FCC Test Report

Report No.:	RF190506C14
FCC ID:	SPYGLIDERXS
Test Model:	Frey Glider XS
Received Date:	May 06, 2019
Test Date:	May 16, 2019 ~ May 30, 2019
Issued Date:	Jun. 06, 2019
Applicant:	Bitatek Co., Ltd.
Address:	6F., No. 288, Sec. 6, Civic Blvd., Xinyi Dist., Taipei City 110, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location (1):	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.
Test Location (2):	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C
FCC Registration / Designation Number:	427177 / TW0011

Testing Laboratory
2021

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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF190506C14	Original Release	Jun. 06, 2019

1 Certificate of Conformity

Product:	Rugged Mobile Computer
Brand:	Bitatek
Test Model:	Frey Glider XS
Sample Status:	Engineering Sample
Applicant:	Bitatek Co., Ltd.
Test Date:	May 16, 2019 ~ May 30, 2019
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Rona Chen , **Date:** Jun. 06, 2019

Rona Chen / Specialist

Approved by : , **Date:** Jun. 06, 2019

Dylan Chiou / 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 -20.64 dB at 0.16967 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 -1.1 dB at 5326.27 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

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

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	**Frequency**	**Expanded Uncertainty (k=2) (±)**
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Rugged Mobile Computer
Brand	Bitatek
Test Model	Frey Glider XS
Status of EUT	Engineering Sample
Power Supply Rating	5 Vdc / 9Vdc / 12Vdc (Adapter) 3.85 Vdc (Battery)
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 300.0 Mbps 802.11ac: up to 866.7 Mbps
Operating Frequency	5180 ~ 5240 MHz, 5260 ~ 5320 MHz, 5500 ~ 5700 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) 5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80) 5500 ~ 5700 MHz: 11 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 5 for 802.11n (HT40), 802.11ac (VHT40) 2 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	49.663 mW for 5180 ~ 5240 MHz 49.662 mW for 5260 ~ 5320 MHz 35.4 mW for 5500 ~ 5700 MHz 36.475 mW for 5745 ~ 5825 MHz
Antenna Type	PIFA antenna
Antenna Gain	5180 ~ 5240 MHz: -1.46 dBi (Chain-0) / 2.53 dBi (Chain-1) 5260 ~ 5320 MHz: -1.46 dBi (Chain-0) / 2.53 dBi (Chain-1) 5500 ~ 5700 MHz: 1.64 dBi (Chain-0) / 1.54 dBi (Chain-1) 5745 ~ 5825 MHz: 1.64 dBi (Chain-0) / 2.26 dBi (Chain-1)
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

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

Modulation Mode	Tx Function
802.11a	2TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX
802.11ac (VHT20)	2TX
802.11ac (VHT40)	2TX
802.11ac (VHT80)	2TX

* 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. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	TEN PAO	S018BYU1200150	I/P: 100-240 Vac, 50-60 Hz, 600 mA O/P: 5 Vdc, 3 A / 9 Vdc, 2 A / 12 Vdc, 1.5 A
Battery	TWS	MAXELL_ICP616180AWR	3.85 Vdc, 4000 mAh, 15.4Wh
USB Cable	Conntek	A36-A033-V149	0.95 m shielded cable w/o core
eMMC 1	Hynix	H9HP52ACPMMDAR-KMM	64GB
eMMC 2	Samsung	KMDD60018M-B320	32GB

3. 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 5260 ~ 5320 MHz

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
58	5290

For 5500 ~ 5700 MHz

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600		

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	122	5610

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	
-	√	√	√	√	2Tx

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

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

Radiated Emission Test (Above 1 GHz):

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

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
		802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	6.5
		802.11n (HT40)	54 to 62	54, 62	OFDM	BPSK	13.5
		802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	6.5
		802.11n (HT40)	102 to 134	102, 110, 134	OFDM	BPSK	13.5
		802.11ac (VHT80)	106 to 122	106, 122	OFDM	BPSK	29.3
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
		802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1 GHz):

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

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3

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)
-	5260-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
		802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	6.5
		802.11n (HT40)	54 to 62	54, 62	OFDM	BPSK	13.5
		802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	6.5
		802.11n (HT40)	102 to 134	102, 110, 134	OFDM	BPSK	13.5
		802.11ac (VHT80)	106 to 122	106, 122	OFDM	BPSK	29.3
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
		802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei
APCM	25 deg. C, 65 % RH	3.85 Vdc	Gavin Wu

3.3 Duty Cycle of Test Signal

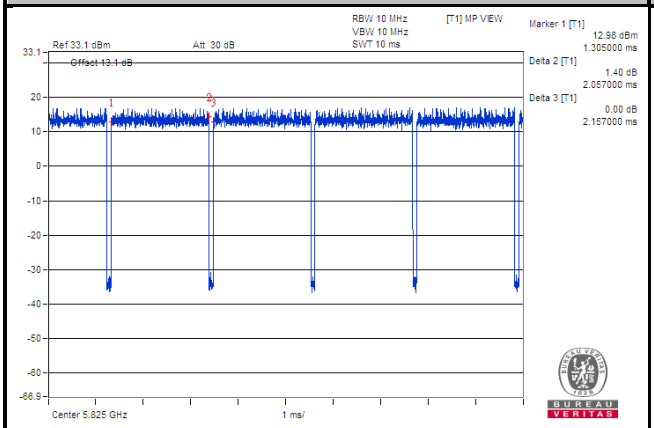
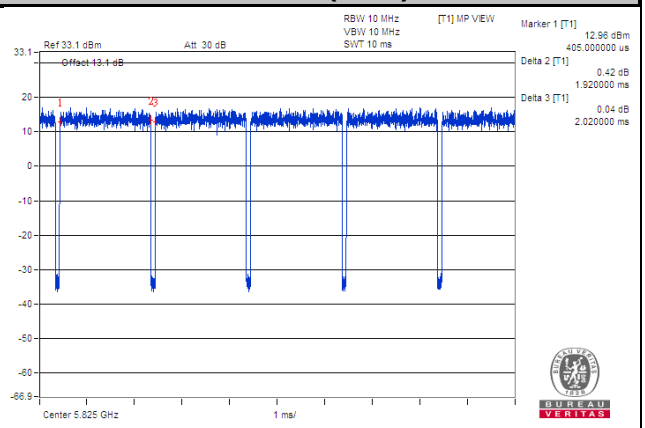
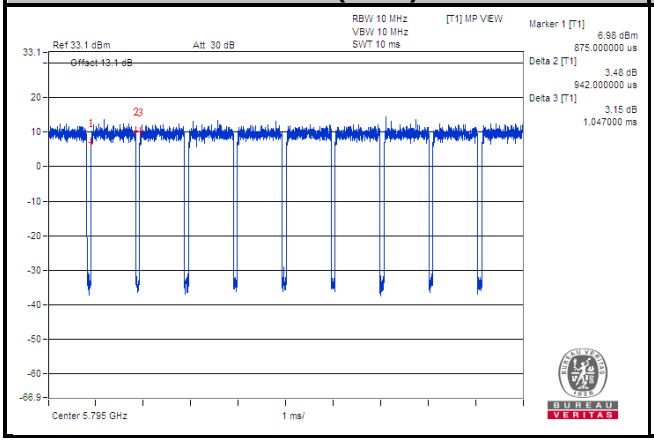
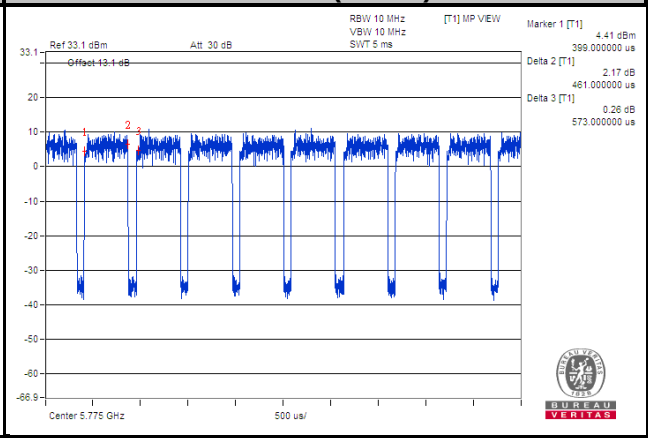
MODULATION TYPE: BPSK

802.11a: Duty cycle = 2.057/2.157 = 0.954, Duty factor = 10 * log(1/0.954) = 0.21

802.11n (HT20): Duty cycle = 1.920/2.020 = 0.950, Duty factor = 10 * log(1/0.950) = 0.22

802.11n (HT40): Duty cycle = 0.942/1.047 = 0.900, Duty factor = 10 * log(1/0.900) = 0.46

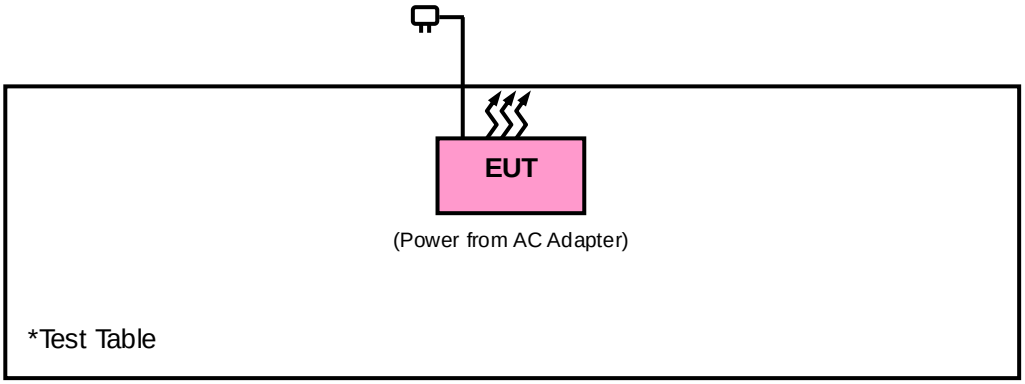
802.11ac (VHT80): Duty cycle = 0.461/0.573 = 0.805, Duty factor = 10 * log(1/0.805) = 0.94

802.11a	802.11n (HT20)
	
802.11n (HT40)	**802.11ac (VHT80)**
	

3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedures New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 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:

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

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1232002	Dec. 17, 2018	Dec. 16, 2019
Power Sensor Anritsu	MA2411B	1207325	Dec. 17, 2018	Dec. 16, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	Oct. 24, 2018	Oct. 23, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019

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 HsinTien Chamber 1.

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. Both Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated Emission above 30 MHz

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

Note:

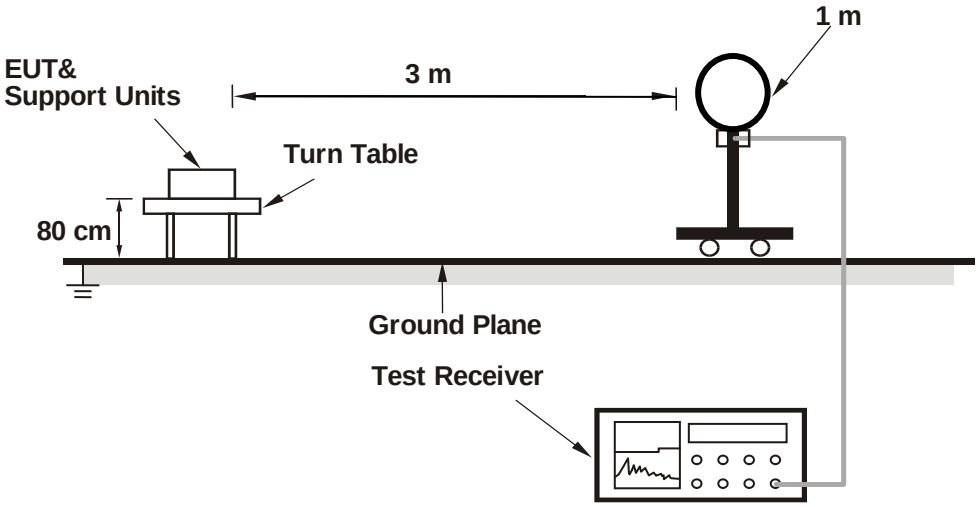
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK)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

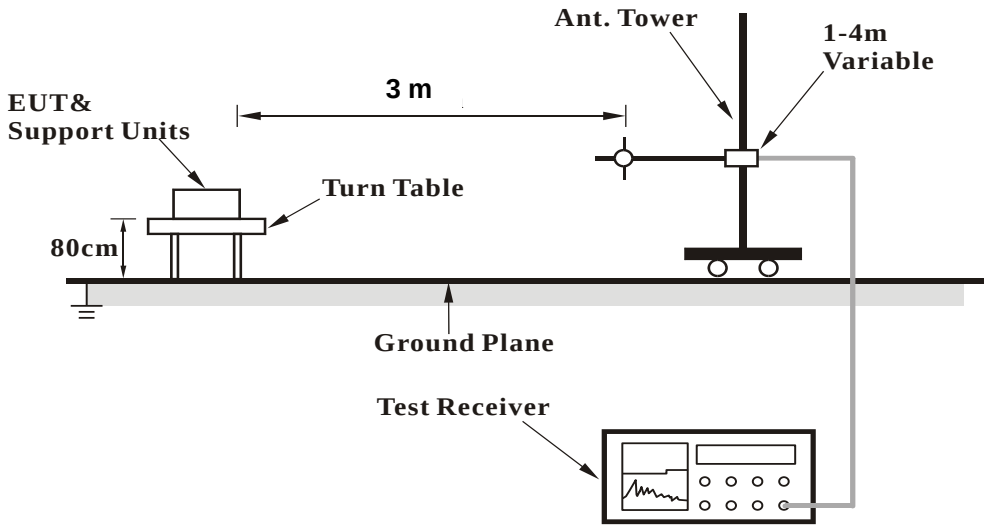
No deviation.

4.1.6 Test Setup

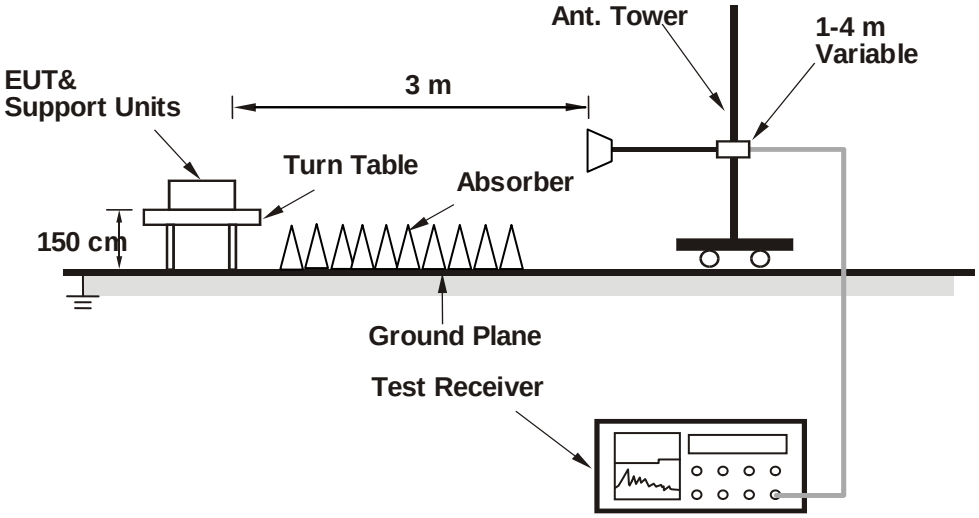
<Radiated Emission below 30 MHz>



<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

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

4.1.8 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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5144.15	42.67	34.42	8.25	54	-11.33	125	192	Average
5144.15	53.72	45.47	8.25	74	-20.28	125	192	Peak
5180	95.44	87.13	8.31			125	192	Average
5180	102.5	94.19	8.31			125	192	Peak
*10360	54.22	39.92	14.3	68.2	-13.98	154	44	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5145.35	43.5	35.25	8.25	54	-10.5	111	197	Average
5145.35	56.8	48.55	8.25	74	-17.2	111	197	Peak
5180	99.72	91.41	8.31			111	197	Average
5180	106.91	98.6	8.31			111	197	Peak
*10360	55.16	40.86	14.3	68.2	-13.04	123	161	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5145.5	42.63	34.38	8.25	54	-11.37	202	181	Average
5145.5	53.08	44.83	8.25	74	-20.92	202	181	Peak
5200	94.39	86.04	8.35			202	181	Average
5200	101.59	93.24	8.35			202	181	Peak
5441.08	42.6	33.81	8.79	54	-11.4	202	181	Average
5441.08	53.39	44.6	8.79	74	-20.61	202	181	Peak
*10400	54.94	40.6	14.34	68.2	-13.26	138	15	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5145.95	43.18	34.93	8.25	54	-10.82	111	197	Average
5145.95	56.69	48.44	8.25	74	-17.31	111	197	Peak
5200	99.71	91.36	8.35			111	197	Average
5200	106.56	98.21	8.35			111	197	Peak
5448.34	42.93	34.1	8.83	54	-11.07	111	197	Average
5448.34	53.69	44.86	8.83	74	-20.31	111	197	Peak
*10400	54.13	39.79	14.34	68.2	-14.07	163	22	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5200 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5240	94.85	86.41	8.44			202	181	Average
5240	101.94	93.5	8.44			202	181	Peak
5450.32	42.71	33.89	8.82	54	-11.29	202	181	Average
5450.32	52.81	43.99	8.82	74	-21.19	202	181	Peak
*10480	55.18	40.67	14.51	68.2	-13.02	104	95	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5240	98.29	89.85	8.44			111	197	Average
5240	105.67	97.23	8.44			111	197	Peak
5422.93	42.99	34.22	8.77	54	-11.01	111	197	Average
5422.93	54.16	45.39	8.77	74	-19.84	111	197	Peak
*10480	54.51	40	14.51	68.2	-13.69	115	322	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 52	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5148.35	42.43	34.18	8.25	54	-11.57	125	192	Average
5148.35	53.31	45.06	8.25	74	-20.69	125	192	Peak
5260	95.22	86.76	8.46			125	192	Average
5260	102.02	93.56	8.46			125	192	Peak
*10520	55.21	40.62	14.59	68.2	-12.99	150	155	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5135.75	42.59	34.34	8.25	54	-11.41	111	197	Average
5135.75	53.38	45.13	8.25	74	-20.62	111	197	Peak
5260	99.77	91.31	8.46			111	197	Average
5260	106.33	97.87	8.46			111	197	Peak
*10520	55.05	40.46	14.59	68.2	-13.15	185	99	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5260 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 60	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5101.25	42.51	34.35	8.16	54	-11.49	125	187	Average
5101.25	53.24	45.08	8.16	74	-20.76	125	187	Peak
5300	94.73	86.19	8.54			125	187	Average
5300	101.58	93.04	8.54			125	187	Peak
5443.06	42.68	33.89	8.79	54	-11.32	125	187	Average
5443.06	53.55	44.76	8.79	74	-20.45	125	187	Peak
10600	45.92	31.24	14.68	54	-8.08	186	199	Average
10600	55.87	41.19	14.68	74	-18.13	186	199	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5129.9	42.51	34.29	8.22	54	-11.49	111	197	Average
5129.9	53.52	45.3	8.22	74	-20.48	111	197	Peak
5300	99.25	90.71	8.54			111	197	Average
5300	106.08	97.54	8.54			111	197	Peak
5352.2	43.92	35.29	8.63	54	-10.08	111	197	Average
5352.2	54.04	45.41	8.63	74	-19.96	111	197	Peak
10600	46.08	31.4	14.68	54	-7.92	164	56	Average
10600	54.86	40.18	14.68	74	-19.14	164	56	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5300 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 64	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5320	95.44	86.86	8.58			125	187	Average
5320	102.1	93.52	8.58			125	187	Peak
5458.13	42.63	33.81	8.82	54	-11.37	125	187	Average
5458.13	54.05	45.23	8.82	74	-19.95	125	187	Peak
10640	45.98	31.25	14.73	54	-8.02	157	77	Average
10640	55.05	40.32	14.73	74	-18.95	157	77	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5320	99.66	91.08	8.58			100	138	Average
5320	106.65	98.07	8.58			100	138	Peak
5353.19	44.69	36.06	8.63	54	-9.31	100	138	Average
5353.19	64.73	56.1	8.63	74	-9.27	100	138	Peak
10640	46.17	31.44	14.73	54	-7.83	124	225	Average
10640	55.66	40.93	14.73	74	-18.34	124	225	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5320 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 100	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5442.96	42.69	33.9	8.79	54	-11.31	127	187	Average
5442.96	53.51	44.72	8.79	74	-20.49	127	187	Peak
*5469.36	51.92	43.09	8.83	68.2	-16.28	127	187	Peak
5500	91.46	82.54	8.92			127	187	Average
5500	98.76	89.84	8.92			127	187	Peak
11000	46.44	31.36	15.08	54	-7.56	140	245	Average
11000	55.74	40.66	15.08	74	-18.26	140	245	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5458.8	43.93	35.11	8.82	54	-10.07	111	197	Average
5458.8	54.8	45.98	8.82	74	-19.2	111	197	Peak
*5469.04	55.42	46.59	8.83	68.2	-12.78	111	197	Peak
5500	99.79	90.87	8.92			111	197	Average
5500	106.66	97.74	8.92			111	197	Peak
11000	46.36	31.28	15.08	54	-7.64	155	186	Average
11000	55.86	40.78	15.08	74	-18.14	155	186	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5500 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 116	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5442.8	42.64	33.85	8.79	54	-11.36	127	187	Average
5442.8	52.88	44.09	8.79	74	-21.12	127	187	Peak
*5469.68	51.53	42.7	8.83	68.2	-16.67	127	187	Peak
5580	92.75	83.76	8.99			127	187	Average
5580	99.46	90.47	8.99			127	187	Peak
*5725.56	52.25	43.09	9.16	68.2	-15.95	127	187	Peak
11160	46.44	31.36	15.08	54	-7.56	135	256	Average
11160	56.66	41.58	15.08	74	-17.34	135	256	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5448.72	43.01	34.18	8.83	54	-10.99	111	197	Average
5448.72	53.1	44.27	8.83	74	-20.9	111	197	Peak
*5469.04	51.98	43.15	8.83	68.2	-16.22	111	197	Peak
5580	99.85	90.86	8.99			111	197	Average
5580	106.65	97.66	8.99			111	197	Peak
*5726.04	53.14	43.98	9.16	68.2	-15.06	111	197	Peak
11160	46.53	31.45	15.08	54	-7.47	160	155	Average
11160	56.55	41.47	15.08	74	-17.45	160	155	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5580 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 140	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5700	93.65	84.52	9.13			104	197	Average
5700	100.31	91.18	9.13			104	197	Peak
*5725	57.6	48.44	9.16	68.2	-10.6	104	197	Peak
11400	46.63	31.53	15.1	54	-7.37	137	284	Average
11400	55.79	40.69	15.1	74	-18.21	137	284	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5700	101.37	92.24	9.13			111	197	Average
5700	108.2	99.07	9.13			111	197	Peak
*5725.24	61.5	52.34	9.16	68.2	-6.7	111	197	Peak
11400	46.38	31.28	15.1	54	-7.62	174	88	Average
11400	55.36	40.26	15.1	74	-18.64	174	88	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5700 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	95.78	86.59	9.19			104	197	Average
5745	102.88	93.69	9.19			104	197	Peak
11490	46.38	31.26	15.12	54	-7.62	141	156	Average
11490	55.35	40.23	15.12	74	-18.65	141	156	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	102.52	93.33	9.19			111	149	Average
5745	109.08	99.89	9.19			111	149	Peak
11490	46.12	31	15.12	54	-7.88	150	265	Average
11490	55.75	40.63	15.12	74	-18.25	150	265	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5598.175	54.15	45.14	9.01	68.2	-14.05	104	197	Peak
5653.825	49.76	40.67	9.09	71.03	-21.27	104	197	Peak
5922.625	49.56	40.16	9.4	69.96	-20.4	104	197	Peak
*5954.125	54.1	44.67	9.43	68.2	-14.1	104	197	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5633.35	53.8	44.73	9.07	68.2	-14.4	111	149	Peak
5655.4	51.78	42.69	9.09	72.2	-20.42	111	149	Peak
5921.575	51.93	42.53	9.4	70.73	-18.8	111	149	Peak
*5979.85	55.36	45.9	9.46	68.2	-12.84	111	149	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	95.38	86.15	9.23			104	197	Average
5785	102.63	93.4	9.23			104	197	Peak
11570	46.54	31.23	15.31	54	-7.46	105	285	Average
11570	56.32	41.01	15.31	74	-17.68	105	285	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	102.57	93.34	9.23			111	149	Average
5785	109.95	100.72	9.23			111	149	Peak
11570	46.56	31.25	15.31	54	-7.44	115	158	Average
11570	55.22	39.91	15.31	74	-18.78	115	158	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5535.175	52.53	43.59	8.94	68.2	-15.67	104	197	Peak
5653.3	49.43	40.33	9.1	70.64	-21.21	104	197	Peak
5921.575	51.22	41.82	9.4	70.73	-19.51	104	197	Peak
*5988.775	53.6	44.14	9.46	68.2	-14.6	104	197	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5592.925	53.96	44.95	9.01	68.2	-14.24	111	149	Peak
5651.725	51.16	42.07	9.09	69.48	-18.32	111	149	Peak
5922.1	51.1	41.7	9.4	70.35	-19.25	111	149	Peak
*5992.975	54.39	44.9	9.49	68.2	-13.81	111	149	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies 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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	95.76	86.47	9.29			104	197	Average
5825	102.29	93	9.29			104	197	Peak
11650	47.06	31.53	15.53	54	-6.94	116	286	Average
11650	56	40.47	15.53	74	-18	116	286	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	102.35	93.06	9.29			111	149	Average
5825	109.42	100.13	9.29			111	149	Peak
11650	46.76	31.23	15.53	54	-7.24	158	355	Average
11650	55.89	40.36	15.53	74	-18.11	158	355	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5647.525	53.71	44.64	9.07	68.2	-14.49	104	197	Peak
5653.825	51.98	42.89	9.09	71.03	-19.05	104	197	Peak
5923.15	51.22	41.82	9.4	69.57	-18.35	104	197	Peak
*5966.2	53.77	44.32	9.45	68.2	-14.43	104	197	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5649.1	54.1	45.03	9.07	68.2	-14.1	111	149	Peak
5652.25	51.86	42.77	9.09	69.86	-18	111	149	Peak
5923.15	50.56	41.16	9.4	69.57	-19.01	111	149	Peak
*5932.075	54.5	45.1	9.4	68.2	-13.7	111	149	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5146.1	42.51	34.26	8.25	54	-11.49	232	181	Average
5146.1	56.45	48.2	8.25	74	-17.55	232	181	Peak
5180	93.34	85.03	8.31			232	181	Average
5180	100.27	91.96	8.31			232	181	Peak
*10360	54.01	39.71	14.3	68.2	-14.19	165	223	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5146.7	43.03	34.78	8.25	54	-10.97	104	117	Average
5146.7	55.45	47.2	8.25	74	-18.55	104	117	Peak
5180	97.37	89.06	8.31			104	130	Average
5180	104.9	96.59	8.31			104	130	Peak
*10360	53.54	39.24	14.3	68.2	-14.66	168	107	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5145.65	42.82	34.57	8.25	54	-11.18	103	130	Average
5145.65	54.62	46.37	8.25	74	-19.38	103	130	Peak
5200	97.22	88.87	8.35			103	130	Average
5200	103.99	95.64	8.35			103	130	Peak
5365.95	42.94	34.3	8.64	54	-11.06	103	130	Average
5365.95	52.99	44.35	8.64	74	-21.01	103	130	Peak
*10400	53.69	39.35	14.34	68.2	-14.51	174	311	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5148.5	42.38	34.13	8.25	54	-11.62	202	181	Average
5148.5	52.94	44.69	8.25	74	-21.06	202	181	Peak
5200	93.03	84.68	8.35			202	181	Average
5200	99.89	91.54	8.35			202	181	Peak
5446.58	42.46	33.63	8.83	54	-11.54	202	181	Average
5446.58	53.08	44.25	8.83	74	-20.92	202	181	Peak
*10400	53.7	39.36	14.34	68.2	-14.5	115	39	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5200 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5240	92.83	84.39	8.44			202	181	Average
5240	100.2	91.76	8.44			202	181	Peak
5381.24	42.61	33.93	8.68	54	-11.39	202	181	Average
5381.24	53.66	44.98	8.68	74	-20.34	202	181	Peak
*10480	54.24	39.73	14.51	68.2	-13.96	159	261	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5240	97.3	88.86	8.44			104	130	Average
5240	104.45	96.01	8.44			104	130	Peak
5435.36	43.5	34.71	8.79	54	-10.5	104	130	Average
5435.36	53.78	44.99	8.79	74	-20.22	104	130	Peak
*10480	54.46	39.95	14.51	68.2	-13.74	132	108	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 52	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5126.3	42.28	34.06	8.22	54	-11.72	125	192	Average
5126.3	52.57	44.35	8.22	74	-21.43	125	192	Peak
5260	93.65	85.19	8.46			125	192	Average
5260	100.11	91.65	8.46			125	192	Peak
*10520	54.71	40.12	14.59	68.2	-13.49	178	88	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5130.2	42.37	34.15	8.22	54	-11.63	100	138	Average
5130.2	52.9	44.68	8.22	74	-21.1	100	138	Peak
5260	97.47	89.01	8.46			100	138	Average
5260	104.52	96.06	8.46			100	138	Peak
*10520	53.64	39.05	14.59	68.2	-14.56	159	66	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5260 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 60	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5116.55	42.22	34.02	8.2	54	-11.78	125	192	Average
5116.55	53.8	45.6	8.2	74	-20.2	125	192	Peak
5300	93.53	84.99	8.54			125	192	Average
5300	100.43	91.89	8.54			125	192	Peak
5353.63	42.59	33.96	8.63	54	-11.41	125	192	Average
5353.63	52.91	44.28	8.63	74	-21.09	125	192	Peak
10600	46.01	31.33	14.68	54	-7.99	102	22	Average
10600	54.11	39.43	14.68	74	-19.89	102	22	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5147.6	42.35	34.1	8.25	54	-11.65	100	138	Average
5147.6	52.91	44.66	8.25	74	-21.09	100	138	Peak
5300	97.55	89.01	8.54			100	138	Average
5300	104.29	95.75	8.54			100	138	Peak
5452.85	43.56	34.74	8.82	54	-10.44	100	138	Average
5452.85	55.34	46.52	8.82	74	-18.66	100	138	Peak
10600	45.93	31.25	14.68	54	-8.07	158	208	Average
10600	54.21	39.53	14.68	74	-19.79	158	208	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5300 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 64	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5320	93.44	84.86	8.58			125	192	Average
5320	100.62	92.04	8.58			125	192	Peak
5365.73	42.69	34.05	8.64	54	-11.31	125	192	Average
5365.73	55.18	46.54	8.64	74	-18.82	125	192	Peak
10640	45.96	31.23	14.73	54	-8.04	188	278	Average
10640	53.74	39.01	14.73	74	-20.26	188	278	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5320	97.56	88.98	8.58			100	138	Average
5320	104.4	95.82	8.58			100	138	Peak
5359.57	43.8	35.17	8.63	54	-10.2	100	138	Average
5359.57	59.43	50.8	8.63	74	-14.57	100	138	Peak
10640	46	31.27	14.73	54	-8	146	253	Average
10640	53.58	38.85	14.73	74	-20.42	146	253	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5320 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 100	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5453.04	42.79	33.97	8.82	54	-11.21	127	187	Average
5453.04	54.15	45.33	8.82	74	-19.85	127	187	Peak
*5469.84	56.09	47.26	8.83	68.2	-12.11	127	187	Peak
5500	91.19	82.27	8.92			127	187	Average
5500	98.7	89.78	8.92			127	187	Peak
11000	46.13	31.05	15.08	54	-7.87	198	265	Average
11000	55.84	40.76	15.08	74	-18.16	198	265	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5459.44	43.53	34.71	8.82	54	-10.47	111	197	Average
5459.44	60.53	51.71	8.82	74	-13.47	111	197	Peak
*5469.36	53.78	44.95	8.83	68.2	-14.42	111	197	Peak
5500	98.91	89.99	8.92			111	197	Average
5500	106.69	97.77	8.92			111	197	Peak
11000	46.34	31.26	15.08	54	-7.66	190	236	Average
11000	55.98	40.9	15.08	74	-18.02	190	236	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5500 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 116	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5443.6	42.55	33.76	8.79	54	-11.45	127	187	Average
5443.6	53.93	45.14	8.79	74	-20.07	127	187	Peak
*5469.52	52.18	43.35	8.83	68.2	-16.02	127	187	Peak
5580	91.08	82.09	8.99			127	187	Average
5580	98.13	89.14	8.99			127	187	Peak
*5725.96	52.3	43.14	9.16	68.2	-15.9	127	187	Peak
11600	45.73	30.3	15.43	54	-8.27	166	145	Average
11600	55.1	39.67	15.43	74	-18.9	166	145	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5454.8	42.97	34.15	8.82	54	-11.03	111	197	Average
5454.8	54.12	45.3	8.82	74	-19.88	111	197	Peak
*5469.84	52.02	43.19	8.83	68.2	-16.18	111	197	Peak
5580	98.79	89.8	8.99			111	197	Average
5580	105.71	96.72	8.99			111	197	Peak
*5725.4	53.1	43.94	9.16	68.2	-15.1	111	197	Peak
11600	46.23	30.8	15.43	54	-7.77	135	273	Average
11600	55.85	40.42	15.43	74	-18.15	135	273	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5580 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 140	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5700	91.51	82.38	9.13			127	187	Average
5700	100.2	91.07	9.13			127	187	Peak
*5725.96	55.82	46.66	9.16	68.2	-12.38	127	187	Peak
11400	46.04	30.94	15.1	54	-7.96	132	109	Average
11400	55.8	40.7	15.1	74	-18.2	132	109	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5700	99.63	90.5	9.13			111	197	Average
5700	107.33	98.2	9.13			111	197	Peak
*5725.72	55.5	46.34	9.16	68.2	-12.7	111	197	Peak
11400	45.97	30.87	15.1	54	-8.03	161	97	Average
11400	55.54	40.44	15.1	74	-18.46	161	97	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5700 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	94.76	85.57	9.19			104	194	Average
5745	102.87	93.68	9.19			104	194	Peak
11490	45.91	30.79	15.12	54	-8.09	139	257	Average
11490	55.54	40.42	15.12	74	-18.46	139	257	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5745	102.37	93.18	9.19			111	174	Average
5745	109.71	100.52	9.19			111	174	Peak
11490	46.74	31.62	15.12	54	-7.26	151	112	Average
11490	56.19	41.07	15.12	74	-17.81	151	112	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5576.125	54.21	45.21	9	68.2	-13.99	104	194	Peak
5653.3	51.84	42.74	9.1	70.64	-18.8	104	194	Peak
5922.1	51.73	42.33	9.4	70.35	-18.62	104	194	Peak
*6020.275	53.34	43.83	9.51	68.2	-14.86	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5644.375	53.67	44.6	9.07	68.2	-14.53	111	174	Peak
5651.2	53.64	44.55	9.09	69.09	-15.45	111	174	Peak
5922.625	52.93	43.53	9.4	69.96	-17.03	111	174	Peak
*6012.925	54.38	44.88	9.5	68.2	-13.82	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	95.57	86.34	9.23			104	194	Average
5785	102.5	93.27	9.23			104	194	Peak
11570	46.43	31.12	15.31	54	-7.57	134	39	Average
11570	56.16	40.85	15.31	74	-17.84	134	39	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5785	102.53	93.3	9.23			111	174	Average
5785	109.05	99.82	9.23			111	174	Peak
11570	45.82	30.51	15.31	54	-8.18	182	207	Average
11570	55.32	40.01	15.31	74	-18.68	182	207	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5572.975	53.5	44.51	8.99	68.2	-14.7	104	194	Peak
5653.3	53.01	43.91	9.1	70.64	-17.63	104	194	Peak
5920.525	52.44	43.06	9.38	71.51	-19.07	104	194	Peak
*5963.575	53.95	44.51	9.44	68.2	-14.25	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5636.5	54.16	45.09	9.07	68.2	-14.04	111	174	Peak
5652.25	53.49	44.4	9.09	69.86	-16.37	111	174	Peak
5922.1	52.73	43.33	9.4	70.35	-17.62	111	174	Peak
*5990.875	54.7	45.21	9.49	68.2	-13.5	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies 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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	94.57	85.28	9.29			104	194	Average
5825	101.76	92.47	9.29			104	194	Peak
11650	46.62	31.09	15.53	54	-7.38	103	208	Average
11650	56.08	40.55	15.53	74	-17.92	103	208	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5825	102.28	92.99	9.29			111	174	Average
5825	108.76	99.47	9.29			111	174	Peak
11650	46.27	30.74	15.53	54	-7.73	144	105	Average
11650	55.79	40.26	15.53	74	-18.21	144	105	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5588.725	54.27	45.26	9.01	68.2	-13.93	104	194	Peak
5655.4	52.82	43.73	9.09	72.2	-19.38	104	194	Peak
5921.05	52.61	43.23	9.38	71.12	-18.51	104	194	Peak
*5928.4	53.7	44.3	9.4	68.2	-14.5	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5619.175	53.53	44.48	9.05	68.2	-14.67	111	174	Peak
5656.45	53.35	44.26	9.09	72.97	-19.62	111	174	Peak
5923.675	52.39	42.99	9.4	69.18	-16.79	111	174	Peak
*5963.575	54.33	44.89	9.44	68.2	-13.87	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5149.25	43.08	34.83	8.25	54	-10.92	122	164	Average
5149.25	57.31	49.06	8.25	74	-16.69	122	164	Peak
5190	90.88	82.54	8.34			122	181	Average
5190	98.06	89.72	8.34			122	181	Peak
5443.06	42.43	33.64	8.79	54	-11.57	122	181	Average
5443.06	53.68	44.89	8.79	74	-20.32	122	181	Peak
*10380	53.84	39.49	14.35	68.2	-14.36	196	230	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5145.65	43.21	34.96	8.25	54	-10.79	109	163	Average
5145.65	54.05	45.8	8.25	74	-19.95	109	163	Peak
5190	94.59	86.25	8.34			103	130	Average
5190	101.77	93.43	8.34			103	130	Peak
5362.56	42.51	33.87	8.64	54	-11.49	109	163	Average
5362.56	53.42	44.78	8.64	74	-20.58	109	163	Peak
*10380	54.39	40.04	14.35	68.2	-13.81	121	57	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5190 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5125.55	42.28	34.06	8.22	54	-11.72	202	181	Average
5125.55	53.16	44.94	8.22	74	-20.84	202	181	Peak
5230	90.14	81.74	8.4			202	181	Average
5230	96.62	88.22	8.4			202	181	Peak
5442.73	42.6	33.81	8.79	54	-11.4	202	181	Average
5442.73	53.56	44.77	8.79	74	-20.44	202	181	Peak
*10460	54.08	39.57	14.51	68.2	-14.12	195	122	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5117.9	42.43	34.23	8.2	54	-11.57	104	130	Average
5117.9	53.81	45.61	8.2	74	-20.19	104	130	Peak
5230	94.58	86.18	8.4			104	130	Average
5230	100.96	92.56	8.4			104	130	Peak
5412.27	42.43	33.7	8.73	54	-11.57	104	130	Average
5412.27	53.62	44.89	8.73	74	-20.38	104	130	Peak
*10460	53.97	39.46	14.51	68.2	-14.23	128	4	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5230 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 54	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5133.05	42.85	34.63	8.22	54	-11.15	125	192	Average
5133.05	52.49	44.27	8.22	74	-21.51	125	192	Peak
5270	90.39	47.89	42.5			125	192	Average
5270	97.52	55.02	42.5			125	192	Peak
5442.95	43.06	34.27	8.79	54	-10.94	125	192	Average
5442.95	53.1	44.31	8.79	74	-20.9	125	192	Peak
*10540	54	39.38	14.62	68.2	-14.2	125	55	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5131.1	42.84	34.62	8.22	54	-11.16	100	138	Average
5131.1	53.13	44.91	8.22	74	-20.87	100	138	Peak
5270	94.7	86.21	8.49			100	138	Average
5270	101.06	92.57	8.49			100	138	Peak
5452.85	43.78	34.96	8.82	54	-10.22	100	138	Average
5452.85	55.24	46.42	8.82	74	-18.76	100	138	Peak
*10540	53.81	39.19	14.62	68.2	-14.39	181	246	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5270 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 62	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5122.55	42.69	34.47	8.22	54	-11.31	125	192	Average
5122.55	52.91	44.69	8.22	74	-21.09	125	192	Peak
5310	90.88	82.33	8.55			125	192	Average
5310	97.84	89.29	8.55			125	192	Peak
5350	50.16	41.53	8.63	54	-3.84	125	192	Average
5350	64.97	56.34	8.63	74	-9.03	125	192	Peak
10620	46.36	31.65	14.71	54	-7.64	153	259	Average
10620	53.7	38.99	14.71	74	-20.3	153	259	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5138.9	42.78	34.53	8.25	54	-11.22	100	138	Average
5138.9	53.03	44.78	8.25	74	-20.97	100	138	Peak
5310	94.93	86.38	8.55			100	138	Average
5310	101.94	93.39	8.55			100	138	Peak
5350.99	52.28	43.65	8.63	54	-1.72	100	109	Average
5350.99	65.45	56.82	8.63	74	-8.55	100	109	Peak
10620	46.59	31.88	14.71	54	-7.41	178	95	Average
10620	54.6	39.89	14.71	74	-19.4	178	95	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5310 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 102	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5458.8	42.63	33.81	8.82	54	-11.37	127	187	Average
5458.8	53.57	44.75	8.82	74	-20.43	127	187	Peak
*5469.84	51.82	42.99	8.83	68.2	-16.38	127	187	Peak
5510	89.03	80.12	8.91			127	187	Average
5510	96.11	87.2	8.91			127	187	Peak
*5724.92	51.56	42.4	9.16	68.2	-16.64	127	187	Peak
11020	46.12	31.05	15.07	54	-7.88	158	64	Average
11020	55.85	40.78	15.07	74	-18.15	158	64	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5459.44	43.58	34.76	8.82	54	-10.42	101	197	Average
5459.44	53.85	45.03	8.82	74	-20.15	101	197	Peak
*5469.84	53.71	44.88	8.83	68.2	-14.49	101	197	Peak
5510	96.95	88.04	8.91			101	197	Average
5510	103.8	94.89	8.91			101	197	Peak
*5725.48	53.04	43.88	9.16	68.2	-15.16	101	197	Peak
11020	46.31	31.24	15.07	54	-7.69	148	124	Average
11020	56.2	41.13	15.07	74	-17.8	148	124	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5510 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 110	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5457.2	42.52	33.7	8.82	54	-11.48	127	187	Average
5457.2	53.78	44.96	8.82	74	-20.22	127	187	Peak
*5469.68	52.18	43.35	8.83	68.2	-16.02	127	187	Peak
5550	89.4	80.43	8.97			127	187	Average
5550	96.73	87.76	8.97			127	187	Peak
*5726.04	52.74	43.58	9.16	68.2	-15.46	127	187	Peak
11100	46.28	31.19	15.09	54	-7.72	196	16	Average
11100	56	40.91	15.09	74	-18	196	16	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5457.52	43.03	34.21	8.82	54	-10.97	111	197	Average
5457.52	53.58	44.76	8.82	74	-20.42	111	197	Peak
*5469.68	51.81	42.98	8.83	68.2	-16.39	111	197	Peak
5550	96.82	87.85	8.97			111	197	Average
5550	103.81	94.84	8.97			111	197	Peak
*5725.56	53.74	44.58	9.16	68.2	-14.46	111	197	Peak
11100	47.45	32.36	15.09	54	-6.55	154	210	Average
11100	56.84	41.75	15.09	74	-17.16	154	210	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5550 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 134	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5453.68	42.59	33.77	8.82	54	-11.41	127	187	Average
5453.68	53.14	44.32	8.82	74	-20.86	127	187	Peak
*5470	51.23	42.4	8.83	68.2	-16.97	127	187	Peak
5670	90.82	81.72	9.1			127	187	Average
5670	97.65	88.55	9.1			127	187	Peak
*5725.56	54.27	45.11	9.16	68.2	-13.93	155	108	Peak
11340	46.35	31.26	15.09	54	-7.65	131	8	Average
11340	55.54	40.45	15.09	74	-18.46	131	8	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5442.96	42.73	33.94	8.79	54	-11.27	111	197	Average
5442.96	53.06	44.27	8.79	74	-20.94	111	197	Peak
*5469.84	52.41	43.58	8.83	68.2	-15.79	111	197	Peak
5670	98.11	89.01	9.1			111	197	Average
5670	104.51	95.41	9.1			111	197	Peak
*5725.72	62.84	53.68	9.16	68.2	-5.36	104	173	Peak
11340	46.39	31.3	15.09	54	-7.61	168	261	Average
11340	55.72	40.63	15.09	74	-18.28	168	261	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5670 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5755	92.77	83.56	9.21			104	194	Average
5755	99.95	90.74	9.21			104	194	Peak
11510	46.17	31.06	15.11	54	-7.83	130	66	Average
11510	55.86	40.75	15.11	74	-18.14	130	66	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5755	100.71	91.5	9.21			111	174	Average
5755	107.49	98.28	9.21			111	174	Peak
11510	46.48	31.37	15.11	54	-7.52	174	123	Average
11510	56.03	40.92	15.11	74	-17.97	174	123	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5636.5	52.81	43.74	9.07	68.2	-15.39	104	194	Peak
5652.25	51	41.91	9.09	69.86	-18.86	104	194	Peak
5921.575	52.22	42.82	9.4	70.73	-18.51	104	194	Peak
*5952.025	53.37	43.94	9.43	68.2	-14.83	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5547.775	54.05	45.09	8.96	68.2	-14.15	111	174	Peak
5655.4	53.82	44.73	9.09	72.2	-18.38	111	174	Peak
5921.575	53.06	43.66	9.4	70.73	-17.67	111	174	Peak
*6017.125	54.45	44.94	9.51	68.2	-13.75	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5755 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5795	92.54	83.3	9.24			104	194	Average
5795	99.58	90.34	9.24			104	194	Peak
11590	46.19	30.82	15.37	54	-7.81	173	215	Average
11590	55.66	40.29	15.37	74	-18.34	173	215	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5795	101.29	92.05	9.24			111	174	Average
5795	107.39	98.15	9.24			111	174	Peak
11590	45.88	30.51	15.37	54	-8.12	168	223	Average
11590	55.57	40.2	15.37	74	-18.43	168	223	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5501.575	53.67	44.76	8.91	68.2	-14.53	104	194	Peak
5653.3	51.17	42.07	9.1	70.64	-19.47	104	194	Peak
5920.525	50.78	41.4	9.38	71.51	-20.73	104	194	Peak
*5929.45	53.87	44.47	9.4	68.2	-14.33	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5506.825	53.58	44.67	8.91	68.2	-14.62	111	174	Peak
5653.3	51.82	42.72	9.1	70.64	-18.82	111	174	Peak
5922.625	51.2	41.8	9.4	69.96	-18.76	111	174	Peak
*5990.875	54.74	45.25	9.49	68.2	-13.46	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5795 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5148.95	46.12	37.87	8.25	54	-7.88	197	181	Average
5148.95	56.82	48.57	8.25	74	-17.18	197	181	Peak
5210	84.91	76.55	8.36			202	181	Average
5210	96.18	87.82	8.36			202	181	Peak
5427.99	43.31	34.54	8.77	54	-10.69	202	181	Average
5427.99	53.76	44.99	8.77	74	-20.24	202	181	Peak
*10420	53.43	39.02	14.41	68.2	-14.77	141	168	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5149.55	50.13	41.88	8.25	54	-3.87	110	130	Average
5149.55	61.52	53.27	8.25	74	-12.48	110	130	Peak
5210	92.71	84.35	8.36			101	130	Average
5210	99.8	91.44	8.36			101	130	Peak
5419.3	44.51	35.74	8.77	54	-9.49	110	130	Average
5419.3	53.84	45.07	8.77	74	-20.16	110	130	Peak
*10420	54.67	40.26	14.41	68.2	-13.53	153	100	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5210 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 58	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5132.3	42.86	34.64	8.22	54	-11.14	125	192	Average
5132.3	53.66	45.44	8.22	74	-20.34	125	192	Peak
5290	85.25	76.72	8.53			125	192	Average
5290	92.49	83.96	8.53			125	192	Peak
5350.11	48.56	39.93	8.63	54	-5.44	125	192	Average
5350.11	58.28	49.65	8.63	74	-15.72	125	192	Peak
*10580	54.91	40.26	14.65	68.2	-13.29	190	355	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5144.9	43.06	34.81	8.25	54	-10.94	100	138	Average
5144.9	53.76	45.51	8.25	74	-20.24	100	138	Peak
5290	89.52	80.99	8.53			100	138	Average
5290	96.07	87.54	8.53			100	138	Peak
5356.27	**52.9**	**44.27**	**8.63**	**54**	**-1.1**	**100**	**125**	**Average**
5356.27	62.69	54.06	8.63	74	-11.31	100	125	Peak
*10580	54.33	39.68	14.65	68.2	-13.87	154	222	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5290 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 106	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5453.36	43.25	34.43	8.82	54	-10.75	104	192	Average
5453.36	54.46	45.64	8.82	74	-19.54	104	192	Peak
*5469.36	54.71	45.88	8.83	68.2	-13.49	107	192	Peak
5530	85.84	76.91	8.93			127	187	Average
5530	93.8	84.87	8.93			127	187	Peak
*5725.56	52.17	43.01	9.16	68.2	-16.03	127	187	Peak
11060	46.39	31.31	15.08	54	-7.61	174	288	Average
11060	55.98	40.9	15.08	74	-18.02	174	288	Peak

Antenna Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5446.8	45.9	37.07	8.83	54	-8.1	138	115	Average
5446.8	57.3	48.47	8.83	74	-16.7	138	115	Peak
*5469.04	57.51	48.68	8.83	68.2	-10.69	192	105	Peak
5530	94.04	85.11	8.93			100	174	Average
5530	101.31	92.38	8.93			100	174	Peak
*5726.04	52.91	43.75	9.16	68.2	-15.29	100	174	Peak
11060	46.23	31.15	15.08	54	-7.77	160	139	Average
11060	55.94	40.86	15.08	74	-18.06	160	139	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5530 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 122	**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**	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5441.04	43.42	34.63	8.79	54	-10.58	127	187	Average
5441.04	53.31	44.52	8.79	74	-20.69	127	187	Peak
*5469.04	51.47	42.64	8.83	68.2	-16.73	127	187	Peak
5610	87.1	78.07	9.03			127	187	Average
5610	94.39	85.36	9.03			127	187	Peak
*5725.4	52.38	43.22	9.16	68.2	-15.82	127	187	Peak
11220	46.74	31.65	15.09	54	-7.26	163	341	Average
11220	56.22	41.13	15.09	74	-17.78	163	341	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5445.84	43.49	34.66	8.83	54	-10.51	111	197	Average
5445.84	53.33	44.5	8.83	74	-20.67	111	197	Peak
*5470	51.12	42.29	8.83	68.2	-17.08	111	197	Peak
5610	95.18	86.15	9.03			111	197	Average
5610	102.36	93.33	9.03			111	197	Peak
*5725.96	53.88	44.72	9.16	68.2	-14.32	111	197	Peak
11220	46.81	31.72	15.09	54	-7.19	150	343	Average
11220	56.45	41.36	15.09	74	-17.55	150	343	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5610 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

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**	Karl Lee

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	89.56	80.33	9.23			104	194	Average
5775	96.71	87.48	9.23			104	194	Peak
11550	46.87	31.6	15.27	54	-7.13	108	137	Average
11550	56.21	40.94	15.27	74	-17.79	108	137	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
5775	96.62	87.39	9.23			111	174	Average
5775	104.53	95.3	9.23			111	174	Peak
11550	46.67	31.4	15.27	54	-7.33	163	224	Average
11550	56.25	40.98	15.27	74	-17.75	163	224	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5555.65	53.55	44.58	8.97	68.2	-14.65	104	194	Peak
5653.3	51.63	42.53	9.1	70.64	-19.01	104	194	Peak
5921.575	51.13	41.73	9.4	70.73	-19.6	104	194	Peak
*5965.675	53.45	44	9.45	68.2	-14.75	104	194	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
*5649.1	54.65	45.58	9.07	68.2	-13.55	111	174	Peak
5652.775	54.64	45.54	9.1	70.25	-15.61	111	174	Peak
5923.15	51.44	42.04	9.4	69.57	-18.13	111	174	Peak
*5935.225	55.38	45.98	9.4	68.2	-12.82	111	174	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. 5775 MHz: Fundamental Frequency
3. *: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

9 kHz ~ 30 MHz Data:

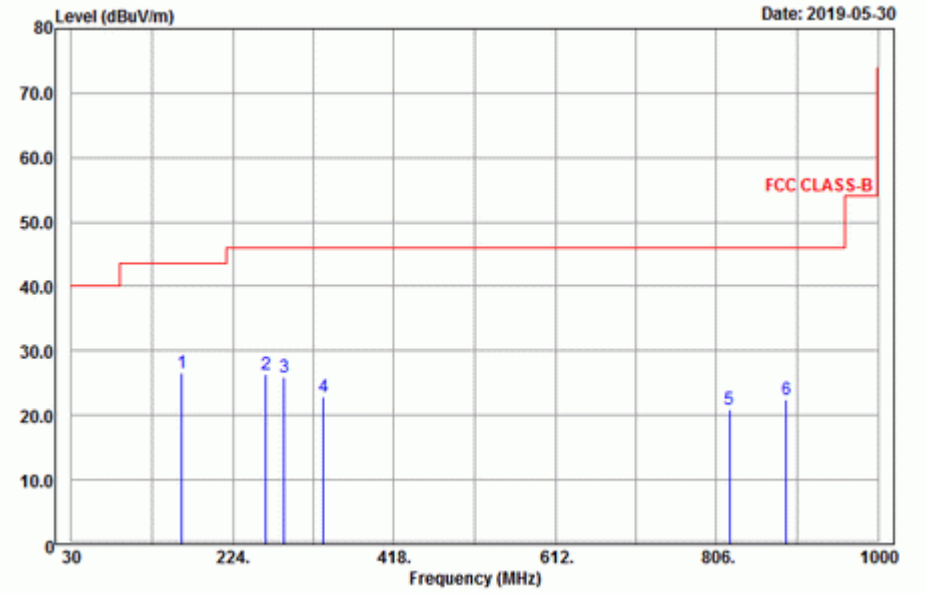
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

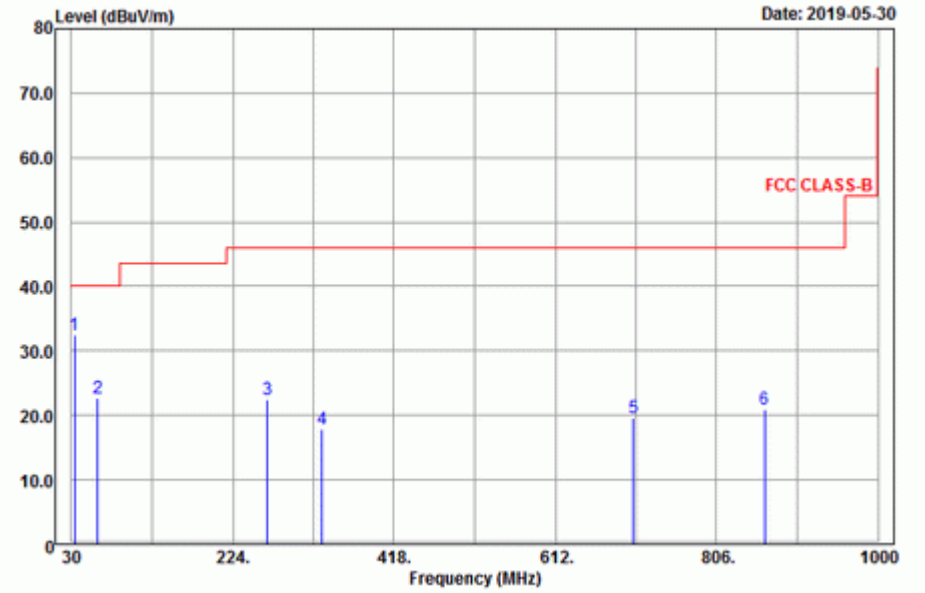
802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 58	**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**	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
163.11	26.58	48.47	-21.89	43.5	-16.92	105	163	Peak
264.09	26.44	44.06	-17.62	46	-19.56	143	255	Peak
286.23	25.92	43.21	-17.29	46	-20.08	188	285	Peak
332.9	22.91	38.95	-16.04	46	-23.09	132	226	Peak
821.5	20.93	28.89	-7.96	46	-25.07	154	178	Peak
890.1	22.47	29.12	-6.65	46	-23.53	123	32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
33.51	32.58	52.25	-19.67	40	-7.42	105	104	Peak
61.32	22.75	40.97	-18.22	40	-17.25	114	143	Peak
265.44	22.45	40.05	-17.6	46	-23.55	154	178	Peak
331.5	17.86	33.92	-16.06	46	-28.14	115	175	Peak
706	19.61	29.27	-9.66	46	-26.39	164	189	Peak
863.5	20.98	28.06	-7.08	46	-25.02	102	353	Peak

Remarks:

1. Emission Level = Read Level + Factor
   Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit

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. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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

4.2.3 Test Procedures

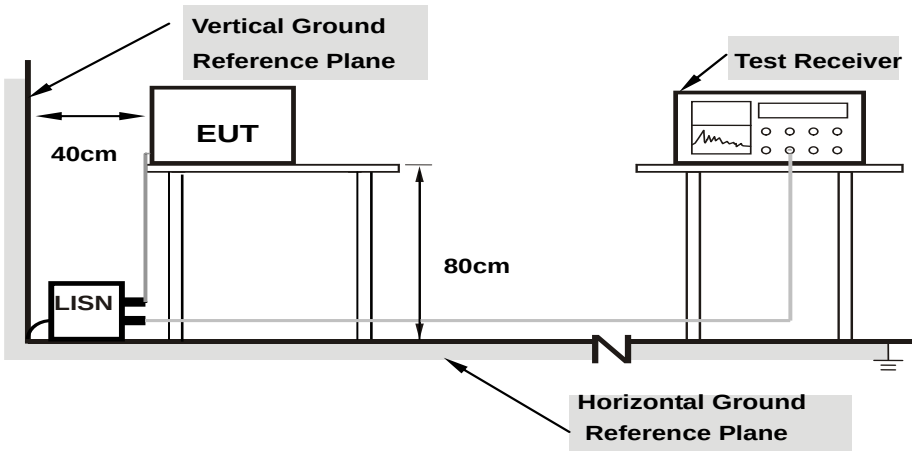
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

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

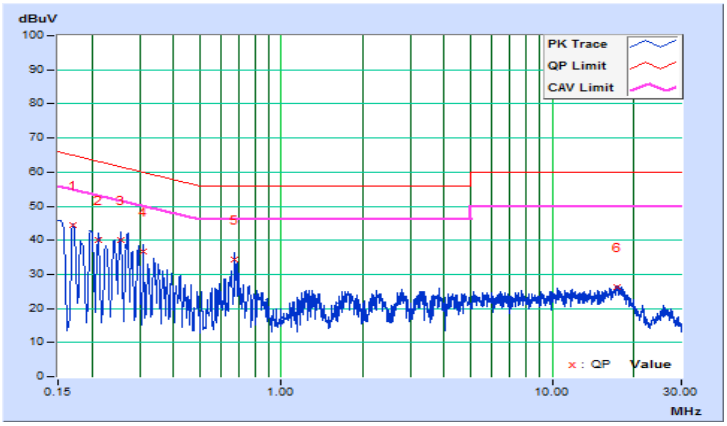
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Thomas Wei	Test Date	2019/5/25

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.16967**	**9.84**	**34.50**	**19.97**	**44.34**	**29.81**	**64.98**	**54.98**	**-20.64**	**-25.17**
2	0.21256	9.85	30.24	14.57	40.09	24.42	63.10	53.10	-23.01	-28.68
3	0.25458	9.86	30.31	13.28	40.17	23.14	61.61	51.61	-21.44	-28.47
4	0.31031	9.87	26.67	8.78	36.54	18.65	59.96	49.96	-23.42	-31.31
5	0.67394	9.90	24.36	5.31	34.26	15.21	56.00	46.00	-21.74	-30.79
6	17.26798	10.23	15.99	4.90	26.22	15.13	60.00	50.00	-33.78	-34.87

Remarks:

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

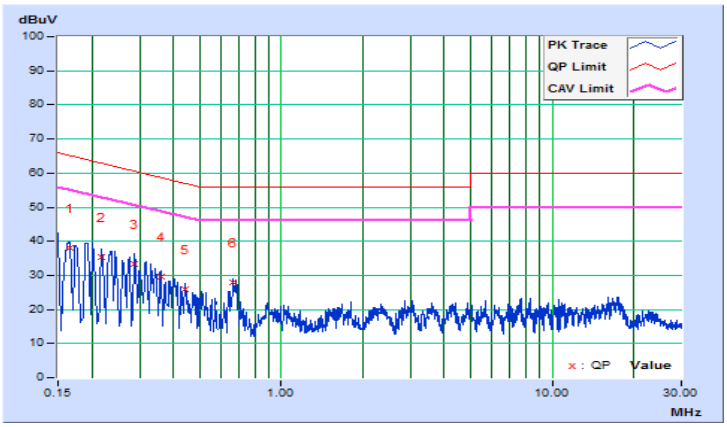


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Thomas Wei	Test Date	2019/5/25

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16526	9.83	28.11	12.54	37.94	22.37	65.20	55.20	-27.26	-32.83
2	0.21679	9.84	25.57	11.39	35.41	21.23	62.94	52.94	-27.53	-31.71
3	0.28685	9.85	23.37	7.33	33.22	17.18	60.62	50.62	-27.40	-33.44
4	0.35953	9.86	19.79	6.28	29.65	16.14	58.74	48.74	-29.09	-32.60
5	0.44273	9.87	16.16	4.05	26.03	13.92	57.01	47.01	-30.98	-33.09
6	0.66255	9.87	18.17	9.27	28.04	19.14	56.00	46.00	-27.96	-26.86

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

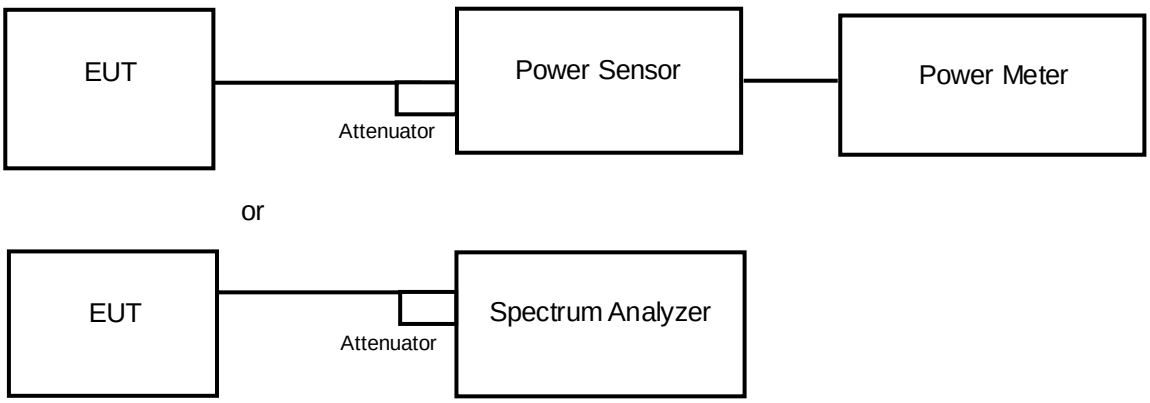
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};

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

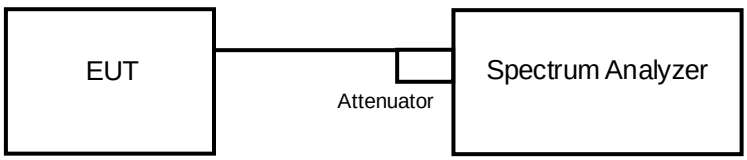
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<802.11a, 802.11n (HT20), 802.11n (HT40)>

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

<802.11ac (VHT80)>

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

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:

802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	13.96	13.94	49.663	16.96	24	Pass
40	5200	13.86	13.86	48.644	16.87	24	Pass
48	5240	13.93	13.94	49.491	16.95	24	Pass
52	5260	13.92	13.81	48.704	16.88	24	Pass
60	5300	13.89	13.84	48.701	16.88	24	Pass
64	5320	13.95	13.95	49.662	16.96	24	Pass
100	5500	11.84	11.76	30.273	14.81	24	Pass
116	5580	11.92	11.59	29.981	14.77	24	Pass
140	5700	11.98	11.85	31.087	14.93	24	Pass
149	5745	12.41	12.32	34.479	15.38	30	Pass
157	5785	12.24	12.43	34.247	15.35	30	Pass
165	5825	12.22	12.53	34.578	15.39	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (22.26) = 24.47 dBm > 24 dBm.
2. 11 dBm + 10log (21.90) = 24.40 dBm > 24 dBm.
3. 11 dBm + 10log (21.98) = 24.42 dBm > 24 dBm.
4. 11 dBm + 10log (22.08) = 24.43 dBm > 24 dBm.
5. 11 dBm + 10log (22.18) = 24.45 dBm > 24 dBm.
6. 11 dBm + 10log (21.59) = 24.34 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (21.43) = 24.31 dBm > 24 dBm.
2. 11 dBm + 10log (21.29) = 24.28 dBm > 24 dBm.
3. 11 dBm + 10log (21.54) = 24.33 dBm > 24 dBm.
4. 11 dBm + 10log (21.40) = 24.30 dBm > 24 dBm.
5. 11 dBm + 10log (21.49) = 24.32 dBm > 24 dBm.
6. 11 dBm + 10log (21.49) = 24.32 dBm > 24 dBm.

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	10.92	10.94	24.776	13.94	24	Pass
40	5200	10.88	10.81	24.296	13.86	24	Pass
48	5240	10.84	10.85	24.296	13.86	24	Pass
52	5260	10.93	10.91	24.719	13.93	24	Pass
60	5300	10.87	10.81	24.268	13.85	24	Pass
64	5320	10.92	10.84	24.493	13.89	24	Pass
100	5500	10.88	10.82	24.324	13.86	24	Pass
116	5580	10.87	10.90	24.521	13.90	24	Pass
140	5700	10.84	10.80	24.157	13.83	24	Pass
149	5745	12.38	12.40	34.676	15.40	30	Pass
157	5785	12.19	12.58	34.671	15.40	30	Pass
165	5825	12.30	12.50	34.765	15.41	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (23.52) = 24.71 dBm > 24 dBm.
2. 11 dBm + 10log (23.18) = 24.65 dBm > 24 dBm.
3. 11 dBm + 10log (22.98) = 24.61 dBm > 24 dBm.
4. 11 dBm + 10log (22.94) = 24.60 dBm > 24 dBm.
5. 11 dBm + 10log (22.93) = 24.60 dBm > 24 dBm.
6. 11 dBm + 10log (23.28) = 24.66 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (23.15) = 24.64 dBm > 24 dBm.
2. 11 dBm + 10log (22.98) = 24.61 dBm > 24 dBm.
3. 11 dBm + 10log (23.35) = 24.68 dBm > 24 dBm.
4. 11 dBm + 10log (23.24) = 24.66 dBm > 24 dBm.
5. 11 dBm + 10log (23.56) = 24.72 dBm > 24 dBm.
6. 11 dBm + 10log (23.12) = 24.63 dBm > 24 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				
38	5190	10.90	10.90	24.606	13.91	24	Pass
46	5230	10.90	10.83	24.409	13.88	24	Pass
54	5270	10.94	10.92	24.776	13.94	24	Pass
62	5310	10.83	10.82	24.184	13.84	24	Pass
102	5510	10.93	10.80	24.411	13.88	24	Pass
110	5550	10.62	10.69	23.257	13.67	24	Pass
134	5670	10.95	10.87	24.663	13.92	24	Pass
151	5755	12.32	12.44	34.6	15.39	30	Pass
159	5795	12.28	12.42	34.362	15.36	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (41.87) = 27.21 dBm > 24 dBm.
2. 11 dBm + 10log (42.00) = 27.23 dBm > 24 dBm.
3. 11 dBm + 10log (41.67) = 27.19 dBm > 24 dBm.
4. 11 dBm + 10log (41.84) = 27.21 dBm > 24 dBm.
5. 11 dBm + 10log (41.89) = 27.22 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (41.52) = 27.18 dBm > 24 dBm.
2. 11 dBm + 10log (41.60) = 27.19 dBm > 24 dBm.
3. 11 dBm + 10log (41.47) = 27.17 dBm > 24 dBm.
4. 11 dBm + 10log (41.69) = 27.20 dBm > 24 dBm.
5. 11 dBm + 10log (41.67) = 27.19 dBm > 24 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				
42	5210	10.80	10.83	24.129	13.83	24	Pass
58	5290	7.65	7.51	11.457	10.59	24	Pass
106	5530	10.90	10.86	24.493	13.89	24	Pass
122	5610	10.80	10.89	24.297	13.86	24	Pass
155	5775	12.30	12.46	34.602	15.39	30	Pass

Note:

For U-NII-2A, U-NII-2C Band:

Chain 0

1. 11 dBm + 10log (85.67) = 30.32 dBm > 24 dBm.
2. 11 dBm + 10log (85.61) = 30.32 dBm > 24 dBm.
3. 11 dBm + 10log (86.34) = 30.36 dBm > 24 dBm.

Chain 1

1. 11 dBm + 10log (84.90) = 30.28 dBm > 24 dBm.
2. 11 dBm + 10log (84.77) = 30.28 dBm > 24 dBm.
3. 11 dBm + 10log (84.68) = 30.27 dBm > 24 dBm.

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	22.44	21.55
40	5200	21.87	21.48
48	5240	22.23	21.60
52	5260	22.26	21.43
60	5300	21.90	21.29
64	5320	21.98	21.54
100	5500	22.08	21.40
116	5580	22.18	21.49
140	5700	21.59	21.49

802.11n (HT20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	23.25	23.31
40	5200	23.57	23.07
48	5240	23.66	23.22
52	5260	23.52	23.15
60	5300	23.18	22.98
64	5320	22.98	23.35
100	5500	22.94	23.24
116	5580	22.93	23.56
140	5700	23.28	23.12

802.11n (HT40)

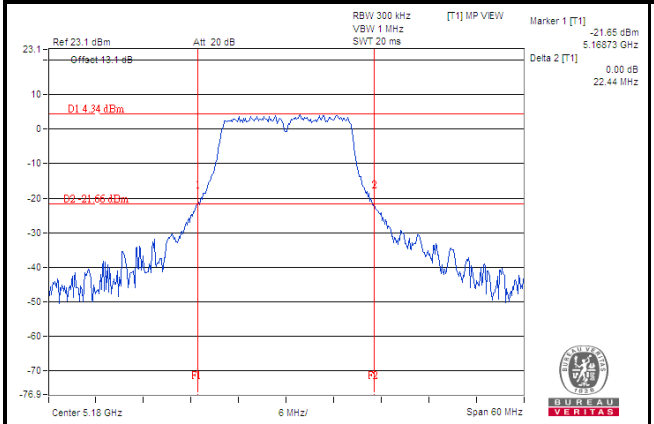
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.88	41.70
46	5230	41.95	41.47
54	5270	41.87	41.52
62	5310	42.00	41.60
102	5510	41.67	41.47
110	5550	41.84	41.69
134	5670	41.89	41.67

802.11ac (VHT80)

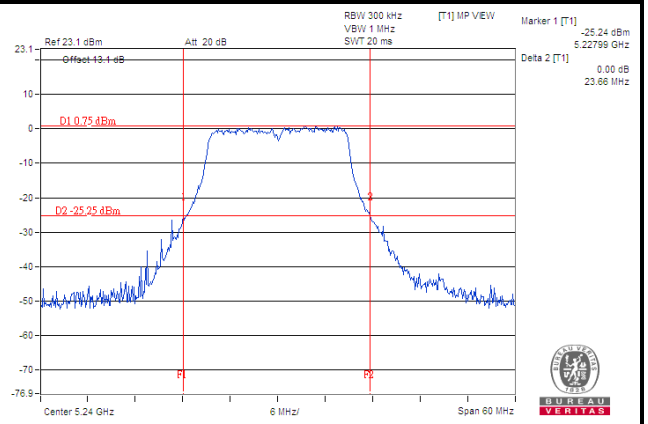
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	86.04	85.08
58	5290	85.67	84.90
106	5530	85.61	84.77
122	5610	86.34	84.68

Spectrum Plot of Worst Value

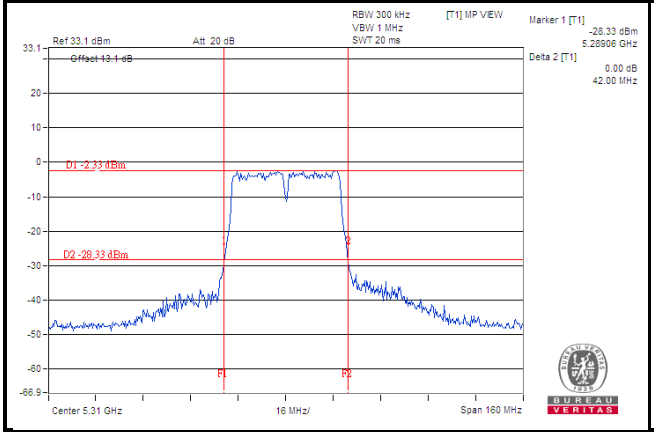
802.11a



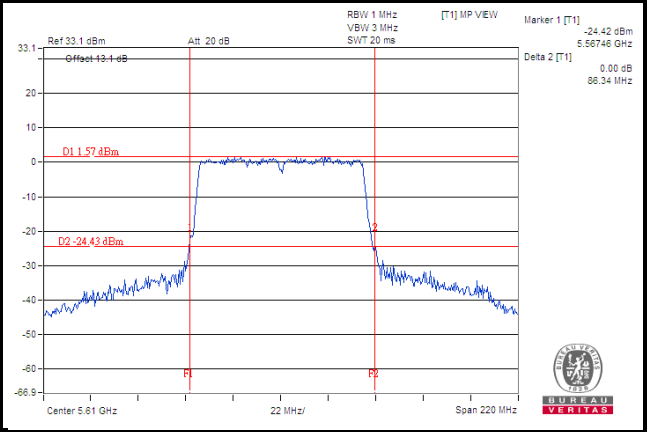
802.11n (HT20)



802.11n (HT40)

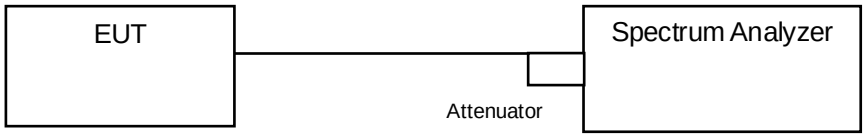


802.11ac (VHT80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.80	16.80
40	5200	16.92	16.68
48	5240	16.80	16.80
52	5260	16.80	16.56
60	5300	16.80	16.80
64	5320	16.80	16.80
100	5500	16.80	16.80
116	5580	16.92	16.80
140	5700	16.80	16.68
149	5745	16.74	16.74
157	5785	16.74	16.74
165	5825	16.83	16.74

802.11n (HT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	18.00	18.00
40	5200	18.12	17.88
48	5240	18.00	18.00
52	5260	18.00	18.00
60	5300	18.12	18.12
64	5320	18.00	18.00
100	5500	18.00	18.00
116	5580	18.00	17.88
140	5700	18.12	18.00
149	5745	17.98	17.88
157	5785	17.98	18.08
165	5825	17.98	17.88

802.11n (HT40)

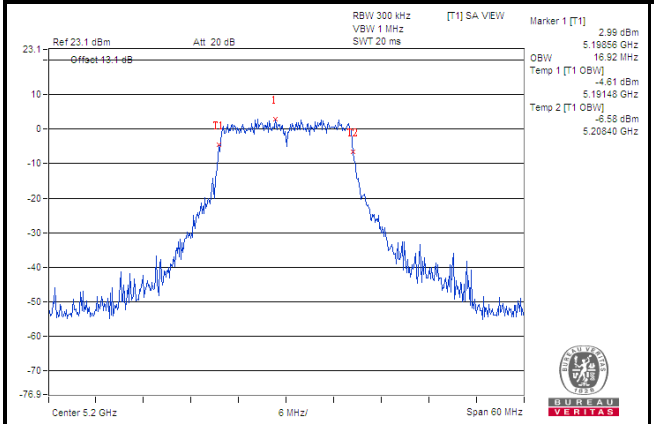
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.96	36.84
46	5230	36.96	36.96
54	5270	36.96	36.84
62	5310	36.96	36.84
102	5510	36.96	36.96
110	5550	36.96	36.84
134	5670	36.84	37.08
151	5755	36.96	36.96
159	5795	36.84	36.96

802.11ac (VHT80)

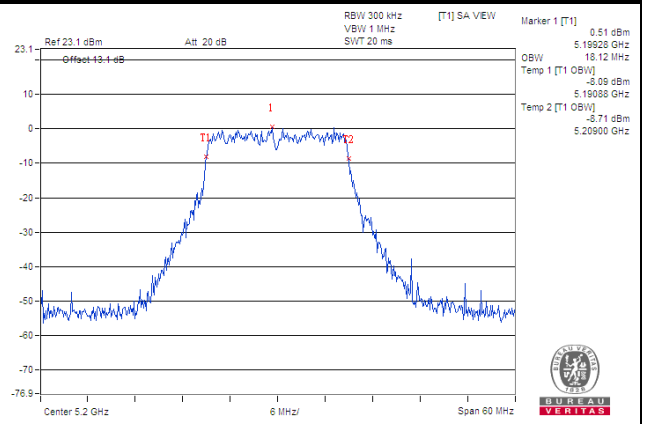
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.08	75.84
58	5290	76.08	76.08
106	5530	76.08	76.08
122	5610	76.32	76.32
155	5775	76.16	75.96

Spectrum Plot of Worst Value

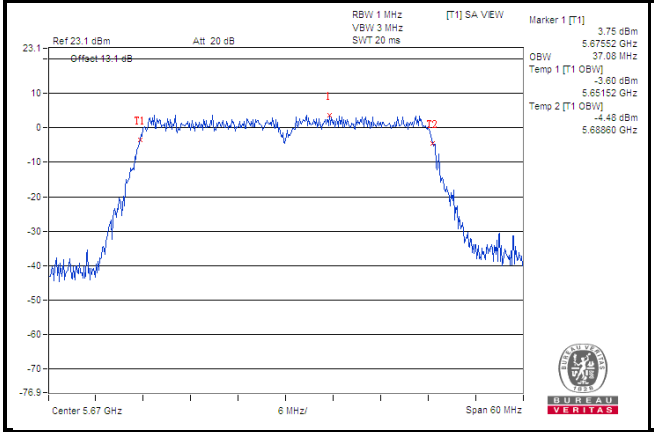
802.11a



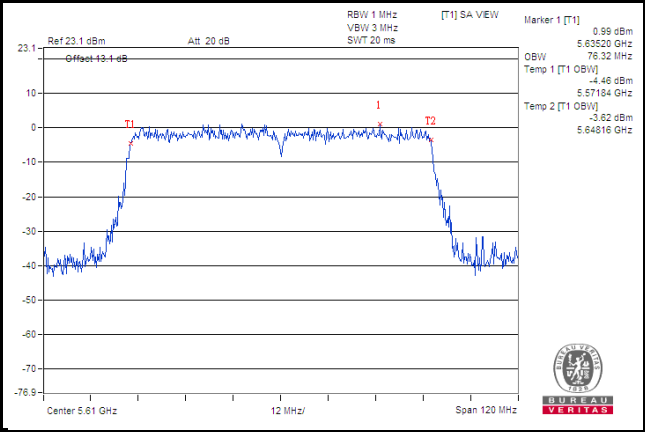
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

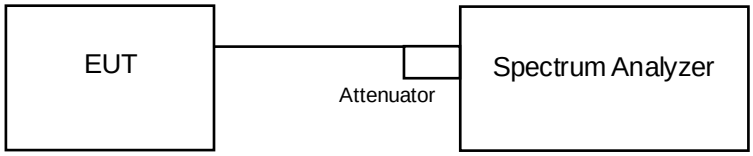


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	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, U-NII-2A, U-NII-2C band:

Using method SA-2

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

※For U-NII-3:

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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, U-NII-2A, U-NII-2C Band

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-1.15	-0.98	0.21	2.15	11	Pass
40	5200	-1.14	-1.02	0.21	2.14	11	Pass
48	5240	-1.02	-1.30	0.21	2.06	11	Pass
52	5260	-1.19	-1.28	0.21	1.98	11	Pass
60	5300	-1.52	-1.35	0.21	1.78	11	Pass
64	5320	-1.23	-1.16	0.21	2.02	11	Pass
100	5500	-1.82	-2.14	0.21	1.24	11	Pass
116	5580	-1.45	-1.91	0.21	1.54	11	Pass
140	5700	-1.80	-2.08	0.21	1.28	11	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1, U-NII-2A Band:**
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 3.77 dBi < 6 dBi, so the limit no need to reduced.
   For U-NII-2C Band:
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 4.60 dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-4.00	-4.74	0.22	-1.12	11	Pass
40	5200	-4.17	-4.71	0.22	-1.20	11	Pass
48	5240	-4.26	-5.19	0.22	-1.47	11	Pass
52	5260	-3.93	-4.66	0.22	-1.05	11	Pass
60	5300	-4.17	-4.89	0.22	-1.28	11	Pass
64	5320	-4.18	-4.08	0.22	-0.90	11	Pass
100	5500	-3.24	-2.95	0.22	0.14	11	Pass
116	5580	-3.21	-3.98	0.22	-0.35	11	Pass
140	5700	-4.24	-3.51	0.22	-0.63	11	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1, U-NII-2A Band:**
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 3.77 dBi < 6 dBi, so the limit no need to reduced.
   For U-NII-2C Band:
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 4.60 dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-6.97	-7.72	0.46	-3.86	11	Pass
46	5230	-7.39	-7.52	0.46	-3.98	11	Pass
54	5270	-6.51	-7.76	0.46	-3.62	11	Pass
62	5310	-7.25	-7.54	0.46	-3.92	11	Pass
102	5510	-6.17	-5.99	0.46	-2.61	11	Pass
110	5550	-6.35	-6.46	0.46	-2.94	11	Pass
134	5670	-6.85	-6.25	0.46	-3.07	11	Pass

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1, U-NII-2A Band:**
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 3.77 dBi < 6 dBi, so the limit no need to reduced.
   For U-NII-2C Band:
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 4.60 dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

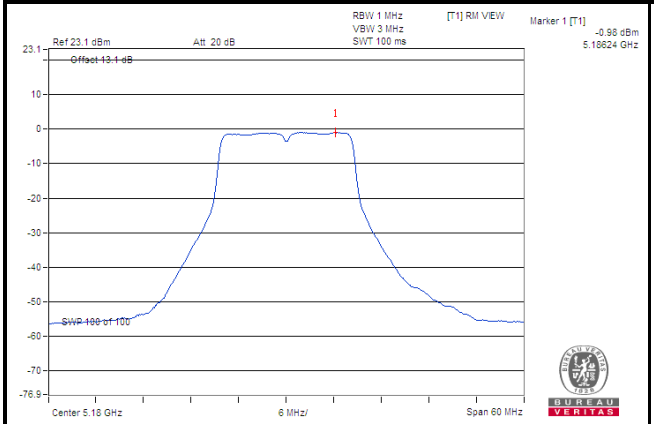
Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-9.62	-10.52	0.94	-6.09	11	Pass
58	5290	-9.75	-9.44	0.94	-5.64	11	Pass
106	5530	-9.30	-9.16	0.94	-5.28	11	Pass
122	5610	-10.12	-10.31	0.94	-6.26	11	Pass

Note:

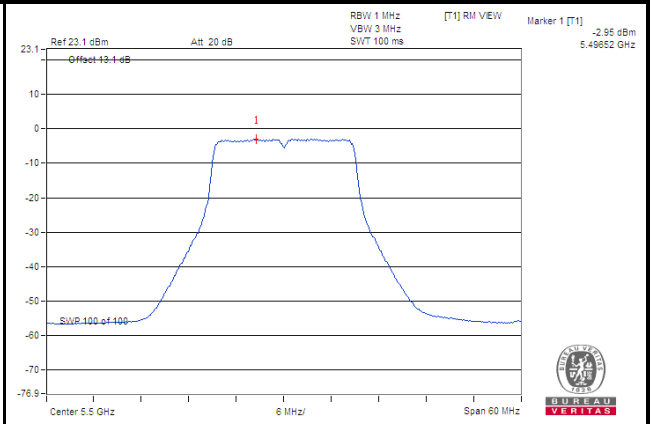
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1, U-NII-2A Band:**
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 3.77 dBi < 6 dBi, so the limit no need to reduced.
   For U-NII-2C Band:
   Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}]$ = 4.60 dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

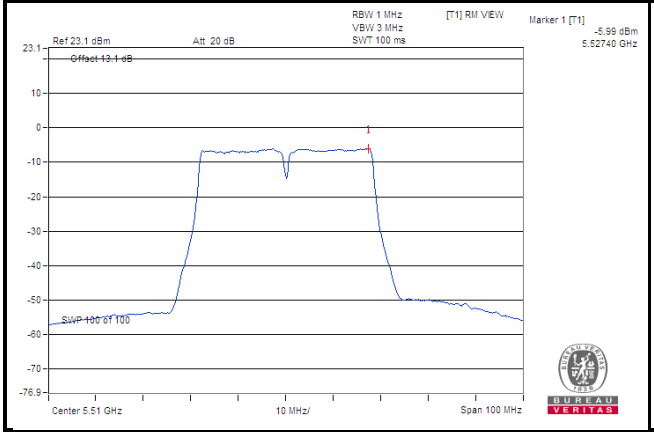
802.11a



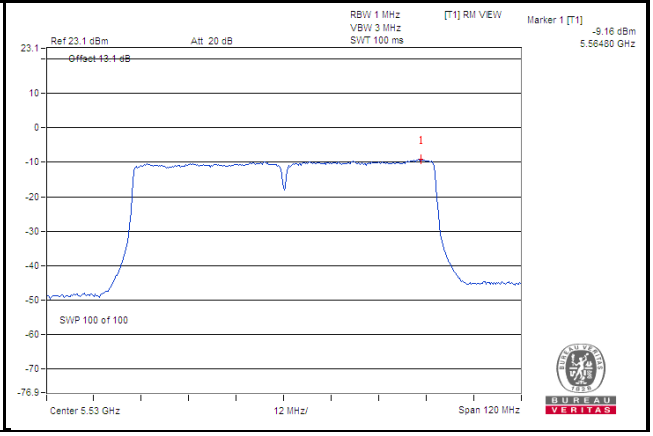
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



For U-NII-3 Band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	-10.04	-7.82	3.01	0.21	-4.60	30	Pass
	157	5785	-10.02	-7.80	3.01	0.21	-4.58	30	Pass
	165	5825	-10.06	-7.84	3.01	0.21	-4.62	30	Pass
1	149	5745	-9.68	-7.46	3.01	0.21	-4.24	30	Pass
	157	5785	-9.46	-7.24	3.01	0.21	-4.02	30	Pass
	165	5825	-9.75	-7.53	3.01	0.21	-4.31	30	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 4.97$ dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	149	5745	-10.32	-8.10	3.01	0.22	-4.87	30	Pass
	157	5785	-10.59	-8.37	3.01	0.22	-5.14	30	Pass
	165	5825	-10.52	-8.30	3.01	0.22	-5.07	30	Pass
1	149	5745	-9.54	-7.32	3.01	0.22	-4.09	30	Pass
	157	5785	-9.37	-7.15	3.01	0.22	-3.92	30	Pass
	165	5825	-9.90	-7.68	3.01	0.22	-4.45	30	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 4.97$ dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	151	5755	-13.94	-11.72	3.01	0.46	-8.25	30	Pass
	159	5795	-13.46	-11.24	3.01	0.46	-7.77	30	Pass
1	151	5755	-13.07	-10.85	3.01	0.46	-7.38	30	Pass
	159	5795	-12.70	-10.48	3.01	0.46	-7.01	30	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 4.97$ dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

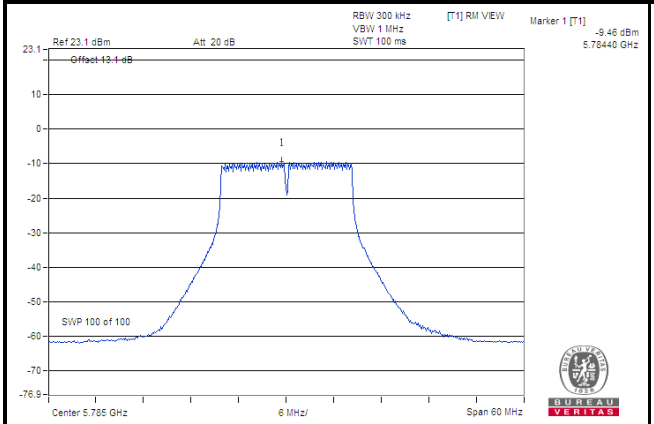
TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	155	5775	-17.38	-15.16	3.01	0.94	-11.21	30	Pass
1	155	5775	-16.44	-14.22	3.01	0.94	-10.27	30	Pass

Note:

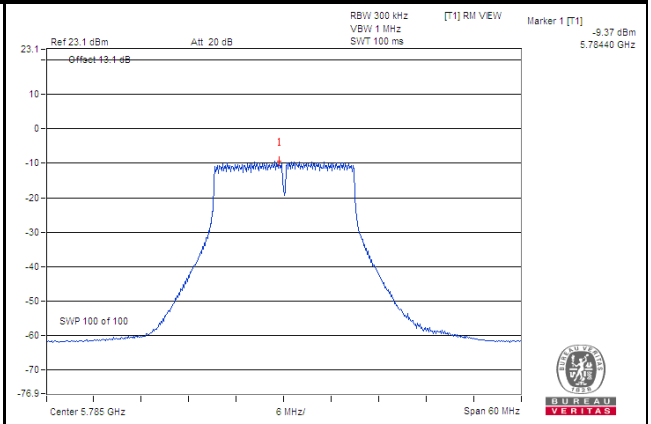
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \ldots. + 10^{GN/20})^2 / N_{ANT}] = 4.97$ dBi < 6 dBi, so the limit no need to reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

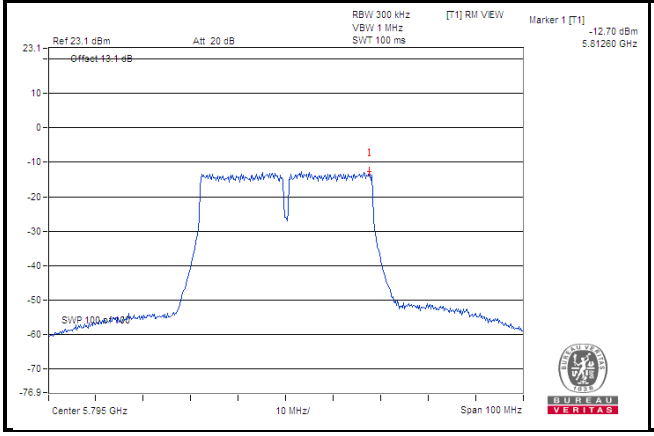
802.11a



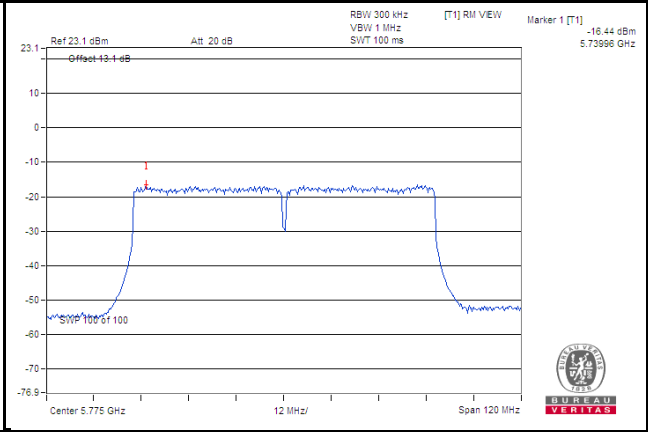
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

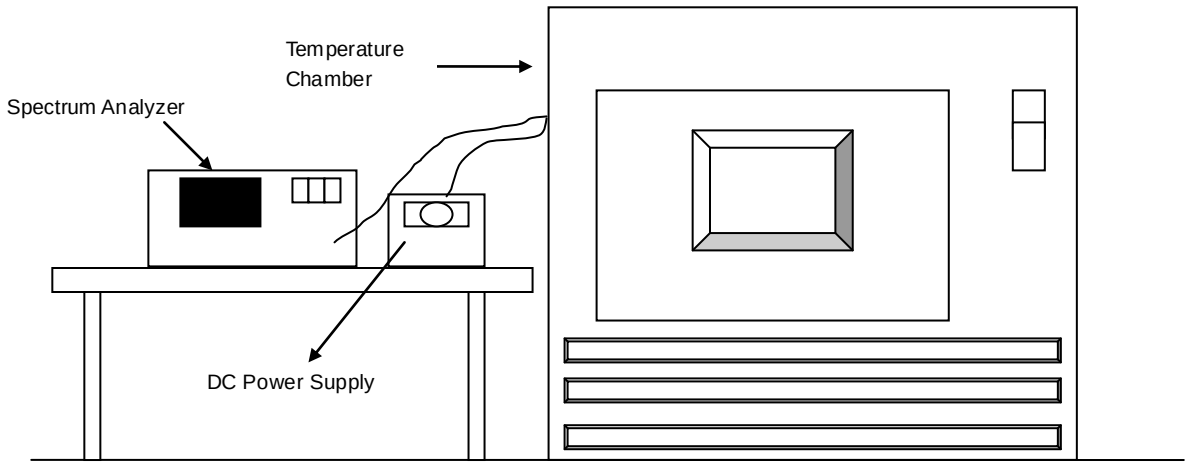


4.6 Frequency Stability

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

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	3.85	5180.016	PASS	5180.0125	PASS	5180.0153	PASS	5180.0125	PASS
40	3.85	5179.9897	PASS	5179.9871	PASS	5179.991	PASS	5179.9908	PASS
30	3.85	5179.9902	PASS	5179.9868	PASS	5179.9893	PASS	5179.9911	PASS
20	3.85	5180.017	PASS	5180.0181	PASS	5180.0194	PASS	5180.0197	PASS
10	3.85	5179.9811	PASS	5179.9812	PASS	5179.9814	PASS	5179.983	PASS
0	3.85	5180.0122	PASS	5180.0109	PASS	5180.0129	PASS	5180.0123	PASS
-10	3.85	5179.9794	PASS	5179.9824	PASS	5179.9832	PASS	5179.9836	PASS
-20	3.85	5180	PASS	5180.0036	PASS	5180.0009	PASS	5180.0025	PASS
-30	3.85	5179.9848	PASS	5179.9823	PASS	5179.985	PASS	5179.9849	PASS

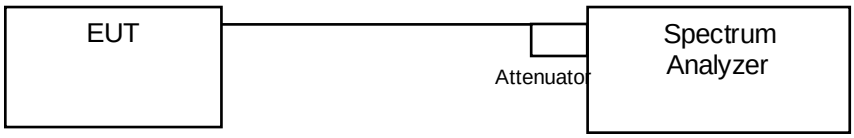
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	4.428	5180.0161	PASS	5180.019	PASS	5180.0185	PASS	5180.0201	PASS
	3.85	5180.017	PASS	5180.0181	PASS	5180.0194	PASS	5180.0197	PASS
	3.273	5180.0176	PASS	5180.0172	PASS	5180.0184	PASS	5180.0205	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

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.40	16.40	0.5	Pass
157	5785	16.42	16.42	0.5	Pass
165	5825	16.40	16.41	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.62	17.59	0.5	Pass
157	5785	17.64	17.62	0.5	Pass
165	5825	17.62	17.62	0.5	Pass

802.11n (HT40)

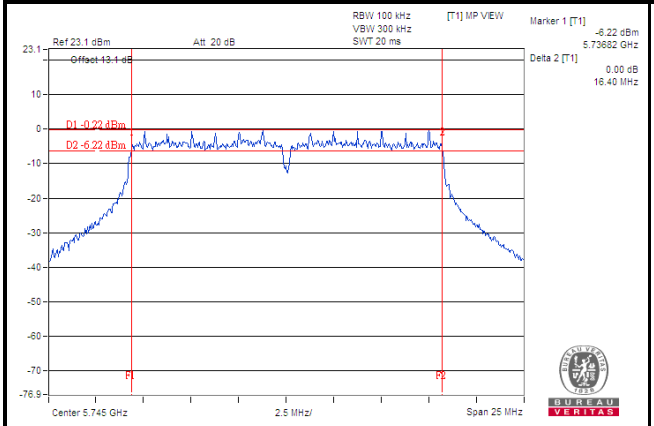
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.41	36.45	0.5	Pass
159	5795	36.40	36.45	0.5	Pass

802.11ac (VHT80)

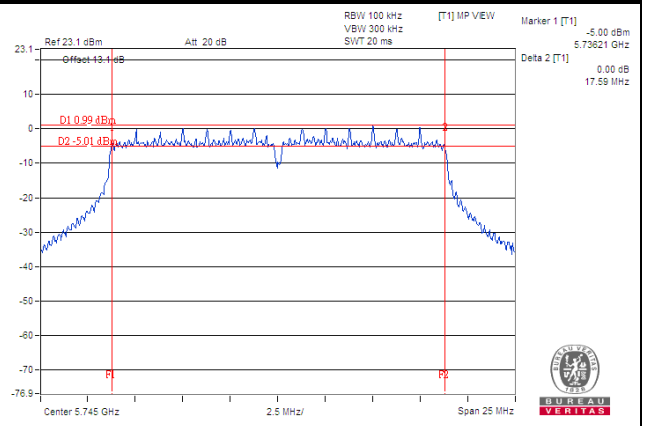
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	76.50	76.48	0.5	Pass

Spectrum Plot of Worst Value

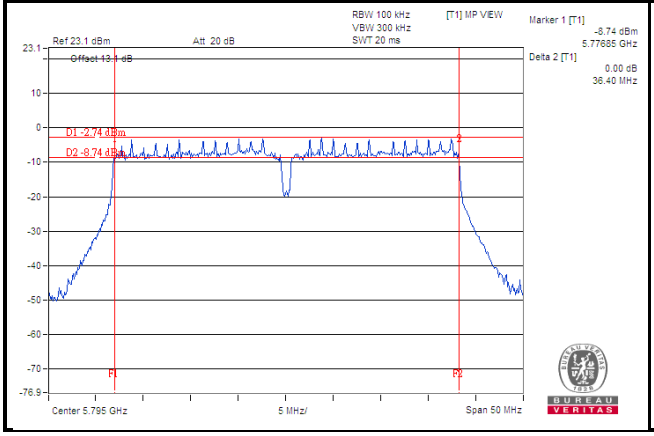
802.11a



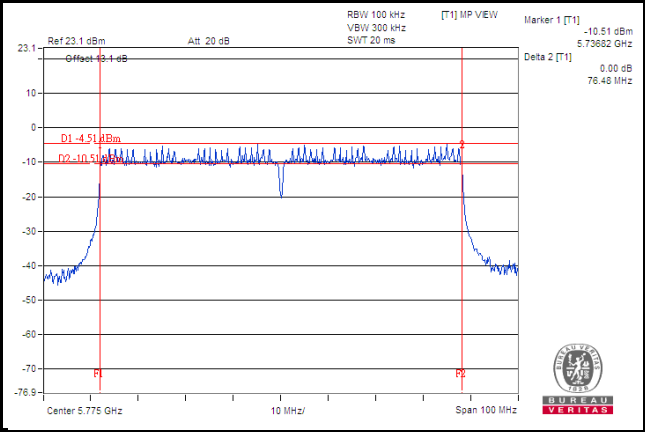
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

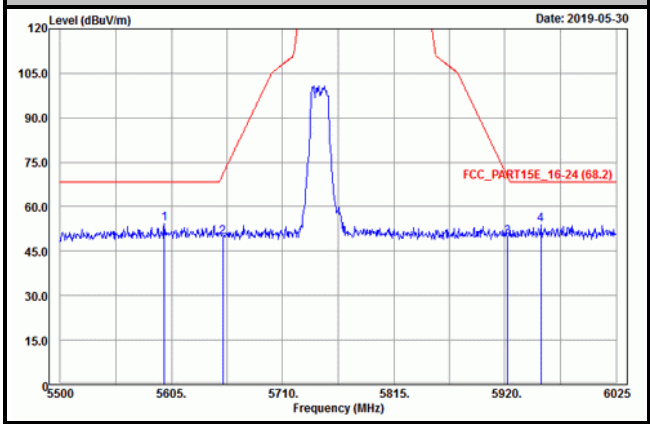
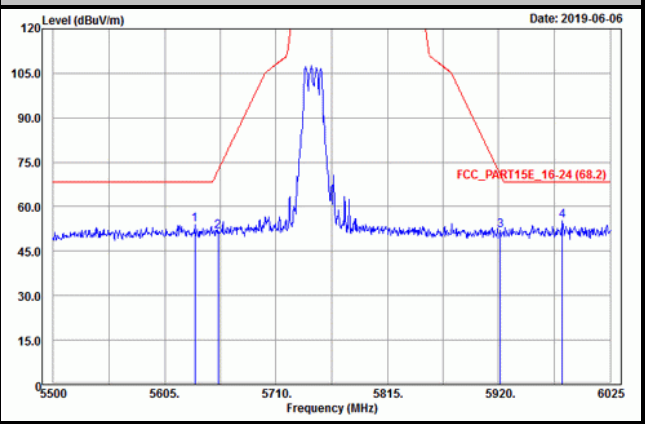
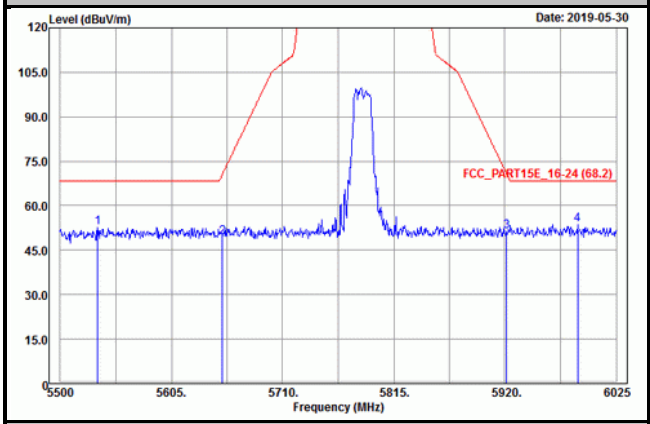
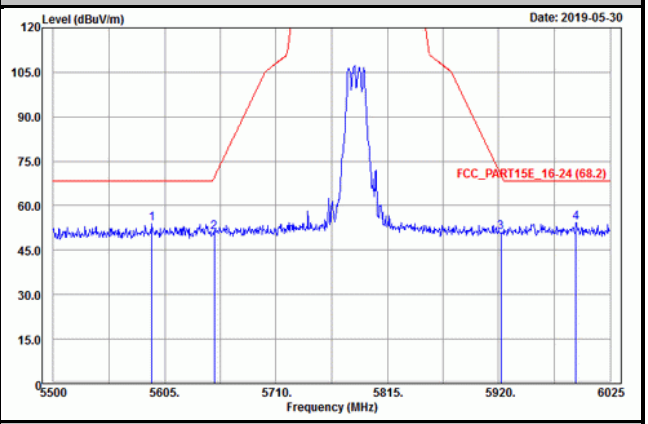
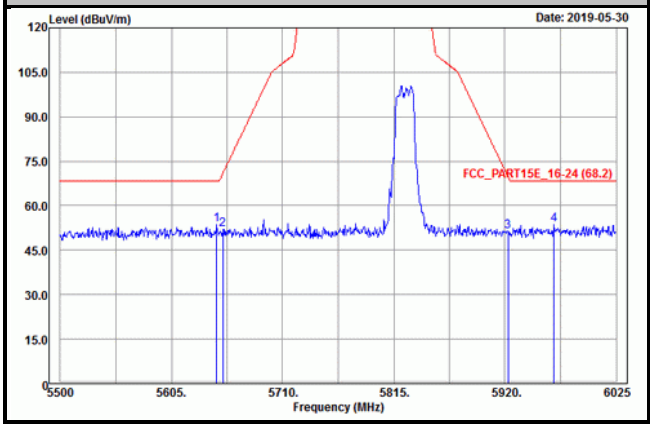
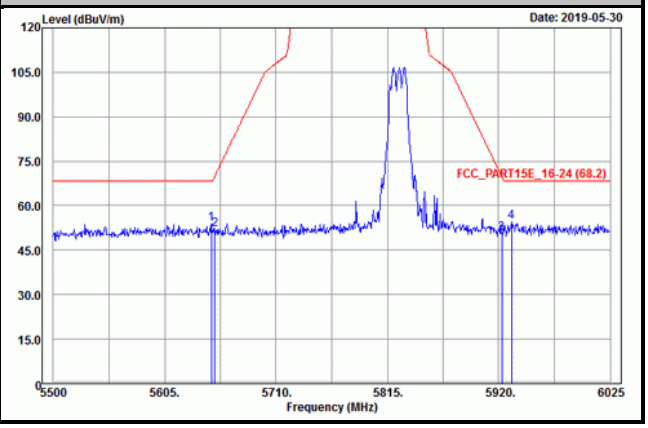


5 Pictures of Test Arrangements

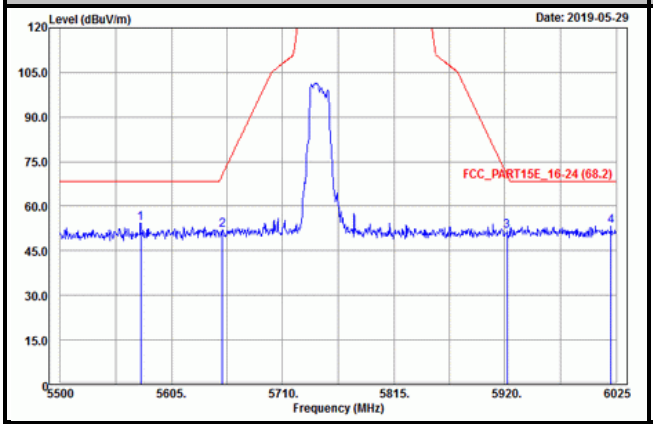
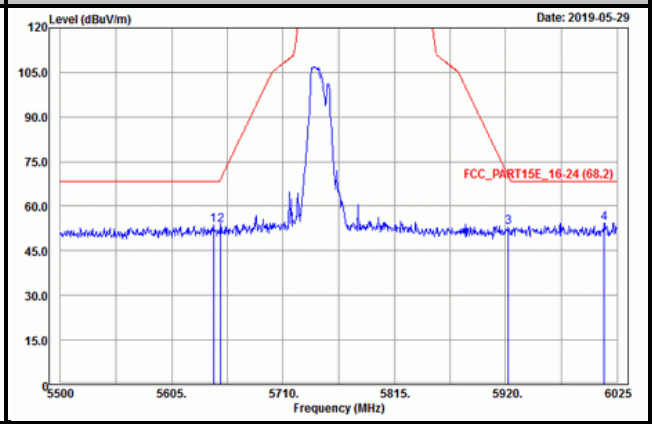
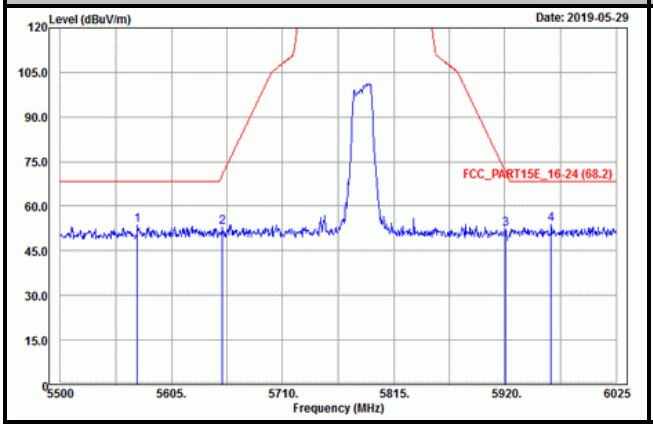
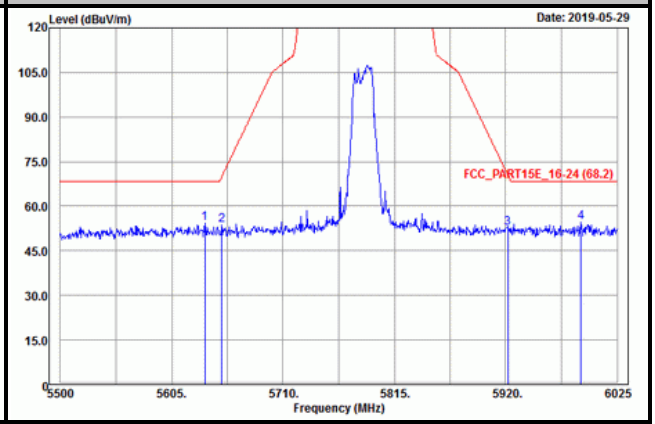
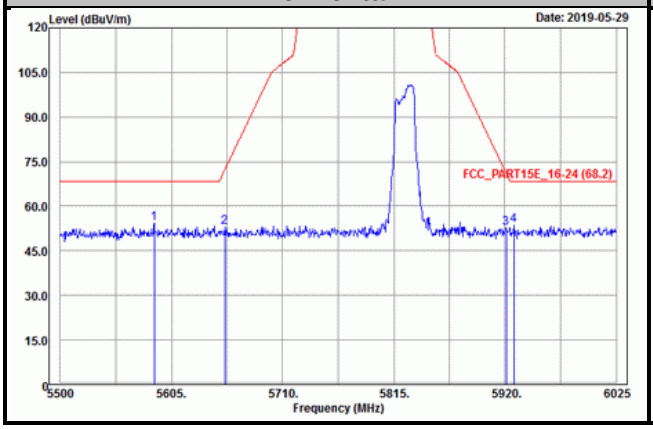
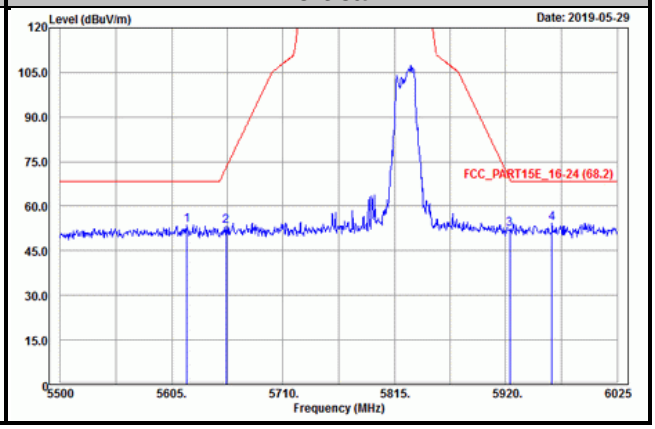
Please refer to the attached file (Test Setup Photo).

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

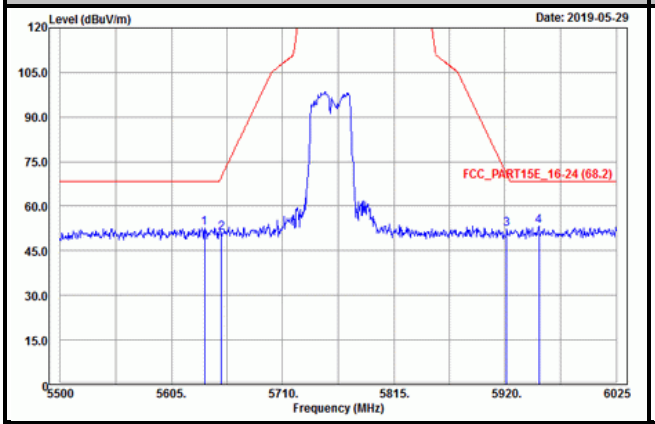
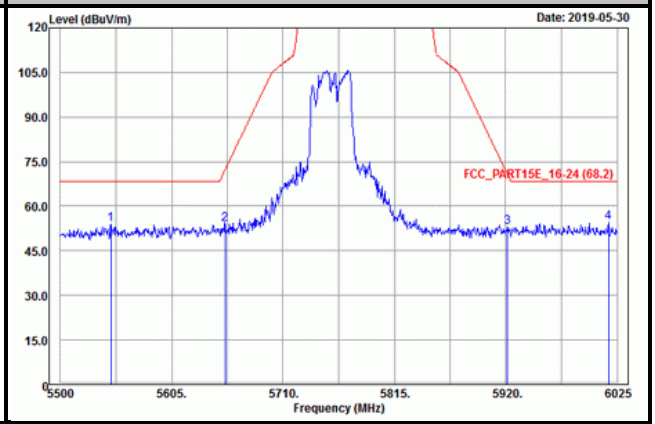
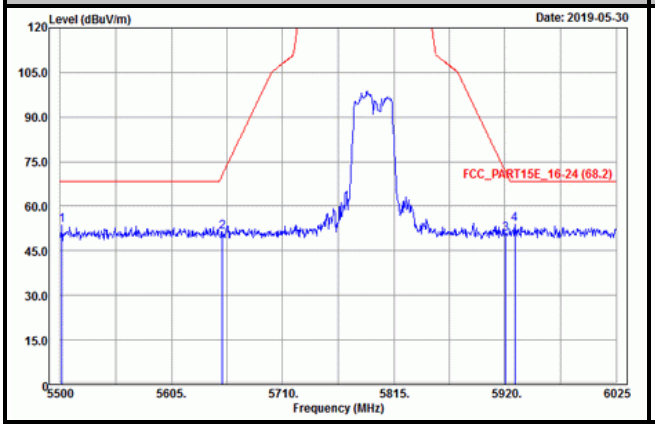
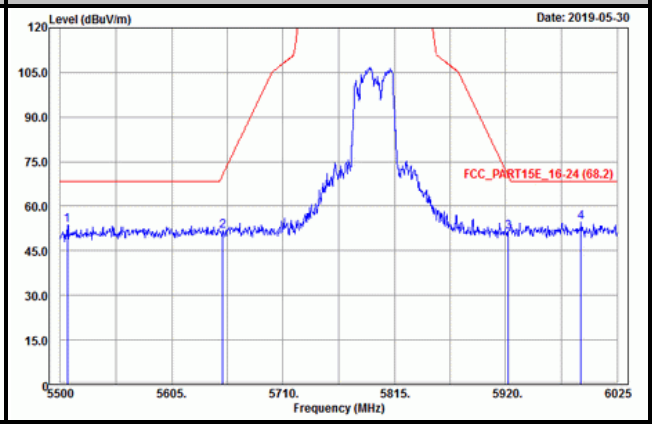
802.11a

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

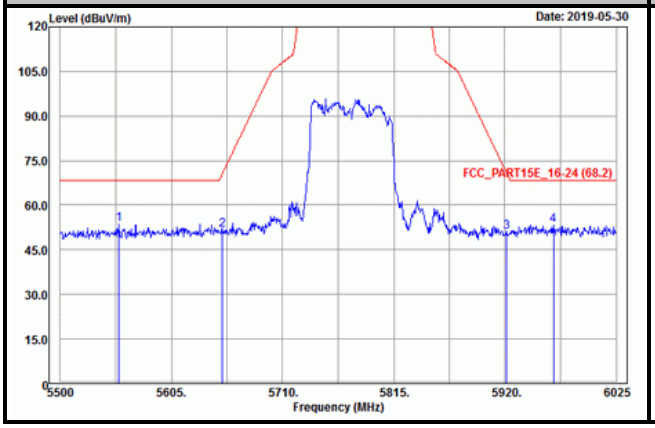
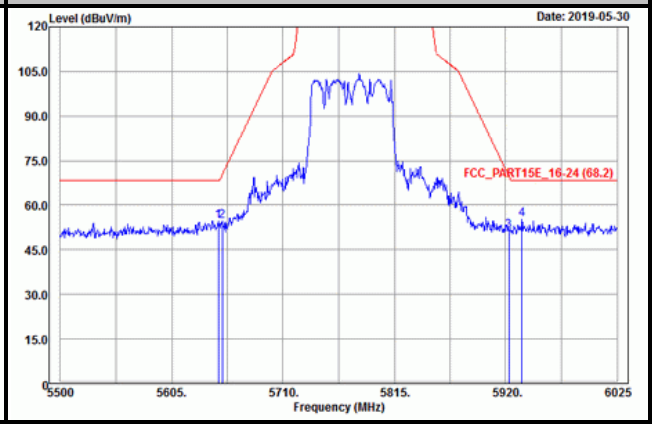
802.11n (HT20)

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

802.11n (HT40)

Ch 151	
Horizontal	Vertical
	
Ch 159	
Horizontal	Vertical
	

802.11ac (VHT80)

Ch 155	
Horizontal	Vertical
	

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.

--- END ---