FCC Test Report

Report No.:	RF160913E02-1
FCC ID:	PY316200342
Test Model:	R6400v2
Received Date:	Sep. 13, 2016
Test Date:	Sep. 22 to Oct. 12, 2016
Issued Date:	Oct. 19, 2016
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 (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF160913E02-1	Original release.	Oct. 19, 2016

1 Certificate of Conformity

Product:	AC1750 Smart WiFi Router
Brand:	NETGEAR
Test Model:	R6400v2
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETGEAR, Inc.
Test Date:	Sep. 22 to Oct. 12, 2016
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 : Wendy Wu , **Date:** Oct. 19, 2016

Wendy Wu / Specialist

Approved by : , **Date:** Oct. 19, 2016

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 -12.7dB at 0.29844MHz.
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 5097.00MHz, 15720.00MHz, 5101.00MHz, 5118.00MHz, 5147.00MHz, 5148.00MHz, 5150.00MHz.
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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.19 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.43 dB
	6GHz ~ 18GHz	3.49 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC1750 Smart WiFi Router
Brand	NETGEAR
Test Model	R6400v2
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz and 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 579.66mW **5GHz:** **5.18GHz ~ 5.24GHz:** **CDD Mode:** 664.278mW **Beamforming Mode:** 650.802mW **5.745GHz ~ 5.825GHz:** **CDD Mode:** 988.92mW **Beamforming Mode:** 984.433mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

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

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

No	Brand Name	Model No.	PN	Spec.
1	NETGEAR	2ABL030F 1 NA	332-10758-01	Input: 100-120Vac, 50/60Hz, 1.0A Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	AD2067F10	332-10797-01	Input: 100-120Vac, 50/60Hz, 1.0A Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)
Note: From the above adapters, the radiated emission 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:

Antenna No.	Brand	Model	Antenna Gain(dBi)	Frequency range (GHz ~ GHz)	Antenna Type	Connecter Type
98612PIPF003	NA	NA	3.4	2.4~2.4835	Dipole	I-pex (MHF)
			3.94	5.15~5.25		
			3.44	5.25~5.35		
			3.44	5.47~5.725		
			3.73	5.725~5.85		
98612PIPF004	NA	NA	3.23	2.4~2.4835	Dipole	I-pex (MHF)
			3.66	5.15~5.25		
			3.83	5.25~5.35		
			3.83	5.47~5.725		
			3.77	5.725~5.85		
98612PIPF005	NA	NA	3.36	2.4~2.4835	Dipole	I-pex (MHF)
			3.32	5.15~5.25		
			3.63	5.25~5.35		
			3.63	5.47~5.725		
			3.74	5.725~5.85		

4. The Directional gain table:

Frequency (MHz)	Max Gain (dBi)
5180-5240	5.95
5745-5825	5.98

Note:

1. Non-TxBF mode & TxBF mode antenna gain refer to KDB 662911 F 2) f) (ii)

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

G_k is the gain in dBi of the kth antenna.

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	3TX	3RX
802.11g	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS16~23	3TX	3RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	3TX	3RX
802.11n (HT20)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS16~23	3TX	3RX
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
	MCS16~23	3TX	3RX
802.11ac (VHT20)	MCS0~8 Nss=1	3TX	3RX
	MCS0~8 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT40)	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX
802.11ac (VHT80)	MCS0~9 Nss=1	3TX	3RX
	MCS0~9 Nss=2	3TX	3RX
	MCS0~9 Nss=3	3TX	3RX

Note:
1. All of modulation mode support beamforming function except 802.11a modulation mode and 2.4GHz band.
2. 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)

6. 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	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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 1
2	√	√	√	√	With adapter 2

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 2 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 (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

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

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

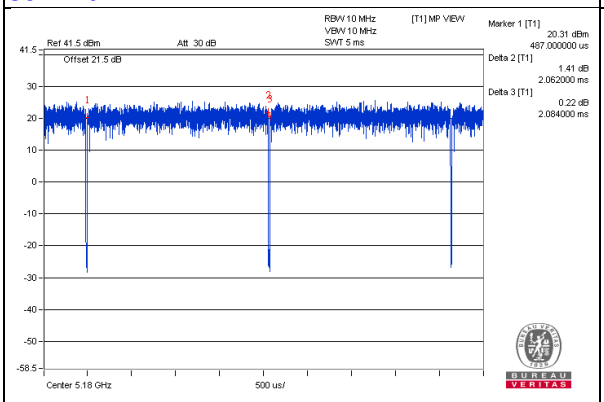
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	22deg. C, 70%RH	120Vac, 60Hz	Robert Cheng
RE<1G	22deg. C, 65%RH	120Vac, 60Hz	Robert Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

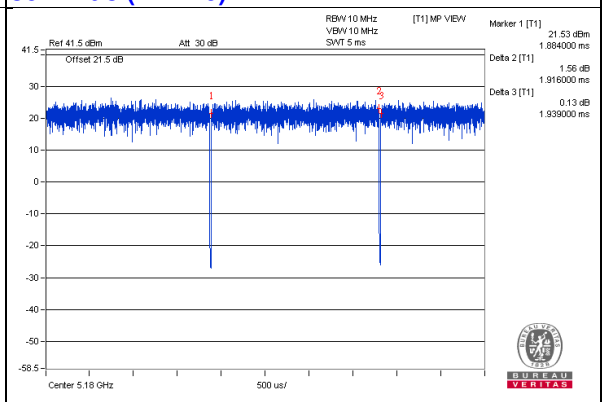
3.3 Duty Cycle of Test Signal

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 = 2.062 ms/2.084 ms = 0.989
802.11ac (VHT20): Duty cycle = 1.916 ms/1.939 ms = 0.988
802.11ac (VHT40): Duty cycle = 1.178 ms/1.201 ms = 0.981
802.11ac (VHT80): Duty cycle = 0.459 ms/0.477 ms = 0.962, Duty factor = 10 * log(1/0.962) = 0.17

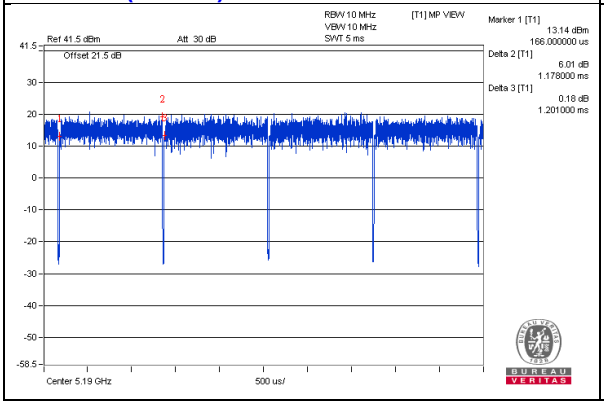
802.11a



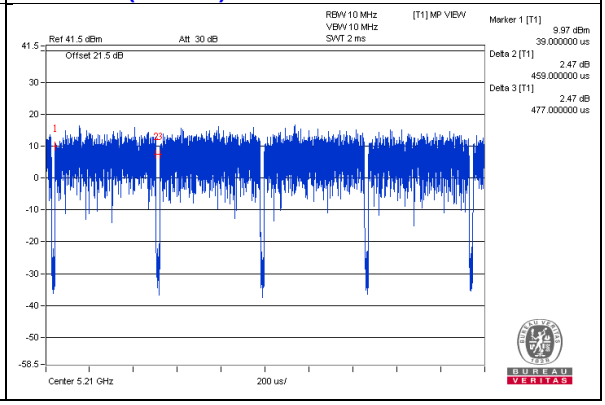
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
D.	iPod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
E.	USB Disk	Transcend(16GB)	NA	NA	NA	Provided by Lab

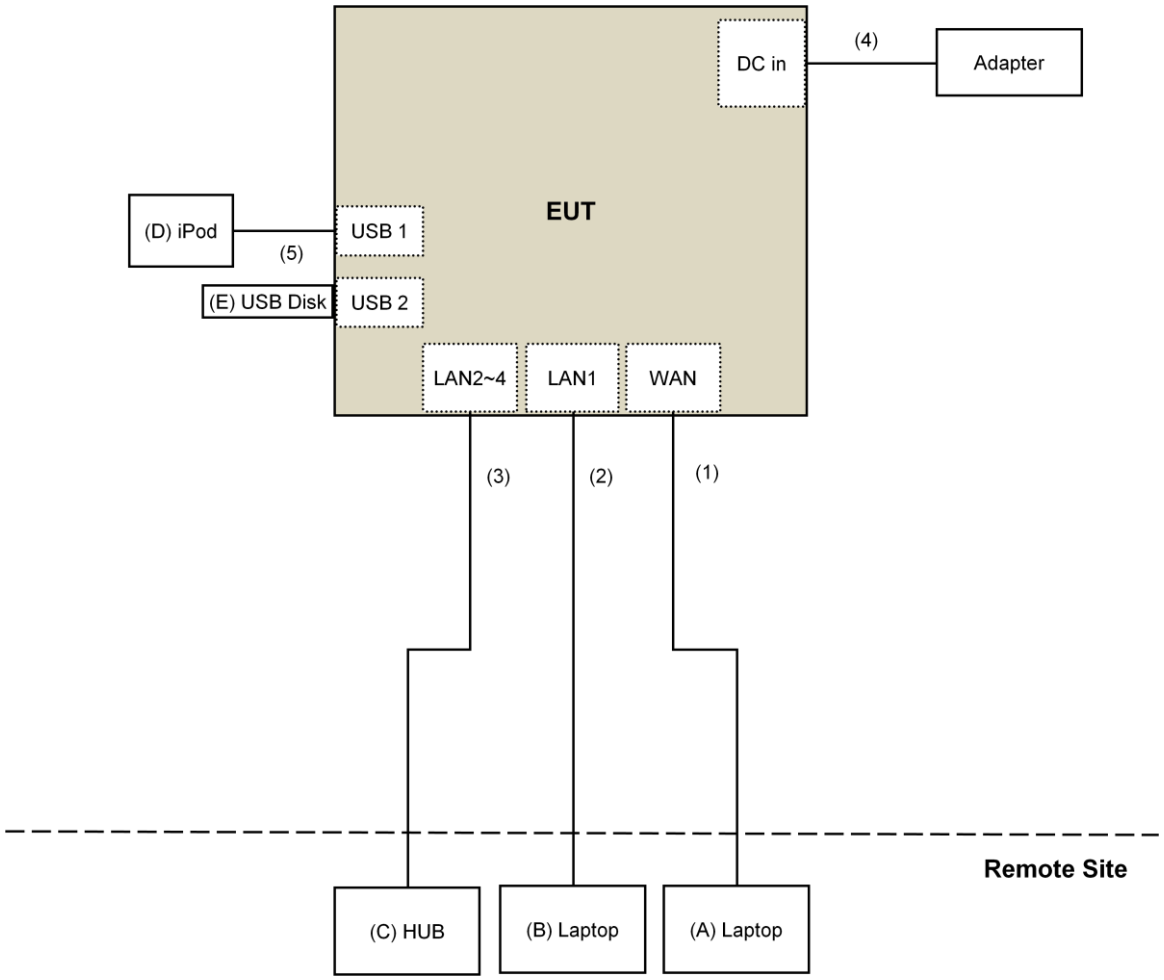
Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	3	10	No	0	Provided by Lab
4.	DC Cable	1	1.8	No	0	Supplied by client
5.	USB Cable	1	0.1	No	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

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 v01r03
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="5">*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

For OOBE test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
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

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The FCC Site Registration No. is 292998
4. The CANADA Site Registration No. is 20331-2
5. Tested Date: Sep. 22, 2016

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
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	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2015	Nov. 09, 2016

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 FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6 Loop antenna was used for all emissions below 30 MHz.
7. Tested Date: Oct. 07 to 08, 2016

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:

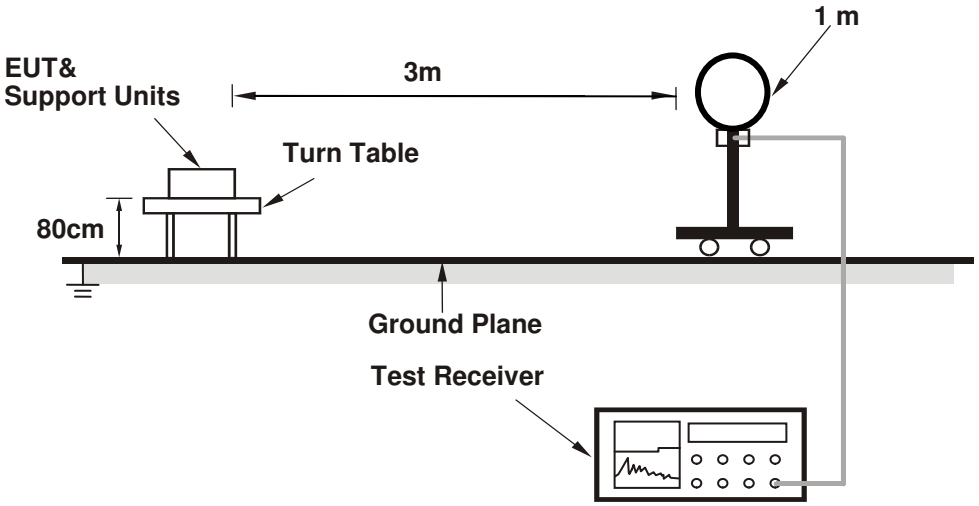
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

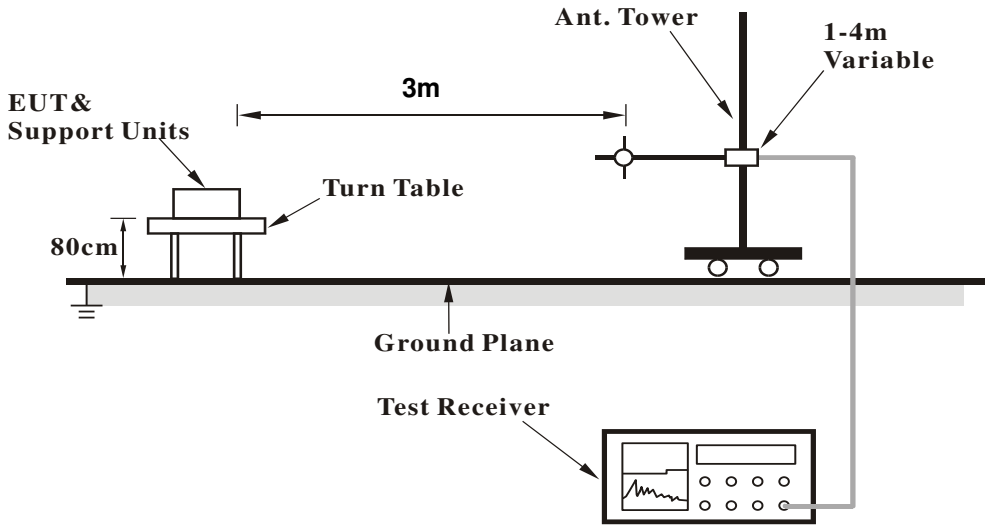
No deviation.

4.1.5 Test Setup

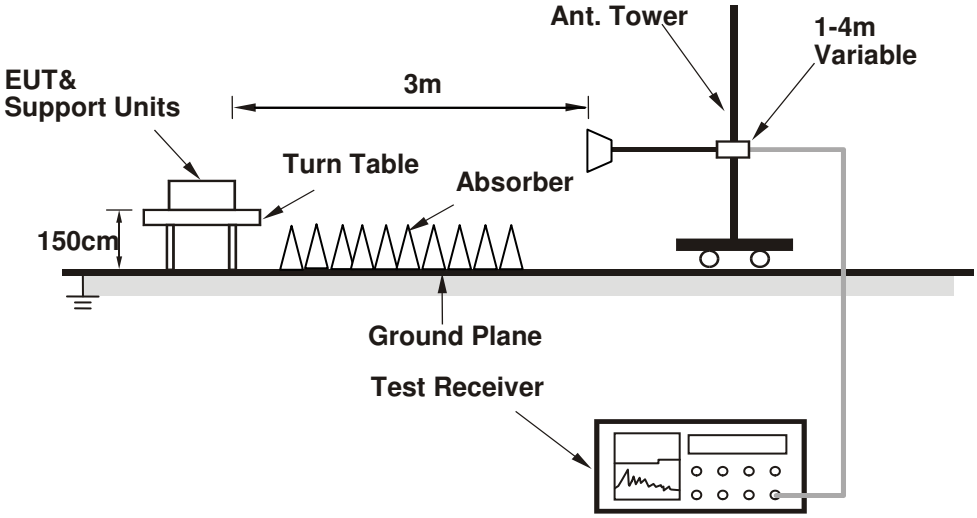
For Radiated emission below 30MHz



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. Contorlling software (Mtool 2.0.1.8.exe) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 2)

Above 1GHz Data:

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	5097.00	57.1 PK	74.0	-16.9	2.76 H	60	55.7	1.4
2	5097.00	46.9 AV	54.0	-7.1	2.76 H	60	45.5	1.4
3	5150.00	58.3 PK	74.0	-15.7	2.76 H	60	56.8	1.5
4	5150.00	43.5 AV	54.0	-10.5	2.76 H	60	42.0	1.5
5	*5180.00	111.1 PK			2.76 H	60	109.5	1.6
6	*5180.00	101.2 AV			2.76 H	60	99.6	1.6
7	#10360.00	50.2 PK	74.0	-23.8	1.69 H	187	38.7	11.5
8	#10360.00	39.0 AV	54.0	-15.0	1.69 H	187	27.5	11.5
9	15540.00	50.4 PK	74.0	-23.6	2.24 H	316	37.3	13.1
10	15540.00	39.6 AV	54.0	-14.4	2.24 H	316	26.5	13.1
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	5097.00	64.0 PK	74.0	-10.0	1.79 V	168	62.6	1.4
2	**5097.00**	**53.9 AV**	**54.0**	**-0.1**	**1.79 V**	**168**	**52.5**	**1.4**
3	5150.00	66.9 PK	74.0	-7.1	1.73 V	150	65.4	1.5
4	5150.00	49.0 AV	54.0	-5.0	1.73 V	150	47.5	1.5
5	*5180.00	117.5 PK			1.73 V	150	115.9	1.6
6	*5180.00	107.7 AV			1.73 V	150	106.1	1.6
7	#10360.00	50.1 PK	74.0	-23.9	2.29 V	194	38.6	11.5
8	#10360.00	39.3 AV	54.0	-14.7	2.29 V	194	27.8	11.5
9	15540.00	55.8 PK	74.0	-18.2	1.20 V	182	42.7	13.1
10	15540.00	41.4 AV	54.0	-12.6	1.20 V	182	28.3	13.1

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.

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	5121.00	57.1 PK	74.0	-16.9	2.75 H	58	55.7	1.4
2	5121.00	46.8 AV	54.0	-7.2	2.75 H	58	45.4	1.4
3	*5200.00	110.2 PK			2.75 H	58	108.5	1.7
4	*5200.00	100.1 AV			2.75 H	58	98.4	1.7
5	#10400.00	49.8 PK	74.0	-24.2	1.63 H	209	38.2	11.6
6	#10400.00	38.5 AV	54.0	-15.5	1.63 H	209	26.9	11.6
7	15600.00	49.9 PK	74.0	-24.1	2.23 H	291	36.8	13.1
8	15600.00	39.2 AV	54.0	-14.8	2.23 H	291	26.1	13.1
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	5121.00	64.1 PK	74.0	-9.9	1.73 V	169	62.7	1.4
2	5121.00	53.8 AV	54.0	-0.2	1.73 V	169	52.4	1.4
3	*5200.00	115.9 PK			1.73 V	169	114.2	1.7
4	*5200.00	106.7 AV			1.73 V	169	105.0	1.7
5	#10400.00	50.5 PK	74.0	-23.5	2.23 V	189	38.9	11.6
6	#10400.00	39.6 AV	54.0	-14.4	2.23 V	189	28.0	11.6
7	15600.00	55.6 PK	74.0	-18.4	1.23 V	173	42.5	13.1
8	15600.00	41.4 AV	54.0	-12.6	1.23 V	173	28.3	13.1

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.

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	116.2 PK			2.81 H	62	114.6	1.6
2	*5240.00	106.8 AV			2.81 H	62	105.2	1.6
3	5401.00	54.6 PK	74.0	-19.4	2.81 H	62	52.5	2.1
4	5401.00	44.7 AV	54.0	-9.3	2.81 H	62	42.6	2.1
5	#10480.00	51.1 PK	74.0	-22.9	1.62 H	209	39.1	12.0
6	#10480.00	39.6 AV	54.0	-14.4	1.62 H	209	27.6	12.0
7	15720.00	65.2 PK	74.0	-8.8	2.17 H	304	52.0	13.2
8	15720.00	50.5 AV	54.0	-3.5	2.17 H	304	37.3	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	*5240.00	120.9 PK			1.77 V	172	119.3	1.6
2	*5240.00	112.0 AV			1.77 V	172	110.4	1.6
3	5401.00	61.2 PK	74.0	-12.8	1.77 V	172	59.1	2.1
4	5401.00	51.5 AV	54.0	-2.5	1.77 V	172	49.4	2.1
5	#10480.00	55.4 PK	74.0	-18.6	2.28 V	196	43.4	12.0
6	#10480.00	43.3 AV	54.0	-10.7	2.28 V	196	31.3	12.0
7	15720.00	69.4 PK	74.0	-4.6	1.21 V	168	56.2	13.2
8	**15720.00**	**53.9 AV**	**54.0**	**-0.1**	**1.21 V**	**168**	**40.7**	**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 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	#5583.25	59.4 PK	68.2	-8.8	1.07 H	171	57.1	2.3
2	*5745.00	114.5 PK			1.07 H	171	111.8	2.7
3	*5745.00	106.8 AV			1.07 H	171	104.1	2.7
4	#5991.75	58.1 PK	68.2	-10.1	1.07 H	171	54.8	3.3
5	11490.00	53.4 PK	74.0	-20.6	1.40 H	5	40.0	13.4
6	11490.00	41.7 AV	54.0	-12.3	1.40 H	5	28.3	13.4
7	#17235.00	59.7 PK	68.2	-8.5	2.19 H	294	41.4	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	#5588.95	60.2 PK	68.2	-8.0	1.78 V	6	57.9	2.3
2	*5745.00	122.1 PK			1.78 V	6	119.4	2.7
3	*5745.00	112.1 AV			1.78 V	6	109.4	2.7
4	#5988.43	61.2 PK	68.2	-7.0	1.78 V	6	57.9	3.3
5	11490.00	56.0 PK	74.0	-18.0	2.18 V	280	42.6	13.4
6	11490.00	45.2 AV	54.0	-8.8	2.18 V	280	31.8	13.4
7	#17235.00	66.5 PK	68.2	-1.7	1.94 V	360	48.2	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	#5628.85	60.0 PK	68.2	-8.2	1.02 H	167	57.5	2.5
2	*5785.00	114.4 PK			1.02 H	167	111.7	2.7
3	*5785.00	106.9 AV			1.02 H	167	104.2	2.7
4	#5993.65	59.0 PK	68.2	-9.2	1.02 H	167	55.7	3.3
5	11570.00	53.2 PK	74.0	-20.8	1.42 H	0	40.1	13.1
6	11570.00	41.3 AV	54.0	-12.7	1.42 H	0	28.2	13.1
7	#17355.00	59.5 PK	68.2	-8.7	2.22 H	297	40.7	18.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5621.73	61.4 PK	68.2	-6.8	1.87 V	4	58.9	2.5
2	*5785.00	121.6 PK			1.87 V	4	118.9	2.7
3	*5785.00	111.6 AV			1.87 V	4	108.9	2.7
4	#5941.40	61.7 PK	68.2	-6.5	1.87 V	4	58.8	2.9
5	11570.00	55.9 PK	74.0	-18.1	2.17 V	266	42.8	13.1
6	11570.00	45.2 AV	54.0	-8.8	2.17 V	266	32.1	13.1
7	#17355.00	66.0 PK	68.2	-2.2	1.88 V	360	47.2	18.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5594.65	58.6 PK	68.2	-9.6	1.02 H	167	56.3	2.3
2	*5825.00	115.1 PK			1.02 H	167	112.4	2.7
3	*5825.00	107.2 AV			1.02 H	167	104.5	2.7
4	#5982.25	61.6 PK	68.2	-6.6	1.02 H	167	58.4	3.2
5	11650.00	53.1 PK	74.0	-20.9	1.42 H	1	40.0	13.1
6	11650.00	41.1 AV	54.0	-12.9	1.42 H	1	28.0	13.1
7	#17475.00	59.7 PK	68.2	-8.5	2.17 H	303	40.5	19.2
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	#5584.20	60.7 PK	68.2	-7.5	1.97 V	5	58.4	2.3
2	*5825.00	121.6 PK			1.97 V	5	118.9	2.7
3	*5825.00	111.7 AV			1.97 V	5	109.0	2.7
4	#5978.93	60.4 PK	68.2	-7.8	1.97 V	5	57.2	3.2
5	11650.00	55.5 PK	74.0	-18.5	2.14 V	255	42.4	13.1
6	11650.00	44.9 AV	54.0	-9.1	2.14 V	255	31.8	13.1
7	#17475.00	66.5 PK	68.2	-1.7	1.83 V	360	47.3	19.2

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.

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	5101.00	57.7 PK	74.0	-16.3	2.70 H	48	56.3	1.4
2	5101.00	47.3 AV	54.0	-6.7	2.70 H	48	45.9	1.4
3	5150.00	54.2 PK	74.0	-19.8	2.70 H	48	52.7	1.5
4	5150.00	44.5 AV	54.0	-9.5	2.70 H	48	43.0	1.5
5	*5180.00	112.6 PK			2.70 H	48	111.0	1.6
6	*5180.00	103.0 AV			2.70 H	48	101.4	1.6
7	#10360.00	49.2 PK	74.0	-24.8	1.61 H	193	37.7	11.5
8	#10360.00	38.5 AV	54.0	-15.5	1.61 H	193	27.0	11.5
9	15540.00	49.8 PK	74.0	-24.2	2.18 H	290	36.7	13.1
10	15540.00	39.3 AV	54.0	-14.7	2.18 H	290	26.2	13.1
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	5101.00	64.5 PK	74.0	-9.5	1.77 V	186	63.1	1.4
2	**5101.00**	**53.9 AV**	**54.0**	**-0.1**	**1.77 V**	**186**	**52.5**	**1.4**
3	5150.00	69.2 PK	74.0	-4.8	1.78 V	183	67.7	1.5
4	5150.00	51.6 AV	54.0	-2.4	1.78 V	183	50.1	1.5
5	*5180.00	117.6 PK			1.78 V	183	116.0	1.6
6	*5180.00	108.3 AV			1.78 V	183	106.7	1.6
7	#10360.00	50.1 PK	74.0	-23.9	2.31 V	181	38.6	11.5
8	#10360.00	39.4 AV	54.0	-14.6	2.31 V	181	27.9	11.5
9	15540.00	56.1 PK	74.0	-17.9	1.16 V	191	43.0	13.1
10	15540.00	41.6 AV	54.0	-12.4	1.16 V	191	28.5	13.1

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.

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	5118.00	57.4 PK	74.0	-16.6	2.81 H	59	56.0	1.4
2	5118.00	46.9 AV	54.0	-7.1	2.81 H	59	45.5	1.4
3	*5200.00	112.9 PK			2.81 H	59	111.2	1.7
4	*5200.00	102.7 AV			2.81 H	59	101.0	1.7
5	#10400.00	50.1 PK	74.0	-23.9	1.69 H	204	38.5	11.6
6	#10400.00	38.9 AV	54.0	-15.1	1.69 H	204	27.3	11.6
7	15600.00	50.3 PK	74.0	-23.7	2.25 H	314	37.2	13.1
8	15600.00	40.0 AV	54.0	-14.0	2.25 H	314	26.9	13.1
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	5118.00	63.8 PK	74.0	-10.2	1.77 V	174	62.4	1.4
2	**5118.00**	**53.9 AV**	**54.0**	**-0.1**	**1.77 V**	**174**	**52.5**	**1.4**
3	*5200.00	118.3 PK			1.77 V	174	116.6	1.7
4	*5200.00	108.0 AV			1.77 V	174	106.3	1.7
5	#10400.00	49.6 PK	74.0	-24.4	2.35 V	193	38.0	11.6
6	#10400.00	38.9 AV	54.0	-15.1	2.35 V	193	27.3	11.6
7	15600.00	55.8 PK	74.0	-18.2	1.15 V	171	42.7	13.1
8	15600.00	41.4 AV	54.0	-12.6	1.15 V	171	28.3	13.1

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.

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	117.1 PK			2.77 H	58	115.5	1.6
2	*5240.00	106.3 AV			2.77 H	58	104.7	1.6
3	5401.00	54.1 PK	74.0	-19.9	2.77 H	58	52.0	2.1
4	5401.00	44.2 AV	54.0	-9.8	2.77 H	58	42.1	2.1
5	#10480.00	50.2 PK	74.0	-23.8	1.67 H	186	38.2	12.0
6	#10480.00	38.9 AV	54.0	-15.1	1.67 H	186	26.9	12.0
7	15720.00	50.2 PK	74.0	-23.8	2.26 H	299	37.0	13.2
8	15720.00	39.5 AV	54.0	-14.5	2.26 H	299	26.3	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	*5240.00	122.2 PK			1.74 V	173	120.6	1.6
2	*5240.00	111.4 AV			1.74 V	173	109.8	1.6
3	5401.00	61.2 PK	74.0	-12.8	1.74 V	165	59.1	2.1
4	5401.00	51.6 AV	54.0	-2.4	1.74 V	165	49.5	2.1
5	#10480.00	55.8 PK	74.0	-18.2	2.29 V	200	43.8	12.0
6	#10480.00	43.8 AV	54.0	-10.2	2.29 V	200	31.8	12.0
7	15720.00	69.4 PK	74.0	-4.6	1.20 V	171	56.2	13.2
8	15720.00	53.7 AV	54.0	-0.3	1.20 V	171	40.5	13.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5582.30	59.4 PK	68.2	-8.8	1.07 H	169	57.1	2.3
2	*5745.00	114.3 PK			1.07 H	169	111.6	2.7
3	*5745.00	106.6 AV			1.07 H	169	103.9	2.7
4	#6021.68	57.5 PK	68.2	-10.7	1.07 H	169	54.2	3.3
5	11490.00	52.6 PK	74.0	-21.4	1.39 H	3	39.2	13.4
6	11490.00	40.8 AV	54.0	-13.2	1.39 H	3	27.4	13.4
7	#17235.00	59.1 PK	68.2	-9.1	2.23 H	283	40.8	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	#5583.25	60.2 PK	68.2	-8.0	1.88 V	7	57.9	2.3
2	*5745.00	122.7 PK			1.88 V	7	120.0	2.7
3	*5745.00	112.1 AV			1.88 V	7	109.4	2.7
4	#5957.55	60.2 PK	68.2	-8.0	1.88 V	7	57.2	3.0
5	11490.00	55.8 PK	74.0	-18.2	2.16 V	268	42.4	13.4
6	11490.00	45.1 AV	54.0	-8.9	2.16 V	268	31.7	13.4
7	#17235.00	66.1 PK	68.2	-2.1	1.87 V	360	47.8	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	#5645.48	59.6 PK	68.2	-8.6	1.07 H	169	57.1	2.5
2	*5785.00	114.3 PK			1.07 H	169	111.6	2.7
3	*5785.00	106.6 AV			1.07 H	169	103.9	2.7
4	#5930.00	59.4 PK	68.2	-8.8	1.07 H	169	56.5	2.9
5	11570.00	52.9 PK	74.0	-21.1	1.38 H	13	39.8	13.1
6	11570.00	41.0 AV	54.0	-13.0	1.38 H	13	27.9	13.1
7	#17355.00	59.7 PK	68.2	-8.5	2.22 H	299	40.9	18.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5553.80	59.2 PK	68.2	-9.0	1.77 V	7	56.9	2.3
2	*5785.00	122.4 PK			1.77 V	7	119.7	2.7
3	*5785.00	112.5 AV			1.77 V	7	109.8	2.7
4	#5938.07	62.2 PK	68.2	-6.0	1.77 V	7	59.3	2.9
5	11570.00	56.2 PK	74.0	-17.8	2.21 V	255	43.1	13.1
6	11570.00	45.7 AV	54.0	-8.3	2.21 V	255	32.6	13.1
7	#17355.00	65.8 PK	68.2	-2.4	1.83 V	360	47.0	18.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5583.73	59.6 PK	68.2	-8.6	1.07 H	170	57.3	2.3
2	*5825.00	114.8 PK			1.07 H	170	112.1	2.7
3	*5825.00	107.1 AV			1.07 H	170	104.4	2.7
4	#5982.25	61.3 PK	68.2	-6.9	1.07 H	170	58.1	3.2
5	11650.00	53.4 PK	74.0	-20.6	1.47 H	0	40.3	13.1
6	11650.00	41.5 AV	54.0	-12.5	1.47 H	0	28.4	13.1
7	#17475.00	59.2 PK	68.2	-9.0	2.17 H	304	40.0	19.2
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	#5579.45	60.8 PK	68.2	-7.4	1.82 V	5	58.5	2.3
2	*5825.00	122.4 PK			1.82 V	5	119.7	2.7
3	*5825.00	112.5 AV			1.82 V	5	109.8	2.7
4	#5994.12	61.4 PK	68.2	-6.8	1.82 V	5	58.1	3.3
5	11650.00	56.0 PK	74.0	-18.0	2.16 V	273	42.9	13.1
6	11650.00	45.3 AV	54.0	-8.7	2.16 V	273	32.2	13.1
7	#17475.00	65.5 PK	68.2	-2.7	1.84 V	360	46.3	19.2

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.

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	57.5 PK	74.0	-16.5	2.77 H	46	56.0	1.5
2	5150.00	47.3 AV	54.0	-6.7	2.77 H	46	45.8	1.5
3	*5190.00	108.4 PK			2.77 H	46	106.7	1.7
4	*5190.00	97.0 AV			2.77 H	46	95.3	1.7
5	#10380.00	50.0 PK	74.0	-24.0	1.65 H	184	38.5	11.5
6	#10380.00	38.9 AV	54.0	-15.1	1.65 H	184	27.4	11.5
7	15570.00	49.6 PK	74.0	-24.4	2.26 H	300	36.5	13.1
8	15570.00	39.3 AV	54.0	-14.7	2.26 H	300	26.2	13.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	73.8 PK	74.0	-0.2	1.77 V	174	72.3	1.5
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.77 V**	**174**	**52.4**	**1.5**
3	*5190.00	113.6 PK			1.77 V	174	111.9	1.7
4	*5190.00	102.1 AV			1.77 V	174	100.4	1.7
5	#10380.00	50.1 PK	74.0	-23.9	2.35 V	204	38.6	11.5
6	#10380.00	39.3 AV	54.0	-14.7	2.35 V	204	27.8	11.5
7	15570.00	50.3 PK	74.0	-23.7	1.09 V	157	37.2	13.1
8	15570.00	39.6 AV	54.0	-14.4	1.09 V	157	26.5	13.1

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.

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	5000.00	54.3 PK	74.0	-19.7	2.80 H	49	53.1	1.2
2	5000.00	44.5 AV	54.0	-9.5	2.80 H	49	43.3	1.2
3	5147.00	56.7 PK	74.0	-17.3	2.80 H	49	55.2	1.5
4	5147.00	46.8 AV	54.0	-7.2	2.80 H	49	45.3	1.5
5	*5230.00	112.5 PK			2.80 H	49	110.9	1.6
6	*5230.00	101.6 AV			2.80 H	49	100.0	1.6
7	5396.00	52.6 PK	74.0	-21.4	2.80 H	49	50.5	2.1
8	5396.00	42.4 AV	54.0	-11.6	2.80 H	49	40.3	2.1
9	#10460.00	49.1 PK	74.0	-24.9	1.65 H	200	37.2	11.9
10	#10460.00	38.2 AV	54.0	-15.8	1.65 H	200	26.3	11.9
11	15690.00	50.5 PK	74.0	-23.5	2.24 H	299	37.2	13.3
12	15690.00	39.8 AV	54.0	-14.2	2.24 H	299	26.5	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	5000.00	59.5 PK	74.0	-14.5	1.76 V	191	58.3	1.2
2	5000.00	52.8 AV	54.0	-1.2	1.76 V	191	51.6	1.2
3	5147.00	66.2 PK	74.0	-7.8	1.74 V	174	64.7	1.5
4	**5147.00**	**53.9 AV**	**54.0**	**-0.1**	**1.74 V**	**174**	**52.4**	**1.5**
5	*5230.00	117.9 PK			1.75 V	173	116.3	1.6
6	*5230.00	106.8 AV			1.75 V	173	105.2	1.6
7	5396.00	58.8 PK	74.0	-15.2	1.76 V	191	56.7	2.1
8	5396.00	46.6 AV	54.0	-7.4	1.76 V	191	44.5	2.1
9	#10460.00	50.0 PK	74.0	-24.0	2.36 V	198	38.1	11.9
10	#10460.00	38.9 AV	54.0	-15.1	2.36 V	198	27.0	11.9
11	15690.00	50.1 PK	74.0	-23.9	1.11 V	160	36.8	13.3
12	15690.00	39.5 AV	54.0	-14.5	1.11 V	160	26.2	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 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	#5647.85	64.5 PK	68.2	-3.7	1.04 H	168	62.0	2.5
2	*5755.00	114.1 PK			1.04 H	168	111.4	2.7
3	*5755.00	102.2 AV			1.04 H	168	99.5	2.7
4	#5951.37	59.4 PK	68.2	-8.8	1.04 H	168	56.4	3.0
5	11510.00	50.7 PK	74.0	-23.3	1.44 H	0	37.3	13.4
6	11510.00	39.3 AV	54.0	-14.7	1.44 H	0	25.9	13.4
7	#17265.00	54.6 PK	74.0	-19.4	2.19 H	283	36.3	18.3
8	#17265.00	43.4 AV	54.0	-10.6	2.19 H	283	25.1	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	#5645.95	67.4 PK	68.2	-0.8	1.95 V	5	64.9	2.5
2	*5755.00	118.8 PK			1.95 V	5	116.1	2.7
3	*5755.00	107.9 AV			1.95 V	5	105.2	2.7
4	#5929.05	60.5 PK	68.2	-7.7	1.95 V	5	57.6	2.9
5	11510.00	51.0 PK	74.0	-23.0	2.12 V	267	37.6	13.4
6	11510.00	39.4 AV	54.0	-14.6	2.12 V	267	26.0	13.4
7	#17265.00	60.8 PK	74.0	-13.2	1.83 V	360	42.5	18.3
8	#17265.00	49.6 AV	54.0	-4.4	1.83 V	360	31.3	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 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	#5632.65	62.5 PK	68.2	-5.7	1.07 H	168	60.0	2.5
2	*5795.00	114.8 PK			1.07 H	168	112.1	2.7
3	*5795.00	103.8 AV			1.07 H	168	101.1	2.7
4	#5957.07	61.5 PK	68.2	-6.7	1.07 H	168	58.5	3.0
5	11590.00	50.2 PK	74.0	-23.8	1.40 H	8	37.2	13.0
6	11590.00	38.9 AV	54.0	-15.1	1.40 H	8	25.9	13.0
7	#17385.00	54.4 PK	74.0	-19.6	2.21 H	288	35.4	19.0
8	#17385.00	43.4 AV	54.0	-10.6	2.21 H	288	24.4	19.0
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	#5650.70	65.9 PK	68.7	-2.8	1.96 V	5	63.4	2.5
2	*5795.00	118.2 PK			1.96 V	5	115.5	2.7
3	*5795.00	108.4 AV			1.96 V	5	105.7	2.7
4	#5938.07	63.2 PK	68.2	-5.0	1.96 V	5	60.3	2.9
5	11590.00	51.2 PK	74.0	-22.8	2.20 V	266	38.2	13.0
6	11590.00	39.8 AV	54.0	-14.2	2.20 V	266	26.8	13.0
7	#17385.00	60.7 PK	74.0	-13.3	1.89 V	360	41.7	19.0
8	#17385.00	49.1 AV	54.0	-4.9	1.89 V	360	30.1	19.0

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.

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	5148.00	57.3 PK	74.0	-16.7	2.73 H	73	55.8	1.5
2	5148.00	46.9 AV	54.0	-7.1	2.73 H	73	45.4	1.5
3	*5210.00	104.8 PK			2.73 H	73	103.1	1.7
4	*5210.00	92.6 AV			2.73 H	73	90.9	1.7
5	5350.00	52.4 PK	74.0	-21.6	2.73 H	73	50.5	1.9
6	5350.00	42.1 AV	54.0	-11.9	2.73 H	73	40.2	1.9
7	#10420.00	49.6 PK	74.0	-24.4	1.67 H	198	37.9	11.7
8	#10420.00	38.6 AV	54.0	-15.4	1.67 H	198	26.9	11.7
9	15630.00	50.0 PK	74.0	-24.0	2.21 H	302	36.8	13.2
10	15630.00	39.5 AV	54.0	-14.5	2.21 H	302	26.3	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	5148.00	73.0 PK	74.0	-1.0	1.75 V	173	71.5	1.5
2	**5148.00**	**53.9 AV**	**54.0**	**-0.1**	**1.75 V**	**173**	**52.4**	**1.5**
3	*5210.00	109.9 PK			1.75 V	173	108.2	1.7
4	*5210.00	97.7 AV			1.75 V	173	96.0	1.7
5	5350.00	59.0 PK	74.0	-15.0	1.75 V	173	57.1	1.9
6	5350.00	47.8 AV	54.0	-6.2	1.75 V	173	45.9	1.9
7	#10420.00	49.7 PK	74.0	-24.3	2.39 V	204	38.0	11.7
8	#10420.00	38.8 AV	54.0	-15.2	2.39 V	204	27.1	11.7
9	15630.00	50.0 PK	74.0	-24.0	1.07 V	148	36.8	13.2
10	15630.00	39.3 AV	54.0	-14.7	1.07 V	148	26.1	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 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	#5628.37	65.9 PK	68.2	-2.3	1.05 H	168	63.4	2.5
2	*5775.00	108.5 PK			1.77 H	6	105.8	2.7
3	*5775.00	97.2 AV			1.77 H	6	94.5	2.7
4	#5947.57	60.8 PK	68.2	-7.4	1.05 H	168	57.9	2.9
5	11550.00	50.9 PK	74.0	-23.1	1.40 H	0	37.7	13.2
6	11550.00	39.4 AV	54.0	-14.6	1.40 H	0	26.2	13.2
7	#17325.00	54.3 PK	74.0	-19.7	2.15 H	273	35.7	18.6
8	#17325.00	43.1 AV	54.0	-10.9	2.15 H	273	24.5	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	#5643.10	67.5 PK	68.2	-0.7	1.77 V	6	65.0	2.5
2	#5647.85	67.3 PK	68.2	-0.9	1.77 V	6	64.8	2.5
3	*5775.00	113.3 PK			1.05 V	168	110.6	2.7
4	*5775.00	101.2 AV			1.05 V	168	98.5	2.7
5	#5928.57	66.5 PK	68.2	-1.7	1.77 V	6	63.6	2.9
6	11550.00	51.3 PK	74.0	-22.7	2.24 V	273	38.1	13.2
7	11550.00	39.9 AV	54.0	-14.1	2.24 V	273	26.7	13.2
8	#17325.00	56.1 PK	74.0	-17.9	1.94 V	360	37.5	18.6
9	#17325.00	46.3 AV	54.0	-7.7	1.94 V	360	27.7	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.

Below 1GHz Data:

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	40.61	31.2 QP	40.0	-8.8	1.65 H	247	40.3	-9.1
2	66.77	31.4 QP	40.0	-8.6	1.42 H	110	41.7	-10.3
3	103.78	31.4 QP	43.5	-12.1	1.42 H	100	43.7	-12.3
4	142.00	39.7 QP	43.5	-3.8	1.24 H	301	48.5	-8.8
5	214.10	38.1 QP	43.5	-5.4	1.24 H	301	50.1	-12.0
6	362.00	36.2 QP	46.0	-9.8	1.42 H	100	42.7	-6.5
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	37.85	36.2 QP	40.0	-3.8	1.46 V	90	45.4	-9.2
2	73.95	33.5 QP	40.0	-6.5	1.65 V	100	45.2	-11.7
3	175.62	39.7 QP	43.5	-3.8	1.65 V	100	49.4	-9.7
4	211.21	36.3 QP	43.5	-7.2	1.42 V	122	48.3	-12.0
5	500.16	42.3 QP	46.0	-3.7	1.65 V	302	45.0	-2.7
6	533.65	42.4 QP	46.0	-3.6	1.42 V	241	44.7	-2.3

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

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	100375	May 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	04	Nov. 18, 2015	Nov. 17, 2016
50 ohms Terminator	50	3	Oct. 21, 2015	Oct. 20, 2016
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. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Oct. 12, 2016

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.

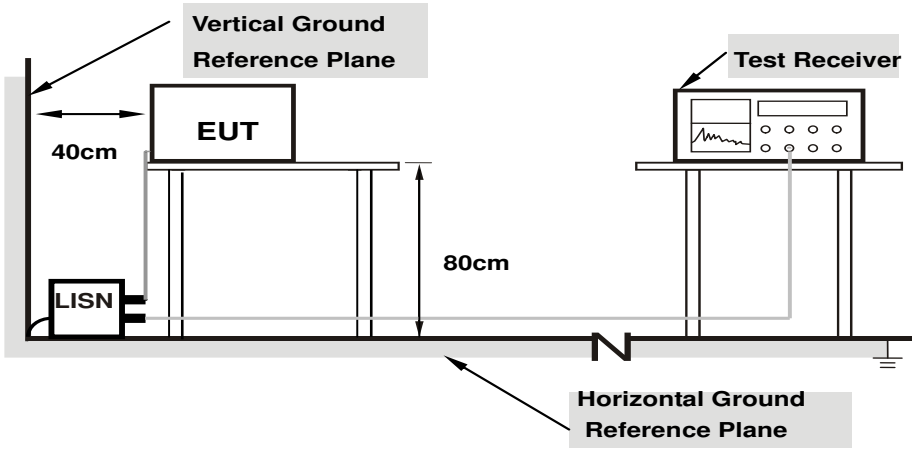
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

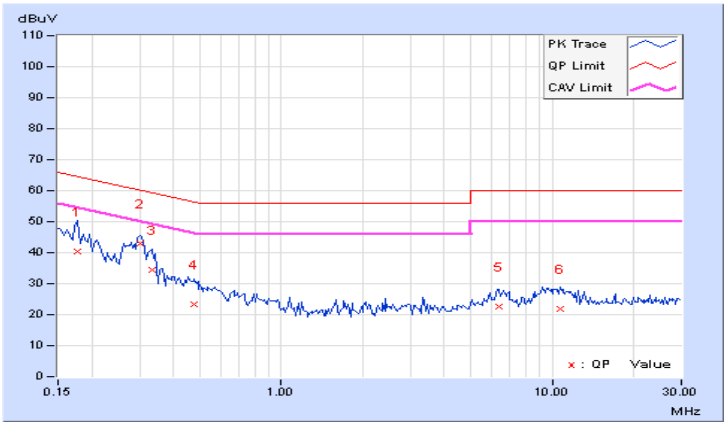
4.2.7 Test Results (Mode 1)

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	0.17734	10.13	30.16	18.26	40.29	28.39	64.61	54.61	-24.32	-26.22
2	0.30234	10.11	33.00	26.69	43.11	36.80	60.18	50.18	-17.07	-13.38
3	0.33359	10.11	24.38	18.02	34.49	28.13	59.36	49.36	-24.87	-21.23
4	0.47813	10.11	13.14	5.41	23.25	15.52	56.37	46.37	-33.12	-30.85
5	6.39063	10.36	12.38	2.64	22.74	13.00	60.00	50.00	-37.26	-37.00
6	10.76953	10.46	11.39	7.21	21.85	17.67	60.00	50.00	-38.15	-32.33

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.

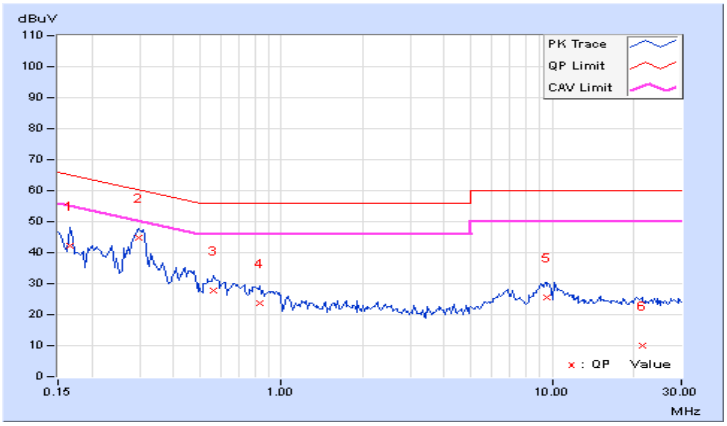


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	10.15	31.91	17.89	42.06	28.04	65.18	55.18	-23.12	-27.14
2	**0.29844**	**10.08**	**34.77**	**27.51**	**44.85**	**37.59**	**60.29**	**50.29**	**-15.44**	**-12.70**
3	0.56016	10.12	17.79	12.47	27.91	22.59	56.00	46.00	-28.09	-23.41
4	0.83359	10.18	13.50	8.27	23.68	18.45	56.00	46.00	-32.32	-27.55
5	9.61719	10.47	15.14	9.64	25.61	20.11	60.00	50.00	-34.39	-29.89
6	21.45703	10.89	-0.82	-4.03	10.07	6.86	60.00	50.00	-49.93	-43.14

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.



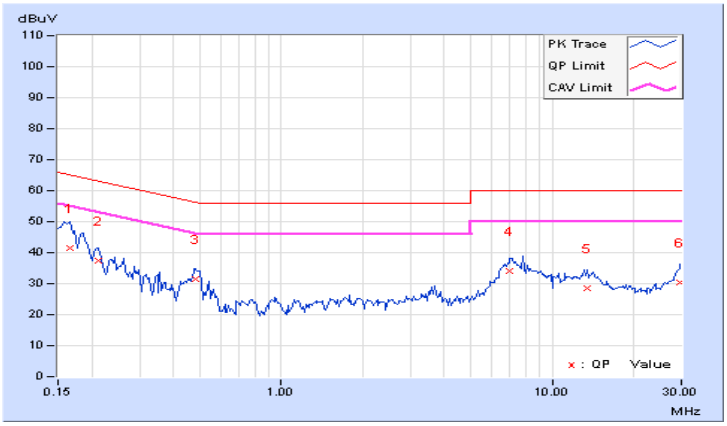
4.2.8 Test Results (Mode 2)

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	10.13	31.24	15.18	41.37	25.31	65.18	55.18	-23.81	-29.87
2	0.21250	10.12	27.44	16.33	37.56	26.45	63.11	53.11	-25.55	-26.66
3	0.48203	10.11	21.21	15.45	31.32	25.56	56.30	46.30	-24.98	-20.74
4	7.00000	10.37	23.52	18.90	33.89	29.27	60.00	50.00	-26.11	-20.73
5	13.51172	10.57	18.00	12.71	28.57	23.28	60.00	50.00	-31.43	-26.72
6	29.69922	11.16	19.17	14.18	30.33	25.34	60.00	50.00	-29.67	-24.66

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.

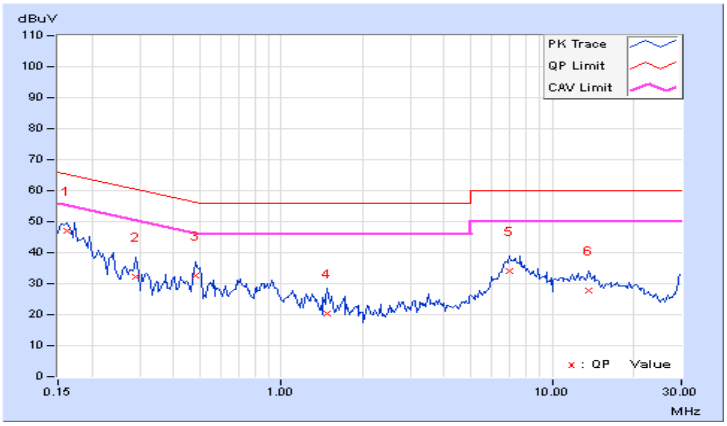


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16172	10.16	36.84	25.44	47.00	35.60	65.38	55.38	-18.38	-19.78
2	0.29063	10.08	22.27	17.56	32.35	27.64	60.51	50.51	-28.16	-22.87
3	0.48203	10.11	22.64	18.90	32.75	29.01	56.30	46.30	-23.55	-17.29
4	1.48438	10.19	10.01	6.22	20.20	16.41	56.00	46.00	-35.80	-29.59
5	6.97266	10.40	23.49	19.05	33.89	29.45	60.00	50.00	-26.11	-20.55
6	13.58203	10.62	17.14	11.81	27.76	22.43	60.00	50.00	-32.24	-27.57

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				
36	5180	19.46	19.19	20.59	285.844	24.56	30	Pass
40	5200	18.87	18.38	19.91	243.904	23.87	30	Pass
48	5240	23.30	23.02	23.98	664.278	28.22	30	Pass
149	5745	25.13	25.17	25.06	975.316	29.89	30	Pass
157	5785	25.12	25.16	25.26	988.92	29.95	30	Pass
165	5825	25.16	25.06	25.22	981.382	29.92	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
36	5180	20.58	20.03	21.56	358.2	25.54	30	Pass
40	5200	19.91	19.12	20.88	302.069	24.80	30	Pass
48	5240	23.13	22.98	23.92	650.802	28.13	30	Pass
149	5745	25.24	25.11	25.09	981.384	29.92	30	Pass
157	5785	25.12	25.09	25.15	975.277	29.89	30	Pass
165	5825	25.08	25.26	25.14	984.433	29.93	30	Pass

802.11ac (VHT40)

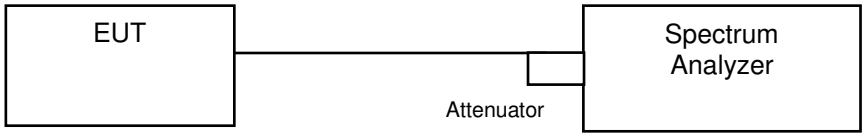
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
38	5190	17.55	17.09	18.41	177.396	22.49	30	Pass
46	5230	22.04	21.63	22.96	503.199	27.02	30	Pass
151	5755	24.90	24.65	24.88	908.383	29.58	30	Pass
159	5795	25.03	25.02	25.10	959.701	29.82	30	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				
42	5210	17.83	16.36	17.97	166.586	22.22	30	Pass
155	5775	22.20	22.32	22.56	516.869	27.13	30	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	16.92	16.80	16.80
40	5200	16.80	16.80	16.80
48	5240	17.52	17.16	17.52
149	5745	26.04	25.20	27.24
157	5785	25.56	25.08	27.60
165	5825	25.56	25.92	27.96

Beamforming Mode

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	17.88	17.88	18.00
40	5200	17.88	17.88	17.88
48	5240	18.36	18.12	18.24
149	5745	27.72	27.00	29.16
157	5785	27.24	27.24	28.68
165	5825	27.12	26.40	29.28

802.11ac (VHT40)

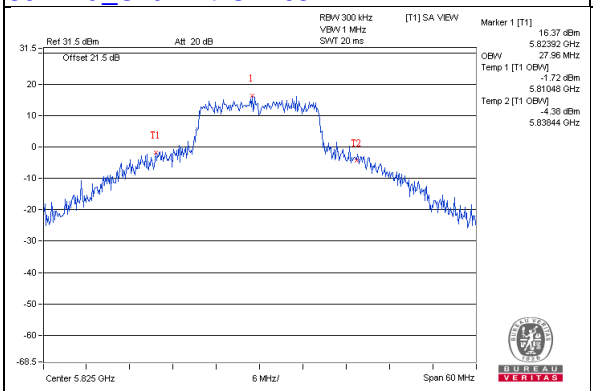
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
38	5190	36.72	36.96	36.72
46	5230	36.96	36.72	36.96
151	5755	54.48	52.08	56.88
159	5795	59.04	58.08	62.64

802.11ac (VHT80)

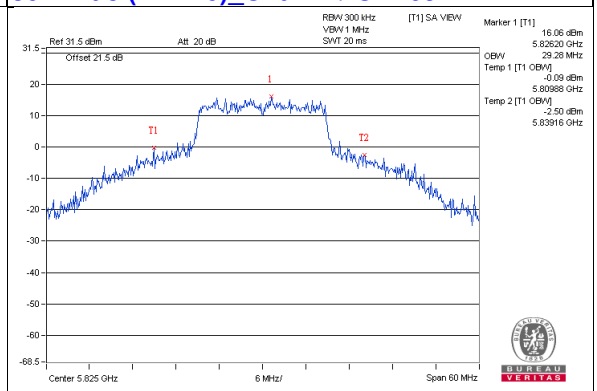
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
42	5210	76.32	75.84	75.36
155	5775	76.32	76.32	76.32

Spectrum Plot of Worst Value

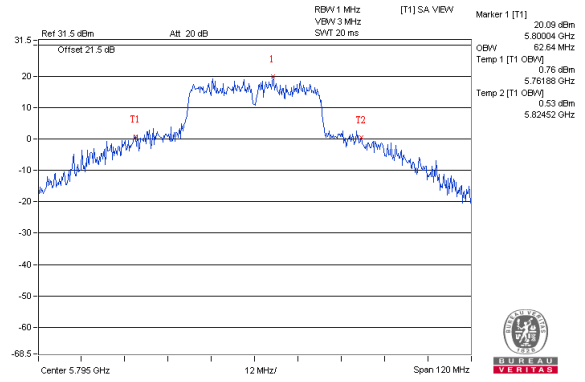
802.11a_Chain2 / CH165



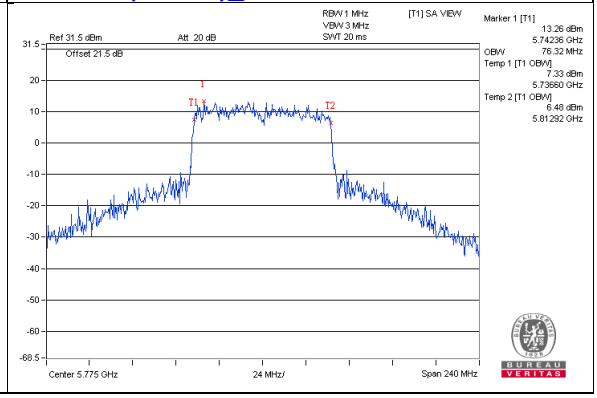
802.11ac (VHT20)_Chain2 / CH165



802.11ac (VHT40)_Chain2 / CH159

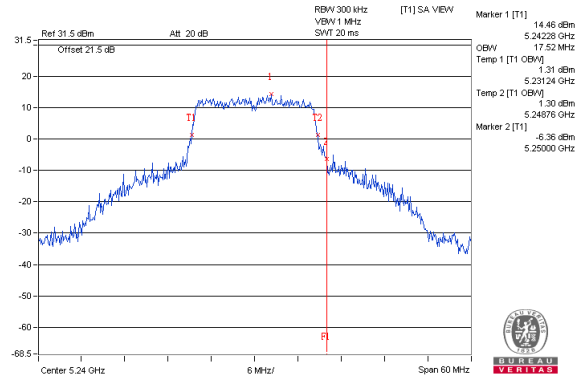


802.11ac (VHT80)_Chain2 / CH155

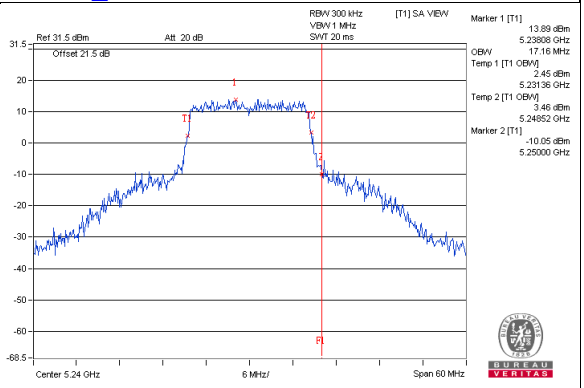


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

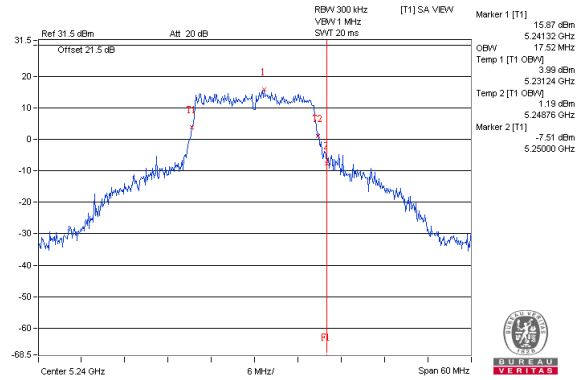
802.11a_Chain0 / CH48



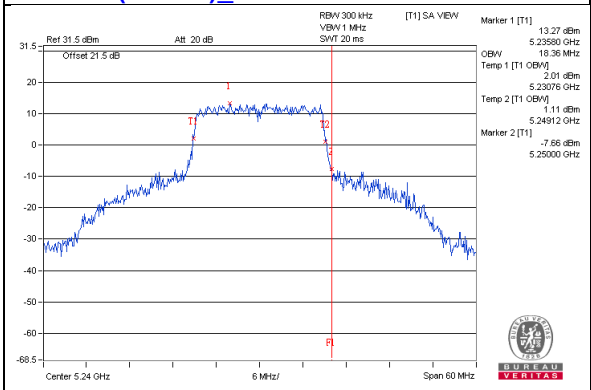
802.11a_Chain1 / CH48



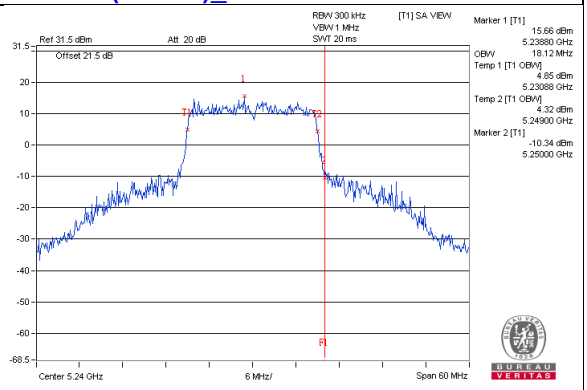
802.11a_Chain2 / CH48



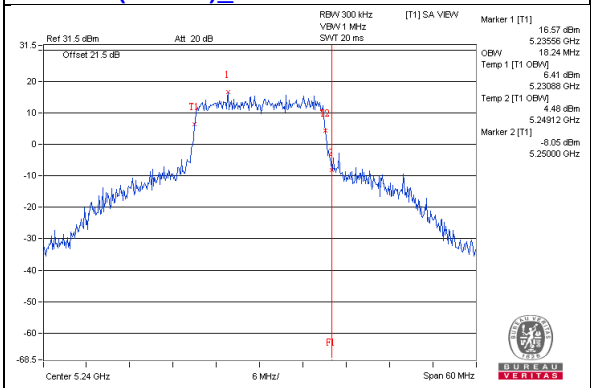
802.11ac(VHT20)_Chain0 / CH48



802.11ac(VHT20)_Chain1 / CH48

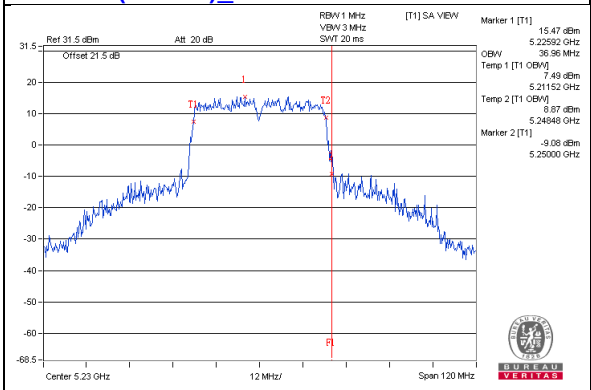


802.11ac(VHT20)_Chain2 / CH48

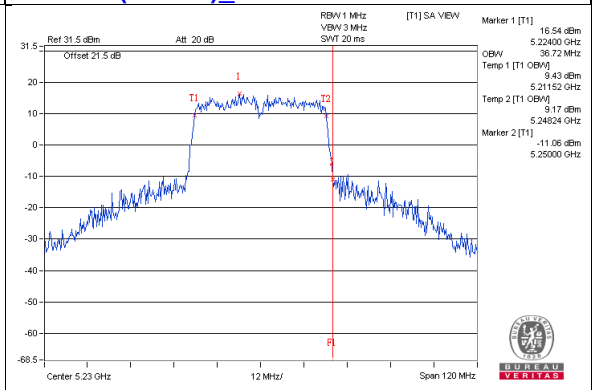


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

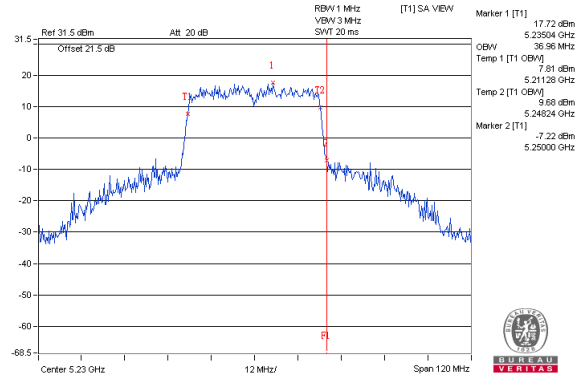
802.11ac(VHT40)_Chain0 / CH46



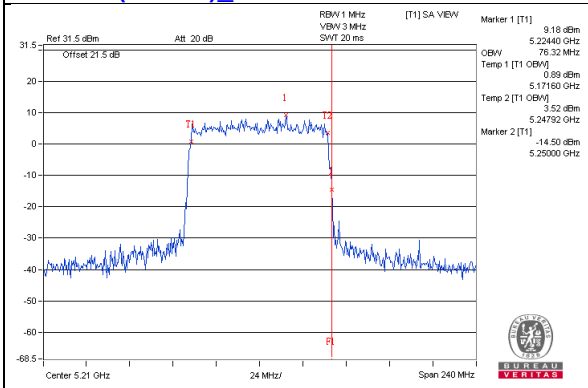
802.11ac(VHT40)_Chain1 / CH46



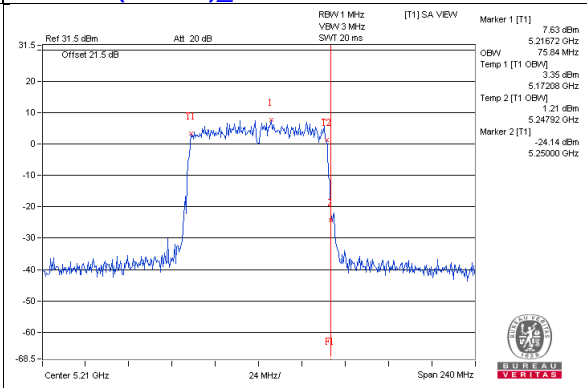
802.11ac(VHT40)_Chain2 / CH46



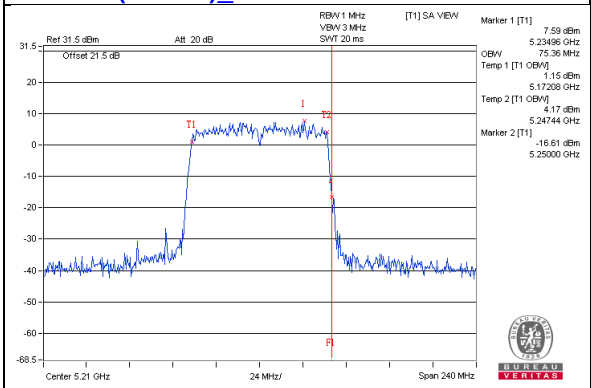
802.11ac(VHT80)_Chain0 / CH42



802.11ac(VHT80)_Chain1 / CH42

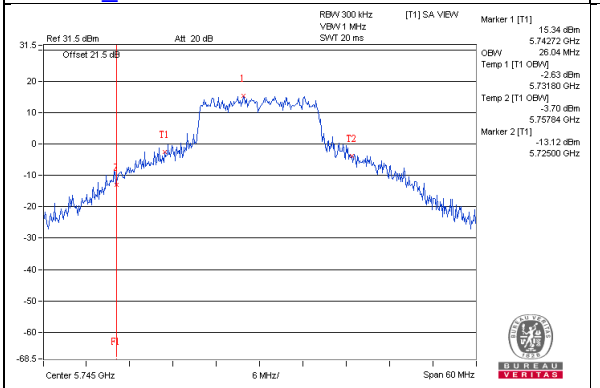


802.11ac(VHT80)_Chain2 / CH42

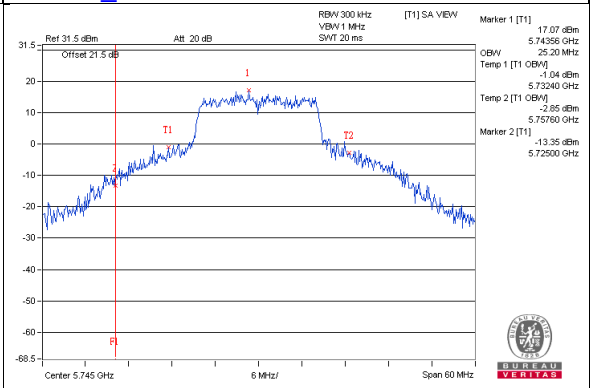


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

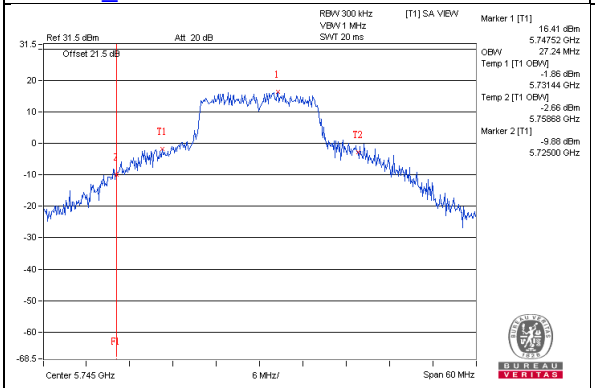
802.11a_Chain0 / CH149



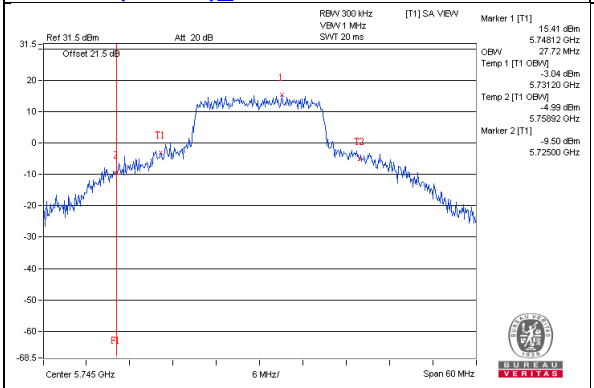
802.11a_Chain1 / CH149



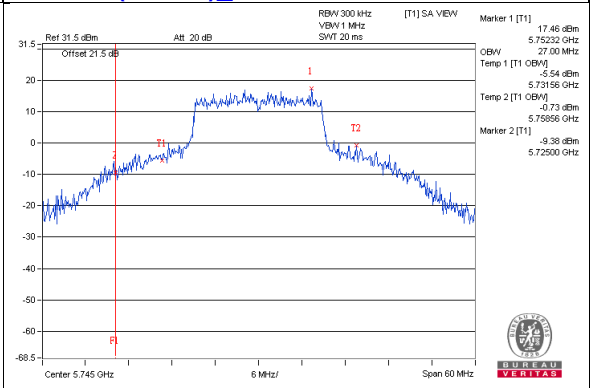
802.11a_Chain2 / CH149



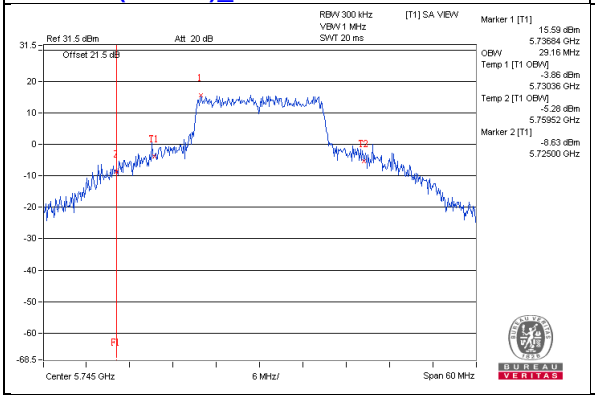
802.11ac(VHT20)_Chain0 / CH149



802.11ac(VHT20)_Chain1 / CH149

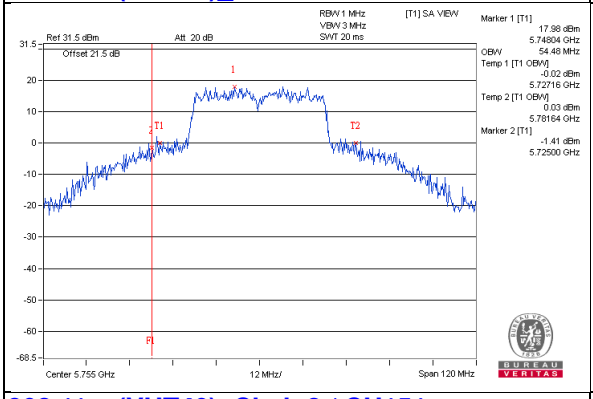


802.11ac(VHT20)_Chain2 / CH149

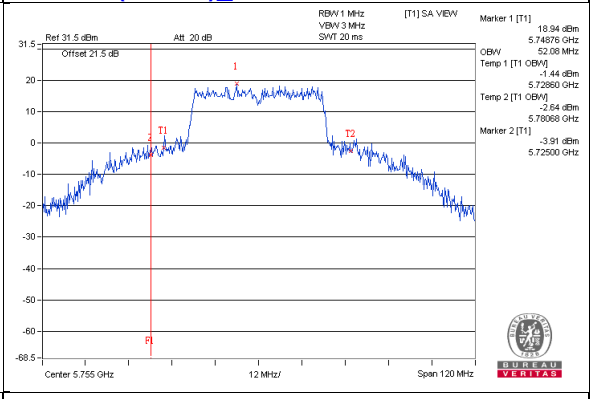


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

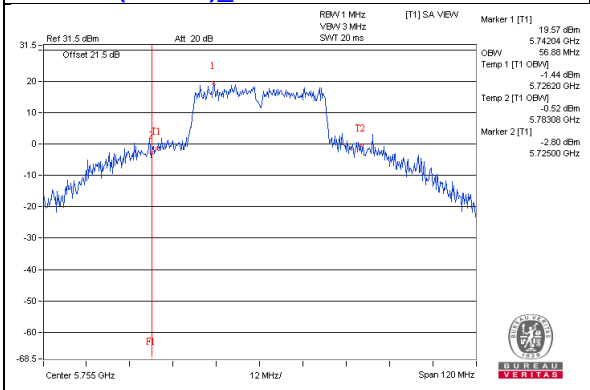
802.11ac(VHT40)_Chain0 / CH151



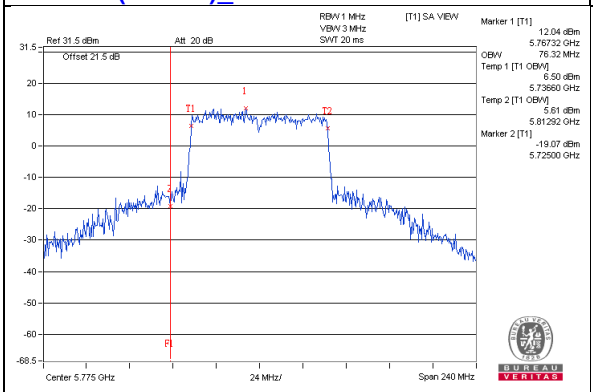
802.11ac(VHT40)_Chain1 / CH151



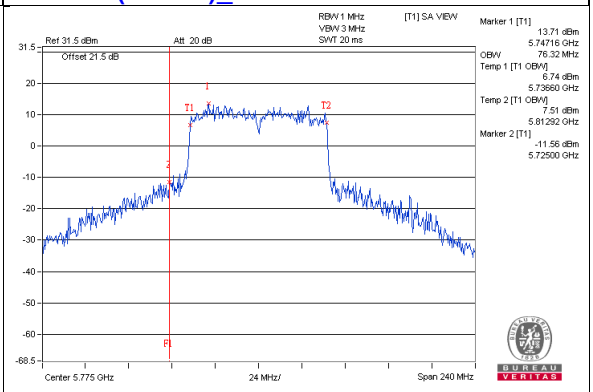
802.11ac(VHT40)_Chain2 / CH151



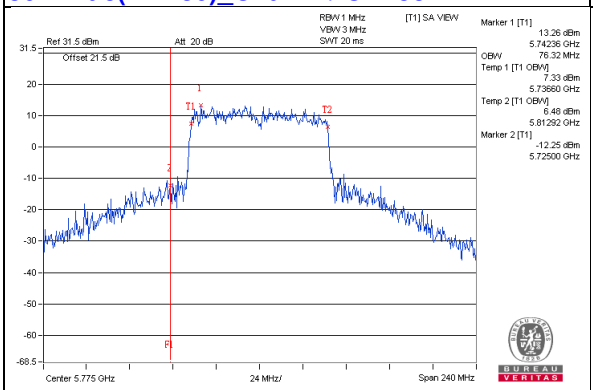
802.11ac(VHT80)_Chain0 / CH155



802.11ac(VHT80)_Chain1 / CH155



802.11ac(VHT80)_Chain2 / CH155

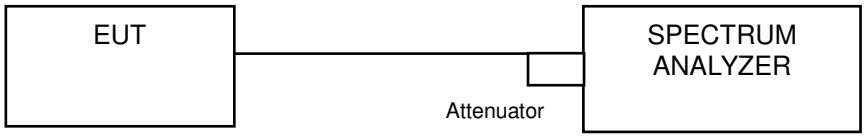


4.5 Peak Power Spectral Density Measurement

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

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

For U-NII-1:

Using method SA-1

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

For U-NII-3:

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

802.11ac (VHT80)

Using method SA-2

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

For 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

For U-NII-1:

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
36	5180	6.24	5.42	8.08	11.50	17.00	Pass
40	5200	5.40	4.96	7.40	10.83	17.00	Pass
48	5240	10.14	10.15	12.14	15.69	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 = 5.95dBi < 6dBi, so the power density limit shall not be reduced.

Beamforming Mode

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			
36	5180	6.84	6.74	8.46	12.19	17.00	Pass
40	5200	6.06	6.23	7.62	11.47	17.00	Pass
48	5240	9.98	10.24	11.45	15.38	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 = 5.95dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)			Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2			
38	5190	1.16	0.44	2.90	6.40	17.00	Pass
46	5230	5.73	5.64	7.78	11.27	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 = 5.95dBi < 6dBi, so the power density limit shall not be reduced.

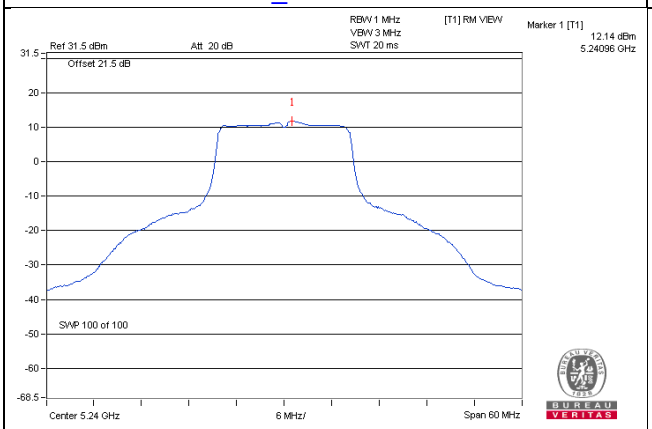
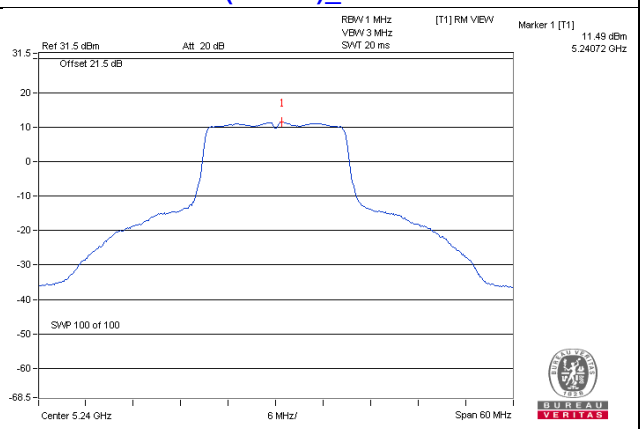
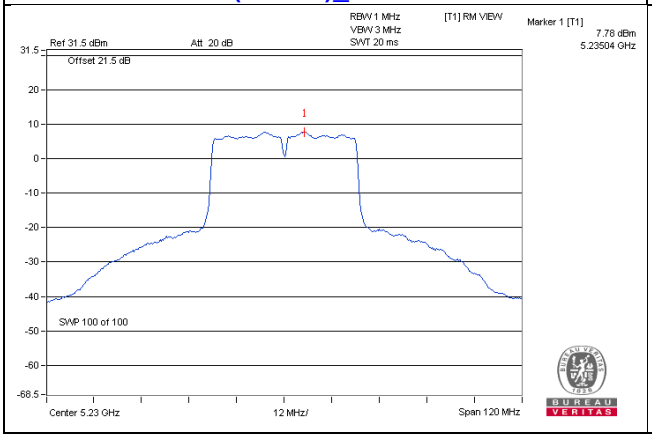
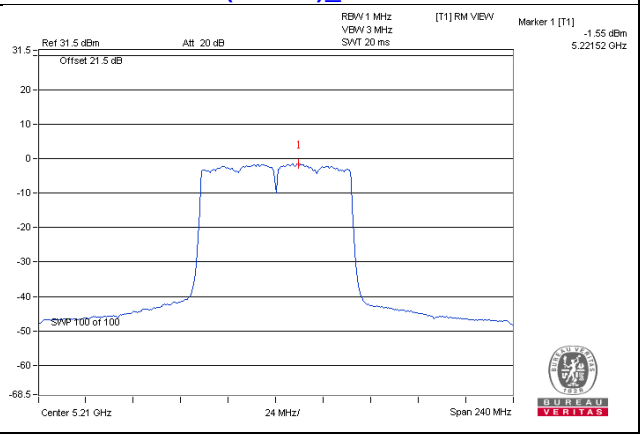
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	-1.60	-2.45	-1.81	0.17	3.00	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 = 5.95dBi < 6dBi, so the power density limit shall not be reduced.

3. Refer to section 3.3 for duty cycle spectrum plot

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

For U-NII-3:

CDD Mode

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	3.60	5.82	4.77	10.59	30.00	Pass
	157	5785	3.46	5.68	4.77	10.45	30.00	Pass
	165	5825	3.17	5.39	4.77	10.16	30.00	Pass
1	149	5745	4.25	6.47	4.77	11.24	30.00	Pass
	157	5785	4.13	6.35	4.77	11.12	30.00	Pass
	165	5825	4.00	6.22	4.77	10.99	30.00	Pass
2	149	5745	4.37	6.59	4.77	11.36	30.00	Pass
	157	5785	4.24	6.46	4.77	11.23	30.00	Pass
	165	5825	3.81	6.03	4.77	10.80	30.00	Pass

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

Beamforming Mode

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	3.53	5.75	4.77	10.52	30.00	Pass
	157	5785	3.14	5.36	4.77	10.13	30.00	Pass
	165	5825	2.86	5.08	4.77	9.85	30.00	Pass
1	149	5745	3.76	5.98	4.77	10.75	30.00	Pass
	157	5785	3.42	5.64	4.77	10.41	30.00	Pass
	165	5825	3.31	5.53	4.77	10.30	30.00	Pass
2	149	5745	3.95	6.17	4.77	10.94	30.00	Pass
	157	5785	3.96	6.18	4.77	10.95	30.00	Pass
	165	5825	3.46	5.68	4.77	10.45	30.00	Pass

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

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-0.07	2.15	4.77	6.92	30.00	Pass
	159	5795	-0.20	2.02	4.77	6.79	30.00	Pass
1	151	5755	0.32	2.54	4.77	7.31	30.00	Pass
	159	5795	0.58	2.80	4.77	7.57	30.00	Pass
2	151	5755	0.38	2.60	4.77	7.37	30.00	Pass
	159	5795	0.69	2.91	4.77	7.68	30.00	Pass

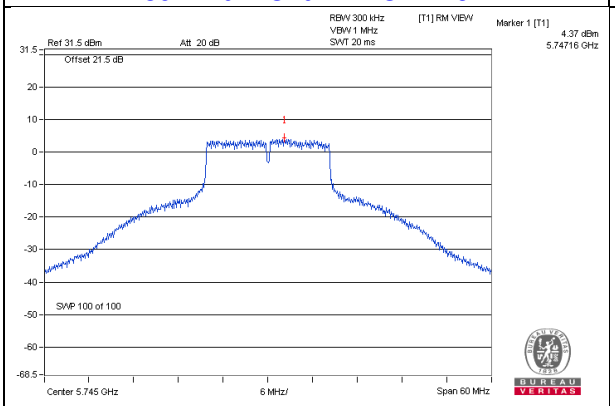
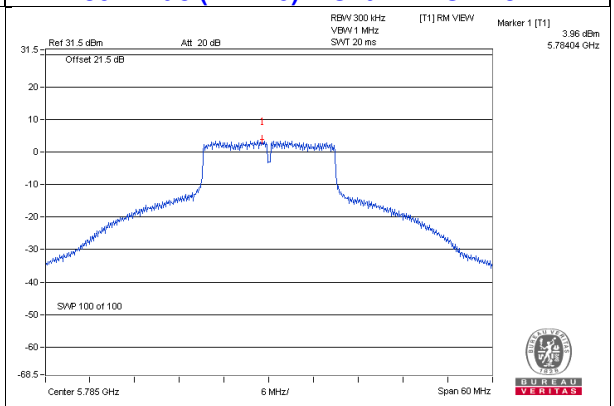
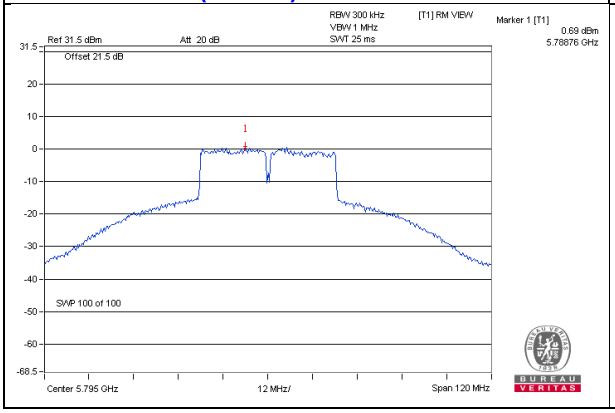
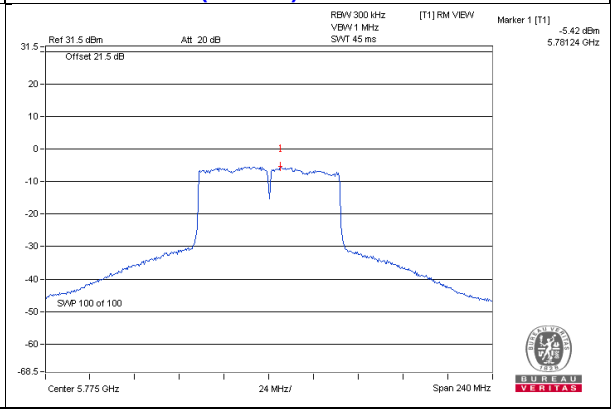
Note: 1. Directional gain = 5.98dBi < 6dBi, so the power density limit shall not be reduced.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-6.21	-3.99	4.77	0.17	0.95	30.00	Pass
1	155	5775	-5.42	-3.20	4.77	0.17	1.74	30.00	Pass
2	155	5775	-5.65	-3.43	4.77	0.17	1.51	30.00	Pass

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

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

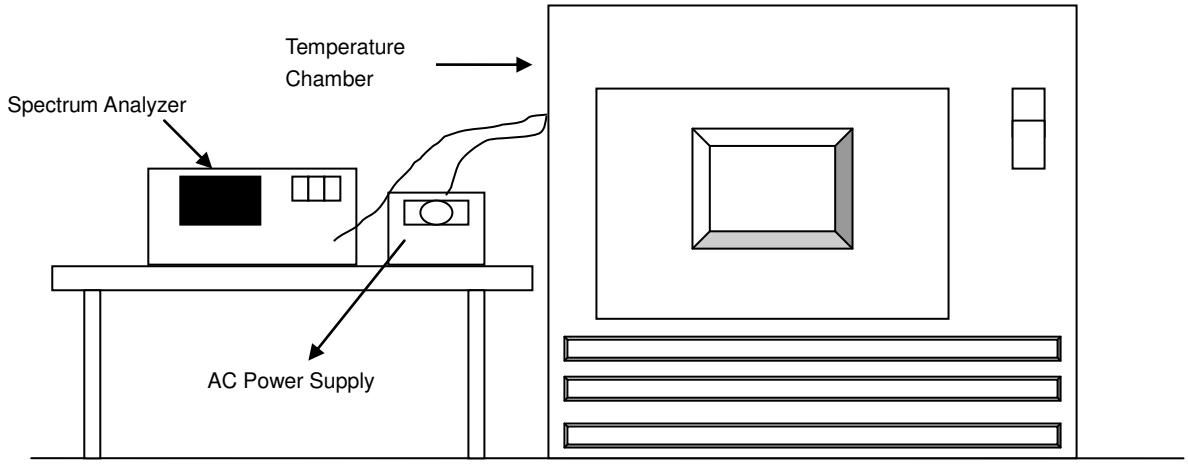
Spectrum Plot of Worst Value	
802.11a – Chain 2: CH 149	**802.11ac (VHT20) – Chain 2: CH 157**
	
802.11ac (VHT40) – Chain 2: CH 159	**802.11ac (VHT80) – Chain 1: CH 155**
	

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	5179.9946	Pass	5179.9905	Pass	5179.9916	Pass	5179.9941	Pass
40	120	5180.0134	Pass	5180.014	Pass	5180.0137	Pass	5180.0149	Pass
30	120	5180.0173	Pass	5180.0199	Pass	5180.0186	Pass	5180.0193	Pass
20	120	5180.0011	Pass	5180.0023	Pass	5180.001	Pass	5180.0003	Pass
10	120	5179.9775	Pass	5179.9784	Pass	5179.9776	Pass	5179.9774	Pass
0	120	5180.025	Pass	5180.0247	Pass	5180.024	Pass	5180.0202	Pass
-10	120	5180.0146	Pass	5180.0143	Pass	5180.0188	Pass	5180.0161	Pass
-20	120	5179.9776	Pass	5179.9764	Pass	5179.9808	Pass	5179.9784	Pass
-30	120	5179.9929	Pass	5179.9932	Pass	5179.9942	Pass	5179.9942	Pass

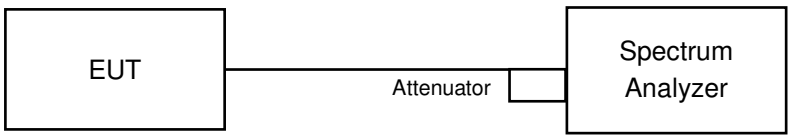
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.002	Pass	5180.0029	Pass	5180.0006	Pass	5179.9997	Pass
	120	5180.0011	Pass	5180.0023	Pass	5180.001	Pass	5180.0003	Pass
	102	5180.0019	Pass	5180.0025	Pass	5180.0016	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		
149	5745	16.39	16.41	16.38	0.5	PASS
157	5785	16.41	16.40	16.39	0.5	PASS
165	5825	16.40	16.40	16.41	0.5	PASS

Beamforming Mode

802.11ac (VHT20)

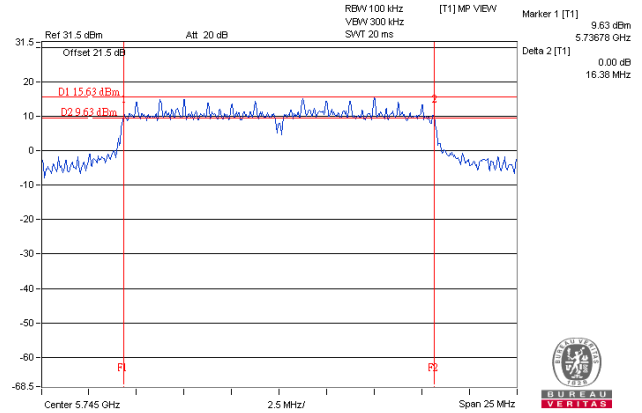
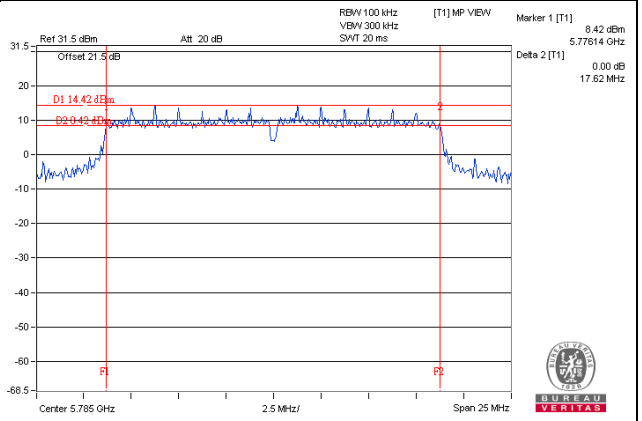
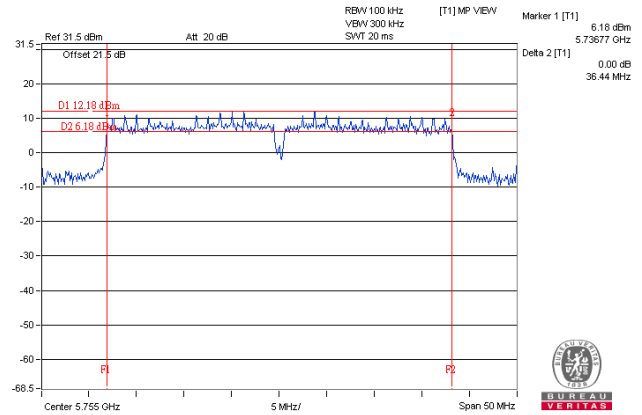
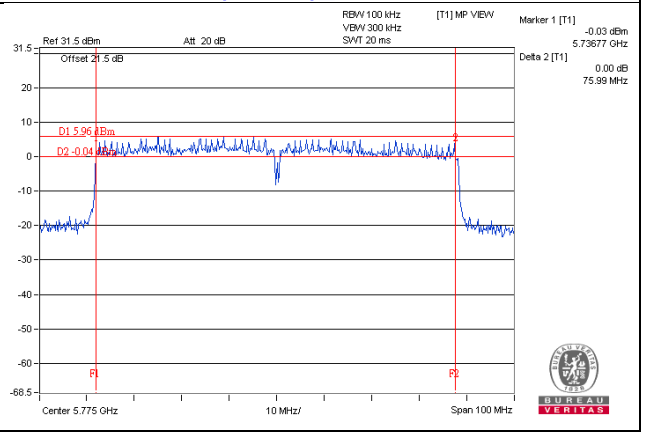
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.63	17.67	17.65	0.5	PASS
157	5785	17.62	17.65	17.64	0.5	PASS
165	5825	17.63	17.66	17.63	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.48	36.50	36.44	0.5	PASS
159	5795	36.44	36.47	36.46	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.10	75.99	76.02	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain 2 / CH149	**802.11ac (VHT20)_Chain 0 / CH157**
	
802.11ac (VHT40)_Chain 2 / CH151	**802.11ac (VHT80)_Chain 1 / CH155**
	

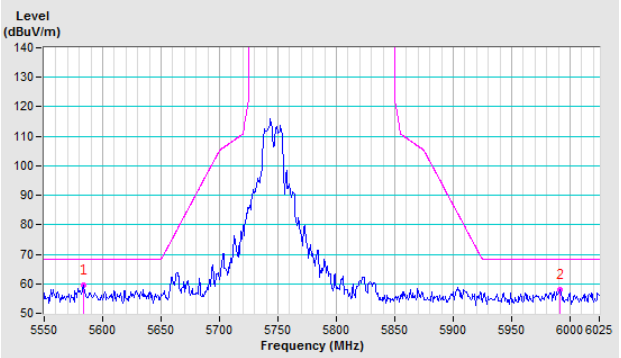
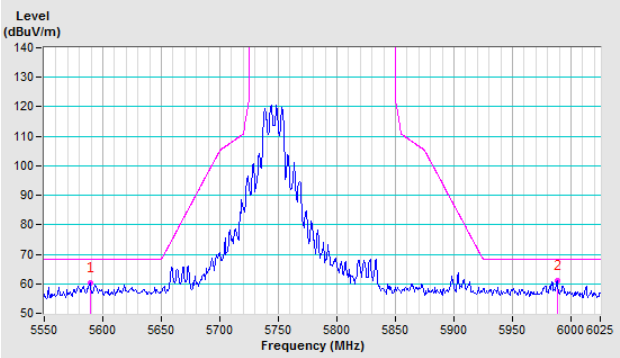
5 Pictures of Test Arrangements

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

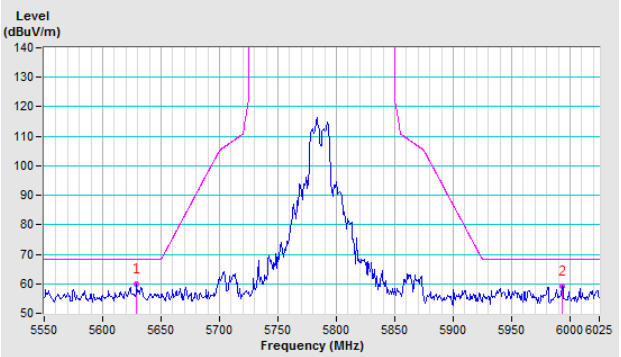
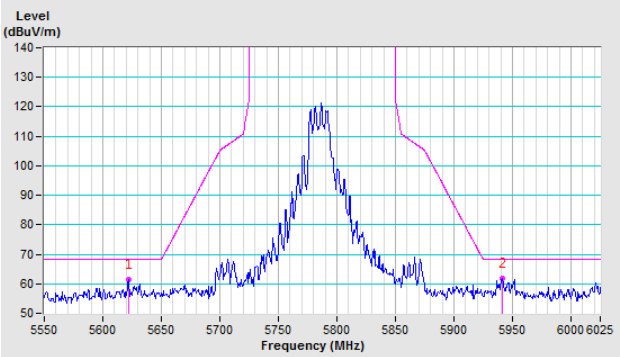
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

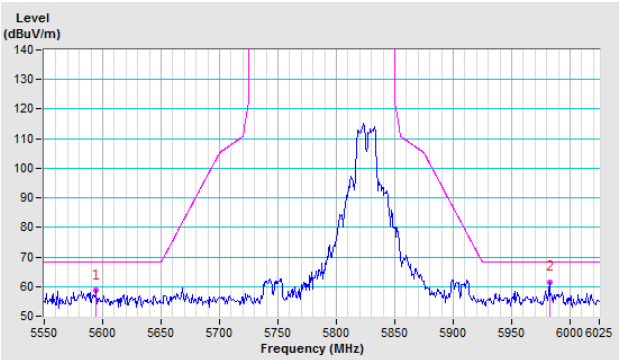
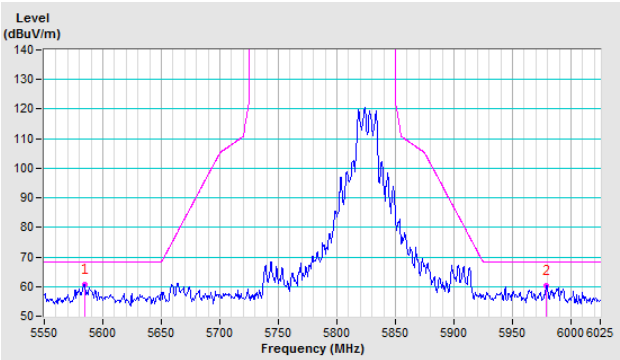
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

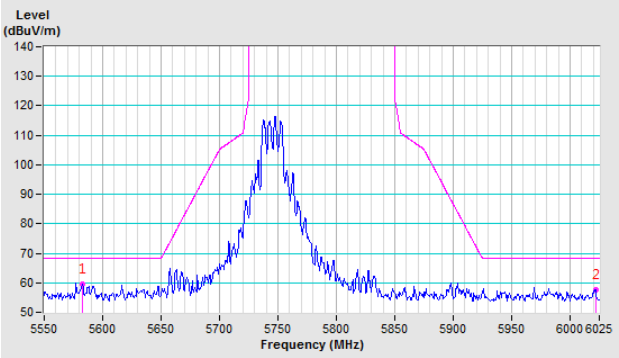
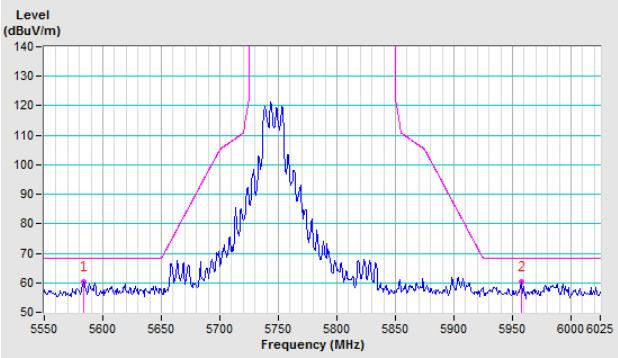
Horizontal	Vertical
	

CH 165 5825 MHz

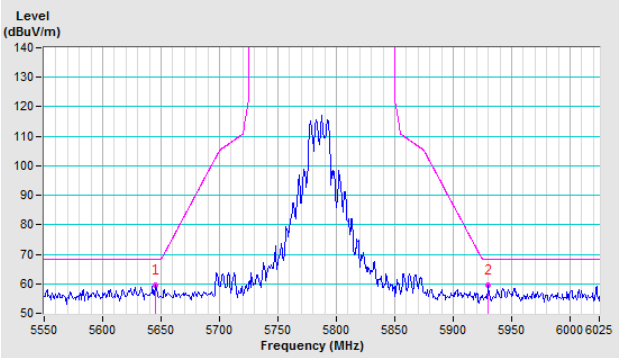
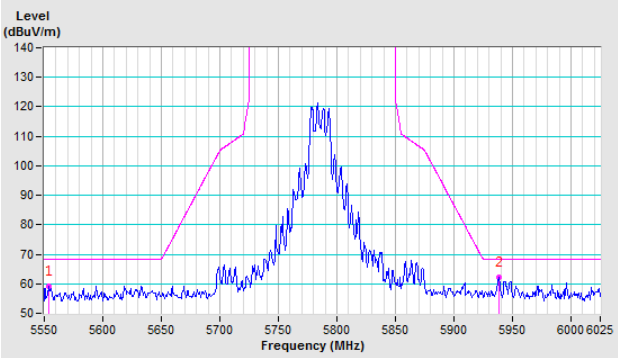
Horizontal	Vertical
	

802.11ac (VHT20)

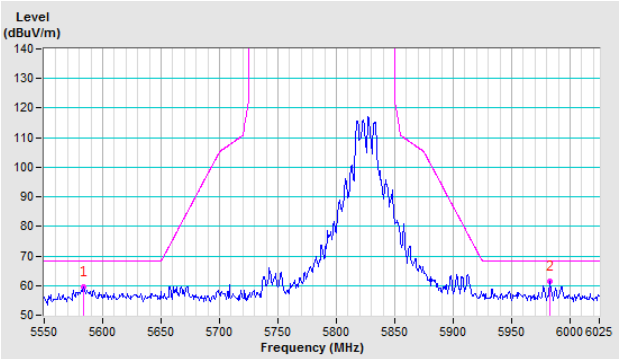
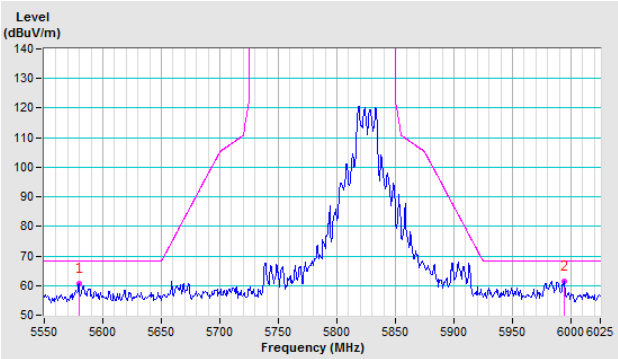
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

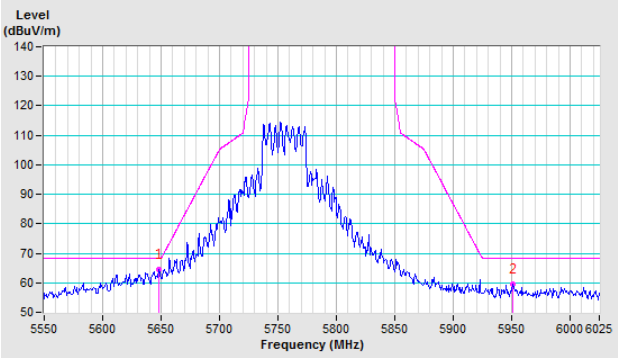
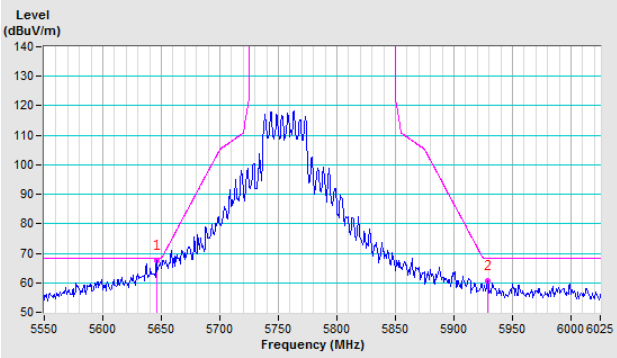
Horizontal	Vertical
	

CH 165 5825 MHz

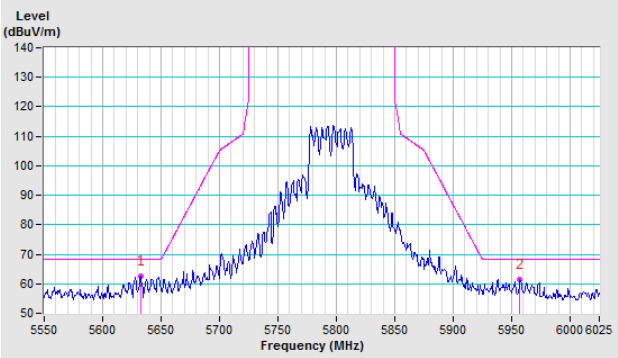
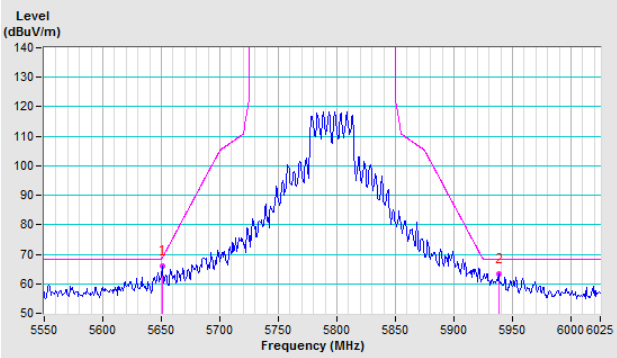
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

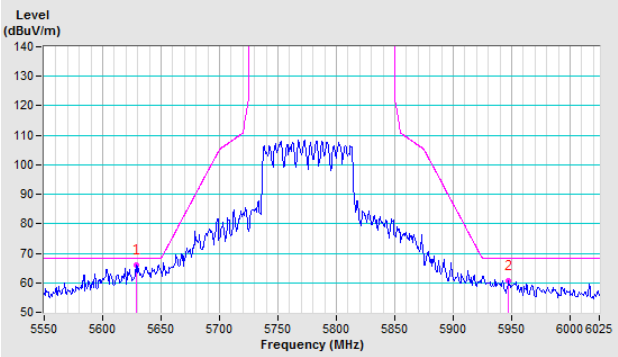
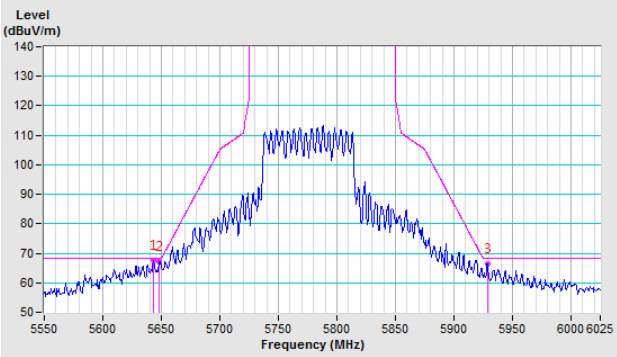
Horizontal	Vertical
	

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 accredited and approved 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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