FCC Test Report

Report No.:	RF161013E06-1
FCC ID:	HED-SSAC1900
Test Model:	SS-AC1900
Received Date:	Oct. 13, 2016
Test Date:	Nov. 11 to 22, 2016
Issued Date:	Dec. 05, 2016
Applicant:	Accton Technology Corporation
Address:	No.1, Creation Rd. III, Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
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.

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF161013E06-1	Original release.	Dec. 05, 2016

1 Certificate of Conformity

Product:	SunSpot AC1900 Dual Band Enterprise AP
Brand:	IgniteNet
Test Model:	SS-AC1900
Sample Status:	ENGINEERING SAMPLE
Applicant:	Accton Technology Corporation
Test Date:	Nov. 11 to 22, 2016
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Dec. 05, 2016

Wendy Wu / Specialist

Approved by : _____ , **Date:** Dec. 05, 2016

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -13.73dB at 0.16172MHz.
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 17355.00MHz, 17235.00MHz, 17265.00MHz, 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex 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	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	SunSpot AC1900 Dual Band Enterprise AP
Brand	IgniteNet
Test Model	SS-AC1900
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 12V from adapter DC 48V or 24V from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18 ~ 5.24GHz and 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 990.783mW **5GHz:** **5.18GHz ~ 5.24GHz:** 560.003mW **5.745GHz ~ 5.825GHz:** 637.218mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

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

2. The EUT power needs to be supplied from one power adapter or POE, the information is as below table:

Adapter		
Brand	Model No.	Spec.
MASS POWER	NBS30D120250HU	Input: 100-240V 50/60Hz, 0.8A Output: 12V 2.5A DC output cable (unshielded, 1.4m)

POE (test only not sale together)			
No	Brand	Model No.	Spec.
1	PowerDsine	PD-3501G/AC	Input: 100-240V 50/60Hz, 0.43A Output: 48V 0.35A
2	LEI	NU24-F240100-I2	Input: 100-240V 50/60Hz, 0.7A Output: 24V 1A

From above adapter and POE, the radiated emission worst case was found in **POE 2.** Therefore only the test data of the modes were recorded in this report individually.

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

2.4GHz Band					
Ant. No.	Transmitter Circuit	Antenna Gain (dBi) <Including cable loss>	Frequency range (GHz)	Antenna Type	Connecter Type
1	Chain (0)	4.71	2.4~2.4835	PIFA	i-pex
2	Chain (1)	4.67	2.4~2.4835	PIFA	i-pex
3	Chain (2)	3.68	2.4~2.4835	PIFA	i-pex
4	Chain (3)	5.53	2.4~2.4835	PIFA	i-pex
5GHz Band					
Ant. No.	Transmitter Circuit	Antenna Gain (dBi) <Including cable loss>	Frequency range (GHz)	Antenna Type	Connecter Type
1	Chain (0)	6.85	5.15~5.85	PIFA	i-pex
2	Chain (1)	5.24	5.15~5.85	PIFA	i-pex
3	Chain (2)	5.44	5.15~5.85	PIFA	i-pex
4	Chain (3)	7.93	5.15~5.85	PIFA	i-pex
Note: For TX configuration mode will fix transmission on Chain (1), Chain (2) and Chain (3)					

4. The EUT incorporates a MIMO function.

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

Note:
1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

Channel	Frequency	Channel	Frequency
36	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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Radiated Emission Test (Above 1GHz):

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

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

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

Radiated Emission Test (Below 1GHz):

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

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5745-5825	149 to 165	157	OFDM	BPSK	6.5

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT20)	5745-5825	149 to 165	157	OFDM	BPSK	6.5

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.

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

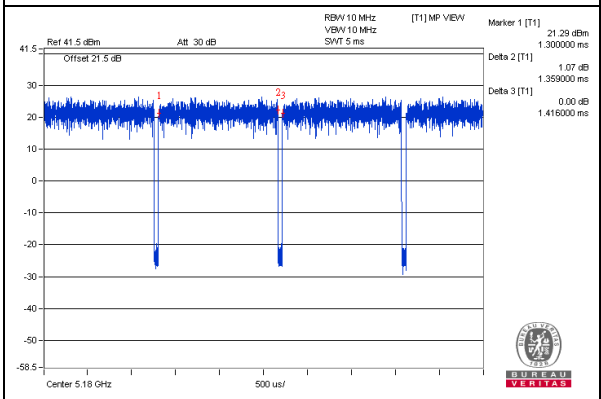
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	26deg. C, 71%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	26deg. C, 68%RH	120Vac, 60Hz	Weiwei Lo
PLC	23deg. C, 73%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Gary Cheng

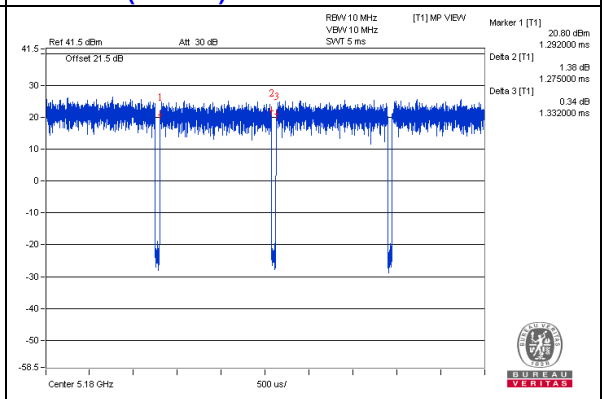
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 1.359 ms/1.416 ms = 0.96, Duty factor = 10 * log(1/0.96) = 0.18
802.11ac (VHT20): Duty cycle = 1.275 ms/1.332 ms = 0.957, Duty factor = 10 * log(1/0.957) = 0.19
802.11ac (VHT40): Duty cycle = 0.635 ms/0.697 ms = 0.911 , Duty factor = 10 * log(1/0.911) = 0.40
802.11ac (VHT80): Duty cycle = 0.316 ms/0.369 ms = 0.856, Duty factor = 10 * log(1/0.856) = 0.67

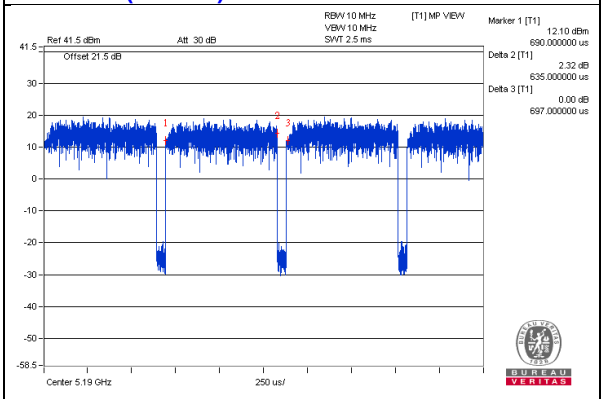
802.11a



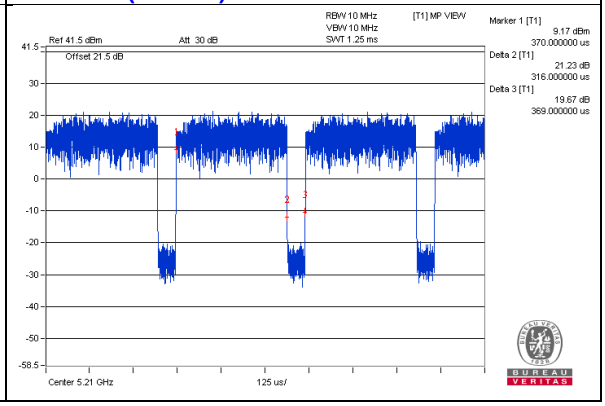
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

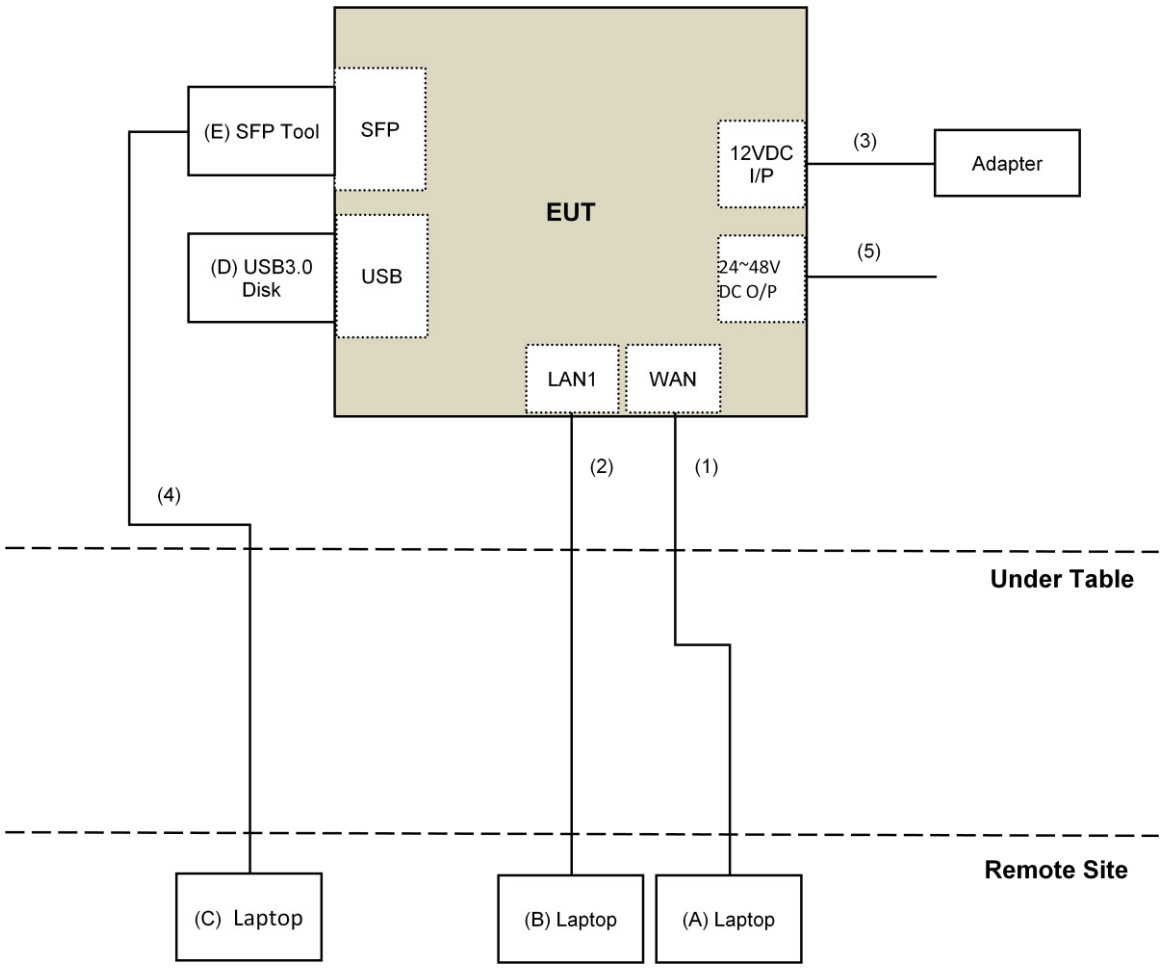
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab
D.	USB 3.0 Disk	Transcend	B50527 9311	3D33193	NA	Provided by Lab
E.	SFP Tool	NA	NA	NA	NA	Supplied by client
F.	POE Adapter	LEI	NU24-F240100-I2	NA	NA	Supplied by client (For DC 24V)
G.	POE Adapter	Power Dsine	PD-3501G/AC	NA	NA	Supplied by client (For DC 48V)

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

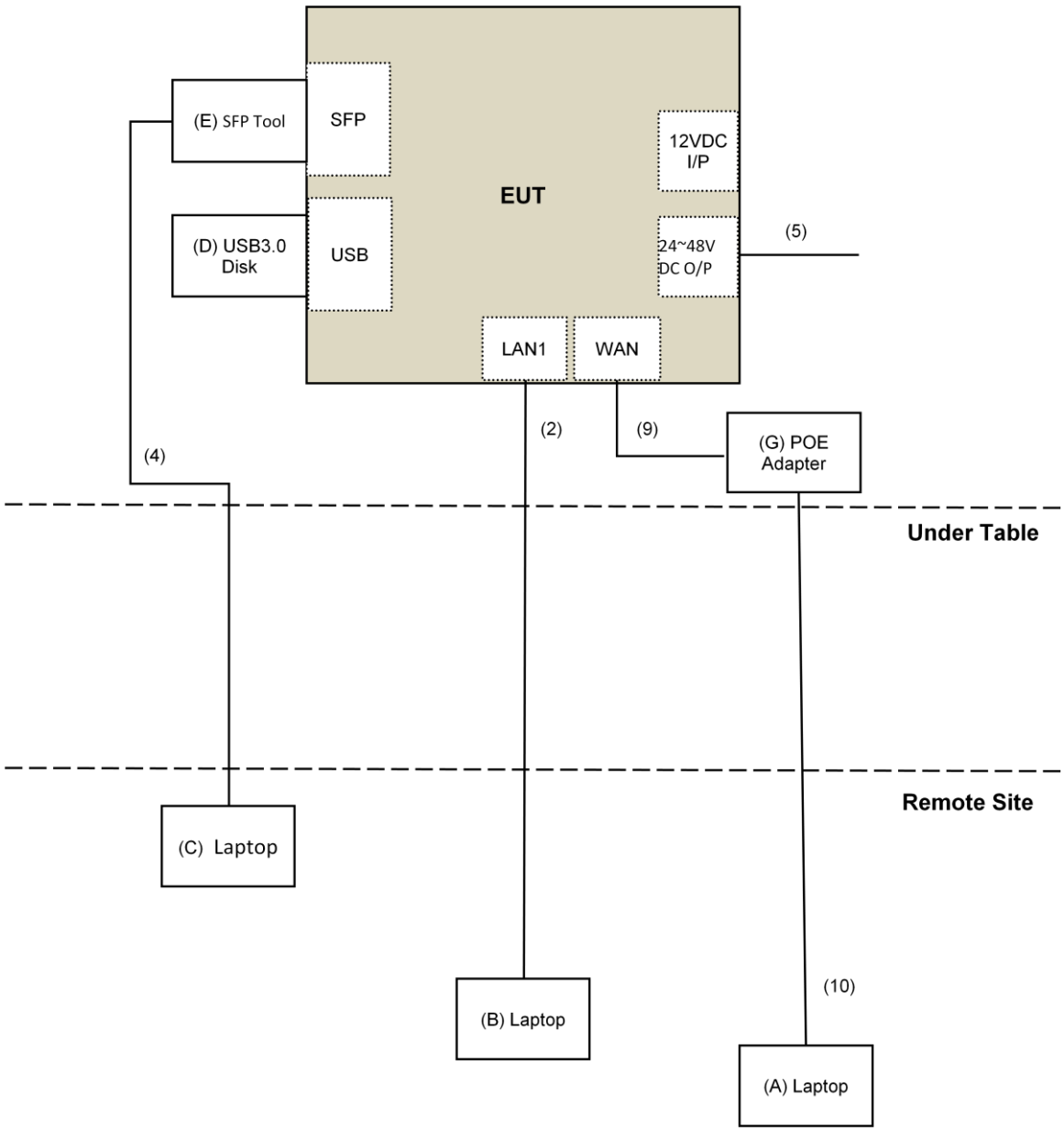
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	DC Cable	1	1.4	No	0	Supplied by client
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	DC Wire Cable	1	0.06	No	0	Supplied by client
6.	RJ-45 Cable	1	3	No	0	Provided by Lab
7.	RJ-45 Cable	1	10	No	0	Provided by Lab
8.	RJ-45 Cable	1	3	No	0	Provided by Lab
9.	RJ-45 Cable	1	3	No	0	Provided by Lab
10.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test

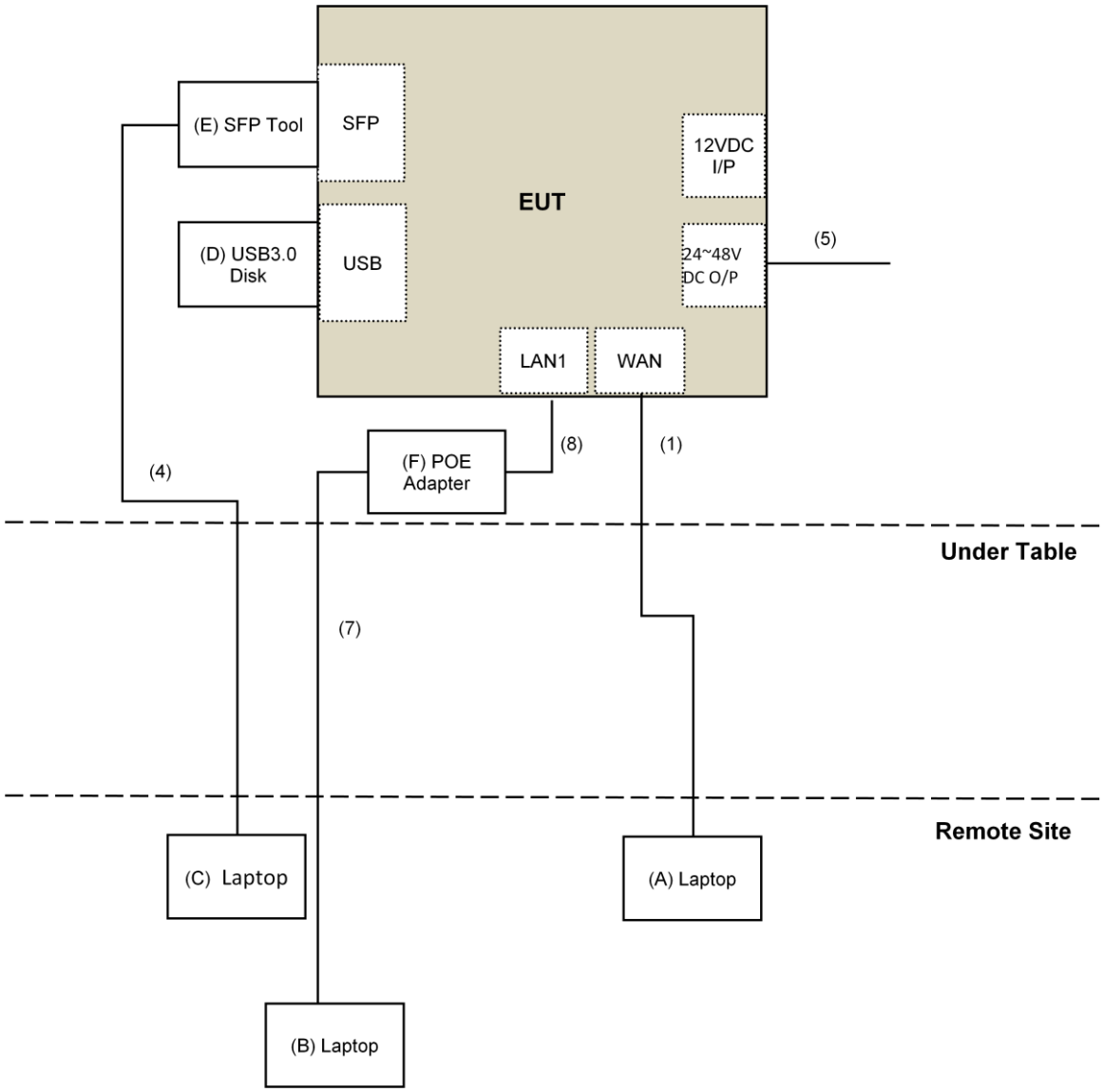
Adapter Mode (for Conduction test mode 1)



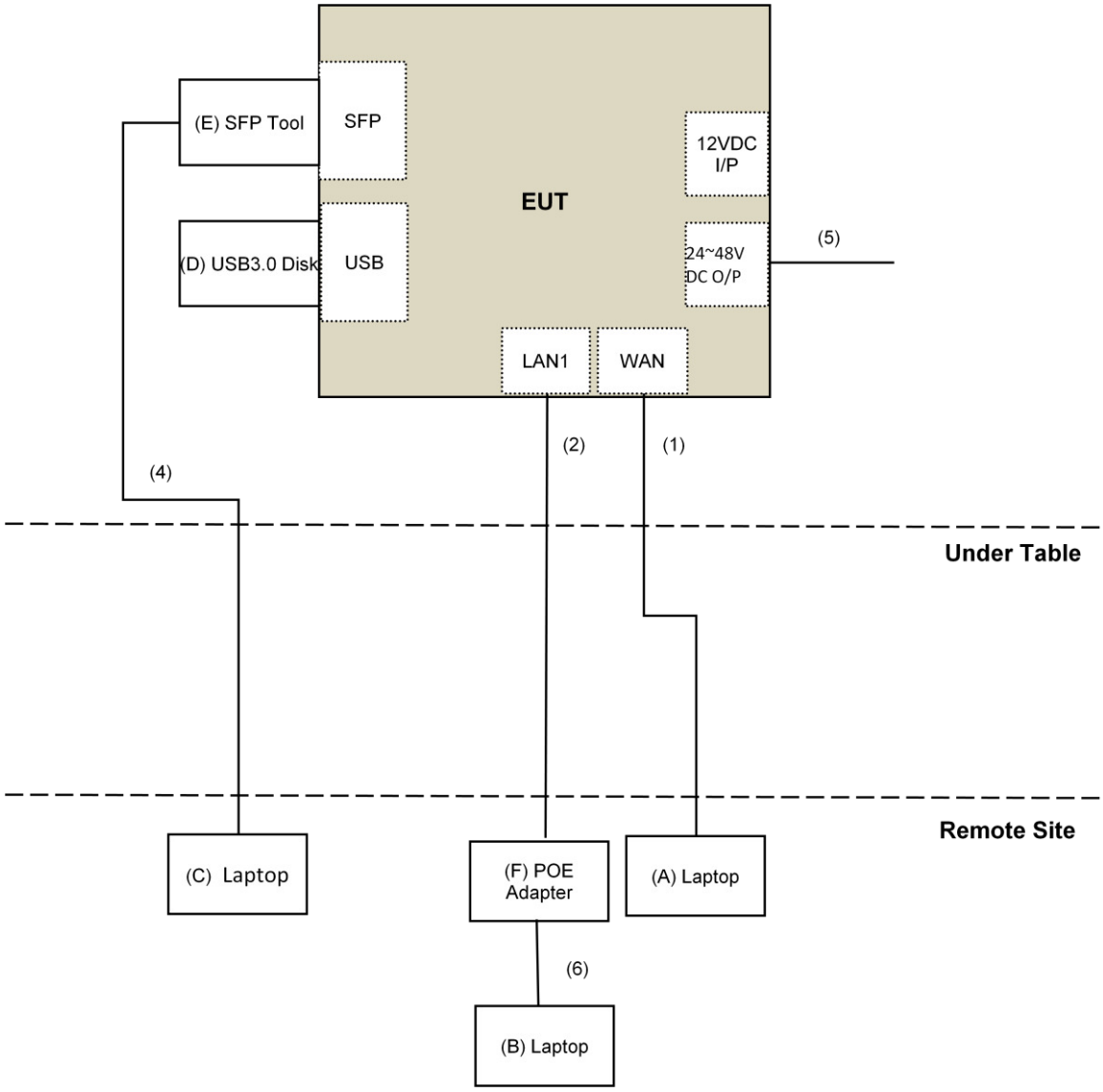
POE Mode (for Conduction test mode 2)



POE Mode (for Conduction test mode 3)



POE Mode (for other test)



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v01r03
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

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, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-156	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 02, 2016	Apr. 01, 2017
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 28, 2016	June 27, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 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 Loop antenna was used for all emissions below 30 MHz.
6. The CANADA Site Registration No. is 20331-1
8. Tested Date: Nov. 11 to 21, 2016

4.1.3 Test Procedure

For Radiated emission below 30MHz

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

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

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

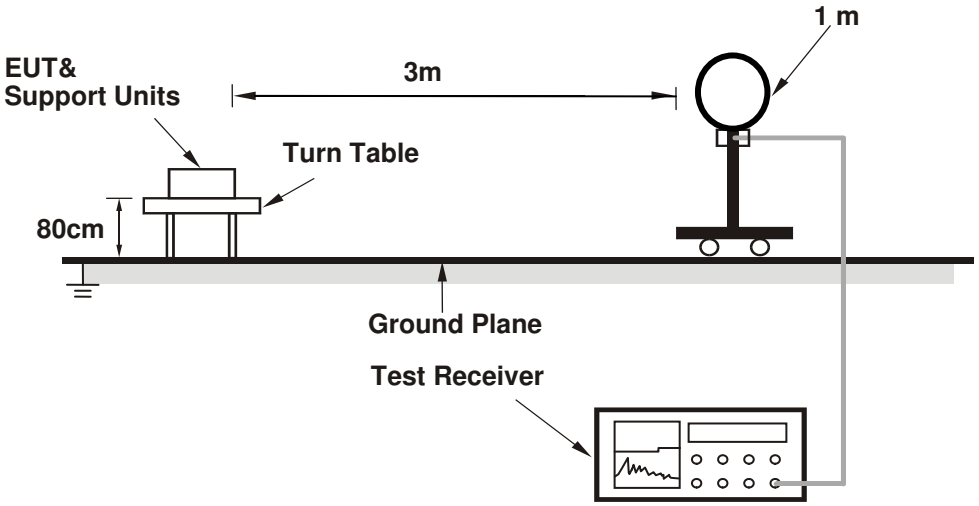
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

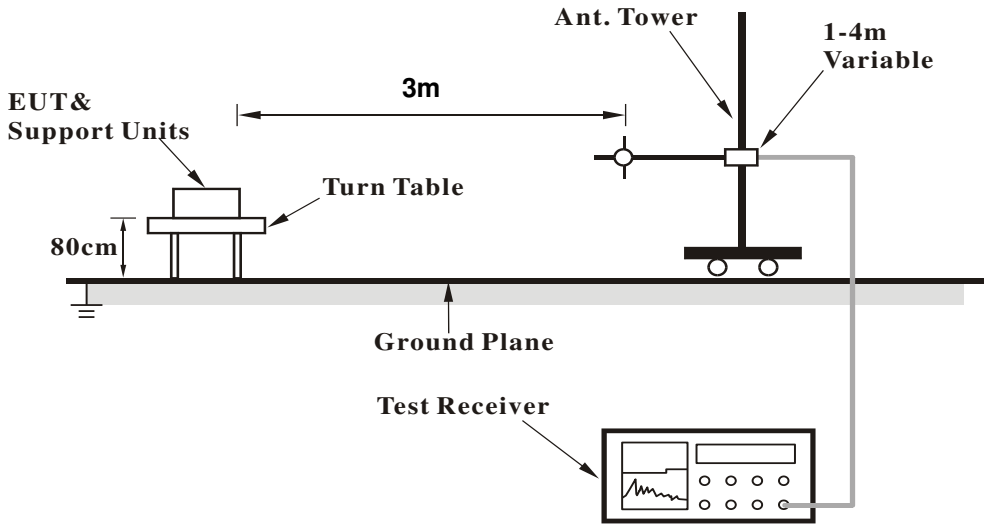
No deviation.

4.1.5 Test Setup

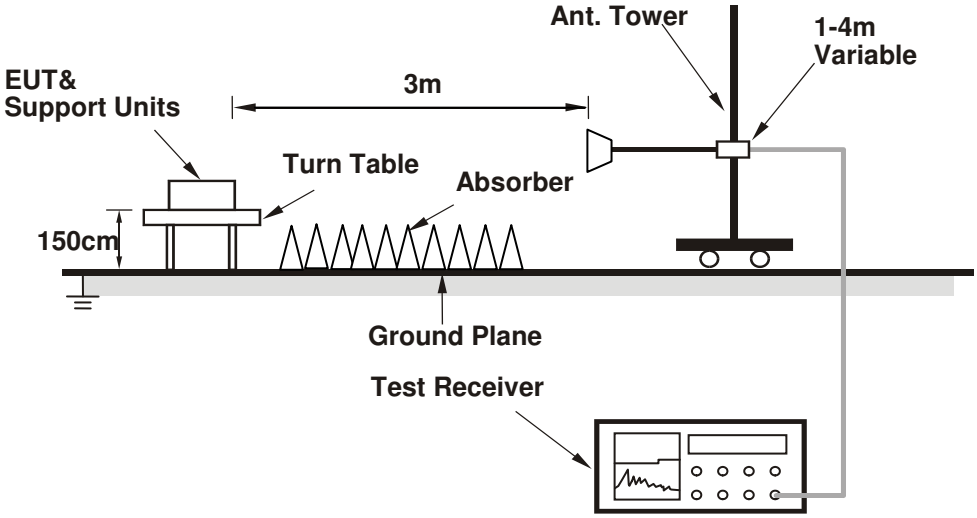
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Condition

a. Connected the EUT with the laptop which is placed on remote site.
b. Contorlling software (RTL819 x3.3) has been activated to set the EUT on specific status.

4.1.7 Test Results (Mode 3)

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	62.1 PK	74.0	-11.9	1.48 H	319	59.1	3.0
2	5150.00	46.2 AV	54.0	-7.8	1.48 H	319	43.2	3.0
3	*5180.00	113.0 PK			1.48 H	319	109.9	3.1
4	*5180.00	104.0 AV			1.48 H	319	100.9	3.1
5	#10360.00	50.8 PK	74.0	-23.2	1.52 H	195	37.2	13.6
6	#10360.00	39.8 AV	54.0	-14.2	1.52 H	195	26.2	13.6
7	15540.00	61.2 PK	74.0	-12.8	1.56 H	227	45.5	15.7
8	15540.00	47.4 AV	54.0	-6.6	1.56 H	227	31.7	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.4 PK	74.0	-4.6	1.86 V	341	66.4	3.0
2	5150.00	52.7 AV	54.0	-1.3	1.86 V	341	49.7	3.0
3	*5180.00	118.5 PK			1.86 V	341	115.4	3.1
4	*5180.00	109.2 AV			1.86 V	341	106.1	3.1
5	#10360.00	56.0 PK	74.0	-18.0	1.46 V	191	42.4	13.6
6	#10360.00	43.5 AV	54.0	-10.5	1.46 V	191	29.9	13.6
7	15540.00	61.7 PK	74.0	-12.3	1.45 V	224	46.0	15.7
8	15540.00	48.2 AV	54.0	-5.8	1.45 V	224	32.5	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5150.00	57.1 PK	74.0	-16.9	1.50 H	325	54.1	3.0
2	5150.00	42.8 AV	54.0	-11.2	1.50 H	325	39.8	3.0
3	*5200.00	113.3 PK			1.50 H	325	110.2	3.1
4	*5200.00	104.3 AV			1.50 H	325	101.2	3.1
5	#10400.00	54.6 PK	74.0	-19.4	1.56 H	193	41.0	13.6
6	#10400.00	41.2 AV	54.0	-12.8	1.56 H	193	27.6	13.6
7	15600.00	62.1 PK	74.0	-11.9	1.44 H	212	46.4	15.7
8	15600.00	47.9 AV	54.0	-6.1	1.44 H	212	32.2	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	1.86 V	341	60.9	3.0
2	5150.00	49.3 AV	54.0	-4.7	1.86 V	341	46.3	3.0
3	*5200.00	118.7 PK			1.86 V	341	115.6	3.1
4	*5200.00	109.3 AV			1.86 V	341	106.2	3.1
5	#10400.00	55.5 PK	74.0	-18.5	1.52 V	191	41.9	13.6
6	#10400.00	43.1 AV	54.0	-10.9	1.52 V	191	29.5	13.6
7	15600.00	61.8 PK	74.0	-12.2	1.53 V	216	46.1	15.7
8	15600.00	48.1 AV	54.0	-5.9	1.53 V	216	32.4	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5150.00	46.6 PK	74.0	-27.4	1.57 H	329	43.6	3.0
2	5150.00	35.5 AV	54.0	-18.5	1.57 H	329	32.5	3.0
3	*5240.00	111.8 PK			1.57 H	329	108.6	3.2
4	*5240.00	102.3 AV			1.57 H	329	99.1	3.2
5	#10480.00	50.6 PK	74.0	-23.4	1.50 H	210	36.6	14.0
6	#10480.00	39.9 AV	54.0	-14.1	1.50 H	210	25.9	14.0
7	15720.00	60.9 PK	74.0	-13.1	1.50 H	212	45.5	15.4
8	15720.00	47.5 AV	54.0	-6.5	1.50 H	212	32.1	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.7 PK	74.0	-20.3	1.86 V	341	50.7	3.0
2	5150.00	42.4 AV	54.0	-11.6	1.86 V	341	39.4	3.0
3	*5240.00	117.3 PK			1.86 V	341	114.1	3.2
4	*5240.00	107.7 AV			1.86 V	341	104.5	3.2
5	#10480.00	55.6 PK	74.0	-18.4	1.50 V	193	41.6	14.0
6	#10480.00	43.1 AV	54.0	-10.9	1.50 V	193	29.1	14.0
7	15720.00	61.4 PK	74.0	-12.6	1.50 V	211	46.0	15.4
8	15720.00	47.8 AV	54.0	-6.2	1.50 V	211	32.4	15.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5610.55	56.5 PK	68.2	-11.7	1.53 H	329	52.6	3.9
2	*5745.00	115.4 PK			1.53 H	329	111.2	4.2
3	*5745.00	106.5 AV			1.53 H	329	102.3	4.2
4	#5976.82	55.9 PK	68.2	-12.3	1.53 H	329	51.4	4.5
5	11490.00	49.1 PK	74.0	-24.9	1.44 H	158	33.9	15.2
6	11490.00	39.2 AV	54.0	-14.8	1.44 H	158	24.0	15.2
7	#17235.00	69.7 PK	74.0	-4.3	1.56 H	247	49.7	20.0
8	#17235.00	53.8 AV	54.0	-0.2	1.56 H	247	33.8	20.0
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	#5628.85	60.0 PK	68.2	-8.2	1.85 V	355	56.0	4.0
2	*5745.00	120.7 PK			1.85 V	355	116.5	4.2
3	*5745.00	111.7 AV			1.85 V	355	107.5	4.2
4	#5945.20	60.5 PK	68.2	-7.7	1.85 V	355	56.1	4.4
5	11490.00	51.5 PK	74.0	-22.5	2.01 V	117	36.3	15.2
6	11490.00	41.3 AV	54.0	-12.7	2.01 V	117	26.1	15.2
7	#17235.00	62.3 PK	74.0	-11.7	1.93 V	213	42.3	20.0
8	#17235.00	51.6 AV	54.0	-2.4	1.93 V	213	31.6	20.0

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 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	#5592.64	54.7 PK	68.2	-13.5	1.70 H	330	50.8	3.9
2	*5785.00	115.5 PK			1.70 H	330	111.4	4.1
3	*5785.00	107.1 AV			1.70 H	330	103.0	4.1
4	#5971.47	56.0 PK	68.2	-12.2	1.70 H	330	51.5	4.5
5	11570.00	49.3 PK	74.0	-24.7	1.50 H	153	34.2	15.1
6	11570.00	39.3 AV	54.0	-14.7	1.50 H	153	24.2	15.1
7	#17355.00	68.0 PK	74.0	-6.0	1.56 H	249	47.5	20.5
8	**#17355.00**	**53.9 AV**	**54.0**	**-0.1**	**1.56 H**	**249**	**33.4**	**20.5**
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.05	59.9 PK	68.2	-8.3	1.86 V	355	55.9	4.0
2	*5785.00	120.8 PK			1.86 V	355	116.7	4.1
3	*5785.00	111.8 AV			1.86 V	355	107.7	4.1
4	#5951.37	60.0 PK	68.2	-8.2	1.86 V	355	55.6	4.4
5	11570.00	51.2 PK	74.0	-22.8	2.02 V	123	36.1	15.1
6	11570.00	41.0 AV	54.0	-13.0	2.02 V	123	25.9	15.1
7	#17355.00	63.3 PK	74.0	-10.7	1.99 V	205	42.8	20.5
8	#17355.00	52.4 AV	54.0	-1.6	1.99 V	205	31.9	20.5

REMARKS:

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

CHANNEL	TX Channel 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	#5599.26	54.3 PK	68.2	-13.9	1.76 H	332	50.4	3.9
2	*5825.00	115.2 PK			1.76 H	332	111.0	4.2
3	*5825.00	105.8 AV			1.76 H	332	101.6	4.2
4	#5998.77	55.7 PK	68.2	-12.5	1.76 H	332	51.2	4.5
5	11650.00	50.1 PK	74.0	-23.9	1.54 H	168	35.1	15.0
6	11650.00	39.8 AV	54.0	-14.2	1.54 H	168	24.8	15.0
7	#17475.00	68.2 PK	74.0	-5.8	1.56 H	247	47.1	21.1
8	#17475.00	53.4 AV	54.0	-0.6	1.56 H	247	32.3	21.1
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	#5617.45	58.6 PK	68.2	-9.6	1.86 V	355	54.7	3.9
2	*5825.00	120.5 PK			1.86 V	355	116.3	4.2
3	*5825.00	111.6 AV			1.86 V	355	107.4	4.2
4	#5982.25	60.0 PK	68.2	-8.2	1.86 V	355	55.5	4.5
5	11650.00	51.1 PK	74.0	-22.9	2.07 V	129	36.1	15.0
6	11650.00	41.1 AV	54.0	-12.9	2.07 V	129	26.1	15.0
7	#17475.00	62.6 PK	74.0	-11.4	2.00 V	233	41.5	21.1
8	#17475.00	51.9 AV	54.0	-2.1	2.00 V	233	30.8	21.1

REMARKS:

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

802.11ac (VHT20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.2 PK	74.0	-9.8	1.72 H	318	61.2	3.0
2	5150.00	47.9 AV	54.0	-6.1	1.72 H	318	44.9	3.0
3	*5180.00	111.9 PK			1.72 H	318	108.8	3.1
4	*5180.00	103.2 AV			1.72 H	318	100.1	3.1
5	#10360.00	54.6 PK	74.0	-19.4	1.54 H	185	41.0	13.6
6	#10360.00	41.0 AV	54.0	-13.0	1.54 H	185	27.4	13.6
7	15540.00	66.6 PK	74.0	-7.4	1.81 H	331	50.9	15.7
8	15540.00	52.4 AV	54.0	-1.6	1.81 H	331	36.7	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.7 PK	74.0	-3.3	1.87 V	342	67.7	3.0
2	5150.00	53.6 AV	54.0	-0.4	1.87 V	342	50.6	3.0
3	*5180.00	117.2 PK			1.87 V	342	114.1	3.1
4	*5180.00	108.1 AV			1.87 V	342	105.0	3.1
5	#10360.00	55.2 PK	74.0	-18.8	1.47 V	203	41.6	13.6
6	#10360.00	42.6 AV	54.0	-11.4	1.47 V	203	29.0	13.6
7	15540.00	61.8 PK	74.0	-12.2	1.52 V	222	46.1	15.7
8	15540.00	48.0 AV	54.0	-6.0	1.52 V	222	32.3	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	5150.00	60.6 PK	74.0	-13.4	1.73 H	345	57.6	3.0
2	5150.00	44.3 AV	54.0	-9.7	1.73 H	345	41.3	3.0
3	*5200.00	112.1 PK			1.73 H	345	109.0	3.1
4	*5200.00	103.6 AV			1.73 H	345	100.5	3.1
5	#10400.00	54.6 PK	74.0	-19.4	1.60 H	179	41.0	13.6
6	#10400.00	41.0 AV	54.0	-13.0	1.60 H	179	27.4	13.6
7	15600.00	66.2 PK	74.0	-7.8	1.50 H	214	50.5	15.7
8	15600.00	52.2 AV	54.0	-1.8	1.50 H	214	36.5	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.4 PK	74.0	-8.6	1.99 V	342	62.4	3.0
2	5150.00	48.7 AV	54.0	-5.3	1.99 V	342	45.7	3.0
3	*5200.00	116.2 PK			1.99 V	342	113.1	3.1
4	*5200.00	108.2 AV			1.99 V	342	105.1	3.1
5	#10400.00	55.6 PK	74.0	-18.4	1.51 V	193	42.0	13.6
6	#10400.00	43.0 AV	54.0	-11.0	1.51 V	193	29.4	13.6
7	15600.00	60.8 PK	74.0	-13.2	1.47 V	208	45.1	15.7
8	15600.00	47.3 AV	54.0	-6.7	1.47 V	208	31.6	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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			1.78 H	344	108.9	3.2
2	*5240.00	102.5 AV			1.78 H	344	99.3	3.2
3	5350.00	60.7 PK	74.0	-13.3	1.78 H	344	57.2	3.5
4	5350.00	44.5 AV	54.0	-9.5	1.78 H	344	41.0	3.5
5	#10480.00	54.3 PK	74.0	-19.7	1.54 H	194	40.3	14.0
6	#10480.00	40.9 AV	54.0	-13.1	1.54 H	194	26.9	14.0
7	15720.00	61.2 PK	74.0	-12.8	1.50 H	211	45.8	15.4
8	15720.00	47.2 AV	54.0	-6.8	1.50 H	211	31.8	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.2 PK			1.97 V	342	113.0	3.2
2	*5240.00	107.1 AV			1.97 V	342	103.9	3.2
3	5350.00	65.6 PK	74.0	-8.4	1.97 V	342	62.1	3.5
4	5350.00	48.7 AV	54.0	-5.3	1.97 V	342	45.2	3.5
5	#10480.00	50.9 PK	74.0	-23.1	1.98 V	102	36.9	14.0
6	#10480.00	41.3 AV	54.0	-12.7	1.98 V	102	27.3	14.0
7	15720.00	59.2 PK	74.0	-14.8	1.41 V	211	43.8	15.4
8	15720.00	44.8 AV	54.0	-9.2	1.41 V	211	29.4	15.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5585.32	56.3 PK	68.2	-11.9	1.81 H	332	52.4	3.9
2	*5745.00	115.5 PK			1.81 H	332	111.3	4.2
3	*5745.00	107.5 AV			1.81 H	332	103.3	4.2
4	#5940.46	57.3 PK	68.2	-10.9	1.81 H	332	52.9	4.4
5	11490.00	49.1 PK	74.0	-24.9	1.38 H	151	33.9	15.2
6	11490.00	39.4 AV	54.0	-14.6	1.38 H	151	24.2	15.2
7	#17235.00	68.3 PK	74.0	-5.7	1.50 H	240	48.3	20.0
8	**#17235.00**	**53.9 AV**	**54.0**	**-0.1**	**1.50 H**	**240**	**33.9**	**20.0**
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	#5625.05	59.7 PK	68.2	-8.5	2.00 V	359	55.7	4.0
2	*5745.00	116.9 PK			2.00 V	359	112.7	4.2
3	*5745.00	108.0 AV			2.00 V	359	103.8	4.2
4	#5965.62	59.7 PK	68.2	-8.5	2.00 V	359	55.2	4.5
5	11490.00	51.4 PK	74.0	-22.6	2.06 V	101	36.2	15.2
6	11490.00	41.5 AV	54.0	-12.5	2.06 V	101	26.3	15.2
7	#17235.00	67.2 PK	74.0	-6.8	1.41 V	165	47.2	20.0
8	#17235.00	52.6 AV	54.0	-1.4	1.41 V	165	32.6	20.0

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 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	#5604.91	54.4 PK	68.2	-13.8	2.01 H	360	50.5	3.9
2	*5785.00	115.9 PK			2.01 H	360	111.8	4.1
3	*5785.00	107.1 AV			2.01 H	360	103.0	4.1
4	#5969.60	54.5 PK	68.2	-13.7	2.01 H	360	50.0	4.5
5	11570.00	49.3 PK	74.0	-24.7	1.41 H	146	34.2	15.1
6	11570.00	39.3 AV	54.0	-14.7	1.41 H	146	24.2	15.1
7	#17355.00	67.8 PK	74.0	-6.2	1.50 H	240	47.3	20.5
8	#17355.00	53.6 AV	54.0	-0.4	1.50 H	240	33.1	20.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5592.27	60.3 PK	68.2	-7.9	2.00 V	359	56.4	3.9
2	*5785.00	120.7 PK			2.00 V	359	116.6	4.1
3	*5785.00	111.6 AV			2.00 V	359	107.5	4.1
4	#5964.20	60.1 PK	68.2	-8.1	3.00 V	359	55.6	4.5
5	11570.00	51.1 PK	74.0	-22.9	2.07 V	120	36.0	15.1
6	11570.00	41.0 AV	54.0	-13.0	2.07 V	120	25.9	15.1
7	#17355.00	66.5 PK	74.0	-7.5	1.57 V	171	46.0	20.5
8	#17355.00	52.2 AV	54.0	-1.8	1.57 V	171	31.7	20.5

REMARKS:

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

CHANNEL	TX Channel 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	#5607.19	54.1 PK	68.2	-14.1	2.06 H	360	50.2	3.9
2	*5825.00	115.1 PK			2.06 H	360	110.9	4.2
3	*5825.00	106.4 AV			2.06 H	360	102.2	4.2
4	#5945.56	54.0 PK	68.2	-14.2	2.06 H	360	49.6	4.4
5	11650.00	48.6 PK	74.0	-25.4	1.48 H	171	33.6	15.0
6	11650.00	38.8 AV	54.0	-15.2	1.48 H	171	23.8	15.0
7	#17475.00	68.2 PK	74.0	-5.8	1.56 H	220	47.1	21.1
8	#17475.00	53.6 AV	54.0	-0.4	1.56 H	220	32.5	21.1
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	#5597.50	58.4 PK	68.2	-9.8	2.00 V	1	54.5	3.9
2	*5825.00	119.0 PK			2.00 V	1	114.8	4.2
3	*5825.00	110.0 AV			2.00 V	1	105.8	4.2
4	#5957.55	59.2 PK	68.2	-9.0	2.00 V	1	54.7	4.5
5	11650.00	51.5 PK	74.0	-22.5	2.09 V	105	36.5	15.0
6	11650.00	41.4 AV	54.0	-12.6	2.09 V	105	26.4	15.0
7	#17475.00	67.0 PK	74.0	-7.0	1.57 V	171	45.9	21.1
8	#17475.00	51.5 AV	54.0	-2.5	1.57 V	171	30.4	21.1

REMARKS:

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

802.11ac (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	60.8 PK	74.0	-13.2	1.56 H	342	57.8	3.0
2	5150.00	44.3 AV	54.0	-9.7	1.56 H	342	41.3	3.0
3	*5190.00	104.1 PK			1.56 H	342	101.0	3.1
4	*5190.00	94.5 AV			1.56 H	342	91.4	3.1
5	#10380.00	55.3 PK	74.0	-18.7	1.51 H	180	41.6	13.7
6	#10380.00	41.5 AV	54.0	-12.5	1.51 H	180	27.8	13.7
7	15570.00	67.0 PK	74.0	-7.0	1.82 H	346	51.4	15.6
8	15570.00	52.7 AV	54.0	-1.3	1.82 H	346	37.1	15.6
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	5150.00	66.2 PK	74.0	-7.8	2.00 V	342	63.2	3.0
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**2.00 V**	**342**	**50.9**	**3.0**
3	*5190.00	110.5 PK			2.00 V	342	107.4	3.1
4	*5190.00	101.9 AV			2.00 V	342	98.8	3.1
5	#10380.00	55.1 PK	74.0	-18.9	1.42 V	193	41.4	13.7
6	#10380.00	42.7 AV	54.0	-11.3	1.42 V	193	29.0	13.7
7	15570.00	62.0 PK	74.0	-12.0	1.52 V	209	46.4	15.6
8	15570.00	48.2 AV	54.0	-5.8	1.52 V	209	32.6	15.6

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 46	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	59.6 PK	74.0	-14.4	1.63 H	329	56.6	3.0
2	5150.00	44.1 AV	54.0	-9.9	1.63 H	329	41.1	3.0
3	*5230.00	111.0 PK			1.63 H	329	107.8	3.2
4	*5230.00	100.9 AV			1.63 H	329	97.7	3.2
5	5350.00	60.4 PK	74.0	-13.6	1.63 H	329	56.9	3.5
6	5350.00	43.6 AV	54.0	-10.4	1.63 H	329	40.1	3.5
7	#10460.00	55.2 PK	74.0	-18.8	1.48 H	180	41.3	13.9
8	#10460.00	41.7 AV	54.0	-12.3	1.48 H	180	27.8	13.9
9	15690.00	64.0 PK	74.0	-10.0	1.32 H	212	48.4	15.6
10	15690.00	51.7 AV	54.0	-2.3	1.32 H	212	36.1	15.6
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	5150.00	65.0 PK	74.0	-9.0	2.00 V	342	62.0	3.0
2	5150.00	52.5 AV	54.0	-1.5	2.00 V	342	49.5	3.0
3	*5230.00	117.4 PK			2.00 V	342	114.2	3.2
4	*5230.00	108.3 AV			2.00 V	342	105.1	3.2
5	5350.00	58.4 PK	74.0	-15.6	2.00 V	342	54.9	3.5
6	5350.00	45.7 AV	54.0	-8.3	2.00 V	342	42.2	3.5
7	#10460.00	54.8 PK	74.0	-19.2	1.43 V	202	40.9	13.9
8	#10460.00	42.1 AV	54.0	-11.9	1.43 V	202	28.2	13.9
9	15690.00	61.4 PK	74.0	-12.6	1.47 V	206	45.8	15.6
10	15690.00	47.8 AV	54.0	-6.2	1.47 V	206	32.2	15.6

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 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	#5566.65	51.5 PK	68.2	-16.7	1.67 H	360	47.6	3.9
2	*5755.00	112.4 PK			1.67 H	360	108.2	4.2
3	*5755.00	101.5 AV			1.67 H	360	97.3	4.2
4	#5959.39	52.8 PK	68.2	-15.4	1.67 H	360	48.3	4.5
5	11510.00	49.4 PK	74.0	-24.6	1.50 H	166	34.3	15.1
6	11510.00	39.4 AV	54.0	-14.6	1.50 H	166	24.3	15.1
7	#17265.00	67.8 PK	74.0	-6.2	1.55 H	169	47.9	19.9
8	**#17265.00**	**53.9 AV**	**54.0**	**-0.1**	**1.55 H**	**169**	**34.0**	**19.9**
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5602.24	55.7 PK	68.2	-12.5	1.75 V	356	51.8	3.9
2	*5755.00	117.1 PK			1.75 V	356	112.9	4.2
3	*5755.00	108.9 AV			1.75 V	356	104.7	4.2
4	#5955.04	56.8 PK	68.2	-11.4	1.75 V	356	52.4	4.4
5	11510.00	51.1 PK	74.0	-22.9	2.00 V	129	36.0	15.1
6	11510.00	41.3 AV	54.0	-12.7	2.00 V	129	26.2	15.1
7	#17265.00	66.5 PK	74.0	-7.5	1.54 V	183	46.6	19.9
8	#17265.00	51.9 AV	54.0	-2.1	1.54 V	183	32.0	19.9

REMARKS:

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

CHANNEL	TX Channel 159	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	#5621.49	52.5 PK	68.2	-15.7	1.80 H	360	48.5	4.0
2	*5795.00	112.1 PK			1.64 H	360	108.0	4.1
3	*5795.00	102.1 AV			1.64 H	360	98.0	4.1
4	#6001.90	52.2 PK	68.2	-16.0	1.80 H	360	47.7	4.5
5	11590.00	49.3 PK	74.0	-24.7	1.51 H	160	34.2	15.1
6	11590.00	39.4 AV	54.0	-14.6	1.51 H	160	24.3	15.1
7	#17385.00	63.6 PK	74.0	-10.4	1.61 H	173	43.0	20.6
8	#17385.00	53.5 AV	54.0	-0.5	1.61 H	173	32.9	20.6
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	#5616.56	52.7 PK	68.2	-15.5	1.77 V	358	48.8	3.9
2	*5795.00	115.1 PK			1.77 V	358	111.0	4.1
3	*5795.00	107.4 AV			1.77 V	358	103.3	4.1
4	#5972.68	53.6 PK	68.2	-14.6	1.77 V	358	49.1	4.5
5	11590.00	50.9 PK	74.0	-23.1	1.99 V	106	35.8	15.1
6	11590.00	41.1 AV	54.0	-12.9	1.99 V	106	26.0	15.1
7	#17385.00	66.2 PK	74.0	-7.8	1.55 V	172	45.6	20.6
8	#17385.00	52.1 AV	54.0	-1.9	1.55 V	172	31.5	20.6

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 (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	5150.00	60.0 PK	74.0	-14.0	1.56 H	328	57.0	3.0
2	5150.00	44.3 AV	54.0	-9.7	1.56 H	328	41.3	3.0
3	*5210.00	107.9 PK			1.56 H	328	104.7	3.2
4	*5210.00	100.4 AV			1.56 H	328	97.2	3.2
5	5350.00	60.5 PK	74.0	-13.5	1.56 H	328	57.0	3.5
6	5350.00	43.9 AV	54.0	-10.1	1.56 H	328	40.4	3.5
7	#10420.00	54.3 PK	74.0	-19.7	1.52 H	169	40.5	13.8
8	#10420.00	40.9 AV	54.0	-13.1	1.52 H	169	27.1	13.8
9	15630.00	66.2 PK	74.0	-7.8	1.81 H	347	50.5	15.7
10	15630.00	52.2 AV	54.0	-1.8	1.81 H	347	36.5	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.2 PK	74.0	-9.8	2.19 V	344	61.2	3.0
2	5150.00	53.5 AV	54.0	-0.5	2.19 V	344	50.5	3.0
3	*5210.00	111.9 PK			2.19 V	344	108.7	3.2
4	*5210.00	103.7 AV			2.19 V	344	100.5	3.2
5	5350.00	57.8 PK	74.0	-16.2	2.19 V	344	54.3	3.5
6	5350.00	47.1 AV	54.0	-6.9	2.19 V	344	43.6	3.5
7	#10420.00	55.6 PK	74.0	-18.4	1.52 V	196	41.8	13.8
8	#10420.00	42.9 AV	54.0	-11.1	1.52 V	196	29.1	13.8
9	15630.00	61.4 PK	74.0	-12.6	1.54 V	228	45.7	15.7
10	15630.00	47.8 AV	54.0	-6.2	1.54 V	228	32.1	15.7

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5633.11	51.9 PK	68.2	-16.3	1.51 H	335	47.9	4.0
2	*5775.00	108.6 PK			1.57 H	336	104.4	4.2
3	*5775.00	100.9 AV			1.57 H	336	96.7	4.2
4	#5933.72	53.8 PK	68.2	-14.4	1.51 H	335	49.4	4.4
5	11550.00	49.0 PK	74.0	-25.0	1.65 H	125	33.8	15.2
6	11550.00	38.4 AV	54.0	-15.6	1.65 H	125	23.2	15.2
7	#17325.00	58.5 PK	74.0	-15.5	1.65 H	133	38.2	20.3
8	#17325.00	50.7 AV	54.0	-3.3	1.65 H	133	30.4	20.3
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	#5627.45	67.0 PK	68.2	-1.2	1.50 V	358	63.0	4.0
2	*5775.00	111.8 PK			1.67 V	330	107.6	4.2
3	*5775.00	103.8 AV			1.67 V	330	99.6	4.2
4	#5941.40	62.0 PK	68.2	-6.2	1.50 V	358	57.6	4.4
5	11550.00	51.0 PK	74.0	-23.0	2.04 V	114	35.8	15.2
6	11550.00	41.1 AV	54.0	-12.9	2.04 V	114	25.9	15.2
7	#17325.00	62.8 PK	74.0	-11.2	1.98 V	219	42.5	20.3
8	#17325.00	51.9 AV	54.0	-2.1	1.98 V	219	31.6	20.3

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.

Below 1GHz Data:

802.11ac (VHT20)

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	95.33	37.3 QP	43.5	-6.2	2.00 H	59	51.0	-13.7
2	250.00	31.2 QP	46.0	-14.8	1.50 H	277	40.7	-9.5
3	375.00	30.0 QP	46.0	-16.0	1.00 H	22	35.5	-5.5
4	499.99	29.5 QP	46.0	-16.5	2.00 H	33	31.8	-2.3
5	625.00	33.7 QP	46.0	-12.3	1.50 H	317	33.3	0.4
6	749.98	34.7 QP	46.0	-11.3	2.00 H	200	32.2	2.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	95.98	39.2 QP	43.5	-4.3	1.50 V	2	52.8	-13.6
2	250.00	36.9 QP	46.0	-9.1	2.00 V	351	46.4	-9.5
3	375.00	40.1 QP	46.0	-5.9	1.50 V	243	45.6	-5.5
4	499.99	39.2 QP	46.0	-6.8	1.00 V	268	41.5	-2.3
5	625.00	39.7 QP	46.0	-6.3	1.00 V	262	39.3	0.4
6	749.98	39.4 QP	46.0	-6.6	1.50 V	111	36.9	2.5

REMARKS:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	Jun. 20, 2016	Jun. 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: Nov. 22, 2016

4.2.3 Test Procedure

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

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

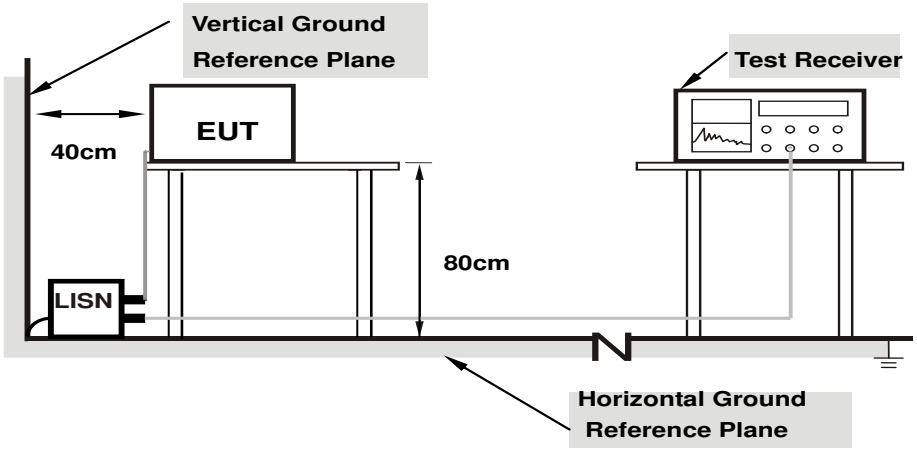
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

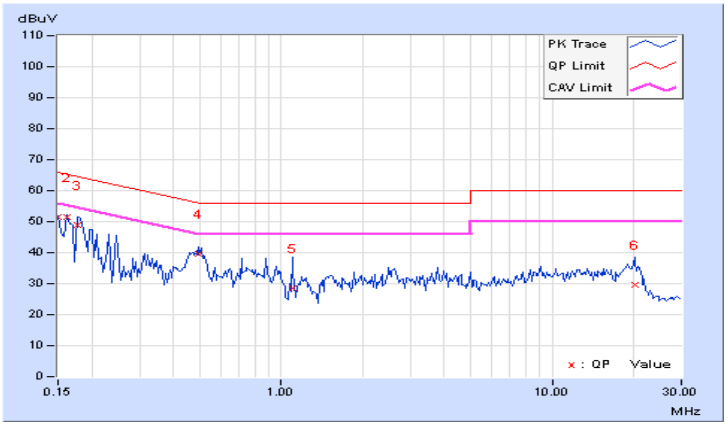
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.20	41.14	21.77	51.34	31.97	66.00	56.00	-14.66	-24.03
2	**0.16172**	**10.20**	**41.45**	**27.40**	**51.65**	**37.60**	**65.38**	**55.38**	**-13.73**	**-17.78**
3	0.17734	10.20	38.80	26.03	49.00	36.23	64.61	54.61	-15.61	-18.38
4	0.49375	10.25	29.30	20.44	39.55	30.69	56.10	46.10	-16.55	-15.41
5	1.09766	10.30	18.39	9.61	28.69	19.91	56.00	46.00	-27.31	-26.09
6	20.14453	11.70	18.09	13.66	29.79	25.36	60.00	50.00	-30.21	-24.64

REMARKS:

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

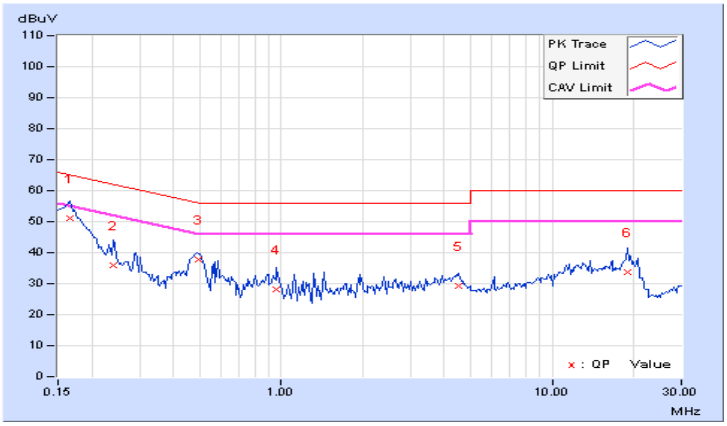


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.18	40.96	27.58	51.14	37.76	65.18	55.18	-14.04	-17.42
2	0.23984	10.18	25.82	15.23	36.00	25.41	62.10	52.10	-26.10	-26.69
3	0.49256	10.24	27.63	18.82	37.87	29.06	56.12	46.12	-18.25	-17.06
4	0.95859	10.26	17.74	4.85	28.00	15.11	56.00	46.00	-28.00	-30.89
5	4.50000	10.25	19.10	9.18	29.35	19.43	56.00	46.00	-26.65	-26.57
6	18.94922	11.32	22.54	17.72	33.86	29.04	60.00	50.00	-26.14	-20.96

REMARKS:

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



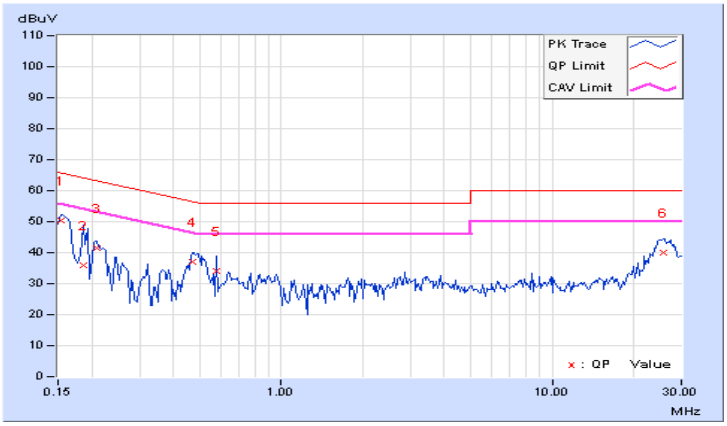
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.19	40.10	28.40	50.29	38.59	65.79	55.79	-15.50	-17.20
2	0.18516	10.19	25.69	-0.95	35.88	9.24	64.25	54.25	-28.37	-45.01
3	0.20859	10.19	31.33	21.73	41.52	31.92	63.26	53.26	-21.74	-21.34
4	0.47031	10.22	26.93	21.50	37.15	31.72	56.51	46.51	-19.36	-14.79
5	0.57578	10.23	23.67	4.64	33.90	14.87	56.00	46.00	-22.10	-31.13
6	25.82031	11.43	28.68	22.73	40.11	34.16	60.00	50.00	-19.89	-15.84

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.

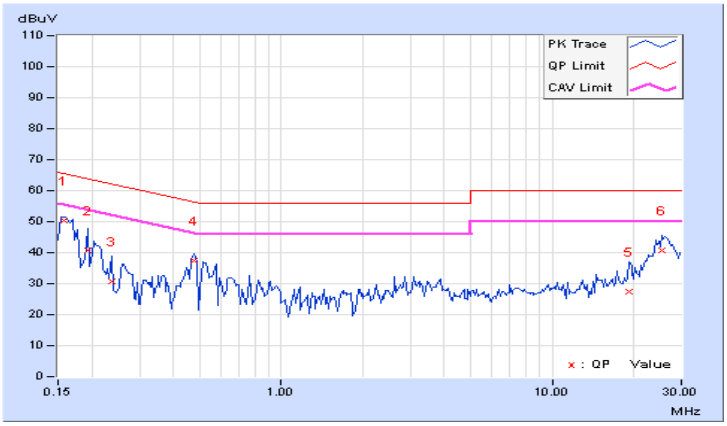


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15781	10.18	40.17	31.13	50.35	41.31	65.58	55.58	-15.23	-14.27
2	0.19297	10.16	30.68	5.07	40.84	15.23	63.91	53.91	-23.07	-38.68
3	0.23594	10.17	20.46	1.60	30.63	11.77	62.24	52.24	-31.61	-40.47
4	0.47813	10.21	27.34	21.91	37.55	32.12	56.37	46.37	-18.82	-14.25
5	19.24219	11.07	16.39	9.87	27.46	20.94	60.00	50.00	-32.54	-29.06
6	25.47656	11.07	29.58	22.97	40.65	34.04	60.00	50.00	-19.35	-15.96

REMARKS:

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



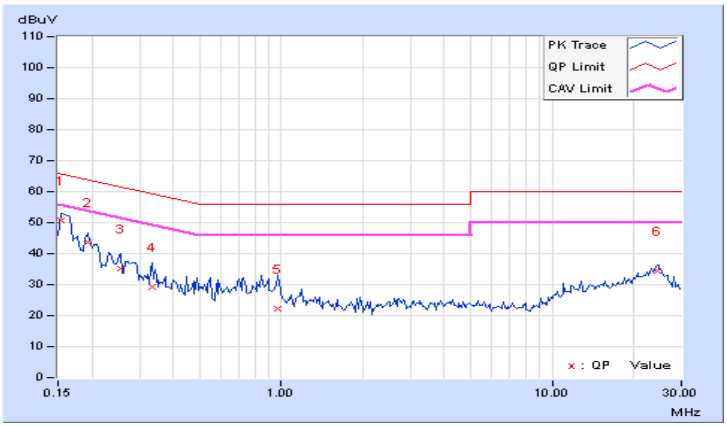
4.2.9 Test Results (Mode 3)

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	0.15391	10.19	40.38	25.30	50.57	35.49	65.79	55.79	-15.22	-20.30
2	0.19297	10.19	33.50	18.42	43.69	28.61	63.91	53.91	-20.22	-25.30
3	0.25547	10.20	24.99	9.82	35.19	20.02	61.58	51.58	-26.39	-31.56
4	0.33359	10.21	19.06	6.50	29.27	16.71	59.36	49.36	-30.09	-32.65
5	0.97422	10.26	12.00	7.37	22.26	17.63	56.00	46.00	-33.74	-28.37
6	24.46484	11.42	23.00	19.35	34.42	30.77	60.00	50.00	-25.58	-19.23

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.

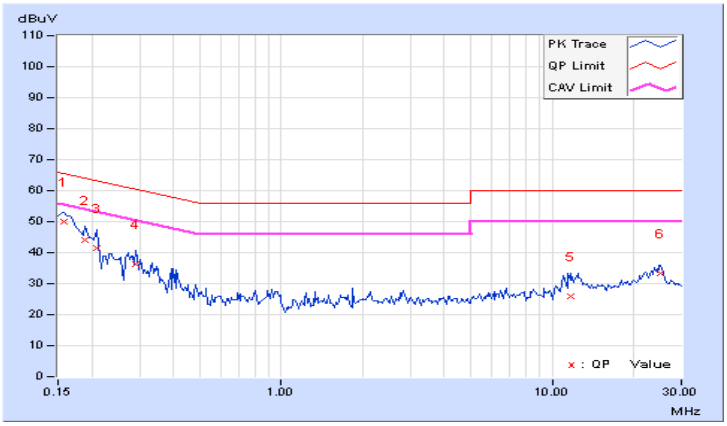


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15781	10.18	39.87	27.89	50.05	38.07	65.58	55.58	-15.53	-17.51
2	0.18906	10.16	33.78	19.01	43.94	29.17	64.08	54.08	-20.14	-24.91
3	0.20859	10.16	31.22	19.27	41.38	29.43	63.26	53.26	-21.88	-23.83
4	0.29063	10.18	26.25	15.78	36.43	25.96	60.51	50.51	-24.08	-24.55
5	11.73828	10.63	15.27	9.64	25.90	20.27	60.00	50.00	-34.10	-29.73
6	25.17578	11.07	22.16	18.85	33.23	29.92	60.00	50.00	-26.77	-20.08

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

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
36	5180	19.84	19.59	18.27	254.517	24.06	28.07	Pass
40	5200	19.55	20.60	20.08	306.831	24.87	28.07	Pass
48	5240	19.53	20.38	19.86	295.715	24.71	28.07	Pass
149	5745	22.72	23.47	23.44	630.199	27.99	28.07	Pass
157	5785	22.70	23.55	23.05	614.51	27.89	28.07	Pass
165	5825	22.04	22.85	22.91	548.142	27.39	28.07	Pass

Note: The directional gain is 7.93dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.93-6) = 28.07dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
36	5180	19.11	20.52	20.51	306.65	24.87	28.07	Pass
40	5200	19.51	21.37	19.14	308.454	24.89	28.07	Pass
48	5240	19.05	21.24	19.62	305.02	24.84	28.07	Pass
149	5745	23.67	23.01	23.00	632.321	28.01	28.07	Pass
157	5785	23.56	23.12	23.12	637.218	28.04	28.07	Pass
165	5825	22.71	23.02	22.57	567.802	27.54	28.07	Pass

Note: The directional gain is 7.93dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.93-6) = 28.07dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
38	5190	16.35	17.70	16.19	143.627	21.57	28.07	Pass
46	5230	22.60	22.77	22.76	560.003	27.48	28.07	Pass
151	5755	22.63	23.12	23.11	592.991	27.73	28.07	Pass
159	5795	21.56	22.04	21.14	433.192	26.37	28.07	Pass

Note: The directional gain is 7.93dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.93-6) = 28.07dBm.

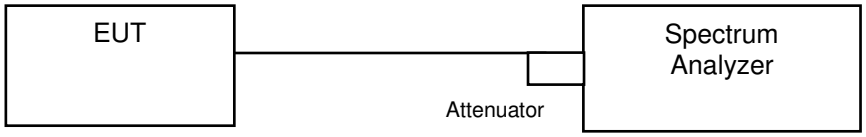
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
42	5210	18.56	20.39	19.06	261.713	24.18	28.07	Pass
155	5775	22.75	22.87	22.77	571.241	27.57	28.07	Pass

Note: The directional gain is 7.93dBi > 6dBi, therefore the limit needs to reduce, so the power limit shall be reduced to 30-(7.93-6) = 28.07dBm.

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

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3
36	5180	16.80	16.92	16.92
40	5200	17.04	17.04	16.80
48	5240	16.92	16.80	16.92
149	5745	16.92	19.08	17.16
157	5785	17.04	20.88	17.40
165	5825	17.16	20.04	17.52

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3
36	5180	17.88	18.00	18.00
40	5200	18.00	18.12	17.88
48	5240	18.12	18.00	17.88
149	5745	18.12	21.48	18.36
157	5785	18.12	23.28	18.48
165	5825	18.12	20.64	18.24

802.11ac (VHT40)

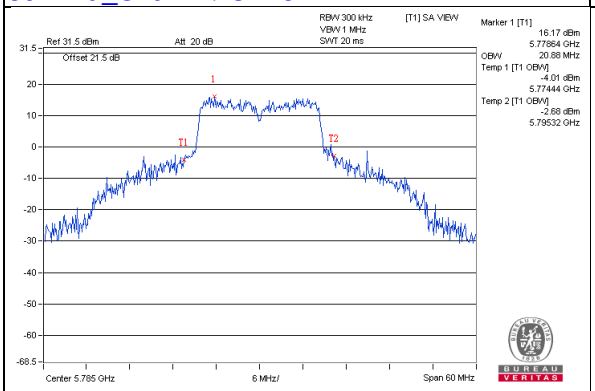
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3
38	5190	36.96	36.72	36.72
46	5230	36.72	36.96	38.64
151	5755	36.96	38.64	37.44
159	5795	36.72	37.44	37.20

802.11ac (VHT80)

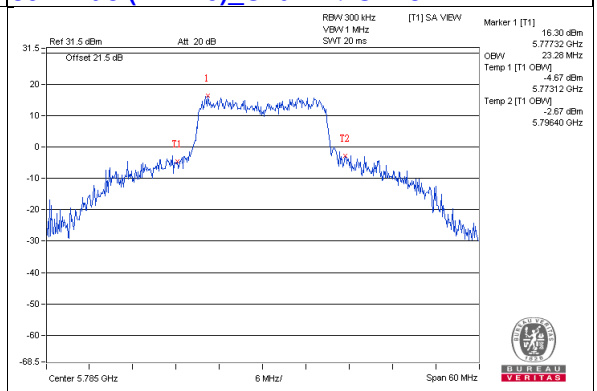
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 1	Chain 2	Chain 3
42	5210	75.36	75.84	75.84
155	5775	76.32	76.32	76.32

Spectrum Plot of Worst Value

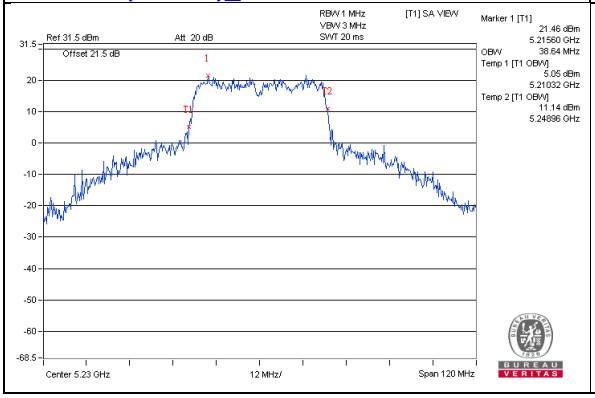
802.11a_Chain2 / CH157



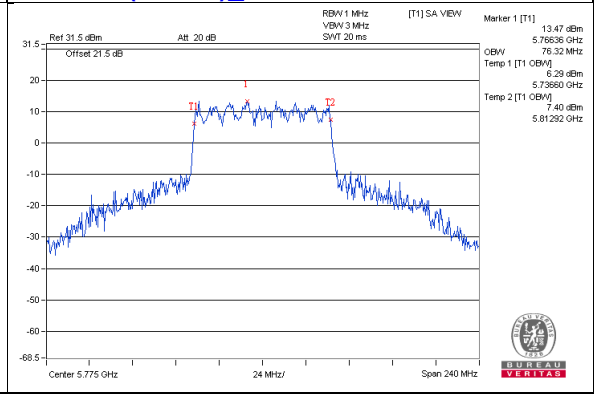
802.11ac (VHT20)_Chain2 / CH157



802.11ac (VHT40)_Chain3 / CH46

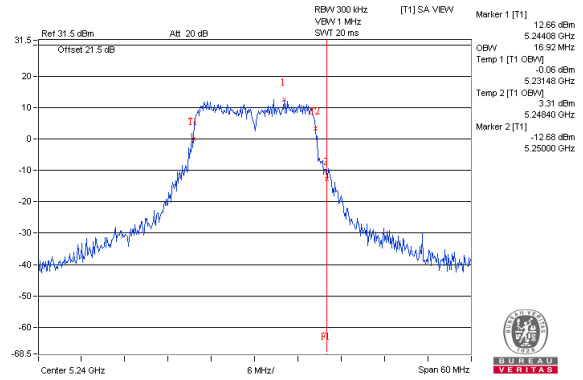


802.11ac (VHT80)_Chain1 / CH155

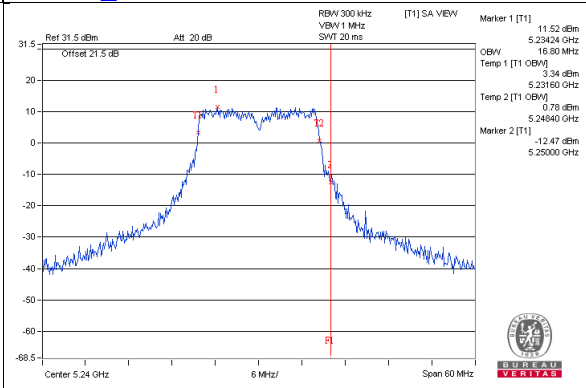


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

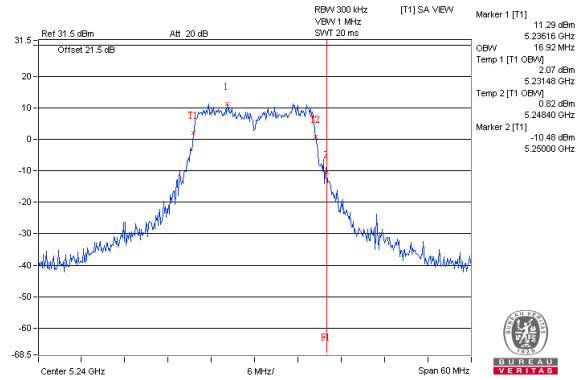
802.11a_Chain1 / CH48



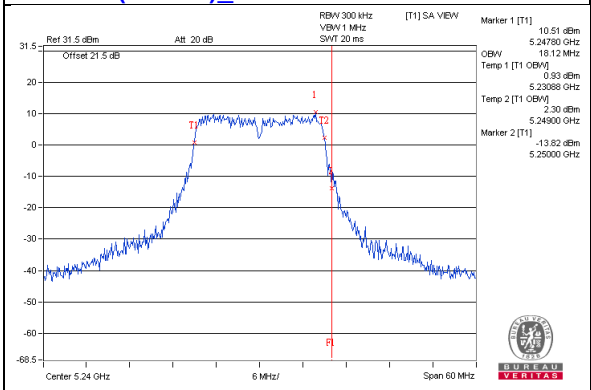
802.11a_Chain2 / CH48



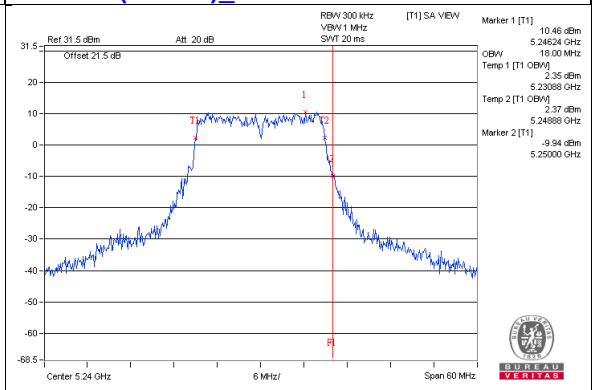
802.11a_Chain3 / CH48



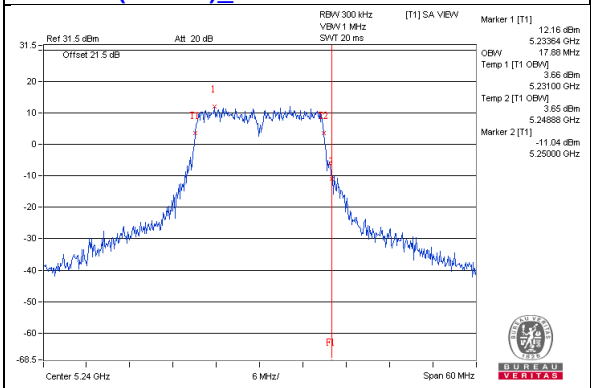
802.11ac(VHT20)_Chain1 / CH48



802.11ac(VHT20)_Chain2 / CH48

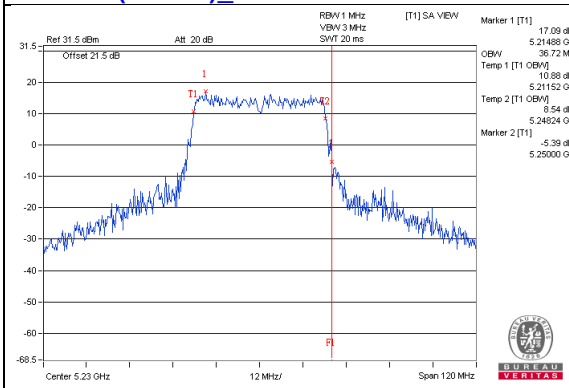


802.11ac(VHT20)_Chain3 / CH48

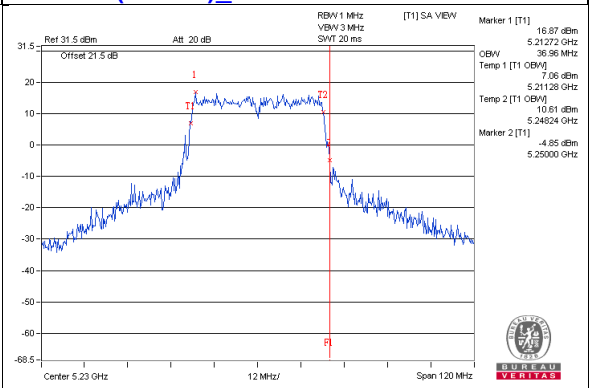


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A band)

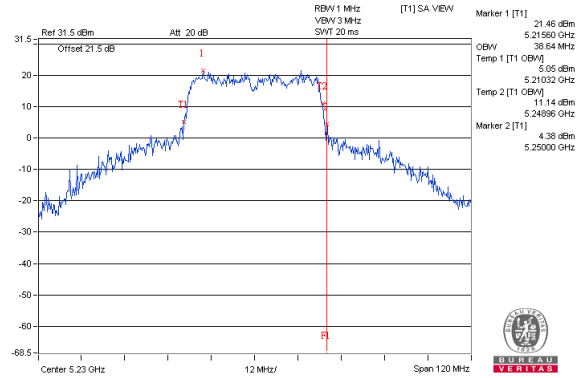
802.11ac(VHT40)_Chain1 / CH46



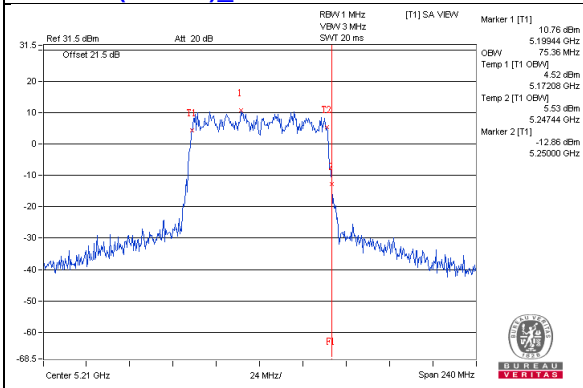
802.11ac(VHT40)_Chain2 / CH46



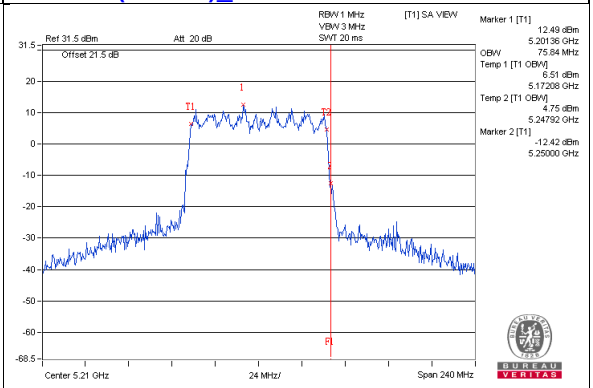
802.11ac(VHT40)_Chain3 / CH46



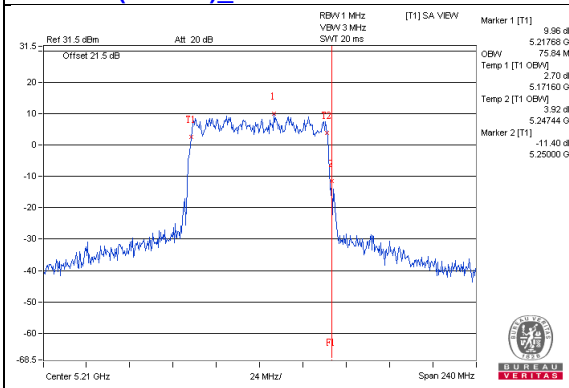
802.11ac(VHT80)_Chain1 / CH42



802.11ac(VHT80)_Chain2 / CH42

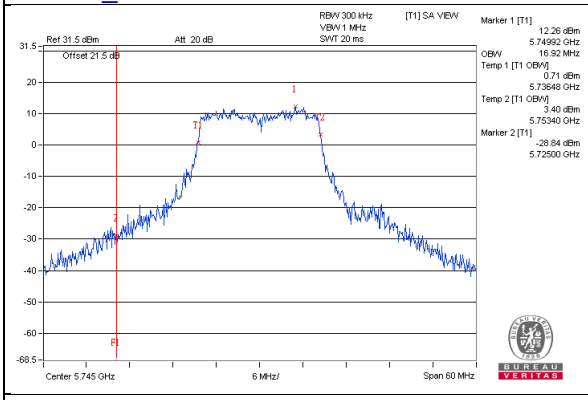


802.11ac(VHT80)_Chain3 / CH42

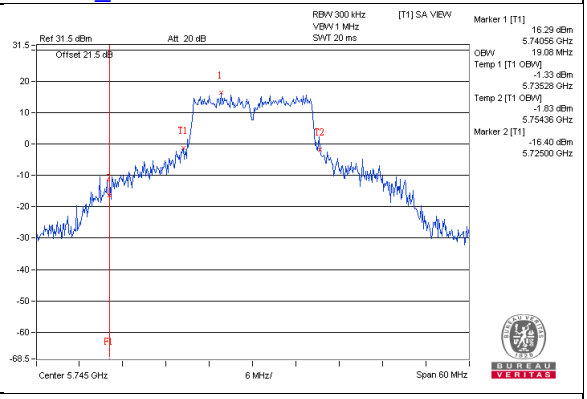


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

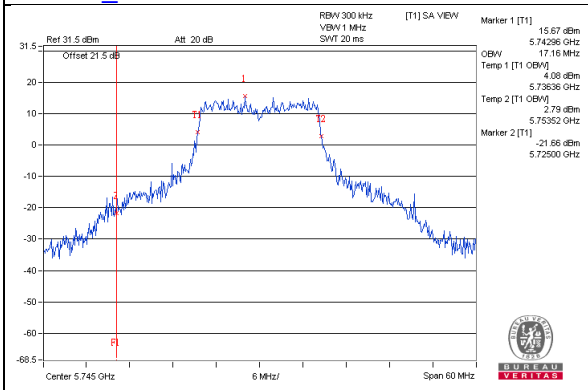
802.11a_Chain1 / CH149



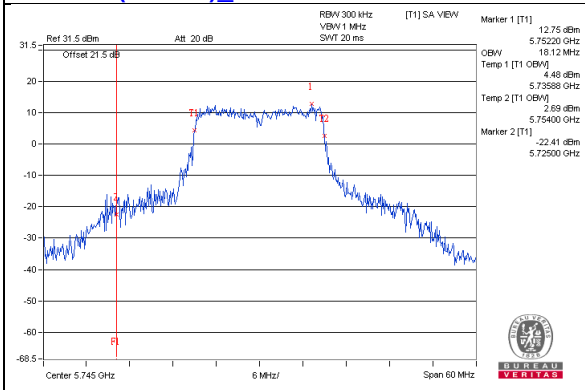
802.11a_Chain2 / CH149



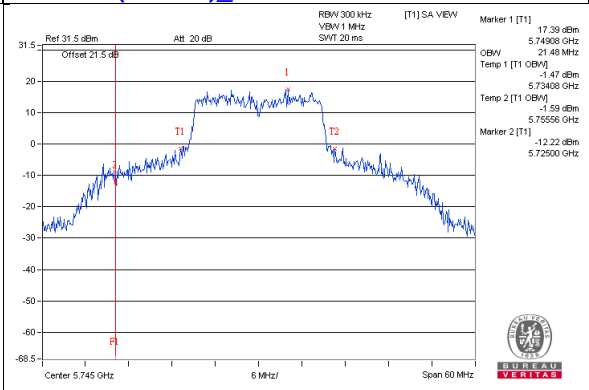
802.11a_Chain3 / CH149



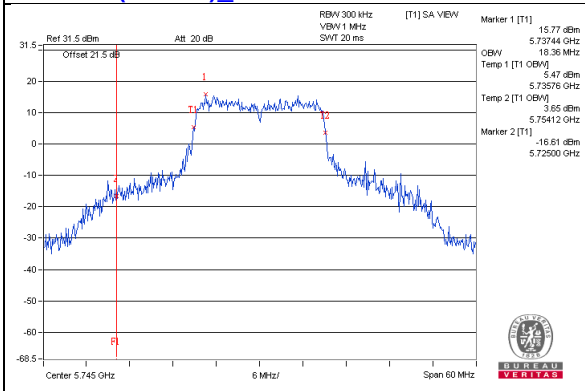
802.11ac(VHT20)_Chain1 / CH149



802.11ac(VHT20)_Chain2 / CH149

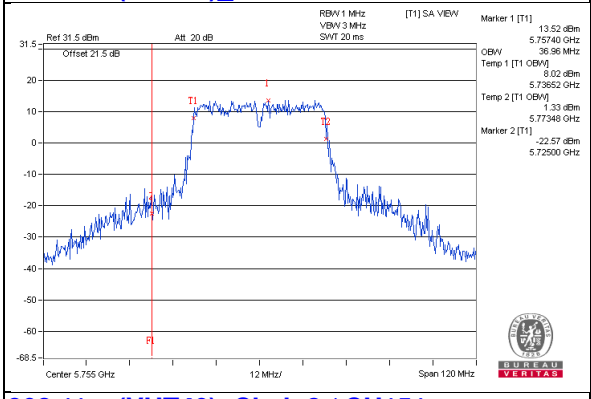


802.11ac(VHT20)_Chain3 / CH149

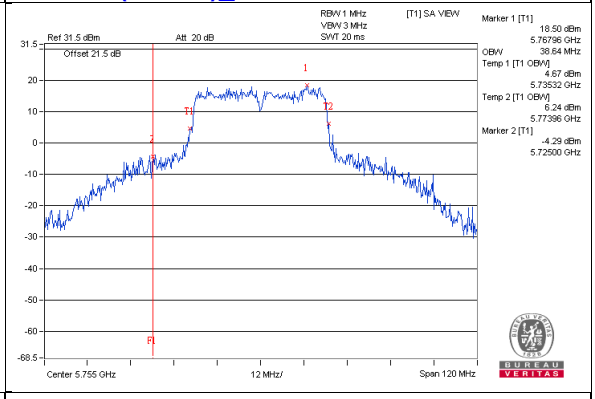


Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

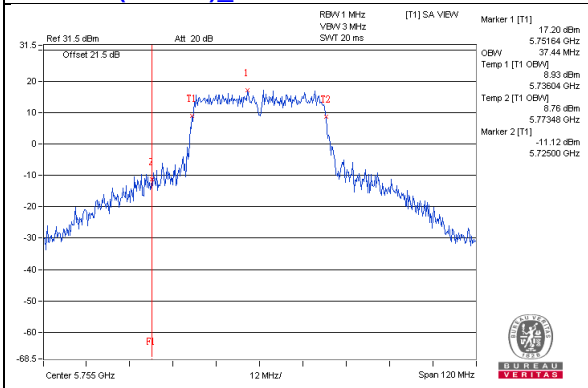
802.11ac(VHT40)_Chain1 / CH151



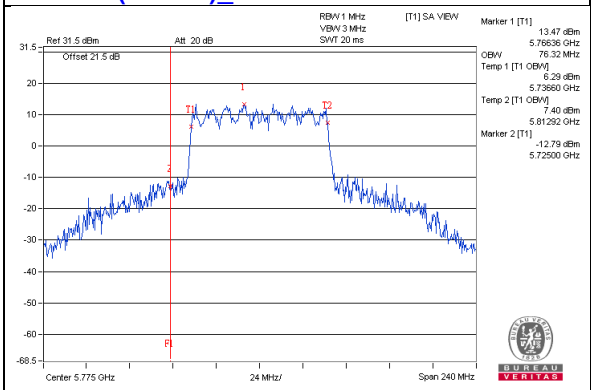
802.11ac(VHT40)_Chain2 / CH151



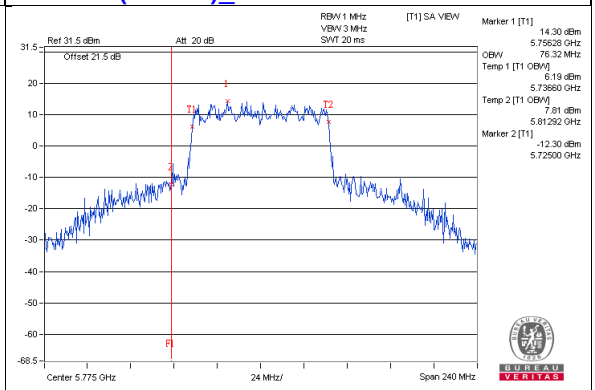
802.11ac(VHT40)_Chain3 / CH151



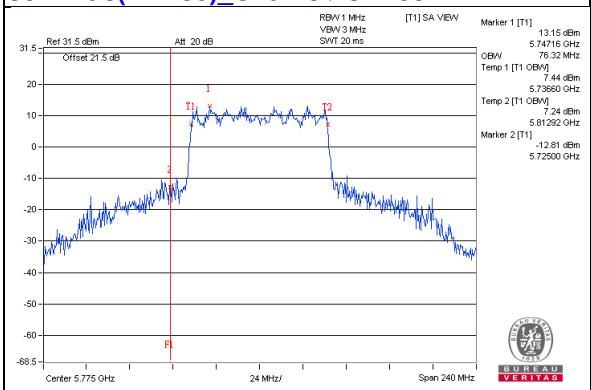
802.11ac(VHT80)_Chain1 / CH155



802.11ac(VHT80)_Chain2 / CH155



802.11ac(VHT80)_Chain3 / CH155

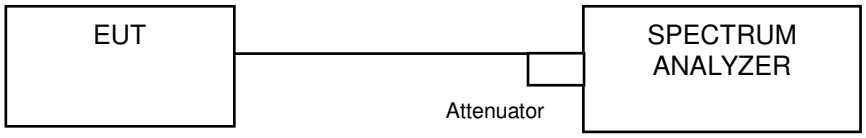


4.5 Peak Power Spectral Density Measurement

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

For U-NII-1:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
36	5180	6.48	5.49	7.10	0.18	11.36	11.94	Pass
40	5200	7.42	6.99	5.52	0.18	11.67	11.94	Pass
48	5240	7.54	6.45	5.97	0.18	11.65	11.94	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[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 17-(11.06-6) = 11.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
36	5180	6.90	6.36	6.61	0.19	11.59	11.94	Pass
40	5200	6.55	6.23	7.00	0.19	11.57	11.94	Pass
48	5240	6.58	6.17	6.97	0.19	11.55	11.94	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[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 17-(11.06-6) = 11.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

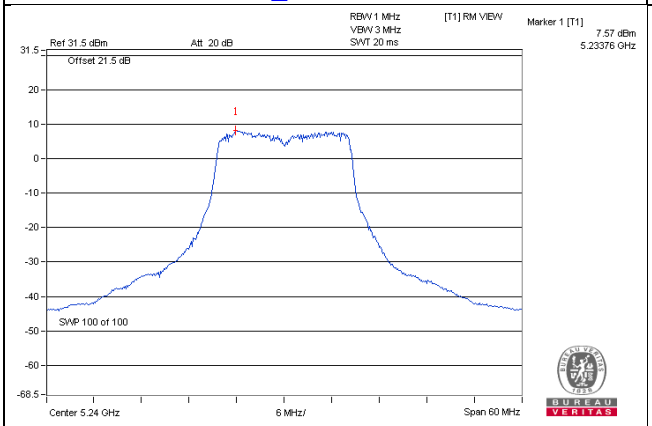
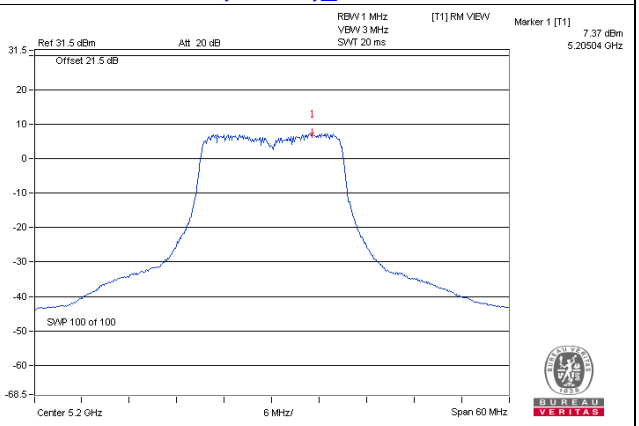
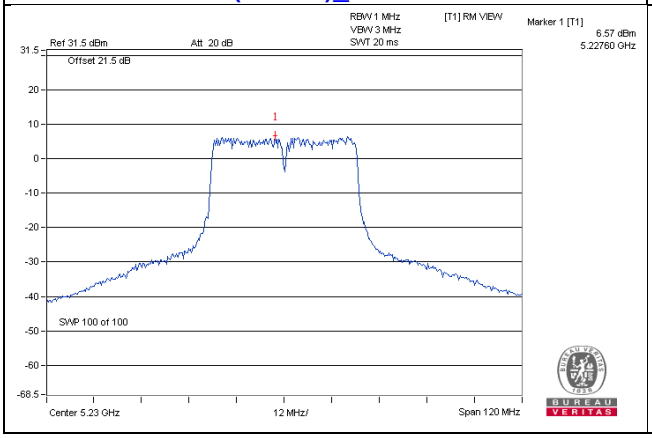
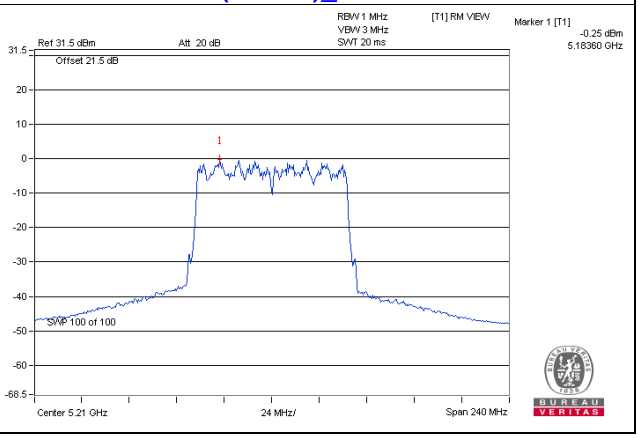
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
38	5190	-1.52	-0.62	-0.31	0.40	4.39	11.94	Pass
46	5230	6.29	6.57	5.64	0.40	11.36	11.94	Pass

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[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 17-(11.06-6) = 11.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)			Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3				
42	5210	-0.85	0.52	-0.43	0.67	5.23	11.94	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[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 17-(11.06-6) = 11.94dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH48	**802.11ac (VHT20)_Chain 3 / CH40**
	
802.11ac (VHT40)_Chain 2 / CH46	**802.11ac (VHT80)_Chain 3 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
1	149	5745	-0.30	1.92	4.77	0.18	6.87	24.94	Pass
	157	5785	-0.21	2.01	4.77	0.18	6.96	24.94	Pass
	165	5825	-1.16	1.06	4.77	0.18	6.01	24.94	Pass
2	149	5745	3.80	6.02	4.77	0.18	10.97	24.94	Pass
	157	5785	3.53	5.75	4.77	0.18	10.70	24.94	Pass
	165	5825	3.07	5.29	4.77	0.18	10.24	24.94	Pass
3	149	5745	2.67	4.89	4.77	0.18	9.84	24.94	Pass
	157	5785	2.50	4.72	4.77	0.18	9.67	24.94	Pass
	165	5825	1.98	4.20	4.77	0.18	9.15	24.94	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 30-(11.06-6) = 24.94dBm.

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

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
1	149	5745	-0.47	1.75	4.77	0.19	6.71	24.94	Pass
	157	5785	-0.28	1.94	4.77	0.19	6.90	24.94	Pass
	165	5825	-1.15	1.07	4.77	0.19	6.03	24.94	Pass
2	149	5745	3.88	6.10	4.77	0.19	11.06	24.94	Pass
	157	5785	3.62	5.84	4.77	0.19	10.80	24.94	Pass
	165	5825	2.57	4.79	4.77	0.19	9.75	24.94	Pass
3	149	5745	2.92	5.14	4.77	0.19	10.10	24.94	Pass
	157	5785	2.64	4.86	4.77	0.19	9.82	24.94	Pass
	165	5825	0.83	3.05	4.77	0.19	8.01	24.94	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 30-(11.06-6) = 24.94dBm.

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

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
1	151	5755	-5.41	-3.19	4.77	0.40	1.98	24.94	Pass
	159	5795	-6.32	-4.10	4.77	0.40	1.07	24.94	Pass
2	151	5755	-0.68	1.54	4.77	0.40	6.71	24.94	Pass
	159	5795	-2.34	-0.12	4.77	0.40	5.05	24.94	Pass
3	151	5755	-2.21	0.01	4.77	0.40	5.18	24.94	Pass
	159	5795	-3.66	-1.44	4.77	0.40	3.73	24.94	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 30-(11.06-6) = 24.94dBm.

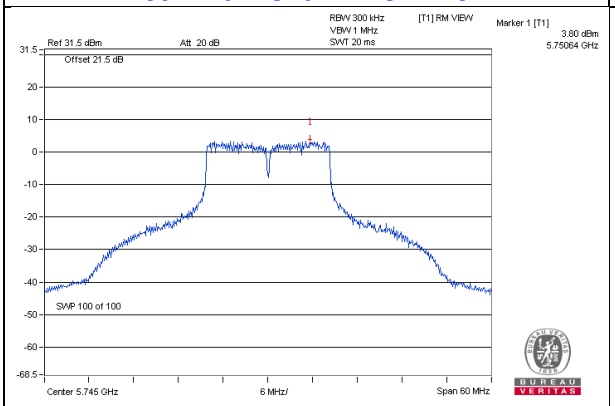
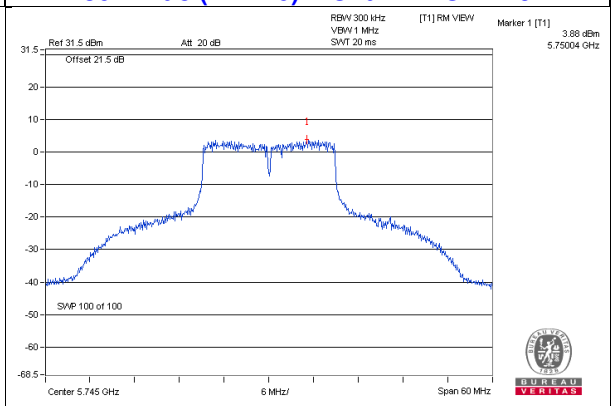
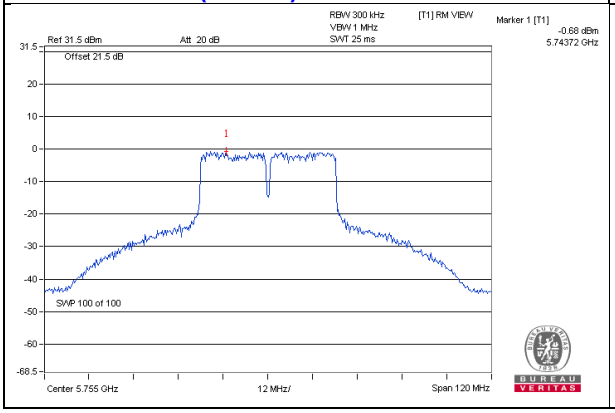
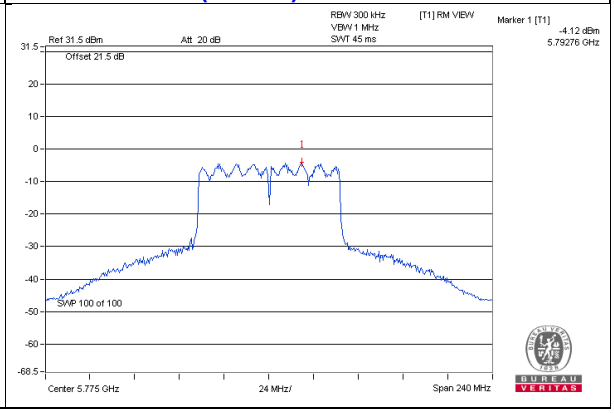
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
1	155	5775	-4.62	-2.40	4.77	0.67	3.04	24.94	Pass
2	155	5775	-4.12	-1.90	4.77	0.67	3.54	24.94	Pass
3	155	5775	-4.73	-2.51	4.77	0.67	2.93	24.94	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 11.06dBi > 6dBi , so the power density limit shall be reduced to 30-(11.06-6) = 24.94dBm.

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

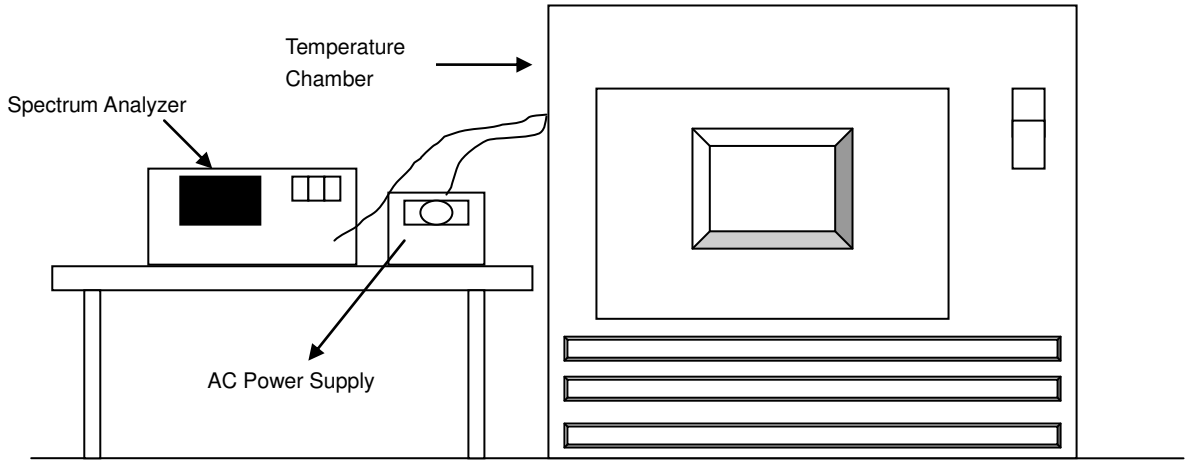
Spectrum Plot of Worst Value	
802.11a – Chain 2: CH 149	**802.11ac (VHT20) – Chain 2: CH 149**
	
802.11ac (VHT40) – Chain 2: CH 151	**802.11ac (VHT80) – Chain 2: CH 155**
	

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	5180	Pass	5180.0028	Pass	5180	Pass	5180	Pass
40	120	5179.9771	Pass	5179.9767	Pass	5179.9757	Pass	5179.9751	Pass
30	120	5180.0199	Pass	5180.0174	Pass	5180.017	Pass	5180.0215	Pass
20	120	5180.0252	Pass	5180.0225	Pass	5180.0237	Pass	5180.022	Pass
10	120	5180.015	Pass	5180.0188	Pass	5180.016	Pass	5180.0177	Pass
0	120	5179.9856	Pass	5179.9878	Pass	5179.986	Pass	5179.9868	Pass
-10	120	5180.0172	Pass	5180.0169	Pass	5180.0174	Pass	5180.0178	Pass
-20	120	5180.0103	Pass	5180.0148	Pass	5180.0137	Pass	5180.0136	Pass
-30	120	5179.996	Pass	5179.9993	Pass	5179.998	Pass	5179.9957	Pass

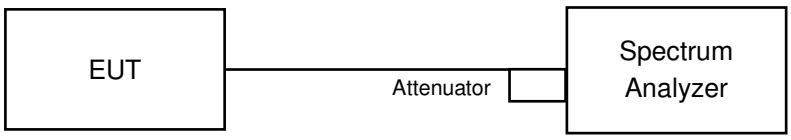
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0259	Pass	5180.0234	Pass	5180.024	Pass	5180.0215	Pass
	120	5180.0252	Pass	5180.0225	Pass	5180.0237	Pass	5180.022	Pass
	102	5180.0248	Pass	5180.0231	Pass	5180.0245	Pass	5180.0221	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

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3		
149	5745	16.38	16.39	16.40	0.5	PASS
157	5785	16.42	16.39	16.41	0.5	PASS
165	5825	16.38	16.39	16.40	0.5	PASS

802.11ac (VHT20)

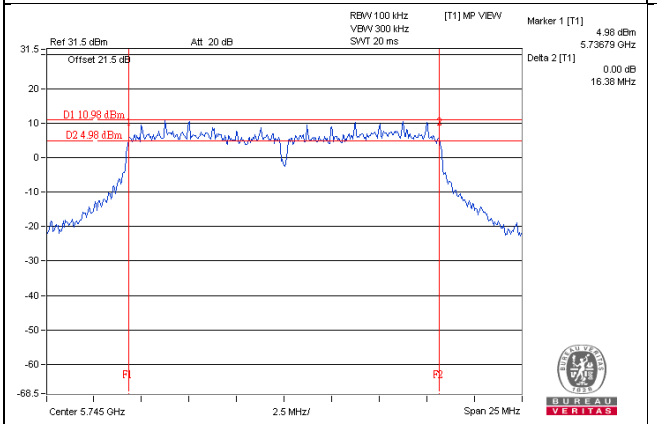
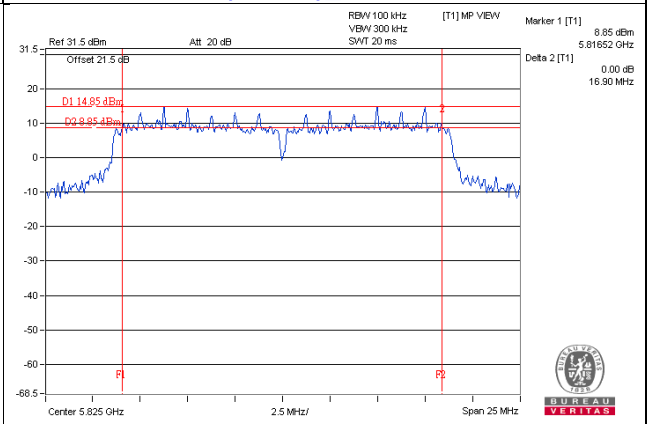
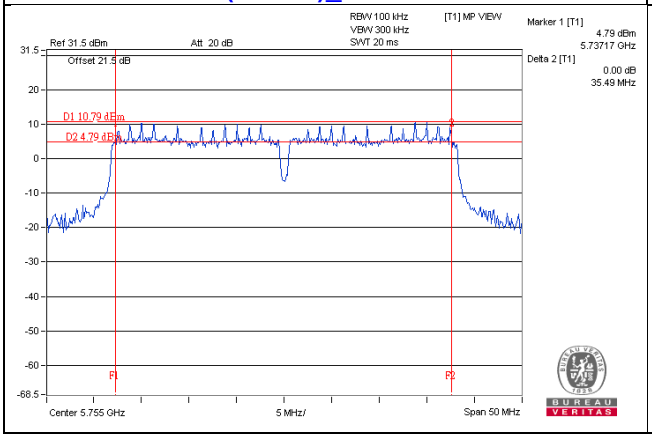
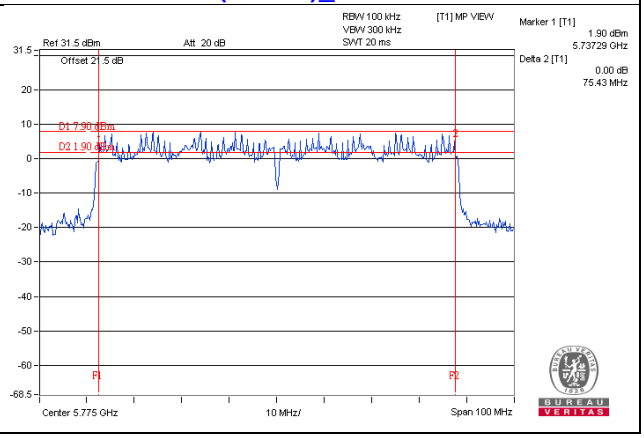
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3		
149	5745	17.60	17.61	17.62	0.5	PASS
157	5785	17.62	17.21	17.58	0.5	PASS
165	5825	17.58	16.90	17.37	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3		
151	5755	36.17	35.56	35.49	0.5	PASS
159	5795	36.44	35.51	36.41	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 1	Chain 2	Chain 3		
155	5775	75.47	75.43	75.48	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 2 / CH165**
	
802.11ac (VHT40)_Chain 3 / CH151	**802.11ac (VHT80)_Chain 2 / CH155**
	

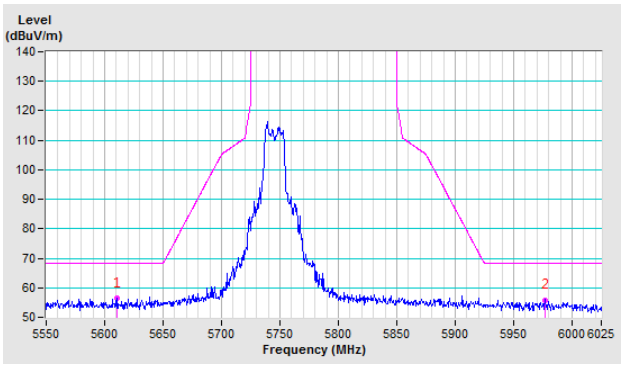
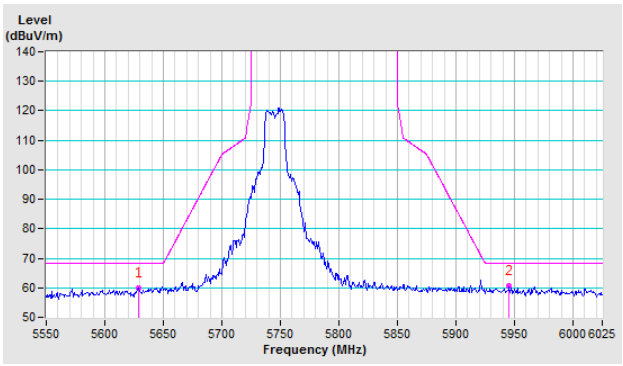
5 Pictures of Test Arrangements

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

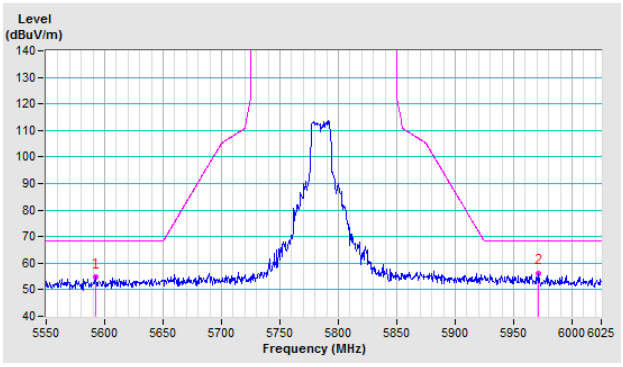
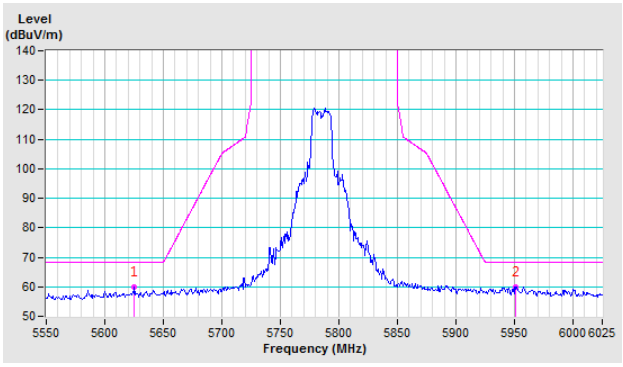
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

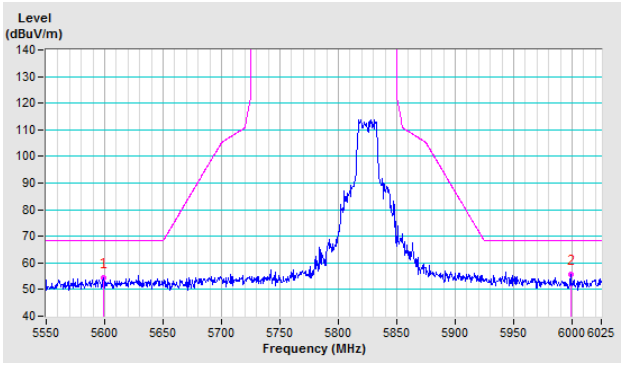
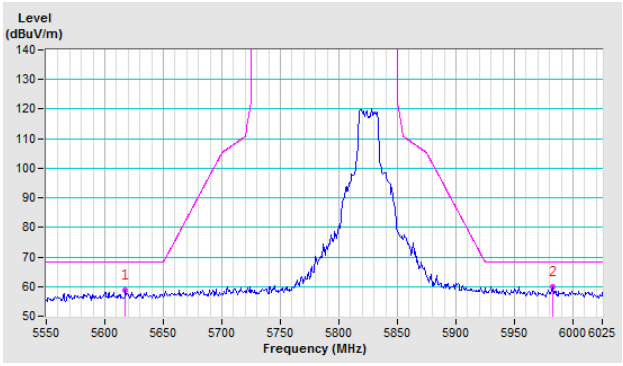
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

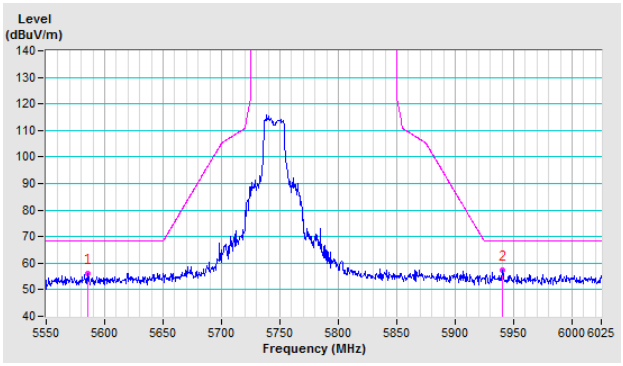
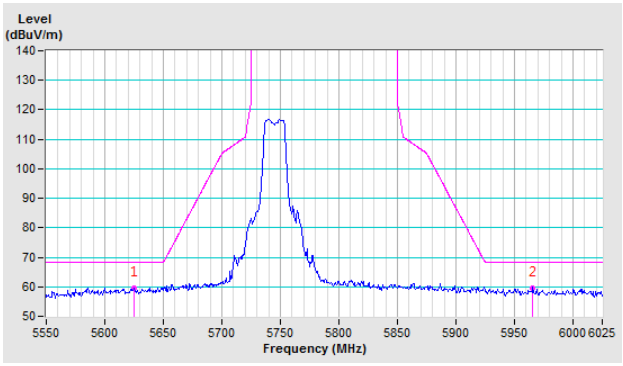
Horizontal	Vertical
	

CH 165 5825 MHz

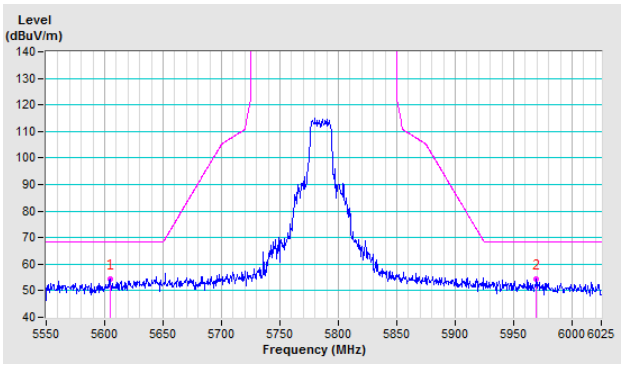
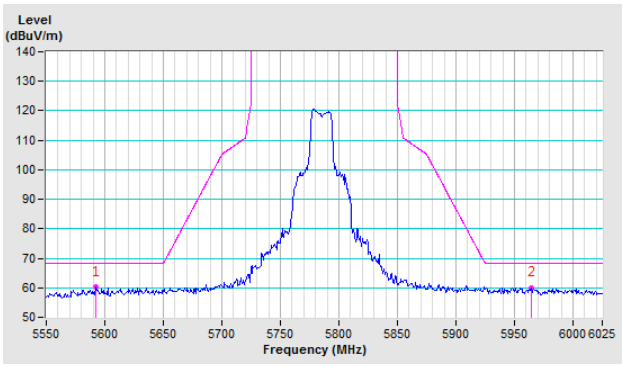
Horizontal	Vertical
	

802.11ac (VHT20)

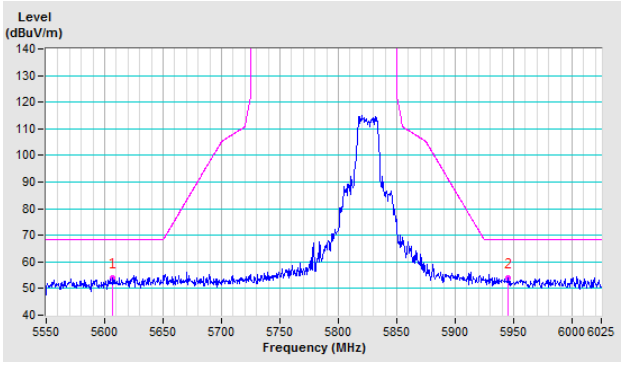
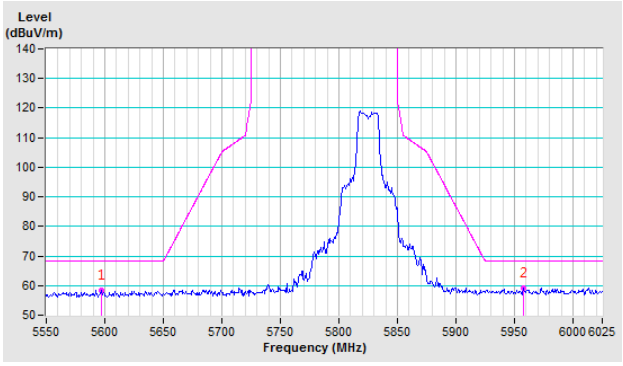
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

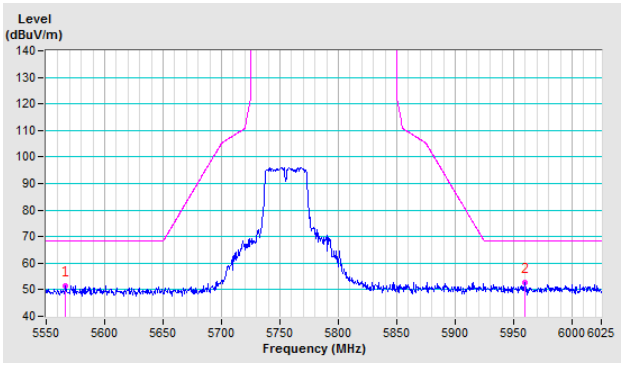
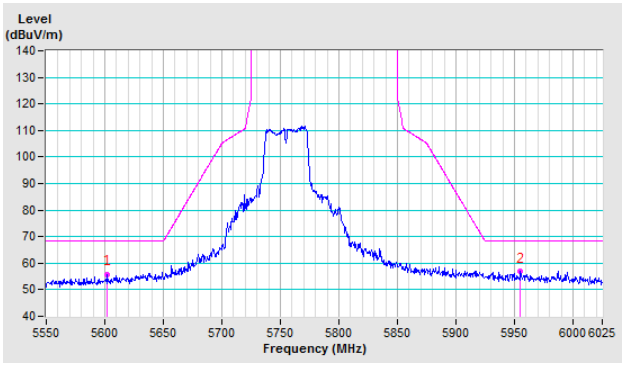
Horizontal	Vertical
	

CH 165 5825 MHz

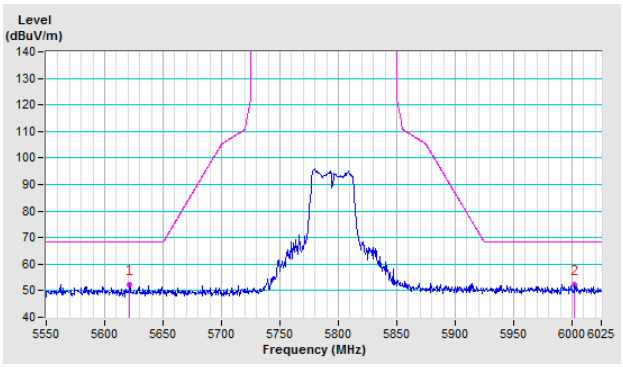
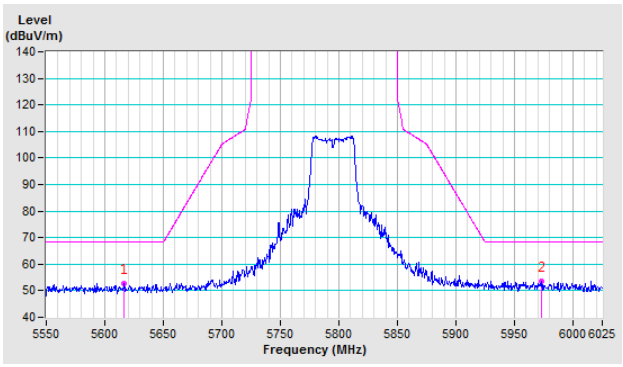
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

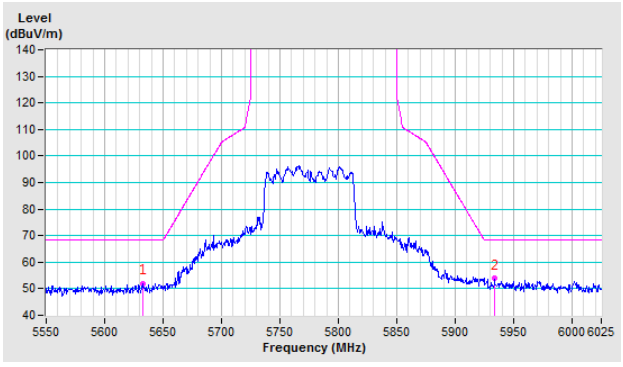
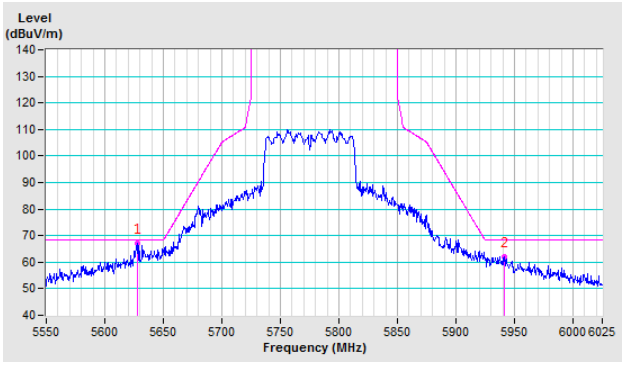
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are 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 ---