Report No. : EED39O816777

CE

EMC TEST REPORT

Product	:	Fiber Fusion Splicer
Trade mark	:	Grandway
Model/Type reference	:	GS-601
Serial Model	:	GS-901
Ratings	:	Input：AC 100-240V(50/60HZ) Output：DC 11-13.5V
Report Number	:	EED39O816777
Date of Issue	:	Feb 23,2023
Regulations	:	See below

Test Standards	Results
☒ EN IEC 61000-3-2: 2019	PASS
☒ EN 61000-3-3:2013+A1:2019	PASS
☒ EN 61326-1:2013	PASS

Prepared for:

Zhejiang Grandway Telecom Tech. Co., Ltd
6 Building,No.8 Haining Avenue,Haining ,Haining City,Zhejiang Province

Prepared by:

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检验检测专用章
Inspection & Testing Services

Compiled by: Jenny. Yu Reviewed by: Tony.Qi

Approved by: Jeff Fang Date of Issue: Feb 23,2023

Jeff Fang
Authorized Signatory

EED39O816777

Scan to check theauthenticity
Check No.:1903241022

Modification Record

No.	Last Report No.	Modification Description
1	EED39O816777	First report

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1. GENERAL INFORMATION

Applicant& Address:	Zhejiang Grandway Telecom Tech. Co., Ltd 6 Building,No.8 Haining Avenue,Haining ,Haining City,Zhejiang Province
Manufacturer& Address:	Shanghai Grandway Telecom Tech. Co., Ltd. 6F, Xin'an Building No.99 Tian Zhou Road，Shanghai China
EMC Directive:	2014/30/EU
Product:	Fiber Fusion Splicer
Trade mark:	Grandway
Model/Type reference:	GS-601
Serial Model:	GS-901
Report Number:	EED39O816777
State of Sample(s):	Normal
Sample Received Date:	Oct 25,2022
Sample tested Date:	Nov 01,2022 to Feb 16,2023

Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

2. TEST SUMMARY

The Product has been tested according to the following specifications:

EMISSION		
Standard	**Test Item**	**Test**
CISPR 11:2015+A1:2016	Conducted Emission	Yes
CISPR 11:2015+A1:2016	Radiated Emission	Yes
EN IEC 61000-3-2:2019	Harmonic current emission	Yes
EN 61000-3-3:2013+A1:2019	Voltage changes,voltage fluctuations and flicker	Yes
IMMUNITY (EN 61326-1:2013)		
Standard	**Test Item**	**Test**
IEC 61000-4-2:2008	Electrostatic discharge Immunity	Yes
IEC 61000-4-3:2020	Radiated, radio-frequency, electromagnetic field immunity	Yes
IEC 61000-4-4:2012	Electrical fast transient/burst immunity	Yes
IEC 61000-4-5:2014+AMD1:2017	Surge Immunity	Yes
IEC 61000-4-6:2013	Immunity to conducted disturbances, induced by radio-frequency fields	Yes
IEC 61000-4-8:2009	Power-frequency magnetic field Immunity	Yes
IEC 61000-4-11:2020	Voltage dips, short interruptions and voltage variations Immunity	Yes

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Conducted emission	+/- 3.43
Radiated emission (30MHz to 1GHz)	+/- 4.53

4. PRODUCT INFORMATION AND TEST SETUP

4.1 PRODUCT INFORMATION

Ratings: Input:AC 100-240V(50/60HZ)
Output:DC 11-13.5V

The highest frequency of the internal sources of the EUT is (less than 108 MHz)MHz:

☒ less than 108 MHz, the measurement shall only be made up to 1 GHz.
☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
☐ above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

Adapter information: N/A

Model difference:
(Provided by the customer)

Models of the product are GS-601,GS-901.
The test model is GS-601
The same point are color, structure, circuit principle, PCB board and key elements,The difference are motor number, power, weight, shape and size.

马达数量	6 个	2 个
功率	64W	80W
重量	2.45KG	2.3KG
形状大小	156mm(L)×141mm(W)×156mm(H)	155mm (L)×144mm (W)×155mm (H)

4.2 TEST SETUP CONFIGURATION

See test photographs attached in APPENDIX 1 PHOTOGRAPHS OF TEST SETUP for the actual connections between Product and support equipment.

4.3 DECISION OF FINAL TEST MODE

1. The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were scanned during the preliminary test:

Pre Test Mode		
Emission	Conducted Emission	**Mode 1: Normal Operation while charging**
	Radiated Emission	**Mode 1: Normal Operation while charging**

2. After the preliminary scan, the following test mode was found to produce the final emission level.

Final Test Mode		
Emission	Conducted Emission	**Mode 1: Normal Operation while charging**
	Radiated Emission	**Mode 1: Normal Operation while charging**

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Building 18, Zhihui New Town Ecological Industrial Park, No. 1206, Jinyang East Road, Lujia Town, Kunshan, Jiangsu, China.The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing. The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

Conducted Emission Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESR3	102043	2023-12-07
LISN	R&S	ENV4200	100325	2023-12-07
LISN	R&S	ENV216	102058	2023-12-07
ISN	R&S	ENY81	100255	2023-12-07
ISN	R&S	ENY81-CA6	101744	2023-12-07
Pulse limiter	SCHWARZBECK	VTSD9561F	00227	2023-12-07
Software	R&S	EMC32	9.26.01	/

Radiated Emission Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
3MChamber	RIKEN	9.25(L)m*6.25(W)m*6.45(H)m	AC-K	2024-09-06
Receiver	R&S	ESU8	100537	2023-12-07
Spectrum analyzer	R&S	FSV40	101185	2023-12-07
Microwave Preamplifier	R&S	SCU-18D	1987397	2023-12-07
Antenna (30MHz~1GHz)	SCHWARZBECK	VULB9163	9163-965	2023-10-21
Software	Fala	EZ-EMC	03A1	/

Harmonic current emission Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Harmonic& Flicker System	PPST	ECTS2-3600F-M18012	550118	2023-08-17

Voltage changes, voltage fluctuations and flicker Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Harmonic& Flicker System	PPST	ECTS2-3600F-M18012	550118	2023-08-17

Electrostatic discharge Immunity Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
ESD Simulator	Noiseken	ESS-B3011A	ESS1940818	2023-12-07
Digital hygrometer	Testo	608-H1	1945222595	2023-11-01

Radiated, radio-frequency, electromagnetic field immunity Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
3MChamber	RIKEN	9.25(L)m*6.25(W)m*6.45(H)m	AC-K	2024-09-06
Radiated immunity test system	TESEQ	ITS 6006	77394	2023-11-30
Stacked double Log.-Per. Antenna	Schwarzbeck	STLP 9129	00131	NCR
Power Amplifier (80MHz~1GHz)	TESEQ	CBA 1G-600B	T2491-0819	2024-01-13
Power Amplifier (1GHz~6GHz)	MILMEGA	AS0860B-50/50	1087034	2023-12-01
Power Meter	TESEQ	PMU 6006	77681	2023-12-01
Power Meter	TESEQ	PMU 6006	77688	2023-12-01

Electrical fast transient/burst immunity Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Compact Generator	EM-TEST	UCS500N7	P1608172945	2023-12-07
Three phase coupling network	EM-TEST	CNI503B7	P1626181212	2023-12-07
Capacitive Clamp	EM-TEST	HFK	P1620179963	2023-12-07
Mechanical auto voltage regulator	EM-TEST	MV2616	P1532162313	2023-12-07

Surge Immunity Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Compact Generator	EM-TEST	UCS500N7	P1608172945	2023-12-07
Coupling/decoupling network	EM-TEST	CNI503B7	P1626181212	2023-12-07
Coupling/decoupling network	EM-TEST	CNV504N2	P1613178139	2023-12-07
Coupling/decoupling network	EM-TEST	CNV504T5	P1612177946	2023-12-07
Coupling/decoupling network	EM-TEST	CNI508N2	P1618179278	2023-12-07
Mechanical auto voltage regulator	EM-TEST	MV2616	P1532162313	2023-12-07

Immunity to conducted disturbances, induced by radio-frequency fields Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Signal generator	TESEQ	NSG 4070C-35	54406	2023-12-07
CDN	FCC	FCC-801-M2/M3-16A	170209	2023-12-07
CDN	FCC	FCC-801-M5-32A	170212	2023-12-07
Eight-wire communication line coupled de-coupling network	TESEQ	T800	51992	2023-05-25
Electromagnetic injection clamp	FCC	F-203I-A-32mm	192109	2023-12-07

Power-frequency magnetic fields immunity				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Programmable AC and DC sources	TESEQ	NSG1007-03-240	1926A02176	2023-11-30
Power frequency magnetic field suite	AMETEK	Option 8-300	1459	2023-12-07

Voltage dips, short interruptions and voltage variations Immunity Test				
Equipment Type	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due**
Harmonic& Flicker System	PPST	ECTS2-3600F-M18012	550118	2023-08-17

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

6. CONDUCTED EMISSION

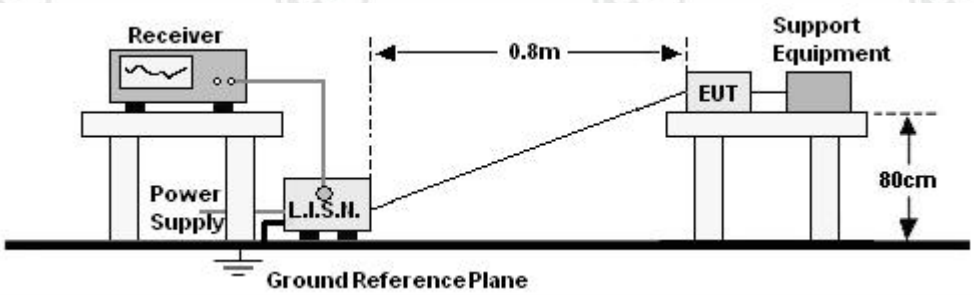
6.1 LIMITS

Limits for class A Equipment

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 - 0.50	79	66
0.50 - 30	73	60

Note: 1. The lower limit shall apply at the transition frequencies.

6.2 BLOCK DIAGRAM OF TEST SETUP



6.3 TEST PROCEDURE

a The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

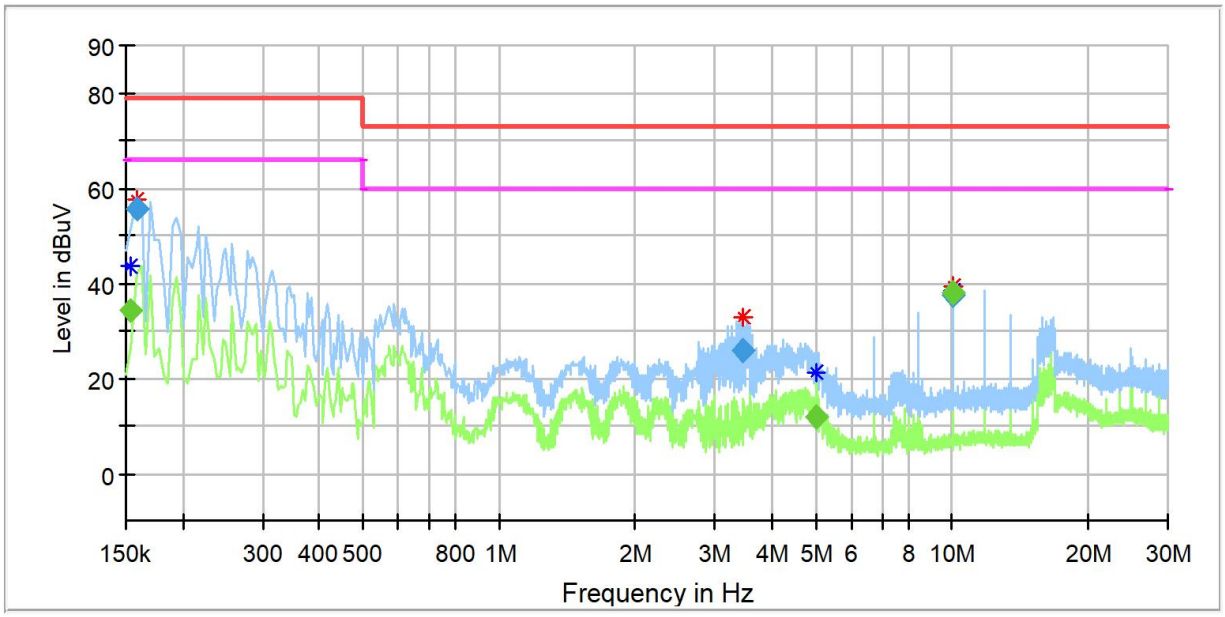
b The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

d The Margin is calculated by adding the correct Factor.The basic equation with a sample calculation is as follows:
Margin = Limit – Quasi Peak / Average
Correct Factor = LISN Factor + Pulse limiter Factor + Cable Factor

6.4 GRAPHS AND DATA

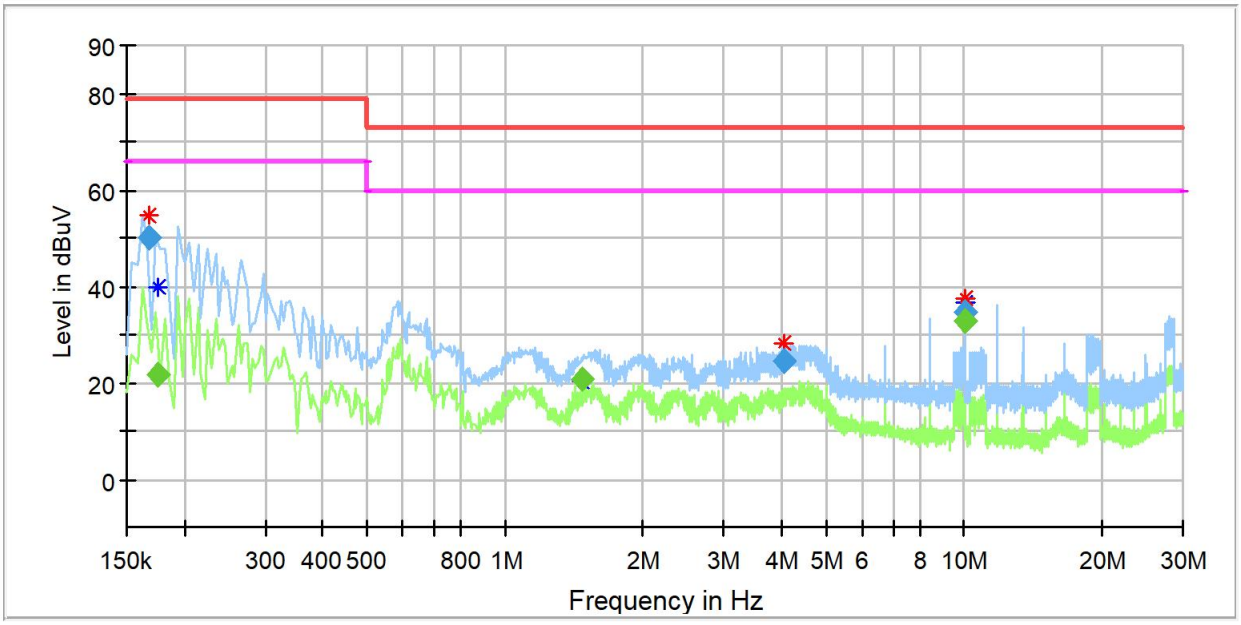
Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	39.1%
Phase	:	L1	**Press**	:	103.3kPa
Test Date	:	2023-02-15			



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154019	---	34.35	66.00	31.65	1000.0	9.000	L1	19.4
0.157956	55.75	---	79.00	23.25	1000.0	9.000	L1	19.4
3.479770	25.64	---	73.00	47.36	1000.0	9.000	L1	19.7
5.003608	---	11.91	60.00	48.09	1000.0	9.000	L1	19.7
10.067328	37.31	---	73.00	35.69	1000.0	9.000	L1	19.9
10.070550	---	37.91	60.00	22.09	1000.0	9.000	L1	19.9

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	39.1%
Phase	:	N	**Press**	:	103.3kPa
Test Date	:	2023-02-15			



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.168108	50.12	---	79.00	28.88	1000.0	9.000	N	19.4
0.174837	---	21.71	66.00	44.29	1000.0	9.000	N	19.4
1.475252	---	20.81	60.00	39.19	1000.0	9.000	N	19.6
4.070318	24.40	---	73.00	48.60	1000.0	9.000	N	19.6
10.071602	34.83	---	73.00	38.17	1000.0	9.000	N	20.0
10.072490	---	32.84	60.00	27.16	1000.0	9.000	N	20.0

7. RADIATED EMISSION

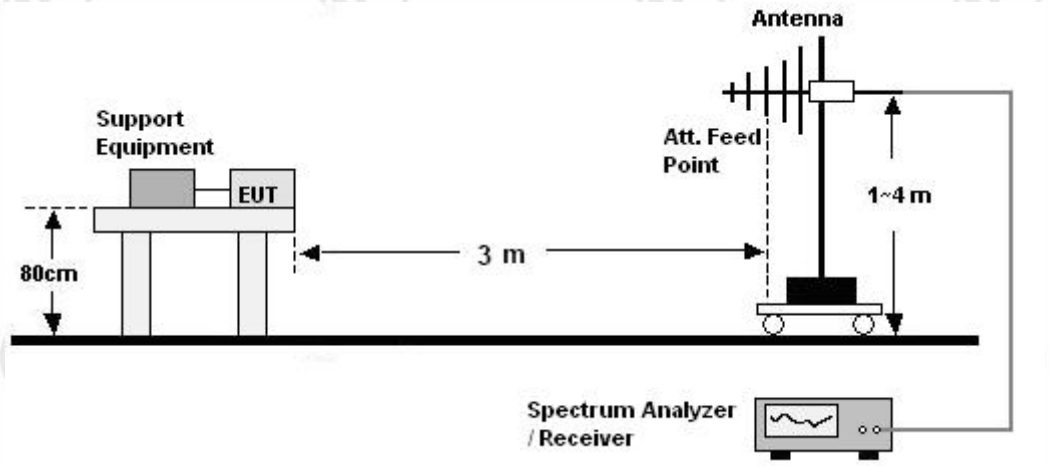
7.1 LIMITS

Frequency (MHz)	Quasi-peak limits at 3m dB(μV/m)
30-230	50
230-1000	57

Note: The lower limit shall apply at the transition frequencies.

7.2 BLOCK DIAGRAM OF TEST SETUP

30MHz ~ 1GHz:



7.3 TEST PROCEDURE

30MHz ~ 1GHz:

a The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.

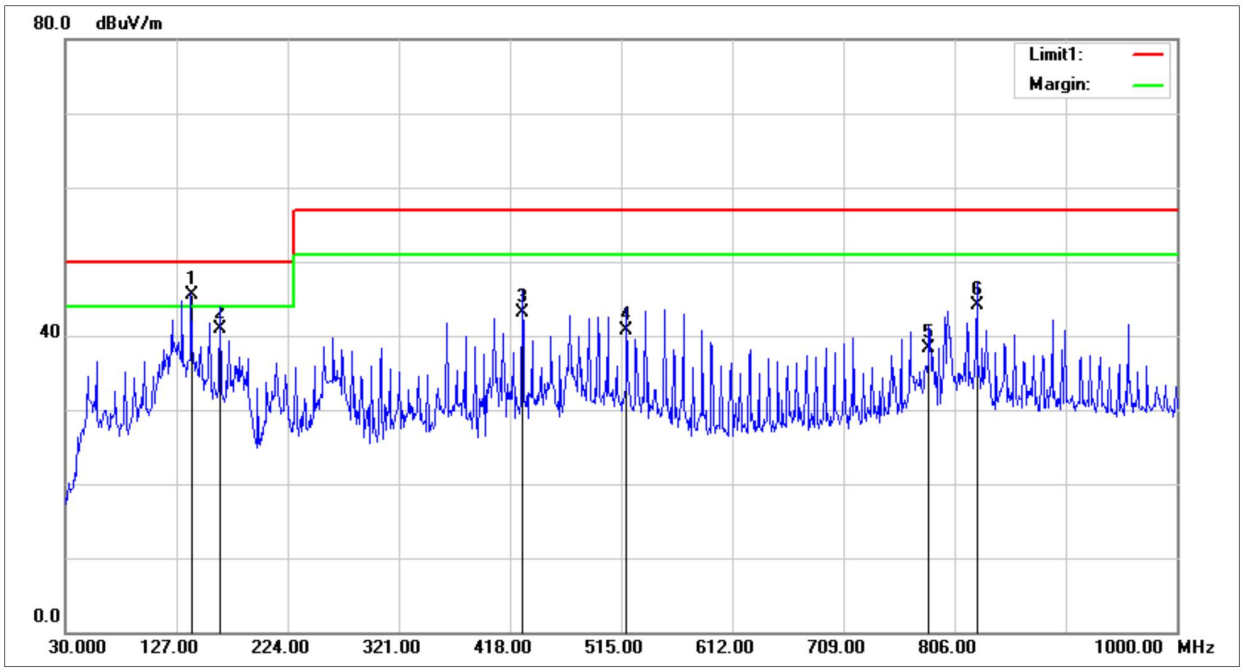
b Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

d The Margin is calculated by adding the correct Factor. The basic equation with a sample calculation is as follows:
Margin = Limit – Result
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

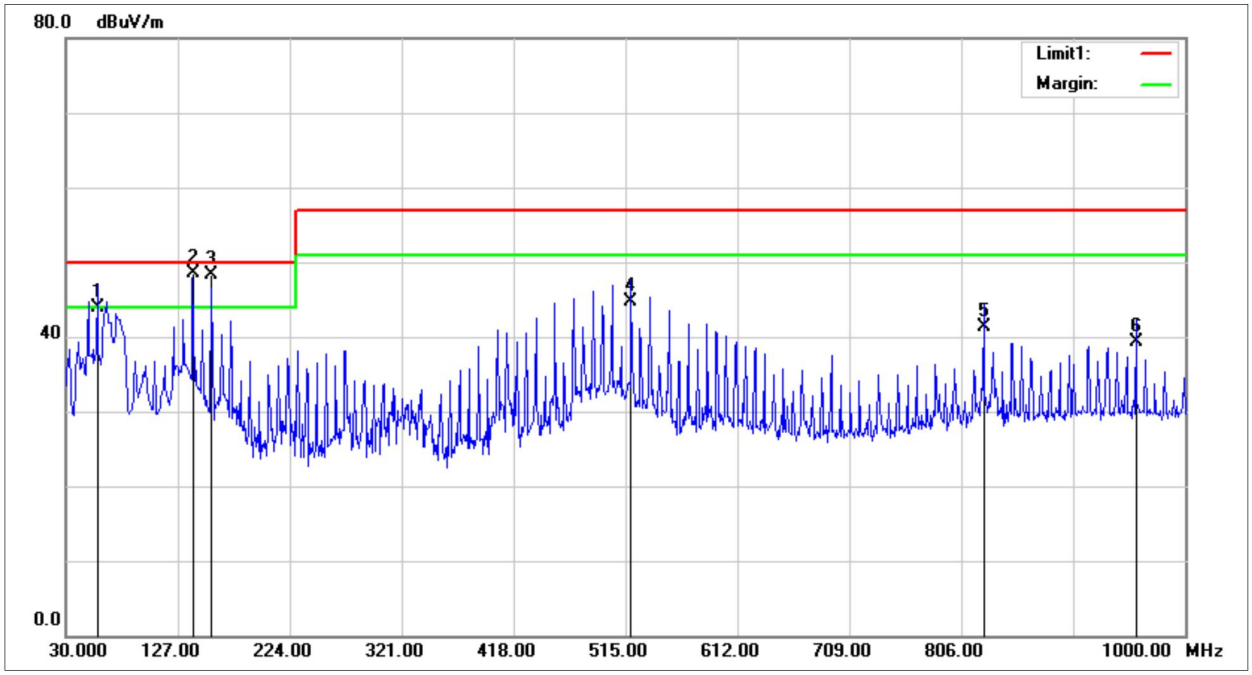
7.4 GRAPHS AND DATA

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.3℃
Mode	:	Mode 1	**Humidity**	:	39.2%
Polarization	:	Horizontal	**Press**	:	103.3kPa
Test Date	:	2023-02-15			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	140.2500	61.65	-16.20	45.45	50.00	-4.55	200	56	QP
2	164.8300	57.21	-16.24	40.97	50.00	-9.03	100	278	QP
3	428.6700	53.89	-10.84	43.05	57.00	-13.95	200	261	QP
4	519.8500	49.25	-8.54	40.71	57.00	-16.29	200	247	QP
5	783.6900	42.90	-4.66	38.24	57.00	-18.76	100	258	QP
6	825.4000	48.03	-3.86	44.17	57.00	-12.83	100	258	QP

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.3℃
Mode	:	Mode 1	**Humidity**	:	39.2%
Polarization	:	Vertical	**Press**	:	103.3kPa
Test Date	:	2023-02-15			



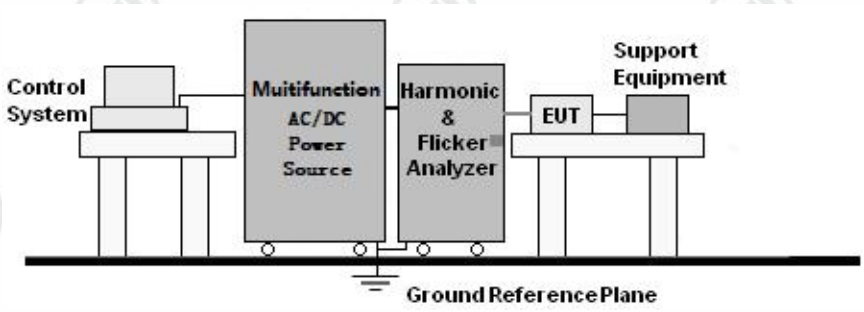
No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	57.1600	59.54	-15.65	43.89	50.00	-6.11	100	360	QP
2	140.2500	64.63	-16.20	48.43	50.00	-1.57	100	213	QP
3	156.7400	64.55	-16.23	48.32	50.00	-1.68	200	264	QP
4	519.8500	53.30	-8.54	44.76	57.00	-12.24	100	209	QP
5	825.4000	45.08	-3.86	41.22	57.00	-15.78	200	135	QP
6	957.3200	41.58	-2.36	39.22	57.00	-17.78	100	154	QP

8. HARMONIC CURRENT EMISSION

8.1 LIMITS

Please refer to EN IEC 61000-3-2:2019 Clause 7.

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 TEST PROCEDURE

a The Product was placed on the top of a non-conductive table above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

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

8.4 TEST RESULTS

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS- 601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

Pass.

General Test Data: (Phase A)					
Vrms (Volts)	:	230.91 / 324.9 / 1.407	Frequency (Hz)	:	50.0001
I_rms (Amps)	:	0.298	Power (VA)	:	68.8 / 64.8
I_fund (Amps)	:	0.109 / 0.109	Power (W)	:	23.3
I_peak (Amps)	:	1.787 / 5.814	Power Factor	:	0.335
V-THD (%)	:	0.35	I-THD (%)	:	251.17
POHC (A)	:	0.099 (method C.3)	POHC Limit (A)	:	0.250
I-THC (A)	:	0.272	Meas. Pwr (Min / Max)	:	22.8W/23.3W
Phase angle of H5 (deg)	:	24.6			

Current Harmonics (values at the end of test)

Harm No.	Harm. Ave.	Harm. Limit (100%)	% Of Limits	Result (Ave.)	Result (Max.)	Harm. Win.	Harm. Win. (150%)	% Of Max
2	0.0013	1.0800	0.1	PASS	PASS	0.0015	1.6200	0.1
3	0.1002	2.3000	4.4	PASS	PASS	0.1005	3.4500	2.9
4	0.0016	0.4300	0.4	PASS	PASS	0.0018	0.6450	0.3
5	0.0977	1.1400	8.6	PASS	PASS	0.0980	1.7100	5.7
6	0.0019	0.3000	0.6	PASS	PASS	0.0022	0.4500	0.5
7	0.0945	0.7700	12.3	PASS	PASS	0.0948	1.1550	8.2
8	0.0024	0.2300	1.0	PASS	PASS	0.0026	0.3450	0.8
9	0.0904	0.4000	22.6	PASS	PASS	0.0907	0.6000	15.1
10	0.0026	0.1840	1.4	PASS	PASS	0.0029	0.2760	1.0
11	0.0856	0.3300	25.9	PASS	PASS	0.0858	0.4950	17.3
12	0.0030	0.1530	2.0	PASS	PASS	0.0032	0.2295	1.4
13	0.0798	0.2100	38.0	PASS	PASS	0.0802	0.3150	25.5
14	0.0031	0.1310	2.4	PASS	PASS	0.0034	0.1965	1.7
15	0.0734	0.1500	49.0	PASS	PASS	0.0737	0.2250	32.8
16	0.0034	0.1150	3.0	PASS	PASS	0.0037	0.1725	2.2
17	0.0671	0.1320	50.8	PASS	PASS	0.0675	0.1980	34.1
18	0.0035	0.1020	3.5	PASS	PASS	0.0038	0.1530	2.5
19	0.0599	0.1180	50.8	PASS	PASS	0.0604	0.1770	34.1
20	0.0036	0.0920	4.0	PASS	PASS	0.0039	0.1380	2.8
21	0.0530	0.1070	49.5	PASS	PASS	0.0535	0.1605	33.3
22	0.0036	0.0830	4.3	PASS	PASS	0.0038	0.1245	3.1
23	0.0462	0.0970	47.6	PASS	PASS	0.0469	0.1455	32.2
24	0.0035	0.0760	4.6	PASS	PASS	0.0038	0.1140	3.3
25	0.0395	0.0900	43.9	PASS	PASS	0.0402	0.1350	29.8
26	0.0035	0.0700	5.0	PASS	PASS	0.0037	0.1050	3.5
27	0.0332	0.0830	40.0	PASS	PASS	0.0338	0.1245	27.1
28	0.0034	0.0650	5.2	PASS	PASS	0.0037	0.0975	3.8
29	0.0276	0.0770	35.9	PASS	PASS	0.0283	0.1155	24.5
30	0.0032	0.0610	5.2	PASS	PASS	0.0035	0.0915	3.8
31	0.0225	0.0720	31.3	PASS	PASS	0.0231	0.1080	21.4
32	0.0031	0.0570	5.4	PASS	PASS	0.0035	0.0855	4.1
33	0.0184	0.0680	27.0	PASS	PASS	0.0190	0.1020	18.6
34	0.0028	0.0540	5.2	PASS	PASS	0.0032	0.0810	3.9
35	0.0150	0.0640	23.5	PASS	PASS	0.0155	0.0960	16.2
36	0.0027	0.0510	5.2	PASS	PASS	0.0030	0.0765	3.9
37	0.0129	0.0600	21.6	PASS	PASS	0.0134	0.0900	14.9
38	0.0026	0.0480	5.4	PASS	PASS	0.0029	0.0720	4.0
39	0.0117	0.0570	20.4	PASS	PASS	0.0120	0.0855	14.1
40	0.0024	0.0460	5.3	PASS	PASS	0.0027	0.0690	4.0

Power Source Verification Data

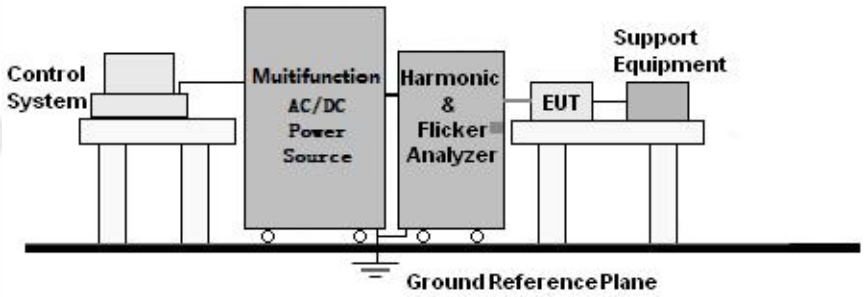
Harm No.	Harm. Value	Harm. Limit	% Of Limits	% Of Vfund	Result
2	0.040	0.460	8.719	0.017	OK
3	0.769	2.070	37.173	0.333	OK
4	0.141	0.460	30.757	0.061	OK
5	0.037	0.920	4.049	0.016	OK
6	0.014	0.460	3.114	0.006	OK
7	0.111	0.690	16.078	0.048	OK
8	0.025	0.460	5.537	0.011	OK
9	0.031	0.460	6.739	0.013	OK
10	0.032	0.460	6.939	0.014	OK
11	0.118	0.230	51.382	0.051	OK
12	0.006	0.230	2.478	0.002	OK
13	0.037	0.230	16.227	0.016	OK
14	0.053	0.230	22.912	0.023	OK
15	0.057	0.230	24.629	0.025	OK
16	0.016	0.230	7.073	0.007	OK
17	0.081	0.230	35.290	0.035	OK
18	0.027	0.230	11.846	0.012	OK
19	0.035	0.230	15.047	0.015	OK
20	0.016	0.230	6.808	0.007	OK
21	0.028	0.230	12.064	0.012	OK
22	0.037	0.230	16.056	0.016	OK
23	0.025	0.230	10.847	0.011	OK
24	0.027	0.230	11.946	0.012	OK
25	0.017	0.230	7.590	0.008	OK
26	0.014	0.230	5.950	0.006	OK
27	0.010	0.230	4.354	0.004	OK
28	0.018	0.230	7.761	0.008	OK
29	0.033	0.230	14.449	0.014	OK
30	0.011	0.230	4.889	0.005	OK
31	0.019	0.230	8.266	0.008	OK
32	0.025	0.230	10.835	0.011	OK
33	0.016	0.230	6.928	0.007	OK
34	0.009	0.230	4.079	0.004	OK
35	0.020	0.230	8.590	0.009	OK
36	0.018	0.230	8.009	0.008	OK
37	0.011	0.230	4.723	0.005	OK
38	0.011	0.230	4.874	0.005	OK
39	0.024	0.230	10.517	0.010	OK
40	0.012	0.230	5.119	0.005	OK

9. VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER

9.1 LIMITS

Please refer to EN 61000-3-3:2013+A1:2019 Clause 5.

9.2 BLOCK DIAGRAM OF TEST SETUP



9.3 TEST PROCEDURE

a The Product was placed on the top of a non-conductive table above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

b During the flick test, the measure time shall include that part of whole operation cycle in which the Product produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

9.4 TEST RESULTS

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

Pass.

Phase A					
Vrms (Volts)	:	230.87	Frequency (Hz)	:	50.00
I_rms (Amps)	:	0.262	Power (W)	:	23.2
V-THD (%)	:	0.467	T-Max (ms)	:	0 (500)
dmax (%)	:	0.000 (4.000)	Hi dmax (%)	:	0.000 (4.000)
dc (%)	:	0.000 (3.300)	Hi dc (%)	:	0.000 (3.300)
Pst-1	:	0.039 (1.000)			
Plt	:	0.017 (0.650)			

10. IMMUNITY TEST

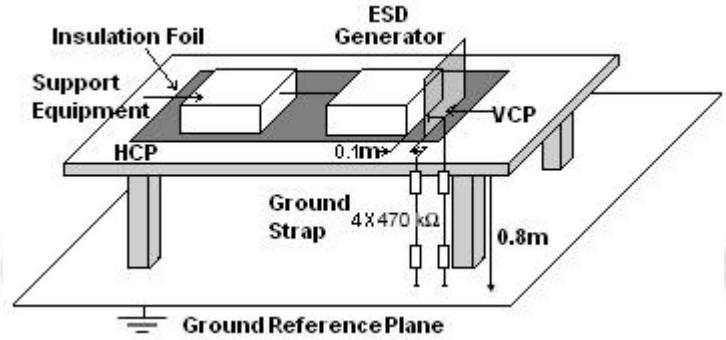
General Performance Criteria	
Product Standard	**EN 61326-1:2013**
CRITERION A	The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.
CRITERION B	The equipment shall continue to operate as intended after the test. 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. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.
CRITERION C	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

10.1 ELECTROSTATIC DISCHARGE IMMUNITY

10.1.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013 & IEC 61000-4-2:2008
Test Port	:	Enclosure port
Discharge Impedance	:	330 ohm / 150 pF
Discharge Mode	:	Single Discharge
Discharge Period	:	one second between each discharge

10.1.2 BLOCK DIAGRAM OF TEST SETUP



10.1.3 TEST PROCEDURE

a Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.

b The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c The time interval between two successive single discharges was at least 1 second.

d The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.

e Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

g At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the Product. The ESD generator was positioned vertically at a distance of 0.1 meters from the Product with the discharge electrode touching the HCP.

h At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

10.1.4 RESULT & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	23.2℃
Mode	:	Mode 1	**Humidity**	:	46.4%
Test Date	:	2022-11-03	**Press**	:	102.1kPa

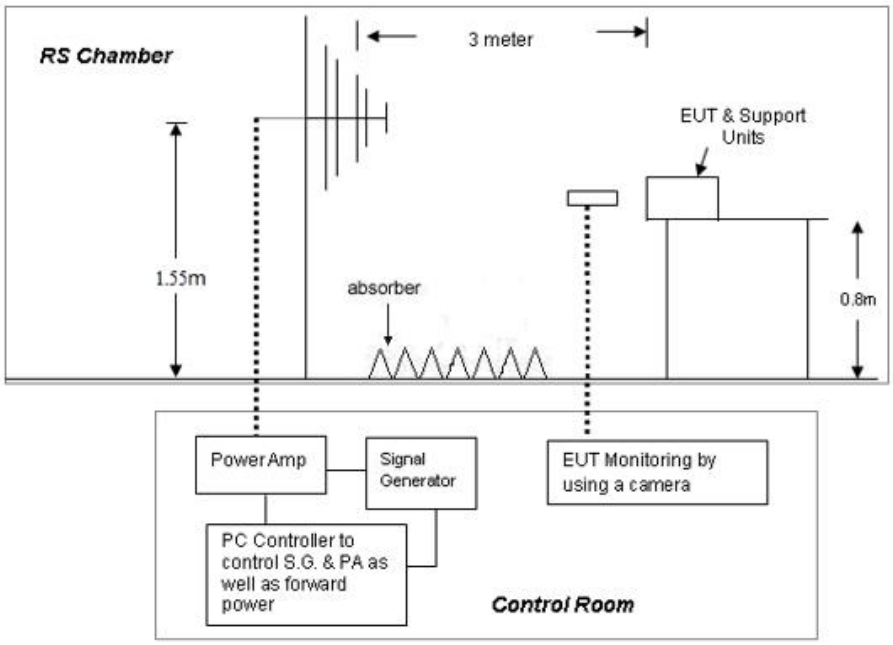
Discharge Method	Discharge Position	Voltage (±kV)	No. of Discharge per polarity (Each Point)	Required Criterion	Performance Criterion
Contact Discharge	Indirect Discharge VCP	± 4	25	B	A
	Indirect Discharge HCP	± 4	25	B	A
	Conductive Surfaces	± 4	25	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	± 8	10	B	A

10.2 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY

10.2.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013 & IEC 61000-4-3:2020
Test Port	:	Enclosure port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	3 seconds
Polarization	:	Horizontal & Vertical

10.2.2 BLOCK DIAGRAM OF TEST SETUP



10.2.3 TEST PROCEDURE

a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3m or 1m from the Product.
b. The frequency range is swept from 80MHz to1000MHz, 1400MHz to 2700MHz,with the signal 80% amplitude modulated with a 1 kHz 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%.
c. The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.

10.2.4 RESULT & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	40.8%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

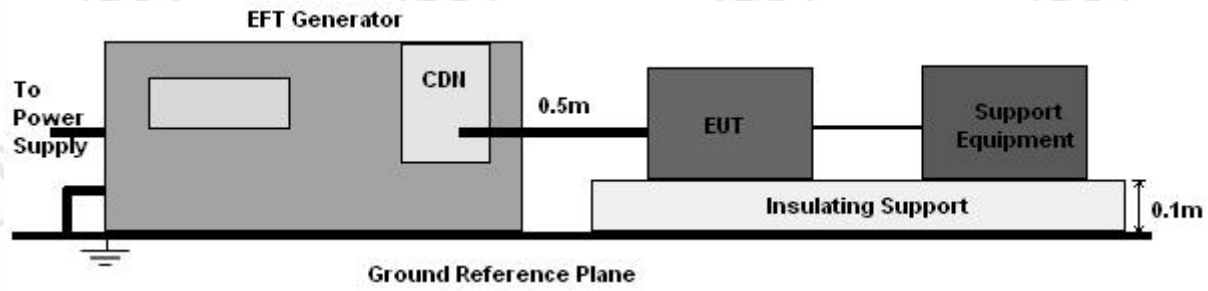
Frequency (MHz)	Position	Field Strength (V/m)	Required Criterion	Performance Criterion
80 - 1000	Front, Back, Left, Right	10	A	A
1400 - 2000	Front, Back, Left, Right	3	A	A
2000 - 2700	Front, Back, Left, Right	1	A	A

10.3 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY

10.3.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013 & IEC 61000-4-4:2012
Test Port	:	Input AC power port
Impulse Frequency	:	5 kHz
Impulse Wave-shape	:	5/50 ns
Burst Duration	:	15 ms
Burst Period	:	300 ms
Test Duration	:	1 minute per polarity

10.3.2 BLOCK DIAGRAM OF TEST SETUP



10.3.3 TEST PROCEDURE

a The Product and support units were located on a non-conductive table above ground reference plane.

b A 0.5m-long power cord was attached to Product during the test.

10.3.4 RESULTS & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230V/50Hz	**Temperature**	:	20.0℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

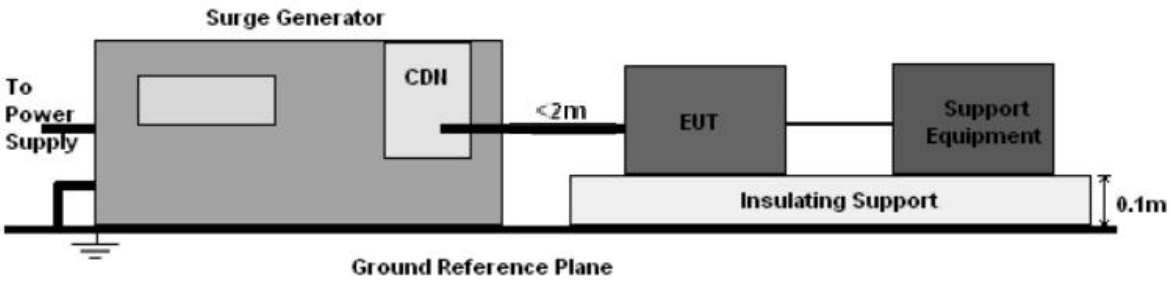
Port type	Coupling	Voltage (kV)	Polarity	Required Criterion	Performance Criterion
AC port	L	2	±	B	A
	N	2	±	B	A
	L+N	2	±	B	A

10.4 SURGE IMMUNITY

10.4.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013& IEC 61000-4-5:2014+AMD1:2017
Test Port	:	Input AC power port
Wave-Shape	:	Open Circuit Voltage: 1.2 / 50 us
Pulse Repetition Rate	:	1 pulse / min.
Test Events	:	5 pulses (positive & negative) for each polarity

10.4.2 BLOCK DIAGRAM OF TEST SETUP



10.4.3 TEST PROCEDURE

a The surge is to be applied to the Product power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave.

b The power cord between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter). Interconnection line between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter).

10.4.4 RESULTS & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230/50Hz	**Temperature**	:	20℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

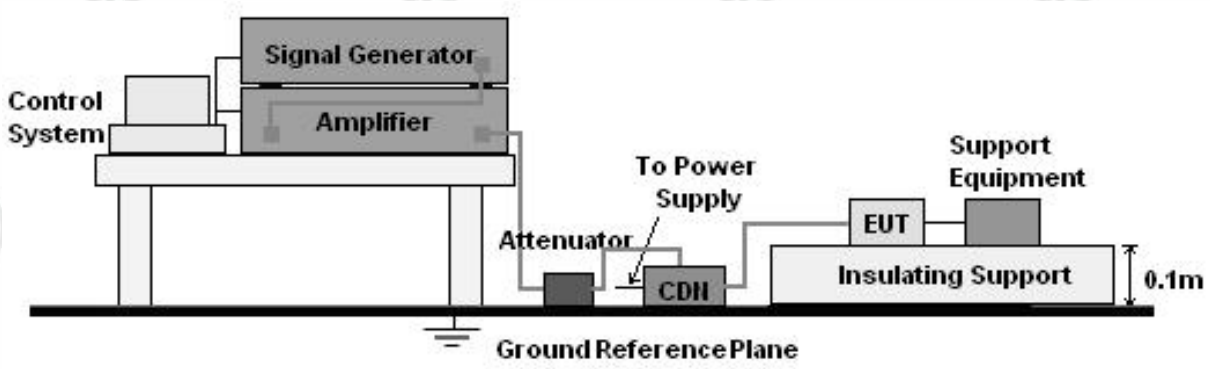
Port type	Coupling Line	Voltage (kV)	Polarity	Phase Angle	Required Criterion	Performance Criterion
AC port	L - N	1	±	0°, 90°, 180°, 270°	B	A

10.5 IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS

10.5.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013 & IEC 61000-4-6:2013
Test Port	:	Input AC power port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	3 seconds

10.5.2 BLOCK DIAGRAM OF TEST SETUP



10.5.3 TEST PROCEDURE

a The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.

b The frequency range is swept from 150 kHz to 80MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-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 Product to be able to respond.

10.5.4 RESULTS & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230/50Hz	**Temperature**	:	22.8℃
Mode	:	Mode 1	**Humidity**	:	47.6%
Test Date	:	2022-11-01	**Press**	:	102.3kPa

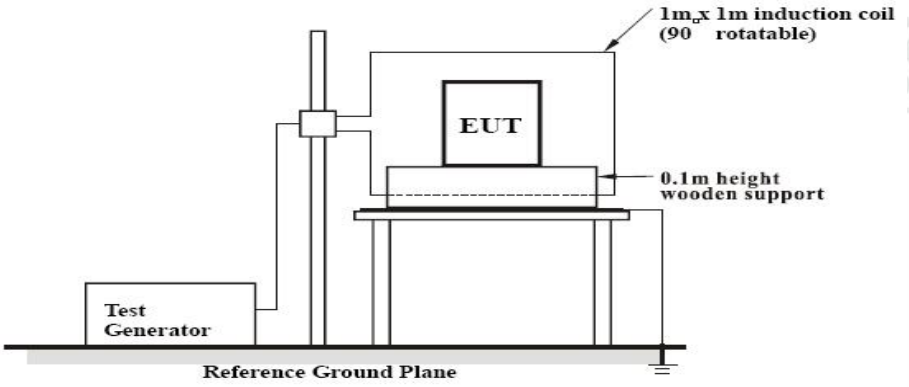
Inject Line	Frequency (MHz)	Voltage Level (V)	Required Criterion	Performance Criterion
AC port	0.15 ~ 80	3	A	A

10.6 POWER-FREQUENCY MAGNETIC FIELDS IMMUNITY

10.6.1 TEST SPECIFICATION

Basic Standard	:	EN 61326-1:2013 & IEC 61000-4-8:2009
Test Port	:	Enclosure port
Power Frequency	:	50Hz
Duration	:	1 Min
Direction	:	X axis; Y axis; Z axis

10.6.2 BLOCK DIAGRAM OF TEST SETUP



10.6.3 TEST PROCEDURE

a The Product and support units were located on a table, 0.8m away from ground floor.

b The Product is configured and connected to satisfy its functional requirements. It shall be place on the GRP with the interposition of a 0.1m thickness insulating support (e.g. dry wood)

c Setting the parameter of tests and then perform the test software of test simulator.

d The induction coil shall enclose the Product placed at its center.

10.6.4 RESULTS & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 230/50Hz	**Temperature**	:	22.8℃
Mode	:	Mode 1	**Humidity**	:	47.6%
Test Date	:	2022-11-01	**Press**	:	102.3kPa

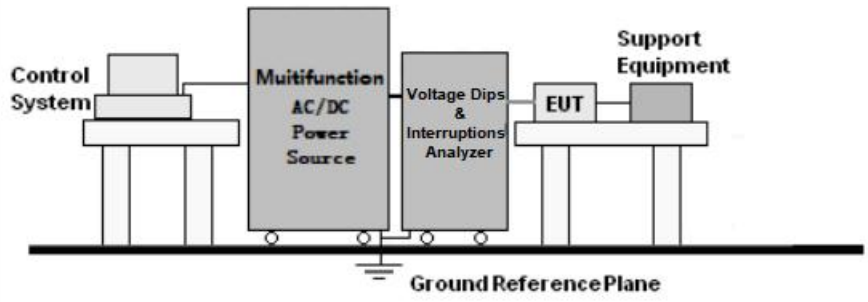
Direction	Field Strength (A/m)	Duration (Min)	Required Criterion	Performance Criterion
X	30	1	A	A
Y	30	1	A	A
Z	30	1	A	A

10.7 VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS IMMUNITY

10.7.1 TEST SPECIFICATION

Basic Standard : EN 61326-1:2013 & IEC 61000-4-11:2020
Test Ports : AC port
Phase Angle : 0°

10.7.2 BLOCK DIAGRAM OF TEST SETUP



10.7.3 TEST PROCEDURE

a The Product and support units were located on a non-conductive table above ground floor.

b Set the parameter of tests and then perform the test software of test simulator.

c Conditions changes to occur at 0 degree crossover point of the voltage waveform.

10.7.4 RESULTS & PERFORMANCE

Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 100V/50Hz	**Temperature**	:	20℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

Test Level % Un	Reduction (%)	Number of cycles	Required Criterion	Performance Criterion
		50Hz		
0	100	1	B	A
40	60	10	C	A
70	30	25	C	A
0	100	250	C	A

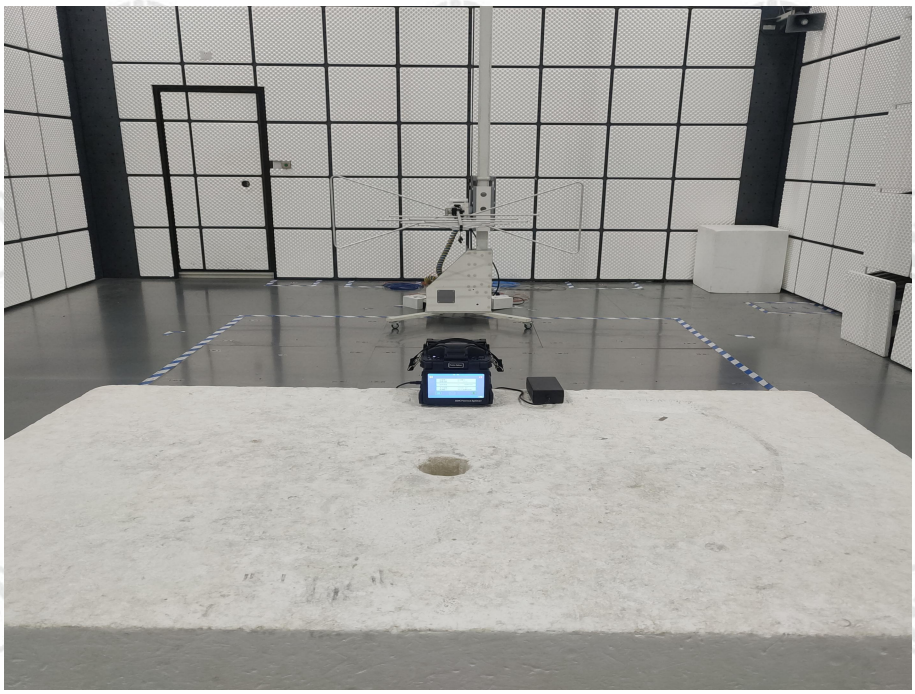
Product	:	Fiber Fusion Splicer	**Model/Type reference**	:	GS-601
Power	:	AC 240V/50Hz	**Temperature**	:	20℃
Mode	:	Mode 1	**Humidity**	:	39.4%
Test Date	:	2023-02-16	**Press**	:	103.2kPa

Test Level % Un	Reduction (%)	Number of cycles	Required Criterion	Performance Criterion
		50Hz		
0	100	1	B	A
40	60	10	C	A
70	30	25	C	A
0	100	250	C	A

APPENDIX 1 PHOTOGRAPHS OF PRODUCT

Conducted Emission Test Setup

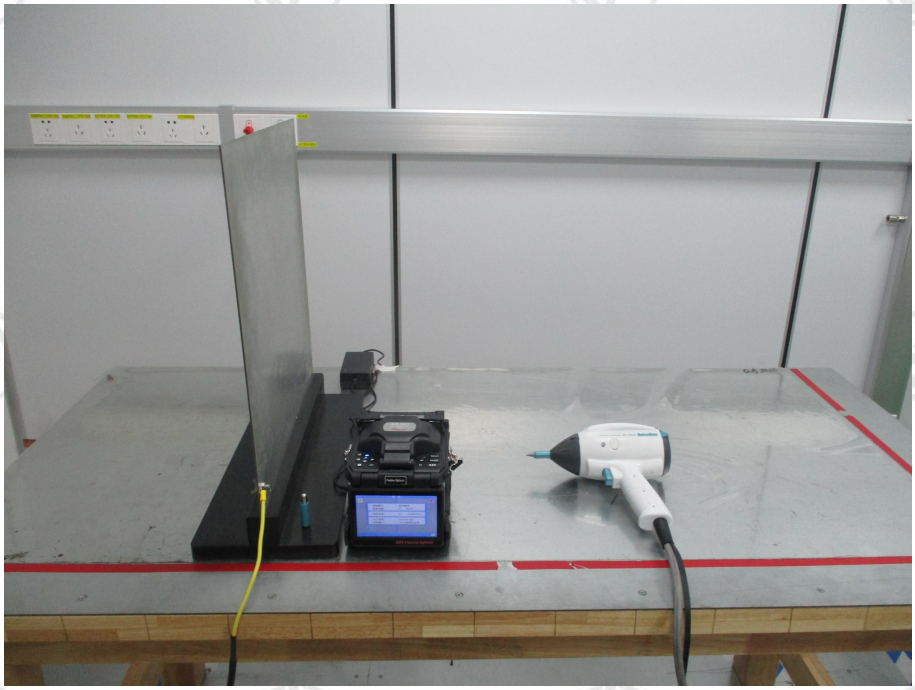
Radiated Emission Test Setup



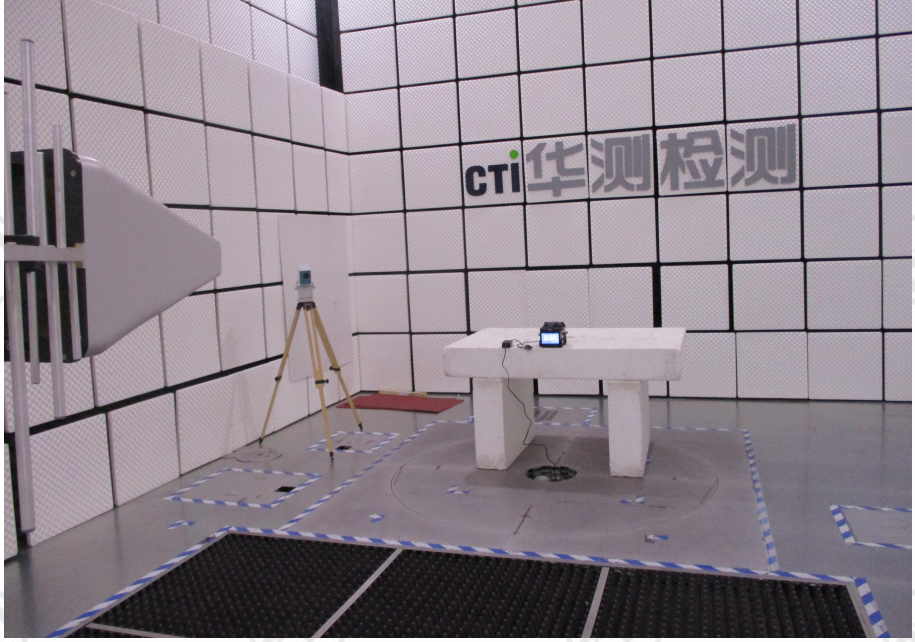
Harmonic Current Emission Test Setup

Voltage changes, voltage fluctuations and flicker Test Setup

Electrostatic Discharge Test Setup

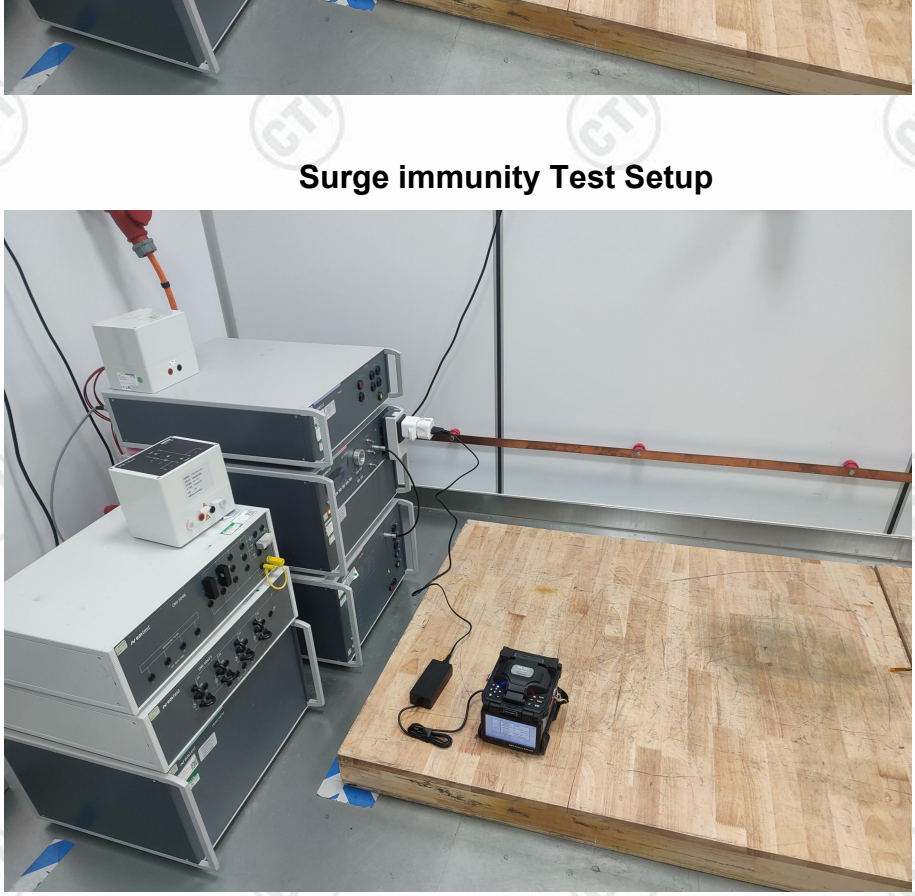


Radiated, radio-frequency, electromagnetic field immunity Test Setup



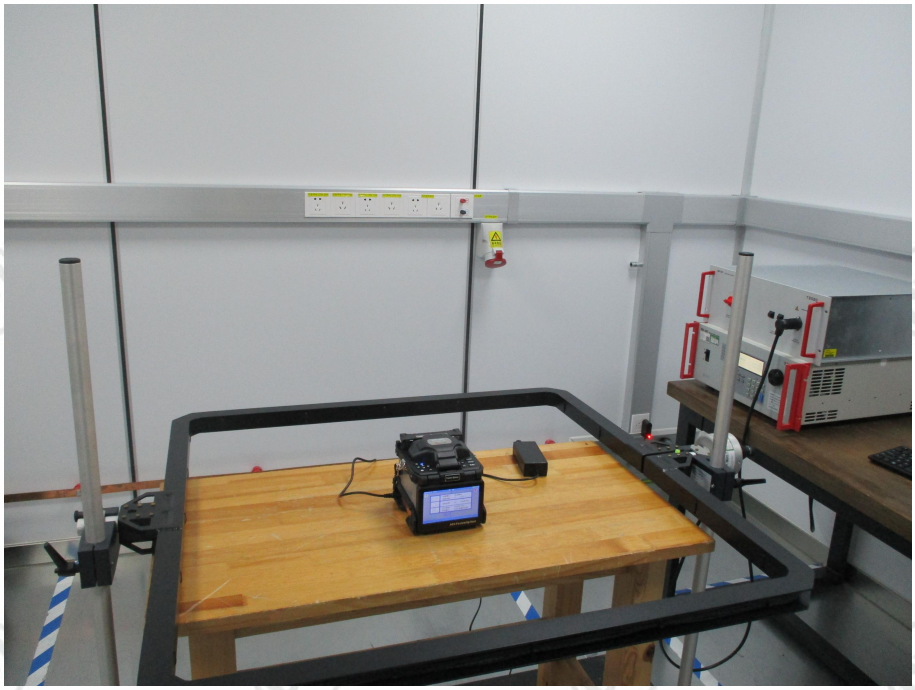
Electrical fast transient/burst immunity Test Setup

Surge immunity Test Setup



Immunity to conducted disturbances, induced by radio-frequency fields Test Setup

Power-frequency magnetic fields immunity Test Setup



Voltage dips, short interruptions and voltage variations Immunity Test Setup

APPENDIX 2 PHOTOGRAPHS OF PRODUCT

View of Product-1

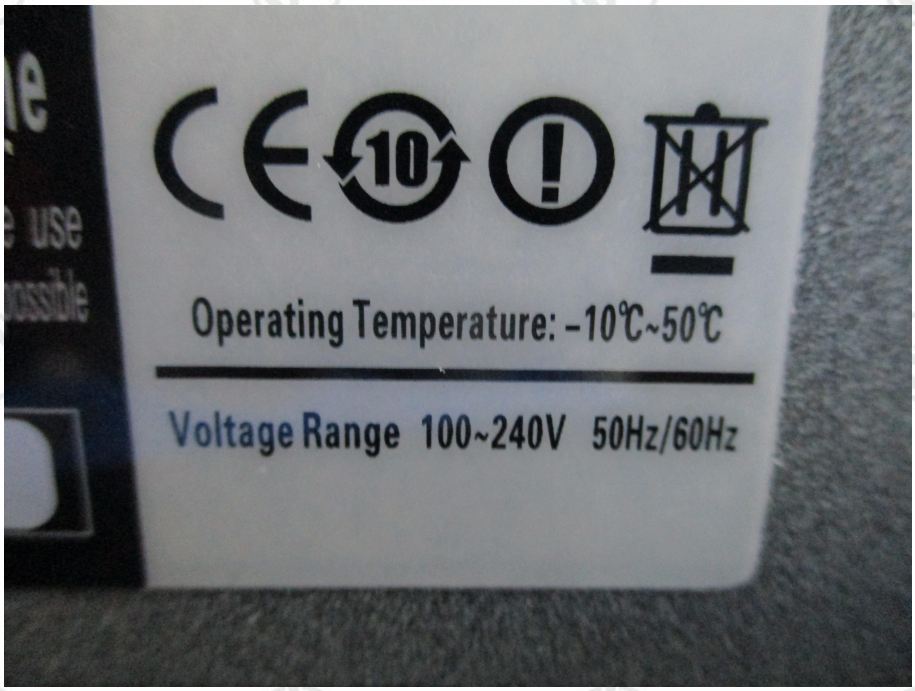
View of Product-2

View of Product-3

View of Product-4

View of Product-5

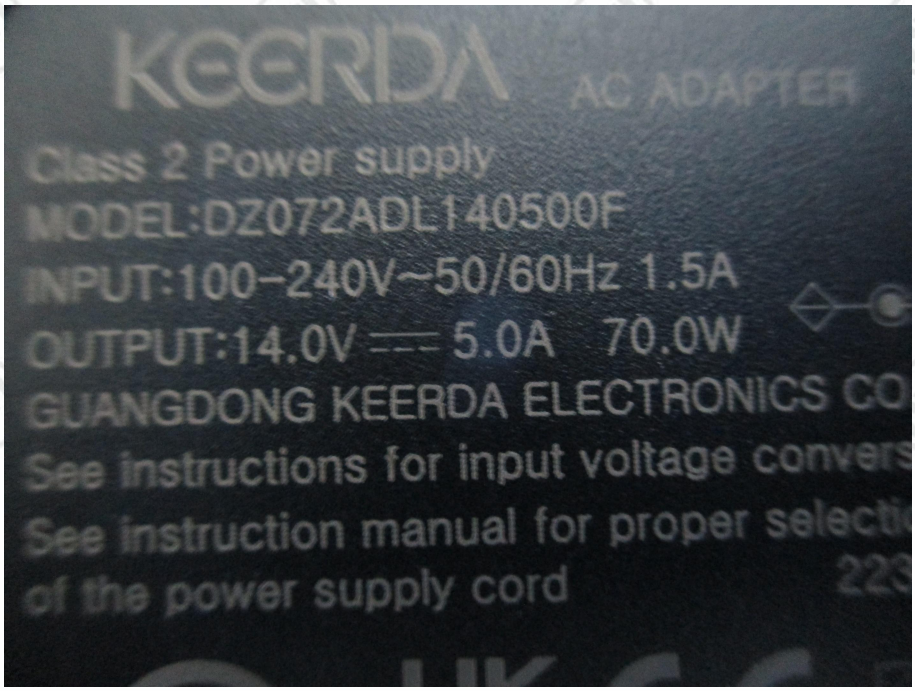
View of Product-6



View of Product-7

View of Product-8

View of Product-9



The testing data and results in this report are just for scientific research, education, internal quality control and product development etc.

*** End of Report ***

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