

## FCC Test Report

**Report No.:** RFBHWX-WTW-P21060926-2

**FCC ID:** SBVRM037

**Test Model:** S37

**Received Date:** Dec. 28, 2021

**Test Date:** Jan. 20 ~ Feb. 03, 2022

**Issued Date:** Mar. 28, 2022

**Applicant:** Sonos, Inc.

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

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33383, Taiwan

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

**Test Location (2):** No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan

**FCC Registration /  
Designation Number:** 281270 / TW0032



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## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty .....	6
2.2 Modification Record .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT .....	7
3.2 Description of Test Modes .....	8
3.2.1 Test Mode Applicability and Tested Channel Detail .....	9
3.3 Duty Cycle of Test Signal .....	11
3.4 Description of Support Units .....	12
3.4.1 Configuration of System under Test .....	12
3.5 General Description of Applied Standards and References .....	12
<b>4 Test Types and Results</b> .....	<b>13</b>
4.1 Radiated Emission and Bandedge Measurement .....	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	13
4.1.2 Test Instruments .....	15
4.1.3 Test Procedures .....	16
4.1.4 Deviation from Test Standard .....	16
4.1.5 Test Setup .....	17
4.1.6 EUT Operating Conditions .....	18
4.1.7 Test Results .....	19
4.2 Conducted Emission Measurement .....	47
4.2.1 Limits of Conducted Emission Measurement .....	47
4.2.2 Test Instruments .....	47
4.2.3 Test Procedures .....	48
4.2.4 Deviation from Test Standard .....	48
4.2.5 Test Setup .....	48
4.2.6 EUT Operating Conditions .....	48
4.2.7 Test Results .....	49
4.3 Transmit Power Measurement .....	51
4.3.1 Limits of Transmit Power Measurement .....	51
4.3.2 Test Setup .....	51
4.3.3 Test Instruments .....	52
4.3.4 Test Procedure .....	52
4.3.5 Deviation from Test Standard .....	52
4.3.6 EUT Operating Conditions .....	52
4.3.7 Test Results .....	53
4.4 Occupied Bandwidth Measurement .....	59
4.4.1 Test Setup .....	59
4.4.2 Test Instruments .....	59
4.4.3 Test Procedure .....	59
4.4.4 Test Results .....	60
4.5 Peak Power Spectral Density Measurement .....	63
4.5.1 Limits of Peak Power Spectral Density Measurement .....	63
4.5.2 Test Setup .....	63
4.5.3 Test Instruments .....	63
4.5.4 Test Procedures .....	63
4.5.5 Deviation from Test Standard .....	64
4.5.6 EUT Operating Conditions .....	64
4.5.7 Test Results .....	65
4.6 Frequency Stability .....	69
4.6.1 Limit of Frequency Stability Measurement .....	69

4.6.2	Test Setup .....	69
4.6.3	Test Instruments .....	69
4.6.4	Test Procedure .....	69
4.6.5	Deviation from Test Standard .....	69
4.6.6	EUT Operating Condition .....	69
4.6.7	Test Results .....	70
4.7	6 dB Bandwidth Measurement.....	71
4.7.1	Limits of 6 dB Bandwidth Measurement.....	71
4.7.2	Test Setup.....	71
4.7.3	Test Instruments .....	71
4.7.4	Test Procedure .....	71
4.7.5	Deviation from Test Standard .....	71
4.7.6	EUT Operating Condition .....	71
4.7.7	Test Results .....	72
<b>5</b>	<b>Pictures of Test Arrangements.....</b>	<b>73</b>
	<b>Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band) .....</b>	<b>74</b>
	<b>Annex B- Band Edge Measurement.....</b>	<b>76</b>
	<b>Appendix – Information of the Testing Laboratories .....</b>	<b>82</b>

### Release Control Record

Issue No.	Description	Date Issued
RFBHWX-WTW-P21060926-2	Original Release	Mar. 28, 2022

## 1 Certificate of Conformity

**Product:** Wireless Smart Speaker

**Brand:** Sonos

**Test Model:** S37

**Sample Status:** Engineering Sample

**Applicant:** Sonos, Inc.

**Test Date:** Jan. 20 ~ Feb. 03, 2022

**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 :** Gina Liu , **Date:** Mar. 28, 2022  
Gina Liu / Specialist

**Approved by :** Jeremy Lin , **Date:** Mar. 28, 2022  
Jeremy Lin / 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)(9)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -7.32 dB at 0.55265 MHz.
15.407(b) (1/2/3/4(i/ii)/ 9)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.68 dB at 5725.00 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is IPEX micro-coax not a standard connector.

Note:

- For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
- For U-NII-1, U-NII-2A, U-NII-2C band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 200 MHz	2.91 dB
	200 MHz ~ 1000 MHz	2.93 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	Wireless Smart Speaker
<b>Brand</b>	Sonos
<b>Test Model</b>	S37
<b>Status of EUT</b>	Engineering Sample
<b>Power Supply Rating</b>	120 Vac
<b>Modulation Type</b>	256QAM, 64QAM, 16QAM, QPSK, BPSK
<b>Modulation Technology</b>	OFDM
<b>Transfer Rate</b>	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 144.4 Mbps
<b>Operating Frequency</b>	5180 ~ 5240 MHz, 5260 ~ 5320 MHz, 5500 ~ 5720 MHz, 5745 ~ 5825 MHz
<b>Number of Channel</b>	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20) 5500 ~ 5720 MHz: 12 for 802.11a, 802.11n (HT20) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20)
<b>Output Power</b>	135.572 mW for 5180 ~ 5240 MHz 120.11 mW for 5260 ~ 5320 MHz 133.678 mW for 5500 ~ 5720 MHz 152.946 mW for 5745 ~ 5825 MHz
<b>Antenna Type</b>	Refer to Note as below
<b>Antenna Connector</b>	Refer to Note as below
<b>Accessory Device</b>	Refer to Note as below
<b>Data Cable Supplied</b>	N/A

#### Note:

- 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

- The EUT contains following accessory devices.

Product	Brand	Model	Description
Power cord	Well Shin	112-00426	Non-shielded with 2 core

- The following antennas were provided to the EUT.

Chain.	Model Name	Antenna Type	Antenna Connector	Peak Gain (dBi)								
				2412 MHz	2450 MHz	2470 MHz	5200 MHz	5300 MHz	5500 MHz	5600 MHz	5700 MHz	5800 MHz
Front Antenna	105-00194	Vertically-Polarized Dipole PCB Antenna	IPEX micro-coax	2.9	3.1	3.1	4.0	5.4	4.2	4.4	3.5	3.6
Rear Antenna	105-00195			4.8	4.9	4.7	4.8	4.7	4.6	5.1	4.2	4.3

- The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
- 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.
- The product does not support co-located.

### 3.2 Description of Test Modes

#### For 5180 ~ 5240 MHz

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

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

#### For 5260 ~ 5320 MHz

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

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

#### For 5500 ~ 5720 MHz

12 channels are provided for 802.11a, 802.11n (HT20):

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	144	5720

#### For 5745 ~ 5825 MHz:

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

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



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

**Note:**

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

#### **Radiated Emission Test (Above 1 GHz):**

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	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
-	5500-5720	802.11a	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
-	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

#### **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)
-	5500-5720	802.11a	100 to 144	140	OFDM	BPSK	6.0

#### **Power Line Conducted Emission Test:**

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5500-5720	802.11a	100 to 144	140	OFDM	BPSK	6.0

**Antenna Port Conducted Measurement:**

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	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
-	5500-5720	802.11a	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 144	100, 116, 140, 144	OFDM	BPSK	6.5
-	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

**Test Condition:**

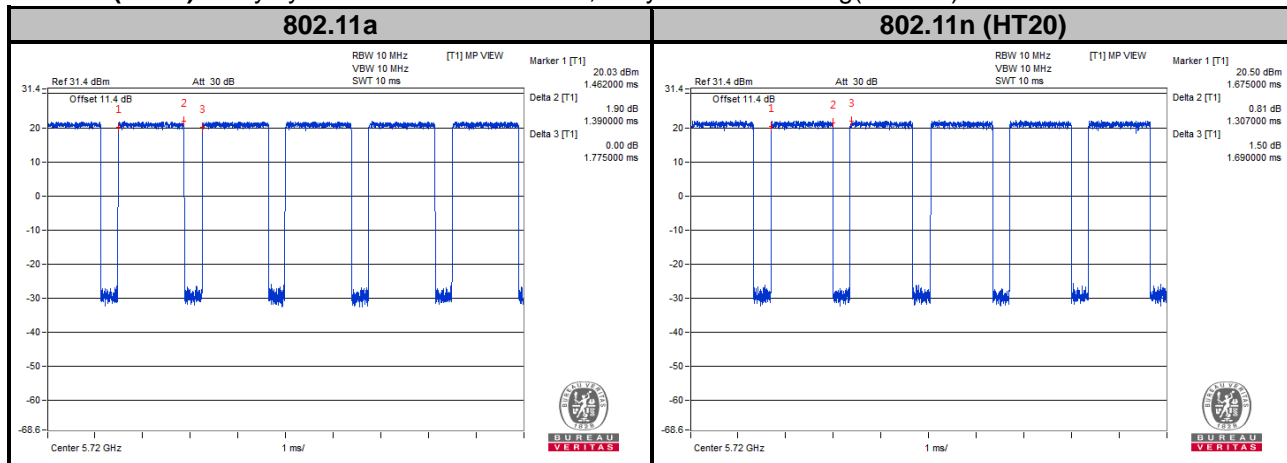
Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 70 % RH	120 Vac, 60 Hz	Hans Wu; Raymond Lee
RE<1G	25 deg. C, 70 % RH	120 Vac, 60 Hz	Raymond Lee
PLC	24 deg. C, 68 % RH	120 Vac, 60 Hz	Raymond Lee
APCM	25 deg. C, 60 % RH	120 Vac, 60 Hz	Jisyong Wang

### 3.3 Duty Cycle of Test Signal

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

**802.11a:** Duty cycle =  $1.39/1.775 = 0.783$ , Duty factor =  $10 * \log(1/0.783) = 1.06$

**802.11n (HT20):** Duty cycle =  $1.307/1.69 = 0.773$ , Duty factor =  $10 * \log(1/0.773) = 1.12$



### 3.4 Description of Support Units

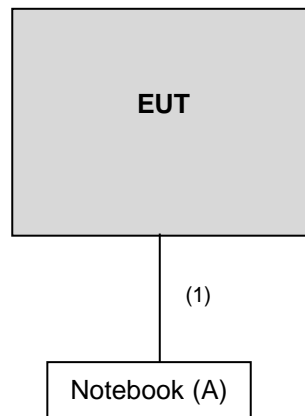
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
1.	Notebook	Dell	E5420	CN-0H5TG2-75900-1B 3-01UT-A01	N/A	-

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	10	N	0	-

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards and References

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

#### Test Standard:

##### FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

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

#### References Test Guidance:

##### KDB 789033 D02 General UNII Test Procedures New Rules v02r01

##### KDB 662911 D01 Multiple Transmitter Output v02r01

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

**Note:**

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

Limits of Unwanted Emission Out of the Restricted Bands

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

<sup>\*1</sup> beyond 75 MHz or more above of the band edge.

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

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

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

**Note:**

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

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

## 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	ESR3	102783	Dec. 21, 2021	Dec. 20, 2022
Spectrum Analyzer KEYSIGHT	N9020B	MY60110513	Dec. 24, 2021	Dec. 23, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-1214	Oct. 27, 2021	Oct. 26, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1170	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980798	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980809	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980786	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(9 000+2000+1000)	201244+ 201232+ 210103	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-N M-(9000+300+500)	201251+ 201249+ 201248	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM- (5000+3000+2000)	201261+201258+20124 9	Jan. 17, 2022	Jan. 16, 2023
Software BV ADT	ADT_Radiated_V7. 6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFA-515BSN	NA	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208676	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004 /MY55190007/MY5521000 5	Jul. 12, 2021	Jul. 11, 2022

- 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 WM Chamber 9.

#### 4.1.3 Test Procedures

##### **For Radiated Emission below 30 MHz**

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

##### **Note:**

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

##### **For Radiated Emission above 30 MHz**

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

##### **Note:**

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

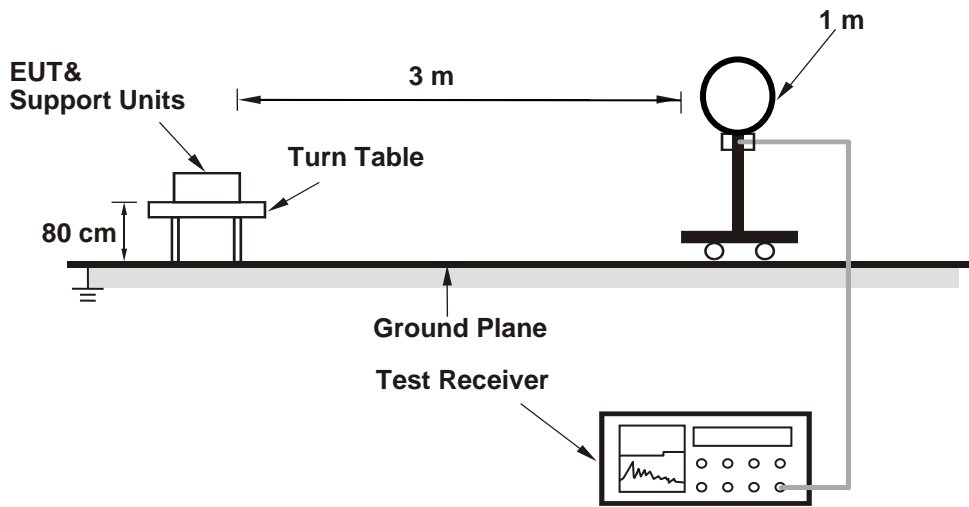
#### 4.1.4 Deviation from Test Standard

No deviation.

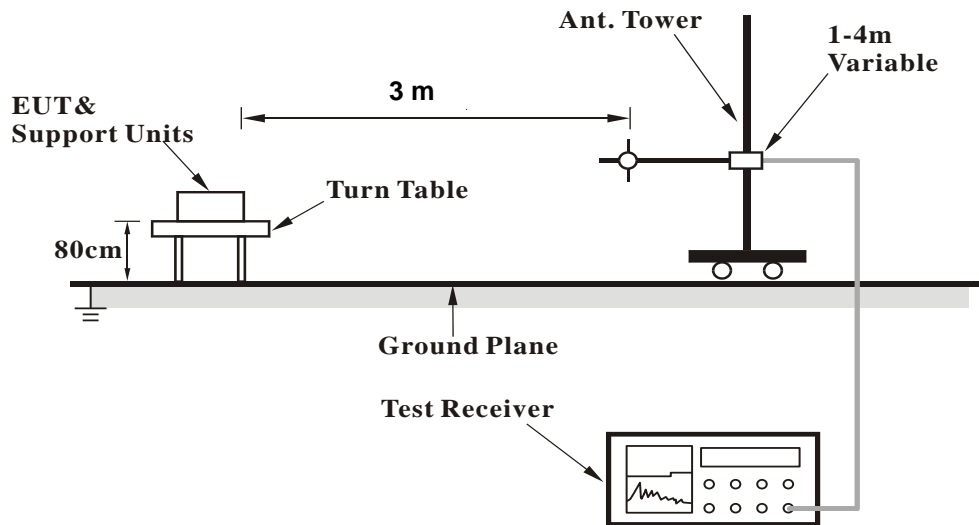


4.1.5 Test Setup

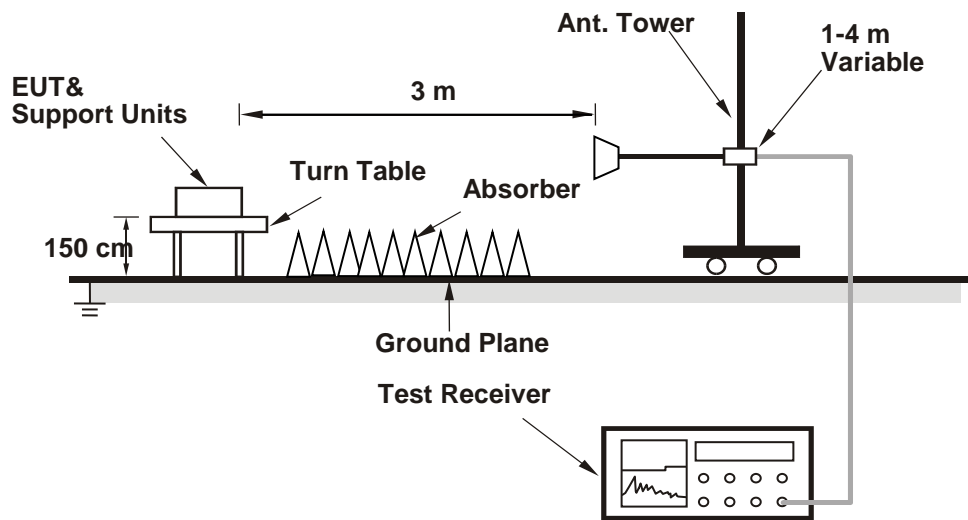
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



**<Radiated Emission above 1 GHz>**



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

**4.1.6 EUT Operating Conditions**

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

#### 4.1.7 Test Results

##### Above 1 GHz Data :

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 36 : 5180 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

##### Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	56.66 PK	74.00	-17.34	3.46 H	178	53.80	2.86
2	5150.00	46.12 AV	54.00	-7.88	3.46 H	178	43.26	2.86
3	*5180.00	107.50 PK			3.46 H	178	67.16	40.34
4	*5180.00	98.59 AV			3.46 H	178	58.25	40.34
5	#10360.00	54.82 PK	68.20	-13.38	2.35 H	78	46.88	7.94

##### Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.87 PK	74.00	-10.13	1.58 V	228	61.01	2.86
2	5150.00	52.46 AV	54.00	-1.54	1.58 V	228	49.60	2.86
3	*5180.00	115.06 PK			1.58 V	228	74.72	40.34
4	*5180.00	105.41 AV			1.58 V	228	65.07	40.34
5	#10360.00	55.21 PK	68.20	-12.99	1.47 V	203	47.27	7.94

##### Remarks:

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 40 : 5200 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	110.63 PK			3.43 H	176	70.31	40.32
2	*5200.00	101.31 AV			3.43 H	176	60.99	40.32
3	#10400.00	56.45 PK	68.20	-11.75	1.49 H	19	48.52	7.93
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	118.01 PK			1.55 V	226	77.69	40.32
2	*5200.00	108.70 AV			1.55 V	226	68.38	40.32
3	#10400.00	56.98 PK	68.20	-11.22	1.59 V	202	49.05	7.93

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 48 : 5240 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	110.26 PK			3.40 H	179	70.12	40.14
2	*5240.00	101.15 AV			3.40 H	179	61.01	40.14
3	5350.00	55.17 PK	74.00	-18.83	3.40 H	179	52.84	2.33
4	5350.00	44.82 AV	54.00	-9.18	3.40 H	179	42.49	2.33
5	#10480.00	58.94 PK	68.20	-9.26	1.53 H	22	51.15	7.79

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	118.15 PK			1.52 V	227	78.01	40.14
2	*5240.00	108.88 AV			1.52 V	227	68.74	40.14
3	5350.00	56.51 PK	74.00	-17.49	1.00 V	227	54.18	2.33
4	5350.00	45.70 AV	54.00	-8.30	1.00 V	227	43.37	2.33
5	#10480.00	59.91 PK	68.20	-8.29	1.45 V	169	52.12	7.79

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 52 : 5260 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	56.01 PK	74.00	-17.99	3.31 H	172	53.15	2.86
2	5150.00	45.37 AV	54.00	-8.63	3.31 H	172	42.51	2.86
3	*5260.00	109.82 PK			3.31 H	172	69.77	40.05
4	*5260.00	100.63 AV			3.31 H	172	60.58	40.05
5	#10520.00	58.81 PK	68.20	-9.39	2.03 H	67	51.02	7.79

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	57.15 PK	74.00	-16.85	1.48 V	230	54.29	2.86
2	5150.00	46.13 AV	54.00	-7.87	1.48 V	230	43.27	2.86
3	*5260.00	117.79 PK			1.48 V	230	77.74	40.05
4	*5260.00	108.02 AV			1.48 V	230	67.97	40.05
5	#10520.00	59.87 PK	68.20	-8.33	1.52 V	78	52.08	7.79

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 60 : 5300 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	109.05 PK			3.27 H	182	69.15	39.90
2	*5300.00	99.39 AV			3.27 H	182	59.49	39.90
3	10600.00	57.45 PK	74.00	-16.55	2.14 H	86	49.47	7.98
4	10600.00	46.63 AV	54.00	-7.37	2.14 H	86	38.65	7.98

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	117.31 PK			1.59 V	224	77.41	39.90
2	*5300.00	107.68 AV			1.59 V	224	67.78	39.90
3	10600.00	58.35 PK	74.00	-15.65	1.50 V	94	50.37	7.98
4	10600.00	46.68 AV	54.00	-7.32	1.50 V	94	38.70	7.98

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 64 : 5320 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5320.00	106.81 PK			3.70 H	337	66.89	39.92
2	*5320.00	97.52 AV			3.70 H	337	57.60	39.92
3	5350.00	56.16 PK	74.00	-17.84	3.70 H	337	53.83	2.33
4	5350.00	46.28 AV	54.00	-7.72	3.70 H	337	43.95	2.33
5	10640.00	54.88 PK	74.00	-19.12	2.08 H	88	46.95	7.93
6	10640.00	43.38 AV	54.00	-10.62	2.08 H	88	35.45	7.93

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5320.00	114.75 PK			1.56 V	229	74.83	39.92
2	*5320.00	104.99 AV			1.56 V	229	65.07	39.92
3	5350.00	66.01 PK	74.00	-7.99	1.56 V	229	63.68	2.33
4	5350.00	53.06 AV	54.00	-0.94	1.56 V	229	50.73	2.33
5	10640.00	55.25 PK	74.00	-18.75	1.51 V	95	47.32	7.93
6	10640.00	44.28 AV	54.00	-9.72	1.51 V	95	36.35	7.93

**Remarks:**

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



<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 100 : 5500 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	57.87 PK	74.00	-16.13	3.47 H	343	55.52	2.35
2	5460.00	46.10 AV	54.00	-7.90	3.47 H	343	43.75	2.35
3	#5470.00	60.68 PK	68.20	-7.52	3.47 H	343	58.31	2.37
4	*5500.00	108.68 PK			3.47 H	343	68.59	40.09
5	*5500.00	99.09 AV			3.47 H	343	59.00	40.09
6	11000.00	54.67 PK	74.00	-19.33	2.10 H	84	46.79	7.88
7	11000.00	43.19 AV	54.00	-10.81	2.10 H	84	35.31	7.88

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	60.24 PK	74.00	-13.76	1.50 V	357	57.89	2.35
2	5460.00	49.13 AV	54.00	-4.87	1.50 V	357	46.78	2.35
3	#5470.00	67.24 PK	68.20	-0.96	1.50 V	357	64.87	2.37
4	*5500.00	116.76 PK			1.50 V	357	76.67	40.09
5	*5500.00	107.51 AV			1.50 V	357	67.42	40.09
6	11000.00	55.39 PK	74.00	-18.61	1.62 V	99	47.51	7.88
7	11000.00	43.74 AV	54.00	-10.26	1.62 V	99	35.86	7.88

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 116 : 5580 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	111.98 PK			3.35 H	102	71.30	40.68
2	*5580.00	102.20 AV			3.35 H	102	61.52	40.68
3	11160.00	55.97 PK	74.00	-18.03	2.16 H	96	47.47	8.50
4	11160.00	44.18 AV	54.00	-9.82	2.16 H	96	35.68	8.50
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	119.59 PK			1.51 V	355	78.91	40.68
2	*5580.00	110.27 AV			1.51 V	355	69.59	40.68
3	11160.00	56.28 PK	74.00	-17.72	1.57 V	103	47.78	8.50
4	11160.00	44.69 AV	54.00	-9.31	1.57 V	103	36.19	8.50

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 140 : 5700 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5700.00	106.97 PK			3.37 H	104	65.69	41.28
2	*5700.00	97.51 AV			3.37 H	104	56.23	41.28
3	#5725.00	60.36 PK	68.20	-7.84	3.37 H	104	56.59	3.77
4	11400.00	56.38 PK	74.00	-17.62	2.23 H	104	47.48	8.90
5	11400.00	44.39 AV	54.00	-9.61	2.23 H	104	35.49	8.90

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5700.00	114.52 PK			1.64 V	98	73.24	41.28
2	*5700.00	104.97 AV			1.64 V	98	63.69	41.28
<b>3</b>	<b>#5725.00</b>	<b>67.52 PK</b>	<b>68.20</b>	<b>-0.68</b>	<b>1.64 V</b>	<b>98</b>	<b>63.75</b>	<b>3.77</b>
4	11400.00	56.53 PK	74.00	-17.47	1.61 V	105	47.63	8.90
5	11400.00	44.66 AV	54.00	-9.34	1.61 V	105	35.76	8.90

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 144 : 5720 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5720.00	110.30 PK			1.62 H	123	68.90	41.40
2	*5720.00	101.60 AV			1.62 H	123	60.20	41.40
3	#5850.00	57.50 PK	74.00	-16.50	1.62 H	123	53.60	3.90
4	11440.00	58.10 PK	74.00	-15.90	2.34 H	70	49.10	9.00
5	11440.00	44.10 AV	54.00	-9.90	2.34 H	70	35.10	9.00

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5720.00	117.51 PK			1.66 V	97	76.12	41.39
2	*5720.00	107.68 AV			1.66 V	97	66.29	41.39
3	#5850.00	57.52 PK	68.20	-10.68	1.66 V	97	53.62	3.90
4	11440.00	57.49 PK	74.00	-16.51	1.52 V	138	48.50	8.99
5	11440.00	45.73 AV	54.00	-8.27	1.52 V	138	36.74	8.99

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 149 : 5745 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5641.60	59.54 PK	68.20	-8.66	1.33 H	308	56.06	3.48
2	*5745.00	109.79 PK			1.33 H	308	68.25	41.54
3	*5745.00	100.87 AV			1.33 H	308	59.33	41.54
4	#5979.20	57.63 PK	68.20	-10.57	1.33 H	308	53.37	4.26
5	11490.00	57.00 PK	74.00	-17.00	1.92 H	188	47.91	9.09
6	11490.00	45.57 AV	54.00	-8.43	1.92 H	188	36.48	9.09

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5642.40	58.57 PK	68.20	-9.63	1.75 V	98	55.08	3.49
2	*5745.00	116.07 PK			1.75 V	98	74.53	41.54
3	*5745.00	107.12 AV			1.75 V	98	65.58	41.54
4	#5943.20	58.14 PK	68.20	-10.06	1.75 V	98	54.15	3.99
5	11490.00	57.76 PK	74.00	-16.24	1.59 V	162	48.67	9.09
6	11490.00	46.11 AV	54.00	-7.89	1.59 V	162	37.02	9.09

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 157 : 5785 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5612.80	57.41 PK	68.20	-10.79	1.38 H	309	54.17	3.24
2	*5785.00	109.00 PK			1.38 H	309	67.44	41.56
3	*5785.00	100.07 AV			1.38 H	309	58.51	41.56
4	#5987.60	58.16 PK	68.20	-10.04	1.38 H	309	53.82	4.34
5	11570.00	55.94 PK	74.00	-18.06	1.80 H	289	46.80	9.14
6	11570.00	45.56 AV	54.00	-8.44	1.80 H	289	36.42	9.14

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5611.60	58.02 PK	68.20	-10.18	1.56 V	97	54.79	3.23
2	*5785.00	115.27 PK			1.56 V	97	73.71	41.56
3	*5785.00	106.28 AV			1.56 V	97	64.72	41.56
4	#5959.20	58.63 PK	68.20	-9.57	1.56 V	97	54.53	4.10
5	11570.00	56.67 PK	74.00	-17.33	1.28 V	160	47.53	9.14
6	11570.00	46.02 AV	54.00	-7.98	1.28 V	160	36.88	9.14

**Remarks:**

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

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 165 : 5825 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5631.60	57.27 PK	68.20	-10.93	1.57 H	69	53.87	3.40
2	*5825.00	108.16 PK			1.57 H	69	66.59	41.57
3	*5825.00	99.28 AV			1.57 H	69	57.71	41.57
4	#5943.60	58.22 PK	68.20	-9.98	1.57 H	69	54.23	3.99
5	11650.00	56.90 PK	74.00	-17.10	2.11 H	230	47.90	9.00
6	11650.00	45.73 AV	54.00	-8.27	2.11 H	230	36.73	9.00

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5646.00	57.08 PK	68.20	-11.12	1.55 V	97	53.56	3.52
2	*5825.00	116.43 PK			1.55 V	97	74.86	41.57
3	*5825.00	107.21 AV			1.55 V	97	65.64	41.57
4	#5970.00	58.55 PK	68.20	-9.65	1.55 V	97	54.36	4.19
5	11650.00	57.11 PK	74.00	-16.89	1.90 V	114	48.11	9.00
6	11650.00	45.68 AV	54.00	-8.32	1.90 V	114	36.68	9.00

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 36 : 5180 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	59.63 PK	74.00	-14.37	2.21 H	119	56.77	2.86
2	5150.00	46.77 AV	54.00	-7.23	2.21 H	119	43.91	2.86
3	*5180.00	105.91 PK			2.21 H	119	65.57	40.34
4	*5180.00	96.44 AV			2.21 H	119	56.10	40.34
5	#10360.00	54.60 PK	68.20	-13.60	1.73 H	152	46.66	7.94

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	68.15 PK	74.00	-5.85	1.59 V	228	65.29	2.86
2	5150.00	52.06 AV	54.00	-1.94	1.59 V	228	49.20	2.86
3	*5180.00	114.19 PK			1.59 V	228	73.85	40.34
4	*5180.00	104.62 AV			1.59 V	228	64.28	40.34
5	#10360.00	55.67 PK	68.20	-12.53	1.66 V	150	47.73	7.94

**Remarks:**

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



<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 40 : 5200 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	109.01 PK			1.43 H	116	68.69	40.32
2	*5200.00	99.32 AV			1.43 H	116	59.00	40.32
3	#10400.00	57.63 PK	68.20	-10.57	1.74 H	149	49.70	7.93
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	116.63 PK			1.59 V	227	76.31	40.32
2	*5200.00	107.19 AV			1.59 V	227	66.87	40.32
3	#10400.00	56.15 PK	68.20	-12.05	1.81 V	145	48.22	7.93

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 48 : 5240 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	109.97 PK			1.69 H	119	69.83	40.14
2	*5240.00	100.68 AV			1.69 H	119	60.54	40.14
3	5350.00	56.34 PK	74.00	-17.66	1.69 H	119	54.01	2.33
4	5350.00	44.81 AV	54.00	-9.19	1.69 H	119	42.48	2.33
5	#10480.00	53.29 PK	68.20	-14.91	2.86 H	208	45.50	7.79

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	116.43 PK			1.64 V	226	76.29	40.14
2	*5240.00	107.16 AV			1.64 V	226	67.02	40.14
3	5350.00	55.21 PK	74.00	-18.79	1.64 V	226	52.88	2.33
4	5350.00	45.72 AV	54.00	-8.28	1.64 V	226	43.39	2.33
5	#10480.00	55.54 PK	68.20	-12.66	1.72 V	138	47.75	7.79

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 52 : 5260 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	56.66 PK	74.00	-17.34	1.63 H	118	53.80	2.86
2	5150.00	44.96 AV	54.00	-9.04	1.63 H	118	42.10	2.86
3	*5260.00	109.84 PK			1.63 H	118	69.79	40.05
4	*5260.00	100.64 AV			1.63 H	118	60.59	40.05
5	#10520.00	57.34 PK	68.20	-10.86	1.57 H	87	49.55	7.79

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	57.26 PK	74.00	-16.74	1.65 V	229	54.40	2.86
2	5150.00	45.70 AV	54.00	-8.30	1.65 V	229	42.84	2.86
3	*5260.00	116.67 PK			1.65 V	229	76.62	40.05
4	*5260.00	106.89 AV			1.65 V	229	66.84	40.05
5	#10520.00	57.05 PK	68.20	-11.15	1.72 V	145	49.26	7.79

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 60 : 5300 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	108.39 PK			1.50 H	117	68.49	39.90
2	*5300.00	99.79 AV			1.50 H	117	59.89	39.90
3	10600.00	57.68 PK	74.00	-16.32	1.52 H	81	49.70	7.98
4	10600.00	47.38 AV	54.00	-6.62	1.52 H	81	39.40	7.98
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5300.00	115.74 PK			1.44 V	228	75.84	39.90
2	*5300.00	106.47 AV			1.44 V	228	66.57	39.90
3	10600.00	57.72 PK	74.00	-16.28	1.65 V	142	49.74	7.98
4	10600.00	47.68 AV	54.00	-6.32	1.65 V	142	39.70	7.98

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 64 : 5320 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5320.00	105.18 PK			1.51 H	118	65.26	39.92
2	*5320.00	96.44 AV			1.51 H	118	56.52	39.92
3	5350.00	59.54 PK	74.00	-14.46	1.51 H	118	57.21	2.33
4	5350.00	46.33 AV	54.00	-7.67	1.51 H	118	44.00	2.33
5	10640.00	54.13 PK	74.00	-19.87	1.58 H	78	46.20	7.93
6	10640.00	44.50 AV	54.00	-9.50	1.58 H	78	36.57	7.93

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5320.00	113.02 PK			1.51 V	228	73.10	39.92
2	*5320.00	103.35 AV			1.51 V	228	63.43	39.92
3	5350.00	64.26 PK	74.00	-9.74	1.51 V	228	61.93	2.33
4	5350.00	52.01 AV	54.00	-1.99	1.51 V	228	49.68	2.33
5	10640.00	52.78 PK	74.00	-21.22	1.67 V	159	44.85	7.93
6	10640.00	42.92 AV	54.00	-11.08	1.67 V	159	34.99	7.93

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 100 : 5500 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	54.60 PK	74.00	-19.40	1.55 H	317	52.25	2.35
2	5460.00	44.77 AV	54.00	-9.23	1.55 H	317	42.42	2.35
3	#5470.00	56.22 PK	68.20	-11.98	1.55 H	317	53.85	2.37
4	*5500.00	106.96 PK			1.55 H	317	66.87	40.09
5	*5500.00	96.70 AV			1.55 H	317	56.61	40.09
6	11000.00	52.81 PK	74.00	-21.19	1.69 H	142	44.93	7.88
7	11000.00	43.68 AV	54.00	-10.32	1.69 H	142	35.80	7.88

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5460.00	58.16 PK	74.00	-15.84	1.50 V	354	55.81	2.35
2	5460.00	47.02 AV	54.00	-6.98	1.50 V	354	44.67	2.35
3	#5467.00	67.50 PK	68.20	-0.70	1.50 V	354	65.14	2.36
4	*5500.00	113.94 PK			1.50 V	354	73.85	40.09
5	*5500.00	104.60 AV			1.50 V	354	64.51	40.09
6	11000.00	55.71 PK	74.00	-18.29	1.60 V	88	47.83	7.88
7	11000.00	45.50 AV	54.00	-8.50	1.60 V	88	37.62	7.88

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 116 : 5580 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	111.81 PK			1.62 H	117	71.13	40.68
2	*5580.00	102.52 AV			1.62 H	117	61.84	40.68
3	11160.00	53.53 PK	74.00	-20.47	1.77 H	135	45.03	8.50
4	11160.00	44.60 AV	54.00	-9.40	1.77 H	135	36.10	8.50
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5580.00	118.64 PK			1.44 V	356	77.96	40.68
2	*5580.00	109.08 AV			1.44 V	356	68.40	40.68
3	11160.00	56.00 PK	74.00	-18.00	1.64 V	92	47.50	8.50
4	11160.00	45.63 AV	54.00	-8.37	1.64 V	92	37.13	8.50

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 140 : 5700 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5700.00	105.21 PK			1.64 H	121	63.93	41.28
2	*5700.00	96.19 AV			1.64 H	121	54.91	41.28
3	#5725.00	61.85 PK	68.20	-6.35	1.64 H	121	58.08	3.77
4	11400.00	53.63 PK	74.00	-20.37	1.82 H	139	44.73	8.90
5	11400.00	44.80 AV	54.00	-9.20	1.82 H	139	35.90	8.90

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5700.00	112.24 PK			2.27 V	277	70.96	41.28
2	*5700.00	102.49 AV			2.27 V	277	61.21	41.28
3	#5725.00	66.77 PK	68.20	-1.43	2.27 V	277	63.00	3.77
4	11400.00	54.59 PK	74.00	-19.41	1.50 V	112	45.69	8.90
5	11400.00	44.74 AV	54.00	-9.26	1.50 V	112	35.84	8.90

**Remarks:**

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



<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 144 : 5720 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5720.00	109.75 PK			1.64 H	124	68.36	41.39
2	*5720.00	100.51 AV			1.64 H	124	59.12	41.39
3	#5850.00	56.85 PK	68.20	-11.35	1.64 H	124	52.95	3.90
4	11440.00	54.51 PK	74.00	-19.49	1.80 H	136	45.52	8.99
5	11440.00	44.59 AV	54.00	-9.41	1.80 H	136	35.60	8.99

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5720.00	116.44 PK			1.72 V	97	75.05	41.39
2	*5720.00	108.02 AV			1.72 V	97	66.63	41.39
3	#5850.00	57.60 PK	68.20	-10.60	1.72 V	97	53.70	3.90
4	11440.00	55.21 PK	74.00	-18.79	1.52 V	70	46.22	8.99
5	11440.00	44.83 AV	54.00	-9.17	1.52 V	70	35.84	8.99

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 149 : 5745 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5604.40	47.57 PK	68.20	-20.63	1.50 H	123	44.40	3.17
2	*5745.00	109.21 PK			1.50 H	123	67.67	41.54
3	*5745.00	99.46 AV			1.50 H	123	57.92	41.54
4	#5950.40	47.81 PK	68.20	-20.39	1.50 H	123	43.79	4.02
5	11490.00	55.96 PK	74.00	-18.04	1.85 H	138	46.87	9.09
6	11490.00	44.74 AV	54.00	-9.26	1.85 H	138	35.65	9.09

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5632.80	58.75 PK	68.20	-9.45	1.39 V	277	55.34	3.41
2	*5745.00	116.65 PK			1.38 V	277	75.11	41.54
3	*5745.00	106.98 AV			1.38 V	277	65.44	41.54
4	#5928.00	59.37 PK	68.20	-8.83	1.39 V	277	55.46	3.91
5	11490.00	56.17 PK	74.00	-17.83	1.56 V	77	47.08	9.09
6	11490.00	45.38 AV	54.00	-8.62	1.56 V	77	36.29	9.09

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 157 : 5785 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5617.60	60.43 PK	68.20	-7.77	1.53 H	120	57.15	3.28
2	*5785.00	108.06 PK			1.53 H	120	66.50	41.56
3	*5785.00	98.86 AV			1.53 H	120	57.30	41.56
4	#5981.60	59.46 PK	68.20	-8.74	1.53 H	120	55.17	4.29
5	11570.00	56.08 PK	74.00	-17.92	1.89 H	142	46.94	9.14
6	11570.00	44.91 AV	54.00	-9.09	1.89 H	142	35.77	9.14

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5618.40	58.55 PK	68.20	-9.65	1.37 V	279	55.26	3.29
2	*5785.00	116.12 PK			1.37 V	279	74.56	41.56
3	*5785.00	106.62 AV			1.37 V	279	65.06	41.56
4	#5940.40	59.71 PK	68.20	-8.49	1.37 V	279	55.74	3.97
5	11570.00	56.39 PK	74.00	-17.61	1.62 V	83	47.25	9.14
6	11570.00	45.51 AV	54.00	-8.49	1.62 V	83	36.37	9.14

**Remarks:**

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 165 : 5825 MHz
<b>Frequency Range</b>	1GHz ~ 40GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

**Antenna Polarity & Test Distance : Horizontal at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5638.00	59.21 PK	68.20	-8.99	1.57 H	124	55.75	3.46
2	*5825.00	108.05 PK			1.57 H	124	66.48	41.57
3	*5825.00	98.12 AV			1.57 H	124	56.55	41.57
4	#5957.20	60.50 PK	68.20	-7.70	1.57 H	124	56.42	4.08
5	11650.00	55.98 PK	74.00	-18.02	1.88 H	134	46.98	9.00
6	11650.00	44.79 AV	54.00	-9.21	1.88 H	134	35.79	9.00

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5604.00	59.03 PK	68.20	-9.17	1.31 V	229	55.86	3.17
2	*5825.00	115.05 PK			1.31 V	229	73.48	41.57
3	*5825.00	105.59 AV			1.31 V	229	64.02	41.57
4	#5986.80	60.70 PK	68.20	-7.50	1.31 V	229	56.37	4.33
5	11650.00	56.05 PK	74.00	-17.95	1.64 V	79	47.05	9.00
6	11650.00	45.24 AV	54.00	-8.76	1.64 V	79	36.24	9.00

**Remarks:**

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

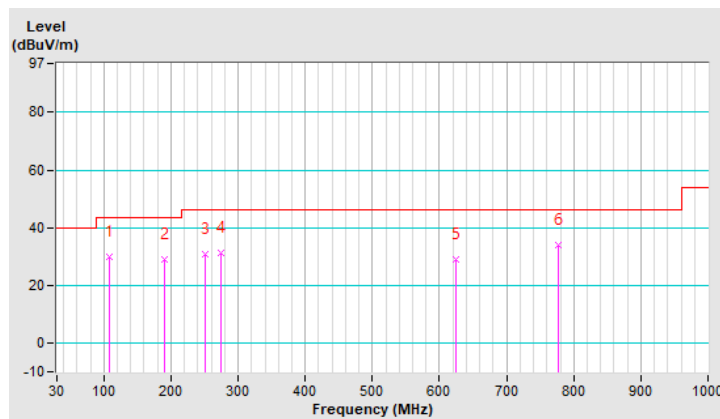
**9 kHz ~ 1 GHz Worst-Case Data:**

<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 140 : 5700 MHz
<b>Frequency Range</b>	30MHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	108.57	30.00 QP	43.50	-13.50	1.50 H	242	51.29	-21.29
2	190.05	28.89 QP	43.50	-14.61	1.00 H	250	49.72	-20.83
3	250.19	30.87 QP	46.00	-15.13	2.00 H	225	50.00	-19.13
4	275.41	31.21 QP	46.00	-14.79	1.00 H	213	49.23	-18.02
5	624.61	28.86 QP	46.00	-17.14	1.50 H	46	38.81	-9.95
6	777.87	34.03 QP	46.00	-11.97	1.00 H	174	41.93	-7.90

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



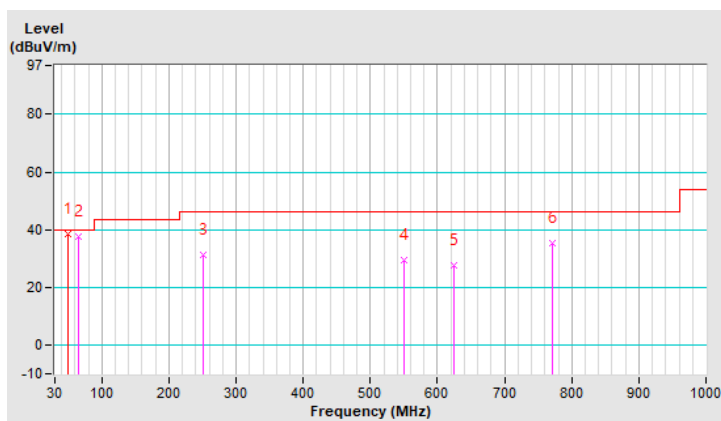
<b>RF Mode</b>	TX 802.11a	<b>Channel</b>	CH 140 : 5700 MHz
<b>Frequency Range</b>	30MHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	50.44	38.36 QP	40.00	-1.64	1.50 V	348	56.35	-17.99
2	64.92	37.73 QP	40.00	-2.27	1.50 V	133	57.29	-19.56
3	250.19	31.46 QP	46.00	-14.54	1.00 V	133	50.59	-19.13
4	549.92	29.38 QP	46.00	-16.62	2.00 V	148	41.34	-11.96
5	624.61	27.62 QP	46.00	-18.38	1.00 V	103	37.57	-9.95
6	772.05	35.12 QP	46.00	-10.88	1.00 V	2	43.10	-7.98

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

- Note: 1. The lower limit shall apply at the transition frequencies.  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
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 (Conduction 1).  
 3. The VCCI Site Registration No. is C-12040.

#### 4.2.3 Test Procedures

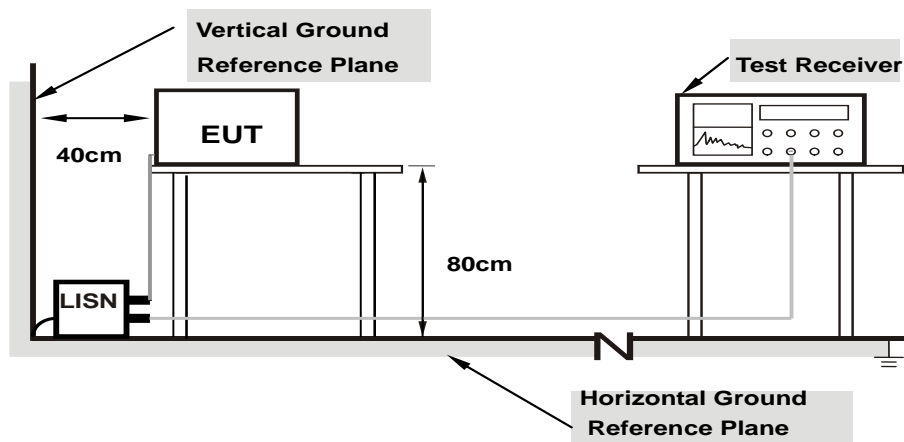
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.



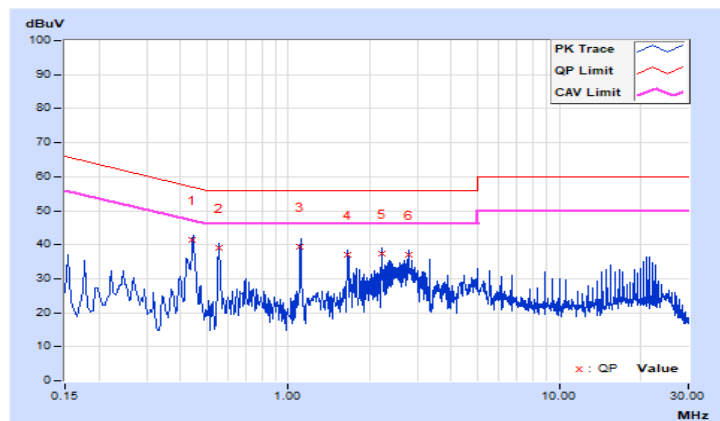
#### 4.2.7 Test Results

<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz
<b>Input Power</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	23 °C, 66% RH
<b>Tested by</b>	Raymond Lee	<b>Test Date</b>	2022/1/25

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	0.44410	9.87	31.54	18.09	41.41	27.96	56.98	46.98	-15.57	-19.02
2	0.55800	9.88	29.12	24.33	39.00	34.21	56.00	46.00	-17.00	-11.79
3	1.10794	9.92	29.31	24.68	39.23	34.60	56.00	46.00	-16.77	-11.40
4	1.66600	9.95	27.05	23.15	37.00	33.10	56.00	46.00	-19.00	-12.90
5	2.22116	9.97	27.55	26.48	37.52	36.45	56.00	46.00	-18.48	-9.55
6	2.77800	9.99	26.90	25.28	36.89	35.27	56.00	46.00	-19.11	-10.73

**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

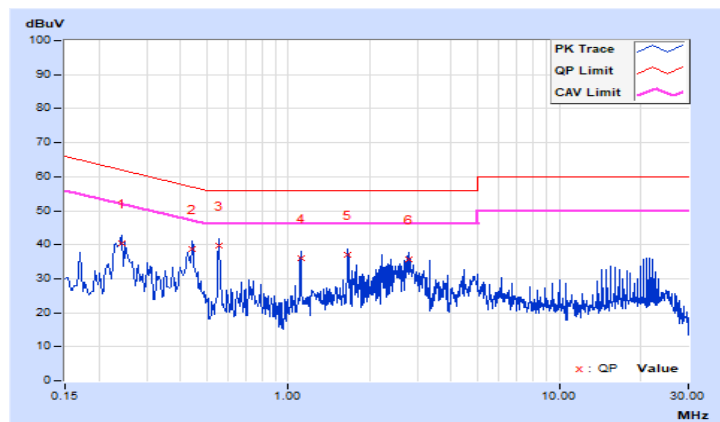


<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz
<b>Input Power</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	23 °C, 66% RH
<b>Tested by</b>	Raymond Lee	<b>Test Date</b>	2022/1/25

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	0.24200	9.88	30.40	25.32	40.28	35.20	62.03	52.03	-21.75	-16.83
2	0.44061	9.94	28.80	14.09	38.74	24.03	57.05	47.05	-18.31	-23.02
<b>3</b>	<b>0.55265</b>	<b>9.95</b>	<b>29.78</b>	<b>28.73</b>	<b>39.73</b>	<b>38.68</b>	<b>56.00</b>	<b>46.00</b>	<b>-16.27</b>	<b>-7.32</b>
4	1.11000	10.00	26.14	23.27	36.14	33.27	56.00	46.00	-19.86	-12.73
5	1.66600	10.02	27.10	24.22	37.12	34.24	56.00	46.00	-18.88	-11.76
6	2.77800	10.06	25.74	25.06	35.80	35.12	56.00	46.00	-20.20	-10.88

**Remarks:**

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



### 4.3 Transmit Power Measurement

#### 4.3.1 Limits of Transmit Power Measurement

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

\*B is the 26 dB emission bandwidth in megahertz

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

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

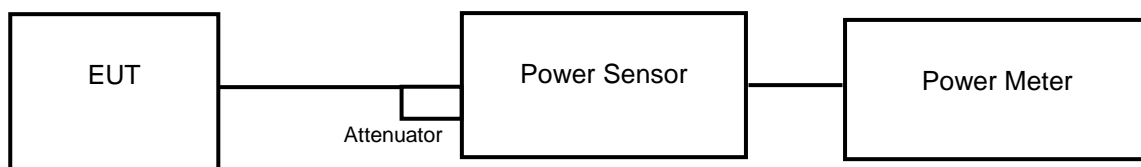
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

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

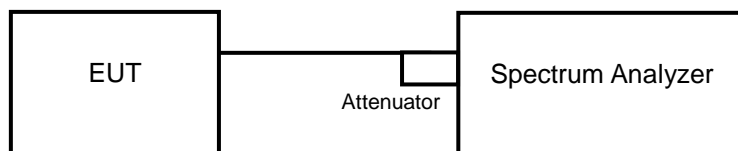
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 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**

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

For transmission above 5.725 GHz where the EBW crosses 5.725 GHz

For channel aggregation (channel 144) measurement refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II E 2 e) method SA-2A.

##### **26 dB Bandwidth**

- a. Set RBW = approximately 1 % of the emission bandwidth.
- b. Set the VBW  $\geq 3 \times$  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	15.72	15.92	76.409	18.83	24	Pass
40	5200	18.20	18.42	135.572	21.32	24	Pass
48	5240	17.18	17.34	106.44	20.27	24	Pass
52	5260	17.72	17.85	120.11	20.80	24	Pass
60	5300	17.68	17.80	118.87	20.75	24	Pass
64	5320	16.62	16.72	92.909	19.68	24	Pass
100	5500	16.72	16.82	95.073	19.78	24	Pass
116	5580	18.20	18.28	133.367	21.25	24	Pass
140	5700	15.13	15.20	65.697	18.18	24	Pass
144	5720 (U-NII-2C)	16.54	17.04	122.161	20.87	24	Pass
144	5720 (U-NII-3)	8.98	9.42	21.27	13.28	30	Pass
149	5745	18.75	18.89	152.436	21.83	30	Pass
157	5785	18.70	18.83	150.515	21.78	30	Pass
165	5825	18.68	18.80	149.648	21.75	30	Pass

##### Note:

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

##### Chain 0

- $11\text{dBm} + 10\log(38.43) = 26.84 > 24\text{dBm}$
- $11\text{dBm} + 10\log(37.93) = 26.78 > 24\text{dBm}$
- $11\text{dBm} + 10\log(35.36) = 26.48 > 24\text{dBm}$
- $11\text{dBm} + 10\log(28.18) = 25.49 > 24\text{dBm}$
- $11\text{dBm} + 10\log(35.26) = 26.47 > 24\text{dBm}$
- $11\text{dBm} + 10\log(20.74) = 24.16 > 24\text{dBm}$
- $11\text{dBm} + 10\log(5725.00 - 5702.90) = 24.44 > 24\text{dBm}$

##### Chain 1

- $11\text{dBm} + 10\log(38.66) = 26.87 > 24\text{dBm}$
- $11\text{dBm} + 10\log(38.15) = 26.81 > 24\text{dBm}$
- $11\text{dBm} + 10\log(35.22) = 26.46 > 24\text{dBm}$
- $11\text{dBm} + 10\log(27.26) = 25.35 > 24\text{dBm}$
- $11\text{dBm} + 10\log(35.16) = 26.46 > 24\text{dBm}$
- $11\text{dBm} + 10\log(20.78) = 24.17 > 24\text{dBm}$
- $11\text{dBm} + 10\log(5725.00 - 5701.89) = 24.63 > 24\text{dBm}$

### 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	15.73	15.87	76.048	18.81	24	Pass
40	5200	18.20	18.32	133.99	21.27	24	Pass
48	5240	16.68	16.78	94.202	19.74	24	Pass
52	5260	17.73	17.82	119.827	20.79	24	Pass
60	5300	17.65	17.75	117.777	20.71	24	Pass
64	5320	16.11	16.17	82.232	19.15	24	Pass
100	5500	15.23	15.30	67.227	18.28	24	Pass
116	5580	18.20	18.30	133.678	21.26	24	Pass
140	5700	14.65	14.76	59.097	17.72	24	Pass
144	5720 (U-NII-2C)	16.77	17.01	126.417	21.02	24	Pass
144	5720 (U-NII-3)	9.74	10.21	25.75	14.11	30	Pass
149	5745	18.80	18.83	152.241	21.83	30	Pass
157	5785	18.72	18.78	149.982	21.76	30	Pass
165	5825	18.81	18.86	152.946	21.85	30	Pass

**Note:**

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

Chain 0

1.  $11\text{dBm} + 10\log(44.08) = 27.44 > 24\text{dBm}$
2.  $11\text{dBm} + 10\log(43.61) = 27.39 > 24\text{dBm}$
3.  $11\text{dBm} + 10\log(38.55) = 26.86 > 24\text{dBm}$
4.  $11\text{dBm} + 10\log(20.67) = 24.15 > 24\text{dBm}$
5.  $11\text{dBm} + 10\log(38.77) = 26.88 > 24\text{dBm}$
6.  $11\text{dBm} + 10\log(20.73) = 24.16 > 24\text{dBm}$
7.  $11\text{dBm} + 10\log(5725.00 - 5700.17) = 24.94 > 24\text{dBm}$

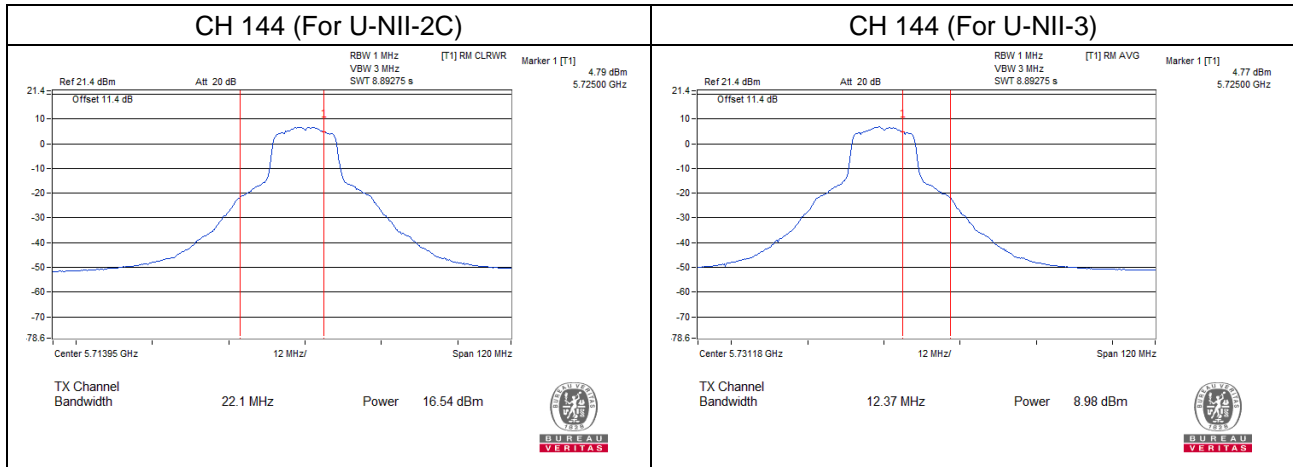
Chain 1

1.  $11\text{dBm} + 10\log(44.64) = 27.49 > 24\text{dBm}$
2.  $11\text{dBm} + 10\log(44.15) = 27.44 > 24\text{dBm}$
3.  $11\text{dBm} + 10\log(38.28) = 26.82 > 24\text{dBm}$
4.  $11\text{dBm} + 10\log(20.65) = 24.14 > 24\text{dBm}$
5.  $11\text{dBm} + 10\log(38.11) = 26.81 > 24\text{dBm}$
6.  $11\text{dBm} + 10\log(21.20) = 24.26 > 24\text{dBm}$
7.  $11\text{dBm} + 10\log(5725.00 - 5700.05) = 24.97 > 24\text{dBm}$

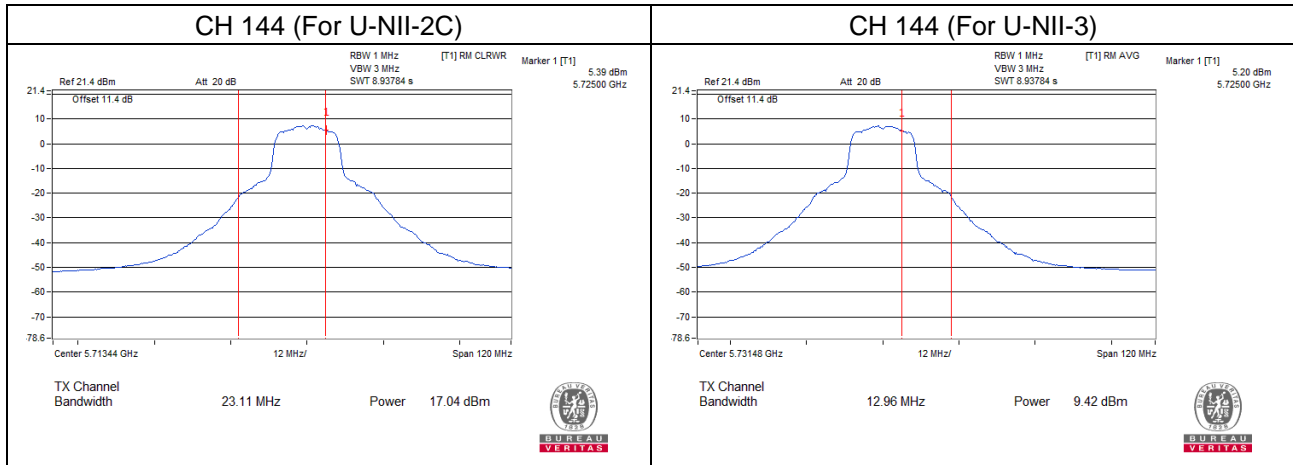
### Straddle channel power plots:

802.11a

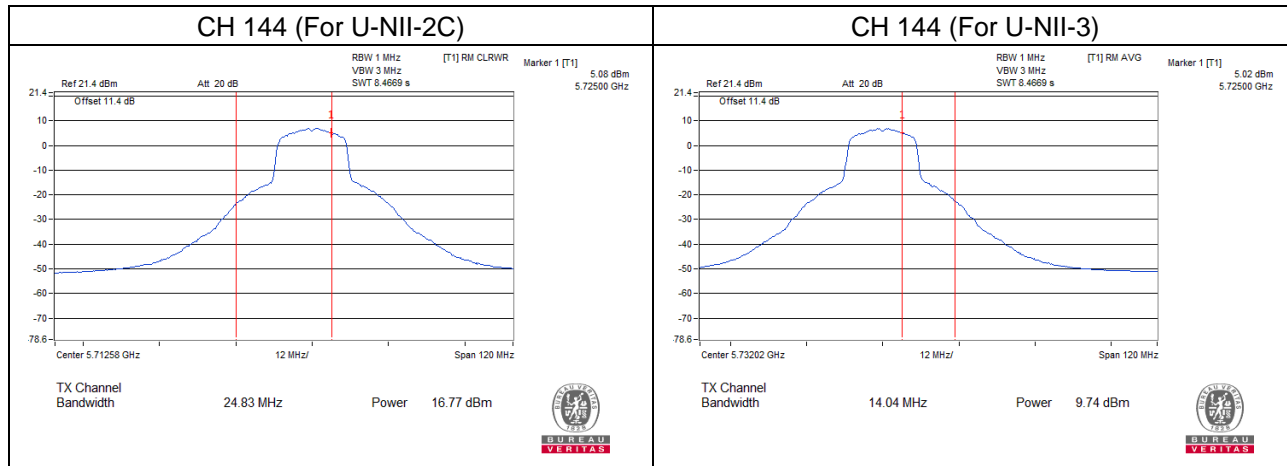
Chain 0



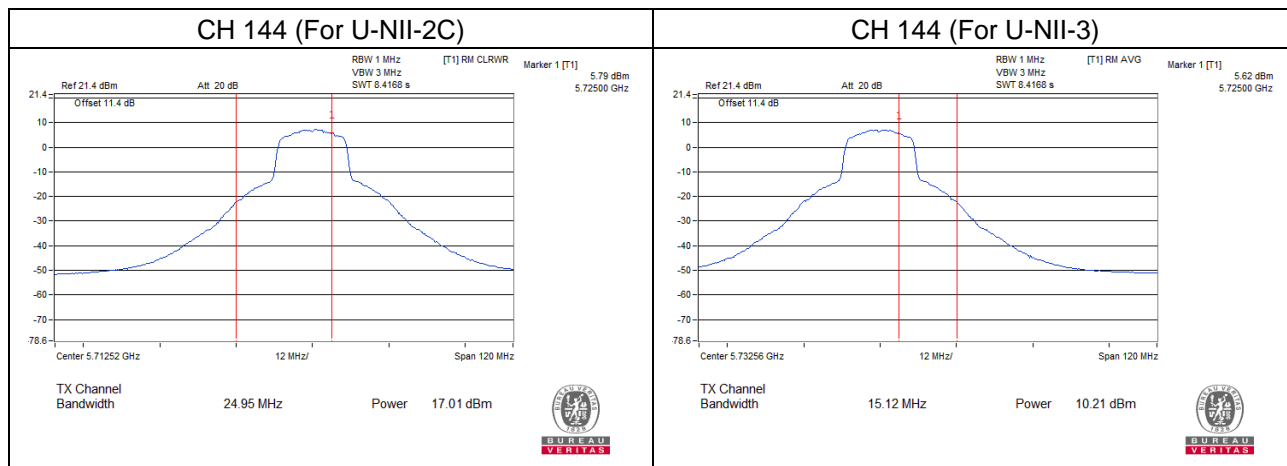
Chain 1



802.11n (HT20)  
Chain 0



Chain 1





**26 dB Bandwidth:**
**802.11a**

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	20.55	20.56
40	5200	41.47	41.30
48	5240	38.29	38.20
52	5260	38.43	38.66
60	5300	37.93	38.15
64	5320	35.36	35.22
100	5500	28.18	27.26
116	5580	35.26	35.16
140	5700	20.74	20.78
144	5720	22.1	23.11

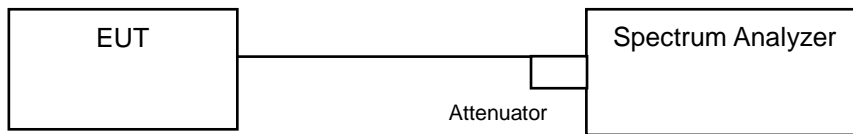
**802.11n (HT20)**

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.00	20.88
40	5200	45.17	46.90
48	5240	43.23	43.29
52	5260	44.08	44.64
60	5300	43.61	44.15
64	5320	38.55	38.28
100	5500	20.67	20.65
116	5580	38.77	38.11
140	5700	20.73	21.20
144	5720	24.83	24.95



## 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

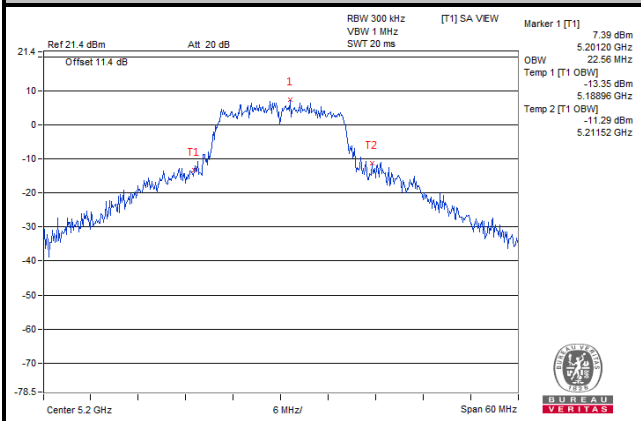
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.8	16.68
40	5200	21.48	22.56
48	5240	19.56	19.8
52	5260	19.44	20.4
60	5300	18.84	18.84
64	5320	17.76	17.28
100	5500	16.92	16.8
116	5580	17.28	17.4
140	5700	16.68	16.68
144	5720 (U-NII-2C)	14.48	15.32
144	5720 (U-NII-3)	4.72	5.68
149	5745	17.82	18.18
157	5785	17.76	18.36
165	5825	18.24	19.08

##### 802.11n (HT20)

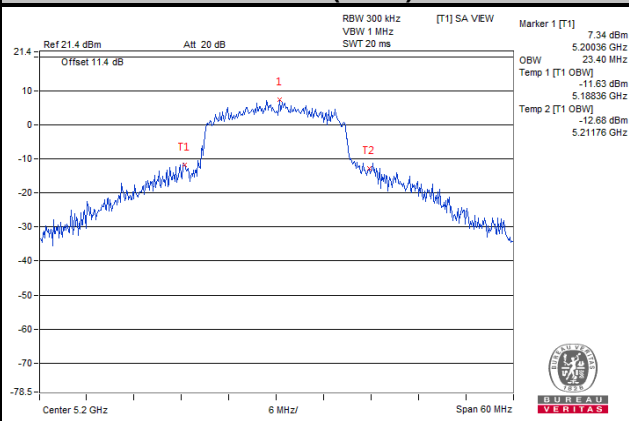
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.88	17.64
40	5200	23.4	22.56
48	5240	19.32	19.68
52	5260	20.16	20.4
60	5300	19.56	20.04
64	5320	18.12	18.12
100	5500	17.64	17.64
116	5580	18.36	18
140	5700	17.88	17.76
144	5720 (U-NII-2C)	15.8	16.64
144	5720 (U-NII-3)	5.92	6.88
149	5745	18.48	18.72
157	5785	19.08	19.08
165	5825	18.84	19.32

### Spectrum Plot of Worst Value

#### 802.11a



#### 802.11n (HT20)

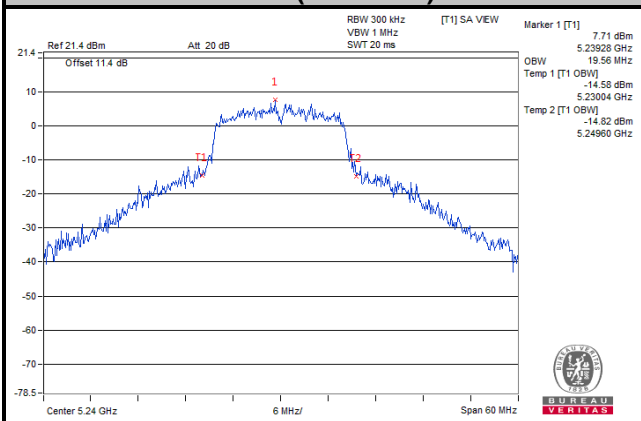


### Chain 0

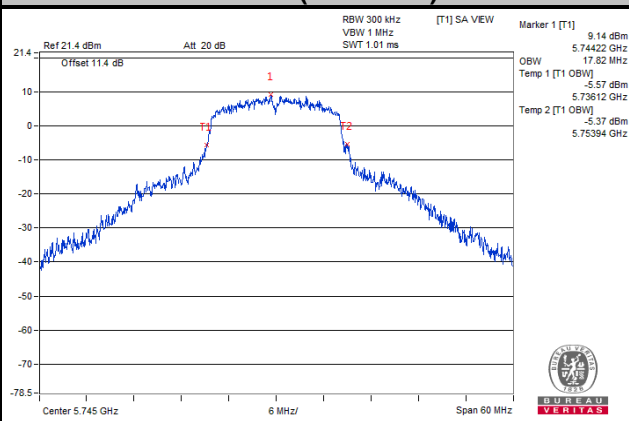
### Spectrum Plot for Nearby DFS Band

#### 802.11a

##### Ch 48 (5240 MHz)

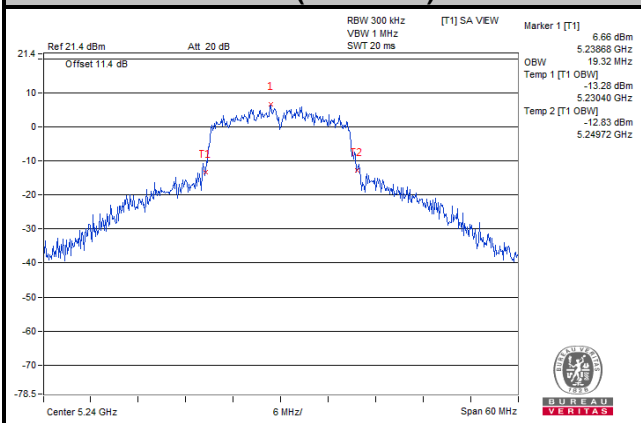


##### Ch 149 (5745 MHz)

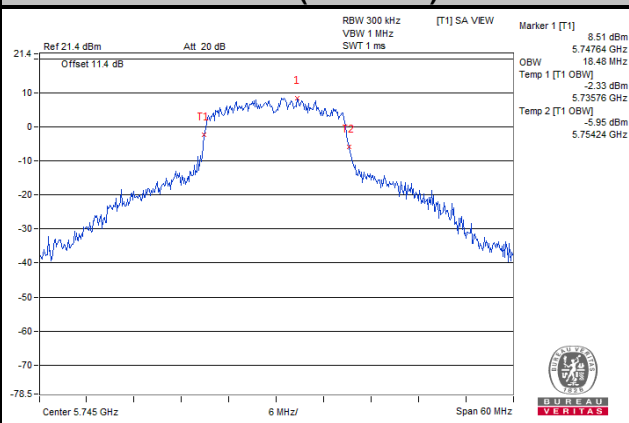


#### 802.11n (HT20)

##### Ch 48 (5240 MHz)



##### Ch 149 (5745 MHz)

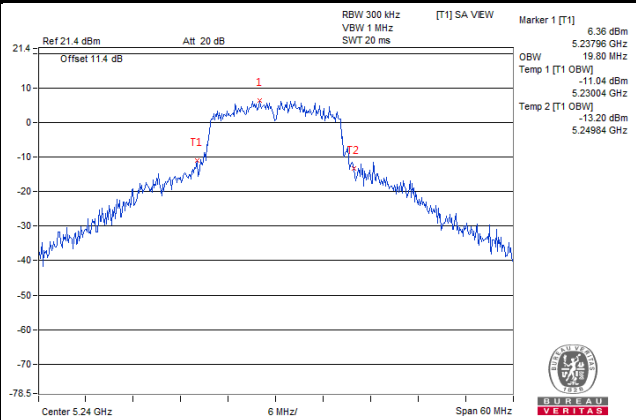


Chain 1

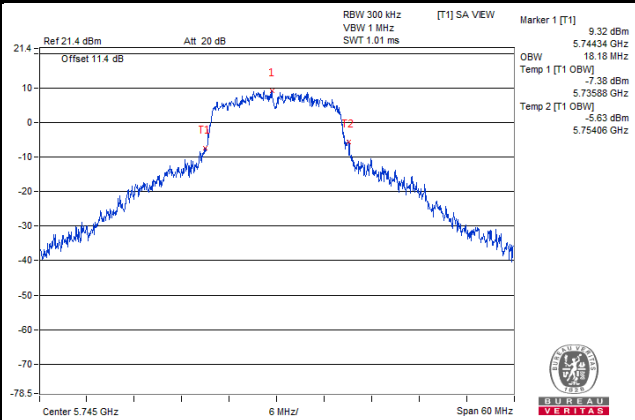
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

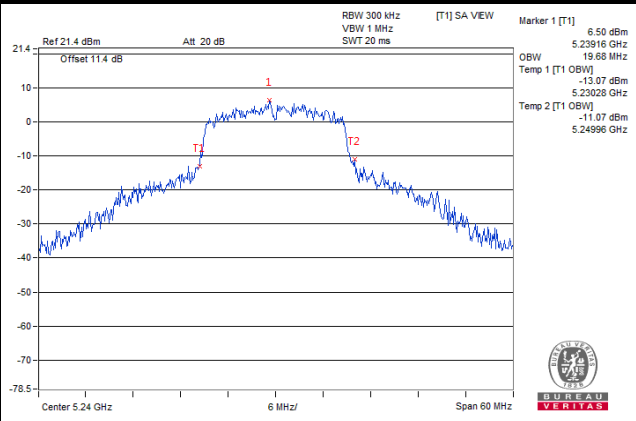


Ch 149 (5745 MHz)

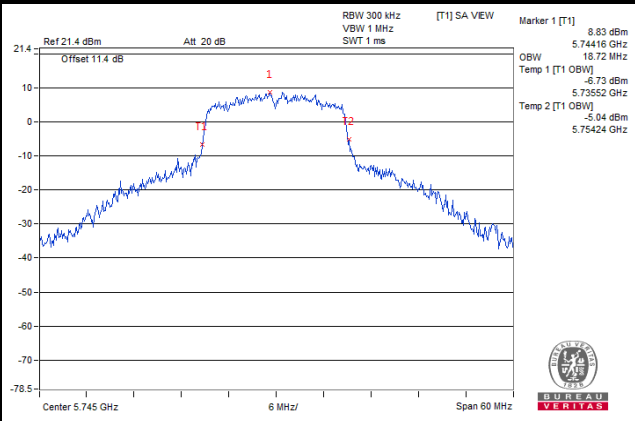


802.11n (HT20)

Ch 48 (5240 MHz)



Ch 149 (5745 MHz)

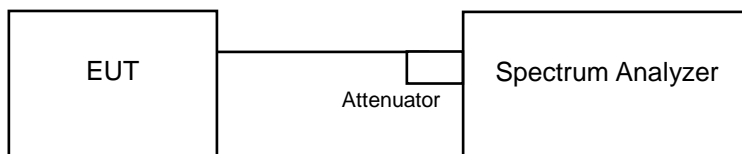


## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedures

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

#### ※ For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW  $\geq$  1 RBW, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$ .
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/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	2.77	2.96	1.06	6.94	9.58	Pass
40	5200	5.29	5.34	1.06	9.39	9.58	Pass
48	5240	4.10	4.51	1.06	8.38	9.58	Pass
52	5260	4.37	4.64	1.06	8.58	8.93	Pass
60	5300	4.78	4.60	1.06	8.76	8.93	Pass
64	5320	3.53	3.75	1.06	7.71	8.93	Pass
100	5500	3.80	3.58	1.06	7.76	9.23	Pass
116	5580	5.10	5.11	1.06	9.18	9.23	Pass
140	5700	2.32	2.14	1.06	6.30	9.23	Pass
144	5720 (U-NII-2C)	4.77	4.97	1.06	8.94	9.23	Pass

**Note:**

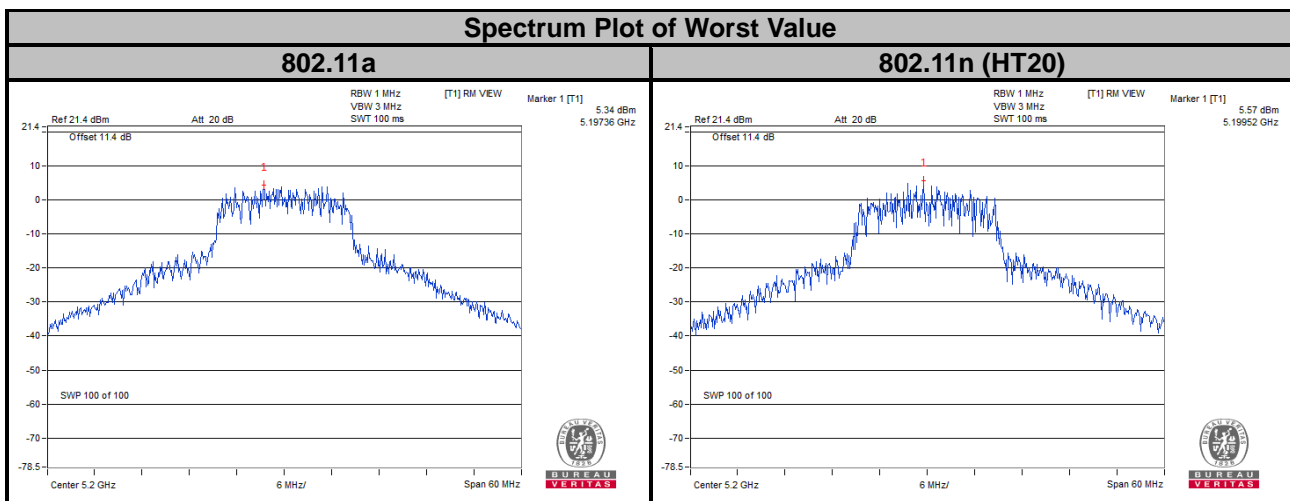
- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**  
 $\text{Directional gain} = 10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.42 \text{ dBi} > 6 \text{ dBi}$ , so the power density limit shall be reduced to  $11 - (7.42 - 6) = 9.58 \text{ dBm}$ .  
**For U-NII-2A Band:**  
 $\text{Directional gain} = 10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 8.07 \text{ dBi} > 6 \text{ dBi}$ , so the power density limit shall be reduced to  $11 - (8.07 - 6) = 8.93 \text{ dBm}$ .  
**For U-NII-2C Band:**  
 $\text{Directional gain} = 10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.77 \text{ dBi} > 6 \text{ dBi}$ , so the power density limit shall be reduced to  $11 - (7.77 - 6) = 9.23 \text{ dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

### 802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	2.48	2.44	1.12	6.59	9.58	Pass
40	5200	5.02	5.57	1.12	9.43	9.58	Pass
48	5240	3.56	3.44	1.12	7.63	9.58	Pass
52	5260	4.72	4.86	1.12	8.92	8.93	Pass
60	5300	4.30	4.50	1.12	8.53	8.93	Pass
64	5320	2.82	2.97	1.12	7.03	8.93	Pass
100	5500	2.58	2.28	1.12	6.56	9.23	Pass
116	5580	4.98	5.11	1.12	9.18	9.23	Pass
140	5700	1.50	1.66	1.12	5.71	9.23	Pass
144	5720 (U-NII-2C)	4.96	5.20	1.12	9.21	9.23	Pass

**Note:**

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**  
 Directional gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.42$  dBi, so the power density limit shall be reduced to  $11-(7.42-6) = 9.58$  dBm.  
**For U-NII-2A Band:**  
 Directional gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 8.07$  dBi, so the power density limit shall be reduced to  $11-(8.07-6) = 8.93$  dBm.  
**For U-NII-2C Band:**  
 Directional gain =  $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.77$  dBi, so the power density limit shall be reduced to  $11-(7.77-6) = 9.23$  dBm.
- Refer to section 3.3 for duty cycle spectrum plot.



**For U-NII-3 Band**  
**802.11a**

TX Chain	Channel	Frequency (MHz)	PSD w/o Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	144	5720 (U-NII-3)	-9.2	-6.98	3.01	1.06	-2.91	29.03	Pass
	149	5745	-4.55	-2.33	3.01	1.06	1.74	29.03	Pass
	157	5785	-4.24	-2.02	3.01	1.06	2.05	29.03	Pass
	165	5825	-3.24	-1.02	3.01	1.06	3.05	29.03	Pass
1	144	5720 (U-NII-3)	-8.87	-6.65	3.01	1.06	-2.58	29.03	Pass
	149	5745	-4.39	-2.17	3.01	1.06	1.9	29.03	Pass
	157	5785	-4.15	-1.93	3.01	1.06	2.14	29.03	Pass
	165	5825	-3.13	-0.91	3.01	1.06	3.16	29.03	Pass

**Note:**

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.97 > 6$  dBi, so the power density limit shall be reduced to  $30 - (6.97 - 6) = 29.03$  dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

**802.11n (HT20)**

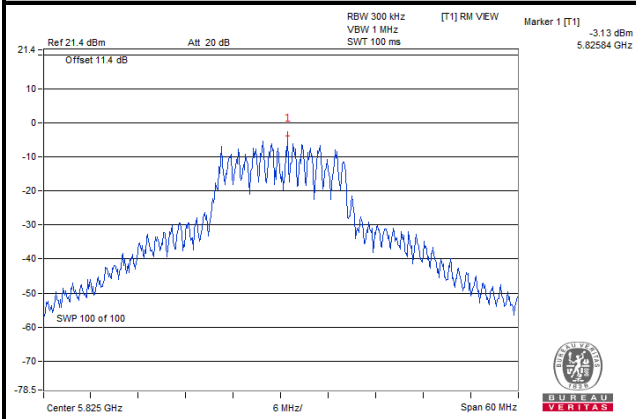
TX Chain	Channel	Frequency (MHz)	PSD		10 log (N=2) dB	Duty Factor (dB)	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
			(dBm/300 kHz)	(dBm/500 kHz)					
0	144	5720 (U-NII-3)	-5.7	-3.48	3.01	1.12	0.65	29.03	Pass
	149	5745	-4.91	-2.69	3.01	1.12	1.44	29.03	Pass
	157	5785	-5.01	-2.79	3.01	1.12	1.34	29.03	Pass
	165	5825	-4.96	-2.74	3.01	1.12	1.39	29.03	Pass
1	144	5720 (U-NII-3)	-5.65	-3.43	3.01	1.12	0.7	29.03	Pass
	149	5745	-4.52	-2.3	3.01	1.12	1.83	29.03	Pass
	157	5785	-4.73	-2.51	3.01	1.12	1.62	29.03	Pass
	165	5825	-4.55	-2.33	3.01	1.12	1.8	29.03	Pass

**Note:**

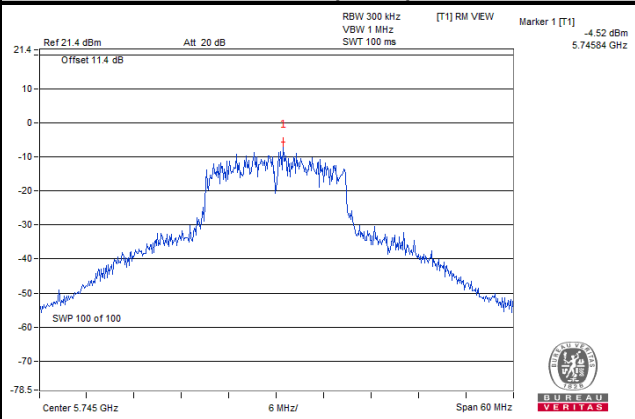
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.97 > 6$  dBi, so the power density limit shall be reduced to  $30 - (6.97 - 6) = 29.03$  dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

#### 802.11a



#### 802.11n (HT20)

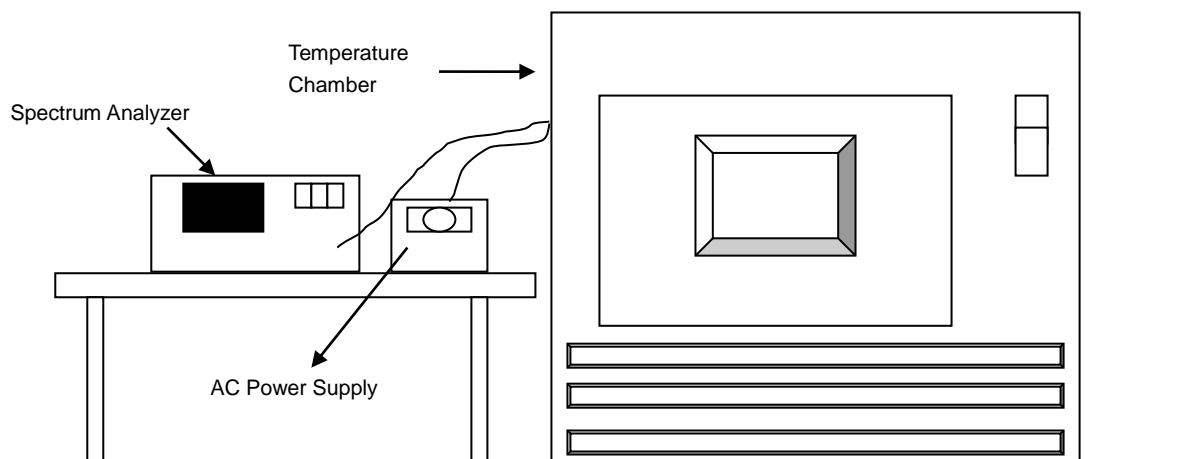


## 4.6 Frequency Stability

### 4.6.1 Limit of Frequency Stability Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

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

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

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

#### 4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Reading (MHz)	Result	Reading (MHz)	Result	Reading (MHz)	Result	Reading (MHz)	Result
45	120	5180.0161	Pass	5180.0172	Pass	5180.016	Pass	5180.0169	Pass
40	120	5180.0092	Pass	5180.0099	Pass	5180.011	Pass	5180.0136	Pass
30	120	5179.9813	Pass	5179.9851	Pass	5179.9807	Pass	5179.9844	Pass
20	120	5180.0026	Pass	5180.0018	Pass	5180.0055	Pass	5180.003	Pass
10	120	5180.0017	Pass	5179.9993	Pass	5180.0009	Pass	5180.0003	Pass
0	120	5180.0013	Pass	5180.0033	Pass	5180.0024	Pass	5179.9996	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Reading (MHz)	Result	Reading (MHz)	Result	Reading (MHz)	Result	Reading (MHz)	Result
20	138	5179.9975	Pass	5180.0003	Pass	5179.9957	Pass	5179.9989	Pass
	120	5180.0026	Pass	5180.0018	Pass	5180.0055	Pass	5180.003	Pass
	102	5180.0043	Pass	5180.0008	Pass	5180.0007	Pass	5180.0043	Pass

## 4.7 6 dB Bandwidth Measurement

### 4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

### 4.7.2 Test Setup



### 4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.7.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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

### 4.7.5 Deviation from Test Standard

No deviation.

### 4.7.6 EUT Operating Condition

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

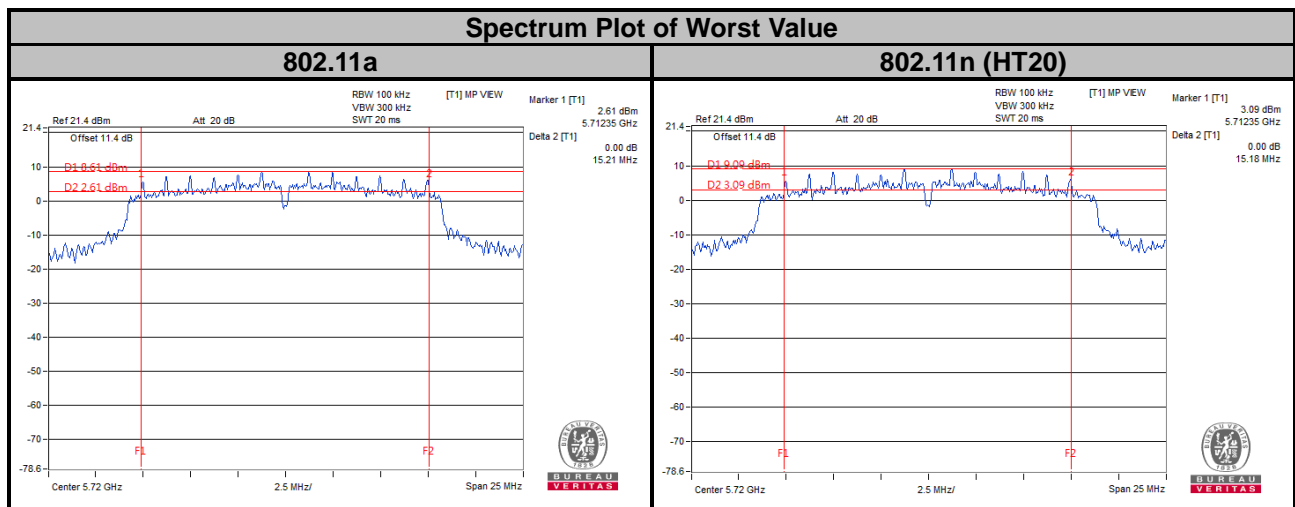
#### 4.7.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144	5720 (U-NII-3)	2.57	2.56	0.5	Pass
149	5745	15.14	15.16	0.5	Pass
157	5785	15.16	15.19	0.5	Pass
165	5825	15.16	15.20	0.5	Pass

##### 802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144	5720 (U-NII-3)	2.55	2.53	0.5	Pass
149	5745	15.19	15.18	0.5	Pass
157	5785	15.18	15.18	0.5	Pass
165	5825	15.16	15.15	0.5	Pass



**Note:**

For Ch144 (UNII-3 Band): The 6 dB bandwidth above 5725 MHz = Marker 1 + Delta 2 – 5725 MHz



## 5 Pictures of Test Arrangements

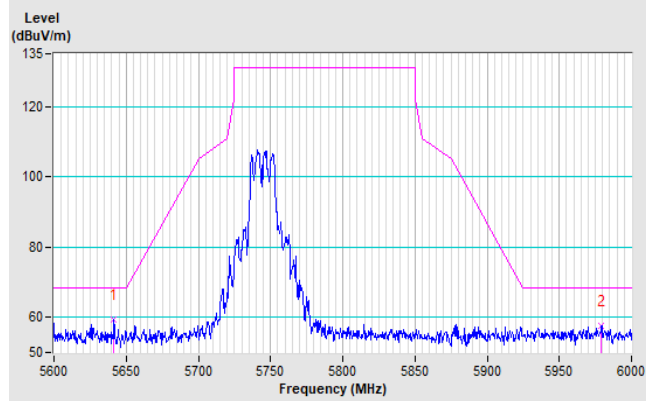
Please refer to the attached file (Test Setup Photo).

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

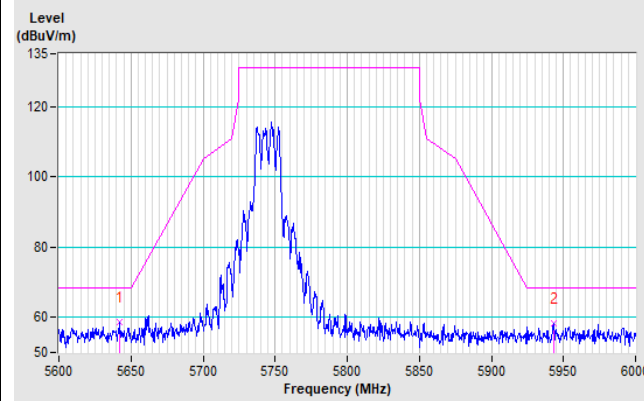
802.11a

**CH 149 5745 MHz**

**Horizontal**

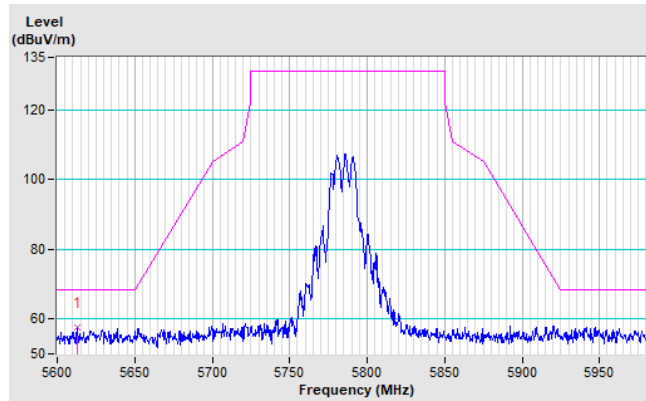


**Vertical**

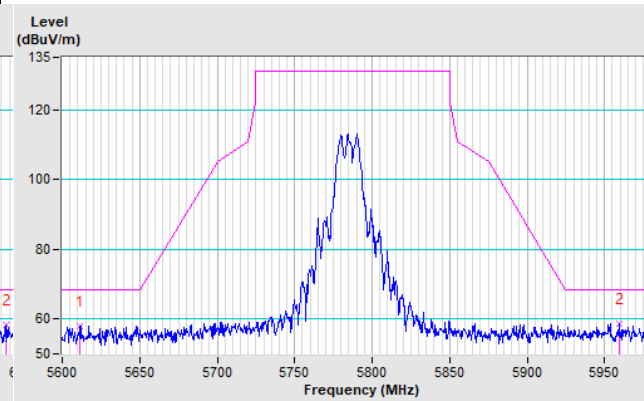


**CH 157 5785 MHz**

**Horizontal**

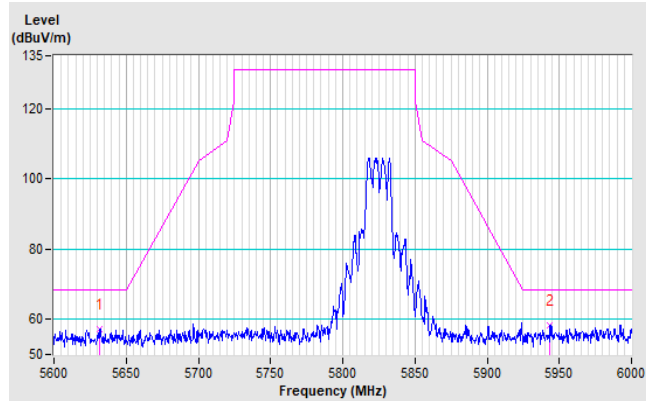


**Vertical**

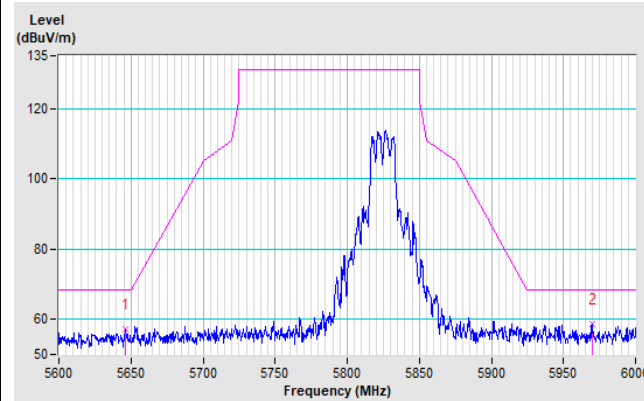


**CH 165 5825 MHz**

**Horizontal**



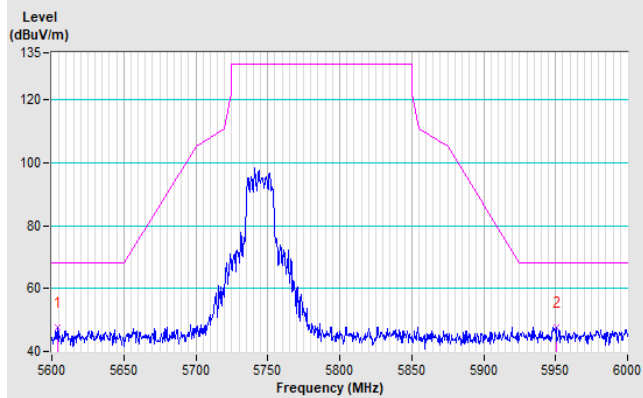
**Vertical**



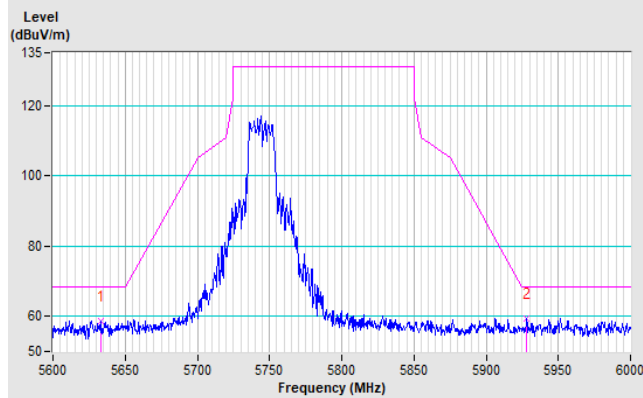
802.11n (HT20)

CH 149 5745 MHz

Horizontal

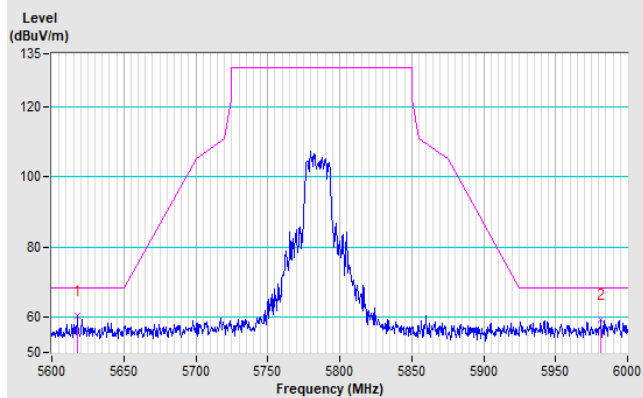


Vertical

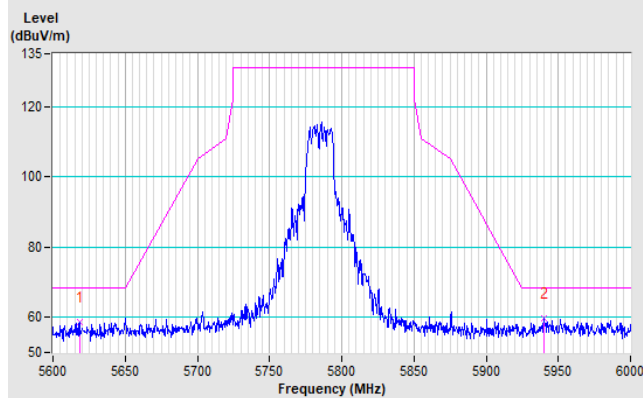


CH 157 5785 MHz

Horizontal

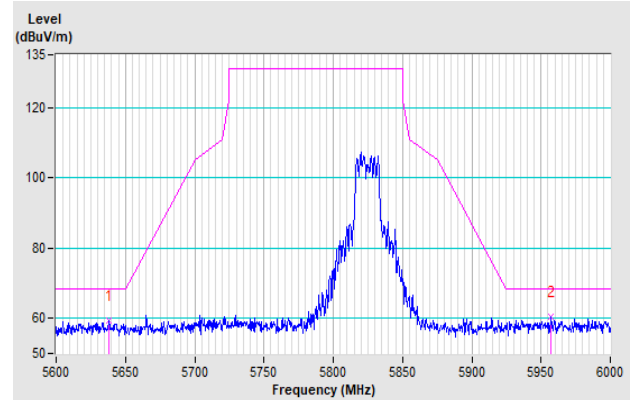


Vertical

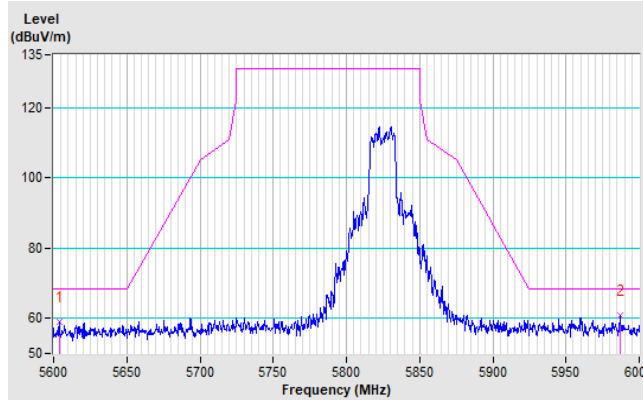


CH 165 5825 MHz

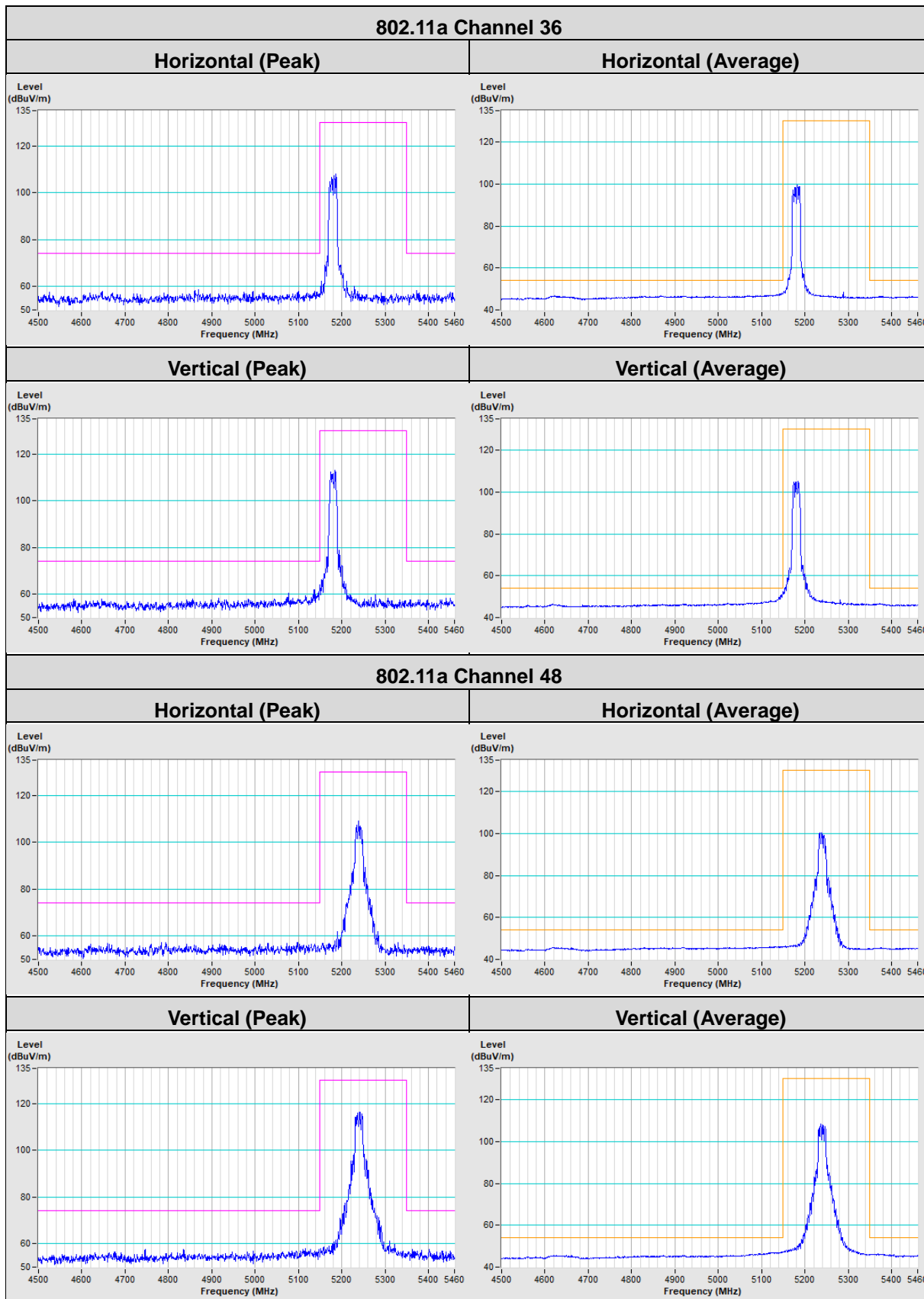
Horizontal



Vertical



### Annex B- Band Edge Measurement















## Appendix – Information of the Testing Laboratories

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

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**Web Site:** [www.bureauveritas-adt.com](http://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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