TEST REPORT

SABS	Application Number:002020 Page (1) / (63) Pages

1	Test Report No.		KST755O2009757Q			
2	Applicant	· Name	GlobTek,Inc.			
		· Address	186 Veterans Dr. Northvale, NJ 07647 USA			
		· Contact Person	Mike Krakovyak			
		· Telephone No	(201)784-1000 x106	· Fax No	N/A	
3	Manufacturer	▪ Name	GlobTek,Inc.			
		▪ Address	186 Veterans Dr. Northvale, NJ 07647 USA			
		▪ Telephone No	(201)784-1000 x106			
4	Factory	▪ Name	GlobTek (Suzhou) Co., Ltd.			
		▪ Address	Building 4 No. 76, Jinling East Road Suzhou Industrial Park Jiangsu 215021, P.R. China.			
5	Use of Report		☆**SANS 2332:2017 /CISPR 32:2015** ☆**SANS 2335:2018 /CISPR 35:2016**			
6	Kind of Product		DC/DC CONVERTER			
7	Model Name		GTD93035L6013.2-F			
8	Variant Model		GTD93035H6013.2-F			
9	Trade Name		GlobTek, Inc.			
10	Receipt date		Sep 10, 2020			
11	Test Period		Sep 20, 2020 to Nov 11, 2020			
12	Issue Date		Nov 17, 2020			
13	Test Standard(method) used		☆**SANS 2332:2017 /CISPR 32:2015** ☆**SANS 2335:2018/CISPR 35:2016**			
14	Test Results		Compliance			

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
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Conformation	Tested by	Approved by
	Bing.He/EMC Test Engineer	Jack.Li/EMC Supervisor

KeySen Testing Certification International Co., Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No

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1.0 General Product Description

1.0.1 Product Specification

No.	ITEM	APPLICATION
1	Test Sample	DC/DC CONVERTER
2	Model	GTD93035L6013.2-F
3	Variant Model/Type No.	GTD93035H6013.2-F
4	Application Number	002020
5	Dimensions (W x L x H)	100mm x 191mm x 55mm
6	Maximum Clock Frequency	＜108MHz
7	S/N	RoHS000158142/08

1.0.2 Electrical Ratings

Model: GTD93035L6013.2-F

Input: 9V – 60Vdc ,9.0A Output:13.2Vdc,4.54A

Model: GTD93035H6013.2-F

Input: 50V – 150Vdc ,2.0A Output:13.2Vdc,4.54A

1.0.3 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Power supply voltage	☐ 230V/50 Hz / 1ϕ	☐ 115V/60Hz / 1ϕ
	☐ 400V/50 Hz 3PE	☐ 400V/50 Hz 3NPE
	■ 9V DC	■ 60 V DC
	■ 50V DC	■ 150 V DC

Remark:

In Emission test, a pre-test shall be made over a range of 9V,50V,60V,150V the rated voltage in order to check the level of disturbance varies considerably with the supply voltage, compliance test at 60V and 150V as worse case was found.

1.1 Model Differences

See section 1.3 of the report for details

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 Difference Table between Basic Model and Variant Models

Model Name		Different Items
GTD93035L6013.2-F	Basic model	
GTD93035H6013.2-F	Variant model	All is the same except model name and input voltage

1.4 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Model No	Serial No.	Manufacturer
Load	10Ω 10A	/	/

☒ Cable Description

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]

* Shielded or Unshielded：Unshielded=U, Shielded=S

1.5 Test Software

EZ-EMC/CTS4/RS/CS/LSS-6230/Vds-2002-Rs

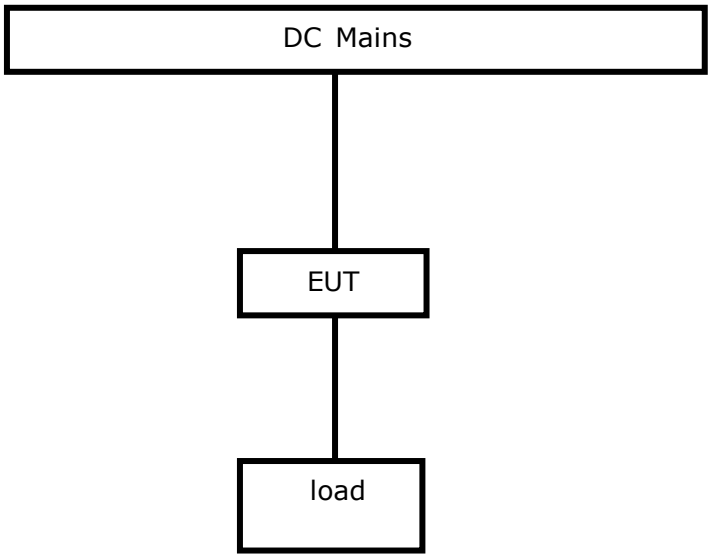
1.6 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

Operating Mode	Function	Test Item
1	Full load	Article 3.0/Article 4.0

After the preliminary scan, The worst case data was selected and recorded in this report.

1.7 Configuration



1.8 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable, therefore, all test data recorded in this report is traceable.

1.9 Test Facility

The measurement facility is KeySense Testing& Certification International Co., Ltd.
Address:1-3/F Lab Building, No. 29 District, Zhongkai Hi-Tech Industrial Development Park, Huizhou, Guangdong,China
The sites are constructed in conformance with the requirements of CISPR 16-1-4.

1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	CNAS Logo	Laboratory Logo
China	CNAS	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	CNAS L9678		

1.11 Measurement Uncertainty(95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in shielding room	2.50dB(150kHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	4.14dB(30M~1GHz,Polarize:V)
	4.25dB(30M~1GHz,Polarize:H)
Uncertainty for Radiation Emission test in 10m chamber	4.10dB(30M~1GHz,Polarize:V)
	4.00dB(30M~1GHz,Polarize:H)

2.0 EMC Test Regulations/Standards

The tests were performed according to following regulations:

EMC –SANS 2332:2017 /CISPR 32:2015/SANS 2335:2018/CISPR 35:2016

2.1 Emission/ImmunityTest Regulations/Standards

SANS 2332:2017 /CISPR 32:2015/SANS 2335:2018/CISPR 35:2016

INFORMATION TECHNOLOGY EQUIPMENT –RADIO DISTURBANCE CHARACTERISTICS –LIMITS AND METHODS OF MEASUREMENT.
INFORMATION TECHNOLOGY EQUIPMENT –RADIO IMMUNITY CHARACTERISTICS –LIMITS AND METHODS OF MEASUREMENT.

2.2 Purpose of Test

To determine whether the equipment under test fulfils the EMC emission and immunity requirements of the standards.

2.3 Summary of Test Results

EMISSION(☆SANS 2332:2017 /CISPR 32:2015)		
Description of Test Item	Standard	Results
Conducted disturbance	**☆SANS 2332:2017 /CISPR 32:2015**	PASS
Radiated Disturbance	**☆SANS 2332:2017 /CISPR 32:2015**	PASS
Harmonic current emission	**☆SANS 61000-3-2:2009/IEC 61000-3-2:2014**	N/A
Voltage fluctuations &flicker	**☆SANS 61000-3-3:2009/IEC 61000-3-3:2013**	N/A
IMMUNITY(☆SANS 2335:2018/CISPR 35:2016)		
Description of Test Item	Basic Standard	Results
Electrostatic discharge	**☆SANS 61000-4-2:2009/IEC 61000-4-2:2008**	PASS
Radio-frequency Continuous radiated disturbance	**☆SANS 61000-4-3:2009/IEC 61000-4-3:2010**	PASS
Electrical fast transient	**☆SANS 61000-4-4:2011/IEC 61000-4-4:2012**	PASS
Surge	**☆SANS 61000-4-5:2006/IEC 61000-4-5:2014**	PASS
Radio-frequency Continuous conducted disturbance	**☆SANS 61000-4-6:2009/IEC 61000-4-6:2013**	PASS
Power frequency magnetic field	**☆SANS 61000-4-8:2009/IEC 61000-4-8:2009**	PASS
Voltage dips, >95% reduction	**☆SANS 61000-4-11:2005/IEC 61000-4-11:2004**	N/A
Voltage dips, 30% reduction		N/A
Voltage interruptions, >95%		N/A
N/A is an abbreviation for Not Applicable.		

3.0 Results of Individual Test

3.1 Conducted disturbance at the mains ports

3.1.1 Test Date

2020-11-03

3.1.2 Test Location

Shielding Room

3.1.3 Limits of mains terminal disturbance voltage

Table A.10– Requirements for conducted emissions from the AC mains power ports of Class A equipment

Frequency range [MHz]	Limits [dBµV]	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE 1 The lower limit shall apply at the transition frequencies. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

3.1.4 Test Procedure

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured. All of the interface cables were manipulated according to CISPR 32 requirements.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

3.1.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Receiver	ESR3	R&S	102054	2020-12-25	Yes
DC LISN	AN-100	Compliance Direction	8321003	2020-12-25	Yes
DC LISN	AN-100	Compliance Direction	8321004	2020-12-25	Yes

3.1.6 Test Software

EZ_EMC

3.1.7 Frequency Range of Measurement

150 kHz to 30 MHz

3.1.8 Instrument Setting

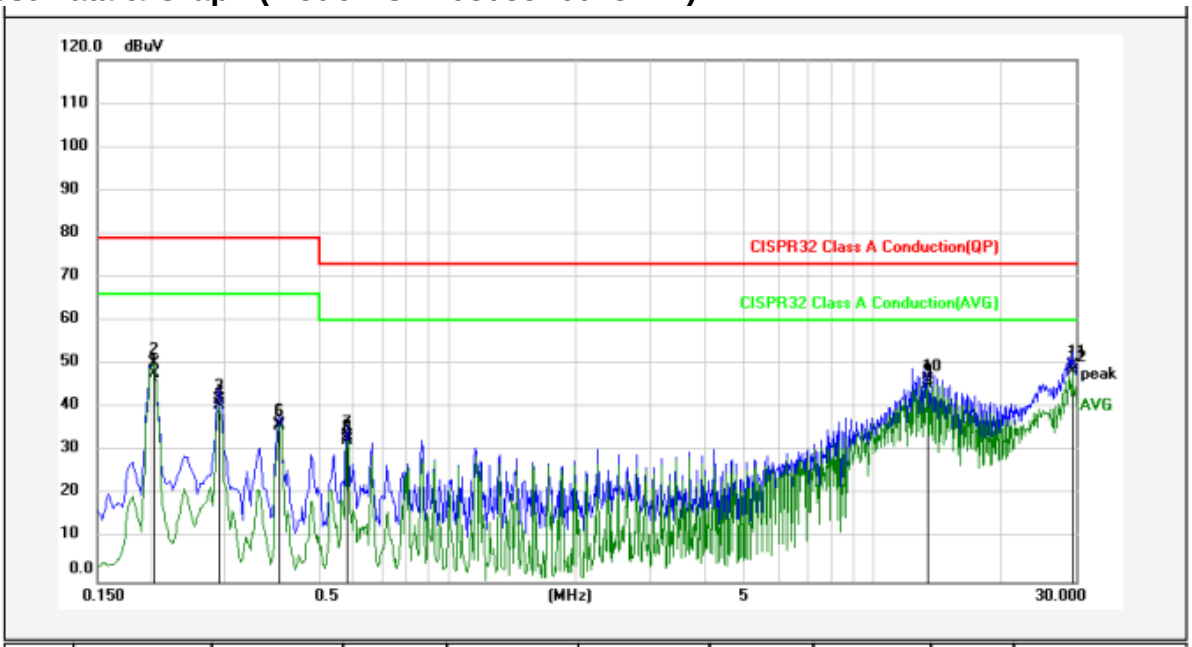
IF Band Width: 9 kHz

3.1.9 Climate Condition

Temperature: 23℃
Relative Humidity: 64%
Atmospheric Pressure: 1014Pa

■ Operating Mode 1 : Preview Line Positive

▪ Test Data & Graph (Model: GTD93035L6013.2-F)

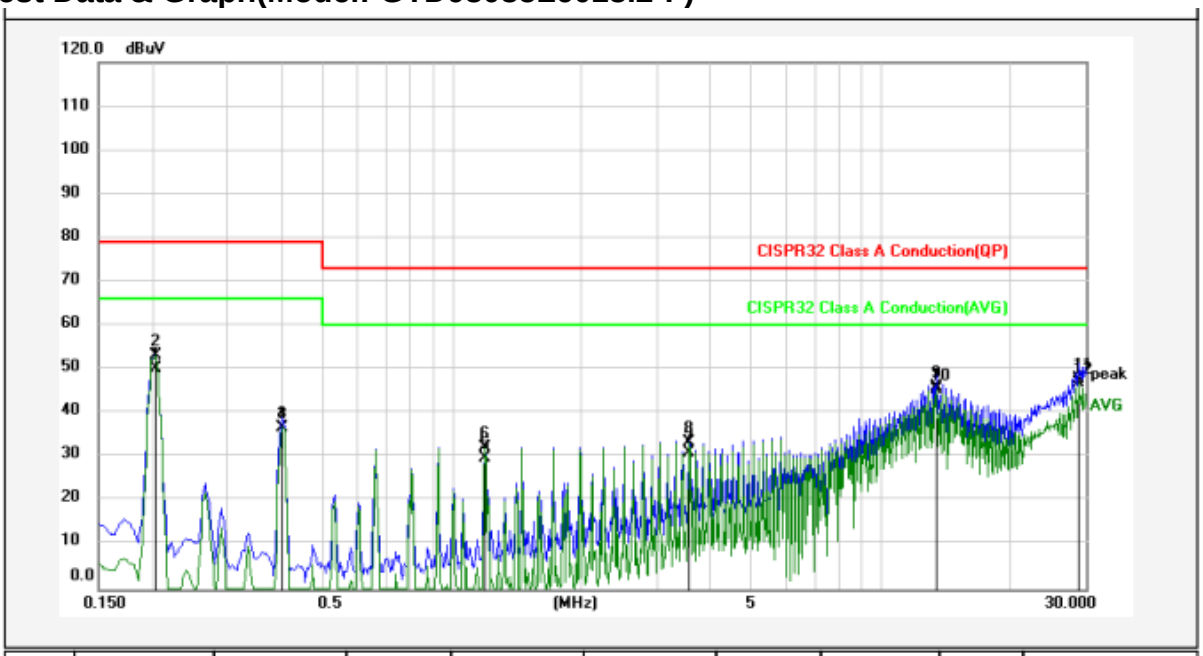


No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2040	47.97	-0.3	0.23	47.90	79.00	-31.10	QP	
2	0.2040	50.20	-0.3	0.23	50.13	66.00	-15.87	AVG	
3	0.2893	41.77	-0.21	0.24	41.80	79.00	-37.20	QP	
4	0.2893	40.72	-0.21	0.24	40.75	66.00	-25.25	AVG	
5	0.4017	35.76	-0.1	0.24	35.90	79.00	-43.10	QP	
6	0.4017	35.92	-0.1	0.24	36.06	66.00	-29.94	AVG	
7	0.5792	33.26	-0.1	0.24	33.40	73.00	-39.60	QP	
8	0.5792	32.44	-0.1	0.24	32.58	60.00	-27.42	AVG	
9	13.4792	45.39	-0.1	0.21	45.50	73.00	-27.50	QP	
10	13.4792	46.36	-0.1	0.21	46.47	60.00	-13.53	AVG	
11	29.5125	49.78	-0.2	0.22	49.80	73.00	-23.20	QP	
12	29.5125	48.56	-0.2	0.22	48.58	60.00	-11.42	AVG	

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detctor is unnecessary.

■ Operating Mode 1 : Preview Line Negative

▪ Test Data & Graph(Model: GTD93035L6013.2-F)

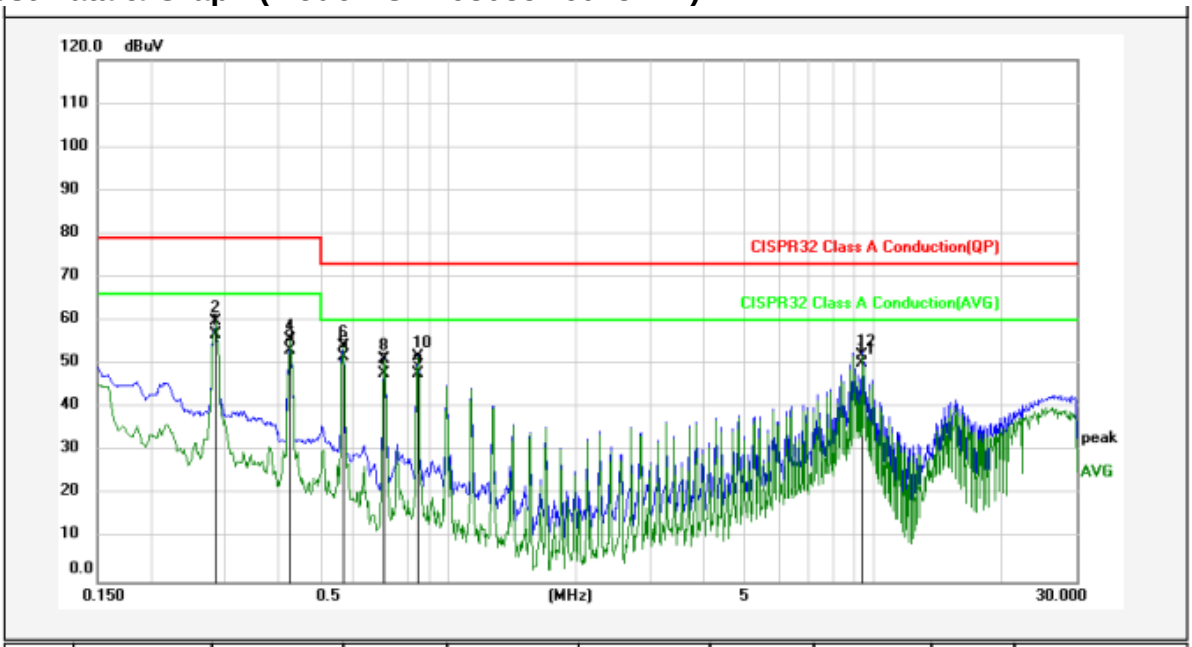


No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2040	50.27	-0.3	0.23	50.20	79.00	-28.80	QP	
2	0.2040	53.35	-0.3	0.23	53.28	66.00	-12.72	AVG	
3	0.4020	36.66	-0.1	0.24	36.80	79.00	-42.20	QP	
4	0.4020	36.62	-0.1	0.24	36.76	66.00	-29.24	AVG	
5	1.1907	29.68	-0.1	0.22	29.80	73.00	-43.20	QP	
6	1.1907	31.99	-0.1	0.22	32.11	60.00	-27.89	AVG	
7	3.5653	31.09	-0.1	0.21	31.20	73.00	-41.80	QP	
8	3.5653	33.37	-0.1	0.21	33.48	60.00	-26.52	AVG	
9	13.5420	45.89	-0.1	0.21	46.00	73.00	-27.00	QP	
10	13.5420	45.29	-0.1	0.21	45.40	60.00	-14.60	AVG	
11	28.9050	47.78	-0.2	0.22	47.80	73.00	-25.20	QP	
12	28.9050	46.84	-0.2	0.22	46.86	60.00	-13.14	AVG	

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detctor is unnecessary.

■ Operating Mode 1 : Preview Line Positive

▪ Test Data & Graph (Model: GTD93035H6013.2-F)

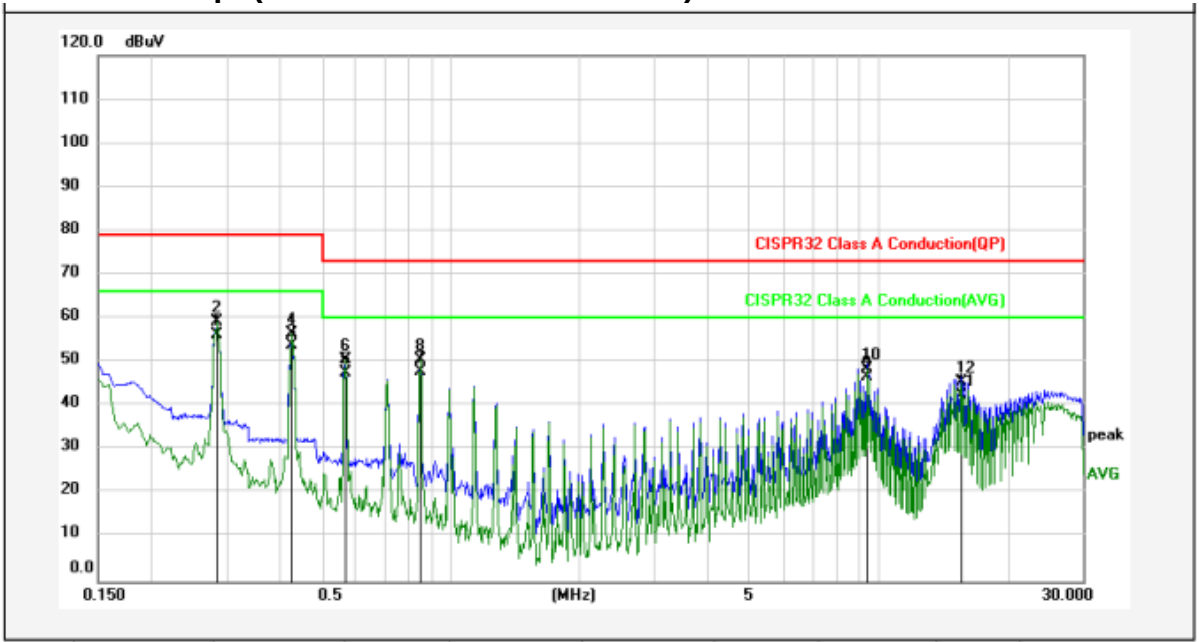


No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2847	56.78	-0.22	0.24	56.80	79.00	-22.20	QP	
2	0.2847	59.82	-0.22	0.24	59.84	66.00	-6.16	AVG	
3	0.4237	53.06	-0.1	0.24	53.20	79.00	-25.80	QP	
4	0.4237	55.38	-0.1	0.24	55.52	66.00	-10.48	AVG	
5	0.5670	51.66	-0.1	0.24	51.80	73.00	-21.20	QP	
6	0.5670	53.96	-0.1	0.24	54.10	60.00	-5.90	AVG	
7	0.7046	47.77	-0.1	0.23	47.90	73.00	-25.10	QP	
8	0.7046	51.14	-0.1	0.23	51.27	60.00	-8.73	AVG	
9	0.8483	47.87	-0.1	0.23	48.00	73.00	-25.00	QP	
10	0.8483	51.76	-0.1	0.23	51.89	60.00	-8.11	AVG	
11	9.3518	50.08	-0.1	0.22	50.20	73.00	-22.80	QP	
12	9.3518	51.83	-0.1	0.22	51.95	60.00	-8.05	AVG	

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detctor is unnecessary.

■ Operating Mode 1 : Preview Line Negative

▪ Test Data & Graph(Model: GTD93035H6013.2-F)



No.	Frequency (MHz)	Reading (dBuV)	Lisn/Isn (dB)	Cab_L (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2847	56.18	-0.22	0.24	56.20	79.00	-22.80	QP	
2	0.2847	59.18	-0.22	0.24	59.20	66.00	-6.80	AVG	
3	0.4237	53.66	-0.1	0.24	53.80	79.00	-25.20	QP	
4	0.4237	56.33	-0.1	0.24	56.47	66.00	-9.53	AVG	
5	0.5670	47.36	-0.1	0.24	47.50	73.00	-25.50	QP	
6	0.5670	50.33	-0.1	0.24	50.47	60.00	-9.53	AVG	
7	0.8483	47.67	-0.1	0.23	47.80	73.00	-25.20	QP	
8	0.8483	50.46	-0.1	0.23	50.59	60.00	-9.41	AVG	
9	9.3518	46.68	-0.1	0.22	46.80	73.00	-26.20	QP	
10	9.3518	48.36	-0.1	0.22	48.48	60.00	-11.52	AVG	
11	15.5523	42.30	-0.11	0.21	42.40	73.00	-30.60	QP	
12	15.5523	45.21	-0.11	0.21	45.31	60.00	-14.69	AVG	

Remarks: 1. Result=Reading+Lisn+Cab_L
2. If the average limit is met when using a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detctor is unnecessary.

3.2 Radiated Disturbance

3.2.1 Test Date
2020-09-23

3.2.2 Test Location
10m Chamber(Test Distance: 3m)

3.2.3 Limits for radiated disturbance

Table A.4 – Limits Requirements for radiated emissions at frequencies up to 1 GHz for class A equipment

Frequency range [MHz]	Distance	Quasi-peak Limits [dBμV/m]
30 to 230	3m	50
230 to 1000	3m	57

3.2.4 Test Procedure
The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of 3 meter chamber. Desktop EUT are set up on a wooden stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.
All of the interface cables were manipulated according to CISPR 32 requirements.

3.2.5 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Receiver	ESR3	R&S	102055	2020-12-25	Yes
Trilog-boardband antenna	VULB 9163 D	Schwarzbeck	9163-961	2022-05-08	Yes

3.2.6 Test Software

EZ_EMC

3.2.7 Frequency Range of Measurement

30 MHz to 1 GHz

3.2.8 Instrument Setting

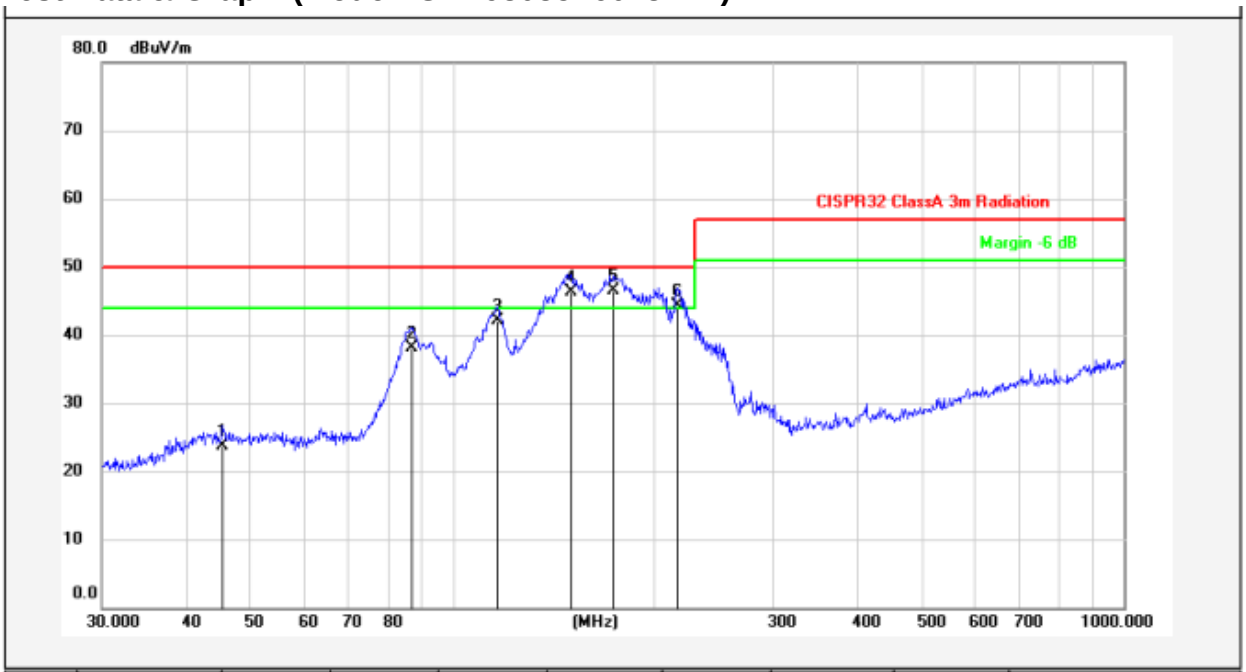
IF Band Width: 120 kHz

3.2.9 Climate Condition

Temperature: 20℃
Relative Humidity: 60%
Atmospheric Pressure: 1015Pa

■ Operating Mode 1 : Horizontal

▪ Test Data & Graph (Model: GTD93035L6013.2-F)

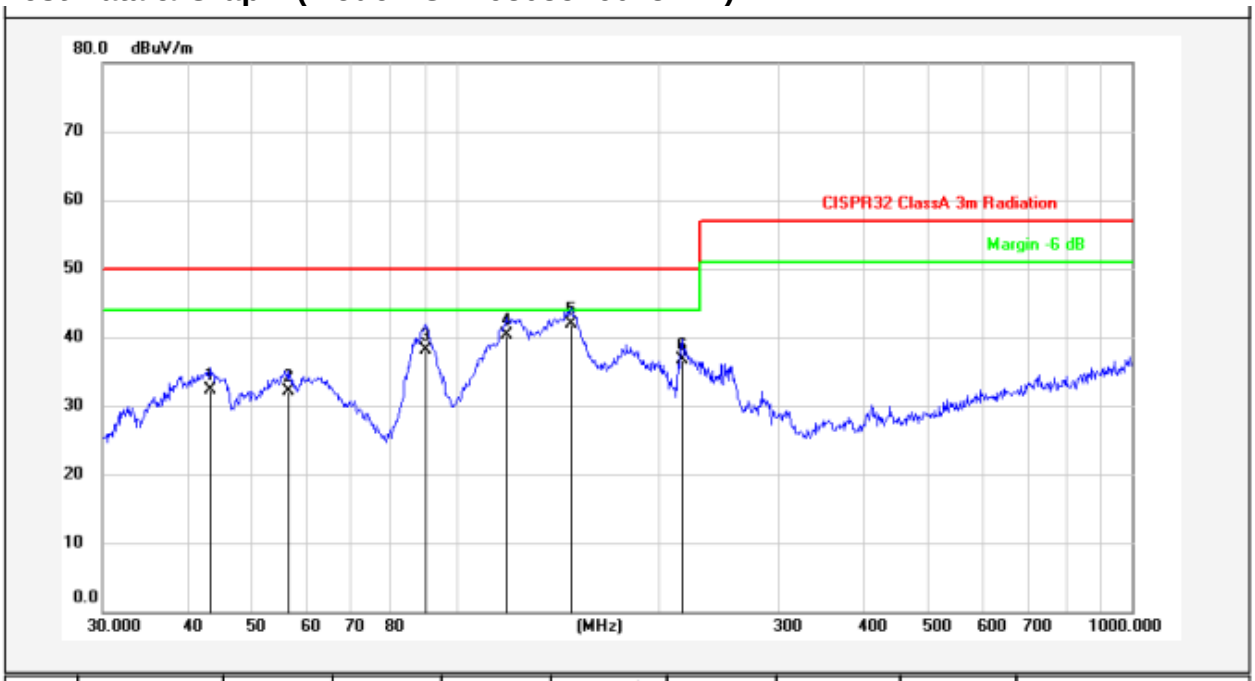


No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	45.3755	8.54	14.45	0.81	23.80	50.00	-26.20	QP	
2	86.8068	27.33	9.73	1.14	38.20	50.00	-11.80	QP	
3	116.5401	29.90	11.06	1.24	42.20	50.00	-7.80	QP	
4	150.0108	36.41	8.44	1.45	46.30	50.00	-3.70	QP	
5	173.8135	35.68	9.27	1.55	46.50	50.00	-3.50	QP	
6	216.0240	31.47	11.12	1.81	44.40	50.00	-5.60	QP	

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

■ Operating Mode 1 : Vertical

▪ Test Data & Graph (Model: GTD93035L6013.2-F)



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	43.3534	17.14	14.35	0.81	32.30	50.00	-17.70	QP	
2	56.3947	17.58	13.64	0.88	32.10	50.00	-17.90	QP	
3	90.2205	26.34	10.69	1.17	38.20	50.00	-11.80	QP	
4	118.6014	28.38	10.68	1.24	40.30	50.00	-9.70	QP	
5	147.9214	32.08	8.39	1.43	41.90	50.00	-8.10	QP	
6	216.0240	23.87	11.12	1.81	36.80	50.00	-13.20	QP	

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

Operating Mode 1 : Horizontal

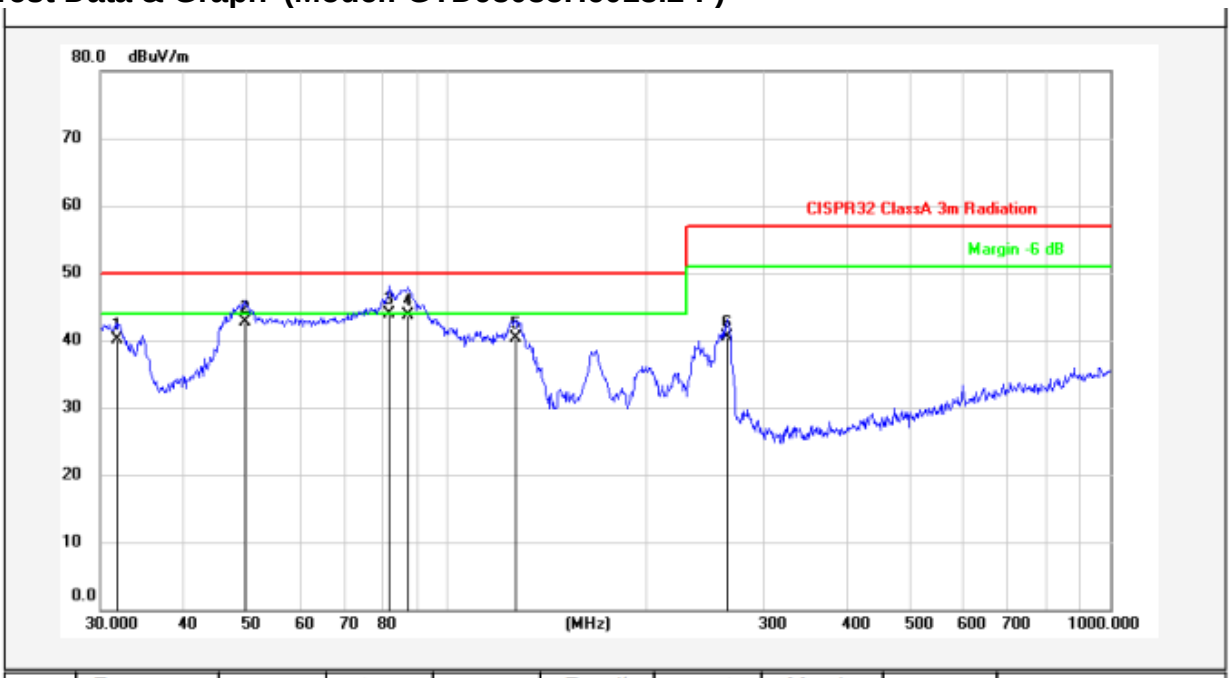
▪ Test Data & Graph (Model: GTD93035H6013.2-F)

No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	47.9940	26.57	14.51	0.82	41.90	50.00	-8.10	QP	
2	86.8068	32.43	9.73	1.14	43.30	50.00	-6.70	QP	
3	128.1130	33.87	9.06	1.27	44.20	50.00	-5.80	QP	
4	165.4866	25.94	9.04	1.52	36.50	50.00	-13.50	QP	
5	237.4756	26.97	12.05	1.88	40.90	57.00	-16.10	QP	
6	264.7457	26.51	12.51	1.98	41.00	57.00	-16.00	QP	

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

■ Operating Mode 1 : Vertical

▪ Test Data & Graph (Model: GTD93035H6013.2-F)



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna. (dB/m)	Cable. (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	31.8427	27.98	11.35	0.77	40.10	50.00	-9.90	QP	
2	49.5328	27.47	14.5	0.83	42.80	50.00	-7.20	QP	
3	81.7831	34.40	8.5	1.1	44.00	50.00	-6.00	QP	
4	87.1115	32.84	9.82	1.14	43.80	50.00	-6.20	QP	
5	126.7723	29.98	9.17	1.25	40.40	50.00	-9.60	QP	
6	264.7456	26.11	12.51	1.98	40.60	57.00	-16.40	QP	

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

4.0 Immunity Test Result

Description of Performance Criteria:

Performance criteria A

During and after the test 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.

Performance criteria 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 replaces 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.

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 except from the equipment if used as intended.

Performance criteria C

During and after testing, a temporary 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.

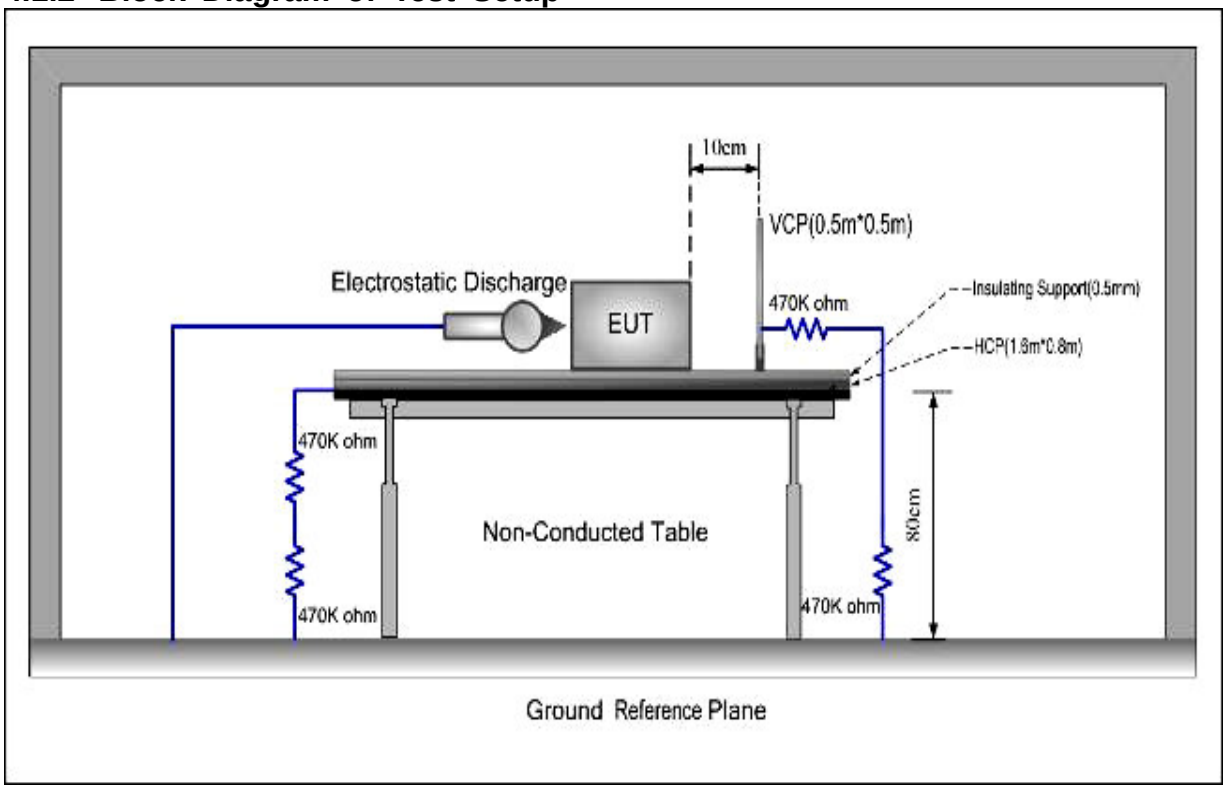
Functions, and/or information stored in non-volatile memory, or protected by a backup, shall not be lost.

4.1 Electrostatic Discharge Test

4.1.1 Test Date

2020-11-10

4.1.2 Block Diagram of Test Setup



4.1.3 Test Location

EMS Room

4.1.4 Severity Levels and Performance Criterion

Severity Levels	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)	Performance criterion
1.	2	2	B
2.	4	4	
3.	6	8	
4.	8	15	
x	Special	Special	

4.1.5 Test Procedure

Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

Contact Discharge:

All the procedure was same as Air Discharge. except that the generator was re-triggered for a new single discharge and repearted 50 times for each pre-selected test point. The tip of the discharge electrode was touch the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane:

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:

At least 20 single discharge were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

4.1.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
ESD generator	ONYX30	HAEFELY	184201	2020-12-25	Yes

4.1.7 Test Software

None

4.1.8 Climate Condition

Temperature: 26℃
Relative Humidity: 56%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

EUT	:	DC/DC CONVERTER			
M/N	:	GTD93035L6013.2-F, GTD93035H6013.2-F			
Test Voltage	:	DC 60V,DC 150V			
Test Engineer	:	BING.HE			
Required Performance	:	B	Actual Performance	:	A
Air Discharge: ±2kV ±4kV ±8kV		# For Air Discharge each Point Positive ＞10 times and negative ＞10 times discharge			
Contact Discharge: ±2kV ±4kV		# For Contact Discharge each point positive ＞10 times and negative ＞10 times discharge			

For the time interval between successive single discharges an initial value of one second.
After discharge to the ungrounded part of EUT, it needs the bleeder resistor to remove the charge prior to next ESD pulse

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observation	
±2	Contact	1, 2 ,3	B	A	Pass
±4	Contact	1, 2 ,3	B	A	Pass
±2	Air	4, 5, 6,	B	A	Pass
±4	Air	3, 4, 5, 6,	B	A	Pass
±8	Air	3, 4, 5, 6,	B	A	Pass

Discharge Points Description

1	Center of VCP	8	
2	Center of HCP	9	
3	Metal surface	10	
4	Gap	11	
5	DC inPort	12	
6	DC outPort	13	
7		14	

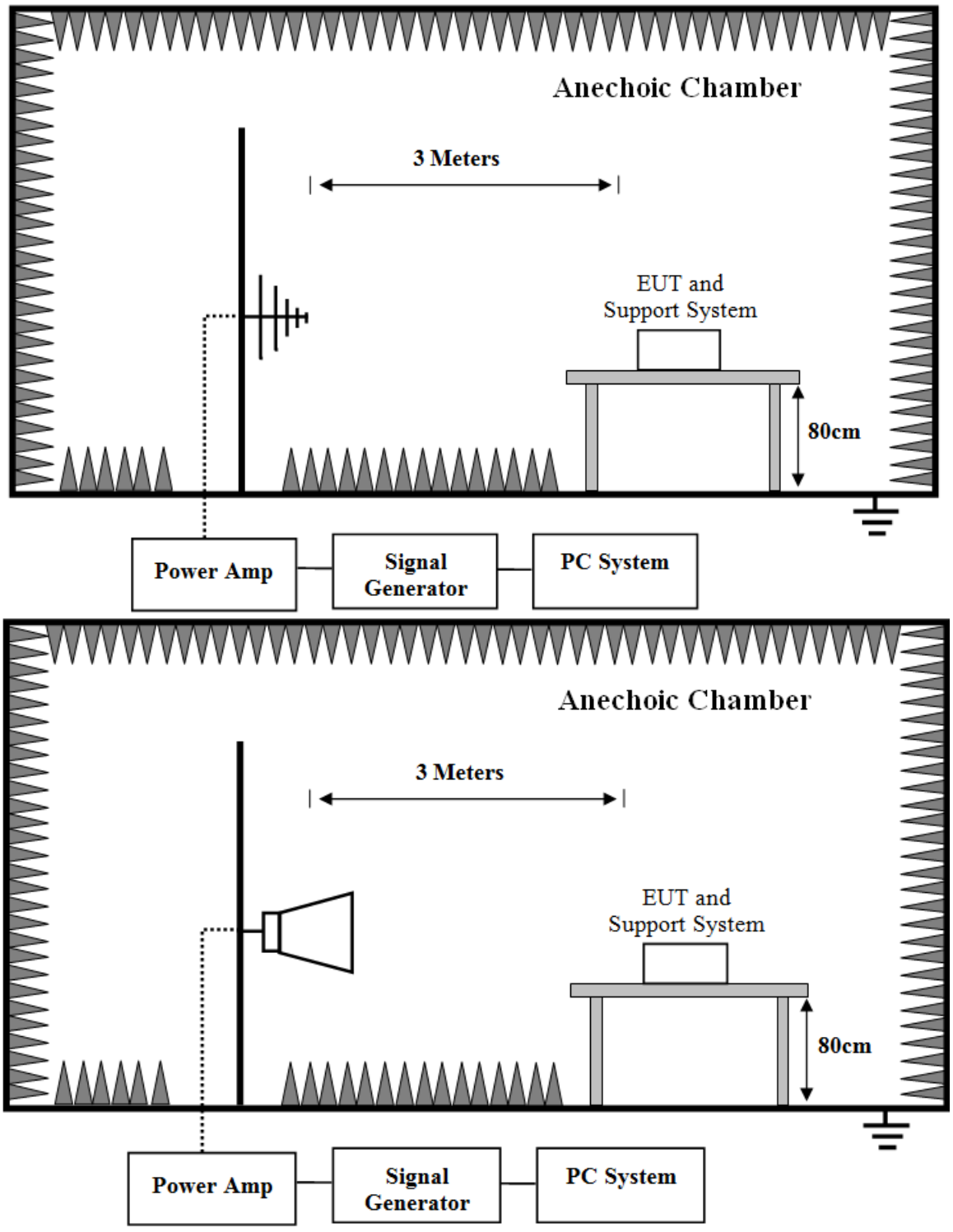
Performance: There was no change compared with initial operation during the test.

4.2 Radio Frequency Electromagnetic Field Immunity Test

4.2.1 Test Date

2020-11-10

4.2.2 Block Diagram of Test Setup



4.2.3 Test Location

3m Chamber

4.2.4 Radio Frequency Electromagnetic Field Immunity Test levels

Level	Test field strength V/m
1	1
2	3
3	10
4	30
X	Special

Note: X is an opoen test level and the associated field strength may be any value. This level may be given in the product standard.

4.2.5 Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator‘s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator’s output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

All the scanning conditions are as follows :

Test Level	
Frequency	80-1000MHz,1800MHz, 2600MHz, 3500MHz, 5000MHz
Test level	3V/m (Severity Level 2)
Antenna polarization	Horizontal & Vertical
Modulation	80%, 1kHz Amplitude Modulation
Steps increment	1%

4.2.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Signal generator	SMC100A	R&S	105651	2020-12-25	Yes
Power amplifier	MT400	PRANA	1507-1746	2020-12-25	Yes
Trilog-boardband antenna	STLP 9128E	Schwarzbeck	9128ES-136	2022-09-02	Yes
Power meter	NRP2	R&S	105155	2020-12-25	Yes
Horn antenna	Schwarzbeck	BBHA 9120E	BBHA9120E698	2020-12-25	Yes
Power amplifier	PRANA	SV70	1602-1820	2020-12-25	Yes

4.2.7 Test Software

RS

4.2.8 Climate Condition

Temperature: 22℃
Relative Humidity: 52%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

EUT: DC/DC CONVERTER	
M/N: GTD93035L6013.2-F, GTD93035H6013.2-F	
Test Voltage: DC 60V,DC 150V	
Test Engineer: BING.HE	
Required Performance: A	Actual Performance: A
Frequency Rage : 80-1000MHz,1800MHz, 2600MHz, 3500MHz, 5000MHz	Test Level: 3V/m
Modulation: ☐ Pulse ☐ none ☑ AM 1 kHz 80%	

Field Strength (V/m)	Test Frequency (MHz)	Test mode (worst case)	Polarization of antenna	Required Performance	Actual Performance	Result
3	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	Mode 1	H	A	A	PASS
			V	A	A	

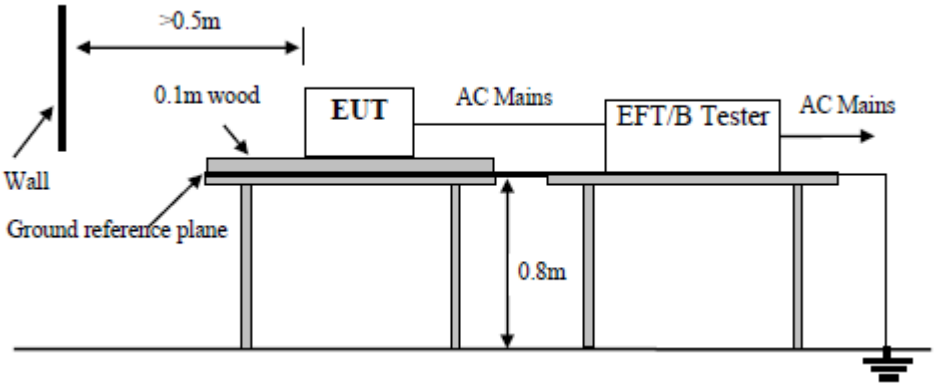
Performance:
There was no change compared with initial operation during the test.

4.3 Electrical Fast Translent/Burst Test

4.3.1 Test Date

2020-11-10

4.3.2 Block Diagram of Test Setup



4.3.3 Test Location

EMS Room

4.3.4 Severity Levels and Performance Criterion

Open Circuit Output Test Voltage ±10%			
Severity Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines	Performance criterion
1.	0.5KV	0.25KV	B
2.	1KV	0.5KV	
3.	2KV	1KV	
4.	4KV	2KV	
X	Special	Special	
The use of 5 kHz repetition frequency is traditional, however, 100 kHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types. With some products, there may be no clear distinction between power ports and signal ports, in which case it is up to product committees to make this determination for test purposes.			
a "X" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification.			

4.3.5 Test Procedure

The EUT and its simulators were placed on a ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. The length of signal and power cable between EUT and EFT generator was 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cabls.

4.3.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EFT generator	FNS-AX3-A 16C	Noiseken	FNS1621762	2021-09-09	Yes

4.3.7 Test Software

None

4.3.8 Climate Condition

Temperature: 26℃
Relative Humidity: 56%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

EUT	:	DC/DC CONVERTER			
M/N	:	GTD93035L6013.2-F,GTD93035H6013.2-F			
Test Voltage	:	DC 60V,DC 150V			
Test Engineer	:	BING.HE			
Required Performance	:	B	Actual Performance	:	A
Repetition Frequency : 5 kHz		Burst Duration : 15ms		Burst Period: 300ms	
Inject Time(s): 120s		Inject Method: Direct		Inject Line: DC Mains	

Line	Test Voltage	Performance		Result
		Required	Observation	(Pass/Fail)
DC Main	±0.5kV	B	A	Pass

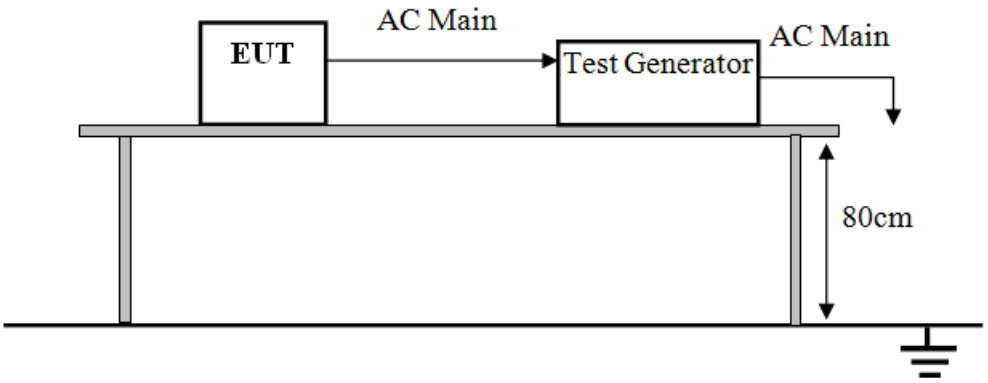
Performance:
There was no change compared with initial operation during the test.

4.4 Surge Test

4.4.1 Test Date

2020-11-10

4.4.2 Block Diagram of Test Setup



4.4.3 Test Location

Shielding Room

4.4.4 Severity Levels

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

4.4.5 Test Procedure

1) Set up the EUT and test generator as shown on Block Diagram of Test Setup
2) For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
4) Different phase angles are done individually.
5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

4.4.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Surge generator	LSS-6230A	Noiseken	LSS1634248	2021-09-09	Yes

4.4.7 Test Software

LSS-6230

4.4.8 Climate Condition

Temperature: 26℃
Relative Humidity: 56%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

EUT: DC/DC CONVERTER											
M/N: GTD93035L6013.2-F, GTD93035H6013.2-F											
Test Voltage: DC 60V,DC 150V											
Test Engineer: BING.HE											
Required Performance: B					Actual Performance: A						
Counts of pulse: +5 times, -5 times					Interval: 60 Seconds						
Line : □ AC Mains ■ DC Supply □ Signal :LAN Port											
Location	Volt	500V			1kV			2kV			Result
	Phase	Performance			Performance			Performance			(Pass/Fail)
		Required	+	-	Required	+	-	Required	+	-	
DC Main	/	B	A	A	/	/	/	/	/	/	pass

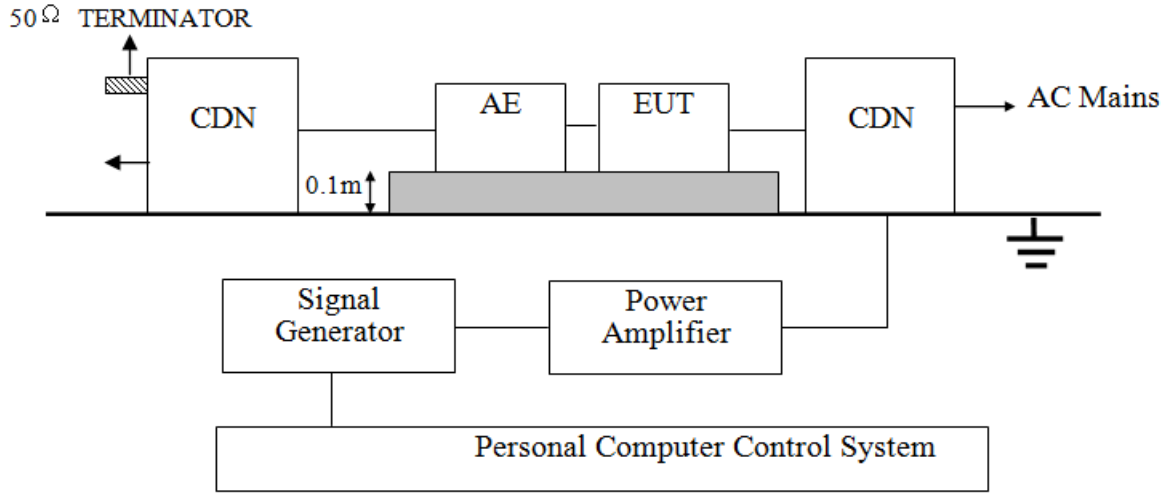
Performance:
There was no change compared with initial operation during the test.

4.5 Radio-Frequency Continuous Conducted Disturbance Test

4.5.1 Test Date

2020-11-10

4.5.2 Block Diagram of Test Setup



4.5.3 Test Location

Shielding Room

4.5.4 Severity Levels

Level	Voltage Level (e.m.f.) V
1	1
2	3
3	10
X	Special

4.5.5 Test Procedure

1)Setup the EUT, CDN and test generators as shown on Block Diagram of Test Setup
2)Let the EUT work in test mode and test it.
3)The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference planeshall bebetween 30 and 50 mm (where possible).
4)The disturbance signal described below is injected to EUT through CDN.
5)The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6)The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
7)The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8)Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

4.5.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Signal generator	SMC100A	R&S	105651	2020-12-25	Yes
CDN	M016	TESEQ	43434	2021-09-09	Yes
Power amplifier	DR220	PRANA	1602-1819	2020-12-25	Yes
EM clamp	KEMA 801A	TESEQ	41399	2020-12-25	Yes

4.5.7 Test Software

CS

4.5.8 Climate Condition

Temperature: 22℃
Relative Humidity: 52%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

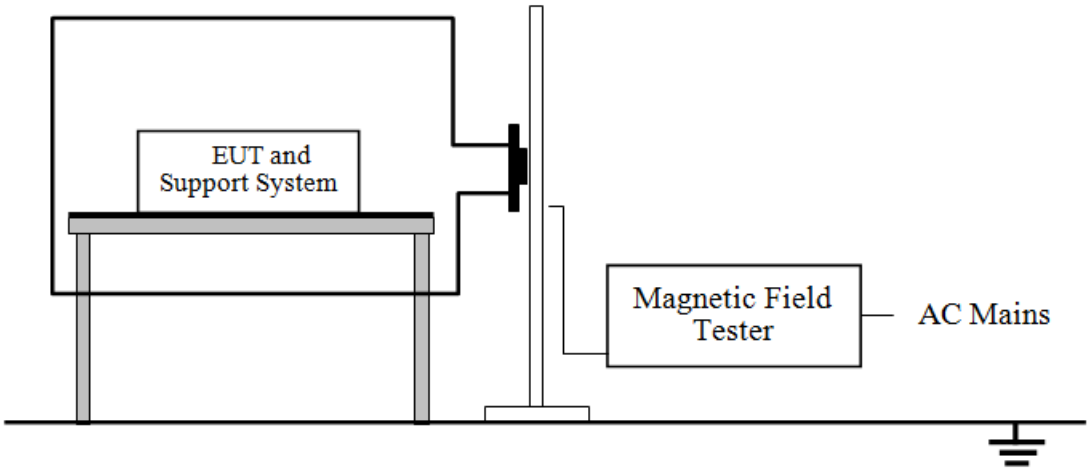
EUT: DC/DC CONVERTER					
M/N: GTD93035L6013.2-F ,GTD93035H6013.2-F					
Test Voltage: DC 60V,DC 150V					
Test Engineer: BING.HE					
Required Performance: A			Actual Performance: A		
Modulation Signal: 1kHz, 80% AM					
Frequency Range (MHz)	Injected Position	Voltage Level (r.m.s)	Required	Observation	Result (Pass / Fail)
0.15 - 10	DC mains	3V	A	A	PASS
10 - 30	DC mains	3V to 1V	A	A	PASS
30 - 80	DC mains	1V	A	A	PASS
Performance: There was no change compared with initial operation during the test.					

4.6 Power Frequency Magnetic Field Immunity Test

4.6.1 Test Date

2020-11-10

4.6.2 Block Diagram of Test Setup



4.6.3 Test Location

Shielding Room

4.6.4 Severity Levels and Performance Criterion

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100

4.6.5 Test Procedure

The EUT was subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m). The induction coil then was rotated by 90°in order to expose the EUT to the test field with different orientations

4.6.6 Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
Magnetic field generator	PMM-1008	NARDA	010WT60502	2021-09-09	Yes

4.6.7 Test Software

None

4.6.8 Climate Condition

Temperature: 26℃
Relative Humidity: 56%
Atmospheric Pressure: 1010Pa

■ Operating Mode 1

▪ Test Data

Not applicable.

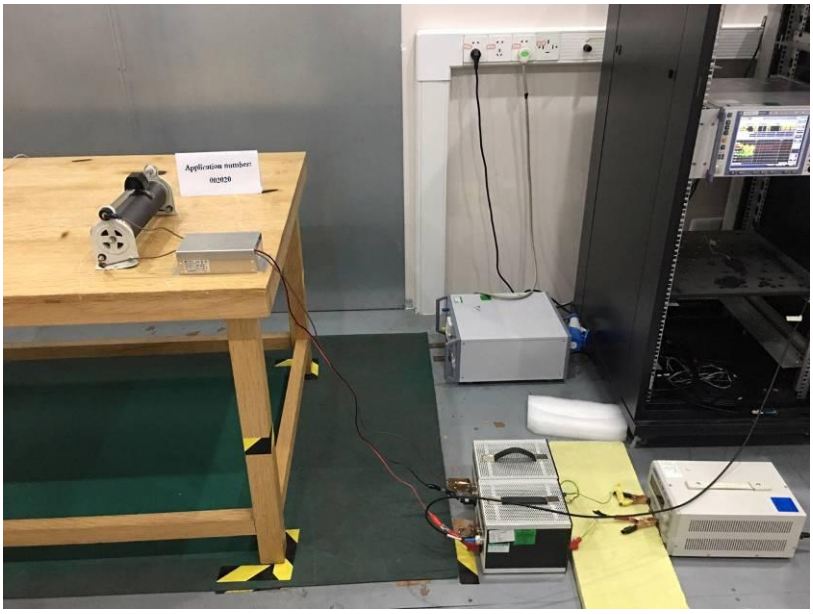
This product dose not contain any devices susceptible to magnetic fields.

There is no need for power frequency magnetic field immunity test to be performed on this product in accordance with Table 1, Remark “a” of SANS 2335:2018/CISPR 35:2016 which states:

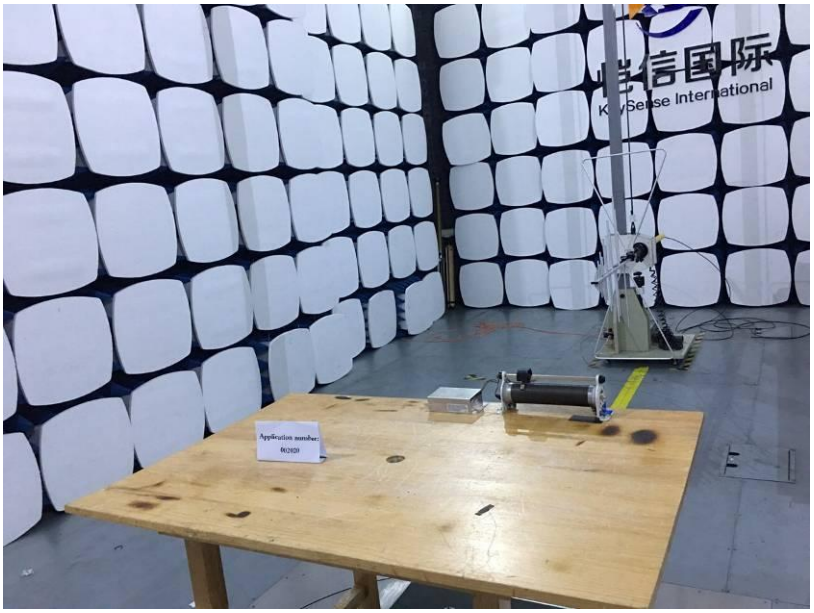
a: “Applicable only to EUT containing devices susceptible to magnetic fields, such as CRT monitors, Hall elements, electrodynamic microphones, magnatic field sensors, etc.”

5.0 APPENDIX A - Test Setup Photos and Configuration

5.1 Conducted disturbance at the mains ports



5.2 Radiated disturbance



5.3 Electrostatic Discharge Test

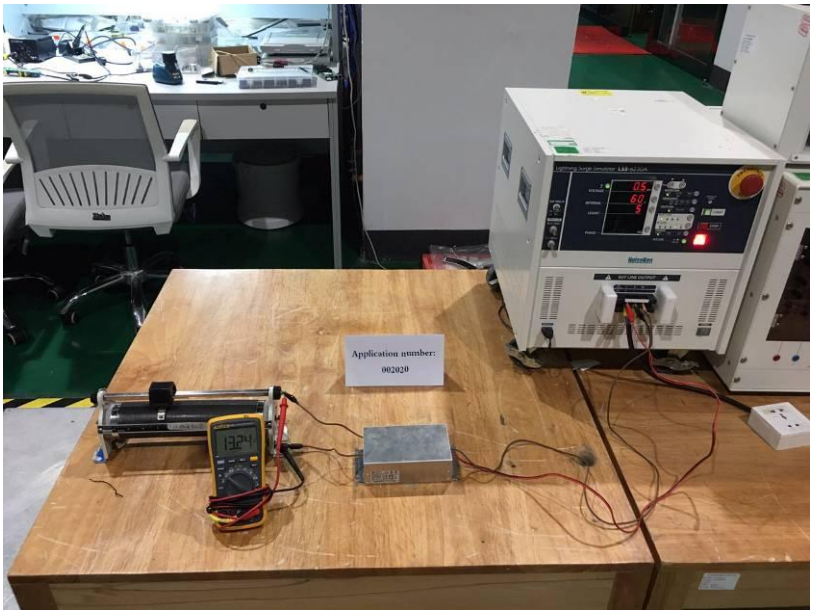
5.4 Radio Frequency Electromagnetic Field Immunity Test

80-1000MHz

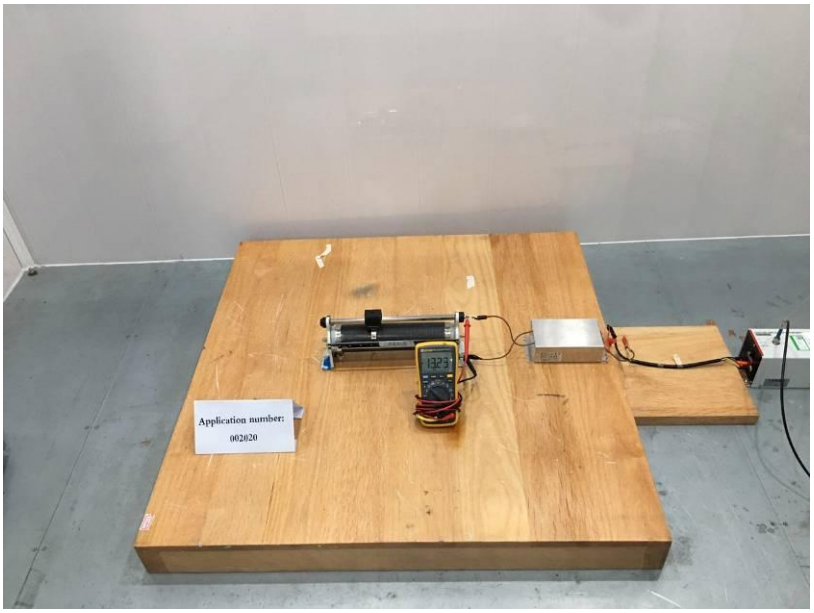
1-6GHz

5.5 Electrical Fast Translent/Burst Test

5.6 Surge Test

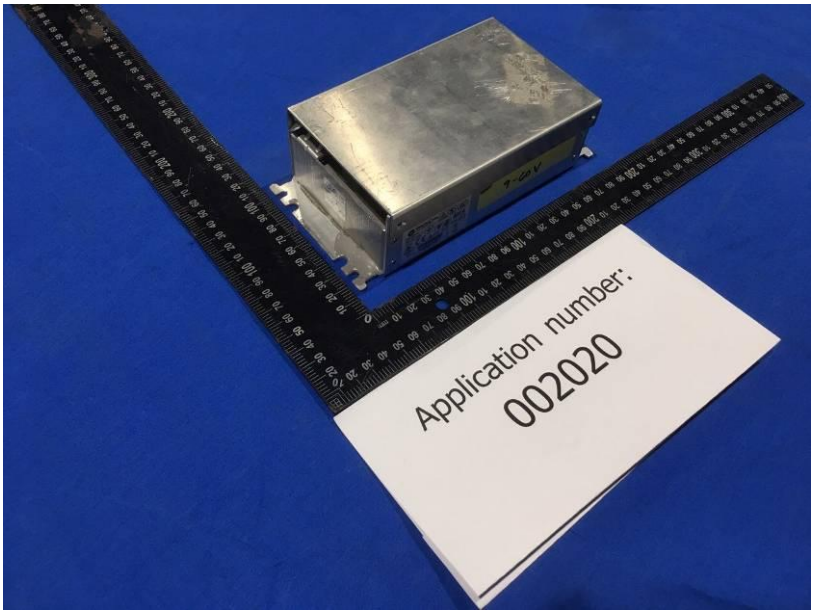


5.7 Radio-Frequency Continuous Conducted Disturbance Test

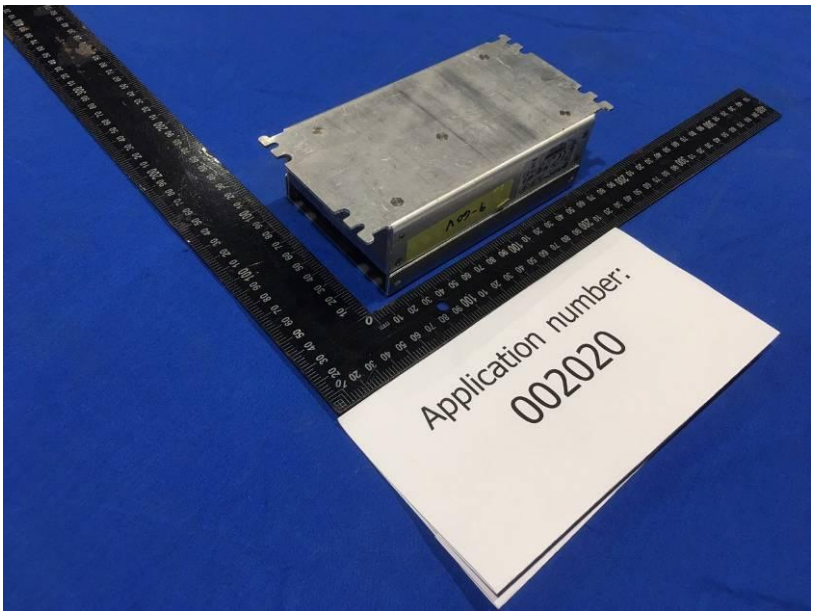


6.0 APPENDIX B – EUT Photographs

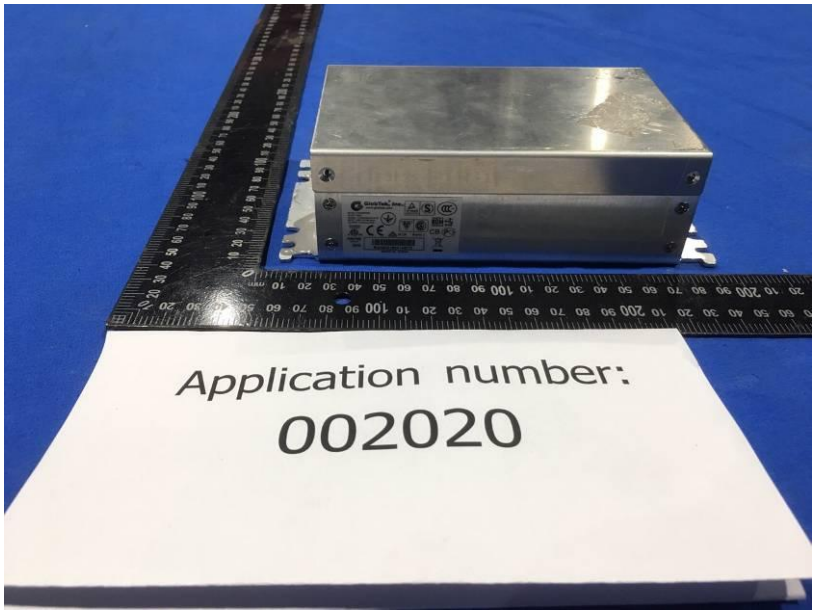
6.1 EUT External Photographs



[M/N:GTD93035L6013.2-F, GTD93035H6013.2-F]

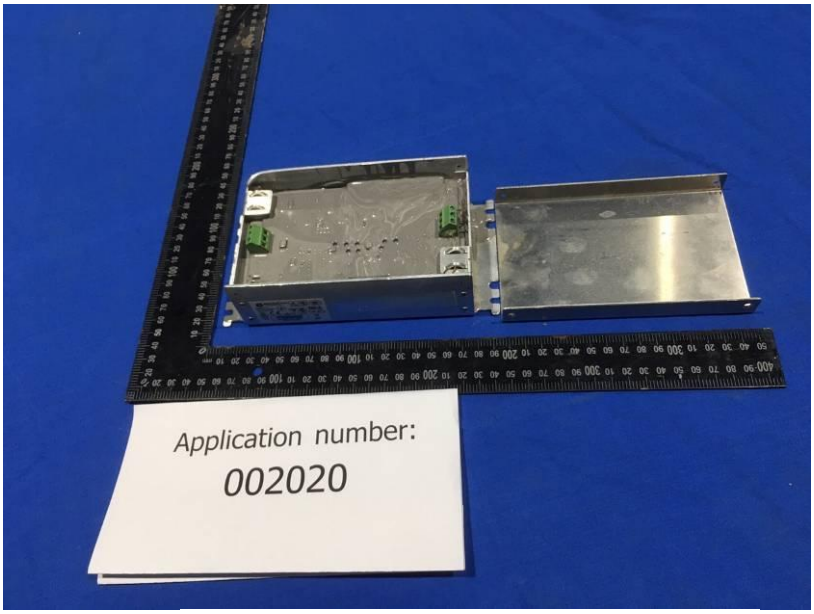


[M/N:GTD93035L6013.2-F, GTD93035H6013.2-F]



[M/N:GTD93035L6013.2-F, GTD93035H6013.2-F]

6.2 EUT Internal Photographs

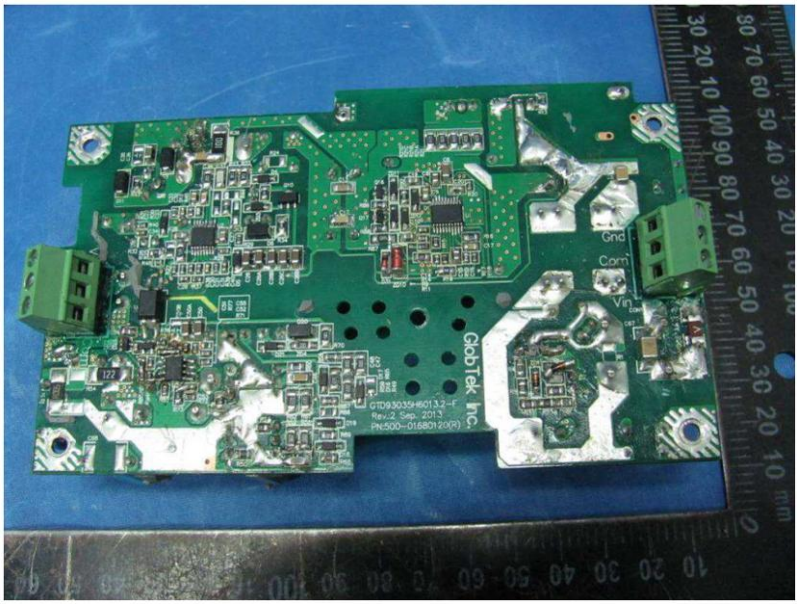


[M/N:GTD93035L6013.2-F, GTD93035H6013.2-F]

[M/N:GTD93035L6013.2-F]

[M/N:GTD93035L6013.2-F]

[M/N:GTD93035H6013.2-F]



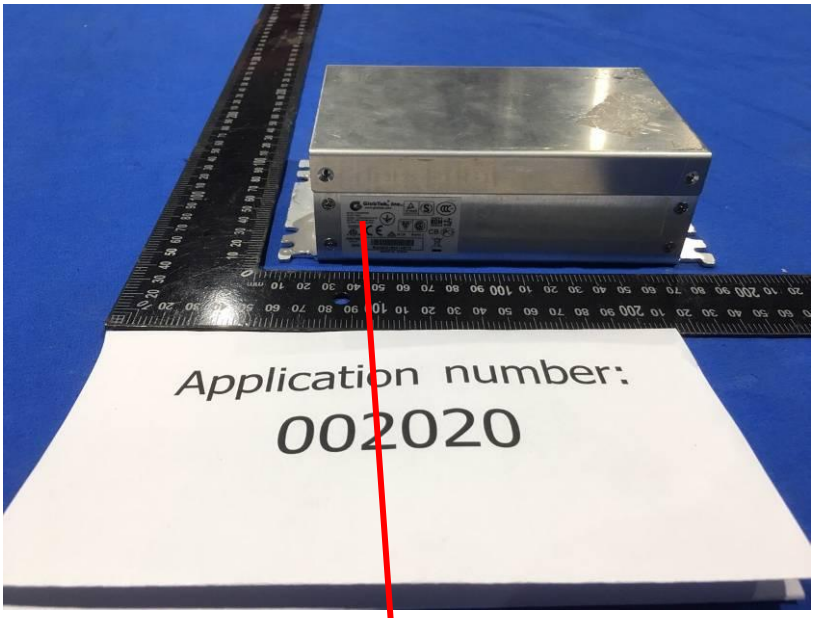
[M/N:GTD93035H6013.2-F]

6.4 Label and Location

[M/N: GTD93035H6013.2-F]

[M/N: GTD93035H6013.2-F]

[Label]



[Location]

7.0 APPENDIX C – Critical Component List

Critical Component List

No	Parts, Components	Location Number	Model	Specification	Manufacturer	Factory	Use Option	Remark
1	PCB	/	TCX	Min. 1,6 mm thickness, min. V-0, 130°C	SHENZHEN TONGCHUANGXIN ELECTRONICS CO LTD	/	yes	/
2	Alt. use	/	T005V0	Min. 1,6 mm thickness, min. V-0, 130°C	SHUANG MING INDUSTRY CO LTD	/	yes	/
3	Alt. use	/	211001	Min. 1,6 mm thickness, min. V-0, 130°C	SHANGHAI H-FAST ELECTRONICS CO LTD	/	yes	/
4	Alt. use	/	BY-1	Min. 1,6 mm thickness, min. V-0, 130°C	GUANGDE BOYA XINXING ELECTRONIC TECHNOLOGY CO LTD	/	yes	/
5	Alt. use	/	JYH-2	Min. 1,6 mm thickness, min. V-0, 130°C	SHENZHEN GOLDEN BOARD CIRCUIT CO LTD	/	yes	/
6	Alt. use	/	JWZ-2	Min. 1,6 mm thickness, min. V-0, 130°C	ZHEJIANG WANZHENG ELECTRONICS SCIENCE & TECHNOLOGY CO.,LTD.	/	yes	/
7	Alt. use	/	ZXH-2	Min. 1,6 mm thickness, min. V-0, 130°C	JIANGXI ZHONG XIN HUA ELECTRONICS INDUSTRY CO LTD	/	yes	/
8	Alt. use	/	Interchangeable	Min. 1,6 mm thickness, min. V-0, 130°C	SHENZHEN TONGCHUANGXIN ELECTRONICS CO LTD	/	yes	/
9	SMT fuse (F1) for 50-150Vdc model	/	AF2	3.50A, 125V;Rated breaking capacity 50A.	AEM COMPONENTS (SUZHOU) CO LTD	/	yes	/
10	SMT fuse (F1) for 9- 60V dc model	/	AF2	12A, 65V; Rated breaking capacity 50A.	AEM COMPONENTS (SUZHOU) CO LTD	/	yes	/
11	Y-Capacitor (CY6) (optional)	/	CD	Y1, min. 250VAC, 125°C max.1000pF	TDK CORPORATION	/	yes	/

12	Alt. use	/	SE	Y1, min. 250VAC, 125°C max.1000pF	Success Electronics Co., Ltd.	/	yes	/
13	Alt. use	/	SB	Y1, min. 250VAC, 125°C max.1000pF	Success Electronics Co., Ltd.	/	yes	/
14	Alt. use	/	KX	Y1, min. 250VAC, 125°C max.1000pF	Murata Mfg. Co., Ltd.	/	yes	/
15	Alt. use	/	AH	Y1, min. 250VAC, 125°C max.1000pF	Walsin Technology Corp.	/	yes	/
16	Alt. use	/	JN	Y1, min. 250VAC, 125°C max.1000pF	JYA-NAY Co., Ltd.	/	yes	/
17	Alt. use	/	CT7	Y1, min. 250VAC, 125°C max.1000pF	Haohua Electronic Co.	/	yes	/
18	Alt. use	/	JD	Y1, min. 250VAC, 125°C max.1000pF	Jyh Chung Electronic Co., Ltd.	/	yes	/
19	Alt. use	/	JX-series	Y1, min. 250VAC, 125°C max.1000pF	Jerro Electronics Corp.	/	yes	/
20	Alt. use	/	WD	Y1, min. 250VAC, 125°C max.1000pF	WELSON INDUSTRIAL CO LT D	/	yes	/
21	Optocoupler(U3, U4)	/	LTV-817	Dti=0.8mm Int. , EXT.dcr=7.8mm, thermal cycling test,110°C	Lite-On Technology Corporation	/	yes	/
22	Alt. use	/	EL817	Dti=0.5mm Int. , dcr=6.0mm EXT.dcr=7.7mm, thermal cycling test,110°C	Everlight Electronics Co., Ltd.	/	yes	/

23	Alt. use	/	H11A817B / FOD817B	Insulation voltage: 850V; Transient overvoltage: 6000V; CTI175; Int. Cr/ Ext. Cr: ≥7,0/ 7,0 mm; 30/110/21	Fairchild Semiconductor Pte Ltd.	/	yes	/
24	Alt. use	/	PC817	Insulation voltage: 890V; Transient overvoltage: 9000V Int. Cr/ Ext. Cr: 7.62/ 7.62 mm; 30/100/21	Sharp Corporation Electronic Components and Devices Group	/	yes	/
25	Alt. use	/	BPC-817 A/B/C/D/L BPC-817 M BPC-817 S	Dti=0.4mm EXT.dcr=7.0mm, thermal cycling test,110oC	Bright Led Electronics Corp.	/	yes	/
26	Alt. use	/	TLP781F	Dti > 0.4mm, Ext cr > 8.0mm, Isolation 3000Vac min., 110°C min., Thermal cycling test	Toshiba Corporation Semiconductor & Storage Products Company	/	yes	/
27	Alt. use	/	K1010 / KP1010	Dti=0.6mm Int. ,dcr=4.0mm EXT.dcr=5.0mm,thermal cycling test,115oC	COSMO Electronics Corporation	/	yes	/
28	Line filter (LF1) (Optional)	/	LF011	130°C	GlobTek/ HAOPUWEI /BOAM/ENG	/	yes	/
29	Line filter (LF2) (Optional)	/	LF012	130°C	GlobTek/ HAOPUWEI /BOAM/ENG	/	yes	/
30	Boost inductor (L1) (Optional)	/	LF013 for 50-150Vdc; LF014 for 9- 60Vdc.	130°C	GlobTek/ HAOPUWEI /BOAM/ENG	/	yes	/
31	Current transducer (T2)	/	LF009	130°C	GlobTek/ HAOPUWEI /BOAM/ENG	/	yes	/
32	Transformer (T1)	/	TF017	Class B	GlobTek/ HAOPUWEI /BOAM/ENG	/	yes	/
33	-Bobbin	/	T375J T375HF	V-0, 150°C, thickness 0,45 mm min.	CHANG CHUN PLASTICS CO LTD	/	yes	/

34	- Alt. use	/	4130	V-0, 140°C, thickness 0,74 mm min.	CHANG CHUN PLASTICS CO LTD	/	yes	/
35	- Alt. use	/	PM-9820	V-0, 150°C, thickness 0,45 mm min.	SUMITOMO BAKELITE CO LTD	/	yes	/
36	- Alt. use	/	CP-J-8800	V-0, 150°C, thickness 0,45 mm min.	HITACHI CHEMICAL CO LTD	/	yes	/
37	-Insulating tape	/	1350F-1 1350T-1 44	Min.130°C	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	/	yes	/
38	- Alt. use	/	370S	Min.130°C	BONDTEC PACIFIC CO LTD	/	yes	/
39	- Alt. use	/	PZ CT WF	Min.130°C	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	/	yes	/
40	- Alt. use	/	JY25-A	Min.130°C	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	/	yes	/
41	- Alt. use	/	LY-XX	Min.130°C	Chang Shu Liang Yi Tape Industry Co Ltd	/	yes	/
42	PTFE tubing	/	TFT / TFS	Min. 300V, 200oC	GREAT HOLDING INDUSTRIAL CO LTD	/	yes	/
43	Alt. use	/	WF	600V, 200oC	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	/	yes	/
44	Alt. use	/	CB-TT-T / CB-TT-S	Min. 300V, 200oC	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	/	yes	/

End of Report

Statement

1. The calibration and measurement of test equipments used in our laboratory are traceable to National primary standard of measurement and BIPM.
2. The report is invalid without the special test seal of the company.
3. The test report is invalid without the signature of main tester,examiner and approver.
4. The report is invalid if altered and added or deleted.
5. The test results in this report only apply to the tested samples.
6. This test report shall not be reproduced except in full, without the written approval of our laboratory.
7. “☆”item cannot be Accredited by CNAS.
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