FCC Test Report

Report No.:	RF150420E01A-1
FCC ID:	VW3FAST3486
Test Model:	F@ST 3486
S/N:	Test sample only
P/N:	253641590
Received Date:	Aug. 03, 2016
Test Date:	Aug. 05 to 15, 2016
Issued Date:	Sep.01, 2016
Applicant:	SAGEMCOM BROADBAND SAS
Address:	250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE
Manufacturer:	SAGEMCOM BROADBAND SAS
Address:	250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF150420E01A-1	Original release.	Sep.01, 2016

1 Certificate of Conformity

Product:	Cable Gateway
Brand:	SAGEMCOM
Test Model:	F@ST 3486
S/N:	Test sample only
P/N:	253641590
Sample Status:	ENGINEERING SAMPLE
Applicant:	SAGEMCOM BROADBAND SAS
Test Date:	Aug. 05 to 15, 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:** Sep.01, 2016

Wendy Wu / Specialist

Approved by : _____ , **Date:** Sep.01, 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 -17.00dB at 3.39844MHz.
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 5600.82MHz, 5932.85MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.37 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 dB
	18GHz ~ 40GHz	4.11 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Cable Gateway
Brand	SAGEMCOM
Test Model	F@ST 3486
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
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	**For 15.247:** 2.412 ~ 2.462GHz **For 15.407** 5.18 ~ 5.24GHz and 5.745 ~ 5.825GHz
Number of Channel	**For 15.247** 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 15.407** 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
Output Power	**5.18 ~ 5.24GHz** **CDD Mode** 528.52mW **Beamforming Mode:** 185.281mW **5.745 ~ 5.825GHz** **CDD Mode** 509.491mW **Beamforming Mode:** 509.491mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC Class II permissive change. The difference compared with the Report No.: RF150420E01-1 are as below information:
   - ◆ Upgrade the standard to section 15.407 under new rule (16-24).
   - ◆ Added a new adapter as the following table:

Original				
No.	Brand	Model No.	Spec.	Remark
1	SAGEMCOM	NBS30B120250VU	AC Input: 100-120V, 0.9A, 60Hz DC Output: 12V, 2.5A DC output cable: Unshielded, 2.0m, without core	Level V
Newly				
No.	Brand	Model No.	Spec.	Remark
2	SAGEMCOM	NBS30E120250VU	AC Input: 100-120V, 0.9A, 60Hz DC Output: 12V, 2.5A DC output cable: Unshielded, 2.0m, without core	Level VI
From the above adapters, the worst spurious emissions test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.				

2. For U-NII-1 Band: There is no increase in authorized power level, so RF test data refer to the original test report (RF150420E01-1)
3. According to above conditions, all test items of U-NII-3 band need to be performed. And all data was verified to meet the requirements.
4. 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.		

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

2.4GHz Band								
Antenna No.	PCB Chain No.	Brand	Model	Ant. Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connecter Type	Cable Length (mm)
E	0	wanshih	NA	2.0979	2.4~2.4835	PIFA	None (like solder)	NA
B	1	wanshih	NA	2.9762	2.4~2.4835	PCB	i-pex(MHF)	160
F	2	wanshih	NA	2.51	2.4~2.4835	PIFA	None (like solder)	NA
5GHz Band								
Antenna No.	PCB Chain No.	Brand	Model	Ant. Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connecter Type	Cable Length (mm)
C	0	wanshih	NA	3.81	5.15~5.85	PIFA	None (like solder)	NA
D	1	wanshih	NA	3.92	5.15~5.85	PIFA	None (like solder)	NA
A	2	wanshih	NA	3.8509	5.15~5.85	PCB	i-pex(MHF)	75

6. The EUT incorporates a MIMO function.

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

Note: 1. For 2.4GHz band and 5GHz band (802.11a), the EUT doesn't support beamforming mode.
2. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

7. 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 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	
-	√	√	√	√	-

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**.

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

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

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

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

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

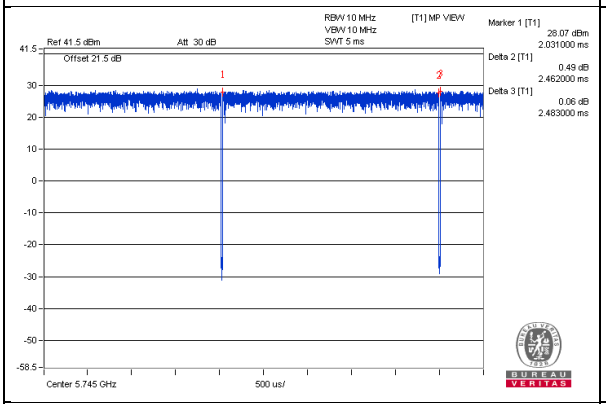
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 70%RH	120Vac, 60Hz	Weiwei Lo
RE<1G	25deg. C, 70%RH	120Vac, 60Hz	Weiwei Lo
PLC	26deg. C, 60%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 66%RH	120Vac, 60Hz	Anderson Chen

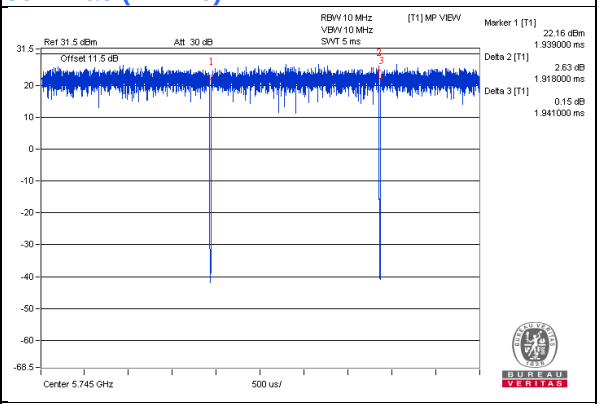
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11a: Duty cycle = 2.462 ms/2.483 ms = 0.992
802.11ac (VHT20): Duty cycle = 1.918 ms/1.941 ms= 0.988
802.11ac (VHT40): Duty cycle = 0.947 ms/0.963 ms= 0.983
802.11ac (VHT80): Duty cycle = 0.463 ms/0.479 ms= 0.967, Duty factor = 10 * log(1/0.967) = 0.15

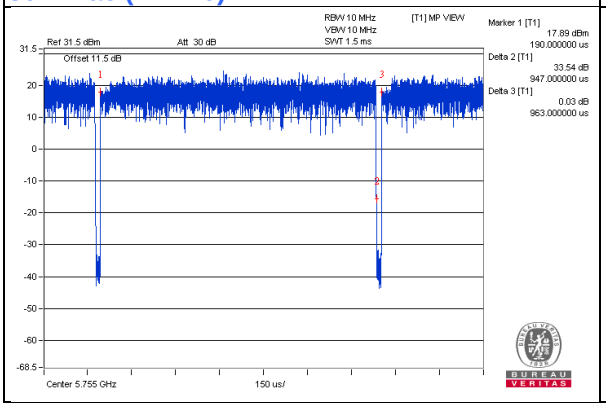
802.11a



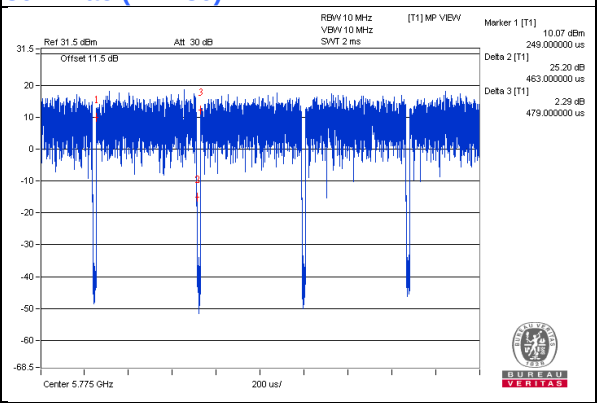
802.11ac (VHT20)



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.

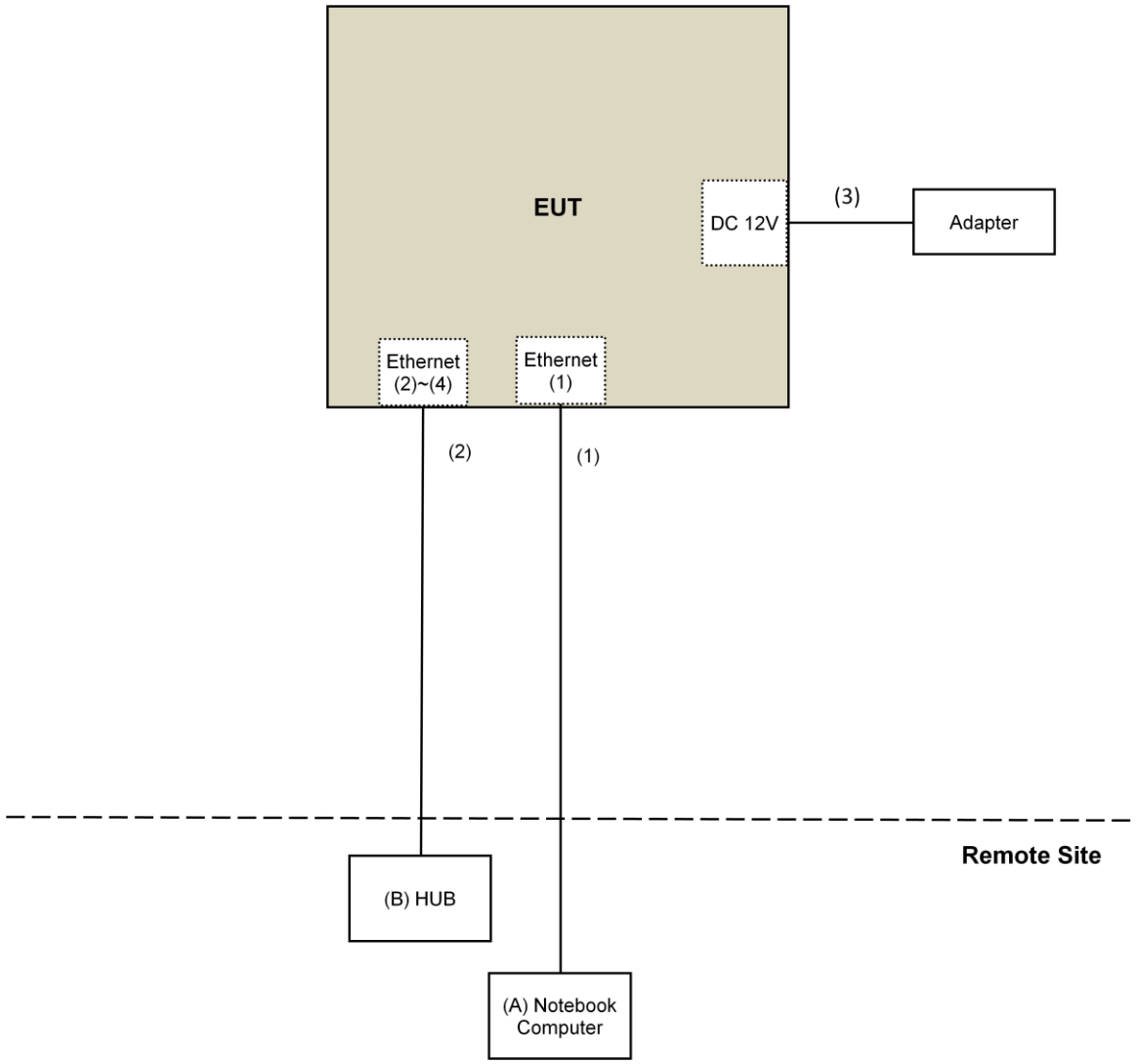
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook Computer	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules 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 v01r02</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) *1
PK:10 (dBm/MHz) *2
PK:15.6 (dBm/MHz) *3
PK:27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK:105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK:122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="4">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210105	July 06, 2016	July 05, 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-03	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D-FB	CHGCAB-001-1 CHGCAB-001-2	Oct. 03, 2015	Oct. 02, 2016
	RF-141	CHGCAB-004	Oct. 03, 2015	Oct. 02, 2016
Horn_Antenna FT-RF	HA-07M18G-NF	0000320091110	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A02578	June 22, 2016	June 21, 2017
RF Cable	NA	131205 131216 131217 SNMY23684/4	Jan. 15, 2016	Jan. 14, 2017
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 25, 2015	Nov. 24, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 11, 2015	Dec. 10, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Jan. 18, 2016	Jan. 17, 2017
RF Cable	SUCOFLEX 102	36442/2 36434/2	Dec. 10, 2015	Dec.09, 2016
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	CM100	NA	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-WD01	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2015	Nov. 09, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Loop antenna was used for all emissions below 30 MHz.
8. Tested Date: Aug. 05 to 15, 2016

4.1.3 Test Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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:

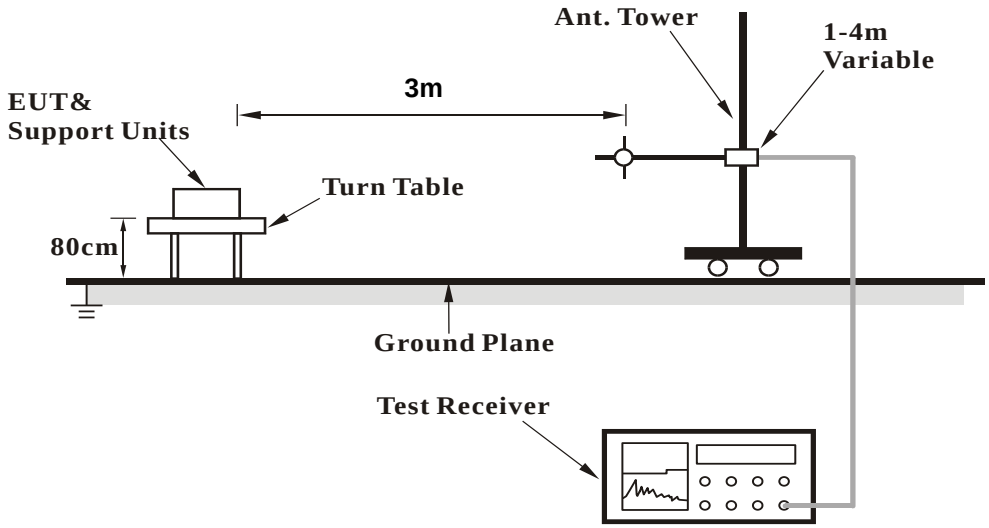
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

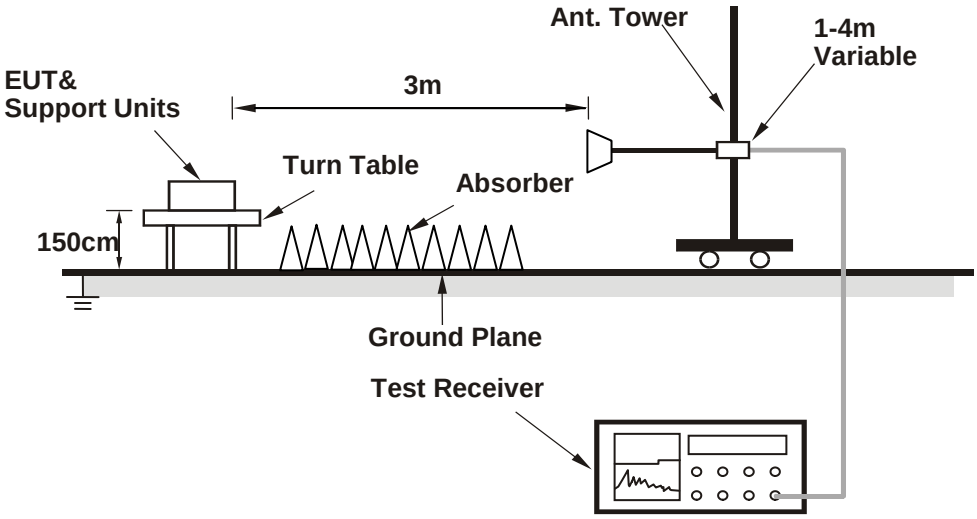
No deviation.

4.1.5 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Condition

1. Connect the EUT with the Notebook Computer which is placed on remote site.
2. Controlling software (MTool 2.0.1.0) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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	#5587.52	64.2 PK	68.2	-4.0	1.50 H	212	52.8	11.4
2	*5745.00	114.9 PK			1.50 H	212	103.2	11.7
3	*5745.00	104.1 AV			1.50 H	212	92.4	11.7
4	#5987.48	57.6 PK	68.2	-10.6	1.50 H	212	44.7	12.9
5	11490.00	51.9 PK	74.0	-22.1	1.93 H	177	34.0	17.9
6	11490.00	40.6 AV	54.0	-13.4	1.93 H	177	22.7	17.9
7	#17235.00	60.5 PK	74.0	-13.5	1.54 H	356	33.3	27.2
8	#17235.00	48.8 AV	54.0	-5.2	1.54 H	356	21.6	27.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5582.77	67.8 PK	68.2	-0.4	1.85 V	17	56.4	11.4
2	*5745.00	117.2 PK			1.85 V	17	105.5	11.7
3	*5745.00	106.2 AV			1.85 V	17	94.5	11.7
4	#5979.40	58.3 PK	68.2	-9.9	1.85 V	17	45.5	12.8
5	11490.00	52.9 PK	74.0	-21.1	1.58 V	262	35.0	17.9
6	11490.00	41.2 AV	54.0	-12.8	1.58 V	262	23.3	17.9
7	#17235.00	60.2 PK	74.0	-13.8	1.63 V	5	33.0	27.2
8	#17235.00	48.7 AV	54.0	-5.3	1.63 V	5	21.5	27.2

REMARKS:

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

CHANNEL	TX Channel 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	#5626.95	62.8 PK	68.2	-5.4	1.33 H	212	51.4	11.4
2	*5785.00	114.6 PK			1.33 H	212	102.7	11.9
3	*5785.00	103.8 AV			1.33 H	212	91.9	11.9
4	#5940.45	61.5 PK	68.2	-6.7	1.33 H	212	49.1	12.4
5	11570.00	52.0 PK	74.0	-22.0	1.85 H	145	34.0	18.0
6	11570.00	40.8 AV	54.0	-13.2	1.85 H	145	22.8	18.0
7	#17355.00	60.4 PK	74.0	-13.6	1.53 H	360	33.1	27.3
8	#17355.00	48.5 AV	54.0	-5.5	1.53 H	360	21.2	27.3
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	#5623.15	64.8 PK	68.2	-3.4	1.98 V	175	53.4	11.4
2	*5785.00	117.3 PK			1.98 V	175	105.4	11.9
3	*5785.00	106.3 AV			1.98 V	175	94.4	11.9
4	#5942.82	65.3 PK	68.2	-2.9	1.98 V	175	52.8	12.5
5	11570.00	53.4 PK	74.0	-20.6	1.58 V	266	35.4	18.0
6	11570.00	41.7 AV	54.0	-12.3	1.58 V	266	23.7	18.0
7	#17355.00	60.7 PK	74.0	-13.3	1.63 V	18	33.4	27.3
8	#17355.00	49.7 AV	54.0	-4.3	1.63 V	18	22.4	27.3

REMARKS:

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

CHANNEL	TX Channel 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	#5582.77	59.0 PK	68.2	-9.2	1.41 H	213	47.6	11.4
2	*5825.00	114.8 PK			1.41 H	213	102.9	11.9
3	*5825.00	104.0 AV			1.41 H	213	92.1	11.9
4	#5987.00	62.0 PK	68.2	-6.2	1.41 H	213	49.1	12.9
5	11650.00	52.6 PK	74.0	-21.4	1.77 H	174	34.6	18.0
6	11650.00	41.3 AV	54.0	-12.7	1.77 H	174	23.3	18.0
7	#17475.00	59.3 PK	74.0	-14.7	1.42 H	355	31.5	27.8
8	#17475.00	47.9 AV	54.0	-6.1	1.42 H	355	20.1	27.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.62	60.1 PK	68.2	-8.1	1.96 V	176	48.7	11.4
2	*5825.00	117.1 PK			1.96 V	176	105.2	11.9
3	*5825.00	106.2 AV			1.96 V	176	94.3	11.9
4	#5989.85	65.8 PK	68.2	-2.4	1.96 V	176	52.9	12.9
5	11650.00	52.0 PK	74.0	-22.0	1.53 V	273	34.0	18.0
6	11650.00	40.9 AV	54.0	-13.1	1.53 V	273	22.9	18.0
7	#17475.00	60.0 PK	74.0	-14.0	1.55 V	13	32.2	27.8
8	#17475.00	48.7 AV	54.0	-5.3	1.55 V	13	20.9	27.8

REMARKS:

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

802.11ac (VHT20)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5584.20	65.5 PK	68.2	-2.7	1.84 H	206	54.1	11.4
2	*5745.00	118.6 PK			1.84 H	206	106.9	11.7
3	*5745.00	108.1 AV			1.84 H	206	96.4	11.7
4	#5983.68	64.5 PK	68.2	-3.7	1.84 H	206	51.7	12.8
5	11490.00	53.5 PK	74.0	-20.5	1.84 H	145	35.6	17.9
6	11490.00	41.9 AV	54.0	-12.1	1.84 H	145	24.0	17.9
7	#17235.00	60.0 PK	74.0	-14.0	1.46 H	360	32.8	27.2
8	#17235.00	48.5 AV	54.0	-5.5	1.46 H	360	21.3	27.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5590.85	67.9 PK	68.2	-0.3	1.70 V	168	56.5	11.4
2	*5745.00	118.9 PK			1.70 V	168	107.2	11.7
3	*5745.00	109.0 AV			1.70 V	168	97.3	11.7
4	#5956.60	65.7 PK	68.2	-2.5	1.70 V	168	53.1	12.6
5	11490.00	51.6 PK	74.0	-22.4	1.60 V	267	33.7	17.9
6	11490.00	40.6 AV	54.0	-13.4	1.60 V	267	22.7	17.9
7	#17235.00	59.6 PK	74.0	-14.4	1.60 V	16	32.4	27.2
8	#17235.00	48.5 AV	54.0	-5.5	1.60 V	16	21.3	27.2

REMARKS:

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

CHANNEL	TX Channel 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	#5619.35	65.5 PK	68.2	-2.7	1.74 H	204	54.2	11.3
2	*5785.00	118.2 PK			1.74 H	204	106.3	11.9
3	*5785.00	107.4 AV			1.74 H	204	95.5	11.9
4	#5942.82	66.8 PK	68.2	-1.4	1.74 H	204	54.3	12.5
5	11570.00	52.6 PK	74.0	-21.4	1.86 H	174	34.6	18.0
6	11570.00	41.4 AV	54.0	-12.6	1.86 H	174	23.4	18.0
7	#17355.00	59.2 PK	74.0	-14.8	1.47 H	343	31.9	27.3
8	#17355.00	48.1 AV	54.0	-5.9	1.47 H	343	20.8	27.3
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	#5620.30	67.5 PK	68.2	-0.7	1.75 V	171	56.1	11.4
2	*5785.00	118.3 PK			1.75 V	171	106.4	11.9
3	*5785.00	108.0 AV			1.75 V	171	96.1	11.9
4	#5952.32	68.0 PK	68.2	-0.2	1.75 V	171	55.5	12.5
5	11570.00	51.8 PK	74.0	-22.2	1.50 V	273	33.8	18.0
6	11570.00	40.8 AV	54.0	-13.2	1.50 V	273	22.8	18.0
7	#17355.00	59.8 PK	74.0	-14.2	1.59 V	6	32.5	27.3
8	#17355.00	48.3 AV	54.0	-5.7	1.59 V	6	21.0	27.3

REMARKS:

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

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5583.25	62.6 PK	68.2	-5.6	1.73 H	205	51.2	11.4
2	*5825.00	117.2 PK			1.73 H	205	105.3	11.9
3	*5825.00	107.4 AV			1.73 H	205	95.5	11.9
4	#5993.65	67.5 PK	68.2	-0.7	1.73 H	205	54.5	13.0
5	11650.00	52.6 PK	74.0	-21.4	1.85 H	162	34.6	18.0
6	11650.00	41.4 AV	54.0	-12.6	1.85 H	162	23.4	18.0
7	#17475.00	59.7 PK	74.0	-14.3	1.43 H	360	31.9	27.8
8	#17475.00	48.3 AV	54.0	-5.7	1.43 H	360	20.5	27.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5588.00	63.6 PK	68.2	-4.6	1.70 V	165	52.2	11.4
2	*5825.00	117.7 PK			1.70 V	165	105.8	11.9
3	*5825.00	107.9 AV			1.70 V	165	96.0	11.9
4	#5992.70	67.7 PK	68.2	-0.5	1.70 V	165	54.7	13.0
5	11650.00	51.6 PK	74.0	-22.4	1.59 V	274	33.6	18.0
6	11650.00	40.6 AV	54.0	-13.4	1.59 V	274	22.6	18.0
7	#17475.00	60.0 PK	74.0	-14.0	1.58 V	20	32.2	27.8
8	#17475.00	49.0 AV	54.0	-5.0	1.58 V	20	21.2	27.8

REMARKS:

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

802.11ac (VHT40)

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	#5589.43	64.9 PK	68.2	-3.3	1.71 H	206	53.5	11.4
2	*5755.00	116.4 PK			1.71 H	206	104.7	11.7
3	*5755.00	108.6 AV			1.71 H	206	96.9	11.7
4	#5923.35	67.4 PK	69.4	-2.0	1.71 H	206	55.0	12.4
5	11510.00	52.9 PK	74.0	-21.1	1.78 H	147	35.0	17.9
6	11510.00	41.6 AV	54.0	-12.4	1.78 H	147	23.7	17.9
7	#17265.00	59.8 PK	74.0	-14.2	1.52 H	355	32.5	27.3
8	#17265.00	48.5 AV	54.0	-5.5	1.52 H	355	21.2	27.3
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	**#5600.82**	**68.1 PK**	**68.2**	**-0.1**	**1.67 V**	**166**	**56.7**	**11.4**
2	*5755.00	118.9 PK			1.67 V	166	107.2	11.7
3	*5755.00	109.8 AV			1.67 V	166	98.1	11.7
4	**#5932.85**	**68.1 PK**	**68.2**	**-0.1**	**1.67 V**	**166**	**55.7**	**12.4**
5	11510.00	52.5 PK	74.0	-21.5	1.58 V	279	34.6	17.9
6	11510.00	41.1 AV	54.0	-12.9	1.58 V	279	23.2	17.9
7	#17265.00	59.9 PK	74.0	-14.1	1.56 V	5	32.6	27.3
8	#17265.00	48.5 AV	54.0	-5.5	1.56 V	5	21.2	27.3

REMARKS:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5629.32	65.7 PK	68.2	-2.5	1.66 H	205	54.4	11.3
2	*5795.00	116.4 PK			1.66 H	205	104.5	11.9
3	*5795.00	108.5 AV			1.66 H	205	96.6	11.9
4	#5938.55	67.2 PK	68.2	-1.0	1.66 H	205	54.8	12.4
5	11590.00	52.4 PK	74.0	-21.6	1.81 H	173	34.4	18.0
6	11590.00	40.9 AV	54.0	-13.1	1.81 H	173	22.9	18.0
7	#17385.00	59.3 PK	74.0	-14.7	1.42 H	344	31.9	27.4
8	#17385.00	47.9 AV	54.0	-6.1	1.42 H	344	20.5	27.4
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	#5638.35	67.0 PK	68.2	-1.2	1.65 V	165	55.7	11.3
2	*5795.00	117.4 PK			1.65 V	165	105.5	11.9
3	*5795.00	109.2 AV			1.65 V	165	97.3	11.9
4	#5957.55	68.0 PK	68.2	-0.2	1.65 V	165	55.4	12.6
5	11590.00	52.6 PK	74.0	-21.4	1.53 V	270	34.6	18.0
6	11590.00	41.1 AV	54.0	-12.9	1.53 V	270	23.1	18.0
7	#17385.00	60.1 PK	74.0	-13.9	1.60 V	15	32.7	27.4
8	#17385.00	49.2 AV	54.0	-4.8	1.60 V	15	21.8	27.4

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.

802.11ac (VHT80)

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	#5648.80	66.1 PK	68.2	-2.1	1.79 H	203	54.8	11.3
2	*5775.00	111.2 PK			1.79 H	203	99.4	11.8
3	*5775.00	103.2 AV			1.79 H	203	91.4	11.8
4	#5942.82	66.4 PK	68.2	-1.8	1.79 H	203	53.9	12.5
5	11550.00	52.6 PK	74.0	-21.4	1.85 H	173	34.6	18.0
6	11550.00	41.2 AV	54.0	-12.8	1.85 H	173	23.2	18.0
7	#17325.00	59.5 PK	74.0	-14.5	1.40 H	344	32.2	27.3
8	#17325.00	48.4 AV	54.0	-5.6	1.40 H	344	21.1	27.3
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	#5647.85	67.8 PK	68.2	-0.4	1.73 V	165	56.5	11.3
2	*5775.00	112.6 PK			1.73 V	165	100.8	11.8
3	*5775.00	104.2 AV			1.73 V	165	92.4	11.8
4	#5928.10	66.4 PK	68.2	-1.8	1.73 V	165	54.0	12.4
5	11550.00	51.9 PK	74.0	-22.1	1.57 V	270	33.9	18.0
6	11550.00	40.9 AV	54.0	-13.1	1.57 V	270	22.9	18.0
7	#17325.00	60.4 PK	74.0	-13.6	1.59 V	20	33.1	27.3
8	#17325.00	49.1 AV	54.0	-4.9	1.59 V	20	21.8	27.3

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 (VHT40)

CHANNEL	TX Channel 151	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	199.99	37.0 QP	43.5	-6.5	1.50 H	88	48.0	-11.0
2	250.02	35.7 QP	46.0	-10.3	1.00 H	308	44.5	-8.8
3	375.00	39.2 QP	46.0	-6.8	1.00 H	26	43.7	-4.5
4	625.00	37.5 QP	46.0	-8.5	1.50 H	360	35.8	1.7
5	799.99	38.4 QP	46.0	-7.6	1.00 H	268	34.1	4.3
6	875.02	37.4 QP	46.0	-8.6	1.50 H	39	31.9	5.5
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	86.09	33.0 QP	40.0	-7.0	2.00 V	360	46.7	-13.7
2	250.00	32.4 QP	46.0	-13.6	2.00 V	358	41.2	-8.8
3	375.00	36.6 QP	46.0	-9.4	1.00 V	338	41.1	-4.5
4	625.00	36.9 QP	46.0	-9.1	1.50 V	86	35.2	1.7
5	800.01	36.2 QP	46.0	-9.8	1.50 V	177	31.9	4.3
6	874.99	37.4 QP	46.0	-8.6	1.00 V	81	31.9	5.5

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	100375	May 09, 2016	May 08, 2017
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 01, 2015	Aug. 31, 2016
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COCCAB-001	Mar. 08, 2016	Mar. 07, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 14, 2015	Sep. 13, 2016
50 ohms Terminator	N/A	EMC-03	Sep. 23, 2015	Sep. 22, 2016
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2015	Sep. 30, 2016
Software BVADT	BVADT_Cond_ V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Aug. 08, 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.

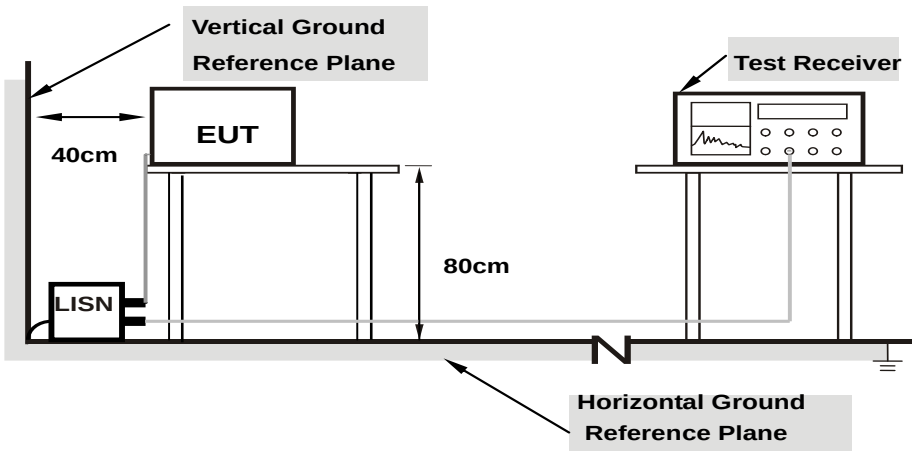
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

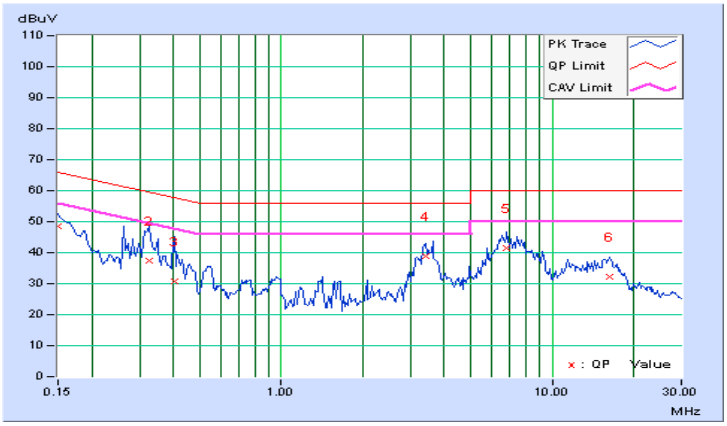
4.2.7 Test Results

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	10.32	38.08	23.98	48.40	34.30	66.00	56.00	-17.60	-21.70
2	0.32578	10.29	27.11	19.65	37.40	29.94	59.56	49.56	-22.16	-19.62
3	0.40391	10.30	20.56	6.64	30.86	16.94	57.77	47.77	-26.91	-30.83
4	**3.39844**	**10.38**	**28.62**	**16.22**	**39.00**	**26.60**	**56.00**	**46.00**	**-17.00**	**-19.40**
5	6.80859	10.48	31.13	16.96	41.61	27.44	60.00	50.00	-18.39	-22.56
6	16.27344	10.83	21.50	15.63	32.33	26.46	60.00	50.00	-27.67	-23.54

REMARKS:

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

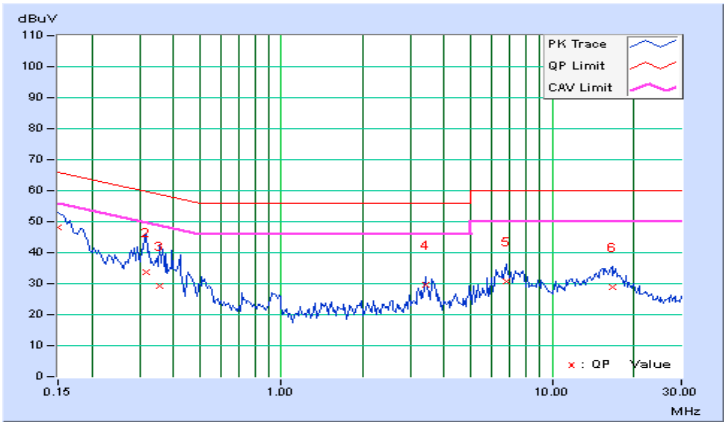


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.30	37.77	23.17	48.07	33.47	66.00	56.00	-17.93	-22.53
2	0.31797	10.27	23.42	14.72	33.69	24.99	59.76	49.76	-26.07	-24.77
3	0.35703	10.28	18.90	4.25	29.18	14.53	58.80	48.80	-29.62	-34.27
4	3.41406	10.39	19.24	7.24	29.63	17.63	56.00	46.00	-26.37	-28.37
5	6.79688	10.49	20.24	6.84	30.73	17.33	60.00	50.00	-29.27	-32.67
6	16.71875	10.87	18.07	12.18	28.94	23.05	60.00	50.00	-31.06	-26.95

REMARKS:

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



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

FOR POWER OUTPUT MEASUREMENT

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

Power Output:

802.11a

Channel	Channel Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
149	5745	468.813	26.71	30	Pass
157	5785	450.817	26.54	30	Pass
165	5825	434.51	26.38	30	Pass

CDD Mode

802.11ac (VHT20)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	21.42	21.63	21.38	421.626	26.25	30	Pass
157	5785	20.15	20.37	19.98	311.948	24.94	30	Pass
165	5825	19.98	20.16	19.82	299.234	24.76	30	Pass

802.11ac (VHT40)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	22.20	22.54	22.15	509.491	27.07	30	Pass
159	5795	22.07	22.35	22.03	492.444	26.92	30	Pass

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	19.86	20.42	20.19	311.454	24.93	30	Pass

Beamforming Mode

802.11ac (VHT20)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	21.42	21.63	21.38	421.626	26.25	27.37	Pass
157	5785	20.15	20.37	19.98	311.948	24.94	27.37	Pass
165	5825	19.98	20.16	19.82	299.234	24.76	27.37	Pass

NOTE: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + 10$^{G3/20}$)^2 / 3] = 8.63dBi > 6dBi , so the power limit shall be reduced to 30-(8.63-6)= 27.37dBm

802.11ac (VHT40)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	22.20	22.54	22.15	509.491	27.07	27.37	Pass
159	5795	22.07	22.35	22.03	492.444	26.92	27.37	Pass

NOTE: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + 10$^{G3/20}$)^2 / 3] = 8.63dBi > 6dBi , so the power limit shall be reduced to 30-(8.63-6)= 27.37dBm

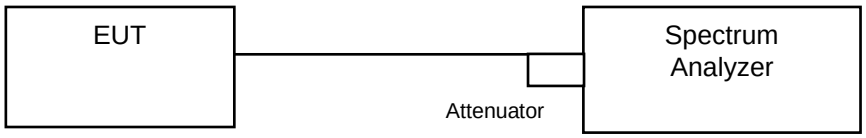
802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	Maximum Conducted Power (dBm)			Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	19.86	20.42	20.19	311.454	24.93	27.37	Pass

NOTE: Directional gain = 10 log[(10$^{G1/20}$ + 10$^{G2/20}$ + 10$^{G3/20}$)^2 / 3] = 8.63dBi > 6dBi , so the power limit shall be reduced to 30-(8.63-6)= 27.37dBm

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

CDD Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
149	5745	32.40
157	5785	33.12
165	5825	34.20

Beamforming Mode

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
149	5745	18.00	18.00	18.24
157	5785	17.88	17.88	18.00
165	5825	18.00	18.00	17.88

802.11ac (VHT40)

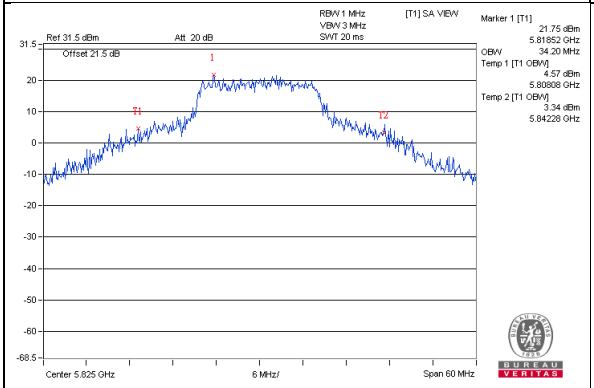
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
151	5755	37.92	37.68	38.40
159	5795	38.40	38.40	39.36

802.11ac (VHT80)

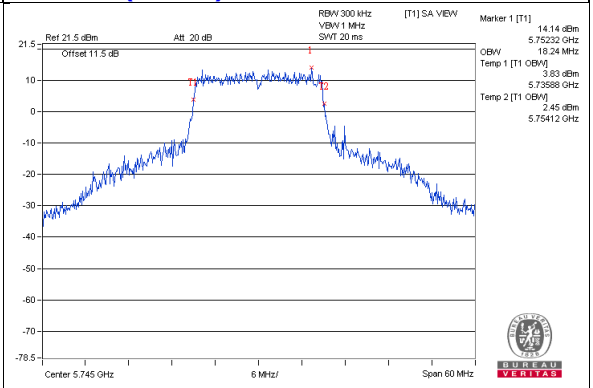
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		CHAIN 0	CHAIN 1	CHAIN 2
155	5775	75.84	75.84	75.84

Spectrum Plot of Worst Value

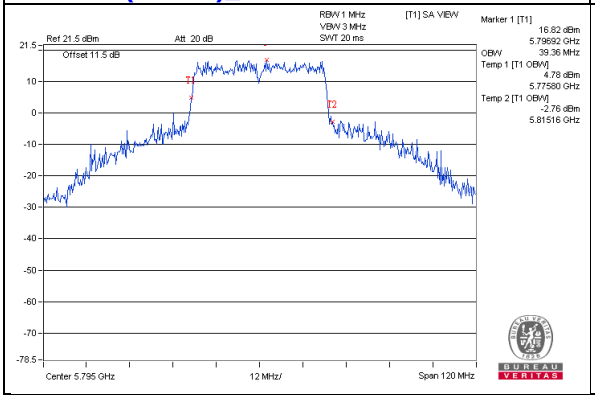
802.11a_Chain1 / CH165



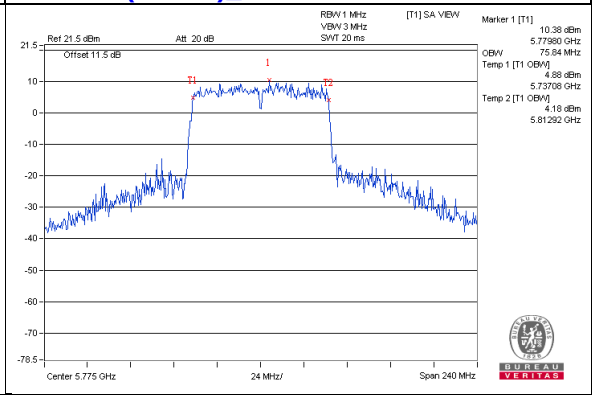
802.11ac (VHT20)_Chain2 / CH149



802.11ac (VHT40)_Chain2 / CH159



802.11ac (VHT80)_Chain0 / CH155

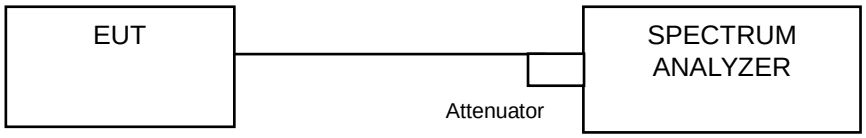


4.5 Peak Power Spectral Density Measurement

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

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

For 802.11ac (VHT80)

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

CDD Mode

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	4.65	6.87	30	Pass
157	5785	4.43	6.65	30	Pass
165	5825	4.48	6.70	30	Pass

Beamforming Mode

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	0.26	2.48	4.77	7.25	27.37	Pass
	157	5785	-0.82	1.40	4.77	6.17	27.37	Pass
	165	5825	-0.63	1.59	4.77	6.36	27.37	Pass
1	149	5745	0.70	2.92	4.77	7.69	27.37	Pass
	157	5785	-0.50	1.72	4.77	6.49	27.37	Pass
	165	5825	-0.29	1.93	4.77	6.70	27.37	Pass
2	149	5745	1.58	3.80	4.77	8.57	27.37	Pass
	157	5785	0.50	2.72	4.77	7.49	27.37	Pass
	165	5825	0.88	3.10	4.77	7.87	27.37	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 8.63dBi > 6dBi , so the power density limit shall be reduced to 30-(8.63-6)= 27.37dBm.

802.11ac (VHT40)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=3) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-2.70	-0.48	4.77	4.29	27.37	Pass
	159	5795	-2.36	-0.14	4.77	4.63	27.37	Pass
1	151	5755	-1.86	0.36	4.77	5.13	27.37	Pass
	159	5795	-1.74	0.48	4.77	5.25	27.37	Pass
2	151	5755	-0.95	1.27	4.77	6.04	27.37	Pass
	159	5795	-0.39	1.83	4.77	6.60	27.37	Pass

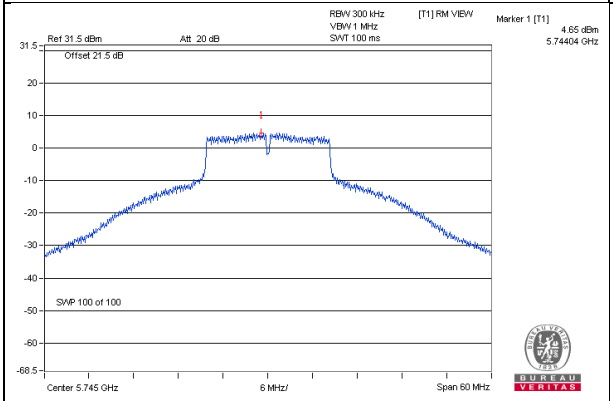
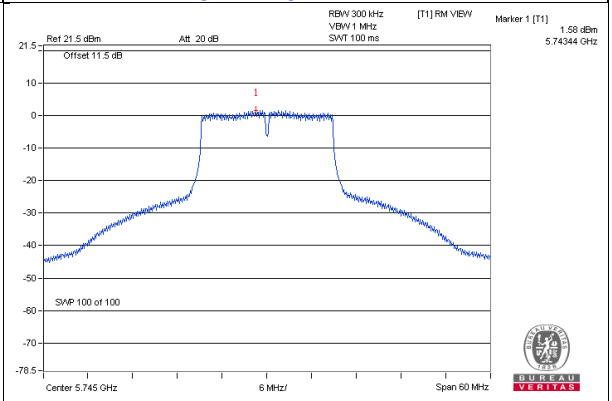
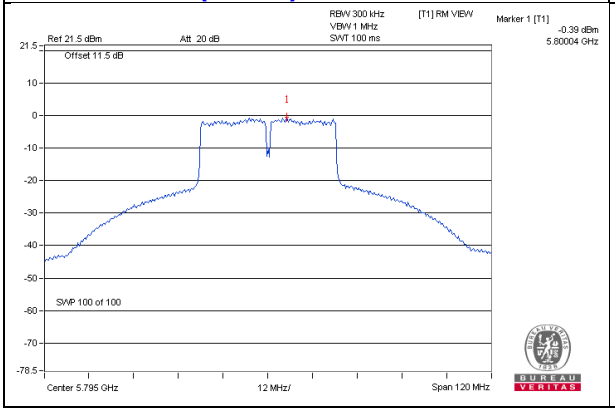
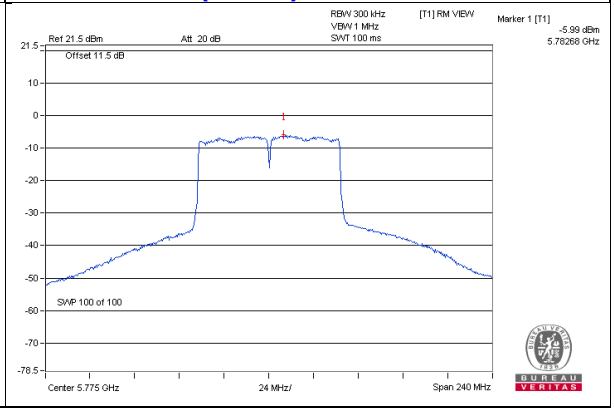
Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 8.63dBi > 6dBi , so the power density limit shall be reduced to 30-(8.63-6)= 27.37dBm.

802.11ac (VHT80)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=3) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-7.79	-5.57	4.77	0.15	-0.65	27.37	Pass
1	155	5775	-7.40	-5.18	4.77	0.15	-0.26	27.37	Pass
2	155	5775	-5.99	-3.77	4.77	0.15	1.15	27.37	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 3] = 8.63dBi > 6dBi , so the power density limit shall be reduced to 30-(8.63-6)= 27.37dBm.

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

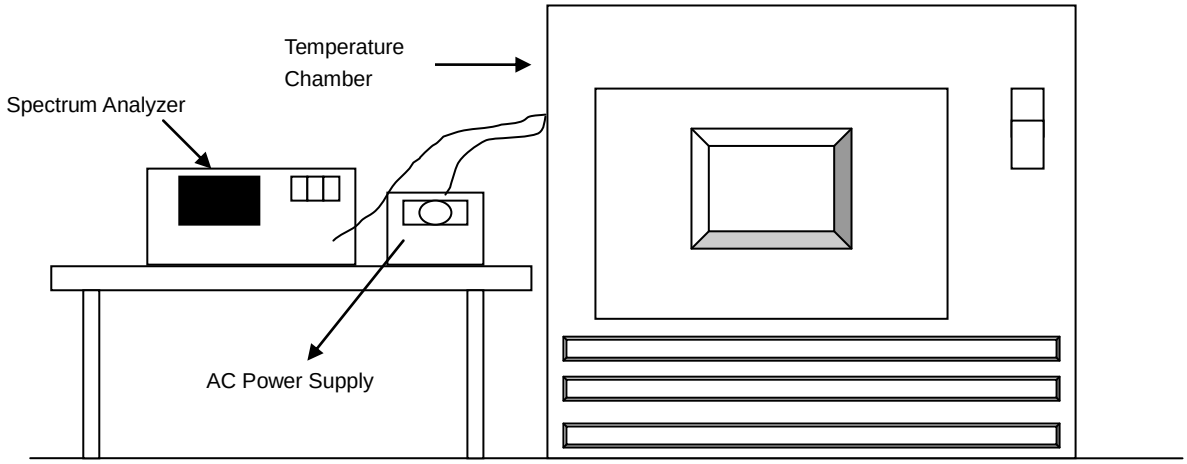
Spectrum Plot of Worst Value	
802.11a – Chain 1: CH 149	**802.11ac (VHT20) – Chain 2: CH 149**
	
802.11ac (VHT40) – Chain 2: CH 159	**802.11ac (VHT80) – Chain 2: CH 155**
	

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: 5745 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	5744.9881	Pass	5744.9888	Pass	5744.9855	Pass	5744.9859	Pass
40	120	5745.0252	Pass	5745.0292	Pass	5745.0256	Pass	5745.0277	Pass
30	120	5744.9872	Pass	5744.983	Pass	5744.9883	Pass	5744.984	Pass
20	120	5745.0163	Pass	5745.015	Pass	5745.0138	Pass	5745.0118	Pass
10	120	5745.0144	Pass	5745.0147	Pass	5745.0159	Pass	5745.0162	Pass
0	120	5744.9739	Pass	5744.9742	Pass	5744.9725	Pass	5744.9734	Pass
-10	120	5744.976	Pass	5744.9805	Pass	5744.9793	Pass	5744.9759	Pass
-20	120	5745.0249	Pass	5745.0292	Pass	5745.0265	Pass	5745.029	Pass
-30	120	5744.9788	Pass	5744.9793	Pass	5744.9794	Pass	5744.9835	Pass

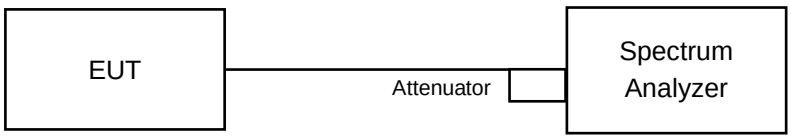
Frequency Stability Versus Voltage									
Operating Frequency: 5745 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5745.0163	Pass	5745.0156	Pass	5745.0137	Pass	5745.011	Pass
	120	5745.0163	Pass	5745.015	Pass	5745.0138	Pass	5745.0118	Pass
	102	5745.0156	Pass	5745.0156	Pass	5745.0139	Pass	5745.0121	Pass

4.7 6dB Bandwidth Measurment

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

CDD Mode

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.38	0.5	PASS
157	5785	16.38	0.5	PASS
165	5825	16.39	0.5	PASS

Beamforming Mode

802.11ac (VHT20)

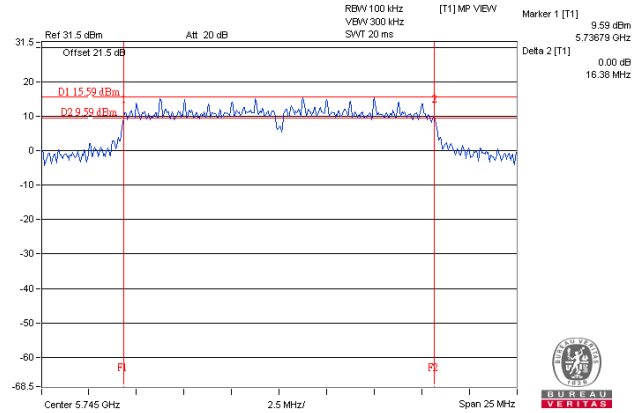
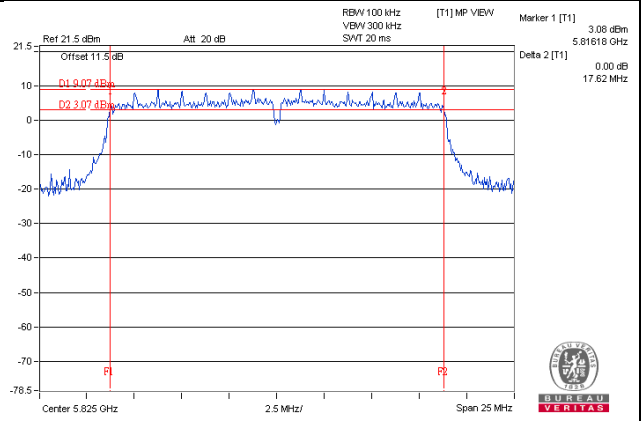
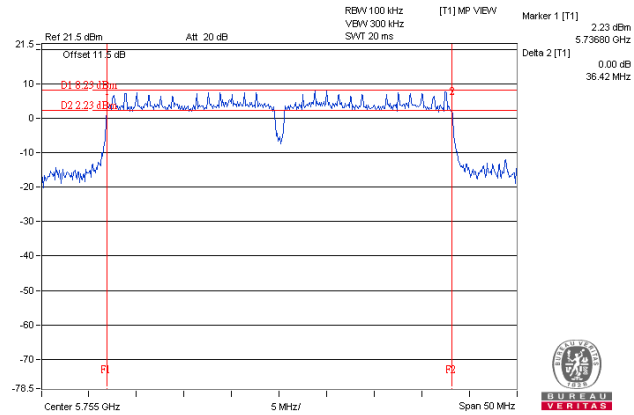
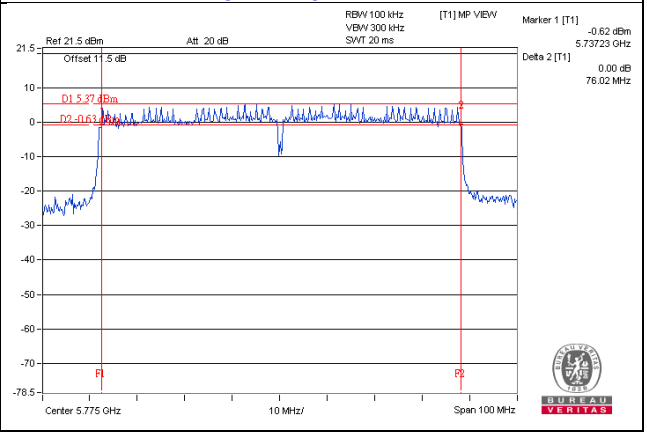
Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	17.63	17.67	17.64	0.5	PASS
157	5785	17.65	17.67	17.65	0.5	PASS
165	5825	17.62	17.66	17.65	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	36.42	36.45	36.45	0.5	PASS
159	5795	36.43	36.49	36.48	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	76.07	76.49	76.02	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH149	**802.11ac (VHT20)_Chain 0 / CH165**
	
802.11ac (VHT40)_Chain 0 / CH151	**802.11ac (VHT80)_Chain 2 / CH155**
	

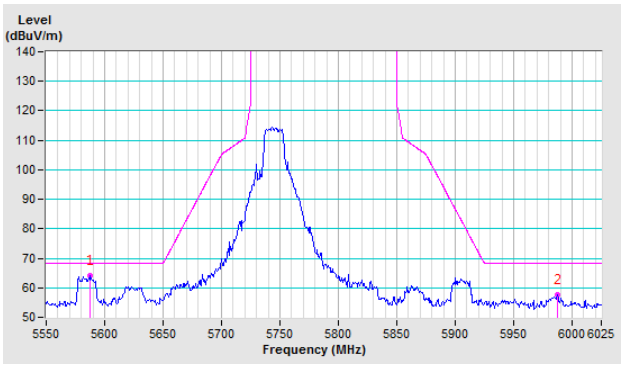
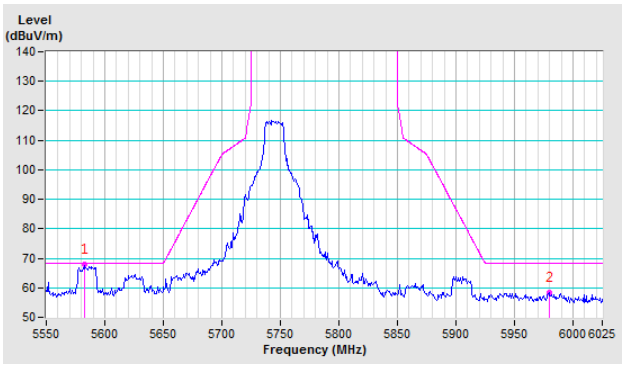
5 Pictures of Test Arrangements

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

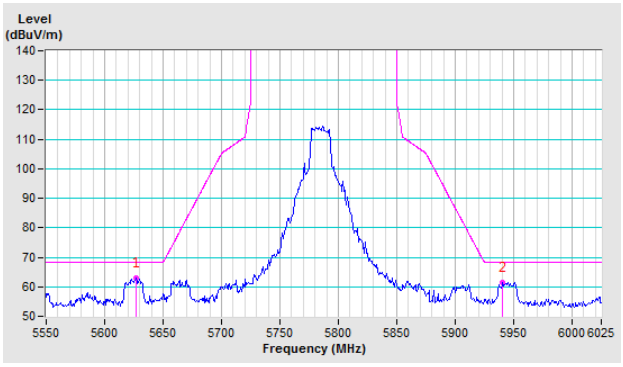
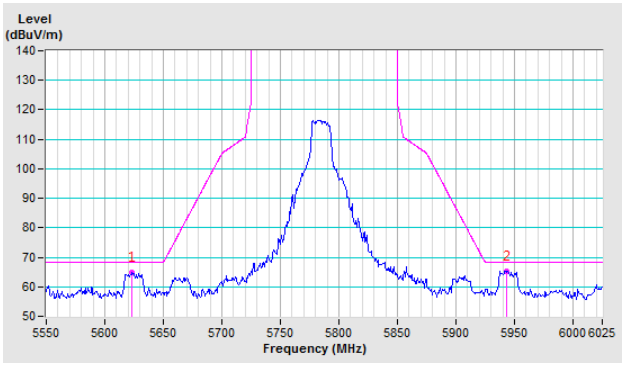
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

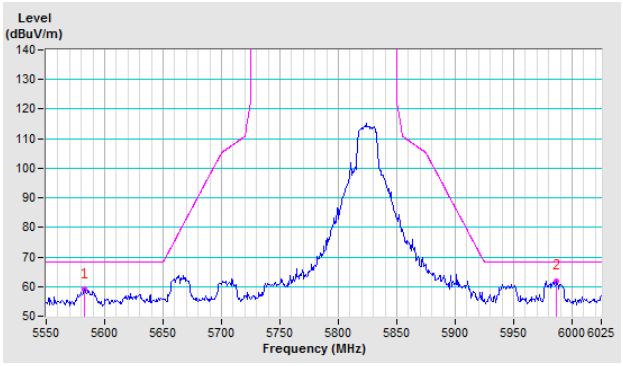
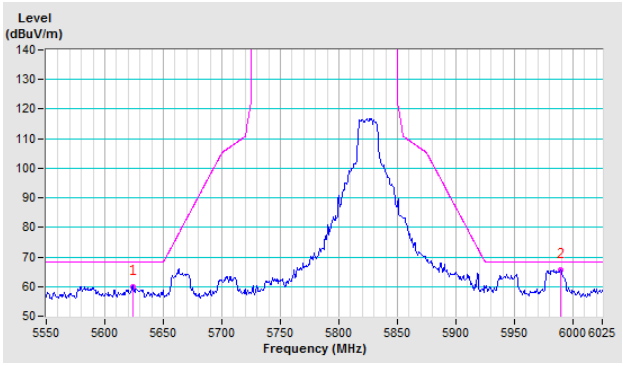
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

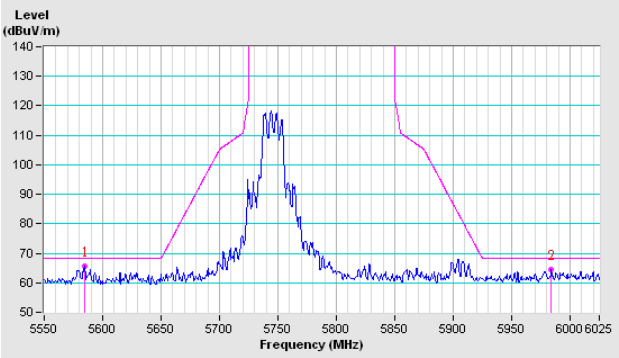
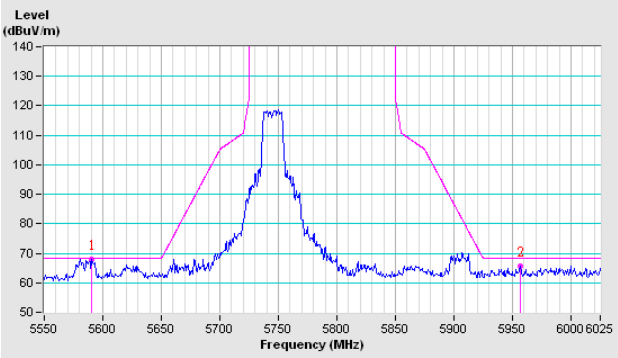
Horizontal	Vertical
	

CH 165 5825 MHz

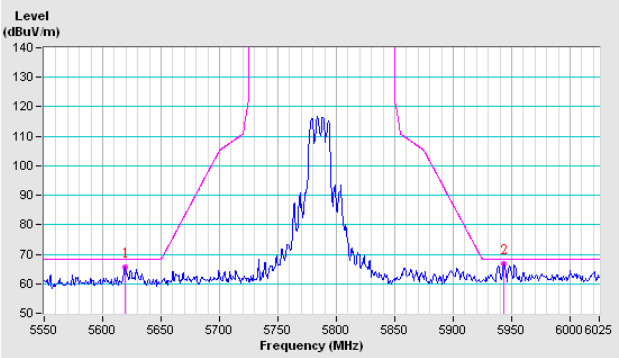
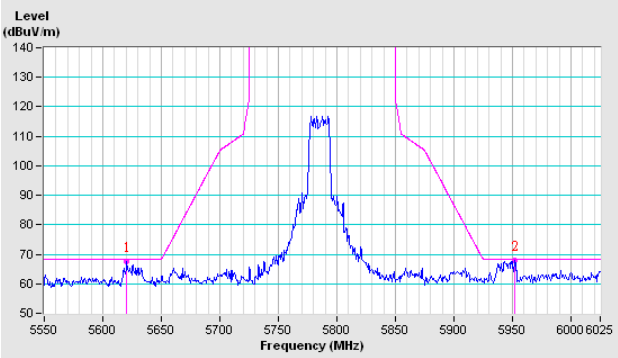
Horizontal	Vertical
	

802.11ac (VHT20)

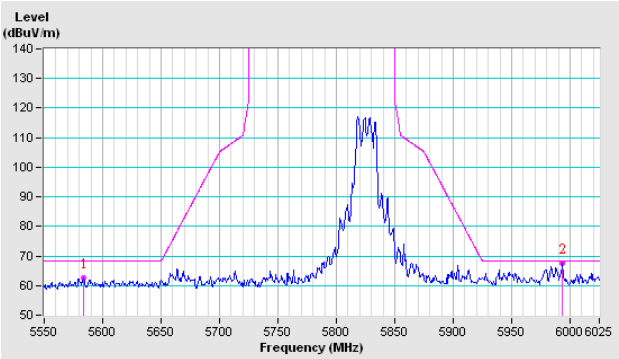
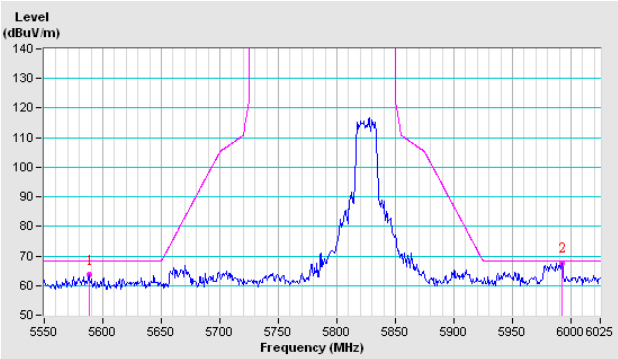
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

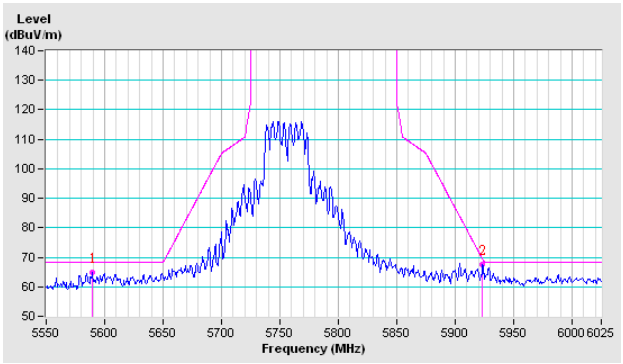
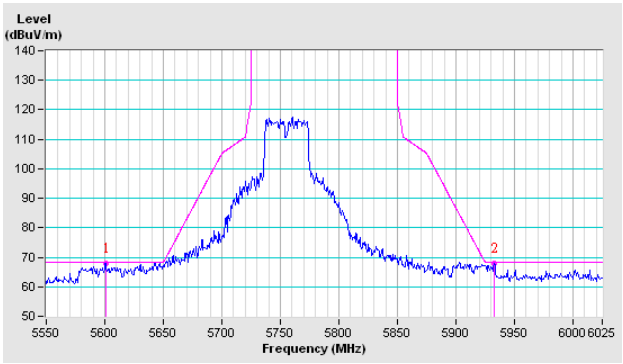
Horizontal	Vertical
	

CH 165 5825 MHz

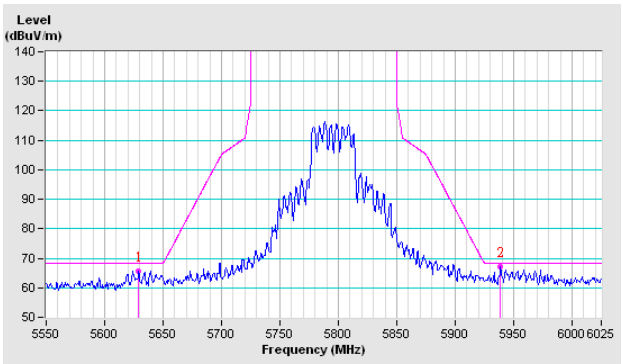
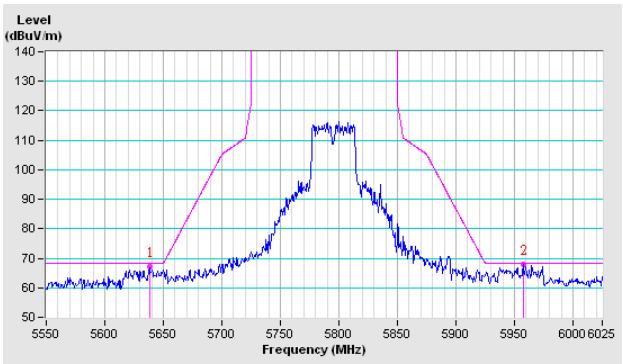
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

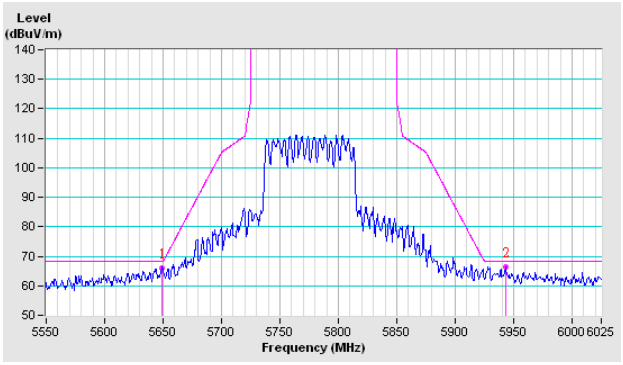
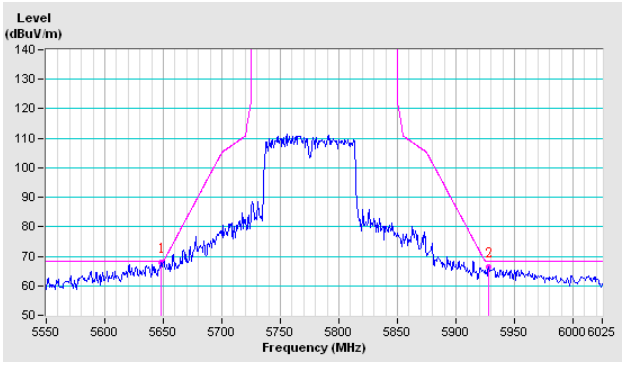
Horizontal	Vertical
	

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:

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

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