

# EMC TEST REPORT

Test item : LED LCD TV monitor  
Model No. : 47LS4500-UD  
Order No. : 1206-00918  
Date of receipt : 2012-06-19  
Test duration : 2012-06-22 ~ 2012-06-26  
Use of report : FCC CoC Marking  
Date of Issue : 2012-06-27

Applicant : LG Electronics Inc.

19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

Test laboratory : Digital EMC Co., Ltd.

683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

Test specification : ANSI C 63.4:2003  
FCC Part 15 Subpart B  
(Type of Device : Class B Personal Computers  
and Peripherals (JBP))

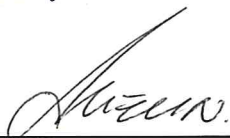
Test environment : Temperature : 21 °C,  
Humidity : 40 % R.H.

Test result : ☒ Comply ☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and  
the use of this test report is inhibited other than its purpose.

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Tested by:



Assistant Manager  
D.H.EUN

Reviewed by:



Manager  
M.J.SONG

**PRESIDENT OF DIGITAL EMC CO., LTD.**

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## 1. General Remarks

This report contains the result of tests performed by:

**DIGITAL EMC CO., LTD.**

Address : 683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

<http://www.digitalemccom>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

## 2. Test Laboratory

Digital EMC Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

| Certificate   | Nation  | Agency | Code                                      | Mark                             |
|---------------|---------|--------|-------------------------------------------|----------------------------------|
| Accreditation | Korea   | KOLAS  | 393                                       | ISO/IEC 17025                    |
| Site Filing   | USA     | FCC    | 101842<br>678747                          | Test Facility list &<br>NSA Data |
|               | Canada  | IC     | 5740A-1<br>5740A-2                        | Test Facility list &<br>NSA Data |
|               | Japan   | VCCI   | C-1427<br>R-1364, R-3385<br>T-1442, G-338 | Test Facility list &<br>NSA Data |
| Certification | Korea   | KC     | KR0034                                    | Test Facility list &<br>NSA Data |
|               | Germany | TUV    | ROK1124C                                  | ISO/IEC 17025                    |

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

### 3. General Information of EUT

|                         |                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------|
| Model No.               | 47LS4500-UD                                                                                          |
| EUT Type                | LED LCD TV monitor                                                                                   |
| Serial No               | N/A                                                                                                  |
| FCC ID                  | BEJ47LS4500UD                                                                                        |
| Type of Sample Tested   | Pre-Production                                                                                       |
| High Frequency          | 800 MHz                                                                                              |
| Rating                  | AC100-240, ~ 50/60Hz                                                                                 |
| Supplied Power for Test | AC120V, 60Hz                                                                                         |
| Applicant               | LG Electronics Inc.<br>19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do,<br>451-713, Korea |
| Manufacturer            | LG Electronics Inc.<br>19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do,<br>451-713, Korea |

#### Related Submittal(s) / Grant(s)

Original submittal only.

| Resolution  | Horizontal Frequency (KHz) | Vertical Frequency (Hz) |
|-------------|----------------------------|-------------------------|
| 640 x 350   | 31.468                     | 70.09                   |
| 720 x 400   | 31.469                     | 70.08                   |
| 640 x 480   | 31.469                     | 59.94                   |
| 800 x 600   | 37.879                     | 60.31                   |
| 1024 x 768  | 48.363                     | 60.00                   |
| 1360 x 768  | 47.712                     | 60.015                  |
| 1152 x 864  | 54.348                     | 60.053                  |
| 1280 x 1024 | 63.981                     | 60.02                   |
| 1920 x 1080 | 67.50                      | 60.00                   |

## 4. Test Summary

### 4.1 Applied standards and test results

| Test Items                                                | Applied Standards | Results |
|-----------------------------------------------------------|-------------------|---------|
| Conducted Disturbance                                     | ANSI C63.4:2003   | C       |
| Radiated Disturbance                                      | ANSI C63.4:2003   | C       |
| C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable |                   |         |

The data in this test report are traceable to the national or international standards.

### 4.2 Test environment and conditions

| Test Items            | Test date (MM-DD) | Temp (°C) | Humidity (% R.H.) |
|-----------------------|-------------------|-----------|-------------------|
| Conducted Disturbance | 06-22             | 21        | 40                |
| Radiated Disturbance  | 06-25             | 21        | 40                |
|                       | 06-26             | 21        | 40                |

### 4.3 Test result Summary

#### (1) Conducted Emission (HDMI MODE)

| Frequency [MHz] | Phase | Result [dB $\mu$ V] | Detector   | Limit [dB $\mu$ V] | Margin [dB] |
|-----------------|-------|---------------------|------------|--------------------|-------------|
| 1.761           | L1    | 44.9                | Quasi-Peak | 56.0               | 11.1        |

#### (2) Radiated Emission (USB MODE)

| Frequency [MHz] | Pol. | Result [dB( $\mu$ V/m)] | Detector   | Limit [dB( $\mu$ V/m)] | Margin [dB] |
|-----------------|------|-------------------------|------------|------------------------|-------------|
| 539.870         | V    | 36.4                    | Quasi-Peak | 46.0                   | 9.6         |

## 5. Test Set-up and operation mode

### 5.1 Principle of Configuration Selection

**Emission** : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 5.2 Test Operation Mode

- HDMI MODE – Resolution : 1920 X 1080 Resolution (Worst Case)
- USB MODE

### 5.3 Support Equipment Used

| Unit          | Model No.  | Serial No.     | Manufacturer                 | CABLE         |            |                          | Backshell | FCC ID |
|---------------|------------|----------------|------------------------------|---------------|------------|--------------------------|-----------|--------|
|               |            |                |                              | Connect type  | Length (m) | shield                   |           |        |
| PC            | VOSTRO430  | 9K77SBX        | DELL                         | POWER         | 1.8        | Non-Shield               | Plastic   | DOC    |
|               |            |                |                              | HDMI          | 1.8        | Shield                   |           |        |
|               |            |                |                              | USB           | 1.8        | Shield                   |           |        |
|               |            |                |                              | USB           | 1.8        | Shield                   |           |        |
| KEYBOARD      | SKG-2000UB | TAKB401425B    | MONITEREY INTERNATIONAL CORP | USB           | 1.8        | Shield                   | Plastic   | DOC    |
| MOUSE         | M-UAE96    | LZ751AP01L3    | LOGITECH Inc.                | USB           | 1.8        | Shield                   | Plastic   | DOC    |
| CD/DVD PLAYER | DVP-NS92V  | 2000407        | SONY EMCS                    | POWER AV      | 1.8<br>1.6 | Non-Shield<br>Non-Shield | Plastic   | VER    |
| USB MEMORY    | USM4GP     | 11725AGGNN     | SONY Corporation             | USB           | -          | -                        | -         | DOC    |
| SOUND BAR     | N32020     | N/A            | LG                           | POWER OPTICAL | 1.8<br>1.5 | Non-Shield<br>Shield     | Plastic   | DOC    |
| PRINTER       | SRP-770    | SRP77008060035 | BICSOLON                     | POWER USB     | 1.8<br>1.8 | Non-Shield<br>Non-Shield | Plastic   | DOC    |

(Configuration of Tested System)

## 6. Test Results : Emission

### 6.1 Conducted Disturbance

#### 6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2<sup>nd</sup> LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

#### 6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

| Frequency range<br>(MHz)                                                                                  | Limits dB(μV) |          |         |          |
|-----------------------------------------------------------------------------------------------------------|---------------|----------|---------|----------|
|                                                                                                           | Quasi-peak    |          | Average |          |
|                                                                                                           | Class A       | Class B  | Class A | Class B  |
| 0.15 to 0.50                                                                                              | 79            | 66 to 56 | 66      | 56 to 46 |
| 0.50 to 5                                                                                                 | 73            | 56       | 60      | 46       |
| 5 to 30                                                                                                   |               | 60       |         | 50       |
| Note 1 The lower limit shall apply at the transition frequencies.                                         |               |          |         |          |
| Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz. |               |          |         |          |

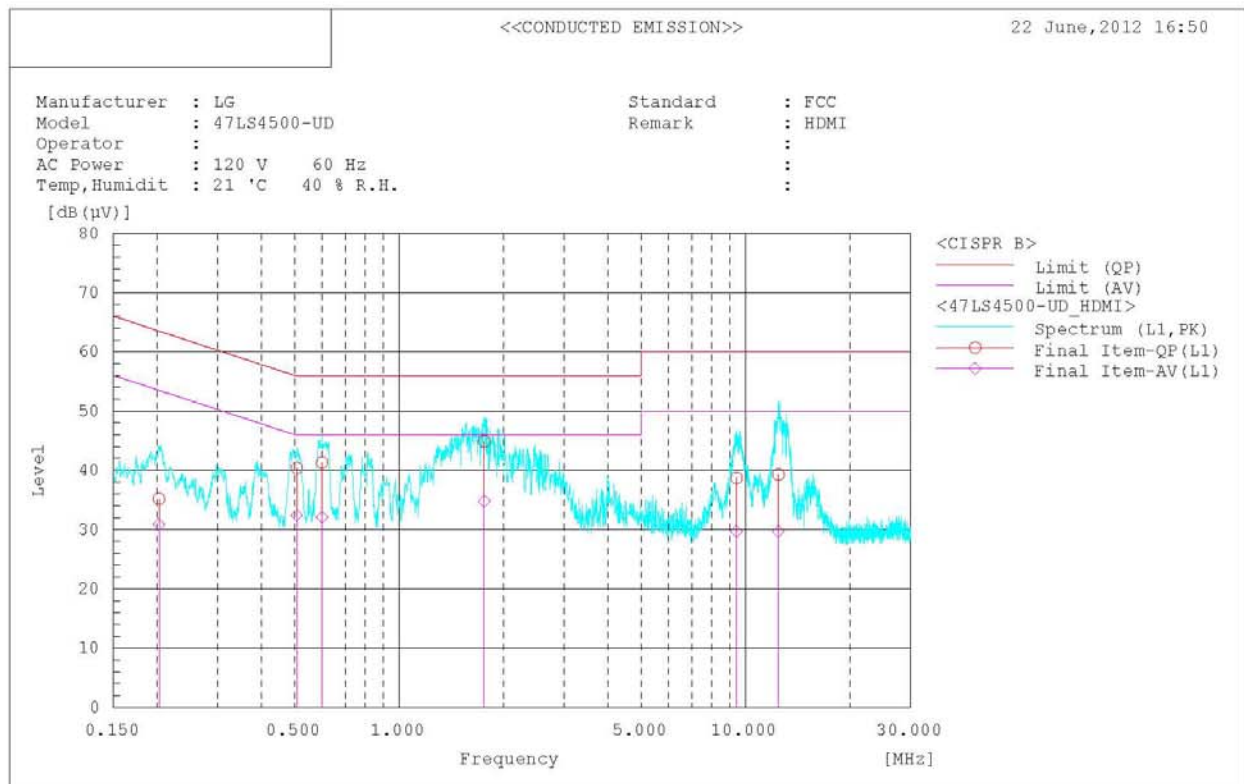
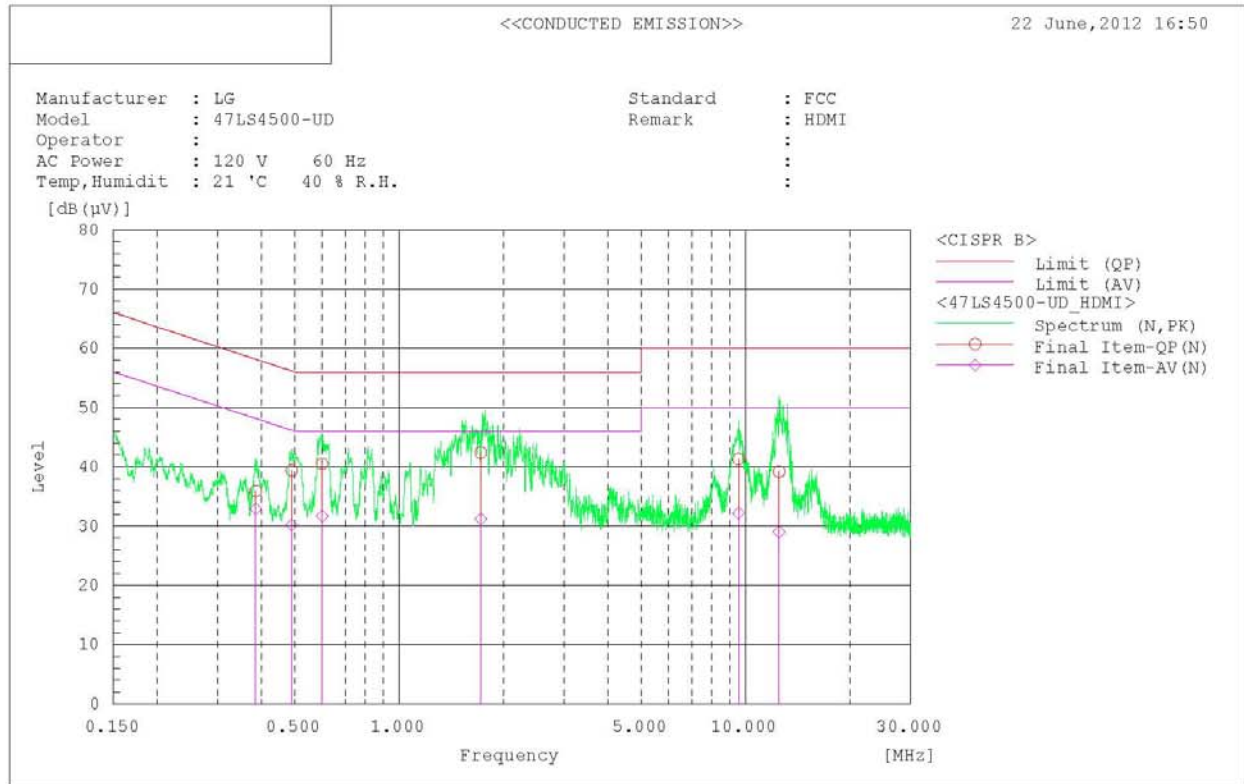
Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable Loss + Insertion Loss of LISN

3. Margin = Limit - Emission level

## Test Result

### < HDMI MODE >



<<CONDUCTED EMISSION>>

22 June, 2012 16:50

Standard : FCC  
Manufacturer : LG  
Model : 47LS4500-UD  
Operator :  
AC Power : 120 V 60 Hz  
Temp, Humidit : 21 °C 40 % R.H.  
Remark : HDMI  
:  
:  
:

Final Result

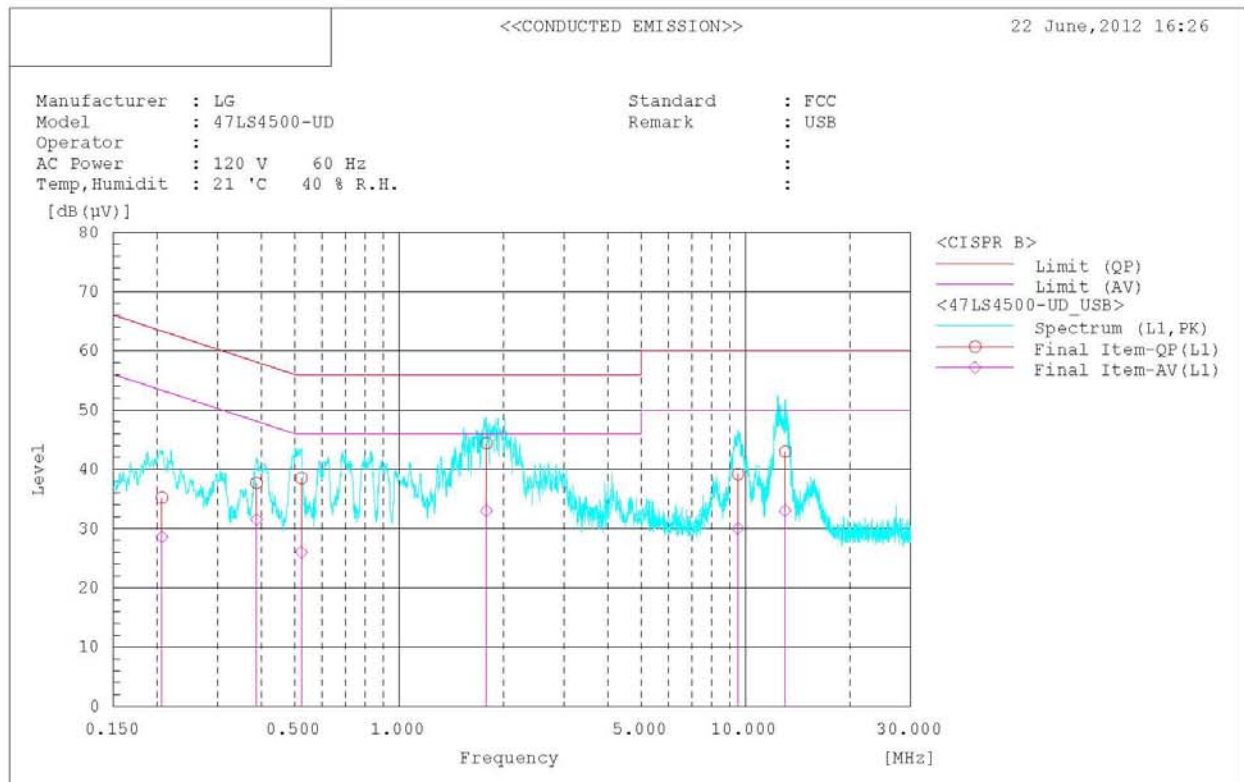
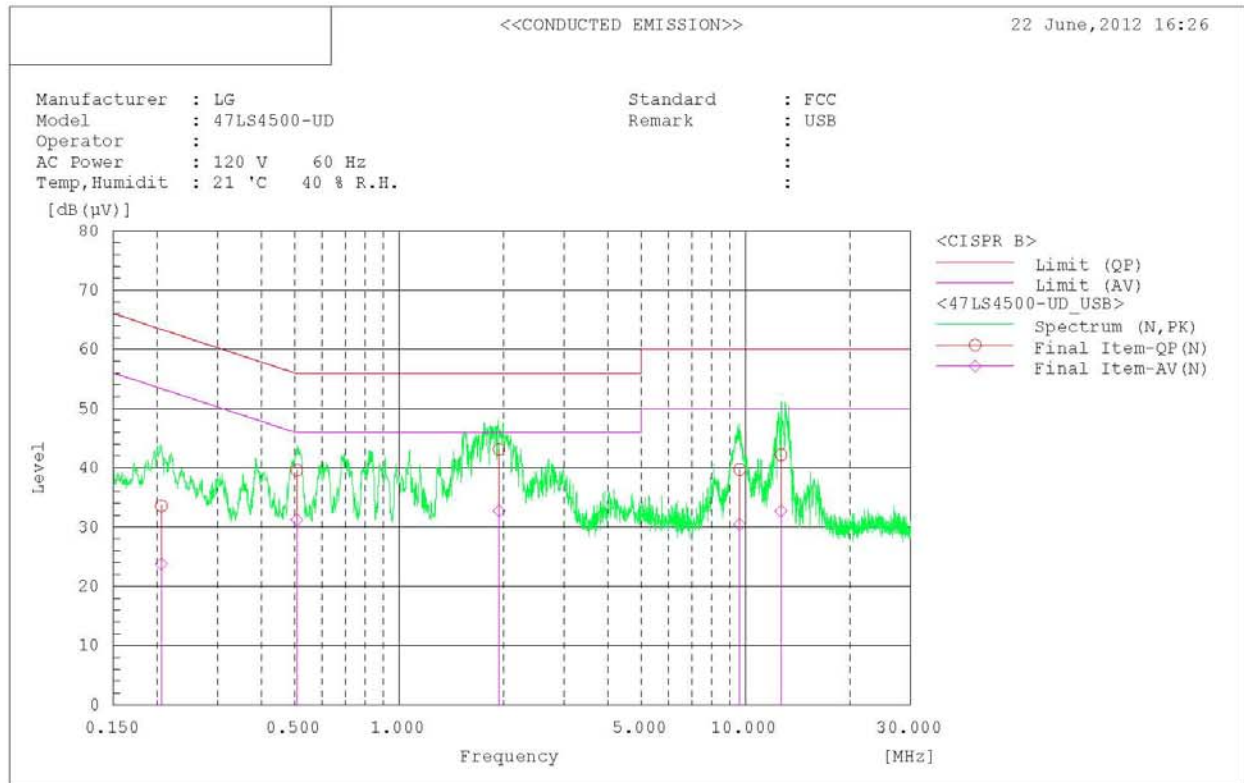
--- N Phase ---

| No. | Frequency | Reading<br>QP | Reading<br>AV | c.f  | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
|     | [MHz]     | [dB (μV)]     | [dB (μV)]     | [dB] | [dB (μV)]    | [dB (μV)]    | [dB (μV)]   | [dB (μV)]   | [dB]         | [dB]         |        |
| 1   | 0.386     | 25.8          | 22.8          | 10.1 | 35.9         | 32.9         | 58.1        | 48.1        | 22.2         | 15.2         |        |
| 2   | 0.490     | 29.2          | 20.0          | 10.2 | 39.4         | 30.2         | 56.2        | 46.2        | 16.8         | 16.0         |        |
| 3   | 0.600     | 30.4          | 21.6          | 10.1 | 40.5         | 31.7         | 56.0        | 46.0        | 15.5         | 14.3         |        |
| 4   | 1.722     | 32.2          | 21.0          | 10.2 | 42.4         | 31.2         | 56.0        | 46.0        | 13.6         | 14.8         |        |
| 5   | 9.547     | 30.9          | 21.8          | 10.4 | 41.3         | 32.2         | 60.0        | 50.0        | 18.7         | 17.8         |        |
| 6   | 12.500    | 28.8          | 18.6          | 10.4 | 39.2         | 29.0         | 60.0        | 50.0        | 20.8         | 21.0         |        |

--- L1 Phase ---

| No. | Frequency | Reading<br>QP | Reading<br>AV | c.f  | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
|     | [MHz]     | [dB (μV)]     | [dB (μV)]     | [dB] | [dB (μV)]    | [dB (μV)]    | [dB (μV)]   | [dB (μV)]   | [dB]         | [dB]         |        |
| 1   | 0.203     | 25.3          | 21.0          | 9.9  | 35.2         | 30.9         | 63.5        | 53.5        | 28.3         | 22.6         |        |
| 2   | 0.507     | 30.4          | 22.4          | 10.0 | 40.4         | 32.4         | 56.0        | 46.0        | 15.6         | 13.6         |        |
| 3   | 0.599     | 31.3          | 22.1          | 10.0 | 41.3         | 32.1         | 56.0        | 46.0        | 14.7         | 13.9         |        |
| 4   | 1.761     | 34.9          | 24.8          | 10.0 | 44.9         | 34.8         | 56.0        | 46.0        | 11.1         | 11.2         |        |
| 5   | 9.416     | 28.5          | 19.5          | 10.2 | 38.7         | 29.7         | 60.0        | 50.0        | 21.3         | 20.3         |        |
| 6   | 12.435    | 29.1          | 19.5          | 10.2 | 39.3         | 29.7         | 60.0        | 50.0        | 20.7         | 20.3         |        |

< USB MODE >



<<CONDUCTED EMISSION>>

22 June, 2012 16:26

|               |   |                 |
|---------------|---|-----------------|
| Standard      | : | FCC             |
| Manufacturer  | : | LG              |
| Model         | : | 47LS4500-UD     |
| Operator      | : |                 |
| AC Power      | : | 120 V 60 Hz     |
| Temp, Humidit | : | 21 °C 40 % R.H. |
| Remark        | : | USB             |
|               | : |                 |
|               | : |                 |

Final Result

--- N Phase ---

| No. | Frequency | Reading<br>QP | Reading<br>AV | c.f  | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
|     | [MHz]     | [dB(μV)]      | [dB(μV)]      | [dB] | [dB(μV)]     | [dB(μV)]     | [dB(μV)]    | [dB(μV)]    | [dB]         | [dB]         |        |
| 1   | 0.206     | 23.4          | 13.6          | 10.2 | 33.6         | 23.8         | 63.4        | 53.4        | 29.8         | 29.6         |        |
| 2   | 0.507     | 29.4          | 21.0          | 10.2 | 39.6         | 31.2         | 56.0        | 46.0        | 16.4         | 14.8         |        |
| 3   | 1.942     | 32.9          | 22.5          | 10.2 | 43.1         | 32.7         | 56.0        | 46.0        | 12.9         | 13.3         |        |
| 4   | 9.615     | 29.3          | 20.0          | 10.4 | 39.7         | 30.4         | 60.0        | 50.0        | 20.3         | 19.6         |        |
| 5   | 12.661    | 31.8          | 22.3          | 10.4 | 42.2         | 32.7         | 60.0        | 50.0        | 17.8         | 17.3         |        |

--- L1 Phase ---

| No. | Frequency | Reading<br>QP | Reading<br>AV | c.f  | Result<br>QP | Result<br>AV | Limit<br>QP | Limit<br>AV | Margin<br>QP | Margin<br>AV | Remark |
|-----|-----------|---------------|---------------|------|--------------|--------------|-------------|-------------|--------------|--------------|--------|
|     | [MHz]     | [dB(μV)]      | [dB(μV)]      | [dB] | [dB(μV)]     | [dB(μV)]     | [dB(μV)]    | [dB(μV)]    | [dB]         | [dB]         |        |
| 1   | 0.207     | 25.3          | 18.7          | 9.9  | 35.2         | 28.6         | 63.3        | 53.3        | 28.1         | 24.7         |        |
| 2   | 0.388     | 27.7          | 21.5          | 10.0 | 37.7         | 31.5         | 58.1        | 48.1        | 20.4         | 16.6         |        |
| 3   | 0.523     | 28.5          | 16.0          | 10.0 | 38.5         | 26.0         | 56.0        | 46.0        | 17.5         | 20.0         |        |
| 4   | 1.786     | 34.4          | 23.0          | 10.0 | 44.4         | 33.0         | 56.0        | 46.0        | 11.6         | 13.0         |        |
| 5   | 9.515     | 29.0          | 19.8          | 10.2 | 39.2         | 30.0         | 60.0        | 50.0        | 20.8         | 20.0         |        |
| 6   | 13.023    | 32.8          | 22.8          | 10.2 | 43.0         | 33.0         | 60.0        | 50.0        | 17.0         | 17.0         |        |

## 6.2 Radiated Disturbance

### 6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Also Peak and Average detector with 1 MHz RBW were used for above 1 GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

## 6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                                      |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Below 108                                                                                        | 1 000                                                                           |
| 108 – 500                                                                                        | 2 000                                                                           |
| 500 – 1 000                                                                                      | 5 000                                                                           |
| Above 1 000                                                                                      | 5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower |

### (1) Limit for Radiated Emission below 1 000MHz

| Frequency range (MHz) | Class A Equipment (10m distance) | Class B Equipment (3m distance) |
|-----------------------|----------------------------------|---------------------------------|
|                       | Quasi-peak (dBμV/m)              | Quasi-peak (dBμV/m)             |
| 30 to 88              | 39.1                             | 40                              |
| 88 to 216             | 43.5                             | 43.5                            |
| 216 to 960            | 46.4                             | 46                              |
| 960 to 1 000          | 49.5                             | 54                              |

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

| Frequency range (MHz) | Class A Equipment (10 m distance) | Class B Equipment (10 m distance) |
|-----------------------|-----------------------------------|-----------------------------------|
|                       | Quasi-peak (dBμV/m)               | Quasi-peak (dBμV/m)               |
| 30 to 230             | 40                                | 30                                |
| 230 to 1 000          | 47                                | 37                                |

### (2) Limits for Radiated Emission above 1 000MHz at a measuring distance of 3 m

| Frequency (GHz) | Class A Equipment |                  | Class B Equipment |                  |
|-----------------|-------------------|------------------|-------------------|------------------|
|                 | Peak (dBμV/m)     | Average (dBμV/m) | Peak (dBμV/m)     | Average (dBμV/m) |
| 1 to 40         | 80                | 60               | 74                | 54               |

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable loss - Amp gain + Antenna Factor

3. Margin = Limit - Emission level

## Test Result

< HDMI MODE\_30 MHz ~ 1 GHz >

### RADIATED EMISSION

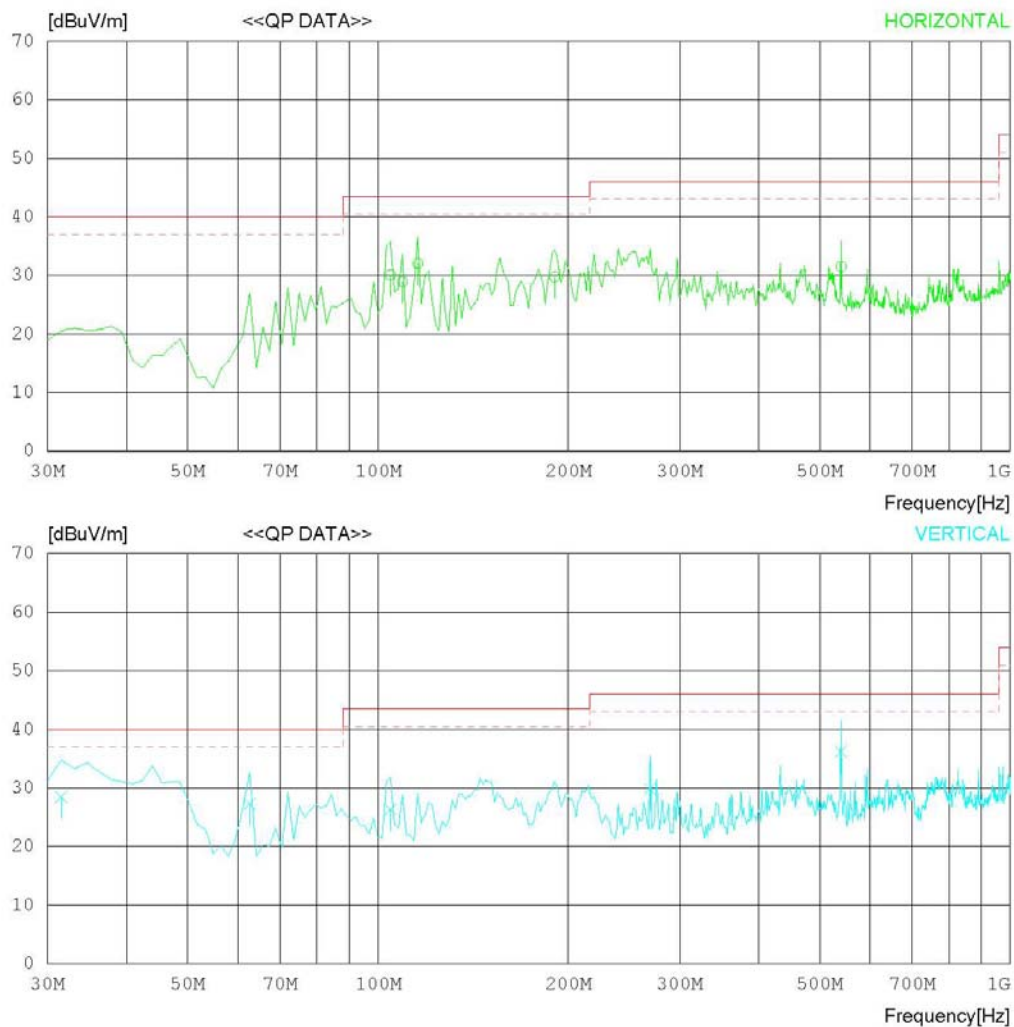
Date : 2012-06-26

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : HDMI

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 °C 40 % R.H.  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)  
MARGIN: 3 dB



## RADIATED EMISSION

Date : 2012-06-26

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : HDMI

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 °C 40 % R.H.  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)  
MARGIN: 3 dB

| No.                    | FREQ<br>[MHz] | READING<br>QP<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 104.616       | 40.2                    | 11.2                  | 1.5          | 22.8         | 30.1               | 43.5              | 13.4           | 232             | 278            |
| 2                      | 109.279       | 38.6                    | 11.6                  | 1.5          | 22.8         | 28.9               | 43.5              | 14.6           | 334             | 248            |
| 3                      | 115.497       | 41.2                    | 12.2                  | 1.5          | 22.9         | 32.0               | 43.5              | 11.5           | 308             | 252            |
| 4                      | 190.112       | 41.6                    | 9.2                   | 2.2          | 23.3         | 29.7               | 43.5              | 13.8           | 231             | 1              |
| 5                      | 539.870       | 34.6                    | 17.9                  | 3.8          | 24.8         | 31.5               | 46.0              | 14.5           | 354             | 314            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 6                      | 31.554        | 33.2                    | 17.6                  | 0.9          | 23.2         | 28.5               | 40.0              | 11.5           | 121             | 35             |
| 7                      | 62.644        | 42.1                    | 6.4                   | 1.5          | 22.7         | 27.3               | 40.0              | 12.7           | 133             | 148            |
| 8                      | 104.616       | 36.5                    | 11.2                  | 1.5          | 22.8         | 26.4               | 43.5              | 17.1           | 106             | 338            |
| 9                      | 269.391       | 38.3                    | 12.6                  | 2.7          | 23.7         | 29.9               | 46.0              | 16.1           | 187             | 358            |
| 10                     | 539.870       | 39.3                    | 17.9                  | 3.8          | 24.8         | 36.2               | 46.0              | 9.8            | 125             | 1              |

< HDMI MODE \_ (1 ~ 6) GHz \_ Peak >

# RADIATED EMISSION

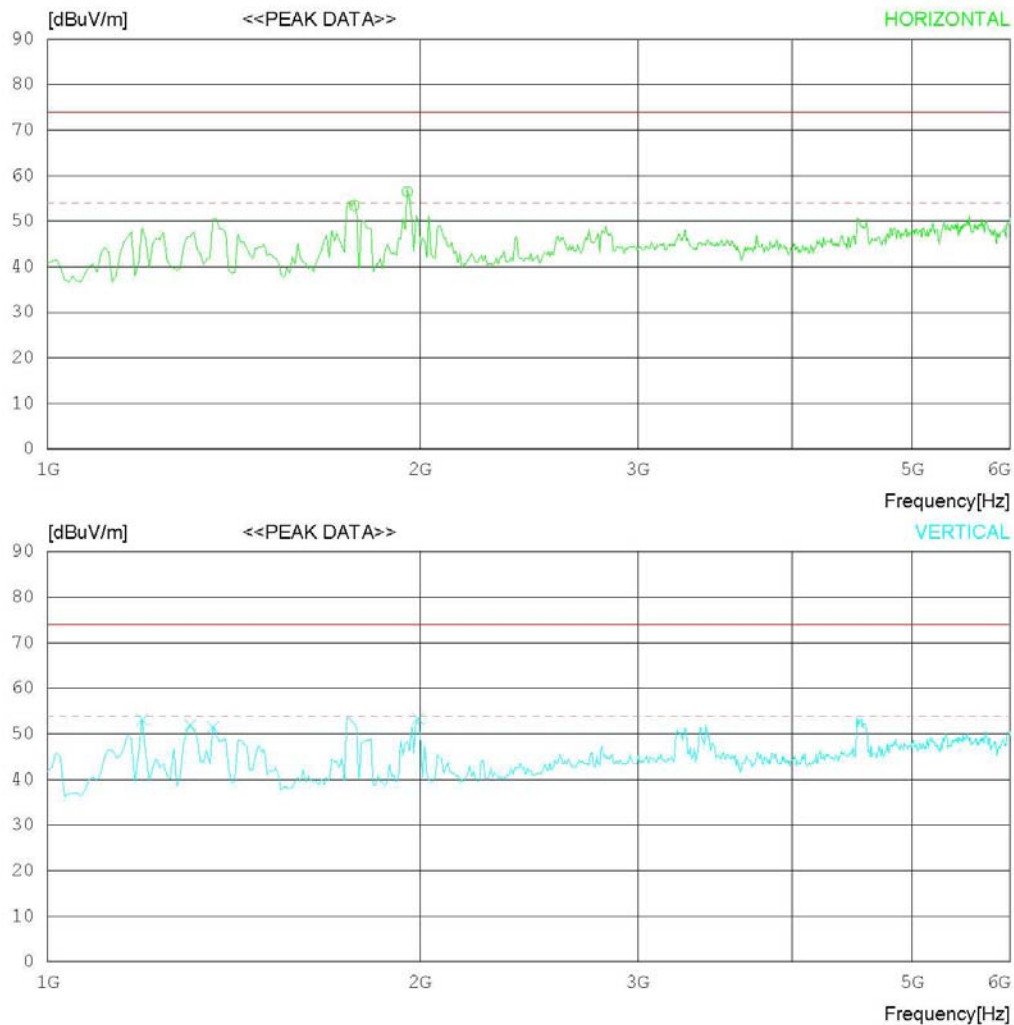
Date : 2012-06-25

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : HDMI

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 'C 40 % R.H  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)  
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



## RADIATED EMISSION

Date : 2012-06-25

|                |               |               |                  |
|----------------|---------------|---------------|------------------|
| Model Name     | : 47LS4500-UD | Reference No. | :                |
| Model No.      | :             | Power Supply  | : 120 V 60 Hz    |
| Serial No.     | :             | Temp/Humi     | : 21 'C 40 % R.H |
| Test Condition | : HDMI        | Operator      | :                |
| Memo           | :             |               |                  |

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)  
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                           |                       |              |              |                    |                   |                |                 |                |
| 1                      | 1769.230      | 64.4                      | 25.2                  | 5.6          | 41.7         | 53.5               | 74.0              | 20.5           | 100             | 243            |
| 2                      | 1953.525      | 66.6                      | 25.2                  | 6.5          | 41.8         | 56.5               | 74.0              | 17.5           | 100             | 219            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 3                      | 1192.308      | 65.6                      | 24.2                  | 5.3          | 41.9         | 53.2               | 74.0              | 20.8           | 100             | 1              |
| 4                      | 1304.487      | 63.9                      | 24.5                  | 5.4          | 41.8         | 52.0               | 74.0              | 22             | 100             | 1              |
| 5                      | 1360.577      | 63.1                      | 24.7                  | 5.5          | 41.8         | 51.5               | 74.0              | 22.5           | 100             | 1              |
| 6                      | 1993.589      | 62.9                      | 25.2                  | 7.0          | 41.7         | 53.4               | 74.0              | 20.6           | 100             | 50             |

< HDMI MODE \_ (1 ~ 6) GHz \_ Average >

# RADIATED EMISSION

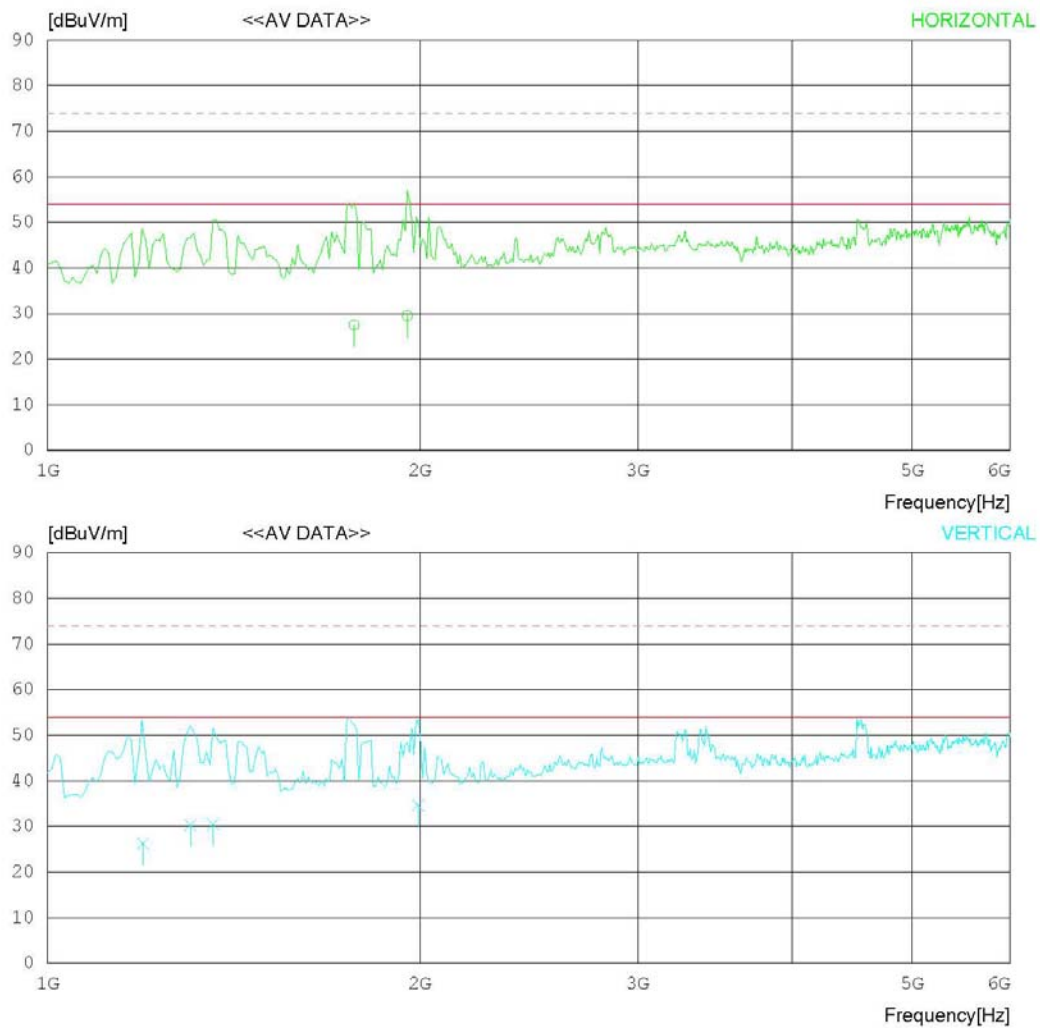
Date : 2012-06-25

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : HDMI

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 'C 40 % R.H  
Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)  
FCC Part15 Subpart B Class B (3m) - 18G(Peak)



## RADIATED EMISSION

Date : 2012-06-25

|                          |                            |
|--------------------------|----------------------------|
| Model Name : 47LS4500-UD | Reference No. :            |
| Model No. :              | Power Supply : 120 V 60 Hz |
| Serial No. :             | Temp/Humi : 21 'C 40 % R.H |
| Test Condition : HDMI    | Operator :                 |

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)  
FCC Part15 Subpart B Class B (3m) - 18G(Peak)

| No.                    | FREQ<br>[MHz] | READING<br>AV<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 1769.230      | 37.6                    | 25.2                  | 6.5          | 41.8         | 27.5               | 54.0              | 26.5           | 100             | 243            |
| 2                      | 1953.525      | 39.1                    | 25.2                  | 6.9          | 41.7         | 29.5               | 54.0              | 24.5           | 100             | 219            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 3                      | 1194.639      | 38.7                    | 24.2                  | 5.3          | 41.9         | 26.3               | 54.0              | 27.7           | 100             | 1              |
| 4                      | 1304.487      | 42.1                    | 24.5                  | 5.5          | 41.8         | 30.3               | 54.0              | 23.7           | 100             | 1              |
| 5                      | 1360.577      | 41.9                    | 24.7                  | 5.6          | 41.7         | 30.5               | 54.0              | 23.5           | 100             | 1              |
| 6                      | 1993.589      | 44.1                    | 25.2                  | 7.0          | 41.7         | 34.6               | 54.0              | 19.4           | 100             | 50             |

< USB MODE\_30 MHz ~ 1 GHz >

## RADIATED EMISSION

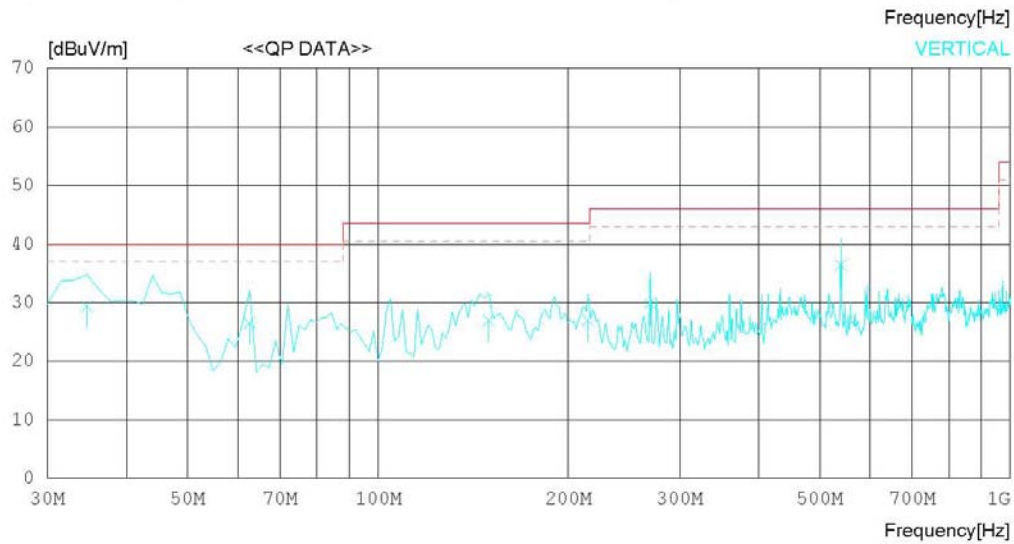
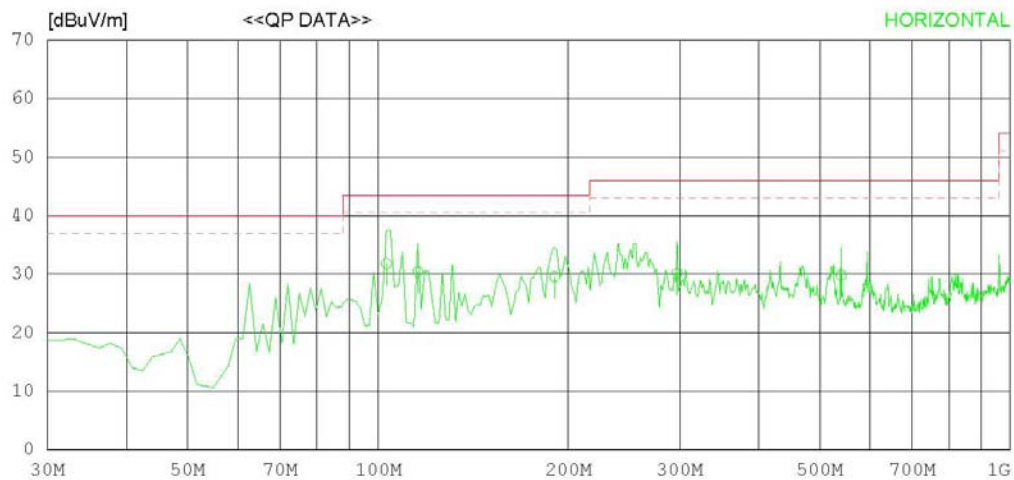
Date : 2012-06-26

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : USB

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 °C 40 % R.H.  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)  
MARGIN: 3 dB



## RADIATED EMISSION

Date : 2012-06-26

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : USB

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 °C 40 % R.H.  
Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m)  
MARGIN: 3 dB

| No.                    | FREQ<br>[MHz] | READING<br>QP<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 103.061       | 42.1                    | 11.1                  | 1.4          | 22.8         | 31.8               | 43.5              | 11.7           | 203             | 273            |
| 2                      | 115.497       | 39.6                    | 12.2                  | 1.5          | 22.9         | 30.4               | 43.5              | 13.1           | 323             | 358            |
| 3                      | 190.112       | 41.5                    | 9.2                   | 2.2          | 23.3         | 29.6               | 43.5              | 13.9           | 232             | 1              |
| 4                      | 297.372       | 38.2                    | 13.1                  | 2.8          | 23.9         | 30.2               | 46.0              | 15.8           | 124             | 77             |
| 5                      | 539.870       | 32.9                    | 17.9                  | 3.8          | 24.8         | 29.8               | 46.0              | 16.2           | 326             | 329            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 6                      | 34.663        | 35.2                    | 16.2                  | 1.1          | 23.1         | 29.4               | 40.0              | 10.6           | 112             | 1              |
| 7                      | 62.644        | 41.3                    | 6.4                   | 1.5          | 22.7         | 26.5               | 40.0              | 13.5           | 189             | 358            |
| 8                      | 149.696       | 37.8                    | 10.6                  | 1.7          | 23.1         | 27.0               | 43.5              | 16.5           | 132             | 1              |
| 9                      | 214.984       | 37.9                    | 10.1                  | 2.4          | 23.4         | 27.0               | 43.5              | 16.5           | 124             | 70             |
| 10                     | 269.391       | 38.3                    | 12.6                  | 2.7          | 23.7         | 29.9               | 46.0              | 16.1           | 203             | 358            |
| 11                     | 539.870       | 39.5                    | 17.9                  | 3.8          | 24.8         | 36.4               | 46.0              | 9.6            | 123             | 1              |

< USB MODE \_ (1 ~ 6) GHz \_ Peak >

## RADIATED EMISSION

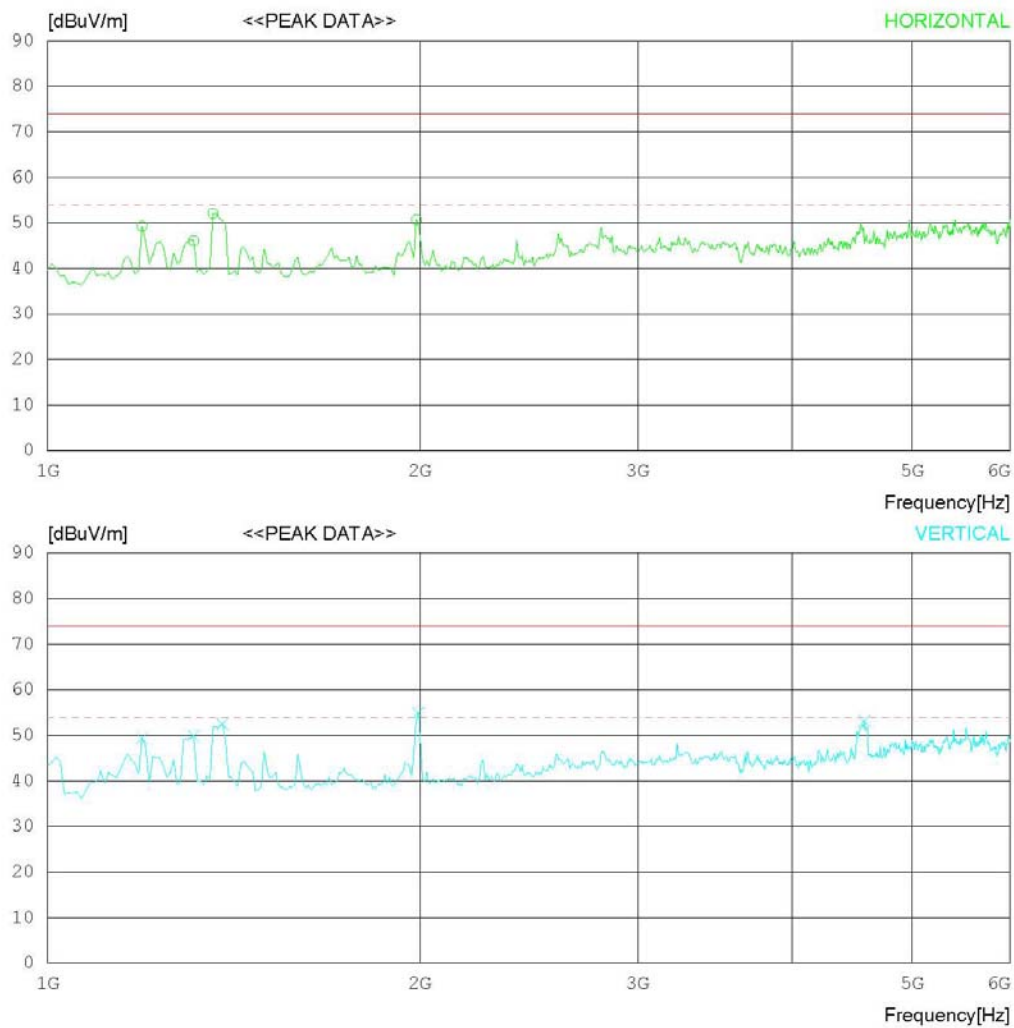
Date : 2012-06-25

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : USB

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 'C 40 % R.H  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)  
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



## RADIATED EMISSION

Date : 2012-06-25

|                          |                            |
|--------------------------|----------------------------|
| Model Name : 47LS4500-UD | Reference No. :            |
| Model No. :              | Power Supply : 120 V 60 Hz |
| Serial No. :             | Temp/Humi : 21 °C 40 % R.H |
| Test Condition : USB     | Operator :                 |

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Peak)  
FCC Part15 Subpart B Class B (3m) - 18G(Avg)

| No.                    | FREQ<br>[MHz] | READING<br>PEAK<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|---------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                           |                       |              |              |                    |                   |                |                 |                |
| 1                      | 1192.308      | 61.6                      | 24.2                  | 5.3          | 41.8         | 49.3               | 74.0              | 24.7           | 100             | 1              |
| 2                      | 1312.500      | 57.9                      | 24.6                  | 5.5          | 41.9         | 46.1               | 74.0              | 27.9           | 100             | 1              |
| 3                      | 1360.577      | 63.7                      | 24.7                  | 5.6          | 41.9         | 52.1               | 74.0              | 21.9           | 100             | 1              |
| 4                      | 1985.577      | 60.5                      | 25.2                  | 7.0          | 42.0         | 50.7               | 74.0              | 23.3           | 100             | 139            |
| ----- Vertical -----   |               |                           |                       |              |              |                    |                   |                |                 |                |
| 5                      | 1192.308      | 61.7                      | 24.2                  | 5.3          | 41.9         | 49.3               | 74.0              | 24.7           | 100             | 49             |
| 6                      | 1312.500      | 61.6                      | 24.6                  | 5.5          | 41.8         | 49.9               | 74.0              | 24.1           | 100             | 172            |
| 7                      | 1384.615      | 63.7                      | 24.8                  | 5.7          | 41.7         | 52.5               | 74.0              | 21.5           | 100             | 358            |
| 8                      | 1993.589      | 64.4                      | 25.2                  | 7.0          | 41.7         | 54.9               | 74.0              | 19.1           | 100             | 358            |
| 9                      | 4573.741      | 53.4                      | 31.0                  | 10.7         | 42.0         | 53.1               | 74.0              | 20.9           | 100             | 226            |

< USB MODE \_ (1 ~ 6) GHz \_ Average >

## RADIATED EMISSION

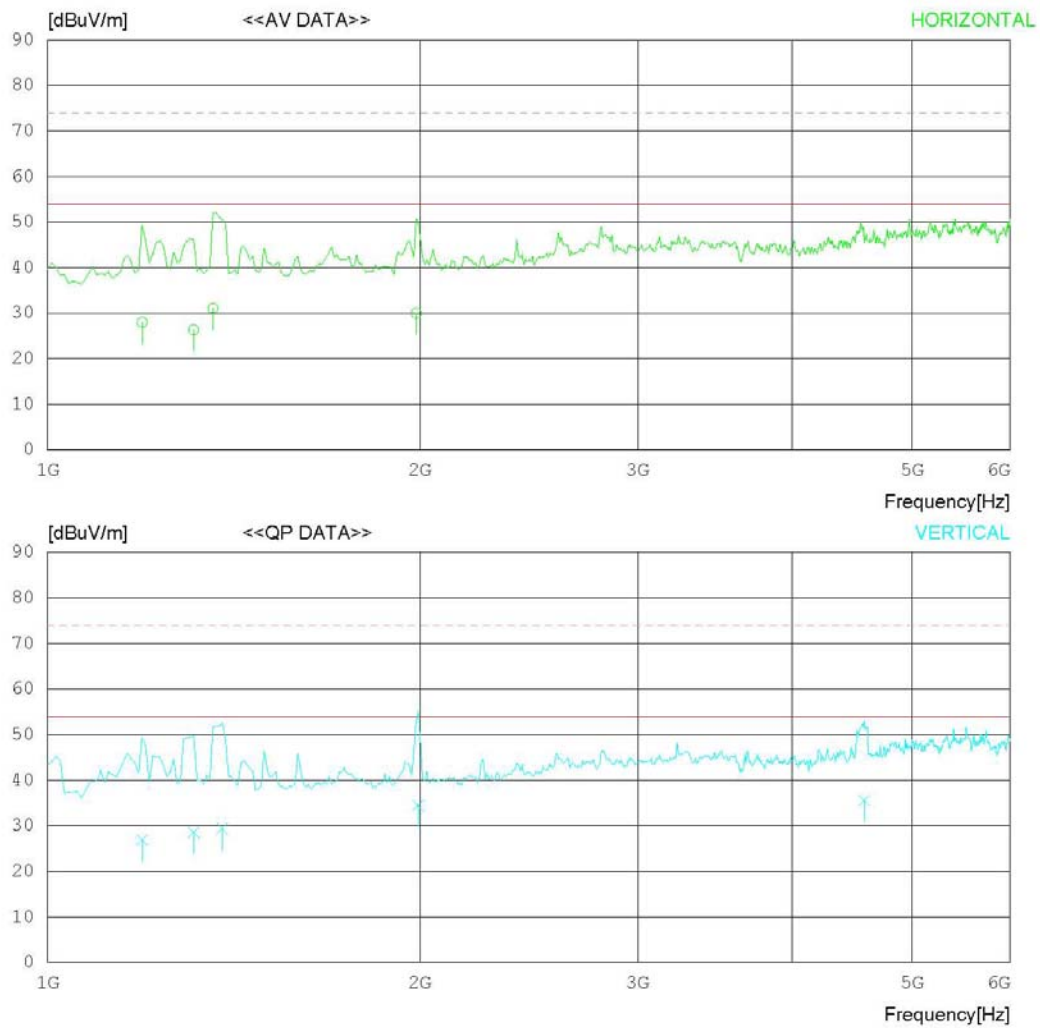
Date : 2012-06-25

Model Name : 47LS4500-UD  
Model No. :  
Serial No. :  
Test Condition : USB

Reference No. :  
Power Supply : 120 V 60 Hz  
Temp/Humi : 21 °C 40 % R.H  
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)  
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



## RADIATED EMISSION

Date : 2012-06-25

|                          |                            |
|--------------------------|----------------------------|
| Model Name : 47LS4500-UD | Reference No. :            |
| Model No. :              | Power Supply : 120 V 60 Hz |
| Serial No. :             | Temp/Humi : 21 'C 40 % R.H |
| Test Condition : USB     | Operator :                 |

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m) - 18G(Avg)  
FCC Part15 Subpart B Class B (3m) - 18G(Peak)

| No.                    | FREQ<br>[MHz] | READING<br>AV<br>[dBuV] | ANT<br>FACTOR<br>[dB] | LOSS<br>[dB] | GAIN<br>[dB] | RESULT<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] | ANTENNA<br>[cm] | TABLE<br>[DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- |               |                         |                       |              |              |                    |                   |                |                 |                |
| 1                      | 1192.308      | 40.3                    | 24.2                  | 5.3          | 41.8         | 28.0               | 54.0              | 26.0           | 100             | 1              |
| 2                      | 1312.500      | 38.2                    | 24.6                  | 5.5          | 41.9         | 26.4               | 54.0              | 27.6           | 100             | 37             |
| 3                      | 1360.577      | 42.7                    | 24.7                  | 5.6          | 41.9         | 31.1               | 54.0              | 22.9           | 100             | 25             |
| 4                      | 1985.577      | 39.8                    | 25.2                  | 7.0          | 42.0         | 30.0               | 54.0              | 24.0           | 100             | 139            |
| ----- Vertical -----   |               |                         |                       |              |              |                    |                   |                |                 |                |
| 5                      | 1192.308      | 39.3                    | 24.2                  | 5.3          | 41.9         | 26.9               | 54.0              | 27.1           | 100             | 49             |
| 6                      | 1312.500      | 40.3                    | 24.6                  | 5.5          | 41.8         | 28.6               | 54.0              | 25.4           | 100             | 172            |
| 7                      | 1384.615      | 40.6                    | 24.8                  | 5.7          | 41.7         | 29.4               | 54.0              | 24.6           | 100             | 358            |
| 8                      | 1993.589      | 44.0                    | 25.2                  | 7.0          | 41.7         | 34.5               | 54.0              | 19.5           | 100             | 358            |
| 9                      | 4573.741      | 35.9                    | 31.0                  | 10.7         | 42.0         | 35.6               | 54.0              | 18.4           | 100             | 226            |

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## Appendix 1

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### List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

## 1. Conducted Disturbance

| Name of Instrument                                            | Model No.    | Manufacturer         | Serial No. | Cal. Date  | Next Cal. Date |
|---------------------------------------------------------------|--------------|----------------------|------------|------------|----------------|
| <input checked="" type="checkbox"/> SPECTRUM ANALYZER         | 8591E        | H/P                  | 3649A05889 | 2012.03.05 | 2013.03.05     |
| <input checked="" type="checkbox"/> RFI/FIELD INTENSITY METER | KNM-2402     | KYORITSU             | 4N-170-3   | 2011.07.02 | 2012.07.02     |
| <input checked="" type="checkbox"/> LISN                      | KNW-407      | KYORITSU             | 8-317-8    | 2012.01.09 | 2013.01.09     |
| <input checked="" type="checkbox"/> LISN                      | PMM L2-16B   | NARDA S.T.S. / PMM   | 000WX20305 | 2011.09.19 | 2012.09.19     |
| <input checked="" type="checkbox"/> ATTENUATOR                | CFA-10BPJ-10 | TAMAGAWA ELECTRONICS | 1760307E   | N/A        | N/A            |
| <input checked="" type="checkbox"/> 50 OHM TERMINATOR         | CT-01        | TME                  | N/A        | 2012.01.09 | 2013.01.09     |
| <input type="checkbox"/> EMI TEST RECEIVER                    | ESCI         | ROHDE & SCHWARZ      | 100364     | 2012.03.06 | 2013.03.06     |
| <input type="checkbox"/> LISN                                 | ESH2-Z5      | ROHDE & SCHWARZ      | 828739/006 | 2011.09.30 | 2012.09.30     |
| <input type="checkbox"/> LISN                                 | LISN1600     | TTI                  | 197204     | 2011.07.02 | 2012.07.02     |
| <input type="checkbox"/> 50 OHM TERMINATOR                    | CT-01        | TME                  | N/A        | 2012.01.09 | 2013.01.09     |

## 2. Radiated Disturbance

| Name of Instrument                                    | Model No.         | Manufacturer    | Serial No. | Cal. Date  | Next Cal. Date |
|-------------------------------------------------------|-------------------|-----------------|------------|------------|----------------|
| <input checked="" type="checkbox"/> EMI TEST RECEIVER | ESU               | ROHDE & SCHWARZ | 100014     | 2012.01.09 | 2013.01.09     |
| <input checked="" type="checkbox"/> BILOG ANTENNA     | CBL6112D          | SCHAFFNER       | 22609      | 2010.12.21 | 2012.12.21     |
| <input checked="" type="checkbox"/> HORN ANTENNA      | BBHA9120A         | SCHWARZBECK     | 322        | 2012.05.15 | 2014.05.15     |
| <input checked="" type="checkbox"/> AMPLIFIER         | 8447E             | H/P             | 2945A02865 | 2012.01.09 | 2013.01.09     |
| <input checked="" type="checkbox"/> AMPLIFIER         | MLA-00108-B02-36  | TSJ             | 1518831    | 2012.01.09 | 2013.01.09     |
| <input type="checkbox"/> SPECTRUM ANALYZER            | E4411B            | AGILENT         | US41062735 | 2011.07.11 | 2012.07.11     |
| <input type="checkbox"/> AMPLIFIER                    | 8447D             | AGILENT         | 2443A03690 | 2011.07.01 | 2012.07.01     |
| <input type="checkbox"/> BILOG ANTENNA                | VULB9160          | SCHAFFNER       | 3151       | 2010.08.25 | 2012.08.25     |
| <input type="checkbox"/> EMI TEST RECEIVER            | ESCI              | ROHDE & SCHWARZ | 100364     | 2012.03.06 | 2013.03.06     |
| <input type="checkbox"/> BICONICAL ANT.               | VHA 9103          | SCHWARZBECK     | 91032789   | 2010.11.29 | 2012.11.29     |
| <input type="checkbox"/> LOG-PERIODIC ANT.            | UHALP 9108A       | SCHWARZBECK     | 590        | 2010.07.07 | 2012.07.07     |
| <input type="checkbox"/> BICONICAL ANT.               | VHA 9103          | SCHWARZBECK     | 91031946   | 2010.12.21 | 2012.12.21     |
| <input type="checkbox"/> LOG-PERIODIC ANT.            | UHALP 9108-A1     | SCHWARZBECK     | 1098       | 2010.11.29 | 2012.11.29     |
| <input type="checkbox"/> AMPLIFIER                    | MLA-100K01-B01-26 | TSJ             | 1252741    | 2012.03.05 | 2013.03.05     |