FCC Test Report

Report No.:	RF190503C13B-1 R1
FCC ID:	MSQ-RTACRH01
Test Model:	RT-ACRH15
Series Model:	RT-AC1200GE, RT-AC59U, RT-AC1500G PLUS, RT-AC1500UHP, RT-AC57U, RT-AC58U, RT-AC1300G PLUS (Refer to item 3.1 for more details)
Received Date:	May 03, 2019
Test Date:	May 17 ~ Jul. 19, 2019
Issued Date:	Aug. 02, 2019
Applicant:	ASUSTeK COMPUTER INC.
Address:	4F, NO. 150, Li-Te Rd. Peitou, Taipei Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003
Test Location (2):	B2F., No. 215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C.
FCC Registration / Designation Number:	427177 / TW0011

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF190503C13B-1	Original release.	Jul. 22, 2019
RF190503C13B-1 R1	Added antennas (Item 5 ~ 8)	Aug. 02, 2019

1 Certificate of Conformity

Product:	Dual Band Gigabit WiFi Router
Brand:	ASUS
Test Model:	RT-ACRH15
Series Model:	RT-AC1200GE, RT-AC59U, RT-AC1500G PLUS, RT-AC1500UHP, RT-AC57U, RT-AC58U, RT-AC1300G PLUS (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	ASUSTeK COMPUTER INC.
Test Date:	May 17 ~ Jul. 19, 2019
Standards:	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 RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen , **Date:** Aug. 02, 2019

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Aug. 02, 2019

Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -13.01dB at 0.26765MHz.
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 -1.00dB at 5644.375MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	2.0153 dB
	200MHz ~1000MHz	2.0224 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dual Band Gigabit WiFi Router
Brand	ASUS
Test Model	RT-ACRH15
Serial Model	RT-AC1200GE, RT-AC59U, RT-AC1500G PLUS, RT-AC1500UHP, RT-AC57U, RT-AC58U, RT-AC1300G PLUS
Model Difference	Refer to Note
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	5180~5240MHz: CDD Mode: 419.327mW Beamforming Mode: 379.889mW 5745~5825MHz: CDD Mode: 487.691mW Beamforming Mode: 487.691mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	0.9m non-shielded RJ45 cable without core

Note:

1. The following models are provided to this EUT. The model of the RT-ACRH15 was chosen for final test.

Brand	Model	Difference
ASUS	RT-ACRH15	All models are electrically identical, different model names are for marketing purpose.
	RT-AC1200GE	
	RT-AC59U	
	RT-AC1500G PLUS	
	RT-AC1500UHP	
	RT-AC57U	
	RT-AC58U	
	RT-AC1300G PLUS	

2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

5.0GHz Band		
Modulation Mode	Beamforming Mode	TX Function
802.11a	Not Support	2TX/2RX
802.11n (HT20)	Support	2TX/2RX
802.11n (HT40)	Support	2TX/2RX
802.11ac (VHT20)	Support	2TX/2RX
802.11ac (VHT40)	Support	2TX/2RX
802.11ac (VHT80)	Support	2TX/2RX

* 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)
* For 802.11n and 802.11ac, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

3. The EUT is powered by the following adapter.

Adapter	
Brand	Shenzhen Gongjin Electronics Co., Ltd.
Model	S18B22-120A150-CJ
Input Power	100-240Vac~50/60Hz Max 0.6A
Output Power	12Vdc, 1.5A
Power Line	1.45m power cable without core

4. The following antennas were provided to the EUT.

Ant. Type	Dipole		
Connecter Type	I-PEX		
Brand	RenFeng		
Antenna Gain (dBi)			
Item	P/N	2.4G	5G
1	RF21C04368A	5	-
2	RF21C04369A	5	-
3	RF21C04370A	5	5
4	RF21C04371A	5	5
5	C6319-510239-A	5	-
6	C6319-510240-A	5	-
7	C6319-510241-A	5	5
8	C6319-510242-A	5	5

*Item 1~4 and item 5~8 are identical to each other, except the length, therefore only Item 1~4 were for final test and presented in the test report.

5. WLAN 2.4GHz and 5GHz technology can transmit at same time.

3.2 Description of Test Modes

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

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement 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 X-plane.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

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.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	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.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11n (HT40)	5180-5240	38 to 46	151	OFDM	13.5
		5745-5825	151 to 159		OFDM	13.5

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11n (HT40)	5180-5240	38 to 46	151	OFDM	13.5
		5745-5825	151 to 159		OFDM	13.5

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

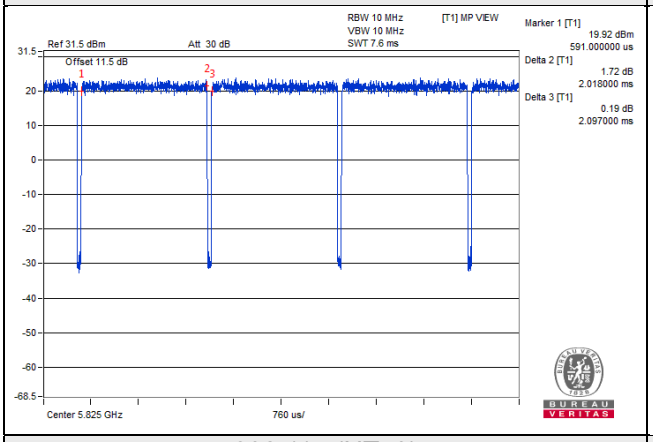
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	22 deg. C, 69% RH	120Vac, 60Hz	Karl Lee
RE<1G	22 deg. C, 69% RH	120Vac, 60Hz	Karl Lee
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Jones Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

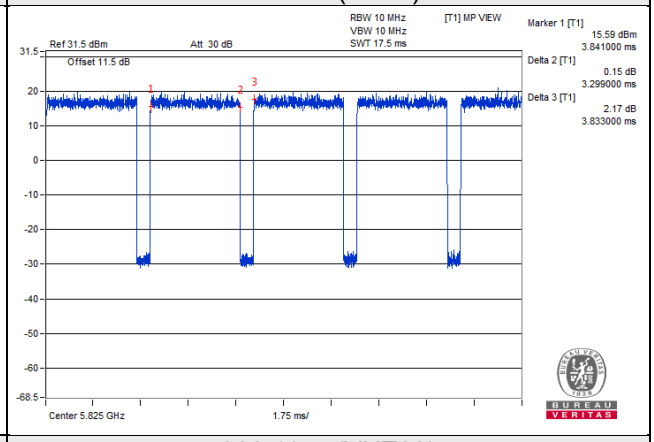
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.018/2.097 = 0.962, Duty factor = 10 * log(1/0.962) = 0.17
802.11n (HT20): Duty cycle = 3.299/3.833 = 0.861, Duty factor = 10 * log(1/0.861) = 0.65
802.11n (HT40): Duty cycle = 2.403/2.508 = 0.958, Duty factor = 10 * log(1/0.958) = 0.19
802.11ac (VHT80): Duty cycle = 3.275/3.818 = 0.858, Duty factor = 10 * log(1/0.858) = 0.67

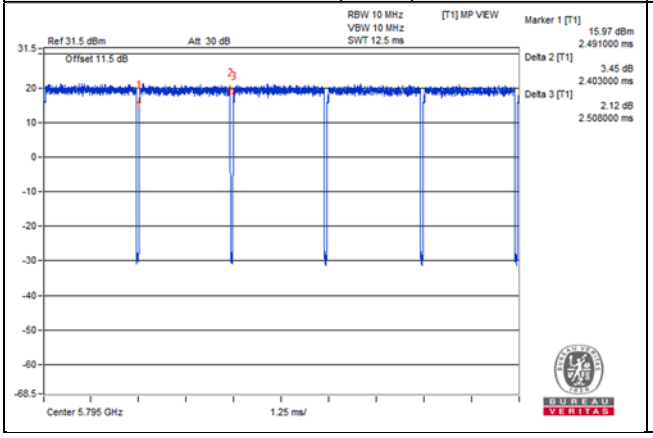
802.11a



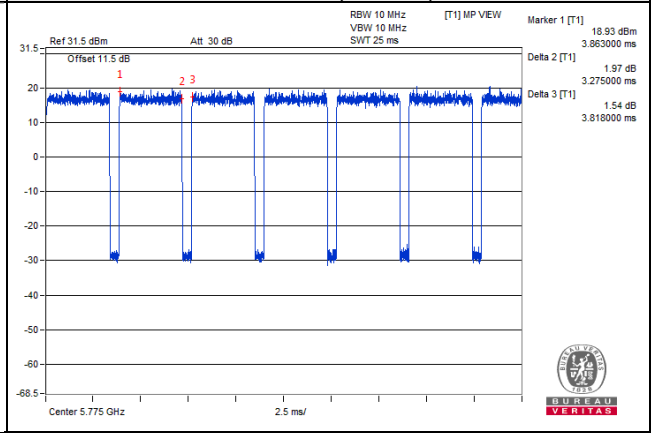
802.11n (HT20)



802.11n (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.

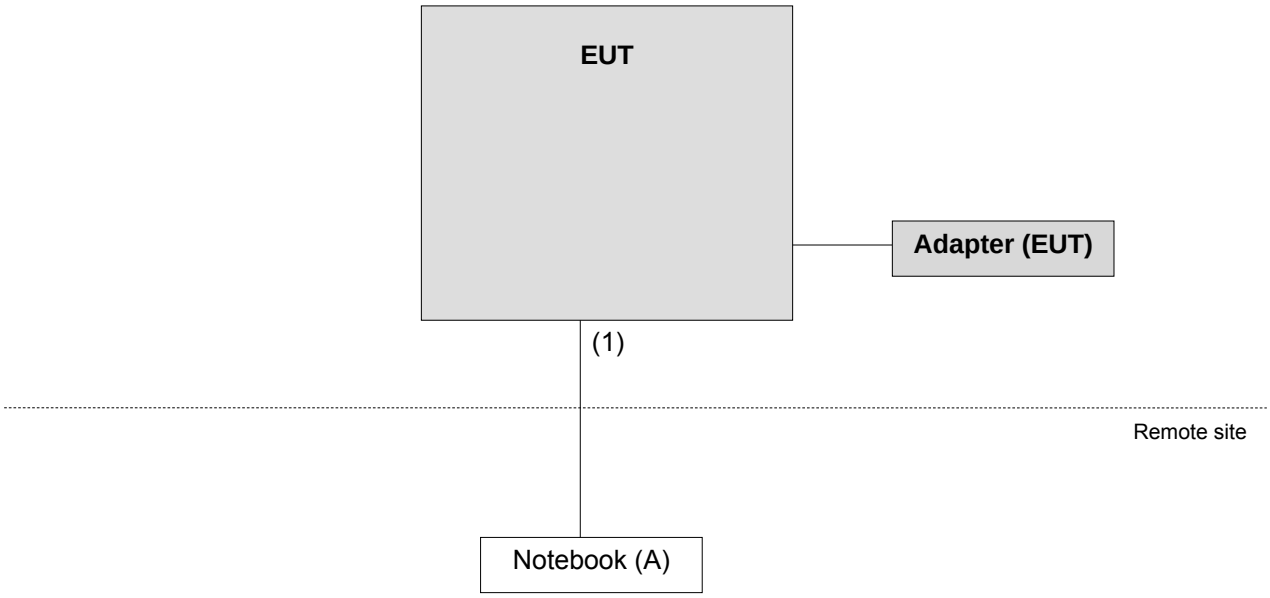
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E6420	D3T96R1	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	10	N	0	Cat5e

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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 v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2 (dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8 (dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2018	Sep. 03, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
			Jun. 18, 2019	Jun. 17, 2020
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	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 Xindian Chamber 1.

4.1.3 Test Procedures

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. Parallel, perpendicular, and ground-parallel orientations 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:

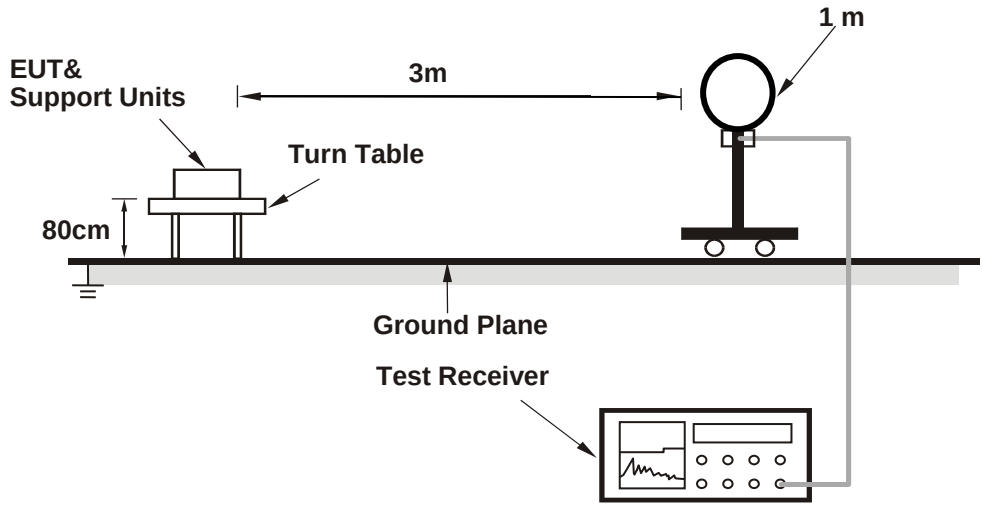
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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. (11a: RBW = 1 MHz, VBW =1 kHz ; 11n (HT20): RBW = 1 MHz, VBW = 1 kHz ; 11n (HT40): RBW = 1 MHz, VBW = 1 kHz ; 11ac (VHT80): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

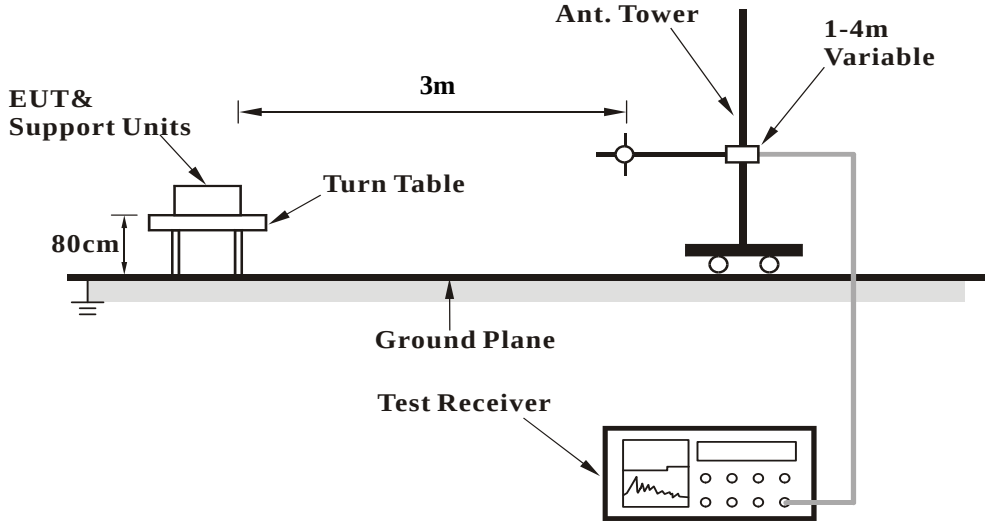
No deviation.

4.1.5 Test Setup

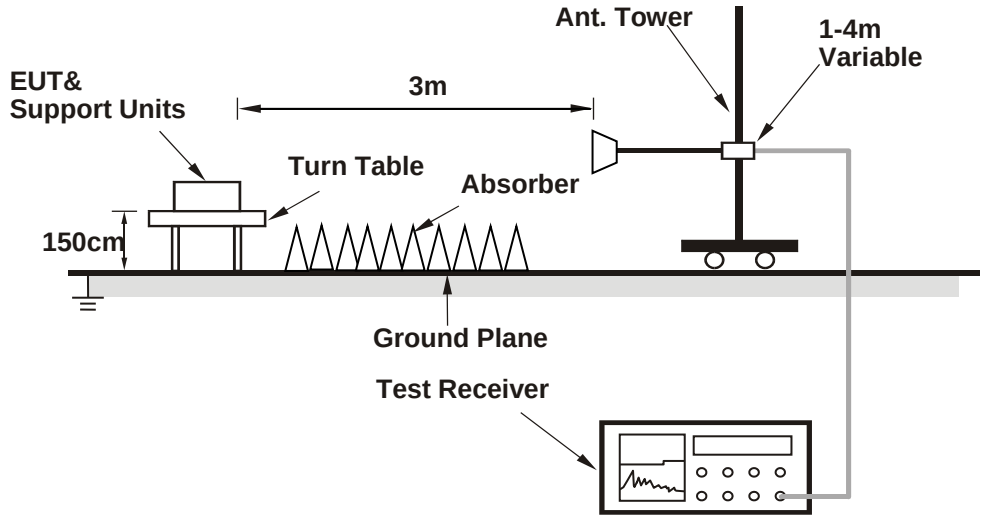
For Radiated emission below 30MHz



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 Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

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								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5148.20	43.39	35.14	8.25	54.0	-10.61	203	244	Average
5148.20	54.19	45.94	8.25	74.0	-19.81	203	244	Peak
5180.00	100.24	91.93	8.31			203	244	Average
5180.00	107.17	98.86	8.31			203	244	Peak
10360.00	53.40	39.10	14.30	68.2	-14.80	178	8	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150.00	52.66	44.41	8.25	54.0	-1.34	156	228	Average
5150.00	62.32	54.07	8.25	74.0	-11.68	156	228	Peak
5180.00	111.83	103.52	8.31			175	252	Average
5180.00	118.53	110.22	8.31			175	252	Peak
10360.00	55.46	41.16	14.30	68.2	-12.74	125	55	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5180 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5140.15	42.40	34.14	8.26	54.0	-11.60	203	243	Average
5140.15	53.20	44.94	8.26	74.0	-20.80	203	243	Peak
5200.00	103.28	94.93	8.35			203	243	Average
5200.00	109.56	101.21	8.35			203	243	Peak
5380.77	42.76	34.08	8.68	54.0	-11.24	203	243	Average
5380.77	53.56	44.88	8.68	74.0	-20.44	203	243	Peak
10400.00	55.68	41.34	14.34	68.2	-12.52	154	114	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5120.00	46.73	38.53	8.20	54.0	-7.27	175	252	Average
5120.00	56.12	47.92	8.20	74.0	-17.88	175	252	Peak
5200.00	113.17	104.82	8.35			175	252	Average
5200.00	119.36	111.01	8.35			175	252	Peak
5365.95	47.80	39.16	8.64	54.0	-6.20	175	252	Average
5365.95	57.46	48.82	8.64	74.0	-16.54	175	252	Peak
10400.00	62.22	47.88	14.34	68.2	-5.98	103	202	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5200 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5240.00	103.25	94.81	8.44			5240.00	103.25	94.81
5240.00	109.78	101.34	8.44			5240.00	109.78	101.34
5410.30	43.00	34.28	8.72	54.0	-11.00	5410.30	43.00	34.28
5410.30	54.33	45.61	8.72	74.0	-19.67	5410.30	54.33	45.61
10480.00	54.39	39.88	14.51	68.2	-13.81	10480.00	54.39	39.88
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5240.00	113.94	105.50	8.44			175	252	Average
5240.00	119.41	110.97	8.44			175	252	Peak
5400.05	47.52	38.80	8.72	54.0	-6.48	175	252	Average
5400.05	57.61	48.89	8.72	74.0	-16.39	175	252	Peak
10480.00	59.44	44.93	14.51	68.2	-8.76	100	191	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5240 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745.00	99.65	90.46	9.19			219	205	Average
5745.00	106.34	97.15	9.19			219	205	Peak
11490.00	46.12	31.00	15.12	54.0	-7.88	140	45	Average
11490.00	55.29	40.17	15.12	74.0	-18.71	140	45	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745.00	112.49	103.30	9.19			200	217	Average
5745.00	118.62	109.43	9.19			200	217	Peak
11490.00	46.14	31.02	15.12	54.0	-7.86	195	157	Average
11490.00	56.19	41.07	15.12	74.0	-17.81	195	157	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5745 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5571.400	53.41	44.42	8.99	68.20	-14.79	219	205	Peak
5653.300	51.34	42.24	9.10	70.64	-19.30	219	205	Peak
5924.200	50.13	40.73	9.40	68.79	-18.66	219	205	Peak
6004.525	53.64	44.15	9.49	68.20	-14.56	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5627.050	57.75	48.69	9.06	68.20	-10.45	200	217	Peak
5651.200	56.28	47.19	9.09	69.09	-12.81	200	217	Peak
5917.375	54.55	45.17	9.38	73.84	-19.29	200	217	Peak
5985.100	54.76	45.30	9.46	68.20	-13.44	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785.00	99.62	90.39	9.23			219	205	Average
5785.00	106.67	97.44	9.23			219	205	Peak
11570.00	47.41	32.10	15.31	54.0	-6.59	112	321	Average
11570.00	56.23	40.92	15.31	74.0	-17.77	112	321	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785.00	112.62	103.39	9.23			200	217	Average
5785.00	118.41	109.18	9.23			200	217	Peak
11570.00	47.50	32.19	15.31	54.0	-6.50	140	245	Average
11570.00	55.66	40.35	15.31	74.0	-18.34	140	245	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5785 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5607.625	53.69	44.66	9.03	68.20	-14.51	219	205	Peak
5653.300	51.28	42.18	9.10	70.64	-19.36	219	205	Peak
5920.000	50.89	41.51	9.38	71.90	-21.01	219	205	Peak
5952.025	53.63	44.20	9.43	68.20	-14.57	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5622.325	58.68	49.63	9.05	68.20	-9.52	200	217	Peak
5655.925	56.54	47.45	9.09	72.58	-16.04	200	217	Peak
5923.150	52.56	43.16	9.40	69.57	-17.01	200	217	Peak
5932.600	55.78	46.38	9.40	68.20	-12.42	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825.00	99.25	89.96	9.29			219	205	Average
5825.00	106.86	97.57	9.29			219	205	Peak
11650.00	47.27	31.74	15.53	54.0	-6.73	156	96	Average
11650.00	56.96	41.43	15.53	74.0	-17.04	156	96	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825.00	112.74	103.45	9.29			200	217	Average
5825.00	118.14	108.85	9.29			200	217	Peak
11650.00	47.79	32.26	15.53	54.0	-6.21	155	245	Average
11650.00	55.41	39.88	15.53	74.0	-18.59	155	245	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5825 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5641.225	54.21	45.14	9.07	68.20	-13.99	219	205	Peak
5653.825	53.24	44.15	9.09	71.03	-17.79	219	205	Peak
5923.150	51.93	42.53	9.40	69.57	-17.64	219	205	Peak
5953.075	54.18	44.75	9.43	68.20	-14.02	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5505.250	61.15	52.24	8.91	68.20	-7.05	200	217	Peak
5657.500	58.95	49.86	9.09	73.75	-14.80	200	217	Peak
5919.475	54.20	44.82	9.38	72.29	-18.09	200	217	Peak
5950.975	54.98	45.55	9.43	68.20	-13.22	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

802.11n (HT20)

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5143.00	42.59	34.33	8.26	54.0	-11.41	203	244	Average
5143.00	53.12	44.86	8.26	74.0	-20.88	203	244	Peak
5180.00	100.78	92.47	8.31			203	244	Average
5180.00	107.65	99.34	8.31			203	244	Peak
10360.00	53.67	39.37	14.30	68.2	-14.53	167	112	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150.00	52.86	44.61	8.25	54.0	-1.14	156	258	Average
5150.00	62.66	54.41	8.25	74.0	-11.34	156	258	Peak
5180.00	110.58	102.27	8.31			175	252	Average
5180.00	117.27	108.96	8.31			175	252	Peak
10360.00	54.21	39.91	14.30	68.2	-13.99	154	209	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5180 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5004.15	43.13	35.12	8.01	54.0	-10.87	203	243	Average
5004.15	54.11	46.10	8.01	74.0	-19.89	203	243	Peak
5200.00	102.46	94.11	8.35			203	243	Average
5200.00	108.70	100.35	8.35			203	243	Peak
5400.00	42.86	34.14	8.72	54.0	-11.14	203	243	Average
5400.00	53.52	44.80	8.72	74.0	-20.48	203	243	Peak
10400.00	54.76	40.42	14.34	68.2	-13.44	140	111	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5149.10	46.35	38.10	8.25	54.0	-7.65	175	252	Average
5149.10	56.84	48.59	8.25	74.0	-17.16	175	252	Peak
5200.00	112.45	104.10	8.35			175	252	Average
5200.00	118.26	109.91	8.35			175	252	Peak
5363.53	47.59	38.95	8.64	54.0	-6.41	175	252	Average
5363.53	58.45	49.81	8.64	74.0	-15.55	175	252	Peak
10400.00	61.12	46.78	14.34	68.2	-7.08	103	202	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5200 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5240.00	102.54	94.10	8.44			203	243	Average
5240.00	109.47	101.03	8.44			203	243	Peak
5352.00	42.95	34.32	8.63	54.0	-11.05	203	243	Average
5352.00	53.36	44.73	8.63	74.0	-20.64	203	243	Peak
10480.00	54.12	39.61	14.51	68.2	-14.08	118	173	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5240.00	112.94	104.50	8.44			175	252	Average
5240.00	118.82	110.38	8.44			175	252	Peak
5402.91	47.64	38.92	8.72	54.0	-6.36	175	252	Average
5402.91	57.64	48.92	8.72	74.0	-16.36	175	252	Peak
10480.00	57.98	43.47	14.51	68.2	-10.22	100	191	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5240 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745.00	98.59	89.40	9.19			219	205	Average
5745.00	105.28	96.09	9.19			219	205	Peak
11490.00	47.48	32.36	15.12	54.0	-6.52	185	5	Average
11490.00	57.00	41.88	15.12	74.0	-17.00	185	5	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5745.00	111.52	102.33	9.19			200	217	Average
5745.00	117.08	107.89	9.19			200	217	Peak
11490.00	47.54	32.42	15.12	54.0	-6.46	121	147	Average
11490.00	55.71	40.59	15.12	74.0	-18.29	121	147	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5745 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5631.25	53.45	44.40	9.05	68.20	-14.75	219	205	Peak
5654.35	49.55	40.46	9.09	71.42	-21.87	219	205	Peak
5920.53	52.14	42.76	9.38	71.51	-19.37	219	205	Peak
5999.28	54.45	44.96	9.49	68.20	-13.75	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5629.68	58.01	48.96	9.05	68.20	-10.19	200	217	Peak
5652.25	52.99	43.90	9.09	69.86	-16.87	200	217	Peak
5923.68	51.73	42.33	9.40	69.18	-17.45	200	217	Peak
5974.08	54.63	45.17	9.46	68.20	-13.57	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785.00	98.90	89.67	9.23			219	205	Average
5785.00	105.80	96.57	9.23			219	205	Peak
11570.00	47.32	32.01	15.31	54.0	-6.68	152	115	Average
11570.00	56.19	40.88	15.31	74.0	-17.81	152	115	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5785.00	111.31	102.08	9.23			200	217	Average
5785.00	117.08	107.85	9.23			200	217	Peak
11570.00	47.62	32.31	15.31	54.0	-6.38	188	95	Average
11570.00	55.78	40.47	15.31	74.0	-18.22	188	95	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5785 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5597.125	54.48	45.47	9.01	68.20	-13.72	219	205	Peak
5650.675	52.63	43.54	9.09	68.70	-16.07	219	205	Peak
5922.625	52.30	42.90	9.40	69.96	-17.66	219	205	Peak
5984.575	53.66	44.20	9.46	68.20	-14.54	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5565.625	58.44	49.45	8.99	68.20	-9.76	200	217	Peak
5652.775	54.15	45.05	9.10	70.25	-16.10	200	217	Peak
5921.575	52.33	42.93	9.40	70.73	-18.40	200	217	Peak
5938.375	54.64	45.23	9.41	68.20	-13.56	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825.00	98.14	88.85	9.29			219	205	Average
5825.00	105.73	96.44	9.29			219	205	Peak
11650.00	47.75	32.22	15.53	54.0	-6.25	105	5	Average
11650.00	57.02	41.49	15.53	74.0	-16.98	105	5	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5825.00	111.49	102.20	9.29			200	217	Average
5825.00	117.32	108.03	9.29			200	217	Peak
11650.00	47.09	31.56	15.53	54.0	-6.91	155	14	Average
11650.00	55.46	39.93	15.53	74.0	-18.54	155	14	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5825 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5584.525	53.68	44.67	9.01	68.20	-14.52	219	205	Peak
5651.725	50.09	41.00	9.09	69.48	-19.39	219	205	Peak
5923.675	50.77	41.37	9.40	69.18	-18.41	219	205	Peak
5974.600	53.28	43.82	9.46	68.20	-14.92	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5504.725	61.16	52.25	8.91	68.20	-7.04	200	217	Peak
5653.300	56.01	46.91	9.10	70.64	-14.63	200	217	Peak
5924.200	52.64	43.24	9.40	68.79	-16.15	200	217	Peak
5936.275	56.47	47.07	9.40	68.20	-11.73	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

802.11n (HT40)

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5112.65	42.46	34.26	8.20	54.0	-11.54	203	244	Average
5112.65	53.37	45.17	8.20	74.0	-20.63	203	244	Peak
5190.00	95.58	87.24	8.34			203	244	Average
5190.00	102.96	94.62	8.34			203	244	Peak
5425.90	42.75	33.98	8.77	54.0	-11.25	203	244	Average
5425.90	53.40	44.63	8.77	74.0	-20.60	203	244	Peak
10380.00	53.18	38.83	14.35	68.2	-15.02	182	155	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5149.70	52.96	44.71	8.25	54.0	-1.04	133	265	Average
5149.70	63.26	55.01	8.25	74.0	-10.74	133	265	Peak
5190.00	105.60	97.26	8.34			135	76	Average
5190.00	112.05	103.71	8.34			135	76	Peak
5442.73	46.42	37.63	8.79	54.0	-7.58	135	76	Average
5442.73	56.87	48.08	8.79	74.0	-17.13	135	76	Peak
10380.00	53.88	39.53	14.35	68.2	-14.32	144	177	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5190 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5149.70	42.72	34.47	8.25	54.0	-11.28	203	243	Average
5149.70	53.47	45.22	8.25	74.0	-20.53	203	243	Peak
5230.00	99.68	91.28	8.40			203	243	Average
5230.00	106.99	98.59	8.40			203	243	Peak
5445.92	42.76	33.93	8.83	54.0	-11.24	203	243	Average
5445.92	53.38	44.55	8.83	74.0	-20.62	203	243	Peak
10460.00	54.47	39.96	14.51	68.2	-13.73	118	325	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5149.70	52.07	43.82	8.25	54.0	-1.93	124	2	Average
5149.70	61.74	53.49	8.25	74.0	-12.26	124	2	Peak
5230.00	110.41	102.01	8.40			162	260	Average
5230.00	116.42	108.02	8.40			162	260	Peak
5386.96	47.58	38.90	8.68	54.0	-6.42	162	260	Average
5386.96	59.37	50.69	8.68	74.0	-14.63	162	260	Peak
10460.00	54.25	39.74	14.51	68.2	-13.95	154	119	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5230 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5755.00	97.89	88.68	9.21			219	205	Average
5755.00	104.78	95.57	9.21			219	205	Peak
11510.00	47.11	32.00	15.11	54.0	-6.89	178	8	Average
11510.00	57.03	41.92	15.11	74.0	-16.97	178	8	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5755.00	110.54	101.33	9.21			200	217	Average
5755.00	116.09	106.88	9.21			200	217	Peak
11510.00	47.34	32.23	15.11	54.0	-6.66	137	15	Average
11510.00	56.66	41.55	15.11	74.0	-17.34	137	15	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5755 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

CHANNEL	TX Channel 151(OOBE)	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5548.825	54.08	45.11	8.97	68.20	-14.12	219	205	Peak
5654.875	53.43	44.34	9.09	71.81	-18.38	219	205	Peak
5918.950	52.24	42.86	9.38	72.68	-20.44	219	205	Peak
5992.975	53.30	43.81	9.49	68.20	-14.90	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5631.250	58.47	49.42	9.05	68.20	-9.73	200	217	Peak
5655.400	57.63	48.54	9.09	72.20	-14.57	200	217	Peak
5922.100	54.54	45.14	9.40	70.35	-15.81	200	217	Peak
5927.875	54.19	44.79	9.40	68.20	-14.01	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5795.000	97.89	88.65	9.24			219	205	Average
5795.000	104.58	95.34	9.24			219	205	Peak
11590.000	47.94	32.57	15.37	54.0	-6.06	132	222	Average
11590.000	55.85	40.48	15.37	74.0	-18.15	132	222	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5795.000	110.36	101.12	9.24			200	217	Average
5795.000	116.63	107.39	9.24			200	217	Peak
11590.000	47.82	32.45	15.37	54.0	-6.18	134	255	Average
11590.000	55.45	40.08	15.37	74.0	-18.55	134	255	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5795 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5563.525	53.86	44.89	8.97	68.20	-14.34	219	205	Peak
5655.400	52.05	42.96	9.09	72.20	-20.15	219	205	Peak
5920.000	52.60	43.22	9.38	71.90	-19.30	219	205	Peak
6018.700	53.44	43.93	9.51	68.20	-14.76	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5621.275	59.61	50.56	9.05	68.20	-8.59	200	217	Peak
5653.825	56.80	47.71	9.09	71.03	-14.23	200	217	Peak
5921.575	54.98	45.58	9.40	70.73	-15.75	200	217	Peak
5927.350	56.07	46.67	9.40	68.20	-12.13	200	217	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

802.11ac (VHT80)

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5148.65	48.09	39.84	8.25	54.0	-5.91	203	243	Average
5148.65	58.42	50.17	8.25	74.0	-15.58	203	243	Peak
5210.00	88.95	80.59	8.36			203	243	Average
5210.00	96.60	88.24	8.36			203	243	Peak
5350.33	43.14	34.51	8.63	54.0	-10.86	203	243	Average
5350.33	53.40	44.77	8.63	74.0	-20.60	203	243	Peak
10420.00	54.30	39.89	14.41	68.2	-13.90	199	304	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5139.50	51.02	42.76	8.26	54.0	-2.98	208	236	Average
5139.50	61.28	53.02	8.26	74.0	-12.72	208	236	Peak
5210.00	98.93	90.57	8.36			208	236	Average
5210.00	106.20	97.84	8.36			208	236	Peak
5350.33	52.32	43.69	8.63	54.0	-1.68	208	236	Average
5350.33	62.13	53.50	8.63	74.0	-11.87	208	236	Peak
10420.00	53.83	39.42	14.41	68.2	-14.37	115	324	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5210 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5775.00	94.74	85.51	9.23			219	205	Average
5775.00	101.28	92.05	9.23			219	205	Peak
11550.00	48.53	33.26	15.27	54.0	-5.47	145	164	Average
11550.00	55.44	40.17	15.27	74.0	-18.56	145	164	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5775.00	106.53	97.30	9.23			200	217	Average
5775.00	112.21	102.98	9.23			200	217	Peak
11550.00	48.79	33.52	15.27	54.0	-5.21	154	218	Average
11550.00	55.72	40.45	15.27	74.0	-18.28	154	218	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. 5775 MHz: Fundamental frequency.

3. The emission levels of other frequencies were very low against the limit.

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5640.700	53.91	44.84	9.07	68.20	-14.29	219	205	Peak
5653.825	53.08	43.99	9.09	71.03	-17.95	219	205	Peak
5917.900	53.38	44.00	9.38	73.45	-20.07	219	205	Peak
6009.250	53.42	43.91	9.51	68.20	-14.78	219	205	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5644.375	**67.20**	**58.13**	**9.07**	**68.20**	**-1.00**	**215**	**296**	**Peak**
5650.675	67.62	58.53	9.09	68.70	-1.08	215	296	Peak
5924.725	65.50	56.10	9.40	68.40	-2.90	215	296	Peak
5925.250	65.13	55.73	9.40	68.20	-3.07	215	296	Peak

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.

Below 1GHz Worst-Case

802.11n (HT40)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

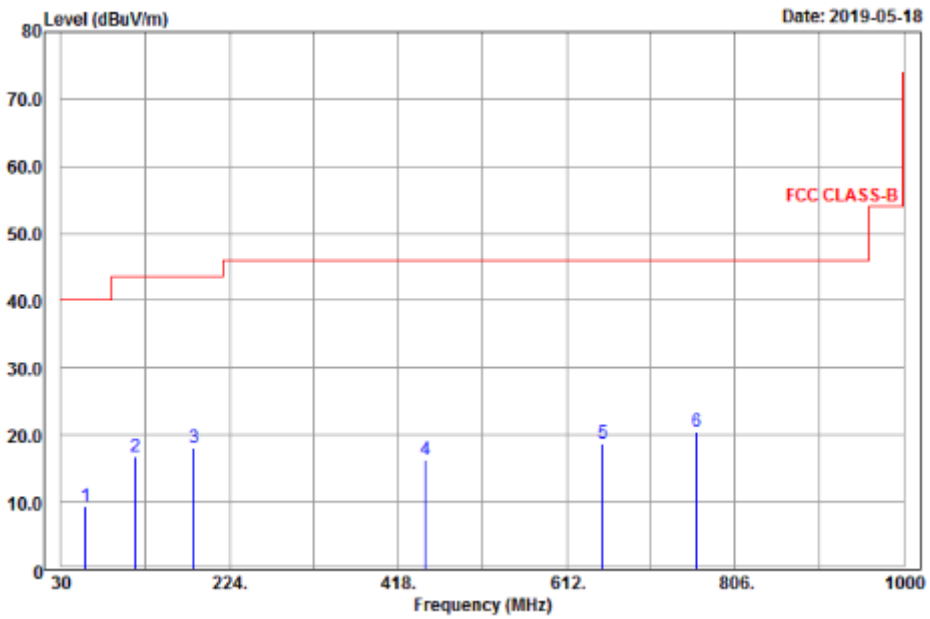
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
58.62	9.29	27.10	-17.81	40.0	-30.71	185	223	QP
115.59	16.72	36.39	-19.67	43.5	-26.78	146	125	QP
183.36	18.16	38.77	-20.61	43.5	-25.34	167	125	QP
449.80	16.30	30.39	-14.09	46.0	-29.70	150	145	QP
653.50	18.75	29.39	-10.64	46.0	-27.25	168	129	QP
761.30	20.53	29.51	-8.98	46.0	-25.47	158	121	QP

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.



CHANNEL	TX Channel 151	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

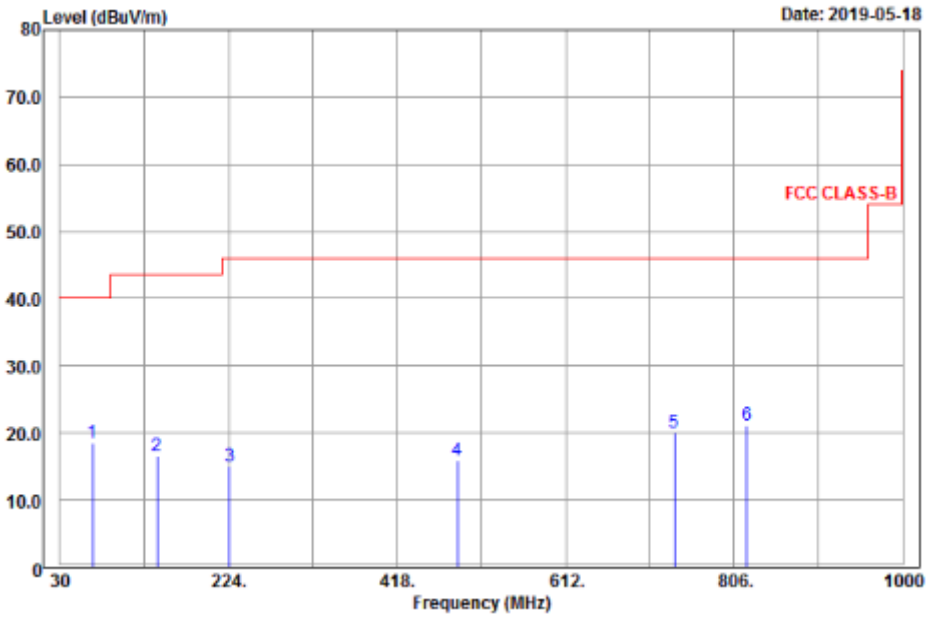
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
67.80	18.60	38.99	-20.39	40.0	-21.40	192	69	QP
141.51	16.64	39.12	-22.48	43.5	-26.86	130	127	QP
224.94	14.98	33.78	-18.80	46.0	-31.02	113	87	QP
487.60	15.90	29.20	-13.30	46.0	-30.10	105	324	QP
737.50	20.14	29.43	-9.29	46.0	-25.86	112	209	QP
820.80	21.22	29.20	-7.98	46.0	-24.78	169	235	QP

Remarks:

1. Emission Level = Read Level + Factor

   Margin value = Emission level – Limit value

2. The emission levels of other frequencies were very low against the limit.



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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

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.

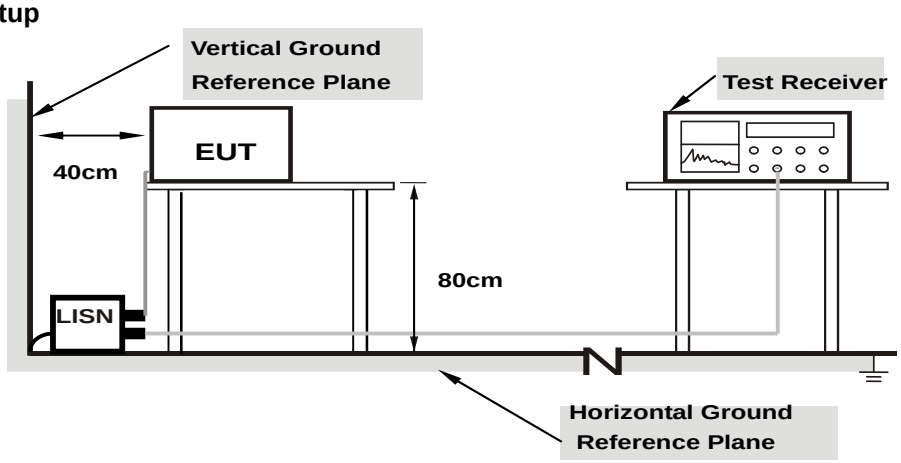
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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 Conditions

Same as 4.1.6.

4.2.7 Test Results

Worst-case data:

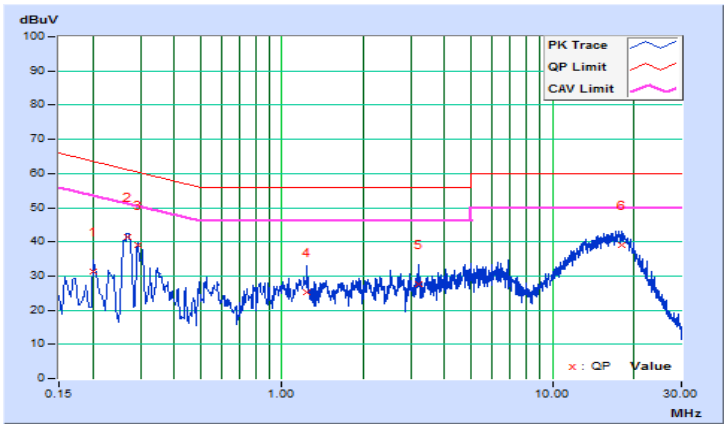
802.11n (HT40)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 151		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20084	9.68	21.52	10.26	31.20	19.94	63.58	53.58	-32.38	-33.64
2	**0.26765**	**9.68**	**31.73**	**28.50**	**41.41**	**38.18**	**61.19**	**51.19**	**-19.78**	**-13.01**
3	0.29429	9.68	29.52	23.16	39.20	32.84	60.40	50.40	-21.20	-17.56
4	1.23698	9.68	15.67	5.37	25.35	15.05	56.00	46.00	-30.65	-30.95
5	3.18807	9.73	17.93	9.67	27.66	19.40	56.00	46.00	-28.34	-26.60
6	18.03434	9.92	29.02	22.15	38.94	32.07	60.00	50.00	-21.06	-17.93

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.

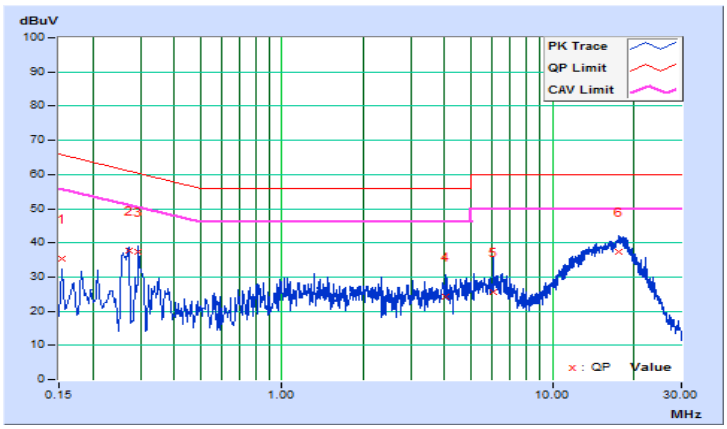


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 151		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.66	25.59	7.58	35.25	17.24	65.79	55.79	-30.54	-38.55
2	0.27120	9.66	28.04	20.81	37.70	30.47	61.08	51.08	-23.38	-20.61
3	0.29467	9.66	27.59	20.18	37.25	29.84	60.39	50.39	-23.14	-20.55
4	4.04436	9.72	14.55	4.98	24.27	14.70	56.00	46.00	-31.73	-31.30
5	6.05410	9.76	15.96	6.39	25.72	16.15	60.00	50.00	-34.28	-33.85
6	17.63943	9.97	27.50	20.83	37.47	30.80	60.00	50.00	-22.53	-19.20

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

*B is the 26 dB emission bandwidth in megahertz

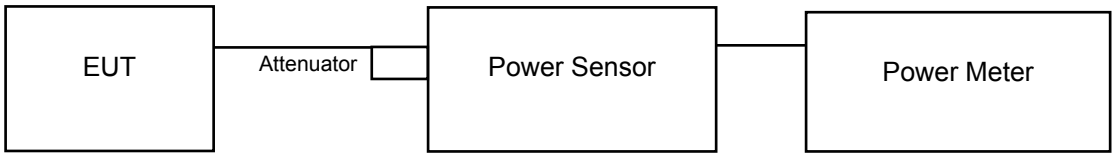
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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

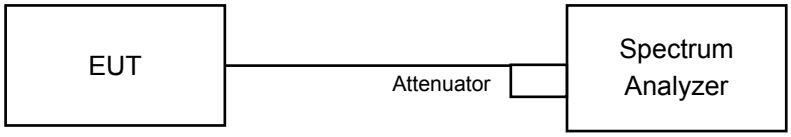
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

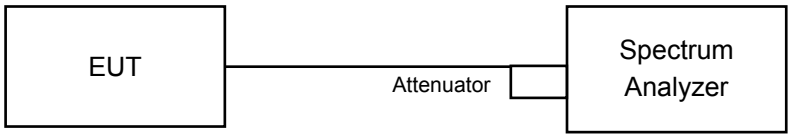
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11n (HT20), 802.11n (HT40)
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 and set the detector to AVERAGE. Duty factor is not added to measured value.

For 802.11ac (VHT80)
1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2) Set sweep trigger to “free run”.
3) Set RBW = 1 MHz.
4) Set VBW ≥ 3 MHz.
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (number of points in sweep) * T
7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
8) Detector = RMS.
9) Trace mode = max hold.
10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
11) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth
1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

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	20.16	20.07	205.378	23.13	30.00	Pass
40	5200	23.34	23.02	416.221	26.19	30.00	Pass
48	5240	23.26	23.17	419.327	26.23	30.00	Pass
149	5745	23.67	23.39	451.082	26.54	30.00	Pass
157	5785	23.95	23.34	464.087	26.67	30.00	Pass
165	5825	23.89	23.24	455.769	26.59	30.00	Pass

802.11n (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	19.70	19.56	183.690	22.64	30.00	Pass
40	5200	22.89	22.68	379.889	25.80	30.00	Pass
48	5240	22.85	22.66	377.254	25.77	30.00	Pass
149	5745	23.23	22.94	407.167	26.10	30.00	Pass
157	5785	23.59	23.04	429.932	26.33	30.00	Pass
165	5825	23.46	22.97	419.973	26.23	30.00	Pass

802.11n (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	17.34	16.94	103.631	20.15	30.00	Pass
46	5230	22.84	22.61	374.699	25.74	30.00	Pass
151	5755	23.97	23.77	487.691	26.88	30.00	Pass
159	5795	23.96	23.69	482.770	26.84	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.21	14.64	62.296	17.94	30.00	Pass
155	5775	21.85	21.30	288.005	24.59	30.00	Pass

Beamforming Mode

802.11n (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	19.70	19.56	183.690	22.64	27.99	Pass
40	5200	22.89	22.68	379.889	25.80	27.99	Pass
48	5240	22.85	22.66	377.254	25.77	27.99	Pass
149	5745	23.23	22.94	407.167	26.10	27.99	Pass
157	5785	23.59	23.04	429.932	26.33	27.99	Pass
165	5825	23.46	22.97	419.973	26.23	27.99	Pass

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

802.11n (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	17.34	16.94	103.631	20.15	27.99	Pass
46	5230	22.84	22.61	374.699	25.74	27.99	Pass
151	5755	23.97	23.77	487.691	26.88	27.99	Pass
159	5795	23.96	23.69	482.770	26.84	27.99	Pass

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.21	14.64	62.296	17.94	27.99	Pass
155	5775	21.85	21.30	288.005	24.59	27.99	Pass

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.12	19.94
40	5200	20.28	19.83
48	5240	20.16	19.80

802.11n (HT20)

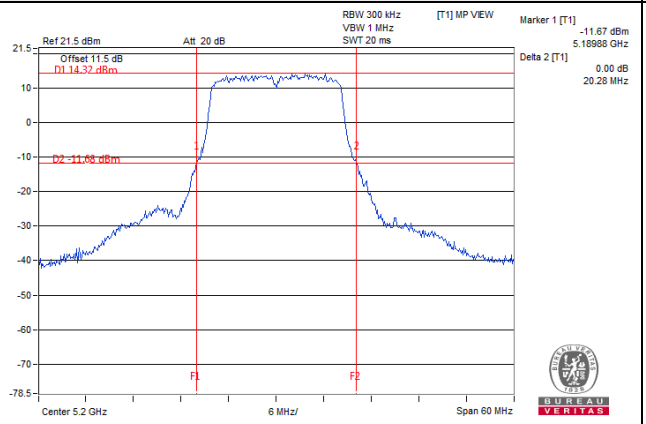
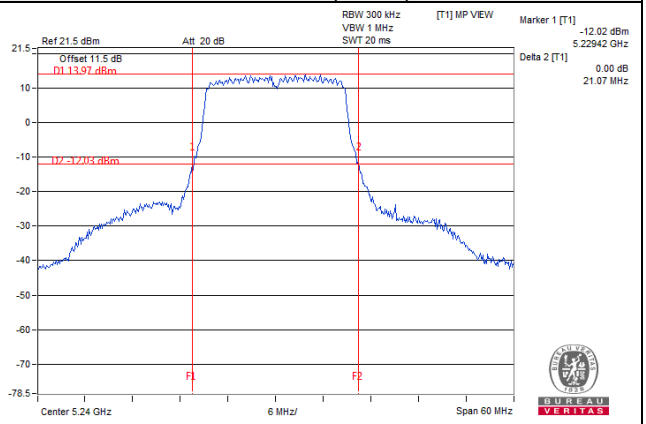
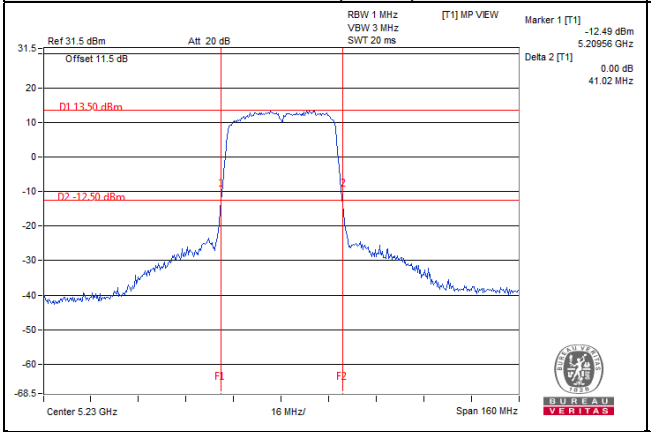
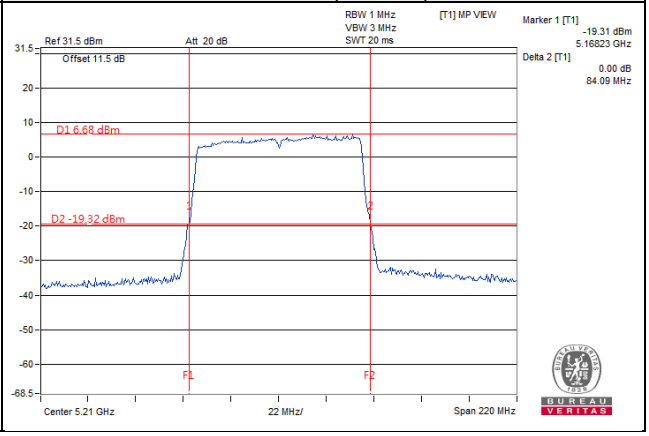
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.87	20.90
40	5200	20.93	21.00
48	5240	21.05	21.07

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	40.80	40.70
46	5230	41.02	40.63

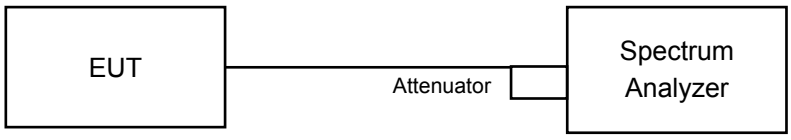
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	84.09	83.97

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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 sampling. 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 Result

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.44
40	5200	16.44	16.44
48	5240	16.56	16.44
149	5745	16.43	16.44
157	5785	16.44	16.44
165	5825	16.44	16.44

802.11n (HT20)

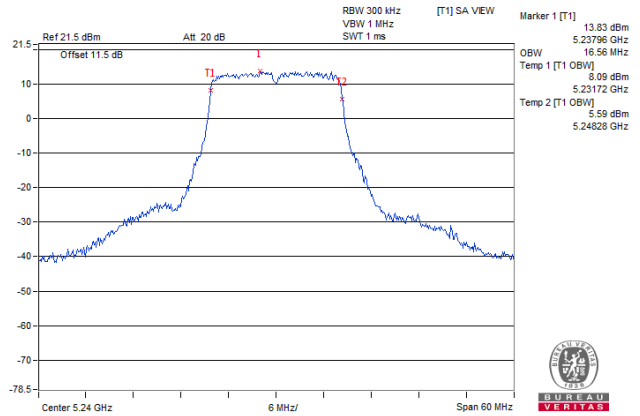
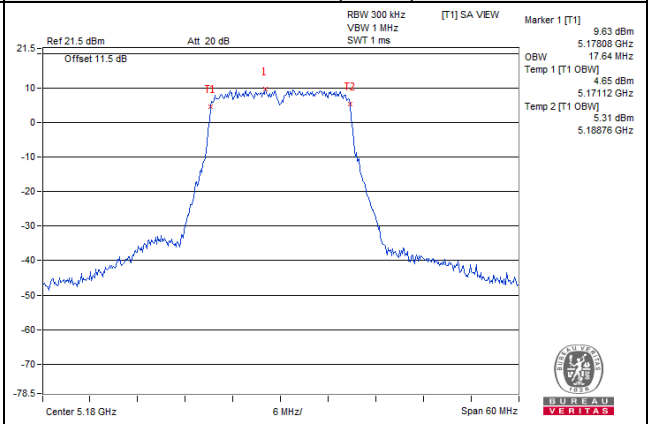
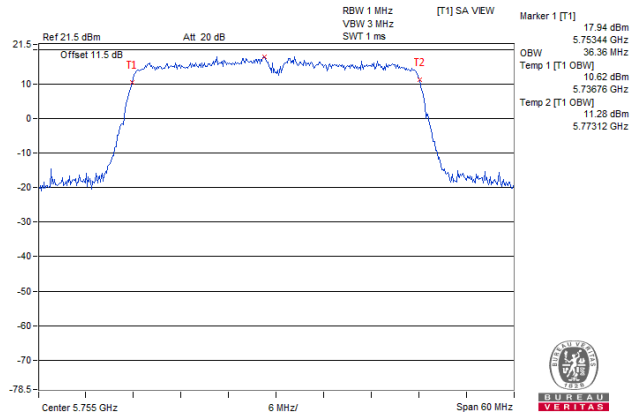
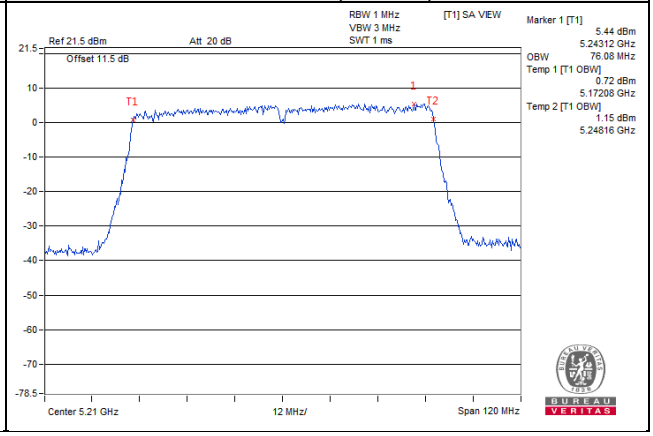
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.64	17.64
48	5240	17.64	17.64
149	5745	17.64	17.64
157	5785	17.64	17.64
165	5825	17.64	17.64

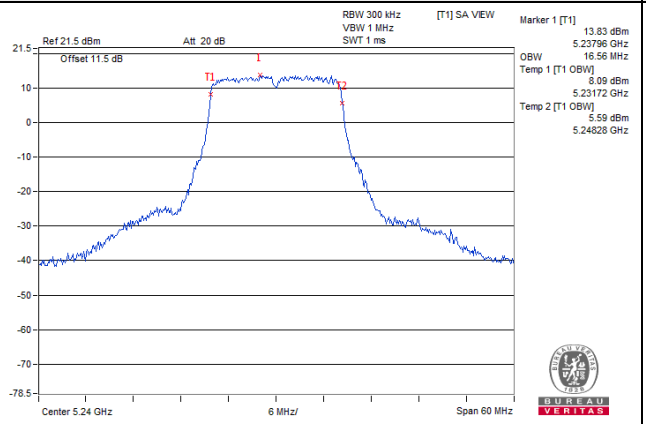
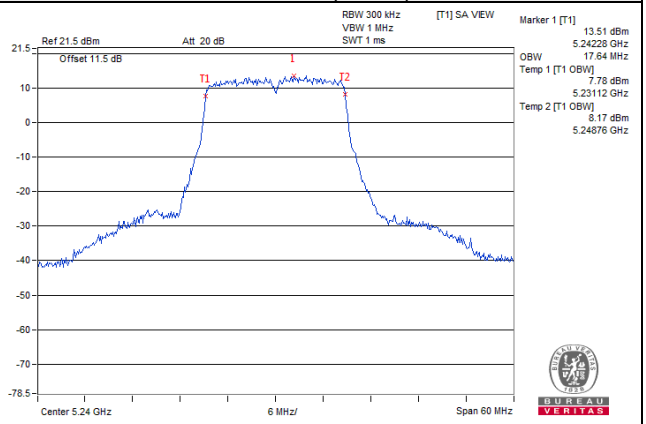
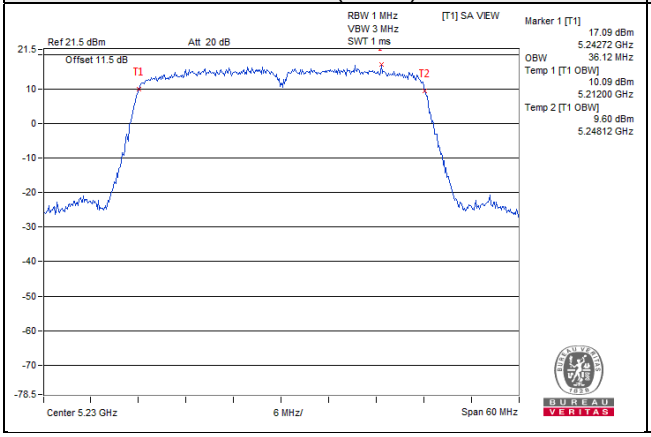
802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.12
46	5230	36.12	36.24
151	5755	36.12	36.36
159	5795	36.12	36.12

802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.08	75.84
155	5775	76.08	75.84

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

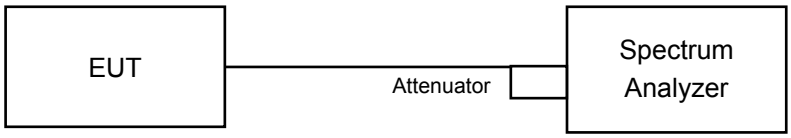
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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 Procedures

For U-NII-1 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
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.

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
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).

For U-NII-3 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
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 1) power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 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.

Duty cycle of test signal is < 98%
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 / 300 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 Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.99	5.92	0.17	9.14	14.99	Pass
40	5200	9.19	8.98	0.17	12.27	14.99	Pass
48	5240	9.39	9.14	0.17	12.45	14.99	Pass

Note:

1. Method E) 2) 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 U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.28	5.03	0.65	8.82	14.99	Pass
40	5200	8.35	8.04	0.65	11.86	14.99	Pass
48	5240	8.67	8.45	0.65	12.22	14.99	Pass

Note:

1. Method E) 2) 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 U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-0.49	-0.22	0.19	2.85	14.99	Pass
46	5230	1.73	2.50	0.19	5.33	14.99	Pass

Note:

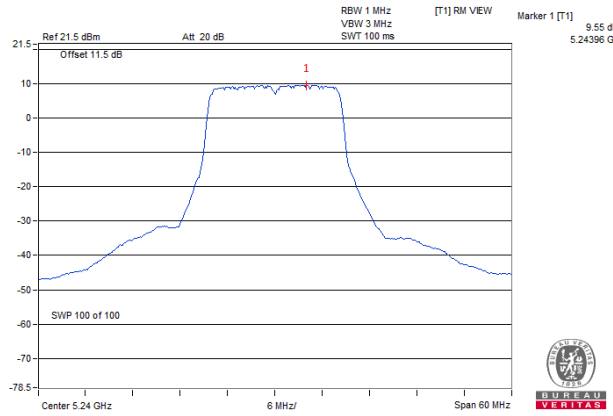
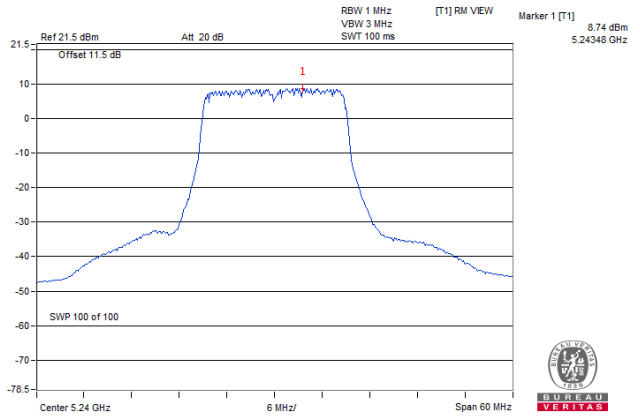
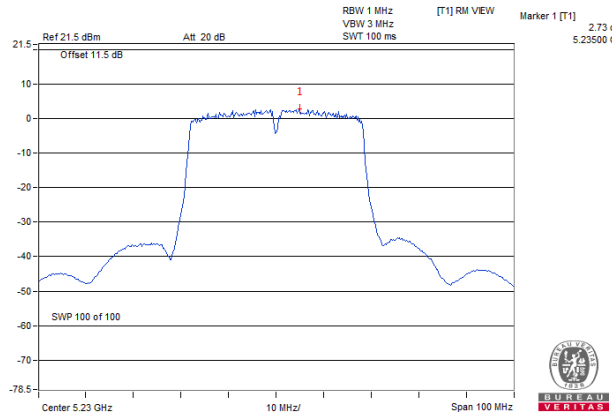
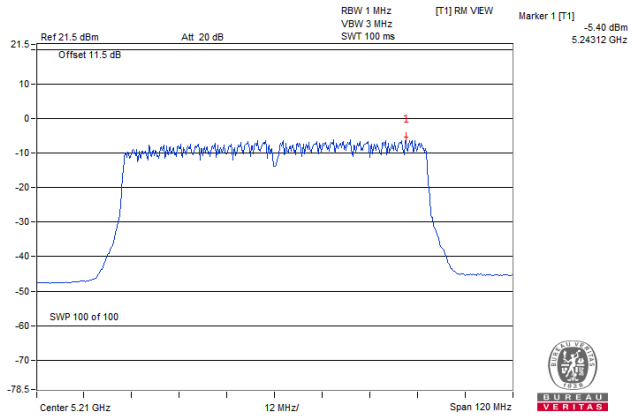
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-5.40	-6.19	0.67	-2.10	14.99	Pass

Note:

1. Method E) 2) 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 U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 48	802.11n (HT20) / Chain 0 / CH 48
	
802.11n (HT40) / Chain 1 / CH 46	802.11ac (VHT80) / Chain 0 / CH 42
	

For U-NII-3 band:

802.11a

TX chain	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	1.22	3.44	3.01	0.17	6.62	27.99	Pass
	157	5785	1.49	3.71	3.01	0.17	6.89	27.99	Pass
	165	5825	1.33	3.55	3.01	0.17	6.73	27.99	Pass
1	149	5745	1.21	3.43	3.01	0.17	6.61	27.99	Pass
	157	5785	1.40	3.62	3.01	0.17	6.80	27.99	Pass
	165	5825	1.19	3.41	3.01	0.17	6.59	27.99	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	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	0.53	2.75	3.01	0.65	6.41	27.99	Pass
	157	5785	0.84	3.06	3.01	0.65	6.72	27.99	Pass
	165	5825	1.06	3.28	3.01	0.65	6.94	27.99	Pass
1	149	5745	0.00	2.22	3.01	0.65	5.88	27.99	Pass
	157	5785	0.16	2.38	3.01	0.65	6.04	27.99	Pass
	165	5825	0.61	2.83	3.01	0.65	6.49	27.99	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

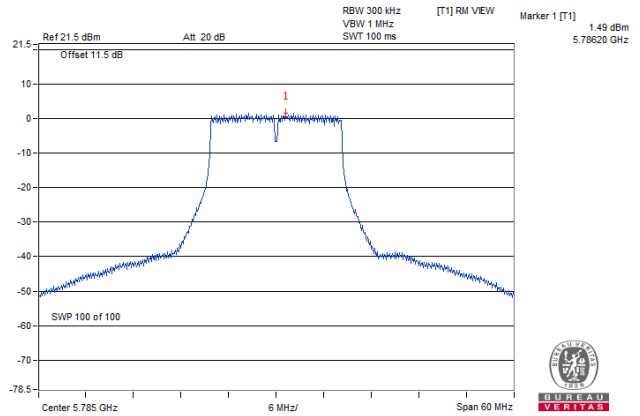
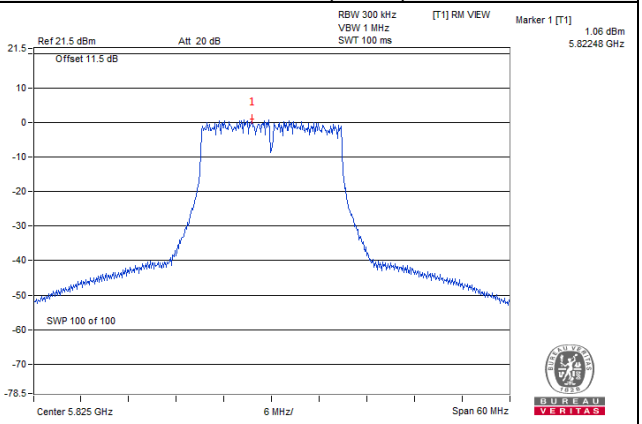
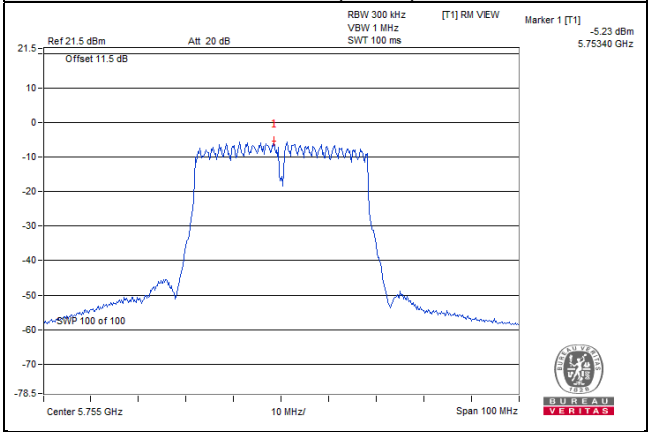
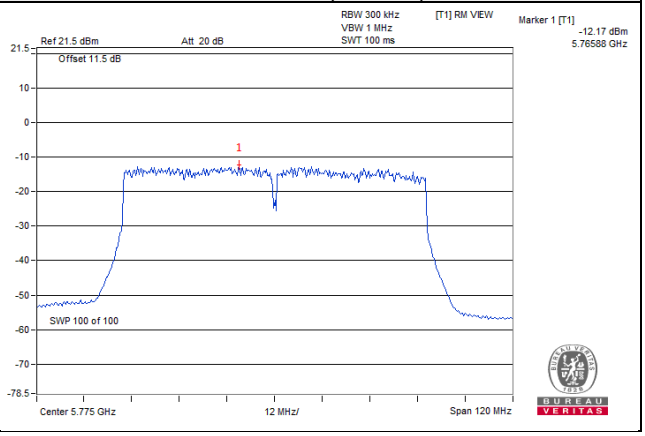
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-6.94	-4.72	3.01	0.19	-1.52	27.99	Pass
	159	5795	-6.29	-4.07	3.01	0.19	-0.87	27.99	Pass
1	151	5755	-5.23	-3.01	3.01	0.19	0.19	27.99	Pass
	159	5795	-5.59	-3.37	3.01	0.19	-0.17	27.99	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	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	-12.84	-10.62	3.01	0.67	-6.94	27.99	Pass
1	155	5775	-12.17	-9.95	3.01	0.67	-6.27	27.99	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

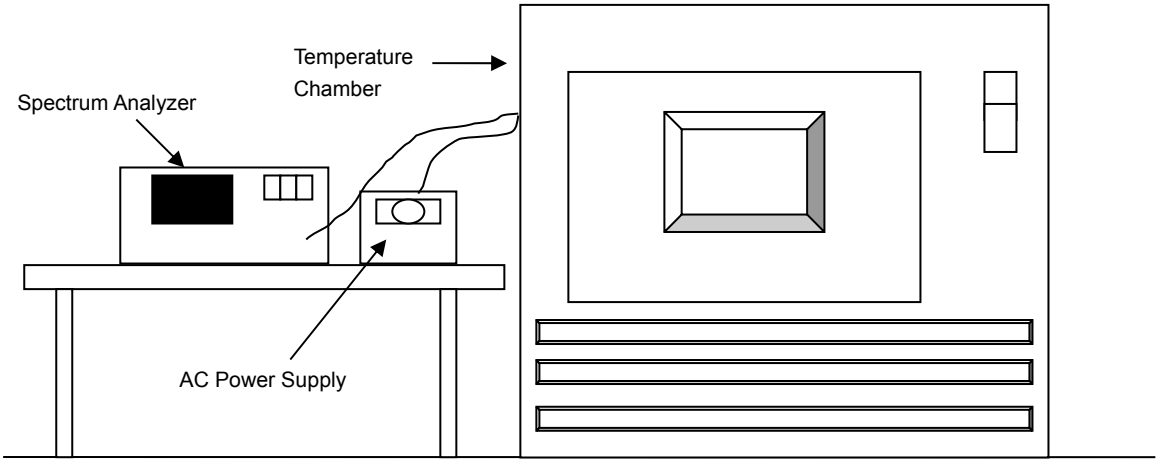
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.6 Frequency Stability

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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 26, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
			Jun. 03, 2019	Jun. 02, 2020
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
			Jun. 27, 2019	Jun. 26, 2020
AC Power Supply Extech	CFW-105	E000603	NA	NA

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: 5180MHz									
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
40	120	5179.9890	PASS	5179.9892	PASS	5179.9921	PASS	5179.9923	PASS
30	120	5179.9984	PASS	5180.0008	PASS	5179.9980	PASS	5179.9979	PASS
20	120	5179.9850	PASS	5179.9848	PASS	5179.9835	PASS	5179.9844	PASS
10	120	5179.9949	PASS	5179.9943	PASS	5179.9936	PASS	5179.9954	PASS
0	120	5180.0154	PASS	5180.0177	PASS	5180.0171	PASS	5180.0190	PASS

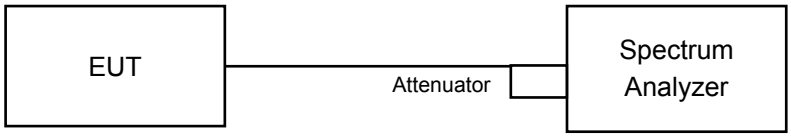
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9849	PASS	5179.9854	PASS	5179.9845	PASS	5179.9840	PASS
	120	5179.9850	PASS	5179.9848	PASS	5179.9835	PASS	5179.9844	PASS
	102	5179.9844	PASS	5179.9843	PASS	5179.9836	PASS	5179.9840	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

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

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.37	16.39	0.5	Pass
157	5785	16.38	15.60	0.5	Pass
165	5825	16.36	16.30	0.5	Pass

802.11n (HT20)

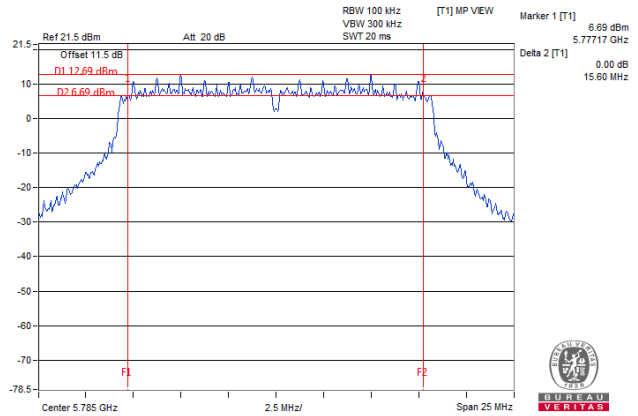
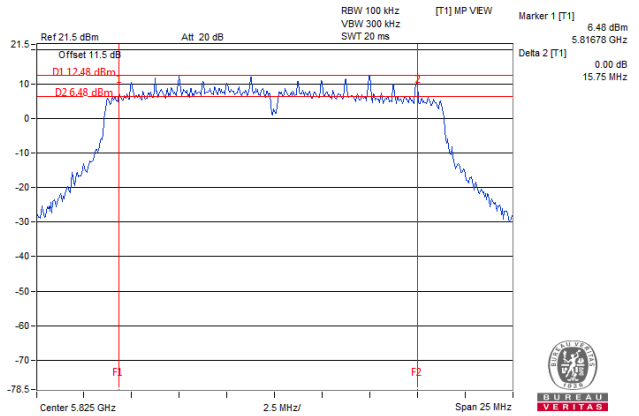
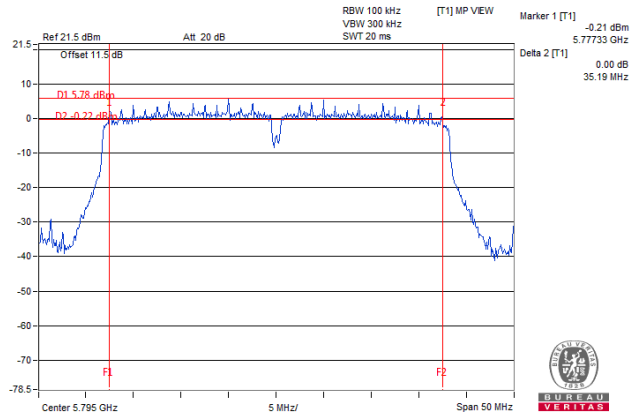
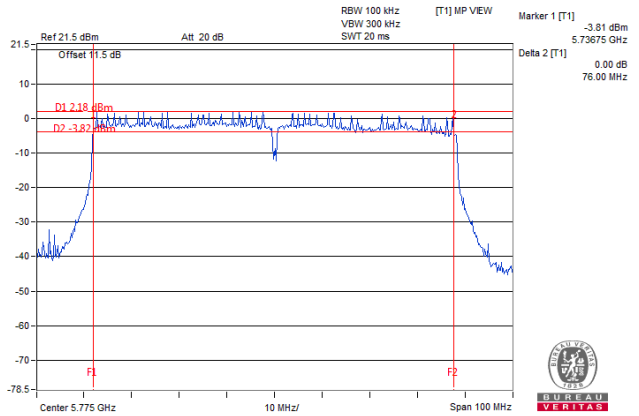
Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.61	17.62	0.5	Pass
157	5785	17.60	17.59	0.5	Pass
165	5825	17.36	15.75	0.5	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.21	35.21	0.5	Pass
159	5795	35.19	35.28	0.5	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.01	76.00	0.5	Pass

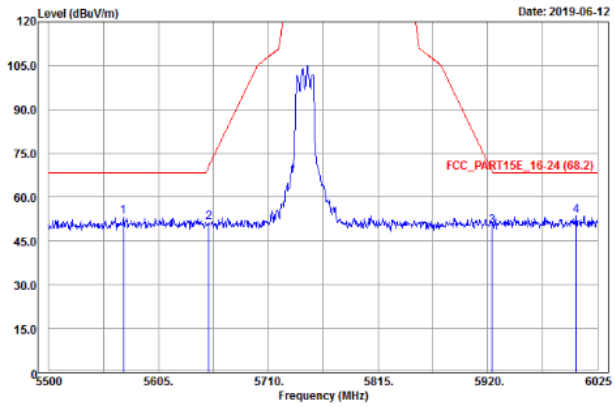
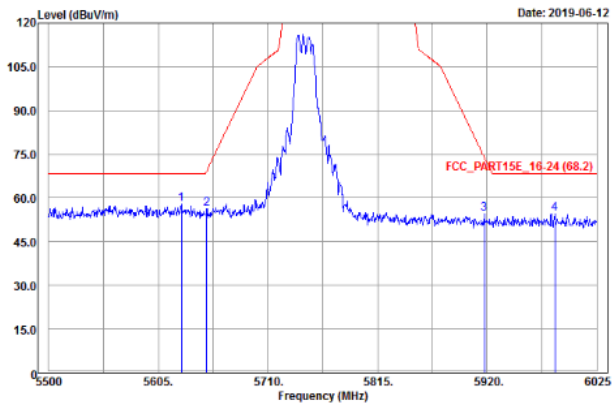
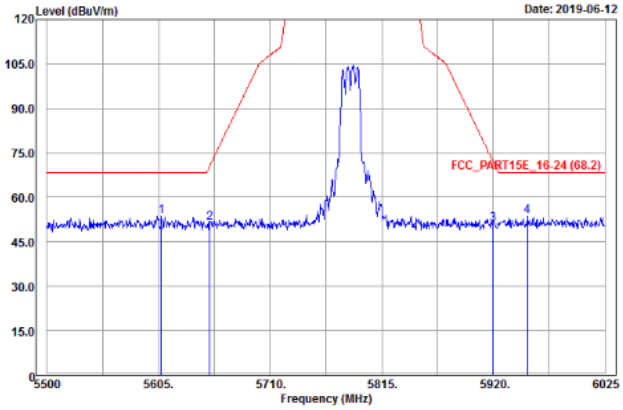
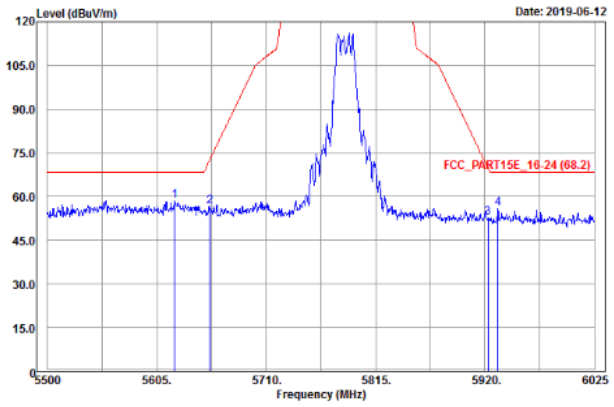
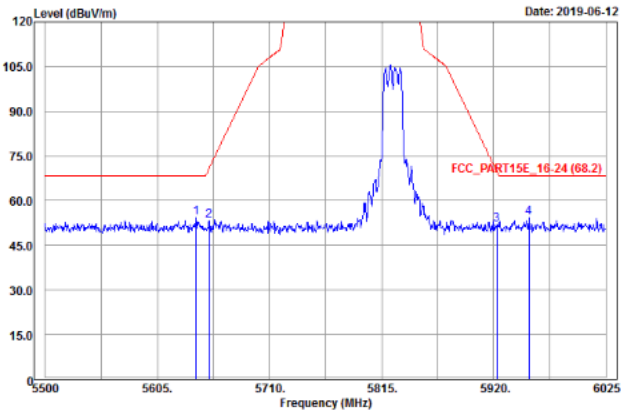
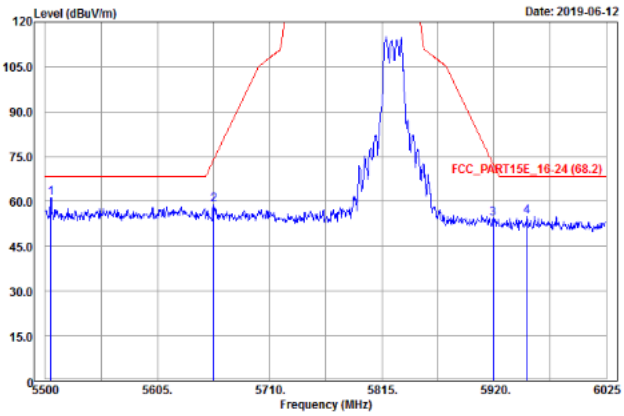
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

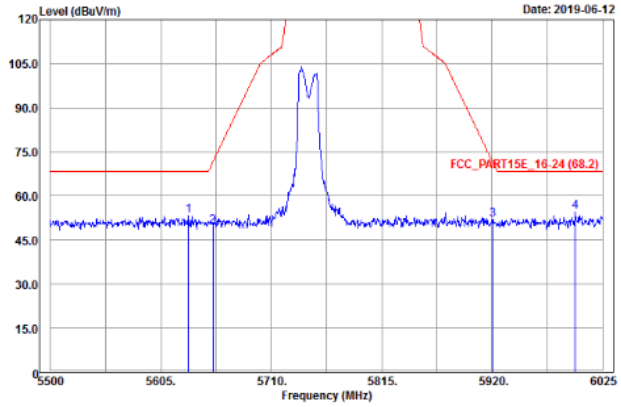
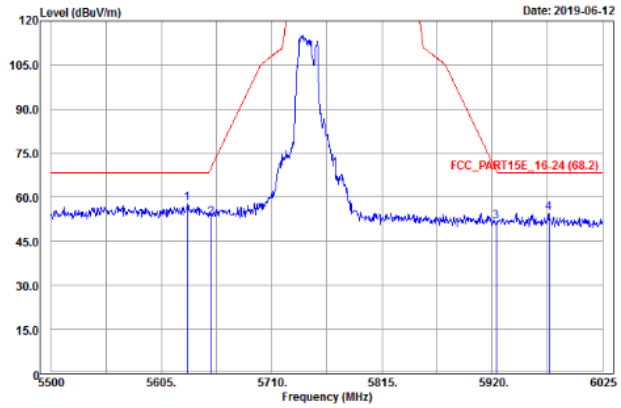
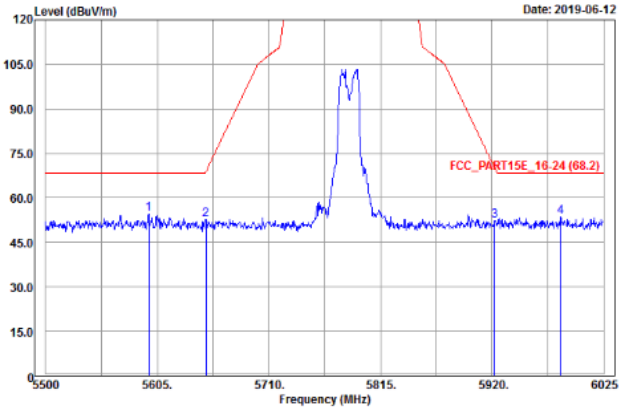
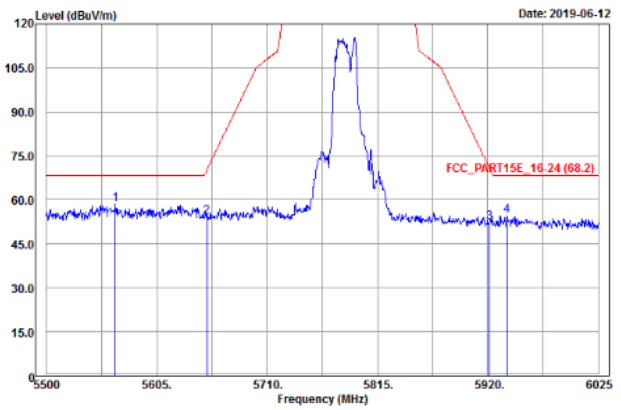
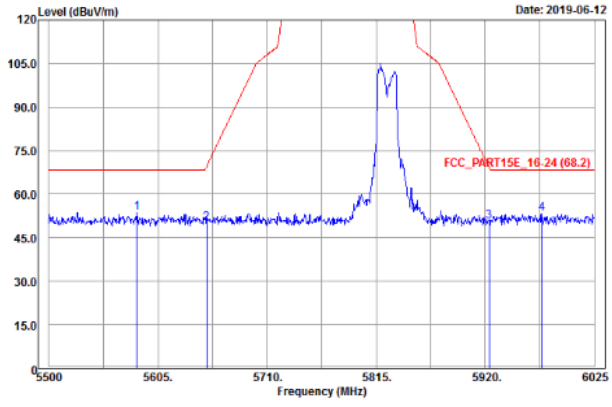
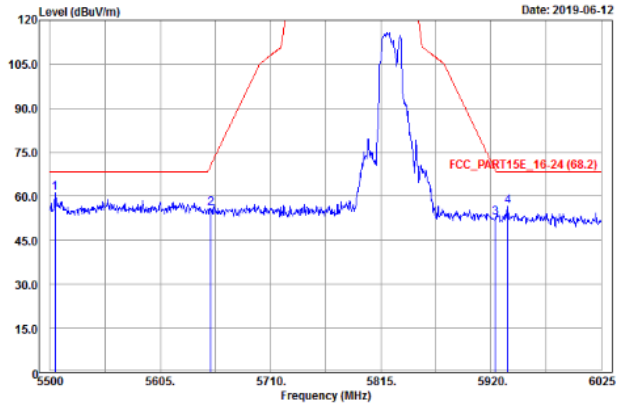
Please refer to the attached file (Test Setup Photo).

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

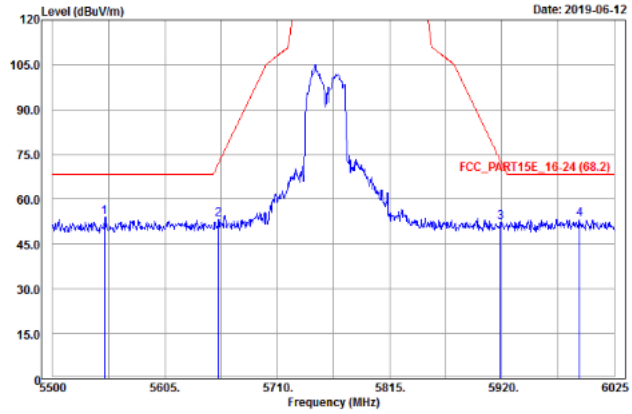
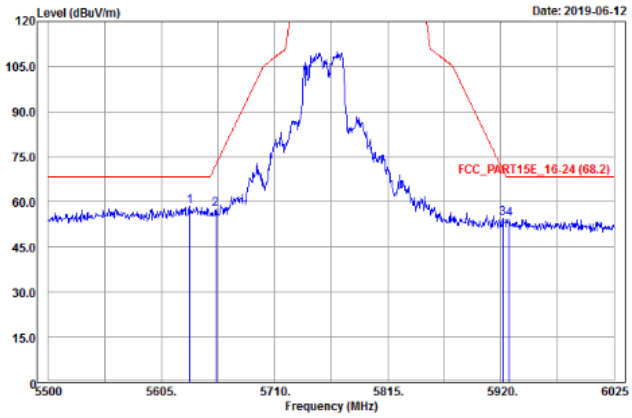
802.11a

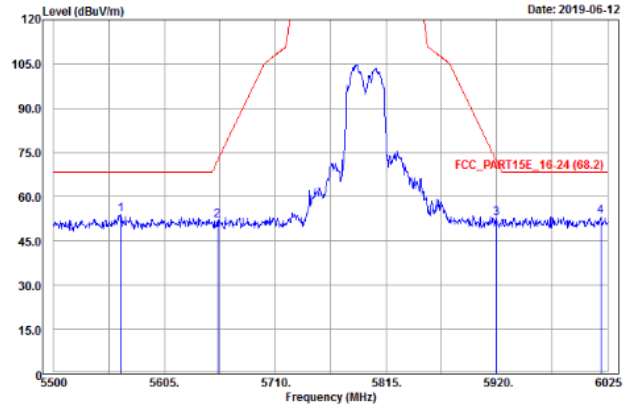
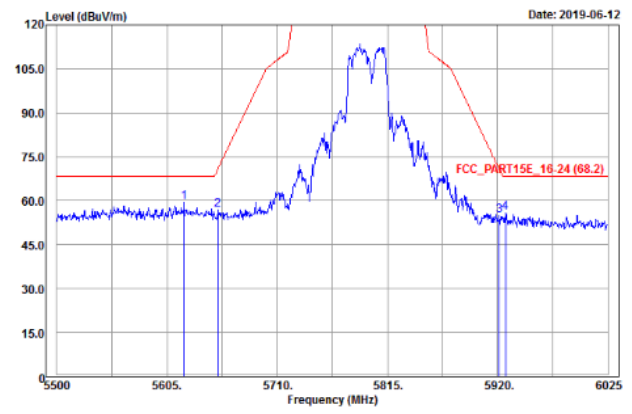
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT20)

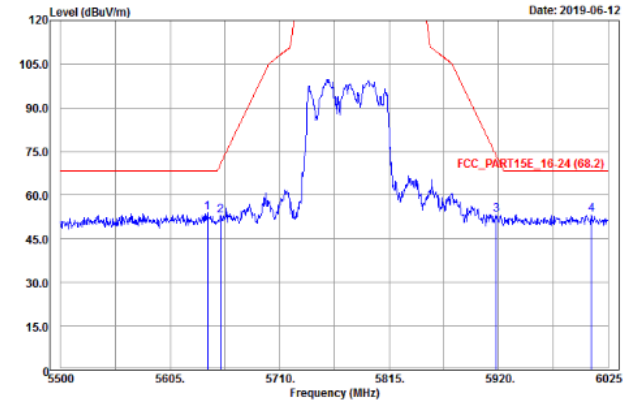
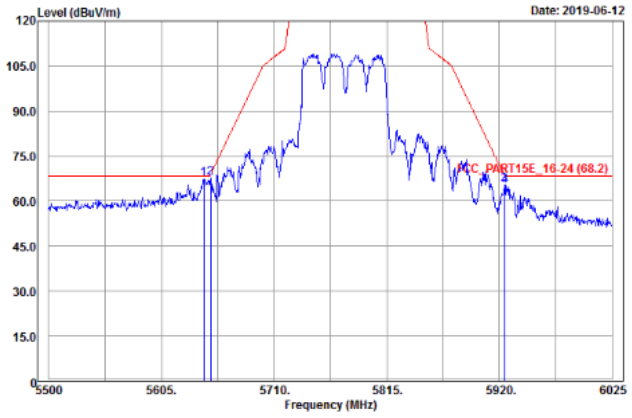
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	

CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information of 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 FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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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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