

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.225)
47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)
47 CFR FCC Part 27
47 CFR FCC Part 2

Report No.: RFBEOE-WTW-P26040365-7

FCC ID: MQT-AT160EL18U

Product: Terminal

Brand: XAC

Model No.: xCL_AT-160-EL-18U

Received Date: 2026/4/14

Test Date: 2026/6/12 ~ 2026/6/23

Issued Date: 2026/6/30

Applicant: XAC AUTOMATION CORP.

Address: 4F, No. 30, INDUSTRY E. RD. IX, SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

FCC Registration / 723255 / TW2022

Designation Number:

Approved by: _____

May Chen / Manager

Date: _____

2026/6/30

This test report consists of 33 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.



Prepared by: Vito Lung / Specialist

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Table of Contents

Release Control Record	3
1 Certificate.....	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Supplementary Information	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Antenna Description of EUT	7
3.3 Test Mode Applicability and Tested Channel Detail	8
3.4 Test Program Used and Operation Descriptions	9
3.5 Connection Diagram of EUT and Peripheral Devices	9
3.6 Configuration of Peripheral Devices and Cable Connections	9
4 Test Instruments	10
4.1 Unwanted Emissions below 1 GHz	10
4.2 Radiated Spurious Emissions below 1GHz	11
4.3 Unwanted Emissions above 1 GHz	11
4.4 Radiated Spurious Emissions above 1GHz	12
4.5 Conducted Out of Band Emissions	12
5 Limits of Test Items.....	13
5.1 Unwanted Emissions below 1 GHz	13
5.2 Radiated Spurious Emissions below 1GHz	13
5.3 Unwanted Emissions above 1 GHz	14
5.4 Radiated Spurious Emissions above 1GHz	15
5.5 Conducted Out of Band Emissions	15
6 Test Arrangements	16
6.1 Unwanted Emissions below 1 GHz	16
6.1.1 Test Setup	16
6.1.2 Test Procedure	17
6.2 Radiated Spurious Emissions below 1GHz	18
6.2.1 Test Setup	18
6.2.2 Test Procedure	19
6.3 Unwanted Emissions above 1 GHz	20
6.3.1 Test Setup	20
6.3.2 Test Procedure	20
6.4 Radiated Spurious Emissions above 1GHz	21
6.4.1 Test Setup	21
6.4.2 Test Procedure	21
6.5 Conducted Out of Band Emissions	22
6.5.1 Test Setup	22
6.5.2 Test Procedure	22
7 Test Results of Test Item	23
7.1 Unwanted Emissions below 1 GHz	23
7.2 Radiated Spurious Emissions below 1GHz	25
7.3 Unwanted Emissions above 1 GHz	27
7.4 Radiated Spurious Emissions above 1GHz	29
7.5 Conducted Out of Band Emissions	31
8 Pictures of Test Arrangements	32
9 Information of the Testing Laboratories	33

Release Control Record

Issue No.	Description	Date Issued
RFBEOE-WTW-P26040365-7	Original release.	2026/6/30

1 Certificate

Product: Terminal

Brand: XAC

Test Model: xCL_AT-160-EL-18U

Sample Status: Engineering sample

Applicant: XAC AUTOMATION CORP.

Test Date: 2026/6/12 ~ 2026/6/23

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.225)

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

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

47 CFR FCC Part 27

47 CFR FCC Part 2

Measurement ANSI C63.10-2020

procedure: ANSI C63.26-2015

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
15.225 (d) / 15.205 /15.209 /15.247(d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band above 30MHz	Pass	Meet the requirement of limit.
	Unwanted Emissions below 1 GHz		
Part 2.1053	Radiated Spurious Emissions below 1GHz	Pass	Meet the requirement of limit.
15.205 /15.209 /15.247(d)	Unwanted Emissions above 1 GHz	Pass	Meet the requirement of limit.
Part 2.1053	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	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.6 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	Terminal	
Brand	XAC	
Test Model	xCL_AT-160-EL-18U	
Modulation Technology	BT-EDR	FHSS
	BT-LE	DTS
	NFC	NFC-A (ISO/IEC 14443 Type A)
	WLAN	DSSS, OFDM
	LTE	QPSK, 16QAM
Operating Frequency	BT	LE/ EDR: 2402 ~ 2480 MHz
	NFC	13.56 MHz
	WLAN	2.4GHz: 2.412 GHz ~ 2.462 GHz 5GHz: 5.18 GHz ~ 5.24 GHz, 5.26 GHz ~ 5.32 GHz, 5.5 GHz ~ 5.7 GHz 5.745 GHz ~ 5.825 GHz
	LTE	Band 2: 1850 ~ 1910 MHz Band 4: 1710 ~ 1755 MHz Band 12: 699 ~ 716 MHz

Note:

1. The EUT uses following accessories.

Item	Brand	Model	Specification
Battery	SHENZHEN UTILITY ENERGY CO., LTD.	U752886PV	Power Rating: 7.6 Vdc, 2400mAh, 18.24Wh

2. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4 GHz+5 GHz) + Bluetooth	WWAN (LTE)	NFC

3. Simultaneously transmission combination.

Combination	Technology			
1	NFC	Bluetooth	WLAN (5 GHz)	WWAN(LTE)

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

4. 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
1	WiFi/BT	Quectel	Y0XAC00A2DA	0.3	2.4~2.4835 GHz	PIFA	ipex(MHF)
				2.4	5.15~5.85 GHz		
2	NFC	XAC	RTOS	5	13.56 MHz	Loop	None
LTE							
1	-	Quectel	Y0XAC00A2AA	3.1	1.850~1.910 GHz	PIFA	Pogo Pin
				2.9	1.710~1.755 GHz		
				-0.5	0.699~0.716 GHz		
2	-	Quectel	Y0XAC00A2BA	-5.5	1.850~1.910 GHz	PIFA	Pogo Pin
				-6.9	1.710~1.755 GHz		
				-17.5	0.699~0.716 GHz		

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

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. For Unwanted Emission (below 1GHz) and AC Power Conducted Emission item: Battery / AC Adapter / Pogo Charger. Pre-scan these modes and find the worst case as a representative test condition. 2. 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. 3. 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).
Worst Case:	1. Power Supply Worst Condition: ➤ Unwanted Emission below 1GHz: AC Adapter 2. X-axis/ Y-axis/ Z-axis Worst Condition: X-axis

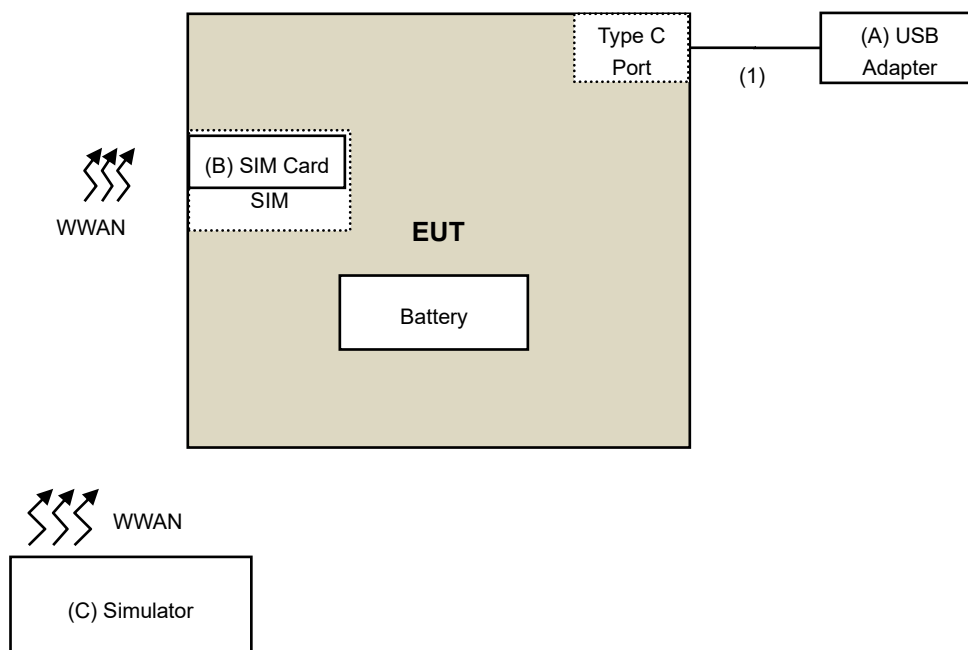
Following channel(s) was (were) selected for the final test as listed below:

Test Item	Combination	Mode	Tested Channel
Unwanted Emissions below 1 GHz	1	802.11ac (VHT80)	106
		GFSK	78
		LTE B12	23060(704 MHz)
		NFC	1 (13.56 MHz)
Radiated Spurious Emissions below 1GHz	1	802.11ac (VHT80)	106
		GFSK	78
		LTE B12	23060(704 MHz)
		NFC	1 (13.56 MHz)
Unwanted Emissions above 1 GHz	1	802.11ac (VHT80)	106
		GFSK	78
		LTE B12	23060(704 MHz)
		NFC	1 (13.56 MHz)
Radiated Spurious Emissions above 1GHz	1	802.11ac (VHT80)	106
		GFSK	78
		LTE B12	23060(704 MHz)
		NFC	1 (13.56 MHz)
Conducted Out of Band Emissions	1	802.11ac (VHT80)	106
		GFSK	78

3.4 Test Program Used and Operation Descriptions

Controlling software (WiFi_BT: QDART_WIN_4_8_Installer_00057_1; WWLAN: EUT link up with simulator; NFC: E.P.T) has been activated to set the EUT under transmission conditions 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	AC (USB) Adapter	MASS POWER	NBS10B050200VUU	N/A	N/A	Supplied by applicant
B	SIM Card	Keysight	E7515-10910	N/A	N/A	Provided by Lab
C	Simulator	Keysight	E7515A	MY55340229	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB Cable	1	1.2	YES	0	Supplied by applicant
2	USB Cable	1	1	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
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2025/9/16	2026/9/15
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2026/3/15	2027/3/14
Loop Antenna TESEQ	HLA 6121	63620	2025/10/20	2026/10/19
MXE EMI Receiver Keysight	N9038A	MY59050100	2025/6/25	2026/6/24
Preamplifier EMCI	EMC330N	980538	2026/3/15	2027/3/14
PXA Signal Analyzer Keysight	N9030B	MY57141948	2026/5/25	2027/5/24
RF Coaxial Cable PEWC	8D	966-5-1	2026/3/15	2027/3/14
		966-5-2	2026/3/15	2027/3/14
		966-5-3	2026/3/15	2027/3/14
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/6/22

4.2 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2025/9/16	2026/9/15
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2026/3/15	2027/3/14
Loop Antenna TESEQ	HLA 6121	63620	2025/10/20	2026/10/19
MXE EMI Receiver Keysight	N9038A	MY59050100	2025/6/25	2026/6/24
Preamplifier EMCI	EMC330N	980538	2026/3/15	2027/3/14
PXA Signal Analyzer Keysight	N9030B	MY57141948	2026/5/25	2027/5/24
RF Coaxial Cable PEWC	8D	966-5-1	2026/3/15	2027/3/14
		966-5-2	2026/3/15	2027/3/14
		966-5-3	2026/3/15	2027/3/14
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/6/23

4.3 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2025/11/9	2026/11/8
	BBHA 9170	9170-739	2025/11/9	2026/11/8
MXE EMI Receiver Keysight	N9038A	MY59050100	2025/6/25	2026/6/24
Preamplifier EMCI	EMC12630SE	980509	2026/1/17	2027/1/16
	EMC184045SE	980387	2025/8/7	2026/8/6
PXA Signal Analyzer Keysight	N9030B	MY57141948	2026/5/25	2027/5/24
RF Coaxial Cable EMCI	EMC102-KM-KM-1200	160924	2026/1/15	2027/1/14
	EMC102-KM-KM-4000	200214	2026/1/15	2027/1/14
	EMC104-SM-SM-1500	180503	2026/3/7	2027/3/6
	EMC104-SM-SM-2000	180501	2026/3/7	2027/3/6
	EMC104-SM-SM-6000	180506	2026/3/7	2027/3/6
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/6/12

4.4 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2025/11/9	2026/11/8
	BBHA 9170	9170-739	2025/11/9	2026/11/8
MXE EMI Receiver Keysight	N9038A	MY59050100	2025/6/25	2026/6/24
Preamplifier EMCI	EMC12630SE	980509	2026/1/17	2027/1/16
	EMC184045SE	980387	2025/8/7	2026/8/6
PXA Signal Analyzer Keysight	N9030B	MY57141948	2026/5/25	2027/5/24
RF Coaxial Cable EMCI	EMC102-KM-KM-1200	160924	2026/1/15	2027/1/14
	EMC102-KM-KM-4000	200214	2026/1/15	2027/1/14
	EMC104-SM-SM-1500	180503	2026/3/7	2027/3/6
	EMC104-SM-SM-2000	180501	2026/3/7	2027/3/6
	EMC104-SM-SM-6000	180506	2026/3/7	2027/3/6
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in HC - 966 Chamber No. 5(Hsinchu).
2. Tested Date: 2026/6/23

4.5 Conducted Out of Band Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
EXA Signal Analyzer Keysight	N9010A	MY56070348	2025/7/14	2026/7/13
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2026/5/21	2027/5/20
Software	ADT_RF Test Software v8.5.6.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSU26	101645	2025/7/28	2026/7/27

Notes:

1. The test was performed in HC - Oven room 2(Hsinchu).
2. Tested Date: 2026/6/22

5 Limits of Test Items

5.1 Unwanted Emissions below 1 GHz

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

According to FCC 47 CFR part 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. The limit of emissions is equal to -13 dBm.

5.3 Unwanted Emissions above 1 GHz

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 (dBuV/m)	AV: 54 (dBuV/m)

For transmitters operating in the 5.15-5.25 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBuV/m)

For transmitters operating in the 5.25-5.35 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dBuV/m)

For transmitters operating in the 5.47-5.725 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBuV/m)

For transmitters operating in the 5.725-5.850 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 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 (dBuV/m) ^{*1} PK: 105.2 (dBuV/m) ^{*2} PK: 110.8 (dBuV/m) ^{*3} PK: 122.2 (dBuV/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:

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

5.4 Radiated Spurious Emissions above 1GHz

According to FCC 47 CFR part 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. The limit of emissions is equal to -13 dBm.

5.5 Conducted Out of Band Emissions

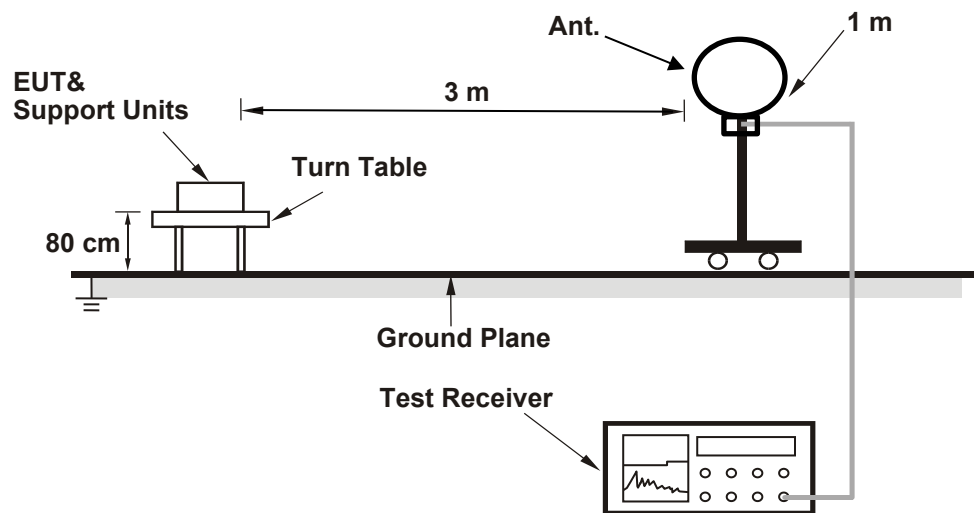
Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

6 Test Arrangements

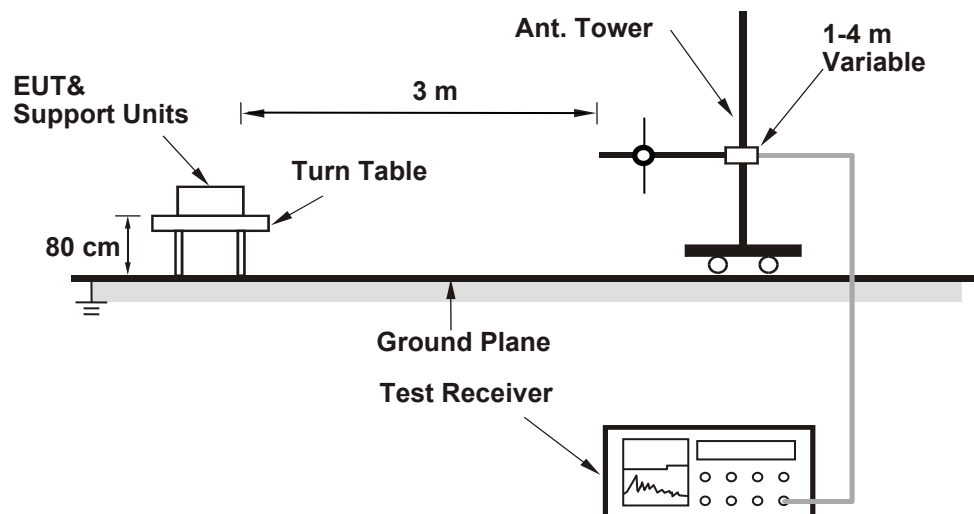
6.1 Unwanted Emissions below 1 GHz

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 (however, peak detector measurements may be used to determine compliance with QP requirements), 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.

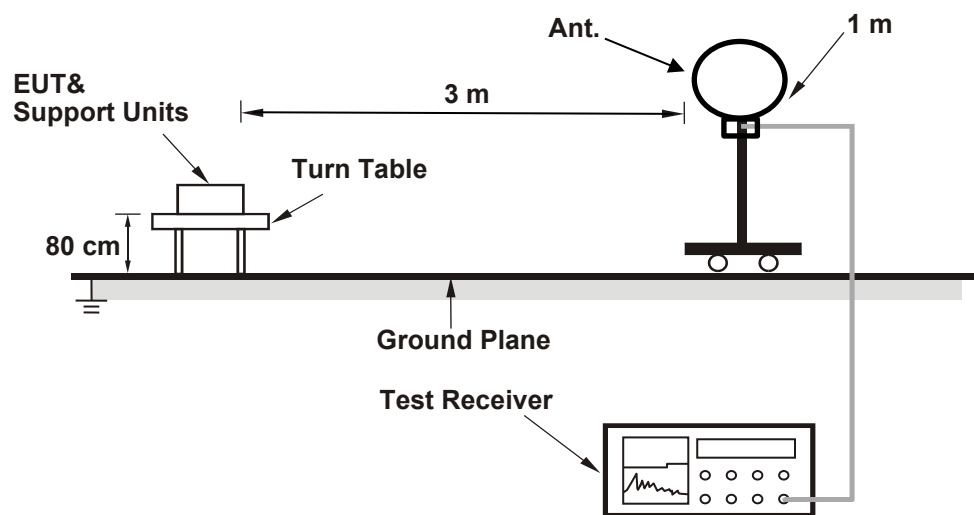
Notes:

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 (however, peak detector measurements may be used to determine compliance with QP requirements).
2. All modes of operation were investigated and the worst-case emissions are reported.

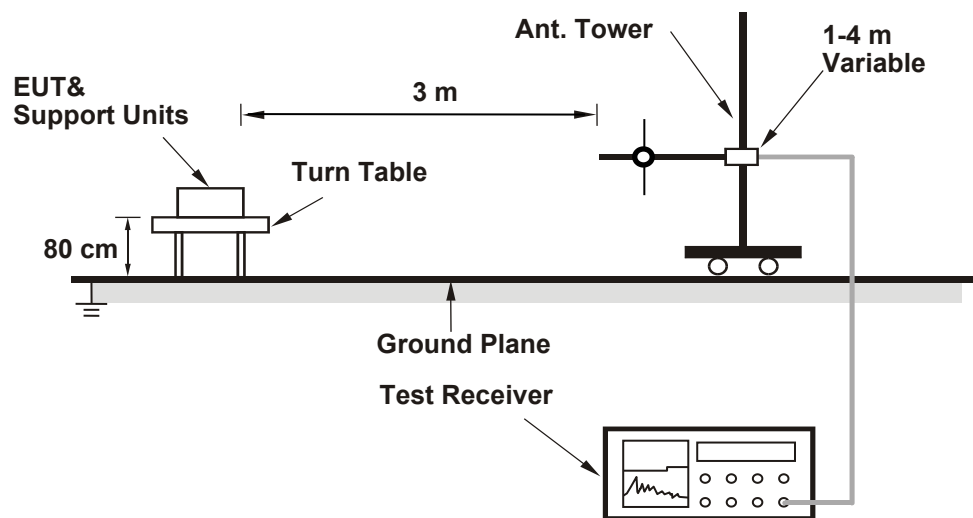
6.2 Radiated Spurious Emissions below 1GHz

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.

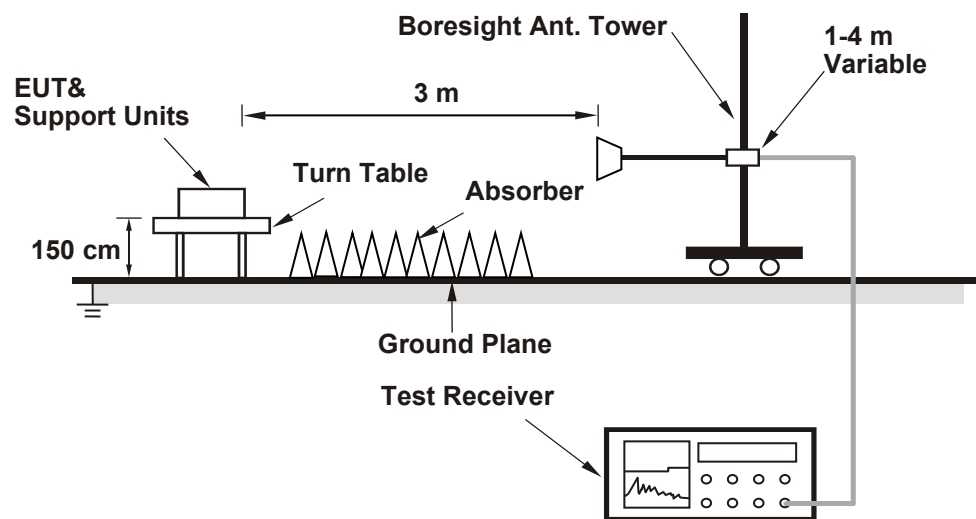
- In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- 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.
- 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.

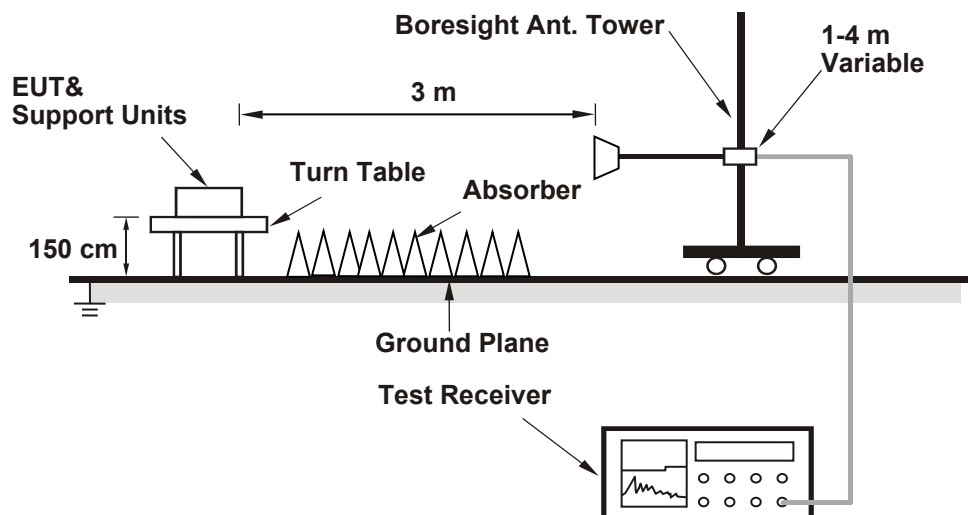
Notes:

- 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.
- For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for 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

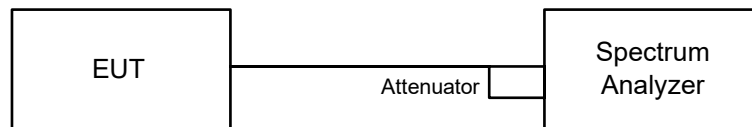
The EUT is configured to set data modulation and maximum power using WWAN technology.

- 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
- $EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8 - 2.15$; 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 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

FCC 15.247

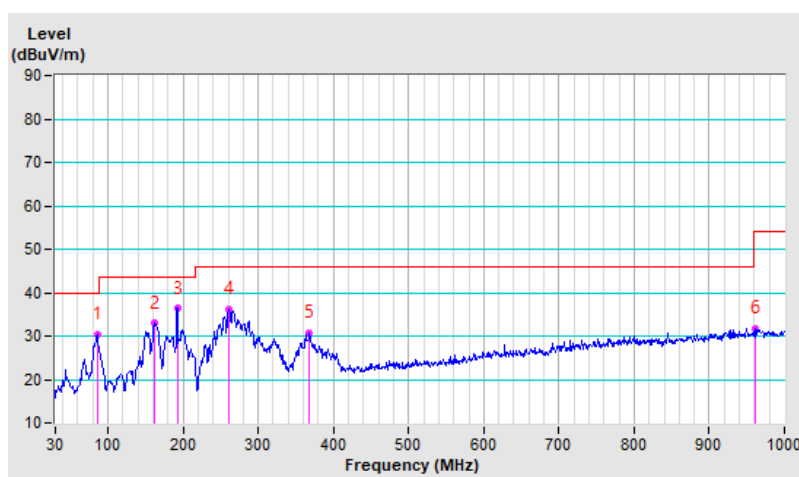
FCC 15.407

Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	PK: RB=120 kHz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 65.3% RH
Tested By	Felix.Chang		

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	85.8	30.3 PK	40.0	-9.7	2.00 H	116	48.7	-18.4
2	161.77	32.9 PK	43.5	-10.6	2.00 H	242	45.5	-12.6
3	191.99	36.3 PK	43.5	-7.2	2.00 H	127	51.9	-15.6
4	261.35	36.1 PK	46.0	-9.9	1.50 H	46	49.5	-13.4
5	367.71	30.8 PK	46.0	-15.2	1.00 H	245	41.3	-10.5
6	962.02	31.8 PK	54.0	-22.2	1.50 H	72	31.8	0.0

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.

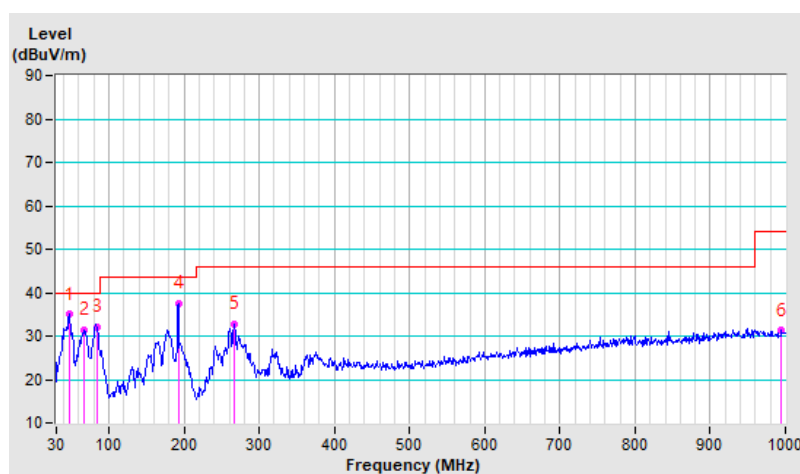


Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	PK: RB=120 kHz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 65.3% RH
Tested By	Felix.Chang		

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	47.02	35.0 PK	40.0	-5.0	1.00 V	360	47.8	-12.8
2	67.15	31.5 PK	40.0	-8.5	1.00 V	1	45.6	-14.1
3	84.88	32.0 PK	40.0	-8.0	2.00 V	78	50.3	-18.3
4	192.01	37.4 PK	43.5	-6.1	1.00 V	68	53.0	-15.6
5	267	32.7 PK	46.0	-13.3	1.00 V	340	45.9	-13.2
6	994.71	31.2 PK	54.0	-22.8	4.00 V	296	31.1	0.1

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 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

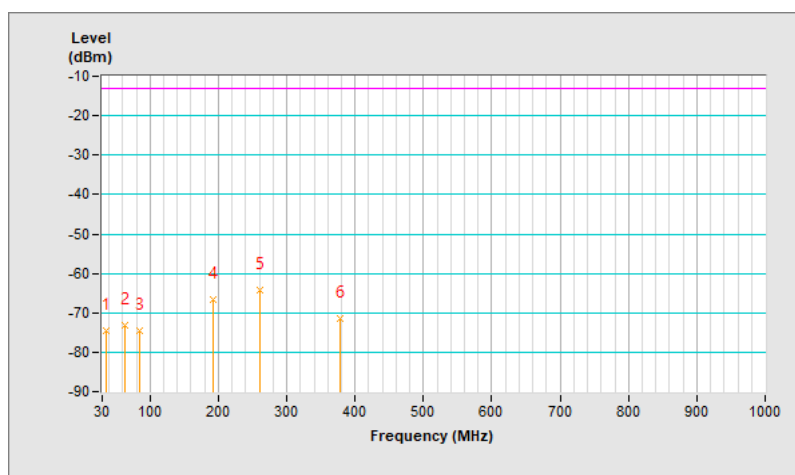
FCC Part 27

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, 73.8% RH
Tested By	Felix Chang		

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	35.5	-74.53	-13.00	-61.53	1.00 H	214	-56.00	-18.53
2	64.2	-73.09	-13.00	-60.09	2.00 H	330	-54.25	-18.84
3	84.5	-74.40	-13.00	-61.40	1.50 H	236	-51.07	-23.33
4	192.4	-66.80	-13.00	-53.80	1.00 H	334	-46.03	-20.77
5	261	-64.09	-13.00	-51.09	2.50 H	174	-45.49	-18.60
6	378.24	-71.30	-13.00	-58.30	3.00 H	210	-56.05	-15.25

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 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.

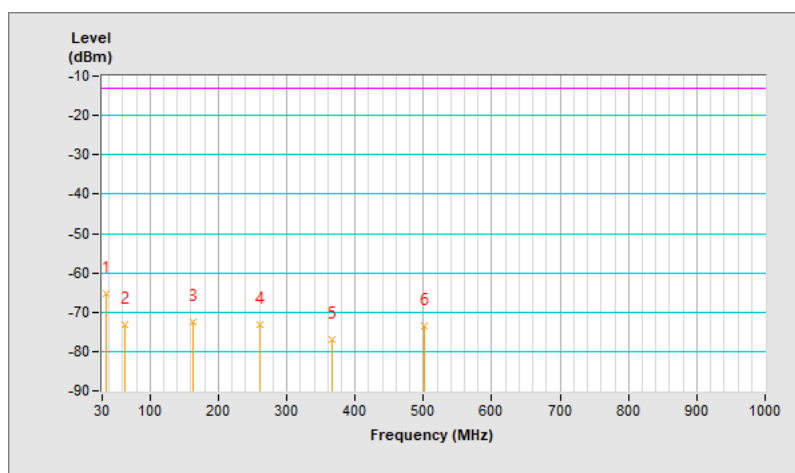


Combination	1		
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 73.8% RH
Tested By	Felix Chang		

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	35.6	-65.40	-13.00	-52.40	1.00 V	224	-46.87	-18.53
2	64.2	-73.09	-13.00	-60.09	2.00 V	331	-54.25	-18.84
3	162.3	-72.40	-13.00	-59.40	1.50 V	305	-54.79	-17.61
4	261.4	-73.20	-13.00	-60.20	2.00 V	305	-54.62	-18.58
5	367.2	-76.90	-13.00	-63.90	1.00 V	213	-61.20	-15.70
6	501	-73.40	-13.00	-60.40	1.00 V	232	-60.79	-12.61

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 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

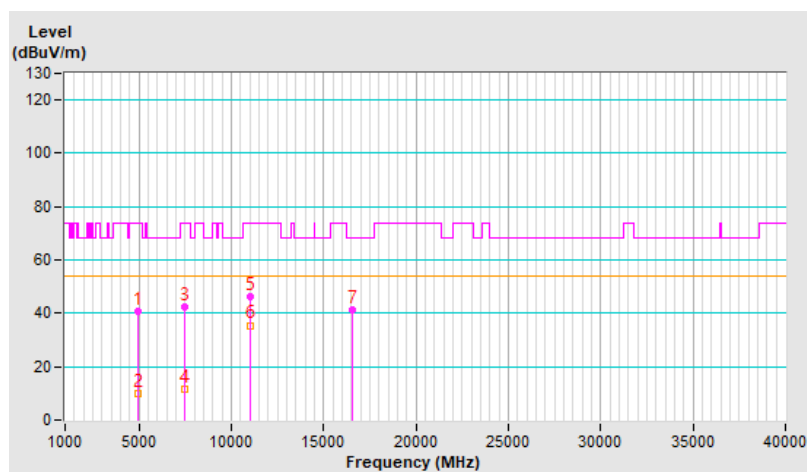
FCC 15.407

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=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75% RH
Tested By	Felix Chang		

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	4960	40.6 PK	74.0	-33.4	1.45 H	255	39.4	1.2
2	4960	9.8 AV	54.0	-44.2	1.45 H	255	8.6	1.2
3	7440	42.4 PK	74.0	-31.6	3.48 H	159	34.9	7.5
4	7440	11.6 AV	54.0	-42.4	3.48 H	159	4.1	7.5
5	11060	46.0 PK	74.0	-28.0	1.17 H	229	33.7	12.3
6	11060	35.5 AV	54.0	-18.5	1.17 H	229	23.2	12.3
7	#16590	41.1 PK	68.2	-27.1	3.24 H	140	26.0	15.1

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. " # ": The radiated frequency is out of the restricted band.

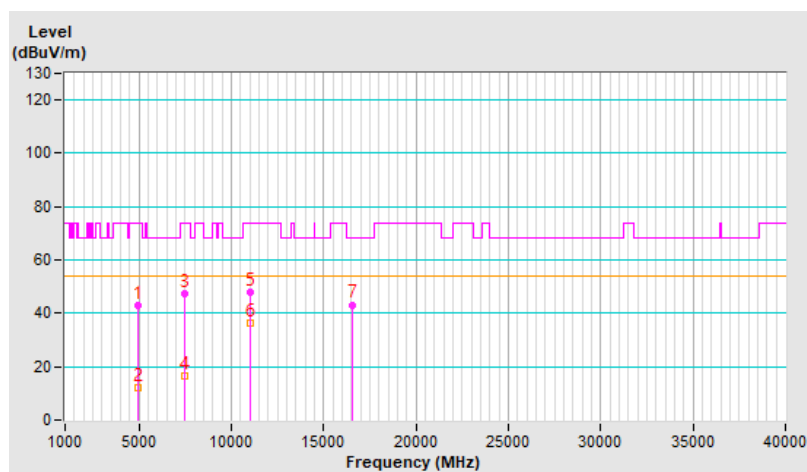


Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75% RH
Tested By	Felix Chang		

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	4960	42.8 PK	74.0	-31.2	2.60 V	96	41.6	1.2
2	4960	12.0 AV	54.0	-42.0	2.60 V	96	10.8	1.2
3	7440	47.4 PK	74.0	-26.6	1.41 V	24	39.9	7.5
4	7440	16.6 AV	54.0	-37.4	1.41 V	24	9.1	7.5
5	11060	47.9 PK	74.0	-26.1	1.33 V	208	35.6	12.3
6	11060	36.2 AV	54.0	-17.8	1.33 V	208	23.9	12.3
7	#16590	43.2 PK	68.2	-25.0	1.61 V	349	28.1	15.1

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. " # ": The radiated frequency is out of the restricted band.



7.4 Radiated Spurious Emissions above 1GHz

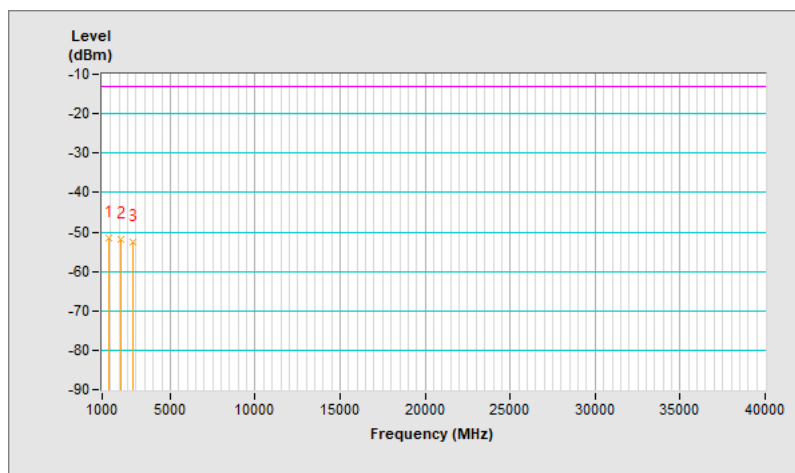
FCC Part 27

Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 75.8% RH
Tested By	Felix Chang		

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	1408	-51.60	-13.00	-38.60	1.00 H	226	-45.51	-6.09
2	2112	-51.80	-13.00	-38.80	1.50 H	306	-47.41	-4.39
3	2816	-52.60	-13.00	-39.60	2.00 H	311	-49.82	-2.78

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.

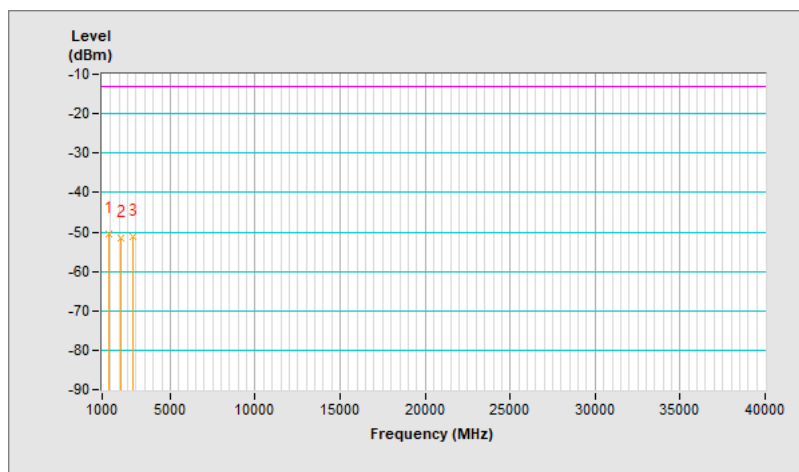


Combination	1		
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	21.6 °C, 75.8% RH
Tested By	Felix Chang		

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	1408	-50.60	-13.00	-37.60	1.50 V	334	-44.51	-6.09
2	2112	-51.40	-13.00	-38.40	1.00 V	206	-47.01	-4.39
3	2816	-51.10	-13.00	-38.10	1.00 V	242	-48.32	-2.78

Remarks:

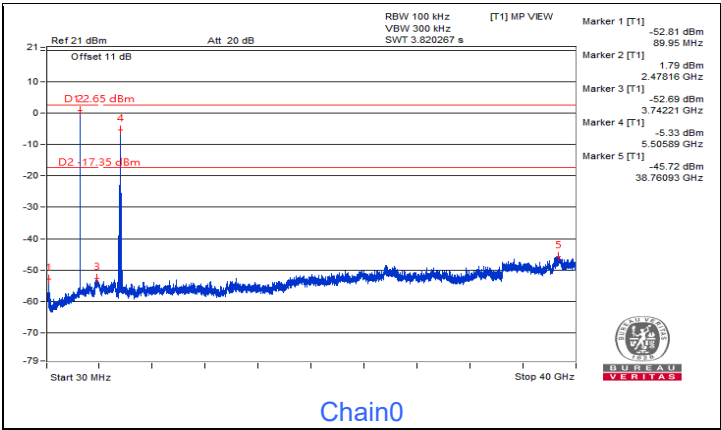
1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



7.5 Conducted Out of Band Emissions

Environmental Conditions:	24°C, 72% RH	Tested By:	Chris Lin
---------------------------	--------------	------------	-----------

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

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Taoyuan Wenming EMC/RF Lab

Tel: 886-3-3183232

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.

--- END ---