EMC TEST REPORT

For Electromagnetic Interference of

Report Reference No. ..... :	EA1804010E 02001
Engineer (name + signature) ..... :	Tiger Xu
Approved by (name + signature)..... :	Fred Zhu
Date of Receipt of EUT ..... :	Apr.10, 2018
Date of Test ..... :	Apr.10, 2018 to Apr.13, 2018
Date of issue ..... :	Apr.16, 2018
Testing Laboratory..... :	Dongguan Anci Electronic Technology Co., Ltd.
Address ..... :	1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong, China
Applicant's name ..... :	Dongguan Haitonglihe Industrial Co., Ltd
Address ..... :	3F, Building A, No. 5 of Cuijing Street, Baiguodong Community, Zhangmutou Town, Dongguan City, Guangdong Province, P.R., China
Manufacturer ..... :	Dongguan Haitonglihe Industrial Co., Ltd
Address ..... :	3F, Building A, No. 5 of Cuijing Street, Baiguodong Community, Zhangmutou Town, Dongguan City, Guangdong Province, P.R., China
Test specification:	
Test item description ..... :	Car Charger
Trade Mark ..... :	N/A
Model/Type reference ..... :	GT680, GT690C, GT720C, A0068, B069C, D072C
Ratings ..... :	Input rating: DC 12-24V, 2.5A Max Output rating: Out USB 1: DC 5V, 2.4A Max Out USB 2: DC 5V, 2.4A Max Out Type C-PD: DC 5V 3A, 9V 2A, 12V 1.5A Out Total: DC 5V, 7.8A Max

Table of Contents **Page**

Table of Contents **Page**

Table of Contents **Page**

1 .GENERAL INFORMATION

1.1 CERTIFICATION

Testing Laboratory..... :	Dong Guan Anci Electronic Technology Co., Ltd.
Address ..... :	1-2 Floor, Building A, No.11, Headquarters 2 Road, Songshan Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.
Applicant's name..... :	Dongguan Haitonglihe Industrial Co., Ltd
Address ..... :	3F, Building A, No. 5 of Cuijing Street, Baiguodong Community, Zhangmutou Town, Dongguan City, Guangdong Province, P.R., China
Manufacturer ..... :	Dongguan Haitonglihe Industrial Co., Ltd
Address……:	3F, Building A, No. 5 of Cuijing Street, Baiguodong Community, Zhangmutou Town, Dongguan City, Guangdong Province, P.R., China
First Factory's name……..:	Dongguan Haitonglihe Industrial Co., Ltd
Address……:	3F, Building A, No. 5 of Cuijing Street, Baiguodong Community, Zhangmutou Town, Dongguan City, Guangdong Province, P.R., China
Test specification:	
Test item description ..... :	Car Charger
Trade Mark ..... :	N/A
Model/Type reference ..... :	GT680, GT690C, GT720C, A0068, B069C, D072C
Test Sample……..:	GT680
Ratings ..... :	Input rating: DC 12-24V, 2.5A Max Output rating: Out USB 1: DC 5V, 2.4A Max Out USB 2: DC 5V, 2.4A Max Out Type C-PD: DC 5V 3A, 9V 2A, 12V 1.5A Out Total: DC 5V, 7.8A Max
Tested Power……:	DC 12V, DC 24V
Standards ..... :	EN 55032: 2015 EN 55024: 2010+A1: 2015

The device described above was tested by Dong Guan Anci Electronic Technology Co., Ltd. to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Dong Guan Anci Electronic Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the above official standards.

This report applies to the above sample only and shall not be reproduced in part without written approval of Dong Guan Anci Electronic Technology Co., Ltd.

1.2 PRODUCT INFORMATION

The equipment models are Car Charger for the use in information technology equipment.

All models are the same, just different model names.

All tests was performed on model GT680.

The EUT passed the test.

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55032: 2015	Conducted Emission	Class B	N/A	
	Radiated Emission Below 1 GHz	Class B	PASS	
	Radiated Emission Above 1 GHz	Class B	N/A	NOTE (1) NOTE (3)
Immunity (EN 55024: 2010+A1:2015)				
Section	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Discharge	B	PASS	
EN 61000-4-3:2006 +A1:2008+A2: 2010	RF electromagnetic field	A	PASS	
EN 61000-4-4:2012	Fast transients	B	N/A	
EN 61000-4-5:2014	Surges	B	N/A	
EN 61000-4-6:2014	Injected Current	A	N/A	
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	N/A	
EN 61000-4-11:2004	Volt. Interruptions Volt. Dips	B / C / C **NOTE (2)**	N/A	

NOTE:

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

(2) Voltage dip: ＞95% reduction – Performance Criteria **B**

Voltage dip: 30% reduction – Performance Criteria **C**

Voltage Interruption: ＞95% reduction – Performance Criteria **C**

(3) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1GHz, measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.

(4) Test in the shielding room.

2.1 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
C01	ANSI	150 KHz ~ 30MHz	3.19	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U(dB)	NOTE
OS02	ANSI	30MHz ~ 200MHz	V	3.69	
		30MHz ~ 200MHz	H	3.69	
		200MHz ~ 1,000MHz	V	3.67	
		200MHz ~ 1,000MHz	H	3.67	

2.2 DESCRIPTION OF TEST MODES

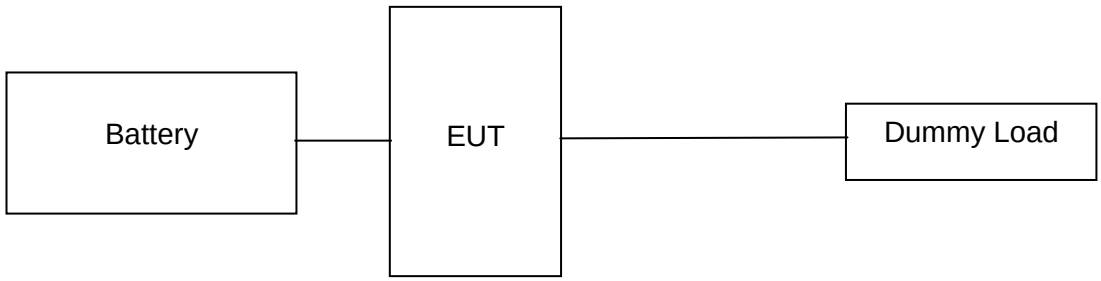
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration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

For Conducted Test	
Pretest Mode	Description
Mode 1	N/A

For Radiated Test	
Final Test Mode	Description
Mode 1	Full Load (USB 5Vdc/4.8A+T-C 5Vdc/3A)
Mode 2	Full Load (USB 5Vdc/4.8A+T-C 9Vdc/2A)
Mode 3	Full Load (USB 5Vdc/4.8A+T-C 12Vdc/1.5A)

For EMS Test	
Final Test Mode	Description
Mode 1	Full Load (USB 5Vdc/4.8A+T-C 5Vdc/3A)
Mode 2	Full Load (USB 5Vdc/4.8A+T-C 9Vdc/2A)
Mode 3	Full Load (USB 5Vdc/4.8A+T-C 12Vdc/1.5A)

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3. EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION(MAINS PORT) (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 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-669	2018-06-11
2	10 db attenuator	JFW	50FP-010-H4	43608.46.427.1	2018-06-11
3	Test Cable	N/A	N/A	N/A	2018-06-11
4	EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101358	2018-06-11

Remark: ” N/A” denotes No Model No. , Serial No. or No Calibration specified.

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.

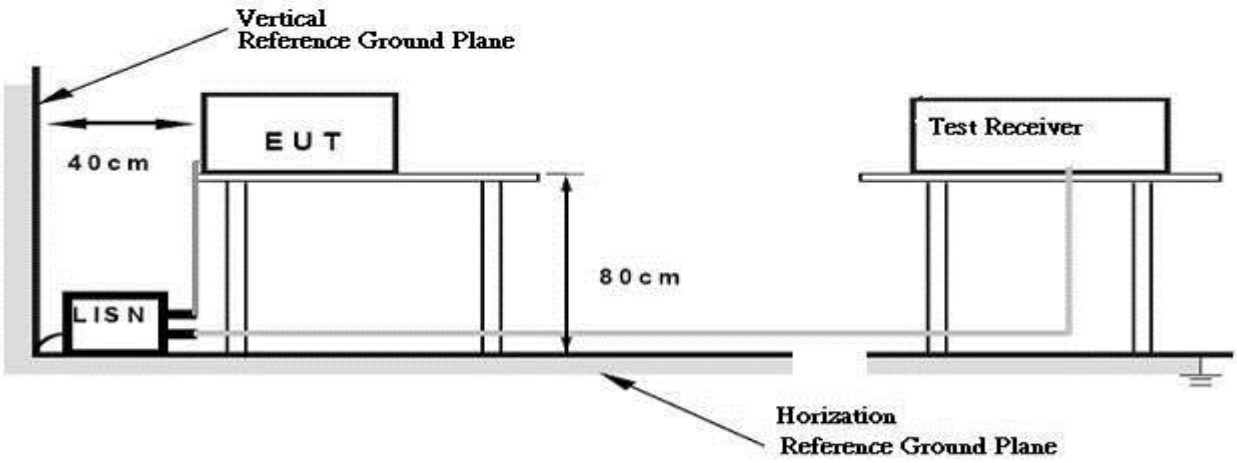
d. LISN at least 80 cm from nearest part of EUT chassis.

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

3.1.4 DEVIATION FROM TEST STANDARD

No deviation

3.1.5 TEST SETUP



3.1.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

3.1.7 TEST RESULTS

No applicable to the DC product.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FRE UENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 – 230	50	40
230 – 1000	57	47

Notes:

(1) The limit for radiated test was performed according to as following: EN 55032/CISPR 32.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 ~ 3	76	56	74	54
3 ~ 6	80	60	70	50

Notes:

(1) The limit for radiated test was performed according to EN 55032/CISPR 32.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	SCHWARZBECK MESS	VULB 9163	9163-588	2018-06-15
2	Test Cable	N/A	N/A	N/A	2018-06-11
3	Test Cable	N/A	N/A	N/A	2018-06-11
4	Pre-Amplifier	HP	8447D	N/A	2018-06-11
5	Test Receiver	ROHDE&SCHWARZ	ESPI	100502	2019-01-07
6	Antenna Mast	N/A	N/A	N/A	N/A
7	Turn Table	N/A	N/A	N/A	N/A
8	Positioning Controller	Max-Full Antenna Corp.	MF7802	N/A	N/A
9	Power amplifier	N/A	BBV 9743	9743-0075	2018-06-11

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

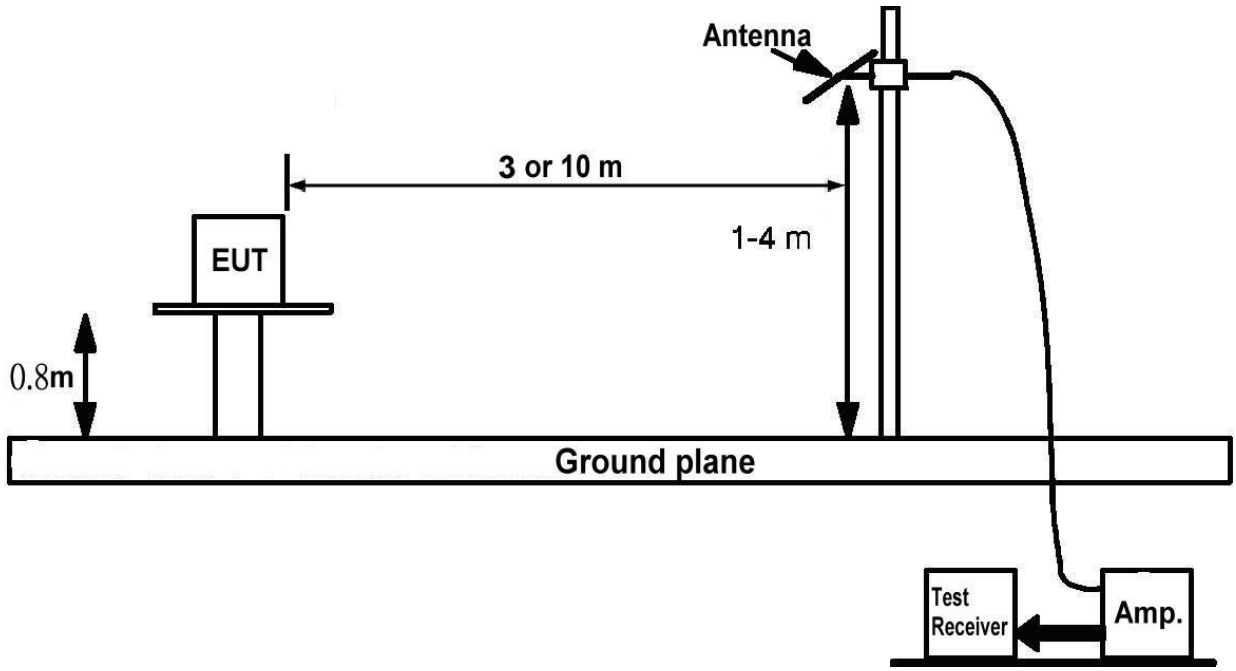
3.2.3 TEST PROCEDURE

a. The measuring distance of at 3m or 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 a 3m or 10 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.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP 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 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP



3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.7 TEST RESULTS

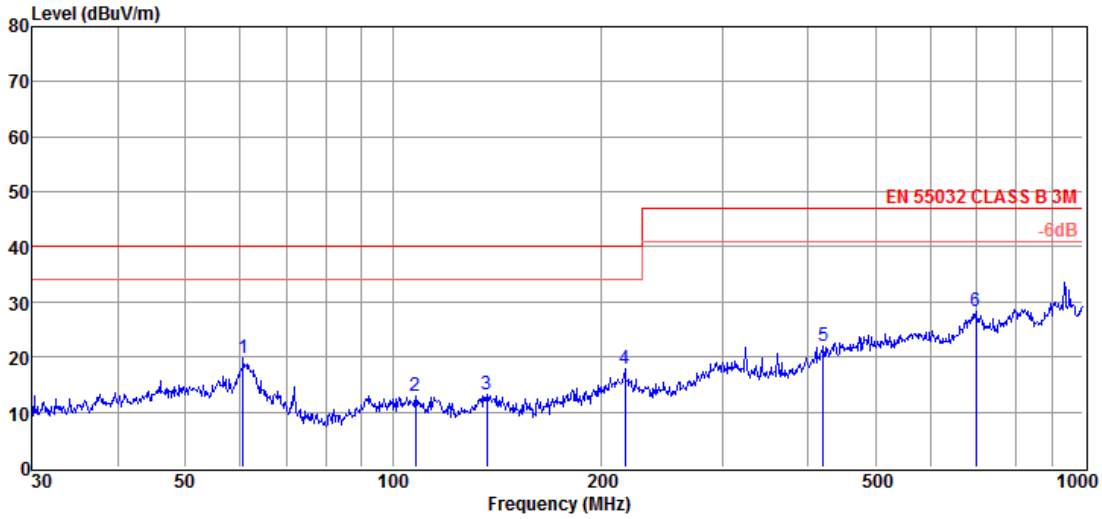
EUT：	Car Charger	**Model No.:**	GT680
Temperature：	25℃	**Relative Humidity：**	55 %
Pressure：	1008 hPa	**Test Power ：**	DC 12V, DC 24V
Test Mode ：	Model 1, Model 2, Model 3		

Remark：

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Detector or Peak Detector.
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
(3) Measuring frequency range from 30MHz to 1000MHz.
(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 1
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

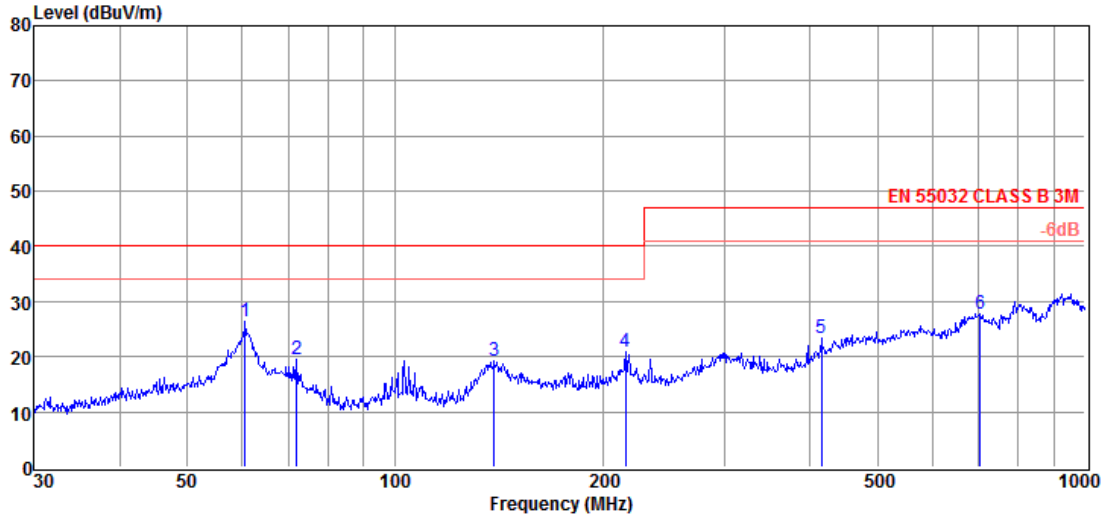


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	60.70	32.47	12.01	26.33	1.66	19.81	40.00	-20.19	Peak	VERTICAL
2	107.89	25.66	11.32	26.22	2.24	13.00	40.00	-27.00	Peak	VERTICAL
3	136.94	28.50	8.42	26.22	2.55	13.25	40.00	-26.75	Peak	VERTICAL
4	216.78	27.82	13.06	26.22	3.22	17.88	40.00	-22.12	Peak	VERTICAL
5	420.58	26.22	18.03	26.77	4.58	22.06	47.00	-24.94	Peak	VERTICAL
6	699.31	28.13	21.39	27.18	6.03	28.37	47.00	-18.63	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 1
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

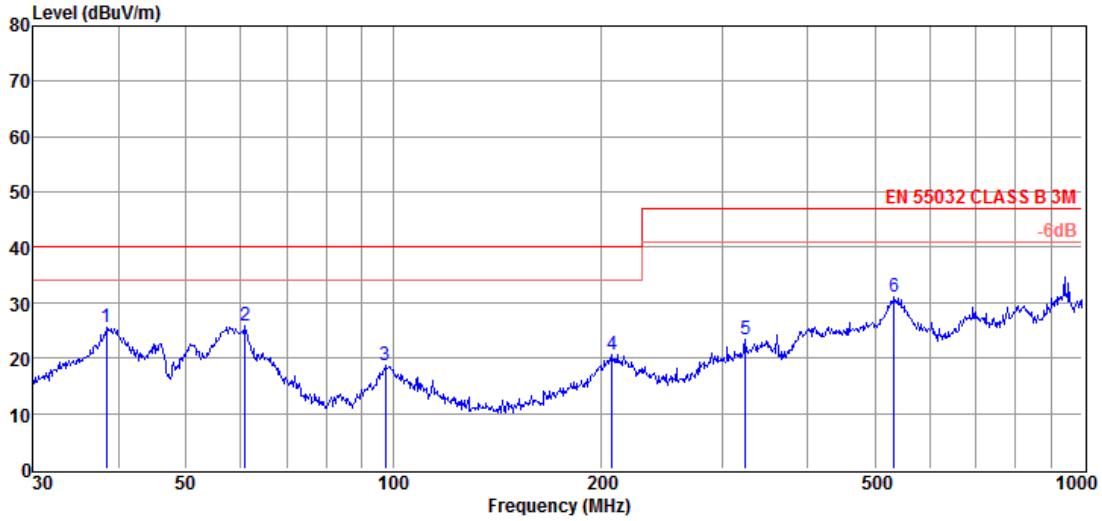


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	60.70	39.10	12.01	26.33	1.66	26.44	40.00	-13.56	Peak	HORIZONTAL
2	72.08	34.64	9.28	26.30	1.81	19.43	40.00	-20.57	Peak	HORIZONTAL
3	139.36	34.49	8.32	26.22	2.57	19.16	40.00	-20.84	Peak	HORIZONTAL
4	216.02	30.73	13.05	26.22	3.21	20.77	40.00	-19.23	Peak	HORIZONTAL
5	414.72	27.78	17.91	26.75	4.54	23.48	47.00	-23.52	Peak	HORIZONTAL
6	704.23	27.44	21.43	27.18	6.05	27.74	47.00	-19.26	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 1
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

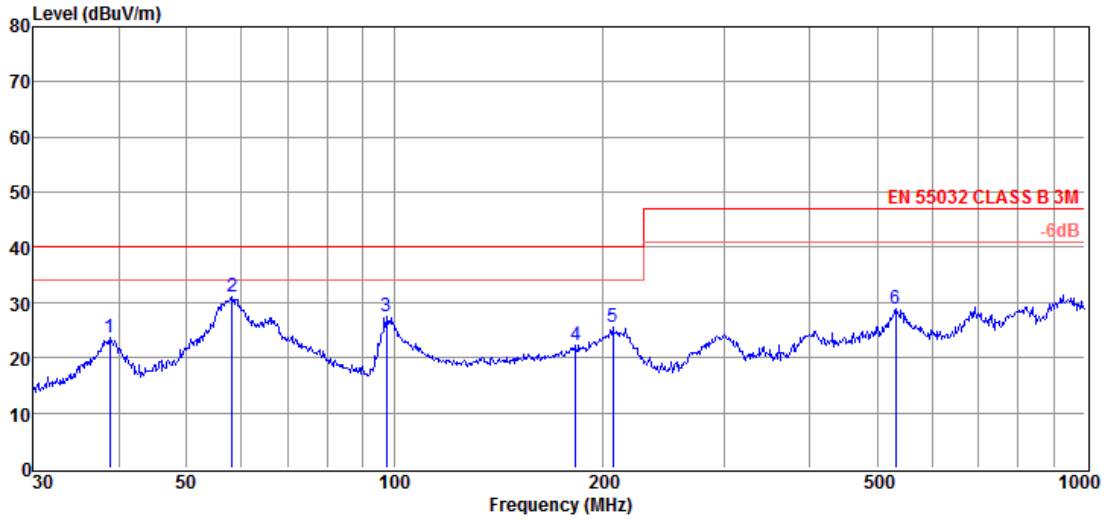


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	38.35	38.47	12.19	26.39	1.31	25.58	40.00	-14.42	Peak	VERTICAL
2	60.92	38.54	11.95	26.33	1.66	25.82	40.00	-14.18	Peak	VERTICAL
3	97.46	31.52	11.38	26.23	2.11	18.78	40.00	-21.22	Peak	VERTICAL
4	207.85	30.88	12.87	26.22	3.14	20.67	40.00	-19.33	Peak	VERTICAL
5	324.46	30.33	15.34	26.35	3.99	23.31	47.00	-23.69	Peak	VERTICAL
6	533.83	33.42	19.57	27.08	5.21	31.12	47.00	-15.88	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 1
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

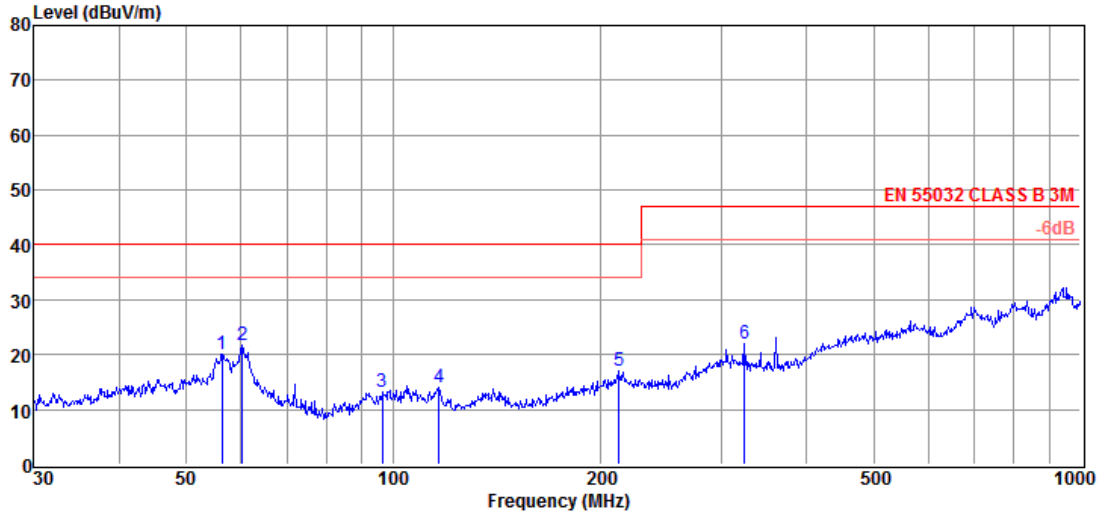


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	38.75	36.32	12.29	26.39	1.32	23.54	40.00	-16.46	Peak	HORIZONTAL
2	58.20	43.36	12.43	26.34	1.62	31.07	40.00	-8.93	Peak	HORIZONTAL
3	97.46	40.35	11.38	26.23	2.11	27.61	40.00	-12.39	Peak	HORIZONTAL
4	183.20	34.03	11.53	26.22	2.95	22.29	40.00	-17.71	Peak	HORIZONTAL
5	207.12	35.73	12.86	26.22	3.14	25.51	40.00	-14.49	Peak	HORIZONTAL
6	531.96	31.04	19.57	27.07	5.20	28.74	47.00	-18.26	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 2
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

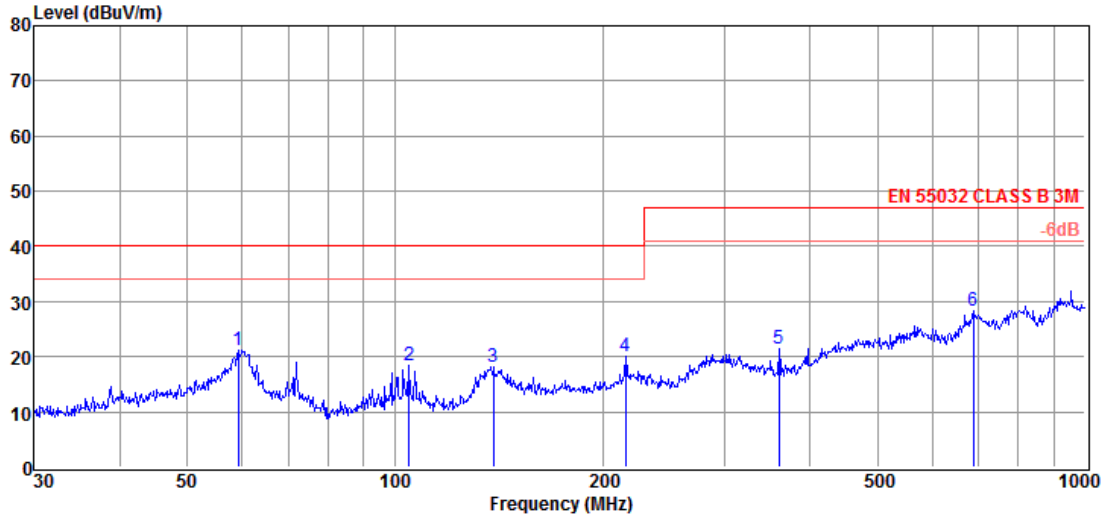


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	56.40	32.27	12.68	26.35	1.59	20.19	40.00	-19.81	Peak	VERTICAL
2	60.28	34.19	12.12	26.33	1.65	21.63	40.00	-18.37	Peak	VERTICAL
3	96.44	26.19	11.21	26.23	2.10	13.27	40.00	-26.73	Peak	VERTICAL
4	116.54	27.54	10.27	26.22	2.34	13.93	40.00	-26.07	Peak	VERTICAL
5	213.02	27.02	12.98	26.22	3.19	16.97	40.00	-23.03	Peak	VERTICAL
6	324.46	28.92	15.34	26.35	3.99	21.90	47.00	-25.10	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 2
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

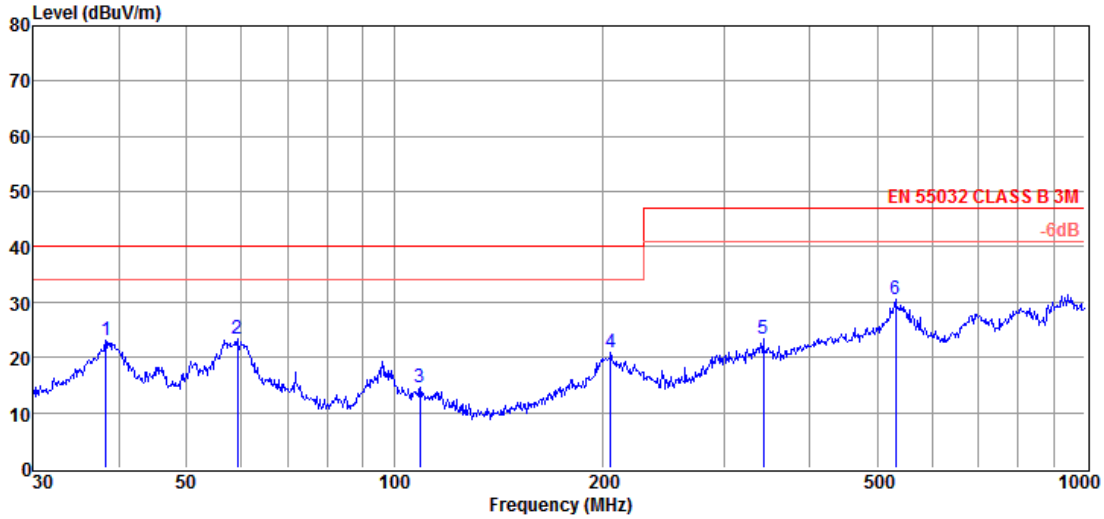


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	59.23	33.55	12.30	26.34	1.64	21.15	40.00	-18.85	Peak	HORIZONTAL
2	104.90	31.04	11.50	26.22	2.20	18.52	40.00	-21.48	Peak	HORIZONTAL
3	138.87	33.53	8.34	26.22	2.57	18.22	40.00	-21.78	Peak	HORIZONTAL
4	216.02	29.96	13.05	26.22	3.21	20.00	40.00	-20.00	Peak	HORIZONTAL
5	360.45	28.59	15.26	26.52	4.22	21.55	47.00	-25.45	Peak	HORIZONTAL
6	689.56	28.27	21.24	27.17	5.98	28.32	47.00	-18.68	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 2
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

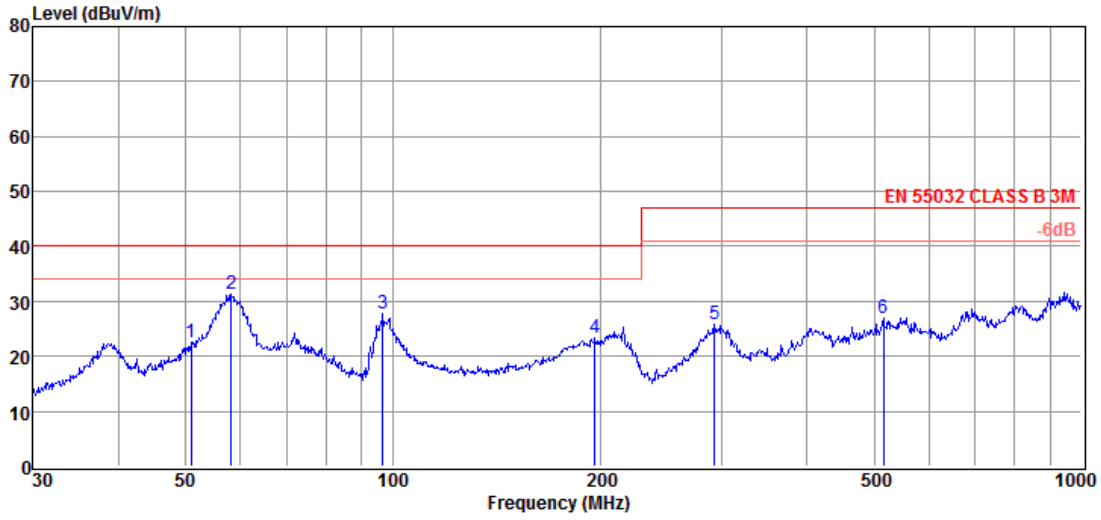


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	38.21	35.90	12.15	26.39	1.31	22.97	40.00	-17.03	Peak	VERTICAL
2	59.23	35.63	12.30	26.34	1.64	23.23	40.00	-16.77	Peak	VERTICAL
3	109.03	27.41	11.26	26.22	2.25	14.70	40.00	-25.30	Peak	VERTICAL
4	205.68	31.03	12.83	26.22	3.13	20.77	40.00	-19.23	Peak	VERTICAL
5	341.98	30.80	14.83	26.43	4.11	23.31	47.00	-23.69	Peak	VERTICAL
6	531.96	32.74	19.57	27.07	5.20	30.44	47.00	-16.56	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 2
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

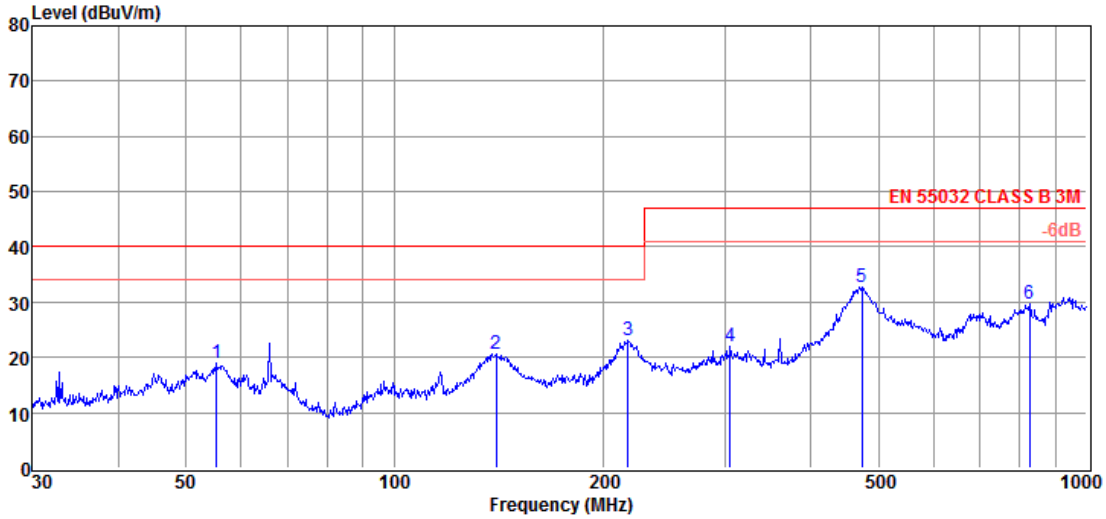


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	50.94	34.04	13.46	26.37	1.51	22.64	40.00	-17.36	Peak	HORIZONTAL
2	58.20	43.53	12.43	26.34	1.62	31.24	40.00	-8.76	Peak	HORIZONTAL
3	96.78	40.57	11.27	26.23	2.10	27.71	40.00	-12.29	Peak	HORIZONTAL
4	196.51	34.12	12.32	26.22	3.05	23.27	40.00	-16.73	Peak	HORIZONTAL
5	293.08	32.41	15.79	26.22	3.77	25.75	47.00	-21.25	Peak	HORIZONTAL
6	515.44	29.35	19.53	27.06	5.11	26.93	47.00	-20.07	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 3
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

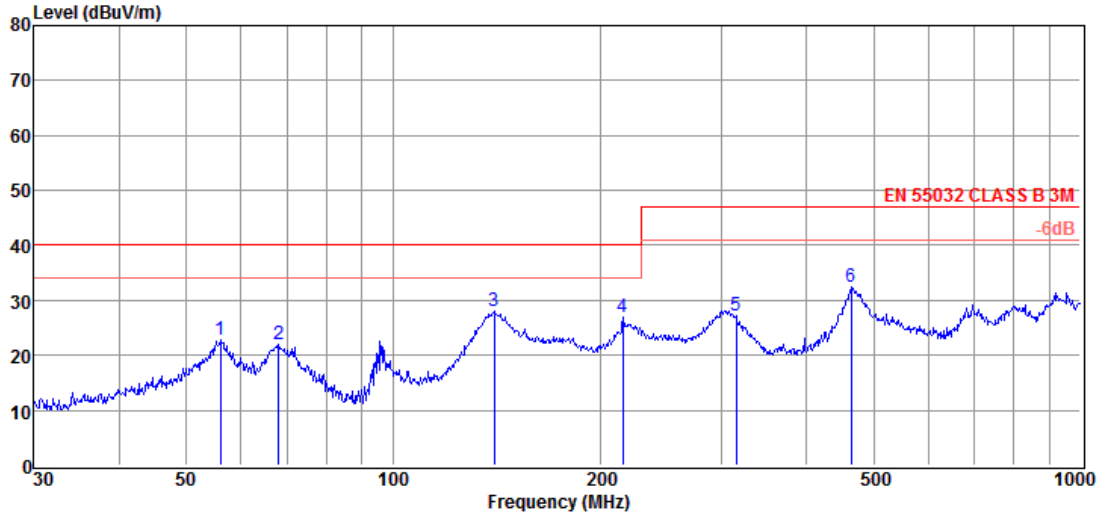


Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	55.42	31.02	12.81	26.35	1.58	19.06	40.00	-20.94	Peak	VERTICAL
2	140.34	35.91	8.32	26.22	2.58	20.59	40.00	-19.41	Peak	VERTICAL
3	217.54	32.90	13.08	26.22	3.22	22.98	40.00	-17.02	Peak	VERTICAL
4	305.68	28.38	15.92	26.25	3.86	21.91	47.00	-25.09	Peak	VERTICAL
5	473.84	35.67	19.04	26.96	4.88	32.63	47.00	-14.37	Peak	VERTICAL
6	827.49	27.87	22.40	27.16	6.61	29.72	47.00	-17.28	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 12V	**Test Mode**	: Model 3
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

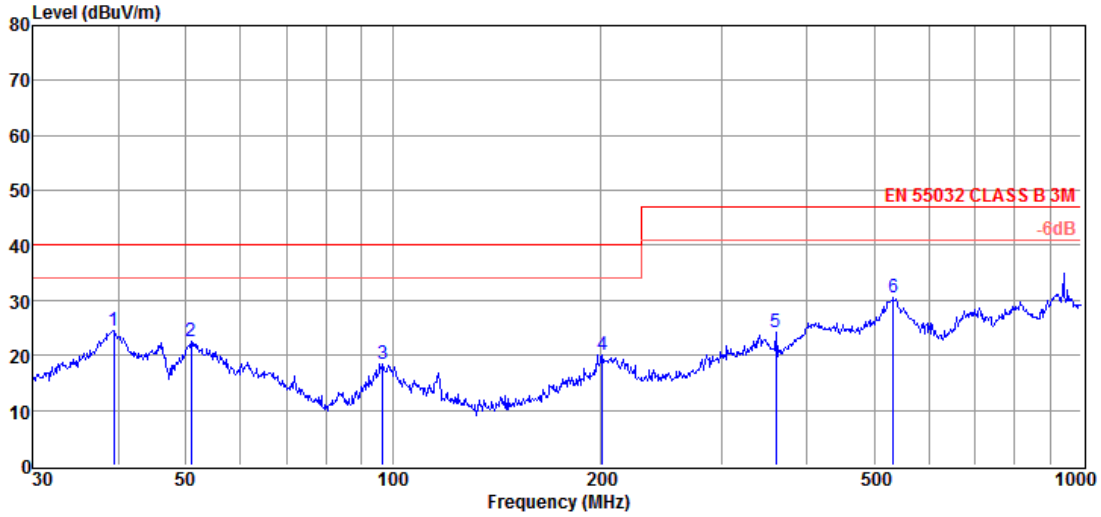


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	56.00	34.81	12.73	26.35	1.59	22.78	40.00	-17.22	Peak	HORIZONTAL
2	68.15	36.36	10.13	26.31	1.76	21.94	40.00	-18.06	Peak	HORIZONTAL
3	140.34	43.37	8.32	26.22	2.58	28.05	40.00	-11.95	Peak	HORIZONTAL
4	216.02	36.82	13.05	26.22	3.21	26.86	40.00	-13.14	Peak	HORIZONTAL
5	315.48	34.02	15.61	26.30	3.93	27.26	47.00	-19.74	Peak	HORIZONTAL
6	463.97	35.76	18.86	26.93	4.83	32.52	47.00	-14.48	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 3
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		

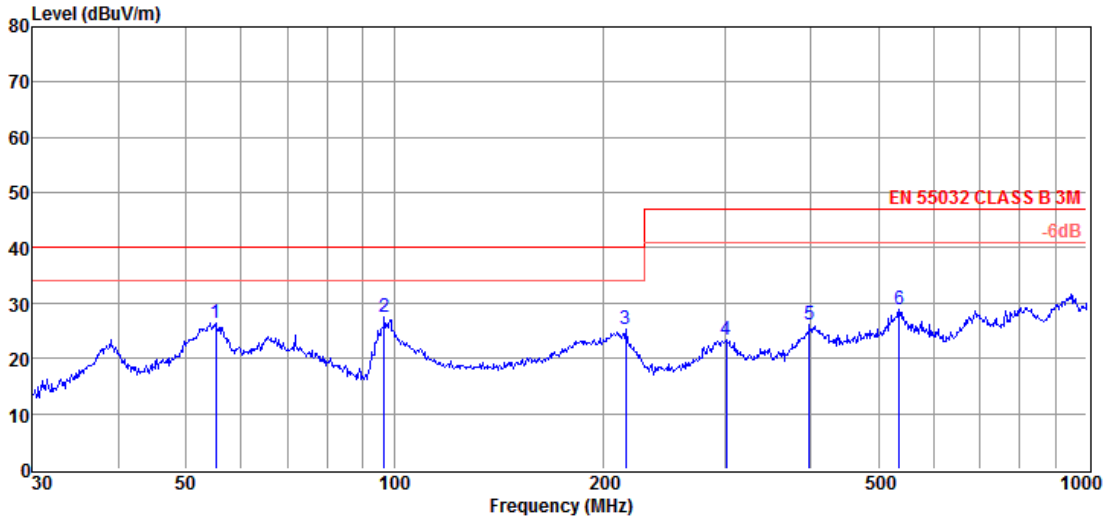


Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	39.30	37.09	12.43	26.39	1.32	24.45	40.00	-15.55	Peak	VERTICAL
2	50.94	33.85	13.46	26.37	1.51	22.45	40.00	-17.55	Peak	VERTICAL
3	96.78	31.36	11.27	26.23	2.10	18.50	40.00	-21.50	Peak	VERTICAL
4	201.39	30.54	12.73	26.22	3.09	20.14	40.00	-19.86	Peak	VERTICAL
5	360.45	31.34	15.26	26.52	4.22	24.30	47.00	-22.70	Peak	VERTICAL
6	533.83	32.93	19.57	27.08	5.21	30.63	47.00	-16.37	Peak	VERTICAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

Radiated Emission Test Result

Test Site	: 966 Chamber	F:\Test Data.EM6	
Test Date	: 2018-04-12	**Tested By**	: Sam
EUT	: Car Charger	**Model Number**	: GT680
Power Supply	: DC 24V	**Test Mode**	: Model 3
Condition	: Temp:25℃,Humi:55%	**Antenna/Distance**	: VULB9163-1/3m
Memo	:		



Item (Mark)	Freq (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	55.22	38.41	12.84	26.35	1.58	26.48	40.00	-13.52	Peak	HORIZONTAL
2	96.78	40.27	11.27	26.23	2.10	27.41	40.00	-12.59	Peak	HORIZONTAL
3	216.02	35.19	13.05	26.22	3.21	25.23	40.00	-14.77	Peak	HORIZONTAL
4	301.42	29.60	16.05	26.23	3.83	23.25	47.00	-23.75	Peak	HORIZONTAL
5	397.63	30.96	17.47	26.68	4.44	26.19	47.00	-20.81	Peak	HORIZONTAL
6	535.71	31.04	19.57	27.08	5.22	28.75	47.00	-18.25	Peak	HORIZONTAL

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- PRM Factor
2. If PK Result complies with QP limit, QP Result is deemed to comply with QP limit
3.RBW 120KHz

4. IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	Test Specification	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC/EN 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B	PASS
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B	PASS
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure	A	PASS
3. EFT/Burst IEC/EN 61000-4-4	1.0KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	AC Power Port	B	N/A
	0.5 KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port	B	N/A
4. Surges IEC/EN 61000-4-5	1 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-N	B	N/A
	2 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-PE N-PE	B	N/A
5 Injected Current IEC/EN 61000-4-6	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A	N/A
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	AC Power Port	A	N/A
	0.15 MHz to 80 MHz 3V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	DC Power Port	A	N/A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz, 1A/m	Enclosure	A	N/A
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage dip＞95% / 30% Interruption＞95%	AC Power Port	B / C C See Remark(2)	N/A

* Remark:

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

(2) Voltage dip: ＞95% reduction – Performance Criteria **B**
Voltage dip: 30% reduction – Performance Criteria **C**
Voltage Interruption: ＞95% reduction – Performance Criteria **C**

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN55024:2010+A1:2015** 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 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 phenomenon 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 if stored data allowed to persist after the test. 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 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 **3.1.6** 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:	Contact and Air
Discharge Period:	1 second minimum

4.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Simulator	Prima	ESD61002B	PR13012530	2018-06-15

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.4.3 TEST PROCEDURE

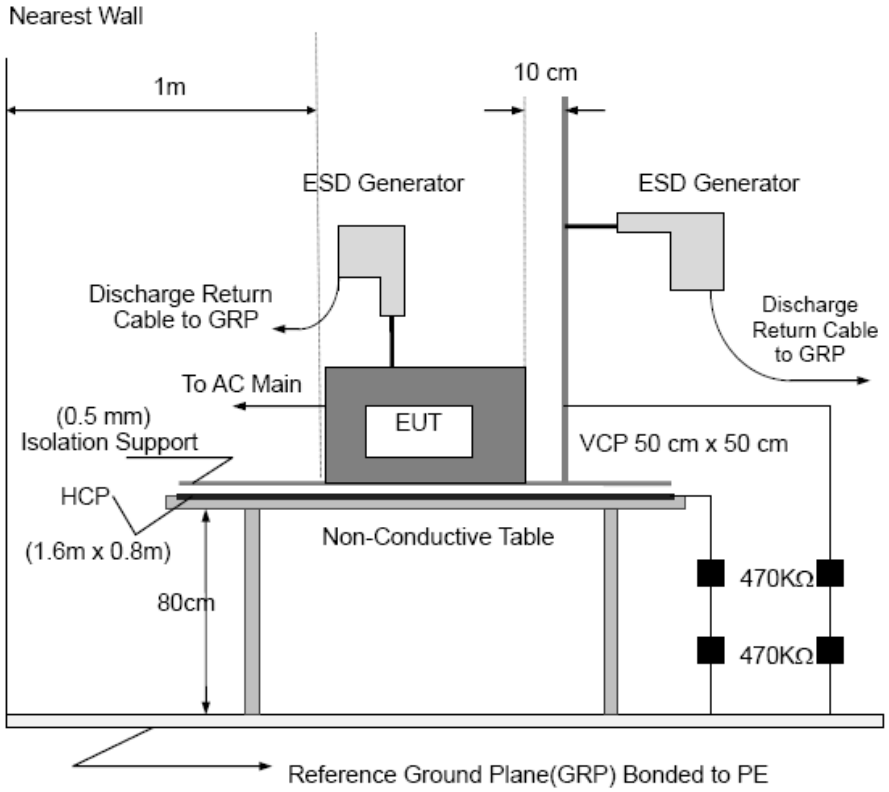
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 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 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.4.6 TEST RESULTS

Mode	Air Discharge								Contact Discharge							
	2KV		4KV		8KV		12KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	--	--	A	A	B	B	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	A	A	B	B	--	--	--	--
3	-	--	--	--	--	--	--	--	A	A	A	A	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	--	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--
9	--	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--
Criteria	**B**								**B**							
Result	**B**								**B**							
Judgment	**PASS**								**PASS**							

Mode	HCP Discharge								VCP Discharge							
	2KV		4KV		6KV		8KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	-	--	A	A	--	--	--	--	-	--	A	A	--	--	--	--
2	--	--	A	A	--	--	--	--	--	--	A	A	--	--	--	--
3	--	--	A	A	-	--	--	--	--	--	A	A	-	--	--	--
4	-	--	A	A	--	--	--	--	-	--	A	A	--	--	--	--
Criteria	**B**								**B**							
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) Test condition:
   Direct discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges / Indirect (HCP/VCP): Minimum 20 times (Positive/Negative) at each point.
3) Test location(s) in which discharge (Air and contact discharge) to be described as following
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
7) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

Test location description:

No	Description		No	Description
1	Slot	2 points	4	
2	Output Port	3 Points	5	
3	Metal	2 points	6	

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
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 MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Aglilet	N517113-50B	MY53050160	2018-10-09
Amplifier	A&R	150W1000M3	313157	2018-10-09
Amplifier	A&R	50SIG6M2	0342835	2018-10-09
Log-periodic Antenna	SCHWARZBECK	STLP 9128E	9128E-012	2019-02-06
Microwave log-periodic antenna	SCHWARZBECK	STLP 9149	9149.222	2018-12-14
Isotropic Field Probe	A&R	FL700	0342652	2018-09-10
10 meter anechoic chamber	Albatross	10m	/	2020-06-26

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.5.3 TEST PROCEDURE

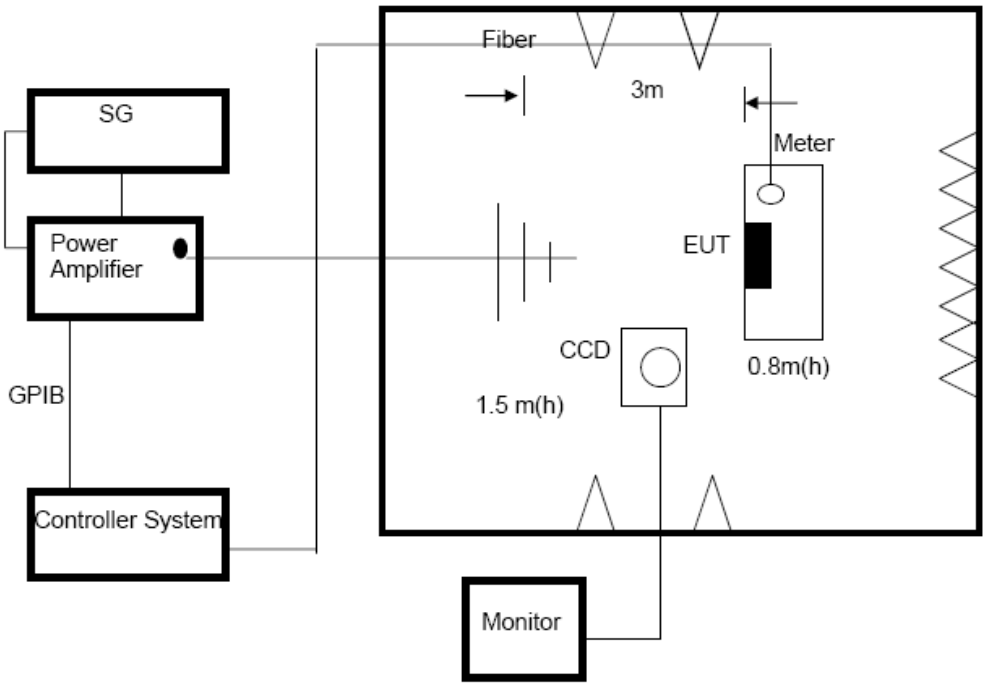
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
The testing distance from antenna to the EUT was 3 meters.
The other condition as following manner:

a. The field strength level was 3V/m.
b. The frequency range is swept from 80 MHz to 1000 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.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 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.

4.5.6 TEST RESULTS

Frequency Range (MHz)	Polarity of Antenna	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	**A**	**A**	**PASS**
			Rear			
			Left			
			Right			

Note:

1) H/V denotes the Horizontal/Vertical polarity of Antenna.
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.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	B
Test Voltage:	Power Line：±1 kV
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.

4.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Electrical Intelligent Transient Generator	Everfine	EMS61000-4B	G114921CA1341115	2018-06-19

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.6.3 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.

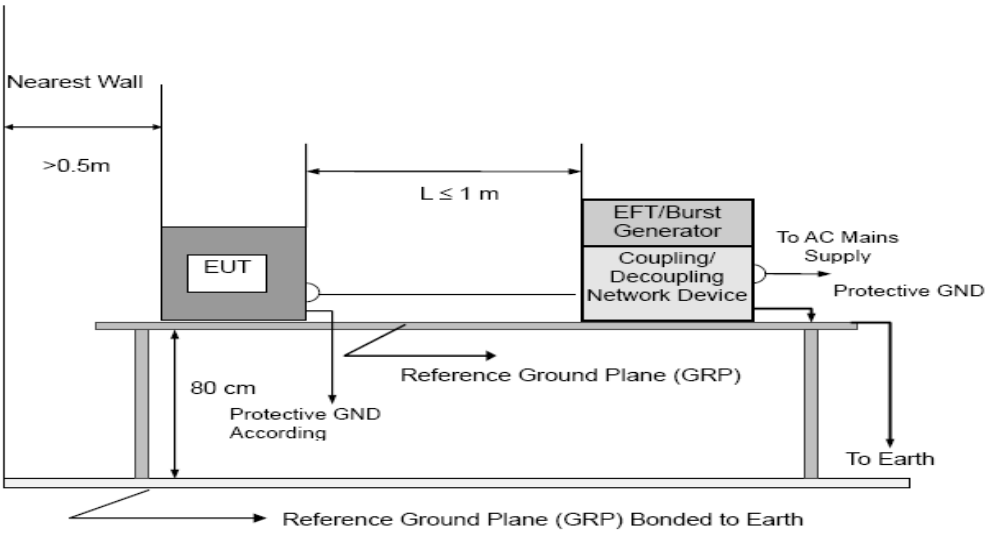
c. The duration time of each test sequential was 1 minute

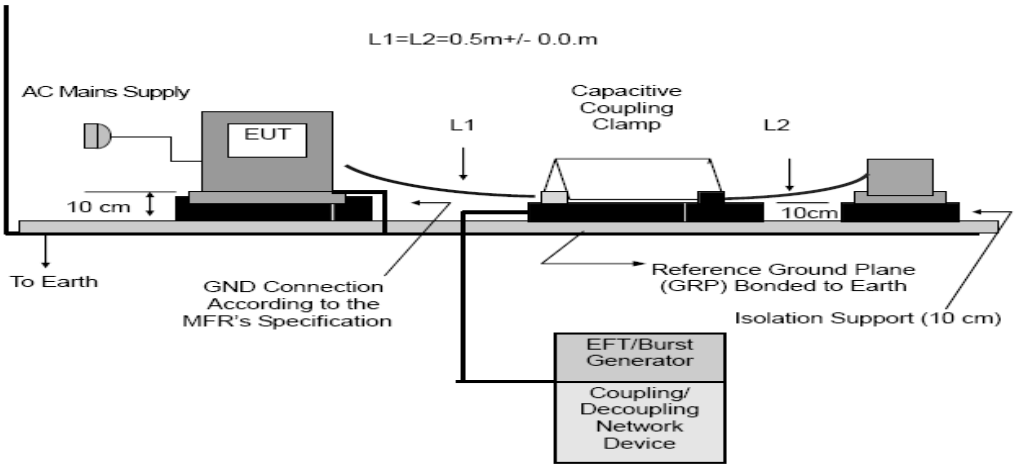
d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 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.

4.6.6 TEST RESULTS

No applicable to the DC product.

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:	L-N, L-PE, N-PE
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 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	Prima	SUG61005CX	PR13065597	2018-06-11

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.7.3 TEST PROCEDURE

a. For EUT:

The surge is to be applied to the 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:

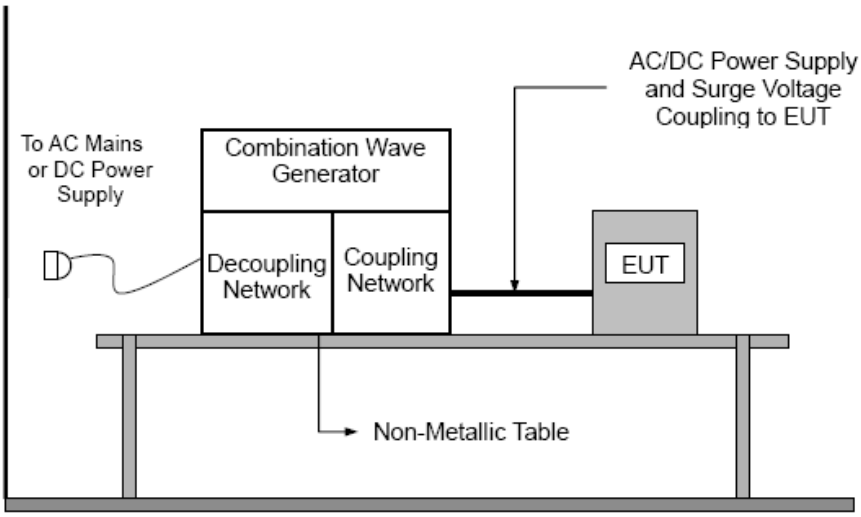
The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

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

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 TEST RESULTS

No applicable to the DC product.

4.8 INJECTION CURRENT TESTING

4.8.1 TEST SPECIFICATION

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

4.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10	102D1253	2018-10-10
2	CDN	FRANKONIA	CDN M2+M3	A3011059	2018-10-10
3	Electromagnetic clamp	FRANKONIA	KEMZ-801	21044	2018-10-10

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.8.3 TEST PROCEDURE

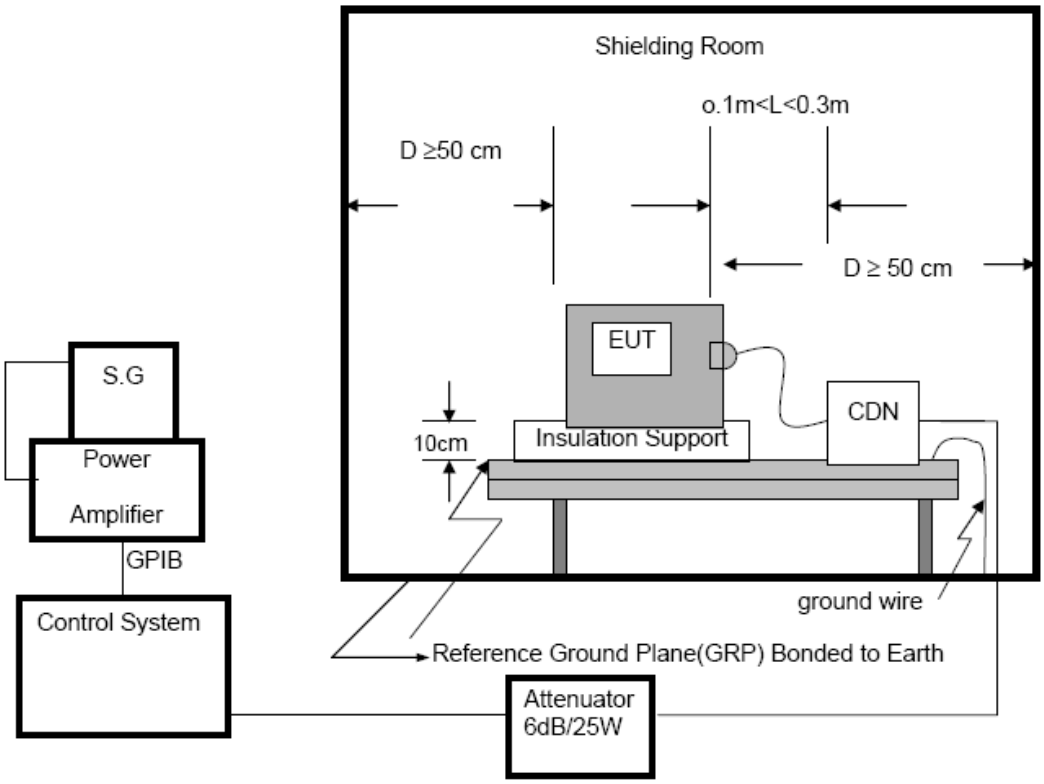
The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.
The other condition as following manner:

a. The field strength level was 3V.
b. 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.
c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 TEST SETUP



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

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.

4.8.6 TEST RESULTS

No applicable to the DC product.

4.9 VOLTAGE INTERRUPTION/DIPS TESTING

4.9.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance**:**	B (For >95% Voltage Dips) C (For 30% Voltage Dips) C (For >95% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°
Test Cycle:	3 times

4.9.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Voltage Dips And Interruptions Generator	Everfine	EMS61000-11K	G113317CA8341117	2018-06-11

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

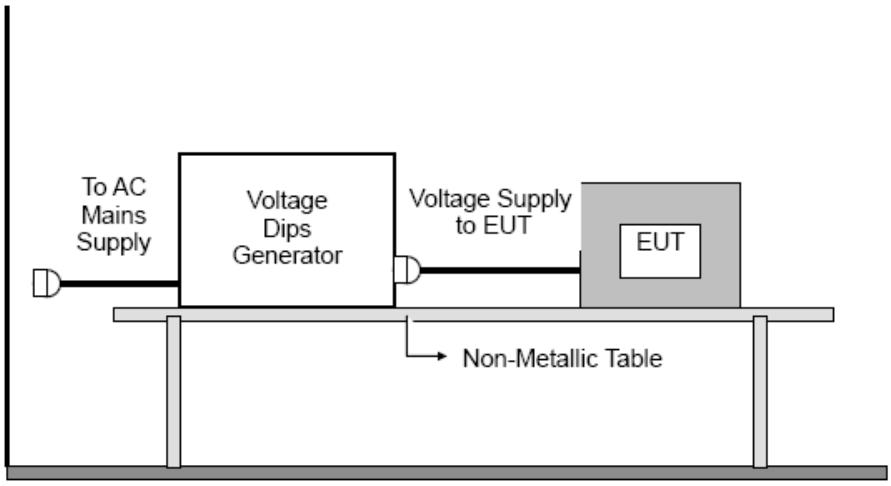
4.9.3 TEST PROCEDURE

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.

4.9.4 DEVIATION FROM TEST STANDARD

No deviation

4.9.5 TEST SETUP



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

4.9.6 TEST RESULTS

No applicable to the DC product.

4.10 POWER-FREQUENCY MAGNETIC FILDS

4.10.1 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic Field Tester	EMC-PARTNER	MF1000-1	121	2018-10-10

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.10.2 TEST LEVEL AND PERFORMANCE CRITERION

Level	Magnetic Field Strength A/m	Performance criterion
1	1	A

Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended

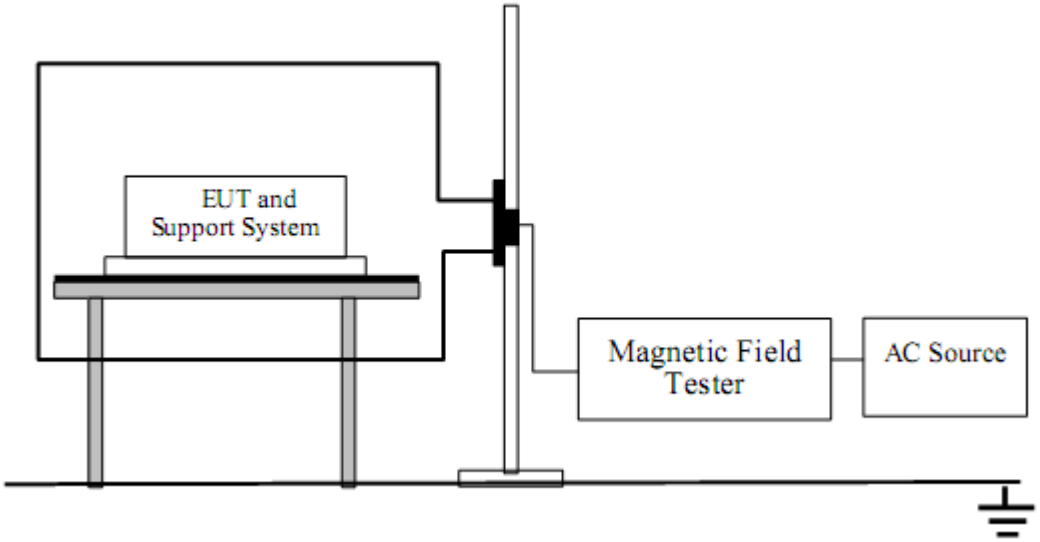
4.10.3 TEST PROCEDURE

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 13.3 The induction coil shall then be rotated by 90 ein order to expose the EUT to the test field with different orientations. .

4.10.4 DEVIATION FROM TEST STANDARD

No deviation

4.10.5 TEST SETUP



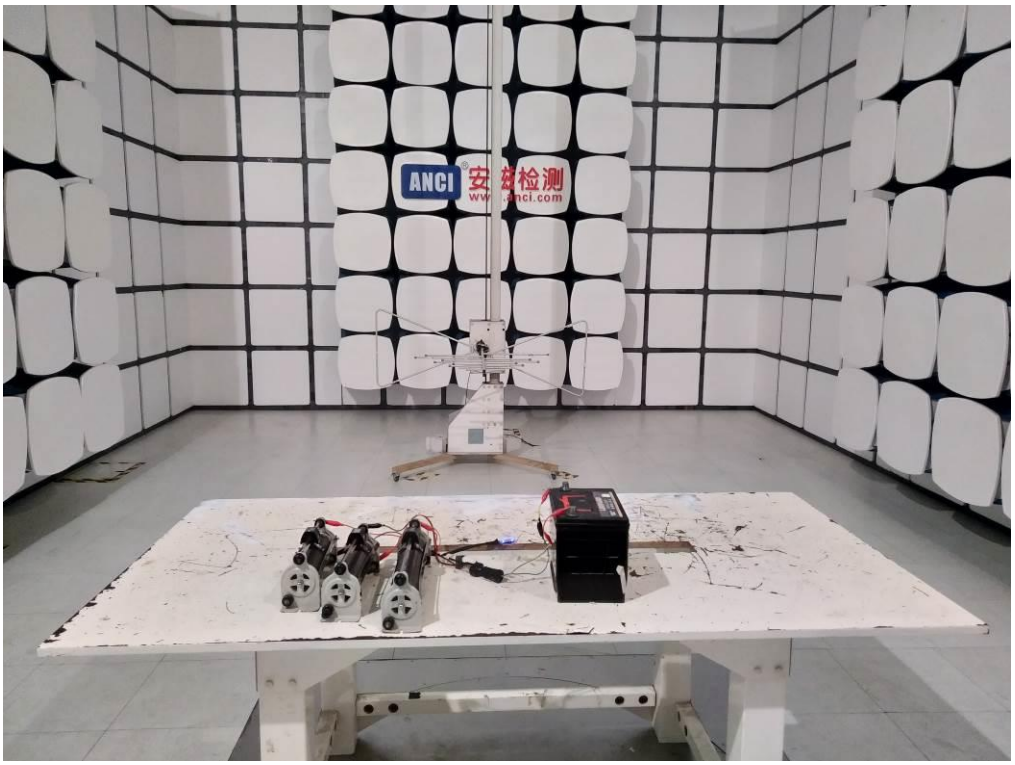
4.10.6 TEST RESULTS

N/A

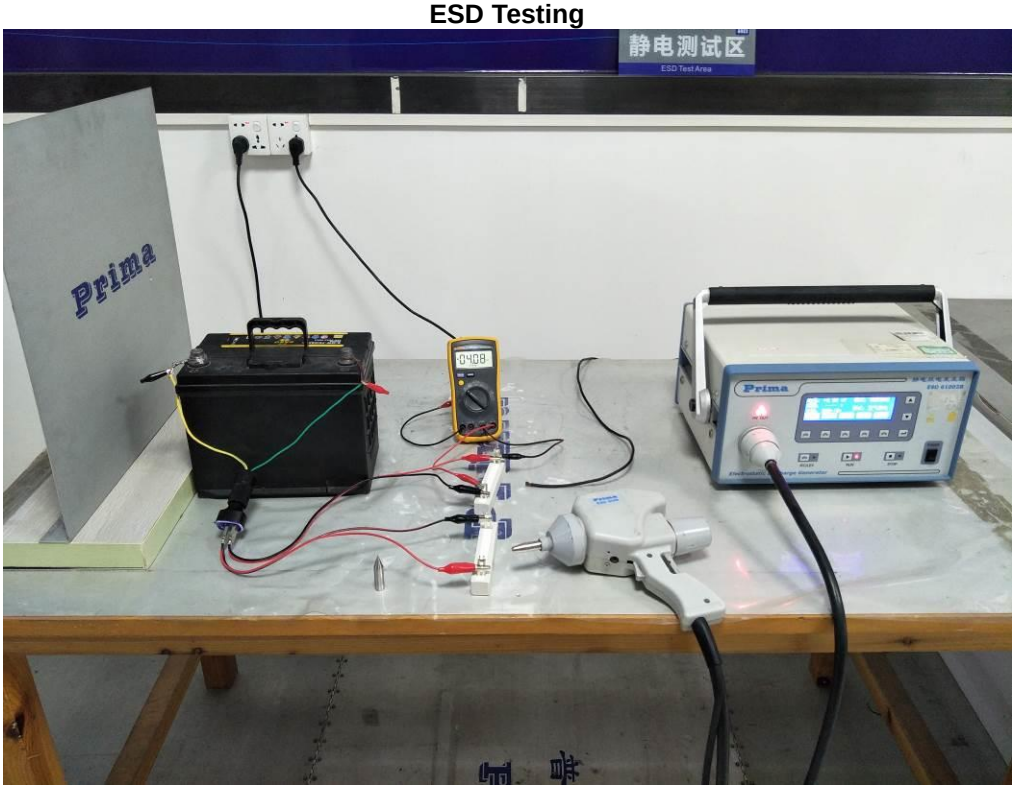
5. ATTACHMENT

5.1 EUT TEST PHOTO

Radiated Measurement Photo



ESD Testing



5.2 EUT PHOTO

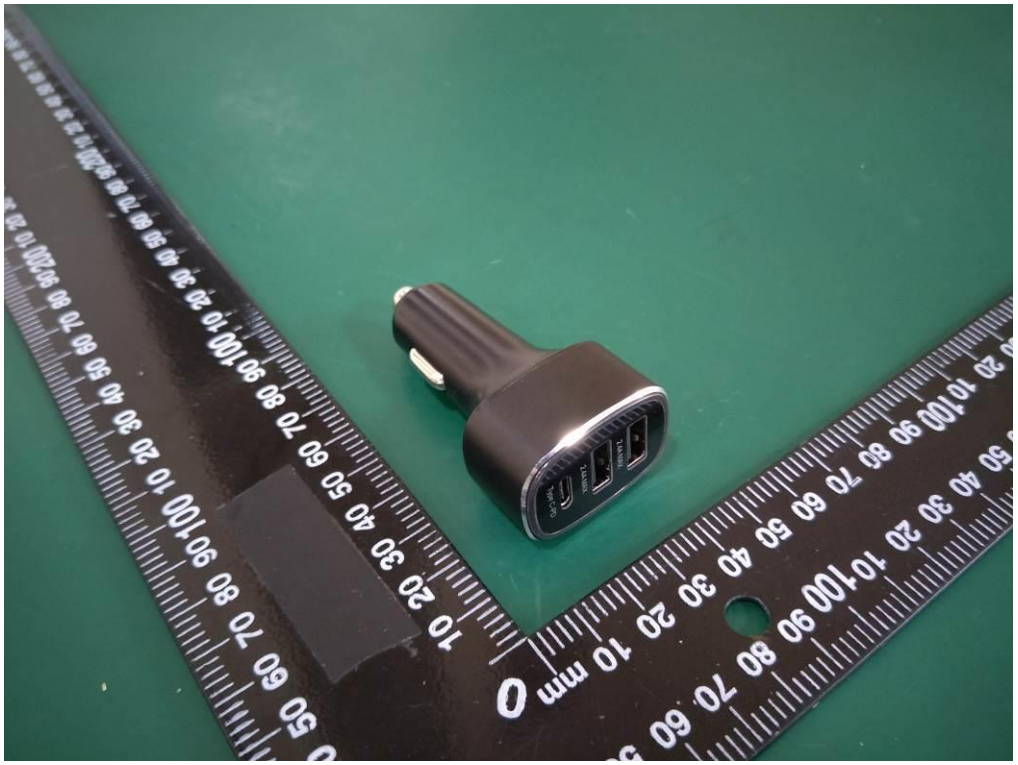


Figure 1.Overall view of unit

Figure 2.Overall view of unit

Figure 3.Inside view of unit

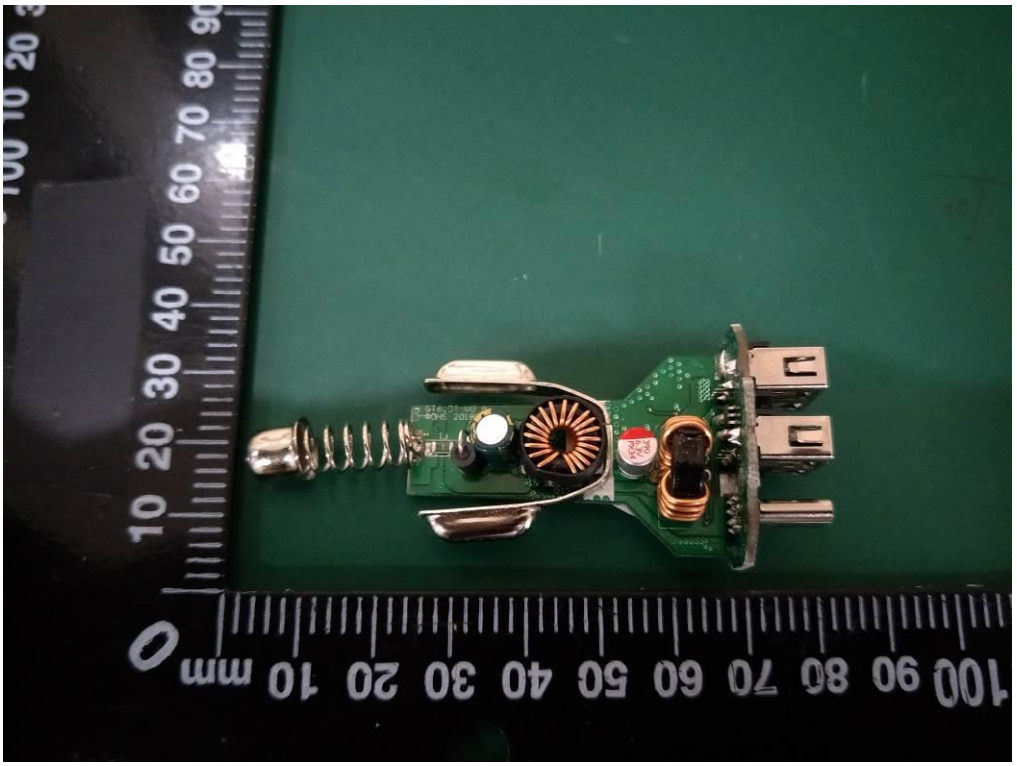


Figure 4.View of PCB

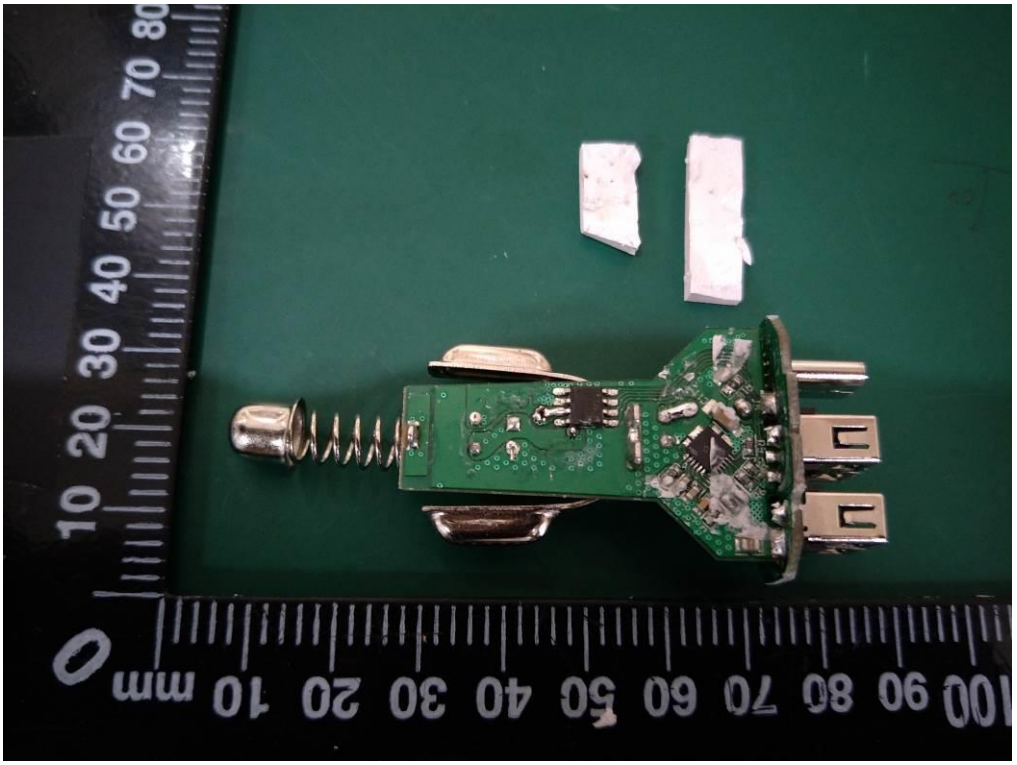


Figure 5.View of PCB