FCC Test Report

Report No.:	RF170503E08-1
FCC ID:	2AHKM-CODA4589
Test Model:	CODA-4589
Received Date:	May. 03, 2017
Test Date:	May 26 to June 01, 2017
Issued Date:	June 23, 2017
Applicant:	HitronTechnologies
Address:	NO. 1-8, LISING 1ST RD., HSINCHU SCIENCE PARK, HSINCHU, 300, TAIWAN.
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.

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF170503E08-1	Original release.	June 23, 2017

1 Certificate of Conformity

Product:	DOCSIS 3.1 WiFi Emta
Brand:	Hitron
Test Model:	CODA-4589
Sample Status:	ENGINEERING SAMPLE
Applicant:	HitronTechnologies
Test Date:	May 26 to June 01, 2017
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : Cindy Hsin , **Date:** June 23, 2017

Cindy Hsin / Specialist

Approved by : , **Date:** June 23, 2017

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -5.13dB at 0.15000MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 17475.00MHz., 5138.60MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.32 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.14 dB
	6GHz ~ 18GHz	5.04 dB
	18GHz ~ 40GHz	5.25 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	DOCSIS 3.1 WiFi Emta
Brand	Hitron
Test Model	CODA-4589
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	AC 100-240V, 2.1A, 50/60Hz
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 600Mbps 802.11ac: up to 1733.3Mbps 802.11ac (80+80): up to 3466.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 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): 2 802.11ac (VHT80+80): 1 set
Output Power	**2.4GHz:** **CDD Mode:** 628.703mW **Beamforming Mode:** 552.116mW **5GHz:** **5.18 ~ 5.24GHz:** **CDD Mode:** 548.147mW **Beamforming Mode:** 301.984mW **5.745 ~ 5.825GHz:** **CDD Mode:** 965.11mW **Beamforming Mode:** 304.934mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	Power cord x1 (unshielded, 1.8m)

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 antennas provided to the EUT, please refer to the following table:

Antenna Set.	Transmitter Circuit	Brand	Model	Antenna Net. Gain(dBi)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length
A1	Chain (2)	AirGain	M2420SL0	3.69	2.4~2.4835	Dipole	i-pex(MHF)	50
A2	Chain (0)	AirGain	M2410CM	3.23	2.4~2.4835	Dipole	i-pex(MHF)	115
A3	Chain (1)	AirGain	M2420SL0	4.28	2.4~2.4835	Dipole	i-pex(MHF)	85
A4	Chain (2)	AirGain	M5X05C	4.51	5.15~5.85	Dipole	i-pex(MHF)	120
A5	Chain (1)	AirGain	M5X05C	6.1	5.15~5.85	Dipole	i-pex(MHF)	110
A6	Chain (0)	AirGain	M5X05C	4.94	5.15~5.85	Dipole	i-pex(MHF)	40
A7	Chain (3)	AirGain	M5X05C	4.83	5.15~5.85	Dipole	i-pex(MHF)	60

3. 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
802.11n (HT40)	MCS 0~7	3TX	3RX
	MCS 8~15	3TX	3RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
	MCS 16~23	4TX	4RX
	MCS 24~31	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~8 Nss=4	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
	MCS0~9 Nss=3	4TX	4RX
	MCS0~9 Nss=4	4TX	4RX
802.11ac (VHT80+VHT80) noncontigurus	MCS 0~9, Nss=1	2TX+2TX	2RX +2RX
	MCS 0~9, Nss=2	2TX+2TX	2RX +2RX

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

4. 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	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

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

For simultaneous transmission:

1 set is provided for 802.11ac (VHT80+80):

Channel	Frequency
42+155	5210MHz + 5775MHz

Note: The transmission is for noncontiguous transmission using two nonadjacent 80MHz channels.

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	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
802.11ac (VHT80+80)	5180-5240 5745-5825	42 to 155	42 + 155	OFDM	BPSK	58.5

Radiated Emission Test (Below 1GHz):

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46 151 to 159	151	OFDM	BPSK	13.5

Power Line Conducted Emission Test:

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

CDD Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46 151 to 159	151	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	**FREQ. Band (MHz)**	**Available Channel**	**Tested Channel**	**Modulation Technology**	**Modulation Type**	**Data Rate (Mbps)**
802.11a	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
802.11ac (VHT80+80)	5180-5240 5745-5825	42 to 155	42 + 155	OFDM	BPSK	58.5
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
802.11ac (VHT80+80)	5180-5240 5745-5825	42 to 155	42 + 155	OFDM	BPSK	58.5

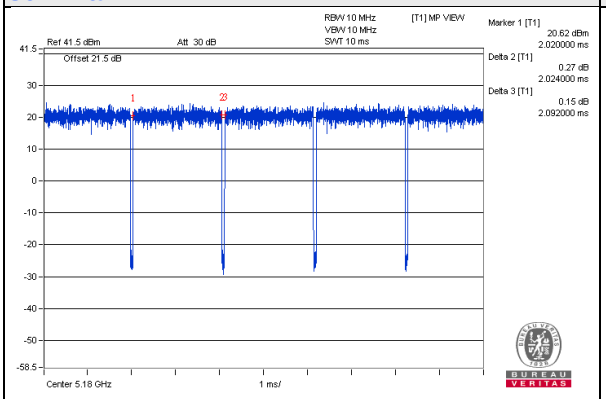
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 69%RH	120Vac, 60Hz	Rey Chen
RE<1G	23deg. C, 70%RH	120Vac, 60Hz	Rey Chen
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	23deg. C, 66%RH	120Vac, 60Hz	Anderson Chen

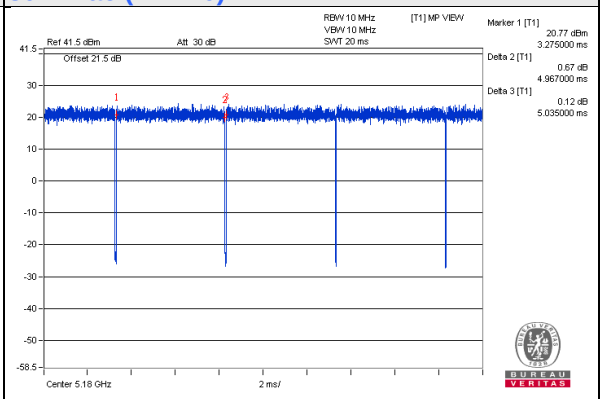
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.024/2.092 = 0.967, Duty factor = 10 * log(1/0.967) = 0.14
802.11ac (VHT20): Duty cycle = 4.967/5.035 = 0.986
802.11ac (VHT40): Duty cycle = 2.413/2.477 = 0.974, Duty factor = 10 * log(1/0.974) = 0.11
802.11ac (VHT80): Duty cycle = 1.134/1.212 = 0.936, Duty factor = 10 * log(1/0.936) = 0.29
802.11ac (VHT80+80): Duty cycle = 1.134/1.212 = 0.933, Duty factor = 10 * log(1/0.936) = 0.29

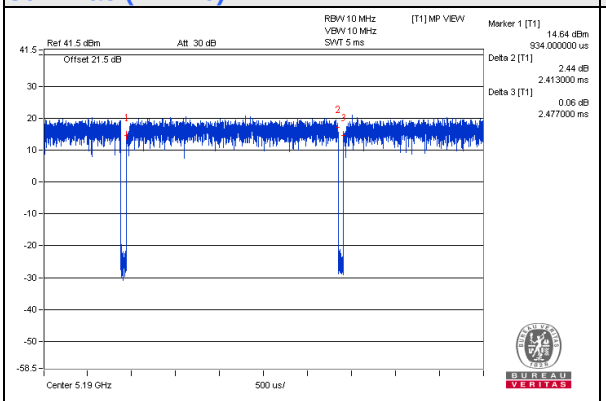
802.11a



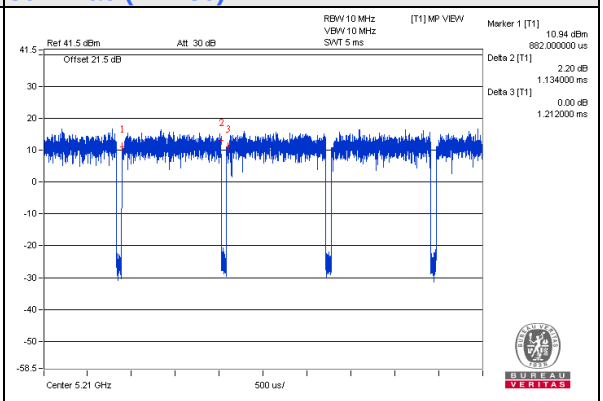
802.11ac (VHT20)



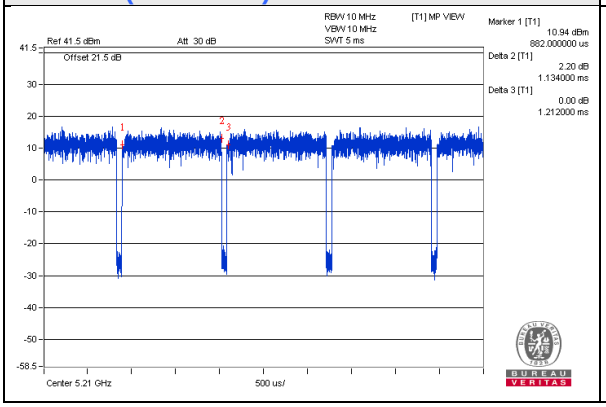
802.11ac (VHT40)



802.11ac (VHT80)



802.11ac (VHT80+80)



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.

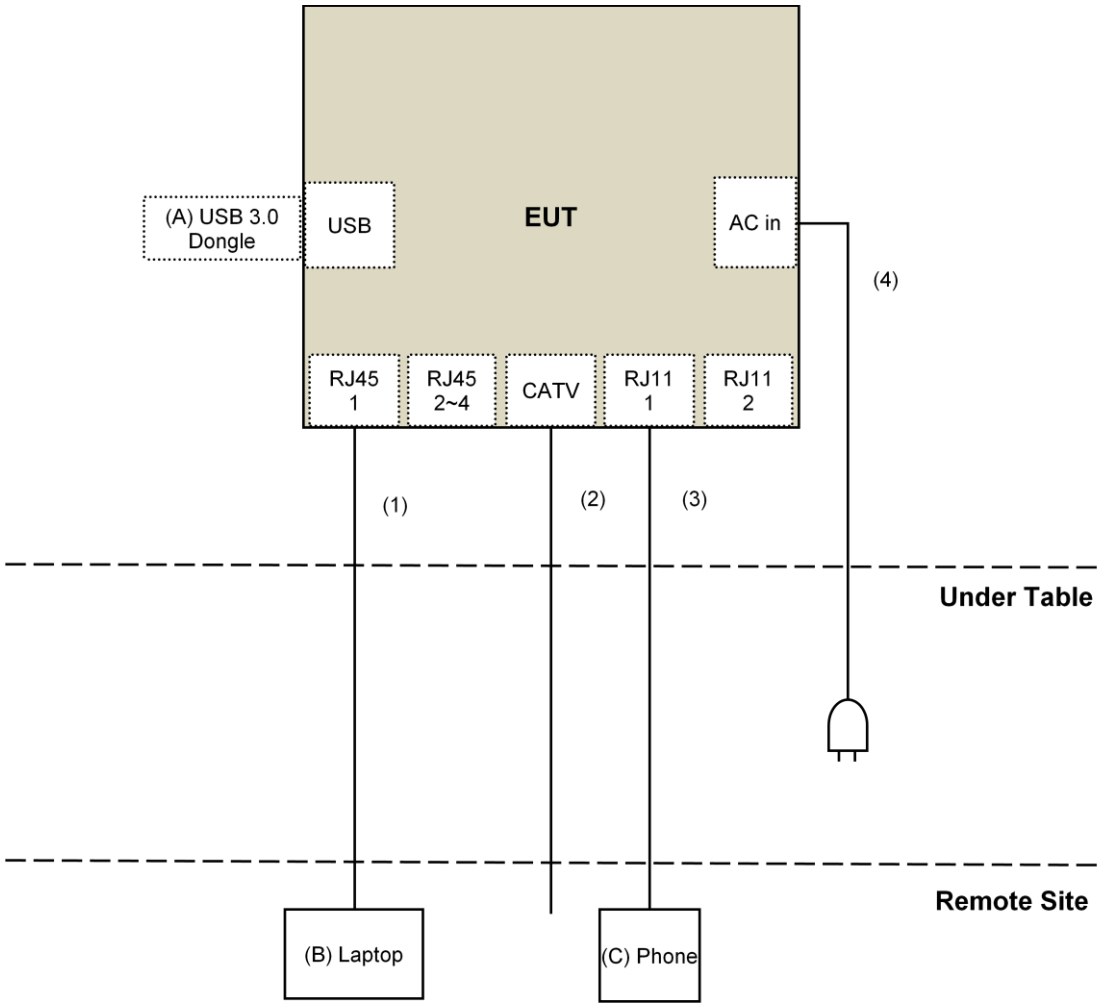
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB 3.0 Dongle	Transcend	JetFlash 700	NA	NA	Provided by Lab
B.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
C.	Phone	Remeo	TE-812	97285638	N/A	Provided by Lab

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.	Coaxial Cable	1	10	Yes	0	Provided by Lab
3.	RJ-11 Cable	1	10	No	0	Provided by Lab
4.	AC Cable	1	1.8	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
AC Power Source Extech Electronics	6502	1140503	NA	NA
Temperature & Humidity Chamber TERCHY	MHU-225AU	911033	Dec. 02, 2016	Dec. 01, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2016	Nov. 09, 2017

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is 147459
5. The CANADA Site Registration No. is 20331-1
6 Loop antenna was used for all emissions below 30 MHz.
7. Tested Date:May 26, 2017

4.1.3 Test Procedure

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Both X and Y axes of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

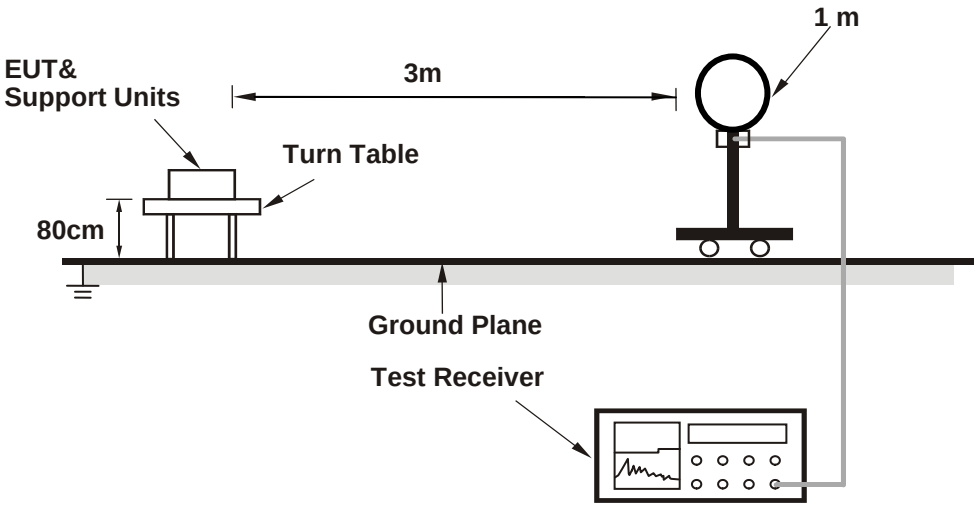
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

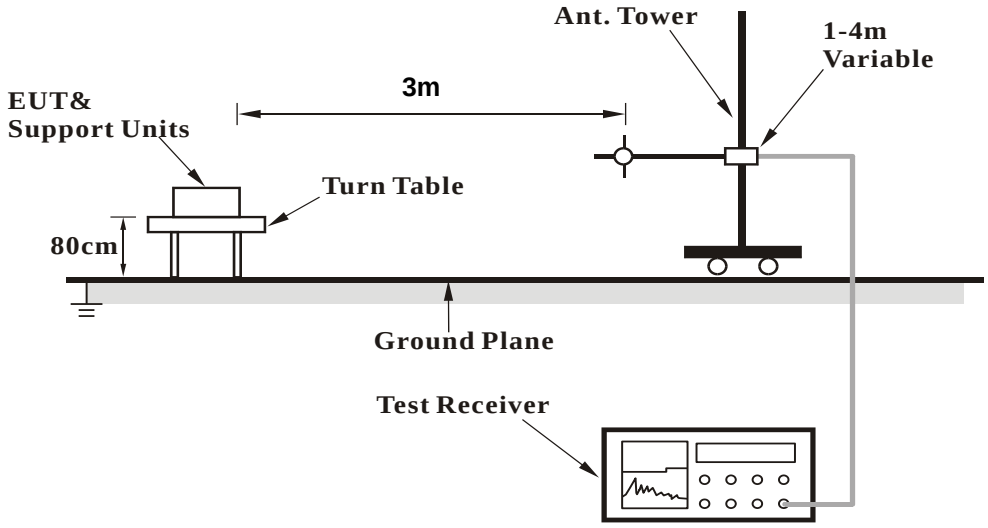
No deviation.

4.1.5 Test Setup

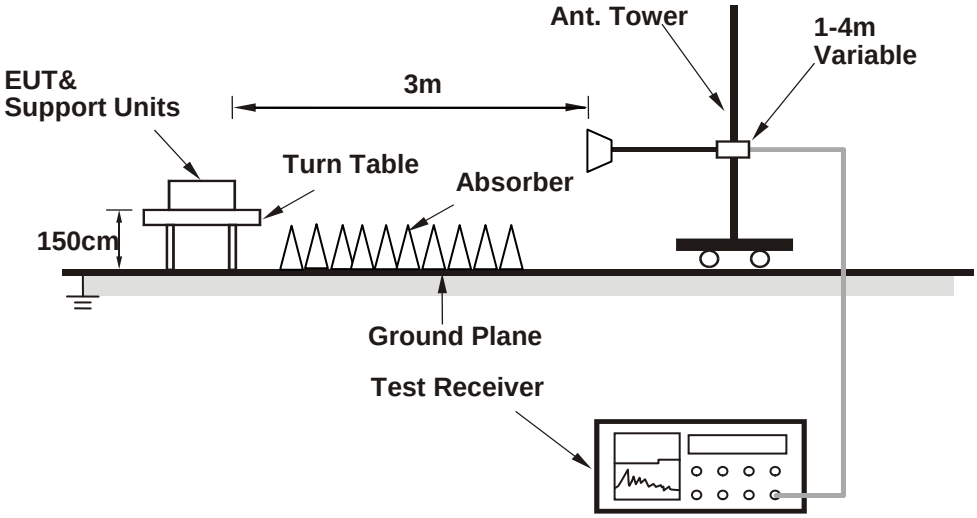
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on remote site.

b. Contorlling software (WiFi 5G QRCT [Verion3.0.187.0]) has been activated to set the EUT on specific status.

4.1.7 Test Results

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	5150.00	52.4 PK	74.0	-21.6	2.34 H	141	48.7	3.7
2	5150.00	41.4 AV	54.0	-12.6	2.34 H	141	37.7	3.7
3	*5180.00	112.5 PK			2.34 H	141	108.8	3.7
4	*5180.00	102.1 AV			2.34 H	141	98.4	3.7
5	#10360.00	43.3 PK	74.0	-30.7	1.64 H	213	30.3	13.0
6	#10360.00	31.5 AV	54.0	-22.5	1.64 H	213	18.5	13.0
7	15540.00	54.8 PK	74.0	-19.2	1.56 H	298	41.7	13.1
8	15540.00	43.8 AV	54.0	-10.2	1.56 H	298	30.7	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	60.0 PK	74.0	-14.0	1.79 V	104	56.3	3.7
2	5150.00	49.8 AV	54.0	-4.2	1.79 V	104	46.1	3.7
3	*5180.00	119.4 PK			1.79 V	104	115.7	3.7
4	*5180.00	110.0 AV			1.79 V	104	106.3	3.7
5	#10360.00	47.1 PK	74.0	-26.9	1.43 V	315	34.1	13.0
6	#10360.00	35.3 AV	54.0	-18.7	1.43 V	315	22.3	13.0
7	15540.00	60.1 PK	74.0	-13.9	1.46 V	327	47.0	13.1
8	15540.00	48.3 AV	54.0	-5.7	1.46 V	327	35.2	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)
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	5150.00	44.1 PK	74.0	-29.9	2.30 H	128	40.4	3.7
2	5150.00	33.1 AV	54.0	-20.9	2.30 H	128	29.4	3.7
3	*5200.00	112.6 PK			2.30 H	128	108.9	3.7
4	*5200.00	102.5 AV			2.30 H	128	98.8	3.7
5	5350.00	40.3 PK	74.0	-33.7	2.30 H	128	36.2	4.1
6	5350.00	32.1 AV	54.0	-21.9	2.30 H	128	28.0	4.1
7	#10400.00	43.8 PK	74.0	-30.2	1.60 H	206	30.8	13.0
8	#10400.00	31.8 AV	54.0	-22.2	1.60 H	206	18.8	13.0
9	15600.00	54.6 PK	74.0	-19.4	1.55 H	295	41.3	13.3
10	15600.00	43.5 AV	54.0	-10.5	1.55 H	295	30.2	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	51.7 PK	74.0	-22.3	1.67 V	108	48.0	3.7
2	5150.00	41.5 AV	54.0	-12.5	1.67 V	108	37.8	3.7
3	*5200.00	119.6 PK			1.67 V	108	115.9	3.7
4	*5200.00	110.1 AV			1.67 V	108	106.4	3.7
5	5350.00	45.9 PK	74.0	-28.1	1.67 V	108	41.8	4.1
6	5350.00	34.0 AV	54.0	-20.0	1.67 V	108	29.9	4.1
7	#10400.00	47.2 PK	74.0	-26.8	1.46 V	325	34.2	13.0
8	#10400.00	35.4 AV	54.0	-18.6	1.46 V	325	22.4	13.0
9	15600.00	62.3 PK	74.0	-11.7	1.05 V	289	49.0	13.3
10	15600.00	49.5 AV	54.0	-4.5	1.05 V	289	36.2	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 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	112.2 PK			2.32 H	130	108.4	3.8
2	*5240.00	101.6 AV			2.32 H	130	97.8	3.8
3	5350.00	40.1 PK	74.0	-33.9	2.32 H	130	36.0	4.1
4	5350.00	32.0 AV	54.0	-22.0	2.32 H	130	27.9	4.1
5	#10480.00	43.7 PK	74.0	-30.3	1.56 H	201	30.5	13.2
6	#10480.00	31.5 AV	54.0	-22.5	1.56 H	201	18.3	13.2
7	15720.00	54.5 PK	74.0	-19.5	1.57 H	287	40.9	13.6
8	15720.00	43.2 AV	54.0	-10.8	1.57 H	287	29.6	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.8 PK			2.23 V	61	116.0	3.8
2	*5240.00	109.9 AV			2.23 V	61	106.1	3.8
3	5350.00	47.0 PK	74.0	-27.0	2.23 V	61	42.9	4.1
4	5350.00	35.5 AV	54.0	-18.5	2.23 V	61	31.4	4.1
5	#10480.00	46.7 PK	74.0	-27.3	1.49 V	326	33.5	13.2
6	#10480.00	35.0 AV	54.0	-19.0	1.49 V	326	21.8	13.2
7	15720.00	61.4 PK	74.0	-12.6	1.03 V	289	47.8	13.6
8	15720.00	49.3 AV	54.0	-4.7	1.03 V	289	35.7	13.6

REMARKS:

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

CHANNEL	TX Channel 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	#5625.26	58.7 PK	68.2	-9.5	1.78 H	144	54.3	4.4
2	*5745.00	116.6 PK			1.78 H	144	112.2	4.4
3	*5745.00	107.4 AV			1.78 H	144	103.0	4.4
4	#6010.76	58.7 PK	68.2	-9.5	1.78 H	144	53.9	4.8
5	11490.00	56.3 PK	74.0	-17.7	1.61 H	197	42.8	13.5
6	11490.00	44.3 AV	54.0	-9.7	1.61 H	197	30.8	13.5
7	#17235.00	64.9 PK	68.2	-3.3	1.60 H	294	47.6	17.3
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	#5626.89	60.1 PK	68.2	-8.1	2.26 V	67	55.7	4.4
2	*5745.00	124.3 PK			2.26 V	67	119.9	4.4
3	*5745.00	114.2 AV			2.26 V	67	109.8	4.4
4	#5973.59	60.8 PK	68.2	-7.4	2.26 V	67	56.1	4.7
5	11490.00	59.3 PK	74.0	-14.7	1.46 V	336	45.8	13.5
6	11490.00	47.8 AV	54.0	-6.2	1.46 V	336	34.3	13.5
7	#17235.00	67.9 PK	68.2	-0.3	1.44 V	306	50.6	17.3

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	#5617.22	59.1 PK	68.2	-9.1	1.73 H	146	54.7	4.4
2	*5785.00	116.2 PK			1.73 H	146	111.8	4.4
3	*5785.00	107.3 AV			1.73 H	146	102.9	4.4
4	#5952.54	59.3 PK	68.2	-8.9	1.73 H	146	54.6	4.7
5	11570.00	56.2 PK	74.0	-17.8	1.62 H	184	42.7	13.5
6	11570.00	44.3 AV	54.0	-9.7	1.62 H	184	30.8	13.5
7	#17355.00	64.6 PK	68.2	-3.6	1.60 H	306	46.6	18.0
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	#5599.73	58.8 PK	68.2	-9.4	1.50 V	0	54.4	4.4
2	*5785.00	123.0 PK			1.50 V	0	118.6	4.4
3	*5785.00	113.2 AV			1.50 V	0	108.8	4.4
4	#5976.02	59.2 PK	68.2	-9.0	1.50 V	0	54.5	4.7
5	11570.00	59.7 PK	74.0	-14.3	1.50 V	340	46.2	13.5
6	11570.00	48.2 AV	54.0	-5.8	1.50 V	340	34.7	13.5
7	#17355.00	67.6 PK	68.2	-0.6	3.53 V	244	49.6	18.0

REMARKS:

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

CHANNEL	TX Channel 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	#5558.70	58.4 PK	68.2	-9.8	1.56 H	147	54.2	4.2
2	*5825.00	116.8 PK			1.56 H	147	112.4	4.4
3	*5825.00	107.8 AV			1.56 H	147	103.4	4.4
4	#5966.93	59.9 PK	68.2	-8.3	1.56 H	147	55.2	4.7
5	11650.00	56.0 PK	74.0	-18.0	1.58 H	202	42.3	13.7
6	11650.00	43.8 AV	54.0	-10.2	1.58 H	202	30.1	13.7
7	#17475.00	65.5 PK	68.2	-2.7	1.54 H	298	46.9	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	#5614.60	59.6 PK	68.2	-8.6	1.50 V	360	55.2	4.4
2	*5825.00	123.3 PK			1.50 V	360	118.9	4.4
3	*5825.00	113.3 AV			1.50 V	360	108.9	4.4
4	#5947.54	58.3 PK	68.2	-9.9	1.50 V	360	53.6	4.7
5	11650.00	60.0 PK	74.0	-14.0	1.43 V	342	46.3	13.7
6	11650.00	48.3 AV	54.0	-5.7	1.43 V	342	34.6	13.7
7	**#17475.00**	**68.1 PK**	**68.2**	**-0.1**	**3.92 V**	**281**	**49.5**	**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.

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	5148.70	52.4 PK	74.0	-21.6	2.38 H	131	48.7	3.7
2	5148.70	41.7 AV	54.0	-12.3	2.38 H	131	38.0	3.7
3	*5180.00	112.1 PK			2.32 H	153	108.4	3.7
4	*5180.00	102.0 AV			2.32 H	153	98.3	3.7
5	#10360.00	43.1 PK	74.0	-30.9	1.63 H	199	30.1	13.0
6	#10360.00	31.3 AV	54.0	-22.7	1.63 H	199	18.3	13.0
7	15540.00	54.8 PK	74.0	-19.2	1.54 H	290	41.7	13.1
8	15540.00	43.6 AV	54.0	-10.4	1.54 H	290	30.5	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	5148.70	64.0 PK	74.0	-10.0	1.73 V	60	60.3	3.7
2	5148.70	51.3 AV	54.0	-2.7	1.73 V	60	47.6	3.7
3	*5180.00	118.0 PK			1.73 V	60	114.3	3.7
4	*5180.00	108.1 AV			1.73 V	60	104.4	3.7
5	#10360.00	47.1 PK	74.0	-26.9	1.49 V	319	34.1	13.0
6	#10360.00	35.5 AV	54.0	-18.5	1.49 V	319	22.5	13.0
7	15540.00	60.2 PK	74.0	-13.8	1.41 V	343	47.1	13.1
8	15540.00	48.3 AV	54.0	-5.7	1.41 V	343	35.2	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	5148.00	52.1 PK	74.0	-21.9	2.31 H	130	48.5	3.6
2	5148.00	41.0 AV	54.0	-13.0	2.31 H	130	37.4	3.6
3	*5200.00	112.3 PK			2.37 H	136	108.6	3.7
4	*5200.00	102.3 AV			2.37 H	136	98.6	3.7
5	#10400.00	43.9 PK	74.0	-30.1	1.67 H	210	30.9	13.0
6	#10400.00	32.0 AV	54.0	-22.0	1.67 H	210	19.0	13.0
7	15600.00	54.5 PK	74.0	-19.5	1.58 H	292	41.2	13.3
8	15600.00	43.3 AV	54.0	-10.7	1.58 H	292	30.0	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5148.00	57.0 PK	74.0	-17.0	1.83 V	60	53.4	3.6
2	5148.00	44.0 AV	54.0	-10.0	1.83 V	60	40.4	3.6
3	*5200.00	119.7 PK			1.83 V	60	116.0	3.7
4	*5200.00	108.6 AV			1.83 V	60	104.9	3.7
5	#10400.00	47.0 PK	74.0	-27.0	1.44 V	323	34.0	13.0
6	#10400.00	35.6 AV	54.0	-18.4	1.44 V	323	22.6	13.0
7	15600.00	61.5 PK	74.0	-12.5	1.00 V	292	48.2	13.3
8	15600.00	48.1 AV	54.0	-5.9	1.00 V	292	34.8	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 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	112.1 PK			2.31 H	131	108.3	3.8
2	*5240.00	101.0 AV			2.31 H	131	97.2	3.8
3	5350.00	39.5 PK	74.0	-34.5	2.27 H	139	35.4	4.1
4	5350.00	31.7 AV	54.0	-22.3	2.27 H	139	27.6	4.1
5	#10480.00	44.1 PK	74.0	-29.9	1.53 H	191	30.9	13.2
6	#10480.00	31.8 AV	54.0	-22.2	1.53 H	191	18.6	13.2
7	15720.00	54.7 PK	74.0	-19.3	1.61 H	275	41.1	13.6
8	15720.00	43.4 AV	54.0	-10.6	1.61 H	275	29.8	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	118.7 PK			1.70 V	60	114.9	3.8
2	*5240.00	108.8 AV			1.70 V	60	105.0	3.8
3	5350.00	46.3 PK	74.0	-27.7	1.70 V	60	42.2	4.1
4	5350.00	33.8 AV	54.0	-20.2	1.70 V	60	29.7	4.1
5	#10480.00	46.9 PK	74.0	-27.1	1.50 V	325	33.7	13.2
6	#10480.00	35.3 AV	54.0	-18.7	1.50 V	325	22.1	13.2
7	15720.00	60.1 PK	74.0	-13.9	1.00 V	255	46.5	13.6
8	15720.00	48.1 AV	54.0	-5.9	1.00 V	255	34.5	13.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5646.85	59.3 PK	68.2	-8.9	1.54 H	143	54.9	4.4
2	*5745.00	116.4 PK			1.54 H	143	112.0	4.4
3	*5745.00	107.3 AV			1.54 H	143	102.9	4.4
4	#5942.06	58.8 PK	68.2	-9.4	1.54 H	143	54.1	4.7
5	11490.00	55.6 PK	74.0	-18.4	1.58 H	181	42.1	13.5
6	11490.00	43.8 AV	54.0	-10.2	1.58 H	181	30.3	13.5
7	#17235.00	65.3 PK	68.2	-2.9	1.61 H	299	48.0	17.3
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	#5618.40	58.9 PK	68.2	-9.3	2.29 V	64	54.5	4.4
2	*5745.00	124.4 PK			2.29 V	64	120.0	4.4
3	*5745.00	113.9 AV			2.29 V	64	109.5	4.4
4	#5968.10	59.4 PK	68.2	-8.8	2.29 V	64	54.7	4.7
5	11490.00	60.4 PK	74.0	-13.6	1.40 V	348	46.9	13.5
6	11490.00	48.8 AV	54.0	-5.2	1.40 V	348	35.3	13.5
7	#17235.00	68.0 PK	68.2	-0.2	1.49 V	303	50.7	17.3

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	#5630.96	58.5 PK	68.2	-9.7	1.56 H	143	54.1	4.4
2	*5785.00	117.6 PK			1.56 H	143	113.2	4.4
3	*5785.00	108.0 AV			1.56 H	143	103.6	4.4
4	#5974.73	59.1 PK	68.2	-9.1	1.56 H	143	54.4	4.7
5	11570.00	56.2 PK	74.0	-17.8	1.58 H	207	42.7	13.5
6	11570.00	44.1 AV	54.0	-9.9	1.58 H	207	30.6	13.5
7	#17355.00	64.1 PK	74.0	-9.9	1.58 H	301	46.1	18.0
8	#17355.00	50.1 AV	54.0	-3.9	1.58 H	301	32.1	18.0
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	#5574.01	59.3 PK	68.2	-8.9	2.16 V	61	55.1	4.2
2	*5785.00	123.5 PK			2.16 V	61	119.1	4.4
3	*5785.00	113.5 AV			2.16 V	61	109.1	4.4
4	#5961.44	58.4 PK	68.2	-9.8	2.16 V	61	53.7	4.7
5	11570.00	60.1 PK	74.0	-13.9	1.38 V	345	46.6	13.5
6	11570.00	48.4 AV	54.0	-5.6	1.38 V	345	34.9	13.5
7	#17355.00	67.1 PK	74.0	-6.9	1.50 V	306	49.1	18.0
8	#17355.00	52.8 AV	54.0	-1.2	1.50 V	306	34.8	18.0

REMARKS:

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

CHANNEL	TX Channel 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	#5639.44	58.4 PK	68.2	-9.8	1.56 H	147	54.0	4.4
2	*5825.00	117.8 PK			1.56 H	147	113.4	4.4
3	*5825.00	108.1 AV			1.56 H	147	103.7	4.4
4	#6011.12	59.1 PK	68.2	-9.1	1.56 H	147	54.3	4.8
5	11650.00	56.0 PK	74.0	-18.0	1.64 H	194	42.3	13.7
6	11650.00	44.2 AV	54.0	-9.8	1.64 H	194	30.5	13.7
7	#17475.00	64.6 PK	74.0	-9.4	1.56 H	282	46.0	18.6
8	#17475.00	50.3 AV	54.0	-3.7	1.56 H	282	31.7	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	#5565.16	59.8 PK	68.2	-8.4	1.76 V	62	55.6	4.2
2	*5825.00	123.1 PK			1.76 V	62	118.7	4.4
3	*5825.00	113.6 AV			1.76 V	62	109.2	4.4
4	#5989.47	59.6 PK	68.2	-8.6	1.76 V	62	54.9	4.7
5	11650.00	60.5 PK	74.0	-13.5	1.43 V	355	46.8	13.7
6	11650.00	48.7 AV	54.0	-5.3	1.43 V	355	35.0	13.7
7	#17475.00	63.6 PK	74.0	-10.4	2.18 V	307	45.0	18.6
8	#17475.00	52.7 AV	54.0	-1.3	2.18 V	307	34.1	18.6

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	44.5 PK	74.0	-29.5	2.41 H	126	40.8	3.7
2	5150.00	33.5 AV	54.0	-20.5	2.41 H	126	29.8	3.7
3	*5190.00	109.2 PK			2.41 H	126	105.5	3.7
4	*5190.00	101.3 AV			2.41 H	126	97.6	3.7
5	5350.00	40.2 PK	74.0	-33.8	2.41 H	126	36.1	4.1
6	5350.00	31.7 AV	54.0	-22.3	2.41 H	126	27.6	4.1
7	#10380.00	43.9 PK	74.0	-30.1	1.67 H	219	30.8	13.1
8	#10380.00	31.9 AV	54.0	-22.1	1.67 H	219	18.8	13.1
9	15570.00	55.2 PK	74.0	-18.8	1.62 H	287	41.9	13.3
10	15570.00	44.2 AV	54.0	-9.8	1.62 H	287	30.9	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.8 PK	74.0	-10.2	1.70 V	59	60.1	3.7
2	5150.00	53.6 AV	54.0	-0.4	1.70 V	59	49.9	3.7
3	*5190.00	116.0 PK			1.70 V	59	112.3	3.7
4	*5190.00	106.9 AV			1.70 V	59	103.2	3.7
5	5350.00	52.1 PK	74.0	-21.9	1.70 V	59	48.0	4.1
6	5350.00	40.3 AV	54.0	-13.7	1.70 V	59	36.2	4.1
7	#10380.00	46.6 PK	74.0	-27.4	1.48 V	318	33.5	13.1
8	#10380.00	34.9 AV	54.0	-19.1	1.48 V	318	21.8	13.1
9	15570.00	60.3 PK	74.0	-13.7	1.47 V	311	47.0	13.3
10	15570.00	48.2 AV	54.0	-5.8	1.47 V	311	34.9	13.3

REMARKS:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5137.30	40.4 PK	74.0	-33.6	2.44 H	128	36.8	3.6
2	5137.30	31.9 AV	54.0	-22.1	2.44 H	128	28.3	3.6
3	*5230.00	112.6 PK			2.44 H	128	108.8	3.8
4	*5230.00	103.0 AV			2.44 H	128	99.2	3.8
5	#10460.00	44.0 PK	74.0	-30.0	1.73 H	226	30.9	13.1
6	#10460.00	32.3 AV	54.0	-21.7	1.73 H	226	19.2	13.1
7	15690.00	54.7 PK	74.0	-19.3	1.65 H	295	40.9	13.8
8	15690.00	43.7 AV	54.0	-10.3	1.65 H	295	29.9	13.8
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	5137.30	59.6 PK	74.0	-14.4	1.72 V	62	56.0	3.6
2	5137.30	46.9 AV	54.0	-7.1	1.72 V	62	43.3	3.6
3	*5230.00	119.4 PK			1.72 V	62	115.6	3.8
4	*5230.00	108.6 AV			1.72 V	62	104.8	3.8
5	#10460.00	46.6 PK	74.0	-27.4	1.52 V	313	33.5	13.1
6	#10460.00	34.7 AV	54.0	-19.3	1.52 V	313	21.6	13.1
7	15690.00	62.7 PK	74.0	-11.3	1.01 V	286	48.9	13.8
8	15690.00	48.9 AV	54.0	-5.1	1.01 V	286	35.1	13.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5650.69	64.8 PK	68.7	-3.9	1.59 H	142	60.5	4.3
2	*5755.00	114.6 PK			1.59 H	142	110.2	4.4
3	*5755.00	106.9 AV			1.59 H	142	102.5	4.4
4	#5968.27	59.6 PK	68.2	-8.6	1.59 H	142	54.9	4.7
5	11510.00	55.9 PK	74.0	-18.1	1.66 H	207	42.3	13.6
6	11510.00	43.9 AV	54.0	-10.1	1.66 H	207	30.3	13.6
7	#17265.00	64.3 PK	74.0	-9.7	1.56 H	272	46.7	17.6
8	#17265.00	50.0 AV	54.0	-4.0	1.56 H	272	32.4	17.6
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	#5643.88	68.0 PK	68.2	-0.2	2.28 V	66	63.6	4.4
2	*5755.00	121.6 PK			2.28 V	66	117.2	4.4
3	*5755.00	112.8 AV			2.28 V	66	108.4	4.4
4	#5959.14	58.8 PK	68.2	-9.4	2.28 V	66	54.1	4.7
5	11510.00	60.6 PK	74.0	-13.4	1.42 V	355	47.0	13.6
6	11510.00	48.9 AV	54.0	-5.1	1.42 V	355	35.3	13.6
7	#17265.00	63.4 PK	74.0	-10.6	1.44 V	306	45.8	17.6
8	#17265.00	52.8 AV	54.0	-1.2	1.44 V	306	35.2	17.6

REMARKS:

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

CHANNEL	TX Channel 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	#5604.11	59.0 PK	68.2	-9.2	1.50 H	145	54.6	4.4
2	*5795.00	114.3 PK			1.50 H	145	109.9	4.4
3	*5795.00	106.0 AV			1.50 H	145	101.6	4.4
4	#5942.54	58.4 PK	68.2	-9.8	1.50 H	145	53.7	4.7
5	11590.00	56.1 PK	74.0	-17.9	1.65 H	182	42.6	13.5
6	11590.00	44.1 AV	54.0	-9.9	1.65 H	182	30.6	13.5
7	#17385.00	64.7 PK	74.0	-9.3	1.61 H	270	46.4	18.3
8	#17385.00	50.6 AV	54.0	-3.4	1.61 H	270	32.3	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	#5643.31	60.7 PK	68.2	-7.5	1.84 V	63	56.3	4.4
2	*5795.00	121.7 PK			1.84 V	63	117.3	4.4
3	*5795.00	112.0 AV			1.84 V	63	107.6	4.4
4	#5938.98	59.0 PK	68.2	-9.2	1.84 V	63	54.3	4.7
5	11590.00	60.7 PK	74.0	-13.3	1.39 V	355	47.2	13.5
6	11590.00	48.7 AV	54.0	-5.3	1.39 V	355	35.2	13.5
7	#17385.00	63.1 PK	74.0	-10.9	1.38 V	296	44.8	18.3
8	#17385.00	52.7 AV	54.0	-1.3	1.38 V	296	34.4	18.3

REMARKS:

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

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	5138.60	44.8 PK	74.0	-29.2	2.39 H	113	41.2	3.6
2	5138.60	33.7 AV	54.0	-20.3	2.39 H	113	30.1	3.6
3	*5210.00	104.3 PK			2.39 H	113	100.6	3.7
4	*5210.00	96.4 AV			2.39 H	113	92.7	3.7
5	5350.00	39.5 PK	74.0	-34.5	2.39 H	113	35.4	4.1
6	5350.00	31.2 AV	54.0	-22.8	2.39 H	113	27.1	4.1
7	#10420.00	44.0 PK	74.0	-30.0	1.67 H	231	30.9	13.1
8	#10420.00	32.3 AV	54.0	-21.7	1.67 H	231	19.2	13.1
9	15630.00	55.0 PK	74.0	-19.0	1.61 H	272	41.4	13.6
10	15630.00	43.9 AV	54.0	-10.1	1.61 H	272	30.3	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5138.60	65.0 PK	74.0	-9.0	1.66 V	57	61.4	3.6
2	**5138.60**	**53.9 AV**	**54.0**	**-0.1**	**1.66 V**	**57**	**50.3**	**3.6**
3	*5210.00	110.6 PK			1.66 V	57	106.9	3.7
4	*5210.00	101.5 AV			1.66 V	57	97.8	3.7
5	5350.00	54.2 PK	74.0	-19.8	1.66 V	57	50.1	4.1
6	5350.00	43.5 AV	54.0	-10.5	1.66 V	57	39.4	4.1
7	#10420.00	46.9 PK	74.0	-27.1	1.46 V	311	33.8	13.1
8	#10420.00	35.1 AV	54.0	-18.9	1.46 V	311	22.0	13.1
9	15630.00	59.8 PK	74.0	-14.2	1.42 V	324	46.2	13.6
10	15630.00	48.0 AV	54.0	-6.0	1.42 V	324	34.4	13.6

REMARKS:

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

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5634.50	60.4 PK	68.2	-7.8	1.62 H	145	56.0	4.4
2	*5775.00	107.5 PK			1.62 H	145	103.1	4.4
3	*5775.00	99.5 AV			1.62 H	145	95.1	4.4
4	#6002.89	58.9 PK	68.2	-9.3	1.62 H	145	54.1	4.8
5	11550.00	52.9 PK	74.0	-21.1	1.61 H	190	39.4	13.5
6	11550.00	40.8 AV	54.0	-13.2	1.61 H	190	27.3	13.5
7	#17325.00	62.0 PK	74.0	-12.0	1.66 H	284	44.2	17.8
8	#17325.00	48.7 AV	54.0	-5.3	1.66 H	284	30.9	17.8
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	#5652.74	69.9 PK	70.2	-0.3	1.50 V	0	65.6	4.3
2	*5775.00	113.8 PK			1.50 V	0	109.4	4.4
3	*5775.00	104.6 AV			1.50 V	0	100.2	4.4
4	#5976.32	59.7 PK	68.2	-8.5	1.50 V	0	55.0	4.7
5	11550.00	60.3 PK	74.0	-13.7	1.35 V	360	46.8	13.5
6	11550.00	48.6 AV	54.0	-5.4	1.35 V	360	35.1	13.5
7	#17325.00	62.9 PK	74.0	-11.1	1.50 V	304	45.1	17.8
8	#17325.00	50.6 AV	54.0	-3.4	1.50 V	304	32.8	17.8

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.

802.11ac (VHT80+80)

CHANNEL	TX Channel 42+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	4649.60	53.5 PK	74.0	-20.5	2.39 H	126	50.9	2.6
2	4649.60	39.5 AV	54.0	-14.5	2.39 H	126	36.9	2.6
3	5139.20	54.7 PK	74.0	-19.3	2.39 H	126	51.1	3.6
4	5139.20	43.7 AV	54.0	-10.3	2.39 H	126	40.1	3.6
5	*5210.00	101.5 PK			2.39 H	126	97.8	3.7
6	*5210.00	93.3 AV			2.39 H	126	89.6	3.7
7	5350.00	44.4 PK	74.0	-29.6	2.39 H	126	40.3	4.1
8	5350.00	33.5 AV	54.0	-20.5	2.39 H	126	29.4	4.1
9	#5614.10	57.8 PK	68.2	-10.4	1.64 H	129	53.4	4.4
10	*5775.00	100.9 PK			1.64 H	129	96.5	4.4
11	*5775.00	92.3 AV			1.64 H	129	87.9	4.4
12	#5959.65	58.6 PK	68.2	-9.6	1.64 H	129	53.9	4.7
13	#10420.00	44.4 PK	74.0	-29.6	1.63 H	219	31.3	13.1
14	#10420.00	32.3 AV	54.0	-21.7	1.63 H	219	19.2	13.1
15	11550.00	52.4 PK	74.0	-21.6	1.58 H	177	38.9	13.5
16	11550.00	40.5 AV	54.0	-13.5	1.58 H	177	27.0	13.5
17	15630.00	55.3 PK	74.0	-18.7	1.68 H	275	41.7	13.6
18	15630.00	44.4 AV	54.0	-9.6	1.68 H	275	30.8	13.6
19	#17325.00	61.7 PK	74.0	-12.3	1.71 H	278	43.9	17.8
20	#17325.00	48.4 AV	54.0	-5.6	1.71 H	278	30.6	17.8
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	4649.60	63.2 PK	74.0	-10.8	1.73 V	61	60.6	2.6
2	4649.60	49.3 AV	54.0	-4.7	1.73 V	61	46.7	2.6
3	5139.20	64.4 PK	74.0	-9.6	1.73 V	56	60.8	3.6
4	5139.20	53.5 AV	54.0	-0.5	1.73 V	56	49.9	3.6
5	*5210.00	109.1 PK			1.73 V	56	105.4	3.7
6	*5210.00	99.5 AV			1.73 V	56	95.8	3.7
7	5350.00	53.7 PK	74.0	-20.3	1.73 V	56	49.6	4.1
8	5350.00	43.0 AV	54.0	-11.0	1.73 V	56	38.9	4.1
9	#5645.72	60.5 PK	68.2	-7.7	1.50 V	159	56.1	4.4
10	*5775.00	108.5 PK			1.50 V	159	104.1	4.4
11	*5775.00	98.5 AV			1.50 V	159	94.1	4.4
12	#5939.70	58.9 PK	68.2	-9.3	1.50 V	159	54.2	4.7
13	#10420.00	47.2 PK	74.0	-26.8	1.53 V	325	34.1	13.1
14	#10420.00	35.4 AV	54.0	-18.6	1.53 V	325	22.3	13.1
15	11550.00	58.4 PK	74.0	-15.6	1.33 V	358	44.9	13.5
16	11550.00	47.2 AV	54.0	-6.8	1.33 V	358	33.7	13.5
17	15630.00	60.3 PK	74.0	-13.7	1.44 V	313	46.7	13.6
18	15630.00	48.1 AV	54.0	-5.9	1.44 V	313	34.5	13.6
19	#17325.00	61.6 PK	74.0	-12.4	1.47 V	290	43.8	17.8
20	#17325.00	49.5 AV	54.0	-4.5	1.47 V	290	31.7	17.8

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.

Below 1GHz Data:

802.11ac (VHT40)

CHANNEL	TX Channel 151	**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	36.04	32.7 QP	40.0	-7.3	3.00 H	351	41.9	-9.2
2	151.95	33.7 QP	43.5	-9.8	1.00 H	63	41.9	-8.2
3	370.23	33.9 QP	46.0	-12.1	1.00 H	33	39.8	-5.9
4	506.63	36.8 QP	46.0	-9.2	1.00 H	360	39.7	-2.9
5	569.27	34.4 QP	46.0	-11.6	1.00 H	360	36.1	-1.7
6	800.01	37.3 QP	46.0	-8.7	1.00 H	358	35.3	2.0
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	38.49	36.9 QP	40.0	-3.1	1.00 V	89	45.6	-8.7
2	49.76	36.8 QP	40.0	-3.2	1.00 V	136	45.0	-8.2
3	149.65	33.9 QP	43.5	-9.6	2.00 V	350	42.1	-8.2
4	209.60	32.6 QP	43.5	-10.9	1.00 V	360	44.1	-11.5
5	400.01	36.9 QP	46.0	-9.1	3.00 V	264	42.2	-5.3
6	494.34	37.2 QP	46.0	-8.8	2.00 V	58	40.3	-3.1

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3 Tested Date: June 01, 2017

4.2.3 Test Procedure

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

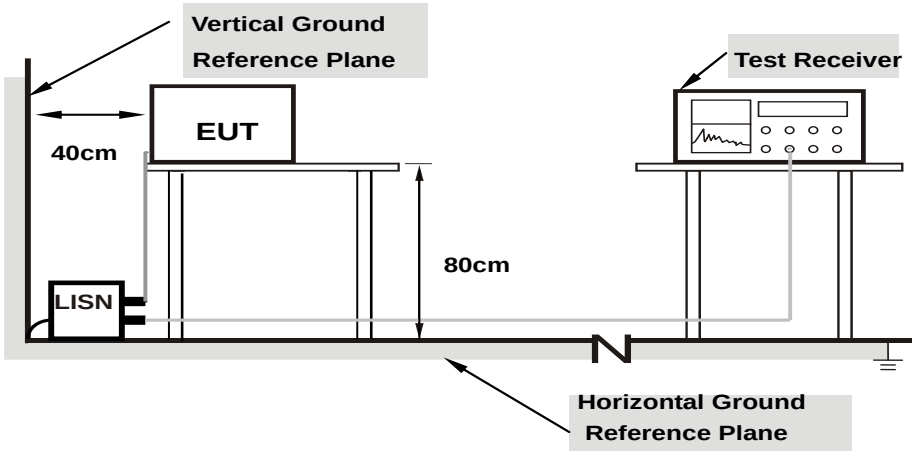
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

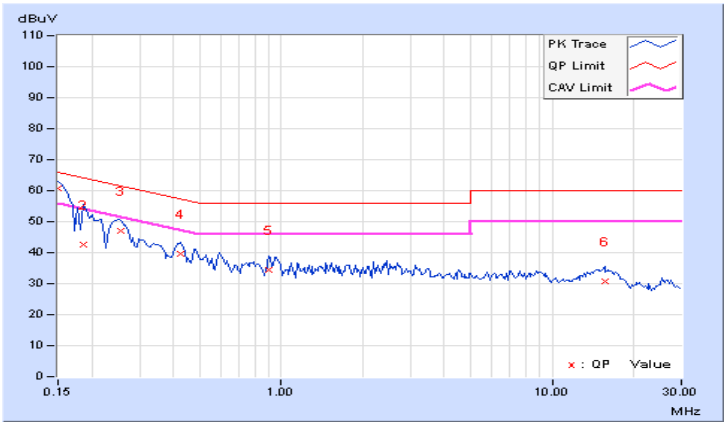
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.19	50.47	40.01	60.66	50.20	66.00	56.00	-5.34	-5.80
2	0.18516	10.19	32.56	12.87	42.75	23.06	64.25	54.25	-21.50	-31.19
3	0.25631	10.20	36.66	27.99	46.86	38.19	61.55	51.55	-14.69	-13.36
4	0.42344	10.22	29.45	18.60	39.67	28.82	57.38	47.38	-17.71	-18.56
5	0.90000	10.25	24.06	14.57	34.31	24.82	56.00	46.00	-21.69	-21.18
6	15.65234	11.09	19.67	14.19	30.76	25.28	60.00	50.00	-29.24	-24.72

REMARKS:

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

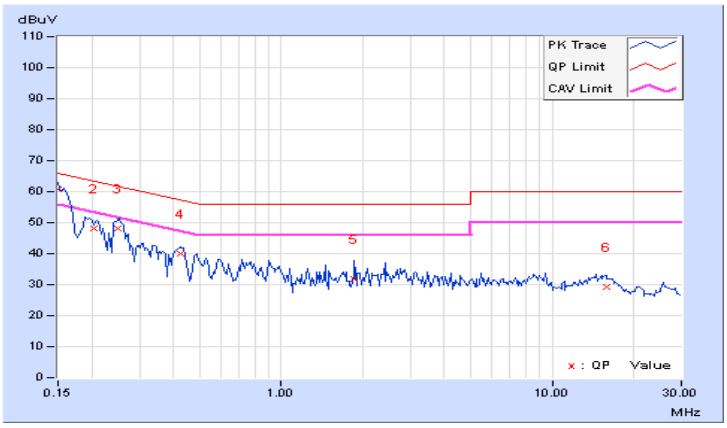


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.18**	**50.69**	**39.61**	**60.87**	**49.79**	**66.00**	**56.00**	**-5.13**	**-6.21**
2	0.20319	10.16	38.13	28.19	48.29	38.35	63.48	53.48	-15.19	-15.13
3	0.24969	10.17	37.95	27.72	48.12	37.89	61.77	51.77	-13.65	-13.88
4	0.42344	10.21	29.88	19.72	40.09	29.93	57.38	47.38	-17.29	-17.45
5	1.86719	10.27	21.54	14.63	31.81	24.90	56.00	46.00	-24.19	-21.10
6	15.81250	10.92	18.40	12.41	29.32	23.33	60.00	50.00	-30.68	-26.67

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)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.50	18.85	17.80	18.52	278.908	24.45	29.90	Pass
40	5200	18.88	19.20	18.34	18.77	304.014	24.83	29.90	Pass
48	5240	18.67	19.16	18.00	18.69	293.092	24.67	29.90	Pass
149	5745	23.61	23.26	22.36	23.23	824.016	29.16	29.90	Pass
157	5785	23.34	23.04	22.58	22.63	781.511	28.93	29.90	Pass
165	5825	23.72	23.59	22.71	22.85	843.455	29.26	29.90	Pass

Note: The max antenna gain = 6.10dBi > 6dBi , so the power limit shall be reduced to 30-(6.10-6) = 29.90dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.82	19.22	18.28	18.62	299.844	24.77	29.90	Pass
40	5200	18.57	18.82	18.14	18.56	285.095	24.55	29.90	Pass
48	5240	18.66	18.72	17.59	18.59	277.613	24.43	29.90	Pass
149	5745	23.37	22.94	22.03	22.83	765.514	28.84	29.90	Pass
157	5785	24.12	23.84	23.30	23.07	916.893	29.62	29.90	Pass
165	5825	24.09	24.17	23.04	23.06	921.338	29.64	29.90	Pass

Note: The max antenna gain = 6.10dBi > 6dBi , so the power limit shall be reduced to 30-(6.10-6) =29.90dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.61	18.74	17.64	18.31	273.268	24.37	29.90	Pass
46	5230	21.40	21.46	20.92	21.66	548.147	27.39	29.90	Pass
151	5755	23.95	24.43	23.23	23.60	965.11	29.85	29.90	Pass
159	5795	23.87	24.16	23.40	23.29	936.476	29.71	29.90	Pass

Note: The max antenna gain = 6.10dBi > 6dBi , so the power limit shall be reduced to 30-(6.10-6) =29.90dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.30	16.64	15.70	16.39	169.495	22.29	29.90	Pass
155	5775	20.88	21.46	20.31	20.35	478.213	26.80	29.90	Pass

Note: The max antenna gain = 6.10dBi > 6dBi , so the power limit shall be reduced to 30-(6.10-6) =29.90dBm.

802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42 +155	5210	17.25	17.83	-	-	113.762	20.56	29.90	Pass
	5775	-	-	16.62	17.50	102.154	20.09	30.00	Pass

Note: 1. For U_NII-1 : the max antenna gain = 6.10dBi > 6dBi , so the power limit shall be reduced to 30-(6.10-6) = 29.90dBm.

2. For U_NII-3: the max antenna gain = 4.83dBi < 6dBi , so the power limit shall not be reduced.

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.82	19.22	18.28	18.62	299.844	24.77	24.86	Pass
40	5200	18.57	18.82	18.14	18.56	285.095	24.55	24.86	Pass
48	5240	18.66	18.72	17.59	18.59	277.613	24.43	24.86	Pass
149	5745	19.14	18.96	18.14	18.81	301.936	24.80	24.86	Pass
157	5785	19.15	18.66	18.32	17.97	286.256	24.57	24.86	Pass
165	5825	19.06	19.04	18.07	18.08	289.096	24.61	24.86	Pass

Note: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/20}$)^2 / 4] = 11.14dBi > 6dBi , so the power limit shall be reduced to 30-(11.14-6) = 24.86dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	18.61	18.74	17.64	18.31	273.268	24.37	24.86	Pass
46	5230	18.64	18.73	18.42	19.28	301.984	24.80	24.86	Pass
151	5755	18.76	19.55	17.95	18.82	303.9	24.83	24.86	Pass
159	5795	18.98	19.23	18.57	18.13	299.779	24.77	24.86	Pass

Note: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/20}$)^2 / 4] = 11.14dBi > 6dBi , so the power limit shall be reduced to 30-(11.14-6) = 24.86dBm.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.30	16.64	15.70	16.39	169.495	22.29	24.86	Pass
155	5775	18.86	19.54	18.47	18.31	304.934	24.84	24.86	Pass

Note: The Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/20}$)^2 / 4] = 11.14dBi > 6dBi , so the power limit shall be reduced to 30-(11.14-6) = 24.86dBm.

802.11ac (VHT80+80)

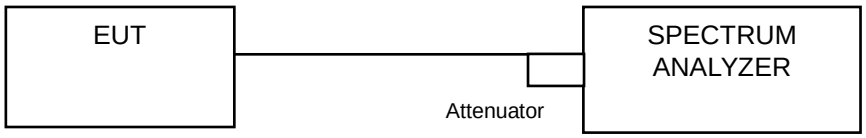
Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42 +155	5210	17.25	17.83	-	-	113.762	20.56	27.45	Pass
	5775	-	-	16.62	17.50	102.154	20.09	28.32	Pass

Note: 1. For U_NII-1 : the Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / 2] = 8.55dBi > 6dBi , so the power limit shall be reduced to 30-(8.55-6) = 27.45dBm.

2. For U_NII-3: the Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / 2] = 7.68dBi > 6dBi , so the power limit shall be reduced to 30-(7.68-6) = 28.32dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
36	5180	16.56	16.44	16.56	16.56
40	5200	16.56	16.44	16.56	16.56
48	5240	16.56	16.44	16.56	16.56
149	5745	16.80	16.68	16.68	16.56
157	5785	16.80	16.80	16.68	16.68
165	5825	16.68	16.80	16.68	16.68

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
36	5180	17.76	17.64	17.64	17.76
40	5200	17.76	17.64	17.76	17.76
48	5240	17.76	17.64	17.76	17.64
149	5745	17.88	17.76	17.76	17.64
157	5785	18.00	17.76	17.76	17.76
165	5825	17.76	18.24	17.76	17.76

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
38	5190	36.24	36.48	36.24	36.24
46	5230	36.24	36.24	36.24	36.48
151	5755	36.72	36.72	36.24	36.48
159	5795	36.72	36.72	36.48	36.48

802.11ac (VHT80)

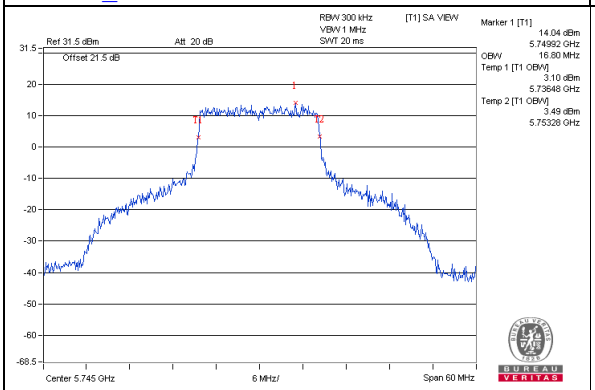
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
42	5210	76.32	76.32	76.32	75.84
155	5775	75.84	75.84	76.32	76.32

802.11ac (VHT80+80)

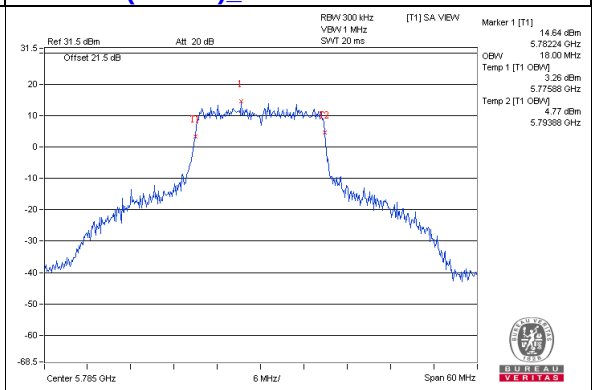
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)			
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 3
42+155	5210	75.84	76.32	-	-
	5775	-	-	76.32	75.84

Spectrum Plot of Worst Value

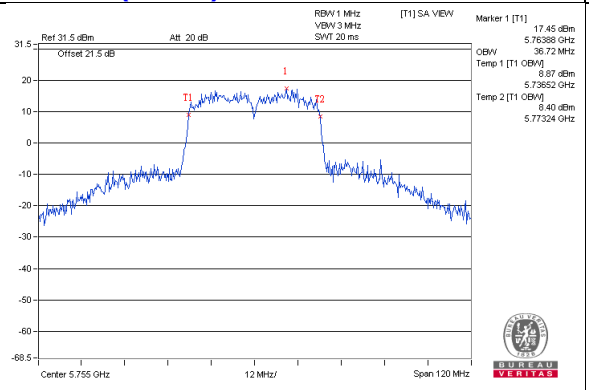
802.11a_Chain0 / CH149



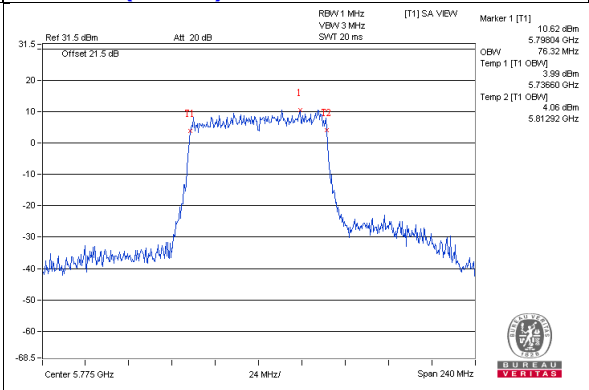
802.11ac (VHT20)_Chain0 / CH157



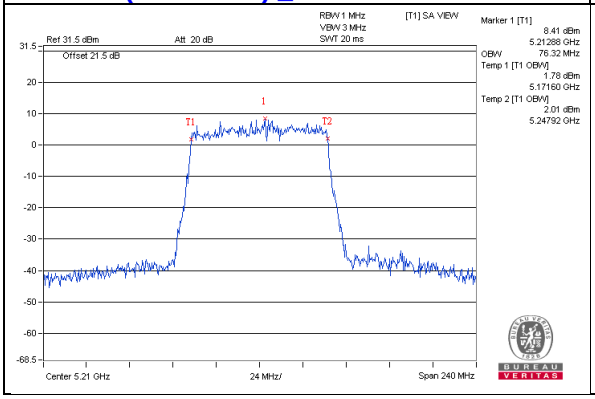
802.11ac (VHT40)_Chain1 / CH151



802.11ac (VHT80)_Chain3 / CH155

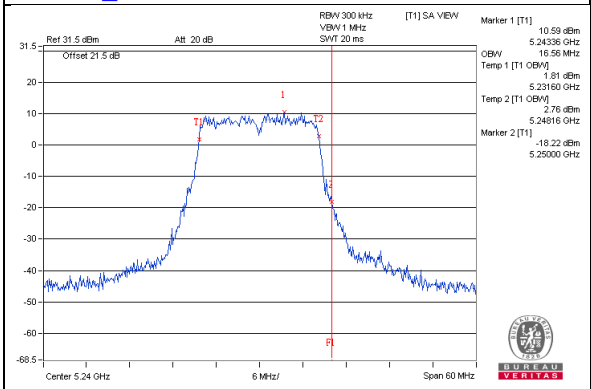


802.11ac (VHT80+80) _Chain1 / CH42

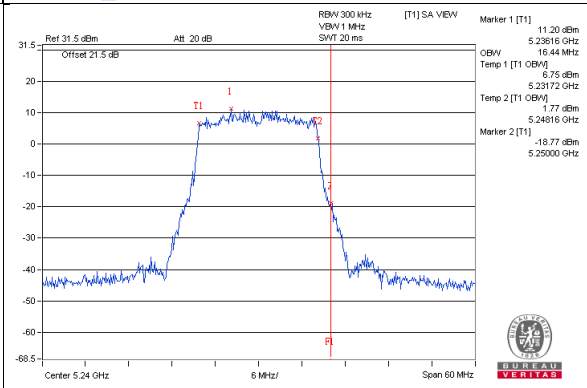


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

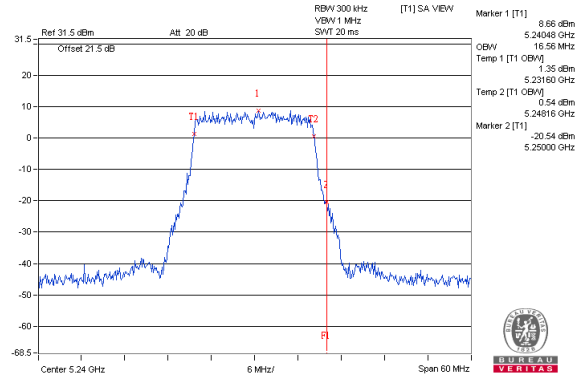
802.11a_Chain0 / CH48



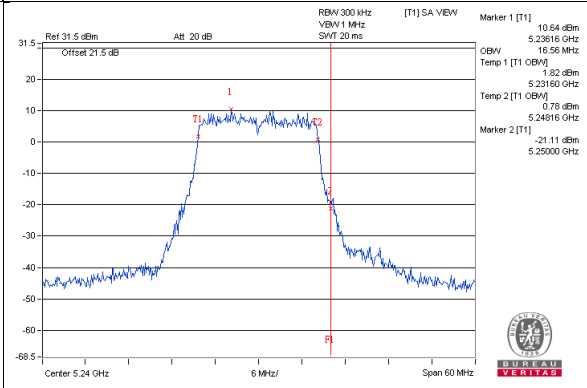
802.11a_Chain1 / CH48



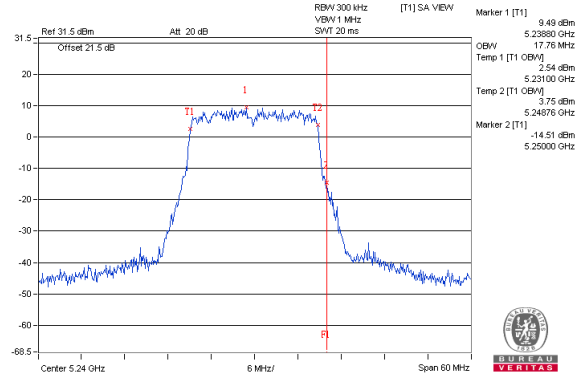
802.11a_Chain2 / CH48



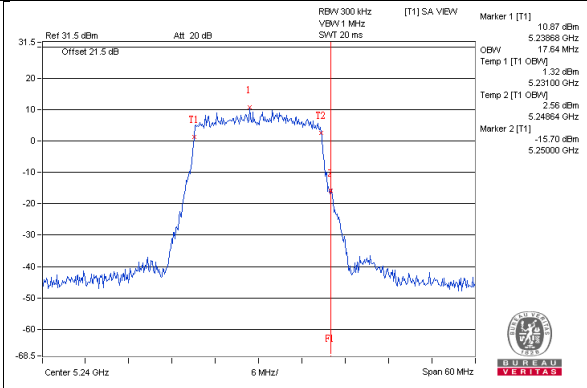
802.11a_Chain3 / CH48



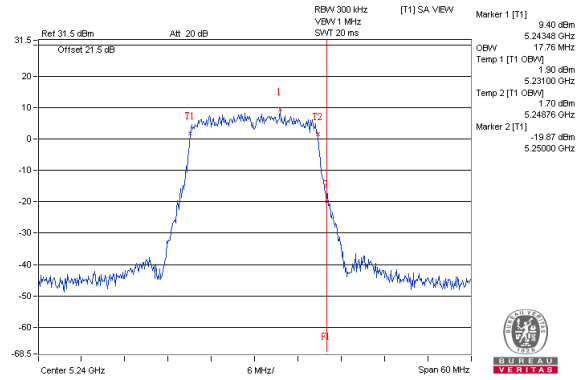
802.11ac(VHT20)_Chain0 / CH48



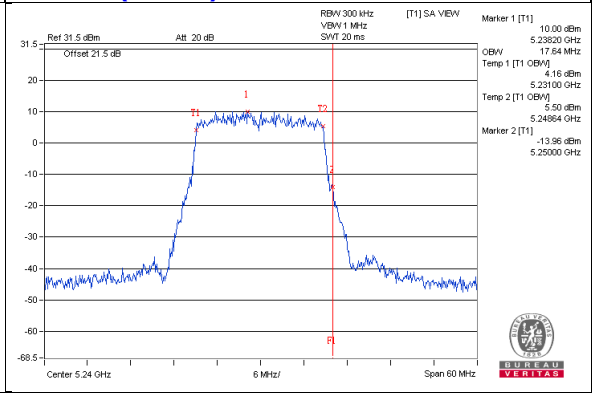
802.11ac(VHT20)_Chain1 / CH48



802.11ac(VHT20)_Chain2 / CH48

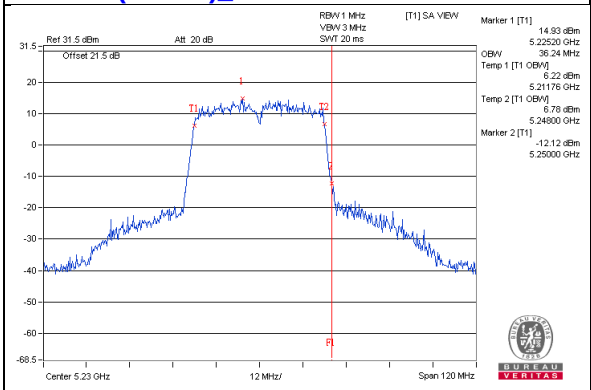


802.11ac(VHT20)_Chain3 / CH48

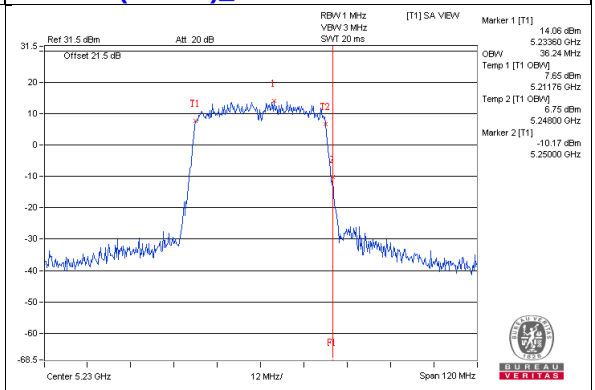


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

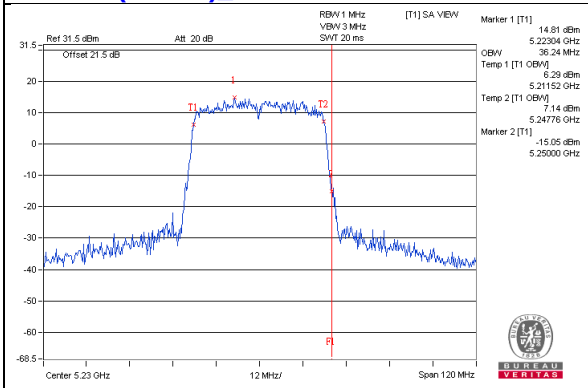
802.11ac(VHT40)_Chain0 / CH46



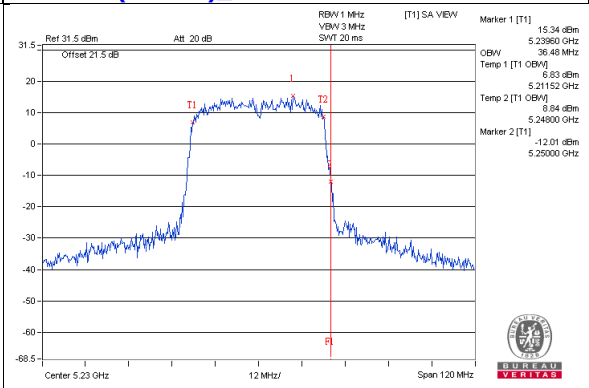
802.11ac(VHT40)_Chain1 / CH46



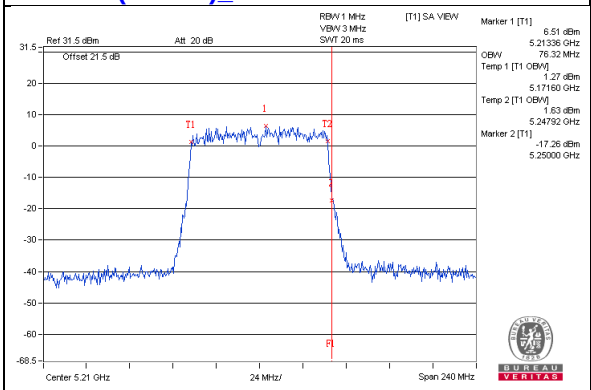
802.11ac(VHT40)_Chain2 / CH46



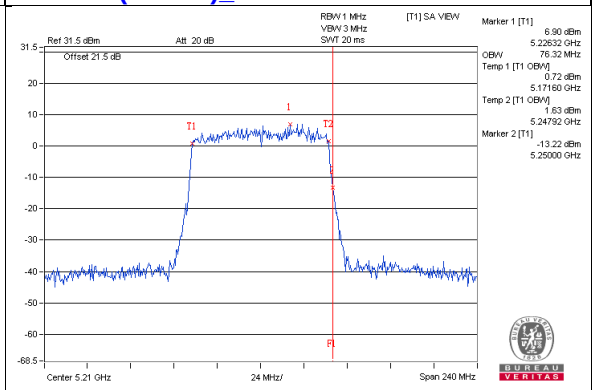
802.11ac(VHT40)_Chain3 / CH46



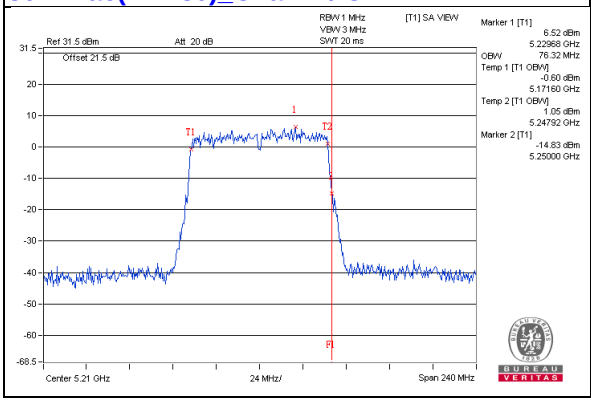
802.11ac(VHT80)_Chain0 / CH42



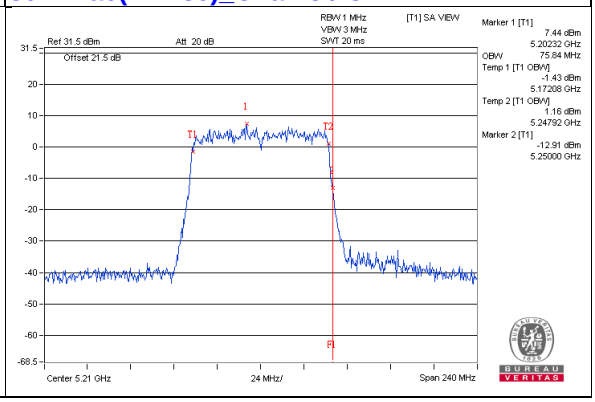
802.11ac(VHT80)_Chain1 / CH42

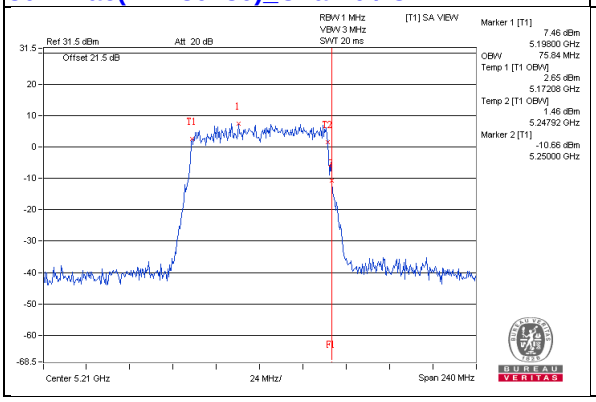
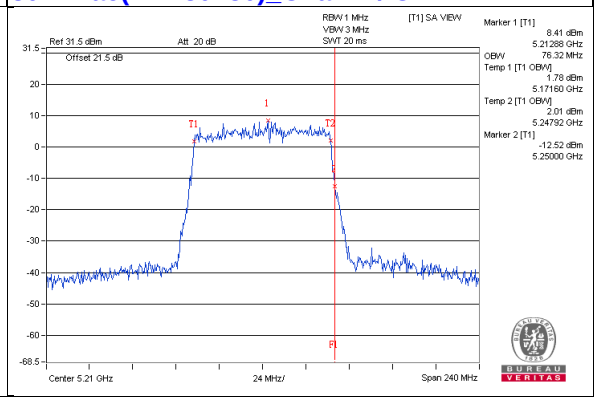


802.11ac(VHT80)_Chain2 / CH42



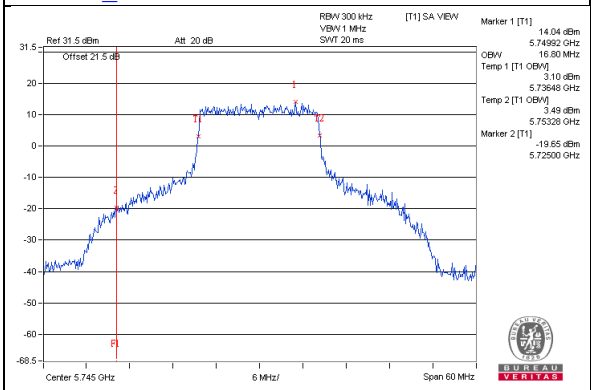
802.11ac(VHT80)_Chain3 / CH42



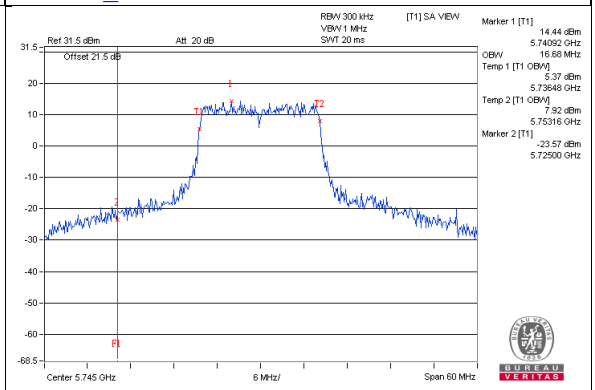
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11ac(VHT80+80)_Chain0 / CH42	**802.11ac(VHT80+80)_Chain1 / CH42**
	

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

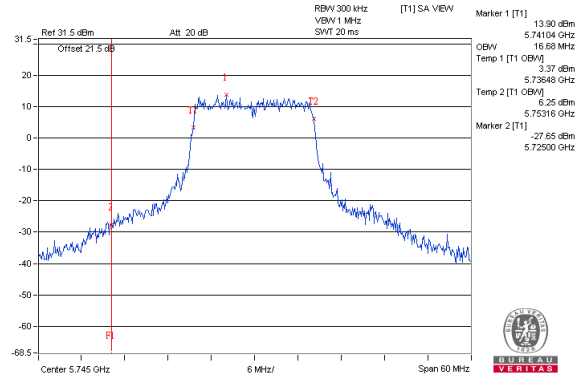
802.11a_Chain0 / CH149



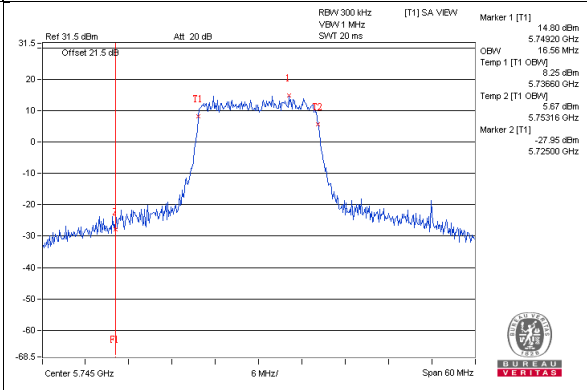
802.11a_Chain1 / CH149



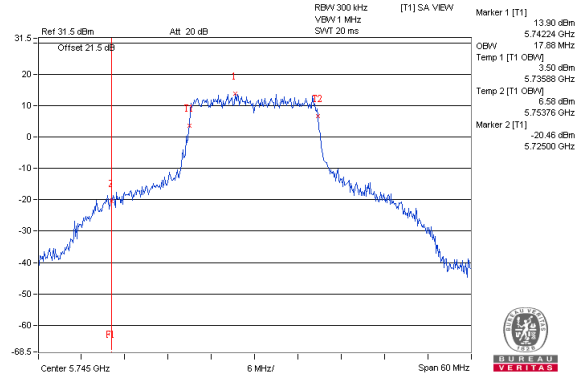
802.11a_Chain2 / CH149



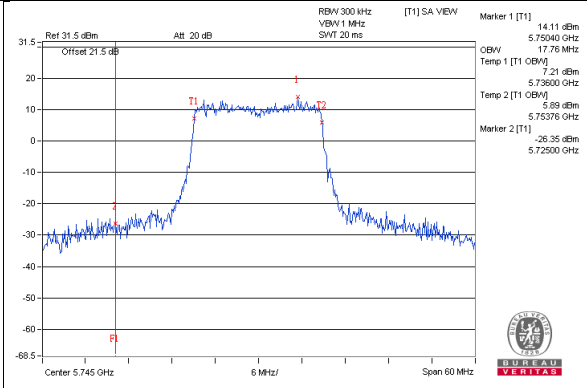
802.11a_Chain3 / CH149



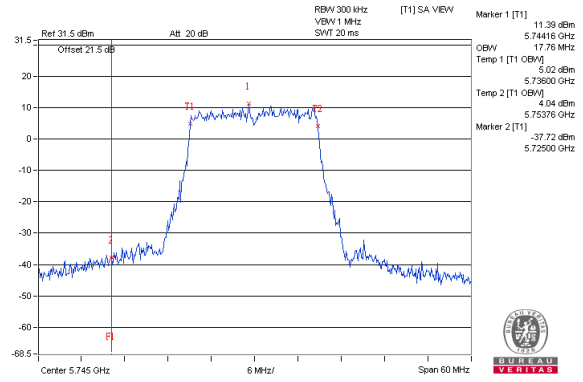
802.11ac(VHT20)_Chain0 / CH149



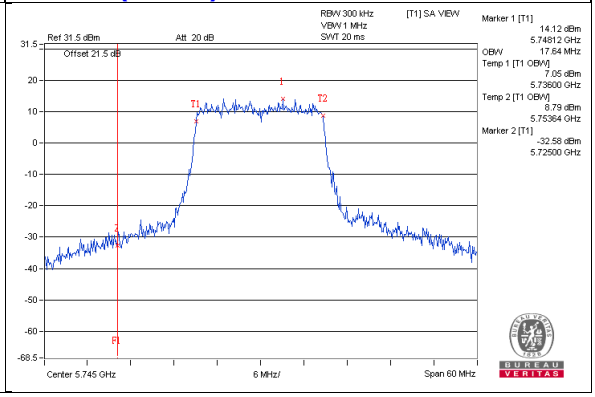
802.11ac(VHT20)_Chain1 / CH149



802.11ac(VHT20)_Chain2 / CH149

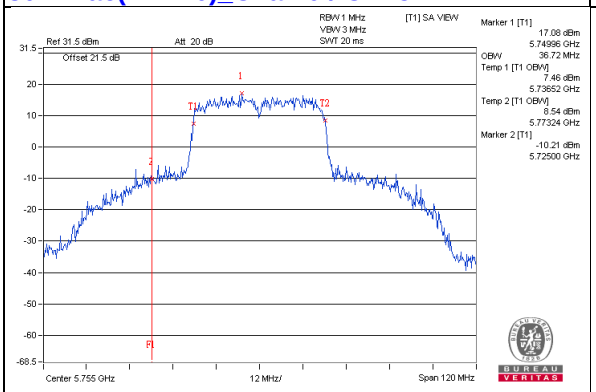


802.11ac(VHT20)_Chain3 / CH149

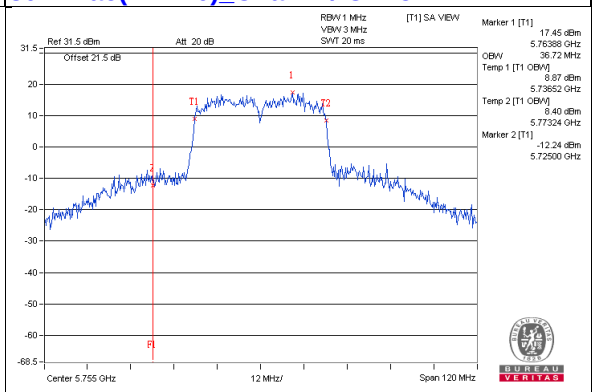


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

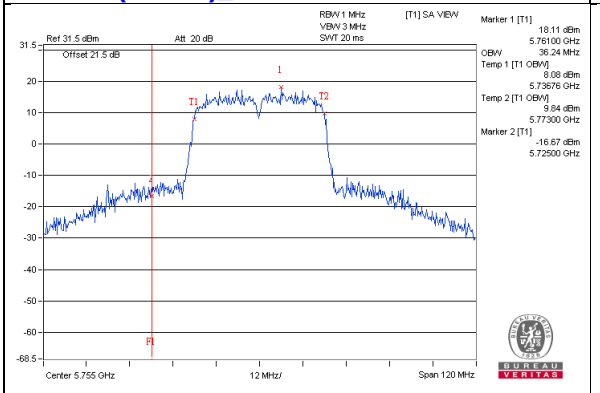
802.11ac(VHT40)_Chain0 / CH151



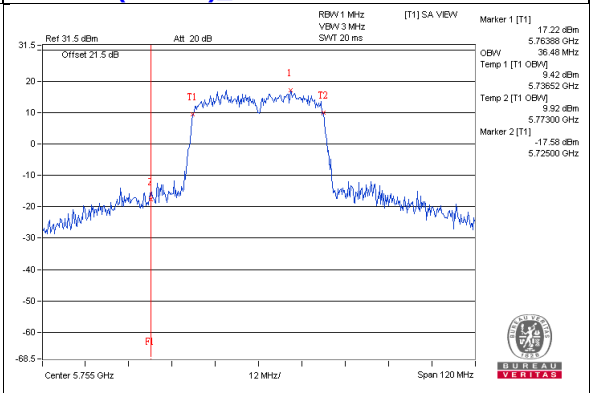
802.11ac(VHT40)_Chain1 / CH151



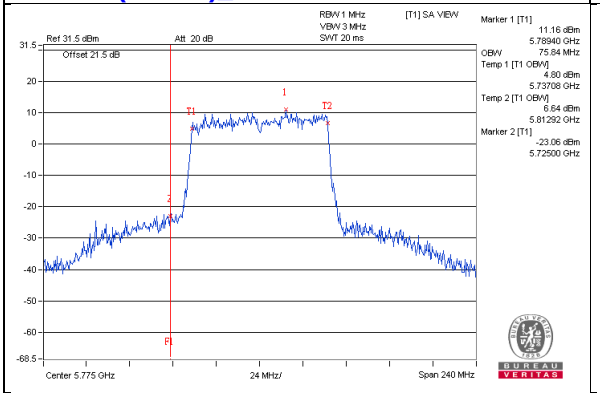
802.11ac(VHT40)_Chain2 / CH151



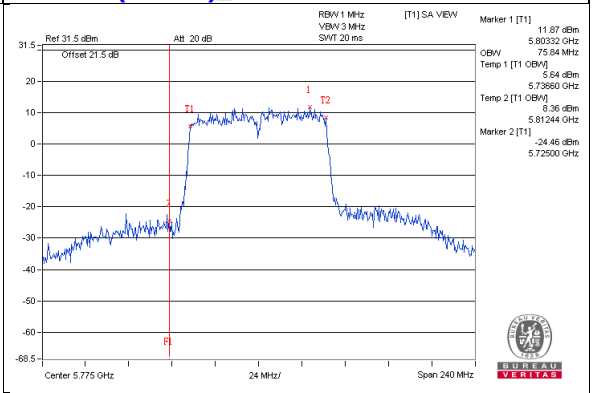
802.11ac(VHT40)_Chain3 / CH151



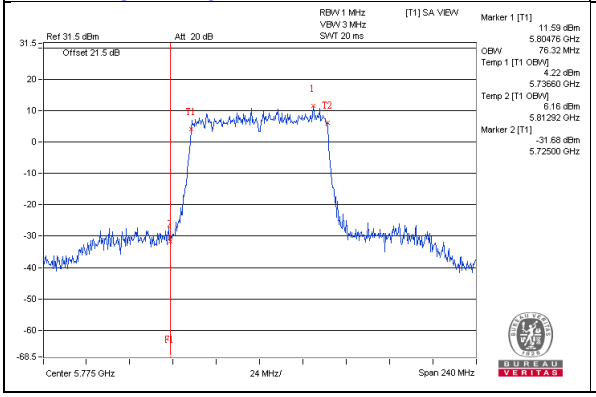
802.11ac(VHT80)_Chain0 / CH155



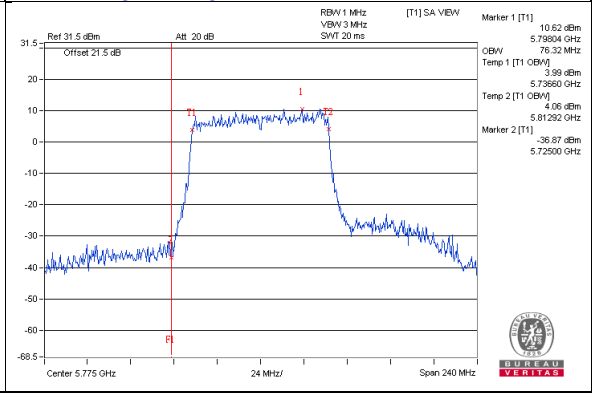
802.11ac(VHT80)_Chain1 / CH155

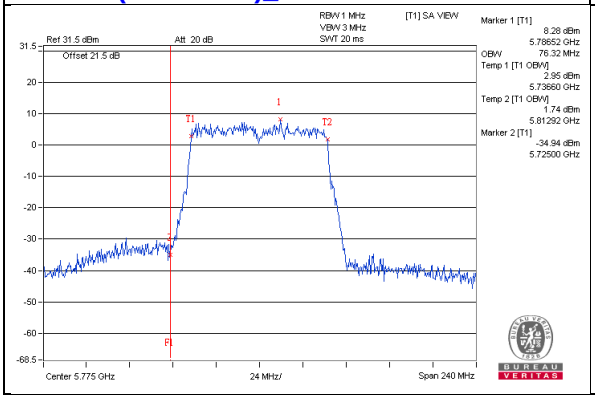
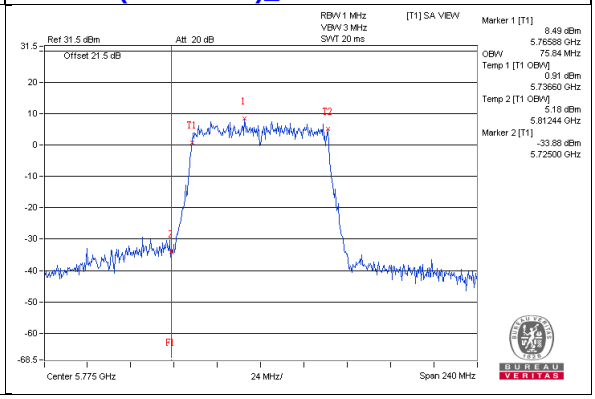


802.11ac(VHT80)_Chain2 / CH155



802.11ac(VHT80)_Chain3 / CH155



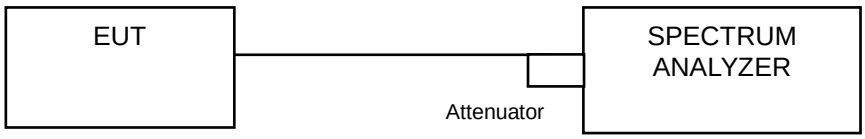
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ac(VHT80+80)_Chain2 / CH155	**802.11ac(VHT80+80)_Chain3 / CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11ac (VHT20)

For U-NII-1 band:

Using method SA-1

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

For U-NII-3:

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

802.11a, 802.11ac (VHT40), 802.11ac (VHT80), 802.11ac (VHT80+80)

For U-NII-1 band:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	4.78	5.47	4.11	4.83	0.14	10.99	11.86	Pass
40	5200	4.96	6.28	5.06	4.36	0.14	11.39	11.86	Pass
48	5240	5.56	6.10	4.35	4.80	0.14	11.42	11.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 17-(11.14-6) = 11.86dBm.

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

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)				Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	4.76	5.78	4.51	4.46	10.93	11.86	Pass
40	5200	4.60	5.62	4.38	5.05	10.96	11.86	Pass
48	5240	4.94	5.41	4.25	4.75	10.88	11.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 17-(11.14-6) = 11.86dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	1.66	2.69	1.57	1.49	0.11	8.02	11.86	Pass
46	5230	4.41	3.51	4.59	5.08	0.11	10.57	11.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 17-(11.14-6) = 11.86dBm.

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

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-3.41	-2.82	-3.48	-4.96	0.29	2.71	11.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 17-(11.14-6) = 11.86dBm.

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

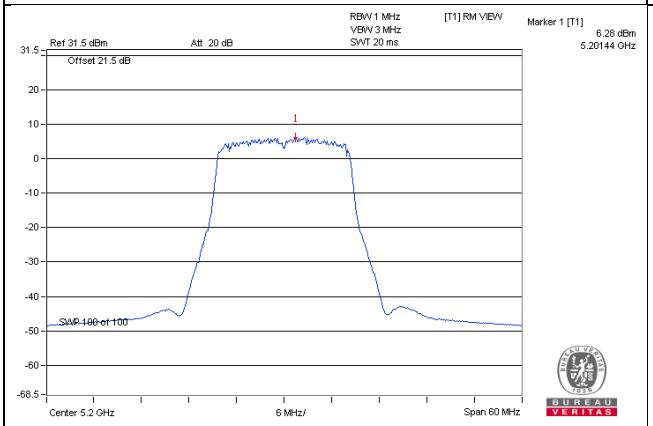
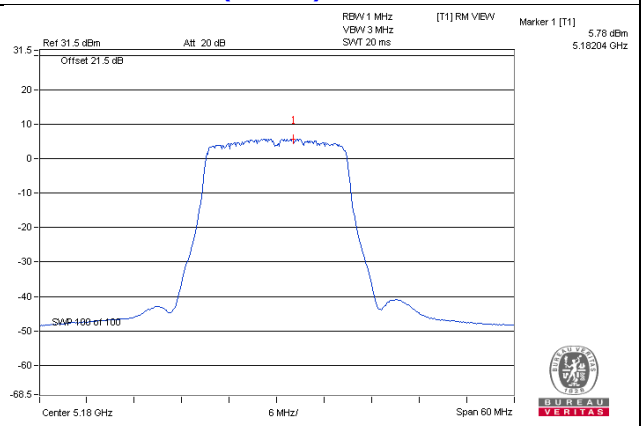
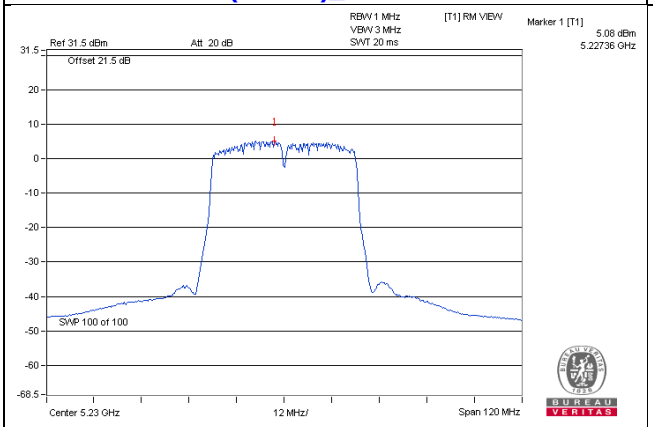
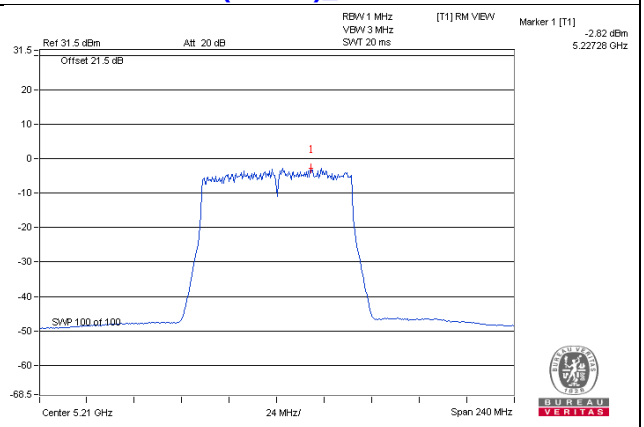
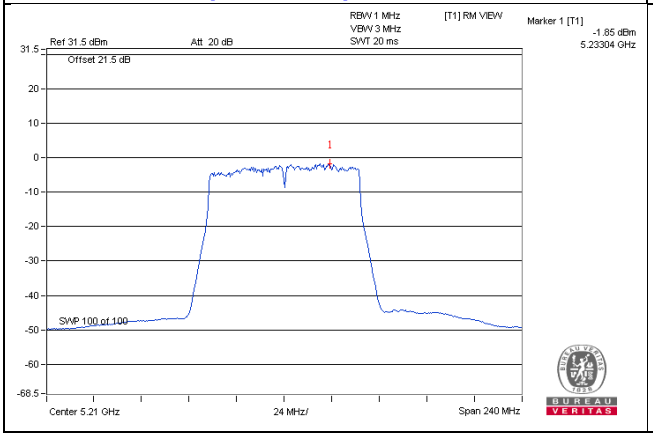
802.11ac (VHT80+80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)				Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42+ 155	5210	-2.31	-1.85	-	-	0.29	1.23	14.45	Pass
	5775	Test results refer to U_NII-3 data							

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 = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 8.55dBi > 6dBi , so the power density limit shall be reduced to 17-(8.55-6) = 14.45dBm.

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

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH 40	**802.11ac (VHT20)_Chain 1 / CH 36**
	
802.11ac (VHT40)_Chain 3 / CH 46	**802.11ac (VHT80)_Chain 1 / CH 42**
	
802.11ac (VHT80+80)_Chain 1 / CH 42	
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.79	4.01	6.02	0.14	10.17	24.86	Pass
	157	5785	1.23	3.45	6.02	0.14	9.61	24.86	Pass
	165	5825	1.24	3.46	6.02	0.14	9.62	24.86	Pass
1	149	5745	1.77	3.99	6.02	0.14	10.15	24.86	Pass
	157	5785	1.82	4.04	6.02	0.14	10.20	24.86	Pass
	165	5825	1.86	4.08	6.02	0.14	10.24	24.86	Pass
2	149	5745	0.50	2.72	6.02	0.14	8.88	24.86	Pass
	157	5785	1.10	3.32	6.02	0.14	9.48	24.86	Pass
	165	5825	0.87	3.09	6.02	0.14	9.25	24.86	Pass
3	149	5745	1.96	4.18	6.02	0.14	10.34	24.86	Pass
	157	5785	1.45	3.67	6.02	0.14	9.83	24.86	Pass
	165	5825	1.29	3.51	6.02	0.14	9.67	24.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 30-(11.14-6) = 24.86dBm.

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

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=4) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	1.64	3.86	6.02	9.88	24.86	Pass
	157	5785	1.39	3.61	6.02	9.63	24.86	Pass
	165	5825	0.92	3.14	6.02	9.16	24.86	Pass
1	149	5745	0.74	2.96	6.02	8.98	24.86	Pass
	157	5785	1.42	3.64	6.02	9.66	24.86	Pass
	165	5825	2.23	4.45	6.02	10.47	24.86	Pass
2	149	5745	-1.97	0.25	6.02	6.27	24.86	Pass
	157	5785	1.22	3.44	6.02	9.46	24.86	Pass
	165	5825	0.62	2.84	6.02	8.86	24.86	Pass
3	149	5745	1.13	3.35	6.02	9.37	24.86	Pass
	157	5785	1.14	3.36	6.02	9.38	24.86	Pass
	165	5825	1.16	3.38	6.02	9.40	24.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 30-(11.14-6) = 24.86dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.33	0.89	6.02	0.11	7.02	24.86	Pass
	159	5795	-1.57	0.65	6.02	0.11	6.78	24.86	Pass
1	151	5755	-1.15	1.07	6.02	0.11	7.20	24.86	Pass
	159	5795	-1.65	0.57	6.02	0.11	6.70	24.86	Pass
2	151	5755	-1.57	0.65	6.02	0.11	6.78	24.86	Pass
	159	5795	-1.84	0.38	6.02	0.11	6.51	24.86	Pass
3	151	5755	-1.50	0.72	6.02	0.11	6.85	24.86	Pass
	159	5795	-2.05	0.17	6.02	0.11	6.30	24.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 30-(11.14-6) = 24.86dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5755	-7.52	-5.30	6.02	0.29	1.01	24.86	Pass
1	155	5755	-6.45	-4.23	6.02	0.29	2.08	24.86	Pass
2	155	5755	-8.11	-5.89	6.02	0.29	0.42	24.86	Pass
3	155	5755	-8.27	-6.05	6.02	0.29	0.26	24.86	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 = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2$ / 4] = 11.14dBi > 6dBi , so the power density limit shall be reduced to 30-(11.14-6) = 24.86dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

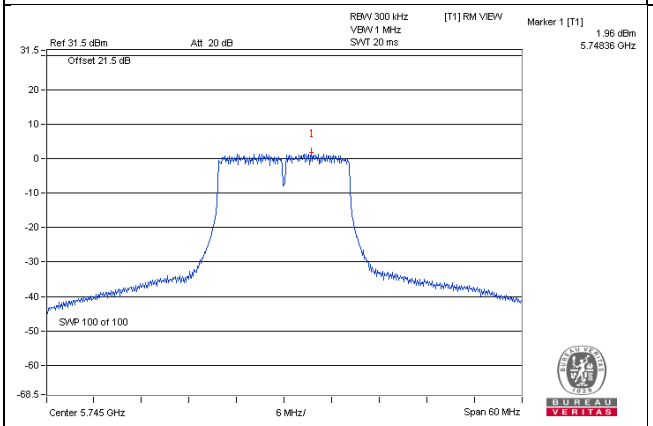
802.11ac (VHT80+80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	42	5210	Test results refer to U_NII-1 data						
1	42	5210							
2	155	5775	-10.48	-8.26	3.01	0.29	-4.96	30.00	Pass
3	155	5775	-10.83	-8.61	3.01	0.29	-5.31	30.00	Pass

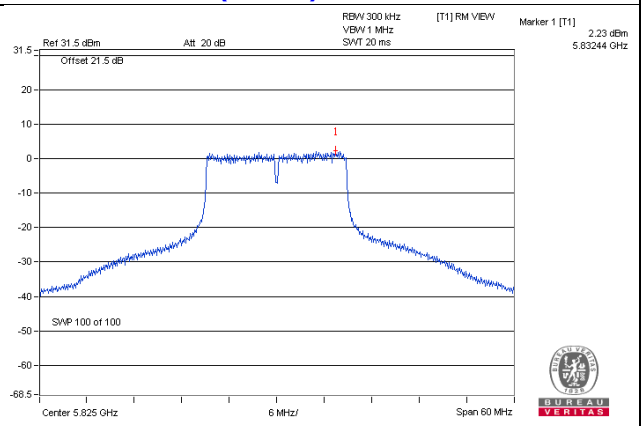
Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 4.83dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

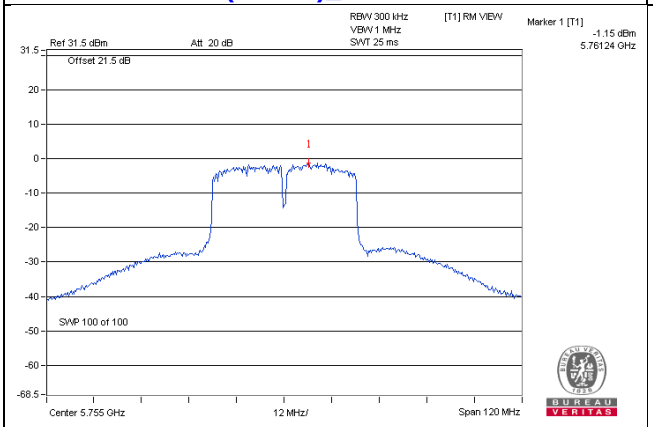
802.11a_Chain 3 / CH149



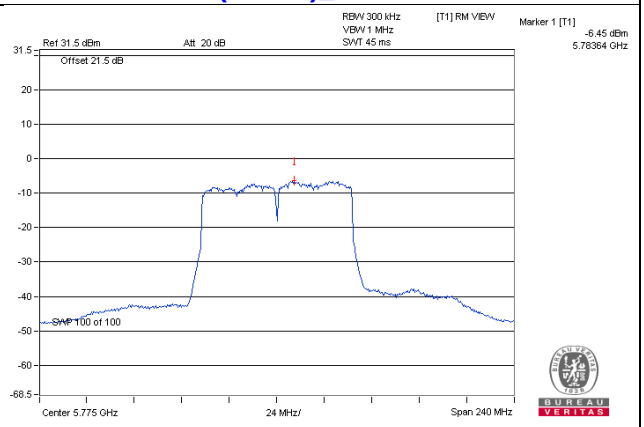
802.11ac (VHT20)_Chain 1 / CH165



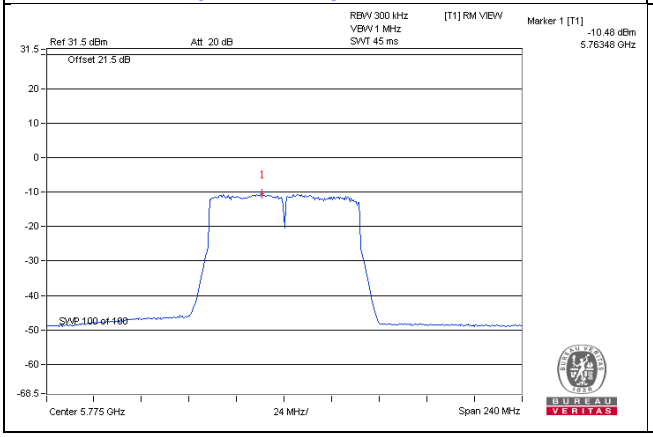
802.11ac (VHT40)_Chain 1 / CH151



802.11ac (VHT80)_Chain 1 / CH155



802.11ac (VHT80+80) – Chain 2: CH 155

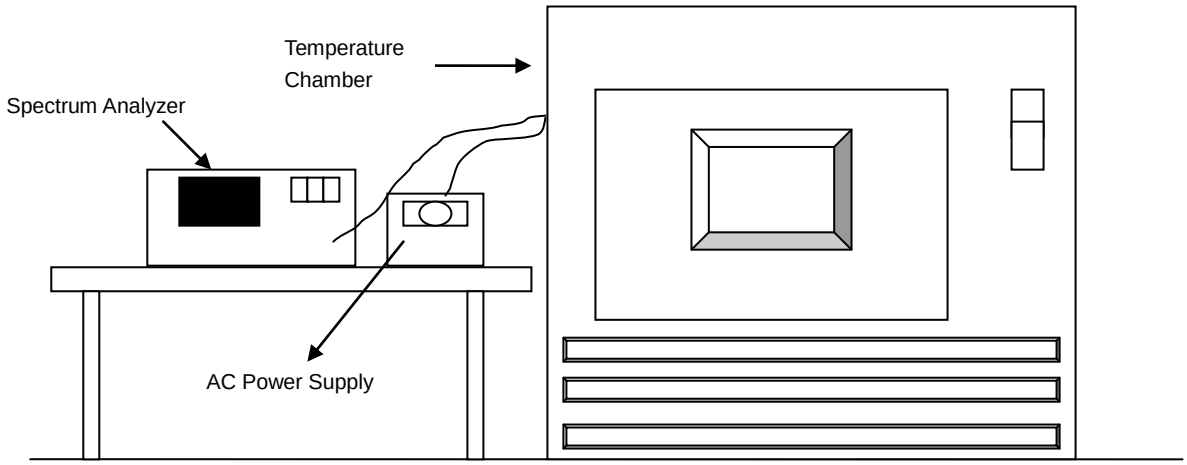


4.6 Frequency Stability Measurement

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	5179.9761	Pass	5179.9772	Pass	5179.9748	Pass	5179.9777	Pass
40	120	5179.9907	Pass	5179.9909	Pass	5179.9923	Pass	5179.9926	Pass
30	120	5179.9925	Pass	5179.9934	Pass	5179.9912	Pass	5179.9921	Pass
20	120	5180.0187	Pass	5180.0192	Pass	5180.0227	Pass	5180.0195	Pass
10	120	5180.0043	Pass	5180.0055	Pass	5180.0055	Pass	5180.0084	Pass
0	120	5179.9952	Pass	5179.9972	Pass	5179.9952	Pass	5179.9994	Pass
-10	120	5180.0053	Pass	5180.0062	Pass	5180.0063	Pass	5180.0042	Pass
-20	120	5180.0205	Pass	5180.0192	Pass	5180.0213	Pass	5180.0222	Pass
-30	120	5180.0144	Pass	5180.017	Pass	5180.018	Pass	5180.0133	Pass

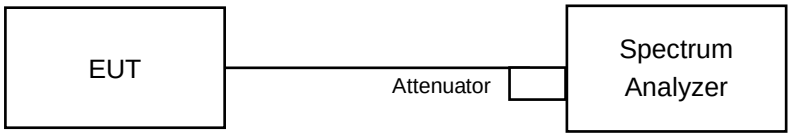
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0193	Pass	5180.02	Pass	5180.0226	Pass	5180.0195	Pass
	120	5180.0187	Pass	5180.0192	Pass	5180.0227	Pass	5180.0195	Pass
	102	5180.0192	Pass	5180.0184	Pass	5180.0227	Pass	5180.0199	Pass

4.7 6dB Bandwidth Measurment

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.37	16.40	16.39	16.39	0.5	PASS
157	5785	16.13	16.39	16.38	16.36	0.5	PASS
165	5825	16.38	16.38	16.38	16.38	0.5	PASS

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.61	17.59	17.59	17.60	0.5	PASS
157	5785	17.58	17.59	17.56	17.65	0.5	PASS
165	5825	17.52	17.68	17.64	17.60	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.07	33.89	35.24	35.28	0.5	PASS
159	5795	35.15	35.17	35.21	35.19	0.5	PASS

802.11ac (VHT80)

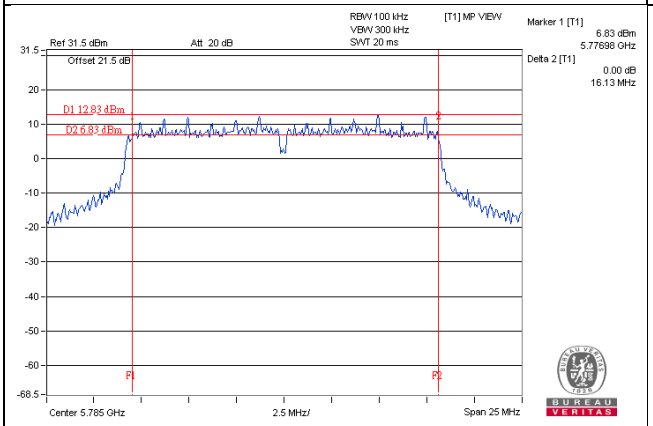
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.44	74.26	75.57	75.48	0.5	PASS

802.11ac (VHT80+80)

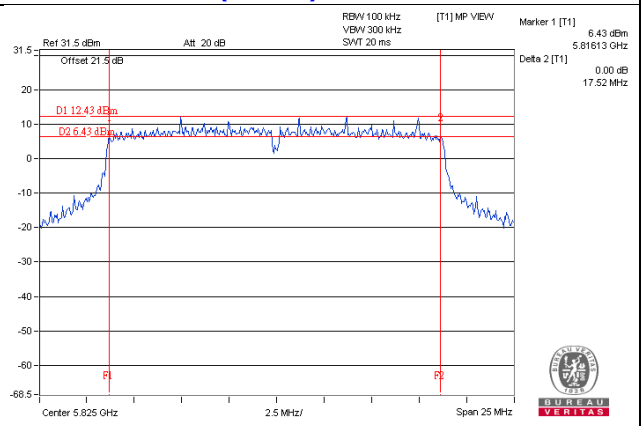
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
42+155	5775	-	-	75.21	75.46	0.5	PASS

Spectrum Plot of Worst Value

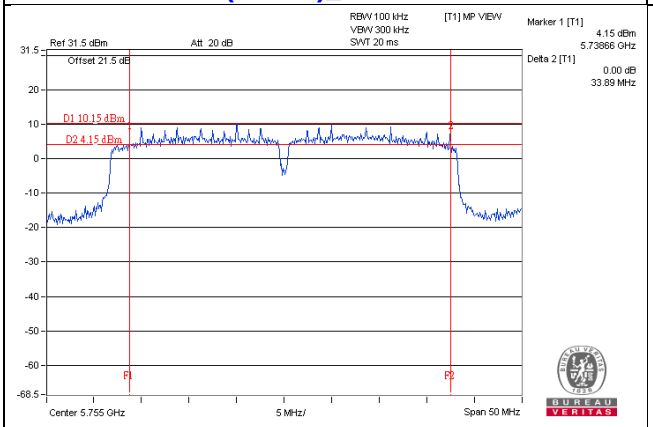
802.11a_Chain 0 / CH157



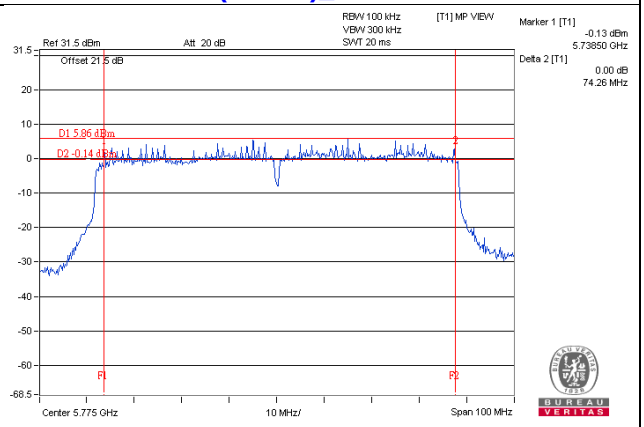
802.11ac (VHT20)_Chain 0 / CH165



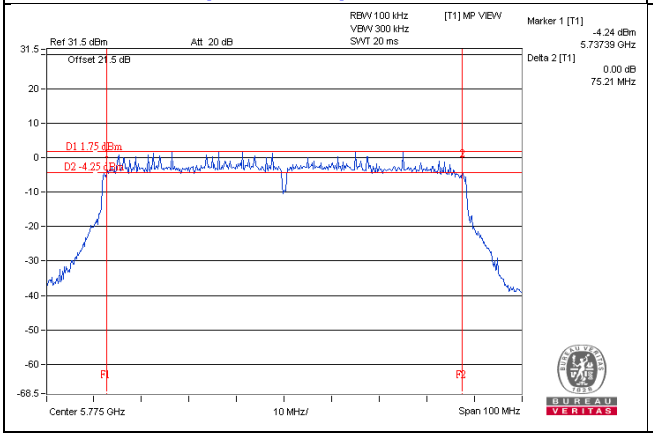
802.11ac (VHT40)_Chain 1 / CH151



802.11ac (VHT80)_Chain 1 / CH155



802.11ac (VHT80+80)_Chain 2 / CH155



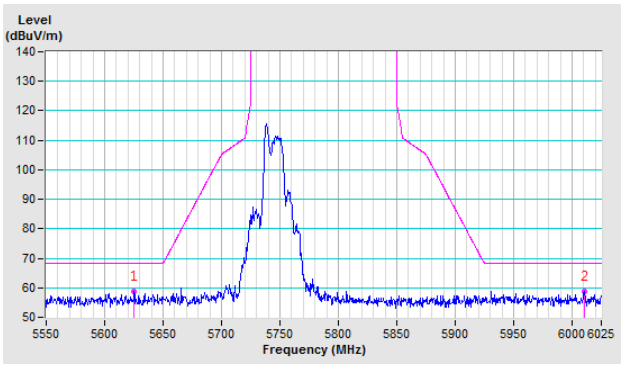
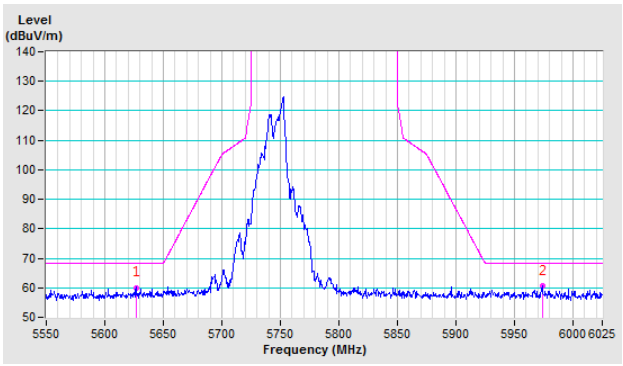
5 Pictures of Test Arrangements

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

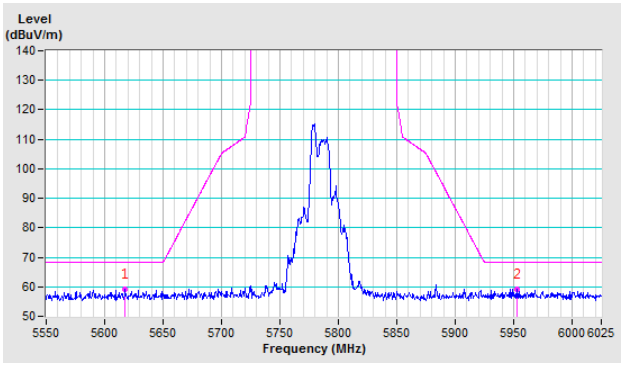
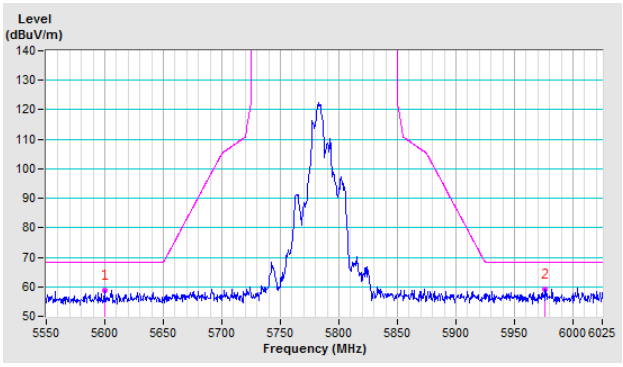
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

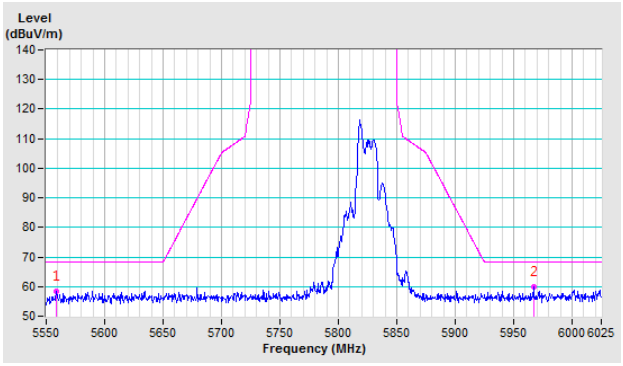
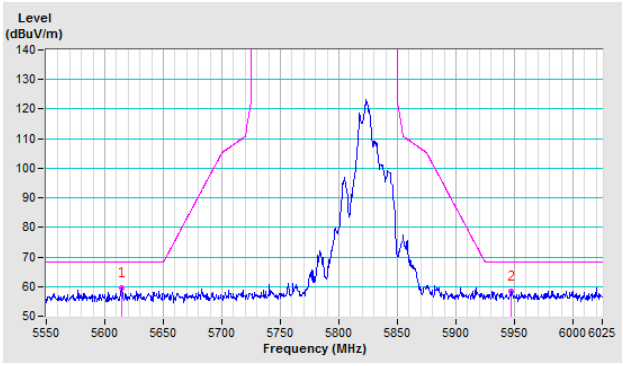
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

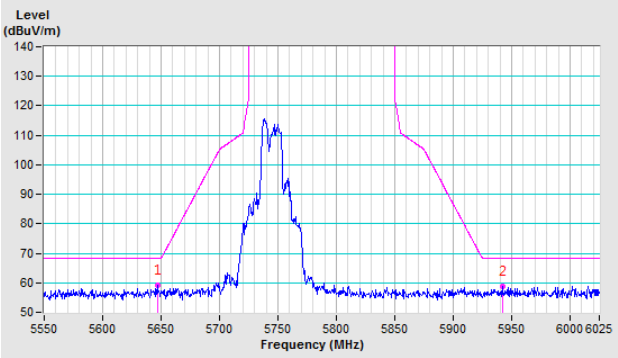
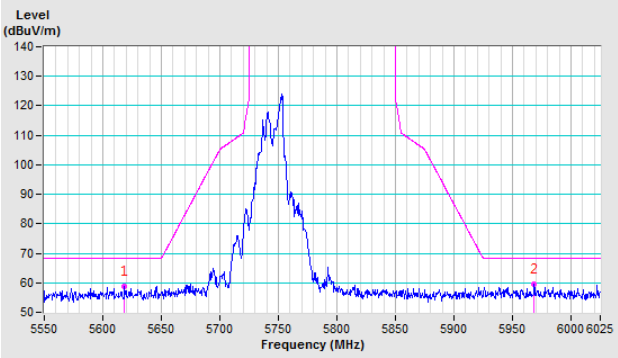
Horizontal	Vertical
	

CH 165 5825 MHz

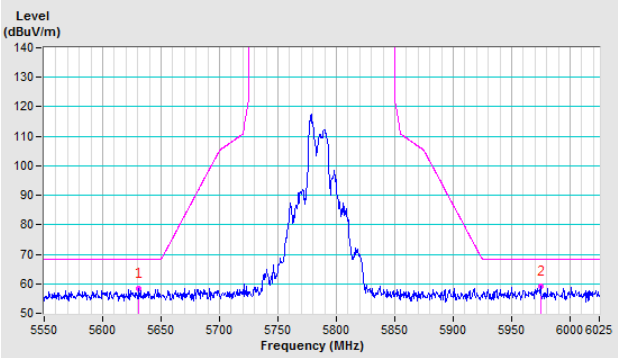
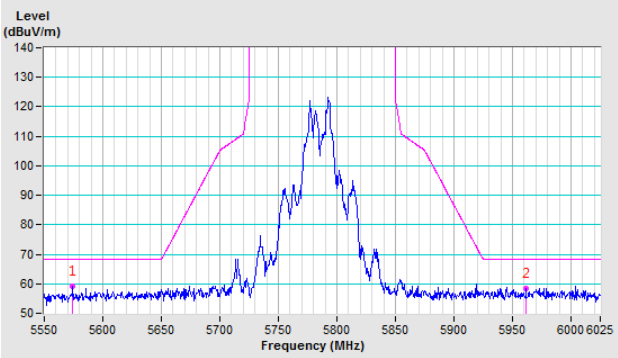
Horizontal	Vertical
	

802.11ac (VHT20)

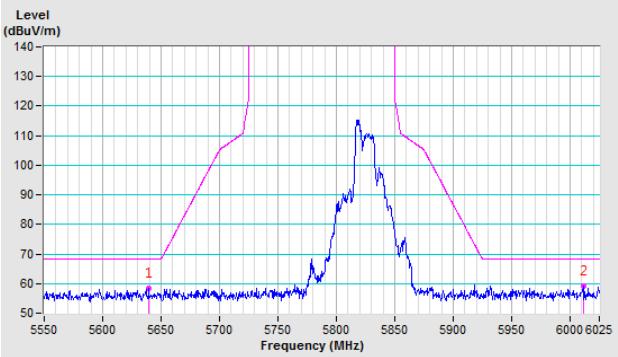
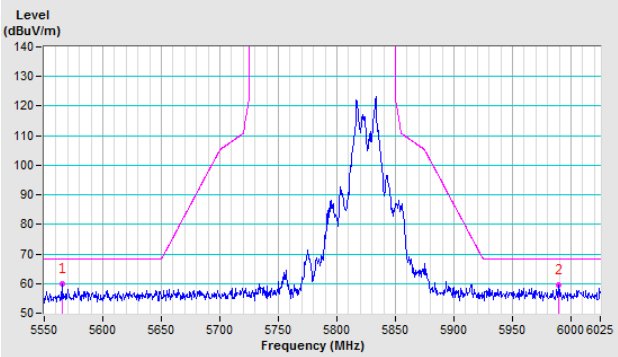
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

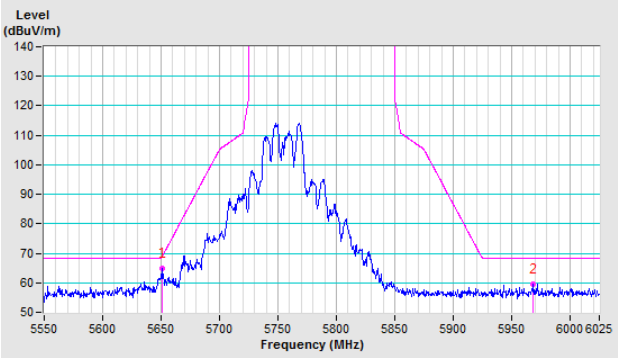
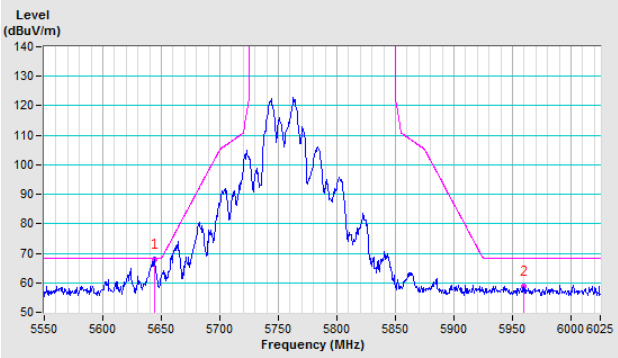
Horizontal	Vertical
	

CH 165 5825 MHz

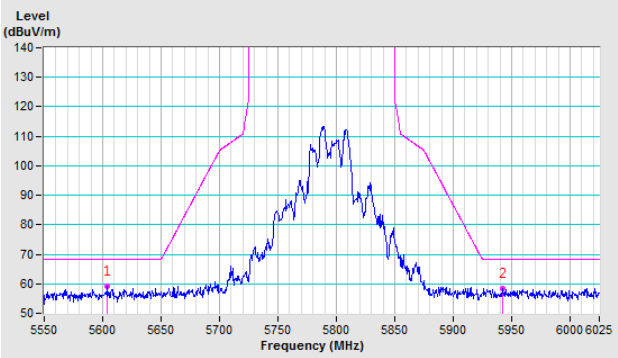
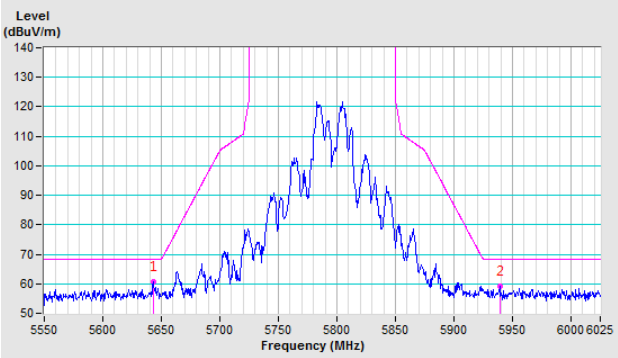
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

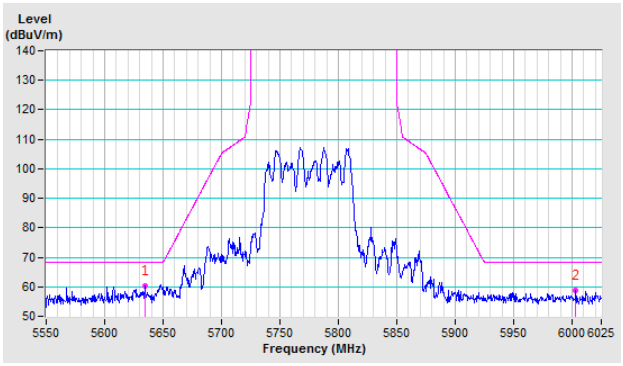
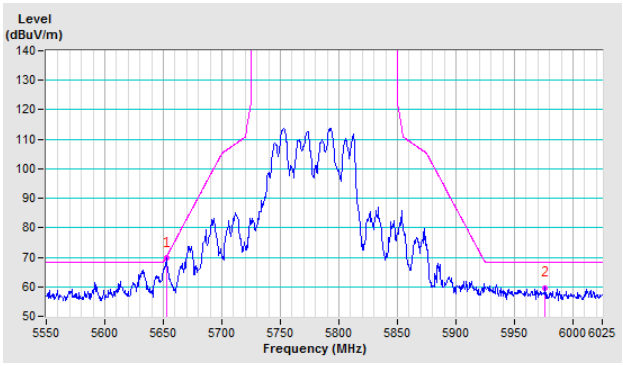
Horizontal	Vertical
	

CH 159 5795 MHz

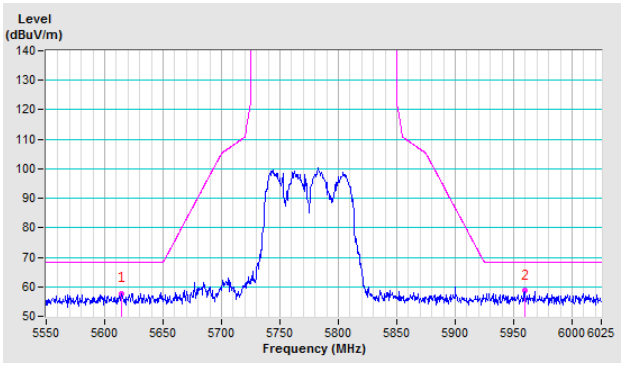
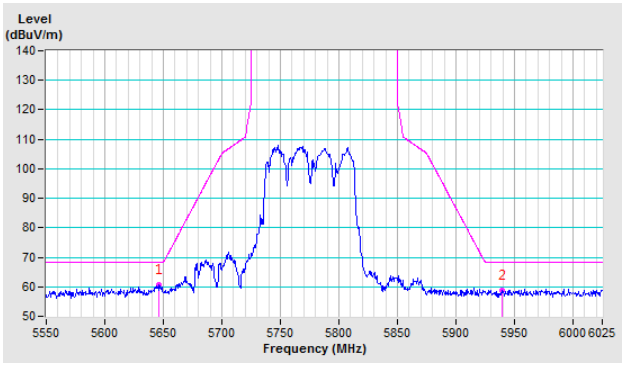
Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

802.11ac (VHT80+80)

CH 42+155 5210+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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---