

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)

Report No.: RFBCKS-WTW-P25100038-2

FCC ID: UXX-S5A609A

Product: 5G Ruggedized Router

Brand: Ericsson

Model No.: S5A609A

Received Date: 2025/9/23

Test Date: 2025/11/24 ~ 2025/11/25

Issued Date: 2025/12/4

Applicant: Ericsson Enterprise Wireless Solutions, Inc.

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FCC Registration / 281270 / TW0032 for Test Location(1)

Designation Number: 788550 / TW0003 for Test Location(2)

Approved by: Jeremy Lin, **Date:** 2025/12/4
Jeremy Lin / Project Engineer

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Prepared by : Polly Chien / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P25100038-2	Original release.	2025/12/4

1 Certificate

Product: 5G Ruggedized Router

Brand: Ericsson

Test Model: S5A609A

Sample Status: Engineering sample

Applicant: Ericsson Enterprise Wireless Solutions, Inc.

Test Date: 2025/11/24 ~ 2025/11/25

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)

**Measurement
procedure:** ANSI C63.10-2020

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.

2 Summary of Test Results

Standard / Clause	Test Item	Result	Remark
15.205 /15.209 /15.247(d) 15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -2.7 dB at 39.70 MHz
15.205 /15.209 /15.247(d) 15.407(b)(9)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -1.0 dB at 2390.00 MHz
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.

Note: 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:

Parameter	Specification	Uncertainty (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3 dB
	30 MHz ~ 1 GHz	2.93 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.79 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	5G Ruggedized Router
Brand	Ericsson
Test Model	S5A609A
Status of EUT	Engineering sample
Power Supply Rating	24Vdc from adapter 9Vdc ~ 36Vdc from DC power supply
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT mode 1024QAM for OFDMA in 11ax mode 4096QAM for OFDMA in 11be mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	2.4GHz: Up to 688.2 Mbps (2TX) Up to 1376.4 Mbps (4TX) 5GHz: Up to 2884 Mbps
Operating Frequency	2.412 GHz ~ 2.462 GHz 5.18 GHz ~ 5.24 GHz 5.745 GHz ~ 5.825 GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20), 802.11be (EHT20): 11 802.11n (HT40), VHT40, 802.11ax (HE40), 802.11be (EHT40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20), 802.11be (EHT20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40), 802.11be (EHT40): 4 802.11ac (VHT80), 802.11ax (HE80), 802.11be (EHT80): 2

Note:

1. The EUT uses following accessory.

Item	Brand	Model	Specification
DC Power Cable	N/A	N/A	Signal Line : 3.0m

2. The EUT uses following support units.

Item	Brand	Model	Specification
AC Adapter	FSP	FSP075-RAAK3	AC Input : 100-240V, 2.0A, 50-60Hz DC Output : 24.0V, 3.125A, 75.0W DC Output Cable : 1.15M, non-shielded, with one core
Power Cable	N/A	N/A	Signal Line : 1.75m
GPIO Cable	Ericsson	170934-000	Signal Line : 2.0m
GNSS Antenna	MAXTENA	MEA-1400-SM	Antenna Type : Active Stacked Patch
Wi-Fi Antenna	cradlepoint	170836-000	Antenna Type : Dipole
Wi-Fi Antenna	Ericsson	MEA-2400-5925-SM	Antenna Type : PIFA

3. There are WLAN (2.4 GHz) and WLAN (5 GHz) technology used for the EUT.

4. The EUT contains WWAN Module (FCC ID: UXX-FE990B40NA).

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 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	RF Chain NO.	Antenna Gain(dBi)	Frequency range	Antenna Type	Connector Type	*Cable Loss(dB)	Including cable loss Antenna Gain(dBi)
0/1/2/3	0/1/2/3	2.47	2.4 GHz ~ 2.4835 GHz	Dipole	RP-SMA	0.5	1.97
		2.18	5.15 GHz ~ 5.25 GHz			0.8	1.38
		2.47	5.725 GHz ~ 5.85 GHz			0.9	1.57
0/1/2/3	0/1/2/3	5.91	2.4 GHz ~ 2.4835 GHz	PIFA	RP-SMA	0.5	5.41
		5.94	5.15 GHz ~ 5.25 GHz			0.8	5.14
		5.82	5.725 GHz ~ 5.85 GHz			0.9	4.92

*Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

For 2TX

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11be (EHT20)	2TX	2RX
802.11be (EHT40)	2TX	2RX
5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX
802.11be (EHT20)	2TX	2RX
802.11be (EHT40)	2TX	2RX
802.11be (EHT80)	2TX	2RX

For 4TX

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11be (EHT20)	4TX	4RX
802.11be (EHT40)	4TX	4RX
5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX
802.11be (EHT20)	4TX	4RX
802.11be (EHT40)	4TX	4RX
802.11be (EHT80)	4TX	4RX

3.3 Channel List

For 2412 ~ 2462 MHz

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20), 802.11be (EHT20):

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

7 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40), 802.11be (EHT40):

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

FOR 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20), 802.11be (EHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40), 802.11be (EHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80), 802.11be (EHT80):

Channel	Frequency
42	5210 MHz

FOR 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20), 802.11be (EHT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40), 802.11be (EHT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80), 802.11be (EHT80):

Channel	Frequency
155	5775 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. Antenna can be used in the following ways: X-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 3. The AC Adapter has the following models: DC 12V / DC 24V / DC 36V. Pre-scan these models of AC Adapters and find the worst case as a representative test condition.
Worst Case:	1. X-axis/ Y-axis/ Z-axis Worst Condition: X-axis (EUT) 2. X-axis/ Z-axis Worst Condition: Z-axis (Dipole Antenna_WIFI 4x4, PIFA Antenna_WIFI 4x4) 3. Worst Condition: AC Adapters (24Vdc)

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

Test Item	EUT Configure Mode	Combination	Test Standard	Mode	Tested Channel
Unwanted Emissions below 1 GHz	A, B	1	FCC 15.247 FCC 15.407	802.11b	6
				802.11be (EHT20)	149
Unwanted Emissions above 1 GHz	A, B	1	FCC 15.247 FCC 15.407	802.11b	6
				802.11be (EHT20)	149
Conducted Out of Band Emissions	A, B	1	FCC 15.247	802.11b	6
				802.11be (EHT20)	149
EUT Configure Mode:	A	Mode A (2.4&5G, WIFI 4x4), with Dipole Ant.			
	B	Mode B (2.4&5G, WIFI 4x4), with PIFA Ant.			

Note:

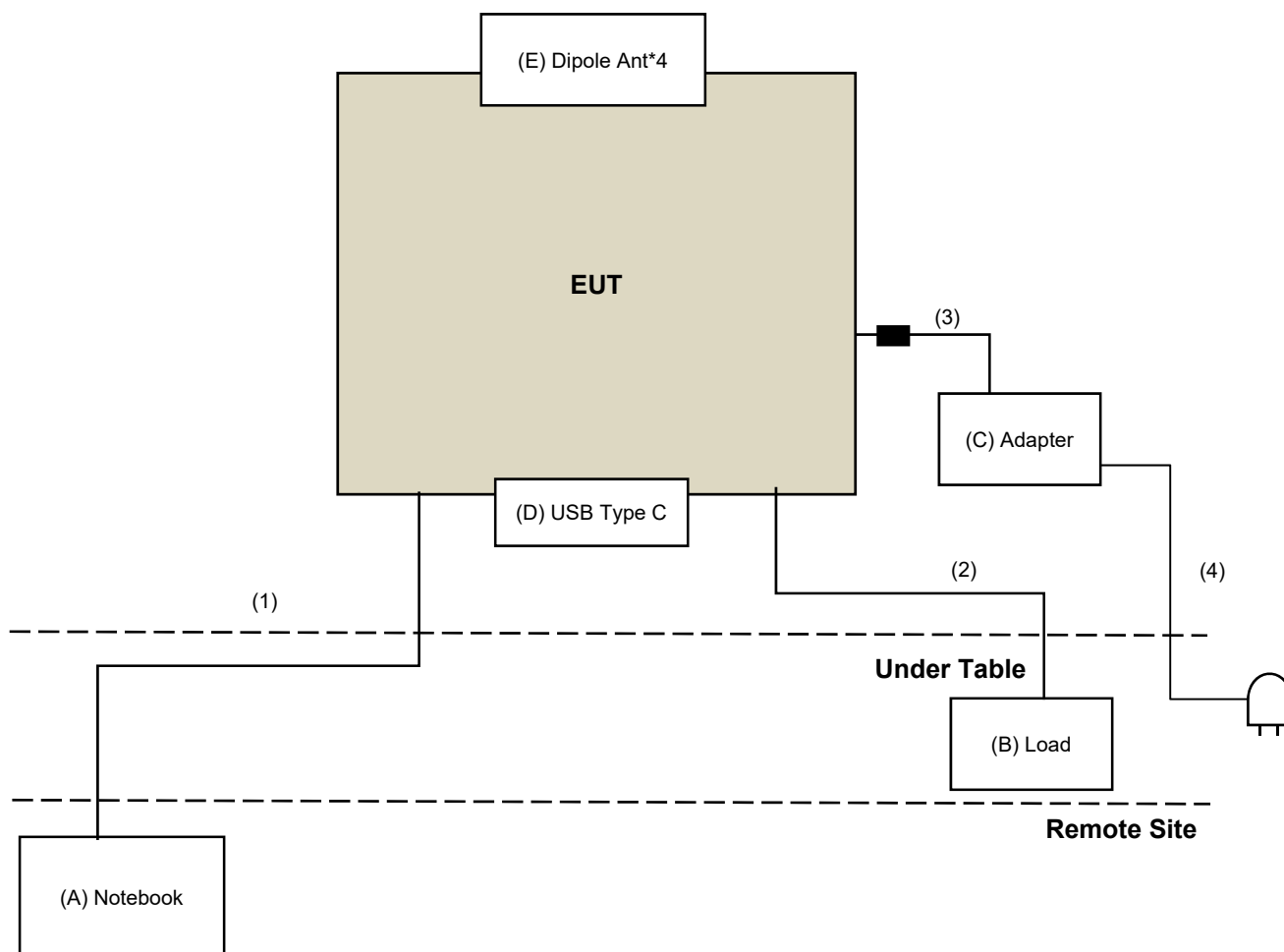
1. After the pretesting of WIFI 2x2 and WIFI 4x4 modes, WIFI 4x4 modes are found to be the worst case test mode and therefore had been chosen for final test.
2. This report is evaluated and tested under the condition that the same antenna is used.

3.5 Test Program Used and Operation Descriptions

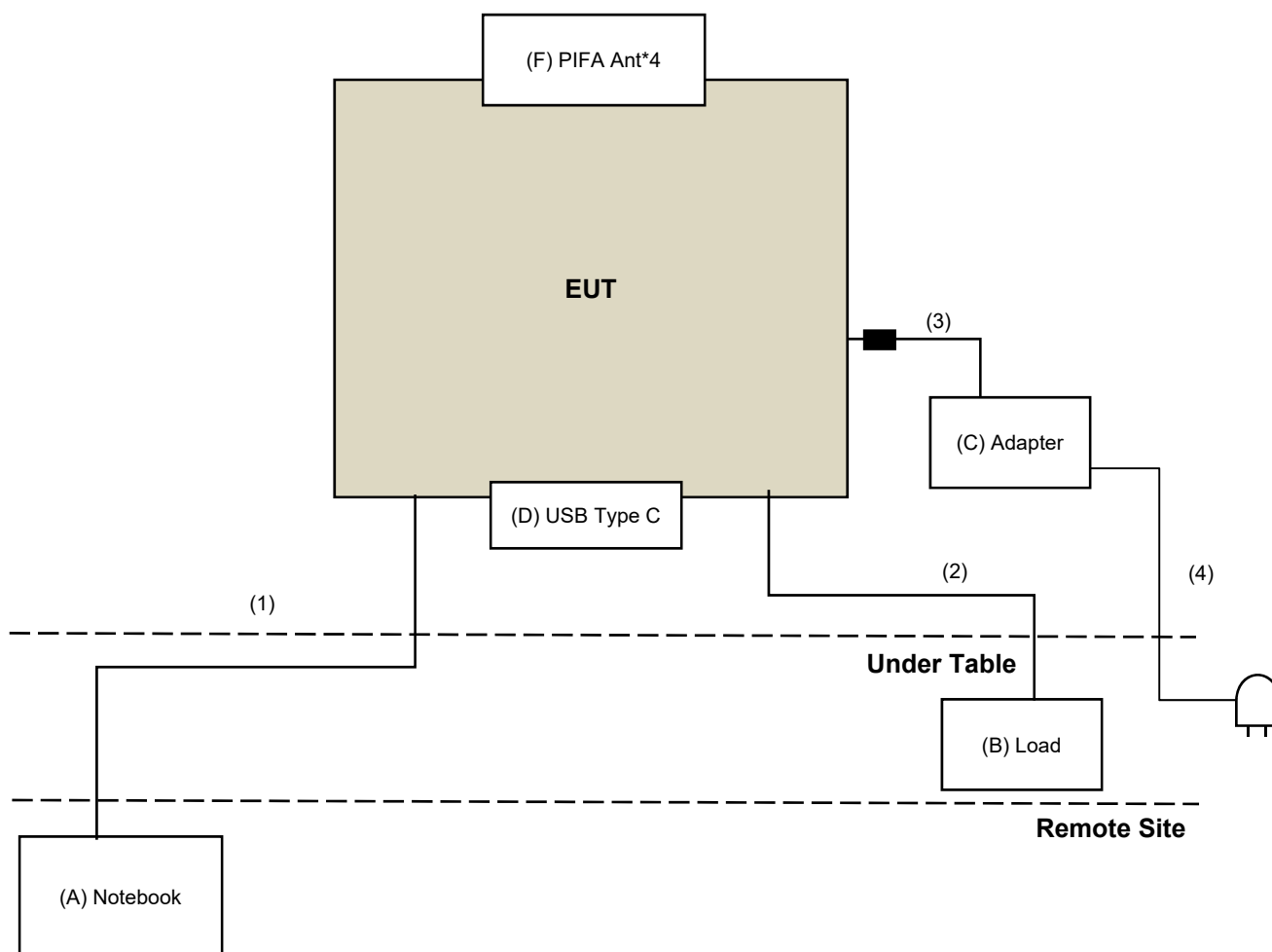
Controlling software QPM3.3.0.121.2.Windows-AnyCPU has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.6 Connection Diagram of EUT and Peripheral Devices

Dipole Ant.



PIFA Ant.



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Notebook	Lenovo	L480	PF1PTVEC	N/A	Provided by Lab
B	Load	N/A	N/A	N/A	N/A	Provided by Lab
C	Adapter	FSP	FSP075-RAAK3	T25411000016	N/A	Supplied by applicant
D	USB Type C	SanDisK	E8BDC	BM2501008385Z	N/A	Provided by Lab
E	Dipole Ant*4	cardlepoint	170836-000	N/A	N/A	Supplied by applicant
F	PIFA Ant*4	Maxtena	MEA-2400-5925-SM	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	1	10	N	0	Provided by Lab
2	RJ-45 Cable	5	1.5	N	0	Provided by Lab
3	DC Output Cable	1	1.15	N	1	Supplied by applicant
4	Power Cable	1	1.75	N	0	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-1213	2025/9/18	2026/9/17
EXA Signal Analyzer Agilent	N9010A	MY52220207	2024/12/30	2025/12/29
Loop Antenna TESEQ	HLA 6121	45745	2025/9/1	2026/8/31
MXE EMI Receiver Keysight	N9038B	MY60180019	2025/1/15	2026/1/14
Preamplifier EMCI	EMC330N	980782	2025/1/14	2026/1/13
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-500	201233	2025/1/14	2026/1/13
	EMCCFD400-NM-NM-3000	201235	2025/1/14	2026/1/13
	EMCCFD400-NM-NM-9000	201236(with PAD)	2025/1/14	2026/1/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2025/11/25

4.2 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
EXA Signal Analyzer Agilent	N9010A	MY52220207	2024/12/30	2025/12/29
Horn Antenna RFSPIN	DRH18-E	210103A18E	2025/11/9	2026/11/8
MXE EMI Receiver Keysight	N9038B	MY60180019	2025/1/15	2026/1/14
Preamplifier EMCI	EMC118A45SE	980808	2024/12/26	2025/12/25
RF Coaxial Cable EMCI	EMC104-SM-SM-1000	210102	2025/1/14	2026/1/13
	EMC104-SM-SM-3000	201231	2025/1/14	2026/1/13
	EMC104-SM-SM-9000	201243	2025/1/14	2026/1/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2025/11/24 ~ 2025/11/25

4.3 Conducted Out of Band Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2025/5/23	2026/5/22
Signal & Spectrum Analyzer R&S	FSV3044	101504	2025/6/18	2026/6/17
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/11/24

5 Limits of Test Items

5.1 Unwanted Emissions below 1 GHz

For FCC 15.247:

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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

For FCC 15.407:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.2 Unwanted Emissions above 1 GHz

For FCC 15.247:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

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.

For FCC 15.407 transmitters operating in the 5.150-5.850 GHz band:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

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.

Limits of unwanted emission out of the restricted bands

Applicable To	Limit	
789033 D02 General UNII Test Procedure New Rules v02r01	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m) *
15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2 (dBμV/m) ^{*1} PK: 105.2 (dBμV/m) ^{*2} PK: 110.8 (dBμV/m) ^{*3} PK: 122.2 (dBμV/m) ^{*4}

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

5.3 Conducted Out of Band Emissions

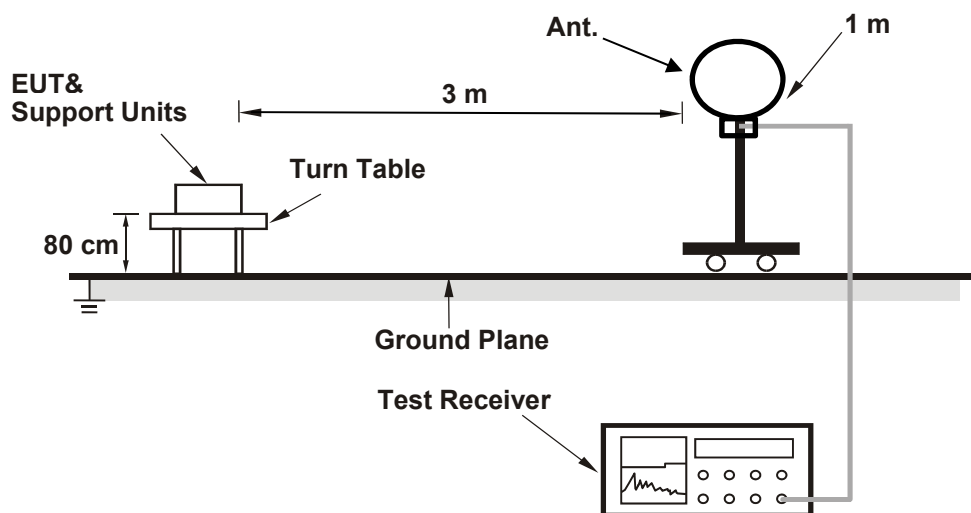
Below 30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

6 Test Arrangements

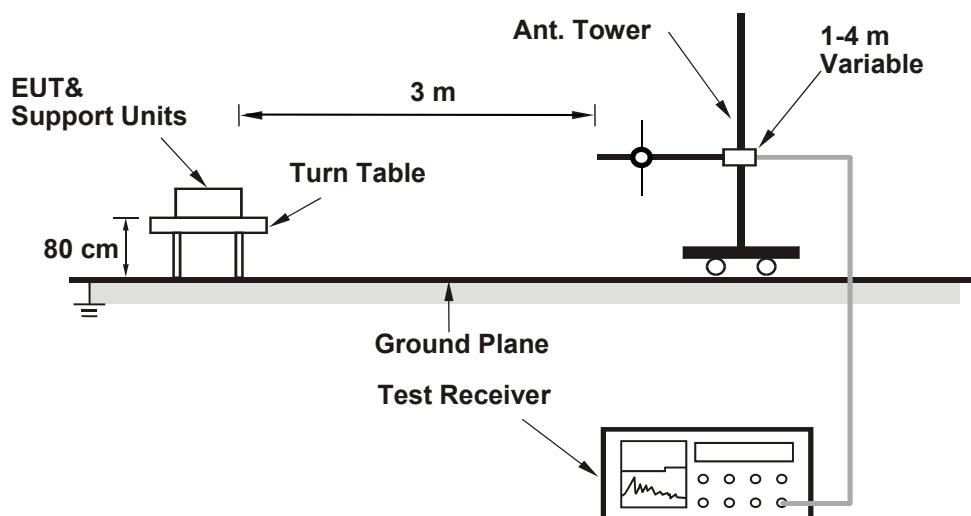
6.1 Unwanted Emissions below 1 GHz

6.1.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.1.2 Test Procedure

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 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. 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

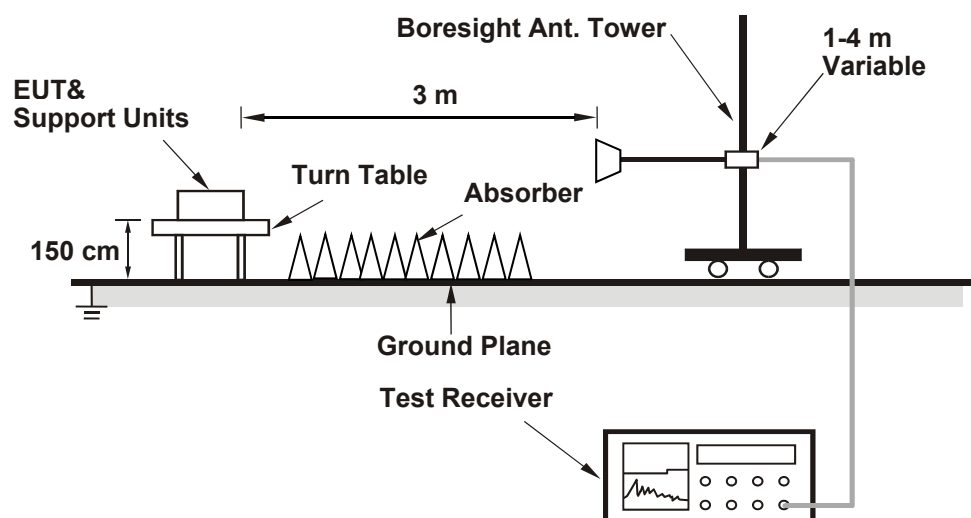
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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(QP) detect function, Average(AV) detect function, Peak(PK) detect function and specified bandwidth with maximum hold mode when the test frequencies less than or equal to 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.2 Unwanted Emissions above 1 GHz

6.2.1 Test Setup



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

6.2.2 Test Procedure

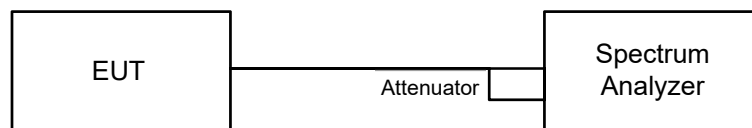
- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver system was set to peak and average detects 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.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.3 Conducted Out of Band Emissions

6.3.1 Test Setup



6.3.2 Test Procedure

MEASUREMENT PROCEDURE REF

- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 times the DTS bandwidth.
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Sweep time = No faster than coupled (auto) time.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum PSD level.

MEASUREMENT PROCEDURE OOB

- Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.
- Set RBW = 100 kHz.
- Set VBW ≥ 300 kHz.
- Detector = peak.
- Sweep = No faster than coupled (auto) time.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

7 Test Results of Test Item

7.1 Unwanted Emissions below 1 GHz

Mode A_Dipole Ant.

FCC 15.247

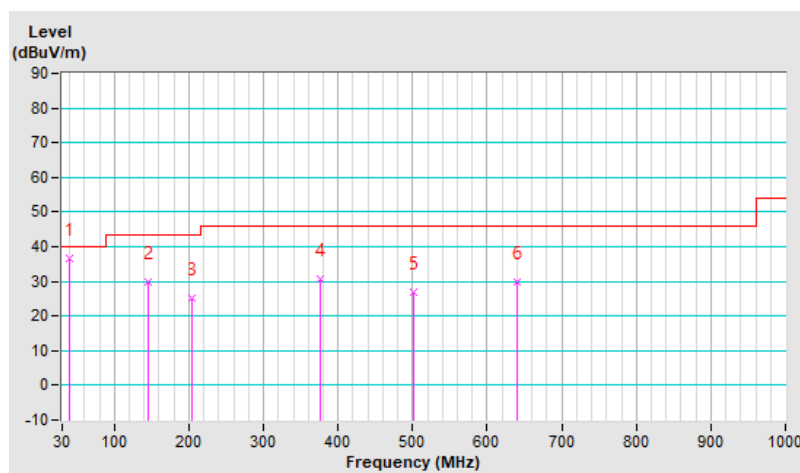
FCC 15.407

Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.70	36.6 QP	40.0	-3.4	1.32 H	149	50.0	-13.4
2	144.46	29.8 QP	43.5	-13.7	1.72 H	151	42.5	-12.7
3	203.63	25.3 QP	43.5	-18.2	1.30 H	182	41.7	-16.4
4	375.32	30.6 QP	46.0	-15.4	1.23 H	150	40.8	-10.2
5	500.45	26.7 QP	46.0	-19.3	1.84 H	162	34.0	-7.3
6	641.10	30.0 QP	46.0	-16.0	1.93 H	14	33.8	-3.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

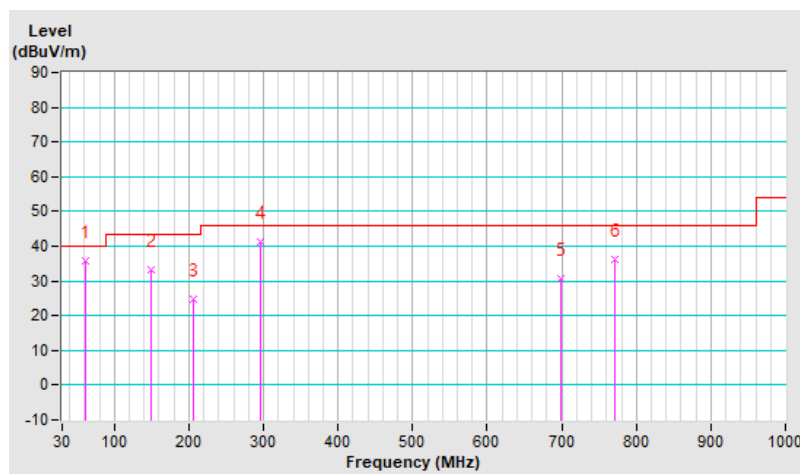


Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	61.04	35.6 QP	40.0	-4.4	1.25 V	148	49.5	-13.9
2	148.34	33.1 QP	43.5	-10.4	1.71 V	106	45.7	-12.6
3	205.57	24.8 QP	43.5	-18.7	1.84 V	225	41.2	-16.4
4	296.75	41.3 QP	46.0	-4.7	1.96 V	204	53.6	-12.3
5	698.33	30.6 QP	46.0	-15.4	1.12 V	145	33.5	-2.9
6	772.05	36.3 QP	46.0	-9.7	1.87 V	161	37.7	-1.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



Mode B_PIFA Ant.

FCC 15.247

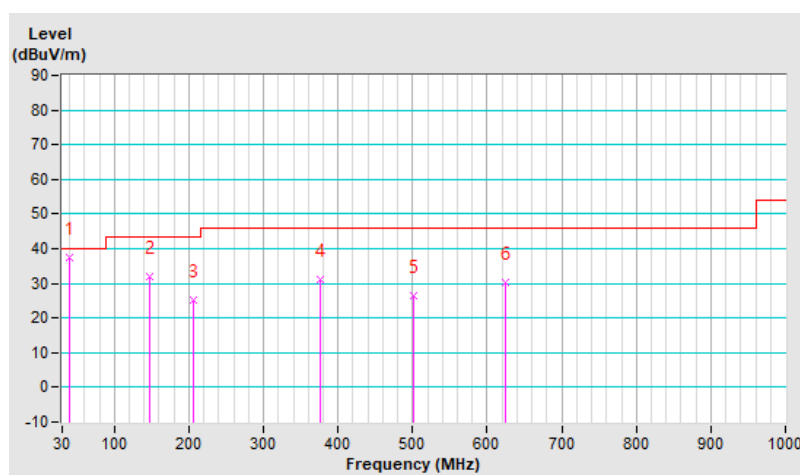
FCC 15.407

Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.70	37.3 QP	40.0	-2.7	1.33 H	245	50.7	-13.4
2	146.40	31.9 QP	43.5	-11.6	1.94 H	151	44.5	-12.6
3	205.57	25.3 QP	43.5	-18.2	1.20 H	224	41.7	-16.4
4	375.32	30.9 QP	46.0	-15.1	1.69 H	131	41.1	-10.2
5	500.45	26.3 QP	46.0	-19.7	1.27 H	154	33.6	-7.3
6	623.64	30.2 QP	46.0	-15.8	1.60 H	201	34.4	-4.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

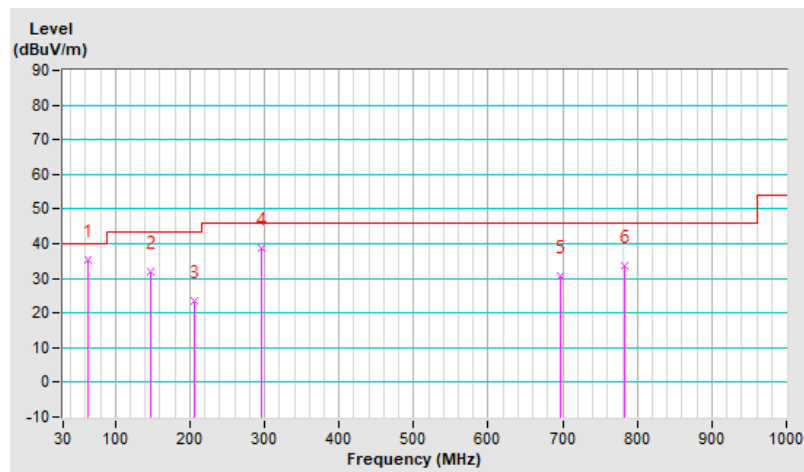


Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120 kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	62.98	35.5 QP	40.0	-4.5	1.35 V	246	49.6	-14.1
2	146.4	32.0 QP	43.5	-11.5	1.72 V	114	44.6	-12.6
3	205.57	23.3 QP	43.5	-20.2	1.82 V	204	39.7	-16.4
4	296.75	38.7 QP	46.0	-7.3	1.63 V	221	51.0	-12.3
5	696.39	30.8 QP	46.0	-15.2	1.84 V	221	33.9	-3.1
6	783.69	33.6 QP	46.0	-12.4	1.06 V	190	34.9	-1.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.2 Unwanted Emissions above 1 GHz

Mode A_Dipole Ant.

FCC 15.247

Combination	1		
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	1.76 H	143	28.3	31.8
2	2390.00	45.8 AV	54.0	-8.2	1.76 H	143	14.0	31.8
3	*2437.00	115.8 PK			1.76 H	143	84.1	31.7
4	*2437.00	101.1 AV			1.76 H	143	69.4	31.7
5	2483.50	61.0 PK	74.0	-13.0	1.76 H	143	29.2	31.8
6	2483.50	46.7 AV	54.0	-7.3	1.76 H	143	14.9	31.8
7	4874.00	48.1 PK	74.0	-25.9	2.06 H	211	44.9	3.2
8	4874.00	34.8 AV	54.0	-19.2	2.06 H	211	31.6	3.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	68.7 PK	74.0	-5.3	2.77 V	222	36.9	31.8
2	2390.00	53.0 AV	54.0	-1.0	2.77 V	222	21.2	31.8
3	*2437.00	124.9 PK			2.77 V	222	93.2	31.7
4	*2437.00	111.0 AV			2.77 V	222	79.3	31.7
5	2483.50	65.1 PK	74.0	-8.9	2.77 V	222	33.3	31.8
6	2483.50	51.3 AV	54.0	-2.7	2.77 V	222	19.5	31.8
7	4874.00	48.3 PK	74.0	-25.7	2.38 V	179	45.1	3.2
8	4874.00	35.6 AV	54.0	-18.4	2.38 V	179	32.4	3.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

FCC 15.407

Combination	1		
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5608.40	58.0 PK	68.2	-10.2	1.38 H	336	54.6	3.4
2	*5745.00	109.6 PK			1.38 H	336	68.2	41.4
3	*5745.00	95.9 AV			1.38 H	336	54.5	41.4
4	#5986.40	57.8 PK	68.2	-10.4	1.38 H	336	53.8	4.0
5	11490.00	57.1 PK	74.0	-16.9	1.89 H	156	47.3	9.8
6	11490.00	44.2 AV	54.0	-9.8	1.89 H	156	34.4	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5632.40	59.8 PK	68.2	-8.4	2.26 V	169	56.3	3.5
2	*5745.00	121.3 PK			2.26 V	169	79.9	41.4
3	*5745.00	107.7 AV			2.26 V	169	66.3	41.4
4	#5956.40	58.2 PK	68.2	-10.0	2.26 V	169	54.3	3.9
5	11490.00	57.1 PK	74.0	-16.9	1.52 V	206	47.3	9.8
6	11490.00	44.2 AV	54.0	-9.8	1.52 V	206	34.4	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

Mode B_PIFA Ant.

FCC 15.247

Combination	1		
Frequency Range	1 GHz ~ 18 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.8 PK	74.0	-3.2	1.72 H	14	39.0	31.8
2	2390.00	52.8 AV	54.0	-1.2	1.72 H	14	21.0	31.8
3	*2437.00	126.3 PK			1.72 H	14	94.6	31.7
4	*2437.00	112.8 AV			1.72 H	14	81.1	31.7
5	2483.50	60.9 PK	74.0	-13.1	1.72 H	14	29.1	31.8
6	2483.50	52.0 AV	54.0	-2.0	1.72 H	14	20.2	31.8
7	4874.00	48.4 PK	74.0	-25.6	2.78 H	156	45.2	3.2
8	4874.00	38.1 AV	54.0	-15.9	2.78 H	156	34.9	3.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.9 PK	74.0	-17.1	2.86 V	135	25.1	31.8
2	2390.00	44.4 AV	54.0	-9.6	2.86 V	135	12.6	31.8
3	*2437.00	118.0 PK			2.86 V	135	86.3	31.7
4	*2437.00	103.9 AV			2.86 V	135	72.2	31.7
5	2483.50	56.1 PK	74.0	-17.9	2.86 V	135	24.3	31.8
6	2483.50	45.0 AV	54.0	-9.0	2.86 V	135	13.2	31.8
7	4874.00	47.3 PK	74.0	-26.7	2.09 V	184	44.1	3.2
8	4874.00	37.4 AV	54.0	-16.6	2.09 V	184	34.2	3.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

FCC 15.407

Combination	1		
Frequency Range	1 GHz ~ 18 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Owen Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5642.00	60.6 PK	68.2	-7.6	1.32 H	20	57.0	3.6
2	*5745.00	121.4 PK			1.32 H	30	80.0	41.4
3	*5745.00	108.0 AV			1.32 H	30	66.6	41.4
4	#5939.20	57.5 PK	68.2	-10.7	1.32 H	20	53.7	3.8
5	11490.00	57.8 PK	74.0	-16.2	1.23 H	196	48.0	9.8
6	11490.00	44.6 AV	54.0	-9.4	1.23 H	196	34.8	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5636.40	57.1 PK	68.2	-11.1	2.56 V	89	53.5	3.6
2	*545.00	110.7 PK			2.56 V	89	69.3	41.4
3	*5745.00	98.0 AV			2.56 V	89	56.6	41.4
4	#5936.80	57.3 PK	68.2	-10.9	2.56 V	89	53.5	3.8
5	11490.00	57.4 PK	74.0	-16.6	1.53 V	147	47.6	9.8
6	11490.00	44.3 AV	54.0	-9.7	1.53 V	147	34.5	9.8

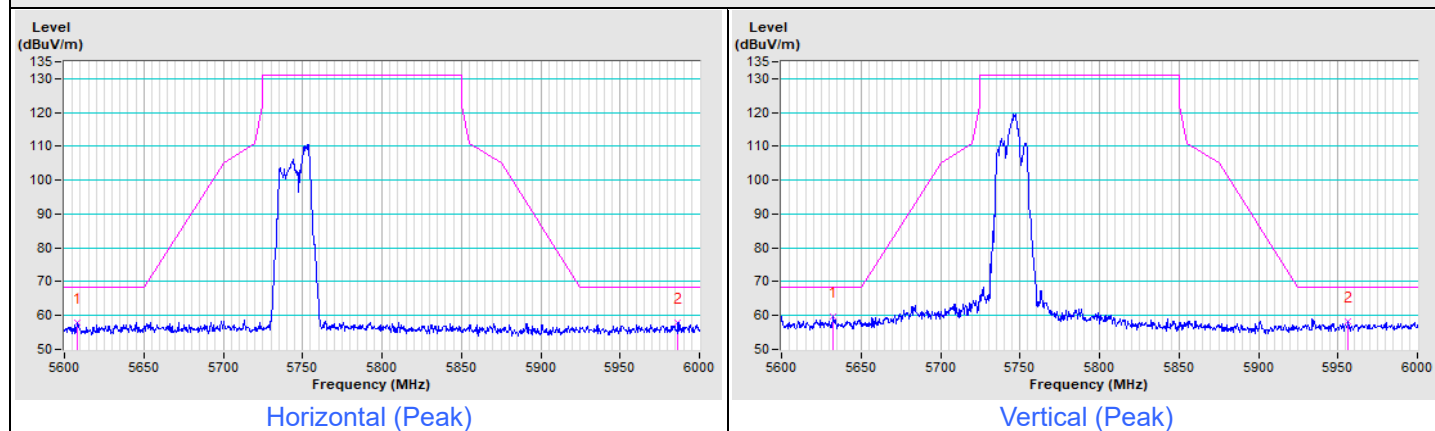
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

Plot of Band Edge

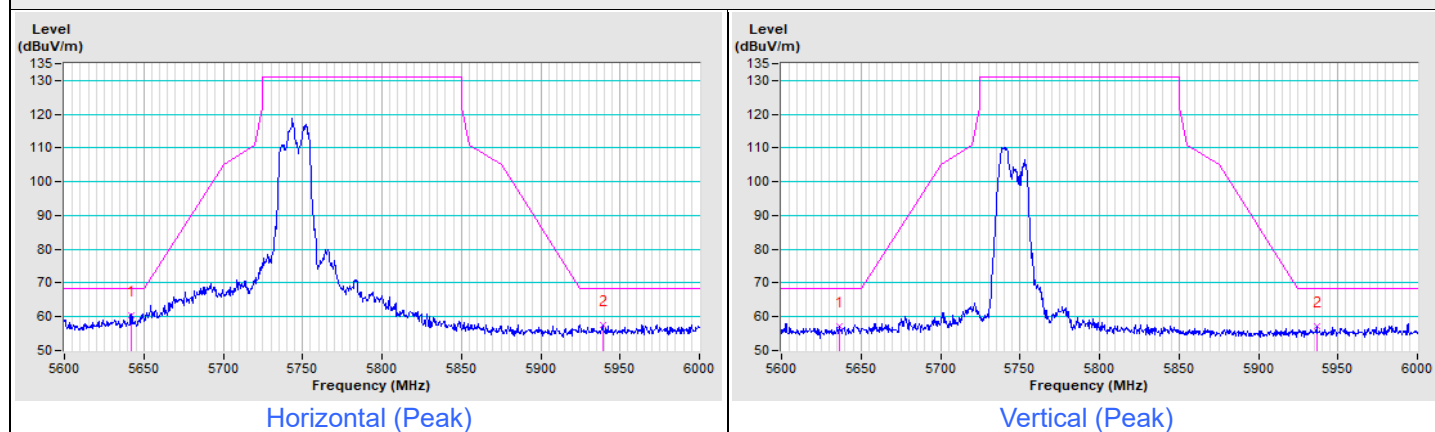
Mode A_Dipole Ant.

Combination 1



Mode B_PIFA Ant.

Combination 1

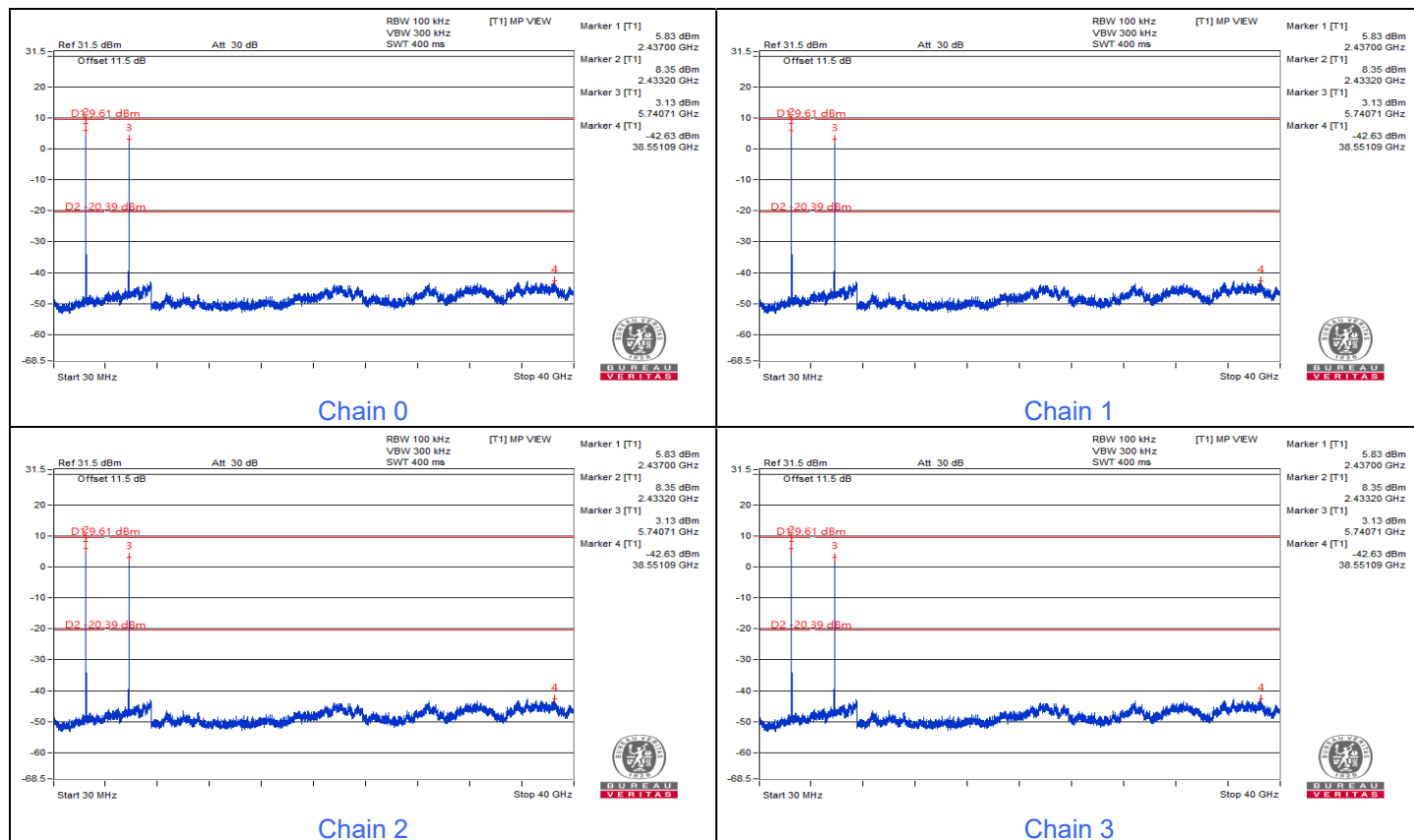


7.3 Conducted Out of Band Emissions

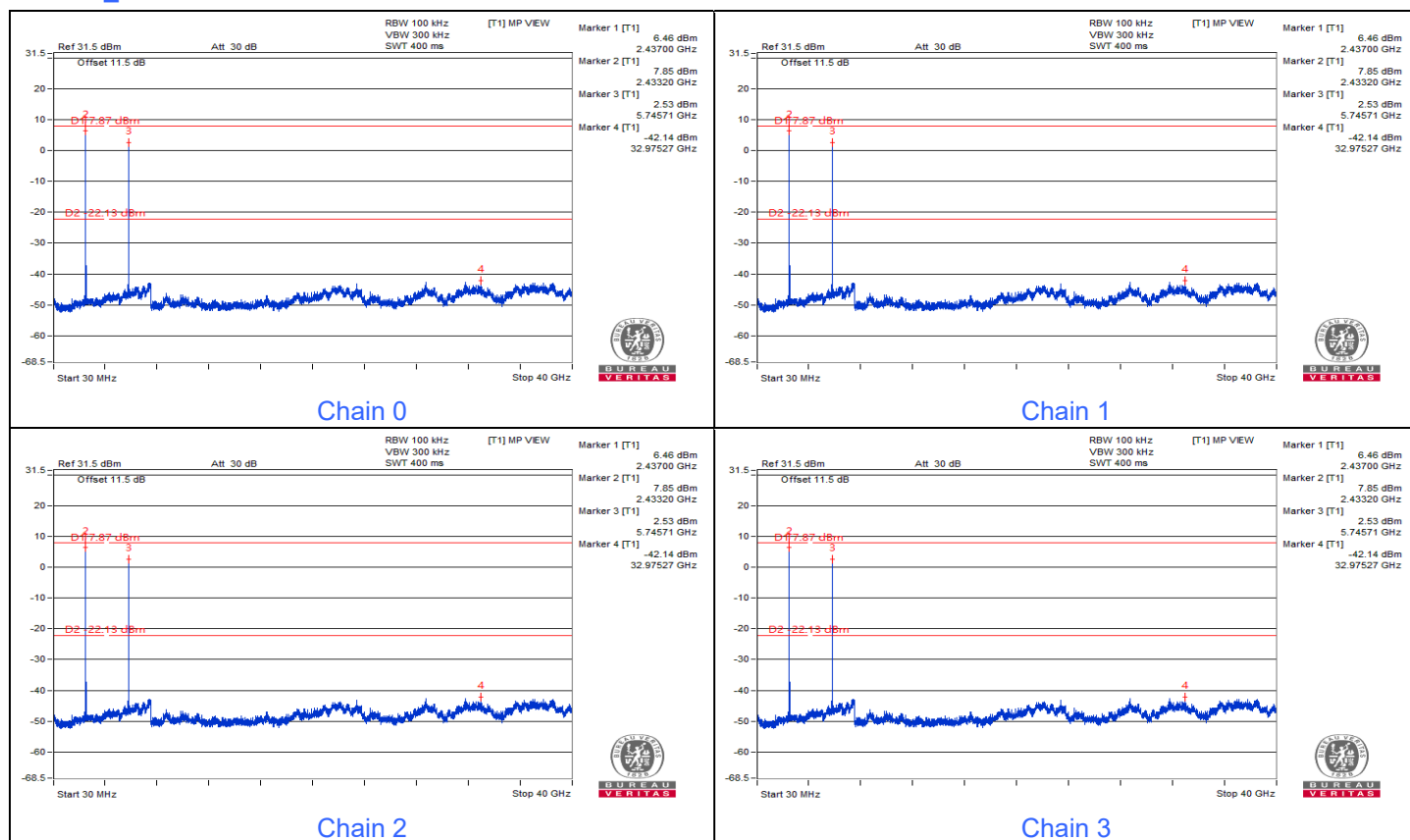
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 65% RH	Tested By:	Jisyoung Wang
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Mode A_Dipole Ant.

Combination 1



Mode B_PIFA Ant.



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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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Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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