

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)
47 CFR FCC Part 22
47 CFR FCC Part 24
47 CFR FCC Part 27
47 CFR FCC Part 90
47 CFR FCC Part 96

Report No.: RFLCI-WTW-P25090339-2
FCC ID: VW3FAST5984
Product: 5GNR CPE Router
Brand: Sagemcom
Model No.: FAST5984
Series Model: BGW830-900
Received Date: 2025/9/11
Test Date: 2025/12/17 ~ 2025/12/22
Issued Date: 2025/12/31

Applicant: Sagemcom Broadband SAS

Address: Sagemcom
4 Allee des Messageries
92271 BOIS-COLOMBES CEDEX
FRANCE

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): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

FCC Registration / 788550 / TW0003 for Test Location(1)

Designation Number: 281270 / TW0032 for Test Location(2)

Approved by:

Jeremy Lin

Date:

2025/12/31

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFLCI-WTW-P25090339-2	Original release.	2025/12/31

1 Certificate

Product: 5GNR CPE Router

Brand: Sagemcom

Test Model: FAST5984

Series Model: BGW830-900

Sample Status: Engineering sample

Applicant: Sagemcom Broadband SAS

Test Date: 2025/12/17 ~ 2025/12/22

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

47 CFR FCC Part 15, Subpart E (Section 15.407)

47 CFR FCC Part 22

47 CFR FCC Part 24

47 CFR FCC Part 27

47 CFR FCC Part 90

47 CFR FCC Part 96

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	Meet the requirement of limit.
Part 2.1053 Part 27.53(n)	Radiated Spurious Emissions below 1GHz	Pass	Meet the requirement of limit.
15.205 /15.209 /15.247(d) 15.407(b) (1/2/3/4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Meet the requirement of limit.
Part 2.1053 Part 27.53(n)	Radiated Spurious Emissions above 1GHz	Pass	Meet the requirement of limit.
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	5GNR CPE Router	
Brand	Sagemcom	
Test Model	FAST5984	
Series Model	BGW830-900	
Model Difference	No difference, FAST5984 is the Sagemcom name and BGW830-900 is the AT&T customer name	
Modulation Technology	WLAN	DSSS, OFDM, OFDMA
	WCDMA	WCDMA, OFDM
	LTE	OFDM, OFDMA, SC-FDMA
	5G NR	CP-OFDM, DFT-s-OFDM
Operating Frequency	WLAN	2.412 GHz ~ 2.462 GHz 5.18 GHz ~ 5.25 GHz 5.25 GHz ~ 5.32 GHz 5.5 GHz ~ 5.72 GHz 5.745 GHz ~ 5.825 GHz
	LTE	LTE Band 2 : 1850 ~ 1910 MHz LTE Band 5 : 824 ~ 849 MHz LTE Band 12 : 699 ~ 716 MHz LTE Band 14 : 788 ~ 798 MHz LTE Band 66 : 1710 ~ 1780 MHz
	5G NR	SA NR Band 2 : 1850 ~ 1910 MHz SA NR Band 5 : 824 ~ 849 MHz SA NR Band 14 : 788 ~ 798 MHz SA NR Band 66 : 1710 ~ 1780 MHz SA NR Band 77 : 3300 ~ 4200 MHz

Note:

1. The following modules can be chosen to be configured in the EUT.

Item	Brand Name	Model Name	Specification
WWAN module	Foxconn	T99W651	LTE+5G NR
WiFi module	Qualcomm	QFW7114 + QPF4209 (2.4GHz) + QPF4509 (5GHz)	4T4R 802.11 a/b/g/n/ac/ax/be WLAN

2. The EUT contains following accessory device.

Adapter 1	
Brand	Sagemcom
Model	NBS42F120350VU
Part Number	191733384-xx 191728953-xx
Input Power	100-127V, 50/60Hz, Max 1.0A
Output Power	12Vdc, 3.5A
DC output cable	1.8m / 0 core
Manufacturer	NETBIT

Adapter 2	
Brand	Sagemcom
Model	ADS-42DG-12 12042EPCU-L
Part Number	191733376-xx 191728929-xx
Input Power	100-127V, 50/60Hz, Max 1.2A
Output Power	12Vdc 3.5A
DC output cable	1.8m / 0 core
Manufacturer	HONOR

Adapter 3	
Brand	Sagemcom
Model	G30-V3500R120-042E0-US
Part Number	191733397-xx 191728961-xx
Input Power	100-127V, 50/60Hz, Max 1.2A
Output Power	12Vdc 3.5A
DC output cable	1.8m / 0 core
Manufacturer	MOSO

3. Simultaneously transmission combination.

Combination	Technology		
1	WLAN (2.4 GHz)	WLAN (5 GHz)	WWAN

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

4. The EUT contains certified module which FCC ID: 2AQ68T99W651.

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.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	*Cable Length
Wi-Fi0	0	COLFLY	10A020107600	2.8	2.4~2.4835GHz	Dipole	ipex(MHF)	147±3
				5.3	5.15~5.25GHz			
				5.1	5.25~5.35GHz			
				5.4	5.47~5.725GHz			
				4.9	5.725~5.85GHz			
Wi-Fi1	1	COLFLY	10A070100800	4.3	2.4~2.4835GHz	Dipole	ipex(MHF)	168±3
				4.9	5.15~5.25GHz			
				5.1	5.25~5.35GHz			
				5.6	5.47~5.725GHz			
				5	5.725~5.85GHz			
Wi-Fi2	2	COLFLY	10A040100700	3.9	2.4~2.4835GHz	Dipole	ipex(MHF)	106±3
				4	5.15~5.25GHz			
				4	5.25~5.35GHz			
				4.2	5.47~5.725GHz			
				3.4	5.725~5.85GHz			
Wi-Fi3	3	COLFLY	10A080101000	4.9	2.4~2.4835GHz	Dipole	ipex(MHF)	157.5±3
				4.3	5.15~5.25GHz			
				4.4	5.25~5.35GHz			
				4.5	5.47~5.725GHz			
				3.9	5.725~5.85GHz			
Directional Gain	0+1+2+3	-	-	4.3	2.4~2.4835GHz	-	-	-
				3.5	5.15~5.25GHz			
				4	5.25~5.35GHz			
				4.5	5.47~5.725GHz			
				4.7	5.725~5.85GHz			

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

* Directional gain report No.: Fast5984 FCC Antenna Report_v2.xlsx

2. The EUT incorporates a MIMO function:

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

Note:

1. All of modulation mode support beamforming function except 802.11b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), VHT mode for 20 MHz (40 MHz), 802.11ax mode for 20 MHz (40 MHz) and 802.11be mode for 20 MHz (40 MHz). Therefore the investigated worst case is the representative mode in test report.

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
802.11ac (VHT160)	4Tx	4Rx
802.11ax (HE20)	4Tx	4Rx
802.11ax (HE40)	4Tx	4Rx
802.11ax (HE80)	4Tx	4Rx
802.11ax (HE160)	4Tx	4Rx
802.11be (EHT20)	4Tx	4Rx
802.11be (EHT40)	4Tx	4Rx
802.11be (EHT80)	4Tx	4Rx
802.11be (EHT160)	4Tx	4Rx
802.11be (MRU484+242/996+484/996+484+242)	4Tx	4Rx

Note:

1. All of modulation mode support beamforming function except 802.11a modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), 802.11ac mode for 20 MHz (40 MHz, 80 MHz, 160 MHz), 802.11ax mode for 20 MHz (40 MHz, 80 MHz, 160 MHz) and 802.11be mode for 20 MHz (40 MHz, 80 MHz, 160 MHz). Therefore the investigated worst case is the representative mode in test report.

3.3 Test Mode Applicability and Tested Channel Detail

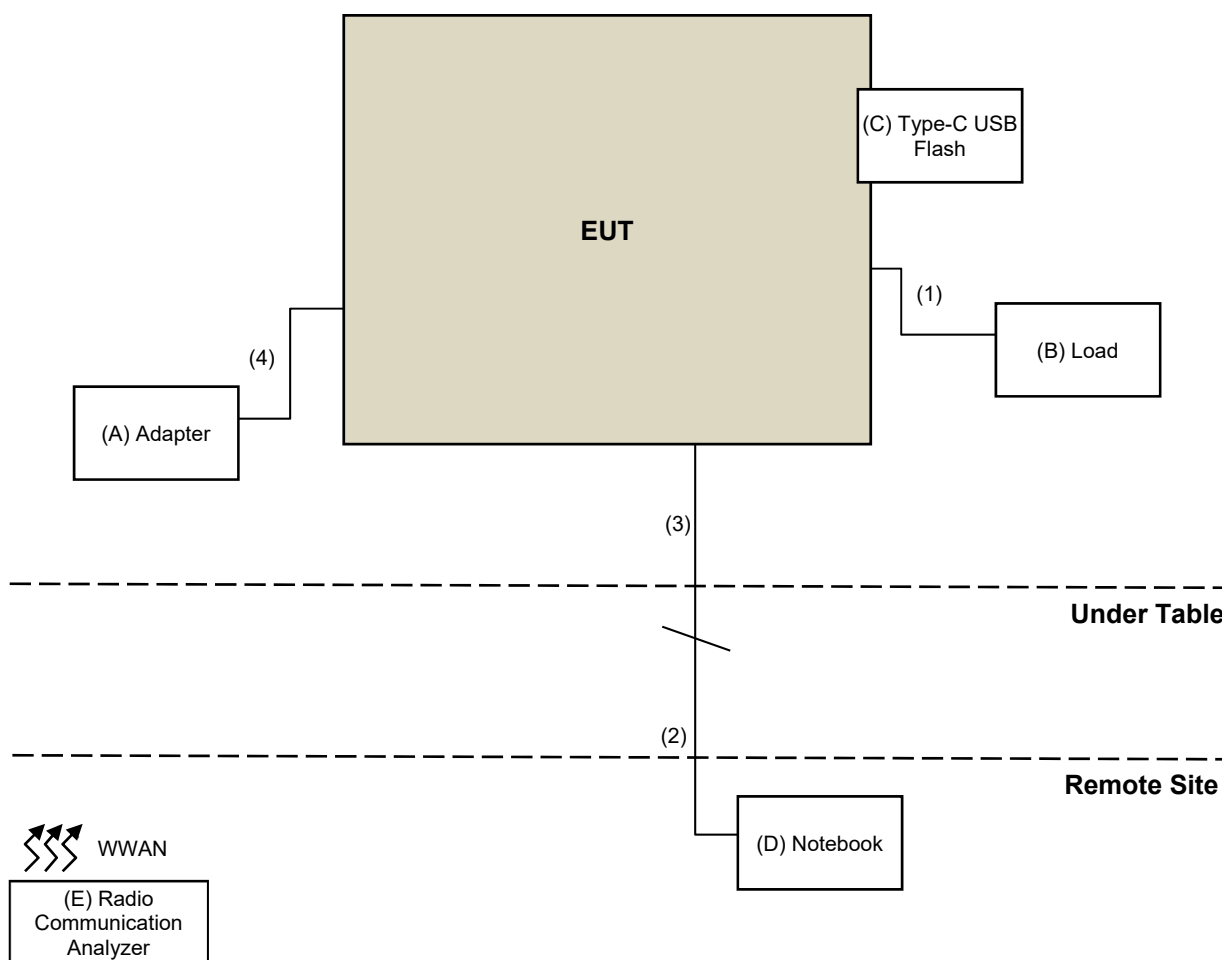
Pre-Scan:	1. EUT can be used in the following ways: X-axis/Y-axis/Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. EUT can be used in the following adapters: Adapter 1/Adapter 2/Adapter 3. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	1. Worst Condition: Z-axis 2. Worst Condition: Adapter 3

Test Item	Combination	Mode	Tested Channel
Unwanted Emissions below 1 GHz	1	802.11be (EHT40) 2.4G	6
		802.11be (EHT20) 5G	149
Radiated Spurious Emissions below 1GHz		5GNR Band 77_BW90MHz_1RB_QPSK	649668
Unwanted Emissions above 1 GHz	1	802.11be (EHT40) 2.4G	6
		802.11be (EHT20) 5G	149
Radiated Spurious Emissions above 1GHz		5GNR Band 77_BW90MHz_1RB_QPSK	649668
Conducted Out of Band Emissions	1	802.11be (EHT40) 2.4G	6
		802.11be (EHT20) 5G	149

3.4 Test Program Used and Operation Descriptions

Controlling software QRCT_v4.0.211.0 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	Sagecom	G30-V3500R120-042E0-US	N/A	N/A	Accessory of EUT
B	Load	BV	LP-4	N/A	N/A	Provided by Lab
C	Type-C USB Flash	SanDisk	E8BDC	BM2501008385Z	N/A	Provided by Lab
D	Notebook	Lenovo	L470	N/A	N/A	Provided by Lab
E	Radio Communication Analyzer	Anritsu	MT8000A	6272278595	NA	-

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	3	1.5	No	0	Provided by Lab
2	RJ-45 Cable	1	10	No	0	Provided by Lab
3	RJ-45 Cable	1	1.5	Yes	0	Provided by Lab
4	AC Power Cable	1	2	Yes	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: 2025/12/22

4.2 Radiated Spurious Emissions below 1GHz

Refer to section 4.1 to get the tested date and information of the instruments.

4.3 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
Horn Antenna Schwarzbeck	BBHA 9170	9170-1049	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
	EMC184045SE	980788	2025/1/14	2026/1/13
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201254	2025/1/14	2026/1/13
	EMC101G-KM-KM-3000	201258	2025/1/14	2026/1/13
	EMC101G-KM-KM-5000	201261	2025/1/14	2026/1/13
	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: 2025/12/22

4.4 Radiated Spurious Emissions above 1GHz

Refer to section 4.3 to get the tested date and information of the instruments.

4.5 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: 2025/12/17

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 Radiated Spurious Emissions below 1GHz

For Part 27:

According to FCC 47 CFR part 27.53(l), for mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.

5.3 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:

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

5.4 Radiated Spurious Emissions above 1GHz

For Part 27:

According to FCC 47 CFR part 27.53(l), for mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.

5.5 Conducted Out of Band Emissions

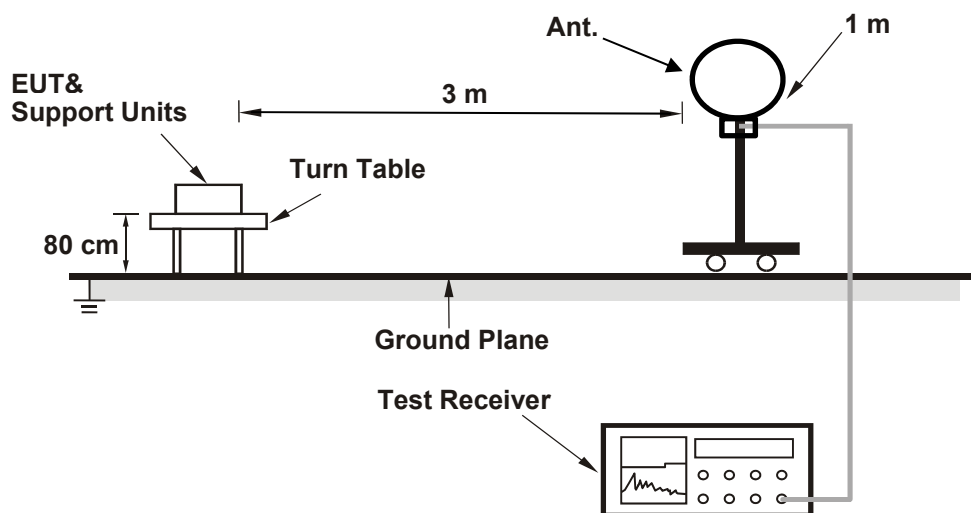
Below 30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

6 Test Arrangements

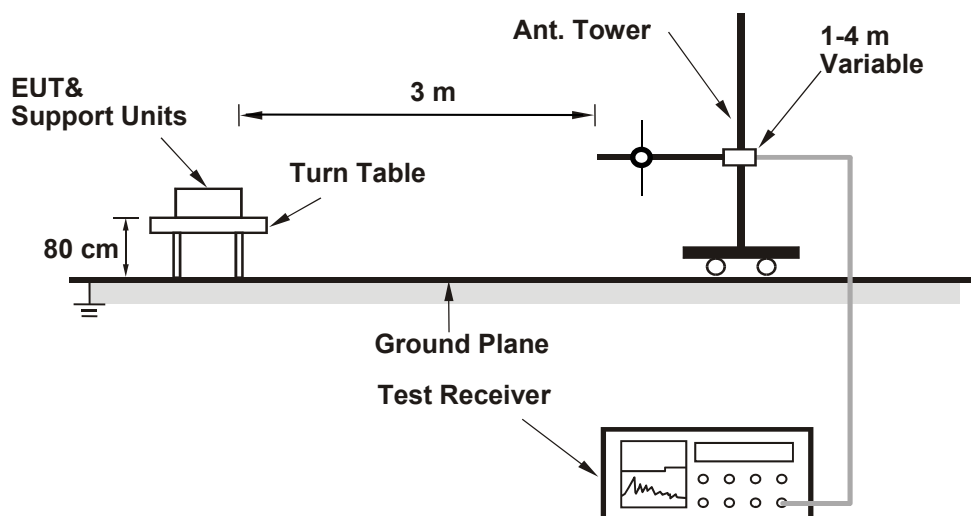
6.1 Unwanted Emissions below 1 GHz

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.

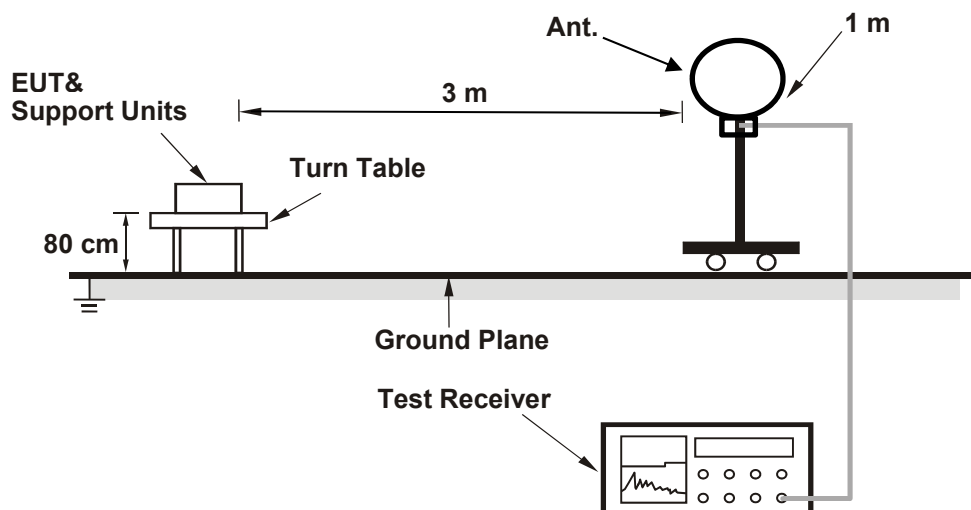
Notes:

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.

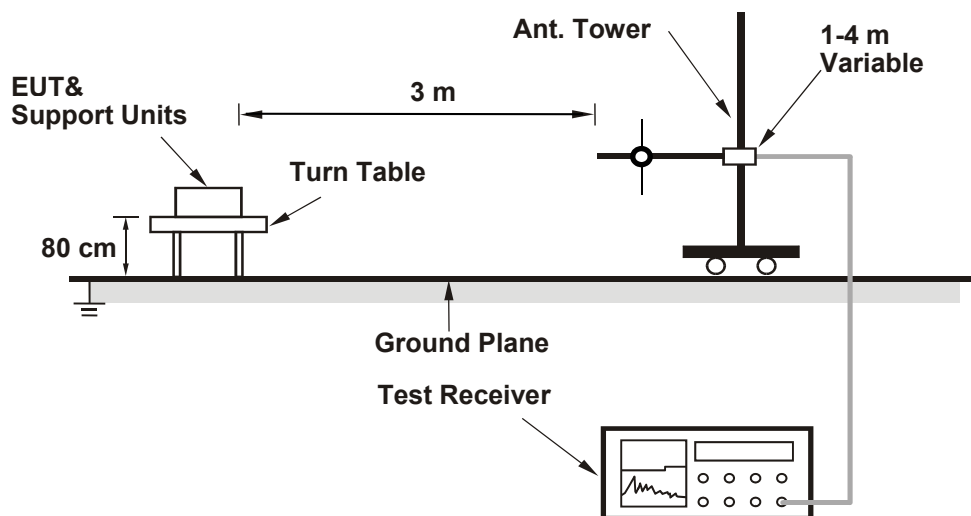
6.2 Radiated Spurious Emissions below 1GHz

6.2.1 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).

6.2.2 Test Procedure

The EUT is configured to set data modulation and maximum power using WWAN technology.

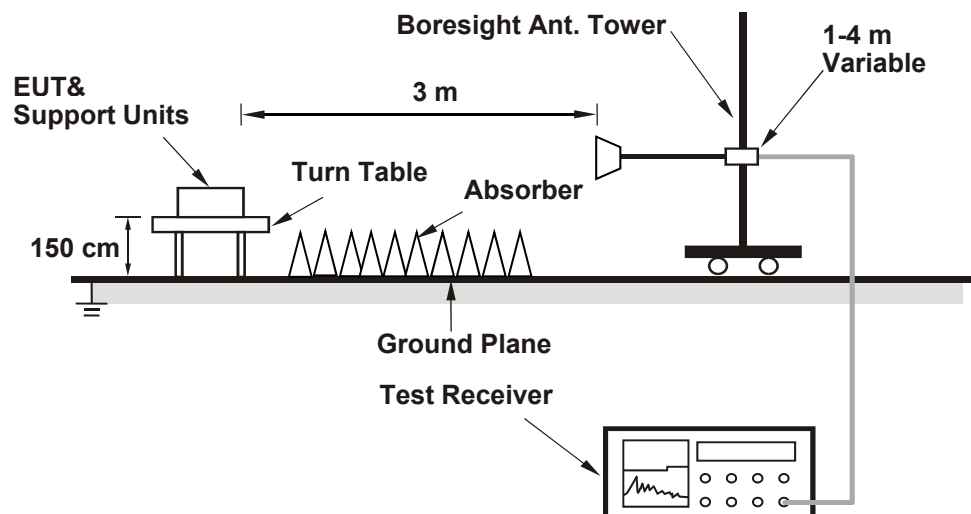
- a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. 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.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following ANSI C63.26 section 5.5 and 5.2.7
- e. $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- f. $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.
2. The amplitude of spurious emissions in the range 9 kHz to 30 MHz which are attenuated more than 20 dB below the permissible value need not be reported.

6.3 Unwanted Emissions above 1 GHz

6.3.1 Test Setup



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

6.3.2 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.

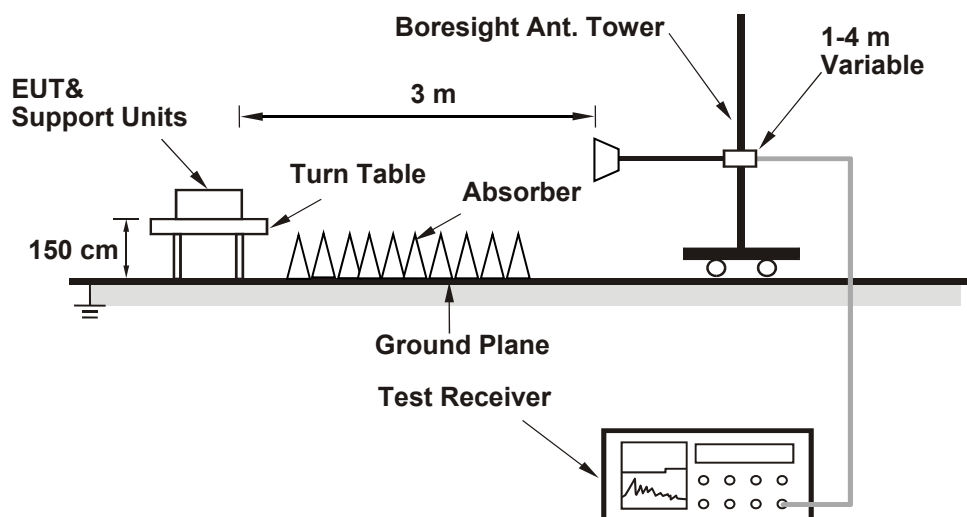
Notes:

- 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.

6.4 Radiated Spurious Emissions above 1GHz

6.4.1 Test Setup

For radiated emission above 1 GHz



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

6.4.2 Test Procedure

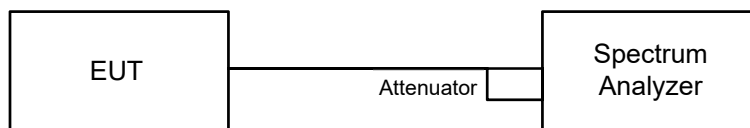
The EUT is configured to set data modulation and maximum power using WWAN technology.

- In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- 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.
- Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- Following ANSI C63.26 section 5.5 and 5.2.7
- $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.5 Conducted Out of Band Emissions

6.5.1 Test Setup



6.5.2 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 OOBE

- 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

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	22 °C, 68% RH
Tested By	Vincent Chen		

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	48.43	26.5 QP	40.0	-13.5	2.00 H	18	38.4	-11.9
2	136.7	29.5 QP	43.5	-14.0	1.00 H	139	42.2	-12.7
3	440.31	26.3 QP	46.0	-19.7	1.00 H	316	34.1	-7.8
4	618.79	27.5 QP	46.0	-18.5	2.00 H	160	31.5	-4.0
5	729.37	39.0 QP	46.0	-7.0	1.00 H	136	40.6	-1.6
6	901.06	33.0 QP	46.0	-13.0	1.50 H	159	32.9	0.1
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	35.82	35.1 QP	40.0	-4.9	1.00 V	349	48.0	-12.9
2	43.58	31.2 QP	40.0	-8.8	1.50 V	123	43.3	-12.1
3	85.29	32.7 QP	40.0	-7.3	2.00 V	126	50.9	-18.2
4	125.06	33.7 QP	43.5	-9.8	1.00 V	170	47.5	-13.8
5	734.22	38.3 QP	46.0	-7.7	1.50 V	40	39.6	-1.3
6	905.91	31.7 QP	46.0	-14.3	2.00 V	163	31.5	0.2

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.

7.2 Radiated Spurious Emissions below 1GHz

Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	56.19	-56.86	-13.00	-43.86	2.00 H	216	50.77	-107.63
2	137.67	-47.39	-13.00	-34.39	2.00 H	134	60.56	-107.95
3	206.54	-58.54	-13.00	-45.54	1.00 H	202	52.22	-110.76
4	265.71	-60.31	-13.00	-47.31	1.50 H	241	47.75	-108.06
5	589.69	-57.26	-13.00	-44.26	1.00 H	162	42.78	-100.04
6	948.59	-51.99	-13.00	-38.99	2.00 H	179	42.29	-94.28
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	43.58	-43.77	-13.00	-30.77	1.00 V	10	63.61	-107.38
2	123.12	-42.15	-13.00	-29.15	1.50 V	172	67.20	-109.35
3	209.45	-53.64	-13.00	-40.64	1.00 V	152	57.06	-110.70
4	273.47	-55.54	-13.00	-42.54	2.00 V	81	52.10	-107.64
5	335.55	-54.59	-13.00	-41.59	1.50 V	149	51.42	-106.01
6	739.07	-47.10	-13.00	-34.10	1.50 V	63	49.21	-96.31

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP 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.

7.3 Unwanted Emissions above 1 GHz

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	22 °C, 68% RH
Tested By	Vincent Chen		

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	54.4 PK	74.0	-19.6	1.51 H	13	19.1	35.3
2	2390	43.5 AV	54.0	-10.5	1.51 H	13	8.2	35.3
3	*2437	120.4 PK			1.51 H	13	85.0	35.4
4	*2437	107.1 AV			1.51 H	13	71.7	35.4
5	2483.5	62.3 PK	74.0	-11.7	1.51 H	13	26.9	35.4
6	2483.5	49.1 AV	54.0	-4.9	1.51 H	13	13.7	35.4
7	4874	44.7 PK	74.0	-29.3	1.69 H	35	37.6	7.1
8	4874	30.2 AV	54.0	-23.8	1.69 H	35	23.1	7.1
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	57.4 PK	74.0	-16.6	1.25 V	322	22.1	35.3
2	2390	43.3 AV	54.0	-10.7	1.25 V	322	8.0	35.3
3	*2437	122.7 PK			1.25 V	322	87.3	35.4
4	*2437	109.6 AV			1.25 V	322	74.2	35.4
5	2483.5	63.1 PK	74.0	-10.9	1.25 V	322	27.7	35.4
6	2483.5	49.4 AV	54.0	-4.6	1.25 V	322	14.0	35.4
7	4874	45.3 PK	74.0	-28.7	1.41 V	325	38.2	7.1
8	4874	30.7 AV	54.0	-23.3	1.41 V	325	23.6	7.1

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 ~ 40 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	22 °C, 68% RH
Tested By	Vincent Chen		

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	#5638.4	64.2 PK	68.2	-4.0	2.06 H	175	57.7	6.5
2	*5745	121.3 PK			2.06 H	175	78.9	42.4
3	*5745	108.6 AV			2.06 H	175	66.2	42.4
4	#5980	60.7 PK	68.2	-7.5	2.06 H	175	53.4	7.3
5	11490	59.4 PK	74.0	-14.6	1.38 H	293	47.1	12.3
6	11490	47.1 AV	54.0	-6.9	1.38 H	293	34.8	12.3
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	#5648.4	65.2 PK	68.2	-3.0	2.23 V	210	58.7	6.5
2	*5745	125.4 PK			2.23 V	210	83.0	42.4
3	*5745	112.2 AV			2.23 V	210	69.8	42.4
4	#5983.6	60.6 PK	68.2	-7.6	2.23 V	210	53.3	7.3
5	11490	59.6 PK	74.0	-14.4	1.02 V	176	47.3	12.3
6	11490	47.5 AV	54.0	-6.5	1.02 V	176	35.2	12.3

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

7.4 Radiated Spurious Emissions above 1GHz

FCC Part 27

Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7490.04	-44.98	-13.00	-31.98	1.25 H	136	39.86	-84.84
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7490.04	-44.28	-13.00	-31.28	1.63 V	274	40.56	-84.84

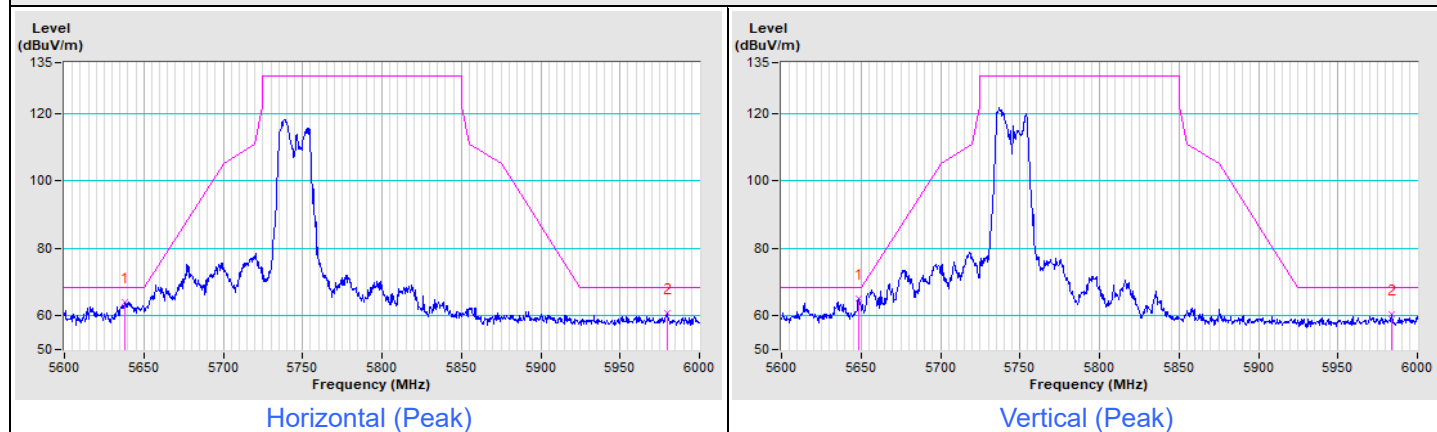
Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Plot of Band Edge

Frequency Range	5.6 GHz ~ 6 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak
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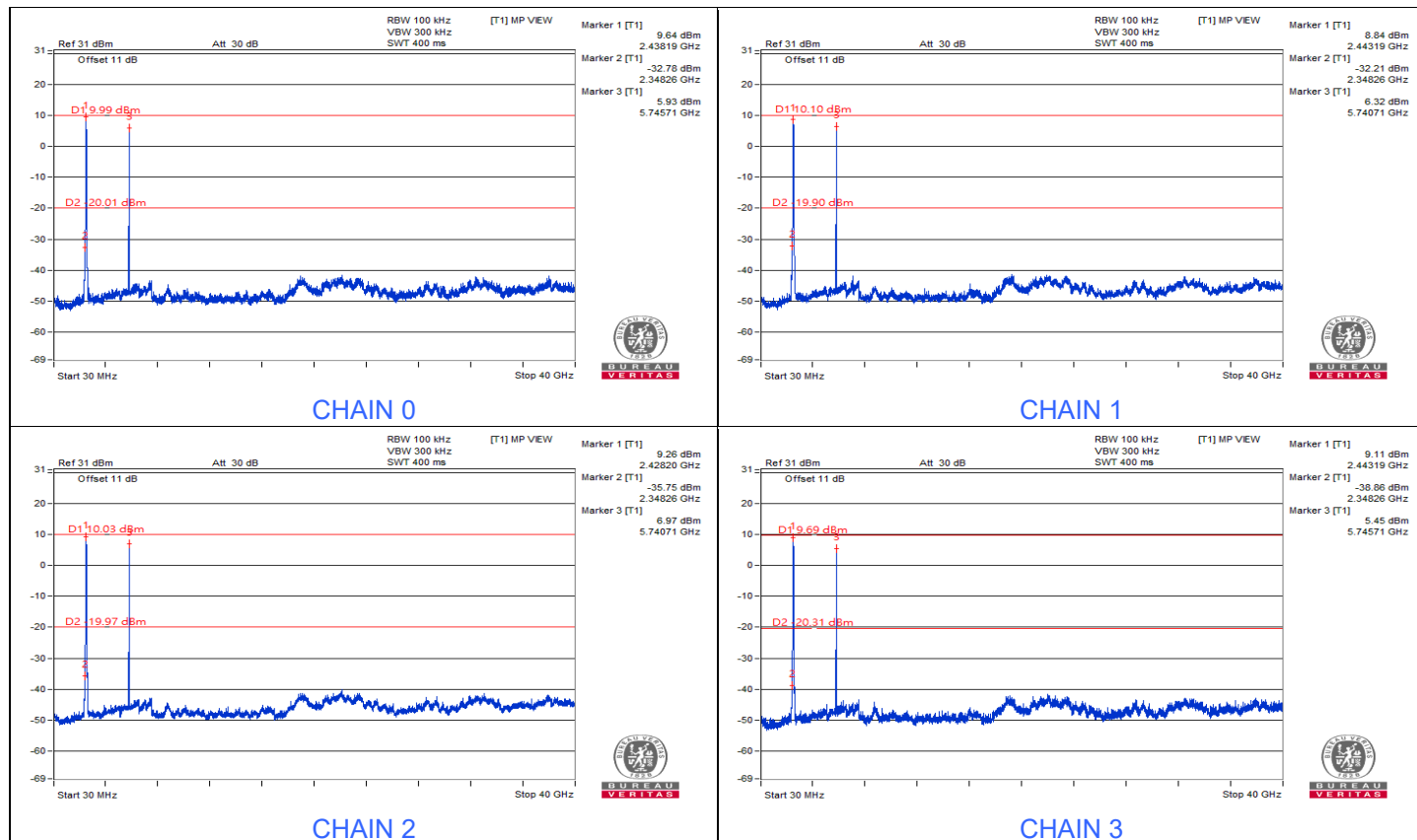
FCC 15.407 Combination 1



7.5 Conducted Out of Band Emissions

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 65% RH	Tested By:	Chris Lin
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Combination 1



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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@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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