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# *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-T19P, SIP-T19** |

| August 8, 2013<br>**Issue Date:** |
|---|
| Original Report<br>**Report Type:** |
| Eric Guo<br>**Test Engineer:** Eric Guo |
| Apollo Liu<br>**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 | : July 19~August 8, 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-T19P |
| Model No.(Extension) | : SIP-T19 |
| Description | : IP Phone |

## Additional Information

| | |
|---|---|
| Frequency | : N/A |
| Number of Channels | : N/A |
| Power Supply | : DC 5V/600mA(Adapter model:OH-1006B0500600U-VDE)<br>DC 5V/0.6A(Adapter model:NSA6EE-050060)<br>POE 48V power |
| Operation Distance | : N/A |
| Resolution | : N/A |

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-T19P and SIP-T19 are electrically identical, they have the same PCB layout and schematic, the only difference is the model SIP-T19P with POE circuit,the model SIP-T19 without POE circuit . SIP-T19P was tested by KMO.

## 1. 6 Test Standards

| |
|---|
| **EN 55022:2010**<br>Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.<br>**EN 55024:2010**<br>Information technology equipment – Immunity characteristics – Limits and methods of measurement<br>**EN 61000-3-2: 2006 +A1:2009 +A2:2009**<br>Limits for harmonics current emissions.<br>**EN 61000-3-3: 2008**<br>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 C63.4-2003. 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-T19P, SIP-T19 | DoC |

### B. Internal Devices

| Device | Manufacturer | Model # | FCCID / DoC |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

### C. Peripherals

| Device | Manufacturer | Model #<br>Serial # | FCC ID/<br>DoC | Cable |
|---|---|---|---|---|
| Printer | HP | HP930C | DoC | 1.5m unshielded power cord<br>1.2m unshielded data cable. |
| Modem | GVC | N/A | DoC | 1.5m unshielded power cord<br>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.

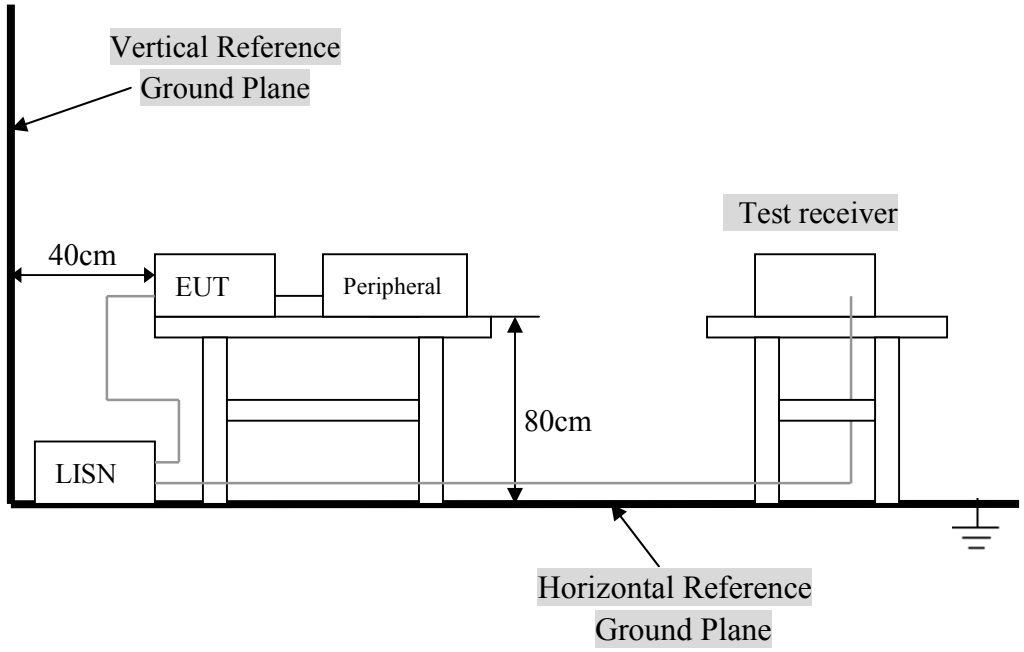
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55022:1998 on conducted measurement.

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

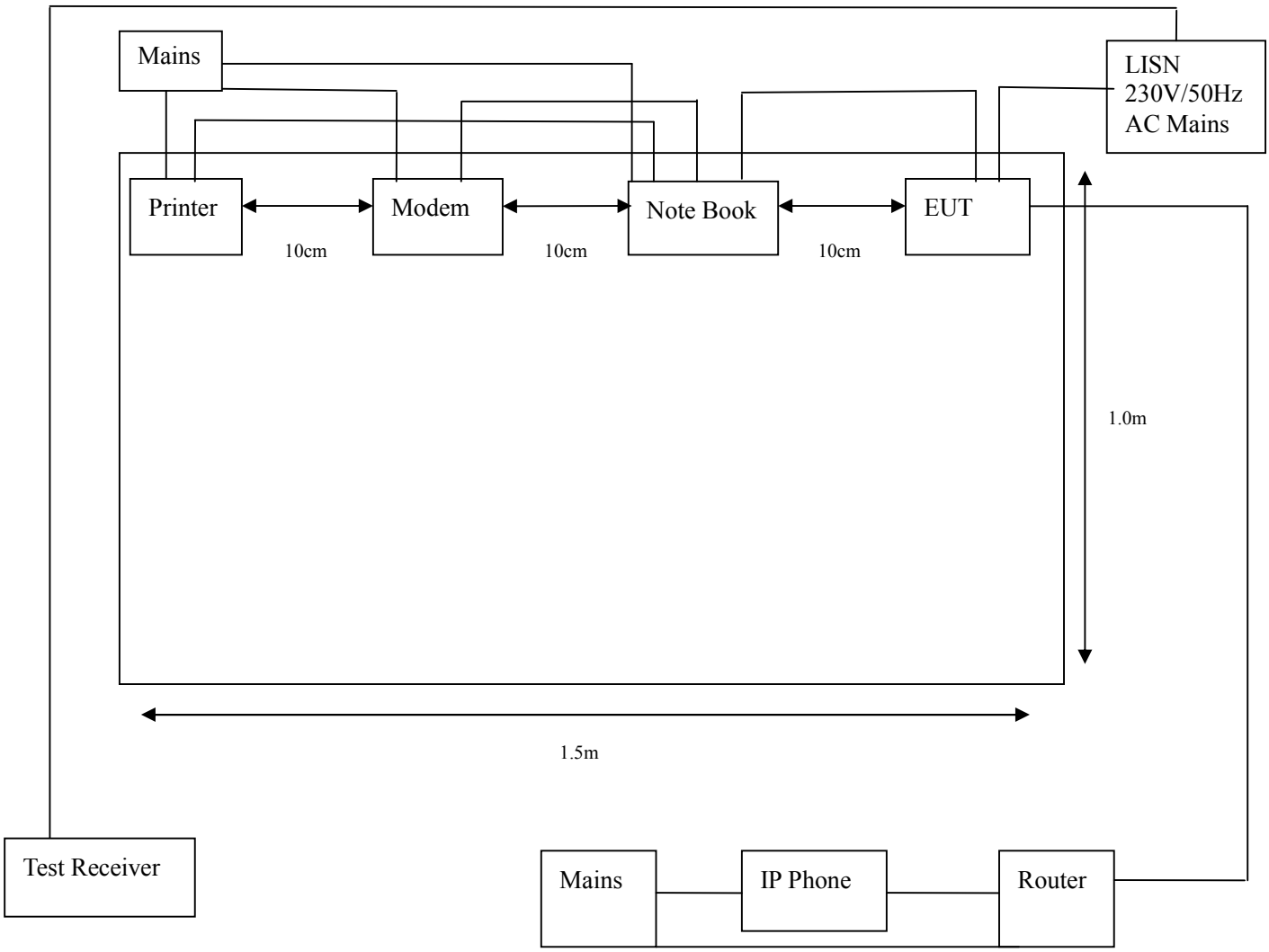
### EUT Operating Mode

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 ℃
· Humidity : 53 % RH

*Adapter model: OH-1006B0500600U-VDE*

| EN55022 Class B | | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission (dBuV) QP | AV | LINE/ NEUTRAL | Limit (dBuV) QP | AV | Margin (dB) QP | AV |
| 0.158 | 51.28 | 34.69 | Line | 65.57 | 55.57 | -14.29 | -20.88 |
| 0.158 | 52.72 | 35.41 | Neutral | 65.57 | 55.57 | -12.85 | -20.16 |
| 0.266 | 46.06 | 32.66 | Line | 61.24 | 51.24 | -15.18 | -18.58 |
| 0.250 | 42.48 | 31.49 | Neutral | 61.76 | 51.76 | -19.28 | -20.27 |
| 6.514 | 41.22 | 35.53 | Line | 60.00 | 50.00 | -18.78 | -14.47 |
| 0.266 | 49.26 | 34.62 | Neutral | 61.24 | 51.24 | -11.98 | -16.62 |

**Note: NF = No Significant Peak was Found.**

*Adapter model: NSA6EE-050060*

| EN55022 Class B | | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission (dBuV) QP | AV | LINE/ NEUTRAL | Limit (dBuV) QP | AV | Margin (dB) QP | AV |
| 0.242 | 53.38 | 43.39 | Line | 62.03 | 52.03 | -8.65 | -8.64 |
| 0.218 | 55.52 | 44.23 | Neutral | 62.89 | 52.89 | -7.37 | -8.66 |
| 0.266 | 53.87 | 44.51 | Line | 61.24 | 51.24 | -7.37 | -6.73 |
| 0.258 | 55.63 | 45.61 | Neutral | 61.50 | 51.50 | -5.87 | -5.89 |
| 0.626 | 48.01 | 40.78 | Line | 56.00 | 46.00 | -7.99 | -5.22 |
| 0.918 | 46.44 | 36.22 | Neutral | 56.00 | 46.00 | -9.56 | -9.78 |

**Note: NF = No Significant Peak was Found.**

*POE*

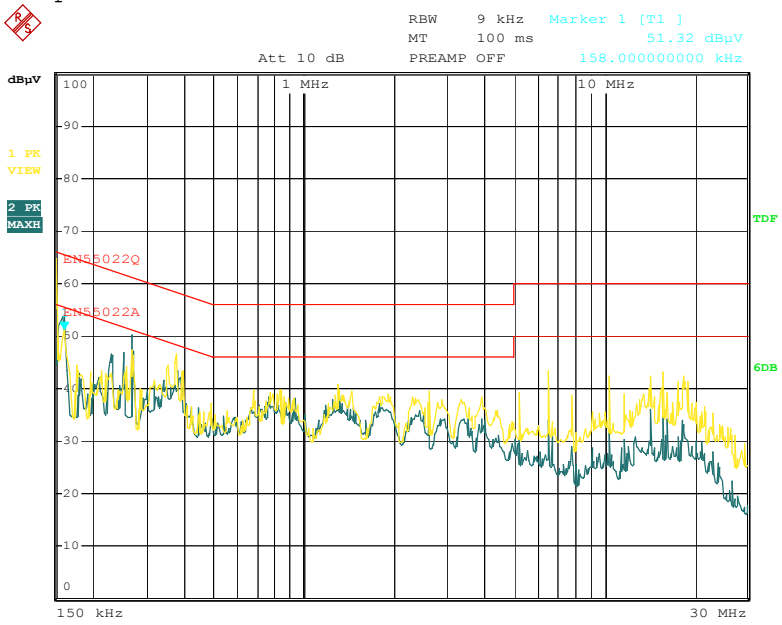
| EN55022 Class B | | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Emission (dBuV) QP | AV | LINE/ NEUTRAL | Limit (dBuV) QP | AV | Margin (dB) QP | AV |
| 0.166 | 46.08 | 31.72 | Line | 65.16 | 55.16 | -19.08 | -23.44 |
| 0.158 | 51.79 | 34.72 | Neutral | 65.57 | 55.57 | -13.78 | -20.85 |
| 0.210 | 45.89 | 30.37 | Line | 63.21 | 53.21 | -17.32 | -22.84 |
| 0.270 | 46.18 | 34.31 | Neutral | 61.12 | 51.12 | -14.94 | -16.81 |
| 0.270 | 43.73 | 30.91 | Line | 61.12 | 51.12 | -17.39 | -20.21 |
| 0.370 | 47.41 | 42.87 | Neutral | 58.50 | 48.50 | -11.09 | -5.63 |

**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-T19P*
*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*

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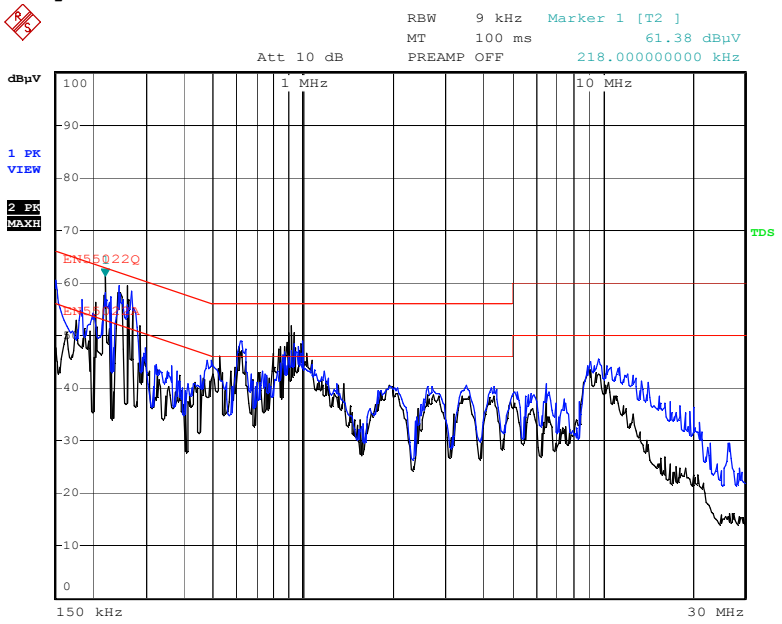
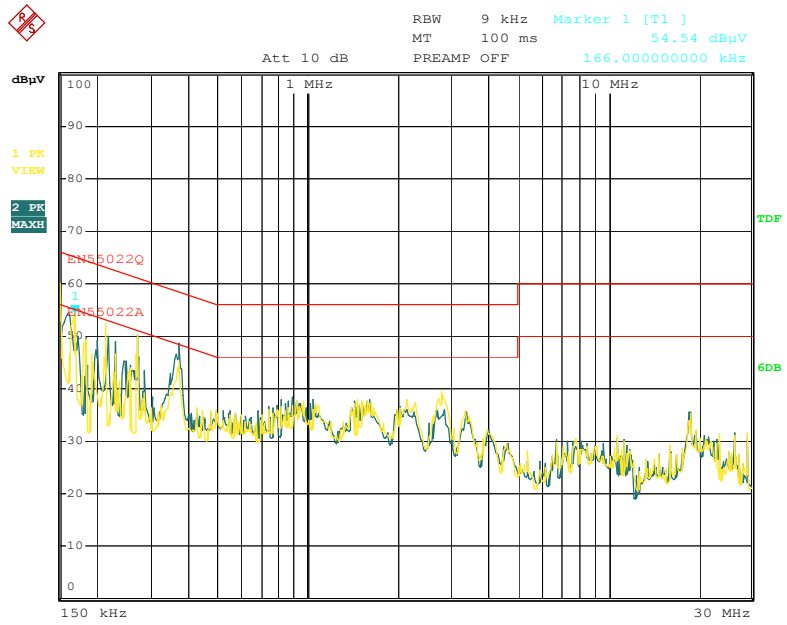
*Adapter model: NSA6EE-050060*




Date: 8.AUG.2013 11:36:26

*POE*

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## 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 ℃
· Humidity ： 53 % RH

100Mbps

| **EN55022 Class B** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Emission (dBuV)** | | **Telecom Ports** | **Limit (dBuV)** | | **Margin (dB)** | |
| | **QP** | **AV** | | **QP** | **AV** | **QP** | **AV** |
| 0.606 | 56.69 | 51.56 | RJ45 | 74.00 | 64.00 | -17.31 | -12.44 |
| 0.634 | 58.56 | 53.21 | RJ45 | 74.00 | 64.00 | -15.44 | -10.79 |
| 5.298 | 49.27 | 43.31 | RJ45 | 74.00 | 64.00 | -24.73 | -20.69 |
| 5.954 | 51.42 | 44.08 | RJ45 | 74.00 | 64.00 | -22.58 | -19.92 |
| 6.066 | 52.78 | 43.02 | RJ45 | 74.00 | 64.00 | -21.22 | -20.98 |
| 9.138 | 55.67 | 50.79 | RJ45 | 74.00 | 64.00 | -18.33 | -13.21 |

**Note: NF = No Significant Peak was Found.**

10Mbps

| **EN55022 Class B** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Frequency (MHz)** | **Emission (dBuV)** | | **Telecom Ports** | **Limit (dBuV)** | | **Margin (dB)** | |
| | **QP** | **AV** | | **QP** | **AV** | **QP** | **AV** |
| 0.490 | 54.67 | 49.78 | RJ45 | 74.17 | 64.17 | -19.50 | -14.39 |
| 0.610 | 57.78 | 51.88 | RJ45 | 74.00 | 64.00 | -16.22 | -12.12 |
| 0.634 | 58.38 | 52.77 | RJ45 | 74.00 | 64.00 | -15.62 | -11.23 |
| 5.814 | 51.41 | 44.21 | RJ45 | 74.00 | 64.00 | -22.59 | -19.79 |
| 6.414 | 49.58 | 37.28 | RJ45 | 74.00 | 64.00 | -24.42 | -26.72 |
| 9.154 | 54.39 | 49.67 | RJ45 | 74.00 | 64.00 | -19.61 | -14.33 |

**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

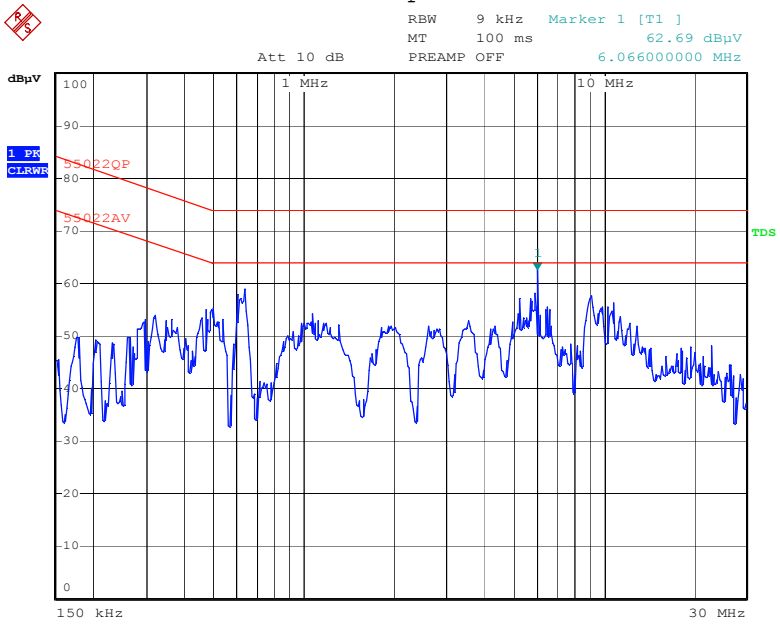
| Frequency Range (MHz) | Limits (dBuV) | | | |
|---|---|---|---|---|
| | Limit for conducted emissions of equipment intended to be used in telecommunication centers only | | Limit for conducted emissions | |
| | QP | AV | QP | AV |
| 0.15 – 0.50 | 97-87 | 84-74 | 84-74 | 74-64 |
| 0.5-30 | 87 | 74 |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

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

***Conducted Emission***

***EN55022***

*Telecom Port: RJ45/100Mbps*

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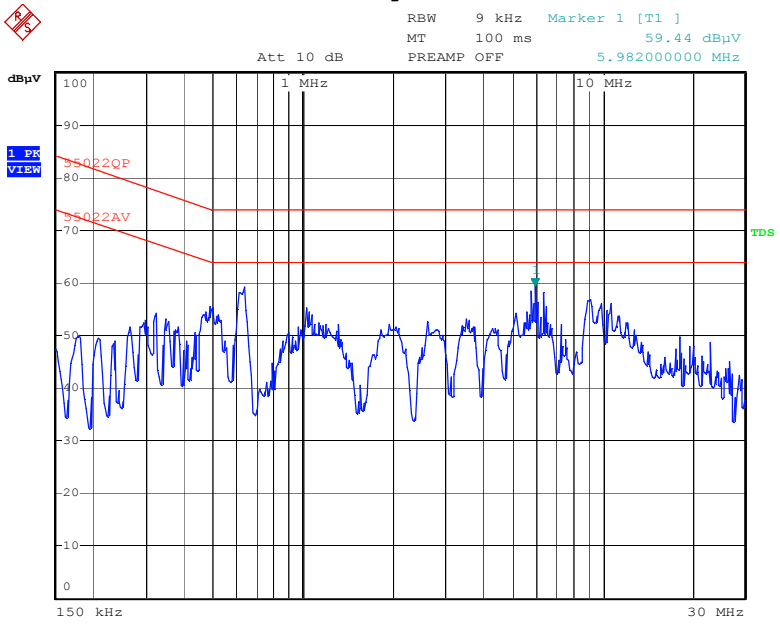
*Telecom Port: RJ45/10Mbps*

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## 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.

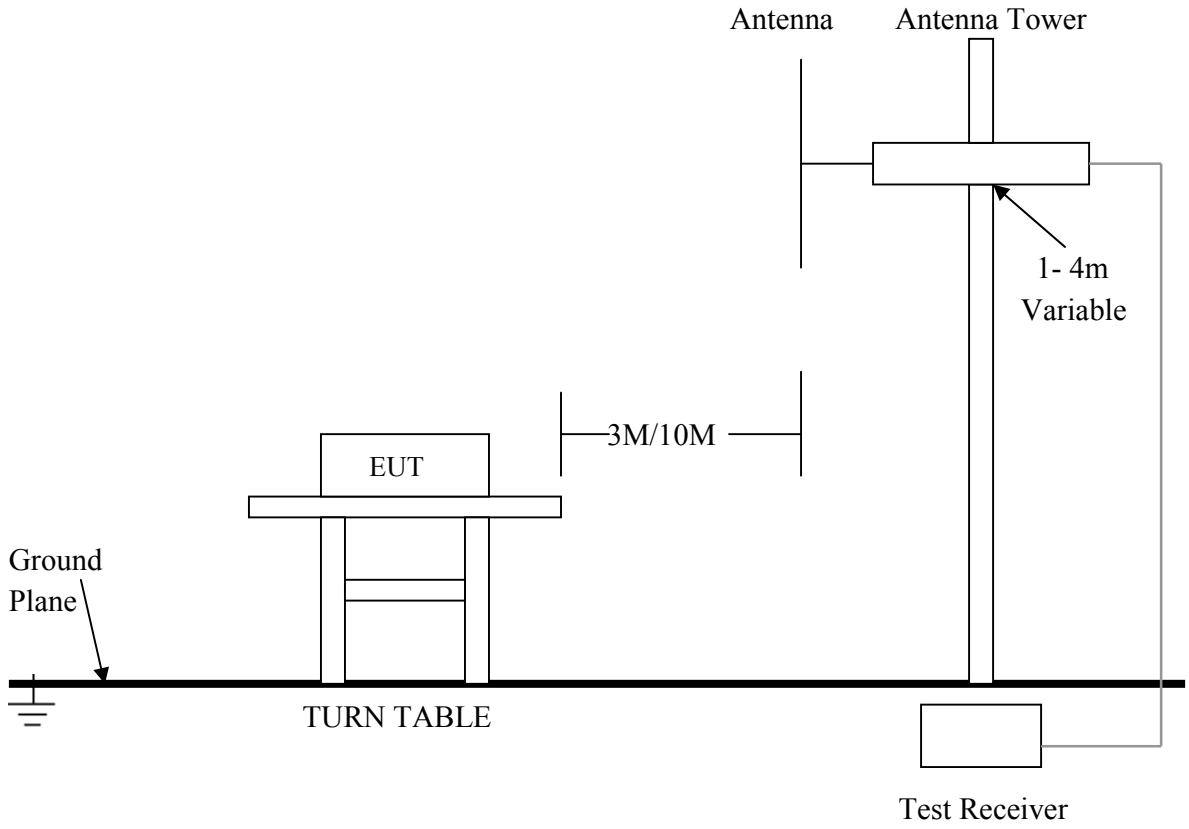
Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission, all of The interface cables must be manipulated according to EN55022: 2010 on radiated measurement.

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 ℃
- 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)** |
| 250.040 | 36.74 | HORZ | 47.0 | -10.26 |
| 32.600 | 36.17 | VERT | 40.0 | -3.83 |
| 331.800 | 39.01 | HORZ | 47.0 | -7.99 |
| 71.640 | 30.01 | VERT | 40.0 | -9.99 |
| 450.040 | 38.72 | HORZ | 47.0 | -8.28 |
| 550.080 | 41.28 | VERT | 47.0 | -5.72 |

**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)** |
| 250.040 | 35.42 | HORZ | 47.0 | -11.58 |
| 30.320 | 38.59 | VERT | 40.0 | -1.41 |
| 331.800 | 41.28 | HORZ | 47.0 | -5.72 |
| 442.400 | 40.01 | VERT | 47.0 | -6.99 |
| 350.040 | 35.87 | HORZ | 47.0 | -11.13 |
| 550.080 | 41.02 | VERT | 47.0 | -5.98 |

**Note: NF = No Significant Peak was Found.**

*POE*

| EN55022: 2010, Class B | | | | |
|---|---|---|---|---|
| **Freq. (MHz)** | **Emission (dBuV/m)** | **HORIZ / VERT** | **Limits (dBuV/m)** | **Margin (dB)** |
| 221.160 | 32.06 | HORZ | 40.0 | -7.94 |
| 32.600 | 36.78 | VERT | 40.0 | -3.22 |
| 250.040 | 36.61 | HORZ | 47.0 | -10.39 |
| 250.000 | 36.27 | VERT | 47.0 | -10.73 |
| 331.840 | 32.98 | HORZ | 47.0 | -14.02 |
| 650.080 | 36.41 | VERT | 47.0 | -10.59 |

**Note: NF = No Significant Peak was Found.**

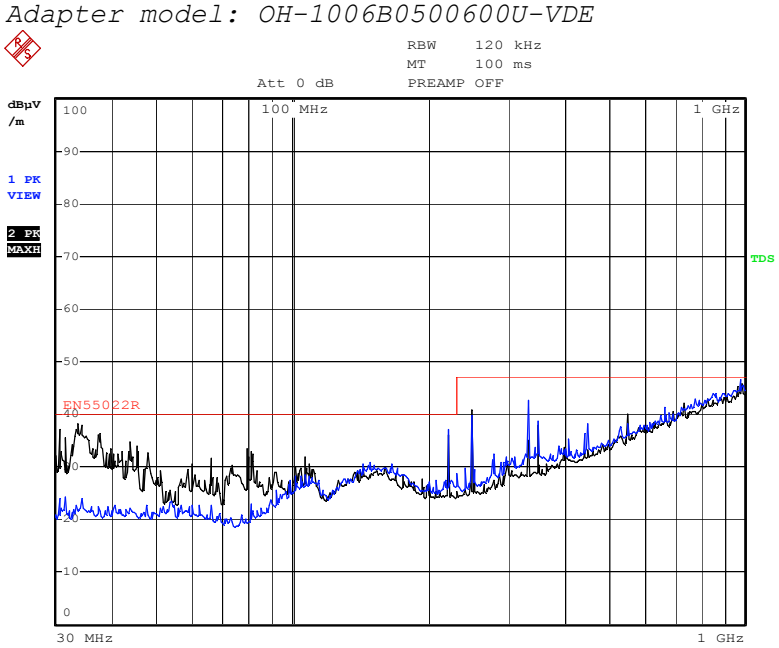
**Note:**

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.

***Radiated Emission***

***EN55022***

*Adapter model: OH-1006B0500600U-VDE*

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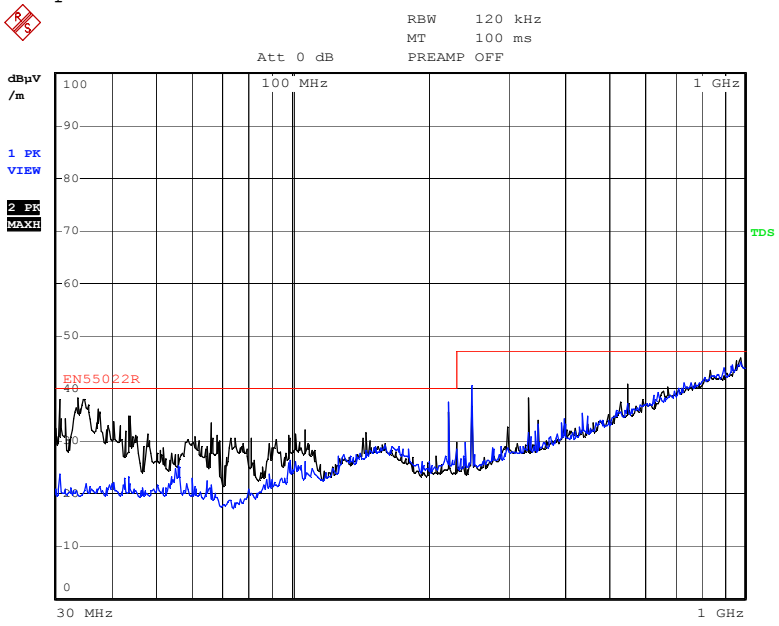
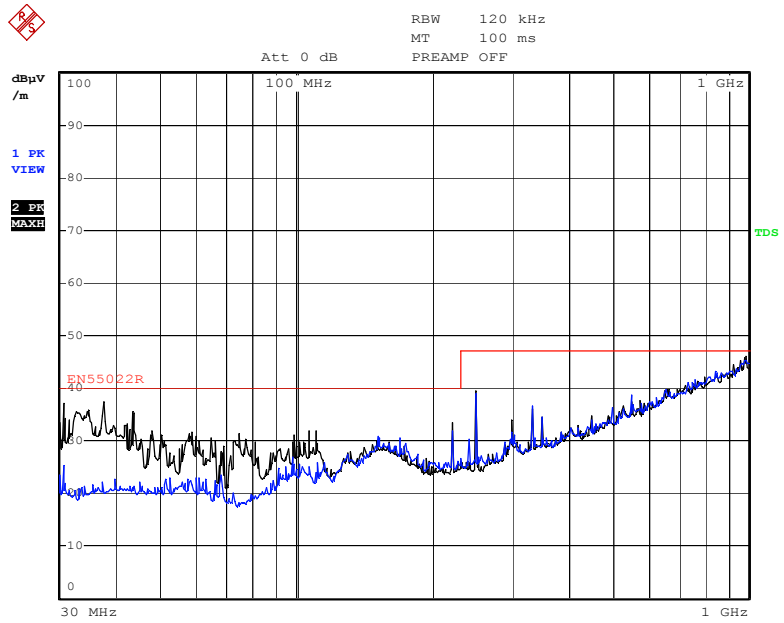
*Adapter model: NSA6EE-050060*




Date: 8.AUG.2013 17:49:34

*POE*

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**For Frequency above 1GHz**

| Freq. (MHz) | Emission (dBuV/m) PK | AV | HORIZ / VERT | Limits(dBuV/m) PK | AV | Margin(dB) PK | AV |
|---|---|---|---|---|---|---|---|
| 1.3172 | 33.46 | 26.89 | HORZ | 70 | 50 | -36.54 | -23.11 |
| 1.1004 | 32.31 | 25.83 | VERT | 70 | 50 | -37.69 | -24.17 |
| 1.5020 | 32.66 | 26.21 | HORZ | 70 | 50 | -37.34 | -23.79 |
| 1.4988 | 32.65 | 26.22 | VERT | 70 | 50 | -37.35 | -23.78 |
| 1.7056 | 33.10 | 26.58 | HORZ | 70 | 50 | -36.90 | -23.42 |
| 1.8576 | 33.90 | 27.51 | VERT | 70 | 50 | -36.10 | -22.49 |

**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.

## 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 | Tx&Rx 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 form 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<=600W.

## 2. 2. 4 Flicker and Voltage Fluctuation

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

### EUT Operating Mode

Normal

### Results

| Port | EUT Operating mode or operating mode no. | Result (Passed / Failed) |
|---|---|---|
| AC Input | Tx&Rx Power<75W | Passed |

### TX

| Test Item | Measurement Value | Limit | Result |
|---|---|---|---|
| $P_{st}$ | 0.07 | 1.0 | Passed |
| $P_{lt}$ | 0.07 | 0.65 | Passed |
| $T_{dt}$ (ms) | 0.00 | 500 | Passed |
| $d_{max}$ (%) | 0.03 | 4% | Passed |
| dc (%) | 0.02 | 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%. |
| $d_{max}$ (%) | 4% | $D_{max}$ means maximum relative voltage change. |
| dc (%) | 3% | Dc means relative steady-state voltage change. |

### 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 most unfavorable sequence of voltage changes under normal operating conditions.

b. 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**

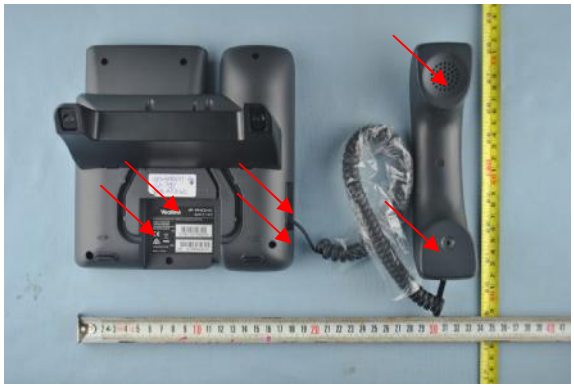
**Failure Criteria Observed** (No performance degradation was observed).

**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])

- Tx & Rx 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

### 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** (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.r.r | **Passed** |
| +0.5kV | 5kHz | n.r.r | n.r.r | **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

### 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.

| 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<br>+0.5kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | **Passed** |
| -1.0kV<br>+1.0kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | **Passed** |
| -2.0kV<br>+2.0kV | N/A | N/A | N/A | N/A | N/A | -- |
| - kV<br>+kV | N/A | N/A | N/A | N/A | N/A | -- |

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<br>+1.0kV | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | No reaction Recognized | **Passed** |

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**

**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)<br>No unintentional responses | *Operate as intended, for equipment type II the communication link may be lost, but shall be recoverable by user<br>*Lost function(s) shall be self-recoverable<br>*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

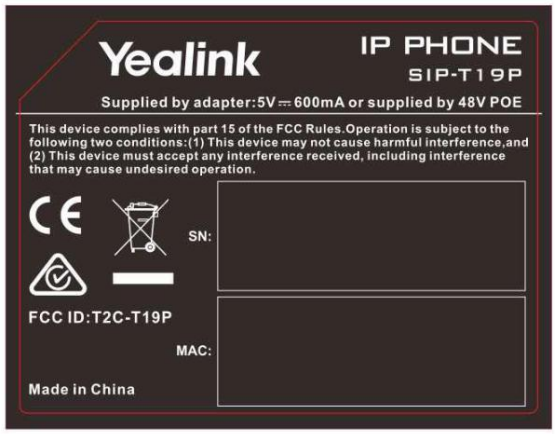
**Voltage Interruptions:**

| 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.




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**

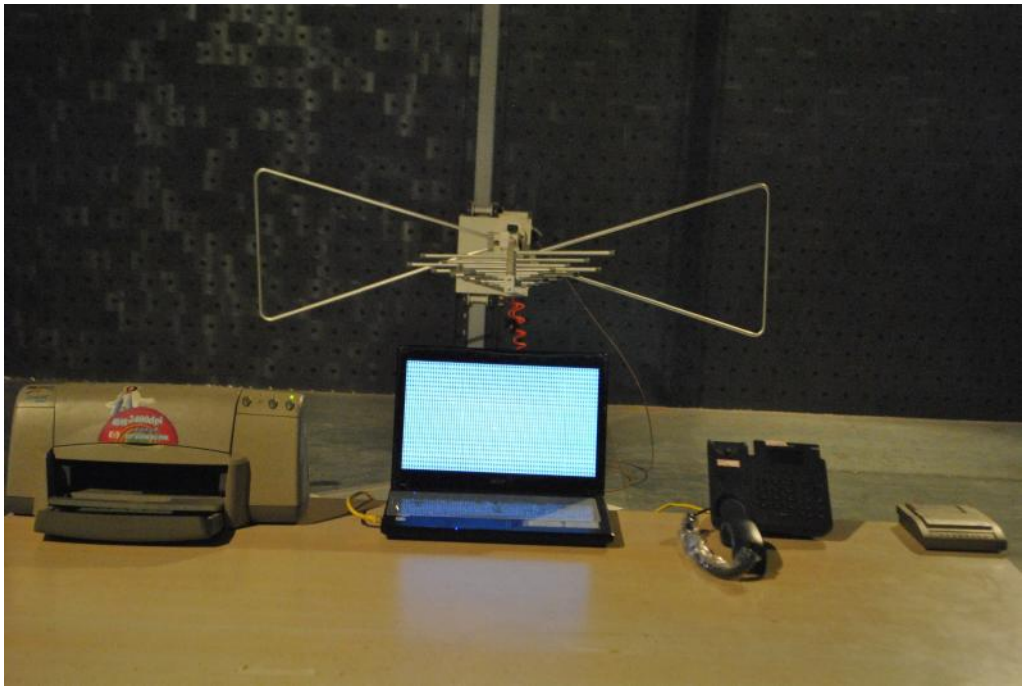
EUT Bottom View/Proposed CE Mark Location

# 4. Photographs – Test Setup

## 4. 1 Photograph – Emission Test Setup

Conducted emission test view

Radiated emission test view



# 5. Photographs – EUT

EUT top view

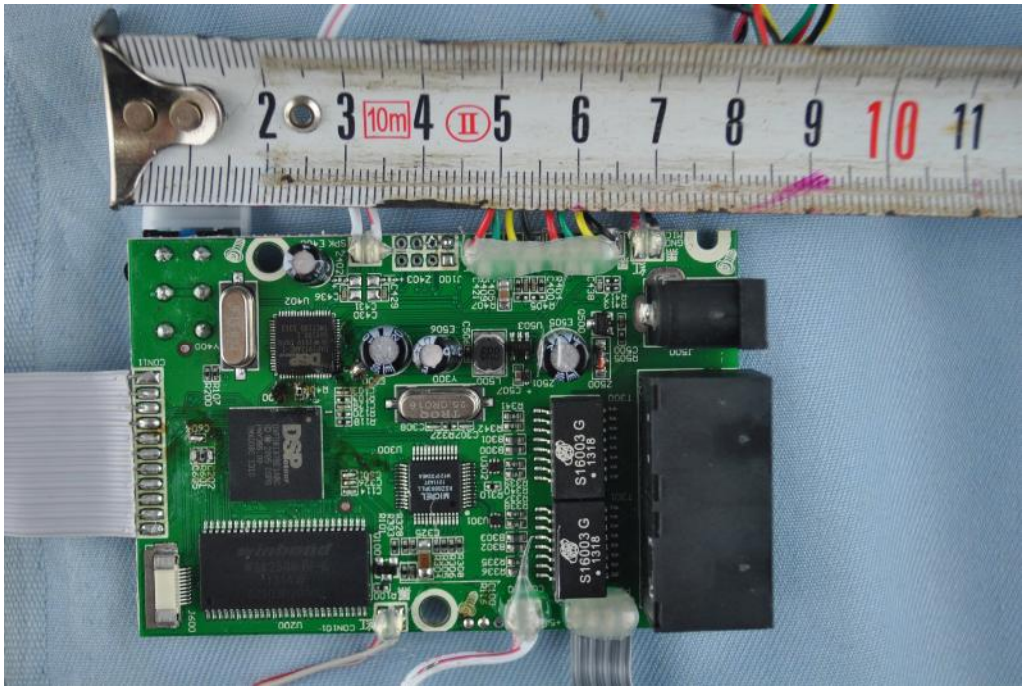
EUT bottom view

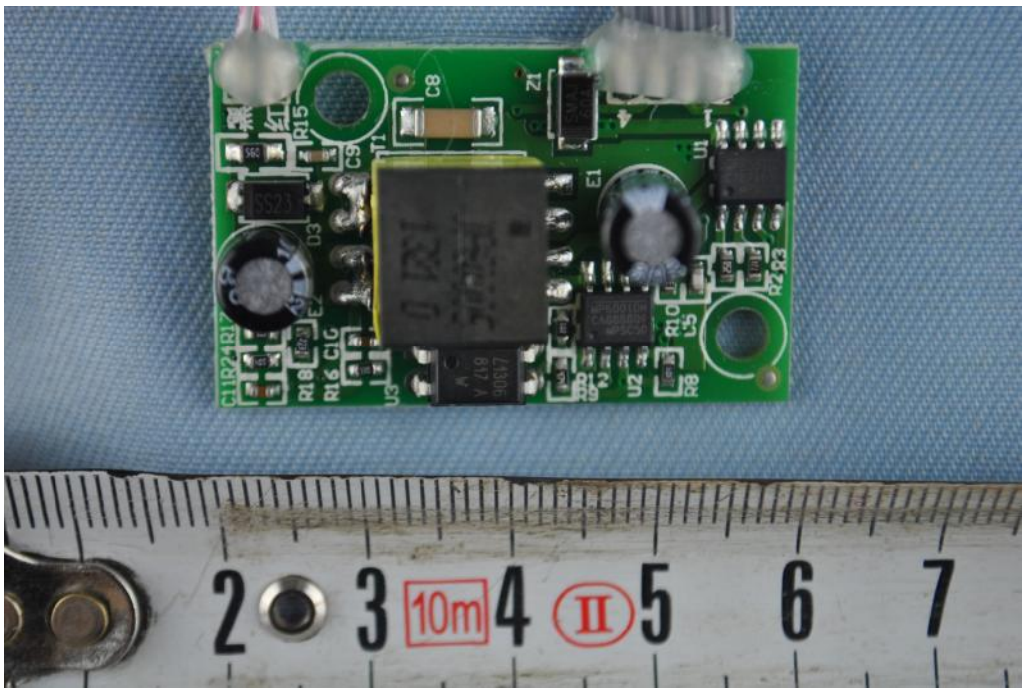

Yealink
IP PHONE


Yealink
IP PHONE

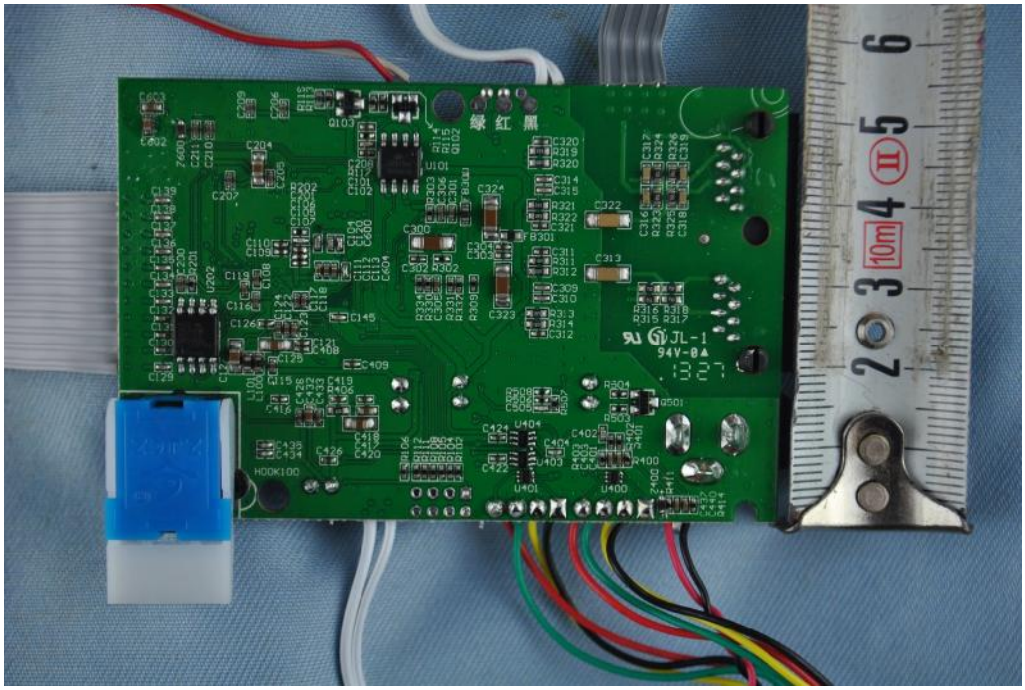
EUT inside whole view

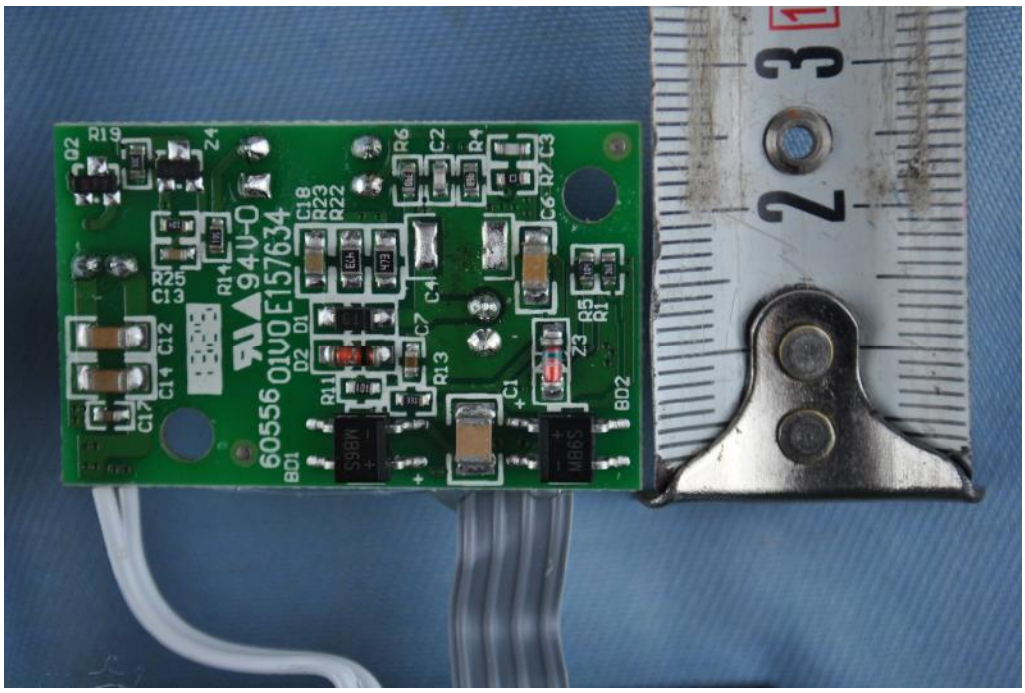
Main & RF board component side





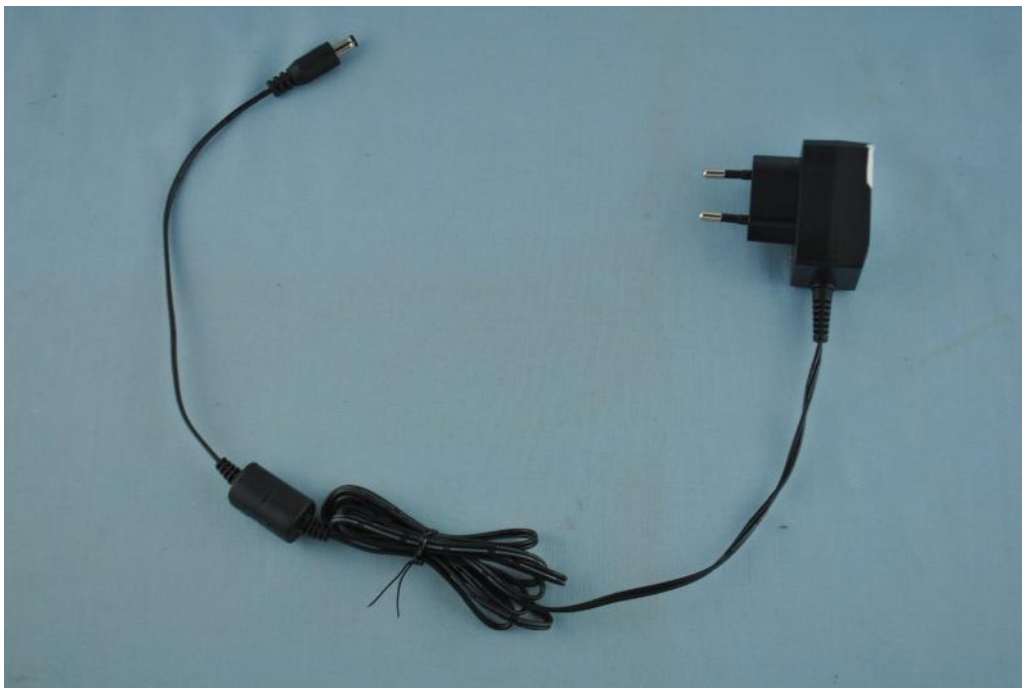
Main & RF board solder side






Adapter top view


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/Bust Generator | SCHAFFNER | MODULA 6000 | 34354 | June 01, 2014 |
| Signal Generator | SCHAFFNER | NSG 2070 | 1086 | June 01, 2014 |
| CDN | SCHAFFNER | M016 | 20812 | June 01, 2014 |