CID TESTING LABORATORY

CE-EMC

TEST REPORT

Prepared for:

Distribuciones Solares del Principado S.L

Polígono Industrial La Roza, nave 25, 33199 Granda (Siero), Asturias, España

Product:	Lead Acid Battery
Test Model:	6GFM100G (C100), 3GFM550 (C100), 6GFM100 (C100), 6GFM250 (C 100), 6GFM300 (C100)
Trade Name:	eleksol
Date of Test:	Jan, 18. 2022～Jan, 28.2022
Date of Report:	Jan, 28.2022
Test Report No:	CE-EMC20220128001

Prepared by:

Shenzhen CID Testing Technology Co., Ltd.

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TEL: 0755-85252582 FAX.: +86-755-85252582

http://www.cid-test.com E-mail:cid@cid-test.com

TEST REPORT VERIFICATION

Applicant :	Distribuciones Solares del Principado S.L
Address :	Polígono Industrial La Roza, nave 25, 33199 Granda (Siero), Asturias, España
Manufacturer :	Jiangxi Jingjiu Power Science & Technology Co. Ltd.
Address :	1388,Fushan No-1 Road, Xiaolan Economic Development Zone, Nanchang, Jiangxi, China.
EUT Description :	Lead Acid Battery
(A) Model No. :	6GFM100G (C100)
(B) Serial Model :	3GFM550 (C100), 6GFM100 (C100), 6GFM250 (C 100), 6GFM300 (C100)
(C) Power Supply :	DC 12V, 100Ah
Standards.....:	EN 55032:2015 EN IEC 61000-3-2:2019 EN 61000-3-3:2013 + A1:2019 EN 55035:2017

This device described above has been tested by CID, and the test results show that the equipment under test (EUT) is in compliance with the 2014/30/EU requirements. And it is applicable only to the tested sample identified in the report.
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Test Result..... PASS

Date of Test: Jan, 18. 2022～Jan, 28.2022

Prepared by: Dick Li

Reviewed by: Edison Ma

Approved by: Abner Wang

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2022/01/25	Dick Li

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55032:2015	Conducted Emission	Class B	N/A	
	Radiated Emission	Class B	Pass	
EN61000-3-2: 2014	Harmonic Current Emission	Class A or D NOTE (2)	N/A	
EN 61000-3-3: 2013	Voltage Fluctuations & Flicker	-----	N/A	
EMC Immunity				
Section EN 55035:2017	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2: 2009	Electrostatic Discharge	B	Pass	
EN 61000-4-3: 2010	RF electromagnetic field	A	Pass	
EN 61000-4-4: 2004+A1: 2010	Fast transients	B	N/A	
EN 61000-4-5: 2006	Surges	B	N/A	
EN 61000-4-6: 2009	Injected Current	A	N/A	
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	Pass	
EN 61000-4-11: 2004	fasdad	C/C/C NOTE(3)	N/A	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) The power consumption of EUT is less than 75W and no Limits apply.

(3) Voltage dip: 100% reduction - Performance Criteria B

Voltage dip: 30% reduction - Performance Criteria C

Voltage Interruption: 100% Interruption - Performance Criteria C

(4) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen CID Testing Technology Co., Ltd.

B124-126, 1/F, Area B, Co-Talent Creative Wisdom Park, No. 18, Shangliao Industrial Road, Xinqiao Sub-district, Shajing Town, Baoan District, Shenzhen, Guangdong Province, China.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U， where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
CIDC01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
CIDA01	ANSI	30MHz ~ 1000MHz	4.1	
		1GHz ~6GHz	5.0	

2 GENERAL INFORMATION

2.1 GENERAL INFORMATION

Equipment	Lead Acid Battery
Model Name	6GFM100G (C100)
Series model	3GFM550 (C100), 6GFM100 (C100), 6GFM250 (C 100), 6GFM300 (C100)
Serial No	None.
Product Description	The EUT is a Lead Acid Battery Operating frequency: N/A Connecting I/O port: N/A Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Power Source	DC Voltage
Power Rating	DC 12V⎓100Ah

2.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Running

For Conducted Test	
Final Test Mode	Description
Mode 1	Running

For Radiated Test	
Final Test Mode	Description
Mode 1	Running

For EMS Test	
Final Test Mode	Description
Mode 1	Running

2.3 DESCRIPTION OF TEST SETUP

Mode 1:

2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units.
The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Serie No.	Note
E-1	EUT		6GFM100G (C100)	N/A	EUT
E-2	LOAD		/	N/A	LOAD

Item	Equipment	Mfr/Brand	Model/Type No.	Serie No.	Note

Note:
(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in Length column.
(3) ‘YES’ means ‘shielded’ ‘with core’ ‘NO’ means ‘unshielded’ ‘without core.

2.5 MEASUREMENT INSTRUMENTS LIST

2.5.1 CONDUCTED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	HKE-002	Dec. 25, 2022
2	LISN	R&S	ENV216	HKE-059	Dec. 25, 2022
3	EMI Test Receiver	R&S	ESCI-7	HKE-010	Dec. 25, 2022

2.5.2 RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 25, 2022
2	Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 25, 2022
3	EMI Test Receiver	R&S	ESCI-7	HKE-010	Dec. 25, 2022
4	Spectrum Analyzer	Agilent	N9020A	HKE-048	Dec. 25, 2022
5	Amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 25, 2022
6	Amplifier	Agilent	83051A	HKE-016	Dec. 25, 2022

2.5.3 HARMONICS AND FILCK

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic flicker tester	California Instruments	5001ix	HKE-037	Dec. 25, 2022

2.5.4 ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD device	Schloder	SESD 216	HKE-023	Dec. 25, 2022

2.5.5 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal generator	Agilent	83630A	CID-028	Dec. 25, 2022
2	Signal generator	Agilent	N5182A	CID-029	Dec. 25, 2022
3	Broadband antenna	Schwarzbeck	VULB 9163	CID-012	Dec. 25, 2022
4	Power amplifier	R&S	5225F	CID-058	Dec. 25, 2022
5	Power amplifier	R&S	NTWPA-1060040E	CID-035	Dec. 25, 2022

2.5.6 SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Full-featured immunity tester	HTEC	HV1P16T	CID-017	Dec. 25, 2022

2.5.7 INJECTION CURRENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic clamp	EMCL	EMCL-20	CID-032	Dec. 25, 2022
2	Integrated Conduction Sensitivity Test System	Schloder	CDG6000	CID-033	Dec. 25, 2022

2.5.8 MF

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power frequency induction coil	HTEC Instruments Ltd.	HPFMF	CID-049	Dec. 25, 2022

3 EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.1.2 Telecommunication Ports CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	97~87	84~74	84~74	74~64
0.50 -30.0	84.00	74.00	74.00	64.00

Note:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

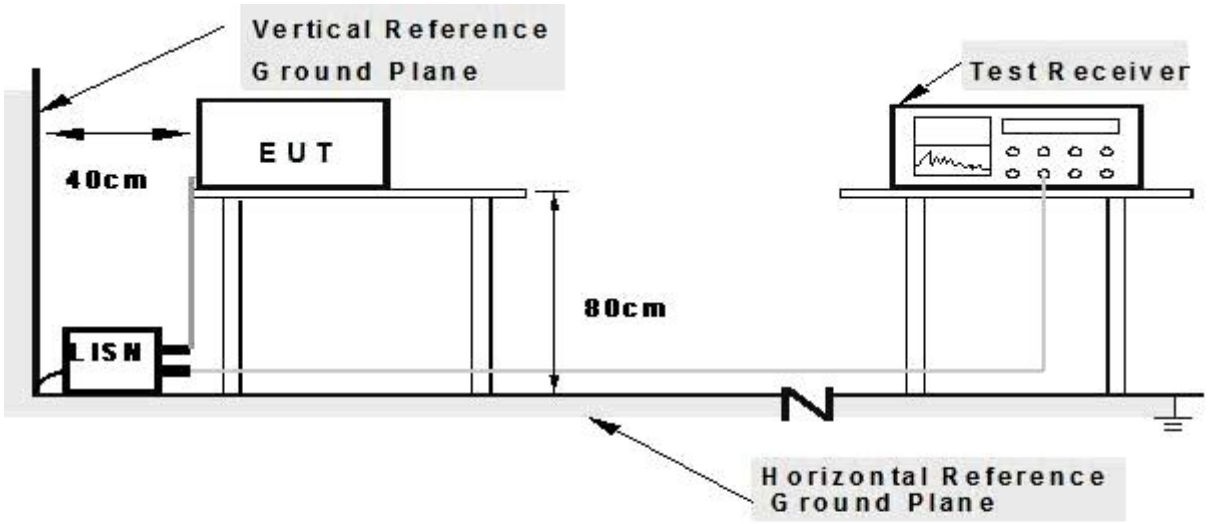
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item – EUT Test Photos.

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

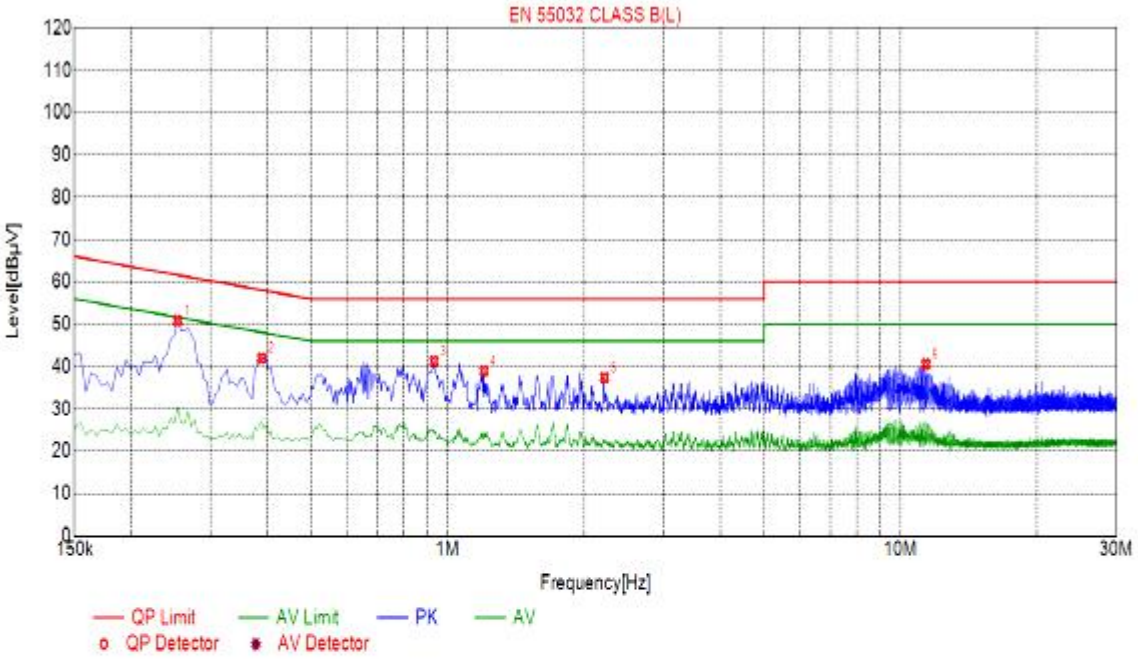
3.1.6 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.

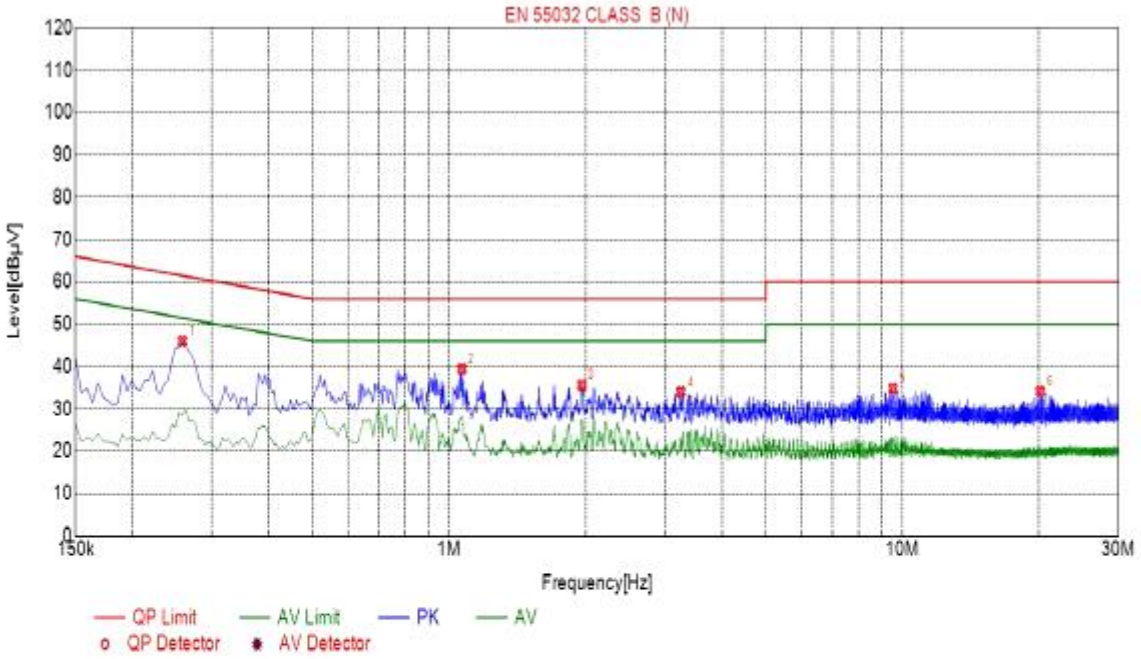
as below:

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.2535	50.89	10.04	61.64	10.75	40.85	PK	L
2	0.3885	42.04	10.04	58.10	16.06	32.00	PK	L
3	0.9330	41.29	10.06	56.00	14.71	31.23	PK	L
4	1.2030	38.96	10.09	56.00	17.04	28.87	PK	L
5	2.2200	37.42	10.17	56.00	18.58	27.25	PK	L
6	11.3820	40.55	10.00	60.00	19.45	30.55	PK	L

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.2580	46.02	10.04	61.50	15.48	35.98	PK	N
2	1.0680	39.51	10.07	56.00	16.49	29.44	PK	N
3	1.9635	35.66	10.14	56.00	20.34	25.52	PK	N
4	3.2460	33.99	10.23	56.00	22.01	23.76	PK	N
5	9.5415	34.83	10.09	60.00	25.17	24.74	PK	N
6	20.1570	34.13	10.11	60.00	25.87	24.02	PK	N

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A		Class B	
	At 10m	At 3m	At 10m	At 3m
	dBuV/m	dBuV/m	dBuV/m	dBuV/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 3m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	50
3000-6000	80	60	74	54

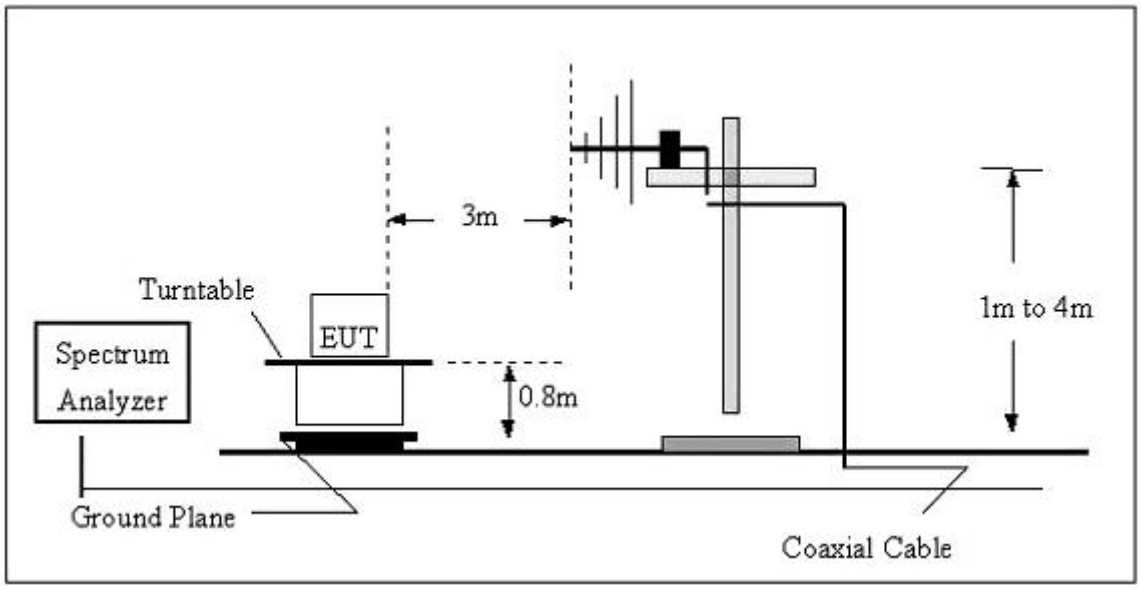
Notes:
(1) The limit for radiated test was performed according to as following: CISPR 32.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

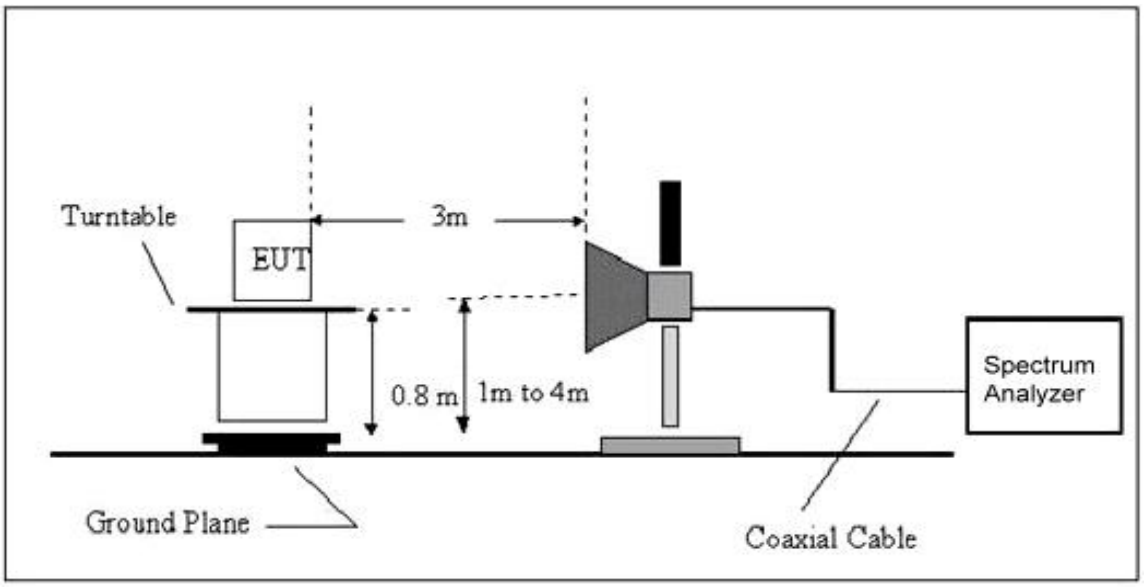
a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer
peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

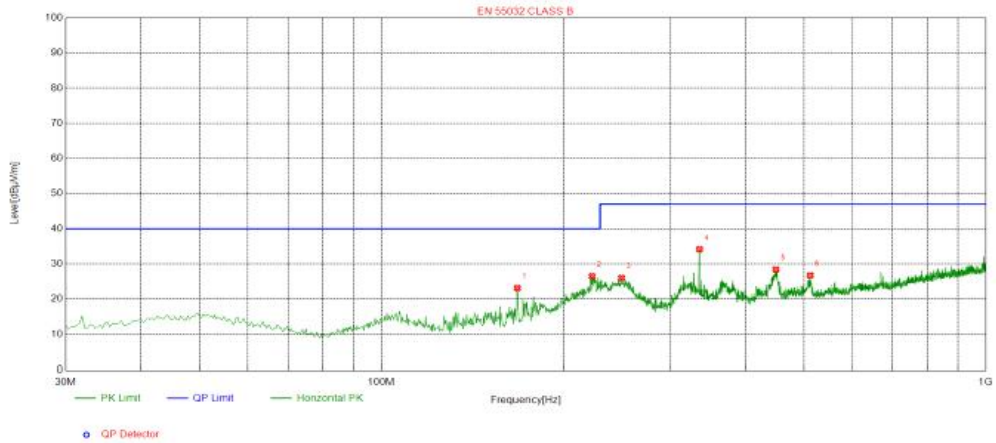
3.2.6 TEST RESULTS

Note:

All the test modes completed for test. only the worst result of was reported.

as below:

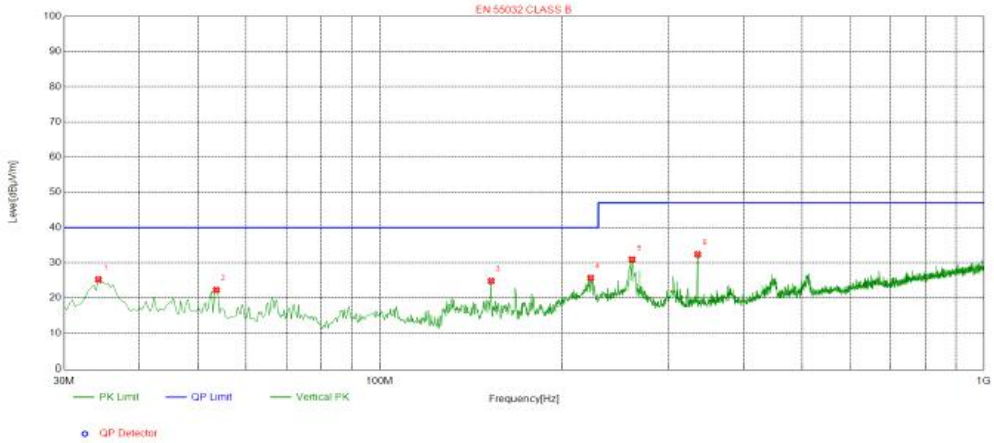
EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	167.7859	-17.50	40.63	23.13	40.00	16.87	100	333	Horizontal
2	223.0944	-14.49	40.98	26.49	40.00	13.51	100	229	Horizontal
3	249.6165	-13.41	39.41	26.00	47.00	21.00	100	315	Horizontal
4	335.9753	-11.62	45.78	34.16	47.00	12.84	100	300	Horizontal
5	449.5032	-9.01	37.41	28.40	47.00	18.60	100	69	Horizontal
6	512.2508	-7.95	34.68	26.73	47.00	20.27	100	73	Horizontal

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		



Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.2047	-16.17	41.40	25.23	40.00	14.77	100	105	Vertical
2	53.6112	-14.20	36.43	22.23	40.00	17.77	100	101	Vertical
3	152.9076	-18.73	43.53	24.80	40.00	15.20	100	109	Vertical
4	223.4178	-14.48	40.15	25.67	40.00	14.33	100	343	Vertical
5	261.5839	-13.55	44.48	30.93	47.00	16.07	100	360	Vertical
6	335.9753	-11.62	43.98	32.36	47.00	14.64	100	220	Vertical

3.2.7 TEST RESULTS(1000~6000MHz)

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Note:

1) N/A - denotes test is not applicable in this test report

2) There was not any unintentional transmission in standby mode

3.3 HARMONICS CURRENT

3.3.1 LIMITS OF HARMONICS CURRENT

IEC 555-2					
Table - I			Table - II		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Ampers)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Ampers)
Non Portable Tools or TV Receivers	Odd Harmonics		TV Receivers	Odd Harmonics	
	3	2.30		3	0.80
	5	1.14		5	0.60
	7	0.77		7	0.45
	9	0.40		9	0.30
	11	0.33		11	0.17
	13	0.21		13	0.12
	15≤n≤39	0.15 · 15/n		15≤n≤39	0.10 · 15/n
	Even Harmonics			Even Harmonics	
	2	1.08		2	0.30
	4	0.43		4	0.15
	8	0.30			
	8≤n≤40	0.23 · 8/n		DC	0.05

EN 61000-3-2/IEC 61000-3-2					
Equipment Category	Max. Permissible Harmonic Current (in Ampers)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in A)	(mA/w)
Class A	Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required	Class D	3	2.30	3.4
			5	1.14	1.9
			7	0.77	1.0
			9	0.40	0.5
			11	0.33	0.35
			13≤n≤39	see Table I	3.85/n
			only odd harmonics required		

3.3.1.1 TEST PROCEDURE

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.

b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

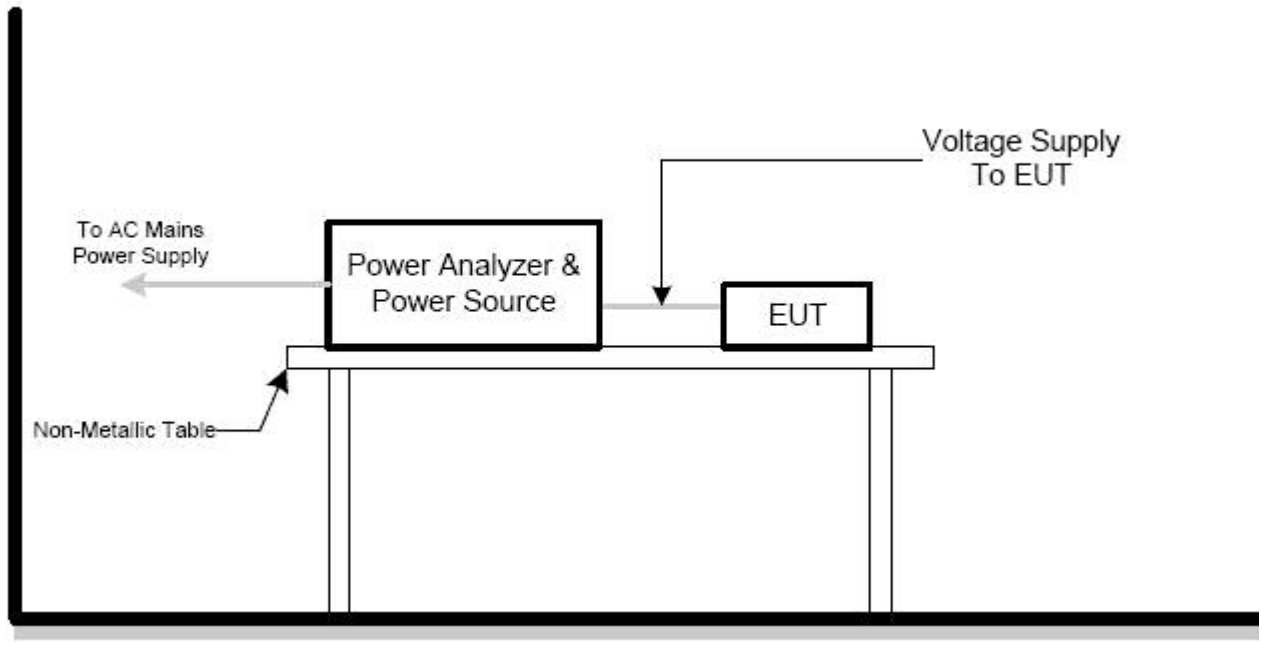
Class D: Equipment having a specified power less than or equal to600 W of the following types: Personal computers and personal computer monitors and television receivers.

c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

3.3.1.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.1.3 TEST SETUP



3.3.2 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Note:

1) N/A - denotes test is not applicable in this test report

2) There was not any unintentional transmission in standby mode

3.4 VOLTAGE FLUCTUATION AND FLICKERS

3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-3	
Pst	≤ 1.0, Tp= 10 min.	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3%	≤ 3.3%	Relative Steady-State V-Chang
dmax	≤ 4%	≤ 4%	Maximum Relative V-change
d (t)	N/A	≤ 3.3% for > 500 ms	Relative V-change characteristic

3.4.1.1 TEST PROCEDURE

a. Harmonic Current Test:

Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

b. Fluctuation and Flickers Test:

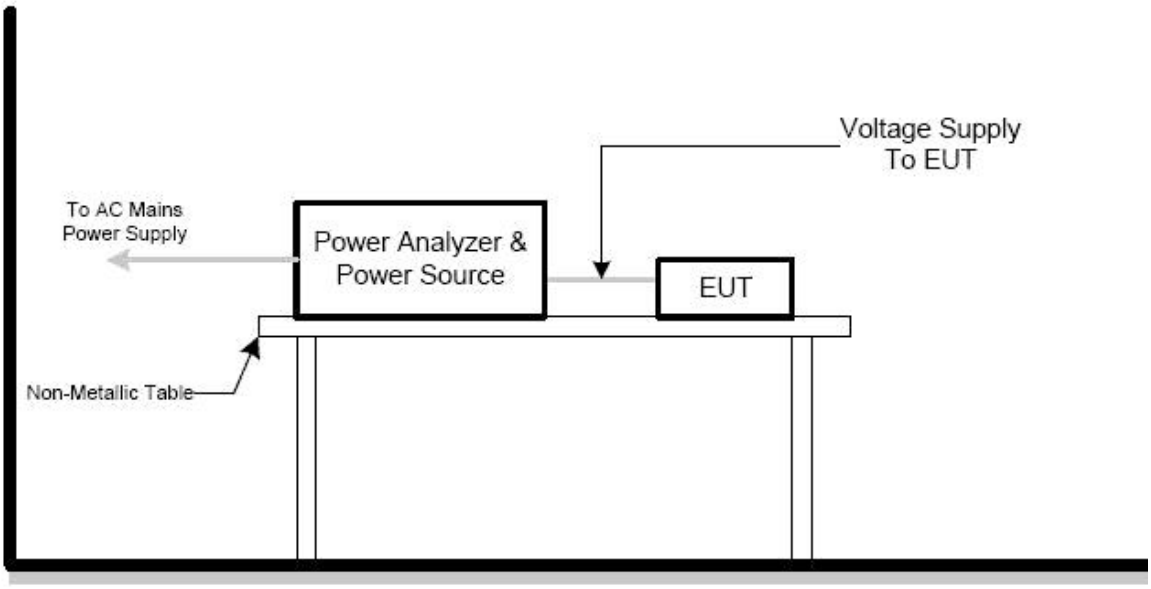
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.4.1.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.1.3 TEST SETUP



3.4.2 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.305	1.0	Pass
P_{lt}	0.113	0.65	Pass
$T_{dt(s)}$	0.086	0.2	Pass
d_{max}(%)	0.00%	4%	Pass
d_c(%)	0.00%	3%	Pass

4 EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION	Test Mode Test Ports	Perform. Criteria
1. ESD IEC/EN 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz, 1800(±1%)MHz, 2600(±1%)MHz, 3500(±1%)MHz, 5000(±1%)MHz, 1000Hz, 80%, AM modulated	Enclosure	A
3. EFT/Burst IEC/EN 61000-4-4	5/50ns Tr/Th 5KHz Repetition Freq.	Power Supply Port	B
	5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port	B
4. Surges IEC/EN 61000-4-5	1.2/50(8/20) Tr/Th us	L-N	B
	1.2/50(8/20) Tr/Th us	L-PE N-PE	B
5 Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz, 1000Hz 80％, AM Modulated 150Ω source impedance	CTL/Signal Port	A
	0.15 MHz to 80 MHz, 1000Hz 80％, AM Modulated 150Ω source impedance	AC Power Port	A
	0.15 MHz to 80 MHz, 1000Hz 80％, AM Modulated 150Ω source impedance	DC Power Port	A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz,	Enclosure	A
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage dip 100% Voltage dip 30% Interruption 100%	AC Power Port	B C C

4.2 GENERAL PERFORMANCE CRITERIA

According to EN 55035 standard, the general performance criteria as following:

Criterion A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.
Criterion C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge：2kV/4kV/8kV (Direct)Contact Discharge：2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

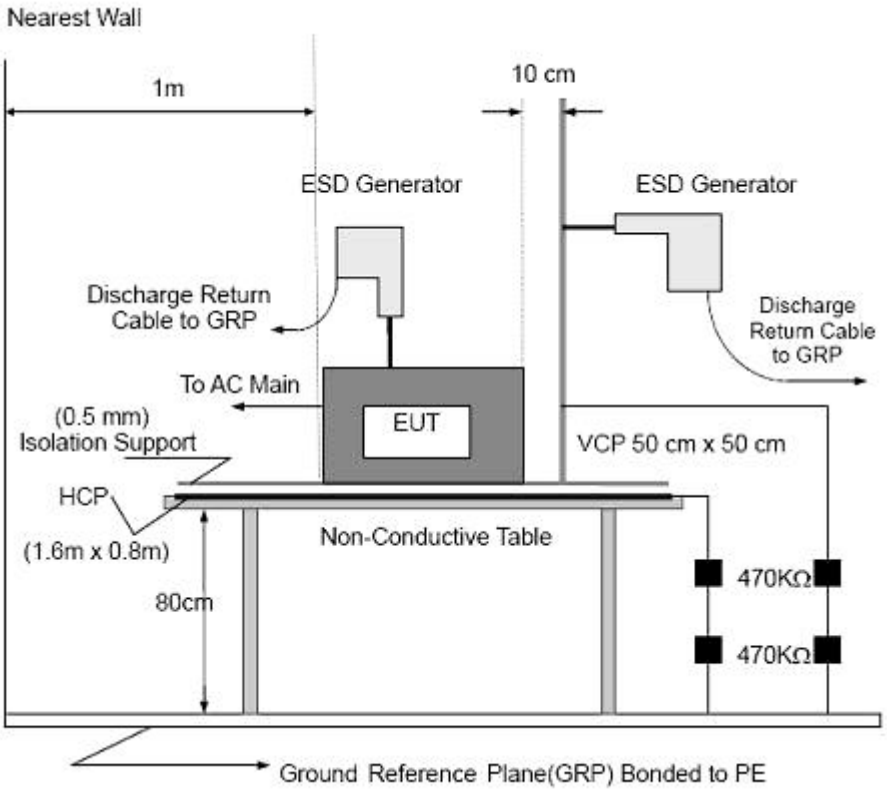
Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

b. Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.4.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Mode	Air Discharge								Contact Discharge								Criterion	Result
Test level (kV)	4		8		10		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
HCP									A	A	A	A					B	PASS
VCP									A	A	A	A						PASS
Metallic parts									A	A	A	A						PASS
enclosure	A	A	A	A														PASS
slot	A	A	A	A														PASS

Note:

1) +/- denotes the Positive/Negative polarity of the output voltage.

2) Test condition:

Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges: Minimum 10 times (Positive/Negative) at each point.

3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next pag(s)

4) The Indirect (HCP/VCP) discharges description of test point as following: 1.left side 2.right side 3.front side 4.rear side

5) N/A - denotes test is not applicable in this test report

4.5 RS TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 1000 MHz, 1800(±1%)MHz, 2600(±1%)MHz,3500(±1%)MHz, 5000(±1%)MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

4.5.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters. The other condition as following manner:

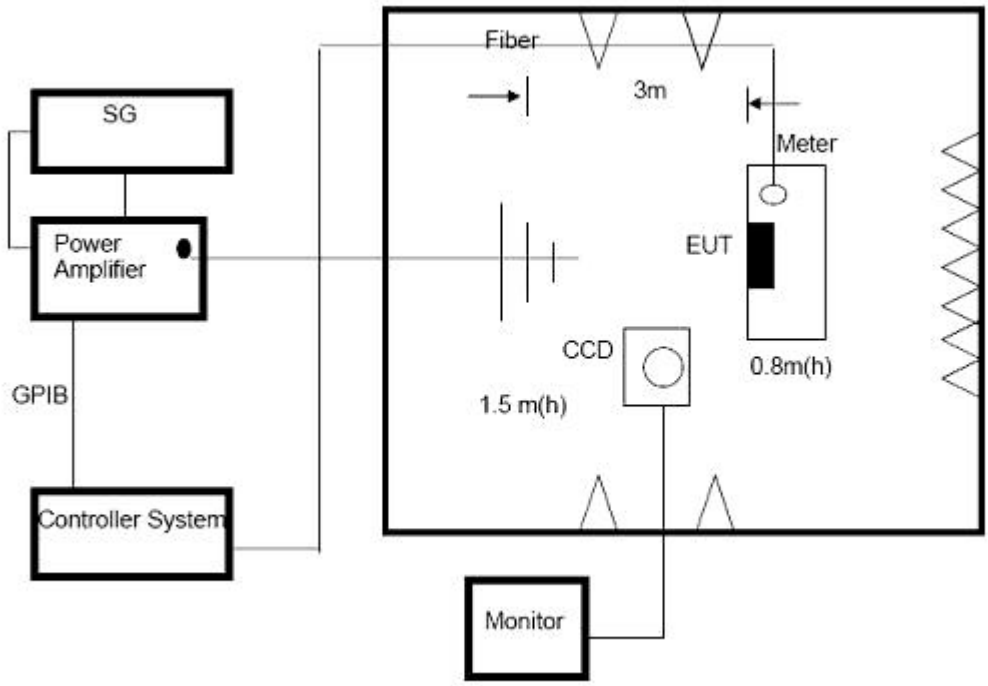
a. The frequency range is swept from 80 MHz to 1000 MHz, & 1400MHz - 2700MHz with the signal 80 % amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

b. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height.

The system under test was connected to the power and signal wire according to relevant installation instructions.

4.5.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80-1000, 1800 (±1%), 2600 (±1%), 3500 (±1%), 5000 (±1%)	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Note:

1) N/A - denotes test is not applicable in this test report.

2) Criteria A: There was no change operated with initial operating during the test.

3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

4) Criteria C: The system shut down during the test.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	B
Test Voltage:	Power Line： 1 kV Signal/Control Line： 0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.
Basic Standard:	IEC/EN 61000-4-4

4.6.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

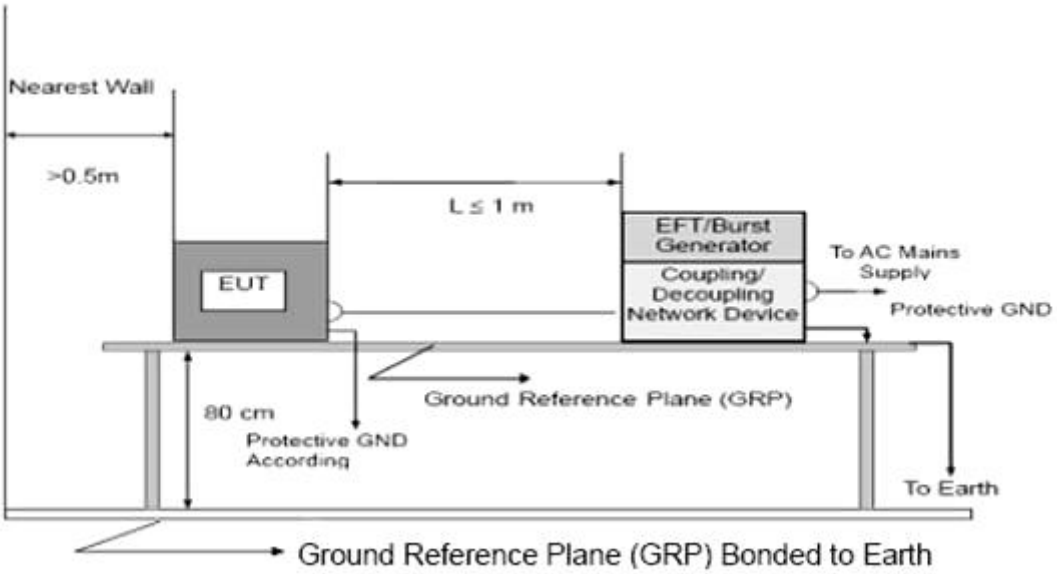
The other condition as following manner:

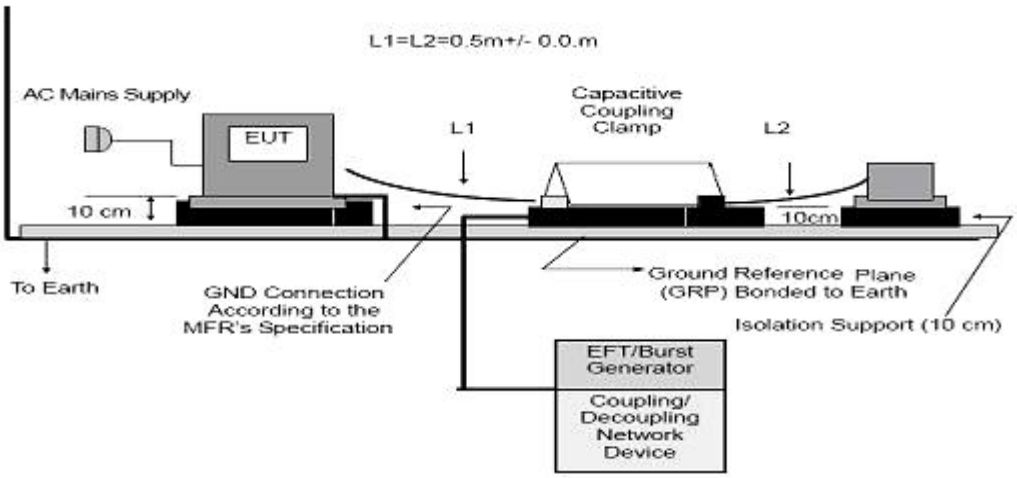
a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.

b. Both positive and negative polarity discharges were applied.

c. The duration time of each test sequential was 1 minute

4.6.3 TEST SETUP





Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane.

The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick.

The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.6.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Coupling Line		Test level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC line	L	A	A	A	A					B	PASS
	N	A	A	A	A						PASS
	PE										
	L+N	A	A	A	A						PASS
	L+PE										
	N+PE										
	L+N+PE										
DC Line											
Signal Line											

Note:

1) +/- denotes the Positive/Negative polarity of the output voltage.

2) N/A - denotes test is not applicable in this test report

3) Criteria A: There was no change operated with initial operating during the test.

4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

5) Criteria C: The system shut down during the test.

4.7 SURGE TESTING

4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Test Voltage:	Power Line：0.5 kV, 1 kV, 2 kV
Surge Input/Output:	DC Line
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.7.2 TEST PROCEDURE

a. For EUT power supply:

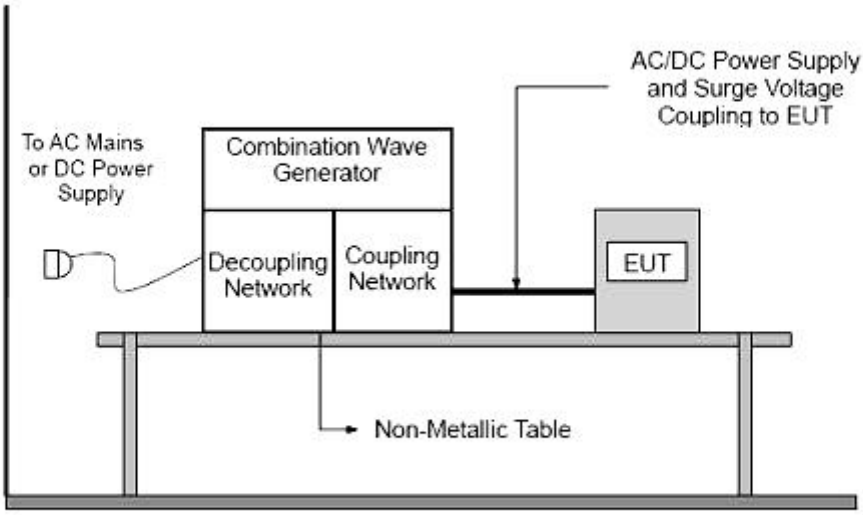
The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT: The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

d. The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

4.7.3 TEST SETUP



4.7.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Coupling Line			Test level								Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV			
			+	-	+	-	+	-	+	-		
AC line	L-N	0°									B	PASS
		90°	A		B							
		180°										
		270°		A		B						
	L-PE	0°										
		90°										
		180°										
		270°										
	N-PE	0°										
		90°										
		180°										
		270°										
DC Line												
Signal Line												

Note:

1) Polarity and Numbers of Impulses:5 Pst / Ngt at each tested mode

2) N/A - denotes test is not applicable in this Test Report

3) Criteria A: There was no change operated with initial operating during the test.

4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

5) Criteria C: The system shut down during the test.

4.8 INJECTION CURRENT TESTING

4.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance	A
Frequency Range:	0.15-10 MHz, 10-30MHz, 30-80MHz
Field Strength:	3 V r.m.s, 3V to 1V r.m.s, 1V r.m.s
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

4.8.2 TEST PROCEDURE

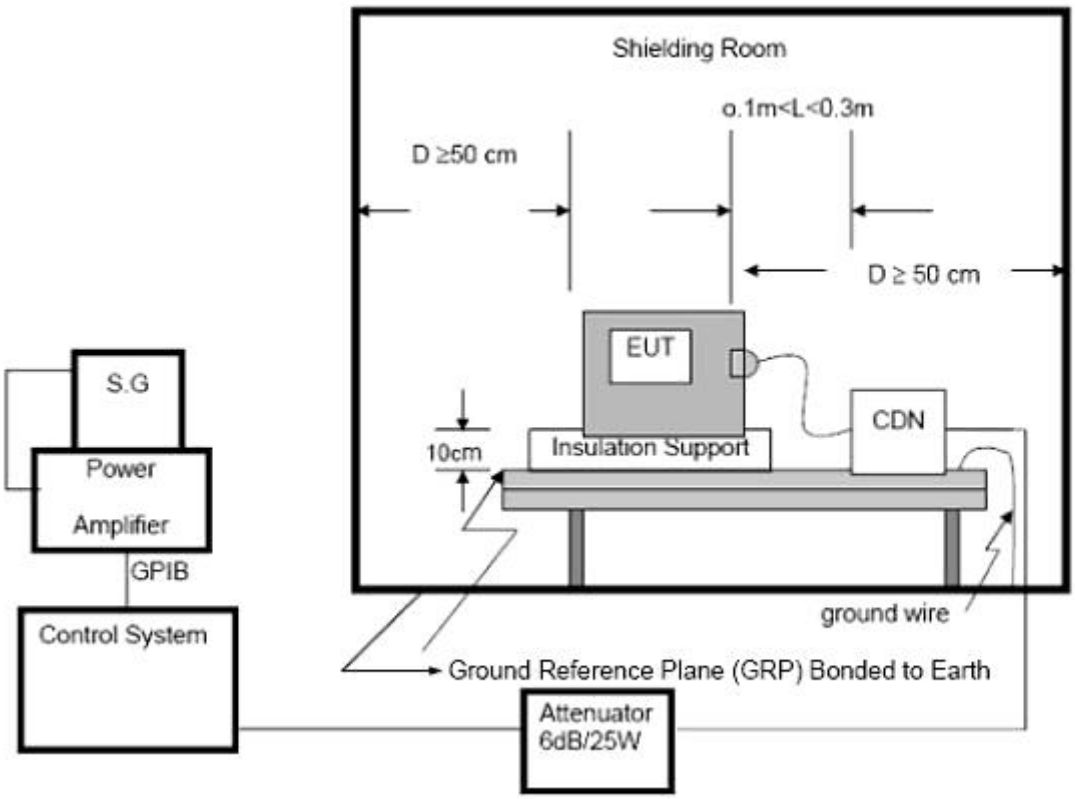
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

a. The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10-3 decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

4.8.3 TEST SETUP



NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

4.8.4 TTEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---10	3V(rms) AM Modulated 1000Hz, 80%	A	A	PASS
	10 --- 30	3V to 1V(rms) AM Modulated 1000Hz, 80%	A	A	PASS
	30 --- 80	1V(rms) AM Modulated 1000Hz, 80%	A	A	PASS
Input/ Output DC. Power Port	0.15 ---10	3V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
	10 --- 30	3V to 1V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
	30 --- 80	1V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
Signal Line	0.15 ---10	3V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
	10 --- 30	3V to 1V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
	30 --- 80	1V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A

NOTE:

1) N/A - denotes test is not applicable in this Test Report.

2) Criteria A: There was no change operated with initial operating during the test.

3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

4) Criteria C: The system shut down during the test.

4.9 POWER FREQUENCY MAGNETIC FIELD TESTING

4.9.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-8
Required Performance	A
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

4.9.2 TEST PROCEDURE

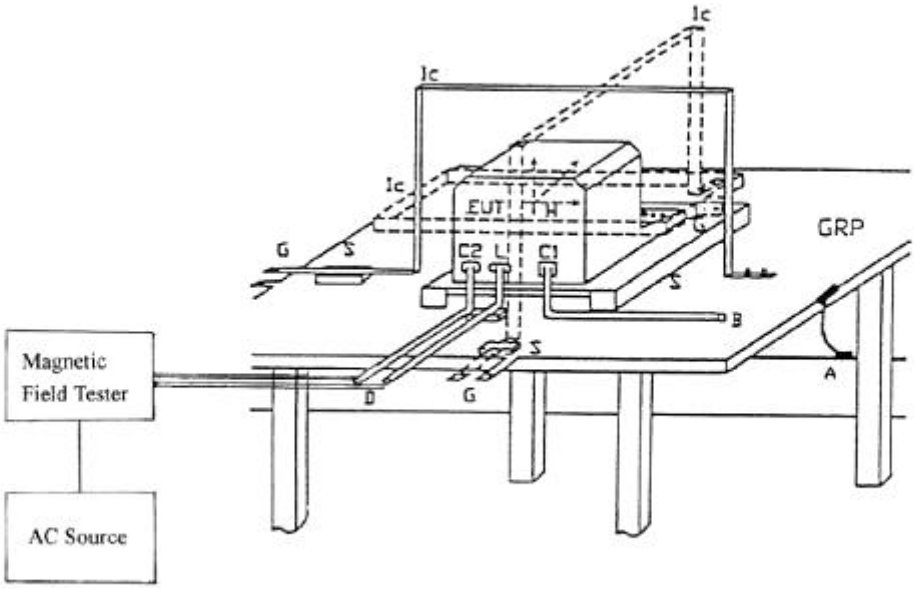
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.9.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction.

The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

4.9.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage ：	DC 12V		

Note:

1) N/A - denotes test is not applicable in this test report

2) Criteria A: There was no change operated with initial operating during the test.

3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

4) Criteria C: The system shut down during the test.

4.10 VOLTAGE INTERRUPTION/DIPS TESTING

4.10.1 TEST SPECIFICATION

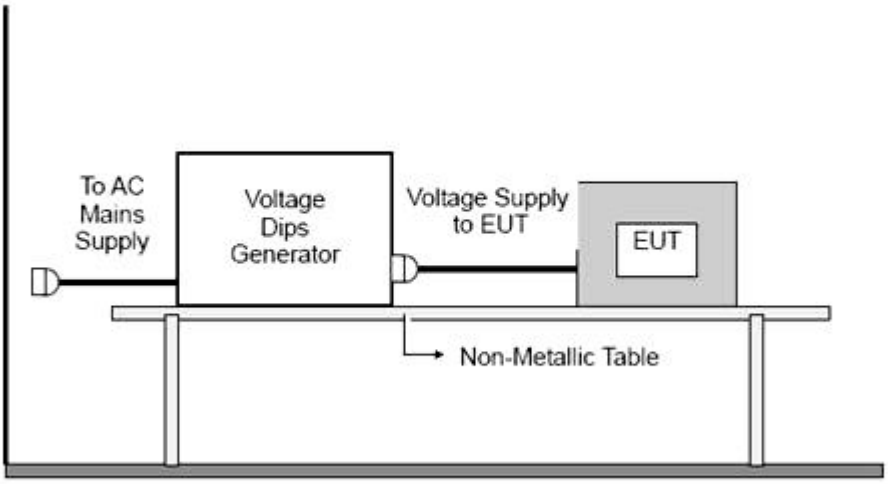
Basic Standard:	IEC/EN 61000-4-11
Required Performance	B (For 100% Voltage Dips) C (For 30% Voltage Dips)C (For 100% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0° /45° /90° /135° /180° /225° /270° /315° /360°
Test Cycle:	3 times

4.10.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event).

Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.10.3 TEST SETUP



4.10.4 TEST RESULTS

EUT：	Lead Acid Battery	Model Name. ：	6GFM100G (C100)
Temperature：	23.6 ℃	Relative Humidity：	50%
Pressure：	1010hPa	Test Date :	2022-01-23
Test Mode：	Running	Phase :	L
Test Voltage：	DC 12V		

Interruption & Dips	Duration (T)	Perform Criteria	Results	Judgment
Voltage dip 100%	0.5	B	B	PASS
Voltage dip 30%	25	C	B	PASS
Voltage dip 100%	250	C	C	PASS

Note:

1) N/A - denotes test is not applicable in this test report.

2) Criteria A: There was no change operated with initial operating during the test.

3) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

4) Criteria C: The system shut down during the test.

ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1

Photo 2

Photo 3

Photo 4

**********END**********