SGS-CSTC Standards Technical Services Co., Ltd.

No. 1 Workshop, M-10, Middle Section, Science & Technology Park,
District Shenzhen, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: sgs_internet_operations@sgs.com

TEST REPORT

Application No.:	SZEM1202000676TX
Applicant/Manufacturer:	Minwa Electronics Co., Ltd
Address of Applicant/ Manufacturer:	22 Floor, Far East Finance Centre, 16 Harcourt Road, Admiralty, Hong Kong
Factory:	Minwa China (Huizhou) Electronics Co Ltd
Address of Factory:	HuiZhou Industrial Park, Minwa (Dalian) Industrial Park, RuHu Town, HuiCheng District, HuiZhou City, 516169 P.R China.
Equipment Under Test (EUT):	
EUT Name:	Battery Charger
Item No.:	MW3398GS (RC-3001)
Trade mark:	MW
Standards:	EN 55014-1:2006+A1:2009, EN 55014-2:1997+A1:2001+A2:2008 EN 61000-3-2:2006+A1:2009+A2:2009, EN 61000-3-3:2008
Date of Receipt:	2012-02-27
Date of Test:	2012-02-28 to 2012-02-29
Date of Issue:	2012-03-02
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2004/108/EC are considered.

CE

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Conducted Emission on AC, 150kHz to 30MHz	EN 55014-1: 2006 +A1: 2009	EN 55014-1: 2006 +A1: 2009	Table 1 Columns 2 & 3	PASS
Radiated Disturbance, (30MHz to 1GHz)	EN 55014-1: 2006 +A1: 2009	CISPR16-2-3	Table 3	PASS
Harmonic Emission on AC	EN 61000-3-2: 2006 +A1:2009+A2:2009	EN 61000-3-2: 2006 +A1:2009+A2:2009	Class A	PASS
Flicker Emission on AC	EN 61000-3-3 : 2008	EN 61000-3-3 : 2008	Clause 5 of EN 61000-3-3	PASS
ESD	EN 55014-2: 1997 + A1: 2001+ A2: 2008	EN 61000-4-2: 2009	Contact±4 kV Air ±8 kV	PASS
Electrical Fast Transients (EFT) on AC	EN 55014-2: 1997 + A1: 2001+ A2: 2008	EN 61000-4-4 : 2004 +A1:2010	AC ± 1.0kV	PASS
Surge Immunity on AC	EN 55014-2: 1997 + A1: 2001+ A2: 2008	EN 61000-4-5: 2006	±1kV D.M.†	PASS
Injected Currents on AC, 150kHz to 230MHz	EN 55014-2: 1997 + A1: 2001+ A2: 2008	EN 61000-4-6: 2009	3Vrms (emf), 80%, 1kHz Amp. Mod.	PASS
Voltage Dips and Interruptions on AC	EN 55014-2: 1997 + A1: 2001+ A2: 2008	EN 61000-4-11: 2004	0 % U_I^ for 0.5per 40% U_I^ for 10per 70% U_I^ for 25per	PASS

Remarks:

^ U_I is the nominal supply voltage

† D.M. – Differential Mode

3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 2

3 CONTENTS 3

4 GENERAL INFORMATION 5

4.1 DETAILS OF E.U.T. 5
4.2 DESCRIPTION OF SUPPORT UNITS 5
4.3 STANDARDS APPLICABLE FOR TESTING 5
4.4 TEST LOCATION 6
4.5 TEST FACILITY 7
4.6 DEVIATION FROM STANDARDS 7
4.7 ABNORMALITIES FROM STANDARD CONDITIONS 7
4.8 MONITORING OF EUT FOR ALL IMMUNITY TEST 7

5 EQUIPMENTS USED DURING TEST 8

6 EMISSION TEST RESULTS 10

6.1 CONDUCTED EMISSIONS MAINS TERMINALS, 150KHZ TO 30MHZ 10
6.1.1 E.U.T. Operation 10
6.1.2 Measurement Data 10
6.2 RADIATED EMISSIONS, 30MHZ TO 1GHZ 13
6.2.1 E.U.T. Operation 13
6.2.2 Measurement Data 13
6.3 HARMONICS TEST RESULTS 20
6.4 FLICKER TEST RESULT 20
6.4.1 E.U.T. Operation 20
6.4.2 Measurement Data 20

7 IMMUNITY TEST RESULTS 22

7.1 PERFORMANCE CRITERIA DESCRIPTION IN CLAUSE 6 OF EN 55014-2 22
7.2 ESD 23
7.2.1 E.U.T. Operation 23
7.2.2 Test Results 23
7.3 ELECTRICAL FAST TRANSIENTS (EFT) 24
7.3.1 E.U.T. Operation 24
7.3.2 Test Results: 24
7.4 SURGE 25
7.4.1 E.U.T. Operation 25
7.4.2 Test Results: 25
7.5 CONDUCTED IMMUNITY 0.15MHZ TO 230MHZ 26
7.5.1 E.U.T. Operation 26
7.5.2 Test Results: 26
7.6 VOLTAGE DIPS AND INTERRUPTIONS 27
7.6.1 E.U.T. Operation 27
7.6.2 Test Results: 27

8 PHOTOGRAPHS 28

8.1 CONDUCTED EMISSION TEST SETUP 28
8.2 RADIATED EMISSION TEST SETUP 28

8.3 FLICKER TEST SETUP 29
8.4 ESD TEST SETUP 29
8.5 EFT, SURGE AND VOLTAGE DIPS TEST SETUP 30
8.6 CONDUCTED IMMUNITY TEST SETUP 30
8.7 EUT CONSTRUCTIONAL DETAILS 31 36

4 General Information

4.1 Details of E.U.T.

Power Supply: Model: MW3398GS
PRI: AC 230V 50Hz
SEC:0.8VA(max)
4X(DC1.2V 120mA)
2X(DC9V 13mA)
Test Voltage: AC 230V 50Hz

Power Cord: N/A

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Standards Applicable for Testing

The standards used were EN 55014-1, EN 61000-3-2, EN 61000-3-3 and EN 55014-2.

Table 1 : Tests Carried Out Under EN 55014-1: 2006+A1: 2009

Standard		Status
EN 55014-1: 2006+A1: 2009	Radiated Emissions	√
EN 55014-1: 2006+A1: 2009	Conducted Emissions on AC	√
EN 55014-1: 2006+A1: 2009	Radiated Power	×
EN 55014-1: 2006+A1: 2009	Discontinuous Emissions on AC	×

Table 2: Tests Carried Out Under EN 61000-3-2:2006+A1:2009+A2:2009 & EN 61000-3-3: 2008

Standard		Status
EN 61000-3-2: 2006+A1:2009+A2:2009	Harmonic Emissions on AC	×
EN 61000-3-3: 2008	Flicker Emissions on AC	√

Table 3 : Tests Carried Out Under EN 55014-2: 1997 + A1: 2001 + A2: 2008

Standard		Cat I	Cat II	Cat III	Cat IV
EN 61000-4-2: 2009	ESD		√	o	o
EN 61000-4-4: 2004+A1:2010	Fast transients		√		o
EN 61000-4-6: 2009	Injection currents up to 230 MHz		√		
EN 61000-4-5: 2006	Surge		√		o
EN 61000-4-11: 2004	Voltage dips		√		o
EN 61000-4-6: 2009	Injection currents up to 80 MHz				o
EN 61000-4-3 :2006+A1:2008+A2:2010	Radio frequency EM fields			o	o
EN 55014-2: 1997 + A1: 2001 + A2: 2008	None	o			

o Indicates the testing requirements for each category of equipment

× Indicates that the test is not applicable.

√ Indicates that the test is applicable

Note: The EUT is AC powered and the maximum clock / oscillator frequency is less than 15MHz. Hence the EUT is defined as category II of EN 55014-2.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong,China 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**
  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.
- **VCCI**
  The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.
- **FCC – Registration No.: 556682**
  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.
- **Industry Canada (IC)**
  The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Monitoring of EUT for All Immunity Test

Visual: Monitored the light of the EUT.
Audio: None.

5 Equipments Used during Test

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2012-06-10
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2012-10-29
3	LISN	ETS-LINDGREN	3818/2	SEL0021	2012-05-26
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2012-11-11
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2012-11-11
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2012-11-11
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2012-05-26
8	Coaxial Cable	SGS	N/A	SEL0024	2012-05-29

RE in Chamber					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2012-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2012-03-11
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	Coaxial cable	SGS	N/A	SEL0028	2012-05-29
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2012-10-29
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2012-05-26
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2012-10-29
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2012-10-29
9	Band Ilter	Amindeon	Asl 3314	SEL0094	2012-05-26
10	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2012-10-26
11	EMI Test Receiver (9K-3GHz)	Rohde & Schwarz	ESCI	SEL0175	2012-05-26

	Harmonics / Flicker test				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	AC Power Source	California Instruments	5001ix	SEL0052	2012-06-01
2	Power Analyzer	California Instruments	PACS-1	SEL0051	2012-06-01
3	CTS 3.0 Software	California Instruments	N/A	SEL0087	N/A

	ESD				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	ESD Simulator	SCHAFFNER	NSG 438	SEL0035	2012-03-21
2	ESD Ground Plane	SGS(3m*3m)	N/A	SEL0004	N/A

	EFT, Surge, Voltage dips and Interruption, Power-frequency Magnetic Field				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	EMC Immunity Test System	Thermo ELECTRON	EMCPro Plus	SEL0007	2012-10-23
2	ProPLUS Capacitive Clamp	Thermo ELECTRON	N/A	SEL0008	N/A
3	MAGNETIC FIELD IMMUNITY LOOP	FCC	F-1000-4-8/9/10-L-1M	SEL0010	2012-10-23

	Conducted Immunity				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	RF-Generator	SCHAFFNER	NSG 2070	SEL0039	2012-10-23
2	Coupling/Decoupling Network	SCHAFFNER	CDN M016	SEL0040	2012-10-23
3	EM CLAMP	SCHAFFNER	KEMZ 801	SEL0041	2012-10-23

	General used equipment				
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0102 to SEL0103	2012-10-27
2	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	SEL0101	2012-10-27
3	Barometer	ChangChun	DYM3	SEL0088	2012-05-18

6 Emission Test Results

6.1 Conducted Emissions Mains Terminals, 150kHz to 30MHz

Test Requirement:	EN 55014-1
Test Method:	EN 55014-1
Frequency Range:	150kHz to 30MHz
Class / Severity:	Table 1, Columns 2 & 3 (AC terminals)
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit

6.1.1 E.U.T. Operation

Operating Environment:

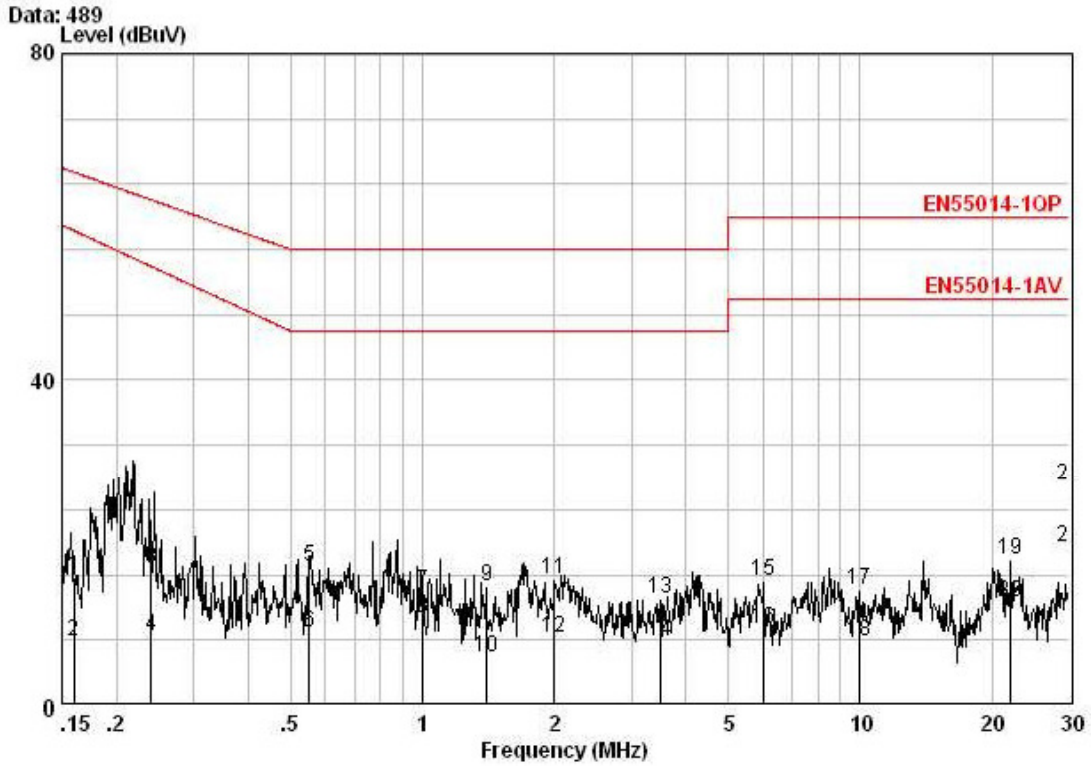
Temperature: 25.0 °C Humidity: 50% RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, (pretest was performed at Charge mode, Discharge mode and Test mode to find the worst case, the completed test was conducted at Charge mode since it was the worst case), keep the EUT charging the rechargeable batteries.

6.1.2 Measurement Data

Measure the maximised peak emissions from the EUT for both the Live and Neutral Lines.Perform quasi-peak & average measurement based on the peak sweep graph.

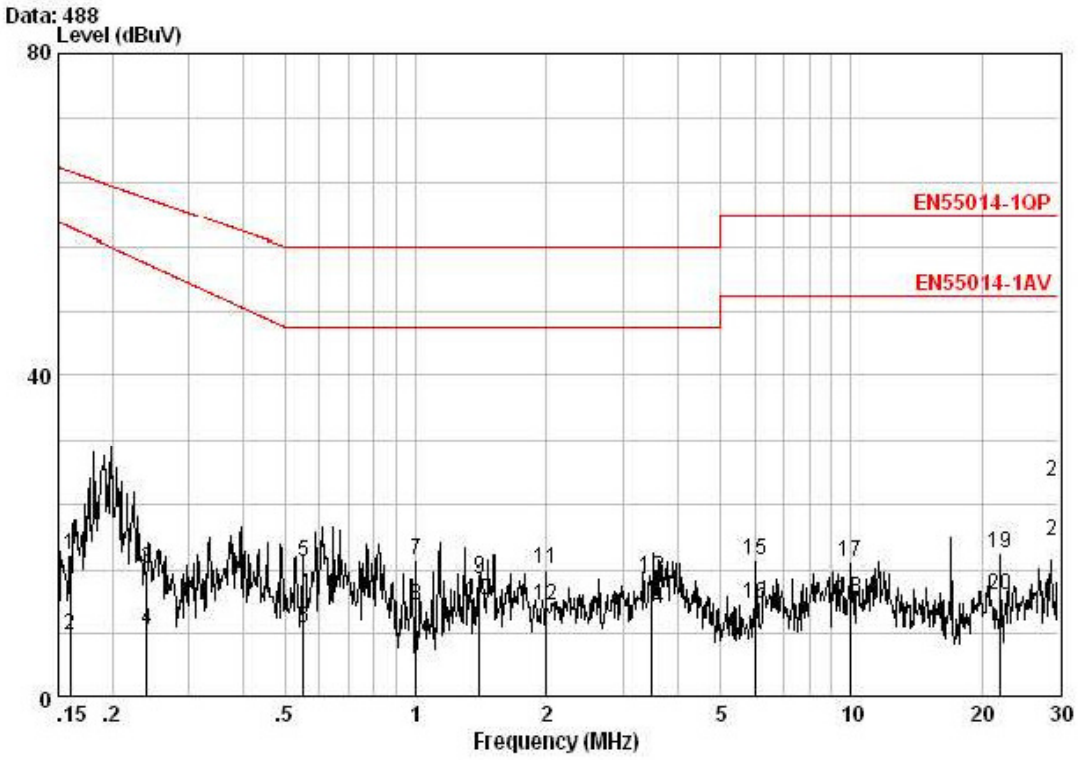
Live Line:



Site : Shielding Room
Condition : EN55014-1QP CE-20101216 LINE
Job No. : 0676TX
Mode : Charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16000	0.04	9.60	6.10	15.74	65.46	-49.72	QP
2	0.16000	0.04	9.60	-1.79	7.85	58.30	-50.45	Average
3	0.24000	0.04	9.60	7.10	16.74	62.10	-45.35	QP
4	0.24000	0.04	9.60	-1.10	8.54	53.93	-45.38	Average
5	0.55000	0.06	9.63	7.30	16.99	56.00	-39.01	QP
6	0.55000	0.06	9.63	-0.73	8.96	46.00	-37.04	Average
7	1.000	0.08	9.70	4.10	13.88	56.00	-42.12	QP
8	1.000	0.08	9.70	0.90	10.68	46.00	-35.32	Average
9	1.400	0.10	9.70	4.90	14.70	56.00	-41.30	QP
10	1.400	0.10	9.70	-3.90	5.90	46.00	-40.10	Average
11	2.000	0.12	9.70	5.60	15.42	56.00	-40.58	QP
12	2.000	0.12	9.70	-1.60	8.22	46.00	-37.78	Average
13	3.500	0.15	9.76	3.10	13.01	56.00	-42.99	QP
14	3.500	0.15	9.76	-2.10	7.81	46.00	-38.19	Average
15	6.000	0.18	9.85	5.20	15.24	60.00	-44.76	QP
16	6.000	0.18	9.85	-0.70	9.34	50.00	-40.66	Average
17	10.000	0.22	9.80	4.10	14.12	60.00	-45.88	QP
18	10.000	0.22	9.80	-2.20	7.82	50.00	-42.18	Average
19	22.000	0.28	10.10	7.50	17.88	60.00	-42.12	QP
20	22.000	0.28	10.10	2.20	12.58	50.00	-37.42	Average
21	30.000	0.30	10.10	16.70	27.10	60.00	-32.90	QP
22 @	30.000	0.30	10.10	8.90	19.30	50.00	-30.70	Average

Neutral Line:



Site : Shielding Room
Condition : EN55014-1QP CE-20101216 NEUTRAL
Job No. : 0676TX
Mode : Charge

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16000	0.04	9.60	8.12	17.76	65.46	-47.70	QP
2	0.16000	0.04	9.60	-1.90	7.74	58.30	-50.56	Average
3	0.24000	0.04	9.60	6.30	15.94	62.10	-46.16	QP
4	0.24000	0.04	9.60	-1.20	8.44	53.93	-45.48	Average
5	0.55000	0.06	9.63	7.19	16.88	56.00	-39.12	QP
6	0.55000	0.06	9.63	-0.90	8.79	46.00	-37.21	Average
7	1.000	0.08	9.70	7.30	17.08	56.00	-38.92	QP
8	1.000	0.08	9.70	1.80	11.58	46.00	-34.42	Average
9	1.400	0.10	9.70	5.10	14.90	56.00	-41.10	QP
10	1.400	0.10	9.70	2.40	12.20	46.00	-33.80	Average
11	2.000	0.12	9.70	6.10	15.92	56.00	-40.08	QP
12	2.000	0.12	9.70	1.70	11.52	46.00	-34.48	Average
13	3.500	0.15	9.76	4.90	14.81	56.00	-41.19	QP
14	3.500	0.15	9.76	1.30	11.21	46.00	-34.79	Average
15	6.000	0.18	9.80	7.10	17.08	60.00	-42.92	QP
16	6.000	0.18	9.80	1.80	11.78	50.00	-38.22	Average
17	10.000	0.22	9.80	6.70	16.72	60.00	-43.28	QP
18	10.000	0.22	9.80	2.30	12.32	50.00	-37.68	Average
19	22.000	0.28	10.10	7.40	17.78	60.00	-42.22	QP
20	22.000	0.28	10.10	2.50	12.88	50.00	-37.12	Average
21	30.000	0.30	10.10	16.40	26.80	60.00	-33.20	QP
22 @	30.000	0.30	10.10	8.90	19.30	50.00	-30.70	Average

6.2 Radiated Emissions, 30MHz to 1GHz

Measurement Distance:	3m (Semi-Anechoic Chamber)
Limit:	40.0 dBμV/m between 30MHz & 230MHz
	47.0 dBμV/m between 230MHz & 1GHz
Detector:	Peak for pre-scan (120kHz resolution bandwidth)
	Quasi-Peak if maximised peak within 6dB of limit

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 50% RH Atmospheric Pressure: 1012 mbar

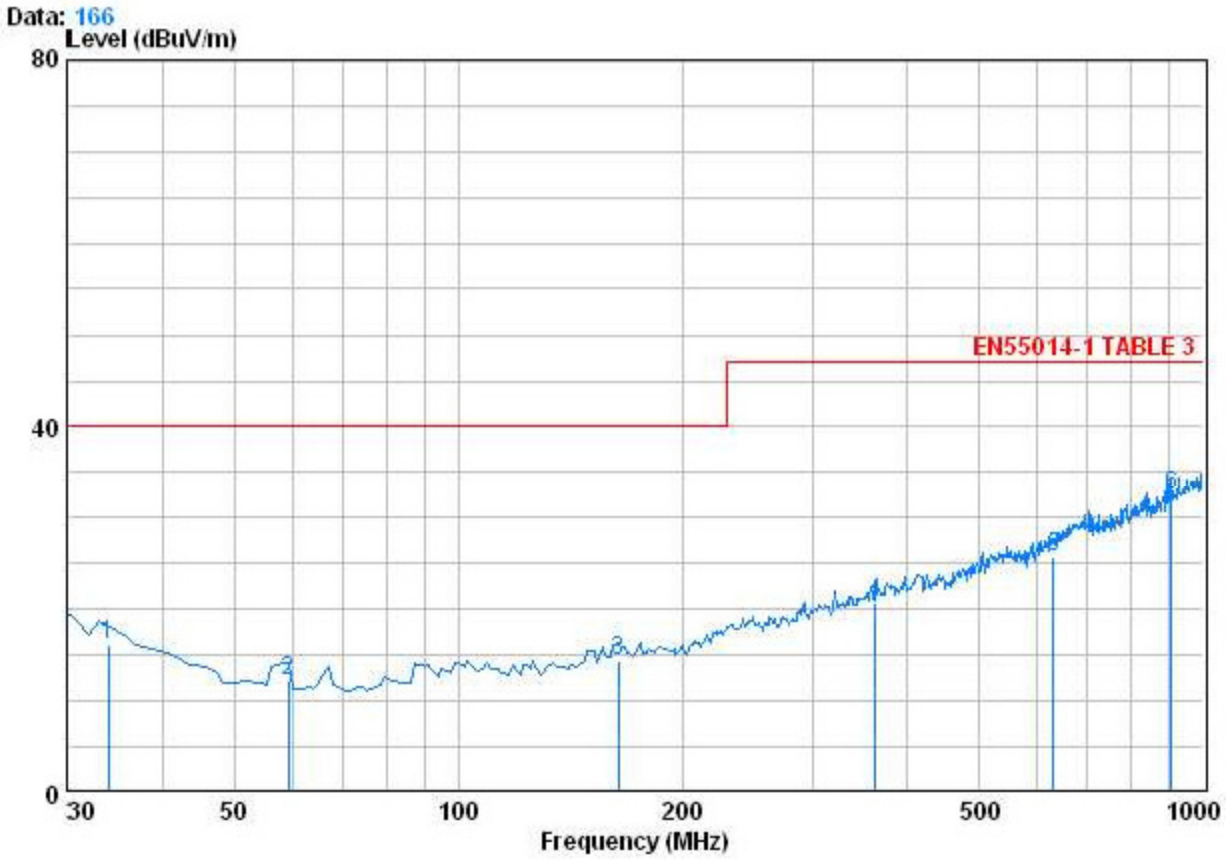
EUT Operation: Test the EUT in Charge mode, keep the EUT charging the rechargeable batteries.
Test the EUT in Discharge mode, keep the EUT discharging the rechargeable batteries.
Test the EUT in Test mode, keep the EUT testing the strength of the batteries.

6.2.2 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Charge mode

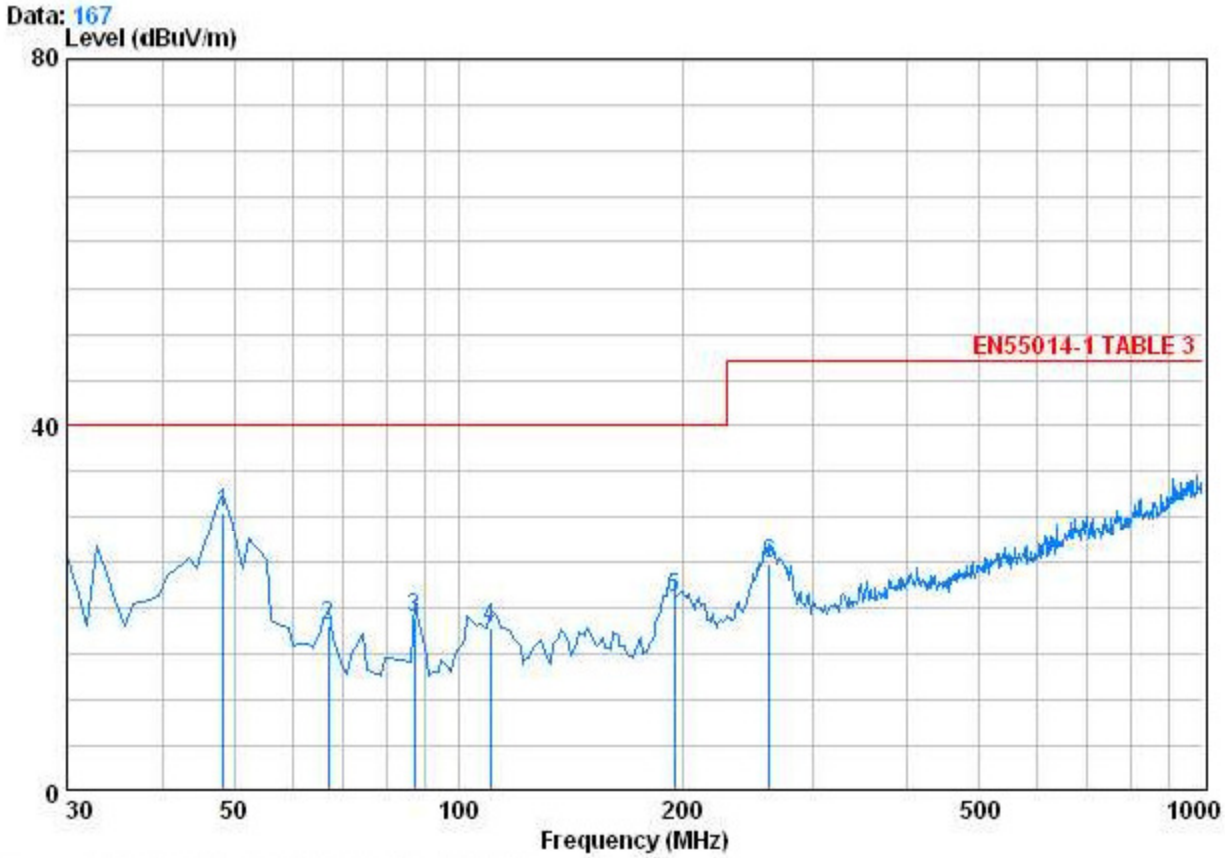
Horizontal



Condition : EN55014-1 TABLE 3 3m 0042673 HORIZONTAL
Job No : 0676TX
MODE : Charge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.880	0.60	13.47	27.34	29.33	16.06	40.00	-23.94
2	59.100	0.80	7.31	27.27	31.39	12.23	40.00	-27.77
3	163.860	1.34	9.56	26.84	30.32	14.38	40.00	-25.62
4	362.710	2.10	15.72	26.89	29.87	20.80	47.00	-26.20
5	629.460	2.76	20.52	27.50	29.94	25.72	47.00	-21.28
6 @	905.910	3.61	23.23	26.75	32.43	32.52	47.00	-14.48

Vertical

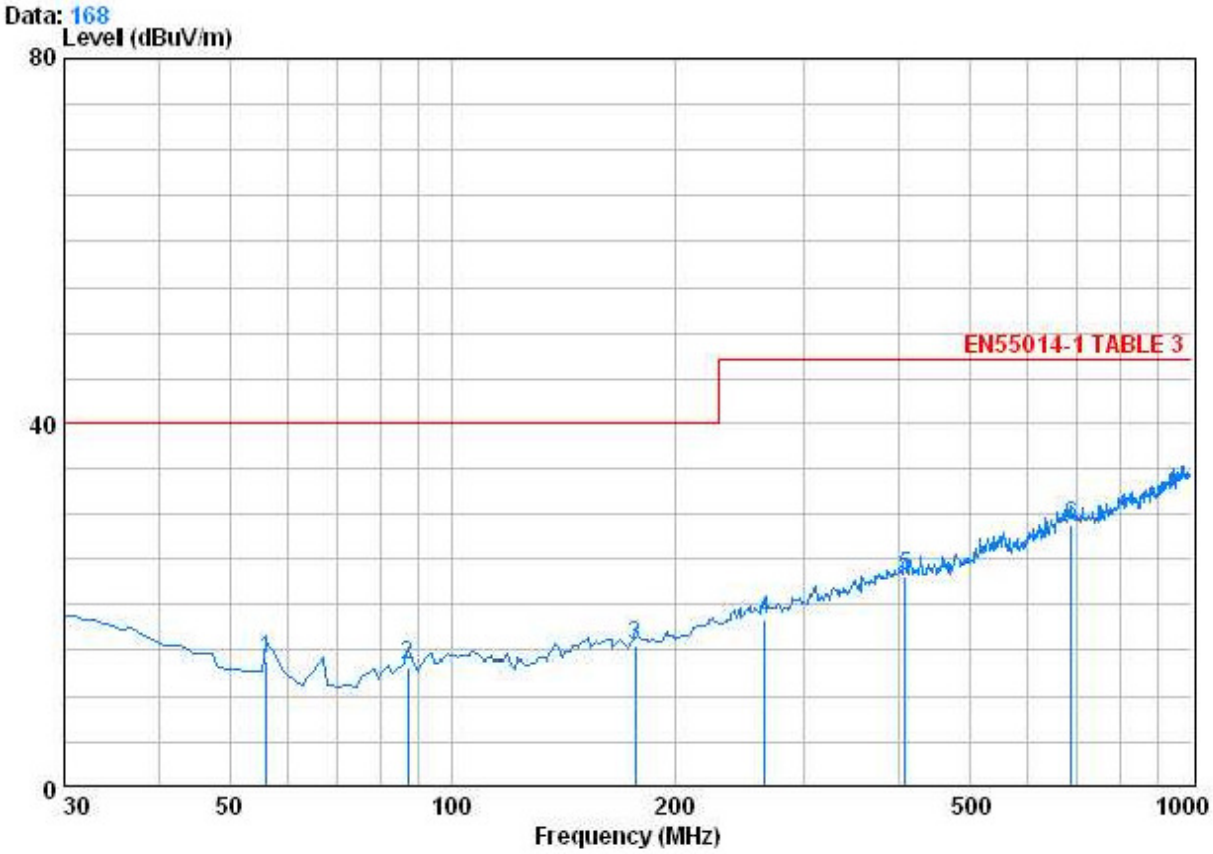


Condition : EN55014-1 TABLE 3 3m 0042673 VERTICAL
Job No : 0676TX
MODE : Charge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 @	48.430	0.77	8.47	27.29	48.56	30.51	40.00	-9.49
2	66.860	0.80	6.99	27.25	37.53	18.07	40.00	-21.93
3	87.230	1.10	8.45	27.22	36.68	19.01	40.00	-20.99
4	110.510	1.23	8.57	27.13	35.23	17.90	40.00	-22.10
5	194.900	1.39	10.15	26.71	36.22	21.05	40.00	-18.95
6	261.830	1.73	12.55	26.50	37.15	24.93	47.00	-22.07

Discharge mode

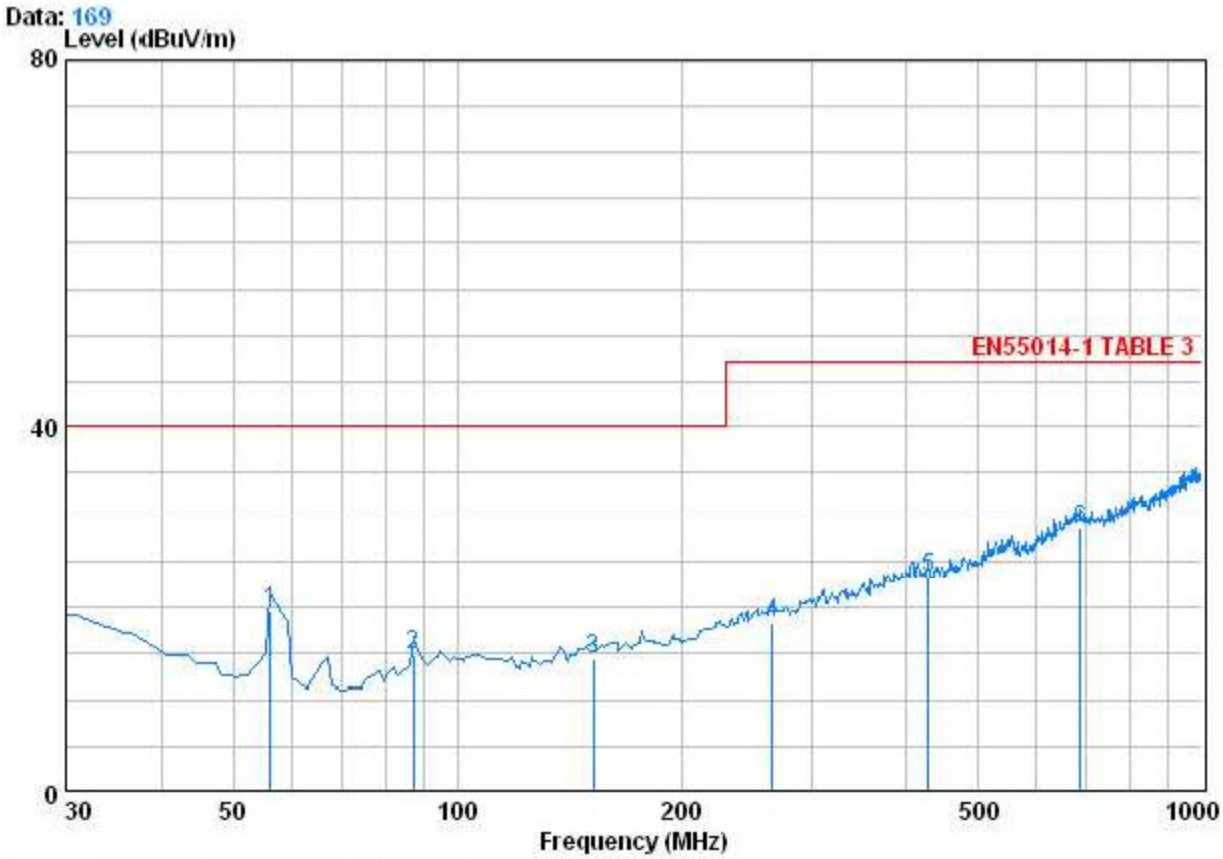
Horizontal



Condition : EN55014-1 TABLE 3 3m 0042673 HORIZONTAL
Job No : 0676TX
MODE : Discharge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	56.190	0.80	7.65	27.28	32.78	13.96	40.00	-26.04
2	87.230	1.10	8.45	27.22	30.90	13.23	40.00	-26.77
3	176.470	1.36	9.77	26.79	31.03	15.37	40.00	-24.63
4	264.740	1.74	12.61	26.49	30.52	18.38	47.00	-28.62
5	408.300	2.24	16.33	27.19	31.70	23.07	47.00	-23.93
6 @	687.660	2.88	21.50	27.43	31.91	28.86	47.00	-18.14

Vertical

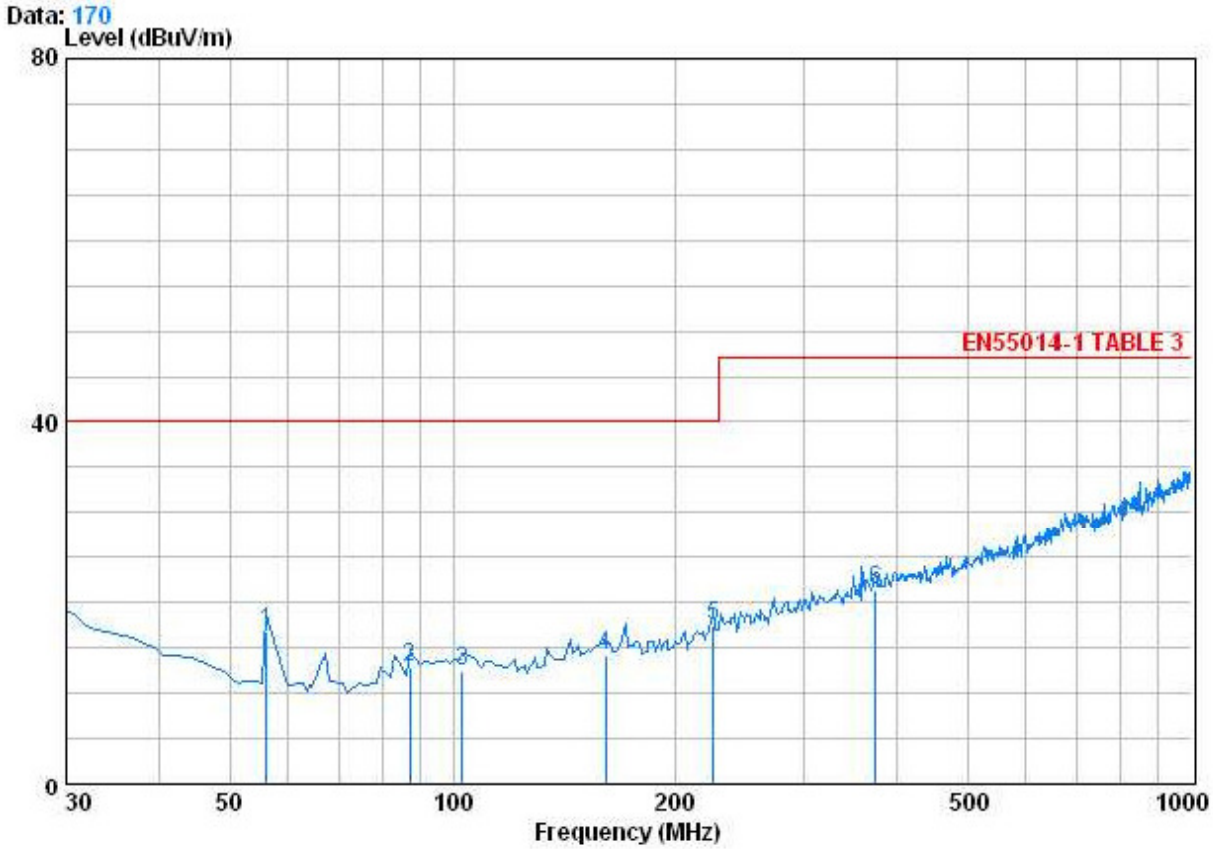


Condition : EN55014-1 TABLE 3 3m 0042673 VERTICAL
Job No : 0676TX
MODE : Discharge

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	56.190	0.80	7.48	27.28	38.60	19.60	40.00	-20.40
2	87.230	1.10	8.45	27.22	32.50	14.83	40.00	-25.17
3	152.220	1.32	9.14	26.90	30.78	14.34	40.00	-25.66
4	264.740	1.74	12.61	26.49	30.52	18.38	47.00	-28.62
5	428.670	2.32	16.46	27.31	31.76	23.23	47.00	-23.77
6 @	687.660	2.88	21.50	27.43	31.91	28.86	47.00	-18.14

Test mode

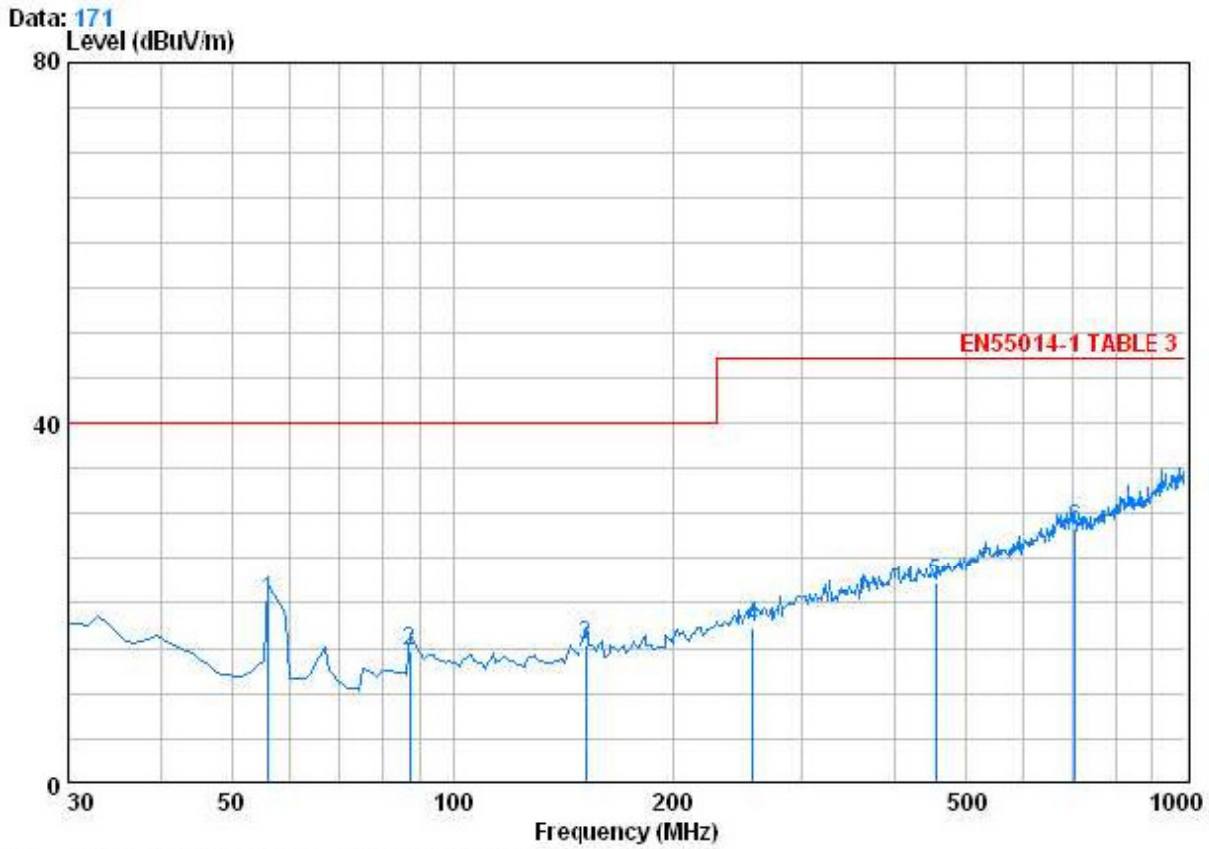
Horizontal



Condition : EN55014-1 TABLE 3 3m 0042673 HORIZONTAL
Job No : 0676TX
MODE : Test

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	56.190	0.80	7.65	27.28	35.67	16.84	40.00	-23.16
2	87.230	1.10	8.45	27.22	30.46	12.79	40.00	-27.21
3	102.750	1.21	8.97	27.18	29.50	12.49	40.00	-27.51
4	160.950	1.34	9.59	26.86	30.05	14.12	40.00	-25.88
5	225.940	1.55	11.53	26.61	30.91	17.38	40.00	-22.62
6	374.350	2.13	16.00	26.97	30.23	21.40	47.00	-25.60

Vertical



Condition : EN55014-1 TABLE 3 3m 0042673 VERTICAL
Job No : 0676TX
MODE : Test

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	56.190	0.80	7.48	27.28	39.22	20.22	40.00	-19.78
2	87.230	1.10	8.45	27.22	32.50	14.83	40.00	-25.17
3	152.220	1.32	9.14	26.90	31.95	15.52	40.00	-24.48
4	256.980	1.71	12.45	26.51	29.81	17.46	47.00	-29.54
5	455.830	2.43	17.09	27.48	30.15	22.20	47.00	-24.80
6 @	703.180	2.92	21.60	27.41	31.15	28.26	47.00	-18.74

6.3 Harmonics Test Results

Test Requirement:	EN 61000-3-2
Test Method:	N/A: See Remark Below
Frequency Range:	100Hz to 2kHz

There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.

For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states:

"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."

6.4 Flicker Test Result

Test Requirement:	EN 61000-3-3
Test Method:	EN 61000-3-3
Class/Severity:	Clause 5 of EN 61000-3-3
Measurement Time:	10 min
Detector:	As per EN 61000-3-3

6.4.1 E.U.T. Operation

Operating Environment:

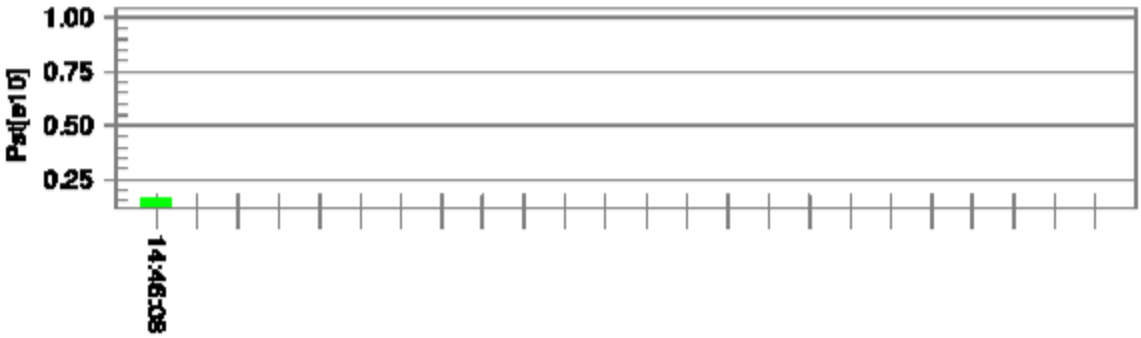
Temperature: 25.0 °C Humidity: 50% RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, (pretest was performed at Charge mode, Discharge mode and Test mode to find the worst case, the completed test was conducted at Charge mode since it was the worst case), keep the EUT charging the rechargeable batteries.

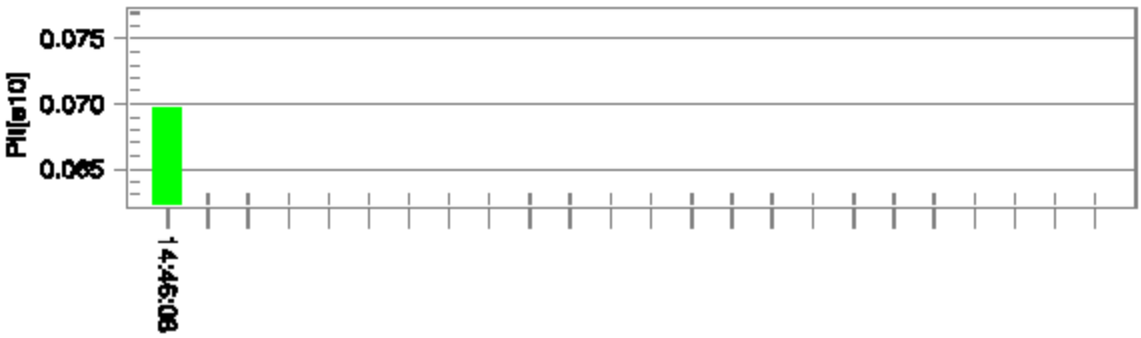
6.4.2 Measurement Data

Test Result: PassStatus: Test Completed

Psti and limit line **European Limits**



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.09			
Highest dt (%):	0.00	Test limit (%):	3.30	Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.160	Test limit:	1.000	Pass

7 Immunity Test Results

7.1 Performance Criteria Description in Clause 6 of EN 55014-2

Criterion A: The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. 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 from what the user may reasonably expect from the apparatus if used as intended.

Criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. 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, then either of these may be derived from the product description and documentation and from what the user may reasonably expect from the apparatus 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, or by any operation specified in the instructions for use.

7.2 ESD

Test Requirement:	EN 55014-2	
Test Method:	EN 61000-4-2	
Performance Criterion:	B	
Discharge Impedance:	330 Ω / 150 pF	
Discharge Voltage:	Air Discharge:	8 kV
	Contact Discharge:	4 kV
	HCP/VCP:	4 kV
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 10 times at each test point	
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 50% RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, Discharge mode and Test mode.

7.2.2 Test Results

Direct Application Test Results

Observations: Test Point:

1. All insulated enclosure and seams.
2. All accessible metal parts of the enclosure.

Direct Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
8	+/-	1	N/A	A
4	+/-	2	A	N/A

Indirect Application Test Results

Observations: Test Point: 1. All sides.

Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
4	+/-	1	A	A

Results:

A: No degradation in the performance of the EUT was observed.

N/A: Not applicable (not requested by Standard).

7.3 Electrical Fast Transients (EFT)

Test Requirement:	EN 55014-2
Test Method:	EN 61000-4-4
Performance Criterion:	B
Test Level:	1.0kV on AC
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	300ms
Test Duration:	2 minute per level & polarity

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 50 % RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, Discharge mode and Test mode.

7.3.2 Test Results:

Lead under Test	Level (±kV)	Coupling Direct/Clamp	EUT operating mode	Observations (Performance Criterion)
Live, Neutral	±1.0	Direct	Above modes	(A)

A: No loss of function was observed.

7.4 Surge

Test Requirement:	EN 55014-2
Test Method:	EN 61000-4-5
Performance Criterion:	B
Test Level:	±1kV Live to Neutral
Polarity:	Positive & Negative
Generator source impedance:	2Ω
Trigger Mode:	Internal
No. of surges:	5 positive at 90°, 5 negative at 270°.

7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 50 % RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, Discharge mode and Test mode.

7.4.2 Test Results:

Pulse No	Line-Line	Level (kV)	Surge Interval	Phase (deg)	Observation (Performance Criterion)
1–5	L-N	+1	60s	90°	No loss of performance (A)
6–10	L-N	-1	60s	270°	(A)

7.5 Conducted Immunity 0.15MHz to 230MHz

Test Requirement: EN 55014-2
Test Method: EN 61000-4-6
Performance Criterion: A
Frequency Range: 0.15MHz to 230MHz
Test level: 3V rms on AC Ports (unmodulated emf into 150 Ω)
Modulation: 80%, 1kHz Amplitude Modulation

7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 25.0 °C Humidity: 50 % RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, Discharge mode and Test mode.

7.5.2 Test Results:

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Observation (Performance Criterion)
150kHz to 230MHz	2 Wires, AC Supply Cable	3Vrms	80%, 1kHz Amp. Mod.	1%	2s	No Loss of Function (A)

7.6 Voltage Dips and Interruptions

Test Requirement:	EN 55014-2
Test Method:	EN 61000-4-11
Performance Criterion:	C
Test Level:	0% of U_t for 0.5 Periods
	40 % of U_t for 10 Periods
	70 % of U_t for 25 Periods
No. of Dips / Interruptions:	3 per Level

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 50% RH Atmospheric Pressure: 1012 mbar

EUT Operation: Test the EUT in Charge mode, Discharge mode and Test mode.

7.6.2 Test Results:

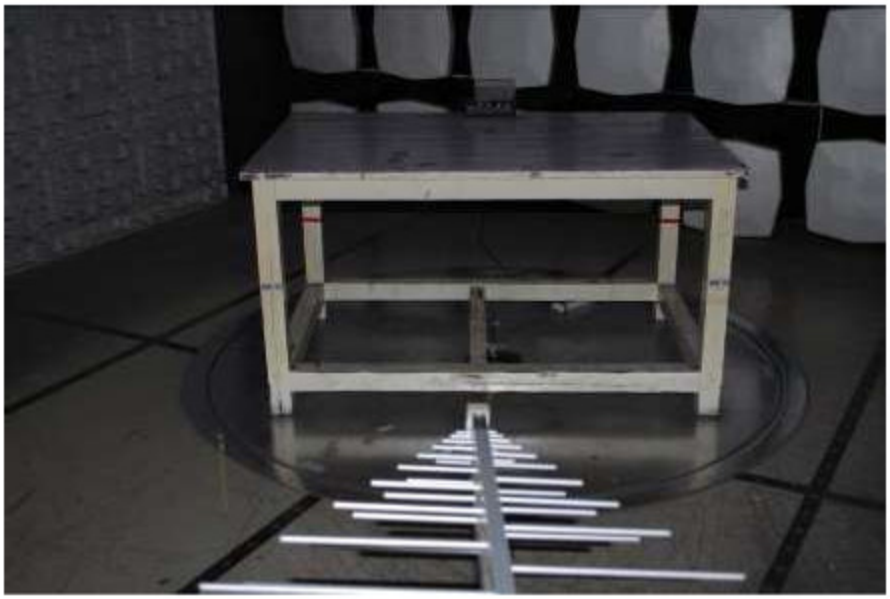
EUT operating modes	% U_T	Phase	Duration of dropout in Periods	No of dropout	Time between dropout	Observations (Performance Criterion)
Above modes	0	0°	0.5	1,2,3	10s	(A)
Above modes	40	0°	10	1,2,3	10s	(A)
Above modes	70	0°	25	1,2,3	10s	(A)

A: No Loss of Function.

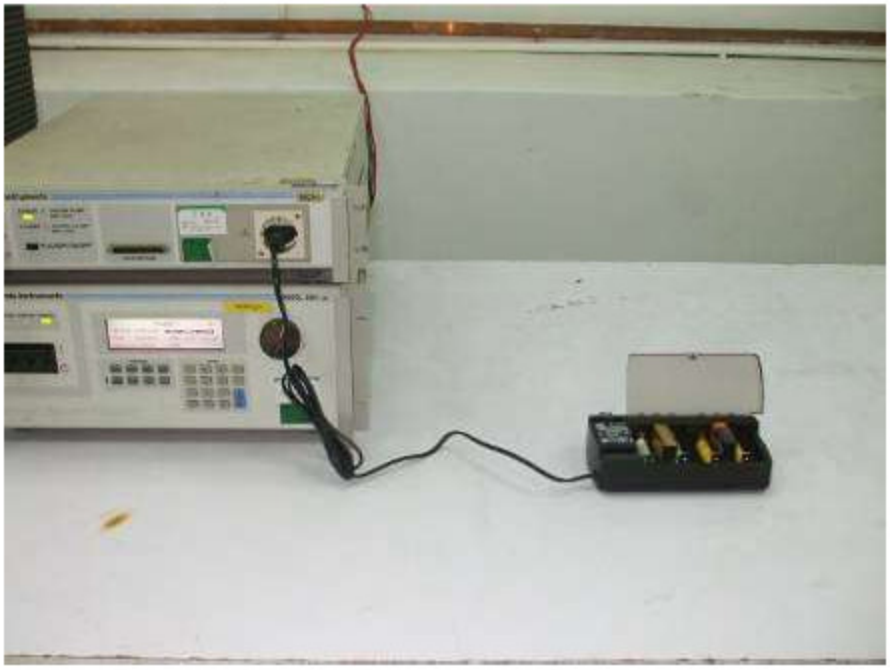
8 Photographs

8.1 Conducted Emission Test Setup

8.2 Radiated Emission Test Setup



8.3 Flicker Test Setup



8.4 ESD Test Setup

8.5 EFT, Surge and Voltage Dips Test Setup

8.6 Conducted Immunity Test Setup

8.7 EUT Constructional Details