FCC Test Report

Report No.:	RF160525E02-1
FCC ID:	I88WRE6606
Test Model:	WRE6606
Received Date:	May 25, 2016
Test Date:	Oct. 06 to Nov. 04, 2016
Issued Date:	Nov. 16, 2016
Applicant:	Zyxel Communications Corporation
Address:	No.2, Industry East Road IX, Science Park, Hsinchu, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF160525E02-1	Original release.	Nov. 16, 2016

1 Certificate of Conformity

Product:	AC1300 MU-MIMO Dual-Band Wireless Range Extender
Brand:	ZYXEL
Test Model:	WRE6606
Sample Status:	ENGINEERING SAMPLE
Applicant:	Zyxel Communications Corporation
Test Date:	Oct. 06 to Nov. 04, 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 : Cindy Hsin , **Date:** Nov. 16, 2016

Cindy Hsin / Specialist

Approved by : , **Date:** Nov. 16, 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 -5.44dB at 0.35703MHz.
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 -0.4dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex (MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.34 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.41 dB
	6GHz ~ 18GHz	3.49 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	AC1300 MU-MIMO Dual-Band Wireless Range Extender
Brand	ZYXEL
Test Model	WRE6606
FW version	V1.00(ABDU.0)B7
Power Supply Rating	100-240V~0.15A, 50/60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866Mbps
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:** **CDD Mode:** 836.868mW **Beamforming Mode:** 727.986mW **5GHz:** **5.18GHz ~ 5.24GHz:** **CDD Mode:** 122.309mW **Beamforming Mode:** 110.639mW **5.745GHz ~ 5.825GHz:** **CDD Mode:** 128.006mW **Beamforming Mode:** 100.527mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
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 antennas provided to the EUT, please refer to the following table:

Antenna No	Transmitter Circuit	Brand	Model	Antenna Gain(dBi)	Antenna Type	Connecter Type	Frequency (GHz to GHz)
1	Chain (0) Tx/Rx	Walsin	RFMTA351202IMLB301	3	PIFA	i-pex(MHF)	2.4~2.4835
				3.5	PIFA	i-pex(MHF)	5.15~5.85
2	Chain (1) Tx/Rx	Walsin	RFMTA321204IMLB301	2	PIFA	i-pex(MHF)	2.4~2.4835
				3.5	PIFA	i-pex(MHF)	5.15~5.85
3	Chain (2) 5GHz_RX_0	Walsin	RFMTA161100NN5B001	3	PIFA	i-pex(MHF)	5.15~5.85
4	Chain (3) 5GHz_RX_1	Walsin	RFMTA161100NN5B001	3	PIFA	i-pex(MHF)	5.15~5.85
Note: For 5GHz: TX configuration mode will fix transmission on Chain (0) and Chain (1).							

3. The RF chip information as the following table:

Brand	Model
Qualcomm	IPQ4018

4. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	4RX
802.11n (HT20)	MCS 0~7	2TX	4RX
	MCS 8~15	2TX	4RX
802.11n (HT40)	MCS 0~7	2TX	4RX
	MCS 8~15	2TX	4RX
802.11ac (VHT20)	MCS 0~8, NSS=1	2TX	4RX
	MCS 0~8, NSS=2	2TX	4RX
802.11ac (VHT40)	MCS 0~9, NSS=1	2TX	4RX
	MCS 0~9, NSS=2	2TX	4RX
802.11ac (VHT80)	MCS 0~9, NSS=1	2TX	4RX
	MCS 0~9, NSS=2	2TX	4RX
Note: 1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.			

5. The power setting are list as below:

CDD Mode				
Modulation Mode	**Frequency (MHz)**	**Power Setting**	**Frequency (MHz)**	**Power Setting**
802.11a	5180	18	5745	17.5
	5200	17.5	5785	17.5
	5240	17.5	5825	17.5
802.11ac (VHT20)	5180	17.5	5745	17
	5200	17	5785	17
	5240	17	5825	17
802.11ac (VHT40)	5190	16	5755	17
	5230	16	5795	17
802.11ac (VHT80)	5210	13	5775	16.5
Beamforming Mode				
Modulation Mode	**Frequency (MHz)**	**Power Setting**	**Frequency (MHz)**	**Power Setting**
802.11ac (VHT20)	5180	17.5	5745	17
	5200	17	5785	17
	5240	17	5825	17
802.11ac (VHT40)	5190	16	5755	17
	5230	16	5795	17
802.11ac (VHT80)	5210	13	5775	16.5

Remark:

- This device can support different category application which switched to master mode or client mode by software.
- Both master mode and client mode used the same power setting.

6. For radiated emission evaluation, the EUT has been pre-tested under following test modes, and test mode A was the worst case for final test.

Pre-test Mode	Power
Mode A	**Power from AC Mode**
Mode B	Power from DC Mode (USB adapter)

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 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	√	√	√	√	Power from AC Mode
2	-	-	√	-	Power from DC Mode (USB adapter)

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.(below 1GHz) & **Y-plane**.(above 1GHz).

NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

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

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (HT40)		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 (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

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

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

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

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

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

CDD Mode						
Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (HT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (HT40)		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 (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (HT40)		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 (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (HT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11ac (HT20)	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (HT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

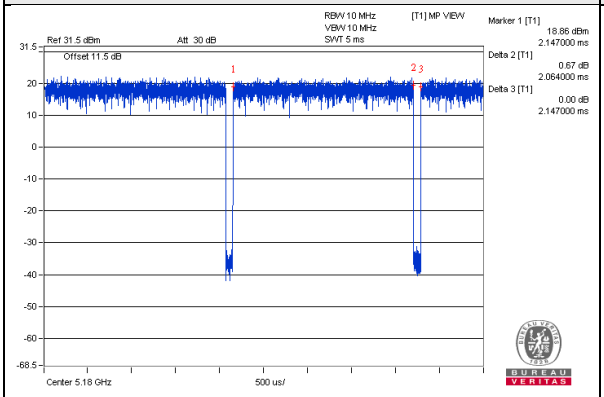
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	22deg. C, 64%RH	120Vac, 60Hz	Gary Cheng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Barry Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

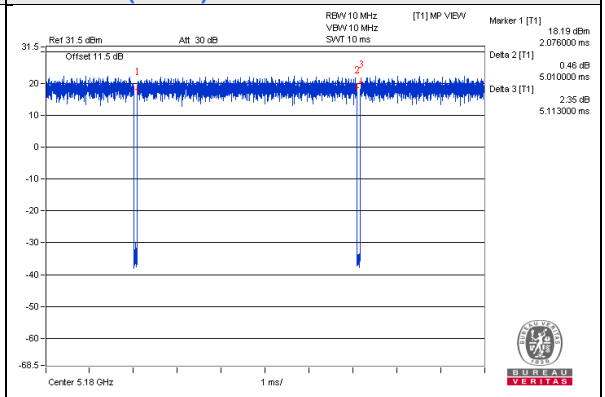
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
Duty cycle of test signal is < 98 %, duty factor is required
802.11a: Duty cycle = 2.064/2.147 = 0.961, Duty factor = 10 * log(1/0.961) = 0.17
802.11ac (HT20): Duty cycle = 5.01/5.113 = 0.98
802.11ac (HT40): Duty cycle = 2.434/2.537 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18
802.11ac (VHT80): Duty cycle = 1.148/1.236 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32

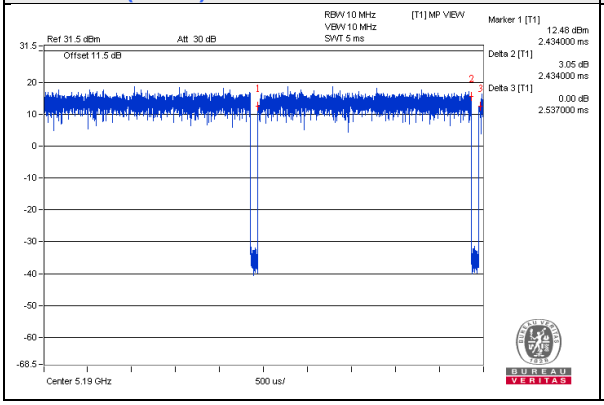
802.11a



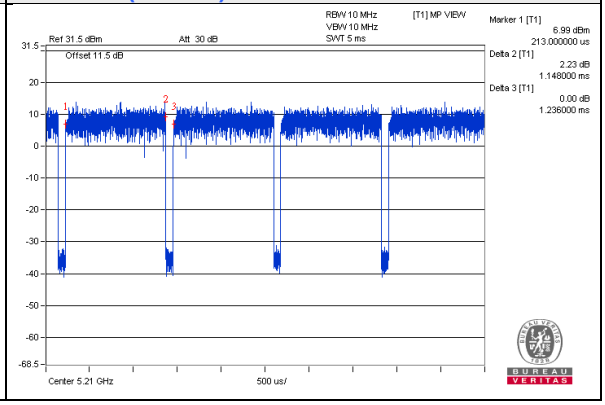
802.11ac (HT20)



802.11ac (HT40)



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	E6440	F9LYQ32	FCC DoC	Provided by Lab
B.	USB Adapter	ASUS	ADB76320	NA	NA	Supplied by client

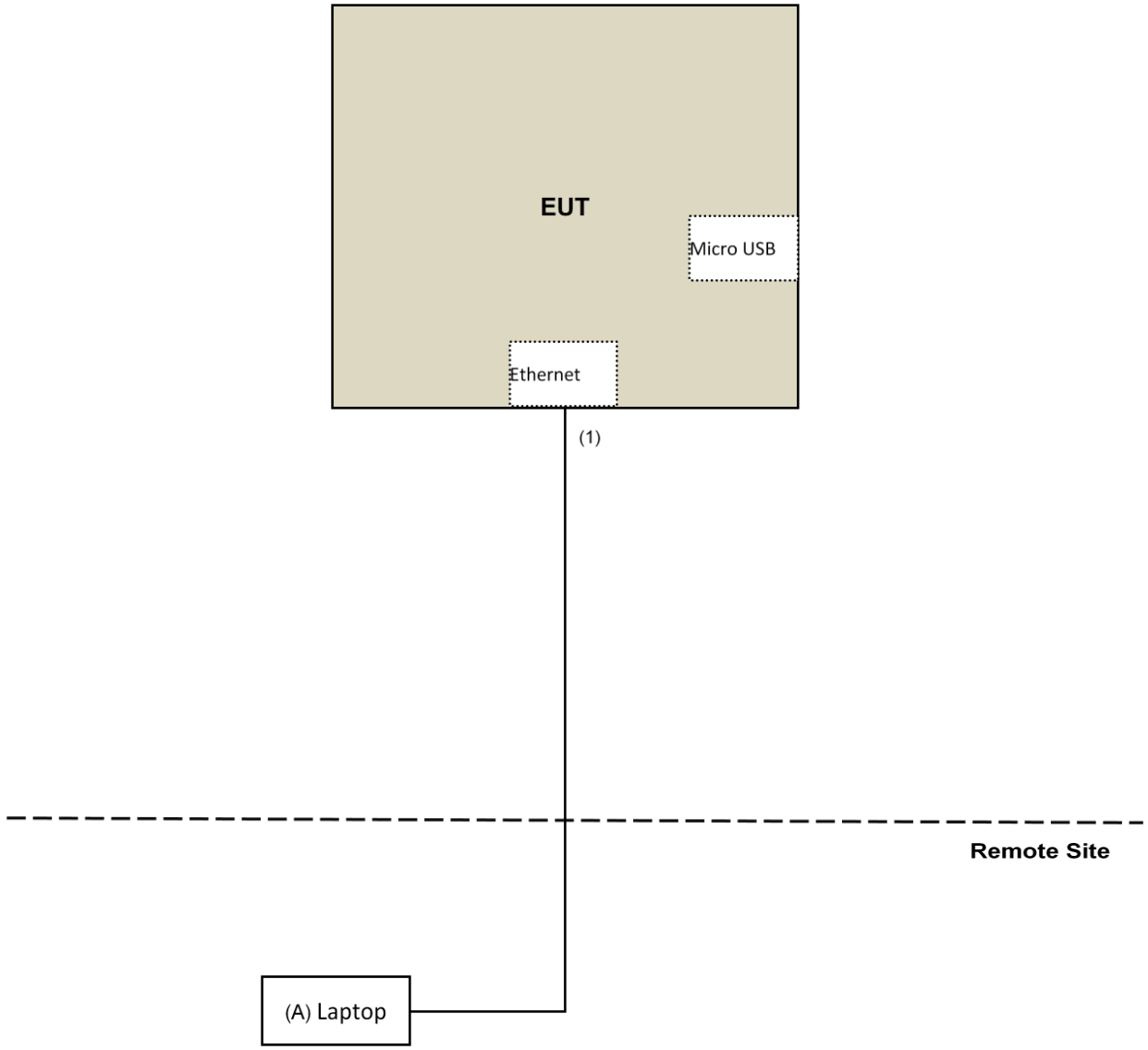
Note:

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

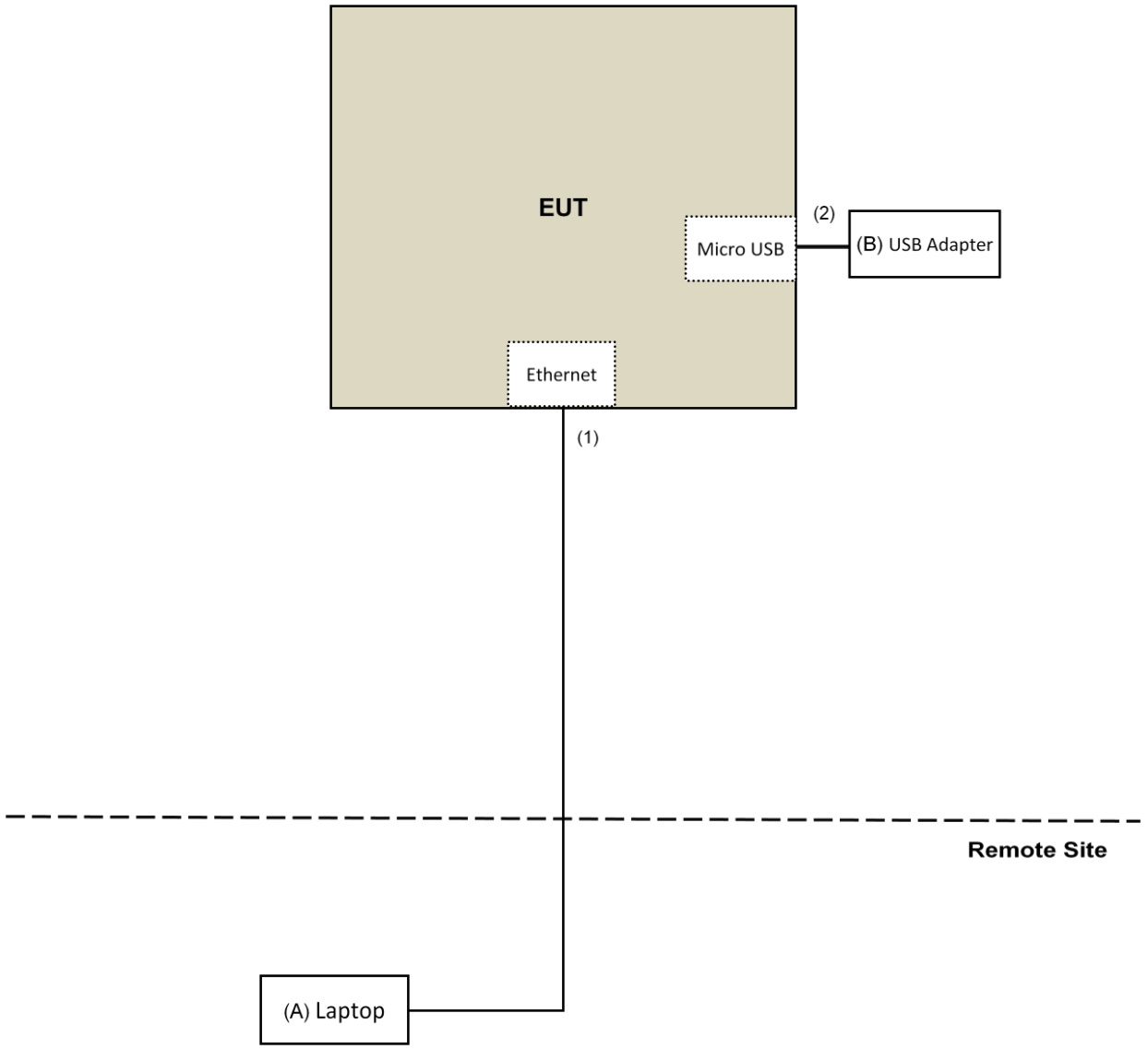
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	USB	1	1	Yes	0	Provided by Lab

3.4.1 Configuration of System under Test

Mode 1



Mode 2



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

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v01r03			Field Strength at 3m	
			PK:74 (dBµV/m)	AV:54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)		PK:-27 (dBm/MHz)	PK:68.2(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*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.

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 11, 2015	Nov. 10, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 02, 2016	Apr. 01, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Jan. 19, 2016	Jan. 18, 2017
Pre-Amplifier Agilent	8449B	3008A01922	Sep. 18, 2016	Sep. 17, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150318 150323 150324	Mar. 30, 2016	Mar. 29, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSP40	100060	May 11, 2016	May 10, 2017
Power meter Anritsu	ML2495A	1014008	May 05, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 05, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 15, 2016	Jan. 14, 2017
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2015	Nov. 09, 2016

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The FCC Site Registration No. is 292998
5. The CANADA Site Registration No. is 20331-2
6 Loop antenna was used for all emissions below 30 MHz.
7. Tested Date: Nov. 04, 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:

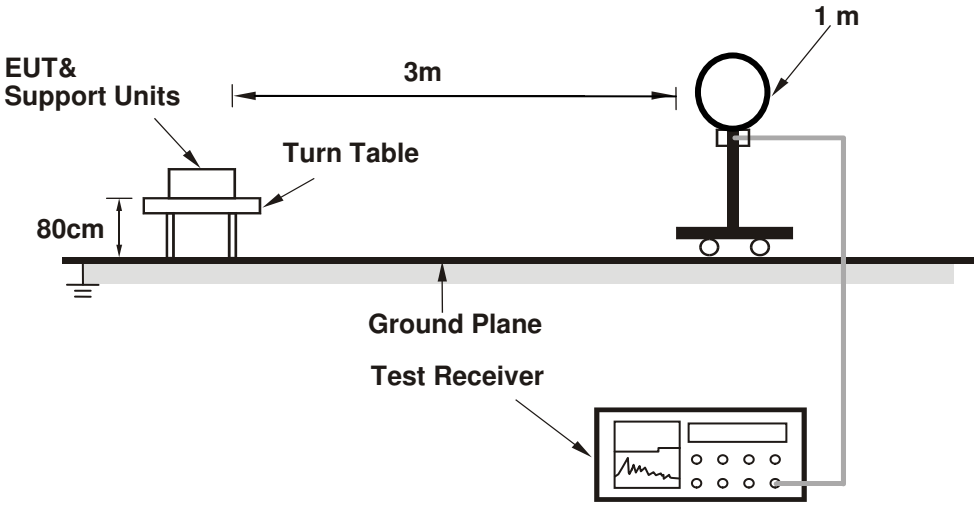
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

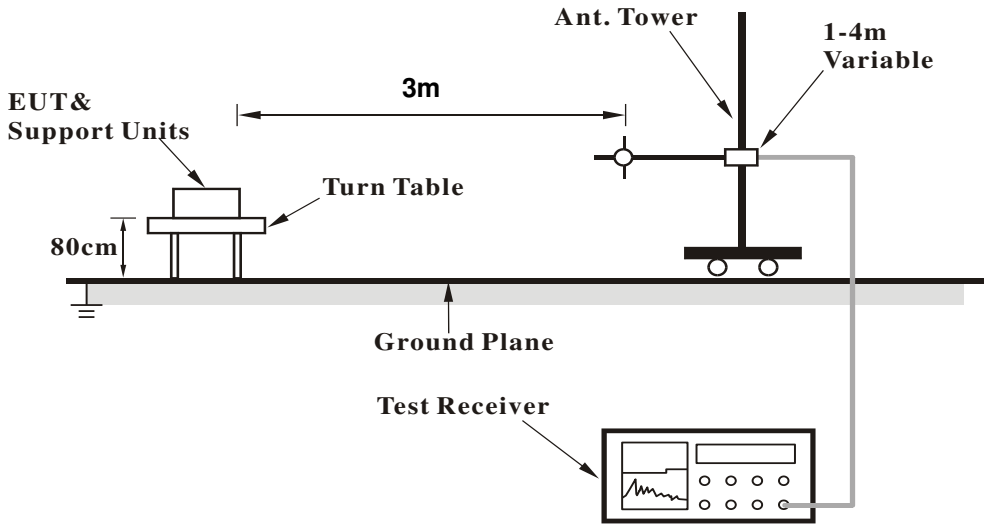
No deviation.

4.1.5 Test Setup

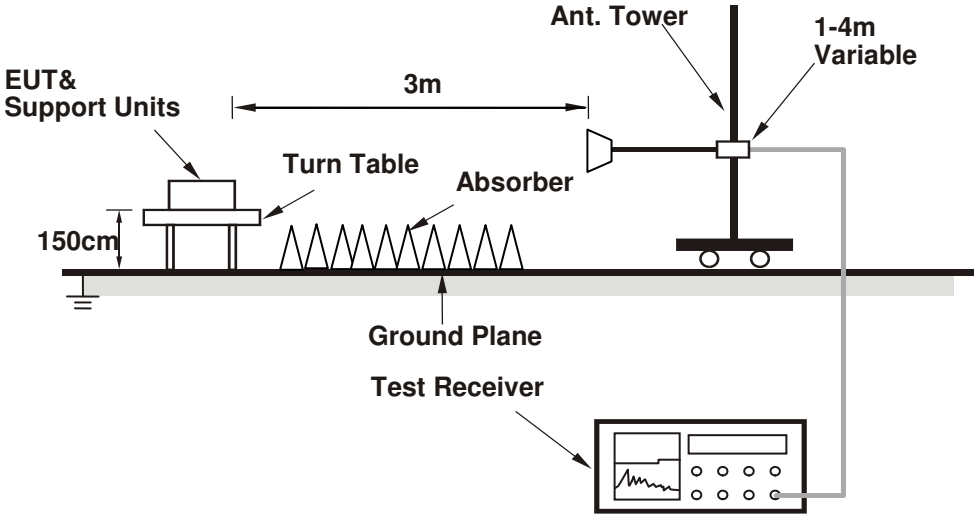
For Radiated emission below 30MHz



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 (QDART CONN.WIN.1.1 Installer-00036.2) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.5 PK	74.0	-7.5	1.19 H	110	64.6	1.9
2	5150.00	50.9 AV	54.0	-3.1	1.19 H	110	49.0	1.9
3	*5180.00	110.3 PK			1.19 H	110	108.3	2.0
4	*5180.00	98.1 AV			1.19 H	110	96.1	2.0
5	#10360.00	53.2 PK	74.0	-20.8	2.13 H	194	40.9	12.3
6	#10360.00	42.4 AV	54.0	-11.6	2.13 H	194	30.1	12.3
7	15540.00	51.7 PK	74.0	-22.3	1.51 H	164	37.8	13.9
8	15540.00	40.6 AV	54.0	-13.4	1.51 H	164	26.7	13.9
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	5150.00	69.1 PK	74.0	-4.9	1.06 V	121	67.2	1.9
2	5150.00	53.5 AV	54.0	-0.5	1.06 V	121	51.6	1.9
3	*5180.00	112.3 PK			1.06 V	121	110.3	2.0
4	*5180.00	100.5 AV			1.06 V	121	98.5	2.0
5	#10360.00	59.4 PK	74.0	-14.6	1.08 V	139	47.1	12.3
6	#10360.00	47.4 AV	54.0	-6.6	1.08 V	139	35.1	12.3
7	15540.00	52.8 PK	74.0	-21.2	1.69 V	216	38.9	13.9
8	15540.00	39.9 AV	54.0	-14.1	1.69 V	216	26.0	13.9

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 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	110.5 PK			1.13 H	118	108.3	2.2
2	*5200.00	98.1 AV			1.13 H	118	95.9	2.2
3	#10400.00	53.3 PK	74.0	-20.7	2.15 H	181	40.9	12.4
4	#10400.00	42.6 AV	54.0	-11.4	2.15 H	181	30.2	12.4
5	15600.00	51.4 PK	74.0	-22.6	1.51 H	178	37.6	13.8
6	15600.00	40.5 AV	54.0	-13.5	1.51 H	178	26.7	13.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.4 PK			1.07 V	120	110.2	2.2
2	*5200.00	100.4 AV			1.07 V	120	98.2	2.2
3	#10400.00	59.1 PK	74.0	-14.9	1.11 V	134	46.7	12.4
4	#10400.00	46.9 AV	54.0	-7.1	1.11 V	134	34.5	12.4
5	15600.00	53.1 PK	74.0	-20.9	1.71 V	216	39.3	13.8
6	15600.00	40.0 AV	54.0	-14.0	1.71 V	216	26.2	13.8

REMARKS:

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

CHANNEL	TX Channel 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	110.5 PK			1.16 H	116	108.4	2.1
2	*5240.00	97.7 AV			1.16 H	116	95.6	2.1
3	#10480.00	52.7 PK	74.0	-21.3	2.20 H	183	39.9	12.8
4	#10480.00	42.2 AV	54.0	-11.8	2.20 H	183	29.4	12.8
5	15720.00	51.0 PK	74.0	-23.0	1.52 H	192	37.0	14.0
6	15720.00	40.3 AV	54.0	-13.7	1.52 H	192	26.3	14.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	112.4 PK			1.04 V	135	110.3	2.1
2	*5240.00	100.5 AV			1.04 V	135	98.4	2.1
3	#10480.00	59.3 PK	74.0	-14.7	1.08 V	139	46.5	12.8
4	#10480.00	47.2 AV	54.0	-6.8	1.08 V	139	34.4	12.8
5	15720.00	52.3 PK	74.0	-21.7	1.77 V	220	38.3	14.0
6	15720.00	39.5 AV	54.0	-14.5	1.77 V	220	25.5	14.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	110.0 PK			1.40 H	305	106.8	3.2
2	*5745.00	97.8 AV			1.40 H	305	94.6	3.2
3	11490.00	56.7 PK	74.0	-17.3	2.54 H	126	42.4	14.3
4	11490.00	44.6 AV	54.0	-9.4	2.54 H	126	30.3	14.3
5	#17235.00	52.6 PK	74.0	-21.4	1.62 H	319	33.3	19.3
6	#17235.00	41.6 AV	54.0	-12.4	1.62 H	319	22.3	19.3
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	*5745.00	108.0 PK			3.52 V	203	104.8	3.2
2	*5745.00	96.3 AV			3.52 V	203	93.1	3.2
3	11490.00	63.2 PK	74.0	-10.8	1.05 V	148	48.9	14.3
4	11490.00	49.6 AV	54.0	-4.4	1.05 V	148	35.3	14.3
5	#17235.00	52.6 PK	74.0	-21.4	1.60 V	251	33.3	19.3
6	#17235.00	41.5 AV	54.0	-12.5	1.60 V	251	22.2	19.3

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	109.8 PK			1.38 H	305	106.6	3.2
2	*5785.00	97.4 AV			1.38 H	305	94.2	3.2
3	11570.00	56.9 PK	74.0	-17.1	2.50 H	125	43.0	13.9
4	11570.00	44.7 AV	54.0	-9.3	2.50 H	125	30.8	13.9
5	#17355.00	52.7 PK	74.0	-21.3	1.67 H	309	32.9	19.8
6	#17355.00	41.5 AV	54.0	-12.5	1.67 H	309	21.7	19.8
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	*5785.00	108.0 PK			3.53 V	214	104.8	3.2
2	*5785.00	96.1 AV			3.53 V	214	92.9	3.2
3	11570.00	63.0 PK	74.0	-11.0	1.04 V	161	49.1	13.9
4	11570.00	49.5 AV	54.0	-4.5	1.04 V	161	35.6	13.9
5	#17355.00	53.0 PK	74.0	-21.0	1.56 V	242	33.2	19.8
6	#17355.00	41.7 AV	54.0	-12.3	1.56 V	242	21.9	19.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	110.2 PK			1.46 H	291	107.0	3.2
2	*5825.00	97.7 AV			1.46 H	291	94.5	3.2
3	11650.00	57.2 PK	74.0	-16.8	2.51 H	126	43.4	13.8
4	11650.00	45.0 AV	54.0	-9.0	2.51 H	126	31.2	13.8
5	#17475.00	52.1 PK	74.0	-21.9	1.66 H	326	31.9	20.2
6	#17475.00	41.3 AV	54.0	-12.7	1.66 H	326	21.1	20.2
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	*5825.00	107.4 PK			3.54 V	197	104.2	3.2
2	*5825.00	96.0 AV			3.54 V	197	92.8	3.2
3	11650.00	63.6 PK	74.0	-10.4	1.01 V	148	49.8	13.8
4	11650.00	50.0 AV	54.0	-4.0	1.01 V	148	36.2	13.8
5	#17475.00	52.2 PK	74.0	-21.8	1.64 V	251	32.0	20.2
6	#17475.00	41.2 AV	54.0	-12.8	1.64 V	251	21.0	20.2

REMARKS:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.3 PK	74.0	-7.7	1.20 H	97	64.4	1.9
2	5150.00	51.0 AV	54.0	-3.0	1.20 H	97	49.1	1.9
3	*5180.00	111.8 PK			1.20 H	97	109.8	2.0
4	*5180.00	97.8 AV			1.20 H	97	95.8	2.0
5	#10360.00	52.9 PK	74.0	-21.1	2.10 H	205	40.6	12.3
6	#10360.00	42.2 AV	54.0	-11.8	2.10 H	205	29.9	12.3
7	15540.00	52.1 PK	74.0	-21.9	1.54 H	152	38.2	13.9
8	15540.00	40.8 AV	54.0	-13.2	1.54 H	152	26.9	13.9
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	5150.00	69.4 PK	74.0	-4.6	1.07 V	120	67.5	1.9
2	**5150.00**	**53.6 AV**	**54.0**	**-0.4**	**1.07 V**	**120**	**51.7**	**1.9**
3	*5180.00	111.0 PK			1.07 V	120	109.0	2.0
4	*5180.00	100.0 AV			1.07 V	120	98.0	2.0
5	#10360.00	59.2 PK	74.0	-14.8	1.12 V	140	46.9	12.3
6	#10360.00	47.2 AV	54.0	-6.8	1.12 V	140	34.9	12.3
7	15540.00	52.5 PK	74.0	-21.5	1.63 V	231	38.6	13.9
8	15540.00	39.8 AV	54.0	-14.2	1.63 V	231	25.9	13.9

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 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	111.6 PK			1.16 H	92	109.4	2.2
2	*5200.00	98.4 AV			1.16 H	92	96.2	2.2
3	#10400.00	53.0 PK	74.0	-21.0	2.16 H	199	40.6	12.4
4	#10400.00	42.3 AV	54.0	-11.7	2.16 H	199	29.9	12.4
5	15600.00	52.2 PK	74.0	-21.8	1.53 H	146	38.4	13.8
6	15600.00	41.2 AV	54.0	-12.8	1.53 H	146	27.4	13.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	110.7 PK			1.05 V	104	108.5	2.2
2	*5200.00	99.6 AV			1.05 V	104	97.4	2.2
3	#10400.00	58.9 PK	74.0	-15.1	1.14 V	137	46.5	12.4
4	#10400.00	46.9 AV	54.0	-7.1	1.14 V	137	34.5	12.4
5	15600.00	52.8 PK	74.0	-21.2	1.62 V	239	39.0	13.8
6	15600.00	40.2 AV	54.0	-13.8	1.62 V	239	26.4	13.8

REMARKS:

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

CHANNEL	TX Channel 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	112.0 PK			1.24 H	98	109.9	2.1
2	*5240.00	98.1 AV			1.24 H	98	96.0	2.1
3	#10480.00	52.2 PK	74.0	-21.8	2.06 H	206	39.4	12.8
4	#10480.00	41.7 AV	54.0	-12.3	2.06 H	206	28.9	12.8
5	15720.00	51.9 PK	74.0	-22.1	1.52 H	160	37.9	14.0
6	15720.00	40.8 AV	54.0	-13.2	1.52 H	160	26.8	14.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	110.9 PK			1.03 V	115	108.8	2.1
2	*5240.00	99.7 AV			1.03 V	115	97.6	2.1
3	#10480.00	58.6 PK	74.0	-15.4	1.15 V	123	45.8	12.8
4	#10480.00	46.8 AV	54.0	-7.2	1.15 V	123	34.0	12.8
5	15720.00	52.1 PK	74.0	-21.9	1.61 V	254	38.1	14.0
6	15720.00	39.8 AV	54.0	-14.2	1.61 V	254	25.8	14.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5745.00	108.1 PK			1.39 H	305	104.9	3.2
2	*5745.00	97.8 AV			1.39 H	305	94.6	3.2
3	11490.00	56.5 PK	74.0	-17.5	2.55 H	128	42.2	14.3
4	11490.00	45.4 AV	54.0	-8.6	2.55 H	128	31.1	14.3
5	#17235.00	52.5 PK	74.0	-21.5	1.57 H	328	33.2	19.3
6	#17235.00	40.8 AV	54.0	-13.2	1.57 H	328	21.5	19.3
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	*5745.00	107.5 PK			2.72 V	187	104.3	3.2
2	*5745.00	96.2 AV			2.72 V	187	93.0	3.2
3	11490.00	63.2 PK	74.0	-10.8	1.05 V	147	48.9	14.3
4	11490.00	49.6 AV	54.0	-4.4	1.05 V	147	35.3	14.3
5	#17235.00	51.3 PK	74.0	-22.7	1.67 V	261	32.0	19.3
6	#17235.00	40.2 AV	54.0	-13.8	1.67 V	261	20.9	19.3

REMARKS:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5785.00	108.3 PK			1.44 H	303	105.1	3.2
2	*5785.00	97.7 AV			1.44 H	303	94.5	3.2
3	11570.00	56.3 PK	74.0	-17.7	2.49 H	113	42.4	13.9
4	11570.00	45.1 AV	54.0	-8.9	2.49 H	113	31.2	13.9
5	#17355.00	52.1 PK	74.0	-21.9	1.57 H	331	32.3	19.8
6	#17355.00	40.5 AV	54.0	-13.5	1.57 H	331	20.7	19.8
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	*5785.00	107.4 PK			2.68 V	193	104.2	3.2
2	*5785.00	95.9 AV			2.68 V	193	92.7	3.2
3	11570.00	62.9 PK	74.0	-11.1	1.00 V	134	49.0	13.9
4	11570.00	49.2 AV	54.0	-4.8	1.00 V	134	35.3	13.9
5	#17355.00	50.6 PK	74.0	-23.4	1.65 V	252	30.8	19.8
6	#17355.00	39.7 AV	54.0	-14.3	1.65 V	252	19.9	19.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5825.00	107.4 PK			1.43 H	295	104.2	3.2
2	*5825.00	97.4 AV			1.43 H	295	94.2	3.2
3	11650.00	56.7 PK	74.0	-17.3	2.60 H	117	42.9	13.8
4	11650.00	45.5 AV	54.0	-8.5	2.60 H	117	31.7	13.8
5	#17475.00	52.8 PK	74.0	-21.2	1.61 H	343	32.6	20.2
6	#17475.00	41.1 AV	54.0	-12.9	1.61 H	343	20.9	20.2
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	*5825.00	107.3 PK			2.71 V	180	104.1	3.2
2	*5825.00	96.2 AV			2.71 V	180	93.0	3.2
3	11650.00	62.7 PK	74.0	-11.3	1.05 V	138	48.9	13.8
4	11650.00	49.2 AV	54.0	-4.8	1.05 V	138	35.4	13.8
5	#17475.00	51.4 PK	74.0	-22.6	1.71 V	272	31.2	20.2
6	#17475.00	40.6 AV	54.0	-13.4	1.71 V	272	20.4	20.2

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.

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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	5140.00	64.7 PK	74.0	-9.3	1.21 H	102	62.8	1.9
2	5140.00	50.2 AV	54.0	-3.8	1.21 H	102	48.3	1.9
3	*5190.00	106.6 PK			1.21 H	102	104.5	2.1
4	*5190.00	96.8 AV			1.21 H	102	94.7	2.1
5	#10380.00	50.2 PK	74.0	-23.8	2.18 H	190	37.9	12.3
6	#10380.00	38.4 AV	54.0	-15.6	2.18 H	190	26.1	12.3
7	15570.00	50.2 PK	74.0	-23.8	1.48 H	150	36.4	13.8
8	15570.00	38.1 AV	54.0	-15.9	1.48 H	150	24.3	13.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5140.00	68.1 PK	74.0	-5.9	1.05 V	118	66.2	1.9
2	5140.00	53.3 AV	54.0	-0.7	1.05 V	118	51.4	1.9
3	*5190.00	108.1 PK			1.05 V	118	106.0	2.1
4	*5190.00	98.5 AV			1.05 V	118	96.4	2.1
5	#10380.00	57.4 PK	74.0	-16.6	1.06 V	152	45.1	12.3
6	#10380.00	45.4 AV	54.0	-8.6	1.06 V	152	33.1	12.3
7	15570.00	52.3 PK	74.0	-21.7	1.58 V	238	38.5	13.8
8	15570.00	39.5 AV	54.0	-14.5	1.58 V	238	25.7	13.8

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5140.00	57.2 PK	74.0	-16.8	1.25 H	95	55.3	1.9
2	5140.00	42.6 AV	54.0	-11.4	1.25 H	95	40.7	1.9
3	*5230.00	106.4 PK			1.16 H	101	104.3	2.1
4	*5230.00	96.4 AV			1.16 H	101	94.3	2.1
5	#10460.00	50.5 PK	74.0	-23.5	2.18 H	193	37.8	12.7
6	#10460.00	38.6 AV	54.0	-15.4	2.18 H	193	25.9	12.7
7	15690.00	50.6 PK	74.0	-23.4	1.50 H	166	36.5	14.1
8	15690.00	38.4 AV	54.0	-15.6	1.50 H	166	24.3	14.1
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	5140.00	61.3 PK	74.0	-12.7	1.06 V	119	59.4	1.9
2	5140.00	46.2 AV	54.0	-7.8	1.06 V	119	44.3	1.9
3	*5230.00	107.6 PK			1.07 V	113	105.5	2.1
4	*5230.00	98.3 AV			1.07 V	113	96.2	2.1
5	#10460.00	57.9 PK	74.0	-16.1	1.05 V	162	45.2	12.7
6	#10460.00	45.7 AV	54.0	-8.3	1.05 V	162	33.0	12.7
7	15690.00	52.8 PK	74.0	-21.2	1.63 V	231	38.7	14.1
8	15690.00	39.8 AV	54.0	-14.2	1.63 V	231	25.7	14.1

REMARKS:

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

CHANNEL	TX Channel 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	*5755.00	104.6 PK			1.36 H	293	101.4	3.2
2	*5755.00	94.6 AV			1.36 H	293	91.4	3.2
3	11510.00	53.6 PK	74.0	-20.4	2.57 H	137	39.3	14.3
4	11510.00	42.3 AV	54.0	-11.7	2.57 H	137	28.0	14.3
5	#17265.00	54.3 PK	74.0	-19.7	1.64 H	345	35.0	19.3
6	#17265.00	42.2 AV	54.0	-11.8	1.64 H	345	22.9	19.3
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	*5755.00	103.6 PK			3.50 V	195	100.4	3.2
2	*5755.00	94.3 AV			3.50 V	195	91.1	3.2
3	11510.00	58.8 PK	74.0	-15.2	1.05 V	147	44.5	14.3
4	11510.00	48.2 AV	54.0	-5.8	1.05 V	147	33.9	14.3
5	#17265.00	52.4 PK	74.0	-21.6	1.66 V	232	33.1	19.3
6	#17265.00	39.8 AV	54.0	-14.2	1.66 V	232	20.5	19.3

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	*5795.00	102.6 PK			1.34 H	285	99.4	3.2
2	*5795.00	94.2 AV			1.34 H	285	91.0	3.2
3	11590.00	53.5 PK	74.0	-20.5	2.59 H	146	39.7	13.8
4	11590.00	41.9 AV	54.0	-12.1	2.59 H	146	28.1	13.8
5	#17385.00	54.7 PK	74.0	-19.3	1.59 H	335	34.8	19.9
6	#17385.00	42.6 AV	54.0	-11.4	1.59 H	335	22.7	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	*5795.00	103.4 PK			3.50 V	198	100.2	3.2
2	*5795.00	93.9 AV			3.50 V	198	90.7	3.2
3	11590.00	59.0 PK	74.0	-15.0	1.02 V	140	45.2	13.8
4	11590.00	48.4 AV	54.0	-5.6	1.02 V	140	34.6	13.8
5	#17385.00	52.4 PK	74.0	-21.6	1.61 V	233	32.5	19.9
6	#17385.00	40.0 AV	54.0	-14.0	1.61 V	233	20.1	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.

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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	5140.00	65.4 PK	74.0	-8.6	1.16 H	102	63.5	1.9
2	5140.00	52.8 AV	54.0	-1.2	1.16 H	102	50.9	1.9
3	*5210.00	101.4 PK			1.16 H	102	99.2	2.2
4	*5210.00	91.0 AV			1.16 H	102	88.8	2.2
5	#10420.00	61.4 PK	74.0	-12.6	2.20 H	209	48.9	12.5
6	#10420.00	48.3 AV	54.0	-5.7	2.20 H	209	35.8	12.5
7	15630.00	49.8 PK	74.0	-24.2	1.44 H	144	35.9	13.9
8	15630.00	38.0 AV	54.0	-16.0	1.44 H	144	24.1	13.9
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	5140.00	66.4 PK	74.0	-7.6	1.05 V	121	64.5	1.9
2	5140.00	53.5 AV	54.0	-0.5	1.05 V	121	51.6	1.9
3	*5210.00	102.7 PK			1.05 V	121	100.5	2.2
4	*5210.00	91.9 AV			1.05 V	121	89.7	2.2
5	#10420.00	63.4 PK	74.0	-10.6	1.10 V	134	50.9	12.5
6	#10420.00	50.2 AV	54.0	-3.8	1.10 V	134	37.7	12.5
7	15630.00	52.1 PK	74.0	-21.9	1.78 V	233	38.2	13.9
8	15630.00	39.6 AV	54.0	-14.4	1.78 V	233	25.7	13.9

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 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	*5775.00	101.6 PK			1.43 H	306	98.4	3.2
2	*5775.00	93.3 AV			1.43 H	306	90.1	3.2
3	11550.00	51.8 PK	74.0	-22.2	2.62 H	152	37.8	14.0
4	11550.00	41.3 AV	54.0	-12.7	2.62 H	152	27.3	14.0
5	#17325.00	52.4 PK	74.0	-21.6	1.67 H	345	32.8	19.6
6	#17325.00	40.3 AV	54.0	-13.7	1.67 H	345	20.7	19.6
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	*5775.00	101.3 PK			3.49 V	187	98.1	3.2
2	*5775.00	91.4 AV			3.49 V	187	88.2	3.2
3	11550.00	58.2 PK	74.0	-15.8	1.03 V	140	44.2	14.0
4	11550.00	45.3 AV	54.0	-8.7	1.03 V	140	31.3	14.0
5	#17325.00	52.7 PK	74.0	-21.3	1.71 V	246	33.1	19.6
6	#17325.00	40.2 AV	54.0	-13.8	1.71 V	246	20.6	19.6

REMARKS:

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

Below 1GHz Data:

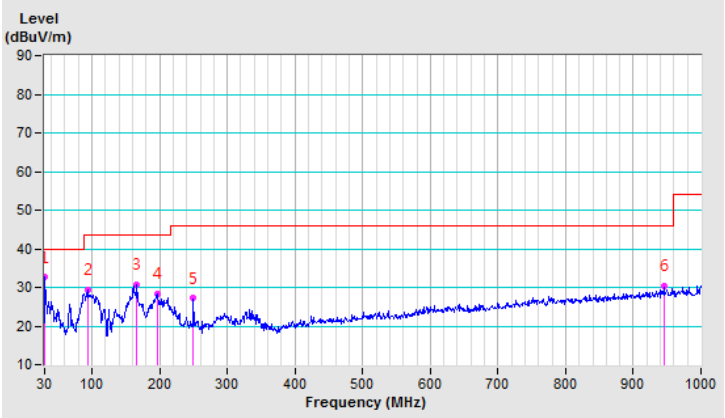
802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.72	32.6 QP	40.0	-7.4	1.00 H	100	42.6	-10.0
2	93.72	29.4 QP	43.5	-14.1	2.00 H	102	43.5	-14.1
3	165.90	30.6 QP	43.5	-12.9	1.50 H	56	39.5	-8.9
4	196.70	28.4 QP	43.5	-15.1	1.00 H	100	40.3	-11.9
5	250.00	27.2 QP	46.0	-18.8	1.00 H	280	37.2	-10.0
6	944.80	30.3 QP	46.0	-15.7	2.50 H	100	25.8	4.5

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

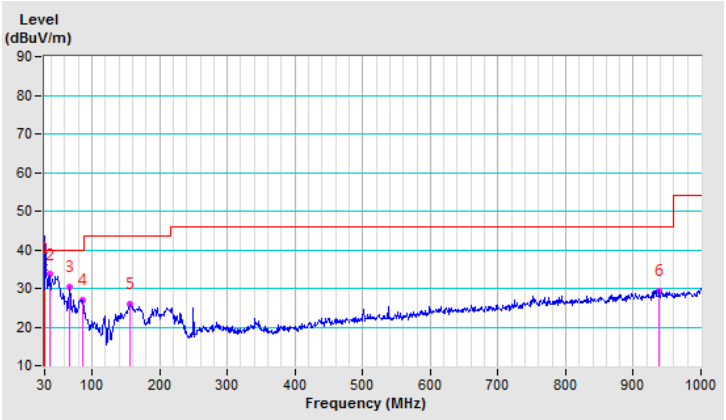


CHANNEL	TX Channel 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	**30.82**	**35.3 QP**	**40.0**	**-4.7**	**1.50 V**	**121**	**45.3**	**-10.0**
2	37.50	33.6 QP	40.0	-6.4	1.00 V	300	42.9	-9.3
3	67.40	30.4 QP	40.0	-9.6	1.00 V	302	40.9	-10.5
4	86.70	26.9 QP	40.0	-13.1	1.00 V	320	41.5	-14.6
5	155.40	25.9 QP	43.5	-17.6	1.00 V	220	34.4	-8.5
6	938.00	29.5 QP	46.0	-16.5	2.00 V	82	25.0	4.5

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	Aug. 31, 2016	Aug. 30, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COACAB-002	Mar. 04, 2016	Mar. 03, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-003	Sep. 13, 2016	Sep. 12, 2017
50 ohms Terminator	N/A	EMC-03	Sep. 29, 2016	Sep. 28, 2017
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 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. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Oct. 06, 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.

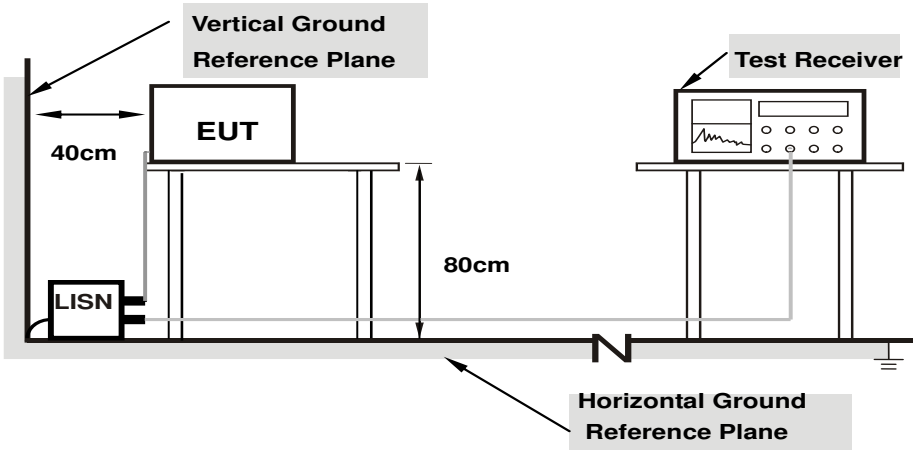
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

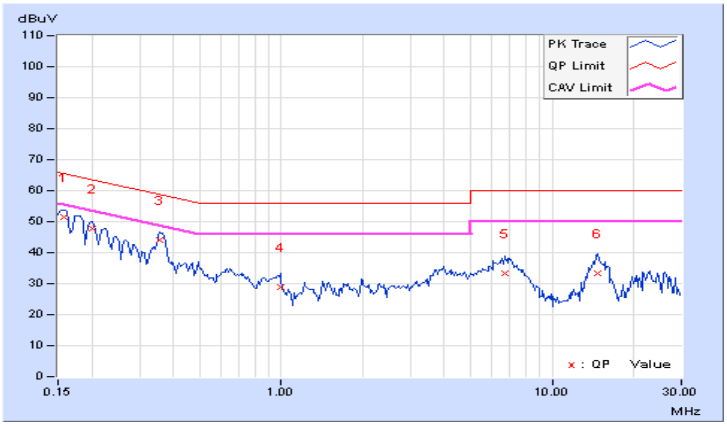
4.2.7 Test Results (Mode 1)

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	0.15781	10.14	41.52	31.15	51.66	41.29	65.58	55.58	-13.92	-14.29
2	0.20078	10.12	37.72	28.05	47.84	38.17	63.58	53.58	-15.74	-15.41
3	0.35703	10.11	34.06	32.46	44.17	42.57	58.80	48.80	-14.63	-6.23
4	0.98984	10.12	18.88	12.72	29.00	22.84	56.00	46.00	-27.00	-23.16
5	6.67188	10.36	22.99	15.53	33.35	25.89	60.00	50.00	-26.65	-24.11
6	14.67578	10.62	22.59	11.88	33.21	22.50	60.00	50.00	-26.79	-27.50

REMARKS:

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

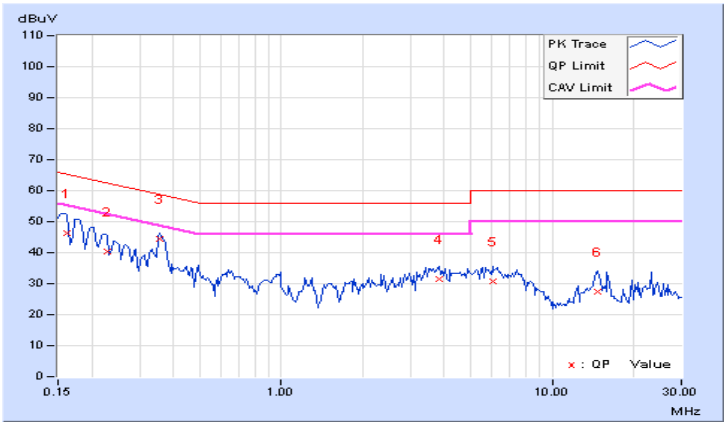


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.16	36.25	22.88	46.41	33.04	65.38	55.38	-18.97	-22.34
2	0.22812	10.07	30.46	19.81	40.53	29.88	62.52	52.52	-21.99	-22.64
3	**0.35703**	**10.09**	**34.52**	**33.27**	**44.61**	**43.36**	**58.80**	**48.80**	**-14.19**	**-5.44**
4	3.82031	10.31	21.02	13.55	31.33	23.86	56.00	46.00	-24.67	-22.14
5	6.03906	10.37	20.38	11.10	30.75	21.47	60.00	50.00	-29.25	-28.53
6	14.68750	10.66	16.74	7.46	27.40	18.12	60.00	50.00	-32.60	-31.88

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.



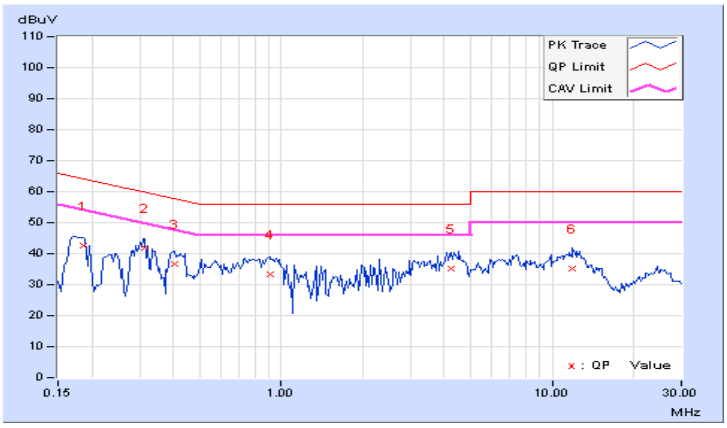
4.2.8 Test Results (Mode 2)

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	0.18516	10.13	32.57	21.98	42.70	32.11	64.25	54.25	-21.55	-22.14
2	0.31406	10.11	31.60	17.32	41.71	27.43	59.86	49.86	-18.15	-22.43
3	0.40391	10.11	26.62	14.51	36.73	24.62	57.77	47.77	-21.04	-23.15
4	0.90781	10.12	23.30	9.23	33.42	19.35	56.00	46.00	-22.58	-26.65
5	4.25000	10.31	24.93	14.58	35.24	24.89	56.00	46.00	-20.76	-21.11
6	11.89844	10.51	24.76	16.88	35.27	27.39	60.00	50.00	-24.73	-22.61

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.

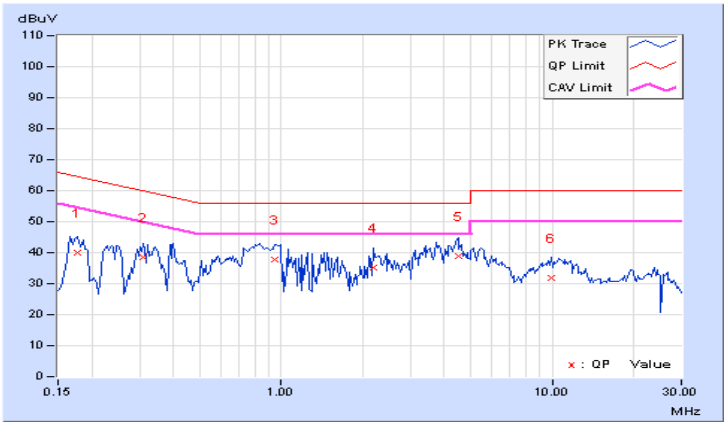


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.17734	10.12	29.95	20.70	40.07	30.82	64.61	54.61	-24.54	-23.79
2	0.31016	10.08	28.37	15.49	38.45	25.57	59.97	49.97	-21.52	-24.40
3	0.95078	10.20	27.46	13.37	37.66	23.57	56.00	46.00	-18.34	-22.43
4	2.19922	10.18	25.05	11.45	35.23	21.63	56.00	46.00	-20.77	-24.37
5	4.49609	10.33	28.59	16.38	38.92	26.71	56.00	46.00	-17.08	-19.29
6	9.87891	10.48	21.50	11.04	31.98	21.52	60.00	50.00	-28.02	-28.48

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

Note: This device can support different category application which switched to master mode or client mode by software.

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

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

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

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

CDD Mode

802.11a

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
36	5180	18.41	17.24	122.309	20.87	23.49	Pass
40	5200	17.66	17.75	117.911	20.72	23.49	Pass
48	5240	17.76	17.51	116.068	20.65	23.49	Pass
149	5745	18.32	17.60	125.464	20.99	29.49	Pass
157	5785	18.52	17.55	128.006	21.07	29.49	Pass
165	5825	18.22	17.61	124.051	20.94	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

802.11ac (HT20)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
36	5180	17.86	16.95	110.639	20.44	23.49	Pass
40	5200	17.00	16.55	95.305	19.79	23.49	Pass
48	5240	17.10	16.52	96.161	19.83	23.49	Pass
149	5745	17.12	16.54	96.605	19.85	29.49	Pass
157	5785	17.22	16.66	99.068	19.96	29.49	Pass
165	5825	17.33	16.67	100.527	20.02	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

802.11ac (HT40)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
38	5190	16.89	15.60	85.173	19.30	23.49	Pass
46	5230	16.64	15.84	84.503	19.27	23.49	Pass
151	5755	16.36	15.64	79.895	19.03	29.49	Pass
159	5795	16.44	15.63	80.614	19.06	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

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				
42	5210	13.54	12.53	40.5	16.07	23.49	Pass
155	5775	15.70	15.18	70.115	18.46	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

Beamforming Mode

802.11ac (HT20)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
36	5180	17.86	16.95	110.639	20.44	23.49	Pass
40	5200	17.00	16.55	95.305	19.79	23.49	Pass
48	5240	17.10	16.52	96.161	19.83	23.49	Pass
149	5745	17.12	16.54	96.605	19.85	29.49	Pass
157	5785	17.22	16.66	99.068	19.96	29.49	Pass
165	5825	17.33	16.67	100.527	20.02	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

802.11ac (HT40)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
38	5190	16.89	15.60	85.173	19.30	23.49	Pass
46	5230	16.64	15.84	84.503	19.27	23.49	Pass
151	5755	16.36	15.64	79.895	19.03	29.49	Pass
159	5795	16.44	15.63	80.614	19.06	29.49	Pass

NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

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				
42	5210	13.54	12.53	40.5	16.07	23.49	Pass
155	5775	15.70	15.18	70.115	18.46	29.49	Pass

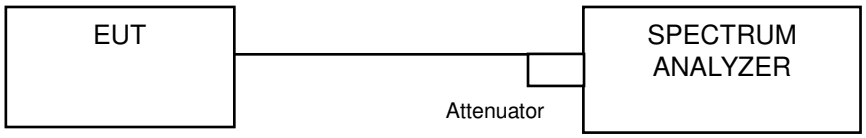
NOTE:

For UNII-1: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 24-(6.51-6) = 23.49dBm.

For UNII-3: Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power limit shall be reduced to 30-(6.51-6) = 29.49dBm.

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 0	CHAIN 1
36	5180	16.68	16.68
40	5200	16.68	16.44
48	5240	16.56	16.56
149	5745	16.56	16.56
157	5785	16.56	16.56
165	5825	16.56	16.56

802.11ac (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	17.76	17.76
40	5200	17.76	17.76
48	5240	17.76	17.76
149	5745	17.76	17.76
157	5785	17.76	17.76
165	5825	17.76	17.76

802.11ac (HT40)

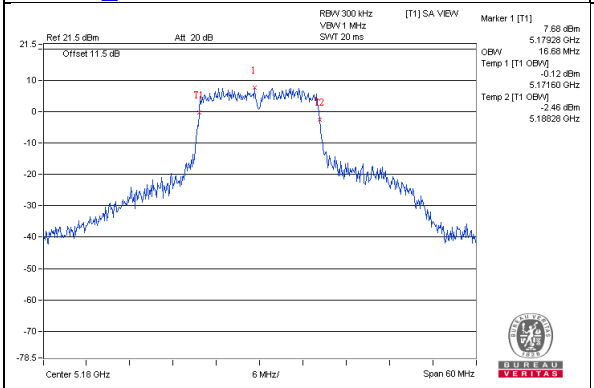
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
38	5190	36.24	36.24
46	5230	36.24	36.24
151	5755	36.24	36.48
159	5795	36.24	36.48

802.11ac (VHT80)

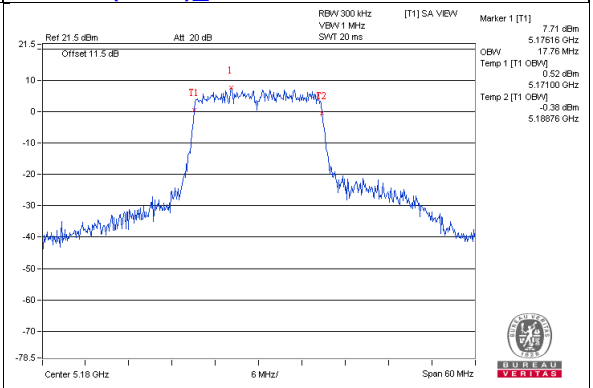
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
42	5210	75.84	75.84
155	5775	76.32	76.32

Spectrum Plot of Worst Value

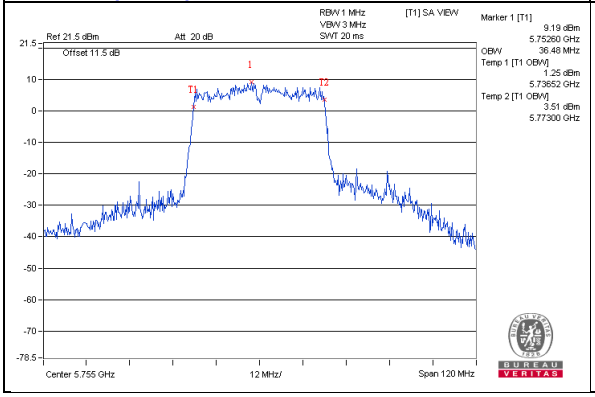
802.11a_Chain0 / CH36



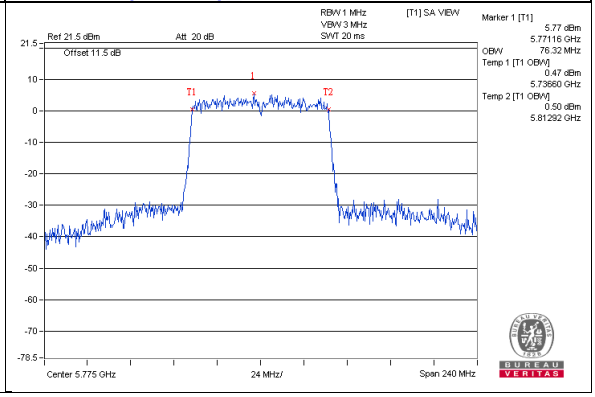
802.11n (HT20)_Chain0 CH36

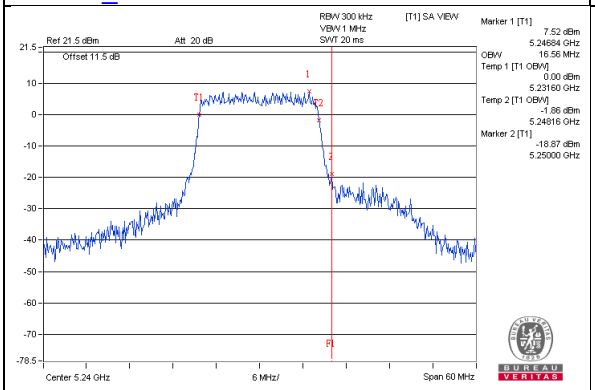
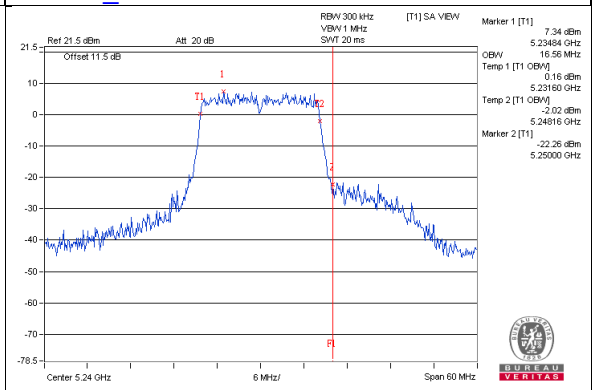
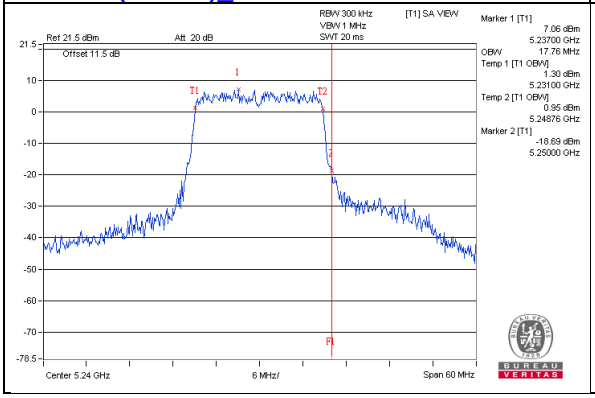
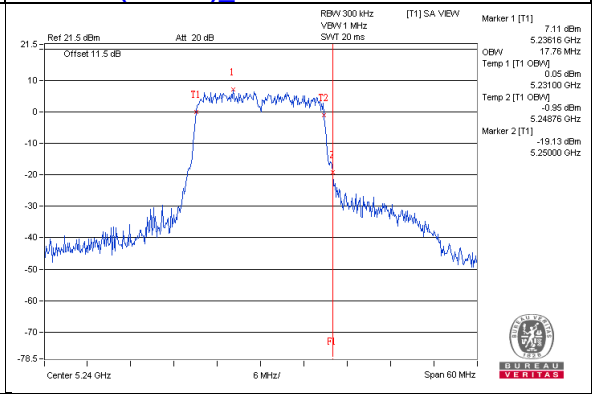


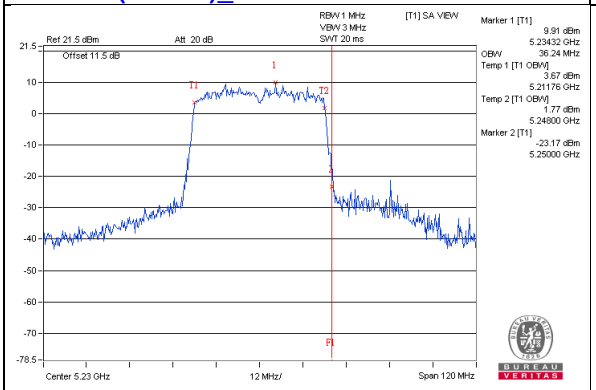
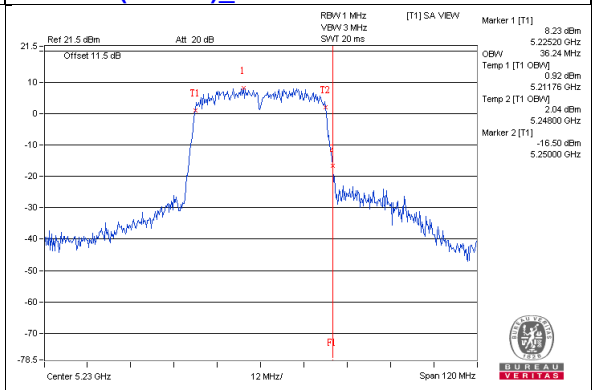
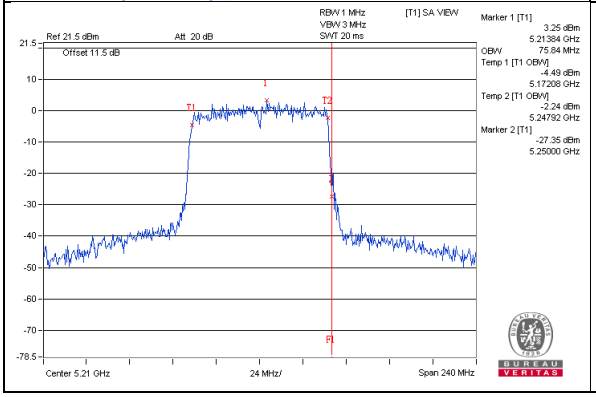
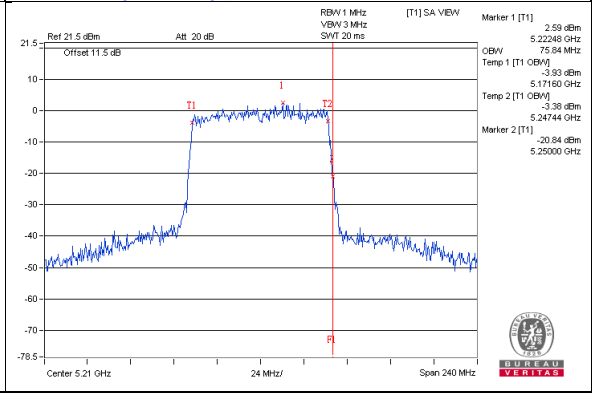
802.11n (HT40)_Chain1/ CH151

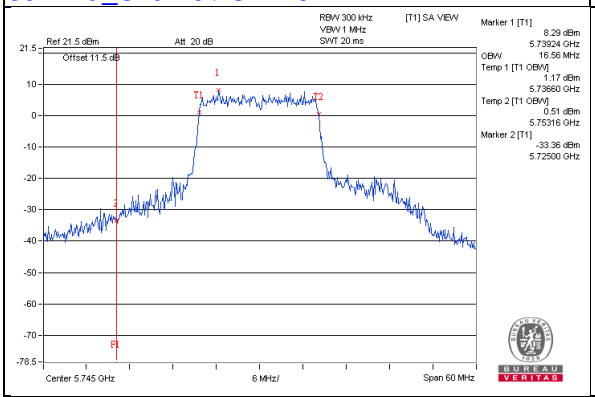
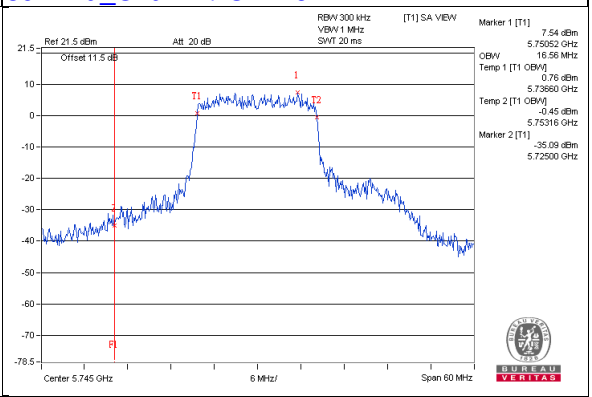
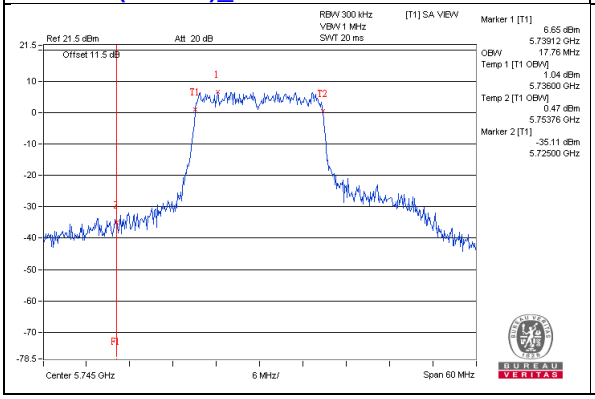
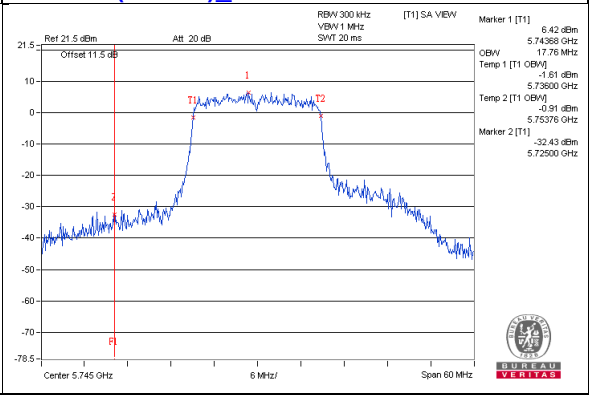


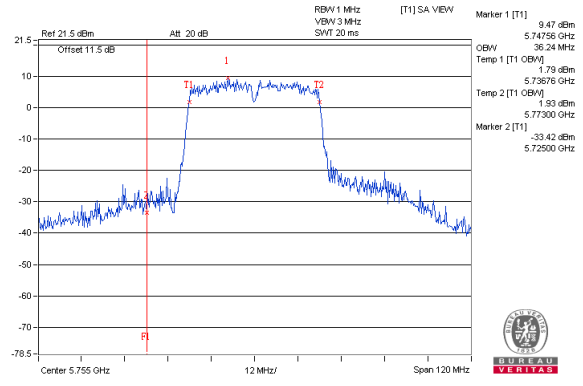
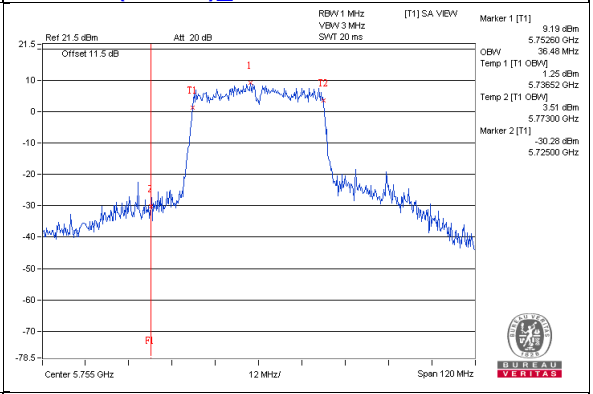
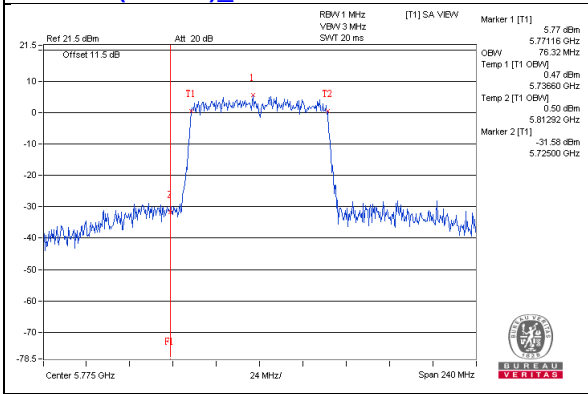
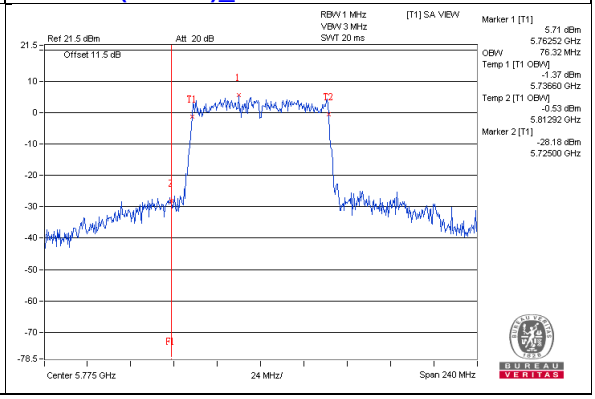
802.11ac (VHT80)_Chain0 / CH155



Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	**802.11a_Chain1 / CH48**
	
802.11ac(VHT20)_Chain0 / CH48	**802.11ac(VHT20)_Chain1 / CH48**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11ac(VHT40)_Chain0 / CH46	**802.11ac(VHT40)_Chain1 / CH46**
	
802.11ac(VHT80)_Chain0 / CH42	**802.11ac(VHT80)_Chain1 / CH42**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a_Chain0 / CH149	**802.11a_Chain1 / CH149**
	
802.11ac(VHT20)_Chain0 / CH149	**802.11ac(VHT20)_Chain1 / CH149**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ac(VHT40)_Chain0 / CH151	802.11ac(VHT40)_Chain1 / CH151
	
802.11ac(VHT80)_Chain0 / CH155	802.11ac(VHT80)_Chain1 / CH155
	

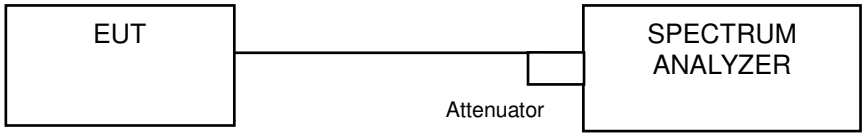
4.5 Peak Power Spectral Density Measurement

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

Note: This device can support different category application which switched to master mode or client mode by software.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11ac (VHT20)

For U-NII-1:

Using method SA-1

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

For U-NII-3:

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

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

For U-NII-1:

Using method SA-2

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

For U-NII-3: Set span to encompass the entire emission bandwidth (EBW) of the signal.

1. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
2. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
3. 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)
4. Sweep time = auto, trigger set to “free run”.
5. Trace average at least 100 traces in power averaging mode.
6. 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)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	3.19	2.50	0.17	6.04	10.49	Pass
40	5200	2.88	3.08	0.17	6.16	10.49	Pass
48	5240	2.79	3.18	0.17	6.17	10.49	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 = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 11-(6.51-6) = 10.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.89	2.41	5.67	10.49	Pass
40	5200	2.85	2.31	5.60	10.49	Pass
48	5240	2.83	2.35	5.61	10.49	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 = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 11-(6.51-6) = 10.49dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.18	-1.53	0.18	1.84	10.49	Pass
46	5230	-0.79	-0.88	0.18	2.36	10.49	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 = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 11-(6.51-6) = 10.49dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

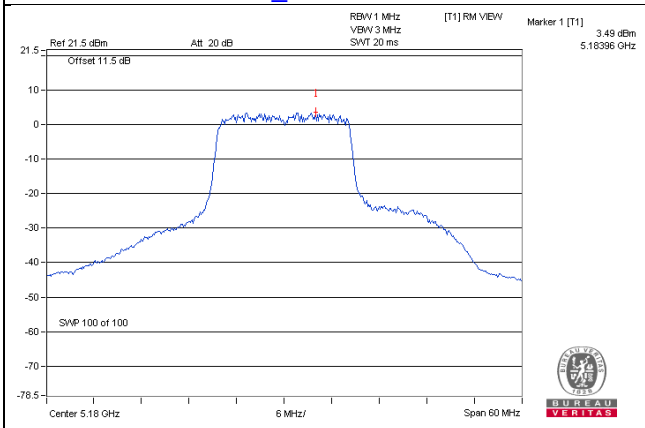
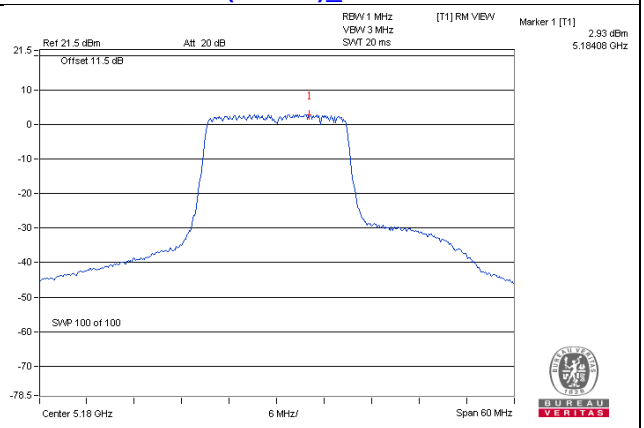
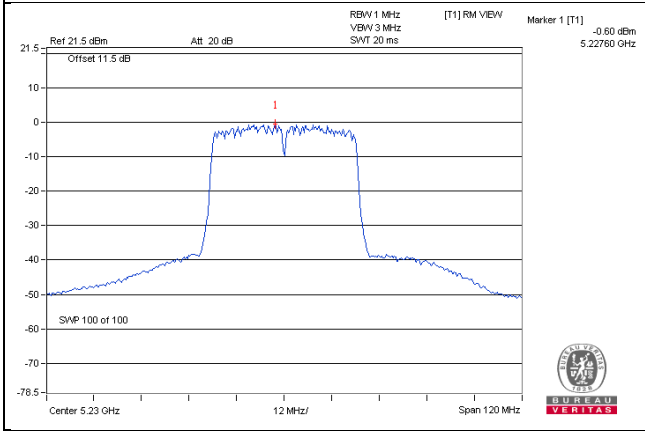
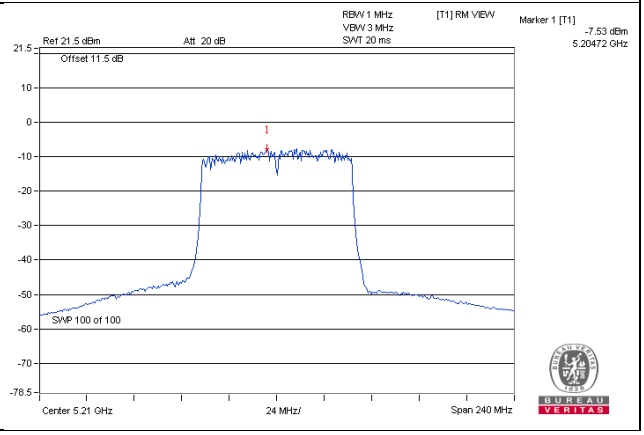
802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-7.53	-8.18	0.32	-4.51	10.49	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 = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 11-(6.51-6) = 10.49dBm.

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

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH36	**802.11ac (VHT20)_Chain 0 / CH36**
	
802.11ac (VHT40)_Chain 0 / CH46	**802.11ac (VHT80)_Chain 0 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-4.46	-2.24	3.01	0.17	0.94	29.49	Pass
	157	5785	-4.49	-2.27	3.01	0.17	0.91	29.49	Pass
	165	5825	-4.69	-2.47	3.01	0.17	0.71	29.49	Pass
1	149	5745	-4.87	-2.65	3.01	0.17	0.53	29.49	Pass
	157	5785	-5.06	-2.84	3.01	0.17	0.34	29.49	Pass
	165	5825	-4.80	-2.58	3.01	0.17	0.60	29.49	Pass

Note: 1. Directional gain = 3.50dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

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

802.11ac (VHT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-5.03	-2.81	3.01	0.20	29.49	Pass
	157	5785	-5.37	-3.15	3.01	-0.14	29.49	Pass
	165	5825	-4.99	-2.77	3.01	0.24	29.49	Pass
1	149	5745	-5.24	-3.02	3.01	-0.01	29.49	Pass
	157	5785	-4.78	-2.56	3.01	0.45	29.49	Pass
	165	5825	-4.33	-2.11	3.01	0.90	29.49	Pass

Note: 1. Directional gain = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-8.83	-6.61	3.01	0.18	-3.42	29.49	Pass
	159	5795	-8.76	-6.54	3.01	0.18	-3.35	29.49	Pass
1	151	5755	-9.28	-7.06	3.01	0.18	-3.87	29.49	Pass
	159	5795	-9.15	-6.93	3.01	0.18	-3.74	29.49	Pass

Note: 1. Directional gain = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

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

802.11ac (VHT80)

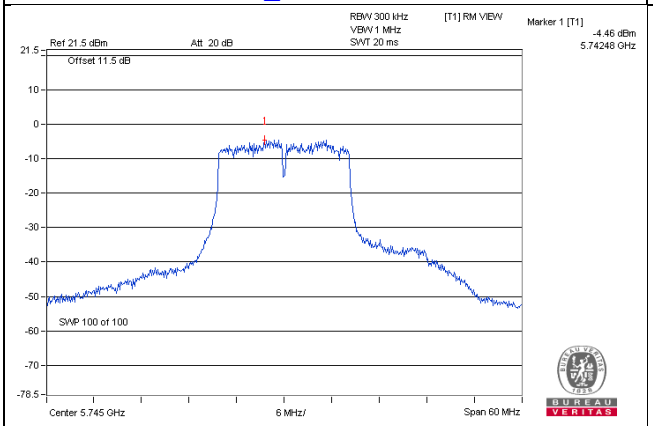
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-13.11	-10.89	3.01	0.32	-7.56	29.49	Pass
1	155	5775	-12.67	-10.45	3.01	0.32	-7.12	29.49	Pass

Note: 1. Directional gain = 3.5dBi + 10log(3) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 30-(6.51-6) = 29.49dBm.

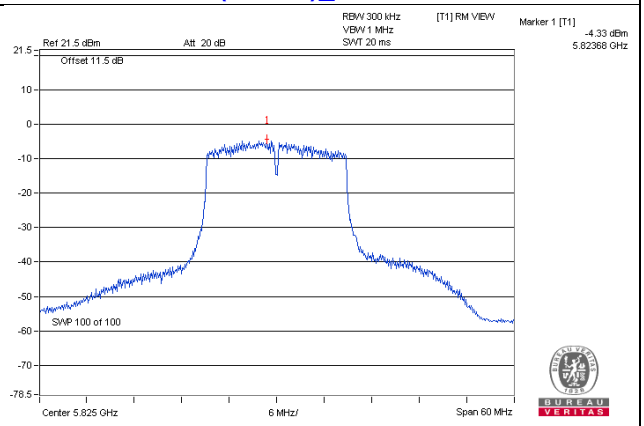
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

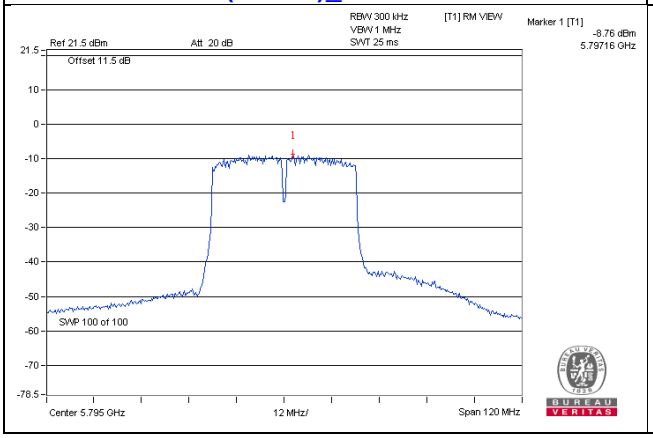
802.11a_Chain 0 / CH149



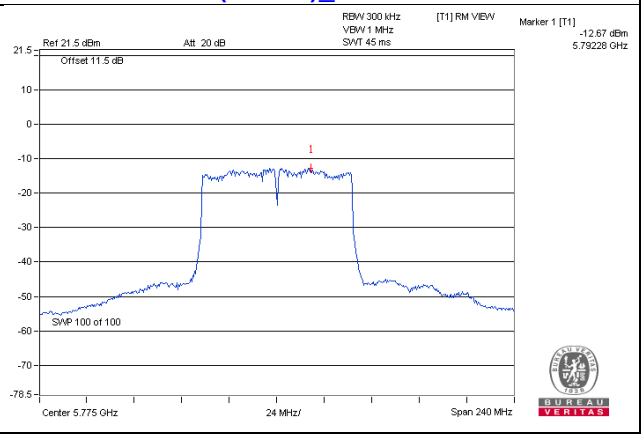
802.11ac (VHT20)_Chain 1 / CH165



802.11ac (VHT40)_Chain 0 / CH159



802.11ac (VHT80)_Chain 1 / CH155

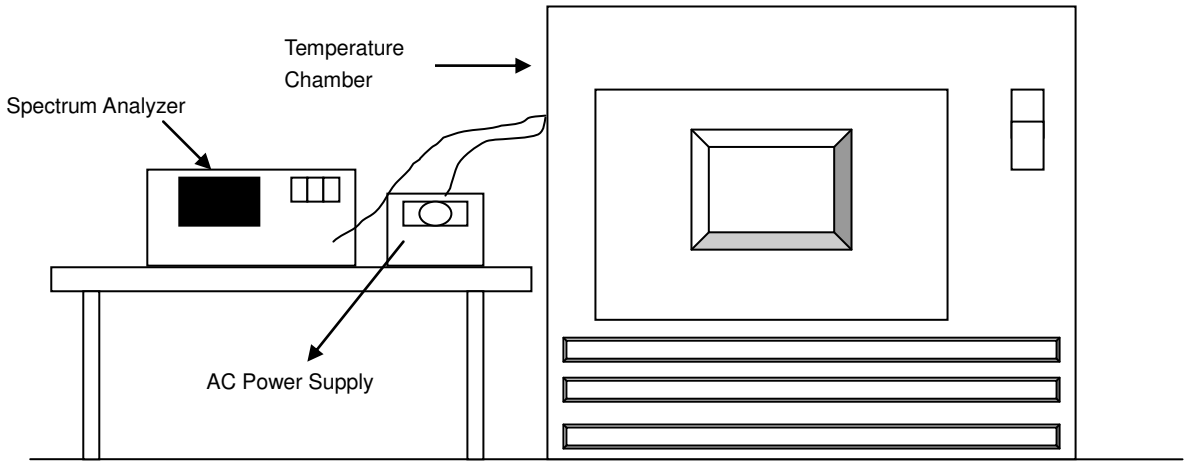


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5179.9928	Pass	5179.9901	Pass	5179.988	Pass	5179.9919	Pass
40	120	5180.013	Pass	5180.0142	Pass	5180.0144	Pass	5180.0123	Pass
30	120	5180.007	Pass	5180.0083	Pass	5180.0042	Pass	5180.0078	Pass
20	120	5179.9831	Pass	5179.9787	Pass	5179.9783	Pass	5179.9811	Pass
10	120	5180.0142	Pass	5180.0123	Pass	5180.0159	Pass	5180.0152	Pass
0	120	5179.9874	Pass	5179.9857	Pass	5179.9862	Pass	5179.9874	Pass
-10	120	5179.9888	Pass	5179.989	Pass	5179.9903	Pass	5179.9866	Pass
-20	120	5180.0067	Pass	5180.01	Pass	5180.0056	Pass	5180.01	Pass
-30	120	5179.9838	Pass	5179.985	Pass	5179.9842	Pass	5179.9815	Pass

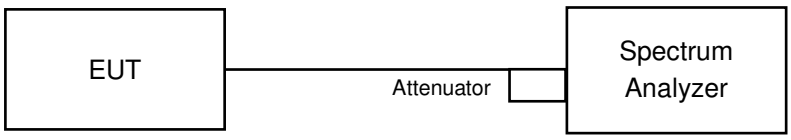
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9832	Pass	5179.9779	Pass	5179.9777	Pass	5179.9818	Pass
	120	5179.9831	Pass	5179.9787	Pass	5179.9783	Pass	5179.9811	Pass
	102	5179.9836	Pass	5179.9797	Pass	5179.9792	Pass	5179.9815	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 0	Chain 1		
149	5745	16.38	16.36	0.5	PASS
157	5785	16.40	15.92	0.5	PASS
165	5825	16.39	15.92	0.5	PASS

802.11ac (VHT20)

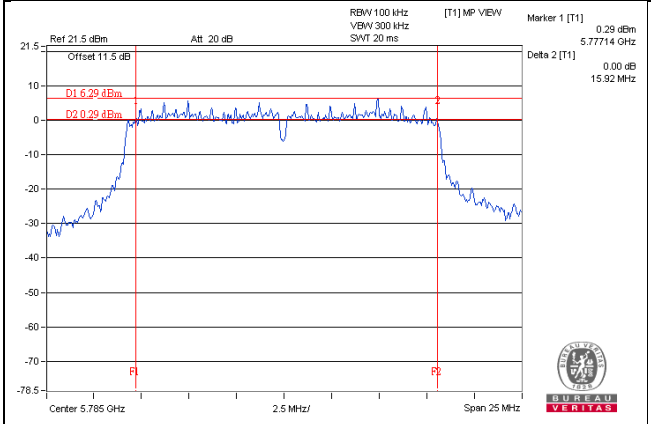
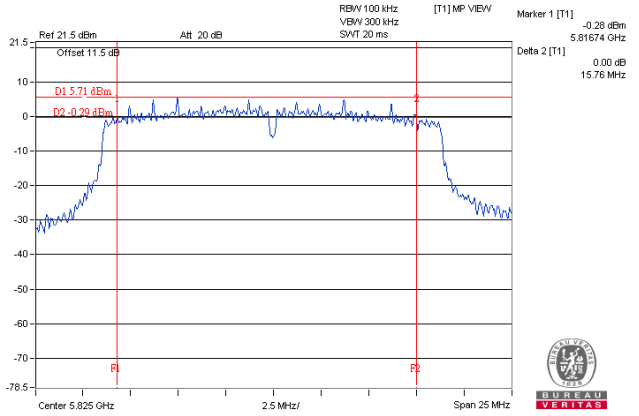
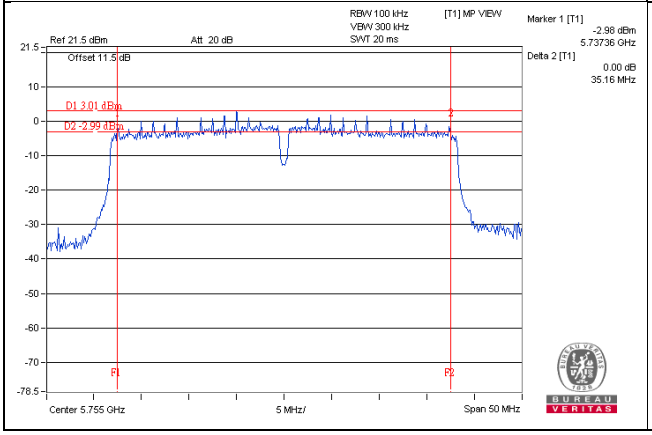
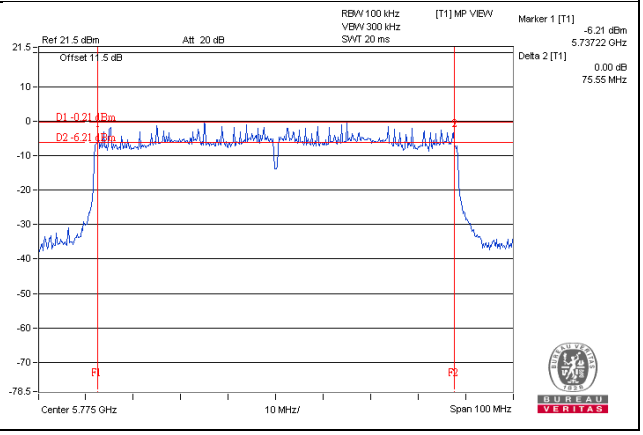
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.61	16.31	0.5	PASS
157	5785	17.65	16.52	0.5	PASS
165	5825	17.62	15.76	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.32	35.16	0.5	PASS
159	5795	35.29	35.17	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.90	75.55	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain1 / CH157	**802.11ac (VHT20)_Chain1 / CH165**
	
802.11ac (VHT40)_Chain1 / CH151	**802.11ac (VHT80)_Chain1 / CH155**
	

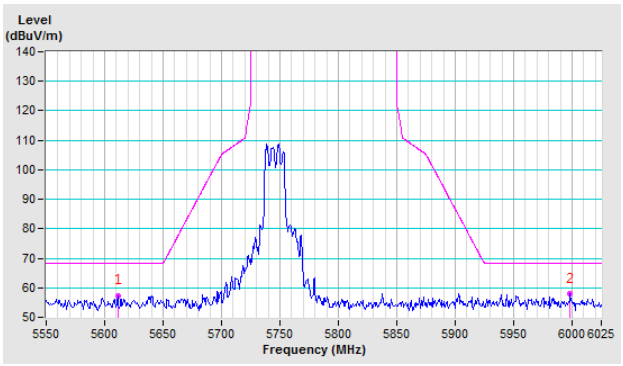
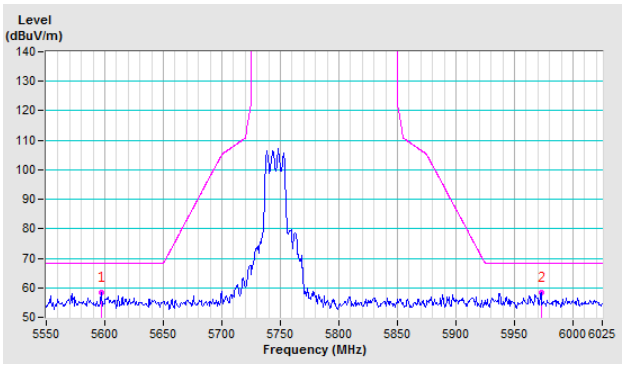
5 Pictures of Test Arrangements

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

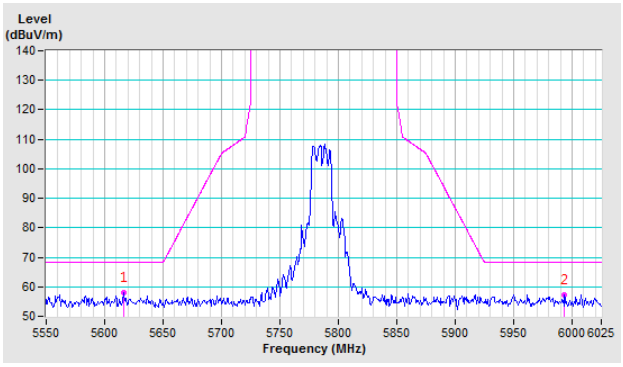
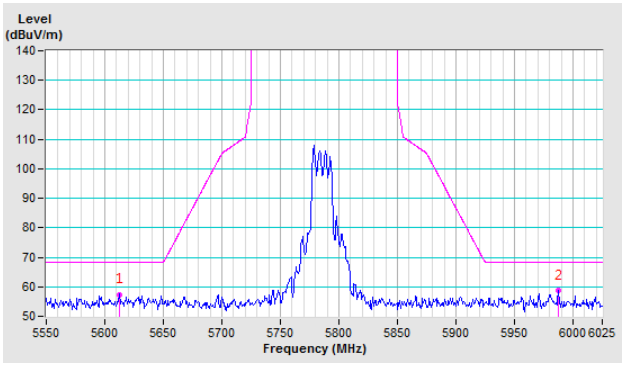
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

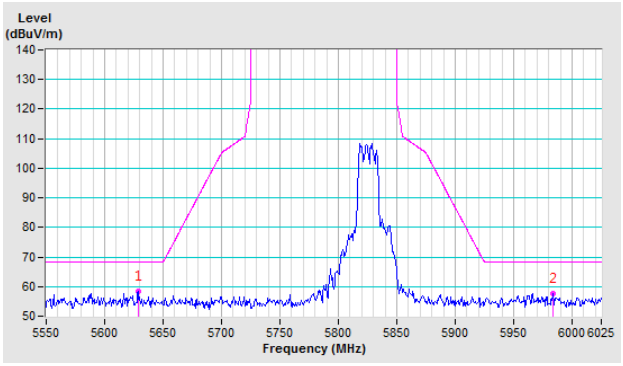
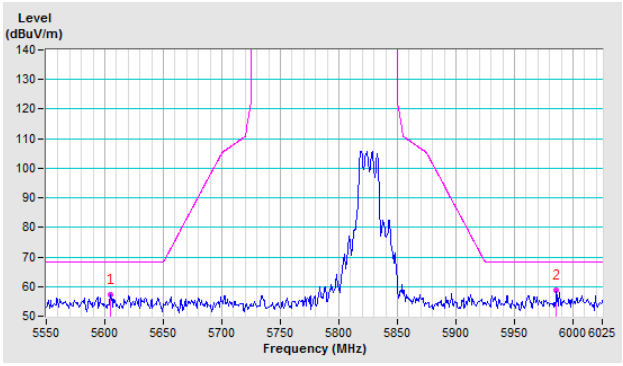
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

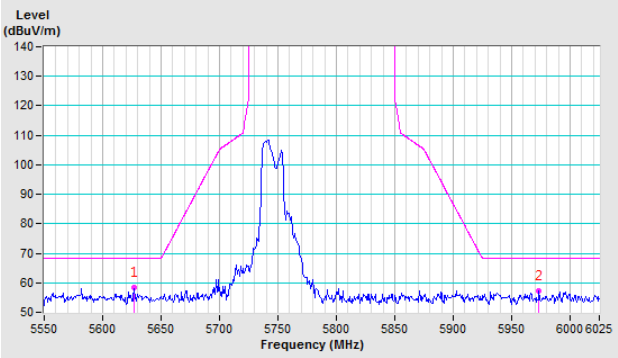
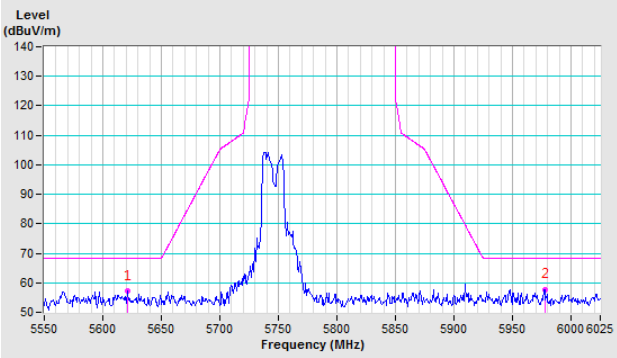
Horizontal	Vertical
	

CH 165 5825 MHz

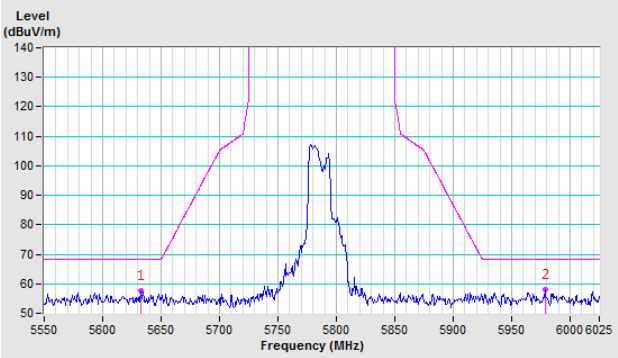
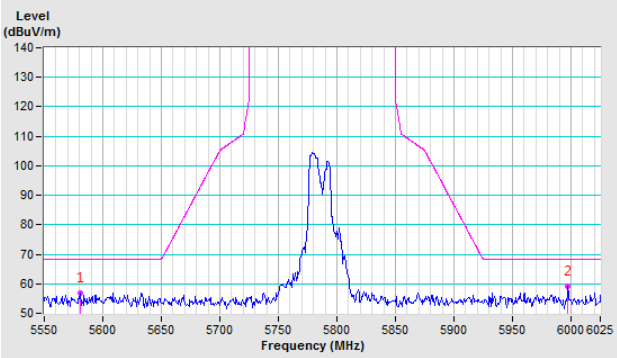
Horizontal	Vertical
	

802.11ac (VHT20)

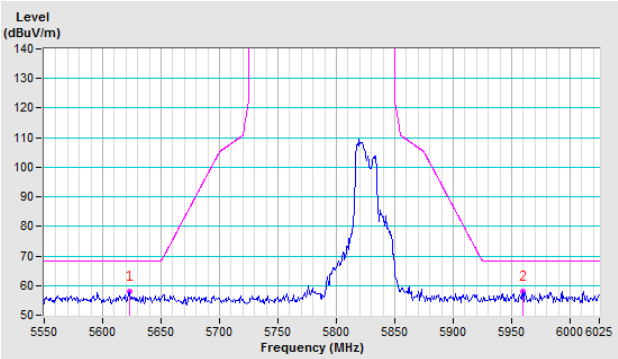
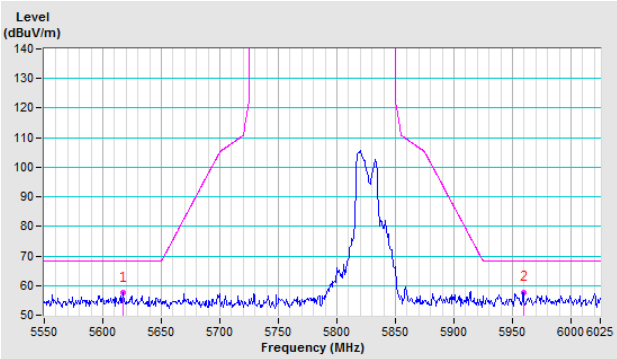
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

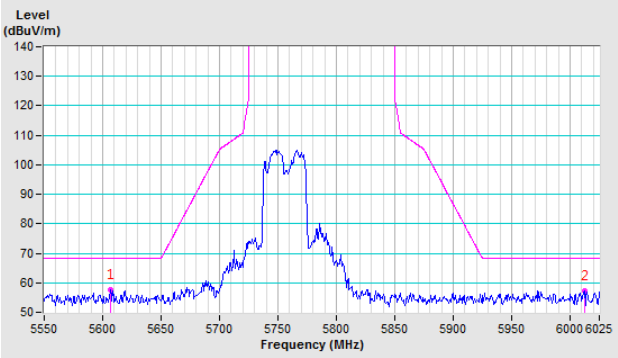
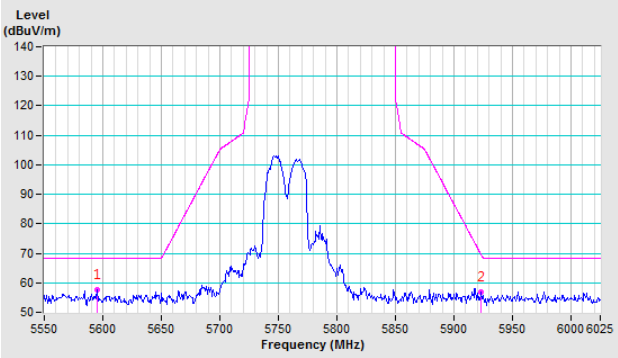
Horizontal	Vertical
	

CH 165 5825 MHz

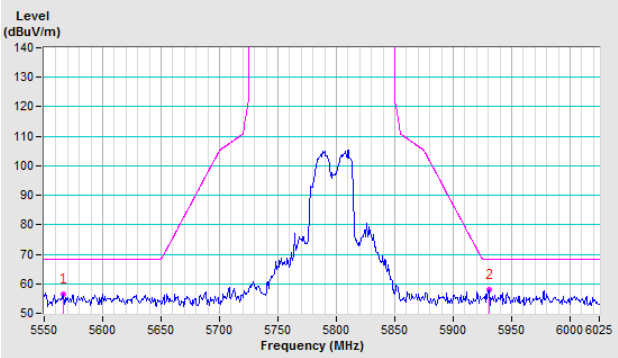
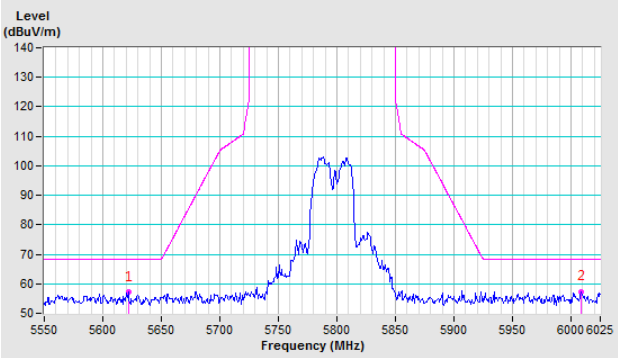
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

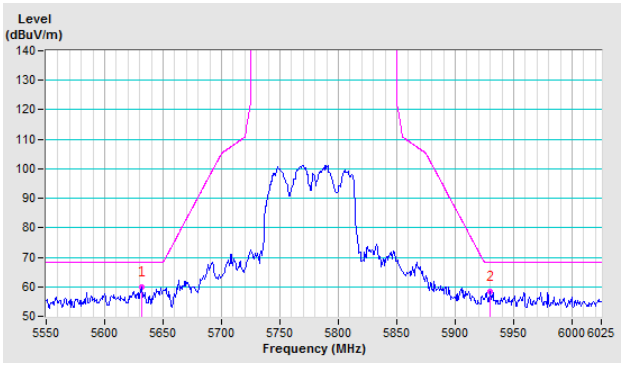
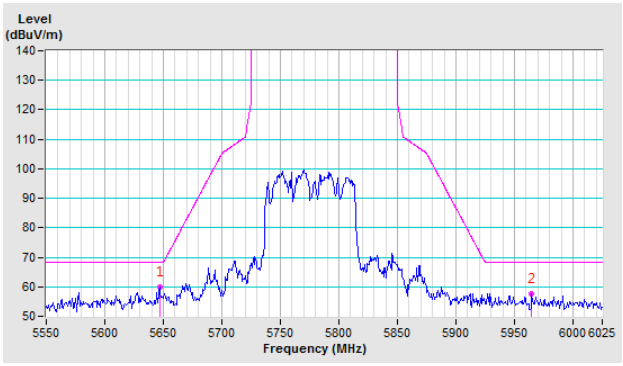
Horizontal	Vertical
	

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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