

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFBIBJ-WTW-P22050509-1

FCC ID: HBWSGC2

Model No.: MYQ-SGC2WCH, MYQ-SGC2WLM

Received Date: 2022/5/23

Test Date: 2022/5/29 ~ 2022/6/2

Issued Date: 2022/7/13

Applicant: The Chamberlain Group Inc.

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

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FCC Registration / 788550 / TW0003

Designation Number:

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

FCC Registration / 281270 / TW0032

Designation Number:

Approved by: Jeremy Lin, **Date:** 2022/7/13
Jeremy Lin / Project Engineer

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Prepared by : Celine Chou / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBIBJ-WTW-P22050509-1	Original release.	2022/7/13

1 Certificate

Product: Indoor IP Camera

Brand: CHAMBERLAIN, LiftMaster

Test Model: MYQ-SGC2WCH, MYQ-SGC2WLM

Sample Status: Engineering sample

Applicant: The Chamberlain Group Inc.

Test Date: 2022/5/29 ~ 2022/6/2

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)(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	Pass	Reference only.
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.407(b)(9)	AC Power Conducted Emissions	Pass	Minimum passing margin is -15.63 dB at 0.43000 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -10.6 dB at 762.35 MHz
15.407(b)(1/2/3/4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -1.2 dB at 5150.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) 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:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.79 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 1 GHz	2.93 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	Indoor IP Camera
Brand	CHAMBERLAIN, LiftMaster
Test Model	MYQ-SGC2WCH, MYQ-SGC2WLM
Status of EUT	Engineering sample
Power Supply Rating	5Vdc from adapter
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 72.2Mbps
Operating Frequency	5180 ~ 5240 MHz 5745 ~ 5825 MHz
Number of Channel	802.11a, 802.11n (HT20): 9
Output Power	5180 ~ 5240 MHz : 75.336 mW (18.77 dBm) 5745 ~ 5825 MHz : 234.963 mW (23.71 dBm)
EUT Category	Client device

Note:

1. The following models are provided to this EUT.

Brand	Model	Description
CHAMBERLAIN	MYQ-SGC2WCH	All models are electrically identical, different model names and brand names are for marketing purpose.
LiftMaster	MYQ-SGC2WLM	

* The model of the MYQ-SGC2WCH was chosen for final test.

2. The EUT uses following accessories.

AC Adapter		
Model	Part Number	Specification
YLS0056E-T050100	YLS2202010W5	AC Input : 100-240Vac, 50/60Hz, 0.5A Max DC Output : 5.0Vdc, 1A Plug : US Manufacturer : DONGGUAN YINLI ELECTRONICS CO., LTD Power Line : 1.83m power cable without core attach on adapter

3. 2.4GHz & 5GHz & BT LE technology can not transmit at same time.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna No.	Gain (dBi)		Antenna Type	Connector Type
	2.4GHz	5GHz		
1	1.83	3.37	PCB	ipex(MHF)

* The above Antenna information refers to the manufacturer's antenna 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

3.3 Channel List

FOR 5180 ~ 5240 MHz

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

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

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		

3.4 Test Mode Applicability and Tested Channel Detail

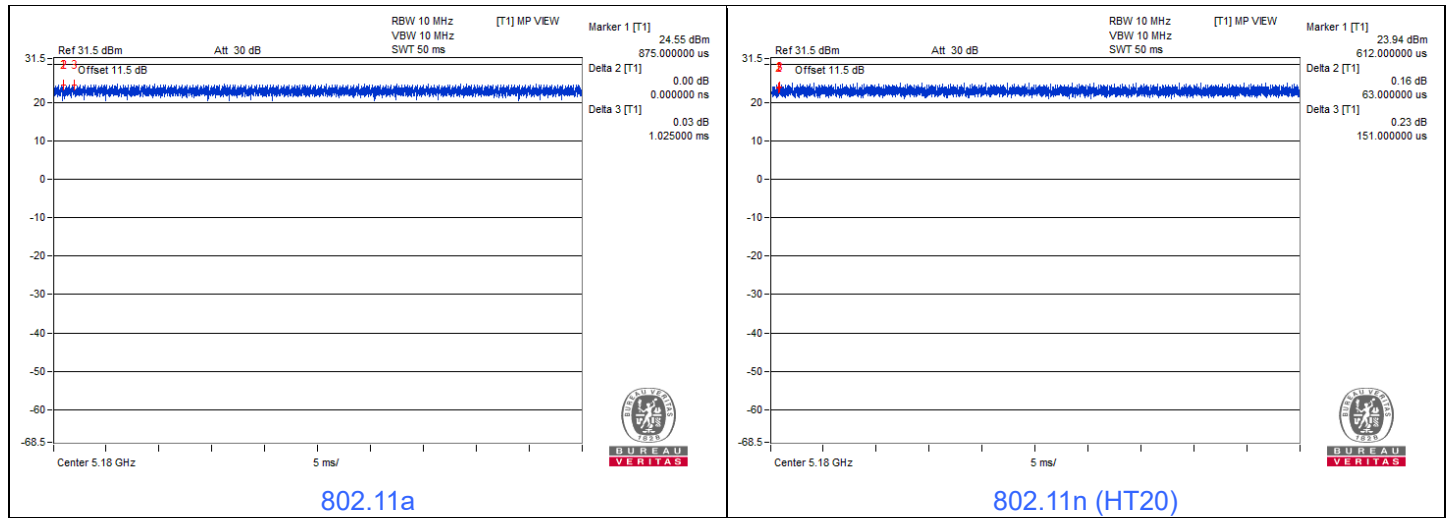
Pre-Scan:	EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan in these ways and find the worst case as a representative test condition.
Worst Case:	The worst case was found when positioned on Z-plane.

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

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
AC Power Conducted Emissions	802.11a	149	BPSK	6Mb/s
Unwanted Emissions below 1 GHz	802.11a	149	BPSK	6Mb/s
Unwanted Emissions above 1 GHz	802.11a	36, 40, 48, 149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	36, 40, 48, 149, 157, 165	BPSK	MCS0
RF Output Power / Power Spectral Density	802.11a	36, 40, 48, 149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	36, 40, 48, 149, 157, 165	BPSK	MCS0
Occupied Bandwidth	802.11a	36, 40, 48, 149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	36, 40, 48, 149, 157, 165	BPSK	MCS0
6 dB Bandwidth	802.11a	149, 157, 165	BPSK	6Mb/s
	802.11n (HT20)	149, 157, 165	BPSK	MCS0
Frequency Stability	802.11a	36	un-modulation	-

3.5 Duty Cycle of Test Signal

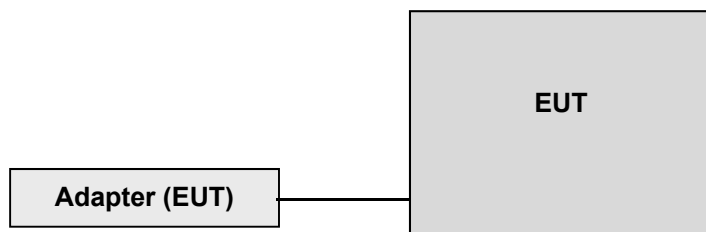
Duty cycle of test signal is 100%, duty factor is not required.



3.6 Test Program Used and Operation Descriptions

Controlling software (mptool 1v9.3) 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

The EUT has been tested as an independent unit.

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 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated 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
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

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/5/31

4.2 Power Spectral Density

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: 2022/5/31

4.3 6 dB Bandwidth

Refer to section 4.2 to get information of the instruments.

4.4 Occupied Bandwidth

Refer to section 4.2 to get information of the instruments.

4.5 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: 2022/5/31

4.6 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
DC LISN R&S	ESH3-Z6	100219	2021/7/25	2022/7/24
		844950/018	2021/7/25	2022/7/24
DC-LISN SCHWARZBECK MESS- ELETRONIK	NNBM 8126G	8126G-069	2021/11/10	2022/11/9
LISN ROHDE & SCHWARZ	ENV216	101826	2022/3/14	2023/3/13
LISN R&S	ESH3-Z5	100311	2021/9/7	2022/9/6
	ENV216	100072	2021/6/16	2022/7/13
RF Coaxial Cable WOKEN	5D-FB	Cable-cond1-01	2022/1/15	2023/1/14
Software BVADT	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
Test Receiver Rohde&Schwarz	ESCI	100613	2021/12/3	2022/12/2
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2021/8/20	2022/8/19

Notes:

1. The test was performed in HY - Conduction 1.
2. Tested Date: 2022/6/2

4.7 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFA-515BSN	N/A	N/A	N/A
Bi-log Broadband Antenna Schwarzbeck	VULB9168	9168-1214	2021/10/27	2022/10/26
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	MY60110513	2021/12/24	2022/12/23
MXE EMI Receiver KEYSIGHT	N9038B	MY60180018	2022/2/18	2023/2/17
Pre_Amplifier EMCI	EMC330N	980798	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	201251	2022/1/17	2023/1/16
	EMCCFD400-NM-NM- 3000	201249	2022/1/17	2023/1/16
	EMCCFD400-NM-NM- 500	201248	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208676	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 9.
2. Tested Date: 2022/5/31

4.8 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFA-515BSN	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	MY60110513	2021/12/24	2022/12/23
MXE EMI Receiver KEYSIGHT	N9038B	MY60180018	2022/2/18	2023/2/17
Pre_Amplifier EMCI	EMC118A45SE	980809	2021/12/30	2022/12/29
	EMC184045SE	980786	2022/1/17	2023/1/16
RF Coaxial Cable EMCI	EMC104-SM-SM-9000	201244	2022/1/17	2023/1/16
	EMC104-SM-SM-3000	201232	2022/1/17	2023/1/16
	EMC104-SM-SM-1000	210103	2022/1/17	2023/1/16
	EMC101G-KM-KM-5000	201261	2022/1/17	2023/1/16
	EMC101G-KM-KM-3000	201258	2022/1/17	2023/1/16
	EMC101G-KM-KM-2000	201255	2022/1/17	2023/1/16
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208676	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 9.
2. Tested Date: 2022/5/29

5 Limits of Test Items

5.1 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	250 mW (24 dBm)

Operation Band	Limit
U-NII-3	1 Watt (30 dBm)

5.2 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-3	30 dBm/ 500 kHz

5.3 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.

5.4 Occupied Bandwidth

The results are for reference only.

5.5 Frequency Stability

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

5.6 AC Power Conducted Emissions

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

Notes:

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

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.		*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

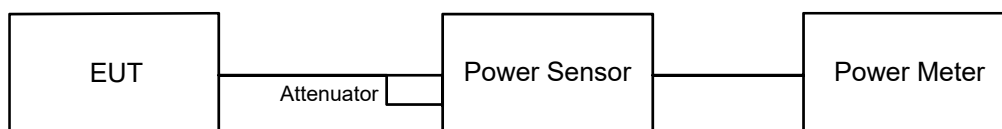
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup

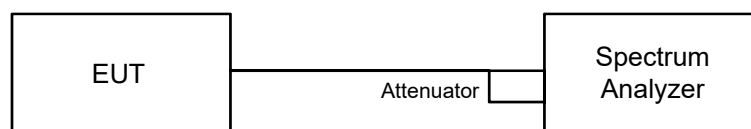


6.1.2 Test Procedure

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.

6.2 Power Spectral Density

6.2.1 Test Setup



6.2.2 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 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

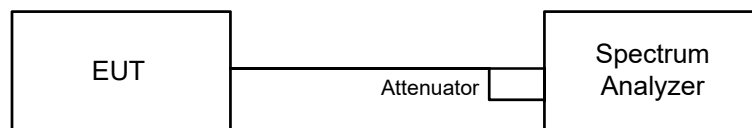
For specified measurement bandwidth 500 kHz:

Method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500 kHz, Set VBW \geq $[3 \times \text{RBW}]$, Detector = RMS
- Sweep points \geq $[2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing \leq 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 6 dB Bandwidth

6.3.1 Test Setup

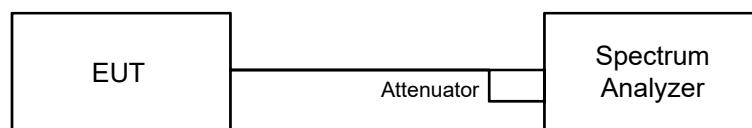


6.3.2 Test Procedure

- g. Set resolution bandwidth (RBW) = 100 kHz.
- h. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- i. Trace mode = max hold.
- j. Sweep = auto couple.
- k. 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.

6.4 Occupied Bandwidth

6.4.1 Test Setup

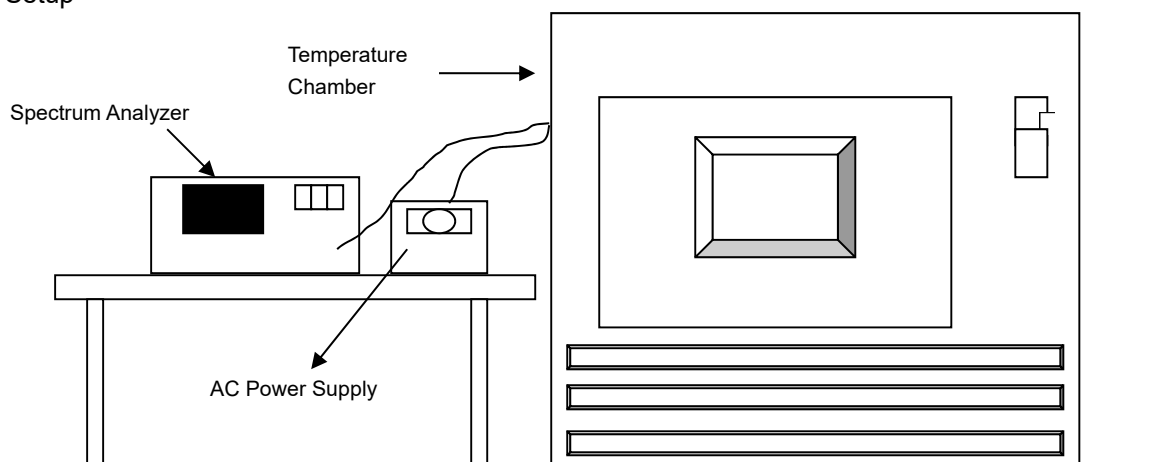


6.4.2 Test Procedure

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.

6.5 Frequency Stability

6.5.1 Test Setup

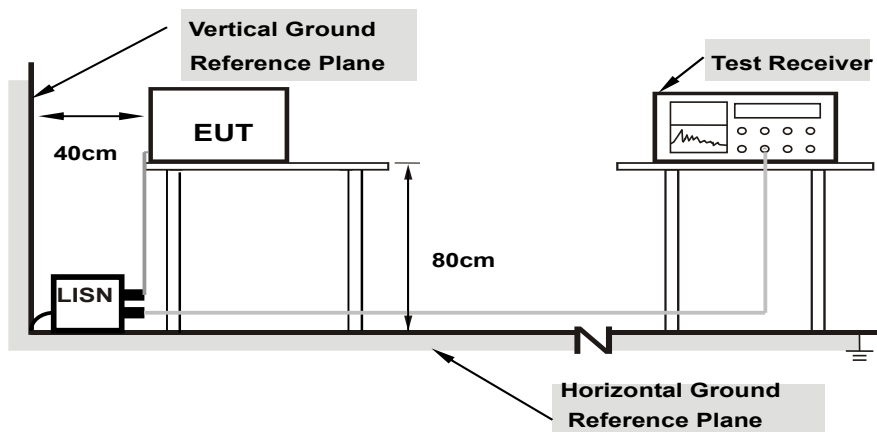


6.5.2 Test Procedure

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

6.6 AC Power Conducted Emissions

6.6.1 Test Setup



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

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

6.6.2 Test Procedure

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

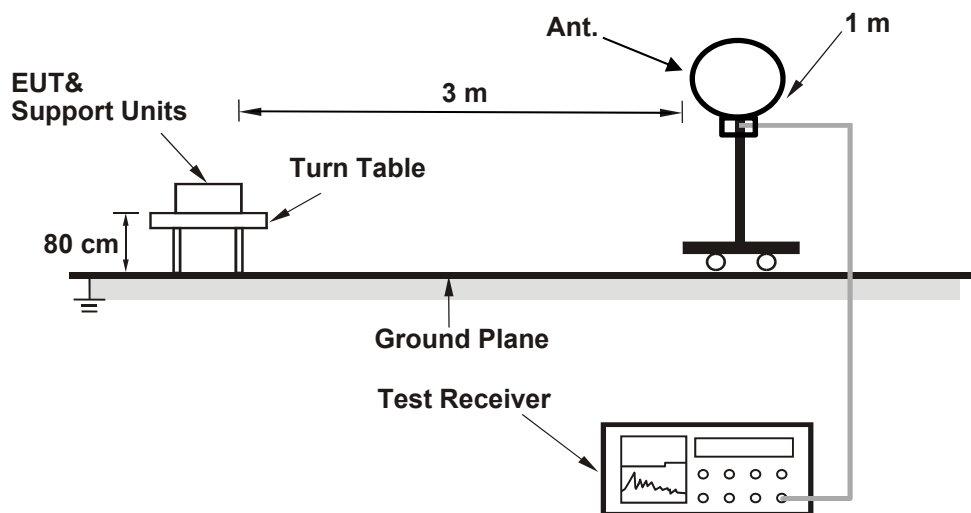
Note:

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

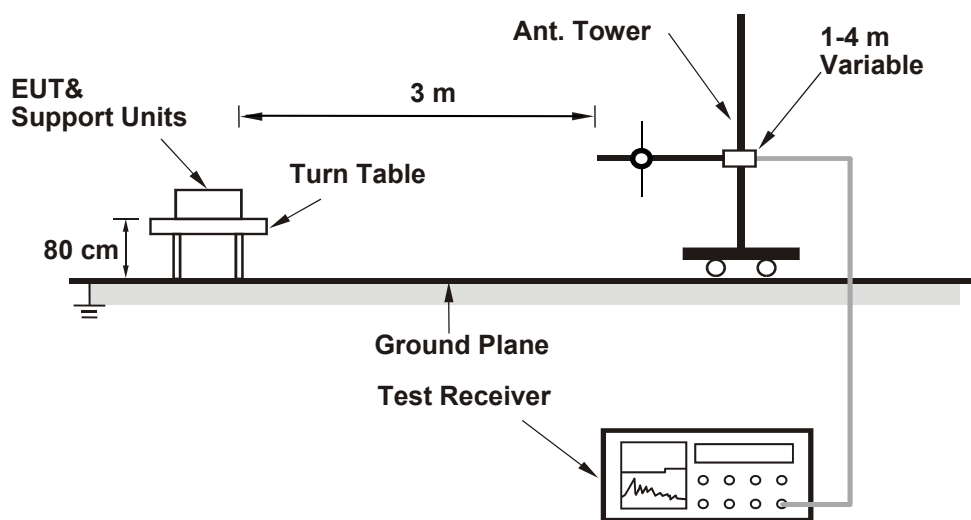
6.7 Unwanted Emissions below 1 GHz

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.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. 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.

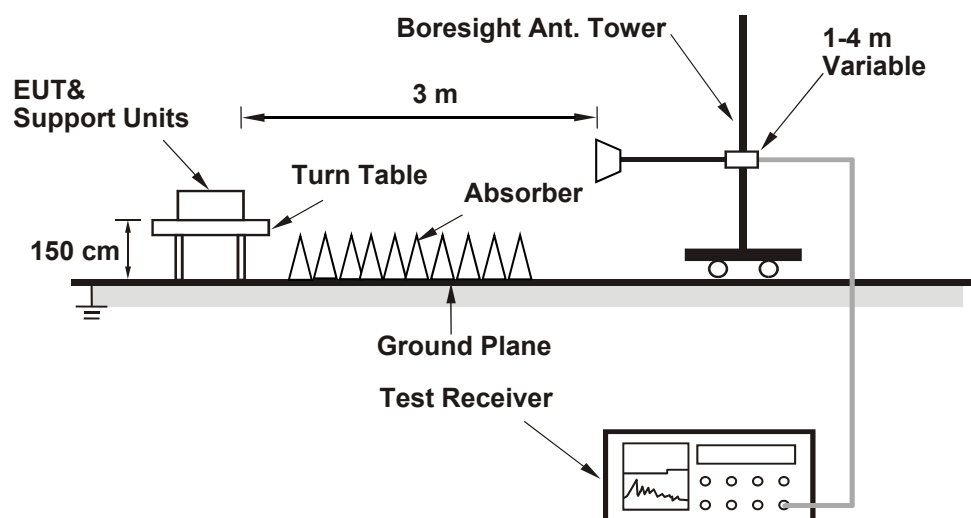
Notes:

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:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Leona Hu
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802.11a

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	72.611	18.61	24	Pass
40	5200	72.946	18.63	24	Pass
48	5240	70.958	18.51	24	Pass
149	5745	234.963	23.71	30	Pass
157	5785	228.034	23.58	30	Pass
165	5825	220.293	23.43	30	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.37 dBi < 6 dBi, so the output power limit shall not be reduced.
2. For U-NII-3, the antenna gain is 3.37 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
36	5180	74.131	18.70	24	Pass
40	5200	75.336	18.77	24	Pass
48	5240	73.114	18.64	24	Pass
149	5745	219.786	23.42	30	Pass
157	5785	229.615	23.61	30	Pass
165	5825	230.675	23.63	30	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.37 dBi < 6 dBi, so the output power limit shall not be reduced.
2. For U-NII-3, the antenna gain is 3.37 dBi < 6 dBi, so the output power limit shall not be reduced.

7.2 Power Spectral Density

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Leona Hu
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802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	6.05	11.00	Pass
40	5200	6.13	11.00	Pass
48	5240	6.29	11.00	Pass

Note: For U-NII-1, the antenna gain is 3.37 dBi < 6dBi, so the power density limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	6.42	11.00	Pass
40	5200	6.36	11.00	Pass
48	5240	6.26	11.00	Pass

Note: For U-NII-1, the antenna gain is 3.37 dBi < 6dBi, so the power density limit shall not be reduced.

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
149	5745	3.39	5.61	30	Pass
157	5785	3.35	5.57	30	Pass
165	5825	3.98	6.20	30	Pass

Note: For U-NII-3, the antenna gain is 3.37 dBi < 6 dBi, so the power density limit shall not be reduced.

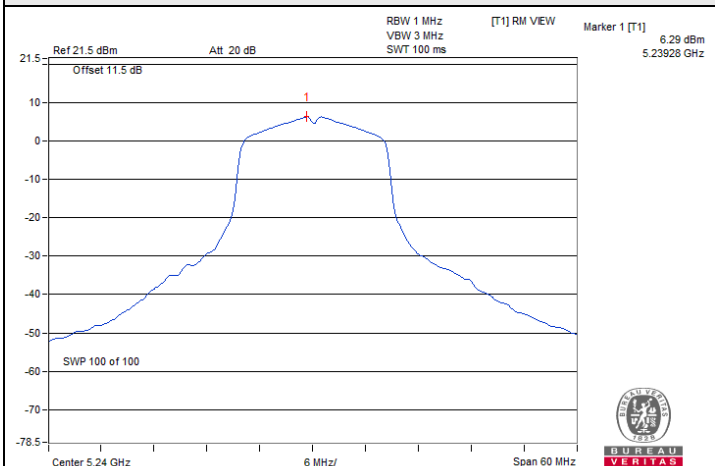
802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
149	5745	3.37	5.59	30	Pass
157	5785	3.09	5.31	30	Pass
165	5825	3.42	5.64	30	Pass

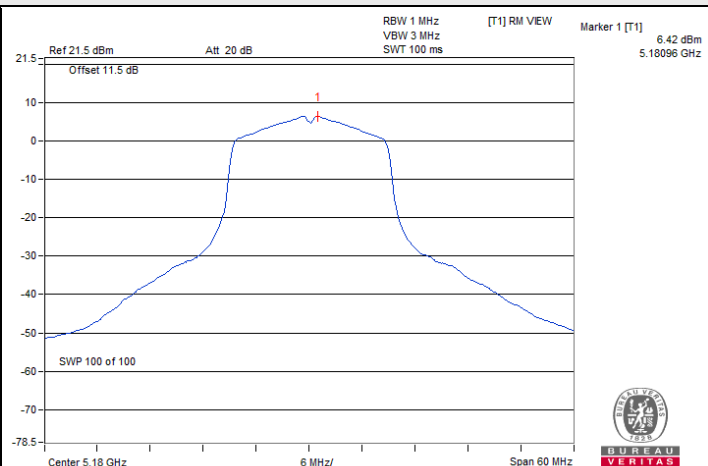
Note: For U-NII-3, the antenna gain is 3.37 dBi < 6 dBi, so the power density limit shall not be reduced.



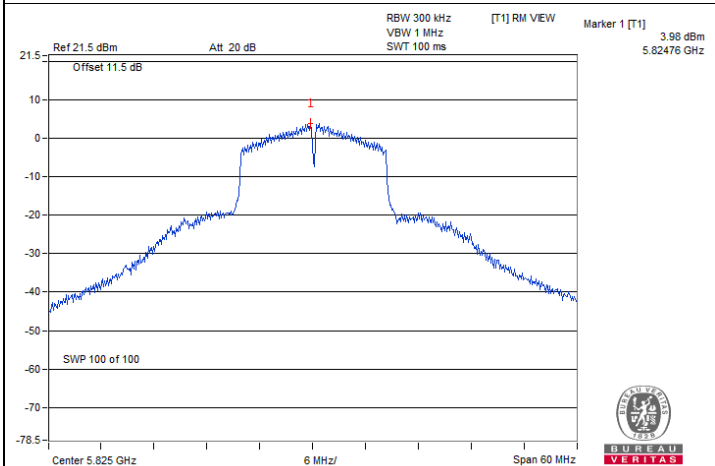
Spectrum Plot of Maximum Value



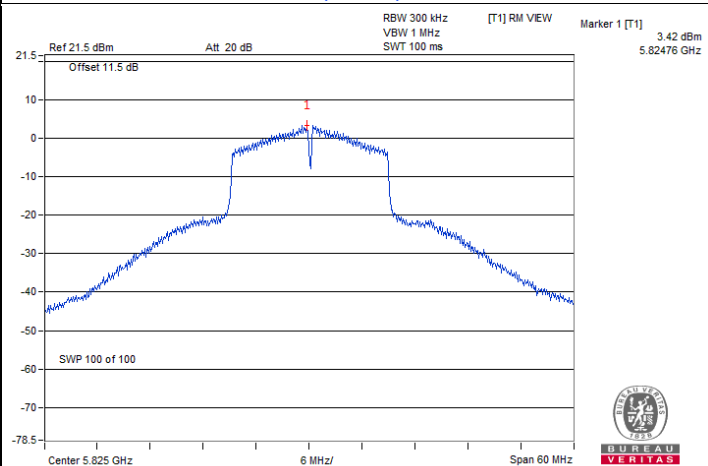
802.11a : CH 48



802.11n (HT20) : CH 36



802.11a : CH 165



802.11n (HT20) : CH 165

7.3 6 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Leona Hu
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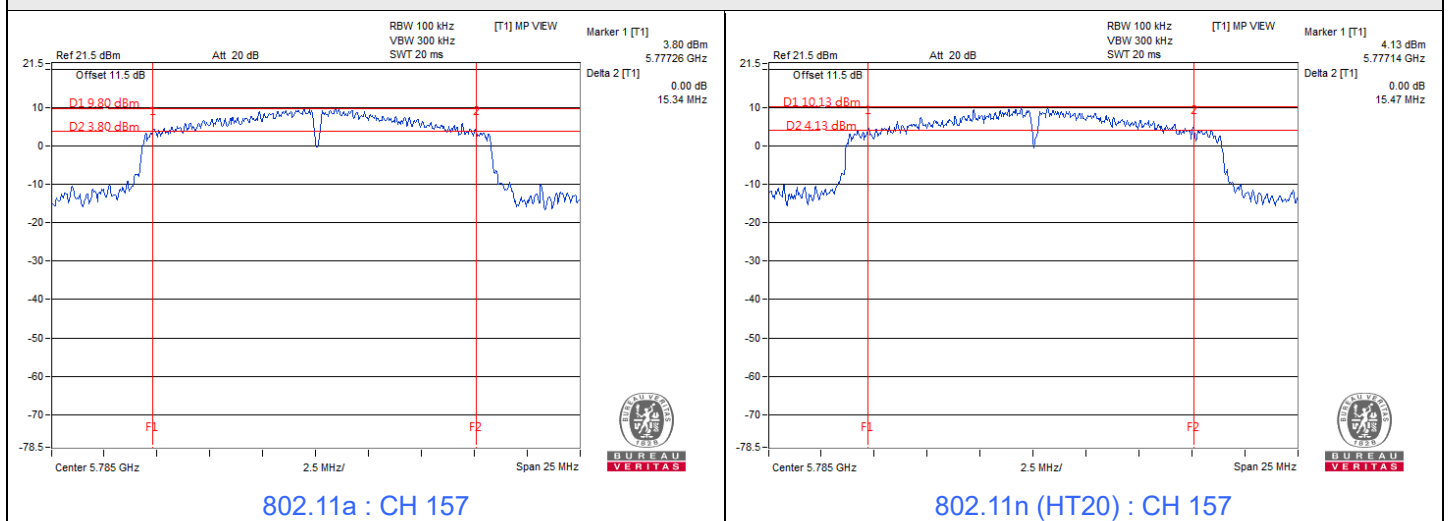
802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
149	5745	15.36	0.5	Pass
157	5785	15.34	0.5	Pass
165	5825	15.35	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
149	5745	15.48	0.5	Pass
157	5785	15.47	0.5	Pass
165	5825	16.16	0.5	Pass

Spectrum Plot of Minimum Value



7.4 Occupied Bandwidth

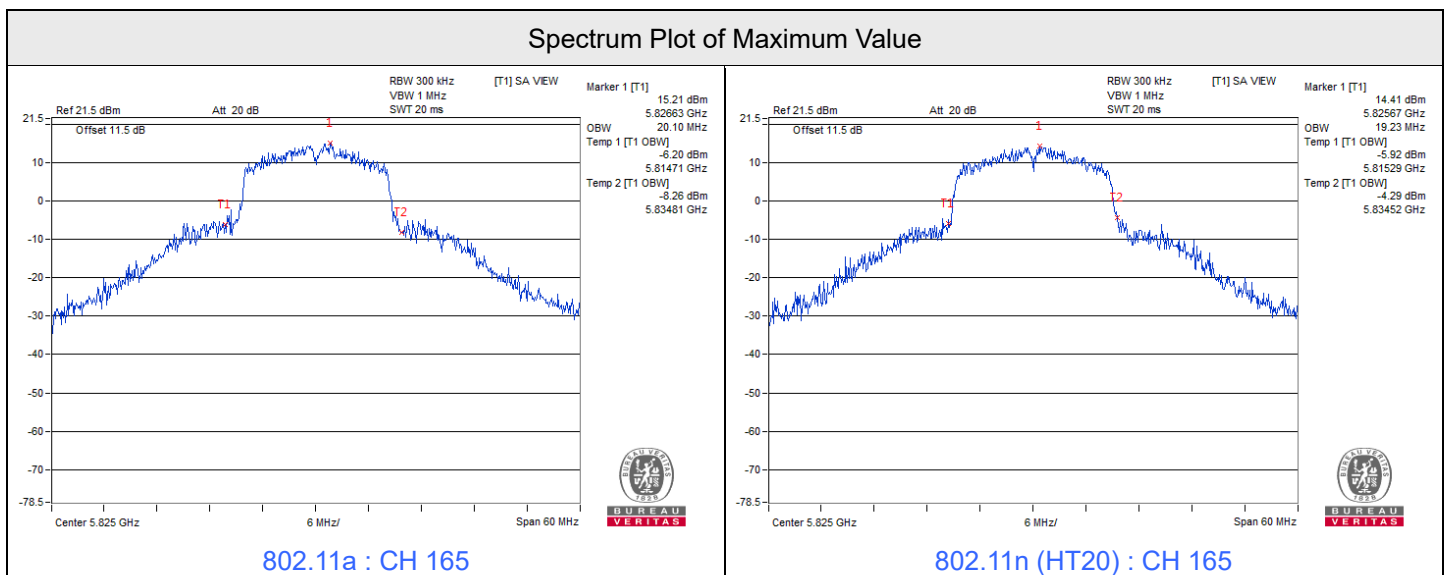
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Leona Hu
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802.11a

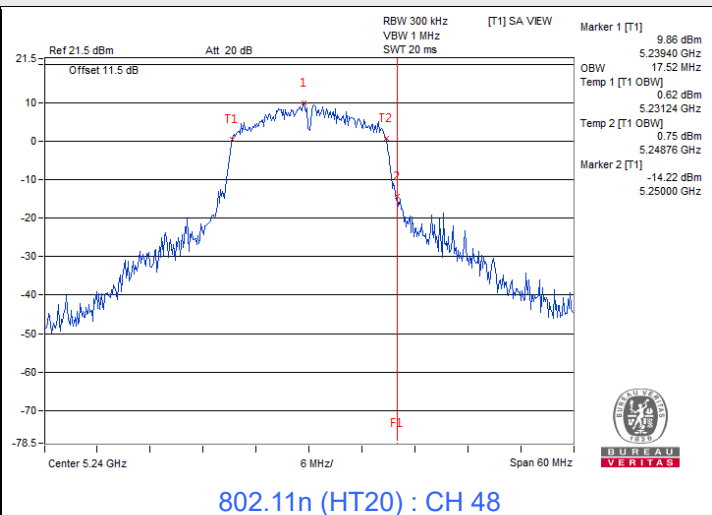
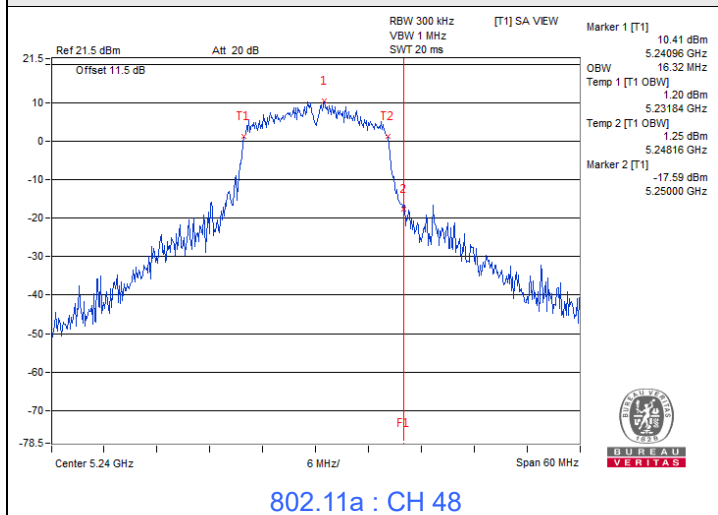
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.44
40	5200	16.44
48	5240	16.32
149	5745	17.12
157	5785	17.31
165	5825	20.10

802.11n (HT20)

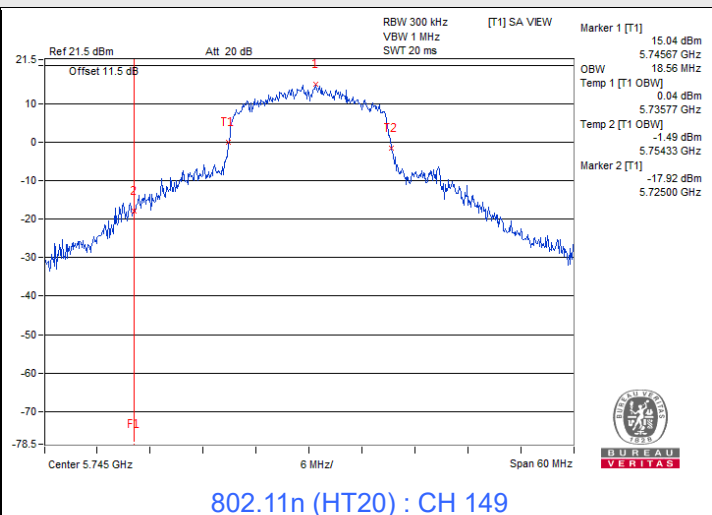
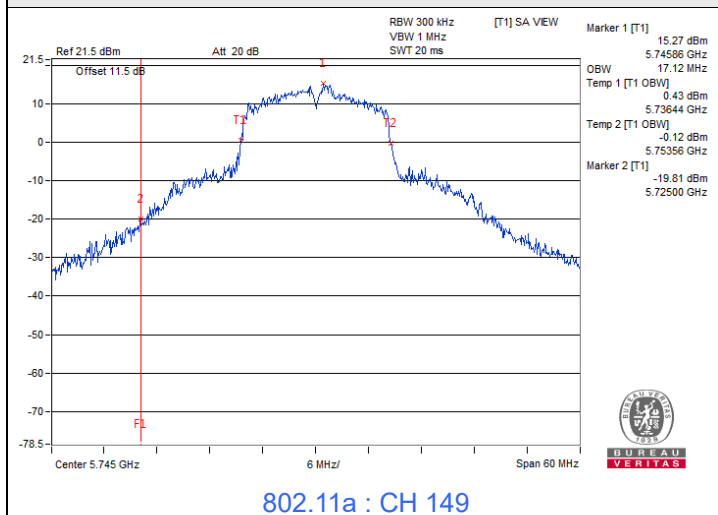
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.52
40	5200	17.52
48	5240	17.52
149	5745	18.56
157	5785	18.65
165	5825	19.23



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



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



7.5 Frequency Stability

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	22°C, 68% RH	Tested By:	Leona Hu
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802.11a

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	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
65	120	5179.9758	Pass	5179.9759	Pass	5179.9784	Pass	5179.9766	Pass
60	120	5180.0253	Pass	5180.0236	Pass	5180.0248	Pass	5180.0224	Pass
50	120	5179.9782	Pass	5179.9774	Pass	5179.977	Pass	5179.9772	Pass
40	120	5179.9893	Pass	5179.9906	Pass	5179.9912	Pass	5179.9883	Pass
30	120	5179.9811	Pass	5179.9801	Pass	5179.9784	Pass	5179.9807	Pass
20	120	5179.9831	Pass	5179.9848	Pass	5179.9828	Pass	5179.984	Pass
10	120	5179.98	Pass	5179.9778	Pass	5179.9786	Pass	5179.9793	Pass
0	120	5180.0128	Pass	5180.0078	Pass	5180.0102	Pass	5180.0121	Pass
-10	120	5179.9792	Pass	5179.9801	Pass	5179.9829	Pass	5179.9823	Pass
-20	120	5179.9906	Pass	5179.99	Pass	5179.9943	Pass	5179.9939	Pass
-25	120	5179.9782	Pass	5179.9753	Pass	5179.9766	Pass	5179.9749	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	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	138	5179.9853	Pass	5179.9809	Pass	5179.9841	Pass	5179.9806	Pass
	120	5179.9831	Pass	5179.9848	Pass	5179.9828	Pass	5179.984	Pass
	102	5179.9769	Pass	5179.9766	Pass	5179.9786	Pass	5179.9782	Pass

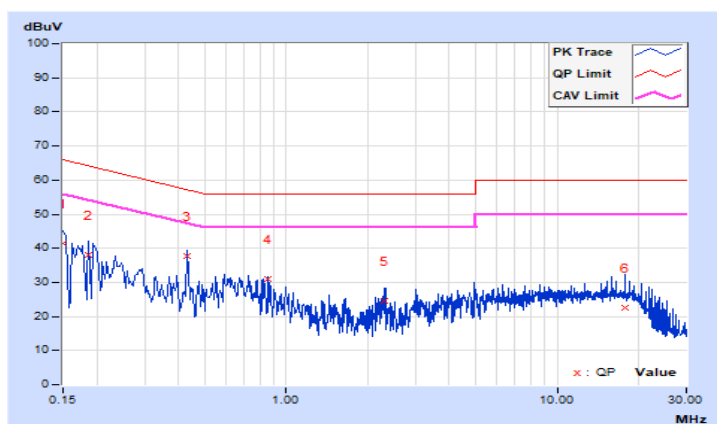
7.6 AC Power Conducted Emissions

RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Titan Hsu		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	31.86	15.92	41.54	25.60	66.00	56.00	-24.46	-30.40
2	0.18600	9.71	28.48	13.40	38.19	23.11	64.21	54.21	-26.02	-31.10
3	0.43000	9.80	27.88	18.95	37.68	28.75	57.25	47.25	-19.57	-18.50
4	0.85800	9.83	21.28	10.29	31.11	20.12	56.00	46.00	-24.89	-25.88
5	2.31800	9.91	14.62	10.02	24.53	19.93	56.00	46.00	-31.47	-26.07
6	17.88200	10.14	12.52	4.05	22.66	14.19	60.00	50.00	-37.34	-35.81

Remarks:

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

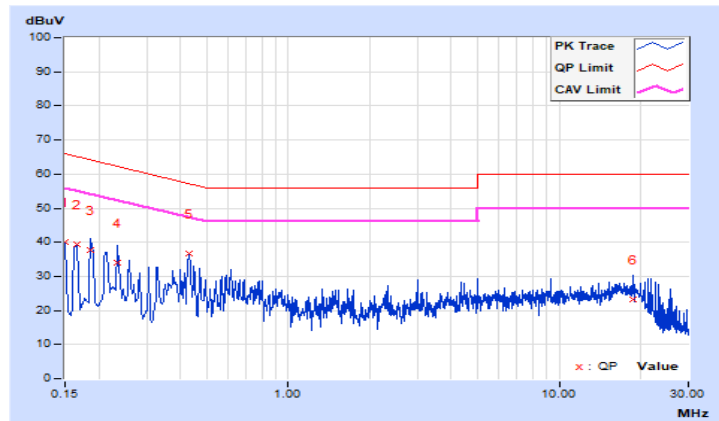


RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 66% RH
Tested By	Titan Hsu		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	30.22	15.36	39.90	25.04	66.00	56.00	-26.10	-30.96
2	0.16579	9.69	29.81	13.73	39.50	23.42	65.17	55.17	-25.67	-31.75
3	0.18600	9.71	27.85	13.76	37.56	23.47	64.21	54.21	-26.65	-30.74
4	0.23400	9.74	24.24	13.52	33.98	23.26	62.31	52.31	-28.33	-29.05
5	0.43000	9.81	26.98	21.81	36.79	31.62	57.25	47.25	-20.46	-15.63
6	18.65400	10.18	13.21	4.52	23.39	14.70	60.00	50.00	-36.61	-35.30

Remarks:

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



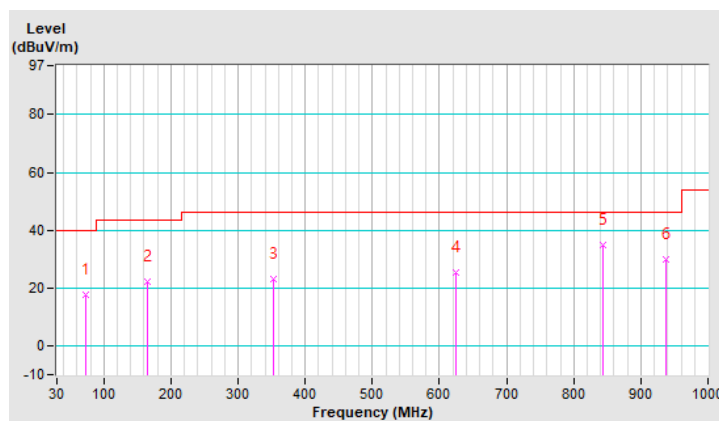
7.7 Unwanted Emissions below 1 GHz

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	25°C, 67% RH
Tested By	Tim Chen		

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	73.65	17.5 QP	40.0	-22.5	3.00 H	299	33.9	-16.4
2	165.80	22.2 QP	43.5	-21.3	1.01 H	84	35.5	-13.3
3	352.04	23.3 QP	46.0	-22.7	1.01 H	130	34.6	-11.3
4	623.64	25.5 QP	46.0	-20.5	1.01 H	16	30.6	-5.1
5	842.86	34.8 QP	46.0	-11.2	1.01 H	196	36.9	-2.1
6	937.92	29.8 QP	46.0	-16.2	1.01 H	29	30.4	-0.6

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 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.

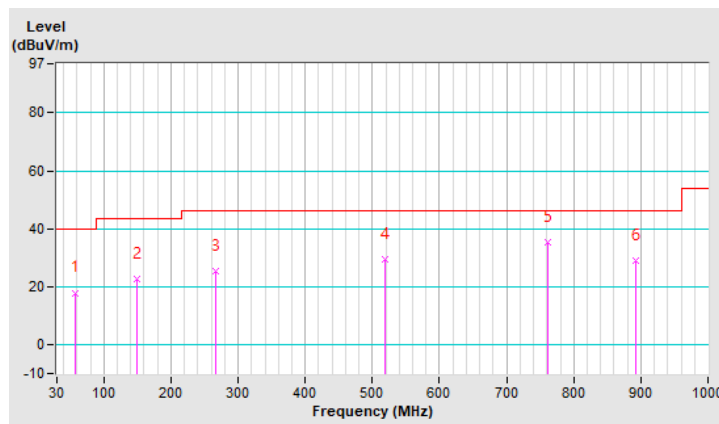


RF Mode	TX 802.11a	Channel	CH 149 : 5745 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Tim Chen		

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	58.13	17.9 QP	40.0	-22.1	1.00 V	304	31.5	-13.6
2	148.34	22.5 QP	43.5	-21.0	1.00 V	4	35.7	-13.2
3	266.68	25.5 QP	46.0	-20.5	1.00 V	307	39.0	-13.5
4	518.88	29.4 QP	46.0	-16.6	1.00 V	249	36.8	-7.4
5	762.35	35.4 QP	46.0	-10.6	2.99 V	201	38.4	-3.0
6	892.33	29.2 QP	46.0	-16.8	1.00 V	154	30.9	-1.7

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 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.



7.8 Unwanted Emissions above 1 GHz

RF Mode	TX 802.11a	Channel	CH 36 : 5180 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	63.1 PK	74.0	-10.9	2.72 H	129	60.2	2.9
2	5150.00	51.2 AV	54.0	-2.8	2.72 H	129	48.3	2.9
3	*5180.00	110.6 PK			2.82 H	129	70.2	40.4
4	*5180.00	103.9 AV			2.82 H	129	63.5	40.4
5	#10360.00	55.3 PK	68.2	-12.9	1.20 H	104	47.3	8.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	64.1 PK	74.0	-9.9	1.86 V	274	61.2	2.9
2	5150.00	52.6 AV	54.0	-1.4	1.86 V	274	49.7	2.9
3	*5180.00	113.7 PK			1.86 V	274	73.3	40.4
4	*5180.00	107.0 AV			1.86 V	274	66.6	40.4
5	#10360.00	56.4 PK	68.2	-11.8	1.24 V	166	48.4	8.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11a	Channel	CH 40 : 5200 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	61.3 PK	74.0	-12.7	2.80 H	130	58.4	2.9
2	5150.00	48.7 AV	54.0	-5.3	2.80 H	130	45.8	2.9
3	*5200.00	112.5 PK			2.80 H	130	72.2	40.3
4	*5200.00	105.8 AV			2.80 H	130	65.5	40.3
5	#10400.00	55.2 PK	68.2	-13.0	2.03 H	166	47.3	7.9

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	62.0 PK	74.0	-12.0	1.95 V	273	59.1	2.9
2	5150.00	50.0 AV	54.0	-4.0	1.95 V	273	47.1	2.9
3	*5200.00	116.0 PK			1.95 V	273	75.7	40.3
4	*5200.00	109.4 AV			1.95 V	273	69.1	40.3
5	#10400.00	56.5 PK	68.2	-11.7	1.04 V	109	48.6	7.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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 802.11a	Channel	CH 48 : 5240 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	111.2 PK			2.79 H	128	71.0	40.2
2	*5240.00	104.5 AV			2.79 H	128	64.3	40.2
3	5350.00	57.6 PK	74.0	-16.4	2.79 H	128	55.2	2.4
4	5350.00	47.2 AV	54.0	-6.8	2.79 H	128	44.8	2.4
5	#10480.00	54.3 PK	68.2	-13.9	1.11 H	302	46.5	7.8

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	*5240.00	115.8 PK			1.89 V	275	75.6	40.2
2	*5240.00	109.2 AV			1.89 V	275	69.0	40.2
3	5350.00	58.0 PK	74.0	-16.0	1.89 V	275	55.6	2.4
4	5350.00	47.6 AV	54.0	-6.4	1.89 V	275	45.2	2.4
5	#10480.00	55.2 PK	68.2	-13.0	1.36 V	219	47.4	7.8

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.
6. " # " : The radiated frequency is out of the restricted band.



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, 67% RH
Tested By	Tim Chen		

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	#5640.40	59.4 PK	68.2	-8.8	2.69 H	157	56.0	3.4
2	*5745.00	112.6 PK			2.69 H	157	71.1	41.5
3	*5745.00	106.3 AV			2.69 H	157	64.8	41.5
4	#5929.20	59.1 PK	68.2	-9.1	2.69 H	157	55.1	4.0
5	11490.00	57.3 PK	74.0	-16.7	1.24 H	134	48.2	9.1
6	11490.00	45.7 AV	54.0	-8.3	1.24 H	134	36.6	9.1

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	#5626.00	59.7 PK	68.2	-8.5	1.92 V	234	56.4	3.3
2	*5745.00	117.7 PK			1.92 V	234	76.2	41.5
3	*5745.00	111.8 AV			1.92 V	234	70.3	41.5
4	#5955.60	59.9 PK	68.2	-8.3	1.92 V	234	55.8	4.1
5	11490.00	57.7 PK	74.0	-16.3	1.56 V	244	48.6	9.1
6	11490.00	46.2 AV	54.0	-7.8	1.56 V	244	37.1	9.1

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.



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, 67% RH
Tested By	Tim Chen		

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	#5643.20	58.7 PK	68.2	-9.5	2.56 H	157	55.3	3.4
2	*5785.00	113.1 PK			2.56 H	157	71.5	41.6
3	*5785.00	106.2 AV			2.56 H	157	64.6	41.6
4	#5952.80	59.7 PK	68.2	-8.5	2.56 H	157	55.7	4.0
5	11570.00	57.4 PK	74.0	-16.6	1.25 H	100	48.2	9.2
6	11570.00	45.9 AV	54.0	-8.1	1.25 H	100	36.7	9.2

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	#5619.60	59.6 PK	68.2	-8.6	2.00 V	244	56.3	3.3
2	*5785.00	118.8 PK			2.00 V	244	77.2	41.6
3	*5785.00	112.0 AV			2.00 V	244	70.4	41.6
4	#5955.20	60.0 PK	68.2	-8.2	2.00 V	244	55.9	4.1
5	11570.00	58.0 PK	74.0	-16.0	1.01 V	144	48.8	9.2
6	11570.00	46.6 AV	54.0	-7.4	1.01 V	144	37.4	9.2

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.
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, 67% RH
Tested By	Tim Chen		

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	#5636.80	59.3 PK	68.2	-8.9	2.63 H	134	55.9	3.4
2	*5825.00	114.2 PK			2.63 H	134	72.6	41.6
3	*5825.00	107.3 AV			2.63 H	134	65.7	41.6
4	#5935.20	59.3 PK	68.2	-8.9	2.63 H	134	55.3	4.0
5	11650.00	56.6 PK	74.0	-17.4	1.35 H	169	47.6	9.0
6	11650.00	46.2 AV	54.0	-7.8	1.35 H	169	37.2	9.0

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	#5615.60	59.4 PK	68.2	-8.8	1.98 V	245	56.2	3.2
2	*5825.00	118.4 PK			1.98 V	245	76.8	41.6
3	*5825.00	111.5 AV			1.98 V	245	69.9	41.6
4	#5934.80	60.7 PK	68.2	-7.5	1.98 V	245	56.7	4.0
5	11650.00	57.5 PK	74.0	-16.5	1.03 V	67	48.5	9.0
6	11650.00	46.7 AV	54.0	-7.3	1.03 V	67	37.7	9.0

Remarks:

1. Emission Level(dBUV/m) = Raw Value(dBUV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 36 : 5180 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	65.8 PK	74.0	-8.2	2.83 H	129	62.9	2.9
2	5150.00	50.8 AV	54.0	-3.2	2.83 H	129	47.9	2.9
3	*5180.00	109.9 PK			2.83 H	129	69.5	40.4
4	*5180.00	103.1 AV			2.83 H	129	62.7	40.4
5	#10360.00	55.2 PK	68.2	-13.0	1.03 H	306	47.2	8.0

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	67.6 PK	74.0	-6.4	1.98 V	272	64.7	2.9
2	5150.00	52.8 AV	54.0	-1.2	1.98 V	272	49.9	2.9
3	*5180.00	112.7 PK			1.98 V	272	72.3	40.4
4	*5180.00	106.1 AV			1.98 V	272	65.7	40.4
5	#10360.00	56.8 PK	68.2	-11.4	2.03 V	169	48.8	8.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 40 : 5200 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	60.9 PK	74.0	-13.1	2.81 H	129	58.0	2.9
2	5150.00	48.9 AV	54.0	-5.1	2.81 H	129	46.0	2.9
3	*5200.00	112.6 PK			2.81 H	129	72.3	40.3
4	*5200.00	105.7 AV			2.81 H	129	65.4	40.3
5	#10400.00	55.1 PK	68.2	-13.1	1.76 H	205	47.2	7.9

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	61.9 PK	74.0	-12.1	1.95 V	274	59.0	2.9
2	5150.00	49.7 AV	54.0	-4.3	1.95 V	274	46.8	2.9
3	*5200.00	116.0 PK			1.95 V	274	75.7	40.3
4	*5200.00	109.1 AV			1.95 V	274	68.8	40.3
5	#10400.00	56.5 PK	68.2	-11.7	1.01 V	169	48.6	7.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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 48 : 5240 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, 67% RH
Tested By	Tim Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	112.2 PK			2.79 H	130	72.0	40.2
2	*5240.00	105.5 AV			2.79 H	130	65.3	40.2
3	5350.00	57.5 PK	74.0	-16.5	2.79 H	130	55.1	2.4
4	5350.00	47.5 AV	54.0	-6.5	2.79 H	130	45.1	2.4
5	#10480.00	55.0 PK	68.2	-13.2	1.99 H	306	47.2	7.8

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	*5240.00	115.8 PK			1.81 V	273	75.6	40.2
2	*5240.00	109.0 AV			1.81 V	273	68.8	40.2
3	5350.00	58.2 PK	74.0	-15.8	1.81 V	273	55.8	2.4
4	5350.00	47.8 AV	54.0	-6.2	1.81 V	273	45.4	2.4
5	#10480.00	55.6 PK	68.2	-12.6	1.02 V	199	47.8	7.8

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.
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, 67% RH
Tested By	Tim Chen		

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	#5619.20	59.0 PK	68.2	-9.2	2.71 H	146	55.7	3.3
2	*5745.00	112.6 PK			2.71 H	146	71.1	41.5
3	*5745.00	105.8 AV			2.71 H	146	64.3	41.5
4	#5950.80	59.1 PK	68.2	-9.1	2.71 H	146	55.1	4.0
5	11490.00	56.4 PK	74.0	-17.6	1.68 H	347	47.3	9.1
6	11490.00	46.0 AV	54.0	-8.0	1.68 H	347	36.9	9.1

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	#5646.40	59.1 PK	68.2	-9.1	1.94 V	243	55.7	3.4
2	*5745.00	118.6 PK			1.94 V	243	77.1	41.5
3	*5745.00	111.9 AV			1.94 V	243	70.4	41.5
4	#5948.80	59.5 PK	68.2	-8.7	1.94 V	243	55.5	4.0
5	11490.00	57.9 PK	74.0	-16.1	1.66 V	132	48.8	9.1
6	11490.00	46.5 AV	54.0	-7.5	1.66 V	132	37.4	9.1

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.



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, 67% RH
Tested By	Tim Chen		

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	#5633.60	59.0 PK	68.2	-9.2	2.81 H	145	55.6	3.4
2	*5785.00	113.4 PK			2.81 H	145	71.8	41.6
3	*5785.00	106.5 AV			2.81 H	145	64.9	41.6
4	#5939.60	59.1 PK	68.2	-9.1	2.81 H	145	55.2	3.9
5	11570.00	57.8 PK	74.0	-16.2	1.85 H	204	48.6	9.2
6	11570.00	46.7 AV	54.0	-7.3	1.85 H	204	37.5	9.2

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	#5627.20	59.3 PK	68.2	-8.9	2.02 V	243	56.0	3.3
2	*5785.00	118.6 PK			2.02 V	243	77.0	41.6
3	*5785.00	111.8 AV			2.02 V	243	70.2	41.6
4	#5943.60	60.6 PK	68.2	-7.6	2.02 V	243	56.7	3.9
5	11570.00	58.0 PK	74.0	-16.0	1.12 V	306	48.8	9.2
6	11570.00	46.9 AV	54.0	-7.1	1.12 V	306	37.7	9.2

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.
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, 67% RH
Tested By	Tim Chen		

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	#5633.60	59.0 PK	68.2	-9.2	2.70 H	135	55.6	3.4
2	*5825.00	114.3 PK			2.70 H	135	72.7	41.6
3	*5825.00	107.3 AV			2.70 H	135	65.7	41.6
4	#5943.20	59.1 PK	68.2	-9.1	2.70 H	135	55.2	3.9
5	11650.00	56.7 PK	74.0	-17.3	1.64 H	215	47.7	9.0
6	11650.00	46.1 AV	54.0	-7.9	1.64 H	215	37.1	9.0

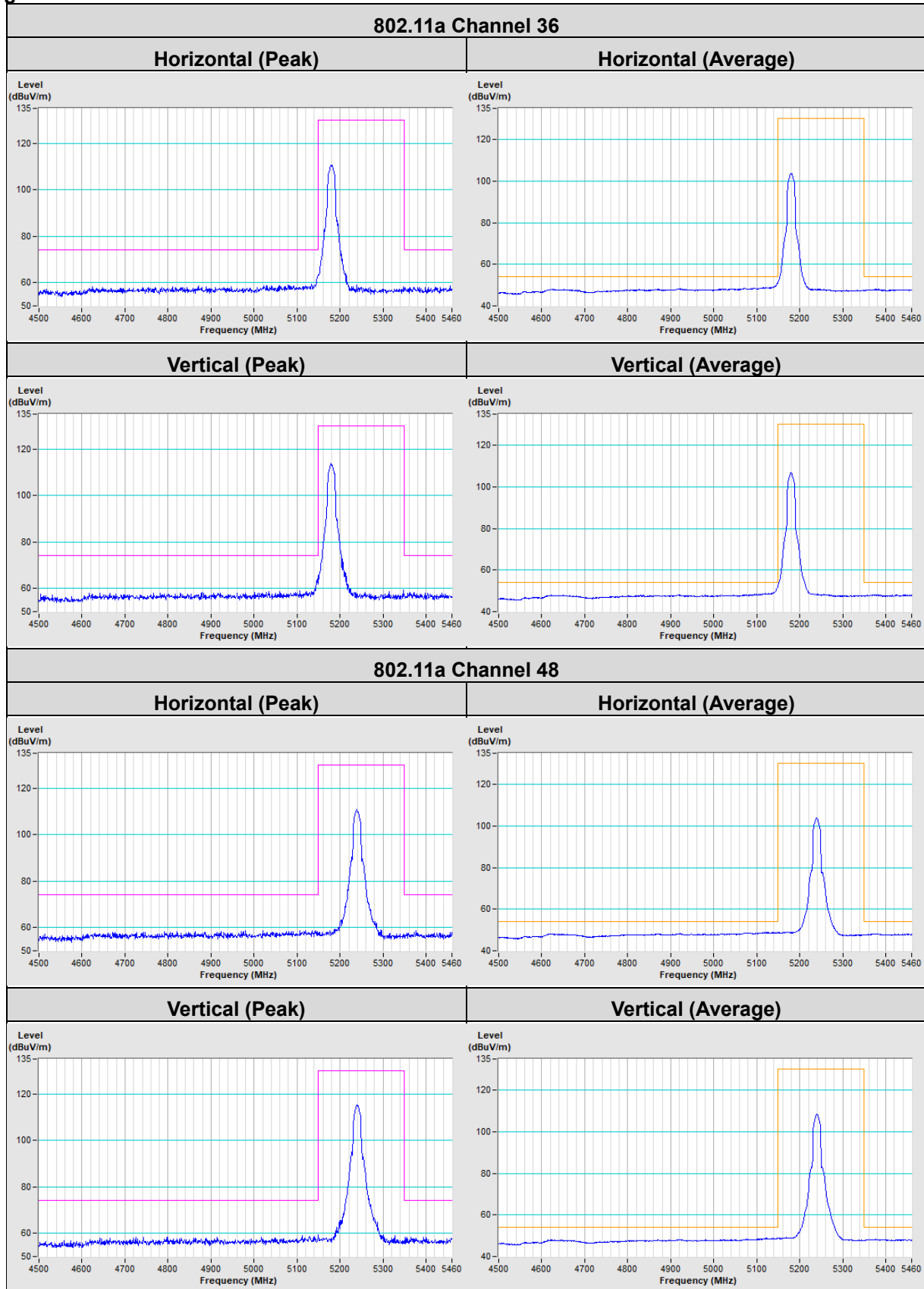
Antenna Polarity & Test Distance : Vertical at 3 m

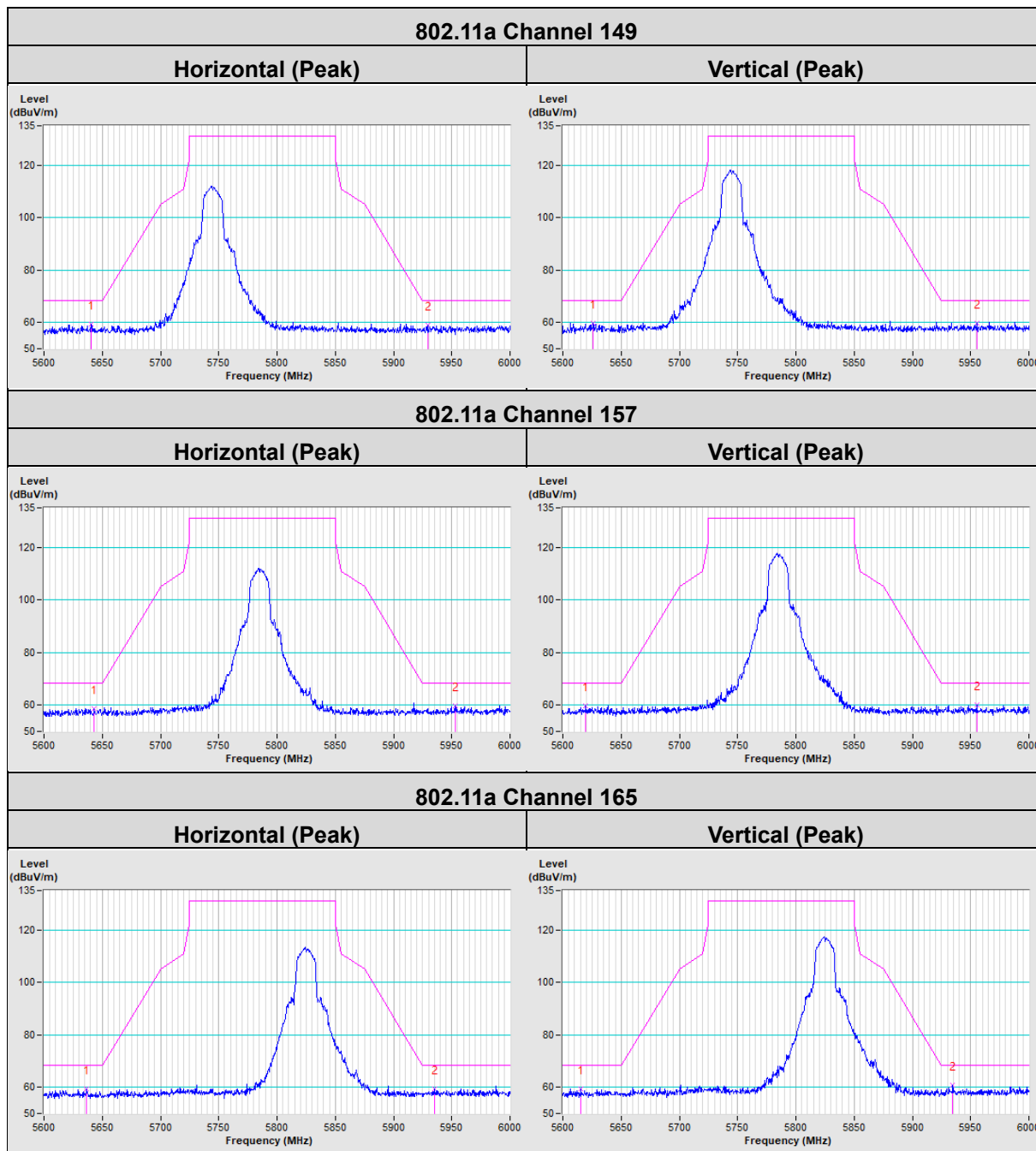
No	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBUV)	Correction Factor (dB/m)
1	#5634.80	58.7 PK	68.2	-9.5	1.86 V	286	55.3	3.4
2	*5825.00	118.6 PK			1.86 V	286	77.0	41.6
3	*5825.00	111.7 AV			1.86 V	286	70.1	41.6
4	#5956.80	59.6 PK	68.2	-8.6	1.86 V	286	55.5	4.1
5	11650.00	57.4 PK	74.0	-16.6	1.05 V	177	48.4	9.0
6	11650.00	46.6 AV	54.0	-7.4	1.05 V	177	37.6	9.0

Remarks:

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

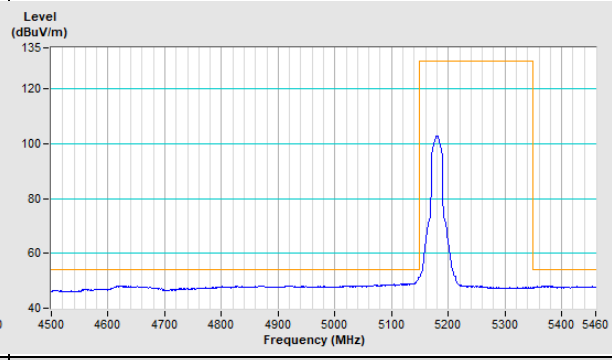
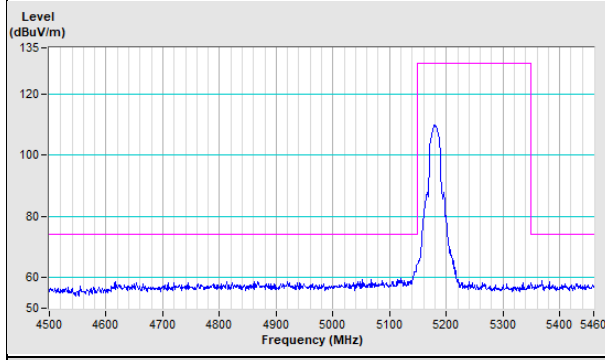
Band Edge Measurement





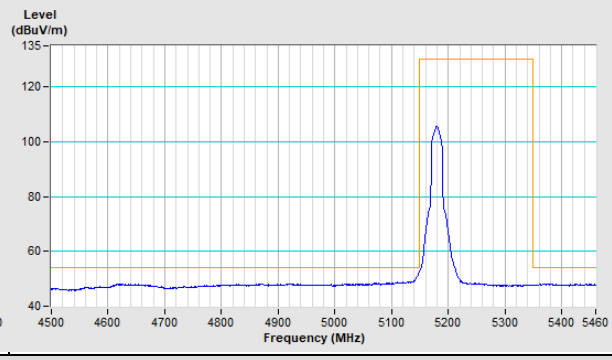
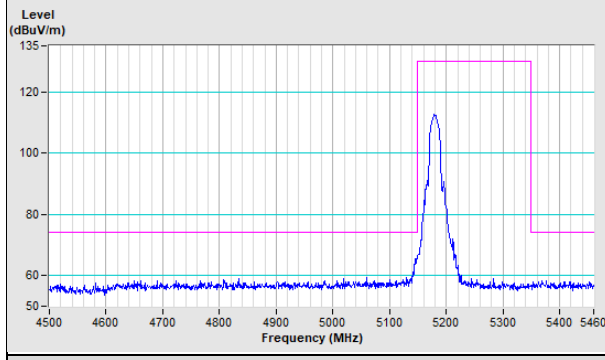
802.11n (HT20) Channel 36

Horizontal (Peak) **Horizontal (Average)**



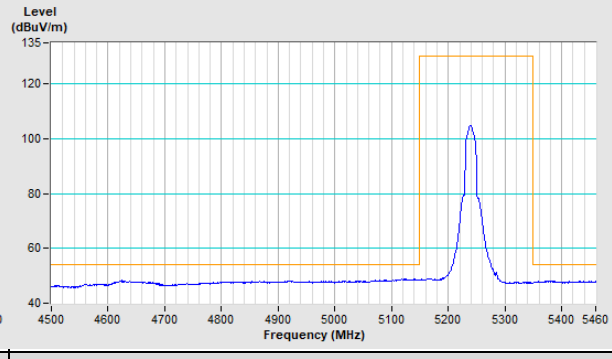
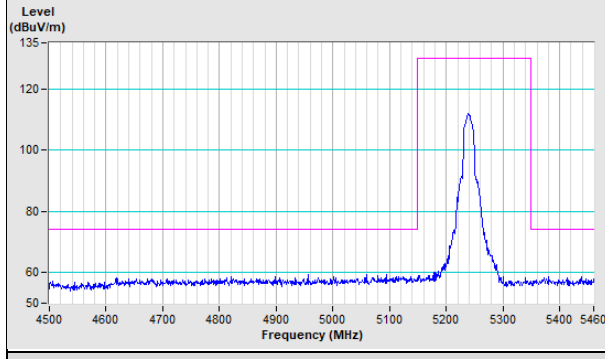
Vertical (Peak)

Vertical (Average)



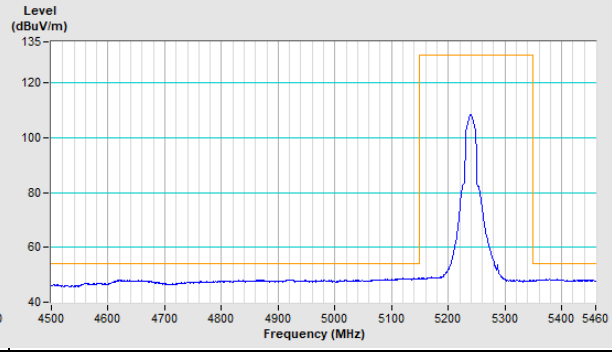
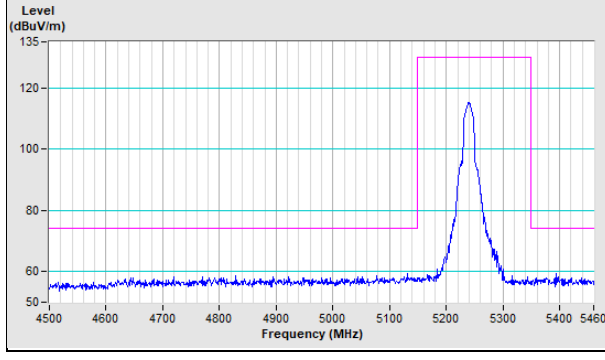
802.11n (HT20) Channel 48

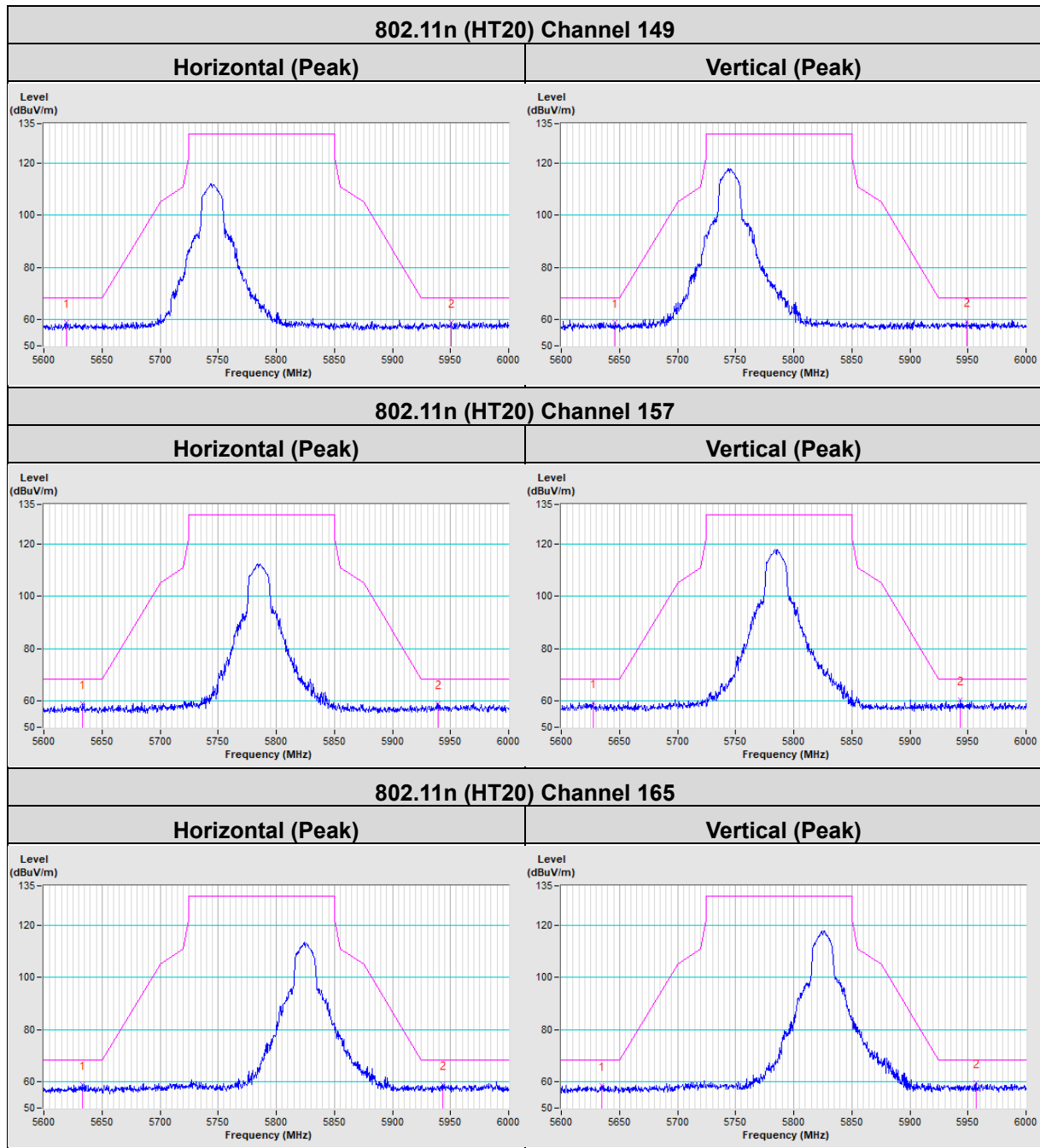
Horizontal (Peak) **Horizontal (Average)**



Vertical (Peak)

Vertical (Average)





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:

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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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