FCC Test Report

Report No.:	RFBHAA-WTW-P21080670 R1
FCC ID:	UJH-R1LOW
Test Model:	R1LOW (refer to item 3.1 for more details)
Received Date:	Aug. 17, 2021
Test Date:	Sep. 03 ~ Sep. 13, 2021
Issued Date:	Nov. 18, 2021
Applicant:	Mitsubishi Electric Corporation Sanda Works
Address:	2-3-33 Miwa, Sanda-City, Hyogo 669-1513, Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

Table of Contents

Release Control Record 4

1 Certificate of Conformity 5

2 Summary of Test Results 6

2.1 Measurement Uncertainty 6
2.2 Modification Record 6

3 General Information 7

3.1 General Description of EUT 7
3.2 Description of Test Modes 9
3.2.1 Test Mode Applicability and Tested Channel Detail 11
3.3 Duty Cycle of Test Signal 12
3.4 Description of Support Units 13
3.4.1 Configuration of System under Test 13
3.5 General Description of Applied Standards and References 13

4 Test Types and Results 14

4.1 Radiated Emission and Bandedge Measurement 14
4.1.1 Limits of Radiated Emission and Bandedge Measurement 14
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 Transmit Power Measurement 29
4.2.1 Limits of Transmit Power Measurement 29
4.2.2 Test Setup 29
4.2.3 Test Instruments 29
4.2.4 Test Procedure 30
4.2.5 Deviation from Test Standard 30
4.2.6 EUT Operating Conditions 30
4.2.7 Test Result 31
4.3 Occupied Bandwidth Measurement 39
4.3.1 Test Setup 39
4.3.2 Test Instruments 39
4.3.3 Test Procedure 39
4.3.4 Test Result 40
4.4 Peak Power Spectral Density Measurement 43
4.4.1 Limits of Peak Power Spectral Density Measurement 43
4.4.2 Test Setup 43
4.4.3 Test Instruments 43
4.4.4 Test Procedures 43
4.4.5 Deviation from Test Standard 44
4.4.6 EUT Operating Conditions 44
4.4.7 Test Results 44
4.5 Frequency Stability 49
4.5.1 Limits of Frequency Stability Measurement 49
4.5.2 Test Setup 49
4.5.3 Test Instruments 49
4.5.4 Test Procedure 49
4.5.5 Deviation from Test Standard 50
4.5.6 EUT Operating Condition 50
4.5.7 Test Results 50
4.6 6dB Bandwidth Measurement 51
4.6.1 Limits of 6dB Bandwidth Measurement 51

4.6.2 Test Setup 51
4.6.3 Test Instruments 51
4.6.4 Test Procedure 51
4.6.5 Deviation from Test Standard 51
4.6.6 EUT Operating Condition 51
4.6.7 Test Results 52
5 Pictures of Test Arrangements 54
Annex A- Band Edge Measurement 55
Appendix – Information of the Testing Laboratories 57

Release Control Record

Issue No.	Description	Date Issued
RFBHAA-WTW-P21080670	Original release	Oct. 08, 2021
RFBHAA-WTW-P21080670 R1	Modify the description of Note 1 on page 8	Nov. 18, 2021

1 Certificate of Conformity

Product:	Display Audio
Brand:	Mitsubishi Electric
Test Model:	R1LOW (refer to item 3.1 for more details)
Sample Status:	DV
Applicant:	Mitsubishi Electric Corporation Sanda Works
Test Date:	Sep. 03 ~ Sep. 13, 2021
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Pettie Chen , **Date:** Nov. 18, 2021

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Nov. 18, 2021

Jeremy Lin / Senior 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	NA	EUT is powered from DC
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 -7.7dB at 62.98MHz.
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)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is RF Receptacle Connector not a standard connector.

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

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 & ETSI TR 100 028:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB
Conducted Emissions at mains ports	9kHz ~ 1GHz	1.65 dB
	1GHz ~ 18GHz	1.86 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Display Audio
Brand	Mitsubishi Electric
Test Model	R1LOW (refer to note for more details)
Sample Status	DV
Power Supply Rating	12.6Vdc
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5720MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 6 802.11ac (VHT80): 3 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	5260 ~ 5320MHz: 2.923mW 5500 ~ 5720MHz: 0.894mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	2m non-shielded DC power cable without core
Cable Supplied	0.5m shielded USB cable with 2 cores

Note:

1. This report is prepared for FCC class II permissive change.This report is issued as a supplementary report to the original BV CPS report no.: RFBHAA-WTW-P20080145-1. The differences are adding straddle channels and series model (No. 61, No. 62). Therefore, test item for straddle channels had been tested. Refer to original report for the other test data. The worst degradation for the permissive change (For adding series model) was found in the radiated emission (Frequency range 30MHz~1GHz) and the results were recorded in this report.
2. The following models with different panel size are provided to this EUT. (New models are marked in boldface)

Brand	Model	Description
Mitsubishi Electric	R1LOW	No. 12 (7" ICS Panel), 16GB
		No. 45 (7"n-ICS Panel)
		No. 35 (8.4” AWS Panel and Sirius(GPS))
		No. 38 (8.4” AWS Panel and DAB/FM2)
		No. 13 (8.4” ICS Panel), 32GB
		No. 36 (8.4” AWS Panel): 2USB
		No. 14 (8.4” ICS Panel), 32GB
		No. 40 (8.4” ICS Panel), 16GB
		No. 42 (7" ICS w/Bezel Panel)
		No. 61 (7"n-ICS Panel), 16GB, digital camera
		No. 62 (8.4" ICS Panel), 32GB, digital camera
	R1LOW-CN1	No. 31 (8.4” AWS Panel)

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

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

* The modulation and bandwidth are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11ac mode, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

4. There two modules are collocated in the EUT.

Module No.	Function
1	WLAN 2.4GHz, 5GHz, BT EDR, BT LE (1M)
2	BT LE (1M, 2M)

5. The EUT uses following antennas.

Type	Sheet metal antenna			
Connecter	RF Receptacle Connector			
Model	2342059-1		2342059-2	
Frequency (MHz)	2400-2500	5150-5850	2400-2500	5150-5850
Gain (dBi)	3	2	1	4

6. 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.

7. The power settings are listed as below.

	802.11a	802.11n (HT20) / 802.11ac (VHT20)		802.11n (HT40) / 802.11ac (VHT40)		802.11ac (VHT80)
CH 144	Default	Default	CH 142	Default	CH 138	Default

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

For 5260 ~ 5320MHz:

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

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

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

For 5500 ~ 5720MHz:

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz
138	5690 MHz		

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	Note 2	√	EUT: No. 12
B	-	√	Note 2	-	EUT: No. 61
C	-	√	Note 2	-	EUT: No. 62

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. No need to concern of PLC due to the EUT is powered from DC.
3. For radiated emission (below 1GHz) test item, the worst maximum power was selected.
4. "-": Means no effect.

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A	802.11a	5500-5720	144	144	OFDM	6.0
	802.11n (HT20)		144	144	OFDM	6.5
	802.11n (HT40)		142	142	OFDM	13.5
	802.11ac (VHT80)		138	138	OFDM	29.3

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B, C	802.11a	5500-5720	144	144	OFDM	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	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A	802.11a	5500-5720	144	144	OFDM	6.0
	802.11n (HT20)		144	144	OFDM	6.5
	802.11n (HT40)		142	142	OFDM	13.5
	802.11ac (VHT80)		138	138	OFDM	29.3

Test Condition:

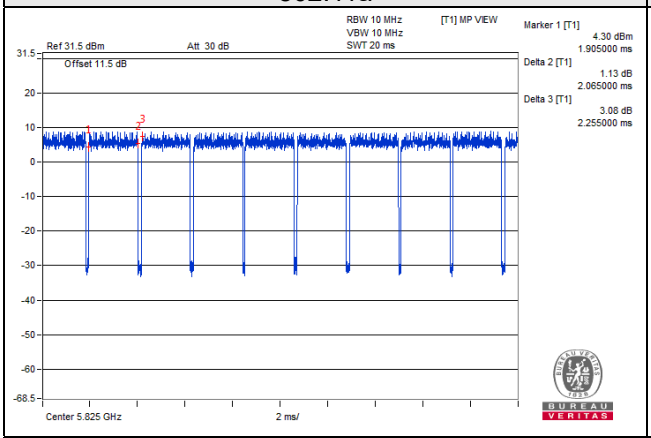
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	22 deg. C, 66% RH	12.6Vdc	Edison Lee
RE<1G	22 deg. C, 66% RH	12.6Vdc	Raymond Lee
APCM	25 deg. C, 60% RH	12.6Vdc	Jisyong Wang

3.3 Duty Cycle of Test Signal

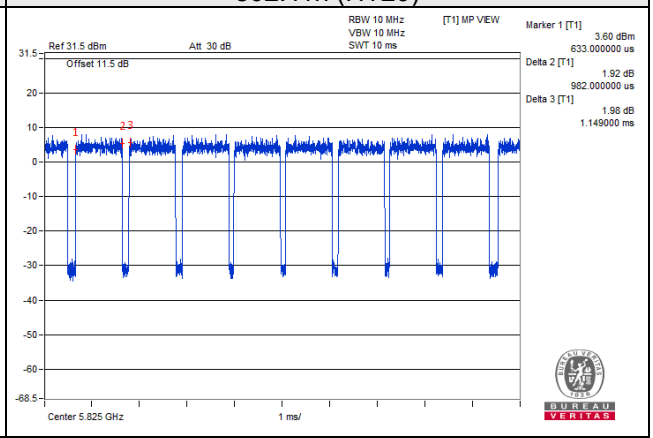
Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 2.065/2.255 = 0.916, Duty factor = 10 * log(1/0.916) = 0.38
802.11n (HT20): Duty cycle = 0.982/1.149 = 0.855, Duty factor = 10 * log(1/0.855) = 0.68
802.11n (HT40): Duty cycle = 0.495/0.62 = 0.798, Duty factor = 10 * log(1/0.798) = 0.98
802.11ac (VHT80): Duty cycle = 0.256/0.423 = 0.605, Duty factor = 10 * log(1/0.605) = 2.18

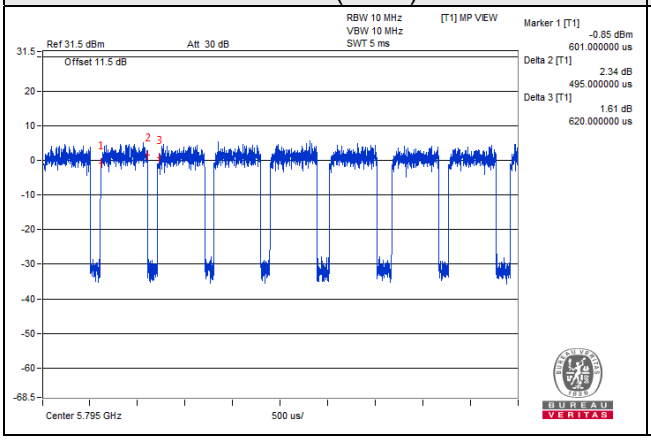
802.11a



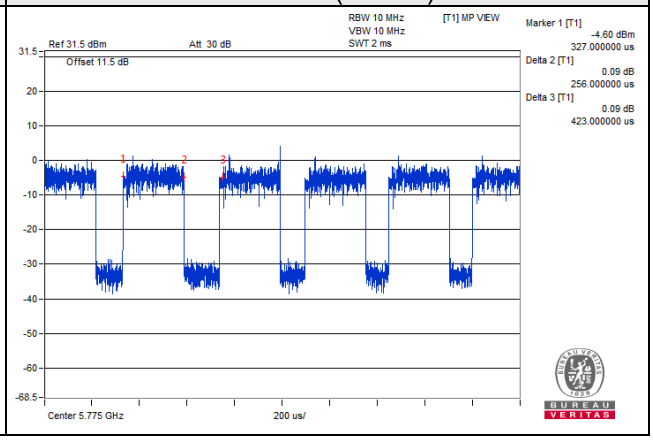
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

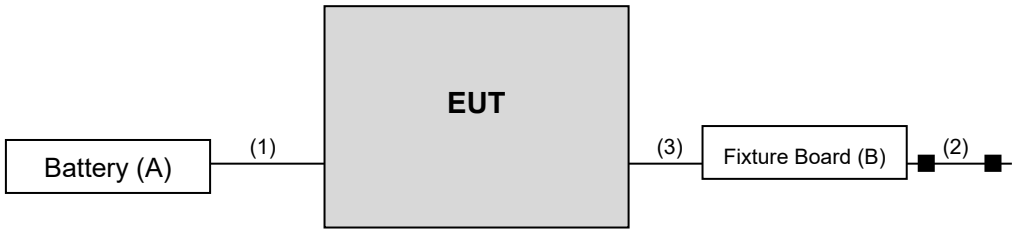
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Battery	YUASA	75D23R-CMF II	NA	NA	-
B.	Fixture Board	NA	NA	NA	NA	Provided by client

Note:

1. 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.	DC power cable	1	2	N	0	Accessory
2.	USB cable	1	0.5	Y	2	Accessory
3.	Harness cable	1	2	N	0	Provided by client

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.

KDB References Test Guidance:

KDB 789033 D02 General UNII Test Procedure 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 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795 /4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
			Sep. 04, 2021	Sep. 03, 2022
Peak Power AnalyzerKEYSIGHT	8990B	MY51000485	Jan. 19, 2021	Jan. 18, 2022
Wideband Power SensorKEYSIGHT	N1923A	MY58020002	Jan. 11, 2021	Jan. 10, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 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 HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

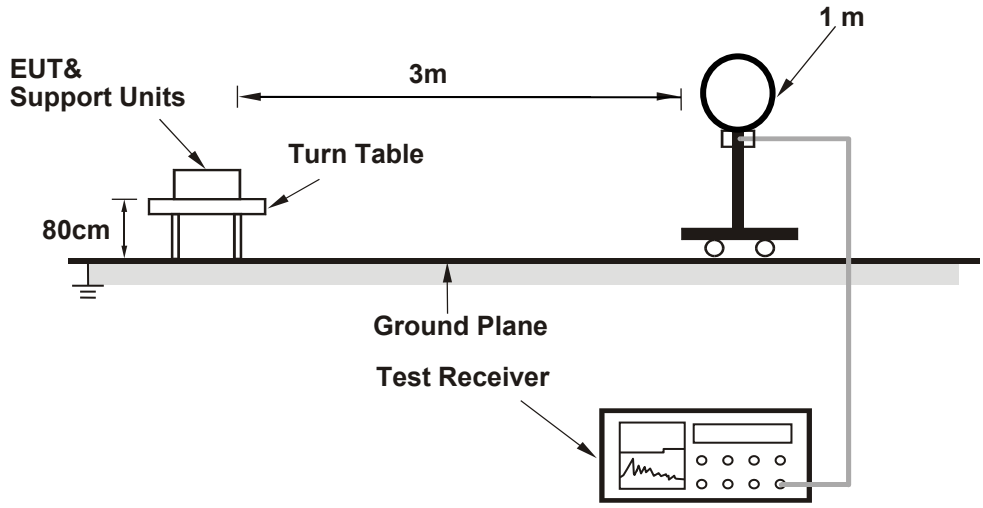
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

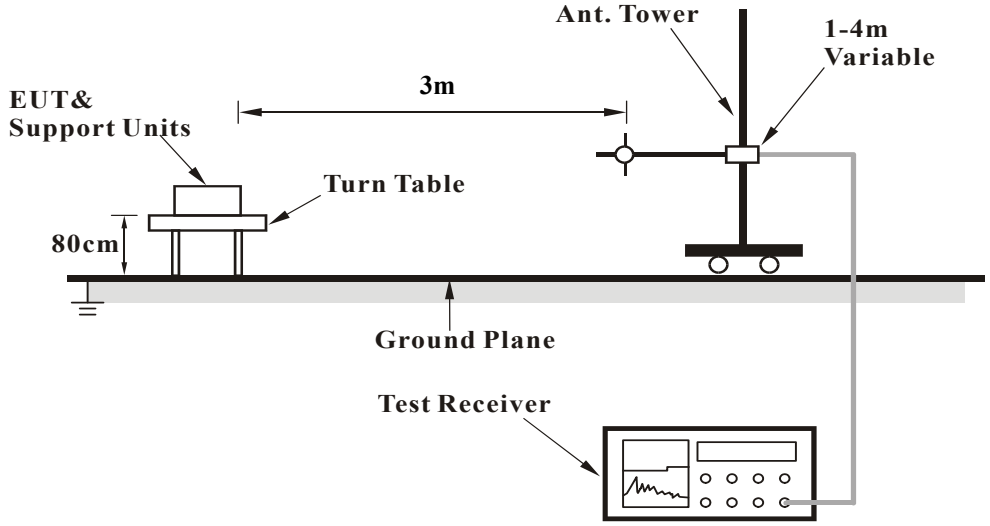
No deviation.

4.1.5 Test Setup

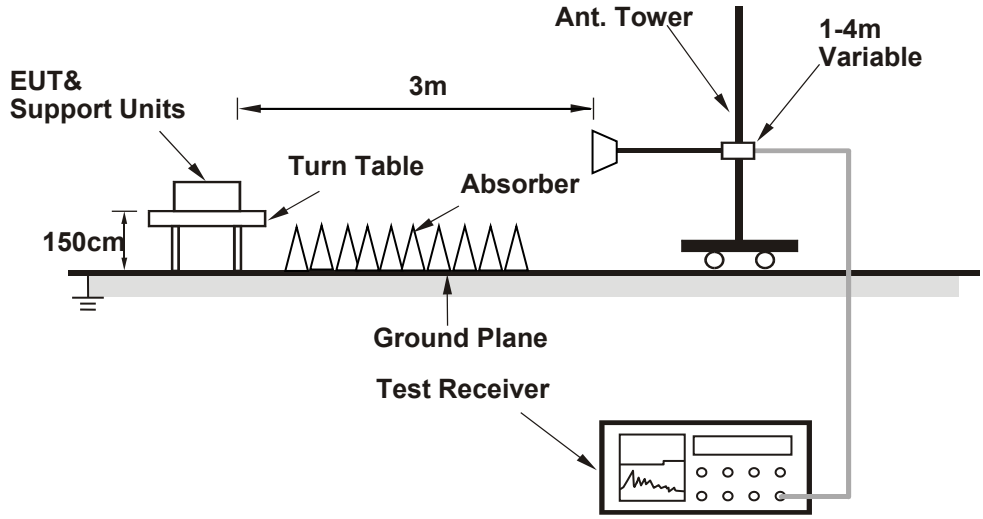
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

RF Mode	TX 802.11a	Channel	CH 144：5720 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	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	#5470.00	56.8 PK	68.2	-11.4	2.26 H	62	54.7	2.1
2	*5720.00	96.7 PK			2.26 H	62	55.5	41.2
3	*5720.00	87.7 AV			2.26 H	62	46.5	41.2
4	#5850.00	58.8 PK	68.2	-9.4	2.26 H	62	55.4	3.4
5	11440.00	55.5 PK	74.0	-18.5	3.10 H	356	47.1	8.4
6	11440.00	45.0 AV	54.0	-9.0	3.10 H	356	36.6	8.4
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	#5470.00	56.6 PK	68.2	-11.6	1.10 V	32	54.5	2.1
2	*5720.00	98.4 PK			1.10 V	32	57.2	41.2
3	*5720.00	91.1 AV			1.10 V	32	49.9	41.2
4	#5850.00	57.6 PK	68.2	-10.6	1.10 V	32	54.2	3.4
5	11440.00	55.7 PK	74.0	-18.3	1.90 V	132	47.3	8.4
6	11440.00	45.0 AV	54.0	-9.0	1.90 V	132	36.6	8.4

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 144：5720 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	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	#5470.00	56.8 PK	68.2	-11.4	2.23 H	57	54.7	2.1
2	*5720.00	94.4 PK			2.23 H	57	53.2	41.2
3	*5720.00	84.7 AV			2.23 H	57	43.5	41.2
4	#5850.00	58.4 PK	68.2	-9.8	2.23 H	57	55.0	3.4
5	11440.00	55.5 PK	74.0	-18.5	3.00 H	342	47.1	8.4
6	11440.00	44.9 AV	54.0	-9.1	3.00 H	342	36.5	8.4
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	#5470.00	57.4 PK	68.2	-10.8	1.00 V	36	55.3	2.1
2	*5720.00	98.4 PK			1.00 V	36	57.2	41.2
3	*5720.00	87.8 AV			1.00 V	36	46.6	41.2
4	#5850.00	57.7 PK	68.2	-10.5	1.00 V	36	54.3	3.4
5	11440.00	55.6 PK	74.0	-18.4	1.82 V	140	47.2	8.4
6	11440.00	42.0 AV	54.0	-12.0	1.82 V	140	33.6	8.4

Remarks:

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

RF Mode	TX 802.11n (HT40)	Channel	CH 142：5710 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	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	#5470.00	57.3 PK	68.2	-10.9	2.19 H	57	55.2	2.1
2	*5710.00	92.0 PK			2.19 H	57	50.9	41.1
3	*5710.00	82.1 AV			2.19 H	57	41.0	41.1
4	#5850.00	57.5 PK	68.2	-10.7	2.19 H	57	54.1	3.4
5	11420.00	56.8 PK	74.0	-17.2	3.05 H	347	48.4	8.4
6	11420.00	45.3 AV	54.0	-8.7	3.05 H	347	36.9	8.4
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	#5470.00	56.3 PK	68.2	-11.9	1.10 V	35	54.2	2.1
2	*5710.00	94.4 PK			1.10 V	35	53.3	41.1
3	*5710.00	84.9 AV			1.10 V	35	43.8	41.1
4	#5850.00	58.2 PK	68.2	-10.0	1.00 V	35	54.8	3.4
5	11420.00	56.6 PK	74.0	-17.4	1.92 V	128	48.2	8.4
6	11420.00	45.5 AV	54.0	-8.5	1.92 V	128	37.1	8.4

Remarks:

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

RF Mode	TX 802.11ac (VHT80)	Channel	CH 138：5690 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	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	#5470.00	56.6 PK	68.2	-11.6	2.40 H	60	54.5	2.1
2	*5690.00	87.8 PK			2.40 H	60	46.7	41.1
3	*5690.00	77.9 AV			2.40 H	60	36.8	41.1
4	#5850.00	57.3 PK	68.2	-10.9	2.40 H	60	53.9	3.4
5	11380.00	56.7 PK	74.0	-17.3	2.99 H	350	48.2	8.5
6	11380.00	45.7 AV	54.0	-8.3	2.99 H	350	37.2	8.5
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	#5470.00	57.3 PK	68.2	-10.9	1.06 V	37	55.2	2.1
2	*5690.00	89.8 PK			1.06 V	37	48.7	41.1
3	*5690.00	80.3 AV			1.06 V	37	39.2	41.1
4	#5850.00	57.9 PK	68.2	-10.3	1.06 V	37	54.5	3.4
5	11380.00	56.6 PK	74.0	-17.4	1.83 V	142	48.1	8.5
6	11380.00	45.7 AV	54.0	-8.3	1.83 V	142	37.2	8.5

Remarks:

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

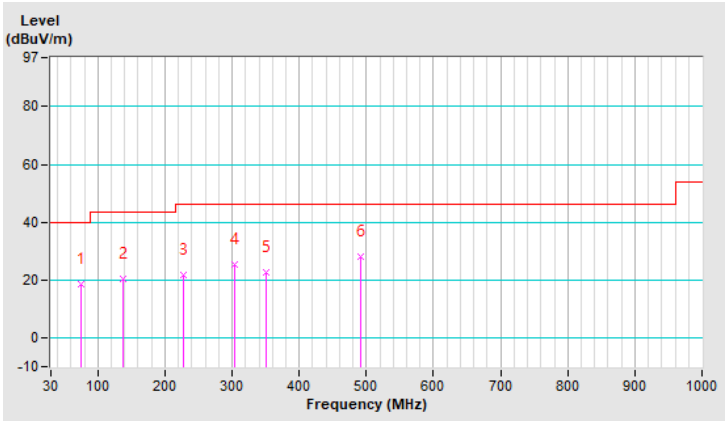
Below 1GHz Worst-Case Data:

RF Mode	TX 802.11a	Channel	CH 144：5720 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

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	75.59	18.4 QP	40.0	-21.6	1.00 H	214	40.4	-22.0
2	136.70	20.6 QP	43.5	-22.9	1.50 H	97	39.6	-19.0
3	226.91	21.9 QP	46.0	-24.1	2.00 H	112	43.2	-21.3
4	303.54	25.5 QP	46.0	-20.5	1.00 H	182	43.2	-17.7
5	351.07	22.7 QP	46.0	-23.3	1.00 H	88	39.4	-16.7
6	490.75	28.1 QP	46.0	-17.9	1.50 H	240	41.4	-13.3

Remarks:

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

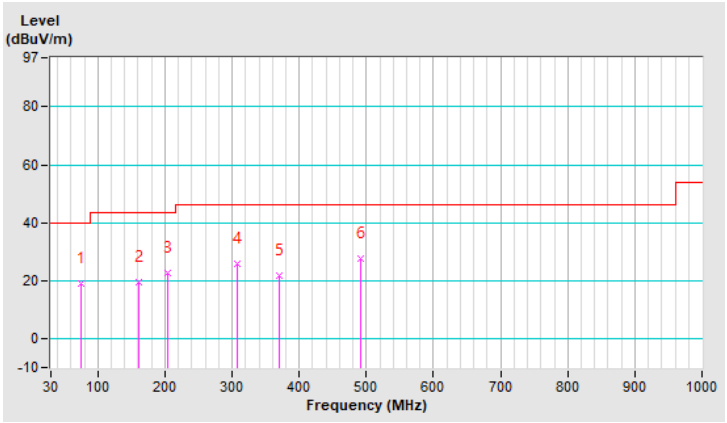


RF Mode	TX 802.11a	Channel	CH 144：5720 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	A		

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	75.59	18.8 QP	40.0	-21.2	1.50 V	211	40.8	-22.0
2	161.92	19.3 QP	43.5	-24.2	2.00 V	134	37.6	-18.3
3	204.60	22.7 QP	43.5	-20.8	1.00 V	119	44.4	-21.7
4	307.42	25.7 QP	46.0	-20.3	2.00 V	202	43.3	-17.6
5	370.47	21.6 QP	46.0	-24.4	1.00 V	92	37.6	-16.0
6	490.75	27.6 QP	46.0	-18.4	1.00 V	232	40.9	-13.3

Remarks:

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

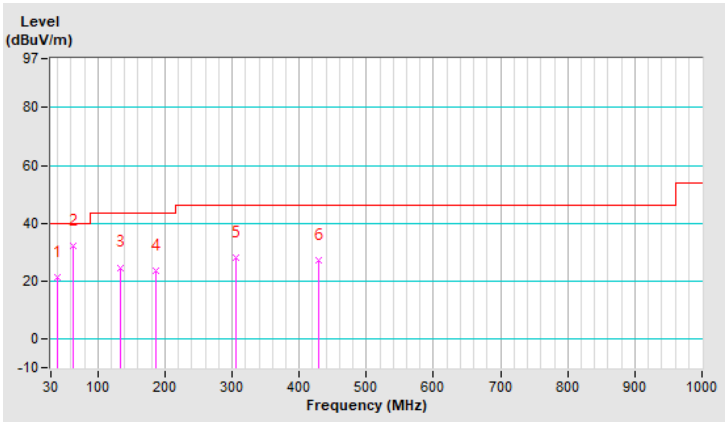


RF Mode	TX 802.11a	Channel	CH 144：5720 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

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	39.70	21.4 QP	40.0	-18.6	1.99 H	72	40.3	-18.9
2	**62.98**	**32.3 QP**	**40.0**	**-7.7**	**1.99 H**	**177**	**51.4**	**-19.1**
3	133.79	24.7 QP	43.5	-18.8	1.00 H	116	43.9	-19.2
4	186.17	23.7 QP	43.5	-19.8	1.49 H	62	44.4	-20.7
5	305.48	28.0 QP	46.0	-18.0	1.00 H	93	45.7	-17.7
6	428.67	27.3 QP	46.0	-18.7	1.49 H	162	41.9	-14.6

Remarks:

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

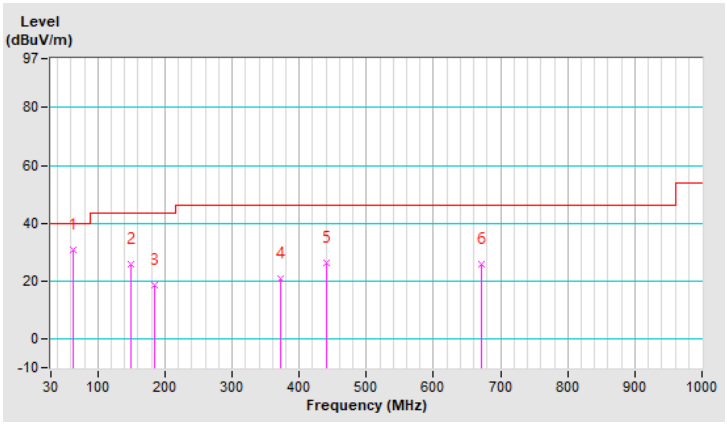


RF Mode	TX 802.11a	Channel	CH 144：5720 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	B		

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	62.98	30.6 QP	40.0	-9.4	1.01 V	286	49.7	-19.1
2	148.34	25.7 QP	43.5	-17.8	1.01 V	18	44.1	-18.4
3	184.23	18.6 QP	43.5	-24.9	1.51 V	190	39.0	-20.4
4	371.44	20.7 QP	46.0	-25.3	2.00 V	209	36.7	-16.0
5	441.28	26.1 QP	46.0	-19.9	1.01 V	341	40.1	-14.0
6	672.14	26.0 QP	46.0	-20.0	1.51 V	349	35.8	-9.8

Remarks:

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

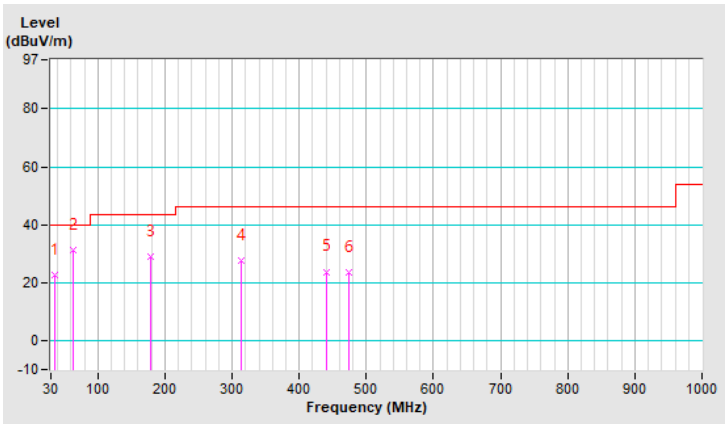


RF Mode	TX 802.11ac (VHT80)	Channel	CH 138：5690 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	C		

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	36.79	22.6 QP	40.0	-17.4	2.00 H	68	41.7	-19.1
2	62.98	31.3 QP	40.0	-8.7	1.51 H	193	50.4	-19.1
3	179.38	29.0 QP	43.5	-14.5	1.51 H	334	48.8	-19.8
4	314.21	27.8 QP	46.0	-18.2	1.01 H	89	45.2	-17.4
5	440.31	23.8 QP	46.0	-22.2	2.00 H	66	37.8	-14.0
6	474.26	23.4 QP	46.0	-22.6	1.51 H	88	37.0	-13.6

Remarks:

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

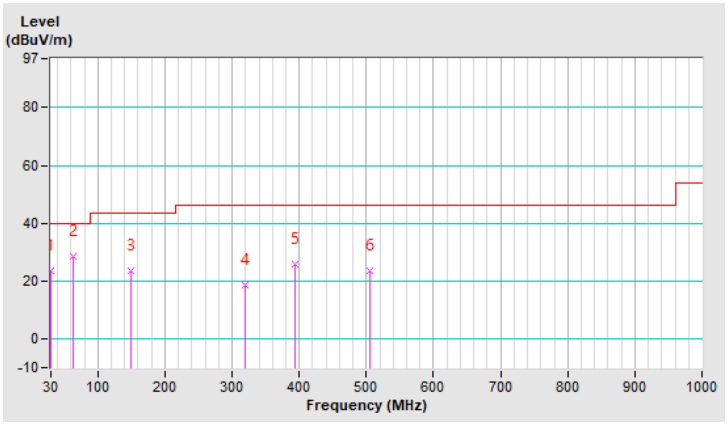


RF Mode	TX 802.11ac (VHT80)	Channel	CH 138：5690 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)
Test Mode	C		

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	30.00	23.4 QP	40.0	-16.6	1.00 V	173	42.9	-19.5
2	63.95	28.7 QP	40.0	-11.3	1.00 V	338	48.3	-19.6
3	148.34	23.4 QP	43.5	-20.1	1.00 V	271	41.8	-18.4
4	320.03	18.7 QP	46.0	-27.3	1.00 V	181	36.0	-17.3
5	392.78	26.0 QP	46.0	-20.0	1.49 V	10	41.6	-15.6
6	504.33	23.6 QP	46.0	-22.4	1.00 V	15	36.7	-13.1

Remarks:

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

4.2.1 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 ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A			250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

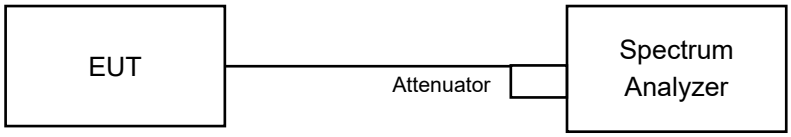
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

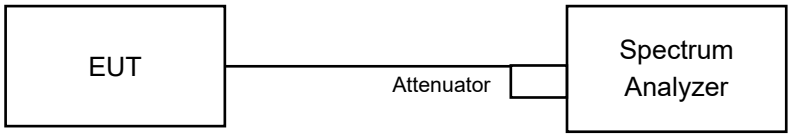
4.2.2 Test Setup

For Power Output

For straddle channels



For 26dB Bandwidth



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

For straddle channels

Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep):

a. Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
b. Set RBW = 1 MHz.
c. Set VBW ≥ 3 MHz.
d. Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e. Sweep time = auto.
f. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
g. If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth

a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
f. For channel aggregation (channel 138, 142, 144) measurement refer to KDB 789033 D02 Section III. CHANNEL AGGREGATION.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
144	5720 (For U-NII-2C)	2.55	0.51	2.923	4.66	23.07	Pass
144	5720 (For U-NII-3)	-2.49	-4.81	0.894	-0.49	30.00	Pass

Note:
For U-NII-2C Band:
Chain 0
1. 11dBm + 10log (5725.00 - 5708.88) = 23.07 < 24dBm
Chain 1
1. 11dBm + 10log (5725.00 - 5708.48) = 23.18 < 24dBm

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
144	5720 (For U-NII-2C)	2.21	-0.97	2.463	3.91	22.93	Pass
144	5720 (For U-NII-3)	-2.95	-5.61	0.782	-1.07	30.00	Pass

Note:
For U-NII-2C Band:
Chain 0
1. 11dBm + 10log (5725.00 - 5709.38) = 22.93 < 24dBm
Chain 1
1. 11dBm + 10log (5725.00 - 5708.95) = 23.05 < 24dBm

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
142	5710 (For U-NII-2C)	2.08	-0.63	2.479	3.94	24.00	Pass
142	5710 (For U-NII-3)	-2.96	-5.60	0.781	-1.07	30.00	Pass

Note:
For U-NII-2C Band:
Chain 0
1. 11dBm + 10log (5725.00 - 5687.00) = 26.79 > 24dBm
Chain 1
1. 11dBm + 10log (5725.00 - 5685.68) = 26.94 > 24dBm

802.11ac (VHT80)

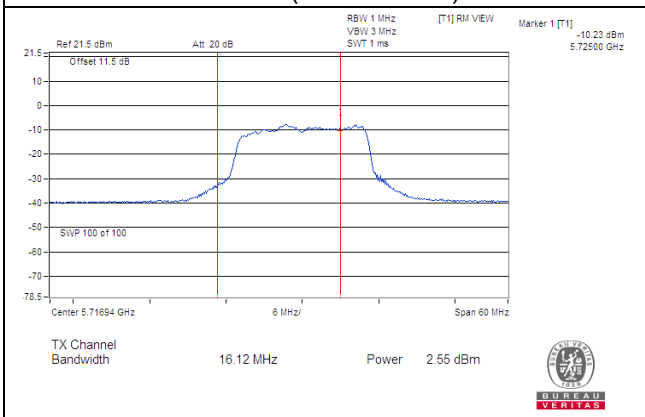
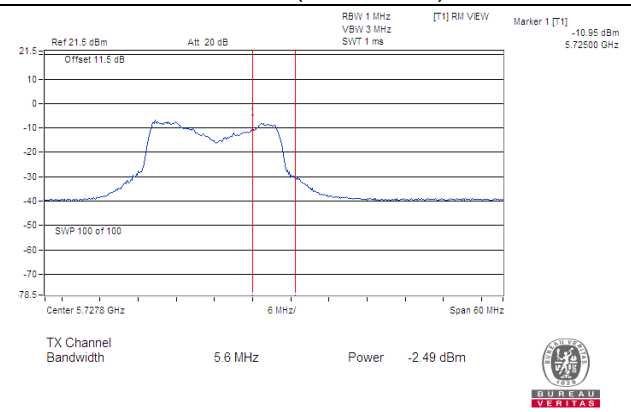
Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
138	5690 (For U-NII-2C)	1.17	-1.37	2.039	3.09	24.00	Pass
138	5690 (For U-NII-3)	-4.16	-6.19	0.624	-2.05	30.00	Pass

Note:
For U-NII-2C Band:
Chain 0
1. 11dBm + 10log (5725.00 - 5644.12) = 30.07 > 24dBm
Chain 1
1. 11dBm + 10log (5725.00 - 5646.57) = 29.94 > 24dBm

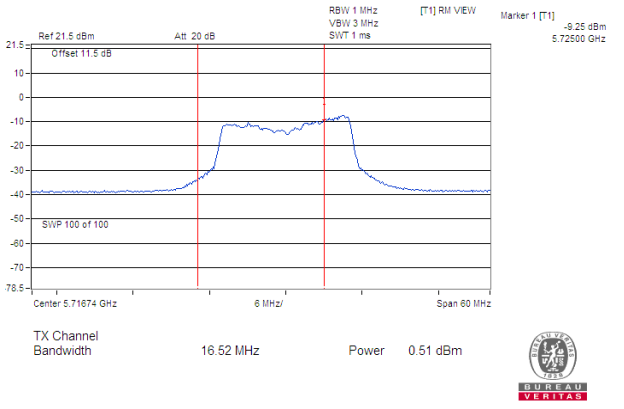
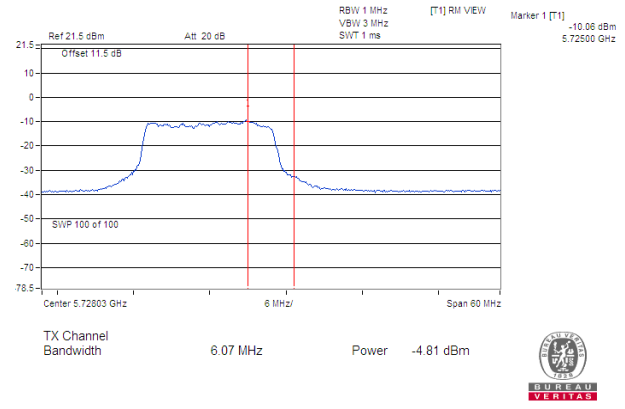
Straddle channel power plots:

802.11a

Chain 0

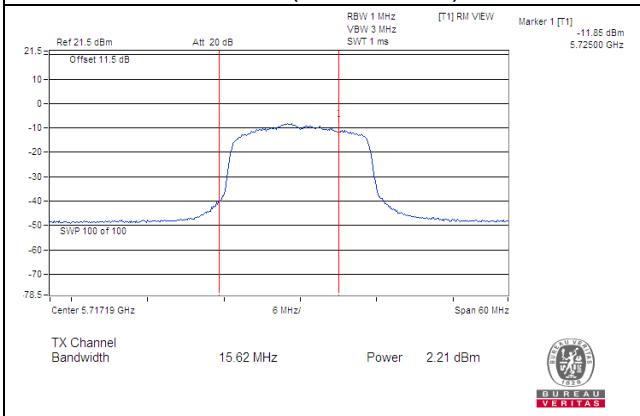
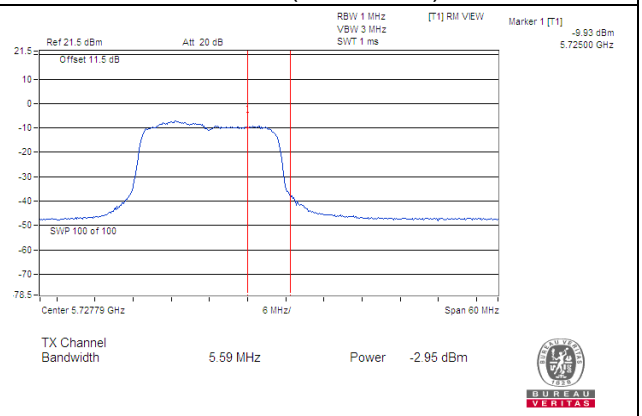
CH 144 (For U-NII-2C)	CH 144 (For U-NII-3)
	

Chain 1

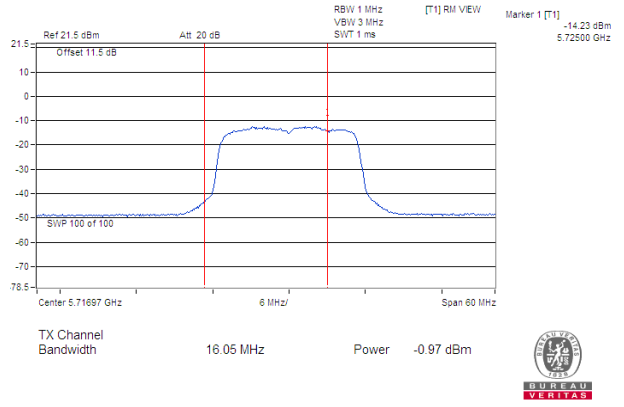
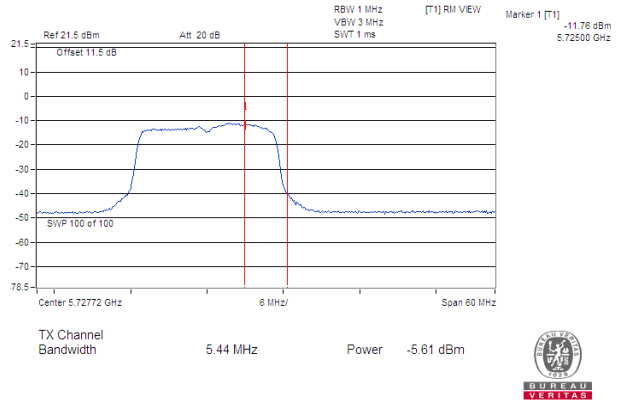
CH 144 (For U-NII-2C)	CH 144 (For U-NII-3)
	

802.11n (HT20)

Chain 0

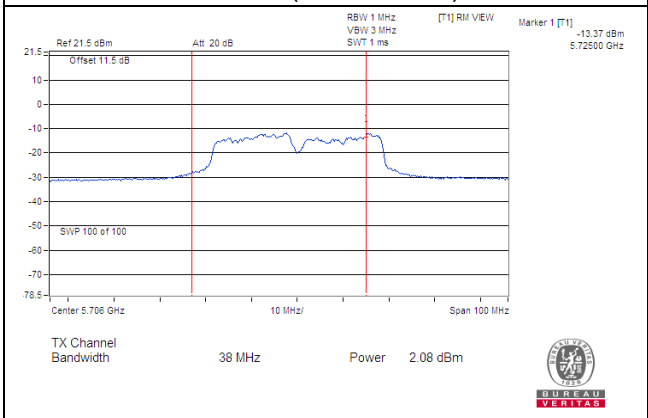
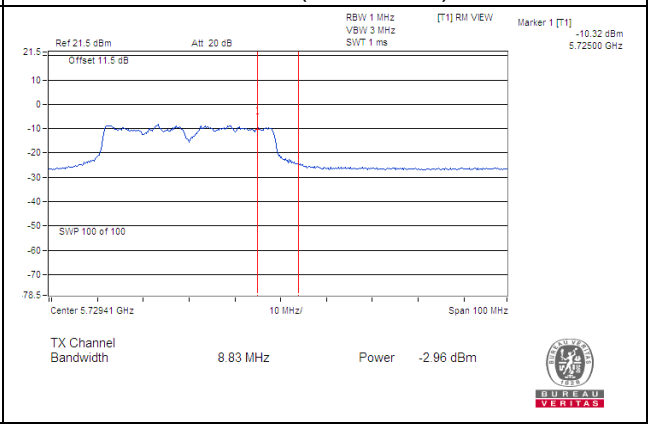
CH 144 (For U-NII-2C)	CH 144 (For U-NII-3)
	

Chain 1

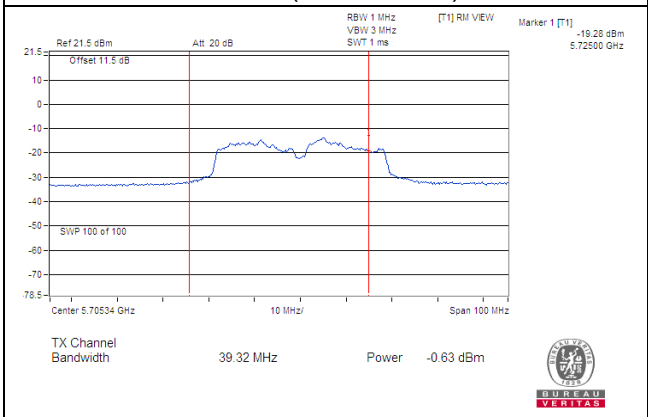
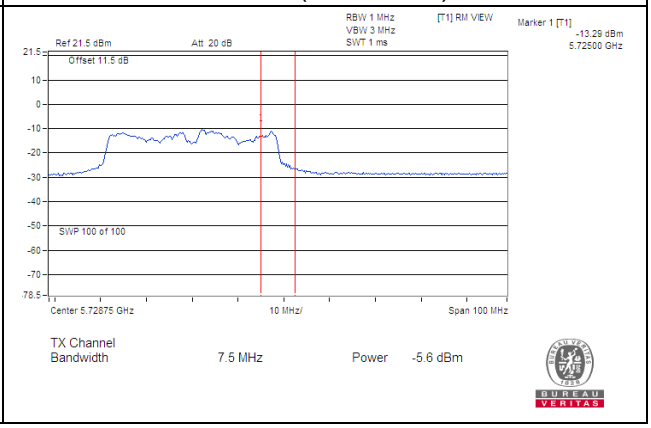
CH 144 (For U-NII-2C)	CH 144 (For U-NII-3)
	

802.11n (HT40)

Chain 0

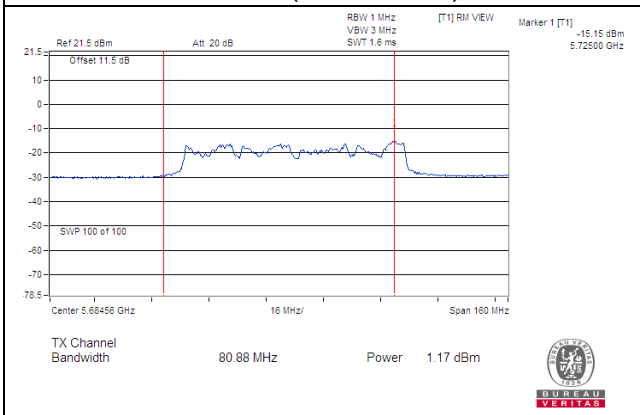
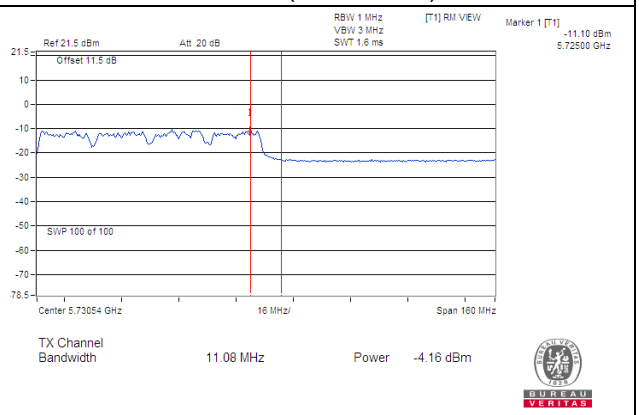
CH 142 (For U-NII-2C)	CH 142 (For U-NII-3)
	
TX Channel Bandwidth 38 MHz Power 2.08 dBm	TX Channel Bandwidth 8.83 MHz Power -2.96 dBm

Chain 1

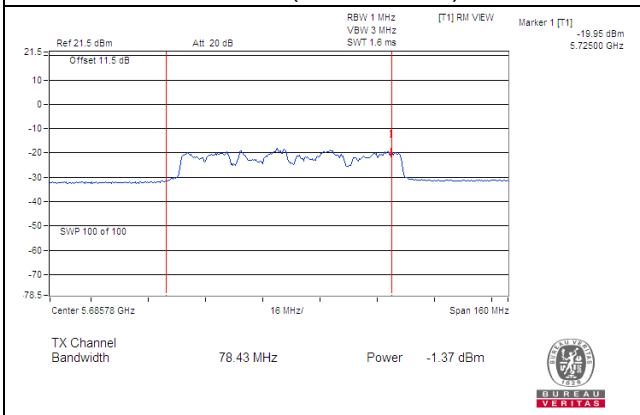
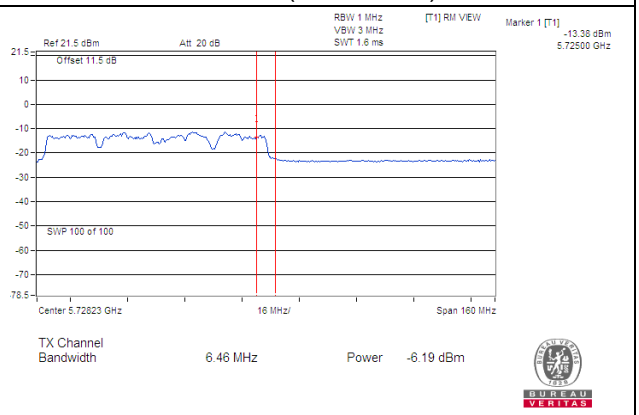
CH 142 (For U-NII-2C)	CH 142 (For U-NII-3)
	
TX Channel Bandwidth 39.32 MHz Power -0.63 dBm	TX Channel Bandwidth 7.5 MHz Power -5.6 dBm

802.11ac (VHT80)

Chain 0

CH 138 (For U-NII-2C)	CH 138 (For U-NII-3)
 TX Channel Bandwidth 80.88 MHz Power 1.17 dBm	 TX Channel Bandwidth 11.08 MHz Power -4.16 dBm

Chain 1

CH 138 (For U-NII-2C)	CH 138 (For U-NII-3)
 TX Channel Bandwidth 78.43 MHz Power -1.37 dBm	 TX Channel Bandwidth 6.46 MHz Power -6.19 dBm

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
144	5720 (For U-NII-2C)	16.12	16.52
144	5720 (For U-NII-3)	5.60	6.07

802.11n (HT20)

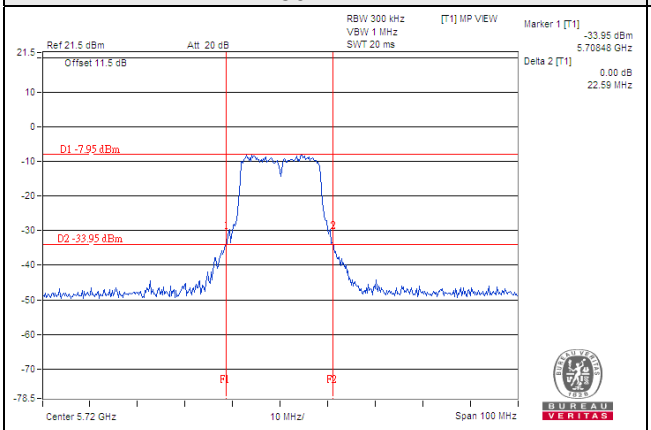
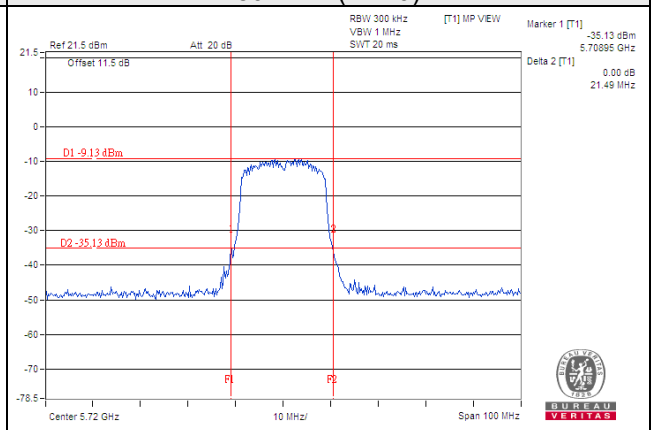
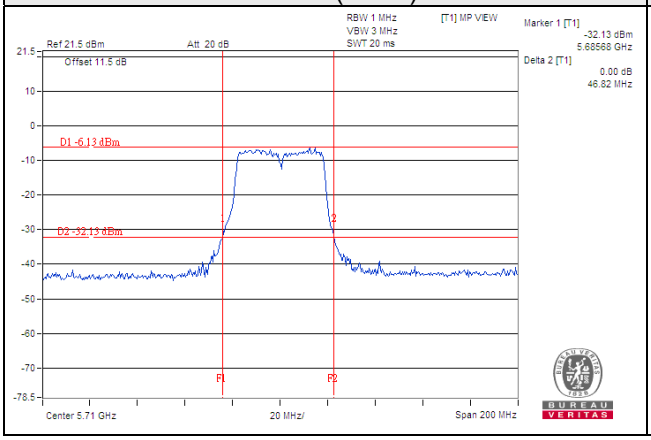
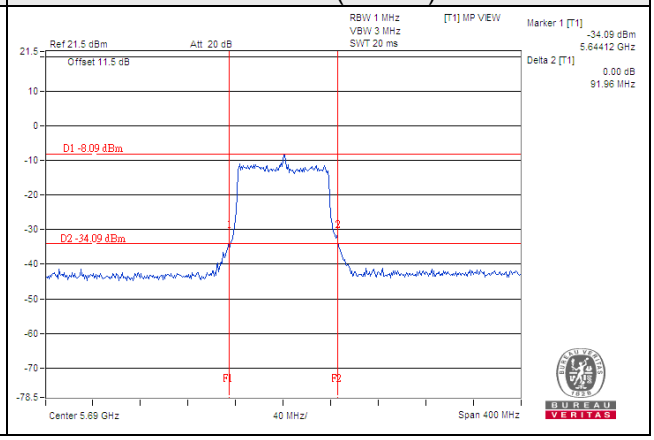
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
144	5720 (For U-NII-2C)	15.62	16.05
144	5720 (For U-NII-3)	5.59	5.44

802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
142	5710 (For U-NII-2C)	38.00	39.32
142	5710 (For U-NII-3)	8.83	7.50

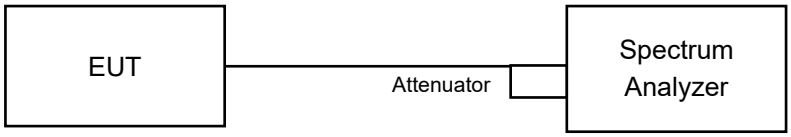
802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
138	5690 (For U-NII-2C)	80.88	78.43
138	5690 (For U-NII-3)	11.08	6.46

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

4.3 Occupied Bandwidth Measurement

4.3.1 Test Setup



4.3.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.3 Test Procedure

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

4.3.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
144	5720 (For U-NII-2C)	13.40	13.40
144	5720 (For U-NII-3)	3.28	3.40

802.11n (HT20)

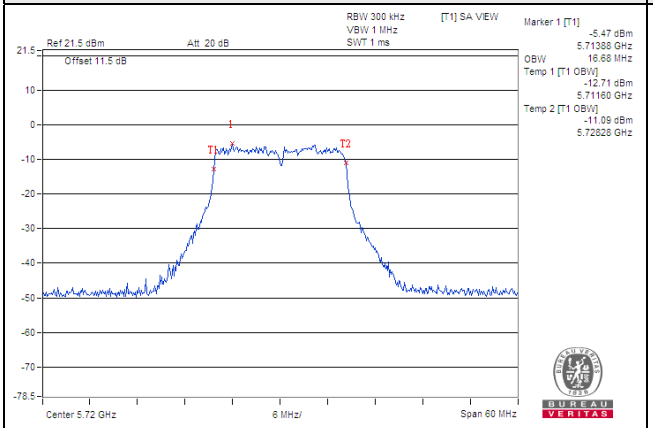
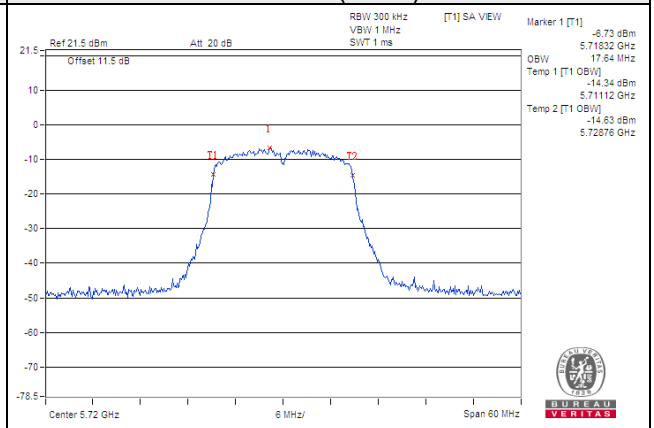
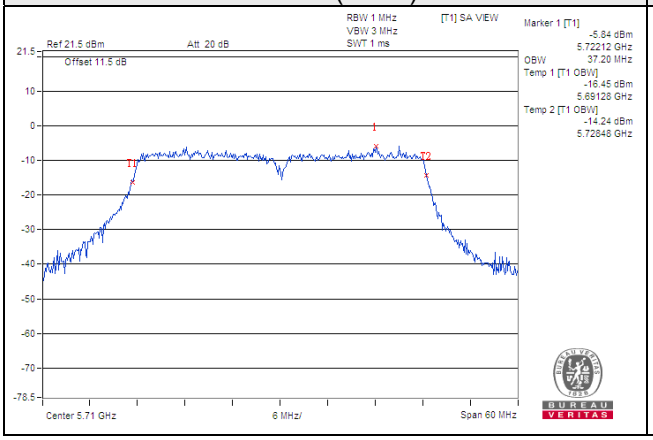
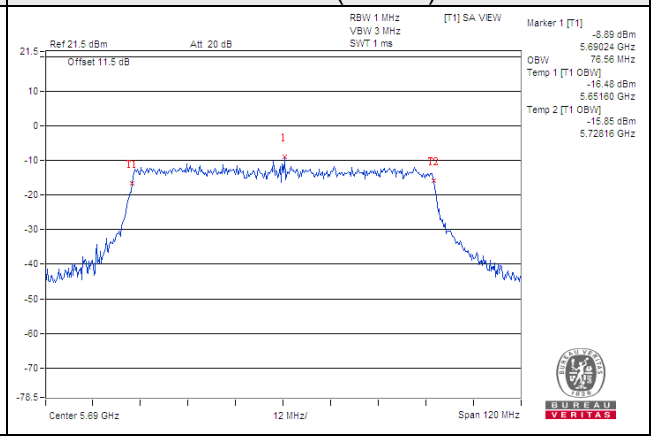
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
144	5720 (For U-NII-2C)	13.88	13.76
144	5720 (For U-NII-3)	3.76	3.76

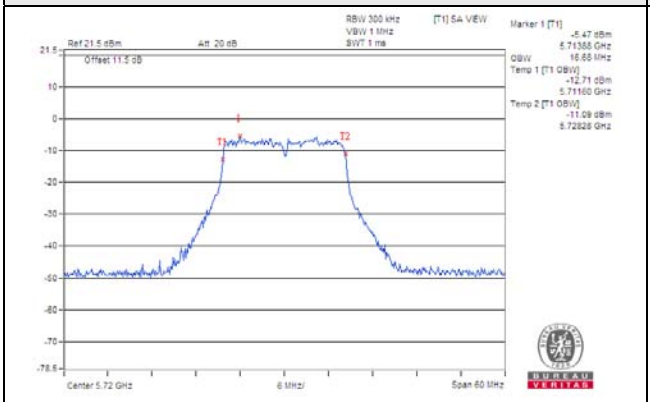
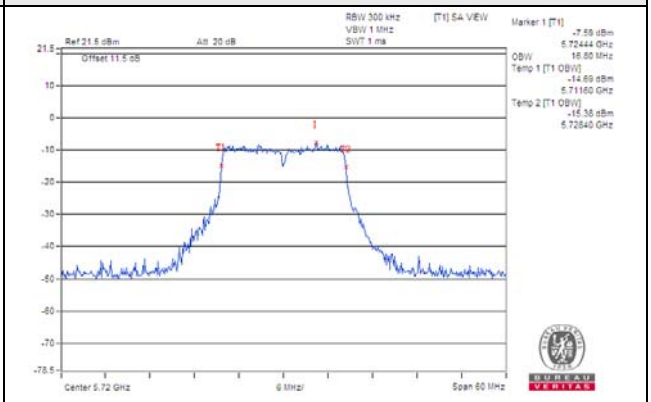
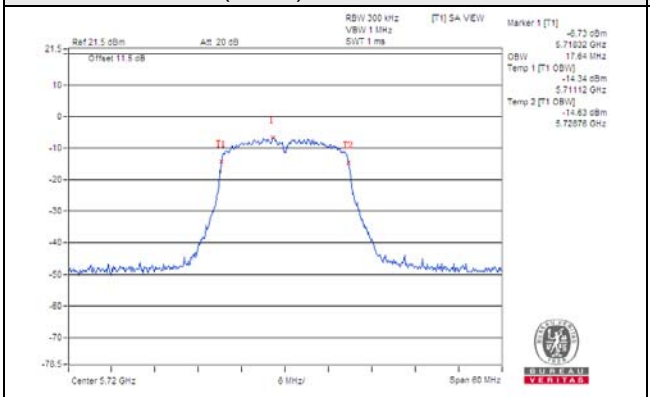
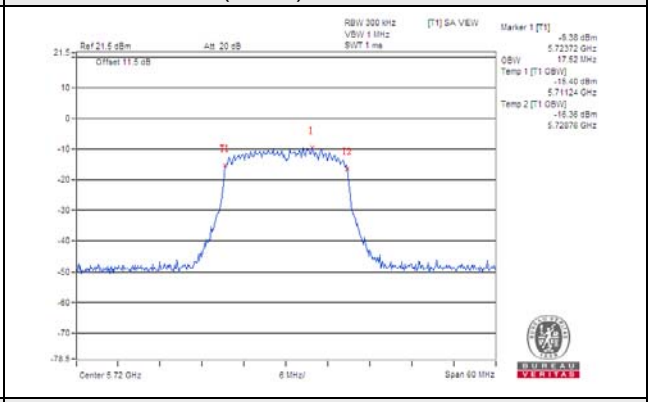
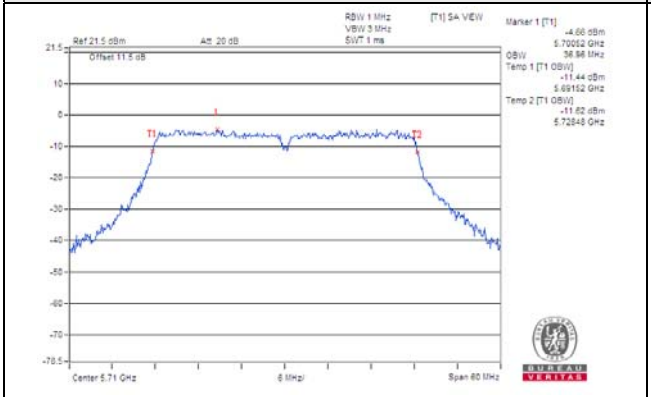
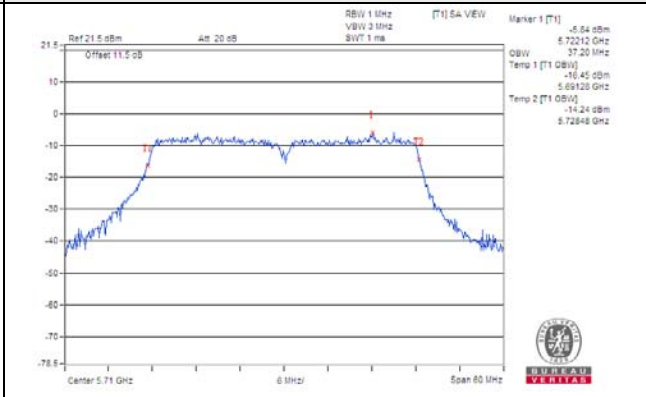
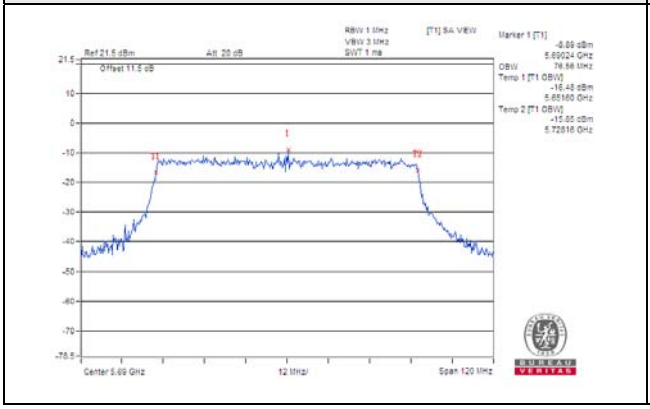
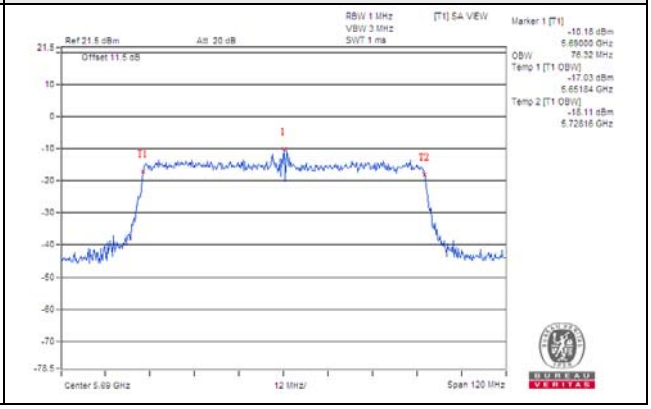
802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
142	5710 (For U-NII-2C)	33.48	33.72
142	5710 (For U-NII-3)	3.48	3.48

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
138	5690 (For U-NII-2C)	73.40	73.16
138	5690 (For U-NII-3)	3.16	3.16

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

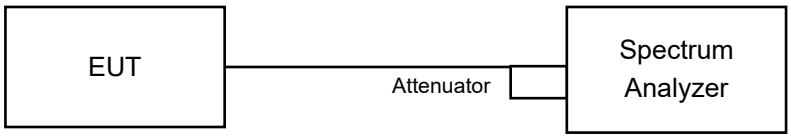
Spectrum Plot of straddle channels	
802.11a / Chain 0 / CH 144	802.11a / Chain 1 / CH 144
	
802.11n (HT20) / Chain 0 / CH 144	802.11n (HT20) / Chain 1 / CH 144
	
802.11n (HT40) / Chain 0 / CH 142	802.11n (HT40) / Chain 1 / CH 142
	
802.11ac (VHT80) / Chain 0 / CH 138	802.11ac (VHT80) / Chain 1 / CH 138
	

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Duty cycle of test signal is > 98%

Using method SA-1

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

b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS

c. Sweep time = auto, trigger set to “free run”.

d. Trace average at least 100 traces in power averaging mode.

e. Record the max value

Duty cycle of test signal is < 98%

Using method SA-2

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

b. Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS

c. Set Channel power measure = 1MHz

d. Sweep time = auto, trigger set to “free run”.

e. Trace average at least 100 traces in power averaging mode.

f. Record the max value and add 10 log (1/duty cycle)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as 4.3.6.

4.4.7 Test Results

For U-NII-2C band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
144	5720 (For U-NII-2C)	-9.05	-11.03	0.38	-6.54	10.93	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 11-(6.07-6) = 10.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
144	5720 (For U-NII-2C)	-9.23	-12.62	0.68	-6.91	10.93	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 11-(6.07-6) = 10.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

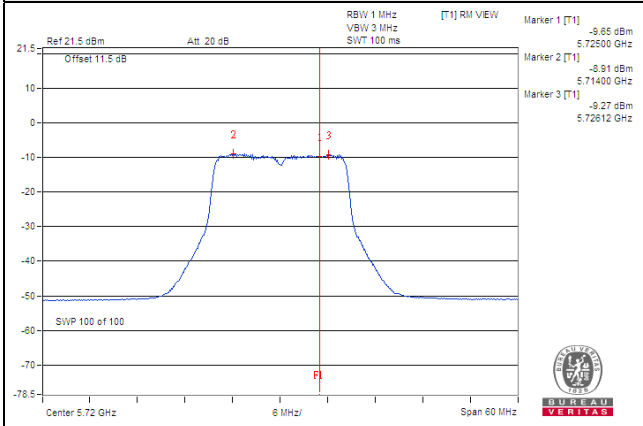
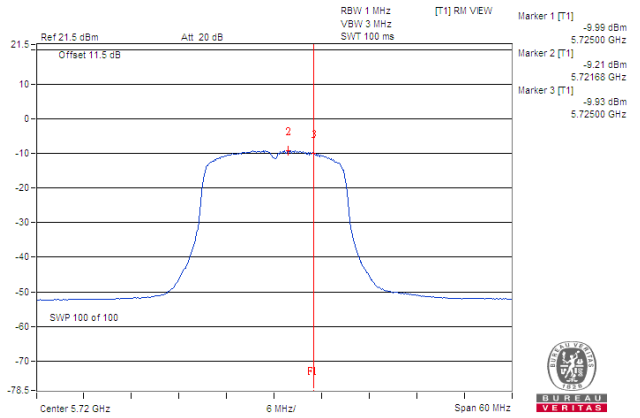
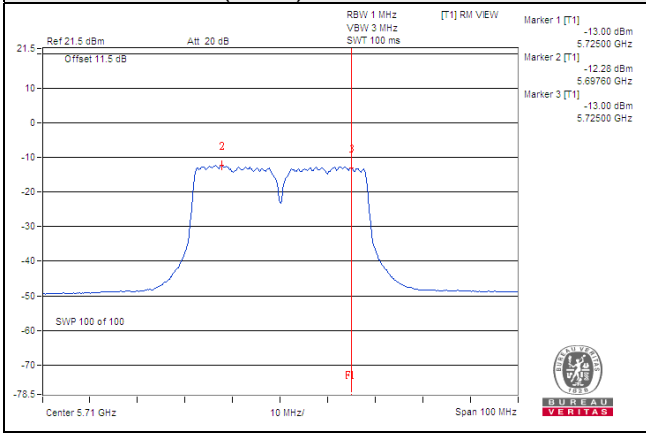
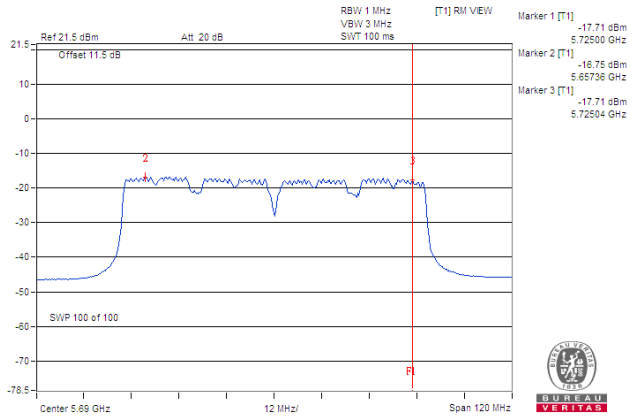
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
142	5710 (For U-NII-2C)	-12.43	-15.28	0.98	-9.64	10.93	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 11-(6.07-6) = 10.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
138	5690 (For U-NII-2C)	-16.86	-19.18	2.18	-12.68	10.93	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 11-(6.07-6) = 10.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 144	802.11n (HT20) / Chain 0 / CH 144
	
802.11n (HT40) / Chain 0 / CH 142	802.11ac (VHT80) / Chain 0 / CH 138
	

For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	144	5720 (For U-NII-3)	-20.43	-18.21	3.01	0.38	-14.82	29.93	Pass
1	144	5720 (For U-NII-3)	-22.47	-20.25	3.01	0.38	-16.86	29.93	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 30-(6.07-6) = 29.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	144	5720 (For U-NII-3)	-20.35	-18.13	3.01	0.68	-14.44	29.93	Pass
1	144	5720 (For U-NII-3)	-23.82	-21.60	3.01	0.68	-17.91	29.93	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 30-(6.07-6) = 29.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	142	5710 (For U-NII-3)	-25.95	-23.73	3.01	0.98	-19.74	29.93	Pass
1	142	5710 (For U-NII-3)	-28.39	-26.17	3.01	0.98	-22.18	29.93	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[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 30-(6.07-6) = 29.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

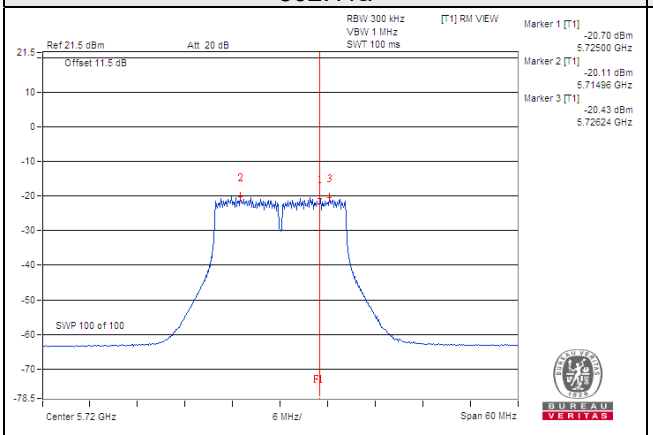
802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	138	5690 (For U-NII-3)	-34.04	-31.82	3.01	2.18	-26.63	29.93	Pass
1	138	5690 (For U-NII-3)	-35.37	-33.15	3.01	2.18	-27.96	29.93	Pass

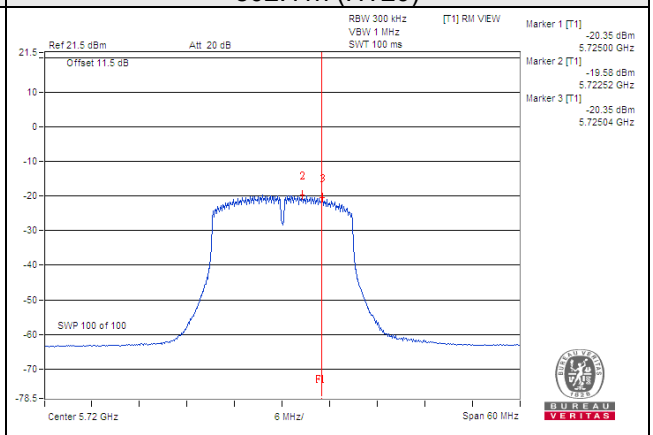
Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/2$] = 6.07dBi, so the power density limit shall be reduced to 30-(6.07-6) = 29.93dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

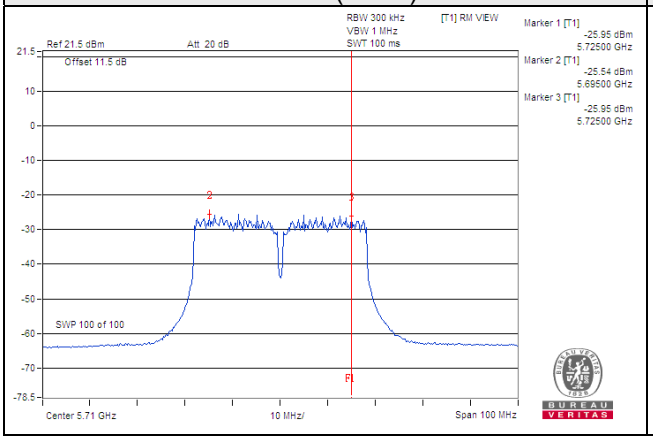
802.11a



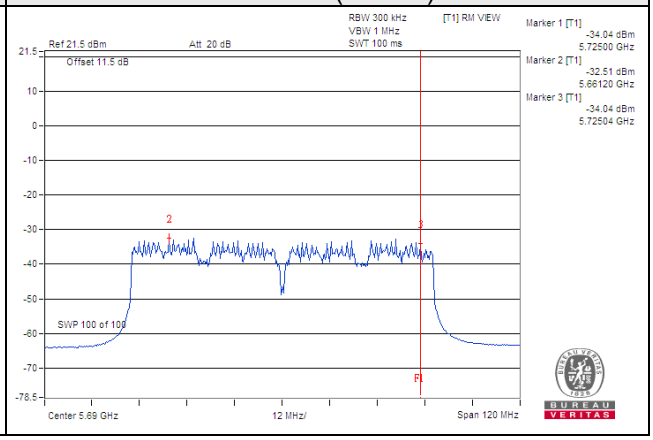
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

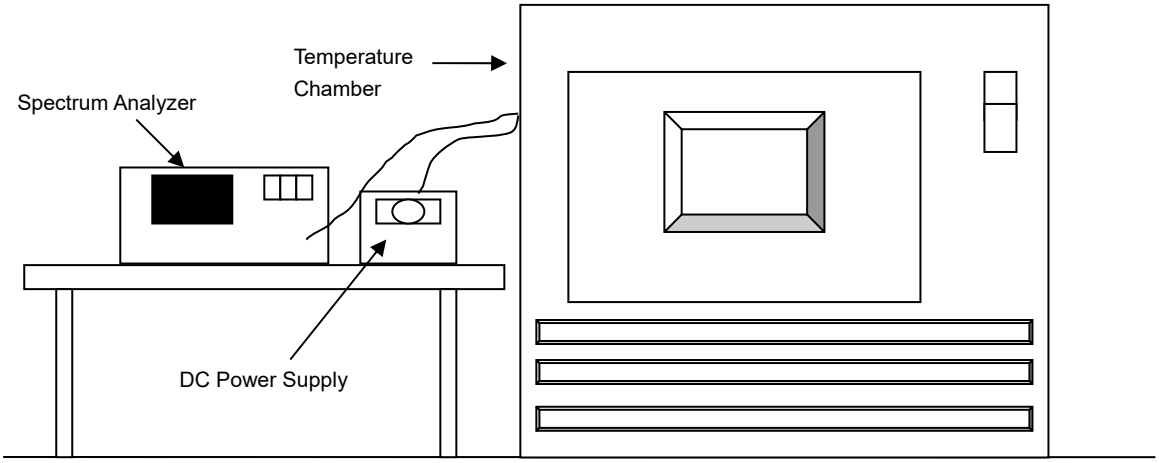


4.5 Frequency Stability

4.5.1 Limits of Frequency Stability Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2021	May 31, 2022
Three-phase coupling / decoupling network TESEQ	CDN 3063	4006	Mar. 10, 2021	Mar. 09, 2022
DC Power Supply Topward	6306A	727263	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.

4.5.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5720MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
75	12.6	5720.0091	PASS	5720.0081	PASS	5720.0087	PASS	5720.0119	PASS
70	12.6	5720.0019	PASS	5720.0033	PASS	5720.0051	PASS	5720.0041	PASS
60	12.6	5720.0222	PASS	5720.0273	PASS	5720.0236	PASS	5720.0241	PASS
50	12.6	5719.9818	PASS	5719.9863	PASS	5719.9855	PASS	5719.9814	PASS
40	12.6	5719.9896	PASS	5719.9931	PASS	5719.9947	PASS	5719.9915	PASS
30	12.6	5719.9856	PASS	5719.9844	PASS	5719.9850	PASS	5719.9866	PASS
20	12.6	5720.0260	PASS	5720.0237	PASS	5720.0215	PASS	5720.0218	PASS
10	12.6	5720.0215	PASS	5720.0165	PASS	5720.0195	PASS	5720.0209	PASS
0	12.6	5719.9860	PASS	5719.9861	PASS	5719.9865	PASS	5719.9871	PASS
-10	12.6	5719.9802	PASS	5719.9825	PASS	5719.9775	PASS	5719.9808	PASS
-20	12.6	5719.9783	PASS	5719.9789	PASS	5719.9780	PASS	5719.9792	PASS
-30	12.6	5720.0239	PASS	5720.0189	PASS	5720.0190	PASS	5720.0202	PASS
-40	12.6	5720.0072	PASS	5720.0076	PASS	5720.0079	PASS	5720.0065	PASS

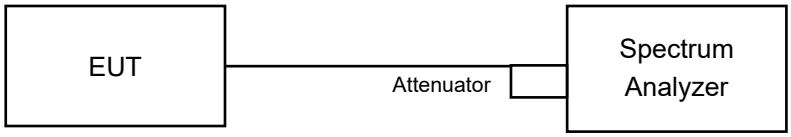
Frequency Stability Versus Voltage									
Operating Frequency: 5720MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	14.49	5720.0260	PASS	5720.0241	PASS	5720.0222	PASS	5720.0210	PASS
	12.6	5720.0260	PASS	5720.0237	PASS	5720.0215	PASS	5720.0218	PASS
	10.71	5720.0270	PASS	5720.0246	PASS	5720.0212	PASS	5720.0210	PASS

4.6 6dB Bandwidth Measurement

4.6.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144	5720 (For U-NII-3)	3.26	3.25	0.5	Pass

802.11n (HT20)

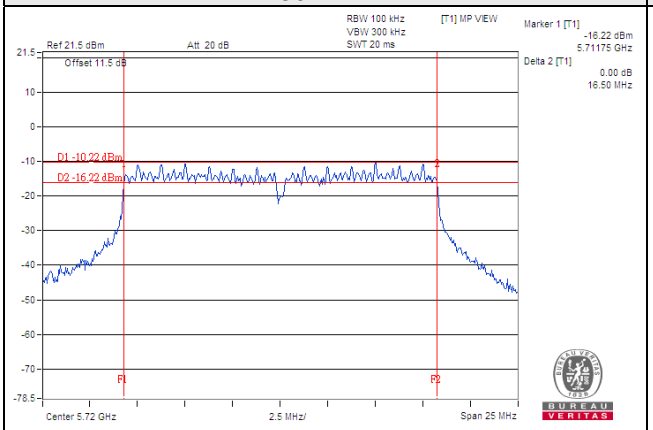
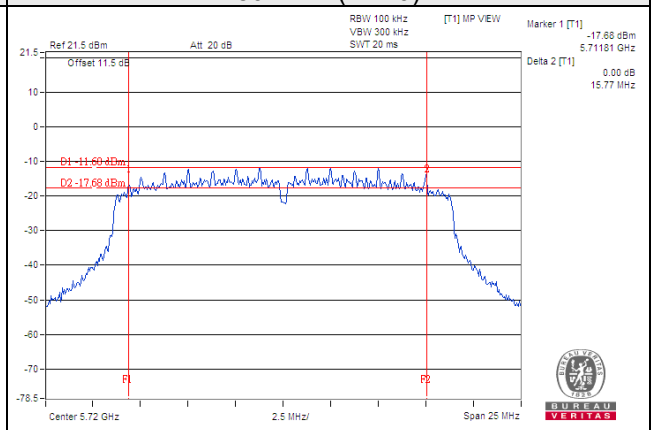
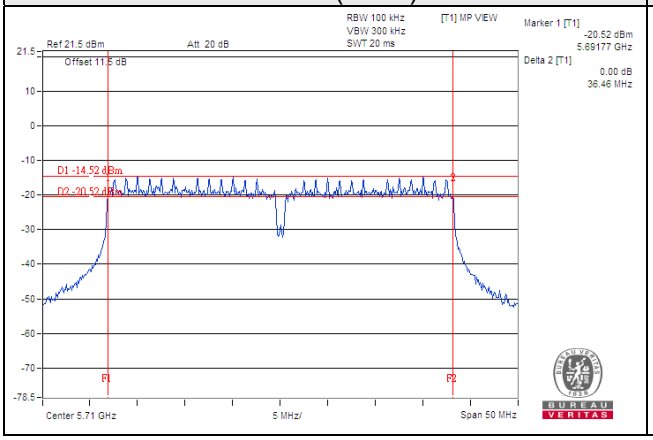
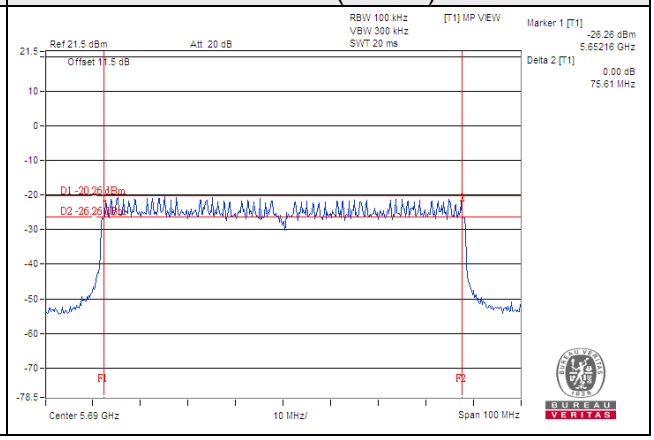
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144	5720 (For U-NII-3)	2.61	2.58	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142	5710 (For U-NII-3)	3.24	3.23	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138	5690 (For U-NII-3)	3.24	2.77	0.5	Pass

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

Note:

For CH144 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

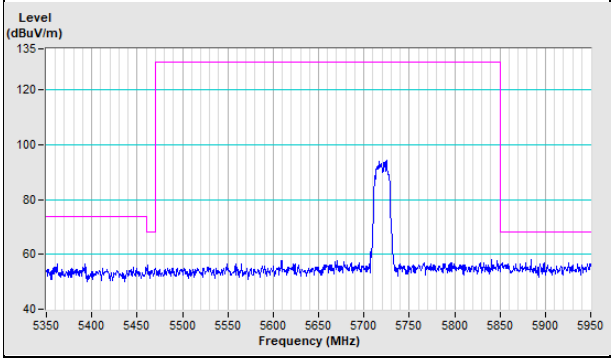
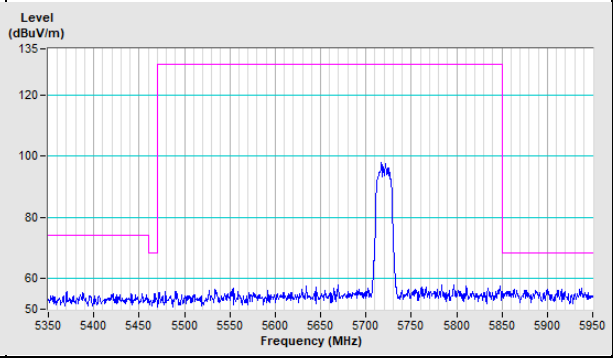
For CH142 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

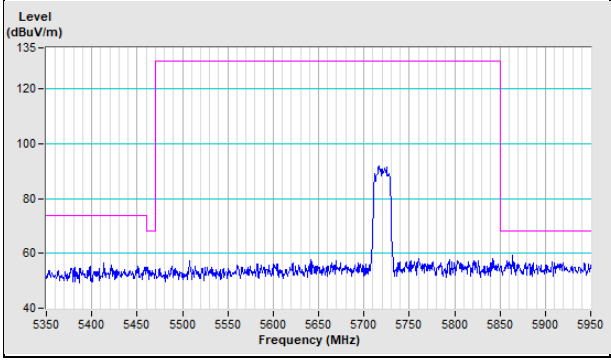
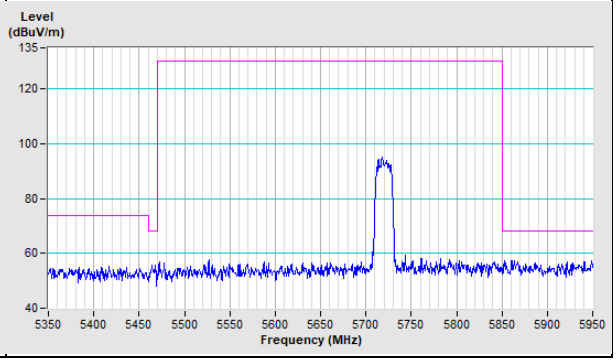
For CH138 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

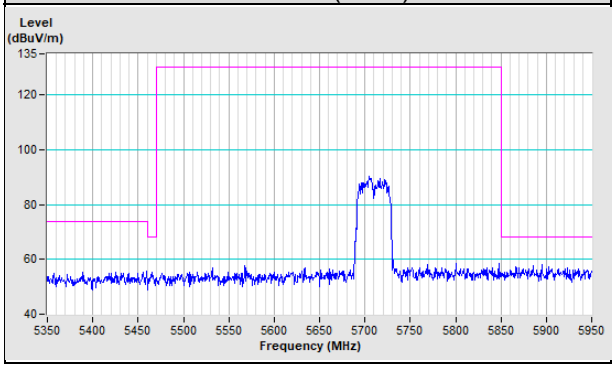
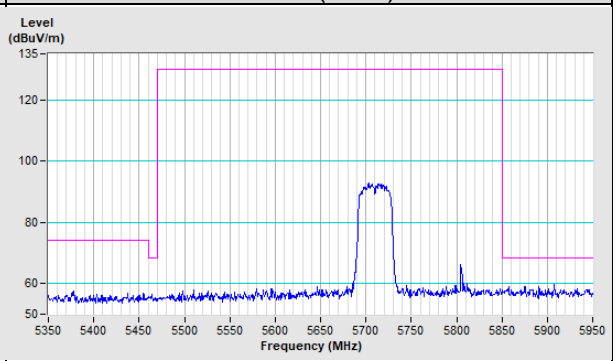
5 Pictures of Test Arrangements

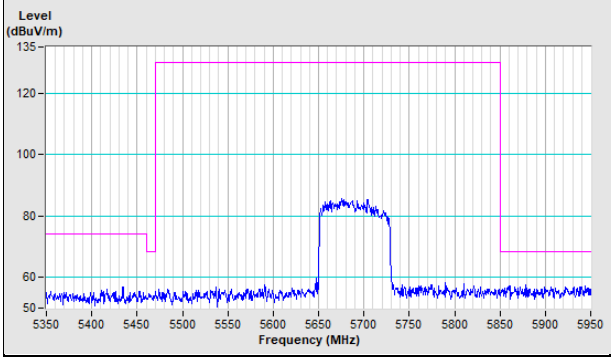
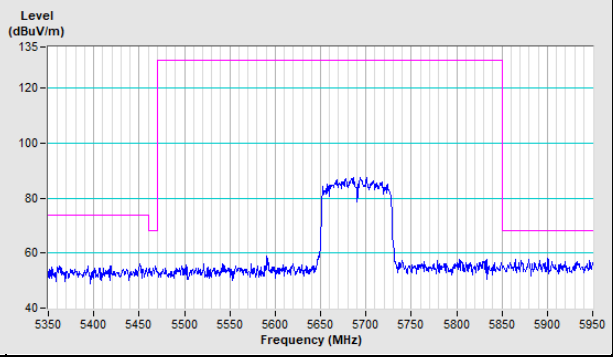
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

802.11a Channel 144	
Horizontal (Peak)	Vertical (Peak)
	

802.11n (HT20) Channel 144	
Horizontal (Peak)	Vertical (Peak)
	

802.11n (HT40) Channel 142	
Horizontal (Peak)	Vertical (Peak)
	

802.11ac (VHT80) Channel 138	
Horizontal (Peak)	Vertical (Peak)
	

Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---