

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
Report No.: RFBHCP-WTW-P22040326-1
FCC ID: ACJ932AT2202
Model No.: AT2202
Received Date: 2022/4/13
Test Date: 2022/5/30 ~ 2022/6/14
Issued Date: 2022/9/14

Applicant: Panasonic Corporation of North America
Address: Two Riverfront Plaza, 9th Floor, Newark New Jersey, United States, 07102-5490
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., Kewi Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / 788550 / TW0003
Designation Number:

Approved by: Jeremy Lin, **Date:** 2022/9/14
Jeremy Lin / Project Engineer

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Prepared by : Lena Wang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBHCP-WTW-P22040326-1	Original Release	2022/9/14

1 Certificate

Product: Display Audio

Brand: Panasonic or Panasonic Automotive Systems Asia Pacific.,Ltd.

Test Model: AT2202

Sample Status: Engineering Sample

Applicant: Panasonic Corporation of North America

Test Date: 2022/5/30 ~ 2022/6/14

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Measurement ANSI C63.10-2013

procedure: KDB 789033 D02 General UNII Test Procedure New Rules v02r01

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.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(2)	26 dB Bandwidth	-	For U-NII-2A U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.
15.407(a)(1/2/3)	RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	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)
---	Occupied Bandwidth	-	Reference only.
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.407(b)(9)	AC Power Conducted Emissions	N/A	Without AC power port of the EUT
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -3.3 dB at 77.53 MHz
15.407(b)(1/2/3/4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.7 dB at 17235.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is U.FL not a standard connector.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Parameter	Specification	Expanded Uncertainty (k=2) (±)
Occupied Bandwidth	-	491.896 Hz
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3 dB
	30 MHz ~ 1 GHz	2.92 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Display Audio
Brand	Panasonic or Panasonic Automotive Systems Asia Pacific.,Ltd.
Test Model	AT2202
Status of EUT	Engineering Sample
Power Supply Rating	12.0 Vdc
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 150 Mbps
Operating Frequency	5.745 GHz ~ 5.825 GHz
Number of Channel	5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
Output Power	5.745 GHz ~ 5.825 GHz : 51.642 mW (17.13 dBm)
EUT Category	Client device

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna No.	Gain (dBi)	Antenna Type	Connector Type
	WLAN 5G		
Max.	3.4	solid	U.FL
Min.	0.3		

*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.

2. The EUT provides 1 completed transmitter and 1 receiver:

5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

3.3 Channel List

FOR 5745 ~ 5825 MHz:

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

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):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	Select worst case from Z axis
-----------	-------------------------------

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

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
26 dB Bandwidth	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
	802.11n (HT40)	151, 159	BPSK	MCS0
RF Output Power / Power Spectral Density	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
	802.11n (HT40)	151, 159	BPSK	MCS0
6 dB Bandwidth	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
	802.11n (HT40)	151, 159	BPSK	MCS0
Occupied Bandwidth	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
	802.11n (HT40)	151, 159	BPSK	MCS0
Frequency Stability	802.11a	149	un-modulation	-
Unwanted Emissions below 1 GHz	802.11a	149	BPSK	6Mb/s
Unwanted Emissions above 1 GHz	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
	802.11n (HT40)	151, 159	BPSK	MCS0
EUT Configure Mode:	12Vdc			

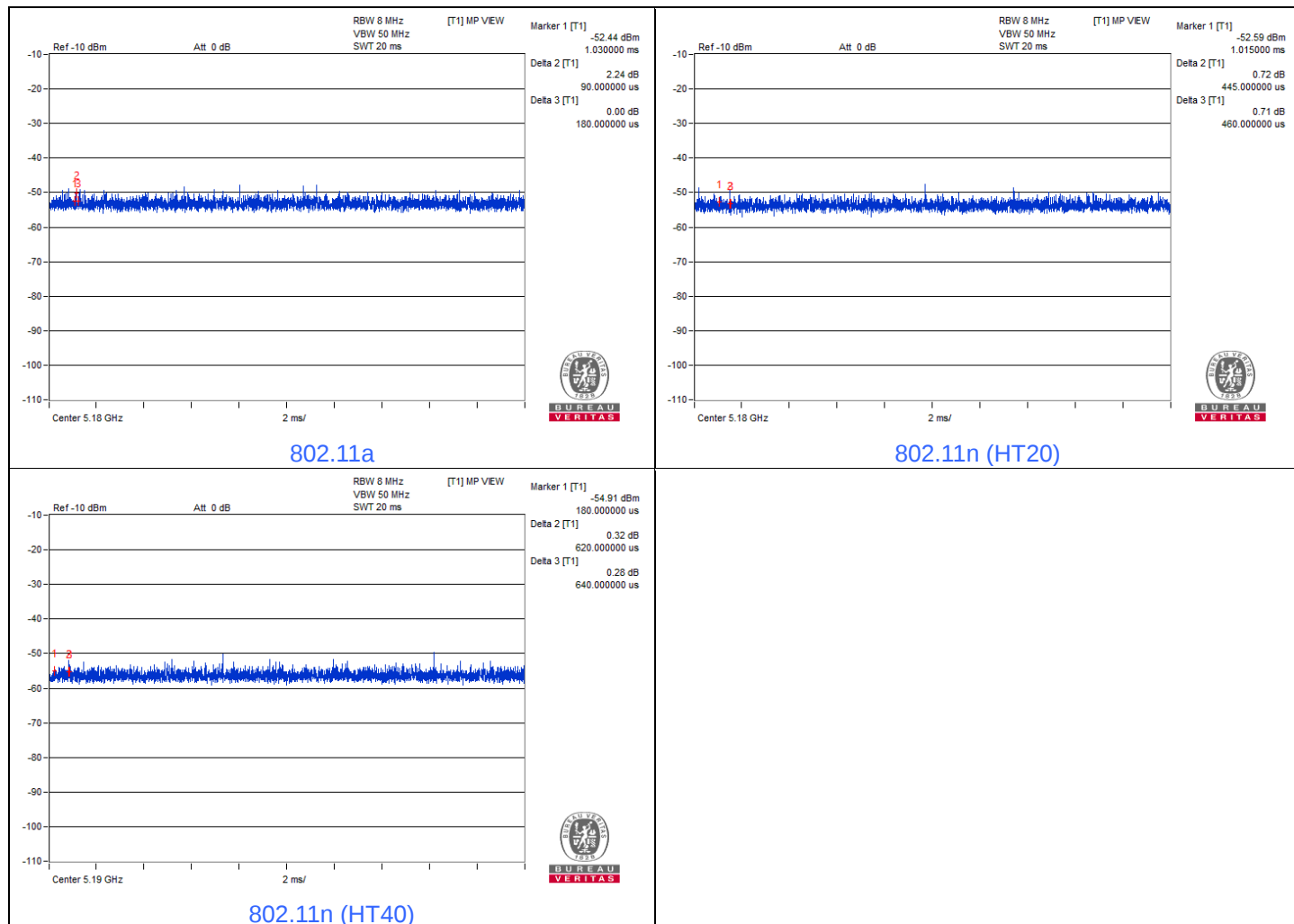
3.5 Duty Cycle of Test Signal

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11a: Duty cycle = 100.0%

802.11n (HT20): Duty cycle = 100.0%

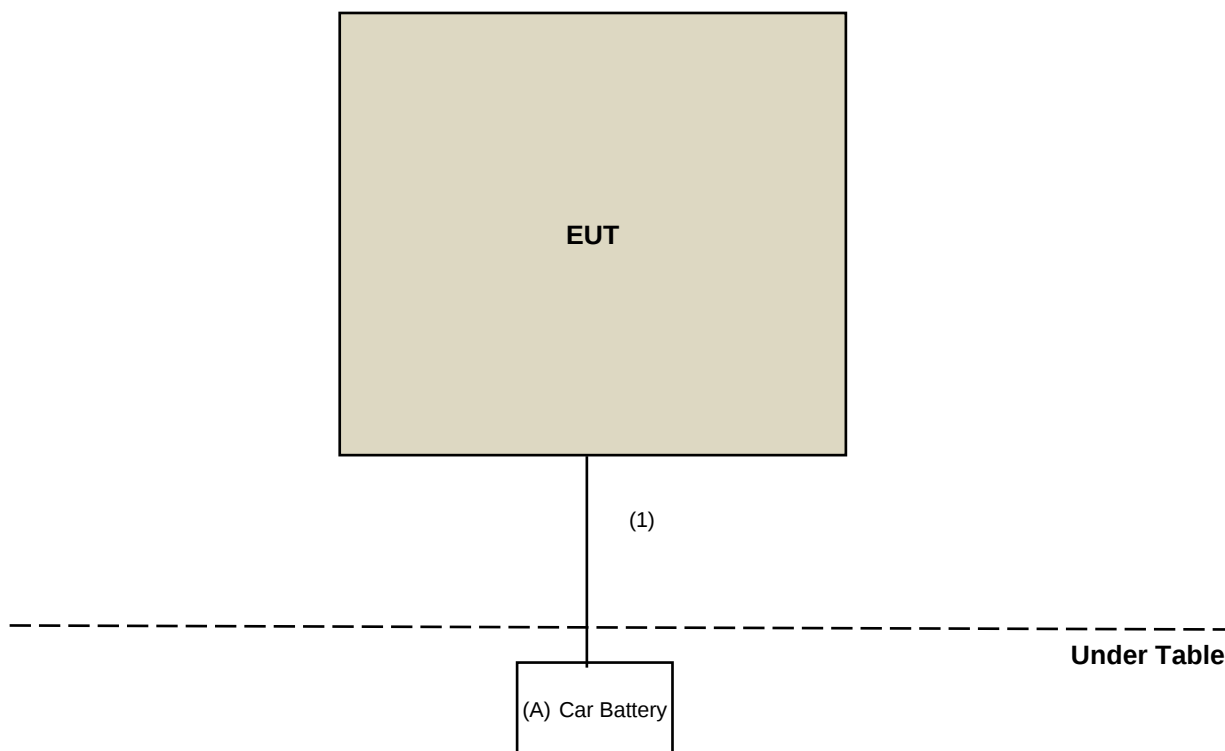
802.11n (HT40): Duty cycle = 100.0%



3.6 Test Program Used and Operation Descriptions

Controlling software Tera Term Version4.83 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Car Battery	Global	NX120-7L	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	2	N	0	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 26 dB Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/6/14

4.2 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrate d Date	Calibrate d Until
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	2022/1/18	2023/1/17
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	2021/7/12	2022/7/11
Wideband Power Sensor(N1923A) KEYSIGHT	N1923A	MY58020002	2022/1/17	2023/1/16
SMA Fixed Attenuator WOKEN	00800A1K01A-20	N/A	2022/06/16	2023/06/15

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/6/14

4.3 Power Spectral Density

Refer to section 4.1 to get information of the instruments.

4.4 6 dB Bandwidth

Refer to section 4.1 to get information of the instruments.

4.5 Occupied Bandwidth

Refer to section 4.1 to get information of the instruments.

4.6 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply JIN YIH Technology	ODP3033	ODP30332128138	N/A	N/A
AC Power Source ExTech	CFW-105	E000603	N/A	N/A
Digital Multimeter Fluke	87-III	70360755	2021/7/8	2022/7/7
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2022/1/3	2023/1/2

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/6/14

4.7 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower KaiTuo	N/A	N/A	N/A	N/A
Antenna Tower Controller KaiTuo	KT-2000	N/A	N/A	N/A
Bi-log Broadband Antenna Schwarzbeck	VULB9168	9168-995	2021/10/28	2022/10/27
Loop Antenna TESEQ	HLA 6121	45745	2021/7/21	2022/7/20
Loop Antenna EMCI	EM-6879	269	2021/9/16	2022/9/15
MXA Signal Analyzer KEYSIGHT	N9020B	MY60110462	2021/12/21	2022/12/20
Pre_Amplifier EMCI	EMC330N	980783	2022/1/17	2023/1/16
Pre-amplifier EMCI	EMC001340	980201	2021/9/15	2022/9/14
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/1/15	2023/1/14
	EMCCFD400-NM-NM-9000	201252	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-3000	201250	2022/1/17	2023/1/16
	EMCCFD400-NM-NM-500	201245	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_V7.6.15.9.5	N/A	N/A	N/A
Test Receiver R&S	ESR3	102579	2021/7/5	2022/7/4
Turn Table Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208675	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 7.
2. Tested Date: 2022/6/1

4.8 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower KaiTuo	N/A	N/A	N/A	N/A
Antenna Tower Controller KaiTuo	KT-2000	N/A	N/A	N/A
Horn Antenna RFSPIN	DRH18-E	210104A18E	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	9170-1048	2021/11/14	2022/11/13
MXA Signal Analyzer KEYSIGHT	N9020B	MY60110462	2021/12/21	2022/12/20
Pre_Amplifier EMCI	EMC118A45SE	980810	2021/12/30	2022/12/29
	EMC184045SE	980787	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	EMC104-SM-SM-9000	201230	2022/1/17	2023/1/16
	EMC104-SM-SM-3000	201242	2022/1/17	2023/1/16
	EMC104-SM-SM-1000	210101	2022/1/17	2023/1/16
	EMC101G-KM-KM-5000	201259	2022/1/17	2023/1/16
	EMC101G-KM-KM-3000	201256	2022/1/17	2023/1/16
	EMC101G-KM-KM-2000	201253	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Test Receiver R&S	ESR3	102579	2021/7/5	2022/7/4
Turn Table Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208675	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 7.
2. Tested Date: 2022/5/30 ~ 2022/6/10

5 Limits of Test Items

5.1 26 dB Bandwidth

The results are for reference only.

5.2 RF Output Power

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

Operation Band	Limit
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

5.3 Power Spectral Density

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

Operation Band	Limit
U-NII-2A	11 dBm/ MHz
U-NII-2C	11 dBm/ MHz
U-NII-3	30 dBm/ 500 kHz

5.4 6 dB Bandwidth

Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.5 Occupied Bandwidth

The results are for reference only.

5.6 Frequency Stability

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

5.7 Unwanted Emissions below 1 GHz

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

Notes:

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

5.8 Unwanted Emissions above 1 GHz

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)
Above 960	500	3

Notes:

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 Procedure New Rules v02r01		Field Strength at 3 m	
		PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2 (dBμV/m) ^{*1} PK: 105.2 (dBμV/m) ^{*2} PK: 110.8 (dBμV/m) ^{*3} PK: 122.2 (dBμV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

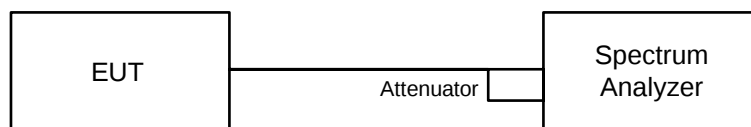
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 26 dB Bandwidth

6.1.1 Test Setup

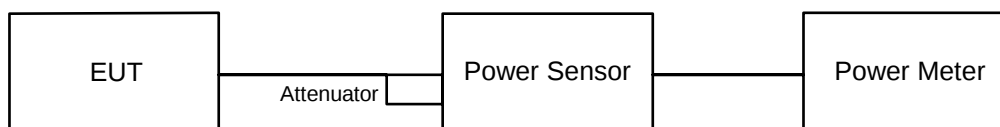


6.1.2 Test Procedure

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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%.

6.2 RF Output Power

6.2.1 Test Setup



For channel straddling:



6.2.2 Test Procedure

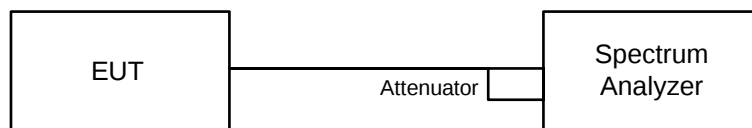
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to average. Duty factor is not added to measured value.

Method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
- Sweep points ≥ $[2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value

6.3 Power Spectral Density

6.3.1 Test Setup



6.3.2 Test Procedure

For specified measurement bandwidth 1 MHz:

Method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- Sweep points $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value

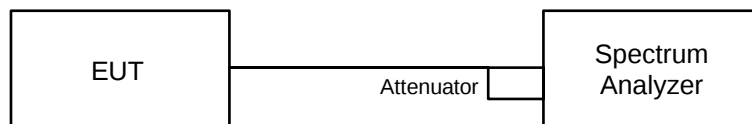
For specified measurement bandwidth 500 kHz:

Method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- 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 $\text{BWCF} = 10\log(500 \text{ kHz}/300 \text{ kHz})$
- Sweep points $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value

6.4 6 dB Bandwidth

6.4.1 Test Setup

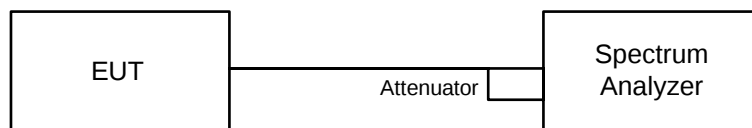


6.4.2 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$, 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.

6.5 Occupied Bandwidth

6.5.1 Test Setup

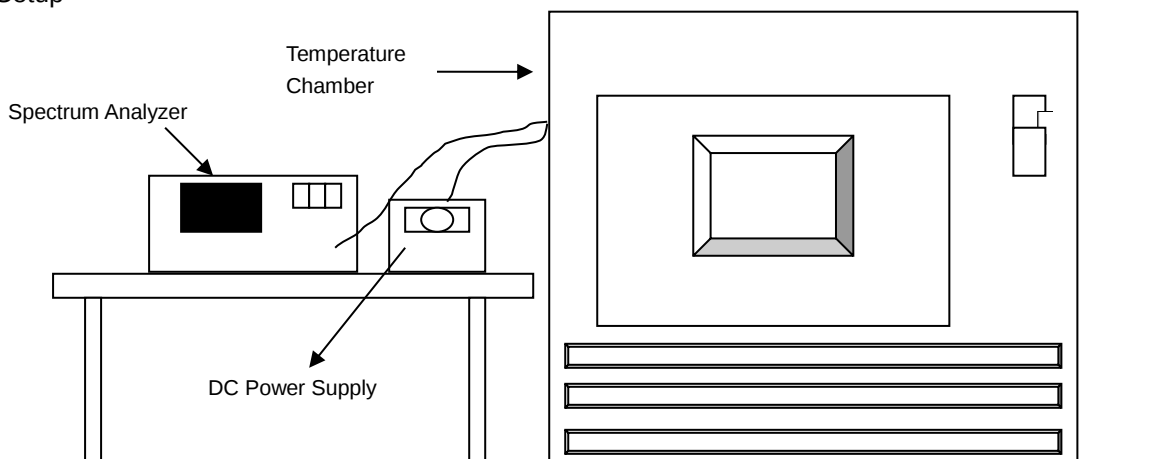


6.5.2 Test Procedure

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.

6.6 Frequency Stability

6.6.1 Test Setup



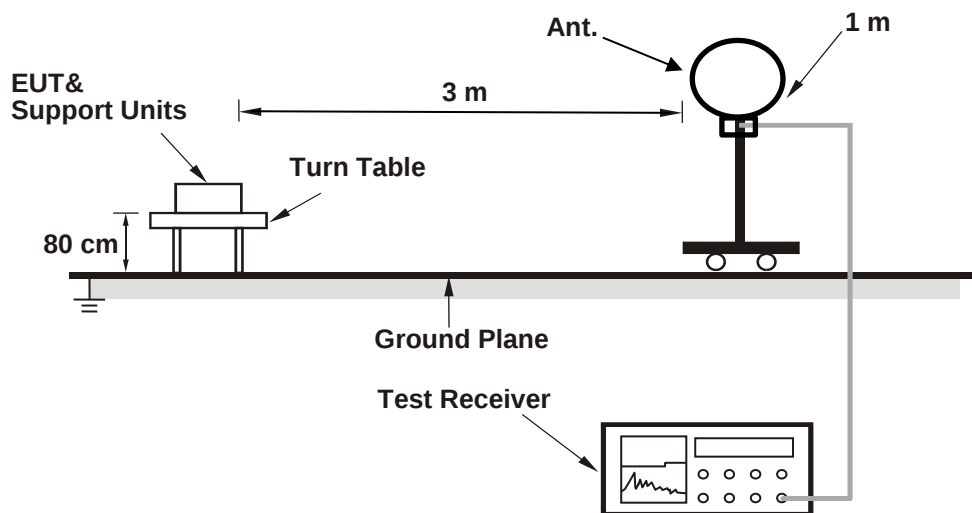
6.6.2 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC 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.

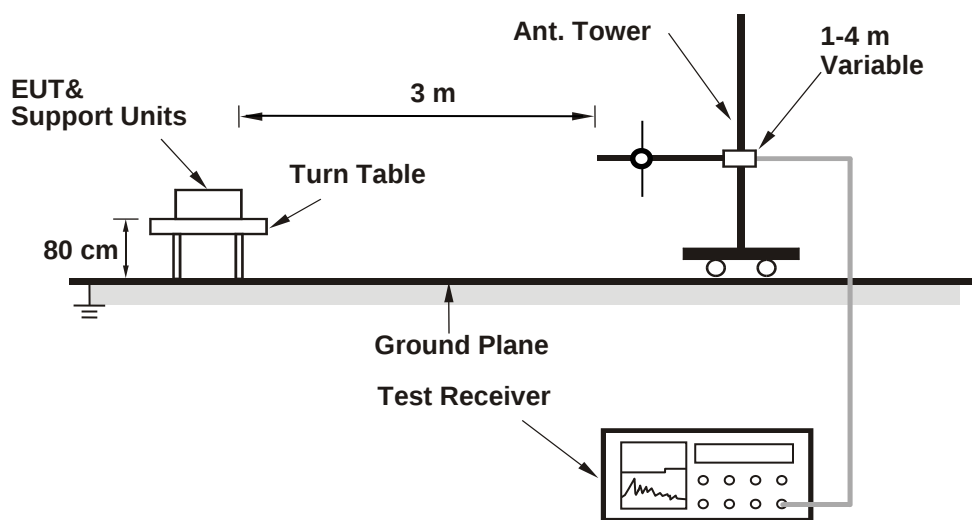
6.7 Unwanted Emissions below 1 GHz

6.7.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



6.7.2 Test Procedure

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 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. 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters 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.

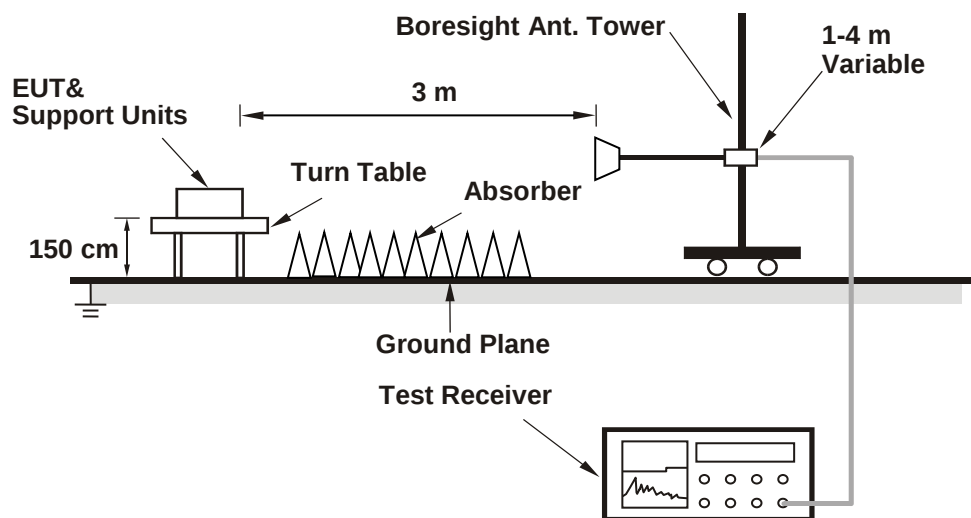
Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.8 Unwanted Emissions above 1 GHz

6.8.1 Test Setup

For Radiated emission above 1 GHz



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

6.8.2 Test Procedure

- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to peak and average detects 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.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- For fundamental and harmonic signal measurement, 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.
- All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	12 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Frank/Wayne
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802.11a

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
149	5745	51.642	17.13	30	Pass
157	5785	44.875	16.52	30	Pass
165	5825	44.978	16.53	30	Pass

Notes:

- * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
- For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
149	5745	50.816	17.06	30	Pass
157	5785	44.361	16.47	30	Pass
165	5825	44.055	16.44	30	Pass

Notes:

- * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
- For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
151	5755	44.875	16.52	30	Pass
159	5795	41.4	16.17	30	Pass

Notes:

- * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
- For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the output power limit shall not be reduced.

7.2 Power Spectral Density

Input Power:	12 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Frank/Wayne
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For U-NII-3 Band

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
149	5745	-3.43	-1.21	30	Pass
157	5785	-4	-1.78	30	Pass
165	5825	-3.91	-1.69	30	Pass

Note: For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
149	5745	-4.62	-2.40	30	Pass
157	5785	-4.79	-2.57	30	Pass
165	5825	-4.95	-2.73	30	Pass

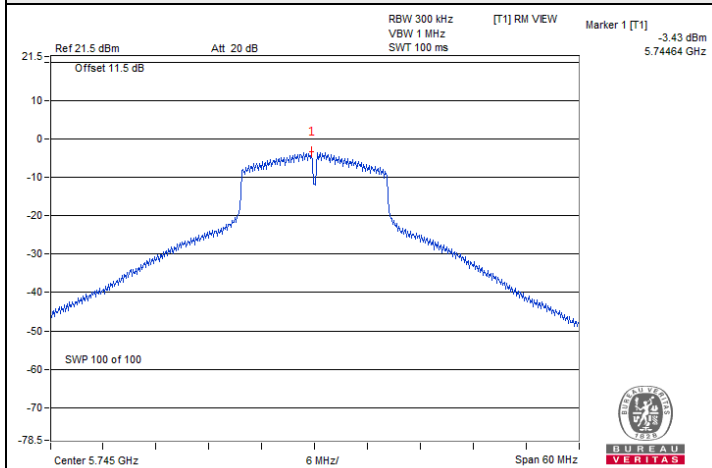
Note: For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11n (HT40)

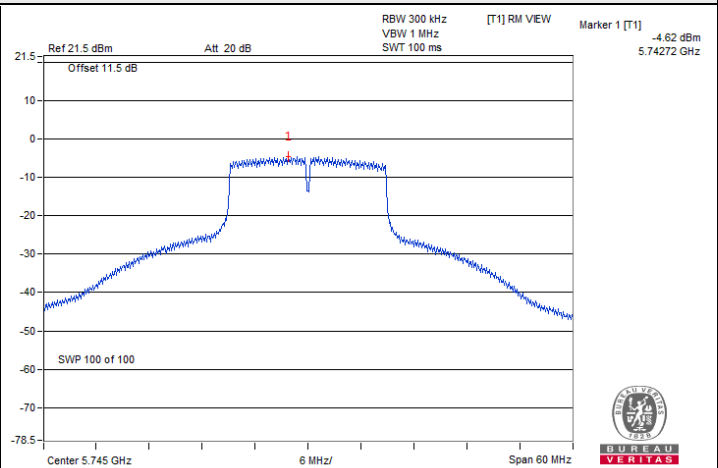
Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
142 (U-NII-3)	5710	-8.73	-6.51	30	Pass
151	5755	-7.98	-5.76	30	Pass
159	5795	-8.42	-6.20	30	Pass

Note: For U-NII-3, the antenna gain is 3.4 dBi < 6 dBi, so the power density limit shall not be reduced.

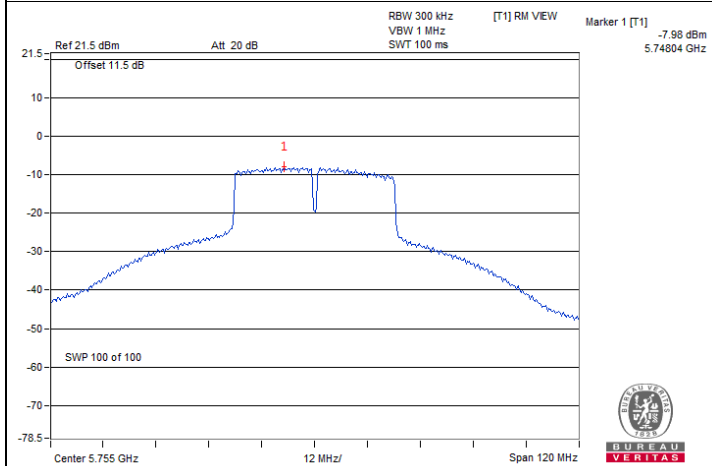
Spectrum Plot of Maximum Value



802.11a : CH 149



802.11n (HT20) : CH 149



802.11n (HT40) : CH 151

7.3 6 dB Bandwidth

Input Power:	12 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Frank/Wayne
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802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
149	5745	16.38	0.5	Pass
157	5785	16.36	0.5	Pass
165	5825	16.38	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
149	5745	17.8	0.5	Pass
157	5785	17.83	0.5	Pass
165	5825	17.79	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
151	5755	36.54	0.5	Pass
159	5795	36.55	0.5	Pass

7.4 Occupied Bandwidth

Input Power:	12 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Frank/Wayne
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802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
149	5745	23.65
157	5785	21.45
165	5825	19.71

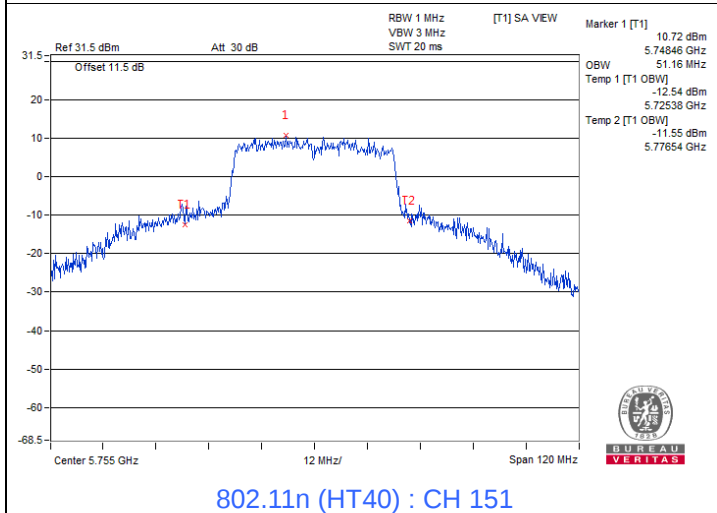
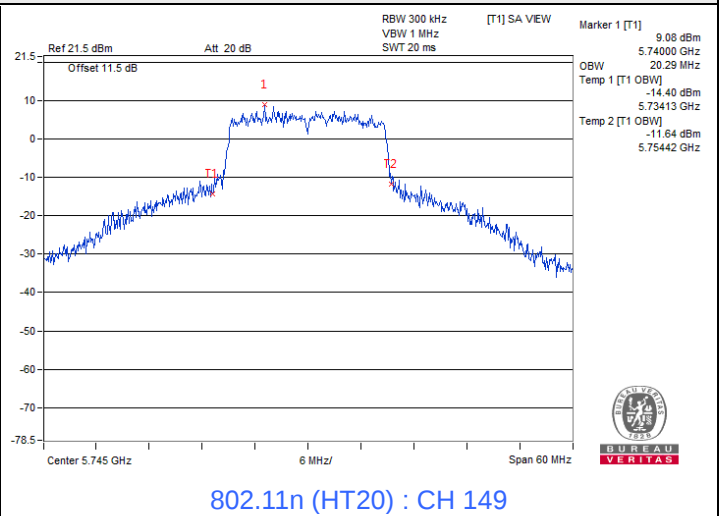
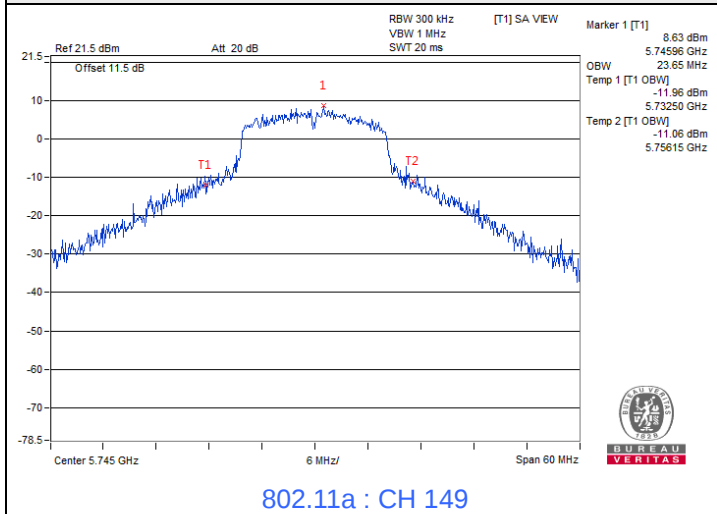
802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
149	5745	20.29
157	5785	20.29
165	5825	19.81

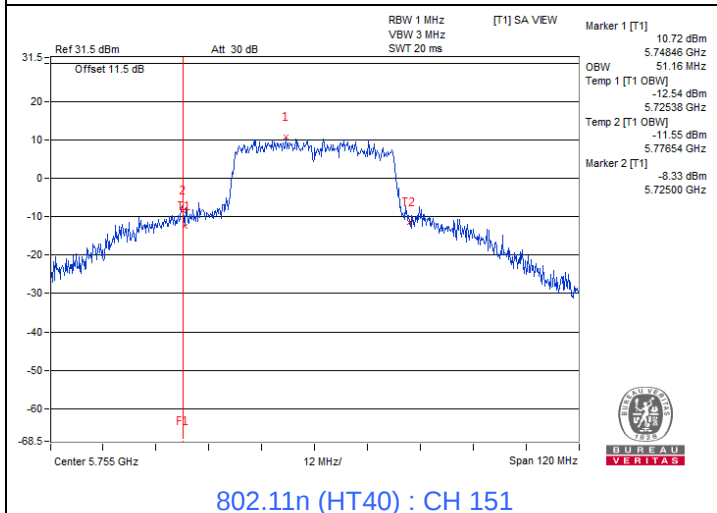
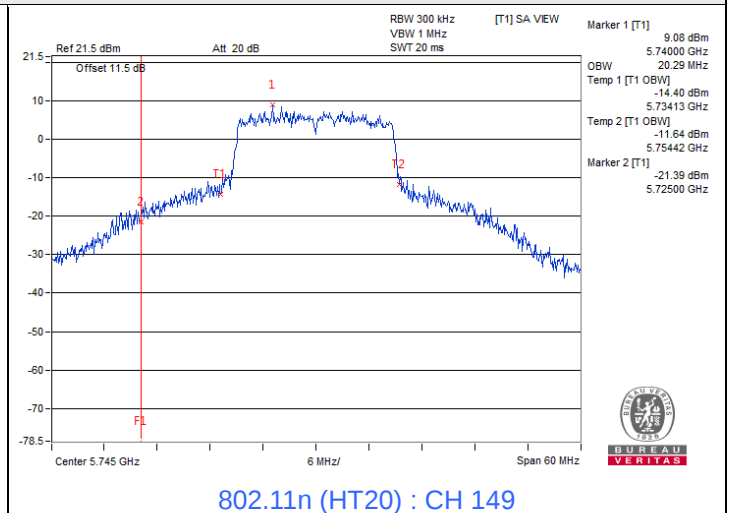
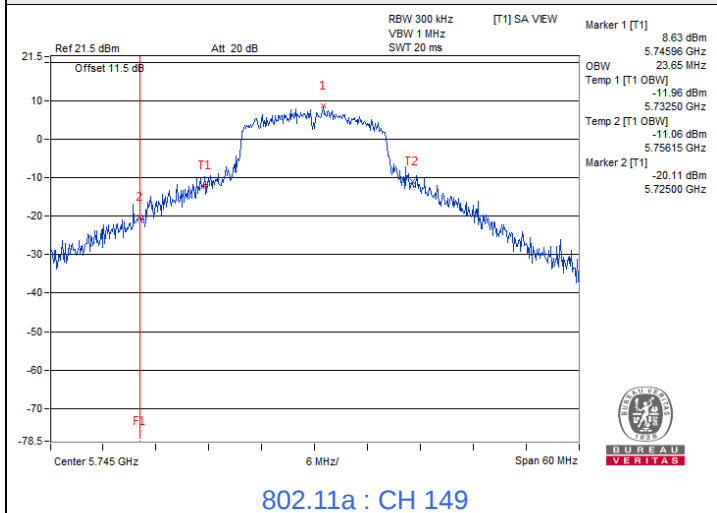
802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
151	5755	51.16
159	5795	38.75

Spectrum Plot of Maximum Value



Spectrum Plot for nearby DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)



7.5 Frequency Stability

Input Power:	12 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Frank/Wayne
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802.11a

Frequency Stability Versus Temp.									
Operating Frequency: 5745 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
50	12	5745.0226	Pass	5745.0224	Pass	5745.0251	Pass	5745.0263	Pass
40	12	5744.9876	Pass	5744.9873	Pass	5744.9869	Pass	5744.9915	Pass
30	12	5744.9765	Pass	5744.977	Pass	5744.974	Pass	5744.9765	Pass
20	12	5744.9894	Pass	5744.9894	Pass	5744.9892	Pass	5744.9875	Pass
10	12	5744.9804	Pass	5744.9844	Pass	5744.9832	Pass	5744.9811	Pass
0	12	5744.9882	Pass	5744.9873	Pass	5744.9854	Pass	5744.9874	Pass
-10	12	5744.9951	Pass	5744.9964	Pass	5744.9935	Pass	5744.9943	Pass
-20	12	5744.9992	Pass	5744.9978	Pass	5744.994	Pass	5744.9973	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5745 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
20	13.8	5744.9953	Pass	5744.9995	Pass	5744.9977	Pass	5744.9978	Pass
	12	5744.9894	Pass	5744.9894	Pass	5744.9892	Pass	5744.9875	Pass
	10.2	5744.984	Pass	5744.9825	Pass	5744.9817	Pass	5744.9825	Pass

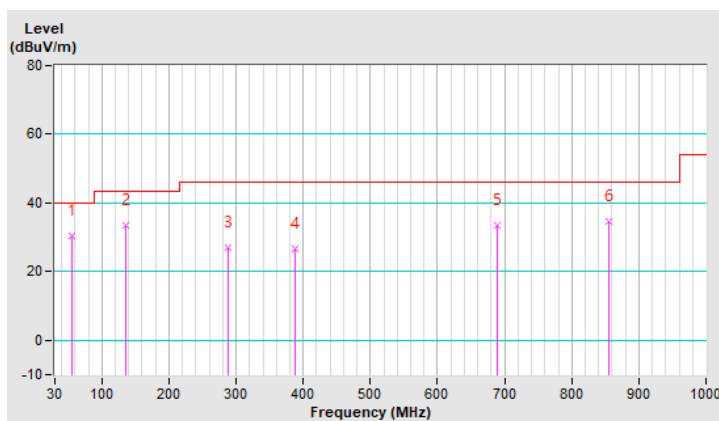
7.6 Unwanted Emissions below 1 GHz

RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 71% RH
Tested By	Greg Lin		

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	56.19	30.5 QP	40.0	-9.5	1.00 H	92	44.0	-13.5
2	134.76	33.4 QP	43.5	-10.1	1.25 H	101	47.5	-14.1
3	288.99	27.1 QP	46.0	-18.9	1.50 H	114	40.3	-13.2
4	387.93	26.6 QP	46.0	-19.4	1.00 H	325	37.3	-10.7
5	688.63	33.5 QP	46.0	-12.5	1.25 H	186	38.0	-4.5
6	854.50	34.5 QP	46.0	-11.5	1.50 H	210	36.6	-2.1

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

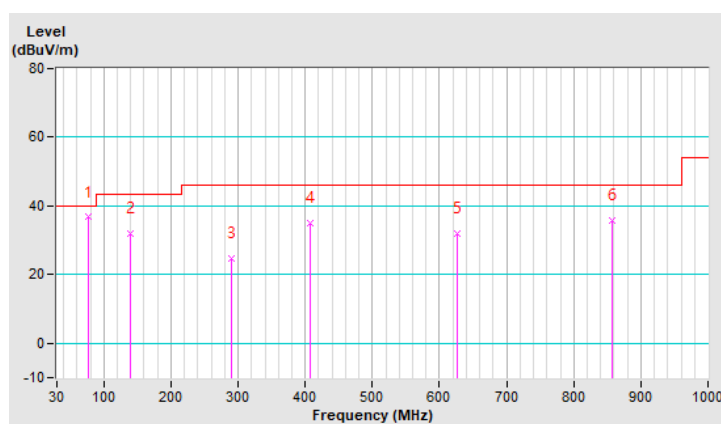


RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 71% RH
Tested By	Greg Lin		

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	77.53	36.7 QP	40.0	-3.3	1.00 V	340	54.4	-17.7
2	139.61	32.0 QP	43.5	-11.5	1.50 V	235	45.7	-13.7
3	290.93	24.6 QP	46.0	-21.4	1.25 V	173	37.8	-13.2
4	408.30	34.9 QP	46.0	-11.1	1.00 V	224	45.3	-10.4
5	625.58	32.0 QP	46.0	-14.0	1.25 V	349	37.4	-5.4
6	857.41	35.6 QP	46.0	-10.4	1.00 V	185	37.7	-2.1

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



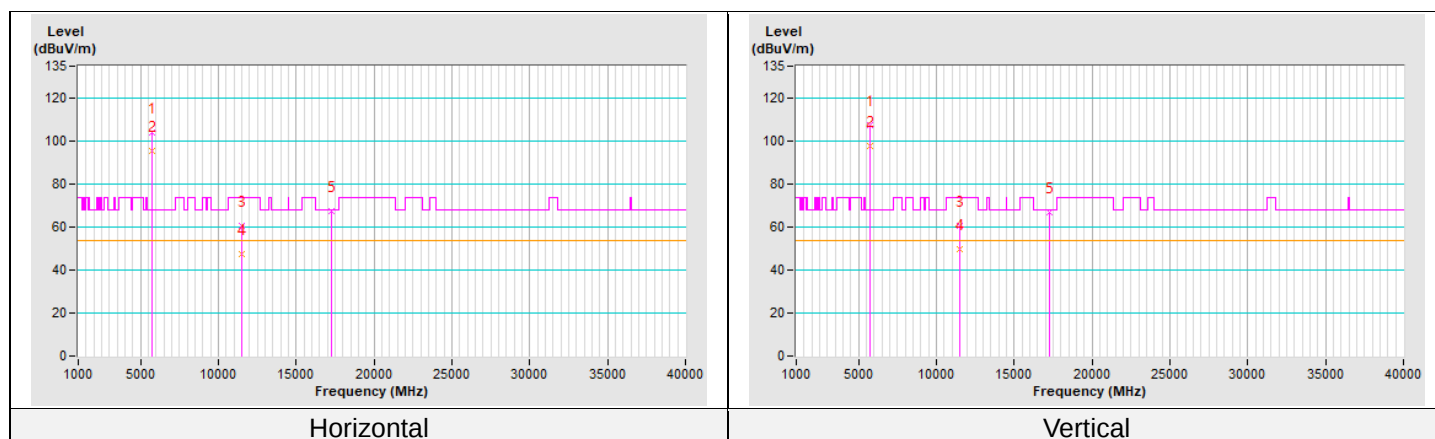
7.7 Unwanted Emissions above 1 GHz

RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5612.40	58.6 PK	68.2	-9.6	1.63 H	246	56.2	2.4
2	*5745.00	104.2 PK			1.63 H	246	62.5	41.7
3	*5745.00	95.4 AV			1.63 H	246	53.7	41.7
4	#5936.00	58.5 PK	68.2	-9.7	1.63 H	246	55.4	3.1
5	11490.00	60.6 PK	74.0	-13.4	1.68 H	219	52.5	8.1
6	11490.00	47.7 AV	54.0	-6.3	1.68 H	219	39.6	8.1
7	#17235.00	67.5 PK	68.2	-0.7	1.66 H	154	57.8	9.7
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	#5606.40	59.7 PK	68.2	-8.5	2.42 V	266	57.3	2.4
2	*5745.00	107.3 PK			2.42 V	266	65.6	41.7
3	*5745.00	98.1 AV			2.42 V	266	56.4	41.7
4	#5935.60	60.9 PK	68.2	-7.3	2.42 V	266	57.8	3.1
5	11490.00	60.5 PK	74.0	-13.5	1.47 V	193	52.4	8.1
6	11490.00	49.5 AV	54.0	-4.5	1.47 V	193	41.4	8.1
7	#17235.00	67.2 PK	68.2	-1.0	1.90 V	18	57.5	9.7

Remarks:

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

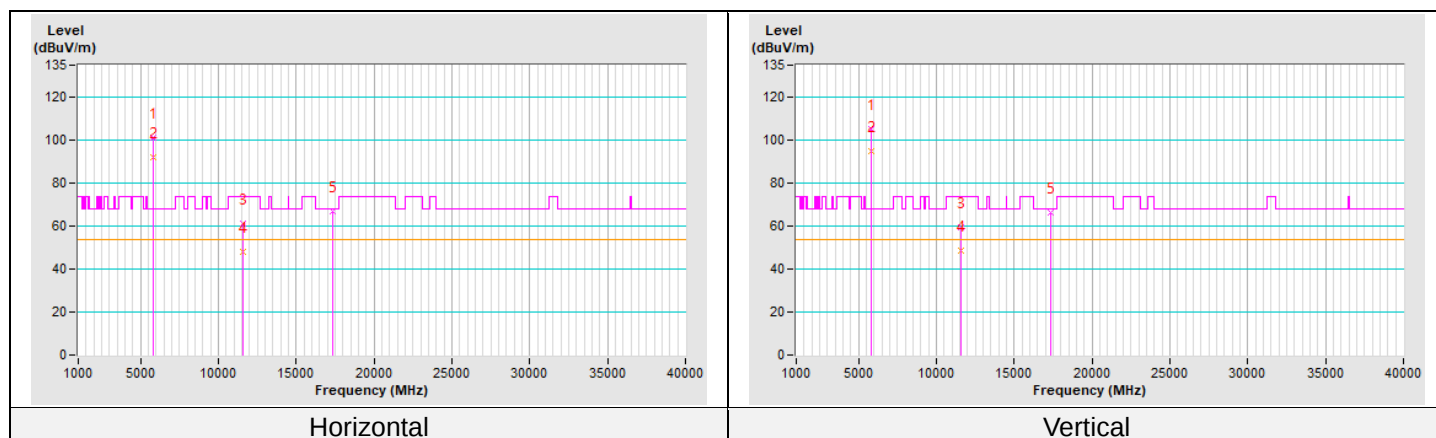


RF Mode	TX 802.11a	Channel	CH 157 : 5785 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5641.20	58.2 PK	68.2	-10.0	1.64 H	245	55.6	2.6
2	*5785.00	101.0 PK			1.64 H	245	59.2	41.8
3	*5785.00	92.1 AV			1.64 H	245	50.3	41.8
4	#5968.80	58.2 PK	68.2	-10.0	1.64 H	245	55.2	3.0
5	11570.00	61.0 PK	74.0	-13.0	1.69 H	230	53.1	7.9
6	11570.00	47.9 AV	54.0	-6.1	1.69 H	230	40.0	7.9
7	#17355.00	66.7 PK	68.2	-1.5	1.67 H	155	56.6	10.1
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	#5616.80	57.9 PK	68.2	-10.3	2.79 V	254	55.5	2.4
2	*5785.00	105.0 PK			2.79 V	254	63.2	41.8
3	*5785.00	95.0 AV			2.79 V	254	53.2	41.8
4	#5964.80	57.4 PK	68.2	-10.8	2.79 V	254	54.4	3.0
5	11570.00	59.6 PK	74.0	-14.4	1.52 V	210	51.7	7.9
6	11570.00	48.9 AV	54.0	-5.1	1.52 V	210	41.0	7.9
7	#17355.00	66.1 PK	68.2	-2.1	1.98 V	188	56.0	10.1

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.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.

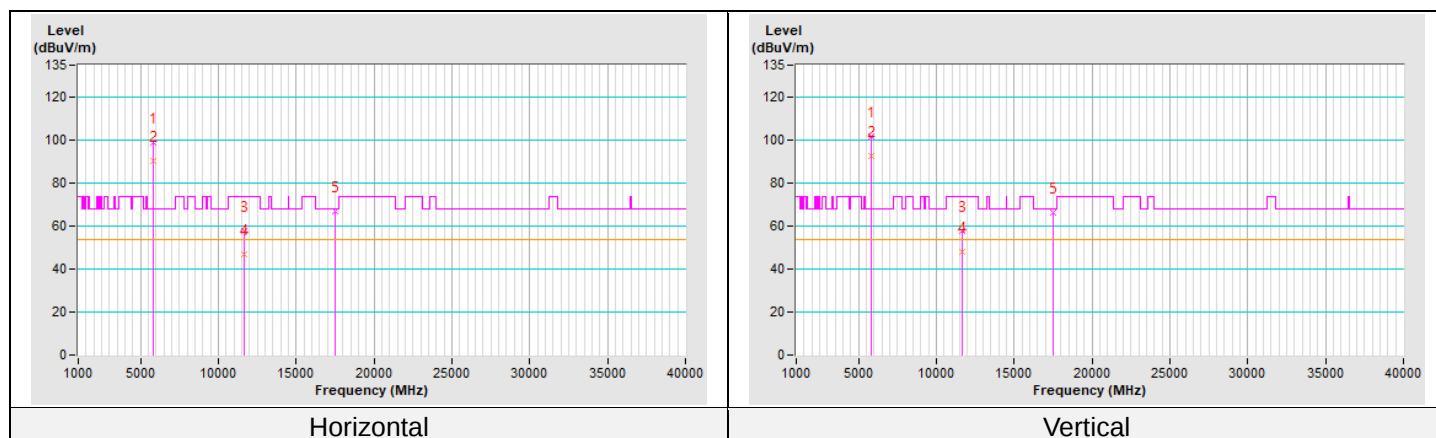


RF Mode	TX 802.11a	Channel	CH 165 : 5825 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5612.40	58.8 PK	68.2	-9.4	1.69 H	244	56.4	2.4
2	*5825.00	99.2 PK			1.69 H	244	57.3	41.9
3	*5825.00	90.2 AV			1.69 H	244	48.3	41.9
4	#5940.00	58.0 PK	68.2	-10.2	1.69 H	244	54.9	3.1
5	11650.00	57.6 PK	74.0	-16.4	1.71 H	201	49.8	7.8
6	11650.00	46.8 AV	54.0	-7.2	1.71 H	201	39.0	7.8
7	#17475.00	67.2 PK	68.2	-1.0	1.66 H	155	57.0	10.2
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	#5642.80	56.9 PK	68.2	-11.3	2.76 V	256	54.3	2.6
2	*5825.00	102.1 PK			2.76 V	256	60.2	41.9
3	*5825.00	92.9 AV			2.76 V	256	51.0	41.9
4	#5953.20	57.1 PK	68.2	-11.1	2.76 V	256	54.1	3.0
5	11650.00	57.9 PK	74.0	-16.1	1.50 V	193	50.1	7.8
6	11650.00	47.8 AV	54.0	-6.2	1.50 V	193	40.0	7.8
7	#17475.00	66.5 PK	68.2	-1.7	2.13 V	215	56.3	10.2

Remarks:

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

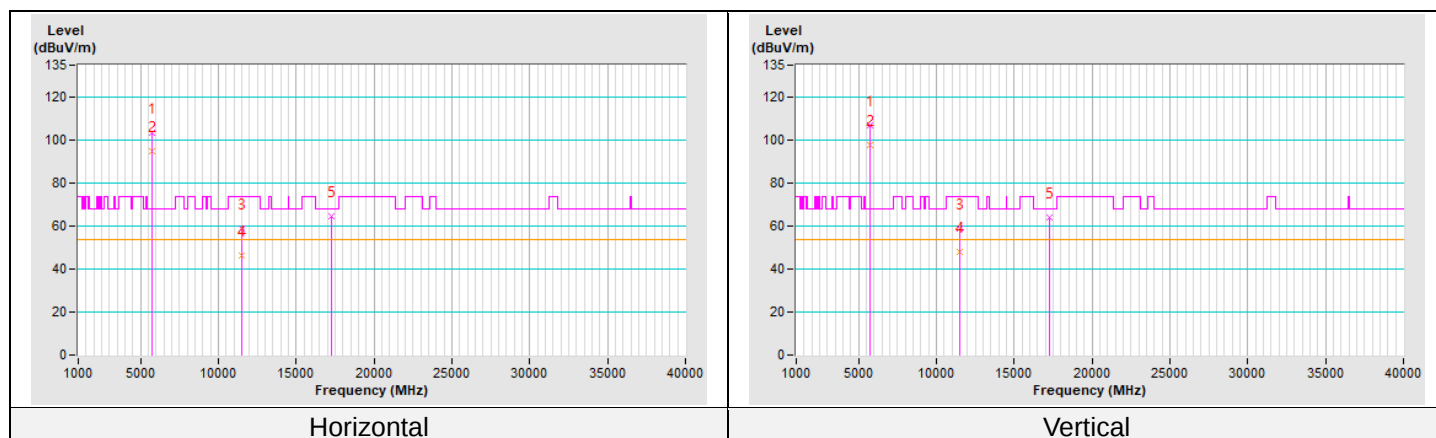


RF Mode	TX 802.11n (HT20)	Channel	CH 149 : 5745 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5617.20	58.9 PK	68.2	-9.3	1.68 H	243	56.5	2.4
2	*5745.00	103.6 PK			1.68 H	243	61.9	41.7
3	*5745.00	94.7 AV			1.68 H	243	53.0	41.7
4	#5937.60	59.0 PK	68.2	-9.2	1.68 H	243	55.9	3.1
5	11490.00	59.0 PK	74.0	-15.0	1.66 H	211	50.9	8.1
6	11490.00	46.5 AV	54.0	-7.5	1.66 H	211	38.4	8.1
7	#17235.00	64.7 PK	68.2	-3.5	1.65 H	150	55.0	9.7
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	#5625.20	59.0 PK	68.2	-9.2	2.49 V	270	56.5	2.5
2	*5745.00	106.8 PK			2.49 V	270	65.1	41.7
3	*5745.00	97.9 AV			2.49 V	270	56.2	41.7
4	#5982.80	59.4 PK	68.2	-8.8	2.49 V	270	56.3	3.1
5	11490.00	59.2 PK	74.0	-14.8	1.55 V	201	51.1	8.1
6	11490.00	48.1 AV	54.0	-5.9	1.55 V	201	40.0	8.1
7	#17235.00	63.9 PK	68.2	-4.3	1.99 V	188	54.2	9.7

Remarks:

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

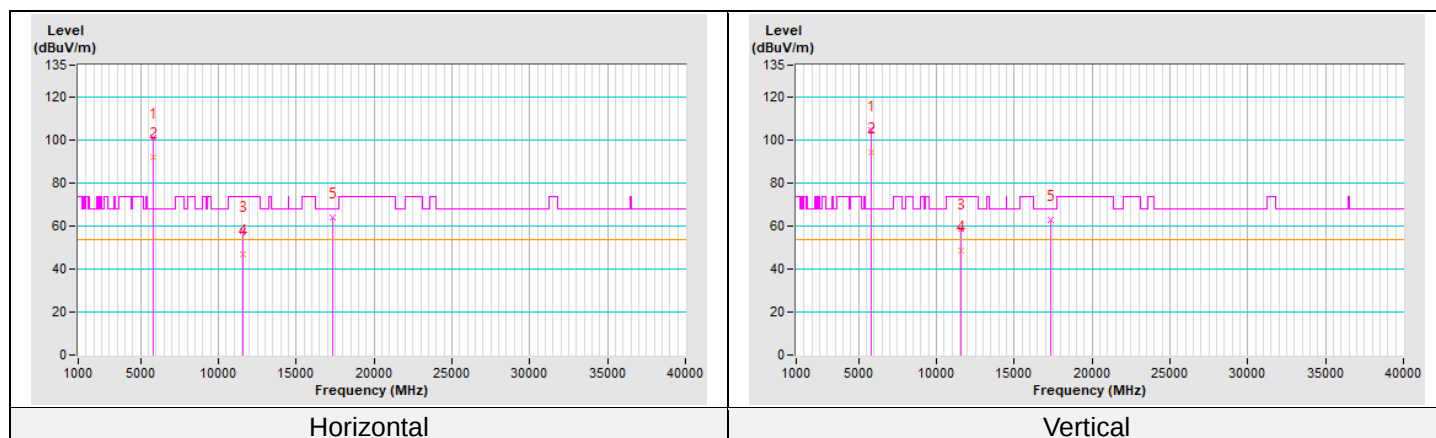


RF Mode	TX 802.11n (HT20)	Channel	CH 157 : 5785 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5625.60	58.1 PK	68.2	-10.1	1.95 H	243	55.6	2.5
2	*5785.00	101.3 PK			1.95 H	243	59.5	41.8
3	*5785.00	92.0 AV			1.95 H	243	50.2	41.8
4	#5981.60	59.7 PK	68.2	-8.5	1.95 H	243	56.7	3.0
5	11570.00	57.9 PK	74.0	-16.1	1.68 H	219	50.0	7.9
6	11570.00	46.8 AV	54.0	-7.2	1.68 H	219	38.9	7.9
7	#17355.00	64.0 PK	68.2	-4.2	1.66 H	150	53.9	10.1
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	#5624.00	57.8 PK	68.2	-10.4	2.58 V	307	55.3	2.5
2	*5785.00	104.5 PK			2.58 V	307	62.7	41.8
3	*5785.00	94.5 AV			2.58 V	307	52.7	41.8
4	#5991.20	58.5 PK	68.2	-9.7	2.58 V	307	55.4	3.1
5	11570.00	59.0 PK	74.0	-15.0	1.49 V	216	51.1	7.9
6	11570.00	48.4 AV	54.0	-5.6	1.49 V	216	40.5	7.9
7	#17355.00	63.1 PK	68.2	-5.1	2.01 V	198	53.0	10.1

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.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.

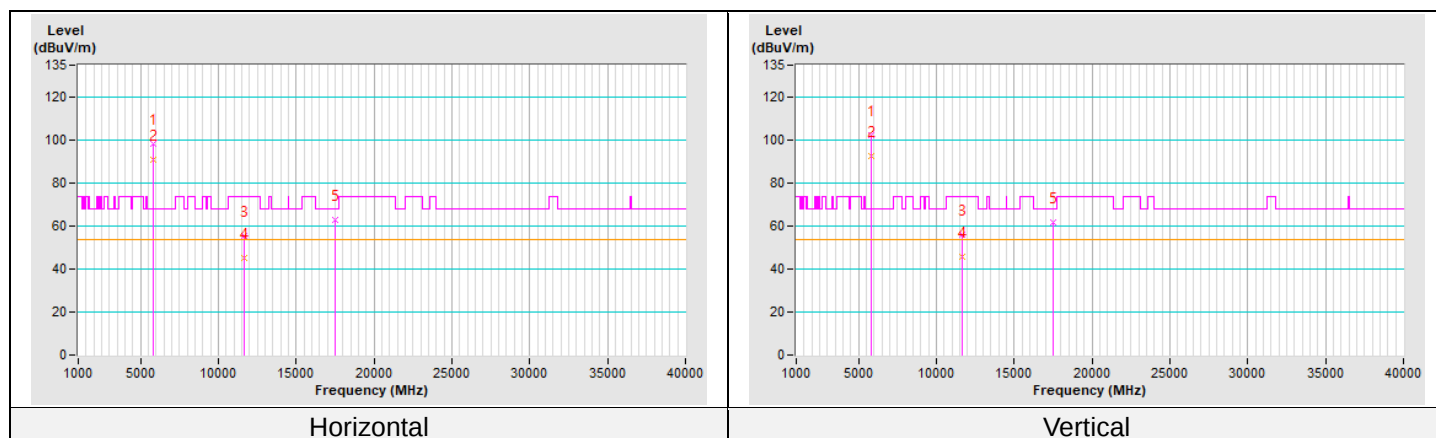


RF Mode	TX 802.11n (HT20)	Channel	CH 165 : 5825 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5634.00	57.6 PK	68.2	-10.6	1.85 H	242	55.1	2.5
2	*5825.00	98.6 PK			1.85 H	242	56.7	41.9
3	*5825.00	90.7 AV			1.85 H	242	48.8	41.9
4	#5930.80	59.3 PK	68.2	-8.9	1.85 H	242	56.2	3.1
5	11650.00	55.4 PK	74.0	-18.6	1.71 H	209	47.6	7.8
6	11650.00	45.4 AV	54.0	-8.6	1.71 H	209	37.6	7.8
7	#17475.00	62.8 PK	68.2	-5.4	1.62 H	150	52.6	10.2
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	#5620.80	58.7 PK	68.2	-9.5	2.76 V	278	56.3	2.4
2	*5825.00	102.2 PK			2.76 V	278	60.3	41.9
3	*5825.00	92.9 AV			2.76 V	278	51.0	41.9
4	#5937.60	59.4 PK	68.2	-8.8	2.76 V	278	56.3	3.1
5	11650.00	56.3 PK	74.0	-17.7	1.62 V	191	48.5	7.8
6	11650.00	45.8 AV	54.0	-8.2	1.62 V	191	38.0	7.8
7	#17475.00	61.8 PK	68.2	-6.4	2.00 V	210	51.6	10.2

Remarks:

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

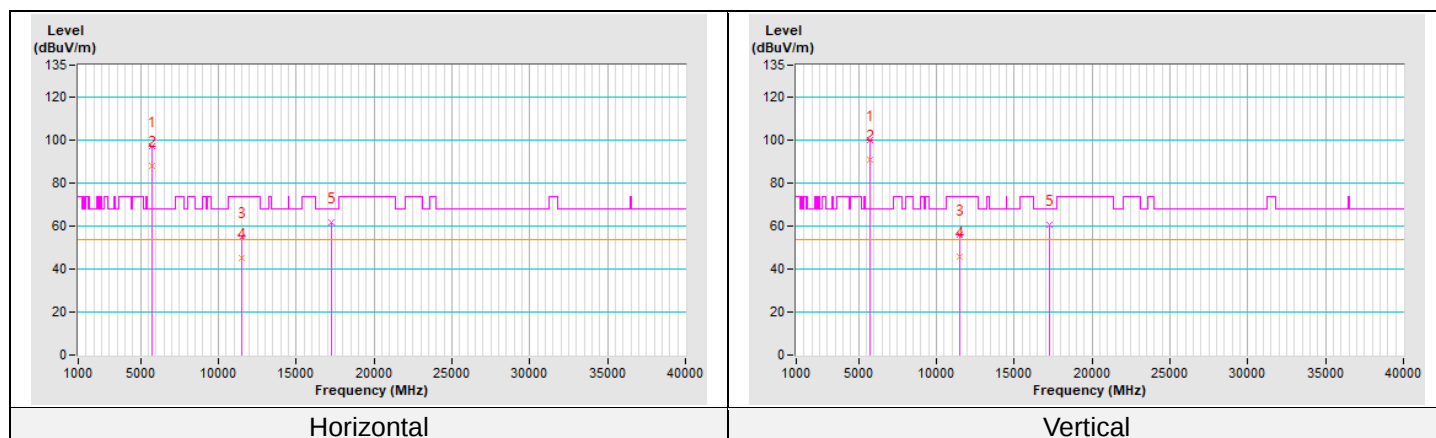


RF Mode	TX 802.11n (HT40)	Channel	CH 151 : 5755 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	59.8 PK	68.2	-8.4	1.91 H	253	57.2	2.6
2	*5755.00	97.5 PK			1.91 H	253	55.8	41.7
3	*5755.00	88.3 AV			1.91 H	253	46.6	41.7
4	#5929.60	61.0 PK	68.2	-7.2	1.91 H	253	57.9	3.1
5	11510.00	54.9 PK	74.0	-19.1	1.82 H	214	46.8	8.1
6	11510.00	45.3 AV	54.0	-8.7	1.82 H	214	37.2	8.1
7	#17265.00	61.6 PK	68.2	-6.6	1.59 H	143	51.8	9.8
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	#5638.40	59.9 PK	68.2	-8.3	1.37 V	192	57.3	2.6
2	*5755.00	100.3 PK			1.37 V	192	58.6	41.7
3	*5755.00	91.0 AV			1.37 V	192	49.3	41.7
4	#5928.00	60.8 PK	68.2	-7.4	1.37 V	192	57.7	3.1
5	11510.00	56.0 PK	74.0	-18.0	1.74 V	203	47.9	8.1
6	11510.00	45.8 AV	54.0	-8.2	1.74 V	203	37.7	8.1
7	#17265.00	60.6 PK	68.2	-7.6	2.08 V	223	50.8	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.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.

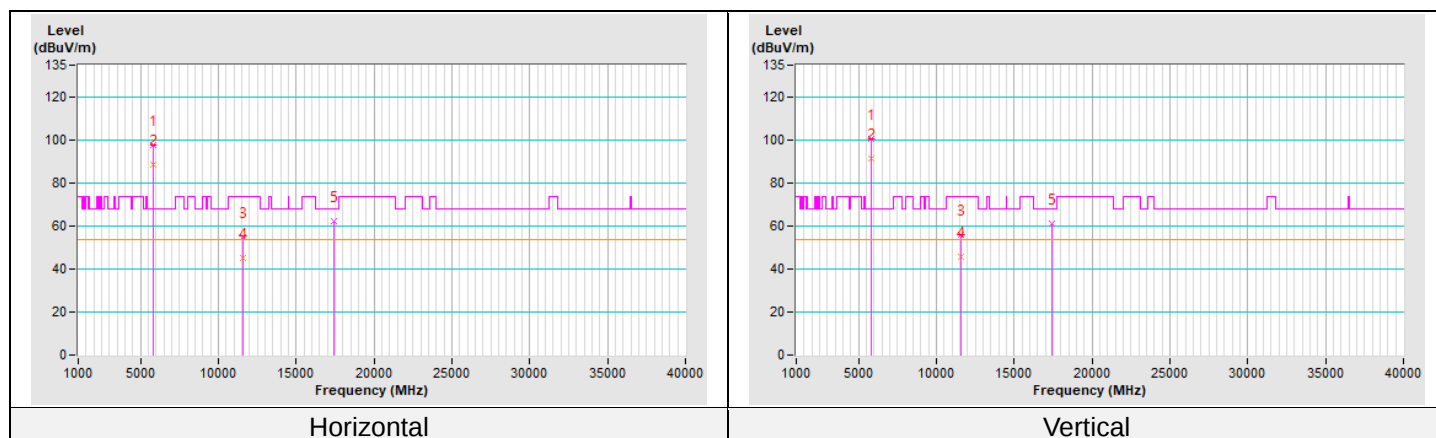


RF Mode	TX 802.11n (HT40)	Channel	CH 159 : 5795 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Edison Lee		

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	#5605.60	60.6 PK	68.2	-7.6	1.98 H	255	58.3	2.3
2	*5795.00	98.1 PK			1.98 H	255	56.3	41.8
3	*5795.00	88.7 AV			1.98 H	255	46.9	41.8
4	#5988.40	60.8 PK	68.2	-7.4	1.98 H	255	57.7	3.1
5	11590.00	55.0 PK	74.0	-19.0	1.86 H	209	47.1	7.9
6	11590.00	45.2 AV	54.0	-8.8	1.86 H	209	37.3	7.9
7	#17385.00	62.2 PK	68.2	-6.0	1.61 H	157	52.1	10.1
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	#5614.40	60.3 PK	68.2	-7.9	3.31 V	227	57.9	2.4
2	*5795.00	100.9 PK			3.31 V	227	59.1	41.8
3	*5795.00	91.4 AV			3.31 V	227	49.6	41.8
4	#5946.40	61.4 PK	68.2	-6.8	3.31 V	227	58.3	3.1
5	11590.00	56.0 PK	74.0	-18.0	1.83 V	217	48.1	7.9
6	11590.00	45.7 AV	54.0	-8.3	1.83 V	217	37.8	7.9
7	#17385.00	61.0 PK	68.2	-7.2	1.97 V	226	50.9	10.1

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.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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