Partial FCC Test Report

Report No.:	RF190807C14-5
FCC ID:	I4L-BM25SD
Test Model:	MS-5776-A-H
Received Date:	Aug. 07, 2019
Test Date:	Sep. 02 ~ Sep. 05, 2019
Issued Date:	Sep. 12, 2019
Applicant:	Micro Star International Co., Ltd.
Address:	No. 69, Li-De Street, Jung He City, Taipei Hsien, R.O.C. TAIWAN
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan.
Test Location (2):	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan
FCC Registration / Designation Number:	788550 / TW0003 427177 / TW0011

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF190807C14-5	Original Release	Sep. 12, 2019

1 Certificate of Conformity

Product:	Edge Computing Gateway
Brand:	Conexio
Test Model:	MS-5776-A-H
Sample Status:	Mass Product
Applicant:	Micro Star International Co., Ltd.
Test Date:	Sep. 02 ~ Sep. 05, 2019
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 : Lena Wang , **Date:** Sep. 12, 2019

Lena Wang / Specialist

Approved by : , **Date:** Sep. 12, 2019

Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	AC Power Conducted Emission	N/A	Without AC power of the EUT
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.45 dB at 2389.83 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to Note
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.247(b)	Conducted power	N/A	Refer to Note
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

1. This report is a partial report. Therefore, only test item of Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RF180518C15 for module (Brand: MSI, Model: BM25)
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	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	Edge Computing Gateway
Brand	Conexio
Test Model	MS-5776-A-H
Status of EUT	Mass Product
Power Supply Rating	12.0 Vdc (DC Power Supply)
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 72.2 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20)
Antenna Type	Couple antenna with 0.78 dBi gain
Antenna Connector	SMA
Accessory Device	Refer to Note as below
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides 1 completed transmitter and 1 receiver.

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

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

3.2 Description of Test Modes

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE≥1G	RE<1G	
-	√	√	-

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz

NOTE: "-"means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT20)	1 to 11	1	OFDM	BPSK	6.5

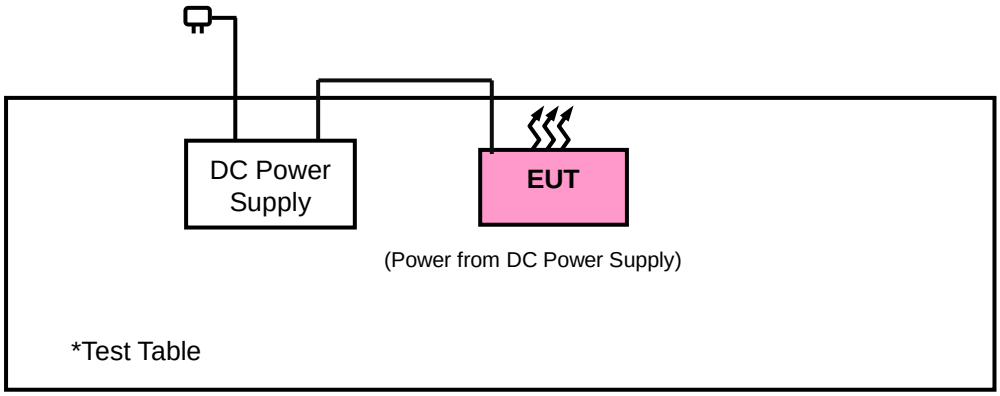
Test Condition:

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

3.3 Description of Support Units

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

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
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	Aug. 26, 2019	Aug. 25, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSW26	102023	Oct. 11, 2018	Oct. 10, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 27, 2018	Nov. 26, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent	310N	187226	Jun. 18, 2019	Jun. 17, 2020
Preamplifier Agilent	83017A	MY39501357	Jun. 18, 2019	Jun. 17, 2020
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 18, 2019	Jun. 17, 2020
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 18, 2019	Jun. 17, 2020
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
DC Power Supply Topward	33010D	807748	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

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

Note:

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

For Radiated Emission above 30 MHz

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

Note:

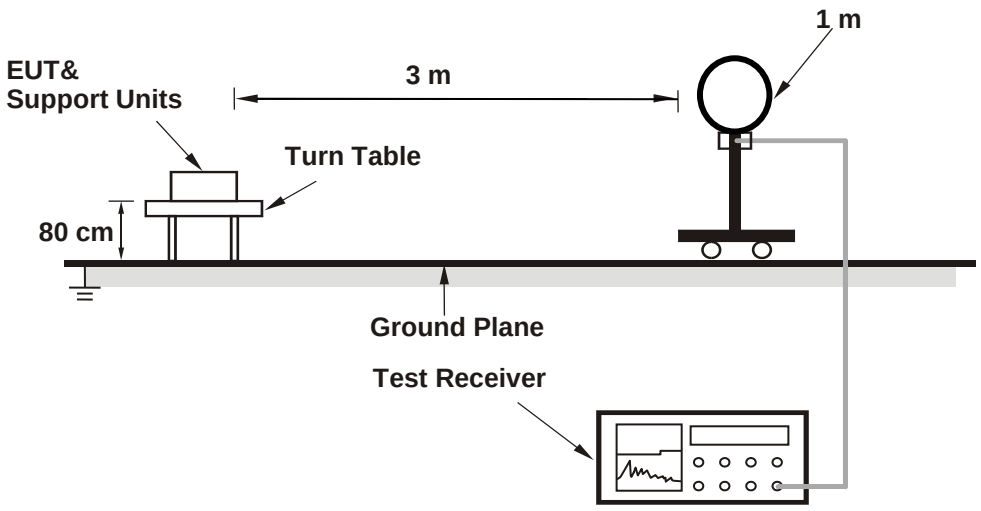
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK)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

4.1.4 Deviation from Test Standard

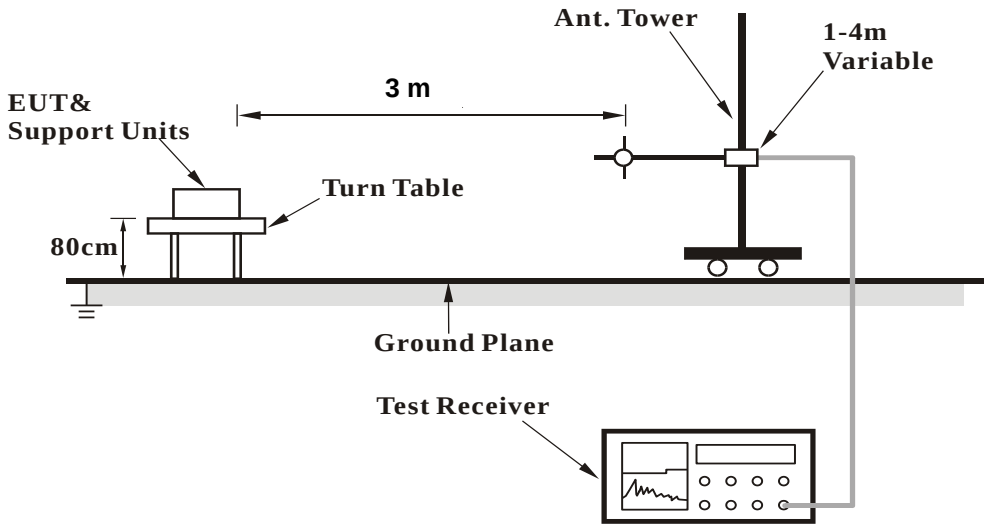
No deviation.

4.1.5 Test Set Up

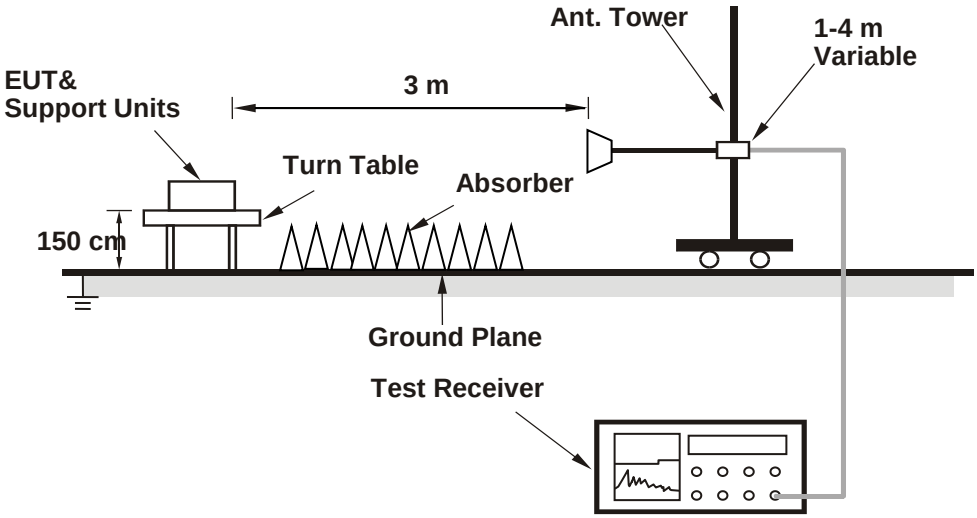
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1 GHz Data：

802.11b

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.38	44.81	40.32	4.49	54	-9.19	116	162	Average
2389.38	53.73	49.24	4.49	74	-20.27	116	162	Peak
2412	103.01	98.46	4.55			116	162	Average
2412	105.54	100.99	4.55			116	162	Peak
4824	41.69	31.4	10.29	54	-12.31	105	137	Average
4824	48.39	38.1	10.29	74	-25.61	105	137	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.92	41.56	37.06	4.5	54	-12.44	287	6	Average
2389.92	51.76	47.26	4.5	74	-22.24	287	6	Peak
2412	98.89	94.34	4.55			287	6	Average
2412	101.43	96.88	4.55			287	6	Peak
4824	41.75	31.46	10.29	54	-12.25	189	213	Average
4824	48.46	38.17	10.29	74	-25.54	189	213	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2360.76	41.37	36.95	4.42	54	-12.63	108	165	Average
2360.76	52.44	48.02	4.42	74	-21.56	108	165	Peak
2437	104.66	100.07	4.59			108	165	Average
2437	107.44	102.85	4.59			108	165	Peak
2494.16	41.58	36.91	4.67	54	-12.42	108	165	Average
2494.16	52.37	47.7	4.67	74	-21.63	108	165	Peak
4874	41.77	31.56	10.21	54	-12.23	105	237	Average
4874	48.33	38.12	10.21	74	-25.67	105	237	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2384.43	40.63	36.16	4.47	54	-13.37	287	6	Average
2384.43	51.97	47.5	4.47	74	-22.03	287	6	Peak
2437	100.69	96.1	4.59			287	6	Average
2437	103.1	98.51	4.59			287	6	Peak
2489.24	41.31	36.63	4.68	54	-12.69	287	6	Average
2489.24	52.65	47.97	4.68	74	-21.35	287	6	Peak
4874	41.59	31.38	10.21	54	-12.41	162	107	Average
4874	48.16	37.95	10.21	74	-25.84	162	107	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	102.13	97.51	4.62			171	165	Average
2462	104.98	100.36	4.62			171	165	Peak
2483.56	43.87	39.21	4.66	54	-10.13	171	165	Average
2483.56	57.02	52.36	4.66	74	-16.98	171	165	Peak
4924	42.14	31.89	10.25	54	-11.86	123	61	Average
4924	49.08	38.83	10.25	74	-24.92	123	61	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	98.01	93.39	4.62			318	19	Average
2462	100.84	96.22	4.62			318	19	Peak
2483.56	41.7	37.04	4.66	54	-12.3	318	19	Average
2483.56	52.62	47.96	4.66	74	-21.38	318	19	Peak
4924	41.52	31.27	10.25	54	-12.48	173	224	Average
4924	48.3	38.05	10.25	74	-25.7	173	224	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.83	48.18	43.68	4.5	54	-5.82	116	162	Average
2389.83	64.98	60.48	4.5	74	-9.02	116	162	Peak
2412	99.17	94.62	4.55			116	162	Average
2412	107.21	102.66	4.55			116	162	Peak
4824	40.57	30.28	10.29	54	-13.43	156	294	Average
4824	47.77	37.48	10.29	74	-26.23	156	294	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.74	43.55	39.06	4.49	54	-10.45	287	6	Average
2389.74	58.37	53.88	4.49	74	-15.63	287	6	Peak
2412	94.37	89.82	4.55			287	6	Average
2412	103.01	98.46	4.55			287	6	Peak
4824	41.97	31.68	10.29	54	-12.03	136	234	Average
4824	48.66	38.37	10.29	74	-25.34	136	234	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.74	48.17	43.68	4.49	54	-5.83	108	165	Average
2389.74	61.77	57.28	4.49	74	-12.23	108	165	Peak
2437	101.88	97.29	4.59			108	165	Average
2437	110.75	106.16	4.59			108	165	Peak
2483.56	47.12	42.46	4.66	54	-6.88	108	165	Average
2483.56	59.24	54.58	4.66	74	-14.76	108	165	Peak
4874	41.74	31.53	10.21	54	-12.26	103	261	Average
4874	48.03	37.82	10.21	74	-25.97	103	261	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.83	43.39	38.89	4.5	54	-10.61	287	6	Average
2389.83	54.18	49.68	4.5	74	-19.82	287	6	Peak
2437	97.93	93.34	4.59			287	6	Average
2437	106.36	101.77	4.59			287	6	Peak
2483.56	43.42	38.76	4.66	54	-10.58	287	6	Average
2483.56	54.86	50.2	4.66	74	-19.14	287	6	Peak
4874	41.64	31.43	10.21	54	-12.36	184	121	Average
4874	48.22	38.01	10.21	74	-25.78	184	121	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	99.93	95.31	4.62			171	165	Average
2462	108.49	103.87	4.62			171	165	Peak
2483.6	48.71	44.05	4.66	54	-5.29	171	165	Average
2483.6	64.09	59.43	4.66	74	-9.91	171	165	Peak
4924	41.36	31.11	10.25	54	-12.64	173	243	Average
4924	48.95	38.7	10.25	74	-25.05	173	243	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	95.57	90.95	4.62			318	19	Average
2462	103.23	98.61	4.62			318	19	Peak
2483.52	44.91	40.25	4.66	54	-9.09	318	19	Average
2483.52	60.7	56.04	4.66	74	-13.3	318	19	Peak
4924	41.2	30.95	10.25	54	-12.8	187	112	Average
4924	47.92	37.67	10.25	74	-26.08	187	112	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.83	50.55	46.05	4.5	54	-3.45	116	162	Average
2389.83	65.68	61.18	4.5	74	-8.32	116	162	Peak
2412	100.15	95.6	4.55			116	162	Average
2412	107.58	103.03	4.55			116	162	Peak
4824	41.03	30.74	10.29	54	-12.97	143	357	Average
4824	47.26	36.97	10.29	74	-26.74	143	357	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.92	44.49	39.99	4.5	54	-9.51	287	6	Average
2389.92	59.81	55.31	4.5	74	-14.19	287	6	Peak
2412	95.6	91.05	4.55			287	6	Average
2412	103.73	99.18	4.55			287	6	Peak
4824	41.66	31.37	10.29	54	-12.34	135	209	Average
4824	48.11	37.82	10.29	74	-25.89	135	209	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.92	43.77	39.27	4.5	54	-10.23	108	165	Average
2389.92	57.4	52.9	4.5	74	-16.6	108	165	Peak
2437	101.26	96.67	4.59			108	165	Average
2437	109.7	105.11	4.59			108	165	Peak
2484.32	42.89	38.23	4.66	54	-11.11	108	165	Average
2484.32	54.88	50.22	4.66	74	-19.12	108	165	Peak
4874	41.05	30.84	10.21	54	-12.95	175	305	Average
4874	47.19	36.98	10.21	74	-26.81	175	305	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2389.74	41.1	36.61	4.49	54	-12.9	287	6	Average
2389.74	53.41	48.92	4.49	74	-20.59	287	6	Peak
2437	97.26	92.67	4.59			287	6	Average
2437	106.02	101.43	4.59			287	6	Peak
2492.24	41.51	36.84	4.67	54	-12.49	287	6	Average
2492.24	53.2	48.53	4.67	74	-20.8	287	6	Peak
4874	41.24	31.03	10.21	54	-12.76	162	231	Average
4874	47.83	37.62	10.21	74	-26.17	162	231	Peak

Remarks:

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

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

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	99.5	94.88	4.62			171	161	Average
2462	107.38	102.76	4.62			171	161	Peak
2483.52	47.45	42.79	4.66	54	-6.55	171	161	Average
2483.52	64.22	59.56	4.66	74	-9.78	171	161	Peak
4924	41.36	31.11	10.25	54	-12.64	150	217	Average
4924	47.82	37.57	10.25	74	-26.18	150	217	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
2462	95.11	90.49	4.62			318	19	Average
2462	103.5	98.88	4.62			318	19	Peak
2483.52	44.22	39.56	4.66	54	-9.78	318	19	Average
2483.52	59.65	54.99	4.66	74	-14.35	318	19	Peak
4924	41.23	30.98	10.25	54	-12.77	186	62	Average
4924	47.64	37.39	10.25	74	-26.36	186	62	Peak

Remarks:

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

9 kHz ~ 30 MHz Data:

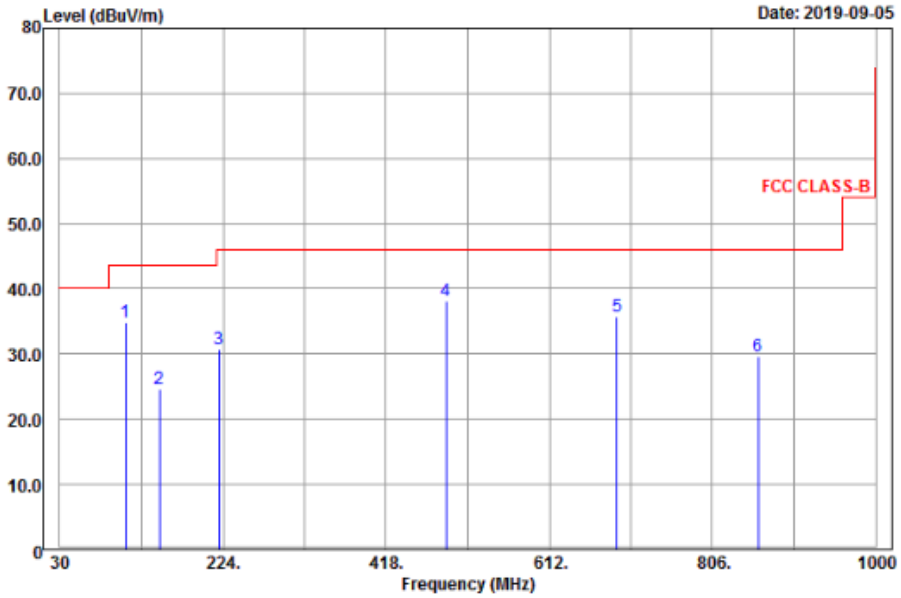
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

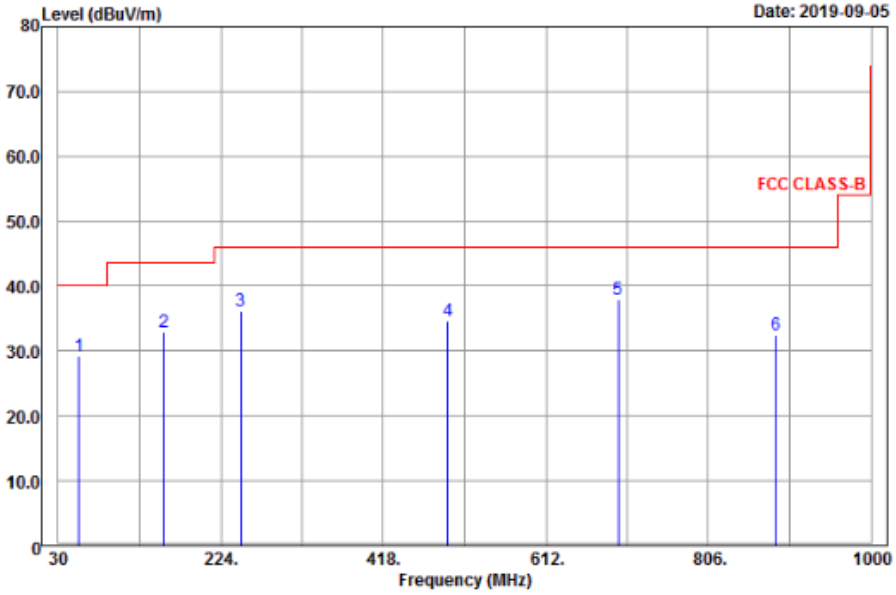
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 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**	Karl Lee

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
108.03	34.91	52.28	-17.37	43.5	-8.59	174	124	Peak
148.26	24.55	45.55	-21	43.5	-18.95	124	180	Peak
219.27	30.78	48.66	-17.88	46	-15.22	136	127	Peak
489	38.2	50.73	-12.53	46	-7.8	130	235	Peak
692.7	35.74	45.03	-9.29	46	-10.26	186	134	Peak
860.7	29.54	36.1	-6.56	46	-16.46	175	114	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	**Emission Level (dBuV/m)**	**Read Level (dBuV)**	**Factor (dB/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (cm)**	**Table Angle (Degree)**	**Remark**
55.11	29.27	44.76	-15.49	40	-10.73	161	127	Peak
156.36	32.96	53.72	-20.76	43.5	-10.54	167	275	Peak
247.89	36.12	52.99	-16.87	46	-9.88	150	323	Peak
495.3	34.68	47.07	-12.39	46	-11.32	199	217	Peak
698.3	37.86	47.11	-9.25	46	-8.14	168	214	Peak
886.6	32.48	38.59	-6.11	46	-13.52	178	56	Peak

Remarks:

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

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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

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