

FCC Test Report

Report No.: RF190429C30B-1

FCC ID: MSQ-RTAC4A00

Test Model: RT-AC1200_V2

Series Model: RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52 (refer to item 3.1 for more details)

Received Date: Apr. 29, 2019

Test Date: May 07, 2019 and Jul. 30 ~ Aug. 01, 2019

Issued Date: Aug. 26, 2019

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF190429C30B-1	Original release.	Aug. 26, 2019

1 Certificate of Conformity

Product: Wireless-AC1200 Dual Band Router

Brand: ASUS

Test Model: RT-AC1200_V2

Series Model: RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52 (refer to item 3.1 for more details)

Sample Status: Engineering sample

Applicant: ASUSTeK COMPUTER INC.

Test Date: May 07, 2019 and Jul. 30 ~ Aug. 01, 2019

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

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

Prepared by : Pettie Chen, **Date:** Aug. 26, 2019
Pettie Chen / Senior Specialist

Approved by : Bruce Chen, **Date:** Aug. 26, 2019
Bruce Chen / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -24.19dB at 0.65439MHz.
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 -1.0dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless-AC1200 Dual Band Router
Brand	ASUS
Test Model	RT-AC1200_V2
Series Model	RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	5180~5240MHz: CDD Mode: 142.036mW Beamforming Mode: 142.036mW 5745~5825MHz: CDD Mode: 259.900mW Beamforming Mode: 259.900mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The following models are provided to this EUT. The model of the RT-AC1200_V2 was chosen for final test.

Brand	Model	Description
ASUS	RT-AC1200_V2	For marketing purpose.
	RT-AC51	
	RT-AC750L	
	RT-AC1200RU	
	RT-AC1200L	
	RT-AC52	

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

Modulation Mode	CDD Mode	Beamforming Mode	TX function
802.11a	Not Support	Not Support	1TX diversity
802.11n (HT20)	Support	Support	2TX
802.11n (HT40)	Support	Support	2TX
802.11ac (VHT20)	Support	Support	2TX
802.11ac (VHT40)	Support	Support	2TX
802.11ac (VHT80)	Support	Support	2TX

* For 802.11a: Ant. 3 was for the final tests.

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

3. The EUT is powered by the following adapter.

Adapter	
Brand	Shenzhen Gongjin Electronics Co., Ltd.
Model	S06AM2-120A050-C9
Input Power	100-240Vac~50/60Hz Max. 0.3A
Output Power	12Vdc / 0.5A
Power Line	1.45m DC cable without core attached on adapter

4. The following antennas were provided to the EUT.

Ant. No.	Antenna Gain(dBi)	Frequency range	Antenna Type	Connecter Type
1	5dBi	2.4~2.4835GHz	Dipole	i-pex(MHF)
2	5dBi	2.4~2.4835GHz		
3	5dBi	5.15~5.85GHz		
4	5dBi	5.15~5.85GHz		

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 PLC: Power Line Conducted Emission
 APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

Radiated Emission Test (Above 1GHz):

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

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

Radiated Emission Test (Below 1GHz):

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

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

Power Line Conducted Emission Test:

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

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

Antenna Port Conducted Measurement:

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

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

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin Han Wu
RE $<$ 1G	22 deg. C, 68% RH	120Vac, 60Hz	Han Wu
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Greg Lin
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Alan Wu

3.3 Duty Cycle of Test Signal

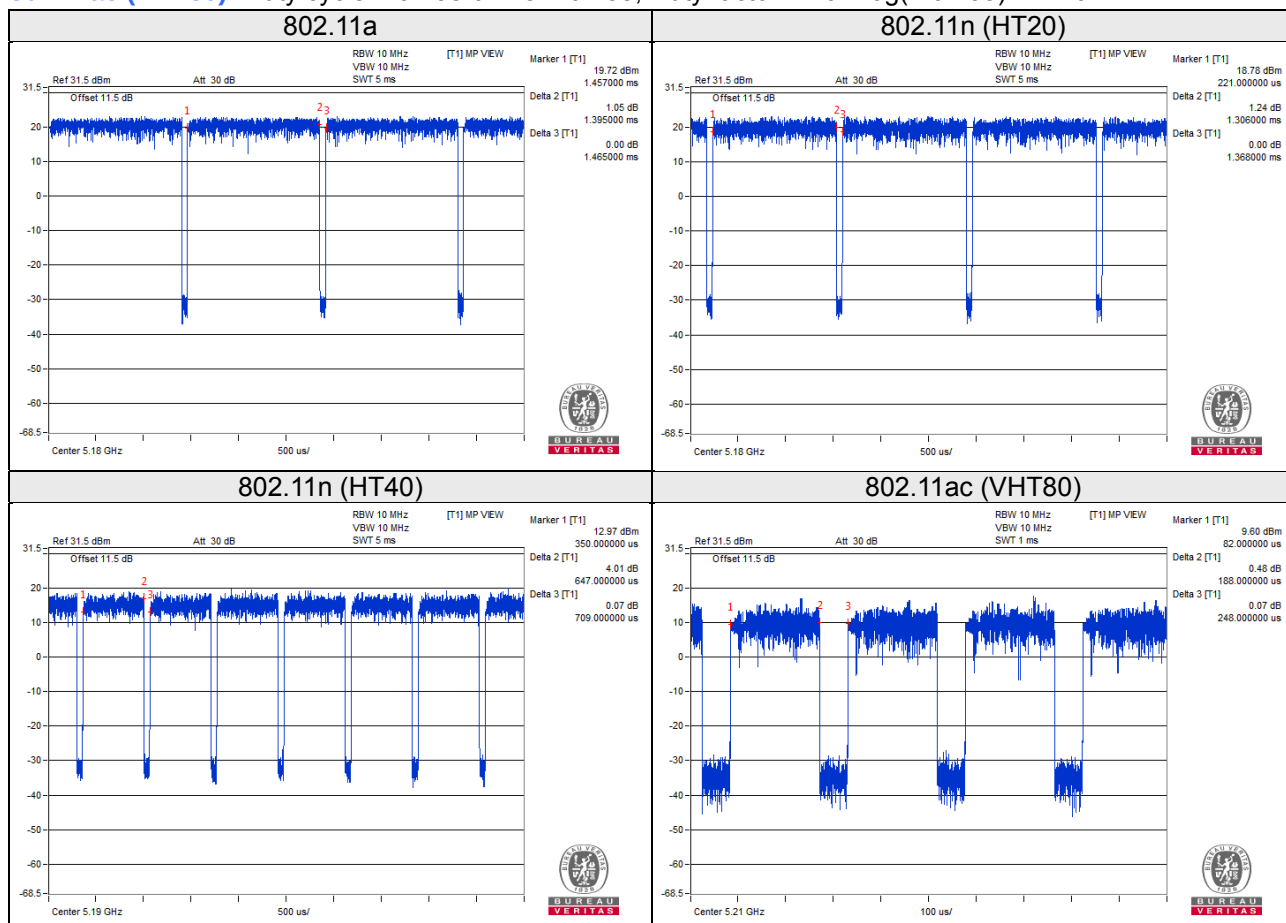
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = $1.395/1.465 = 0.952$, Duty factor = $10 * \log(1/0.952) = 0.21$

802.11n (HT20): Duty cycle = $1.306/1.368 = 0.955$, Duty factor = $10 * \log(1/0.955) = 0.20$

802.11n (HT40): Duty cycle = $0.647/0.709 = 0.913$, Duty factor = $10 * \log(1/0.913) = 0.40$

802.11ac (VHT80): Duty cycle = $0.188/0.248 = 0.758$, Duty factor = $10 * \log(1/0.758) = 1.20$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

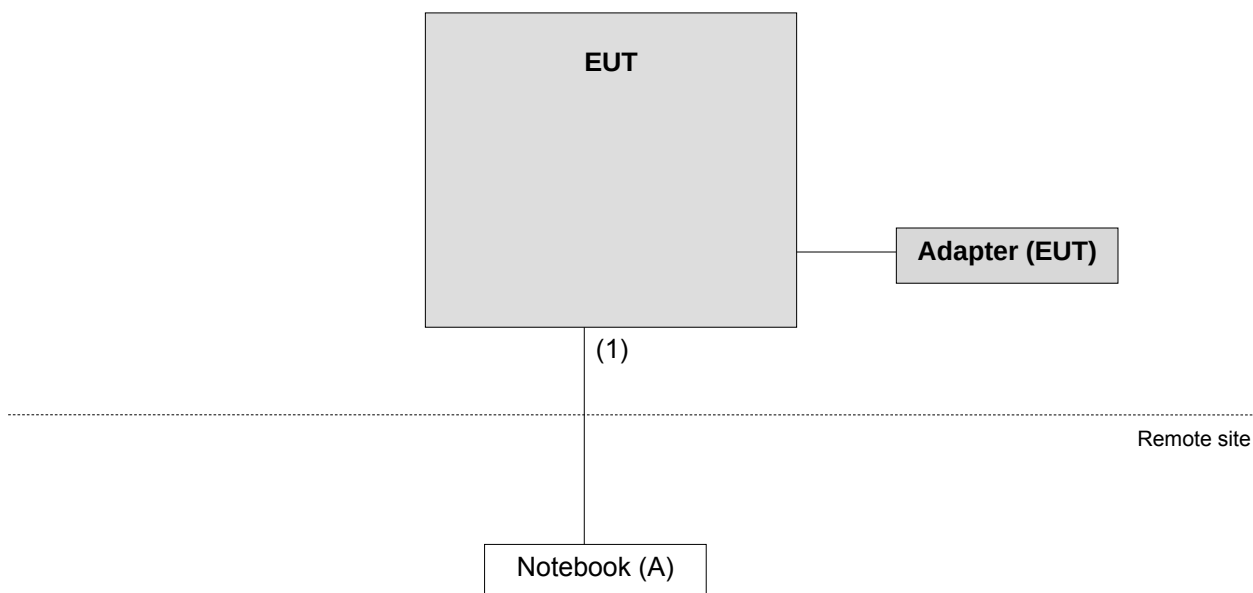
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	81A4	YD02TWF5	PPD-QCNFA435	-

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3m	
			PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	Applicable To		EIRP Limit	Equivalent Field Strength at 3m
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:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 24, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2018 Jul. 11, 2019	Aug. 07, 2019 Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/ 4)	Aug. 08, 2018 Jul. 11, 2019	Aug. 07, 2019 Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 31, 2018 Jul. 30, 2019	Jul. 30, 2019 Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519 0004/MY55190007/MY 55210005	Jul. 10, 2018 Jul. 15, 2019	Jul. 09, 2019 Jul. 14, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

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

Note:

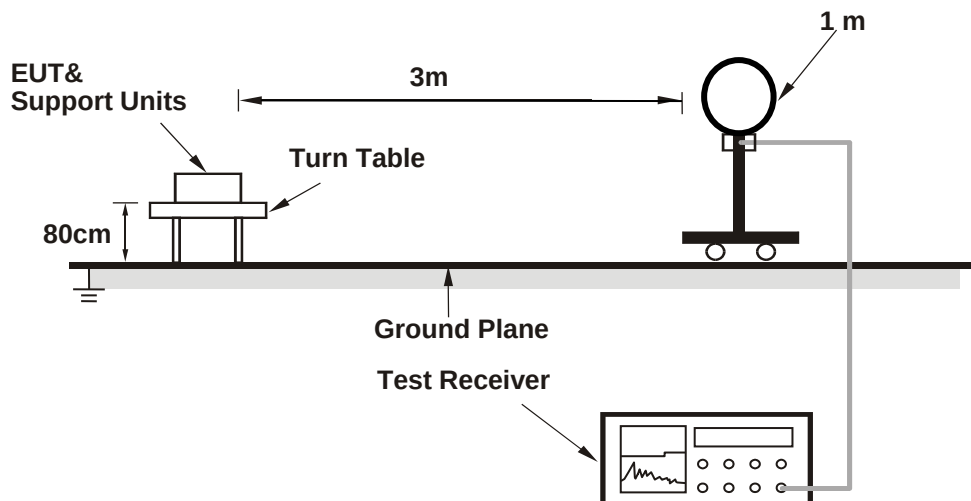
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz. (802.11a: RBW = 1 MHz, VBW = 1kHz ; 802.11n (HT20): RBW = 1 MHz, VBW = 1 kHz ; 802.11n (HT40): RBW = 1 MHz, VBW = 3kHz ; 802.11ac (VHT80): RBW = 1 MHz, VBW = 3kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

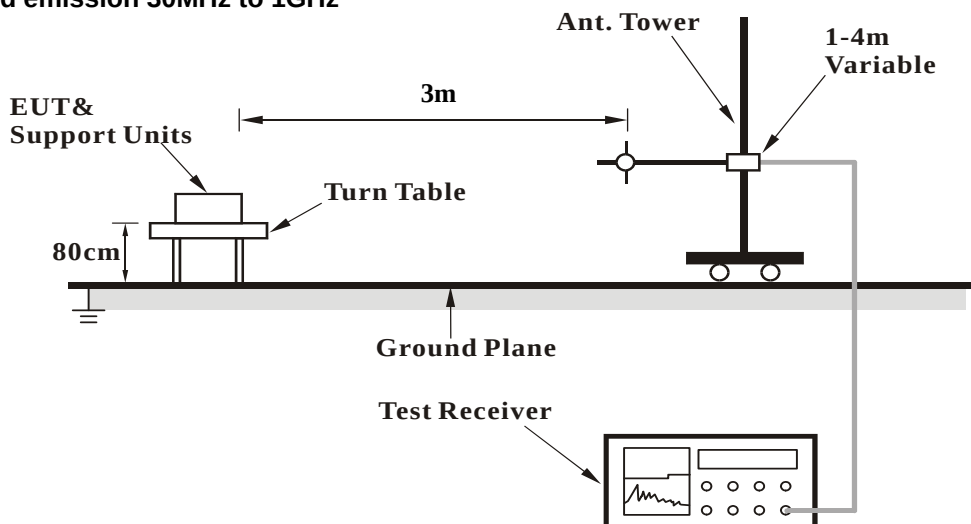
No deviation.

4.1.5 Test Setup

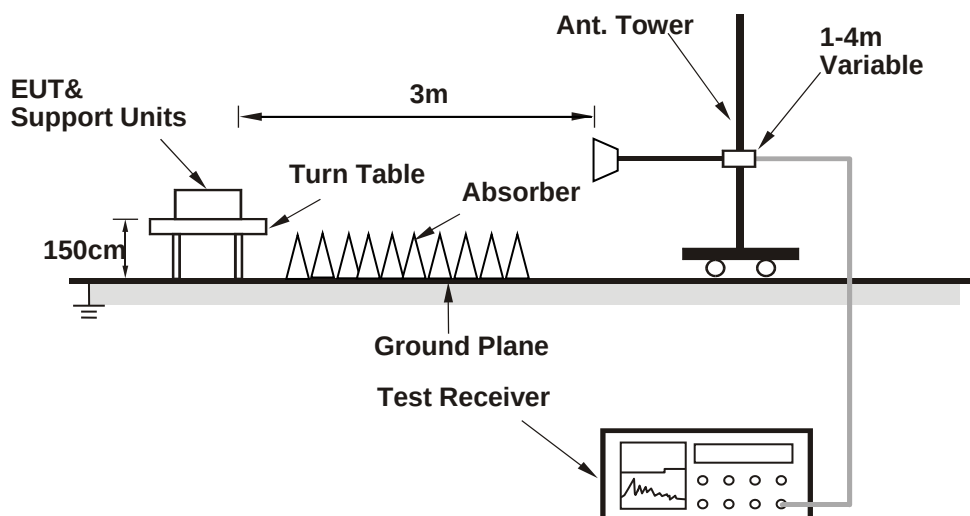
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.3 PK	74.0	-6.7	1.32 H	254	63.8	3.5
2	5150.00	49.6 AV	54.0	-4.4	1.32 H	254	46.1	3.5
3	*5180.00	103.3 PK			1.32 H	254	65.3	38.0
4	*5180.00	93.1 AV			1.32 H	254	55.1	38.0
5	#10360.00	55.8 PK	68.2	-12.4	1.43 H	118	40.2	15.6
6	15540.00	62.9 PK	74.0	-11.1	1.13 H	302	46.7	16.2
7	15540.00	48.5 AV	54.0	-5.5	1.13 H	302	32.3	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.8 PK	74.0	-5.2	1.53 V	185	65.3	3.5
2	5150.00	52.8 AV	54.0	-1.2	1.53 V	185	49.3	3.5
3	*5180.00	116.4 PK			1.53 V	185	78.4	38.0
4	*5180.00	106.0 AV			1.53 V	185	68.0	38.0
5	#10360.00	57.7 PK	68.2	-10.5	2.02 V	351	42.1	15.6
6	15540.00	66.7 PK	74.0	-7.3	2.01 V	349	50.5	16.2
7	15540.00	52.0 AV	54.0	-2.0	2.01 V	349	35.8	16.2

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	103.2 PK			1.27 H	246	65.3	37.9
2	*5200.00	93.1 AV			1.27 H	246	55.2	37.9
3	#10400.00	56.1 PK	68.2	-12.1	1.52 H	121	40.5	15.6
4	15600.00	62.5 PK	74.0	-11.5	1.19 H	293	46.5	16.0
5	15600.00	48.4 AV	54.0	-5.6	1.19 H	293	32.4	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	116.2 PK			1.58 V	203	78.3	37.9
2	*5200.00	106.0 AV			1.58 V	203	68.1	37.9
3	#10400.00	58.2 PK	68.2	-10.0	1.97 V	345	42.6	15.6
4	15600.00	65.1 PK	74.0	-8.9	1.93 V	346	49.1	16.0
5	15600.00	51.6 AV	54.0	-2.4	1.93 V	346	35.6	16.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	104.5 PK			1.29 H	255	66.8	37.7
2	*5240.00	94.3 AV			1.29 H	255	56.6	37.7
3	5350.00	55.2 PK	74.0	-18.8	1.29 H	255	51.8	3.4
4	5350.00	42.2 AV	54.0	-11.8	1.29 H	255	38.8	3.4
5	#10480.00	56.2 PK	68.2	-12.0	1.52 H	122	40.8	15.4
6	15720.00	62.8 PK	74.0	-11.2	1.05 H	312	47.4	15.4
7	15720.00	48.7 AV	54.0	-5.3	1.05 H	312	33.3	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	117.3 PK			1.61 V	199	79.6	37.7
2	*5240.00	107.1 AV			1.61 V	199	69.4	37.7
3	5350.00	56.5 PK	74.0	-17.5	1.61 V	199	53.1	3.4
4	5350.00	43.0 AV	54.0	-11.0	1.61 V	199	39.6	3.4
5	#10480.00	58.6 PK	68.2	-9.6	1.92 V	342	43.2	15.4
6	15720.00	65.7 PK	74.0	-8.3	2.01 V	351	50.3	15.4
7	15720.00	51.7 AV	54.0	-2.3	2.01 V	351	36.3	15.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5647.20	54.8 PK	68.2	-13.4	1.58 H	311	50.7	4.1
2	*5745.00	102.8 PK			1.58 H	311	64.3	38.5
3	*5745.00	92.7 AV			1.58 H	311	54.2	38.5
4	#5992.80	54.0 PK	68.2	-14.2	1.58 H	311	49.3	4.7
5	11490.00	56.0 PK	74.0	-18.0	1.32 H	124	40.3	15.7
6	11490.00	42.2 AV	54.0	-11.8	1.32 H	124	26.5	15.7
7	#17235.00	63.1 PK	68.2	-5.1	1.25 H	317	41.2	21.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	57.0 PK	68.2	-11.2	2.15 V	138	52.9	4.1
2	*5745.00	115.7 PK			2.15 V	138	77.2	38.5
3	*5745.00	105.6 AV			2.15 V	138	67.1	38.5
4	#5935.20	55.6 PK	68.2	-12.6	2.15 V	138	50.9	4.7
5	11490.00	57.9 PK	74.0	-16.1	1.86 V	347	42.2	15.7
6	11490.00	44.0 AV	54.0	-10.0	1.86 V	347	28.3	15.7
7	#17235.00	65.9 PK	68.2	-2.3	2.07 V	349	44.0	21.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5617.60	54.3 PK	68.2	-13.9	1.52 H	306	50.4	3.9
2	*5785.00	103.2 PK			1.52 H	306	64.5	38.7
3	*5785.00	93.1 AV			1.52 H	306	54.4	38.7
4	#5951.20	53.9 PK	68.2	-14.3	1.52 H	306	49.2	4.7
5	11570.00	56.1 PK	74.0	-17.9	1.36 H	106	40.6	15.5
6	11570.00	42.7 AV	54.0	-11.3	1.36 H	106	27.2	15.5
7	#17355.00	63.0 PK	68.2	-5.2	1.08 H	287	41.2	21.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.20	55.4 PK	68.2	-12.8	1.82 V	209	51.5	3.9
2	*5785.00	116.0 PK			1.82 V	209	77.3	38.7
3	*5785.00	105.9 AV			1.82 V	209	67.2	38.7
4	#5930.40	53.7 PK	68.2	-14.5	1.82 V	209	49.0	4.7
5	11570.00	57.9 PK	74.0	-16.1	1.97 V	338	42.4	15.5
6	11570.00	43.7 AV	54.0	-10.3	1.97 V	338	28.2	15.5
7	#17355.00	65.8 PK	68.2	-2.4	2.10 V	348	44.0	21.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	55.7 PK	68.2	-12.5	1.45 H	313	51.6	4.1
2	*5825.00	101.6 PK			1.45 H	313	62.8	38.8
3	*5825.00	91.5 AV			1.45 H	313	52.7	38.8
4	#5980.80	56.9 PK	68.2	-11.3	1.45 H	313	52.2	4.7
5	11650.00	56.2 PK	74.0	-17.8	1.53 H	107	40.8	15.4
6	11650.00	42.1 AV	54.0	-11.9	1.53 H	107	26.7	15.4
7	#17475.00	63.2 PK	68.2	-5.0	1.25 H	292	40.6	22.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5608.80	55.3 PK	68.2	-12.9	1.88 V	207	51.5	3.8
2	*5825.00	114.5 PK			1.88 V	207	75.7	38.8
3	*5825.00	104.4 AV			1.88 V	207	65.6	38.8
4	#5977.60	56.7 PK	68.2	-11.5	1.88 V	207	52.0	4.7
5	11650.00	58.2 PK	74.0	-15.8	2.03 V	337	42.8	15.4
6	11650.00	43.8 AV	54.0	-10.2	2.03 V	337	28.4	15.4
7	#17475.00	66.0 PK	68.2	-2.2	2.00 V	352	43.4	22.6

Remarks:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.9 PK	74.0	-15.1	1.00 H	258	55.4	3.5
2	5150.00	44.9 AV	54.0	-9.1	1.00 H	258	41.4	3.5
3	*5180.00	102.2 PK			1.00 H	258	64.2	38.0
4	*5180.00	92.2 AV			1.00 H	258	54.2	38.0
5	#10360.00	58.8 PK	68.2	-9.4	1.16 H	174	43.2	15.6
6	15540.00	62.3 PK	74.0	-11.7	1.02 H	295	46.1	16.2
7	15540.00	48.5 AV	54.0	-5.5	1.02 H	295	32.3	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.8 PK	74.0	-6.2	1.84 V	128	64.3	3.5
2	5150.00	47.0 AV	54.0	-7.0	1.84 V	128	43.5	3.5
3	*5180.00	116.0 PK			1.84 V	128	78.0	38.0
4	*5180.00	106.0 AV			1.84 V	128	68.0	38.0
5	#10360.00	61.2 PK	68.2	-7.0	2.43 V	37	45.6	15.6
6	15540.00	65.0 PK	74.0	-9.0	3.74 V	31	48.8	16.2
7	15540.00	51.6 AV	54.0	-2.4	3.74 V	31	35.4	16.2

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	103.3 PK			1.04 H	253	65.4	37.9
2	*5200.00	93.5 AV			1.04 H	253	55.6	37.9
3	#10400.00	59.0 PK	68.2	-9.2	1.21 H	172	43.4	15.6
4	15600.00	62.9 PK	74.0	-11.1	1.13 H	287	46.9	16.0
5	15600.00	48.8 AV	54.0	-5.2	1.13 H	287	32.8	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	117.1 PK			1.60 V	187	79.2	37.9
2	*5200.00	107.3 AV			1.60 V	187	69.4	37.9
3	#10400.00	61.9 PK	68.2	-6.3	2.10 V	39	46.3	15.6
4	15600.00	65.6 PK	74.0	-8.4	3.82 V	359	49.6	16.0
5	15600.00	51.7 AV	54.0	-2.3	3.82 V	359	35.7	16.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	104.3 PK			1.12 H	253	66.6	37.7
2	*5240.00	94.5 AV			1.12 H	253	56.8	37.7
3	5350.00	55.8 PK	74.0	-18.2	1.12 H	253	52.4	3.4
4	5350.00	43.8 AV	54.0	-10.2	1.12 H	253	40.4	3.4
5	#10480.00	59.9 PK	68.2	-8.3	1.06 H	184	44.5	15.4
6	15720.00	62.5 PK	74.0	-11.5	1.06 H	301	47.1	15.4
7	15720.00	49.2 AV	54.0	-4.8	1.06 H	301	33.8	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	118.2 PK			1.84 V	158	80.5	37.7
2	*5240.00	108.4 AV			1.84 V	158	70.7	37.7
3	5350.00	57.6 PK	74.0	-16.4	1.84 V	158	54.2	3.4
4	5350.00	45.2 AV	54.0	-8.8	1.84 V	158	41.8	3.4
5	#10480.00	61.6 PK	68.2	-6.6	2.51 V	42	46.2	15.4
6	15720.00	65.0 PK	74.0	-9.0	3.68 V	9	49.6	15.4
7	15720.00	51.7 AV	54.0	-2.3	3.68 V	9	36.3	15.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.00	53.2 PK	68.2	-15.0	2.12 H	296	49.1	4.1
2	*5745.00	101.9 PK			2.12 H	296	63.4	38.5
3	*5745.00	91.9 AV			2.12 H	296	53.4	38.5
4	#5936.80	53.1 PK	68.2	-15.1	2.12 H	296	48.4	4.7
5	11490.00	56.3 PK	74.0	-17.7	1.52 H	133	40.6	15.7
6	11490.00	42.9 AV	54.0	-11.1	1.52 H	133	27.2	15.7
7	#17325.00	63.7 PK	68.2	-4.5	1.53 H	114	41.6	22.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.00	56.5 PK	68.2	-11.7	2.16 V	117	52.4	4.1
2	*5745.00	115.6 PK			2.16 V	117	77.1	38.5
3	*5745.00	105.5 AV			2.16 V	117	67.0	38.5
4	#5948.80	55.8 PK	68.2	-12.4	2.16 V	117	51.1	4.7
5	11490.00	56.9 PK	74.0	-17.1	2.64 V	28	41.2	15.7
6	11490.00	43.3 AV	54.0	-10.7	2.64 V	28	27.6	15.7
7	#17235.00	66.1 PK	68.2	-2.1	2.63 V	39	44.2	21.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5615.20	53.6 PK	68.2	-14.6	2.13 H	308	49.7	3.9
2	*5785.00	103.5 PK			2.13 H	308	64.8	38.7
3	*5785.00	93.4 AV			2.13 H	308	54.7	38.7
4	#5944.00	54.1 PK	68.2	-14.1	2.13 H	308	49.4	4.7
5	11570.00	55.1 PK	74.0	-18.9	1.53 H	127	39.6	15.5
6	11570.00	42.3 AV	54.0	-11.7	1.53 H	127	26.8	15.5
7	#17355.00	63.5 PK	68.2	-4.7	1.62 H	113	41.7	21.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.20	60.2 PK	68.2	-8.0	2.03 V	124	56.3	3.9
2	*5785.00	117.2 PK			2.03 V	124	78.5	38.7
3	*5785.00	107.1 AV			2.03 V	124	68.4	38.7
4	#5954.40	57.9 PK	68.2	-10.3	2.03 V	124	53.2	4.7
5	11570.00	55.9 PK	74.0	-18.1	2.57 V	17	40.4	15.5
6	11570.00	43.1 AV	54.0	-10.9	2.57 V	17	27.6	15.5
7	#17355.00	65.8 PK	68.2	-2.4	2.58 V	41	44.0	21.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.00	52.7 PK	68.2	-15.5	2.09 H	301	48.8	3.9
2	*5825.00	102.4 PK			2.09 H	301	63.6	38.8
3	*5825.00	92.2 AV			2.09 H	301	53.4	38.8
4	#5933.60	53.7 PK	68.2	-14.5	2.09 H	301	49.0	4.7
5	11650.00	55.7 PK	74.0	-18.3	1.59 H	142	40.3	15.4
6	11650.00	42.5 AV	54.0	-11.5	1.59 H	142	27.1	15.4
7	#17475.00	64.4 PK	68.2	-3.8	1.43 H	106	41.8	22.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5628.80	55.3 PK	68.2	-12.9	2.16 V	124	51.4	3.9
2	*5825.00	116.0 PK			2.16 V	124	77.2	38.8
3	*5825.00	106.0 AV			2.16 V	124	67.2	38.8
4	#5949.60	56.5 PK	68.2	-11.7	2.16 V	124	51.8	4.7
5	11650.00	56.7 PK	74.0	-17.3	2.56 V	38	41.3	15.4
6	11650.00	42.8 AV	54.0	-11.2	2.56 V	38	27.4	15.4
7	#17475.00	65.9 PK	68.2	-2.3	2.89 V	33	43.3	22.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.6 PK	74.0	-9.4	1.12 H	242	61.1	3.5
2	5150.00	50.9 AV	54.0	-3.1	1.12 H	242	47.4	3.5
3	*5190.00	98.5 PK			1.12 H	242	60.6	37.9
4	*5190.00	88.2 AV			1.12 H	242	50.3	37.9
5	#10380.00	60.2 PK	68.2	-8.0	1.28 H	177	44.5	15.7
6	15570.00	59.9 PK	74.0	-14.1	1.17 H	294	43.7	16.2
7	15570.00	47.4 AV	54.0	-6.6	1.17 H	294	31.2	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.3 PK	74.0	-7.7	1.65 V	161	62.8	3.5
2	5150.00	52.7 AV	54.0	-1.3	1.65 V	161	49.2	3.5
3	*5190.00	112.2 PK			1.65 V	161	74.3	37.9
4	*5190.00	101.9 AV			1.65 V	161	64.0	37.9
5	#10380.00	63.1 PK	68.2	-5.1	2.36 V	46	47.4	15.7
6	15570.00	62.6 PK	74.0	-11.4	3.68 V	36	46.4	16.2
7	15570.00	49.7 AV	54.0	-4.3	3.68 V	36	33.5	16.2

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	102.3 PK			1.16 H	247	64.6	37.7
2	*5230.00	91.8 AV			1.16 H	247	54.1	37.7
3	5350.00	56.7 PK	74.0	-17.3	1.16 H	247	53.3	3.4
4	5350.00	43.6 AV	54.0	-10.4	1.16 H	247	40.2	3.4
5	#10460.00	62.9 PK	68.2	-5.3	1.24 H	182	47.5	15.4
6	15690.00	63.1 PK	74.0	-10.9	1.05 H	303	47.6	15.5
7	15690.00	50.0 AV	54.0	-4.0	1.05 H	303	34.5	15.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	116.2 PK			1.79 V	129	78.5	37.7
2	*5230.00	105.6 AV			1.79 V	129	67.9	37.7
3	5350.00	58.6 PK	74.0	-15.4	1.79 V	129	55.2	3.4
4	5350.00	44.0 AV	54.0	-10.0	1.79 V	129	40.6	3.4
5	#10460.00	65.0 PK	68.2	-3.2	2.00 V	40	49.6	15.4
6	15690.00	65.0 PK	74.0	-9.0	3.68 V	32	49.5	15.5
7	15690.00	51.8 AV	54.0	-2.2	3.68 V	32	36.3	15.5

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5624.80	53.4 PK	68.2	-14.8	2.06 H	291	49.5	3.9
2	*5755.00	102.4 PK			2.06 H	291	63.8	38.6
3	*5755.00	91.9 AV			2.06 H	291	53.3	38.6
4	#5960.00	54.2 PK	68.2	-14.0	2.06 H	291	49.4	4.8
5	11510.00	56.2 PK	74.0	-17.8	1.49 H	127	40.5	15.7
6	11510.00	42.6 AV	54.0	-11.4	1.49 H	127	26.9	15.7
7	#17265.00	63.9 PK	68.2	-4.3	1.56 H	106	41.9	22.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5647.20	59.3 PK	68.2	-8.9	2.02 V	112	55.2	4.1
2	*5755.00	115.9 PK			1.99 V	112	77.3	38.6
3	*5755.00	105.3 AV			1.99 V	112	66.7	38.6
4	#5935.20	57.3 PK	68.2	-10.9	2.02 V	112	52.6	4.7
5	11510.00	56.9 PK	74.0	-17.1	3.63 V	27	41.2	15.7
6	11510.00	43.2 AV	54.0	-10.8	3.63 V	27	27.5	15.7
7	#17265.00	66.2 PK	68.2	-2.0	2.65 V	37	44.2	22.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5601.60	52.6 PK	68.2	-15.6	1.83 H	117	48.8	3.8
2	*5795.00	104.5 PK			1.83 H	117	65.8	38.7
3	*5795.00	94.6 AV			1.83 H	117	55.9	38.7
4	#5926.40	52.4 PK	68.2	-15.8	1.83 H	117	47.7	4.7
5	11590.00	57.0 PK	74.0	-17.0	1.56 H	132	41.6	15.4
6	11590.00	43.0 AV	54.0	-11.0	1.56 H	132	27.6	15.4
7	#17385.00	64.0 PK	68.2	-4.2	1.63 H	102	42.4	21.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5638.40	61.6 PK	68.2	-6.6	1.95 V	67	57.6	4.0
2	*5795.00	118.5 PK			1.95 V	67	79.8	38.7
3	*5795.00	107.8 AV			1.95 V	67	69.1	38.7
4	#5930.40	66.0 PK	68.2	-2.2	1.95 V	67	61.3	4.7
5	11590.00	58.2 PK	74.0	-15.8	2.59 V	19	42.8	15.4
6	11590.00	44.3 AV	54.0	-9.7	2.59 V	19	28.9	15.4
7	#17385.00	65.6 PK	68.2	-2.6	2.62 V	39	44.0	21.6

Remarks:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	67.0 PK	74.0	-7.0	1.05 H	266	63.5	3.5
2	5150.00	50.8 AV	54.0	-3.2	1.05 H	266	47.3	3.5
3	*5210.00	95.1 PK			1.05 H	266	57.3	37.8
4	*5210.00	79.7 AV			1.05 H	266	41.9	37.8
5	#10420.00	57.3 PK	68.2	-10.9	1.22 H	171	41.7	15.6
6	15630.00	58.7 PK	74.0	-15.3	1.01 H	285	42.8	15.9
7	15630.00	46.3 AV	54.0	-7.7	1.01 H	285	30.4	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.4 PK	74.0	-4.6	1.70 V	168	65.9	3.5
2	5150.00	53.0 AV	54.0	-1.0	1.70 V	168	49.5	3.5
3	*5210.00	108.9 PK			1.70 V	168	71.1	37.8
4	*5210.00	93.5 AV			1.70 V	168	55.7	37.8
5	#10420.00	58.1 PK	68.2	-10.1	2.07 V	44	42.5	15.6
6	15630.00	60.9 PK	74.0	-13.1	3.65 V	36	45.0	15.9
7	15630.00	47.6 AV	54.0	-6.4	3.65 V	36	31.7	15.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.20	55.3 PK	68.2	-12.9	1.51 H	327	51.2	4.1
2	#5650.00	62.6 PK	68.2	-5.6	1.46 H	318	58.5	4.1
3	*5775.00	98.3 PK			1.51 H	327	59.7	38.6
4	*5775.00	83.5 AV			1.51 H	327	44.9	38.6
5	#5956.00	53.4 PK	68.2	-14.8	1.51 H	327	48.7	4.7
6	11550.00	55.3 PK	74.0	-18.7	1.57 H	131	39.7	15.6
7	11550.00	42.4 AV	54.0	-11.6	1.57 H	131	26.8	15.6
8	#17325.00	63.9 PK	68.2	-4.3	1.64 H	101	41.8	22.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	66.2 PK	68.2	-2.0	1.92 V	122	62.1	4.1
2	#5650.00	66.9 PK	68.2	-1.3	1.90 V	134	62.8	4.1
3	*5775.00	111.9 PK			1.92 V	122	73.3	38.6
4	*5775.00	95.5 AV			1.92 V	122	56.9	38.6
5	#5929.60	60.3 PK	68.2	-7.9	1.92 V	122	55.6	4.7
6	11550.00	56.0 PK	74.0	-18.0	2.30 V	50	40.4	15.6
7	11550.00	42.8 AV	54.0	-11.2	2.30 V	50	27.2	15.6
8	#17325.00	64.4 PK	68.2	-3.8	3.59 V	55	42.3	22.1

Remarks:

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

Below 1GHz Worst-Case

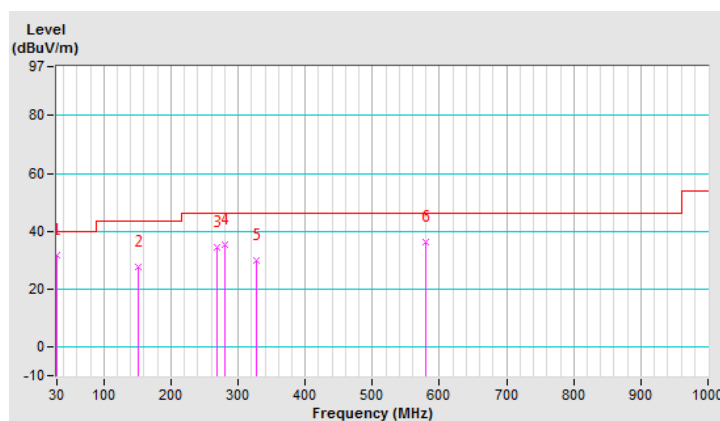
802.11n (HT40)

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	31.6 QP	40.0	-8.4	1.50 H	115	42.8	-11.2
2	150.28	27.7 QP	43.5	-15.8	1.25 H	123	37.1	-9.4
3	267.65	34.4 QP	46.0	-11.6	1.00 H	272	43.3	-8.9
4	280.26	35.4 QP	46.0	-10.6	1.00 H	262	43.7	-8.3
5	326.82	30.1 QP	46.0	-15.9	1.50 H	245	37.4	-7.3
6	579.99	36.2 QP	46.0	-9.8	1.00 H	336	39.1	-2.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

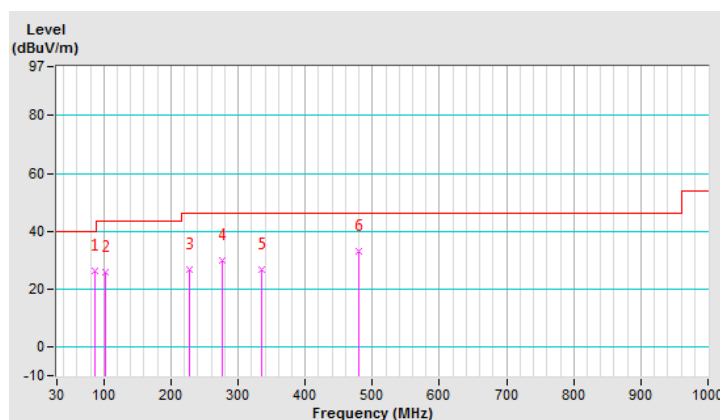


CHANNEL	TX Channel 159	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	87.23	26.3 QP	40.0	-13.7	1.25 V	229	41.0	-14.7
2	101.78	25.6 QP	43.5	-17.9	1.50 V	184	39.0	-13.4
3	227.88	26.7 QP	46.0	-19.3	1.00 V	50	37.7	-11.0
4	277.35	29.8 QP	46.0	-16.2	1.00 V	187	38.3	-8.5
5	335.55	26.7 QP	46.0	-19.3	1.50 V	268	33.9	-7.2
6	480.08	32.9 QP	46.0	-13.1	1.25 V	299	37.8	-4.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2018	Aug. 12, 2019
			Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Conf_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

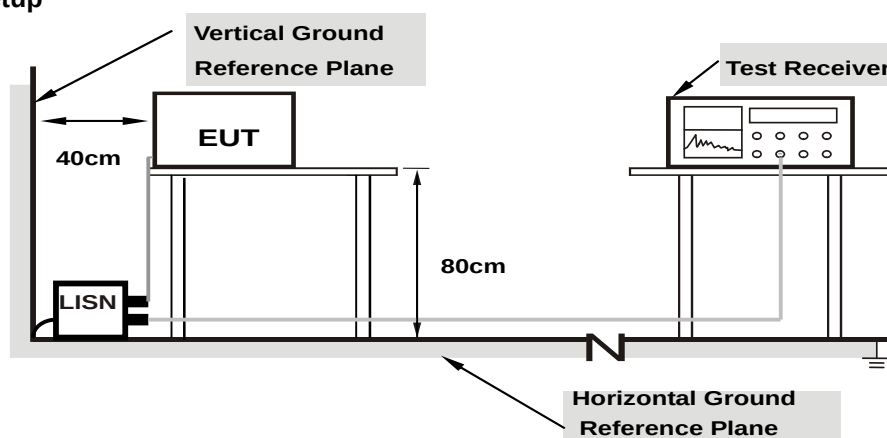
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

Worst-case data:

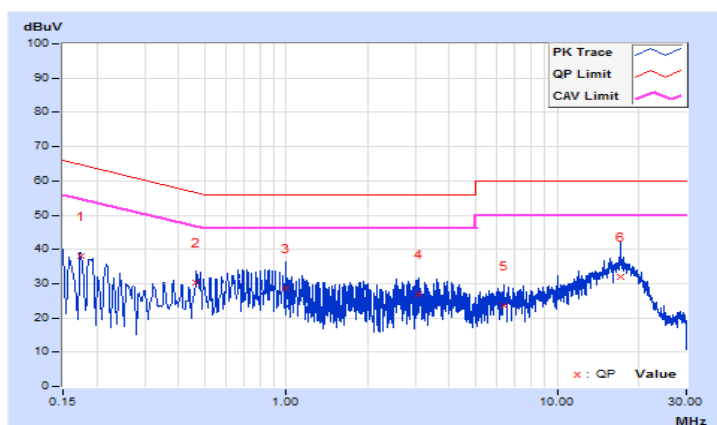
802.11n (HT40)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 159		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17374	9.69	28.49	16.44	38.18	26.13	64.78	54.78	-26.60	-28.65
2	0.46301	9.68	20.59	9.69	30.27	19.37	56.64	46.64	-26.37	-27.27
3	1.00238	9.67	18.99	8.11	28.66	17.78	56.00	46.00	-27.34	-28.22
4	3.07077	9.73	17.22	6.68	26.95	16.41	56.00	46.00	-29.05	-29.59
5	6.36690	9.80	13.75	4.35	23.55	14.15	60.00	50.00	-36.45	-35.85
6	17.20933	9.92	22.09	10.24	32.01	20.16	60.00	50.00	-27.99	-29.84

REMARKS:

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

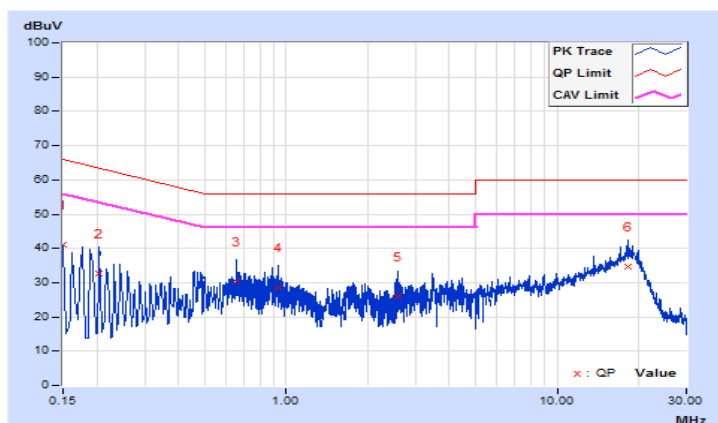


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 159		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.66	31.35	18.43	41.01	28.09	66.00	56.00	-24.99	-27.91
2	0.20474	9.66	23.15	8.73	32.81	18.39	63.42	53.42	-30.61	-35.03
3	0.65439	9.65	20.72	12.16	30.37	21.81	56.00	46.00	-25.63	-24.19
4	0.93568	9.64	19.14	10.35	28.78	19.99	56.00	46.00	-27.22	-26.01
5	2.58984	9.68	16.36	7.68	26.04	17.36	56.00	46.00	-29.96	-28.64
6	18.24157	9.98	24.75	13.89	34.73	23.87	60.00	50.00	-25.27	-26.13

REMARKS:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

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

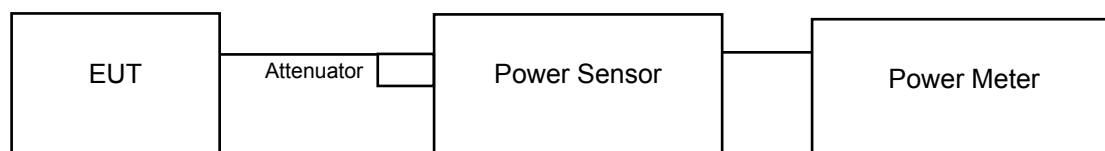
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

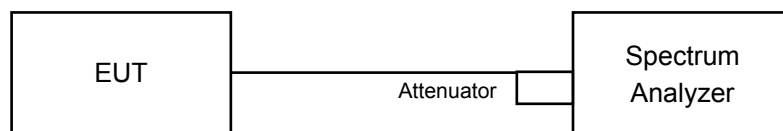
4.3.2 Test Setup

For Power Output

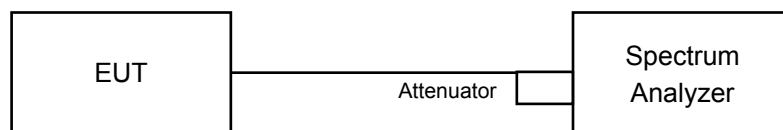
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

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

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

For 802.11ac (VHT80)

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

For 26dB Bandwidth

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

CDD Mode

802.11a

Chan.	Freq. (MHz)	Conducted Power (mW)	Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	62.517	17.96	30.00	Pass
40	5200	70.632	18.49	30.00	Pass
48	5240	96.605	19.85	30.00	Pass
149	5745	63.680	18.04	30.00	Pass
157	5785	89.536	19.52	30.00	Pass
165	5825	64.863	18.12	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	15.86	16.55	83.734	19.23	30.00	Pass
40	5200	16.88	17.17	100.872	20.04	30.00	Pass
48	5240	17.34	17.63	112.143	20.50	30.00	Pass
149	5745	17.17	17.31	105.946	20.25	30.00	Pass
157	5785	17.30	18.26	120.691	20.82	30.00	Pass
165	5825	17.14	17.23	104.606	20.20	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	14.67	14.91	60.283	17.80	30.00	Pass
46	5230	18.23	18.78	142.036	21.52	30.00	Pass
151	5755	20.18	20.24	209.914	23.22	30.00	Pass
159	5795	20.67	21.56	259.900	24.15	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.54	14.21	48.957	16.90	30.00	Pass
155	5775	17.45	18.54	127.040	21.04	30.00	Pass

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	15.86	16.55	83.734	19.23	27.99	Pass
40	5200	16.88	17.17	100.872	20.04	27.99	Pass
48	5240	17.34	17.63	112.143	20.50	27.99	Pass
149	5745	17.17	17.31	105.946	20.25	27.99	Pass
157	5785	17.30	18.26	120.691	20.82	27.99	Pass
165	5825	17.14	17.23	104.606	20.20	27.99	Pass

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

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	14.67	14.91	60.283	17.80	27.99	Pass
46	5230	18.23	18.78	142.036	21.52	27.99	Pass
151	5755	20.18	20.24	209.914	23.22	27.99	Pass
159	5795	20.67	21.56	259.900	24.15	27.99	Pass

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

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	13.54	14.21	48.957	16.90	27.99	Pass
155	5775	17.45	18.54	127.04	21.04	27.99	Pass

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

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
36	5180	21.47
40	5200	20.83
48	5240	29.05

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.65	20.78
40	5200	20.92	25.50
48	5240	21.63	27.08

802.11n (HT40)

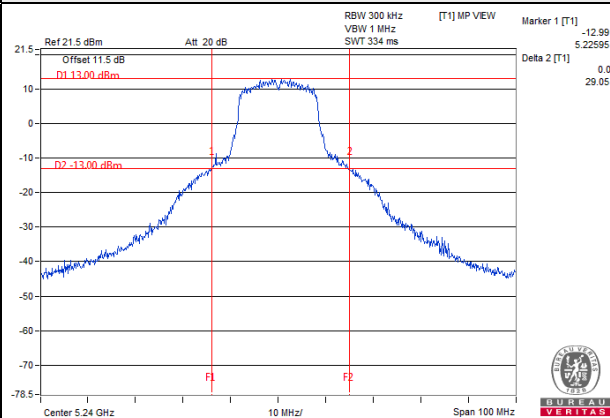
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.67	42.04
46	5230	64.82	77.85

802.11ac (VHT80)

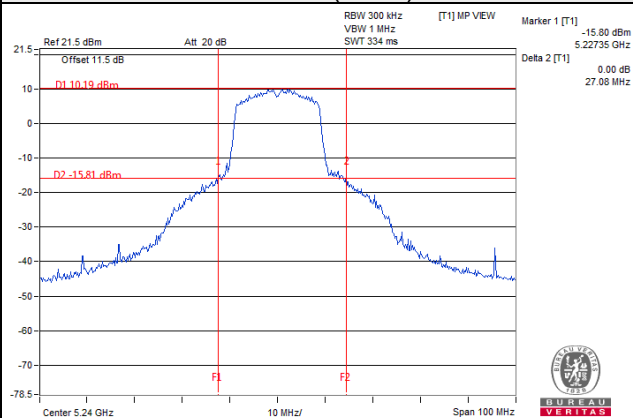
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	81.74	82.25

Spectrum Plot of Worst Value

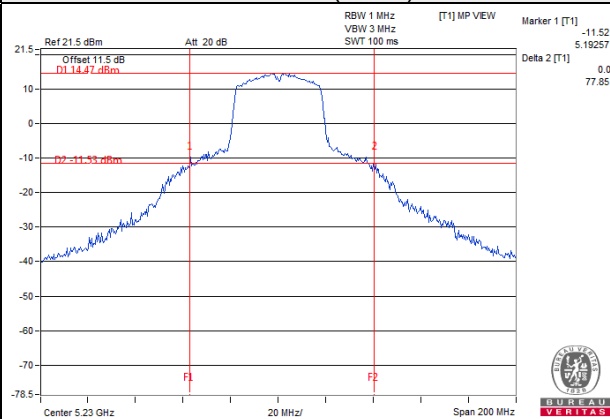
802.11a



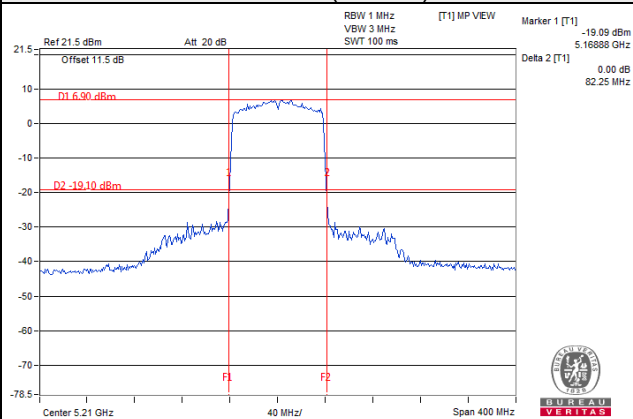
802.11n (HT20)



802.11n (HT40)

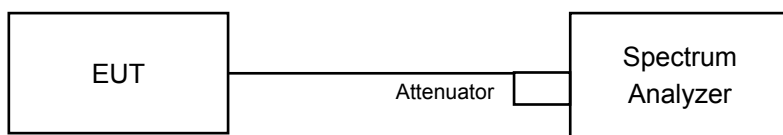


802.11ac (VHT80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.92
40	5200	16.80
48	5240	17.48
149	5745	16.86
157	5785	17.04
165	5825	16.80

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.64	17.88
48	5240	17.83	17.88
149	5745	17.65	17.88
157	5785	17.88	18.12
165	5825	17.76	17.88

802.11n (HT40)

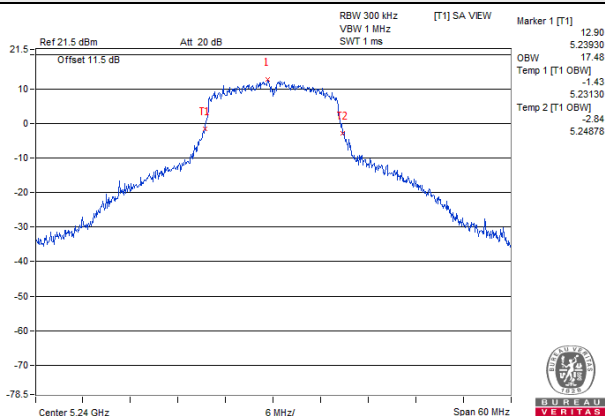
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.96	37.20
151	5755	37.44	38.16
159	5795	50.88	49.44

802.11ac (VHT80)

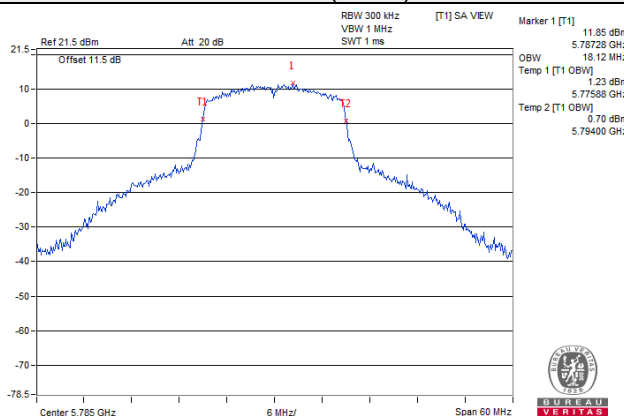
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.36	75.84
155	5775	76.32	76.32

Spectrum Plot of Worst Value

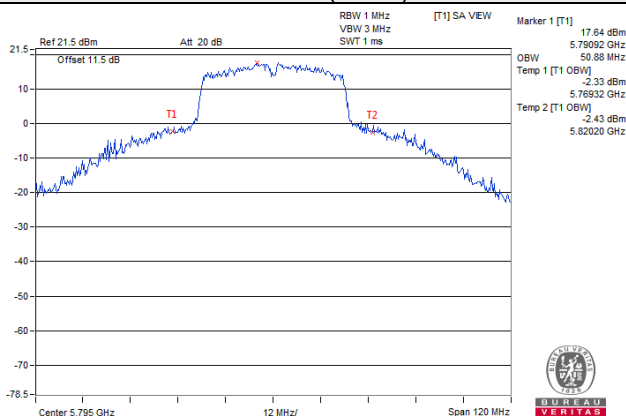
802.11a



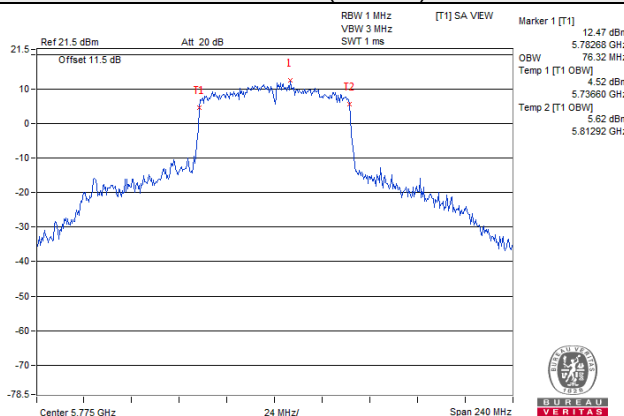
802.11n (HT20)



802.11n (HT40)

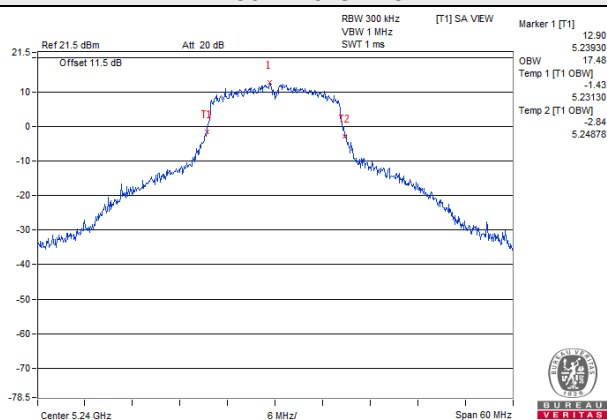


802.11ac (VHT80)

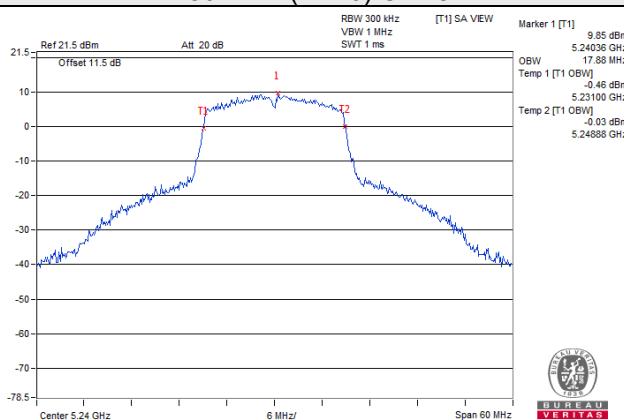


Spectrum Plot of Worst Value

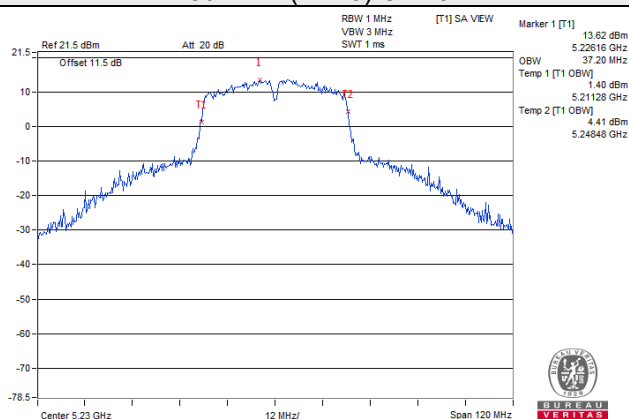
802.11a Ch 48



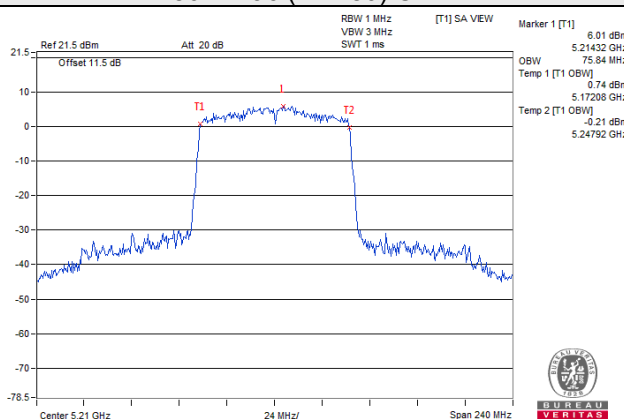
802.11n (HT20) Ch 48



802.11n (HT40) Ch 46



802.11ac (VHT80) Ch 42

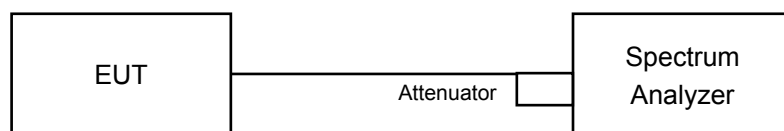


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	11dBm/ MHz
		Mobile and Portable client device	
U-NII-2A	-		11dBm/ MHz
U-NII-2C	-		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Duty cycle of test signal is $\geq 98\%$

Using method SA-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
- 3) Set Channel power measure = 1MHz.
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value.

Duty cycle of test signal is $< 98\%$

Using method SA-2

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

For U-NII-3 band:

Duty cycle of test signal is $\geq 98\%$

Using method SA-1

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

Duty cycle of test signal is $< 98\%$

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
- 3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $\text{BWCF} = 10\log(500 \text{ kHz} / 300 \text{ kHz})$.
- 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 $10 \log (1/\text{duty cycle})$.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	6.07	0.21	6.28	17.00	Pass
40	5200	6.48	0.21	6.69	17.00	Pass
48	5240	7.87	0.21	8.08	17.00	Pass

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:**
Directional gain = 5dBi < 6dBi, so the power density limit no need to be reduced.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	4.52	5.08	0.20	8.02	14.99	Pass
40	5200	5.15	4.99	0.20	8.28	14.99	Pass
48	5240	5.33	5.26	0.20	8.51	14.99	Pass

Note:

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

802.11n (HT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.35	-0.67	0.40	2.41	14.99	Pass
46	5230	2.97	3.67	0.40	6.74	14.99	Pass

Note:

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

802.11ac (VHT80)

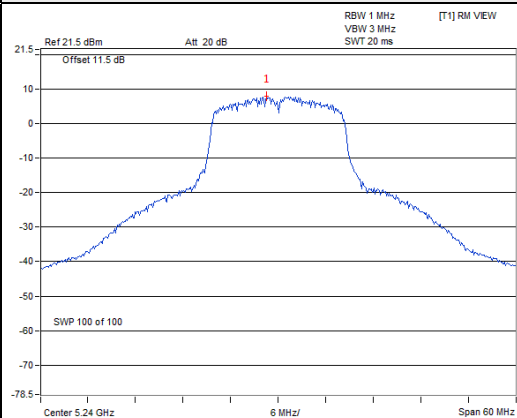
Chan.	Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-5.84	-8.17	1.20	-2.64	14.99	Pass

Note:

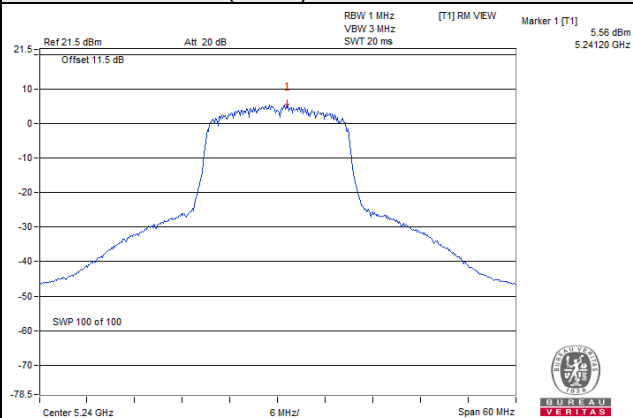
- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1:**
Directional gain = 5dBi + 10log (2) = 8.01dBi > 6dBi, so the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

Spectrum Plot of Worst Value

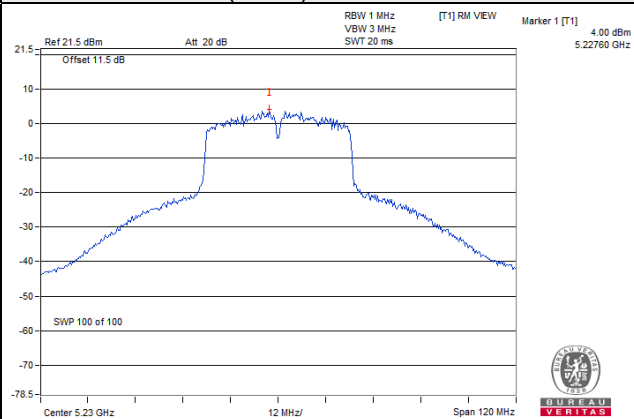
802.11a / CH 48



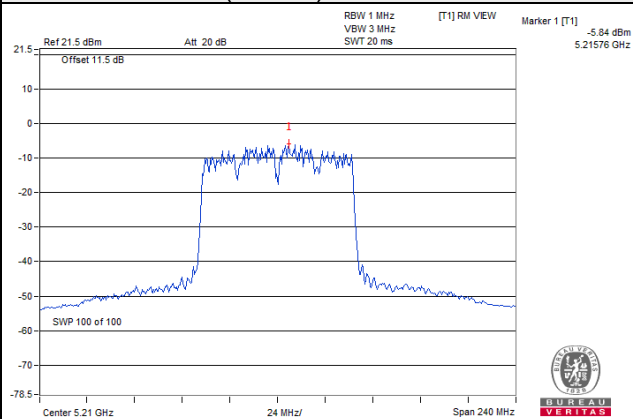
802.11n (HT20) / Chain 0 / CH 48



802.11n (HT40) / Chain 1 / CH 46



802.11ac (VHT80) / Chain 0 / CH 42



For U-NII-3 band:
802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor		Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)				
149	5745	-1.81	0.41	0.21	0.62	30	Pass
157	5785	-0.09	2.13	0.21	2.34	30	Pass
165	5825	-1.70	0.52	0.21	0.73	30	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-3.26	-1.04	3.01	0.20	2.17	27.99	Pass
	157	5785	-1.23	0.99	3.01	0.20	4.20	27.99	Pass
	165	5825	-2.25	-0.03	3.01	0.20	3.18	27.99	Pass
1	149	5745	-2.81	-0.59	3.01	0.20	2.62	27.99	Pass
	157	5785	-0.61	1.61	3.01	0.20	4.82	27.99	Pass
	165	5825	-2.57	-0.35	3.01	0.20	2.86	27.99	Pass

Note:

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

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-3.97	-1.75	3.01	0.40	1.66	27.99	Pass
	159	5795	-1.90	0.32	3.01	0.40	3.73	27.99	Pass
1	151	5755	-3.63	-1.41	3.01	0.40	2.00	27.99	Pass
	159	5795	-1.87	0.35	3.01	0.40	3.76	27.99	Pass

Note:

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

802.11ac (VHT80)

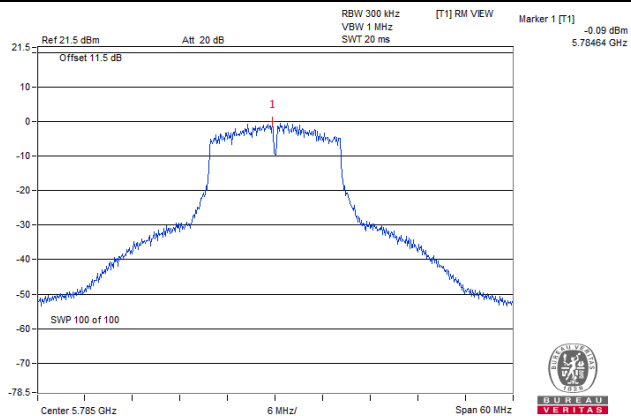
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.29	-6.07	3.01	1.20	-1.86	27.99	Pass
1	155	5775	-8.18	-5.96	3.01	1.20	-1.75	27.99	Pass

Note:

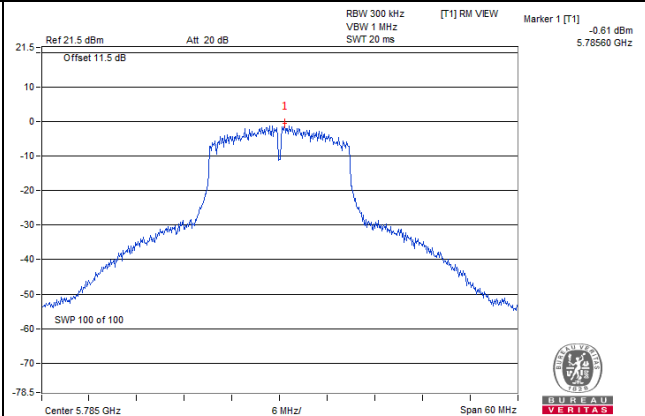
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi + 10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

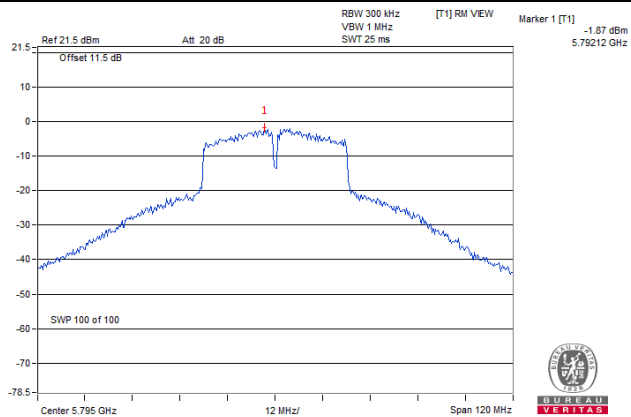
802.11a



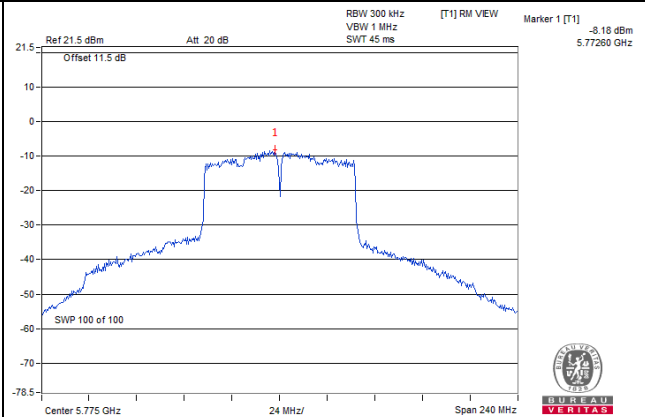
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

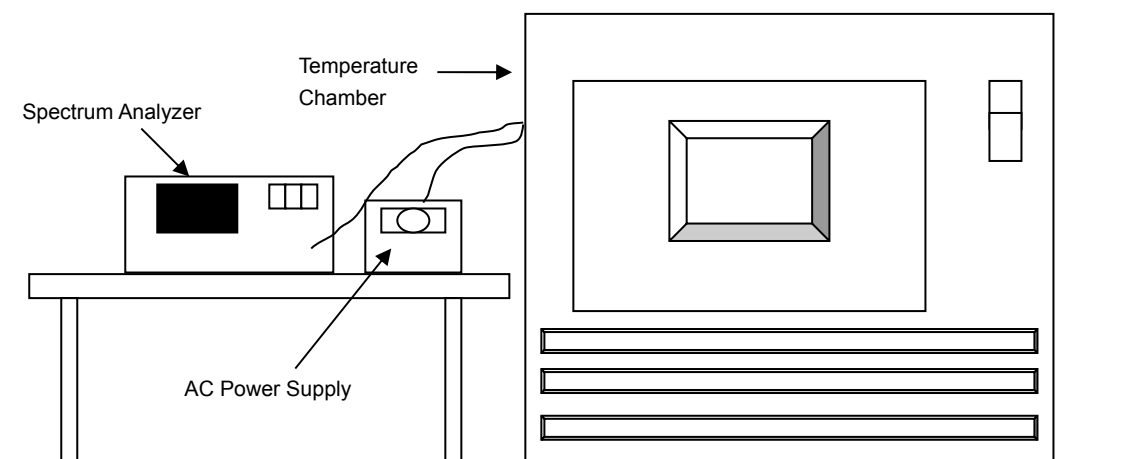


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

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

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
40	120	5180.0236	PASS	5180.0200	PASS	5180.0216	PASS	5180.0221	PASS
30	120	5179.9838	PASS	5179.9860	PASS	5179.9856	PASS	5179.9836	PASS
20	120	5179.9782	PASS	5179.9768	PASS	5179.9792	PASS	5179.9782	PASS
10	120	5180.0231	PASS	5180.0246	PASS	5180.0218	PASS	5180.0223	PASS
0	120	5179.9971	PASS	5179.9947	PASS	5179.9955	PASS	5179.9949	PASS

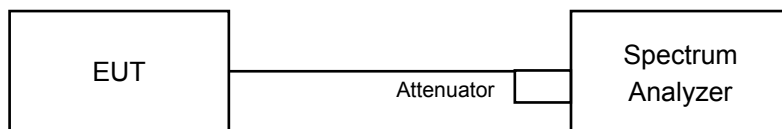
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5180.0222	PASS	5180.0256	PASS	5180.0220	PASS	5180.0233	PASS
	120	5180.0231	PASS	5180.0246	PASS	5180.0218	PASS	5180.0223	PASS
	102	5180.0234	PASS	5180.0245	PASS	5180.0219	PASS	5180.0227	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.19	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.20	0.5	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.74	15.18	0.5	Pass
157	5785	16.34	15.20	0.5	Pass
165	5825	16.33	15.18	0.5	Pass

802.11n (HT40)

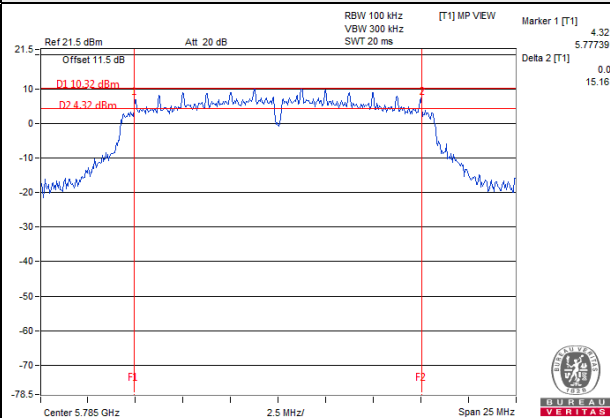
Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.19	35.18	0.5	Pass
159	5795	35.14	33.94	0.5	Pass

802.11ac (VHT80)

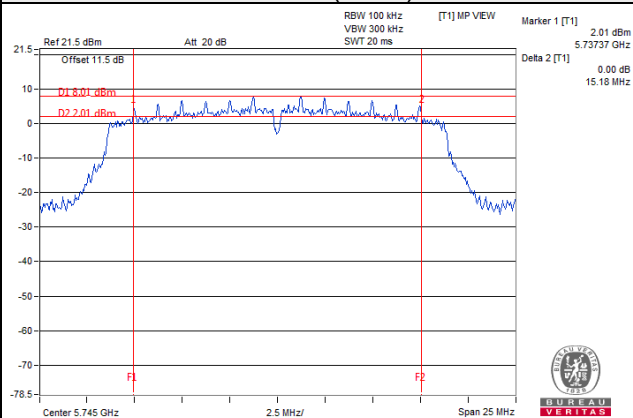
Chan.	Freq. (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.39	75.36	0.5	Pass

Spectrum Plot of Worst Value

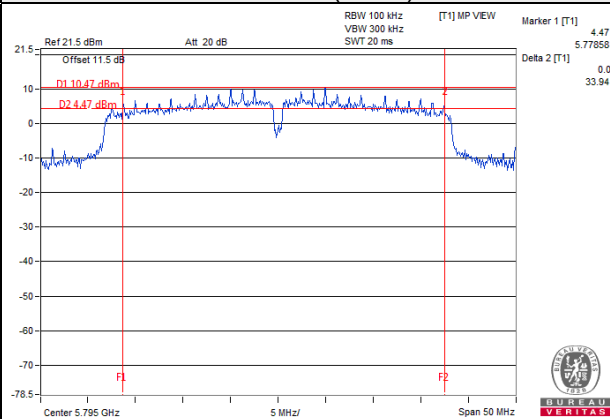
802.11a



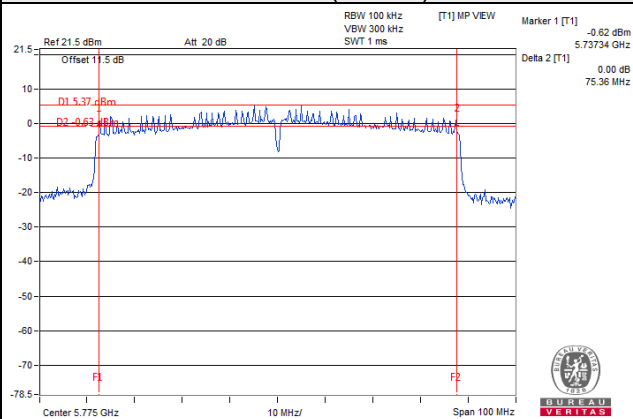
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

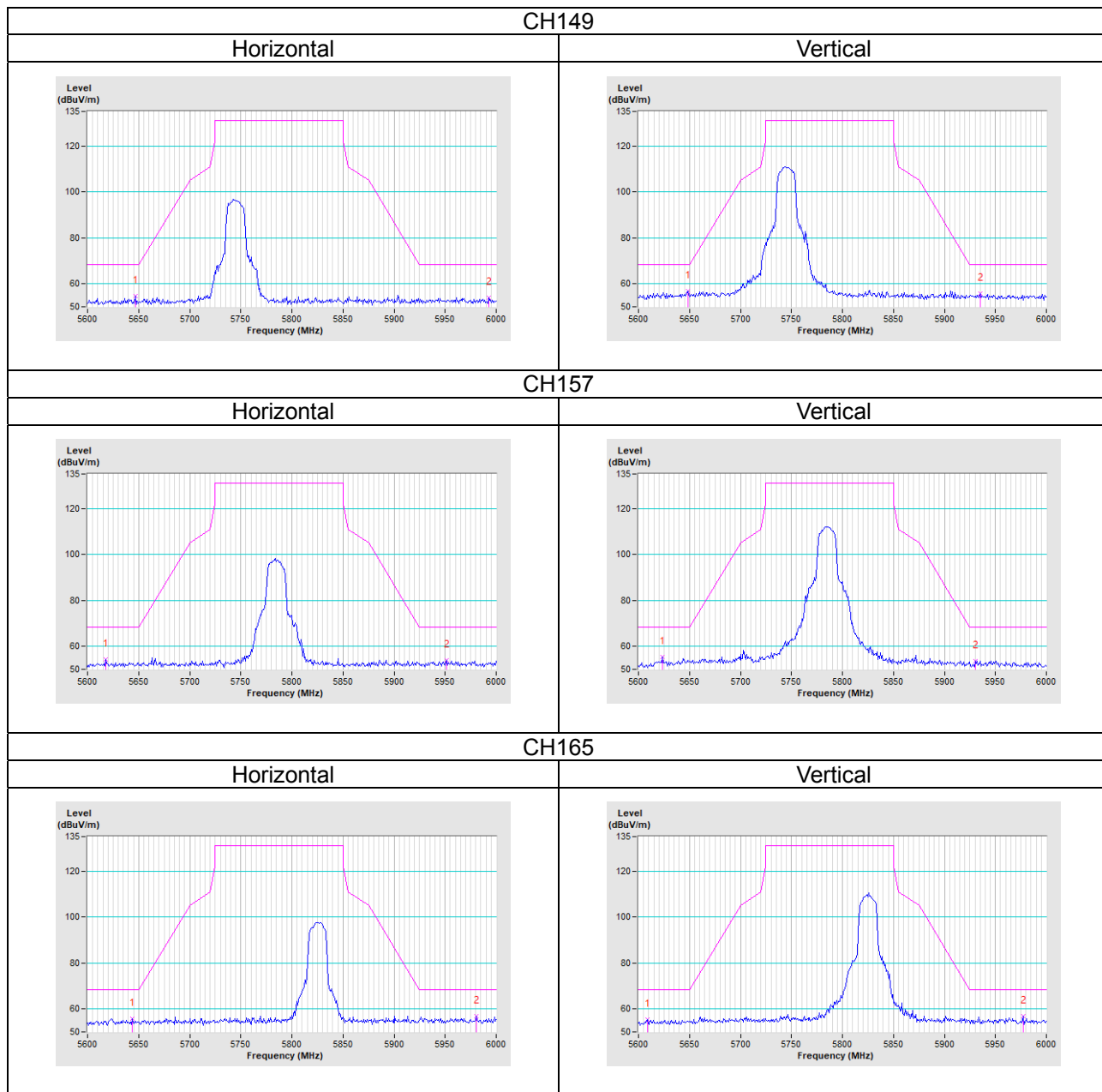


5 Pictures of Test Arrangements

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

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

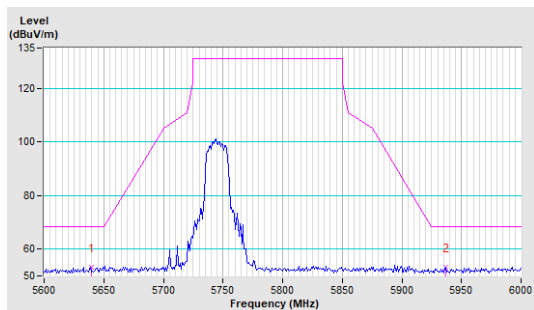
802.11a



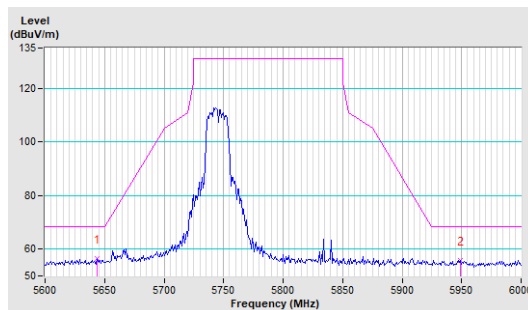
802.11n (HT20)

CH149

Horizontal

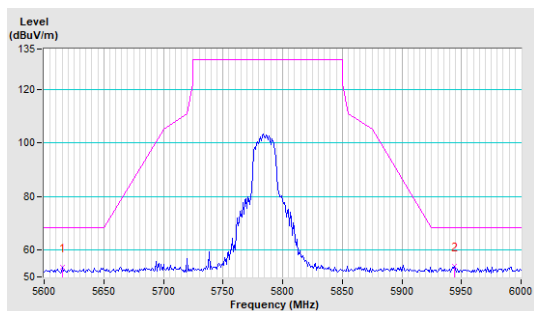


Vertical

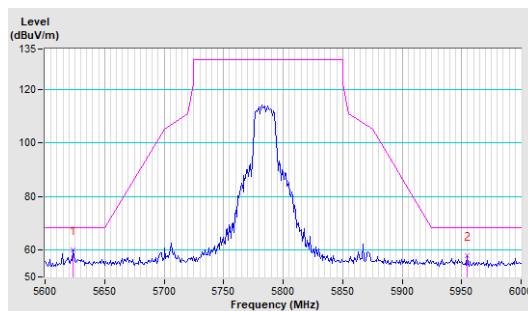


CH157

Horizontal

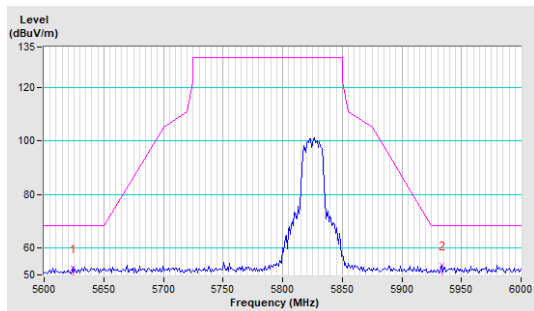


Vertical

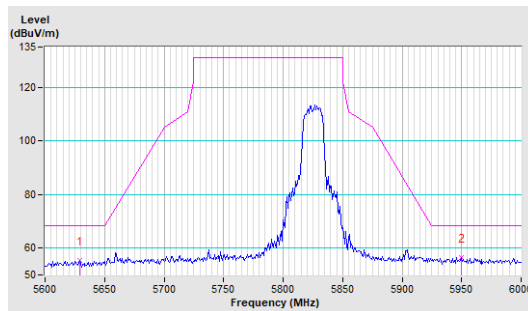


CH165

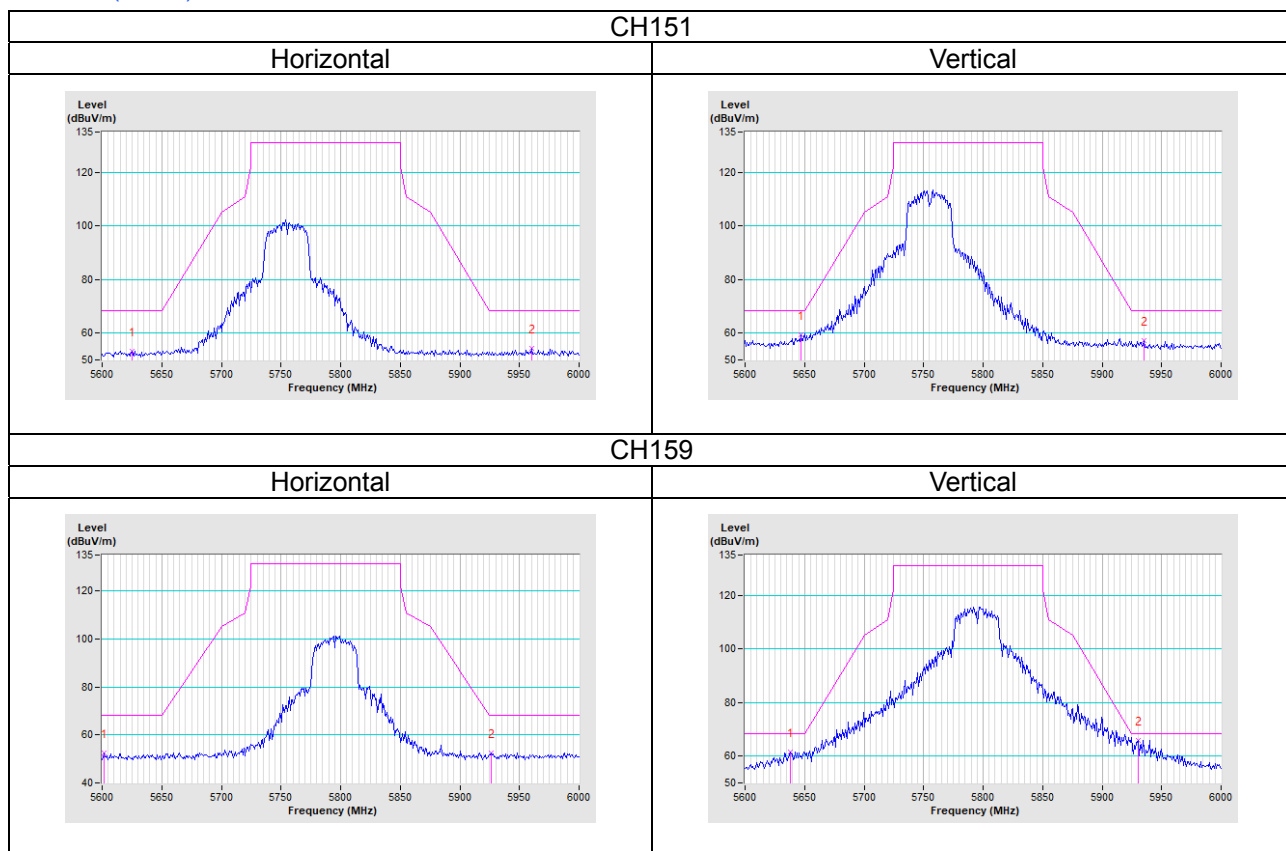
Horizontal



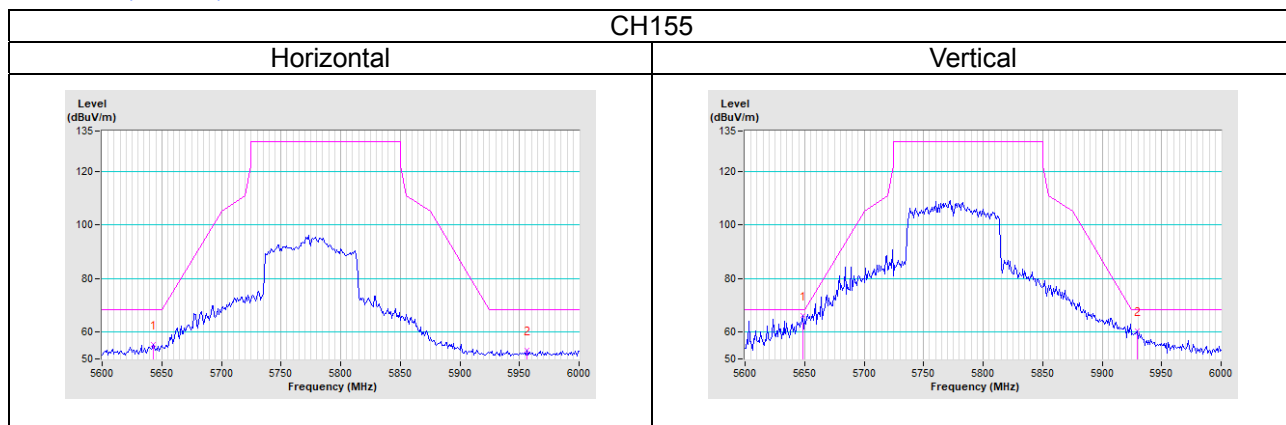
Vertical



802.11n (HT40)



802.11ac (VHT80)



Appendix – Information of the Testing Laboratories

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

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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