

FCC Test Report

Report No.: RF191202C09-1

FCC ID: KA2COVR1900A1

Test Model: COVR-1900

Series Model: COVR-1902

Received Date: Dec. 02, 2019

Test Date: Dec. 25, 2019 ~ Jan. 02, 2020

Issued Date: Jan. 07, 2020

Applicant: D-Link Corporation

Address: 17595 Mt. Herrmann, Fountain Valley, California, United States, 92708

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF191202C09-1	Original Release	Jan. 07, 2020

1 Certificate of Conformity

Product: AC1900 Dual Band Whole Home Mesh Wi-Fi System

Brand: D-Link

Test Model: COVR-1900

Series Model: COVR-1902

Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Dec. 25, 2019 ~ Jan. 02, 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.

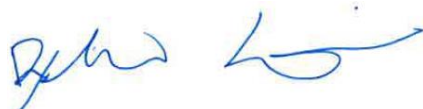
Prepared by :



Date: Jan. 07, 2020

Shelly Hsueh / Specialist

Approved by :



Date: Jan. 07, 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 -14.47 dB at 0.15782 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 -0.8 dB at 11490 MHz, 11570 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	Antenna connector is i-pex (MHF) connector not a standard connector.

Note:

- For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
- 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) ($\pm$)
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	AC1900 Dual Band Whole Home Mesh Wi-Fi System
Brand	D-Link
Test Model	COVR-1900
Series Model	COVR-1902
Model Difference	bundle kit, no physical differences
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 450 Mbps 802.11ac: up to 1300 Mbps
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: 277.319 mW for 5180 ~ 5240 MHz 405.047 mW for 5745 ~ 5825 MHz Beamforming Mode: 273.633 mW for 5180 ~ 5240 MHz 396.286 mW for 5745 ~ 5825 MHz
Antenna Type	Refer to Note as below
Antenna Connector	i-pex(MHF)
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

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

2. All models are listed as below.

Brand	Model	Difference
D-Link	COVR-1900	bundle kit, no physical differences
	COVR-1902	
* Above samples had been pre-tested and the worst case was found on model: COVR-1900. Therefore, only this COVR-1900 was as a representative for the final test and recorded in this report.		

3. The antenna information is listed as below.

Antenna No.	RF Chain No.	Brand	Model	Antenna Gain (dBi)		Antenna Type	Connector Type
				2.4G	5G		
1	WiFi Chain 0	Airgain	N2420DG-T10L-PK1-G180U	4.0	4.3	Dipole	i-pex (MHF)
2	WiFi Chain 1		N2420DG-T10L-PK1-B190U	4.0	4.0		
3	WiFi Chain 2		N2420DG-T10L-PK1-A200U	3.5	5.1		

4. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Asian Power Devices Inc.	WB-18Q12R	I/P: 100-240 Vac, 50/60 Hz, 0.6 A O/P: 12 Vdc, 1.5 A 1.2M/0core
Adapter 2	AMIGO	AMS200-12015000FU (US) AMS200-12015000FB (UK) AMS200-12015000FV (EU) AMS200-12015000FS (AU)	I/P: 100-240 Vac, 50/60 Hz, 0.8 A O/P: 12 Vdc, 1.5 A 1.2M/0core
Adapter 3	Asian Power Devices Inc.	WB-18Q12FU (US) WB-18Q12FK (UK) WB-18Q12FG (EU) WB-18Q12FN (AU)	I/P: 100-240 Vac, 50/60 Hz, 0.6 A O/P: 12 Vdc, 1.5 A 1.2M/0core

5. 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	
1	√	√	√	√	EUT + Adapter 1
2	-	√	-	-	EUT + Adapter 2
3	-	√	-	-	EUT + Adapter 3

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

NOTE: For radiated emission (below 1GHz) and power line conducted emission test items, the worst maximum power was selected.

NOTE: “-” 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)
1	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
1		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
1		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
1		802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
1	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
1		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
1		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
1		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)
1, 2, 3	5745-5825	802.11n (HT20)	149 to 165	149	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1	5745-5825	802.11n (HT20)	149 to 165	149	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
1		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
1		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
1		802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
1	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
1		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
1		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
1		802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Greg Lin
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Alan Wu
APCM	25 deg. C, 65 % RH	12 Vdc	Alan Wu

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

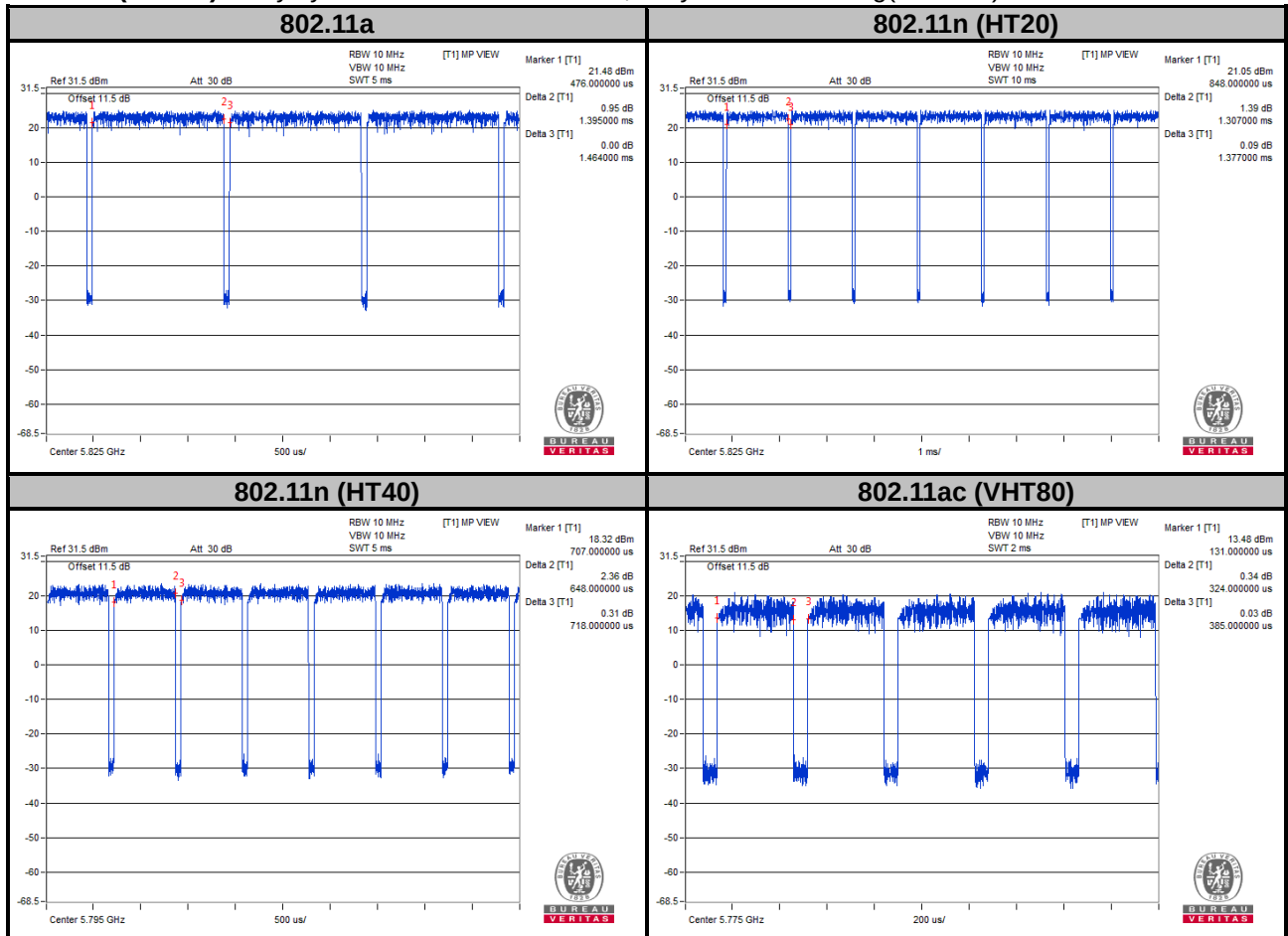
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.395/1.464 = 0.953$, Duty factor = $10 * \log(1/0.953) = 0.21$

802.11n (HT20): Duty cycle = $1.307/1.377 = 0.949$, Duty factor = $10 * \log(1/0.949) = 0.23$

802.11n (HT40): Duty cycle = $0.648/0.718 = 0.903$, Duty factor = $10 * \log(1/0.903) = 0.45$

802.11ac (VHT80): Duty cycle = $0.324/0.385 = 0.842$, Duty factor = $10 * \log(1/0.842) = 0.75$



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.

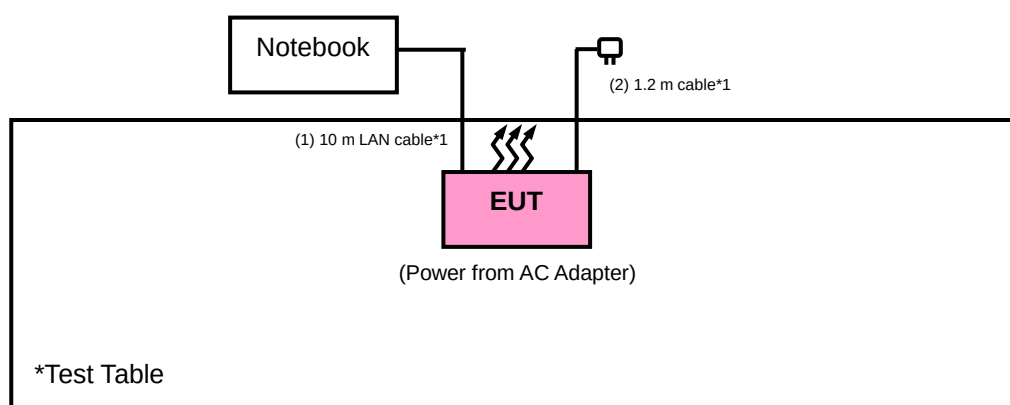
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	DELL	E5420	BPQ8MQ1	N/A

No.	Signal Cable Description of The Above Support Units
1.	10 m LAN cable*1
2.	1.2 m cable*1

Note:

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

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.

4.1.2 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:

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

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2019	Jun. 11, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM- SM8000	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz- 40GHz) EMC	EMC184045B	980175	Sep. 05, 2019	Sep. 04, 2020
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY 55190004/MY551 90007/MY552100 05	Jul. 15, 2019	Jul. 14, 2020
Peak Power Analyzer KEYSIGHT (Support 8TX and 160MHz Bandwidth)	8990B	MY51000485	Jan. 14, 2019	Jan. 13, 2020
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Jan. 11, 2019	Jan. 10, 2020
AC Power Source EEC	6905S	1991553	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 Chamber 9.

4.1.4 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:

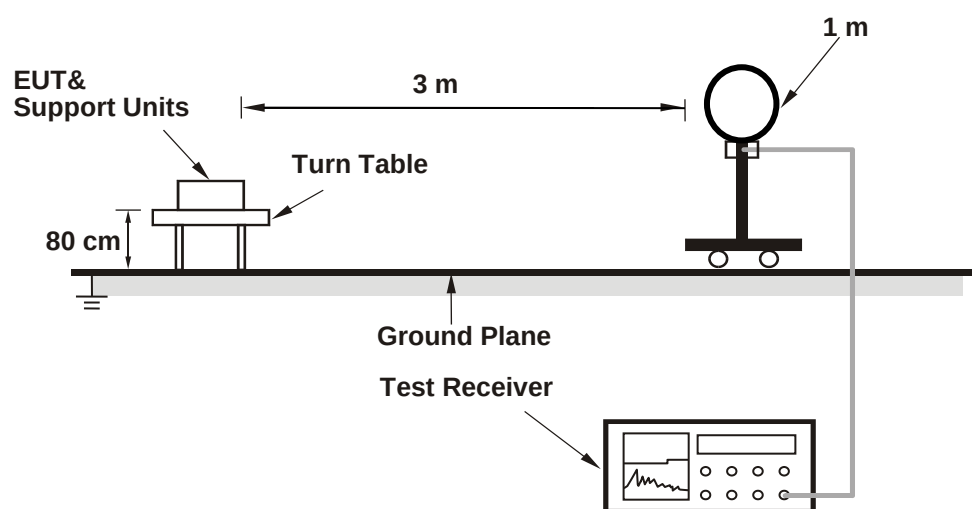
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) 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 = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

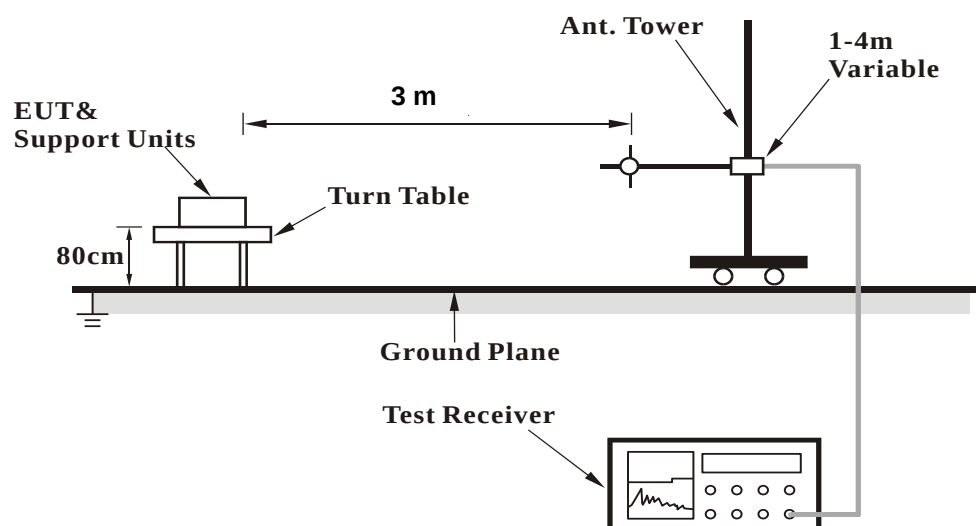
No deviation.

4.1.6 Test Setup

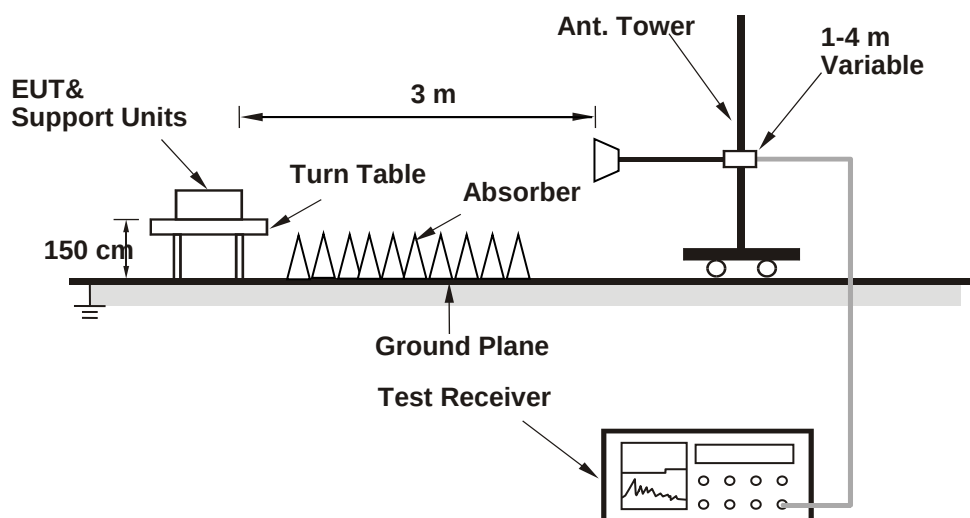
<Radiated Emission below 30 MHz>



<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).

4.1.7 EUT Operating Conditions

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

4.1.8 Test Results

Above 1 GHz Data :

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	64.0 PK	74.0	-10.0	2.92 H	15	60.1	3.9
5150.00	47.7 AV	54.0	-6.3	2.92 H	15	43.8	3.9
*5180.00	111.8 PK			2.88 H	13	73.5	38.3
*5180.00	101.9 AV			2.88 H	13	63.6	38.3
#10360.00	60.7 PK	68.2	-7.5	1.46 H	204	44.1	16.6
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	69.3 PK	74.0	-4.7	1.84 V	296	65.4	3.9
5150.00	52.8 AV	54.0	-1.2	1.84 V	296	48.9	3.9
*5180.00	119.2 PK			1.70 V	286	80.9	38.3
*5180.00	109.1 AV			1.70 V	286	70.8	38.3
#10360.00	64.7 PK	68.2	-3.5	2.56 V	313	48.1	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.

EUT Test Condition		Measurement Detail	
Channel	Channel 40	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5200.00	109.9 PK			2.94 H	19	71.8	38.1
*5200.00	99.8 AV			2.94 H	19	61.7	38.1
#10400.00	63.4 PK	68.2	-4.8	1.57 H	213	46.7	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5200.00	117.1 PK			1.90 V	282	79.0	38.1
*5200.00	107.0 AV			1.90 V	282	68.9	38.1
#10400.00	67.2 PK	68.2	-1.0	2.64 V	269	50.5	16.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5240.00	111.4 PK			2.83 H	21	73.3	38.1
*5240.00	101.5 AV			2.83 H	21	63.4	38.1
5350.00	54.3 PK	74.0	-19.7	2.74 H	16	50.5	3.8
5350.00	43.5 AV	54.0	-10.5	2.74 H	16	39.7	3.8
#10480.00	63.3 PK	68.2	-4.9	1.53 H	211	46.8	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5240.00	118.4 PK			2.24 V	294	80.3	38.1
*5240.00	108.5 AV			2.24 V	294	70.4	38.1
5350.00	55.4 PK	74.0	-18.6	2.16 V	283	51.6	3.8
5350.00	44.1 AV	54.0	-9.9	2.16 V	283	40.3	3.8
#10480.00	67.2 PK	68.2	-1.0	2.27 V	299	50.7	16.5

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.

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5745.00	111.7 PK			2.91 H	17	72.8	38.9
*5745.00	102.0 AV			2.91 H	17	63.1	38.9
11490.00	63.1 PK	74.0	-10.9	1.00 H	217	46.2	16.9
11490.00	49.4 AV	54.0	-4.6	1.00 H	217	32.5	16.9
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5745.00	118.2 PK			1.65 V	318	79.3	38.9
*5745.00	108.4 AV			1.65 V	318	69.5	38.9
11490.00	66.9 PK	74.0	-7.1	1.74 V	287	50.0	16.9
11490.00	53.2 AV	54.0	-0.8	1.74 V	287	36.3	16.9

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5785.00	110.4 PK			2.85 H	21	71.4	39.0
*5785.00	100.6 AV			2.85 H	21	61.6	39.0
11570.00	63.5 PK	74.0	-10.5	1.49 H	223	46.8	16.7
11570.00	50.1 AV	54.0	-3.9	1.49 H	223	33.4	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5785.00	117.5 PK			1.67 V	320	78.5	39.0
*5785.00	107.7 AV			1.67 V	320	68.7	39.0
11570.00	67.3 PK	74.0	-6.7	1.81 V	286	50.6	16.7
11570.00	53.2 AV	54.0	-0.8	1.81 V	286	36.5	16.7

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5825.00	110.9 PK			2.88 H	18	71.8	39.1
*5825.00	101.1 AV			2.88 H	18	62.0	39.1
11650.00	63.0 PK	74.0	-11.0	1.53 H	208	46.5	16.5
11650.00	49.9 AV	54.0	-4.1	1.53 H	208	33.4	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5825.00	118.2 PK			1.66 V	316	79.1	39.1
*5825.00	108.2 AV			1.66 V	316	69.1	39.1
11650.00	66.8 PK	74.0	-7.2	1.89 V	295	50.3	16.5
11650.00	52.9 AV	54.0	-1.1	1.89 V	295	36.4	16.5

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.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

a. Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	64.3 PK	74.0	-9.7	2.78 H	14	60.4	3.9
5150.00	48.1 AV	54.0	-5.9	2.78 H	14	44.2	3.9
*5180.00	109.9 PK			2.85 H	19	71.6	38.3
*5180.00	99.6 AV			2.85 H	19	61.3	38.3
#10360.00	60.4 PK	68.2	-7.8	1.42 H	207	43.8	16.6
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	72.0 PK	74.0	-2.0	1.90 V	288	68.1	3.9
5150.00	52.6 AV	54.0	-1.4	1.90 V	288	48.7	3.9
*5180.00	117.1 PK			1.86 V	295	78.8	38.3
*5180.00	106.8 AV			1.86 V	295	68.5	38.3
#10360.00	64.4 PK	68.2	-3.8	2.63 V	304	47.8	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.

EUT Test Condition		Measurement Detail	
Channel	Channel 40	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5200.00	111.7 PK			2.84 H	23	73.6	38.1
*5200.00	101.3 AV			2.84 H	23	63.2	38.1
#10400.00	63.3 PK	68.2	-4.9	1.53 H	216	46.6	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5200.00	118.9 PK			1.84 V	291	80.8	38.1
*5200.00	108.4 AV			1.84 V	291	70.3	38.1
#10400.00	67.3 PK	68.2	-0.9	3.13 V	315	50.6	16.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5240.00	112.0 PK			2.78 H	23	73.9	38.1
*5240.00	101.9 AV			2.78 H	23	63.8	38.1
5350.00	54.1 PK	74.0	-19.9	2.64 H	15	50.3	3.8
5350.00	43.4 AV	54.0	-10.6	2.64 H	15	39.6	3.8
#10480.00	63.2 PK	68.2	-5.0	1.43 H	224	46.7	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5240.00	119.4 PK			1.91 V	295	81.3	38.1
*5240.00	109.2 AV			1.91 V	295	71.1	38.1
5350.00	55.5 PK	74.0	-18.5	1.86 V	287	51.7	3.8
5350.00	44.2 AV	54.0	-9.8	1.86 V	287	40.4	3.8
#10480.00	67.1 PK	68.2	-1.1	2.17 V	256	50.6	16.5

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5745.00	112.2 PK			3.09 H	21	73.3	38.9
*5745.00	102.5 AV			3.09 H	21	63.6	38.9
11490.00	62.7 PK	74.0	-11.3	1.51 H	209	45.8	16.9
11490.00	49.6 AV	54.0	-4.4	1.51 H	209	32.7	16.9
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5745.00	118.4 PK			2.24 V	359	79.5	38.9
*5745.00	108.7 AV			2.24 V	359	69.8	38.9
11490.00	66.3 PK	74.0	-7.7	2.15 V	313	49.4	16.9
11490.00	52.7 AV	54.0	-1.3	2.15 V	313	35.8	16.9

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5785.00	112.5 PK			2.87 H	9	73.5	39.0
*5785.00	102.4 AV			2.87 H	9	63.4	39.0
11570.00	63.3 PK	74.0	-10.7	1.59 H	217	46.6	16.7
11570.00	50.4 AV	54.0	-3.6	1.59 H	217	33.7	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5785.00	119.3 PK			1.69 V	312	80.3	39.0
*5785.00	109.1 AV			1.69 V	312	70.1	39.0
11570.00	67.0 PK	74.0	-7.0	2.27 V	312	50.3	16.7
11570.00	52.8 AV	54.0	-1.2	2.27 V	312	36.1	16.7

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5825.00	111.0 PK			2.97 H	15	71.9	39.1
*5825.00	101.4 AV			2.97 H	15	62.3	39.1
11650.00	63.2 PK	74.0	-10.8	1.54 H	223	46.7	16.5
11650.00	50.3 AV	54.0	-3.7	1.54 H	223	33.8	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5825.00	117.5 PK			1.68 V	322	78.4	39.1
*5825.00	108.0 AV			1.68 V	322	68.9	39.1
11650.00	67.0 PK	74.0	-7.0	2.35 V	313	50.5	16.5
11650.00	52.8 AV	54.0	-1.2	2.35 V	313	36.3	16.5

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.

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	65.1 PK	74.0	-8.9	2.87 H	21	61.2	3.9
5150.00	47.6 AV	54.0	-6.4	2.87 H	21	43.7	3.9
*5190.00	106.2 PK			2.96 H	25	67.9	38.3
*5190.00	96.1 AV			2.96 H	25	57.8	38.3
#10380.00	60.1 PK	68.2	-8.1	1.47 H	198	43.4	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	67.6 PK	74.0	-6.4	1.97 V	284	63.7	3.9
5150.00	52.7 AV	54.0	-1.3	1.97 V	284	48.8	3.9
*5190.00	78.9 PK			1.94 V	289	75.2	3.7
*5190.00	68.6 AV			1.94 V	289	64.9	3.7
#10380.00	63.0 PK	68.2	-5.2	2.73 V	309	46.3	16.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.

EUT Test Condition		Measurement Detail	
Channel	Channel 46	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	64.7 PK	74.0	-9.3	2.79 H	11	60.8	3.9
5150.00	47.6 AV	54.0	-6.4	2.79 H	11	43.7	3.9
*5230.00	108.9 PK			2.85 H	16	70.8	38.1
*5230.00	99.1 AV			2.85 H	16	61.0	38.1
5350.00	56.2 PK	74.0	-17.8	2.89 H	23	52.4	3.8
5350.00	44.5 AV	54.0	-9.5	2.89 H	23	40.7	3.8
#10460.00	62.2 PK	68.2	-6.0	1.56 H	210	45.7	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	68.1 PK	74.0	-5.9	1.65 V	286	64.2	3.9
5150.00	52.7 AV	54.0	-1.3	1.65 V	286	48.8	3.9
*5230.00	115.9 PK			1.73 V	287	77.8	38.1
*5230.00	106.2 AV			1.73 V	287	68.1	38.1
5350.00	59.2 PK	74.0	-14.8	1.62 V	281	55.4	3.8
5350.00	45.4 AV	54.0	-8.6	1.62 V	281	41.6	3.8
#10460.00	66.2 PK	68.2	-2.0	2.26 V	298	49.7	16.5

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.

EUT Test Condition		Measurement Detail	
Channel	Channel 151	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5755.00	110.2 PK			3.10 H	21	71.3	38.9
*5755.00	100.5 AV			3.10 H	21	61.6	38.9
11510.00	62.7 PK	74.0	-11.3	1.52 H	216	45.8	16.9
11510.00	49.6 AV	54.0	-4.4	1.52 H	216	32.7	16.9
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5755.00	117.1 PK			1.73 V	313	78.2	38.9
*5755.00	107.3 AV			1.73 V	313	68.4	38.9
11510.00	66.2 PK	74.0	-7.8	1.84 V	285	49.3	16.9
11510.00	52.6 AV	54.0	-1.4	1.84 V	285	35.7	16.9

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 159	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5795.00	108.8 PK			3.05 H	19	69.8	39.0
*5795.00	99.3 AV			3.05 H	19	60.3	39.0
11590.00	62.3 PK	74.0	-11.7	1.43 H	207	45.8	16.5
11590.00	49.8 AV	54.0	-4.2	1.43 H	207	33.3	16.5
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
*5795.00	115.7 PK			1.74 V	310	76.7	39.0
*5795.00	106.0 AV			1.74 V	310	67.0	39.0
11590.00	66.1 PK	74.0	-7.9	1.79 V	287	49.6	16.5
11590.00	52.6 AV	54.0	-1.4	1.79 V	287	36.1	16.5

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.

802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	62.5 PK	74.0	-11.5	2.79 H	14	58.6	3.9
5150.00	48.2 AV	54.0	-5.8	2.79 H	14	44.3	3.9
*5210.00	100.3 PK			2.83 H	20	62.2	38.1
*5210.00	88.9 AV			2.83 H	20	50.8	38.1
5350.00	54.1 PK	74.0	-19.9	2.89 H	24	50.3	3.8
5350.00	44.0 AV	54.0	-10.0	2.89 H	24	40.2	3.8
#10420.00	59.6 PK	68.2	-8.6	1.38 H	197	43.0	16.6
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
5150.00	64.6 PK	74.0	-9.4	1.65 V	282	60.7	3.9
5150.00	52.8 AV	54.0	-1.2	1.65 V	282	48.9	3.9
*5210.00	107.7 PK			1.81 V	286	69.6	38.1
*5210.00	96.0 AV			1.81 V	286	57.9	38.1
5350.00	55.0 PK	74.0	-19.0	1.72 V	276	51.2	3.8
5350.00	45.0 AV	54.0	-9.0	1.72 V	276	41.2	3.8
#10420.00	62.4 PK	68.2	-5.8	2.67 V	298	45.8	16.6

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 155	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
#5650.00	62.1 PK	68.2	-6.1	3.06 H	22	57.8	4.3
*5775.00	106.8 PK			3.12 H	13	67.8	39.0
*5775.00	95.2 AV			3.12 H	13	56.2	39.0
#5925.00	59.7 PK	68.2	-8.5	3.01 H	18	54.7	5.0
11550.00	61.9 PK	74.0	-12.1	1.59 H	224	45.2	16.7
11550.00	49.3 AV	54.0	-4.7	1.59 H	224	32.6	16.7
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
#5650.00	66.8 PK	68.2	-1.4	1.75 V	308	62.5	4.3
*5775.00	113.9 PK			1.68 V	312	74.9	39.0
*5775.00	101.9 AV			1.68 V	312	62.9	39.0
#5925.00	66.9 PK	68.2	-1.3	1.62 V	317	61.9	5.0
11550.00	65.5 PK	74.0	-8.5	2.17 V	313	48.8	16.7
11550.00	51.9 AV	54.0	-2.1	2.17 V	313	35.2	16.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.

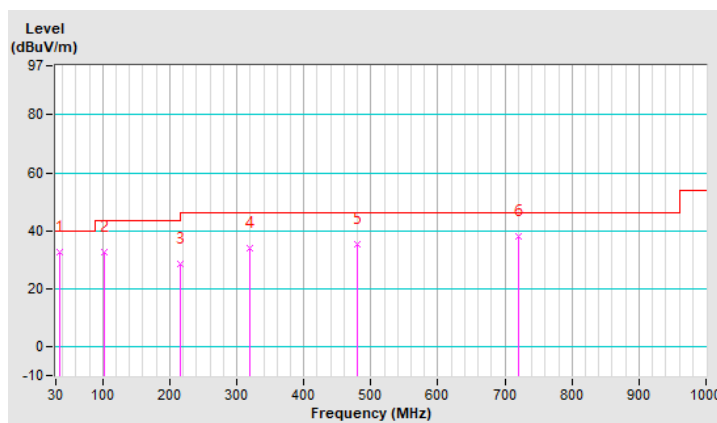
30 MHz ~ 1 GHz Worst-Case Data:

Mode 1

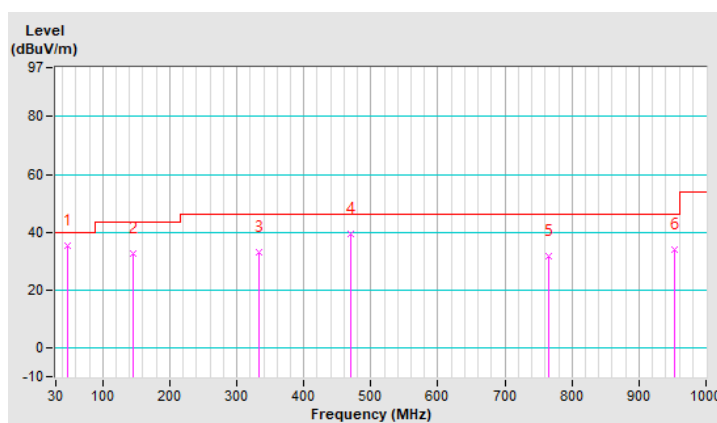
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
36.79	32.4 QP	40.0	-7.6	1.50 H	15	43.3	-10.9
101.78	32.7 QP	43.5	-10.8	1.25 H	296	46.3	-13.6
215.27	28.6 QP	43.5	-14.9	1.00 H	282	40.5	-11.9
320.03	34.0 QP	46.0	-12.0	1.00 H	208	41.5	-7.5
480.08	35.4 QP	46.0	-10.6	1.00 H	64	39.5	-4.1
719.67	38.0 QP	46.0	-8.0	1.50 H	210	38.3	-0.3
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
47.46	35.2 QP	40.0	-4.8	1.25 V	57	45.0	-9.8
145.43	32.6 QP	43.5	-10.9	1.00 V	73	42.1	-9.5
332.64	33.1 QP	46.0	-12.9	1.50 V	194	40.3	-7.2
470.38	39.5 QP	46.0	-6.5	1.25 V	276	43.7	-4.2
766.23	31.8 QP	46.0	-14.2	1.25 V	121	30.5	1.3
953.44	33.9 QP	46.0	-12.1	1.00 V	270	29.4	4.5

Remarks:

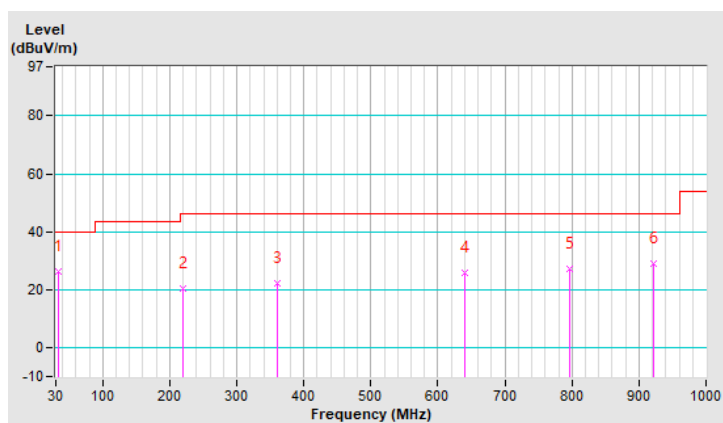
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.

Mode 2

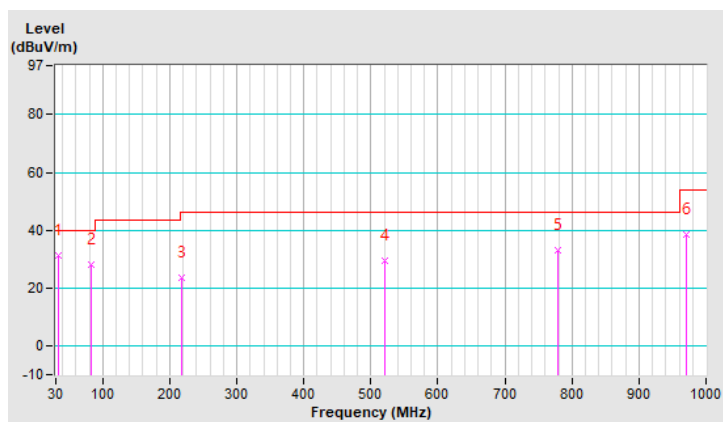
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
33.88	26.4 QP	40.0	-13.6	1.25 H	37	37.7	-11.3
220.12	20.3 QP	46.0	-25.7	1.50 H	33	32.1	-11.8
359.80	22.1 QP	46.0	-23.9	1.00 H	33	28.7	-6.6
641.10	26.0 QP	46.0	-20.0	1.00 H	247	27.3	-1.3
796.30	27.0 QP	46.0	-19.0	1.50 H	191	25.5	1.5
922.40	29.0 QP	46.0	-17.0	1.25 H	167	25.1	3.9
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
33.88	31.4 QP	40.0	-8.6	1.25 V	166	42.7	-11.3
82.38	27.9 QP	40.0	-12.1	1.50 V	196	42.2	-14.3
218.18	23.6 QP	46.0	-22.4	1.00 V	307	35.5	-11.9
520.82	29.3 QP	46.0	-16.7	1.50 V	171	32.6	-3.3
778.84	33.2 QP	46.0	-12.8	1.00 V	51	31.8	1.4
970.90	38.7 QP	54.0	-15.3	1.00 V	247	33.8	4.9

Remarks:

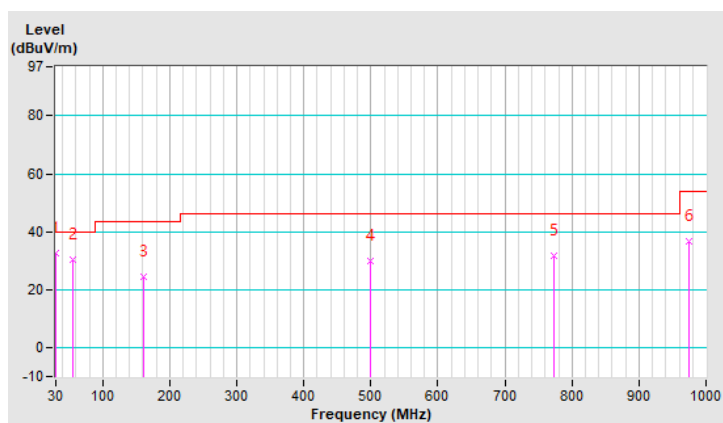
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.

Mode 3

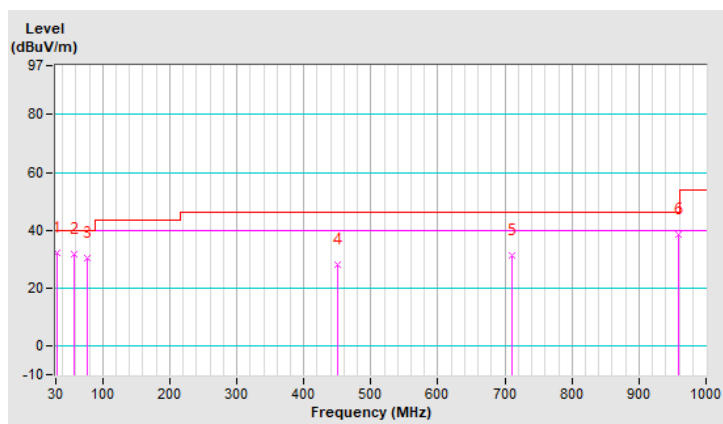
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Greg Lin

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
30.00	32.4 QP	40.0	-7.6	1.00 H	17	43.7	-11.3
55.22	30.3 QP	40.0	-9.7	1.00 H	6	40.2	-9.9
161.92	24.5 QP	43.5	-19.0	1.25 H	233	33.6	-9.1
499.48	29.9 QP	46.0	-16.1	1.25 H	289	33.7	-3.8
773.02	31.9 QP	46.0	-14.1	1.25 H	206	30.6	1.3
974.78	36.8 QP	54.0	-17.2	1.00 H	7	31.8	5.0
Antenna Polarity & Test Distance: Vertical at 3 m							
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Read Level (dBuV)	Factor (dB/m)
31.94	32.3 QP	40.0	-7.7	1.50 V	350	43.7	-11.4
57.16	31.6 QP	40.0	-8.4	1.50 V	16	41.8	-10.2
76.56	30.4 QP	40.0	-9.6	1.00 V	171	43.6	-13.2
450.98	27.9 QP	40.0	-12.1	1.00 V	210	32.2	-4.3
710.94	31.4 QP	40.0	-8.6	1.00 V	81	31.8	-0.4
959.26	38.3 QP	40.0	-1.7	1.25 V	18	33.7	4.6

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 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 (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	101826	Feb. 21, 2019	Feb. 20, 2020
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

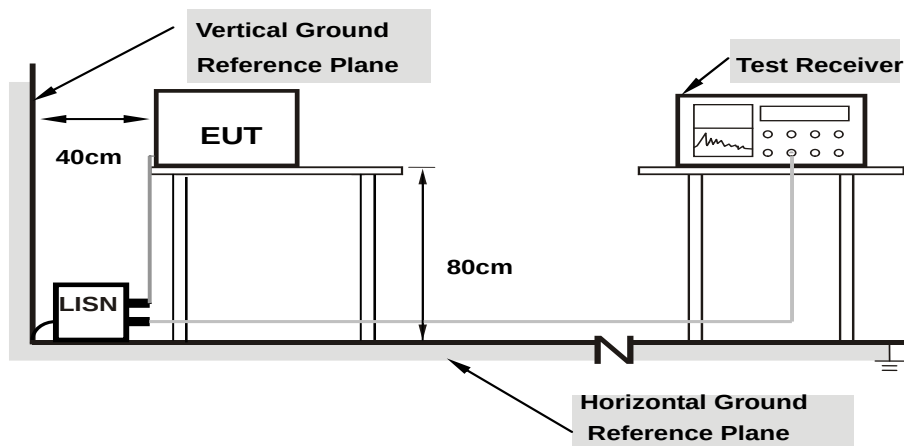
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 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:**
- Support units were connected to second LISN.
 - 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

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

4.2.7 Test Results

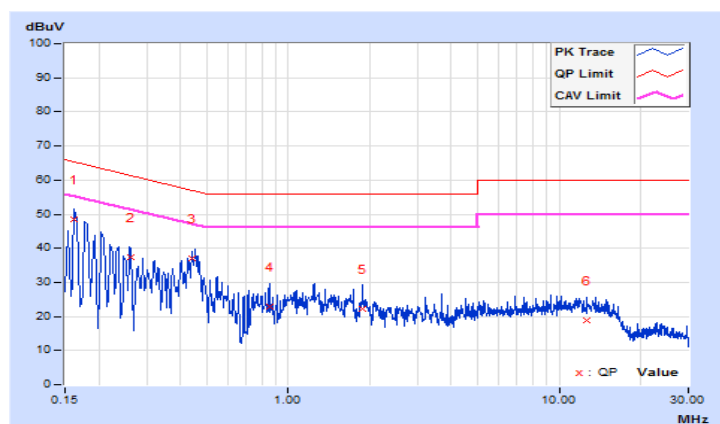
Mode 1

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.16173	9.67	38.89	26.13	48.56	35.80	65.37	55.37	-16.81	-19.57
2	0.26339	9.67	27.72	14.84	37.39	24.51	61.32	51.32	-23.93	-26.81
3	0.44273	9.69	27.47	20.61	37.16	30.30	57.01	47.01	-19.85	-16.71
4	0.84989	9.72	13.31	5.98	23.03	15.70	56.00	46.00	-32.97	-30.30
5	1.88213	9.77	12.30	6.36	22.07	16.13	56.00	46.00	-33.93	-29.87
6	12.58380	9.95	8.85	3.74	18.80	13.69	60.00	50.00	-41.20	-36.31

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

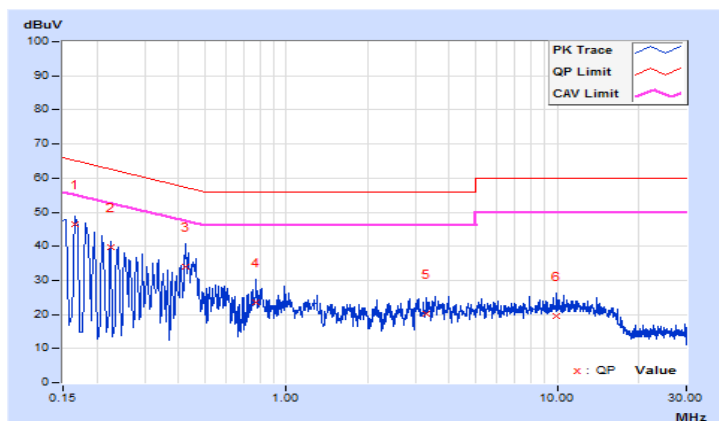


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.16564	9.64	36.78	21.39	46.42	31.03	65.18	55.18	-18.76	-24.15
2	0.22429	9.64	30.24	16.54	39.88	26.18	62.66	52.66	-22.78	-26.48
3	0.42370	9.66	24.19	14.27	33.85	23.93	57.38	47.38	-23.53	-23.45
4	0.77169	9.68	13.95	7.54	23.63	17.22	56.00	46.00	-32.37	-28.78
5	3.28973	9.79	10.25	5.46	20.04	15.25	56.00	46.00	-35.96	-30.75
6	9.98756	9.91	9.52	4.68	19.43	14.59	60.00	50.00	-40.57	-35.41

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



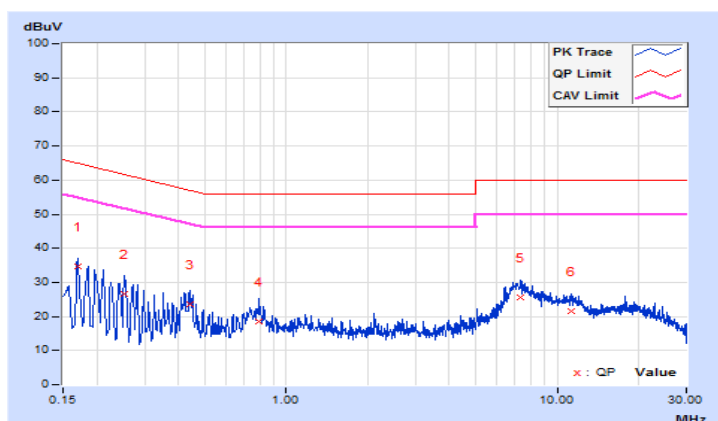
Mode 2

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.16955	9.67	25.12	13.20	34.79	22.87	64.98	54.98	-30.19	-32.11
2	0.25166	9.67	16.80	5.40	26.47	15.07	61.70	51.70	-35.23	-36.63
3	0.43934	9.69	13.86	7.45	23.55	17.14	57.07	47.07	-33.52	-29.93
4	0.79124	9.72	8.70	3.45	18.42	13.17	56.00	46.00	-37.58	-32.83
5	7.34049	9.89	15.79	7.19	25.68	17.08	60.00	50.00	-34.32	-32.92
6	11.27004	9.94	11.60	6.12	21.54	16.06	60.00	50.00	-38.46	-33.94

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

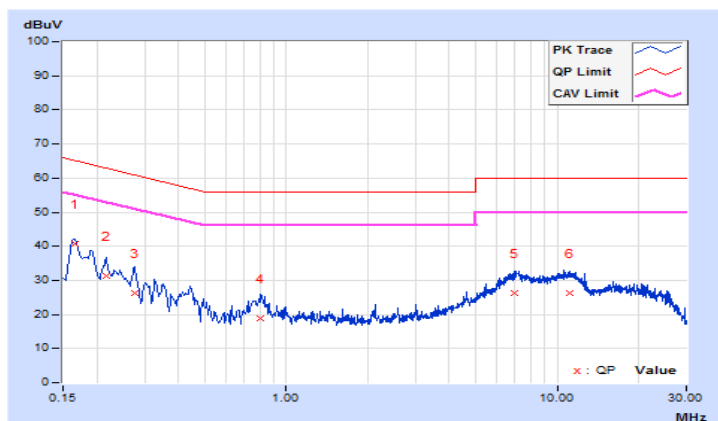


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.16526	9.64	31.07	19.35	40.71	28.99	65.20	55.20	-24.49	-26.21
2	0.21621	9.64	21.71	10.63	31.35	20.27	62.96	52.96	-31.61	-32.69
3	0.27480	9.65	16.74	4.76	26.39	14.41	60.97	50.97	-34.58	-36.56
4	0.80688	9.69	9.07	3.24	18.76	12.93	56.00	46.00	-37.24	-33.07
5	6.94167	9.86	16.42	10.26	26.28	20.12	60.00	50.00	-33.72	-29.88
6	11.15665	9.93	16.47	9.52	26.40	19.45	60.00	50.00	-33.60	-30.55

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



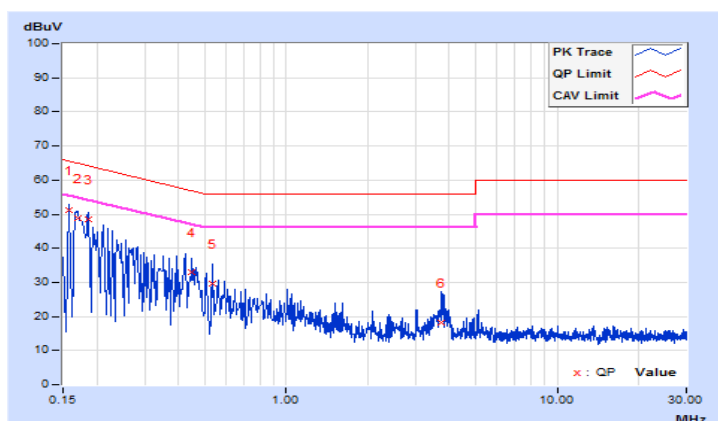
Mode 3

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.15782	9.67	41.44	26.21	51.11	35.88	65.58	55.58	-14.47	-19.70
2	0.16955	9.67	39.08	23.66	48.75	33.33	64.98	54.98	-16.23	-21.65
3	0.18508	9.66	38.67	25.07	48.33	34.73	64.25	54.25	-15.92	-19.52
4	0.44716	9.69	23.41	14.82	33.10	24.51	56.93	46.93	-23.83	-22.42
5	0.53709	9.70	20.08	7.35	29.78	17.05	56.00	46.00	-26.22	-28.95
6	3.73547	9.83	8.52	1.51	18.35	11.34	56.00	46.00	-37.65	-34.66

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

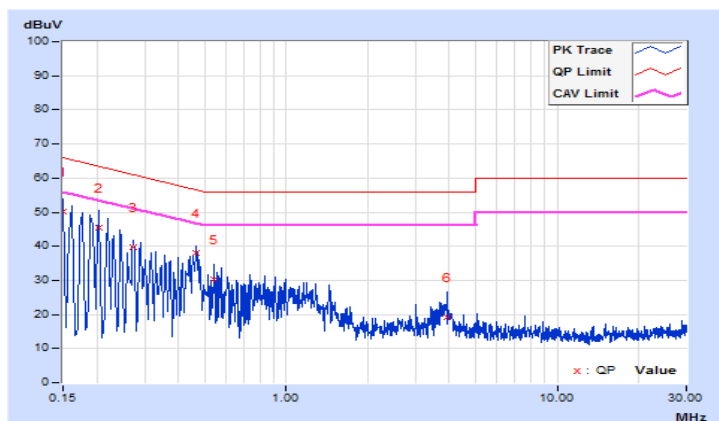


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 75%RH

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	0.15000	9.64	40.66	25.96	50.30	35.60	66.00	56.00	-15.70	-20.40
2	0.20474	9.64	35.88	22.25	45.52	31.89	63.42	53.42	-17.90	-21.53
3	0.27120	9.65	30.11	17.15	39.76	26.80	61.08	51.08	-21.32	-24.28
4	0.46669	9.66	28.41	18.86	38.07	28.52	56.57	46.57	-18.50	-18.05
5	0.54089	9.67	20.80	8.57	30.47	18.24	56.00	46.00	-25.53	-27.76
6	3.92706	9.81	9.23	0.08	19.04	9.89	56.00	46.00	-36.96	-36.11

Remarks:

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



4.3 Transmit Power Measurement

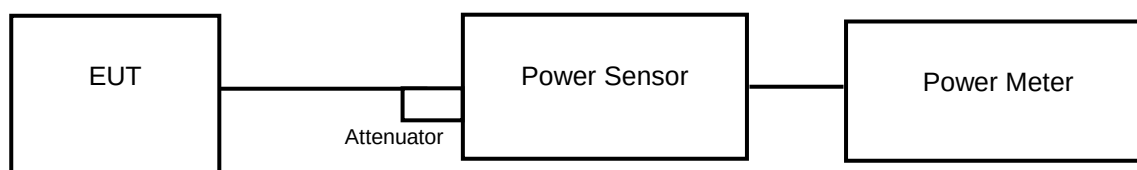
4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 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)

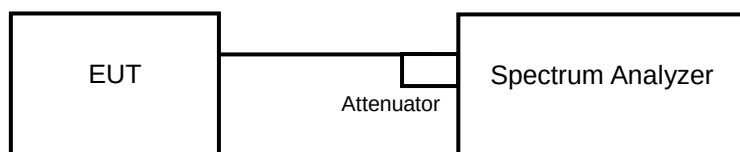
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

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.

26 dB Bandwidth

- a. Set RBW = approximately 1 % of the emission bandwidth.
- b. Set the VBW > RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test 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	Chain 2				
36	5180	18.82	19.24	18.57	232.099	23.66	30	Pass
40	5200	18.79	19.17	18.23	224.814	23.52	30	Pass
48	5240	19.47	20.23	19.21	277.319	24.43	30	Pass
149	5745	19.48	19.83	19.17	267.481	24.27	30	Pass
157	5785	18.71	19.03	18.36	222.834	23.48	30	Pass
165	5825	19.76	20.14	19.45	286.005	24.56	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	Chain 2				
36	5180	17.42	17.65	17.12	164.941	22.17	30	Pass
40	5200	19.25	19.71	19.14	259.716	24.14	30	Pass
48	5240	19.51	19.93	19.34	273.633	24.37	30	Pass
149	5745	21.06	21.19	21.64	405.047	26.08	30	Pass
157	5785	20.13	20.48	20.15	318.239	25.03	30	Pass
165	5825	19.51	19.92	19.12	269.164	24.30	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	Chain 2				
38	5190	16.47	16.60	16.34	133.123	21.24	30	Pass
46	5230	19.20	19.62	19.13	256.644	24.09	30	Pass
151	5755	20.48	20.51	21.27	358.114	25.54	30	Pass
159	5795	20.17	20.22	20.86	331.087	25.20	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	Chain 2				
42	5210	13.38	13.95	13.02	66.653	18.24	30	Pass
155	5775	18.69	18.63	18.74	221.724	23.46	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	Chain 2				
36	5180	17.42	17.65	17.12	164.941	22.17	26.75	Pass
40	5200	19.25	19.71	19.14	259.716	24.14	26.75	Pass
48	5240	19.51	19.93	19.34	273.633	24.37	26.75	Pass
149	5745	21.02	21.08	21.51	396.286	25.98	26.75	Pass
157	5785	20.13	20.48	20.15	318.239	25.03	26.75	Pass
165	5825	19.51	19.92	19.12	269.164	24.30	26.75	Pass

NOTE: Directional gain = $10 \log[(10^{4.3/20} + 10^{4.0/20} + 10^{5.1/20})^2/3] = 9.25\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.25 - 6) = 26.75\text{dBm}$.

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	Chain 2				
38	5190	16.47	16.60	16.34	133.123	21.24	26.75	Pass
46	5230	19.20	19.62	19.13	256.644	24.09	26.75	Pass
151	5755	20.48	20.51	21.27	358.114	25.54	26.75	Pass
159	5795	20.17	20.22	20.86	331.087	25.20	26.75	Pass

NOTE: Directional gain = $10 \log[(10^{4.3/20} + 10^{4.0/20} + 10^{5.1/20})^2/3] = 9.25\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.25 - 6) = 26.75\text{dBm}$.

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	Chain 2				
42	5210	13.38	13.95	13.02	66.653	18.24	26.75	Pass
155	5775	18.69	18.63	18.74	221.724	23.46	26.75	Pass

NOTE: Directional gain = $10 \log[(10^{4.3/20} + 10^{4.0/20} + 10^{5.1/20})^2/3] = 9.25\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.25 - 6) = 26.75\text{dBm}$.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	20.40	20.27	20.22
40	5200	20.26	20.15	20.24
48	5240	20.30	20.20	20.29

802.11n (HT20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	20.59	20.17	20.42
40	5200	20.81	20.46	22.38
48	5240	20.79	20.29	20.64

802.11n (HT40)

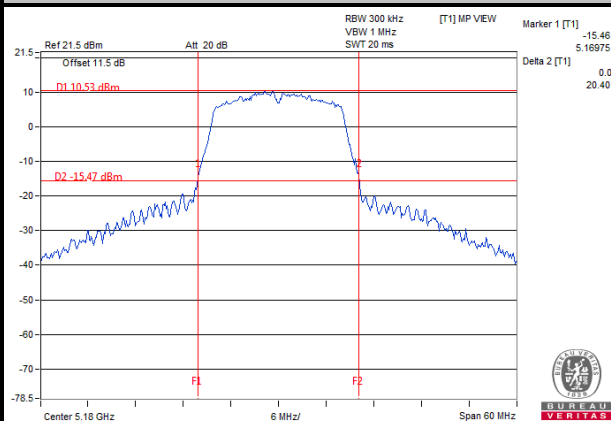
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
38	5190	41.75	41.57	41.88
46	5230	41.86	41.46	42.89

802.11ac (VHT80)

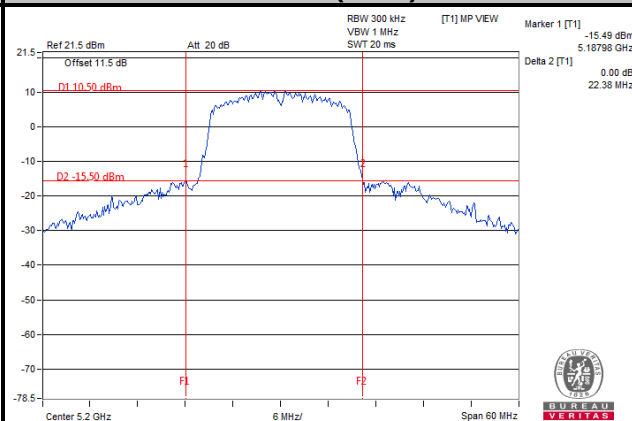
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
42	5210	81.95	80.63	80.58

Spectrum Plot of Worst Value

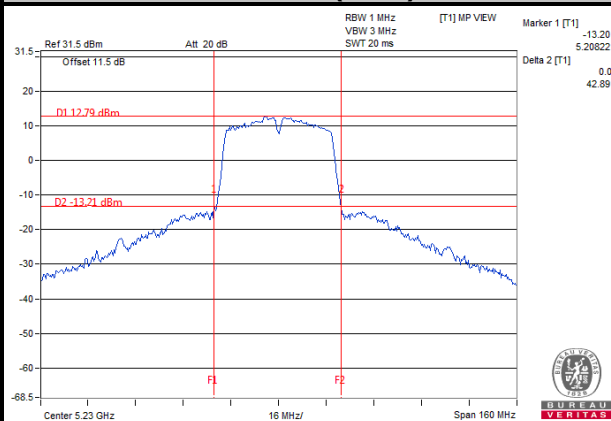
802.11a



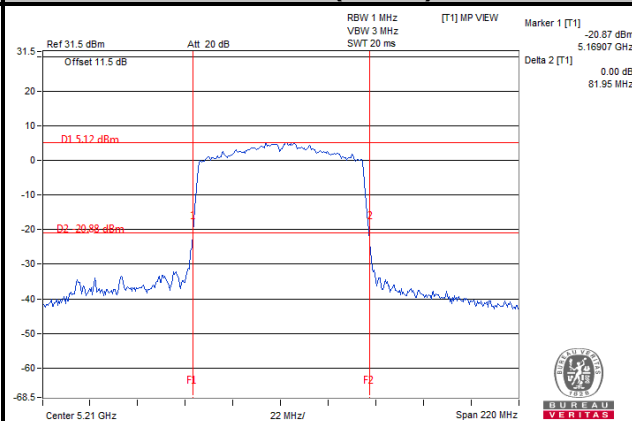
802.11n (HT20)



802.11n (HT40)

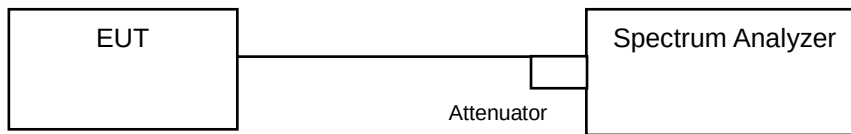


802.11ac (VHT80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.3 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	Chain 2
36	5180	16.80	16.56	16.56
40	5200	16.80	16.56	16.56
48	5240	16.92	16.68	16.80
149	5745	17.16	16.92	16.56
157	5785	16.80	16.80	17.04
165	5825	16.80	16.92	16.56

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
36	5180	17.76	17.52	17.64
40	5200	17.76	17.64	17.88
48	5240	17.88	17.64	17.76
149	5745	21.00	20.04	18.00
157	5785	18.00	18.24	17.76
165	5825	17.88	17.76	17.64

802.11n (HT40)

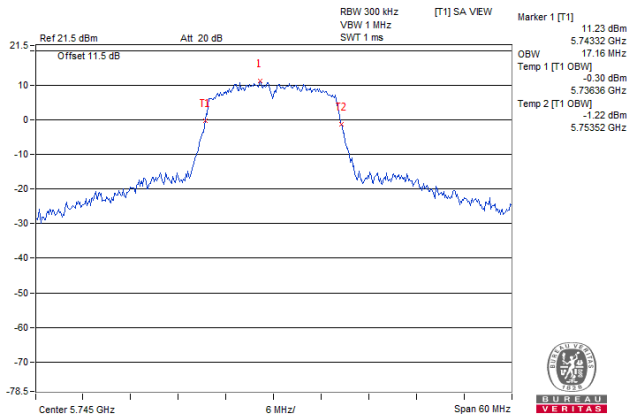
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
38	5190	36.12	36.36	36.36
46	5230	36.36	36.48	36.36
151	5755	36.84	37.20	36.36
159	5795	36.36	37.08	36.36

802.11ac (VHT80)

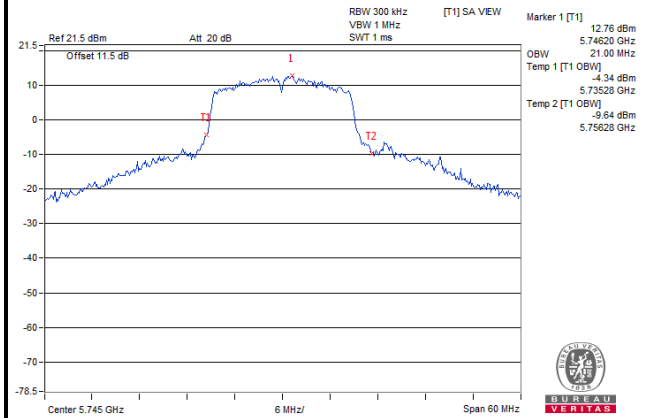
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)		
		Chain 0	Chain 1	Chain 2
42	5210	75.36	75.12	75.12
155	5775	75.36	75.12	75.12

Spectrum Plot of Worst Value

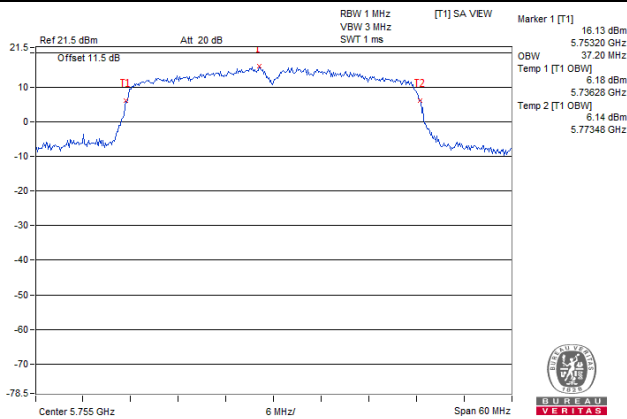
802.11a



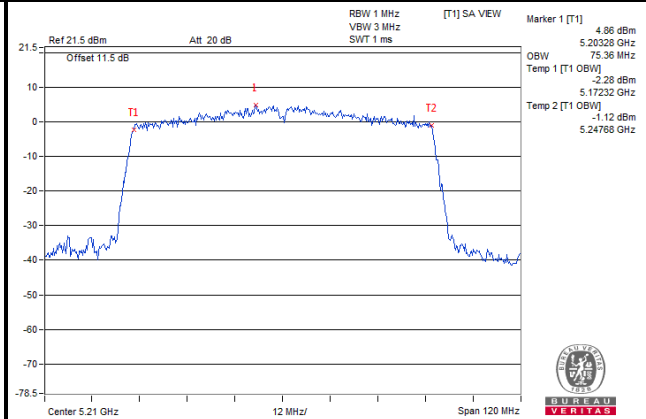
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

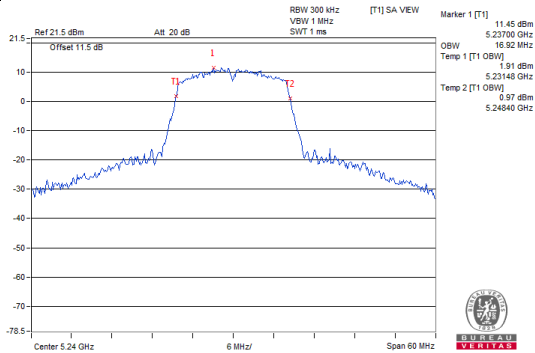


Chain 0

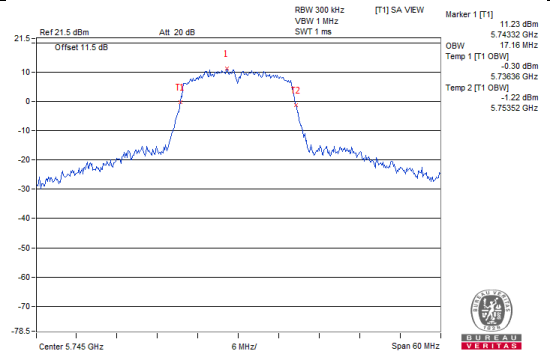
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

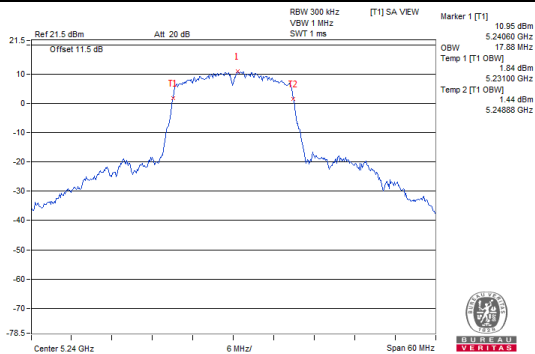


Ch 149 (5745 MHz)

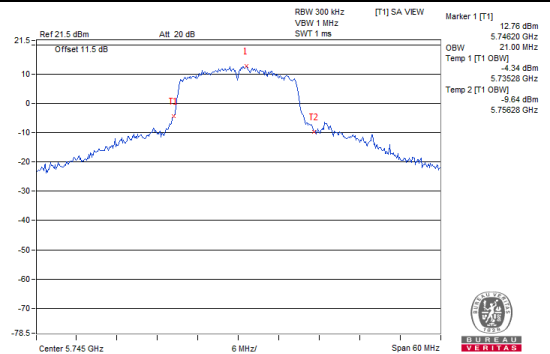


802.11n (HT20)

Ch 48 (5240 MHz)

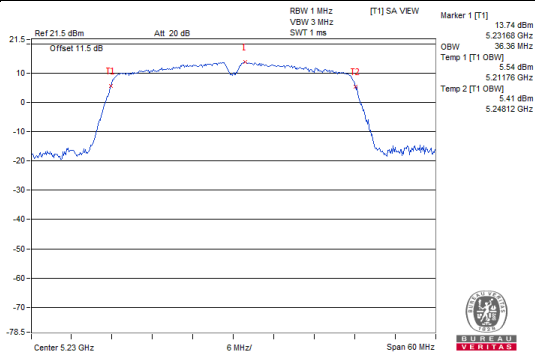


Ch 149 (5745 MHz)

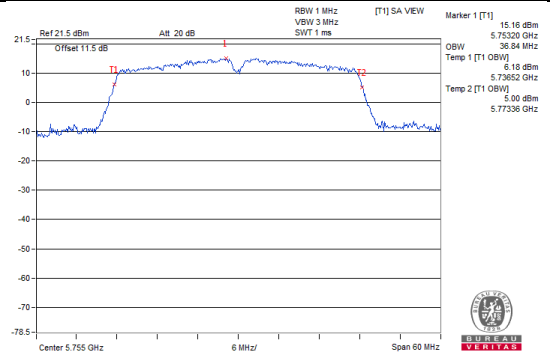


802.11n (HT40)

Ch 46 (5230 MHz)

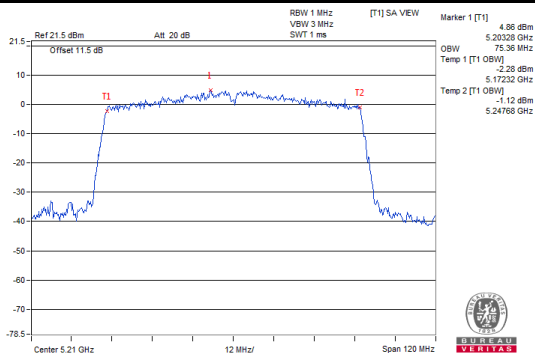


Ch 151 (5755 MHz)

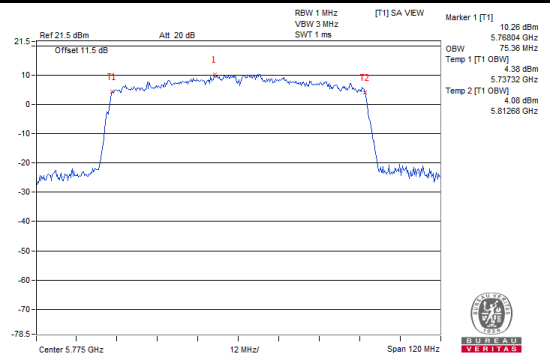


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

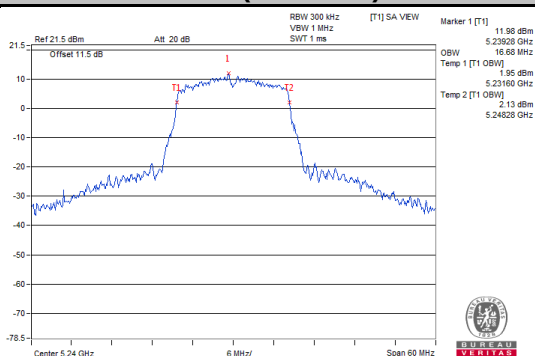


Chain 1

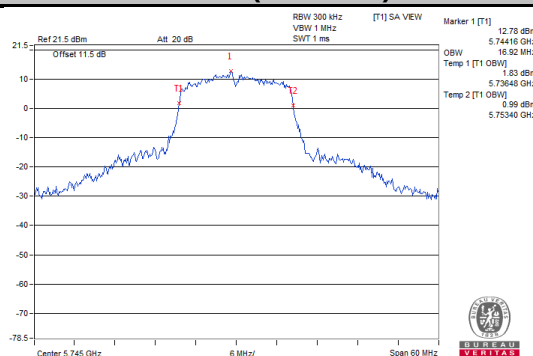
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

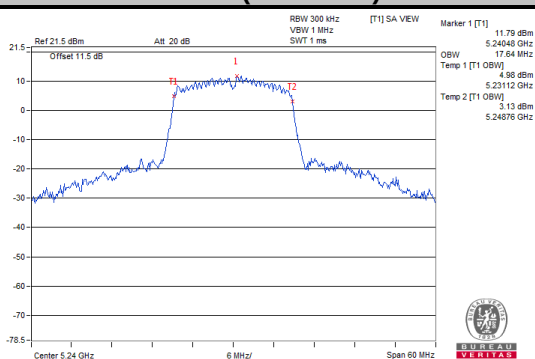


Ch 149 (5745 MHz)

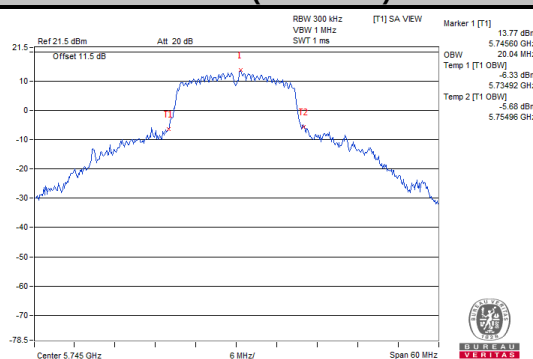


802.11n (HT20)

Ch 48 (5240 MHz)

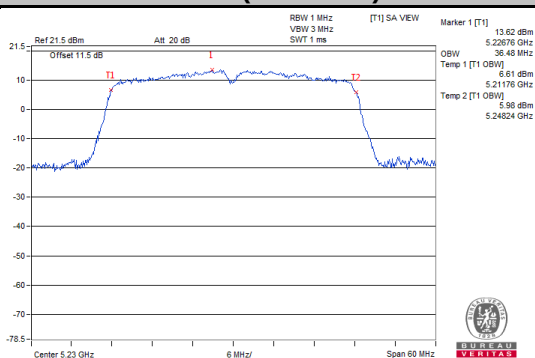


Ch 149 (5745 MHz)

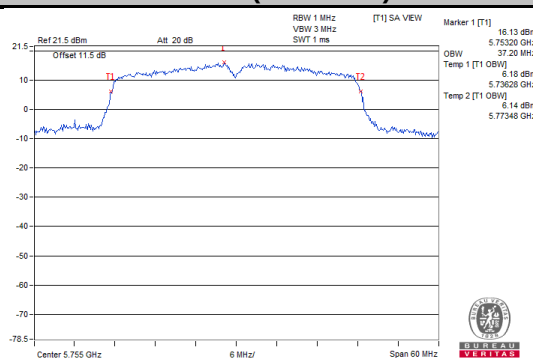


802.11n (HT40)

Ch 46 (5230 MHz)

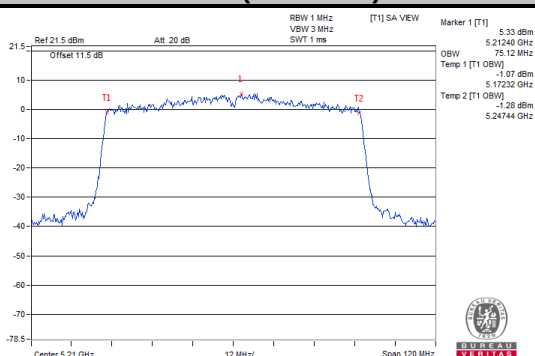


Ch 151 (5755 MHz)

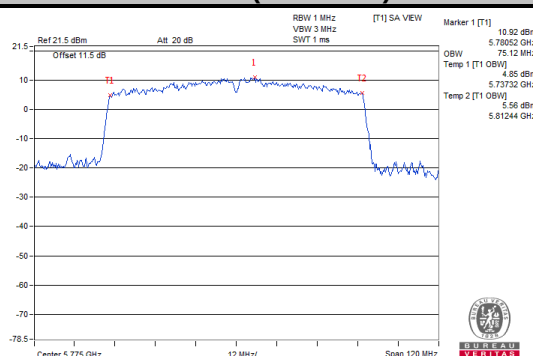


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

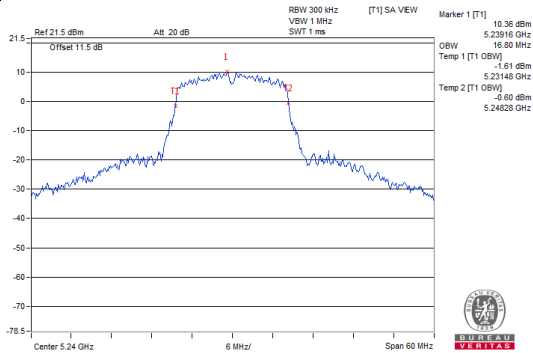


Chain 2

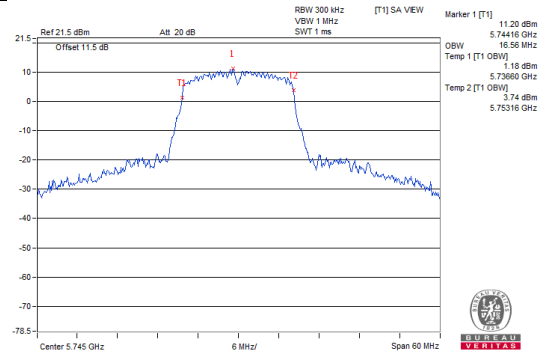
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

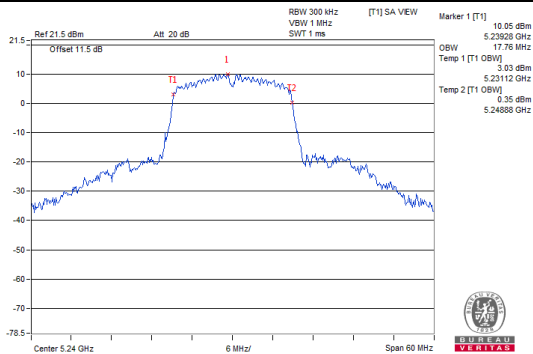


Ch 149 (5745 MHz)

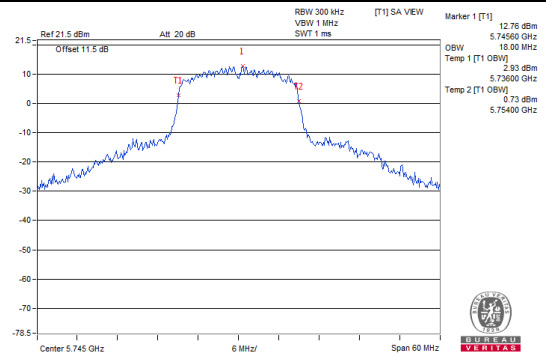


802.11n (HT20)

Ch 48 (5240 MHz)

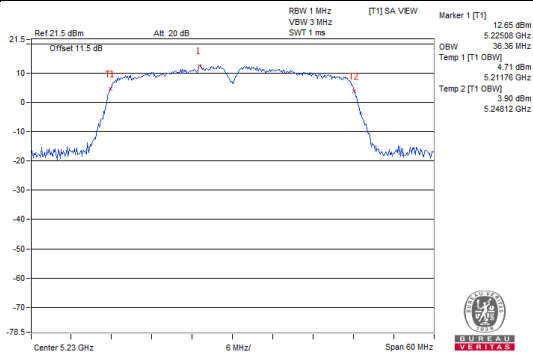


Ch 149 (5745 MHz)

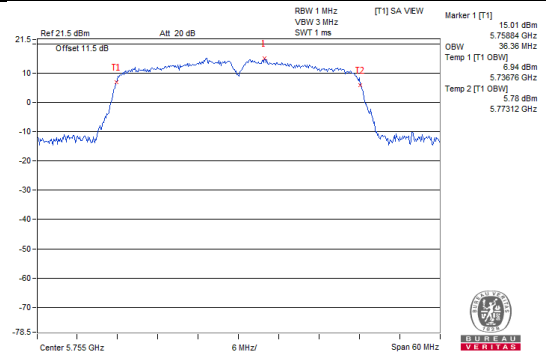


802.11n (HT40)

Ch 46 (5230 MHz)

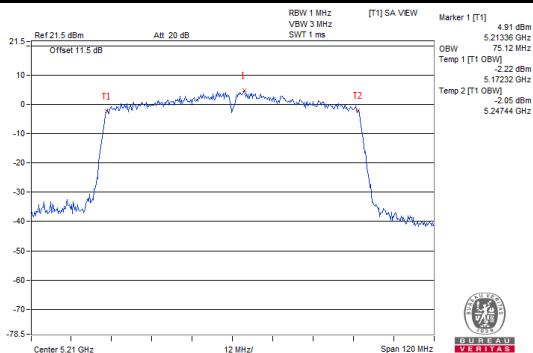


Ch 151 (5755 MHz)

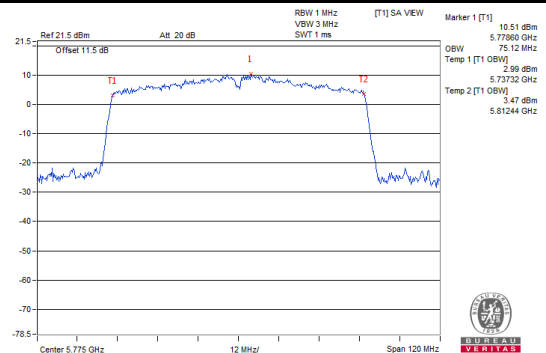


802.11ac (VHT80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

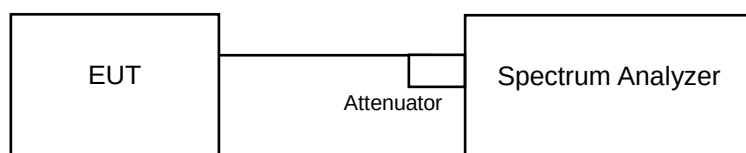


4.5 Peak Power Spectral Density Measurement

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 4.1.3 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1

Using method SA-2

Set span to encompass the entire emission bandwidth (EBW) of the signal.

1. Set RBW = 1 MHz, Set VBW $\geq$ 3 RBW, Detector = RMS
2. Sweep time = auto, trigger set to "free run".
3. Trace average at least 100 traces in power averaging mode.
4. Record the max value and add 10 log (1/duty cycle)

✖ For U-NII-3:

Set span to encompass the entire emission bandwidth (EBW) of the signal.

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating 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	Chain 2				
36	5180	6.58	6.88	5.47	0.21	11.33	13.75	Pass
40	5200	6.66	6.95	5.58	0.21	11.42	13.75	Pass
48	5240	7.64	7.60	6.04	0.21	12.14	13.75	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (9.25 - 6) = 13.75 \text{ dBm}$.
- 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	Chain 2				
36	5180	4.72	5.03	3.91	0.23	9.58	13.75	Pass
40	5200	6.55	7.09	5.93	0.23	11.55	13.75	Pass
48	5240	7.17	7.21	5.87	0.23	11.79	13.75	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (9.25 - 6) = 13.75 \text{ dBm}$.
- 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	Chain 2				
38	5190	0.29	0.59	-0.14	0.45	5.48	13.75	Pass
46	5230	3.69	2.93	2.21	0.45	8.21	13.75	Pass

Note:

- 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.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (9.25 - 6) = 13.75 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

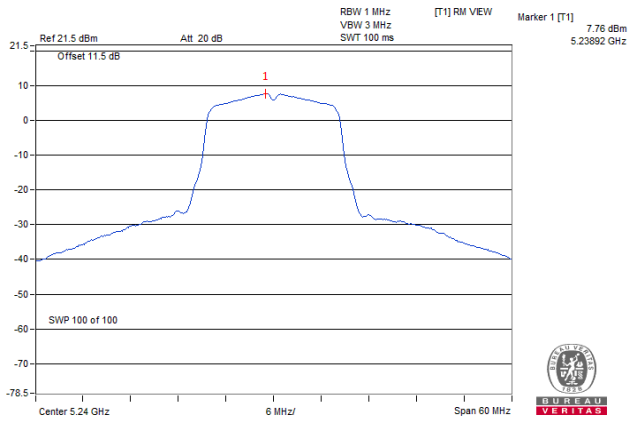
Channel	Frequency (MHz)	PSD (dBm/MHz)			Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2				
42	5210	-5.26	-5.43	-6.05	0.75	-0.05	13.75	Pass

Note:

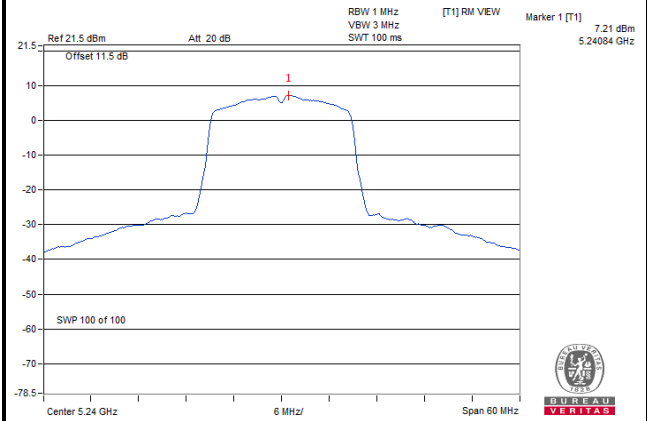
- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (9.25 - 6) = 13.75 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

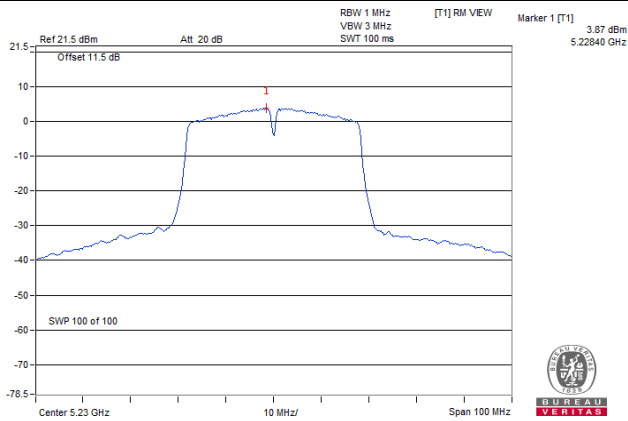
802.11a



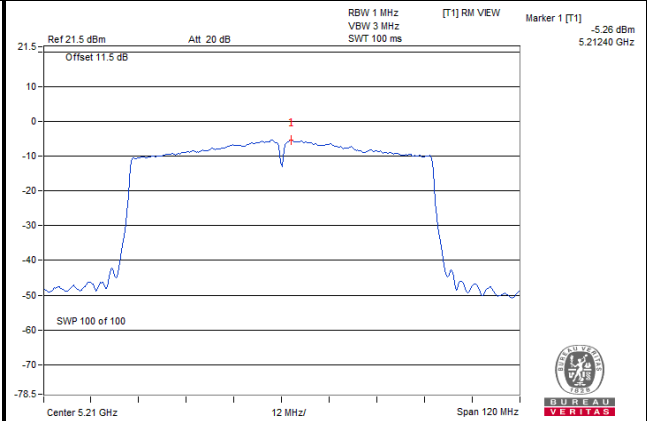
802.11n (HT20)



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=3) 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	-1.13	1.09	4.77	0.21	6.07	26.75	Pass
	157	5785	-1.17	1.05	4.77	0.21	6.03	26.75	Pass
	165	5825	-0.03	2.19	4.77	0.21	7.17	26.75	Pass
1	149	5745	0.00	2.22	4.77	0.21	7.20	26.75	Pass
	157	5785	-1.40	0.82	4.77	0.21	5.80	26.75	Pass
	165	5825	-0.92	1.30	4.77	0.21	6.28	26.75	Pass
2	149	5745	-1.57	0.65	4.77	0.21	5.63	26.75	Pass
	157	5785	-1.80	0.42	4.77	0.21	5.40	26.75	Pass
	165	5825	-0.84	1.38	4.77	0.21	6.36	26.75	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 > 6$ dBi , so the power density limit shall be reduced to $30 - (9.25 - 6) = 26.75$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=3) 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	0.59	2.81	4.77	0.23	7.81	26.75	Pass
	157	5785	-0.37	1.85	4.77	0.23	6.85	26.75	Pass
	165	5825	-0.74	1.48	4.77	0.23	6.48	26.75	Pass
1	149	5745	0.34	2.56	4.77	0.23	7.56	26.75	Pass
	157	5785	0.08	2.30	4.77	0.23	7.30	26.75	Pass
	165	5825	-0.95	1.27	4.77	0.23	6.27	26.75	Pass
2	149	5745	-0.88	1.34	4.77	0.23	6.34	26.75	Pass
	157	5785	-0.56	1.66	4.77	0.23	6.66	26.75	Pass
	165	5825	-1.64	0.58	4.77	0.23	5.58	26.75	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 > 6$ dBi , so the power density limit shall be reduced to $30 - (9.25 - 6) = 26.75$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=3) 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	-3.17	-0.95	4.77	0.45	4.27	26.75	Pass
	159	5795	-3.64	-1.42	4.77	0.45	3.80	26.75	Pass
1	151	5755	-3.50	-1.28	4.77	0.45	3.94	26.75	Pass
	159	5795	-4.04	-1.82	4.77	0.45	3.40	26.75	Pass
2	151	5755	-4.31	-2.09	4.77	0.45	3.13	26.75	Pass
	159	5795	-4.86	-2.64	4.77	0.45	2.58	26.75	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (9.25 - 6) = 26.75 \text{ dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

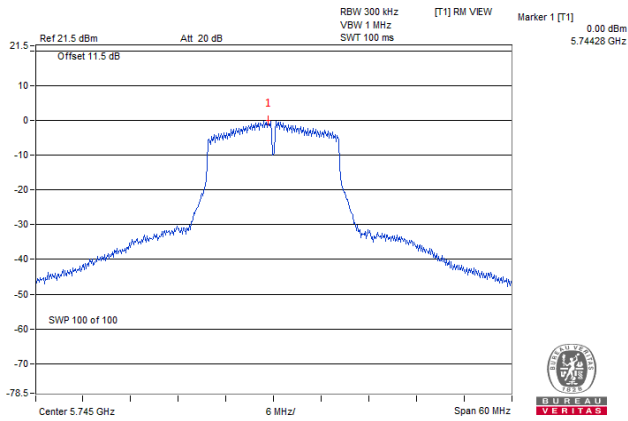
TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=3) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	155	5775	-8.62	-6.40	4.77	0.75	-0.88	26.75	Pass
1	155	5775	-8.51	-6.29	4.77	0.75	-0.77	26.75	Pass
2	155	5775	-9.39	-7.17	4.77	0.75	-1.65	26.75	Pass

Note:

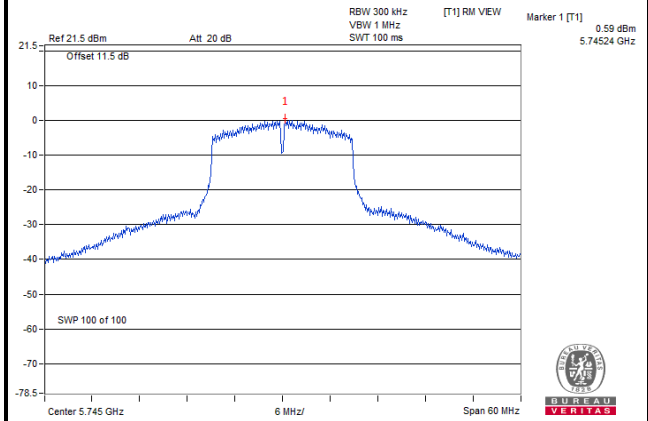
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 9.25 > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (9.25 - 6) = 26.75 \text{ dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

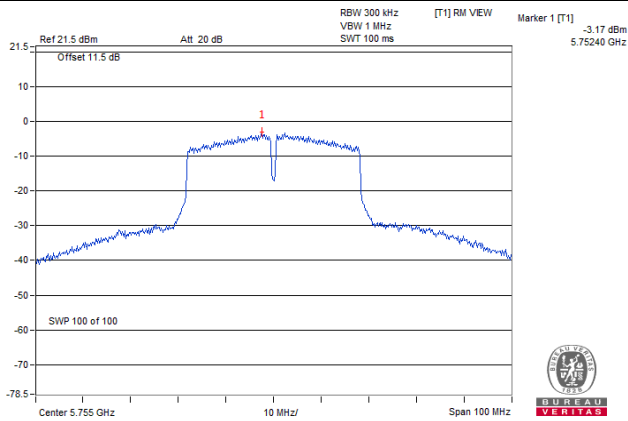
802.11a



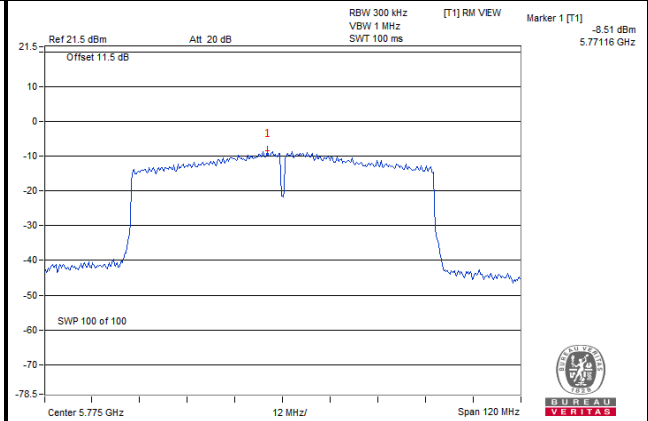
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

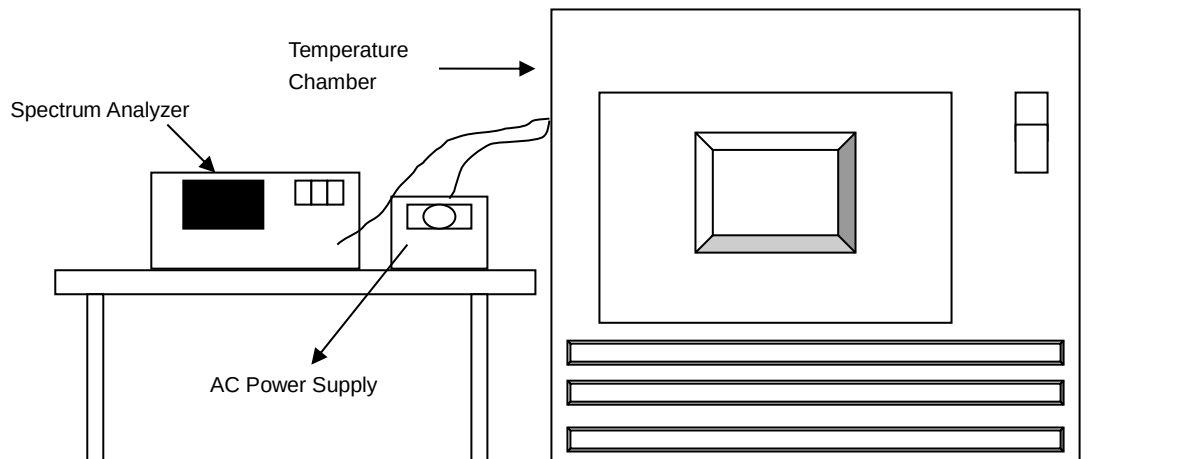


4.6 Frequency Stability

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 4.1.3 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	120	5180.008	PASS	5180.0122	PASS	5180.009	PASS	5180.01	PASS
30	120	5180.0179	PASS	5180.0195	PASS	5180.0173	PASS	5180.0212	PASS
20	120	5179.9895	PASS	5179.9884	PASS	5179.9902	PASS	5179.9903	PASS
10	120	5180.01	PASS	5180.0072	PASS	5180.0061	PASS	5180.0095	PASS
0	120	5179.9988	PASS	5179.9961	PASS	5179.9955	PASS	5179.9958	PASS

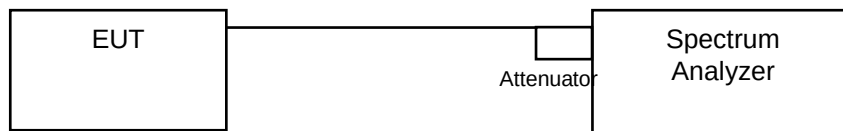
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5179.9905	PASS	5179.9874	PASS	5179.9895	PASS	5179.9911	PASS
	120	5179.9895	PASS	5179.9884	PASS	5179.9902	PASS	5179.9903	PASS
	102	5179.9893	PASS	5179.9875	PASS	5179.9894	PASS	5179.9905	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 4.1.3 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	15.20	15.16	15.19	0.5	Pass
157	5785	15.15	15.20	15.18	0.5	Pass
165	5825	15.17	15.19	15.16	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
149	5745	15.16	15.18	15.18	0.5	Pass
157	5785	15.18	15.76	15.17	0.5	Pass
165	5825	15.19	15.19	15.19	0.5	Pass

802.11n (HT40)

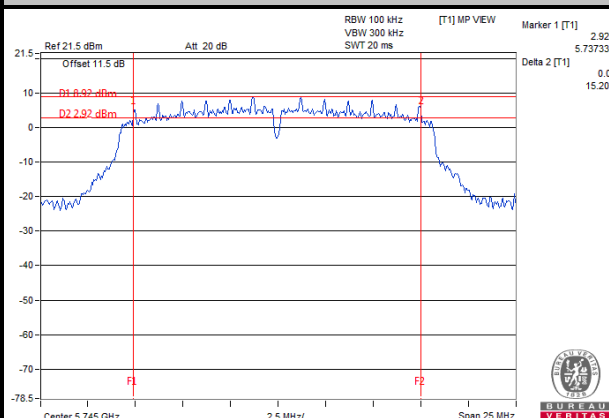
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
151	5755	35.23	35.21	35.19	0.5	Pass
159	5795	35.21	35.18	35.21	0.5	Pass

802.11ac (VHT80)

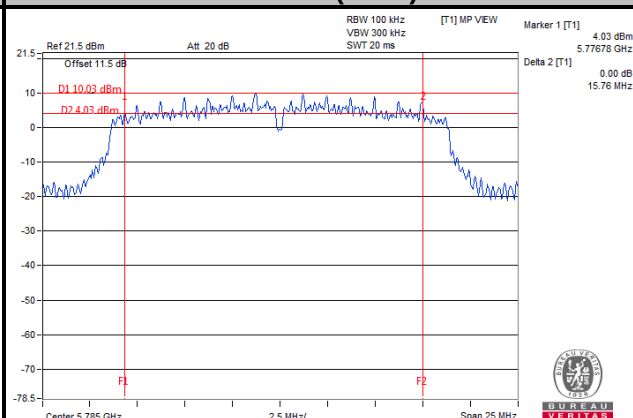
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)			Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2		
155	5775	75.29	75.27	75.27	0.5	Pass

Spectrum Plot of Worst Value

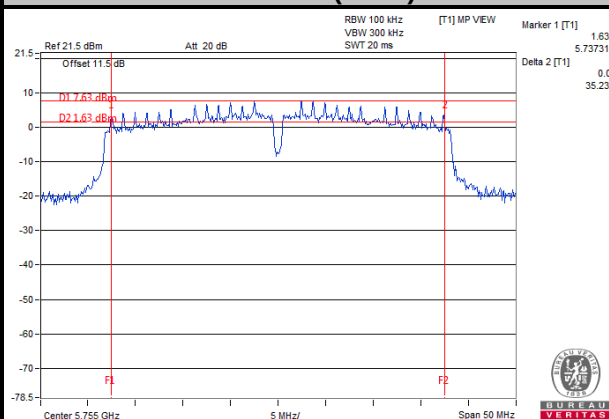
802.11a



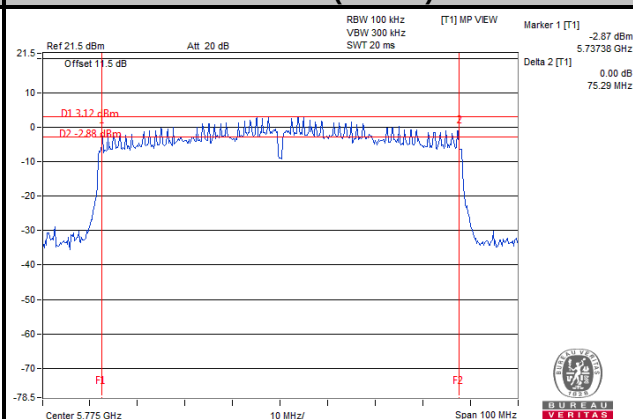
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

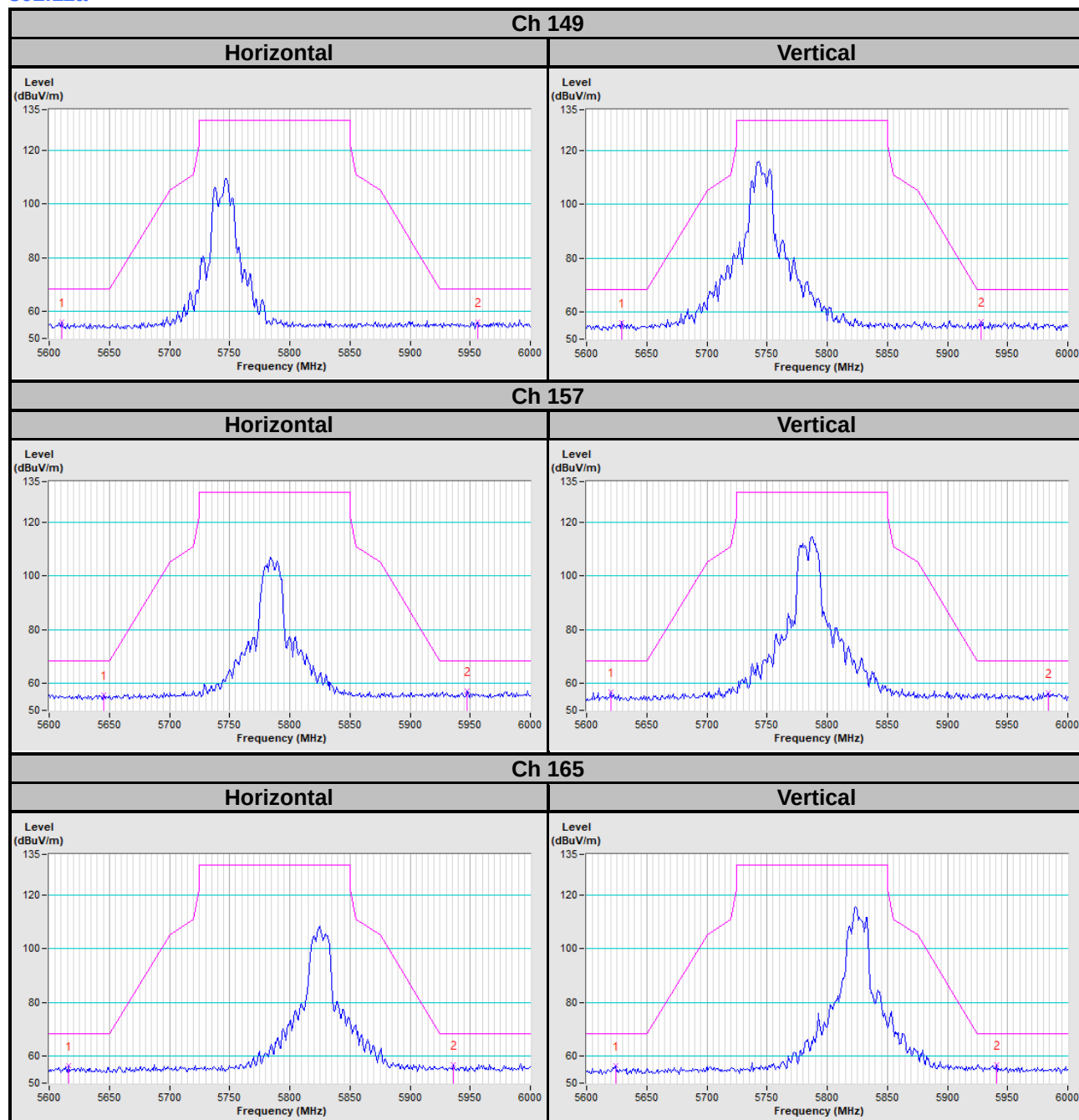


5 Pictures of Test Arrangements

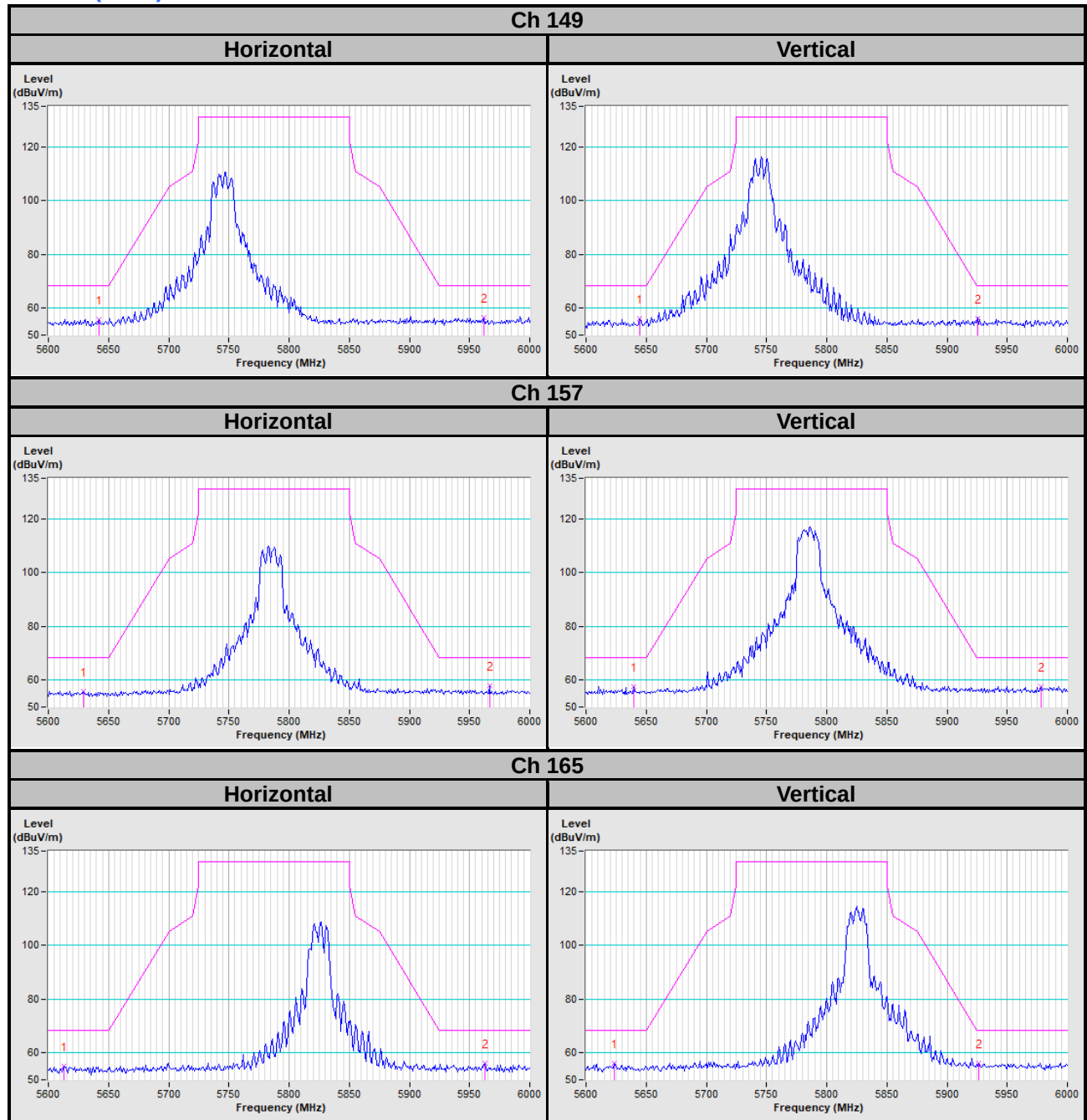
Please refer to the attached file (Test Setup Photo).

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

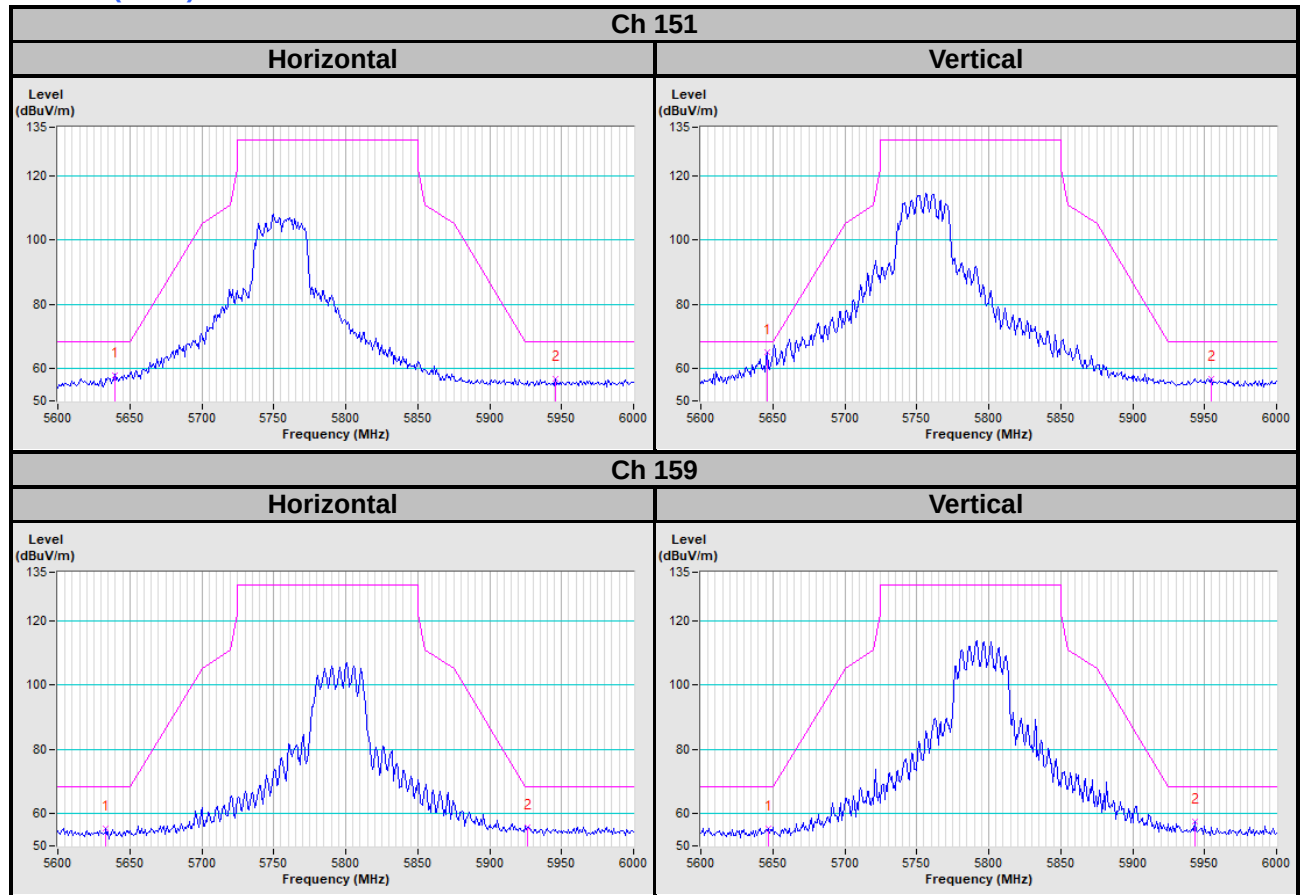
802.11a



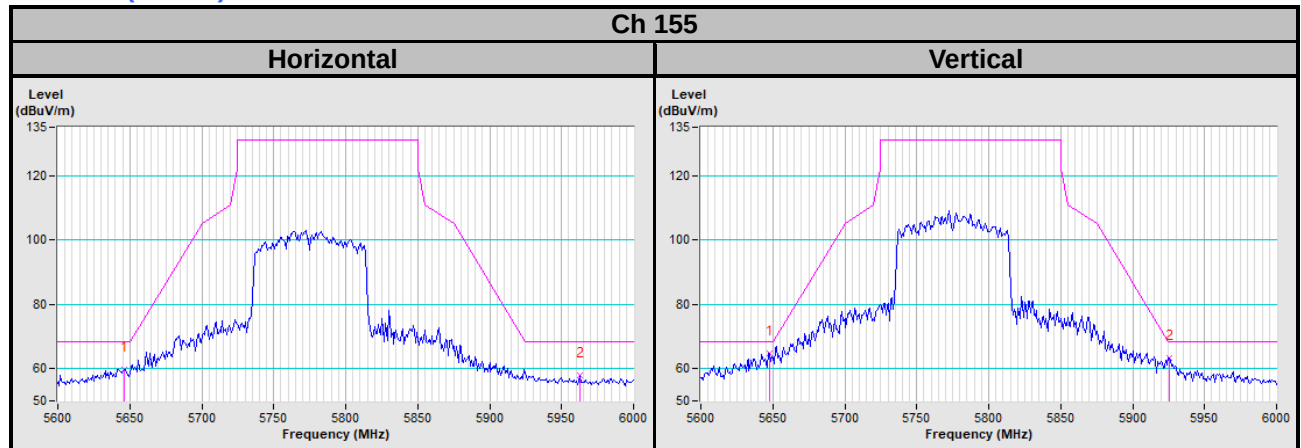
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



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.

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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