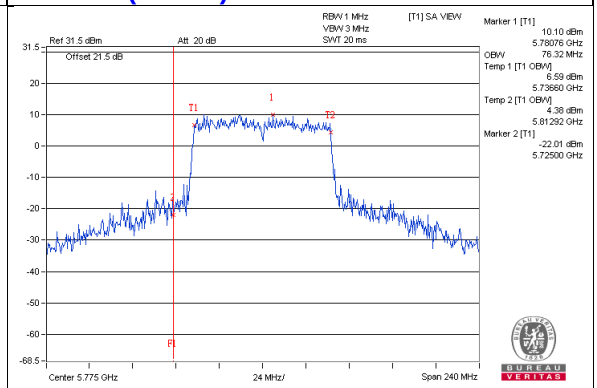
802.11ac (VHT40) / Chain 3 : CH151



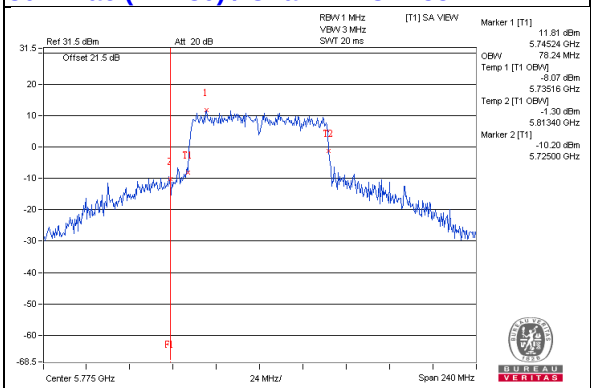
802.11ac (VHT80) / Chain 0 : CH155



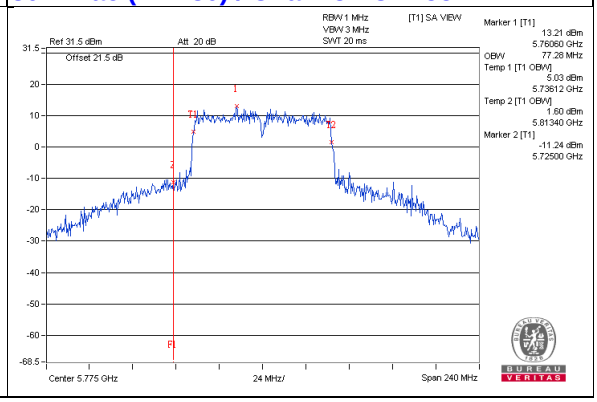
802.11ac (VHT80) / Chain 1 : CH155



802.11ac (VHT80) / Chain 2 : CH155



802.11ac (VHT80) / Chain 3 : CH155

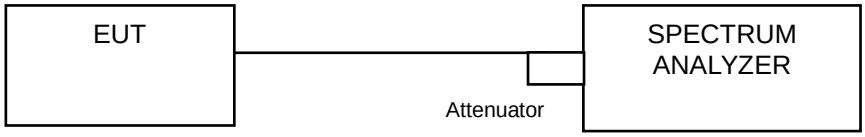


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11ac (VHT20)

For U-NII-1:

Using method SA-1

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

For U-NII-3:

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

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

For U-NII-1:

Using method SA-2

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

CDD Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	8.35	8.59	8.49	8.36	0.26	14.73	14.85	Pass
40	5200	8.03	8.60	8.61	8.22	0.26	14.66	14.85	Pass
48	5240	8.20	8.58	8.10	8.56	0.26	14.65	14.85	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi, so the power density limit shall be reduced to 17-(8.15-6) = 14.85dBm.
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			
36	5180	9.00	8.54	8.61	8.78	14.76	14.85	Pass
40	5200	8.90	8.86	8.41	9.03	14.83	14.85	Pass
48	5240	8.81	8.76	8.44	9.06	14.79	14.85	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi, so the power density limit shall be reduced to 17-(8.15-6) = 14.85dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	2.81	1.60	1.38	2.71	0.15	8.34	14.85	Pass
46	5230	5.65	4.58	5.29	5.12	0.15	11.35	14.85	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi, so the power density limit shall be reduced to 17-(8.15-6) = 14.85dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

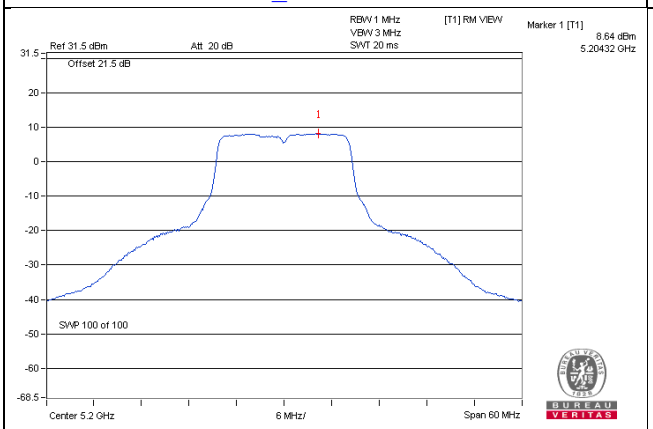
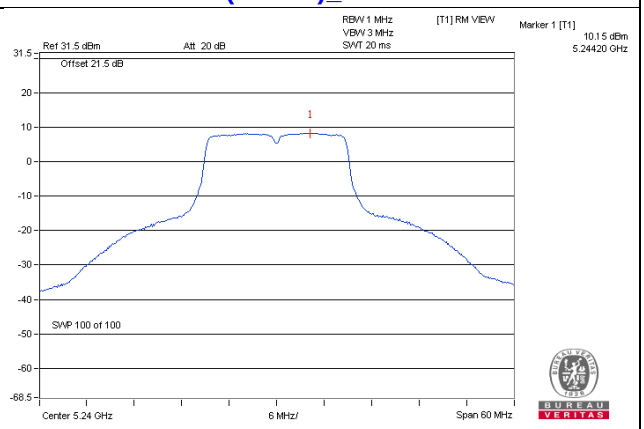
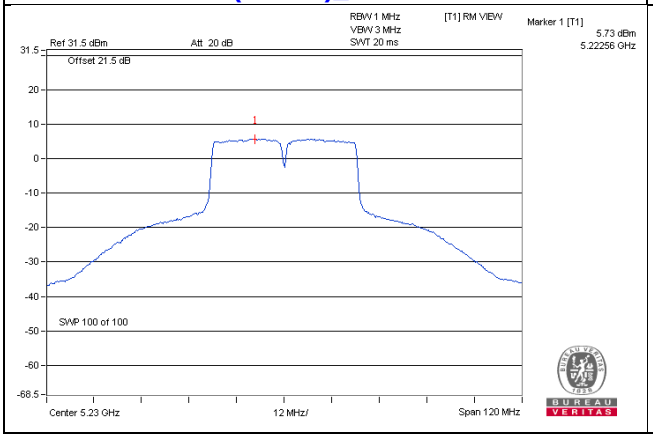
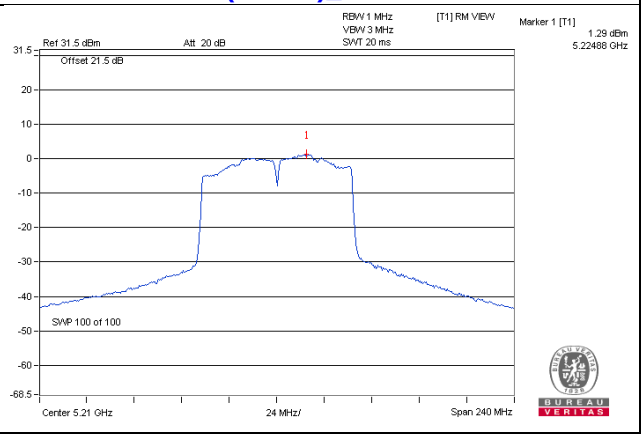
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-0.05	-0.76	-1.02	1.29	0.27	6.25	14.85	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = 2.13dBi + 10log(4) = 8.15dBi > 6dBi, so the power density limit shall be reduced to 17-(8.15-6) = 14.85dBm.

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

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH40	**802.11ac (VHT20)_Chain 3 / CH48**
	
802.11ac (VHT40)_Chain 0 / CH46	**802.11ac (VHT80)_Chain 3 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	0.96	3.18	6.02	0.26	9.46	28.79	Pass
	157	5785	0.99	3.21	6.02	0.26	9.49	28.79	Pass
	165	5825	0.85	3.07	6.02	0.26	9.35	28.79	Pass
1	149	5745	0.12	2.34	6.02	0.26	8.62	28.79	Pass
	157	5785	0.36	2.58	6.02	0.26	8.86	28.79	Pass
	165	5825	0.41	2.63	6.02	0.26	8.91	28.79	Pass
2	149	5745	0.90	3.12	6.02	0.26	9.40	28.79	Pass
	157	5785	0.94	3.16	6.02	0.26	9.44	28.79	Pass
	165	5825	0.62	2.84	6.02	0.26	9.12	28.79	Pass
3	149	5745	1.64	3.86	6.02	0.26	10.14	28.79	Pass
	157	5785	1.61	3.83	6.02	0.26	10.11	28.79	Pass
	165	5825	1.72	3.94	6.02	0.26	10.22	28.79	Pass

Note: 1. Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi, so the power density limit shall be reduced to 30-(7.21-6) = 28.79dBm.

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

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	1.26	3.48	6.02	9.50	28.79	Pass
	157	5785	1.35	3.57	6.02	9.59	28.79	Pass
	165	5825	1.05	3.27	6.02	9.29	28.79	Pass
1	149	5745	0.63	2.85	6.02	8.87	28.79	Pass
	157	5785	0.80	3.02	6.02	9.04	28.79	Pass
	165	5825	0.50	2.72	6.02	8.74	28.79	Pass
2	149	5745	1.20	3.42	6.02	9.44	28.79	Pass
	157	5785	0.55	2.77	6.02	8.79	28.79	Pass
	165	5825	0.69	2.91	6.02	8.93	28.79	Pass
3	149	5745	1.66	3.88	6.02	9.90	28.79	Pass
	157	5785	1.67	3.89	6.02	9.91	28.79	Pass
	165	5825	1.58	3.80	6.02	9.82	28.79	Pass

Note: 1. Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi, so the power density limit shall be reduced to 30-(7.21-6) = 28.79dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.70	0.52	6.02	0.15	6.69	28.79	Pass
	159	5795	-2.16	0.06	6.02	0.15	6.23	28.79	Pass
1	151	5755	-3.11	-0.89	6.02	0.15	5.28	28.79	Pass
	159	5795	-3.35	-1.13	6.02	0.15	5.04	28.79	Pass
2	151	5755	-2.10	0.12	6.02	0.15	6.29	28.79	Pass
	159	5795	-2.97	-0.75	6.02	0.15	5.42	28.79	Pass
3	151	5755	-1.45	0.77	6.02	0.15	6.94	28.79	Pass
	159	5795	-1.48	0.74	6.02	0.15	6.91	28.79	Pass

Note: 1. Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi, so the power density limit shall be reduced to 30-(7.21-6) = 28.79dBm.

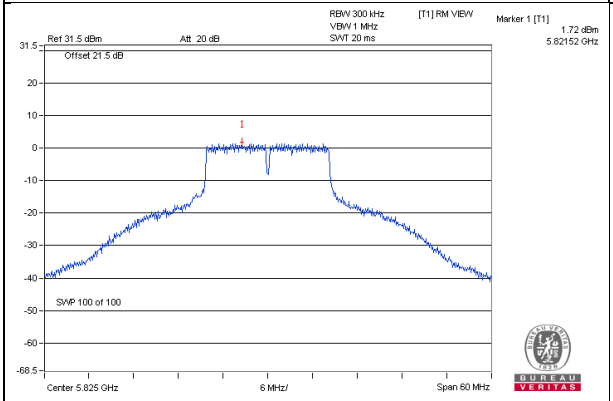
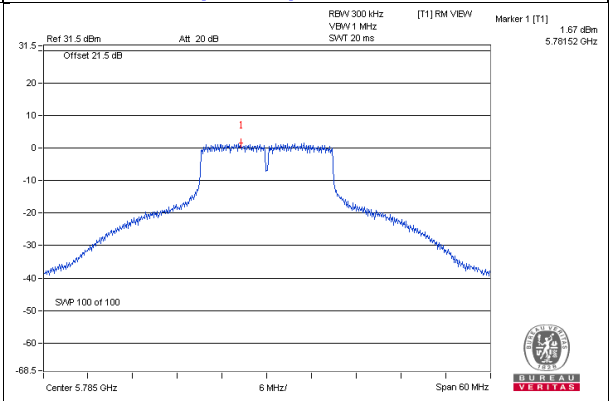
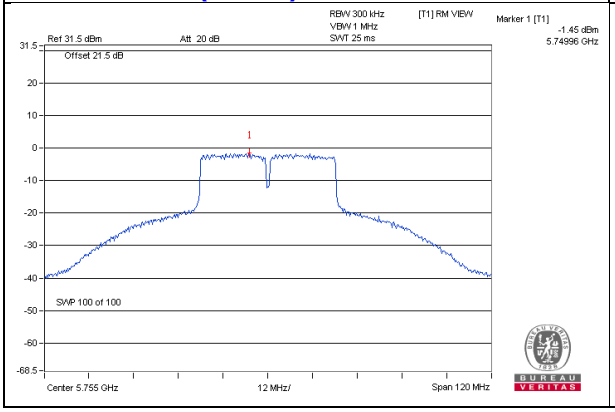
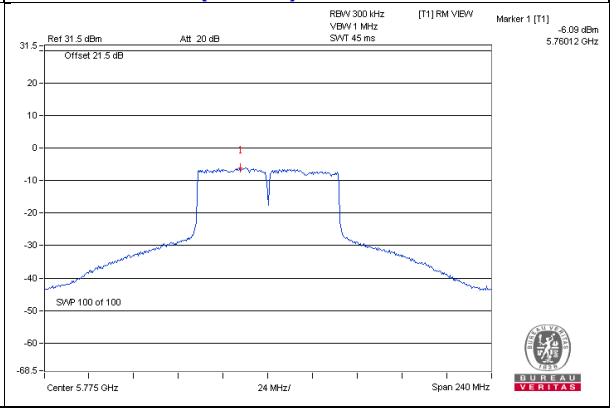
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-7.53	-5.31	6.02	0.27	0.98	28.79	Pass
1	155	5775	-8.38	-6.16	6.02	0.27	0.13	28.79	Pass
2	155	5775	-6.53	-4.31	6.02	0.27	1.98	28.79	Pass
3	155	5775	-6.09	-3.87	6.02	0.27	2.42	28.79	Pass

Note: 1. Directional gain = 1.19dBi + 10log(4) = 7.21dBi > 6dBi, so the power density limit shall be reduced to 30-(7.21-6) = 28.79dBm.

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

Spectrum Plot of Worst Value	
802.11a – Chain 3: CH 165	**802.11ac (VHT20) – Chain 3: CH 157**
	
802.11ac (VHT40) – Chain 3: CH 151	**802.11ac (VHT80) – Chain 3: CH 155**
	

Beamforming Mode (Nss=2)

For U-NII-1:

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			
36	5180	9.72	9.68	9.24	9.47	15.55	17.00	Pass
40	5200	9.74	9.70	9.21	9.93	15.67	17.00	Pass
48	5240	9.59	9.79	10.00	9.62	15.77	17.00	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. Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 6dBi , so the power density limit shall not be reduced.

802.11ac (VHT40)

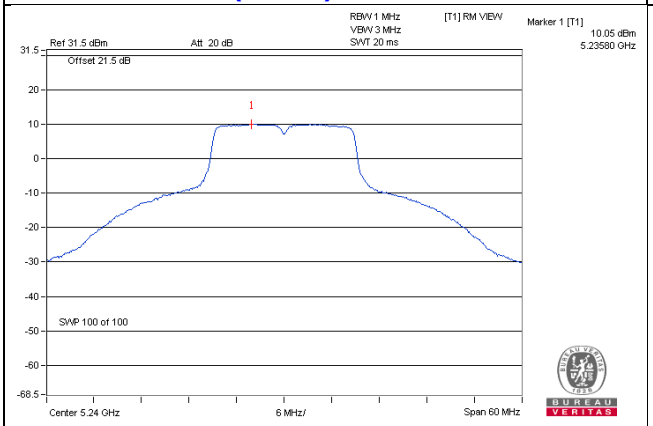
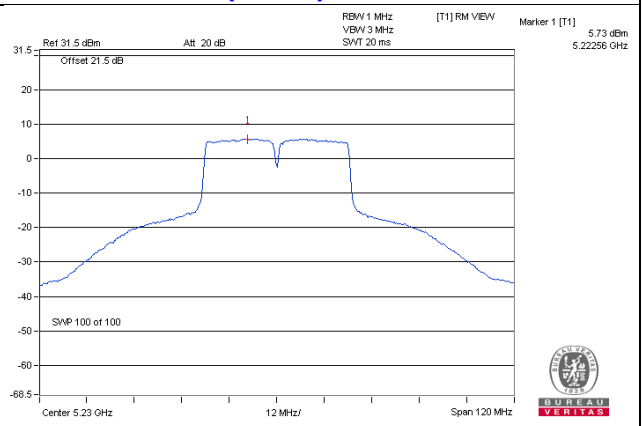
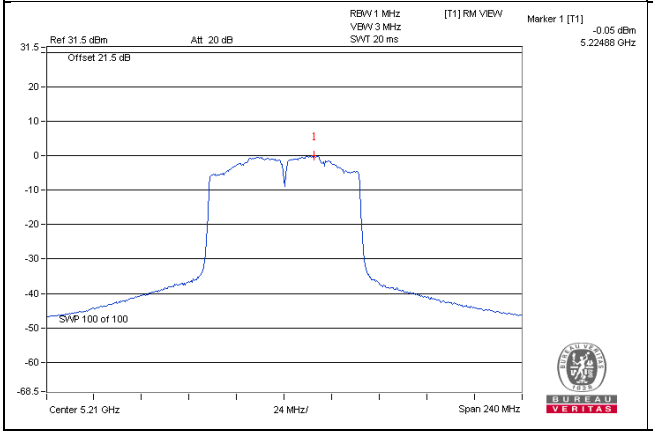
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	2.81	1.60	1.38	2.71	0.15	8.34	17.00	Pass
46	5230	5.65	4.58	5.29	5.12	0.15	11.35	17.00	Pass

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. Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 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)				Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-0.05	-0.76	-1.02	1.29	0.27	6.25	17.00	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. Directional gain = 2.13dBi + 10log(2) = 5.14dBi < 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	
802.11ac (VHT20)_Chain 2 / CH48	**802.11ac (VHT40)_Chain 0 / CH46**
	
802.11ac (VHT80)_Chain 0 / CH42	
	

For U-NII-3:

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	1.26	3.48	6.02	9.50	30.00	Pass
	157	5785	1.35	3.57	6.02	9.59	30.00	Pass
	165	5825	1.05	3.27	6.02	9.29	30.00	Pass
1	149	5745	0.63	2.85	6.02	8.87	30.00	Pass
	157	5785	0.80	3.02	6.02	9.04	30.00	Pass
	165	5825	0.50	2.72	6.02	8.74	30.00	Pass
2	149	5745	1.20	3.42	6.02	9.44	30.00	Pass
	157	5785	0.55	2.77	6.02	8.79	30.00	Pass
	165	5825	0.69	2.91	6.02	8.93	30.00	Pass
3	149	5745	1.66	3.88	6.02	9.90	30.00	Pass
	157	5785	1.67	3.89	6.02	9.91	30.00	Pass
	165	5825	1.58	3.80	6.02	9.82	30.00	Pass

Note: 1. Directional gain = 1.19dBi + 10log(2) = 4.2dBi < 6dBi , so the power density limit shall not be reduced.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.70	0.52	6.02	0.15	6.69	30.00	Pass
	159	5795	-2.16	0.06	6.02	0.15	6.23	30.00	Pass
1	151	5755	-3.11	-0.89	6.02	0.15	5.28	30.00	Pass
	159	5795	-3.35	-1.13	6.02	0.15	5.04	30.00	Pass
2	151	5755	-2.10	0.12	6.02	0.15	6.29	30.00	Pass
	159	5795	-2.97	-0.75	6.02	0.15	5.42	30.00	Pass
3	151	5755	-1.45	0.77	6.02	0.15	6.94	30.00	Pass
	159	5795	-1.48	0.74	6.02	0.15	6.91	30.00	Pass

Note: 1. Directional gain = 1.19dBi + 10log(2) = 4.2dBi < 6dBi , so the power density limit shall not be reduced.

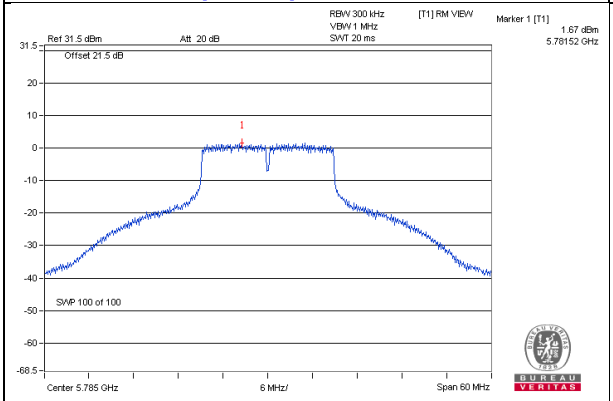
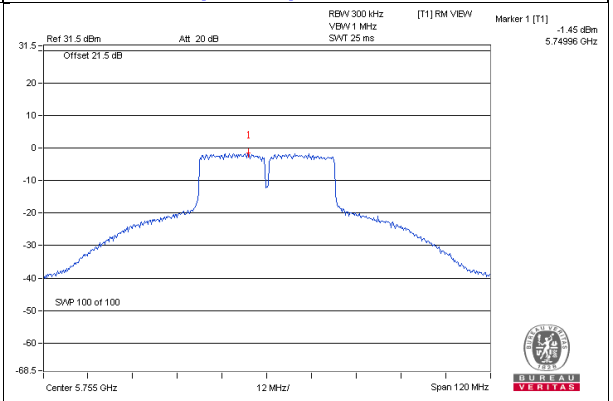
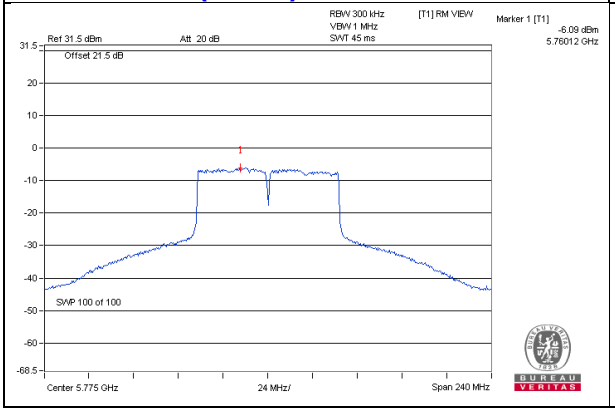
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-7.53	-5.31	6.02	0.27	0.98	30.00	Pass
1	155	5775	-8.38	-6.16	6.02	0.27	0.13	30.00	Pass
2	155	5775	-6.53	-4.31	6.02	0.27	1.98	30.00	Pass
3	155	5775	-6.09	-3.87	6.02	0.27	2.42	30.00	Pass

Note: 1. Directional gain = 1.19dBi + 10log(2) = 4.2dBi < 6dBi , so the power density limit shall not be reduced.

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

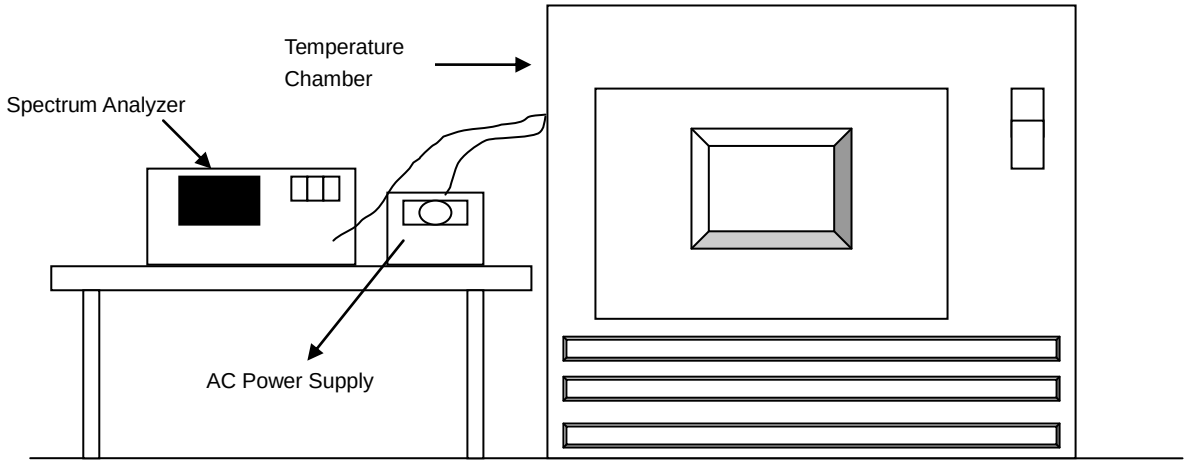
Spectrum Plot of Worst Value	
802.11ac (VHT20) – Chain 3: CH 157	**802.11ac (VHT40) – Chain 3: CH 151**
	
802.11ac (VHT80) – Chain 3: CH 155	
	

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 2 and 3 with the temperature chamber set to the lowest temperature.
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

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5179.9842	PASS	5179.9795	PASS	5179.9823	PASS	5179.9798	PASS
40	120	5179.9802	PASS	5179.9762	PASS	5179.9795	PASS	5179.9803	PASS
30	120	5179.9925	PASS	5179.9943	PASS	5179.9954	PASS	5179.9941	PASS
20	120	5180.0037	PASS	5180.0023	PASS	5180.0036	PASS	5180.0001	PASS
10	120	5180.0128	PASS	5180.0082	PASS	5180.0086	PASS	5180.0099	PASS
0	120	5179.9818	PASS	5179.979	PASS	5179.9807	PASS	5179.98	PASS
-10	120	5180.0049	PASS	5180.0052	PASS	5180.0078	PASS	5180.0058	PASS
-20	120	5180.0055	PASS	5180.005	PASS	5180.0071	PASS	5180.0065	PASS
-30	120	5179.9842	PASS	5179.9868	PASS	5179.986	PASS	5179.9864	PASS

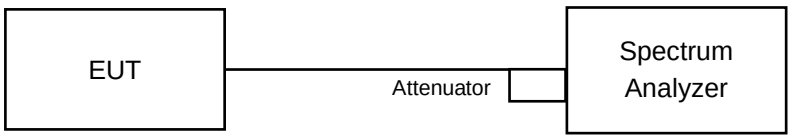
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0044	PASS	5180.0033	PASS	5180.0046	PASS	5179.9998	PASS
	120	5180.0037	PASS	5180.0023	PASS	5180.0036	PASS	5180.0001	PASS
	102	5180.004	PASS	5180.0024	PASS	5180.003	PASS	5179.9995	PASS

4.7 6dB Bandwidth Measurment

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

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.41	16.43	16.43	16.41	0.5	PASS
157	5785	16.39	16.40	16.42	16.40	0.5	PASS
165	5825	16.41	16.40	16.40	16.39	0.5	PASS

Beamforming Mode (Nss=2)

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.65	17.65	17.68	17.64	0.5	PASS
157	5785	17.64	17.63	17.65	17.63	0.5	PASS
165	5825	17.63	17.65	17.61	17.66	0.5	PASS

802.11ac (VHT40)

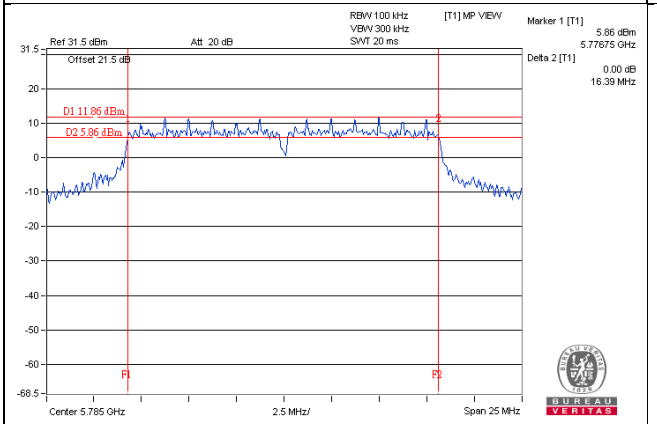
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.49	36.48	36.49	36.50	0.5	PASS
159	5795	36.49	36.46	36.46	36.48	0.5	PASS

802.11ac (VHT80)

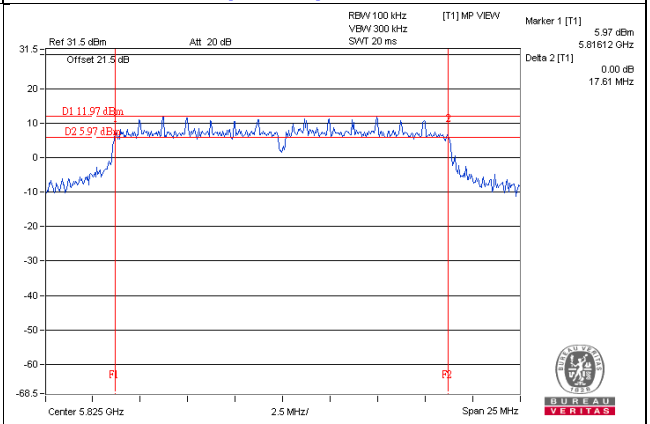
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.36	76.50	76.02	76.12	0.5	PASS

Spectrum Plot of Worst Value

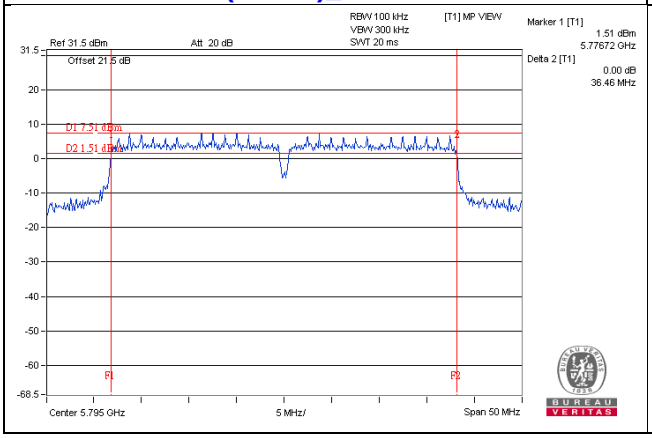
802.11a_Chain 0 / CH157



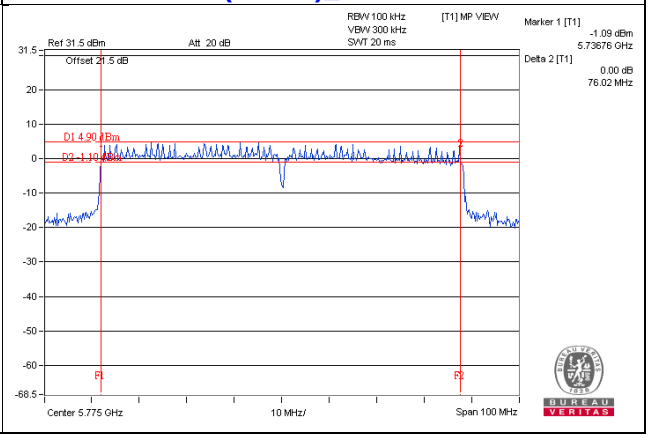
802.11ac (VHT20)_Chain 2 / CH165



802.11ac (VHT40)_Chain 1 / CH159



802.11ac (VHT80)_Chain 2 / CH155



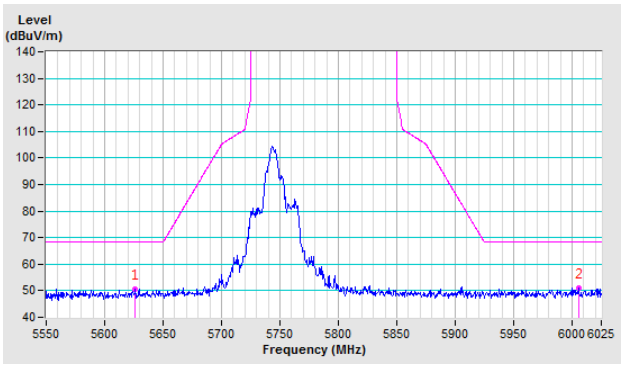
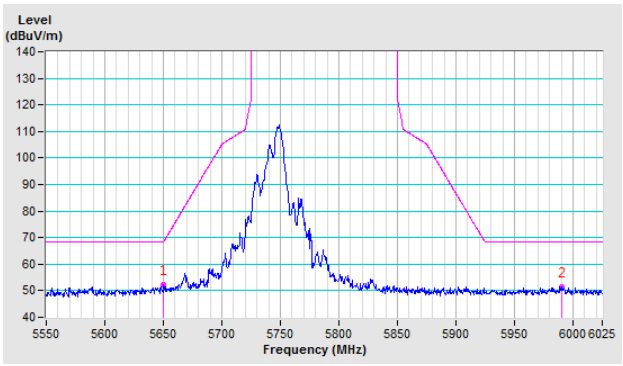
5 Pictures of Test Arrangements

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

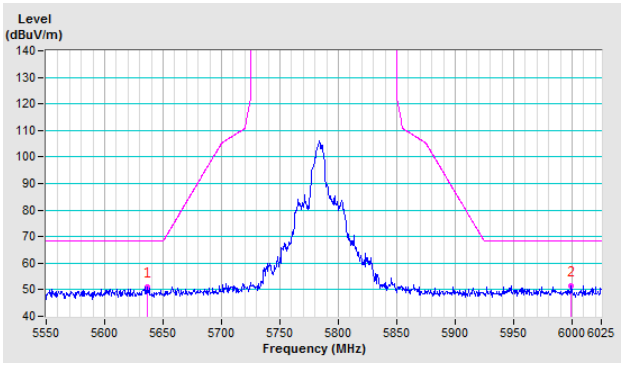
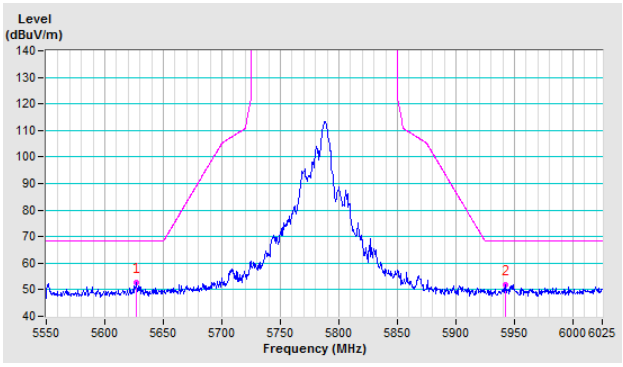
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

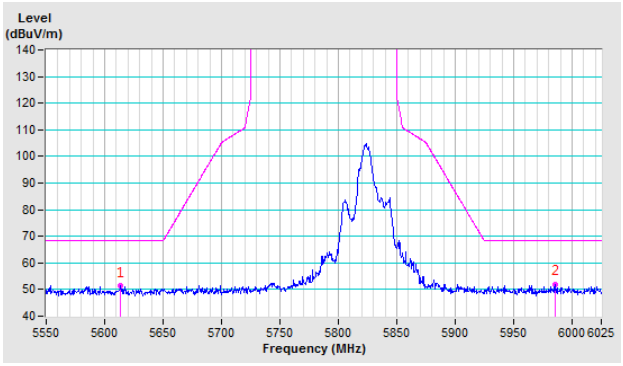
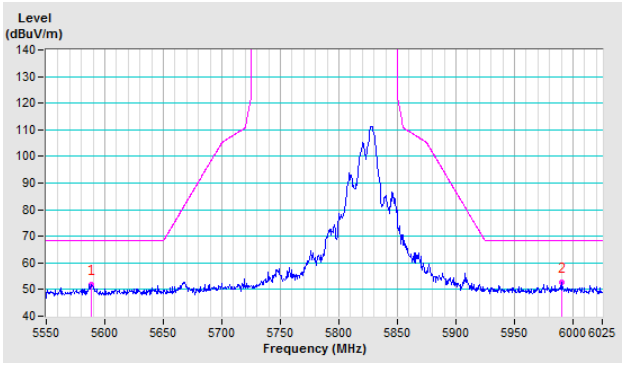
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

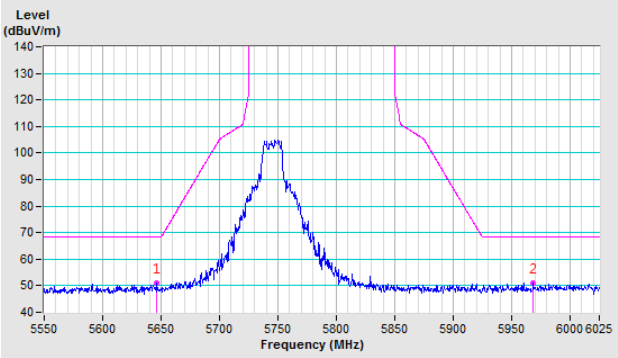
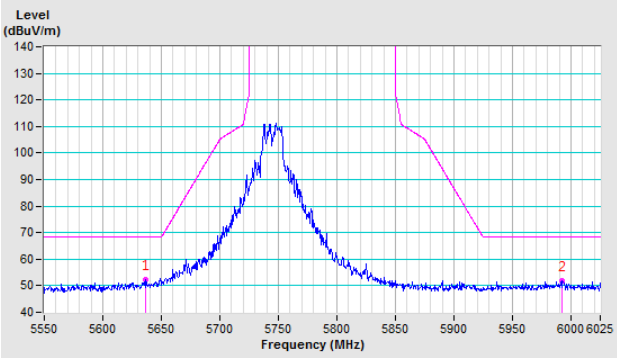
Horizontal	Vertical
	

CH 165 5825 MHz

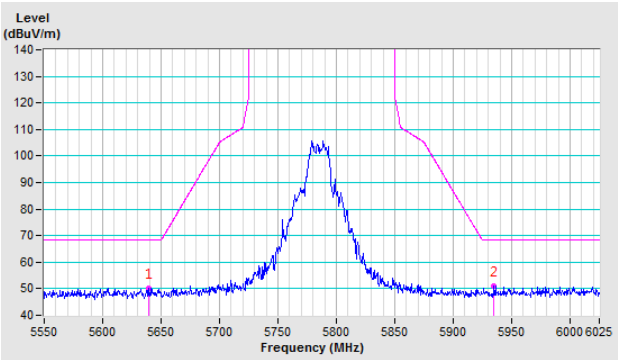
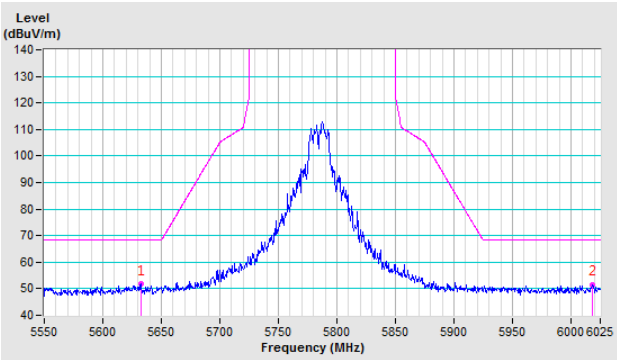
Horizontal	Vertical
	

802.11ac (VHT20)

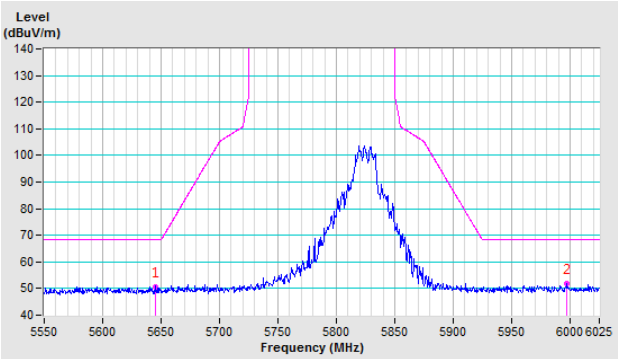
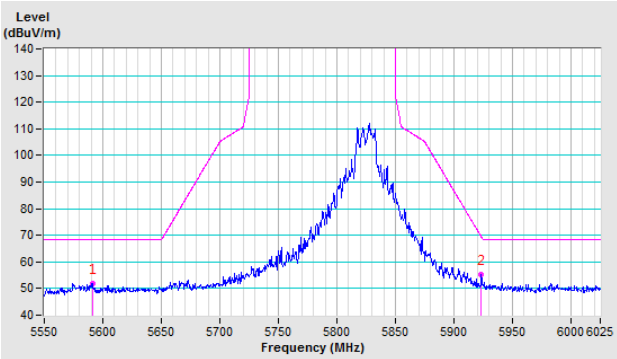
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

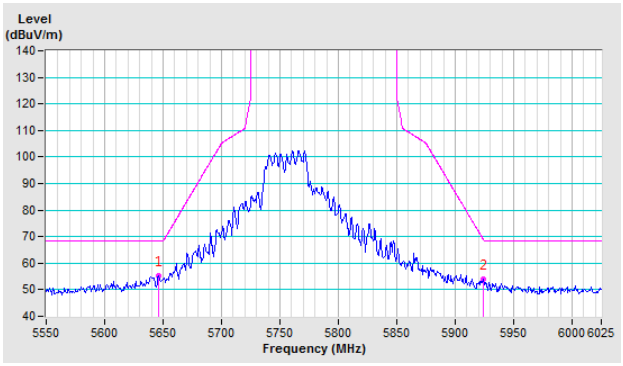
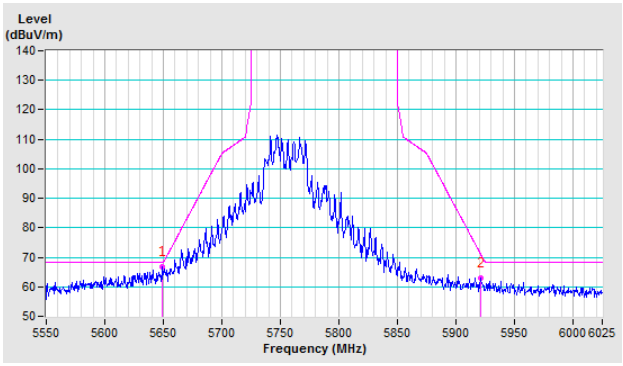
Horizontal	Vertical
	

CH 165 5825 MHz

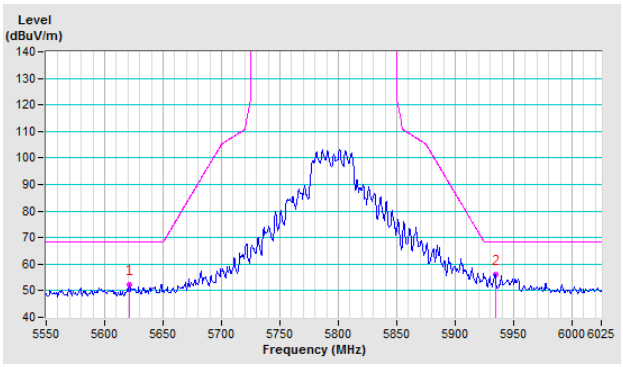
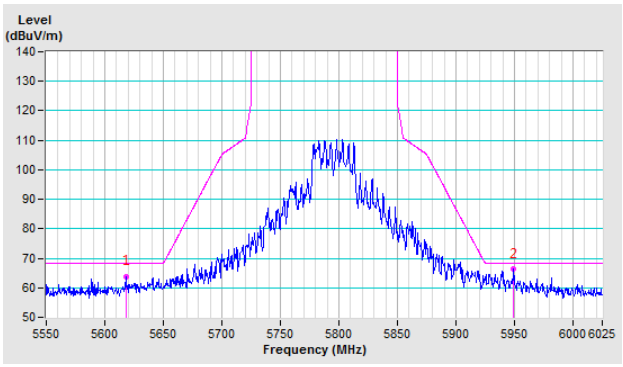
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

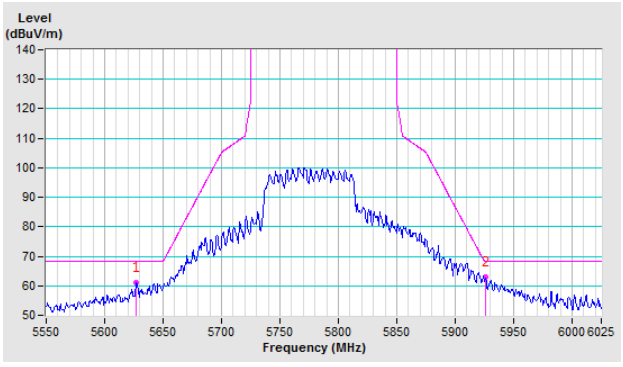
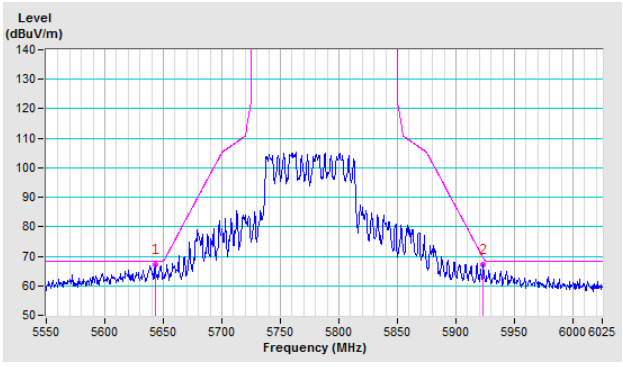
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

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

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

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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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