

Partial FCC Test Report

Report No.: RF170927C20C-2

FCC ID: B94-8265D2WB

Test Model: TPN-Q200

Received Date: Oct. 27, 2017

Test Date: Jan. 11, 2018 ~ Feb. 05, 2018

Issued Date: Feb. 09, 2018

Applicant: HP Inc.

Address: 3390 East Harmony Road, Fort Collins, Colorado 80528, United States

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)

Test Location (1): No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Test Location (2): B2F, No.215, Sec. 3, Beixin Rd. Xindian Dist. New Taipei City, R.O.C. Taiwan

**FCC Registration /
Designation Number:** 427177 / TW0011



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Release Control Record

Issue No.	Description	Date Issued
RF170927C20C-2	Original Release	Feb. 09, 2018

1 Certificate of Conformity

Product: Notebook Computer

Brand: HP

Test Model: TPN-Q200

Sample Status: Production Unit

Applicant: HP Inc.

Test Date: Jan. 11, 2018 ~ Feb. 05, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10:2013

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

Prepared by : _____

Vera Huang

Date: _____ Feb. 09, 2018 _____

Vera Huang / Specialist

Approved by : _____

Dylan Chiou

Date: _____ Feb. 09, 2018 _____

Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Refer to Note
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.02 dB at 2484.64 MHz and 2483.52 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

Only test items for Radiated Emissions and Conducted power tests were performed for this report. For other test data, please refer to Intel Report No.: 160321-02.TR04 for module (Brand: Intel, Model: 8265D2W).

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Notebook Computer
Brand	HP
Test Model	TPN-Q200
Status of EUT	Production Unit
Power Supply Rating	5 Vdc or 9 Vdc or 10 Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 300 Mbps
Operating Frequency	2412 ~ 2472 MHz
Number of Channel	13 for 802.11b, 802.11g, 802.11n (HT20) 9 for 802.11n (HT40)
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	N/A

Note:

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

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	2TX
802.11n (HT40)	2TX

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	hp	TPN-DA08	I/P: 100-240 Vac, 50/60 Hz, 1.8 A O/P: 5 Vdc, 3 A or 9 Vdc, 3 A or 10 Vdc, 5 A 1.76m shielded cable w/o core

3. The antenna information is listed as below.

Antenna Type	Mode	Manufacturer	Parts Number	Antenna Gain			
				WLAN 2.4 GHz / Bluetooth	WLAN 5.15~5.35 GHz	WLAN 5.47~5.725 GHz	WLAN 5.725~5.850 GHz
PIFA	NB Mode	WNC	WLAN Main Antenna: DQ6415GB200 WLAN Aux Antenna: DQ6415GB200	2.48	2.39	-0.16	-1.17
	Tablet Mode	WNC	WLAN Main Antenna: DQ6415GB200 WLAN Aux Antenna: DQ6415GB200	1.21	2.38	1.45	0.82

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

3.2 Description of Test Modes

13 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442		

9 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	8	2447
4	2427	9	2452
5	2432	10	2457
6	2437	11	2462
7	2442		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE \geq 1G	RE $<$ 1G	
-	√	√	-

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE $<$ 1G**: Radiated Emission below 1 GHz

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

NOTE: "-" means no effect.

Radiated Emission Test (Above 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1.0
-	802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	MCS0
-	802.11n (HT40)	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 13	13	DSSS	DBPSK	1.0

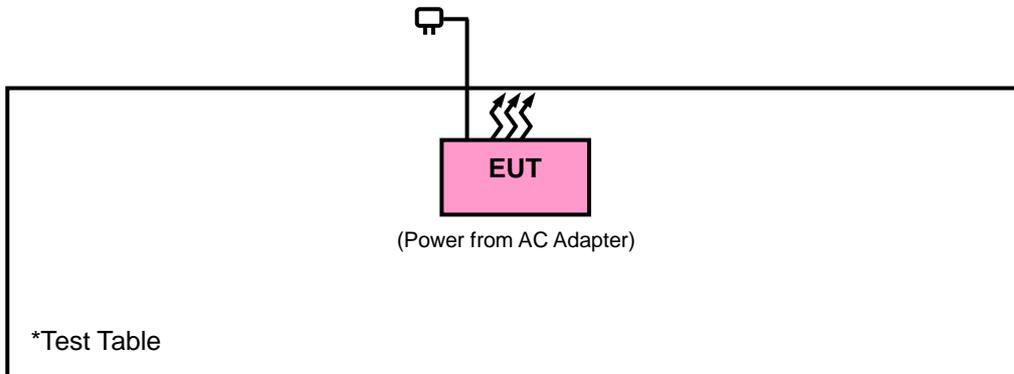
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao
RE $<$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v04

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).
The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Jul. 05, 2017	Jul. 04, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 06, 2017	Dec. 05, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Jun. 26, 2017	Jun. 25, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 07, 2017	Jul. 06, 2018
Bluetooth Tester	CBT	100980	Jun. 28, 2017	Jun. 27, 2019
Loop Antenna	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent	310N	187226	Jun. 23, 2017	Jun. 22, 2018
Preamplifier Agilent	83017A	MY39501357	Jun. 23, 2017	Jun. 22, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 26, 2017	Jun. 25, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 26, 2017	Jun. 25, 2018
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is IC7450I-1.

4.1.3 Test Procedures

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

Note:

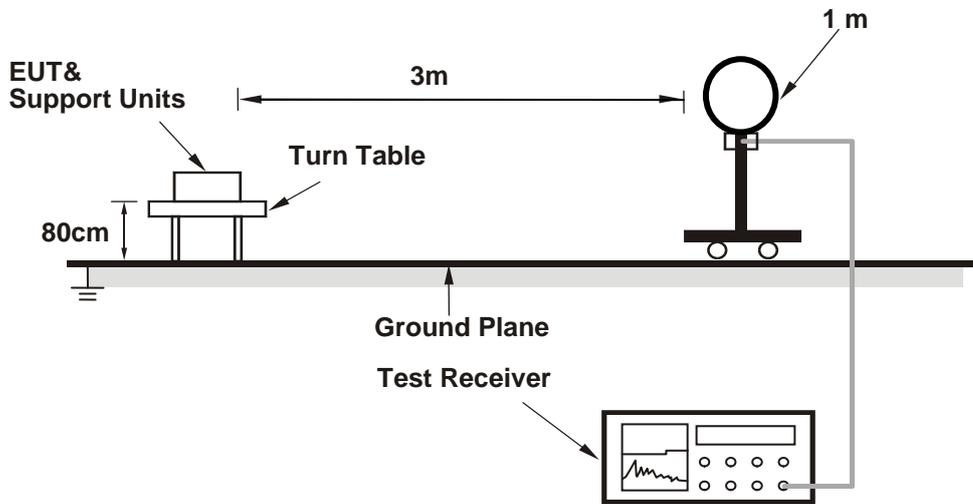
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle \geq 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

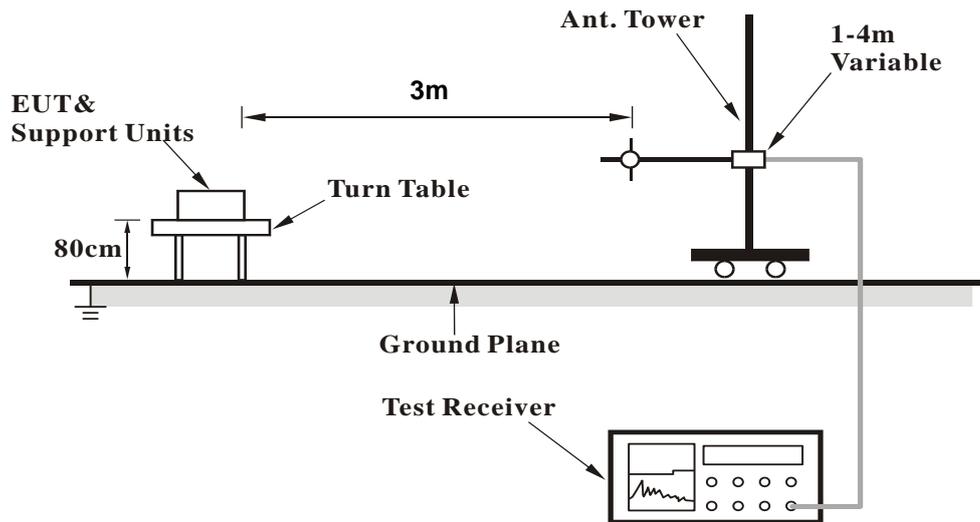
No deviation.

4.1.5 Test Set Up

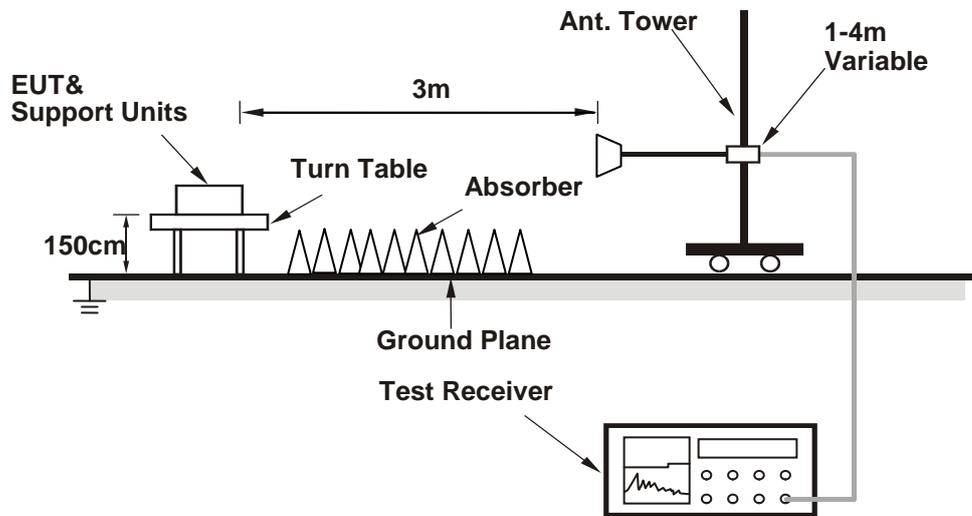
<Radiated emission below 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1 GHz Data :
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	51.04	49.33	54	-2.96	31.8	5.4	35.49	192	301	Average
2389.74	55.36	53.65	74	-18.64	31.8	5.4	35.49	192	301	Peak
2412	105.45	103.68			31.81	5.43	35.47	192	301	Average
2412	108.89	107.12			31.81	5.43	35.47	192	301	Peak
4824	41.01	32.88	54	-12.99	33.97	8.26	34.1	116	185	Average
4824	47.25	39.12	74	-26.75	33.97	8.26	34.1	116	185	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2385.78	44.86	43.15	54	-9.14	31.8	5.4	35.49	200	291	Average
2385.78	53.24	51.53	74	-20.76	31.8	5.4	35.49	200	291	Peak
2412	96.6	94.83			31.81	5.43	35.47	200	291	Average
2412	99.92	98.15			31.81	5.43	35.47	200	291	Peak
4824	40.62	32.49	54	-13.38	33.97	8.26	34.1	133	326	Average
4824	47.28	39.15	74	-26.72	33.97	8.26	34.1	133	326	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.3	49.53	47.82	54	-4.47	31.8	5.4	35.49	192	301	Average
2388.3	56.41	54.7	74	-17.59	31.8	5.4	35.49	192	301	Peak
2437	107.43	105.58			31.85	5.46	35.46	192	301	Average
2437	110.03	108.18			31.85	5.46	35.46	192	301	Peak
2485.76	48.12	46.13	54	-5.88	31.88	5.53	35.42	192	301	Average
2485.76	57.01	55.02	74	-16.99	31.88	5.53	35.42	192	301	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.04	42.13	40.42	54	-11.87	31.8	5.4	35.49	200	291	Average
2387.04	51.94	50.23	74	-22.06	31.8	5.4	35.49	200	291	Peak
2437	98.47	96.62			31.85	5.46	35.46	200	291	Average
2437	101.02	99.17			31.85	5.46	35.46	200	291	Peak
2487.84	42.56	40.55	54	-11.44	31.9	5.53	35.42	200	291	Average
2487.84	53.35	51.34	74	-20.65	31.9	5.53	35.42	200	291	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	105.01	103.08			31.87	5.5	35.44	255	69	Average
2462	107.77	105.84			31.87	5.5	35.44	255	69	Peak
2483.52	51.94	49.98	54	-2.06	31.88	5.5	35.42	255	69	Average
2483.52	55.37	53.41	74	-18.63	31.88	5.5	35.42	255	69	Peak
4924	38.18	29.93	54	-15.82	33.99	8.28	34.02	108	75	Average
4924	47.94	39.69	74	-26.06	33.99	8.28	34.02	108	75	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.44	94.51			31.87	5.5	35.44	233	89	Average
2462	99.49	97.56			31.87	5.5	35.44	233	89	Peak
2483.64	44.12	42.16	54	-9.88	31.88	5.5	35.42	233	89	Average
2483.64	54.08	52.12	74	-19.92	31.88	5.5	35.42	233	89	Peak
4924	38.27	30.02	54	-15.73	33.99	8.28	34.02	139	181	Average
4924	48.18	39.93	74	-25.82	33.99	8.28	34.02	139	181	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	103.57	101.62			31.87	5.5	35.42	237	65	Average
2467	106.53	104.58			31.87	5.5	35.42	237	65	Peak
2484.08	52.46	50.5	54	-1.54	31.88	5.5	35.42	237	65	Average
2484.08	64.91	62.95	74	-9.09	31.88	5.5	35.42	237	65	Peak
4934	38.66	30.4	54	-15.34	33.99	8.29	34.02	107	75	Average
4934	48.32	40.06	74	-25.68	33.99	8.29	34.02	107	75	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	97.82	95.87			31.87	5.5	35.42	158	133	Average
2467	101	99.05			31.87	5.5	35.42	158	133	Peak
2484.4	44.66	42.67	54	-9.34	31.88	5.53	35.42	158	133	Average
2484.4	55.37	53.38	74	-18.63	31.88	5.53	35.42	158	133	Peak
4934	38.71	30.45	54	-15.29	33.99	8.29	34.02	153	188	Average
4934	48.53	40.27	74	-25.47	33.99	8.29	34.02	153	188	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	96.09	94.13			31.88	5.5	35.42	240	68	Average
2472	98.97	97.01			31.88	5.5	35.42	240	68	Peak
2484.64	52.98	50.99	54	-1.02	31.88	5.53	35.42	240	68	Average
2484.64	57.94	55.95	74	-16.06	31.88	5.53	35.42	240	68	Peak
4944	38.42	30.15	54	-15.58	33.99	8.29	34.01	164	136	Average
4944	48.51	40.24	74	-25.49	33.99	8.29	34.01	164	136	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	90.59	88.63			31.88	5.5	35.42	158	133	Average
2472	93.3	91.34			31.88	5.5	35.42	158	133	Peak
2484.64	46.8	44.81	54	-7.2	31.88	5.53	35.42	158	133	Average
2484.64	54.61	52.62	74	-19.39	31.88	5.53	35.42	158	133	Peak
4944	38.54	30.27	54	-15.46	33.99	8.29	34.01	174	223	Average
4944	48.02	39.75	74	-25.98	33.99	8.29	34.01	174	223	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.92	52.41	50.68	54	-1.59	31.8	5.4	35.47	192	301	Average
2389.92	65.73	64	74	-8.27	31.8	5.4	35.47	192	301	Peak
2412	101.29	99.52			31.81	5.43	35.47	192	301	Average
2412	109.53	107.76			31.81	5.43	35.47	192	301	Peak
4824	41.25	33.12	54	-12.75	33.97	8.26	34.1	159	226	Average
4824	47.82	39.69	74	-26.18	33.97	8.26	34.1	159	226	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.56	43.82	42.11	54	-10.18	31.8	5.4	35.49	200	291	Average
2389.56	56.79	55.08	74	-17.21	31.8	5.4	35.49	200	291	Peak
2412	92.22	90.45			31.81	5.43	35.47	200	291	Average
2412	100.27	98.5			31.81	5.43	35.47	200	291	Peak
4824	41.24	33.11	54	-12.76	33.97	8.26	34.1	158	155	Average
4824	47.66	39.53	74	-26.34	33.97	8.26	34.1	158	155	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.92	48.23	46.5	54	-5.77	31.8	5.4	35.47	192	301	Average
2389.92	58.99	57.26	74	-15.01	31.8	5.4	35.47	192	301	Peak
2437	103.25	101.4			31.85	5.46	35.46	192	301	Average
2437	111.13	109.28			31.85	5.46	35.46	192	301	Peak
2483.76	48.89	46.93	54	-5.11	31.88	5.5	35.42	192	301	Average
2483.76	64.57	62.61	74	-9.43	31.88	5.5	35.42	192	301	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.56	42.14	40.43	54	-11.86	31.8	5.4	35.49	200	291	Average
2389.56	52.63	50.92	74	-21.37	31.8	5.4	35.49	200	291	Peak
2437	94.55	92.7			31.85	5.46	35.46	200	291	Average
2437	102.37	100.52			31.85	5.46	35.46	200	291	Peak
2484.72	42.34	40.35	54	-11.66	31.88	5.53	35.42	200	291	Average
2484.72	53.62	51.63	74	-20.38	31.88	5.53	35.42	200	291	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	100.36	98.43			31.87	5.5	35.44	192	301	Average
2462	108.09	106.16			31.87	5.5	35.44	192	301	Peak
2483.68	52.41	50.45	54	-1.59	31.88	5.5	35.42	192	301	Average
2483.68	65.19	63.23	74	-8.81	31.88	5.5	35.42	192	301	Peak
4924	41.09	32.84	54	-12.91	33.99	8.28	34.02	134	44	Average
4924	47.23	38.98	74	-26.77	33.99	8.28	34.02	134	44	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	91.4	89.47			31.87	5.5	35.44	200	291	Average
2462	99.1	97.17			31.87	5.5	35.44	200	291	Peak
2483.72	43.21	41.25	54	-10.79	31.88	5.5	35.42	200	291	Average
2483.72	55.67	53.71	74	-18.33	31.88	5.5	35.42	200	291	Peak
4924	41.27	33.02	54	-12.73	33.99	8.28	34.02	125	22	Average
4924	47.64	39.39	74	-26.36	33.99	8.28	34.02	125	22	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	97.88	95.93			31.87	5.5	35.42	237	68	Average
2467	106.07	104.12			31.87	5.5	35.42	237	68	Peak
2483.52	52.26	50.3	54	-1.74	31.88	5.5	35.42	237	68	Average
2483.52	68.66	66.7	74	-5.34	31.88	5.5	35.42	237	68	Peak
4934	38.36	30.1	54	-15.64	33.99	8.29	34.02	141	103	Average
4934	48.28	40.02	74	-25.72	33.99	8.29	34.02	141	103	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	92.06	90.11			31.87	5.5	35.42	158	133	Average
2467	100.08	98.13			31.87	5.5	35.42	158	133	Peak
2483.52	46.9	44.94	54	-7.1	31.88	5.5	35.42	158	133	Average
2483.52	61.49	59.53	74	-12.51	31.88	5.5	35.42	158	133	Peak
4934	38.49	30.23	54	-15.51	33.99	8.29	34.02	156	214	Average
4934	48.32	40.06	74	-25.68	33.99	8.29	34.02	156	214	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	77.74	75.78			31.88	5.5	35.42	295	68	Average
2472	85.92	83.96			31.88	5.5	35.42	295	68	Peak
2483.52	51.82	49.86	54	-2.18	31.88	5.5	35.42	295	68	Average
2483.52	64.81	62.85	74	-9.19	31.88	5.5	35.42	295	68	Peak
4944	38.21	29.94	54	-15.79	33.99	8.29	34.01	195	226	Average
4944	48.17	39.9	74	-25.83	33.99	8.29	34.01	195	226	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	72.06	70.1			31.88	5.5	35.42	158	133	Average
2472	80.53	78.57			31.88	5.5	35.42	158	133	Peak
2483.56	44.19	42.23	54	-9.81	31.88	5.5	35.42	158	133	Average
2483.56	56.93	54.97	74	-17.07	31.88	5.5	35.42	158	133	Peak
4944	37.56	29.29	54	-16.44	33.99	8.29	34.01	126	118	Average
4944	47.36	39.09	74	-26.64	33.99	8.29	34.01	126	118	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.83	42	40.27	54	-12	31.8	5.4	35.47	195	33	Average
2389.83	53.56	51.83	74	-20.44	31.8	5.4	35.47	195	33	Peak
2412	99.43	97.66			31.81	5.43	35.47	206	33	Average
2412	108.64	106.87			31.81	5.43	35.47	206	33	Peak
4824	38.62	30.49	54	-15.38	33.97	8.26	34.1	162	248	Average
4824	48.53	40.4	74	-25.47	33.97	8.26	34.1	162	248	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.92	40.96	39.23	54	-13.04	31.8	5.4	35.47	112	63	Average
2389.92	52.36	50.63	74	-21.64	31.8	5.4	35.47	112	63	Peak
2412	93.99	92.22			31.81	5.43	35.47	112	63	Average
2412	102.19	100.42			31.81	5.43	35.47	112	63	Peak
4824	38.25	30.12	54	-15.75	33.97	8.26	34.1	190	157	Average
4824	48	39.87	74	-26	33.97	8.26	34.1	190	157	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.65	44.96	43.25	54	-9.04	31.8	5.4	35.49	199	296	Average
2389.65	55.96	54.25	74	-18.04	31.8	5.4	35.49	199	296	Peak
2437	103.28	101.43			31.85	5.46	35.46	199	296	Average
2437	111.25	109.4			31.85	5.46	35.46	199	296	Peak
2483.52	44.31	42.35	54	-9.69	31.88	5.5	35.42	199	296	Average
2483.52	55.59	53.63	74	-18.41	31.88	5.5	35.42	199	296	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.67	40.92	39.21	54	-13.08	31.8	5.4	35.49	200	290	Average
2387.67	52.01	50.3	74	-21.99	31.8	5.4	35.49	200	290	Peak
2437	94.19	92.34			31.85	5.46	35.46	200	290	Average
2437	102.05	100.2			31.85	5.46	35.46	200	290	Peak
2483.68	41.43	39.47	54	-12.57	31.88	5.5	35.42	200	290	Average
2483.68	52.49	50.53	74	-21.51	31.88	5.5	35.42	200	290	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	100.66	98.73			31.87	5.5	35.44	199	296	Average
2462	108.25	106.32			31.87	5.5	35.44	199	296	Peak
2483.6	46.03	44.07	54	-7.97	31.88	5.5	35.42	199	296	Average
2483.6	57.74	55.78	74	-16.26	31.88	5.5	35.42	199	296	Peak
4924	41.13	32.88	54	-12.87	33.99	8.28	34.02	177	188	Average
4924	48.09	39.84	74	-25.91	33.99	8.28	34.02	177	188	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	91.77	89.84			31.87	5.5	35.44	200	290	Average
2462	99.97	98.04			31.87	5.5	35.44	200	290	Peak
2483.52	41.95	39.99	54	-12.05	31.88	5.5	35.42	200	290	Average
2483.52	52.89	50.93	74	-21.11	31.88	5.5	35.42	200	290	Peak
4924	41.49	33.24	54	-12.51	33.99	8.28	34.02	133	326	Average
4924	48.27	40.02	74	-25.73	33.99	8.28	34.02	133	326	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	99.89	97.94			31.87	5.5	35.42	257	36	Average
2467	108.15	106.2			31.87	5.5	35.42	257	36	Peak
2483.52	52.96	51	54	-1.04	31.88	5.5	35.42	239	67	Average
2483.52	69.69	67.73	74	-4.31	31.88	5.5	35.42	239	67	Peak
4934	38.5	30.24	54	-15.5	33.99	8.29	34.02	195	274	Average
4934	48.7	40.44	74	-25.3	33.99	8.29	34.02	195	274	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	93.91	91.96			31.87	5.5	35.42	240	144	Average
2467	102.66	100.71			31.87	5.5	35.42	240	144	Peak
2483.52	47.43	45.47	54	-6.57	31.88	5.5	35.42	219	144	Average
2483.52	62.11	60.15	74	-11.89	31.88	5.5	35.42	219	144	Peak
4934	38.38	30.12	54	-15.62	33.99	8.29	34.02	175	125	Average
4934	48.58	40.32	74	-25.42	33.99	8.29	34.02	175	125	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	80.2	78.24			31.88	5.5	35.42	357	36	Average
2472	87.35	85.39			31.88	5.5	35.42	357	36	Peak
2483.52	52.98	51.02	54	-1.02	31.88	5.5	35.42	178	36	Average
2483.52	67.73	65.77	74	-6.27	31.88	5.5	35.42	178	36	Peak
4944	38.41	30.14	54	-15.59	33.99	8.29	34.01	161	178	Average
4944	48.23	39.96	74	-25.77	33.99	8.29	34.01	161	178	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	74.24	72.28			31.88	5.5	35.42	195	132	Average
2472	81.74	79.78			31.88	5.5	35.42	195	132	Peak
2483.64	47.89	45.93	54	-6.11	31.88	5.5	35.42	171	109	Average
2483.64	60.9	58.94	74	-13.1	31.88	5.5	35.42	171	109	Peak
4944	37.74	29.47	54	-16.26	33.99	8.29	34.01	128	118	Average
4944	47.61	39.34	74	-26.39	33.99	8.29	34.01	128	118	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2472 MHz: Fundamental frequency.

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.83	46.44	44.71	54	-7.56	31.8	5.4	35.47	199	296	Average
2389.83	57.37	55.64	74	-16.63	31.8	5.4	35.47	199	296	Peak
2422	96.63	94.83			31.83	5.43	35.46	199	296	Average
2422	103.08	101.28			31.83	5.43	35.46	199	296	Peak
2496.4	42.43	40.41	54	-11.57	31.9	5.53	35.41	199	296	Average
2496.4	53.33	51.31	74	-20.67	31.9	5.53	35.41	199	296	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.67	41.63	39.92	54	-12.37	31.8	5.4	35.49	200	290	Average
2387.67	51.65	49.94	74	-22.35	31.8	5.4	35.49	200	290	Peak
2422	87.44	85.64			31.83	5.43	35.46	200	290	Average
2422	94.38	92.58			31.83	5.43	35.46	200	290	Peak
2489.76	41.4	39.39	54	-12.6	31.9	5.53	35.42	200	290	Average
2489.76	52.47	50.46	74	-21.53	31.9	5.53	35.42	200	290	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.74	45.06	43.35	54	-8.94	31.8	5.4	35.49	199	296	Average
2389.74	55.61	53.9	74	-18.39	31.8	5.4	35.49	199	296	Peak
2437	99.6	97.75			31.85	5.46	35.46	199	296	Average
2437	106.1	104.25			31.85	5.46	35.46	199	296	Peak
2483.64	44.09	42.13	54	-9.91	31.88	5.5	35.42	199	296	Average
2483.64	55.44	53.48	74	-18.56	31.88	5.5	35.42	199	296	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.66	41.4	39.69	54	-12.6	31.8	5.4	35.49	200	290	Average
2388.66	51.8	50.09	74	-22.2	31.8	5.4	35.49	200	290	Peak
2437	90.3	88.45			31.85	5.46	35.46	200	290	Average
2437	97.35	95.5			31.85	5.46	35.46	200	290	Peak
2498.24	41.93	39.91	54	-12.07	31.9	5.53	35.41	200	290	Average
2498.24	52.49	50.47	74	-21.51	31.9	5.53	35.41	200	290	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2383.62	42.46	40.77	54	-11.54	31.78	5.4	35.49	199	296	Average
2383.62	52.85	51.16	74	-21.15	31.78	5.4	35.49	199	296	Peak
2452	97.49	95.62			31.85	5.46	35.44	199	296	Average
2452	104.03	102.16			31.85	5.46	35.44	199	296	Peak
2484.44	46.21	44.22	54	-7.79	31.88	5.53	35.42	199	296	Average
2484.44	58.32	56.33	74	-15.68	31.88	5.53	35.42	199	296	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2380.38	41.06	39.37	54	-12.94	31.78	5.4	35.49	200	290	Average
2380.38	51.67	49.98	74	-22.33	31.78	5.4	35.49	200	290	Peak
2452	88.74	86.87			31.85	5.46	35.44	200	290	Average
2452	95.56	93.69			31.85	5.46	35.44	200	290	Peak
2483.52	42.89	40.93	54	-11.11	31.88	5.5	35.42	200	290	Average
2483.52	53.43	51.47	74	-20.57	31.88	5.5	35.42	200	290	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 10	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2376.69	42.13	40.47	54	-11.87	31.78	5.37	35.49	200	68	Average
2376.69	52.77	51.11	74	-21.23	31.78	5.37	35.49	200	68	Peak
2457	96.01	94.12			31.87	5.46	35.44	224	68	Average
2457	105.77	103.88			31.87	5.46	35.44	224	68	Peak
2483.52	52.95	50.99	54	-1.05	31.88	5.5	35.42	200	68	Average
2483.52	63.87	61.91	74	-10.13	31.88	5.5	35.42	200	68	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2367.87	40.84	39.2	54	-13.16	31.76	5.37	35.49	225	137	Average
2367.87	52.23	50.59	74	-21.77	31.76	5.37	35.49	225	137	Peak
2457	89.04	87.15			31.87	5.46	35.44	240	144	Average
2457	97.65	95.76			31.87	5.46	35.44	240	144	Peak
2483.52	47.2	45.24	54	-6.8	31.88	5.5	35.42	225	137	Average
2483.52	55.97	54.01	74	-18.03	31.88	5.5	35.42	225	137	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2457 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2382	40.91	39.22	54	-13.09	31.78	5.4	35.49	301	73	Average
2382	51.8	50.11	74	-22.2	31.78	5.4	35.49	301	73	Peak
2462	77.59	75.66			31.87	5.5	35.44	295	73	Average
2462	85.65	83.72			31.87	5.5	35.44	295	73	Peak
2483.52	52.96	51	54	-1.04	31.88	5.5	35.42	301	73	Average
2483.52	63.54	61.58	74	-10.46	31.88	5.5	35.42	301	73	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2383.26	40.74	39.05	54	-13.26	31.78	5.4	35.49	186	132	Average
2383.26	52.54	50.85	74	-21.46	31.78	5.4	35.49	186	132	Peak
2462	71.9	69.97			31.87	5.5	35.44	199	132	Average
2462	80.22	78.29			31.87	5.5	35.44	199	132	Peak
2483.52	47.79	45.83	54	-6.21	31.88	5.5	35.42	186	132	Average
2483.52	58.57	56.61	74	-15.43	31.88	5.5	35.42	186	132	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
45.66	28.45	45.36	40	-11.55	14.41	0.9	32.22	156	240	Peak
93.99	38.19	57.62	43.5	-5.31	11.39	1.11	31.93	191	133	Peak
200.91	37.46	57.01	43.5	-6.04	11.09	1.65	32.29	165	270	Peak
347.6	28.05	43.76	46	-17.95	14.17	2.19	32.07	126	150	Peak
643	20.11	30.94	46	-25.89	18.34	2.99	32.16	163	174	Peak
874.7	23.16	30.02	46	-22.84	21.29	3.49	31.64	155	129	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
47.28	32.39	49.2	40	-7.61	14.51	0.9	32.22	168	134	Peak
92.1	35.19	54.98	43.5	-8.31	10.92	1.11	31.82	185	219	Peak
196.86	36.8	56.47	43.5	-6.7	11	1.61	32.28	130	166	Peak
399.4	32.26	47.15	46	-13.74	14.99	2.34	32.22	196	125	Peak
820.1	21.37	29.35	46	-24.63	20.65	3.32	31.95	163	233	Peak
921.6	22.98	29.2	46	-23.02	21.57	3.53	31.32	157	145	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

4.2 Conducted Output Power Measurement

4.2.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

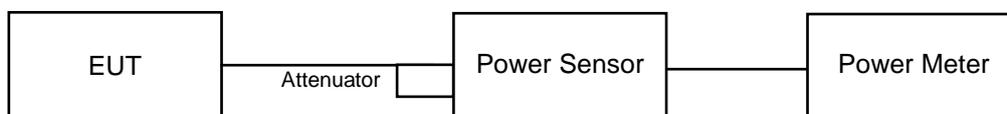
Array Gain = 0 dB (i.e., no array gain) for NANT \leq 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths \geq 40 MHz for any NANT;

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

For power measurements on all other devices: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB.

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

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

4.2.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	99.77	19.99	30	Pass
6	2437	152.05	21.82	30	Pass
11	2462	116.14	20.65	30	Pass
12	2467	41.88	16.22	30	Pass
13	2472	10.96	10.40	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	125.31	20.98	30	Pass
6	2437	186.21	22.70	30	Pass
11	2462	118.85	20.75	30	Pass
12	2467	56.36	17.51	30	Pass
13	2472	2.21	3.45	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	15.76	15.98	77.27	18.88	30	Pass
6	2437	19.74	19.76	188.80	22.76	30	Pass
11	2462	16.34	16.55	88.31	19.46	30	Pass
12	2467	10.80	10.30	22.75	13.57	30	Pass
13	2472	-3.07	-3.26	0.97	-0.15	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.25	14.33	53.70	17.30	30	Pass
6	2437	16.92	17.13	100.93	20.04	30	Pass
9	2452	14.88	15.21	63.97	18.06	30	Pass
10	2457	12.40	12.38	34.67	15.40	30	Pass
11	2462	-3.27	-3.73	0.90	-0.48	30	Pass

5 Pictures of Test Arrangements

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

Appendix – Information on 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:

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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