
FCC Test Report

Report No.: AGC01741230301FE02A

FCC ID : 2AYT3-AC180

APPLICATION PURPOSE : Class II Permissive Change

PRODUCT DESIGNATION : Portable Power Station

BRAND NAME : BLUETTI

MODEL NAME : AC180

APPLICANT : SHENZHEN POWEROAK NEWENER CO., LTD

DATE OF ISSUE : Oct. 19, 2023

STANDARD(S) : FCC Part 15 Subpart C §15.247

REPORT VERSION : V1.0

Attestation Of Global Compliance (Shenzhen) Co., Ltd



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Attestation of Global Compliance(Shenzhen)Co., Ltd
Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd
Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: <http://www.agccert.com/>



Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 19, 2023	Valid	Initial Release

Note: The original test report AGC01741230301FE02 (dated Apr. 21, 2023 and tested from Mar. 07, 2023 to Apr. 21, 2023) was modified on Oct. 19, 2023 to include the following changes and additions for:

- Hardware Version change from AC180_U2 V3.0 to AC180_U2 V6.0
- The A3 motherboard has replaced the plug-in differential mode inductor (the inductance has been changed from 520uH Min to 1.3mH Min)
- The A3 motherboard replaced Y1 capacitor (100pF/400Vac changed to 2.2nF/400Vac)
- Add a grounding wire to the A3 motherboard
- Solution for replacing USB-C with U2 motherboard (changed from SC9711QDMR to SC8002QDKR+SC2151AQDER)
- M1 motherboard adds magnetic rings and beads for optimization
- The M1 motherboard has added a cement resistor (47 Ω), a SMD common mode inductance (700 Ω @ 100MHz), a SMD N-MOS transistor (NCE6003M, 60V/3A, SOT-89), and a SMD magnetic bead (600 Ω)
- The battery motherboard has added an insulation strip for connecting the metal plate mounting bracket, providing insulation effect

For above described change(s), Updated Radiated Emission and Line Conducted Emission Test.

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1. General Information

Applicant	SHENZHEN POWEROAK NEWENER CO., LTD
Address	F19, BLD No.1, Kaidar Tongsha Rd No.168, Xili Street, Nanshan, Shenzhen, China
Manufacturer	SHENZHEN POWEROAK NEWENER CO., LTD
Address	F19, BLD No.1, Kaidar Tongsha Rd No.168, Xili Street, Nanshan, Shenzhen, China
Factory	Huizhou PowerOak Innovation Co., Ltd
Address	(No.1 Workshop) Longsheng 5th Road, Laoshe Village, Dayawan West Zone, Huizhou, Guangdong, China
Product Designation	Portable Power Station
Brand Name	BLUETTI
Test Model	AC180
Date of receipt of test item	Sep. 28, 2023
Date of Test	Sep. 28, 2023 to Oct. 19, 2023
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-BLE-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By 
 Alan Duan
 (Project Engineer) Oct. 19, 2023

Reviewed By 
 Calvin Liu
 (Reviewer) Oct. 19, 2023

Approved By 
 Max Zhang
 Authorized Officer Oct. 19, 2023

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2. Product Information

2.1 Product Technical Description

Frequency Band	2400MHz-2483.5MHz
Operation Frequency Range	2402MHz-2480MHz
Bluetooth Version	V5.0
Modulation Type	BLE <input checked="" type="checkbox"/> GFSK 1Mbps <input checked="" type="checkbox"/> GFSK 2Mbps
Number of channels	40
Carrier Frequency of Each Channel	40 Channel (37 hopping + 3 advertising channel)
Channel Separation	2 MHz
Hardware Version	AC180_U2 V6.0
Software Version	V2071
Antenna Designation	PCB Antenna
Antenna Gain	-2.31dBi
Input Rating	<ul style="list-style-type: none"> ➤ AC: 120V~50/60Hz, 15A Max. ➤ DC/PV: 12V-60V=10A, 500W Max.
Output Rating	<ul style="list-style-type: none"> ➤ AC: 120V~50/60Hz, 1800W/1800VA Max. ➤ USB-A: 5V=3A, 15W Total x2 ➤ USB-C: 5/9/12/15/20V=3A; 20V=5A(E-Marker chip built-in) ➤ Wireless Charge: 5/7.5/10/15W ➤ Cigarette Lighter Socket: 12V=10A ➤ AC and DC output: 1800W Total

2.2 Test Frequency List

Frequency Band	Channel Number	Frequency
2400~2483.5MHz	0	2402 MHz
	1	2404 MHz
	:	:
	19	2440MHz
	:	:
	38	2478 MHz
	39	2480 MHz

Note: $f = 2402 + 2 * k$ MHz, $k = 0, \dots, 39$ f is the operating frequency (MHz) k is the operating channel.

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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2AYT3-AC180**, filing to comply with Part 15 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 15	Radio Frequency Devices
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.5 Special Accessories

Not available for this EUT intended for grant.

2.6 Equipment Modifications

Not available for this EUT intended for grant.

2.7 Antenna Requirement

Standard Requirement
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi</p> <p>EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is -2.31dBi.</p>

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3. Test Environment

3.1 Address of the Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories).

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	Normal Conditions
Temperature range (°C)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106
Power supply	AC120V

3.4 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9$ dB
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9$ dB
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.9$ dB
Uncertainty of total RF power, conducted	$U_c = \pm 0.8$ dB
Uncertainty of RF power density, conducted	$U_c = \pm 2.6$ dB
Uncertainty of spurious emissions, conducted	$U_c = \pm 2$ %
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2$ %

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3.5 List of Equipment Use

● RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
<input type="checkbox"/>	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2023-06-01	2024-05-31
<input type="checkbox"/>	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2023-03-03	2024-03-02
<input type="checkbox"/>	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2023-03-03	2024-03-02
<input type="checkbox"/>	AGC-EM-A152	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08
<input type="checkbox"/>	AGC-ER-E083	Signal Generator	Agilent	E4421B	US39340815	2023-06-01	2024-05-31
<input type="checkbox"/>	N/A	RF Connection Cable	N/A	1#	N/A	Each time	N/A
<input type="checkbox"/>	N/A	RF Connection Cable	N/A	2#	N/A	Each time	N/A

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
<input checked="" type="checkbox"/>	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2023-02-18	2024-02-17
<input type="checkbox"/>	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2023-06-03	2024-06-02
<input type="checkbox"/>	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2023-06-01	2024-05-31
<input type="checkbox"/>	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2022-03-12	2024-03-11
<input checked="" type="checkbox"/>	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
<input type="checkbox"/>	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2023-03-23	2024-03-22
<input type="checkbox"/>	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2021-10-31	2023-10-30
<input type="checkbox"/>	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2022-08-04	2024-08-03
<input type="checkbox"/>	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2023-06-01	2024-05-31
<input checked="" type="checkbox"/>	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08
<input type="checkbox"/>	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2024-06-08

● AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
<input checked="" type="checkbox"/>	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2023/06/03	2024/06/02
<input checked="" type="checkbox"/>	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2024-06-08
<input checked="" type="checkbox"/>	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2023/06/03	2024/06/02

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● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
<input checked="" type="checkbox"/>	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
<input checked="" type="checkbox"/>	AGC-EM-S003	RE Test System	FARA	EZ-EMC	VRA-03A
<input type="checkbox"/>	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

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4. System Test Configuration

4.1 EUT Configuration

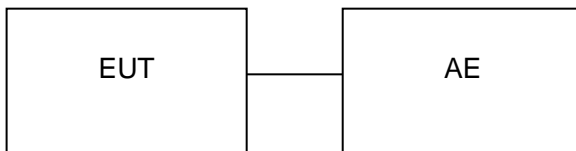
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

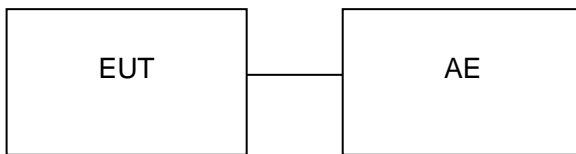
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System

Radiated Emission Configure:



Conducted Emission Configure:



4.4 Equipment Used In Tested System

The following peripheral devices and interface cables were connected during the measurement:

- Test Accessories Come From The Laboratory
 Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	wireless charging load	N/A	Huawei	Support 5W,7.5W,10W,15W	--

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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.209	Radiated Emission& Band Edge	Pass
2	§15.207	AC Power Line Conducted Emission	Pass

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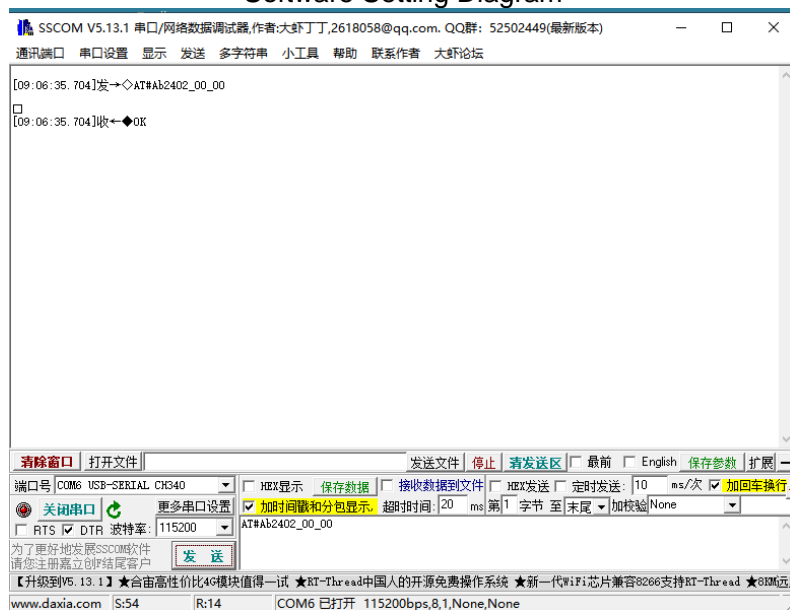
5. Description of Test Modes

Summary Table of Test Cases	
Test Item	Data Rate / Modulation
	Bluetooth – LE(1Mbps/2Mbps) / GFSK
Radiated & Conducted Test Cases	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps(Battery powered or AC/DC adapter)
	Mode 2: Bluetooth Tx CH19_2440 MHz_1Mbps(Battery powered or AC/DC adapter)
	Mode 3: Bluetooth Tx CH39_2480 MHz_1Mbps(Battery powered or AC/DC adapter)
	Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps(Battery powered or AC/DC adapter)
	Mode 5: Bluetooth Tx CH19_2440 MHz_2Mbps(Battery powered or AC/DC adapter)
	Mode 6: Bluetooth Tx CH39_2480 MHz_2Mbps(Battery powered or AC/DC adapter)
AC Conducted Emission	Mode 1: Bluetooth Link + Battery + AC Power (Charging from AC Adapter)

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

Software Setting Diagram



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6. Radiated Spurious Emission

6.1 Measurement Limit

FCC Part 15.209 Limit in the below table to be followed

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

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

6.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the

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- pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9kHz~150kHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9kHz~150kHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP

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- **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

- **Peak Measurements above 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

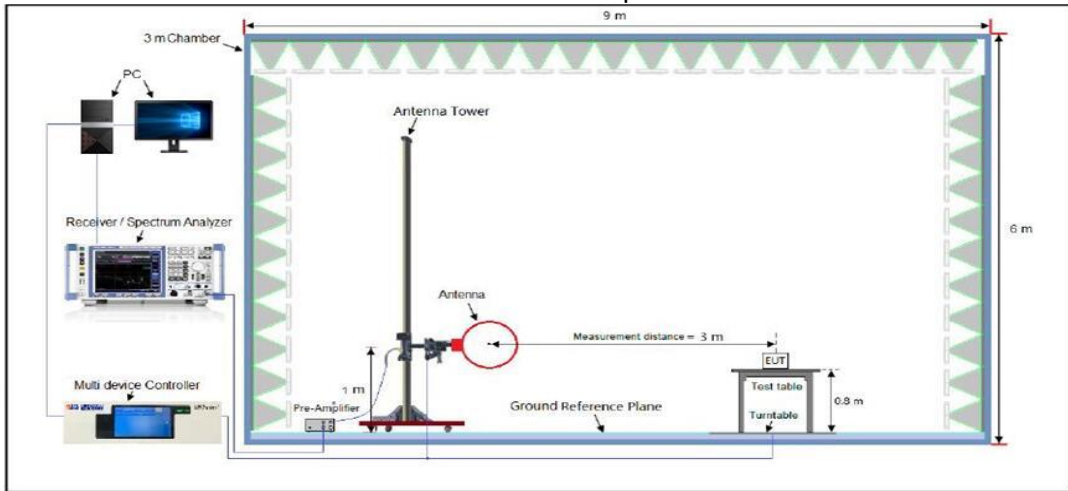
- **Average Measurements above 1GHz (Method VB)**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW setting requirements are as follows:
4. If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
5. If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration.
6. Detector = Peak
7. Sweep time = auto
8. Trace mode = max hold
8. Trace was allowed to stabilize

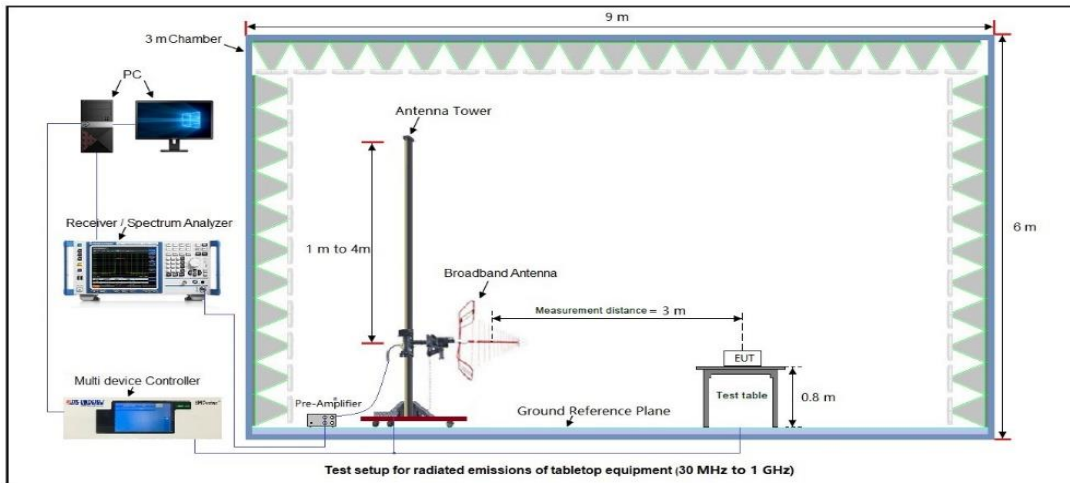
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

6.3 Measurement Setup (Block Diagram of Configuration)

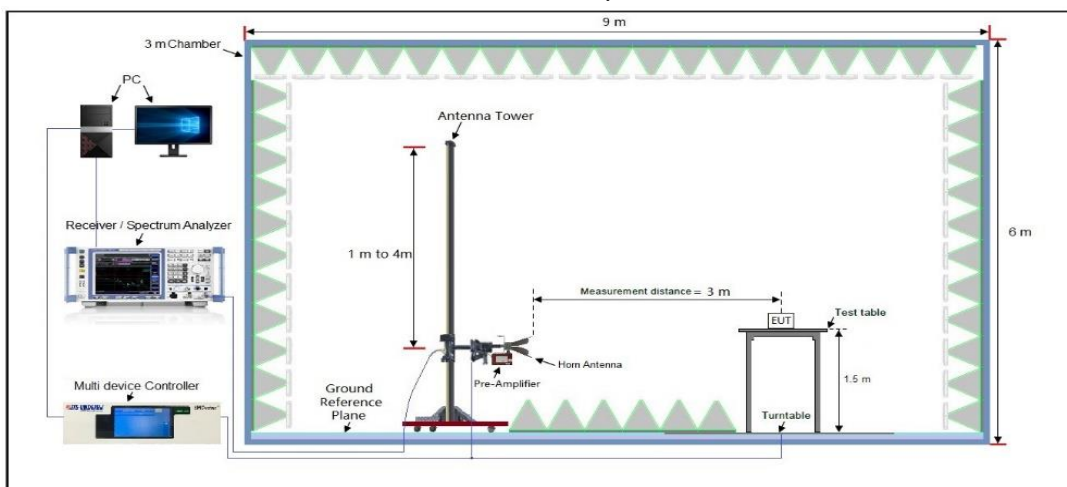
Radiated Emission Test Setup 9KHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz



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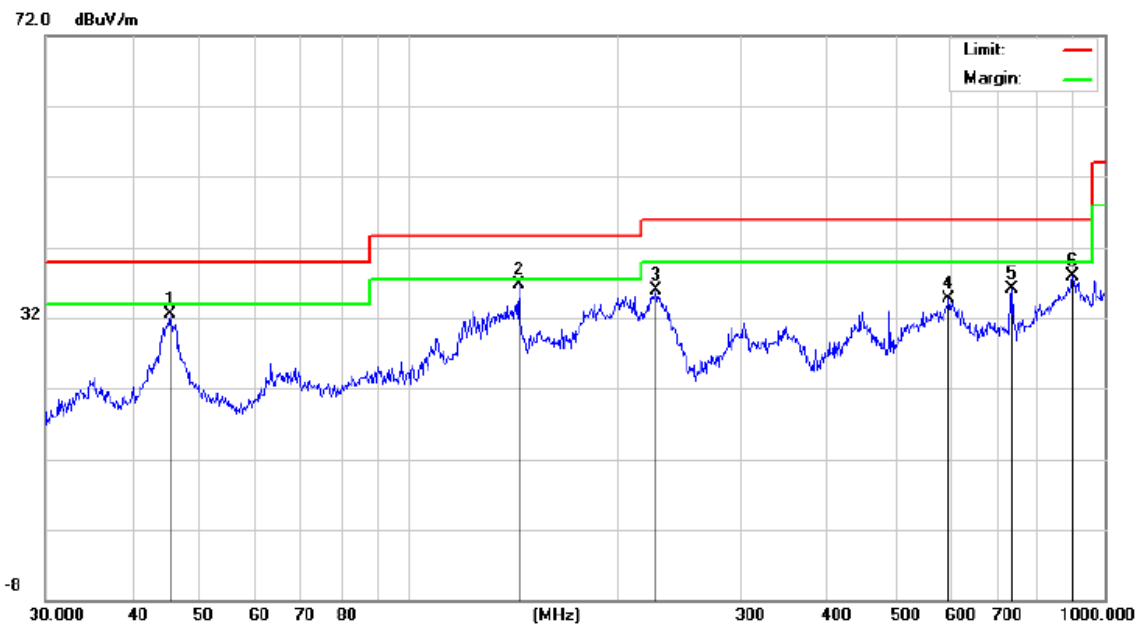
6.4 Measurement Result

Radiated Emission Below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

Radiated Emission Test Results at 30MHz-1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	23.3° C	Relative Humidity	60.7%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 1	Antenna Polarity	Horizontal

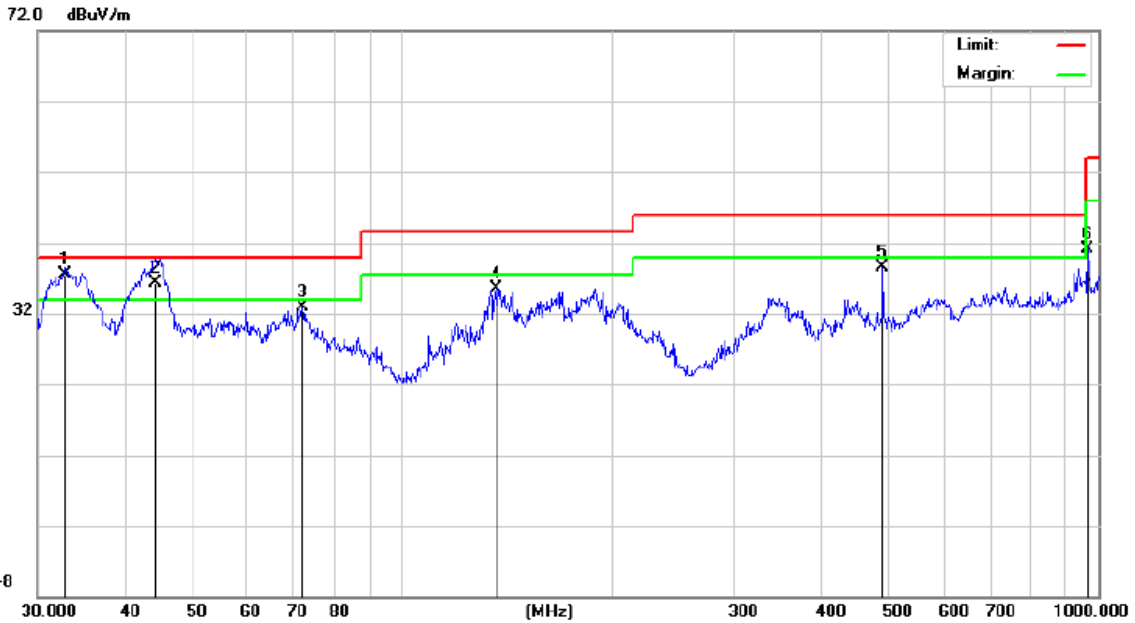


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		45.3755	19.01	13.52	32.53	40.00	-7.47	peak
2	*	143.8295	22.14	14.63	36.77	43.50	-6.73	peak
3		226.0994	21.13	14.70	35.83	46.00	-10.17	peak
4		597.2234	9.72	24.99	34.71	46.00	-11.29	peak
5		737.0714	12.93	23.18	36.11	46.00	-9.89	peak
6		900.1474	6.03	31.78	37.81	46.00	-8.19	peak

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Radiated Emission Test Results at 30MHz-1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	23.3° C	Relative Humidity	60.7%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 1	Antenna Polarity	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1	*	32.8637	22.88	14.54	37.42	40.00	-2.58	QP
2	!	44.2752	19.35	16.94	36.29	40.00	-3.71	QP
3		72.0843	15.89	16.98	32.87	40.00	-7.13	peak
4		136.4598	17.38	18.11	35.49	43.50	-8.01	peak
5		490.7447	14.57	23.96	38.53	46.00	-7.47	peak
6		965.5421	11.16	29.95	41.11	54.00	-12.89	peak

RESULT: Pass

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 1	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.011	50.23	0.08	50.31	74.00	-23.69	peak
4804.011	42.56	0.08	42.64	54.00	-11.36	AVG
7206.022	46.48	2.21	48.69	74.00	-25.31	peak
7206.022	40.15	2.21	42.36	54.00	-11.64	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 1	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.011	49.79	0.08	49.87	74.00	-24.13	peak
4804.011	41.26	0.08	41.34	54.00	-12.66	AVG
7206.022	48.11	2.21	50.32	74.00	-23.68	peak
7206.022	38.50	2.21	40.71	54.00	-13.29	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 2	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4880.000	49.76	0.14	49.90	74.00	-24.10	peak
4880.000	42.73	0.14	42.87	54.00	-11.13	AVG
7320.000	46.62	2.36	48.98	74.00	-25.02	peak
7320.000	40.15	2.36	42.51	54.00	-11.49	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 2	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4880.000	50.44	0.14	50.58	74.00	-23.42	peak
4880.000	43.31	0.14	43.45	54.00	-10.55	AVG
7320.000	47.65	2.36	50.01	74.00	-23.99	peak
7320.000	41.04	2.36	43.40	54.00	-10.60	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 3	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4960.012	50.52	0.22	50.74	74.00	-23.26	peak
4960.012	40.34	0.22	40.56	54.00	-13.44	AVG
7440.027	46.16	2.64	48.80	74.00	-25.20	peak
7440.027	38.78	2.64	41.42	54.00	-12.58	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 3	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4960.013	49.14	0.22	49.36	74	-24.64	peak
4960.013	41.15	0.22	41.37	54	-12.63	AVG
7440.027	46.33	2.64	48.97	74	-25.03	peak
7440.027	38.52	2.64	41.16	54	-12.84	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 4	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.011	48.86	0.08	48.94	74.00	-25.06	peak
4804.011	42.17	0.08	42.25	54.00	-11.75	AVG
7206.022	46.32	2.21	48.53	74.00	-25.47	peak
7206.022	38.45	2.21	40.66	54.00	-13.34	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 4	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4804.011	50.55	0.08	50.63	74.00	-23.37	peak
4804.011	41.46	0.08	41.54	54.00	-12.46	AVG
7206.022	46.79	2.21	49.00	74.00	-25.00	peak
7206.022	39.83	2.21	42.04	54.00	-11.96	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 5	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4880.005	49.88	0.14	50.02	74.00	-23.98	peak
4880.005	42.16	0.14	42.30	54.00	-11.70	AVG
7320.140	46.43	2.36	48.79	74.00	-25.21	peak
7320.140	40.35	2.36	42.71	54.00	-11.29	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 5	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4880.050	48.43	0.14	48.57	74.00	-25.43	peak
4880.050	41.65	0.14	41.79	54.00	-12.21	AVG
7320.080	48.14	2.36	50.50	74.00	-23.50	peak
7320.080	39.66	2.36	42.02	54.00	-11.98	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

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Radiated Emissions Test Results for Above 1GHz

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 6	Antenna Polarity	Horizontal

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4960.012	48.43	0.22	48.65	74.00	-25.35	peak
4960.012	38.68	0.22	38.90	54.00	-15.10	AVG
7440.027	46.52	2.64	49.16	74.00	-24.84	peak
7440.027	38.03	2.64	40.67	54.00	-13.33	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Portable Power Station	Model Name	AC180
Temperature	25.2°C	Relative Humidity	55.6%
Pressure	960hPa	Test Voltage	AC 120V
Test Mode	Mode 6	Antenna Polarity	Vertical

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Value Type
4960.013	49.89	0.22	50.11	74	-23.89	peak
4960.013	42.13	0.22	42.35	54	-11.65	AVG
7440.027	48.24	2.64	50.88	74	-23.12	peak
7440.027	38.35	2.64	40.99	54	-13.01	AVG

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: Pass

Note:

1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
2. Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
3. The “Factor” value can be calculated automatically by software of measurement system.

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7. AC Power Line Conducted Emission Test

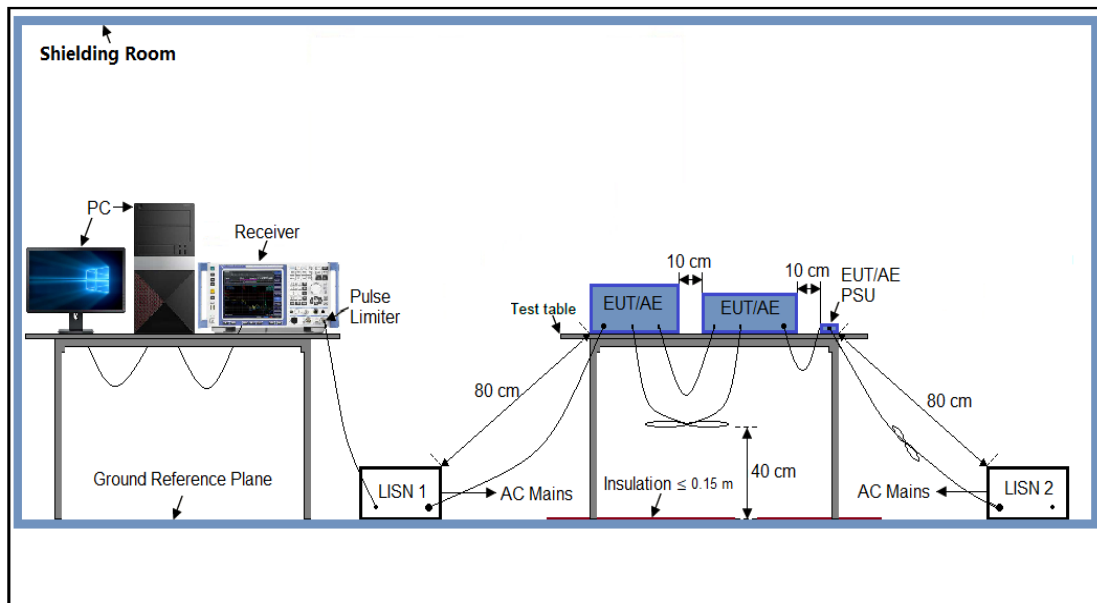
7.1 Measurement Limit

Frequency	Maximum RF Line Voltage	
	Q.P. (dB μ V)	Average (dB μ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

7.2 Measurement Setup (Block Diagram of Configuration)



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7.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received AC120V/60Hz power from the LISN by connecting the adapter.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

7.4 Final Procedure of Line Conducted Emission Test

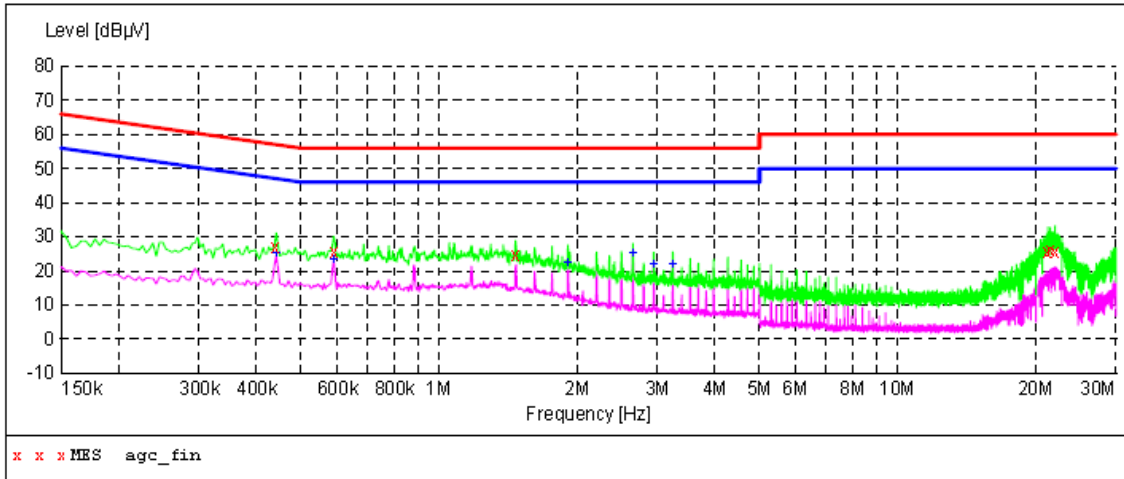
1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

7.5 Measurement Results

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AC Power Line Conducted Emission Test

Test Mode	Mode 1	LISN Line	Hot Side
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MEASUREMENT RESULT: "agc_fin"

2023/10/10 10:29

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.442000	27.20	6.1	57	29.8	QP	L1
0.590000	25.60	6.2	56	30.4	QP	L1
1.470000	24.40	6.2	56	31.6	QP	L1
21.286000	25.80	7.3	60	34.2	QP	L1
21.554000	25.90	7.4	60	34.1	QP	L1
22.078000	25.70	7.5	60	34.3	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2023/10/10 10:29

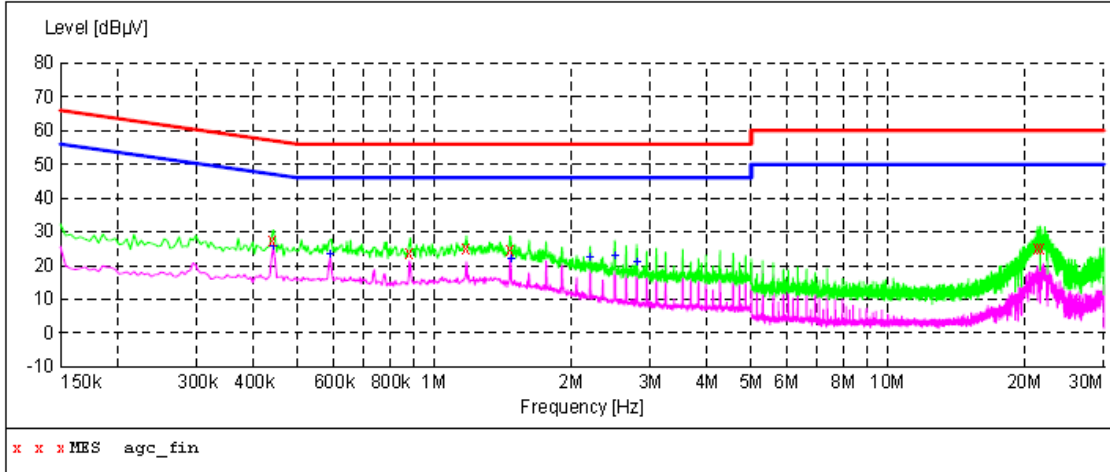
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.442000	25.20	6.1	47	21.8	AV	L1
0.590000	23.20	6.2	46	22.8	AV	L1
1.914000	22.40	6.2	46	23.6	AV	L1
2.650000	24.90	6.3	46	21.1	AV	L1
2.946000	22.00	6.3	46	24.0	AV	L1
3.238000	21.90	6.3	46	24.1	AV	L1

RESULT: Pass

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

AC Power Line Conducted Emission Test

Test Mode	Mode 1	LISN Line	Neutral Side
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MEASUREMENT RESULT: "agc_fin"

2023/10/10 10:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.442000	27.30	6.1	57	29.7	QP	N
0.886000	23.90	6.2	56	32.1	QP	N
1.178000	25.30	6.2	56	30.7	QP	N
1.470000	24.70	6.2	56	31.3	QP	N
21.418000	25.30	7.4	60	34.7	QP	N
21.682000	25.20	7.4	60	34.8	QP	N

MEASUREMENT RESULT: "agc_fin2"

2023/10/10 10:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.442000	25.50	6.1	47	21.5	AV	N
0.590000	23.00	6.2	46	23.0	AV	N
1.474000	22.00	6.2	46	24.0	AV	N
2.210000	22.30	6.3	46	23.7	AV	N
2.502000	22.70	6.3	46	23.3	AV	N
2.798000	20.90	6.3	46	25.1	AV	N

RESULT: PASS

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Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC01741230301AP02A

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC01741230301AP03A

-----End of Report-----

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Attestation of Global Compliance(Shenzhen)Co., Ltd
Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd
Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: <http://www.agccert.com/>



Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the “Dedicated Testing/Inspection Stamp” is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15 days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.