FCC Test Report

Report No.:	RF190605C51-1
FCC ID:	GZ5NVG578FHL
Test Model:	NVG578FHLM
Series Model:	NVG578FHL (Refer to item 3.1 for more details)
Received Date:	Jun. 05, 2019
Test Date:	Jul. 03 ~ Jul. 30, 2019
Issued Date:	Aug. 08, 2019
Applicant:	ARRIS
Address:	2500 Walsh Ave., Santa Clara, CA 95051 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF190605C51-1	Original release.	Aug. 08, 2019

1 Certificate of Conformity

Product:	NVG578FHLM, NVG578FHL
Brand:	ARRIS
Test Model:	NVG578FHLM
Series Model:	NVG578FHL (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	ARRIS
Test Date:	Jul. 03 ~ Jul. 30, 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. 08, 2019

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Aug. 08, 2019

Bruce Chen / Senior 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 -16.99dB at 0.16569MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 5150.00MHz.
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(MHF) not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
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	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	NVG578FHLM, NVG578FHL
Brand	ARRIS
Test Model	NVG578FHLM
Series Model	NVG578FHL
Model Difference	Refer to Note
Status of EUT	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 600Mbps 802.11ac: up to 1733.3Mbps
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	CDD Mode: 5180~5240MHz: 948.419mW 5745~5825MHz: 939.597mW Beamforming Mode: 5180~5240MHz: 112.906mW 5745~5825MHz: 268.402mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	NA

Note:

1. All models are listed as below.

Product	Model	Optional functions
NVG578FHLM	NVG578FHLM (Test Model)	with MoCA
NVG578FHL	NVG578FHL	without MoCA

Note: Use NVG578FHLM full function model for final tests.

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitter and 4 receivers.

Modulation Mode	Beamforming Mode	TX Function
802.11a	Not Support	4TX/4RX
802.11n (HT20)	Support	4TX/4RX
802.11n (HT40)	Support	4TX/4RX
802.11ac (VHT20)	Support	4TX/4RX
802.11ac (VHT40)	Support	4TX/4RX
802.11ac (VHT80)	Support	4TX/4RX

* The modulation and bandwidth are similar for 802.11n mode for HT20/HT40 and 802.11ac mode for VHT20/VHT40, 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 adapters.

Adapter 1	
Brand	Asian Power Devices Inc.
Model	WA-36L12FU
Input Power	100-120Vac~, 60Hz, 0.9A
Output Power	12Vdc, 3A

Adapter 2	
Brand	ARRIS
Model	NBS42D120300VU
Input Power	100-120Vac~, 50/60Hz, 1.0A
Output Power	12Vdc, 3A

4. The following antennas were provided to the EUT.

No.	Brand	Model	Gain(dBi)	Frequency Range	Type	Connector
ANT1	INPAQ	WA-P-LB-02-684	2.71/4.80	2400~2500/5150~5850MHz	PCB	i-pex(MHF)
ANT2	INPAQ	WA-P-LB-01-238	3.59/5.74	2400~2500/5150~5850MHz	PCB	i-pex(MHF)
ANT3	INPAQ	WA-P-LB-03-138	3.82/4.64	2400~2500/5150~5850MHz	PCB	i-pex(MHF)
ANT4	INPAQ	WA-P-LB-05-011	3.61/4.87	2400~2500/5150~5850MHz	PCB	i-pex(MHF)

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	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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 **Z-plane**.
2. "-": Means no effect.

Radiated Emission Test (Above 1GHz):

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

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

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	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
-	802.11ac (VHT80)		42	42	OFDM	130.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
-	802.11ac (VHT80)		155	155	OFDM	130.0

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)
-	802.11a	5180-5240	36 to 48	48	OFDM	6.0
		5745-5825	149 to 165		OFDM	6.0

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)
-	802.11a	5180-5240	36 to 48	48	OFDM	6.0
		5745-5825	149 to 165		OFDM	6.0

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	7.2
-	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
-	802.11ac (VHT80)		42	42	OFDM	130.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
-	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
-	802.11ac (VHT80)		155	155	OFDM	130.0

Test Condition:

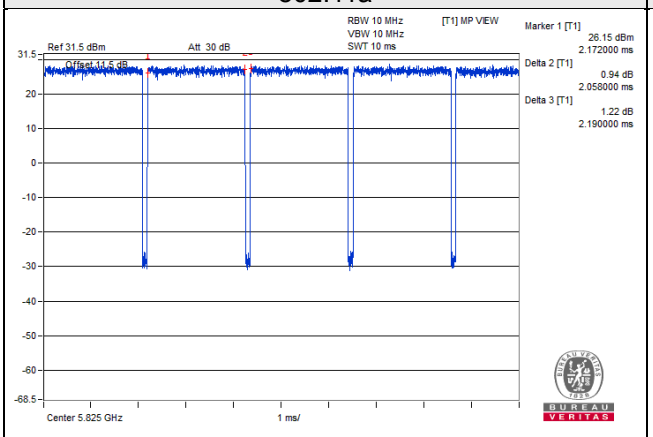
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
RE<1G	25 deg. C, 70% RH	120Vac, 60Hz	Noah Chang
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Noah Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

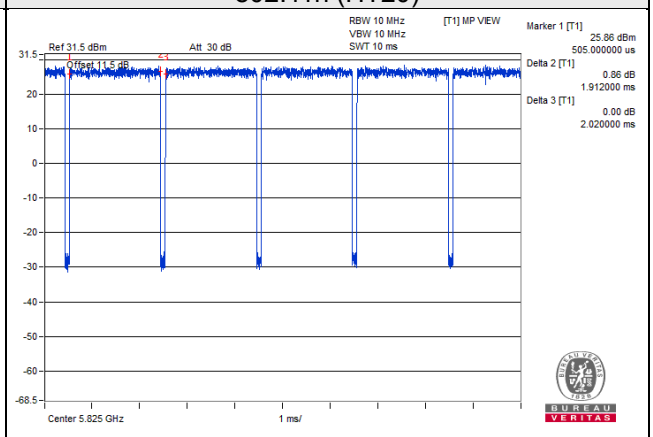
Duty cycle of test signal is > 98%, duty factor is not required
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.058/2.190 = 0.940, Duty factor = 10 * log(1/0.940) = 0.27
802.11n (HT20): Duty cycle = 1.912/2.02 = 0.947, Duty factor = 10 * log(1/0.947) = 0.24
802.11n (HT40): Duty cycle = 0.940/1.065 = 0.883, Duty factor = 10 * log(1/0.883) = 0.54
802.11ac (VHT80): Duty cycle = 0.459/0.491 = 0.935, Duty factor = 10 * log(1/0.935) = 0.29

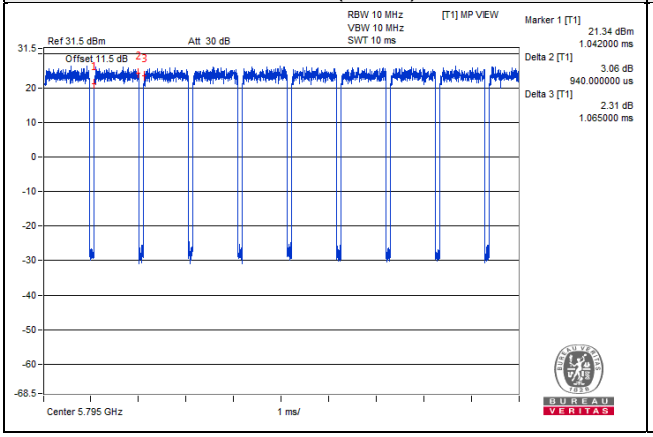
802.11a



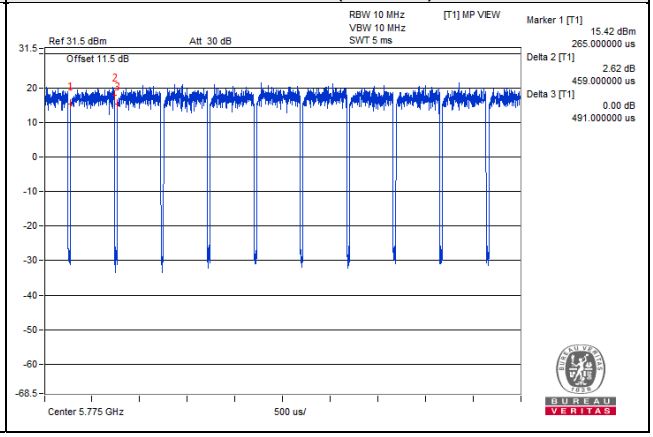
802.11n (HT20)



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.

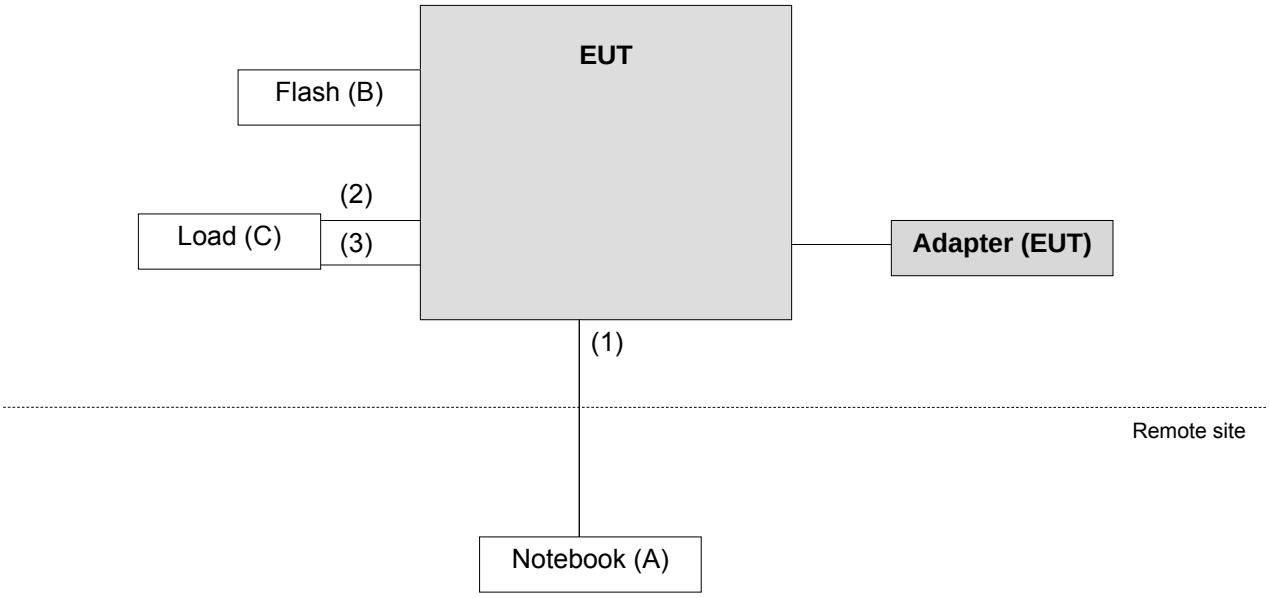
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	Latitude E6420	HPFC5Q1	FCC DoC Approved	-
B.	Flash	HP	v250W	02	NA	-
C.	Load	NA	NA	NA	NA	-

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	-
2.	RJ45 cable	1	4	N	0	-
3.	RJ11 cable	1	1	N	0	-

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 ROHDE & SCHWARZ	ESCI	100424	Jan. 03, 2019	Jan. 02, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 24, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2018	Aug. 07, 2019
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 11, 2019	Jun. 10, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2018	Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2018	Nov. 13, 2019
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY551 90004/MY55190007/ MY55210005	Jul. 17, 2018	Jul. 16, 2019
			Jul. 15, 2019	Jul. 14, 2020

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 Chamber 4.

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:

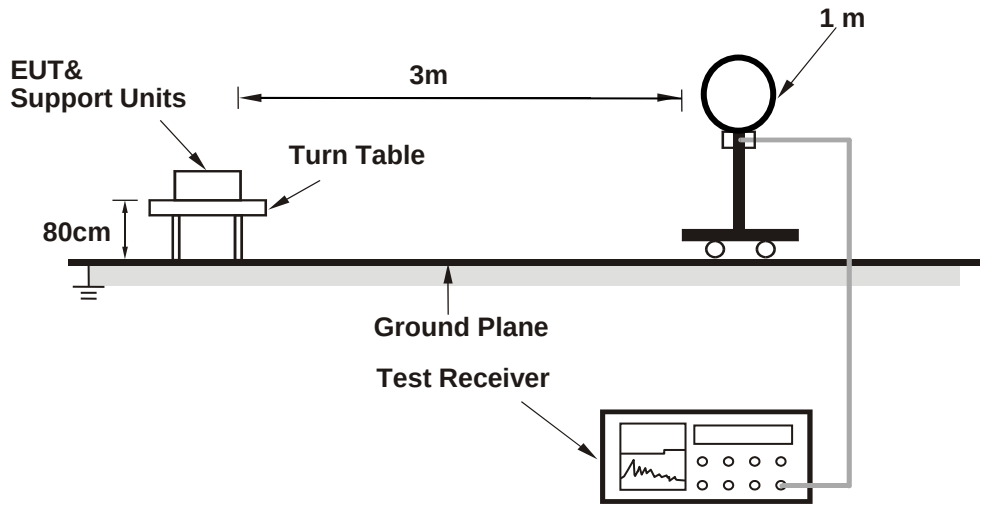
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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. (802.11a: RBW = 1MHz, VBW = 1kHz; 802.11n (HT20): RBW = 1MHz, VBW = 1kHz; 802.11n (HT40): RBW = 1MHz, VBW = 3kHz; 802.11ac (VHT80): RBW = 1MHz, VBW = 3kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

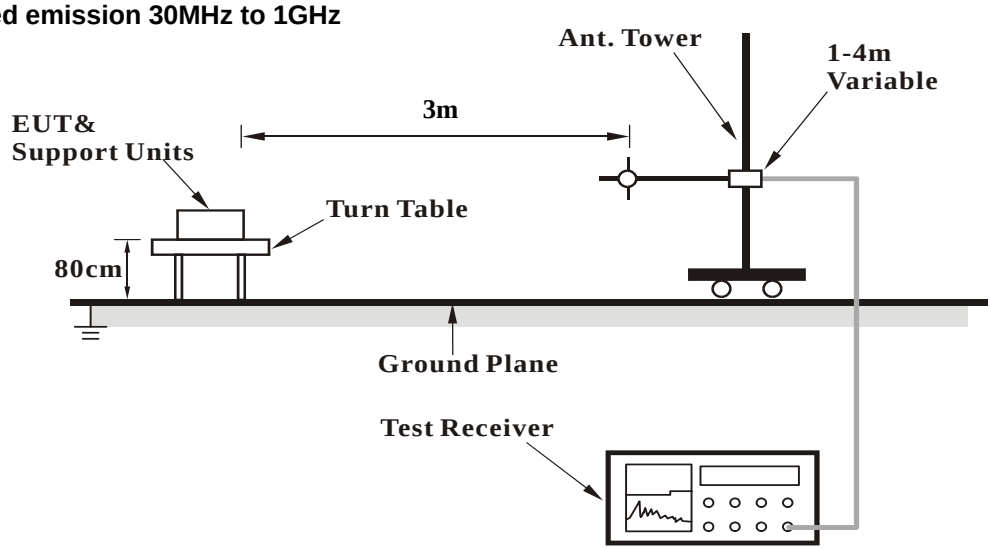
No deviation.

4.1.5 Test Set Up

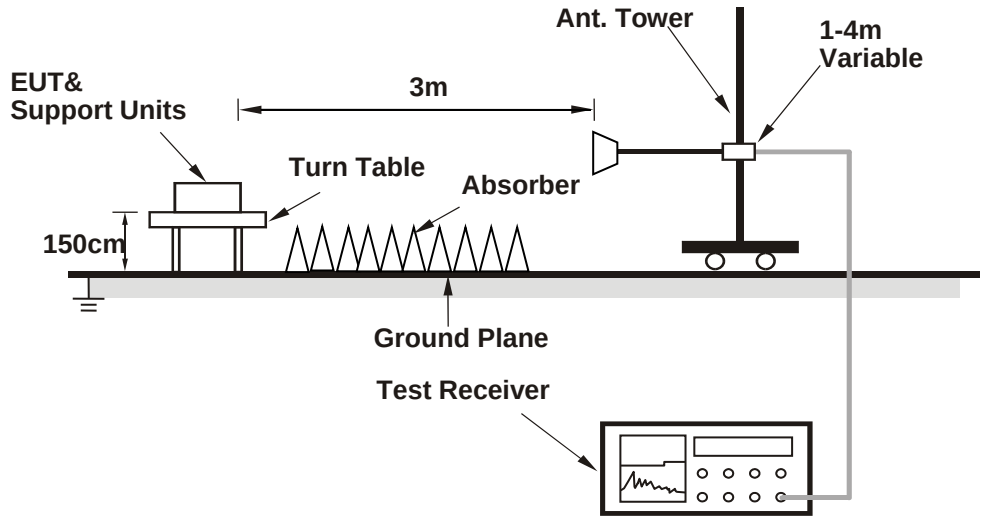
For Radiated emission below 30MHz



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								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5143.00	60.9 PK	74.0	-13.1	1.05 H	13	48.3	12.6
2	5143.00	47.8 AV	54.0	-6.2	1.05 H	13	35.2	12.6
3	*5180.00	120.1 PK			1.00 H	20	78.6	41.5
4	*5180.00	110.2 AV			1.00 H	20	68.7	41.5
5	#10360.00	62.4 PK	68.2	-5.8	2.22 H	215	39.9	22.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5143.00	70.3 PK	74.0	-3.7	2.16 V	47	57.7	12.6
2	5143.00	53.1 AV	54.0	-0.9	2.16 V	47	40.5	12.6
3	*5180.00	124.1 PK			2.16 V	40	82.6	41.5
4	*5180.00	114.2 AV			2.16 V	40	72.7	41.5
5	#10360.00	63.0 PK	68.2	-5.2	1.23 V	197	40.5	22.5

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5123.00	61.2 PK	74.0	-12.8	1.05 H	16	48.7	12.5
2	5123.00	47.8 AV	54.0	-6.2	1.05 H	16	35.3	12.5
3	*5200.00	119.2 PK			1.02 H	9	77.7	41.5
4	*5200.00	109.0 AV			1.02 H	9	67.5	41.5
5	#10400.00	63.1 PK	68.2	-5.1	3.19 H	32	40.2	22.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5123.00	65.4 PK	74.0	-8.6	2.16 V	42	52.9	12.5
2	5123.00	53.3 AV	54.0	-0.7	2.16 V	42	40.8	12.5
3	*5200.00	123.2 PK			2.20 V	40	81.7	41.5
4	*5200.00	113.0 AV			2.20 V	40	71.5	41.5
5	#10400.00	63.7 PK	68.2	-4.5	1.32 V	225	40.8	22.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.1 PK			1.06 H	11	78.9	41.2
2	*5240.00	110.1 AV			1.06 H	11	68.9	41.2
3	5350.00	60.5 PK	74.0	-13.5	1.09 H	3	48.1	12.4
4	5350.00	47.4 AV	54.0	-6.6	1.09 H	3	35.0	12.4
5	#10480.00	62.9 PK	68.2	-5.3	2.22 H	147	40.1	22.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	124.1 PK			2.12 V	42	82.9	41.2
2	*5240.00	114.1 AV			2.12 V	42	72.9	41.2
3	5350.00	64.6 PK	74.0	-9.4	2.16 V	27	52.2	12.4
4	5350.00	52.2 AV	54.0	-1.8	2.16 V	27	39.8	12.4
5	#10480.00	63.4 PK	68.2	-4.8	1.40 V	235	40.6	22.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5632.80	62.9 PK	68.2	-5.3	1.00 H	290	50.2	12.7
2	*5745.00	119.2 PK			1.00 H	290	76.7	42.5
3	*5745.00	108.7 AV			1.00 H	290	66.2	42.5
4	#5976.80	66.0 PK	68.2	-2.2	1.00 H	290	52.2	13.8
5	11490.00	64.3 PK	74.0	-9.7	2.54 H	142	40.2	24.1
6	11490.00	50.9 AV	54.0	-3.1	2.54 H	142	26.8	24.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5630.40	62.8 PK	68.2	-5.4	2.36 V	46	50.1	12.7
2	*5745.00	122.7 PK			2.36 V	46	80.2	42.5
3	*5745.00	113.2 AV			2.36 V	46	70.7	42.5
4	#5991.20	67.3 PK	68.2	-0.9	2.36 V	46	53.5	13.8
5	11490.00	64.9 PK	74.0	-9.1	1.95 V	220	40.8	24.1
6	11490.00	52.0 AV	54.0	-2.0	1.95 V	220	27.9	24.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	62.8 PK	68.2	-5.4	1.00 H	289	50.1	12.7
2	*5785.00	120.1 PK			1.00 H	289	77.5	42.6
3	*5785.00	110.4 AV			1.00 H	289	67.8	42.6
4	#5935.20	64.6 PK	68.2	-3.6	1.00 H	289	51.0	13.6
5	11570.00	64.3 PK	74.0	-9.7	1.47 H	225	40.3	24.0
6	11570.00	50.9 AV	54.0	-3.1	1.47 H	225	26.9	24.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.60	64.0 PK	68.2	-4.2	2.36 V	44	51.3	12.7
2	*5785.00	123.3 PK			2.36 V	44	80.7	42.6
3	*5785.00	113.7 AV			2.36 V	44	71.1	42.6
4	#5948.00	66.3 PK	68.2	-1.9	2.36 V	44	52.7	13.6
5	11570.00	64.8 PK	74.0	-9.2	1.47 V	230	40.8	24.0
6	11570.00	51.7 AV	54.0	-2.3	1.47 V	230	27.7	24.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5631.20	62.8 PK	68.2	-5.4	1.04 H	292	50.1	12.7
2	*5825.00	119.8 PK			1.04 H	292	77.2	42.6
3	*5825.00	110.4 AV			1.04 H	292	67.8	42.6
4	#5969.60	63.6 PK	68.2	-4.6	1.04 H	292	49.9	13.7
5	11650.00	63.8 PK	74.0	-10.2	1.65 H	220	40.2	23.6
6	11650.00	50.4 AV	54.0	-3.6	1.65 H	220	26.8	23.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.00	62.8 PK	68.2	-5.4	2.36 V	44	50.1	12.7
2	*5825.00	123.0 PK			2.36 V	44	80.4	42.6
3	*5825.00	113.2 AV			2.36 V	44	70.6	42.6
4	#5988.80	65.4 PK	68.2	-2.8	2.36 V	44	51.6	13.8
5	11650.00	64.4 PK	74.0	-9.6	1.95 V	214	40.8	23.6
6	11650.00	51.3 AV	54.0	-2.7	1.95 V	214	27.7	23.6

Remarks:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5147.00	61.5 PK	74.0	-12.5	2.22 H	15	48.9	12.6
2	5147.00	47.9 AV	54.0	-6.1	2.22 H	15	35.3	12.6
3	*5180.00	118.5 PK			1.05 H	33	77.0	41.5
4	*5180.00	107.0 AV			1.05 H	33	65.5	41.5
5	#10360.00	62.6 PK	68.2	-5.6	2.66 H	322	40.1	22.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5147.00	72.7 PK	74.0	-1.3	2.12 V	46	60.1	12.6
2	5147.00	53.2 AV	54.0	-0.8	2.12 V	46	40.6	12.6
3	*5180.00	122.5 PK			2.11 V	28	81.0	41.5
4	*5180.00	111.0 AV			2.11 V	28	69.5	41.5
5	#10360.00	63.0 PK	68.2	-5.2	1.95 V	271	40.5	22.5

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5124.00	61.1 PK	74.0	-12.9	1.00 H	10	48.6	12.5
2	5124.00	47.8 AV	54.0	-6.2	1.00 H	10	35.3	12.5
3	*5200.00	119.8 PK			1.56 H	21	78.3	41.5
4	*5200.00	107.7 AV			1.56 H	21	66.2	41.5
5	#10400.00	63.2 PK	68.2	-5.0	2.63 H	133	40.3	22.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5124.00	66.5 PK	74.0	-7.5	2.11 V	27	54.0	12.5
2	5124.00	52.7 AV	54.0	-1.3	2.11 V	27	40.2	12.5
3	*5200.00	123.8 PK			2.08 V	31	82.3	41.5
4	*5200.00	112.7 AV			2.08 V	31	71.2	41.5
5	#10400.00	63.7 PK	68.2	-4.5	1.63 V	241	40.8	22.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.9 PK			1.05 H	10	78.7	41.2
2	*5240.00	109.4 AV			1.05 H	10	68.2	41.2
3	5395.00	61.0 PK	74.0	-13.0	1.53 H	10	48.3	12.7
4	5395.00	48.0 AV	54.0	-6.0	1.53 H	10	35.3	12.7
5	#10480.00	62.9 PK	68.2	-5.3	2.33 H	299	40.1	22.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	123.9 PK			2.09 V	34	82.7	41.2
2	*5240.00	113.4 AV			2.09 V	34	72.2	41.2
3	5395.00	65.0 PK	74.0	-9.0	2.08 V	31	52.3	12.7
4	5395.00	52.4 AV	54.0	-1.6	2.08 V	31	39.7	12.7
5	#10480.00	63.5 PK	68.2	-4.7	1.55 V	201	40.7	22.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5602.40	63.0 PK	68.2	-5.2	1.04 H	286	50.4	12.6
2	*5745.00	120.8 PK			1.04 H	286	78.3	42.5
3	*5745.00	110.0 AV			1.04 H	286	67.5	42.5
4	#5992.80	65.8 PK	68.2	-2.4	1.04 H	286	52.0	13.8
5	11490.00	64.3 PK	74.0	-9.7	1.58 H	226	40.2	24.1
6	11490.00	50.8 AV	54.0	-3.2	1.58 H	226	26.7	24.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.80	63.0 PK	68.2	-5.2	2.36 V	42	50.3	12.7
2	*5745.00	122.1 PK			2.36 V	42	79.6	42.5
3	*5745.00	111.8 AV			2.36 V	42	69.3	42.5
4	#5977.60	65.9 PK	68.2	-2.3	2.36 V	42	52.1	13.8
5	11490.00	65.0 PK	74.0	-9.0	1.55 V	270	40.9	24.1
6	11490.00	51.7 AV	54.0	-2.3	1.55 V	270	27.6	24.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5634.40	62.7 PK	68.2	-5.5	1.04 H	289	50.0	12.7
2	*5785.00	120.2 PK			1.04 H	289	77.6	42.6
3	*5785.00	109.9 AV			1.04 H	289	67.3	42.6
4	#5948.00	63.7 PK	68.2	-4.5	1.04 H	289	50.1	13.6
5	11570.00	64.1 PK	74.0	-9.9	1.85 H	201	40.1	24.0
6	11570.00	50.9 AV	54.0	-3.1	1.85 H	201	26.9	24.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5616.80	63.5 PK	68.2	-4.7	2.36 V	41	50.8	12.7
2	*5785.00	122.3 PK			2.36 V	41	79.7	42.6
3	*5785.00	111.8 AV			2.36 V	41	69.2	42.6
4	#5945.60	65.2 PK	68.2	-3.0	2.36 V	41	51.6	13.6
5	11570.00	64.8 PK	74.0	-9.2	1.65 V	291	40.8	24.0
6	11570.00	51.2 AV	54.0	-2.8	1.65 V	291	27.2	24.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5637.60	63.8 PK	68.2	-4.4	1.03 H	287	51.1	12.7
2	*5825.00	120.6 PK			1.03 H	287	78.0	42.6
3	*5825.00	109.9 AV			1.03 H	287	67.3	42.6
4	#5955.20	63.9 PK	68.2	-4.3	1.03 H	287	50.3	13.6
5	11650.00	63.7 PK	74.0	-10.3	2.10 H	154	40.1	23.6
6	11650.00	50.4 AV	54.0	-3.6	2.10 H	154	26.8	23.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5616.00	63.2 PK	68.2	-5.0	2.36 V	38	50.5	12.7
2	*5825.00	122.4 PK			2.36 V	38	79.8	42.6
3	*5825.00	111.8 AV			2.36 V	38	69.2	42.6
4	#5990.40	65.3 PK	68.2	-2.9	2.36 V	38	51.5	13.8
5	11650.00	64.4 PK	74.0	-9.6	1.96 V	225	40.8	23.6
6	11650.00	51.4 AV	54.0	-2.6	1.96 V	225	27.8	23.6

Remarks:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.7 PK	74.0	-11.3	1.05 H	21	50.1	12.6
2	5150.00	48.6 AV	54.0	-5.4	1.05 H	21	36.0	12.6
3	*5190.00	111.0 PK			1.05 H	20	69.5	41.5
4	*5190.00	99.6 AV			1.05 H	20	58.1	41.5
5	#10380.00	62.9 PK	68.2	-5.3	2.11 H	152	40.2	22.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.5 PK	74.0	-5.5	2.12 V	18	55.9	12.6
2	**5150.00**	**53.5 AV**	**54.0**	**-0.5**	**2.12 V**	**18**	**40.9**	**12.6**
3	*5190.00	115.0 PK			2.16 V	28	73.5	41.5
4	*5190.00	103.6 AV			2.16 V	28	62.1	41.5
5	#10380.00	63.2 PK	68.2	-5.0	1.73 V	201	40.5	22.7

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	112.7 PK			1.06 H	9	71.4	41.3
2	*5230.00	101.8 AV			1.06 H	9	60.5	41.3
3	5350.00	60.6 PK	74.0	-13.4	1.05 H	11	48.2	12.4
4	5350.00	47.7 AV	54.0	-6.3	1.05 H	11	35.3	12.4
5	#10460.00	62.9 PK	68.2	-5.3	3.11 H	155	40.0	22.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	116.7 PK			2.14 V	27	75.4	41.3
2	*5230.00	105.8 AV			2.14 V	27	64.5	41.3
3	5350.00	65.9 PK	74.0	-8.1	2.16 V	29	53.5	12.4
4	5350.00	53.2 AV	54.0	-0.8	2.16 V	29	40.8	12.4
5	#10460.00	63.7 PK	68.2	-4.5	1.50 V	236	40.8	22.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5633.60	63.2 PK	68.2	-5.0	1.00 H	287	50.5	12.7
2	*5755.00	117.6 PK			1.00 H	287	75.1	42.5
3	*5755.00	107.2 AV			1.00 H	287	64.7	42.5
4	#5928.80	63.1 PK	68.2	-5.1	1.00 H	287	49.5	13.6
5	11510.00	63.9 PK	74.0	-10.1	1.69 H	145	40.0	23.9
6	11510.00	50.3 AV	54.0	-3.7	1.69 H	145	26.4	23.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.00	66.3 PK	68.2	-1.9	2.23 V	46	53.7	12.6
2	*5755.00	119.9 PK			2.23 V	46	77.4	42.5
3	*5755.00	109.4 AV			2.23 V	46	66.9	42.5
4	#5928.00	64.0 PK	68.2	-4.2	2.23 V	46	50.4	13.6
5	11510.00	64.8 PK	74.0	-9.2	1.58 V	264	40.9	23.9
6	11510.00	51.5 AV	54.0	-2.5	1.58 V	264	27.6	23.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5609.60	62.8 PK	68.2	-5.4	1.02 H	288	50.1	12.7
2	*5795.00	117.4 PK			1.02 H	288	74.8	42.6
3	*5795.00	107.2 AV			1.02 H	288	64.6	42.6
4	#5953.60	63.9 PK	68.2	-4.3	1.02 H	288	50.3	13.6
5	11590.00	63.9 PK	74.0	-10.1	1.52 H	214	40.1	23.8
6	11590.00	50.2 AV	54.0	-3.8	1.52 H	214	26.4	23.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5636.80	63.8 PK	68.2	-4.4	2.15 V	40	51.1	12.7
2	*5795.00	120.2 PK			2.15 V	40	77.6	42.6
3	*5795.00	109.6 AV			2.15 V	40	67.0	42.6
4	#5924.80	66.1 PK	68.3	-2.2	2.15 V	40	52.5	13.6
5	11590.00	64.5 PK	74.0	-9.5	1.33 V	208	40.7	23.8
6	11590.00	51.6 AV	54.0	-2.4	1.33 V	208	27.8	23.8

Remarks:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5145.00	61.1 PK	74.0	-12.9	1.59 H	12	48.5	12.6
2	5145.00	47.9 AV	54.0	-6.1	1.59 H	12	35.3	12.6
3	*5210.00	106.5 PK			1.00 H	12	65.1	41.4
4	*5210.00	96.5 AV			1.00 H	12	55.1	41.4
5	5350.00	60.6 PK	74.0	-13.4	2.00 H	10	48.2	12.4
6	5350.00	47.5 AV	54.0	-6.5	2.00 H	10	35.1	12.4
7	#10420.00	63.0 PK	68.2	-5.2	3.33 H	300	40.2	22.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5145.00	64.7 PK	74.0	-9.3	2.13 V	26	52.1	12.6
2	5145.00	53.1 AV	54.0	-0.9	2.13 V	26	40.5	12.6
3	*5210.00	110.5 PK			2.02 V	29	69.1	41.4
4	*5210.00	100.5 AV			2.02 V	29	59.1	41.4
5	5350.00	63.0 PK	74.0	-11.0	2.20 V	40	50.6	12.4
6	5350.00	50.9 AV	54.0	-3.1	2.20 V	40	38.5	12.4
7	#10420.00	63.7 PK	68.2	-4.5	1.55 V	182	40.9	22.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5628.00	62.8 PK	68.2	-5.4	1.00 H	288	50.1	12.7
2	*5775.00	111.5 PK			1.00 H	288	68.9	42.6
3	*5775.00	101.3 AV			1.00 H	288	58.7	42.6
4	#5933.60	62.9 PK	68.2	-5.3	1.00 H	288	49.3	13.6
5	11550.00	64.0 PK	74.0	-10.0	1.87 H	201	40.1	23.9
6	11550.00	50.8 AV	54.0	-3.2	1.87 H	201	26.9	23.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.80	67.4 PK	68.2	-0.8	2.11 V	38	54.7	12.7
2	*5775.00	114.8 PK			2.11 V	38	72.2	42.6
3	*5775.00	103.9 AV			2.11 V	38	61.3	42.6
4	#5940.00	65.2 PK	68.2	-3.0	2.11 V	38	51.6	13.6
5	11550.00	64.8 PK	74.0	-9.2	1.65 V	222	40.9	23.9
6	11550.00	51.7 AV	54.0	-2.3	1.65 V	222	27.8	23.9

Remarks:

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

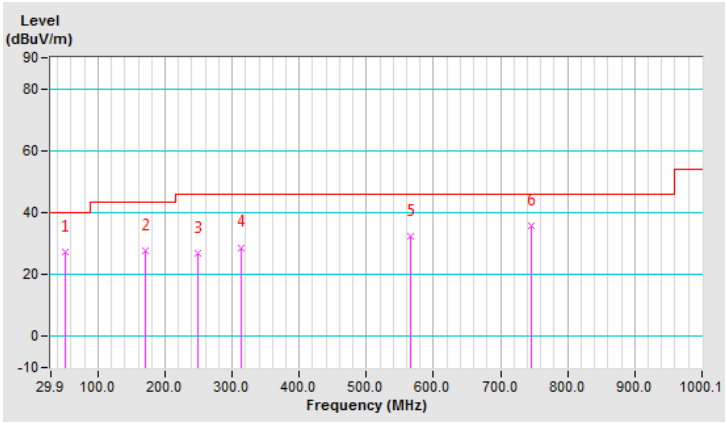
Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.24	27.1 QP	40.0	-12.9	1.00 H	67	36.1	-9.0
2	171.55	27.6 QP	43.5	-15.9	1.50 H	99	37.0	-9.4
3	249.17	27.0 QP	46.0	-19.0	1.50 H	183	36.5	-9.5
4	313.20	28.8 QP	46.0	-17.2	1.00 H	0	36.3	-7.5
5	565.45	32.2 QP	46.0	-13.8	1.00 H	145	36.0	-3.8
6	745.91	35.6 QP	46.0	-10.4	1.00 H	117	34.8	0.8

Remarks:

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

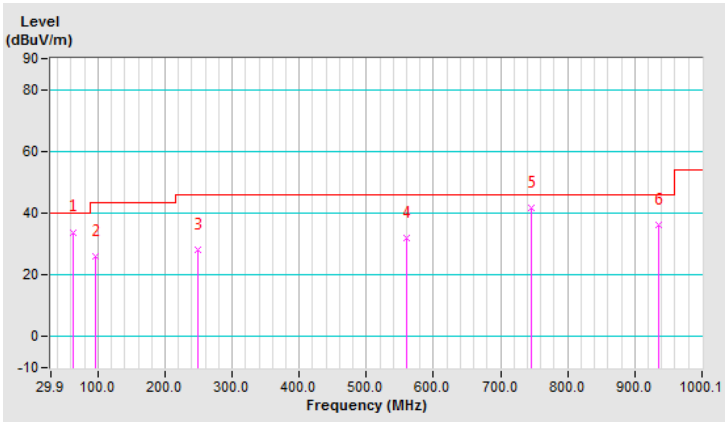


CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	62.89	33.9 QP	40.0	-6.1	1.01 V	184	43.9	-10.0
2	95.87	26.1 QP	43.5	-17.4	1.01 V	129	39.8	-13.7
3	249.17	28.0 QP	46.0	-18.0	1.50 V	147	37.5	-9.5
4	559.63	32.0 QP	46.0	-14.0	1.01 V	192	36.1	-4.1
5	745.91	41.8 QP	46.0	-4.2	1.50 V	7	41.0	0.8
6	936.07	36.3 QP	46.0	-9.7	1.50 V	7	32.3	4.0

Remarks:

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



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.

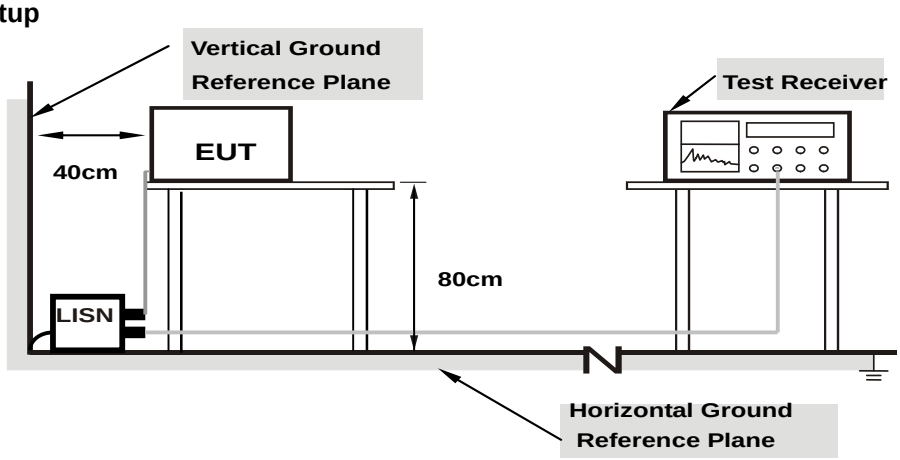
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

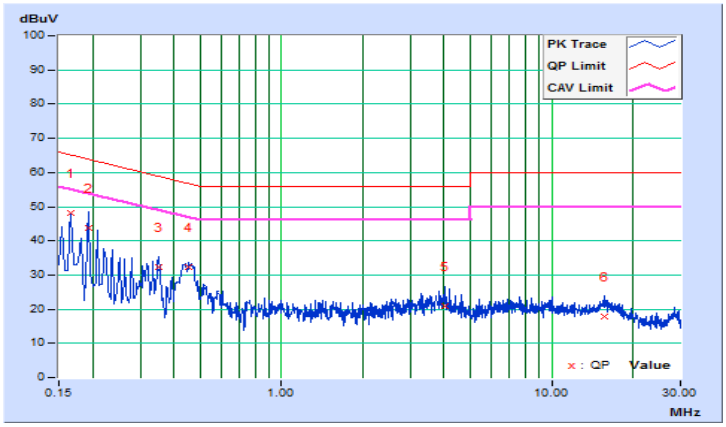
4.2.7 Test Results

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.16569**	**9.84**	**38.34**	**23.82**	**48.18**	**33.66**	**65.17**	**55.17**	**-16.99**	**-21.51**
2	0.19301	9.85	34.08	19.25	43.93	29.10	63.91	53.91	-19.98	-24.81
3	0.34941	9.87	22.38	12.65	32.25	22.52	58.98	48.98	-26.73	-26.46
4	0.45455	9.88	22.37	14.31	32.25	24.19	56.79	46.79	-24.54	-22.60
5	4.02090	10.02	10.80	4.57	20.82	14.59	56.00	46.00	-35.18	-31.41
6	15.67270	10.22	7.57	2.17	17.79	12.39	60.00	50.00	-42.21	-37.61

REMARKS:

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

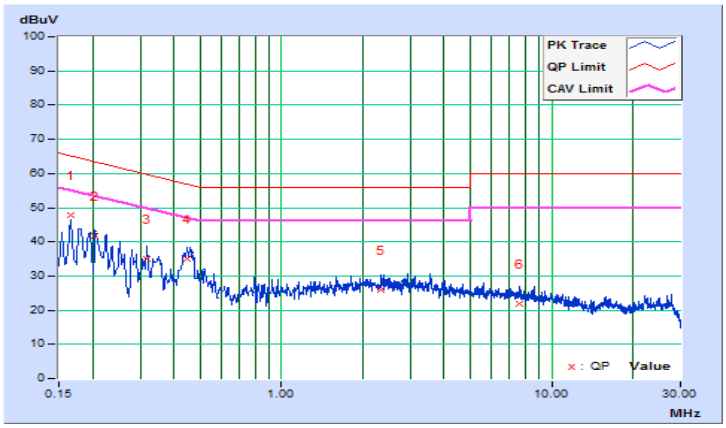


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16564	9.83	38.12	24.06	47.95	33.89	65.18	55.18	-17.23	-21.29
2	0.20474	9.84	32.05	18.00	41.89	27.84	63.42	53.42	-21.53	-25.58
3	0.31813	9.86	25.12	17.11	34.98	26.97	59.76	49.76	-24.78	-22.79
4	0.44624	9.87	25.24	17.49	35.11	27.36	56.94	46.94	-21.83	-19.58
5	2.34351	9.94	16.11	9.78	26.05	19.72	56.00	46.00	-29.95	-26.28
6	7.60637	10.10	11.62	6.01	21.72	16.11	60.00	50.00	-38.28	-33.89

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

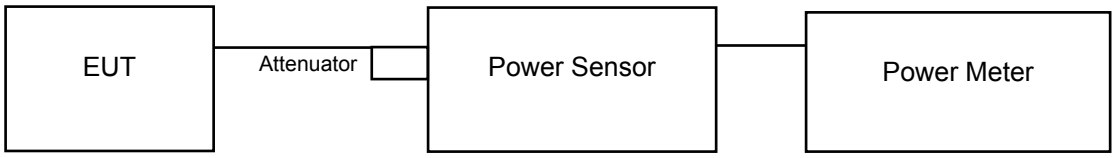
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

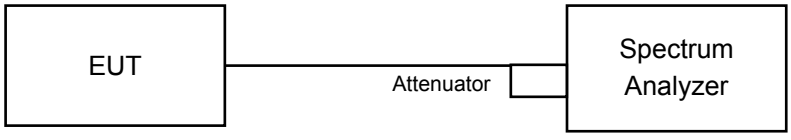
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

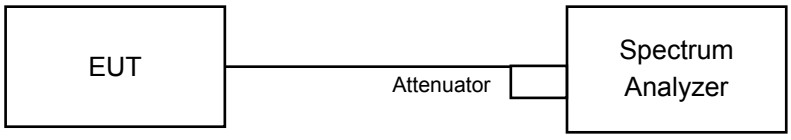
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



For 26dB 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. Duty factor is not added to measured value.

For 802.11ac (VHT80)
a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
b. Set sweep trigger to “free run”.
c. Set RBW = 1 MHz
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ 2 Span / RBW
f. Sweep time ≤ (number of points in sweep) * T
g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
h. Detector = RMS
i. Trace mode = max hold
j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
k. 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
a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. 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

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	21.65	20.66	21.35	20.95	523.540	27.19	30.00	Pass
40	5200	21.87	21.09	21.87	21.31	571.366	27.57	30.00	Pass
48	5240	23.55	23.82	23.58	24.03	**948.419**	29.77	30.00	Pass
149	5745	23.55	22.98	23.45	23.87	890.163	29.49	30.00	Pass
157	5785	23.51	23.92	23.54	23.85	**939.597**	29.73	30.00	Pass
165	5825	23.71	23.39	23.37	23.71	905.469	29.57	30.00	Pass

802.11n (HT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	17.76	17.13	17.34	17.06	216.362	23.35	30.00	Pass
40	5200	19.26	18.84	18.91	18.06	302.670	24.81	30.00	Pass
48	5240	20.26	19.76	19.54	19.63	382.577	25.83	30.00	Pass
149	5745	23.71	23.03	23.55	23.88	906.679	29.57	30.00	Pass
157	5785	23.41	22.96	23.05	23.76	856.498	29.33	30.00	Pass
165	5825	23.56	23.55	23.26	23.74	901.878	29.55	30.00	Pass

802.11n (HT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	16.71	16.66	16.73	16.52	185.199	22.68	30.00	Pass
46	5230	18.74	17.49	18.71	18.66	278.675	24.45	30.00	Pass
151	5755	23.55	23.14	23.66	23.71	899.764	29.54	30.00	Pass
159	5795	23.57	23.09	23.89	23.68	909.466	29.59	30.00	Pass

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	14.58	14.16	14.39	14.45	110.110	20.42	30.00	Pass
155	5775	21.22	20.47	21.63	21.45	529.046	27.23	30.00	Pass

Beamforming Mode

802.11n (HT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	12.46	11.83	12.04	11.76	63.854	18.05	24.96	Pass
40	5200	13.96	13.54	13.61	12.76	89.324	19.51	24.96	Pass
48	5240	14.96	14.46	14.24	14.33	**112.906**	20.53	24.96	Pass
149	5745	18.41	17.73	18.25	18.58	267.581	24.27	24.96	Pass
157	5785	18.11	17.66	17.75	18.46	252.771	24.03	24.96	Pass
165	5825	18.26	18.25	17.96	18.44	266.162	24.25	24.96	Pass

Note: Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power limit shall be reduced to 30-(11.04-6) = 24.96dBm.

802.11n (HT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	11.41	11.36	11.43	11.22	54.656	17.38	24.96	Pass
46	5230	13.44	12.19	13.41	13.36	82.243	19.15	24.96	Pass
151	5755	18.25	17.84	18.36	18.41	265.540	24.24	24.96	Pass
159	5795	18.27	17.79	18.59	18.38	**268.402**	24.29	24.96	Pass

Note: Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power limit shall be reduced to 30-(11.04-6) = 24.96dBm.

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	9.28	8.86	9.09	9.15	32.495	15.12	24.96	Pass
155	5775	15.92	15.17	16.33	16.15	156.133	21.93	24.96	Pass

Note: Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power limit shall be reduced to 30-(11.04-6) = 24.96dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	21.77	21.87	21.42	21.50
40	5200	21.87	22.08	21.46	21.52
48	5240	21.81	21.86	21.45	21.52

802.11n (HT20)

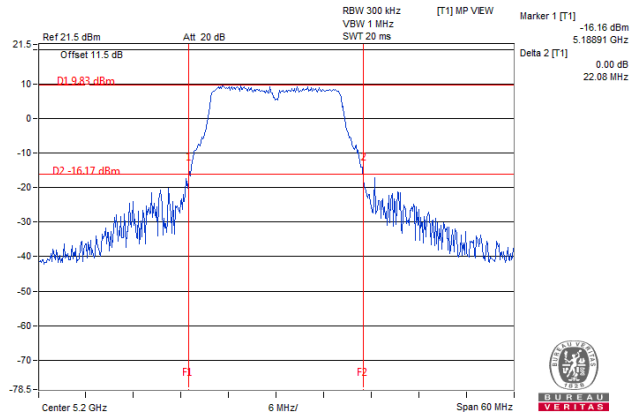
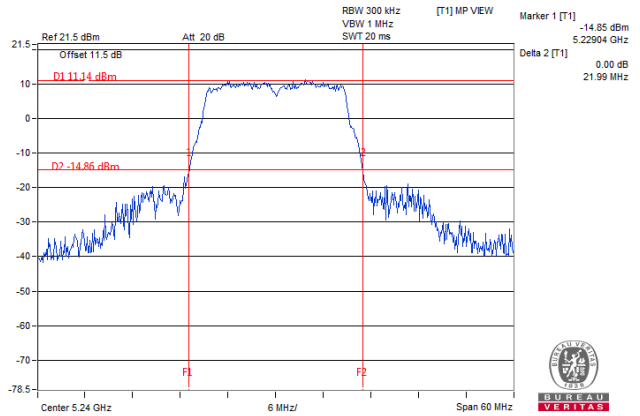
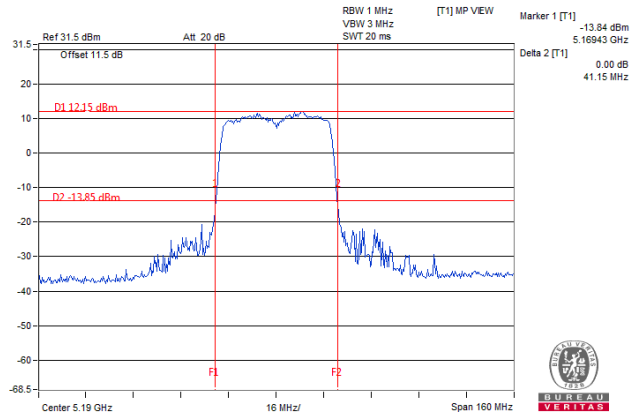
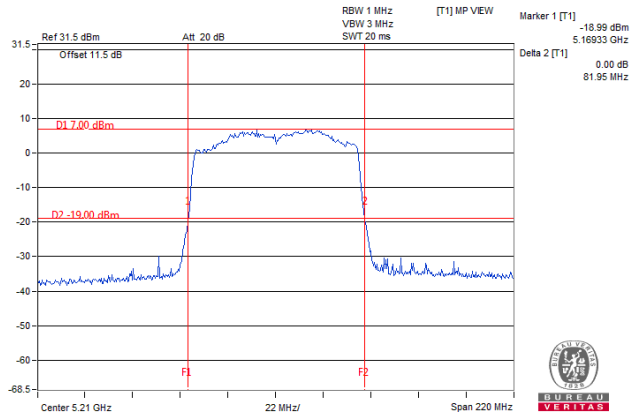
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	21.97	21.83	21.61	21.55
40	5200	21.99	21.85	21.72	21.61
48	5240	21.99	21.60	21.81	21.60

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	41.15	41.01	41.05	40.76
46	5230	41.07	41.06	40.96	40.75

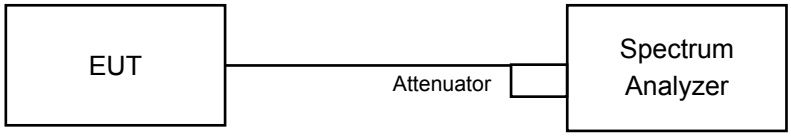
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	81.95	81.52	81.10	81.56

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	Chain 2	Chain 3
36	5180	17.04	17.16	16.92	16.80
40	5200	17.16	17.16	16.92	16.80
48	5240	17.04	17.16	16.80	17.04
149	5745	18.00	17.48	17.65	17.57
157	5785	17.88	17.52	17.52	17.52
165	5825	17.76	17.40	17.40	17.52

802.11n (HT20)

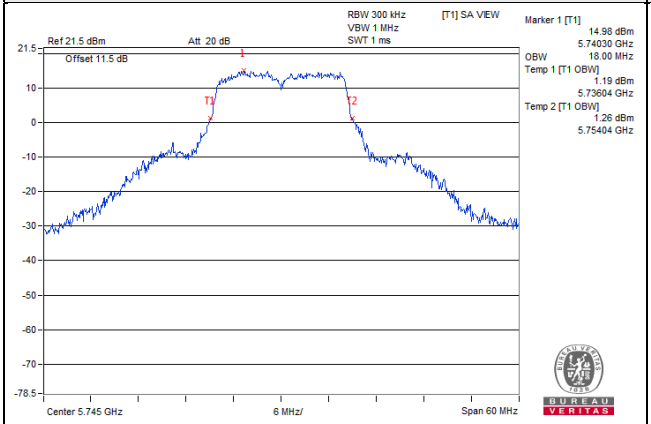
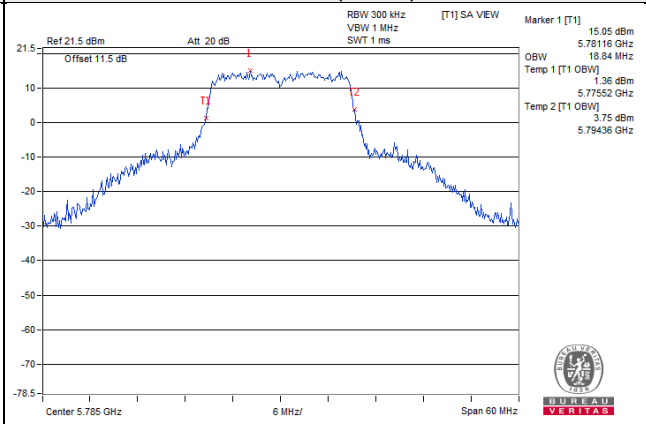
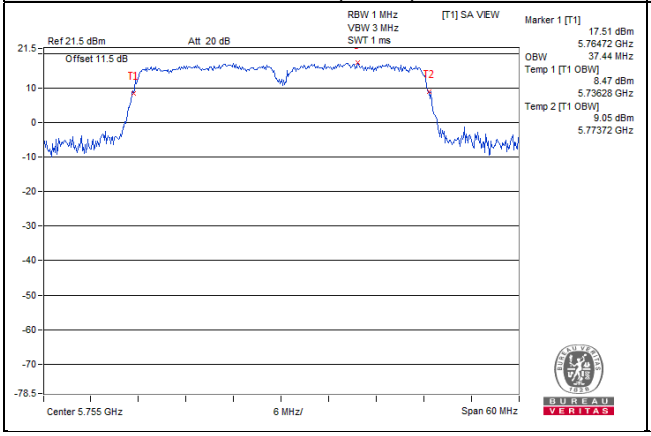
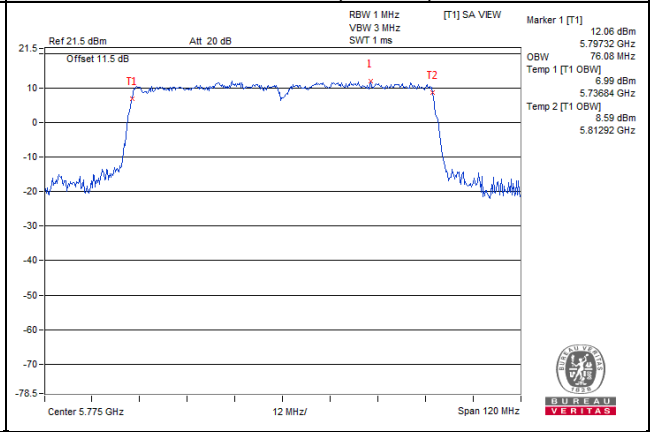
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.24	18.00	17.88	17.88
40	5200	18.12	17.88	18.12	17.88
48	5240	18.12	17.88	18.00	17.88
149	5745	18.72	18.48	18.48	18.48
157	5785	18.84	18.36	18.48	18.48
165	5825	18.60	18.48	18.48	18.36

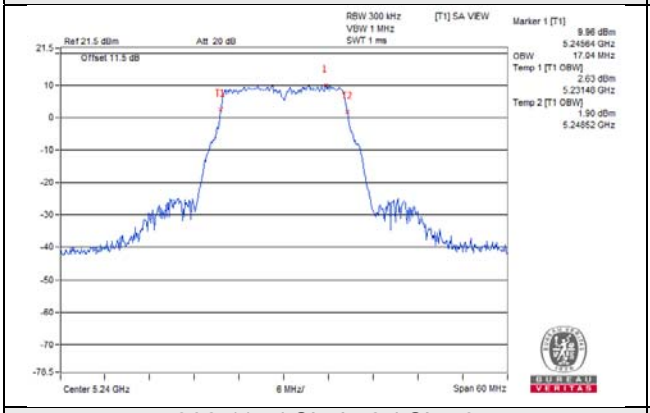
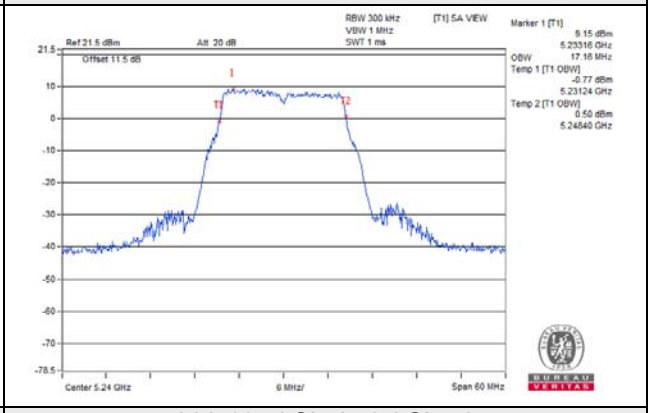
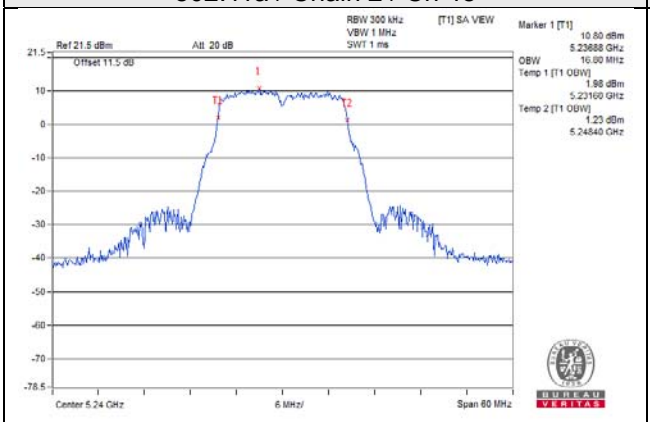
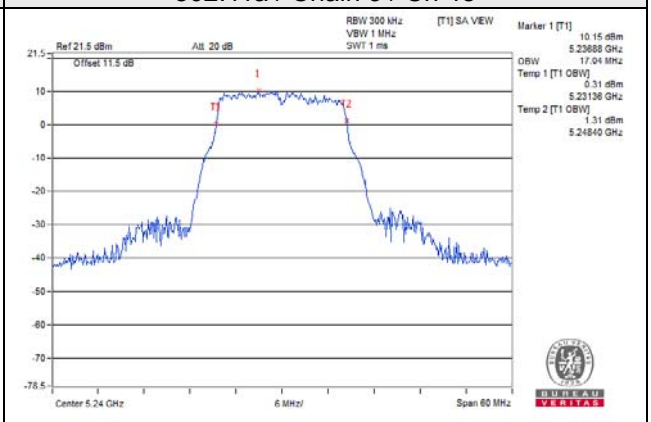
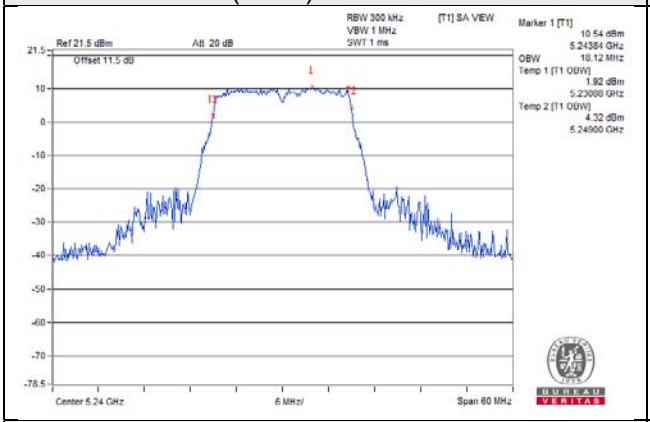
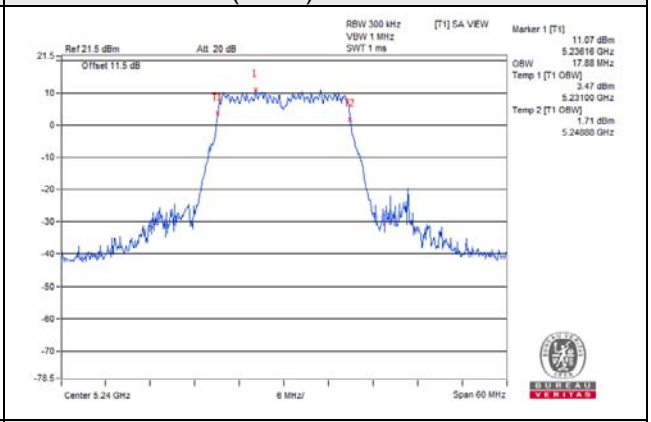
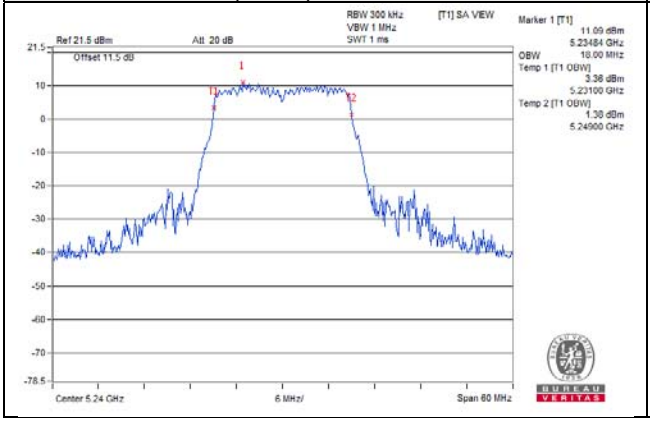
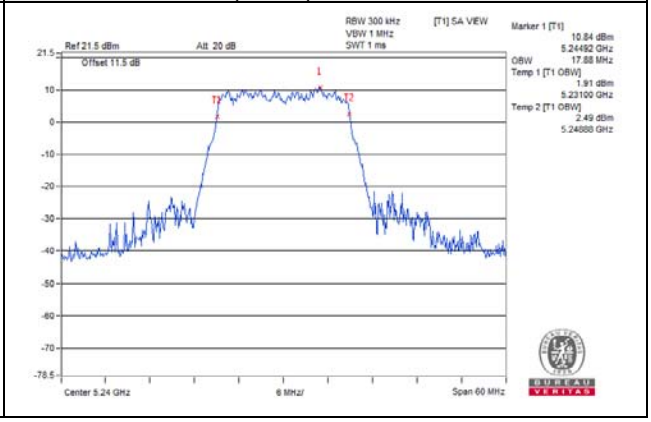
802.11n (HT40)

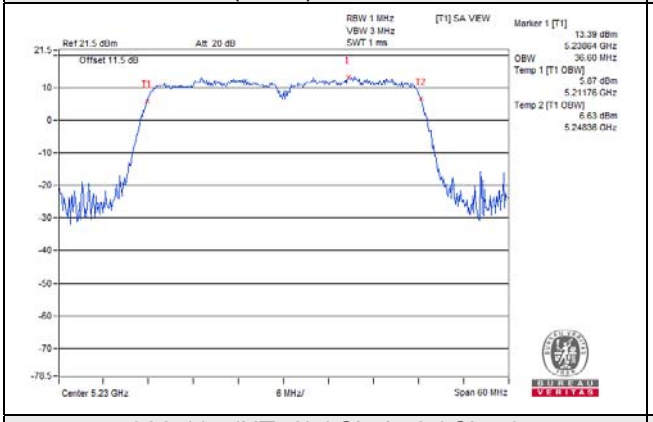
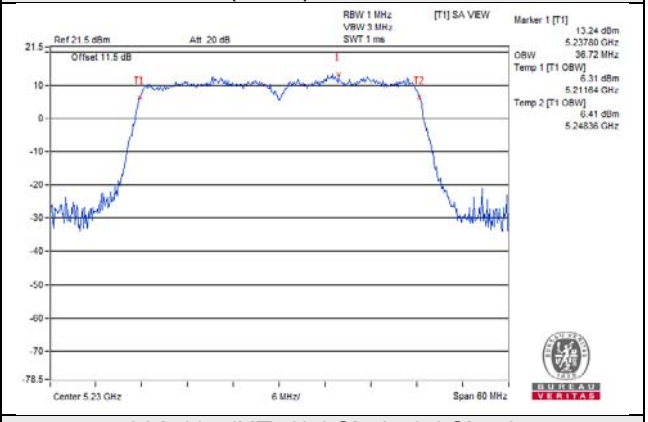
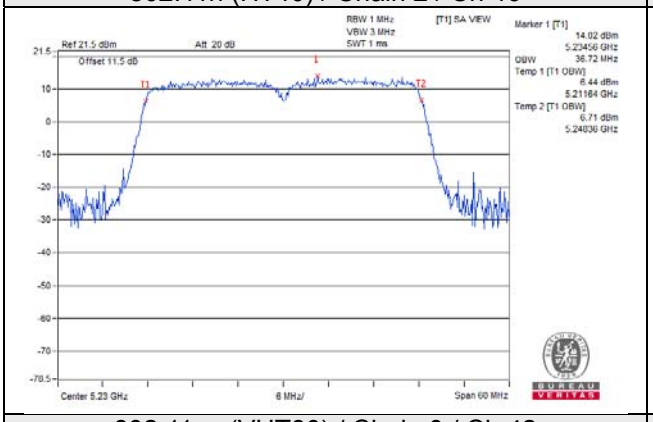
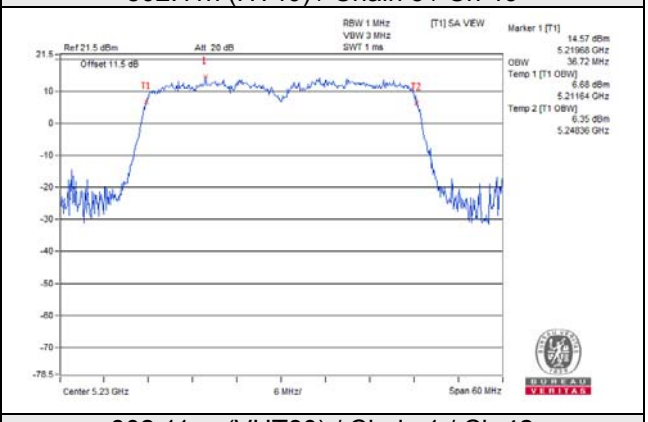
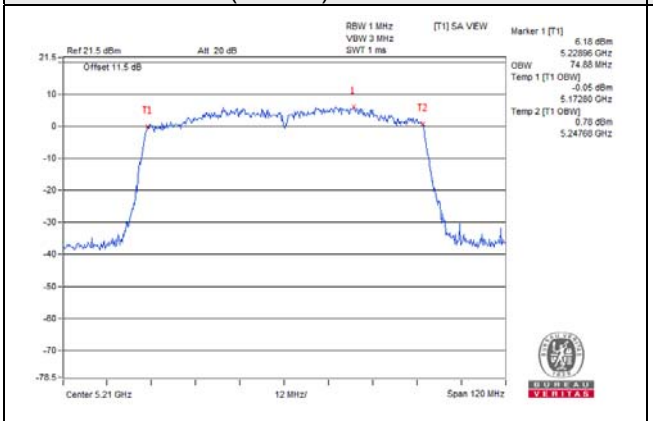
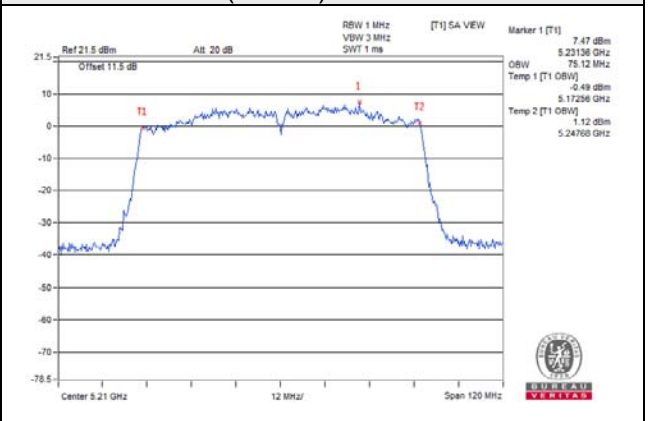
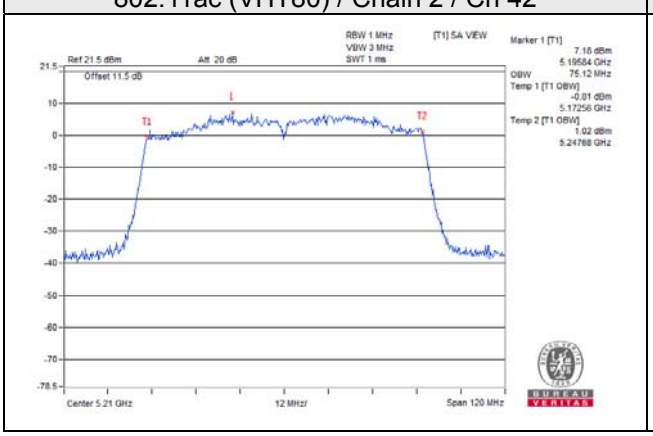
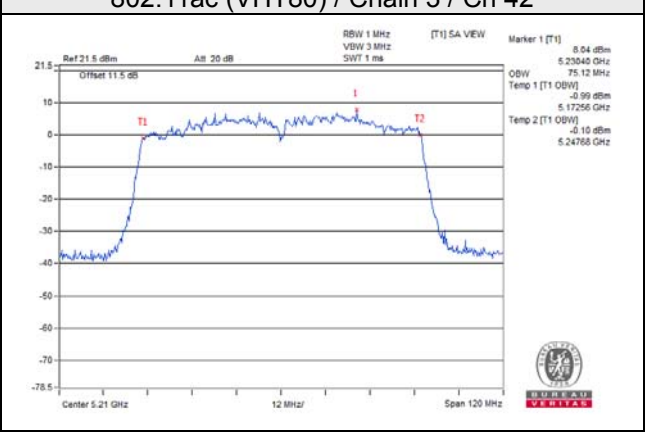
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.60	36.72	36.60	36.60
46	5230	36.60	36.72	36.72	36.72
151	5755	37.44	37.08	36.96	37.20
159	5795	37.32	36.96	36.96	37.08

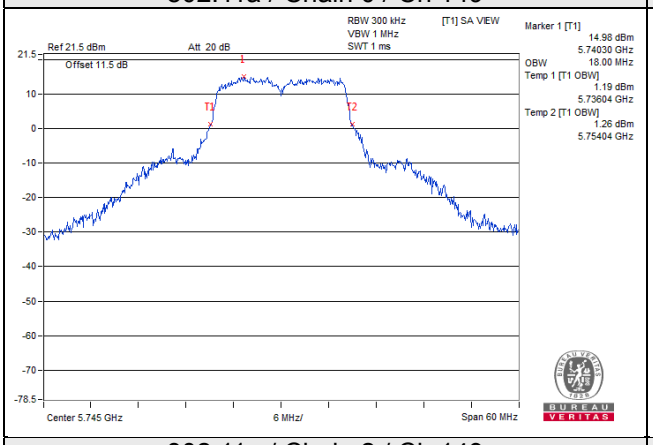
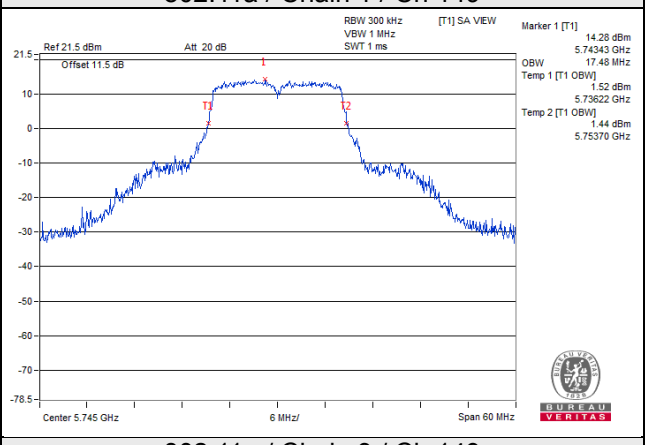
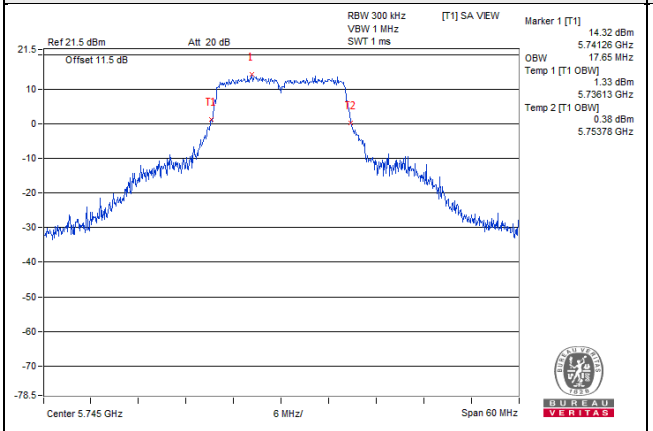
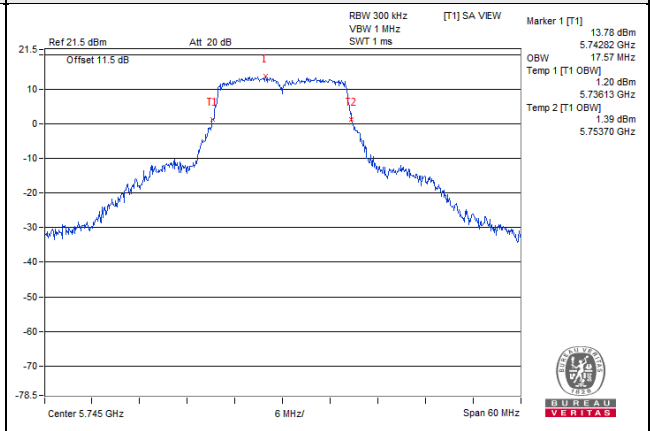
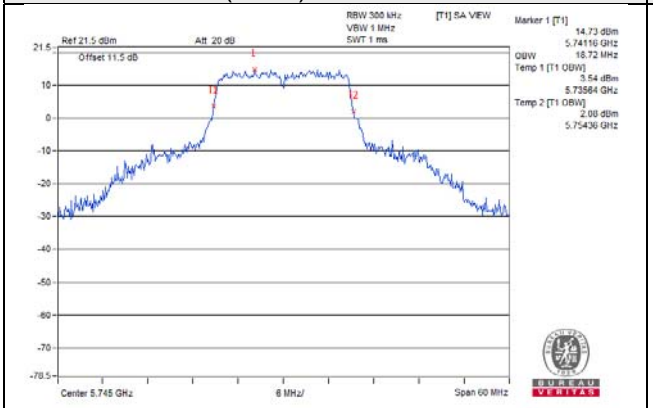
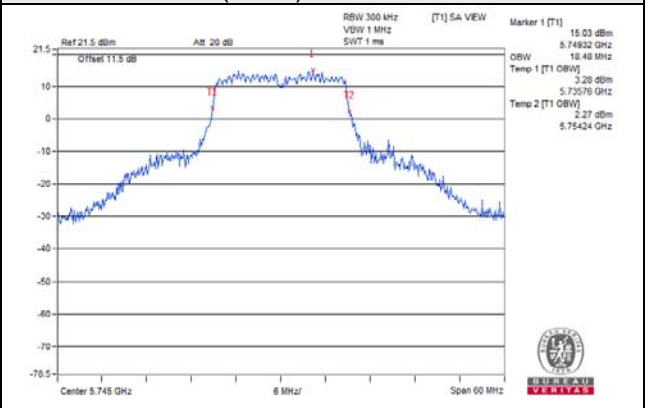
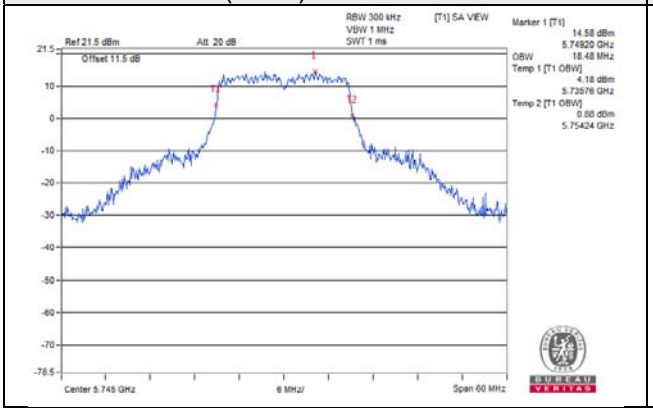
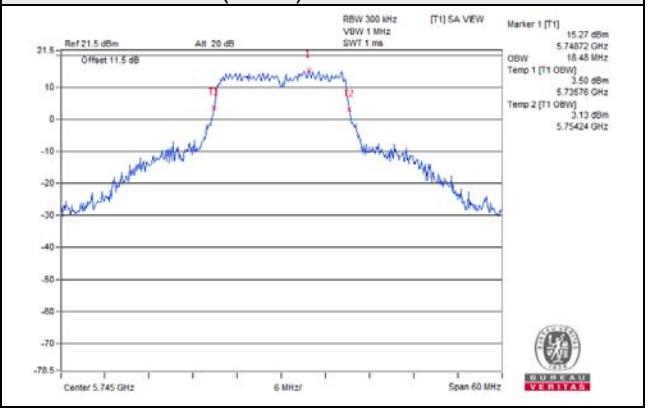
802.11ac (VHT80)

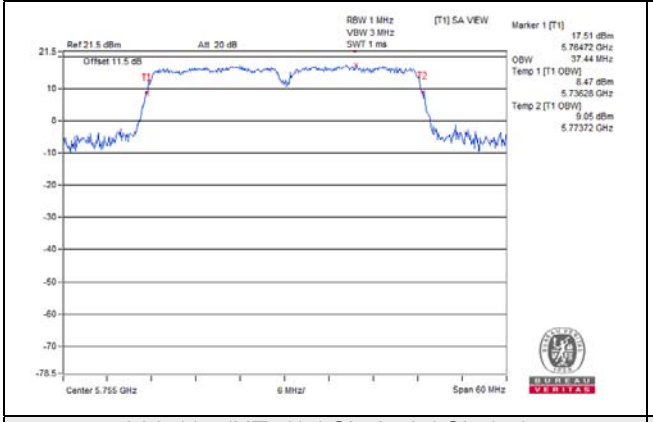
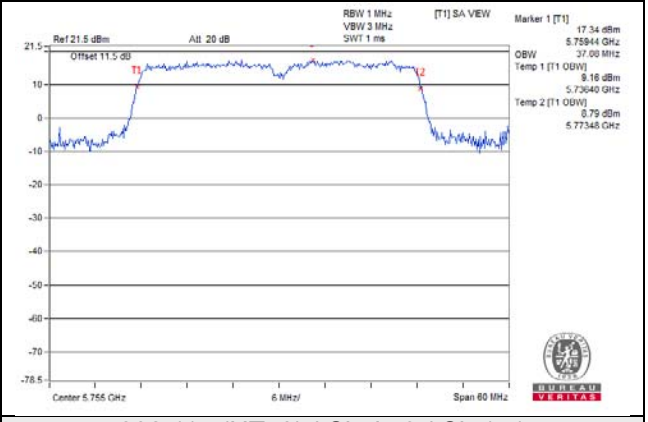
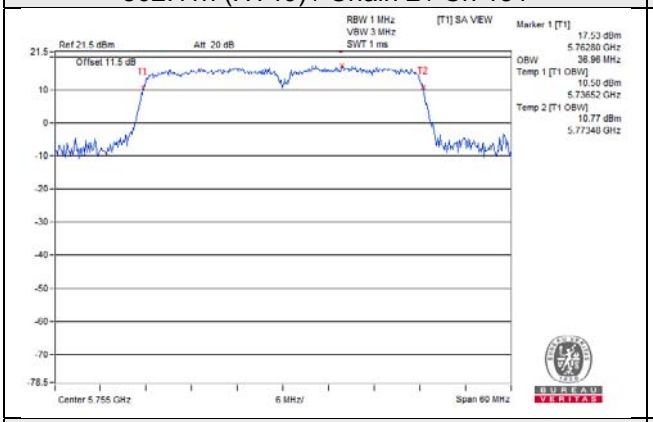
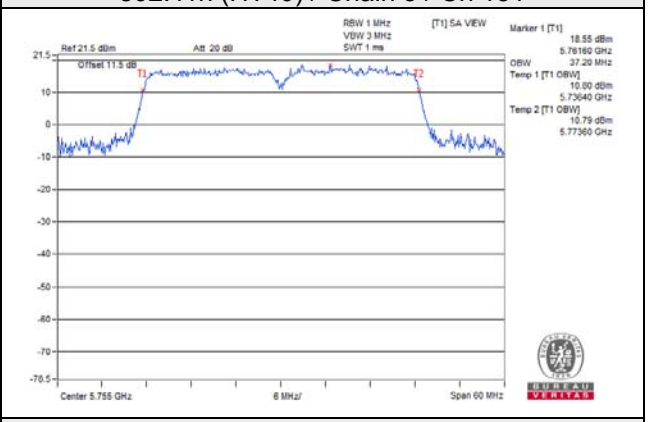
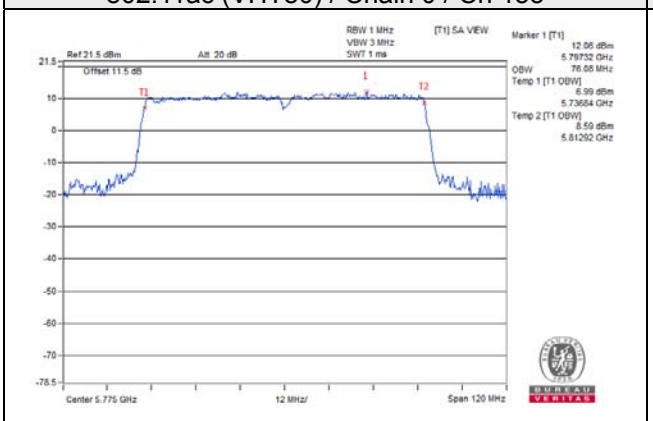
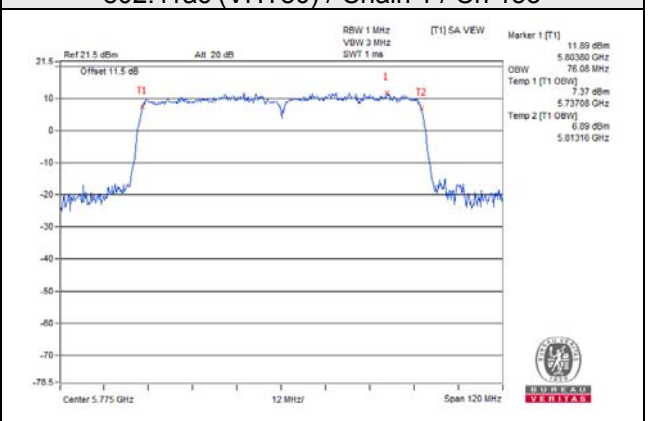
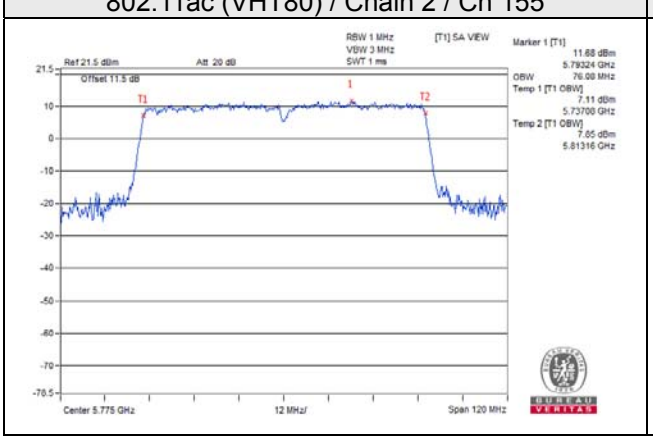
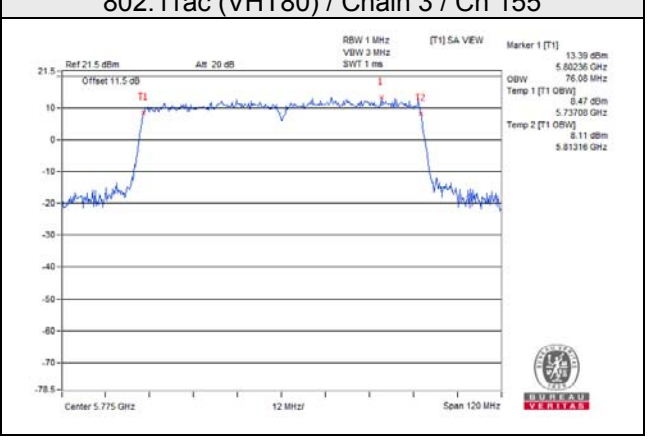
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	74.88	75.12	75.12	75.12
155	5775	76.08	76.08	76.08	76.08

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

Spectrum Plot for nearby DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a / Chain 0 / Ch 48	802.11a / Chain 1 / Ch 48
	
802.11a / Chain 2 / Ch 48	802.11a / Chain 3 / Ch 48
	
802.11n (HT20) / Chain 0 / Ch 48	802.11n (HT20) / Chain 1 / Ch 48
	
802.11n (HT20) / Chain 2 / Ch 48	802.11n (HT20) / Chain 3 / Ch 48
	

802.11n (HT40) / Chain 0 / Ch 46	802.11n (HT40) / Chain 1 / Ch 46
	
802.11n (HT40) / Chain 2 / Ch 46	802.11n (HT40) / Chain 3 / Ch 46
	
802.11ac (VHT80) / Chain 0 / Ch 42	802.11ac (VHT80) / Chain 1 / Ch 42
	
802.11ac (VHT80) / Chain 2 / Ch 42	802.11ac (VHT80) / Chain 3 / Ch 42
	

Spectrum Plot for nearby DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11a / Chain 0 / Ch 149	802.11a / Chain 1 / Ch 149
	
802.11a / Chain 2 / Ch 149	802.11a / Chain 3 / Ch 149
	
802.11n (HT20) / Chain 0 / Ch 149	802.11n (HT20) / Chain 1 / Ch 149
	
802.11n (HT20) / Chain 2 / Ch 149	802.11n (HT20) / Chain 3 / Ch 149
	

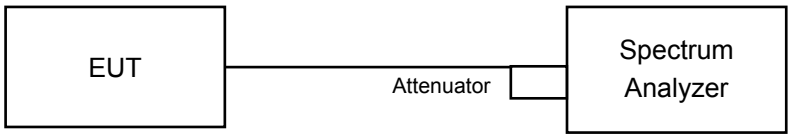
802.11n (HT40) / Chain 0 / Ch 151	802.11n (HT40) / Chain 1 / Ch 151
	
802.11n (HT40) / Chain 2 / Ch 151	802.11n (HT40) / Chain 3 / Ch 151
	
802.11ac (VHT80) / Chain 0 / Ch 155	802.11ac (VHT80) / Chain 1 / Ch 155
	
802.11ac (VHT80) / Chain 2 / Ch 155	802.11ac (VHT80) / Chain 3 / Ch 155
	

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-1band:
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

Using method SA-2, Duty cycle <98%
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 1 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%
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 <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/300kHz)
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 Band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.62	4.43	6.36	5.30	0.27	11.77	11.96	Pass
40	5200	5.33	4.35	6.57	5.86	0.27	11.89	11.96	Pass
48	5240	5.60	4.48	6.36	5.65	0.27	11.86	11.96	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 17-(11.04-6) = 11.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.44	4.85	5.84	6.35	0.24	11.92	11.96	Pass
40	5200	5.80	4.66	5.56	6.29	0.24	11.88	11.96	Pass
48	5240	6.08	4.43	5.35	6.39	0.24	11.89	11.96	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 17-(11.04-6) = 11.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

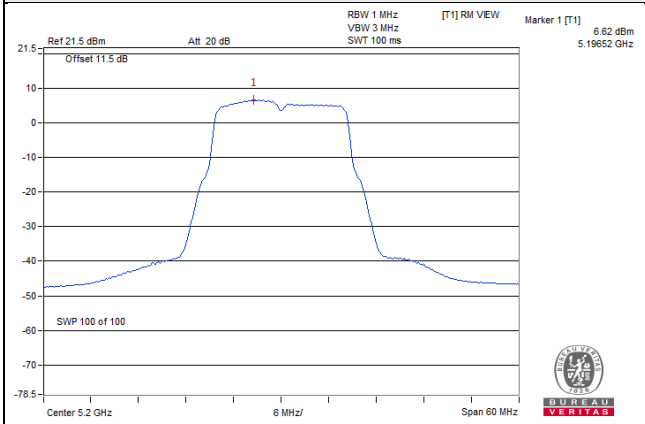
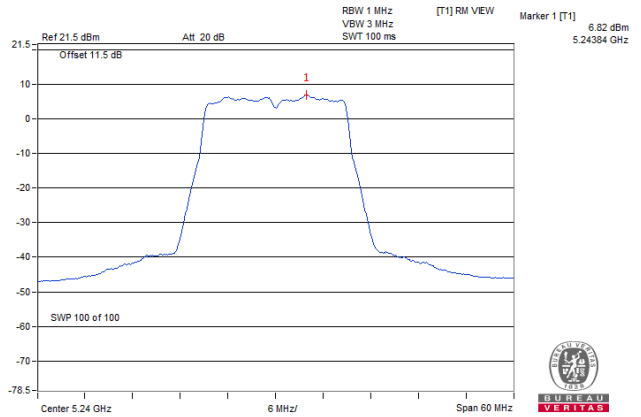
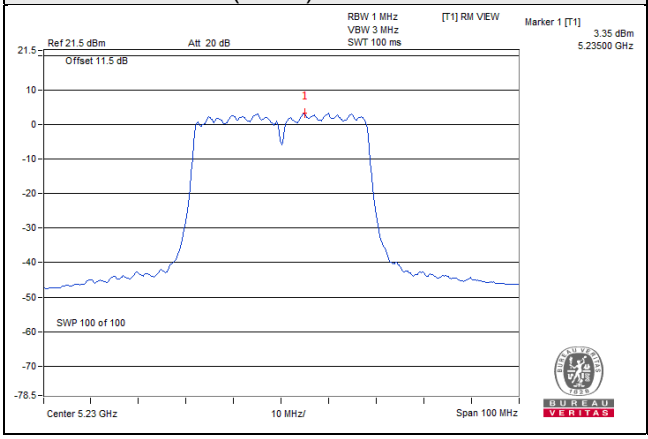
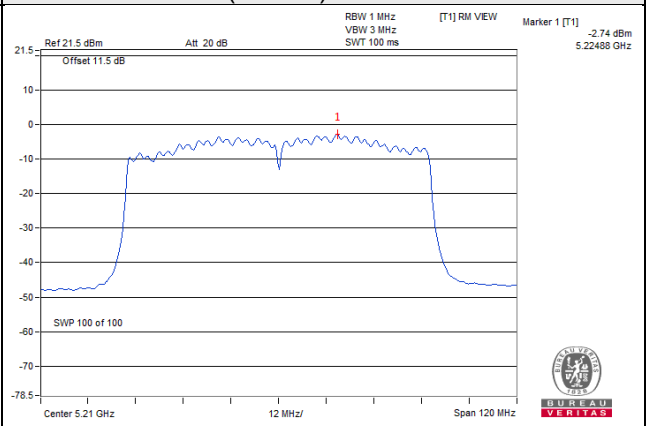
Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-0.14	-0.55	0.28	1.31	0.54	6.84	11.96	Pass
46	5230	1.77	1.99	2.16	2.89	0.54	8.78	11.96	Pass

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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 17-(11.04-6) = 11.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-3.76	-4.65	-3.44	-2.74	0.29	2.72	11.96	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 17-(11.04-6) = 11.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 2 / Ch 40	802.11n (HT20) / Chain 0 / Ch 48
	
802.11n (HT40) / Chain 3 / Ch 46	802.11ac (VHT80) / Chain 3 / Ch 42
	

For U-NII-3 band:

802.11a

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.49	4.71	6.02	0.27	11.00	24.96	Pass
	157	5785	2.51	4.73	6.02	0.27	11.02	24.96	Pass
	165	5825	2.65	4.87	6.02	0.27	11.16	24.96	Pass
1	149	5745	1.53	3.75	6.02	0.27	10.04	24.96	Pass
	157	5785	1.63	3.85	6.02	0.27	10.14	24.96	Pass
	165	5825	1.33	3.55	6.02	0.27	9.84	24.96	Pass
2	149	5745	1.15	3.37	6.02	0.27	9.66	24.96	Pass
	157	5785	1.29	3.51	6.02	0.27	9.80	24.96	Pass
	165	5825	1.23	3.45	6.02	0.27	9.74	24.96	Pass
3	149	5745	1.40	3.62	6.02	0.27	9.91	24.96	Pass
	157	5785	1.31	3.53	6.02	0.27	9.82	24.96	Pass
	165	5825	2.63	4.85	6.02	0.27	11.14	24.96	Pass

Note:

1. Method E)2)c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 30-(11.04-6) = 24.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.24	4.46	6.02	0.24	10.72	24.96	Pass
	157	5785	2.58	4.80	6.02	0.24	11.06	24.96	Pass
	165	5825	2.22	4.44	6.02	0.24	10.70	24.96	Pass
1	149	5745	1.48	3.70	6.02	0.24	9.96	24.96	Pass
	157	5785	1.57	3.79	6.02	0.24	10.05	24.96	Pass
	165	5825	1.33	3.55	6.02	0.24	9.81	24.96	Pass
2	149	5745	1.19	3.41	6.02	0.24	9.67	24.96	Pass
	157	5785	1.25	3.47	6.02	0.24	9.73	24.96	Pass
	165	5825	1.46	3.68	6.02	0.24	9.94	24.96	Pass
3	149	5745	2.10	4.32	6.02	0.24	10.58	24.96	Pass
	157	5785	2.21	4.43	6.02	0.24	10.69	24.96	Pass
	165	5825	2.28	4.50	6.02	0.24	10.76	24.96	Pass

Note:
1. Method E)2)c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 30-(11.04-6) = 24.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.59	0.63	6.02	0.54	7.19	24.96	Pass
	159	5795	-1.54	0.68	6.02	0.54	7.24	24.96	Pass
1	151	5755	-2.21	0.01	6.02	0.54	6.57	24.96	Pass
	159	5795	-2.07	0.15	6.02	0.54	6.71	24.96	Pass
2	151	5755	-2.31	-0.09	6.02	0.54	6.47	24.96	Pass
	159	5795	-2.21	0.01	6.02	0.54	6.57	24.96	Pass
3	151	5755	-1.53	0.69	6.02	0.54	7.25	24.96	Pass
	159	5795	-1.25	0.97	6.02	0.54	7.53	24.96	Pass

Note:
1. Method E)2)c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 30-(11.04-6) = 24.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

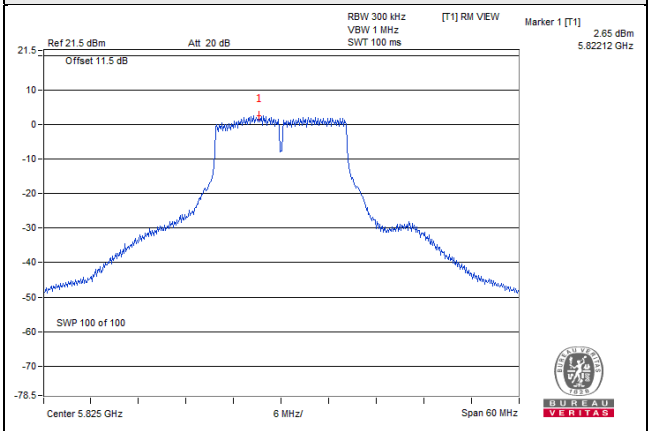
802.11ac (VHT80)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-6.44	-4.22	6.02	0.29	2.09	24.96	Pass
1	155	5775	-7.39	-5.17	6.02	0.29	1.14	24.96	Pass
2	155	5775	-7.40	-5.18	6.02	0.29	1.13	24.96	Pass
3	155	5775	-6.10	-3.88	6.02	0.29	2.43	24.96	Pass

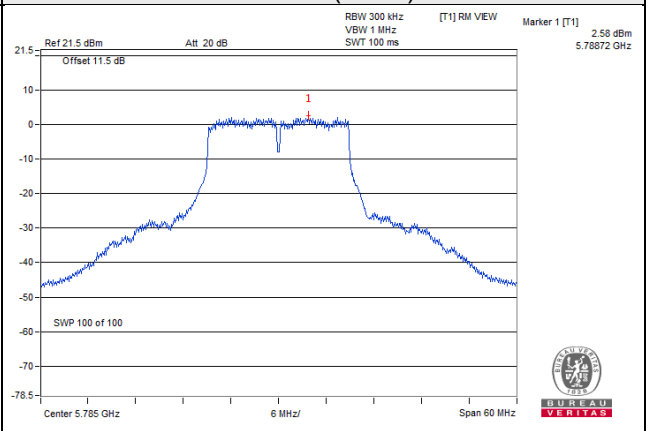
Note:
1. Method E)2)c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$] = 11.04dBi > 6dBi, so the power density limit shall be reduced to 30-(11.04-6) = 24.96dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

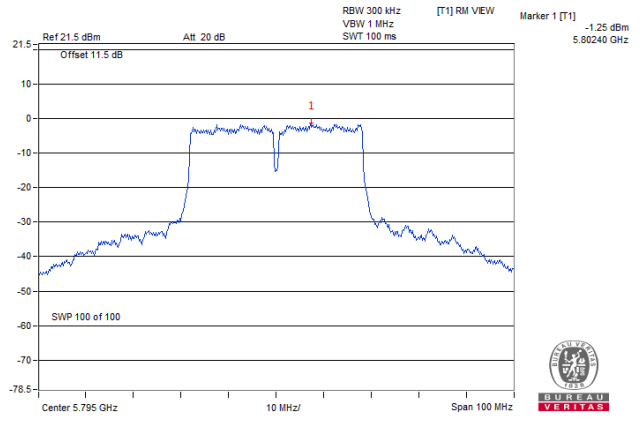
802.11a



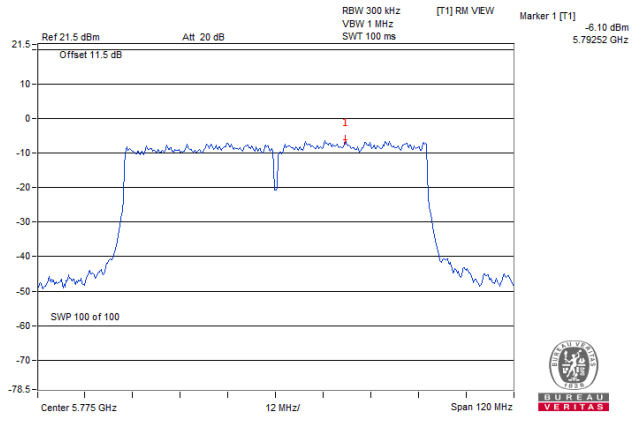
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

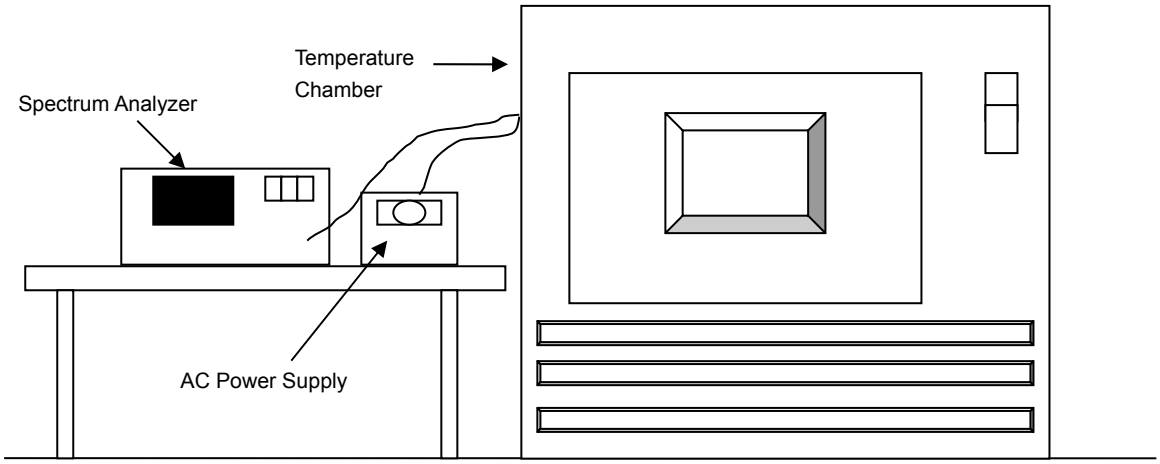


4.6 Frequency Stability

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. 24, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 03, 2019	Jun. 02, 2020
Digital Multimeter Fluke	87-III	70360742	Jun. 27, 2019	Jun. 26, 2020
AC Power Supply Extech	CFW-105	E000603	NA	NA
True RMS Clamp Meter / Fluke	325	31130711WS	May 21, 2019	May 20, 2020

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)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	120	5180.0009	Pass	5180.0006	Pass	5180.0006	Pass	5179.9960	Pass
30	120	5179.9862	Pass	5179.9872	Pass	5179.9857	Pass	5179.9851	Pass
20	120	5180.0025	Pass	5180.0022	Pass	5179.9992	Pass	5179.9997	Pass
10	120	5179.9886	Pass	5179.9857	Pass	5179.9862	Pass	5179.9851	Pass
0	120	5179.9823	Pass	5179.9795	Pass	5179.9797	Pass	5179.9816	Pass

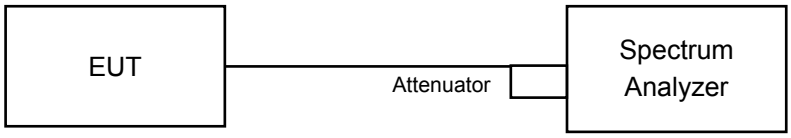
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0035	Pass	5180.0018	Pass	5180.0000	Pass	5180.0003	Pass
	120	5180.0025	Pass	5180.0022	Pass	5179.9992	Pass	5179.9997	Pass
	102	5180.0018	Pass	5180.0012	Pass	5179.9998	Pass	5179.9989	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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	15.76	16.35	16.35	16.35	0.5	Pass
157	5785	15.79	16.39	16.36	16.36	0.5	Pass
165	5825	16.38	16.37	16.37	15.77	0.5	Pass

802.11n (HT20)

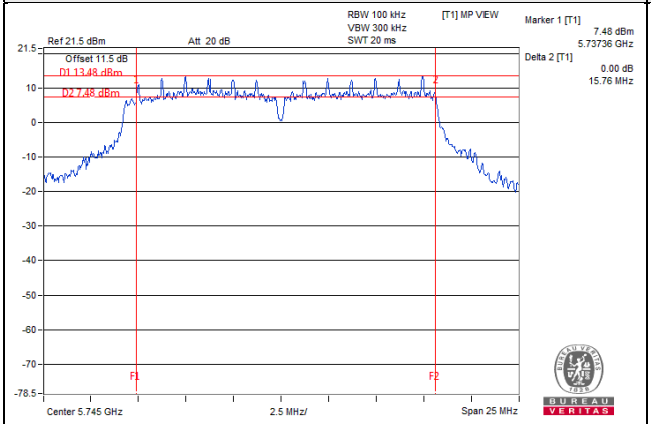
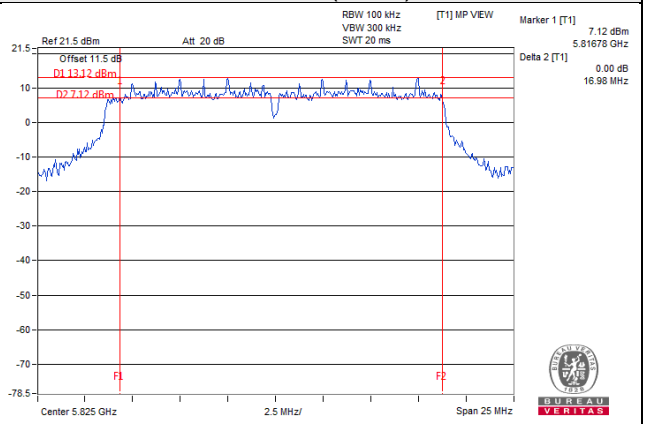
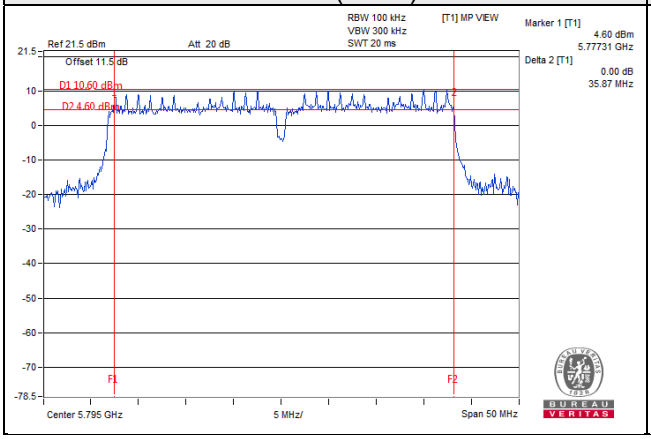
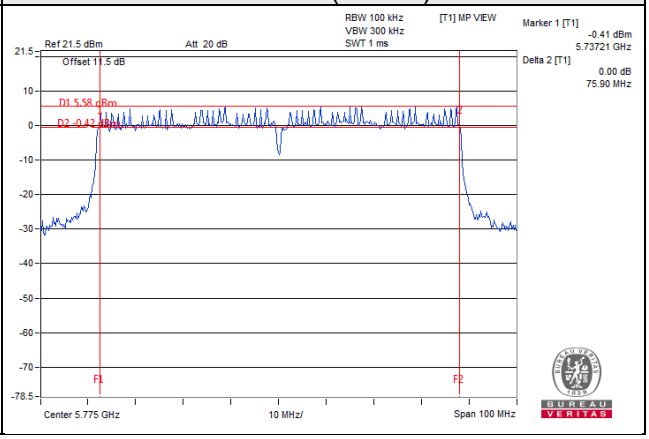
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	17.22	17.64	17.66	17.61	0.5	Pass
157	5785	16.98	17.65	17.65	17.01	0.5	Pass
165	5825	16.98	17.65	17.64	17.59	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.20	36.39	36.41	36.22	0.5	Pass
159	5795	36.14	36.19	36.42	35.87	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.90	76.09	76.03	76.03	0.5	Pass

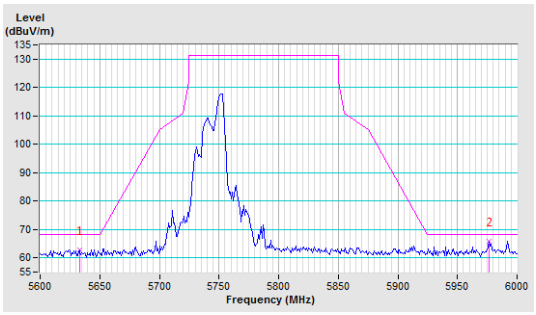
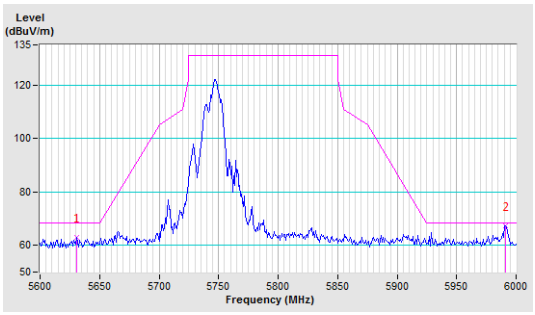
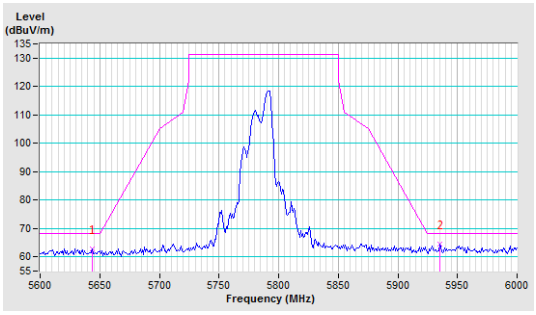
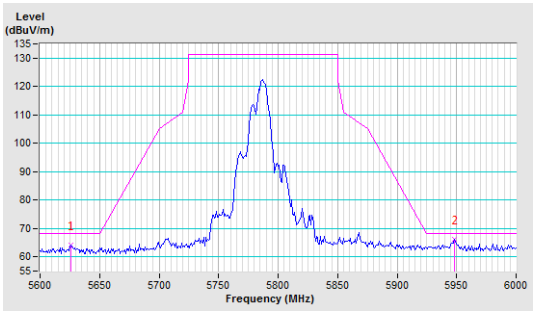
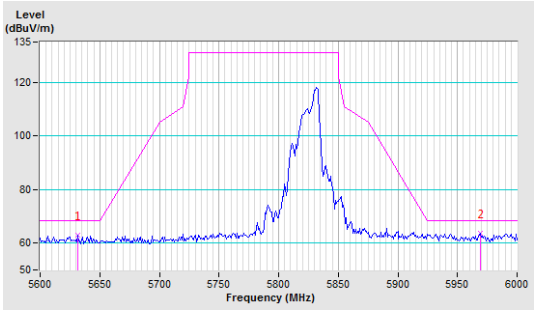
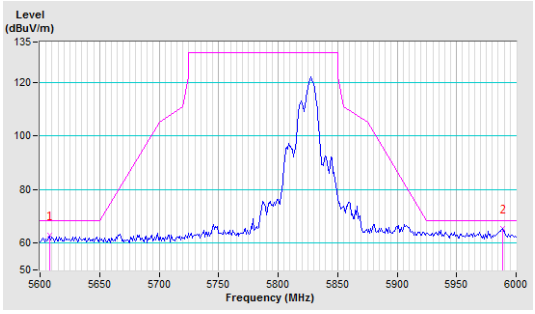
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

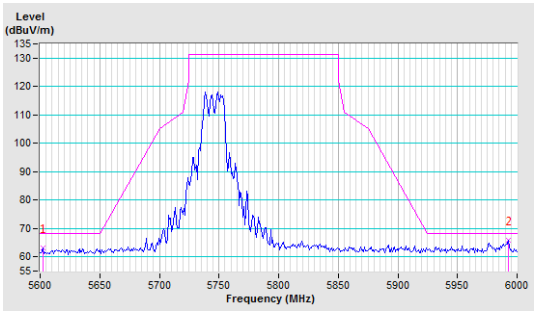
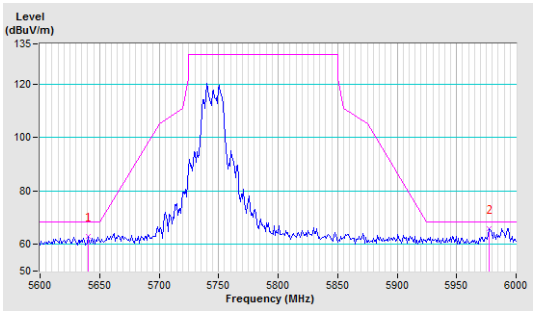
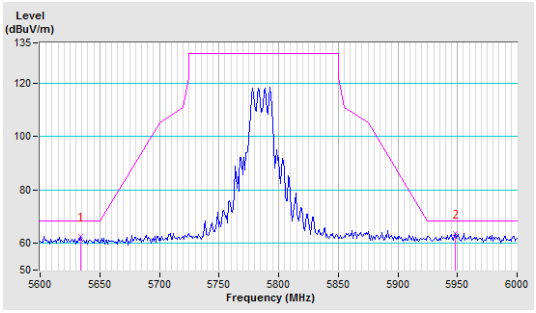
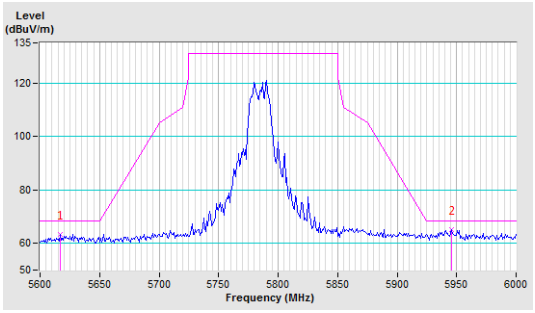
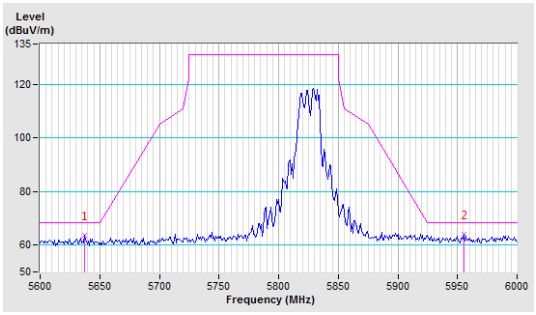
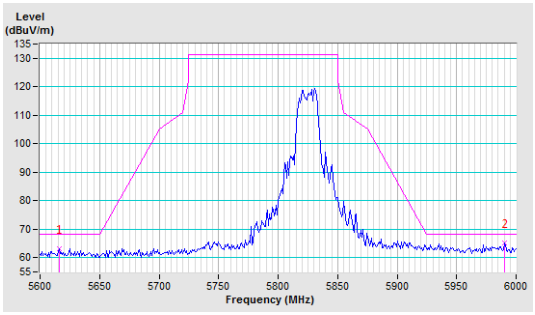
Please refer to the attached file (Test Setup Photo).

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

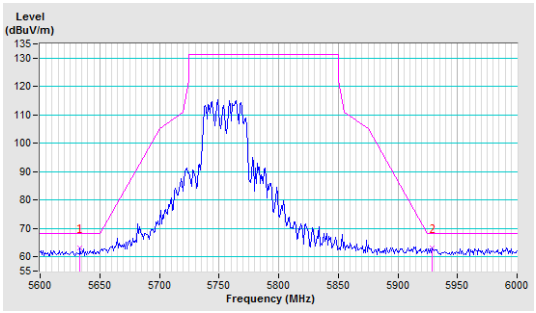
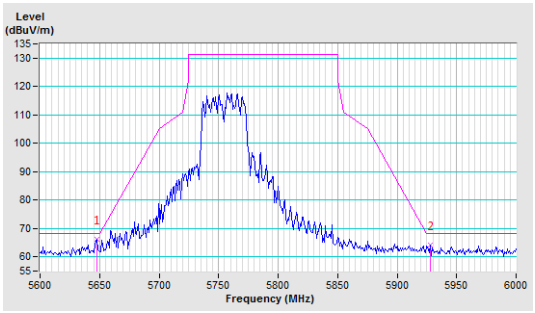
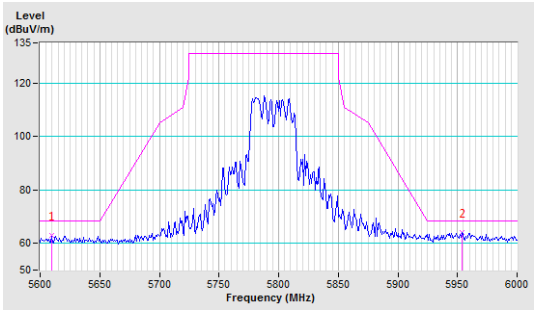
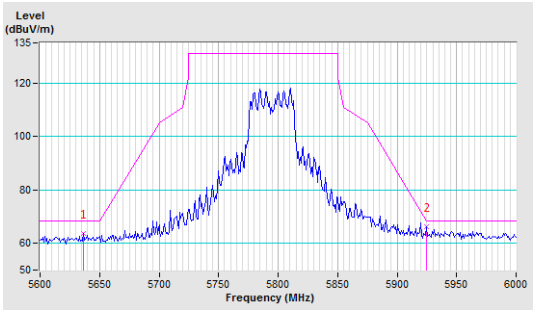
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

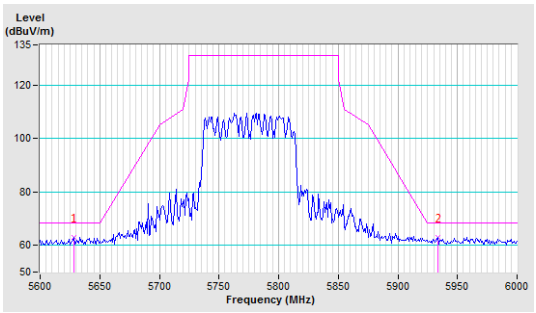
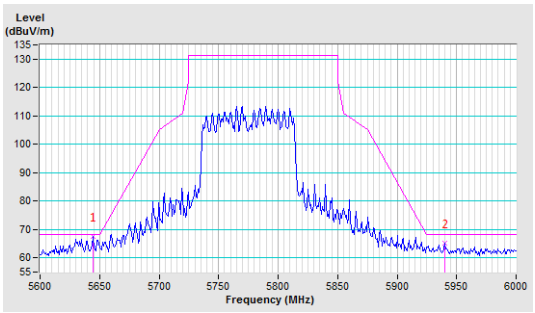
802.11n (HT20)

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 on the Testing Laboratories

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

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

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

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