Partial FCC Test Report

Report No.:	RF180629C33-2
FCC ID:	B94-9560D2WZ
Test Model:	TPN-Q213
Received Date:	Jun. 29, 2018
Test Date:	Jul. 20, 2018 ~ Jul. 23, 2018
Issued Date:	Aug. 14, 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:	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	427177 / TW0011

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Release Control Record

Issue No.	Description	Date Issued
RF180629C33-2	Original Release	Aug. 14, 2018

1 Certificate of Conformity

Product:	Notebook PC
Brand:	HP
Test Model:	TPN-Q213
Sample Status:	ENGINEERING SAMPLE
Applicant:	HP Inc.
Test Date:	Jul. 20, 2018 ~ Jul. 23, 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 :  , **Date:** Aug. 14, 2018

Gina Liu / Specialist

Approved by :  , **Date:** Aug. 14, 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 -0.73 dB at 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	N/A	Refer to Note
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note: This report is a partial report, only test item of Radiated Emissions tests was performed for this report. Other testing data please refer to Intel report no.: 170919-03.TR04 for module (Brand: Intel, Model: 9560D2W).

2.1 Measurement Uncertainty

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

Measurement	**Frequency**	**Expended 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 PC
Brand	HP
Test Model	TPN-Q213
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	19.5 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 ~ 2462 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 WLAN/BT module (Brand: Intel, Model: 9560D2W) was installed in the EUT.
2. 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

3. The antenna information is listed as below.

Antenna Type	Manufacturer	Parts Number	Antenna Gain			
			WLAN 2.4 GHz / Bluetooth	WLAN 5.15~5.35 GHz	WLAN 5.47~5.725 GHz	WLAN 5.725~5.875 GHz
PIFA	**Tablet Mode**					
	INPAQ	Main Antenna: DQ6LB040500 (WA-P-LBLB-04-050) Aux Antenna: DQ6LB040500 (WA-P-LBLB-04-050)	Main: -0.3 Aux: -0.9	Main: 1.0 Aux: 1.1	Main: 2.9 Aux: 0.8	Main: 2.9 Aux: 1.2
	Laptop Mode					
	INPAQ	Main Antenna: DQ6LB040500 (WA-P-LBLB-04-050) Aux Antenna: DQ6LB040500 (WA-P-LBLB-04-050)	Main: -1.0 Aux: -1.1	Main: 2.1 Aux: 0	Main: 0.4 Aux: -0.8	Main: -0.8 Aux: -0.1

4. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	HP	TPN-DA11	I/P: 100-240 Vac, 50/60 Hz, 1.9 A O/P: 19.5 Vdc, 6.9 A 1.78M/0 core
Adapter 2	HP	TPN-CA09	I/P: 100-240 Vac, 50/60 Hz, 1.7 A O/P: 19.5 Vdc, 4.62 A, 90W 1.74M/0 core

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

3.2 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≥1G	RE<1G	
-	√	√	-

Where **RE≥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 **Z-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	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9, 10, 11	OFDM	BPSK	13.5

Radiated Emission Test (Below 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT20)	1 to 13	13	OFDM	BPSK	6.5

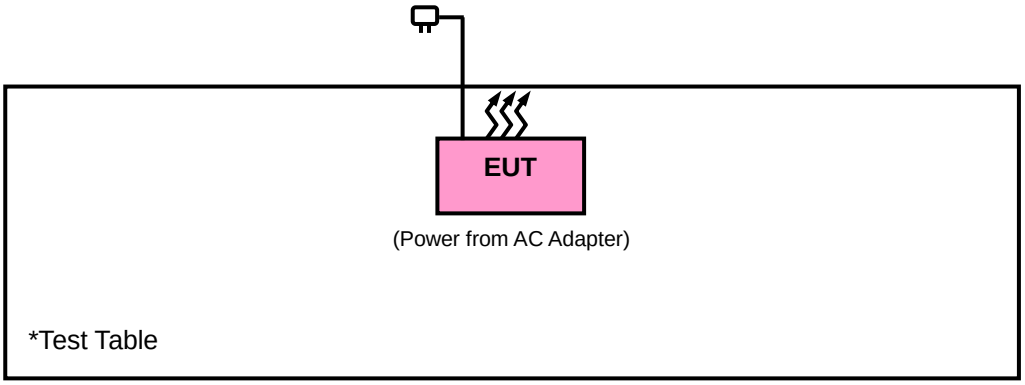
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

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)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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	MY51210203	Mar. 16, 2018	Mar. 15, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Dec. 14, 2017	Dec. 13, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
Loop Antenna	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
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(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
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

For Radiated Emission below 30 MHz

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

Note:

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

For Radiated Emission above 30 MHz

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

Note:

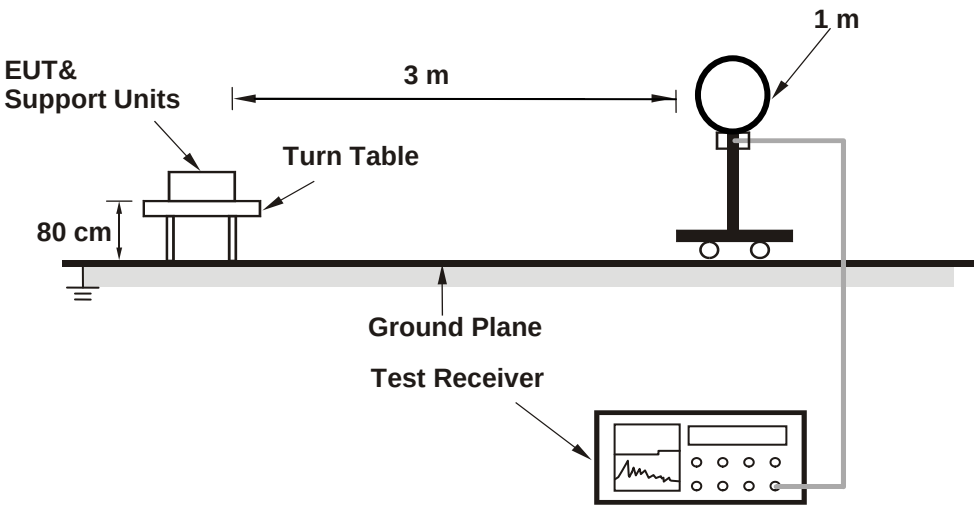
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz. (11b: RBW = 1 MHz, VBW =3 kHz ; 11g: RBW = 1 MHz, VBW = 3 kHz ;
   11n (HT20): RBW = 1 MHz, VBW = 3 kHz ; 11n (HT40): RBW = 1 MHz, VBW = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

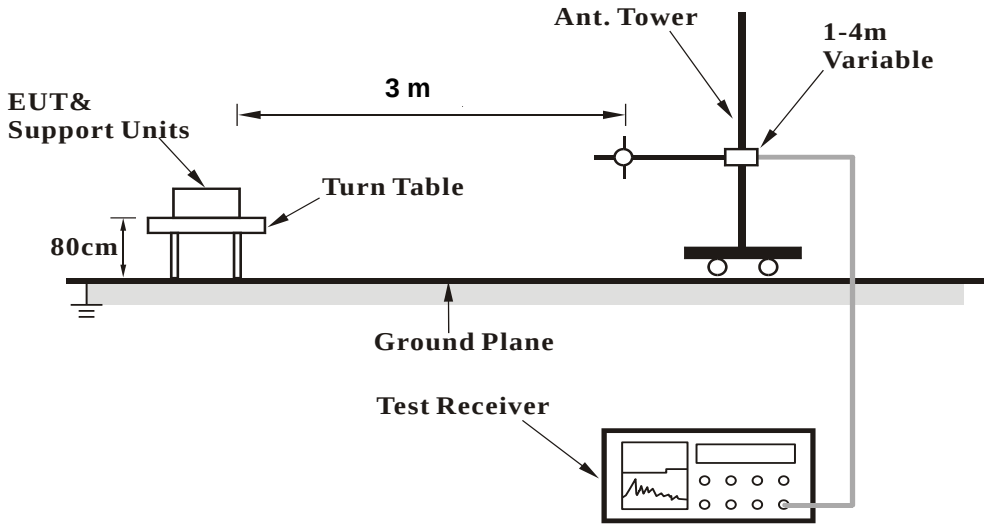
No deviation.

4.1.5 Test Set Up

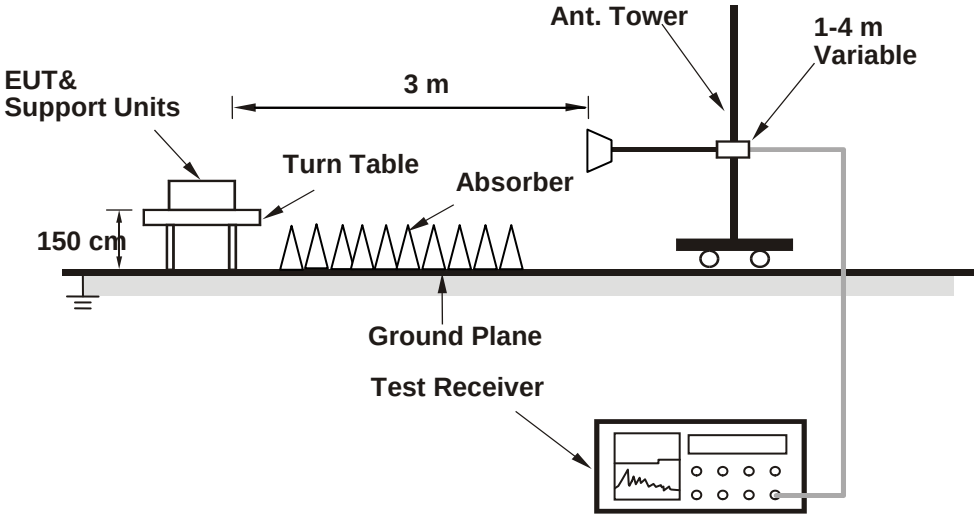
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1 GHz Data：

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**	Karl Lee

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**
2389.2	40.41	38.7	54	-13.59	31.8	5.4	35.49	133	153	Average
2389.2	51.19	49.48	74	-22.81	31.8	5.4	35.49	133	153	Peak
2412	87.93	86.16			31.81	5.43	35.47	133	153	Average
2412	90.52	88.75			31.81	5.43	35.47	133	153	Peak
4824	37.24	29.11	54	-16.76	33.97	8.26	34.1	192	107	Average
4824	46.87	38.74	74	-27.13	33.97	8.26	34.1	192	107	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	52.51	50.8	54	-1.49	31.8	5.4	35.49	286	0	Average
2389.56	57.68	55.97	74	-16.32	31.8	5.4	35.49	286	0	Peak
2412	105.69	103.92			31.81	5.43	35.47	286	0	Average
2412	108.25	106.48			31.81	5.43	35.47	286	0	Peak
4824	37	28.87	54	-17	33.97	8.26	34.1	162	235	Average
4824	46.68	38.55	74	-27.32	33.97	8.26	34.1	162	235	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2385.78	40.35	38.64	54	-13.65	31.8	5.4	35.49	131	125	Average
2385.78	51.73	50.02	74	-22.27	31.8	5.4	35.49	131	125	Peak
2437	89.19	87.34			31.85	5.46	35.46	131	125	Average
2437	91.52	89.67			31.85	5.46	35.46	131	125	Peak
2483.92	40.91	38.95	54	-13.09	31.88	5.5	35.42	131	125	Average
2483.92	51.65	49.69	74	-22.35	31.88	5.5	35.42	131	125	Peak
4874	36.37	28.18	54	-17.63	33.98	8.27	34.06	195	222	Average
4874	45.79	37.6	74	-28.21	33.98	8.27	34.06	195	222	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**
2389.02	42.01	40.3	54	-11.99	31.8	5.4	35.49	279	354	Average
2389.02	52.01	50.3	74	-21.99	31.8	5.4	35.49	279	354	Peak
2437	106.65	104.8			31.85	5.46	35.46	279	354	Average
2437	109.08	107.23			31.85	5.46	35.46	279	354	Peak
2484.36	41.52	39.53	54	-12.48	31.88	5.53	35.42	279	354	Average
2484.36	52.43	50.44	74	-21.57	31.88	5.53	35.42	279	354	Peak
4874	37.62	29.43	54	-16.38	33.98	8.27	34.06	131	188	Average
4874	47.15	38.96	74	-26.85	33.98	8.27	34.06	131	188	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	86.81	84.88			31.87	5.5	35.44	123	125	Average
2462	89.68	87.75			31.87	5.5	35.44	123	125	Peak
2483.56	41.13	39.17	54	-12.87	31.88	5.5	35.42	123	125	Average
2483.56	53.16	51.2	74	-20.84	31.88	5.5	35.42	123	125	Peak
4924	36.67	28.42	54	-17.33	33.99	8.28	34.02	103	325	Average
4924	46.28	38.03	74	-27.72	33.99	8.28	34.02	103	325	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	105.28	103.35			31.87	5.5	35.44	250	355	Average
2462	107.66	105.73			31.87	5.5	35.44	250	355	Peak
2483.52	52.98	51.02	54	-1.02	31.88	5.5	35.42	250	355	Average
2483.52	58.66	56.7	74	-15.34	31.88	5.5	35.42	250	355	Peak
4924	37.45	29.2	54	-16.55	33.99	8.28	34.02	136	96	Average
4924	47.04	38.79	74	-26.96	33.99	8.28	34.02	136	96	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	84.95	83			31.87	5.5	35.42	123	125	Average
2467	87.16	85.21			31.87	5.5	35.42	123	125	Peak
2491.68	40.95	38.94	54	-13.05	31.9	5.53	35.42	123	125	Average
2491.68	52.57	50.56	74	-21.43	31.9	5.53	35.42	123	125	Peak
4934	36.87	28.61	54	-17.13	33.99	8.29	34.02	146	117	Average
4934	46.34	38.08	74	-27.66	33.99	8.29	34.02	146	117	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	102.88	100.93			31.87	5.5	35.42	250	356	Average
2467	105.25	103.3			31.87	5.5	35.42	250	356	Peak
2483.52	52.14	50.18	54	-1.86	31.88	5.5	35.42	250	356	Average
2483.52	57.7	55.74	74	-16.3	31.88	5.5	35.42	250	356	Peak
4934	37.82	29.56	54	-16.18	33.99	8.29	34.02	123	55	Average
4934	47.45	39.19	74	-26.55	33.99	8.29	34.02	123	55	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	102.43	100.47			31.88	5.5	35.42	242	354	Average
2472	104.97	103.01			31.88	5.5	35.42	242	354	Peak
2484.52	49.93	47.94	54	-4.07	31.88	5.53	35.42	242	354	Average
2484.52	55.58	53.59	74	-18.42	31.88	5.53	35.42	242	354	Peak
4944	37.24	28.97	54	-16.76	33.99	8.29	34.01	105	249	Average
4944	46.87	38.6	74	-27.13	33.99	8.29	34.01	105	249	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	87.31	85.35			31.88	5.5	35.42	123	125	Average
2472	89.52	87.56			31.88	5.5	35.42	123	125	Peak
2487.76	40.94	38.93	54	-13.06	31.9	5.53	35.42	123	125	Average
2487.76	51.95	49.94	74	-22.05	31.9	5.53	35.42	123	125	Peak
4944	37.05	28.78	54	-16.95	33.99	8.29	34.01	153	169	Average
4944	46.36	38.09	74	-27.64	33.99	8.29	34.01	153	169	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2387.13	40.41	38.7	54	-13.59	31.8	5.4	35.49	133	153	Average
2387.13	51.74	50.03	74	-22.26	31.8	5.4	35.49	133	153	Peak
2412	82.1	80.33			31.81	5.43	35.47	133	153	Average
2412	90.55	88.78			31.81	5.43	35.47	133	153	Peak
4824	37.31	29.18	54	-16.69	33.97	8.26	34.1	183	112	Average
4824	46.75	38.62	74	-27.25	33.97	8.26	34.1	183	112	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	47.9	46.17	54	-6.1	31.8	5.4	35.47	286	0	Average
2389.92	64.44	62.71	74	-9.56	31.8	5.4	35.47	286	0	Peak
2412	99.34	97.57			31.81	5.43	35.47	286	0	Average
2412	108.02	106.25			31.81	5.43	35.47	286	0	Peak
4824	37.14	29.01	54	-16.86	33.97	8.26	34.1	114	160	Average
4824	46.53	38.4	74	-27.47	33.97	8.26	34.1	114	160	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2387.22	40.61	38.9	54	-13.39	31.8	5.4	35.49	131	125	Average
2387.22	52.1	50.39	74	-21.9	31.8	5.4	35.49	131	125	Peak
2437	85.48	83.63			31.85	5.46	35.46	131	125	Average
2437	94.38	92.53			31.85	5.46	35.46	131	125	Peak
2484.56	41.08	39.09	54	-12.92	31.88	5.53	35.42	131	125	Average
2484.56	51.39	49.4	74	-22.61	31.88	5.53	35.42	131	125	Peak
4874	36.6	28.41	54	-17.4	33.98	8.27	34.06	173	185	Average
4874	46.18	37.99	74	-27.82	33.98	8.27	34.06	173	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**
2389.92	46.54	44.81	54	-7.46	31.8	5.4	35.47	279	354	Average
2389.92	60.21	58.48	74	-13.79	31.8	5.4	35.47	279	354	Peak
2437	103.44	101.59			31.85	5.46	35.46	279	354	Average
2437	111.82	109.97			31.85	5.46	35.46	279	354	Peak
2483.52	51.34	49.38	54	-2.66	31.88	5.5	35.42	279	354	Average
2483.52	66.22	64.26	74	-7.78	31.88	5.5	35.42	279	354	Peak
4874	37.46	29.27	54	-16.54	33.98	8.27	34.06	121	57	Average
4874	47.33	39.14	74	-26.67	33.98	8.27	34.06	121	57	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	82.15	80.22			31.87	5.5	35.44	123	125	Average
2462	90.73	88.8			31.87	5.5	35.44	123	125	Peak
2488.24	41.08	39.07	54	-12.92	31.9	5.53	35.42	123	125	Average
2488.24	52.52	50.51	74	-21.48	31.9	5.53	35.42	123	125	Peak
4924	36.74	28.49	54	-17.26	33.99	8.28	34.02	111	158	Average
4924	46.33	38.08	74	-27.67	33.99	8.28	34.02	111	158	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	98.38	96.45			31.87	5.5	35.44	250	351	Average
2462	107.06	105.13			31.87	5.5	35.44	250	351	Peak
2483.72	48.53	46.57	54	-5.47	31.88	5.5	35.42	250	351	Average
2483.72	64.06	62.1	74	-9.94	31.88	5.5	35.42	250	351	Peak
4924	37.38	29.13	54	-16.62	33.99	8.28	34.02	172	105	Average
4924	47.18	38.93	74	-26.82	33.99	8.28	34.02	172	105	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	81.85	79.9			31.87	5.5	35.42	123	126	Average
2467	89.87	87.92			31.87	5.5	35.42	123	126	Peak
2483.52	41.31	39.35	54	-12.69	31.88	5.5	35.42	123	126	Average
2483.52	52.38	50.42	74	-21.62	31.88	5.5	35.42	123	126	Peak
4934	36.93	28.67	54	-17.07	33.99	8.29	34.02	128	172	Average
4934	46.39	38.13	74	-27.61	33.99	8.29	34.02	128	172	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	97.87	95.92			31.87	5.5	35.42	250	352	Average
2467	106.15	104.2			31.87	5.5	35.42	250	352	Peak
2483.52	52.99	51.03	54	-1.01	31.88	5.5	35.42	250	352	Average
2483.52	64.91	62.95	74	-9.09	31.88	5.5	35.42	250	352	Peak
4934	37.74	29.48	54	-16.26	33.99	8.29	34.02	149	78	Average
4934	47.61	39.35	74	-26.39	33.99	8.29	34.02	149	78	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	68.45	66.49			31.88	5.5	35.42	123	125	Average
2472	76.31	74.35			31.88	5.5	35.42	123	125	Peak
2483.52	41.4	39.44	54	-12.6	31.88	5.5	35.42	123	125	Average
2483.52	52.79	50.83	74	-21.21	31.88	5.5	35.42	123	125	Peak
4944	37.11	28.84	54	-16.89	33.99	8.29	34.01	125	343	Average
4944	46.5	38.23	74	-27.5	33.99	8.29	34.01	125	343	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	78.3	76.34			31.88	5.5	35.42	225	354	Average
2472	86.28	84.32			31.88	5.5	35.42	225	354	Peak
2483.64	52.98	51.02	54	-1.02	31.88	5.5	35.42	225	354	Average
2483.64	63.06	61.1	74	-10.94	31.88	5.5	35.42	225	354	Peak
4944	37.21	28.94	54	-16.79	33.99	8.29	34.01	105	181	Average
4944	46.68	38.41	74	-27.32	33.99	8.29	34.01	105	181	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	40.48	38.75	54	-13.52	31.8	5.4	35.47	174	327	Average
2389.92	51.38	49.65	74	-22.62	31.8	5.4	35.47	174	327	Peak
2412	89.89	88.12			31.81	5.43	35.47	177	331	Average
2412	98.25	96.48			31.81	5.43	35.47	177	331	Peak
4824	38.87	30.74	54	-15.13	33.97	8.26	34.1	125	322	Average
4824	46.8	38.67	74	-27.2	33.97	8.26	34.1	125	322	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**
2389.83	43.57	41.84	54	-10.43	31.8	5.4	35.47	106	353	Average
2389.83	53.39	51.66	74	-20.61	31.8	5.4	35.47	106	353	Peak
2412	98.25	96.48			31.81	5.43	35.47	265	353	Average
2412	106.41	104.64			31.81	5.43	35.47	265	353	Peak
4824	39	30.87	54	-15	33.97	8.26	34.1	124	205	Average
4824	46.9	38.77	74	-27.1	33.97	8.26	34.1	124	205	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2412 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2387.94	40.56	38.85	54	-13.44	31.8	5.4	35.49	294	315	Average
2387.94	51.59	49.88	74	-22.41	31.8	5.4	35.49	294	315	Peak
2437	95.66	93.81			31.85	5.46	35.46	321	315	Average
2437	103.95	102.1			31.85	5.46	35.46	321	315	Peak
2492.16	41.11	39.09	54	-12.89	31.9	5.53	35.41	294	315	Average
2492.16	51.93	49.91	74	-22.07	31.9	5.53	35.41	294	315	Peak
4874	39.14	30.95	54	-14.86	33.98	8.27	34.06	111	95	Average
4874	47.27	39.08	74	-26.73	33.98	8.27	34.06	111	95	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**
2384.88	41.62	39.93	54	-12.38	31.78	5.4	35.49	131	346	Average
2384.88	52.51	50.82	74	-21.49	31.78	5.4	35.49	131	346	Peak
2437	102.19	100.34			31.85	5.46	35.46	127	350	Average
2437	110.69	108.84			31.85	5.46	35.46	127	350	Peak
2483.56	42.71	40.75	54	-11.29	31.88	5.5	35.42	131	346	Average
2483.56	54.68	52.72	74	-19.32	31.88	5.5	35.42	131	346	Peak
4874	39.18	30.99	54	-14.82	33.98	8.27	34.06	125	242	Average
4874	47.04	38.85	74	-26.96	33.98	8.27	34.06	125	242	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	92.96	91.03			31.87	5.5	35.44	313	315	Average
2462	100.74	98.81			31.87	5.5	35.44	313	315	Peak
2483.68	41.28	39.32	54	-12.72	31.88	5.5	35.42	305	311	Average
2483.68	52.52	50.56	74	-21.48	31.88	5.5	35.42	305	311	Peak
4924	39.12	30.87	54	-14.88	33.99	8.28	34.02	146	249	Average
4924	46.5	38.25	74	-27.5	33.99	8.28	34.02	146	249	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	99.48	97.55			31.87	5.5	35.44	124	350	Average
2462	107.99	106.06			31.87	5.5	35.44	124	350	Peak
2483.76	43.75	41.79	54	-10.25	31.88	5.5	35.42	124	352	Average
2483.76	58.13	56.17	74	-15.87	31.88	5.5	35.42	124	352	Peak
4924	38.63	30.38	54	-15.37	33.99	8.28	34.02	124	216	Average
4924	47.13	38.88	74	-26.87	33.99	8.28	34.02	124	216	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	88.44	86.49			31.87	5.5	35.42	314	313	Average
2467	97.21	95.26			31.87	5.5	35.42	314	313	Peak
2483.52	41.71	39.75	54	-12.29	31.88	5.5	35.42	306	311	Average
2483.52	52.71	50.75	74	-21.29	31.88	5.5	35.42	306	311	Peak
4934	38.95	30.69	54	-15.05	33.99	8.29	34.02	112	213	Average
4934	46.69	38.43	74	-27.31	33.99	8.29	34.02	112	213	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	97.53	95.58			31.87	5.5	35.42	123	350	Average
2467	105.99	104.04			31.87	5.5	35.42	123	350	Peak
2483.52	47.1	45.14	54	-6.9	31.88	5.5	35.42	112	350	Average
2483.52	60.12	58.16	74	-13.88	31.88	5.5	35.42	112	350	Peak
4934	39.3	31.04	54	-14.7	33.99	8.29	34.02	121	205	Average
4934	48.29	40.03	74	-25.71	33.99	8.29	34.02	121	205	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2467 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	73.66	71.7			31.88	5.5	35.42	314	314	Average
2472	80.2	78.24			31.88	5.5	35.42	314	314	Peak
2483.52	45.04	43.08	54	-8.96	31.88	5.5	35.42	314	314	Average
2483.52	56.91	54.95	74	-17.09	31.88	5.5	35.42	314	314	Peak
4944	38.83	30.56	54	-15.17	33.99	8.29	34.01	187	1	Average
4944	48.19	39.92	74	-25.81	33.99	8.29	34.01	187	1	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	81.47	79.51			31.88	5.5	35.42	123	350	Average
2472	88.64	86.68			31.88	5.5	35.42	123	350	Peak
2483.52	53.27	51.31	54	-0.73	31.88	5.5	35.42	124	351	Average
2483.52	66.91	64.95	74	-7.09	31.88	5.5	35.42	124	351	Peak
4944	39.42	31.15	54	-14.58	33.99	8.29	34.01	135	326	Average
4944	48.02	39.75	74	-25.98	33.99	8.29	34.01	135	326	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2472 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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	41.43	39.7	54	-12.57	31.8	5.4	35.47	320	317	Average
2389.92	52.07	50.34	74	-21.93	31.8	5.4	35.47	320	317	Peak
2422	87.28	85.48			31.83	5.43	35.46	268	317	Average
2422	95.51	93.71			31.83	5.43	35.46	268	317	Peak
2486.36	40.99	39	54	-13.01	31.88	5.53	35.42	320	317	Average
2486.36	52.21	50.22	74	-21.79	31.88	5.53	35.42	320	317	Peak
4844	40.04	31.89	54	-13.96	33.97	8.26	34.08	113	245	Average
4844	46.67	38.52	74	-27.33	33.97	8.26	34.08	113	245	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**
2389.38	46.28	44.57	54	-7.72	31.8	5.4	35.49	107	355	Average
2389.38	57	55.29	74	-17	31.8	5.4	35.49	107	355	Peak
2422	96.51	94.71			31.83	5.43	35.46	128	348	Average
2422	104.7	102.9			31.83	5.43	35.46	128	348	Peak
2483.88	42.19	40.23	54	-11.81	31.88	5.5	35.42	107	355	Average
2483.88	54.63	52.67	74	-19.37	31.88	5.5	35.42	107	355	Peak
4844	39.71	31.56	54	-14.29	33.97	8.26	34.08	124	306	Average
4844	47.35	39.2	74	-26.65	33.97	8.26	34.08	124	306	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2422 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2388.84	41	39.29	54	-13	31.8	5.4	35.49	321	306	Average
2388.84	51.86	50.15	74	-22.14	31.8	5.4	35.49	321	306	Peak
2437	90.47	88.62			31.85	5.46	35.46	321	315	Average
2437	98.82	96.97			31.85	5.46	35.46	321	315	Peak
2483.84	41.6	39.64	54	-12.4	31.88	5.5	35.42	321	306	Average
2483.84	52.75	50.79	74	-21.25	31.88	5.5	35.42	321	306	Peak
4874	40.19	32	54	-13.81	33.98	8.27	34.06	124	175	Average
4874	47.12	38.93	74	-26.88	33.98	8.27	34.06	124	175	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**
2389.02	43.99	42.28	54	-10.01	31.8	5.4	35.49	106	350	Average
2389.02	54.55	52.84	74	-19.45	31.8	5.4	35.49	106	350	Peak
2437	98.81	96.96			31.85	5.46	35.46	127	350	Average
2437	106.93	105.08			31.85	5.46	35.46	127	350	Peak
2483.68	45.44	43.48	54	-8.56	31.88	5.5	35.42	106	350	Average
2483.68	56.44	54.48	74	-17.56	31.88	5.5	35.42	106	350	Peak
4874	40.09	31.9	54	-13.91	33.98	8.27	34.06	113	326	Average
4874	46.24	38.05	74	-27.76	33.98	8.27	34.06	113	326	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2437 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2388.75	40.65	38.94	54	-13.35	31.8	5.4	35.49	314	315	Average
2388.75	51.81	50.1	74	-22.19	31.8	5.4	35.49	314	315	Peak
2452	89.76	87.89			31.85	5.46	35.44	314	315	Average
2452	98.09	96.22			31.85	5.46	35.44	314	315	Peak
2483.6	41.53	39.57	54	-12.47	31.88	5.5	35.42	314	315	Average
2483.6	52.56	50.6	74	-21.44	31.88	5.5	35.42	314	315	Peak
4904	40.28	32.06	54	-13.72	33.98	8.28	34.04	124	322	Average
4904	46.99	38.77	74	-27.01	33.98	8.28	34.04	124	322	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**
2387.76	41.42	39.71	54	-12.58	31.8	5.4	35.49	124	350	Average
2387.76	52.52	50.81	74	-21.48	31.8	5.4	35.49	124	350	Peak
2452	97.03	95.16			31.85	5.46	35.44	124	350	Average
2452	105.35	103.48			31.85	5.46	35.44	124	350	Peak
2483.6	46.22	44.26	54	-7.78	31.88	5.5	35.42	131	356	Average
2483.6	57.22	55.26	74	-16.78	31.88	5.5	35.42	131	356	Peak
4904	40.21	31.99	54	-13.79	33.98	8.28	34.04	115	204	Average
4904	47.31	39.09	74	-26.69	33.98	8.28	34.04	115	204	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2452 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2387.58	40.34	38.63	54	-13.66	31.8	5.4	35.49	314	313	Average
2387.58	51.72	50.01	74	-22.28	31.8	5.4	35.49	314	313	Peak
2457	84.34	82.45			31.87	5.46	35.44	314	313	Average
2457	92.73	90.84			31.87	5.46	35.44	314	313	Peak
2484.36	41.25	39.26	54	-12.75	31.88	5.53	35.42	314	313	Average
2484.36	52.34	50.35	74	-21.66	31.88	5.53	35.42	314	313	Peak
4914	40.32	32.1	54	-13.68	33.98	8.28	34.04	135	350	Average
4914	46.69	38.47	74	-27.31	33.98	8.28	34.04	135	350	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**
2386.77	40.73	39.02	54	-13.27	31.8	5.4	35.49	123	350	Average
2386.77	51.59	49.88	74	-22.41	31.8	5.4	35.49	123	350	Peak
2457	92.19	90.3			31.87	5.46	35.44	123	350	Average
2457	100.96	99.07			31.87	5.46	35.44	123	350	Peak
2483.56	45.35	43.39	54	-8.65	31.88	5.5	35.42	126	357	Average
2483.56	58.41	56.45	74	-15.59	31.88	5.5	35.42	126	357	Peak
4914	40.23	32.01	54	-13.77	33.98	8.28	34.04	155	222	Average
4914	46.71	38.49	74	-27.29	33.98	8.28	34.04	155	222	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2457 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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**	Karl Lee

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**
2380.56	40.3	38.61	54	-13.7	31.78	5.4	35.49	300	313	Average
2380.56	50.91	49.22	74	-23.09	31.78	5.4	35.49	300	313	Peak
2462	77.47	75.54			31.87	5.5	35.44	300	313	Average
2462	84.54	82.61			31.87	5.5	35.44	300	313	Peak
2483.52	41.59	39.63	54	-12.41	31.88	5.5	35.42	300	313	Average
2483.52	54.05	52.09	74	-19.95	31.88	5.5	35.42	300	313	Peak
4924	39.68	31.43	54	-14.32	33.99	8.28	34.02	112	2	Average
4924	46.74	38.49	74	-27.26	33.99	8.28	34.02	112	2	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**
2382.63	40.97	39.28	54	-13.03	31.78	5.4	35.49	123	350	Average
2382.63	51.41	49.72	74	-22.59	31.78	5.4	35.49	123	350	Peak
2462	85.47	83.54			31.87	5.5	35.44	123	350	Average
2462	92.48	90.55			31.87	5.5	35.44	123	350	Peak
2483.52	47.97	46.01	54	-6.03	31.88	5.5	35.42	116	350	Average
2483.52	65.55	63.59	74	-8.45	31.88	5.5	35.42	116	350	Peak
4924	40.19	31.94	54	-13.81	33.99	8.28	34.02	194	165	Average
4924	46.72	38.47	74	-27.28	33.99	8.28	34.02	194	165	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

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:

802.11n (HT20)

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**	Karl Lee

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**
50.52	21.05	37.83	40	-18.95	14.54	0.9	32.22	153	243	Peak
104.79	16.48	35.04	43.5	-27.02	12.42	1.28	32.26	168	148	Peak
230.34	15.98	34.51	46	-30.02	11.79	1.85	32.17	151	46	Peak
453.3	16.19	30.23	46	-29.81	15.61	2.49	32.14	171	145	Peak
655.6	18.18	28.79	46	-27.82	18.54	2.99	32.14	139	185	Peak
843.9	21.36	28.87	46	-24.64	20.94	3.38	31.83	182	164	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**
53.49	23.96	40.99	40	-16.04	14.3	0.9	32.23	113	168	Peak
126.66	5.4	26.95	43.5	-38.1	9.31	1.38	32.24	155	246	Peak
246	10.71	28.74	46	-35.29	12.23	1.85	32.11	178	154	Peak
407.1	12.68	27.4	46	-33.32	15.08	2.41	32.21	104	209	Peak
515.6	15.47	28.35	46	-30.53	16.55	2.7	32.13	165	8	Peak
846	21.78	29.25	46	-24.22	20.97	3.38	31.82	157	123	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value.
2. The emission levels of other frequencies were very low against the limit.

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:

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

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