

CE TEST REPORT

EC-DECLARATION OF CONFORMITY (DoC)

Under:

EN 55022:2010 ; EN 55024:2010
EN61000-3-2: 2006+A1:2009+A2:2009; EN61000-3-3:2008

Prepared For :

Yealink (Xiamen) Network Technology Co., Ltd

4th-5th Floor, South Building, NO.63 WangHai Road, 2nd Software Park, Xiamen, China

EUT: IP Phone
Model: SIP-T21P, SIP-T21


August 12, 2013
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Original Report
Report Type:
<i>Eric Guo</i>
Test Engineer: Eric Guo

Review By: Apollo Liu / Manager

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1.2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

E506, 5th Floor, No.39 Keji Middle 2nd Rd, Science & Technology Park, Nanshan District, Shenzhen, P. R. China

Tel: +86 755 83642690 Fax: +86 755 83297077

Email: kmo@kmolab.com

Internet: www.kmolab.com

1.3 Details of Applicant

Name : Yealink (Xiamen) Network Technology Co.,Ltd

Address : 4th-5th Floor, South Building,NO.63 WangHai Road, 2nd Software Park, Xiamen, China

1.4 Application Details

Date of Receipt of Application : June 21, 2013

Date of Receipt of Test Item : June 21, 2013

Date of Test : June 27~July 16, 2013

1.5 Test Item

Manufacturer : Yealink (Xiamen) Network Technology Co.,Ltd

Address : 4th-5th Floor, South Building,NO.63 WangHai Road, 2nd Software Park, Xiamen, China

Trade Name : Yealink

Model No.(Base) : SIP-T21P

Model No.(Extension) : SIP-T21

Description : IP Phone

Additional Information

Frequency : N/A

Number of Channels : N/A

Power Supply : DC 5V/600mA(Adapter model:OH-1006B0500600U-VDE)
DC 5V/600mA(Adapter model:NSA6EE-050060)
POE 48V power

Operation Distance : N/A

Dimension : 20.8cm (L)*20cm(W)*14cm(H)

Remark: The Applicant's statement is as follows:

We, Yealink (Xiamen) Network Technology Co., LTD. hereby declare that our product IP Phone, the model SIP-T21P and SIP-T21 are electrically identical, they have the same PCB layout and schematic, the only difference is the model SIP-T21P with POE circuit, the model SIP-T22 without POE circuit. SIP-T21P was tested by KMO.

1. 6 Test Standards

EN 55022:2010 Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
EN 55024:2010 Information technology equipment – Immunity characteristics – Limits and methods of measurement
EN 61000-3-2: 2006 +A1:2009 +A2:2009 Limits for harmonics current emissions.
EN 61000-3-3: 2008 Limits for voltage fluctuations and flicker in low-voltage supply systems.

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

1. 7 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2009. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model #	Type
IP Phone	Yealink (Xiamen) Network Technology Co.,Ltd	SIP-T21P, SIP-T21	DoC

B. Internal Devices

Device	Manufacturer	Model #	FCCID / DoC
N/A			

C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Printer	HP	HP930C	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Modem	GVC	N/A	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Notebook	DELL	PP10L	DoC	1.5m unshielded power cord
PC	Dell	2400n	DoC	1.5m unshielded power cord

2. Technical Test

2.1 Summary of Test Results

Emission (EMI)

EMI Phenomenon	Port	Basic Standard	EUT Setup	Result	Applicability
Conducted Interference Voltage	AC Mains	EN 55022:2010	Refer to Section 4	Complies	Applicable
Conducted Interference Voltage	Telecommunication Ports	EN 55022:2010	Refer to Section 4	Complies	Applicable
Radiated Interference Field Strength 30 ~ 6000MHz	Enclosure	EN 55022:2010	Refer to Section 4	Complies	Applicable
Harmonic Current Emissions	AC Mains Input Port	EN 61000-3-2:2006/A2:2009	Refer to Section 4	Complies	Not Applicable
Flicker & Voltage Fluctuation	AC Mains Input Port	EN 61000-3-3:2008	Refer to Section 4	Complies	Applicable

Emission (EMS)

EMS Phenomenon	Port	Basic Standard	EUT Setup	Result	Applicability
Electronic Discharge (ESD)	Enclosure	IEC 61000-4-2:2008	Refer to Section 4	Complies	Applicable
RF-Electro-Magnetic Field (80 – 1000 MHz and 1400 – 2700 MHz)	Enclosure	IEC61000-4-3:2010	Refer to Section 4	Complies	Applicable
Fast Transients, Burst	Power Line AC/DC	IEC 61000-4-4:2012	Refer to Section 4	Complies	Applicable
Surge Test	Power Line (1 Phase)	IEC61000-4-5:2009	Refer to Section 4	Complies	Applicable
RF Common Mode (0.15 – 80MHz)	Power Line AC/DC Signal Lines	IEC 61000-4-6:2008	Refer to Section 4	Complies	Applicable
Power Frequency Magnetic-Field Test	Power Line	IEC 61000-4-8:2009	Refer to Section 4	Complies	Applicable
Vol. Dips, Interruptions & Fluctuations (AC Power)	Input & Output AC Ports Only	IEC 61000-4-11:2004	Refer to Section 4	Complies	Applicable

N/A=Not Applicable

-Performance criteria A for immunity tests with phenomena of a continuous nature;
Communication between the Tx and Rx in the front of pings should not drop during the test.

-Performance criteria B for immunity tests with phenomena of a transient nature;

N/A

-Performance criteria C for immunity tests with power interruptions exceeding a certain time.

N/A

Note: For details see EN55024.

2. 2 Emission Test

2. 2. 1 Conducted Emissions

According to EMC Basic Standard (EN 55022)

1. For the table top EUT the distance to the reference ground plane (wall) should be 40 cm.
2. AC input line plugged into LISN.

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provide a 50ohm/50uH coupling impedance with 50ohm termination.

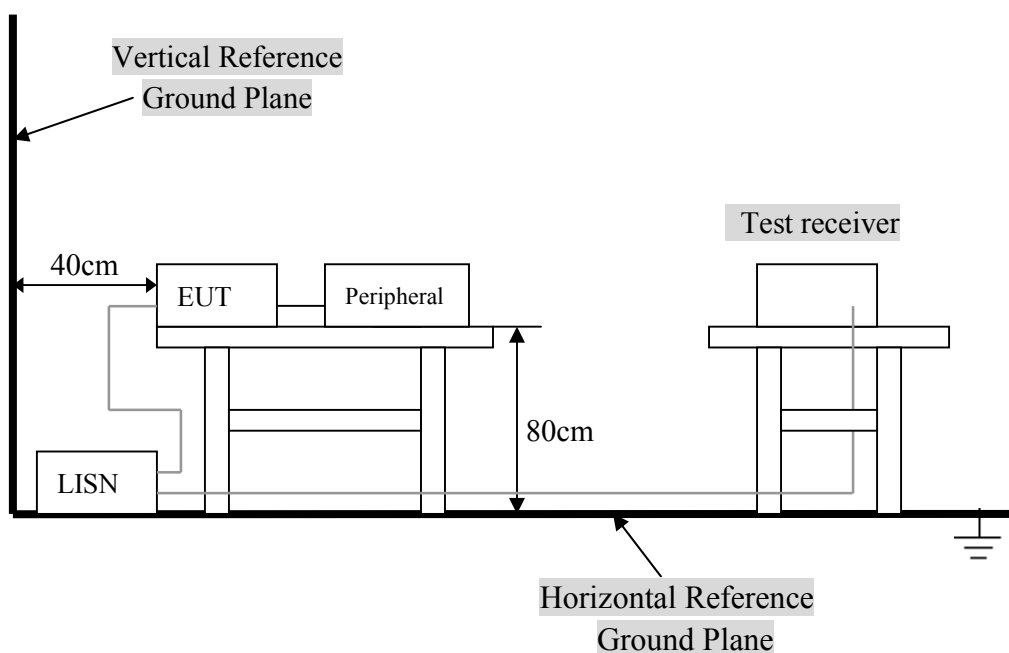
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55022:1998 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

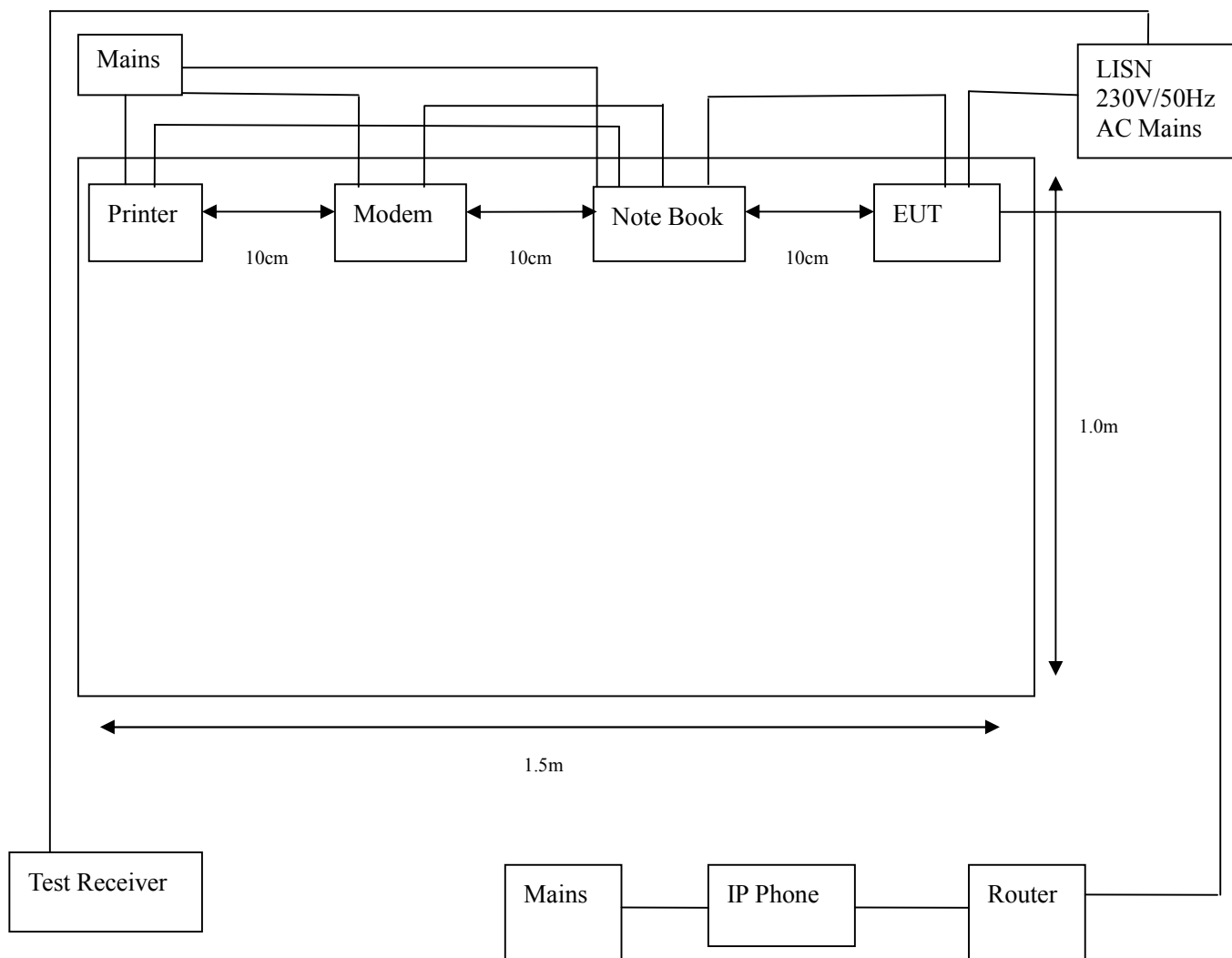
EUT Operating Mode

Normal

Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.



Limits

Frequency Range (MHz)	Limits (dBuV)			
	Limit for conducted emissions of equipment intended to be used in telecommunication centers only		Limit for conducted emissions	
	QP	AV	QP	AV
0.15 – 0.5	79	66	66-56	56-46
0.5 – 5.0	73	60	56	46
5.0-30	73	60	60	50

Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50MHz .

Results

Power Line (L,N)	Eut Operating mode or operating mode no.	Detector (Peak, AV,QP)	Additional (scan-) information (e.g. Pre-test Fastscan, Maxhold, Final measurement.)	Result (Passed / Failed)
L+N	--	QP&AV	Normal	Passed

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

- Temperature : 26 °C
- Humidity : 53 % RH

Adapter model: *OH-1006B0500600U-VDE*

EN55022:2010							
Frequency (MHz)	Emission (dBuV)		LINE/ NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.330	52.58	44.39	Line	59.45	49.45	-6.87	-5.06
0.162	44.65	33.01	Neutral	65.36	55.36	-20.71	-22.35
0.682	45.26	36.51	Line	56.00	46.00	-10.74	-9.49
0.326	45.73	35.78	Neutral	59.55	49.55	-13.82	-13.77
0.814	45.29	38.29	Line	56.00	46.00	-10.71	-7.71
0.738	38.38	29.57	Neutral	56.00	46.00	-17.62	-16.43

Note: NF = No Significant Peak was Found.

Adapter model: *NSA6EE-050060*

EN55022:2010							
Frequency (MHz)	Emission (dBuV)		LINE/ NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.154	53.52	40.68	Line	65.78	55.78	-12.26	-15.10
0.154	53.22	39.38	Neutral	65.78	55.78	-12.56	-16.40
0.162	53.88	43.89	Line	65.36	55.36	-11.48	-11.47
0.178	49.48	35.52	Neutral	64.58	54.58	-15.10	-19.06
0.654	51.78	44.56	Line	56.00	46.00	-4.22	-1.44
0.650	48.38	41.78	Neutral	56.00	46.00	-7.62	-4.22

Note: NF = No Significant Peak was Found.

POE

EN55022:2010							
Frequency (MHz)	Emission (dBuV)		LINE/ NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.154	45.90	31.41	Line	65.78	55.78	-19.88	-24.37
0.162	51.56	34.57	Neutral	65.36	55.36	-13.80	-20.79
0.178	41.65	29.28	Line	64.58	54.58	-22.93	-25.30
0.214	48.94	33.61	Neutral	63.05	53.05	-14.11	-19.44
0.218	42.67	31.38	Line	62.89	52.89	-20.22	-21.51
0.266	47.58	33.87	Neutral	61.24	51.24	-13.66	-17.37

Note: NF = No Significant Peak was Found.

Remarks :

- 1.Uncertainty in conducted emission measured is <+/-2dB.
- 2.QP and AV are abbreviations of quasi-peak and average individually.
- 3.The emission levels of other frequencies were very low against the limit.
- 4.The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
- 5.Margin Value= Emission Level – Limit Value.

Conducted Emission
EN55022

EUT: IP Phone

M/N: SIP-T21P

Manufacturer: Yealink (Xiamen) Network Technology Co.,Ltd

Operating Condition: Normal

Adapter model:

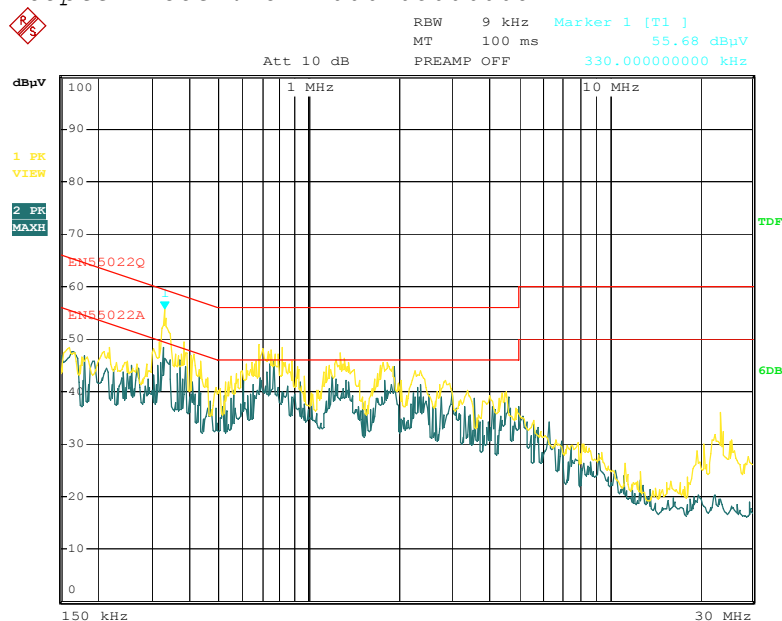
Test Site: Ke Mei Ou Laboratory

Operator: Eric

Test Specification: LINE&NEUTRAL

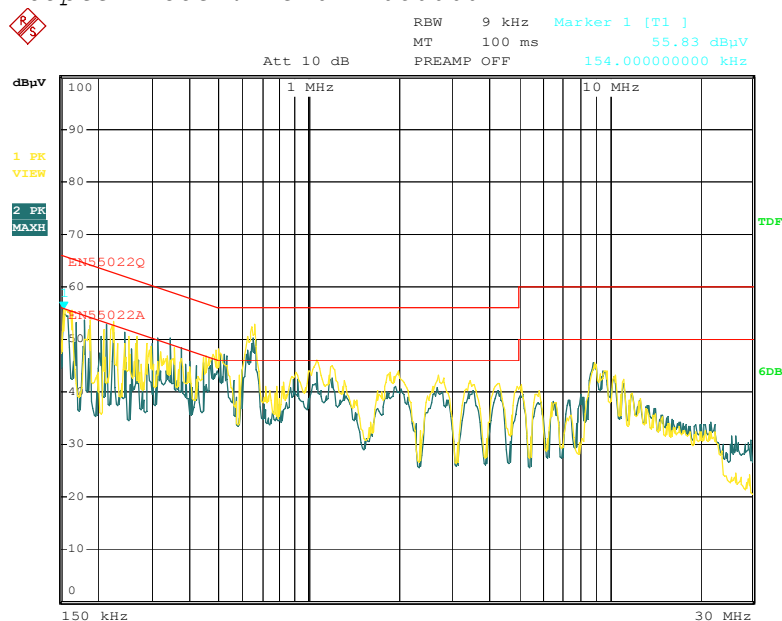
Comment:

Adapter model: OH-1006B0500600U-VDE



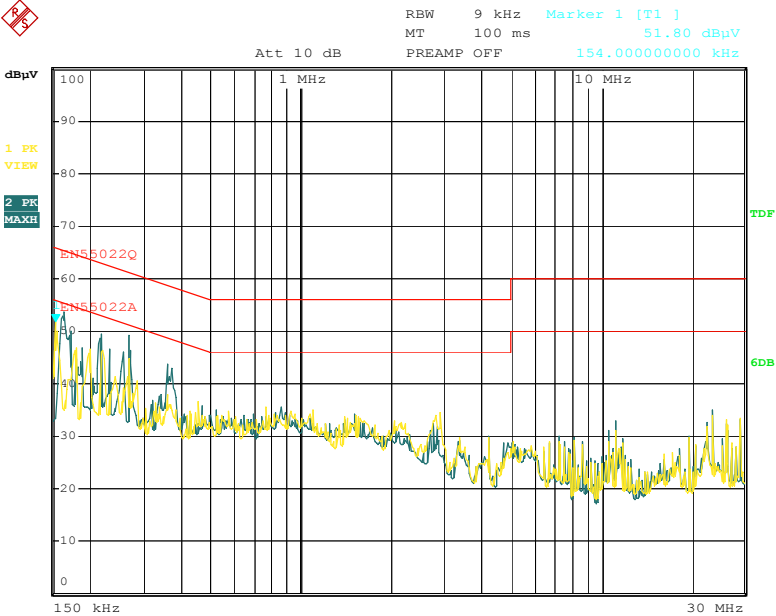
Date: 3.JUL.2013 14:30:29

Adapter model: NSA6EE-050060



Date: 3.JUL.2013 14:40:38

POE



Date: 16.JUL.2013 15:33:39

According to EMC Basic Standard (EN 55022) – Telecommunication Ports

- 1.For the table top EUT the distance to the reference ground plane (wall) should be 40 cm.
- 2.AC input line plugged into LISN. Other support unit were connected to the power mains through another LISN.

Voltage at the measurement port of the ISN was detected, the reading was corrected by adding the voltage division factor of the ISN, and was compared to the voltage limits. The disturbance levels and the frequencies of at least six highest disturbances were recorded from each telecommunication port, which comprises the EUT.

EUT Operating Mode

Normal

Results

Telecommunication Ports	Eut Operating mode or operating mode no.	Detector (Peak, AV, QP)	Additional (scan-) information (e.g. Pre-test Fastscan, Maxhold, Final measurement.)	Result (Passed / Failed)
RJ11/RJ45	--	QP&AV	Normal	Passed

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

- Temperature : 26 °C
- Humidity : 53 % RH

100Mbps

EN55022:2010							
Frequency (MHz)	Emission (dBuV)		Telecom Ports	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.362	55.16	47.18	RJ45	76.68	66.68	-21.52	-19.50
12.750	60.49	59.01	RJ45	74.00	64.00	-13.51	-4.99
13.422	61.27	60.18	RJ45	74.00	64.00	-12.73	-3.82
16.230	62.88	61.31	RJ45	74.00	64.00	-11.12	-2.69
17.698	61.77	59.78	RJ45	74.00	64.00	-12.23	-4.22
18.246	62.82	60.21	RJ45	74.00	64.00	-11.18	-3.79

Note: NF = No Significant Peak was Found.

10Mbps

EN55022:2010							
Frequency (MHz)	Emission (dBuV)		Telecom Ports	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.326	55.81	47.59	RJ45	77.55	67.55	-21.74	-19.96
7.926	58.27	56.67	RJ45	74.00	64.00	-15.73	-7.33
13.362	60.35	59.29	RJ45	74.00	64.00	-13.65	-4.71
16.230	62.79	61.11	RJ45	74.00	64.00	-11.21	-2.89
17.698	61.65	59.57	RJ45	74.00	64.00	-12.35	-4.43
18.246	62.72	60.06	RJ45	74.00	64.00	-11.28	-3.94

Note: NF = No Significant Peak was Found.

Remarks :

- 1.Uncertainty in conducted emission measured is <+/- 2dB.
- 2.QP and AV are abbreviations of quasi-peak and average individually.
- 3.The emission levels of other frequencies were very low against the limit.
- 4.The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
- 5.Margin Value= Emission Level – Limit Value.

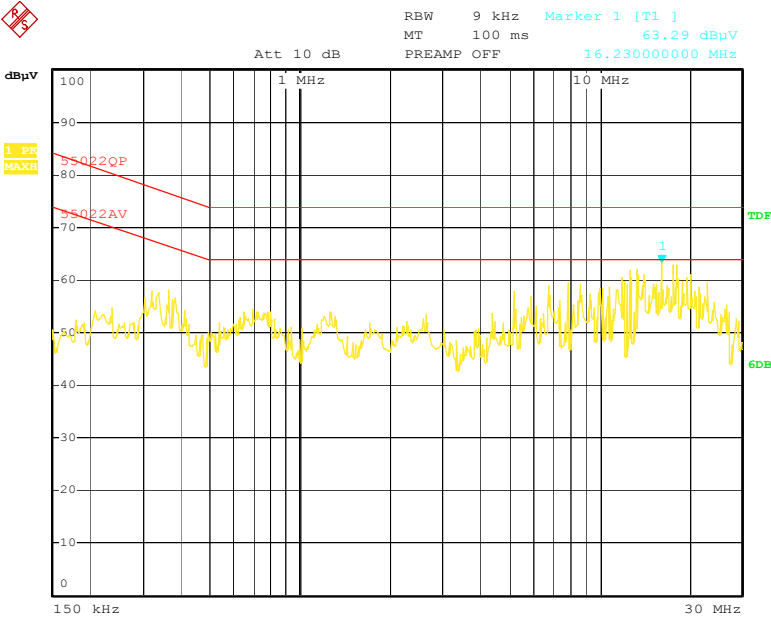
Limits

Frequency Range (MHz)	Limits (dBuV)			
	Limit for conducted emissions of equipment intended to be used in telecommunication centers only		Limit for conducted emissions	
	QP	AV	QP	AV
0.15 – 0.50	97-87	84-74	84-74	74-64
0.5-30	87	74	74	64

Note: In the above table, the tighter limit applies at the band edges.

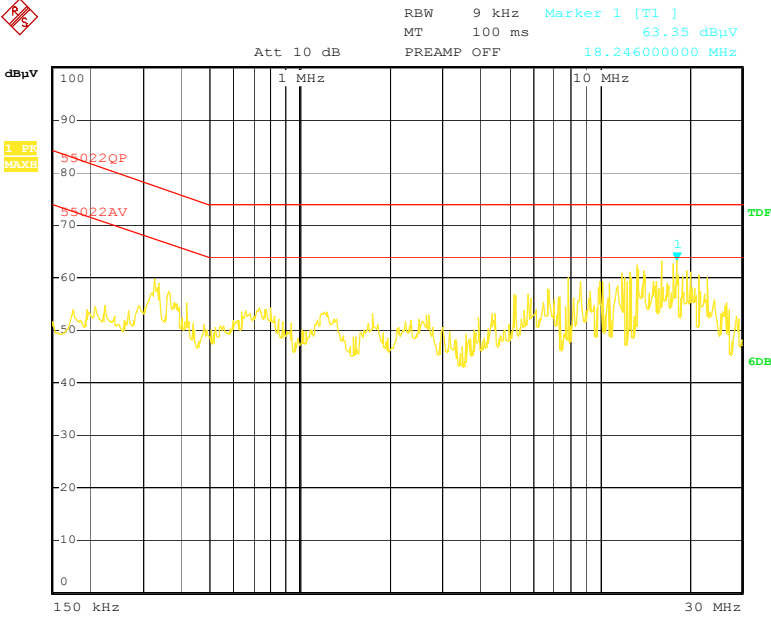
Conducted Emission
EN55022

Telecom Port: RJ45/100Mbps



Date: 10.JUL.2013 10:10:21

Telecom Port: RJ45/10Mbps



Date: 10.JUL.2013 10:16:01

2. 2. 2 Radiated Emissions

This test assesses that ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

According to EMC basic standard (EN 55022 [7] Class-B)

Measurement according to EMC basic standard , The test results correspond to the 10m-OATS results.

The EUT and it simulators are placed on a turntable which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

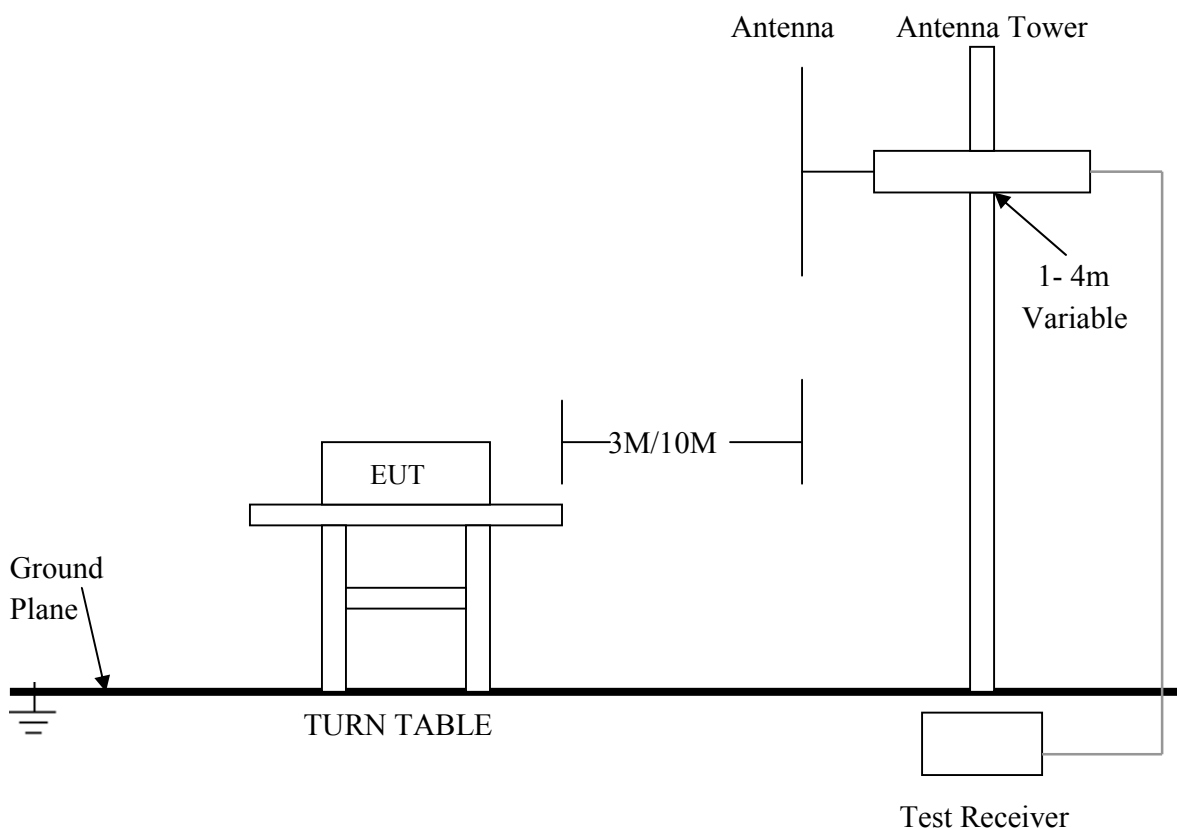
Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission, all of The interface cables must be manipulated according to EN55022: 2010 on radiated measurement.

Radiated emissions were invested over the frequency range from 30MHz to 1 GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 10 meters.

EUT Operating Mode

Normal

Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

Limits

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Class B

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 230	10/3	30/40
230 - 1000	10/3	37/47

Frequency (GHz)	Distance (m)	Field Strength(dBuV/m)	
		Peak	Average
1 - 3	3	70	50
3 - 6	3	74	54

Note:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

Highest frequency generated or used in the device or no which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 6GHz, whichever is lower

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. The lower limit shall apply at the transition frequencies.

Results

The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.

- Temperature : 24 °C
- Humidity : 56 %RH
- Result : **PASSED**

Adapter model: OH-1006B0500600U-VDE

EN55022: 2010, Class B				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
221.200	34.53	HORZ	40.0	-5.47
30.960	34.22	VERT	40.0	-5.78
350.040	36.48	HORZ	47.0	-10.52
39.520	33.94	VERT	40.0	-6.06
442.400	39.67	HORZ	47.0	-7.33
442.400	41.18	VERT	47.0	-5.82

Note: NF = No Significant Peak was Found.

Adapter model: NSA6EE-050060

EN55022: 2010, Class B				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
221.200	32.95	HORZ	40.0	-7.05
30.720	32.72	VERT	40.0	-7.28
276.480	34.18	HORZ	47.0	-12.82
37.560	36.01	VERT	40.0	-3.99
442.400	39.41	HORZ	47.0	-7.59
442.400	38.76	VERT	47.0	-8.24

Note: NF = No Significant Peak was Found.

POE

EN55022: 2010, Class B				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
276.520	35.52	HORZ	47.0	-11.48
36.160	35.25	VERT	40.0	-4.75
442.400	40.31	HORZ	47.0	-6.69
221.200	32.87	VERT	40.0	-7.13
850.120	41.19	HORZ	47.0	-5.81
442.400	37.78	VERT	47.0	-9.22

Note: NF = No Significant Peak was Found.

Note:

1. Uncertainty in radiated emission measured is <+/-4dB
2. Any departure from specification : N/A
3. Emission = Reading Level + Probe Factor + Cable Loss.
4. Margin value = Emission level – Limit value.

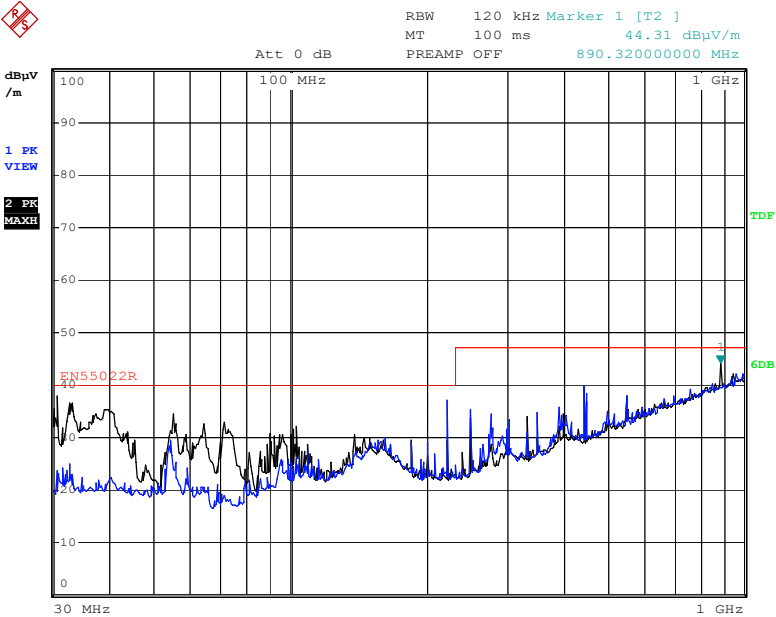
For Frequency above 1GHz Adapter model: NSA6EE-050060 (worst case)

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
1.05636	29.37	HORZ	70	-40.63
1.07508	29.36	VERT	70	-40.64
1.30244	30.58	HORZ	70	-39.42
1.28064	30.39	VERT	70	-39.61
1.87864	30.35	HORZ	70	-39.65
1.62836	29.36	VERT	70	-40.64

- Note:
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.

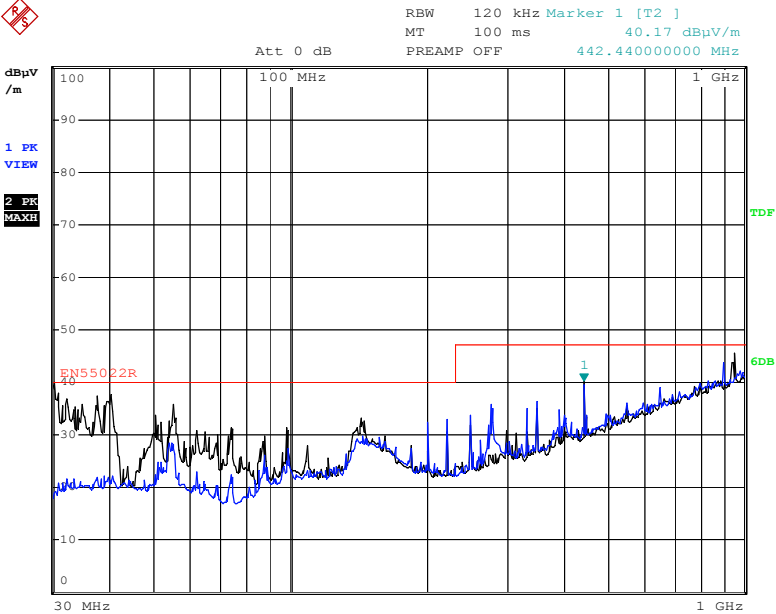
Radiated Emission
EN55022

Adapter model: OH-1006B0500600U-VDE



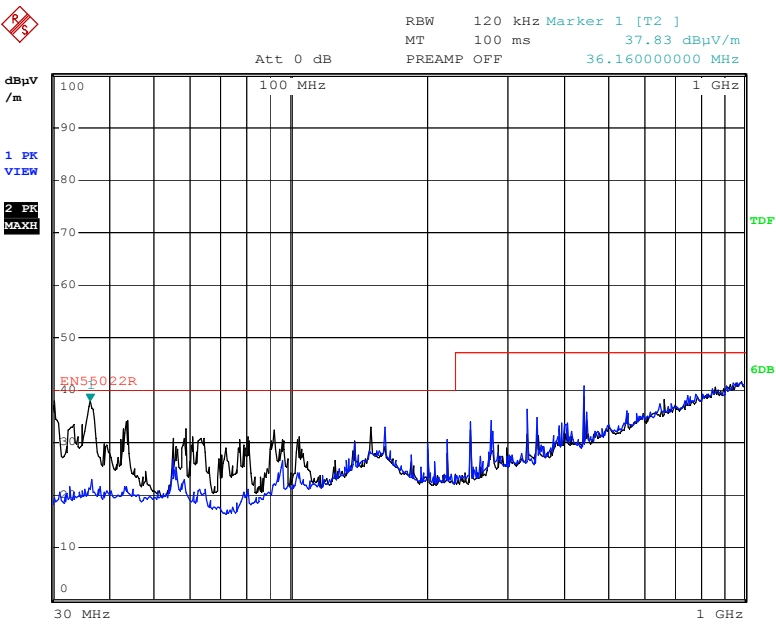
Date: 9.JUL.2013 15:32:04

Adapter model: NSA6EE-050060



Date: 3.JUL.2013 11:15:12

POE



Date: 9.JUL.2013 15:41:29

2. 2. 3 Harmonic Current Emissions

This test was performed as per EMC Basic Standard EN61000-3-2 (2006)

EUT Operating Mode

Normal

Results

Port	EUT Operating mode or operating mode no.	Result (Passed / Failed)
AC Input	Power<75W	Not Applicable

Table 1 - Limit of Harmonics Current Measurement

Limits for Class A equipment	
Harmonics order (n)	Max. permissible harmonics current (A)
Odd harmonics	
3	2.3
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤n≤39	0.15 x 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤n≤40	0.23 x 8/n

Note:

1. For Class A equipment, the harmonics of the input current shall not exceed the absolute values given in table 1.
2. For Class B equipment, the harmonics of the input current shall not exceed the values given in table 1 multiplied by factor of 1, 5.

Table 2 - Limit of Harmonics Current Measurement

Limits for Class C equipment	
Harmonics order (n)	Max. permissible harmonics current expressed as a percentage of the input current at the fundamental frequency (A)
Odd harmonics only	
2	2
3	30 x λ*
5	10
7	7
9	5
11≤n≤39	3
*λ is the circuit power factor	

Note:

The harmonic current limits of lighting equipment shall not exceed the relative limits given in table 2.

Table 3 - Limit of Harmonics Current Measurement

Limits for Class D equipment		
Harmonics order (n)	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
Odd harmonics only		
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
13≤n≤39	3.85/n	See table 1

Note:

The harmonic of the input current shall not exceed the values that can be derived from table 3.

Test Equipment

Please refer to Section 6 this report.

Test Procedure

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- b. The EUT is classified as follows:
 - Class A: Balanced three-phase equipment and all other equipment, except that stated in one of the following classes.
 - Class B: Portable tools.
 - Class C: lighting equipment, including dimming devices.
 - Class D: Equipment having an input current with “special wave shape” and an active input power, $P \leq 600W$.

2.2.4 Flicker and Voltage Fluctuation

This test was performed as per EMC Basic Standard EN 61000-3-3

EUT Operating Mode

Talk

Results

Port	EUT Operating mode or operating mode no.	Result (Passed / Failed)
AC Input	Normal	Passed

Tx

Test Item	Measurement Value	Limit	Result
P _{st}	0.08	1.0	Passed
P _{lt}	0.06	0.65	Passed
T _{dt} (ms)	0.00	500	Passed
d _{max} (%)	0.00	4%	Passed
dc (%)	0.05	3.3%	Passed

Limits of Voltage Fluctuation and Flicks Measurement

Test Item	Limit	Note
P _{st}	1.0	P _{st} means short-term flicker indicator
P _{lt}	0.65	P _{lt} means long-term flicker indicator
T _{dt} (ms)	500	T _{dt} means maximum time that dt exceeds 3.3%.
d _{max} (%)	4%	D _{max} means maximum relative voltage change.
dc (%)	3.3%	Dc means relative steady-state voltage change.

Test Equipment

Please refer to Section 6 this report.

Test Procedure

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short- term flicker indicator is 10 minutes and the observation period for long- term flicker indicator is 2 hours.

2. 2. 5 Electrostatic Discharge

According to EMC basic standard (EN61000-4-2[10])

- Type of Port: includes Enclosure, LCD、MIC、RJ11port, Speaker, Key, Surface etc (see below photo for details)
- Performance Criterion: Criteria B

For the table top EUT the distance to the reference ground plane should be 80 cm.

Direct contact discharge on conducting surfaces of EUT

Indirect air discharge on insulating surfaces of EUT

±2kV, ±4kV direct discharge & ±2kV, ±4kV, ±8kV air discharge

Failure Criteria

Failure Criteria Observed (No performance degradation was observed).

Test Results

Item	Contact Discharge to conducted surfaces and to coupling planes		Air Discharge at insulating surfaces
	Direct Contact Discharge	Indirect Contact Discharge	
Test Voltage	Reaction of EUT / Result	Reaction of EUT / Result	Reaction of EUT / Result
+2kV	n.r.r Passed	n.r.r Passed	n.r.r Passed
-2kV	n.r.r Passed	n.r.r Passed	n.r.r Passed
+4kV	n.r.r Passed	n.r.r Passed	n.r.r Passed
-4kV	n.r.r Passed	n.r.r Passed	n.r.r Passed
+6kV	-	-	-
-6kV	-	-	-
+8kV	-	-	n.r.r Passed
-8kV	-	-	n.r.r Passed

Remarks: n.r.r. = no reaction recognized

Performance Criteria A observed and No any function degraded during the tests.



2. 2. 6 Immunity Test – Radiated, RF Electromagnetic Fields

According to EMC Basic Standard (EN 61000-4-3[9])

- EUT at Operating Mode
- Type of Port: Enclosure
- Performance Criterion: CT/CR
- The distance between the turn-table axis and Tx&Rx-antenna is 3m.
- Frequency Range: 80MHz to 1GHz, 1.4GHz to 2GHz, 2GHz to 2.7GHz
- Test Level: 80MHz to 1GHz, 10V/m on enclosure; 1.4GHz to 2GHz, 3V/m on enclosure; 2GHz to 2.7GHz, 1V/m on enclosure
- Modulation = AM, 1KHz, 80%

Results

Frequency (MHz)	Antenna Polarity	Radiation to	Reaction of the EUT During and after test	Result
80-1000, 1400-2700	Horizontal	Front	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Front	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Rear	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Rear	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Left	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Left	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Right	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Right	No reactions recognized	Passed

Note: Performance criteria A observed.

Performance Criteria A observed and No any function degraded during the tests.

Test Equipment

Please refer to Section 6 this report.

Test Procedure

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

2. 2. 7 Fast Transients Common Mode

According to EMC basic standard (EN61000-4-4[11])

- Type of Port: AC mains power input/output port
 - Performance Criterion: Criterion B
1. For the table top EUT the distance to the reference ground plane should be 80 cm.
 2. The test level for ac mains power input ports shall be 1KV open circuit.

Test Setup

Burst on Power Line (direct injection)

Failure Criteria

Failure Criteria Observed (No performance degradation was observed).

Test Results

Adjustment on UCS 500 M4: Trigger: “AUTO”, Burst length:15ms				Testing Time: ●60s for every voltage and polarity ○120s for every voltage and polarity				
Testing on power Line(direct injection)		Reaction of The Test Object During and after Test						Result
Test Voltage	Repetition Frequency	L1 =>GND (+=>GND)	L2=> GND	L3=> GND	N=> GND	PE=> GND	L1,N,=> GND	
-0.5kV	5kHz	n.r.r	N/A	N/A	n.r.r	N/A	n.r.r	Passed
+0.5kV	5kHz	n.r.r	N/A	N/A	n.r.r	N/A	n.r.r	Passed
-1.0kV	5kHz	n.r.r	N/A	N/A	n.r.r	N/A	n.r.r	Passed
+1.0kV	5kHz	n.r.r	N/A	N/A	n.r.r	N/A	n.r.r	Passed

Note: Performance criteria A observed.

Remarks: n.r.r. = no reaction recognized, N/A = not applicable.

Test Results (I/O data cables longer than 3m)

Adjustment on UCS 500 M4: Trigger: “AUTO”, Burst length:15ms			Testing Time: ●60s for every voltage and polarity ○120s for every voltage and polarity		
Testing on RJ 45 Port & RJ11 Port(Clamp)		Reaction of The Test Object During and after Test			Result
Test Voltage	Repetition Frequency	RJ45 Port (LAN Cable)	RJ11 Port (Line Cable)		
-0.5kV	5kHz	n.r.r	N/A		Passed
+0.5kV	5kHz	n.r.r	N/A		Passed

Note: Performance criteria A observed.

Remarks: n.r.r. = no reaction recognized, N/A = not applicable.

2. 2. 8 Surges Common & Differential Model (1-phase)

According to EMC basic standard (EN61000-4-5 [14])

- Type of Port: AC mains power input/output port
- Performance Criterion: CT/CR
- For the table top EUT the distance to the reference ground plane should be 80 cm.
- 1KV open circuit for common mode & 0.5KV open circuit for differential mode.

Failure Criteria

Failure Criteria Observed (No performance degradation was observed).

Test Results

5 pulses for each polarity and test voltage, alternating negative/positive, triggered in case of AC –power line:

0° ,45° ,90° ,180° ,270° referred to the line frequency (L1),

Repetition rate is 1 per min.

Repetition rate is 1 per min.						
Test Voltage	Reaction of the test object during and after test by trigger angle/pulse no.(coupling on DC-lines =>trigger angle not relevant).					Result
	0° /pulse no.1,2	45° /no.3,4	90° /no.5,6	180° /no. 7,8	270° /no. 9,10	
Capacitive coupling on AC lines: L1=>N or DC lines +=>- (Ri=2 Ω/C =18uF)						
-0.5kV +0.5kV	No reaction Recognized	No reaction Recognized	No reaction Recognized	No reaction Recognized	No reaction Recognized	Passed
-1.0kV +1.0kV	No reaction Recognized	No reaction Recognized	No reaction Recognized	No reaction Recognized	No reaction Recognized	Passed
-2.0kV +2.0kV	N/A	N/A	N/A	N/A	N/A	--
- kV +kV	N/A	N/A	N/A	N/A	N/A	--

Performance Criteria A Observed.

Performance Criteria A Observed:						
Test Voltage	Reaction of the test object during and after test by trigger angle/pulse no.(coupling on Telecommunication port=>trigger angle not relevant).					Result
	0° /pulse no.1,2	45° /no.3,4	90° /no.5,6	180° /no. 7,8	270° /no. 9,10	
Capacitive coupling on T,R to Ground of Telecommunication port						
-1.0kV	No reaction	No reaction	No reaction	No reaction	No reaction	Passed
+1.0kV	Recognized	Recognized	Recognized	Recognized	Recognized	

Performance Criteria A Observed.

2. 2. 9 RF Common Mode

According to EMC basic standard (EN61000-4-6 [10])

- Type of Port: AC mains power input/output port
 - Performance Criterion: CT/CR
- Start Frequency = 150KHz Stop Frequency = 80MHz
Frequency Step = 50KHz in the range of 150KHz – 5MHz
1% increment in the range of 5MHz – 80MHz
Field Strength = 3V/m,
Modulation = AM, 400Hz, 1KHz, 80%

Test Setup

Injection via CDN or BIC clamp

Failure Criteria

Failure Criteria Observed (No performance degradation was observed).

Test Results

Injection On	Injection Via	Reaction of the EUT During and after test	Result
AC input power line	CDN	No reactions recognized	Passed

Performance criteria A observed

2. 2. 10 Power Frequency Magnetic-Field Test

According to EMC basic standard (EN61000-4-8)

- Type of Port: Enclosure
- Performance Criterion: CT/CR

Test Level: 1A/m

Polarization: X, Y, Z

Criteria: A

Test Setup

Injection via CDN or BIC clamp

Failure Criteria

Failure Criteria Observed (No performance degradation was observed).

Test Results

Power Frequency Magnetic Field : 50 Hz, 1 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

Performance criteria A observed

2. 2. 11 Voltage Dips

According to EMC basic standard (EN61000-4-11 [13])

- Type of Port: AC mains power input/output port
- Performance Criterion: CT/CR
- For the table top EUT the distance to the reference ground plane should be 80 cm.
- Phase angle 0,45,90,135,180,225,270,315 degrees

Description of Performance Criteria

Class 3 SRD equipment		
Criteria	During test	After test
A and B	May be loss of function (one or more) No unintentional responses	*Operate as intended, for equipment type II the communication link may be lost, but shall be recoverable by user *Lost function(s) shall be self-recoverable *No degradation of performance

Test Results

For each test 3 repetitions in an interval of 10s time for decrease or increase of supply voltage: T down/up < 5uS(due to switching)

Voltage Dips:

Test Level % U _T	Reduction (%)	Duration (periods)	Observation	Meet Performance Criteria
0	100	0.5	No any functions degrade during and after the test.	A
0	100	1.0	No any functions degrade during and after the test.	A
70	30	25	No any functions degrade during and after the test.	A

Normal: No any functions degrade during and after the test.

No unintentional responses shall occur at the end of the test.

n.r.r – no reaction recognized

Voltage Interruptions:

Test Level % U _T	Reduction (%)	Duration (periods)	Observation	Meet Performance Criteria
0	100	250	The EUT shuts down while test is performing, it can be restarted automatically after finishing the test.	B

n.r.r – no reaction recognized

No unintentional responses shall occur at the end of the test.

3. CE Label

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.



Note:

1. Reference main label of contents shall show them in the formal label.
2. Height of CE marking should not less than 5mm.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/Proposed CE Mark Location



4. Photographs – Test Setup

4. 1 Photograph – Emission Test Setup

Conducted emission test view



Radiated emission test view



5. Photographs – EUT

EUT top view



EUT bottom view

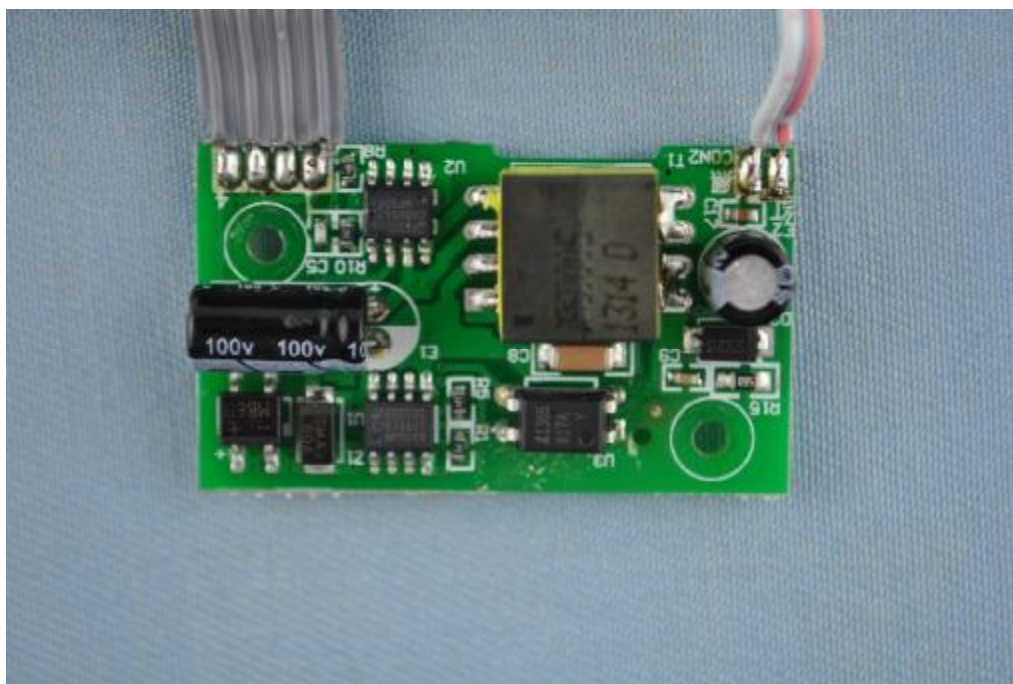
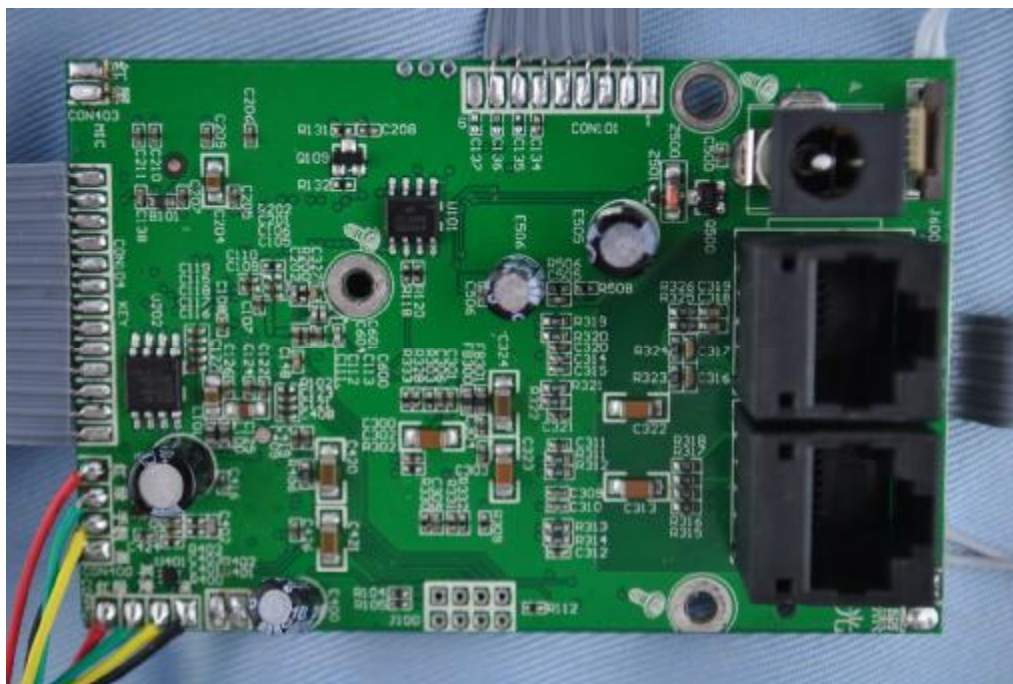


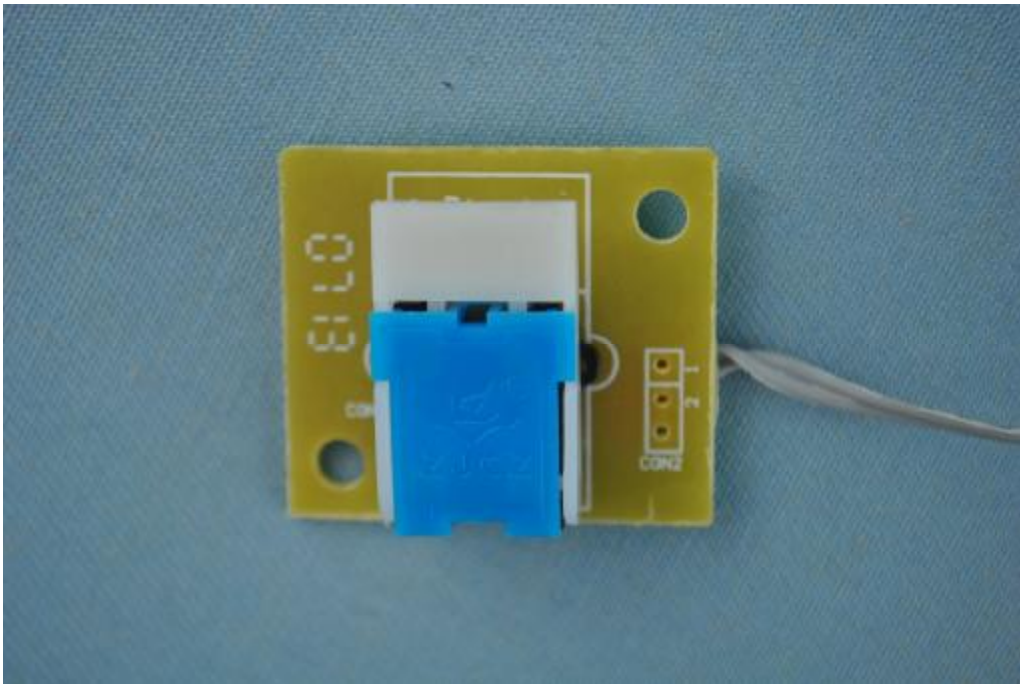
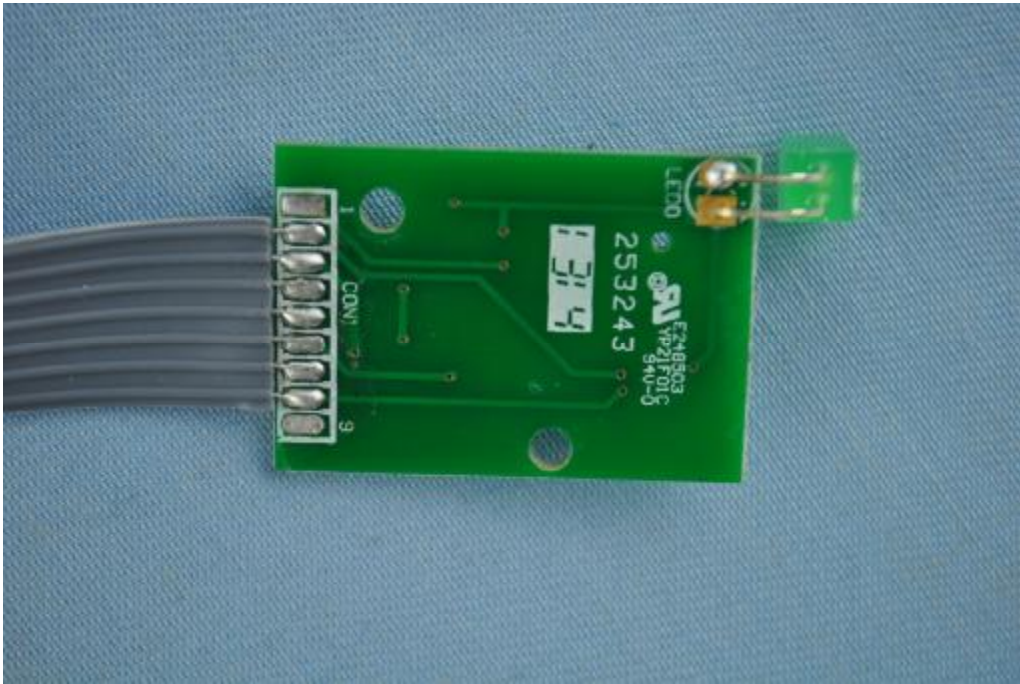


EUT inside whole view

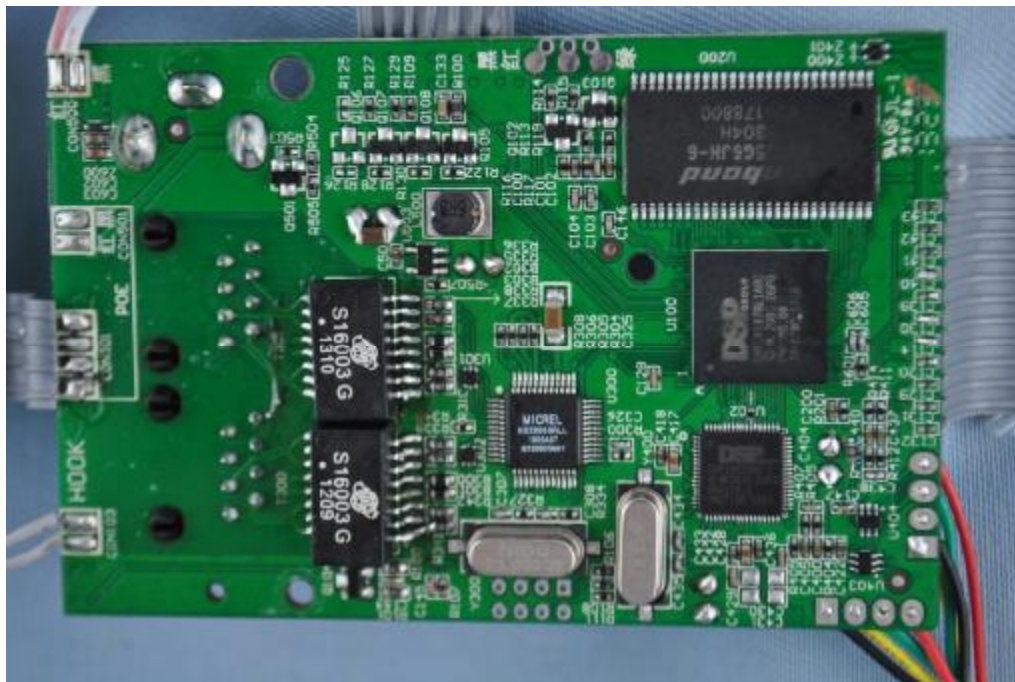


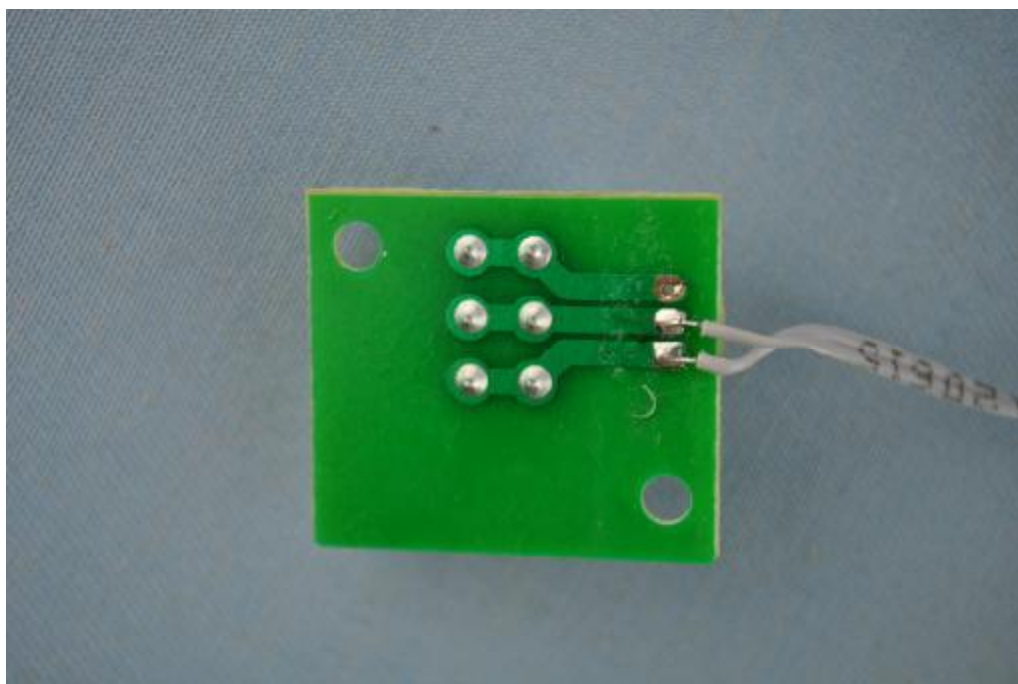
Main & RF board component side





Main & RF board solder side





Adapter top view



Yealink
AC/DC SWITCHING ADAPTER
MODEL: OH-100680500600H-VDE
INPUT: 100-240V ~ 50/60Hz 250mA
OUTPUT: 5V = 600mA
CE, LPS, 1323, MADE IN CHINA



KSZ2013062101
2013.07.01/42

Yealink
AC ADAPTOR
Model No.: NSABEE-050060
Input: 100-240V ~ 50/60Hz 0.2A
Output: 5V = 0.6A
CE, LPS, 1325, indoor use only, Made in China

Adapter side view



6. Test Equipment

Part I

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	SinTek	N/A	N/A	NCR
Antenna Tower	SinTek	N/A	N/A	NCR
OATS	SinTek	N/A	N/A	Sep.28, 2013
Pre-Amplifier	Agilent	87405C	KMO-SZ155	Dec.6, 2013
Pre-Amplifier	Com-Power	PAM-840	KMO-SZ156	Dec.6, 2013
Horn Antenna	Com-Power	AH-840	KMO-SZ157	Dec.6, 2013
EMI Test Receiver	Rohde & Schwarz	ESPI7	KMO-SZ002	June 01, 2014
Spectrum Analyzer	Rohde & Schwarz	FSP40	KMO-SZ003	May 27, 2014
Signal Generator	FLUKE	PM5418+Y/C	KMO-SZ020	May 27, 2014
Loop Antenna	Rohde & Schwarz	HFH2-Z2	KMO-SZ004	Jan. 30, 2014
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	Sep.18, 2013
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ006	Sep.18, 2013
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ007	Sep.18, 2013
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ008	Sep.18, 2013
AMN	Rohde & Schwarz	ESH3-Z5	KMO-SZ009	May 27, 2014
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	KMO-SZ077	Nov.29, 2013
ISN	SCHWARZBECK	NTFM 8158 CAT3	KMO-SZ070	Nov.19, 2013
ISN	SCHWARZBECK	NTFM 8158 CAT5	KMO-SZ071	Nov.19, 2013
ISN	SCHWARZBECK	NTFM 8158 CAT6	KMO-SZ072	Nov.19, 2013
KMO Shielded Room	KMO	KMO-001	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	KMO-SZ037	Sep.18, 2013
AC Power Source / Analyzer	Agilent	6813B	KMO-S166	July 22, 2014
SOHO Telephone Switching System	IKE	2000-108C	N/A	NCR
3m Anechoic Chamber	KMO	KMO-3AC	KMO-3AC-1	May 29, 2014
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2014

Part II

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
ESD Tester	EMTEST	DITO	KMO-SZ010	June 01, 2014
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2014
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.01, 2014
Voltage Probe	Rohde & Schwarz	URV5-Z2	100012	Feb.01, 2014
Voltage Probe	Rohde & Schwarz	URV5-Z2	100013	Feb.01, 2014
Power Amplifier	AR	150W1000	300999	Feb.01, 2014
Field Probe	Holaday	HI-6005	105152	Feb.01, 2014
Ultra Compact Simulator	EMTEST	UCS 500 M4	KMO-SZ012	June 01, 2014
Power Mains Adaptor	EM TEST	MV 2616	KMO-SZ013	June 01, 2014
Capacitive Coupling Clamp	EM TEST	HFK	KMO-SZ014	June 01, 2014
Signal	Maconi	2022D	119246/003	June 01, 2014
Power Amplifier	M2S	A00181/ 1000	9801-112	June 01, 2014
Power Amplifier	M2S	AC8113/ 800-250A	9801-179	June 01, 2014
Power Antenna	SCHAFFNER	CBL6140A	1204	June 01, 2014
Fast Transients/Burst Generator	SCHAFFNER	MODULA 6000	34354	June 01, 2014
Signal Generator	SCHAFFNER	NSG 2070	1086	June 01, 2014
CDN	SCHAFFNER	M016	20812	June 01, 2014