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# Report On

EMC Evaluation of  
NantWorks  
HBox Access Point for Medical Devices

FCC Part 15 Subpart B  
ICES-003 Issue 5

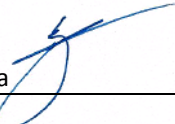
Report No. SD72106517-0515E Rev.1

July 2015



America

TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121  
Tel: (858) 678-1400. Website: [www.TUVamerica.com](http://www.TUVamerica.com)

|                    |                                                                                                                                                                                                    |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REPORT ON          | EMC Evaluation of the<br>NantWorks<br>HBox Access Point for Medical Devices                                                                                                                        |
| TEST REPORT NUMBER | SD72106517-0515E Rev.1                                                                                                                                                                             |
| TEST REPORT DATE   | July 2015                                                                                                                                                                                          |
| PREPARED FOR       | NantWorks<br>9920 Jefferson Blvd.<br>Culver City, CA 90232                                                                                                                                         |
| CONTACT PERSON     | David Lu<br>Principal Engineer<br>dlu@nantworks.com<br>(858) 735-6852                                                                                                                              |
| PREPARED BY        | <br>_____<br>Ivan Retana<br>Name<br>Title: EMC Test Engineer                                                    |
| APPROVED BY        | <br>_____<br>Juan Manuel Gonzalez<br>Name<br>Authorized Signatory<br>Title: Commercial/Wireless EMC Lab Manager |
| DATED              | _____<br>July 15, 2105                                                                                                                                                                             |



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#### Revision History

| SD72106517-0515E Rev.1<br>NantWorks<br>200-HBX-PDL rev 1<br>HBox Access Point for Medical Devices |                 |              |                       |                |                  |
|---------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------------|----------------|------------------|
| DATE                                                                                              | OLD REVISION    | NEW REVISION | REASON                | PAGES AFFECTED | APPROVED BY      |
| 06/24/2015                                                                                        | Initial Release |              |                       |                | Juan M. Gonzalez |
| 07/15/2015                                                                                        |                 | Rev.1        | Model name correction | 5              | Alex Chang       |
|                                                                                                   |                 |              |                       |                |                  |
|                                                                                                   |                 |              |                       |                |                  |
|                                                                                                   |                 |              |                       |                |                  |



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## **SECTION 1**

### **REPORT SUMMARY**

EMC Evaluation of the  
NantWorks  
Access Point for Medical Devices



## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the NantWorks HBox Access Point for Medical Devices to the requirements of FCC Part 15 Subpart B and Industry Canada ICES-003.

|                                     |                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                           | To perform EMC Evaluation to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.                                                                                                                                            |
| Manufacturer                        | NantWorks                                                                                                                                                                                                                                                                                         |
| Model Name                          | HBox                                                                                                                                                                                                                                                                                              |
| Model Number(s)                     | 200-HBX-PDL rev 1                                                                                                                                                                                                                                                                                 |
| FCC ID Number:                      | IFU1001012                                                                                                                                                                                                                                                                                        |
| Serial Number(s)                    | 5                                                                                                                                                                                                                                                                                                 |
| Number of Samples Tested            | 1                                                                                                                                                                                                                                                                                                 |
| Highest Frequency Generated or Used | 5825 MHz                                                                                                                                                                                                                                                                                          |
| Test Specification/Issue/Date       | <ul style="list-style-type: none"><li>• FCC Part 15 Subpart B (October 1, 2014)</li><li>• Spectrum Management and Telecommunications Interference-Causing Equipment Standard ICES-003 Information Technology Equipment (ITE) — Limits and methods of measurement (Issue 5 August 2012).</li></ul> |
| Start of Test                       | April 28, 2015                                                                                                                                                                                                                                                                                    |
| Finish of Test                      | April 28, 2015                                                                                                                                                                                                                                                                                    |
| Name of Engineer(s)                 | Ivan Retana                                                                                                                                                                                                                                                                                       |
| Related Document(s)                 | None                                                                                                                                                                                                                                                                                              |

**1.2 BRIEF SUMMARY OF RESULTS**

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart B is shown below. Test results from these tests are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003.

| Part 15 | Test Description    | Result    | Comments/Base Standard |
|---------|---------------------|-----------|------------------------|
| §15.107 | Conducted Emissions | Compliant | Class B requirement    |
| §15.109 | Radiated Emissions  | Compliant | Class B requirement    |

Note: All verifications performed on model 200-HBV-PDL. The two models 200-HBV-PDL and HBox are identical except that 200-HBV-PDL has CDMA2000 and ISM900 RF modules and HBox unit does not have.



### **1.3 PRODUCT INFORMATION**

#### **1.3.1 Technical Description**

The Equipment Under Test (EUT) was a NantWorks HBox Access Point for Medical Devices. The EUT can connect to a network through Ethernet port or Wi-Fi. In normal operation, the EUT collects user data via USB, Bluetooth or Wi-Fi and upload the information back to a data server. The NFC function is for quick Bluetooth pairing by obtaining the device info when within NFC range of the EUT.

#### **1.3.2 Labelling Requirement for Industry Canada**

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Industry Canada ICES-003. Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

Industry Canada ICES-003 Compliance Label

CAN ICES-3 (B)/NMB-3(B)

#### **1.3.3 Labelling Requirement for Part 15 Device**

See FCC Publication Number: 784748 for details:

<https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=27980&switch=P>

## 1.4 EUT TEST CONFIGURATION

### 1.4.1 Test Configuration Description

| Test Configuration | Description                                                     |
|--------------------|-----------------------------------------------------------------|
| Default            | Normal test operation. EUT powered and all I/O ports populated. |

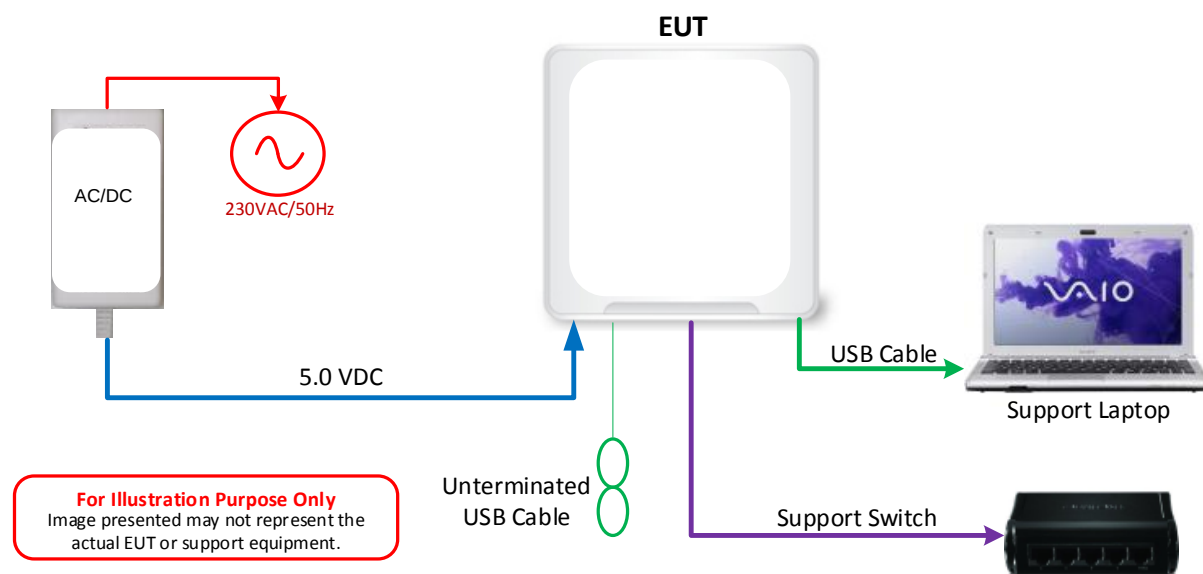
### 1.4.2 EUT Exercise Software

None. No special software was used to exercise the EUT during verification

### 1.4.3 Support Equipment and I/O cables

| Manufacturer | Equipment/Cable                     | Description                           |
|--------------|-------------------------------------|---------------------------------------|
| Sony         | Personal Computer (Y Series Laptop) | PCG-31311L                            |
| Sony         | AC Adapter                          | PCGA-AC19V9                           |
| HON-KWANG    | Switching Power Supply (x2)         | HK-AD-050A500-US                      |
| Trendnet     | Broadband Router                    | TW100-S4W1CA,                         |
| Generic      | CAT5E Cable                         | Unshielded, 1.5 meters Ethernet cable |
| Generic      | USB cable                           | Shielded, 1.7m generic USB cable      |

### 1.4.4 Simplified Test Configuration Diagram



**1.5 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standards or test plan were made during testing.

**1.6 MODIFICATION RECORD**

| Description of Modification | Modification Fitted By | Date Modification Fitted |
|-----------------------------|------------------------|--------------------------|
| Serial Number: 5            |                        |                          |
| N/A                         |                        |                          |

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

**1.7 TEST METHODOLOGY**

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

For radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

**1.8 TEST FACILITY****1.8.1 FCC – Registration No.: US1146**

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

**1.8.2 Industry Canada (IC) Registration No.: 3067A**

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.



## **SECTION 2**

### **TEST DETAILS**

EMC Evaluation of the  
NantWorks  
Access Point for Medical Devices



## 2.1 CONDUCTED EMISSIONS

### 2.1.1 Specification Reference

Part 15 Subpart B §15.107(a)

### 2.1.2 Standard Applicable

Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|------------------------------|-----------|
|                             | Quasi-peak                   | Average   |
| 0.15–0.5                    | 66 to 56*                    | 56 to 46* |
| 0.5–5                       | 56                           | 46        |
| 5–30                        | 60                           | 50        |

\*Decreases with the logarithm of the frequency.

### 2.1.3 Equipment Under Test and Modification State

Serial No: 5 /Default Test Configuration

### 2.1.4 Date of Test/Initial of test personnel who performed the test

April 28, 2015/IR

### 2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.1.6 Environmental Conditions/Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

|                     |          |
|---------------------|----------|
| Ambient Temperature | 23.7°C   |
| Relative Humidity   | 45.2.%   |
| ATM Pressure        | 99.9 kPa |

### 2.1.7 Additional Observations

- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.1.8 for sample computation.

**2.1.8 Sample Computation (Conducted Emission – Quasi Peak)**

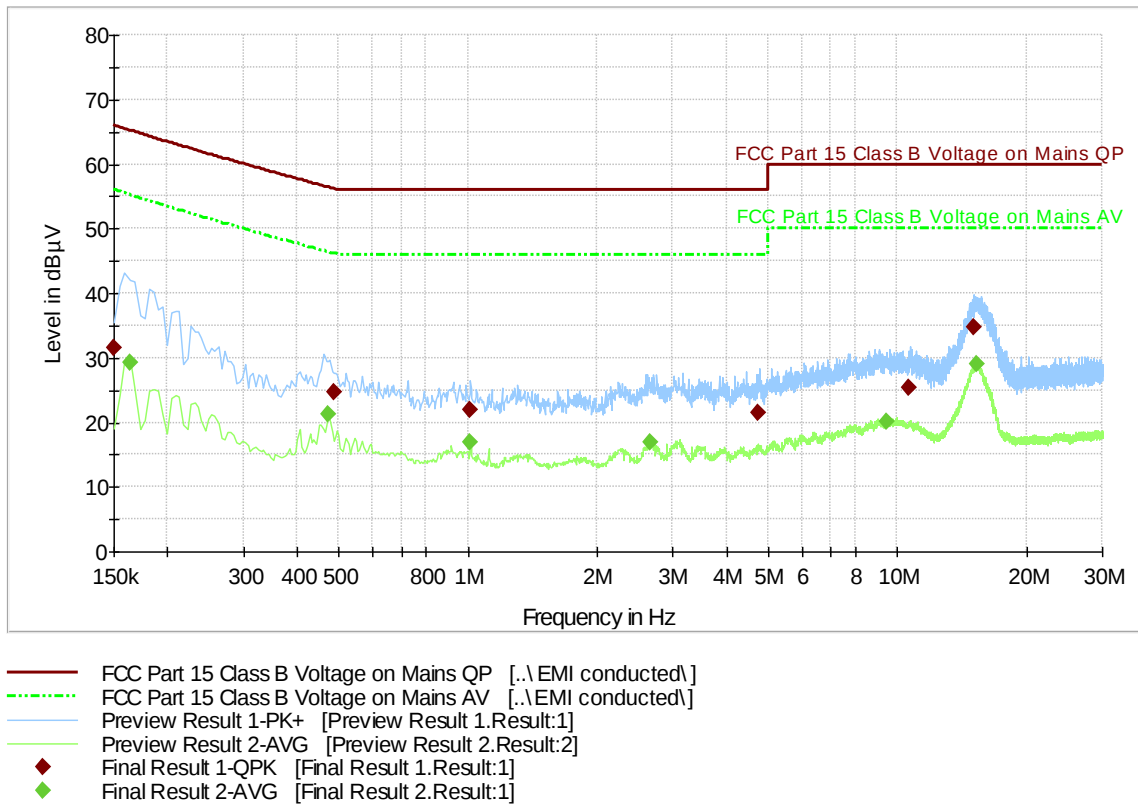
|                                                            |                                |      |      |
|------------------------------------------------------------|--------------------------------|------|------|
| Measuring equipment raw measurement (db $\mu$ V) @ 150kHz  |                                |      | 5.5  |
| Correction Factor (dB)                                     | Asset# 8607 (20 dB attenuator) | 19.9 | 20.7 |
|                                                            | Asset# 1177 (cable)            | 0.15 |      |
|                                                            | Asset# 1176 (cable)            | 0.35 |      |
|                                                            | Asset# 7568 (LISN)             | 0.30 |      |
| Reported QuasiPeak Final Measurement (db $\mu$ V) @ 150kHz |                                |      | 26.2 |

**2.1.9 Test Results**

Compliant. See attached plots and tables.

## 2.1.10 Line 1 (120V/60Hz – Hot)

TUV SR7 Line 1 ESCS



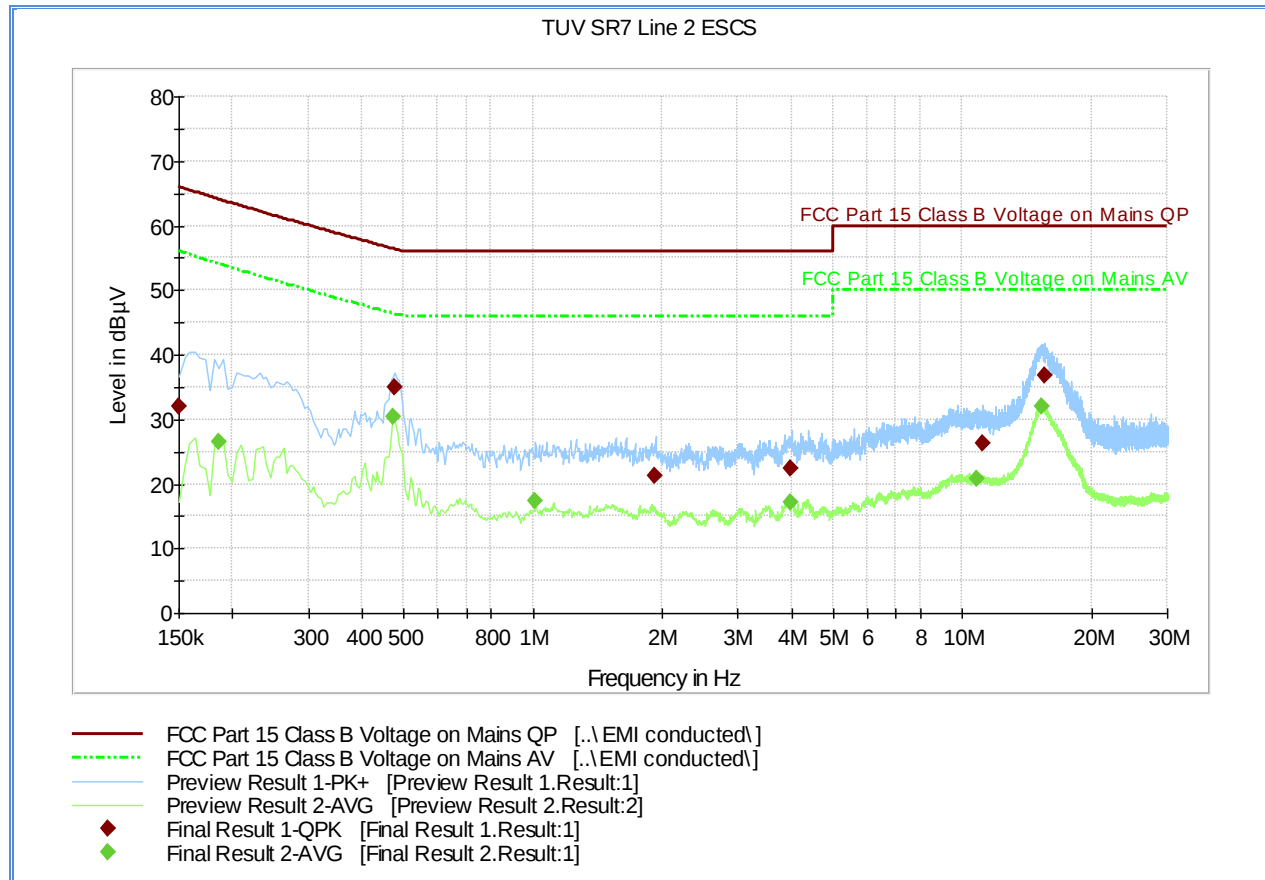
## Quasi Peak Data

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.150000        | 31.6             | 1000.0          | 9.000           | Off    | L1   | 20.1       | 34.4              | 66.0               |
| 0.487500        | 24.7             | 1000.0          | 9.000           | Off    | L1   | 20.1       | 31.5              | 56.2               |
| 1.014000        | 21.9             | 1000.0          | 9.000           | Off    | L1   | 20.2       | 34.1              | 56.0               |
| 4.722000        | 21.6             | 1000.0          | 9.000           | Off    | L1   | 20.6       | 34.4              | 56.0               |
| 10.671000       | 25.4             | 1000.0          | 9.000           | Off    | L1   | 20.7       | 34.6              | 60.0               |
| 15.076500       | 34.8             | 1000.0          | 9.000           | Off    | L1   | 20.9       | 25.2              | 60.0               |

## Average Data

| Frequency (MHz) | Average (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBμV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.163500        | 29.3           | 1000.0          | 9.000           | Off    | L1   | 20.1       | 25.9              | 55.2               |
| 0.474000        | 21.2           | 1000.0          | 9.000           | Off    | L1   | 20.1       | 25.2              | 46.4               |
| 1.014000        | 17.0           | 1000.0          | 9.000           | Off    | L1   | 20.2       | 29.0              | 46.0               |
| 2.661000        | 16.9           | 1000.0          | 9.000           | Off    | L1   | 20.5       | 29.1              | 46.0               |
| 9.433500        | 20.1           | 1000.0          | 9.000           | Off    | L1   | 20.7       | 29.9              | 50.0               |
| 15.310500       | 28.9           | 1000.0          | 9.000           | Off    | L1   | 20.9       | 21.1              | 50.0               |

## 2.1.11 Line 2 (120V/60Hz – Neutral)



## Quasi Peak Data

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - QPK (dB) | Limit - QPK (dBµV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.150000        | 32.1             | 1000.0          | 9.000           | Off    | N    | 20.1       | 33.9              | 66.0               |
| 0.478500        | 35.0             | 1000.0          | 9.000           | Off    | N    | 20.1       | 21.4              | 56.3               |
| 1.927500        | 21.1             | 1000.0          | 9.000           | Off    | N    | 20.1       | 34.9              | 56.0               |
| 3.975000        | 22.3             | 1000.0          | 9.000           | Off    | N    | 20.5       | 33.7              | 56.0               |
| 11.134500       | 26.3             | 1000.0          | 9.000           | Off    | N    | 20.7       | 33.7              | 60.0               |
| 15.513000       | 36.9             | 1000.0          | 9.000           | Off    | N    | 20.7       | 23.1              | 60.0               |

## Average Data

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin - Ave (dB) | Limit - Ave (dBµV) |
|-----------------|----------------|-----------------|-----------------|--------|------|------------|-------------------|--------------------|
| 0.186000        | 26.4           | 1000.0          | 9.000           | Off    | N    | 20.1       | 27.6              | 54.1               |
| 0.474000        | 30.4           | 1000.0          | 9.000           | Off    | N    | 20.1       | 16.0              | 46.4               |
| 1.014000        | 17.3           | 1000.0          | 9.000           | Off    | N    | 20.2       | 28.7              | 46.0               |
| 3.966000        | 17.1           | 1000.0          | 9.000           | Off    | N    | 20.5       | 28.9              | 46.0               |
| 10.770000       | 20.8           | 1000.0          | 9.000           | Off    | N    | 20.6       | 29.2              | 50.0               |
| 15.310500       | 32.0           | 1000.0          | 9.000           | Off    | N    | 20.7       | 18.0              | 50.0               |



## **2.2 RADIATED EMISSIONS**

### **2.2.1 Specification Reference**

Part 15 Subpart B §15.109(a)

### **2.2.2 Standard Applicable**

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of emission (MHz) | Field Strength (microvolts/meter) |
|-----------------------------|-----------------------------------|
| 30-88                       | 100                               |
| 88-216                      | 150                               |
| 216-960                     | 200                               |
| Above 960                   | 500                               |

### **2.2.3 Equipment Under Test and Modification State**

Serial No: 5 / Default Test Configuration

### **2.2.4 Date of Test/Initial of test personnel who performed the test**

April 28, 2015/IR

### **2.2.5 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.2.6 Environmental Conditions/Test Location**

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

|                     |          |
|---------------------|----------|
| Ambient Temperature | 23.7°C   |
| Relative Humidity   | 45.2%    |
| ATM Pressure        | 99.9 kPa |

### **2.2.7 Additional Observations**

- The spectrum was searched from 30MHz to 18GHz and verified to Class B limits. There are no spurious emissions observed above 3GHz when in "Receive" mode.
- Verifications are performed at 3 meters.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.2.8 for sample computation.

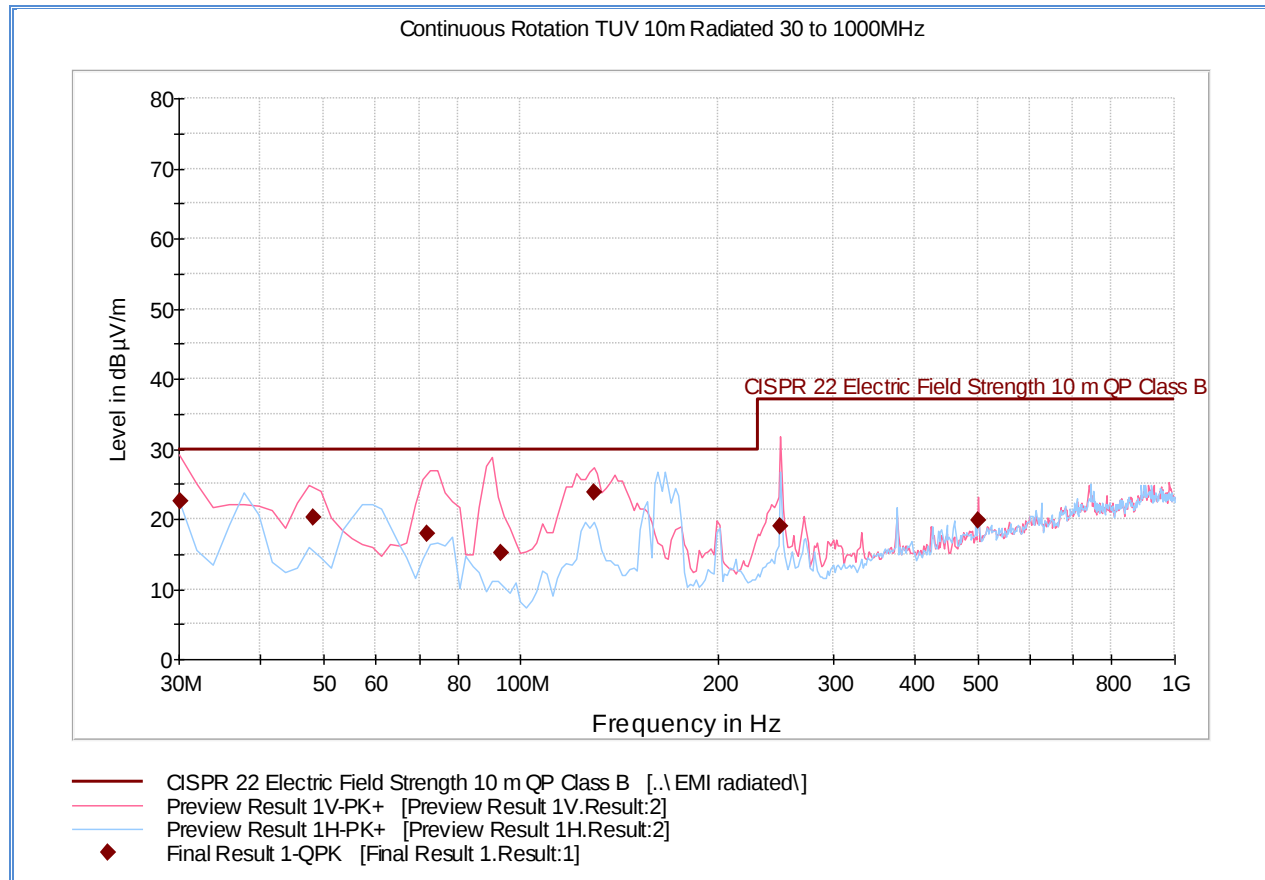
**2.2.8** Sample Computation (Radiated Emission)

|                                                             |                            |       |       |
|-------------------------------------------------------------|----------------------------|-------|-------|
| Measuring equipment raw measurement (db $\mu$ V) @ 30 MHz   |                            |       | 24.4  |
| Correction Factor (dB)                                      | Asset# 1066 (cable)        | 0.3   | -12.6 |
|                                                             | Asset# 1172 (cable)        | 0.3   |       |
|                                                             | Asset# 1016 (preamplifier) | -30.7 |       |
|                                                             | Asset# 1175(cable)         | 0.3   |       |
|                                                             | Asset# 1002 (antenna)      | 17.2  |       |
| Reported QuasiPeak Final Measurement (db $\mu$ V/m) @ 30MHz |                            |       | 11.8  |

**2.2.9** Test Results

Compliant. See attached plots.

### 2.2.9.1 Below 1GHz Radiated Emission Test

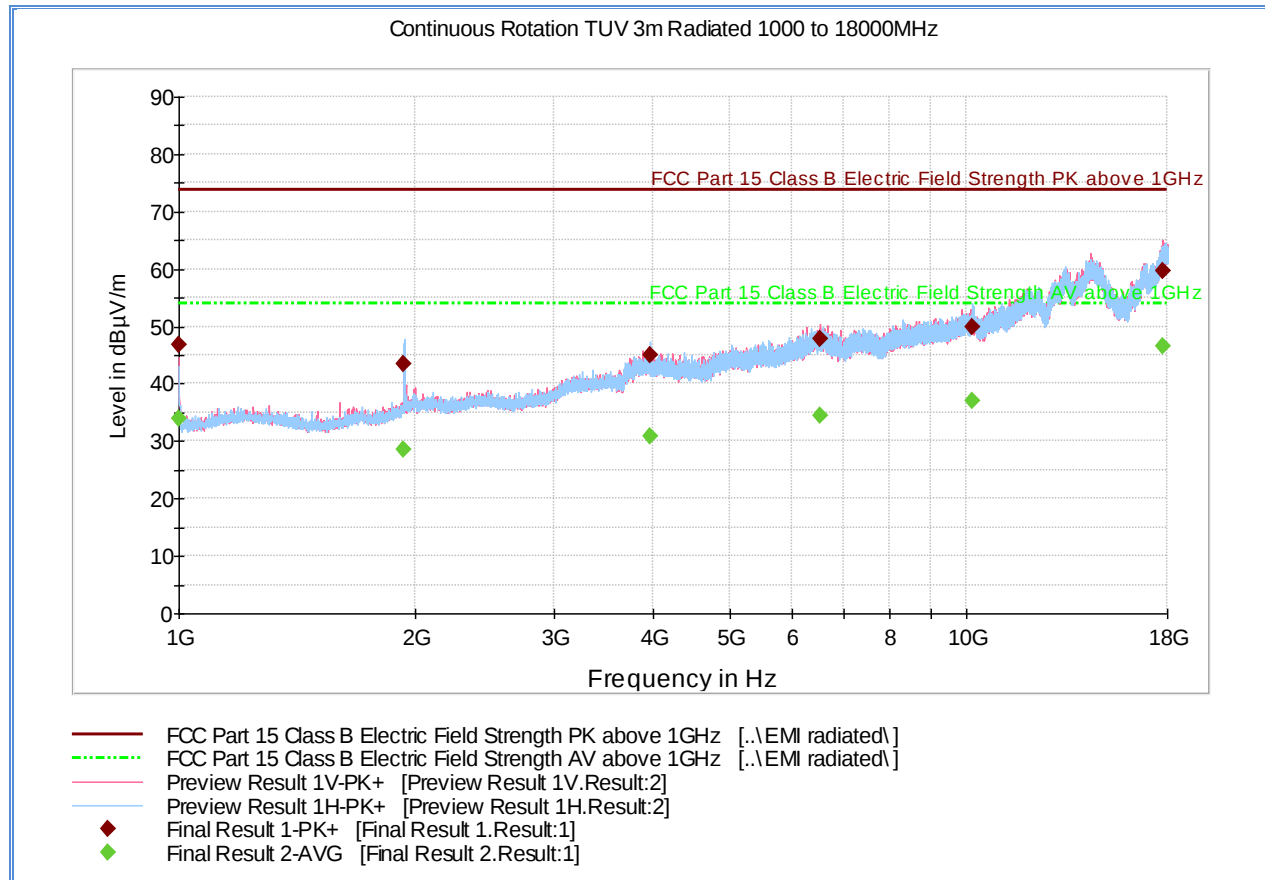


Note: FCC Accepts CISPR 22 by §15.38 Incorporation by reference.

#### Quasi-Peak Data

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 30.080000       | 22.5               | 1000.0          | 120.000         | 100.0       | V            | 263.0         | -13.1      | 7.5         | 30.0           |
| 48.134990       | 20.2               | 1000.0          | 120.000         | 105.0       | V            | 104.0         | -21.1      | 9.8         | 30.0           |
| 71.925531       | 18.0               | 1000.0          | 120.000         | 400.0       | V            | 284.0         | -23.1      | 12.0        | 30.0           |
| 93.460521       | 15.2               | 1000.0          | 120.000         | 109.0       | V            | -14.0         | -21.5      | 14.8        | 30.0           |
| 129.298277      | 23.9               | 1000.0          | 120.000         | 128.0       | V            | 87.0          | -22.5      | 6.1         | 30.0           |
| 249.899319      | 18.9               | 1000.0          | 120.000         | 150.0       | V            | 189.0         | -15.5      | 18.1        | 37.0           |
| 500.020842      | 19.7               | 1000.0          | 120.000         | 100.0       | V            | 296.0         | -8.6       | 17.3        | 37.0           |

### 2.2.9.2 Above 1GHz Radiated Emission Test



#### Peak Data

| Frequency (MHz) | Max Peak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|-------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 46.9              | 1000.0          | 1000.000        | 256.4       | V            | 211.0         | -10.5      | 27.0        | 73.9           |
| 1932.533333     | 43.4              | 1000.0          | 1000.000        | 354.2       | H            | 272.0         | -5.9       | 30.5        | 73.9           |
| 3967.866667     | 44.9              | 1000.0          | 1000.000        | 403.6       | H            | 211.0         | 3.8        | 29.0        | 73.9           |
| 6512.366667     | 47.8              | 1000.0          | 1000.000        | 279.3       | V            | 200.0         | 9.7        | 26.1        | 73.9           |
| 10191.333333    | 49.9              | 1000.0          | 1000.000        | 201.3       | H            | 3.0           | 13.5       | 24.0        | 73.9           |
| 17797.533333    | 59.7              | 1000.0          | 1000.000        | 303.5       | V            | 192.0         | 26.1       | 14.2        | 73.9           |

#### Average Data

| Frequency (MHz) | Average (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|
| 1000.000000     | 33.9             | 1000.0          | 1000.000        | 256.4       | V            | 211.0         | -10.5      | 20.0        | 53.9           |
| 1932.533333     | 28.6             | 1000.0          | 1000.000        | 354.2       | H            | 272.0         | -5.9       | 25.3        | 53.9           |
| 3967.866667     | 31.0             | 1000.0          | 1000.000        | 403.6       | H            | 211.0         | 3.8        | 22.9        | 53.9           |
| 6512.366667     | 34.5             | 1000.0          | 1000.000        | 279.3       | V            | 200.0         | 9.7        | 19.4        | 53.9           |
| 10191.333333    | 37.0             | 1000.0          | 1000.000        | 201.3       | H            | 3.0           | 13.5       | 16.9        | 53.9           |
| 17797.533333    | 46.6             | 1000.0          | 1000.000        | 303.5       | V            | 192.0         | 26.1       | 7.3         | 53.9           |



### **SECTION 3**

#### **TEST EQUIPMENT USED**

**3.1 TEST EQUIPMENT USED**

List of absolute measuring and other principal items of test equipment.

| ID Number<br>(SDGE/SDRB)   | Test Equipment                       | Type                | Serial Number | Manufacturer               | Cal Date | Cal Due Date |
|----------------------------|--------------------------------------|---------------------|---------------|----------------------------|----------|--------------|
| <b>Radiated Test Setup</b> |                                      |                     |               |                            |          |              |
| 1002                       | Bilog Antenna                        | 3142C               | 00058717      | ETS-Lindgren               | 01/30/14 | 01/30/16     |
| 1051                       | Double-ridged waveguide horn antenna | 3115                | 9408-4329     | EMCO                       | 02/28/14 | 02/28/16     |
| 8628                       | Pre-amplifier                        | QLJ 01182835-JO     | 8986002       | QuinStar Technologies Inc. | 03/20/15 | 03/20/16     |
| 1040                       | EMI Test Receiver                    | ESIB40              | 100292        | Rhode & Schwarz            | 09/29/14 | 09/29/15     |
| 1049                       | EMI Test Receiver                    | ESU                 | 100133        | Rhode & Schwarz            | 03/11/15 | 03/11/16     |
| 1016                       | Pre-amplifier                        | PAM-0202            | 187           | PAM                        | 12/10/14 | 12/10/15     |
| <b>Conducted Emissions</b> |                                      |                     |               |                            |          |              |
| 1024                       | EMI Test Receiver                    | ESCS 30             | 847793/001    | Rhode & Schwarz            | 04/10/15 | 04/10/16     |
| 7567                       | LISN                                 | FCC-LISN-50-25-2-10 | 120304        | Fischer Custom Comm.       | 07/01/14 | 07/01/15     |
| 8822                       | 20dB Attenuator                      | 34-20-34            | N/A           | MCE / Weinschel            | 02/20/15 | 02/20/16     |
| 8824                       | 20dB Attenuator                      | 34-20-34            | N/A           | MCE / Weinschel            | 02/20/15 | 02/20/16     |
| 1024                       | EMI Test Receiver                    | ESCS 30             | 847793/001    | Rhode & Schwarz            | 04/10/15 | 04/10/16     |
| <b>Miscellaneous</b>       |                                      |                     |               |                            |          |              |
|                            | Test Software                        | EMC32               | V8.53         | Rhode & Schwarz            | N/A      |              |

### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

#### 3.2.1 Radiated Emission Measurements (Below 1GHz)

| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.45                           | 0.26                          | 0.07         |
| 2                               | Cables                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 3                               | Preamplifier               | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 4                               | Antenna                    | Rectangular                   | 0.75                           | 0.43                          | 0.19         |
| 5                               | Site                       | Rectangular                   | 3.89                           | 2.25                          | 5.04         |
| 6                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 2.41         |
| Coverage Factor ( $k$ ):        |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 4.82         |

#### 3.2.1 Radiated Emission Measurements (Above 1GHz)

| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.57                           | 0.33                          | 0.11         |
| 2                               | Cables                     | Rectangular                   | 0.70                           | 0.40                          | 0.16         |
| 3                               | Preamplifier               | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 4                               | Antenna                    | Rectangular                   | 0.37                           | 0.21                          | 0.05         |
| 5                               | Site                       | Rectangular                   | 3.89                           | 2.25                          | 5.04         |
| 6                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 2.40         |
| Coverage Factor ( $k$ ):        |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 4.81         |

#### 3.2.2 AC Conducted Emissions Measurements

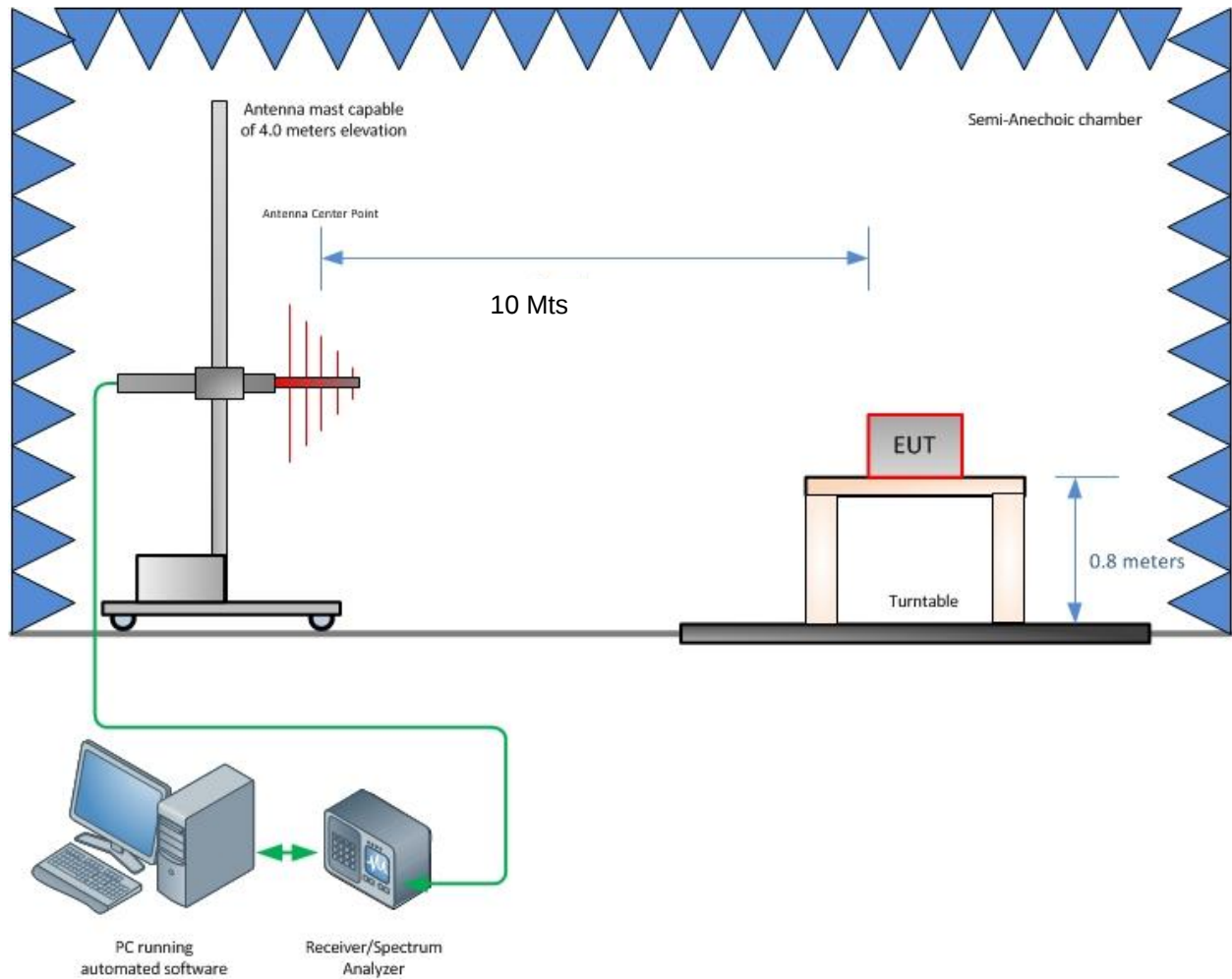
| Contribution                    |                            | Probability Distribution Type | Probability Distribution $x_i$ | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 1                               | Receiver/Spectrum Analyzer | Rectangular                   | 0.36                           | 0.21                          | 0.04         |
| 2                               | Cables                     | Rectangular                   | 0.50                           | 0.29                          | 0.08         |
| 3                               | LISN                       | Rectangular                   | 0.66                           | 0.38                          | 0.15         |
| 4                               | Attenuator                 | Rectangular                   | 0.30                           | 0.17                          | 0.03         |
| 5                               | EUT Setup                  | Rectangular                   | 1.00                           | 0.58                          | 0.33         |
| Combined Uncertainty ( $u_c$ ): |                            |                               |                                |                               | 0.80         |
| Coverage Factor ( $k$ ):        |                            |                               |                                |                               | 2            |
| Expanded Uncertainty:           |                            |                               |                                |                               | 1.59         |



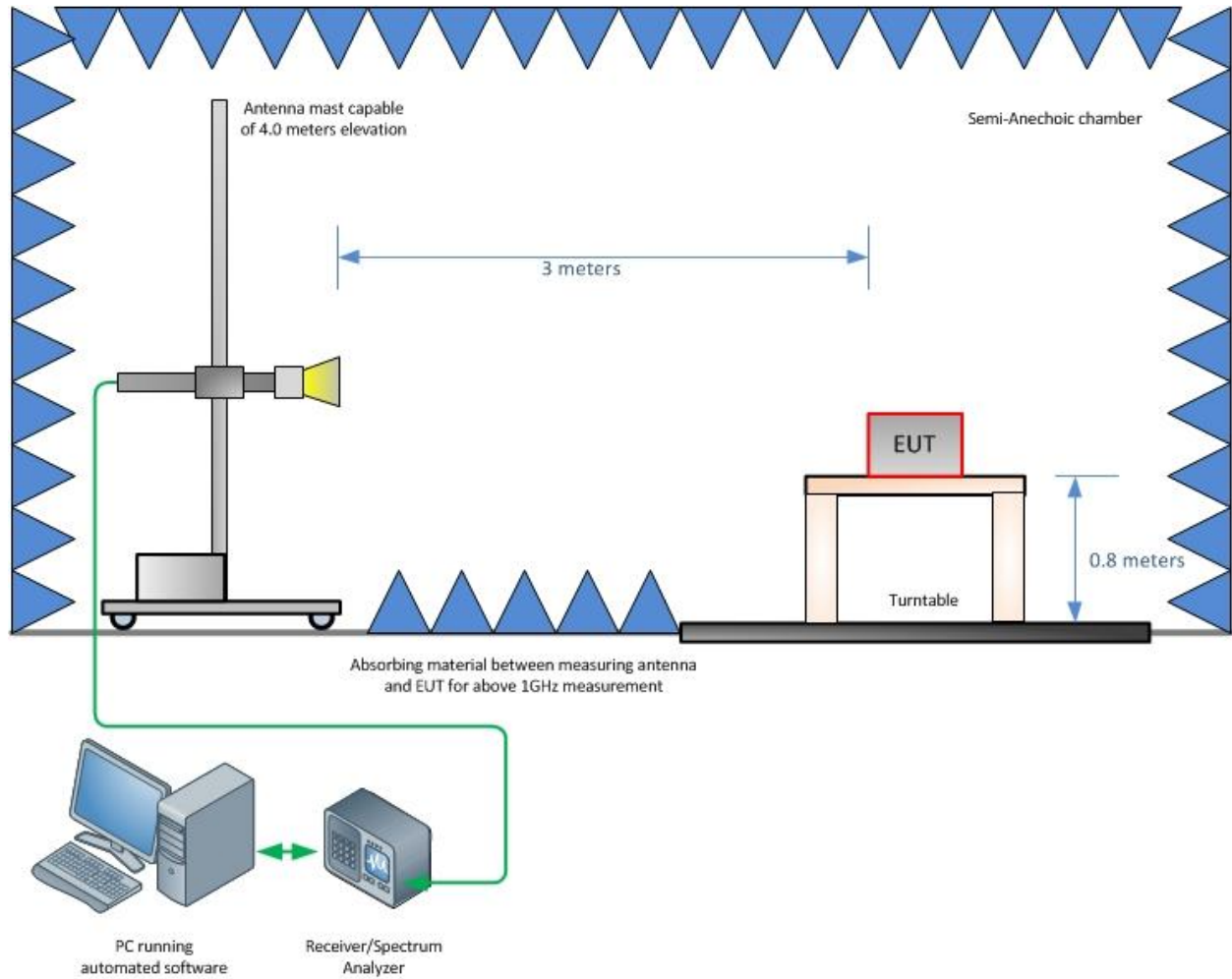
## **SECTION 4**

### **DIAGRAM OF TEST SETUP**

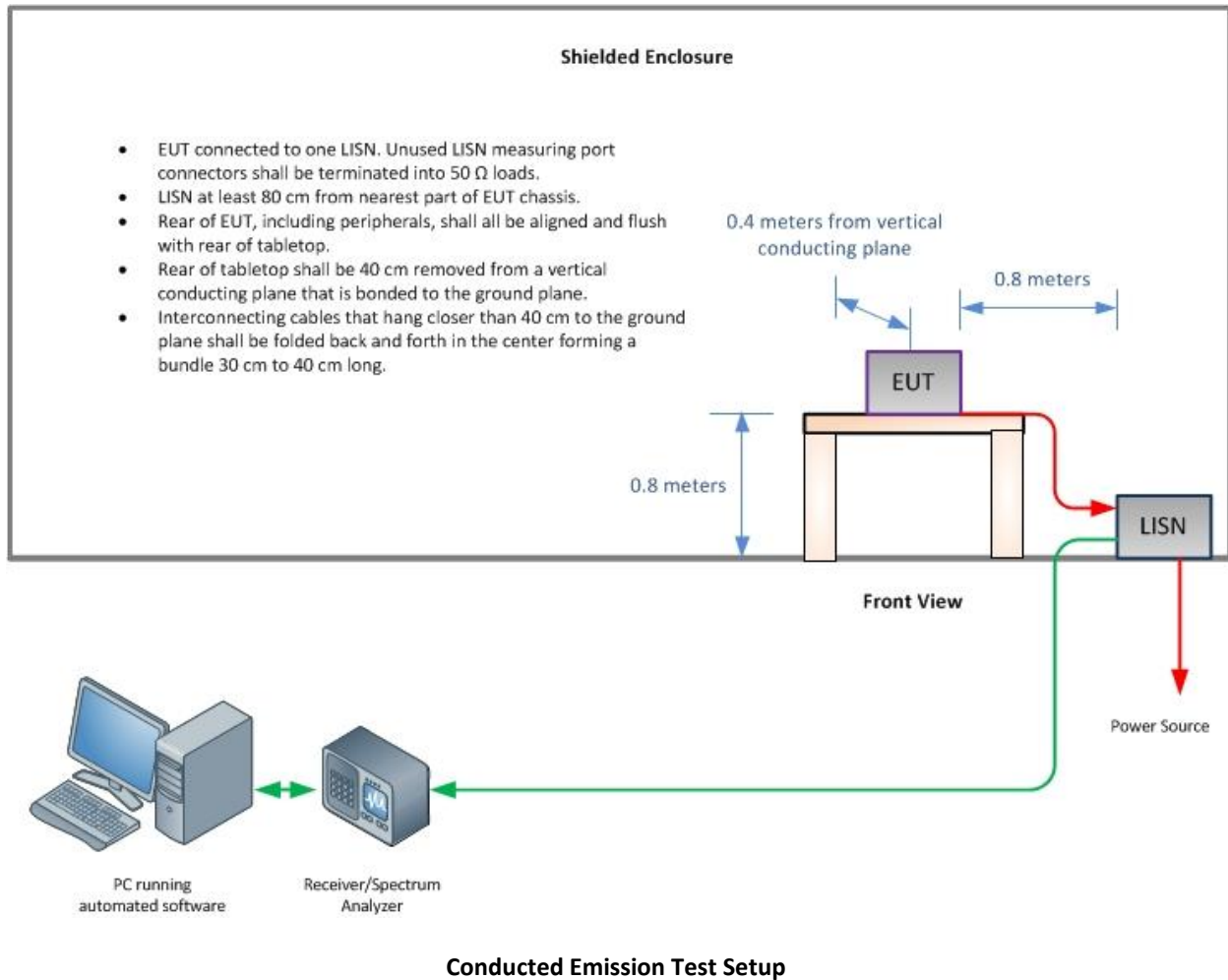
#### 4.1 TEST SETUP DIAGRAM



**Radiated Emission Test Setup (Below 1GHz)**



**Radiated Emission Test Setup (Above 1GHz)**





## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

**5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

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