



**KES Co., Ltd.**

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www.kes.co.kr

Report No.:

KES-E1-16T0285-R2

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## EMC TEST REPORT For FCC

Test Report No. : KES-E1-16T0285-R2  
Date of Issue : Feb. 24, 2023  
Product name : NETWORK CONTROLLER  
Model/Type No. : SPC-7000  
Variant Model : -  
Applicant : Hanwha Vision Co., Ltd  
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, Republic of Korea  
Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED  
2. D-TECH CO.,LTD.  
Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,  
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam  
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,  
Korea (Suwon Industrial Complex)  
Equipment authorization : ☐ Declaration of Conformity  
☒ Verification  
☐ Certification  
Date of Receipt : Jun. 07, 2016  
Test date : Jun. 23, 2016 - Jun. 26, 2016  
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

김세헌

Reviewed by

Se Heon, Kim  
EMC Test Engineer

Dong-Hun, Jang  
EMC Technical Manager

Tested by Young-Jun Jo  
(Department changed person)  
Proxy signature : Se Heon, Kim

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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### REPORT REVISION HISTORY

| Date          | Test Report No.   | Revision History                                                       |
|---------------|-------------------|------------------------------------------------------------------------|
| Jun. 29, 2016 | KES-E1-16T0285    | Issued                                                                 |
| Aug. 17, 2021 | KES-E1-16T0285-R1 | Model name/Applicant Address/Manufacturer change at customer's request |
| Feb. 24, 2023 | KES-E1-16T0285-R2 | Change the Applicant and manufacturer at the request of the customer   |
|               |                   |                                                                        |
|               |                   |                                                                        |
|               |                   |                                                                        |
|               |                   |                                                                        |
|               |                   |                                                                        |
|               |                   |                                                                        |
|               |                   |                                                                        |

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## 1.0 General Product Description

### Main Specifications of EUT are:

|                       |                             |
|-----------------------|-----------------------------|
| LCD DISPLAY           | 5 inch TFT LCD              |
| Communication Method  | SSM, RJ-45                  |
| Operating temperature | 0 ~ 40 °C                   |
| Humidity              | 10 ~ 70 %                   |
| dimension             | ( 459.1 x 59.1 x 177.9 ) mm |
| weight                | 1.5 kg                      |

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## 1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☐ 100 Vac ☐ 110 Vac ☒ 120 Vac ☐ PoE ☐ 12 Vdc

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

## 1.2 Variant Model Differences

Not applicable

## 1.3 Device Modifications

Not applicable

## 1.4 Equipment Under Test

| Description        | Model Number | Serial Number | Manufacturer                               | Remarks |
|--------------------|--------------|---------------|--------------------------------------------|---------|
| NETWORK CONTROLLER | SPC-7000     | -             | HANWHA VISION VIETNAM COMPANY LIMITED      | E.U.T   |
| AC/DC Adapter      | KPL-048F-VI  | -             | Channel Well Technology(guangzhou)co.,Ltd. | -       |

## 1.5 Support Equipments

| Description              | Model Number | Serial Number   | Manufacturer                       | Remarks |
|--------------------------|--------------|-----------------|------------------------------------|---------|
| Notebook                 | RV518        | HSVX91HC801452M | Samsung Electronics Co., Ltd.      | -       |
| Notebook AC/DC Adapter   | CPA09-004A   | -               | Chicony Power Technology Co., Ltd. | -       |
| PTZ Camera               | -            | -               | -                                  | -       |
| PTZ Camera AC/DC Adapter | DRL-241500AC | -               | Dream Electronics Co., Ltd.        | -       |



## 1.6 External I/O Cabling

- USB Mode

| Start                      |          | END         |          | Cable Spec. |        |
|----------------------------|----------|-------------|----------|-------------|--------|
| Description                | I/O Port | Description | I/O Port | Length      | Shield |
| NETWORK CONTROLLER (E.U.T) | USB      | Notebook    | USB      | 1.2         | U      |

- LAN Mode

| Start                      |          | END         |          | Cable Spec. |        |
|----------------------------|----------|-------------|----------|-------------|--------|
| Description                | I/O Port | Description | I/O Port | Length      | Shield |
| NETWORK CONTROLLER (E.U.T) | RJ45     | PTZ Camera  | RJ45     | 3.5         | U      |

\* Unshielded=U, Shielded=S

## 1.7 EUT Operating Mode(s)

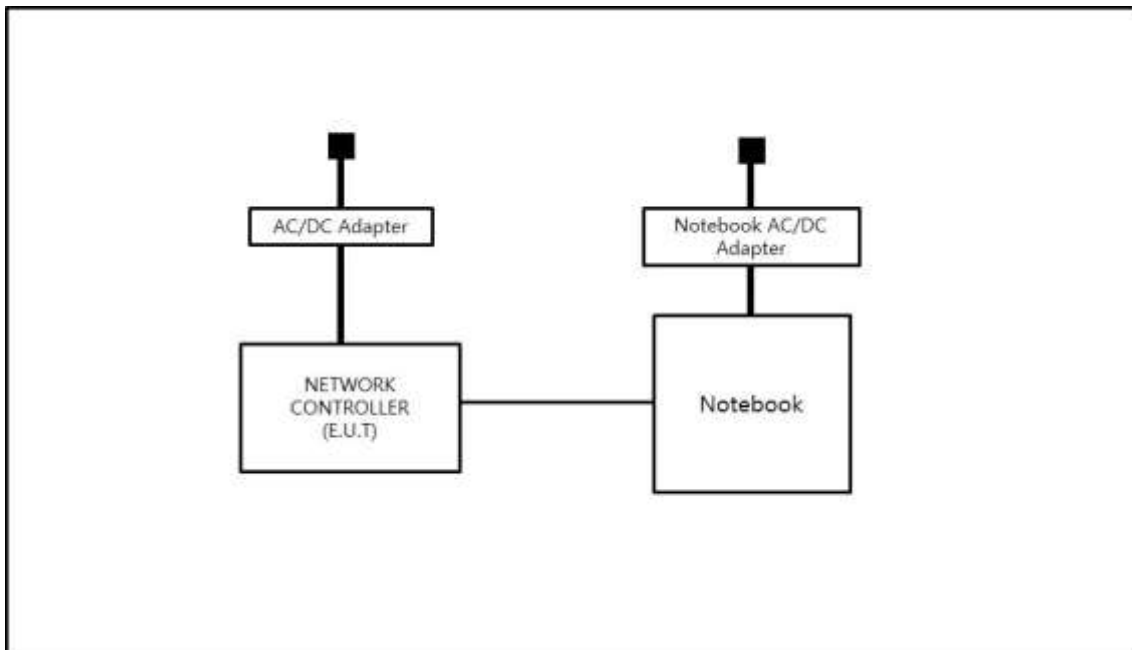
Equipment under test was operated during the measurement under the following conditions:

| Test mode | Normal operating                               |
|-----------|------------------------------------------------|
| USB       | Notebook's game controller setting page check. |
| LAN       | PTZ Camera Controlled                          |

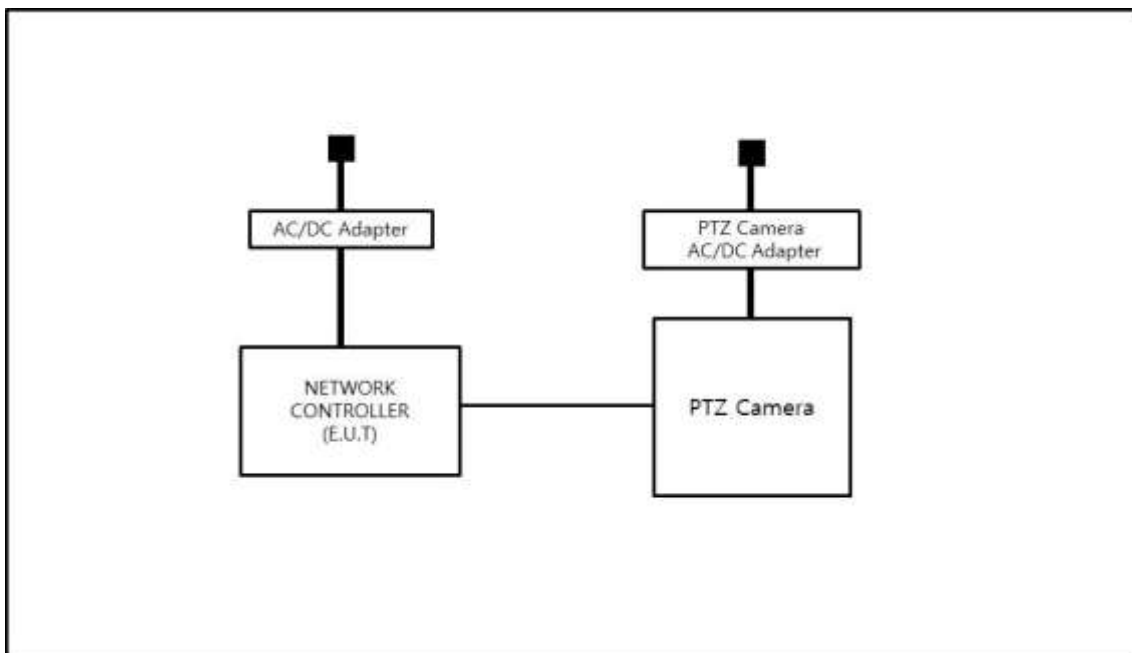
## 1.8 Configuration

■ AC Main  
 □ DC Main

- USB Mode



- LAN Mode



## 1.9 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

## 1.10 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

## 1.11 Laboratory Accreditations and Listings

| Country       | Agency  | Scope of Accreditation                                                                                                                  | Logo                                                                                                                           |
|---------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| KOREA         | RRA     | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KR0100                                  |
| International | KOLAS   | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KT489                                  |
| USA           | FCC     | 3 m & 10 m Semi-Anechoic Chamber<br>Conducted test site to perform FCC Part 15/18 measurements.                                         | <br>KR0100                                |
| Canada        | ISED    | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site                                                                                | <br>23298                                 |
| JAPAN         | VCCI    | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)                                                                          | <br>C-20136, T-20137,<br>R-20181, G-20176 |
| Europe        | TÜV SÜD | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>CARAT 001633 0004                     |





## 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1  
☐ Class A

☐ Group 2  
☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55022:2010

☐ Class A

☐ Class B

☐ EN 55024:2010

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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- |                                                                      |                                             |                                  |
|----------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI V-3 / 2015.04</b>                   | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR22:2009 +A1:2010</b>         | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> <b>47 CFR Part 15, Subpart B</b> |                                             |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010                      | <input checked="" type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> ANSI C63.4-2009                  |                                             |                                  |
| <input type="checkbox"/> <b>IC Regulation ICES-003 : 2016</b>        |                                             |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010                      | <input type="checkbox"/> Class A            | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                             |                                             |                                  |
| <br>                                                                 |                                             |                                  |
| <input type="checkbox"/> <b>RE- Directive 2014/53/EU</b>             |                                             |                                  |
| <br>                                                                 |                                             |                                  |
| <input type="checkbox"/> EN 301 489-1 V1.9.2                         |                                             |                                  |
| <input type="checkbox"/> Equipment for fixed use                     |                                             |                                  |
| <input type="checkbox"/> Equipment for vehicular use                 |                                             |                                  |
| <input type="checkbox"/> Equipment for portable use                  |                                             |                                  |
| <input type="checkbox"/> EN 301 489-3 V1.6.1                         |                                             |                                  |
| <input type="checkbox"/> EN 301 489-17 V2.2.1                        |                                             |                                  |
| <input type="checkbox"/> EN 60945:2002                               |                                             |                                  |

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## 2.1 Conducted Emissions at Mains Power Ports

**Test Date**

Jun. 23, 2016

**Test Location**

Electro wave Shieldroom

**Test Equipment**

| Used                                | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test Receiver       | ESR3         | R&S          | 101783        | 05, 03, 2017 |
| <input checked="" type="checkbox"/> | LISN                    | ENV216       | R&S          | 101137        | 02, 04, 2017 |
| <input checked="" type="checkbox"/> | LISN                    | ENV216       | R&S          | 101786        | 05, 02, 2017 |
| <input checked="" type="checkbox"/> | Electro wave Shieldroom | -            | SEMITEC      | -             | -            |

**Test Conditions**

Temperature: 23,8 °C

Relative Humidity: 43,6 %

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Settings**

IF Band Width: 9 kHz

**Test Results**

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

**Remarks**See Appendix A for test data.

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## 2.2 Radiated Electric Field Emissions(Below 1 GHz)

**Test Date**

Jun. 26, 2016

**Test Location**

☒ Open Area Test Site #1 ☐ Open Area Test Site #2

**Test Equipment**

| Used                                | Description          | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|----------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI TEST Receiver    | ESU26        | R&S          | 100551        | 04, 18, 2017 |
| <input checked="" type="checkbox"/> | Trilog-Broadband ANT | VULB 9163    | Schwarzbeck  | 9163-715      | 04, 14, 2018 |
| <input checked="" type="checkbox"/> | OATS                 | -            | KES          | -             | -            |
| <input checked="" type="checkbox"/> | Antenna Mast         | 1070/1080    | EMCO         | -             | -            |
| <input checked="" type="checkbox"/> | Turn Table           | -            | DAEIL EMC    | -             | -            |

**Test Conditions**

Temperature: 31,2 °C  
Relative Humidity: 50,0 %

**Frequency Range of Measurement**

30 MHz to 1 GHz

**Instrument Settings**

IF Band Width: 120 kHz

**Test Results**

The requirements are:

☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

**Remarks**

See Appendix A for test data.

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## 2.3 Radiated Electric Field Emissions(Above 1 GHz)

### Test Date

Jun. 26, 2016

### Test Location

Semi Anechoic Chamber #2

### Test Equipment

| Used                                | Description                    | Model Number | Manufacturer                  | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------------|--------------|-------------------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test Receiver              | ESU26        | R&S                           | 100552        | 04, 24, 2017 |
| <input checked="" type="checkbox"/> | Broadband Coaxial Preamplifier | BBV 9718     | Schwarzbeck Mess - Elektronik | 9718-246      | 10, 23, 2016 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA     | SAS-571      | A.H.SYSTEM,INC                | 781           | 05, 07, 2017 |
| <input checked="" type="checkbox"/> | Semi Anechoic Chamber #2       | -            | SEMITEC                       | -             | -            |
| <input checked="" type="checkbox"/> | Antenna Mast                   | -            | AUDIX                         | -             | -            |
| <input checked="" type="checkbox"/> | Turn Table                     | -            | AUDIX                         | -             | -            |

### Test Conditions

Temperature: 23,6 °C  
Relative Humidity: 52,1 %

### Frequency Range of Measurement

1 GHz to 5 GHz

### Instrument Settings

IF Band Width: 1 MHz

### Test Results

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



## APPENDIX A – TEST DATA

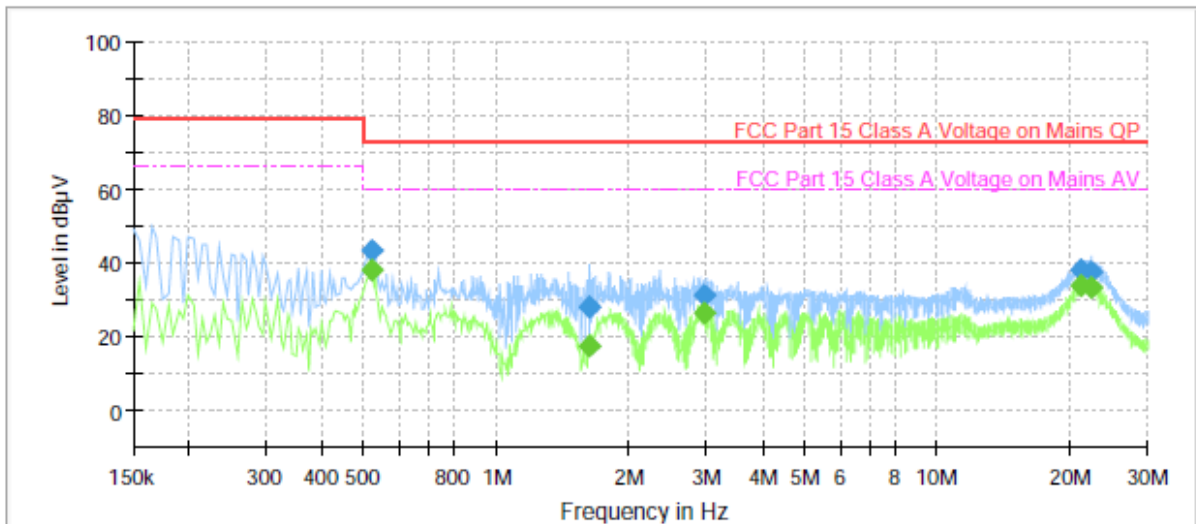
### Conducted Emissions at Mains Power Ports

- USB Mode

[HOT]

#### Common Information

|                   |                    |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.:        | SPC-7000N          |
| Mode              | USB                |
| Operator Name:    | KES                |



#### Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.520000        | ---              | 37.87           | 60.00        | 22.13       | 1000.0          | 9.000           | L1   | 9.7        |
| 0.520000        | 43.56            | ---             | 73.00        | 29.44       | 1000.0          | 9.000           | L1   | 9.7        |
| 1.630000        | ---              | 17.69           | 60.00        | 42.31       | 1000.0          | 9.000           | L1   | 9.7        |
| 1.630000        | 27.92            | ---             | 73.00        | 45.08       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.970000        | ---              | 26.68           | 60.00        | 33.32       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.970000        | 31.16            | ---             | 73.00        | 41.84       | 1000.0          | 9.000           | L1   | 9.7        |
| 21.190000       | ---              | 33.74           | 60.00        | 26.26       | 1000.0          | 9.000           | L1   | 10.2       |
| 21.190000       | 38.11            | ---             | 73.00        | 34.89       | 1000.0          | 9.000           | L1   | 10.2       |
| 22.280000       | ---              | 33.39           | 60.00        | 26.61       | 1000.0          | 9.000           | L1   | 10.2       |
| 22.280000       | 37.82            | ---             | 73.00        | 35.18       | 1000.0          | 9.000           | L1   | 10.2       |

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[NEUTRAL]

## Common Information

Test Description:

Model No.:

Mode

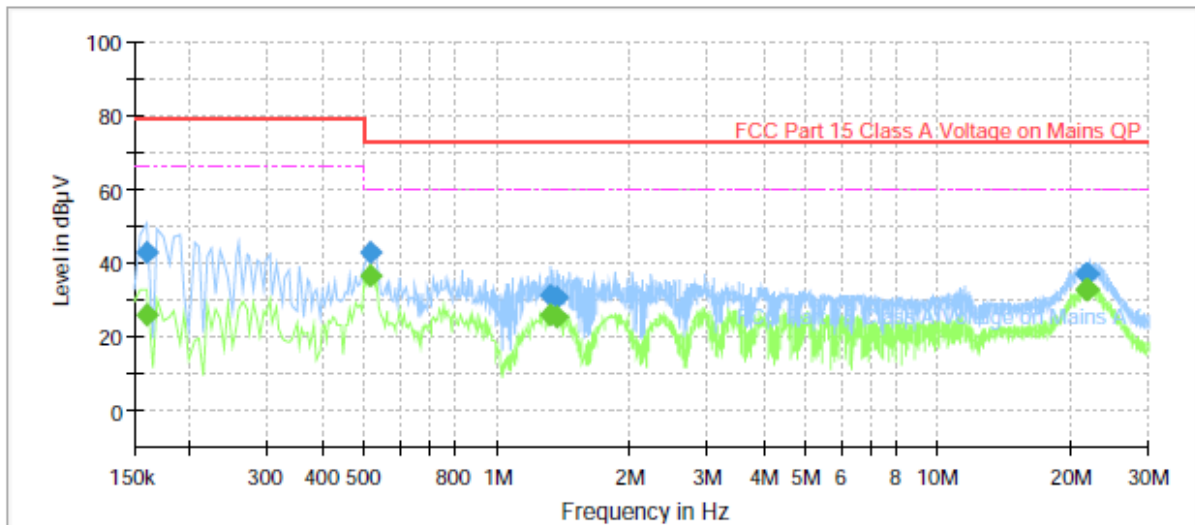
Operator Name:

Conducted Emission

SPC-7000N

USB

KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.160000        | ---              | 26.02           | 66.00        | 39.98       | 1000.0          | 9.000           | N    | 9.6        |
| 0.160000        | 43.05            | ---             | 79.00        | 35.95       | 1000.0          | 9.000           | N    | 9.6        |
| 0.515000        | ---              | 36.73           | 60.00        | 23.27       | 1000.0          | 9.000           | N    | 9.7        |
| 0.515000        | 43.07            | ---             | 73.00        | 29.93       | 1000.0          | 9.000           | N    | 9.7        |
| 1.325000        | ---              | 25.90           | 60.00        | 34.10       | 1000.0          | 9.000           | N    | 9.7        |
| 1.325000        | 31.03            | ---             | 73.00        | 41.97       | 1000.0          | 9.000           | N    | 9.7        |
| 1.360000        | ---              | 25.25           | 60.00        | 34.75       | 1000.0          | 9.000           | N    | 9.7        |
| 1.360000        | 30.84            | ---             | 73.00        | 42.16       | 1000.0          | 9.000           | N    | 9.7        |
| 21.660000       | ---              | 32.66           | 60.00        | 27.34       | 1000.0          | 9.000           | N    | 10.2       |
| 21.660000       | 36.99            | ---             | 73.00        | 36.01       | 1000.0          | 9.000           | N    | 10.2       |
| 21.750000       | ---              | 32.73           | 60.00        | 27.27       | 1000.0          | 9.000           | N    | 10.2       |
| 21.750000       | 37.07            | ---             | 73.00        | 35.93       | 1000.0          | 9.000           | N    | 10.2       |

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- LAN Mode

[HOT]

### Common Information

Test Description:

Model No.:

Mode

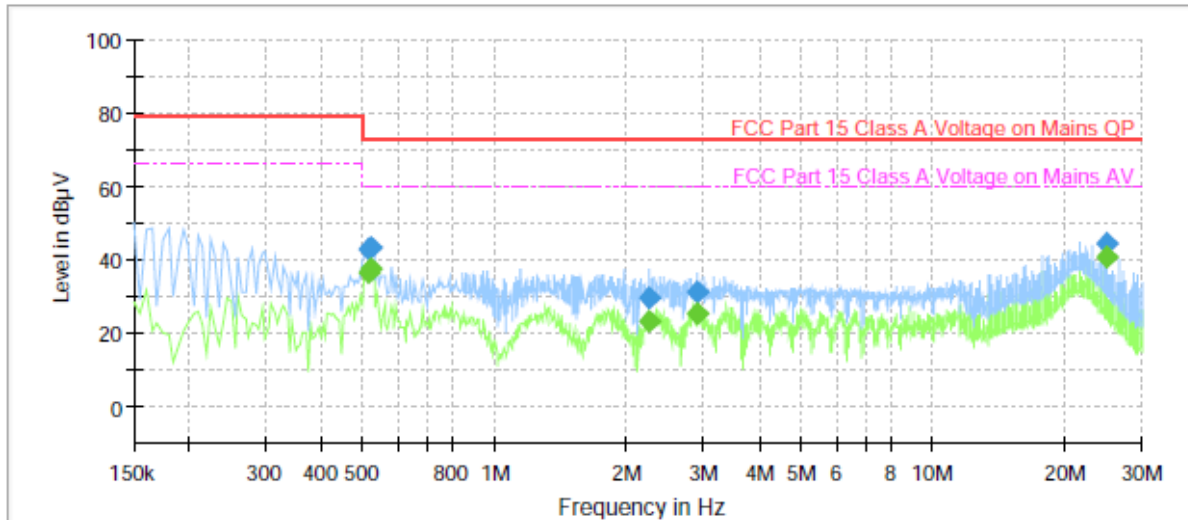
Operator Name:

Conducted Emission

SPC-7000N

RJ45

KES



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.515000        | ---              | 36.72           | 60.00        | 23.28       | 1000.0          | 9.000           | L1   | 9.7        |
| 0.515000        | 43.02            | ---             | 73.00        | 29.98       | 1000.0          | 9.000           | L1   | 9.7        |
| 0.520000        | ---              | 37.46           | 60.00        | 22.54       | 1000.0          | 9.000           | L1   | 9.7        |
| 0.520000        | 43.35            | ---             | 73.00        | 29.65       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.255000        | ---              | 23.34           | 60.00        | 36.66       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.255000        | 29.75            | ---             | 73.00        | 43.25       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.905000        | ---              | 25.50           | 60.00        | 34.50       | 1000.0          | 9.000           | L1   | 9.7        |
| 2.905000        | 31.10            | ---             | 73.00        | 41.90       | 1000.0          | 9.000           | L1   | 9.7        |
| 25.000000       | ---              | 40.84           | 60.00        | 19.16       | 1000.0          | 9.000           | L1   | 10.2       |
| 25.000000       | 44.64            | ---             | 73.00        | 28.36       | 1000.0          | 9.000           | L1   | 10.2       |

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Report No.:

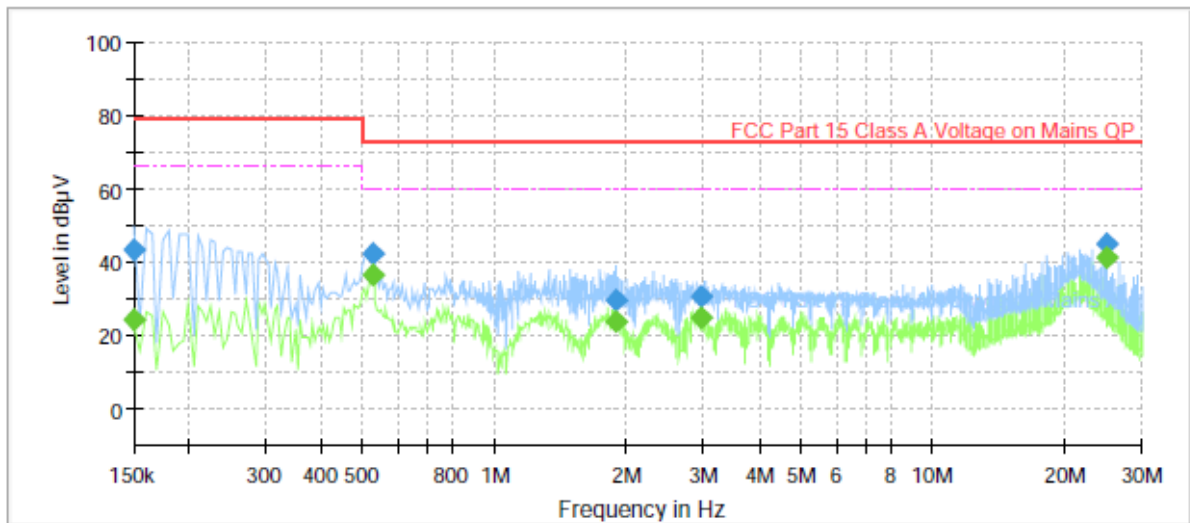
KES-E1-16T0285-R2

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[NEUTRAL]

### Common Information

Test Description: Conducted Emission  
Model No.: SPC-7000N  
Mode: RJ45  
Operator Name: KES



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.150000        | ---              | 24.29           | 66.00        | 41.71       | 1000.0          | 9.000           | N    | 9.6        |
| 0.150000        | 43.25            | ---             | 79.00        | 35.75       | 1000.0          | 9.000           | N    | 9.6        |
| 0.525000        | ---              | 36.36           | 60.00        | 23.64       | 1000.0          | 9.000           | N    | 9.7        |
| 0.525000        | 42.43            | ---             | 73.00        | 30.57       | 1000.0          | 9.000           | N    | 9.7        |
| 1.895000        | ---              | 23.67           | 60.00        | 36.33       | 1000.0          | 9.000           | N    | 9.7        |
| 1.895000        | 29.78            | ---             | 73.00        | 43.22       | 1000.0          | 9.000           | N    | 9.7        |
| 2.970000        | ---              | 24.80           | 60.00        | 35.20       | 1000.0          | 9.000           | N    | 9.7        |
| 2.970000        | 30.85            | ---             | 73.00        | 42.15       | 1000.0          | 9.000           | N    | 9.7        |
| 25.000000       | ---              | 41.11           | 60.00        | 18.89       | 1000.0          | 9.000           | N    | 10.3       |
| 25.000000       | 44.87            | ---             | 73.00        | 28.13       | 1000.0          | 9.000           | N    | 10.3       |

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## Radiated Electric Field Emissions(Below 1 GHz)

- USB Mode

| Frequency | Amplitude    | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|--------------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dB $\mu$ V] | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dB $\mu$ V/m]      | [dB $\mu$ V/m]   | [dB]   |
| 144.16    | 8.34         | V               | 1.15        | 8.05              | 2.42          | 18.81               | 43.50            | 24.69  |
| 150.23    | 11.25        | H               | 3.97        | 8.22              | 2.47          | 21.94               | 43.50            | 21.56  |
| 250.00    | 19.57        | H               | 4.00        | 12.55             | 3.33          | 35.45               | 46.40            | 10.95  |
| 275.17    | 11.16        | V               | 1.02        | 12.98             | 3.52          | 27.66               | 46.40            | 18.74  |
| 400.96    | 14.26        | H               | 4.00        | 15.59             | 4.23          | 34.08               | 46.40            | 12.32  |
| 494.31    | 8.42         | V               | 1.22        | 17.20             | 4.91          | 30.53               | 46.40            | 15.87  |

\* H : Horizontal, V : Vertical

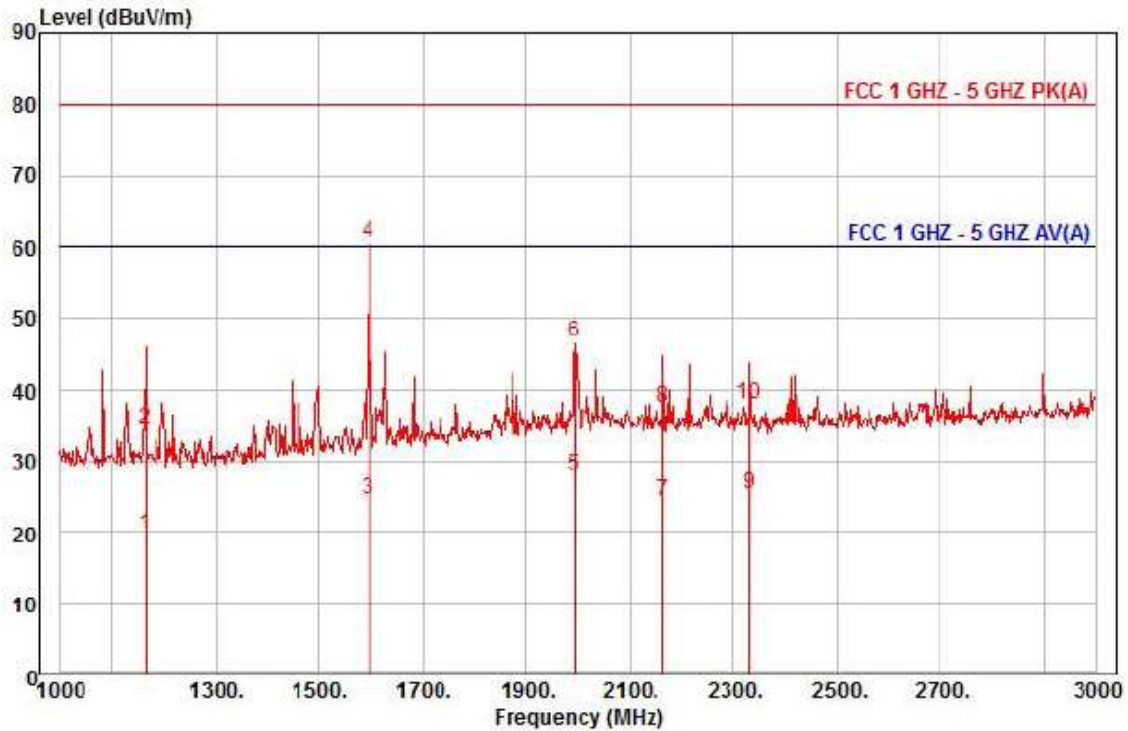
- LAN Mode

| Frequency | Amplitude    | ANT             | ANT. Height | Correction Factor |               | Corrected Amplitude | Applicable Limit | Margin |
|-----------|--------------|-----------------|-------------|-------------------|---------------|---------------------|------------------|--------|
| [MHz]     | [dB $\mu$ V] | Polar.<br>(H/V) | [m]         | ANT.<br>[dB/m]    | Cable<br>[dB] | [dB $\mu$ V/m]      | [dB $\mu$ V/m]   | [dB]   |
| 150.01    | 25.13        | H               | 3.67        | 8.21              | 2.47          | 35.81               | 43.50            | 7.69   |
| 225.43    | 13.84        | V               | 1.41        | 12.02             | 3.10          | 28.96               | 46.40            | 17.44  |
| 275.57    | 22.14        | H               | 4.00        | 12.98             | 3.52          | 38.64               | 46.40            | 7.76   |
| 325.99    | 10.46        | V               | 1.08        | 13.96             | 3.80          | 28.22               | 46.40            | 18.18  |
| 496.38    | 16.43        | H               | 3.76        | 17.24             | 4.92          | 38.59               | 46.40            | 7.81   |
| 560.48    | 14.72        | V               | 1.00        | 18.49             | 5.32          | 38.53               | 46.40            | 7.87   |

\* H : Horizontal, V : Vertical

## Radiated Electric Field Emissions(Above 1 GHz)

- USB Mode



Site : chamber  
Condition: FCC 1 GHz - 5 GHz PK(A) 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : USB  
Memo : 1 - 3 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|------------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |            |         |
| 1    | 1164.00 | 28.17      | 24.56      | 6.99       | 40.04         | 81   | 60.00      | -40.32     | horizontal | Average |
| 2    | 1164.00 | 42.90      | 24.56      | 6.99       | 40.04         | 81   | 80.00      | -45.59     | horizontal | Peak    |
| 3    | 1596.00 | 29.95      | 26.28      | 8.24       | 39.83         | 113  | 60.00      | -35.36     | horizontal | Average |
| 4 pp | 1596.00 | 66.00      | 26.28      | 8.24       | 39.83         | 113  | 80.00      | -19.31     | horizontal | Peak    |
| 5 av | 1992.00 | 30.38      | 27.85      | 9.33       | 39.63         | 211  | 60.00      | -32.07     | horizontal | Average |
| 6    | 1992.00 | 49.16      | 27.85      | 9.33       | 39.63         | 211  | 80.00      | -33.29     | horizontal | Peak    |
| 7    | 2164.00 | 26.21      | 28.28      | 9.60       | 39.73         | 293  | 60.00      | -35.64     | horizontal | Average |
| 8    | 2164.00 | 39.28      | 28.28      | 9.60       | 39.73         | 293  | 80.00      | -42.57     | horizontal | Peak    |
| 9    | 2332.00 | 26.48      | 28.69      | 9.86       | 39.82         | 296  | 60.00      | -34.79     | horizontal | Average |
| 10   | 2332.00 | 39.40      | 28.69      | 9.86       | 39.82         | 296  | 80.00      | -41.87     | horizontal | Peak    |

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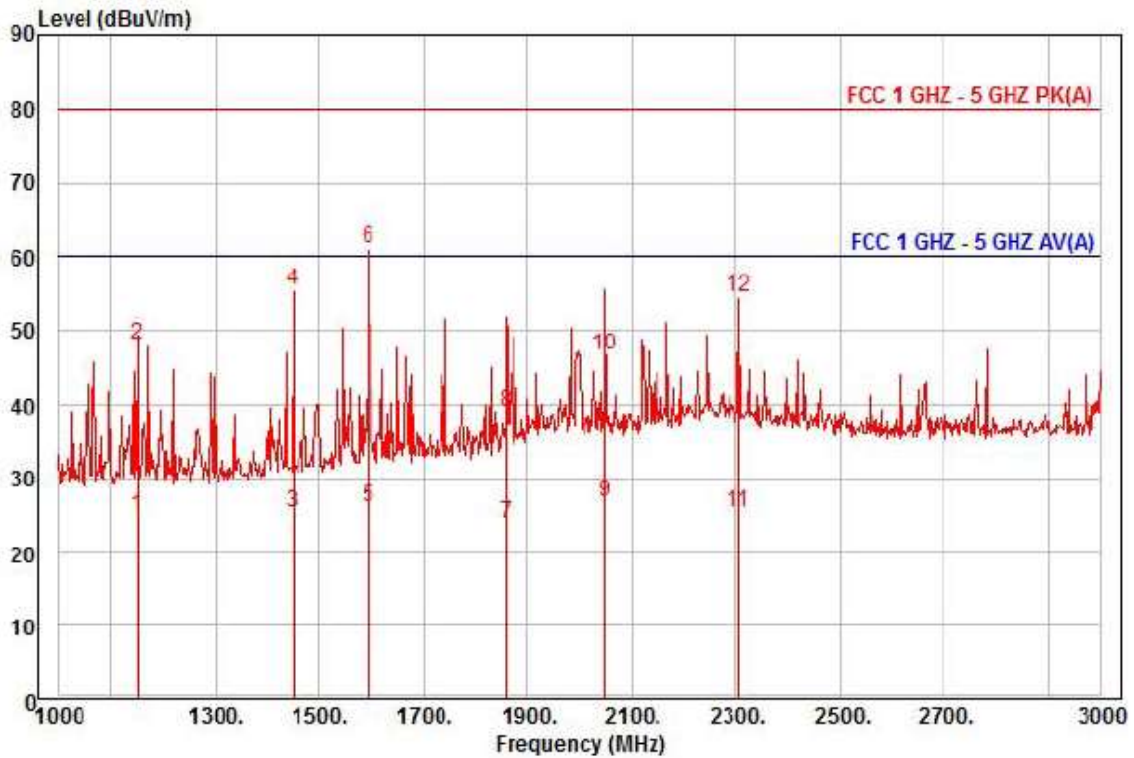
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Report No.:  
KES-E1-16T0285-R2  
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Site : chamber  
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : USB  
Memo : 1 - 3 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 1150.00 | 33.45      | 24.51      | 6.95       | 40.05         | 184  | 60.00      | -35.14     | vertical  | Average |
| 2    | 1150.00 | 56.74      | 24.51      | 6.95       | 40.05         | 184  | 80.00      | -31.85     | vertical  | Peak    |
| 3    | 1450.00 | 31.71      | 25.70      | 7.82       | 39.90         | 282  | 60.00      | -34.67     | vertical  | Average |
| 4    | 1450.00 | 61.74      | 25.70      | 7.82       | 39.90         | 282  | 80.00      | -24.64     | vertical  | Peak    |
| 5    | 1594.00 | 31.45      | 26.27      | 8.23       | 39.83         | 204  | 60.00      | -33.88     | vertical  | Average |
| 6 pp | 1594.00 | 66.47      | 26.27      | 8.23       | 39.83         | 204  | 80.00      | -18.86     | vertical  | Peak    |
| 7    | 1858.00 | 27.19      | 27.32      | 8.96       | 39.70         | 302  | 60.00      | -36.23     | vertical  | Average |
| 8    | 1858.00 | 42.51      | 27.32      | 8.96       | 39.70         | 302  | 80.00      | -40.91     | vertical  | Peak    |
| 9 av | 2050.00 | 28.94      | 28.00      | 9.43       | 39.66         | 294  | 60.00      | -33.29     | vertical  | Average |
| 10   | 2050.00 | 48.84      | 28.00      | 9.43       | 39.66         | 294  | 80.00      | -33.39     | vertical  | Peak    |
| 11   | 2306.00 | 26.65      | 28.63      | 9.82       | 39.81         | 296  | 60.00      | -34.71     | vertical  | Average |
| 12   | 2306.00 | 55.79      | 28.63      | 9.82       | 39.81         | 296  | 80.00      | -25.57     | vertical  | Peak    |

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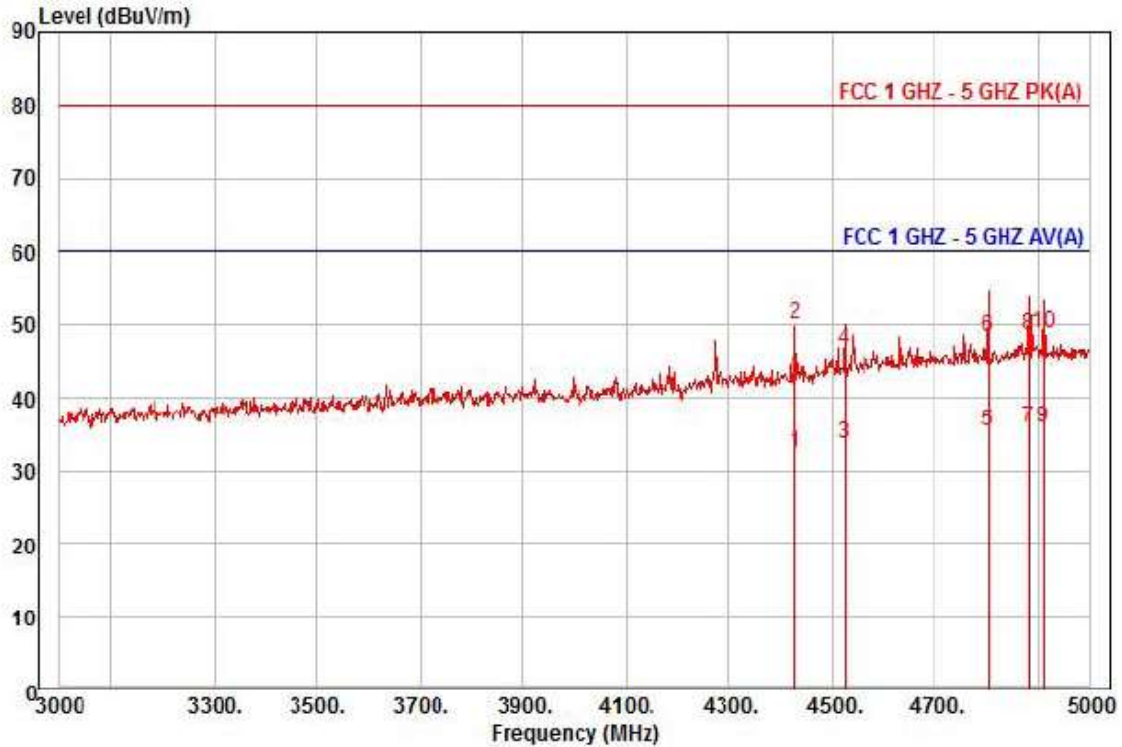




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Site : chamber  
Condition: FCC 1 GHz - 5 GHz PK(A) 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : USB  
Memo : 3 - 5 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|------------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |            |         |
| 1    | 4428.00 | 23.96      | 34.45      | 14.30      | 40.41         | 29   | 60.00      | -27.70     | horizontal | Average |
| 2 pk | 4428.00 | 41.73      | 34.45      | 14.30      | 40.41         | 29   | 80.00      | -29.93     | horizontal | Peak    |
| 3    | 4524.00 | 24.64      | 35.00      | 14.47      | 40.41         | 156  | 60.00      | -26.30     | horizontal | Average |
| 4    | 4524.00 | 37.61      | 35.00      | 14.47      | 40.41         | 156  | 80.00      | -33.33     | horizontal | Peak    |
| 5    | 4802.00 | 24.11      | 36.59      | 14.97      | 40.41         | 258  | 60.00      | -24.74     | horizontal | Average |
| 6    | 4802.00 | 37.09      | 36.59      | 14.97      | 40.41         | 258  | 80.00      | -31.76     | horizontal | Peak    |
| 7 pp | 4882.00 | 24.00      | 37.05      | 15.12      | 40.41         | 261  | 60.00      | -24.24     | horizontal | Average |
| 8    | 4882.00 | 36.81      | 37.05      | 15.12      | 40.41         | 261  | 80.00      | -31.43     | horizontal | Peak    |
| 9    | 4910.00 | 23.74      | 37.21      | 15.17      | 40.41         | 264  | 60.00      | -24.29     | horizontal | Average |
| 10   | 4910.00 | 36.88      | 37.21      | 15.17      | 40.41         | 264  | 80.00      | -31.15     | horizontal | Peak    |

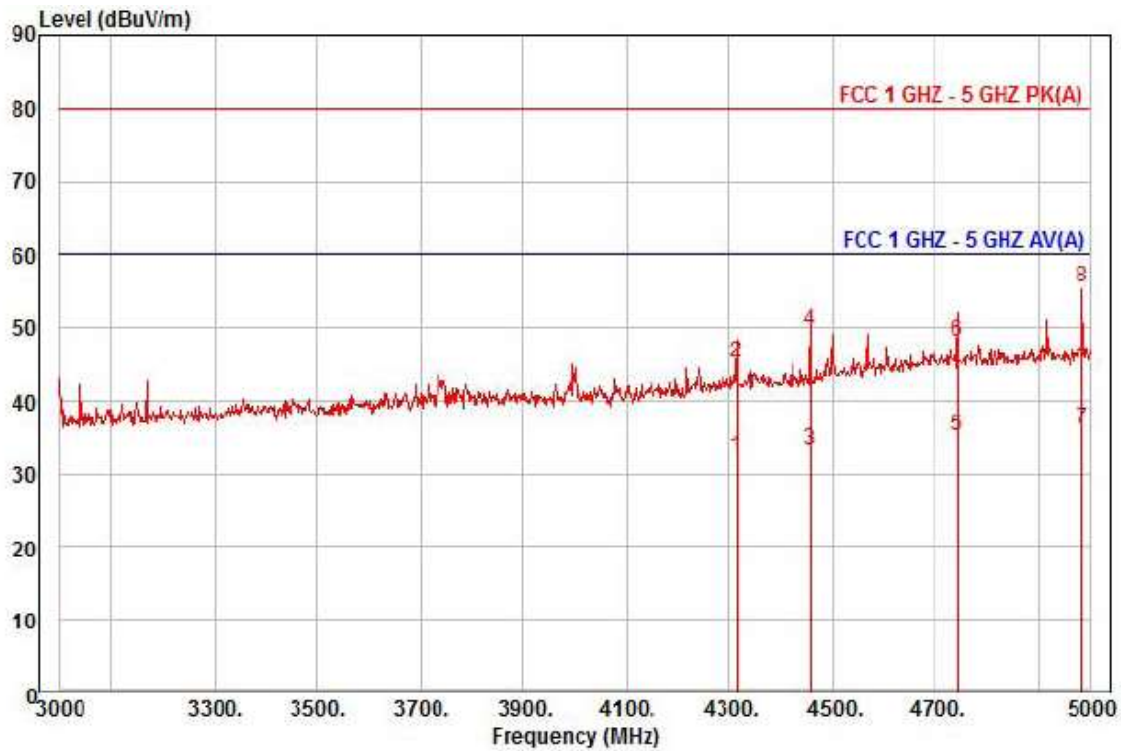
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Report No.:  
KES-E1-16T0285-R2  
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Site : chamber  
Condition: FCC 1 GHz - 5 GHz PK(A) 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : USB  
Memo : 3 - 5 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 4316.00 | 24.62      | 33.81      | 14.09      | 40.41         | 208  | 60.00      | -27.89     | vertical  | Average |
| 2    | 4316.00 | 37.68      | 33.81      | 14.09      | 40.41         | 208  | 80.00      | -34.83     | vertical  | Peak    |
| 3    | 4458.00 | 24.57      | 34.63      | 14.35      | 40.41         | 179  | 60.00      | -26.86     | vertical  | Average |
| 4    | 4458.00 | 40.96      | 34.63      | 14.35      | 40.41         | 179  | 80.00      | -30.47     | vertical  | Peak    |
| 5    | 4744.00 | 24.45      | 36.26      | 14.87      | 40.41         | 219  | 60.00      | -24.83     | vertical  | Average |
| 6    | 4744.00 | 37.40      | 36.26      | 14.87      | 40.41         | 219  | 80.00      | -31.88     | vertical  | Peak    |
| 7 pp | 4986.00 | 23.49      | 37.64      | 15.30      | 40.41         | 202  | 60.00      | -23.98     | vertical  | Average |
| 8 pk | 4986.00 | 42.81      | 37.64      | 15.30      | 40.41         | 202  | 80.00      | -24.66     | vertical  | Peak    |

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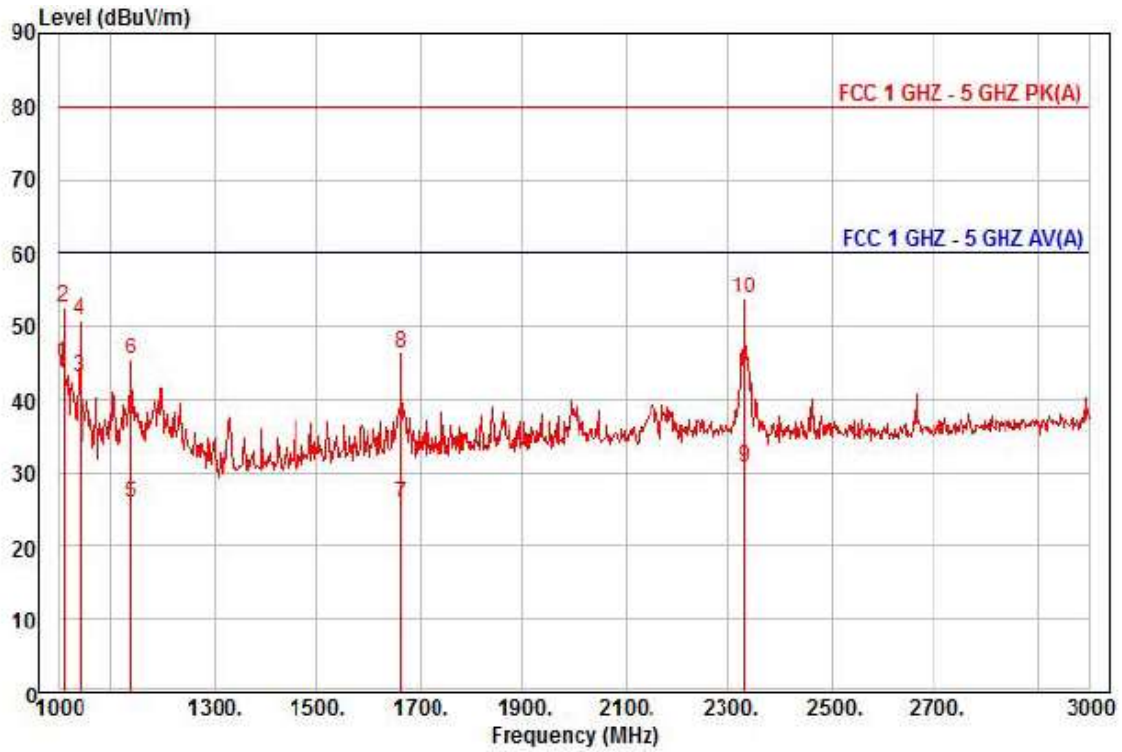


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## - LAN Mode



Site : chamber  
Condition: FCC 1 GHz - 5 GHz PK(A) 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : LAN  
Memo : 1 - 3 GHz

|       | Freq    | Read Level | Ant Factor | Cable Loss | Preamplifier Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|-------|---------|------------|------------|------------|---------------------|------|------------|------------|------------|---------|
|       | MHz     | dBuV       | dB/m       | dB         | dB                  | deg  | dBuV/m     | dB         |            |         |
| 1 pp  | 1008.00 | 54.73      | 23.94      | 6.53       | 40.12               | 288  | 60.00      | -14.92     | horizontal | Average |
| 2     | 1008.00 | 62.23      | 23.94      | 6.53       | 40.12               | 288  | 80.00      | -27.42     | horizontal | Peak    |
| 3     | 1040.00 | 52.26      | 24.07      | 6.63       | 40.10               | 302  | 60.00      | -17.14     | horizontal | Average |
| 4     | 1040.00 | 60.24      | 24.07      | 6.63       | 40.10               | 302  | 80.00      | -29.16     | horizontal | Peak    |
| 5     | 1138.00 | 34.48      | 24.46      | 6.91       | 40.05               | 308  | 60.00      | -34.20     | horizontal | Average |
| 6     | 1138.00 | 54.00      | 24.46      | 6.91       | 40.05               | 308  | 80.00      | -34.68     | horizontal | Peak    |
| 7     | 1664.00 | 30.62      | 26.55      | 8.43       | 39.79               | 339  | 60.00      | -34.19     | horizontal | Average |
| 8     | 1664.00 | 51.25      | 26.55      | 8.43       | 39.79               | 339  | 80.00      | -33.56     | horizontal | Peak    |
| 9     | 2332.00 | 31.80      | 28.69      | 9.86       | 39.82               | 278  | 60.00      | -29.47     | horizontal | Average |
| 10 pk | 2332.00 | 54.99      | 28.69      | 9.86       | 39.82               | 278  | 80.00      | -26.28     | horizontal | Peak    |

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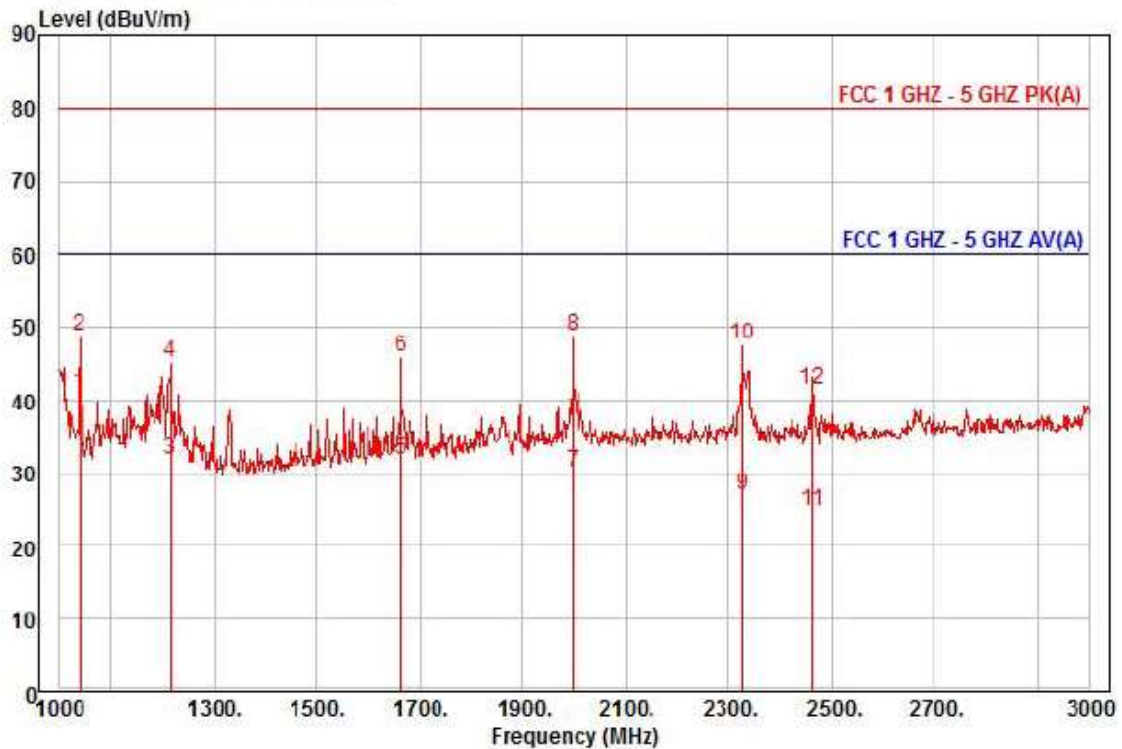
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Report No.:

KES-E1-16T0285-R2

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Site : chamber  
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : LAN  
Memo : 1 - 3 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamplifier | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|--------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB           | deg  | dBuV/m     | dB         |           |         |
| 1 pp | 1040.00 | 50.32      | 24.07      | 6.63       | 40.10        | 343  | 60.00      | -19.08     | vertical  | Average |
| 2    | 1040.00 | 58.25      | 24.07      | 6.63       | 40.10        | 343  | 80.00      | -31.15     | vertical  | Peak    |
| 3    | 1216.00 | 40.07      | 24.77      | 7.14       | 40.01        | 349  | 60.00      | -28.03     | vertical  | Average |
| 4    | 1216.00 | 53.12      | 24.77      | 7.14       | 40.01        | 349  | 80.00      | -34.98     | vertical  | Peak    |
| 5    | 1664.00 | 36.58      | 26.55      | 8.43       | 39.79        | 329  | 60.00      | -28.23     | vertical  | Average |
| 6    | 1664.00 | 50.70      | 26.55      | 8.43       | 39.79        | 329  | 80.00      | -34.11     | vertical  | Peak    |
| 7    | 1998.00 | 32.69      | 27.87      | 9.34       | 39.63        | 15   | 60.00      | -29.73     | vertical  | Average |
| 8 pk | 1998.00 | 51.33      | 27.87      | 9.34       | 39.63        | 15   | 80.00      | -31.09     | vertical  | Peak    |
| 9    | 2328.00 | 28.16      | 28.68      | 9.85       | 39.82        | 170  | 60.00      | -33.13     | vertical  | Average |
| 10   | 2328.00 | 48.92      | 28.68      | 9.85       | 39.82        | 170  | 80.00      | -32.37     | vertical  | Peak    |
| 11   | 2464.00 | 25.58      | 29.02      | 10.06      | 39.90        | 87   | 60.00      | -35.24     | vertical  | Average |
| 12   | 2464.00 | 42.34      | 29.02      | 10.06      | 39.90        | 87   | 80.00      | -38.48     | vertical  | Peak    |

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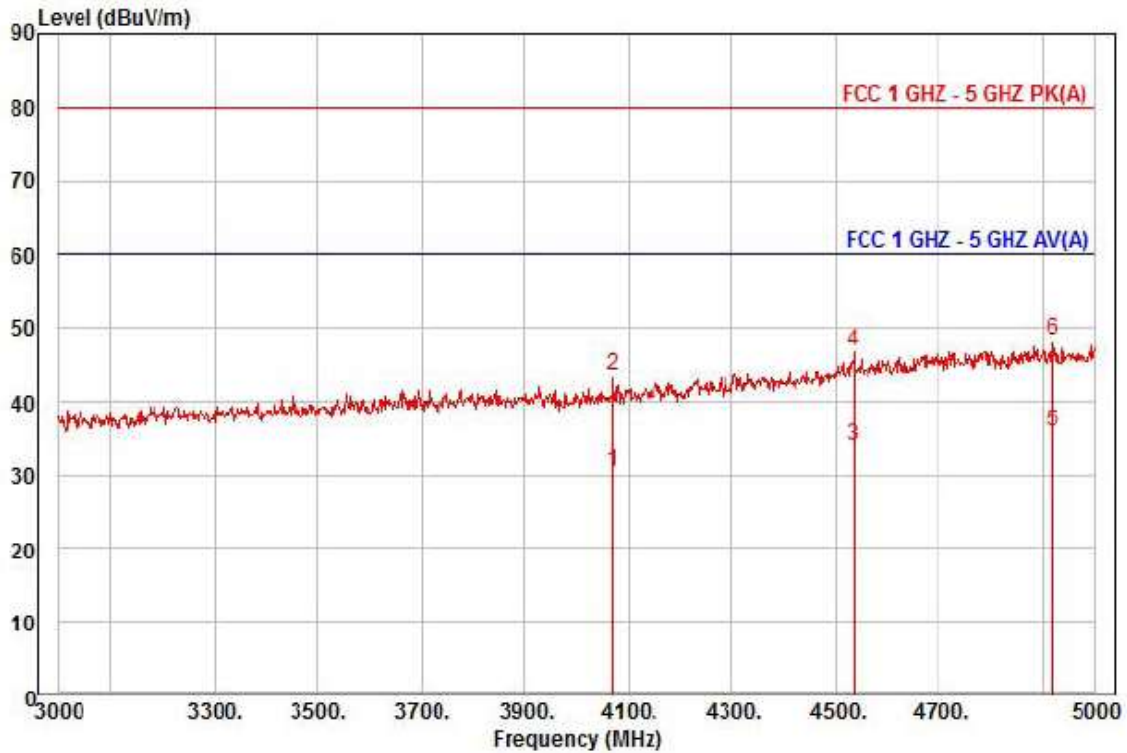




# KES Co., Ltd.

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Report No.:  
KES-E1-16T0285-R2  
Page (25) of (44)



Site : chamber  
Condition: FCC 1 GHz - 5 GHz PK(A) 3m HORN781(2015.05.07) horizontal  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : LAN  
Memo : 3 - 5 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase  | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|------------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |            |         |
| 1    | 4070.00 | 24.69      | 32.41      | 13.64      | 40.41         | 326  | 60.00      | -29.67     | horizontal | Average |
| 2    | 4070.00 | 37.65      | 32.41      | 13.64      | 40.41         | 326  | 80.00      | -36.71     | horizontal | Peak    |
| 3    | 4534.00 | 24.71      | 35.06      | 14.49      | 40.41         | 171  | 60.00      | -26.15     | horizontal | Average |
| 4    | 4534.00 | 37.82      | 35.06      | 14.49      | 40.41         | 171  | 80.00      | -33.04     | horizontal | Peak    |
| 5 pp | 4920.00 | 23.70      | 37.26      | 15.19      | 40.41         | 357  | 60.00      | -24.26     | horizontal | Average |
| 6 pk | 4920.00 | 36.29      | 37.26      | 15.19      | 40.41         | 357  | 80.00      | -31.67     | horizontal | Peak    |

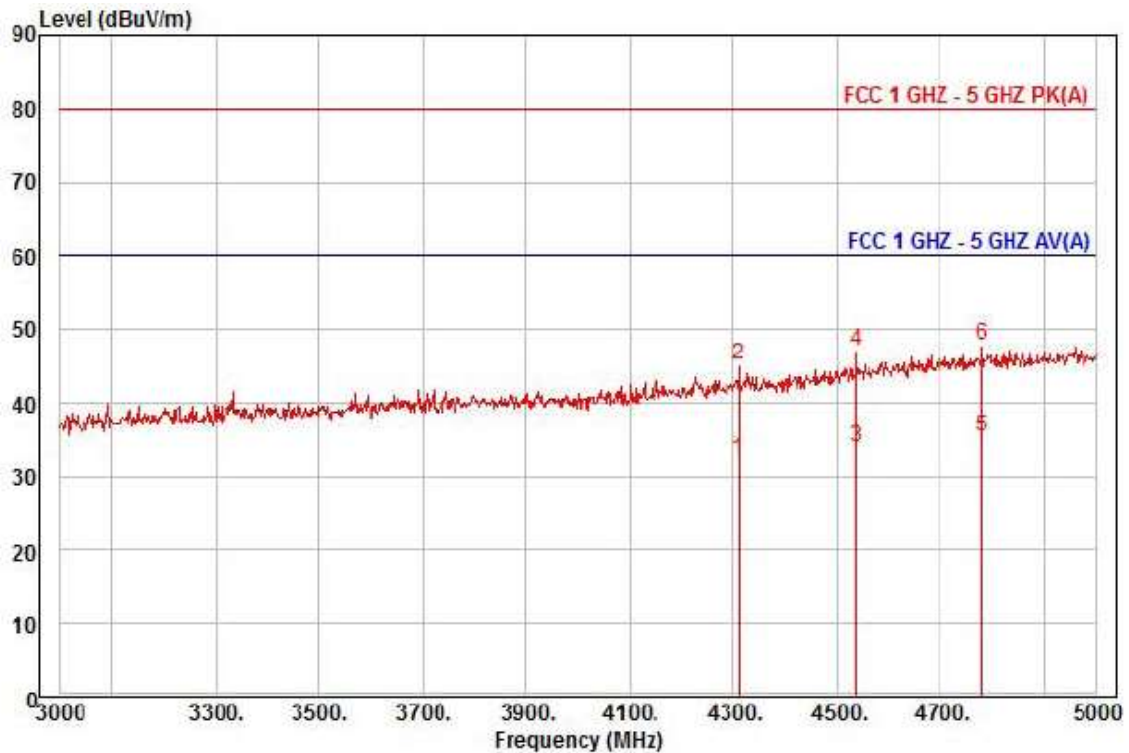
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Report No.:  
KES-E1-16T0285-R2  
Page (26) of (44)



Site : chamber  
Condition: FCC 1 GHZ - 5 GHZ PK(A) 3m HORN781(2015.05.07) vertical  
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto  
Project :  
Model : SPC-7000N  
Mode : LAN  
Memo : 3 - 5 GHz

|      | Freq    | Read Level | Ant Factor | Cable Loss | Preamp Factor | TPos | Limit Line | Over Limit | Pol/Phase | Remark  |
|------|---------|------------|------------|------------|---------------|------|------------|------------|-----------|---------|
|      | MHz     | dBuV       | dB/m       | dB         | dB            | deg  | dBuV/m     | dB         |           |         |
| 1    | 4312.00 | 24.73      | 33.79      | 14.08      | 40.41         | 66   | 60.00      | -27.81     | vertical  | Average |
| 2    | 4312.00 | 37.78      | 33.79      | 14.08      | 40.41         | 66   | 80.00      | -34.76     | vertical  | Peak    |
| 3    | 4536.00 | 24.75      | 35.07      | 14.49      | 40.41         | 186  | 60.00      | -26.10     | vertical  | Average |
| 4    | 4536.00 | 37.83      | 35.07      | 14.49      | 40.41         | 186  | 80.00      | -33.02     | vertical  | Peak    |
| 5 pp | 4780.00 | 24.27      | 36.46      | 14.93      | 40.41         | 58   | 60.00      | -24.75     | vertical  | Average |
| 6 pk | 4780.00 | 36.73      | 36.46      | 14.93      | 40.41         | 58   | 80.00      | -32.29     | vertical  | Peak    |

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## Test Setup Photos and Configuration

### Conducted Voltage Emissions

- USB Mode



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---

- LAN Mode





## **Radiated Electric Field Emissions(Below 1 GHz)**

- USB Mode



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- LAN Mode





## **Radiated Electric Field Emissions(Above 1 GHz)**

- USB Mode



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- LAN Mode



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## EUT External Photographs

(Top)



(Bottom)



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## **EUT Internal Photographs**

(Internal View)



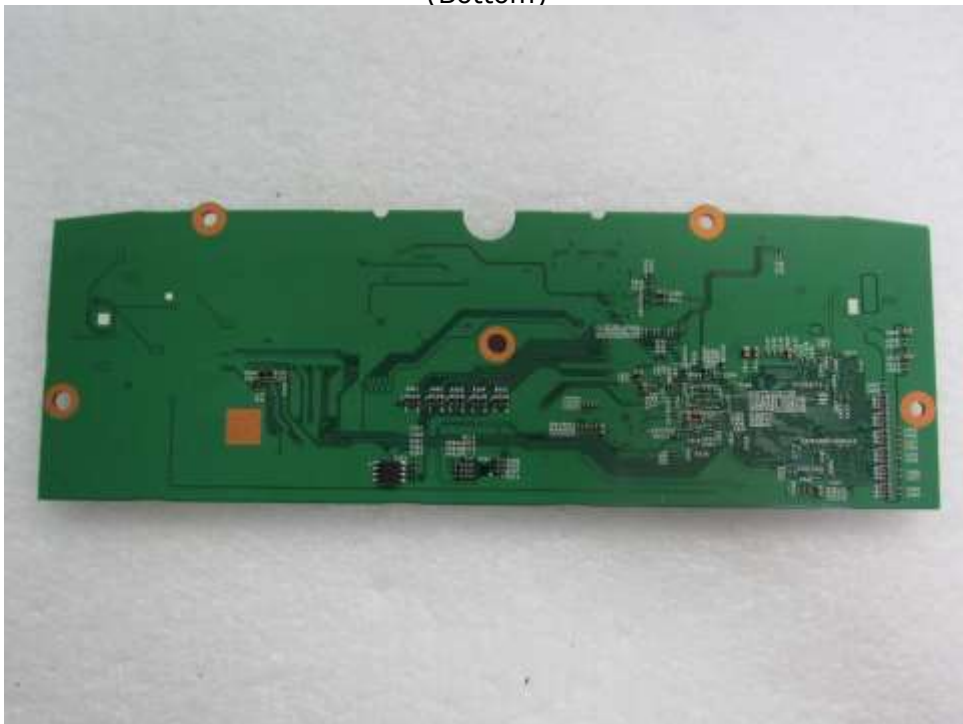


## **EUT Internal View – Main Board**

(Top)



(Bottom)

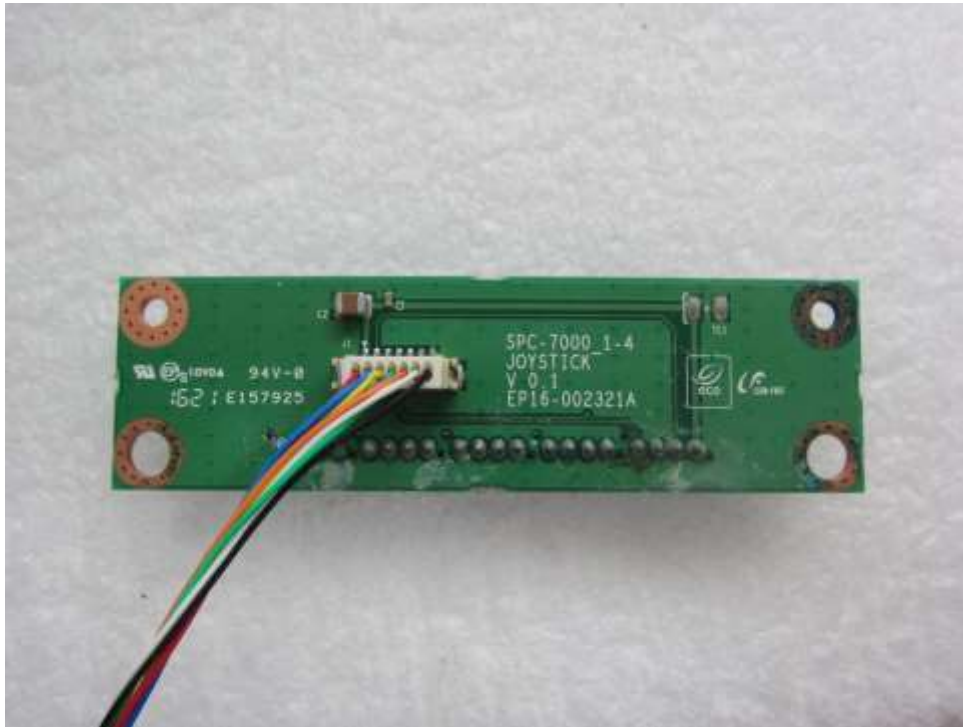


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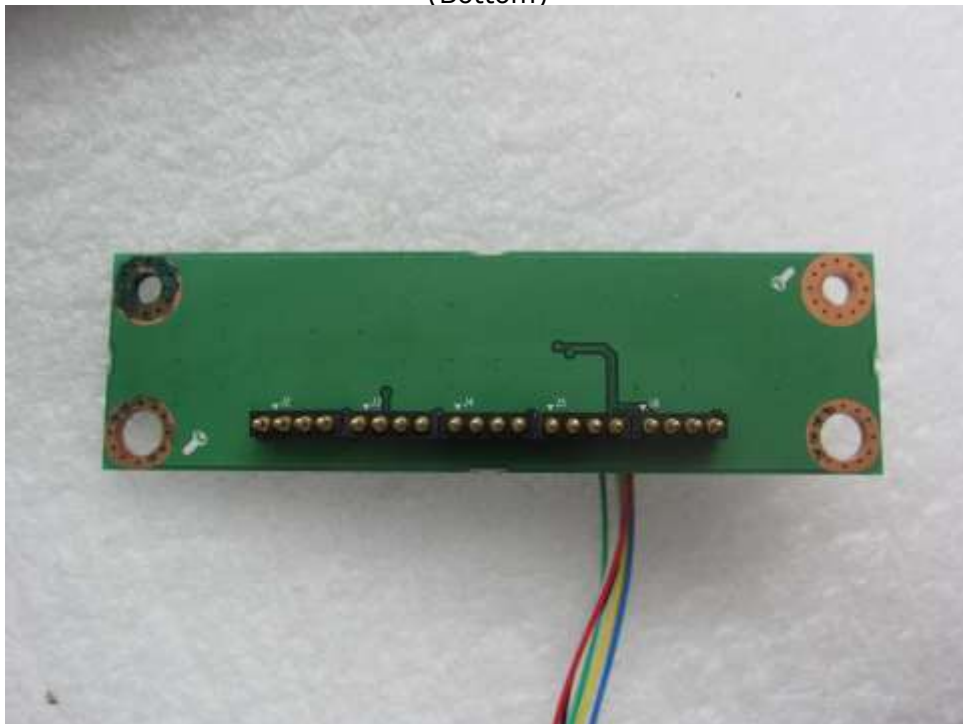


## EUT Internal View – Sub Board 1

(Top)



(Bottom)

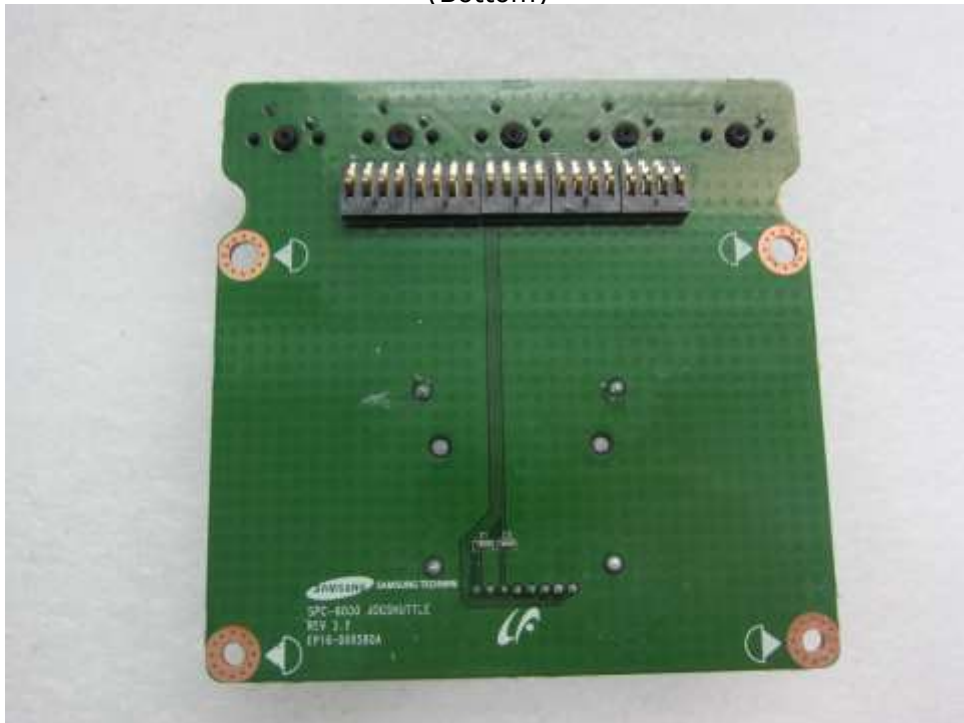


## EUT Internal View – Sub Board 2

(Top)



(Bottom)



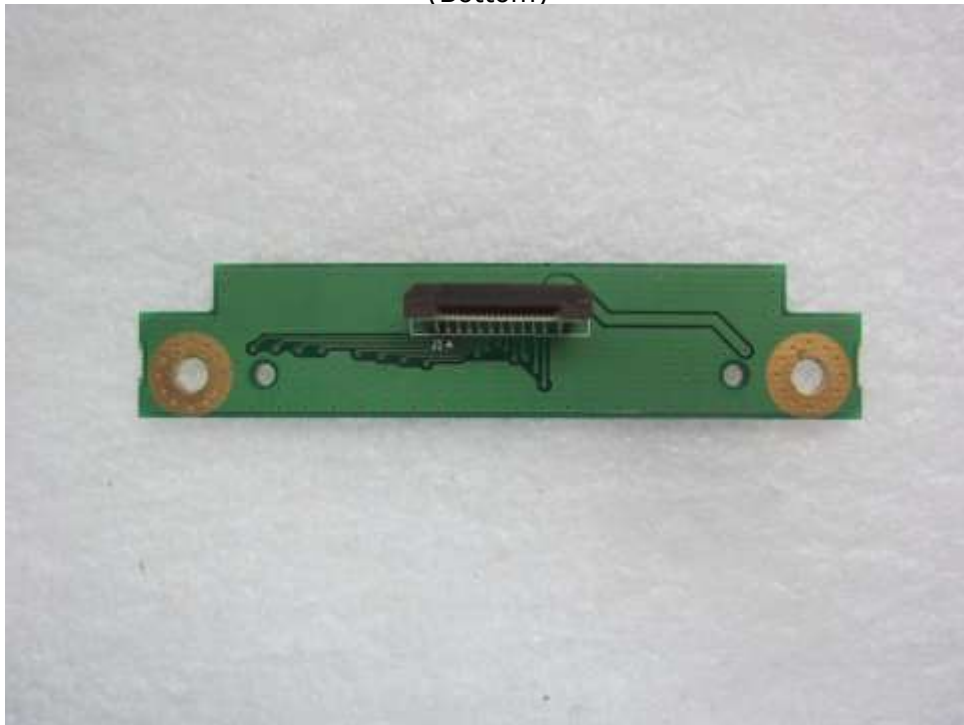
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## EUT Internal View – Sub Board 3

(Top)

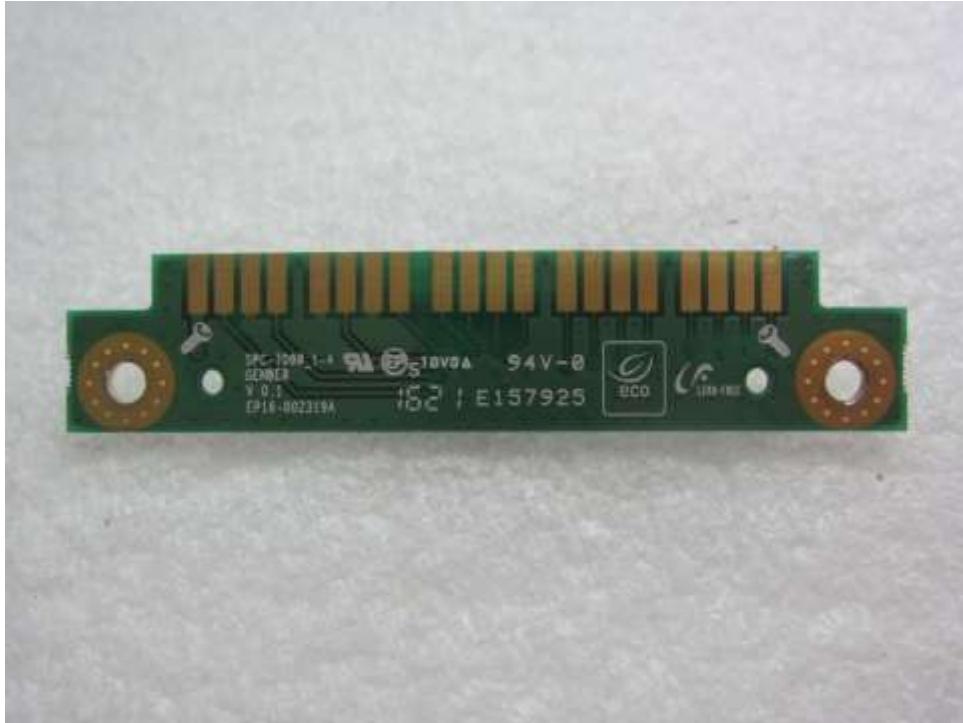


(Bottom)

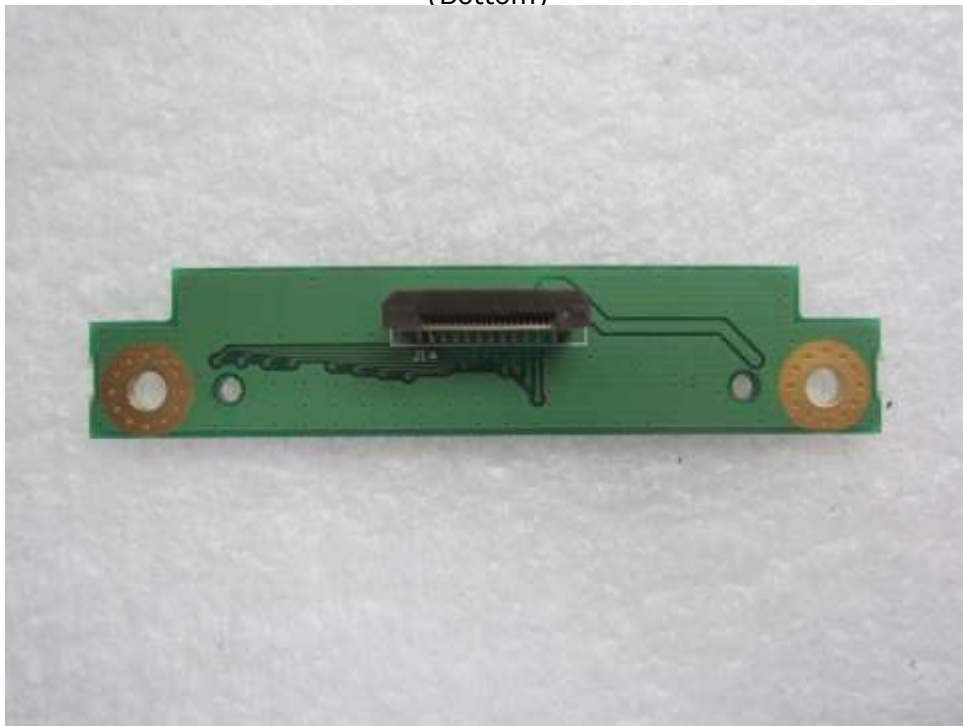


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### **EUT Internal View – Sub Board 4** (Top)



(Bottom)



### **EUT Internal View – Sub Board 5**

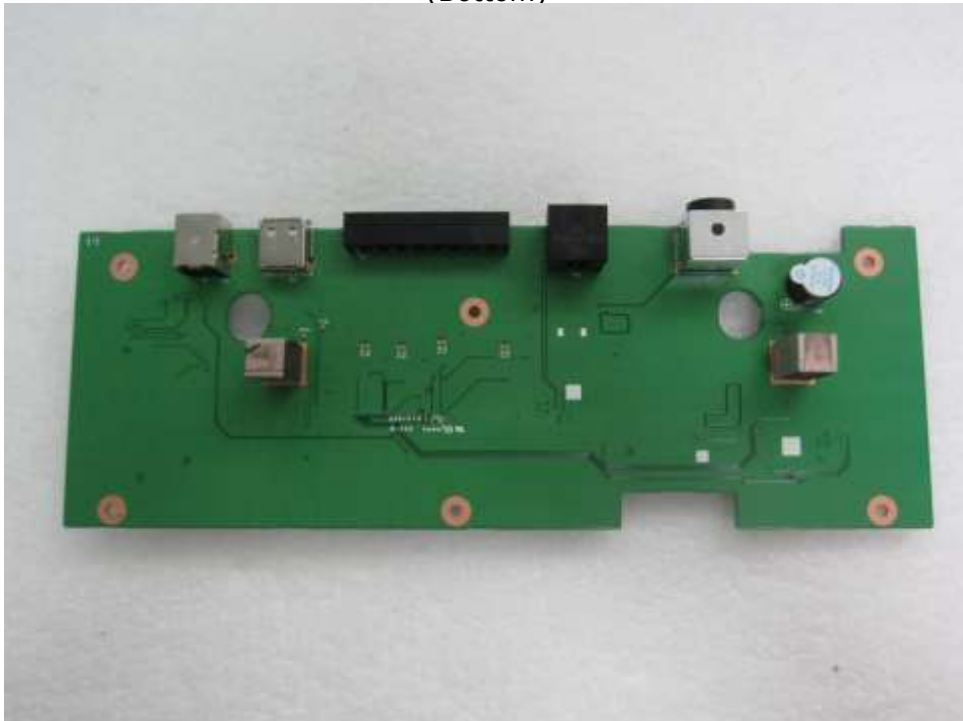
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(Top)



(Bottom)

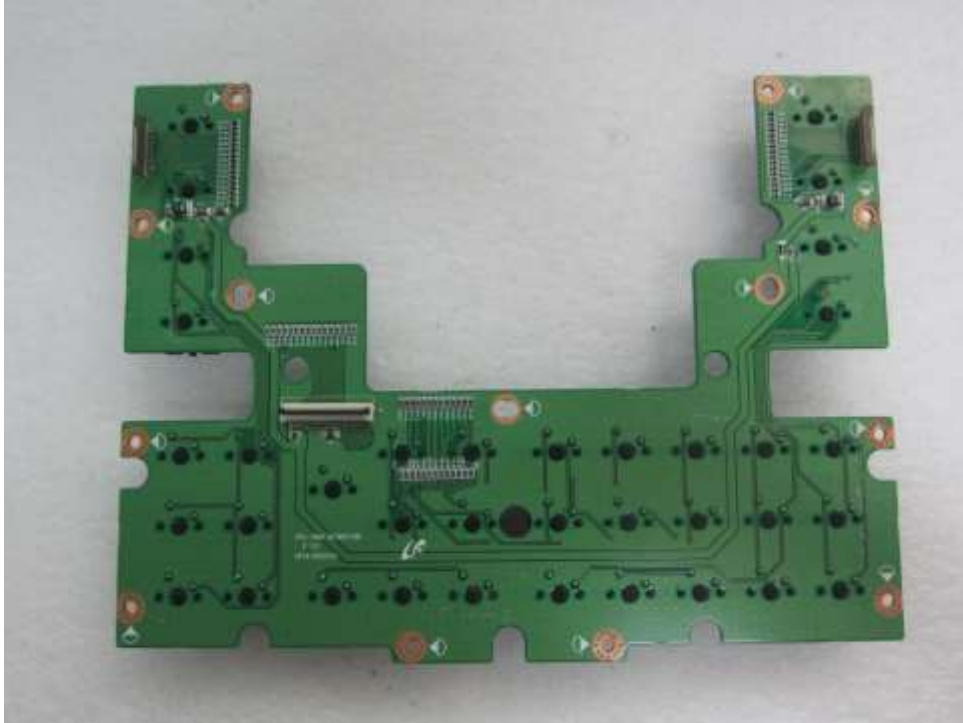


## EUT Internal View – Sub Board 6

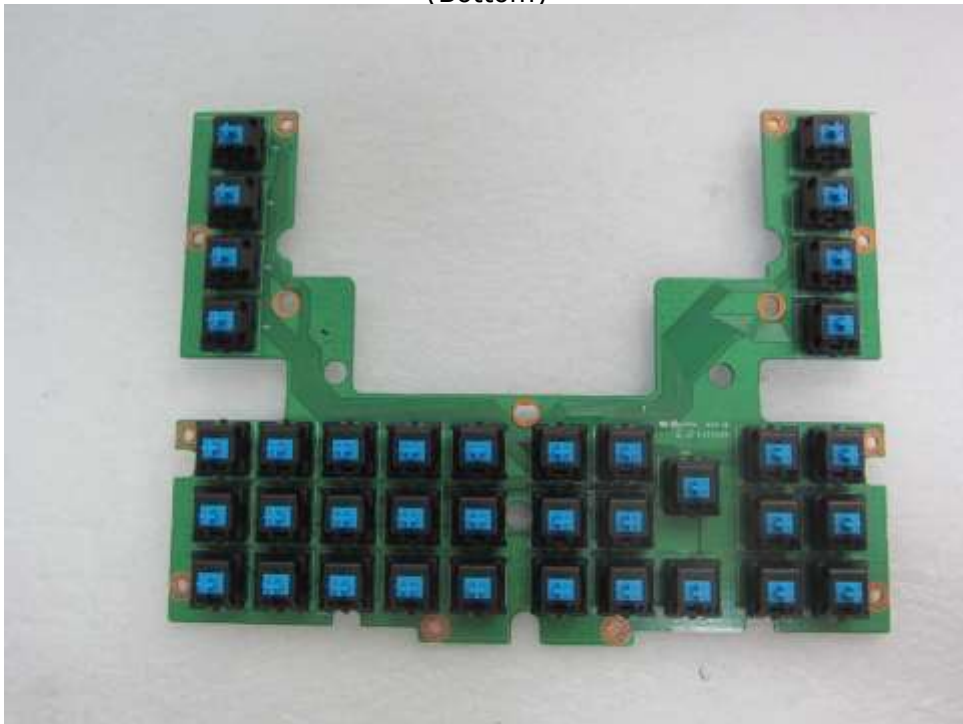
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(Top)



(Bottom)

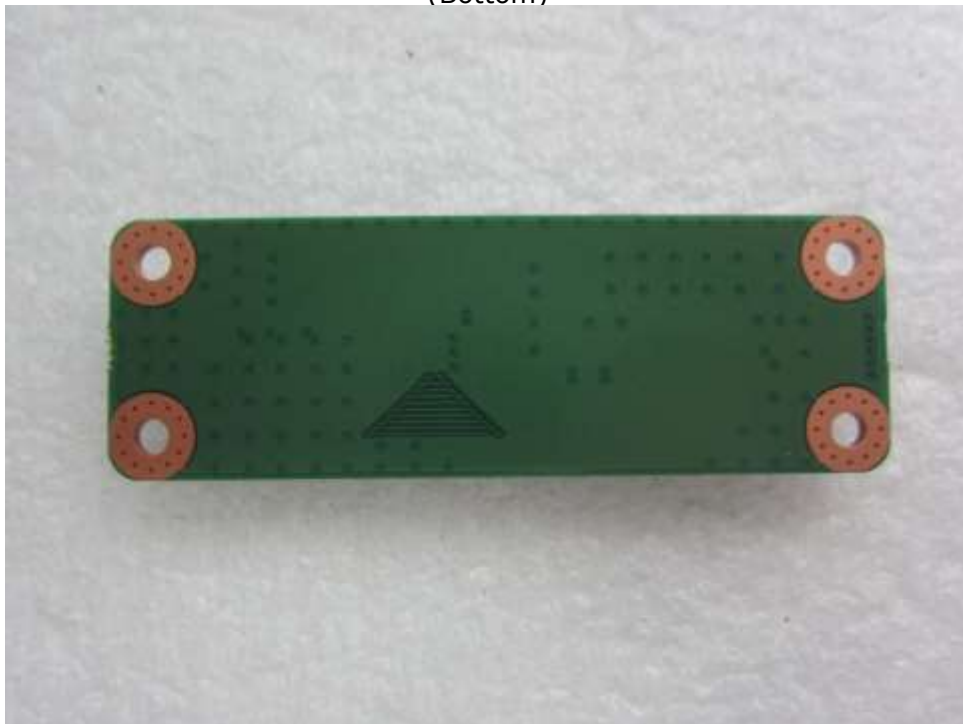


## EUT Internal View – Sub Board 7

(Top)



(Bottom)



## EUT Internal View – Adaptor

(Top)



(Bottom)



## Label Photographs



This device complies with part 15 of the FCC Rules. Operation in subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.