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TEST REPORT

Application No.: GLEMO060300521IT
Applicant: ISS MANUFACTURING LTD.
Manufacturer: NTL ELECTRONICS FACTORY

Equipment Under Test (EUT):

EUT Name: USB HEADSET WITH MICROPHONE
Item No.: SPRO5004, SPRO5005 ♣
Serial No.: Not supplied by client

♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Standards: EN 55022: 1998 + A1: 2000 + A2: 2003
EN 55024: 1998 + A1: 2001 + A2:2003
EN 61000-3-2: 2000
EN 61000-3-3: 1995 + A1: 2001

Date of Receipt: 16 March 2006
Date of Test: 20 March to 21 April 2006
Date of Issue: 14 April 2006

Test Result :	PASS*
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* 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.

Jeff Zhao
April 06

Jeff Zhao
Manager



This report refers to the General Conditions for Inspection and Testing Services, printed overleaf.
This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the SGS PRODUCT CERTIFICATION MARK. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. 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
Radiated Emission, 30MHz to 1GHz	EN 55022 : 1998 + A1:2000+A2:2003	EN 55022 : 1998 + A1:2000+A2:2003	Class B	PASS①
Conducted Emission (150kHz to 30MHz)	EN 55022 : 1998 + A1:2000+A2:2003	EN 55022 : 1998 + A1:2000+A2:2003	Class B	PASS
Harmonic Emission on AC, 50Hz	EN 61000-3-2: 2000	EN 61000-3-2: 2000	Class A	N/A
Flicker Emission on AC	EN 61000-3-3 :1995 + A1: 2001	EN 61000-3-3 :1995 + A1: 2001	Clause 5 of EN 61000-3-11	N/A
ESD	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-2 :1995 + A1:1999 +A2 :2001	Contact ±4 kV Air ±8 kV	PASS②
Radiated Immunity, 80MHz to 1 GHz	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-3 :2002 + A1: 2002	3V/m 80%, 1kHz, AM	PASS
Electrical Fast Transients (EFT) on AC	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-4 :1995 + A1:2001 +A2 :2001	AC ± 1.0kV	PASS③
Surge Immunity on AC	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-5 :1995 + A1:2001	±1kV D.M.†	PASS
Injected Currents on AC, 150kHz to 80MHz	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-6 :1996 + A1:2001	3Vrms (emf), 80%, 1kHz Amp. Mod.	PASS
Voltage Dips and Interruptions on AC	EN 55024: 1998 + A1: 2001+A2:2003	EN 61000-4-11 :1994 + A1:2001	0 % U_T^* for 0.5per 0 % U_T^* for 250per 70 % U_T^* for 25per	PASS

* U_T is the nominal supply voltage

† D.M. – Differential Mode

Remark :

N/A Not applicable, please refers to Section 6.3 & 6.4 of this report for details.

①-③ The EUT passed the tests after modification. Please refer to the following information and this report for further details.

Added one core for the USB cable as the following photo shown:



Core model No.: RC 25*12*15

Manufacturer: KING CORE Electronics Co., Ltd.

Item No.: SPRO5004, SPRO5005

Only the Item SPRO5005 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above items, only the outer decoration was difference.



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4 General Information

4.1 Client Information

Applicant: ISS MANUFACTURING LTD.
Address of Applicant: UNIT 604-606, 6/F., PHASE II, CHAI WAN INDUSTRIAL CITY, 70 WING TAI ROAD, CHAI WAN, HONGKONG
Manufacturer: NTL ELECTRONICS FACTORY
Address of Manufacturer: BUILDING B22, THE FIRST INDUSTRY DISTRICT, FENG HUANG VILLAGE, FU YONG, SHENZHEN, CHINA

4.2 General Description of E.U.T.

EUT Name: USB HEADSET WITH MICROPHONE
Item No.: SPRO5004, SPRO5005 ♣
Serial No.: Not supplied by client

4.3 Details of E.U.T.

Power Supply: Supplied by PC USB Port
Signal Cable: 2.0m USB Cable

4.4 Description of Support Units

The EUT has been tested with PC system as following:

Description	Manufacturer	Model No.	Serial No.
Personal Computer	Hewlett-Packard	P7314A	CN21003501
NoteBook	IBM	2374-14N	99-FBAF9
17" Monitor	Philips	107P20/29H	BZ000144445038
Mouse	Hewlett-Packard	M-S480	LZE20353501 FCC ID: JNZ201213
ROM Programmer	DASI Electronics	EMP-100A	J007
Printer	Epson	P310B	DLRE134863
Personal Computer	IBM	M/T 3126-KCH	99F6434
Personal Computer	IBM	M/T 8189-39C	99FX366
15" Monitor	IBM	6331-4CN	23-NTYF6
17" Monitor	IBM	6737-66N/A	23-NG949

4.5 Standards Applicable for Testing

The customer requested EMC tests for a USB headset with microphone.

The standards used were EN 55022, EN 61000-3-2, EN 61000-3-3 and EN 55024.

Table 1 : Tests Carried Out Under EN 55022 :1998 + A1:2000 + A2:2003

Standard		Status
EN 55022 :1998 + A1:2000 + A2:2003	Radiated Emissions	√
EN 55022 :1998 + A1:2000 + A2:2003	Conducted Emissions on AC	√
EN 55022 :1998 + A1:2000 + A2:2003	Conducted Emissions on Telecommunication Ports	×

× Indicates that the test is not applicable

√ Indicates that the test is applicable

Table 2: Tests Carried Out Under EN 61000-3-2: 2000 & EN 61000-3-3: 1995 + A1: 2001

Standard		Status
EN 61000-3-2: 2000	Harmonic Emissions on AC	×
EN 61000-3-3:1995 + A1: 2001	Flicker Emissions on AC	×

× Indicates that the test is not applicable

Table 3: Tests carried out under EN 55024 : 1998+A1: 2001+A2:2003

Standard		Status
EN 61000-4-2 :1995 +A1:1998 +A2 :2001	Electrostatic discharge immunity test	√
EN 61000-4-3:2002+A1:2002	Radiated, radio-frequency electromagnetic field electromagnetic field immunity test	√
EN 61000-4-4: 1995+A1:2001+A2:2001	Electrical fast transients/burst immunity test	√
EN 61000-4-5: 1995 + A1: 2001	Surge immunity test	√
EN 61000-4-6: 1996+A1:2001	Immunity to conducted disturbances, induced by radio-frequency fields	√
EN 61000-4-8: 1993+A1:2001	Power-frequency magnetic field immunity test	×
EN 61000-4-11: 1994+A1:2001	Voltage dips, short interruptions and voltage variations immunity tests	√

× Indicates that the test is not applicable

√ Indicates that the test is applicable

Note The EUT does not contain any component which is susceptible from the magnetic field.

4.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.7 Test Facility

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

- **NVLAP – Lab Code: 200611-0**
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2006.
- **ACA**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**
The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.
Date of Registration: June 01, 2005. Valid until February 22, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**
Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**
SGS-CSTC Standards Technical Services Co., Ltd., 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 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **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.: 5169.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

The EUT passed the Radiated Emission test, ESD test and EFT test after modification.

4.10 Monitoring of EUT for All Immunity Test

Visual: Monitored the LED light of the EUT and PC screen.

Audio: Monitored the sound of the EUT.

5 Equipment Used during Test

RE in Chamber/OATS						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0525	Impact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	06-03-2006	06-03-2007
EMC0525	Compact chamber	ZhongYu	N/A	N/A	20-12-2005	20-12-2006
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	05-12-2005	05-12-2006
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2005	04-12-2006
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	16-01-2006	16-01-2007
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	10-05-2005	09-05-2006
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2005	05-12-2006
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	06-03-2006	06-03-2007
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	06-03-2006	06-03-2007
EMC0523	Active Loop Antenna	EMCO	6502	00042963	14-01-2006	14-01-2007
EMC0529	10m Open Site	ZhongYu	N/A	N/A	26-12-2005	26-12-2006

Conducted Emission						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m ³	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	05-12-2005	05-12-2006
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	05-12-2005	05-12-2006
EMC0107	Coaxial Cable	SGS	2m	N/A	25-11-2005	25-11-2006

ESD						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
SEL0012	ESD Gun	Keytek	MZ-15/EC	0502182	20-12-2005	20-12-2006
EMC0804	ESD Ground Plane	SGS	3m x 3m	N/A	N/A	N/A

EFT, Surge, Voltage dips and Interruption						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC1010	EMC Immunity Test System	Thermo KeyTek	Pro-Plus	0501276	05-12-2005	05-12-2006
EMC1009	Capacitive Coupling Clamp	Thermo KeyTek	Pro-CCL	0501362	05-12-2005	05-12-2006
EMC1005	Digital Oscilloscope	Tektronix	TDS3012	B015508	23-05-2005	22-05-2006



Radiated Immunity						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0525	Impact 3m Semi-Anechoic Chamber	Frankonia	N/A	N/A	06-03-2006	06-03-2007
EMC0516	Signal Generator	Rohde & Schwarz	SMR20	100416	05-12-2005	05-12-2006
EMC0915	Amplifier 20M-1GHz	EMPOWER	BBS2E4ALP	1007	06-03-2006	06-03-2007
EMC0914	Amplifier 800M-2.5GHz	EMPOWER	BBS3Q5KIN	1006	06-03-2006	06-03-2007
EMC0904	Power Meter	Rohde & Schwarz	NRVS	825770/074	18-07-2005	18-07-2006
EMC0905	Power Sensor	Rohde & Schwarz	NRV-Z5	825802/013	18-07-2005	18-07-2006
EMC0917	Dual Directional Coupler	EMCA	715-10-1.400	070031	06-10-2005	06-10-2007
EMC0907	Electric Field Probe	Wandel & Goltermann	EMC-20	M-0063	26-04-2005	25-04-2006
EMC0908	Oscilloscope Type 485	Tektronix	485	B144408	18-07-2005	18-07-2006
EMC0909	Monitor System	Mitsubish Corp.	M-0552AB	91510185	N/A	N/A
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	16-01-2006	16-01-2007
EMC0916	Microwave Horn Antenna(0.8-5GHz)	Amplifier Research	AT4002A	308071	25-10-2005	25-10-2006

Conducted Immunity						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC1101	Signal Generator	Rohde & Schwarz	SMY01	825675/016	19-09-2005	18-09-2006
EMC1102	Amplifier 0.15-230MHz	Ophirrf	GRF5048	1003	06-03-2006	06-03-2007
EMC1103	Power Meter	Rohde & Schwarz	NRVS	825770/079	07-07-2005	07-07-2006
EMC1104	Power Sensor	Rohde & Schwarz	NRV-Z5	825802/012	07-07-2005	07-07-2006
EMC1105	Dual Directional coupler	Werlatone Inc.	C1795	6635	24-11-2005	24-11-2006
EMC0908	Oscilloscope Type 485	Tektronix	485	B144408	18-07-2005	18-07-2006
EMC1108	CDN M3	Schaffner Chase	CDN-M3-16	9866	05-12-2005	05-12-2006
EMC1107	CDN M2	Schaffner Chase	CDN-M2-16	9863	05-12-2005	05-12-2006
EMC1120	Immunity S/W Ver 4.31	Schaffner Chase	CIS9942	WHHPKB	N/A	N/A
EMC1116	Current Probe	Schaffner Chase	CIP9136	1155	25-11-2005	25-11-2006
EMC1117	Current Probe	Schaffner Chase	CSP8445	18	25-11-2005	25-11-2006

General used equipment						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0050 to EMC0053	Temperature, & Humidity	ZHENGZHOU BO YANG	WSB	N/A	05-12-2005	05-12-2006
EMC0054	Temperature, & Humidity	Shenzhen Tai Kong	THG-1	N/A	04-01-2006	04-01-2007
EMC0006	DMM	Fluke	73	70681569	28-09-2005	28-09-2006
EMC0007	DMM	Fluke	73	70671122	12-09-2005	12-09-2006



6 Emission Test Results

6.1 Radiated Emissions, 30MHz to 1GHz

Test Requirement:	EN 55022
Test Method:	EN 55022
Test Date:	21 March 2006 (Initial test) 21 March 2006 (Test after modification)
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Class:	Class B
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 48% RH Atmospheric Pressure: 1008 mbar

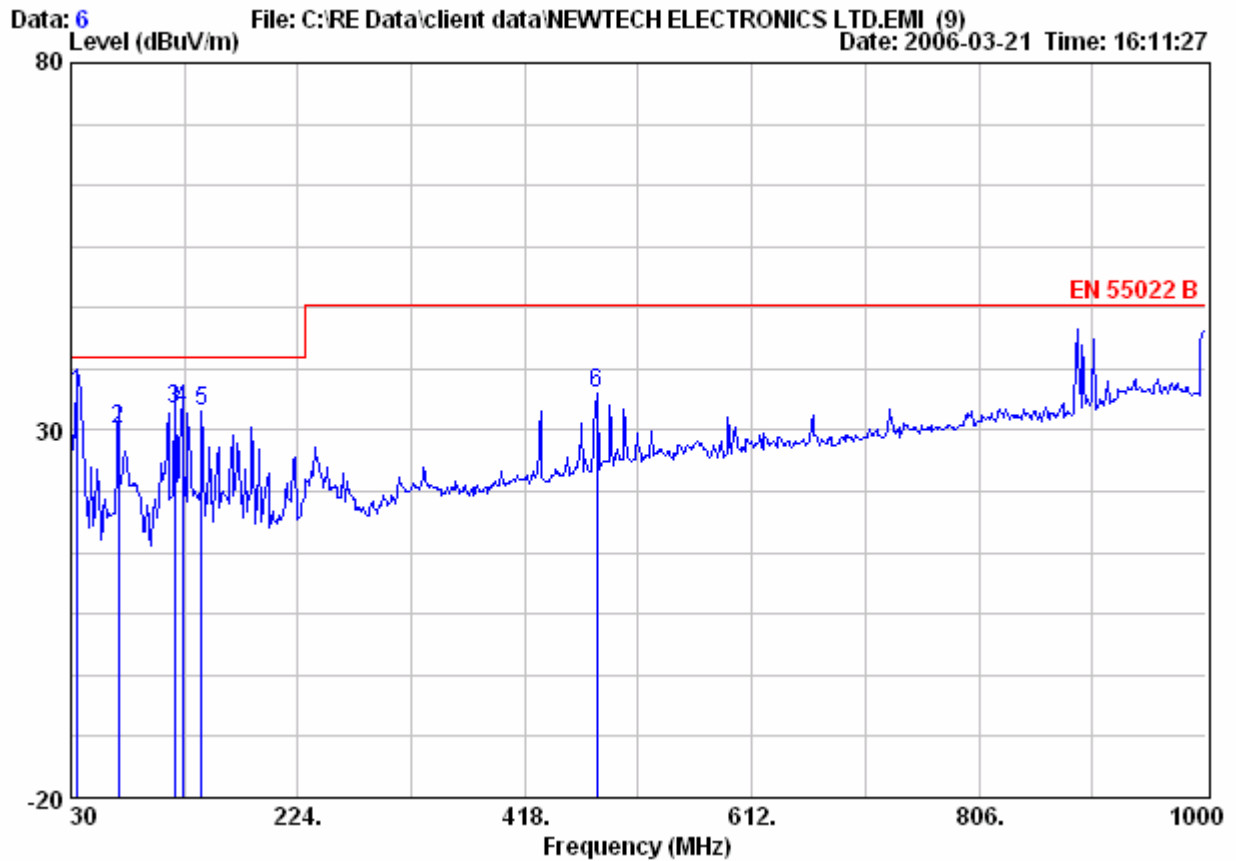
EUT Operation: Test the EUT in PC Connection Mode with test program running.

6.1.2 Measurement Data

An initial pre-scan was performed in the 3m 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 Bilog antenna with 2 orthogonal polarities.

The following quasi-peak measurement data were performed on the EUT on 21 March 2006:

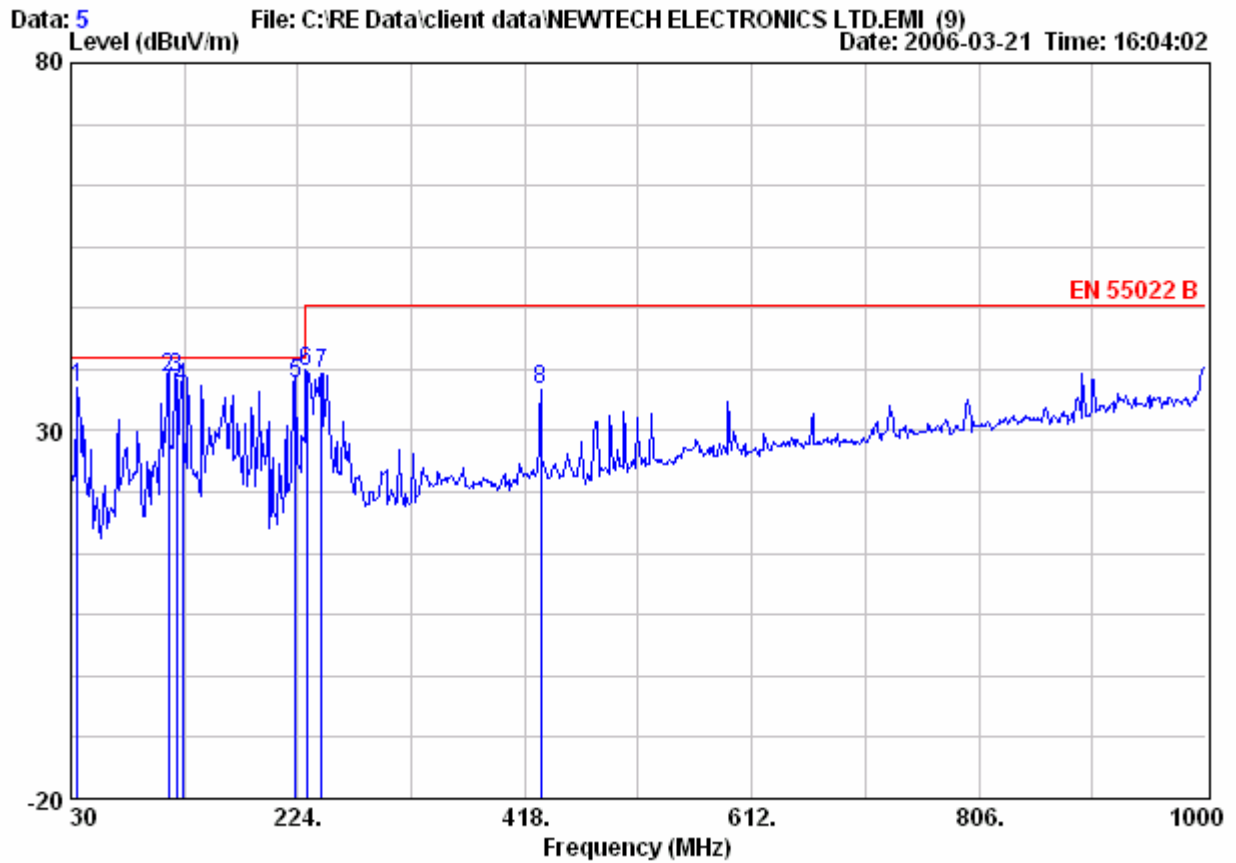
Vertical:



	Read	Antenna	Cable	Preamp	Limit	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 Max.	35.820	43.84	15.97	0.56	25.30	35.07	40.00	-4.93 QP
2	70.740	47.26	7.21	0.71	25.10	30.08	40.00	-9.92 QP
3	118.270	45.71	11.26	0.98	25.10	32.85	40.00	-7.15 QP
4	125.060	46.11	10.94	1.01	25.10	32.96	40.00	-7.04 QP
5	141.550	46.20	10.30	1.07	25.07	32.51	40.00	-7.49 QP
6	479.110	40.16	18.35	2.14	25.73	34.93	47.00	-12.07 QP



Horizontal:



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 Max.	35.820	40.87	19.67	0.56	25.30	35.80	40.00	-4.20	QP
2 Max.	113.420	48.99	12.49	0.96	25.10	37.34	40.00	-2.66	QP
3 Max.	120.048	48.27	13.19	0.99	25.10	37.35	40.00	-2.65	QP
4 Max.	125.060	47.36	12.72	1.01	25.10	35.99	40.00	-4.01	QP
5 Max.	222.060	47.86	11.69	1.39	24.51	36.44	40.00	-3.56	QP
6	231.760	48.87	12.20	1.43	24.47	38.03	47.00	-8.97	QP
7	244.370	48.28	12.35	1.48	24.42	37.68	47.00	-9.32	QP
8	431.580	41.21	17.62	2.00	25.30	35.52	47.00	-11.48	QP

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

2. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.



6.2 Conducted Emissions Mains Terminals, 150kHz to 30MHz

Test Requirement: EN 55022
Test Method: EN 55022
Test Date: 23 March 2006
Frequency Range: 150KHz to 30MHz
Class / Severity: Class B
Detector: Peak for pre-scan (9kHz Resolution Bandwidth)
Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit

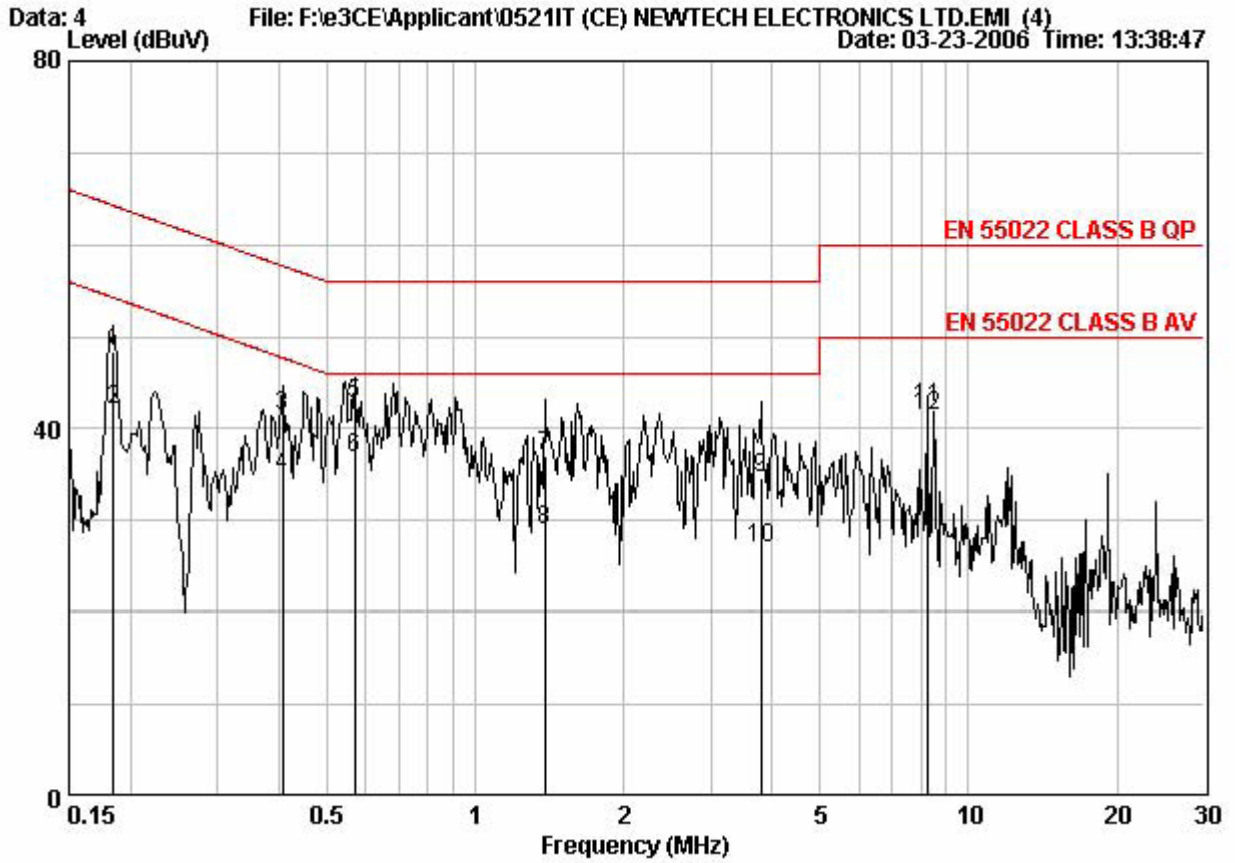
6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 27.0 °C Humidity: 62% RH Atmospheric Pressure: 1014 Mbar
EUT Operation: A pre-test was performed on the EUT in On Mode power supplied by PC USB Port in order to find the worst case.
Test the EUT in On Mode with test program running for the compliance test as no worst case was found.

6.2.2 Measurement Data

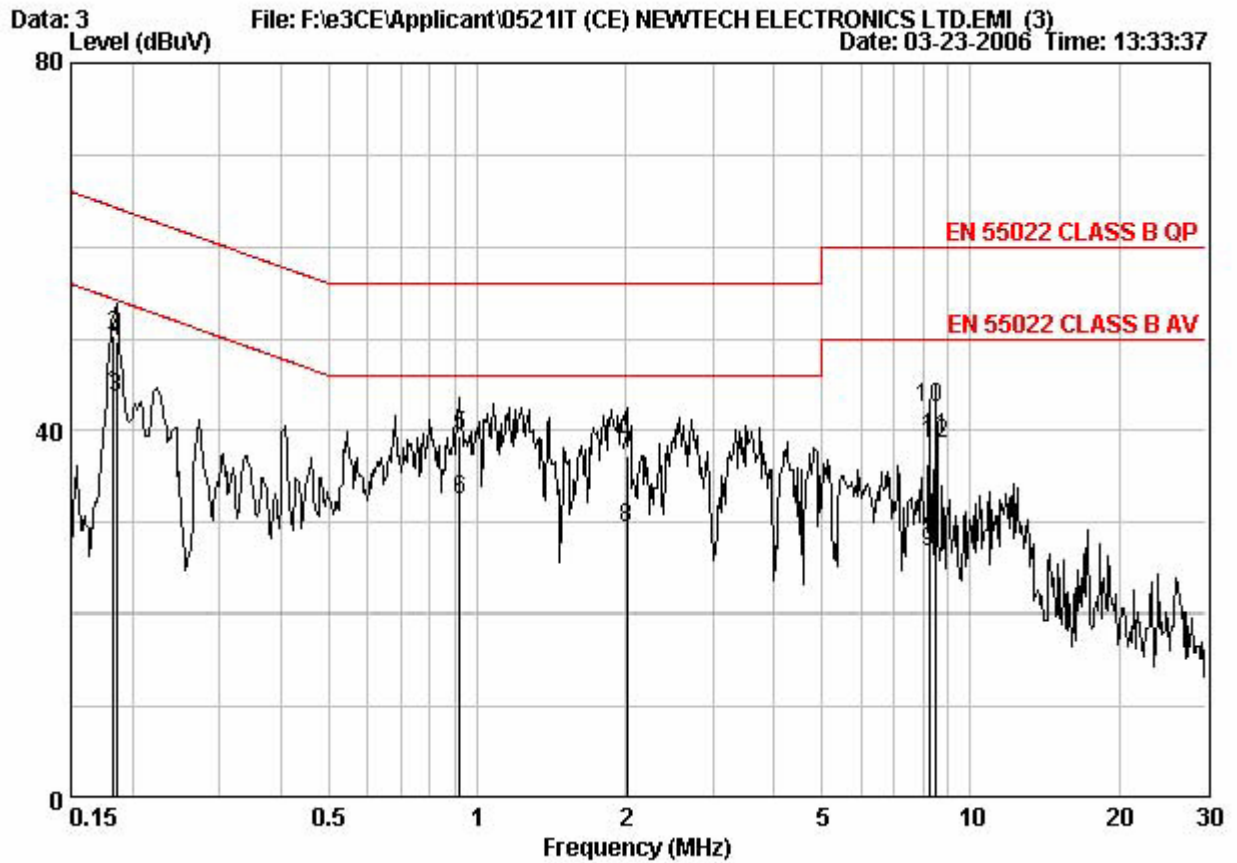
An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.
The following Quasi-Peak and Average measurements were performed on the EUT on 23 March 2006:

Live Line:



	Read Freq	Read Level	Cable Loss	LISN Factor	Limit Level	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.184	48.38	-0.09	0.06	48.35	64.28	-15.94 QP
2	0.184	42.17	-0.09	0.06	42.14	54.28	-12.15 AVERAGE
3	0.406	41.52	-0.05	0.05	41.52	57.73	-16.20 QP
4	0.406	34.95	-0.05	0.05	34.95	47.73	-12.77 AVERAGE
5	0.570	42.72	-0.03	0.06	42.75	56.00	-13.25 QP
6	0.570	36.82	-0.03	0.06	36.85	46.00	-9.15 AVERAGE
7	1.381	36.96	0.01	0.06	37.04	56.00	-18.96 QP
8	1.381	28.93	0.01	0.06	29.01	46.00	-16.99 AVERAGE
9	3.799	34.50	0.06	0.14	34.70	56.00	-21.30 QP
10	3.799	26.85	0.06	0.14	27.05	46.00	-18.95 AVERAGE
11	8.255	41.96	0.09	0.31	42.37	60.00	-17.63 QP
12 !	8.255	41.05	0.09	0.31	41.46	50.00	-8.54 AVERAGE

Neutral Line:



	Read Freq	Read Level	Cable Loss	LISN Factor	Limit Level	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dB	
1	0.183	44.05	-0.09	0.06	44.02	54.34 -10.32	AVERAGE
2	0.183	50.32	-0.09	0.06	50.29	64.34 -14.05	QP
3	0.185	43.59	-0.09	0.06	43.56	54.24 -10.68	AVERAGE
4	0.185	49.74	-0.09	0.06	49.71	64.24 -14.53	QP
5	0.923	39.40	0.00	0.08	39.48	56.00 -16.52	QP
6	0.923	32.45	0.00	0.08	32.53	46.00 -13.47	AVERAGE
7	2.012	37.28	0.03	0.07	37.38	56.00 -18.62	QP
8	2.012	29.40	0.03	0.07	29.50	46.00 -16.50	AVERAGE
9	8.235	26.52	0.09	0.30	26.91	60.00 -33.09	QP
10 !	8.255	42.08	0.09	0.30	42.47	50.00 -7.53	AVERAGE
11	8.521	38.74	0.09	0.31	39.14	60.00 -20.86	QP
12	8.521	38.20	0.09	0.31	38.60	50.00 -11.40	AVERAGE

Remark:

*: Average value was only measured if QP value was within 6dB of Average limit line.

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 :2000

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 Results

Test Requirement:	EN 61000-3-3
Test Method:	N/A: See Remark Below

There is no need for Flicker test to be performed on this product in accordance with EN 61000-3-3:1995 + A1:2001.

For further details, please refer to Clause 6.1 of EN 61000-3-3 which states:

“For voltage changes caused by manual switching, equipment is deemed to comply without further testing if the maximum r.m.s. input current (including inrush current)evaluated over each 10 ms half-period between zero-crossings does not exceed 20 A, and the supply current after inrush is within a variation band of 1,5A..”

7 Immunity Test Results

7.1 Performance Criteria Description in Clause 7 of EN 55024

- Criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- Criterion B: After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the 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 operating state or stored data is allowed to persist after the test.
- If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- Criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.
- Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

7.2 ESD

Test Requirement: EN 55024
 Test Method: EN 61000-4-2
 Criterion required: B
 Test Date: 27 March 2006 (Initial test)
 21 April 2006 (Test after modification)
 Discharge Impedance: 330 Ω / 150 pF
 Discharge Voltage: Air Discharge: 2, 4, 8 kV
 VCP, HCP: 2, 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: 24.0 °C Humidity: 52% RH Atmospheric Pressure: 1023 mbar
 EUT Operation: Test the EUT in On Mode with test program running.

7.2.2 Test Results

Direct Application Test Results

Observations: Test Point: 1. All Enclosure & Seams;
2. None.

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

Test Requirement: EN 55024
 Test Method: EN 61000-4-3
 Criterion required: A
 Test Date: 22 March 2006
 Frequency Range: 80MHz to 1GHz
 Face under Test: Three Orthogonal Faces
 Severity: 3V/m 80%, 1kHz Amplitude Modulated

7.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 28.0 °C Humidity: 53% RH Atmospheric Pressure: 1008 mbar
 EUT Operation: Test the EUT in On Mode with test program running.

7.3.2 Test Results

Frequency	Level	Modulation	EUT Face	Result / Observations
80MHz-1GHz	3V/m	1kHz, 80% Amp. Mod, 1% increment	0°V	A
			0°H	
			90°V	A
			90°H	
			180°V	A
			180°H	
			270°V	A
			270°H	

Remarks:

A: No degradation in the performance of the E.U.T. was observed.

7.4 Electrical Fast Transients (EFT)

Test Requirement: EN 55024
 Test Method: EN 61000-4-4
 Criterion required: B
 Test Date: 20 March 2006 (Initial test)
 21 April 2006 (Test after modification)
 Test Level: 0.5kV, 1.0kV on AC
 Polarity: Positive & Negative
 Repetition Frequency: 5kHz
 Burst Duration: 300ms
 Test Duration: 2 minute per level & polarity

7.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.0 °C Humidity: 58% RH Atmospheric Pressure: 1028 mbar
 EUT Operation: Test the EUT in On Mode with test program running.

7.4.2 Test Results On AC Supply:

Lead under Test	Level (±kV)	Coupling Direct/Clamp	EUT operating mode	Observations (Performance Criterion)
Live	±0.5, 1.0	Direct	On mode	(B)
Neutral	±0.5, 1.0	Direct	On mode	(B)
Earth	±0.5, 1.0	Direct	On mode	(B)
Live, Neutral & Earth	±0.5, 1.0	Direct	On mode	(B)

Performance B is within the acceptable criterion for EFT test.

- B The audio output of the EUT stopped when it was interfered during test, but it could recover automatically after test.



7.5 Surge

Test Requirement: EN 55024
Test Method: EN 61000-4-5
Criterion required:: B
Test Date: 20 March 2006
Test Level: ±1kV Live to Neutral
±2kV Live to Earth or Neutral to Earth
Polarity: Positive & Negative
Interval: 60s between each surge
No. of surges: 5 positive, 5 negative at 0°, 90°, 180°, 270°.

7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 23.0 °C Humidity: 65 % RH Atmospheric Pressure: 1020 mbar
EUT Operation: Test the EUT in On Mode with test program running.

7.5.2 Test Results:

Pulse No	Line-Line	Level (kV)	Surge Interval	Phase (deg)	Observation (Performance Criterion)
1-5	L-N	+1	60s	0°	No loss of performance (A)
6-10	L-N	-1	60s	0°	(A)
11-15	L-N	+1	60s	90°	(A)
16-20	L-N	-1	60s	90°	(A)
21-25	L-N	+1	60s	180°	(A)
26-30	L-N	-1	60s	180°	(A)
31-35	L-N	+1	60s	270°	(A)
36-40	L-N	-1	60s	270°	(A)
41-45	L-PE	+2	60s	0°	(A)
46-50	L-PE	-2	60s	0°	(A)
51-55	L-PE	+2	60s	90°	(A)
56-60	L-PE	-2	60s	90°	(A)
61-65	L-PE	+2	60s	180°	(A)
66-70	L-PE	-2	60s	180°	(A)
71-75	L-PE	+2	60s	270°	(A)
76-80	L-PE	-2	60s	270°	(A)
81-85	N-PE	+2	60s	0°	(A)
86-90	N-PE	-2	60s	0°	(A)
91-95	N-PE	+2	60s	90°	(A)
96-100	N-PE	-2	60s	90°	(A)
101-105	N-PE	+2	60s	180°	(A)
106-110	N-PE	-2	60s	180°	(A)
111-115	N-PE	+2	60s	270°	(A)
116-120	N-PE	-2	60s	270°	(A)



7.6 Conducted Immunity 0.15MHz to 80MHz

Test Requirement: EN 55024
Test Method: EN 61000-4-6
Criterion required: A
Test Date: 20 March 2006
Frequency Range: 0.15MHz to 80MHz
Test level: 3V rms on AC Ports (unmodulated emf into 150 Ω)
Modulation: 80%, 1kHz Amplitude Modulation

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24.0 °C Humidity: 65 % RH Atmospheric Pressure: 1020 mbar

EUT Operation: Test the EUT in On Mode with test program running

7.6.2 Test Results:

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

7.7 Voltage Dips and Interruptions

Test Requirement: EN 55024
 Test Method: EN 61000-4-11
 Criterion required: >95%VD,0.5period: B; >95%VD,250periods: C;
 30%VD, 25periods: C
 Test Date: 20 March 2006
 Test Level: 0% of U_T (Supply Voltage) for 0.5 Periods
 0% of U_T (Supply Voltage) for 250 Periods
 70 % of U_T (Supply Voltage) for 25 Periods
 No. of Dips / Interruptions: 3 per Level

7.7.1 E.U.T. Operation

Operating Environment:
 Temperature: 22.0 °C Humidity: 65 % RH Atmospheric Pressure: 1020 mbar
 EUT Operation: Test the EUT in On Mode with test program running.

7.7.2 Test Results:

EUT operating mode	Test Level % U_T	Phase	Duration of dropout in Periods	No of dropout	Time between dropout	Observations (Performance Criterion)
On mode	0	0°	0.5	3	10s	No Loss of Function (A)
On mode	0	180°	0.5	3	10s	No Loss of Function (A)
On mode	0	0°	250	3	10s	(C)
On mode	70	0°	25	3	10s	(C)

Performance B and C are within the acceptable criterion for Voltage Dips and Interruptions test.

C The power of the EUT shut down during test, but it could recover as intended by operator intervention after test.

8 Photographs

8.1 Radiated Emission Test Setup



8.2 Conducted Emission Test Setup



8.3 ESD Test Setup



8.4 Radiated Immunity Test Setup



8.5 EFT, Surge and Voltage dips Test Setup



8.6 CI Test Setup



8.7 EUT Constructional Details



