

FCC Test Report

Report No.: RF180227C27-2

FCC ID: QYL8265NGK

Test Model: K120

Received Date: Mar. 02, 2018

Test Date: Apr. 11, 2018 ~ May 14, 2018

Issued Date: May 15, 2018

Applicant: Getac Technology Corporation.

Address: 5F., Building A, No. 209, Sec.1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

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): No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

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



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Release Control Record

Issue No.	Description	Date Issued
RF180227C27-2	Original Release	May 15, 2018

1 Certificate of Conformity

Product: Tablet

Brand: Getac

Test Model: K120

Sample Status: Identical Prototype

Applicant: Getac Technology Corporation.

Test Date: Apr. 11, 2018 ~ May 14, 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 : Evonne Liu, **Date:** May 15, 2018
Evonne Liu / Specialist

Approved by : Dylan Chiou, **Date:** May 15, 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	Pass	Meet the requirement of limit. Minimum passing margin is -16.10 dB at 0.16600 MHz.
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 2489.48 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: This report is a partial report, only test item of Conducted Emission, Conducted power and Radiated Emissions tests were performed for this report. Other testing data please refer to Intel report no.: 160321-01.TR02 for module (Brand: Intel, Model: 8265NGW).

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	Tablet
Brand	Getac
Test Model	K120
Status of EUT	Identical Prototype
Power Supply Rating	11.1 Vdc (Battery) 19 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 150.0 Mbps
Operating Frequency	2412 ~ 2472 MHz
Number of Channel	13 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Antenna Type	PIFA antenna with 2.42 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- 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

- The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Chicony	A12-065N2A	I/P: 100-240 Vac, 50-60 Hz, 1.7 A O/P: 19 Vdc, 3.42 A 1.75 m shielded cable with 1 core
Battery 1	Getac	BP3S1P2100S-01	11.1 Vdc, 2100 mAh
Battery 2	Getac	BP4S1P3450P-01	14.4 Vdc, 3450 mAh
WWAN Module	Sierra	EM7455	--
WiFi & BT Module	Intel	8265NGK	--

* According to the pretest result, the Battery 1 had worse value. Therefore, Battery 1 was used for the final test.

- 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		

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE $<$ 1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission

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

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 11	1, 6, 11, 12, 13	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11, 12, 13	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	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)
-	802.11b	1 to 11	12	OFDM	BPSK	13.5

Power Line Conducted Emission Test:

- 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 11	12	OFDM	BPSK	13.5

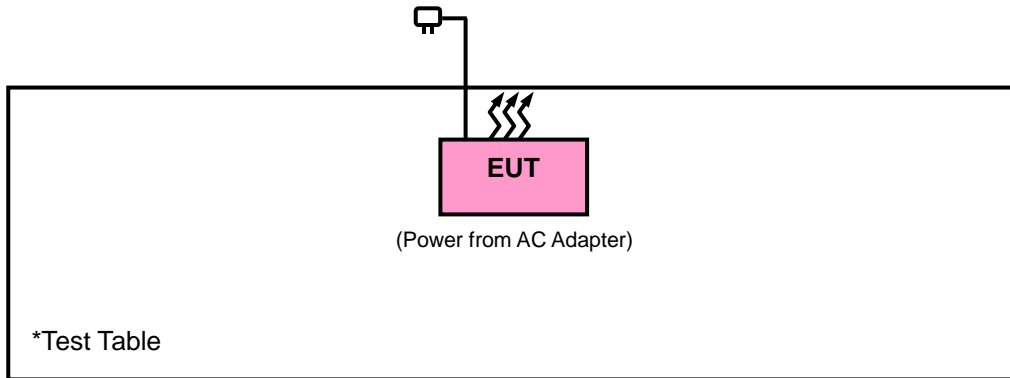
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 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
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang

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.

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
Double Ridge Guide Horn Antenna EMCO	3115	5619	Nov. 30, 2017	Nov. 29, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 06, 2017	Dec. 05, 2018
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
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 23, 2017	Jun. 22, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 23, 2017	Jun. 22, 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
HORN Antenna Schwarzbeck	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018
Preamplifier Agilent	EMC 184045	980116	Oct. 20, 2017	Oct. 19, 2018

- 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:

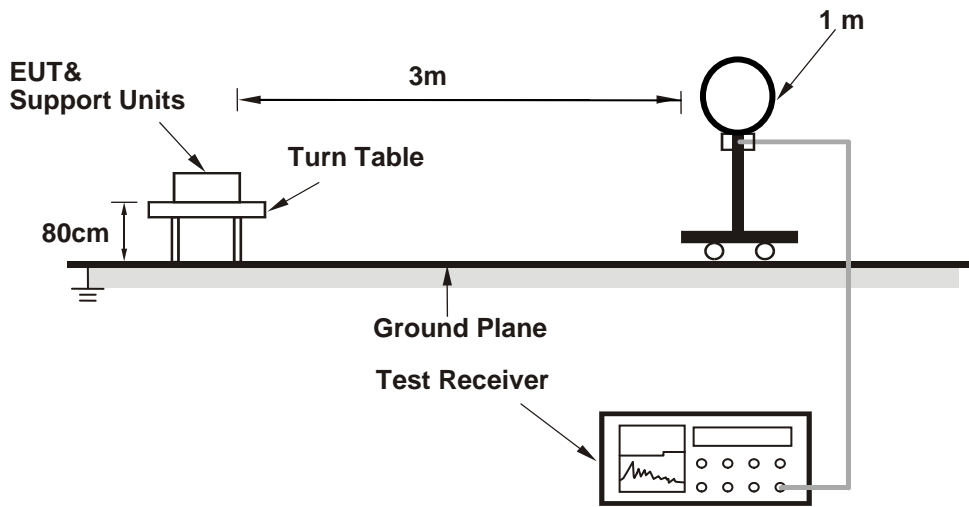
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency 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

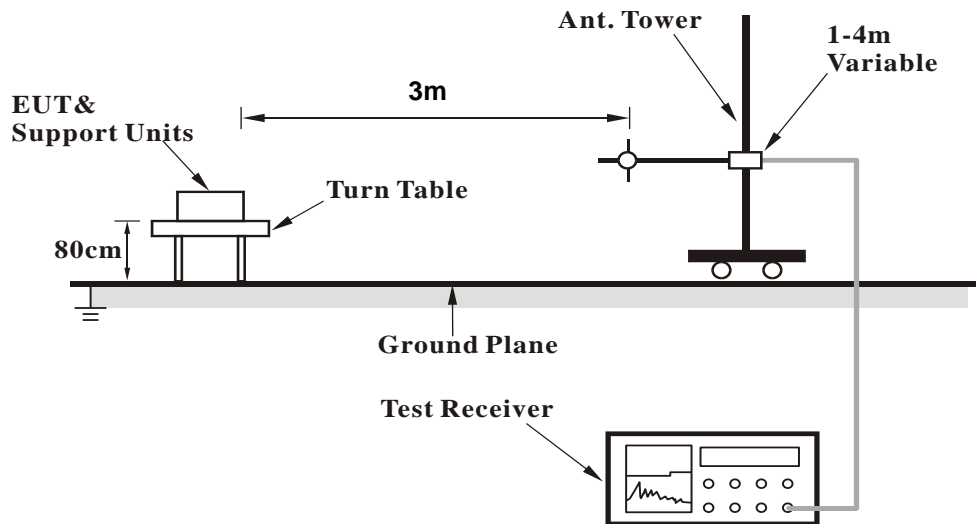
No deviation.

4.1.5 Test Set Up

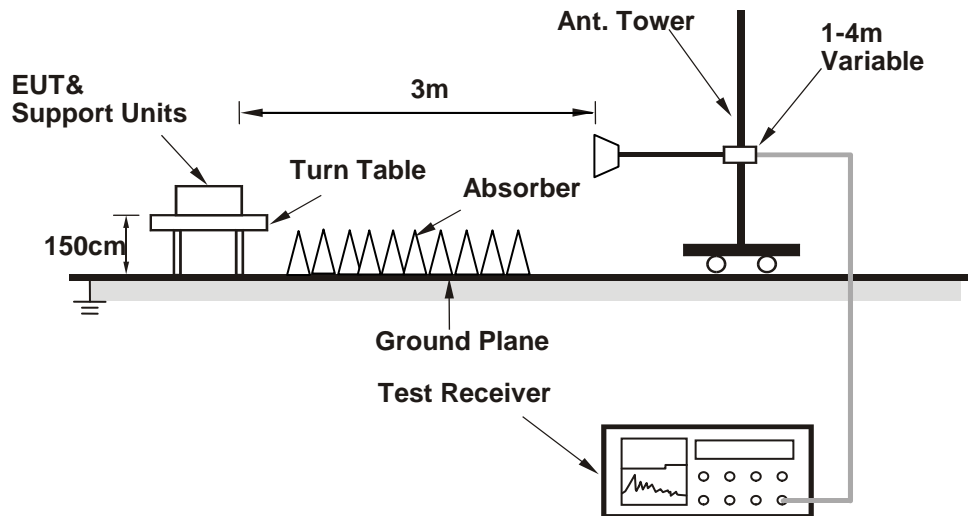
<Radiated emission below 30 MHz>



<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	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	46.32	44.59	54	-7.68	31.8	5.4	35.47	297	300	Average
2389.92	52.55	50.82	74	-21.45	31.8	5.4	35.47	297	300	Peak
2412	98.45	96.68			31.81	5.43	35.47	297	300	Average
2412	102.35	100.58			31.81	5.43	35.47	297	300	Peak
4824	38.07	29.94	54	-15.93	33.97	8.26	34.1	136	304	Average
4824	48.37	40.24	74	-25.63	33.97	8.26	34.1	136	304	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
2388.03	46.41	44.7	54	-7.59	31.8	5.4	35.49	155	77	Average
2388.03	55.01	53.3	74	-18.99	31.8	5.4	35.49	155	77	Peak
2412	100.74	98.97			31.81	5.43	35.47	155	77	Average
2412	104.74	102.97			31.81	5.43	35.47	155	77	Peak
4824	37.55	29.42	54	-16.45	33.97	8.26	34.1	129	245	Average
4824	47.47	39.34	74	-26.53	33.97	8.26	34.1	129	245	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	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
2388.66	44.05	42.34	54	-9.95	31.8	5.4	35.49	297	300	Average
2388.66	52.6	50.89	74	-21.4	31.8	5.4	35.49	297	300	Peak
2437	100.66	98.81			31.85	5.46	35.46	297	300	Average
2437	104.18	102.33			31.85	5.46	35.46	297	300	Peak
2491.2	44.45	42.44	54	-9.55	31.9	5.53	35.42	297	300	Average
2491.2	52.83	50.82	74	-21.17	31.9	5.53	35.42	297	300	Peak
4874	37.86	29.67	54	-16.14	33.98	8.27	34.06	176	105	Average
4874	47.6	39.41	74	-26.4	33.98	8.27	34.06	176	105	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
2388.39	45.44	43.73	54	-8.56	31.8	5.4	35.49	155	77	Average
2388.39	54.03	52.32	74	-19.97	31.8	5.4	35.49	155	77	Peak
2437	102.97	101.12			31.85	5.46	35.46	155	77	Average
2437	106.81	104.96			31.85	5.46	35.46	155	77	Peak
2491.12	46.62	44.61	54	-7.38	31.9	5.53	35.42	155	77	Average
2491.12	54.57	52.56	74	-19.43	31.9	5.53	35.42	155	77	Peak
4874	38.05	29.86	54	-15.95	33.98	8.27	34.06	142	116	Average
4874	47.79	39.6	74	-26.21	33.98	8.27	34.06	142	116	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	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	99.42	97.49			31.87	5.5	35.44	312	303	Average
2462	103.74	101.81			31.87	5.5	35.44	312	303	Peak
2484.52	45.19	43.2	54	-8.81	31.88	5.53	35.42	312	303	Average
2484.52	53.06	51.07	74	-20.94	31.88	5.53	35.42	312	303	Peak
4924	38.24	29.99	54	-15.76	33.99	8.28	34.02	158	226	Average
4924	48.5	40.25	74	-25.5	33.99	8.28	34.02	158	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
2462	101.77	99.84			31.87	5.5	35.44	158	77	Average
2462	105.71	103.78			31.87	5.5	35.44	158	77	Peak
2485.92	48.64	46.65	54	-5.36	31.88	5.53	35.42	158	77	Average
2485.92	54.82	52.83	74	-19.18	31.88	5.53	35.42	158	77	Peak
4924	38.16	29.91	54	-15.84	33.99	8.28	34.02	118	150	Average
4924	48.13	39.88	74	-25.87	33.99	8.28	34.02	118	150	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	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	96.82	94.87			31.87	5.5	35.42	312	303	Average
2467	100.74	98.79			31.87	5.5	35.42	312	303	Peak
2483.52	49.94	47.98	54	-4.06	31.88	5.5	35.42	312	303	Average
2483.52	56.92	54.96	74	-17.08	31.88	5.5	35.42	312	303	Peak
4934	37.85	29.59	54	-16.15	33.99	8.29	34.02	144	132	Average
4934	47.68	39.42	74	-26.32	33.99	8.29	34.02	144	132	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	98.66	96.71			31.87	5.5	35.42	158	77	Average
2467	102.62	100.67			31.87	5.5	35.42	158	77	Peak
2489.48	52.98	50.97	54	-1.02	31.9	5.53	35.42	158	77	Average
2489.48	58.02	56.01	74	-15.98	31.9	5.53	35.42	158	77	Peak
4934	38.61	30.35	54	-15.39	33.99	8.29	34.02	126	74	Average
4934	49.26	41	74	-24.74	33.99	8.29	34.02	126	74	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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	89.29	87.33			31.88	5.5	35.42	286	324	Average
2472	91.88	89.92			31.88	5.5	35.42	286	324	Peak
2484.64	45.25	43.26	54	-8.75	31.88	5.53	35.42	286	324	Average
2484.64	53.76	51.77	74	-20.24	31.88	5.53	35.42	286	324	Peak
4944	38.54	30.27	54	-15.46	33.99	8.29	34.01	105	196	Average
4944	48.85	40.58	74	-25.15	33.99	8.29	34.01	105	196	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	92.88	90.92			31.88	5.5	35.42	148	83	Average
2472	95.56	93.6			31.88	5.5	35.42	148	83	Peak
2486.8	49.51	47.52	54	-4.49	31.88	5.53	35.42	148	83	Average
2486.8	56.5	54.51	74	-17.5	31.88	5.53	35.42	148	83	Peak
4944	38.36	30.09	54	-15.64	33.99	8.29	34.01	127	342	Average
4944	48.75	40.48	74	-25.25	33.99	8.29	34.01	127	342	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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	46.25	44.52	54	-7.75	31.8	5.4	35.47	297	300	Average
2389.92	59.23	57.5	74	-14.77	31.8	5.4	35.47	297	300	Peak
2412	96.74	94.97			31.81	5.43	35.47	297	300	Average
2412	104.52	102.75			31.81	5.43	35.47	297	300	Peak
4824	37.69	29.56	54	-16.31	33.97	8.26	34.1	111	283	Average
4824	47.41	39.28	74	-26.59	33.97	8.26	34.1	111	283	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	48.64	46.91	54	-5.36	31.8	5.4	35.47	155	77	Average
2389.83	62.3	60.57	74	-11.7	31.8	5.4	35.47	155	77	Peak
2412	98.94	97.17			31.81	5.43	35.47	155	77	Average
2412	106.68	104.91			31.81	5.43	35.47	155	77	Peak
4824	38.04	29.91	54	-15.96	33.97	8.26	34.1	129	311	Average
4824	48.32	40.19	74	-25.68	33.97	8.26	34.1	129	311	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	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	42.96	41.23	54	-11.04	31.8	5.4	35.47	297	300	Average
2389.92	54.72	52.99	74	-19.28	31.8	5.4	35.47	297	300	Peak
2437	99.13	97.28			31.85	5.46	35.46	297	300	Average
2437	106.84	104.99			31.85	5.46	35.46	297	300	Peak
2483.52	43.98	42.02	54	-10.02	31.88	5.5	35.42	297	300	Average
2483.52	56.26	54.3	74	-17.74	31.88	5.5	35.42	297	300	Peak
4874	38.15	29.96	54	-15.85	33.98	8.27	34.06	156	182	Average
4874	48.33	40.14	74	-25.67	33.98	8.27	34.06	156	182	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
2389.74	45.09	43.38	54	-8.91	31.8	5.4	35.49	155	77	Average
2389.74	55.08	53.37	74	-18.92	31.8	5.4	35.49	155	77	Peak
2437	100.54	98.69			31.85	5.46	35.46	155	77	Average
2437	108.54	106.69			31.85	5.46	35.46	155	77	Peak
2484.32	46.17	44.18	54	-7.83	31.88	5.53	35.42	155	77	Average
2484.32	58.66	56.67	74	-15.34	31.88	5.53	35.42	155	77	Peak
4874	38.88	30.69	54	-15.12	33.98	8.27	34.06	165	224	Average
4874	49.25	41.06	74	-24.75	33.98	8.27	34.06	165	224	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	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	96.39	94.46			31.87	5.5	35.44	312	303	Average
2462	104.1	102.17			31.87	5.5	35.44	312	303	Peak
2483.52	45.12	43.16	54	-8.88	31.88	5.5	35.42	312	303	Average
2483.52	57.26	55.3	74	-16.74	31.88	5.5	35.42	312	303	Peak
4924	38.26	30.01	54	-15.74	33.99	8.28	34.02	132	228	Average
4924	48.44	40.19	74	-25.56	33.99	8.28	34.02	132	228	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	98.47	96.54			31.87	5.5	35.44	158	77	Average
2462	106.55	104.62			31.87	5.5	35.44	158	77	Peak
2483.6	48.01	46.05	54	-5.99	31.88	5.5	35.42	158	77	Average
2483.6	61.71	59.75	74	-12.29	31.88	5.5	35.42	158	77	Peak
4924	37.62	29.37	54	-16.38	33.99	8.28	34.02	172	134	Average
4924	47.74	39.49	74	-26.26	33.99	8.28	34.02	172	134	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	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	90.96	89.01			31.87	5.5	35.42	312	303	Average
2467	98.77	96.82			31.87	5.5	35.42	312	303	Peak
2483.52	44.68	42.72	54	-9.32	31.88	5.5	35.42	312	303	Average
2483.52	60.95	58.99	74	-13.05	31.88	5.5	35.42	312	303	Peak
4934	38.42	30.16	54	-15.58	33.99	8.29	34.02	123	95	Average
4934	48.67	40.41	74	-25.33	33.99	8.29	34.02	123	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
2467	93.63	91.68			31.87	5.5	35.42	158	77	Average
2467	101.7	99.75			31.87	5.5	35.42	158	77	Peak
2483.56	47.41	45.45	54	-6.59	31.88	5.5	35.42	158	77	Average
2483.56	65.34	63.38	74	-8.66	31.88	5.5	35.42	158	77	Peak
4934	37.75	29.49	54	-16.25	33.99	8.29	34.02	152	223	Average
4934	47.98	39.72	74	-26.02	33.99	8.29	34.02	152	223	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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	77.45	75.49			31.88	5.5	35.42	286	324	Average
2472	85.26	83.3			31.88	5.5	35.42	286	324	Peak
2483.52	46.26	44.3	54	-7.74	31.88	5.5	35.42	286	324	Average
2483.52	59.2	57.24	74	-14.8	31.88	5.5	35.42	286	324	Peak
4944	37.48	29.21	54	-16.52	33.99	8.29	34.01	164	129	Average
4944	47.84	39.57	74	-26.16	33.99	8.29	34.01	164	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
2472	80.18	78.22			31.88	5.5	35.42	148	83	Average
2472	88.06	86.1			31.88	5.5	35.42	148	83	Peak
2483.6	50.47	48.51	54	-3.53	31.88	5.5	35.42	148	83	Average
2483.6	64.23	62.27	74	-9.77	31.88	5.5	35.42	148	83	Peak
4944	38.03	29.76	54	-15.97	33.99	8.29	34.01	186	314	Average
4944	48.3	40.03	74	-25.7	33.99	8.29	34.01	186	314	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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	43.41	41.7	54	-10.59	31.8	5.4	35.49	274	115	Average
2389.2	54.54	52.83	74	-19.46	31.8	5.4	35.49	274	115	Peak
2412	94.32	92.55			31.81	5.43	35.47	322	136	Average
2412	102.51	100.74			31.81	5.43	35.47	322	136	Peak
4824	37.21	29.08	54	-16.79	33.97	8.26	34.1	194	107	Average
4824	47.38	39.25	74	-26.62	33.97	8.26	34.1	194	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
2389.83	46.25	44.52	54	-7.75	31.8	5.4	35.47	283	353	Average
2389.83	57.05	55.32	74	-16.95	31.8	5.4	35.47	283	353	Peak
2412	96.86	95.09			31.81	5.43	35.47	244	357	Average
2412	104.6	102.83			31.81	5.43	35.47	244	357	Peak
4824	37.48	29.35	54	-16.52	33.97	8.26	34.1	123	169	Average
4824	47.87	39.74	74	-26.13	33.97	8.26	34.1	123	169	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	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
2388.48	41.63	39.92	54	-12.37	31.8	5.4	35.49	340	123	Average
2388.48	52.24	50.53	74	-21.76	31.8	5.4	35.49	340	123	Peak
2437	98.66	96.81			31.85	5.46	35.46	340	123	Average
2437	106.67	104.82			31.85	5.46	35.46	340	123	Peak
2485.2	42.22	40.23	54	-11.78	31.88	5.53	35.42	340	123	Average
2485.2	52.83	50.84	74	-21.17	31.88	5.53	35.42	340	123	Peak
4874	37.6	29.41	54	-16.4	33.98	8.27	34.06	136	192	Average
4874	47.69	39.5	74	-26.31	33.98	8.27	34.06	136	192	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
2387.85	41.69	39.98	54	-12.31	31.8	5.4	35.49	302	221	Average
2387.85	52.46	50.75	74	-21.54	31.8	5.4	35.49	302	221	Peak
2437	100.74	98.89			31.85	5.46	35.46	295	221	Average
2437	108.6	106.75			31.85	5.46	35.46	295	221	Peak
2483.56	42.35	40.39	54	-11.65	31.88	5.5	35.42	295	221	Average
2483.56	53.43	51.47	74	-20.57	31.88	5.5	35.42	295	221	Peak
4874	37.41	29.22	54	-16.59	33.98	8.27	34.06	145	180	Average
4874	47.6	39.41	74	-26.4	33.98	8.27	34.06	145	180	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	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	95.66	93.73			31.87	5.5	35.44	322	131	Average
2462	104.17	102.24			31.87	5.5	35.44	322	131	Peak
2483.72	44.32	42.36	54	-9.68	31.88	5.5	35.42	322	131	Average
2483.72	55.41	53.45	74	-18.59	31.88	5.5	35.42	322	131	Peak
4924	37.81	29.56	54	-16.19	33.99	8.28	34.02	169	43	Average
4924	47.95	39.7	74	-26.05	33.99	8.28	34.02	169	43	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	98.25	96.32			31.87	5.5	35.44	226	227	Average
2462	106.57	104.64			31.87	5.5	35.44	226	227	Peak
2483.6	46.9	44.94	54	-7.1	31.88	5.5	35.42	260	232	Average
2483.6	59.5	57.54	74	-14.5	31.88	5.5	35.42	260	232	Peak
4924	37.43	29.18	54	-16.57	33.99	8.28	34.02	142	186	Average
4924	47.68	39.43	74	-26.32	33.99	8.28	34.02	142	186	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	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	89.13	87.18			31.87	5.5	35.42	366	153	Average
2467	96.77	94.82			31.87	5.5	35.42	366	153	Peak
2483.52	45.39	43.43	54	-8.61	31.88	5.5	35.42	367	153	Average
2483.52	60.75	58.79	74	-13.25	31.88	5.5	35.42	367	153	Peak
4934	38.27	30.01	54	-15.73	33.99	8.29	34.02	125	162	Average
4934	48.32	40.06	74	-25.68	33.99	8.29	34.02	125	162	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	91.32	89.37			31.87	5.5	35.42	226	227	Average
2467	99.31	97.36			31.87	5.5	35.42	226	227	Peak
2483.56	46.92	44.96	54	-7.08	31.88	5.5	35.42	260	233	Average
2483.56	61.51	59.55	74	-12.49	31.88	5.5	35.42	260	233	Peak
4934	37.39	29.13	54	-16.61	33.99	8.29	34.02	174	340	Average
4934	47.57	39.31	74	-26.43	33.99	8.29	34.02	174	340	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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	74.68	72.72			31.88	5.5	35.42	366	153	Average
2472	82.81	80.85			31.88	5.5	35.42	366	153	Peak
2483.6	47.33	45.37	54	-6.67	31.88	5.5	35.42	366	153	Average
2483.6	62.92	60.96	74	-11.08	31.88	5.5	35.42	366	153	Peak
4944	37.24	28.97	54	-16.76	33.99	8.29	34.01	129	321	Average
4944	47.32	39.05	74	-26.68	33.99	8.29	34.01	129	321	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	77.74	75.78			31.88	5.5	35.42	226	227	Average
2472	85.53	83.57			31.88	5.5	35.42	226	227	Peak
2483.56	49.25	47.29	54	-4.75	31.88	5.5	35.42	221	243	Average
2483.56	62.93	60.97	74	-11.07	31.88	5.5	35.42	221	243	Peak
4944	37.54	29.27	54	-16.46	33.99	8.29	34.01	174	124	Average
4944	47.75	39.48	74	-26.25	33.99	8.29	34.01	174	124	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	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
2388.21	44.93	43.22	54	-9.07	31.8	5.4	35.49	340	106	Average
2388.21	55.39	53.68	74	-18.61	31.8	5.4	35.49	340	106	Peak
2422	91.31	89.51			31.83	5.43	35.46	340	123	Average
2422	99.42	97.62			31.83	5.43	35.46	340	123	Peak
2484.24	41.89	39.9	54	-12.11	31.88	5.53	35.42	340	106	Average
2484.24	52.48	50.49	74	-21.52	31.88	5.53	35.42	340	106	Peak
4844	37.5	29.35	54	-16.5	33.97	8.26	34.08	126	347	Average
4844	47.63	39.48	74	-26.37	33.97	8.26	34.08	126	347	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
2388.39	47.81	46.1	54	-6.19	31.8	5.4	35.49	387	348	Average
2388.39	58.32	56.61	74	-15.68	31.8	5.4	35.49	387	348	Peak
2422	93.5	91.7			31.83	5.43	35.46	373	348	Average
2422	101.81	100.01			31.83	5.43	35.46	373	348	Peak
2484.48	43.05	41.06	54	-10.95	31.88	5.53	35.42	387	348	Average
2484.48	54.07	52.08	74	-19.93	31.88	5.53	35.42	387	348	Peak
4844	37.84	29.69	54	-16.16	33.97	8.26	34.08	145	228	Average
4844	47.94	39.79	74	-26.06	33.97	8.26	34.08	145	228	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	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
2388.39	42.75	41.04	54	-11.25	31.8	5.4	35.49	288	131	Average
2388.39	53.72	52.01	74	-20.28	31.8	5.4	35.49	288	131	Peak
2437	93.95	92.1			31.85	5.46	35.46	322	131	Average
2437	102.18	100.33			31.85	5.46	35.46	322	131	Peak
2484.04	43.15	41.19	54	-10.85	31.88	5.5	35.42	288	131	Average
2484.04	53.57	51.61	74	-20.43	31.88	5.5	35.42	288	131	Peak
4874	37.43	29.24	54	-16.57	33.98	8.27	34.06	158	224	Average
4874	47.69	39.5	74	-26.31	33.98	8.27	34.06	158	224	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
2389.65	44.58	42.87	54	-9.42	31.8	5.4	35.49	315	271	Average
2389.65	54.89	53.18	74	-19.11	31.8	5.4	35.49	315	271	Peak
2437	96.19	94.34			31.85	5.46	35.46	295	221	Average
2437	104.1	102.25			31.85	5.46	35.46	295	221	Peak
2483.68	45.74	43.78	54	-8.26	31.88	5.5	35.42	315	271	Average
2483.68	55.45	53.49	74	-18.55	31.88	5.5	35.42	315	271	Peak
4874	37.49	29.3	54	-16.51	33.98	8.27	34.06	144	276	Average
4874	47.6	39.41	74	-26.4	33.98	8.27	34.06	144	276	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	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
2388.93	40.6	38.89	54	-13.4	31.8	5.4	35.49	322	136	Average
2388.93	52.27	50.56	74	-21.73	31.8	5.4	35.49	322	136	Peak
2452	91.46	89.59			31.85	5.46	35.44	322	136	Average
2452	99.59	97.72			31.85	5.46	35.44	322	136	Peak
2483.96	42.65	40.69	54	-11.35	31.88	5.5	35.42	299	128	Average
2483.96	54.1	52.14	74	-19.9	31.88	5.5	35.42	299	128	Peak
4904	38.17	29.95	54	-15.83	33.98	8.28	34.04	120	183	Average
4904	48.16	39.94	74	-25.84	33.98	8.28	34.04	120	183	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	40.8	39.09	54	-13.2	31.8	5.4	35.49	226	226	Average
2389.56	51.88	50.17	74	-22.12	31.8	5.4	35.49	226	226	Peak
2452	93.72	91.85			31.85	5.46	35.44	224	232	Average
2452	101.75	99.88			31.85	5.46	35.44	224	232	Peak
2483.72	45.13	43.17	54	-8.87	31.88	5.5	35.42	217	226	Average
2483.72	56	54.04	74	-18	31.88	5.5	35.42	217	226	Peak
4904	38.09	29.87	54	-15.91	33.98	8.28	34.04	153	216	Average
4904	48.13	39.91	74	-25.87	33.98	8.28	34.04	153	216	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	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
2383.17	40.95	39.26	54	-13.05	31.78	5.4	35.49	366	153	Average
2383.17	52.17	50.48	74	-21.83	31.78	5.4	35.49	366	153	Peak
2457	89.12	87.23			31.87	5.46	35.44	366	153	Average
2457	97.4	95.51			31.87	5.46	35.44	366	153	Peak
2483.52	47.07	45.11	54	-6.93	31.88	5.5	35.42	343	153	Average
2483.52	58.33	56.37	74	-15.67	31.88	5.5	35.42	343	153	Peak
4914	37.49	29.27	54	-16.51	33.98	8.28	34.04	176	107	Average
4914	47.71	39.49	74	-26.29	33.98	8.28	34.04	176	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
2384.52	41.16	39.47	54	-12.84	31.78	5.4	35.49	266	228	Average
2384.52	51.55	49.86	74	-22.45	31.78	5.4	35.49	266	228	Peak
2457	91.52	89.63			31.87	5.46	35.44	227	229	Average
2457	99.3	97.41			31.87	5.46	35.44	227	229	Peak
2483.52	49.6	47.64	54	-4.4	31.88	5.5	35.42	266	228	Average
2483.52	58.51	56.55	74	-15.49	31.88	5.5	35.42	266	228	Peak
4914	38.41	30.19	54	-15.59	33.98	8.28	34.04	128	307	Average
4914	48.48	40.26	74	-25.52	33.98	8.28	34.04	128	307	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 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	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
2388.93	41	39.29	54	-13	31.8	5.4	35.49	366	153	Average
2388.93	51.47	49.76	74	-22.53	31.8	5.4	35.49	366	153	Peak
2462	72.33	70.4			31.87	5.5	35.44	366	153	Average
2462	80.24	78.31			31.87	5.5	35.44	366	153	Peak
2483.52	47.94	45.98	54	-6.06	31.88	5.5	35.42	366	153	Average
2483.52	58.42	56.46	74	-15.58	31.88	5.5	35.42	366	153	Peak
4924	37.74	29.49	54	-16.26	33.99	8.28	34.02	100	179	Average
4924	47.95	39.7	74	-26.05	33.99	8.28	34.02	100	179	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
2381.91	40.84	39.15	54	-13.16	31.78	5.4	35.49	261	230	Average
2381.91	51.49	49.8	74	-22.51	31.78	5.4	35.49	261	230	Peak
2462	74.58	72.65			31.87	5.5	35.44	226	227	Average
2462	82.63	80.7			31.87	5.5	35.44	226	227	Peak
2483.52	50.39	48.43	54	-3.61	31.88	5.5	35.42	261	230	Average
2484.08	60.62	58.66	74	-13.38	31.88	5.5	35.42	261	230	Peak
4924	37.39	29.14	54	-16.61	33.99	8.28	34.02	196	145	Average
4924	47.68	39.43	74	-26.32	33.99	8.28	34.02	196	145	Peak

Remarks:

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

9 kHz ~ 30 MHz Data:

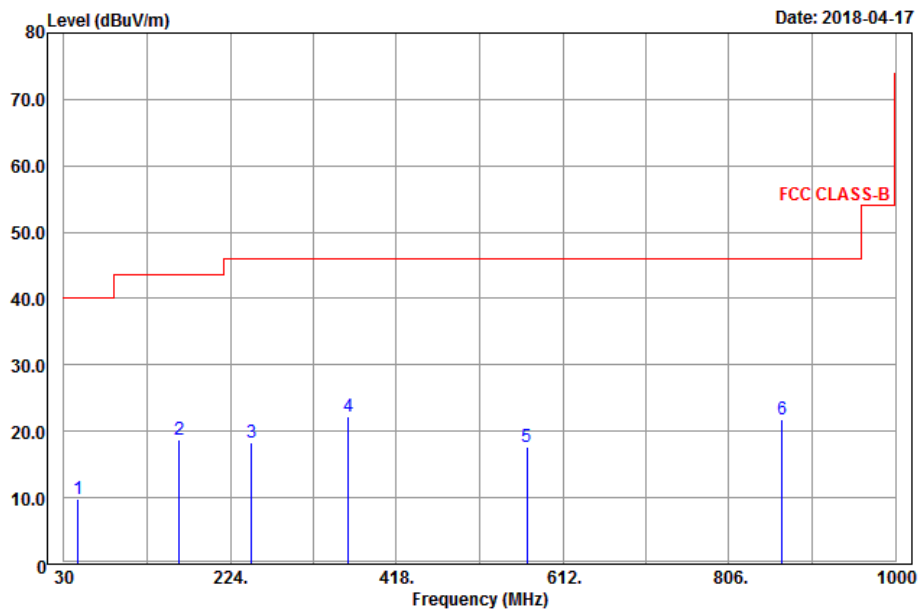
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

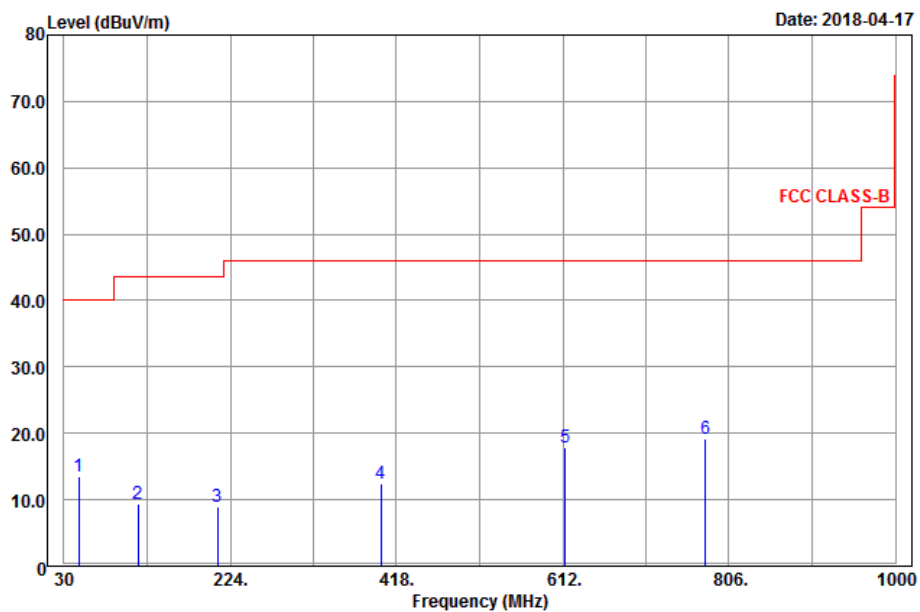
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 12	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

Horizontal



Vertical



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
46.2	9.89	26.75	40	-30.11	14.46	0.9	32.22	146	245	Peak
164.19	18.85	40.7	43.5	-24.65	8.89	1.52	32.26	189	132	Peak
249.24	18.42	36.37	46	-27.58	12.3	1.85	32.1	151	117	Peak
362.3	22.28	37.75	46	-23.72	14.38	2.26	32.11	104	133	Peak
570.2	17.75	29.66	46	-28.25	17.47	2.82	32.2	165	205	Peak
868.4	21.71	28.72	46	-24.29	21.23	3.44	31.68	148	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
47.01	13.56	30.37	40	-26.44	14.51	0.9	32.22	145	223	Peak
116.67	9.32	29.22	43.5	-34.18	11.07	1.28	32.25	186	119	Peak
209.55	8.95	28.41	43.5	-34.55	11.15	1.65	32.26	147	204	Peak
400.1	12.52	27.4	46	-33.48	15	2.34	32.22	128	224	Peak
615	17.95	29.12	46	-28.05	18.08	2.93	32.18	103	165	Peak
778.8	19.24	27.94	46	-26.76	20.12	3.27	32.09	118	214	Peak

Remarks:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 06, 2018	Mar. 05, 2019
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	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 HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

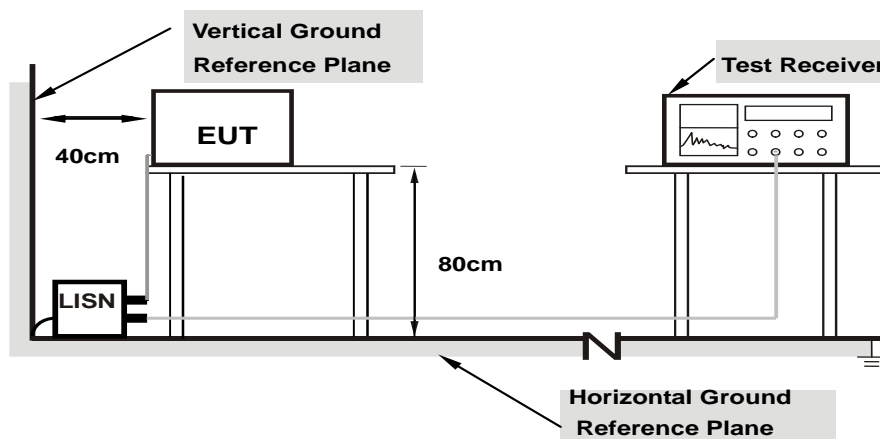
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 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.

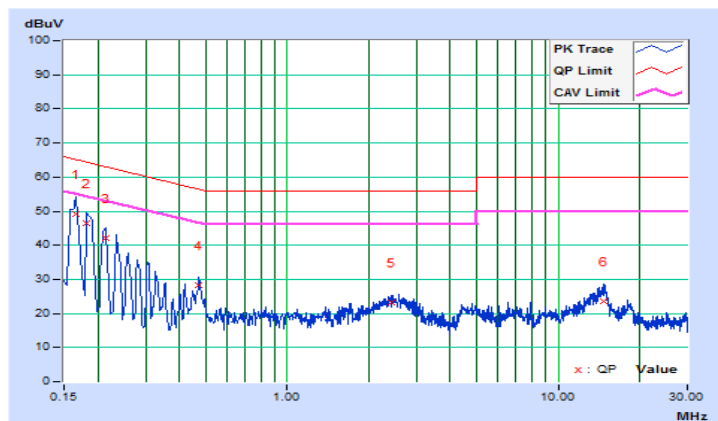
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/4/13

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16600	10.10	38.96	21.94	49.06	32.04	65.16	55.16	-16.10	-23.12
2	0.18200	10.10	36.46	19.08	46.56	29.18	64.39	54.39	-17.83	-25.21
3	0.21400	10.10	32.02	14.35	42.12	24.45	63.05	53.05	-20.93	-28.60
4	0.47000	10.12	18.11	7.16	28.23	17.28	56.51	46.51	-28.28	-29.23
5	2.43400	10.21	12.87	1.88	23.08	12.09	56.00	46.00	-32.92	-33.91
6	14.63400	10.90	12.66	2.35	23.56	13.25	60.00	50.00	-36.44	-36.75

Remarks:

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

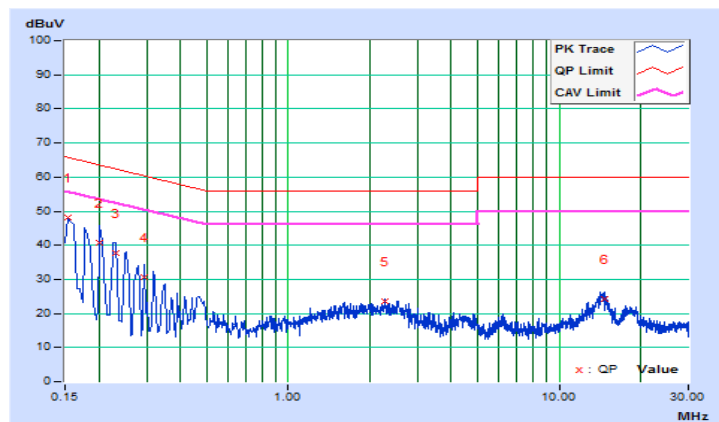


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/4/13

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.10	38.11	20.57	48.21	30.67	65.78	55.78	-17.57	-25.11
2	0.20200	10.10	30.51	12.92	40.61	23.02	63.53	53.53	-22.92	-30.51
3	0.23000	10.11	27.45	9.70	37.56	19.81	62.45	52.45	-24.89	-32.64
4	0.29400	10.11	20.46	3.76	30.57	13.87	60.41	50.41	-29.84	-36.54
5	2.27800	10.19	13.35	2.41	23.54	12.60	56.00	46.00	-32.46	-33.40
6	14.77800	10.72	13.61	1.44	24.33	12.16	60.00	50.00	-35.67	-37.84

Remarks:

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



4.3 Conducted Output Power Measurement

4.3.1 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,

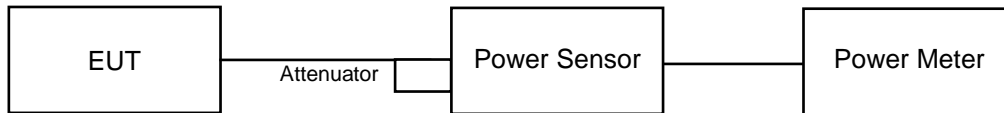
Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

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

Array Gain = $5 \log(NANT/NSS)$ 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 = $10 \log(NANT/NSS)$ dB.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	106.905	20.29	30	Pass
6	2437	115.611	20.63	30	Pass
11	2462	105.925	20.25	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	172.187	22.36	30	Pass
6	2437	179.473	22.54	30	Pass
11	2462	170.608	22.32	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	20.59	20.71	232.312	23.66	30	Pass
6	2437	20.86	20.77	241.298	23.83	30	Pass
11	2462	20.65	20.76	235.269	23.72	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	19.32	19.56	175.872	22.45	30	Pass
6	2437	19.30	19.66	177.584	22.49	30	Pass
9	2452	19.54	19.77	184.792	22.67	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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