FCC Test Report

Report No.: RF200717C08-1

FCC ID: 2AKCZ-101

Test Model: APL57-0F2, APL57-101 (refer to item 3.1 for more details)

Received Date: Jul. 17, 2020

Test Date: Aug. 24, 2020 ~ Sep. 25, 2020

Issued Date: Oct. 08, 2020

Applicant: SonicWall Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration / Designation Number: 788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF200717C08-1	Original Release	Oct. 08, 2020

1 Certificate of Conformity

Product: Wireless Network Security Appliance

Brand: SONICWALL

Test Model: APL57-0F2, APL57-101 (refer to item 3.1 for more details)

Sample Status: Engineering Sample

Applicant: SonicWall Inc.

Test Date: Aug. 24, 2020 ~ Sep. 25, 2020

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 : Vera Huang , **Date:** Oct. 08, 2020

Vera Huang / Specialist

Approved by : , **Date:** Oct. 08, 2020

Dylan Chiou / 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 -19.22 dB at 20.35400 MHz.
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 -0.6 dB at 17475.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
2. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3
3. 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	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Network Security Appliance
Brand	SONICWALL
Test Model	APL57-0F2, APL57-101
Model Difference	Refer to note for more details
Status of EUT	Engineering Sample
Power Supply Rating	12 Vdc (adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
Output Power	CDD Mode: 5180 ~ 5240MHz: 138.845mW 5745 ~ 5825MHz: 252.386mW Beamforming Mode: 5180 ~ 5240MHz: 69.427mW 5745 ~ 5825MHz: 122.375mW
Antenna Type	Refer to Note as below
Antenna Connector	Refer to Note as below
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The following models are provided to this EUT. The model 'APL57-0F2' was chosen for final tests.
   (a) The EUT using the same PCB Layout.
   (b) Due to series models, the parts are different as below:

Model	APL57-0F2	APL57-101
PSE Out	N/A	N/A
Copper Ports	x8 GbE	x8 GbE
SFP Ports	x2 SFP (Max: 2.5Gbps)	NO
mPCIe WiFi Module	2x2 11ac Wave 2 (Module)	2x2 11ac Wave 2 (Module)
WiFi SPEC	2.4G+5G 11ac+abgn support Beamforming	2.4G+5G 11ac+abgn support Beamforming
ANT for WiFi	x2 ANTs (EXT)	x2 ANTs (EXT)
Console (RJ45)	YES	YES
USB Port	3.0 x2	3.0 x2
FAN(s)	YES	YES
Outer covering	Metal	Metal
CPU	1.4GHz	1.2GHz

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

Modulation Mode	TX Function	Beamforming Mode
802.11a	2TX	Not Support
802.11n (HT20)	2TX	Support
802.11n (HT40)	2TX	Support
802.11ac (VHT20)	2TX	Support
802.11ac (VHT40)	2TX	Support
802.11ac (VHT80)	2TX	Support

* 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 uses following antennas.

Ant. Type	Dipole					
Ant. Connector	RP-SMA					
Frequency (MHz)	2400	2450	2500	5150	5550	5850
Peak Gain (dBi)	3.19	3.10	3.05	5.85	5.73	5.03

* The max. gain was chosen for final tests.

4. The EUT consumes power from the following adapters.

Product	Brand	Model	Description
Adapter 1	Sunny COMPUTER TECHNOLOGY CO.,LTD.	SYS1546-3612-T3	I/P: 100-240 Vac, 50-60 Hz, 1.5 A O/P: 12 Vdc, 3 A 1.85m power cable with 1 core
Adapter 2 (Support unit only)	BILLION	BA040-120300MAX	I/P: 100-240 Vac, 50/60 Hz, 1 A O/P: 12 Vdc, 3 A 1.46m power cable without core

* After the pretesting, the adapter 1 was chosen for final test.

5. WLAN 2.4GHz & WLAN 5GHz technology cannot transmit at same time.
6. Spurious emission of the simultaneous operation (2.4GHz and 5GHz) has been evaluated and no non-compliance was found.
7. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
8. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

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

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

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

For 5745 ~ 5825 MHz:

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

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

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5775

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

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

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

Radiated Emission Test (Below 1 GHz):

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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 66 % RH	120 Vac, 60 Hz	Titan Hsu
RE<1G	23 deg. C, 66 % RH	120 Vac, 60 Hz	Greg Lin
PLC	25 deg. C, 75 % RH	120 Vac, 60 Hz	Greg Lin
APCM	25 deg. C, 60 % RH	120 Vac, 60 Hz	Ivan Tseng

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

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

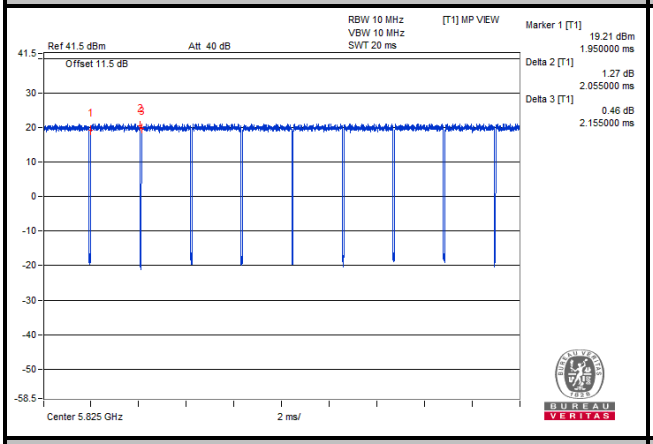
802.11a: Duty cycle = 2.055/2.155 = 0.954, Duty factor = 10 * log(1/0.954) = 0.21

802.11n (HT20): Duty cycle = 4.975/5.088 = 0.978, Duty factor = 10 * log(1/0.978) = 0.10

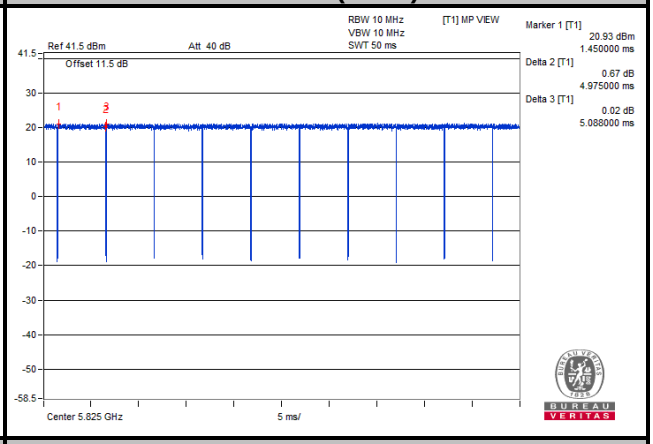
802.11n (HT40): Duty cycle = 2.4/2.53 = 0.949, Duty factor = 10 * log(1/0.949) = 0.23

802.11ac (VHT80): Duty cycle = 3.325/3.835 = 0.867, Duty factor = 10 * log(1/0.867) = 0.62

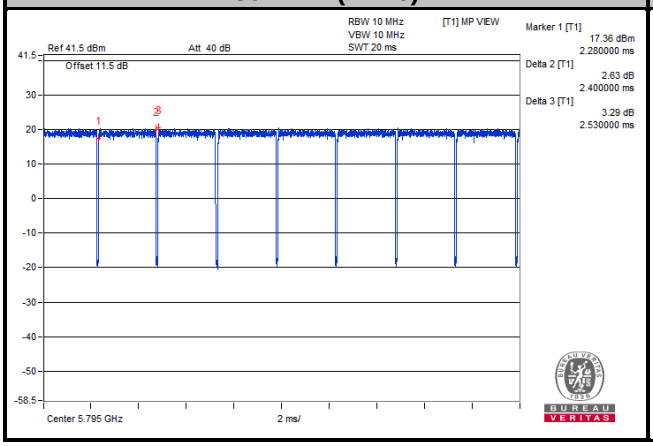
802.11a



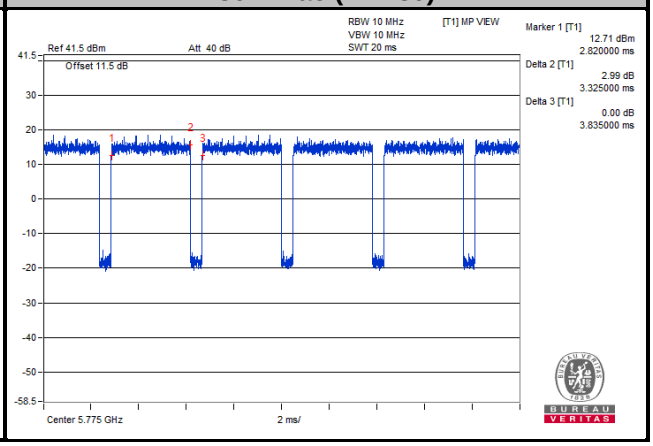
802.11n (HT20)



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.

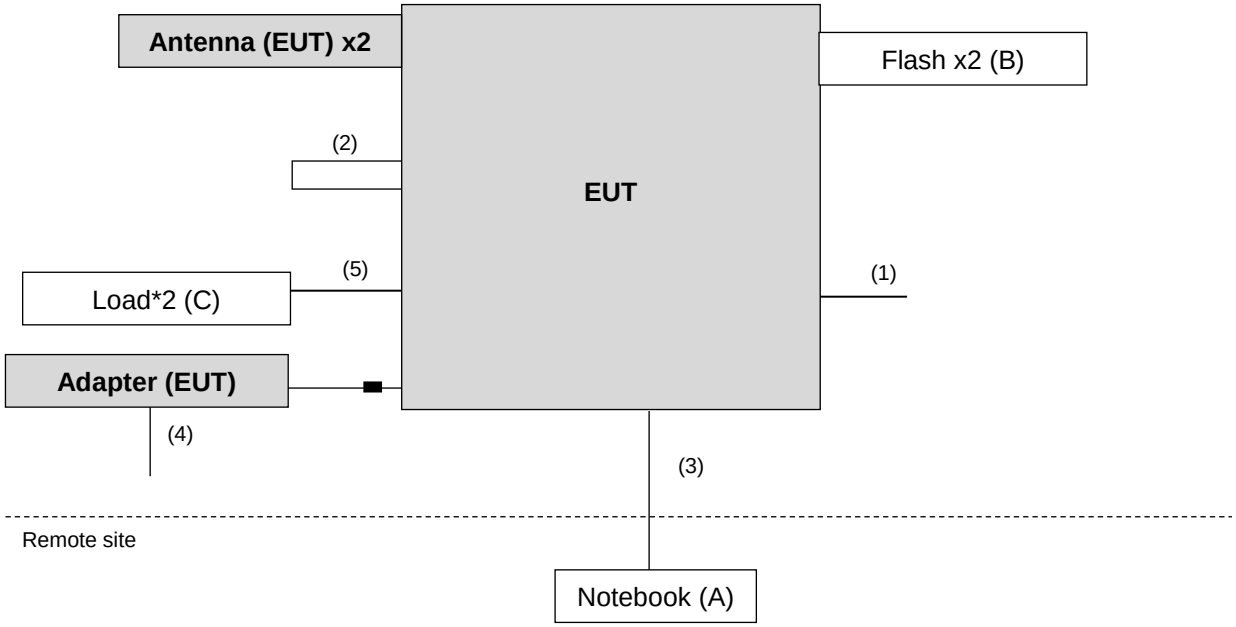
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
1.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
2.	Flash	HP	v250W	05	NA	-
	Flash	HP	v250W	03	NA	-
3.	Load*2	NA	NA	NA	NA	-

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.	Console cable	1	1.15	N	0	Accessory of EUT
2.	Fiber cable	1	3	N	0	Provided by client
3.	LAN cable	1	6	N	0	RJ45, Cat5e
4.	Power cord	1	0.9	N	0	Accessory of EUT
5.	LAN cable	7	1.5	N	0	RJ45, Cat5e

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart E (15.407)
ANSI C63.10-2013

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

References Test Guidance:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

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 1000 MHz, 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 20 dB under any condition of modulation.

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To			Limit	
789033 D02 General UNII Test Procedures New Rules v02r01			Field Strength at 3 m	
			PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	**Applicable To**		**EIRP Limit**	**Equivalent Field Strength at 3 m**
5150~5250 MHz	15.407(b)(1)		PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8 (dBμV/m) *3 PK:122.2 (dBμV/m) *4
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102579	Jul. 07, 2020	Jul. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
			Sep. 17, 2020	Sep. 16, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 23, 2020	Mar. 22, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 13, 2020	Jul. 12, 2021

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 3.
3. Test Date: 2020/08/24 ~ 2020/09/21

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

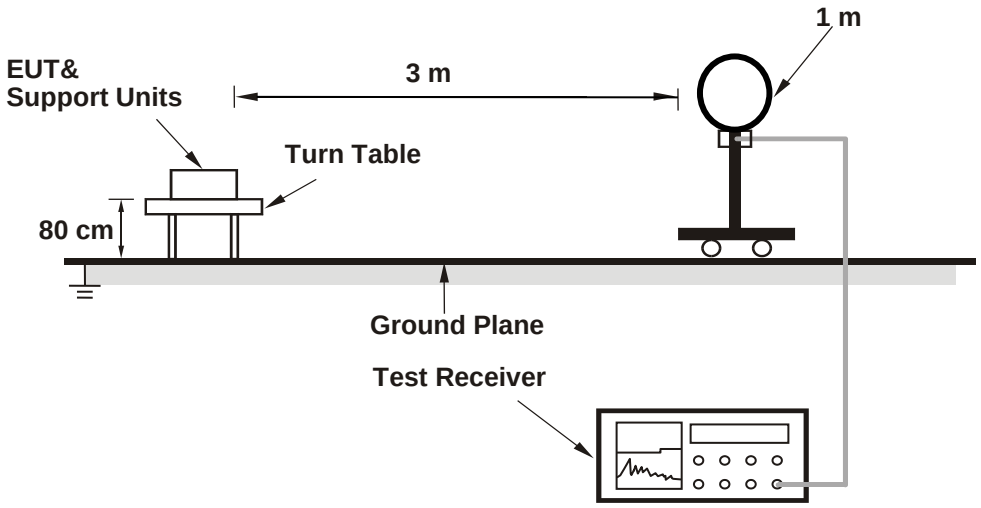
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
   (11a: RBW = 1 MHz, VBW = 1 kHz ; 11n (HT20): RBW = 1 MHz, VBW = 1 kHz ;
   11n (HT40): RBW = 1 MHz, VBW = 1 kHz ; 11ac (VHT80): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

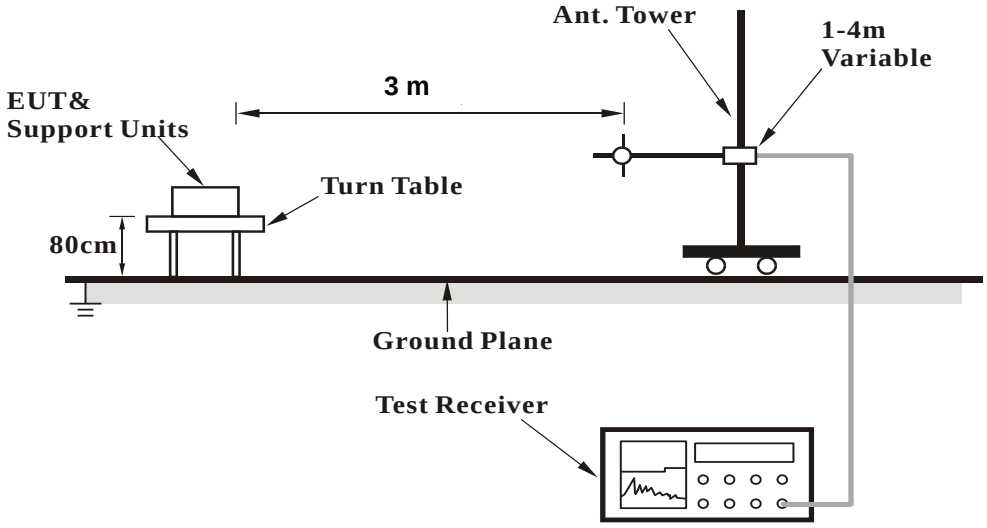
No deviation.

4.1.5 Test Setup

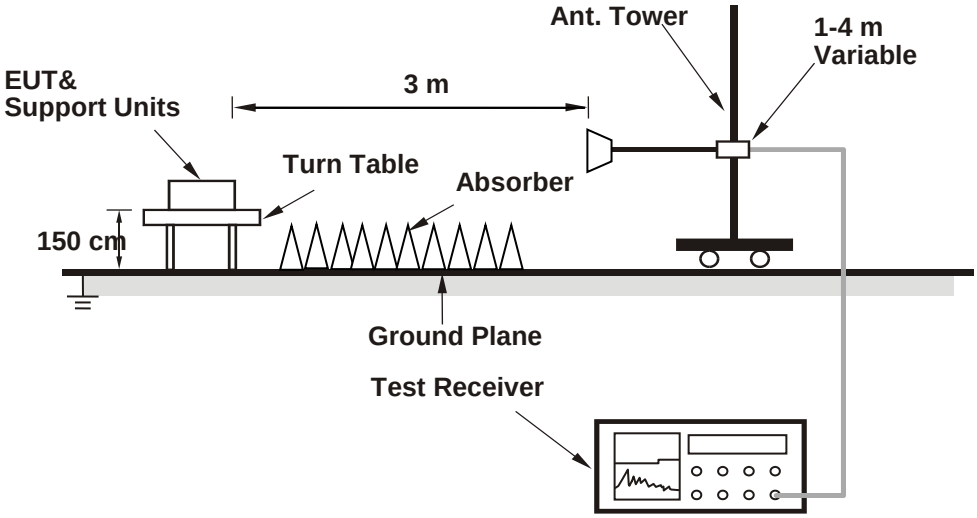
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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 a testing table.

b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz 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	Frequency (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	57.7 PK	74.0	-16.3	1.62 H	335	51.2	6.5
2	5150.00	44.9 AV	54.0	-9.1	1.62 H	335	38.4	6.5
3	*5180.00	104.0 PK			1.67 H	331	61.9	42.1
4	*5180.00	94.0 AV			1.67 H	331	51.9	42.1
5	#10360.00	58.3 PK	68.2	-9.9	2.29 H	320	41.7	16.6
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	68.0 PK	74.0	-6.0	1.71 V	115	61.5	6.5
2	5150.00	52.7 AV	54.0	-1.3	1.71 V	115	46.2	6.5
3	*5180.00	120.5 PK			1.68 V	106	78.4	42.1
4	*5180.00	109.4 AV			1.68 V	106	67.3	42.1
5	#10360.00	59.1 PK	68.2	-9.1	1.78 V	220	42.5	16.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	57.8 PK	74.0	-16.2	1.63 H	328	51.3	6.5
2	5150.00	44.9 AV	54.0	-9.1	1.63 H	328	38.4	6.5
3	*5200.00	105.1 PK			1.58 H	333	63.0	42.1
4	*5200.00	94.8 AV			1.58 H	333	52.7	42.1
5	#10400.00	58.7 PK	68.2	-9.5	2.32 H	335	41.8	16.9
6	15600.00	67.3 PK	74.0	-6.7	1.17 H	96	49.3	18.0
7	15600.00	52.3 AV	54.0	-1.7	1.17 H	96	34.3	18.0
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	59.2 PK	74.0	-14.8	1.58 V	102	52.7	6.5
2	5150.00	46.4 AV	54.0	-7.6	1.58 V	102	39.9	6.5
3	*5200.00	119.9 PK			1.70 V	106	77.8	42.1
4	*5200.00	109.6 AV			1.70 V	106	67.5	42.1
5	#10400.00	59.4 PK	68.2	-8.8	1.81 V	230	42.5	16.9
6	15600.00	61.2 PK	74.0	-12.8	1.53 V	174	43.2	18.0
7	15600.00	49.0 AV	54.0	-5.0	1.53 V	174	31.0	18.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	104.0 PK			1.61 H	331	62.1	41.9
2	*5240.00	93.5 AV			1.61 H	331	51.6	41.9
3	5350.00	57.8 PK	74.0	-16.2	1.65 H	336	51.5	6.3
4	5350.00	44.7 AV	54.0	-9.3	1.65 H	336	38.4	6.3
5	#10480.00	59.2 PK	68.2	-9.0	2.18 H	309	41.7	17.5
6	15720.00	65.5 PK	74.0	-8.5	1.18 H	95	48.4	17.1
7	15720.00	52.3 AV	54.0	-1.7	1.18 H	95	35.2	17.1
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	119.5 PK			1.78 V	109	77.6	41.9
2	*5240.00	108.3 AV			1.78 V	109	66.4	41.9
3	5350.00	57.8 PK	74.0	-16.2	1.72 V	113	51.5	6.3
4	5350.00	45.5 AV	54.0	-8.5	1.72 V	113	39.2	6.3
5	#10480.00	58.8 PK	68.2	-9.4	1.71 V	212	41.3	17.5
6	15720.00	60.4 PK	74.0	-13.6	1.53 V	174	43.3	17.1
7	15720.00	47.3 AV	54.0	-6.7	1.53 V	174	30.2	17.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5745.00	107.2 PK			1.30 H	127	65.2	42.0
2	*5745.00	95.9 AV			1.30 H	127	53.9	42.0
3	11490.00	60.1 PK	74.0	-13.9	2.05 H	316	42.1	18.0
4	11490.00	46.9 AV	54.0	-7.1	2.05 H	316	28.9	18.0
5	#17235.00	67.5 PK	68.2	-0.7	1.10 H	59	45.0	22.5
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5745.00	122.3 PK			1.89 V	123	80.3	42.0
2	*5745.00	111.3 AV			1.89 V	123	69.3	42.0
3	11490.00	60.2 PK	74.0	-13.8	1.89 V	236	42.2	18.0
4	11490.00	46.8 AV	54.0	-7.2	1.89 V	236	28.8	18.0
5	#17235.00	64.7 PK	68.2	-3.5	1.88 V	199	42.2	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5785.00	104.7 PK			1.30 H	125	62.8	41.9
2	*5785.00	94.5 AV			1.30 H	125	52.6	41.9
3	11570.00	59.8 PK	74.0	-14.2	2.08 H	311	42.2	17.6
4	11570.00	46.4 AV	54.0	-7.6	2.08 H	311	28.8	17.6
5	#17355.00	67.4 PK	68.2	-0.8	1.10 H	67	44.1	23.3
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5785.00	119.1 PK			1.85 V	124	77.2	41.9
2	*5785.00	108.2 AV			1.85 V	124	66.3	41.9
3	11570.00	59.7 PK	74.0	-14.3	1.93 V	238	42.1	17.6
4	11570.00	46.3 AV	54.0	-7.7	1.93 V	238	28.7	17.6
5	#17355.00	65.6 PK	68.2	-2.6	2.02 V	206	42.3	23.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5825.00	103.9 PK			1.20 H	129	61.7	42.2
2	*5825.00	92.9 AV			1.20 H	129	50.7	42.2
3	11650.00	59.7 PK	74.0	-14.3	2.11 H	319	42.0	17.7
4	11650.00	46.6 AV	54.0	-7.4	2.11 H	319	28.9	17.7
5	#17475.00	67.5 PK	68.2	-0.7	1.06 H	90	43.0	24.5
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5825.00	116.6 PK			1.87 V	122	74.4	42.2
2	*5825.00	105.8 AV			1.87 V	122	63.6	42.2
3	11650.00	59.7 PK	74.0	-14.3	1.93 V	235	42.0	17.7
4	11650.00	46.5 AV	54.0	-7.5	1.93 V	235	28.8	17.7
5	#17475.00	66.7 PK	68.2	-1.5	1.92 V	205	42.2	24.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	57.8 PK	74.0	-16.2	1.72 H	336	51.3	6.5
2	5150.00	44.8 AV	54.0	-9.2	1.72 H	336	38.3	6.5
3	*5180.00	104.9 PK			1.70 H	333	62.8	42.1
4	*5180.00	94.1 AV			1.70 H	333	52.0	42.1
5	#10360.00	58.0 PK	68.2	-10.2	2.23 H	305	41.4	16.6
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	66.0 PK	74.0	-8.0	1.65 V	100	59.5	6.5
2	5150.00	52.3 AV	54.0	-1.7	1.65 V	100	45.8	6.5
3	*5180.00	119.2 PK			1.72 V	113	77.1	42.1
4	*5180.00	108.7 AV			1.72 V	113	66.6	42.1
5	#10360.00	58.2 PK	68.2	-10.0	1.61 V	202	41.6	16.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.31 H	336	51.5	6.5
2	5150.00	45.0 AV	54.0	-9.0	1.31 H	336	38.5	6.5
3	*5200.00	106.1 PK			1.26 H	332	64.0	42.1
4	*5200.00	94.7 AV			1.26 H	332	52.6	42.1
5	#10400.00	58.8 PK	68.2	-9.4	2.29 H	305	41.9	16.9
6	15600.00	69.4 PK	74.0	-4.6	1.24 H	95	51.4	18.0
7	15600.00	52.8 AV	54.0	-1.2	1.24 H	95	34.8	18.0
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	59.2 PK	74.0	-14.8	1.78 V	113	52.7	6.5
2	5150.00	46.1 AV	54.0	-7.9	1.78 V	113	39.6	6.5
3	*5200.00	120.0 PK			1.85 V	110	77.9	42.1
4	*5200.00	109.2 AV			1.85 V	110	67.1	42.1
5	#10400.00	59.5 PK	68.2	-8.7	1.78 V	220	42.6	16.9
6	15600.00	61.0 PK	74.0	-13.0	1.55 V	176	43.0	18.0
7	15600.00	48.3 AV	54.0	-5.7	1.55 V	176	30.3	18.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	103.4 PK			1.30 H	330	61.5	41.9
2	*5240.00	92.8 AV			1.30 H	330	50.9	41.9
3	5350.00	57.6 PK	74.0	-16.4	1.36 H	328	51.3	6.3
4	5350.00	44.8 AV	54.0	-9.2	1.36 H	328	38.5	6.3
5	#10480.00	59.3 PK	68.2	-8.9	2.26 H	324	41.8	17.5
6	15720.00	68.6 PK	74.0	-5.4	1.16 H	94	51.5	17.1
7	15720.00	52.3 AV	54.0	-1.7	1.16 H	94	35.2	17.1
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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			1.84 V	110	78.0	41.9
2	*5240.00	108.9 AV			1.84 V	110	67.0	41.9
3	5350.00	57.3 PK	74.0	-16.7	1.63 V	119	51.0	6.3
4	5350.00	44.3 AV	54.0	-9.7	1.63 V	119	38.0	6.3
5	#10480.00	59.4 PK	68.2	-8.8	1.70 V	202	41.9	17.5
6	15720.00	60.6 PK	74.0	-13.4	1.55 V	173	43.5	17.1
7	15720.00	47.4 AV	54.0	-6.6	1.55 V	173	30.3	17.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5745.00	105.5 PK			1.43 H	122	63.5	42.0
2	*5745.00	95.0 AV			1.43 H	122	53.0	42.0
3	11490.00	60.2 PK	74.0	-13.8	2.12 H	319	42.2	18.0
4	11490.00	46.8 AV	54.0	-7.2	2.12 H	319	28.8	18.0
5	#17235.00	67.5 PK	68.2	-0.7	1.15 H	60	45.0	22.5
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5745.00	121.0 PK			1.88 V	125	79.0	42.0
2	*5745.00	110.3 AV			1.88 V	125	68.3	42.0
3	11490.00	60.1 PK	74.0	-13.9	1.92 V	238	42.1	18.0
4	11490.00	46.9 AV	54.0	-7.1	1.92 V	238	28.9	18.0
5	#17235.00	64.6 PK	68.2	-3.6	1.90 V	196	42.1	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5785.00	104.2 PK			1.18 H	131	62.3	41.9
2	*5785.00	93.3 AV			1.18 H	131	51.4	41.9
3	11570.00	59.8 PK	74.0	-14.2	2.12 H	322	42.2	17.6
4	11570.00	46.4 AV	54.0	-7.6	2.12 H	322	28.8	17.6
5	#17355.00	67.5 PK	68.2	-0.7	1.09 H	80	44.2	23.3
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5785.00	118.9 PK			1.92 V	123	77.0	41.9
2	*5785.00	107.8 AV			1.92 V	123	65.9	41.9
3	11570.00	59.7 PK	74.0	-14.3	1.92 V	239	42.1	17.6
4	11570.00	46.5 AV	54.0	-7.5	1.92 V	239	28.9	17.6
5	#17355.00	65.3 PK	68.2	-2.9	1.82 V	192	42.0	23.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5825.00	103.1 PK			1.18 H	131	60.9	42.2
2	*5825.00	92.1 AV			1.18 H	131	49.9	42.2
3	11650.00	59.8 PK	74.0	-14.2	2.03 H	312	42.1	17.7
4	11650.00	46.4 AV	54.0	-7.6	2.03 H	312	28.7	17.7
5	**#17475.00**	**67.6 PK**	**68.2**	**-0.6**	**1.08 H**	**83**	**43.1**	**24.5**
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5825.00	116.3 PK			1.89 V	125	74.1	42.2
2	*5825.00	105.7 AV			1.89 V	125	63.5	42.2
3	11650.00	59.8 PK	74.0	-14.2	1.93 V	242	42.1	17.7
4	11650.00	46.6 AV	54.0	-7.4	1.93 V	242	28.9	17.7
5	#17475.00	66.5 PK	68.2	-1.7	1.92 V	198	42.0	24.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	57.9 PK	74.0	-16.1	1.71 H	336	51.4	6.5
2	5150.00	44.8 AV	54.0	-9.2	1.71 H	336	38.3	6.5
3	*5190.00	99.1 PK			1.68 H	333	57.0	42.1
4	*5190.00	89.0 AV			1.68 H	333	46.9	42.1
5	#10380.00	58.4 PK	68.2	-9.8	2.29 H	320	41.6	16.8
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	1.66 V	117	62.0	6.5
2	5150.00	52.3 AV	54.0	-1.7	1.66 V	117	45.8	6.5
3	*5190.00	113.8 PK			1.67 V	114	71.7	42.1
4	*5190.00	103.9 AV			1.67 V	114	61.8	42.1
5	#10380.00	58.6 PK	68.2	-9.6	1.85 V	227	41.8	16.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	57.9 PK	74.0	-16.1	1.62 H	328	51.4	6.5
2	5150.00	44.8 AV	54.0	-9.2	1.62 H	328	38.3	6.5
3	*5230.00	101.9 PK			1.67 H	333	60.0	41.9
4	*5230.00	91.6 AV			1.67 H	333	49.7	41.9
5	#10460.00	59.1 PK	68.2	-9.1	2.22 H	315	41.8	17.3
6	15690.00	66.6 PK	74.0	-7.4	1.10 H	96	49.3	17.3
7	15690.00	52.3 AV	54.0	-1.7	1.10 H	96	35.0	17.3
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	62.1 PK	74.0	-11.9	1.68 V	113	55.6	6.5
2	5150.00	49.4 AV	54.0	-4.6	1.68 V	113	42.9	6.5
3	*5230.00	117.6 PK			1.71 V	111	75.7	41.9
4	*5230.00	107.0 AV			1.71 V	111	65.1	41.9
5	#10460.00	59.4 PK	68.2	-8.8	1.82 V	205	42.1	17.3
6	15690.00	60.3 PK	74.0	-13.7	1.55 V	177	43.0	17.3
7	15690.00	47.5 AV	54.0	-6.5	1.55 V	177	30.2	17.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5650.00	57.4 PK	68.2	-10.8	1.99 H	136	51.3	6.1
2	*5755.00	102.7 PK			1.94 H	131	60.7	42.0
3	*5755.00	92.2 AV			1.94 H	131	50.2	42.0
4	11510.00	60.2 PK	74.0	-13.8	1.99 H	58	42.3	17.9
5	11510.00	47.1 AV	54.0	-6.9	1.99 H	58	29.2	17.9
6	#17265.00	66.2 PK	68.2	-2.0	1.06 H	60	43.7	22.5
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5650.00	66.6 PK	68.2	-1.6	1.90 V	140	60.5	6.1
2	*5755.00	117.4 PK			1.88 V	122	75.4	42.0
3	*5755.00	106.8 AV			1.88 V	122	64.8	42.0
4	11510.00	60.1 PK	74.0	-13.9	1.82 V	231	42.2	17.9
5	11510.00	47.0 AV	54.0	-7.0	1.82 V	231	29.1	17.9
6	#17265.00	65.1 PK	68.2	-3.1	1.77 V	192	42.6	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5795.00	102.1 PK			1.56 H	122	60.1	42.0
2	*5795.00	91.5 AV			1.56 H	122	49.5	42.0
3	#5925.00	58.1 PK	68.2	-10.1	1.61 H	125	51.1	7.0
4	11590.00	59.6 PK	74.0	-14.4	2.18 H	308	42.1	17.5
5	11590.00	46.3 AV	54.0	-7.7	2.18 H	308	28.8	17.5
6	#17385.00	67.2 PK	68.2	-1.0	1.10 H	79	43.4	23.8
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5795.00	115.4 PK			1.87 V	103	73.4	42.0
2	*5795.00	105.0 AV			1.87 V	103	63.0	42.0
3	#5925.00	61.3 PK	68.2	-6.9	1.88 V	108	54.3	7.0
4	11590.00	59.7 PK	74.0	-14.3	1.82 V	226	42.2	17.5
5	11590.00	46.6 AV	54.0	-7.4	1.82 V	226	29.1	17.5
6	#17385.00	66.0 PK	68.2	-2.2	1.63 V	189	42.2	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (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	57.8 PK	74.0	-16.2	1.72 H	325	51.3	6.5
2	5150.00	44.8 AV	54.0	-9.2	1.72 H	325	38.3	6.5
3	*5210.00	94.2 PK			1.66 H	333	52.2	42.0
4	*5210.00	83.6 AV			1.66 H	333	41.6	42.0
5	5350.00	57.7 PK	74.0	-16.3	1.65 H	328	51.4	6.3
6	5350.00	44.7 AV	54.0	-9.3	1.65 H	328	38.4	6.3
7	#10420.00	58.9 PK	68.2	-9.3	2.31 H	316	41.7	17.2
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (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	70.6 PK	74.0	-3.4	1.65 V	115	64.1	6.5
2	5150.00	52.4 AV	54.0	-1.6	1.65 V	115	45.9	6.5
3	*5210.00	109.0 PK			1.68 V	114	67.0	42.0
4	*5210.00	98.6 AV			1.68 V	114	56.6	42.0
5	5350.00	58.0 PK	74.0	-16.0	1.59 V	111	51.7	6.3
6	5350.00	44.8 AV	54.0	-9.2	1.59 V	111	38.5	6.3
7	#10420.00	59.3 PK	74.0	-14.7	1.74 V	212	42.1	17.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5650.00	57.3 PK	68.2	-10.9	1.61 H	123	51.2	6.1
2	*5775.00	94.9 PK			1.52 H	119	52.9	42.0
3	*5775.00	85.2 AV			1.52 H	119	43.2	42.0
4	#5925.00	58.0 PK	68.2	-10.2	1.66 H	126	51.0	7.0
5	11550.00	59.9 PK	74.0	-14.1	2.05 H	316	42.1	17.8
6	11550.00	46.7 AV	54.0	-7.3	2.05 H	316	28.9	17.8
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5650.00	67.1 PK	68.2	-1.1	1.84 V	118	61.0	6.1
2	*5775.00	110.3 PK			1.88 V	121	68.3	42.0
3	*5775.00	100.4 AV			1.88 V	121	58.4	42.0
4	#5925.00	62.8 PK	68.2	-5.4	1.93 V	106	55.8	7.0
5	11550.00	59.9 PK	74.0	-14.1	1.75 V	229	42.1	17.8
6	11550.00	46.8 AV	54.0	-7.2	1.75 V	229	29.0	17.8

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

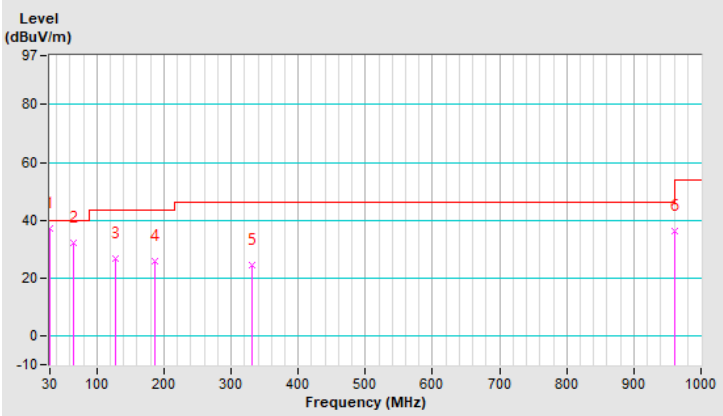
802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.97	37.1 QP	40.0	-2.9	1.50 H	247	50.7	-13.6
2	64.92	32.1 QP	40.0	-7.9	1.00 H	119	45.2	-13.1
3	127.97	26.7 QP	43.5	-16.8	1.25 H	12	40.1	-13.4
4	186.17	25.9 QP	43.5	-17.6	1.00 H	350	40.0	-14.1
5	331.67	24.5 QP	46.0	-21.5	1.25 H	105	35.0	-10.5
6	960.23	36.4 QP	54.0	-17.6	1.00 H	192	36.9	-0.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

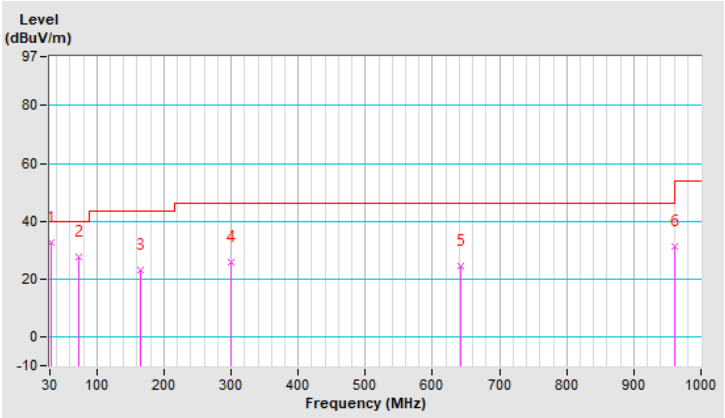


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	32.6 QP	40.0	-7.4	1.25 V	98	45.9	-13.3
2	73.65	27.5 QP	40.0	-12.5	1.00 V	328	42.1	-14.6
3	165.80	23.1 QP	43.5	-20.4	1.00 V	115	35.1	-12.0
4	299.66	25.7 QP	46.0	-20.3	1.50 V	272	36.8	-11.1
5	643.04	24.5 QP	46.0	-21.5	1.00 V	313	30.1	-5.6
6	960.23	31.3 QP	54.0	-22.7	1.25 V	78	31.8	-0.5

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 20, 2020	Feb. 19, 2021
V-LISN/AMN SCHWARZBECK (Peripheral)	NNBL 8226-2	8226-142	Jul. 31, 2020	Jul. 30, 2021
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. Test Date: 2020/8/25

4.2.3 Test Procedures

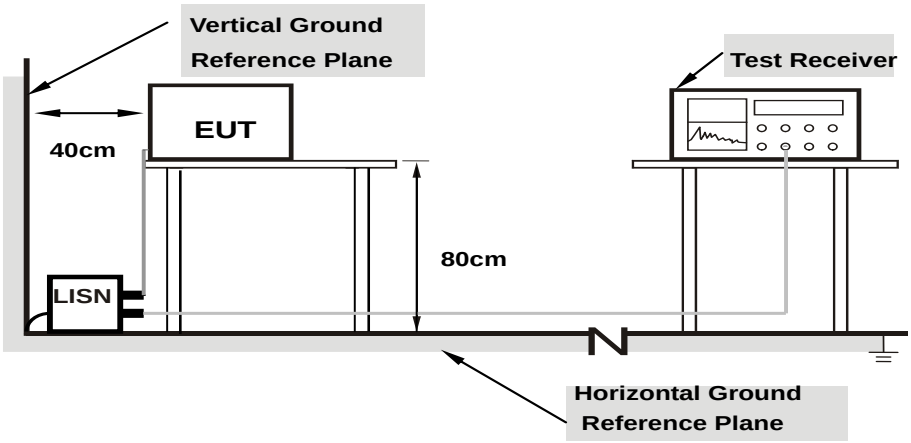
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

a. Placed the EUT on a testing table.
b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

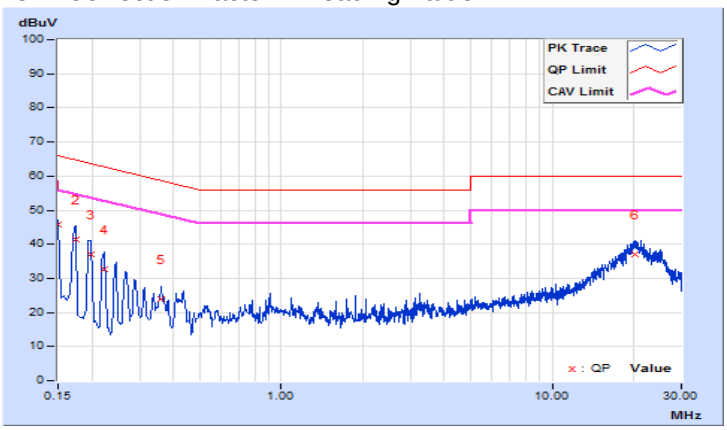
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Greg Lin	Test Date	2020/8/25

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.56	36.35	22.08	45.91	31.64	66.00	56.00	-20.09	-24.36
2	0.17384	9.56	31.95	17.86	41.51	27.42	64.77	54.77	-23.26	-27.35
3	0.19800	9.55	27.42	13.25	36.97	22.80	63.69	53.69	-26.72	-30.89
4	0.22200	9.55	23.04	9.55	32.59	19.10	62.74	52.74	-30.15	-33.64
5	0.36200	9.57	14.46	7.59	24.03	17.16	58.68	48.68	-34.65	-31.52
6	20.35400	9.83	27.19	20.84	37.02	30.67	60.00	50.00	-22.98	-19.33

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

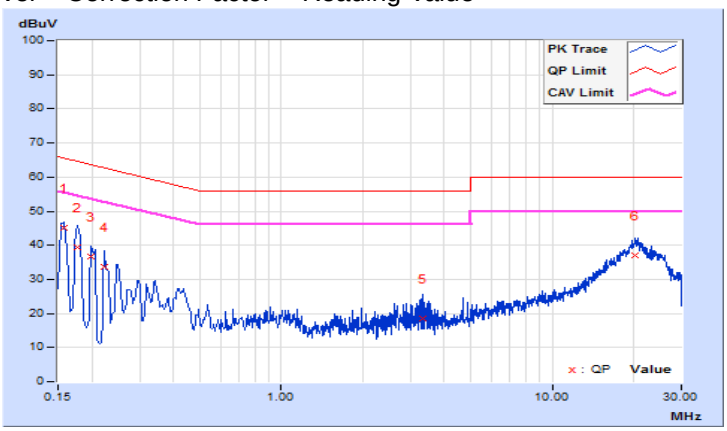


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 75%RH
Tested by	Greg Lin	Test Date	2020/8/25

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15687	9.54	35.57	21.82	45.11	31.36	65.63	55.63	-20.52	-24.27
2	0.17754	9.53	29.95	15.86	39.48	25.39	64.60	54.60	-25.12	-29.21
3	0.19800	9.53	27.26	12.53	36.79	22.06	63.69	53.69	-26.90	-31.63
4	0.22200	9.53	23.98	9.90	33.51	19.43	62.74	52.74	-29.23	-33.31
5	3.31400	9.68	8.95	2.05	18.63	11.73	56.00	46.00	-37.37	-34.27
6	**20.35400**	**9.88**	**27.26**	**20.90**	**37.14**	**30.78**	**60.00**	**50.00**	**-22.86**	**-19.22**

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 ≦ 125 mW (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	250 mW (24 dBm)
U-NII-2A	-		250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C	-		250 mW (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 $N_{ANT} \leq 4$;

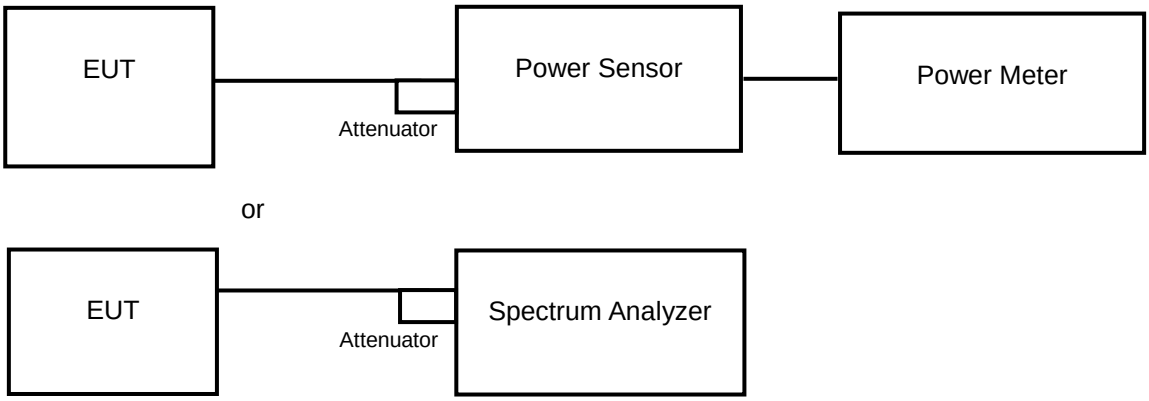
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

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

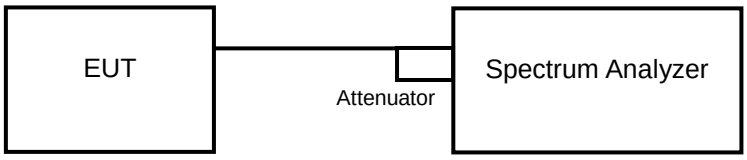
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<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.

<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

26 dB Bandwidth

a. Set RBW = approximately 1 % of the emission bandwidth.
b. Set the VBW ≥ 3 x 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 Results

Power Output:

CDD Mode

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.55	17.13	108.527	20.36	30	Pass
40	5200	18.18	17.98	128.572	21.09	30	Pass
48	5240	17.23	17.32	106.796	20.29	30	Pass
149	5745	21.30	20.70	252.386	24.02	30	Pass
157	5785	19.60	19.01	170.817	22.33	30	Pass
165	5825	17.72	17.75	118.722	20.75	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.21	17.02	102.952	20.13	30	Pass
40	5200	18.42	18.41	138.845	21.43	30	Pass
48	5240	17.43	17.57	112.483	20.51	30	Pass
149	5745	21.11	20.63	244.733	23.89	30	Pass
157	5785	19.15	18.85	158.96	22.01	30	Pass
165	5825	17.40	17.56	111.971	20.49	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.56	15.25	69.471	18.42	30	Pass
46	5230	17.96	18.12	127.381	21.05	30	Pass
151	5755	19.96	19.05	179.436	22.54	30	Pass
159	5795	19.52	19.04	169.704	22.30	30	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.69	13.55	46.035	16.63	30	Pass
155	5775	16.67	16.56	91.741	19.63	30	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	14.20	14.01	51.479	17.12	27.14	Pass
40	5200	15.41	15.40	69.427	18.42	27.14	Pass
48	5240	14.42	14.56	56.245	17.50	27.14	Pass
149	5745	18.10	17.62	122.375	20.88	27.14	Pass
157	5785	16.14	15.84	79.486	19.00	27.14	Pass
165	5825	14.39	14.55	55.989	17.48	27.14	Pass

Note: Beamforming Gain = 5.85 + 10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 30-(8.86-6) = 27.14dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	12.55	12.24	34.738	15.41	27.14	Pass
46	5230	14.95	15.11	63.695	18.04	27.14	Pass
151	5755	16.95	16.04	89.724	19.53	27.14	Pass
159	5795	16.51	16.03	84.858	19.29	27.14	Pass

Note: Beamforming Gain = 5.85 + 10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 30-(8.86-6) = 27.14dBm.

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	10.68	10.54	23.019	13.62	27.14	Pass
155	5775	13.66	13.55	45.874	16.62	27.14	Pass

Note: Beamforming Gain = 5.85 + 10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 30-(8.86-6) = 27.14dBm.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.93	20.81
40	5200	22.56	22.48
48	5240	21.26	20.98

802.11n (HT20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.81	20.90
40	5200	24.79	25.15
48	5240	21.82	22.51

802.11n (HT40)

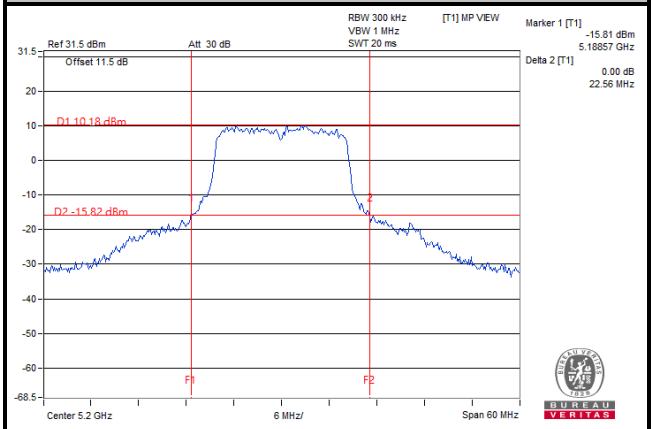
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.34	41.27
46	5230	55.77	61.92

802.11ac (VHT80)

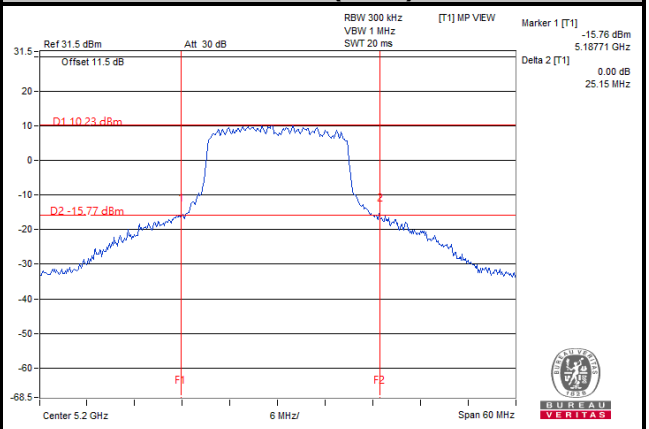
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	80.99	81.00

Spectrum Plot of Worst Value

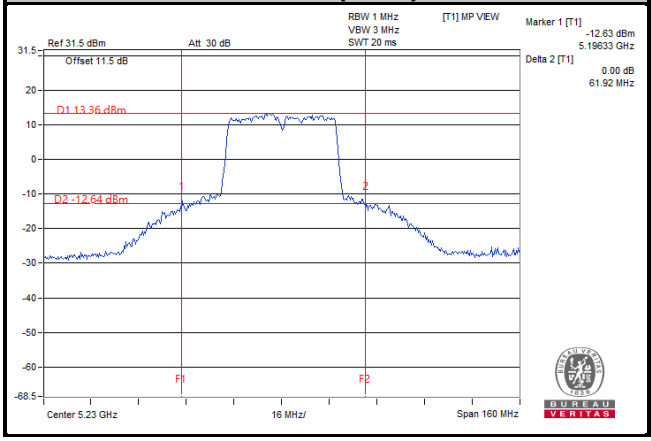
802.11a



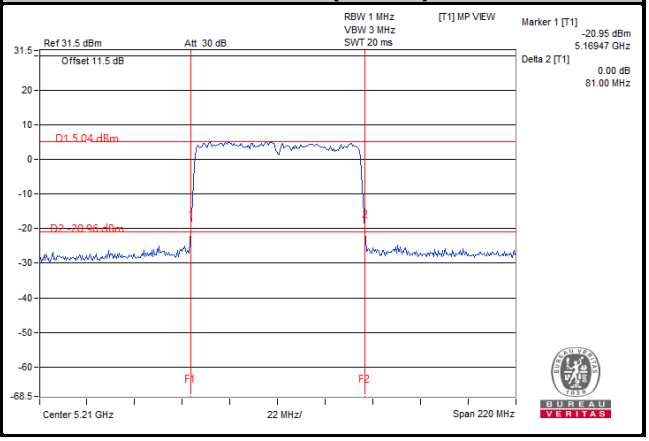
802.11n (HT20)



802.11n (HT40)

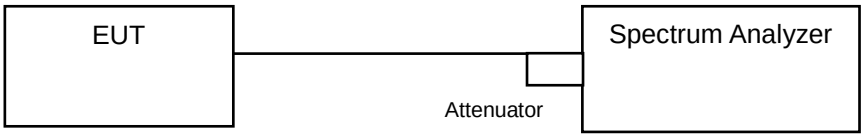


802.11ac (VHT80)



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 SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.56	16.56
40	5200	16.68	16.68
48	5240	16.56	16.56
149	5745	37.44	34.20
157	5785	29.76	25.32
165	5825	16.78	17.76

802.11n (HT20)

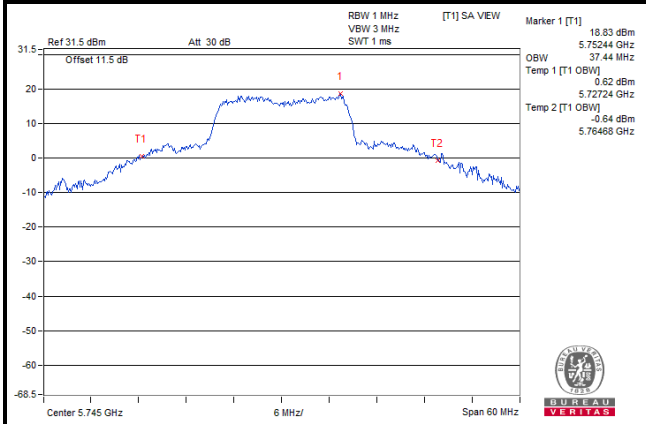
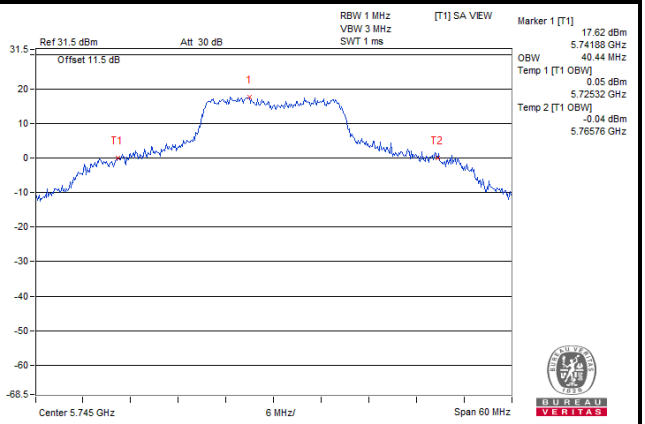
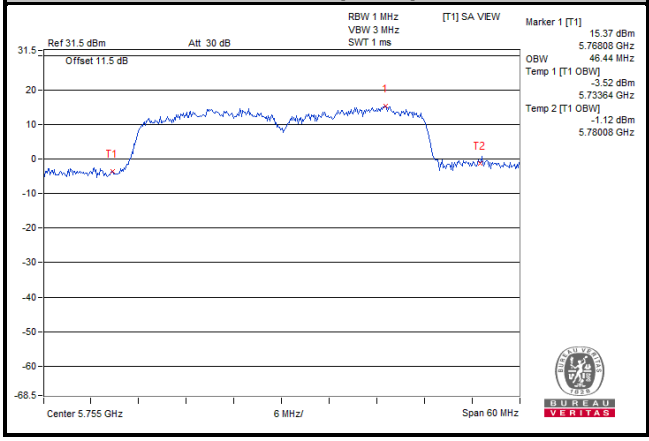
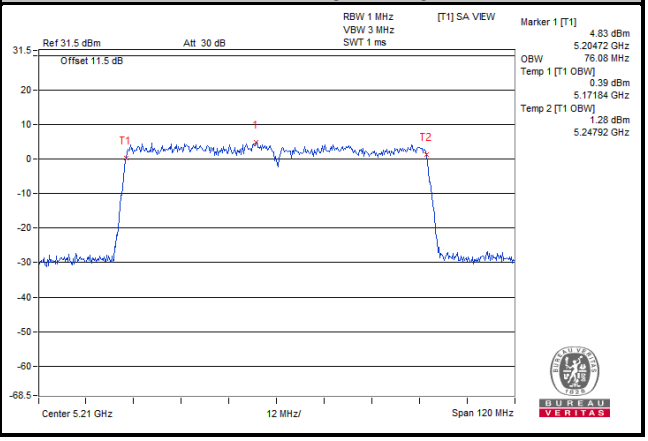
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.88	17.88
48	5240	17.64	17.64
149	5745	40.44	35.52
157	5785	22.80	22.56
165	5825	18.48	18.48

802.11n (HT40)

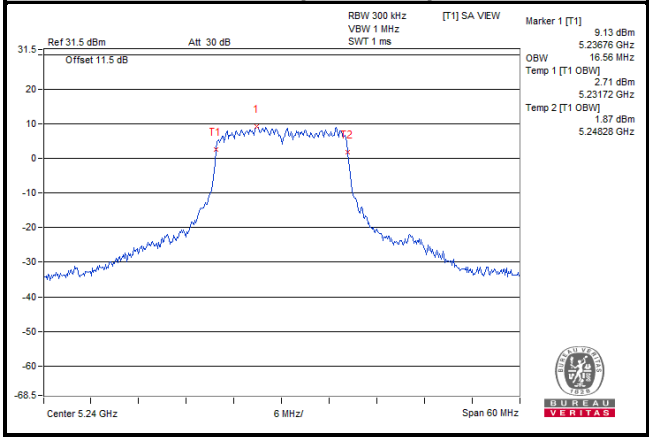
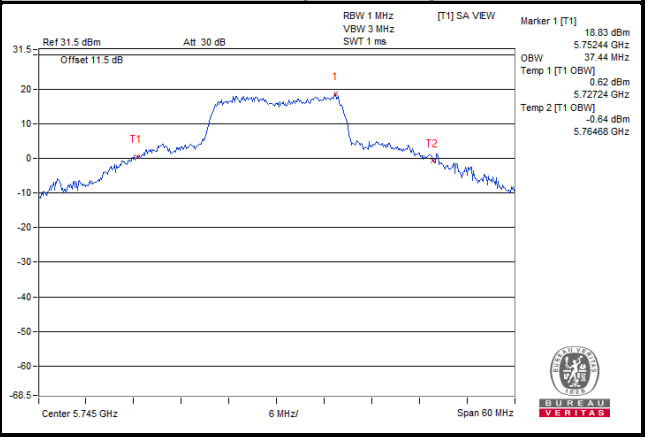
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.48	36.48
46	5230	36.61	36.72
151	5755	46.44	38.76
159	5795	41.52	39.12

802.11ac (VHT80)

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

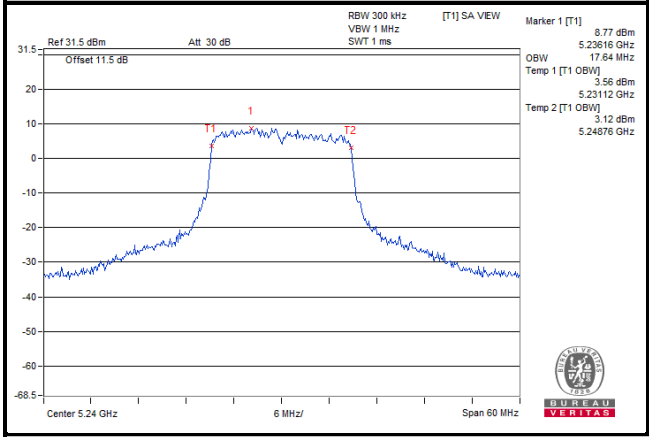
Spectrum Plot of Worst Value	
802.11a	**802.11n (HT20)**
	
802.11n (HT40)	**802.11ac (VHT80)**
	

Chain 0

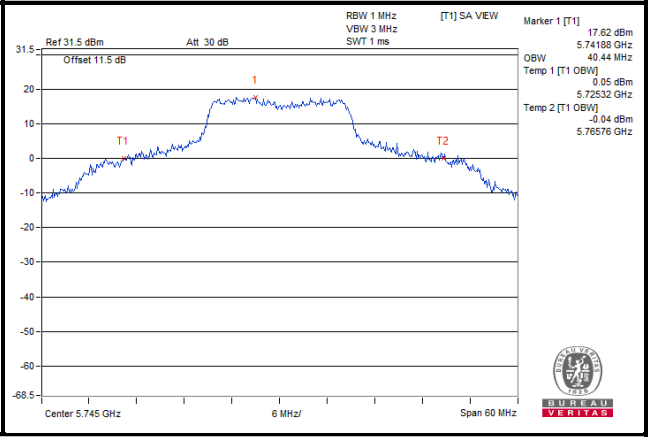
Spectrum Plot for Nearby DFS Band	
802.11a	
Ch 48 (5240 MHz)	**Ch 149 (5745 MHz)**
	

802.11n (HT20)

Ch 48 (5240 MHz)

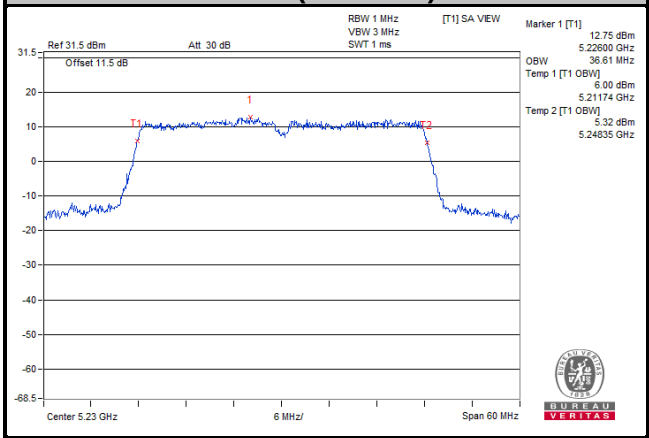


Ch 149 (5745 MHz)

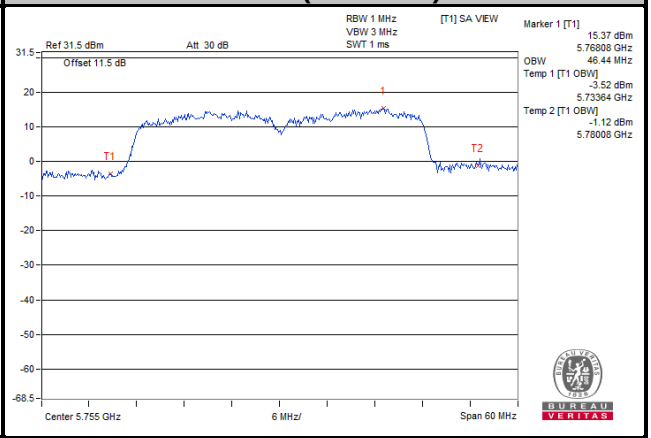


802.11n (HT40)

Ch 46 (5230 MHz)

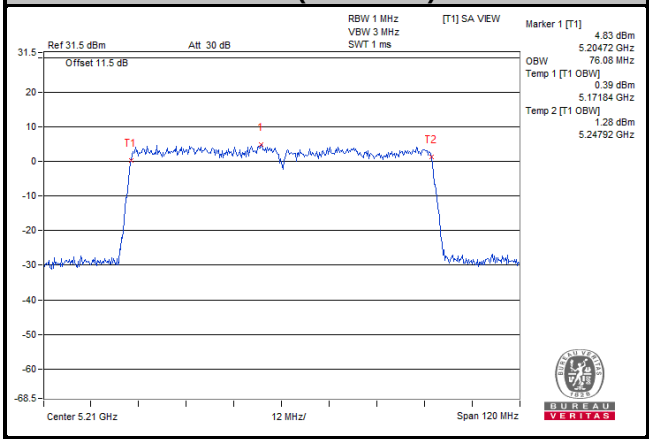


Ch 151 (5755 MHz)

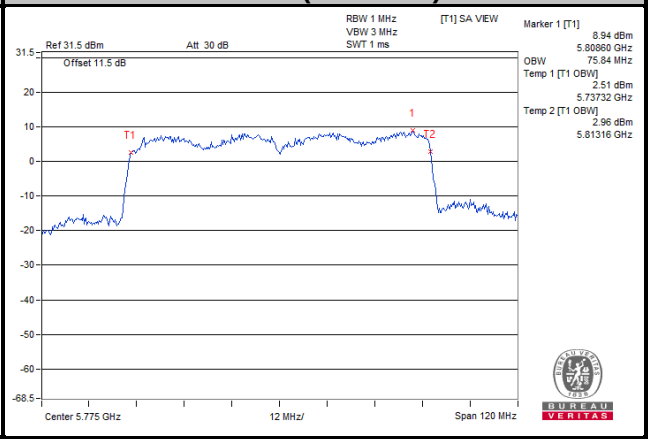


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

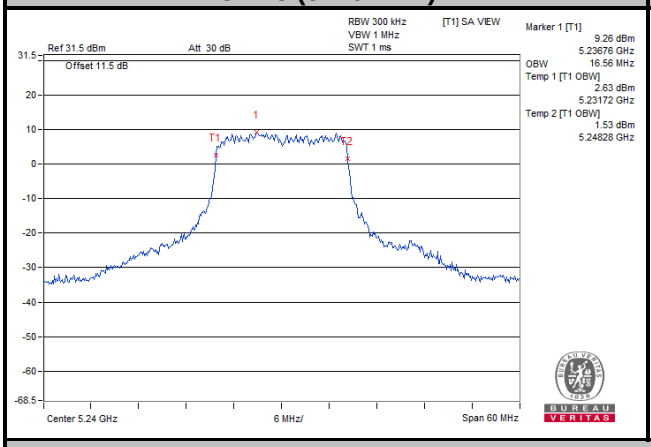


Chain 1

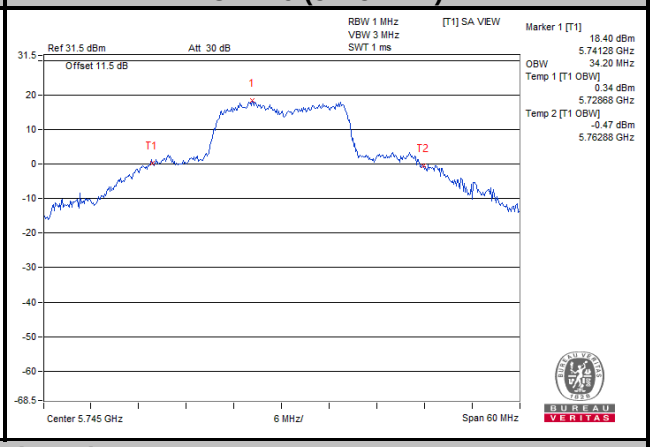
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

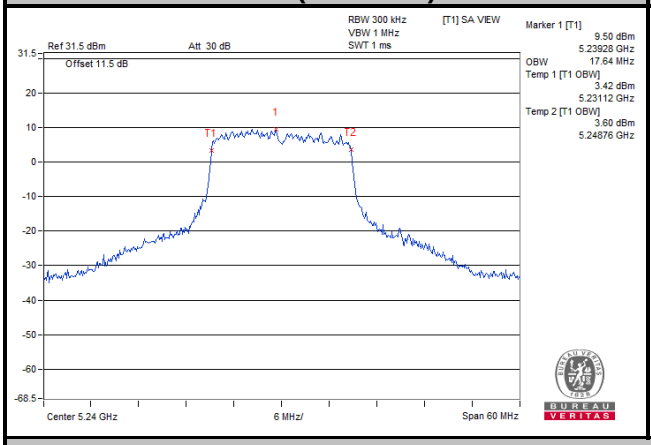


Ch 149 (5745 MHz)

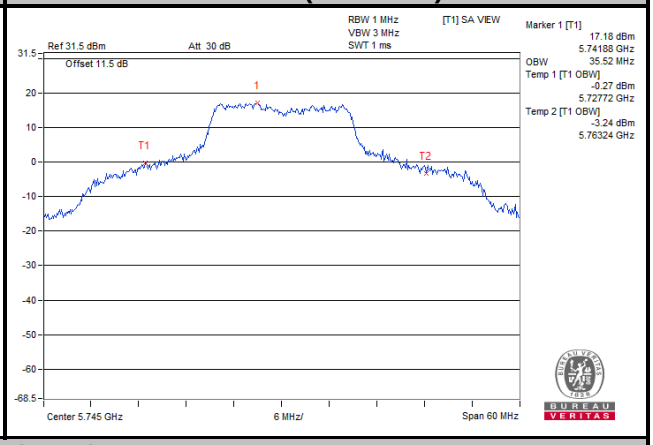


802.11n (HT20)

Ch 48 (5240 MHz)

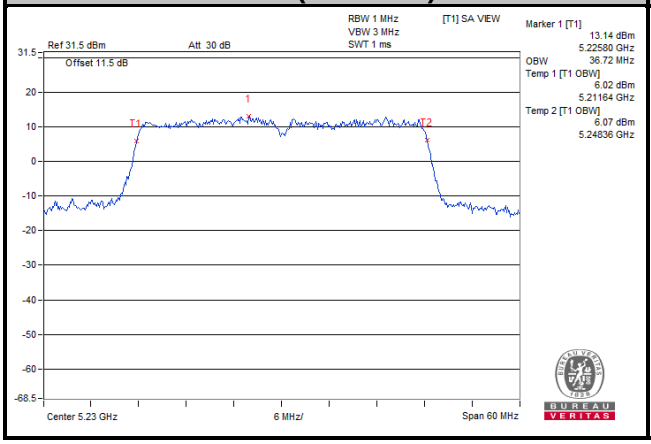


Ch 149 (5745 MHz)

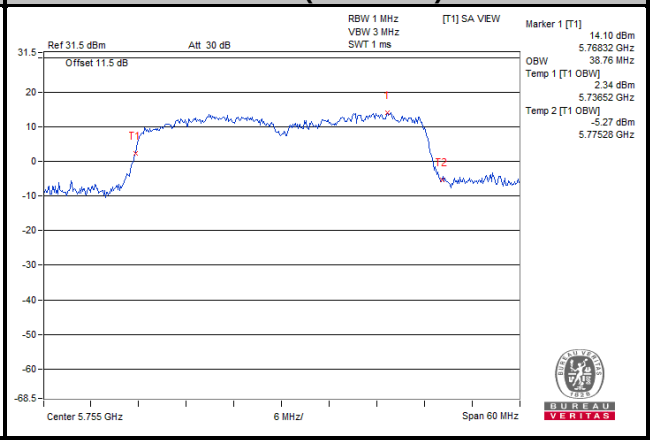


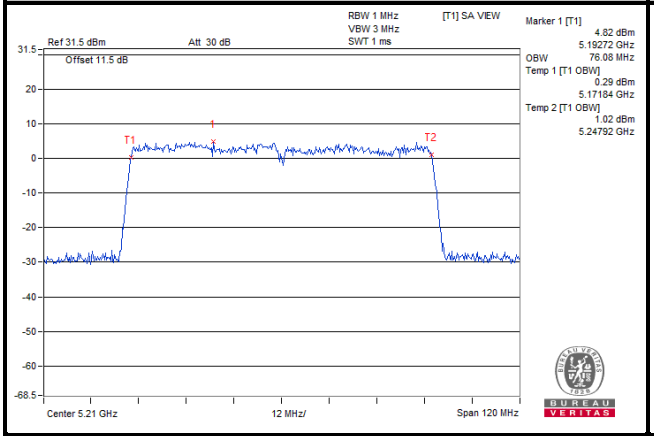
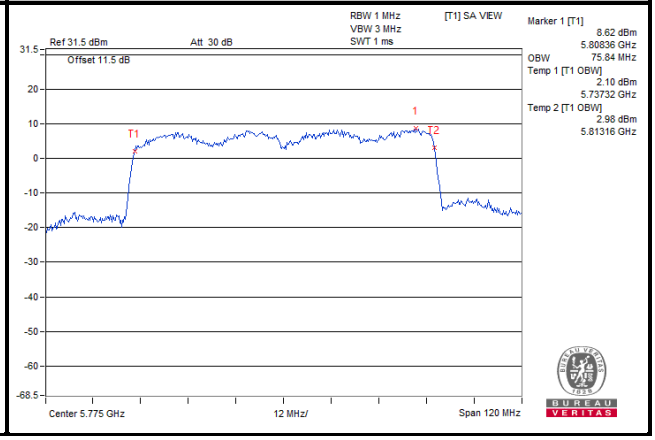
802.11n (HT40)

Ch 46 (5230 MHz)



Ch 151 (5755 MHz)



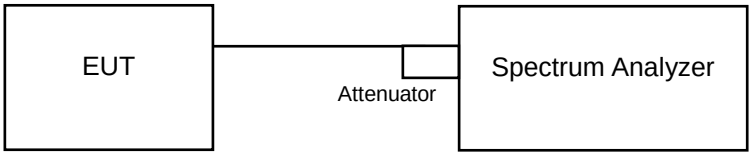
802.11ac (VHT80)	
Ch 42 (5210 MHz)	**Ch 155 (5775 MHz)**
	

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	17 dBm/MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Mobile and Portable client device	11 dBm/MHz
U-NII-2A	-		11 dBm/MHz
U-NII-2C	-		11 dBm/MHz
U-NII-3	√		30 dBm/500 kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1:

Using method SA-2

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

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 RBW, 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 (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

For U-NII-1

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.03	4.61	0.21	8.04	14.14	Pass
40	5200	4.90	5.40	0.21	8.37	14.14	Pass
48	5240	4.82	4.83	0.21	8.04	14.14	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 = 5.85dBi+10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 17-(8.86-6) = 14.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	4.60	4.13	0.10	7.48	14.14	Pass
40	5200	5.35	5.29	0.10	8.43	14.14	Pass
48	5240	4.32	4.78	0.10	7.66	14.14	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 = 5.85dBi+10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 17-(8.86-6) = 14.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.06	-1.51	0.23	1.96	14.14	Pass
46	5230	1.15	2.49	0.23	5.11	14.14	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 = 5.85dBi+10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 17-(8.86-6) = 14.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

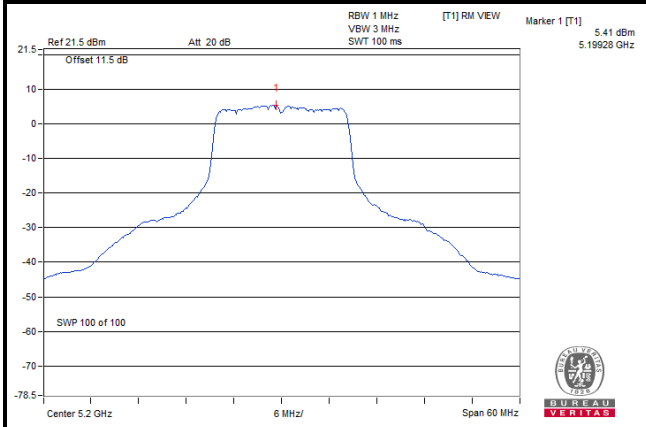
Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-6.86	-6.73	0.62	-3.16	14.14	Pass

Note:

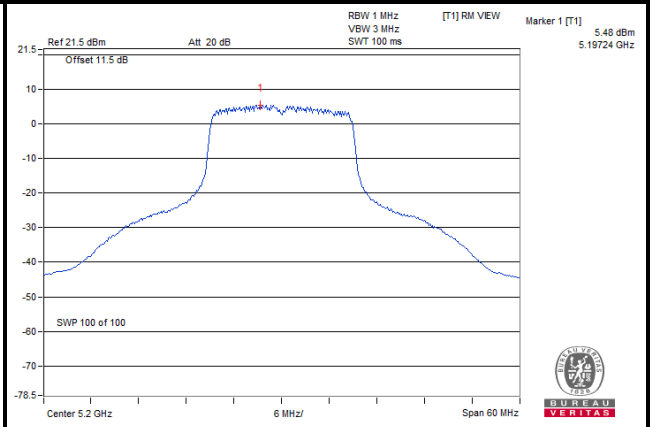
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.85dBi+10log(2) = 8.86dBi > 6dBi, so the limit shall be reduced to 17-(8.86-6) = 14.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

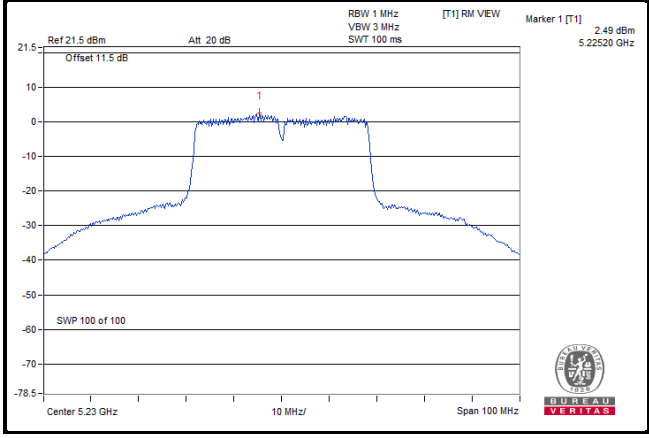
802.11a



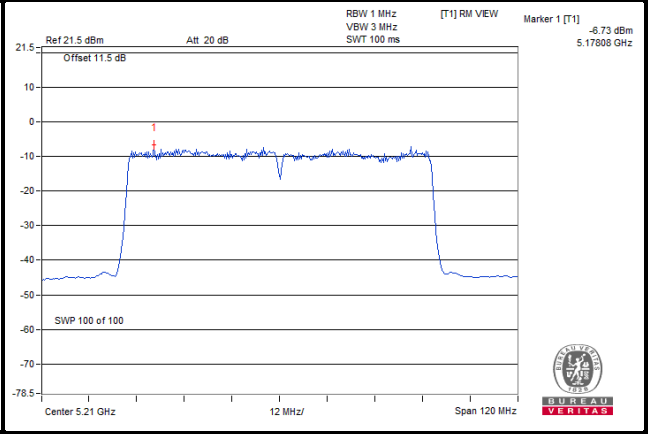
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



For U-NII-3 Band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	-0.01	2.21	3.01	0.21	5.43	27.14	Pass
	157	5785	-0.95	1.27	3.01	0.21	4.49	27.14	Pass
	165	5825	-3.12	-0.9	3.01	0.21	2.32	27.14	Pass
1	149	5745	-0.02	2.2	3.01	0.21	5.42	27.14	Pass
	157	5785	-1.62	0.6	3.01	0.21	3.82	27.14	Pass
	165	5825	-2.48	-0.26	3.01	0.21	2.96	27.14	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5.85dBi + 10log(2) = 8.86dBi > 6dBi, so the power density limit shall be reduced to 30 - (8.86 - 6) = 27.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	-0.43	1.79	3.01	0.1	4.9	27.14	Pass
	157	5785	-1.61	0.61	3.01	0.1	3.72	27.14	Pass
	165	5825	-3.12	-0.9	3.01	0.1	2.21	27.14	Pass
1	149	5745	-0.82	1.4	3.01	0.1	4.51	27.14	Pass
	157	5785	-1.93	0.29	3.01	0.1	3.4	27.14	Pass
	165	5825	-3.28	-1.06	3.01	0.1	2.05	27.14	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5.85dBi + 10log(2) = 8.86dBi > 6dBi, so the power density limit shall be reduced to 30 - (8.86 - 6) = 27.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	151	5755	-4.59	-2.37	3.01	0.23	0.87	27.14	Pass
	159	5795	-5.67	-3.45	3.01	0.23	-0.21	27.14	Pass
1	151	5755	-5.9	-3.68	3.01	0.23	-0.44	27.14	Pass
	159	5795	-6.1	-3.88	3.01	0.23	-0.64	27.14	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5.85dBi + 10log(2) = 8.86dBi > 6dBi, so the power density limit shall be reduced to 30 - (8.86 - 6) = 27.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

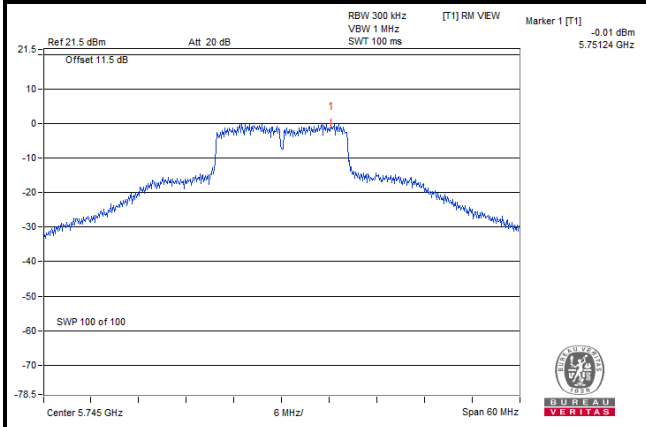
TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	155	5775	-13.21	-10.99	3.01	0.62	-7.36	27.14	Pass
1	155	5775	-12.31	-10.09	3.01	0.62	-6.46	27.14	Pass

Note:

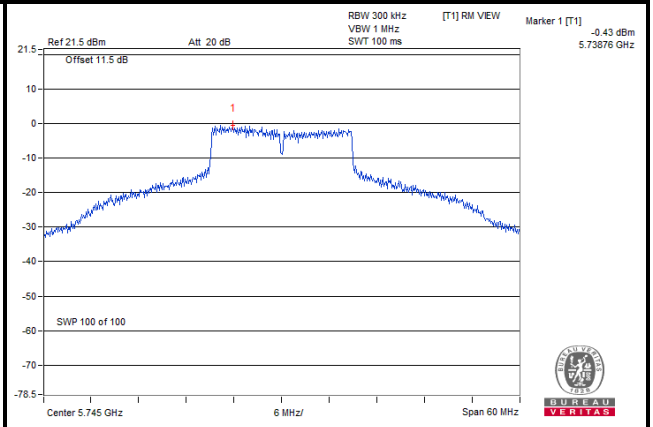
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5.85dBi + 10log(2) = 8.86dBi > 6dBi, so the power density limit shall be reduced to 30 - (8.86 - 6) = 27.14dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

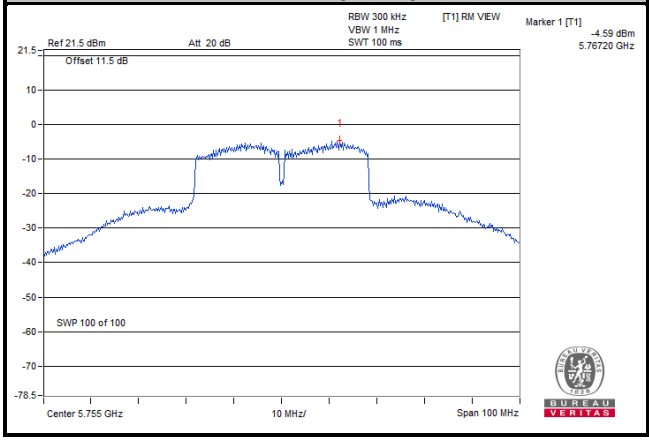
802.11a



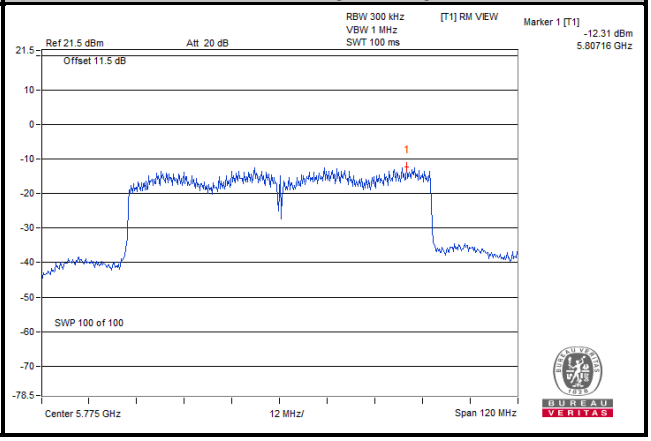
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

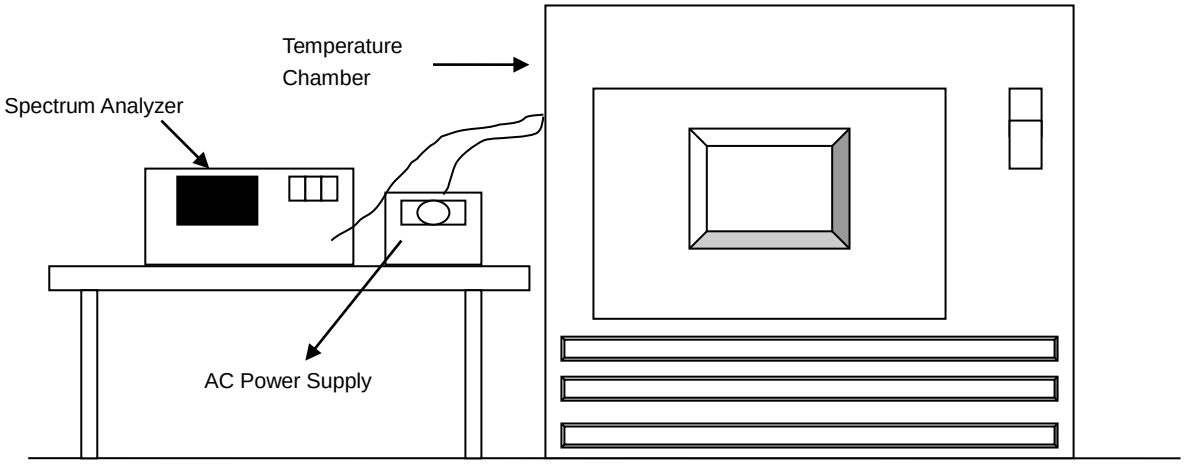


4.6 Frequency Stability

4.6.1 Limit of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	120	5179.9774	PASS	5179.9763	PASS	5179.9757	PASS	5179.9767	PASS
30	120	5179.9811	PASS	5179.9844	PASS	5179.9848	PASS	5179.9834	PASS
20	120	5180.0111	PASS	5180.0109	PASS	5180.0126	PASS	5180.0104	PASS
10	120	5179.9944	PASS	5179.9948	PASS	5179.9919	PASS	5179.993	PASS
0	120	5180.0143	PASS	5180.0162	PASS	5180.0148	PASS	5180.0147	PASS

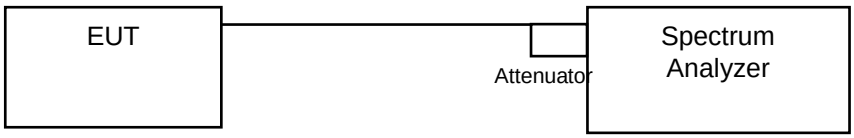
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0114	PASS	5180.0113	PASS	5180.012	PASS	5180.0094	PASS
	120	5180.0111	PASS	5180.0109	PASS	5180.0126	PASS	5180.0104	PASS
	102	5180.0107	PASS	5180.0116	PASS	5180.0134	PASS	5180.0095	PASS

4.7 6 dB Bandwidth Measurement

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

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) = 100 kHz
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)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.75	15.74	0.5	Pass
157	5785	15.76	15.73	0.5	Pass
165	5825	15.72	15.75	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.60	17.58	0.5	Pass
157	5785	17.03	17.03	0.5	Pass
165	5825	17.02	17.05	0.5	Pass

802.11n (HT40)

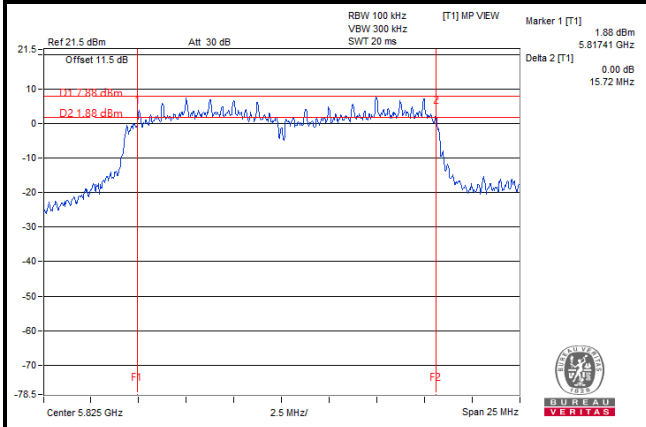
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.13	35.18	0.5	Pass
159	5795	34.01	35.19	0.5	Pass

802.11ac (VHT80)

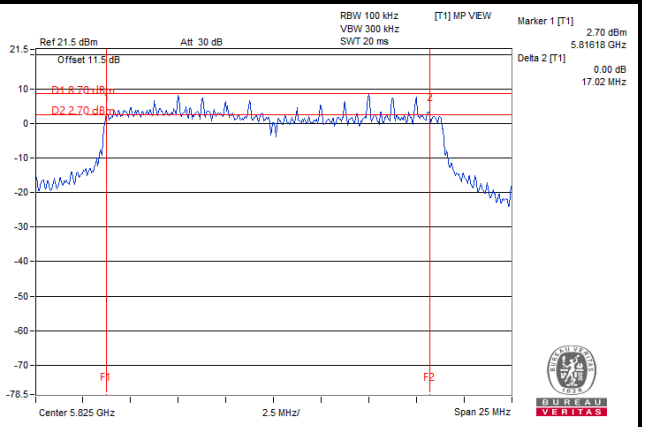
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	74.32	75.44	0.5	Pass

Spectrum Plot of Worst Value

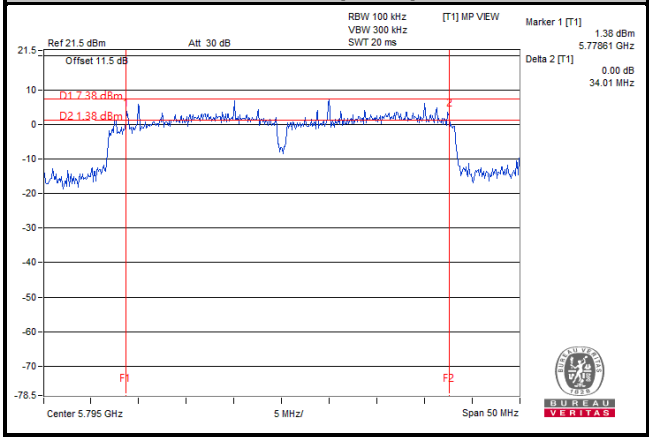
802.11a



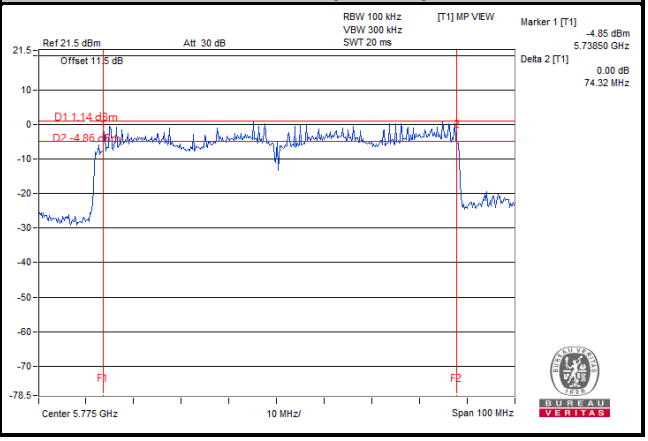
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

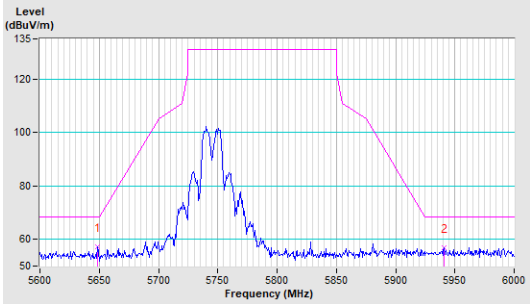
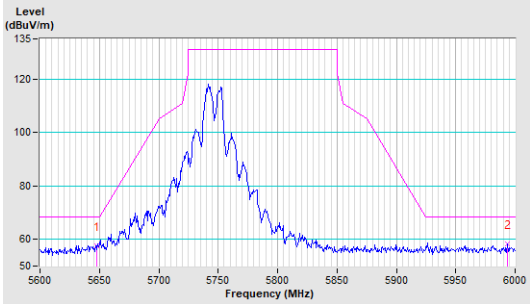
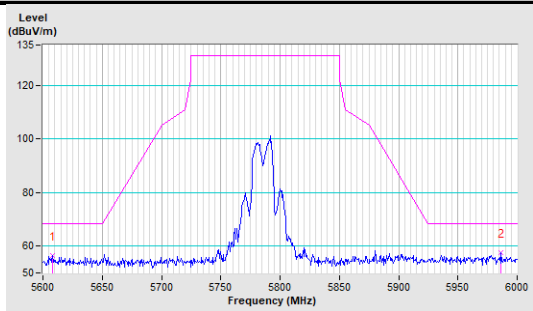
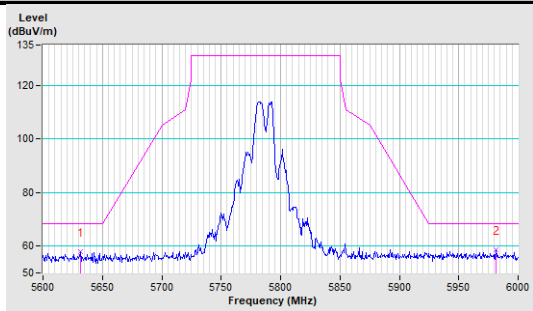
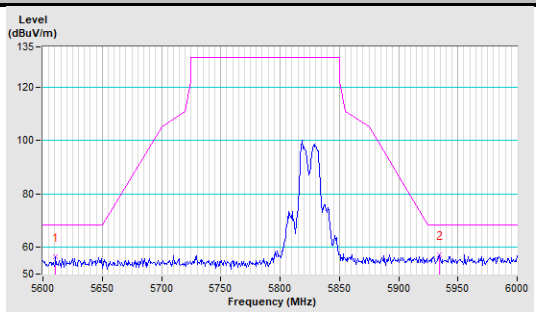
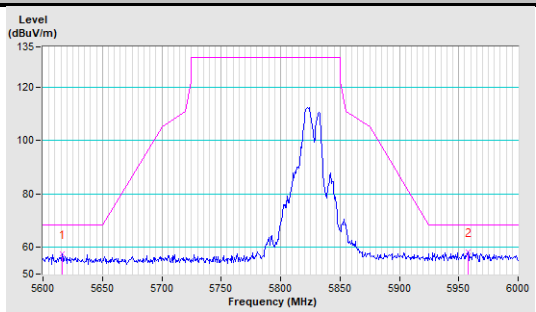


5 Pictures of Test Arrangements

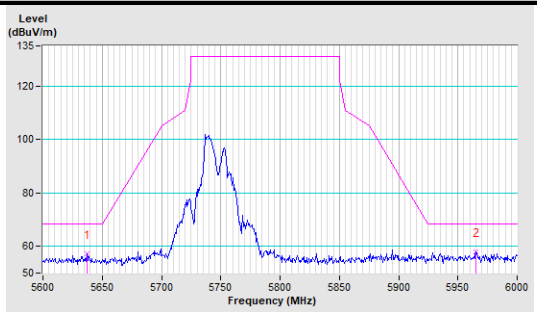
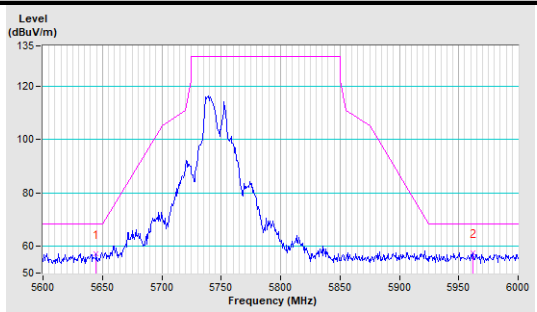
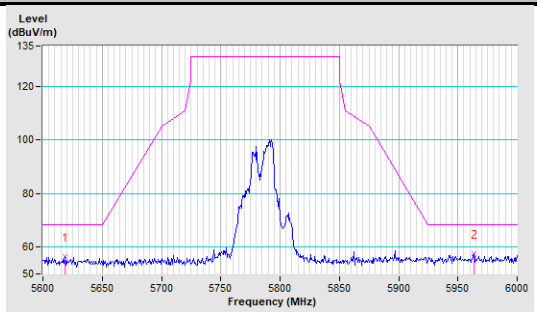
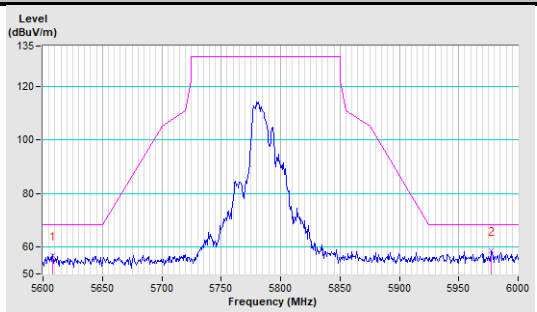
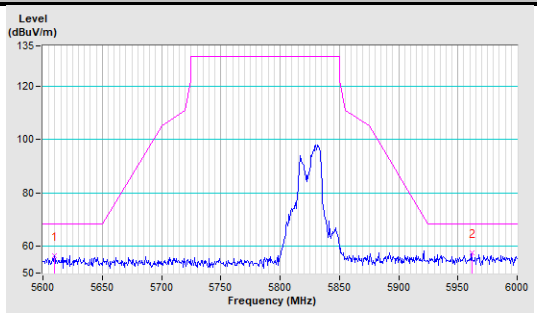
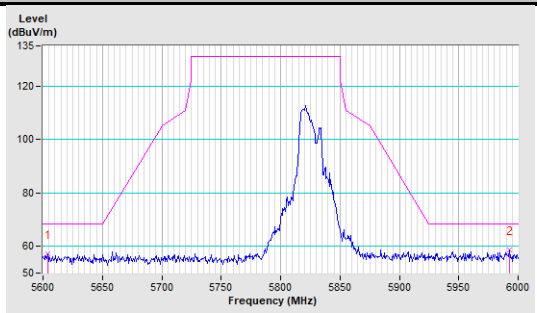
Please refer to the attached file (Test Setup Photo).

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

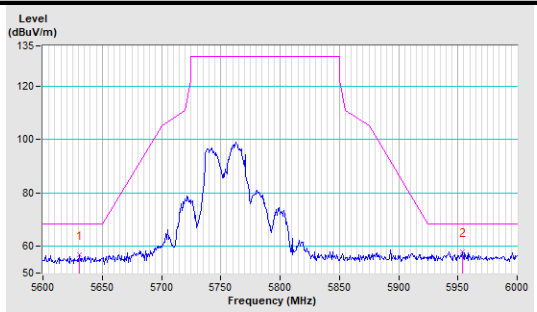
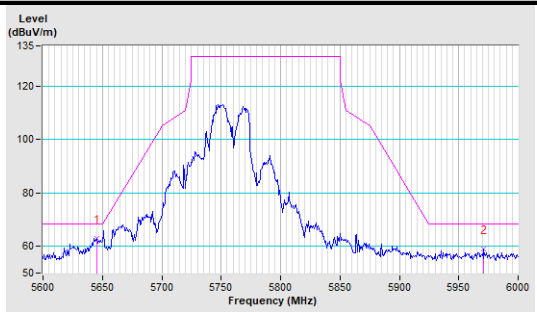
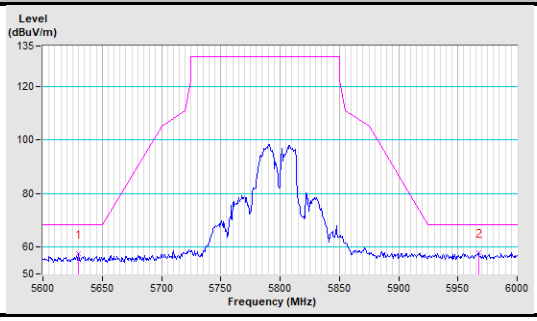
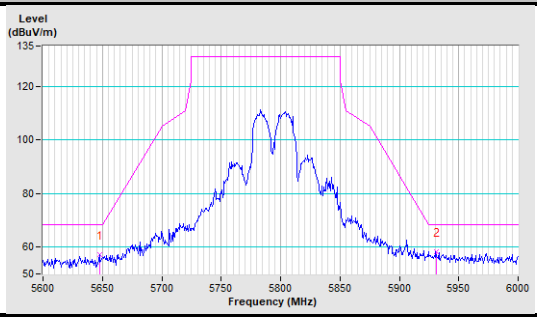
802.11a

Ch 149	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
Ch 165	
Horizontal	Vertical
	

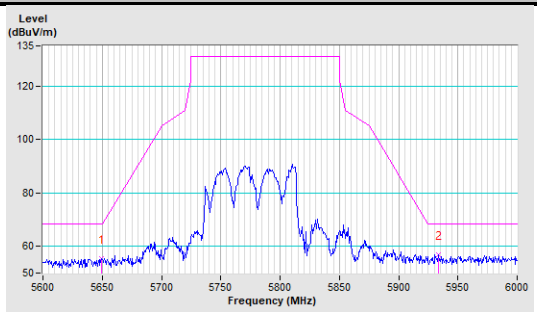
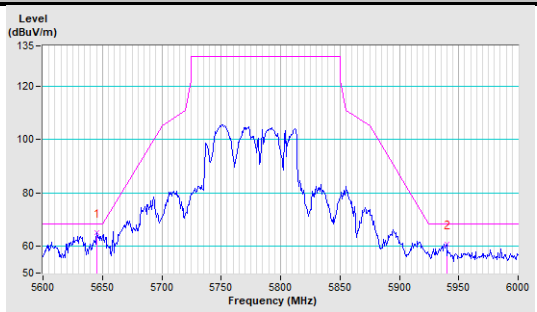
802.11n (HT20)

Ch 149	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
Ch 165	
Horizontal	Vertical
	

802.11n (HT40)

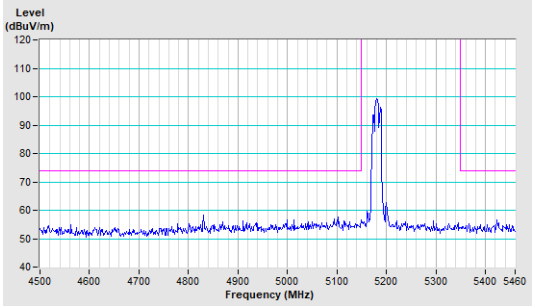
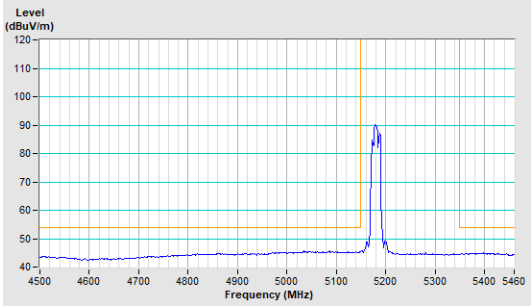
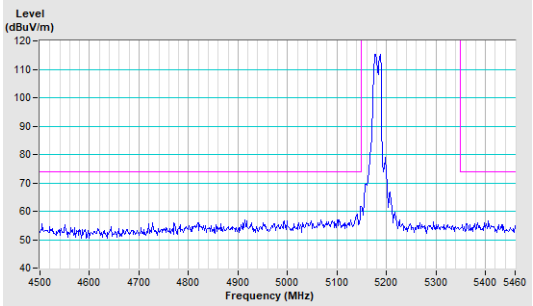
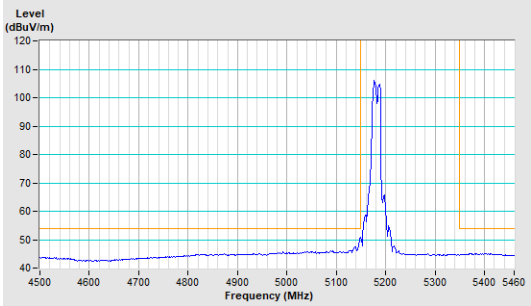
Ch 151	
Horizontal	Vertical
	
Ch 159	
Horizontal	Vertical
	

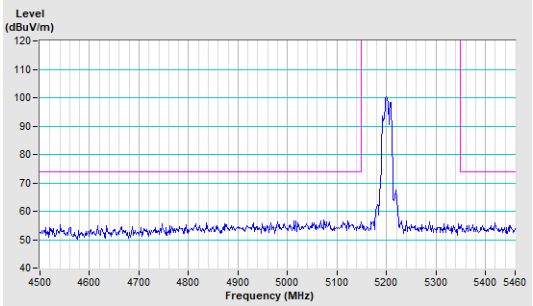
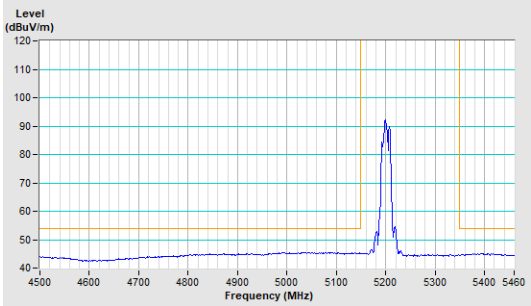
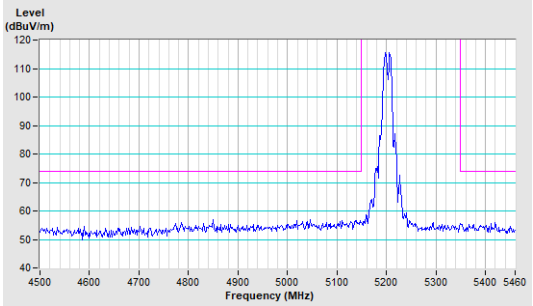
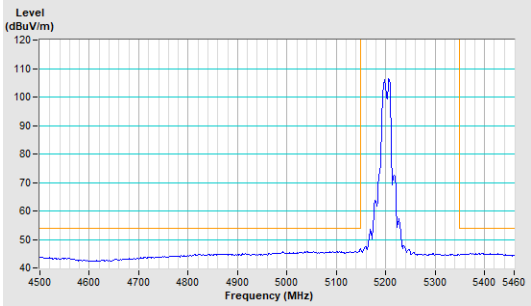
802.11ac (VHT80)

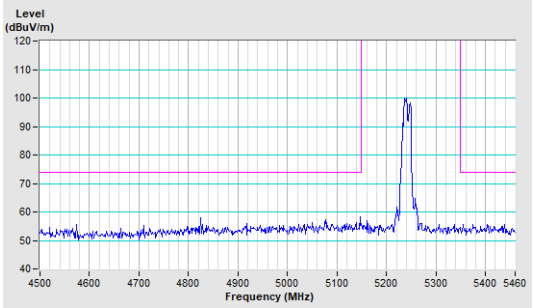
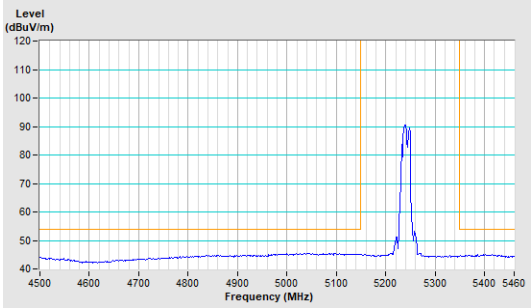
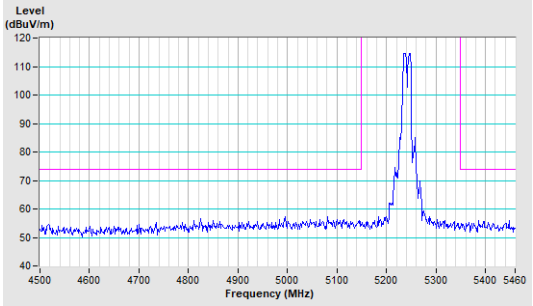
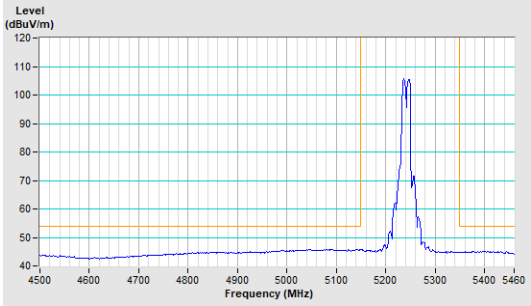
Ch 155	
Horizontal	Vertical
	

Annex B- Band Edge Measurement

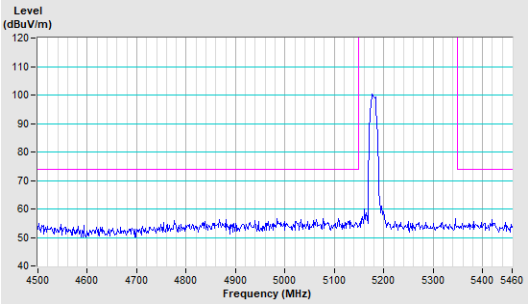
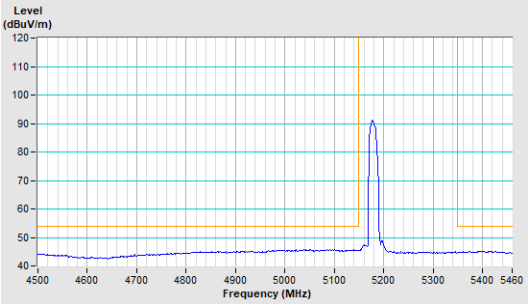
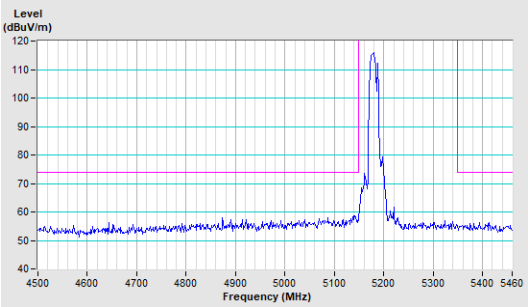
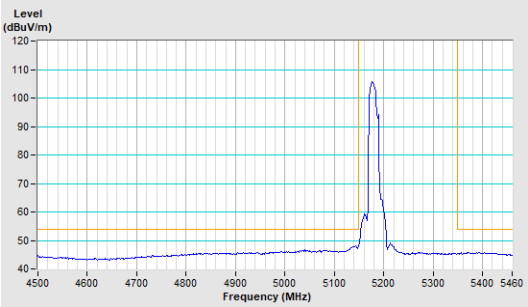
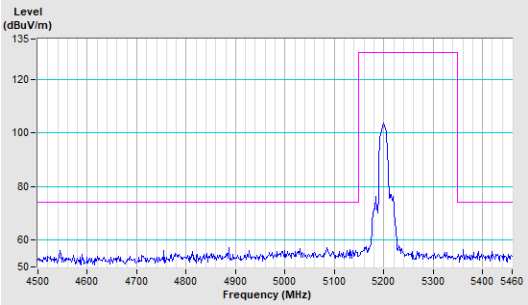
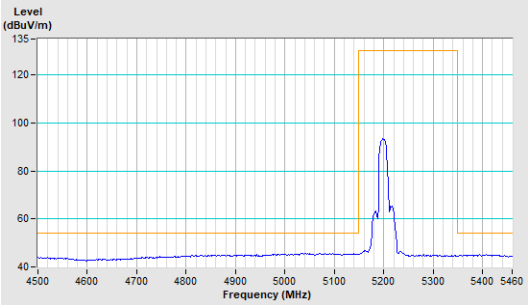
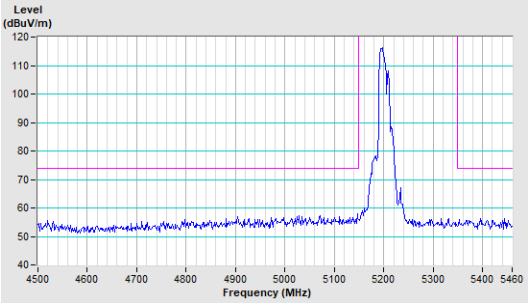
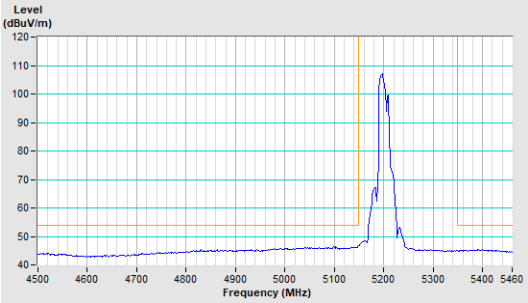
802.11a

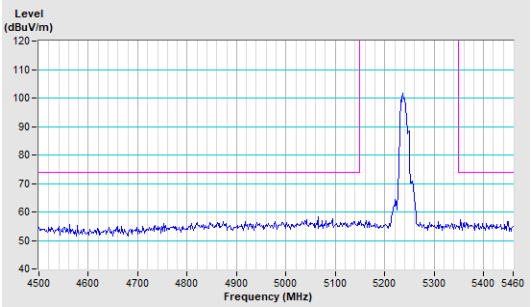
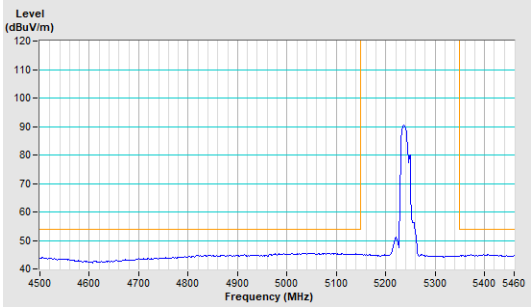
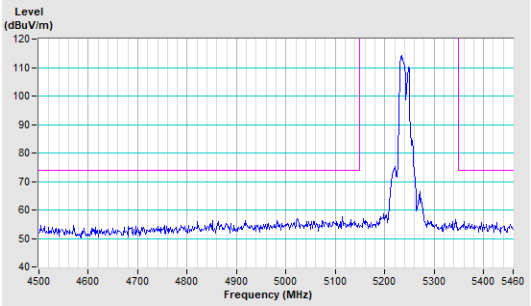
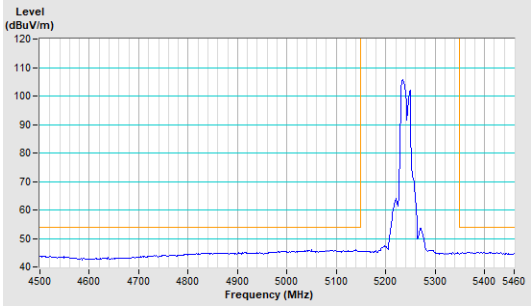
Channel 36	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Channel 40	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

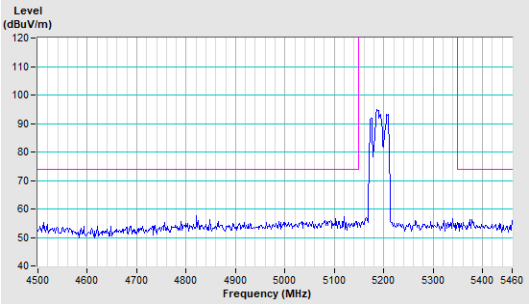
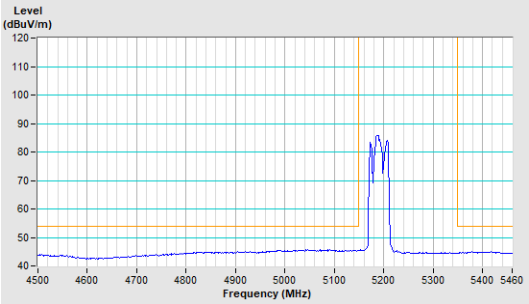
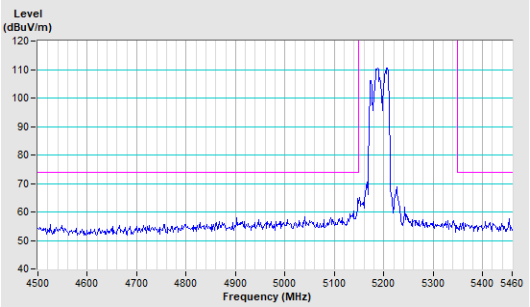
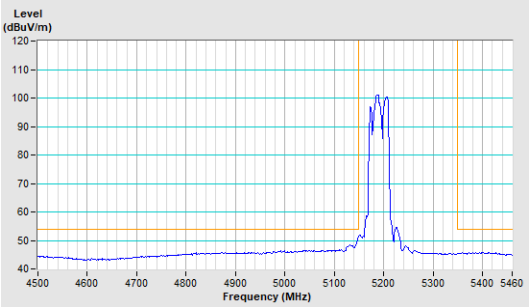
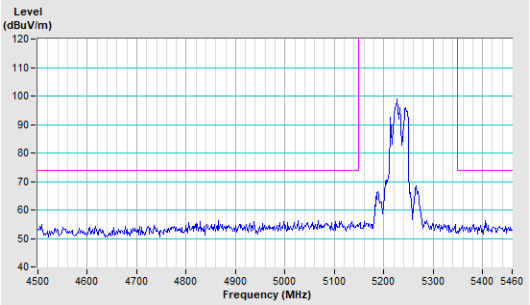
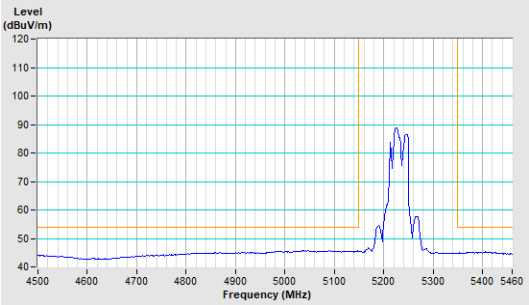
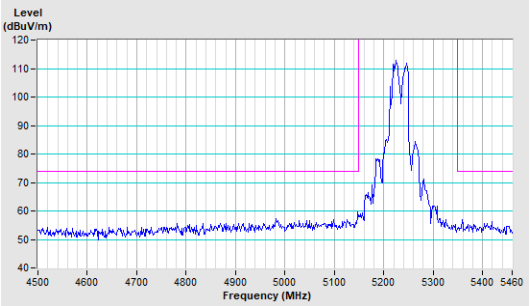
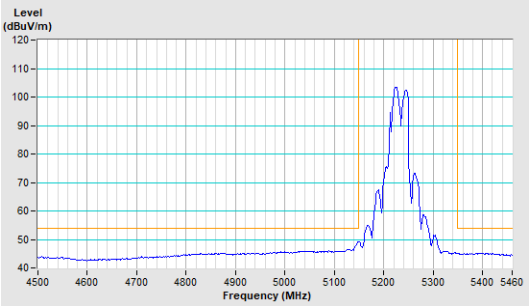
Channel 48	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

802.11n (HT20)

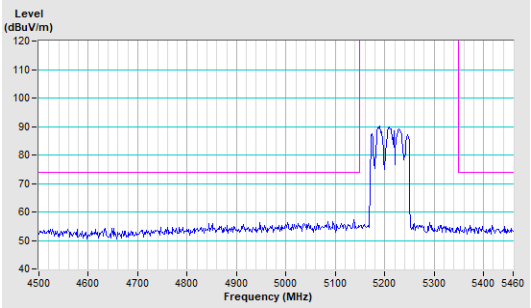
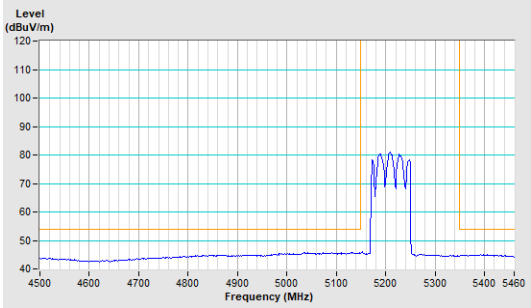
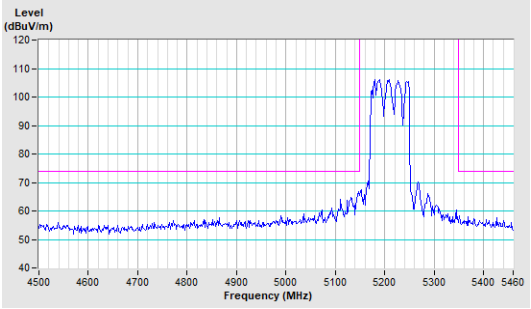
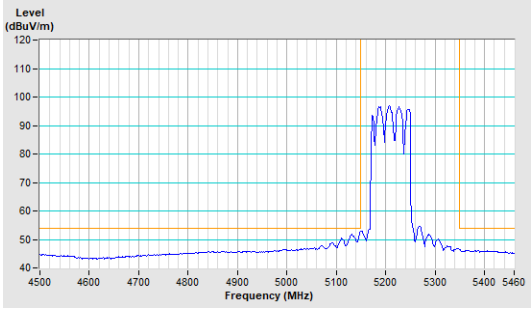
Channel 36	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	
Channel 40	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

Channel 48	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

802.11n (HT40)

Channel 38	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 46	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ac (VHT80)

Channel 42	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

Appendix – Information of the Testing Laboratories

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

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

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