

FCC Test Report

Report No.: RF170508E05A-1

FCC ID: PY317100370

Test Model: EX3110

Received Date: May 08, 2017

Test Date: May 10 to 18, 2017

Issued Date: July 10, 2017

Applicant: Netgear, Inc.

Address: 350 East Plumeria Drive ,San Jose,California 95134,United States

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.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	4
1 Certificate of Conformity.....	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information.....	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	13
3.5 General Description of Applied Standard	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement.....	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedure	18
4.1.4 Deviation from Test Standard	18
4.1.5 Test Setup.....	19
4.1.6 EUT Operating Condition	20
4.1.7 Test Results	21
4.2 Conducted Emission Measurement	40
4.2.1 Limits of Conducted Emission Measurement	40
4.2.2 Test Instruments	40
4.2.3 Test Procedure	41
4.2.4 Deviation from Test Standard	41
4.2.5 Test Setup.....	41
4.2.6 EUT Operating Condition	41
4.2.7 Test Results	42
4.3 Transmit Power Measurement	44
4.3.1 Limits of Transmit Power Measurement	44
4.3.2 Test Setup.....	44
4.3.3 Test Instruments	44
4.3.4 Test Procedure	44
4.3.5 Deviation from Test Standard	44
4.3.6 EUT Operating Condition	44
4.3.7 Test Result.....	45
4.4 Occupied Bandwidth Measurement	46
4.4.1 Test Setup.....	46
4.4.2 Test Instruments	46
4.4.3 Test Procedure	46
4.4.4 Test Results	47
4.5 Peak Power Spectral Density Measurement	51
4.5.1 Limits of Peak Power Spectral Density Measurement	51
4.5.2 Test Setup.....	51
4.5.3 Test Instruments	51
4.5.4 Test Procedure	51
4.5.5 Deviation from Test Standard	51
4.5.6 EUT Operating Condition	52
4.5.7 Test Results	53
4.6 Frequency Stability Measurement.....	59
4.6.1 Limits of Frequency Stability Measurement	59

4.6.2	Test Setup.....	59
4.6.3	Test Instruments	59
4.6.4	Test Procedure	59
4.6.5	Deviation from Test Standard	59
4.6.6	EUT Operating Condition	59
4.6.7	Test Results	60
4.7	6dB Bandwidth Measurment.....	61
4.7.1	Limits of 6dB Bandwidth Measurement.....	61
4.7.2	Test Setup.....	61
4.7.3	Test Instruments	61
4.7.4	Test Procedure	61
4.7.5	Deviation from Test Standard	61
4.7.6	EUT Operating Condition	61
4.7.7	Test Results	62
5	Pictures of Test Arrangements.....	64
	Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)	65
	Appendix – Information on the Testing Laboratories	68

Release Control Record

Issue No.	Description	Date Issued
RF170508E05A-1	Original release.	July 10, 2017

1 Certificate of Conformity

Product: AC750 WiFi Range Extender

Brand: NETGEAR

Test Model: EX3110

Sample Status: ENGINEERING SAMPLE

Applicant: Netgear, Inc.

Test Date: May 10 to 18, 2017

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10: 2013

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

Prepared by :  , **Date:** July 10, 2017
Wendy Wu / Specialist

Approved by :  , **Date:** July 10, 2017
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -3.04dB at 21.66306MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00MHz, 15600.00MHz.
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	No antenna connector is used.

*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) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AC750 WiFi Range Extender
Brand	NETGEAR
Test Model	EX3110
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	AC 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 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.4GHz: 779.985mW 5.18 ~ 5.24GHz: 198.677mW 5.745 ~ 5.825GHz: 242.326mW
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:

Ant No.	Antenna Gain(dBi)	Frequency range	Antenna Type
1	1.98	2.4~2.4835GHz	PIFA
	2.52	5.15~5.25GHz	
	2.68	5.25~5.35GHz	
	2.68	5.47~5.725GHz	
	2.7	5.725~5.85GHz	
2	1.34	2.4~2.4835GHz	PIFA
	3.15	5.15~5.25GHz	
	3.26	5.25~5.35GHz	
	3.26	5.47~5.725GHz	
	3.24	5.725~5.85GHz	

3. 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	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
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

Note:

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

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	165	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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240 5745-5825	36 to 48 149 to 165	165	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.

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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	25deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	22deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin
PLC	26deg. C, 69%RH	120Vac, 60Hz	Andy Ho
APCM	21deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

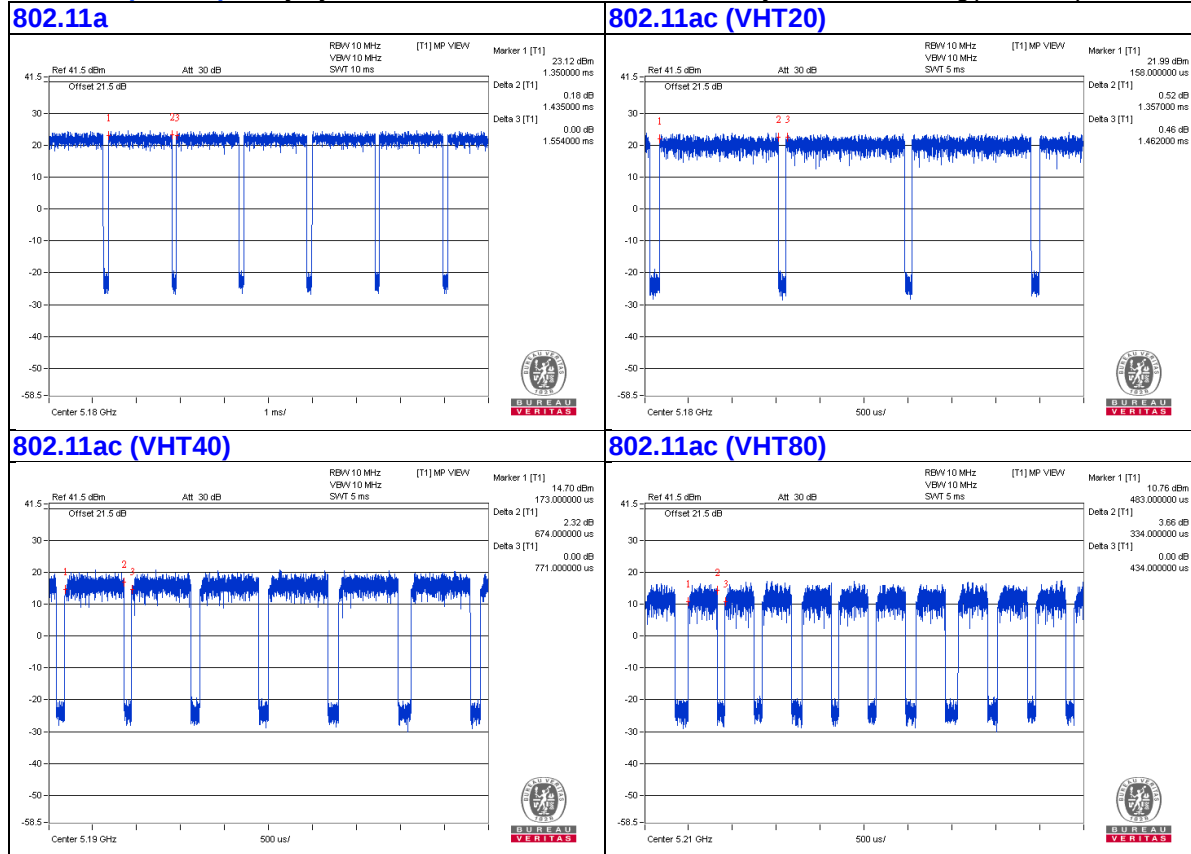
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11a: Duty cycle = 2.063 ms/2.14 ms = 0.964, Duty factor = $10 * \log(1/0.964) = 0.16$

802.11ac (VHT20): Duty cycle = 3.711ms/3.81 ms = 0.974, Duty factor = $10 * \log(1/0.974) = 0.11$

802.11ac (VHT40): Duty cycle = 1.807 ms/1.904 ms = 0.949, Duty factor = $10 * \log(1/0.949) = 0.23$

802.11ac (VHT80): Duty cycle = 0.855 ms/0.96 ms = 0.891, Duty factor = $10 * \log(1/0.891) = 0.50$



3.4 Description of Support Units

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

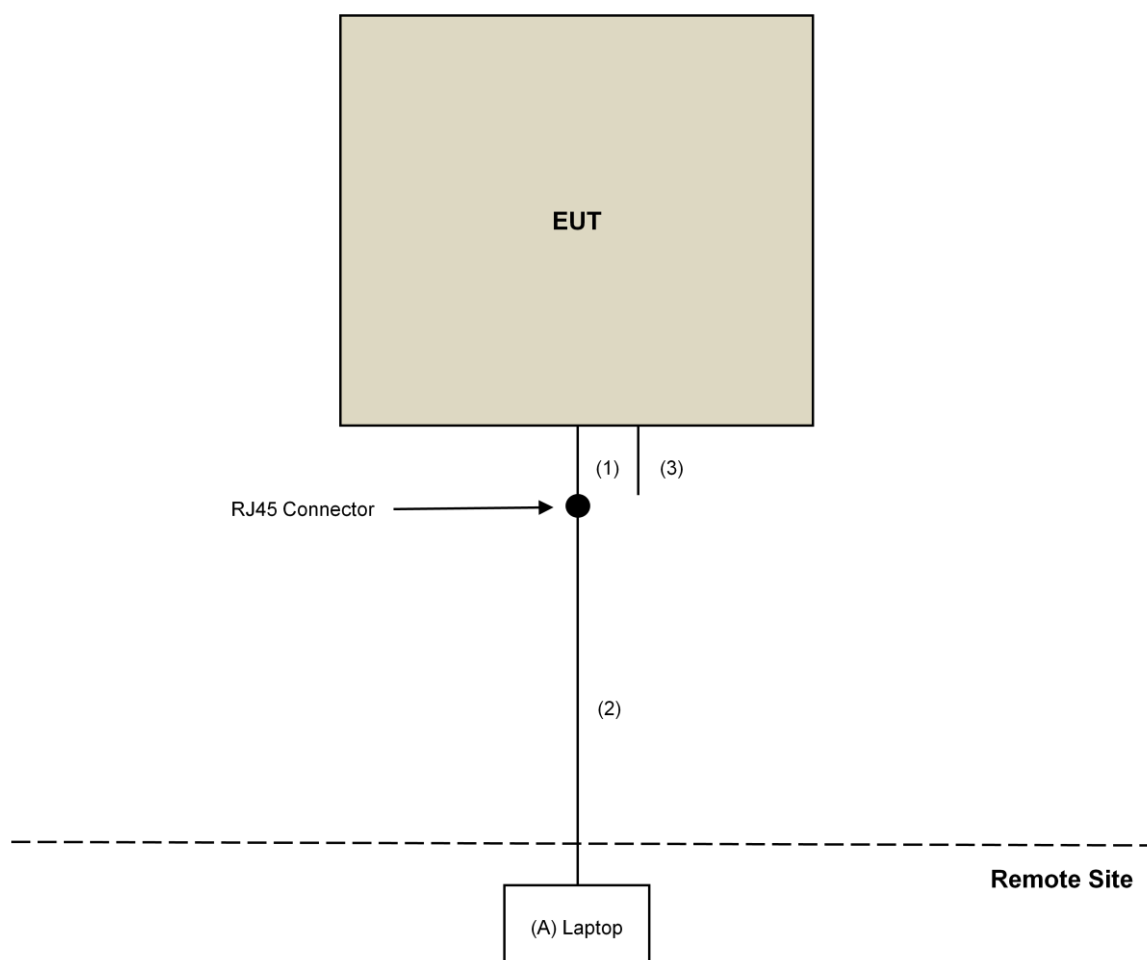
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RF Cable	1	0.1	No	0	Supplied by client (for RF Setup)
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RF Cable	1	0.1	No	0	Supplied by client (for RF Setup)

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v01r04

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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 v01r04			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:

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

4.1.2 Test Instruments

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 27, 2016	Dec. 26, 2017
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200	160923	Feb. 02, 2017	Feb. 01, 2018
	EMC104-SM-SM-2000	150318	Mar. 29, 2017	Mar. 28, 2018
	EMC104-SM-SM-5000	150323	Mar. 29, 2017	Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The FCC Site Registration No. is 292998
4. The CANADA Site Registration No. is 20331-2
5. Tested Date: May 10, 2017

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 20, 2016	July 19, 2017
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 10, 2016	Nov. 09, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Dec. 13, 2016	Dec. 12, 2017
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 05, 2016	Oct. 04, 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	FSv40	100964	June 28, 2016	June 27, 2017
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2016	Nov. 09, 2017

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 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: May 17 to 18, 2017

4.1.3 Test Procedure

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) 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

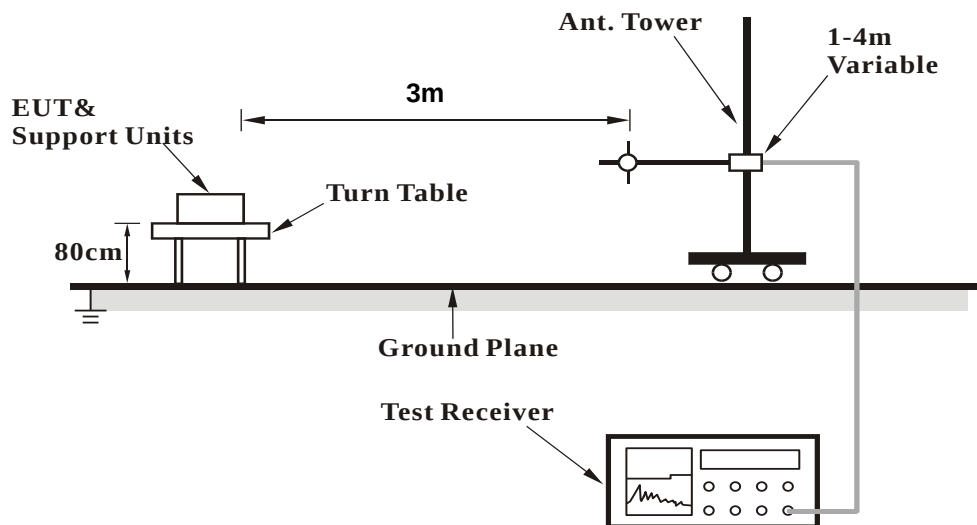
No deviation.

4.1.5 Test Setup

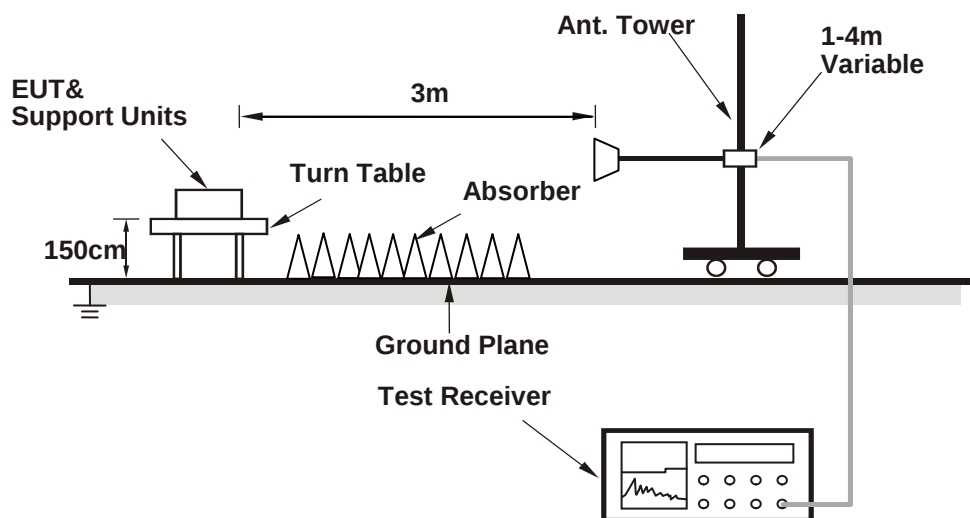
For Radiated emission below 30MHz



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

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (MT76xxE_AP.exe [V0.0.2.3]) 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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.3 PK	74.0	-15.7	1.72 H	336	54.3	4.0
2	5150.00	46.2 AV	54.0	-7.8	1.72 H	336	42.2	4.0
3	*5180.00	108.7 PK			1.72 H	336	104.7	4.0
4	*5180.00	99.8 AV			1.72 H	336	95.8	4.0
5	#10360.00	43.7 PK	74.0	-30.3	1.59 H	42	30.1	13.6
6	#10360.00	33.3 AV	54.0	-20.7	1.59 H	42	19.7	13.6
7	15540.00	65.3 PK	74.0	-8.7	1.84 H	59	52.1	13.2
8	15540.00	53.7 AV	54.0	-0.3	1.84 H	59	40.5	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.8 PK	74.0	-19.2	1.09 V	360	50.8	4.0
2	5150.00	44.3 AV	54.0	-9.7	1.09 V	360	40.3	4.0
3	*5180.00	108.4 PK			1.09 V	360	104.4	4.0
4	*5180.00	100.4 AV			1.09 V	360	96.4	4.0
5	#10360.00	45.9 PK	74.0	-28.1	2.03 V	162	32.3	13.6
6	#10360.00	34.9 AV	54.0	-19.1	2.03 V	162	21.3	13.6
7	15540.00	66.2 PK	74.0	-7.8	1.83 V	360	53.0	13.2
8	15540.00	53.1 AV	54.0	-0.9	1.83 V	360	39.9	13.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	110.5 PK			1.92 H	360	106.5	4.0
2	*5200.00	101.9 AV			1.92 H	360	97.9	4.0
3	#10400.00	43.8 PK	74.0	-30.2	1.58 H	42	30.2	13.6
4	#10400.00	33.2 AV	54.0	-20.8	1.58 H	42	19.6	13.6
5	15600.00	66.4 PK	74.0	-7.6	1.82 H	68	53.0	13.4
6	15600.00	53.7 AV	54.0	-0.3	1.82 H	68	40.3	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	108.6 PK			1.00 V	334	104.6	4.0
2	*5200.00	100.0 AV			1.00 V	334	96.0	4.0
3	#10400.00	46.1 PK	74.0	-27.9	1.97 V	155	32.5	13.6
4	#10400.00	34.8 AV	54.0	-19.2	1.97 V	155	21.2	13.6
5	15600.00	63.2 PK	74.0	-10.8	1.80 V	360	49.8	13.4
6	15600.00	51.5 AV	54.0	-2.5	1.80 V	360	38.1	13.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	108.1 PK			1.13 H	327	103.9	4.2
2	*5240.00	99.7 AV			1.13 H	327	95.5	4.2
3	5350.00	49.0 PK	74.0	-25.0	1.13 H	327	44.6	4.4
4	5350.00	37.4 AV	54.0	-16.6	1.13 H	327	33.0	4.4
5	#10480.00	43.5 PK	74.0	-30.5	1.62 H	33	29.8	13.7
6	#10480.00	32.9 AV	54.0	-21.1	1.62 H	33	19.2	13.7
7	15720.00	65.3 PK	74.0	-8.7	1.90 H	53	51.3	14.0
8	15720.00	53.8 AV	54.0	-0.2	1.90 H	53	39.8	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	108.6 PK			1.00 V	360	104.4	4.2
2	*5240.00	99.8 AV			1.00 V	360	95.6	4.2
3	5350.00	48.6 PK	74.0	-25.4	1.00 V	360	44.2	4.4
4	5350.00	37.8 AV	54.0	-16.2	1.00 V	360	33.4	4.4
5	#10480.00	46.5 PK	74.0	-27.5	1.92 V	147	32.8	13.7
6	#10480.00	35.2 AV	54.0	-18.8	1.92 V	147	21.5	13.7
7	15720.00	63.8 PK	74.0	-10.2	3.62 V	360	49.8	14.0
8	15720.00	51.4 AV	54.0	-2.6	3.62 V	360	37.4	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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5606.05	57.9 PK	68.2	-10.3	2.60 H	340	54.2	3.7
2	*5745.00	114.8 PK			2.60 H	340	109.8	5.0
3	*5745.00	102.4 AV			2.60 H	340	97.4	5.0
4	#5979.87	58.1 PK	68.2	-10.1	2.60 H	340	53.7	4.4
5	11490.00	43.7 PK	74.0	-30.3	1.52 H	34	29.6	14.1
6	11490.00	33.2 AV	54.0	-20.8	1.52 H	34	19.1	14.1
7	#17235.00	66.0 PK	74.0	-8.0	2.30 H	360	47.7	18.3
8	#17235.00	53.1 AV	54.0	-0.9	2.30 H	360	34.8	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5647.85	59.2 PK	68.2	-9.0	2.46 V	360	55.5	3.7
2	*5745.00	116.1 PK			2.46 V	360	111.1	5.0
3	*5745.00	104.2 AV			2.46 V	360	99.2	5.0
4	#5963.25	58.8 PK	68.2	-9.4	2.46 V	360	54.4	4.4
5	11490.00	45.3 PK	74.0	-28.7	2.02 V	174	31.2	14.1
6	11490.00	34.4 AV	54.0	-19.6	2.02 V	174	20.3	14.1
7	#17235.00	60.4 PK	74.0	-13.6	1.78 V	29	42.1	18.3
8	#17235.00	50.2 AV	54.0	-3.8	1.78 V	29	31.9	18.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.05	58.6 PK	68.2	-9.6	2.62 H	323	54.9	3.7
2	*5785.00	115.2 PK			2.62 H	323	110.2	5.0
3	*5785.00	103.0 AV			2.62 H	323	98.0	5.0
4	#5992.23	57.2 PK	68.2	-11.0	2.62 H	323	52.8	4.4
5	11570.00	44.1 PK	74.0	-29.9	1.53 H	40	30.1	14.0
6	11570.00	33.6 AV	54.0	-20.4	1.53 H	40	19.6	14.0
7	#17355.00	62.4 PK	74.0	-11.6	1.00 H	36	43.5	18.9
8	#17355.00	49.5 AV	54.0	-4.5	1.00 H	36	30.6	18.9
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	#5592.75	57.5 PK	68.2	-10.7	2.45 V	360	53.9	3.6
2	*5785.00	116.7 PK			2.45 V	360	111.7	5.0
3	*5785.00	104.6 AV			2.45 V	360	99.6	5.0
4	#5974.65	58.1 PK	68.2	-10.1	2.45 V	360	53.7	4.4
5	11570.00	45.5 PK	74.0	-28.5	2.01 V	164	31.5	14.0
6	11570.00	34.4 AV	54.0	-19.6	2.01 V	164	20.4	14.0
7	#17355.00	56.3 PK	74.0	-17.7	1.72 V	28	37.4	18.9
8	#17355.00	45.3 AV	54.0	-8.7	1.72 V	28	26.4	18.9

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5597.98	59.5 PK	68.2	-8.7	2.38 H	338	55.9	3.6
2	*5825.00	114.6 PK			2.38 H	338	109.4	5.2
3	*5825.00	102.6 AV			2.38 H	338	97.4	5.2
4	#5945.68	58.3 PK	68.2	-9.9	2.38 H	338	54.0	4.3
5	11650.00	44.2 PK	74.0	-29.8	1.55 H	53	30.1	14.1
6	11650.00	33.7 AV	54.0	-20.3	1.55 H	53	19.6	14.1
7	#17475.00	62.3 PK	74.0	-11.7	2.22 H	360	42.6	19.7
8	#17475.00	49.1 AV	54.0	-4.9	2.22 H	360	29.4	19.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.43	59.2 PK	68.2	-9.0	2.48 V	360	55.5	3.7
2	*5825.00	116.8 PK			2.48 V	360	111.6	5.2
3	*5825.00	104.8 AV			2.48 V	360	99.6	5.2
4	#5969.90	57.6 PK	68.2	-10.6	2.48 V	360	53.2	4.4
5	11650.00	46.1 PK	74.0	-27.9	1.96 V	160	32.0	14.1
6	11650.00	34.8 AV	54.0	-19.2	1.96 V	160	20.7	14.1
7	#17475.00	56.7 PK	74.0	-17.3	1.68 V	37	37.0	19.7
8	#17475.00	45.4 AV	54.0	-8.6	1.68 V	37	25.7	19.7

REMARKS:

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

802.11ac (VHT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.3 PK	74.0	-5.7	1.10 H	17	64.3	4.0
2	5150.00	49.3 AV	54.0	-4.7	1.10 H	17	45.3	4.0
3	*5180.00	110.2 PK			1.10 H	17	106.2	4.0
4	*5180.00	101.6 AV			1.10 H	17	97.6	4.0
5	#10360.00	47.6 PK	74.0	-26.4	2.21 H	47	34.0	13.6
6	#10360.00	36.0 AV	54.0	-18.0	2.21 H	47	22.4	13.6
7	15540.00	68.1 PK	74.0	-5.9	1.77 H	67	54.9	13.2
8	15540.00	53.8 AV	54.0	-0.2	1.77 H	67	40.6	13.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	60.4 PK	74.0	-13.6	2.36 V	329	56.4	4.0
2	5150.00	46.6 AV	54.0	-7.4	2.36 V	329	42.6	4.0
3	*5180.00	109.6 PK			2.36 V	329	105.6	4.0
4	*5180.00	100.7 AV			2.36 V	329	96.7	4.0
5	#10360.00	48.6 PK	74.0	-25.4	2.10 V	0	35.0	13.6
6	#10360.00	35.4 AV	54.0	-18.6	2.10 V	0	21.8	13.6
7	15540.00	66.9 PK	74.0	-7.1	1.83 V	25	53.7	13.2
8	15540.00	52.6 AV	54.0	-1.4	1.83 V	25	39.4	13.2

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	54.2 PK	74.0	-19.8	1.00 H	360	50.2	4.0
2	5150.00	40.0 AV	54.0	-14.0	1.00 H	360	36.0	4.0
3	*5200.00	110.3 PK			1.00 H	360	106.3	4.0
4	*5200.00	102.0 AV			1.00 H	360	98.0	4.0
5	#10400.00	45.1 PK	74.0	-28.9	2.18 H	50	31.5	13.6
6	#10400.00	35.5 AV	54.0	-18.5	2.18 H	50	21.9	13.6
7	15600.00	68.2 PK	74.0	-5.8	1.82 H	58	54.8	13.4
8	15600.00	53.9 AV	54.0	-0.1	1.82 H	58	40.5	13.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	53.9 PK	74.0	-20.1	2.96 V	330	49.9	4.0
2	5150.00	39.2 AV	54.0	-14.8	2.96 V	330	35.2	4.0
3	*5200.00	110.0 PK			2.96 V	330	106.0	4.0
4	*5200.00	101.1 AV			2.96 V	330	97.1	4.0
5	#10400.00	48.5 PK	74.0	-25.5	2.06 V	9	34.9	13.6
6	#10400.00	35.4 AV	54.0	-18.6	2.06 V	9	21.8	13.6
7	15600.00	66.9 PK	74.0	-7.1	1.83 V	24	53.5	13.4
8	15600.00	53.7 AV	54.0	-0.3	1.83 V	24	40.3	13.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	110.4 PK			1.10 H	326	106.2	4.2
2	*5240.00	102.2 AV			1.10 H	326	98.0	4.2
3	#10480.00	44.5 PK	74.0	-29.5	1.55 H	50	30.8	13.7
4	#10480.00	33.8 AV	54.0	-20.2	1.55 H	50	20.1	13.7
5	15720.00	67.5 PK	74.0	-6.5	1.81 H	58	53.5	14.0
6	15720.00	53.8 AV	54.0	-0.2	1.81 H	58	39.8	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	109.9 PK			3.45 V	319	105.7	4.2
2	*5240.00	101.5 AV			3.45 V	319	97.3	4.2
3	#10480.00	48.3 PK	74.0	-25.7	2.05 V	3	34.6	13.7
4	#10480.00	35.5 AV	54.0	-18.5	2.05 V	3	21.8	13.7
5	15720.00	67.1 PK	74.0	-6.9	1.83 V	36	53.1	14.0
6	15720.00	53.6 AV	54.0	-0.4	1.83 V	36	39.6	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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5582.30	58.5 PK	68.2	-9.7	3.16 H	323	54.9	3.6
2	*5745.00	113.3 PK			3.16 H	323	108.3	5.0
3	*5745.00	103.8 AV			3.16 H	323	98.8	5.0
4	#5940.45	58.5 PK	68.2	-9.7	3.16 H	323	54.2	4.3
5	11490.00	44.3 PK	74.0	-29.7	1.50 H	67	30.2	14.1
6	11490.00	33.8 AV	54.0	-20.2	1.50 H	67	19.7	14.1
7	#17235.00	62.9 PK	74.0	-11.1	1.88 H	360	44.6	18.3
8	#17235.00	49.6 AV	54.0	-4.4	1.88 H	360	31.3	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5598.45	58.1 PK	68.2	-10.1	2.33 V	19	54.5	3.6
2	*5745.00	115.4 PK			2.33 V	19	110.4	5.0
3	*5745.00	106.2 AV			2.33 V	19	101.2	5.0
4	#5948.52	59.0 PK	68.2	-9.2	2.33 V	19	54.7	4.3
5	11490.00	46.0 PK	74.0	-28.0	1.92 V	154	31.9	14.1
6	11490.00	35.0 AV	54.0	-19.0	1.92 V	154	20.9	14.1
7	#17235.00	58.8 PK	74.0	-15.2	1.73 V	32	40.5	18.3
8	#17235.00	48.6 AV	54.0	-5.4	1.73 V	32	30.3	18.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.62	58.4 PK	68.2	-9.8	2.84 H	18	54.7	3.7
2	*5785.00	114.0 PK			2.59 H	18	109.0	5.0
3	*5785.00	104.5 AV			2.59 H	18	99.5	5.0
4	#5936.18	57.6 PK	68.2	-10.6	2.84 H	18	53.3	4.3
5	11570.00	44.2 PK	74.0	-29.8	1.60 H	58	30.2	14.0
6	11570.00	34.0 AV	54.0	-20.0	1.60 H	58	20.0	14.0
7	#17355.00	60.5 PK	74.0	-13.5	1.80 H	360	41.6	18.9
8	#17355.00	49.1 AV	54.0	-4.9	1.80 H	360	30.2	18.9
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	#5591.80	58.3 PK	68.2	-9.9	2.62 V	347	54.7	3.6
2	*5785.00	115.6 PK			2.62 V	347	110.6	5.0
3	*5785.00	106.3 AV			2.62 V	347	101.3	5.0
4	#5976.55	59.1 PK	68.2	-9.1	2.62 V	347	54.7	4.4
5	11570.00	45.7 PK	74.0	-28.3	1.91 V	147	31.7	14.0
6	11570.00	34.7 AV	54.0	-19.3	1.91 V	147	20.7	14.0
7	#17355.00	58.7 PK	74.0	-15.3	1.67 V	45	39.8	18.9
8	#17355.00	48.7 AV	54.0	-5.3	1.67 V	45	29.8	18.9

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5595.60	57.3 PK	68.2	-10.9	2.59 H	3	53.7	3.6
2	*5825.00	113.0 PK			2.59 H	3	107.8	5.2
3	*5825.00	104.0 AV			2.59 H	3	98.8	5.2
4	#5996.02	57.6 PK	68.2	-10.6	2.59 H	3	53.2	4.4
5	11650.00	43.9 PK	74.0	-30.1	1.59 H	37	29.8	14.1
6	11650.00	33.4 AV	54.0	-20.6	1.59 H	37	19.3	14.1
7	#17475.00	60.2 PK	74.0	-13.8	1.86 H	360	40.5	19.7
8	#17475.00	48.9 AV	54.0	-5.1	1.86 H	360	29.2	19.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5627.43	58.4 PK	68.2	-9.8	2.40 V	349	54.7	3.7
2	*5825.00	115.8 PK			2.40 V	349	110.6	5.2
3	*5825.00	106.5 AV			2.40 V	349	101.3	5.2
4	#5970.37	58.0 PK	68.2	-10.2	2.40 V	347	53.6	4.4
5	11650.00	46.1 PK	74.0	-27.9	1.98 V	153	32.0	14.1
6	11650.00	35.0 AV	54.0	-19.0	1.98 V	153	20.9	14.1
7	#17475.00	58.6 PK	74.0	-15.4	1.68 V	35	38.9	19.7
8	#17475.00	48.5 AV	54.0	-5.5	1.68 V	35	28.8	19.7

REMARKS:

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

802.11ac (VHT40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.7 PK	74.0	-5.3	1.00 H	341	64.7	4.0
2	5150.00	53.9 AV	54.0	-0.1	1.00 H	341	49.9	4.0
3	*5190.00	103.7 PK			1.00 H	341	99.7	4.0
4	*5190.00	95.2 AV			1.00 H	341	91.2	4.0
5	5350.00	48.9 PK	74.0	-25.1	1.00 H	341	44.5	4.4
6	5350.00	37.2 AV	54.0	-16.8	1.00 H	341	32.8	4.4
7	#10380.00	45.1 PK	74.0	-28.9	1.25 H	305	31.5	13.6
8	#10380.00	34.8 AV	54.0	-19.2	1.25 H	305	21.2	13.6
9	15570.00	60.3 PK	74.0	-13.7	1.99 H	346	47.0	13.3
10	15570.00	48.6 AV	54.0	-5.4	1.99 H	346	35.3	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.6 PK	74.0	-7.4	3.84 V	1	62.6	4.0
2	5150.00	52.5 AV	54.0	-1.5	3.84 V	1	48.5	4.0
3	*5190.00	104.5 PK			3.84 V	1	100.5	4.0
4	*5190.00	96.3 AV			3.84 V	1	92.3	4.0
5	5350.00	48.6 PK	74.0	-25.4	3.84 V	1	44.2	4.4
6	5350.00	37.1 AV	54.0	-16.9	3.84 V	1	32.7	4.4
7	#10380.00	44.6 PK	74.0	-29.4	1.87 V	40	31.0	13.6
8	#10380.00	34.8 AV	54.0	-19.2	1.87 V	40	21.2	13.6
9	15570.00	59.5 PK	74.0	-14.5	3.05 V	360	46.2	13.3
10	15570.00	48.4 AV	54.0	-5.6	3.05 V	360	35.1	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	109.4 PK			1.60 H	360	105.2	4.2
2	*5230.00	101.0 AV			1.60 H	360	96.8	4.2
3	5350.00	52.8 PK	74.0	-21.2	1.60 H	360	48.4	4.4
4	5350.00	40.1 AV	54.0	-13.9	1.60 H	360	35.7	4.4
5	#10460.00	44.7 PK	74.0	-29.3	1.28 H	306	31.0	13.7
6	#10460.00	34.6 AV	54.0	-19.4	1.28 H	306	20.9	13.7
7	15690.00	63.1 PK	74.0	-10.9	1.93 H	355	49.1	14.0
8	15690.00	51.5 AV	54.0	-2.5	1.93 H	355	37.5	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	*5230.00	110.5 PK			1.00 V	329	106.3	4.2
2	*5230.00	101.3 AV			1.00 V	329	97.1	4.2
3	5350.00	54.4 PK	74.0	-19.6	1.00 V	329	50.0	4.4
4	5350.00	42.0 AV	54.0	-12.0	1.00 V	329	37.6	4.4
5	#10460.00	45.1 PK	74.0	-28.9	1.85 V	39	31.4	13.7
6	#10460.00	35.1 AV	54.0	-18.9	1.85 V	39	21.4	13.7
7	15690.00	62.5 PK	74.0	-11.5	3.00 V	360	48.5	14.0
8	15690.00	51.1 AV	54.0	-2.9	3.00 V	360	37.1	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 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5628.34	60.0 PK	68.2	-8.2	2.72 H	360	56.3	3.7
2	*5755.00	111.1 PK			2.72 H	360	106.1	5.0
3	*5755.00	101.9 AV			2.72 H	360	96.9	5.0
4	#5937.05	58.3 PK	68.2	-9.9	2.72 H	360	54.0	4.3
5	11510.00	44.1 PK	74.0	-29.9	1.58 H	56	30.1	14.0
6	11510.00	33.8 AV	54.0	-20.2	1.58 H	56	19.8	14.0
7	#17265.00	59.6 PK	74.0	-14.4	1.85 H	360	41.1	18.5
8	#17265.00	47.7 AV	54.0	-6.3	1.85 H	360	29.2	18.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5599.87	60.1 PK	68.2	-8.1	2.51 V	345	56.5	3.6
2	*5755.00	112.9 PK			2.51 V	345	107.9	5.0
3	*5755.00	104.0 AV			2.51 V	345	99.0	5.0
4	#6000.60	58.3 PK	68.2	-9.9	2.51 V	345	53.9	4.4
5	11510.00	46.8 PK	74.0	-27.2	1.98 V	153	32.8	14.0
6	11510.00	35.4 AV	54.0	-18.6	1.98 V	153	21.4	14.0
7	#17265.00	57.1 PK	74.0	-16.9	1.63 V	20	38.6	18.5
8	#17265.00	47.2 AV	54.0	-6.8	1.63 V	20	28.7	18.5

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.17	59.7 PK	68.2	-8.5	2.30 H	332	56.0	3.7
2	*5795.00	111.0 PK			2.30 H	332	105.9	5.1
3	*5795.00	102.2 AV			2.30 H	332	97.1	5.1
4	#5998.63	58.3 PK	68.2	-9.9	2.30 H	332	53.9	4.4
5	11590.00	44.0 PK	74.0	-30.0	1.59 H	57	30.0	14.0
6	11590.00	33.5 AV	54.0	-20.5	1.59 H	57	19.5	14.0
7	#17385.00	60.1 PK	74.0	-13.9	1.85 H	360	41.0	19.1
8	#17385.00	48.0 AV	54.0	-6.0	1.85 H	360	28.9	19.1
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	#5640.45	58.3 PK	68.2	-9.9	2.44 V	360	54.6	3.7
2	*5795.00	112.6 PK			2.44 V	360	107.5	5.1
3	*5795.00	103.9 AV			2.44 V	360	98.8	5.1
4	#5931.61	58.5 PK	68.2	-9.7	2.44 V	360	54.2	4.3
5	11590.00	47.1 PK	74.0	-26.9	1.94 V	139	33.1	14.0
6	11590.00	35.7 AV	54.0	-18.3	1.94 V	139	21.7	14.0
7	#17385.00	56.7 PK	74.0	-17.3	1.63 V	14	37.6	19.1
8	#17385.00	47.1 AV	54.0	-6.9	1.63 V	14	28.0	19.1

REMARKS:

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

802.11ac (VHT80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.3 PK	74.0	-11.7	2.79 H	333	58.3	4.0
2	5150.00	51.7 AV	54.0	-2.3	2.79 H	333	47.7	4.0
3	*5210.00	100.8 PK			2.79 H	333	96.7	4.1
4	*5210.00	90.9 AV			2.79 H	333	86.8	4.1
5	#10420.00	45.2 PK	74.0	-28.8	1.69 H	205	31.6	13.6
6	#10420.00	34.4 AV	54.0	-19.6	1.69 H	205	20.8	13.6
7	15630.00	45.8 PK	74.0	-28.2	1.37 H	271	32.2	13.6
8	15630.00	37.5 AV	54.0	-16.5	1.37 H	271	23.9	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.8 PK	74.0	-8.2	3.95 V	360	61.8	4.0
2	5150.00	53.9 AV	54.0	-0.1	3.95 V	360	49.9	4.0
3	*5210.00	98.4 PK			3.95 V	360	94.3	4.1
4	*5210.00	90.4 AV			3.95 V	360	86.3	4.1
5	#10420.00	46.1 PK	74.0	-27.9	2.49 V	341	32.5	13.6
6	#10420.00	34.8 AV	54.0	-19.2	2.49 V	341	21.2	13.6
7	15630.00	46.0 PK	74.0	-28.0	1.00 V	214	32.4	13.6
8	15630.00	38.0 AV	54.0	-16.0	1.00 V	214	24.4	13.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5650.70	67.0 PK	68.7	-1.7	2.38 H	346	63.4	3.6
2	*5775.00	106.8 PK			2.38 H	346	101.8	5.0
3	*5775.00	97.8 AV			2.38 H	346	92.8	5.0
4	#5925.73	64.3 PK	68.2	-3.9	2.38 H	346	60.0	4.3
5	11550.00	45.8 PK	74.0	-28.2	1.09 H	268	31.8	14.0
6	11550.00	35.6 AV	54.0	-18.4	1.09 H	268	21.6	14.0
7	#17325.00	51.3 PK	74.0	-22.7	2.20 H	18	32.7	18.6
8	#17325.00	40.7 AV	54.0	-13.3	2.20 H	18	22.1	18.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.57	67.5 PK	68.2	-0.7	2.42 V	14	63.8	3.7
2	*5775.00	107.1 PK			2.42 V	14	102.1	5.0
3	*5775.00	98.4 AV			2.42 V	14	93.4	5.0
4	#5932.37	65.4 PK	68.2	-2.8	2.42 V	14	61.1	4.3
5	11550.00	46.1 PK	74.0	-27.9	2.97 V	312	32.1	14.0
6	11550.00	35.9 AV	54.0	-18.1	2.97 V	312	21.9	14.0
7	#17325.00	51.5 PK	74.0	-22.5	1.16 V	360	32.9	18.6
8	#17325.00	40.9 AV	54.0	-13.1	1.16 V	360	22.3	18.6

REMARKS:

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

Below 1GHz Data:

802.11a

CHANNEL	TX Channel 165	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	33.13	24.9 QP	40.0	-15.1	3.00 H	29	33.9	-9.0
2	131.03	25.3 QP	43.5	-18.2	1.50 H	48	34.5	-9.2
3	196.14	29.8 QP	43.5	-13.7	1.00 H	44	41.2	-11.4
4	580.01	40.5 QP	46.0	-5.5	1.50 H	310	41.6	-1.1
5	814.15	27.4 QP	46.0	-18.6	2.00 H	295	24.7	2.7
6	935.13	29.1 QP	46.0	-16.9	1.50 H	47	24.6	4.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.93	31.9 QP	40.0	-8.1	1.00 V	156	40.1	-8.2
2	193.91	26.8 QP	43.5	-16.7	1.00 V	85	37.9	-11.1
3	433.64	21.5 QP	46.0	-24.5	1.50 V	0	25.5	-4.0
4	580.01	33.7 QP	46.0	-12.3	1.00 V	174	34.8	-1.1
5	750.03	27.6 QP	46.0	-18.4	1.50 V	360	25.4	2.2
6	936.39	29.7 QP	46.0	-16.3	2.50 V	16	25.2	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	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
- 3 Tested Date: May 17, 2017

4.2.3 Test Procedure

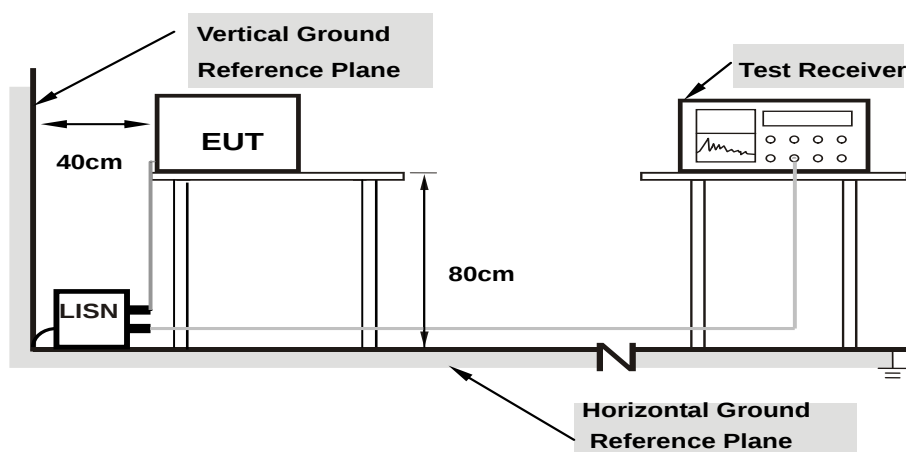
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

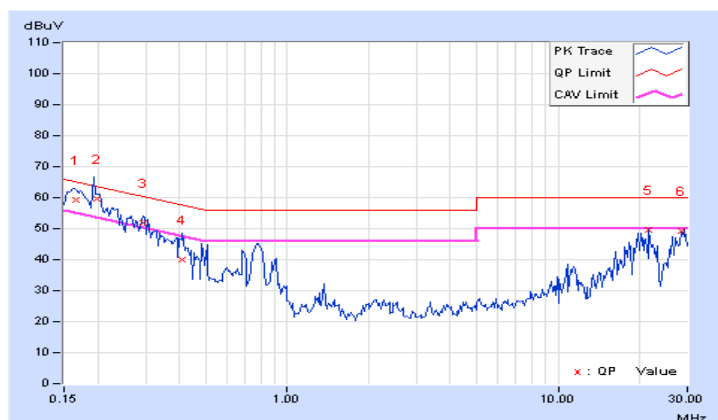
4.2.7 Test Results

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

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16609	10.20	49.03	36.63	59.23	46.83	65.15	55.15	-5.92	-8.32
2	0.19759	10.20	49.26	37.81	59.46	48.01	63.71	53.71	-4.25	-5.70
3	0.29453	10.22	41.59	30.23	51.81	40.45	60.40	50.40	-8.59	-9.95
4	0.41172	10.24	29.64	18.75	39.88	28.99	57.61	47.61	-17.73	-18.62
5	21.66406	11.72	37.82	34.71	49.54	46.43	60.00	50.00	-10.46	-3.57
6	28.68563	11.83	37.51	34.58	49.34	46.41	60.00	50.00	-10.66	-3.59

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.

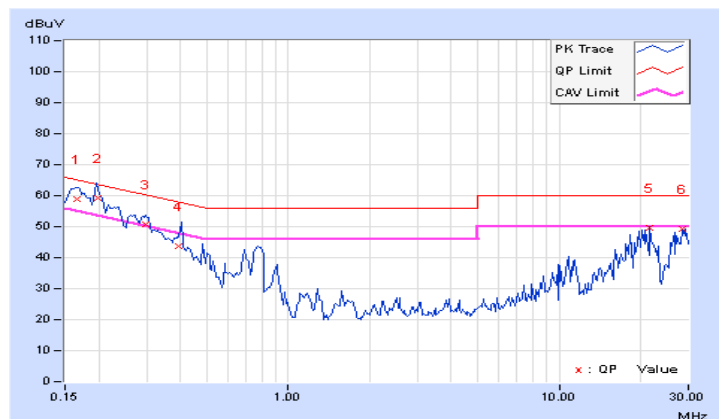


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.18	48.60	36.33	58.78	46.51	65.18	55.18	-6.40	-8.67
2	0.19900	10.17	49.16	37.91	59.33	48.08	63.65	53.65	-4.32	-5.57
3	0.29844	10.20	40.46	29.57	50.66	39.77	60.29	50.29	-9.63	-10.52
4	0.39603	10.24	33.29	21.61	43.53	31.85	57.94	47.94	-14.41	-16.09
5	21.66306	11.38	38.42	35.58	49.80	46.96	60.00	50.00	-10.20	-3.04
6	28.68550	11.40	37.81	35.34	49.21	46.74	60.00	50.00	-10.79	-3.26

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 Measurement

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 $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	√	Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

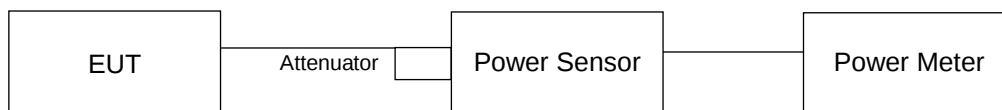
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.12	19.40	189.898	22.79	30.00	Pass
40	5200	20.33	19.58	198.677	22.98	30.00	Pass
48	5240	19.70	19.20	176.501	22.47	30.00	Pass
149	5745	20.75	20.11	221.415	23.45	30.00	Pass
157	5785	21.11	20.32	236.769	23.74	30.00	Pass
165	5825	21.10	20.55	242.326	23.84	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	19.20	18.59	155.453	21.92	30.00	Pass
40	5200	19.75	19.07	175.13	22.43	30.00	Pass
48	5240	19.80	19.20	178.675	22.52	30.00	Pass
149	5745	20.54	19.86	210.068	23.22	30.00	Pass
157	5785	20.66	19.80	211.912	23.26	30.00	Pass
165	5825	20.72	20.45	228.949	23.60	30.00	Pass

802.11ac (VHT40)

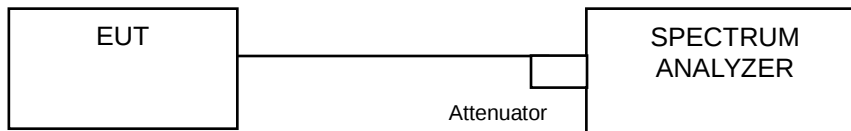
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.65	17.10	109.496	20.39	30.00	Pass
46	5230	19.80	19.04	175.667	22.45	30.00	Pass
151	5755	20.45	19.99	210.687	23.24	30.00	Pass
159	5795	20.66	20.12	219.215	23.41	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.40	14.70	64.186	18.07	30.00	Pass
155	5775	19.52	18.69	163.497	22.14	30.00	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	21.12	17.28
40	5200	21.36	17.04
48	5240	17.16	17.04
149	5745	23.76	18.00
157	5785	26.52	19.56
165	5825	27.36	20.88

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	18.36	17.88
40	5200	18.60	18.12
48	5240	18.48	17.88
149	5745	27.12	18.24
157	5785	27.00	18.24
165	5825	25.32	18.60

802.11ac (VHT40)

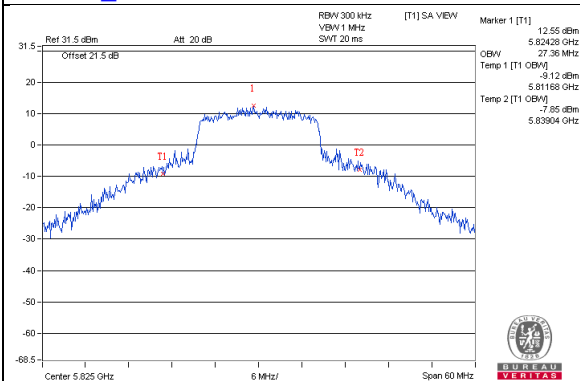
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
38	5190	36.72	36.72
46	5230	37.92	36.96
151	5755	51.60	38.16
159	5795	50.88	39.12

802.11ac (VHT80)

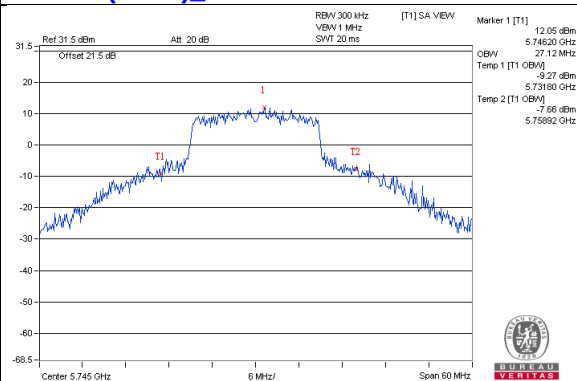
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
42	5210	75.36	74.88
155	5775	104.16	76.80

Spectrum Plot of Worst Value

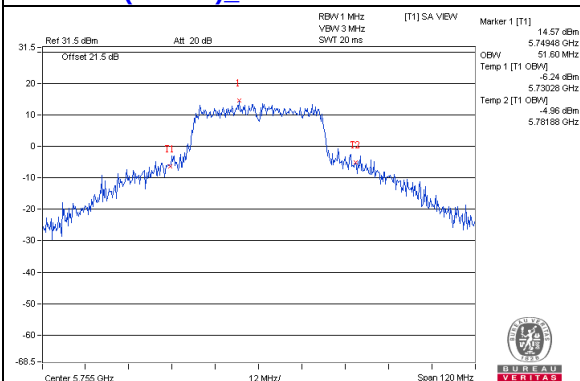
802.11a_Chain0 / CH165



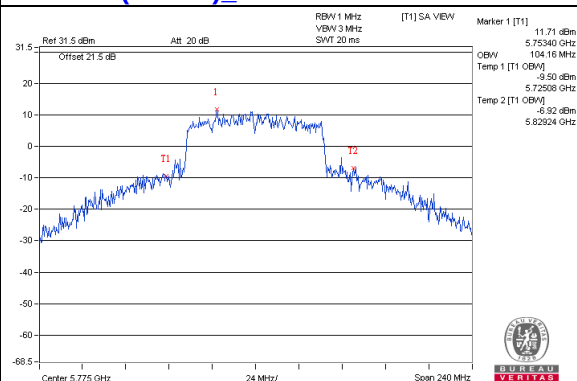
802.11n (HT20)_Chain0 / CH149



802.11ac (VHT40)_Chain0 / CH151

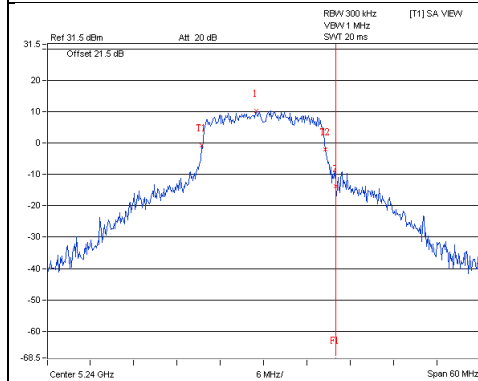


802.11ac (VHT80)_Chain0 / CH155

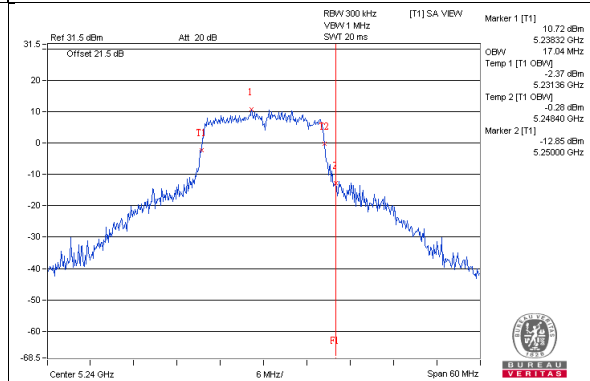


Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)

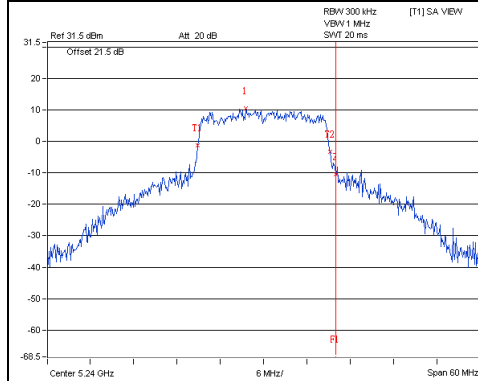
802.11a_Chain0 / CH48



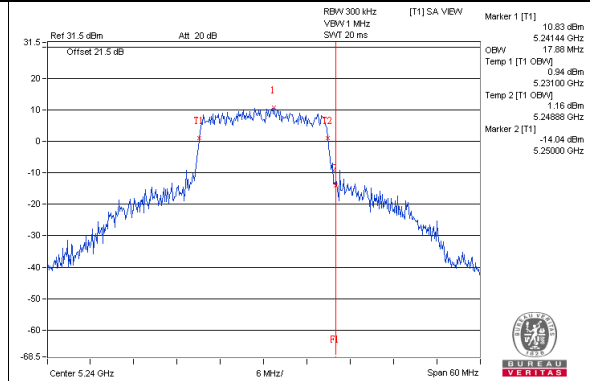
802.11a_Chain1 / CH48



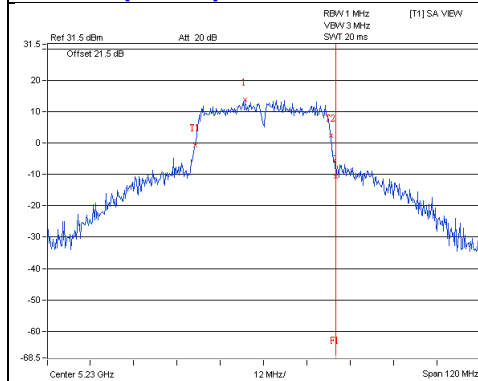
802.11ac(VHT20)_Chain0 / CH48



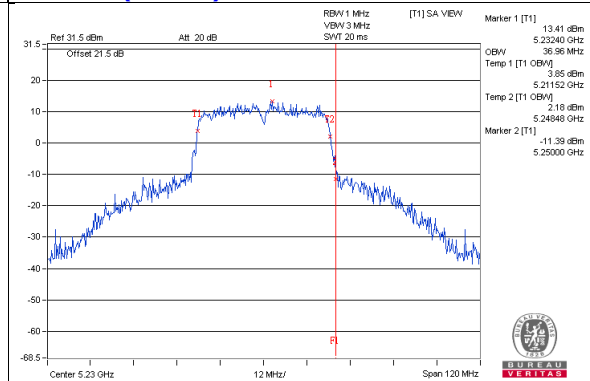
802.11ac(VHT20)_Chain1 / CH48



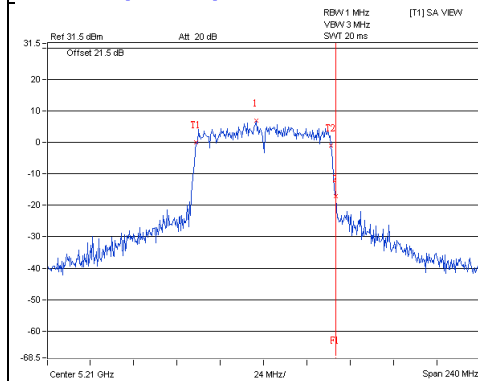
802.11ac(VHT40)_Chain0 / CH46



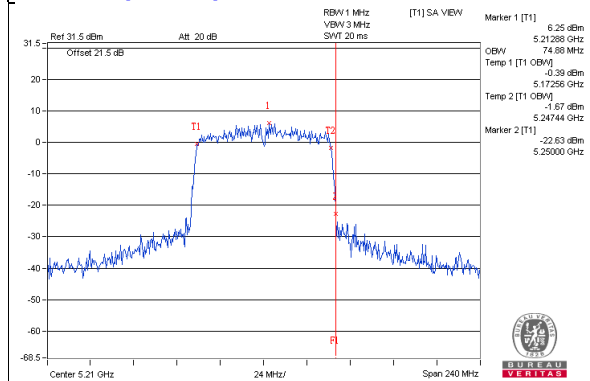
802.11ac(VHT40)_Chain1 / CH46



802.11ac(VHT80)_Chain0 / CH42

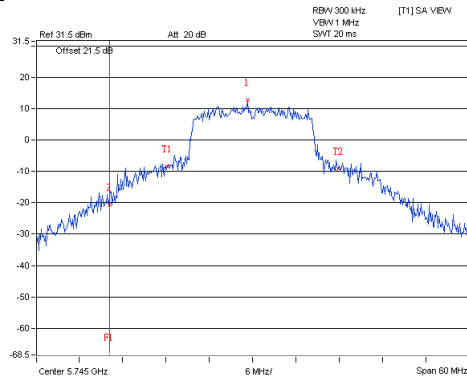


802.11ac(VHT80)_Chain1 / CH42

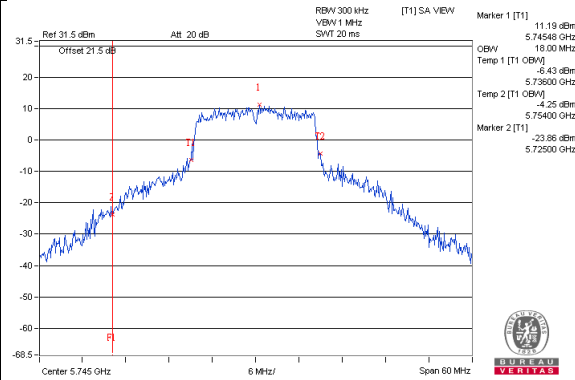


Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)

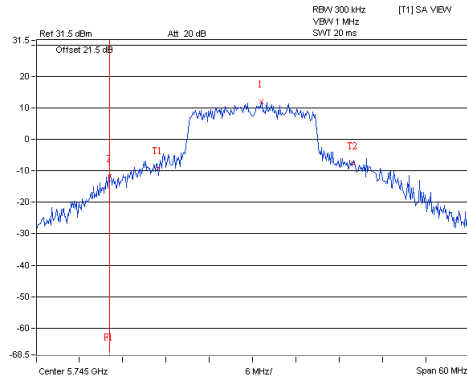
802.11a_Chain0 / CH149



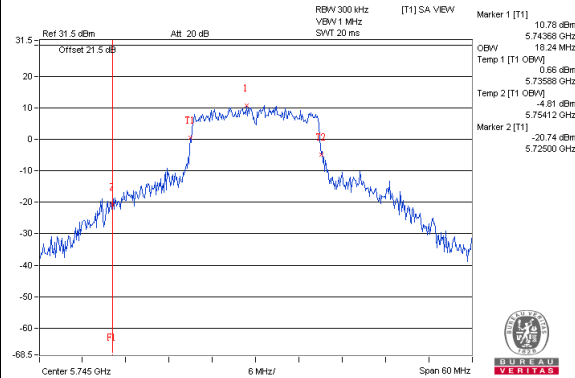
802.11a_Chain1 / CH149



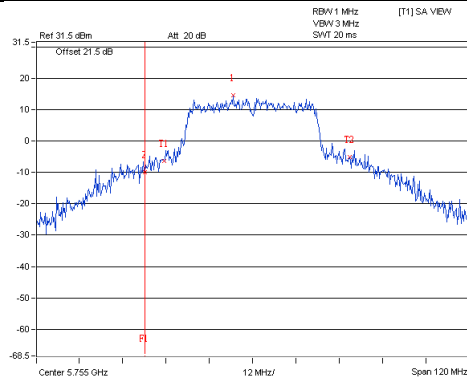
802.11ac(VHT20)_Chain0 / CH149



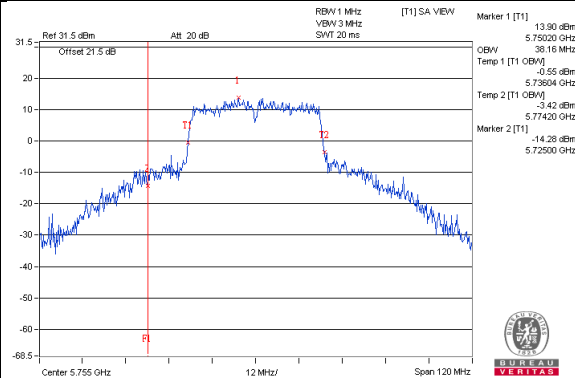
802.11ac(VHT20)_Chain1 / CH149



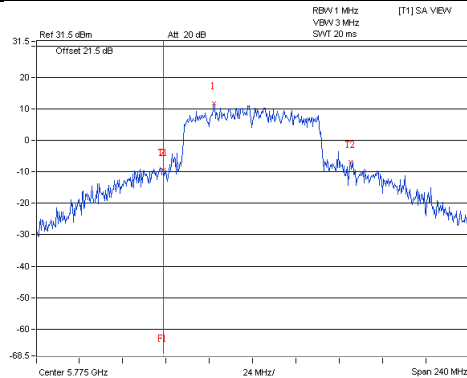
802.11ac(VHT40)_Chain0 / CH151



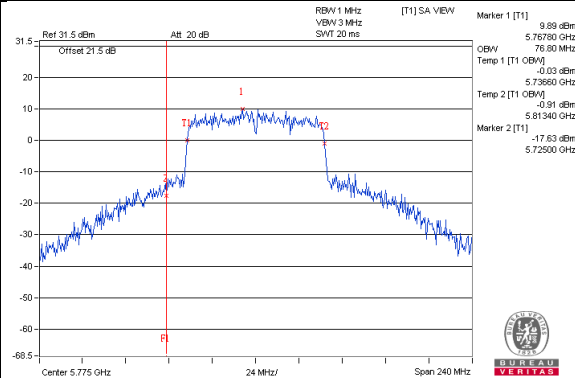
802.11ac(VHT40)_Chain1 / CH151



802.11ac(VHT80)_Chain0 / CH155



802.11ac(VHT80)_Chain1 / CH155

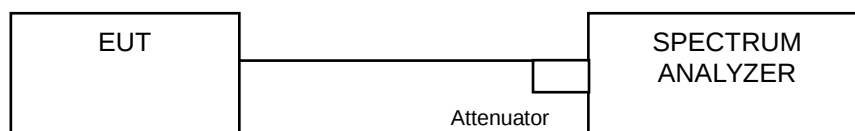


4.5 Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For UNII-1:

Using method SA-2

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

For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For UNII-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	6.56	5.43	0.35	9.39	17.00	Pass
40	5200	6.48	5.38	0.35	9.32	17.00	Pass
48	5240	4.69	5.60	0.35	8.53	17.00	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For UNII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.85\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

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	4.94	4.86	0.32	8.23	17.00	Pass
40	5200	5.81	5.08	0.32	8.79	17.00	Pass
48	5240	6.03	4.09	0.32	8.50	17.00	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For UNII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.85\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

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	-1.01	-1.96	0.58	2.14	17.00	Pass
46	5230	2.74	2.14	0.58	6.04	17.00	Pass

- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For UNII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.85\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

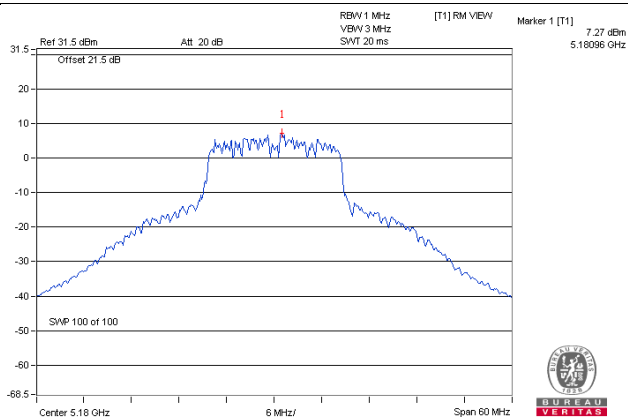
802.11ac (VHT80)

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	-7.38	-9.38	1.14	-4.12	17.00	Pass

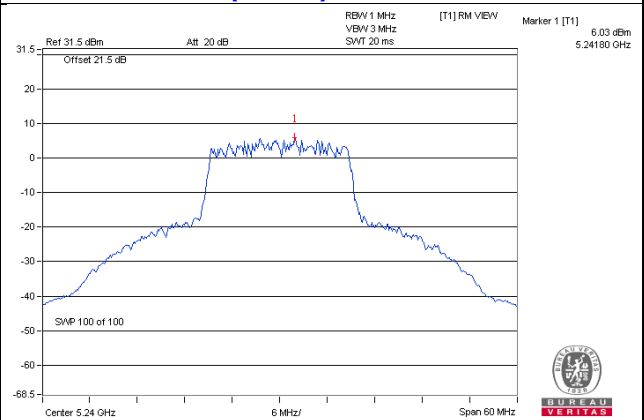
- Note:** 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For UNII-1: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.85\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

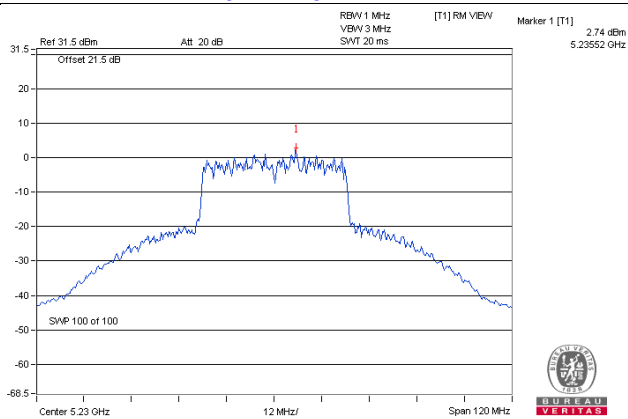
802.11a_Chain 0 / CH36



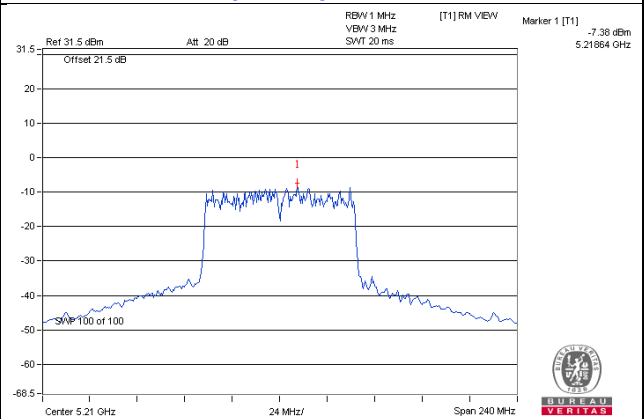
802.11ac (VHT20)_Chain 0 / CH48



802.11ac (VHT40)_Chain 0 / CH46



802.11ac (VHT80)_Chain 0 / CH42



For UNII-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	-0.88	1.34	3.01	0.35	4.70	30.00	Pass
	157	5785	-1.28	0.94	3.01	0.35	4.30	30.00	Pass
	165	5825	-0.75	1.47	3.01	0.35	4.83	30.00	Pass
1	149	5745	-1.23	0.99	3.01	0.35	4.35	30.00	Pass
	157	5785	-0.74	1.48	3.01	0.35	4.84	30.00	Pass
	165	5825	-1.28	0.94	3.01	0.35	4.30	30.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.98\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

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

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-1.11	1.11	3.01	0.32	4.44	30.00	Pass
	157	5785	-1.64	0.58	3.01	0.32	3.91	30.00	Pass
	165	5825	-2.08	0.14	3.01	0.32	3.47	30.00	Pass
1	149	5745	-2.66	-0.44	3.01	0.32	2.89	30.00	Pass
	157	5785	-2.54	-0.32	3.01	0.32	3.01	30.00	Pass
	165	5825	-2.26	-0.04	3.01	0.32	3.29	30.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.98\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

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

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-5.88	-3.66	3.01	0.58	-0.07	30.00	Pass
	159	5795	-6.17	-3.95	3.01	0.58	-0.36	30.00	Pass
1	151	5755	-6.35	-4.13	3.01	0.58	-0.54	30.00	Pass
	159	5795	-6.15	-3.93	3.01	0.58	-0.34	30.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.98\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

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

802.11ac (VHT80)

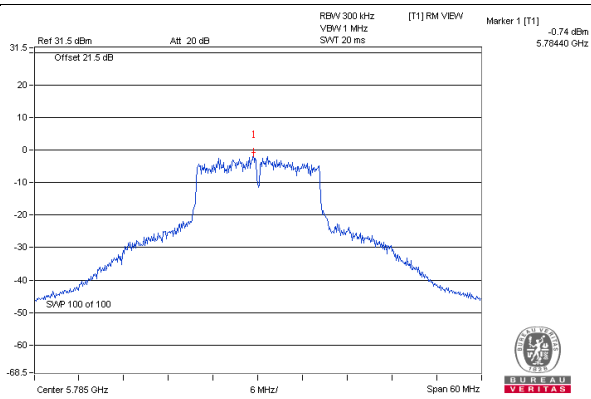
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.44	-6.22	3.01	1.14	-2.07	30.00	Pass
1	155	5775	-10.37	-8.15	3.01	1.14	-4.00	30.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.98\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

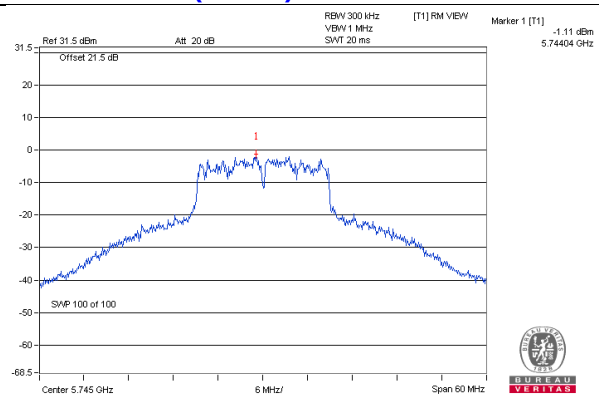
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

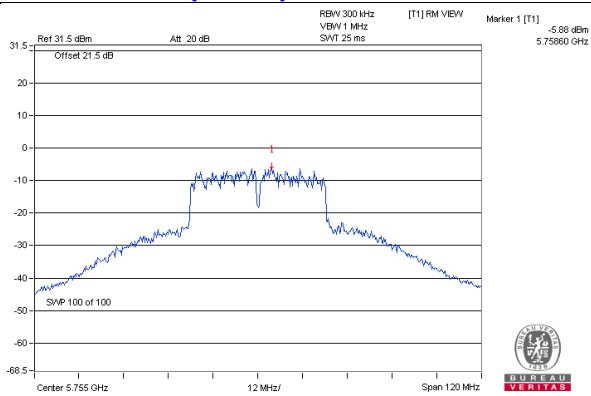
802.11a – Chain 1: CH 157



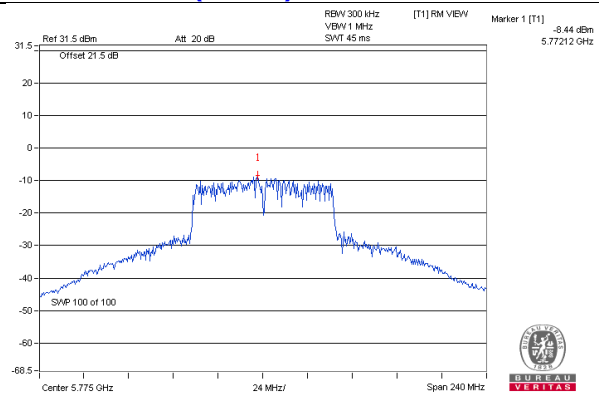
802.11ac (VHT20) – Chain 0: CH 149



802.11ac (VHT40) – Chain 0: CH 151



802.11ac (VHT80) – Chain 0: CH 155

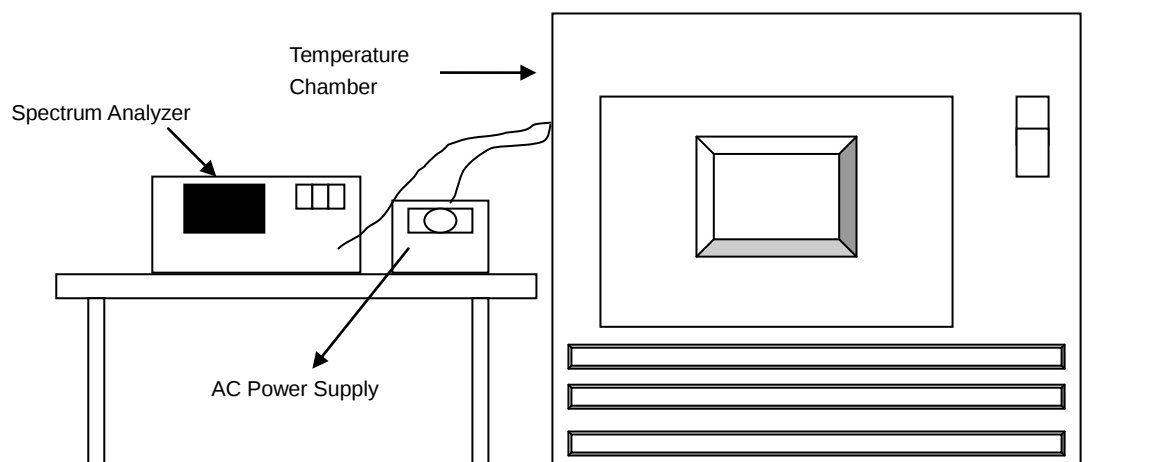


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5180.0144	PASS	5180.0177	PASS	5180.0145	PASS	5180.0181	PASS
40	120	5179.9837	PASS	5179.9863	PASS	5179.9836	PASS	5179.9864	PASS
30	120	5179.9804	PASS	5179.9817	PASS	5179.9843	PASS	5179.9845	PASS
20	120	5180.0021	PASS	5180.0053	PASS	5180.0042	PASS	5180.0052	PASS
10	120	5179.9774	PASS	5179.9804	PASS	5179.9809	PASS	5179.9803	PASS
0	120	5180.0044	PASS	5180.0052	PASS	5180.0047	PASS	5180.005	PASS
-10	120	5179.9785	PASS	5179.977	PASS	5179.9795	PASS	5179.9787	PASS
-20	120	5179.9932	PASS	5179.9937	PASS	5179.9939	PASS	5179.9908	PASS
-30	120	5180.0267	PASS	5180.0268	PASS	5180.0253	PASS	5180.026	PASS

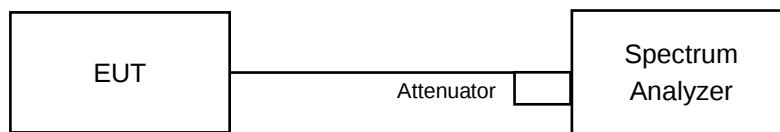
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.002	PASS	5180.0059	PASS	5180.0045	PASS	5180.0062	PASS
	120	5180.0021	PASS	5180.0053	PASS	5180.0042	PASS	5180.0052	PASS
	102	5180.0029	PASS	5180.0051	PASS	5180.0044	PASS	5180.0057	PASS

4.7 6dB Bandwidth Measurement

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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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	15.91	15.24	0.5	PASS
157	5785	16.31	15.78	0.5	PASS
165	5825	16.08	15.94	0.5	PASS

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.58	16.32	0.5	PASS
157	5785	17.01	16.55	0.5	PASS
165	5825	16.56	16.89	0.5	PASS

802.11ac (VHT40)

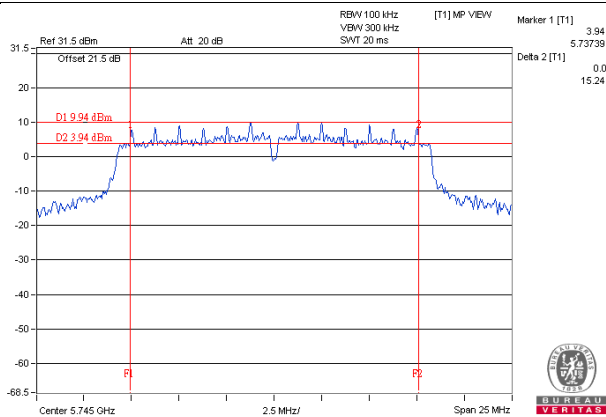
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.23	35.19	0.5	PASS
159	5795	35.25	35.31	0.5	PASS

802.11ac (VHT80)

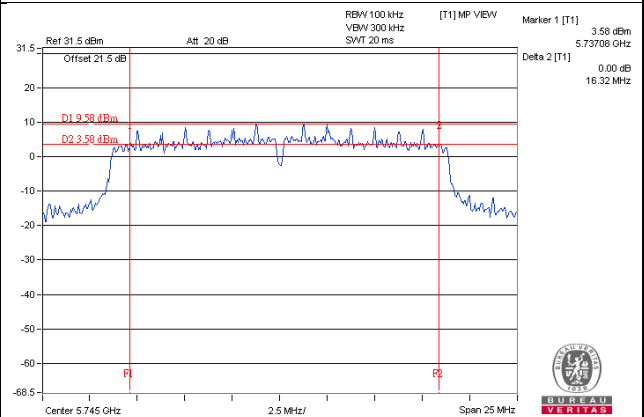
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	74.11	75.30	0.5	PASS

Spectrum Plot of Worst Value

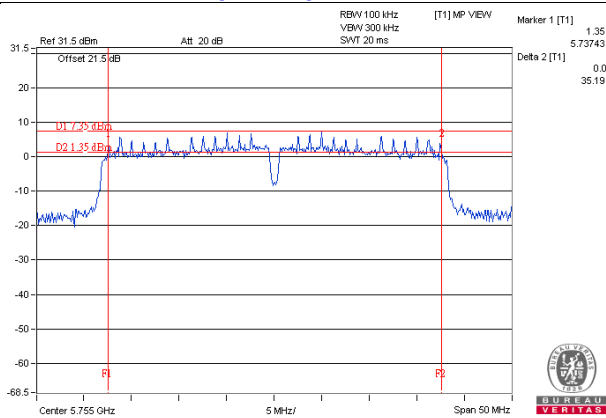
802.11a_Chain 1 / CH149



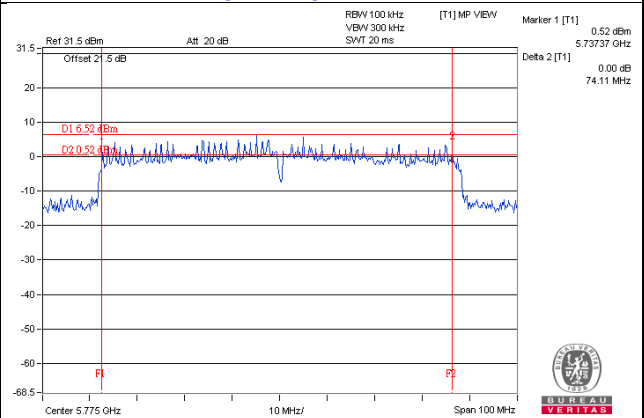
802.11ac (VHT20)_Chain 1 / CH149



802.11ac (VHT40)_Chain 1 / CH151



802.11ac (VHT80)_Chain 0 / CH155



5 Pictures of Test Arrangements

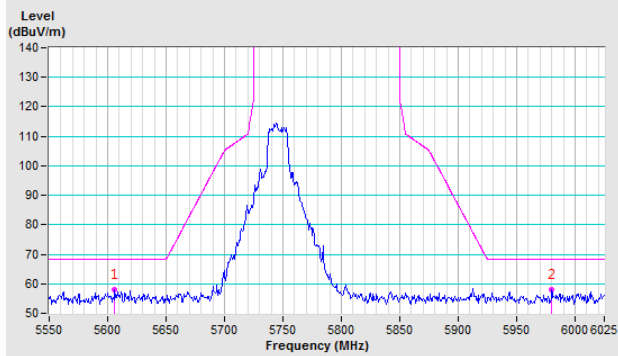
Please refer to the attached file (Test Setup Photo).

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

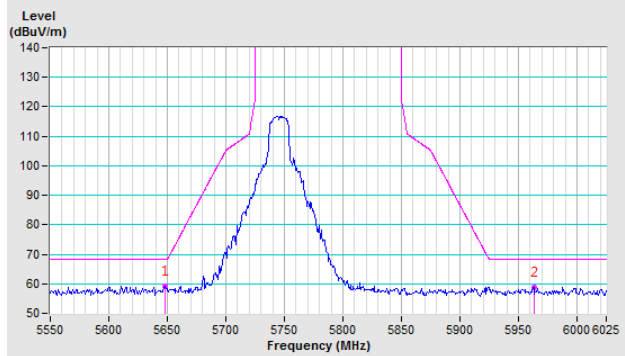
802.11a

CH 149 5745 MHz

Horizontal

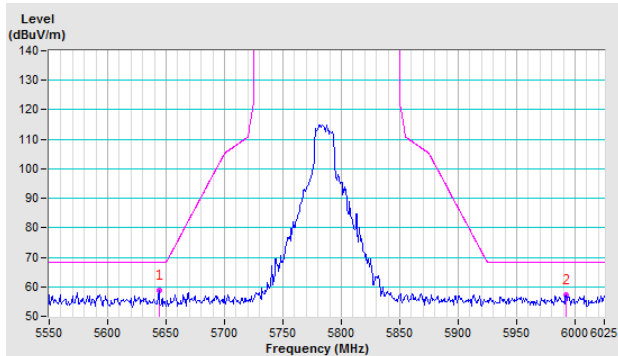


Vertical

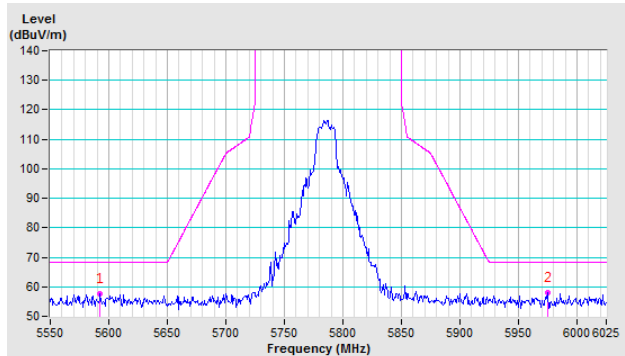


CH 157 5785 MHz

Horizontal

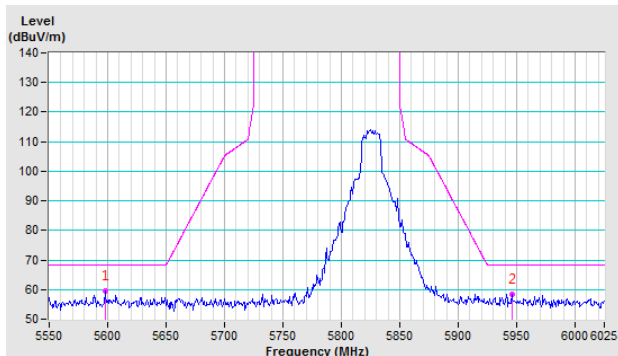


Vertical

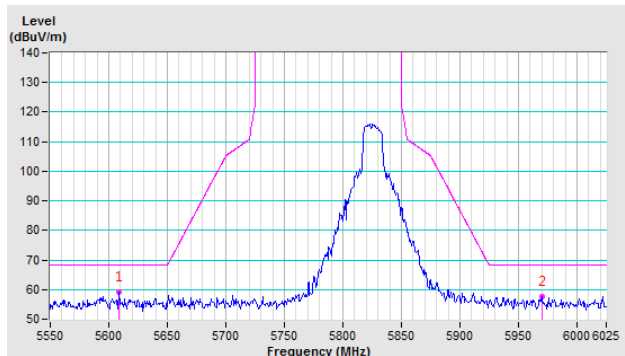


CH 165 5825 MHz

Horizontal



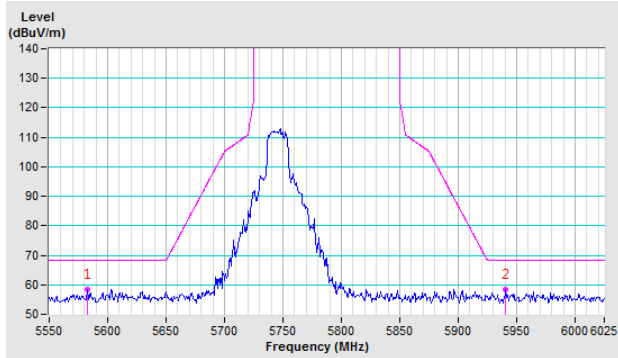
Vertical



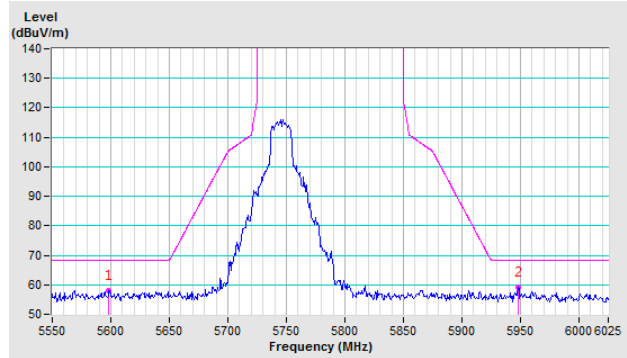
802.11ac (VHT20)

CH 149 5745 MHz

Horizontal

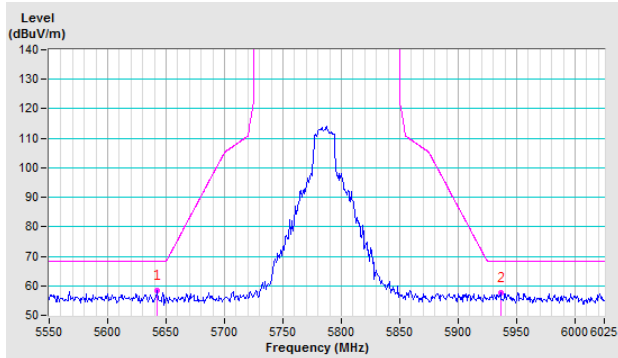


Vertical

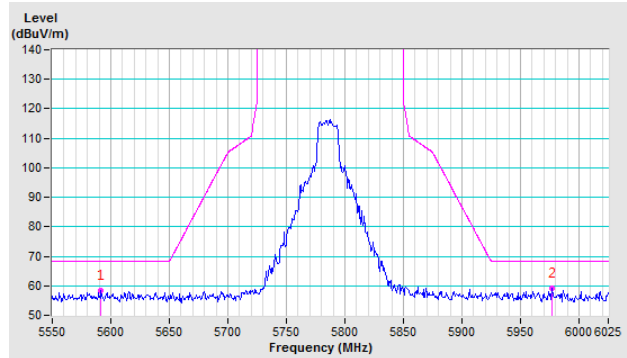


CH 157 5785 MHz

Horizontal

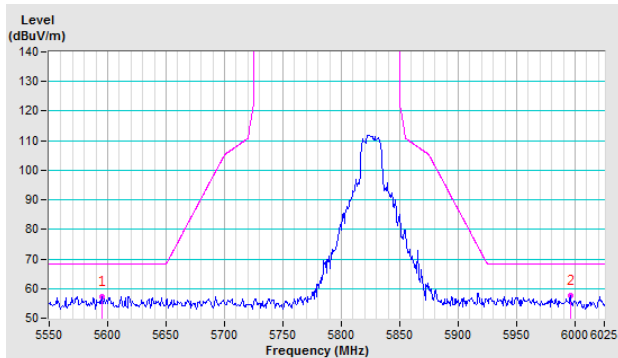


Vertical

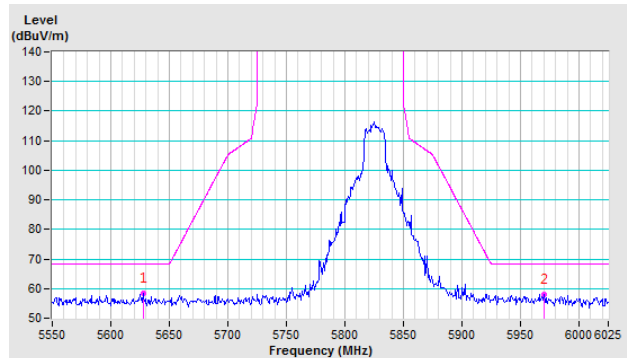


CH 165 5825 MHz

Horizontal



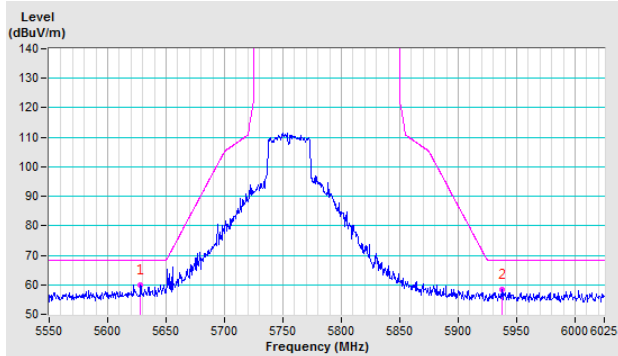
Vertical



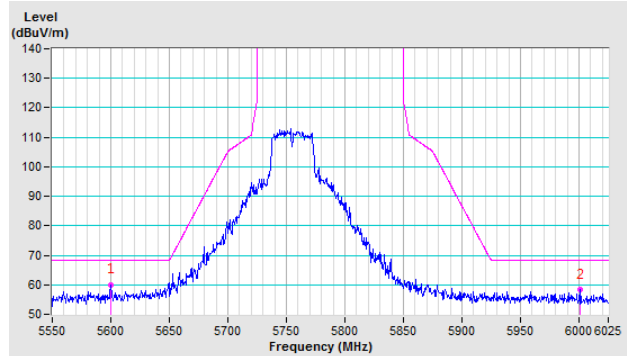
802.11ac (VHT40)

CH 151 5755 MHz

Horizontal

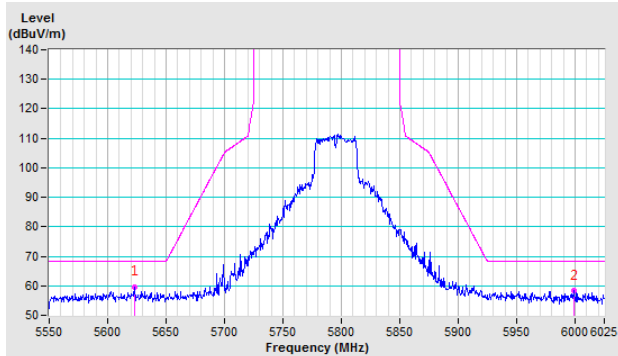


Vertical

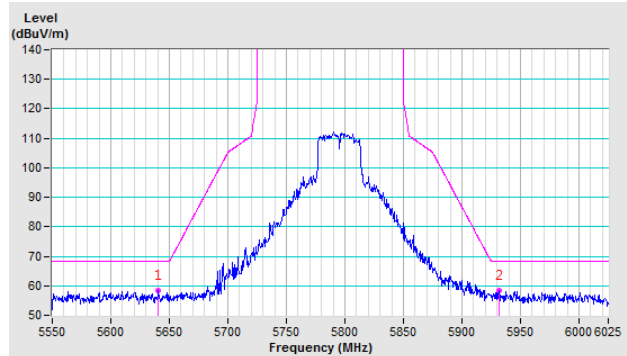


CH 159 5795 MHz

Horizontal



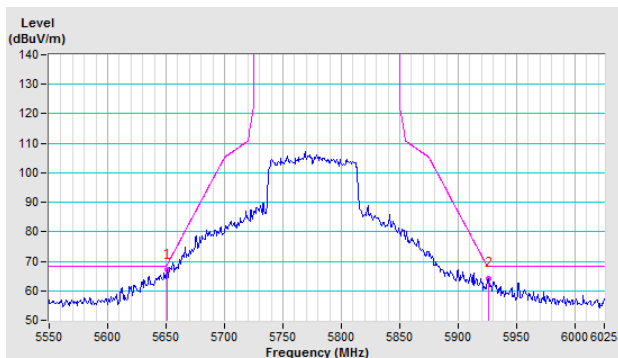
Vertical



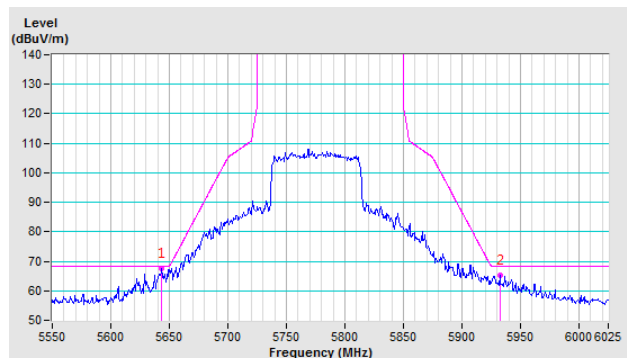
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal



Vertical



Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---