Partial FCC Test Report

Report No.:	RF170309C18
FCC ID:	TLZ-CM389NF
Test Model:	AW-CM389NF
Received Date:	Mar. 09, 2017
Test Date:	Mar. 16, 2017 ~ Mar. 20, 2017
Issued Date:	Apr. 28, 2017
Applicant:	AzureWave Technologies, Inc.
Address:	8F., No. 94, Baozhong Rd., Xindian Dist., New Taipei City Taiwan
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:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan, R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF170309C18	Original Release	Apr. 28, 2017

1 Certificate of Conformity

Product:	IEEE 802.11 2X2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth Module
Brand:	AzureWave
Test Model:	AW-CM389NF
Sample Status:	Identical Prototype
Applicant:	AzureWave Technologies, Inc.
Test Date:	Mar. 16, 2017 ~ Mar. 20, 2017
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 EMC characteristics under the conditions specified in this report.

Prepared by : Rona Chen , **Date:** Apr. 28, 2017

Rona Chen / Specialist

Approved by : David Huang , **Date:** Apr. 28, 2017

David Huang / 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 -19.12 dB at 0.26339 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.33 dB at 2389.92 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6 dB Bandwidth	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: Test items for AC Power Conducted Emission and Radiated Emissions were performed for this report.
For other test data, please refer to BV CPS Report No.: RF140407E07D for module (Brand: AzureWave, Model: AW-CM389NF).

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**	**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	2.93 dB
	200 MHz ~1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	IEEE 802.11 2X2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth Module
Brand	AzureWave
Test Model	AW-CM389NF
Status of EUT	Identical Prototype
Power Supply Rating	3.3 Vdc (Host equipment)
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 MCS7
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Antenna Type	Refer to BV CPS Report No.: RF140407E07D
Antenna Connector	Refer to BV CPS Report No.: RF140407E07D
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

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

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

2. The EUT is authorized for use in specific End-product. Please refer to below for more details.

Product	Brand	Model
Smart IOT	Compal	EIH3

3. The information of antenna which collocated in the End-product is listed as below.

Antenna Type	Manufacturer	Antenna Gain (dBi)
Dipole	Speed	Main: 3.33 Aux.: 3.75

4. The End-product contains following accessory devices.

Product	Brand	Model	Description
Adapter	DVE	DSA-24PFM-12 FUS	I/P: 100-240 Vac, 0.8 A O/P: 12 Vdc, 2 A
BT/WLAN Module	AzureWave	AW-CM389NF	--
Zigbee Module	MMBnetwork	Z357PA40-SMT	--
Z-Wave Module	Sigma Designs	ZM5202AU	--

5. 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

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

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

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≥1G	RE<1G	PLC	
A	√	√	-	SISO
B	√	√	√	MIMO

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

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)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
B	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
B	802.11n (HT20)	1 to 11	1	OFDM	BPSK	MCS0

Co-location of Radiated Emission Test:

Since WLAN is possibly operated with Zigbee or Z-Wave at the same time, so the EUT was evaluated co-location by the channel of the maximum power of WLAN and Zigbee / Z-Wave.

Tested Channel of Co-location		
		WLAN Mode
		802.11g
Other Mode	Tested Channel	6
Zigbee	11	V
Z-Wave	2 (908.40 MHz)	V

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)
B	802.11n (HT20)	1 to 11	1	OFDM	BPSK	MCS0

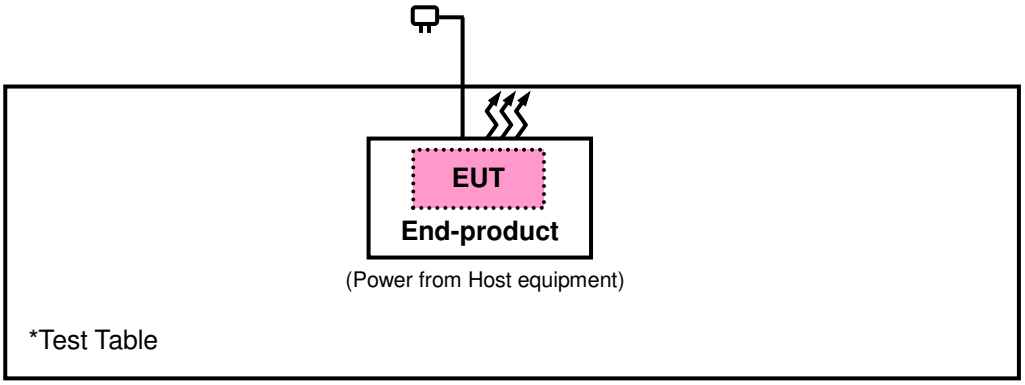
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
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 v03r05
662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	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 HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

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:

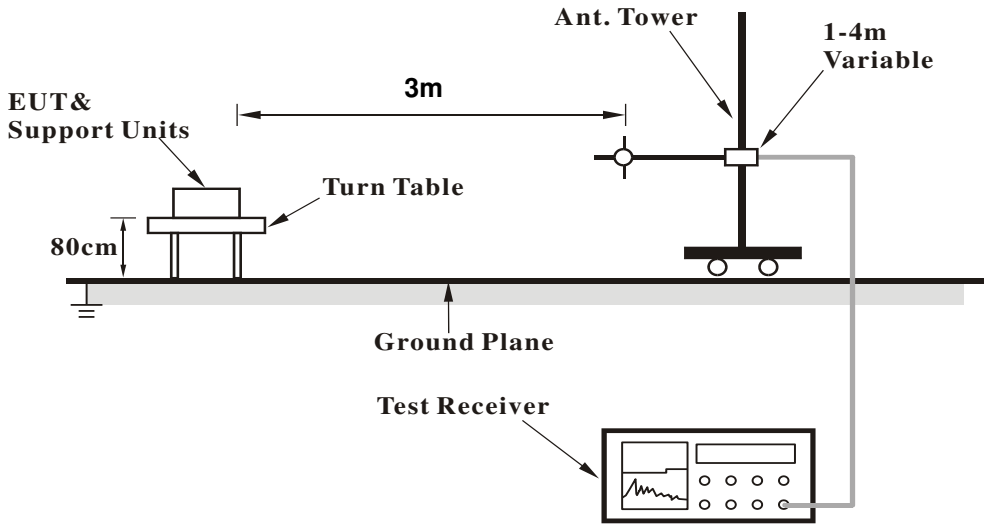
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency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

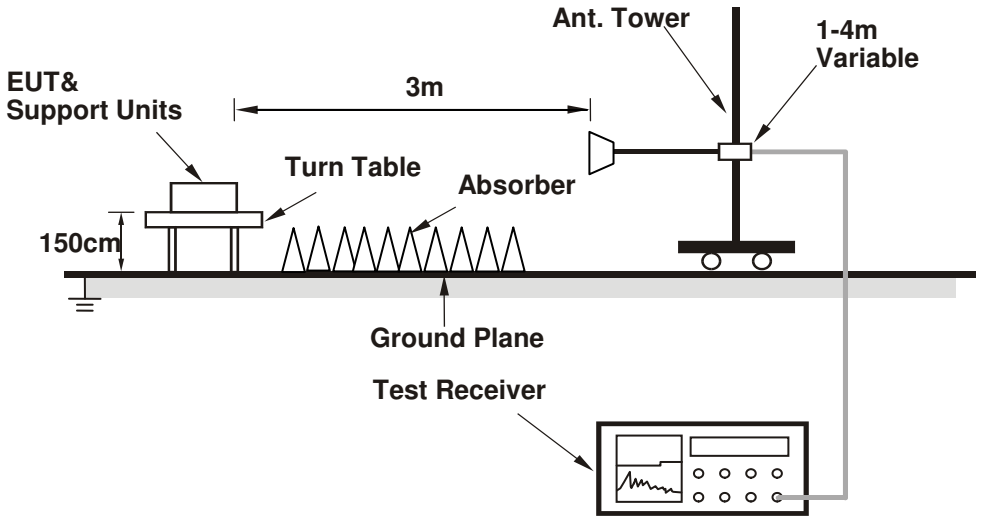
No deviation.

4.1.5 Test Set Up

<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：

Mode A

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**	Getaz Yang

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**
2386.77	48.38	54.89	74	-25.62	26.91	4.08	37.5	220	308	Peak
2386.95	38.87	45.38	54	-15.13	26.91	4.08	37.5	220	308	Average
2412	99.22	105.69			26.96	4.09	37.52	220	308	Average
2412	102.46	108.93			26.96	4.09	37.52	220	308	Peak
4824	38.38	53.68	54	-15.62	30.99	6.79	53.08	184	320	Average
4824	45.92	61.22	74	-28.08	30.99	6.79	53.08	184	320	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**
2326.11	38.24	44.96	54	-15.76	26.72	4.03	37.47	214	72	Average
2389.65	54.61	61.12	74	-19.39	26.91	4.08	37.5	214	72	Peak
2412	92.01	98.48			26.96	4.09	37.52	214	72	Average
2412	95.24	101.71			26.96	4.09	37.52	214	72	Peak
4824	36.65	51.95	54	-17.35	30.99	6.79	53.08	210	66	Average
4824	45.18	60.48	74	-28.82	30.99	6.79	53.08	210	66	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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**
2310.45	40.56	47.31	54	-13.44	26.67	4.03	37.45	217	62	Average
2384.97	51.2	57.76	74	-22.8	26.86	4.08	37.5	217	62	Peak
2437	98.84	105.12			27.06	4.12	37.46	217	62	Average
2437	102.34	108.62			27.06	4.12	37.46	217	62	Peak
2485.28	50.51	56.53	74	-23.49	27.15	4.15	37.32	217	62	Peak
2499.76	40.48	46.37	54	-13.52	27.2	4.16	37.25	217	62	Average
4874	38.68	53.82	54	-15.32	31.06	6.85	53.05	183	327	Average
4874	45.61	60.75	74	-28.39	31.06	6.85	53.05	183	327	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**
2324.94	50.55	57.27	74	-23.45	26.72	4.03	37.47	204	288	Peak
2356.44	39.88	46.51	54	-14.12	26.81	4.05	37.49	204	288	Average
2437	93.7	99.98			27.06	4.12	37.46	204	288	Average
2437	95.26	101.54			27.06	4.12	37.46	204	288	Peak
2492.72	39.86	45.75	54	-14.14	27.2	4.16	37.25	204	288	Average
2493.6	50.12	56.01	74	-23.88	27.2	4.16	37.25	204	288	Peak
4874	37.73	52.87	54	-16.27	31.06	6.85	53.05	209	65	Average
4874	45.93	61.07	74	-28.07	31.06	6.85	53.05	209	65	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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	97.6	103.76			27.1	4.13	37.39	213	308	Average
2462	101.19	107.35			27.1	4.13	37.39	213	308	Peak
2483.52	38.87	44.89	54	-15.13	27.15	4.15	37.32	213	308	Average
2483.68	47.88	53.9	74	-26.12	27.15	4.15	37.32	213	308	Peak
4924	37.4	52.43	54	-16.6	31.12	6.88	53.03	184	328	Average
4924	45.01	60.04	74	-28.99	31.12	6.88	53.03	184	328	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	90.8	96.96			27.1	4.13	37.39	206	70	Average
2462	94.03	100.19			27.1	4.13	37.39	206	70	Peak
2483.68	37.45	43.47	54	-16.55	27.15	4.15	37.32	206	70	Average
2486.56	47.12	53.14	74	-26.88	27.15	4.15	37.32	206	70	Peak
4920	36.71	51.74	54	-17.29	31.12	6.88	53.03	208	71	Average
4920	45.75	60.78	74	-28.25	31.12	6.88	53.03	208	71	Peak

Remarks:

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

Mode B

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**	Getaz Yang

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	65.7	72.21	74	-8.3	26.91	4.08	37.5	220	305	Peak
2389.92	49.63	56.16	54	-4.37	26.91	4.08	37.52	220	305	Average
2412	99.61	106.08			26.96	4.09	37.52	220	305	Average
2412	105.71	112.18			26.96	4.09	37.52	220	305	Peak
4824	33.45	48.75	54	-20.55	30.99	6.79	53.08	215	170	Average
4824	44.76	60.06	74	-29.24	30.99	6.79	53.08	215	170	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**
2386.86	64	70.51	74	-10	26.91	4.08	37.5	221	252	Peak
2389.92	49.73	56.26	54	-4.27	26.91	4.08	37.52	221	252	Average
2412	101	107.47			26.96	4.09	37.52	221	252	Average
2412	107.86	114.33			26.96	4.09	37.52	221	252	Peak
4824	33.45	48.75	54	-20.55	30.99	6.79	53.08	199	210	Average
4824	44.84	60.14	74	-29.16	30.99	6.79	53.08	199	210	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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**
2364.18	42.61	49.22	54	-11.39	26.81	4.07	37.49	217	57	Average
2388.57	58.18	64.69	74	-15.82	26.91	4.08	37.5	217	57	Peak
2437	100.14	106.42			27.06	4.12	37.46	217	57	Average
2437	107.23	113.51			27.06	4.12	37.46	217	57	Peak
2488.4	41.45	47.41	54	-12.55	27.2	4.16	37.32	217	57	Average
2489.36	59.69	65.65	74	-14.31	27.2	4.16	37.32	217	57	Peak
4874	36.36	51.5	54	-17.64	31.06	6.85	53.05	215	173	Average
4874	43.75	58.89	74	-30.25	31.06	6.85	53.05	215	173	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**
2388.48	59.34	65.85	74	-14.66	26.91	4.08	37.5	218	108	Peak
2389.56	43.61	50.12	54	-10.39	26.91	4.08	37.5	218	108	Average
2437	102.6	108.88			27.06	4.12	37.46	218	108	Average
2437	110.23	116.51			27.06	4.12	37.46	218	108	Peak
2484.48	42.64	48.66	54	-11.36	27.15	4.15	37.32	218	108	Average
2486.88	59.02	65.04	74	-14.98	27.15	4.15	37.32	218	108	Peak
4874	39.06	54.2	54	-14.94	31.06	6.85	53.05	200	211	Average
4874	47.86	63	74	-26.14	31.06	6.85	53.05	200	211	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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	96.97	103.13			27.1	4.13	37.39	233	308	Average
2462	104.56	110.72			27.1	4.13	37.39	233	308	Peak
2483.52	45.43	51.45	54	-8.57	27.15	4.15	37.32	233	308	Average
2483.72	59.28	65.3	74	-14.72	27.15	4.15	37.32	233	308	Peak
4924	33.71	48.74	54	-20.29	31.12	6.88	53.03	216	180	Average
4924	44.24	59.27	74	-29.76	31.12	6.88	53.03	216	180	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	98.74	104.9			27.1	4.13	37.39	218	246	Average
2462	106.01	112.17			27.1	4.13	37.39	218	246	Peak
2483.56	61.44	67.46	74	-12.56	27.15	4.15	37.32	218	246	Peak
2483.64	46.27	52.29	54	-7.73	27.15	4.15	37.32	218	246	Average
4924	33.11	48.14	54	-20.89	31.12	6.88	53.03	201	215	Average
4924	43.1	58.13	74	-30.9	31.12	6.88	53.03	201	215	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 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**	Getaz Yang

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**
2389.11	64.47	70.98	74	-9.53	26.91	4.08	37.5	221	304	Peak
2389.47	48.81	55.32	54	-5.19	26.91	4.08	37.5	221	304	Average
2412	99.09	105.56			26.96	4.09	37.52	221	304	Average
2412	106.56	113.03			26.96	4.09	37.52	221	304	Peak
4824	33.45	48.75	54	-20.55	30.99	6.79	53.08	216	181	Average
4824	42.9	58.2	74	-31.1	30.99	6.79	53.08	216	181	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	66.27	72.78	74	-7.73	26.91	4.08	37.5	220	270	Peak
2389.92	**50.67**	**57.2**	**54**	**-3.33**	**26.91**	**4.08**	**37.52**	**220**	**270**	**Average**
2412	100.42	106.89			26.96	4.09	37.52	220	270	Average
2412	108.68	115.15			26.96	4.09	37.52	220	270	Peak
4824	33.45	48.75	54	-20.55	30.99	6.79	53.08	199	215	Average
4824	43.82	59.12	74	-30.18	30.99	6.79	53.08	199	215	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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**
2364.9	43.37	49.99	54	-10.63	26.81	4.07	37.5	220	78	Average
2387.49	52.91	59.42	74	-21.09	26.91	4.08	37.5	220	78	Peak
2437	102.15	108.43			27.06	4.12	37.46	220	78	Average
2437	108.28	114.56			27.06	4.12	37.46	220	78	Peak
2484.88	41.25	47.27	54	-12.75	27.15	4.15	37.32	220	78	Average
2485.72	58.91	64.93	74	-15.09	27.15	4.15	37.32	220	78	Peak
4874	36.2	51.34	54	-17.8	31.06	6.85	53.05	214	174	Average
4874	45.75	60.89	74	-28.25	31.06	6.85	53.05	214	174	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	45.31	51.82	54	-8.69	26.91	4.08	37.5	214	102	Average
2389.47	66.46	72.97	74	-7.54	26.91	4.08	37.5	214	102	Peak
2437	102.86	109.14			27.06	4.12	37.46	214	102	Average
2437	111.33	117.61			27.06	4.12	37.46	214	102	Peak
2483.52	42.24	48.26	54	-11.76	27.15	4.15	37.32	214	102	Average
2491.12	60.57	66.53	74	-13.43	27.2	4.16	37.32	214	102	Peak
4874	38.86	54	54	-15.14	31.06	6.85	53.05	200	215	Average
4874	46.57	61.71	74	-27.43	31.06	6.85	53.05	200	215	Peak
7311	48.31	56.08	54	-5.69	35.84	8.24	51.85	211	199	Average
7311	55.04	62.81	74	-18.96	35.84	8.24	51.85	211	199	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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	98.83	104.99			27.1	4.13	37.39	217	307	Average
2462	106.25	112.41			27.1	4.13	37.39	217	307	Peak
2483.8	48.39	54.41	54	-5.61	27.15	4.15	37.32	217	307	Average
2483.92	64.97	70.99	74	-9.03	27.15	4.15	37.32	217	307	Peak
4924	33.64	48.67	54	-20.36	31.12	6.88	53.03	213	170	Average
4924	42.96	57.99	74	-31.04	31.12	6.88	53.03	213	170	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	101.18	107.34			27.1	4.13	37.39	220	272	Average
2462	108.44	114.6			27.1	4.13	37.39	220	272	Peak
2483.52	61.52	67.54	74	-12.48	27.15	4.15	37.32	220	272	Peak
2483.6	49.18	55.2	54	-4.82	27.15	4.15	37.32	220	272	Average
4924	33.61	48.64	54	-20.39	31.12	6.88	53.03	200	213	Average
4924	44.01	59.04	74	-29.99	31.12	6.88	53.03	200	213	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2462 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**	Getaz Yang

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**
2386.23	60.72	67.23	74	-13.28	26.91	4.08	37.5	221	307	Peak
2389.83	49.34	55.87	54	-4.66	26.91	4.08	37.52	221	307	Average
2422	93.74	100.08			27.01	4.11	37.46	221	307	Average
2422	100.83	107.17			27.01	4.11	37.46	221	307	Peak
2486.32	41.16	47.18	54	-12.84	27.15	4.15	37.32	221	307	Average
2488.24	51.26	57.22	74	-22.74	27.2	4.16	37.32	221	307	Peak
4844	34.52	49.75	54	-19.48	31.01	6.82	53.06	210	170	Average
4844	42.91	58.14	74	-31.09	31.01	6.82	53.06	210	170	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Factor (dB/m)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2385.78	56.03	62.54	74	-17.97	26.91	4.08	37.5	222	274	Peak
2387.22	45.57	52.08	54	-8.43	26.91	4.08	37.5	222	274	Average
2422	95.1	101.44			27.01	4.11	37.46	222	274	Average
2422	102.11	108.45			27.01	4.11	37.46	222	274	Peak
2485.84	53.05	59.07	74	-20.95	27.15	4.15	37.32	222	274	Peak
2488.24	43.24	49.2	54	-10.76	27.2	4.16	37.32	222	274	Average
4844	35.72	50.95	54	-18.28	31.01	6.82	53.06	198	213	Average
4844	43.1	58.33	74	-30.9	31.01	6.82	53.06	198	213	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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**
2389.47	59.4	65.91	74	-14.6	26.91	4.08	37.5	219	78	Peak
2389.92	48.18	54.71	54	-5.82	26.91	4.08	37.52	219	78	Average
2437	95.71	101.99			27.06	4.12	37.46	219	78	Average
2437	102.45	108.73			27.06	4.12	37.46	219	78	Peak
2485.68	43	49.02	54	-11	27.15	4.15	37.32	219	78	Average
2491.6	54.23	60.19	74	-19.77	27.2	4.16	37.32	219	78	Peak
4874	35.68	50.82	54	-18.32	31.06	6.85	53.05	215	173	Average
4874	44.99	60.13	74	-29.01	31.06	6.85	53.05	215	173	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**
2389.2	58.02	64.53	74	-15.98	26.91	4.08	37.5	219	95	Peak
2389.65	47.08	53.59	54	-6.92	26.91	4.08	37.5	219	95	Average
2437	96.97	103.25			27.06	4.12	37.46	219	95	Average
2437	104.12	110.4			27.06	4.12	37.46	219	95	Peak
2483.88	46.3	52.32	54	-7.7	27.15	4.15	37.32	219	95	Average
2487.04	58.43	64.45	74	-15.57	27.15	4.15	37.32	219	95	Peak
4874	35.59	50.73	54	-18.41	31.06	6.85	53.05	200	220	Average
4874	44.71	59.85	74	-29.29	31.06	6.85	53.05	200	220	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 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**	Getaz Yang

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**
2364.9	41.56	48.18	54	-12.44	26.81	4.07	37.5	238	310	Average
2389.47	52.55	59.06	74	-21.45	26.91	4.08	37.5	238	310	Peak
2452	91.02	97.22			27.06	4.13	37.39	238	310	Average
2452	98.18	104.38			27.06	4.13	37.39	238	310	Peak
2483.68	42.13	48.15	54	-11.87	27.15	4.15	37.32	238	310	Average
2484.68	56.12	62.14	74	-17.88	27.15	4.15	37.32	238	310	Peak
4904	33.7	48.75	54	-20.3	31.1	6.88	53.03	216	175	Average
4904	43.24	58.29	74	-30.76	31.1	6.88	53.03	216	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**
2384.52	49.99	56.55	74	-24.01	26.86	4.08	37.5	220	262	Peak
2389.92	39.43	45.96	54	-14.57	26.91	4.08	37.52	220	262	Average
2452	92.3	98.5			27.06	4.13	37.39	220	262	Average
2452	100.44	106.64			27.06	4.13	37.39	220	262	Peak
2486.28	46.89	52.91	54	-7.11	27.15	4.15	37.32	220	262	Average
2486.6	63.85	69.87	74	-10.15	27.15	4.15	37.32	220	262	Peak
4904	33.11	48.16	54	-20.89	31.1	6.88	53.03	201	213	Average
4904	43.73	58.78	74	-30.27	31.1	6.88	53.03	201	213	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 2452 MHz: Fundamental frequency.

Co-location:

802.11g + Zigbee

EUT Test Condition		Measurement Detail	
WLAN Channel	Channel 6	**Frequency Range**	1 GHz ~ 25 GHz
Zigbee Channel	Channel 11		
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

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**
4810	46.01	61.35	54	-7.99	30.97	6.79	53.1	202	26	Average
4810	55.04	70.38	74	-18.96	30.97	6.79	53.1	202	26	Peak
4874	37.13	52.27	54	-16.87	31.06	6.85	53.05	211	183	Average
4874	45.49	60.63	74	-28.51	31.06	6.85	53.05	211	183	Peak
7311	43.11	50.88	54	-10.89	35.84	8.24	51.85	201	265	Average
7311	53.15	60.92	74	-20.85	35.84	8.24	51.85	201	265	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**
4810	43.16	58.5	54	-10.84	30.97	6.79	53.1	113	125	Average
4810	51.14	66.48	74	-22.86	30.97	6.79	53.1	113	125	Peak
4874	39.18	54.32	54	-14.82	31.06	6.85	53.05	199	202	Average
4874	47.62	62.76	74	-26.38	31.06	6.85	53.05	199	202	Peak
7311	45.09	52.86	54	-8.91	35.84	8.24	51.85	213	191	Average
7311	55.41	63.18	74	-18.59	35.84	8.24	51.85	213	191	Peak

Remarks:

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

802.11g + Z-Wave

EUT Test Condition		Measurement Detail	
WLAN Channel	Channel 6	**Frequency Range**	1 GHz ~ 25 GHz
Z-Wave Channel	Channel 2 (908.40 MHz)		
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

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**
2726	49.69	70.56	54	-4.31	27.81	4.86	53.54	169	94	Average
2726	52.18	73.05	74	-21.82	27.81	4.86	53.54	169	94	Peak
3633.6	42.32	61.54	54	-11.68	29.02	5.76	54	191	77	Average
3633.6	47.74	66.96	74	-26.26	29.02	5.76	54	191	77	Peak
4874	36.5	51.64	54	-17.5	31.06	6.85	53.05	190	331	Average
4874	45.6	60.74	74	-28.4	31.06	6.85	53.05	190	331	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**
2726	48.13	69	54	-5.87	27.81	4.86	53.54	184	126	Average
2726	51.92	72.79	74	-22.08	27.81	4.86	53.54	184	126	Peak
3633.6	39.72	58.94	54	-14.28	29.02	5.76	54	215	273	Average
3633.6	43.55	62.77	74	-30.45	29.02	5.76	54	215	273	Peak
4874	39.95	55.09	54	-14.05	31.06	6.85	53.05	160	206	Average
4874	50.76	65.9	74	-23.24	31.06	6.85	53.05	160	206	Peak
7311	46.9	54.67	54	-7.1	35.84	8.24	51.85	174	196	Average
7311	54.68	62.45	74	-19.32	35.84	8.24	51.85	174	196	Peak

Remarks:

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

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:

Mode B

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	**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**	Getaz Yang

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**
136.7	33.29	51.72	43.5	-10.21	12.14	1.14	31.71	117	187	Peak
213.33	39.33	59.68	43.5	-4.17	9.93	1.35	31.63	109	244	Peak
321.97	40.85	57.56	46	-5.15	13.47	1.69	31.87	115	1	Peak
374.35	31.02	46.38	46	-14.98	14.73	1.84	31.93	111	147	Peak
474.26	34.75	47.77	46	-11.25	16.81	2.04	31.87	112	219	Peak
520.82	29.92	41.58	46	-16.08	17.79	2.13	31.58	120	313	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**
207.51	39.99	60.61	43.5	-3.51	9.69	1.33	31.64	105	271	Peak
256.01	36.89	55.62	46	-9.11	11.65	1.51	31.89	108	253	Peak
324.88	41.48	58.09	46	-4.52	13.54	1.7	31.85	129	55	Peak
376.29	37.27	52.59	46	-8.73	14.77	1.85	31.94	104	228	Peak
474.26	34.84	47.86	46	-11.16	16.81	2.04	31.87	105	290	Peak
524.7	31.06	42.67	46	-14.94	17.88	2.14	31.63	134	182	Peak

Remarks:

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

Co-location:

802.11g + Zigbee

EUT Test Condition		Measurement Detail	
WLAN Channel	Channel 6	**Frequency Range**	30 MHz ~ 1 GHz
Zigbee Channel	Channel 11		
Input Power	120 Vac, 60 Hz	**Detector Function**	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	**Tested By**	Getaz Yang

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**
135.73	31.68	50.2	43.5	-11.82	12.08	1.14	31.74	119	122	Peak
209.45	40.46	60.97	43.5	-3.04	9.77	1.33	31.61	132	75	Peak
341.37	38.04	54.18	46	-7.96	13.94	1.74	31.82	100	66	Peak
374.35	35.89	51.25	46	-10.11	14.73	1.84	31.93	113	122	Peak
475.23	36.12	49.12	46	-9.88	16.83	2.04	31.87	103	29	Peak
749.74	27.25	34.5	46	-18.75	21.52	2.53	31.3	138	339	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**
135.73	29.9	48.42	43.5	-13.6	12.08	1.14	31.74	105	209	Peak
209.45	40.36	60.87	43.5	-3.14	9.77	1.33	31.61	128	54	Peak
294.81	36.5	53.84	46	-9.5	12.8	1.62	31.76	122	173	Peak
341.37	42.16	58.3	46	-3.84	13.94	1.74	31.82	119	115	Peak
479.11	33.24	46.13	46	-12.76	16.91	2.05	31.85	123	236	Peak
785.63	27.07	33.87	46	-18.93	22.02	2.59	31.41	137	90	Peak

Remarks:

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

802.11g + Z-Wave

EUT Test Condition		Measurement Detail	
WLAN Channel	Channel 6	Frequency Range	30 MHz ~ 1 GHz
Z-Wave Channel	Channel 2 (908.40 MHz)		
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Getaz Yang

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
136.7	33.07	51.5	43.5	-10.43	12.14	1.14	31.71	110	355	Peak
166.77	35.73	54.32	43.5	-7.77	12.05	1.13	31.77	113	208	Peak
209.45	39.63	60.14	43.5	-3.87	9.77	1.33	31.61	119	198	Peak
341.37	37.5	53.64	46	-8.5	13.94	1.74	31.82	130	269	Peak
482.02	35.34	48.16	46	-10.66	16.96	2.05	31.83	117	47	Peak
753.62	26.56	33.8	46	-19.44	21.57	2.54	31.35	102	177	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
93.05	22.92	45.36	43.5	-20.58	8.53	0.99	31.96	127	234	Peak
174.53	37.09	56.43	43.5	-6.41	11.28	1.16	31.78	100	233	Peak
201.69	40.04	61.04	43.5	-3.46	9.44	1.3	31.74	113	309	Peak
341.37	42.81	58.95	46	-3.19	13.94	1.74	31.82	127	275	Peak
516.94	31.56	43.31	46	-14.44	17.71	2.12	31.58	126	69	Peak
781.75	27.1	33.96	46	-18.9	21.97	2.59	31.42	120	271	Peak

Remarks:

1. 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 & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 21, 2016	Nov. 20, 2017
RF signal cable Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
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

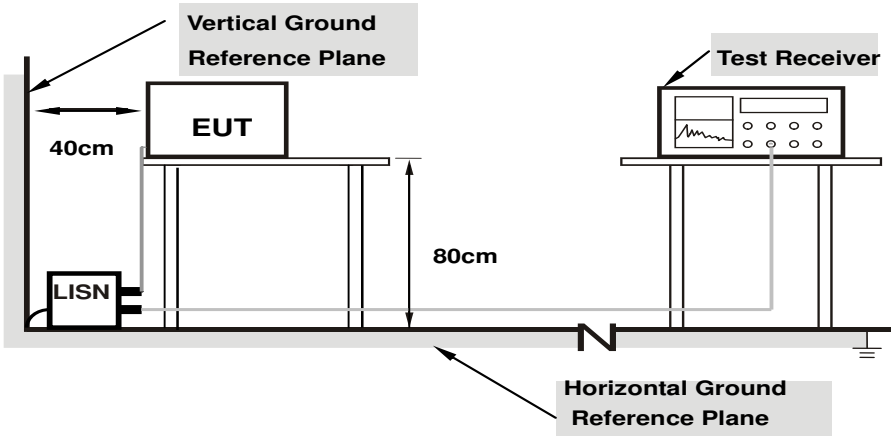
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling 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: All modes of operation were investigated and the worst-case emissions are reported.

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.

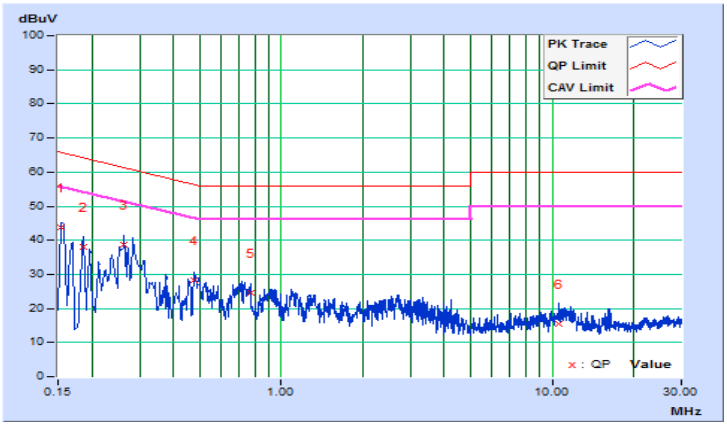
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/3/20

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	0.15391	10.35	33.48	15.64	43.83	25.99	65.79	55.79	-21.96	-29.80
2	0.18519	10.36	27.67	10.08	38.03	20.44	64.25	54.25	-26.22	-33.81
3	**0.26339**	**10.38**	**28.33**	**21.82**	**38.71**	**32.20**	**61.32**	**51.32**	**-22.61**	**-19.12**
4	0.47453	10.40	17.83	10.72	28.23	21.12	56.43	46.43	-28.20	-25.31
5	0.77169	10.40	14.21	4.99	24.61	15.39	56.00	46.00	-31.39	-30.61
6	10.60534	10.86	4.59	-1.12	15.45	9.74	60.00	50.00	-44.55	-40.26

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

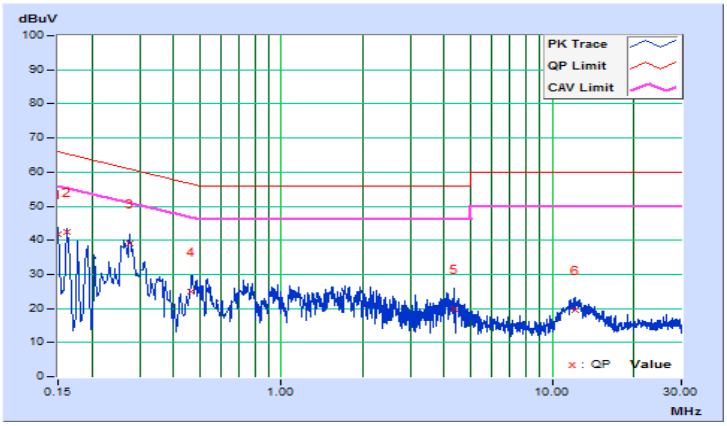


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/3/20

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.10	31.78	14.23	41.88	24.33	66.00	56.00	-24.12	-31.67
2	0.16173	10.11	32.19	16.33	42.30	26.44	65.37	55.37	-23.07	-28.93
3	0.27512	10.15	29.07	19.07	39.22	29.22	60.96	50.96	-21.74	-21.74
4	0.46669	10.16	14.82	7.28	24.98	17.44	56.57	46.57	-31.59	-29.13
5	4.32588	10.35	9.68	1.28	20.03	11.63	56.00	46.00	-35.97	-34.37
6	12.13806	10.64	8.96	3.42	19.60	14.06	60.00	50.00	-40.40	-35.94

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



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 accredited and approved 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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