



# CE EMC TEST REPORT

Report No.: RPA-16JY0025VNTY-94-R1  
MODEL NO.: DH-NKB1000, NKB1000, DHI-NKB1000,  
OEM-NKB1000, DH-KB1000, KB1000,  
DHI-KB1000, OEM-KB1000, DH-KBD1000,  
KBD1000, DHI-KBD1000, OEM-KBD1000,  
DH-NKB, DH-NKB3000, DH-KBDB,  
NKB3000T, DH-NKB3000T, DHI-NKB3000T  
Received: Mar 06, 2016  
ISSUED: Mar 12, 2016

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Issued By: BUREAU VERITAS ADT (Shanghai) Corporation  
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China

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## 1. TEST PROGRAM

**PRODUCT:** NETWORK KEYBOARD, DOME KEYBOARD,  
CONTROL KEYBOARD, KEYBOARD  
DH-NKB1000, NKB1000, DHI-NKB1000, OEM-NKB1000, DH-KB1000,  
KB1000, DHI-KB1000, OEM-KB1000, DH-KBD1000, KBD1000,  
**MODEL NO.:** DHI-KBD1000, OEM-KBD1000, DH-NKB, DH-NKB3000, DH-KBDB,  
NKB3000T, DH-NKB3000T, DHI-NKB3000T  
**APPLICANT:** Zhejiang Dahua Vision Technology Co., Ltd.  
**TESTED:** Mar 07, 2016 and Mar 11, 2016  
**STANDARDS:** EN 55032: 2012+AC:2013 (Class B)  
EN 61000-6-3: 2007+A1:2011  
EN 50130-4: 2011  
EN 61000-3-2: 2014  
EN 61000-3-3 : 2013  
EN 55024: 2010  
IEC 61000-4-2: 2008  
IEC 61000-4-3 : 2006+A1:2007+A2:2010  
IEC 61000-4-4 : 2012  
IEC 61000-4-5: 2005  
IEC 61000-4-6: 2008  
IEC 61000-4-8: 2009  
IEC 61000-4-11: 2004

We, BUREAU VERITAS ADT (Shanghai) Corporation, declare that the equipment above has been tested in Cerpess Technology Corp., and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

**PREPARED BY :** Sally Wan, **DATE:** Mar 12, 2016  
Sally Wan  
Report Engineer

**TECHNICAL ACCEPTANCE :** Joy ZHU, **DATE:** Mar 12, 2016  
Joy ZHU  
Testing Manager

**APPROVED BY :** Zhaocian YU, **DATE:** Mar 12, 2016  
Zhaocian YU  
Lab Manager

## 2. Summary of Test Procedure and Test Results

<b>EMISSION(EN55032: 2012+AC:2013)</b>		
Test Item	Normative References	Test Result
Conducted Emission	EN55032: 2012+AC:2013 EN 61000-6-3: 2007+A1:2011	PASS
Radiated Emission	EN55032: 2012+AC:2013 EN 61000-6-3: 2007+A1:2011	PASS
Harmonics	EN61000-3-2:2014	PASS
Voltage Fluctuations	EN 61000-3-3: 2013	PASS

<b>IMMUNITY (EN 55024 : 2010)</b>		
Test Item	Test Spec	Test Result
Electrostatic Discharge Immunity Test (ESD)	$\pm 4$ kV (contact discharge, HCP/VCP) $\pm 8$ kV (Air discharge)	PASS
Radio Frequency electromagnetic field immunity test (RS)	80-1000 MHz, 3V/m, 80%AM(1KHz)	PASS
Electrical Fast Transient/ Burst Immunity Test (EFT)	AC Port: $\pm 1$ kV, Signal Port: $\pm 0.5$ kV	PASS
Surge Immunity Test	AC Power Ports: Line to Line: $\pm 1$ kV Line to earth: $\pm 2$ kV Signal and telecommunication port: $\pm 1$ kV	PASS
Conduction Disturbances induced by Radio-Frequency Fields	0.15-80MHz, 3V, 80%AM(1KHz)	PASS
Power Frequency Magnetic Field Immunity Test	50Hz, 1A/m	PASS
Voltage Dips and Voltage Interruptions Immunity Test	Voltage dips: >95% Reduction, 0.5 Durations (Cycle)	PASS
	30% Reduction, 25 Durations (Cycle)	PASS
	Voltage interruptions: >95% Reduction, 250 Durations (Cycle)	PASS

<b>IMMUNITY (EN 50130-4: 2011)</b>		
Test Item	Test Spec	Test Result
Electrostatic Discharge Immunity Test (ESD)	$\pm 6$ kV (contact discharge ,HCP/VCP) $\pm 8$ kV (Air discharge)	PASS
Radio Frequency electromagnetic field immunity test (RS)	80-2700 MHz, 10V/m, 80%AM(1KHz)	PASS
Electrical Fast Transient/ Burst Immunity Test (EFT)	AC Port: $\pm 2.0$ kV, Signal Port: $\pm 1.0$ kV	PASS
Surge Immunity Test	AC Power Ports: line to line: $\pm 0.5$ , $\pm 1$ kV line to earth: $\pm 0.5$ , $\pm 1$ , $\pm 2$ kV Signal Port: $\pm 0.5$ , $\pm 1$ kV	PASS
Conduction Disturbances induced by Radio-Frequency Fields	0.15-100MHz, 10V, 80%AM(1KHz)	PASS
Voltage Dips and Voltage Interruptions Immunity Test	Voltage Interruptions: 100% Reduction, 250 Cycle	PASS
	Voltage Dips: 60% Reduction, 10 Cycle 30% Reduction, 25 Cycle 20% Reduction, 250 Cycle	PASS



■ Additional attachment as following record:

Report No.: RPA-16JY0025VNTY-94-R1

### 3. Immunity Testing Performance Criteria Definition

- A. Normal performance within limits specified by the manufacture, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operation intervention;
- D. Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.



## 4. Test Configuration of Equipment under Test


### 4.1. Manufacturer

Zhejiang Dahua Vision Technology Co., Ltd.


No.1199, Bin'an road, Binjiang District, Hangzhou, P.R.China.

### 4.2. Feature of Equipment under Test

First edition

NETWORK KEYBOARD , DOME KEYBOARD, CONTROL KEYBOARD , KEYBOARD	Model No.:	DH-NKB1000, NKB1000, DHI-NKB1000, OEM-NKB1000, DH-KB1000, KB1000, DHI-KB1000, OEM-KB1000, DH-KBD1000, KBD1000, DHI-KBD1000, OEM-KBD1000, DH-NKB, DH-NKB3000, DH-KBDB, NKB3000T, DH-NKB3000T, DHI-NKB3000T
Remark	<b>NKB1000</b> was selected as the test model and its data have been recorded in this report. The new models and original models are similar except for sale regions.	
Adapter	Model No.:	ADS-12B-12 12012Gz
	Input :	100-240V~ 50/60Hz Max.0.3A
	Output :	12V  1.0A

Original

NETWORK KEYBOARD , DOME KEYBOARD, CONTROL KEYBOARD , KEYBOARD	Model No.:	DH-NKB1000 , NKB1000, DHI-NKB1000 , OEM-NKB1000 , DH-KB1000, KB1000, DHI-KB1000 , OEM-KB1000 , DH-KBD1000, KBD1000 , DHI-KBD1000 , OEM-KBD1000, DH-NKB , DH-NKB3000 , DH-KBDB
Remark	<b>NKB1000</b> was selected as the test model and its data have been recorded in this report.	
Adapter	Model No.:	ADS-12B-12 12012Gz
	Input :	100-240V~ 50/60Hz Max.0.3A
	Output :	12V  1.0A

Models' Differences:

Model No	DH-NKB1000, NKB1000, DHI-NKB1000, OEM-NKB1000, DH-KB1000, KB1000, DHI-KB1000, OEM-KB1000, DH-KBD1000, KBD1000 , DHI-KBD1000, OEM-KBD1000, DH-NKB, DH-NKB3000, DH-KBDB, NKB3000T, DH-NKB3000T, DHI-NKB3000T
Differences	<p>1) NKB1000 support NET, 232,485 control DVR, NVD, ball machine. The difference between with "DH" and with "DHI" is different sale regions.</p> <p>2) KB1000 support 485 control ball machine. The difference between with "DH" and with "DHI" is different sale regions.</p> <p>3) KBD1000 support 232,485 control DVR, NVD, ball machine. The difference between with "DH" and with "DHI" is different sale regions.</p>

#### 4.3. Test Software and Test Mode

##### Test Manner

- a During testing, the interface cables and equipment positions were varied according to Europe Standard.
- b Turn on the power of all equipment.
- c The complete test system included iPod, Notebook PC and EUT for EMC test.

##### The pre-test modes

Test Mode 1: Normal Operation

##### Select the worst case of the pre-test modes as the final test mode

Test Mode 1: Normal Operation

#### 4.4. Description of Support Unit

No.	Device	Manufacturer	Model No.	Description
1	iPod	APPLE	A1199	N/A
2	Notebook PC	SONY	PCG-71811P	Non-Shielded, 1.5m

No.	Cable	Quantity	Description
A	USB Cable	1	Non-Shielded, 1.2m
B	RS232 Cable	1	Non-Shielded, 1.5m
C	LAN Cable	1	Non-Shielded>3.0m

#### 4.5. Measurement Uncertainty

Conducted Emission		
The measurement uncertainty is evaluated as $\pm 2.71$ dB.		
Radiated Emission		
(30MHz -1000MHz)	Horizontal	The measurement uncertainty is evaluated as $\pm 3.59$ dB.
	Vertical	The measurement uncertainty is evaluated as $\pm 3.89$ dB
(1G-6GHz)	Horizontal	The measurement uncertainty is evaluated as $\pm 2.31$ dB.
	Vertical	The measurement uncertainty is evaluated as $\pm 2.15$ dB.

## 5. Test of Conducted Emission

### 5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55032.

**Table A.8 – Requirements for conducted emissions from the AC mains power ports of Class A equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A limits dB(μV)
A8.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 – 30			73
A8.2	0,15 – 0,5	AMN	Average / 9 kHz	66
	0,5 – 30			60
NOTE Apply A8.1 and A8.2 across the entire frequency range.				

**Table A.9 – Requirements for conducted emissions from the AC mains power ports of Class B equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B limits dB(μV)
A9.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	66 – 56
	0,5 – 5			56
	5 – 30			60
A9.2	0,15 – 0,5	AMN	Average / 9 kHz	56 – 46
	0,5 – 5			46
	5 – 30			50

NOTE    Apply A9.1 and A9.2 across the entire frequency range.

**Table A.10 – Requirements for asymmetric mode conducted emissions  
from Class A equipment**

Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A voltage limits dB(μV)	Class A current limits dB(μA)
A10.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	97 – 87	n/a
	0,5 – 30			87	
	0,15 – 0,5	AAN	Average / 9 kHz	84 – 74	
	0,5 – 30			74	
A10.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	97 – 87	53 – 43
	0,5 – 30			87	43
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
A10.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
	0,5 – 30				43
	0,15 – 0,5	Current Probe	Average / 9 kHz		40 – 30
	0,5 – 30				30
NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.					
NOTE 2 AC mains power ports shall meet the limits given in Table A.8.					
NOTE 3 The test shall cover the entire frequency range.					
NOTE 4 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.					
NOTE 5 Testing is required at only one EUT supply voltage and frequency.					
NOTE 6 Applicable to ports listed above and intended to connect to cables longer than 3 m.					

**Table A.11 – Requirements for asymmetric mode conducted emissions  
from Class B equipment**

Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. broadcast receiver tuner ports (3.1.8) 4. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
A11.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	84 – 74	n/a
	0,5 – 30			74	
	0,15 – 0,5	AAN	Average / 9 kHz	74 – 64	
	0,5 – 30			64	
A11.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	74 – 64	30 – 20
	0,5 – 30			64	20
A11.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 – 30
	0,5 – 30				30
	0,15 – 0,5	Current Probe	Average / 9 kHz		30 – 20
	0,5 – 30				20
NOTE 1 The choice of coupling device and measurement procedure is defined in Annex C.					
NOTE 2 Screened ports including TV broadcast receiver tuner ports are tested with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth.					
NOTE 3 AC mains power ports shall meet the limits given in Table A.9.					
NOTE 4 The test shall cover the entire frequency range.					
NOTE 5 The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.					
NOTE 6 Testing is required at only one EUT supply voltage and frequency.					
NOTE 7 Applicable to ports listed above and intended to connect to cables longer than 3 m.					



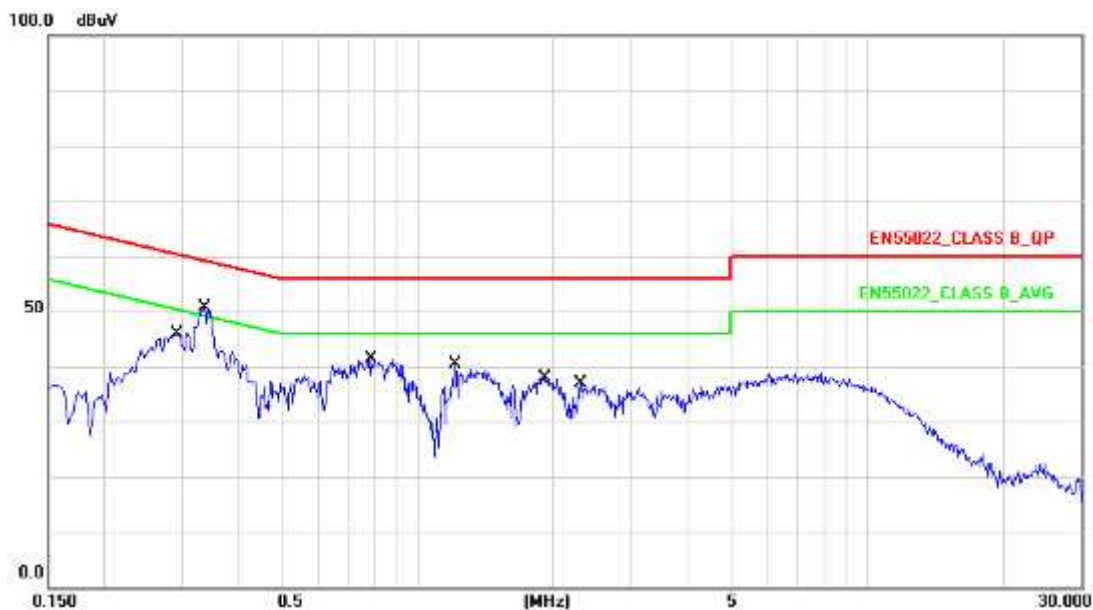
#### 5.4. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2015.03.29	2016.03.28
AMN	R&S	ESH2-Z5	100182	2015.09.06	2016.09.05
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2015.03.29	2016.03.28
ISN	FCC	FCC-TLISN-T4-02	20380	2015.03.29	2016.03.28
ISN	FCC	FCC-TLISN-T8-02	20381	2015.03.29	2016.03.28
ISN	TESEQ	ISN ST08	30175	2015.03.29	2016.03.28
Current Probe	R&S	EZ-17	100303	2015.03.29	2016.03.28
Passive Voltage Probe	R&S	ESH2-Z3	100026	2015.03.29	2016.03.28
Pulse Limiter	R&S	ESH3-Z2	100529	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2015.04.02	2016.04.01
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



## 5.5. Test Data and Result

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Phase :	LINE
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07

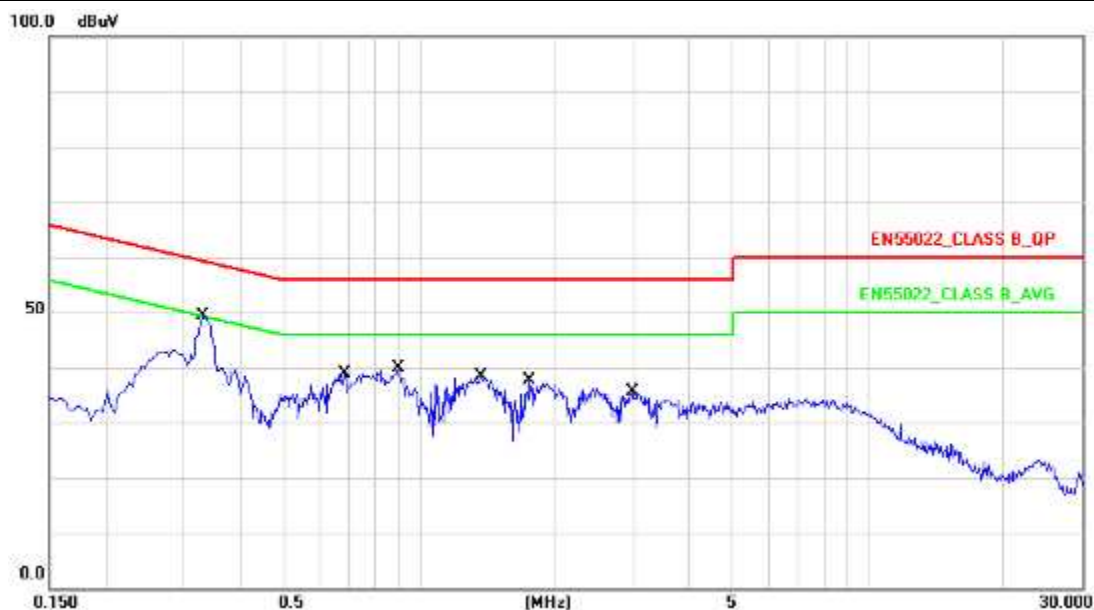


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2900	10.14	33.12	43.26	60.52	-17.26	QP
2	0.2900	10.14	20.17	30.31	50.52	-20.21	AVG
3	0.3339	10.14	38.72	48.86	59.35	-10.49	QP
4	0.3339	10.14	25.44	35.58	49.35	-13.77	AVG
5	0.7860	10.15	28.41	38.56	56.00	-17.44	QP
6	0.7860	10.15	16.31	26.46	46.00	-19.54	AVG
7	1.2100	10.16	22.81	32.97	56.00	-23.03	QP
8	1.2100	10.16	10.81	20.97	46.00	-25.03	AVG
9	1.9220	10.17	23.97	34.14	56.00	-21.86	QP
10	1.9220	10.17	13.32	23.49	46.00	-22.51	AVG
11	2.2980	10.17	19.48	29.65	56.00	-26.35	QP
12	2.2980	10.17	8.03	18.20	46.00	-27.80	AVG

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Phase :	NEUTRAL
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3300	10.14	36.39	46.53	59.45	-12.92	QP
2	0.3300	10.14	26.84	36.98	49.45	-12.47	AVG
3	0.6860	10.16	24.12	34.28	56.00	-21.72	QP
4	0.6860	10.16	15.46	25.62	46.00	-20.38	AVG
5	0.9020	10.17	26.33	36.50	56.00	-19.50	QP
6	0.9020	10.17	17.85	28.02	46.00	-17.98	AVG
7	1.3779	10.18	24.71	34.89	56.00	-21.11	QP
8	1.3779	10.18	17.40	27.58	46.00	-18.42	AVG
9	1.7700	10.18	20.77	30.95	56.00	-25.05	QP
10	1.7700	10.18	13.18	23.36	46.00	-22.64	AVG
11	2.9820	10.20	20.95	31.15	56.00	-24.85	QP
12	2.9820	10.20	14.24	24.44	46.00	-21.56	AVG

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test Mode :	Mode 1: Normal Operation(10M)		
AC Power :	AC 230V/50Hz	Phase :	10M
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	6.2500	10.00	53.07	63.07	74.00	-10.93	QP
2	6.2500	10.00	40.20	50.20	64.00	-13.80	AVG
3	7.5020	10.01	56.24	66.25	74.00	-7.75	QP
4	7.5020	10.01	41.47	51.48	64.00	-12.52	AVG
5	8.7500	9.98	51.78	61.76	74.00	-12.24	QP
6	8.7500	9.98	37.70	47.68	64.00	-16.32	AVG
7	10.0060	9.95	41.84	51.79	74.00	-22.21	QP
8	10.0060	9.95	28.95	38.90	64.00	-25.10	AVG
9	11.1980	9.95	45.20	55.15	74.00	-18.85	QP
10	11.1980	9.95	32.09	42.04	64.00	-21.96	AVG
11	12.4460	9.95	48.27	58.22	74.00	-15.78	QP
12	12.4460	9.95	32.57	42.52	64.00	-21.48	AVG

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test Mode :	Mode 1: Normal Operation(100M)		
AC Power :	AC 230V/50Hz	Phase :	100M
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temperature :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.3339	9.89	50.58	60.47	78.74	-18.27	QP
2	0.3339	9.89	42.85	52.74	68.74	-16.00	AVG
3	5.7860	10.00	44.68	54.68	74.00	-19.32	QP
4	5.7860	10.00	39.40	49.40	64.00	-14.60	AVG
5	13.3580	9.96	47.51	57.47	74.00	-16.53	QP
6	13.3580	9.96	44.68	54.64	64.00	-9.36	AVG
7	16.2300	9.98	48.66	58.64	74.00	-15.36	QP
8	16.2300	9.98	45.51	55.49	64.00	-8.51	AVG
9	18.2420	10.01	48.46	58.47	74.00	-15.53	QP
10	18.2420	10.01	45.69	55.70	64.00	-8.30	AVG
11	23.1299	10.06	49.90	59.96	74.00	-14.04	QP
12	23.1299	10.06	47.81	57.87	64.00	-6.13	AVG

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test engineer: Leber

## 5.6. Test Photographs

Main

Front View



Rear View





LAN

Front View



Rear View



## 6. Test of Radiated Emission

### 6.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in European Standard EN 55032. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

**Table 1 – Required highest frequency for radiated measurement**

Highest internal frequency ( $F_x$ )	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
$108 \text{ MHz} < F_x \leq 500$ MHz	2 GHz
$500 \text{ MHz} < F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, $F_x$ is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	
NOTE 2 $F_x$ is defined in 3.1.19.	

Where the  $F_x$  is unknown, the radiated emission measurements shall be performed up to 6 GHz.

**Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57
NOTE Apply only A2.1 or A2.2 across the entire frequency range.				

**Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80
NOTE Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.				

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz  
for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47

NOTE    Apply only table clause A4.1 or A4.2 across the entire frequency range.

**Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz  
for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74

NOTE Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Table A.6 – Requirements for radiated emissions from FM receivers**

Table clause	Frequency range MHz	Measurement		Class B limit dB(μV/m)	
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42
	230 – 300				42
	300 – 1 000				46
A6.2	30 – 230	3		60	52
	230 – 300				52
	300 – 1 000				56

NOTE 1 Apply only A.6.1 or A.6.2 across the entire frequency range.

NOTE 2 These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.



**Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment**

Applicable to						
1. TV broadcast receiver tuner ports (3.1.8) with an accessible connector						
2. RF modulator output ports (3.1.27)						
3. FM broadcast receiver tuner ports (3.1.8) with an accessible connector						
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB(μV) 75 Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies ≤1 GHz	46	46	46	See NOTE 1
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak/ 120 kHz	46	54	54	See NOTE 2
A12.3	30 – 300		46	54	50	See NOTE 3
	300 – 1 000	52				
A12.4	30 – 300	For frequencies ≥1 GHz	46	66	59	See NOTE 4
	300 – 1 000				52	
A12.5	30 – 950	Peak/ 1 MHz	46	76	46	See NOTE 5
	950 – 2 150			n/a	54	
NOTE 1 Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.						
NOTE 2 Tuner units (not the LNB) for satellite signal reception.						
NOTE 3 Frequency modulation audio receivers and PC tuner cards.						
NOTE 4 Frequency modulation car radios.						
NOTE 5 Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.						
NOTE 6 Testing is required at only one EUT supply voltage and frequency.						
NOTE 7 The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.						
NOTE 8 The test shall be performed with the device operating at each reception channel.						
NOTE 9 The test shall cover the entire frequency range.						

## 6.2. Test Procedures

- a. The EUT was placed on a relatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 6.3. Typical test Setup

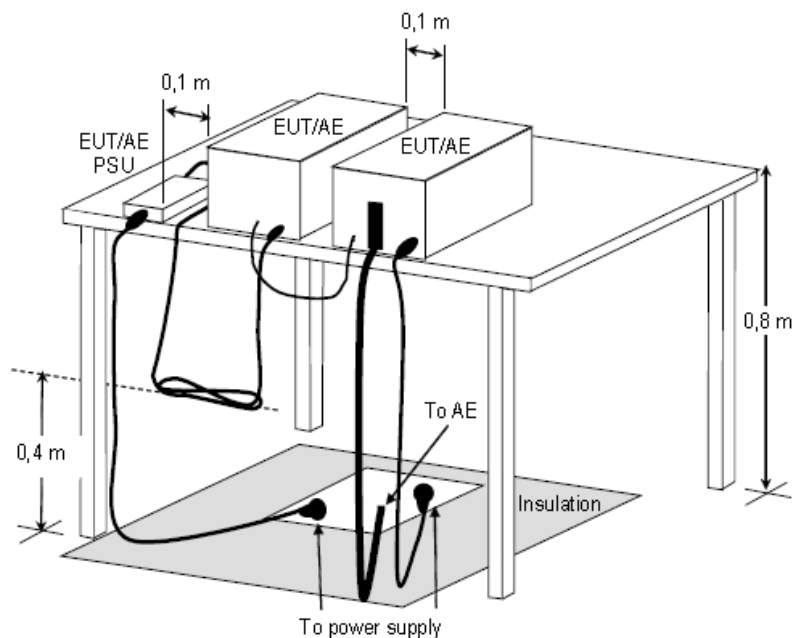


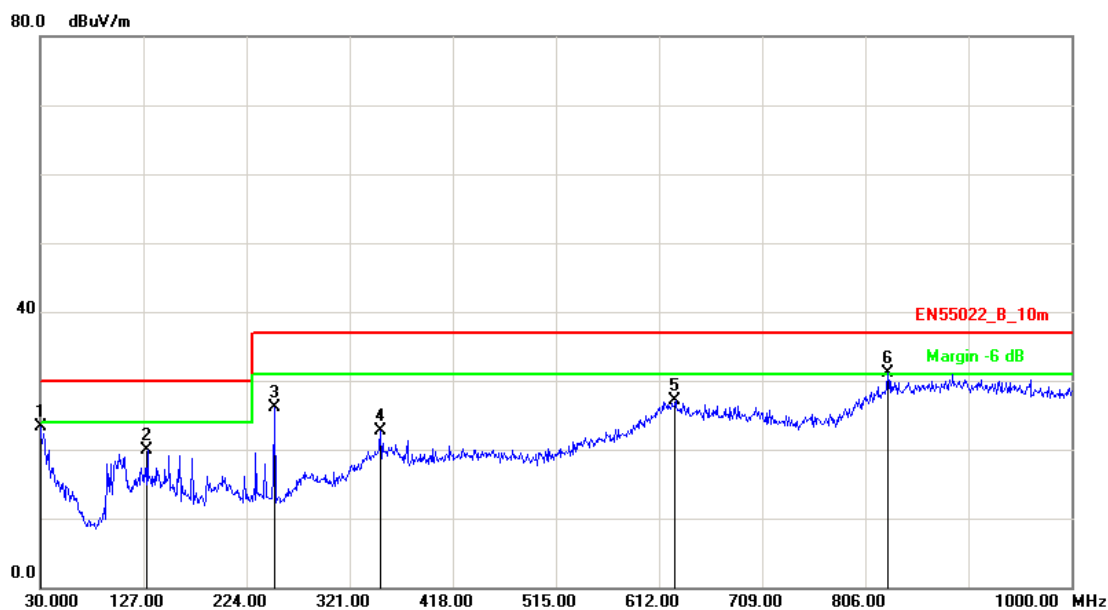
Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)

### 6.4. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI7	100968	2015.03.29	2016.03.28
Preamplifier	Agilent	87405B	My39500554	2015.03.29	2016.03.28
Preamplifier	Agilent	8449B	3008A02342	2015.03.29	2016.03.28
Bilog Antenna	Sunol Science	JB1	A072414-1	2015.04.22	2016.04.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2015.04.20	2016.04.19
Spectrum Analyzer	R&S	FSP40	100324	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2015.04.02	2016.04.01
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A

## 6.5. Test Result and Data (30MHz ~ 1000MHz)

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temp :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07

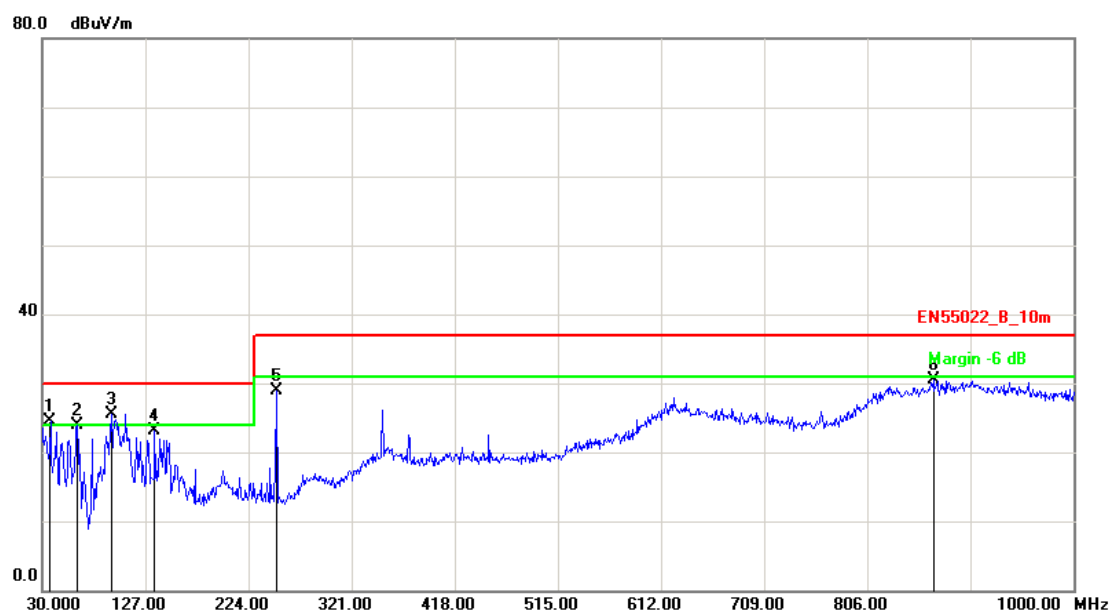


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	30.0000	-2.48	25.72	23.24	30.00	-6.76	QP	300	103
2	130.8799	-9.83	29.75	19.92	30.00	-10.08	QP	137	360
3	250.1899	-12.04	38.13	26.09	37.00	-10.91	QP	300	107
4	350.1000	-5.21	27.88	22.67	37.00	-14.33	QP	400	147
5	627.5198	1.23	25.82	27.05	37.00	-9.95	QP	200	213
6	827.3400	3.15	28.03	31.18	37.00	-5.82	QP	300	295

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temp :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2016/03/07



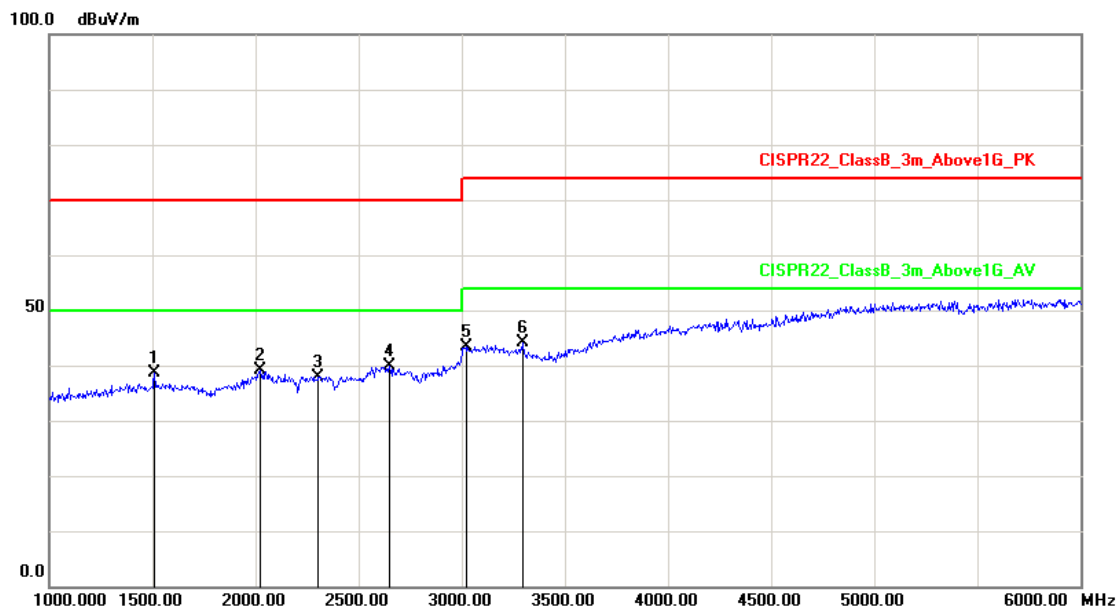
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	37.7599	-6.96	31.47	24.51	30.00	-5.49	QP	111	360
2	62.9800	-13.55	37.39	23.84	30.00	-6.16	QP	100	312
3	94.9900	-14.01	39.48	25.47	30.00	-4.53	QP	124	360
4	135.7300	-9.83	32.99	23.16	30.00	-6.84	QP	201	0
5	250.1900	-12.04	41.04	29.00	37.00	-8.00	QP	100	212
6	868.0800	3.99	26.45	30.44	37.00	-6.56	QP	200	217

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

## 6.6. Test Result and Data (1000MHz ~ 6000MHz)

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Horizontal
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temp :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2014/01/23

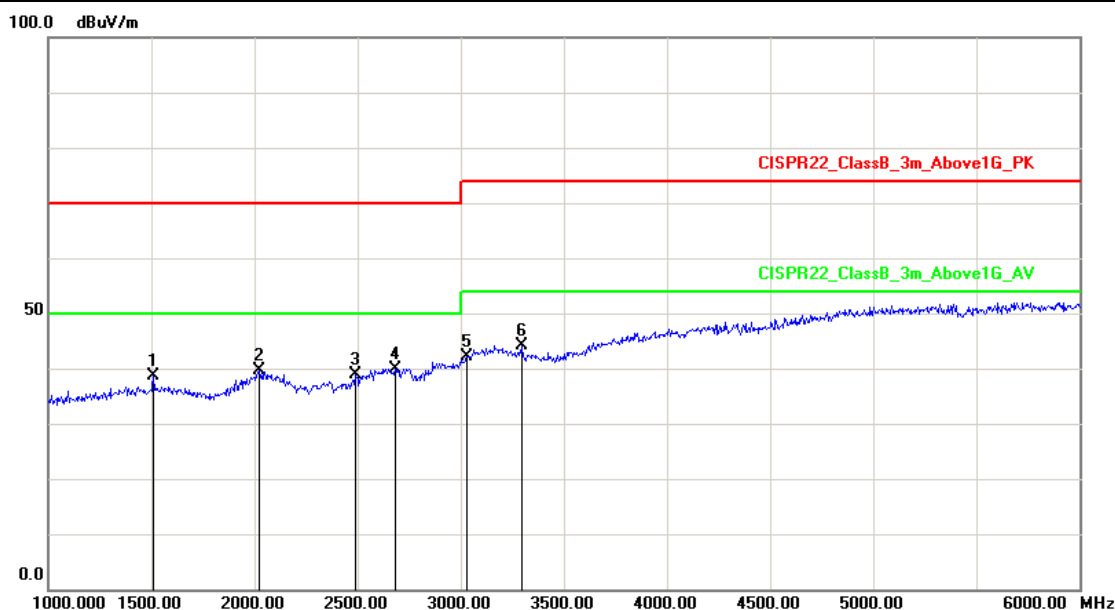


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1510.000	-10.63	49.25	38.62	70.00	-31.38	peak	100	92
2	2025.000	-6.01	45.20	39.19	70.00	-30.81	peak	100	336
3	2305.000	-4.65	42.60	37.95	70.00	-32.05	peak	400	20
4	2650.000	-3.50	43.26	39.76	70.00	-30.24	peak	100	98
5	3020.000	-3.04	46.46	43.42	74.00	-30.58	peak	100	62
6	3295.000	-3.26	47.29	44.03	74.00	-29.97	peak	200	148

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 230V/50Hz	Ant. Polarization:	Vertical
Equipment :	NETWORK KEYBOARD	Model No :	NKB1000
Temp :	26°C	Humidity :	60%
Pressure(mbar) :	1002	Date :	2014/01/23

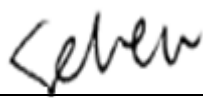


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1510.000	-10.63	49.25	38.62	70.00	-31.38	peak	100	0
2	2025.000	-6.01	45.70	39.69	70.00	-30.31	peak	100	126
3	2490.000	-3.76	42.56	38.80	70.00	-31.20	peak	100	98
4	2685.000	-3.45	43.36	39.91	70.00	-30.09	peak	200	336
5	3030.000	-3.04	45.16	42.12	74.00	-31.88	peak	100	128
6	3295.000	-3.26	47.29	44.03	74.00	-29.97	peak	100	2

Note: 1. Measurement Level = Reading Level + Correct Factor

2. EN55032 Limit=EN55022 Limit

Test engineer: \_\_\_\_\_



## 6.7. Test Photographs (30MHz ~ 1000MHz)

Front View



Rear View





## 6.8. Test Photographs (1000MHz ~ 6000MHz)

Front View



Rear View



## 7. Harmonics Test

### 7.1. Limits of Harmonics Current Measurement

#### (a) Limits for Class A equipment

Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current A
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	8 ≤ n ≤ 40	0.23x8/n
11	0.33		
13	0.21		
15 ≤ n ≤ 39	0.15x15/n		

#### (b) Limits for Class B equipment

For Class B equipment, the harmonics of the input current shall not exceed the values given in Table that is the limit of Class A multiplied by a factor of 1,5.

#### (c) Limits for Class C equipment

Harmonics Order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
11 < n < 39 (odd harmonics only)	3

\*  $\lambda$  is the circuit power factor

#### (d) Limits for Class D equipment

Harmonics Order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
11 < n < 39 (odd harmonics only)	3.85/n	See limit of Class A

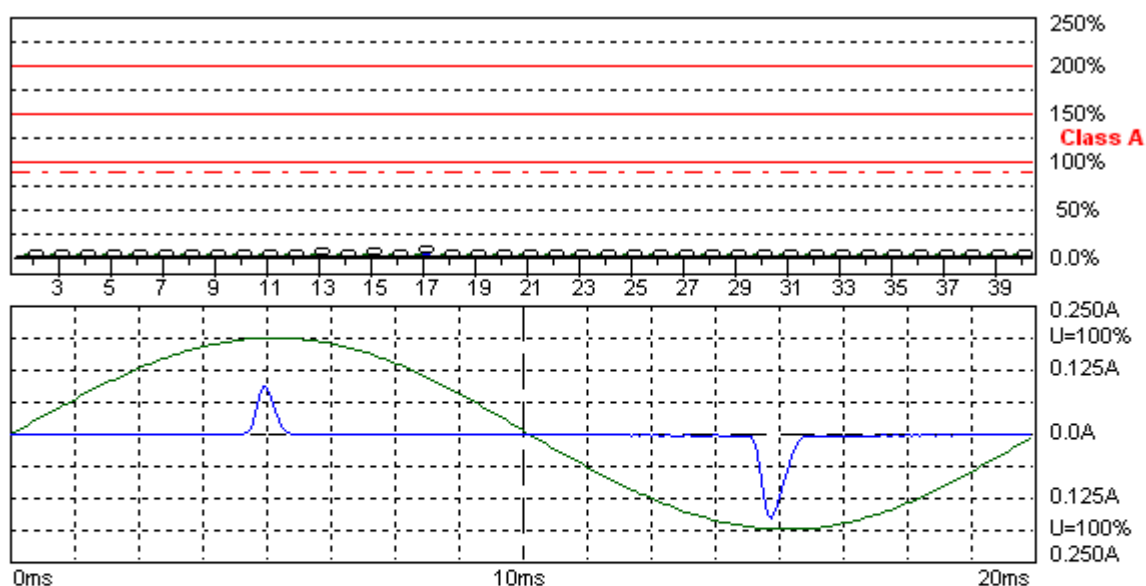
**NOTE:** According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

## 7.2. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2015.04.24	2016.04.23
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2015.04.02	2016.04.01
HARCS	EMC Partner AG	Ver 4.18	N/A	N/A	N/A

### 7.3. Test Result and Data

Basic Standard	:	EN 61000-3-2
Final Test Result	:	PASS
Test Mode	:	Mode 1
Equipment	:	NETWORK KEYBOARD
Model No.	:	NKB1000
Temperature	:	20°C
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Mar 08, 2016



Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

2016-3-8 18:53:17 harmonic.hsu

Urms = 230.7 V P = 2.135 W THC = 0.024 A  
Irms = 0.025 A pf = 0.370

Range: 0.25 A  
V-nom: 230 V  
TestTime: 15 min (100%)

NKB1000

**Test completed, Result: PASSED**

HAR-1000 EMC-Parber

Full Bar : Actual Values

Empty Bar : Maximum Values

Blue : Current , Green : Voltage , Red : Failed

Urms = 230.7V Freq = 50.000 Range: 0.25 A

Irms = 0.025A Ipk = 0.168A cf = 6.727

P = 2.135W S = 5.773VA pf = 0.370

THDi = 93.4 % THDu = 0.90 % Class A

Test - Time : 15min ( 100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Irms [A]	Irms%L [%]	I <sub>max</sub> [A]	I <sub>max</sub> %L [%]	Limit [A]
1	50	0.0093		0.0094		
2	100	0.0030	0.2769	0.0031	0.2840	1.0800
3	150	0.0081	0.3523	0.0081	0.3543	2.3000
4	200	0.0029	0.6813	0.0030	0.6955	0.4300
5	250	0.0079	0.6974	0.0080	0.7014	1.1400
6	300	0.0029	0.9613	0.0029	0.9766	0.3000
7	350	0.0077	1.0007	0.0077	1.0047	0.7700
8	400	0.0028	1.2141	0.0028	1.2273	0.2300
9	450	0.0073	1.8349	0.0074	1.8539	0.4000
10	500	0.0027	1.4678	0.0027	1.4927	0.1840
11	550	0.0070	2.1131	0.0070	2.1316	0.3300
12	600	0.0025	1.6420	0.0026	1.6718	0.1533
13	650	0.0065	3.1172	0.0066	3.1462	0.2100
14	700	0.0023	1.7879	0.0024	1.8228	0.1314
15	750	0.0061	4.0385	0.0061	4.0690	0.1500
16	800	0.0022	1.9107	0.0022	1.9505	0.1150
17	850	0.0055	4.1734	0.0056	4.2196	0.1324
18	900	0.0021	2.0152	0.0021	2.0599	0.1022
19	950	0.0050	4.2006	0.0051	4.2650	0.1184
20	1000	0.0019	2.0732	0.0020	2.1230	0.0920
21	1050	0.0044	4.1300	0.0045	4.2013	0.1071
22	1100	0.0018	2.1346	0.0018	2.1893	0.0836
23	1150	0.0039	3.9619	0.0040	4.0398	0.0978
24	1200	0.0017	2.2092	0.0018	2.2888	0.0767
25	1250	0.0033	3.7130	0.0034	3.7977	0.0900
26	1300	0.0016	2.3286	0.0017	2.3933	0.0708
27	1350	0.0028	3.3875	0.0029	3.4973	0.0833
28	1400	0.0016	2.4381	0.0016	2.5077	0.0657
29	1450	0.0024	3.0484	0.0024	3.1467	0.0776
30	1500	0.0016	2.5376	0.0016	2.6122	0.0613
31	1550	0.0019	2.6699	0.0020	2.7751	0.0726
32	1600	0.0015	2.6802	0.0016	2.7599	0.0575
33	1650	0.0016	2.2827	0.0016	2.4170	0.0682
34	1700	0.0015	2.7914	0.0016	2.8760	0.0541
35	1750	0.0012	1.9226	0.0013	2.0650	0.0643
36	1800	0.0015	2.8660	0.0015	2.9854	0.0511
37	1850	0.0010	1.6059	0.0011	1.7815	0.0608
38	1900	0.0014	2.9622	0.0015	3.0882	0.0484
39	1950	0.0008	1.3753	0.0009	1.5340	0.0577
40	2000	0.0014	2.9854	0.0014	3.1513	0.0460

EUT is PASSED if:

- all Average values of the Individual Harmonic Currents (I<sub>avg</sub>)  
are below 100% of the Individual Limits.
- all Maximum values of the Individual Harmonic Currents (I<sub>max</sub>)  
are below 150% of the Individual Limits.

Test engineer: 

## 7.1. Test Photographs



## 8. Voltage Fluctuations Test

### 8.1. Test Procedure

The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of  $\pm 8\%$  is achieved during the whole assessment procedure.

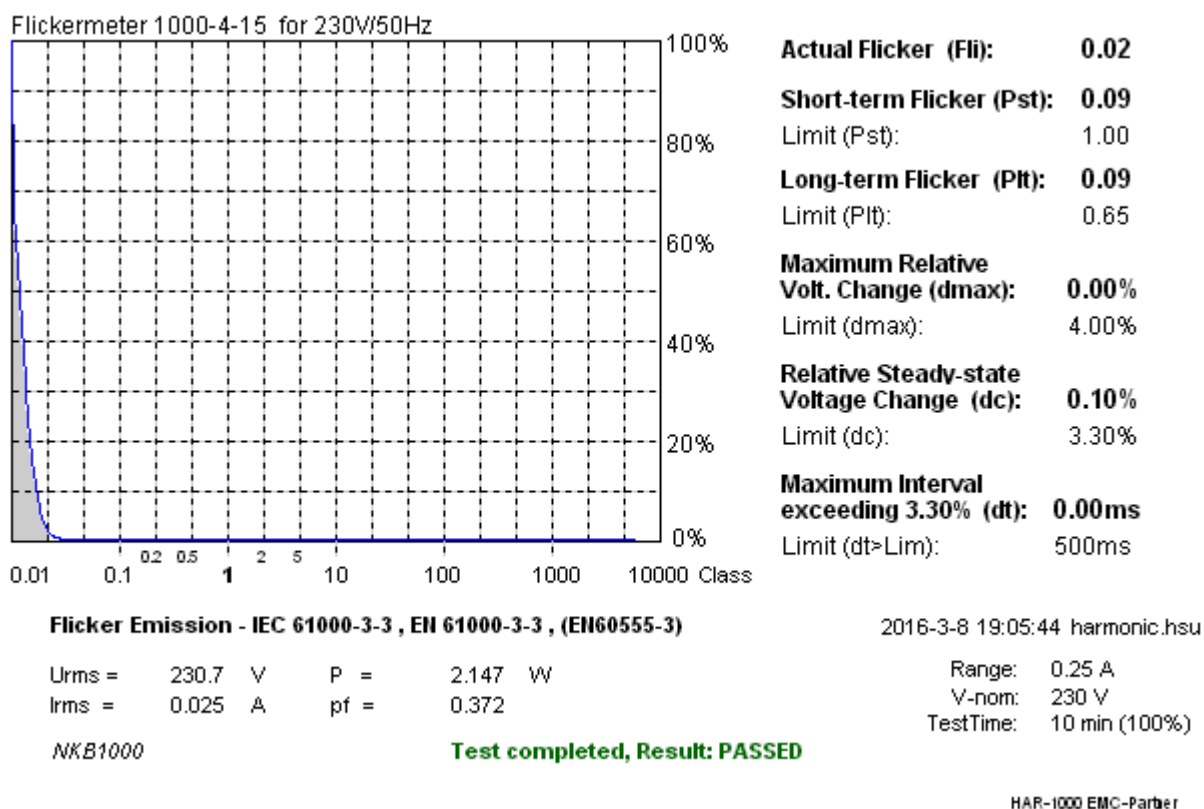
### 8.2. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMC Emission Tester	EMCPARTNER	Harmonics-1000	159	2015.04.24	2016.04.23
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2015.04.02	2016.04.01
HARCS	EMC Partner AG	Ver 4.18	N/A	N/A	N/A



### 8.3. Test Result and Data

Basic Standard	:	EN 61000-3-3
Final Test Result	:	PASS
Test Mode	:	Mode 1
Equipment	:	NETWORK KEYBOARD
Model No.	:	NKB1000
Temperature	:	20°C
Humidity	:	50 %
Atmospheric Pressure	:	100 kPa
Test Date	:	Mar 08, 2016



Full Bar : Actual Values

Empty Bar : Maximum Values

Circles : Average Values

Blue : Current , Green : Voltage , Red : Failed





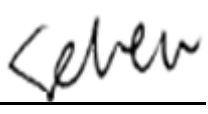
Urms = 230.7V Freq = 49.987 Range: 0.25 A  
Irms = 0.025A Ipk = 0.169A cf = 6.741  
P = 2.147W S = 5.773VA pf = 0.372

Test - Time : 1 x 10min = 10min ( 100 %)

LIN (Line Impedance Network) : No LIN

Limits : Plt : 0.65 Pst : 1.00  
dmax : 4.00 % dc : 3.30 %  
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Test engineer: 

#### 8.4. Test Photographs

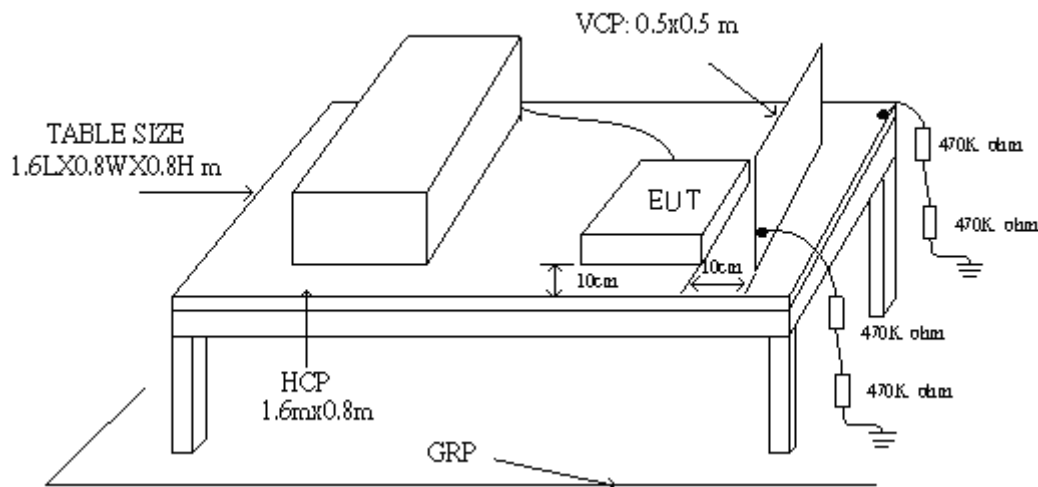


## 9. Electrostatic Discharge Immunity Test

### 9.1. Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
  - ambient temperature: 15°C to 35°C;
  - relative humidity : 30% to 60%;
  - atmospheric pressure : 86 KPa (860 hPa) to 106 KPa (1060 hPa).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On reselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On reselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
  - ✧ If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
  - ✧ Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
  - ✧ The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

## 9.2. Test Setup for Tests Performed in Laboratory



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner :

- a. Contact Discharge to the conductive surfaces and to coupling plane;
- b. Air Discharge at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the Exclusive Certification Corp., we provided 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 2.5 m x 2.5 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

### 9.3. Test Severity Levels

Contact Discharge		Air Discharge	
Level	Test Voltage (KV) of Contact discharge	Level	Test Voltage (KV) of Air Discharge
1	$\pm 2$	1	$\pm 2$
2	$\pm 4$	2	$\pm 4$
3	$\pm 6$	3	$\pm 8$
4	$\pm 8$	4	$\pm 15$
X	Specified	X	Specified
Remark: "X" is an open level.			

### 9.4. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
ESD Simulator	EM Test	dito	V0714102399	2015.04.28	2016.04.27
Tonometer	shanghaifengyun	DYM3	3251	2015.11.30	2016.11.29
Dehumidifier	ZEDO	ZD-220LB	CEP-TH-01	N/A	N/A
Humidifier	YADU	YZ-DS251C	CEP-TH-02	N/A	N/A
Temperature/ Humidity Meter	feiyun	N/A	102	2015.04.02	2016.04.01

## 9.5. Test Result and Data

Basic Standard : IEC 61000-4-2  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 17°C  
 Relative Humidity : 49 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 09, 2016

Test Mode 1

For EN 55024: 2010

Test Voltage: 230V/50Hz

	Contact Discharge								Air Discharge							
	25 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	—	+	—	+	—	+	—	+	—	+	—	+	—	+	—
HCP	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
VCP	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Case	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Screw	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Power Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
LAN Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
RS232 Port	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Button	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Panel	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
USB Port	A	A	A	A	---	---	---	---	---	---	---	---	---	---	---	---
Light	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz																
	Contact Discharge								Air Discharge							
	25 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	—	+	—	+	—	+	—	+	—	+	—	+	—	+	—
HCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
VCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Case	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Screw	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Power Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
LAN Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
RS232 Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Button	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Panel	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
USB Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Light	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---

Test Voltage: 195.5V/50Hz																
	Contact Discharge								Air Discharge							
	25 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	—	+	—	+	—	+	—	+	—	+	—	+	—	+	—
HCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
VCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Case	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Screw	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Power Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
LAN Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
RS232 Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Button	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Panel	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
USB Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Light	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---

Test Voltage: AC 253V/50Hz																
	Contact Discharge								Air Discharge							
	25 times / each								10 times / each							
Voltage	2 kV		4 kV		6 kV		8 kV		2 kV		4 kV		8 kV		10 kV	
Point\Polarity	+	—	+	—	+	—	+	—	+	—	+	—	+	—	+	—
HCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
VCP	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Case	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Screw	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Power Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
LAN Port	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
RS232 Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Button	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
Panel	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---
USB Port	A	A	A	A	A	A	---	---	---	---	---	---	---	---	---	---
Light	---	---	---	---	---	---	---	---	A	A	A	A	A	A	---	---

Test engineer: *Seben*



## 9.6. Test Photographs



## 10. Radio Frequency electromagnetic field immunity test

### 10.1. Test Procedure

- i. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- j. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- k. The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the bucolical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
- l. At each of the above conditions, the frequency range is swept 80-2700 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of  $1.5 \cdot 10^{-3}$  decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

## 10.2. Test Severity Levels

	Condition of Test	Remarks
1.	Field Strength	10 V/m
2.	Radiated Signal	AM 80% Modulated with 1kHz Pulse modulation 1Hz (0.5s ON; 0.5s OFF)
3.	Scanning Frequency	80MHz - 2700MHz
4.	Dwell Time	3 Seconds
5.	Frequency step size $\Delta f$ :	1%
6.	The rate of Swept of Frequency	1.5 x 10 <sup>-3</sup> decades/s

## 10.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Signal Generator	R&S	SML03	103287	2015.03.29	2016.03.28
Power Sensor	R&S	NR P-Z91	100383	2015.03.29	2016.03.28
Power Sensor	R&S	NRP-Z91	100384	2015.03.29	2016.03.28
Power Meter	R&S	NRP	101206	2015.03.29	2016.03.28
Power Amplifier	BONN	BLWA0830-16 0/100/40D	076659	2015.03.29	2016.03.28
Istropic Electric Field Probe	EST.LINDGRE N	HI-6105	137445	2015.11.20	2016.11.19
EMS Antenna	R&S	HL046E	100028	N/A	N/A
Temperature/ Humidity Meter	feiyang	N/A	101	2015.04.02	2016.04.01
EMC-32	Rohde&Schwa rz	Ver 6.10.0	N/A	N/A	N/A

## 10.4. Test Result and Data

Basic Standard : IEC 61000-4-3  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 19°C  
 Relative Humidity : 50%  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 10, 2016

Test Mode 1

For EN 55024: 2010

Test Voltage: 230V/50Hz

Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~1000	Vertical	Front	3 V/m	A
80~1000	Vertical	Rear	3 V/m	A
80~1000	Vertical	Left	3 V/m	A
80~1000	Vertical	Right	3 V/m	A
80~1000	Horizontal	Front	3 V/m	A
80~1000	Horizontal	Rear	3 V/m	A
80~1000	Horizontal	Left	3 V/m	A
80~1000	Horizontal	Right	3 V/m	A

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz


Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~2700	Horizontal & Vertical	Front	10 V/m	A
80~2700	Horizontal & Vertical	Rear	10 V/m	A
80~2700	Horizontal & Vertical	Left	10 V/m	A
80~2700	Horizontal & Vertical	Right	10 V/m	A

Test Voltage: AC 195.5V/50Hz

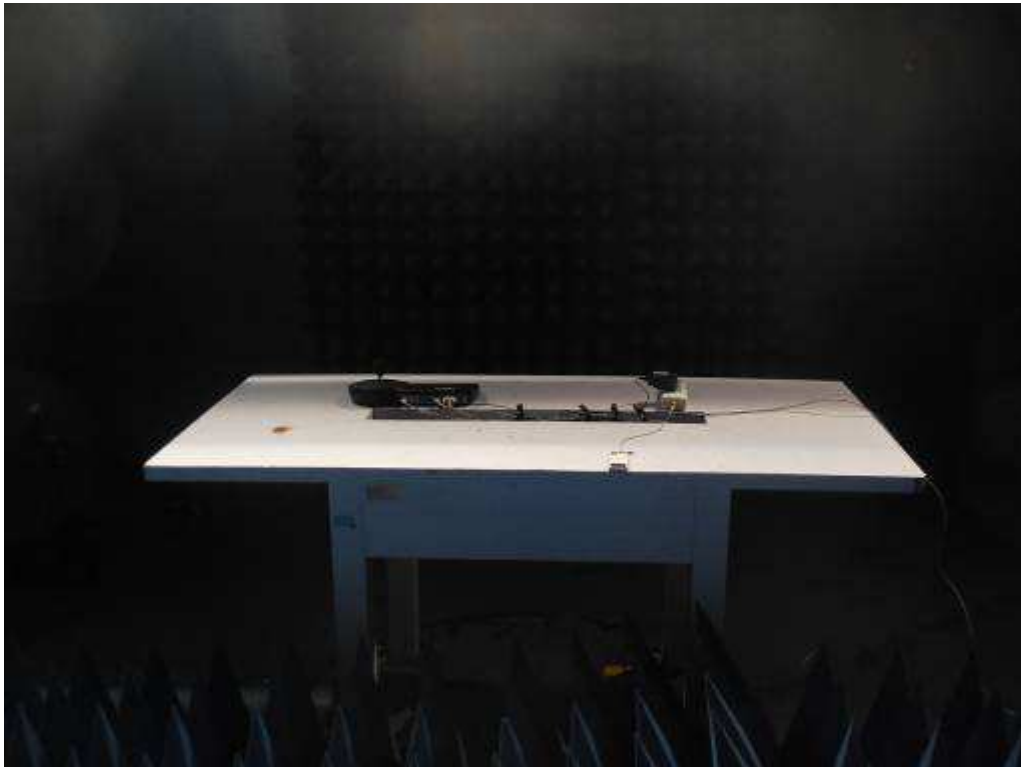
Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~2700	Horizontal & Vertical	Front	10 V/m	A
80~2700	Horizontal & Vertical	Rear	10 V/m	A
80~2700	Horizontal & Vertical	Left	10 V/m	A
80~2700	Horizontal & Vertical	Right	10 V/m	A

Test Voltage: AC 253V/50Hz

Modulation : AM 80% , 1KHz sine wave , Dwell time: 3.0 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~2700	Horizontal & Vertical	Front	10 V/m	A
80~2700	Horizontal & Vertical	Rear	10 V/m	A
80~2700	Horizontal & Vertical	Left	10 V/m	A
80~2700	Horizontal & Vertical	Right	10 V/m	A

Test engineer: 

## 10.5. Test Photographs



## 11. Electrical Fast Transient/ Burst Immunity Test

### 11.1. Test Procedure

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
  - ✧ ambient temperature: 15°C to 35°C;
  - ✧ relative humidity : 45% to 75%;
  - ✧ Atmospheric pressure: 86 Kpa (860 hPa) to 106 Kpa (1060 hPa).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. Test on Power Line:
  - ✧ The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT is not exceeding 1 m.
  - ✧ The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.
- e. Test on Communication Lines
  - ✧ The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP.
  - ✧ The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.
- f. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
  - ✧ Normal performance within the specification limits.
  - ✧ Temporary degradation or loss of function or performance which is self-recoverable.
  - ✧ Temporary degradation or loss of function or performance which requires operator intervention or system reset.
  - ✧ Degradation or loss of function which is not recoverable due to damage of equipment (components).



## 11.2. Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

Open circuit output test voltage $\pm 10\%$		
Level	On Power Supply	On I/O signal, data and control line
1	0.5 KV	0.25 KV
2	1.0 KV	0.50 KV
3	2.0 KV	1.00 KV
4	4.0 KV	2.00 KV
X	Specified	Specified

Remark : “ X ” is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

## 11.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
TRANSIENT	EMCPARTNER	TRA2000IN6	901	2015.03.29	2016.03.28
CDN	EMCPARTNER	CDN2000-06-32	121	2015.03.29	2016.03.28
Coupling clamp	EMCPARTNER	CN-EFT1000	547	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2015.04.02	2016.04.01



#### 11.4. Test Result and Data

Basic Standard : IEC 61000-4-4  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 21 °C  
 Relative Humidity : 51 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 10, 2016  
 Test Mode 1  
 For EN 55024: 2010  
 Test Voltage: 230V/50Hz

Pulse : 5/50 ns		Repetition Rate: <u>5</u> kHz above 2.0 kV			
Burst : 15m/300ms		<u>5</u> kHz below and equal 2.0 kV			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>0.5</u> kV		<u>1.0</u> kV	
		+	—	+	—
Power Line	L	---	---	A	A
	N	---	---	A	A
	L-N	---	---	A	A
Signal Line	RJ45	A	A	---	---

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz

Pulse : 5/50 ns		Repetition Rate: <u>5/100</u> kHz above 2.0 kV			
Burst : 15m/300ms		<u>5/100</u> kHz below and equal 2.0 kV			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>1</u> kV		<u>2.0</u> kV	
		+	—	+	—
Power Line	L	---	---	A	A
	N	---	---	A	A
	L-N	---	---	A	A
Signal Line	RJ45	A	A	---	---

Test Voltage: AC 195.5V/50Hz

Pulse : 5/50 ns		Repetition Rate: <u>5/100</u> kHz above 2.0 kV			
Burst : 15m/300ms		5/100 kHz below and equal 2.0 kV			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>1</u> kV		<u>2.0</u> kV	
		+	—	+	—
Power Line	L	---	---	A	A
	N	---	---	A	A
	L-N	---	---	A	A
Signal Line	RJ45	A	A	---	---

Test Voltage: AC 253V/50Hz

Pulse : 5/50 ns		Repetition Rate: <u>5/100</u> kHz above 2.0 kV			
Burst : 15m/300ms		5/100 kHz below and equal 2.0 kV			
Test time : 1 min/each condition					
Voltage/ Mode/ Polarity/ Result/ Phase		<u>1</u> kV		<u>2.0</u> kV	
		+	—	+	—
Power Line	L	---	---	A	A
	N	---	---	A	A
	L-N	---	---	A	A
Signal Line	RJ45	A	A	---	---

Test engineer: Seben

## 11.5. Test Photographs

Main



## Signal



## 12. Surge Immunity Test

### 12.1. Test Procedure

a. Climatic conditions

The climatic conditions shall comply with the following requirements :

- ✧ ambient temperature : 15 °C to 35 °C
- ✧ relative humidity : 10 % to 75 %
- ✧ atmospheric pressure : 86 kPa to 106 kPa ( 860 hPa to 1060 hPa )

b. Electromagnetic conditions

the electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according the test plan that shall specify the test set-up with

- ✧ generator and other equipment utilized;
- ✧ test level ( voltage/current );
- ✧ generator source impedance;
- ✧ internal or external generator trigger;
- ✧ number of tests : at least five positive and five negative at the selected points;
- ✧ repetition rate : maximum 1/min.
- ✧ inputs and outputs to be tested;
- ✧ representative operating conditions of the EUT;
- ✧ sequence of application of the surge to the circuit;
- ✧ phase angle in the case of AC. power supply;
- ✧ actual installation conditions, for example :

AC : neutral earthed,

DC : ( + ) or ( - ) earthed to simulated the actual earthing conditions.

- d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the AC. voltage wave ( positive and negative ).
- e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
- g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level ( let-through level ) of the primary protection.
- h. If the actual operating signal sources are not available, that may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.
- i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test previously unstressed equipment shall be used to the protection devices shall be replaced.

## 12.2. Test Severity Level

Level	Open-circuit test voltage, $\pm 10\%$ , KV
1	0.5
2	1.0
3	2.0
4	4.0
X	Specified
NOTE: "X" is an open class. This level can be specified in the product specification.	

## 12.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
TRANSIENT	EMCPARTNER	TRA2000IN6	901	2015.03.29	2016.03.28
CDN	EMCPARTNER	CDN-UTP8	021	2015.03.29	2016.03.28
CDN	EMCPARTNER	CDN2000-06-32	121	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2015.04.02	2016.04.01

## 12.4. Test Result and Data

Basic Standard : IEC 61000-4-5  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 21°C  
 Relative Humidity : 51 %  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 11, 2016

Test Mode 1

For EN 55024: 2010

Test Voltage: AC 230V/50Hz

Waveform : 1.2/50µs(8/20µs) Repetition rate : 60 sec Time : 20 time/each condition						
/Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
<u>0.5/1.0</u> kV	L-N	+	A	A	A	A
		—	A	A	A	A

Waveform :10/700µs Repetition rate : 60 sec Time : 5 time/each condition				
Voltage		<u>0.5</u> kV		<u>1</u> kV
Mode / Polarity / Result		+	—	+
RJ45		A	A	A

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz						
Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 20 time/each condition						
/Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
<u>0.5/1.0</u> kV	L-N	+	A	A	A	A
		—	A	A	A	A

Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Waveform : 10/700µs    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Test Voltage: AC 195.5V/50Hz						
Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 20 time/each condition						
/Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
<u>0.5/1.0</u> kV	L-N	+	A	A	A	A
		—	A	A	A	A

Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A




Waveform : 10/700µs    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Test Voltage: AC 253V/50Hz						
Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 20 time/each condition						
/Phase Voltage / Mode / Polarity / Result			0°	90°	180°	270°
<u>0.5/1.0</u> kV	L-N	+	A	A	A	A
		—	A	A	A	A

Waveform : 1.2/50µs(8/20µs)    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Waveform : 10/700µs    Repetition rate : 60 sec    Time : 5 time/each condition				
Voltage	<u>0.5</u> kV		<u>1</u> kV	
Mode / Polarity / Result	+	—	+	—
RJ45	A	A	A	A

Test engineer: 

## 12.5. Test Photographs



## 13. Conduction Disturbances induced by Radio-Frequency Fields

### 13.1. Test Procedure

- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- d. The frequency range is swept from 150 KHz to 100 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1KHz sign wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.
- g. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- h. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- i. The use of special exercising programs is recommended.
- j. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- k. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

### 13.2. Test Severity Levels

Level	Voltage Level ( emf.)
1	1 V
2	3 V
3	10 V
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

### 13.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Conducted immunity test system	FRANKONIA	CIT-10/75	102D1294	2015.03.29	2016.03.28
EM Injection clamp	FCC	F-203I-23MM	536	2015.03.29	2016.03.28
CDN	FRANKONIA	CDN-T2	A3010029	2015.03.29	2016.03.28
CDN	FRANKONIA	CDN-T4	A3015017	2015.03.29	2016.03.28
CDN	FRANKONIA	CDN-T8	A3022010	2015.03.29	2016.03.28
CDN	FRANKONIA	CDN-M2	A3002037	2015.03.29	2016.03.28
CDN	FRANKONIA	CDN-M2+M3	A3011102	2015.03.29	2016.03.28
CDN	FCC	CDN-M5/32	A3013024	2015.03.29	2016.03.28
6 dB Attenuator	FRANKONIA	N/A	N/A	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2015.04.02	2016.04.01
EN61000-4-6	Hubert GmbH	Ver 2.21	N/A	N/A	N/A

### 13.4. Test Result and Data

Basic Standard	: IEC 61000-4-6
Product Standard	: EN 50130-4: 2011
Product Standard	: EN 55024 : 2010
Equipment	: NETWORK KEYBOARD
Model No.	: NKB1000
Final Test Result	: PASS
Temperature	: 21 °C
Relative Humidity	: 51%
Atmospheric Pressure	: 100 kPa
Test Date	: Mar 11, 2016

#### Test Mode 1

For EN 55024: 2010

Test Voltage:230V/50Hz

Frequency : 0.15~80MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 80MHz	Power(M2)	3	A
0.15 ~ 80MHz	RJ45	3	A

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz


Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A

Test Voltage: AC 195.5V/50Hz

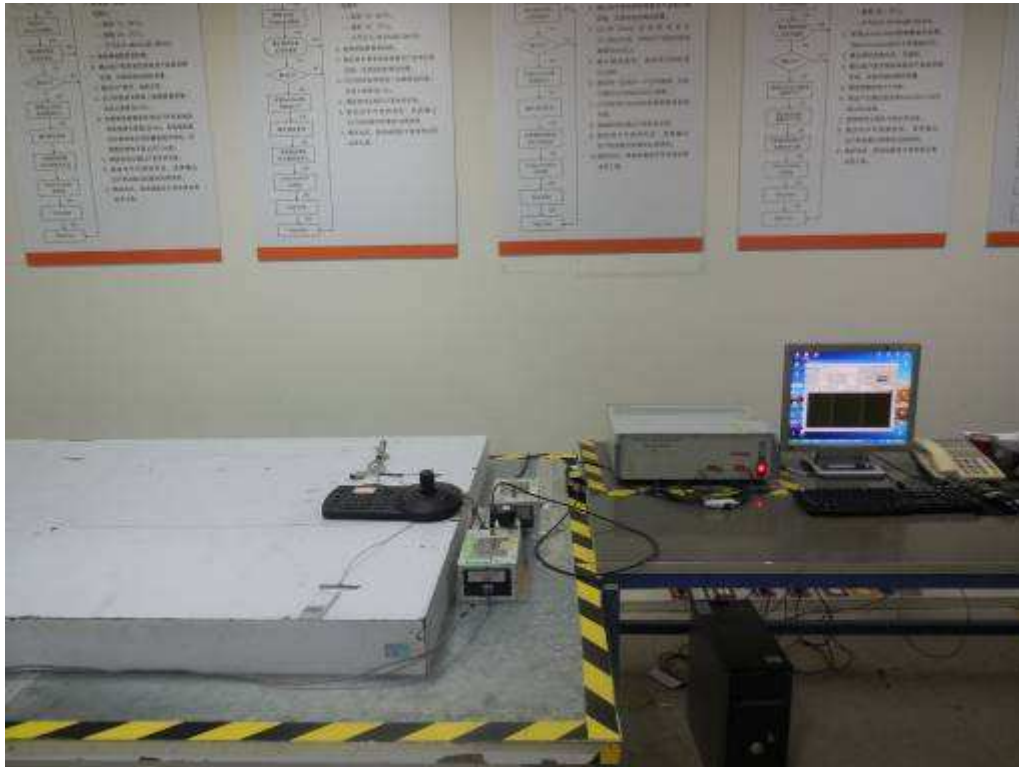
Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A

Test Voltage: AC 253V/50Hz

Frequency : 0.15~100MHz, Modulation : AM 80%,1KHz sine wave, Dwell time: 3.0s Frequency Step Size : 1 % of preceding frequency value			
Frequency	Test mode	Voltage(V)	Result
0.15 ~ 100MHz	Power(M2)	10	A
0.15 ~ 100MHz	RJ45	10	A

Test engineer: 

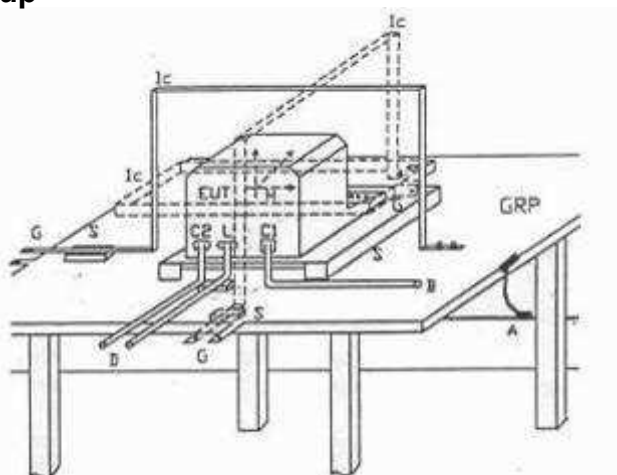
### 13.5. Test Photographs





## 14. Power Frequency Magnetic Field Immunity Tests

### 14.1. Test Setup



GPR	:	Ground plane	C1	:	Power supply circuit
A	:	Safety earth	C2	:	Signal circuit
S	:	Insulating support	L	:	Communication line
EUT	:	Equipment under test	B	:	To power supply source
Lc	:	Induction coil	D	:	To signal source, simulator
E	:	Earth terminal	G	:	To the test generator

### 14.2. Test Severity Levels

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X <sup>1)</sup>	special
NOTE 1 "X" is an open level. This level can be given in the product specification.	

### 14.3. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
TRANSIENT	EMCPARTNER	TRA2000IN6	901	2015.03.29	2016.03.28
H-Filed-Loop	EMCPARTNER	MF1000-1	144	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2015.04.02	2016.04.01

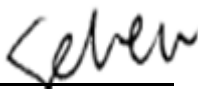


#### 14.4. Test Result and Data

Basic Standard : IEC 61000-4-8  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 21 °C  
 Relative Humidity : 51%  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 10, 2016

##### Test Mode 1

Power Frequency Magnetic Field : <u>50</u> Hz, <u>1</u> A/m		
Coil Orientation	Testing duration	Results
X-axis	1.0 Min	A
Y-axis	1.0 Min	A
Z-axis	1.0 Min	A

Test engineer: 

## 14.5. Test Photographs



## 15. Voltage Dips and Voltage Interruptions Immunity Test Setup

### 15.1. Test Conditions

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequence of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5  $\mu$ s.
5. Test severity :

Voltage dips and Interrupt reduction (%)	Test Duration (period)
>95%	250
30%	25
>95%	0.5

Item	Environmental Phenomena	Units	Test Specification	Performance Criteria
Input AC Power Ports				
Voltage Dips		% Reduction period	20 250	
		% Reduction period	30 25	
		% Reduction period	60 10	
Voltage Interruptions		% Reduction period	100 250	

### 15.2. Measurement equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
TRANSIENT	EMCPARTNER	TRA2000IN6	901	2015.03.29	2016.03.28
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-005	2015.04.02	2016.04.01

### 15.3. Test Result and Data

Basic Standard : IEC 61000-4-11  
 Product Standard : EN 50130-4: 2011  
 Product Standard : EN 55024 : 2010  
 Equipment : NETWORK KEYBOARD  
 Model No. : NKB1000  
 Final Test Result : PASS  
 Temperature : 21 °C  
 Relative Humidity : 51%  
 Atmospheric Pressure : 100 kPa  
 Test Date : Mar 10, 2016  
 Test Mode 1  
 For EN 55024: 2010

Voltage(UT): AC 100V/50 Hz Interval(s) : 10s Times : 3										
Test mod	Test level UT %	Durations (period / ms )	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage interruptions	>95%	250	C	C	C	C	C	C	C	C
Voltage dips	30%	25	B	B	B	B	B	B	B	B
	>95%	0.5	B	B	B	B	B	B	B	B

Voltage(UT): AC 230V-240 V/50 Hz Interval(s) : 10s Times : 3										
Test mod	Test level UT %	Durations (period / ms )	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage interruptions	>95%	250	C	C	C	C	C	C	C	C
Voltage dips	30%	25	A	A	A	A	A	A	A	A
	>95%	0.5	A	A	A	A	A	A	A	A

For EN 50130-4: 2011

Test Voltage: AC 230V/50Hz										
Voltage(UT): AC 230 V 50 Hz    Interval(s) : 10s    Times : 3										
Test mod	Test level UT %	Durations (period / ms )	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage interruptions	100%	250	A	A	A	A	A	A	A	A
Voltage dips	20%	250	A	A	A	A	A	A	A	A
	30%	25	A	A	A	A	A	A	A	A
	60%	10	A	A	A	A	A	A	A	A

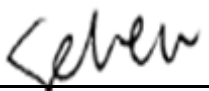
100% and 20% is permitted to UPS to meet the requirements of Result A.

Test Voltage: AC 195.5V/50Hz										
Voltage(UT): AC 230 V 50 Hz    Interval(s) : 10s    Times : 3										
Test mod	Test level UT %	Durations (period / ms )	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage interruptions	100%	250	A	A	A	A	A	A	A	A
Voltage dips	20%	250	A	A	A	A	A	A	A	A
	30%	25	A	A	A	A	A	A	A	A
	60%	10	A	A	A	A	A	A	A	A

100% and 20% is permitted to UPS to meet the requirements of Result A.

Test Voltage: AC 253V/50Hz										
Voltage(UT): AC 230 V 50 Hz    Interval(s) : 10s    Times : 3										
Test mod	Test level UT %	Durations (period / ms )	Phase / Result							
			0	45	90	135	180	225	270	315
Voltage interruptions	100%	250	A	A	A	A	A	A	A	A
Voltage dips	20%	250	A	A	A	A	A	A	A	A
	30%	25	A	A	A	A	A	A	A	A
	60%	10	A	A	A	A	A	A	A	A

100% and 20% is permitted to UPS to meet the requirements of Result A.

Test engineer: 

#### 15.4. Test Photographs





## 16. EUT Photographs

### 1) EUT Photo



### 2) EUT Photo





3) EUT Photo



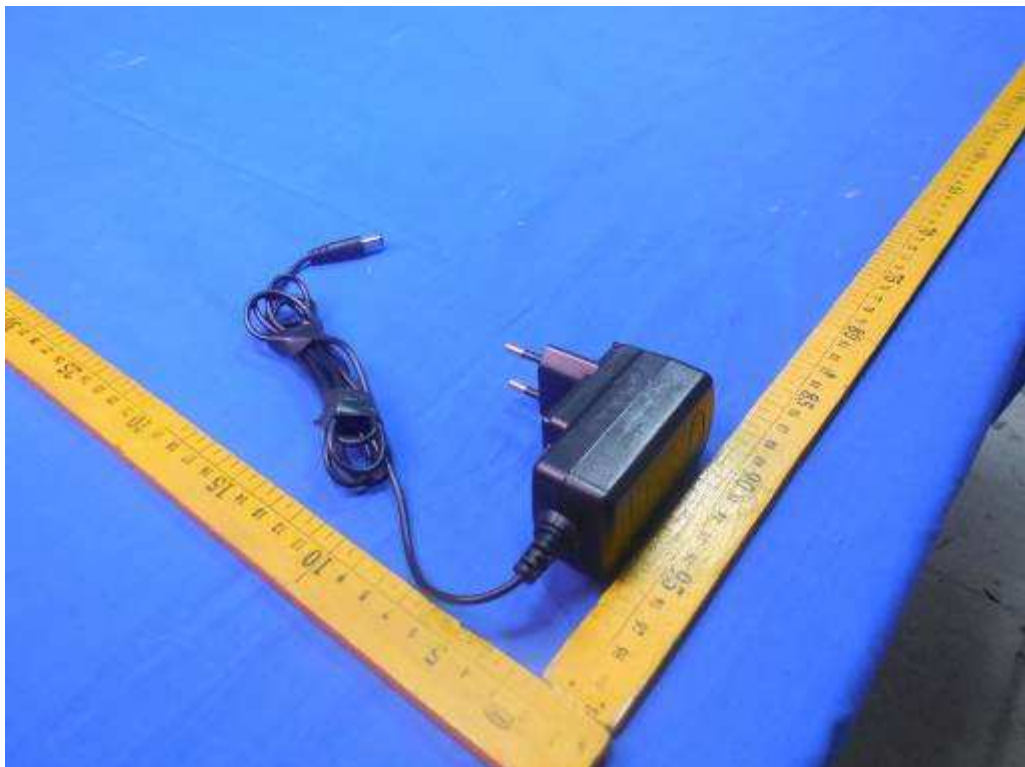
4) EUT Photo



5) EUT Photo(Adapter)



6) EUT Photo(Adapter)



7) EUT Photo(Adapter)



8) EUT Photo(Adapter)





## 17. APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, BUREAU VERITAS ADT (Shanghai) Corporation, were founded in 2004 to provide our best service in EMC, Radio and Vehicle consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

<b>USA</b>	A2LA Certificate No.: 2343.01
<b>China</b>	CNAS Certificate No.: L2810

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

**EMC / RF / Vehicle Lab:**

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