

EMC TEST REPORT

The device described above is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Dongguan Nore Testing Center Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Applicant/Manufacturer : TommaTech UG
Address : Angerlweg 14 85748 Garching HRB Nummer 213239 Amtsgericht München, Germany
Factory : VOLTRONIC POWER TECHNOLOGY (SHENZHEN) CORP.
Address : 1-4F, Building 5, Yusheng Industrial Park, No.467, Section Xixiang, National Highway 107, Xixiang, Bao An District, Shenzhen, China
E.U.T. : Inverter/Charger
Brand Name : TOMMATECH
Model No. : Tommatech New 1K
Measurement Standard : EN 55032: 2015
EN 61000-3-2: 2014, EN 61000-3-3: 2013
EN 55024:2010+A1:2015
(EN 61000-4-2: 2009, EN 61000-4-3: 2006+A2: 2010,
EN 61000-4-4: 2012, EN 61000-4-5: 2014,
EN 61000-4-6: 2014, EN 61000-4-11: 2004)
Date of Receiver : : February 24, 2018
Date of Test : : February 25, 2018 to March 15, 2018
Date of Report : : March 17, 2018

This Test Report is Issued Under the Authority of :

Prepared by

Approved & Authorized Signer

Bowen Zhu / Engineer

Iori Fan / Authorized Signatory

This report shows that the E.U.T. is technically compliant with the EN 55032, EN 61000-3-2, EN 61000-3-3 and EN 55024. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Appendix I (Photos of E.U.T.) (7 pages)



Revision History of This Test Report

Report Number	Description	Issued Date
NTC1802657EV00	Initial Issue	2018-03-17

1. SUMMARY OF TEST RESULTS

The E.U.T. has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 55032: 2015	Mains Terminal Disturbance Voltage Test	PASS	Uncertainty: 2.7dB
	Radiated Emission Test	PASS	Uncertainty: 3.4dB
EN 61000-3-2: 2014	Harmonic current emission	PASS	Meets the requirements.
EN 61000-3-3: 2013	Voltage fluctuations & flicker	PASS	Meets the requirements.

IMMUNITY(EN 55024:2010+A1:2015)			
Standard	Test Type	Result	Remarks
EN 61000-4-2: 2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-3: 2006+A2: 2010	Radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-4: 2012	Electrical fast transient/ burst immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-5: 2014	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-6: 2014	Injected Currents immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-11: 2004	Voltage Dips and Interruptions	PASS	Meets the requirements of Performance Criterion B&C

2. GENERAL INFORMATION

2.1 Details of E.U.T.

E.U.T.	: Inverter/Charger
Model No.	: Tommatech New 1K
Brand Name	: TOMMATECH
E.U.T. Type	: Class A
Operation Frequency	: Below 108MHz
Rating	: <u>Inverter Mode:</u> Rated Power: 1000W DC Input: 12VDC, 95A AC Output: 230VAC, 50/60Hz, 4.3A, 1Φ <u>AC Charger Mode:</u> AC Input: 230VAC, 50/60Hz, 5.9A, 1Φ DC Output: 13.5VDC, 20/10A AC Output: 230VAC, 50/60Hz, 4.3A, 1Φ <u>Solar Charger Mode:</u> Rated Current: 50A System Voltage: 12VDC Operating Voltage Range: 15~18Vdc Max. Solar Voltage (VOC): 55VDC
Test Voltage	: AC 230V / 50Hz, DC 12V External battery
Cable	: None
Description of model difference	: None
Remark	: None

2.2 Description of Support Device

None

2.3 Block Diagram of Test Setup

Block diagram of connection between the E.U.T. and simulators

(1) AC Charger Mode



(2) Inverter Mode



2.4 Test Facility

Site Description
EMC Lab

: Listed by CNAS, November 02, 2016
The certificate is valid until August 13, 2018
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by FCC, July 03, 2014
The Certificate Number is 665078.

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number is 46405-9743

Name of Firm 1

: Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location 1

: Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

Name of Firm 2

: Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch

Site Location 2

: No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China

2.5 Abnormalities from Standard Conditions

None

3. MEASURING DEVICES AND TEST EQUIPMENT

3.1 For Mains terminals Disturbance voltage Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 07, 2017	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 07, 2017	1 Year
3.	L.I.S.N	Schwarzbeck	NNLK8129	8129-212	Mar. 07, 2017	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 07, 2017	1 Year

3.2 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 07, 2017	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Apr. 25, 2017	1 Year
3.	Positioning Controller	UC	UC 3000	N/A	N/A	N/A
4.	Color Monitor	SUNSP0	SP-140A	N/A	N/A	N/A
5.	Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
6.	3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
7.	DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
8.	Cable	Huber+Suhner	CBL3-NN-9M	21490001	Mar. 07, 2017	1 Year
9.	Cable	Huber+Suhner	CIL02	N/A	Mar. 07, 2017	1 Year
10.	Power Amplifier	HP	HP 8447D	1145A00203	Mar. 07, 2017	1 Year

3.3 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	California Instruments	CTS	72846	Apr. 25, 2017	1 Year
2.	Software	California Instruments	CTS30	N/A	N/A	N/A

3.4 For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	432	Apr. 25, 2017	1 Year

3.5 For RF Electromagnetic Field Immunity Test

(Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter	ESE	4242	13984	Aug. 31, 2017	1 Year
2.	Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	N/A
3.	Signal Generator	Agilent	N5181A	MY501425 30	Aug. 31, 2017	1 Year
4.	Power Sensor	ESE	51011EMC	35716	Aug. 31, 2017	1 Year
5.	Antenna Log-Periodic	CORAD	ATR80M6G	0337307	Aug. 25, 2017	1 Year

3.6 For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS 500N	V1104108683	Mar. 07, 2017	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 07, 2017	1 Year
3.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

3.7 For Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EM TEST	UCS 500N	V1104108683	Mar. 07, 2017	1 Year
2.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

3.8 For Injected Currents Immunity Measurement

(Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch)

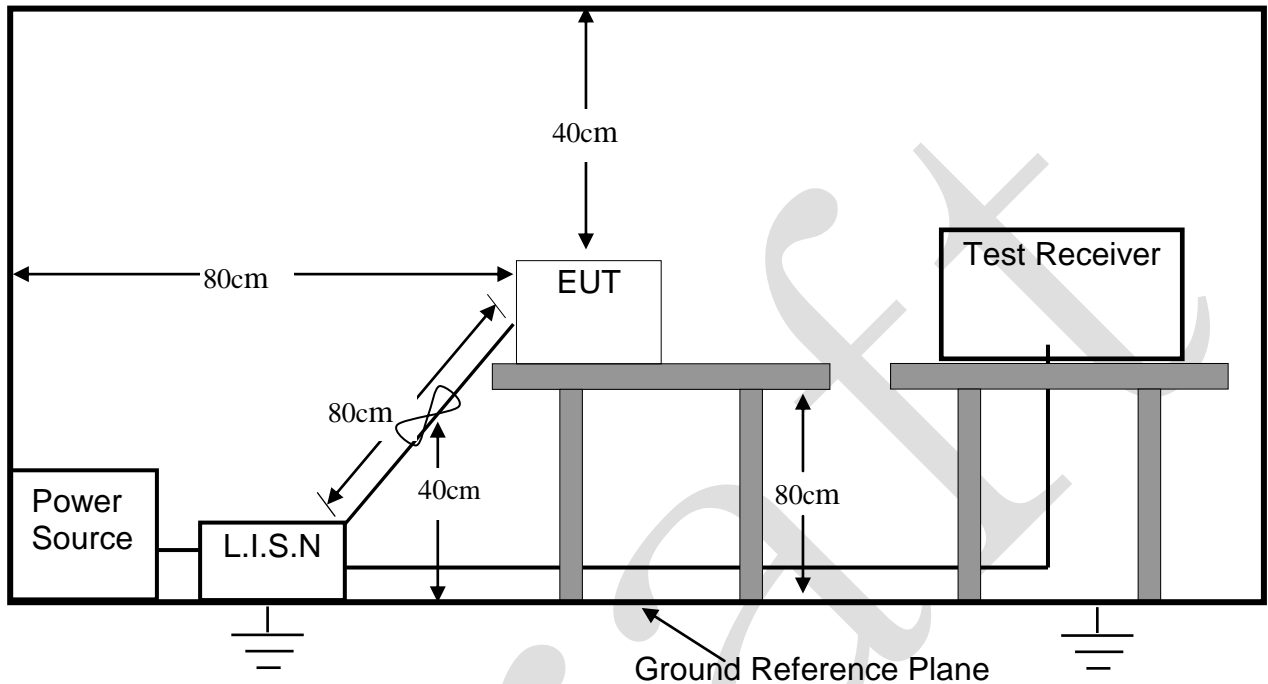
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CDN	Luthi	L-801M2/M3	2015	Oct.19, 2017	1 Year
2.	C/S Test System	HAEFELY	WinPAMP	NSEMC002	N/A	N/A

3.9 For Voltage Dips and Interruptions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	EM TEST	UCS500N	V110410868 3	Mar. 07, 2017	1 Year
2.	Test Soft	EM TEST	lec.control	N/A	N/A	N/A
3.	Dips Modulator	EM TEST	V4780S2	0111-11	Mar. 07, 2017	1 Year

4. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

4.1 Block Diagram of Test Setup



4.2 Limit of Mains Terminal Disturbance voltage measurement

Test Standard: EN 55032

Limits for conducted disturbance at the mains ports of class A ITE.

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

*Decreasing linearly with the logarithm of the frequency.

Note: 1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
 2. The higher value measured with and without the outer conductor screen of the antenna terminal connected to earth is considered.
 3. Television receivers with teletext facilities should be tested in teletext mode with teletext picture.

4.3 Test Procedure

The E.U.T. is put on the 0.8 m high table and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN55022 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9 KHz.

4.4 Operating Condition of E.U.T.

4.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

4.4.2 Turn on the power of all equipments.

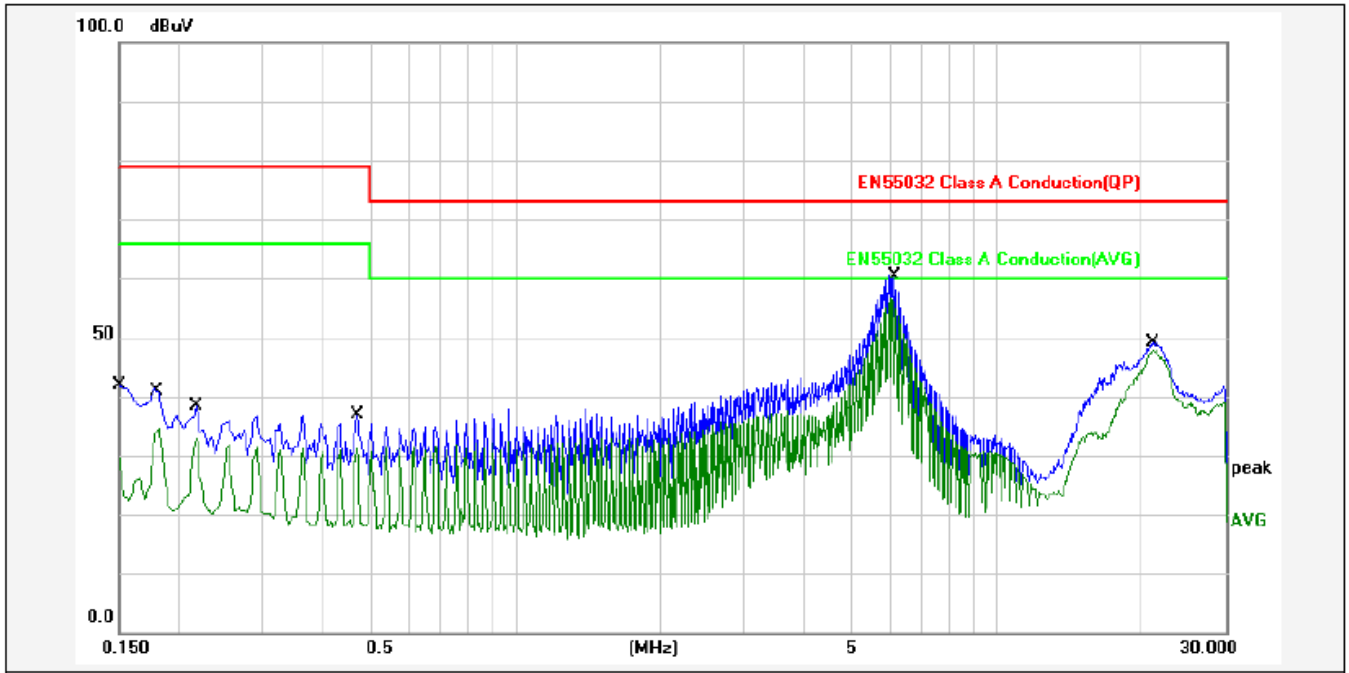
4.4.3 Let the E.U.T. work in modes (AC Charger Mode, Inverter Mode) and test it.

4.5 Mains Terminal Disturbance Voltage Test Results

PASS.

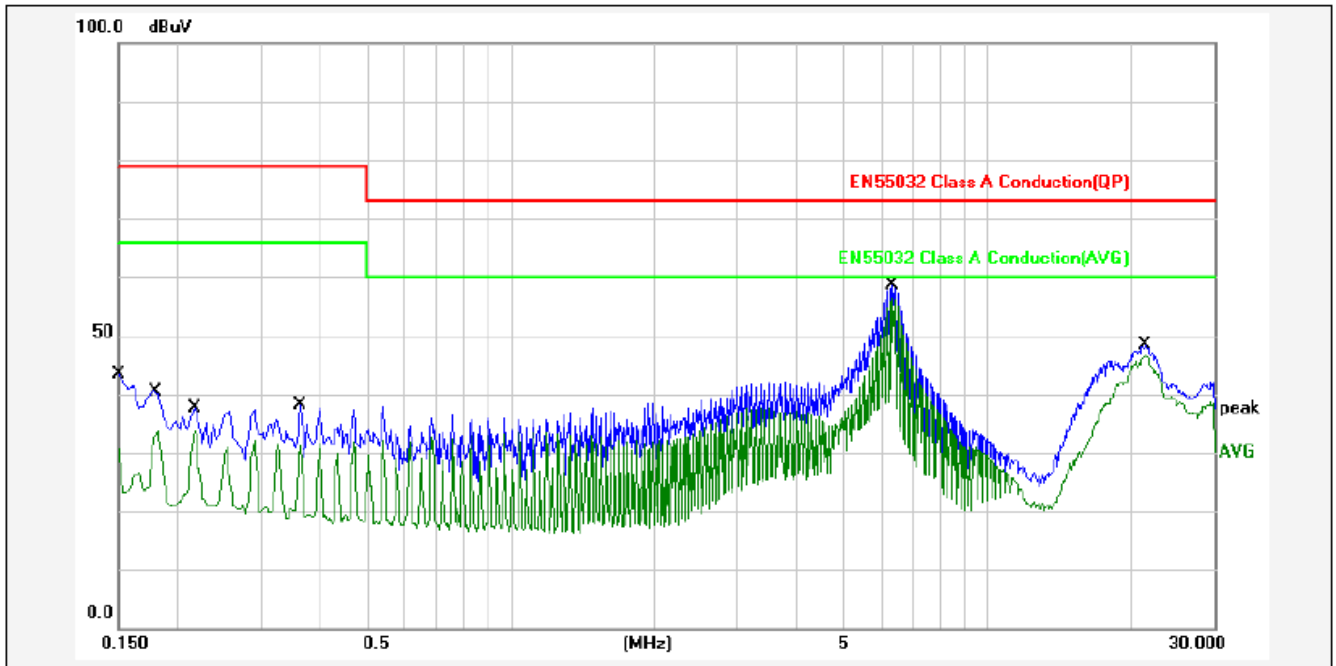
Please refer to the following pages.

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1006 hPa	Test Voltage:	DC 12V
Test Mode:	Inverter Mode	Phase:	Line



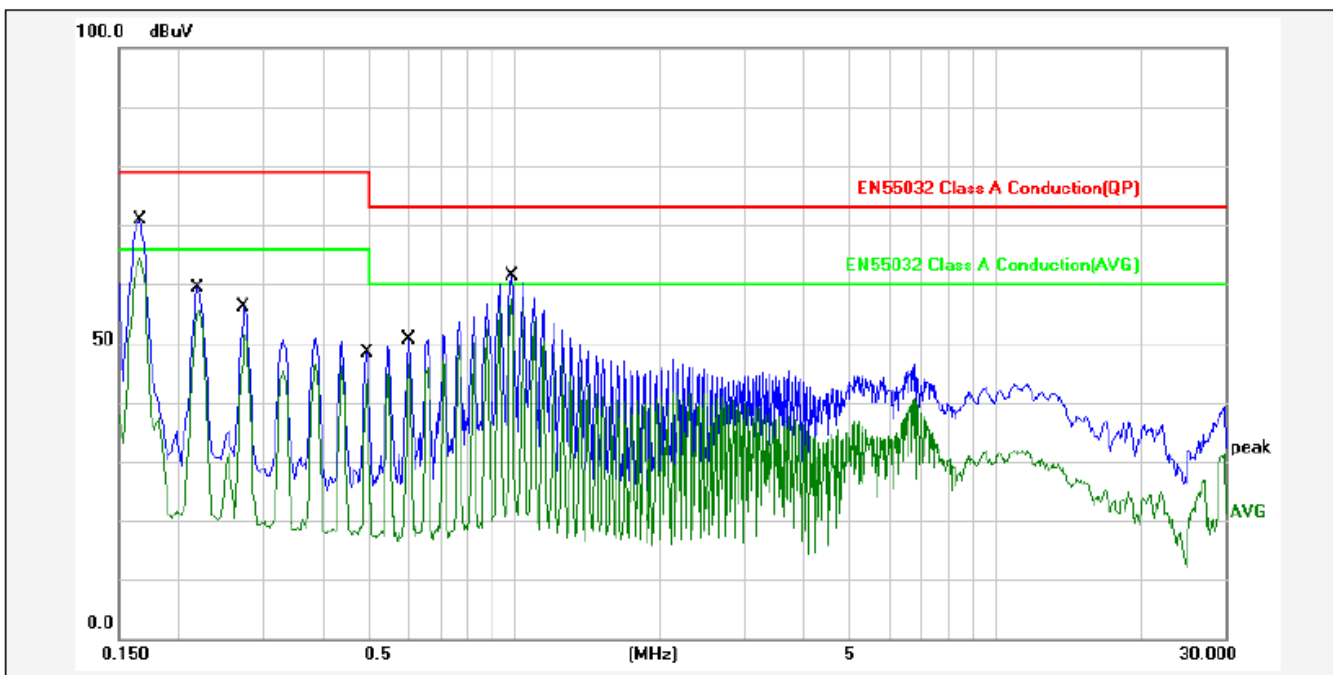
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	6.46	35.38	41.84	79.00	-37.16	QP	P	
2	0.1500	6.46	23.08	29.54	66.00	-36.46	AVG	P	
3	0.1819	6.43	34.91	41.34	79.00	-37.66	QP	P	
4	0.1819	6.43	28.24	34.67	66.00	-31.33	AVG	P	
5	0.2180	6.40	31.90	38.30	79.00	-40.70	QP	P	
6	0.2180	6.40	26.59	32.99	66.00	-33.01	AVG	P	
7	0.4700	6.33	30.56	36.89	79.00	-42.11	QP	P	
8	0.4700	6.33	24.87	31.20	66.00	-34.80	AVG	P	
9	6.0540	6.34	54.19	60.53	73.00	-12.47	QP	P	
10	6.0540	6.34	50.18	56.52	60.00	-3.48	AVG	P	
11	21.3819	6.59	42.65	49.24	73.00	-23.76	QP	P	
12	21.3819	6.59	41.41	48.00	60.00	-12.00	AVG	P	

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1006 hPa	Test Voltage:	DC 12V
Test Mode:	Inverter Mode	Phase:	Neutral



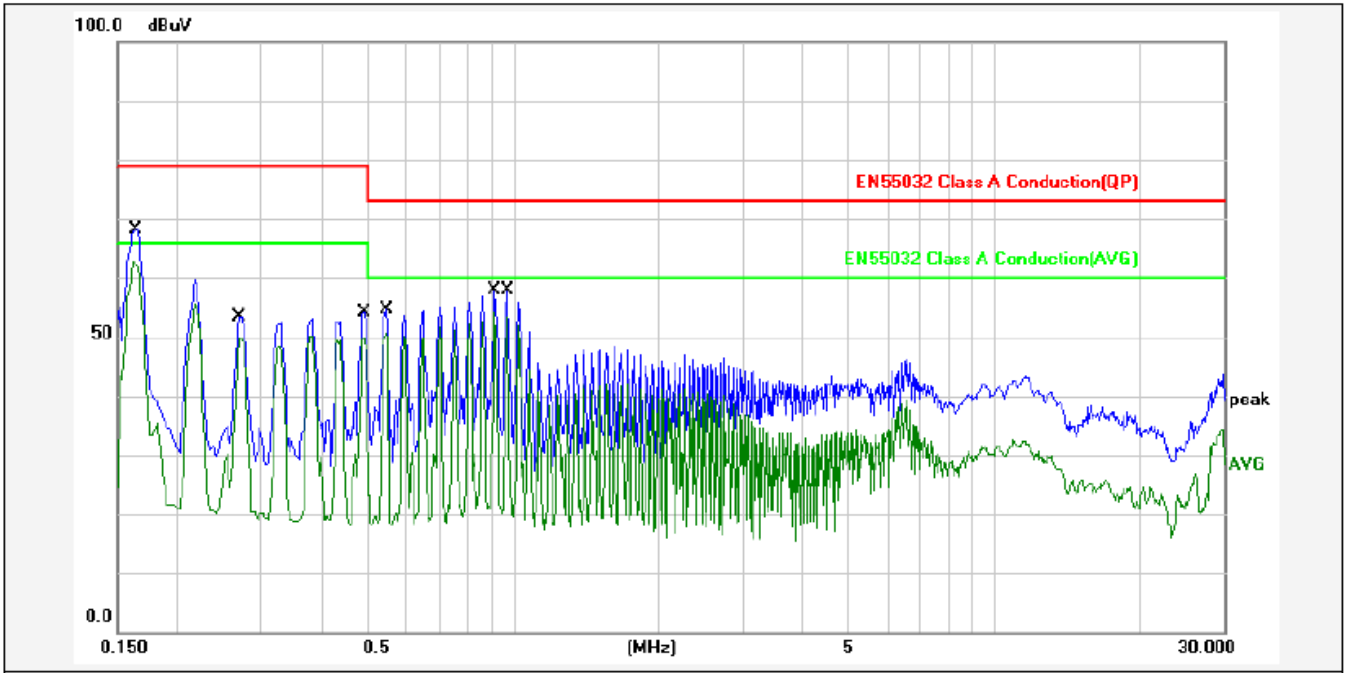
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	6.46	36.88	43.34	79.00	-35.66	QP	P	
2	0.1500	6.46	24.22	30.68	66.00	-35.32	AVG	P	
3	0.1819	6.43	34.22	40.65	79.00	-38.35	QP	P	
4	0.1819	6.43	27.17	33.60	66.00	-32.40	AVG	P	
5	0.2179	6.40	31.27	37.67	79.00	-41.33	QP	P	
6	0.2179	6.40	27.21	33.61	66.00	-32.39	AVG	P	
7	0.3619	6.33	31.90	38.23	79.00	-40.77	QP	P	
8	0.3619	6.33	24.72	31.05	66.00	-34.95	AVG	P	
9	6.3500	6.34	52.40	58.74	73.00	-14.26	QP	P	
10	6.3500	6.34	50.04	56.38	60.00	-3.62	AVG	P	
11	21.5459	6.59	41.76	48.35	73.00	-24.65	QP	P	
12	21.5459	6.59	39.98	46.57	60.00	-13.43	AVG	P	

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	AC Charger Mode	Phase:	Line



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1660	6.45	63.75	70.20	79.00	-8.80	QP	P	
2	0.1660	6.45	57.35	63.80	66.00	-2.20	AVG	P	
3	0.2220	6.40	53.09	59.49	79.00	-19.51	QP	P	
4	0.2220	6.40	49.12	55.52	66.00	-10.48	AVG	P	
5	0.2740	6.35	49.89	56.24	79.00	-22.76	QP	P	
6	0.2740	6.35	45.13	51.48	66.00	-14.52	AVG	P	
7	0.4940	6.33	42.15	48.48	79.00	-30.52	QP	P	
8	0.4940	6.33	37.54	43.87	66.00	-22.13	AVG	P	
9	0.6020	6.33	44.42	50.75	73.00	-22.25	QP	P	
10	0.6020	6.33	40.11	46.44	60.00	-13.56	AVG	P	
11	0.9860	6.33	54.37	60.70	73.00	-12.30	QP	P	
12	0.9860	6.33	51.67	58.00	60.00	-2.00	AVG	P	

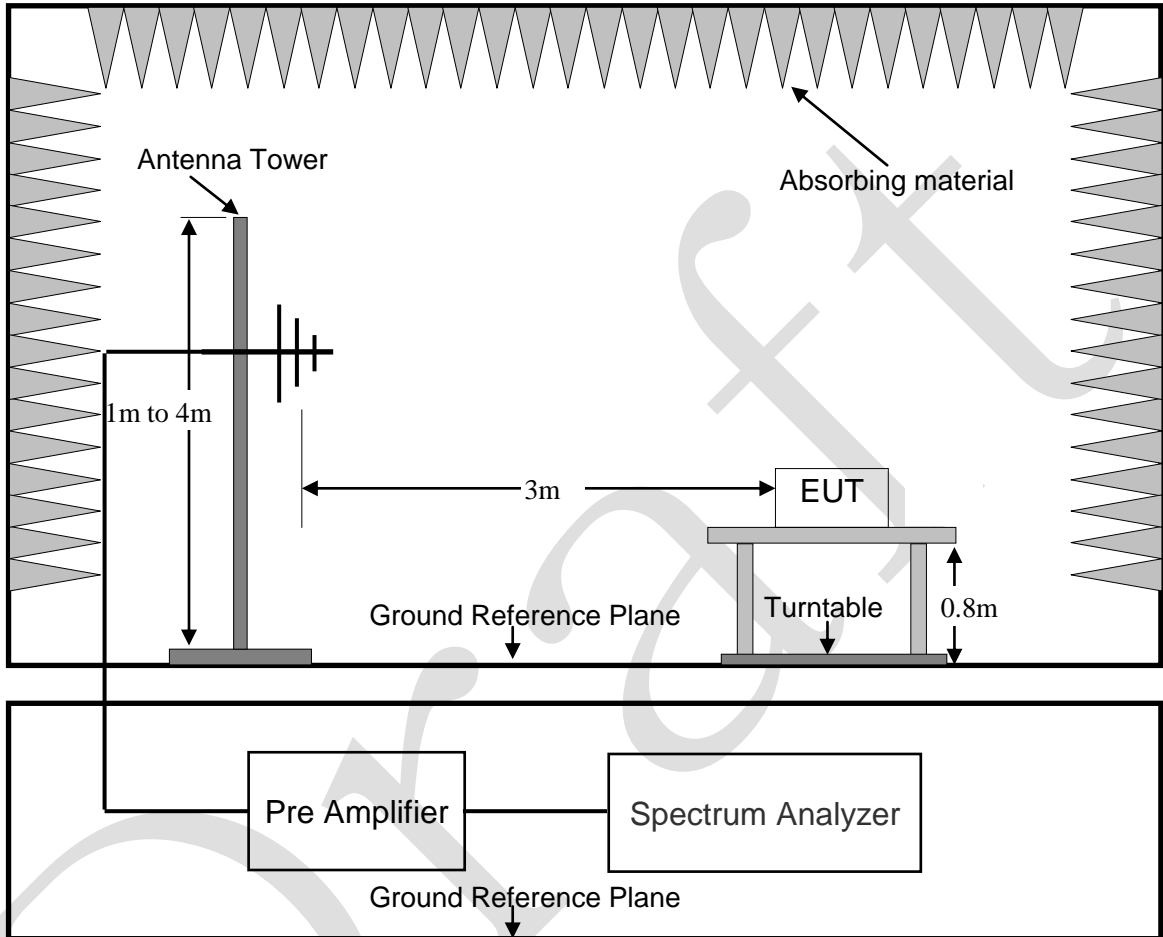
E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	26 °C	Relative Humidity:	55%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	AC Charger Mode	Phase:	Neutral



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	6.45	61.76	68.21	79.00	-10.79	QP	P	
2	0.1620	6.45	56.14	62.59	66.00	-3.41	AVG	P	
3	0.2700	6.35	47.10	53.45	79.00	-25.55	QP	P	
4	0.2700	6.35	43.46	49.81	66.00	-16.19	AVG	P	
5	0.4899	6.33	47.84	54.17	79.00	-24.83	QP	P	
6	0.4899	6.33	43.46	49.79	66.00	-16.21	AVG	P	
7	0.5460	6.33	48.27	54.60	73.00	-18.40	QP	P	
8	0.5460	6.33	44.32	50.65	60.00	-9.35	AVG	P	
9	0.9180	6.33	51.44	57.77	73.00	-15.23	QP	P	
10	0.9180	6.33	47.74	54.07	60.00	-5.93	AVG	P	
11	0.9699	6.33	51.51	57.84	73.00	-15.16	QP	P	
12	0.9699	6.33	47.07	53.40	60.00	-6.60	AVG	P	

5. RADIATED EMISSION MEASUREMENT

5.1 Block Diagram of Test



5.2 Limit of Radiated Emission Measurement

Test Standard: EN 55032

Limits for radiated disturbance of class A ITE at a measuring distance of 3m
 Limits below 1GHz

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	50
230 to 1000	57

Note 1 The lower limit shall apply at the transition frequency.
 Note 2 Additional provisions may be required for cases where interference occurs.

5.3 Test Procedure

E.U.T. and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. E.U.T. is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to EN 55032 on radiated emission measurement.

The bandwidth of the EMI test receiver (R&S ESC17) is set at 120 KHz. The frequency range from 30 MHz to 1000 MHz is checked.

5.4 Operating Condition of E.U.T.

5.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

5.4.2 Turn on the power of all equipments.

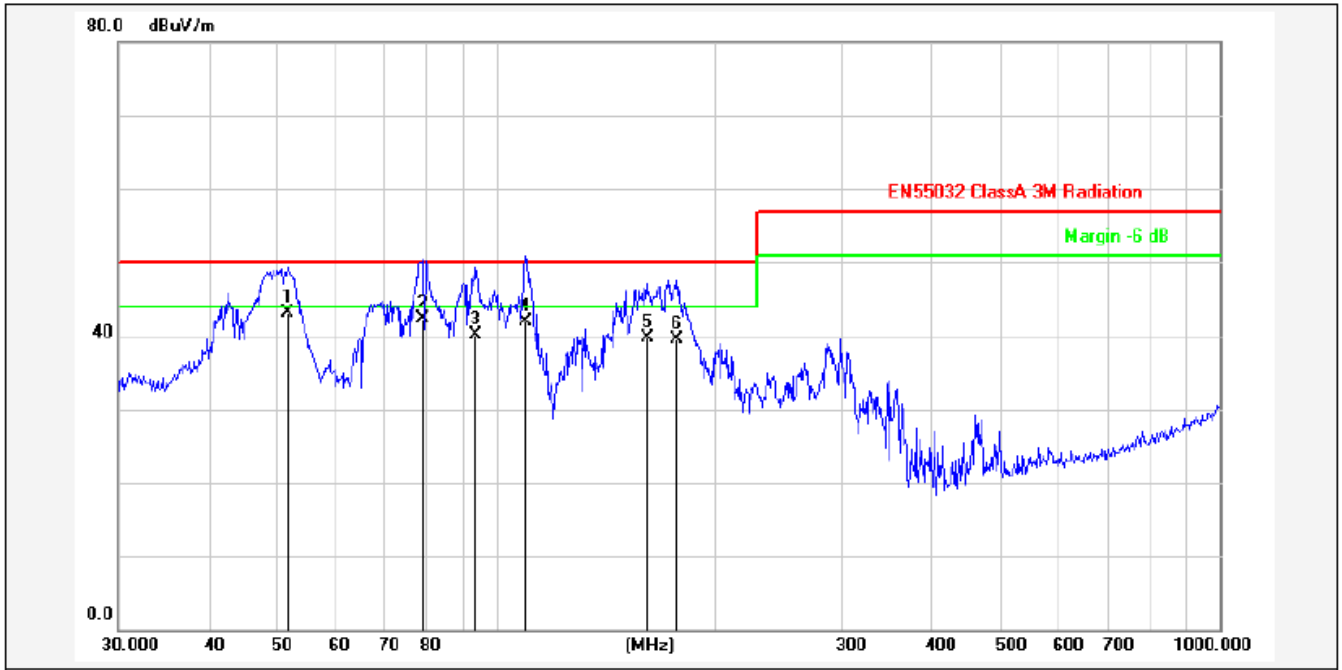
5.4.3 Let the E.U.T. work in modes (AC Charger Mode, Inverter Mode) and test it.

5.5 Radiated Emission Measurement Result

PASS.

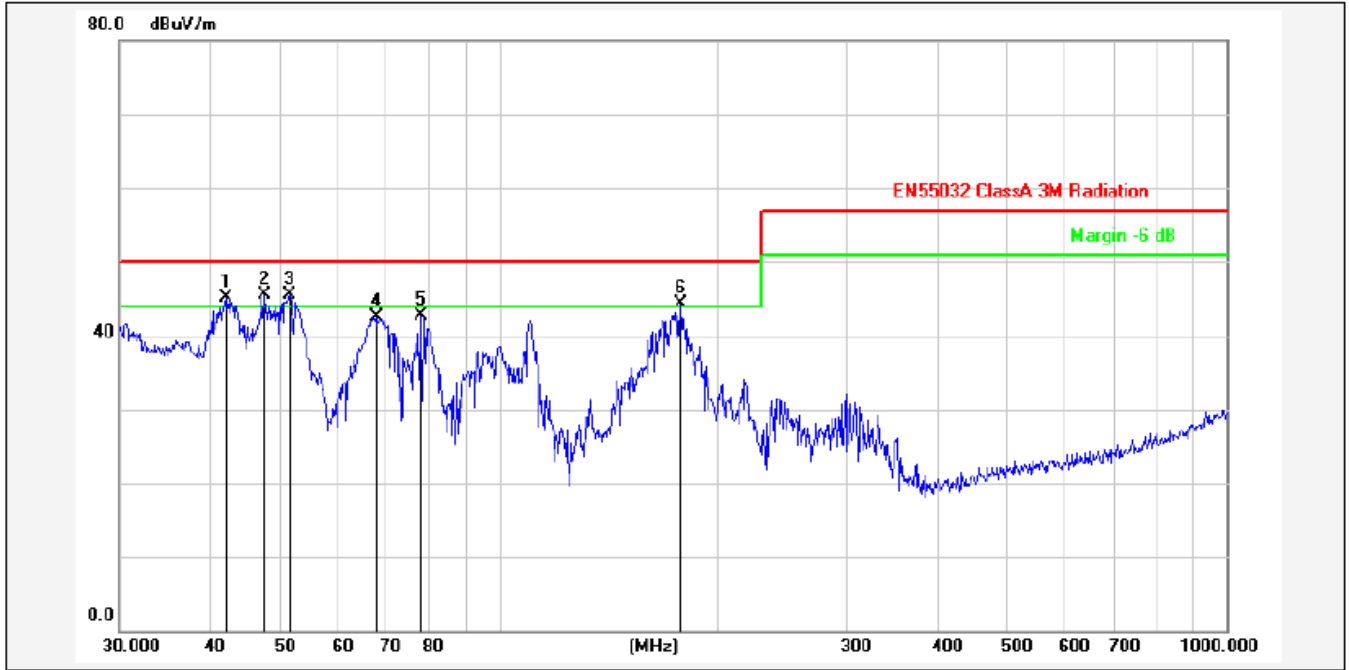
Please refer to the following pages.

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	25 °C	Relative Humidity:	58%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	AC Charger Mode	Phase:	Horizontal



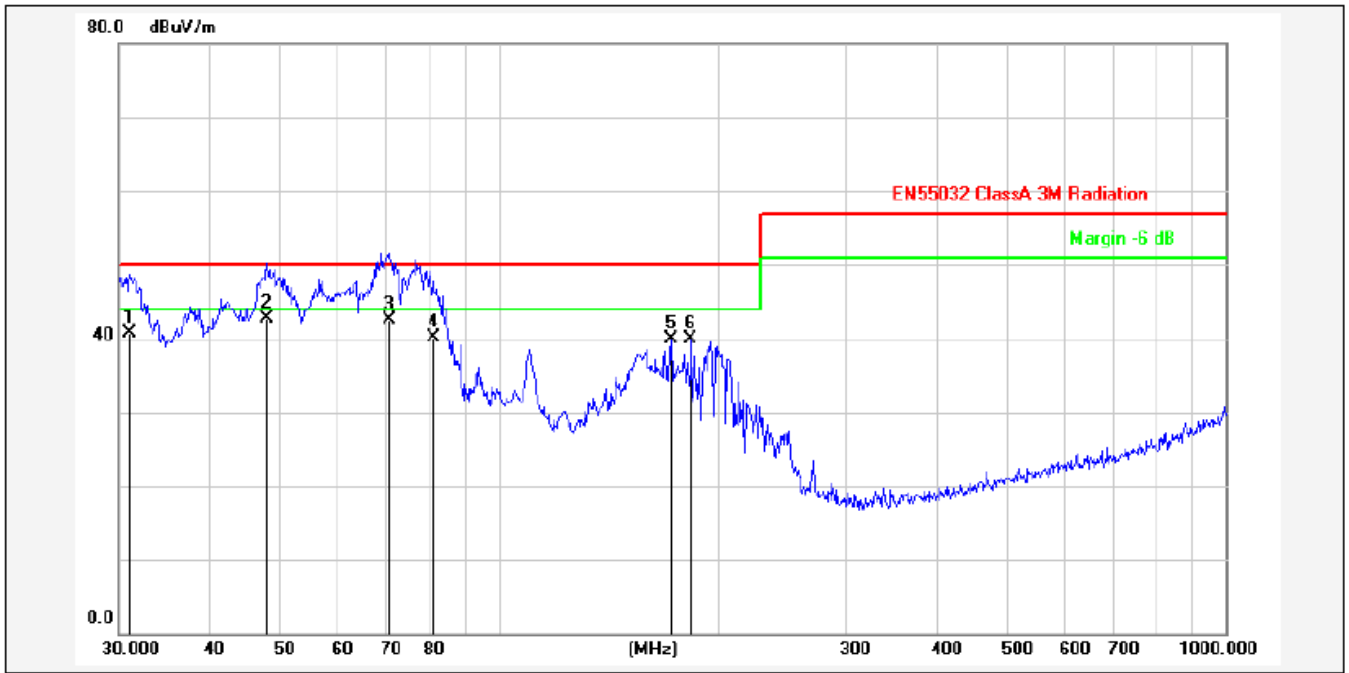
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	51.4807	-11.56	54.66	43.10	50.00	-6.90	QP			P	
2	79.2426	-9.75	51.98	42.23	50.00	-7.77	QP			P	
3	93.7685	-7.35	47.45	40.10	50.00	-9.90	QP			P	
4	109.7960	-6.05	47.95	41.90	50.00	-8.10	QP			P	
5	161.4742	-6.81	46.61	39.80	50.00	-10.20	QP			P	
6	177.5092	-7.46	46.89	39.43	50.00	-10.57	QP			P	

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	25 °C	Relative Humidity:	58%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	AC Charger Mode	Phase:	Vertical



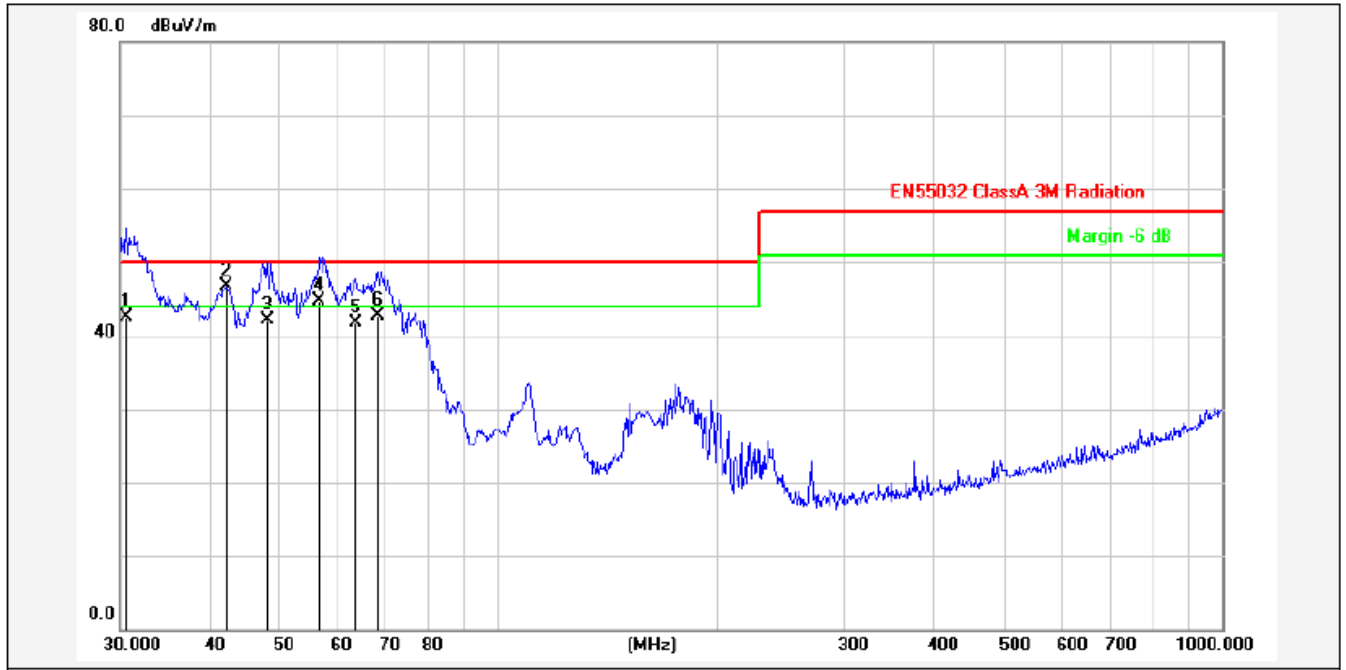
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	42.1542	-7.56	52.67	45.11	50.00	-4.89	QP			P	
2	47.4918	-10.04	55.60	45.56	50.00	-4.44	QP			P	
3	51.4807	-11.56	57.11	45.55	50.00	-4.45	QP			P	
4	67.9129	-12.38	54.97	42.59	50.00	-7.41	QP			P	
5	78.1389	-10.36	52.98	42.62	50.00	-7.38	QP			P	
6	177.5092	-7.46	51.80	44.34	50.00	-5.66	QP			P	

E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	25 °C	Relative Humidity:	58%
Pressure:	1006 hPa	Test Voltage:	DC 12V
Test Mode:	Inverter Mode	Phase:	Horizontal



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	31.0706	-1.00	41.80	40.80	50.00	-9.20	QP			P	
2	47.9940	-9.67	52.46	42.79	50.00	-7.21	QP			P	
3	70.5836	-11.98	54.48	42.50	50.00	-7.50	QP			P	
4	81.2117	-8.86	48.96	40.10	50.00	-9.90	QP			P	
5	172.5988	-7.26	47.17	39.91	50.00	-10.09	QP			P	
6	183.8440	-7.69	47.69	40.00	50.00	-10.00	QP			P	

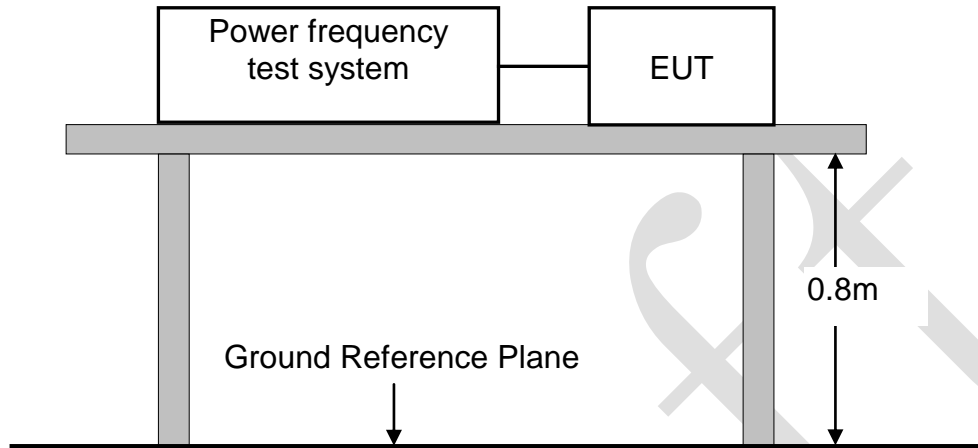
E.U.T:	Inverter/Charger	Model Name:	Tommatech New 1K
Temperature:	25 °C	Relative Humidity:	58%
Pressure:	1006 hPa	Test Voltage:	DC 12V
Test Mode:	Inverter Mode	Phase:	Vertical



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.6379	-3.60	46.10	42.50	50.00	-7.50	QP			P	
2	42.1542	-7.56	54.25	46.69	50.00	-3.31	QP			P	
3	47.9940	-10.27	52.40	42.13	50.00	-7.87	QP			P	
4	56.5929	-12.80	57.52	44.72	50.00	-5.28	QP			P	
5	63.5356	-13.07	54.84	41.77	50.00	-8.23	QP			P	
6	68.1514	-12.35	55.01	42.66	50.00	-7.34	QP			P	

6. HARMONIC CURRENT EMISSION TEST

6.1 Block Diagram of Test Setup



6.2 Limits of Harmonics current measurement

Test Standard: EN 61000-3-2

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics				
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15 ≤ n ≤ 39	0.15 × 15/n	15 ≤ n ≤ 39	3.85/n	0.15 × 15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8 ≤ n ≤ 40	0.23 × 8/n			

For the following categories of equipment limits are not specified in this edition of the standard.

Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.

6.3 Test Procedure

The E.U.T. was put on the top of a wooden table 0.8m above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The E.U.T. is classified as follows:

Class A:

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

Class B:

Portable tools; Arc welding equipment which is not professional equipment.

Class C:

Lighting equipment.

Class D:

Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.

6.4 Operating Condition of E.U.T.

6.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

6.4.2 Turn on the power of all equipments.

6.4.3 Let the E.U.T. work in test mode (AC Charger Mode) and test it.

6.5 Test Results

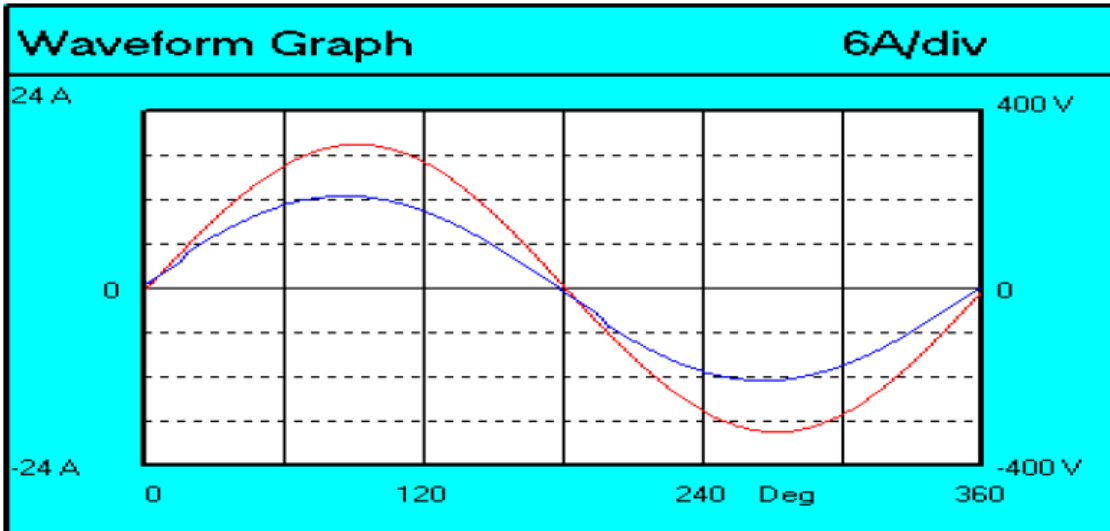
PASS.

Please refer to the following page.

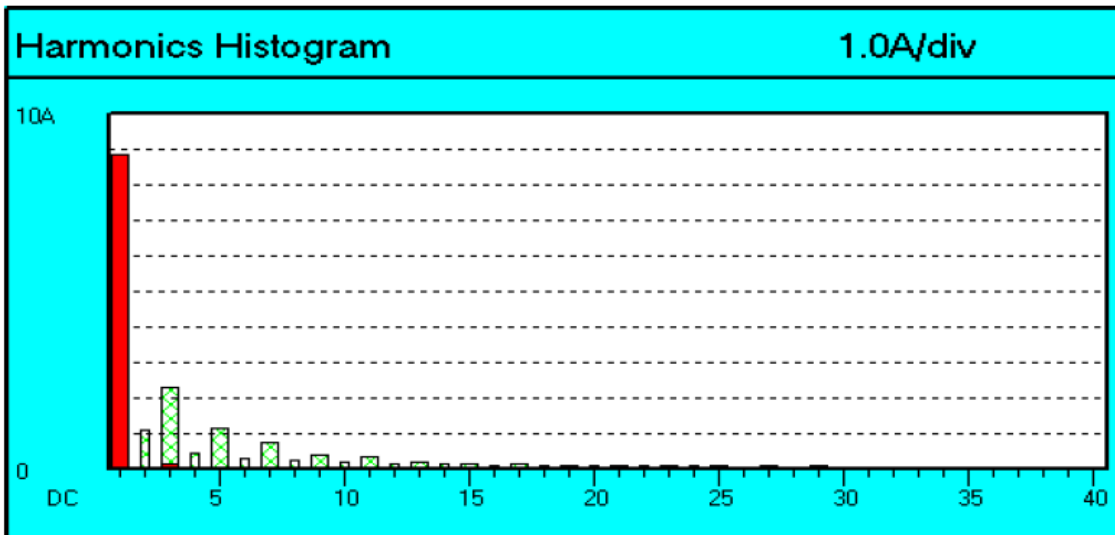
Harmonics – Class-A per Ed. 3.2 (Run time)

EUT: Inverter/Charger
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Test date: 2018-03-01
Test duration (min): 2.5
Comment: AC Charger Mode
Customer: VOLTRONIC POWER TECHNOLOGY (SHENZHEN) CORP.
Model: Tommatech New 1K
Test Result: Pass
Source qualification: Normal

Tested by: KONTER
Test Margin: 100
Start time: 16:04:40
End time: 16:13:31
Data file name: H-000806.cts_data



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #9 with 25.86% of the limit.

Current Test Result Summary (Run time)

Report Number : NTC1802657EV00
 Tested On : 01 March 2018 16:04 for 150 Seconds.
 Equipment Under Test : Inverter/Charger
 Serial Number : Tommatech New 1K
 Tested by : Louis

 Supply Voltage : 228.8 Vrms 325.0 Vpk Frequency : 50.00 Hz
 Supply Meets EN Requirements

Load Power : 2.042 kW 2.037 kVA Power Factor 0.998
 Load Current : 8.8 Arms 12.5 Apk Crest Factor 1.408
 THC(A):0.18 I-THD(%):2.0

Limits Applied : EN61000-3-2:2014 Class A Limits Apply.

Harmonic Number	Limit Current Amp	Average (filtered) Amp	% Limit	max. Value (Filtered) Amp	% Limit	Assessment
Fundamental :		8.859				
2 :	1.080	0.005	0.5	0.006	0.6	Pass
3 :	2.300	0.133	5.8	0.149	6.5	Pass
4 :	0.430	0.003	0.7	0.004	0.9	Pass
5 :	1.140	0.054	4.7	0.066	5.8	Pass
6 :	0.300	0.002	0.7	0.003	1.0	Pass
7 :	0.770	0.040	5.2	0.046	6.0	Pass
8 :	0.230	0.002	0.9	0.002	0.9	Pass
9 :	0.400	0.032	8.0	0.039	9.8	Pass
10 :	0.184	0.001	0.5	0.002	1.1	Pass
11 :	0.330	0.025	7.6	0.030	9.1	Pass
12 :	0.153	0.001	0.7	0.002	1.3	Pass
13 :	0.210	0.022	10.5	0.025	11.9	Pass
14 :	0.131	0.001	0.8	0.002	1.5	Pass
15 :	0.150	0.019	12.7	0.023	15.3	Pass
16 :	0.115	0.001	0.9	0.002	1.7	Pass
17 :	0.132	0.017	12.9	0.020	15.2	Pass
18 :	0.102	0.001	1.0	0.002	2.0	Pass
19 :	0.118	0.015	12.7	0.017	14.4	Pass
20 :	0.092	0.001	1.1	0.002	2.2	Pass
21 :	0.107	0.014	13.1	0.016	15.0	Pass
22 :	0.084	0.001	1.2	0.002	2.4	Pass
23 :	0.098	0.013	13.3	0.015	15.3	Pass
24 :	0.077	0.001	1.3	0.002	2.6	Pass
25 :	0.090	0.012	13.3	0.014	15.6	Pass
26 :	0.071	0.001	1.4	0.002	2.8	Pass
27 :	0.083	0.012	14.5	0.013	15.7	Pass
28 :	0.066	0.001	1.5	0.002	3.0	Pass
29 :	0.078	0.011	14.1	0.012	15.4	Pass
30 :	0.061	0.001	1.6	0.002	3.3	Pass
31 :	0.073	0.010	13.7	0.012	16.4	Pass
32 :	0.057	0.001	1.8	0.002	3.5	Pass
33 :	0.068	0.010	14.7	0.011	16.2	Pass
34 :	0.054	0.001	1.9	0.002	3.7	Pass
35 :	0.064	0.010	15.6	0.011	17.2	Pass
36 :	0.051	0.001	2.0	0.002	3.9	Pass
37 :	0.061	0.009	14.8	0.010	16.4	Pass
38 :	0.048	0.001	2.1	0.002	4.2	Pass
39 :	0.058	0.009	15.5	0.010	17.2	Pass
40 :	0.046	0.001	2.2	0.002	4.3	Pass
21 - 39 :	0.251	0.035	13.9	0.041	16.3	POHC

Voltage Source Verification Data (Run time)

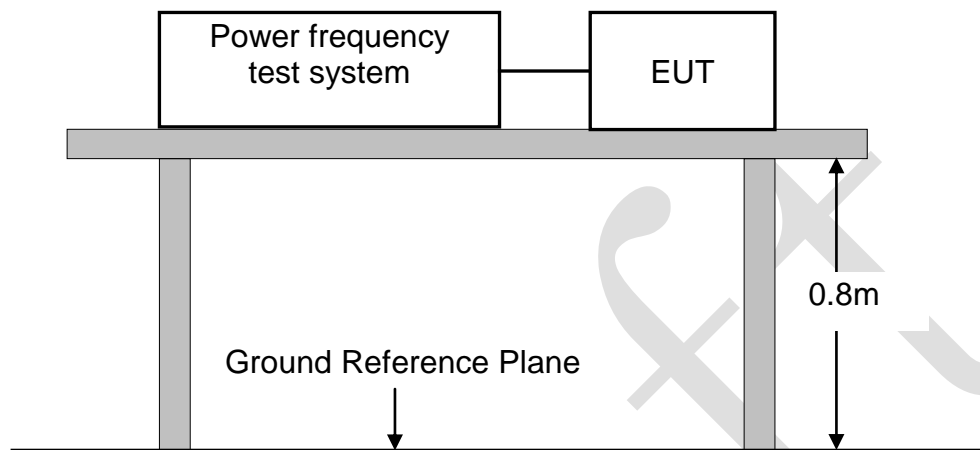
Report Number : NTC1802657EV00
 Tested On : 01 March 2018 16:04 for 150 Seconds.
 Equipment Under Test : Inverter/Charger
 Serial Number : Tommatech New 1K
 Tested by : Louis

	Nominal	Measured Low	Measured High	Deviation	Allowed Deviation	Result
Supply Voltage	: 230	229.09	229.83	-0.90	4.60	PASS
Supply Frequency	: 50	49.99	50.01	-0.01	0.25	PASS
Crest Phase	: 90.0	89.4	90.3	-0.6	3.0	PASS
Crest Factor	: 1.414	1.413	1.415	0.001	-0.014/+0.006	PASS
Fundamental Voltage	: 229.51	-	-	-	-	-

Harmonic	Harmonic Voltage	Harmonic Ratio	Limit	Result
2	0.04	0.071	0.20	PASS
3	0.10	0.157	0.90	PASS
4	0.07	0.036	0.20	PASS
5	0.11	0.066	0.40	PASS
6	0.03	0.029	0.20	PASS
7	0.07	0.054	0.30	PASS
8	0.02	0.013	0.20	PASS
9	0.03	0.026	0.20	PASS
10	0.01	0.008	0.10	PASS
11	0.03	0.019	0.10	PASS
12	0.00	0.008	0.10	PASS
13	0.02	0.015	0.10	PASS
14	0.00	0.003	0.10	PASS
15	0.02	0.015	0.10	PASS
16	0.01	0.005	0.10	PASS
17	0.02	0.011	0.10	PASS
18	0.00	0.003	0.10	PASS
19	0.01	0.009	0.10	PASS
20	0.00	0.003	0.10	PASS
21	0.01	0.009	0.10	PASS
22	0.00	0.003	0.10	PASS
23	0.02	0.010	0.10	PASS
24	0.00	0.003	0.10	PASS
25	0.01	0.010	0.10	PASS
26	0.00	0.003	0.10	PASS
27	0.02	0.009	0.10	PASS
28	0.00	0.003	0.10	PASS
29	0.02	0.009	0.10	PASS
30	0.00	0.003	0.10	PASS
31	0.01	0.009	0.10	PASS
32	0.00	0.003	0.10	PASS
33	0.02	0.010	0.10	PASS
34	0.00	0.003	0.10	PASS
35	0.02	0.009	0.10	PASS
36	0.00	0.003	0.10	PASS
37	0.01	0.008	0.10	PASS
38	0.00	0.003	0.10	PASS
39	0.01	0.008	0.10	PASS
40	0.00	0.003	0.10	PASS

7. VOLTAGE FLUCTUATIONS & FLICKER TEST

7.1 Block Diagram of Test Setup



7.2 Limits of Voltage Fluctuations & Flicker Measurement

Test Standard: EN 61000-3-3

Test Item	Limit
P_{st} (Short-term flicker indicator.)	1.0
P_{lt} (Long-term flicker indicator.)	0.65
$T_{d(t)}$ (ms) (Maximum time that $d(t)$ exceeds 3.3%)	500
d_{max} (%) (Maximum relative voltage change.)	4
d_c (%) (Relative steady-state voltage change)	3.3

7.3 Test Procedure

The E.U.T. was put on the top of a wooden table 0.8m above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

7.4 Operating Condition of E.U.T.

7.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

7.4.2 Turn on the power of all equipments.

7.4.3 Let the E.U.T. work in test mode (AC Charger Mode) and test it.

7.5 Test Results

PASS.

Please refer to the following page.

Draft

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

Report Number : NTC1802657EV00
 Tested On : 01 March 2018 17:08 for 600 Seconds.
 Equipment Under Test : Inverter/Charger
 Serial Number : Tommatech New 1K
 Tested by : Louis

Load Power : 2.223 kW 2.289 kVA Power Factor 0.971
 Load Current : 8.2 Arms 10.9 Apk Crest Factor 1.247

EN 61000-3-3:2013 - Voltage reduction is positive

Voltage Variations

Nominal Voltage: 230 Vrms
 Highest Half-cycle level: -0.17%
 Lowest Half-cycle level: +0.52%

d(max): -0.35% Limit: 4% PASS
 t(max): 0.00seconds Limit: 500ms PASS

Steady State definition: >1000ms within +/- 0.2%
 Largest d(c) change down: +0.18%
 Largest d(c) change up: -0.39%
 Largest d(c) change: -0.39% Limit: 3.3% PASS

Flicker

Pst Classifier		Plt Calculation	
Duration	Flicker	Interval	Pst
0.1%	0.16		
0.7%	0.02		
1.0%	0.02		
1.5%	0.02		
2.2%	0.02		
3%	0.02		
4%	0.01		
6%	0.01		
8%	0.01		
10%	0.01		
13%	0.01		
17%	0.01		
30%	0.00		
50%	0.00		
80%	0.00		

8. PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard: EN 55024

Performance Criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

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 replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after 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.

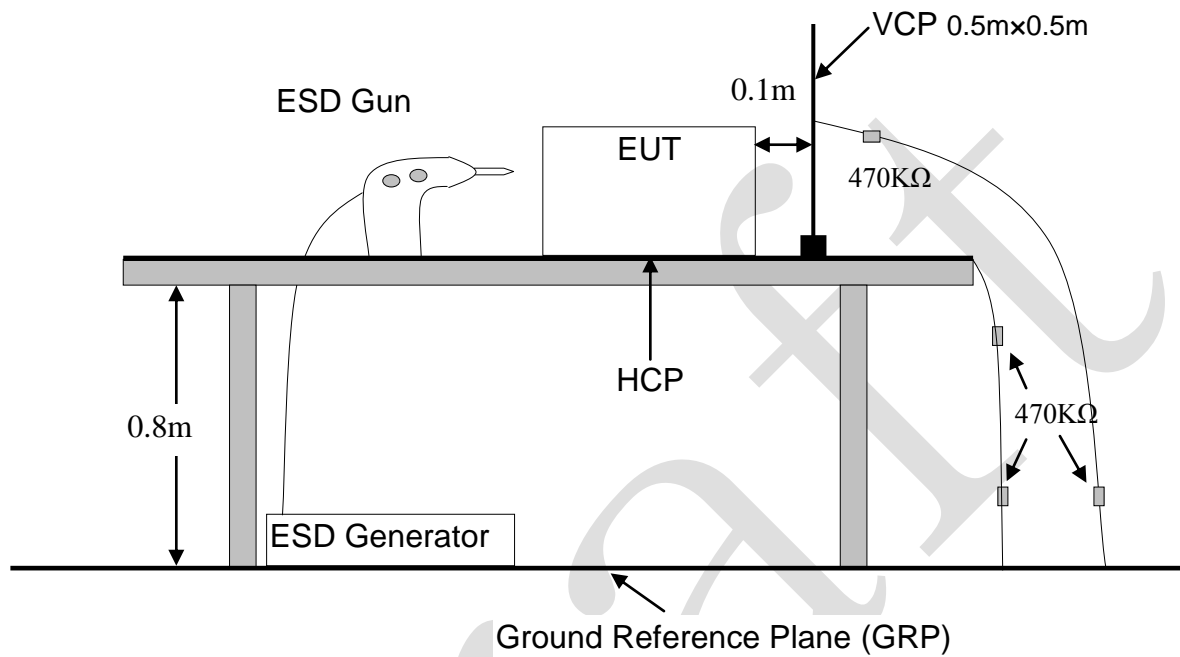
Performance Criteria C

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.

9. ELECTROSTATIC DISCHARGE TEST

9.1 Block Diagram of Test Setup



9.2 Test Standard and Severity Levels

9.2.1 Test Standard:

EN 55024

(EN 61000-4-2, Air Discharge: Severity Level: 3, ± 8KV;

Contact Discharge: Level: 2, ± 4KV)

9.2.2 Severity Levels:

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

9.3 Test Procedure

9.3.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the E.U.T.. After each discharge, the discharge electrode shall be removed from the E.U.T.. The generator is then re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

9.3.2 Contact Discharge:

All the procedure shall be same as Section 9.3.1. except that the tip of the discharge electrode shall touch the E.U.T. and the generator is then re-triggered for a new single discharge and repeated 50 times for each pre-selected test point.

9.3.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges(in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit(if applicable) of the E.U.T. and 0.1m from the front of the E.U.T.. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

9.3.4 Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the E.U.T.. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the E.U.T. are completely illuminated.

9.4 Test Results

PASS.

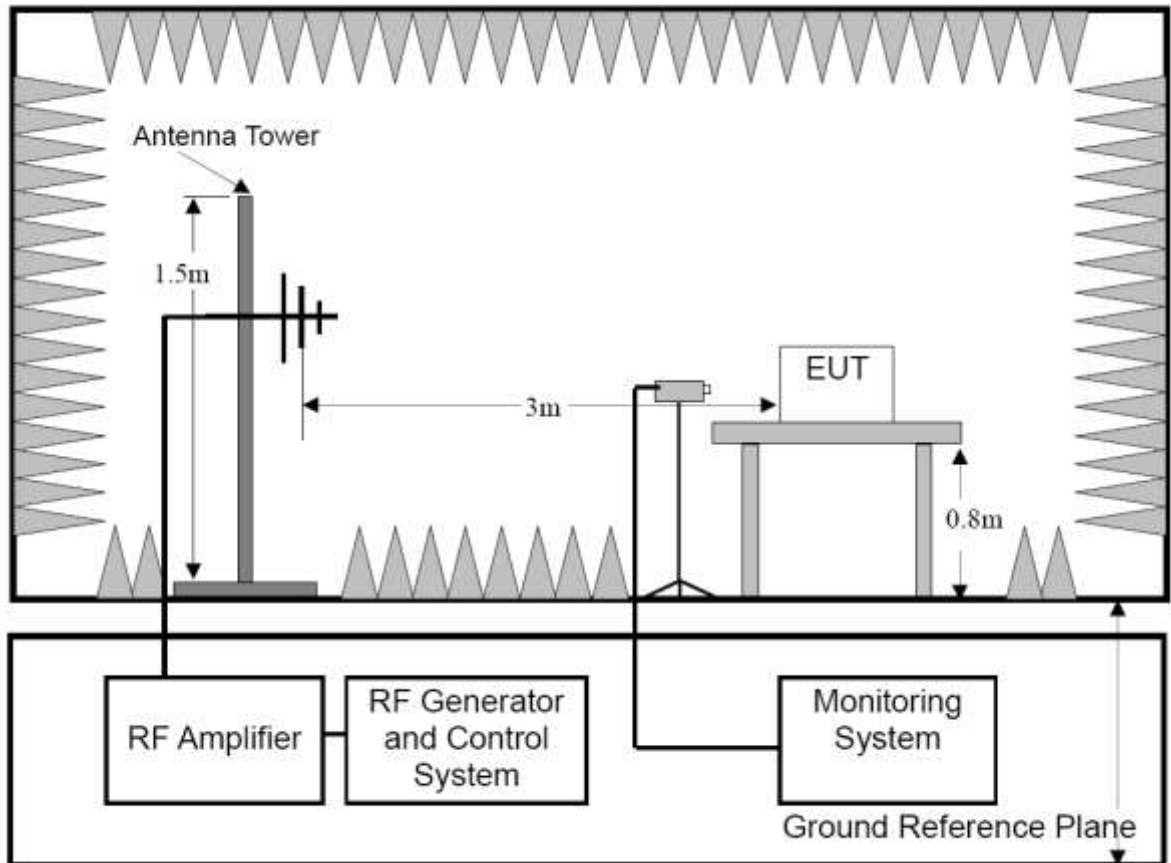
Please refer to the following page.

Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa
Power Supply:	AC 230V 50Hz, DC 12V	Required Performance Criterion: B	
Test Specifications:	$\pm 2, 4$ kV Contact Discharge; $\pm 2, 4, 6, 8$ kV Air Discharge Contact: For each point positive 25 times and negative 25 times Air: For each point positive 10 times and negative 10 times		
Tested mode:	AC Charger Mode, Inverter Mode		
Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)	
Slot of the E.U.T. 10 points	C	A	
DC Output 8 points	A	A	
Enclosure 10 points	A	A	
Indirect Discharge (HCP)	C	A	
Indirect Discharge (VCP)	C	A	
Note:			
Test Equipment : ESD Tester (TESEQ, NSG 437)		Test Engineer : Sance	

10. RF FIELD STRENGTH SUSCEPTIBILITY TEST

10.1 Block Diagram of Test Setup



10.2 Test Standard and Severity Levels

10.2.1 Test Standard

EN 55024

(EN 61000-4-3, Severity Level: 2, 3V/m)

10.2.2 Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

10.3 Test Procedure

The E.U.T. and its simulators are placed on a turn table which is 0.8 meter above ground. E.U.T. is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of E.U.T. must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows :

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

10.4 Test Results

PASS.

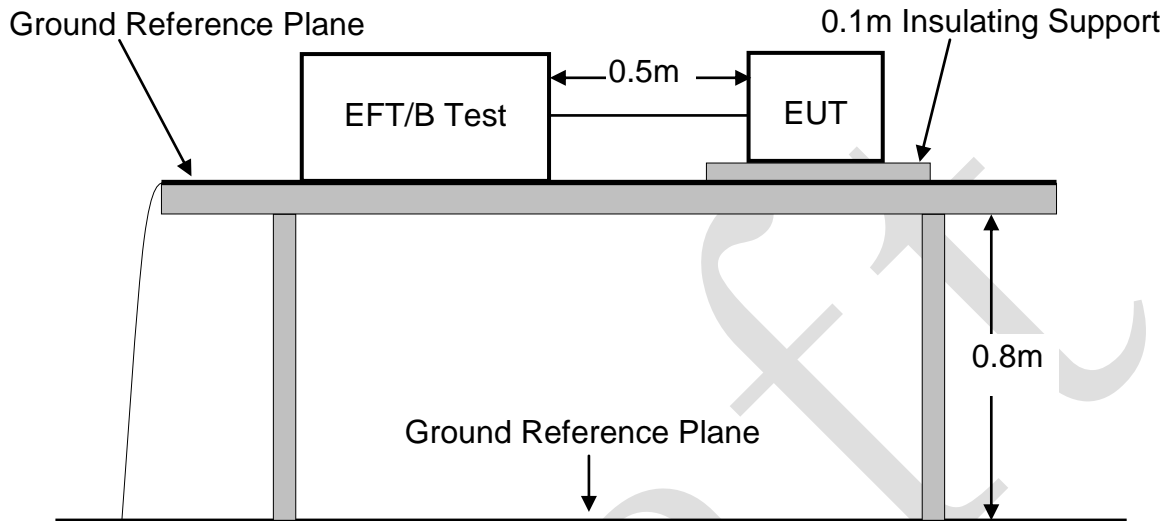
Please refer to the following page.

RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa	
Power Supply:	AC 230V 50Hz, DC 12V	Required Performance Criterion: A		
Test Specifications:	Modulation: 1kHz, 80%AM; Step Size: 1%; Dwell Time: 1s			
Tested mode:	AC Charger Mode, Inverter Mode			
Frequency (MHz)	Level (V/m)	Antenna polarity	Side	Result (Performance Criterion)
80-1000	3	Horizontal	Front	A
			Left	A
			Right	A
			Back	A
		Vertical	Front	A
			Left	A
			Right	A
			Back	A
Note:				
Test Equipment : 1. Signal Generator : N5181A (Agilent) 2. Power Amplifier : CBA 1G-150 (TESEQ) 3. Log.-Per. Antenna: ATR80M6G (CORAD) 4. RF Power Meter. Dual Channel : 4242 (ESE) 5. Power Sensor: 51011EMC (ESE)				
				Test Engineer : Sance

11. ELECTRICAL FAST TRANSIENT/BURST TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard and Severity Levels

11.2.1 Test Standard EN 55024

(EN 61000-4-4, Severity Level, Level 2: 1KV)

11.2.2 Severity level

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O (Input/Output) Signal data and control ports	
	Voltage peak KV	Repetition rate KHz	Voltage peak KV	Repetition rate KHz
1.	0.5	5 or 100	0.25	5 or 100
2.	1.0	5 or 100	0.5	5 or 100
3.	2.0	5 or 100	1.0	5 or 100
4.	4.0	5 or 100	2.0	5 or 100
X	Special	Special	Special	Special

Note 1 Use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.

Note 2 With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.

Note 3 "X" is an open level. The level has to be specified in the dedicated equipment specification.

11.3 Test Procedure

The E.U.T. is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the E.U.T. by at least 0.1m on all sides and the minimum distance between E.U.T. and all other conductive structure, except the ground plane beneath the E.U.T., shall be more than 0.5m.

11.3.1 For input and output AC power ports:

The E.U.T. is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

11.3.2 For signal lines ports:

It's unnecessary to test.

11.3.3 For DC ports:

It's unnecessary to test.

11.4 Test Result

PASS.

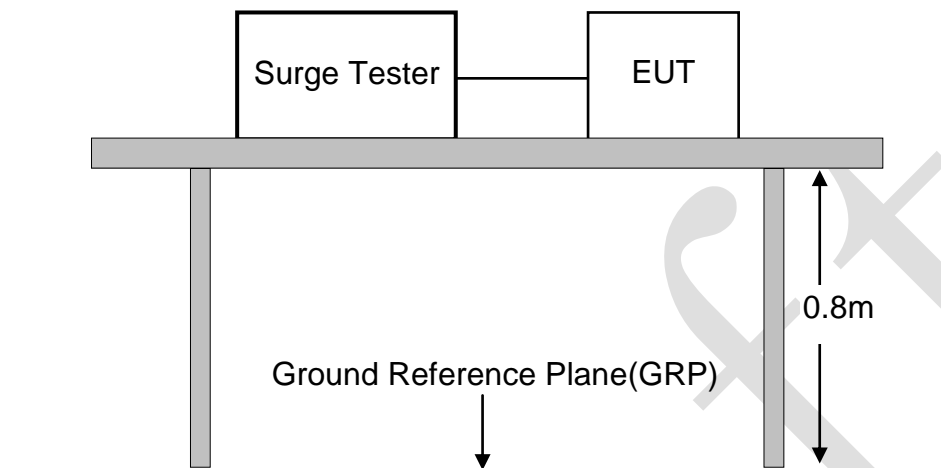
Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Specifications:	Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms		
Test mode:	AC Charger Mode		
Line :	<input checked="" type="checkbox"/> AC Mains	<input type="checkbox"/> Signal line	<input type="checkbox"/> DC line
Coupling :	<input checked="" type="checkbox"/> Direct	<input type="checkbox"/> Capacitive	
Line	Test Voltage	Result (Performance Criterion)	
L	±1KV	A	
N	±1KV	A	
PE	±1KV	A	
L、N	±1KV	A	
L、PE	±1KV	A	
N、PE	±1KV	A	
L、N、PE	±1KV	A	
Signal line			
DC line			
Note :			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Sance	

12. SURGE IMMUNITY TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard and Severity Levels

12.2.1 Test Standard

EN 55024

(EN 61000-4-5, Severity Level: Line To Line, Level 2: 1.0KV;
 Line To Earth, Level 3: 2.0KV)

12.2.2 Severity level

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

12.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 12.1.
2. For line to line coupling mode, provide a 1.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to E.U.T. selected points.
3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4. Different phase angles are done individually.
5. Record the E.U.T. operating situation during compliance test and decide the E.U.T. immunity criterion for above each test.

12.4 Test Result

PASS.

Please refer to the following page.

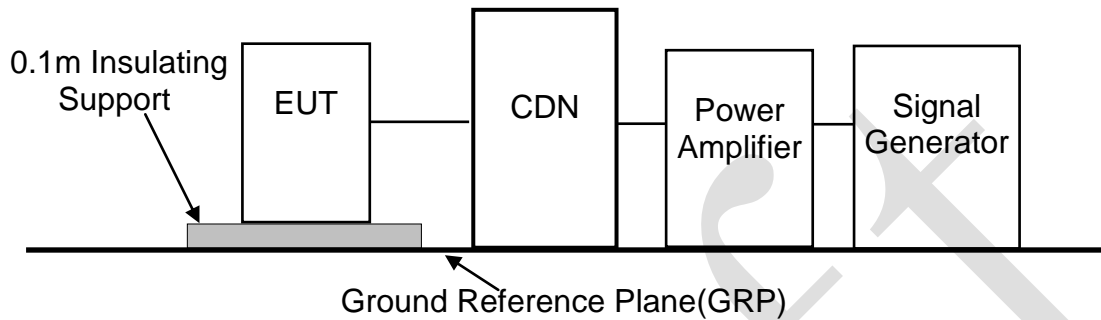
Draft

Surge Immunity Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Specifications:	Voltage surge 1.2/50 us ; Current surge 8/20 us ; Five positive and five negative pulses each at 0°, 90°, 180° and 270°.		
Test mode:	AC Charger Mode		
Line	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	0°, 90°, 180°, 270°	±1KV	A
L-PE	0°, 90°, 180°, 270°	±2KV	A
N-PE	0°, 90°, 180°, 270°	±2KV	A
Signal line			
DC line			
Note :			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Sance	

13. INJECTED CURRENTS SUSCEPTIBILITY TEST

13.1 Block Diagram of Test Setup



13.2 Test Standard and Severity Levels

13.2.1 Test Standard

EN 55024

(EN 61000-4-6, Severity Level 2: 3V (rms), 0.15MHz ~ 80MHz)

13.2.2 Severity level

Level	Field Strength V
1.	1
2.	3
3.	10
X	Special

13.3 Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 13.1.
2. Let the E.U.T. work in test mode and measure it.
3. The E.U.T. 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 E.U.T.. Cables between CDN and E.U.T. are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4. The disturbance signal described below is injected to E.U.T. through CDN.
5. The E.U.T. operates within its operational mode(s) under intended climatic conditions after power on.
6. The frequency range is swept from 150 KHz to 80 MHz 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^{-3} decades/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 E.U.T. operating situation during compliance testing and decide the E.U.T. immunity criterion.

13.4 Test Result

PASS.

Please refer to the following page.

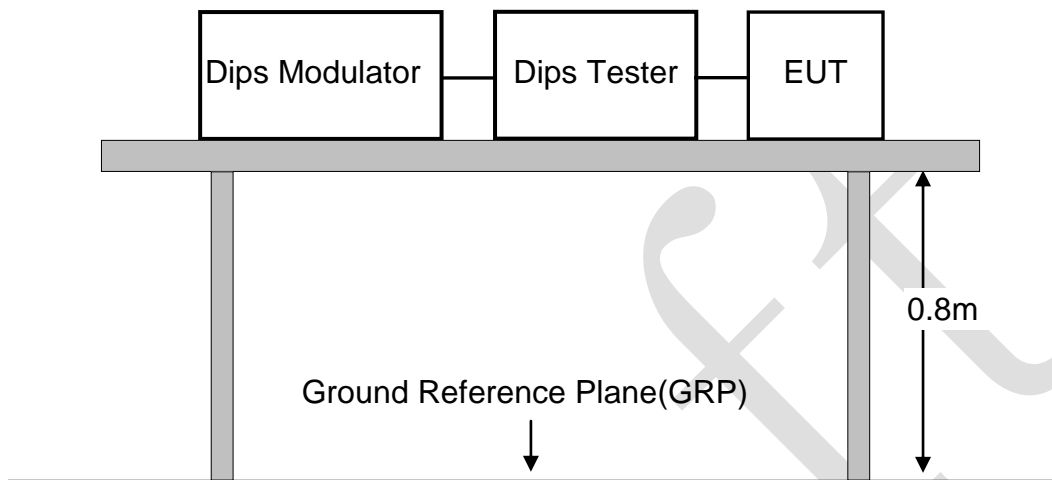
Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: A	
Test Specifications:	Modulation : 1KHz, 80%AM, Step Size : 1%, Dwell Time : 1s		
Test mode:	AC Charger Mode		
Test Port	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Mains	0.15~80	3	A
Note :			
Test Equipment : FRANNOKIA, CIT-10		Test Engineer : Sance	

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14.VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1 Block Diagram of Test Setup



14.2 Test Standard and Severity Levels

14.2.1 Test Standard
 EN 55024
 (EN 61000-4-11)

14.2.2 Severity level

Test Level %U _T	Voltage dip and short interruptions %U _T	Duration (in period)
0	100	0.5
40	60	1
		5
70	30	10
		25
		50
		*

14.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 14.1.
2. The interruptions is introduced at selected phase angles with specified duration.
3. Record any degradation of performance.

14.4 Test Result

PASS.

Please refer to the following page.

Draft

Voltage Dips And Interruptions Test Results

Ambient Condition:	Temp.: 27 °C	R.H.: 56 %	Air Pressure: 98 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B & C	
Test Specifications:	0%U _T , 0.5Cycle; 70%U _T , 25Cycle; 0%U _T ,250Cycle		
Test mode:	AC Charger Mode		
Test Level % UT	Duration (in period)	Result (Performance Criterion)	
0	0.5P	B	
70	25P	A	
0	250P	B	
Note : Performance Criterion B switch to Inverter Mode			
Test Equipment : Dips Tester: EM TEST, UCS 500N		Test Engineer : Sance	

15.PHOTOGRAPH

15.1 Photo of Conducted Emission Measurement



15.2 Photo of Radiation Emission Measurement



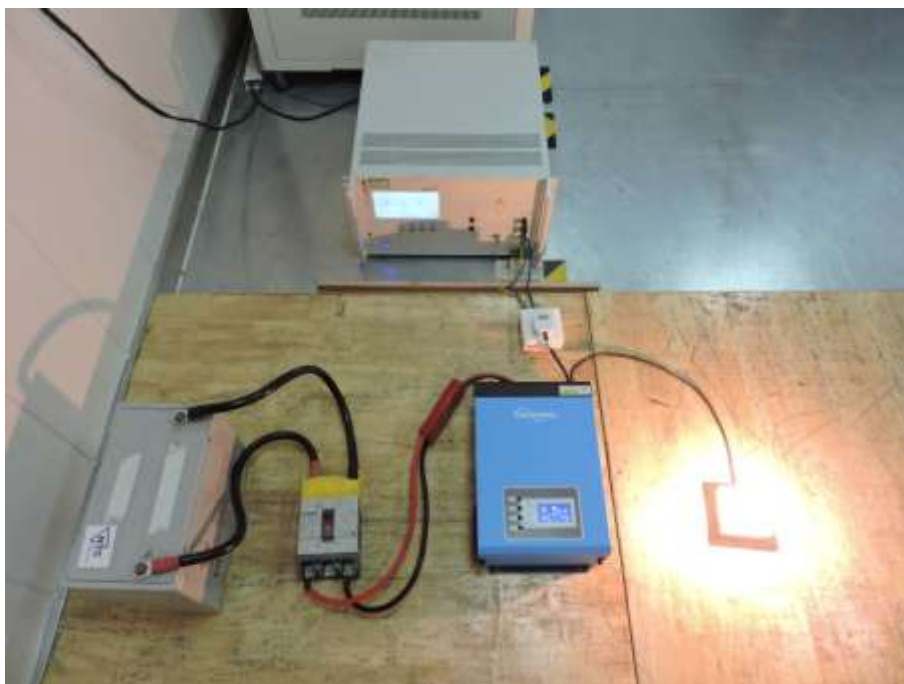
15.3 Photo of Harmonic/Flicker Measurement



15.4 Photo of Electrostatic Discharge Test



15.5 Photo of Electrical Fast Transient /Surge /Voltage Dips Test



APPENDIX I
(Photos of E.U.T.)

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Figure 1
General Appearance of the E.U.T.

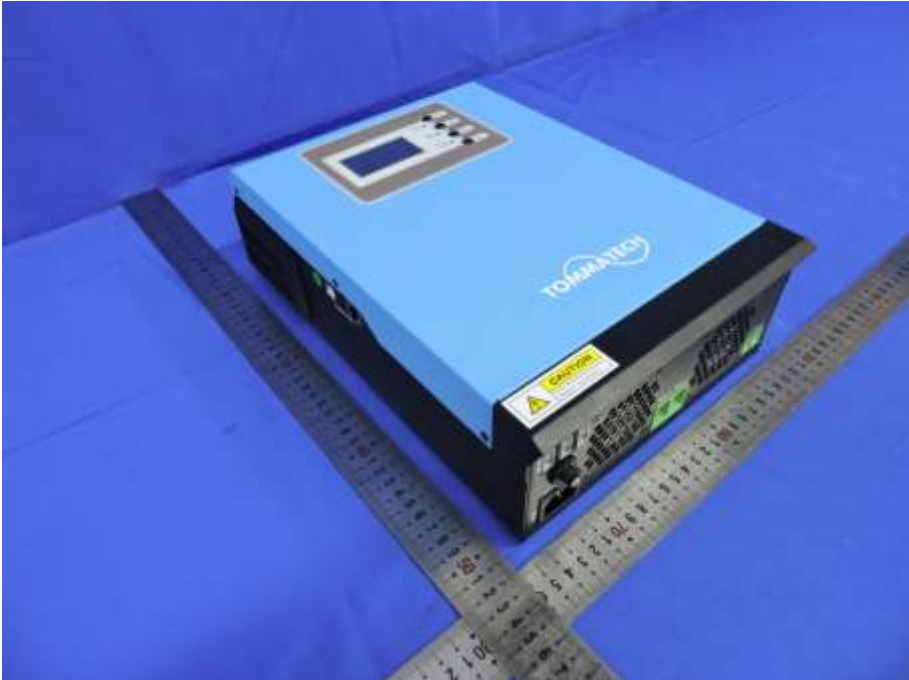


Figure 2
General Appearance of the E.U.T.



Figure 3
General Appearance of the E.U.T.



Figure 4
General Appearance of the E.U.T.



Figure 5
General Internal of the E.U.T.



Figure 6
General Internal of the E.U.T.

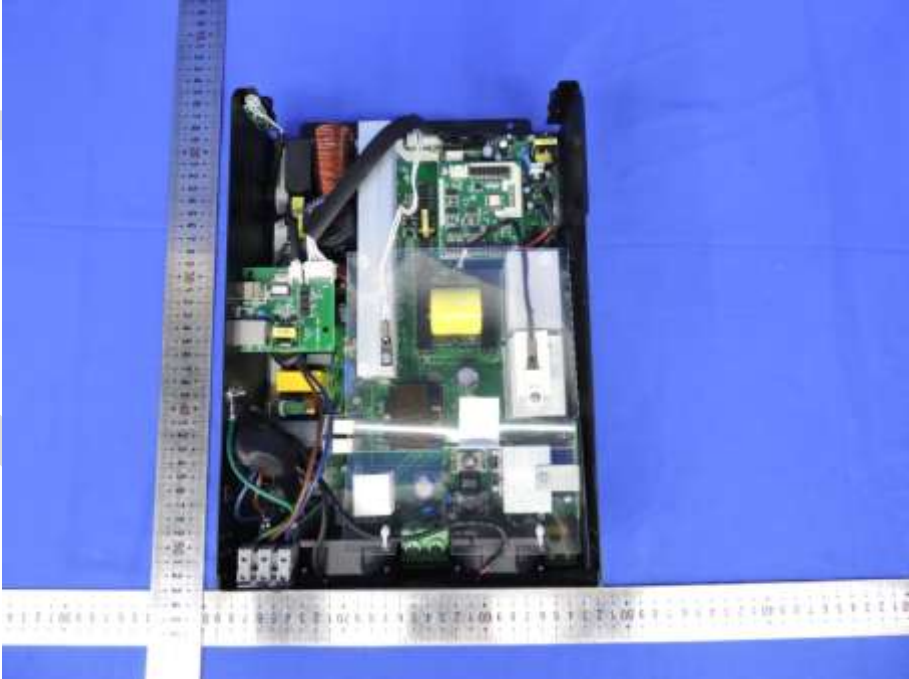


Figure 7
General Appearance of the PCB

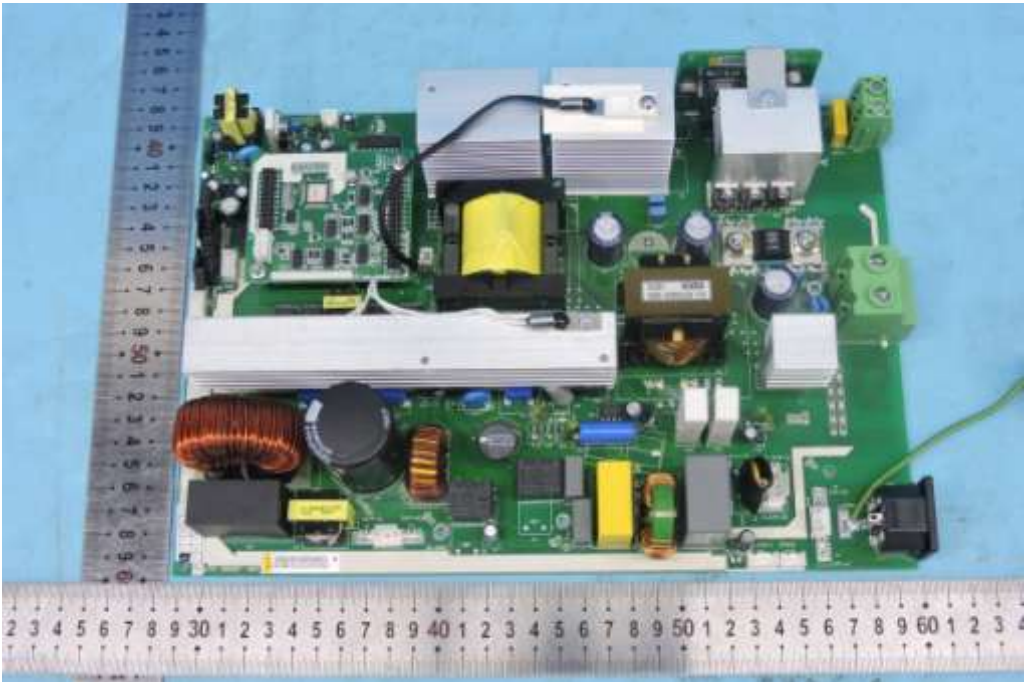


Figure 8
General Appearance of the PCB

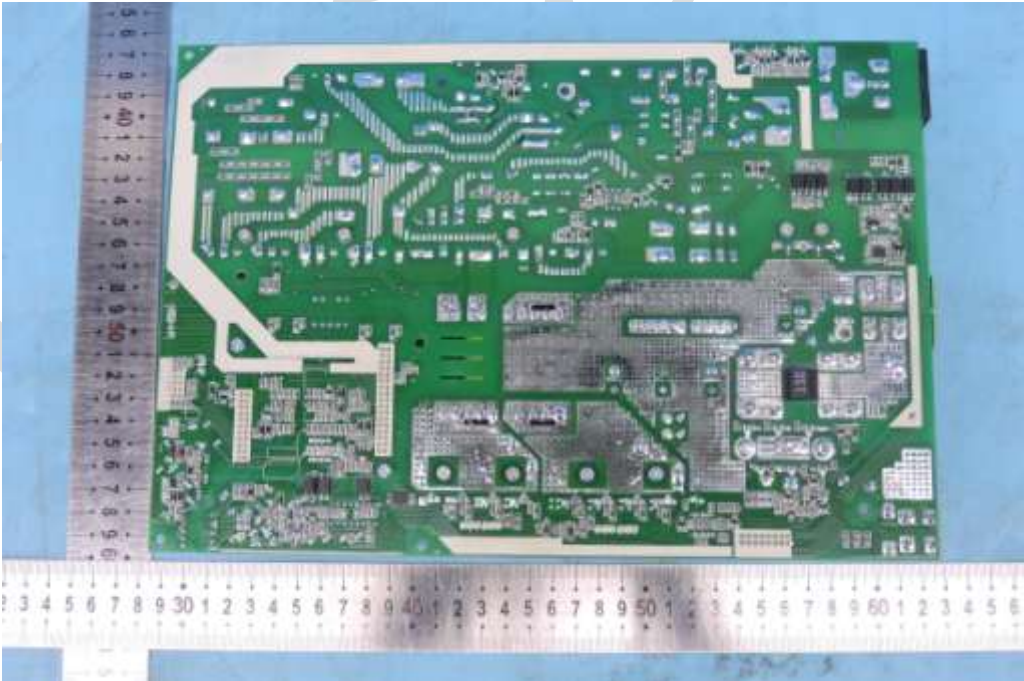


Figure 9
General Appearance of the PCB

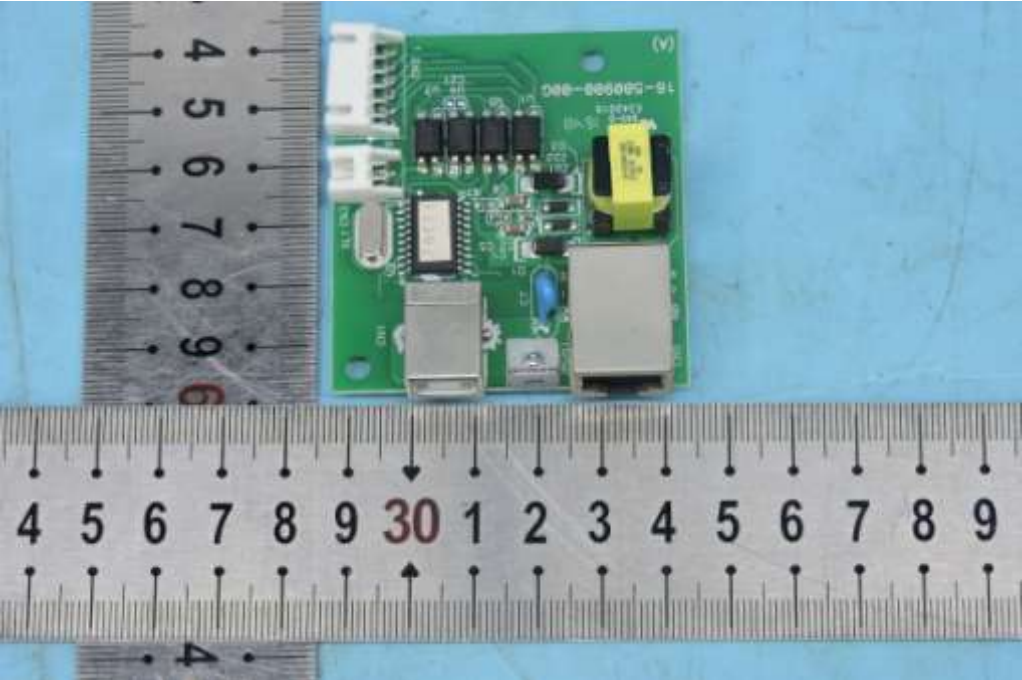


Figure 10
General Appearance of the PCB

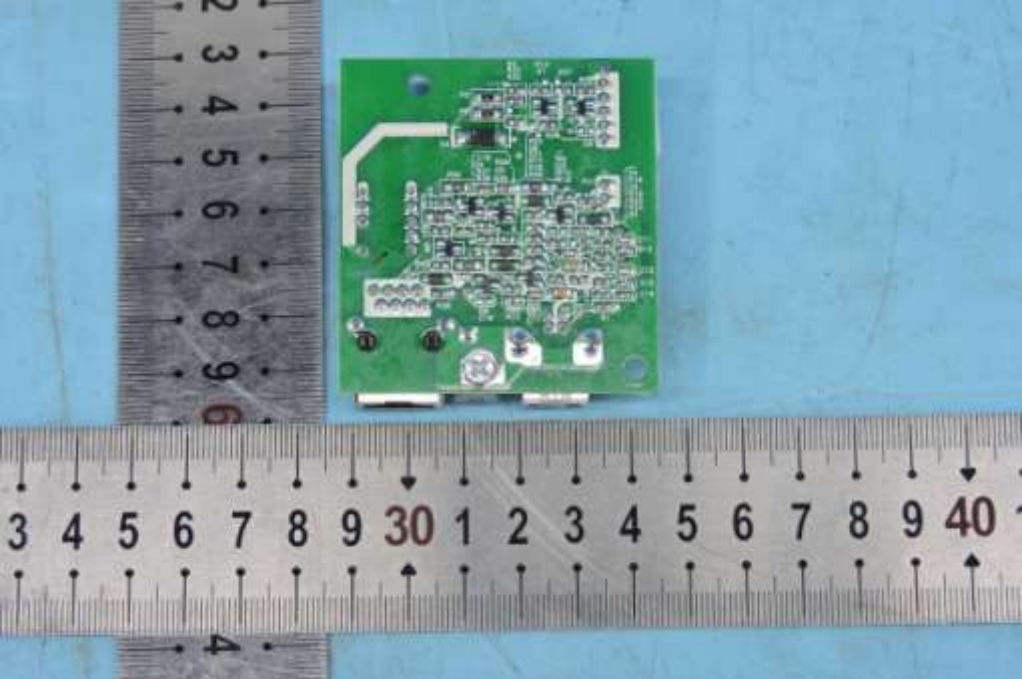


Figure 11
General Appearance of the PCB

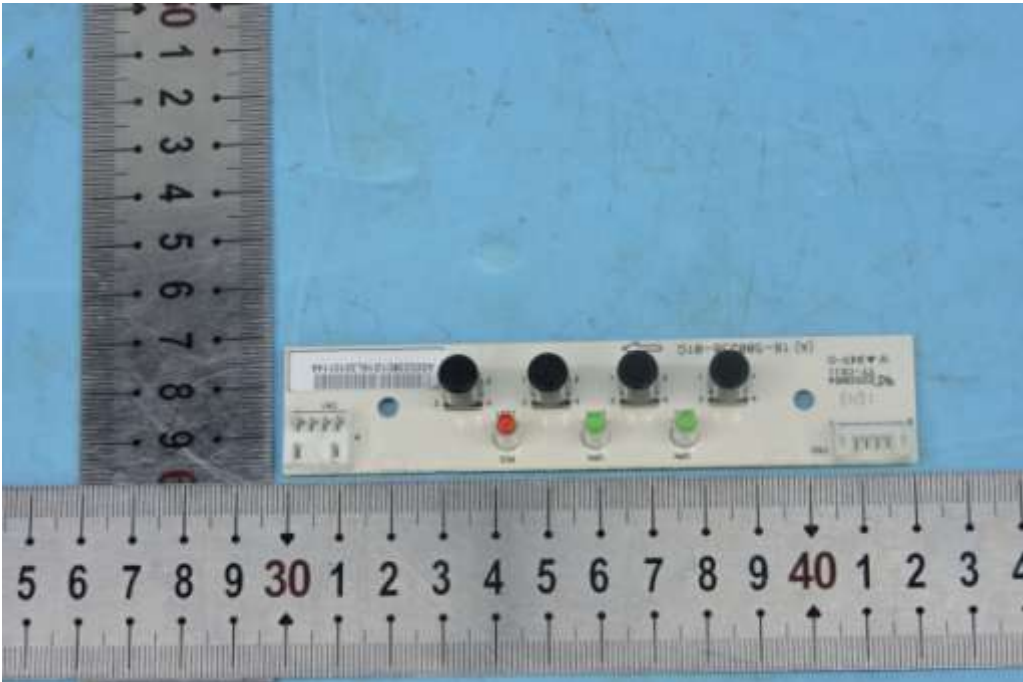


Figure 12
General Appearance of the PCB

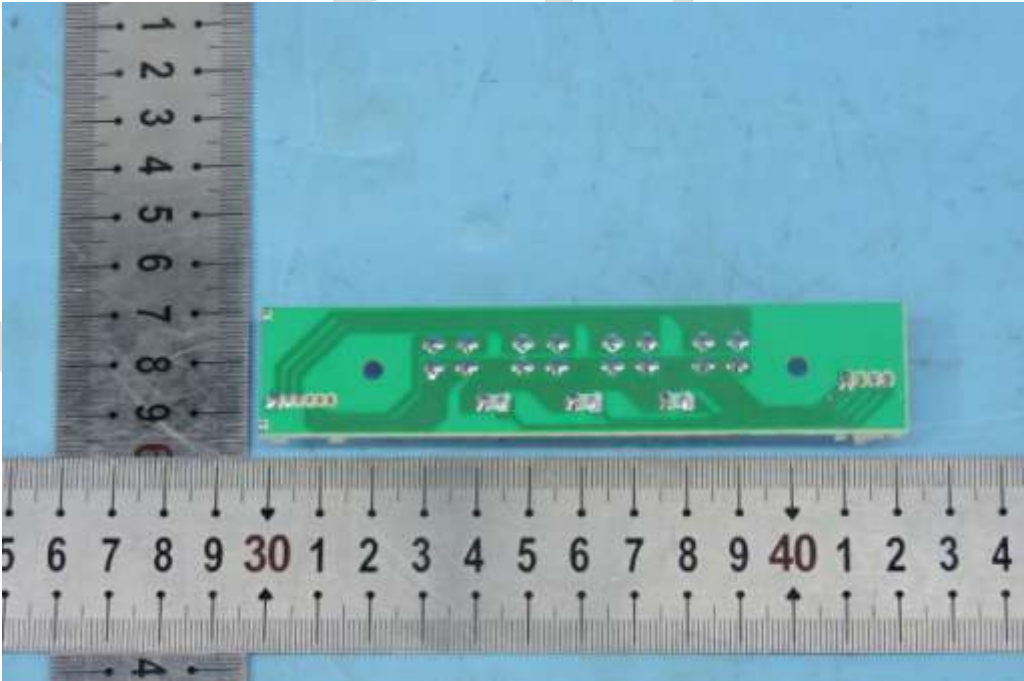


Figure 13
General Appearance of the PCB

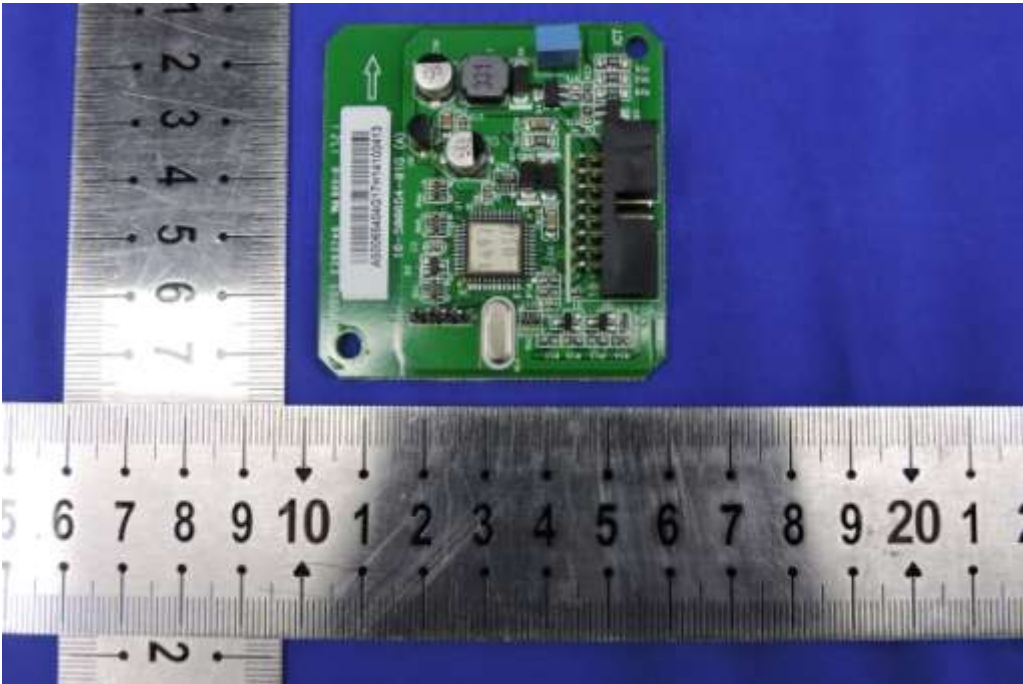
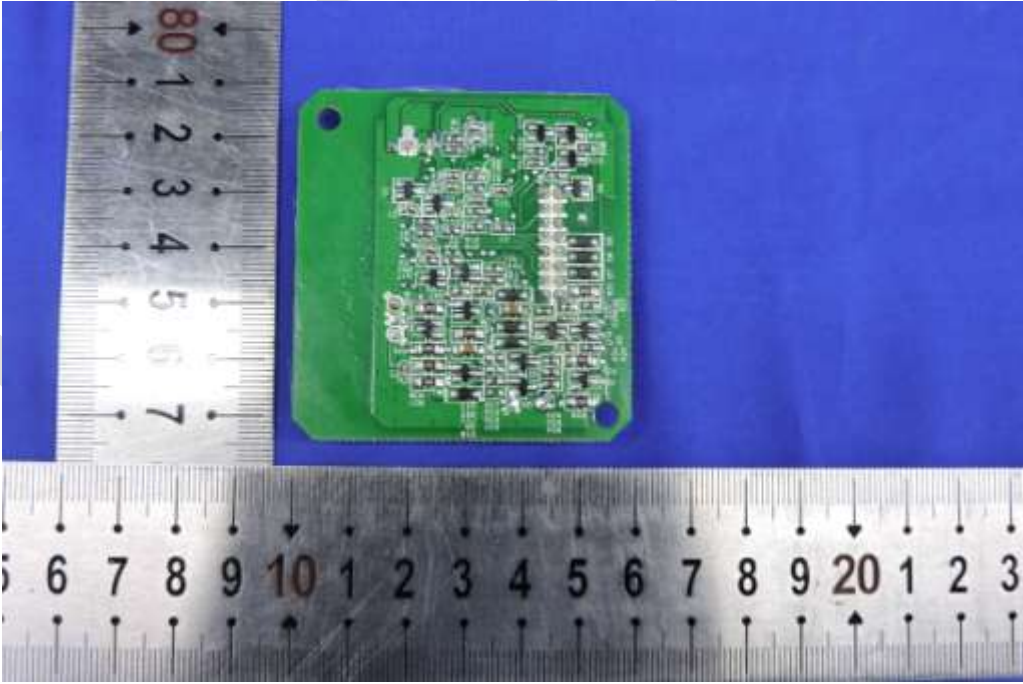


Figure 14
General Appearance of the PCB



---End---